PREPARED FOR M J STRATFORD
14 JAN 2016

ORIGINAL
URBAN DEVELOPMENT

Infrastructure Report
Proposed Private Plan Change

COMMERCIAL IN CONFIDENCE

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QUALITY ASSURANCE STATEMENT

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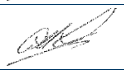
Prepared by	Graham Fowler	
Reviewed by		
Approved for Issue by	Graham Fowler	

DOCUMENT REVISIONS

Issue	Date	Issue Details	Author	Checked	Approved

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1 GENERAL

1.1 INTRODUCTION

The infrastructure report has been prepared to address the servicing requirements for the Private Plan Change of the proposed rural residential development located at 631 Shands Road, Prebbleton, as requested by Michael Joseph Stratford. The proposed Plan Change relates to the whole of the property described as being Lot 1 DP 53113 containing an area of 15.9905 hectares. It is anticipated that the Plan Change to rezone the land to Living 3 will result in 26 rural residential lots containing areas ranging from 0.45 hectares to 1.29 hectares, plus roading and access.

This report addresses the servicing of the development that would follow any successful rezoning of the site and includes sewer reticulation and outfall, water supply, power and telecommunications, stormwater treatment and disposal, and roading. The report includes comment on the suitability of the soils to accommodate the intended rural residential development.

A submission was made to the Rural Residential Strategy under the Land Use Recovery Plan for the application site to be included within the preferred locations for the establishment of rural residential development. The "comments and conclusion" in the Recommendations of the Hearing Commissioners on the Rural residential Strategy stated:

> ***Comment***
>
> *131. It would be necessary to avoid direct access to Shands Road as this is an arterial road, but this appears to be feasible via the proposed connection to Trents Road. We were not told how sewerage reticulation would be provided, but presume this would be by an extension to the service for the PC41 site.*
>
> *132. When we considered this site, we could not see how it differed materially from the Anderson site to the south which has been recommended by the Council for inclusion. If that site is suitable to provide for a peri urban fringe, then we consider this would be similar, and a logical extension of it. It might however be necessary for the proposed road to be extended out to a new intersection at Shands Road, as it would be too long for a cul de sac. However this level of detail is more appropriate for consideration if a plan change is prepared.*
>
> *133. If the balance of the land up to Blakes Road is to be considered we would observe that issues of urban form might arise. We note that in another case Ms Lauenstein did not favour extending rural residential development all the way along the Shands Road edge of the town.*
>
> ***Recommendation***
>
> *134. We recommend that this amended site be included in the RSS, and that this issue of future proofing be considered by the Council at plan change stage.*

1.2 THE SITE

The Plan Change site is located at 631 Shands Road, at a distance of 225 metres northeast of the intersection of Shands Road and Trents Road. The buildings on the property include a single storey dwelling with attached garaging, stables and storage shed, a barn and farm buildings. The site is level and the other than the sealed area around the dwelling, the property is grassed.

The property abuts the Kingcraft Drive Existing Development Area (EDA) for the southern half of the southeastern boundary, where subdivision is provided to create sites containing areas of not less than 1.0 hectare. The properties to the northeast and the property along the balance of the southeast boundary are zoned Rural Inner Plains, where subdivision to create sites of 4.0 hectares is permitted.

An enquiry to the Ecan Listed Land Use Register does not identify that the application site is listed.

2 SITE CONDITIONS

2.1 SOILS

With reference to the New Zealand Geological and Nuclear Sciences Geologic Map 16, Christchurch, dated 2008, the site is overlain by river and alluvial fan deposits consisting of gravels, sands and silts of the Pleistocene Age.

The test pits excavated by Soil and Rock Consultants Ltd, identify 0.2 metres of topsoil, comprising dark brown silt with some fine sand, overlying yellow fine sandy silt. The bore logs obtained from the Environment Canterbury GIS website of the two bores relevant to the property, confirm that the area was overlaid by various assortment of sandy river gravels, interspersed with occasional layers of clay.

