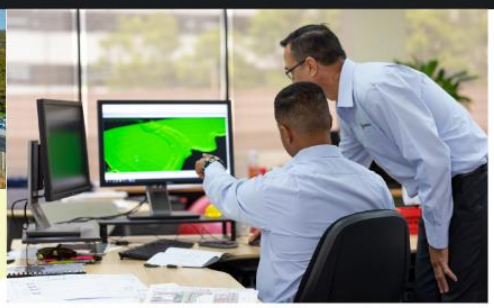
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2 Karingal Drive, Pimpama

Civil Engineering Report for DA Submission

Client: BJS Gets Richer Pty Ltd

Project No: BE200223

Document No: BE200223-RP-CER-00

January 2021

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Date:	8 January 2021

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Appendix C – Burchills Engineering Solutions Drawings

1. Introduction

BJS Gets Richer Pty Ltd has engaged Burchills Engineering Solutions to prepare a Civil Engineering Report to be considered as part of a Development Application to the City of Gold Coast Council, for a proposed 71 lot multi-unit development at 2 Karingal Drive, Pimpama.

This report has determined that the site is suitable for the proposed development, in terms of those matters particularly relating to civil engineering design parameters and site constraints. The development can be undertaken in accordance with the current City of Gold Coast guidelines, SEQ Water Supply and Sewerage, Design and Construction Code and best management practices.

1.1 Scope of Report

This report describes the existing physical conditions of the site, and suitability for the proposed development with particular respect to:

- Site Earthworks;
- Roadworks, Access and Traffic;
- Stormwater Drainage;
- Water Supply;
- Sewer Reticulation;
- Electricity Supply;
- Telecommunications Supply.

This report represents an assessment of the facts and circumstances pertaining to these matters, as they are known to the writer at the time of preparation.

2. Project Identification

2.1 Real Property Description

The site is legally described as Lot 19 on RP 152380 and is situated between Karingal Drive and Imelda Way. The total site area is approximately 2.459 Ha.

The site is to be developed as shown on the Site Layout Plan prepared by Brian Johnston Plan Design, which is included within Appendix A of this report. A detailed site survey has been completed by Stewart McIntyre & Associates and is included within Appendix B of this report. The location of the subject site is shown on Figure 2.1, below.

