

STORMWATER LEGEND

- RW** DENOTES 100mm DIA. FULLY SEALED UNDERGROUND RAINWATER SYSTEM PIPE U.N.O.
- SW** DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- 150** DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- 150** DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- GD** GRATED DRAIN
- RWO** RAINWATER OUTLET
- DENOTES TREE PROTECTION ZONE ON EXISTING TREES TO REMAIN. NOTE: PROVIDE APPROPRIATE PROTECTION MEASURES DURING CONSTRUCTION IN ACCORDANCE WITH ARBORISTS REQUIREMENTS
- DENOTES STRUCTURAL ROOT ZONES ON EXISTING TREES TO REMAIN

DARLINGTON ROAD

CONSTRUCT 100 WIDE GRATED BOX DRAIN MIN 100 DEEP. GRADE FROM INVERT TO OUTLET AT A MINIMUM GRADE OF 2%
GRADE LEVEL TO BE CONFIRMED FROM FINISH FLOOR LEVELS PROVIDED BY ARCHITECTS

REFER TO HYDRAULIC ENGINEERS PLAN FOR RAINWATER TANK CONNECTION DETAILS

ON-SITE DETENTION/RAINWATER RE-USE TANK - 2

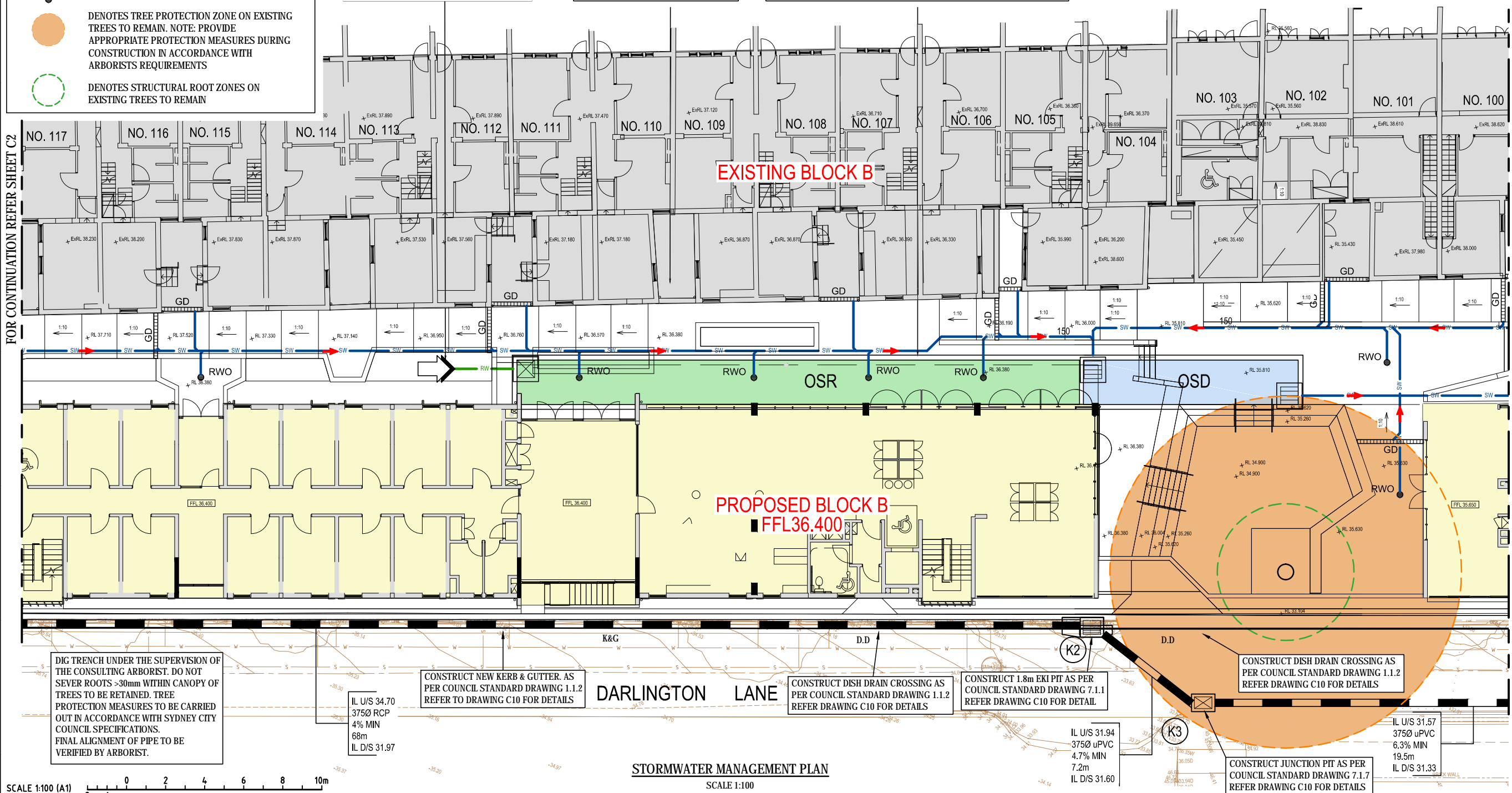
PROVIDE 1 x 48,000 litre & 1 x 73,000 litre BELOW GROUND TANKS FOR OSD/RE-USE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BASIX CERTIFICATE & COUNCIL REQUIREMENTS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION, AS/NZS 3500 AND COUNCIL'S GUIDELINES. REFER TO SHEET C3 FOR DETAILS

