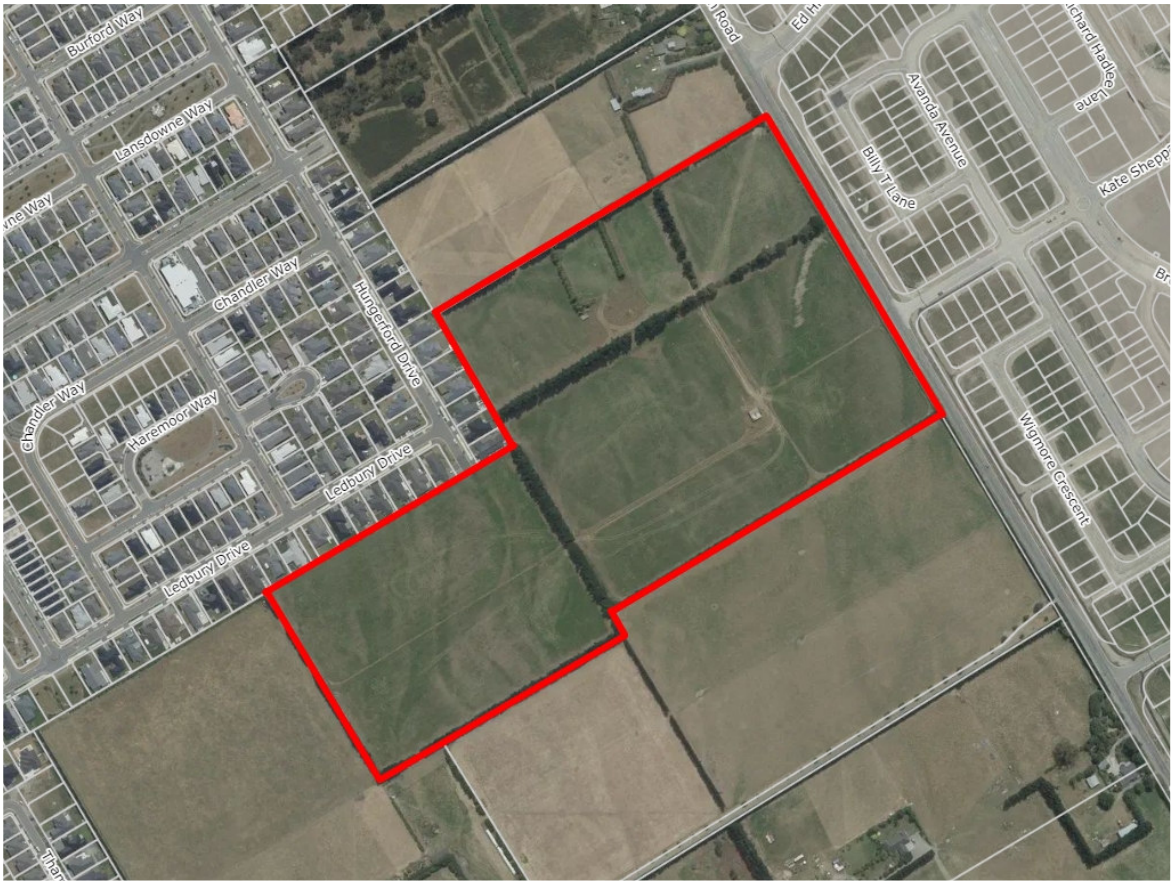


SERVICING REPORT

SPRINGSTON ROLLESTON ROAD - ROLLESTON

DATE
29/09/22

CLIENT
KEVLER DEVELOPMENT LTD

SURVUS CONSULTANTS
surveying engineering property development

Document Control

Document ID: J:\15100-15149\15124KEVLERDEVELOPMENTLTD\ENGINEERING\15124 INFRASTRUCTURE REPORT REV A.DOCX

Rev No	Date	Revision Details	Author	Verifier	Approver
A	29/09/22	FOR INFORMATION	CWH		CWH

Contents

1. Executive Summary

Kevler Development Limited have instructed Survus Consultants to complete an servicing report for a site in Springston Rolleston Road (the “subject site”) located on the south east side of Rolleston. This report assesses the feasibility of providing the engineering services to develop this land as a residential subdivision in accordance with all relevant Council and industry standards and guidelines.

The site is gently sloping from north west to south east at a grade of approx. 1:200 (0.5%). Soils consist of topsoil overlying silty gravels. Groundwater levels (as interpolated from well cards) typically vary between 5-6m BGL.

Access to the proposed subdivision would be from several points. There is a proposed new access point onto Springston Rolleston Road. There are other access points that tie into existing roads, including Hungerford Drive to the north, and Lemonwood Drive to the west. There are other connections proposed to other recently consented developments to the north and other proposed roading to the south.

Stormwater servicing is proposed to be a network which discharges to ground via rapid soakage trenched/soakpits.

Wastewater servicing will be provided by way of a gravity reticulation system that drains to an existing sewer main that is located on Springston Rolleston Road. A wastewater pump/lift station is required to be installed to service the development.

