BORNHORST + WARD
CONSULTING ENGINEERS
CIVIL AND STRUCTURAL

CIVIL ENGINEERING REPORT

FOR THE PROPOSED MIXED USE DEVELOPMENT

LOCATED AT 15 ANDERSON ST FORTITUDE VALLEY

PREPARED FOR PROPERTYLINK

MAY 2014

Bornhorst & Ward Project No. **13221**

If you have any queries regarding this report please contact James Dewhurst.

Revision	Date	Description	Author	Rev.	App.
A	March 2014	Issue for Development Approval	JD	KR	NR
DRAFT	March 2014	Draft Issue	JD	KR	NR

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1. INTRODUCTION

Bornhorst and Ward has been commissioned to investigate and report on the Civil Engineering and Servicing requirements pertaining to the proposed mixed use development located at 15 Anderson Street, Fortitude Valley.

The development site is located within the Economic Development Queensland (EDQ) Priority Development Area (PDA) of Bowen Hills. All engineering requirements for this proposal shall however be in accordance with the Brisbane City Council (BCC) Subdivision and Development Guidelines, the Queensland Urban Drainage Manual (QUDM) and the Southeast Queensland (SEQ) Water Supply and Sewerage Design Construction Code. This is consistent with other developments within the Bowen Hills PDA, and EDQ requirements.

This report outlines the proposed design methodology and calculations in support of a Development Application to Economic Development Queensland (EDQ) and should be read in conjunction with other documents issued by the consultant team.

2. SITE CHARACTERISTICS

2.1 LOCATION

The site is bound by Costin Street, Water Street and Anderson Street to the northeast, southeast and southwest respectively. Private property lies to the northwest of the site. The RNA Showgrounds site is currently under development and located to the east, opposite the intersection of Costin and Water Streets.

Street Address: 15 Anderson Street, Fortitude Valley 4006
RP Description: Lot 10 on SP208752

Figure 1: Locality Plan (Retrieved from Nearmap on 14/03/2014)

2.2 LANDUSE

2.2.1 EXISTING

The 2896m^2 development site is currently predominately built over by 3 adjoining warehouse buildings. The remaining ground areas consist of sealed car parking, located in the west and north. Access to the western car parking area is provided through a crossover to Anderson Street, while a crossover to Costin Street services the small car parking area in the north.

2.2.2 PROPOSED

The development proposal consists of 2 residential towers in 2 stages, with Tower 1 to be constructed in the west of the site initially, and Tower 2 to be constructed in the east during Stage 2. A summary of each tower is shown below.

Table 1: Tower Summary

	Tower 1	Tower 2
Number of Levels	14	16
Number of Units	98	132

Car parking will be provided for at podium and ground levels, and within two basement levels. Access to the internal vehicle circulation areas will be facilitated through a new crossover to Anderson Street, in the same approximate location of the existing access in the western corner of the site.

There is a required road dedication at all frontages to the site which is outlined in Section 3.1 of this report. The developed site area will be reduced to 2603m^2 as a result of this.

Refer to the Nettleton Tribe architectural plans attached in Appendix B for further information.

2.3 TOPOGRAPHY & SITE DRAINAGE

As previously outlined, the development site is predominately built over. Ground level areas fall from the northwest to the southeast, with levels ranging from approximately RL 9.8m along the northwest property boundary, to RL 7.7m at the eastern corner. Refer to the site detail survey attached in Appendix C for further information.

In existing conditions, stormwater predominately discharges as piped flow from roof and car park areas within the site to kerb adaptors located on Water and Costin Streets. The exception to this is the small car parking area in the northern corner, which currently discharges via overland flow to the Costin Street road reserve.

2.4 SITE FLOODING

The surrounding areas are affected by overland flows under existing conditions. Refer to Section 4.4 of this report for further information.

3. EXISTING AND PROPOSED CIVIL WORKS AND INFRASTRUCTURE

3.1 ROADWORKS

As outlined in Section 2.2.2 of this report, access for the development will be provided in the northwest corner of the site. Minor works will be required for the construction of the new crossover.

There is a proposed property setback on Anderson Street and Water Street frontages to the site which is a result of the future road widening of Water Street, and footpath dedication on the Anderson Street and Water Street frontages. In the ultimate case, all footpaths fronting the development site will be 3.75m wide in accordance with the Fortitude Valley Neighbourhood Plan. To achieve this, there is also a setback on Costin Street affecting only the basement levels, ground floor and first level. Refer to the Preliminary Siteworks and Servicing Layout SKC030 attached in Appendix A for details.

No external roadworks are outlined as part of this proposal.

3.2 EARTHWORKS

Bulk excavation will be required at the site to facilitate basement levels. A cut ranging from approximately 3.2m to 6.8m below the surface level is expected. Minor detailed earthworks will also likely be required for service trenching. Refer to the Preliminary Earthworks Layout SKC010 attached in Appendix A for further information.

It is noted that there is an indication of soil contamination on the site, affecting ground levels up to 2.7m below the existing surface level. This includes material proposed for excavation of the basement levels. Works involving any contaminate material will be carried out in accordance with the Site Management Plan. Refer to the Lloyd Consulting Contamination Land Audit Report for further information.

3.3 STORMWATER

3.3.1 EXISTING

Review of the detail survey and BCC Bimap Plans, both attached in Appendix C, indicate that there is existing stormwater infrastructure within the road reserves fronting the development site. This information is summarised below:

- There is a brick arch stomwater main, approximately 1275x2150mm in size, which drains northeast down Water Street.
- There is a 300mm diameter stormwater line which drains southeast down Anderson Street and connects to the outlined infrastructure in Water Street.
- There are 3 on grade gully pits fronting the development site which drain to the outlined drainage infrastructure in Water Street through pipes of varying sizes. This includes two pits located in Costin Street which discharge to the Water Street infrastructure at a maintenance structure located at the intersection of Costin and Water Streets.
- The survey indicates the presence of other stormwater infrastructure in Costin Street, and a second stormwater line in Water Street. These items are proposed future infrastructure upgrades to be completed at an unknown date and are separate to the works outlined in this report.

Under existing conditions, the site discharges stormwater to kerb adaptors in Water and Costin Streets, with flows ultimately captured by the existing drainage infrastructure in Water Street.

3.3.2 PROPOSED

It is intended to drain the proposed development through a new connection to the maintenance structure located at the intersection of Costin and Water Streets. Refer to the Preliminary Siteworks and Servicing Layout SKC030 attached in Appendix A for further information. Due to the age of this infrastructure, there is no as constructed or design information available. It should be noted that survey of this infrastructure will be required prior to detail design.

The proposed development will incorporate two 5kL rainwater tanks for irrigation. Further details are outlined in Stormwater Management Plan in Section 4 of this report. Internal drainage is private plumbing and will be designed by the hydraulic engineer as required.

3.4 SEWER

3.4.1 EXISTING INFRASTRUCTRE

Review of the detail survey and BCC Bimap Plans, both attached in Appendix C, indicate that there is existing sewerage reticulation infrastructure within the road reserves fronting the development site. This information is summarised below:

- There is a 225mm diameter gravity sewer in Water Street fronting the development site. This infrastructure drains to the northeast through the RNA Showgrounds, increasing to 300mm in diameter.
- Two separate 150mm diameter gravity sewers, one in Anderson Street and another in Costin Street connect to this 225mm sewer main at the respective intersections in Water Street.
- There are a number of existing property connections from the described sewers in Anderson, Costin and Water Streets that service existing developments at the site.

3.4.2 PROPOSED INFRATRUCTURE

It is intended that a new sewer connection be made to the existing 150mm diameter sewer in Costin Street to service the proposed development. Refer to the Preliminary Siteworks and Servicing Layout SKC030 attached in Appendix A for further information.

All internal sewer infrastructure is private plumbing and will be designed by the Hydraulic Engineer for the project.

3.4.3 EXTENRAL INFRASTRUCTURE UPGRADES

Queensland Urban Utilities (QUU) has been contacted regarding the capacity of the existing sewer infrastructure surrounding the development site. Their response to the enquiry has been attached in Appendix D, with the information summarised below.