OSD = 48m³
RE-USE = 73m³

PROVIDE TANK RE-USE PUMP CONTROL UNIT TO MANUFACTURERS SPECIFICATION. PROVIDE FIRST FLUSH DEVICE OR EQUIVALENT PRIOR TO DISCHARGING TO TANK.

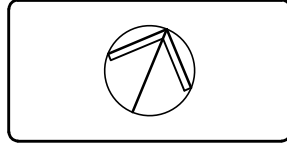
WARNING
LOCATION AND DEPTH OF ALL UNDERGROUND SERVICES TO BE INVESTIGATED WITH THE RELEVANT AUTHORITIES PRIOR TO COMMENCING WORK

NOTES:
1. FOR STORMWATER MANAGEMENT NOTES REFER TO DRAWING C2



REV	DATE	DRAWN	REV'D	APP'D	REVISION
A	15.06.16	RJC/B			ISSUED FOR DRAFT DEVELOPMENT APPLICATION

DRAWING NUMBER	REFERENCE DRAWING TITLE



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CLIENT	UNIVERSITY OF SYDNEY	ARCHITECT	ALLEN JACK & COTTIER
PROJECT	DARLINGTON ROAD TERRACES MIXED USE DEVELOPMENT		
DRAWN	R.J.C.B.	DRAWING CHECK	REVIEWED
DESIGNED	R.J.	DESIGN REVIEW	APPROVED
		DATE	DATE

TITLE
STORMWATER MANAGEMENT PLAN
SHEET 2

SCALE AS SHOWN
DRAWING No C3
REV A

DATE: 15/06/2016 5:39:58 PM LOGIN NAME: BOVIN, CODY
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NOTES:
1. FOR STORMWATER MANAGEMENT NOTES REFER TO DRAWING C2

ON-SITE DETENTION/RAINWATER RE-USE TANK - 3
PROVIDE 1 x 9,000 litre & 1 x 16,300 litre BELOW GROUND TANKS FOR OSD/RE-USE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BASIX CERTIFICATE & COUNCIL REQUIREMENTS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION, AS/NZS 3500 AND COUNCIL'S GUIDELINES. REFER TO SHEET C3 FOR DETAILS

OSD = 9m³
RE-USE = 16.3m³

PROVIDE TANK RE-USE PUMP CONTROL UNIT TO MANUFACTURERS SPECIFICATION. PROVIDE FIRST FLUSH DEVICE OR EQUIVALENT PRIOR TO DISCHARGING TO TANK.