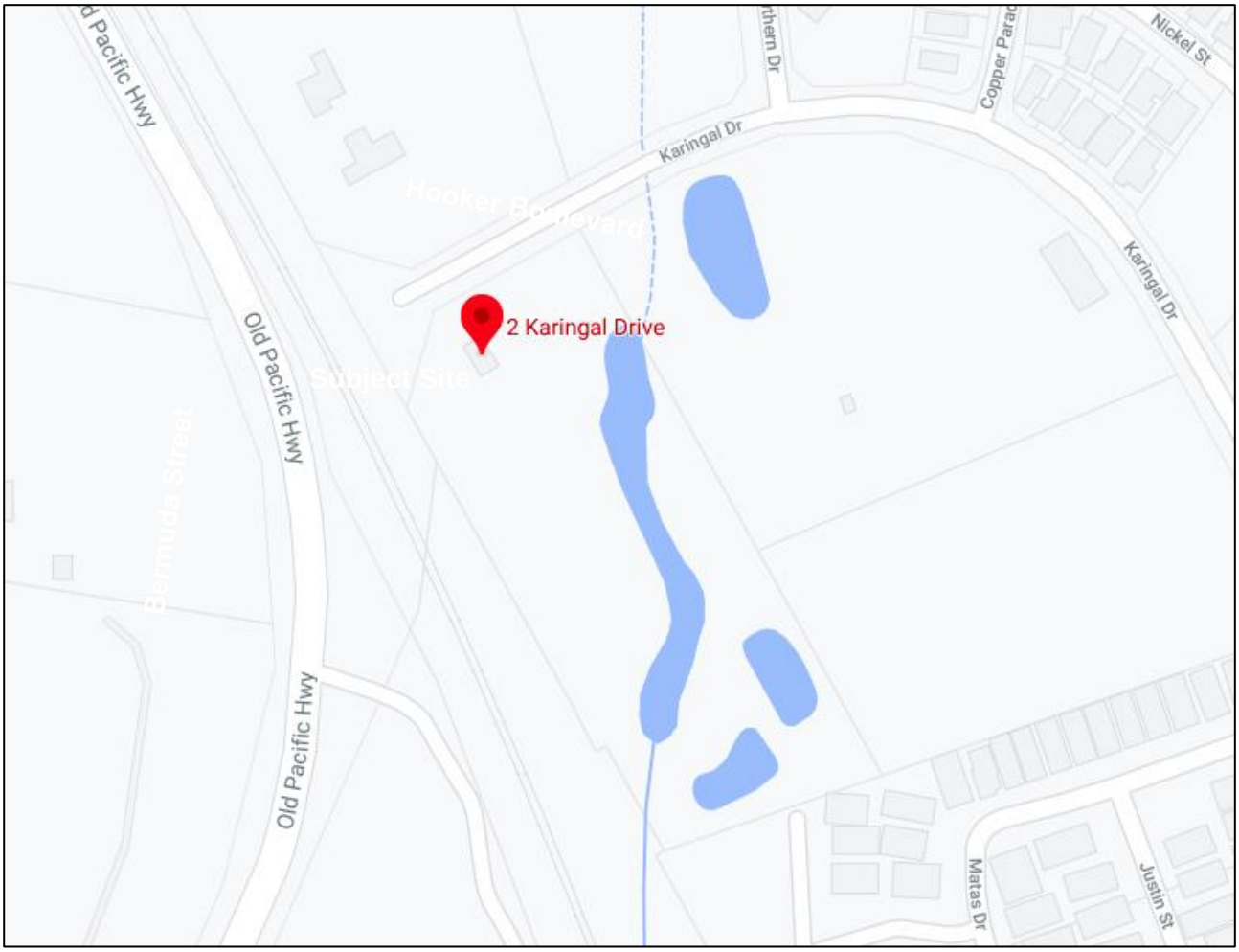


Figure 2.1 Site Locality Plan

2.2 Physical Description

The site is currently accessed from Karingal Drive bounding its northern property boundary. The end stub of Imelda Way also bounds the sites southern property boundary, however is not currently utilised for access purposes.

There is an existing waterway traversing diagonally through the site, entering the site in the southern corner, and exiting the site at the northern corner of the site. The extents of this waterway are depicted within the Detailed Site Survey included within Appendix B.

All portions of the site generally fall towards this central waterway that splits the site into two (2) catchments. The highest points in the site are at RL 10.0m AHD in the north-west corner, and RL 8.0m AHD in the south-east corner of the site. The site is currently vacant and is vegetated with grass and tree cover, where various material stockpiles are also scattered throughout the site.

The site is bounded by the following existing land uses:

North: Karingal Drive;

East: Vacant Land (mapped as medium-density residential);

South: Imelda Way, Residential Dwellings, and Conservation Land;

West: Railway Corridor.

3. Proposed Development

The proposed development consists of 71 multi-unit residential townhouses to be established under a Community Title Scheme. The development proposes a series of internal private roadways and associated car parking; where the development is generally positioned around the central waterway.

The proposed Site Layout Plan is shown below in Figure 3.1, in reduced form and a full-scale drawing is included within Appendix A of this report.

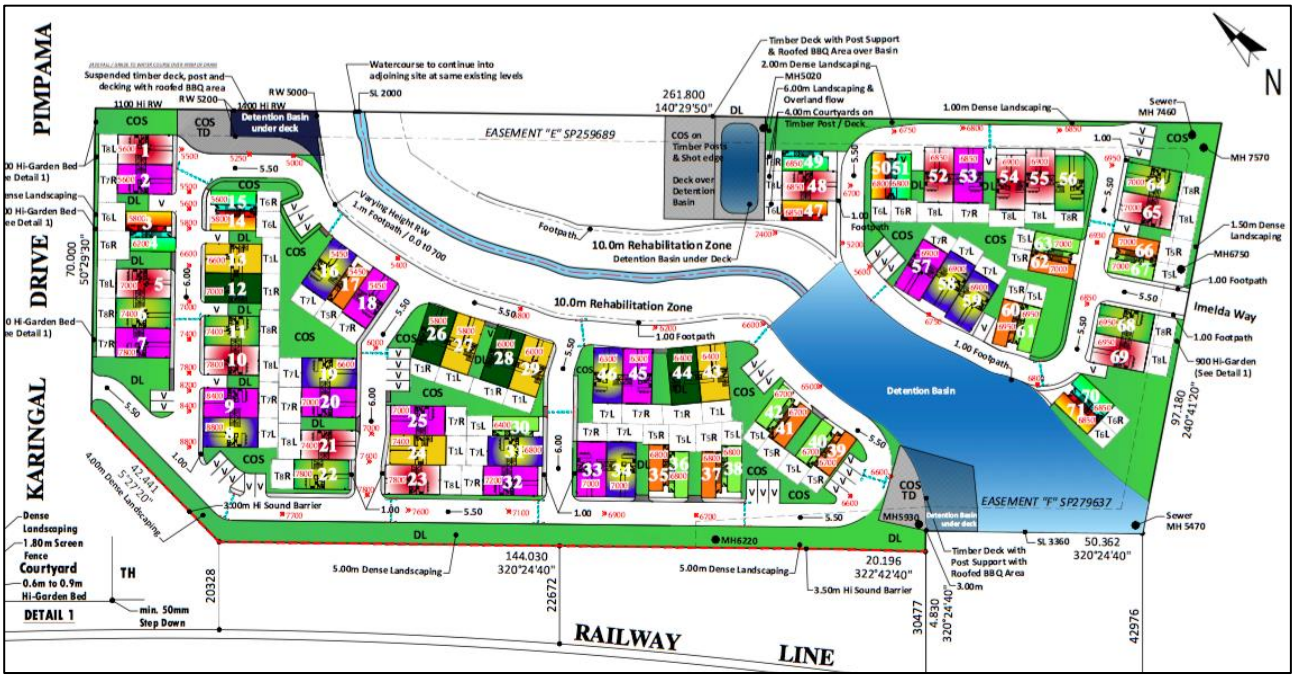


Figure 3.1 Site Layout Plan

Based on the SEQ Water Supply and Sewerage Design & Construction Code, the Equivalent Tenements (ET) and Equivalent Population (EP) for the proposed development are shown below in Table 3.1.

