711 Hunter Street – Soil and Water Management Strategy

Prepared for Hunter Street JV Unit Trust

May/2023
Project Number N21112

OPPORTUNITIES THROUGH EXCELLENCE
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Contents

Appendices

Document Control				
Revision	Date	Prepared	Reviewed	Approved
A - DRAFT	07.10.2022	Naomi Honan	Ben Collyer	Ben Collyer
B – FOR DA	14.10.2022	Naomi Honan	Ben Collyer	Ben Collyer
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E – Staging addressed	17.05.2023	D.Woodley	Ben Collyer	Ben Collyer

1. Executive Summary

Plans for a proposed two-stage residential and mixed use tower development at 711 Hunter Street are intended to be submitted to the City of Newcastle for a Development Application. This report provides commentary addressing Soil and Water Management associated with the development and the controls intended to address the site requirements and Council's compliance requirements in the Development Control Plan.

The development will be developed in two stages, with the northernmost tower intended to be developed first. Site Stormwater Controls will be wholly located within the first stage, comprising a ground-level detention tank, rainwater tank and water quality chamber for treatment and attenuation of stormwater generated from the development. Rainwater tank will be reticulated to external landscaping scheme and will be further developed as part of detail design development.

The site is considered low risk for potential soil loss arising from the development and suitable controls are provided in this report and documented on the erosion and sediment control plan in Appendix B.

The site is in a known flood storage area and this is considered in a separate Flood Study (BG&E October 2022).

There are two storages provided for stormwater control as summarised thus:

a) Two Rainwater tanks, each of capacity 5.5kL (On Podium and Mezzanine Level)
b) Site Stormwater Tank 137kL (under ground floor driveway ramp)

2. Introduction

This Soil and Water Management Plan has been prepared by BG&E on behalf of Hunter Street JV CoP/L (the applicant). It accompanies a Statement of Environmental Effects (SEE) in support of a Development Application (DA) at 711 Hunter Street, Newcastle West (the site). This Stormwater report assesses the development objectives against the legislated requirements for stormwater management and soil management.

The development has undergone an Architectural Design Competition where three competitors put forward their designs in accordance with the brief. The Plus Architecture scheme was recommended by the Jury as the winning scheme in the competitive design process. The overall outcome of the proposal aims to develop a mixed-use precinct with high quality tower forms providing a positive relationship to the immediate surrounds and acknowledging the surrounding heritage context. The proposal intends to act as a landmark for Newcastle West with a curated mix of eclectic and creative retail, food and Beveridge and commercial opportunities activating the ground levels.

The key features are summarised below:

- Demolition of the existing commercial premises and ancillary structures on-site
- Construction of a mixed-use precinct forming active ground and podium levels reaching 5 storeys of retail and commercial tenancies, with two tower forms for residential apartments reaching 26 storeys, comprising of 258 apartments
- Podium level car park for 300 cars incorporated within the podium levels
- Communal open space for residents located on level 5 and 17
- Vehicle access to the site via Little King Street
- Associated landscaping with the public domain improvements
- An urban plaza fronting National Park Street providing opportunities for activation and public art, and
- Construction of ancillary infrastructure and utilities as required.

It is noted that the overall development will form two separate concurrent DAs. Stage 1 will form the northern tower and podium elements and Stage 2 will form the southern tower and podium elements. These separate DA components are explored further below:

<u>Stage 1:</u>
The northern tower will include commercial and retail tenancies at ground level which will be accessible via National Park Street, Little King Street and Hunter Street. The podium levels will be situated above ground and contain car parking for both visitors and residents, accessed via Little King Street. Level 5 to Level 25 will contain a mixture of residential apartments ranging from 1 bedroom to 3 bedrooms. A numerical breakdown of Stage 1 is shown below:

- 136 apartments including: 35 one bedroom, 74 two bedroom, 26 three bedroom, 1 four bedroom
- Total GFA: 13,581 sqm
- Floor space ratio: 5.41:1
- Total car parking spaces: 165 spaces over 4 podium levels

<u>Stage 2:</u>
The southern tower will include commercial and retail tenancies at ground level which will be accessible via National Park Street, Little King Street and Hunter Street. The podium levels will be situated above ground and contain car parking for both visitors and residents, accessed via Little King Street. Level 1 to Level 25 will contain a mixture of residential apartments ranging from 1 bedroom to 3 bedrooms

- 122 apartments including: 35 one bedroom, 72 two bedroom, 15 three bedroom.
- Total GFA: 12,027sqm
- Floor space ratio: 5.43:1
- Total car parking spaces: 135 spaces over 4 podium levels.

Both stages will include surrounding landscaping, public domain works and green spaces. The strata and

stratum approach are detailed further in the SEE

2.1 Site Details

Site Address	711 Hunter Street, Newcastle West
Lot/DP	Lot 1, DP 867617
Site Area	4724m^2
Boundaries:	The site has frontages of 48m to Hunter Street to the north, 113m to National Park Street to the east and 43m to King Street to the south.
Heritage Significance	Not identified as a heritage item but is adjoining an identified local heritage item to the south-west, namely the Army Drill Hall (I508) located at 498 King Street and is diagonally adjacent to the Bank Corner which is a locally listed heritage item located at 744 Hunter Street. The site is also located within the Newcastle City Centre Heritage Conservation Area

The subject site is presented in Figure 1. The subject land is currently zoned B3 (Commercial Core), in City of Newcastle (CoN) Local Environmental Plan (LEP) 2012. The stormwater design has been developed in accordance with the CoN Development Control Plan (DCP (2012) and CoN Technical Manual (2017).

2.2 Glossary of terms

FFL - Finished Floor Level
FPL – Flood Planning Level
AEP – Average Exceedance Probability (Event)
PMF – Probable Maximum Flood
CoN – City of Newcastle (Council)
DCP – Development Control Plan
AHD – Australian Height Datum
LEP – Local Environmental Plan

2.3 Development Controls

Development of the site is situated in the City of Newcastle (CoN) Development Control Plan (DCP) – city-wide planning requirements. Under Council's DCP, the site must address Soil Management (5.01), Stormwater (7.06) and Water Efficiency (7.07). This strategy provides commentary justifying the proposal and the controls intended for the site to alleviate risks and impacts arising from the development.

Development Controls:

Development of the property is subject to NCC LEP (2012) and DCP (2012) and has been identified as development type that seeks to create more than 20 dwellings. The objectives include:

1. Ensure stormwater is controlled in a way that minimises nuisance to adjoining properties
2. Match post development runoff to the predevelopment or natural water runoff regime as closely as possible
3. Minimise soil erosion and sedimentation from site disturbance
4. Prevent pollutants such as litter, sediment, nutrients and oils from entering waterways
5. Minimise the potential impacts of development and other associated activities on the aesthetics, recreational and ecological values of receiving waters
6. Ensure appropriate easements are provided over drainage systems on private properties

7. Ensure easements are unimpeded by development for maintenance purposes
8. Protect natural watercourses and their associated ecosystems and ecological processes
9. Incorporate water sensitive urban design elements into the landscape in a manner that provides multiple benefits including: water quality protection; stormwater retention and detention as well as ecological enhancement
10. Provide objectives, targets and controls (where appropriate) for the management of waterfront lands, water use, stormwater and groundwater
11. Ensure stormwater infrastructure is identified on site and can be appropriately maintained; and
12. To clearly define the stormwater disposal requirements for development located in coastal wetlands catchments and minimise the impacts of stormwater run-off on coastal wetlands.

2.4 Site Context

The site is located on 711 Hunter Street, which also has frontage on National Park Street between Hunter Street and King Street and partially along the dead-end stub road known as Little King Street. It is recently known as the 'Spotlight' and 'Anaconda' building.

Development of this project site follows a series of recent developments in the local area including:

- 731 Hunter Street
- 1 National Park Street
- Verve Apartments
- City of Newcastle Civic Building
- Birdwood Park Long Tan Building
- Holiday Inn Apartments

2.4.1 Location

The proposed site is confined by three frontage roads on the north, east and south and is known as Lot 1 DP867617. The subject site is presented in Figure 1.