STORMWATER LEGEND

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- DENOTES 100mm DIA. UNDERGROUND STORMWATER / SURFACE WATER SYSTEM PIPE AT 1% MIN. GRADE U.N.O.
- DENOTES RAINWATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- DENOTES STORMWATER/SURFACE WATER PIPE AND DIA. WHEN PIPE EXCEEDS 100mm DIA.
- GRATED DRAIN
- RAINWATER OUTLET

FOR CONTINUATION REFER SHEET C3

CONNECT EXISTING ROOF DRAINAGE TO NEW SYSTEM AS REQUIRED
REFER TO HYDRAULIC ENGINEERS PLAN FOR RAINWATER TANK CONNECTION DETAILS

NOTE:
LANDSCAPE SURFACE DRAINAGE SYSTEM TO DISCHARGE IN TO PROPOSED OSD. ONE ENVIPOD TO BE INSTALLED IN THE SURFACE INLET BEFORE DISCHARGE INTO THE DETENTION TANK. SURFACE DRAINAGE CONNECTION TO BE DETAILED IN THE CC STAGE.

ON-SITE DETENTION/RAINWATER RE-USE TANK - 3
PROVIDE 1 x 10,000 litre & 1 x 10,000 litre BELOW GROUND TANKS FOR OSD/RE-USE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BASIX CERTIFICATE & COUNCIL REQUIREMENTS. INSTALL IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION, AS/NZS 3500 AND COUNCIL'S GUIDELINES. REFER TO SHEET C3 FOR DETAILS

OSD = 10m³
RE-USE = 10m³

PROVIDE TANK RE-USE PUMP CONTROL UNIT TO MANUFACTURERS SPECIFICATION. PROVIDE FIRST FLUSH DEVICE OR EQUIVALENT PRIOR TO DISCHARGING TO TANK.

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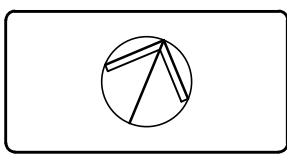
DARLINGTON LANE

STORMWATER MANAGEMENT PLAN
SCALE 1:100

SCALE 1:100 (A1)
0 2 4 6 8 10m

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TITLE		STORMWATER MANAGEMENT PLAN SHEET 3	
SCALE	AS SHOWN	DRAWING No	C4
		REV	A

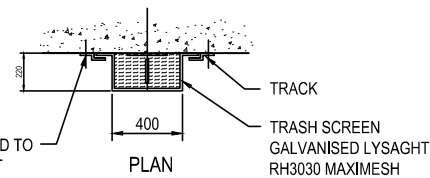
ORIFICE DISCHARGE CALCULATION - TANK 1

$$Q = C.A. (2gh)^{1/2} \quad PSD = 56 \text{ l/s}$$

$$d = \sqrt{\frac{4.Q}{C.(2gh)^{1/2} \times \pi}} = \sqrt{\frac{4 \times 0.056}{0.6 (2 \times 9.81 \times 2.133)^{1/2} \times 3.14}} = 134 \text{ mm}$$

