REPORT

September 2014

PRIVATE PLAN CHANGE APPLICATION AND SECTION 32 ANALYSIS

Roxburgh Property Developers Limited, High Street, Southbridge, Zone Change Rural - Outer Plains to Living 1

Submitted to:
Selwyn District Council
PO Box 90
Rolleston, 7643

Report Number. 1078107287_001_R_Rev1_003

Distribution:

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1.0 INTRODUCTION

1.1 Overview

This report includes the plan change application and section 32 evaluation report on behalf of Roxburgh Property Developers Limited to initiate a change to the Selwyn District Plan (SDP, or the Plan).

This privately initiated plan change application proposes to rezone approximately 6 hectares (ha) of land, on the southwest boundary of Southbridge, from Rural – Outer Plains to Living 1 in order to provide for the residential growth of Southbridge. The site is located on the southwest extent of Southbridge at the rural / urban interface and is considered to be a logical extension of the township.

Section 73(1A) of the Resource Management Act 1991 (RMA, or the Act), gives a territorial authority the right to change its plan. Section 73(2) provides for any person to request a territorial authority to change a district plan in the manner set out in Schedule 1.

This application is a privately initiated request for a change to the Plan and meets all of the relevant requirements of the Act. Pursuant to Clause 25(2) of the Schedule 1 to the RMA, it is requested that the application be either accepted in whole (Clause 25(2)(b)) or adopted by the Selwyn District Council (SDC) (Clause 25(2)(a)).

This report is subject to Golder Associates (NZ) Limited (Golder) report limitations included in APPENDIX A.

1.2 Background

This Plan Change application has been discussed with the Selwyn District Council (SDC) for a number of years. The Plan Change was first lodged with the SDC in June 2014. It was subsequently accepted by the SDC as Plan Change 34 (PC34). A letter dated 30 July 2012 was received from the SDC requesting further information on the application including additional comment on servicing issues, geotechnical matters, reserve areas and potential reverse sensitivity effects. A response to the matters raised in the letter was provided to the SDC on 14 November 2012.

A copy of the 30 July 2012 SDC letter, and the 14 November 2012 response letter is included as APPENDIX B.

2.0 SITE AND SURROUNDS

2.1 Site Information

The site subject to this proposed plan change has an area of 5.9286 ha. It is held in Certificate of Title (CT) CB 5D/57, and encompasses Lots 1 to 15, 50 to 62 and 88 to 89, DP 825. All allotments are amalgamated under the single CT and owned by the applicant, Roxburgh Property Developers Limited. A copy of the CT is attached as APPENDIX C.

The site is bounded by High Street, Brook Street and Bellfield / Robinson Street (unformed). High Street, to the east of the site, is a sealed road with kerb and channel down one side, and is classified as arterial in the Plan with a speed limit of 70 km/hr. Brook Street, to the south of the site, is formed, metalled and sealed for an approximate distance of 30 m from the intersection with High Street, beyond which Brook Street has a metal surface. Brook Street has a speed limit of 50 km, increasing to 100 km from the end of the extent of seal. Bellfield / Robinson Street runs adjacent to the site to the west, is unformed and contains a number of trees and a water race. An open drain begins in Bellfield Street and passes under Brook Street, eventually linking with the Tent Burn waterway approximately 500 m downstream.

It is noted that Bellfield Street and Robinson Street converge at the northwest corner of the site. However, to avoid confusion, for the purposes of this report the entire street will be referred to as Bellfield Street.

The site is generally flat with a few minor undulations in the topography. One dwelling, surrounded by trees, is located on the site with metalled access to High Street. The remainder of the site is currently bare and generally used for non-intensive cropping activities or grazing. Other than the trees surrounding the existing dwelling, there are no trees or other vegetation of significance located on the site.

The site is currently zoned Rural – Outer Plains in the operative SDP, which allows for a minimum allotment size of 20 ha. The Rural – Outer Plains zoning covers the majority of the Selwyn District.

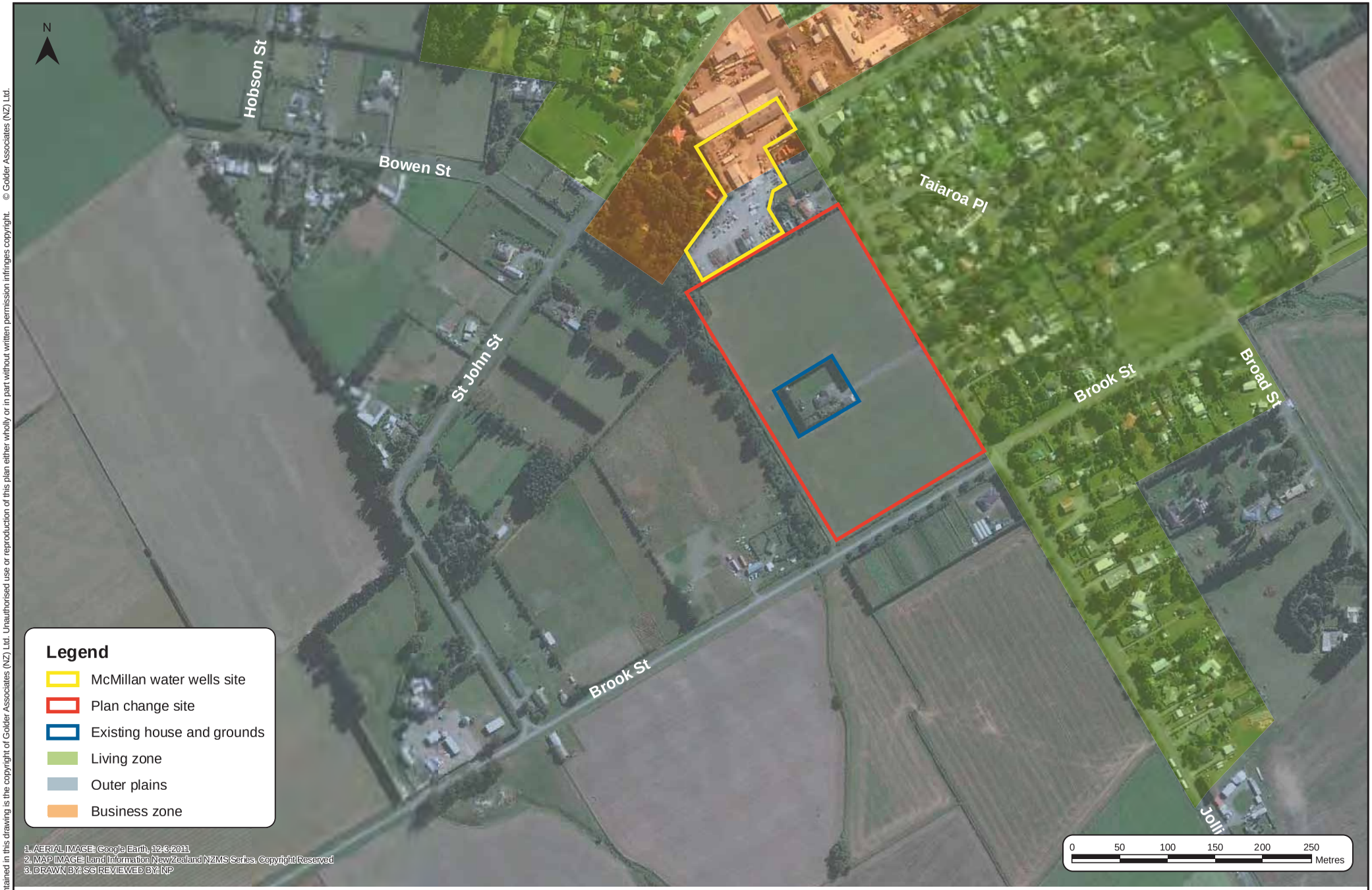
2.2 Surrounds

The site is located on the southwest boundary of Southbridge Township at the rural / urban interface. Figure 1 shows an aerial photograph of the subject site and surrounding areas. To the northeast across High Street, the site is flanked by residential activity, contained in the Living 1 Zone, and which has reticulated water, sewer, stormwater, electricity and telecommunications.

Adjoining the site to the northwest is the McMillan Specialist Drilling Services site, which is located partly in the Rural – Outer Plains Zone, and partly in the Business 2 Zone. Also adjoining the site to the northwest is a residential dwelling contained in the Rural – Outer Plains Zone. The Business 2 Zone, south of St John Street and to the northwest of the site, contains SDC owned land and properties occupied by both residential and business activities.

Land to the south and west of the site is zoned Rural – Outer Plains and is generally used as farmland including stock grazing and cropping.

Figure 1 shows the proposed plan change site, and the surrounding land uses and zones.



1. AERIAL IMAGE: Google Earth, 12-3-2011
2. MAP IMAGE: Land Information New Zealand NZMS Series. Copyright Reserved
3. DRAWN BY: SG REVIEWED BY: NP

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TITLE SITE AND SURROUNDING AREA

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Figure 2: Looking south west across site from north east corner on High Street.

Figure 3: View along northern boundary from High Street, with adjoining Living 1 zone.

Figure 4: View south from corner of High Street and Brook Street.

Figure 5: View north along Bellfield Street from Brook Street.

2.3 Southbridge Township

Southbridge is a rural township characteristic of Selwyn District generally. Southbridge primarily provides rural support for the surrounding, mainly agricultural area. However, the township is also a suitable base for families which may work in Christchurch, Rolleston or Lincoln. Southbridge has a well-patronised hotel, dairy, cafe and petrol station, along with many other small to medium sized businesses.

The current Selwyn District Planning Map 138 is attached as APPENDIX D. It shows the current zoning of the site, and the surrounding area.

A detailed description of the current traffic environment is included in the Transport Assessment prepared by the Traffic Design Group (TDG), and is attached as APPENDIX E.

3.0 REASONS FOR PLAN CHANGE

3.1 Growth Trends

Currently there are no significant areas of vacant land available for residential development in Southbridge.

Selwyn District was shown to be one of the fastest growing districts in New Zealand after the results of the 2013 Census were released with an additional 10,953 people since the 2006 Census, an increase of 24.5 %. The Greater Christchurch Urban Development Strategy (UDS) recognised Selwyn's growth trend, and Chapter 6 of the Regional Policy Statement) provides a framework for managing urban development in the Greater Christchurch area.

The 2013 Census information[1] indicates that 858 people live in Southbridge in 318 occupied dwellings. There has been an increase of 123 people living in Southbridge since the 2006 Census, an increase of 16.7 %. Given the quiet lifestyle and accessibility to the main amenities along High Street, it is also attractive to retired or elderly residents. Currently 11.8 % of the population of Southbridge is over 65[2].

There is currently no vacant or 'greenfield' areas of land in Southbridge which are zoned Living 1 and which are available for residential development. This will have an effect on future population growth figures.

In 2006 Roxburgh Property Developers Limited gained subdivision and land use consent as a non-complying activity for the residential development of Rural zoned land at the corner of Bridge Street and Taumutu Road in Southbridge. This is now nearly completely developed, and provides an indication of continued gradual demand for residential sections in Southbridge.

The recent Canterbury earthquakes have also contributed to the need for new areas of housing, although no specific studies on areas as wide as Southbridge have been carried out to determine actual or projected future trends. It is worth noting that Southbridge does provide a living opportunity within commutable distance to business areas of Christchurch, and that following the earthquakes many of these business areas have moved to locations closer to the Selwyn District, such as Wigram, Addington, Hornby, and the Christchurch Airport. The growing urban hubs of Rolleston, Prebbleton and Lincoln also provide local employment opportunities for Southbridge residents.

The change of zoning proposed by this Plan Change will enable additional fully serviced residential allotments to be developed on the current urban fringe of a rural township. It affords a quiet lifestyle as part of an established rural township, and has the potential to reduce demand for additional rural residential development in the area. Southbridge falls outside the urban limits set out on Chapter 6, Map A Greenfield Priority Areas in the RPS, and is considered to be an area where low density urban form is entirely appropriate.

[1] http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx?request_value=14899&parent_id=14888&tabname=

[2] http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx?request_value=14899&tabname=Ageandsex

3.2 Environment Court Direction

The Environment Court identified in the Operation Homer decision (*Operation Homer Limited v Selwyn DC C100/2007*), that applications for non-complying subdivision in the Rural zone that may be contrary to density policies, are best dealt with by means of a Plan Change, rather than by non-complying resource consent application. That decision specifically references the earlier Roxburgh Property Developers Limited Bridge Street subdivision decision made by a panel of appointed SDC Councillors.

Given the location and size of the site it is considered that a Plan Change is the most appropriate method of achieving integrated residential development of this area of Southbridge.

4.0 PLAN CHANGE DETAILS

4.1 Introduction

An Outline Development Plan (ODP) forms an integral part of this Plan Change. It is proposed that the ODP be inserted into the Plan to provide guidance and certainty for the future development of the site. The ODP is attached to this report as APPENDIX F.

A transport assessment, included as APPENDIX E, has been carried out by Traffic Design Group Ltd (TDG). The traffic assessment assesses the potential traffic effects of development within the plan change area upon the existing transport networks. A servicing strategy is also included within this report as a means of testing the viability of the site for potential residential activity.

The ODP, servicing strategy and other relevant matters are discussed further in the following sections of this report.

4.2 Outline Development Plan

4.2.1 Area

Outline development plans (ODPs) are generally considered to be the simplification of a development framework whereby the main elements of site design are extracted to form an ODP. Such plans can include a number of layers of plans, or separate areas of a site. In this case, the ODP is contained in one simple plan that covers all of the main design elements, and covers the whole site subject to this Plan Change. ODPs are a mechanism already widely used within the SDP, and the proposed ODP is consistent with other ODPs contained in the SDP.

The majority of Southbridge is contained in the Living 1 zone including the area to the east of the site across High Street. The ODP has been designed to function within the Living 1 zone and reflect the character of the existing environment within the Living 1 zoned areas of Southbridge.

The ODP comprises transport and reserve networks. The specific design of these networks, as well as the individual allotments, are to be determined as part of future development, but the ODP design process enables the networks to be appropriately provided for. The successful servicing of the allotments is assisted by the relatively flat nature of the site.

4.2.2 Road network

The ODP identifies an indicative road network comprising of a main link road from High Street to Brook Street. This link road provides ample room for the required development of carriageway width, footpath and berm areas along with connections to the High Street footpaths and amenities of Southbridge.

The function of the road network promotes safe and efficient vehicle movement. The primary road links onto High Street directly opposite Taiaroa Place to reduce potential vehicle conflict at this intersection. This has been designed following early consultation with SDC staff.

The primary road onto Brook Street is located a sufficient distance from the intersection of Brook and High Streets to avoid any potential vehicle conflict.

The TDG report (APPENDIX E) outlines the effects of the proposed development on the existing transport networks. It concludes that the current provision of roads in Southbridge is sufficient to accommodate additional vehicles generated from consequential development on the Plan Change site.

4.2.3 Pedestrian and cycle network

Pedestrian and cycle networks are available within Southbridge's road and reserve networks. Given these networks, the ODP shows a linkage requirement through to Bellfield Street from the main link road. Footpaths are a requirement of road construction and the road areas will be of sufficient size to allow for cyclists to utilise the road area. The cycle and pedestrian network within the road reserve areas will provide connections within the site as well as externally to High Street, Brook Street and Bellfield Street.

Matters related to the design of pedestrian and cycle networks are also covered by the Plan's existing assessment matters, so this still allows additional specific consideration to be given to this matter by the SDC if necessary at the time of subdivision.

The function of the pedestrian and cycle network will promote safe and efficient movement and non-motorised mobility, particularly as the site is located a short walking distance from the centre of Southbridge. The external link to High Street will facilitate integration with the pedestrian and cycle network on the street. The location of the network within the road and reserve areas, and with the link to Bellfield Street (an unformed paper road) will effectively link areas of public space and promote the use of the Bellfield Street area, providing for the community's long term non-motorised mobility and recreational needs.

4.2.4 Green network

The ODP identifies indicative reserve areas, which comprise formal recreational and utility reserve areas, along with other 'green' areas set aside for appropriate planting and landscaping in the context of the sustainable development of the site.

The function of the green network seeks to provide amenity within the built environment and opportunities for passive and active recreation. The area where final design determines as the most appropriate for stormwater treatment and detention on the site will have value as both a stormwater management area and an open space or green area. The reverse sensitivity buffer area creates a linear green space that provides ample space for a combination of noise attenuation methods such as planting, fencing or bunding as required, to protect the existing adjoining commercial land use from any potential reverse sensitivity effects arising from future residential activity on the site. An assessment from an acoustic expert is included in APPENDIX B.

It is envisaged that at the time of subdivision this reverse sensitivity buffer area will predominantly be incorporated into the allotments along the northern boundary of the site, with appropriate covenants also put in place to ensure that the specific noise attenuation measures remain intact. However, if at the time of subdivision, the SDC wished to vest this area as part of the recreation reserve, or alternatively as an all-purpose utility reserve, this is also considered to be an effective option.

4.2.5 Conclusion

The ODP has been designed to function within the Living 1 zone and as such it indicates appropriate roading, cycle, pedestrian and green networks. These networks create internal linkages on the site and external linkage with existing and future neighbourhoods.

It is anticipated that as part of the Plan Change process, the ODP will be incorporated into the Plan, and that any future development of the site will be undertaken in general accordance with the ODP.

The ODP is in keeping with the design qualities and principles of the New Zealand Urban Design Protocol and the objectives, policies and rules of the Plan. It confirms the viability of the site for residential zoning and subsequent residential activity and provides a workable coordinated concept for the development of an attractive living environment.

4.3 Servicing Strategy

4.3.1 Overview

The Servicing Strategy has been determined in consultation with the SDC standards and strategies, and with New Zealand construction standards. The subdivision standards for the Living 1 zone require that each allotment be provided with connections to water supply, reticulated sewage disposal, electricity and telecommunications supply. The provision of services for residential subdivision are covered by the Plan's existing assessment matters, so this allows specific consideration to be given to this matter by the SDC at the time of subdivision. It is anticipated that subdivision of the site will secure the provision of such connections as a requirement of the conditions of the subdivision consent.

The detail of these services will be confirmed through final engineering design which will be undertaken as part of the subdivision consent process. At the time of subdivision an arrangement will be determined between the applicant and the SDC as to cost sharing. All internal development costs are to be met by the applicant, along with appropriate cost sharing for agreed upgrades to the facilities servicing Southbridge.

4.3.2 Potable water supply

In a letter dated 6 April 2013 (attached in APPENDIX G) Opus International Consultants Ltd (Opus) discusses annual demand for potable water supply for Southbridge at typically around 230,000 m^3, which is within the consented annual volume of 360,000 m^3 under CRC010893.1. The Opus letter also refers to the peak day demand that peaked at 2,194 m^3 in January 2013, *"…marginally above the consented daily volume of 2,140 m3"*, and that demand management measures may be successful in reducing the relatively high water usage in Southbridge. The Opus letter confirms that there is potential to increase pumping capacity from the existing bores to service the additional connections required as a result of subdivision of the site for residential purposes; that a network upgrade is unlikely to be required but the consented flow rate and daily volume limits may need to be increased.

Currently a 100 mm diameter water main exists in High Street that has an approximate pressure of 400 kPa, as determined from SDC records. It has been calculated that a 150 mm diameter water main laid within the main link road of the site will have the capacity to provide potable water supply to the site. Smaller 100 mm diameter sub-mains within the development will ensure water is supplied to all potential future allotments. The Opus letter dated 6 April 2013 discusses the lack of fire fighting allowance in the existing Southbridge water supply. A water main of 150 mm diameter allows for a residual pressure at the site connection points of a minimum of 250 kPa and appropriate capacity for fire fighting purposes should an upgrade for this purpose be undertaken by the SDC.

It is acknowledged that the supply of high pressure water has been identified as a potential issue in the 5 Waters Activity Plan for Te Waihora. In relation to the Plan Change site, the water supply system for future residential allotments will be subject to specific engineering design and SDC approval at the time of subdivision, including any necessary upgrades to the system.

4.3.3 Stormwater

Stormwater from allotments adjoining Brook Street and High Street can discharge via household sumps into the existing swale systems in these streets. Stormwater from all other allotments and internal roading can be conveyed via various options (e.g., low profile kerb and channel, or swales) to the proposed stormwater treatment / detention area. This area will provide for the appropriate treatment and attenuation of the stormwater prior to discharge, which is likely to be into the drain to the west or southwest of the site. This drain meanders through farm land, to the Tent Burn waterway and out to sea.

Soil and infiltration testing has been carried out on the site, and a report detailing the results and potential stormwater detention and treatment options is attached as APPENDIX H. A detailed stormwater treatment and disposal system will be subject to SDC approval and appropriate resource consents at the time of subdivision.

4.3.4 Wastewater

Southbridge has a reticulated sewage disposal system. A sewage pump station, located in Broad Street, pumps the reticulated sewage from Southbridge to the Leeston Waste Water Treatment Plant (WWTP) for treatment and disposal via a rising main.

A gravity sewer main is located on the northwest side of High Street and extends beyond the road frontage of the site. Two manholes on this section of the gravity sewer main provide for possible connections to enable the extension of the main into the site so as to provide sewage disposal for future potential development on the site. Manhole 15 (MH A15) is located at the northern end of the site and Manhole 18 (MH A18) is located at the southern end of the site. SDC records indicate that the main is a 150 mm diameter pipe laid 2.7 m deep and has a relatively flat gradient.

The maximum flow rate capacity for a 150 mm diameter pipe laid at the gradients provided by the Council has been calculated as 8.6 l/s between MH A15 and MH A18 and 9.2 l/s between MH A18 and the next manhole in the main.

It has been calculated that MH A15 currently serves 128 allotments and has a peak flow rate of 5.55 L/s and MH A18 currently serves 134 allotments and has a peak flow rate of 5.80 L/s. Potential future development on the site as a result of this Plan Change could present a yield in the vicinity of 55 allotments. Calculations to predict the peak flows at the manholes after the inclusion of an additional 55 allotments result in MH A15 serving 183 allotments with a peak flow rate of 7.93 L/s and MH A18 serving 189 allotments with a peak flow rate of 8.19 L/s.

All calculations have been made using the New Zealand Standard 4404 assumption of an average of three people per allotment and each person discharging 250 litres per day.

The Opus letter dated 6 April 2013 discusses the capacity of the existing pumping station, calculating that the pumping capacity would increase by about 2 L/s as a result of subdivision of the site for Living zone purposes. It explains that the ‘duty pump’ capacity is 12.2 L/s at 490 kPa, and that the ‘flush pump’ capacity is 16 L/s at 780 kPa. The ‘flush pump’ was installed to regularly pump at a higher rate to flush the line. Opus considers that the flush pump has sufficient capacity to accommodate the additional connections as a result of subdivision of the site, however reliance on the flush pump for this would increase the risk of an overflow event.

Options were put forward by Opus regarding various options to address the issue of pumping capacity. These options were then assigned costs for capital expenditure, as well as ongoing maintenance costs in a letter from Opus dated 20 June 2014 (attached in APPENDIX G).

These options and cost scenarios were presented to the Southbridge Advisory Committee meeting on 21 July 2014. The Southbridge Advisory Committee agreed to the option of duplicating the flush pump so that there is greater pumping capacity whilst still providing for pump capacity redundancy. This is presented as Option (b) in the Opus letter dated 20 June 2014. The Southbridge Advisory Committee considered the capital cost estimate, and operational and maintenance cost estimates to be reasonable in order to provide for development of Southbridge. The minutes of the Southbridge Advisory Committee meeting are attached as APPENDIX I.

4.3.5 Electricity and telecommunications

The reticulated electricity system in Southbridge can be extended from the southeast side of High Street into the site to provide energy supply for future allotments. A letter from Orion New Zealand Limited, confirming that this extension is feasible, is attached in APPENDIX J of this report.

The capacity of telecommunications supply in Southbridge is currently being investigated by Chorus so as to determine how the capacity will be increased (i.e., the use of extended copper facilities, or changing to fibre). It is anticipated that the result of that investigation will be available within the next six weeks and this will be forwarded to the SDC as soon as it is available. A letter from Chorus, confirming that this work is currently being undertaken, is attached in APPENDIX J of this report.

It is understood from a follow up conversation with the Chorus subdivision specialist that there are not expected to be any problems with an upgrade to service the site in question, only a matter of what level of service the capacity upgrade will produce (copper versus fibre) (pers. comm. Jane West and Don Henderson 12 June 2012). A follow up email was sent to Chorus on 8 August 2014 to confirm the current situation. To date no response has been received, however this will be forwarded as soon as it comes to hand.

4.4 Other Matters

4.4.1 Flooding

Based on consultation with Canterbury Regional Council (CRC) and from a review of the SDC Plan's planning maps, the Southbridge area is not identified as an area with specific flooding hazards.

Nevertheless, a stormwater treatment / detention area is indicated on the ODP. This area will ensure that any future development of the site is designed in a manner which ensures appropriate stormwater treatment and disposal is undertaken and that new flooding hazards in the area do not occur as a result of residential development in the area.

4.4.2 Earthworks

Earthworks for roading, stormwater treatment areas, and accessways, and possibly for noise attenuation works along the northern boundary of the site, will be undertaken at the time of subdivision. Best practice engineering designs and appropriate SDC approvals will ensure that earthworks are undertaken in an appropriate manner.

4.4.3 Geotechnical

A geotechnical investigation was carried out during February 2012. The geotechnical report, attached as APPENDIX K, concludes that the ground conditions are generally favourable and consistent across the site, and that the site would be suitable for residential use. The 14 November 2012 letter in response to the SDC further information request includes some additional commentary on the matter of geotechnical conditions at the site (APPENDIX B).

5.0 PROPOSED CHANGES TO THE SELWYN DISTRICT PLAN

Amendments and additions to the Township Volume of the SDP text are shown in **bold and underlined.** Deletions are shown in ~~**bold strikethrough**~~.

This Plan Change seeks to change the zoning of the area of land previously described, for the reasons set out in Section 3.0 of this report. It is proposed that 5.9286 ha of land is rezoned from its current zoning of Rural – Outer Plains to Living 1.

5.1 Issues, Objectives and Policies

For the proposed rezoning of the site, the existing issues, objectives and policies are appropriate in their current form.

5.2 Rules

Insert the following rule into Part C, 12 Living Zone Rules - Subdivision, Rule 12.1.3 after the rules for Springston:

Southbridge

12.1.3.43 Any subdivision of land in the area shown in Appendix E43, at High Street, Southbridge, shall be designed in general accordance with the Outline Development Plan shown in Appendix E43.

The remaining rules for West Melton and Outline Development Plans are to be renumbered accordingly.

Insert the following assessment matters into Part C, after 12.1.4.77:

Southbridge – High Street, Southbridge Outline Development Plan (Appendix E43)

12.1.4.78 The extent to which any amendments to the roading pattern will provide for connectivity and avoid piecemeal and uncoordinated subdivision patterns.

12.1.4.79 The extent to which any amendments to the layout of development will still enable efficient and coordinated provision of services, and provide adequately for reserve, pedestrian or cycle linkages.

The remaining assessment matters to be renumbered accordingly.

Add the following rule to Part C, Rule 12.1.6:

12.1.6 The following activities shall be discretionary activities:

12.1.6.8 Any subdivision subject to Rule 12.1.1 which does not comply with Rule 12.1.3.43.

5.3 Reasons for Rules

The Reasons for Rules are considered appropriate in their current form as they provide an appropriate explanation of the reasons for outline development plans and the status of subdivision consent applications.

5.4 Planning Maps

Amend Rural Township Planning Map 138 (sheets 1 and 2), and Rural Planning Map 004 (sheets 1 and 2) to reflect Living 1 zoning across the site. Amended Rural Township Planning Map 138 (sheets 1 and 2) and Rural Planning Map 004 (sheets 1 and 2) are attached as APPENDIX L to this report.

5.5 Appendices

Include the High Street, Southbridge Outline Development Plan as Appendix E43 to the Township Volume of the SDP.

The ODP, attached as APPENDIX F to this report, is to be included as Appendix E43 in the SDP, Volume 1 – Townships. The ODP shows the main road, pedestrian and cycle linkages, as well as green areas, an area for potential stormwater treatment and detention, and an area within which reverse sensitivity buffer solutions are to be developed.

6.0 ASSESSMENT OF EFFECTS

6.1 Introduction

Clause 22(2) of the First Schedule to the RMA requires that where environmental effects are anticipated from the implementation of a plan change, an assessment of these effects shall be provided. Such an assessment follows below.

The development of the land for residential purposes will be subject to the rules of the SDP, to ensure that future development of the site will occur in a manner consistent with the relevant objectives and policies of the SDP. Currently the site is predominantly rural with one residential dwelling.

6.2 Effects on the Neighbourhood and Southbridge Community

6.2.1 Character and amenity

Southbridge is a small rural township situated on the Canterbury Plains and predominantly surrounded by agricultural activities. The township serves rural activities and contains wide tree lined streets. Residential areas of Southbridge are zoned Living 1 in the Plan, and these areas contain low to medium density development with gardens and a general sense of open space.

The Plan does not include any greenfield areas for integrated residential development within Southbridge. The proposed Plan Change will enable residential development of a low to medium density, while also providing for the logical expansion of Southbridge in a manner which is in keeping with the existing character of the township. Further, the density of development associated with the Plan Change will minimise the potential for infill subdivision, retaining the spacious character of the township and the associated amenity values.

The Plan Change area, once developed with residential housing, will alter the rural/urban fringe of Southbridge and increase the urban limit of the township. The effect of this shift is the loss of the rural character of this site as viewed from adjoining properties, and the road. It is considered that with existing business activities to the north and residential activity to the east, the site represents a logical extension to the residential boundary of Southbridge.

The site is already smaller than the minimum allotment size permitted by the Plan for the Rural – Outer Plains Zone, and is adjacent to the existing Living 1 Zone. Given this proximity to the existing Living 1 zone, certain farming practices at the site are avoided in order to minimise effects such as spray drift and dust on existing residential development in the area. The site is located within the 50 km per hour township vehicle speed. The loss of rural character of this site is not considered to be a significant adverse effect in the context of the Southbridge township.

6.2.2 Reverse sensitivity

The site is currently zoned Rural – Outer Plains, which is one of the main rural zones in the district allowing for most forms of agricultural farming and ancillary activities. As such it is able to be used for activities such as cropping or grazing of animals. These rural type activities have the potential to create adverse dust and airborne effects from associated spraying of crops or fertilising soil, and noise effects associated with harvesting of crops. These are effects that are anticipated in a small rural township such as Southbridge.

The Rural – Outer Plains zoning would also allow for farming activities such as non-intensive rearing of pigs and chickens, subject to other rules of the Plan, and structures such as large hay barns up to 12 m in height, and grain silos up to 25 m in height, with appropriate boundary setbacks.

However, given the proximity of residential land uses across the road from this site, and the relatively small size of the property, the owners are cautious about the agricultural use of the site. It is predominantly a rural residential lifestyle block, and generally only small scale cropping or grazing activities are carried out.

Potential for reverse sensitivity effects are most likely to arise from future residential development on the plan change site which may be sensitive to noise effects associated with the business activity on the property to the north (currently occupied by McMillian Drilling). To mitigate the potential for these effects to occur, a reverse sensitivity buffer is included on the ODP which provides an area appropriate for establishment of effects mitigation measures such as a noise attenuation bund and / or acoustic fence combination. An assessment from an acoustic expert with respect to the McMillan Drilling site, and the proposed buffer area is included in APPENDIX B.

6.2.3 Traffic

An assessment of the effects on the transport network generated as a result of the Plan Change has been undertaken by TDG and the report is attached in APPENDIX E. The TDG report concludes that while additional traffic volumes will be generated by development consequential to the rezoning, the effects of this will be negligible and development enabled by the Plan Change will not affect the safe and efficient operation of the transport network or contribute to adverse effects on the transport network.

6.2.4 Positive effects

The Plan Change will enable a number of positive effects to occur within the wider Southbridge community. Additional residents will increase the number of people utilising local businesses and services as well as increasing the usage of community facilities such as the school and Plunket facilities, the large domain area, the library, and the swimming pool. This will contribute to the Southbridge economy and provide additional funding for improving and maintaining these facilities.

Having additional residential land available within the township provides for housing opportunities within Southbridge, will ensure an available supply of affordable housing for residents, and has the potential to attract new residents and workers to the township.

Associated with a subdivision that would be subsequent to the Plan Change is the upgrade of Brook Street and High Street for the length of the site, improving the safety and the efficient functioning of the road network within Southbridge. The addition of footpaths along Brook and High Streets and the addition of pedestrian and cycle linkages to Bellfield Street will improve the safety of pedestrians walking within Southbridge and will enable greater access to Bellfield Street. Bellfield Street is currently an unformed paper road, frequently used as a reserve/walkway area.

6.3 Effects on the Site

6.3.1 Positive effects

Positive effects on the site include improved walking and cycling access within the development and across to Bellfield Street. Linkages between the road reserve associated with the cul-de-sac roads and Bellfield Street, along with the reserve areas on the site, will provide future residents with greater access to pedestrian friendly green areas.

The upgrade of Brook Street and High Street for the length of the site will provide a safer and more efficient pedestrian access around the vicinity.

The existing size of the site means that it is not able to be utilised as an economic farming unit. More intensive farming activities would be possible on the site. However, given its proximity to the urban area of Southbridge it is not considered to be a suitable location for such activities.

The conversion of this site to residential use will allow a more efficient use of the site, in a logical location for the expansion of the township.

The Plan Change and subsequent residential development of the site will also provide additional housing options for displaced Christchurch residents following the Canterbury earthquake sequence.

6.3.2 Effects on ecosystems

The site is a modified pastoral landscape with no known ecosystems of significance. It is considered that there are no potential effects on ecosystems at the site. There are also no known ecosystems of significance in the immediate area.

6.3.3 Effects on natural or physical resources

6.3.3.1 Versatile soils

The Southbridge area, like much of the Canterbury Plains, contains high quality versatile soils due to the area being part of the alluvial fan created by the major rivers including Rakaia River[3]. These soils are historically known as ideal for cropping and pasture and more recently for dairy farming when aided by irrigation.

Assessment of soils from the site and the area to the south and west of the site, predominantly consist of approximately 265 ha of Waimakariri Silt Loam soils. These soils are considered to be highly fertile and hold moisture well, except for short periods during the dry season, where soils may not be able to sustain pasture[4].

The area north and east of the site is made up of a number of different soil types including Paparua Sandy Loam on Silt Loam, Paparua Fine Sandy Loam and Temuka Silt Loam. All of these types of soils are considered to be highly fertile and tend to hold moisture better than the Waimakariri soils.