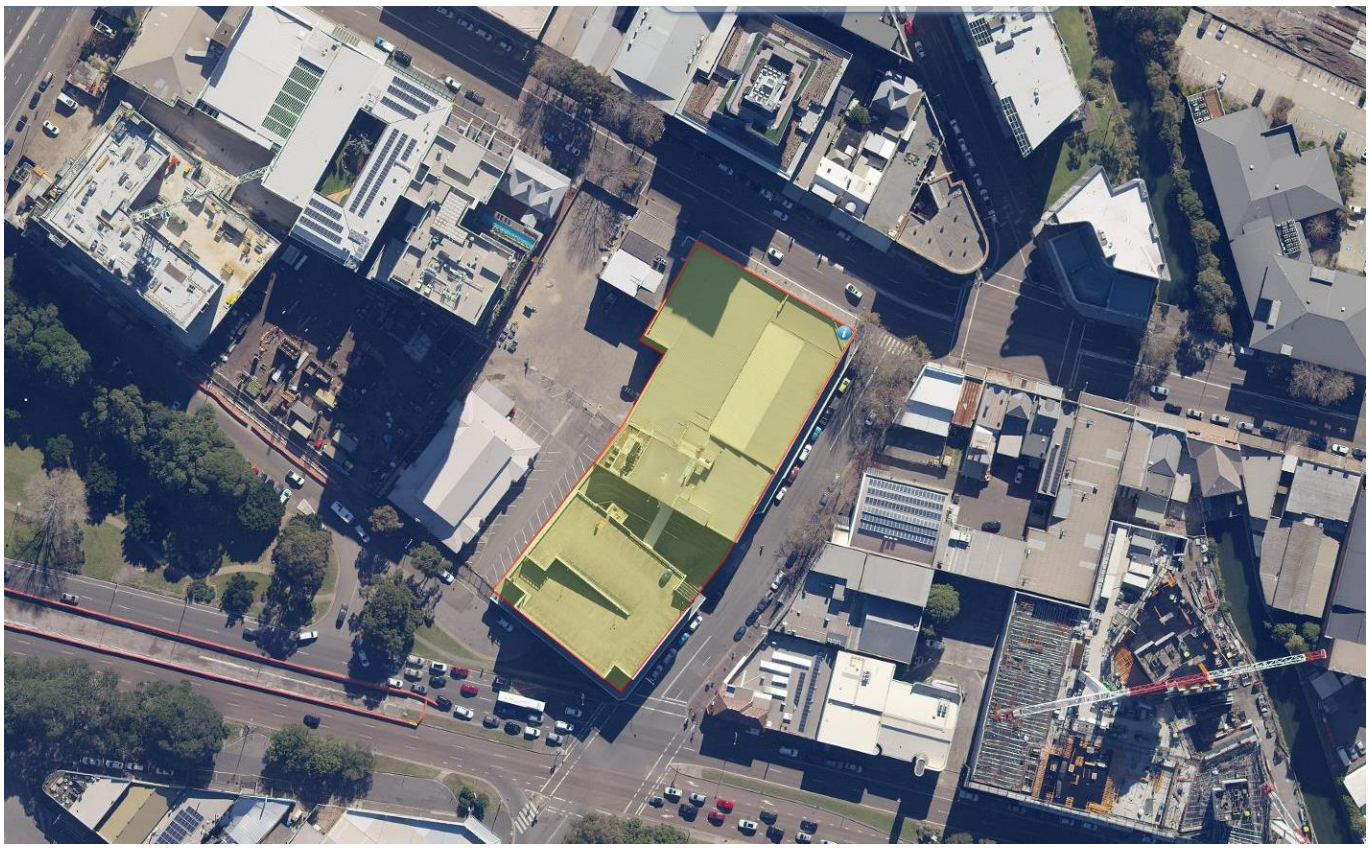


Figure 1: Site Context

2.4.2 Existing Site Information and Description

The site covers an area of approximately 4724m^2, and is currently occupied with a three-storey building along the northern edge ("Spotlight") and a multi-level car-park on the southern edge over an "Anytime Fitness" tenancy on the ground level. Vehicular access to the multi-level car park is off National Park Street.

A survey of the existing site from Cahill and Cameron is provided in Appendix A.

2.4.3 Topography

Given the existing buildings located across the existing site, it is assumed that the natural ground levels across the site are relatively flat. This is reinforced by surveyed kerb levels surrounding three edges of the site within a range of RL1.75 to RL2.2m AHD.

The existing driveway on the adjacent site, No. 496 King Street, provides rear-access to the current construction works on 731 Hunter Street. This driveway is near-flat, with perhaps only marginal fall toward Hunter Street.

National Park Street is crowned in the road centre, with two-way falls to existing kerb and gutter on both sides. Similarly, Hunter Street is also crowned in the centre. The stub road is known in this report as 'Little King Street', which ends at the frontage of the subject site. This dead-end road also has kerb and gutter surrounding the road end with a very slight crest in the road centre.

There is an existing vehicular ramp and driveway access to National Park Street which grades to the level 1 carparking. Either side of this, the ground levels are relatively flat.

2.4.4 Existing Services

Apart from an existing electrical substation located adjacent to the driveway on National Park Street, and a sewer line along the western edge of site, there are no further major utilities located on-site. All other utilities are in the road reserve, typically being located in the footpath, however some services are within the carriageway.

From a storm water perspective, the CoN provided drainage maps have been used and supplemented with survey to inform the following drainage connection points for the site:

- Kerb Inlet pit on Little King Street, approximately near the south-west site frontage
- Kerb Inlet pit on National Park Street, approximately 20m south of the intersection with Hunter Street
- Kerb inlet pit on Hunter Street, near the intersection with National Park Street

2.4.5 Proposed Development

The site is proposed to be developed into two connected residential towers, with ground floor commercial tenancies on a raised podium. Each tower will consist of 27 storeys. The development also consists of pedestrian pavement and landscaping.

The proposed stormwater layout plans are provided in Appendix B.

3. Proposed Water Cycle Management

3.1 Rainwater Management

3.1.1 Reducing Water Consumption

Potable water will be provided to the development from direct connection to the existing water mains on Hunter Street. Water efficiency measures to be adopted for the development will be documented on the BASIX certificate provided with the Development Application (DA). This Stormwater Strategy does not provide any specific recommendations or guidance on water efficiency measures.

3.1.2 Rain Water Harvesting

Following discussions with the City of Newcastle, the rainwater harvesting scheme is based minimum storage requirement to fully fill rainwater tanks over a four day period. Based on Newcastle mean average annual rainfall[1] (1118mm) averaged for four days, applied over the contributing roof area of 592m^2, the total rainwater tank size for the two combined towers is 7.7kL, however two 5.5kL tanks are nominated, one for each tower. It is recognised that this exceeds the minimum storages required by BASIX.

The re-use strategy for the rainwater is understood to comprise external landscape (irrigation supply) to the podium and ground levels and to the ground-level toilets and end of trip facilities. The re-use rates are set in the City of Newcastle DCP to draw-down the supply over a 20 day period, resulting in a re-use rate of 0.55kL/day.

3.1.3 Grey Water Harvesting

The legislative conditions[2] placed on the diversion and pre-treatment of grey-water re-use makes this option unviable and is not further considered in this study.

3.1.4 Waste Water

The development is wholly located within Hunter Water Corporation's gravity sewer network and will be provided with a point of connection for sewage flows.

3.2 Stormwater Management

3.2.1 Stormwater Collection

To protect the ecology of downstream waterways and to ensure downstream flooding conditions are not exacerbated as a result of the development, stormwater treatment controls will be required on-site. The site is classified as small-scale development, less than 5,000m^2 in area, so Council's Element 7.06 Stormwater permits appropriately sized treatment controls in accordance with the CoN Technical Manual (2017) without the need for detailed stormwater quality modelling.

Rainwater collecting on roof surfaces will drain through internal downpipes to a single rainwater tank. Runoff from the podium level will be captured in pits on the podium level and separately plumbed to the on site detention and water quality control tank under the ground floor driveway ramp. External surfaces on ground level cannot drain to the tank due to the depth and will sheet flow to the street. Wherever possible, ground level hardstand surfaces open to the weather will drain to planters for passive watering.

[1] Bureau of Meteorology – Newcastle Nobbys Signal Station AWS 061055 Mean Annual Rainfall

[2] Water for Life, NSW Government: "NSW Guidelines for Greywater Re-use in Sewered Single Household Residential Premises", May 2008, Sydney.

A nominal area of driveway drains directly to Little King Street. Separate stormwater controls are provided for the small area draining to this street frontage. This will comprise a grated trench drain across the top and toe of the vehicle ramp. The top drain will drain to the street through a 1200x1200 grated pit in the driveway, which will house a single filter cartridge for treatment of runoff from the driveway surface. The bottom of the driveway will not be able to drain through the water quality control due to inadequate depth to the existing council drainage pipes.

Approximately 470m^2 of the ground floor plane at street level, between the two stages will likewise be unable to drain through a treatment control due to there being insufficient height between the street level and the receiving drainage. This small area represents approximately 10% of the total site. The surface of this 'uncontrolled' area is largely paved and is likely to result in minimal increase in nutrients or suspended solids.

3.2.2 Storage and Storage Draw-down

The site is approximately 84% impervious and 16% pervious with a total area of 4724m. For a site with an 84% impervious area, NCC's DCP 7.06 requires the site storage based on 20.2mm of rainfall across the site. Therefore, the OSD for this site must have a minimum volume of 95m^3. An on-site detention system with a volume of 131kL is proposed to meet Council's storage requirements.

In addition, two 5,500L rainwater tanks are proposed for external re-use in landscaped surfaces and ground level toilets consistent with the DCP. Re-use rate of 0.55kL/day was applied for the site. The two 5500L tanks meets 80% of the demand for re-use.

Due to the known flood level at the site, the on-site detention tank and stormwater quality controls are located above the 1% AEP flood level and the orifice outlet is located above RL2.6m AHD. The tank is intended to be located in the void under the vehicular ramp to level 1.

3.2.3 Site Discharge Controls

The site will discharge directly to Council's pit and pipe network on Hunter St (being the eastern boundary of the site). The outlet orifice is sized to limit the rate of stormwater discharge to pre-developed flow rates, to minimise the impact of the flow on the existing pit and pipe network and the ensure the outflow rate from the site is no greater than the flow from the 'pre-developed' site. The 'pre-developed' site assumes a fully grassed site.

It is noted that some public drainage system upgrades are being considered by the City of Newcastle for works in Hunter Street and National Park Street. Whilst the details of these upgrade works are yet to be formalised by Council, the connection point into Hunter Street will likely be unaffected.

3.2.4 Overflow Disposal

The stormwater management system has been designed to have capacity up to the 1% AEP event. In the event of major rainfall events exceeding design limits, the stormwater overflows will be directed to Council's drainage network on Hunter St.

3.2.5 Stormwater Quality Assessment

Water quality objectives for the post-developed site are based on reductions in mean annual pollutant loads. A quantitative assessment was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.2 software package to assess the post-development stormwater discharge concentration of key pollutants. The stormwater treatment devices chosen and modelled include the following:

- Rainwater tanks with reuse
- Oceanguard baskets
- Stormfilter Cartridges
- On Site Detention Tank

In order to meet NCC stormwater pollution reduction and stormwater quality targets established in the NCC DCP (2012) – Section 7.06 Stormwater, 16 Stormfilter cartridges are proposed as well as 6 Oceanguard baskets. A MUSIC-LINK report has been prepared and provided in Appendix D.

Refer to Figure 2 below for the proposed stormwater quality treatment train used within MUSIC. The Broad-scale Development Assessment checklist is provided in Appendix C. As the development is privately owned and the stormwater controls are not intended to be handed to Council as public assets, some of the checklist items are not relevant.