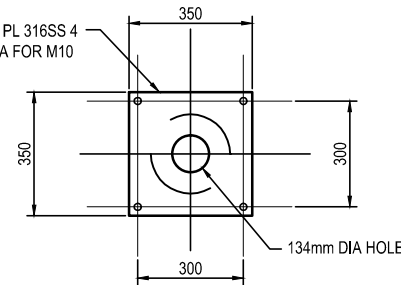
ORIFICE SIZE = 134mm

TRACK GUIDE BOLTED TO WALL USING RAMSET CHEMICAL ANCHORS



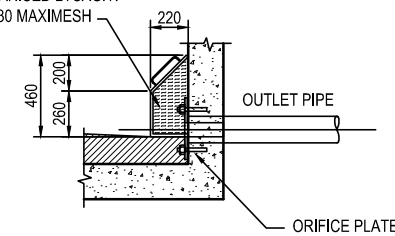
DETAIL 1 - TRASH SCREEN
SCALE NTS

350 x 350 x 4 PL 316SS 4 HOLES 12 DIA FOR M10 CHEMSETS

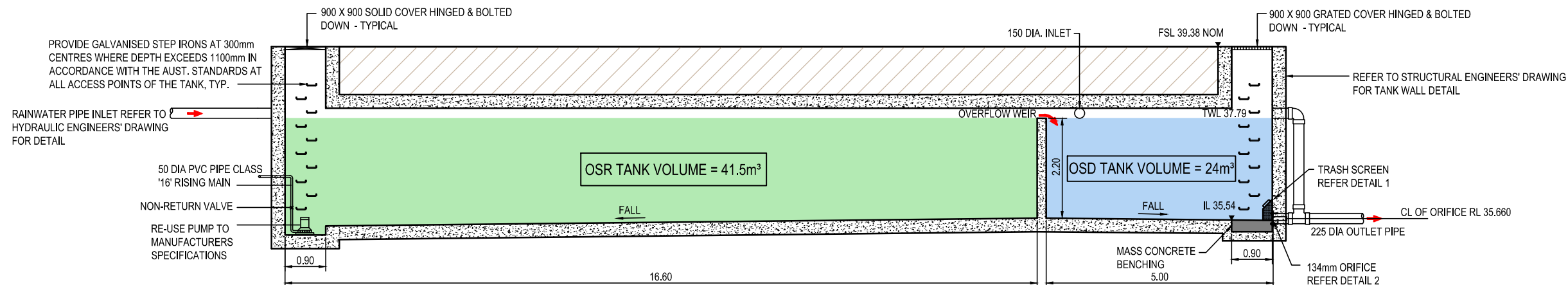


DETAIL 2 - ORIFICE PLATE
SCALE NTS

TRASH SCREEN GALVANISED LYSAGHT RH3030 MAXIMESH

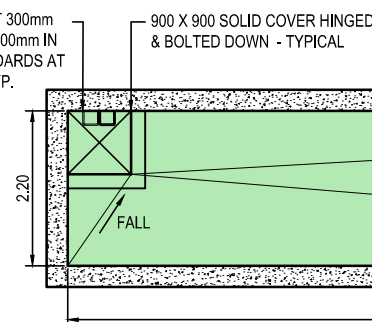


SIDE VIEW CROSS SECTION



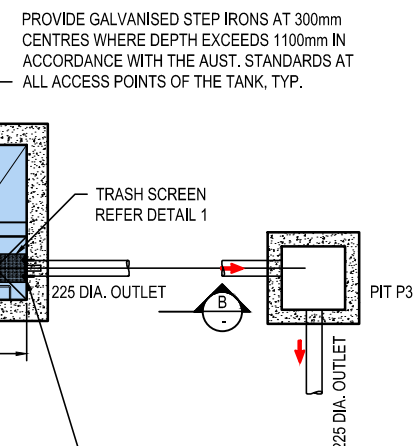
SECTION
SCALE: 1:25/A1, 1:50/A3

PROVIDE GALVANISED STEP IRONS AT 300mm CENTRES WHERE DEPTH EXCEEDS 1100mm IN ACCORDANCE WITH THE AUST. STANDARDS AT ALL ACCESS POINTS OF THE TANK, TYP.

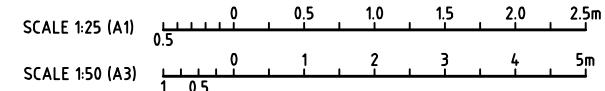


ON-SITE DETENTION AND RETENTION TANK 1 BASE PLAN
SCALE - 1:25/A1, 1:50/A3

PROVIDE GALVANISED STEP IRONS AT 300mm CENTRES WHERE DEPTH EXCEEDS 1100mm IN ACCORDANCE WITH THE AUST. STANDARDS AT ALL ACCESS POINTS OF THE TANK, TYP.