Table 3.1 Development Summary

Use	Unit	Total Units	ET's/Unit	EP's/ET	Total ET	Total EP
3 Bedroom Multi-Unit Residential	Dwelling	71	0.9	2.73	63.9	174
Total Proposed	**-**		**-**	**-**	**63.9**	**174**

4. Site Earthworks

Site earthworks associated with the proposed development will be limited to general shaping and profiling of building platforms associated with the development, construction of internal roadways, and excavation for services trenches. The proposed earthworks are shown on the Earthworks Layout Plan, Drawing BE200233-C200-A, prepared by Burchills Engineering Solutions and included within Appendix C of this report.

4.1 Sediment and Erosion Control

The best management practices will be implemented according to the IECA Best Practice Erosion and Sediment Control (2008) guidelines.

The following is a procedure of water quality controls to be implemented for the construction stage of the development.

4.1.1 Phase 1 – Stripping & Bulk Earthworks

- Identify and erect exclusions zones.
- Prior to any demolition, stripping or bulk earthworks on site, sediment fences, inlet traps, gully protection and entry/exit pad shall be put in place.
- A wash-down area and entry/exit pad will be provided at the construction site entrance to minimise the amount of sediment being tracked off the site.
- The wash-down area will be drained to a suitable sediment capture device installed downstream of the construction entry.
- Sediment fences are to be installed along the downstream property boundaries prior to stripping and earthworks commencing.
- Construct an appropriately-sized sediment basin for the development.
- If refuelling of machinery is to occur on site, appropriate absorbent products for cleaning oil spills will be provided.
- Provide bins on site for the disposal of waste and building debris.
- If it is anticipated that stockpiled material will not be used for a period of two weeks or more, a polythene cover (or equivalent) shall be used to prevent sediment transport by rain during wet periods. Conversely, during dry spells a cover shall be used to prevent fine sediments becoming airborne.
- The contractor shall provide on-going monitoring and maintenance of sediment and erosion control devices around the site.
- The contractor is to stage all works so that disturbed areas remain exposed for as short a period as practical.

Measures to minimise airborne pollutants during construction in the form of dust during dry and/or windy weather shall include the following:

- Exposed soils shall be kept damp to prevent particulates becoming airborne; and
- Stockpiles exposed for more than two weeks shall be covered to prevent wind erosion.

4.1.2 Phase 2 – Infrastructure, Building & Roadworks

- The site stormwater pipes and pits shall be installed with drop inlets provided to all pits.
- Provide sediment fences, sandbags or fine mesh cover to all gully pits.
- Monitoring of new stormwater pipes and infrastructure (including the stormwater quality improvement devices) to ensure they are free of sediment and debris.
- Maintain shake-down and wash-down area at site entry/exit.
- All disturbed areas are to be surfaced or landscaped/grassed (maintained to minimum 70% ground cover) as soon as practicable after completion of localised works.

4.1.3 Phase 3 – Finishing Works & Defects Liability Period

All erosion and sediment control measures, including sediment fences and inlet traps shall be maintained until completion of surface finishes, including landscaping and turfing:

- Maintain sediment fences.
- Tend to landscaped areas to maintain ground cover.

5. Roadworks, Access and Traffic

Access into the development is proposed from two locations; one being a new vehicle crossover from Karingal Drive that links to the internal private roadway that services the northern portion of the development; the other being an extension of Imelda Way that links to the internal private roadway that services the southern portion of the site.

Note that all internal roadways and carpark areas under this proposal are intended to remain private infrastructure, under the ownership and control of the body corporate.

Design and grading of the internal roadways and carpark areas will generally be in accordance with the City of Gold Coast Land Development Guidelines, along with AS/NZS 2890 – Parking Facilities.

The general concept for the proposed access roads and carpark areas is shown on the Site Layout Plan prepared by Brian Johnston Plan Design, and contained within Appendix A of this report.

6. Stormwater Drainage

All site stormwater runoff within the development footprint (excluding waterway) will be collected via stormwater drainage lines within the roadways, and conveyed to the bio retention and detention basins positioned adjacent to the waterway.

There is also an external catchment that flows through the site via the existing waterway, where an on-line detention basin is proposed to detain this runoff. The general proposed for stormwater drainage lines is shown on the Stormwater Mains plans prepared by Brian Johnston Plan Design, and contained within Appendix A of this report.