As is often the case with rural service townships, Southbridge and its immediate hinterlands consist of high quality versatile soils. Growth of Southbridge has the potential to reduce the availability of versatile soils for farming purposes, however, given the expansive extent of these soils, the proposal to rezone 5.9286 ha for residential use will have a minimal impact on the total available versatile land for agricultural activities in the vicinity.

6.3.3.2 Earthworks

The Plan Change would enable residential activities to occur on the site, subject to the grant of subdivision consent. Site development will be associated with a period of earthworks during construction. The effects arising from this period of construction include heavy machinery creating noise and vibration, stripped land potentially creating a dust nuisance, and potential runoff of sediment laden stormwater. In order to minimise potential adverse effects from the construction activity, it is common practice for earthworks and construction to be undertaken in accordance with engineering approval from SDC and the appropriate New Zealand guidelines at the time of construction. On this basis, the temporary effects arising from earthworks associated with future subdivision and development of this site are not considered to be significant. These matters will need to be considered at the time of subdivision.

6.3.3.3 Infrastructure

Southbridge has reticulated water supply, sewage disposal, telecommunications and electrical supply, all of which will be utilised and extended to service future potential allotments on the site.

The Servicing Strategy outlined in this report identifies that both telecommunications and energy supply can be extended to accommodate appropriate residential development on the site. The site once developed will increase the peak flow rates in the sewage mains beyond that for which the system is currently designed.

It has been agreed with SDC that the most feasible solution is for additional pumping capacity to be provided. The Servicing Strategy also identifies that upgrades may be required in order to ensure the necessary capacity for additional high pressure water connections to service the site, as well as for additional sewage pumping capacity.

[3] Soil Bureau Bulletin 14, 1967, Soils of the Downs and Plains, Canterbury and North Otago, New Zealand.

[4] Soil Bureau Bulletin 21, 1964, Soils and Agriculture of Ellesmere County Canterbury, New Zealand.

Financial contributions towards infrastructure will be required to be paid at the time of subdivision, in accordance with the SDC Development Contributions Policy in the Selwyn Community Plan (LTP) 2012 - 2022. These contributions will assist the SDC in any further upgrade or maintenance of the Southbridge water and sewage reticulation.

6.3.4 Effects of the discharge of contaminants

Subject to final engineering design and SDC approvals, residential activities on the site will be able to connect to the Southbridge sewer reticulation. Further, treated stormwater is able to be disposed of to appropriate drains for which the necessary resource consents will be required at the time of subdivision. No contaminants will be discharged to the environment as a result of the Plan Change. Any potential effects arising from the discharge of contaminants will be considered at the time of subdivision, and will be similar to those of any other residential area.

6.3.5 Effects of hazards or the use of hazardous substances

The potential residential subdivision that would occur as a result of the Plan Change will generate additional motor vehicles on the site which have the potential to discharge oils. Also oil and petrol spills can occur in association with vehicle crashes. TDG's Transport Assessment (APPENDIX E) confirms that the frequency of crashes in Southbridge has been low over the last ten years. It is considered that the effects of discharges of oil or petrol from motor vehicles using the site or from vehicle crashes on the site will be negligible, and can be easily mitigated by the use of submerged outlet sumps to collect stormwater runoff.

6.4 Potential Effects from Nearby Incompatible Activities

Activities undertaken on the business site to the north or the rural sites to the west and south have the potential to affect the quality of life experienced by future residents on the site.

Noise is one such effect, and the business use made of the property to the north of the site is considered to be the most potentially affected site in terms of potential reverse sensitivity effects as a result of residential use of the Plan Change site. For this reason, a reverse sensitivity buffer is included on the ODP which provides ample room for establishment of effects mitigation measures such as a noise attenuation bund and/or acoustic fence combination. An assessment from an acoustic expert is included in APPENDIX B that confirms the appropriate use of the buffer area to mitigate potential noise effects.

Future occupants of the site may also be subject to effects associated with rural activities to the west and south of the site. This may include heavy machinery during crop harvest and animal noise. It is considered that Bellfield Street and Brook Street provide an adequate separation distance between the proposal site and adjoining rural land thus providing some mitigation from noise and other effects from rural activities. Bellfield Street in particular is a paper road that is currently planted with trees, which provides an effective visual screen between the proposed Living 1 zone and the adjoining Rural – Outer Plains zone to the west. Additional mitigation between rural and urban land uses will occur as the site is developed with buildings, fences and gardens.

Noise from rural farming practices is considered to be normal near the rural / urban fringe of a township. Noise heard at potential future allotments on this site will be no greater than what is experienced by other residential areas also on the rural/urban fringe of Southbridge.

Agricultural spray drift or air borne dust is another potential effect from nearby farming activities. The property to the west is a small lifestyle block and is unlikely to be undertaking any significant agricultural spraying or ploughing activities that may cause dust to become airborne. The property directly to the south of the site currently grows flowers for commercial sale.

Most of the activities undertaken on the site to the south are carried out within greenhouses, reducing the likelihood of agricultural sprays drifting across future residential allotments on the site.

Agricultural spraying practices are generally undertaken in the manner recommended by the manufacturers of the chemical product and through common sense measures, such as spraying in calm weather conditions

to reduce the distance the spray drifts before settling. The separation provided by Bellfield Street (20 m wide road reserve) and Brook Street (20 m wide road reserve) helps to mitigate the effects of any airborne spray or dust reaching potential future allotments on this site. Bellfield and Brook Streets also contain a number of trees that will help to capture dust and spray drift before it reaches the site. Approximately 95 m of the frontage of Brook Street is taken up with a residential lifestyle property. Given the temporary nature of spray and dust drift, and the distance to properties likely to be undertaking activities that cause such drift, it is considered that any potential adverse effects will be minor and consistent with effects commonly experienced by properties at the edge of rural townships.

6.5 Summary

The effects arising from the Plan Change and subsequent future potential residential activities on the site are considered to be primarily positive. Any potential adverse effects are not considered to be significant, or can be easily mitigated by appropriate urban and engineering design tools.

Overall, the site lends itself to residential zoning and activity and any actual or potential effects arising from the Plan Change will be in keeping with those of the surrounding residential area.

7.0 PLANNING FRAMEWORK

7.1 Overview

The RMA is the principal legislation for the management of the natural and physical resources of New Zealand. The Act provides a framework within which a privately initiated plan change may be promulgated and assessed. This includes an evaluation under section 32 of the Act and the matters set out in Schedule 1 to the Act.

7.2 Part 2 Matters

7.2.1 Introduction

The proposed Plan Change is subject to the provisions of Part 2 of the Act, which sets out the purpose and principles that guide this legislation.

7.2.2 Section 5 – purpose

Section 5 identifies the purpose of the RMA as being the sustainable management of natural and physical resources. The term "sustainable management" is defined as meaning:

> *"…managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well - being and for their health and safety while –*
>
> *a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."*

The Plan Change is able to satisfy the purpose and principles of the RMA, by providing appropriately zoned vacant land that will provide for a potential increase of housing stock in Southbridge for present and future generations.

It provides a logical extension of the township that can be fully serviced with existing and upgraded infrastructure. This, along with the ODP, ensures that any potential environmental effects are minimised, and the ODP also provides certainty and ensures an integrated form of development.

7.2.3 Section 6 – matters of national importance

"In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

b) The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:

c) The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

d) The maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:

e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

f) The protection of historic heritage from inappropriate subdivision, use, and development:

g) the protection of protected customary rights."

Section 6 sets out the matters of national importance that shall be recognised and provided for, none of which are considered relevant in this case.

7.2.4 Section 7 – other matters

"In achieving the purpose of the Act, all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources, shall have particular regard to:

a) Kaitiakitanga

aa) the ethic of stewardship

b) the efficient use and development of natural and physical resources

ba) the efficiency of the end use of energy

c) the maintenance and enhancement of amenity values

d) Intrinsic values of ecosystems

e) Repealed

f) Maintenance and enhancement of the quality of the environment

g) Any finite characteristics of natural and physical resources

h) The protection of the habitat of trout and salmon

i) the effects of climate change:

j) the benefits to be derived from the use and development of renewable energy."

Section 7 requires particular regard to be given to certain matters. Of relevance to this Plan Change are the efficient use of natural and physical resources (b), the maintenance and enhancement of amenity values (c) and the maintenance and enhancement of the quality of the environment (f). The formulation of this Plan Change has had regard to these matters through the planning and consultative process, and the development of the ODP.

The Plan Change represents an efficient use of a 5.9 ha parcel of land of which little productive use is currently made. It is surrounded by various land uses (including residential, commercial and rural) on the urban fringe of Southbridge, and represents a logical extension of the urban rural interface. The residential amenity values of Southbridge will be enhanced by the development of a high quality residential environment in line with the ODP for the site. The quality of the residential environment in this area will be enhanced by the development of the site that ensures the appropriate green areas and linkages are provided through the ODP, whilst also mitigating against any reverse sensitivity effects on the commercial activities on adjoining land.

7.2.5 Section 8 – Treaty of Waitangi

Section 8 requires that the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) be taken into account:

> *"In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)."*

The RMA does not go so far as to define the principles of the Treaty that should be taken into account, but the Court of Appeal, the Waitangi Tribunal, and statements by Government, define the principles as including:

- Early consultation and acting in good faith;
- The principle of partnership; and
- The need for active protection.

Consultation with local Iwi has been undertaken (as detailed in Section 10), and no responses have been received.

7.3 Section 32 – Consideration of Alternatives, Benefits and Costs

Section 32 of the RMA was amended by s70 of the Resource Management Amendment Act 2013, with effect from 3 December 2013. This means that this Plan Change must be assessed in accordance with the amended version of section 32.[5]

An analysis of the Plan Change pursuant to section 32 is included in Section 9.0 of this report.

7.4 Section 73 - Preparation and Change of District Plans

Section 73 of the RMA deals with the preparation and change of district plans and section 73(2) allows any person to request a territorial authority to change a District Plan in the manner set out in Schedule 1 of the RMA. Clause 22 of Schedule 1 requires an application to explain the purpose and reasons for the proposed plan change and to include an evaluation under section 32 for the methods proposed.

It also requires an assessment of the environmental effects of the proposed change, corresponding to the scale and significance of effects anticipated by the proposal.

[5] Clause 2 of schedule 12 to the RMA (inserted by section 68 of the Resource Management Amendments Act 2013) provides that the unamended (pre-December 2013) version of section 32 applies if the closing date for making further submissions on a plan change is prior to the date when the section 32 amendments came into force. The Plan Change has not yet been notified, and so the Council must assess the provision in accordance with the amended version of section 32.

An explanation of the purpose and reasons for the plan change is included in this report, along with an assessment of the environmental effects and an evaluation under section 32.

7.5 Canterbury Regional Policy Statements

7.5.1 Introduction

Section 75(3) of the RMA requires that a district plan must give effect to any regional policy statement, and must not be inconsistent with a regional plan. The operative Canterbury Regional Policy Statement (CRPS) and the relevant regional plans are considered below.

7.5.2 Canterbury Regional Policy Statement

The CRPS became operative on 15 January 2013. The CRPS provides an overview of the significant resource management issues facing the region, and sets out objectives, policies and methods to achieve integrated management of natural and physical resources of Canterbury.

Within the CRPS, Chapters 5, 6 and 15 are considered to be relevant to the proposed Plan Change.

Chapter 5 relates to land use and infrastructure whereby land development is to be designed so that the appropriate infrastructure is in place to support the development, and includes the integration of land use and the transport system. In particular, Policy 5.3.1 seeks to provide sustainable urban patterns that ensure urban growth occurs in a form that concentrates, or is attached to, existing urban areas and promotes a coordinated pattern of development. Policy 5.3.5 specifically requires development to be appropriately serviced for the collection, treatment and disposal or re-use of sewage and stormwater, and the provision of potable water.

Policy 5.3.8 seeks to promote the integration of land use and transport by encouraging the use of transport modes with low adverse effects, and the safe, efficient and effective use of transport infrastructure. It also requires the avoidance or mitigation of conflicts between incompatible activities.

Being located at the edge of the existing township makes this site a logical extension of Southbridge, which can utilise infrastructure services and ensure a sustainable urban pattern and coordination of development, which in itself helps to minimise the potential for conflict with productive uses in the surrounding area. Conflicts with incompatible activities are to be mitigated through the provision of a reverse sensitivity buffer area identified on the ODP. The appropriate use of the buffer area is confirmed in an assessment from an acoustic expert in APPENDIX B.

Policy 5.3.11 relates to the use of established community-scale irrigation, stockwater and rural drainage infrastructure, and seeks to avoid development which constrains its operational ability. The proposed Plan Change has a stormwater treatment and detention area which will use an existing operational rural water race as a secondary flowpath. The stormwater treatment facility will be designed to a 1 in 50 year storm event ensuring that only the more extreme weather events will result in additional run off to this water race.

Policy 5.3.12 seeks to maintain and enhance natural and physical resources that are valued for existing or foreseeable primary production, in a manner which does not foreclose the ability to appropriately use that land for primary production. While the Plan Change site encompasses an area of approximately 6 ha currently used for cropping, the land cannot be put to its full potential productive use due to its existing size, and vicinity to existing residential housing. It is therefore considered that this is an appropriate location for a zoning change such as that sought by the Plan Change.

Overall, it is considered the Plan Change is consistent with the policy approach set out in Chapter 5 of the CRPS. The proposed development is a logical extension of the township and utilises existing infrastructure as far as practicable while also addressing any potential for reverse sensitivity effects that may arise with existing activities in the vicinity.

Chapter 6 Recovery and Rebuilding of Greater Christchurch provides a framework for the recovery of Greater Christchurch, to enable and support earthquake recovery and rebuilding, including restoration and

enhancement, for the area through to 2028. Chapter 6 identifies an urban form and settlement pattern including for rural townships, but does not extend as far as Southbridge. Policies 6.3.2 and 6.3.3 require ODPs to be used for greenfield priority areas. Although Southbridge is not a greenfield priority area, the ODP for the site has been developed using the general principles of the NZ Urban Design Protocol as required by Policy 6.3.2.

Chapter 15 relates to maintaining the versatile soils of the region. This chapter focuses on the management of soils per se, rather than the reduction of the primary productive base through change of land use, which is addressed under Chapter 5, and discussed above.

Overall, it is considered the Plan Change is consistent with the CRPS.

7.6 Canterbury Regional Plans

There is currently an operative and proposed regional plan for Canterbury; the operative Natural Resources Regional Plan (NRRP), and the Proposed Land and Water Regional Plan (LWRP).

The NRRP consists of eight chapters which address sustainable management of natural resources in the Canterbury Region. All chapters were made fully operative, along with a number of variations, in June 2011.

Hearings for the LWRP (replacing Chapters 4 to 8 of the NRRP) were held during 2013, with Council's decision on submissions to the LWRP being notified on 18 January 2014. Its purpose is to provide clear direction on the management of land and water in order to meet community aspirations for water quality in both urban and rural areas. Under section 52 of the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act, the jurisdiction of the Environment Court is excluded from the plan formulation process, and therefore the recent decisions version of the LWRP could only be appealed to the High Court on points of law. The appeals period closed on 17 February 2014 and a number of appeals have been lodged.

Pursuant to Section 75(4) of the RMA, The SDP must not be inconsistent with the NRRP or PLWP.

A full assessment of the Plan Change application against the relevant objectives and policies of the SDP is discussed in Section 8.0 below and on the basis of that assessment it is considered that the plan change is consistent with the direction of the NRRP and PLWP.

Development of the subject site will need to comply with the provisions of the regional plans at the time of subdivision and development or any necessary resource consents obtained from the CRC.

7.7 Recovery Strategy for Greater Christchurch

The Recovery Strategy for Greater Christchurch 2012 provides a vision, goals and a strategy for ensuring the success of Christchurch for recovery and future leadership in earthquake resilience. It was developed by the Canterbury Earthquake Authority (CERA) in consultation with the CRC, Christchurch City Council, Waimakariri District Council (WDC), SDC, and Te Rūnanga o Ngāi Tahu (Ngai Tahu), and has guided the development of the Land Use Recovery Plan (LURP) and the Natural Environment Recovery Programme (NERP).

The Recovery Strategy coordinates the programmes of work, including Recovery Plans, prepared under the Canterbury Earthquake Recovery (CER) Act 2011. The CER Act lists several purposes, which fall into the following categories:

- *The provision of appropriate institutions, powers and support to enable greater Christchurch to be rebuilt and otherwise recover as quickly and fully as possible.*
- *The involvement of communities and the public in the decisions made about the rebuilding of their own area.*
- *The restoration of the greater well-being of Christchurch communities.*

Section 23 of the Canterbury Earthquake Recovery Act (CER Act) requires any person exercising functions and powers under the RMA to not make a decision or recommendation that is inconsistent with the Recovery Plan. The Land Use Recovery Plan (LURP) has been prepared by CRC, working with its strategic partners. It was approved by the Minister for Canterbury Earthquake Recovery, and gazetted on 6 December 2013.

The LURP is a statutory document that directed CRC to make changes to the CRPS which included inserting Chapter 6. The LURP looks at the impacts of the earthquakes on residential and business land use, and provides a pathway for the transition from rebuild to longer term planning.

The LURP does not extend as far as Southbridge in terms of determining location and mix of residential and business activities, however it is considered that the proposed Plan Change is consistent with the LURP in providing for housing opportunities to meet the residential needs of the existing and future community of Southbridge.

8.0 ISSUES, OBJECTIVES AND POLICIES OF THE SDP

8.1 Proposed Plan Change

The objective of the proposed Plan Change is to provide for a coherent extension to the Southbridge residential community by way of a well designed neighbourhood, providing for an efficient and sustainable use of the land resource.

An overview of the SDP key issues, objectives and policies is included below along with an explanation of how they are provided for by the proposed Plan Change.

8.2 Section B1 – Natural Resources

The irreversible use of land for an activity that would preclude its use for other activities is recognised as an issue by the Plan under Section B1.1. The Plan recognises that this may or may not be an issue depending on the specific situational factors. The Plan refers to Chapter 7 Policy 6 of the CRPS 1998 (now replaced by the Operative CRPS 2013) regarding a decision needing to be made on the irreversible use of land. Discussion in respect of the relevant CRPS 2013 policy is included in Section 7.6.2 of this report. It is considered that while the Plan Change is located on a site that is considered to contain versatile soils there are no alternative feasible locations for the expansion of Southbridge containing land that is less versatile. The rezoning is consistent with urban densities envisaged for the township and the Living 1 zone, and provides important housing land without creating a shortage of soil resources within the district. Particularly when considered in the context of Policy B1.1.8 as set out below, this site is the most appropriate location for the proposed rezoning and forms a logical extension of Southbridge, while due to its size and location it offers very limited productive potential as rural land resource.

Policy B1.1.8 relates to the permanent use of land for one activity. This policy seeks to avoid rezoning land which contains versatile soils for new residential or business development if:

- the land is appropriate for other activities; and
- there are other areas adjoining the township which are appropriate for new residential or business development which do not contain versatile soils.

That explanation and reasons for Policy B1.1.8 acknowledges that all townships in the Selwyn District need an opportunity to expand to have the population to support services and facilities within the town and reduce the demand for transport[6].

[6] Selwyn District Plan, Township Volume, Part B Natural Resources, page 010.

The proposed Plan Change is consistent with the policy direction sought in Section B1.1 regarding permanent use of land for one activity, and provides for the logical compact expansion of Southbridge.

The Plan Change is also consistent with the policy direction set out in Section B1.2 regarding water supply, stormwater and wastewater disposal, by providing for reticulated services, albeit with the requirement for some upgrades, as set out in Policies B1.2.2, B1.2.3 and B1.2.5.

8.3 Section B2 – Physical Resources

The physical resources covered by this section of the SDP include transport, utilities, community facilities and waste disposal.

Transport Policy B2.1.12 refers to the impact of new development on the district road network, while Policy B2.1.13 deals with assessing the effects of growth in Selwyn townships on transport demand, and Policy B2.1.14 encourages people to walk or cycle within townships. These matters are addressed in the transport assessment attached as APPENDIX E.

The TDG traffic assessment concludes that while additional traffic volumes will be generated by development consequential to the rezoning, the effects of this will be negligible and the development enabled by the Plan Change will not affect the safe and efficient operation of the transport network or contribute to adverse effects on the transport network.

Section B2.2 relates to utilities. The proposed Plan Change is consistent with all relevant objectives and policies.

Enabling the compact expansion of the existing township also gives effect to the direction sought in Section B2.3 Community Facilities and Section B2.4 Waste Disposal by locating the development so that it maximises future use of existing community facilities and waste collection services available to Southbridge.

8.4 Section B3 – People's Health, Safety and Values

This section includes issues related to natural hazards, hazardous substances, culture and heritage.

Section B3.4 relates to Quality of the Environment and sets out objectives requiring townships to be pleasant places to live, that a variety of activities are provided for, that character and amenity values are maintained, and that reverse sensitivity effects are avoided. The Plan Change is considered to be consistent with the relevant policies regarding various character and amenity issues.

Specifically, Policy B3.4.3 provides for living zones which are less busy and more spacious than residential areas in metropolitan centres. This Plan Change introduces an extension to the urban boundary of Southbridge by rezoning 5.9 ha of currently rural zoned land to Living 1. The site, once developed will appear as a logical extension to the township as it is located across the road from residential living, and bounded to the north by residential and commercial land uses. The Living 1 zone will ensure a low density residential section size in keeping with the existing Southbridge residential character.

Policy B3.4.38 deals with the potential for adverse reverse sensitivity effects to arise from residential activities locating near existing activities with which they are incompatible. The proposed Plan Change mitigates the potential for reverse sensitivity effects to occur between future residential activity on the site and the adjacent McMillan Drilling site, by providing a reverse sensitivity area on the ODP.

This area provides for acoustic mitigation measures to be developed on the plan change site, between future residential development and the McMillan site. APPENDIX B contains an assessment from an acoustic expert regarding the potential for reverse sensitivity, with specific reference to the McMillan site.

8.5 Section B4 – Growth of Townships

Section B4 of the District Plan sets out the general issues, objectives and policies associated with the growth of townships. The policy direction within this chapter is separated into general policy applying to all township growth and specific policy applying to individual townships. In the case of Southbridge, the specific policy approach is set out on pages B4-092 and B4-093. There are also a wide range of general issues, objectives and policies set out in Section B4 relevant to the proposed Plan Change.

The Southbridge specific section of the SDP recognises that there may be more than one area for the future expansion of Southbridge that complies with all relevant provisions. The proposed Plan Change is consistent with the relevant provisions in the SDP and also provides the most appropriate location for future residential development within Southbridge,

Policy B4.3.82 encourages *"new residential or business areas to locate on sites in the existing Living and Business zones, if sites are available and appropriate for the proposed activity."*

Although there is some land zoned for living and business activities in Southbridge that is not currently utilised, there is no area of any significance set aside for new housing development, such as that proposed by the Plan Change. This lack of choice has the potential to result in the price of existing land becoming too expensive and inefficient to develop. It is considered that providing more land for residential use is a more efficient approach than identifying future needs only when there is no other option.

The general provisions set out in Section B4 seek to ensure a range of requirements including that newly zoned residential land forms a logical extension to existing townships, townships expand in an integrated compact manner, newly zoned land adjoins existing urban areas and provide a range of allotment sizes while maintaining and enhancing amenity values and in particular the spacious character enjoyed by Selwyn townships. Objectives and policies warranting particular consideration in respect of this Plan Change are set out below.

Under the heading "Residential Density", the following objectives and policies are relevant:

> *"Objective B4.1.1*
>
> *A range of living environments is provided for in townships, while maintaining the overall 'spacious' character of Living zones, except within Medium Density areas identified in an Outline Development Plan where a high quality, medium density of development is anticipated.*
>
> *Objective B4.1.2*
>
> *New residential areas are pleasant places to live and add to the character and amenity values of townships.*
>
> *Policy B4.1.1*
>
> *Provide for a variety of allotment sizes for erecting dwellings in Living 1 Zones, while maintaining average section size similar to that for existing residential areas in townships, except within Medium Density areas identified in an Outline Development Plan where a higher density of development is anticipated.*
>
> *Policy B4.1.11*
>
> *Encourage new residential areas to be designed to maintain or enhance the aesthetic values of the township, including (but not limited to):*
>
> – *Retaining existing trees, bush, or other natural features on sites; and*
> – *Landscaping public places."*

Under the heading “Residential and Business Development” the following objectives and policies are relevant:

“Objective B4.3.1
The expansion of townships does not adversely affect:

- *Natural or physical resources;*
- *Other activities;*
- *Amenity values of the township or the rural area; or*
- *Sites with special ecological, cultural, heritage or landscape values.*

Objective B4.3.2
For townships outside the Greater Christchurch area, new residential or business development adjoins existing townships at compatible urban densities or at a low density around townships to achieve a compact township shape which is consistent with the preferred growth direction for townships and other provisions in the Plan.

Policy B4.3.2
In areas outside the Greater Christchurch area, require any land rezoned for new residential or business development to adjoin, along at least one boundary, an existing Living or Business zone in a township, except that low density living environments need not adjoin a boundary provided they are located in a manner that achieves a compact township shape.

Policy B4.3.6
Encourage townships to expand in a compact shape where practical.”

The proposed Plan Change gives effect to the above objectives and policies in that:

- It provides a large parcel of developable land at the edge of the existing Southbridge township, while retaining a compact township format.
- By maintaining a compact pattern of development, once developed, residents within the Plan Change area will be able to fully utilise existing community facilities, transportation infrastructure and utility services available to Southbridge.
- The Plan Change area is large enough to provide for a range of site sizes, whilst maintaining the overall spacious character of Southbridge, and thereby providing for the maintenance and enhancement of the aesthetic and amenity values of the township.
- Potential reverse sensitivity issues are considered to be minor, and are addressed by the existing buffer areas provided by roads, and through provision of the proposed reverse sensitivity buffer area on the ODP.
- The Plan Change site is outside of the Greater Christchurch area and provides an appropriate Living zone that adjoins an existing Living zone along at least one boundary, maintaining a compact township shape.

9.0 SECTION 32 ANALYSIS

9.1 Overview

Section 32(1)(a) of the Act requires the Council to examine the extent to which the objectives are the most appropriate way to achieve the purpose of the Act. The proposed Plan Change does not seek to amend any of the objectives in the District Plan.

The reasons for the Plan Change discussed in section 3.0 of this report which identifies that there are no significant areas of vacant land available for residential development in Southbridge. The purpose of the Plan Change is to extend the residential area of Southbridge with appropriate new planning provisions to provide for the continued gradual growth of the township, currently not provided for by the SDP. Further, the recent Canterbury earthquake sequence has added to the need for additional new areas of housing and the proposed Plan Change provides the potential to add to Canterbury's housing stock. The Plan Change will enable the Southbridge community to provide for their social needs, and for their future well-being through meeting future demand for residential development. The consequential development of the natural land resource will enable the needs of future generations to be met while provisions proposed within the plan change will ensure adverse effects on the environment are appropriately avoided or mitigated. The Plan Change is considered the most appropriate way to achieve the purpose of the RMA, and this is discussed further in terms of the costs and benefits within the options assessment in section 9.2 below.

Section 32(1)(b) requires examination as to whether the provisions in the proposal are the most appropriate way to achieve the objectives by:

(i) identifying other reasonable practicable options for achieving the objectives; and

(ii) assessing the efficiency and effectiveness of the provisions in achieving the objectives; and

(iii) summarising the reasons for deciding on the provisions; and

The evaluation must contain a level of detail that corresponds to the scale and significance of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the proposal. The summary on other reasonably practicable options for achieving the objectives of the proposal are set out in section 9.2 below.

No new objectives are being added to the Plan as a result of the proposed Plan Change. However, the Plan Change has been discussed in relation to efficiently and effectively achieving the objectives of the SDP, as outlined in Sections B1-B4 of the SDP (refer Section 8 above), and found to be consistent with the policy direction of the SDP.

Section 32(2) requires that in assessing the efficiency and effectiveness of the provisions under section 32(1)(b)(ii) the assessment must:

(a) identify and assess the benefits and costs of the environmental, economic, social, and cultural effects that are anticipated from the implementation of the provisions including the opportunities for-

(i) economic growth that are anticipated to be provided or reduced; and

(ii) employment that are anticipated to be provided or reduced; and

Section 32(2)(b) requires that if practicable, an assessment is to quantify the benefits and costs referred to in section 32(2)(a), and section 32(c) requires an assessment of the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.

The Plan Change has the potential to provide for economic growth through the development of additional housing in Southbridge, increasing the population which supports local businesses and amenities. Given the existing limited value of the land for rural use, the Plan Change provides the potential to realise the higher value of the land for residential use. Construction activities on the site will provide for employment of contractors, both during subdivision works, housing development, landscaping and other residential amenities. The current rural value of the land resource is comparatively insignificant compared to the future residential value of the site, and detailed quantification of these costs and benefits is therefore not considered necessary.

Section 32(3) requires that where a proposal will amend an existing plan the examination under section 32(1)(b) must relate to:

(a) the provisions and objectives of the amending proposal; and

(b) the objectives of the existing proposal to the extent that those objectives-

(i) are relevant to the objectives of the amending proposal; and
(ii) would remain if the amending proposal were to take effect.

The Plan Change proposal does not seek to amend any of the objectives of the SDP. The Plan Change objective is to provide for the extension of the residential area of Southbridge with appropriate new planning provisions to provide for the continued gradual growth of the township which is currently not provided for by the SDP. It proposes to insert new rules into the SDP, with an ODP to ensure certainty regarding the form of residential development of the site. The Plan Change has been assessed as according with the objectives and policies of the SDP. The objectives of the SDP would remain if the Plan Change were to take effect.

9.2 Summary of Options, Benefits and Costs

Five different options, and the benefits and costs associated with these reasonably practicable options, have been considered as part of the section 32 analysis for this rezoning and are discussed in the table below.

Table 1: Summary of Reasonably Practicable Options, Benefits and Costs.

Option	Benefits	Costs
Option 1: Rezone the site from Rural – Outer Plains to Living 1 without the use of additional controls such as an ODP.	▪ Provides for high value development of the site. ▪ Provides living opportunities for those living and working in Southbridge through a new greenfield development site. ▪ Provides for a high level of amenity, a compact urban form, and retention of the spacious character of the Southbridge township. ▪ Provides for land to be developed for residential purposes as demand arises. ▪ Provides for land to be developed in accordance with provisions of the Living 1 zone rather than through resource consent processes for non-complying activities within the Rural – Outer Plains zone. ▪ Provides for employment at the site during construction of subdivision works, as well as the development of housing and other residential amenities. ▪ Provides for economic growth of Southbridge through increased population, and through the realisation of the residential value of the land.	▪ Small loss of productive Rural – Outer Plains zoned land (versatile soils). ▪ Potential for reverse sensitivity effects to arise due to proximity of McMillan site. ▪ Potential for effects associated with growth to arise, such as ad-hoc extensions of reticulated services, or effects from increased stormwater runoff. ▪ Potential for piecemeal and uncoordinated roading patterns and subsequent development to arise. ▪ Loss of rural employment at the site (approximately one farmer maintaining cropping, or minor grazing activities from time to time throughout the year).
Option 2 – Rezone the site from Rural – Outer Plains to Living 1	▪ Allows integrated, high quality development of the site.	▪ Small loss of productive Rural – Outer Plains zoned

with additional rules, assessment criteria and an ODP.	▪ Provides living opportunities for those living and working in Southbridge through a new greenfield development site. ▪ Provides for a high level of amenity, a compact urban form and retention of the spacious character of the Southbridge township. ▪ Provides for land to be developed for residential purposes as demand arises. ▪ Provides for land to be developed in accordance with provisions of the Living 1 zone rather than through resource consent processes for non-complying activities within the Rural – Outer Plains zone. ▪ Provides for employment at the site during construction of subdivision works, as well as the development of housing and other residential amenities. ▪ Provides for economic growth of Southbridge through increased population, and through the realisation of the residential value of the land.	land (versatile soils). ▪ Loss of rural employment at the site (approximately one farmer maintaining cropping, or minor grazing activities from time to time throughout the year).
Option 3: Maintain existing Rural – Outer Plains zoning (do nothing).	▪ Use of the land for productive activities will be retained. ▪ No adverse effects arising from residential activity such as traffic generation or increased stormwater runoff. ▪ No time and money spent to complete a plan change process. ▪ Retains employment at current levels at the site (approximately one farmer maintaining cropping, or minor grazing activities from time to time throughout the year).	▪ Fails to provide for ongoing growth and affordable housing development within Southbridge. ▪ Fails to appropriately release the value of land for residential development. ▪ May result in other, less appropriate, sites being developed to accommodate future residential growth within Southbridge. The option of ad hoc infill development is unlikely to provide for integrated growth, and it is unlikely that this type of growth could be effectively and efficiently serviced by existing inadequate sewage pumping facilities. ▪ May encourage less integrated development, affecting the townships compact form through a lack of residential living opportunities.

Option 4: Resource consent for a non-complying subdivision.	▪ Achieve same effect in terms of allotment sizes and development. ▪ Specific subdivision design determined. ▪ Provides for employment at the site during construction of subdivision works, as well as the development of housing and other residential amenities. ▪ Provides for economic growth of Southbridge through increased population, and through the realisation of the residential value of the land.	▪ Inappropriate method of developing such sites as discussed in the Environment Court decision on Operation Homer (*Operation Homer Limited v Selwyn DC C100/2007*). In that decision it determined that applications for non-complying subdivision in the rural zone that may be contrary to density policies are best dealt with by means of a plan change, rather than by non-complying resource consent application. ▪ Subdivision may occur prior to actual demand for sections, which would bring forward costs. ▪ Land is not zoned for residential development meaning ad-hoc land use consents would also be required. ▪ Small loss of productive Rural – Outer Plains zoned land (versatile soils). ▪ In future potential changes to dwellings and accessory buildings would also be subject to individual land use consent applications for activities that would otherwise be permitted within a Living 1 zone. ▪ May result in inappropriate siting of houses and reticulation of services, rather than reflecting actual future demand. ▪ Potential for adverse effects as a result of individual stormwater discharges. ▪ Loss of rural employment at the site (approximately one farmer maintaining cropping, or minor grazing activities from time to time throughout the year).
Option 5: Different plan change proposal, e.g., rezone to Business zone, or a combination of Living and Business zones.	▪ Maximises business land available within Southbridge. ▪ Provides for a wider range of uses on the site. ▪ Provides for employment at during earthworks at the site,	▪ Greater potential for adverse reverse sensitivity effects to arise with adjoining Living zone neighbours. ▪ May generate a higher level of effects such as noise, dust,

	as well as the development of buildings and other facilities. ▪ Contributes economic vitality and growth of Southbridge through increased business and potentially residential development, and through the realisation of the business and residential value of the land.	heavy traffic volumes, etc. ▪ Small loss of productive Rural – Outer Plains zoned land (versatile soils). ▪ Surplus of business land could lead to businesses locating away from established business zoning within the centre of town and removing the heart of the community; a social cost. ▪ Potential for a lower level of amenity arising from business zoning. ▪ Limited demand for this kind of development with Southbridge. ▪ Loss of rural employment at the site (approximately one farmer maintaining cropping, or minor grazing activities from time to time throughout the year).