Water Supply is readily available and able to connect onto. There is an existing 450mm water main located in Springston Rolleston Road. Connections will also be made onto the existing reticulation at Hungerford Drive and Lemonwood Drive. Modelling will confirm there is an adequate water supply to service the development with potable water and to satisfy fire-fighting requirements.

Given the information available and the investigations conducted to date we recommend that the development land can be effectively serviced to the requirements of SDC and other national standards.

2. Introduction

2.1 Scope

Survus Consultants has been commissioned by Kevler Development Limited to complete a servicing report to support a subdivision and land use consent application for the subject site in Rolleston. The report will cover the following components:

- Bulk Earthworks
- Roading/Transportation
- Stormwater drainage
- Wastewater reticulation
- Water reticulation
- Power, Telecommunications and Streetlighting.

2.2 Site Background

The site is located on the southern side of Rolleston, fronting Springston Rolleston Road. The site backs onto the "Faringdon" Development to the north east. There is currently 1 underlying title involved, as follows;

Address	Name of Lot/Appellation	Area (ha)	Record of Title (RT)
Springston Rolleston Road	Lot 2 DP 61162	15.9235	CB38C/605
	Total	**15.9235ha**	

The development is a proposed subdivision that will ultimately provide facilities for up 275 lots.

There are no other resource consents in with SDC or any other consenting authority at this stage for this property.

3. Bulk Earthworks

3.1 Bulk Earthworks Design

The topography of the existing site is generally sloping from north west to south east, with a height difference of approximately 2.2 metres between the two points. Currently the majority of the site comprises agricultural fields and pasture. There are no existing houses on the site, but there is an old garage and deer sheds. Please find attached existing site contour plan in **Appendix A**.

Bulk earthwork design would be dictated by the need to have a 1:500 (absolute minimum) grade from the top of kerb to the rear of the sections fronting the road.

The design philosophy for the setting of earthwork levels will be determined by the following criteria:

1. Road gradients not to exceed 1 in 20, not to be less than 1:450 where possible
2. Cut/fill balance where applicable

Overland flow paths for the subdivision are to follow the roading and stormwater layout, with the overall site overland flows not being substantially different to the current situation.

There is an old depression in the eastern paddock which has now been abandoned. It is proposed that the depression would filled in as part of the general earthworks carried out onsite.

Existing levels will need to be met along shared external boundaries where applicable.

3.2 Proposed Earthworks Design Methodology

There will be the need to complete a cut/fill balance across the site, to avoid carting material off-site. This means that engineered fill may be utilised in certain areas to reapportion dugout materials from roading areas.

Certain areas will need to be filled to ensure that flooding does not cause a problem. There is an area that can be seen on the below flooding map, to the east of the property, which will need to be filled.

If there is any filling exceeding 300mm it will be engineered fill and testing requirements will be met as per NZS4431:1989.

It is envisaged that material won from site, will be sufficient to use as structural engineered fill.

3.3 Flooding

As discussed below, there is a certain amount of flood ponding on the existing site. Flooding from both the 1:200 and 1:500-year ARI rain events is present on the subject site. Please see following flooding map. It is envisaged that any of the minor depressions that are running through site will be locally filled and the overall site will be graded such that any minor flooding issues are minimised.

The flooding map shown below in Figure 1 shows that the worst flooding is on the eastern side of the site adjacent to Springston Rolleston Road. The worst flooding depth as shown as the light blue colour is 0.51m.