350 x 350 x 4 ORIFICE PL 316SS 4 HOLES 12 DIA FOR M10 CHEMSETS REFER DETAIL 2



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TITLE	STORMWATER MANAGEMENT DETAILS SHEET 1
SCALE	AS SHOWN
DRAWING No	C5
REV	A

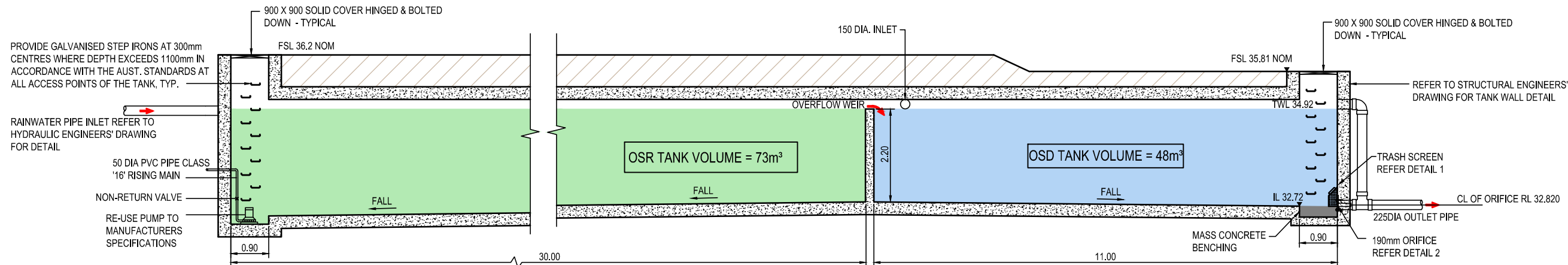
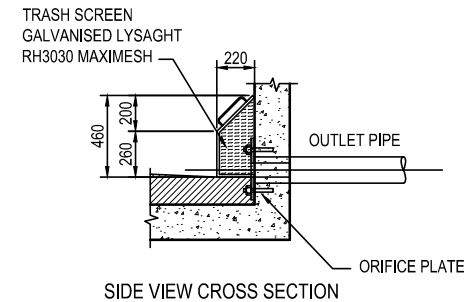
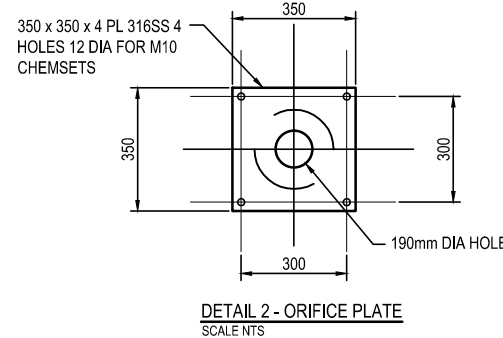
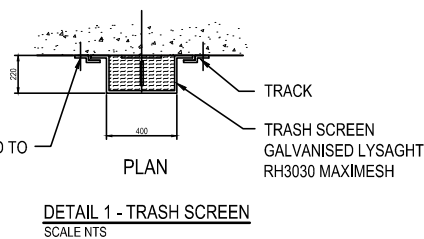
ORIFICE DISCHARGE CALCULATION - TANK 2

$$Q = C.A. (2gh)^{1/2} \quad PSD = 112 \text{ l/s}$$

$$d = \sqrt{\frac{4.Q}{C.(2gh)^{1/2} \times \pi}} = \sqrt{\frac{4 \times 0.112}{0.6 (2 \times 9.81 \times 2.105)^{1/2} \times 3.14}} = 190\text{mm}$$