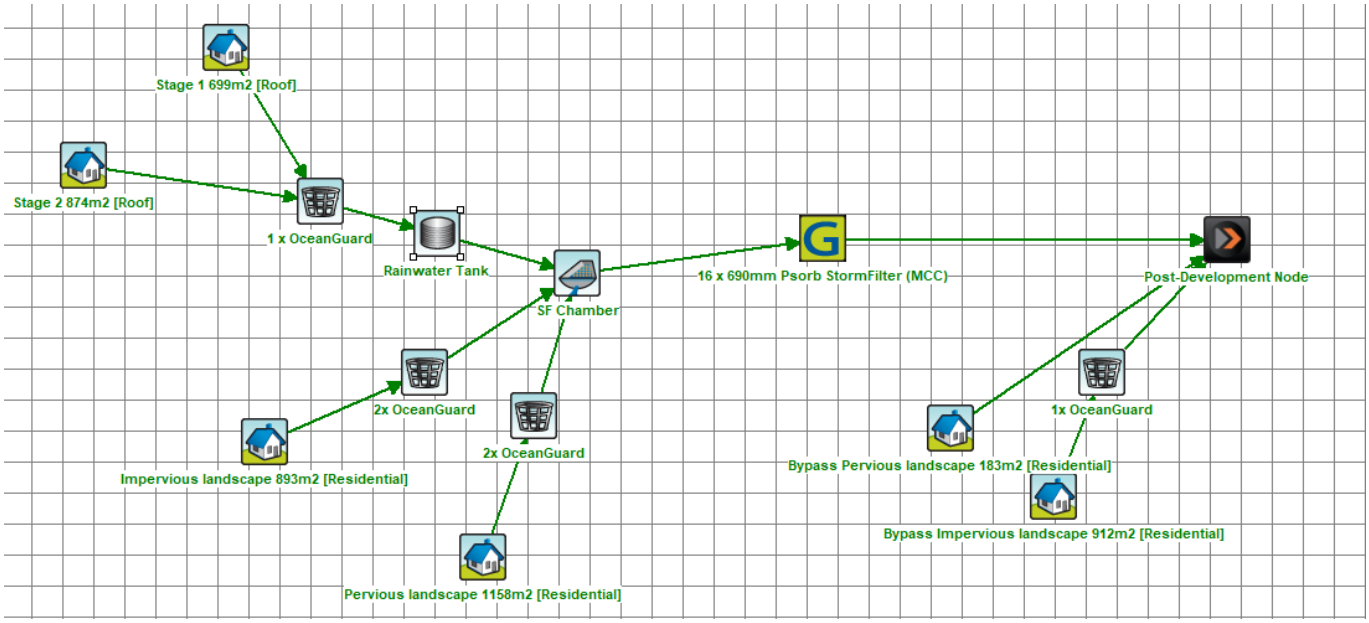


Figure 2 MUSIC model

Rainwater tanks are assumed to be provided to satisfy the requirements of the NCC DCP (2012) for alternative water sources for external landscaping areas.

Table 1 outlines Council's Pollutant reduction requirements and the stormwater pollutant reductions for the modelled treatment train. All pollutant loads were reduced to satisfy treatment targets.

Table 1 MUSIC Modelling Results

Pollutant	Council Requirement (according to Table 4 of NCC DCP 7.06 (2012)	Post Development Reduction (MUSIC result)	Compliant?
Total Suspended Solids	85%	87.7%	Yes
Total Phosphorus	65%	66.1%	Yes
Total Nitrogen	45%	50.6%	Yes
Gross Pollutants	90%	100%	Yes

3.2.6 Maintenance

The majority of the site will either be sealed pavement or landscaped following development. As such the amount of sediment generated by a mulched and watered landscape area is likely to be minimal. Gross pollutants will be minimised from entering the stormwater drainage system by the installation of grates and Oceanguard baskets to all stormwater inlets.

All stormwater pipes will be fully sealed and no contaminants will be able to enter the stormwater system from the roof catchment area or through infiltration into the stormwater pipes constructed below the ground.

Regular inspections of control systems should be carried out to ensure satisfactory performance of the drainage systems proposed. All noted stormwater treatment devices noted within this report are to be inspected, maintained, rectified and reported on in accordance with the NCC DCP (2012) and Technical Manual (2017).

A stormwater maintenance plan will be prepared to coincide with the completed construction works, comprising and addressing each stormwater element (rainwater tank, pipes, floor wastes, inlet/outlet screens, the filter chambers and filter cartridges and on-site detention storages). The schedule will outline the inspection frequency, the maintenance requirements and include the provision for management of worker health and safety through the inspection and maintenance regime. The stormwater maintenance plan is anticipated to be conditioned with the Development Approval, and cannot be prepared as part of the Development Application, as the maintenance plan needs more clarity from each of the designed and ‘as-built’ drainage elements to be of use. It is common-place for the maintenance plans to be prepared at the completion of construction stage, prior to issue of the Occupation Certificate.

4. Erosion Control Strategy

The contractor will be obliged to instigate erosion and sediment controls for the construction to minimise risk of sediment deposition in the downstream drainage corridors.

Erosion and Sediment Controls are documented on the DA plans, which includes sediment fencing downslope of disturbed areas, filter socks around kerb inlet pits during construction and controls around stockpile locations.

After the buildings are demolished, the residual ground levels around the site will be estimated to be 200mm lower than the footpath levels and hence a temporary depression will be created with the demolition. This temporary depression will be utilised as sedimentation control measure for the construction works.

There is no basement proposed with the development, so pump-out and dewatering is not a consideration for the site. The above-listed erosion controls should be sufficient to minimise sedimentation from the site.

The site is considered very low erosion risk hazard (soil loss class 1) under Revised Universal Soil Loss Equation (RUSLE) below.

Table 2: Site RUSLE Calculation for the Site

	Unit	Value
Total Catchment Area	ha	0.472
Total Disturbed Catchment Area	ha	0.472
Soil Texture Group		F (Hamilton Soil Landscape)
5 day, 75th Percentile Rainfall depth	mm	24.4
Rainfall erosivity	R factor	2590
Soil Erodibility	K factor	0.016
Slope Length	m	50
Slope gradient (%)	%	0.7
Length/Gradient	LS factor	0.016
Erosion Control Practice	P factor	1.3
Ground Cover factor	C factor	1
Soil Loss	(t/ha/yr)	9
Soil Loss Class		1 (Very Low)
Estimated Soil Loss	m^3/ha/yr	7

Management of soil on site will be maintained through the use of sediment fencing constructed around the site boundary during the earthworks phase. Potential soil loss is likely to be minimal, given excavation is to levels below the adjacent street level and that the structure will contain site soils a very early stage of construction.

Other soil loss prevention measures are as documented on the erosion and sediment control plans.

5. Summary

The proposed development at 711 Hunter Street, Newcastle is planned to be provided in accordance with the NCC Development Control Plan (2012) and Technical Manual (2017).

The stormwater management plan:

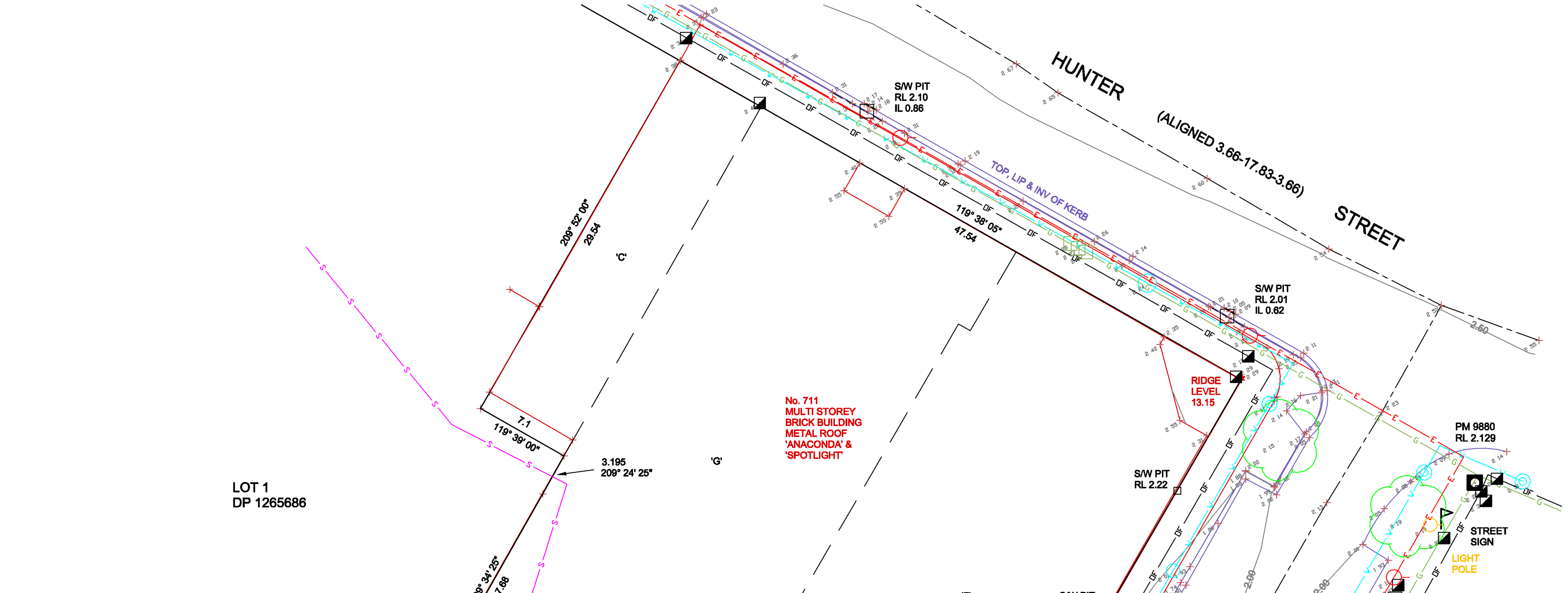
- Provides stormwater controls that satisfy the provisions of the DCP and designed in accordance with the Stormwater Technical Manual
- Provides Rainwater tanks to offset potable water supply for re-use both externally in irrigation of the podium and ground level as well as toilets on the ground floor and this exceeds the minimum requirements of BASIX
- Ensures stormwater runoff for waterborne pollutants are achieved through the abovementioned treatment measures
- Provides on-site detention to reduce the peak and attenuate outflows to lessen the flood peak