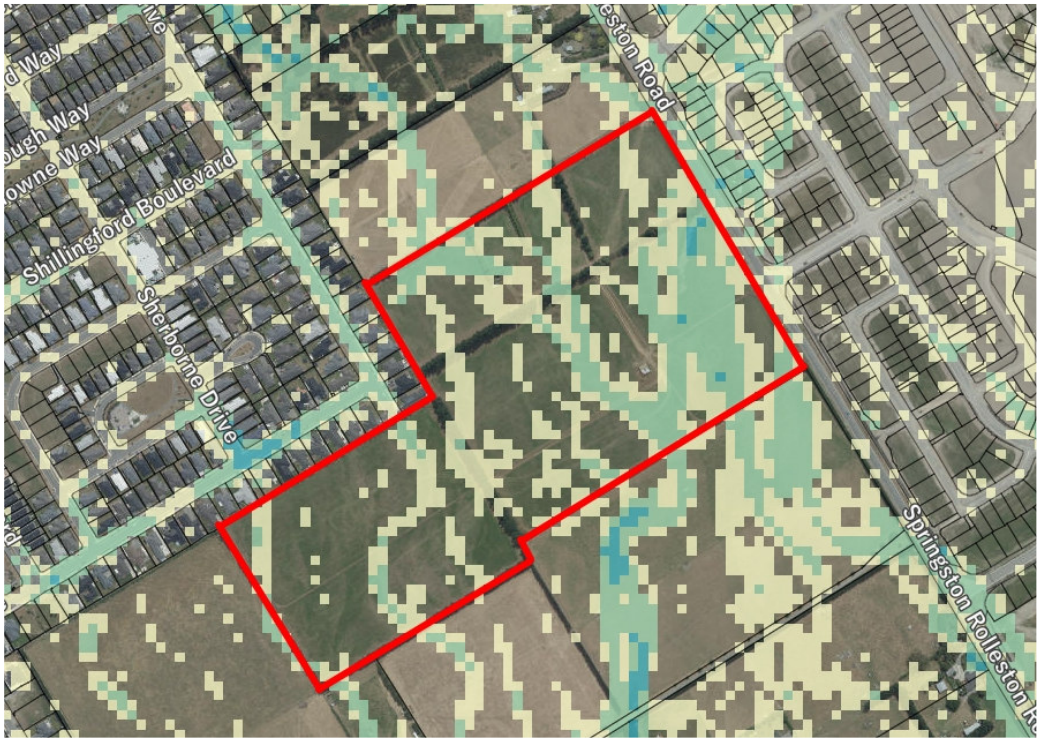


Figure 1: 200 year ARI rainfall flooding depth

4. Roading/Transportation

4.1 Proposed Road Network

4.1.1 Layout

The proposed roading layout can be seen on the ODP plan attached as **Appendix B.**

There are multiple proposed connections onto the subject property.

The first connection enters the site from Springston Rolleston Road to the east. This has been extended through to the western boundary of the subject site and is intended to link up with the adjacent Lemonwood Drive.

The second proposed connection enters the site from existing Hungerford Drive and once links through to the property to the south.

There are other links that will be created, such to the north of the subject site through to the "Silverstone" development that is currently being completed.

4.1.2 Roading Typology

All roading typologies and widths will be as per attached **Appendix B.**

4.1.3 Stormwater drainage

Stormwater runoff within the road corridors will be via kerb and channel into appropriately spaced sumps which will be connected to rapid soakage trenches/soakpits. All sumps will have trapped and/or inverted outlets.

It is envisaged that all lots will have individual soakpits onsite that will enable direct connections of dwelling and hardstand area stormwater.

The road corridor will be used as overland flow paths to direct stormwater runoff when the piped system is at full capacity (i.e. larger than a 50 year storm).

4.1.4 Pavement profiles

In reviewing the existing Geotech report, the underlying material will be suitable to achieve required compaction levels to ensure that the roading can be built to necessary standards.

4.1.5 Kerbing Options

Standard "SDC Low Profile" kerb and channel will be used in all roads in the subdivision, with cutdowns where appropriate.

4.1.6 Footpaths

Footpaths are to be installed in the roading network.

4.1.7 Roading Upgrades

It is anticipated that the Springston Rolleston Road frontage will be required to be upgraded to full roading standard. This includes kerb and channel, footpath and piping the stormwater drain.

5. Stormwater

5.1 Existing site stormwater management

There is currently no existing reticulated stormwater network located on the subject site, or close to the site.

Minor depressions and drains run throughout the site which will be dealt with through the detailed design process.

5.2 Proposed Stormwater Disposal

The proposed stormwater network for the development is proposed to be a surface water conveyance system which will discharge to soakage trenches or soakpits.

Individual lots will need to apply for individual consents for lot discharges to ground.

5.3 Proposed stormwater design

5.3.1 Roading System

It is proposed that the roading stormwater network for the development will consist of a surface water conveyance system which will discharge into sumps to soakage devices.

Key design parameters of the system are as follows;

- Kerbs will direct stormwater from roads into the appropriately spaced sumps.
- 50m² of hardstand area from private lots will be accounted for within the roading sumps.
- All sumps will have submerged outlets into the soakpits.
- Stormwater up to and including the 2 percent annual exceedance probability critical storm for the site will be catered for within the soakpits.

5.3.2 Private Lots

It is envisaged that all lots will have individual soakpits onsite that will enable direct connections of dwelling and hardstand area stormwater.

5.4 Soil profile and Groundwater

The geotechnical report, alongside the analysis of several well cards adjacent to the area, indicate that the ground profile would be similar to the following

- 200mm of topsoil, on
- Silty Gravels around 5-5 – 6.0m Below Ground Level (BGL) in this general area of Rolleston.

5.5 ECAN Consents

It is envisaged that Ecan consents will be required for the following activities;

- To use land for excavation and earthworks
- Discharge construction phase stormwater
- Discharge operational discharge to land

These consents will be applied for at the time of subdivision consent or engineering approval.

6. Wastewater

6.1 Existing Infrastructure

There is an existing 450mm uPVC sewer main in Springston Rolleston Road that was installed in 2017. This is the only possible sewer connection at present. Council have advised that this pipe has sufficient capacity to take the subject site.

The existing sewer line is approx. 2.8m deep, which will not provide sufficient depth to service the entire subject site catchment. It is therefore proposed that a sewer pump/lift station would be installed central to the site which would then allow the entire subject site to reticulate to Springston Rolleston Road. The location and specification of the pump station has been shown on the scheme plan. This will be subject to detailed design at engineering approval stage.