2.2 GEOTECHNICAL ASSESSMENT

Soil and Rock Consultants Ltd undertook geotechnical site investigations for subdivision potential in July 2012 and October 2015 for the suitability of the site for the Plan Change application, and to provide recommendations for foundations for future new dwellings.

A summary of the findings is:

- Up to 0.3 metres of topsoil overlies 0.6 metres of firm to stiff sandy silt, which overlies 6 metres of dense sandy gravel.
- Groundwater level 8metres below ground level is considered.
- The site can be considered to have at least 8 metres of non-liquefiable crust.
- Liquefaction analysis indicates that liquefaction-induced ground subsidence is within the designated confines of TC1.
- Ultimate Bearing Capacity 200kPa is available from 0.3 metres below current ground level.
- 300kPa is available from 0.4 metres below current ground level for the design of shallow foundations.
- The site is considered suitable for subdivision from a geotechnical perspective.

Liquefaction Analysis

Existing bores M36/3989, within the property, and M36/5119 suggest groundwater levels between 10.10 metres and 8.50 metres below ground level, respectively. A groundwater level of 3 metres below ground level was used for the liquefaction analysis. A ground water level of 8 metres was also considered.

The liquefaction analysis indicated that there was no liquefiable layers in the three design levels, and that the site can be considered to have at least an 8 metre liquefiable crust.

Ground Suitability

Soil and Rock Consultants Ltd consider that with reference to their investigation and analysis, that a geotechnical Ultimate Bearing Capacity of 200kPa is available from 0.3 metres below current ground surface. 300kPa is available below 0.4 metres below current ground level for the design of shallow foundations.

It was considered in the investigations, that the site was unlikely to be subject to erosion due to water-courses, and that the site was unlikely to be subject to adverse wind erosion. It was considered that the site is suitable for subdivision from a geotechnical perspective.

2.3 CONTAMINATED SOIL POTENTIAL

In October 2015 Lowe Environmental Impact Ltd undertook a Preliminary Site Investigation under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, to assess whether any HAIL activities may have occurred on the application site. The review of the information available included viewing aerial photos, examining Selwyn District Council property files, historic property titles, and a site walk-over to assess currant site conditions and land uses.

The summary of the investigation concluded that based on the information examined, evidence was found that various HAIL activities have historically been undertaken on the site including:

- Storage of hazardous substances on bare land including oil and water based paint, paint conditioners, concrete chemical, oil and lubricants.
- Solid waste disposal to land.
- Scrap metal deposition onto land.
- Spills of hazardous substance and metal grinding/ polishing dust onto land.

It was concluded that the provisions of the National Environmental Standards apply to the application site, and it is recommended that:

- Intrusive investigations should be undertaken prior to redevelopment works occurring.
- Suggested contaminants for analysis in a Detailed Site Inspection would be petroleum hydrocarbons, polycyclic aromatic hydrocarbon compounds, and heavy metals.

2.4 GROUNDWATER

The excavation and testing by Soil and Rock Consultants Ltd were limited to 7.2 metres below ground level, and no ground water was encountered at this depth. Ecan wellbores M36/5119 (82 Blakes Road) and M36/3989 (within the application site) indicate ground water levels of 10.10 metres below ground level and 8.50 metres below ground level respectively.

The ground water level of 8 metres has been assessed for the site, and for the purposes of the liquefaction analysis, a ground water level of 3 metres below ground level was analysed to confirm the suitability of the ground.

3 EARTHWORKS

The application site is flat with a slight fall in a southeasterly direction as applies to the Canterbury Plains. The earthworks proposed will involve the stripping of the topsoil within the road and rights-of-way and excavation for the road and access formations. While the works may include some site shaping, there is no proposal to undertake bulk earthworks.

Within the property, the internal amenity shelter will be removed where no coincident with the proposed lot boundaries, and where the removal disturbs the surrounding soils, restoration and compaction will be undertaken.

In the event that areas of site shaping should involve fill depths that trigger NZS4431:1989, the required compaction will be undertaken and appropriate certifications provided.

Prior to site works being commenced, a sediment control and dust mitigation plan will be prepared and approved by Selwyn District Council and Environment Canterbury. Any excessive dust generated during the construction phase, will be mitigated by the use of dampening by irrigation or dust carts.

