CIVIL ENGINEERING REPORT

PRIVATE PLAN CHANGE

3 BRIGHTSIDE ROAD AND 149, 151 & 153 GILLIES AVE EPSOM

for Southern Cross Hospitals Limited

Job No:	61106#C
Date of Issue:	1 Feb 2019
Revision:	Final

Rev	Date	eTrack Ref	Status	Prepared By	Reviewed By
Final	1 Feb 19	200024530		Michael Martin	
DRAFT3	21 Dec 18	200024070		Michael Martin	
DRAFT2	18 Dec 18	2000223964		Michael Martin	
DRAFT1	11 Dec 18	200023845		Michael Martin	

Architecture
Building Surveying
Structural Engineering
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Geotechnical Engineering
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CONTENTS

1.0 EXECUTIVE SUMMARY

1.1 The most significant planning controls associated with the civil engineering aspects of the proposed plan change are the potential increase in:

- Extent of earthworks
- Impervious area
- Building coverage and height

1.2 The volcanic materials at the site are not high sediment generating materials. Alternative methods can be used to mitigate noise during earthworks construction. Any increased sediment and noise effects from earthworks can be mitigated by standard controls required as part of the land use resource consent process.

1.3 The Auckland Council's GeoMaps indicates the site is affected by two different types of flood hazards; an overland flow path and a flood prone area. We consider the overland flow path does not enter the site and flood prone area is localised and will not affect potential development of the site.

1.4 The increase in primary stormwater runoff from potential development can be readily disposed using ground soakage in accordance with Auckland Council's TR 2013/040.

1.5 Any uncovered pavements that meet the definition of a "High contaminant generating carpark" could be treated using underground proprietary devices such as Stormfilters or by vegetative devices such as swales or rain gardens.

1.6 The increase in secondary stormwater runoff from potential development could also be discharged to ground soakage, or detention provided on site, to mitigate effects on downstream flooding.

1.7 The increase in wastewater from potential development could be discharged to the existing public reticulation, which is expected to have sufficient capacity for the increased flow.

1.8 Flow and pressure testing of the existing public water supply in the adjacent road berms indicates there is sufficient capacity for potable and firefighting water supply for potential development.

1.9 There are existing utility services (power, telecommunications and gas) within the adjacent road berms that are expected to have sufficient capacity for the potential development.

2.0 INTRODUCTION

2.1 Babbage Consultants Limited (Babbage) has been engaged by Southern Cross Hospitals Limited (Southern Cross) to prepare a civil engineering report to support a private plan change application for the properties at No. 3 Brightside Road and No.'s 149, 151 and 153 Gillies Avenue, Epsom.

2.2 The property at No. 3 Brightside Road is currently within the Residential – Mixed Housing Suburban Zone and the properties at 149, 151 and 153 Gillies Avenue are currently within the Residential – Single House Zone. The properties are proposed to be rezoned to Special Purpose – Healthcare Facility and Hospital.

2.3 This report provides information on the civil engineering aspects of the proposed plan change, including:

- Earthworks
- Stormwater and wastewater drainage
- Water supply
- Utility services

2.4 We note the assessment and design associated with this report is preliminary in nature. The final construction details for any proposed development will be subject to resource consent, engineering and building consent approvals.

3.0 THE SITE

3.1 The site consists of four properties at the corner of Brightside Road and Gillies Avenue in Epsom. The legal descriptions of the properties and the property areas are provided in the table below.

Address	Legal Description	Area
3 Brightside Road	Lot 1 DP 188920	5,245 m^2
149 Gillies Avenue	Pt Lot 16 DP 3541 Pt Lot 15 DP 3541	2,208 m^2
151 Gillies Avenue	Lot 1 DP 44293	971 m^2
153 Gillies Avenue	Lot 2 DP 44293	849 m^2
		9,273 m^2

3.2 The layout of the existing site is shown on Archimedia's drawings A101 in Appendix A.

3.3 A topographical survey of the site was undertaken by Harrison Grierson in February and May 2018 and is attached in Appendix B.

3.4 The site is located within a Quality-Sensitive Aquifer Management Area overlay of the the Auckland Unitary Plan. The Auckland Council GeoMaps also shows the site is affected by an Overland Flow Path. The Unitary Plan overlay and GeoMaps features are shown in Appendix C.

3.5 The site is bounded by residential houses and Owens Road to the north, Brightside Road to the west and south and to Gillies Avenue to the east.

3.6 There are currently two existing vehicle access points to the existing hospital at 3 Brightside Road, one entry point to the hospital main entrance from Brightside Road and one entry/exit point to the hospital carpark also from Brightside Road. There are

also existing vehicle access points to 153 Gillies Avenue from Brightside Road and to 151 and 149 Gillies Avenue from Gillies Avenue.

3.7 The site generally falls eastwards along the frontage of Brightside Road with an average surface road gradient of approximately 4.2% (1v to 25h) and falls northwards along the frontage of Gillies Avenue with an average surface road gradient of approximately 3.0% (1v to 33h). The existing ground elevations at the site boundaries are:

Northwest corner	RL 88.0 m
Southwest corner	RL 87.5 m
Southeast corner	RL 81.7 m
Northeast corner	RL 79.3 m

3.8 There are existing landscaping areas covering most of the eastern area on 3 Brightside Road. Almost all of the properties at 149, 151 and 153 Gillies Avenue are developed with paved surfaces or buildings.

4.0 PROPOSED DEVELOPMENT

4.1 The potential development layout of the properties under the Special Purpose – Healthcare Facility and Hospital (SP-HFH zone) is shown on Archimedia architectural Massing Reference Plan – Ground Floor, A920 Rev. C and Massing Reference Plan – First Floor, A921 Rev. C in Appendix A.

4.2 The significant differences in the civil engineering aspects of any potential development due to the proposed zone change are as follows:

- Increase in earthworks areas and volumes
- Increase in maximum impervious area
- Increase in building coverage and height

5.0 EARTHWORKS

5.1 Earthworks would typically be required to create building platforms and pavement subgrades as part of any development of the site. The change in zoning increases the permitted area and volume of earthworks from 500 m^2 and 250 m^3 to 2,500 m^2 and 2,500 m^3.

5.2 The increase in the extent of earthworks has the potential to increase sediment generation, however, Tonkin and Taylor's geotechnical report (submitted as part of the concurrent resource consent application) indicates any earthworks are likely to be largely within volcanic rock materials and these materials are not considered to be high sediment generating materials and standard erosion and sediment control measures could be installed in accordance with the GD05, Guidance for Erosion & Sediment Control in the Auckland Region, June 2016 to mitigate effects of sediment generated from any proposed earthworks.

5.3 The increase in the extent of earthworks may result in a longer duration of earthworks, which could increase construction noise effects, especially in volcanic materials. However, construction techniques other than rock breaking, such as hydraulic fracturing, can be used to mitigate these issues.

5.4 In general, any effects from any increase in earthworks as a result of the change in zoning could be mitigated by the standard controls required as part of a land use consent process.

6.0 FLOOD HAZARDS

6.1 The Auckland Council GIS information indicates the site is affected by a 100 year overland flow path and flood prone area as shown on the Auckland Council GIS Plan in Appendix C.

6.2 We understand that flood prone areas are not included in the Unitary Plan and are not required to be addressed as part of a resource consent process. In addition, the flood prone area is generated by an existing small, localised depression within the central-eastern area of the site and it is expected the flood prone area could easily be modified or removed as part of any future development of the site.

6.3 The alignment of the overland flow paths shown on GeoMaps are generally based on GIS contours which do not capture features such as road kerbs and buildings. Based on our observations on site and the topographical survey information, we consider the overland flow path is likely to be retained within the road carriageway and be directed around the southern side of the site within Brightside Road, i.e. the overland flow path is unlikely to enter the site. The existing overland flow path would therefore not be affected by any future development of the site and would also not affect potential development of the site.

7.0 STORMWATER DRAINAGE

EXISTING PRIMARY STORMWATER DRAINAGE

7.1 There is no existing public stormwater reticulation in the vicinity of the site. The development is located within a basalt volcanic area and in-ground soakage is used to dispose of primary stormwater from private properties and public roads. The future development of the site is therefore not reliant on connection to an existing public primary drainage system.

PROPOSED PRIMARY STORMWATER DRAINAGE

7.2 The proposed change in zoning increases the potential maximum impervious areas from 60% to 80% of the total site area. This equates to a potential increase in impervious area of approximately 1,850 m^2, which equates to approximately 50 litres/second (l/s) potential increase primary (10 % AEP) stormwater runoff.

7.3 The total impermeable surface area for the potential development is 80% of the total site area which equates to approximately 7,420 m^2. The total 10% AEP peak flow rate from the potential development is approximately 200 litres/second (l/s).

7.4 Tonkin and Taylor's geotechnical report states the soakage tests on existing soakpits indicates soakage rates from 11 l/s to greater than 30 l/s. Based on this, we have assumed an average soakage rates of 20 l/s per proposed soakpit. As per the Auckland Council's TR 2013/040, this rate would be reduced by a factor of 1.4 to provide a factored capacity of approximately 14 l/s for each proposed soakpit.

7.5 The disposal of primary stormwater from potential development could be achieved by the construction of 14 soakpits at various locations around the site.