6.2 Proposed wastewater design

It is proposed that the basis of the wastewater reticulation is to be a gravity reticulation with a lift/pumping station for part of the site grading to the existing sewer main on Springston Rolleston Road.

The gravity sewer is proposed to be laid at 1:200 (minimum grade) for the development.

Minimum grades as per the below table will been used for the system.

Table 3: Minimum Grades

Pipe Diameter	Public/Private	Min Grade Used
150mm uPVC SN10	Public	1:200
100mm uPVC (laterals)	Private	1:80

All new lots will be supplied with a 100mm uPVC lateral connection which will be connected to the wastewater mains.

7. Water Supply

7.1 Existing Infrastructure

As per the SDC 5 Waters Activity Management Plan, there has been a 450mm watermain laid along the frontage of the subject site. Discussions with Council have indicated that this is readily to connect onto.

There are existing water mains located to the north that would be reticulated into.

7.2 Proposed Water Reticulation

It is envisaged that a ring water main would be extended from Springston Rolleston Road and connected to the Hungerford Drive, or a number of other connection points. Additional mains would be extended through the development to connect onto other watermains if available. All other internal reticulation sizing and layout would be modelled and designed to maintain required pressure. A combination of main and submain reticulation would be used throughout the development area.

7.3 Fire fighting requirements

All reticulated supply would be unrestricted, and as such would be subject to the provisions of FW2 from SNZ PAS 4509:2008.

This standard requires at least one fire hydrant to be located within 135 m of any dwelling, and two hydrants located within 270m of any dwelling. Each hydrant must have the capacity to provide a minimum of 12.5 L/s with a minimum residual pressure of 100 kPa.

It is anticipated that there would be sufficient pressure in the current system to comply with the above requirements.

All new mains will have hydrants spaced to satisfy SNZ PAS 4509:2008.

8. Power, Telecommunications and Streetlights

8.1 Power Supply

There is an existing overhead HV line on Sprinston Rolleston Road. It is envisaged that the subject site will be reticulated from this line.