9.3 Discussion of Options

9.3.1 Option 1 - Rezone the site from Rural – Outer Plains to Living 1 without the use of additional controls such as an ODP

Rezoned to Living 1, the site is large enough to provide for a range of allotment sizes which would maintain the spacious character that currently exists within the township and enhance amenity values. Such rezoning ensures the compact format of Southbridge is retained, maximises the use of township utilities and facilities, and enables the site to be subdivided as required in accordance with the provisions of the Living 1 zone.

There is also potential for reverse sensitivity effects to arise between future residential development on the Plan Change site and rural industrial activity on the McMillan site, while stormwater issues may also be a potential issue arising from future development.

The development of the site into Living 1 zoned land will result in a small loss of productive potential. However, as has been discussed elsewhere in this report, the productive capacity of this site is no greater than any other potential development sites adjoining Southbridge, and the current productive utilisation of the site is very low; approximately one farmer maintaining cropping or minor grazing activities from time to time throughout the year. Conversely the potential development of the land for residential activities brings with it the potential for employment at the site during subdivision construction works, and throughout the life of the residential development of the site, including the development of reserves, stormwater facilities, and upgrades and extensions to other reticulated services. There is also the potential for ongoing employment of the new residents of the Plan Change site in the rural sector, in local businesses within Southbridge, or the wider Selwyn community.

Development of the site will also result in economic benefits to the Southbridge township and wider Selwyn community as the increased population make use of local businesses and services, as well as other local amenities such as sports and recreation clubs and associations.

The economic value of the site will be realised through the increased residential value of the land, as opposed to the limited value of the land in rural use.

9.3.2 Option 2 – Rezone the site from Rural – Outer Plains to Living 1 with additional rules, assessment criteria and an ODP

This option has many of the benefits of Option 1, but removes potential for effects to arise due to unresolved reverse sensitivity and stormwater issues by incorporating relevant rules and assessment criteria into the plan through the inclusion of an ODP which addresses these matters.

Subdivision of land in the Plan Change area is to be in general accordance with the ODP, and as described in a proposed new rule. Where development is not in general accordance with the ODP, land use consent is to be sought for a discretionary activity, enabling full consideration of the effects of the proposed development. For instance, any amendments to the roading pattern would need to ensure connectivity, and avoid piecemeal and uncoordinated subdivision patterns.

Additional Assessment Criterion 12.1.4.79 has been included to provide for consideration as to whether any amendments to the layout of development will still enable efficient and coordinated provision of services including adequate provision for reserve, pedestrian and cycle linkages.

Including these additional provisions does not generate significant extra costs at the development stage as the plan provisions to be included are targeted and subdivision consent will need to be obtained for subdivision in any case.

As with Option 1, this option will still result in a small loss of productive land that will occur as a result of the development. However given the size and location of the land, its productive potential is already significantly reduced.

Option 2 provides for a coordinated pattern of residential development, taking account of important linkages, reserve and reverse sensitivity areas, and stormwater management. The use of an ODP in the SDP ensures a high level of community certainty regarding expectations for the site.

Option 2 provides for the same social, economic and employment opportunities described for Option 1, and these would be realised in a more coordinated manner.

9.3.3 Option 3 – Maintain existing Rural – Outer Plains zoning (do nothing)

Maintaining the site as it is presently generates few benefits. While it will not result in a loss of productive land, there is minimal rural production currently occurring on the site with approximately one farmer maintaining cropping or minor grazing activities from time to time throughout the year.

The option of infill development of Southbridge is unlikely to provide for integrated growth, and it is unlikely that this type of growth could be effectively and efficiently serviced by existing inadequate sewage pumping facilities.

Not rezoning the site provides for some other future rural use of the land, either through permitted activity status or through a resource consent process. However, there is no shortage of sites for similar such activities to take place in proximity to Southbridge, and as this report has outlined previously, the location of the site does not lend itself to the limited intensive production activities that could take place on a block of this size.

9.3.4 Option 4 – Resource consent for a non-complying subdivision

Obtaining resource consent for a non-complying activity to either subdivide the site into residential sized allotments with or without land use consent for future dwellings may achieve essentially the same effect as the proposed Plan Change and result in similar costs and benefits in terms of the social, economic and employment opportunities. However, doing so brings forward the costs of development, and may result in an allotment configuration which does not fully meet the requirements of sound urban design or the needs of the final buyers when the land is required for residential development.

Such an approach has been identified by the Environment Court as being an inappropriate method of developing such sites as discussed by the Court in the Operation Homer decision (*Operation Homer Limited v Selwyn DC C100/2007*) which maintains that applications for non-complying subdivision in the rural zone

that may be contrary to density policies, are best dealt with by means of a plan change, rather than by non-complying resource consent application.

Further any application for non-complying subdivision consent would also be likely to require individual consent applications for land use consent for each proposed dwelling. As soon as building plans are altered or relevant accessory buildings are proposed, additional future land use consents may be required as the Rural – Outer Plains zoning will not appropriately provide for residential development.

9.3.5 Option 5 – Different plan change proposal, e.g., rezone to Business zone, or a combination of Living and Business zones

A plan change to a different zoning such as Business, or a combination of zonings, such as Living and Business, is the final option considered as part of this section 32 analysis. Such an approach may maximise business or other zoning within Southbridge and provide for a wider range of land uses to take place on the site. Such a rezoning would increase land values on the site and also provides for productive business activities. It is likely to have similar economic and employment opportunities as the land is developed for non-rural use.

However, at the present time, there appears to be limited demand for this kind of development within Southbridge. A surplus of business land could lead to businesses locating away from established business zoning within the centre of town and detracting from the 'heart' of the community; a social cost of this option.

A business zoning also has greater potential to give rise to effects such as noise, dust and odour, resulting in lower amenity values overall. Mixed zoning has greater potential to result in lower amenity values but also result in adverse reverse sensitivity effects due to residential activity locating alongside business activity. Further, a mixed zoning is generally used in conjunction with higher density and comprehensive housing proposals, and is not considered to be in keeping with the character and amenity of the Southbridge community.

Such a rezoning will still result in the site being lost from its limited productive rural potential.

9.3.6 Section 32 summary

From the above analysis, it is clear that the proposed Plan Change utilising Option 2 above, is the most effective and efficient way of achieving the objectives of the SDP and the Plan Change itself, and providing for the purposes of the RMA. The Plan Change provides additional residentially zoned land to accommodate for growth and changing demographics within Southbridge. The Plan Change is consistent with the policy direction of the SDP and forms a logical extension of Southbridge, providing for its expansion in an integrated and compact manner, allowing access to necessary services and utilities, and maintaining and enhancing amenity values within Southbridge.

There is sufficient information available to fully understand the effects associated with the proposed rezoning so there is negligible risk in respect of the sufficiency of information needed to understand the effects of the Plan Change.

10.0 CONSULTATION

10.1 Consultation Framework

Detailed consultation was undertaken during 2008, and all those consulted have also been sent an updated letter (dated 20 June 2012) and consultation booklet for their information. Consultation has been undertaken with the following:

- Selwyn District Council (meetings held 12 February 2008, and 31 October 2011).
- Canterbury Regional Council (letters dated 24 October 2008, and 20 June 2012).

- Immediate neighbours (meeting held 6 May 2008, and letter dated 20 June 2012).
- Te Taumutu Rūnanga (letters dated 24 October 2008, and 20 June 2012).
- New Zealand Historic Places Trust (letters dated 24 October 2008, and 20 June 2012).
- New Zealand Fish and Game (letters dated 24 October 2008, and 20 June 2012).
- Te Rūnanga ō Ngāi Tahu (letters dated 24 October 2008, and 20 June 2012).
- Department of Conservation (letters dated 24 October 2008, and 20 June 2012).
- Royal Forest and Bird Protection Society of New Zealand Inc (letters dated 24 October 2008, and 20 June 2012).
- Southbridge Township Committee / Advisory Board (letters dated 24 October 2008, and 20 June 2012).

In 2008 an initial meeting was held with the SDC on 12 February 2008 with ongoing email and phone correspondence regarding service provision, the reserve areas and the features of the ODP. Consultation with immediate neighbours in 2008 included information pertaining to the proposed Plan Change, and invitation to a public meeting which was held at the Southbridge Rugby Club Rooms on 6 May 2008 at 6.30pm. Five people attended this meeting.

Soon after this round of consultation, the economy went into recession, and the applicant decided to delay the Plan Change application.

In October 2011, another meeting was held with SDC representatives to inform of the intention to continue with the proposal, and discuss finer details with regard to the ODP, in particular the location and configuration of reserve areas, and the options for reverse sensitivity measures within the area depicted. Another letter, dated 20 June 2012, was sent to all of the parties listed above along with a copy of the ODP, and the proposed new SDP planning maps for the area. A copy of the 20 June 2012 letter is attached as APPENDIX M. No additional feedback was received as a result.

Since this time, ongoing consultation has occurred between the applicant and the SDC regarding the options for servicing the Plan Change area, particularly with respect to sewage reticulation. As discussed in Section 4.3 the preferred approach to achieving the necessary level of service to the area has been agreed as an increase to the pumping capacity of sewage from Southbridge to the Leeston WWTP. The cost estimates for the various sewage reticulation upgrade options, and the resolution of the Southbridge Advisory Committee Meeting are attached in Appendices G and I.

10.2 Consultation Outcomes

As a result of consultation with the SDC changes have been made to the final ODP design. In particular the final ODP takes account of the SDC's comments regarding stormwater drainage and treatment, road layout, and the location and amount of land to be shown as reserve.

In the 2008 public consultation meeting, there was general support for the ODP. However, some people had concerns regarding the effect of stormwater discharges from the site into the drain that runs through farmland to the southwest of the site. Queries were also made regarding future staging of development with a preference for the site to be developed slowly. There is a general knowledge within the community regarding the proposed Plan Change.

11.0 CONCLUSION

11.1 Overview

Roxburgh Property Developers Limited has requested a Private Plan Change to the SDP to rezone Lots 1 to 15, 50 to 62 and 88 to 89, DP 825 from Rural - Outer Plains to Living 1. The Plan Change includes additional rules and assessment criteria to fully enable consideration of future development of the site, in addition to an ODP which recognises the characteristics of the site and provides for a positive outcome in respect of reserve sensitivity effects, stormwater and roading layout.

11.2 Effects

The Plan Change proposal will provide for future residential development of Southbridge. The site is located on the edge of the township and its development into Living 1 will provide for the compact and integrated expansion of the township, in accordance with the SDP objectives and policies for growth of townships.

Any potential adverse effects are not considered to be significant, or can be mitigated by appropriate urban and engineering design tools. Overall the site lends itself to residential zoning and activity and any actual or potential effects arising from the Plan Change will be in keeping with those of the surrounding residential area.

An ODP is proposed for the site and indicates appropriate roading, cycle, pedestrian and green networks, as well as addressing potential reverse sensitivity and stormwater issues. It is anticipated that as part of the Plan Change process, the ODP will be incorporated into the Plan, and that any future development of the site will be undertaken in general accordance with the ODP.

11.3 Statutory Considerations

11.3.1 Relevant plans

This report has assessed the proposed Plan Change against the relevant provisions of the CRPS, the Recovery Strategy for Greater Christchurch and the LURP, the NRRP and LWRP, and the SDP.

The proposed Plan Change is consistent with the provisions of these documents and promotes the outcomes envisaged with respect to growth of rural townships.

11.3.2 RMA options and alternatives

The section 32 analysis undertaken in this report demonstrates that the proposed rezoning of the site from Rural – Outer Plains to Living 1 with the proposed additional rules, assessment criteria and ODP has the greatest benefits while also the least costs and is the most appropriate option that achieves the objectives of the SDP and meets the purpose of the RMA.

12.0 REFERENCES

Canterbury Regional Council 2013, Canterbury Regional Policy Statement.

Canterbury Regional Council 2011, Canterbury Natural Resources Regional Plan.

Canterbury Regional Council 2014, Proposed Canterbury Land and Water Regional Plan.

Canterbury Regional Council 2012, Recovery Strategy for Greater Christchurch.

Canterbury Regional Council 2013, Land Use Recovery Plan.

Ministry for the Environment 2005, New Zealand Urban Design Protocol.

Selwyn District Council 2012, 5Waters Activity Plan Part 3, Te Waihora – Water, Wastewater.

Selwyn District Council 2008, Selwyn District Plan.

Statistics New Zealand, Census 2013, Quick Stats about Southbridge.

APPENDIX A

Report Limitations

Report Limitations

This Report / Document has been provided by Golder Associates (NZ) Limited ("Golder") subject to the following limitations:

i) This Report / Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Report / Document, in whole or in part, in other contexts or for any other purpose.

ii) The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Report / Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

iii) Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Report / Document. Accordingly, if information in addition to that contained in this report is sought, additional studies and actions may be required.

iv) The passage of time affects the information and assessment provided in this Report / Document. Golder's opinions are based upon information that existed at the time of the production of the Report / Document. The Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

v) Any assessments, designs and advice made in this Report / Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Report / Document.

vi) Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

vii) The Client acknowledges that Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. Golder will be fully responsible to the Client for the Services and work done by all of its subconsultants and subcontractors. The Client agrees that it will only assert claims against and seek to recover losses, damages or other liabilities from Golder and not Golder's affiliated companies. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any legal recourse, and waives any expense, loss, claim, demand, or cause of action, against Golder's affiliated companies, and their employees, officers and directors.

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APPENDIX B

Request for Further Information and Applicant Response

Selwyn
DISTRICT COUNCIL

30 July 2012

Roxburgh Property Developers
C/- Golder Associates
PO Box 2281
CHRISTCHURCH 8011

Attention: Jane West

Dear Madam,

PC120034: ROXBURGH PROPERTY DEVELOPMENTS - PRIVATE PLAN CHANGE - REQUEST FOR FURTHER INFORMATION AND AMENDMENTS

Your application for the above plan change has been assessed for completeness under the First Schedule of the Resource Management Act 1991. An assessment has been undertaken on the application, with the following further information request.

Further Information
The following further information is requested so Council can better evaluate the nature and effects of the request (Clause 23 (1)):

Reserves and open space

Further information

1. Overall the application is devoid of any specific information on the rationale for reserve provision for this development and how it integrates with the existing open space network in Southbridge. Please provide an explanation on how the open space provision has been determined and the approximate area (m^2) to be provided.

2. With regard to the area defined on the ODP as "reverse sensitivity buffer area":

    i. Who is intended to own this?

    ii. Is it intended to be public land and vested in Council? If so will it be vested as some form of local purpose reserve?

    iii. If it is vested in Council is it expected that it will form part of the reserve contribution for the subdivision.

Comments

3. The area shown as neighbourhood reserve is acceptable. No specific size is given but it appears to be around 2,000 m^2 (judging from the lot sizes on the Draft Development Plan) which conforms with the Development Contributions Policy in relation to optimum size of neighbourhood reserves. Rough calculations undertaken by the Open Space and Property Manager indicate that Council should be taking a reserve of around 1,800m^2 to meet the target level of 1.2 ha per 1,000 population. However Southbridge currently has a low level of provision overall so an amount above that required is acceptable. This however is subject to confirmation of actual reserve size and whether the reverse sensitivity buffer area is likely to be vested. Although we are generally accepting of the reserve area any discussion reserve area for cash in relation to reserve contributions will be a matter for the subdivision process.

4. Please note that there is an area of land held as reserve (8,000 m^2) and vested in Council on St Johns St next to the unformed Bellfield St. This was previously a depot and is currently unused. It could potentially be developed as reserve in the future or disposed of and it (apparently) has some existing informal land drainage function. This should be given some consideration in defining the reserve provision and potential linkages to the proposed subdivision. However its actual future use is uncertain.

Services

Water

Further Information

1. The 5Waters Activity Plan states that "Water supply just coping with peak demand with no ability for additional connections". If the Plan Change was approved and development proceeded on the site then infrastructure upgrades will be required along with variations to ECan consents. Please provide a detail on how the demand for a potable water supply will likely be met given the existing system is at capacity.

Comments

2. Environment Canterbury consent CRC010893.1 limits the water take to 43 l/s with the current pumps having a maximum capacity of 36 l/s. There are currently 342 connections with the potential for an additional 21 connections to be made under current development allowances. Existing pumps provide peak flows in the order of 35l/s (at capacity).

Wastewater

Further Information

3. The 5Waters Activity Plan states that "The Southbridge scheme is ultimately limited by the capacity of the Leeston WWTP, which in turn is bound by the resource consents." Although the pump station currently has capacity to convey flows from the development, once the existing unconnected Lots are connected the system will be over design

capacity. Please provide details on how the demand for a waste water system will likely be met given the existing system capacity.

Comments

4. There are currently 302 connections with the potential for an additional 94 connections to be made under current development allowances. The pump station was designed on 350 households 2.8 people per household therefore a population of 980 people.

General Services Comments

5. There is a stockwater race flowing along the western boundary of the site. Stormwater is not permitted to be discharged into this race.

6. Stormwater is required to be treated and discharged to the existing drain flowing along the western boundary of Bellfield Street parallel with the water race. Please note that there is anecdotal evidence that this drain, in moderate rainfall events, overflows due to significant overland flow paths.

Roading

Comments

1. Traffic generation is low from the proposed 56 lot subdivision in the context of a significantly underutilised adjoining local network. Issues will be more related to expected street frontage upgrade requirements and the application of development contributions relating to this which are a matter more for subdivision consent. However what follows are some more specific comments.

2. For any future residential development on the site treatment of how lots adjoining Bellfield St will occur will need careful consideration to avoid tall continuous fences and other adverse amenity outcomes if Bellfield St is seen as an important recreational amenity for the wider community etc.

3. The ODP shows the alignment of the new road reserve intersecting with corresponding road reserve of Talaroa Pl opposite as requested previously, which is acceptable. One would then presume that the respective carriageways on either side of High St would align to form true cross roads, but Figure 6 in the TDG Transport Assessment shows this not quite occurring. Something to be aware of through subdivision engineering design to this desired outcome.

4. Our Transportation Engineer comments that it will have to be a point of specific assumption by all that Robinson St and Bellfield St will remain unformed road and will exist instead as a local amenity recreational linkage for the foreseeable future. The proposed walkway reserve linking the cul de sac to Bellfield St is wide enough to accommodate a road carriageway extension to link to the two if it was considered worthwhile if Bellfield St was ever formed as a road

5. Localised upgrade of the Brook St/High St intersection needed in conjunction with frontage upgrade e.g. inclusion quadrant kerbing on south east corner.

6. Corner splays will need to be consistent with revised provisions in Council Plan Change 12.

7. Our Transportation Manager has no issue with minor non compliances to intersection and vehicle entranceway spacing's due low traffic volume environment.

Geotechnical assessment

Further information

The Geotech Assessment infers that there is sand and gravelly sand above and below the water table. Our Geotech Engineers concern is that there could be an issue with liquefaction of the soil below the water table, and at shallower depth if the water table is higher.

This has raised the following questions

1. Is the gravelly sand really gravelly sand, or is it sandy gravel? Our Geotech Engineer has seen photos from test pits not far away and that appears to be good gravel.

2. Is the water level recorded reliable? It has often been found that test pits take a long time to stabilise and hence is it actually 3 - 4m down, or conceivably higher? Do the Ecan well logs provide any additional information?

3. The DBH guidelines are applicable for both Plan Change and Subdivision Consent applications. A similar approach is inferred for both, with the only differentiation made being the investigation densities. Therefore, to comply with the guidelines, the report should ideally include a broad classification of the land (TC1 – TC3) and a quantitative liquefaction analysis to enable the technical land classification to be made, where there is a possible liquefaction hazard (as appears to be at this site).

4. Overall can more definitive statements be made about the extent of the liquefaction potential and magnitude of settlement, equivalent TC category?

Note: Our Geotech Consultant has liaised already with Clive Anderson of Golder Associates regarding the above but has not had a response.

Environmental Health

Further information

1. It is stated in Sections 6.2.2 and 6.4 that the reverse sensitivity buffer in the ODP provides ample room for a noise attenuation bund and/or acoustic fence combination to mitigate effects of the McMillan Specialist Drilling Services site on the north boundary of the Plan Change Area. However the depth of the buffer area is not stated, and the extent and specification of acoustic bunding or fencing is not described. Unless the potential noise emissions of the McMillan activity are evaluated, there is no certainty that the buffer area will provide "ample room" to achieve the necessary mitigation or whether additional provisions may be required in the Plan Change. Please provide an evaluation of noise emissions of the McMillan activity and the extent and nature of any buffer, bund, fencing or other necessary noise attenuation measures, by an experienced practitioner in environmental acoustics.

2. The potential for spray drift effects to be buffered at the west and south rural boundaries of the Plan Change Area is discussed in Section 6.4. This discussion should include an

evaluation of the mitigation distances and available screening by Bellfield Street and Brooke St, with regard to Canterbury NRRP Chapter 3 Rule AQL71 and the Drift Hazard Guidance Chart on page 303 of Chapter 3.

3. The potential for the storage and use of hazardous substances in the rural zone to generate reverse sensitivity effects is not discussed. Rule 7.1 of the Rural Volume of the District Plan allows significantly greater quantities of hazardous substances than are permitted in the Living Zone and the assessment should include comment on any significant quantities that are known to exist within 30 m of the proposed Living 1 zone boundary, and any mitigation that might be necessary.

4. It is plausible that some of the land subject to this development could have been previously used for a "HAIL" activity (i.e. an activity specified in the Ministry for the Environment's Hazardous activities industries list) particularly the bulk storage and use of persistent pesticides, waste disposal or the bulk storage of fuels. Please provide Soil Contamination assessment for the Plan Change Area. The assessment should be from a suitably qualified and experienced contaminated land practitioner and should establish if any HAILs have taken place on site, and what remedial or management action is necessary to ensure the prosed zone change is appropriate. Any investigation, reporting and remediation and management should be undertaken in accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health and its associated documents.

Comments

5. In Sections 7.6.3 and 8.5, it is stated that conflicts with incompatible activities and potential reverse sensitivity effects are to be mitigated by the reverse sensitivity buffer in the ODP. However the ODP shows that buffer is adjacent only to the McMillan Drilling site on the north boundary of the Plan Change Area, and would not mitigate effects at the west and south Rural OP boundaries.

6. Section 4.2.4 states that specific noise attenuation measures (plantings, fencing or bunds) at allotments within the reverse sensitivity buffer area in the ODP will be protected by covenants on titles at the time of subdivision. However the extent of the buffer area and the nature and practicability of the attenuation measures should first be determined through this Plan Change.

7. Earthworks are "construction work" in terms of NZS 6803:1999 *Acoustics – construction noise*. It should be stated that construction noise will be managed in accordance with that standard.

8. The potential for air contaminants to be discharged from home heating appliances has not been identified. However any potential adverse effects on the local airshed would be expected to be considered by Environment Canterbury's in terms of the Canterbury NRRP.

9. The potential for domestic storage and use of hazardous substances other than oil and petrol in vehicles has not been considered. However the existing rules in the District Plan Townships Volume which allow limited quantities in the Living 1 zone subject to secure containment, labelling etc, and additional controls in the Canterbury NRRP and HSNO

(Hazardous Substances and New Organisms legislation) would be sufficient to avoid and mitigate any potential effects.

10. As noted above, the Rural Volume of the District Plan allows significantly greater quantities of hazardous substances than are permitted in the Living Zone, and there is potential for the storage and use of hazardous substances in the rural zone to generate reverse sensitivity effects, which has not been considered.

General

1. The PC makes no reference to the CERA Earthquake Recovery Strategy. Please provide an assessment as to the Plan Changes consistency or otherwise with this document.

2. In Section 6.3.3.3 it refers to the 2009/19 LTP DC's in this regard but obviously this now superseded by the requirements in the 2012/22 LTP.

Process from Here

Once we have received a response to the above requests, it may be necessary to ask for further clarification of the extent to which this response addresses the above requests.

Whilst you may decline to provide the above information (Clause 23 (6)) you need to be aware that the Council may reject the request on this basis.

Once the Council is satisfied that it has adequate information, a report will be finalised to consider and make a recommendation on how to deal with your request

If you have any queries or have any concerns regarding this request for information, please contact me on (03) 347 2824 or benjamin.rhodes@selwyn.govt.nz.

Yours sincerely

Ben Rhodes
STATEGY AND POLICY PLANNER

14 November 2012 Project No. 1078107287

Ben Rhodes, Strategy and Policy Planner
Selwyn District Council
2 Norman Kirk Drive
PO Box 90
Rolleston 7643

PC34 – RURAL – OUTER PLAINS TO LIVING 1, HIGH STREET, SOUTHBRIDGE

Dear Ben

Thank you for your letter dated 30 July 2012 requesting further information on Plan Change 34 (PC34) at Southbridge. This letter is a response to the matters raised and follows the same order as your letter.

Reserves and open space

1. *Please provide an explanation on how the open space provision has been determined and the approximate area (m^2) to be provided.*

The open space provision was determined over the course of a number of meetings with Selwyn District Council (SDC) staff, in particular Anne Greenup, and from the various versions of the Outline Development Plan (ODP). The location of the neighbourhood reserve area was agreed upon based on a number of matters including:

- The desire for the continuation of a green corridor from Bellfield Street through the reverse sensitivity buffer area and out to High Street.
- The requirement that SDC did not wish to have the reverse sensitivity buffer area as part of the reserve area.
- The practicality of having the area out to High Street contained within the reserve so as to provide for a green street scene in this part of the development. When combined with the adjacent entrance to the site, enhanced amenity would be provided by an expansive street scape and views into the development.

The neighbourhood reserve area contains a total of approximately 2,780 m^2. The reverse sensitivity buffer area not included in the reserve, which is likely to including planting and green corridor to Bellfield Street, provides an additional 1,845 m^2.

2. *With regard to the area defined on the ODP as "reverse sensitivity buffer area":*
   - *i. Who is intended to own this?*
   - *ii. Is it intended to be public land and vested in Council? If so will it be vested as some form of local purpose reserve?*
   - *iii. If it is vested in Council is it expected that it will form part of the reserve contribution for the subdivision.*

Golder Associates (NZ) Limited
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Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

On the basis of previous meetings and discussion with the SDC, it was intended that the reverse sensitivity buffer area would be privately owned (with appropriate covenants) as part of each of the allotments that would be created along the northern boundary (approximately 3 allotments). However, the applicant would be open to the vesting of this area in the SDC as an extension of the reserve / green space provision. If the SDC agreed that the area should be vested but did not wish for it to form part of the reserve contribution for the subdivision (at subdivision stage) it is suggested that it could perhaps vest as an all-purpose utility reserve.

Alternatively, it has been suggested that for compliance under the District Plan for noise attenuation it may be most appropriate to keep the zoning of the reverse sensitivity buffer area as Rural to ensure that the lower Living zone noise limits of the District Plan apply at the boundary with the new Living zoned properties. The applicant is also agreeable to this option.

Services

Water

1. *The 5Waters Activity Plan states that "Water supply just coping with peak demand with no ability for additional connections". If the Plan Change was approved and development proceeded on the site then infrastructure upgrades will be required along with variations to ECan consent. Please provide a detail on how the demand for a potable water supply will likely be met given the existing system is at capacity.*

Following our meeting on 28 August 2012 it has been agreed that upgrades may be required as part of the subdivision consent. These upgrades would facilitate the subdivision of any allotments over and above the first 21 (or however many connections exist at the time of subdivision application). The identified upgrades are:

- Potential upgrade to the existing pump
- 'Renewal' of water permit CRC010893.1, held by the SDC, in order to accommodate an increased volume of water to be taken.

Wastewater

3. *The 5Waters Activity Plan states that "The Southbridge scheme is ultimately limited by the capacity of the Leeston WWTP, which in turn is bound by the resource consents." Although the pump station currently has capacity to convey flows from the development, once the existing unconnected Lots are connected the system will be over design capacity. Please provide details on how the demand for a waste water system will likely be met given the existing system capacity.*

Following our meeting on 28 August 2012 the SDC Asset Manager, Murray England, agreed to organise the necessary investigations to determine what upgrades to the wastewater system would be required to service the potential number of allotments that could be developed under PC34. This information is crucial to the financial viability of PC34. Indeed, the issue of wastewater capacity is crucial to the realisation of any development in Southbridge beyond the 94 connections that are currently available.

Information available to date indicates that although the pump is over capacity, there appears to be lower peak flows than expected, which may provide an opportunity for additional connections. It is considered that a workable solution will be available that can be dealt with in more detail at the subdivision design phase, and through development contributions on subdivision consent(s). It is also worth noting that any subdivision of the land is likely to be undertaken in stages, rather than all at once. It is therefore feasible that a number of allotments could be connected to the wastewater system prior to the need for upgrade works.

General Services

Following our meeting on 28 August 2012 is has been agreed that the stormwater from the site will be collected, treated and disposed of on-site up to a 2% AEP (20 year event). For storm events that exceed that volume, the overflow will be discharged to the existing drain flowing along the western boundary of Bellfield Street parallel with the stockwater race. It is acknowledged and accepted that the SDC does not wish for any additional stormwater to enter the stockwater race.

Further design detail of the stormwater treatment and disposal system will be submitted for approval with the subdivision consent application.

Roading

Thank you for your comments which have been taken on board.

Geotechnical assessment

Golder's geotechnical experts have considered the matters raised by the geotechnical engineer on behalf of the SDC, and offer the following response:

> "The test pits reached a depth of between 3.3 and 4.0 m below ground level and all encountered silts and sands to a depth of about 2.7 m, underlain by gravels. The gravels are logged as "gravelly sands and sandy gravels" and from discussion with the geologist and review of the photographs, we believe that these gravels are mainly clast supported and therefore not particularly susceptible to liquefaction.
>
> The pits were left to stand open for the duration of the site investigation and groundwater levels were recorded several hours later, prior to backfilling. The geologist reported little change in water levels during the few hours they were left open, with final measured groundwater levels of about 2.7 to 3.4 m. However, the pits were excavated in February so groundwater levels undoubtedly can get higher. Some orange mottling was logged within the sands at shallower depths which suggests that periodic (probably seasonal) shallow groundwater levels do occur.
>
> Given that shallow groundwater levels can occur, saturating some of the shallow silts and sands that are present on the site, we suggest that some ground improvement of the shallow soils is undertaken prior to construction of the subdivision. Design of such ground improvements would follow more geotechnical investigation for design of the subdivision, however, based on our experience elsewhere, a square, heavy impact roller or similar would probably effect the necessary compaction.
>
> Given appropriate ground improvement and achievement of the required compaction we believe the site could be classified as TC1."

Environmental Health

1. *It is stated in Section 6.2.2 and 6.4 that the reverse sensitivity buffer in the OPD [sic] provides ample room for a noise attenuation bund and/or acoustic fence combination to mitigate the effects of the McMillan Specialist Drilling Services site on the north boundary of the Plan Change Area. However the depth of the buffer area is not stated, and the extent and specification of acoustic bunding or fencing is not described. Unless the potential noise emissions of the McMillan activity are evaluated, there is no certainty that the buffer area will provide "ample room" to achieve the necessary mitigation or whether additional provisions may be required in the Plan Change. Please provide an evaluation of noise emissions of the McMillan activity and the extent and nature of any buffer, bund, fencing or other necessary noise attenuation measures, by an experienced practitioner in environmental acoustics.*

The depth of the reverse sensitivity buffer area shown on the ODP is approximately 18 m. In the attached letter, Golder's Principal Acoustic Specialist has assessed the noise emissions expected from the McMillan site and the options available for mitigation within the reverse sensitivity buffer area. The conclusion is that the ODP does in fact provide for the necessary mitigation options to be put in place to provide reverse sensitivity protection for the McMillan site.

It is not considered necessary at this stage to carry out a full evaluation of the noise emissions from the McMillan site. Such an assessment may be appropriate to be completed as part of the application to subdivide in order to complete final design of the proposed noise mitigation measures prior to development.

2. *The potential for spray drift effects to be buffered at the west and south rural boundaries of the Plan Change Area is discussed in Section 6.4. This discussion should include an evaluation of the mitigation*

distances and available screening by Bellfield Street and Brooke St, with regard to Canterbury NRRP Chapter 3 Rule AQL71 and the Drift Hazard Guidance Chart on page 303 of Chapter 3.

Rule AQL71 provides for ground-based application of agrichemicals using techniques other than hand-held application as a permitted activity so long as certain provisions are met. This is relevant to farming operations, and the need to avoid spray drift and odour when applying agrichemicals. In particular, Condition (5) of this rule requires that the dispersal or deposition of agrichemical particles shall not cause a noxious, dangerous, offensive or objectionable effect beyond the boundary of the property on which the agrichemicals are applied, and Condition (6) describes the notification procedures required when it is intended to spray agrichemicals, with part (b) of Condition (6) requiring notification of any person in residence within 100 m of the area where agrichemicals are applied and who has requested that they be notified.

The plan change introduces the potential for additional residences to the east and north of existing rural land. However, it is not considered that this poses a significant risk in terms of reverse sensitivity from spray drift from farming operations. To the south of the plan change site, Brook Street, with a 20 m wide road reserve provides some setback from any potential spray drift issues from nearby farmland, added to which approximately 95 m of frontage to the south of Brook Street is taken up with a residential lifestyle property. To the west of the plan change site is Bellfield Street, again providing a 20 m wide road reserve along which there are also established trees and planting, providing set back and a planted buffer area between the site and any effects from the potential for spray drift from nearby farming activities to the west.

The application of agrichemicals on properties to the west and south of the subject site, given the precautions contained in the conditions of Rule AQL71 and the Drift Hazard Guidance Chart of Chapter 3 of the NRRP, will not be affected by the proposed plan change. It is not considered that the application of agrichemicals on nearby farms will pose a risk any higher than that already experienced by rural townships established to serve the surrounding agricultural environment throughout Canterbury.

3. *The potential for the storage and use of hazardous substances in the rural zone to generate reverse sensitivity effects is not discussed. Rule 7.1 of the Rural Volume of the District Plan allows significantly greater quantities of hazardous substances than are permitted in the Living Zone and the assessment should include comment on any significant quantities that are known to exist within 30 m of the proposed Living 1 zone boundary, and any mitigation that might be necessary.*

There is no known storage of hazardous substances within 30 m of the plan change site.