There is sufficient capacity in the 150mm diameter Costin Street sewer to service the proposed development; however, the existing 225mm diameter sewer in Water Street, downstream of the proposed connection is currently at capacity. Metro, a developer to the west of the site in Water Street is currently constructing a sewer augmentation of the 225mm diameter Water Street sewer to the RNA site. The developer of the RNA site, Lend Lease, has also been conditioned to upgrade the existing 225mm into 300mm diameter sewer through this site to ultimate size.

It is understood that once the outlined upgrades are complete, adequate capacity will exist in the network to service the proposed development. The current completion date for the works is 31/05/2015, however, it is understood that this may be pushed back to 31/03/2016.

3.4.4 PROPOSED SEWER DISCHARGE METHODOLOGY

Based on QUU discussions, two sewer discharge solutions are proposed and outlined below. It is the intention of the developer to obtain endorsement for both the options outlined below. The ultimate solution will depend on the completion date for the proposed development.

Solution 1

A sewerage holding tank would be constructed within the proposed development to facilitate off-peak sewerage discharge. This approach utilises the capacity that exists within the surrounding network during off-peak times and allows the use of the development to occur before the completion of the aforementioned external sewer upgrades.

The holding tank details would be confirmed through coordination with QUU and the Hydraulic Engineer for the project during detail design.

Solution 2

The second option is to allow use of the development only after external upgrade works are completed. This scenario removes the requirement for additional internal or external sewer infrastructure works. To coordinate the timing of occupation, it is expected that the Permit to Occupy the proposed development would be dated to coincide with or be conditioned upon the completion and acceptance of the previously outlined external sewer upgrades.

3.5 WATER

Review of the detail survey and BCC Bimap records for the site, both attached in Appendix C, indicate that there is existing water reticulation infrastructure within the road reserves fronting the development site. This information is summarised below:

- There is an 80mm diameter potable water main located in Anderson Street.
- There is a 150mm diameter potable water main located in the Water Street road reserve, within the verge fronting the development site.
- There is an 80mm diameter potable water main located in Costin Street.
- There are also 4 fire hydrants located in the road reserves fronting the development site.

It is intended to service the potable water requirements for the proposed development through connection to the aforementioned 150mm water main located in the development side verge of Water Street. Refer to the Siteworks and Services Layout SKC030 attached in Appendix A for further reference. Final service connection details will be confirmed by the Hydraulic Engineer for the project, who will also augment internal water infrastructure.

QUU Correspondence attached in Appendix D confirms that this infrastructure has adequate capacity to service the proposed development.

3.6 OTHER UNDERGROUND SERVICES

The results from a Dial Before You Dig enquiry lodged for the site indicate the presence of other underground services within the vicinity of the development which are summarised below:

- There are Telstra local and mains cables located within the development side verge at all three road frontages to the site.
- There is Optus fibre optic cable which appears to be located within the development side verge of Costin Street, along the entire frontage. From the Optus plans, the same infrastructure is also located in the verge of Water Street, opposite the development site.
- There are APA controlled medium pressure gas mains located in all three road reserves fronting the development site. The detail survey for the site indicates that this infrastructure is located under the road itself in each case.
- There is Energex controlled low voltage underground cables in all three road reserves fronting the development site, including infrastructure located within the development side verge of Costin Street. There is also a high voltage cable located within Costin Street itself.

4. STORMWATER MANAGEMENT PLAN

4.1 STORMWATER OBJECTIVES

Under the Brisbane City Council Land Use Development Guidelines, several design elements were identified in relation to stormwater management issues. Brisbane City Council must be satisfied that:

- The proposed development can be drained;
- The stormwater management system can follow the features and functions of the natural drainage system;
- The volume, timing, velocity and pollutant load of stormwater has no adverse effect on any surrounding properties; and
- Suitable provision is made in the design layout to accommodate for major drainage.

4.2 EXISTING AND PROPOSED CATCHMENT DESCRIPTION

Under existing conditions, the property consists of a single catchment containing roof and sealed car park areas. As a result, the existing catchment can be considered to have a completely impervious area. Runoff from the site is conveyed to kerb and channel through piped flow.

The proposed development consists of roof and podium level areas. As a result, the site area will remain completely impervious in its ultimate condition for the purposes of stormwater runoff calculations. The development will discharge stormwater to Council infrastructure through a direct piped connection.

4.3 LAWFUL POINT OF DISCHARGE

The existing point of discharge for the site is to the brick arch stormwater main located in Water Street. It is intended to maintain this point of discharge for the proposed development.

Under QUDM Section 3.02, determination of whether a lawful point of discharge exists at a particular location is subject to the following two-point test:

a) The location of the discharge is under the lawful control of the local government or statutory authority from whom permission to discharge has been received.
b) That in discharging in that location, the discharge will not cause an actionable nuisance.

As the proposed stormwater connection will be to existing Council infrastructure and there will be a no worsening effect as a result of the discharge, the existing point of discharge for the site satisfies the above two-point test, and thus can be considered lawful.

4.4 SITE FLOODING AND OVERLAND FLOW

4.4.1 SOURCES OF FLOODING

BCC's Online Flood Awareness Mapping was used to identify area potentially affected by flooding. The mapping indicates that the development site and surrounding area are affected by flooding from Overland Flows. Refer to Figure 2 for details.

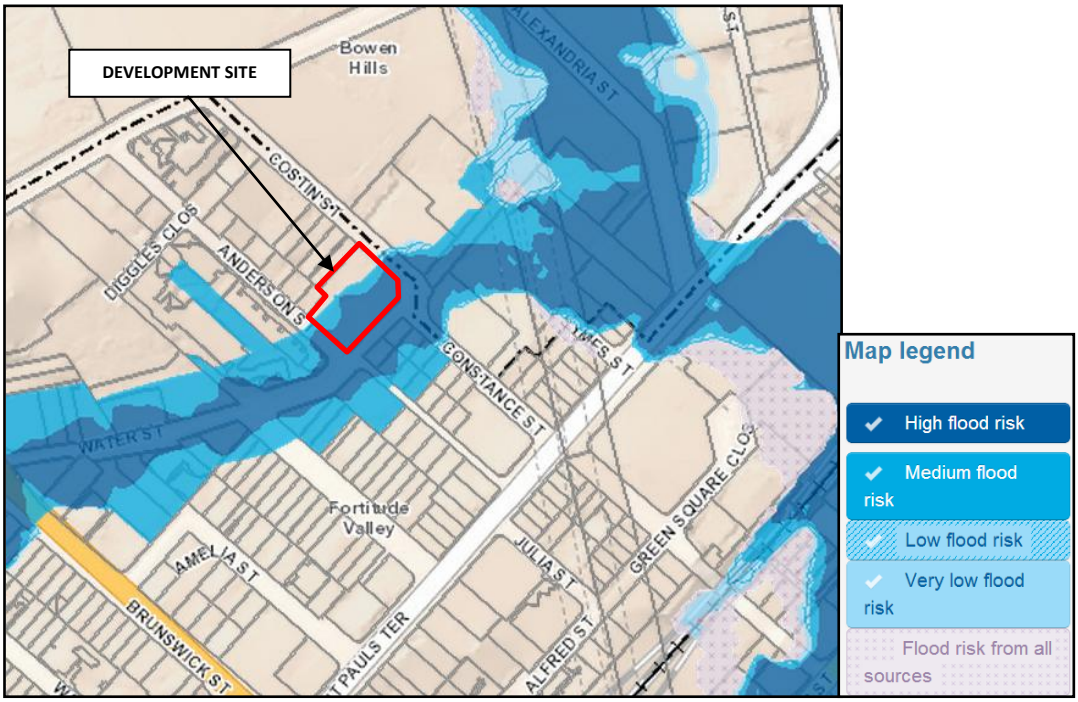


Figure 2: BCC Flood Awareness Map Extract

The development site is located at the lower end of Water Street which contains the trunk drainage infrastructure for the surrounding catchment. The overland flow studies outlined in Section 4.4.2 of this report indicated that during major storm events, the upstream drainage infrastructure has insufficient capacity to convey runoffs, and as a result, overland flows occur.

No other sources of flooding were identified for the site, which is consistent with the level of the site.