4 ROADING

Shands Road is identified in Appendix E9 Roading Hierarchy of Selwyn District Plan as being an Arterial Road. Trents Road from which the Plan Change proposal seeks to use as the access point for all new dwelling sites, is identified as being a local road. The proposal is that only the existing dwelling on Lot 16 on the proposed development plan, will be serviced off Shands Road.

The existing entranceway servicing the dwelling has been formed and sealed with large splays to allow for safe entry and exit onto Shands Road.

At subdivision stage, engineering proposals will be prepared and submitted to Council and approved prior to works commencing. The roading works will include the construction of a length of approximately 75 metres of road within the 18 metre road reserve within the adjoining Living 3 zoned land to the south, and extending the formation to the property boundary.

The roading proposals within the site will include extending the road within an 18 metre wide road reserve to the northern boundary.

5 SEWAGE TREATMENT AND DISPOSAL

The Prebbleton Township gravity reticulated sewage system extends from Springs Road eastward along Trents Road to the intersection with Lindsay Drive. As part of the site works for the Living 3 Trents Road development of the adjoining Anderson property, 90mm diameter PE100 PN16 pressure sewer piping has been installed within Trents Road from the intersection of the new road of the Living 3 zone subdivision to the south, to the sewer manhole at the Trents Road / Lindsay Drive intersection. A 75mm diameter PE100 PN16 pressure sewer has been installed within the eastern side of the new road under construction, terminating at the boundary of the Stratford property. Each of the 16 lots within the adjoining subdivision are to be serviced with an Environment One grinder pump installed within a pump chamber outfalling to a boundary kits located at the road frontages.

It is proposed that the 75mm diameter low pressure sewer reticulation installed to the southern boundary of the application site, be extended along the full length of the proposed new road servicing the Stratford development, to the northern boundary of the application site. 63mm diameter pressure piping will be installed off the 75mm diameter line to the head of the two cul-de sacs. At the time that the low pressure sewer reticulation for the Anderson subdivision was being designed, allowance was made for the pressure sewer to be extended to service the Stratford land, and the pipes within Trents Road and the adjoining Living 3 Trents Road site, were appropriately sized by Ecoflow Ltd to provide for the additional future capacity.

Each of the proposed allotments will be required to install a grinder pump within a chamber at building consent stage, and to install a connection to the boundary kit installed within the roadway at subdivision development stage. The required installation will also include an alarm which will activate when there is approximately only 24 hours of sewage storage available in the pumping chambers located within each lot.

The costs to install the pressure sewage system and the boundary kits will be met by the developer. The costs to install the pumps and pump chambers within the allotments will be met by the land owners, together with any ongoing maintenance.

The existing dwelling on the property is connected to a septic tank with a field tile sewage effluent dispersion system, and it is proposed to decommission this dispersion system within the 1.29 hectare allotment. As part of the site works, a pump chamber will be installed and a 32mm diameter pressure sewer lateral will be installed off the reticulation within the new roading, and installed to the pumping chamber. Following the commissioning of the low pressure reticulated sewage scheme, the outfall from the dwelling will be connected to the pump chamber and the low pressure sewage reticulation.

The existing septic tank will be cleaned and the tank removed from the site.

6 STORMWATER TREATMENT AND DISPOSAL

Existing roof and hard stand stormwater discharges to ground within the site. It is proposed that stormwater from new building erected upon the sites, will discharge to ground via sealed soakpits and that stormwater from impervious surfaces will discharge to swales.

It is not proposed that kerb and channel will be installed within the new roads. Stormwater from the roads will drain to swales on both sides of the roads, which will connect to manholes on either side of boulder pits, where discharge to ground will be via perforated piping installed along the length of the boulder pits. The frequency and location of the boulder pits will be determined following the road design and tests to determine the permeability of the soils.

The discharge of stormwater to land is subject to compliance with the Land and Water Regional Plan and the Natural Resources Regional Plan.