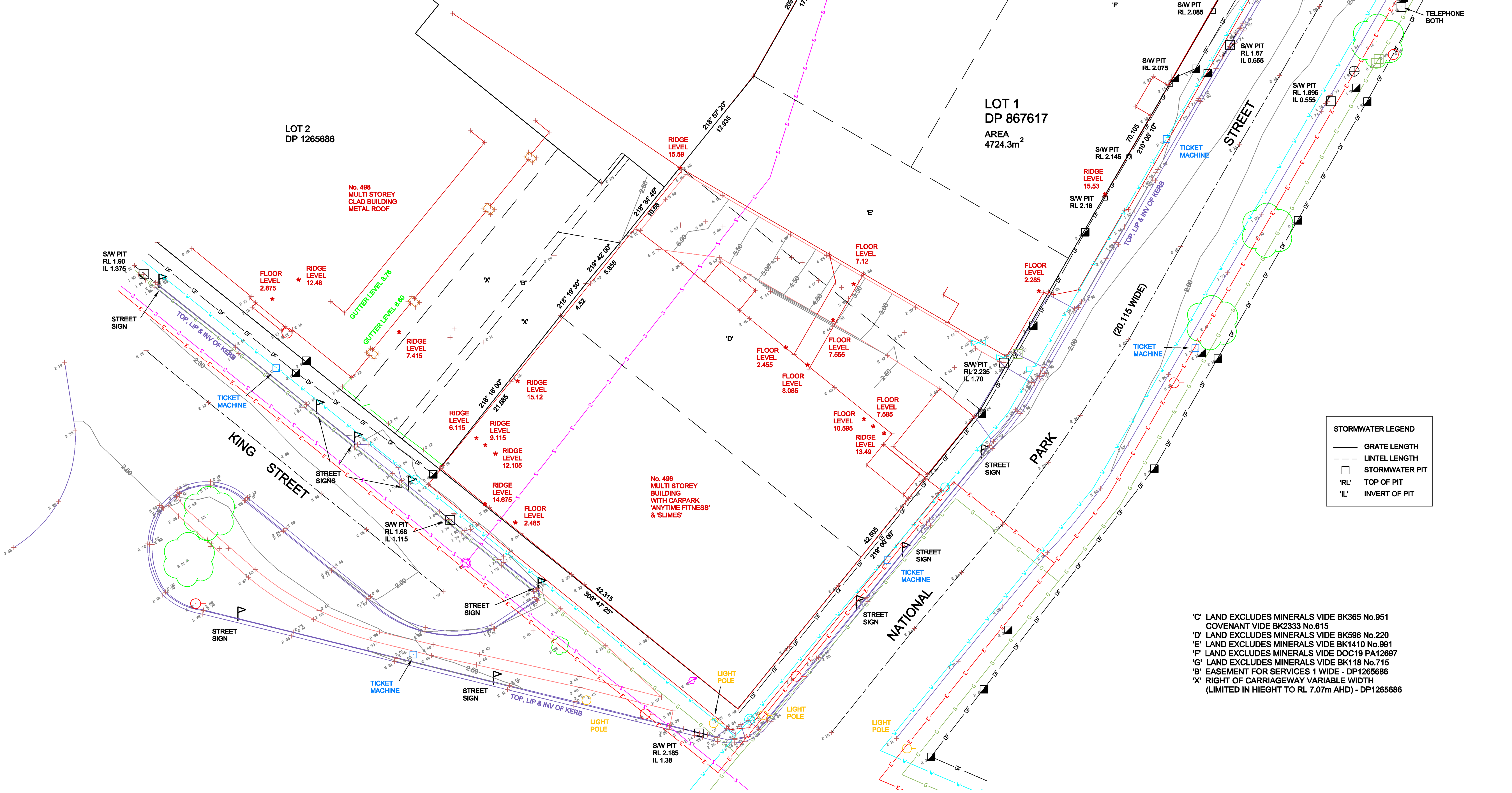
The erosion and sediment controls:

- The site is relatively flat and has a low erosion hazard
- The plan demonstrates adequate controls, including sediment fencing, stormwater pit inlet filters, stabilised site access entry points and the utilisation of the depth of excavation to drop and settle any suspended sediments before discharge.

Appendices

Appendix A - Site Survey





'C' LAND EXCLUDES MINERALS VIDE BK365 No.951
COVENANT VIDE BK2333 No.615
'D' LAND EXCLUDES MINERALS VIDE BK596 No.220
'E' LAND EXCLUDES MINERALS VIDE BK1410 No.991
'F' LAND EXCLUDES MINERALS VIDE DOC19 PA12697
'G' LAND EXCLUDES MINERALS VIDE BK118 No.715
'B' EASEMENT FOR SERVICES 1 WIDE - DP1265686
'X' RIGHT OF CARRIAGEWAY VARIABLE WIDTH
(LIMITED IN HIEGHT TO RL 7.07m AHD) - DP1265686

STORMWATER LEGEND

- GRATE LENGTH
- LINTEL LENGTH
- STORMWATER PIT
- 'RL' TOP OF PIT
- 'IL' INVERT OF PIT

LEGEND

- POWER POLE
- SEWER MANHOLE
- SEWER INSPECTION OUTLET
- HYDRANT
- STOP VALVE
- WATER METER
- STORM WATER PIT
- TELSTRA BOX
- BENCH MARK
- TREE (DIAGRAMMATIC ONLY)
- PALM TREE (DIAGRAMMATIC ONLY)
- ROCK OUTCROP
- APPROX. LOCATION OF GAS LINE
- APPROX. LOCATION OF AUSGRID LINE
- APPROX. LOCATION OF SEWER MAIN
- APPROX. LOCATION OF WATER MAIN
- APPROX. LOCATION OF OPTIC FIBRE LINE
- APPROX.LOCATION OF BOTTOM OF BANK
- APPROX.LOCATION OF TOP OF BANK
- APPROX.LOCATION OF FENCE LINE
- APPROX.LOCATION OF KERB LINE
- APPROX.LOCATION OF EDGE OF BITUMEN
- CONTOUR LINE

NOTES

- THIS IS A DETAIL SURVEY ONLY
- LEVELS ARE ON AUSTRALIAN HEIGHT DATUM (ORIGIN PM 9880 - RL 2.129)
- THIS PLAN SHOWS THE TITLE PLAN BOUNDARY DIMENSIONS, BUT DOES NOT INCLUDE ANY BOUNDARY DEFINITION. FURTHER INVESTIGATION AND SURVEY WORK WILL BE REQUIRED TO ENABLE ANY BUILDING OR FENCE CONSTRUCTION WORKS TO ACHIEVE CORRECT POSITIONING IN RELATIONSHIP TO BOUNDARIES.
- THE RELATIONSHIP OF DETAILS ON THE LAND TO THE BOUNDARIES ARE DIAGRAMMATIC ONLY DO NOT SCALE CLEARANCES FROM THIS SKETCH
- BEARINGS, DISTANCES AND AREA ARE BY THE TITLE ONLY AND SUBJECT TO CONFIRMATION BY SURVEY
- BEARINGS SHOW ARE MAGNETIC
- SERVICES SHOWN ARE THOSE FOUND DURING VISUAL INSPECTION
- LOCATE SERVICES WITH RELEVANT DEPARTMENTS AND 'DIAL BEFORE YOU DIG"
- THIS INFORMATION IS FOR CLIENTS OF CAHIL & CAMERON SURVEYORS ONLY

CAHILL & CAMERON
REGISTERED SURVEYORS
A.B.N. 30 003 280 751
UNIT 3/2 MOORE STREET, WEST GOSFORD. N.S.W. 2250
TEL: (02) 4325 3129 E-MAIL: admin@surveycc.com.au

SCALES
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1:250@A1
DO NOT SCALE CLEARANCES FROM THE SKETCH

SHEET 1 OF 1 SHEETS

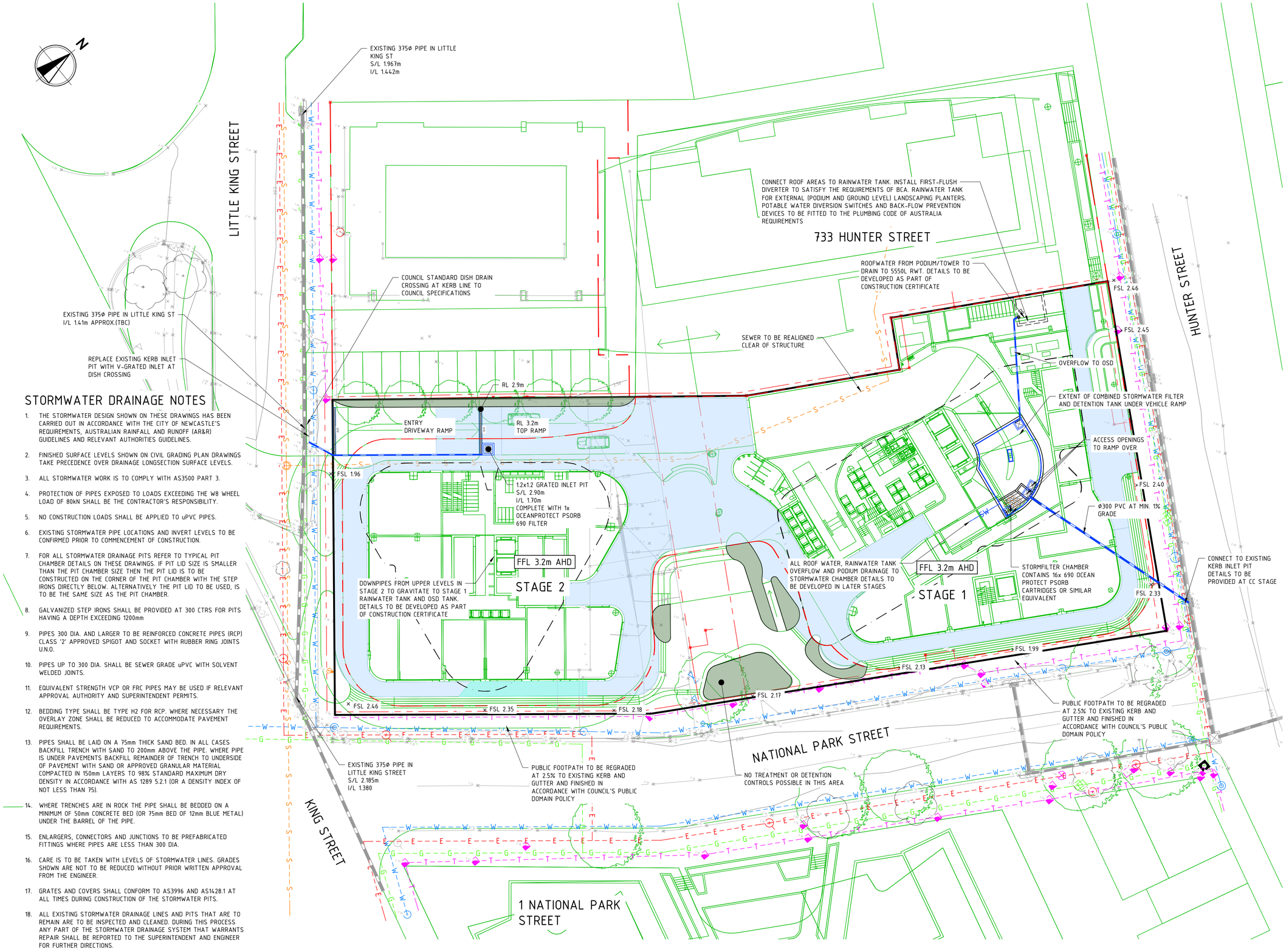
DATUM:	A.H.D.	PROJECT:	
GRID:			DETAIL SURVEY OVER LOT 1 IN D.P. 867617 No.711 HUNTER STREET, NEWCASTLE
SURVEY REF:	C23016		
SURVEY DATE:	19.05.22	CLIENT:	JUSTIN RODGERS