STORMWATER TREATMENT

7.6 Any carparking areas within the potential development that meet the definition of a "High contaminant generating carpark" within the Unitary Plan would require stormwater treatment in accordance with Auckland Council's GD01. This could be

provided by underground proprietary devices such as Stormfilters or by vegetative devices such as swales or rain gardens.

EXISTING SECONDARY (OVERLAND) STORMWATER

7.7 The secondary flow from the existing surfaces on 3 Brightside Road generally discharges to Brightside Road (which directs flows to Gillies Avenue) and the secondary flow from the existing surfaces on 149, 151 and 153 Gillies Avenue discharges to Gillies Avenue.

7.8 The calculations for the existing secondary stormwater peak flow are shown in Appendix D. The secondary (overland) flow from the existing site is calculated at 252 l/s, which is conservatively taken as the difference between the 50% AEP and the 1% AEP peak flow rates as the site is in a soakage area. This calculation allows for increase in rainfall intensity associated with climate change.

PROPOSED SECONDARY (OVERLAND) STORMWATER

7.9 The calculations for the proposed secondary stormwater peak flow are shown in Appendix D. The secondary (overland) flow from the potential development is calculated at 258 l/s, also conservatively taken as the difference between the 50% AEP and the 1% AEP peak flow rates, and allows for climate change. This proposed flow rate is 6 l/s greater than the existing flow rate.

7.10 There is 1% AEP flooding shown on the Auckland Council's GIS that affects properties in Owens Road, approximately 200 m downstream of the proposed development. The flooding is within a depression with a maximum flooding depth of approximately 1.5 m. We estimate the increased secondary flow rate from the proposed development would increase the flood depth by less than 3 mm. If required, this small effect could be mitigated by also discharging the increase in secondary flow rate to on-site soakpits.

7.11 Alternatively, if required the additional secondary flow could be attenuated to pre-development flows using on-site detention. The estimated volume required would be approximately 100 m^3.

8.0 WASTEWATER DRAINAGE

8.1 The existing public wastewater drainage within Brightside Road and Gillies Avenue is shown on the Council GIS plan in Appendix B. There are existing 150 mm diameter wastewater to the south in Brightside Road, and to the east and north of the site in Gillies Avenue.

8.2 The peak wet weather wastewater flow from the three existing residential properties is estimated to be less than 0.5 l/s. The peak flow from the potential development is expected to be less than 20 l/s, i.e. an increase of approximately 14.5 l/s.

8.3 The existing 150 mm public wastewater pipeline in Brightside Road connects to a 225 mm public wastewater pipeline in Gillies Avenue. We have checked the capacity of this pipeline in relation to the existing flows and the flows from the proposed development as shown in the table below.

	Flow Rate
Existing Upstream Wastewater Flow	11.5 l/s
Potential Development Wastewater Flow under the concurrent resource consent application	20.0 l/s
Total Proposed Wastewater Flow	31.5 l/s
Existing Pipe Capacity	91.0 l/s

8.4 Based on the above assessment, the existing public wastewater pipeline within Gillies Avenue is expected to have capacity for increased flows from potential development of the site.

9.0 WATER SUPPLY

9.1 The Auckland Council GIS information in Appendix B shows there is an existing 150 mm public watermain located along the southern side of Brightside Road and there are also existing 50 mm and 200 mm public watermains located in the eastern side along Gillies Avenue.

9.2 Flow and pressure hydrant testing has been carried out on the existing watermains which provided results of 67.1 l/s at 405 kPa. These results exceed the minimum requirements for fire fighting water supply classification FW2 (sprinkler system) as per NZS PAS 4509.

9.3 The estimated peak domestic cold water supply demand from additional development on the site is likely to be less than 10 l/s. It is considered the existing public reticulation would have sufficient capacity for this relatively low water demand.

10.0 ELECTRICAL SUPPLY

10.1 Information extracted from BeforeYouDig source shows there is a High Voltage (HV) line along Brightside Road and Gillies Avenue as shown on the utility services plans in Appendix E. The existing electrical reticulation is expected to have sufficient capacity for potential development of the site.

11.0 TELECOMMUNICATIONS

11.1 There are fibre optic cables in the adjacent berm of Gillies Avenue as shown on on the utility services plans in Appendix E. These are expected to have sufficient capacity for proposed development on the site.

12.0 GAS

12.1 Information extracted from BeforeYouDig (see Appendix E) shows that there is an existing gas line (MP4 50 mm) along Gillies Avenue, which is expected to have sufficient capacity for proposed development of the site.

Appendix A

Architectural Plans

PLOTTED: 27/04/2018 4:35:48 PM

Rev	Date	Description
A	20.10.2017	FOR INFORMATION
B	06.12.2017	PRE APP MEETING
C	02.03.18	CONCEPT DES. UPDATE
D	12.03.18	DRAFT FOR ENVELOPE SIGN-OFF
E	19.03.18	CONCEPT DESIGN APPROVAL
F	27.04.18	PRELIM. DESIGN UPDATE

Client
SOUTHERN CROSS HOSPITALS LTD

Southern Cross Hospitals

Consultants

Project
BRIGHTSIDE HOSPITAL '2'

3 BRIGHTSIDE ROAD,
149, 151 & 153 GILLIES
AVE, EPSOM

Notes

NOT FOR CONSTRUCTION | COLOUR PRINT

PRELIM. DESIGN UPDATE

Sheet Title	Scale @ A1	Scale @ A3
EXISTING SITE PLAN	1 : 250	
	QA Checked	Signed

Date	Project number	Sheet Number	Revision
27.04.18	17046	A101	F

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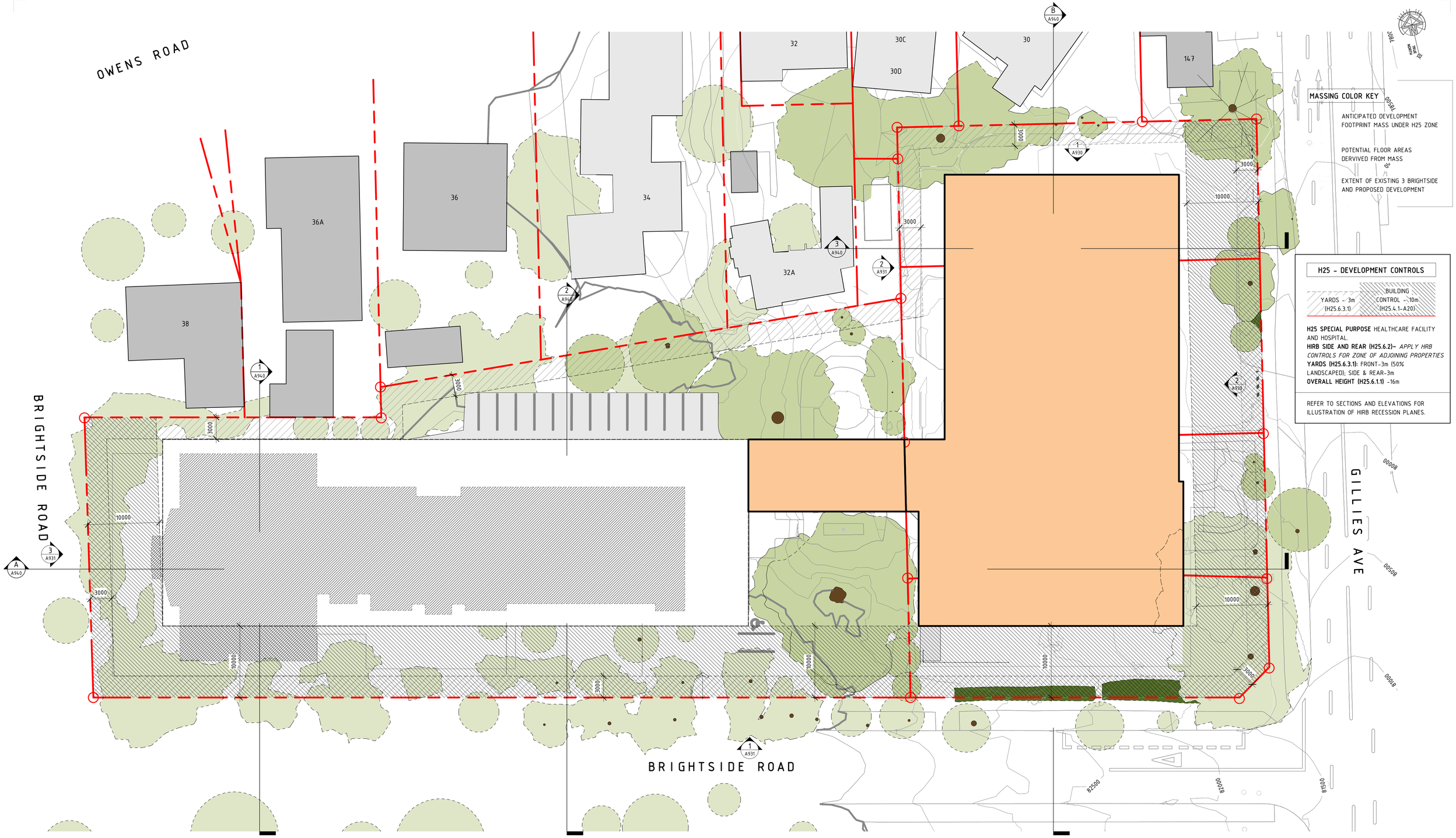