In respect of Rule 5.95 of the Partly Operative Canterbury Land and Water Regional Plan:

5.95 The discharge of stormwater into a river, lake, wetland or artificial watercourse or onto or into land in circumstances where a contaminant may enter a river, lake, wetland, or artificial watercourse is a permitted activity, provided the following conditions are met:

1. The discharge is into a reticulated stormwater system and the discharger has obtained written permission from the system owner to discharge into the system; or

2. The discharge is not into a reticulated stormwater system, and

(a) The discharge is not from, into or onto contaminated or potentially contaminated land; and

(b) The discharge is not into:

- *(i) a water race, as defined in Section 5 of the Local Government Act 2002; or*
- *(ii) a wetland, unless the wetland is part of a lawfully established stormwater or wastewater treatment system; or*
- *(iii) a waterbody that is Natural State, unless the discharge was lawfully established before 1 November 2013; and*

(c) The discharge does not result in an increase in the flow in the receiving waterbody at the point of discharge of more than 1% of a flood event with an Annual Exceedance Probability of 20% (one in five year event); and

(d) The discharge meets the water quality standards in Schedule 5 after reasonable mixing with the receiving waters, in accordance with Schedule 5; and

(e) The concentration of total suspended solids in the discharge shall not exceed:

- *(i) 50 g/m3, where the discharge is to any spring-fed river, Banks Peninsula river, or to a lake except when the background total suspended solids in the waterbodyis greater than 50 g/m3 in which case the Schedule 5 visual clarity standards shall apply; or*
- *(ii) 100 g/m3 where the discharge is to any other river or to an artificial watercourse except when the background total suspended solids in the waterbody is greater than 100 g/m3 in which case the Schedule 5 visual clarity*

(f) The discharge to water is not within a Group or Community Drinking-water Protection Zone as set out in Schedule 1.

The proposal to discharge stormwater to ground within the proposed development will comply with all of the conditions under the Land and Water Regional Plan so no consents will be required under this plan.

In respect of the Canterbury Resources Regional Plan, Rule WQL6 states:

Discharge from any Source

1.

(a) *The discharge shall not cause stormwater from up to and including a 24 hour duration 2% exceedance probability rainfall event to enter any other property beyond the boundary of the property or area in which the discharge occurs, unless written authorisation from the affected landowner is obtained;*

(b) *The discharge shall not result in the ponding of stormwater on the ground for more than 48 hours;*

(c) *The discharge shall not cause erosion of soil;*

(d) *The discharge system shall be located at least one metre above the highest groundwater level that can be reasonably inferred for the site at or about the time the system is constructed; and*

(e) *The discharge shall not be onto or from a property that has been registered by the Environment Canterbury on its Listed Land Use Register as a site that is; 'not investigated', 'below guideline values for', 'managed for', 'partially investigated', 'significant adverse environmental effects' or 'contaminated for'.*

Discharge solely from a roof

2.

(a) *The discharge system shall be sealed to prevent any other contaminants entering the system.*

Discharge from any source other than a roof

3.

(a) *The discharge shall not be within a Community Drinking Water Supply Protection Zone for a well listed in Schedule WQL2 if:*

(i) the discharge was not lawfully established before the date this rule became operative; and

(ii) the discharge is from that part of a road, including a State Highway, that has four lanes for motor vehicles.

(b) *The discharge shall not be from a property where:*

(i) an activity or industry specified in Schedule WQL9 is occurring; or

(ii) the quantity of hazardous substances stored or handled exceeds the thresholds in Schedule WQL9;

and the hazardous substances may become entrained in stormwater.

(c) *A discharge that is:*

(i) solely from a sealed road; or

(ii) from a combination of sources;

and is located in an area where the depth to unconfined or semi-confined groundwater is less than six metres as indicated in Map Volume - Part 2 Indicative Maps, shall either be via a fully vegetated soil treatment system with the following characteristics:

(1) a minimum depth of 200 millimetres of soil, and

(2) an infiltration rate between 20 and 50 millimetres per hour, and

(3) at least 5 per cent clay content in the soil, and

(4) be designed to capture and infiltrate all contributing stormwater for rainfall events up to and including a 24 hour duration ten per cent annual exceedance probability;
or via an alternative stormwater treatment system that is certified in writing by a suitably qualified and competent person as providing at least equivalent stormwater treatment.