4. *It is plausible that some of the land subject to this development could have been previously used for a "HAIL" activity (i.e. an activity specified in the Ministry for the Environment's Hazardous activities industries list) particularly the bulk storage and use of persistent pesticides, waste disposal or the bulk storage of fuels. Please provide Soil Contamination assessment for the Plan Change Area. The assessment should be from a suitably qualified and experienced contaminated land practitioner and should establish if any HAILs have taken place on site, and what remedial or management action is necessary to ensure the prosed [sic] zone change is appropriate. Any investigation, reporting and remediation and management should be undertaken in accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health and its associated documents.*

The plan change site was owned by the Johnson Family and cropped for over 40 years before being sold in 1993 at which time the house was built. Since then the site has been used only for small scale cropping, and sheep grazing activities, with no known HAIL activities occurring. Please refer to the attached confirmation from the CRC that there are currently no LLUR sites located on the land. The site has not been identified as previously being used for a HAIL activity and there is no requirement under the NES for any type of contaminated site investigation or assessment.

General

1. *The PC makes no reference to the CERA Earthquake Recovery Strategy. Please provide an assessment as to Plan Changes consistency or otherwise with this document.*

The Canterbury Earthquake Recovery Strategy was published in May 2012, and provides a vision, goals and a road map for ensuring the success of greater Christchurch, which includes the Selwyn District, for recovery and future leadership in earthquake resilience. Broad goals for the recovery strategy include matters such as:

- *"delivering smarter council and government planning and services"*,[1]
- *"planning for a well-functioning Christchurch central city, thriving suburban centres, flourishing rural towns and a productive rural sector",*[2]
- *"enabling and empowering local communities to shape and lead their own recovery"*[3]*, and,*
- *"zoning sufficient land for recovery needs within settlement patterns consistent with an urban form that provides for the future development of greater Christchurch"*[4]

PC34 is consistent with and delivers on the vision and goals within the Canterbury Earthquake Recovery Strategy. It provides the potential for residential development with an urban form consistent with the existing rural township, providing additional support to the local community and maintaining the surrounding productive rural sector.

2. *In Section 6.3.3.3 it refers to the 2009/19 LTP DC's in this regard by obviously this now [sic] superseded by the requirements in the 2012/13 LTP.*

Thank you for this item of clarification. It is acknowledged that the most recent LTP will be used when determining development contributions at the time of subdivision of the site, should the plan change be successful.

We trust this information satisfies the SDC in terms of the additional matters to be considered in the RFI letter of 30 July 2012, and we request that the SDC now proceed with the notification of PC34.

GOLDER ASSOCIATES (NZ) LIMITED

Jane West
Senior Planner

JW/CT/kc

CC: Roxburgh Property Developers, High Street, Southbridge, Attention: Rob Roxburgh

Attachments: Letter from Acoustic Expert, Golder Associates (NZ) Ltd, 13 November 2012
CRC LLUR letter, 13 November 2012

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[1] Recovery Strategy for Greater Christchurch, Section 4: Vision and Goals for the Recovery, page 9, point 1.5.

[2] Recovery Strategy for Greater Christchurch, Section 4: Vision and Goals for the Recovery, page 9, point 2.1.

[3] Recovery Strategy for Greater Christchurch, Section 4: Vision and Goals for the Recovery, page 10, point 3.1.

[4] Recovery Strategy for Greater Christchurch, Section 4: Vision and Goals for the Recovery, page 11, point 5.5.

13 November 2012 Project No. 10781-07-287

Mr Rob Roxburgh
Roxburgh Property Developers Limited
High Street
Southbridge

ACOUSTIC CONSULTANCY SERVICE – PROPOSED ROXBURGH PLAN CHANGE PC34

Dear Mr Roxburgh

Introduction

Roxburgh Property Developers Ltd has made an application to Selwyn District Council to initiate a change to the Selwyn District Plan (PC34). This privately initiated plan change application proposes to rezone approximately 6 ha of land (the subject site), on the southwest boundary of Southbridge, from Rural – Outer Plains to Living 1 in order to provide for the residential growth of Southbridge.

Golder Associates (NZ) Limited (Golder) has been commissioned to comment[1] on the potential effects of noise emissions from the adjacent site used by McMillan Specialist Drilling Services (the McMillan site) in response to the request for further information from Selwyn District Council dated 30 July 2012, specifically Environmental Health – Item 1 relating to the proposed reverse sensitivity buffer between the subject site and the McMillan site.

Design Requirements

The site is located on the southwest boundary of Southbridge Township at the rural/urban interface. To the northeast across High Street, the site is flanked by residential activity, contained in the Living 1 Zone. Adjoining the site to the northwest is the McMillan site, which is located partly in the Rural – Outer Plains Zone, and partly in the Business 2 Zone. Also adjoining the site to the northwest is a residential dwelling contained in the Rural – Outer Plains Zone. Land to the south and west of the site is zoned Rural – Outer Plains and is generally used as farmland including stock grazing and cropping.

The Selwyn District Plan – Rural Volume, Part C Rural Rules identifies noise limits for rural dwellings and living zones under Rule 9.16.1.

The subject site is currently zoned for rural use and the noise limits that would apply at the notional boundary (20 m from the closest facade) of the existing rural dwelling are:

- 60 dB L_{A10} and 85 dB L_{Amax} between 07:30-20:00; and
- 45 dB L_{A10} and 70 dB L_{Amax} at all other times.

If the subject site were rezoned to Living Zone as proposed, the noise limits that would apply at the common boundary (at any living zone boundary) would be:

- 55 dB L_{A10} and 85 dB L_{Amax} between 07:30-20:00; and
- 40 dB L_{A10} and 70 dB L_{Amax} at all other times.

[1] This letter report is issued subject to the limitations set out in Attachment 1

Section 4.4 of New Zealand Standard NZS 6802:1991 Assessment of Environmental Sound identifies that "When a noise has special audible characteristics the relevant performance standard L_{10} descriptor may be reduced arithmetically by 5 dB(A) for comparison with the measured L_{10} descriptor of the noise.". This may be applicable to, for instance, tonal or impulsive associated with working metal or hammering.

Section 4.5 of NZS 6802:1991 identifies that where sleep disturbance is not an issue, measured exceedances of noise limits by up to 5 dB(A) are acceptable, provided that the noise level remains compliant when averaged over the duration of the applicable noise limit.

Section 4.2 of NZS 6802:1991 identifies the upper recommended noise limits for residential amenity, based on open window ventilation, to be:

- 55 dB L_{A10} during the day (normally between 07:00-22:00); and
- 45 dB L_{A10} and 75 dB L_{Amax} at night (normally between 22:00-07:00).

Australian/New Zealand Standard AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation time for building interiors identifies recommended internal noise levels for residential buildings near minor roads of:

- living areas 30-40 dB L_{Aeq} (approximately equivalent to 32/33-42/43 dB L_{A10}); and
- sleeping areas 30-35 dB L_{Aeq} (approximately equivalent to 32/33-37/38 dB L_{A10}) respectively.

In most cases, internal noise levels of 40 dB L_{A10} in living areas and 35 dB L_{A10} in bedrooms at night are generally consider to be acceptable in terms of residential amenity and sleep protection. It should be noted that daytime District Plan noise limits are not intended to achieve the recommended internal levels for sleep protection.

Assessment of Noise Effects

Golder has utilised aerial images as the basis for the identification of the likely activities undertaken on the McMillan site. The McMillan site appears to be used mainly for the storage of equipment and vehicles, the buildings in the middle of the site and on the northern side of the site near the entrance are likely to be used as workshops and storage facilities.

Noise generating activities on the McMillan site are already constrained by the need to comply with the noise limits that apply at the existing Living Zone boundary to the north-east which is within 50-150 m of the southern side of the McMillan site where it adjoins the subject site and barely 25 m from the McMillan site entrance. The exact extent to which these constraints limit potential noise levels on the subject site will depend on the sensitivity of the receivers between the McMillan site and High Street, which appear to be residential.

Golder notes that data from noise measurements undertaken for assessments of effects for similar rural services yards indicates that the likely boundary noise levels would probably only approach the highest potential noise levels on the subject site during short periods where the areas near the common boundary were actively used for vehicle manoeuvring and equipment handling. Such sites are typically not sources of significant noise levels for extended periods or noise exhibiting special audible characteristics unless they are used for major equipment manufacturing, repair or maintenance.

The subject site layout proposed under PC34 would include an 18 m wide reverse sensitivity buffer between the McMillan site and the closest of the new residential lots. Attenuation over this distance from individual point noise sources on the McMillan site close to the common boundary to receivers on the new residential would be in the region of 25 dB(A).

The construction of an acoustic screen on the reverse sensitivity buffer in the form of an earth bund and/or solid fence could further reduce noise from the McMillan site by 10-15 dB(A) if the acoustic line of sight between source and receiver were broken. This could be achieved at ground floor receiver level (1.5 m above ground level) by a 2.0-2.5 m high screen, although a significantly higher screen would be required to break the line of sight to a first floor receiver (4.5 m above ground level).

Typically a 10 dB(A) reduction between external and internal noise levels can be expected through an open, ventilating, window and a 25 dB(A) reduction can readily be achieved through a closed window.

Thus, at least 35-40 dB(A) attenuation could be expected between sources located near the common boundary and outdoor ground-floor level receivers on the closest lots on the subject site, which would be sufficient to reduce daytime noise levels from activities near the common boundary of 85-90 dB(A) to compliance on the residential lots.

On the basis of the existing compliance constraints on the McMillan site and its likely use for noise generating activities, Golder considers that the proposed rezoning and development of the subject site is unlikely to result in reverse sensitivity constraints on the daytime use of the McMillan site provided that measures are put in place to optimise the acoustic separation between the two sites as follows:

- keep the reverse sensitivity buffer land use zoning as Rural so that the compliance point for the McMillan site is the closest of the residential lots and not the common boundary;
- construct an acoustic screen to a height of at least 2.0 m (2.5 m would be preferable) with a minimum equivalent surface mass of 10 kg m^2 and no gaps between or below components along the full length of the reverse sensitivity buffer area; and
- require that any upper level habitable rooms in two storey dwellings on those lots adjacent to the reverse sensitivity buffer area that would otherwise have to rely on windows overlooking the McMillan site for ventilation be fitted with alternative mechanical ventilation systems so that windows can be kept closed as required.

Golder would, however, note that activities on the McMillan site before 07:30 or after 20:00 would be subject to the more stringent night-time noise limits and it may not, therefore, be possible to undertake significant noise generating activities near the common boundary during this period and comply.

This may require that the night-time noise limits are relaxed to enable the McMillan site to operate in a compliant manner. If this were the case, potential reverse sensitivity effects associated with sleep disturbance could be minimised by upgrading the acoustic performance of bedroom windows and providing an alternative mechanical ventilation source so that window could be kept closed as required.

Depending upon the types of activities undertaken on the McMillan site during the night-time period and the potential noise levels generated by these activities, it may also be necessary to specify a minimum acoustic rating of the entire facade of the closest residential buildings on the subject site, not just the windows.

Conclusions

Roxburgh Property Developers Ltd have applied to Selwyn District Council to initiate a change to the Selwyn District Plan. Selwyn District Council has requested further information relating to the proposed reverse sensitivity buffer between the subject site and the McMillan Specialist Drilling Services site.

Golder considers that on the basis of data from other typical rural services activities, with the recommended noise control measures in place, the daytime use of the McMillan site is unlikely to be constrained by reverse sensitivity effects resulting from the residential receivers on the subject site.

Golder Associates (NZ) Limited

John Cowley
Principal Acoustic Specialist

JC/ML/jc

Attachments: Attachment 1 – Report Limitations

Attachment 1 – Report Limitations

This Document has been provided by Golder Associates (NZ) Ltd ("Golder") subject to the following limitations:

(i). This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

(ii). The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

(iii). Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

(iv). In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

(v). Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

(vi). Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

(vii). The Client acknowledges that Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. Golder will be fully responsible to the Client for the Services and work done by all of its subconsultants and subcontractors. The Client agrees that it will only assert claims against and seek to recover losses, damages or other liabilities from Golder and not Golder's affiliated companies. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any legal recourse, and waives any expense, loss, claim, demand, or cause of action, against Golder's affiliated companies, and their employees, officers and directors.

(viii). This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Document.

APPENDIX C

Certificate of Title

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952
Limited as to Parcels

Search Copy

Identifier	**CB5D/57**
Land Registration District	**Canterbury**
Date Issued	19 April 1966

Prior References

CB408/25 CB408/27 DI 8 C/S 612

Estate	Fee Simple
Area	5.9286 hectares more or less
Legal Description	Lot 1-15, Lot 50-62 and Lot 88-89 Deposited Plan 825

Proprietors

Roxburgh Property Developers Limited as to a 13/28 share

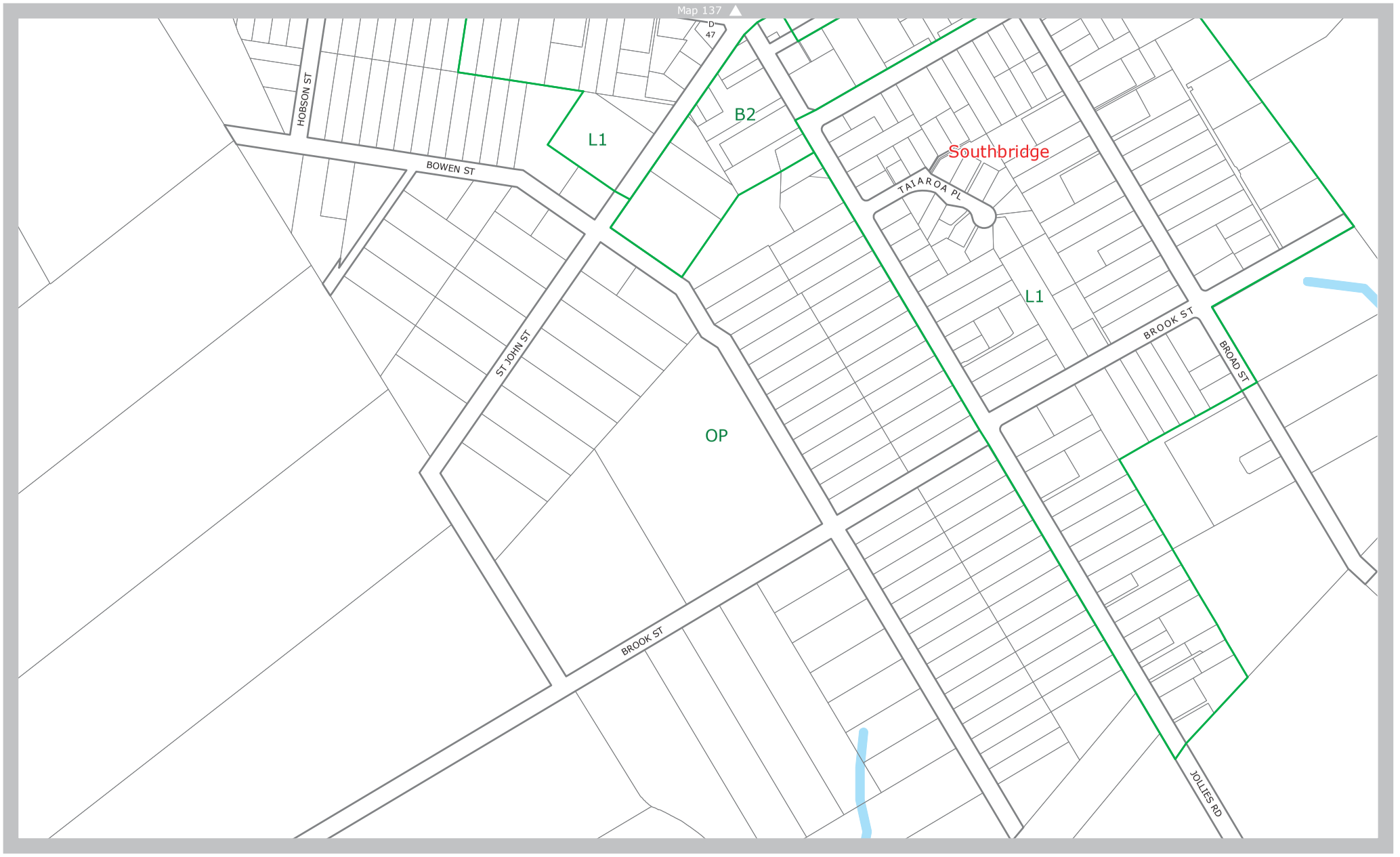
Robert Ian Roxburgh, Bridget Lea Roxburgh and Stewart Charles Williams as to a 15/28 share

Interests

6807421.3 Mortgage to (now) Westpac New Zealand Limited - 30.3.2006 at 9:00 am

APPENDIX D

SDC Planning Map 138 and 004



MAP
138
SHEET 1

SELWYN DISTRICT PLAN

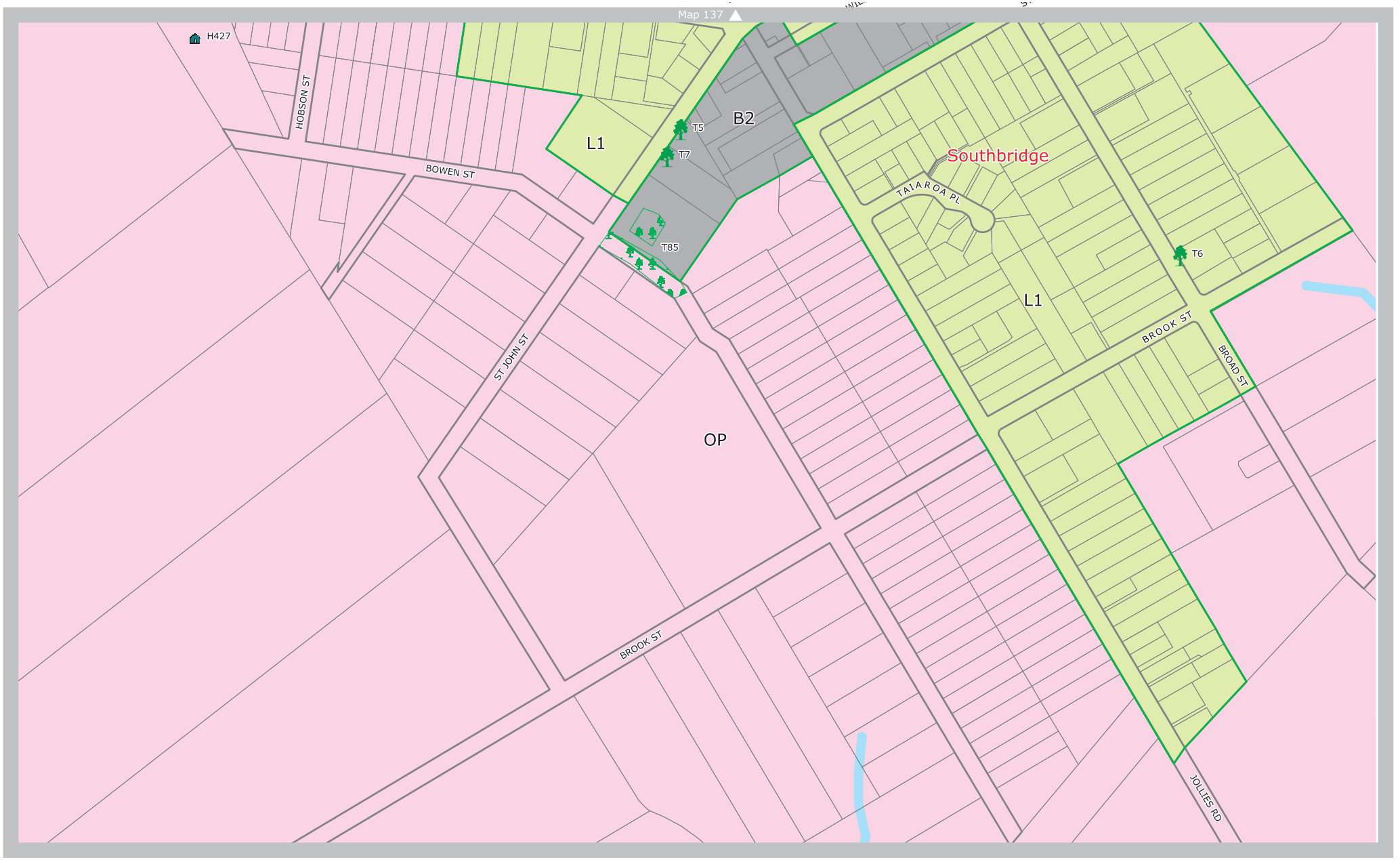
Scale: 1:4,000 at A3

100 0 m

▲ NORTH

KEY

- SDC Designated Sites
- Chch International Airport Noise Contour
- Fault Lines
- Transpower Main Lines
- Forestry Exclusions
- West Melton Observatory Zone
- Territorial Authority
  - Surrounding Districts
  - Selwyn District
- Other Designations
- NZTA Widening Designation
- Coastal Hazard
- Zones
- Outstanding Landscape
- Outstanding Natural Feature
- Visual Amenity Landscape
- Flood Zone
  - Waimakariri Flood Plain
  - Lower Plains Flood Area
  - Lake Ellesmere Flood Area



KEY

Waahi Taonga Area

Heritage Building

Protected Tree

Scheduled Site

Statutory Acknowledgement Site

State Highways

Railway

Road Parcel

Land Parcel

Water Body

Archaeological Site

Historic Heritage Site

Silent File Area

Contours Above Sea Level

160m

60m

Zones

High Country

Port Hills

Existing Development Area

Living 1

Living 2

Living X

Living 3

Living WM

Living Z

Living Z Deferred

Business 1

Business 2

Business 3

Inner Plains

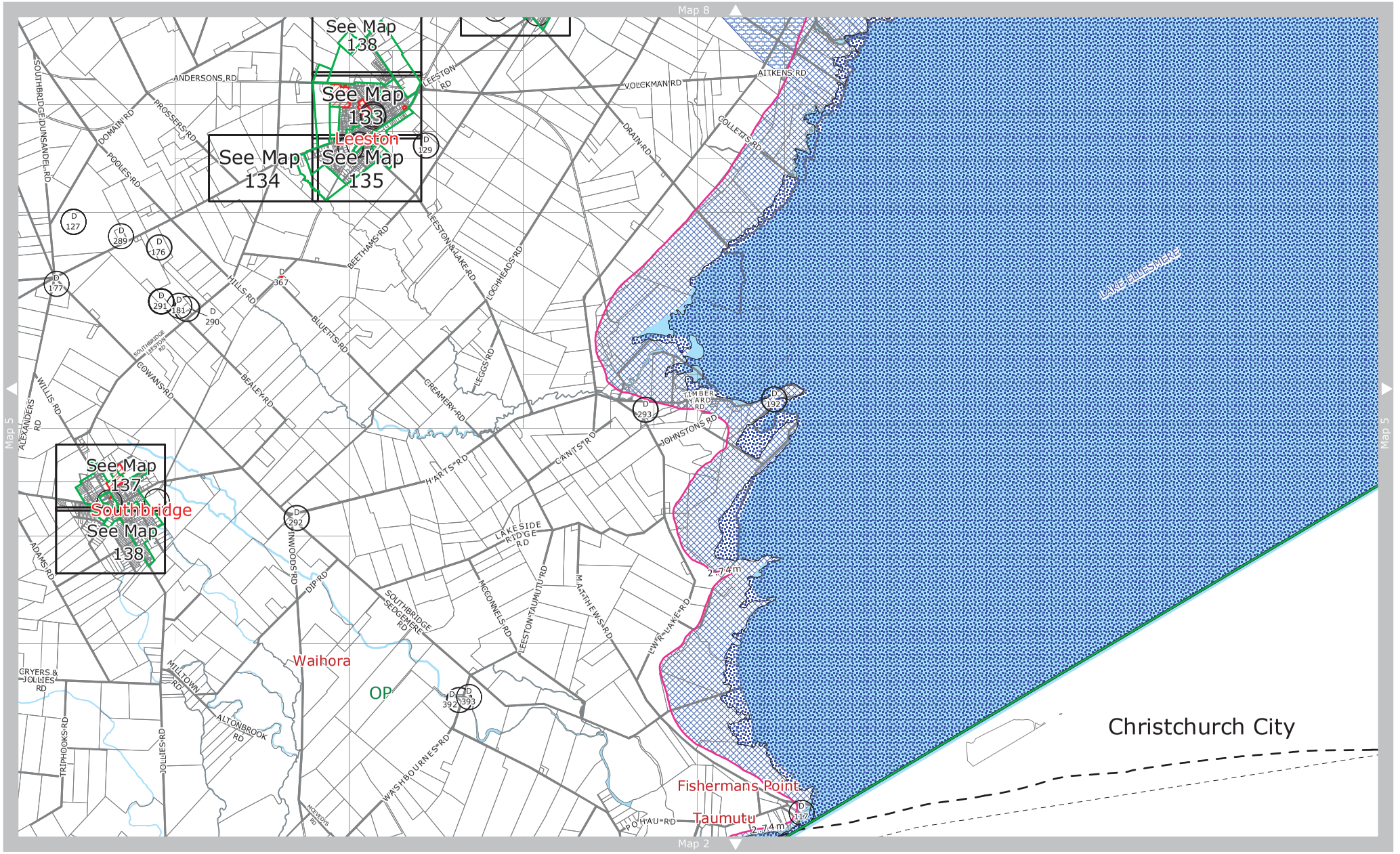
Outer Plains

Malvern Hills

Selwyn DISTRICT COUNCIL

MAP 138

SHEET 2



MAP
004
SHEET 1

SELWYN DISTRICT PLAN
Scale: 1:50,000 at A3

1000 0 1000 m

▲ NORTH

KEY

SDC Designated Sites

Chch International Airport Noise Contour

Fault Lines

Transpower Main Lines

Forestry Exclusions

West Melton Observatory Zone

Territorial Authority
- Surrounding Districts
- Selwyn District

Other Designations

NZTA Widening Designation

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- Waimakariri Flood Plain
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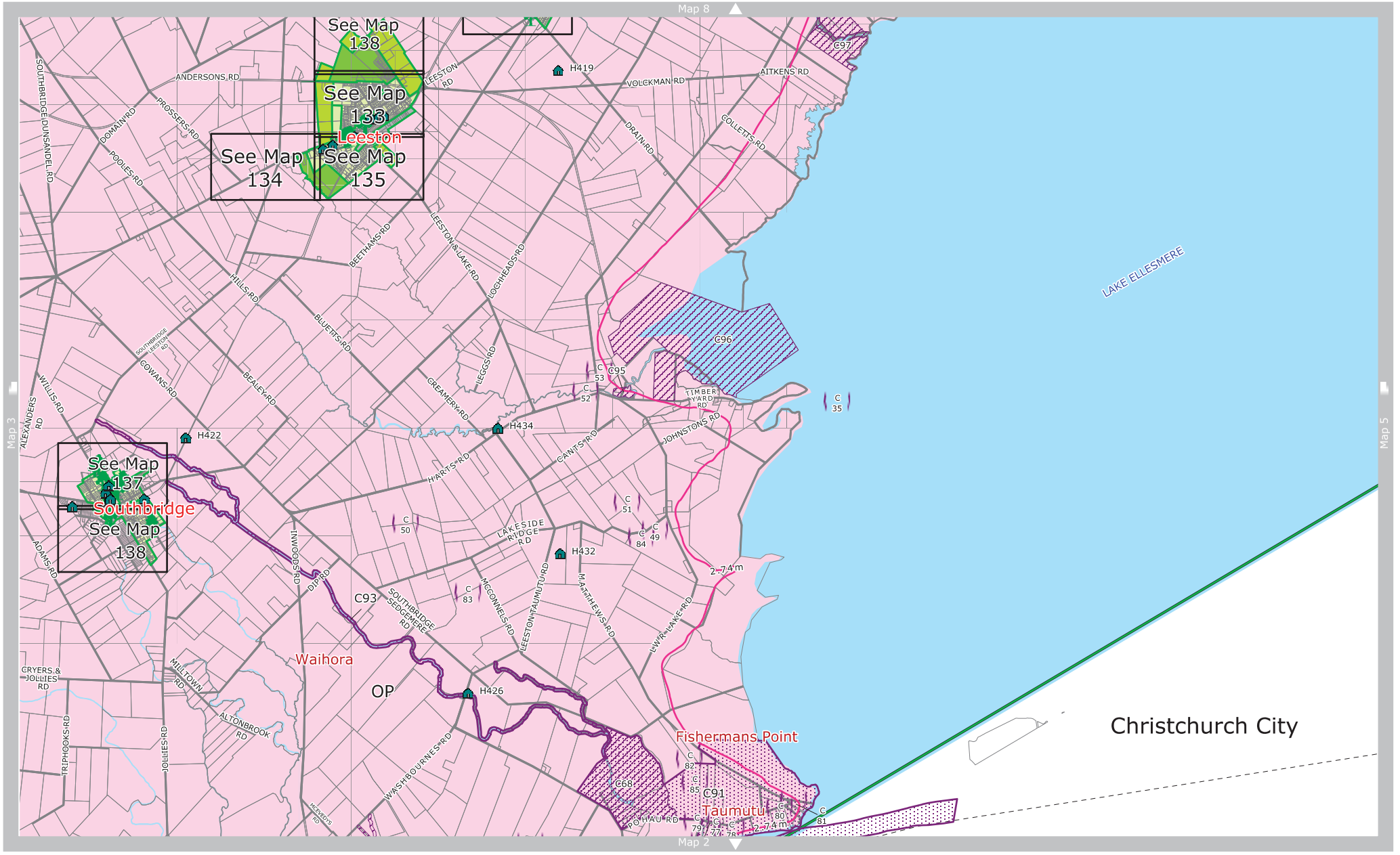


KEY

Waahi Taonga Area

Heritage Building

Protected Tree

Scheduled Site

Statutory Acknowledgement Site

State Highways

Railway

Road Parcel

Land Parcel

Water Body

Archaeological Site

Historic Heritage Site

Silent File Area

Contours Above Sea Level
- 160m
- 60m
- 2.74m

Zones
- High Country
- Port Hills
- Existing Development Area
- Living 1
- Living 2
- Living X
- Living 3
- Living WM
- Living Z
- Living Z Deferred
- Business 1
- Business 2
- Business 3
- Inner Plains
- Outer Plains
- Malvern Hills

Selwyn DISTRICT COUNCIL

MAP 004

SHEET 2

APPENDIX E

TDG Transport Assessment

Roxburgh Property Developers Ltd

Proposed Plan Change, High Street, Southbridge

Transportation Assessment Report

April 2012

Traffic Design Group

9705 transportation assessment - final

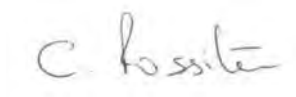
Roxburgh Property Developers Ltd

Proposed Plan Change, High Street, Southbridge

Transportation Assessment Report
Quality Assurance Statement

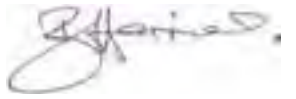
Prepared by:

Chris Rossiter
Senior Transportation Engineer



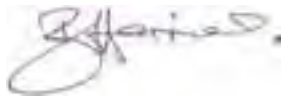
Reviewed by:

Brett Harries
Managing Director



Approved for Issue by:

Brett Harries
Managing Director



Status: FINAL

Date: April 2012

PO Box 8615, Riccarton
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New Zealand

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Executive Summary

Roxburgh Property Developers Limited proposes to initiate a private plan change to the Selwyn District Council Partially Operative District Plan. The proposal would result in approximately 6ha of rural land bounded by High Street to the east, Brook Street to the south, Bellfield Street to the west and the existing township to the north being rezoned from Rural - Outer Plains to Living 1.

The Outline Development Plan indicates that a new road will be constructed through the plan change area with connections to High Street and Brook Street. A pedestrian and cycle link is also proposed to connect the new road with Bellfield Street to improve network connectivity for these road users. It is understood that 56 residential allotments could be created under the plan change.

An analysis of the potential transportation related effects arising from the proposed residential development has been undertaken and it has been concluded that the likely increase in traffic volumes can be accommodated on the existing road network whilst retaining a high level of service and without adversely affecting the safety and efficiency of the surrounding transportation networks.

With the development also providing good pedestrian and cycle access to the existing development within Southbridge, it is considered that the proposed plan change is consistent with the transportation related objectives of the Selwyn District Plan. Accordingly, the proposed plan change can be supported from a transportation perspective.

Table of Contents

1. Introduction

Roxburgh Property Developers Limited proposes to initiative a private plan change to the Selwyn District Council Partially Operative District Plan (District Plan). The proposal would result in approximately 6ha of rural land towards the south of the Southbridge township being rezoned from Outer Plains to Living 1, which will facilitate the development of 56 residential allotments together with supporting infrastructure.

This Transportation Assessment Report assesses the potential traffic effects of the proposed plan change upon the existing transport networks, and includes a consideration of the relevant transportation policies, objectives, and recommendations within the District Plan, the Canterbury Regional Policy Statement, and the Canterbury Regional Land Transport Strategy.

Whilst this report addresses travel by private motor vehicle, it also recognises the importance of other forms of transport. Consequently consideration has also been given to public transport, walking and cycling.

2. Existing Transportation Environment

2.1 Site Location

Southbridge is located approximately 40km to the southwest of Christchurch within the Selwyn District, to the south-west of Leeston and north of Milltown as shown on **Figure 1**.

Figure 2 shows the location of the proposed plan change area in relation to Southbridge township and the existing road network, as well as the various roading hierarchy classifications defined in the District Plan. The site is approximately 500m south of the central township intersection of High Street / Gordon Street / St John Street / Taumutu Road and is bounded by High Street to the east and Brook Street to the south.

2.2 Existing Road Network

2.2.1 High Street

High Street is the main north-south route through the township, and is classified as an Arterial Road in the District Plan (between the Living 1 Zone to Brook Street). In the vicinity of the plan change area, High Street is both flat and straight, and has a 7m wide sealed carriageway that provides one traffic lane in each direction. Grassed berms of 8m width are provided on both sides of the carriageway.

Photograph 1: Layout of High Street in the vicinity of the subject site

Adjacent to the site, High Street has a posted speed limit of 50km/h which increases to 70km/h south of its intersection with Brook Street.