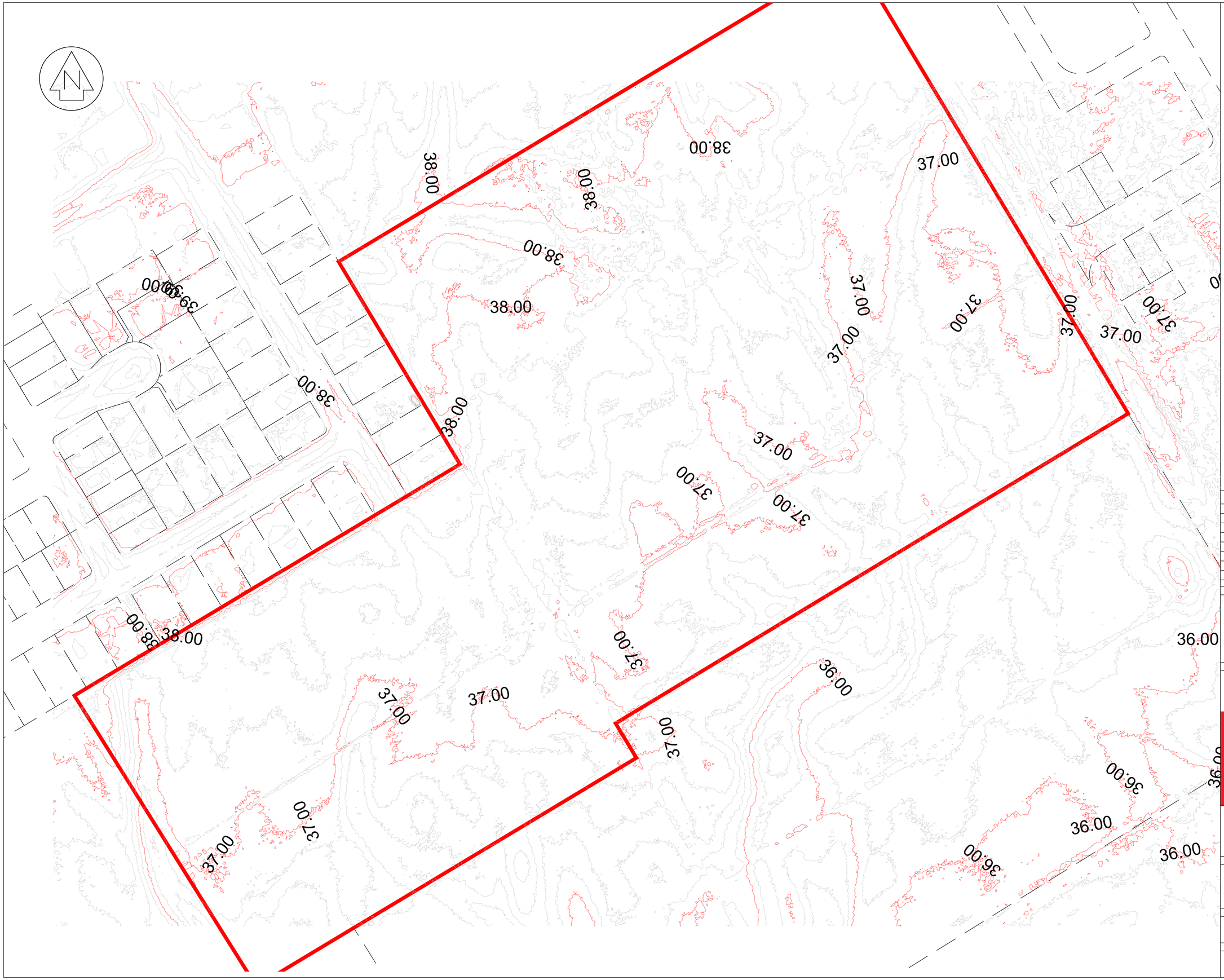
8.2 Telecommunication Supply

The subject site is within an Enable supply area. It is noted that all new subdivided land to the north have current enable connections

Liaison with Enable will be undertaken to determine network connection points.

8.3 Streetlighting

All streetlighting will be installed as per industry regulations. A lighting design will be completed at the detailed engineering approval stage.



REV	DATE	REVISION DETAILS	ISSUED
A	18/08/21	FOR INFORMATION	CWH

PROJECT

SPRINGSTON
ROLLESTON ROAD

CLIENT

KEVLER
DEVELOPMENT LTD

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DRAWING TITLE

EXISTING CONTOURS
LOT 2 DP 61162

STATUS	SCALE	SIZE
FOR INFORMATION	1:1000	A1

PROJECT NO	DRAWING NO	REVISION
15124	EN-01	A

TIE INTO EXISITNG ADAMITE DRIVE FORMATION

ROAD 5

ROAD 3

ROAD 7

ROAD 1

ROAD 4

SPRINGSTON ROLLESTON ROAD

120 492m² + access	2001 309m²	119 402m²	118 400m²
117 400m²	116 400m²	115 400m²	114 400m²
113 400m²	112 400m²	111 424m²	
121 400m²			
122 476m²			
123 494m²			
124 494m²			
125 494m²			
126 494m²			
127 556m²			
237 343m²	233 417m² + access	128 322m²	
236 331m²		129 319m²	
235 376m²	234 336m²	232 340m²	231 330m²
230 347m²			

136 465m²	137 465m²		
135 473m²	138 473m²		
134 473m²	139 473m²		
133 473m²	140 473m²		
132 473m²	141 473m²		
131 473m²	142 473m²		
130 462m²	143 462m²		
147 402m²	146 404m²	145 404m²	144 401m²

110 503m²	99 486m²		
109 511m²	100 493m²		
108 511m²	101 493m²		
107 511m²	102 493m²		
106 511m²	103 493m²		
105 511m²	104 493m²		
500 1948m²			

74 417m²	73 406m²	72 406m²	71 406m²
70 406m²	69 406m²		

75 444m²	76 443m²	77 443m²	78 461m²
98 403m²			79 418m²
97 345m²	96 413m² + access		80 418m²
94 345m²	95 413m² + access		81 418m²
93 345m²	92 413m² + access		82 418m²
90 345m²	91 413m² + access		83 418m²
89 308m²	88 341m²	87 341m²	86 341m²
85 341m²	84 333m²		

68 431m² + access	67 384m²	66 382m²	65 382m²
64 382m²	63 382m²	62 382m²	61 382m²
60 382m²	59 382m²	58 408m²	

1 300m²	2 300m²	3 300m²	4 300m²
5 300m²	6 300m²	7 300m²	8 300m²
9 300m²	10 300m²	11 300m²	12 300m²
13 300m²	14 333m²		

158 400m²	157 404m²	156 403m²	155 403m²
154 403m²	153 402m²	152 402m²	151 401m²
150 401m²	149 400m²	148 401m²	2000 2202m²
3000 Local Purpose Reserve	159 456m²	160 455m²	161 455m²
162 455m²	163 455m²	164 415m²	165 400m²
166 400m²	167 400m²	168 400m²	169 400m²
170 400m²	171 405m²		

52 314m²	51 354m²	50 354m²	49 347m²
53 322m²			48 354m²
54 322m²	55 349m² + access		47 354m²
57 282m²	56 349m² + access		46 354m²
40 319m²	41 352m²	42 352m²	43 351m²
44 351m²	45 342m²		

25 416m²	26 400m²	27 400m²	28 400m²
29 400m²	30 400m²	31 400m²	32 435m² + access
15 336m²	16 301m²	17 301m²	18 301m²
19 301m²	20 301m²	21 301m²	22 301m²
23 301m²	24 300m²		

187 334m²	186 338m²	185 337m²	184 337m²
183 337m²	182 337m²	181 337m²	180 337m²
179 337m²	178 337m²	177 337m²	176 337m²
175 337m²	174 337m²	173 337m²	172 306m²
188 367m²	189 436m²		