4.4.2 OVERLAND FLOW STUDIES

Information regarding flooding in the local area has been obtained through two separate reports:

- The Brisbane City Council Water-Campbell Streets Catchment Relief Drainage Investigation (1997), prepared by TOD Group; and
- The RNA Redevelopment Flooding and Drainage Report Stage 1 Compliance A (2011), prepared by Cardno Pty Ltd.

The TOD Group report was completed in 1997 and investigates proposed relief drainage in the area. The construction commencement date of this relief drainage is currently unknown. The TOD Group report finds that the existing drainage within Water Street has insufficient capacity to convey runoff from rainfall events with an Average Recurrence Interval (ARI) of 2 years of more. This report models rainfall events up to and including the 50y ARI. Subsequent to the completion of this report, the Inner City Bypass was constructed, in turn reducing the size of the upstream catchment area. Therefore overland flow water surface levels found in TOD Group report are somewhat outdated and can be considered conservative.

The Cardno report was completed in 2011 and details stormwater infrastructure upgrades pertaining to the RNA Showgrounds redevelopment, examining the effects of this infrastructure on the surrounding catchment. This report models rainfall events up to and including the 100y ARI. In general, infrastructure upgrades outlined for the RNA redevelopment appears to reduce the level of overland flows in Water Street, however reference locations modelled to find water surface levels do not match those from the TOD Group report in all areas.

4.4.3 ADOPTED WATER SURFACE LEVELS

The redevelopment of the RNA Showgrounds has commenced at the time of issuing this report and as a result, levels found in the Cardno report for the ultimate case (post RNA development), have been adopted for the development. The exception to this is the location at the intersection of Anderson and Water Streets, where there is no water surface level provided in the Cardno report. As a result, the water surface level from the TOD Group report utilised for this location. Water surface levels adopted correspond to the 50y ARI, in accordance with BCC requirements for overland flows, however 100y ARI levels have also been included for reference where available. Refer to Table 2.

Table 2: Adopted 50y ARI Water Surface Levels

Reference Location	Source	50y ARI Water Surface Level
Intersection of Water and Costin St	Cardno Report	RL 8.43m (RL 8.68m 100y ARI)
Upstream of where Costin St intersects Water St	Cardno Report	RL 8.61m (RL 8.73m 100y ARI)
Intersection of Water and Anderson St	TOD Group Report	RL 9.23m

4.4.4 ADOPTED FLOOD IMMUNITY MEASURES

Building levels for the development have been set in accordance with Table A1.2 of the BCC Subdivision and Development Guidelines Chapter 1 – Flood Affected Land. All hotel areas provide at least 500mm of freeboard to the 50y ARI water surface level, while retail levels are all above the 50y ARI event. The access to the basement reaches RL 9.80 before ramping down; this provides 570mm of freeboard to the 50y ARI water surface level. Basement areas lower than this level will be protected against the intrusion of overland flows from Water Street to this level.

Based off the information outlined in Section 4.4.3 of this report, the building levels outlined on the Nettleton Tribe Ground Floor Plan (3400_DA17) attached in Appendix B provide sufficient immunity to flooding from overland flows.

4.5 STORMWATER QUANTITY

4.5.1 STORMWATER DRAINAGE METHODOLOGY

Modelling of stormwater runoff quantity has been considered for the existing case and operational phase of the development. In order to assess the existing and predicted future (operational phase) discharge rates from the development site, calculations have been conducted based on the Rational Method, according to the methods specified in the Queensland Urban Drainage Manual and Brisbane City Council's Subdivision and Development Guidelines.

4.5.2 PEAK FLOW CALCULATIONS

The Rational Method as outlined in the Queensland Urban Drainage Manual was used to determine the peak flow rate corresponding to the minor and major storm events for this development. The fraction impervious for the existing and developed conditions have been estimated based on a review of aerial photography of the site and the proposed development layout.

As previous outlined, the property size will decrease from 2896m^2 to 2603m^2 in its developed condition due to a road dedication. To assess the impact of the proposed development on downstream discharge rates, peak flow calculations have been carried out for the 2603m^2 ultimate land area in both the existing and developed case.

Brisbane City Council Subdivision and Development Guidelines, Table B2.1, "Design Standards for Major/Minor Drainage Systems" was used to identify the design storm events for this development as:

Minor - 1 in 10 year ARI
Major - 1 in 50 year ARI

Flow rates were calculated at the point of discharge from the site for the existing and developed phases of the development as indicated in Table 3. Detailed calculations can be reviewed in Appendix E.

Table 3: Pre & Post Development Peak Flow Calculations

	Parameter	Existing	Proposed	Change
Catchment Details	Area (Ha)	0.2603	0.2603	-
	Coefficient of Runoff (C10)	0.90	0.90	-
	Time of Concentration (min)	5.0	5.0	-
	10 year Rainfall Intensity (mm/hr)	216	216	-
	50 year Rainfall Intensity (mm/hr)	292	292	-
	100 year Rainfall Intensity (mm/hr)	326	326	-
Discharge	**1 in 10 year ARI (m^3/s)**	**0.141**	**0.141**	-
	1 in 50 year ARI (m^3/s)	**0.211**	**0.211**	-
	1 in 100 year ARI (m^3/s)	**0.235**	**0.235**	-

4.5.3 STORMWATER QUANTITY MITIGATION MEASURES

As indicated in the Table 3, there is no increase in discharge rates for the proposed development. This is due to the fact that the existing site area is imperious. As a result, stormwater detention measures are not proposed or required.

4.6 STORMWATER QUALITY

Stormwater Quality for the site has been assessed in accordance with Part E of the Queensland Government State Planning Policy December 2013 which sets out Interim Development Assessment Requirements. The following extract from the document describes when the policy is applicable:

Receiving waters – a development application for any of the following:

1. *A material change of use for urban purposes that involves a land area greater than 2500 square metres that:*
    a) *Will result in an impervious area greater than 25 per cent of the net developable area, or*
    b) *Will result in six or more dwellings, or*
2. *Reconfiguring a lot for urban purposes that involves a land area greater than 2500 square metres and will result in six or more lots, or*
3. *Operational works for urban purposes that involve disturbing more than 2500 square metres of land.*

The proposed development involves a material change of use for urban purposes for a land area greater than 2500m^2 in size and results in more than six dwellings. As previously outlined, property setbacks at the site reduce the developed land area to 2603m^2. This does not include the area at ground level dedicated to a footpath widening on Costin Street and the proposed pedestrian thoroughfare at the intersection of Water and Costin Streets. As a result of this, given the size, existing site use and the surrounding land uses, it is considered that BCC's Water Quality Guidelines for 'low risk' developments is more applicable to the proposal.

Stormwater Quality requirements for the site will be addressed through the implementation of Best Management Practices (BMP's) in accordance with Part C of the BCC's Subdivision and Development Guidelines. Water Quality Objectives do not need to be targeted, which is consistent with the requirements for 'low risk' developments.

4.6.1 PROPOSED TREATMENT MEASURES

Stormwater recycling is recognised by BCC as a stormwater quality BMP as it reduces the volume of urban stormwater and pollutant loads from urban stormwater that are discharged into waterways. The approach also has the secondary advantage of reducing the use of potable water.

To address stormwater quality at the site, two 5kL rainwater tanks will be installed at the site as a Best Management Practice, providing a combined 10kL of storage. Stormwater retained in the tanks will be reused for irrigation of landscaped areas. The tanks are to be located under the level 4 podium level, adjacent to the pool.