A copy of that certification, design plans for the system and appropriate technical documentation that demonstrates the technical basis for the certification shall be provided to the Environment Canterbury at least 20 working days prior to installation.

***(d)** Unless the discharge from a combination of sources was lawfully established before the date this rule became operative, or the discharge is into a stormwater collection system for an authorised stormwater discharge, the discharge shall not be from an area of disturbed land of greater than:*

(i) 1000 square metres within Zone BP in Map Volume - Part 1 Planning Maps, or

(ii) (ii) two hectares in any other location.

The proposed stormwater discharge will generally meet the requirements for permitted discharge in terms of the Canterbury Resources Regional Plan possibly other than the discharge may be from an area of disturbed land greater than 2 hectares in area.

The area of the road reserves within the development area is 1.25 hectares, and regrading the frontages to match the berm layout may result in an area greater than 2 hectares being disturbed. Staging the development area would result in compliance with Rule WQL6.

Prior to any earthworks or site construction works being undertaken, an Erosion and Sediment Control Plan will be prepared and forwarded to Environment Canterbury and Selwyn District Council for approval. The proposals in terms of Environment Canterbury Erosion and Sediment Control Guidelines, will detail any sediment retention basin or silt control that may be required with the construction and implementation prior to commencement of extensive roading works.

The nearest water race is along the northern frontage of Trents Road, at a distance of 220 metres from the application site.

7 ELECTRICITY SUPPLY

Overhead high voltage electrical cabling is located along the northern side of Shands Road. A pole transformer is located in a position some 85 metres north of the southern boundary of the application site and low voltage overhead electrical reticulation extends northwards to a pole 125 metres from the southern Shands Road frontage, where the low voltage cabling crosses to a pole at the road frontage, from which the reticulation to the dwelling and sheds on the property is underground reticulation.

In terms of the subdivision layout, the underground reticulation to the dwelling on proposed Lot 15, passes along the northern boundary of the two lots to the south of the dwelling site. The reticulation will be retained within proposed easements to be created at subdivision stage.

The electrical reticulation for the potential to reticulate the Stratford property should the land be rezoned as Living 3, was considered when the servicing was planned for the Living 3 zoned property immediately to the south. The adjoining Anderson property was serviced by providing electrical connection to the high voltage reticulation in Trents Road, and installing underground high voltage cabling to an electrical kiosk located on the eastern side of the new road which allows for extension to the Stratford land. The new lots within the Anderson property have been serviced with low voltage underground reticulation from the electrical kiosk.

The electrical design of the Living 3 zoned property to the south, was prepared by Design-Net. The design plan acknowledged that up to 14 lots could be serviced from the low voltage reticulation from the electrical kiosk, and that possibly 28 lots might be created by the future subdivision of the Stratford land. The full servicing of the Stratford land could be undertaken by extending high voltage reticulation through the proposed future subdivision and connecting to the high voltage reticulation in Springs Road.

To fully provide electrical reticulation to the proposed subdivision, it is proposed that underground high voltage cabling be extended northwards from the electrical kiosk site along the proposed road, along the northern cul-de-sac, along the right-of-way servicing Lots 16 and 19 on the application plan, with a connection to the high voltage overhead electrical reticulation on the western side of Shands Road.

The electrical cable network to service all proposed lots will be installed by Orion New Zealand approved contractors and will be paid for by the developer.

8 TELECOMMUNICATIONS

Underground telephone cabling has been installed along the eastern side of Shands Road and an underground telephone connection to the dwelling on the property has been installed in a common trench with the power connection, located on the northern boundary of the two proposed lots adjoining proposed Lot 15. It is proposed that this reticulation to the dwelling be retained, and appropriate easement created.

Enable have installed fibre cabling from the Oakley Drive subdivision, westward along Trents Road and into the Anderson Living 3 zoned subdivision to the south of the application site, terminating at the common boundary of the new road. We have sought and obtained confirmation from Enable Ltd that the existing reticulation has the capacity to be extended to service the land subject to this Plan Change proposal.