PROPOSED GROUND FLOOR PLAN

PLOTTED: 17/01/2019 10:03:42 AM

Rev	Date	Description
A	28.11.18	DRAFT FOR INFORMATION
B	13.12.18	DRAFT FOR INFORMATION
C	17.01.19	FOR PRIVATE PLAN CHANGE REQUEST

Client
SOUTHERN CROSS HOSPITALS LTD

Southern Cross Hospitals

Consultants

Project
BRIGHTSIDE HOSPITAL '2'
PRIVATE PLAN CHANGE
3 BRIGHTSIDE ROAD,
149, 151 & 153 GILLIES AVE, EPSOM

Notes

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FOR PRIVATE PLAN CHANGE REQUEST

Sheet Title
MASSING REFERENCE PLAN - GROUND FLOOR

Scale @ A1: 1 : 250
Scale @ A3:
QA Checked:
Signed:
Date: 17.01.19
Project number: 18058
Sheet Number: A920
Revision: C

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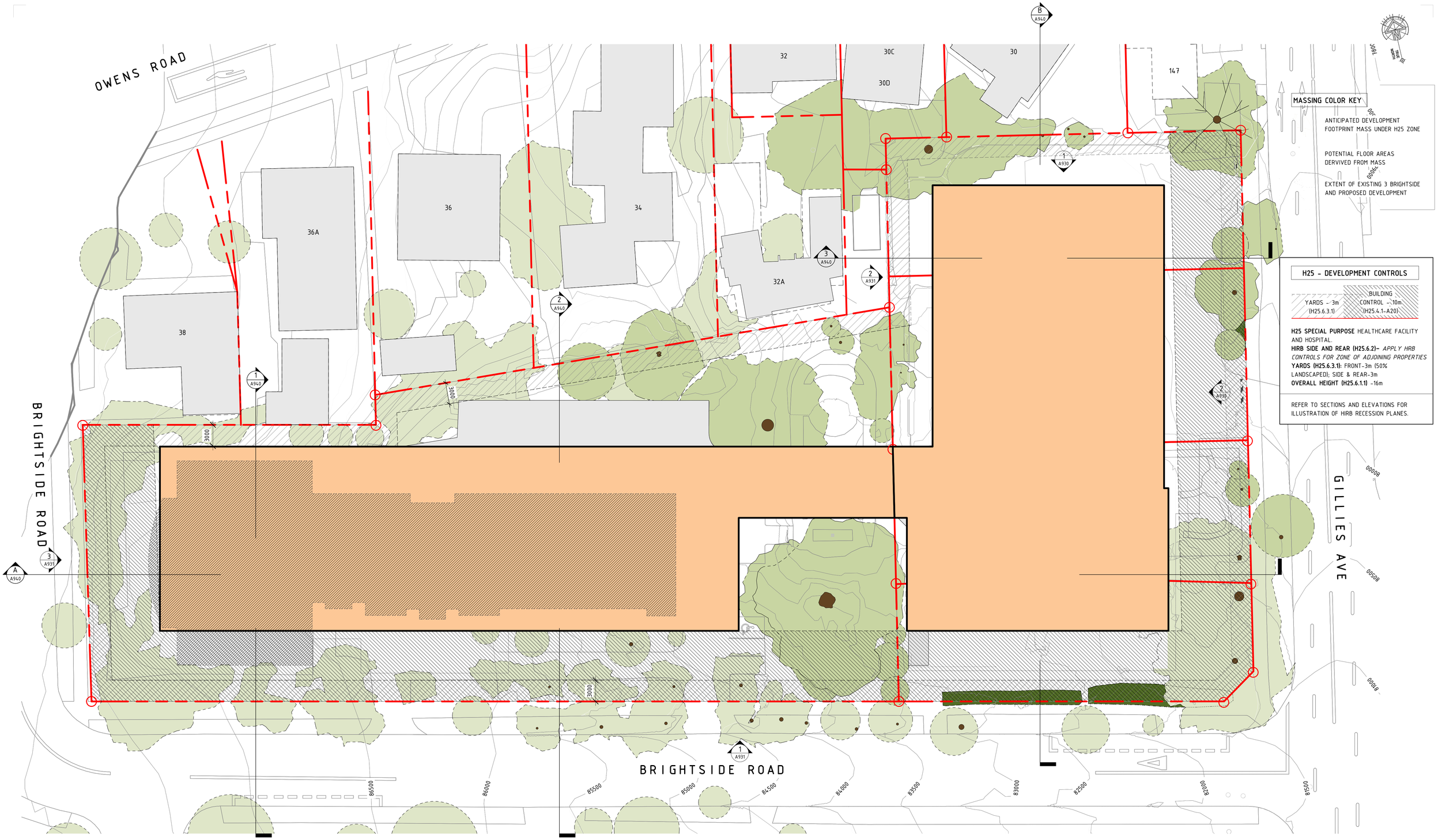

PROPOSED FIRST FLOOR PLAN

PLOTTED: 17/01/2019 10:05:09 AM

Rev	Date	Description
A	28.11.18	DRAFT FOR INFORMATION
B	13.12.18	DRAFT FOR INFORMATION
C	17.01.19	FOR PRIVATE PLAN CHANGE REQUEST

Client
SOUTHERN CROSS HOSPITALS LTD

Consultants

Project
BRIGHTSIDE HOSPITAL '2'
PRIVATE PLAN CHANGE
3 BRIGHTSIDE ROAD,
149, 151 & 153 GILLIES AVE, EPSOM

Notes

NOT FOR CONSTRUCTION | COLOUR PRINT

FOR PRIVATE PLAN CHANGE REQUEST

Sheet Title
MASSING REFERENCE PLAN - FIRST FLOOR

Scale @ A1: 1 : 250
Scale @ A3:
QA Checked:
Signed:
Date: 17.01.19
Project number: 18058
Sheet Number: A921
Revision: C

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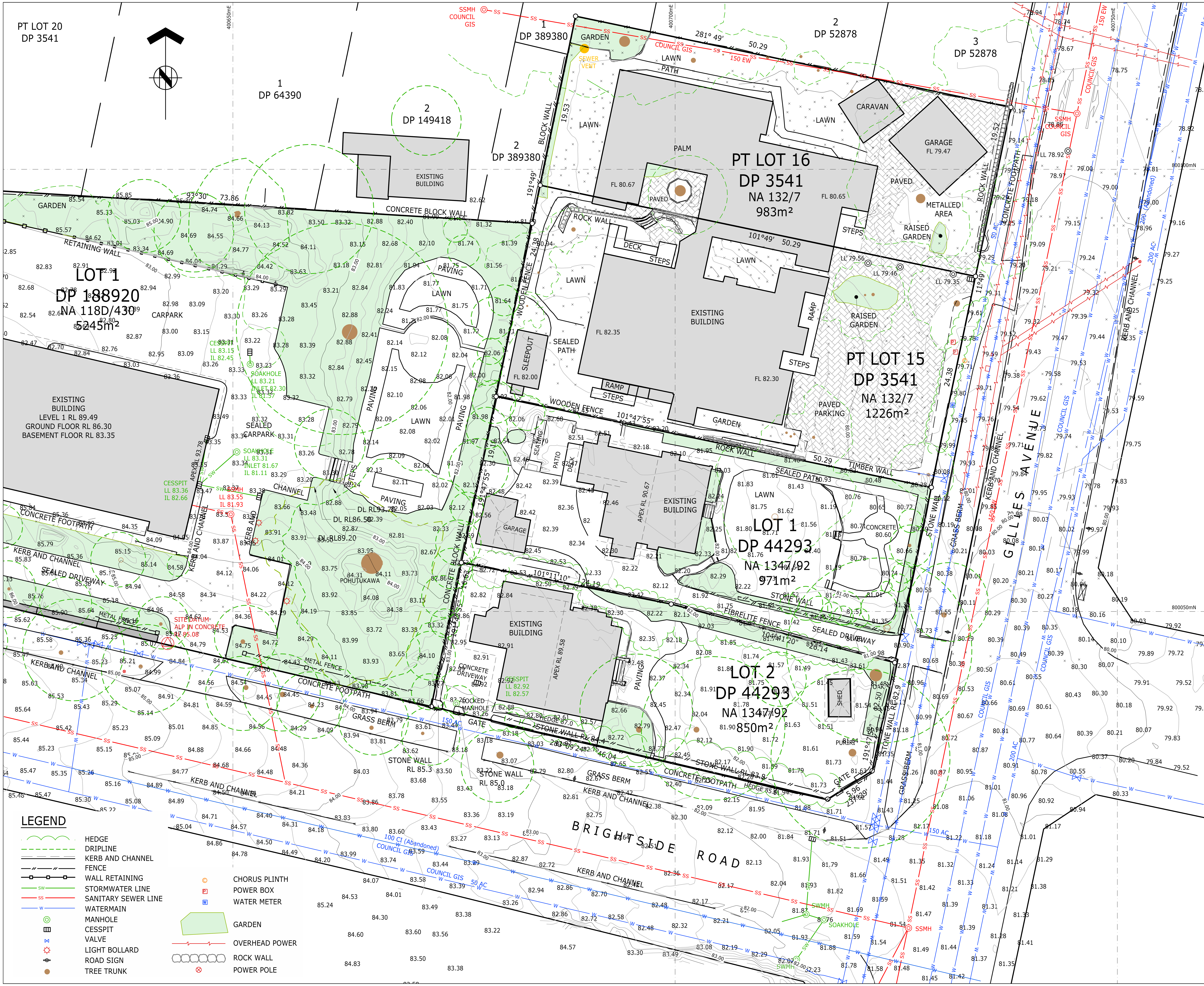
Figured dimensions are to be taken in preference to scaled dimensions. Verify all dimensions on the job before preparing shop drawings or commencing work.