5. SUMMARY

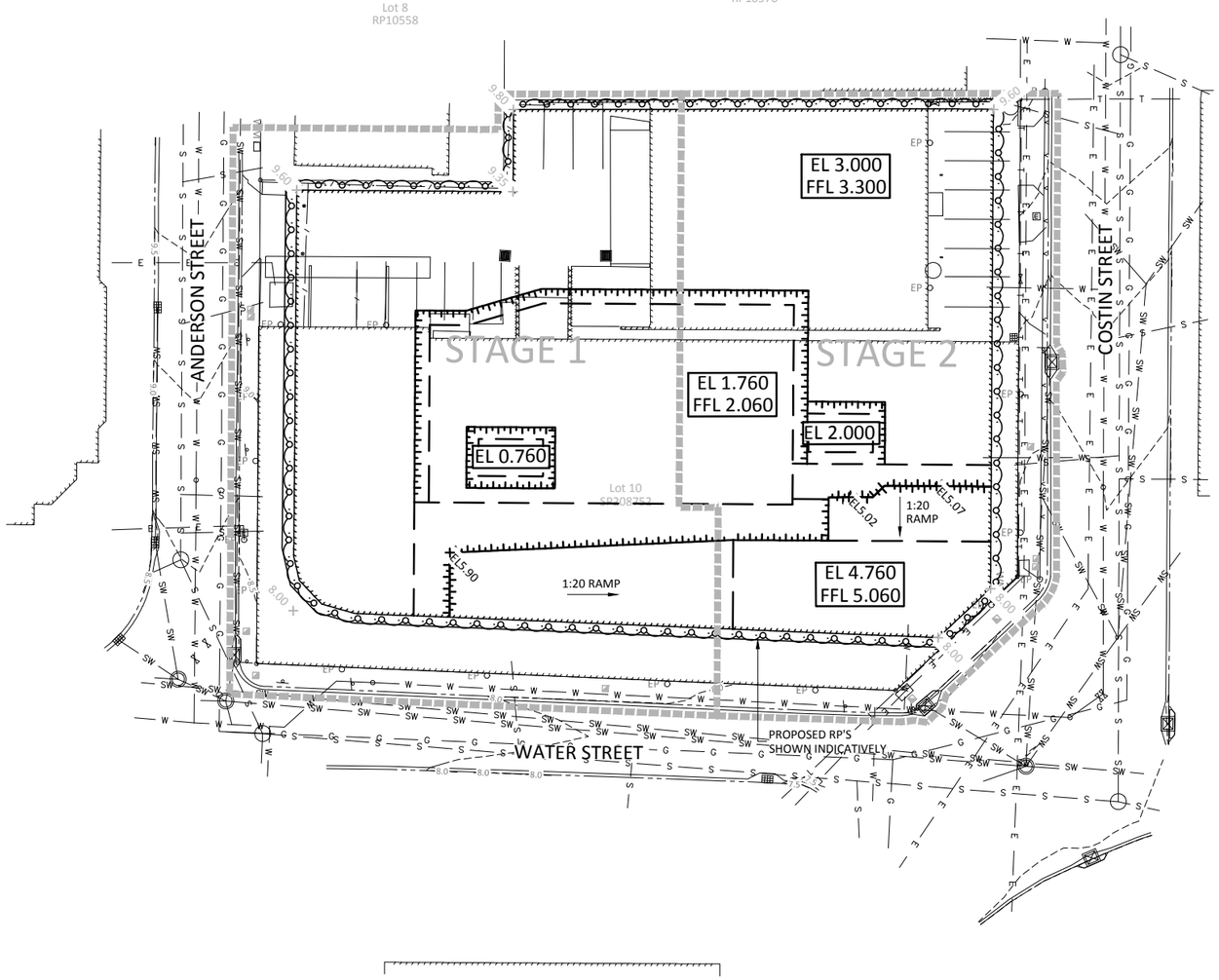
The investigations and reporting relating to the proposed mixed use development, located at 15 Anderson Street, Fortitude Valley have shown the following:

- Stormwater from the site will discharge through a direct piped connection to existing infrastructure in Water Street.
- Sewer requirements for the development will be serviced through a new connection to existing infrastructure in Costin Street.
- The downstream sewer network is currently at capacity. The proposed development will either incorporate a sewer holding tank to discharge at off-peak times, or have the timing of occupation coordinated to coincide with the completion of external network upgrades.
- Water requirements for the development will be serviced through a new connection to existing infrastructure in Water Street.
- The site is affected by flooding from overland flows. Levels for the proposed development have been set to provide sufficient flood immunity to the water surface levels determined by previously completed flood studies.
- No stormwater detention measures are required for the proposed development.
- Rainwater tanks will be included as a Best Management Practice to address stormwater quality for the development.

From the investigations conducted, it has been shown that the proposed development can be constructed and serviced in accordance with Brisbane City Council Guidelines, the Queensland Urban Drainage Manual and the SEQ Water Supply and Sewerage Design Construction Code, as required by Economic Development Queensland.

APPENDIX A

BORNHORST AND WARD CIVIL ENGINEERING SKETCHES



PLAN
SCALE A

LEGEND

EXISTING	PROPOSED	
		KERB AND CHANNEL
		KERB ONLY
		EXTENT OF BASEMENT
		SHORING WALL
		PROPERTY BOUNDARY
SW		STORMWATER DRAINAGE
	TOP OF BATTER / TOE OF BATTER	BATTER
52		CONTOURS
		FENCE
S		SEWER
W		WATER
G		GAS
T		TELSTRA
		OVER HEAD POWER
E		UNDER GROUND POWER
		STAGE BOUNDARY
61.35 +	61.35 +	SURFACE LEVEL
		CUT
	EL 1.000	EARTHWORKS LEVEL
	FFL 1.000	FINISHED FLOOR LEVEL

NOTE:
1. CONSTRUCTION ENTRANCE DETAILS TO BE CONFIRMED AT OPERATIONAL WORKS.
2. ALL BATTERS AT 1:1 UNLESS NOTED OTHERWISE.
3. STAGES APPLY TO ABOVE GROUND LEVELS ONLY.

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES — A1 UNREDUCED / A3 REDUCED

SCALES — UNREDUCED / REDUCED

A 0 2.5 5.0 7.5 10.0 12.5m — 1 : 250 / 1 : 500

STATUS
PRELIMINARY

REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APP

ASSOCIATED CONSULTANTS

APPROVED . . . . . RPEQ . . . . . DATE

CHECKED DATE

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CLIENT
PROPERTY LINK

PROJECT
RESIDENTIAL DEVELOPMENT
15 ANDERSON STREET
FORTITUDE VALLEY

SUBJECT
EARTHWORKS LAYOUT

PROJECT No. 13221
DRAWING No. SKC010 — REVISION -

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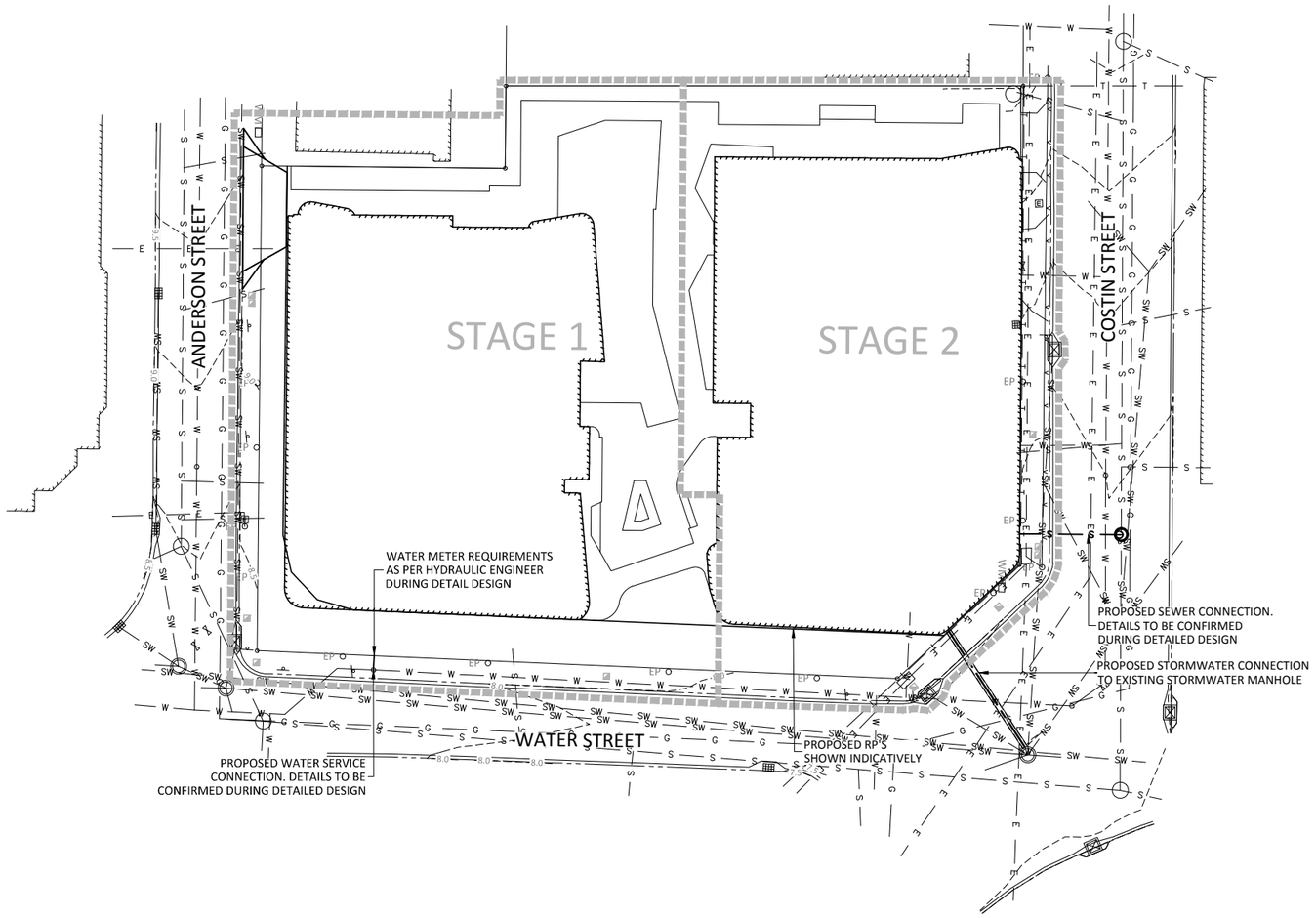