A Conceptual Stormwater Management Plan (CSMP), Report No. BE200223-RP-CSMP-00, has been prepared by Burchills Engineering Solutions. This study reviews the hydrology and hydraulics of the site for pre-development and post-development conditions.

Based on this study, the following recommendations have been made:

Stormwater Quantity

- The Lawful Point of Dishcharge for the site has been defined as the existing waterway on the site's eastern property boundary.
- Stormwater runoff from Catchment A1 & A2 will be conveyed to detention basins within their respective catchments, where it will be released at the LPD in a controlled manner to ensure that there is non-worsening peak flow in the post-developed scenario. The detention Basin A1 will have a 1% AEP volume of 104m^3, and Basin A2 will have a 1% AEP volume of 41.4m^3.
- Stormwater runoff entering the site from Catchment Ext A and A3 will be detained via the On-Line detention system. This detention device will have a 1% AEP volume of 1,360m^3.
- Minor flows from all catchments have been minimised to ensure that peak discharge from the developed catchment will be that of or less than the pre-developed scenario.

Stormwater Quality

- To achieve the City of Gold Coast's Water Quality Objectives, it is proposed to use bioretention systems to treat stormwater runoff. These bioretention systems will be private infrastructure, owned and maintained by the body corporate.
- The bioretention device positioned within Catchment A1 will have a total filter media footprint of 130m^2.
- The bioretention device positioned within Catchment A2 will have a total filter media footprint of 60m^2.

7. Flood Storage Requirements

The overall flood storage balance for the site has been assessed and achieved in accordance with City of Gold Coast requirements, as part of the overall site bulk earthworks.

A Hydraulic Impact Assessment, Report No. BE200233-RP-HIA-00, has been completed by Burchills Engineering Solutions and is intended to accompany this Development Application. Further detailed flood-storage modelling will be carried out under the detailed design phase for this development.

8. Water Supply

There is an existing 150mm water main on Imelda Way bounding the southern boundary of the site. The development will gain its potable water supply via connection to this main. Being a private development, the site will be serviced via a single master water meter and connection to the Council-owned main on Imelda Way; where the internal reticulation will be owned by the development Body Corporate.

The Water Main Plan prepared by Brian Johnston Plan Design, depicts the proposed internal water reticulation and is contained within Appendix A of this report

Sizing of the development's water connection, master-meter and internal reticulation is to occur at the detailed design phase of the development.

A Detailed Water and Sewer Assessment, BE200223-RP-WAS-00, has been completed by Burchills Engineering Solutions and is intended to accompany this Development Application.

8.1 Water Demand Calculation

To determine suitable pipe sizing for the proposed development, water demands are calculated according to the intended new development. The water criteria and design parameters are based on the following references:

- Gold Coast Water (GCW) Desired Standards of Service (DSS);
- SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code); and
- Water Services Association of Australia – WSA 03-2013 Water Supply Code of Australia, Part 1: Planning and Design.

The service mains internal of each building will be designed and constructed in accordance with AS/NZS 3500.1:2003 Plumbing and Drainage – Water services (Standards Australia, 2003).

The water flow parameters shown in Table 8.1, 8.2 and 8.3 required to meet Council's Standards of Service and have been based on Single Supply (Drinking Water Only) Network parameters shown in SEQ Design Criteria Table 4.1.

Table 8.1 Potable Water Supply Demand and Peaking Factor

Property Type	Average Day Demand L/EP/day	Non-Revenue L/EP/day	Peaking Factors		
			MDMM	PD	PH
Commercial	220	20	1.06	2.07	2.32
Multi-Unit Residential	220	20	1.27	2.05	2.97

Notes:

MDMM Mean Day Maximum Month Demand
PD Peak Day Demand
AD Average Day Demand
PH Peak Hour Demand

Table 8.2 Potable Water Pressure Parameters

Item	Pressure Parameter
Minimum Service Pressure	22 metres (adjoining the property boundary)
Maximum Service Pressure	Target 55 metres (at the property boundary) Max. 80 metres (subject to installation of pressure reducing valves)

Table 8.3 Fire Fighting Parameters

Item	Pressure Parameter
Minimum Residential Mains Pressure (Emergency Fire operating conditions)	12 metres at the main at the property boundary 9 metres elsewhere
Fire Flow Urban Residential	15 L/s for a duration of 2 hrs
Fire Flow Commercial	30 L/s for a duration of 4 hrs
Background Demand	2/3 x Peak Hour demand (not less than Average Day demand)

The calculated water supply demand for the proposed development is shown in Table 8.4.