Appendix B

Topographical Plans



ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND — ACENZ

ISO 9001 QUALITY ASSURED

NOTES

1. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
   ORIGIN OF LEVELS
   SS 1490 SO 48382
   RL 81.27m
2. COORDINATES ARE IN TERMS OF NZ GEODETIC DATUM 2000 MT EDEN CIRCUIT
   ORIGIN OF COORDINATES
   SM 1490 SO 48382
   800004.74 mN
   400736.10 mE
3. CONTOURS ARE AT 0.25m INTERVALS. CONTOURS SHOWN ON THIS PLAN HAVE BEEN ELECTRONICALLY COMPUTED FROM SPOT HEIGHT DETERMINATIONS AND MAY NOT REPRESENT THE TRUE GROUND LEVELS. ANY CRITICAL HEIGHTS SHOULD BE CHECKED ON SITE PRIOR TO DESIGN AND CONSTRUCTION COMMENCING.
4. THIS PLAN HAS BEEN CARRIED OUT TO TOPOGRAPHICAL STANDARDS. ALL LEVELS SHOWN ARE CORRECT AT TIME OF SURVEY. CRITICAL DIMENSIONS AND LEVELS SHOULD BE VERIFIED.
5. BOUNDARIES SHOWN ON THIS PLAN ARE FROM LAND INFORMATION NZ DCDB AND HAVE NOT BEEN SURVEYED. A BOUNDARY DEFINITION SURVEY SHOULD BE CARRIED OUT TO ESTABLISH EXACT BOUNDARY POSITIONS ON SITE.
6. ALL EASEMENTS, COVENANTS AND OTHER LEGAL INSTRUMENTS ASSOCIATED WITH THIS SITE MAY NOT BE SHOWN ON THIS PLAN. AN INVESTIGATION OF THE MOST CURRENT LEGAL RECORDS SHOULD BE UNDERTAKEN PRIOR TO DESIGN AND CONSTRUCTION COMMENCING.
7. SERVICES POSITIONS AND ALIGNMENT MAY HAVE BEEN OBTAINED FROM THIRD PARTY RECORDS AND SHOULD BE VERIFIED ON SITE PRIOR TO CONSTRUCTION COMMENCING. HARRISON GRIERSON DOES NOT IN ANY WAY GUARANTEE THE ACCURACY OF ANY UNDERGROUND SERVICE SHOWN ON THIS PLAN.
8. THIS PLAN MAY NOT PROVIDE ENOUGH INFORMATION FOR HEIGHT TO BOUNDARY CALCULATIONS. WHERE ANY PROPOSED BUILDING OR PART THEREOF IS REQUIRED TO MEET COUNCIL'S HEIGHT IN RELATION TO BOUNDARY CONTROLS, HARRISON GRIERSON SHOULD BE CONSULTED.
9. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.
10. THIS PLAN IS ISSUED FOR A SPECIFIC PROJECT AND MAY NOT BE ALTERED OR USED FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF HARRISON GRIERSON.
11. LEGAL DESCRIPTION
    LOT 1 DP 188920, LOTS 1 & 2 DP 44293 AND
    PT LOTS 15 & 16 DP 3541
    COMPRISED IN C'sT NA118D/430 NA1347/92 & NA132/7
    TOTAL AREA 9275m²

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F	EXTRA SURVEY BRIGHTSIDE ROAD CORNER	AJP	24.05.18
E	EXTRA HEIGHTS ADDED	ISC	08.03.18
D	EXTRA SURVEY LOTS 15 AND 16	ISC	21.02.18
C	DRAINAGE INFORMATION ADDED	JBM	01.05.17
B	TREE DETAIL ADDED	JBM	19.04.17
A	CLIENT ISSUE	MSB	29.03.17
REF	REVISIONS	BY	DATE

PROJECT:

SOUTHERN CROSS HEALTHCARE
BRIGHTSIDE HOSPITAL
EPSOM

TITLE:

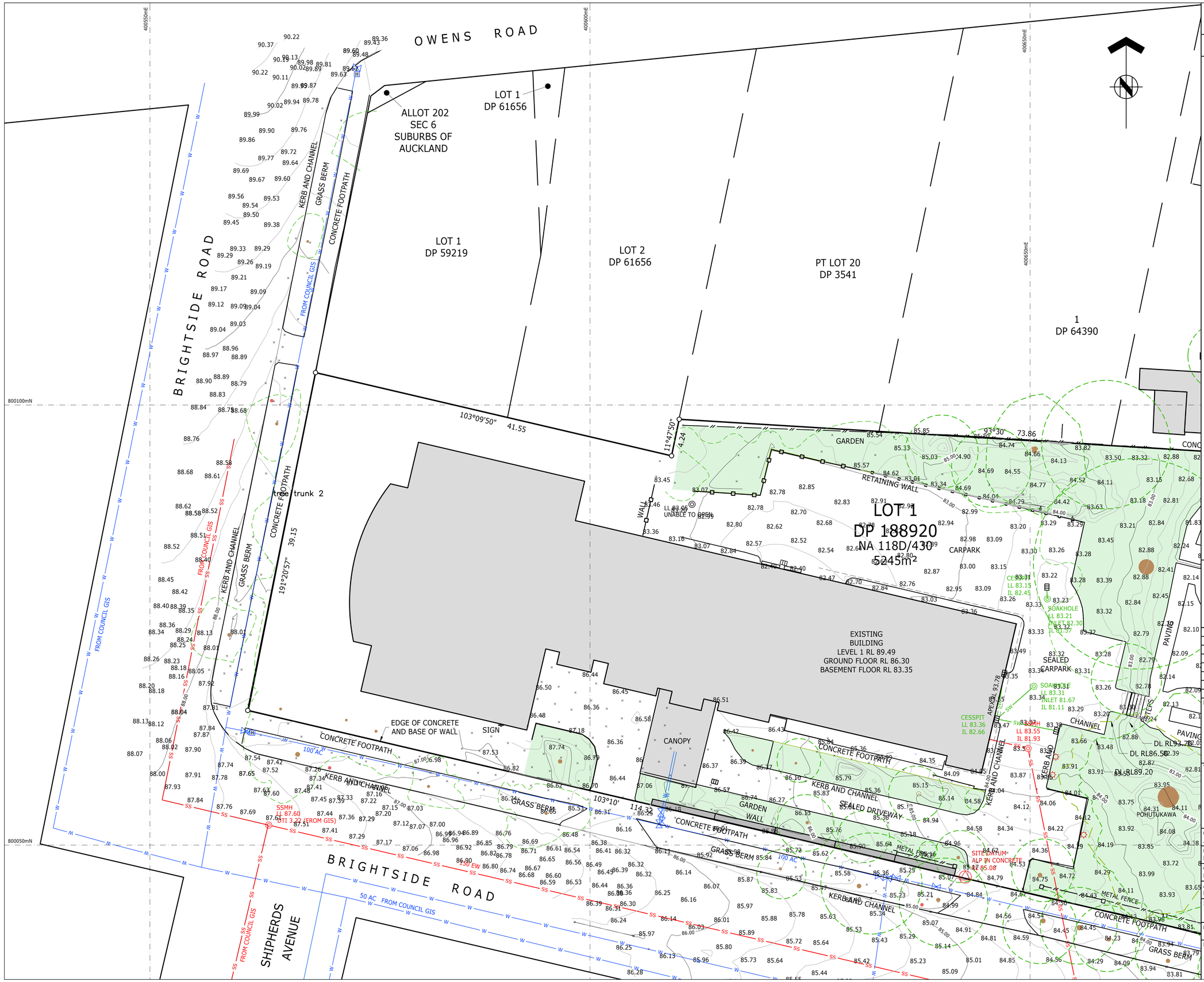
SITE SURVEY
SHEET 1 OF 2

ORIGINATOR: JBM	DATE: 23.03.17	SIGNED:	PLOT BY: AJP
DRAWN: HSJ	DATE: 24.03.17	SIGNED:	PLOT DATE: 29.05.18
CHECKED: MSB	DATE: 24.03.17	SIGNED:	SURVEY BY: JBM
APPROVED: MSB	DATE: 29.03.17	SIGNED:	SURVEY DATE: 22.03.17

ISSUE STATUS: CLIENT ISSUE

PROJECT No: 1030-141281-01
SCALES: 1:200-A1, 1:400-A3
A1

DRAWING No: 141281-SS01
REV: F



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NOTES

SEE SHEET 1 FOR NOTES

LEGEND

- HEDGE
- DRIPLINE
- KERB AND CHANNEL
- FENCE
- WALL RETAINING
- STORMWATER LINE
- SANITARY SEWER LINE
- WATERMAIN
- MANHOLE
- CESSPIT
- VALVE
- LIGHT BOLLARD
- ROAD SIGN
- TREE TRUNK
- CHORUS PLINTH
- POWER BOX
- WATER METER
- GARDEN
- OVERHEAD POWER
- ROCK WALL
- POWER POLE