Southbridge Plan Change

Site Location

Traffic Design Group

1

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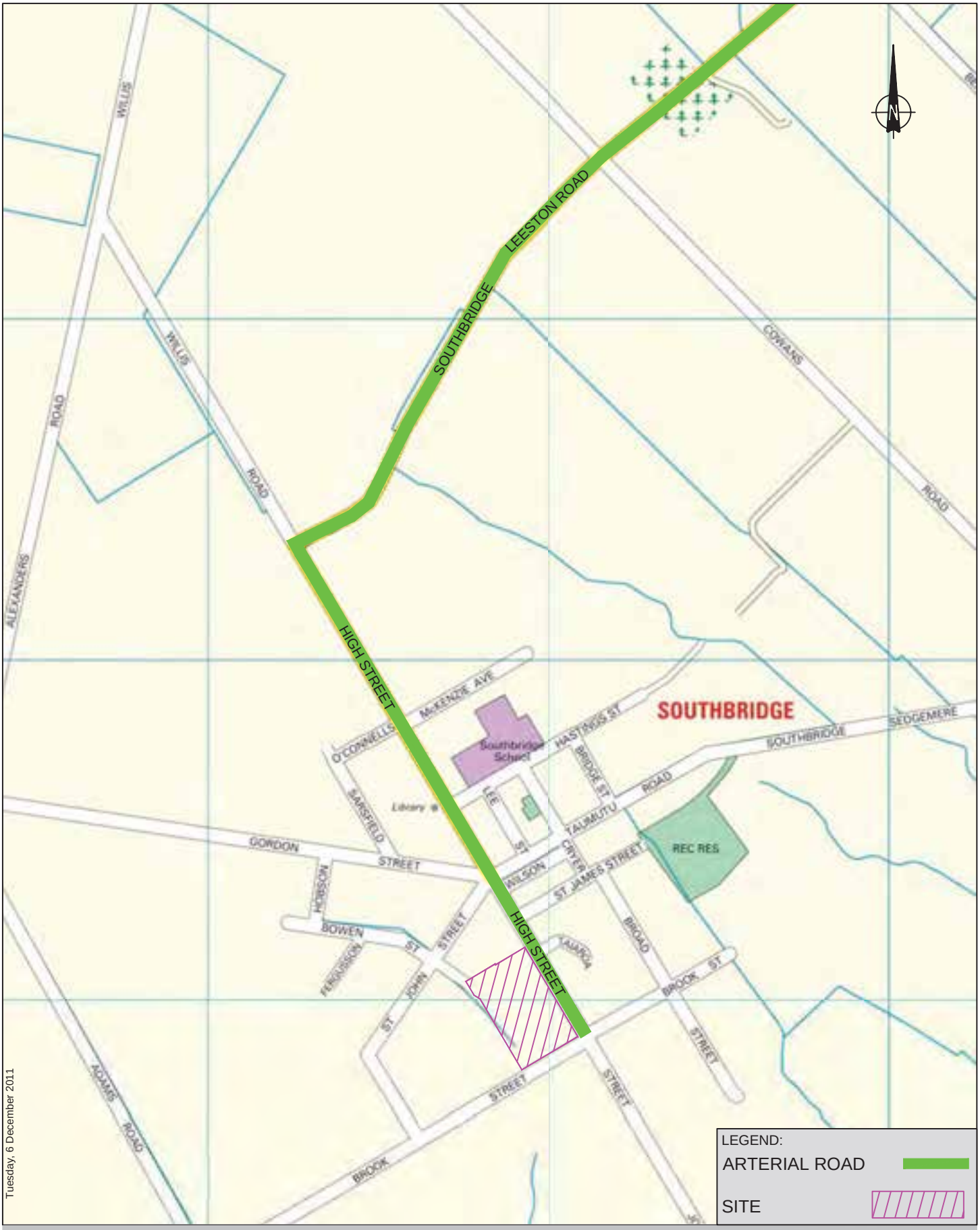

Tuesday, 6 December 2011

Southbridge Plan Change

Stie Location & Road Hierarchy

Traffic Design Group

2

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2.2.2 Brook Street

Along the frontage of the plan change area, Brook Street is flat and straight, and has a carriageway width of 4m, with 6-7m berms provided on either side. Trees are planted within the southern berm. The carriageway is sealed for about 30m from the High Street / Brook Street intersection, thereafter it is gravel formed.

Photograph 2: Layout of Brook Street in the vicinity of the subject site

Brook Street is subject to a maximum speed limit of 50km/h near the High Street / Brook Street intersection, but this increases to 100km/h at the termination point of the sealed section of carriageway.

Brook Street is not specifically mentioned within the District Plan roading hierarchy, and therefore is classified as a Local Road with a primary function of providing for property access.

2.2.3 High Street / Brook Street Intersection

Brook Street meets High Street at a crossroads intersection that has a small offset between the Brook Street approaches. The eastern approach is controlled by Give Way signs and includes a limit line. The western approach has no pavement markings or sign posts.

Sufficient area is available on the eastern Brook Street approach to allow a left turning and through travelling / right turning vehicle to queue side by side. Due to the straight and level alignment of High Street, excellent sight distance (greater then 200m) is available for drivers emerging from Brook Street.

2.3 Public Transport

On-site observations indicate that there are no public bus stops in the immediate vicinity of the site. One unused bus stop is however located on High Street within Southbridge, approximately 50m north of the High Street / St John Street / Gordon Street / Taumutu Road intersection. It is understood that services to this bus stop were discontinued in 1995.

It is also understood that in 2004/5 Environment Canterbury (ECAN) investigated the possibility of introducing a bus service for Southbridge-Lincoln, stopping at Leeston, Doyleston, Irwell and Springston but concluded at that time that the service was not affordable.

A school bus service for the Southbridge Primary School is however in operation.

2.4 Pedestrian Facilities

A 1.5m wide footpath is provided within the eastern berm of High Street. This extends from Southbridge and terminates approximately 50m south of Brook Street. No footpaths are provided on Brook Street.

Within Southbridge town centre, footpaths are provided on both sides of High Street and also along other key routes. Footpath locations are indicated in **Figure 3**.

2.5 Cycle Facilities

There are no separate cycle lanes on any of the roads surrounding the development site or within the township itself. However within the township, sufficient width is provided within the carriageways of the existing roads to allow for safe cyclist movements.

Tuesday, 6 December 2011

Southbridge Plan Change

Footpath Locations & Speed Restrictions

Traffic Design Group

3

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3. Current Traffic Conditions

3.1 Daily Traffic Volumes

Traffic counts obtained from the Selwyn District Council for roads in the vicinity of the plan change area are summarised below in Table 1:

LOCATION	AVERAGE DAILY TRAFFIC (VPD)	SURVEY DATE
Southbridge Leeston Road east of High Street	1,150	Jul-2009
Willis Road north of High Street	170	Jul-2009
High Street (between Taiaroa Place and Brook Street)	700	Aug-2009
High Street (between Willis Road and McKenzie Avenue)	1,490	Aug-2009
High Street (between Hastings Street and Taumutu Road)	1,320	Jul-2009
High Street (South of Brook Street0	480	Aug-2009
Gordon Street (between Alexanders Road and Hobson Street)	310	May-2010
Gordon Street (between Hobson Street and Sarsfield Street)	410	Aug-2009
Gordon Street (between Sarsfield Street and High Street)	490	Aug 2009
Brook Street east of High Street	150	Aug 2009
Brook Street west of High Street	30	Aug 2009
Taumutu Road (East Bridge Street)	170	Sep-2009

Table 1: Average Daily Traffic Volumes

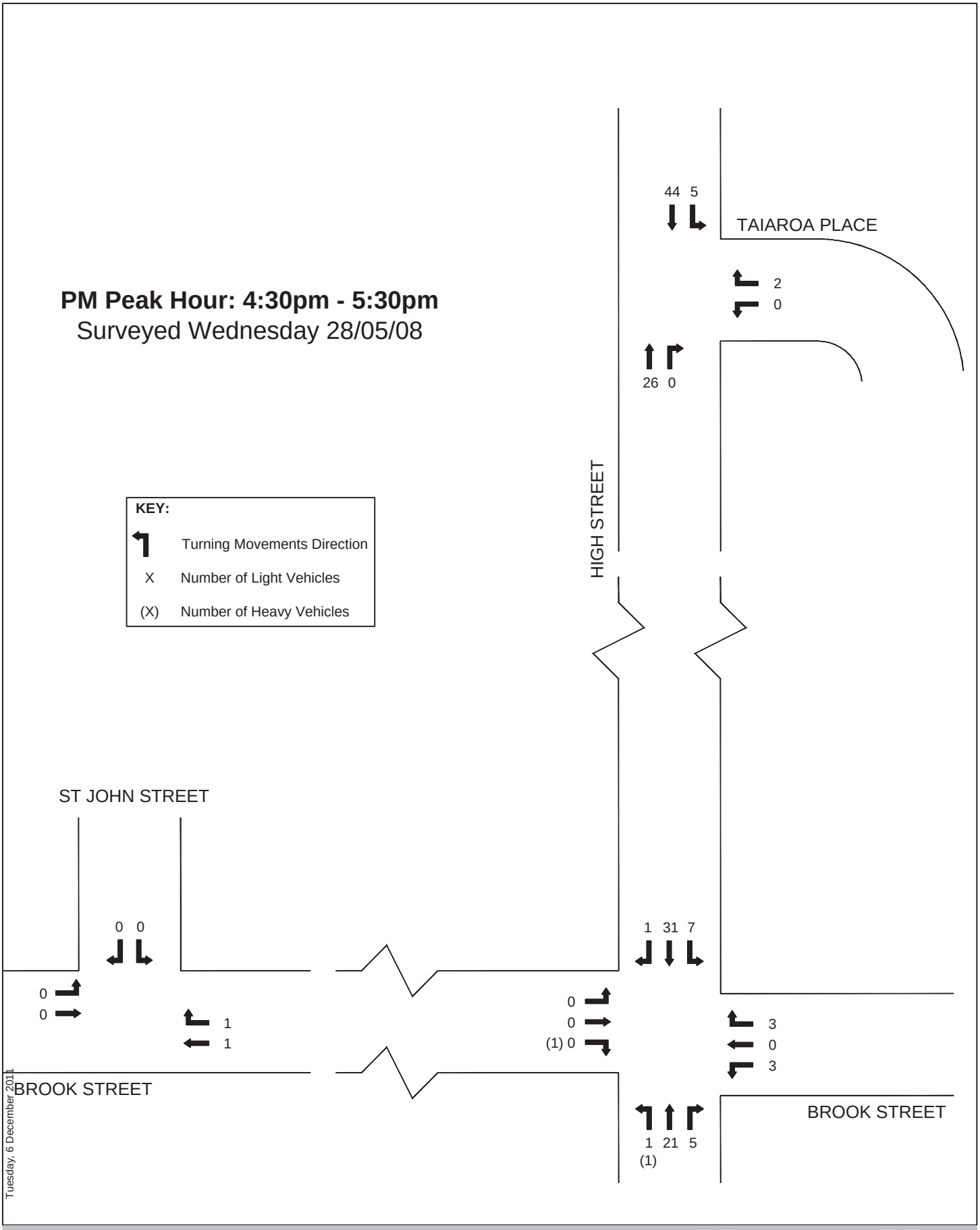
The low traffic volumes shown in the above table are typical of a rural township. The traffic volumes are dominated by the High Street traffic volumes which are primarily associated with access to Southbridge from urban centres to the north.

Based on a cordon around Southbridge, the average daily traffic generation of Southbridge is about 2,300 vehicles per day (vpd). The 2006 census data indicates that there were 264 households in Southbridge and therefore the average daily traffic generation rate is about 9 vph per household.

3.2 Intersection Turning Movements

Key intersections surrounding the development site were informally surveyed by Traffic Design Group in May 2008 during the evening weekday period of 4:30pm to 5:30pm, in order to gauge an understanding of the existing traffic flows. Low volumes of traffic were observed which reflects the generally rural nature of the area and were consistent with the SDC traffic counts the following year which suggests that the rate of traffic growth in the area is very low.

The surveyed traffic flows, illustrated as turning movement volumes are shown in **Figure 4**.



Southbridge Plan Change

PM Peak Hour Traffic Movements

Traffic Design Group

4

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4. Road Safety

The NZTA Crash Analysis System (CAS) was used to identify all reported accidents for the most recent full ten year period ending 2011. The search area included the entire Southbridge Township, bounded by Cryers Road to the west, the Adams Street / Brook Street intersection to the south, the Taumutu Road / Southbridge Sedgemere Road intersection to the east and the Southbridge Leeston Road / Cowans Road intersection to the north.

There were eight reported accidents in the ten year period ending 2011 with one of these resulting in injuries. There have been no accidents reported in 2012.

The injury accident occurred at a driveway on Willis Road when a driver entered the road without ensuring that it was safe to do so.

All of the other reported accidents are widely dispersed across the Southbridge road network and no common factors have been identified.

The number and nature of the reported accidents does not suggest any underlying road safety issues on the roading network in the immediate vicinity of the plan change area or within the township.

5. Current Levels of Service

5.1 Motorised Vehicles

Part 3 of the AUSTROADS Guide to Traffic Management, Traffic Studies and Analyses provides the following description for Level of Service A on a rural two lane road.

> *LOS A describes the highest quality of traffic service, when motorists are able to travel at their desired speed. Without strict enforcement, this highest quality would result in average speeds of 90 km/h or more on two-lane highways in Class I. The overtaking frequency required to maintain these speeds has not reached a demanding level, so that overtaking demand is well below overtaking capacity, and bunches of three or more vehicles are rare. Drivers are delayed no more than 35% of their travel time by slow-moving vehicles. A maximum flow rate of 490 pc/h total in both directions may be achieved with base conditions.*

Within the Southbridge area, the peak hour volumes on all roads are below 200 vehicles per hour (vph) and it is expected that all roads will operate with Level of Service A.

Based on the Austroads Guide, the typical capacity of an urban road is about 900vphin each direction. On this basis, the two-way capacity of High Street and Brook Street would be about 1,800vph. This is far in excess of the current traffic volumes in Southbridge where the highest recorded traffic volume is 1,300 vehicles **per day** (High Street) which equates to about 130vph in the busiest hour. It is considered therefore that both High Street and Brook Street offer an excellent level of service.

5.2 Pedestrians and Cyclists

It is considered that the existing provisions for pedestrians and cyclists are appropriate for the likely volumes and desire lines (that is, to, from and within Southbridge).

6. The Proposed Plan Change

6.1 Existing Site Use

The site is currently a green field site and used for rural purposes.

6.2 Proposed Plan Change

The proposed plan change will enable residential activity on the site and it is understood that 56 residential allotments would be developed. In order to serve the allotments, a new local road is proposed that will be located entirely within the site boundaries as shown on the Outline Development Plan (ODP) on **Figure 5**. The new road will require that the existing High Street / Taiaroa Place intersection be converted to a cross-roads and a new T-intersection is formed on Brook Street. The ODP indicates that the new road will be constructed within an 18m wide road reserve that includes corner splays at its intersections with High Street and Brook Street.

The ODP shows a pedestrian and cycle link from the new road to Bellfield Street which will improve connectivity to the west.

Figure 6 shows an *indicative* subdivision plan. This suggests that it is likely that those lots fronting onto High Street may also have direct property access onto the road, with the bulk of lots gaining accessing onto the proposed new internal road.

High Street, Southbridge
Outline Development Plan

Traffic Design Group

5

Comprised In - CT 5D/57
Total Area - 5.9286ha
Areas and dimensions are subject to survey
Landscaping and engineering is Indicative only

Reverse Sensitivity Buffer Area

Gravel Road

Water Race/Drain

DRAFT ONLY

MKL Draughting

7. Traffic Generation and Distribution

7.1 Expected Traffic Generation

The trip generation characteristics of various residential land uses around the greater Christchurch area have been surveyed by Traffic Design Group and other parties over recent years.

Based on the SDC traffic counts, it is considered that the residential lots within the proposed development will have a daily traffic generation of about nine movements per day per household (vpd/hh) with one movement per household occurring during the commuter peak hours. Although this is at the lower end of the range of residential traffic generation rates, it is considered that the predominantly rural nature of the township will contribute to a high proportion of linked vehicle trips and hence a low average traffic generation rate per household.

In the morning peak hour, it is expected that 70% of all residential vehicle movements will be outbound whereas in the evening, the dominant movement direction is return trips which account for 60% of all movements. Table 2 shows the expected traffic generation of the plan change area if it was developed with 56 households.

TIME PERIOD	TRAFFIC GENERATION		
	In	Out	Total
Morning Peak Hour	17	39	56
Evening Peak Hour	34	22	56
Per Day	252	252	504

Table 2: Traffic Generation of the Residential Allotments

Based on 56 households being developed within the plan change area, it is expected that there would be about 40 outbound vehicle movements in the morning peak hour and less than 20 inbound movements. In the evening peak hour, it is expected that there would be about 35 inbound vehicle movements and about 20 outbound movements.

With full development of the site, it is expected that the average total daily traffic generation would be about 500 vehicle movements.

7.2 Expected Traffic Distribution

An analysis of the available data from the 2006 Census 'journey to work' data shows that all the work trips generated by Southbridge involved travel to the north, with 80% of trips involving travel to Christchurch City and the remaining 20% involving travel to townships north of Southbridge in the Selwyn District. In this regard it is expected that all employment generated trips by the development proposal will involve travel to the north of Southbridge.

With about 25% of all new lots having direct access to High Street, it is expected that 25% of the traffic generation shown in Table 3 will contribute to the High Street traffic volumes south of Taiaroa Place. The remaining 75% of the traffic generation will be on the new road through the plan change area and will therefore not result in increases on High Street to the south of Taiaroa Place. These vehicles will however use High Street to the north of Taiaroa Place.

8. Effects on the Transport Network

8.1 Effects on Road and Intersection Capacity

The existing traffic volume on High Street between Taiaroa Place and Brook Street is about 70vph based on a 10% peak hour factor. With full development of the site, the traffic volume on this section of High Street is expected to increase to about 85vph in the morning and evening peaks. Even with this increase in traffic volume, the resultant peak hour traffic flows are still very small and remain well within the capacity of the road. The small increase in traffic volumes will not be discernible and its effects will be negligible.

If all the traffic generated by the site used High Street north of Gordon Street in the morning and evening periods, then the peak hour traffic volumes would increase from about 130vph to about 190vph. Although this is a large proportional increase, the numbers are low and the overall traffic volume is well within the capacity of the road. As a result, it is also expected to have negligible effect on the safe and efficient operation of the road.

Part 3 of the AUSTROADS Guide to Traffic Management, Traffic Studies and Analyses provides guidance on when detailed intersection analyses should be undertaken based on the volumes of turning and through traffic at an intersection. The expected turning volumes at the High Street / New Road intersection are below 50vph which is below the thresholds at which detailed intersection analysis would be required, and within the range at which the intersection is considered to be operating under 'free flow' conditions. On this basis, it is expected that the new intersections will operate safely and efficiently with a high level of service.

Overall, it is considered that the additional traffic associated with full development of the site will have negligible effect on the safe and efficient operation of the Southbridge road network.

8.2 Road Safety

The proposed new road meets both High Street and Brook Street at right angles. With both existing roads having straight and level alignments, it is considered that the available sight distances will exceed minimum requirements and that the intersections will operate safely.

Based upon the accident record in the vicinity of the site, it is considered that there are no particular features or factors involved that would affect, or be affected by, the proposed development, given the low traffic volumes that will be generated by the proposal and the excellent level of sight distance that will be available at the intersections connecting the site to the existing road network.

The NZTA Pedestrian Planning and Design Guide describes a methodology for assessing levels of service for pedestrians. Although the proposed plan change will contribute to increased traffic volumes on High Street, it is considered that this increase will have no effect on the level of service provided to pedestrians crossing the road.

8.3 Public Transport

At this stage, it is considered that the proposed plan change would be unlikely to result in a sufficient increase in the potential patronage level that Southbridge could support a dedicated bus route.

8.4 Pedestrians and Cyclists

The ODO shows a pedestrian and cycle link provided between the proposed new road and Bellfield Street towards the west, and there are no reasons why the Council's requirements for footpaths cannot be achieved at subdivision.

Part 4 of the Austroads Guide to Traffic Management, Network Performance, contains guidance on the recommended cycling facilities that should be provided on new roads based upon daily traffic volumes and vehicle speed. With the expected traffic volumes on all roads within the vicinity of Southbridge being below 2,000vpd and roads within Southbridge having a speed limit of 50km/h, the Guide considers it is safe and appropriate for cyclists to share the road with motor vehicles and no specific cycling facilities are required.

9. Strategic Planning Provisions

9.1 Canterbury Regional Policy Statement

The Canterbury Regional Policy Statement (RPS) aims to promote sustainable management of physical and natural resources.

Chapter 15 of the RPS includes two transportation related Objectives:

> *Objective 1: "Enable a safe, efficient and cost-effective transport system to meet present and future regional, inter-regional and national needs for transport".*
>
> *Objective 2: "Avoid, remedy, or mitigate the adverse effects on the environment of transport use and provision".*

Chapter 15 of the RPS outlines four transportation related policies:

> *Policy 1: "Protect Canterbury's existing transport infrastructure and land transport corridors necessary for future strategic transport requirements by avoiding, remedying, or mitigating the adverse effects of the use, development or protection of land and associated natural and physical resources on transport infrastructure."*
>
> *Policy 2: "Promote the use of transport modes which have low adverse environmental effects."*
>
> *Policy 3: "Promote changes in movement patterns, travel habits and the location of activities, which achieve a safe, efficient and cost-effective use of the transport infrastructure and reduce the demand for transport."*
>
> *Policy 4: "Ensure that in the provision, realignment or maintenance of transport infrastructure, adverse effects on natural resources that meet the criteria of sub-chapter 20.4 are avoided, remedied, or mitigated."*

It is considered that the proposed plan change is consistent with the Objective 1 and Policies 2 and 3 of the RPS because the development that it enables will be located close (less than 500m) to the centre of Southbridge, meaning that walking and cycling to the township are feasible modes of transport.

Although the development will contribute to an increase in traffic volumes on the road network within Southbridge, the forecast traffic volumes will remain well below the capacity of the roads and any effects due to the increased traffic volumes are expected to be negligible. Therefore, it is considered that the development enabled by the plan change will be consistent with objective 2 and Policies 1 and 4.

9.2 Proposed Canterbury Regional Policy Statement 2011

The proposed Canterbury Regional Policy Statement 2011 includes revised objectives for transportation.

> *Objective 5.2.3 – Transport Network (Wider Region)*

"A safe, efficient and effective transport system to meet regional, inter-regional and national needs for transport which:

(1) Supports a consolidated and sustainable urban form;

(2) Avoids or mitigates the adverse effects of transport use and its provision; and

(3) Provides an acceptable level of accessibility."

The associated policies encourage urban growth in a form that concentrates or is attached to existing urban area and promotes energy efficiency in urban forms, transport patterns, site location and subdivision layout. It is therefore considered that the development enabled by the plan change is consistent with these policies and the transportation objective for the wider region.

9.3 Canterbury Regional Land Transport Strategy

The Canterbury Regional Land Transport Strategy (RLTS) 2008-2018 describes a series of key result areas for achieving the vision of "*the best possible quality of life*"

The RLTS takes into account the priorities, needs and aspirations contained in the Update of the New Zealand Land Transport Strategy and the Land Transport Management Act as well other national policy documents specifically addressing vehicle emissions, road safety, walking and cycling and climate change.

The RLTS states that quality of life is supported by a land transport system that:

- Provides equitable access for all sectors of the community
- Supports a thriving economy
- Promotes a social environment that is safe and supportive
- Promotes public health outcomes, is pleasant and environmentally sustainable
- Is safe
- Involves community participation in land transport decision-making
- Is part of an integrated planning framework
- Is innovative and responsive to change

The RLTS identifies five key result areas that represent a balanced approach to achieving this vision. These areas are:

- Providing transport options
- Roads
- Demand management
- Land use
- Freight

It is considered that the development enabled by the plan change is consistent with the RLTS in the following ways:

- A safe pedestrian and cycle environment will be provided within the site. Along with the existing pedestrian and cycle facilities, this promotes the use of these modes for travel to and from the centre of Southbridge.
- The site will be well connected to the existing road network. The alignments of High Street and Brook Street will ensure that good sight distance are achieved at the proposed intersections and ensure that the safety of the road network will not be compromised.

9.4 Selwyn District Plan

The transportation related objectives are contained within Part B of the Township Volume of the Selwyn District Plan and are replicated below.

> ***Objective B2.1.1***
> *The safe and efficient operation of the District's transport networks is not impeded by adverse effects from activities on surrounding land or by residential growth.*
>
> ***Objective B2.1.2***
> *Adverse effects of transport networks on adjoining land uses.*
>
> ***Objective B2.1.3***
> *The establishment of land uses is to be avoided where they may give rise to "reverse sensitivity" effects on the operation of transport networks.*
>
> ***Objective B2.1.4***
> *The future, unrestricted operation of Christchurch International Airport is not jeopardised by "reverse sensitivity" effects from residential development in the Selwyn District.*
>
> ***Objective B2.1.5***
> *Adverse effects of land transport networks on natural or physical resources or amenity values are minimised.*

Although the development enabled by the proposed plan change will result in higher traffic volumes within Southbridge, it is considered that any effects due to the additional traffic will be negligible because all roads and intersections currently operate with a high level of service and the forecast traffic volumes will remain below the thresholds at which detailed analysis of performance is considered necessary. Therefore, it is considered that the development enabled by the Plan change will not affect the safe and efficient operation of the transport network or contribute to adverse effects on the transport network. However, it is recommended that Give Way sign controls are installed on the western Brook Street approach to High Street.

The District Plan outlines the expected environmental outcomes from the policies and methods associated with the transportation related objectives. The following table discusses each expected outcome in relation to the development enabled by the proposed plan change.

Expected Environmental Outcome	Comments
Strategic Roads are safe and efficient transport routes for "through" traffic travelling across the District.	The Southbridge road network has sufficient capacity to accommodate the additional traffic arising from the plan change area with negligible effects. Consequently, the through movement of vehicles on strategic routes in the Southbridge area is not expected to be compromised.
Other roads in the District serve all their functions safely and efficiently.	The Southbridge road network has sufficient capacity to accommodate the additional traffic arising from the plan change area with negligible effects. Consequently, it is expected that roads within Southbridge will continue to operate safely and efficiently.
The visibility of roads, intersections, vehicular accessways and railway crossings is not impaired.	The proposed connections to the existing road network will not impair visibility of roads, intersections or vehicular accessways.
Roads are designed, maintained, and if necessary, upgraded to the standard required for their traffic volume, traffic type and the amenity values of the zone.	The roads within the site will be designed to a standard appropriate for their use in accordance with Selwyn District Council standards.
Adverse effects of residential and business growth in Selwyn District on road links into Christchurch City are addressed.	The adverse effects of the development on roads to Christchurch will be less than minor.
Heavy traffic bypasses townships, where practical.	The proposed residential development will not contribute to heavy vehicle traffic volumes.
An increase in separate cycleways and walkways in townships.	Footpaths will be provided on one side of all the internal roads within the development. Separate cycle ways are not proposed because of the low vehicle speeds within Southbridge and the prevailing low traffic volumes.
No increase in the extent to which main transport routes "bisect" townships.	The development of the subject site will increase traffic within Southbridge but this is not expected to create any severance issues.
Fewer impacts from the construction, maintenance and repair of roads or other utilities in road reserves, on people and the environment.	The development is not expected to affect maintenance and repair requirements for the Southbridge road network.
New settlement and residential activities occur closer to places of work or existing townships.	The site is within 500m of the centre of Southbridge Township.
The number of walkways and cycleways increase that are effective in providing alternative linkages within townships.	The ODP indicates that a new road will be constructed through the plan change site with a new pedestrian link from this road to Bellfield Street. With footpaths on all new roads, the development will increase the number of walkways within the area and improve pedestrian and cycle connectivity.

Table 3: District Plan Objectives – Expected Environmental Outcomes

Based on this assessment, it is considered that the development proposal will achieve the desired outcomes of implementing the transportation policies and objectives of the District Plan.

9.5 Selwyn District Plan Transportation Rules

No new transportation related rules are proposed within the plan change and it is expected that the plan change area will be developed on the basis of the existing transportation rules of the Selwyn District Plan.

An initial review of the proposed Outline Development Plan has been undertaken, which shows that the majority of the Rules can be met. There is the potential that the separation distances of individual lot accesses from intersections may not be met in the vicinity of the High Street / Brook Street and High Street / Taiaroa Place intersections (Table E13.5 of the District Plan) although it will be possible to provide accesses which "most nearly" comply. There will also be a non-compliance with the spacing of the High Street / Brook Street, Brook Street / Site Access and Brook Street / Bellfield Street intersections where at least 125m separation is required and around 65m would be provided. Given the very low traffic volumes on these roads, this non-compliance is unlikely to give rise to any adverse effects.

A number of the District Plan Rules are proposed to be amended under Council's proposed plan change. However these do not affect the nature or extent of the non-compliances noted above, other than the separation distances between intersections on Local Roads reduce to 75m from 125m and thus the situation on Brook Street is improved.

It is not considered appropriate to undertake a full assessment against the District Plan Rules at this stage, rather this should be undertaken when subdivision consent is sought.

10. Summary and Conclusions

This Transport Assessment has identified, evaluated and assessed the various transport and access elements of a proposed plan change to enable residential development on approximately 6ha of rural land towards the south of Southbridge.

It is considered that the likely connections between the site and the existing road network will allow for good integration of the site with its surrounds. Consideration has also been given to the needs of cyclists and pedestrians, and it is concluded that the likely generated volumes of motorised vehicles can be accommodated on the surrounding road network whilst retaining a good level of service and without adversely affecting the safety and efficiency of the surrounding transportation network.

An assessment of the proposed plan change against the Canterbury Regional Policy Statement, Proposed Canterbury Regional Policy Statement, Canterbury Regional Land Transport Strategy and the objectives of the Selwyn District Plan has been undertaken. It has been concluded that the proposed plan change is consistent with the regional planning objectives and also the District Plan objectives.

Having due regard to the provision for motorised vehicles, public transport, pedestrians and cyclists, it is considered that the proposed plan change will have negligible effects upon the adjacent transport networks and can be supported from a transportation perspective.

Traffic Design Group
April 2012

APPENDIX F

Outline Development Plan

High Street, Southbridge
Outline Development Plan

Outline Development Plan Area

Existing Road

Proposed Road Design

Local Road

Neighbourhood Reserve

Potential Stormwater Treatment / Detention

Pedestrian and Cycle Links

Reverse Sensitivity Buffer Area

North

0 50 100 Metres

Scale 1:2500 (A4)

APPENDIX G

Opus Servicing Reports

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6 April 2013

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3c1004.10/101

Dear Murray

Southbridge Servicing Assessment for Plan Change 34

We have completed our water supply and wastewater disposal servicing assessment for Plan Change 34: Southbridge High Street (PC34).

Neither the water supply or the wastewater system have sufficient capacity to accommodate the additional 56 residential lots proposed by PC34, as summarised below.

Water Supply

The existing peak water demand utilises the full installed and consented capacity of the water supply. Some degree of demand management may be required from time to time in order to accommodate additional demand from the 21 existing half rated connections. Existing water demand and losses are high. If this were to be addressed it would be possible to service the proposed addition of 56 connections. There is potential to increase pumping capacity from the existing bores to service the additional connections either with or without an associated change in consented rates and volumes. It is noted that the system has limited redundancy and cannot deliver an adequate supply of water for fire fighting. It may be an appropriate time to consider construction of a third bore source to provide both increased capacity and improved level of service.

Wastewater System

While the capacity of the existing infrastructure is not yet fully utilised it is fully allocated (or overallocated). There is no scope to accommodate the proposed additional 56 connections without compromising design standards and accepting environmental and financial risks. The Leeston wastewater treatment plant (WWTP) has no surplus design capacity and operation of this plant is already problematic with regard to nitrogen loadings. If increased treatment capacity could be provided at Leeston, perhaps as part of a wider growth strategy or system upgrade, then the capacity of the Southbridge Broad Street pumping station and rising main to Leeston becomes the constraint. This effectively limits growth in Southbridge to that already allowed for by the existing allocated connections. There is already potential for subdivision of existing Living zoned land in Southbridge to create demand for connections in excess of the present system

design capacity. A small peak capacity increase could potentially be achieved by installing a second progressive cavity pump at Broad Street, but if treatment and disposal capacity is provided at Leeston and growth is anticipated in Southbridge then a longer term view to increasing transfer capacity should be taken. This would require significant capital investment to construct either a second rising main and pumping station or potentially an intermediate pump station for two stage pumping through the existing rising main.

Conclusion

The ability to service PC34 is dependent on Council's strategic view of accommodating growth in the wider Leeston area by providing additional wastewater treatment and disposal capacity. If demand planning indicates that additional WWTP capacity be provided then upgrades of the Southbridge water supply capacity and wastewater pumping capacity should be considered in the context of anticipated population growth in Southbridge. Minor upgrades and level of service compromises may be an acceptable solution if no growth beyond proposed PC34 is anticipated. If continued growth is expected then PC34 may be the catalyst for a new bore water source and significant increase in wastewater transfer capacity. This would also provide opportunity to make level of service improvements (eg fire fighting capacity).

Please find our assessment attached. We are happy to meet and discuss this with you.

Yours sincerely
Opus International Consultants

Paul Carran
Senior Engineer

1 Water Supply Assessment – Plan Change 34: High Street Southbridge

1.1 Overview

Water is abstracted from two bores (L36/0421 and M36/0698) with a combined installed pumping capacity of about 37 L/s. Water is pumped directly to the distribution network. There is no treatment and no storage reservoir.

Plans for the proposed PC34 development area indicate the creation of 56 residential lots. No details of the proposed water reticulation layout have been provided but based on the supplied draft roading plan it is anticipated that a new main would connect at the High Street / Taiaroa Place intersection, run through the site to Brook Street and return to the High Street / Brook Street intersection. A rider main along the High Street frontage would be appropriate. The existing DN100 High Street main is in close proximity to the Taiaria Place bore source. It is unlikely that any network upgrade would be required.

Water meter records to 1 July 2012 and SCADA records to 16 April 2013 have been reviewed.

1.2 Consideration of Demand and Capacity

1.2.1 Annual Demand

Annual demand is typically around 230,000 m³ , perhaps up to about 275,000 m³ in a peak year, which is within the consented annual volume of 360,000 m³ (CRC010893.1). The surplus consented annual volume would allow for about 80 additional connections assuming similar demand patterns. It is noted that annual demand has been significantly lower (<200,000 m³) over the last couple of years. It is too soon to say if this reflects a genuine shift in usage patterns or is indicative of climatic variation from year to year.

1.2.2 Peak Day Demand

Peak day demand reached 2,194 m³ in January 2013, marginally above the consented daily volume of 2,140 m³. Peak days of around 2000 m³ were also recorded in January 2008 and January 2009. Implementation of demand management techniques (eg hosing restrictions) may be necessary from time to time as existing half rated connections are taken up. A further modest increase in the number of connections would likely be manageable but summertime restrictions would be required more frequently.