39 318m²	38 340m²	37 340m²	36 340m²
35 340m²	34 340m²	33 340m²	

REV	DATE	REVISION DETAILS	ISSUED
1	30/09/22	FOR INFORMATION	CWH

PROJECT

HARROW GREEN

CLIENT

KEVLER DEVELOPMENT

SURVUS CONSULTANTS
PLANNING + SURVEYING + ENGINEERING

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TOLL FREE 0508 787 887 DARFIELD 03 318 8151

DRAWING TITLE

ROADING LAYOUT
SHEET 1 OF 2

STATUS	SCALE	SIZE
FOR INFORMATION	1:600	A1

PROJECT NO	DRAWING NO	REVISION
15124	EN-300	A

UNGERFORD DRIVE

TIE INTO EXISITNG HUNGERFORD DRIVE FORMATION

ROAD 1

ROAD 2

ROAD 4

ROAD 5

ROAD 6

ROAD 7

ROAD 8

REV	DATE	REVISION DETAILS	ISSUED
1	30/09/22	FOR INFORMATION	CWH

PROJECT

HARROW GREEN

CLIENT

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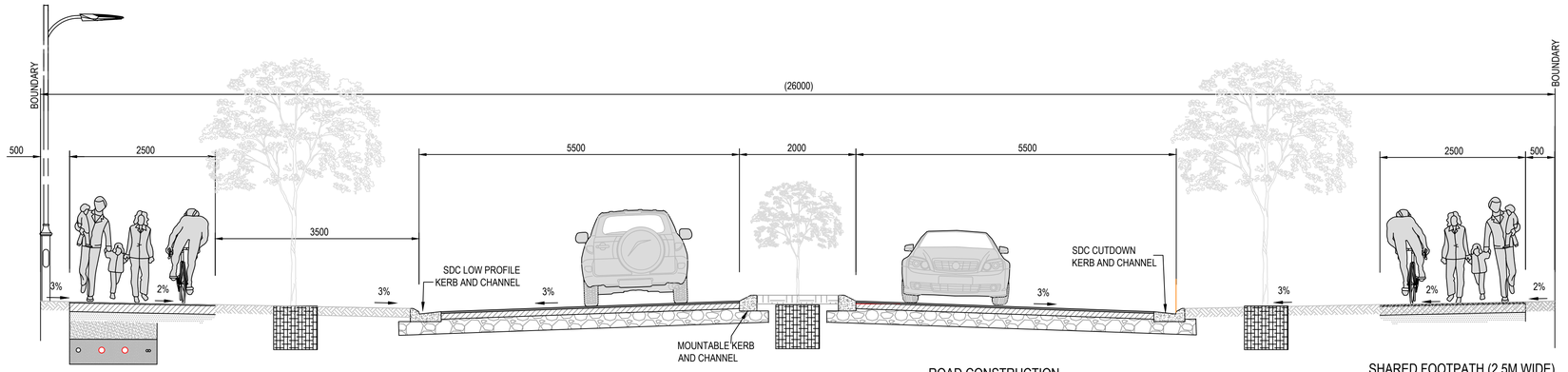
DRAWING TITLE

ROADING LAYOUT
SHEET 2 OF 2

STATUS	SCALE	SIZE
FOR INFORMATION	1:600	A1

PROJECT NO	DRAWING NO	REVISION
15124	EN-301	A

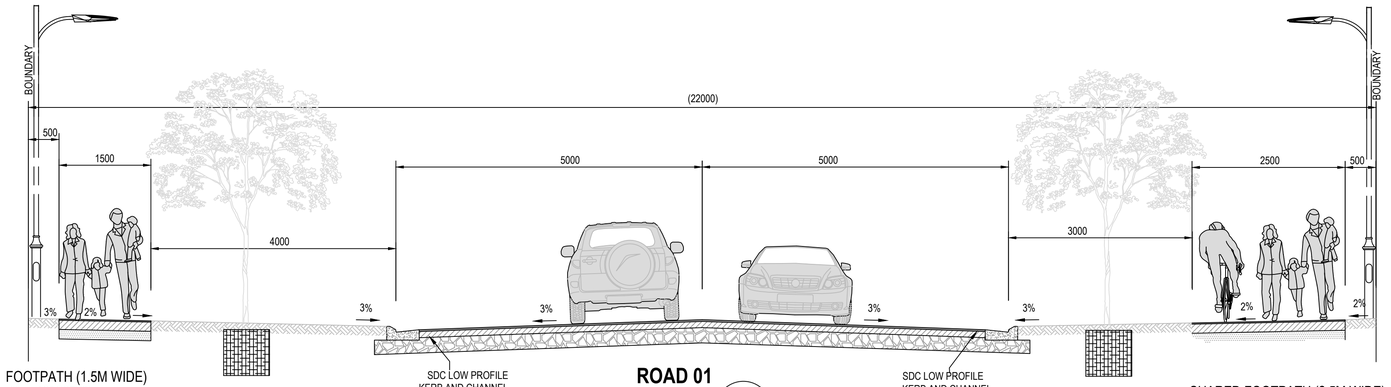


SHARED FOOTPATH (2.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

ROAD 01 SECTION A-A
1:50

ROAD CONSTRUCTION
- 30mm AC10 HOTMIX (ON FULL GRADE 6 PRIME COAT)
- 100mm M/4 AP40 BASECOURSE
- 380 MM AP65 SUBBASE ON COMPACTED SUBGRADE (CBR8)