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REF	REVISIONS	BY	DATE
F	EXTRA SURVEY BRIGHTSIDE ROAD CORNER	AJP	24.05.18
E	EXTRA HEIGHTS ADDED	ISC	08.03.18
D	EXTRA SURVEY LOTS 15 AND 16	ISC	21.02.18
C	DRAINAGE INFORMATION ADDED	JBM	01.05.17
B	TREE DETAIL ADDED	JBM	19.04.17
A	CLIENT ISSUE	MSB	29.03.17

PROJECT:

SOUTHERN CROSS HEALTHCARE
BRIGHTSIDE HOSPITAL
EPSOM

TITLE:

SITE SURVEY
SHEET 2 OF 2

ORIGINATOR: JBM	DATE: 23.03.17	SIGNED:	PLOT BY: AJP
DRAWN: HSJ	DATE: 24.03.17	SIGNED:	PLOT DATE: 29.05.18
CHECKED: MSB	DATE: 24.03.17	SIGNED:	SURVEY BY: JBM
APPROVED: MSB	DATE: 29.03.17	SIGNED:	SURVEY DATE: 22.03.17

ISSUE STATUS: CLIENT ISSUE

PROJECT No: 1030-141281-01

SCALES: 1:200-A1, 1:400-A3

A1

DRAWING No: 141281-SS02

REV F

Appendix C

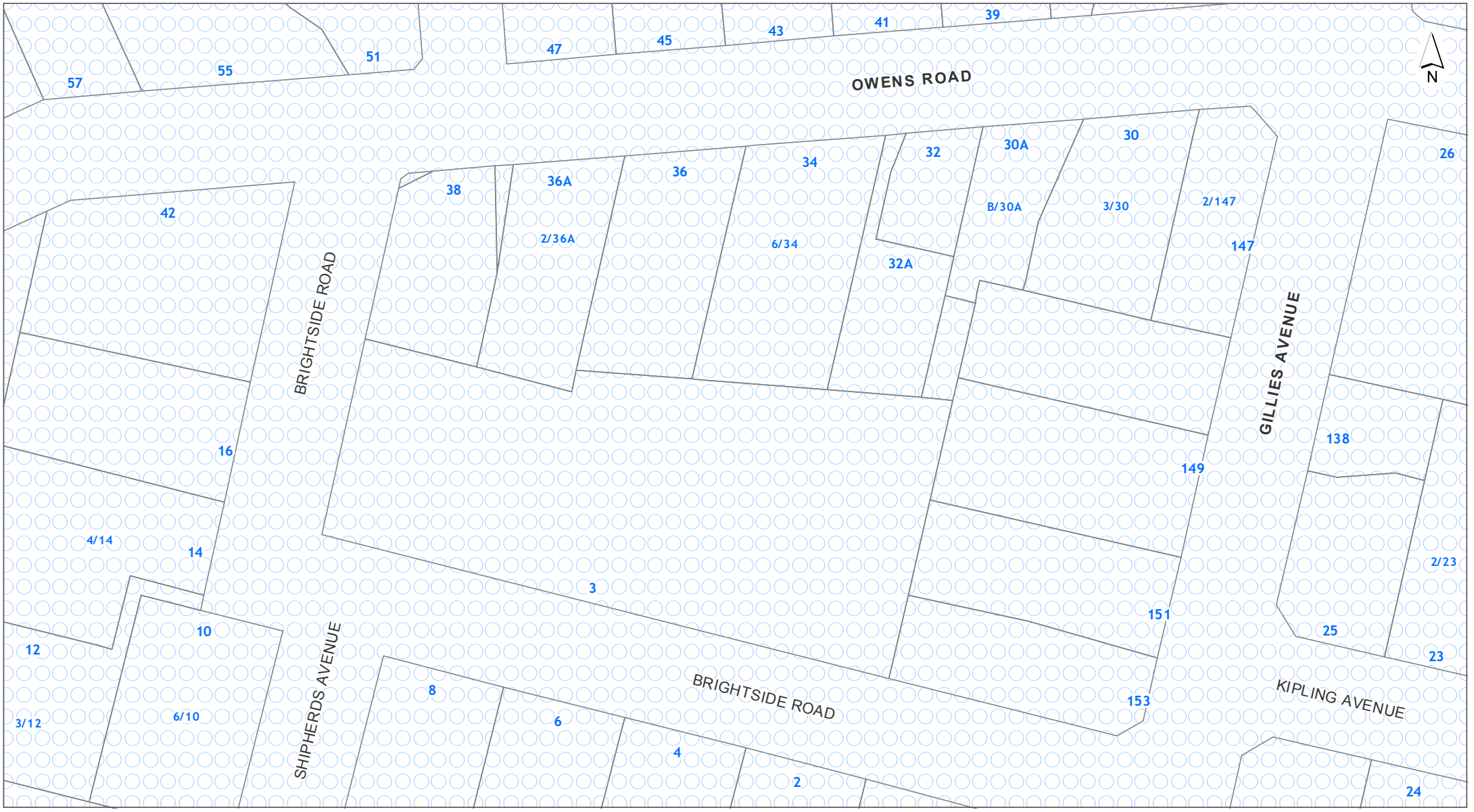
Unitary Plan Overlays and GIS Plans

0 25 50 75
Meters

Scale @ A3
= 1:2,500

Date Printed:
4/03/2018

Auckland Council
Te Kaunihera o Tāmaki Makaurau



Natural Resources

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Meters

Scale @ A4
= 1:1,000

Date Printed:
1/03/2018

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Auckland Unitary Plan Operative in part 15th November 2016 - LEGEND

Appeals

- Properties affected by Appeals seeking change to zones or management layers
- Properties affected by Appeals seeking reinstatement of management layers

Plan Modifications

- Notice of Requirements
- Plan Changes

ZONES

- Residential - Large Lot Zone
- Residential - Rural and Coastal Settlement Zone
- Residential - Single House Zone
- Residential - Mixed Housing Suburban Zone
- Residential - Mixed Housing Urban Zone
- Residential - Terrace Housing and Apartment Buildings Zone
- Business - City Centre Zone
- Business - Metropolitan Centre Zone
- Business - Town Centre Zone
- Business - Local Centre Zone
- Business - Neighbourhood Centre Zone
- Business - Mixed Use Zone
- Business - General Business Zone
- Business - Business Park Zone
- Business - Heavy Industry Zone
- Business - Light Industry Zone
- Open Space - Conservation Zone
- Open Space - Informal Recreation Zone
- Open Space - Sport and Active Recreation Zone
- Open Space - Civic Spaces Zone
- Open Space - Community Zone

ZONES

- Rural - Rural Production Zone
- Rural - Mixed Rural Zone
- Rural - Rural Coastal Zone
- Rural - Rural Conservation Zone
- Rural - Countryside Living Zone
- Rural - Waitakere Foothills Zone
- Rural - Waitakere Ranges Zone
- Future Urban Zone
- Green Infrastructure Corridor (Operative in some Special Housing Areas)
- Coastal - General Coastal Marine Zone [rcp]
- Coastal - Marina Zone [rcp/dp]
- Coastal - Mooring Zone [rcp]
- Coastal - Minor Port Zone [rcp/dp]
- Coastal - Ferry Terminal Zone [rcp/dp]
- Coastal - Defence Zone [rcp]
- Coastal - Coastal Transition Zone
- Special Purpose Zone - Airports & Airfields, Cemetery, Quarry, Healthcare Facility & Hospital, Tertiary Education, Maori Purpose, Major Recreation Facility, School
- Strategic Transport Corridor Zone
- Water [i]

Tagging of Provisions:

- [i] = Information only
- [rp] = Regional Plan
- [rcp] = Regional Coastal Plan
- [rps] = Regional Policy Statement
- [dp] = District Plan (only noted when dual provisions apply)

DESIGNATIONS

- 123 Designations
- 200 Airspace Restriction Designations

- Precincts
- Indicative Coastline [i]
- Rural Urban Boundary

OVERLAYS

Natural Resources

- Terrestrial [rp/dp]
- Marine 1 [rcp]
- Marine 2 [rcp]

Significant Ecological Areas Overlay

- Natural
- Urban

Lake Management Areas Overlay (Natural Lake and Urban Lake)

- Water Supply Management Areas Overlay [rp]
- Natural Stream Management Areas Overlay [rp]
- High-Use Stream Management Areas Overlay [rp]
- High-Use Aquifer Management Areas Overlay [rp]
- Quality-Sensitive Aquifer Management Areas Overlay [rp]
- Wetland Management Areas Overlay [rp]

Infrastructure

- Airport Approach Surface Overlay
- Aircraft Noise Overlay
- City Centre Port Noise Overlay [rcp / dp]
- Quarry Buffer Area Overlay

National Grid Corridor Overlay

- National Grid Subdivision Corridor
- National Grid Substation Corridor
- National Grid Yard Compromised
- National Grid Yard Uncompromised

Mana Whenua

- Sites & Places of Significance to Mana Whenua Overlay [rcp/dp]

OVERLAYS

Natural Heritage

- Notable Trees Overlay
- Outstanding Natural Features Overlay [rcp/dp]
- Outstanding Natural Landscapes Overlay [rcp/dp]
- Outstanding Natural Character Overlay [rcp/dp]
- High Natural Character Overlay [rcp/dp]
- Local Public Views Overlay [rcp/dp]