1.2.3 Pump Capacity and Peak Hour Demand

The installed pump capacity is nominally 37 L/s. Recorded flows over the last five years have infrequently exceeded 33 L/s but have on occasion been as high as 40 L/s (suggesting a drop in system pressure at times of peak demand). The uptake of existing half connections could push peak flow demand to this level more frequently. If this

adversely impacted on system pressure to an unacceptable degree some form of time based water use restrictions would act to manage demand within installed capacity. Peak demands from a further modest increase in the number of connections would increase the frequency of operation at (or slightly above) nominal installed capacity. The consented rate of take is 43 L/s thus a slightly larger pump could be installed, otherwise time based water use restrictions would be required more frequently and for longer over the summer months.

There is no pump capacity redundancy, ie failure of a bore pump would severely impact the available supply capacity. If the larger bore pump (26 L/s, High St) was inoperable then the smaller pump (11 L/s, Taiaroa Pl) would not be able to supply an average day demand peak.

1.2.4 Fire Fighting

Further, there is no allowance for fire fighting water supply. This would require 25 L/s to be available in addition to 60% of the peak hour flow rate for residential land use (FW2). If a higher standard of fire protection (eg FW3) is desired in the business zone then 50L/s would be required in addition to 60% of the peak hour flow rate. Council Policy W211 requires that any capital works be designed to meet fire fighting requirements (at the discretion of the Asset Delivery Manager). An upgrade of the water supply would thus require consideration of fire fighting capacity improvements.

1.2.5 Demand Management

It is noted that existing water demand in Southbridge is relatively high. The night flow is high at around 20 L/connection/hour (2 L/s). Average and peak day demands are up to 2100 and 6400 L/connection respectively. Demand management measures may be successful in reducing water use, freeing up installed capacity for new connections.

1.2.6 Hydraulic Model

The recently developed hydraulic model of the Southbridge water supply has been used to consider the impact of a further 56 residential lots. This confirms that the network pressure falls below the pressure level of service (310 kPa) over about half of the supply zone at times of peak demand. This is related to demand exceeding supply capacity rather than head losses through the network.

1.3 Other considerations

1.3.1 Groundwater Allocation

Southbridge is in the Rakaia Selwyn Groundwater Allocation Zone. This is presently identified as a Red Zone meaning that water resources are fully or over allocated. Additional water is normally available for community supply purposes where this can be justified. In this case an increase in the annual volume allocation is not required, but the flow rate and daily volume limits may need to be increased.

1.3.2 Aquifer Testing

No aquifer test records for the wells are available from www.ecan.govt.nz. It is considered unlikely that comprehensive testing has been undertaken. An application to increase the rate of water take from these bores may require a reviewed aquifer test in the supporting assessment of environmental effects.

1.3.3 Groundwater Quality

The two water supply bores at High Street and Taiaroa Place are 27m and 25m deep respectively. It is assumed that these bores supply secure groundwater that does not require treatment to achieve DWSNZ compliance. PC34 may provide an opportunity to identify and set aside a suitable site for a new deeper bore, with sufficient land to construct a small treatment plant headworks should this be required in future.

1.3.4 Other Improvements

The Southbridge PHRMP identifies that there is no provision for connection of a portable generator at the Taiaroa Place bore and recommends that this be considered. Any planned upgrade works at this site should take this into account.

1.4 Options for Servicing PC34

There are several potential approaches to servicing the proposed PC34 development.

1) ***Demand Management***
   - Implement and sustain effective demand management techniques such that peak day volume and peak hour flow demands are reduced, allowing additional connections to be serviced with the existing installed pump capacity and within existing consent limits.
   - This does not address redundancy or fire fighting capacity issues.
   - Potentially an unpopular option with existing residents who would be required to moderate their usage in order to allow for development.

2) ***Pump Upgrade and Demand Management***
   - Upsize existing pump(s) to increase capacity to consented limit. There may be associated power supply and control system upgrades required.
   - Demand management, in particular to control peak day volumes within consented limit.
   - This does not address redundancy or fire fighting capacity issues.

3) ***Pump Upgrade and Consent Change***
   - Obtain consent to increase peak hour flow and peak day volume from the existing bores to a suitable level – subject to availability of additional yield from existing bores without adverse effects (not investigated).
   - Upsize existing pump(s) to increase capacity to new consented limit. There may be associated power supply and control system upgrades required.
   - This does not address redundancy or fire fighting capacity issues.

4) New Source

- Drill and test a new (deeper?) bore. Obtain necessary water take consent. Install pumping and control system.
- This offers potential benefits in terms of supply capacity redundancy and fire fighting capacity. A deeper bore may also be better protected from contamination in the longer term.

1.5 Conclusion

The existing water supply infrastructure has sufficient capacity to meet the current level of consumer demand (342 connections) but cannot accommodate growth over and above uptake of the existing half rated connections (21 connections) unless effective demand management measures are introduced and sustained .

Capacity is constrained by the size of the installed bore pumps and the consented flow rate and daily volume. A pump upgrade, possibly with associated resource consent changes, may be sufficient to provide additional capacity to service PC34. Construction of a new water source to provide the required capacity increase offers opportunity to make level of service improvements (redundancy and fire fighting) and manage water quality risks.

A longer term supply strategy for the existing and potential future serviced area needs to be considered.

2 Wastewater Assessment – Plan Change 34: High Street Southbridge

2.1 Overview

Southbridge wastewater is predominantly collected by a gravity sewer system terminating at a pump station on Broad Street. Outlying areas are serviced by pressure sewerage systems. All wastewater is pumped from Broad Street to the Leeston wastewater treatment plant (WWTP). No emergency storage is provided at the pump station. There is sufficient volume within the gravity sewer pipes to provide at least four hours emergency storage.

The Broad Street Pump Station was designed to serve 350 households. As at 1 September 2012 there were 302 actual connections with a further 94 rated connections giving a total of 396 rated connections. Thus the design capacity of the pump station is already potentially exceeded by 46 connections (13%).

No details of the proposed wastewater reticulation layout have been provided but based on the supplied draft roading plan it is anticipated that a new gravity sewer would connect to the existing DN150 High Street main (depth to invert approx 2.8m). The nominal capacity of the main equates to 250 households. With approximately 190 existing connections in the subcatchment the addition of 56 new connections would bring this line to capacity. This may be undesirable as it would preclude connection of existing half rated properties at the upper end of the catchment. A preferable alternative would be to discharge to the lower High Street catchment (south of Brook Street) (depth to invert approx. 2.0m).

2.2 Consideration of Pump Station Capacity

2.2.1 Design Criteria

The following flow rates have been calculated by applying the SDC Engineering Code of Practice design assumptions:

	Peak Flow m³/day	Peak Flow L/s	Cumulative Flow L/s
350 original connections	1040	12.0	
46 additional connections (existing)	137	1.6	13.6
56 proposed connections (PC34)	166	1.9	15.5

Thus the required pumping capacity would increase by about 2 L/s, from 13.6 L/s to 15.5 L/s, if the proposed PC34 development proceeded.

2.2.2 Board Street Pump Station Capacity

The pump station capacity is limited by the size of the pumps and associated rising main (DN160 PE). Head losses along the 9.7km long rising main are significant. The rising main was sized to keep the head loss low enough to allow use of a submersible centrifugal pump, but this does not achieve the required flushing velocity so a high head progressive cavity pump has also been provided to regularly pump at a higher rate to flush the line.

The duty pump capacity (measured October 2004) is 12.2 L/s @ 490 kPa. The flush pump can deliver 16 L/s @ 780 kPa and operates every 14 pump cycles or after 12 hours. Correlation of daily volumes and pump hours suggests that the duty and flush pump capacities are 10 L/s and 17 L/s respectively. It is recommended that this data be validated any reduction in duty pump capacity be investigated.

2.2.3 Ability to meet current demand

The current dry weather flow is well in excess of the average dry weather flow assumed for design. This is likely to be associated with groundwater infiltration given the high water table in this locality. However, the actual peaking factor is less than that assumed for design so the peak flow per connection is less than that adopted for design purposes. This means that the existing 46 additional connections can be satisfactorily accommodated by the existing pump station.

2.2.4 Ability to accommodate additional demand

The capacity of the duty pump is already exceeded by the design flow for the existing allocated connections, by about 10%. This can be managed adequately, but there is no surplus capacity to accommodate any additional connections to the system. The existing flush pump has greater capacity, sufficient to accommodate the increased flow proposed from PC34, however reliance on the flush pump capacity increases the risk of an overflow event as there is insufficient standby capacity.

2.3 Consideration of Leeston WWTP Capacity

A further constraint is the capacity of the Leeston WWTP to accept and treat additional wastewater from Southbridge.

The design population for the WWTP is 3600 (nominally 1300 connections). This is split between Leeston (850 connections), Doyleston (115) and Southbridge (350). Currently there are 1246 full and half rated connections in total; Leeston (734 connections), Doyleston (116) and Southbridge (396). The number Southbridge rated connections already exceed the Southbridge allocation. Anticipated (zoned) growth at Leeston will require (and exceed) the remaining connections so these are not likely to be allocated to Southbridge to support PC34 growth.

The point source discharge of nitrogen from community sewerage systems is presently under scrutiny in the context of the Canterbury Water Management Strategy. The Zone Implementation Programme (ZIP) will set nitrogen load limits for community sewerage systems and require demonstration of industry best practice for treatment and disposal of wastewater to minimise nitrogen and phosphorous leaching losses. Until nutrient limits are set, there is a risk that future treatment plant capacity will be limited. Council

is addressing this matter but it is unlikely that additional wastewater loading would be acceptable until such time that current issues are resolved.

Even if additional pumping capacity were to be provided at Southbridge there is no capacity to accept and treat the additional wastewater at the Leeston WWTP.

2.4 Other Considerations

2.4.1 Central Plains Water

The Central Plains Water (CPW) irrigation scheme is anticipated to affect (increase) groundwater levels downgradient of the irrigated area. This is difficult to quantify with any degree of confidence but must be considered. A higher ground water level may increase infiltration to the wastewater pipe network, thus increasing the volume of wastewater needing to the pumped to Leeston for treatment and disposal.

2.5 Options for Servicing PC34

There is no simple, low cost option for servicing additional wastewater connections at Southbridge, which would require:

i. provision of additional treatment capacity at the Leeston WWTP, and

ii. provision of additional pumping capacity at Southbridge.

Assuming that additional WWTP capacity could be developed at Leeston as part of a wider programme of work necessary to support anticipated growth in the Leeston area the shortage in transfer pumping capacity at Southbridge could be approached in a variety of ways.

1) Accept additional connections to existing system – no upgrade

The existing peak wastewater load is considerably less than the existing system design capacity, even when the full uptake of connections is factored in. Originally designed for a peaking factor of 5 the existing over allocation of connections has already dropped this factor to about 4.5. Addition of 56 connections (PC34) would see this factor further reduced to 3.9.

Advantages

- No capital works cost

Disadvantages

- Departure from CoP

Risks

- Longer-term deterioration of pipe network could see progressive increase in infiltration that would ultimately produce flows in excess of pump station capacity.
- Existing pump station capacity may decrease over time as the pipeline friction factor increases. There is already some evidence of a reduction in capacity since commissioning.
- Uncertainty around groundwater level effects that may result from Central Plains Water and adversely impact on infiltration.

2) *Accept additional connections to existing system – provide storage*

The additional 56 connections (PC34) would potentially generate peak flows of up to 2 L/s or 166 m³/day. If sufficient storage could be provide to contain the additional wastewater production then the existing Broad Street pump station could deliver this to Leeston when surplus capacity becomes available. An indicative storage capacity of 500 m³ has been considered here, being three days storage. This assumes that peak flows from the system would not occur for more than three consecutive days before stored effluent could be pumped to the WWTP.

Advantages

- Utilises existing pump station and rising main without upgrade.

Disadvantages

- High capital cost for providing storage
- Potential odour problems
- Potential adverse impact on Leeston WWTP (effluent quality)
- High groundwater level will create difficulty for constructing storage

Risks

- An extended period of wet weather with associated high levels of inflow and infiltration may generate peak flows for longer than allowed for by storage resulting in overflows.

3) *Accept additional connections to existing system – utilise Flush Pump*

The existing Flush Pump capacity (16 L/s) is sufficient to accommodate the design peak wastewater flow (15.5 L/s). The pump station control logic could configured to operate the Flush Pump exclusively when pump station inflows exceed the Duty Pump capacity (12.2 L/s).

Advantages

- Utilises existing pump station and rising main without upgrade.

Disadvantages

- No pump capacity redundancy in event that Flush Pump fails
- The Flush Pump is a progressive cavity (PC) type of pump which is not so effective for pumping solids and sharp objectives which can cause damage.
- Higher maintenance costs for PC pump.

Risks

- There would be pump redundancy up to 12.2L/s as at present (Flush Pump operates as standby), but at peak times when the Flush Pump is needed to provide capacity there would be insufficient standby pump capacity. This may result in an overflow.
- A progressive cavity pump is prone to damage from solids so pumping the entire peak flow, potentially over several days may increase vulnerability to pump failure.

4) *Accept additional connections to existing system – duplicate Flush Pump*

As above, but with duplication of the progressive cavity Flush Pump (16 L/s).

Advantages

- Addresses risk by providing pump capacity redundancy

Disadvantages

- Capital works cost
- Site configuration may be awkward

Risks

- A reduction in risk relative to previous option.
- Potential for creating a legacy of unduly high operation and maintenance costs should pumping of solids cause recurrent pump damage

5) Reconfigure rising main with an intermediate pump station

The technical issues of this option have not been given specific consideration but it may be possible to construct an intermediate pump station such that a higher flow rate through the existing rising main can be achieved by pumping in two stages.

Advantages

- Increases capacity without construction of a second rising main
- Restore design capacity for existing over allocation of connections
- Provide capacity for further growth

Disadvantages

- Requires a second pumping station to be constructed
- May require existing pumps to be changed
- Capital cost of new works
- Operation and maintenance costs for two pump stations

Risks

- SDC may have to carry the cost of additional capacity for an extended period of time if future growth is slow.

6) Require construction of new wastewater pump station and rising main

The additional 56 proposed connections (PC34) plus the existing 46 additional approved connections exceed the design capacity by 30%. Development at Southbridge will be constrained until such time that additional pumping and rising main capacity is provided. It may be appropriate to duplicate the existing system and provide further capacity for growth.

Advantages

- Restore design capacity for existing over allocation of connections
- Provide capacity for further growth

Disadvantages

- High capital cost

Risks

- SDC may have to carry the cost of additional capacity for an extended period of time if future growth is slow.

2.6 Conclusion

The existing wastewater infrastructure has been designed to serve up to 350 properties based on the Code of Practice design requirements and is limited by the pumping capacity of the sole pumping station that transfers wastewater to the Leeston wastewater treatment plant (WWTP) and by the capacity of the Leeston WWTP to receive additional wastewater loads.

There are presently 396 rated connections (including 94 half rated properties) so the design capacity would be exceeded if all potential connections were taken up. This over-allocation can be managed; however, no additional connections can be accommodated without (further) compromising design standards and creating a higher level of environmental and financial risk to Council.

Options for addressing the Leeston WWTP limitations are beyond the scope of this assessment. The issues are complex and any development of the WWTP would need to consider growth planning for the wider Leeston area.

Should additional treatment and disposal capacity be provided for Southbridge as part of a wider upgrade strategy then a corresponding increase in transfer pumping capacity will be required. A small increase (to serve PC34 alone) could potentially be achieved by duplicating the higher capacity flush pump, but this would again leave the Southbridge wastewater system with no capacity to accommodate future growth. Strategically, a larger capacity increase would be preferable, requiring a new pump station and rising main, or possibly two stage pumping along the existing rising main.

Relaxation of design standards to allow additional connections, based on apparent under-utilisation of the existing assets, carries a significant risk for Council. A comprehensive study of actual and potential future loadings would need to be undertaken to support any application. This would need to take a very conservative approach to quantifying the potential impact of Central Plains Water on groundwater levels and infiltration. Council risk adverse environmental and financial impacts should long-term wastewater volumes exceed the capacity of the existing pump station, which cannot readily be upgraded.

Provision of storage is not considered to be a feasible option.

Opus International Consultants

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Date:	6 May 2013

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20 June 2014

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Dear Murray

Southbridge Wastewater Upgrade Options - Cost Estimates

In March 2014 Opus International Consultants produced capital cost estimates for options to upgrade the Southbridge wastewater facilities in response to the PC34 application. Selwyn District Council (SDC) has now commissioned Opus to develop operational and maintenance costs for the same options. For completeness both the capital and operational costs are presented in this report.

Rough order cost estimates have been prepared for the following options, which are described in the *Southbridge Servicing Assessment for Plan Change 34,* Opus report dated 6 April 2013:

a. Provide storage (500m^3)
b. Duplicate flush pump
c. Reconfigure rising main with an intermediate pump station
d. Construction of new wastewater pump station and rising main

Our rough order cost estimates and costing assumptions are presented below and a detailed breakdown of the costings are attached. All estimates are rough order cost (accuracy ± 30%) and a 20% contingency is included.

As-built drawings of the pump station and rising main, and the existing system's operation and maintenance manual provided by SDC, have been used as a basis for our cost estimates. No site visit was undertaken for this project.

The general assumptions made for the operation and maintenance NPV costs are:

- 30 year assessment period
- Current average daily flow – 350 m^3/day (396 connections)
- Future average daily flow - 400 m^3/day (452 connections)
- Pump replacement every 15 years
- Control panel replacement every 20 years

- Power costs $0.20/kWh
- Maintenance cost for current pump station $11,250 per annum(from SDC data)
- Discount rate – 8%
- Costs associated with the WWTP have not been included
- Existing pumps and control panel have not been replaced since pump station construction in 2004 and therefore require replacement at year 5 and year 10 respectively

Provide storage (500m³) - ROC $1,340,000, O&M NPV $360,000

Capital cost assumptions:
- Constructed underground from DN1200 RCRRJ pipe
- Located in road reserve south of existing pump station
- Offline storage (i.e. lowest invert level of storage is above pump start level)
- Depth between 2.4-4.6 m. Storage is deep to stay under the invert level of pump station's electrical control ducts.
- No allowance for dewatering has been included
- Maximum number of connections 452

Operational and maintenance cost assumptions:
- Allowance for cleaning the storage tanks after use

Duplicate flush pump – ROC $230,000, O&M NPV $430,000

Capital cost assumptions:
- New progressive cavity pump is the same make and model as the existing
- There is sufficient room in existing pump chamber for two pumps
- Suction pipework will make use of existing "spare nozzle" pipework in wet well
- New VFD required
- Maximum number of connections 452

Operational and maintenance cost assumptions:
- Increased maintenance cost as extra PC pump to service
- Installing new PC will require upgrade of control panel so replacement timeframe has been reset

Reconfigure rising main with an intermediate pump station – ROC $500,000, O&M NPV $660,000

Capital cost assumptions:
- Maximum number of connections 452
- Design Parameters
    - » Flow rate – 16 L/s
    - » Static head – existing PS = 4.5m , new PS = 3m
    - » Rising main - DN160 PN12.5 PE100,
    - » Roughness coefficient - 0.6 mm
    - » Rising main length - existing PS 3750 m, new PS 5950 m

- New Pump Station
    - » Wet well – 3 m deep
    - » Pumps - two submersible pumps (47kW)
    - » Allowance for valve chamber, electrical cabinet and SCADA connection has been included.
    - » Power and water are available at the pump station location, this has not been confirmed.
    - » Suitable land is available for purchase at new PS site, however no allowance for land purchase has been included in the cost estimate
    - » No allowance for dewatering has been included

Operational and maintenance cost assumptions:

- Double maintenance cost as extra pump station to service

Construction of new wastewater pump station and rising main – ROC $2,470,000, O&M NPV $680,000

Capital cost assumptions:

- Maximum number of connections 627
- Design Parameters
    - » Flow rate - 10L/s – lower flow rate will not provide self-cleansing
    - » Static head – 4.5 m
    - » Rising main details - same diameter and material as existing (DN160 PN12.5 PE100), length 10,400 m
    - » Roughness coefficient - 0.6 mm
- New Pump Station
    - » Wet well – 4 m deep
    - » Pumps - two submersible pumps (22kW)
    - » Valve chamber, electrical cabinet and SCADA connection have been included.
    - » Power and water are available at the pump station location, this has not been confirmed
    - » Suitable land is available for purchase at new PS site; however no allowance for land purchase has been included in the cost estimate
    - » No allowance for dewatering has been included
- New rising main alignment laid beside existing in the berm with same vertical alignment and therefore the same amount of air valves and pigging points have been included (9 and 4 respectively)

Operational and maintenance cost assumptions:

- Double maintenance cost as extra pump station to service
- Allowance for checking and servicing air valves on new rising main

Cost Estimate Summary Table

Option	Approximate maximum number of connections	ROC	Increase in O&M NPV	Total NPV
Provide storage (500m^3)	452	$1,340,000	$10,000	$1,700,000
Duplicate flush pump	452	$230,000	$80,000	$660,000
Reconfigure rising main with an intermediate pump station	452	$500,000	$310,000	$1,160,000
Construction of new wastewater pump station and rising main	627	$2,470,000	$330,000	$3,150,000

Please contact me if you have any further queries.

Regards

Charlotte Mills
Senior Environmental Engineer

PC34 High Street, Southbridge - Rough Order Capital Cost Estimates

Prepared	Charlotte Mills	7/03/2014
Reviewed	Greg Birdling	10/03/2014

Provide Storage

Item	Description	Unit	Quantity	Rate	Total
1	**P&G**	LS	0.1	$924,000	$92,000
2	**Underground Storage - 500 m^3**				
2.1	Supply and install underground storage - DN1200 RCRRJ	m	442	$2,000	$884,000
2.2	Supply and install connecting manholes and pipework	LS	1	$40,000	$40,000
3	**Engineering**	LS	0.1	$1,016,000	$102,000
4	**Contingency**	LS	0.2	$1,118,000	$224,000
	Total				**$1,340,000**

Duplicate Flush Pump

Item	Description	Unit	Quantity	Rate	Total
1	**P&G**	LS	0.1	$160,000	$16,000
2	**Duplicate Flush Pump**				
2.1	Supply and install new PC Pump (30kW)	LS	1	$75,000	$75,000
2.2	Supply and install suction pipework	LS	1	$25,000	$25,000
2.3	Supply and install pipework downstream of pump	LS	1	$20,000	$20,000
2.4	Supply and install VFD - includes cabinet modifications	LS	1	$40,000	$40,000
3	**Engineering**	LS	0.1	$176,000	$18,000
4	**Contingency**	LS	0.2	$194,000	$39,000
	Total				**$230,000**

Reconfigure Rising Main with an Intermediate Pump Station

Item	Description	Unit	Quantity	Rate	Total
1	**P&G**	LS	0.1	$345,500	$35,000
2	**Pump Station**				
2.1	Supply and install pumps (47kW) and pipework	ea	2	$60,000	$120,000
2.2	Supply and install wetwell - 3m deep	LS	1	$90,000	$90,000
2.3	Supply and install valve chamber	LS	1	$25,000	$25,000
2.4	Cabinet, Switch board, Instrumentation & Power supply	LS	1	$104,000	$104,000
2.5	SCADA	LS	1	$6,500	$6,500
3	**Engineering**	LS	0.1	$380,500	$38,000
4	**Contingency**	LS	0.2	$418,500	$84,000
	Total				**$500,000**

Construct New Wastewater Pump Station and Rising Main

Item	Description	Unit	Quantity	Rate	Total
1	**P&G**	LS	0.1	$1,704,500	$170,000
2	**Pump Station**				
2.1	Supply and install pumps (22kW) and pipework	ea	2	$45,000	$90,000
2.2	Supply and install wetwell - 4m deep	LS	1	$120,000	$120,000
2.3	Supply and install valve chamber	LS	1	$25,000	$25,000
2.4	Cabinet, Switch board, Instrumentation & Power supply	LS	1	$76,000	$76,000
2.5	SCADA	LS	1	$5,500	$5,500
3	**Rising Main**				
3.1	Supply and install PN12.5 DN160 PE100	m	10400	$120	$1,248,000
3.2	Supply and install air valve	ea	9	$10,000	$90,000
3.3	Supply and install pigging point	ea	4	$10,000	$40,000
3.4	Supply and install inline valves	ea	4	$2,500	$10,000
4	**Engineering**	LS	0.1	$1,874,500	$187,000
5	**Contingency**	LS	0.2	$2,061,500	$412,000
	Total				**$2,470,000**

Provide Storage

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Capital cost	$1,340,000																														
Pump replacement						$87,000															$87,000										
Control Panel Replacement											$40,000																				$40,000
Power		$9,422	$9,656	$9,889	$10,123	$10,357	$10,591	$10,824	$11,058	$11,292	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525
Maintenance (base $11,250)		$12,210	$12,210	$12,210	$12,210	$12,210	$12,210	$12,210	$12,210	$12,210	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170	$13,170
Total Costs	$1,340,000	$21,632	$21,866	$22,099	$22,333	$109,567	$22,801	$23,034	$23,268	$23,502	$64,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$111,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$24,695	$64,695
NPV	*$1,340,000*	*$20,030*	*$18,746*	*$17,543*	*$16,416*	*$74,569*	*$14,368*	*$13,440*	*$12,571*	*$11,757*	*$29,966*	*$10,591*	*$9,807*	*$9,080*	*$8,408*	*$7,785*	*$7,208*	*$6,674*	*$6,180*	*$5,722*	*$23,964*	*$4,906*	*$4,542*	*$4,206*	*$3,894*	*$3,606*	*$3,339*	*$3,092*	*$2,863*	*$2,650*	*$6,429*
Operational Cost NPV	$360,000																													
Total NPV	$1,700,000																													

Duplicate Flush Pump

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Capital cost	$230,000																														
Pump replacement						$87,000										$65,000					$87,000										$65,000
Control Panel Replacement																					$40,000										
Power		$9,422	$9,656	$9,889	$10,123	$10,357	$10,591	$10,824	$11,058	$11,292	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525	$11,525
Maintenance (base $11,250)		$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
Total Costs	$230,000	$26,297	$26,531	$26,764	$26,998	$114,232	$27,466	$27,699	$27,933	$28,167	$28,400	$28,400	$28,400	$28,400	$28,400	$93,400	$28,400	$28,400	$28,400	$28,400	$155,400	$28,400	$28,400	$28,400	$28,400	$28,400	$28,400	$28,400	$28,400	$28,400	$93,400
NPV	*$230,000*	*$24,349*	*$22,746*	*$21,246*	*$19,844*	*$77,744*	*$17,308*	*$16,162*	*$15,091*	*$14,090*	*$13,155*	*$12,180*	*$11,278*	*$10,443*	*$9,669*	*$29,444*	*$8,290*	*$7,676*	*$7,107*	*$6,581*	*$33,341*	*$5,642*	*$5,224*	*$4,837*	*$4,479*	*$4,147*	*$3,840*	*$3,555*	*$3,292*	*$3,048*	*$9,282*
Operational Cost NPV	$430,000																														
Total NPV	$660,000																														

Reconfigure Rising Main with an Intermediate Pump Station

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Capital cost	$500,000																														
Pump replacement						$87,000										$60,000					$87,000										$60,000
Control Panel Replacement											$40,000										$40,000										$40,000
Power		$22,633	$22,932	$23,230	$23,528	$23,826	$24,125	$24,423	$24,721	$25,019	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318	$25,318
Maintenance (base $11,250)		$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500
Total Costs	$500,000	$45,133	$45,432	$45,730	$46,028	$133,326	$46,625	$46,923	$47,221	$47,519	$87,818	$47,818	$47,818	$47,818	$47,818	$107,818	$47,818	$47,818	$47,818	$47,818	$174,818	$47,818	$47,818	$47,818	$47,818	$47,818	$47,818	$47,818	$47,818	$47,818	$147,818
NPV	*$500,000*	*$41,790*	*$38,950*	*$36,302*	*$33,832*	*$90,740*	*$29,381*	*$27,379*	*$25,512*	*$23,772*	*$40,677*	*$20,508*	*$18,989*	*$17,582*	*$16,280*	*$33,989*	*$13,957*	*$12,924*	*$11,966*	*$11,080*	*$37,507*	*$9,499*	*$8,796*	*$8,144*	*$7,541*	*$6,982*	*$6,465*	*$5,986*	*$5,543*	*$5,132*	*$14,690*
Operational Cost NPV	$660,000																														
Total NPV	$1,160,000																														

Construct New Wastewater Pump Station and Rising Main

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Capital cost	$2,470,000																														
Pump replacement						$87,000										$44,000					$87,000										$44,000
Control Panel Replacement											$40,000										$40,000										$40,000
Power		$22,757	$23,075	$23,392	$23,709	$24,027	$24,344	$24,661	$24,979	$25,296	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613	$25,613
Maintenance (base $11,250)		$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500	$24,500
Total Costs	$2,470,000	$47,257	$47,575	$47,892	$48,209	$135,527	$48,844	$49,161	$49,479	$49,796	$90,113	$50,113	$50,113	$50,113	$50,113	$94,113	$50,113	$50,113	$50,113	$50,113	$177,113	$50,113	$50,113	$50,113	$50,113	$50,113	$50,113	$50,113	$50,113	$50,113	$134,113
NPV	*$2,470,000*	*$43,757*	*$40,788*	*$38,018*	*$35,435*	*$92,237*	*$30,780*	*$28,685*	*$26,732*	*$24,910*	*$41,740*	*$21,493*	*$19,901*	*$18,427*	*$17,062*	*$29,668*	*$14,628*	*$13,544*	*$12,541*	*$11,612*	*$37,999*	*$9,955*	*$9,218*	*$8,535*	*$7,903*	*$7,317*	*$6,775*	*$6,274*	*$5,809*	*$5,379*	*$13,328*
Operational Cost NPV	$680,000																														
Total NPV	$3,150,000																														

APPENDIX H

Stormwater Report

14 June 2012 Document No. 1078107287

Rob Roxburgh
Roxbury Property Developers Ltd
PO Box 1
High Street
Southbridge

STORMWATER MANAGEMENT – PROPOSED RESIDENTIAL DEVELOPMENT, SOUTHBRIDGE

Dear Rob

Golder Associates (NZ) Limited (Golder) has been engaged to assist Roxburgh Property Developers prepare an application for plan change with respect to a proposed change of zoning to allow residential development in Southbridge, Canterbury. This letter[1] has been prepared in order to provide an assessment of stormwater management requirements at the site, assuming development proceeds.

It should be noted that stormwater calculations included in this report are conservative, and intended to be used at a conceptual level only; detailed calculations would be undertaken for design purposes, should the proposed re-zoning be approved.

Background Information

The proposed development is of a 6 ha block bounded by High Street, Brook Street and Bellfield/Robinson Street (unformed) in Southbridge, Canterbury. The owner is currently applying for a plan change to alter the zoning of the site from Rural – Outer Plains to Living 1.

The concept plan for the proposed development includes the subdivision of the site into approximately 56 residential lots, with a central road and three culs-de-sac.

The site is topographically flat, with a watercourse running along the western boundary. The watercourse meets the Lee River just upstream of Lake Ellesmere. Upstream of the site, the watercourse has a catchment area of approximately 10 ha (NIWA Water Resources Website).

Infiltration Testing

A site investigation was undertaken on 21 February 2012 to determine soakage rates on site (refer attached letter dated 15 March 2012). The conclusions from the site investigation were that for design purposes, infiltration rates of 2.9 and 2.4 m/day can be utilised for soakage pits and surface infiltration devices respectively.

[1] This letter is subject to the attached limitations.

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Stormwater Runoff Calculations

Stormwater runoff calculations have been undertaken following the Selwyn District Council (SDC) Engineering Code of Practice (February 2012), and the Christchurch City Council Waterways, Wetlands and Drainage Guide (February 2003, updated May 2012). Calculations sheets are attached as Appendix A.

For the purposes of stormwater runoff calculations, the imperviousness of each site has been estimated to be 60 %. The impervious area of the remainder of the site (roads, reserves, berms) is assumed to be approximately 80 %. The time of concentration for runoff from the site has been estimated to be 28 minutes (based on calculations recommended in CCC (2003, revised 2012) for the developed system (including a reticulated network). Rainfall depths for design storm events have been obtained from the SDC guidelines.

Table 1 below provides a summary of estimated existing peak runoff rates, and those likely in the future under a residential development scenario. A variety of Average Recurrance Interval (ARI) storms have been examined, and peak flows from pervious and impervious areas have been assumed to coincide.

Table 1: Stormwater peak flow, pre- and post – development.

ARI (years)	Rainfall intensity (mm/hr)	Pre-development peak flow (L/s)	Post – development peak flow (L/s)
2.33	16.66	67.2	183.7
5	22.93	92.5	252.8
10	27.83	112.3	306.8
20	32.73	132.1	360.9
50	39.00	157.4	430.0
100	43.51	175.6	479.7

Stormwater Management

The proposed site is next to a watercourse, which ultimately drains to Lake Ellesmere. The options for discharge of stormwater from the site are the public network (owned and maintained by SDC), discharge to ground, surface water discharge, or a combination of all three. Lake Ellesmere is a sensitive receiving environment, and currently has from poor water quality as a result of high nutrient loads entering the lake.

Stormwater Treatment

Current best practice for stormwater management is to utilise a ‘treatment train’ approach. This involves the use of a variety of methods to minimise the impact of development on the hydrological cycle, as well as reducing the input of stormwater contaminants to the receiving environment.

Stormwater management would ideally start with low impact design or on-site management of stormwater to reduce runoff or minimise the generation of contaminants (such as limiting or managing the use of metallic based roofing products (e.g., those containing zinc to reduce zinc loading) or using permeable paving to reduce runoff). Following this, a treatment train might include methods such as swales, filter strips and catchpit filters to remove a proportion of stormwater contaminants, whilst slowing runoff rates and potentially infiltrating some of the surface water. Final treatment may include the use of a pond, wetland, rain garden, infiltration basin or proprietary filter system.

The design of a treatment train system for stormwater management would be undertaken at the design phase, when decisions regarding imperviousness, building type, extent and layout of roading network have been made, and downstream controls and stormwater issues are fully determined.

Stormwater treatment is commonly designed to manage the ‘first flush’ of stormwater during a rain event, and the CCC Waterways, Wetlands and Drainage Guide (WWDG 2003, revised 2012) recommend the treatment of at least the first flush volume from greenfields development; the first flush volume has been calculated to be equivalent to between 12.5 mm and 25 mm of rainfall. Also, the WWDG (Revised 2012)

advises that when a treatment system is close to stormwater source, only the first flush need be captured and treated. Auckland Regional Council (TP10) guidance defines a 'water quality storm' (first flush) as 1/3 of the 24 hour, 1 in 2 yr ARI rainfall event. For this site, the ARC first flush is equivalent to approximately 17 mm of rain. First flush volumes, based on these values, are summarised in Table 2 below, as calculated using the CCC guidelines.