Table 8.4 Water Supply Demand Calculations

Use	EP	AD Flow	Non-Revenue	AD (L/s)	PH (L/s)
Proposed 3-Bedroom Multi-Unit	174	220	20	0.48	1.35
Total Proposed	**174**			**0.48**	**1.35**

Calculations of maximum peak demand and demand multiplier for the residential aspect of the development are based on an allowance of 220 L/EP/day and a peak hour factor of 2.97 while applying the Non-Revenue flows of 20 L/EP/day, as follows:

Maximum Peak Demand = PHF x Demand Rate x EP's + NR
= 2.97 x 220 x 174 + 20 x 174
= 116.64 kL/day
= 1.4 L/s

Demand Multiplier = Maximum Demand / EP's
= 0.008

9. Sewerage Reticulation

There is an existing 375mm trunk gravity sewer main within the site that traverses along the boundary of the site. It is anticipated that wastewater generated from the development will be conveyed via internal private gravity sewer to this existing trunk main.

The Sewage Plan prepared by Brian Johnston Plan Design, depicts the proposed internal sewerage reticulation and is contained within Appendix A of this report

Sizing of the development's sewerage reticulation is to occur at the detailed design phase of the development.

A Detailed Water and Sewer Assessment, BE200223-RP-WAS-00, has been completed by Buchills Engineering Solutions and is intended to accompany this Development Application.

9.1 Sewer Demand Calculation

The sewer criteria and design parameters are based on the following references:

- Gold Coast Water (GCW) Desired Standards of Service (DSS)
- SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code); and
- Water Services Association of Australia – WSA 02-2014 Sewerage Code of Australia, Part 1: Planning and Design.

The sewer flow generation, pipe design parameters, minimum sewer pipe grades and maximum capacity are shown below in Table 8.1, 8.2 and 8.3. The following parameters are based on a Reduced Infiltration Gravity System (RIGS):

Table 8.1 Sewer Flow Generation Parameters

Flow	Parameter
Average Dry Weather Flow (ADWF)	200 L/EP/d
Peak Dry Weather Flow (PDWF)	C_2 x ADWF where $C_2 = 4.7 \times (EP)^{-0.105}$
Peak Wet Weather Flow (PWWF)	5 x ADWF

Table 8.2 Pipe Design Parameters

Flow	Parameter
Mannings 'n'	0.013
Minimum velocity @ PDWF	0.7 m/s
Depth of Flow @ PWWF – Existing system	Up to 1.0 m below MH cover level and no spillage through overflow structures
Depth of Flow @ PWWF – Proposed sewers	Max flow depth shall not exceed ¾ pipe full (75% d/D).

Table 8.3 Minimum Pipe Capacity – New Sewers Flowing ¾ Full

Pipe Size (mm)	Min Pipe Grade (1 in x)	Capacity (L/s)
150	180	10.4
225	300	23.6

The total development yield has been taken into account, not just the increase in equivalent persons on the subject site. The calculated sewer demand generation for the proposed development is shown in Table 8.4.

Table 8.4 Sewer Demand Calculation

Use	EP	ADWF Rate	ADWF (kL/d)	ADWF (L/s)	PWWF (kL/d)	PWWF (L/s)
Total Proposed	174	200	34.8	0.4	174	2.0

The calculations indicate that the total post development demand at PWWF will be approximately 2.0 L/s. The existing trunk sewer main therefore has the capacity to service the proposed development. A detailed sewer reticulation layout for development will be prepared under the detailed civil design phase.

10. Electrical and Telecommunications

A detailed site survey has been prepared by Stewart McIntyre & Associates and is included within Appendix B. A Dial Before You Dig search has also been completed.

The survey indicates that there are existing electrical and telecommunications services in the vicinity of Imelda Way and Karingal Drive. It is envisaged that adequate power supply can be provided to the site from the existing infrastructure. However, a specialist electrical consultant will need to be engaged to provide advice in relation to internal electrical reticulation requirements, to prepare detailed designs and to liaise with the relevant authorities.

11. Conclusion

The findings of this Civil Engineering Report support the site-use proposed in this development application to the City of Gold Coast Council.

Site earthworks associated with the proposed development will be limited to general shaping and profiling of building platforms associated with the development, construction of internal roadways, and excavation for services trenches.

Access into the development is proposed from two locations; one being a new vehicle crossover from Karingal Drive that links to the internal private roadway that services the northern portion of the development; the other being an extension of Imelda Way that links to the internal private roadway that services the southern portion of the site.

All site stormwater runoff within the development footprint (excluding waterway) will be collected via stormwater drainage lines within the roadways, and conveyed to the bio retention and detention basins positioned adjacent to the waterway. There is also an external catchment that flows through the site via the existing waterway, where an on-line detention basin is proposed to detain this runoff.