Regionally Significant Volcanic Viewshafts & Height Sensitive Areas Overlay [rcp/dp]

- Viewshafts
- Height Sensitive Areas

- Regionally Significant Volcanic Viewshafts Overlay Contours [i]
- Locally Significant Volcanic Viewshafts Overlay [rcp/dp]
- Locally Significant Volcanic Viewshafts Overlay Contours [i]

Waitakere Ranges Heritage Area Overlay

- Extent of Overlay
- Subdivision Schedule

Ridgeline Protection Overlay

- Modified
- Natural

Built Heritage & Character

- Historic Heritage Overlay Place [rcp/dp]
- Historic Heritage Overlay Extent of Place [rcp/dp]
- Special Character Areas Overlay Residential and Business
- Auckland War Memorial Museum Viewshaft Overlay [rcp/dp]
- Auckland War Memorial Museum Viewshaft Overlay Contours [rcp/dp]
- Dilworth Terrace Houses Viewshaft Overlay
- Dilworth Terrace Houses Viewshaft Overlay Contours

Built Environment

- Identified Growth Corridor Overlay

CONTROLS

Building Frontage Control

- Key Retail Frontage
- General Commercial Frontage

Vehicle Access Restriction Control

- Adjacent to Level Crossings
- General
- Motorway Interchange Control

- Coastal Inundation 1 per cent AEP Plus 1m Control
- Business Park Zone Office Control
- Cable Protection Areas Control [rcp]
- Centre Fringe Office Control
- Height Variation Control
- Arterial Roads

CONTROLS

Emergency Management Area Control

- Hazardous Facilities
- Infrastructure

Stormwater Management Area Control

- Flow 1 [rp]
- Flow 2 [rp]

- Level Crossings With Sightlines Control
- Macroinvertebrate Community Index
- Parking Variation Control
- Subdivision Variation Control
- Surf Breaks [rcp]

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Date: 21/11/2017

Appendix D

Stormwater Calculations

STORMWATER MITIGATION WORKSHEET - GENERAL - TP108

Project:	Brightside Hospital	By:	MJM	Date:	18/12/18
Location:	Epsom	Checked:		Date:	
SMAF	0	Zoning	Mixed House Suburban		

1. CATCHMENT AREAS:

IMPERVIOUS

	pre	0.5382	ha
	post	**0.7418**	ha
Other			
Area	pre		ha
	post		ha

PERVIOUS

Grass			
Area	pre	0.3891	ha
	post	**0.1855**	ha
Other			
Area	pre		ha
	post		ha

TOTAL

Area	pre	0.9273	ha
	post	**0.9273**	ha

Total new and redevloped imperviousness > 50% No
Area for hydrology mitigation **0.2036** ha

2. 24 HOUR RAINFALL DEPTH:

#N/A	#N/A	40.6	mm	(From TR-2013-035 +16% for Climate Change)
2 year:	$P_{2=}$	91.4	mm	
10 year:	$P_{10=}$	146.5	mm	
100 year:	$P_{100=}$	259.9	mm	

Note: Rainfall depth from NIWA HIRDS website (incl. 2.1 deg C Climate Change)
Link: https://hirds.niwa.co.nz/

3. REQUIRED MITIGATION VOLUMES:

(Difference between post- and pre-development)

Total Volume for mitigation (m^3)	**N/A**	(90^{th} or 95^{th} percentile volume Post - Pre)
which consists of:		
Required Retention Volume (m^3)	N/A	(equals 5mm rainfall on impervious area)
Require Detention Volume (m^3)	N/A	(additional required Storage Tank Volume)

STORMWATER MITIGATION WORKSHEET - PRE-DEVELOPMENT SCENARIO - TP108

Project: *Brightside Hospital* MJM Date: 18/12/2018

Location: *Epsom* Checked: Date:

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN	Area (hectares)	Product of CN x Area
	Pervious Areas (List)			
	Grass	39	0.3891	15
	Other		0.0000	0
	Subtotal for Pervious Areas		0.3891	15
	Impervious Areas (List)			
	0	98	0.5382	53
	Road		0.0000	0
	Other		0.0000	0
	Subtotal for Impervious Areas		0.5382	53
		Totals	**0.9273**	**68**

CN (weighted) : $\frac{\text{total product}}{\text{total area}} = \frac{68}{0.9273} =$ 73.2

Ia (weighted) : $\frac{5 \times \text{pervious area}}{\text{total area}} = \frac{5 \times 0.3891}{0.9273} =$ 2.098 mm

2. Time of Concentration

0.2

Channelization Factor : C = 0.8 (0.6 for Piped SW system, 0.8 for Eng. grass channels)

Catchment Length : L = 0.186 km (along drainage path)

Catchment Slope : Sc = 0.045 m/m (by equal area method)

Runoff Factor R : $\frac{CN}{200 - CN}$ = 0.58

Time of Concentration : $t_c = 0.14\ C\ L^{0.66}\ R^{-0.55}\ Sc^{-0.30}$ = 0.17 hrs

SCS Lag for HEC-HMS : $t_p = 2/3\ t_c$ = 0.11 hrs

3. Soil Storage Parameter : S = ((1000/CN)-10)*25.4

Total = 92.8 mm

Pervious = 397.3 mm

Impervious = 5.2 mm

		#N/A	2	10	100
4. Average Recurrence Interval, ARI:					
5. 24 hour Rainfall Depth, P_{24}:		40.6	91.4	146.5	259.9
6. Runoff Index, c* : $= \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$		0.16	0.32	0.43	0.58
7. Specific Peak Flow Rate, q*, (from TP108, Figure 5.1)		0.050	0.089	0.113	0.136
8. Peak Flow Rate, q_p : $= q^* A P_{24}$		0.0187	0.0757	0.1531	0.3284
9. Runoff Depth, Q_{24} : $= \frac{(P_{24} - Ia)2}{(P_{24} - Ia) + S}$	Pervious	2.93	15.43	37.16	99.63
	Impervious	36.00	86.49	141.49	254.82
10. Runoff Volume, V_{24} : $= 1000 \times Q_{24} A$	Pervious	11.392	60.052	144.598	387.643
	Impervious	193.769	465.514	761.518	1371.429
	Total	205.161	525.566	906.115	1759.072

STORMWATER MITIGATION WORKSHEET - POST-DEVELOPMENT SCENARIO - TP108

Project: *Brightside Hospital* MJM

Location: *Epsom* Checked: Date:

1. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN	Area (hectares)	Product of CN x Area
	Pervious Areas (List)			
	Grass	39	0.1855	7
	Other		0.0000	0
	Subtotal for Pervious Areas		0.1855	7
	Impervious Areas (List)			
	0	98	0.7418	73
	Other		0.0000	0
	Subtotal for Impervious Areas		0.7418	73
		Totals	**0.9273**	**80**

CN (weighted) : $\frac{\text{total product}}{\text{total area}} = \frac{80}{0.9273} =$ 86.2

Ia (weighted) : $\frac{\text{5 x pervious area}}{\text{total area}} = \frac{5 \times 0.18546}{0.9273} =$ 1.000 mm

2. Time of Concentration

0.2

Channelization Factor : C = 0.8 (0.6 for Piped SW system, 0.8 for Eng. grass channels)

Catchment Length : L = 0.186 km (along drainage path)

Catchment Slope : Sc = 0.045 m/m (by equal area method)

Runoff Factor R : $\frac{CN}{200 - CN}$ = 0.76

Time of Concentration : $t_c = 0.14\ C\ L^{0.66}\ R^{-0.55}\ Sc^{-0.30}$ = 0.17 hrs