Table 2: Stormwater first flush volume.

Rainfall depth (mm)	Volume (m^3)
12.5	378
25	756
17	514

The calculated area of an infiltration basin to treat the first flush is between 380 m^2 and 684 m^2, assuming an infiltration rate of 20 mm/hr (recommended by CCC WWDG).

Stormwater Detention / Soakage

Storage of flood flows above the design capacity of the stormwater network is usually required in an urban environment. The SDC Engineering Code of Practice states that a stormwater drainage system should include a primary piped system with the ability to convey a 1 in 10 yr ARI storm event, and a secondary system to convey and manage the additional flows up to a 1 in 50 yr ARI event. The Building Code currently requires that *'surface water (flood) with a 2% Annual Exceedance Probability (AEP) must not enter buildings*' to prevent the risk of flooding affecting a building. Table 3 below summarises calculations of storm volumes based on the flow rates in Table 1. Further design will allow for the consideration of a variety of storm durations, to identify the critical storm for the site.

Table 3: Storm volumes.

ARI	Maximum storm volume (m^3) (28 minute storm)
2.33	309
5	425
10	516
20	606
50	722
100	806

Conclusion

The concept plan for the development includes an area designated for stormwater management. While this will be reviewed at the design stage (based on site constraints and specific treatment and management objectives), calculations have been undertaken to determine the required volume and area of an infiltration basin on the site, to ensure that stormwater management devices can be accommodated within the development area. On this basis, a volume of 756 m^3 would be required to manage the flows from a 1 in 50 yr ARI storm event (allowing for infiltration of 20 mm/hr).

It is noted that due to the small time of concentration of this site, the maximum first flush volume calculated above is almost equal to the runoff volume generated by a storm with an ARI of 1 in 50 years, when calculated using the methodologies provided in the CCC guidelines. This issue will be examined during the design phase of this project.

Therefore, an infiltration basin with an area of 684 m^2 would be sufficient to manage both the first flush of stormwater, and any additional volume that may be generated by a 1 in 50 yr ARI rainfall event.

Yours sincerely

GOLDER ASSOCIATES (NZ) LIMITED

Helen Shaw
Senior Water Resources Engineer

HS/kc

Attachments: Report limitations
Calculation Sheets

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Rainfall / Runoff Calculations

Parameters

Input cells	
Calculated cells	

				CA	
Total Area		57014	Sq.m		
Houses area		42214	**Sq.m**		
	% Roof in house	60			
	Roof area	25328.4	Sq.m	22795.56	Sq.m
	yards+green	16885.6	Sq.m	5909.96	Sq.m
Roads+Street+Greens		14800	**Sq.m**		
	% Impervious	80			
	Impervious area	11840	Sq.m	10064	Sq.m
	Pervious area	2960	Sq.m	888	Sq.m
Impervious area - pre development		400	Sq.m	360	Sq.m

Dif. Height	1	m		
Length	340	m		
Slope	0.0029	m/m		
Time of concentration	28	min		
	T entrance	15	min	WWDG Section 21.3.2.2
	T network	12.4	min	
	T road ch.	3	min	WWDG Fig 21-2
	T pipe flow	9.4	min	WWDG Tab 21-2

Calcualted flow

ARI	30 min	I (mm/hr)	Pre-develop flow (l/s)			Post develop flow (l/s)		
			Impervious	Previous	Total	Impervious	Previous	Total
2.33	8.5	16.66	1.7	65.6	67.2	152.2	31.5	183.7
5	11.7	22.93	2.3	90.2	92.5	209.5	43.3	252.8
10	14.2	27.83	2.8	109.5	112.3	254.2	52.6	306.8
20	16.7	32.73	3.3	128.8	132.1	299.0	61.9	360.9
50	19.9	39.00	3.9	153.5	157.4	356.3	73.7	430.0
100	22.2	43.51	4.4	171.2	175.6	397.5	82.2	479.7

Depth of First Flush

min	12.5	mm
max	25	mm
1/3 of ARI 2.33	17	mm
Effective First Flush Runoff Area	3.7	ha

Composite First Flush Coefficient	0.53

First flush volume

min	377.7	cumecs
max	755.4	cumecs
1/3 of ARI 2.33	513.7	cumecs

Soakage Basin Sizing

soakage basin first flush depth	1	m	WWDG recommended
Basin floor infiltration rate			
min	2.84E-05	m/s	
max	3.79E-05	m/s	invert soils to restrict flow, will be
WWDG recommend	1.39E-05	m/s	designed by 20mm/hr
First flush basin water surface area			
min	533.2	sq. m	1:4 side batters
max	975.3	sq. m	1:4 side batters
1/3 of ARI 2.33	695.0	sq. m	1:4 side batters
First flush infiltration area			
min	378.8	sq. m	1:4 side batters
max	683.2	sq. m	1:4 side batters
1/3 of ARI 2.33	490.5	sq. m	1:4 side batters

Basin floor infiltration rate and underdrain flow rate (m3/s)

	Infiltration rate min	Infiltration rate max	Infiltration rate infil=20 mm/hr
min	0.01436	0.01076	0.00211
max	0.02589	0.01940	0.00380
1/3 of ARI 2.33	0.01859	0.01393	0.00273

Infiltration volume (m3)

	Infiltration rate min	Infiltration rate max	Infiltration rate infil=20 mm/hr
min	24.12	18.07	3.54
max	43.50	32.59	6.38
1/3 of ARI 2.33	31.23	23.40	4.58

Basin volumes

ARI	Storm volume (cumecs)	Basin full volume (cumecs)	Basin live storage volume (cumecs)
2.33	308.6	303.6	-263.0
5	424.7	419.8	-146.8
10	515.5	510.5	-56.0
20	606.3	601.3	34.7
50	722.4	717.5	150.9
100	805.9	801.0	234.4

15 March 2012 Document No. 1078107287

Rob Roxburgh
Roxburgh Property Developers Ltd
PO Box 1
High Street
Southbridge

SITE INVESTIGATION AND INFILTRATION TESTING

Dear Rob

In response to a request from Davis Ogilvie, site investigations and infiltration testing have been undertaken at the 6 ha site bounded by High Street, Brook Street and Bellfield/Robinson Street (unformed) in Southbridge, Canterbury.

The purpose of the investigations was to determine infiltration rates in four locations, as indicated in the attached site plan. Testing was designed to simulate performance of stormwater soakage pits and infiltration basins on the site.

SITE INVESTIGATION

A site investigation was undertaken on 21 February 2012. The soakage pit tests consisted of two pits, SP1 and SP2, excavated to a depth of 1.15m. Infiltration basin sites are referred to as I1 and I2.

The two soakage pits were filled with water to a depth of 0.25 m and 0.3 m respectively, and the infiltration rates measured over a period of six hours.

Two sets of 24” and 12” double ring infiltrometers were installed on the ground surface at two sites (I1 and I2). The test was conducted according to the guidelines set out by the U.S. Department of the Interior (Johnson, 1963). To begin, both rings were filled with water to a depth of 100 mm with respect the ground surface. The amount of water required to retain a constant water level in each ring was then monitored at fifteen minute intervals for the first hour, 30 minute intervals for the second, and then hourly for the remaining four hours. After completion of the infiltration testing, the soil beside the rings was excavated to determine the final soil moisture profile.

RESULTS

The soakage pit results are shown below in Figure 1 and Table 1. The results of the infiltrometer tests (measured infiltration rates in the inner ring, and soil moisture profiles) are shown below in Figure 2 and Figure 3. The calculated rates can be seen below in Table 1.

Golder Associates (NZ) Limited
Level 1, 132 Tuam Street, Christchurch 8011, New Zealand (PO Box 2281, Christchurch 8140)
Tel: +64 3 377 5696 Fax: +64 3 377 9944 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

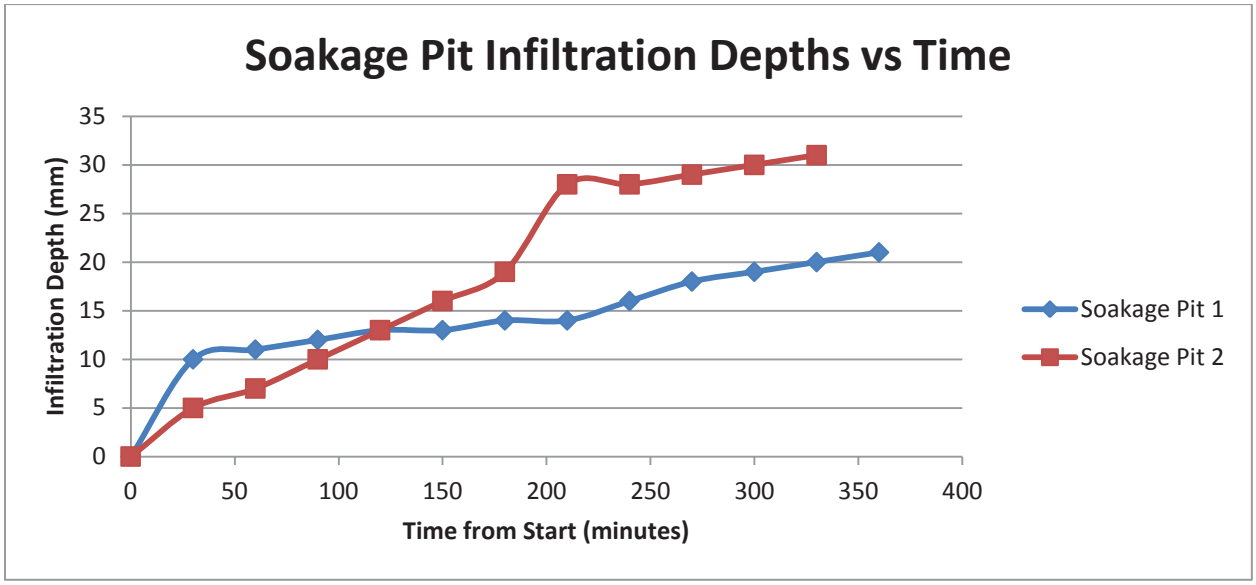

Figure 1: Infiltration rates in Soakage Pit Sites

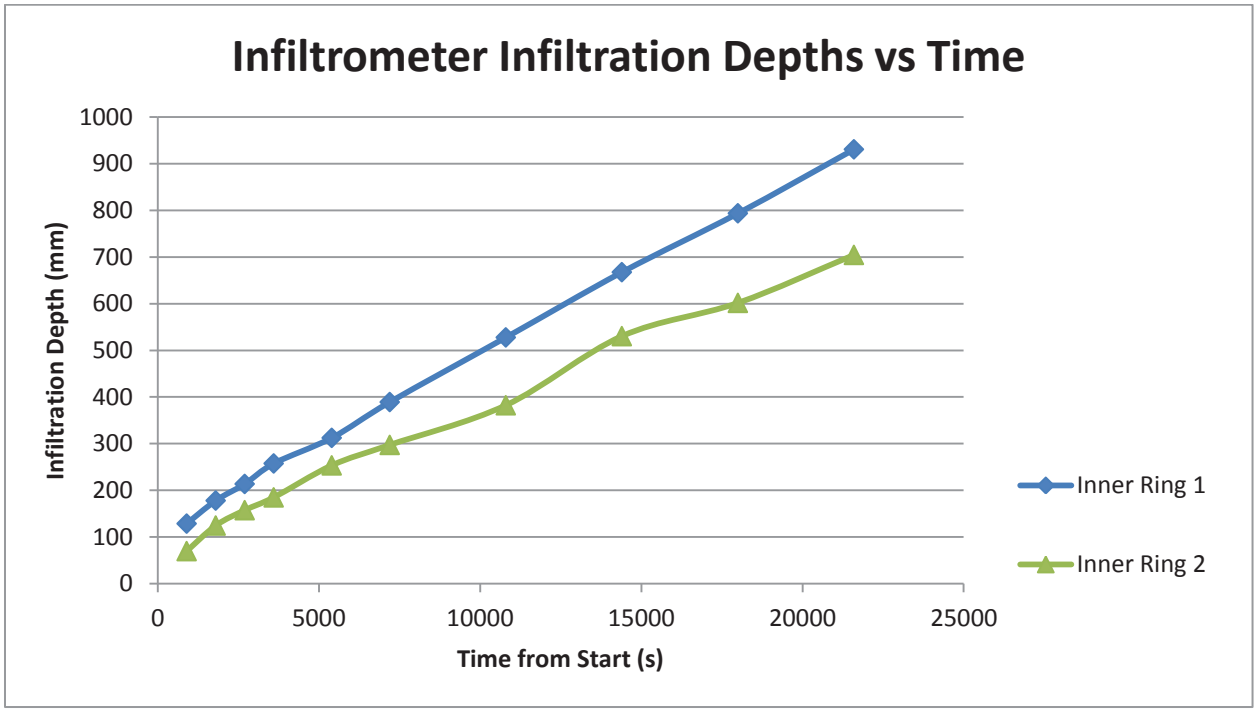

Figure 2: Infiltration Rates at Proposed Infiltration Basin Sites

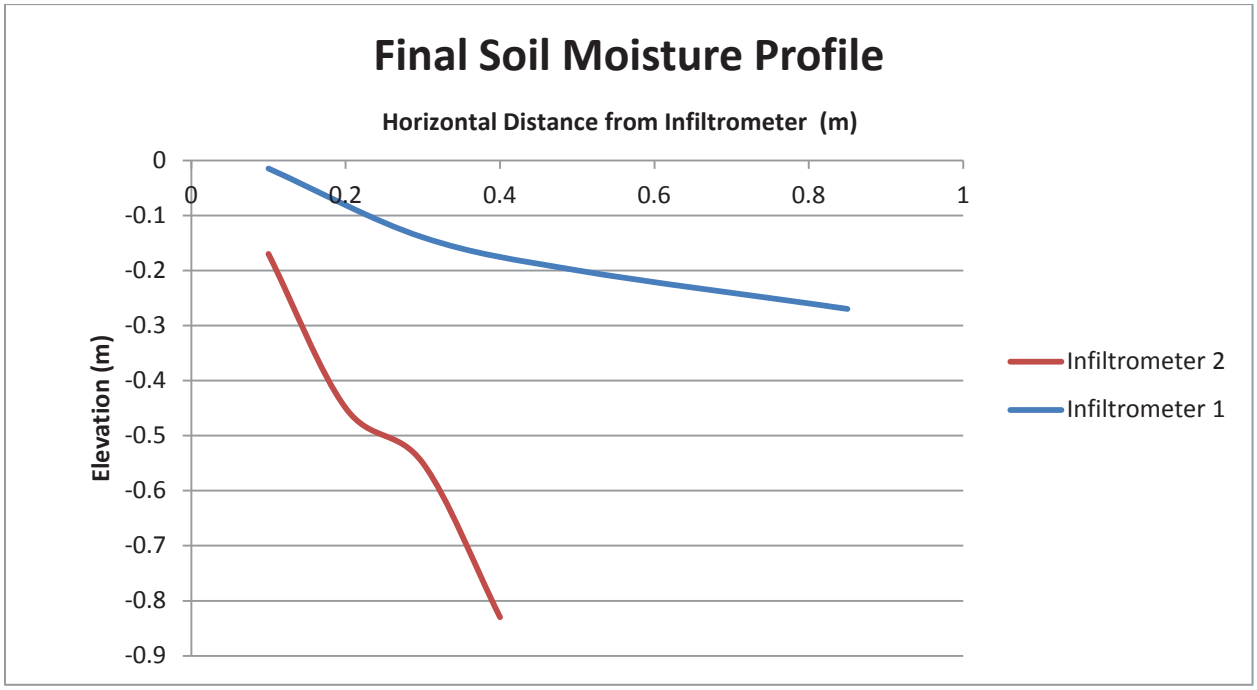

Figure 3: Soil Moisture Profiles after completion of Infiltrometer Tests at Infiltration Basin Sites

The slope of the infiltration depth vs time graphs when the rate achieves a steady state indicates the infiltration rate for the soil. For each infiltrometer, the initial four data points have been disregarded during calculation of the steady state infiltration rate, and the soakage pit infiltration rates were calculated based only on the final four data points available.

Table 1: Infiltration rates at testing locations

Test Location	Infiltration rate (mm/s)	Infiltration rate (m/day)
I 1	0.0379	3.27
I2	0.0284	2.45
SP1	0.0333	2.88
SP2	0.0333	2.88

Discussion

It is observed that the two soakage pits displayed very similar infiltration rates by the end of the testing period, with the infiltrometer results falling almost equally on either side. The greater amount of lateral movement of the water resource observed in the vicinity of I1 supports the higher measured rate of infiltration at that location, potentially caused by cracks or laminations not present at the SP1, SP2 and I2 sites.

The online soil map published by Landcare Research (Landcare Research, 2011) identifies soil at the site as “silty loam”. Silty loam soils are identified in the Waterways, Wetlands and Drainage Guide, Part B; Design (Christchurch City Council, 2003) as having an ultimate infiltration rate of 7mm/hr.

The infiltration rate found during the investigation was in the order of 120mm/hr. The inconsistency with the published value is likely due to the underlying silty sand and gravel layers encountered in the test pits (Golder Associates (NZ) Ltd, 2012). The ultimate infiltration rate for a sandy loam is reported as 230 mm/hr (Christchurch City Council, 2003) which accounts for the increased infiltration rate.

Conclusion / Recommendation

Based on this information, it is recommended that for design purposes, infiltration rates of 2.9 and 2.4 m/day are utilised for soakage pits and surface infiltration devices respectively. It should be noted that due to soil variability in the Southbridge area, new infiltration measurements would be required if any change in the infiltration basin locations is proposed.

Should you require any further information regarding this testing, please contact the undersigned.

Yours sincerely

GOLDER ASSOCIATES (NZ) LIMITED

Megan Wakefield
Graduate Water Management Engineer

Helen Shaw
Principal Water Resource Engineer

HS/JW/kc

CC: Russell Benge, Davis Ogilvie and Partners

Attachments: Site Plan

Reference List

Christchurch City Council. (2003). *Waterways, Wetlands and Drainage Guide, Part B: Design.*

Golder Associates (NZ) Ltd. (2012). *Liquefaction Risk of the Proposed Sub-division in Southbridge.* Christchurch: Golder Associates (NZ) Ltd.

Johnson, A. I. (1963). *A Field Method for Measurement of Infiltration*. Retrieved 20/02/2012 from U.S. Geological Survey Publications Warehouse; http://pubs.usgs.gov/wsp/1544f/report.pdf

Landcare Research. (2011), *Databases: S-map Project*. Retrieved 08/03/2012 from Landcare Research: http://smap.landcareresearch.co.nz

Figure not to scale. Drawn by SG, Reviewed by VG
1. AERIAL IMAGE: Google Earth, 12-03-2011 2. MAP IMAGE: Land Information New Zealand NZMS Series. Copyright Reserved

Golder Associates

TITLE | EXPLORATORY HOLE LOCATION PLAN
ROXBOROUGH PROPERTY DEVELOPERS LTD

MARCH 2012
PROJECT | 1078107287

1

S:\Graphics\Projects-numbered\2010\10781x\07xxx\1078107_287_\Mar12

APPENDIX I

Southbridge Advisory Committee Minutes

Southbridge Advisory Committee
Minutes of Meeting

Chairman: Wayne Palmer 324-2096 *Secretary:* Lieuwe Doubleday 324-2992 17 St John Street Southbridge

Date: 21st July 2014
Day: Monday (3rd Monday in Month)
Time: 7.37 p.m. – 10.05 p.m.
Venue: Hall
Chair: Wayne Palmer
Next Meeting: (3rd Monday) in August 18th

Present:

Wayne Palmer [WP] **Chairman**	Lieuwe Doubleday [LD]
Susan Stewart [SS]	Peter McLean [PMc]
Geoff Allan [[GA]	~~Donald McMillan [DmcM] (Res)~~
~~Martin Wellby [MW]~~	Pat McEvedy [PMcE]

Also in attendance: Murray England SDC Assets Manager- Water Services 7.30 – 9.12 pm.

1. **Apologies:** [MW], [DMcM]

2. **Public Forum:** None

3. **Minutes of Last Meeting:** 16th June 2014
Moved [WP] Seconded [SS] accepting minutes of last meeting. Carried by All.

4. **Communications:** Emails schedule attached.

5. **Finance Expenditure Approvals**

6. **Councillor's Update:** Insufficient time for an update this meeting.

Activity Reports.

7. **Hall – Purchase Orders:** [SS] noted that the SDC could expect to receive a large number of new order numbers as a result of the hall upgrade many of the existing accessories e.g. cleaning equipment needed to be upgraded in keeping with the standard of the facility and the new hire charges for the Halls use.
Hall – Hire Rates [SS] noted that after discussions with the Glentunnel committee (which have a new hall) hire rates have been amended. **AP # 1** [SS] to circulate updated rates The hire agreement has also been updated.
Hall – Usage [SS] noted that she is meeting with the SDC Hall activity co-ordinator to look at ways in the which the Hall can be promoted and used.

8. **Swimming Pool –** [SS] noted discussions with the Pool Manager who was reluctant to open the Pool until a guarantee had been provided by the SDC that all employees and patrons would not be harmed in the event of an earthquake. Engineering reports indicated that the Pool was safe to use but this appeared to hold no sway for the manager. This could be an issue.

9. Generators: (update and advice from Murray England)

Generator for water supply – to be located behind the library. SDC consider that if you put one generator in for water you need one also for the Sewerage – have put out to tender – prices have come in at $28,000 which is a lot cheaper than expected. The generator with a 110 Kva will also power the hall. The generators are supplied by Goughs (Catepillar).

The SAC will have to arrange and pay for the connection to the Hall. We had previously obtained a quote from Nairns for this purpose and the quote (from memory) was less than $5,000**. Installation Timing:** a concrete pad for the generators is due to installed prior to Xmas.

Generator for Sewerage Scheme – also a Gough generators – currently looking at 65 kva but would prefer to have a higher output generator. Discussed how the generator was to be engaged and agreed to use a manual switch as opposed to an automatic system.

Storm water (Jo Golden/Murray England) – refer paper and maps. OÇonnell Street issue – question: how much should the township contribute to the fix (if anything). Refer notes supplied and options.

[ME] presented the options and discussion ensued.

- Discussed the general principles governing the committee's and Council's responsibility and role in flood mitigation (see below).
- Noted that steps had already been taken which may well be successful in fully mitigating further flooding. Whether this is true however remains to be seen.
- Discussed other options eg. Insuring against adverse events, setting up a 'fund' for future initiatives (if the current mitigations proved ineffective).
- Noted that the rates had increased for Storm Water *(see minutes of 3rd March 2014 where the following resolution was made:* ***Moved****[LD]* ***Seconded****[WP] that the targeted rate for storm water be increased to $50 (2014/5) i.e. an increase of $12 up from $38).*
- Agreed that consultation was desirable before any major financial commitment was undertaken by the SDC.
- As an interim measure agreed that costings should be obtained for a scaled down version of option #3 with the partial amendment whereby the option only involved running a swale /pipe to start of Sarsfield St. and nothing more.

Also agreed by way of determining that all options were considered:

AP#2 Agreed SDC to write to Mr Sluys requesting access to take levels - when approached personally by PMcEv and LD he declined access but may have since reconsidered. A letter will confirm the position one way or the other.

AP#3 SDC to also write (after a response is received to AP#2) to advise that baleage should not be used to block natural waterways because of the 'nuisance' downstream.

Decision Making Principles

1. SDC is not liable to fix the issue – particularly in the O'Connell street properties as the owners were aware of the flooding issues with these properties. (as a result SDC can't be said to be responsible – by extension the same is true for the committee);
2. SDC and the township as a 'good neighbour' is prepared to help and put some funds aside to assist (provided its risk exposure is limited);
3. Any solution advanced to protect properties 'affected' by flooding must not have an adverse impact on other property owners currently not affected by flooding. The risk which needs to be managed is that a solution for one party may create unintended consequences for other parties which may create a liability for the Council if its actions can be seen as a contributor to adverse impacts on those other properties.
4. Accordingly it is considered that the SDC need to have a solution which entitles the SDC to 'cut off' water moving into the proposed drain solution if it becomes clear that other properties are going to be impacted adversely. Accordingly the present 'affected property owners' need to understand that they may be exposed if the SDC has to terminate the drainage solution. As a consequence the SDC may need to consider what legal safeguards it can introduce into any agreement which protects the Council if it has to alter or change a solution designed to protect land owners currently affected by flooding.
5. The Council should consider seeking a capital contribution from land owners as opposed to placing the total burden on the township.

Recommendation: Price option #3 with the partial amendment that a swale /pipe only run to the start of Sarsfield St)
Moved [WP] Seconded [PMcl] approving recommendation above. Carried by all.

10. Maintenance [PMcL] enquired whether we had ever received advice from the Council about its footpath maintenance programme for the township. It was noted that we had been promised a copy of the programme but it had never materialized. Agreed [LD] should email Mark Chamberlain requesting (a) a copy of the footpath maintenance plan for Southbridge; and also (b) enquiring as to the timetable for the creation of the turning circle on St John Street – outside the Seed factory (part of the townships LTP).

11. Sewerage – tabled Southbridge Sewer Connections table showing the growth in connections over time. Noted the scheme was originally designed for 350 connections. Currently we have 316 full connections with an additional 80 (1/2 connections) giving a total of 396 connections – which is higher than the original design. That said, Opus Consultants have advised that the system appears to be able to cope with this capacity based on average flows. Accordingly the current capacity of the system as it currently stands is confirmed at 396 full connections.

Roxburgh development is projected to create another 54 connections.

Accordingly in thinking about the sewerage options the SDC have considered a capacity of 450 full connections.

[ME] tabled and discussed each of the options below:

Sewerage Upgrade Options:

Planning for a capacity of say 450 connections then the options (with indicative prices) are to:

(a) Install holding capacity ($1.3M plus on going maintenance);

(b) Install a flush pump ($230,000 upgrade);

(c) Reconfigure rising main and put a pumping station half way between Leeston and Southbridge ($540,000);

(d) Brand new pump station, brand new rising main (approx. $2.5M);

There was concern that maintenance costs would increase but Murray England has reviewed this aspect and doesn't anticipate a significant increase in maintenance costs for option (b).

Moved [LD] Seconded [GA] agreeing that the preferred option is (b) above, an upgraded flush pump with an estimated cost of $230,000 largely to be funded by Rob Roxburgh's land development which is subject to planning approval. Carried by all.

A consequential issue is water capacity – and the solution is to sink another well.

12. Other Business

"DH Golden" Replacement Plaque
Joyce Greenwood requested that the Committee fund a plaque (lost by previous committees) commerating the donation of a 'tree' to the township.
Moved [WP] Seconded [SS] approving the expenditure to cover the cost of the plaque and installation (estimated at $200). Carried by all.

Lodge Opening
Regrettably will decline. [**AP#4**] WP to communicate to the Lodge along the following lines: Thank you for your kind offer but because there has been a large number of the community involved in the hall redevelopment we would prefer to have an open day which is 'free'to the public and which is catered with an afternoon tea for those coming through. Agreed that the Lodge could promote the event as a first event to be held in the Hall since its upgrade.

Open Day – set as September 14th Sunday – 2.00 p.m. – afternoon tea at 3.00 p.m.
Pat McEvedy agreed to fund afternoon tea from Councillor's discretionary fund (Anna Ridgen to cater) – suggested that we fund $200 of food for afternoon tea. Invite the Mayor – Graham Creed and family. Advertisement to be placed in August in Echo

150th Labour Day – [WP] chairing this day's events. Combined Sports Club – each club to provide two committee members and they can help run the event. Top Team events. Agreed that proceeds of the day could be used to develop a Southbridge Information Kiosk or something similar.

BNZ Closed for Good – agreed that a suitable activity was the conduct of the stock take of the Hall catering equipment. The BNZ staff had conducted the same exercise last year and it had been a valuable help. **[AP#5]** Charlotte McLean and [SS] to complete the necessary forms by the due date of the 26th July.

LTP 3 year review – agreed that advice to Derek Hayes in email of 7th July covered the additional activities required for the Hall but note not all the window frames required replacement and in many cases it was just the 'glass' which required replacement. Noted also that an addition to the Hall improvements should include the sanding and varnishing of all wooden floors (excluding the main hall which has been replaced). The Supper room in particular would benefit from a revamp of the floor surface. **[AP#6]** [LD] to respond to Derek Hayes with the amendments and other information required ASAP**.**

13. Meeting Closed: 10.05 p.m.

14. Next Meeting: 18th August 2014

Southbridge Advisory Committee
Minutes of Meeting

Chairman: Wayne Palmer 324-2096 *Secretary:* Lieuwe Doubleday 324-2992 17 St John Street Southbridge

Email Communications in the Period 17th June through to 21 July 2014

Received	From	To	Subject
9:05 a.m.	Teri Findlater		Selwyn District Plan Updates
Sat 19/07	Murray England	LAD	Auto reply: Southbridge Township Meeting
Sat 19/07	LAD	Derek Hayes	RE: 2014 07 18 RE: Southbridge Community Ctr / Hall
Sat 19/07	LAD	SAC	FW: 2014 07 07 RE: Southbridge Community Ctr / Hall
Sat 19/07	LAD	Murray England	RE: Southbridge Township Meeting
Fri 18/07	Wayne	LAD	Fwd: Southbridge Township Meeting
Fri 18/07	Derek Hayes	LAD	RE: 2014 07 07 RE: Southbridge Community Ctr / Hall
Tue 15/07	LAD	SAC	2014 07 15 Southbridge Hall opening
Tue 15/07	BNZ	LAD	Don't forget to register your Closed for Good project
Tue 15/07	Karen Bartlett	LAD	FW: Message from "SDCHQA01"
Mon 14/07	LAD	'Karen Bartlett'	RE: Monitoring Agreement
Mon 14/07	Pam Stephens	LAD; Douglas Marshall	RE: 2014.05.19 Discretionary Funds for Southbridge - year end transfer
Mon 14/07	LAD	'martin wellby'	RE: 2014 07 09 Heritage Funds Quotes
11/07/2014	Karen Bartlett	LAD	Monitoring Agreement
11/07/2014	Karen Bartlett	Carl Colenutt	Southbridge Hall GL Codes
11/07/2014	Karen Bartlett	LAD	FW: Message from "SDCHQA01"
11/07/2014	Lieuwe	heritagefund	2014 07 11 Southbridge Heritage Fund Application - supporting information
11/07/2014	Squiz Matrix	LAD	Accessible CAPTCHA Form Verification
11/07/2014	Squiz Matrix	LAD	Accessible CAPTCHA Form Verification
11/07/2014	Squiz Matrix	LAD	Accessible CAPTCHA Form Verification
10/07/2014	martin wellby	LAD; Susan	RE: 2014 07 09 Heritage Funds Quotes
10/07/2014	LAD	Susan	2014 07 10 RE: Quotes
10/07/2014	LAD	Susan	2014 07 10 RE: Quotes
10/07/2014	Susan	LAD	FW: Enquiry from the Alloyfold site:
10/07/2014	Susan	LAD	FW: Enquiry from the Alloyfold site:
10/07/2014	Susan	LAD	Quotes
10/07/2014	Susan	LAD	Quotes
9/07/2014	LAD	Susan	2014 07 09 Heritage Funds Quotes
8/07/2014	LAD	SAC	FW: Electronic Purchase System
8/07/2014	LAD	SAC	FW: Selwyn World War I Centenary Commemoration
8/07/2014	LAD	SAC	FW: 2014 07 07 RE: Southbridge Community Ctr / Hall
8/07/2014	Derek Hayes	LAD	RE: 2014 07 07 RE: Southbridge Community Ctr / Hall
8/07/2014	Joy Farrington		Electronic Purchase System

Southbridge Advisory Committee
Minutes of Meeting

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Email Communications in the Period 17th June through to 21 July 2014

Received	From	To	Subject
8/07/2014	Joy Farrington	LAD	RE: Selwyn World War I Centenary Commemoration
7/07/2014	LAD	SAC	2014 07 07 Southbridge Community Ctr / Hall
7/07/2014	LAD	'Derek Hayes'	2014 07 07 RE: Southbridge Community Ctr / Hall
7/07/2014	LAD	'Joy Farrington'	RE: Selwyn World War I Centenary Commemoration
7/07/2014	Derek Hayes	LAD	FW: Southbridge Community Ctr / Hall
7/07/2014	Derek Hayes	LAD	FW: Southbridge Community Ctr / Hall
7/07/2014	Joy Farrington		Selwyn World War I Centenary Commemoration
6/07/2014	Karen Bartlett	LAD	Automatic reply: 2014 07 06 Fire Emergency Contact Numbers for the Southbridge Hall
6/07/2014	LAD	Karen.Bartlett	2014 07 06 Fire Emergency Contact Numbers for the Southbridge Hall
5/07/2014	Susan	LAD	RE: 2014 07 04 contact numbers for the hall in the event of a fire emergency
5/07/2014	Wayne	LAD	Re: 2014 07 03 Heritage Funding for Southbridge Hall
5/07/2014	Wayne	LAD	Re: 2014 07 03 Heritage Funding for Southbridge Hall
4/07/2014	Wayne	LAD	Re: 2014 07 04 contact numbers for the hall in the event of a fire emergency
4/07/2014	Wayne	LAD	Re: 2014 07 04 contact numbers for the hall in the event of a fire emergency
4/07/2014	LAD	Wayne Susan Donald	2014 07 04 contact numbers for the hall in the event of a fire emergency
4/07/2014	Susan	LAD	RE: 2014 07 03 Heritage Funding for Southbridge Hall
4/07/2014	LAD	LAD	2014 07 04 Email Karen Bartlett re Emergency contact numbers - Landline / Mobile/ Names Wayne Susan Myself / Donald?
3/07/2014	LAD	SAC	2014 07 03 Heritage Funding for Southbridge Hall
1/07/2014	Lieuwe	LAD	Heritage funding
1/07/2014	Karen Bartlett	LAD	RE: filming
1/07/2014	Cr Pat McEvedy	LAD; Karen Bartlett	RE: filming

Southbridge Advisory Committee
Minutes of Meeting

Chairman: Wayne Palmer 324-2096 *Secretary:* Lieuwe Doubleday 324-2992 17 St John Street Southbridge

Email Communications in the Period 17th June through to 21 July 2014

Received	From	To	Subject
30/06/2014	Wayne	LAD	Re: filming
30/06/2014	LAD	'Karen Bartlett'	RE: filming
30/06/2014	LAD	SAC	FW: filming
30/06/2014	LAD	SAC	FW: filming
30/06/2014	LAD	Karen.Bartlett	FW: Hall Window
30/06/2014	BNZ	LAD	Need a helping hand?
30/06/2014	Allanah Jarman	Karen Bartlett	RE: filming
30/06/2014	Karen Bartlett	Allanah Jarman	RE: filming
30/06/2014	Cr Pat McEvedy	LAD	Hall Window
29/06/2014	LAD	'Cr Pat McEvedy'	RE: 2014 06 26 Heritage Building Earth-quake repairs - Southbridge Hall
29/06/2014	Cr Pat McEvedy	LAD	Re: 2014 06 26 Heritage Building Earth-quake repairs - Southbridge Hall
29/06/2014	LAD	SAC	2014 06 29 Southbridge Advisory Commit-tee financial report - May 2014
29/06/2014	LAD	CrPat.McEvedy	FW: 2014 06 26 Heritage Building Earth-quake repairs - Southbridge Hall
27/06/2014	Pam Stephens	WAYNE; LAD	Southbridge Advisory Committee financial report - May 2014
27/06/2014	Susan	LAD	RE: 2014 06 26 Heritage Building Earth-quake repairs - Southbridge Hall
27/06/2014	Karen Bartlett	LAD	RE: 2014 06 26 Heritage Building Earth-quake repairs - Southbridge Hall
27/06/2014	Karen Bartlett	LAD	RE: 2014 06 26 re Fire Alarm monitoring for Southbridge Hall - followup re Message from "SDCHQA01"
26/06/2014	LAD	Karen Bartlett	2014 06 26 Heritage Building Earthquake repairs - Southbridge Hall
26/06/2014	LAD	Karen Bartlett	2014 06 26 re Fire Alarm monitoring for Southbridge Hall - followup re Message from "SDCHQA01"
26/06/2014	LAD	'David James'	2014 06 26 re Monitored alarms for Southbridge Hall
26/06/2014	LAD	LAD	Send hall photos to Karen Bartlett and SDC
25/06/2014	David James	LAD	RE: 2014 06 24 Query re Southbridge Hall
25/06/2014	Karen Bartlett	LAD	RE: 2014 06 24 Fire Alarm monitoring for Southbridge Hall - followup re Message from "SDCHQA01"

Southbridge Advisory Committee
Minutes of Meeting

Chairman: Wayne Palmer 324-2096 *Secretary:* Lieuwe Doubleday 324-2992 17 St John Street Southbridge

Email Communications in the Period 17th June through to 21 July 2014

Received	From	To	Subject
25/06/2014	Joy Farrington		Year end procedure 2014 - committees
24/06/2014	LAD	'Karen Bartlett'; 'Allan, James'	2014 06 24 Fire Alarm monitoring for Southbridge Hall - followup re Message from "SDCHQA01"
24/06/2014	LAD	davidj@pfc.co.nz	2014 06 24 Query re Southbridge Hall
24/06/2014	LAD	davidj@pfc.co.nz	2014 06 24 Query re Southbridge Hall
23/06/2014	LAD	d mcmillan	2014 06 23 Message from "SDCHQA01"
23/06/2014	Karen Bartlett	'Allan, James'	RE: Message from "SDCHQA01"
18/06/2014	Jeanette Ford	LAD	Anniversary Celebrations
18/06/2014	Joy Farrington		Providers /Volunteer Open Day
17/06/2014	LAD	SAC	2014 06 17 Draft minutes of Monday nights meeting attached
17/06/2014	Joy Farrington		Open Days
17/06/2014	Susan	LAD	FW: Contact Details
17/06/2014	Susan	LAD	FW: Enquiry from the Alloyfold site:
16/06/2014	LAD	Kevin.Chappell	FW: 2014 06 11 Southbridge Hall invoice for Acoustic Consultancy

APPENDIX J

Electricity and Telecommunications Letters

Orion
yournetwork

11 June 2012. DKW.12/48

Senior Planner,
Golder Associates (NZ) Ltd.,
P O Box 2281,
CHRISTCHURCH, 8042.