LEGEND

EXISTING	PROPOSED
	KERB AND CHANNEL
	KERB ONLY
	EXTENT OF BUILDING
	PROPERTY BOUNDARY
SW	STORMWATER DRAINAGE
52	CONTOURS
	FENCE
S	SEWER
W	WATER
G	GAS
T	TELSTRA
OH / PP	OVER HEAD POWER
E	UNDER GROUND POWER
	TRAFFIC SIGN
	STAGE BOUNDARY

NOTE:
STAGES APPLY TO ABOVE GROUND LEVELS ONLY

PLAN
SCALE A

PROJECT NORTH

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES — A1 UNREDUCED, A3 REDUCED

SCALES — UNREDUCED / REDUCED

A 0 2.5 5.0 7.5 10.0 12.5m 1 : 250 / 1 : 500

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DATE

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CLIENT: PROPERTY LINK

PROJECT: RESIDENTIAL DEVELOPMENT
15 ANDERSON STREET
FORTITUDE VALLEY

SUBJECT: SITEWORKS AND SERVICING LAYOUT

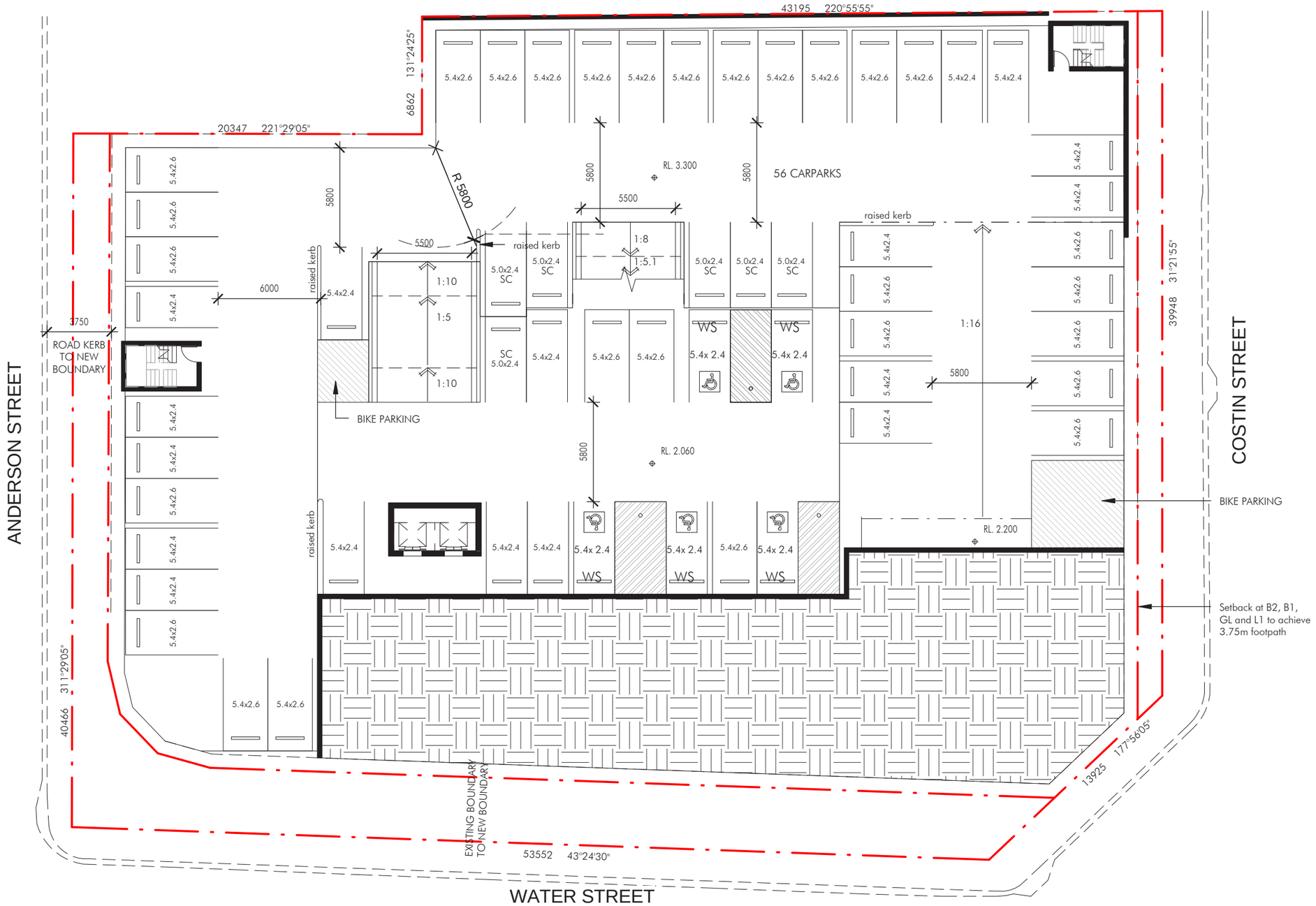
PROJECT No. 13221

DRAWING No. SKC030 — REVISION -

0 10 20 30 40 50 100 150 A1

APPENDIX B

ARCHITECTURAL DRAWINGS



Client

Propertylink
thinking property

Project

Residential Development
15 Anderson Street, Fortitude Valley

Title	BASEMENT 2
Scale	1:250
Date	24/03/14
Number	3400_DA15

Architectural Consultant

nettletontribe

nettleton tribe partnership pty ltd ABN 58 161 683 122