SCS Lag for HEC-HMS : $t_p = 2/3\ t_c$ = 0.11 hrs

3. Soil Storage Parameter : S = ((1000/CN)-10)*25.4

Total = 40.7 mm

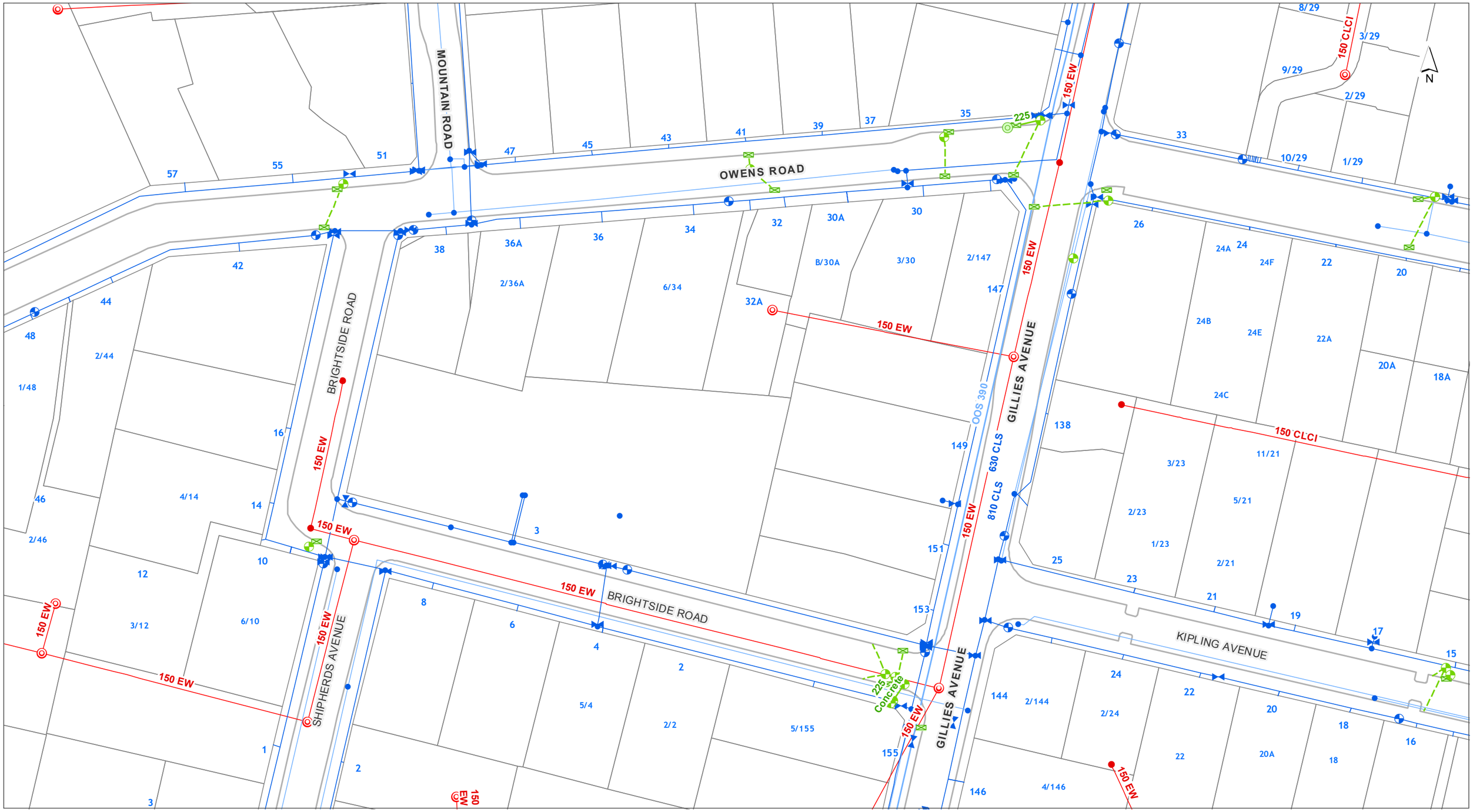
Pervious = 397.3 mm

Impervious = 5.2 mm

		#N/A	1/3 * 2	2	10	100	
4. Average Recurrence Interval, ARI:							year
5. 24 hour Rainfall Depth, P_{24}:		40.6	30.5	91.4	146.5	259.9	mm
6. Runoff Index, c* : $= \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$		0.32	0.26	0.52	0.64	0.76	
7. Specific Peak Flow Rate, q*, (from TP108, Figure 5.1)		0.090	0.075	0.128	0.144	0.152	
8. Peak Flow Rate, q_p : $= q^* A P_{24}$		0.0338	0.0211	0.1083	0.1960	0.3655	m^3/s
9. Runoff Depth, Q_{24} : $= \frac{(P_{24} - Ia)2}{(P_{24} - Ia) + S}$	Pervious	2.93	1.53	15.43	37.16	99.63	mm
	Impervious	36.00	26.04	86.49	141.49	254.82	mm
10. Runoff Volume, V_{24} : $= 1000 \times Q_{24} A$	Pervious	5.43	2.85	28.62	68.92	184.77	m^3
	Impervious	267.09	193.15	641.65	1049.66	1890.34	m^3
	Total	272.516	195.996	670.274	1118.576	2075.105	m^3

Appendix E

Public and Utility Services Information



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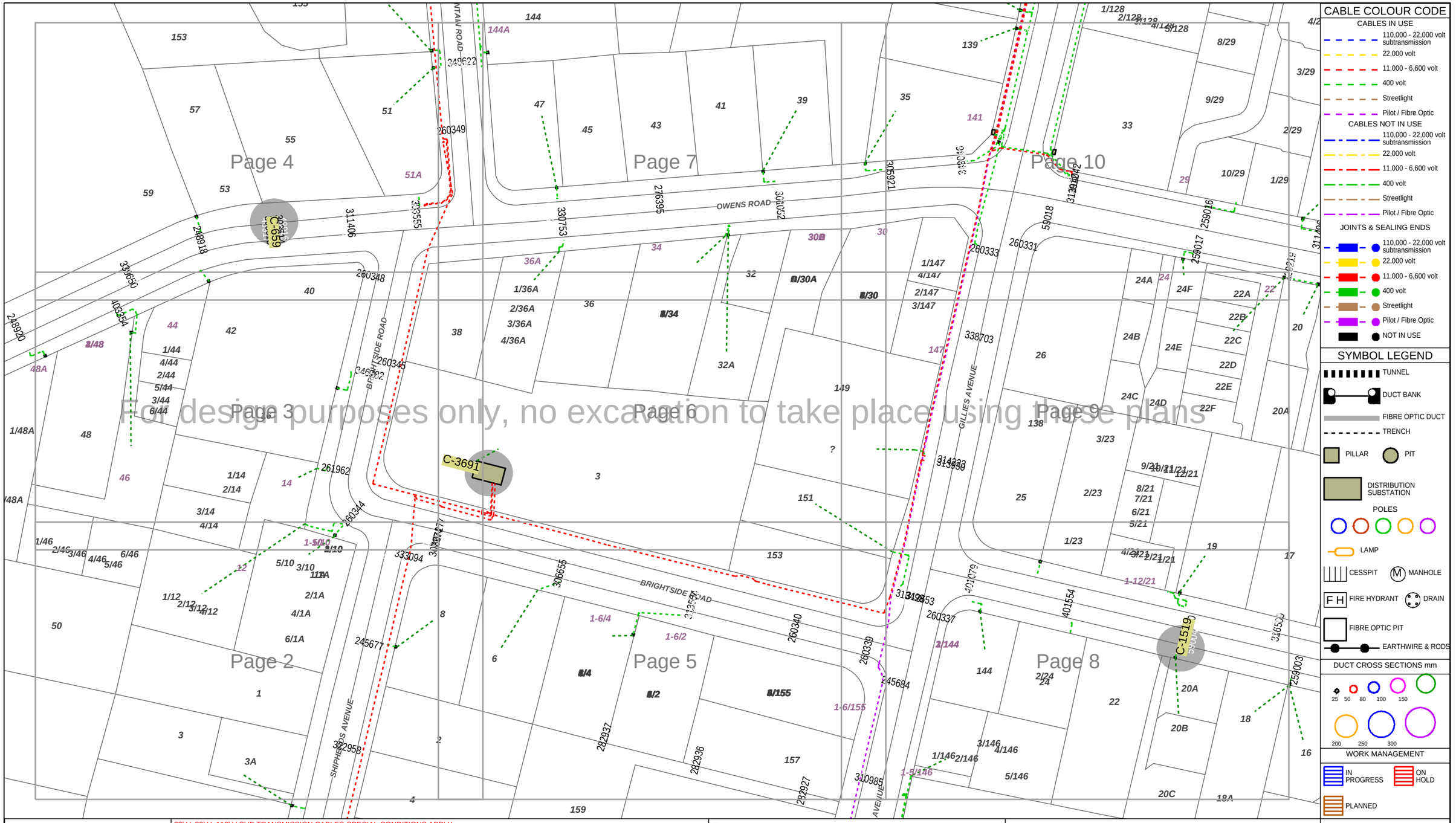
Underground Services

0 10 20 30
Meters

Scale @ A3
= 1:1,000

Date Printed:
6/03/2018

Auckland Council
Te Kaunihera o Tāmaki Makaurau



Vector

22kV, 33kV, 110kV SUB TRANSMISSION CABLES-SPECIAL CONDITIONS APPLY:

Vector Limited provides a free standover service that requires 2 working days notice. Hand digging is required when excavating within 1 metre of the cable. Replacement trench backfill material must be the same as that removed and it must be replaced to the same level of compaction. Refer to attached covering letter for additional information.

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Vector reminds you of your responsibilities under the Health and Safety at Work Act 2015, whereby you must establish the location of underground services before commencing excavation.

If you hit an electricity cable or overhead line please call us immediately on 0508 VECTOR (0508 832 867). If you hit any gas pipeline call the Fire Service first on 111. If you hit a gas distribution pipe in the Auckland area call us on 0800 764 764. If you hit a gas pipeline in the rest of the North Island call FIRST GAS on 0800 800 393. If you hit a gas transmission pipeline call FIRST GAS on 0800 734 567. If you hit a communications cable (all areas) call us immediately on 0800 826 436 (select option 1).