SHARED FOOTPATH (2.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

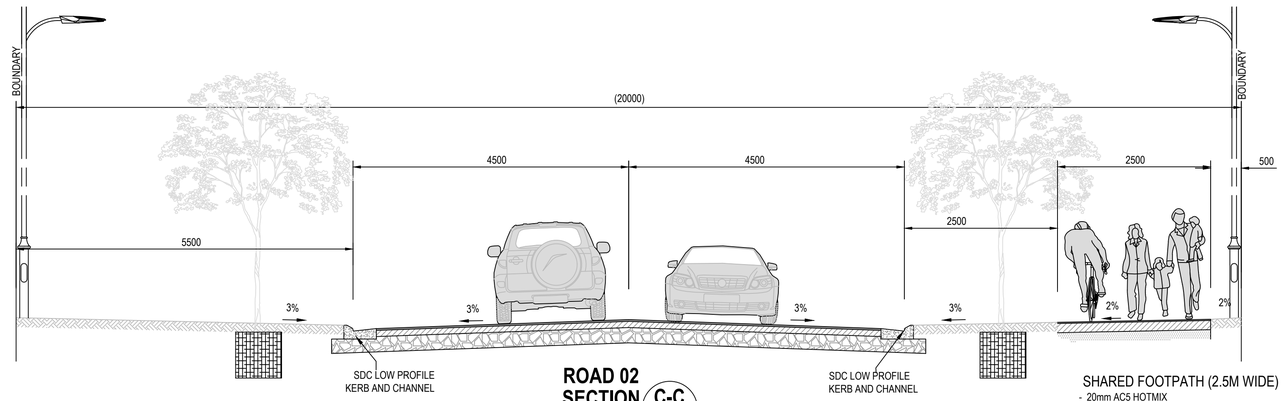


FOOTPATH (1.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

ROAD 01 SECTION B-B
1:50

ROAD CONSTRUCTION
- 30mm AC10 HOTMIX (ON FULL GRADE 6 PRIME COAT)
- 100mm M/4 AP40 BASECOURSE
- 260 MM AP65 SUBBASE ON COMPACTED SUBGRADE (CBR8)
** METAL DEPTHS TO BE CONFIRMED BY ENGINEER FOLLOWING CBR TESTING OF SUBGRADE IF NECESSARY

SHARED FOOTPATH (2.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES



ROAD 02 SECTION C-C
1:50

ROAD CONSTRUCTION
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- 100mm M/4 AP40 BASECOURSE
- 260 MM AP65 SUBBASE ON COMPACTED SUBGRADE (CBR8)
** METAL DEPTHS TO BE CONFIRMED BY ENGINEER FOLLOWING CBR TESTING OF SUBGRADE IF NECESSARY

SHARED FOOTPATH (2.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED).
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