REVISION No.	REVISION DATE
-	-
-	-
-	-
-	-
-	-

"WARNING"
BEFORE ANY EXCAVATION IS UNDERTAKEN, "DIAL BEFORE YOU DIG" MUST BE CONTACTED FOR LOCATION OF UNDERGROUND SERVICES.

www.dialbeforeyoudig.com.au
DIAL 1100 BEFORE YOU DIG

Appendix B - Stormwater and Erosion Control Plans



PLAN
SCALE 1:250

STORMWATER DRAINAGE NOTES

1. THE STORMWATER DESIGN SHOWN ON THESE DRAWINGS HAS BEEN CARRIED OUT IN ACCORDANCE WITH THE CITY OF NEWCASTLE'S REQUIREMENTS, AUSTRALIAN RAINFALL AND RUNOFF (AR&R) GUIDELINES AND RELEVANT AUTHORITIES GUIDELINES.
2. FINISHED SURFACE LEVELS SHOWN ON CIVIL GRADING PLAN DRAWINGS TAKE PRECEDENCE OVER DRAINAGE LONGSECTION SURFACE LEVELS.
3. ALL STORMWATER WORK IS TO COMPLY WITH AS3500 PART 3.
4. PROTECTION OF PIPES EXPOSED TO LOADS EXCEEDING THE W8 WHEEL LOAD OF 80kN SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
5. NO CONSTRUCTION LOADS SHALL BE APPLIED TO uPVC PIPES.
6. EXISTING STORMWATER PIPE LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. FOR ALL STORMWATER DRAINAGE PITS REFER TO TYPICAL PIT CHAMBER DETAILS ON THESE DRAWINGS. IF PIT LID SIZE IS SMALLER THAN THE PIT CHAMBER SIZE THEN THE PIT LID IS TO BE CONSTRUCTED ON THE CORNER OF THE PIT CHAMBER WITH THE STEP IRONS DIRECTLY BELOW. ALTERNATIVELY THE PIT LID TO BE USED, IS TO BE THE SAME SIZE AS THE PIT CHAMBER.
8. GALVANIZED STEP IRONS SHALL BE PROVIDED AT 300 CTRS FOR PITS HAVING A DEPTH EXCEEDING 1200mm
9. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE PIPES (RCP) CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS U.N.O.
10. PIPES UP TO 300 DIA. SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
11. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED IF RELEVANT APPROVAL AUTHORITY AND SUPERINTENDENT PERMITS.
12. BEDDING TYPE SHALL BE TYPE H2 FOR RCP. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS.
13. PIPES SHALL BE LAID ON A 75mm THICK SAND BED. IN ALL CASES BACKFILL TRENCH WITH SAND TO 200mm ABOVE THE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1 (OR A DENSITY INDEX OF NOT LESS THAN 75).
14. WHERE TRENCHES ARE IN ROCK THE PIPE SHALL BE BEDDED ON A MINIMUM OF 50mm CONCRETE BED (OR 75mm BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE.
15. ENLARGERS, CONNECTORS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
16. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
17. GRATES AND COVERS SHALL CONFORM TO AS3996 AND AS1428.1 AT ALL TIMES DURING CONSTRUCTION OF THE STORMWATER PITS.
18. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT AND ENGINEER FOR FURTHER DIRECTIONS.

LEGEND

- SITE BOUNDARY
- ARCHITECTURAL FLOOR PLAN
- ø375 uPVC — PROPOSED STORMWATER (SIZE AND TYPE)
- ø375 uPVC — EXISTING STORMWATER (SIZE AND TYPE)
- PROPOSED GRATED INLET/JUNCTION PIT
- PROPOSED KERB INLET PIT
- GTD — PROPOSED GRATED TRENCH DRAIN
- PROPOSED WATER QUALITY CHAMBER
- DP — INDICATIVE DOWNPIPE LOCATION
- PROPOSED GRATED INLET/JUNCTION PIT
- EXISTING KERB INLET PIT
- EXISTING TREE
- PERVIOUS CATCHMENT AREAS (SUPERIMPOSED FROM ALL LEVELS)
- FLOOD STORAGE AREAS (APPROX. 800 kL)
- EXTENT OF THE ROOF OVER GROUND LEVEL
- EXTENT OF TOWER

EXISTING SERVICES

- E — EXISTING ELECTRICITY
- G — EXISTING GAS
- W — EXISTING WATER
- T — EXISTING TELSTRA
- S — EXISTING SEWER

STORMWATER NOTES

SITE AREA = 4724 m^2
IMPERVIOUS AREA = 3963 m^2 (84%)
OSD MIN. REQUIRED = (20mm x 4719 m^2) = 95 kL
OSD PROVIDED = 131 kL

PERVIOUS AREA BUILD-UP:
GROUND = 163 m^2
PODIUM / ROOF = 592 m^2
TOTAL PERVIOUS SURFACE = 755 (16%)

ROOF AREA TO RWT = 1574 m^2
RWT SIZE = 5550L (BASIX COMMITMENT)
RWT CONNECTED TO EXTERNAL IRRIGATION

NOTES

1. SITE LEVELS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION
2. DOWNPIPE CONNECTIONS TO BE LAID BELOW GROUND WITH MINIMUM 250mm COVER TO AS3500.3 AND MINIMUM 1% SLOPE
3. FINAL DOWNPIPE POSITIONS TO BE COORDINATED WITH ARCHITECT AND HYDRAULIC CONSULTANT THROUGH DETAIL DESIGN DEVELOPMENT
4. PUBLIC AUTHORITY SERVICES DRAWN ARE DIGITISED FROM DIAL BEFORE YOU DIG ONLY AND SHOULD NOT BE RELIED UPON FOR DETAIL DESIGN

0 2.5 5.0 7.5 10 12.5 15m
SCALE 1:250 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
C	18.05.23	ISSUED FOR INFORMATION	BC
B	14.10.22	ISSUED FOR PRELIMINARY DA COORDINATION	BC
A	07.10.22	ISSUED FOR PRELIMINARY DA COORDINATION	BC

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BG&E

PROJECT: 711 HUNTER STREET
NEWCASTLE

STATUS: ISSUED FOR INFORMATION
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
HA	NH	BC	BC

DATUM	GRID	SCALE	
AHD	ASSUMED	AS SHOWN	AT A1 SIZE

TITLE: STORMWATER MANAGEMENT PLAN
GROUND LEVEL

PROJECT No.	DRAWING No.	REV.
N21112	CI-0200	C

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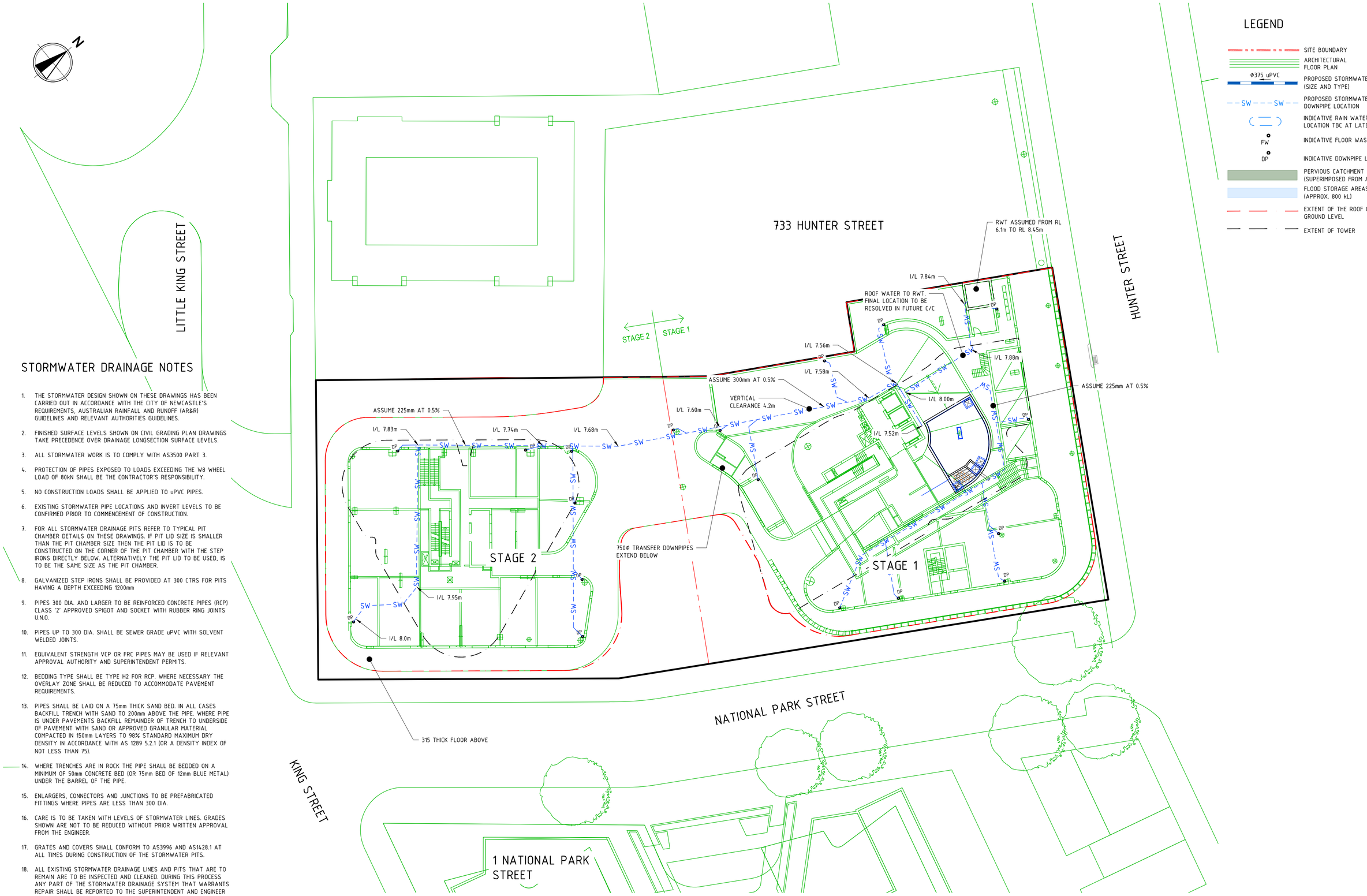