It is proposed that regardless of whether the reticulation be provided by Enable Ltd or Chorus Ltd, that underground fibre telephone connections be provided to all proposed lots, and installed in terms of the standard subdivisional requirements. The costs of extending the telephone network and providing cabling to each allotment, will be met by the developer.

9 WATER RETICULATION

There is no Council reticulated water supply installed within Shands Road. The dwelling on the property is serviced from a 200mm diameter bore, located on the western side of the dwelling. The bore was sunk to a depth of 30 metres and the calculated minimum water level is 10.1 metres. It is proposed that this well be retained as the potable supply source for the dwelling.

A Selwyn District Council reticulated water supply is installed in Trents Road, and a 150mm diameter has been installed off this reticulation along the new road within the Living 3 zone immediately to the south, terminating at the proposed extension of the road to service the proposed development of the Stratford land.

The water supply to service the development will be designed in accordance with Selwyn District Council specifications and SNZ PAS 4509:2008 New Zealand Fire Fighting Water Supplies Code of Practice. The water main will be extended to the northern boundary of the development, and fire hydrants will be spaced at distances not greater than 135 metres as required by the standard.

Submains will be installed along the proposed roads and water laterals to the proposed new lots will be installed at development stage, following approval of the works by Selwyn District Council.

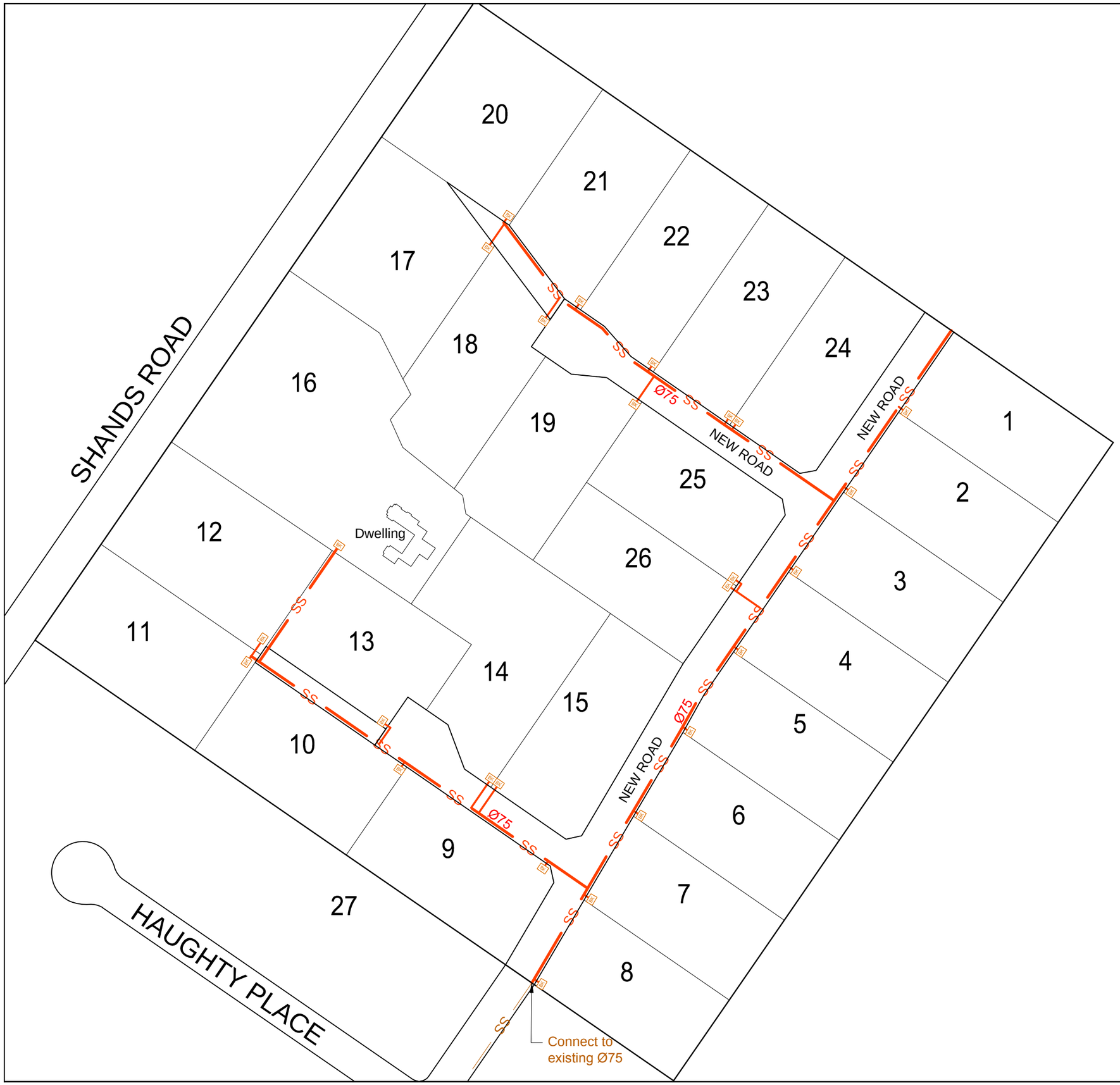
The costs associated with the extension of the water main and the provision of connections to the allotments, will be met by the developer.