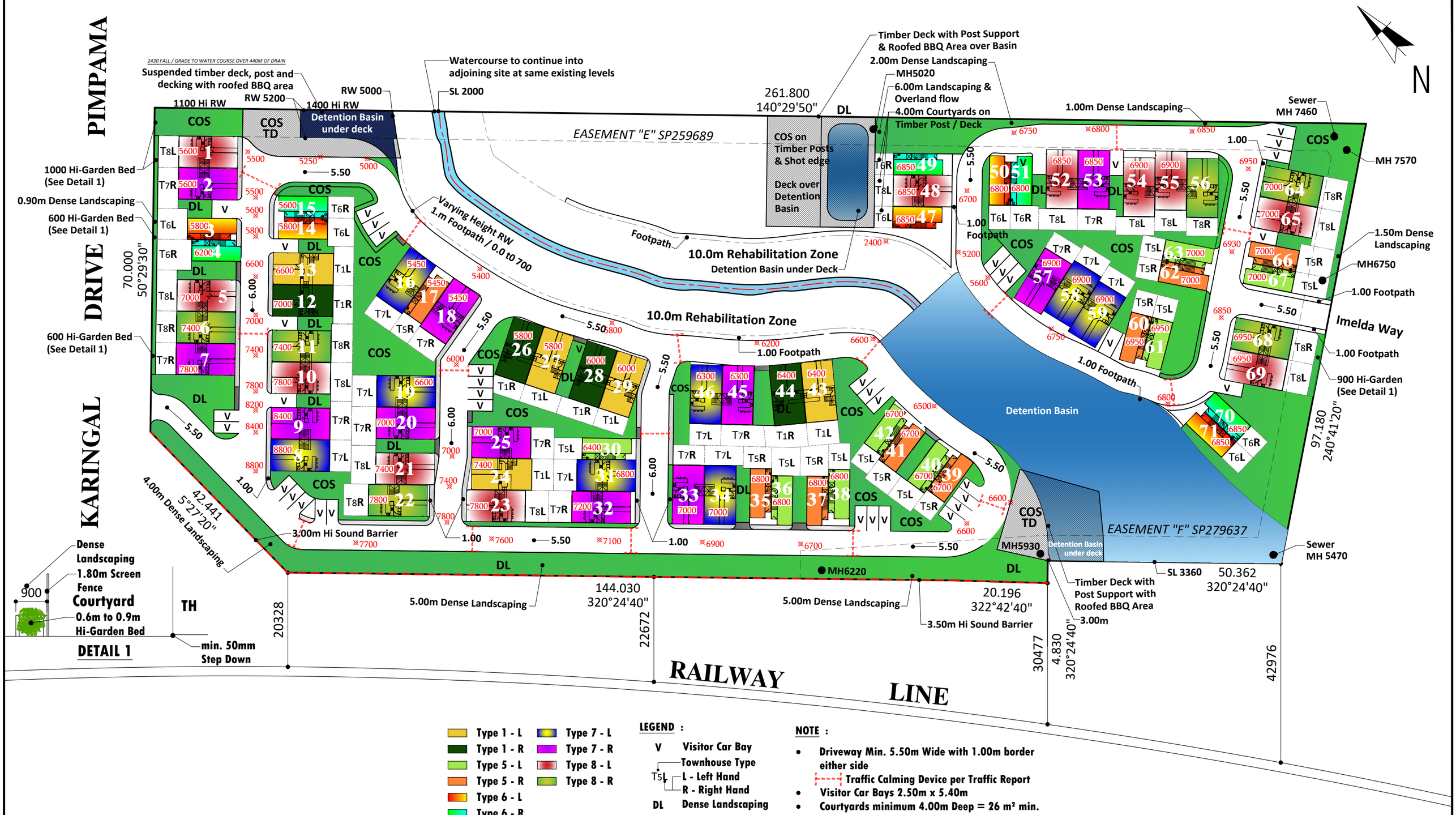
There is an existing 150mm water main on Imelda Way bounding the southern boundary of the site. The development will gain its potable water supply via connection to this main.

There is an existing 375mm trunk gravity sewer main within the site that traverses along the boundary of the site. It is anticipated that wastewater generated from the development will be conveyed via internal private gravity sewer to this existing trunk main.

All required essential services can be suitably provided to the development, including:

- Stormwater Drainage;
- Reticulated Water Services;
- Reticulated Sewerage Services;
- Electricity Supply;
- Telecommunications Supply.

Appendix A – Development Concept Plans



Type 1 - L
Type 1 - R
Type 5 - L
Type 5 - R
Type 6 - L
Type 6 - R
Type 7 - L
Type 7 - R
Type 8 - L
Type 8 - R

LEGEND :

- V — Visitor Car Bay
- T5L — Townhouse Type; L - Left Hand; R - Right Hand
- DL — Dense Landscaping
- COS — Community Open Space
- TD — Timber Deck

NOTE :

- Driveway Min. 5.50m Wide with 1.00m border either side
  - Traffic Calming Device per Traffic Report
- Visitor Car Bays 2.50m x 5.40m
- Courtyards minimum 4.00m Deep = 26 m² min.