STORMWATER DRAINAGE NOTES

1. THE STORMWATER DESIGN SHOWN ON THESE DRAWINGS HAS BEEN CARRIED OUT IN ACCORDANCE WITH THE CITY OF NEWCASTLE'S REQUIREMENTS, AUSTRALIAN RAINFALL AND RUNOFF (AR&R) GUIDELINES AND RELEVANT AUTHORITIES GUIDELINES.
2. FINISHED SURFACE LEVELS SHOWN ON CIVIL GRADING PLAN DRAWINGS TAKE PRECEDENCE OVER DRAINAGE LONGSECTION SURFACE LEVELS.
3. ALL STORMWATER WORK IS TO COMPLY WITH AS3500 PART 3.
4. PROTECTION OF PIPES EXPOSED TO LOADS EXCEEDING THE W8 WHEEL LOAD OF 80kN SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
5. NO CONSTRUCTION LOADS SHALL BE APPLIED TO uPVC PIPES.
6. EXISTING STORMWATER PIPE LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
7. FOR ALL STORMWATER DRAINAGE PITS REFER TO TYPICAL PIT CHAMBER DETAILS ON THESE DRAWINGS. IF PIT LID SIZE IS SMALLER THAN THE PIT CHAMBER SIZE THEN THE PIT LID IS TO BE CONSTRUCTED ON THE CORNER OF THE PIT CHAMBER WITH THE STEP IRONS DIRECTLY BELOW. ALTERNATIVELY THE PIT LID TO BE USED, IS TO BE THE SAME SIZE AS THE PIT CHAMBER.
8. GALVANIZED STEP IRONS SHALL BE PROVIDED AT 300 CTRS FOR PITS HAVING A DEPTH EXCEEDING 1200mm
9. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE PIPES (RCP) CLASS '2' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS U.N.O.
10. PIPES UP TO 300 DIA. SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
11. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED IF RELEVANT APPROVAL AUTHORITY AND SUPERINTENDENT PERMITS.
12. BEDDING TYPE SHALL BE TYPE H2 FOR RCP. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS.
13. PIPES SHALL BE LAID ON A 75mm THICK SAND BED. IN ALL CASES BACKFILL TRENCH WITH SAND TO 200mm ABOVE THE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1 (OR A DENSITY INDEX OF NOT LESS THAN 75).
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LEGEND

- SITE BOUNDARY
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- SW SW — PROPOSED STORMWATER DOWNPIPE LOCATION
- INDICATIVE RAIN WATER TANK LOCATION TBC AT LATER STAGE
- FW — INDICATIVE FLOOR WASTE LOCATION
- DP — INDICATIVE DOWNPIPE LOCATION
- PERVIOUS CATCHMENT AREAS (SUPERIMPOSED FROM ALL LEVELS)
- FLOOD STORAGE AREAS (APPROX. 800 kL)
- EXTENT OF THE ROOF OVER GROUND LEVEL
- EXTENT OF TOWER

PLAN
SCALE 1:250

0 2.5 5.0 7.5 10 12.5 15m
SCALE 1:250 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
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CLIENT: StHilliers

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BG&E

PROJECT: 711 HUNTER STREET
NEWCASTLE

STATUS: ISSUED FOR INFORMATION
NOT TO BE USED FOR CONSTRUCTION

DRAWN	DESIGNED	CHECKED	APPROVED
JL	NH	BC	BC

DATUM	GRID	SCALE	
AHD	ASSUMED	AS SHOWN	AT A1 SIZE

TITLE: STORMWATER MANAGEMENT PLAN
MEZZANINE LEVEL

PROJECT No.	DRAWING No.	REV.
N21112	CI-0201	A

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PLAN
SCALE 1:250

0 2.5 5.0 7.5 10 12.5 15m
SCALE 1:250 AT A1 SIZE

LEGEND

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PROJECT: 711 HUNTER STREET
NEWCASTLE

STATUS: ISSUED FOR INFORMATION
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DRAWN	DESIGNED	CHECKED	APPROVED
JL	NH	BC	BC

DATUM	GRID	SCALE	
AHD	ASSUMED	AS SHOWN	AT A1 SIZE

TITLE: STORMWATER MANAGEMENT PLAN LEVEL 5

PROJECT No.	DRAWING No.	REV.
N21112	CI-0206	A

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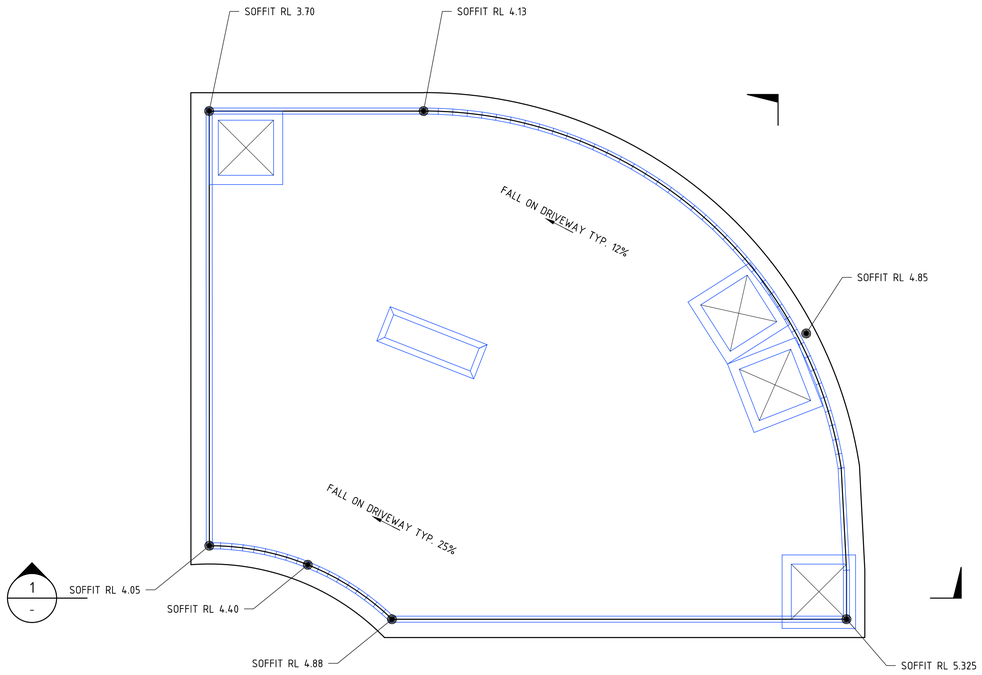
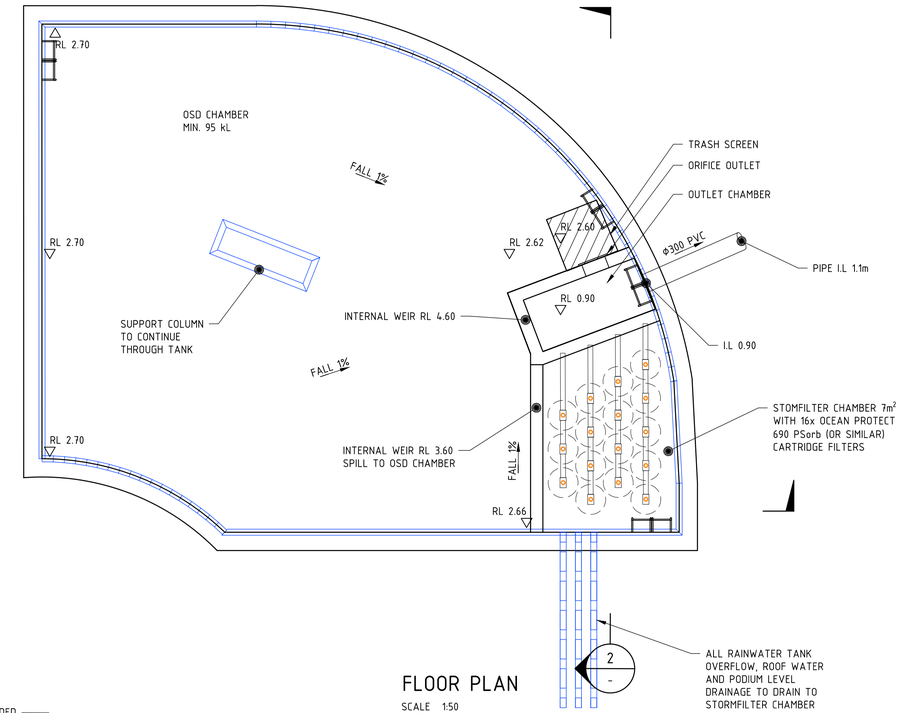


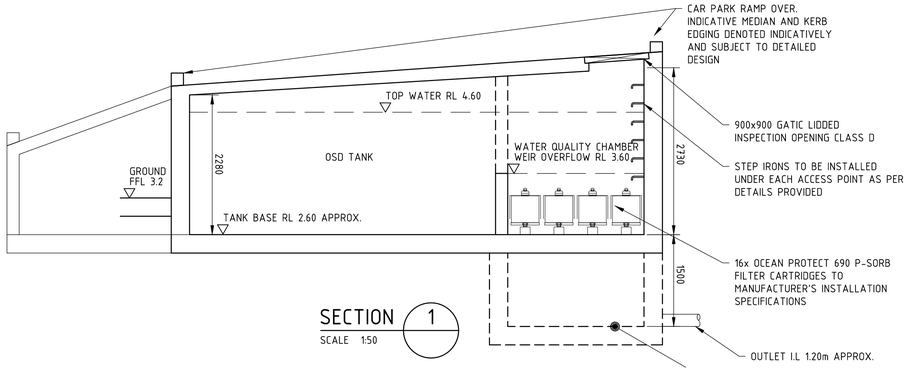
ROOF PLAN

SCALE 1:50



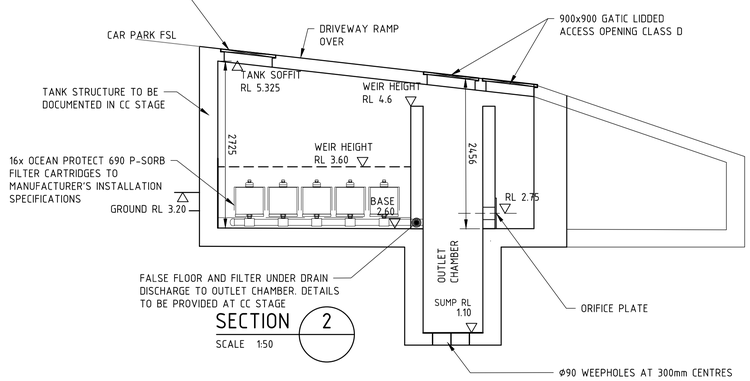
FLOOR PLAN

SCALE 1:50



SECTION 1

SCALE 1:50



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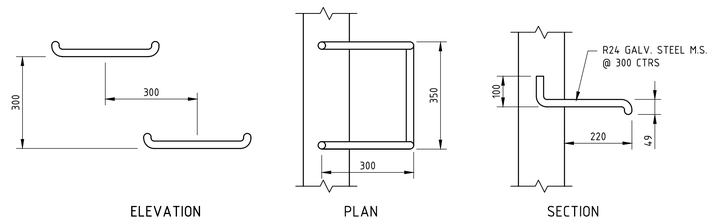