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CLIENT: KEVLER DEVELOPMENT

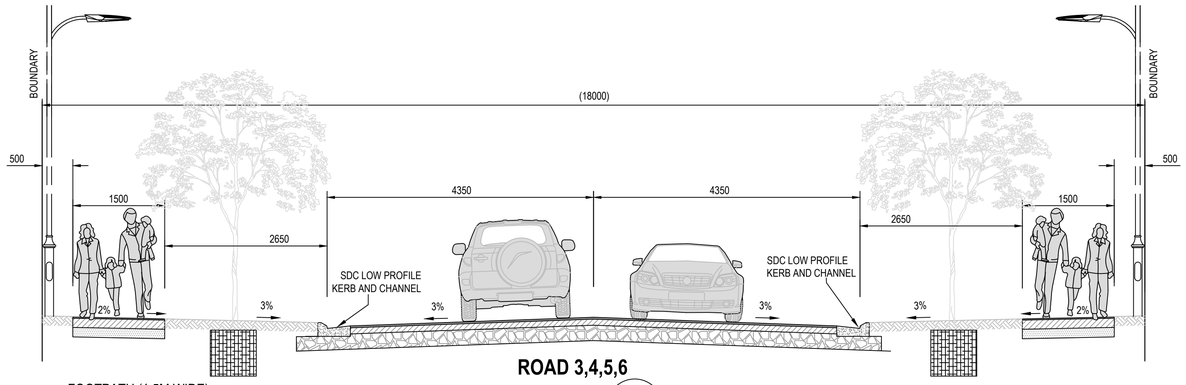
PROJECT: HARROW GREEN

REV	DATE	REVISION DETAILS	ISSUED
1	30/09/22	FOR INFORMATION	CWH

DRAWING TITLE: ROADING DETAILS PLAN SHEET 1 OF 2

STATUS	SCALE	SIZE
FOR INFORMATION	AS SHOWN	A1

PROJECT NO	DRAWING NO	REVISION
15124	EN-302	A



ROAD 3,4,5,6

SECTION D-D

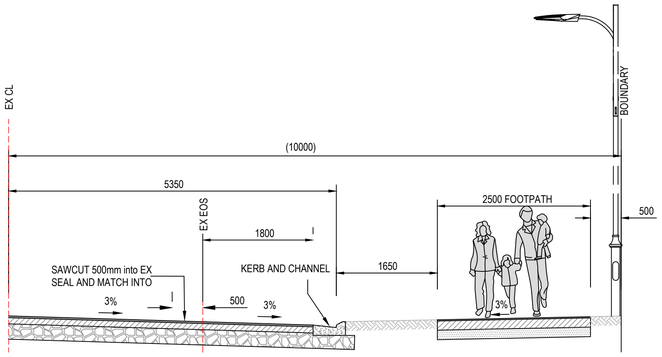
1:50

FOOTPATH (1.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

ROAD CONSTRUCTION
- 30mm AC10 HOTMIX (ON FULL GRADE 6 PRIME COAT)
- 100mm M/4 AP40 BASECOURSE
- 260 MM AP65 SUBBASE ON COMPACTED SUBGRADE (CBR8)

** METAL DEPTHS TO BE CONFIRMED BY ENGINEER FOLLOWING CBR TESTING OF SUBGRADE IF NECESSARY

FOOTPATH (1.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES



ROAD CONSTRUCTION
- GRADE 4/6 TWO COAT CHIP SEAL
- 100mm M/4 AP40 BASECOURSE
- 250 MM AP65 SUBBASE ON COMPACTED SUBGRADE

** METAL DEPTHS TO BE CONFIRMED BY ENGINEER FOLLOWING CBR TESTING OF SUBGRADE IF NECESSARY

FOOTPATH (2.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

SPRINGSTON ROLLESTON ROAD

SECTION F-F

1:50

ROAD 7.8

SECTION E-E

1:50

FOOTPATH (1.5M WIDE)
- 20mm AC5 HOTMIX
- 100mm AP20 (STABILISED)
- ON COMPACTED SUBGRADE.
- 75 x 25 H4 TIMBER BATTENS WITH 75 X 25 PEGS @ 1m CENTRES

ROAD CONSTRUCTION
- 30mm AC10 HOTMIX (ON FULL GRADE 6 PRIME COAT)
- 100mm M/4 AP40 BASECOURSE
- 260 MM AP65 SUBBASE ON COMPACTED SUBGRADE (CBR8)

** METAL DEPTHS TO BE CONFIRMED BY ENGINEER FOLLOWING CBR TESTING OF SUBGRADE IF NECESSARY

FOOTPATH (1.5M WIDE)
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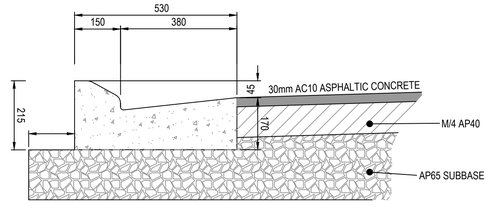
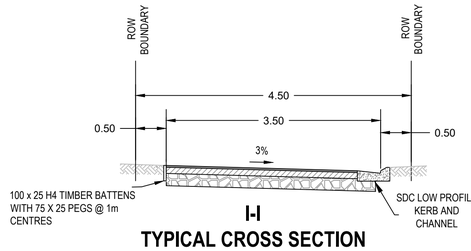


SDC LOW PROFILE K & C
SD RD 2.0

1:10



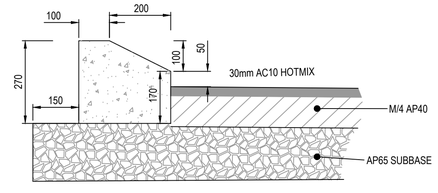
I-I

TYPICAL CROSS SECTION

4.5m RIGHT OF WAY

SCALE 1:50

ROW CONSTRUCTION
- 30mm AC10 HOTMIX (ON FULL GRADE 6 PRIME COAT)
- 100mm M/4 AP40 BASECOURSE
- 250 MM AP65 SUBBASE ON COMPACTED SUBGRADE (CBR8)



MOUNTABLE KERB DETAIL
CCC SD 603

SURVUS CONSULTANTS
PLANNING + SURVEYING + ENGINEERING

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CLIENT: KEVLER DEVELOPMENT

PROJECT: HARROW GREEN

REV	DATE	REVISION DETAILS	ISSUED
1	30/09/22	FOR INFORMATION	CWH

DRAWING TITLE: ROADING DETAILS PLAN SHEET 2 OF 2

STATUS	SCALE	SIZE
FOR INFORMATION	AS SHOWN	A1

PROJECT NO	DRAWING NO	REVISION
15124	EN-303	A