10 CONCLUSION

This report addresses the servicing of the proposed rural residential development of the application site following acceptance of the rezoning proposal, and includes roading, sewage disposal, stormwater treatment, electrical and telecommunications supply, and water reticulation.

The proposed infrastructure has been investigated in conjunction with specialist utility engineers and utility operators. The methodologies and proposal presented are consistent with established standard engineering practice.

Based upon our investigations, preliminary calculations and consultation with specialists, we have concluded that the infrastructure proposed for this development is appropriate to meet the future servicing requirements.



GENERAL NOTES

Property Address:	631 Shands Road
Registered Owners:	M.J. Stratford
Comprised in:	CB31B/383
Local Authority:	Selwyn District Council
Total Area:	15.9905ha
Zoning:	Inner Plains

1. Existing lot boundaries shown are derived from information sourced from LINZ.
2. Horizontal Datum:
   NZGD 2000
   Mount Pleasant Circuit

N

LEGEND

Extent of Subdivision

EXISTING SERVICES

SS Wastewater Pipe

PROPOSED SERVICES

SS Wastewater Pipe
Wastewater Lateral
BK Low Pressure Boundary Kit

Revision		App	Date
0 INITIAL ISSUE		GF	14.01.16
Surveyed	-		
Designed	GF	22.12.15	
Drawn	JK	22.12.15	
Reviewed	GF	22.12.15	
Approved	GRAHAM FOWLER		

Client
M.J. STRATFORD

Project Title
REZONING -
631 SHANDS ROAD

Sheet Title
CONCEPT WASTEWATER LAYOUT -
LOW PRESSURE SUPPLY

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Scale (A3 Original) 1:2000

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Project No	Sheet	Revision
708726.002	V45	0

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GENERAL NOTES

Property Address:	631 Shands Road
Registered Owners:	M.J. Stratford
Comprised in:	CB31B/383
Local Authority:	Selwyn District Council
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1. Existing lot boundaries shown are derived from information sourced from LINZ.
2. Horizontal Datum:
   NZGD 2000
   Mount Pleasant Circuit

N

LEGEND

Extent of Subdivision

EXISTING SERVICES

W Water

PROPOSED SERVICES

W Water
FH Fire Hydrant

Revision		App	Date
0 INITIAL ISSUE		GF	14.04.16
Surveyed	-		
Designed	GF		22.12.15
Drawn	JK		22.12.15
Reviewed	GF		22.12.15
Approved	GRAHAM FOWLER		

Client
M.J. STRATFORD

Project Title
REZONING -
631 SHANDS ROAD

Sheet Title
CONCEPT WATER SUPPLY PLAN

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calibre CONSULTING

Scale (A3 Original) 1:2000

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Project No	Sheet	Revision
708726.002	V50	0

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