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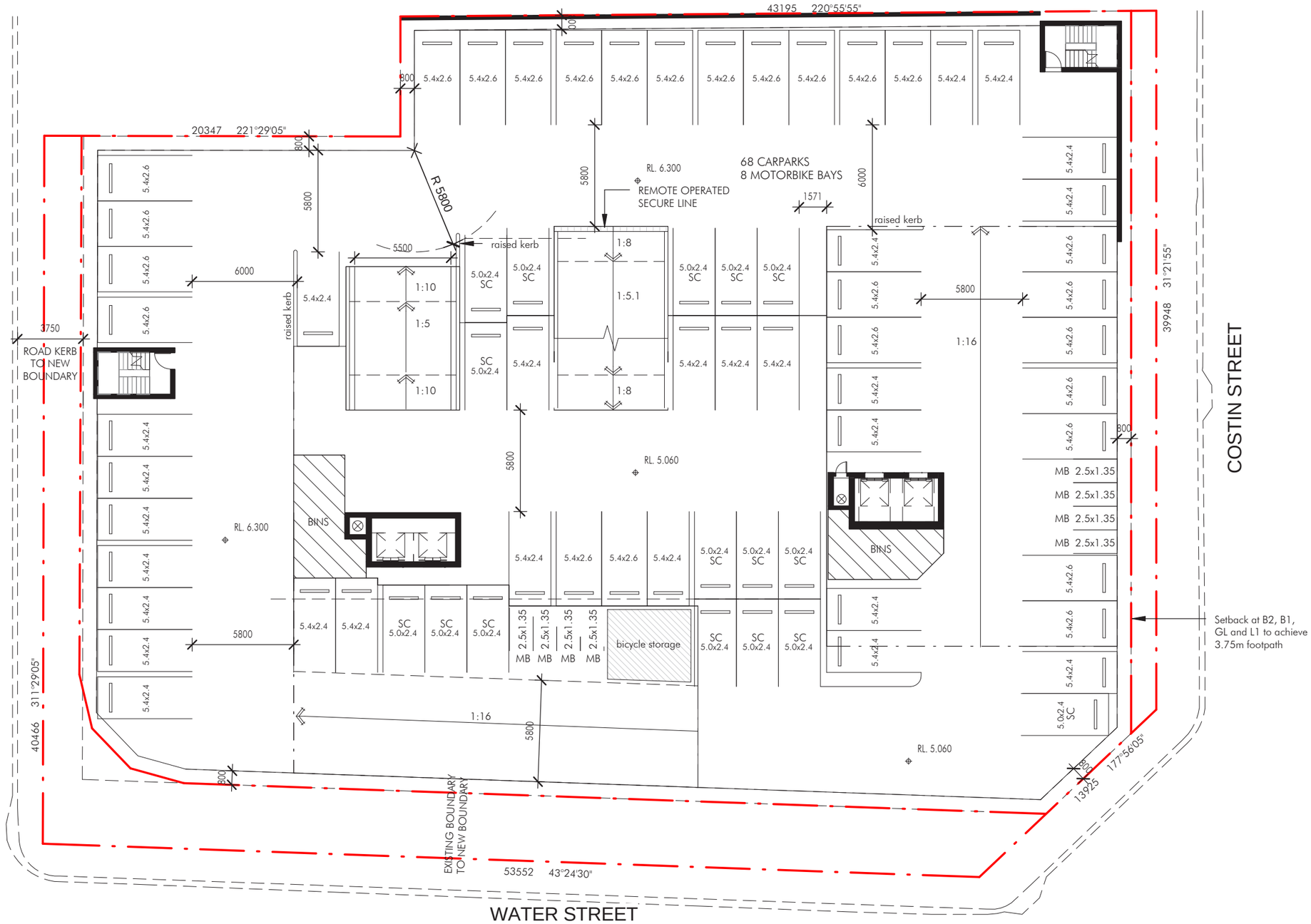

Client

Propertylink
thinking property

Project

Residential Development
15 Anderson Street, Fortitude Valley

Title	BASEMENT 1
Scale	1:250
Date	24/03/14
Number	3400_DA16

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Level 5, 344 queen street brisbane qld 4000
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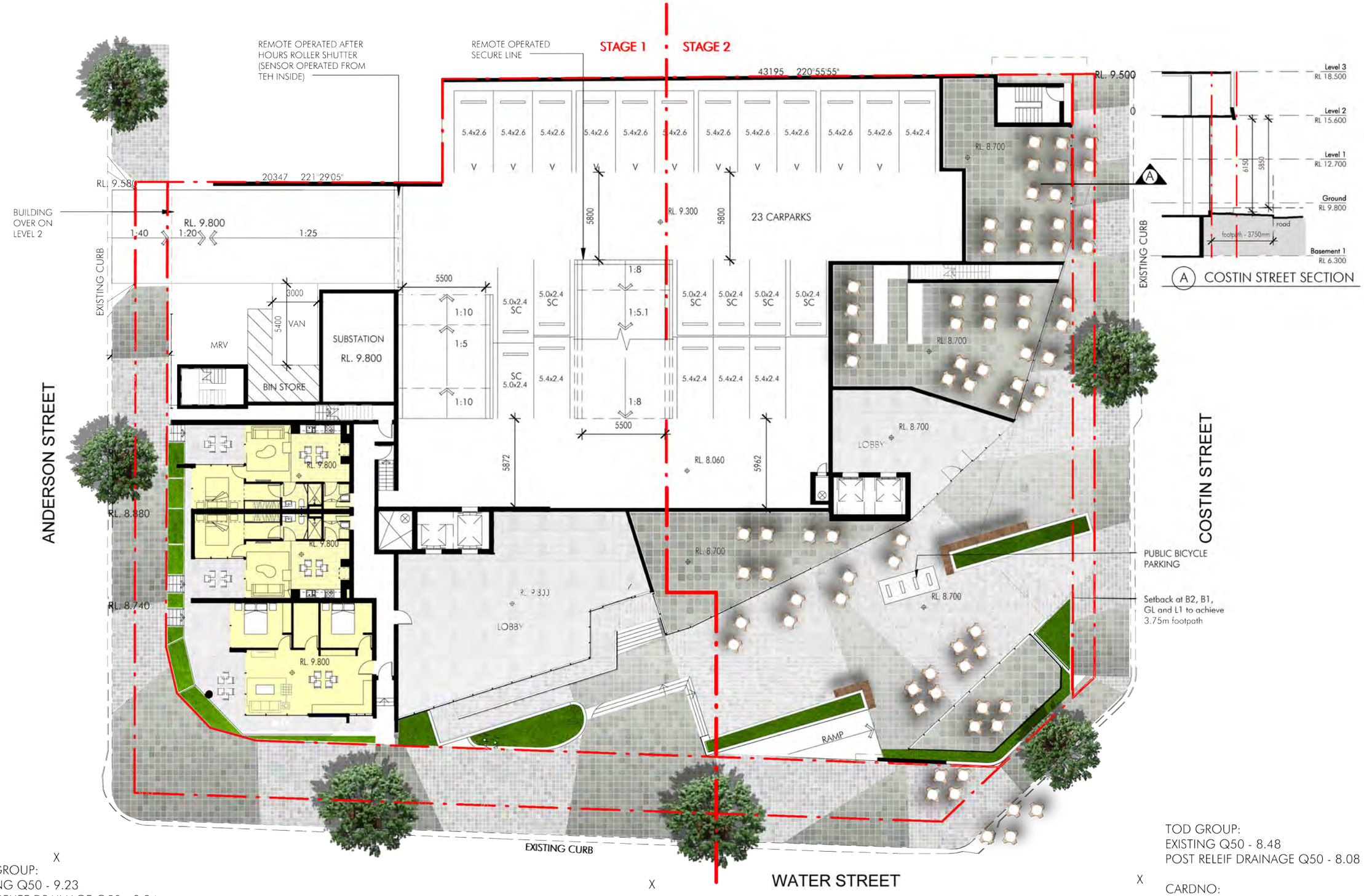
e brisbane@nettletontribe.com.au w nettletontribe.com.au



X

TOD GROUP:
EXISTING Q50 - 9.23
POST RELIEF DRAINAGE Q50 - 8.24

CARDNO:
EXISTING Q50 - 8.68
EXISTING Q100 - 8.77
POST RNA Q50 - 8.61
POST RNA Q100 - 8.73

X

TOD GROUP:
EXISTING Q50 - 8.48
POST RELEIF DRAINAGE Q50 - 8.08

CARDNO:
EXISTING Q50 - 8.59
EXISTING Q100 - 8.71
POST RNA Q50 - 8.43
POST RNA Q100 - 8.68

X

Client
Propertylink
thinking property

Project
Residential Development
15 Anderson Street, Fortitude Valley

Title	GROUND FLOOR PLAN
Scale	1:250
Date	24/03/14
Number	3400_DA17

Architectural Consultant
nettletontribe
nettleton tribe partnership pty ltd ABN 58 161 683 122
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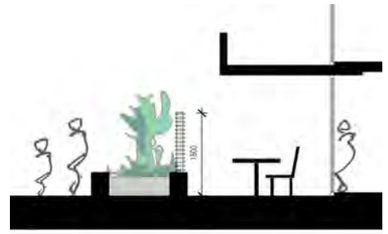
STAGE 1 STAGE 2