TYPICAL STEP IRON DETAILS

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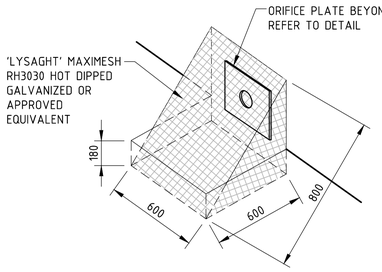
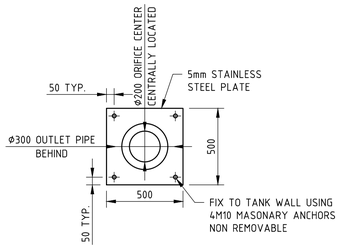


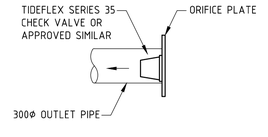
TRASH SCREEN DETAIL

N.T.S



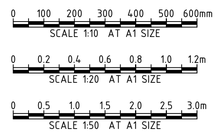
ϕ200 ORIFICE PLATE DETAIL

SCALE 1:20



OSD TANK OUTLET PIPE DETAILS

N.T.S.



REV	DATE	DESCRIPTION	RVD
A	14.10.22	ISSUED FOR PRELIMINARY DA COORDINATION	BC

REVISIONS

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BG&E

PROJECT: 711 HUNTER STREET
NEWCASTLE

STATUS: ISSUED FOR INFORMATION
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DRAWN	DESIGNED	CHECKED	APPROVED
HA	NH	BC	BC

DATUM	GRID	SCALE	
AHD	ASSUMED	AS SHOWN	AT A1 SIZE

TITLE: OSD PLAN AND SECTIONS

PROJECT No.	DRAWING No.	REV.
N21112	CI-0350	A

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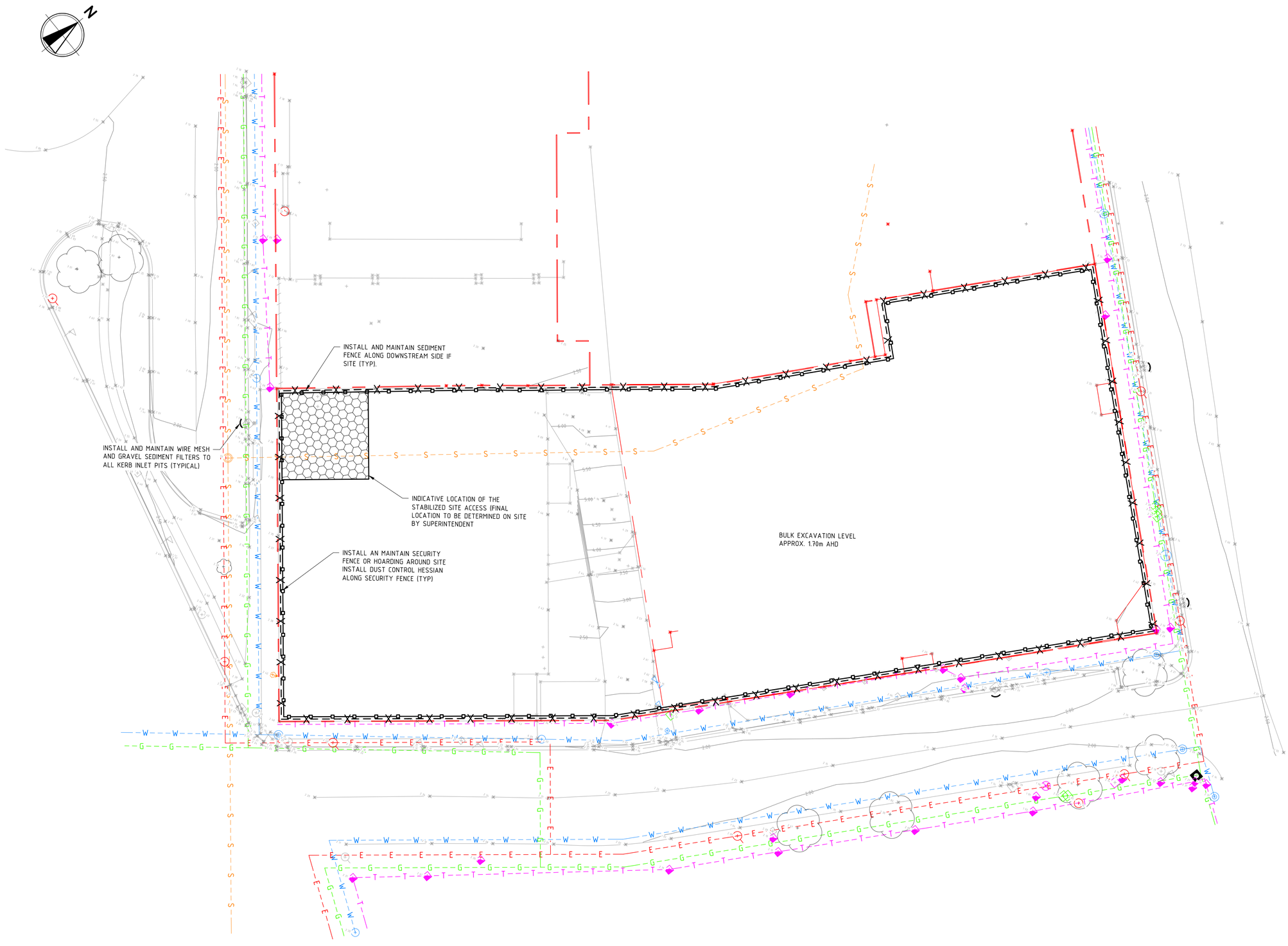

LEGEND

- SITE BOUNDARY
- EXISTING TREE
- PROPOSED GRATED INLET PIT
- STABILISED SITE ACCESS
- MESH & GRAVEL INLET FILTER
- SECURITY FENCE
- SEDIMENT FENCE

EXISTING SERVICES

- EXISTING ELECTRICITY
- EXISTING GAS
- EXISTING WATER
- * EXISTING TELSTRA
- EXISTING SEWER

EROSION AND SEDIMENT CONTROL NOTES

1.1. ALL SEDIMENT CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH RELEVANT AUTHORITY GUIDELINES AND ANY DETAILS SHOWN ON THESE DRAWINGS.

1.2. ALL PERIMETER AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO, OR AS THE FIRST STEP IN EARTHWORKS AND/OR DEMOLITION.

1.3. THE EROSION AND SEDIMENT CONTROL PLAN MAY REQUIRE FUTURE ADJUSTMENT TO REFLECT CONSTRUCTION STAGING. IT IS THE CONTRACTORS RESPONSIBILITY TO PREPARE THEIR OWN EROSION AND SEDIMENT CONTROL PLAN WHICH SUITS THE DESIGNED CONSTRUCTION STAGING.

1.4. FILTRATION BUFFER ZONES ARE TO BE FENCED OFF AND ACCESS PROHIBITED TO ALL PLANT AND MACHINERY.

1.5. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING. DAMAGED SEDIMENT TRAPPING STRUCTURES ARE TO BE REPAIRED AND ANY TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE LOCATION.

1.6. ALL TOPSOIL IS TO BE STOCKPILED ON SITE (AWAY FROM TREES AND DRAINAGE LINES) IN ACCORDANCE WITH DETAILS PROVIDED AND WITH RELEVANT AUTHORITY GUIDELINES. MEASURES SHALL BE APPLIED TO PREVENT EROSION OF THE STOCKPILES.

1.7. ALL EARTHWORK AREAS SHALL BE ROLLED EACH EVENING TO SEAL THE EARTHWORKS. DUST SUPPRESSION SHALL BE CARRIED OUT IN ACCORDANCE WITH RELEVANT AUTHORITIES GUIDELINES.

1.8. UPON COMPLETION OF ALL EARTHWORKS OR AS DIRECTED BY RELEVANT AUTHORITY, SOIL CONSERVATION TREATMENTS SHALL BE APPLIED SO AS TO RENDER AREAS THAT HAVE BEEN DISTURBED, EROSION PROOF WITHIN 14 DAYS.

1.9. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND STRAW MULCHED WITHIN 14 DAYS OF COMPLETION OF FORMATION U.N.O. BY LANDSCAPE ARCHITECTS.

1.10. EROSION AND SILT PROTECTION MEASURES ARE TO BE MAINTAINED AT ALL TIMES.

1.11. ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE TEMPORARY CONSTRUCTION ENTRY/EXIT AS PER DETAILS PROVIDED OR WITH RELEVANT AUTHORITY GUIDELINES.

1.12. ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING SITE TO LIMIT SEDIMENT TRACKING TO ROADWAYS.