Total Area (sqm) : 24,592

Dence Landscaping = 1,566 sqm
Community Open Space = 3,174 sqm
20.0m Rehabilitation Zone = 4,118.19 sqm
Timber Deck = 1414 sqm

NOTE :
HRV / GARBAGE TRUCK MANOEUVRING MIN. 10.5m KERB TO KERB PER J.J. RICHARDS DESIGN

1:750
15m 0 15m 30m 45m 60m 75m

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Verify all dimensions on site and from the dimension on the plans. Do not scale from drawings

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Brian Johnston Plan Design Pty Ltd - BLD 216547
By way of notice I reserve my rights E&OE intellectual property.

Design, Building, Civil Works.

Drawn by
John C.

Checked by
JPD, Brian Johnston plan design P/L

Client

SITE LAYOUT

RAY SUGARS
2 Karingal Drive Pimpama
Lot 19 on RP 152380

Drawing Scale
1:750

Layout ID
JPD-P24-KDP-01

Status

Paper Size
@A3

Appendix B – Detailed Site Survey

DRIVE

KARINGAL

20 RP152380

21 RP152380

13 SP259688

16 SP259688

17 SP259688

902 SP259688

19
RP152380
2.459 ha

1 SP135200

62 SP109417

EASEMENT E SP259689

EASEMENT F SP279637

DIRECTION OF WATER FLOW

DIRECTION OF WATER FLOW

DIRECTION OF WATER FLOW

IMELDA WAY

CREEK

CREEK

DAM

DAM

SWAMP

Brick Dwelling

Concrete Tanks

Concrete Slab

Shed

Shed

STOCKPILE

Adjoining Dwelling

Culvert

Concrete Culvert

3x 1.75m Dia RCP

Invert Levels

Invert Level RL 5.24

Wire Fence

G.I. Fence

Edge of Bitumen

TOP OF BANK

WATERLINE

OVERHEAD POWER

SITE BENCHMARK
SPIKE IN BITUMEN
RL 9.59 AHD DERIVED

SPIKE

Scale 1:400
0m 10m 20m

RAILWAY LINE

SEWER LINE	MH - MANHOLE
FENCE LINE	PIT - SEWERAGE INSPECTION PIT
TELECOM CABLE	TELE - TELECOM PIT
UNDERGROUND POWER	ELEC - ELECTRICAL PIT
OVERHEAD POWERLINE	PP - POWER POLE
GAS MAIN	ELP - ELECTRIC LIGHT POLE
WATER MAIN	V - VALVE
ROUND CONCRETE PIPE	FH - FIRE HYDRANT
	GT - GULLY TRAP
	TREE
	FL - FLOOR LEVEL
	WM - WATER METER

THE SURFACE EXPRESSION OF THE SERVICES SHOWN ON THIS PLAN HAVE BEEN LOCATED BY FIELD SURVEY.
PRIOR TO DEMOLITION , EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.

STEWART McINTYRE & ASSOCIATES P/L
CONSULTING SURVEYORS
21 PHILIPPINE PARADE
PALM BEACH, QLD. 4221
PHONE 55983334 FAX 55981522

TITLE: CONTOUR AND DETAIL SURVEY OVER LOT 19 ON RP152380

PARISH OF PIMPAMA COUNTY OF WARD

CLIENT: EA INVEST PTY LTD.

SURVEYOR	DATE
AF	19/05/17
DRAWN	FIELD BOOK
AF	
COMFILE 17943PM	
DRAWING NO. DWG17943	

SCALE 1:400

LEVEL DATUM AHD DERIVED
PSM191892 RL 8.662m AHD

Appendix C – Burchills Engineering Solutions Drawings

LEGEND

N

- EARTHWORKS AREA OF FILL
- EARTHWORKS AREA OF CUT
- STAGE BOUNDARY - EARTHWORKS LIMITS
- 38.35 — FINISHED SURFACE CONTOURS

WARNING : UNDERGROUND SERVICES

UNDERGROUND SERVICES EXIST IN THIS VICINITY. THE CONTRACTOR IS TO CONTACT THE RELEVANT AUTHORITIES TO CONFIRM EXACT LOCATION OF SERVICES ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION COMMENCING.

NOTE :

ALL DESIGN/SETOUT INFORMATION SHOWN ON THIS DRAWING IS AVAILABLE IN DIGITAL FORMAT FROM THE OFFICE OF THE SUPERINTENDENT UPON REQUEST BY THE CONTRACTOR.

FLOOD STORAGE SUMMARY

DEVELOPMENT AREA	
EXISTING FLOOD STORAGE:	828 cu.m.
DESIGN FLOOD STORAGE:	1,319 cu.m.
∴ FLOOD STORAGE CREDIT:	491 cu.m.