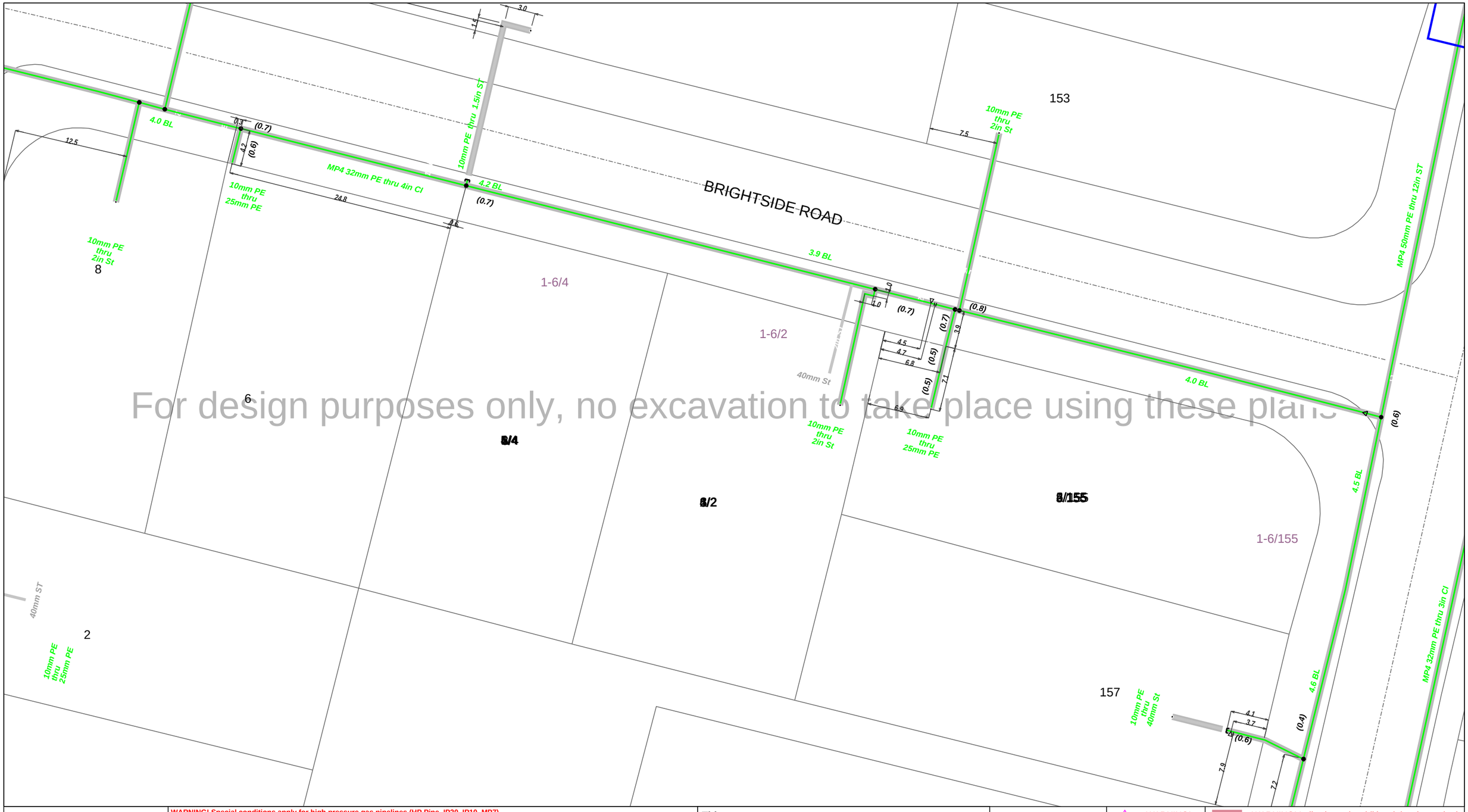
Title:

Request Title:

Company Name:

Usage:	Request ID: 6044291
Request for:	No associated viewport
Customer Contact:	Printed by: swadmin
Phone:	Date printed: 17. January 2018
Client Reference:	Page: 1 of 10

A3 ELECTRICITY OBSTRUCTION PLAN



Vector

WARNING! Special conditions apply for high pressure gas pipelines (HP Pipe, IP20, IP10, MP7)

A permit/consent is required for any excavation within 2 metres of this pipeline. A MINIMUM of 3 working days notice is required when applying for a permit/consent. Refer to attached covering letter for additional information.

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Title:

Request Title:	
Company Name:	
Usage:	Request ID: 6044292
Request for:	Scale: 1:400
Customer Contact:	Printed by:
Phone:	Date printed: 17. January 2018
Client Reference:	Page: 5 of 10

PIPE COLOUR BY PRESSURE

- LP Pipe
- LPG Pipe
- MP1 Pipe
- MP2 Pipe
- MP4 Pipe
- MP7 Pipe
- IP10 Pipe
- IP20 Pipe
- HP Pipe
- 0 kPa

WARNING! Live service within this property.

WORK MANAGEMENT

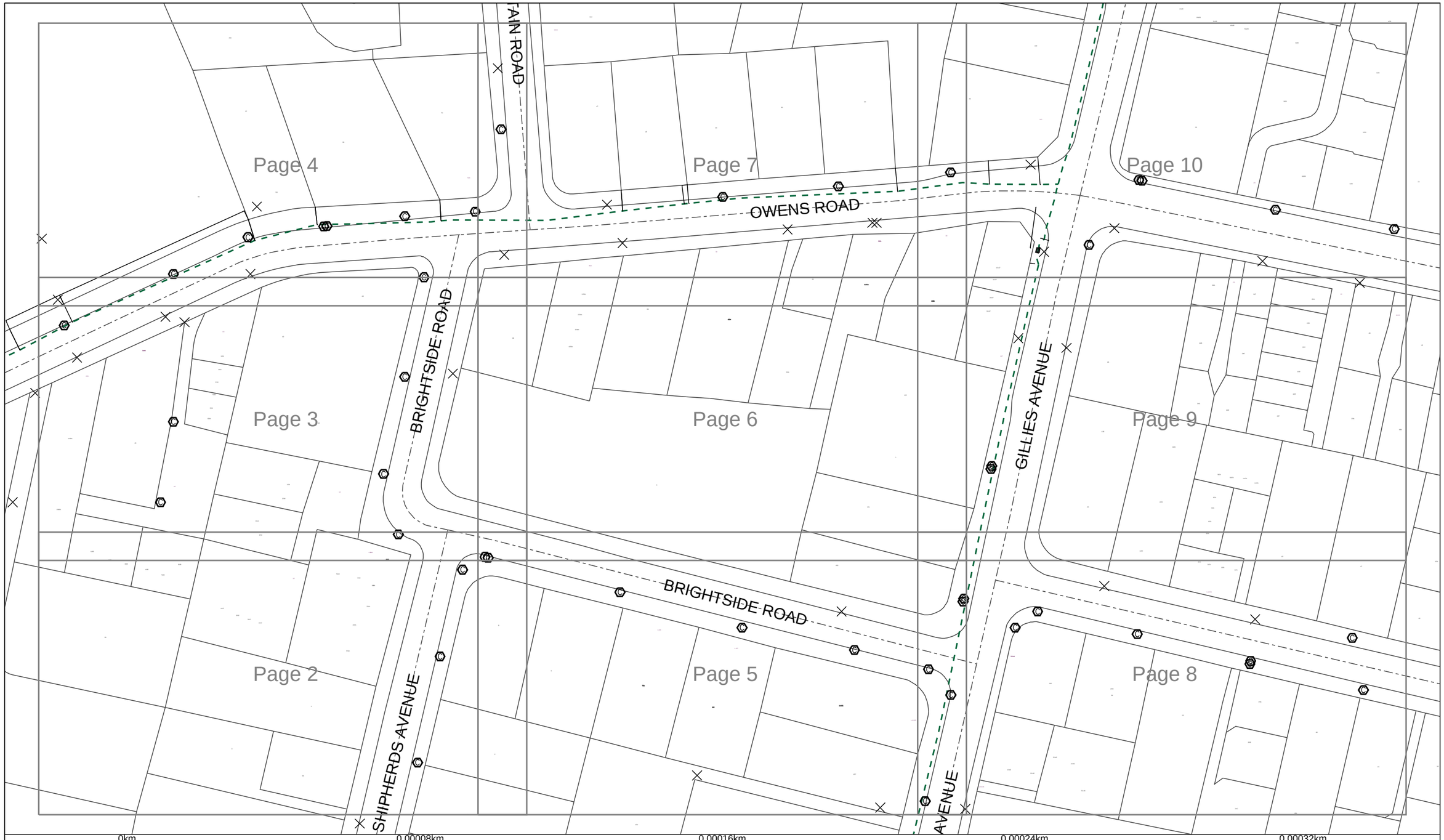
- In Progress
- On Hold
- Planned

WARNING! Indication only additional data is required

Transmission Pipeline (ex - NGC)
Please contact Vector - New Plymouth on 0800 734 567 for On-Site Location and Work Permits. A minimum of 48 hours notice is required.

OTHER GAS FEATURES

- Fibre Optic
- Closed Valve
- Gate
- Riser
- Open Valve
- PRS
- Service Regulator
- Reducer



Vector communications

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In the event of damage to equipment please remain clear of the area and immediately phone:

Electricity - 0508 VECTOR (0508 832 867)

Gas - Auckland area call us on 0800 764 764. If you hit a gas pipeline in the rest of the North Island call FIRST GAS on 0800 800 393. If you hit a gas transmission pipeline call FIRST GAS on 0800 734 567

Communication Cable - 0800 826 436

Title:

Company Name:

Customer Contact:

Output: Page 1 | **Scale: 1:1**

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Legend

Strand & Structure [Gis]

Pole.Location Inactive Concrete

Pole.Location Inactive Power

Underground Route.Route Active

MH **Underground Utility Box.Location Active Manhole**

N W E S