PWD
UNIT TYPE A
LEVEL 4 - 10

PWD
UNIT TYPE B
LEVEL 4 - 15



Ⓐ TYPICAL COURTYARD SECTION

Client
Propertylink
thinking property

Project
Residential Development
15 Anderson Street, Fortitude Valley

Title	LEVEL 04 PLAN - PODIUM
Scale	1:250
Date	24/03/14
Number	3400_DA21

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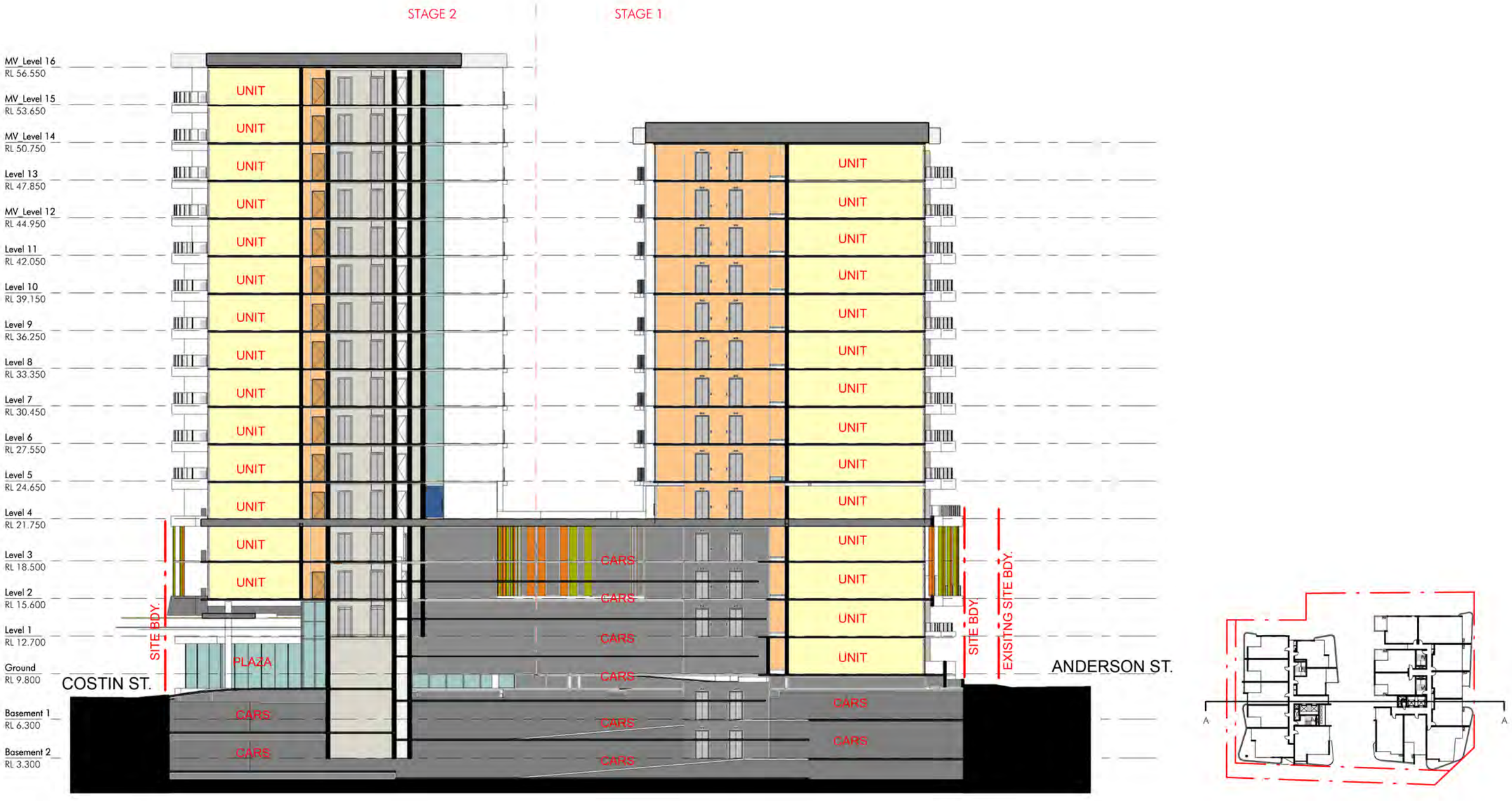

Client

Propertylink
thinking property

Project

Residential Development
15 Anderson Street, Fortitude Valley

Title	SITE SECTION
Scale	1:300
Date	24/03/14
Number	3400_DA32

Architectural Consultant

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APPENDIX C

SURVEY AND EXISTING INFRASTRUCTURE INFORMATION

Dimensions of subject Lot should be verified by Identification Survey

Legend

Electricity Box	B	Gully Pit (Centre of Grate)		Gas	G
Elect. Light Pole		Inspection Opening		Electrical	E
Electricity Pit	E	Post		Sewerage	S
Electricity Pole	P	Sewerage MH		Water	W
Fire Hydrant		Stormwater MH		Edge Of Bit.	
Gas	G	Telstra Pit	T	Stormwater	D
Gully Pit (Backstone)		Tree		Optus Cables	
Building Light		Valve		Comms	T
		Water Meter	M	Overhead Wires	
				Fence	
				Crown of Road	

Coding for Trees

SO=Silky Oak
FIG=Fig Tree
GM =Gum Tree
LE= Leopard Tree
IB =Ironbark
J =Jacaranda
M =Mango Tree
CA =Camphor Laurel
OR =Ornamental Tree
PA =Palm Tree
PN =Pine Tree
SB =Stringy Bark
TT =Tea Tree
UTR =Unknown Tree
PO=Poinciana Tree

Type of Tree
Dia. of Trunk 0.2m
Radial Spread of Canopy 3.0m
Height of Tree 8.0m
Group of 5 Trees
GM-0203085
Tree Legend

Field Shot Taken Here
Typical Mountable Kerb

Field Shot Taken Here
Typical Box Kerb

Field Shot Taken Here
Pavement
Typical Traffic Island Kerb

Notes

Service	Visible service	Field survey	DBYD records	Cable/pipe locator	Vacuum potholing
Sewer	Yes	No	Yes	No	No
Drainage	Yes	No	Yes	No	No
Water	Yes	No	Yes	No	No
Elect.	Yes	No	Yes	No	No
Comms.	Yes	No	Yes	No	No
Gas	No	No	Yes	No	No

All the underground services have been plotted from records.
No Telstra underground services have been investigated.
Invert levels and pipe sizes of hydraulics have been determined by field survey wherever possible. Whilst all care is taken to obtain accurate measurements, it should be noted that OH&S restricts entry to confined spaces. Where pipe details have been obtained from council records, the plan has been noted accordingly. The accuracy of service alignments shown on this plan may vary depending on the source of the data. Pot holing should always be undertaken to verify the exact position prior to construction. Whilst all care has been taken to represent the location of all underground services, further services may exist.
Title boundaries were not marked at the time of survey and have been determined from the original survey plan (SP208752) dimensions only.
For accurate locations of boundaries, an Identification survey is recommended.
These contours and levels do not represent the natural ground levels as defined by Cityplan 2000.