BULK EARTHWORKS SUMMARY

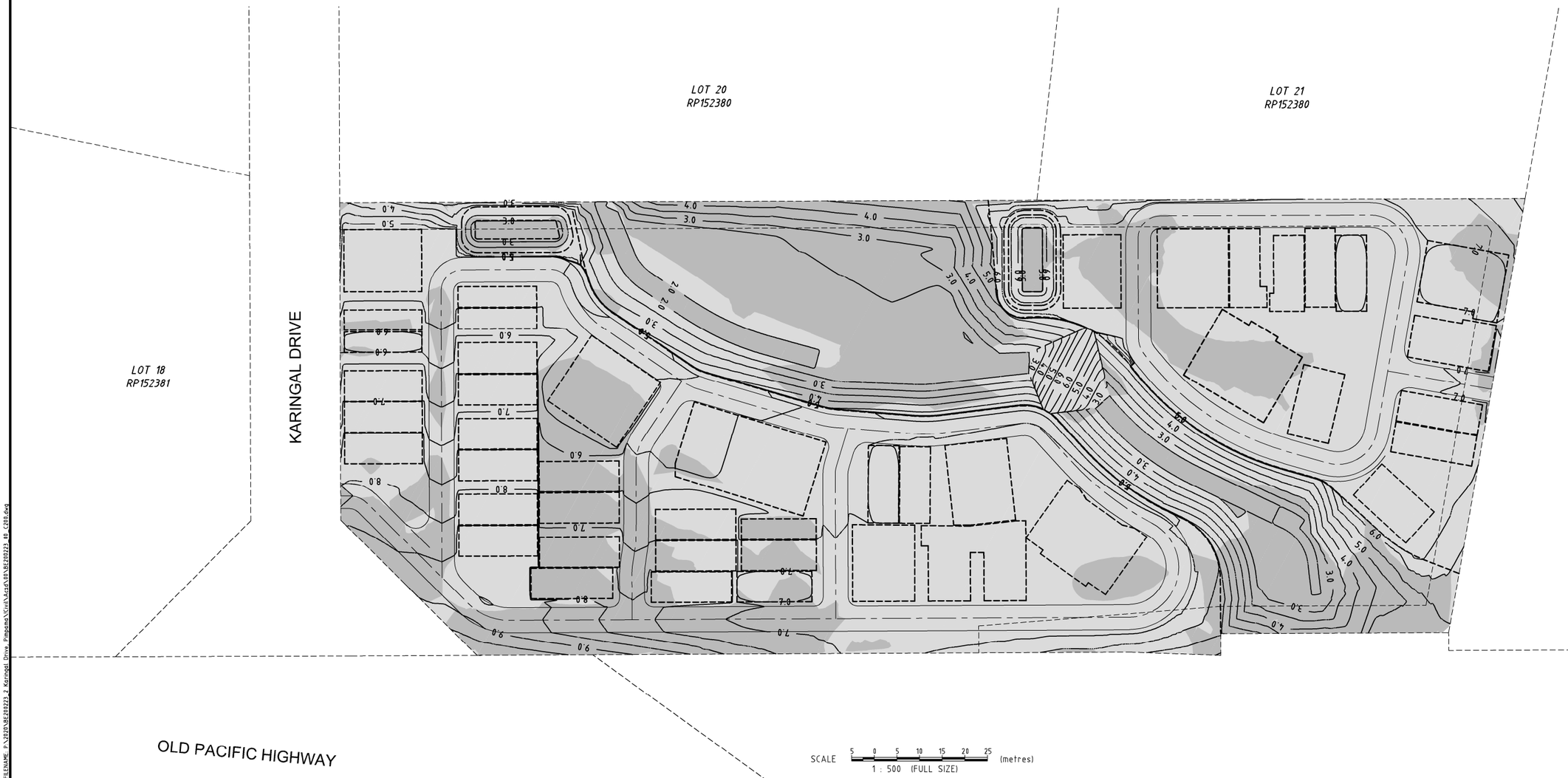
STRUCTURAL FILLING

AREA	NETT SOLID FILL	incl. COMPACTION FACTOR (0.80)
OVERALL FILLING		
(ALLOTMENTS, ROADS, BATTERS		
AND PARK AREAS)	11,664 cu.m.	2,332 cu.m
TOTAL FILL REQUIRED	13,996 cu.m.	

EXCAVATION

AREA	NETT CUT	
OVERALL STIE EXCAVATION	6,900 cu.m.	
TOTAL CUT	6,900 cu.m.	

SUMMARY:
TOTAL MATERIAL ON LEADS (NETT CUT) = 6,900 cu.m.
i.e. 13,996 cu.m. - 6,900 cu.m. = 7,096 cu.m. IMPORTED MATERIAL REQUIRED



2 KARINGAL DRIVE
BULK EARTHWORKS
FOR
BJS GETS RICHER PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
A	ORIGINAL ISSUE	18-12-20

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PROJECT: ----

DRAWING TITLE :
BULK EARTHWORKS LAYOUT PLAN

DEVEL. APPLIC. No. :		DATE : 18-12-20
PROJECT LEADER : J.CUELL	DESIGNER : Z.CAMPBELL	
DRAFTSPERSON : Z.CAMPBELL	CHECKED : J.CUELL	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
RPEQ No. :		
SCALE :	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE200223-00	DRAWING No. : C200	VERSION: ----

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