PLAN
SCALE 1:250

0 2.5 5.0 7.5 10 12.5 15m
SCALE 1:250 AT A1 SIZE

REV	DATE	DESCRIPTION	RVD
B	14.10.22	ISSUED FOR PRELIMINARY DA COORDINATION	BC
A	07.10.22	ISSUED FOR PRELIMINARY DA COORDINATION	BC

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bgeeng.com—

BG&E

PROJECT: 711 HUNTER STREET
NEWCASTLE

STATUS: ISSUED FOR INFORMATION
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DRAWN	DESIGNED	CHECKED	APPROVED
HA	NH	BC	BC

DATUM	GRID	SCALE	
AHD	ASSUMED	AS SHOWN	AT A1 SIZE

TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	DRAWING No.	REV
N21112	CI-0700	B

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Appendix C -
Broad Scale Development Checklist

Table 1.1 - Broad scale assessment checklist for WSUD

BROAD SCALE DEVELOPMENT ASSESSMENT CHECKLIST **Newcastle Development Control Plan 2012 – Section 7.06 Stormwater and Section 7.07 Water Efficiency**				
Site/Project Name:	711 Hunter Street - ('Spotlight' Redevelopment)			
Applicant:	BG&E Engineers			
Catchment Area	**1 2 3 4** (circle relevant catchment from Appendix 9)			
ITEM		**Y**	**N**	**NA**
1	**Integration of the whole water cycle**			
	Stormwater Management and WSUD principles have been integrated into the proposed development.	✓		
	Opportunities for on site water re-use have been identified and utilised.	✓		
2	**Management and minimisation of hydrologic impacts**			
	Hydrologic Objectives have been identified and addressed (impervious areas shown, design events indicated, conveyance requirements identified, peak flows shown, appropriately sized on-site retention etc.).	✓		
	High flows have been catered for (bypass structures, overland flow paths, overflow disposal to legal point of discharge shown etc.).	✓		
	Impacts upon receiving environment have been determined and minimised (erosion protection, dissipation of concentrated flows).	✓		
3	**Management and minimisation of ecological impacts**			
	Water Quality Management Objectives have been identified and addressed (MUSIC modelling results submitted, site discharge controls in accordance with DCP)	✓		
	A treatment train approach has been developed where practicable (larger developments).	✓		
	Appropriate use of source controls to minimise the generation of excessive runoff/pollution at or near its source.	✓		
4	**Maintenance and/or enhancement of visual and social amenity**			
	WSUD has been integrated into landscape form.			✓
	Multiple use assets and/or corridors are proposed (verge side swales, bio-retention ponds, constructed wetlands etc.).			✓
	Public health and safety issues considered and addressed (batter slopes, water depths/velocities, stagnant water etc.).			✓
5	**Minimisation of whole of life asset costs**			
	Maintenance requirements are considered (maintenance plans provided, maintenance access point for vehicles identified).			✓
	Asset life cycle cost determined.			✓
	Asset ownership and responsibility defined and agreed.			✓
	Cost effectiveness of strategy evaluated and maximised.			✓
6	**Provision of alternative sources of water/mains water use reduced**			
	Rainwater harvesting consistent with expected reuse opportunity & DCP (number of people using site, type of development etc.).	✓		
	Water tank reticulated to ~~new toilets, laundry and~~ external taps where appropriate (water reuse fit for purpose).	✓		
	Water reused in industrial/commercial developments where practicable. (eg. vehicle washing, landscaping, irrigation).			✓

Appendix D -
MUSIC-LINK report Summary

THE CITY OF NEWCASTLE

MUSIC-*link* Report

Project Details		Company Details	
Project:	711 Hunter Street	**Company:**	BG&E
Report Export Date:	14/10/2022	**Contact:**	Ben Collyer
Catchment Name:	N21112-CAL-CI-0001-DA MUSICLink	**Address:**	Suite2, L3, 426 King Street Newcastle
Catchment Area:	0.471ha	**Phone:**	02 49023000
Impervious Area*:	71.54%	**Email:**	ben.collyer@bgeeng.com
Rainfall Station:	61078 WILLIAMTOWN		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1995 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	1125mm		
Evapotranspiration:	1735mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.34		
Study Area:	Newcastle		
Scenario:	Newcastle		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Post-Development Node	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	0.368%	Rain Water Tank Node	1	Urban Source Node	6
TSS	87.5%	Detention Basin Node	1		
TP	65.7%	Generic Node	1		
TN	49.1%	GPT Node	4		
GP	100%				

Comments

Note failing parameters on RWT are an error on the MUSIC-LINK report - These are actually passing parameters

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Detention	SF Chamber	% Reuse Demand Met	None	None	0
Detention	SF Chamber	Hi-flow bypass rate (cum/sec)	None	99	99
GPT	1 x OceanGuard	Hi-flow bypass rate (cum/sec)	None	None	0.02
GPT	1x OceanGuard	Hi-flow bypass rate (cum/sec)	None	None	0.02
GPT	2x OceanGuard	Hi-flow bypass rate (cum/sec)	None	None	0.04
GPT	2x OceanGuard	Hi-flow bypass rate (cum/sec)	None	None	0.04
Post	Post-Development Node	% Load Reduction	None	None	0.368
Post	Post-Development Node	GP % Load Reduction	90	None	100
Post	Post-Development Node	TN % Load Reduction	45	None	49.1
Post	Post-Development Node	TP % Load Reduction	65	None	65.7
Post	Post-Development Node	TSS % Load Reduction	85	None	87.5
Rain	Rainwater Tank	% Reuse Demand Met	70	None	100
Urban	GND Hardstand 912m2	Area Impervious (ha)	None	None	0.091
Urban	GND Hardstand 912m2	Area Pervious (ha)	None	None	0
Urban	GND Hardstand 912m2	Total Area (ha)	None	None	0.091
Urban	GND Landscape 183m2	Area Impervious (ha)	None	None	0
Urban	GND Landscape 183m2	Area Pervious (ha)	None	None	0.018
Urban	GND Landscape 183m2	Total Area (ha)	None	None	0.018
Urban	Podium Hardstand 893m2	Area Impervious (ha)	None	None	0.089
Urban	Podium Hardstand 893m2	Area Pervious (ha)	None	None	0
Urban	Podium Hardstand 893m2	Total Area (ha)	None	None	0.089
Urban	Podium Pervious 1158m2	Area Impervious (ha)	None	None	0
Urban	Podium Pervious 1158m2	Area Pervious (ha)	None	None	0.116
Urban	Podium Pervious 1158m2	Total Area (ha)	None	None	0.116
Urban	STG1 ROOF 699m2	Area Impervious (ha)	None	None	0.07
Urban	STG1 ROOF 699m2	Area Pervious (ha)	None	None	0
Urban	STG1 ROOF 699m2	Total Area (ha)	None	None	0.07
Urban	STG2 ROOF 874m2	Area Impervious (ha)	None	None	0.087
Urban	STG2 ROOF 874m2	Area Pervious (ha)	None	None	0
Urban	STG2 ROOF 874m2	Total Area (ha)	None	None	0.087

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rain	Rainwater Tank	Total Nitrogen - C** (mg/L)	0	0	1.4
Rain	Rainwater Tank	Total Phosphorus - C** (mg/L)	0	0	0.13
Rain	Rainwater Tank	Total Suspended Solids - C** (mg/L)	0	0	12

Only certain parameters are reported when they pass validation

Appendix E -
Council RFI summary table

E.1 Council RFI

The relevant matters raised regarding stormwater and flooding in the Request for Additional Information from Council, 4th May 2023:

1D: The functionality of the stormwater design and operation requirements must be capable of being independently managed once the Stage 1 development is completed. Amended plans are to be provided, which satisfactorily demonstrated how the stormwater design interface between Stage 1 and Stage 2 will be developed and managed. A concept design is to be prepared that addresses this matte	The stormwater downpipes through the building are typically documented as part of future design development phase, incorporating multiple disciplines, including architectural, structural, hydraulic, civil and other building services. An indicative downpipe layout has been provided, which indicates how the drainage connections could be achieved.
1E: An amended plan which clearly details any proposed drainage and associated easements (please ensure easement widths are correctly noted).	Similar to the previous response, an indicative downpipe layout has been provided showing how drainage connections could potentially connect the two stages. The Stratum Report (Ref: 21745) prepared by CMS Surveyors has been amended to specifically identify the inclusion of future stormwater easements.
1F: As part of the assessment, CN is required to ensure that stormwater infrastructure including drainage and associated easements (if required), locations of rainwater tanks, pits and pipes and other water sensitive treatments can be appropriately managed and accommodated. Details including a maintenance schedule is to be addressed as part of the Stage 1 application.	The intention is for the whole of the drainage infrastructure to be located in stage 1, which must occur first, given all building services are located in stage 1. The future stage 2 downpipes and rainwater tanks will ultimately connect to downpipes suspended under the level 1 slab, which will be provisioned in the stage 1 design for future stage 2 connection. Maintenance schedules cannot be addressed until detail services drawings are prepared and 'as built' drawings are issued. Section 3.2.6 addresses future maintenance and describes basic elements to be included.
7N: It is noted that the use of BASIX component for stormwater reuse calculation purposes is not supported. Further, due to the proposed staging, the section of the driveway access areas within the Stage 2 development area will be open to the elements for an unknown period of time. i) The development stormwater reuse aspect must be demonstrated and must be designed to the CN DCP 7.06. The roof area for both Stages must be confirmed and calculations for stormwater reuse is to be provided. reuse can be calculated based on the DA roof area. Stormwater reuse can be provided within the landscaped areas on the ground level and podium level, any car wash bays, and on ground floor commercial level toilets (if adequate reuse is available). ii) The amended plans must clearly indicate the potential location of the rainwater tanks (the tanks could be located at different levels e.g., ground level and podium). iii) The stormwater reuse designed so that both Stage 1 and 2 can operate independently, to allow for independent management and maintenance of such infrastructure. iv) The driveway area falls toward Little King Street, the stormwater run-off from the driveway area must be captured and treated to CN DCP requirements.	The Re-use calculations have been revisited, refer to Section 3.1.2. The revised rates now exceed the minimum requirements from BASIX and reflects re-use for the landscaping (irrigation) and the ground-level toilets. The stage 2 landscaping area is proposed as an interim treatment for the site in case of a delay between the two stages. Stormwater controls for the second stage will be impractical to achieve, given the surface levels of the interim stage 2 (landscaped) area must remain at street level to mitigate potential flood storage issues, and that this conflicts with the ability to capture the stormwater and treat in an underground treatment control. It is instead intended that landscaping of the interim stage 2 area will incorporate shallow depressions that can be planted or grassed out, and that these areas will provide a nominal surface depression for slow-infiltration to the underlying sand substrate, whilst simultaneously allowing temporary reductions in suspended sediments and some nutrient controls. (i) For the Stormwater Re-use aspect, refer to this report, section 3.1.2 (ii) A second Rainwater tank is nominated on the plans for the stage 2 tower, located on the podium level. The stage 1 rainwater tank remains in the same position. (iii) A second rainwater tank would enable draw-down for podium level landscaping, whilst the original tank could service the ground level toilets (iv) A second (smaller) in-ground treatment for water quality is provided for the very small area of driveway draining to Little King Street. Refer to this report, section 3.2.1 (v) A second discharge connection is provided to King Street and is covered on the revised plans. It is noted that this connection to King Street covers the drainage from the small area of rainfall landing on the

v) A Stormwater discharge connection to King Street is required and must be illustrated on the submitted plans.	driveway only. There is inadequate depth to provide a more significant storage for control of the rest of stage 2 and hence most of stage 2 will drain through to the OSD main tank in stage 1

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