Attention: Jane West.

Dear Jane,

POSSIBLE SUBDIVISION: HIGH STREET, SOUTHBRIDGE.

In reply to your letter of your email of 29 May 2012, we confirm that our electrical network in the area has sufficient capacity available at present to supply the proposed load to the 56 lots shown on your plan.

The electrical reticulation for the subdivision would be in terms of Orion's Connections and Extensions policy applicable at the time of subdivision. An electrical kiosk substation site would be required in the subdivision.

Yours sincerely,

David Wade.
LAND CO ORDINATOR.
DD Phone: 363 9850.
Email: david.wade@oriongroup.co.nz.

The Subdivision Group
55 Shands Road, Hornby 8042
P O Box 1374, Christchurch 8140
Telephone: (03) 339 3402
Facsimile: (03) 338 0133
Email: tsg@chorus.co.nz

Chorus

7 June 2012

Chorus Ref: SOU10345
Your Ref:

The Developer
C/o Golder Associates (NZ) Ltd
Level 1 132 Tuam Street
Po Box 2281
Christchurch 8140

Attention: Jane West

Re: Proposed Subdivision: SOU: 56 Lot Subdn 134 High St Southbridge

(Subdivision Location: 134 High Street Southbridge)

Dear Sir / Madam

Thank you for letter and scheme plan for the above subdivision.

Chorus requires infrastructure and architecture design work to be completed prior to quoting the price for the provision of their services. At this time, due to other works in the area, the situation regarding spare capacity is unclear and requires further investigation.

Please allow up to six weeks for the Network design work to be completed, (some can occasionally take longer), before we can get back to you with confirmation of the cost to extend Chorus Network in Subdivision Location: 134 High Street Southbridge.

Please do not hesitate to contact me should you have any queries.

Yours faithfully

Don Henderson

Sub Division Specialist

APPENDIX K

Geotechnical Report

April 2012

GEOTECHNICAL ASSESSMENT REPORT

Plan Change (Rural Outer Plains to Living 1), High Street, Southbridge

Submitted to:
Roxburgh Property Developers Ltd
P O Box 1
Southbridge 7642

Report Number. 1078107_287

Distribution:

Roxburgh Property Developers Ltd - 1 x Email
Roxburgh Property Developers Ltd - 1 x Post
Golder Associates (NZ) Ltd - 1 x File Copy

REPORT

Golder Associates

Table of Contents

1.0 INTRODUCTION

Roxburgh Property Developers Ltd has engaged Golder Associates (NZ) Limited (Golder) to undertake a geotechnical assessment at the proposed plan change site in Southbridge, Canterbury. Our scope of work for this assignment comprises a geotechnical engineering review of existing information, together with an investigation using nine test pits to assess the suitability of the ground conditions for a proposed land use change of the site from rural to suburban. The scope of this investigation and report is limited to the geotechnical aspects of the site and does not include any investigation and assessment of potential soil or groundwater contamination, bioenvironmental or archaeological aspects of the property and proposed residential land use. Further, more detailed investigations will be required for subdivision consent application.

2.0 SITE DESCRIPTION AND POTENTIAL DEVELOPMENT

The proposed site is relatively flat lying with a slight slope (approximately < 5 degrees or less) to the south. The site is bounded by High Street, Brook Street and Bellfield/Robinson Street (unformed) and has an area of approximately 6 ha. The proposed development is located approximately 25 km away from the Greendale fault that ruptured on 4 September 2010 and approximately 40 km away from the Port Hills Fault that ruptured on 22 February 2011.

A review of existing information on land damage identified that the site is unmapped by EQC, but residents in the area indicated there was no evidence of liquefaction or lateral spreading (Project Orbit Map CR0119 - 31/10/2011).

At the time of preparation of this report, only draft information was available to Golder on the anticipated layout, site grades, and building or other infrastructure loads and performance criteria.

3.0 GEOLOGICAL SETTING

Canterbury is underlain by a series of inter-bedded terrestrial gravels and fine grained marine and estuarine sediments. The gravels are mainly aggradational alluvial deposits and the finer sediments comprise flood overbank alluvium, estuarine and shallow marine deposits. The gravels are high yielding aquifers, while the finer beds are of low permeability, and act as confining layers to water held in the gravels at high pressure.

The Geological Survey Map of the area (Forsyth et al 2008) indicates the site is underlain by river alluvium, comprising gravel, sand and silt.

3.1 Seismic Hazard

Review of records held on Geonet indicates the peak ground accelerations (PGAs) experienced at the Southbridge School adjacent to the site from the 4 September 2010 and 22 February 2011 events were 0.15g and 0.070g, respectively. These have been the largest events from the sequence of Canterbury earthquakes so are considered to be a reasonable representation of accelerations likely to occur at the site in the future.

The earthquake loadings code NZS1170.5:2004 defines earthquake hazard around New Zealand for building purposes. This document holds additional information for further analysis of the seismic hazards.

4.0 AVAILABLE INFORMATION

A review of publically available Environment Canterbury (ECan) boreholes indicate the geology at the site is likely to consist of a layer of topsoil approximately 0.2-0.3 m below ground level (bgl) with a layer of clay/silt down to approximately 2.4 m bgl. Underlying these layers, sandy gravels are interpreted with some layers of clay bound gravels, to the maximum test hole depth of approximately 20 m. The water table is reported to be approximately 4.0-4.5 m bgl. This information was sourced from Environment Canterbury (ECan) borehole data from wells L37/1208, M36/0698, L36/0422 and L37/1285 that are located on or adjacent to the site.

5.0 GEOTECHNICAL INVESTIGATIONS

A geotechnical test pit investigation was undertaken on 21 February 2012, to assess the near surface soil structure, geology and groundwater levels on site.

To evaluate the near surface ground conditions and suitability of the site for a plan change, a series of nine test pits were dug at various locations around the site on 21 February 2012. The test pits were terminated at target depths varying between 3.4 – 4 m bgl. The approximate locations of the test pits are presented in Appendix B, and the detailed descriptions of the soil and groundwater conditions encountered at each of the test pits are presented in Appendix C.

5.1 Investigation Results

The ground conditions encountered at the nine test pits put down across the site are generally similar, with relatively limited variations in thickness and composition of the individual soil strata or layers. These soils include, topsoil, silts with clay, fine to medium sands and medium sandy gravels. The near surface soil structure on site can be summarised as follows, in order of increasing depth:

- SILT with traces of fine sand (TOPSOIL) to 0.25 m bgl.
- SILT with minor fine sand and traces of clay to depths between 0.25 – 1.3 m bgl, with the exception of TP7 where the material was present to 2.9 m bgl.
- Fine to medium SAND with minor silt, extending to depths between 0.50 – 3.0 m bgl, except in TP7 where this material was not encountered.
- Gravelly medium SAND with traces of silt was commonly encountered in TP1, TP2 and TP6, extending to depths varying between 1.1 – 3.0 m bgl. Underlying this gravelly SAND layer in these test pits, with the exception of TP6, SILT with minor fine sand and clay was encountered between 1.8 – 2.8 m bgl and then the sandy gravel is encountered again to the termination depth of the test pit. In TP6, SILT with some clay and traces of organics is present between 3.0 – 3.2 m bgl and is underlain by gravelly SAND to the termination depth of the test pit.
- Underlying the sand in the remaining test pits (TP3, TP4, TP5, TP8 and TP9) is SILT with minor fine sand and clay between the depths of 2.0 – 3.4 m bgl. This material was not encountered in TP7.
- Underlying the silt in the remaining test pits (TP3, TP4, TP5, TP7, TP8 and TP9) is gravelly medium SAND with traces of silt that extended below the maximum depth of the test pits.
- Groundwater in the open test pits at the site was observed between 2.7 – 3.45 m bgl. There appeared to be no seepage from the side walls of the test pits above the groundwater level, which indicates that the observed depth to the water in the test pits represents the groundwater levels.

The test pit investigation did not provide specific information on the consistency of the materials at the site. Based on visual observations of the difficulty in excavating the materials, the upper materials at the site appear to be firm to stiff, or loose to medium dense. The gravelly sand underlying these shallow materials appears to be relatively dense and consolidated. Similarly, the available well logs do not provide specific test data to determine the consistency or compactness of the subsoils.

6.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

The soil stratigraphy encountered at the test pits put down across the site during the investigation is similar to that identified by the ECan borehole logs. In addition, the results of the test pit investigation indicate that there are no significant variations in the soil or groundwater conditions across the site.

Based on the relatively low groundwater level, approximately 3 to 4 m below existing ground surface, and the presence of an extensive, thick deposit of gravel or gravelly sand at and extending up to 20 m below the groundwater level, that is interpreted to be medium dense or dense, the risk of significant damage to residential structures and associated facilities such as roads and buried utilities is considered to be low. Even if some liquefaction does occur within the soils below the groundwater level, it is anticipated that the 3 to 4 m layer of unsaturated soils above the groundwater level will provide continuing support for lightly loaded foundations and limit the impact of liquefaction induced settlements. Due to the generally level ground surface within and adjacent to the site, the risk of lateral spreading is assessed as being low.

The upper soil strata are considered to be suitable for shallow foundation support of lightly loaded residential structures. Where fine grained silty or clayey soils are present at or close to foundation or slab on grade level, it may be desirable or necessary to over excavate these materials and place a layer of well compacted granular fill to provide a free draining, relatively high strength and disturbance resistant layer beneath structures.

As a result of the relatively low groundwater level, it is anticipated that buried utilities can be installed and maintained at depths up to about 4 m depth using conventional open cut temporary excavations, without need for dewatering or other seepage control measures.

In summary, based on the generally favourable and consistent ground conditions, the site is considered suitable for a plan change from rural to residential from a geotechnical perspective.

As described above, this assessment is based on information from a near surface test pit investigation and review of available well records. More detailed geotechnical investigation, including testing to determine the engineering properties (including liquefaction susceptibility) of the subsoils and confirm the groundwater level across the site, should be carried out as part of subdivision and development of the residential development.

7.0 REFERENCES

Forsythe, P. J., Barrell, D. J. A., Jongens, R. (compilers), 2008: Geology of the Christchurch area. 1:250 000 scale. GNS Science.

Department of Building and Housing *Te Tari Kaupapa Whare.* November 2011. Revised guidance on repairing and rebuilding houses affected by the Canterbury earthquake sequence.

Standards New Zealand *Paerewa Aotearoa*. February 2011. NZS3604:2011 New Zealand Standard, Timber-framed buildings, superseding NZS 3604:1999.

APPENDIX A

Report Limitations

REPORT LIMITATIONS

This Document has been provided by Golder Associates (NZ) Ltd ("Golder") subject to the following limitations:

(i). This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

(ii). The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

(iii). Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

(iv). In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

(v). Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

(vi). Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

(vii). The Client acknowledges that Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. Golder will be fully responsible to the Client for the Services and work done by all of its subconsultants and subcontractors. The Client agrees that it will only assert claims against and seek to recover losses, damages or other liabilities from Golder and not Golder's affiliated companies. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any legal recourse, and waives any expense, loss, claim, demand, or cause of action, against Golder's affiliated companies, and their employees, officers and directors.

(viii). This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Document.

APPENDIX B

Site Plan

Figure not to scale. Drawn by SG, Reviewed by VG
1. AERIAL IMAGE: Google Earth, 12-03-2011 2. MAP IMAGE: Land Information New Zealand NZMS Series. Copyright Reserved

Golder Associates

DRAFT

TITLE EXPLORATORY HOLE LOCATION PLAN
ROXBURGH PROPERTY DEVELOPERS LTD

MARCH 2012
PROJECT 1078107287

1

S:\Graphics\Projects-numbered\2010\10781x\07xxx\1078107_287_\Mar12

APPENDIX C

Test Pit Logs

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP1
North (m): 5148534
East (m): 1539953
Elevation (m): 23
Hole Depth (m): 3.60

Depth	Graphic Log	Description	Water Observations
	TS	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
0.5		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
1			
		Gravelly medium SAND with traces of silt, brownish grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
1.5			
2			
		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
2.5			
		Gravelly medium SAND with traces of silt, grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
3			
			▼ Static Water Level, 3.25m
3.5			
			EOH: 3.6m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 45	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP2
North (m): 5148431
East (m): 1539845
Elevation (m): 23
Hole Depth (m): 3.30

Depth	Graphic Log	Description	Water Observations
	TS / T / TS	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
1.5		Gravelly medium SAND with traces of silt, brownish grey. Moist, well graded. Gravel, fine to cobble sized and sud-rounded.	
2		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
2.5		Gravelly medium SAND with traces of silt, grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
3			▼ Static Water Level, 2.95m

EOH: 3.3m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 90	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP3
North (m): 5148415
East (m): 1539941
Elevation (m): 23
Hole Depth (m): 3.80

Depth	Graphic Log	Description	Water Observations
	TS / T	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1			
1.5		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
2		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
2.5		Gravelly medium SAND with traces of silt, grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
3			
3.5			Static Water Level, 3.4m

EOH: 3.8m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 95	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP4
North (m): 5148428
East (m): 1540018
Elevation (m): 23
Hole Depth (m): 4.00

Depth	Graphic Log	Description	Water Observations
	TS / T	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
1.5			
2			
2.5		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
3		Gravelly medium SAND with traces of silt, grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
3.5			▼ Static Water Level, 3.4m
4			EOH: 4m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 45	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Golder Associates

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM **Datum:** MSL

Project: 1078107287
Hole: TP5
North (m): 5148346
East (m): 1539886
Elevation (m): 23
Hole Depth (m): 3.40

Depth	Graphic Log	Description	Water Observations
	TS T TS	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
0.5			
1		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
1.5			
2		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
		Gravelly medium SAND with traces of silt, brownish grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
2.5			▼ Static Water Level, 2.7m
		Gravelly medium SAND with traces of silt, grey. Saturated, well graded. Gravel, fine to cobble sized and sud -rounded.	
3			
			EOH: 3.4m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 110	**Date** 21/02/2012	

Notes:
Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP6
North (m): 5148273
East (m): 1539928
Elevation (m): 23
Hole Depth (m): 4.00

Depth	Graphic Log	Description	Water Observations
	TS T	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
1.5			
2			
2.5			
		Gravelly medium SAND with traces of silt, brownish grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	
3		SILT with some clay and traces of organics, bluish grey. Saturated, high plasticity.	▼ Static Water Level, 3m
		Gravelly medium SAND with traces of silt, grey. Saturated, well graded. Gravel, fine to cobble sized and sud -rounded.	
3.5			
4			EOH: 4m

Contractor
Ellesmere Excavation and Aggregate

Machine
Excavator

Length (m): 2.5
Width (m): 1
Orientation (°): 130

Inspector
DG

Checked By
JF

Date
21/02/2012

Remarks
Termination at target depth of 4.0 m bgl with collapse of material below water table.

Notes:
Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP7
North (m): 5148214
East (m): 1539958
Elevation (m): 23
Hole Depth (m): 3.80

Depth	Graphic Log	Description	Water Observations
	TS T	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1			
1.5			
2			
2.5			
3		Gravelly medium SAND with traces of silt, brownish grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	▼ Static Water Level, 3m
3.5			

EOH: 3.8m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 130	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP8
North (m): 5148331
East (m): 1539996
Elevation (m): 23
Hole Depth (m): 3.60

Depth	Graphic Log	Description	Water Observations
	TS / T / TC	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1			
1.5		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
2			
2.5		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
3		Gravelly medium SAND with traces of silt, brownish grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	▼ Static Water Level, 3.4m
3.5			

EOH: 3.6m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 45	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

Test Pit Log

Client: Roxburgh Property Developers Ltd
Project: Roxburgh Subdivision, Southbridge

Location: 134 High Street, Southbridge, Canterbury

Grid: NZTM | **Datum:** MSL

Project: 1078107287
Hole: TP9
North (m): 5148304
East (m): 1540091
Elevation (m): 23
Hole Depth (m): 3.90

Depth	Graphic Log	Description	Water Observations
	TS T	SILT with traces of fine sand, dark brown. Dry, low plasticity, rootlets down to 0.1 m bgl. (TOPSOIL).	
0.5		SILT with minor fine sand and traces of clay, yellowish brown. Dry to moist, low plasticity.	
1		Fine to medium SAND with minor silt, yellowish brown mottled orange. Moist, poorly graded.	
1.5			
2			
2.5			
3		SILT with minor fine sand and clay, yellowish brown mottled orange. Moist to wet, low plasticity.	
3.5		Gravelly medium SAND with traces of silt, grey. Wet to saturated, well graded. Gravel, fine to cobble sized and sud-rounded.	▼ Static Water Level, 3.45m

EOH: 3.9m

Contractor Ellesmere Excavation and Aggregate	**Inspector** DG	**Remarks** Termination at target depth of 4.0 m bgl with collapse of material below water table.
Machine Excavator	**Checked By** JF	
Length (m): 2.5 **Width (m):** 1 **Orientation (°):** 45	**Date** 21/02/2012	**Notes:** Test Pit logged in accordance with NZGS guideline "Field description of soil and rock" 2005

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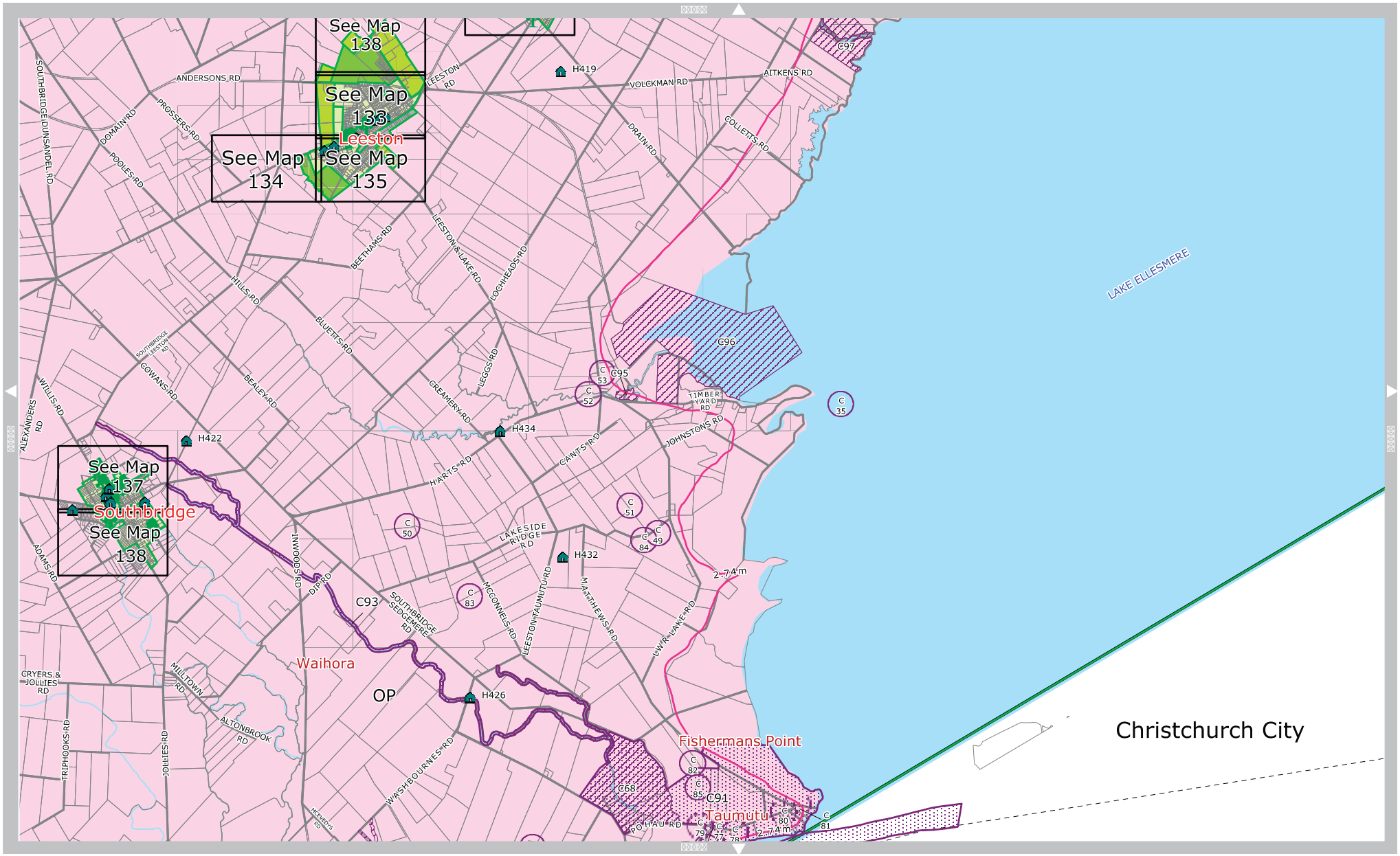
APPENDIX L

Amended Planning Maps 138 and 004



KEY

Waahi Taonga Area

Heritage Building

Protected Tree

Scheduled Site

Statutory Acknowledgement Site

State Highways

Railway

Road Parcel

Land Parcel

Water Body

Archaeological Site

Historic Heritage Site

Silent File Area

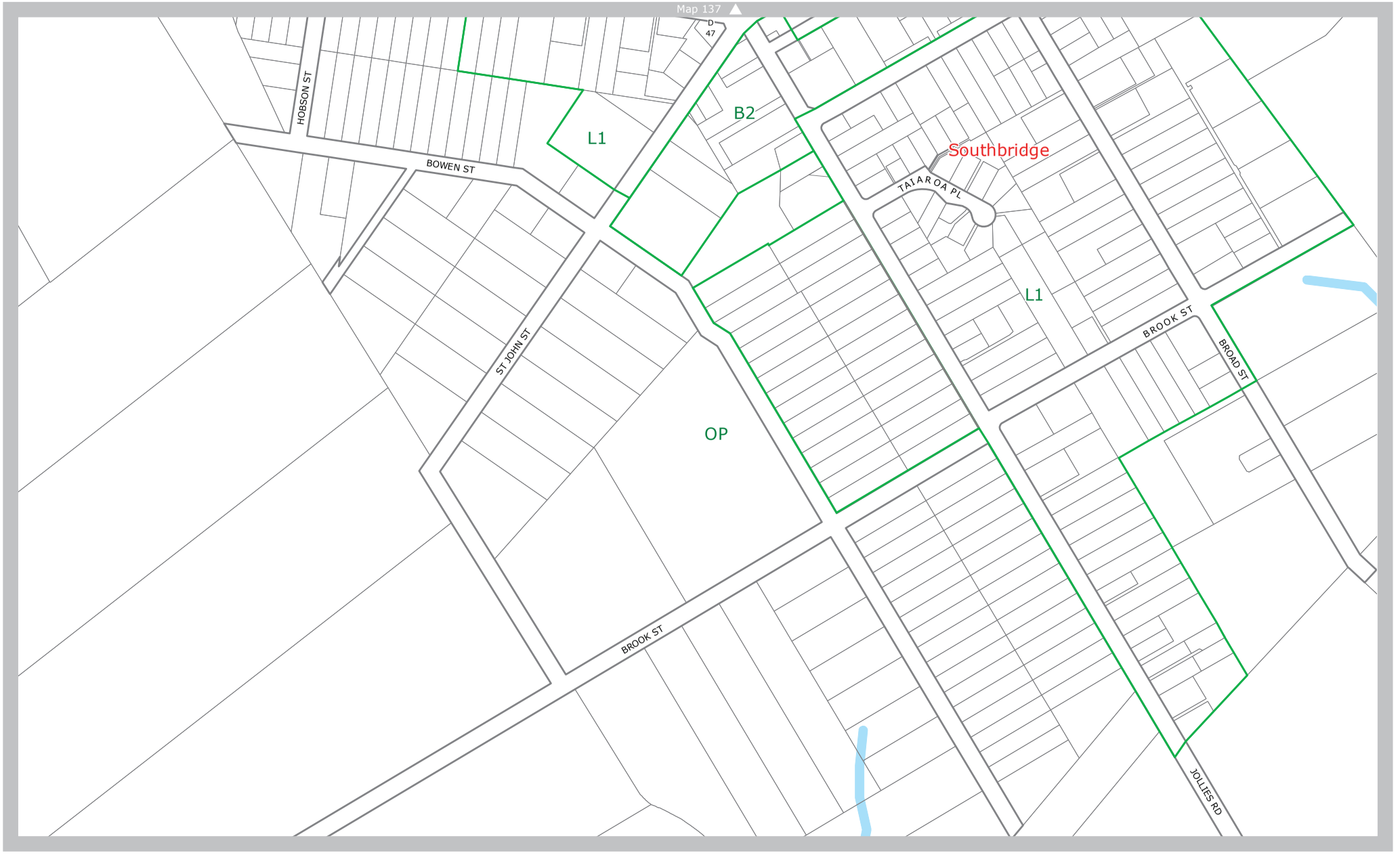
Contours Above Sea Level
- 160m
- 60m
- 2.74m

Zones
- High Country
- Port Hills
- Existing Development Area
- Living 1
- Living 2
- Living X
- Living 3
- Living WM
- Living Z
- Living Z Deferred
- Business 1
- Business 2
- Business 3
- Inner Plains
- Outer Plains
- Malvern Hills

Selwyn DISTRICT COUNCIL

MAP 004

SHEET 2



MAP
138
SHEET 1

SELWYN DISTRICT PLAN

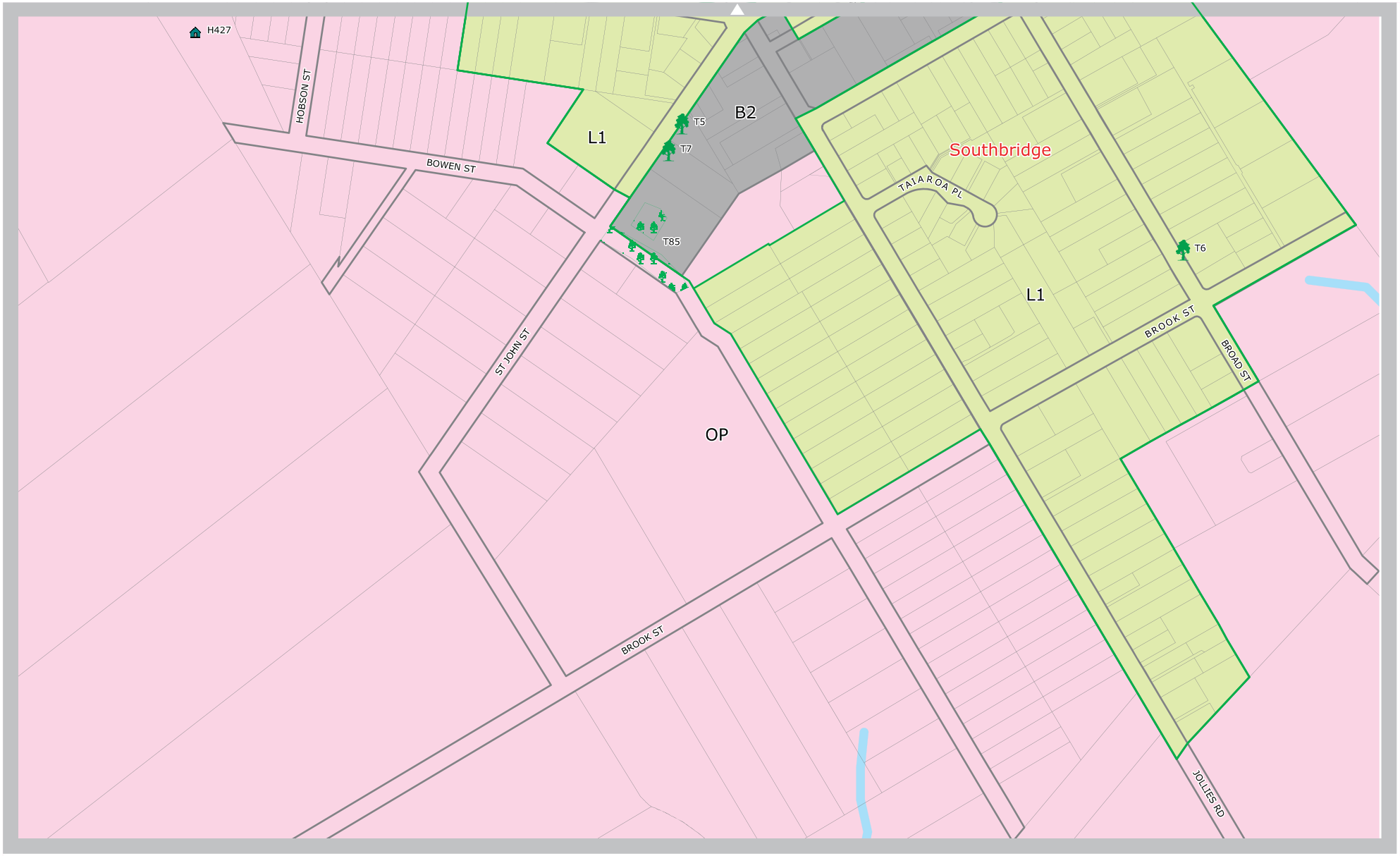
Scale: 1:4,000 at A3

100 0 m

▲ NORTH

KEY

- SDC Designated Sites
- Other Designations
- Chch International Airport Noise Contour
- NZTA Widening Designation
- Fault Lines
- Coastal Hazard
- Transpower Main Lines
- Zones
- Forestry Exclusions
- Outstanding Landscape
- West Melton Observatory Zone
- Outstanding Natural Feature
- Visual Amenity Landscape
- Territorial Authority
  - Surrounding Districts
  - Selwyn District
- Flood Zone
  - Waimakariri Flood Plain
  - Lower Plains Flood Area
  - Lake Ellesmere Flood Area



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Selwyn DISTRICT COUNCIL

MAP
138
SHEET 2

APPENDIX M

Consultation Letter June 2012

20 June 2012

10781 07 287

ROXBURGH PRPOERTY DEVELOPERS LIMITED
PLAN CHANGE TO REZONE FROM RURAL – OUTER PLAINS TO LIVING 1, HIGH STREET, SOUTHBRIDGE

Dear,

You are being sent this letter as a potentially interested party in relation to an application for a proposed Plan Change to the Selwyn District Plan to rezone land at High Street, Southbridge from Rural – Outer Plains to Living 1.

Initial consultation for this project was undertaken in 2008 and a series of consultation meetings was held. However, as a result of the economic downturn, the project was put on hold until recently.

It is now intended to proceed with the application, and as such we have enclosed the proposed Outline Development Plan for the site so that you may have the opportunity to consider the proposal ahead of the formal notification process of the Selwyn District Council under the Resource Management Act 1991.

We would be happy to receive any feedback from you, and this can be addressed to the undersigned.

Thank you for your time in considering this proposal.

GOLDER ASSOCIATES (NZ) LIMITED

Jane West
Senior Planner
Mobile: 021 323 040

JW/kc

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