Rev	Amendment	Date

Real Property Description
Lot 10 on SP208752
Parish North Brisbane County Stanley
Datum for Levels PM131313 RL 9.562 AHD Derived

Client: Property Link Australia P/L

Detail and Level Survey
15 Anderson Street, Fortitude Valley

F Book	L Book	Drawn	Scale	Date	Surveyor	Project No.	Drawing No.	Rev
BNE130471.sdr Civilcad File	BNE130471.csv BNE130471.ccx	AC	1:200 @ A1	16/09/2013	AC	BNE130471	S7165-A1	0

dts urban planning, surveying & development
Brisbane
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Mackay
PO Box 11711, Mackay Caneland QLD 4740
Ph: 1300 278 783
mackay@dtsqld.com.au

BCC BIMAP
STORMWATER

Scale = 1:400

Metres 10 20

Location :

6,963,439
503,124 N 503,262
6,963,330

Disclaimer :

BCC BIMAP
SEWER

Scale = 1:400

Metres 10 20

Location :

6,963,439

503,124 N 503,262

6,963,330

Disclaimer :

BCC BIMAP
WATER

Scale = 1:400

Metres 10 20

Location :

6,963,439

503,124 N 503,262

6,963,330

Disclaimer :

BRISBANE CITY

GDA

Qasco

APPENDIX D

QUU WATER/SEWER CAPACITY ASSESSMENT ADVICE

James Dewhurst

From: David Morrow [David.Morrow@urbanutilities.com.au]
Sent: Friday, 3 January 2014 10:52 AM
To: James Dewhurst
Subject: Completed RE: 13/4642, Waster & Sewerage capacity check 15 Anderson Street, Fortitude Valley - David

Hi James

I am responding to your request for a water and sewerage assessment of the impact of your proposed development on the existing networks.

The proposed development is a high rise residential complex consisting of 199 1xbdrm and 76 2xbdrm units with 323 m2 of retail. The expected EP loading is 489 EP.

Sewerage.

The expected PWWF generated by the proposed development has been assessed as 5.94 L/s. The grade of the 150mm sewer in Costin St between the proposed development and the 225mm sewer in Water St is 0.056 (1 in 18). Based on this grade the full pipe capacity of this pipe is 36 L/s. The estimated allocated PWWF in the 150mm sewer is between 7 to 10 L/s. This range is due to the unknown RNA contribution from buildings along Costin St. This means the 150mm sewer could take the proposed loading from the development.

There is however an issue with capacity of the 225mm sewer and downstream sewer. Currently there is no more capacity available in the system. It is overloaded. The area is part of the EDQ (formerly ULDA) Water St Precinct. A developer in water St near Brunswick Street is currently constructing a 450mm sewer augmentation of the 225mm sewer down Water St to the RNA property boundary. RNA/ Lend lease have been conditioned as part of the RNA redevelopment development approvals to upgrade the existing 225/300mm sewer through the RNA grounds to ultimate size all the way downstream to the S1 sewer connection. QUU allowed them 1496 EP of development prior to completion of the conditioned trunk works. Originally it was agreed it had to be constructed by 1st July 2013, but was approved to have completion delayed till 1st July 2013. This has since been stalled till 31st may 2015 and Lend lease are currently negotiating a 31St March 2016 completion date requirement. Because it is a developer who has agreed to take on the major capital works on behalf of EDQ and QUU, construction of the sewer is now causing a bottleneck to further development in the catchment. Until this is constructed no more development can be approved to connect to the sewer.

There are really only two options available at this stage. They are; one, your development negotiates with Lend Lease to take over construction of the RNA trunk sewer upgrades. Or two, negotiate with the Development Assessment Manager handling your DA application to allow the development to proceed with construction completion and issuing of building permit to occupy timed to coincide with completion and acceptance of the RNA trunk sewer going live in April 2016.

Water

An assessment of the water supply available at the site has been completed including computer modelling of the network under peak demand and fire flow conditions. The assessment indicates the existing 150mm water main in Water St has the capacity to service the proposed development in accordance with QUU design standards. However, the water mains in Costin St and Anderson St fail in fire flow for high density residential (60 L/s). To remedy this will require the upgrading of the water mains to 150mm in both streets from Water St to the point of fire supply take off point for the building.

Regards

David Morrow
Senior Engineer
Development Services

T 07 3432 2200
E DevelopmentEnquiries@urbanutilities.com.au
www.urbanutilities.com.au/Development services/

QUEENSLAND UrbanUtilities

From: James Dewhurst [mailto:J.Dewhurst@bornhorstward.com.au]
Sent: Tuesday, 3 December 2013 5:17 PM
To: DevelopmentEnquiries
Subject: Due 7 January 2014, 13/4642, Waster & Sewerage capacity check 15 Anderson Street, Fortitude Valley - David

To Whom it May Concern,

We have a new development proposal for a site located at 15 Anderson Street, Fortitude Valley, as described by Lot 10 on SP208752.

The proposal includes the construction of two residential towers broken into two stages, which include the following split of apartment types:

Stage 1

No. 1 Bed	105
No. 2 Bed	38

Stage 2

No. 1 Bed	94
No. 2 Bed	38

TOTAL

No. 1 Bed	**199**
No. 2 Bed	**76**

323m^2 of ground floor retail space is also proposed in the second stage.

We are proposing to connect to the existing 150mm diameter sewer in Costin Street and to the 150mm diameter water main in Water Street. Can you confirm that the existing sewer and water infrastructure has capacity to service the proposal and also comment on the suitability of the outlined connection locations?

Thank you.

Regards
James

James Dewhurst | **Civil Engineer** | Bornhorst + Ward Consulting Engineers

Level 4, 67 Astor Terrace, Spring Hill, Qld 4000, Australia
E. J.Dewhurst@bornhorstward.com.au | **P.** (07) 3013 4699 | **D.** (07) 3013 4667

Bornhorst+Ward ProjectId: 13221-CO

Please consider the environment before printing this email

APPENDIX E

HYDRAULIC CALCULATIONS

INITIAL PEAK FLOW CALCULATIONS

Based on QUDM (2008) 4.00 'Catchment Hydrology'

Written by BB 31/10/08

BORNHORST + WARD
CONSULTING ENGINEERS
CIVIL AND STRUCTURAL

Job Number: **13221**
Job Name: **15 Anderson Street, Fortitude Valley**

Designed: JD
Checked:

IFD Location: Fortitude Valley

TOTAL RUNOFF COEFF.

	Sub Catchment Area (Ha)		Runoff Coeficients		Calculated C10	
No.	Existing	Proposed	Existing	Proposed	Existing	Proposed
Roof	0.2055	0.1824	0.90	0.90		
Hardstand	0.0548	0.0561	0.90	0.90		
Landscaping	0.0000	0.0218	0.70	0.90		
	0.2603	**0.2603**			**0.90**	**0.90**

Raw IFD data has been obtained from the Bureau of Meteorology (BOM) website.

EXISTING TIME OF CONCENTRATION

	Std Inlet Time	5
SHEET FLOW	Site Slope (%)	0
	Flow Length (m)	0
	Horton's "n"	0
	Travel Time (min)	0.00
CHANNEL/PIPE FLOW	Travel Length (m)	0
	Fall (m)	0
	Travel Time (min)	0
	Multiplier	0
	Travel Time (min)	0
	Total Time (Tc)	**5.0**

DEVELOPED TIME OF CONCENTRATION

	Std Inlet Time	5
SHEET FLOW	Site Slope (%)	0
	Flow Length (m)	0
	Horton's "n"	0
	Travel Time (min)	0.00
CHANNEL/PIPE FLOW	Travel Length (m)	0
	Fall (m)	0
	Travel Time (min)	0
	Multiplier	0
	Travel Time (min)	0
	Total Time (Tc)	**5.0**

PEAK RUNOFF CALCULATIONS

	Rainfall Intenciety (mm/hr)		Coeficient of Runoff		Peak Runoff Rates (m^3/s)	
ARI Event yr	Existing	Proposed	Existing	Proposed	Existing	Proposed
1	118	118	0.72	0.72	**0.061**	**0.061**
2	152	152	0.77	0.77	**0.084**	**0.084**
5	192	192	0.86	0.86	**0.119**	**0.119**
10	216	216	0.90	0.90	**0.141**	**0.141**
20	249	249	0.95	0.95	**0.170**	**0.170**
50	292	292	1.00	1.00	**0.211**	**0.211**
100	326	326	1.00	1.00	**0.235**	**0.235**

PEAK FLOWS FOR FREQUENT EVENTS

ARI Event	% of Q1	Peak discharge (m^/s)	
yr		Existing	Proposed
1mth	25%	**0.015**	**0.015**
2mth	40%	**0.025**	**0.025**
3mth	50%	**0.031**	**0.031**
4mth	60%	**0.037**	**0.037**
6mth	75%	**0.046**	**0.046**
9mth	90%	**0.055**	**0.055**
12mth	100%	**0.061**	**0.061**