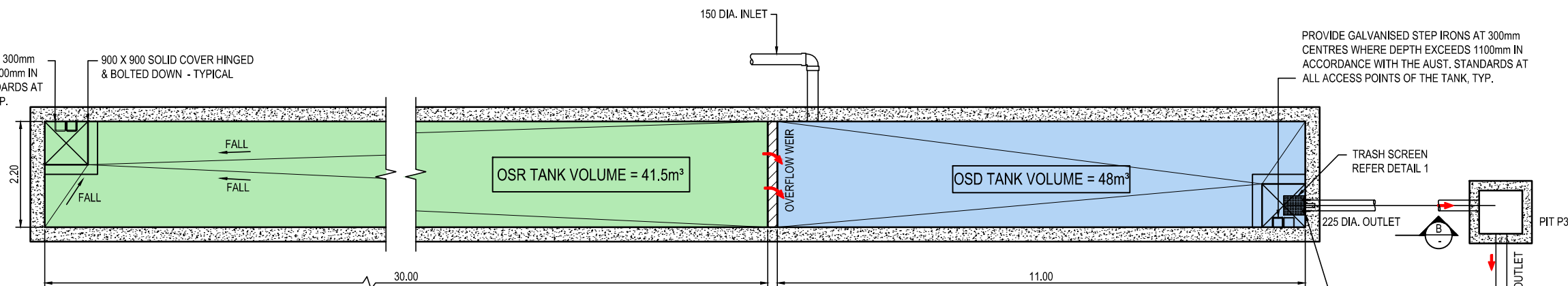
ORIFICE SIZE = 190mm

TRACK GUIDE BOLTED TO WALL USING RAMSET CHEMICAL ANCHORS



SECTION A-A
SCALE: 1:25/A1, 1:50/A3

PROVIDE GALVANISED STEP IRONS AT 300mm CENTRES WHERE DEPTH EXCEEDS 1100mm IN ACCORDANCE WITH THE AUST. STANDARDS AT ALL ACCESS POINTS OF THE TANK, TYP.



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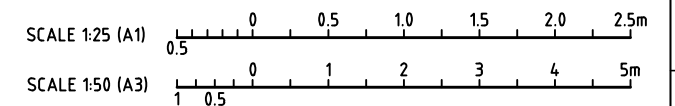
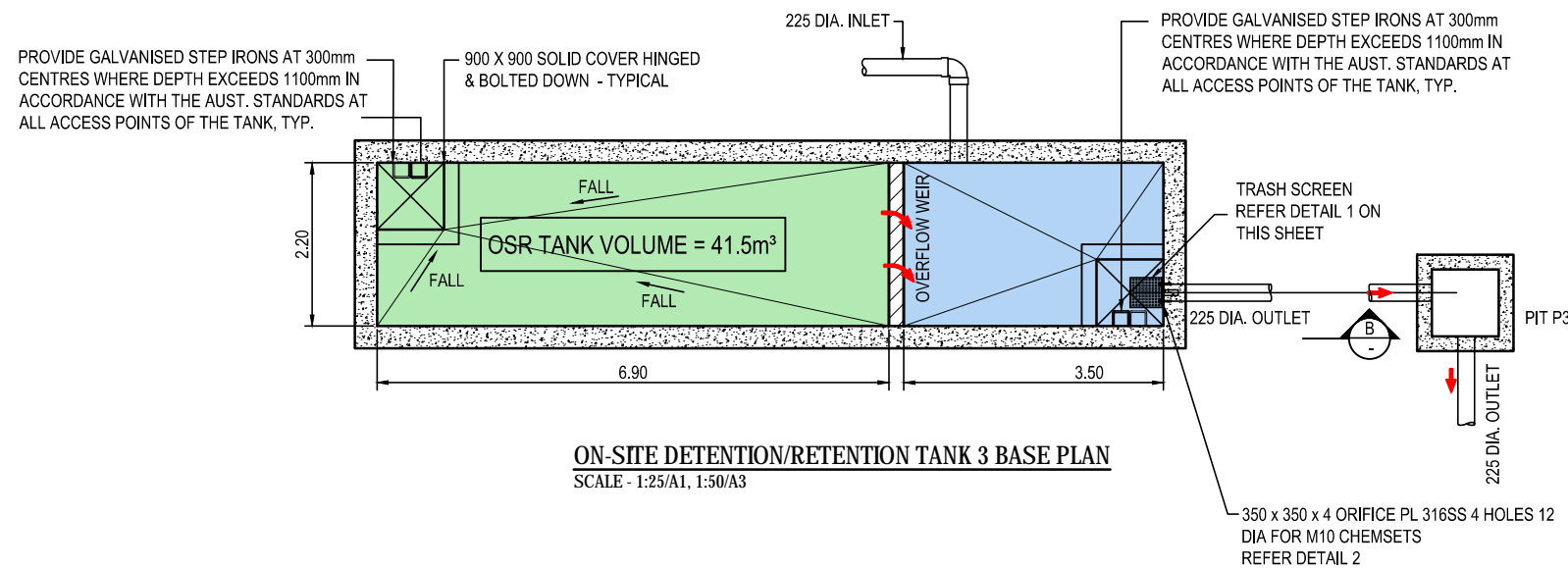
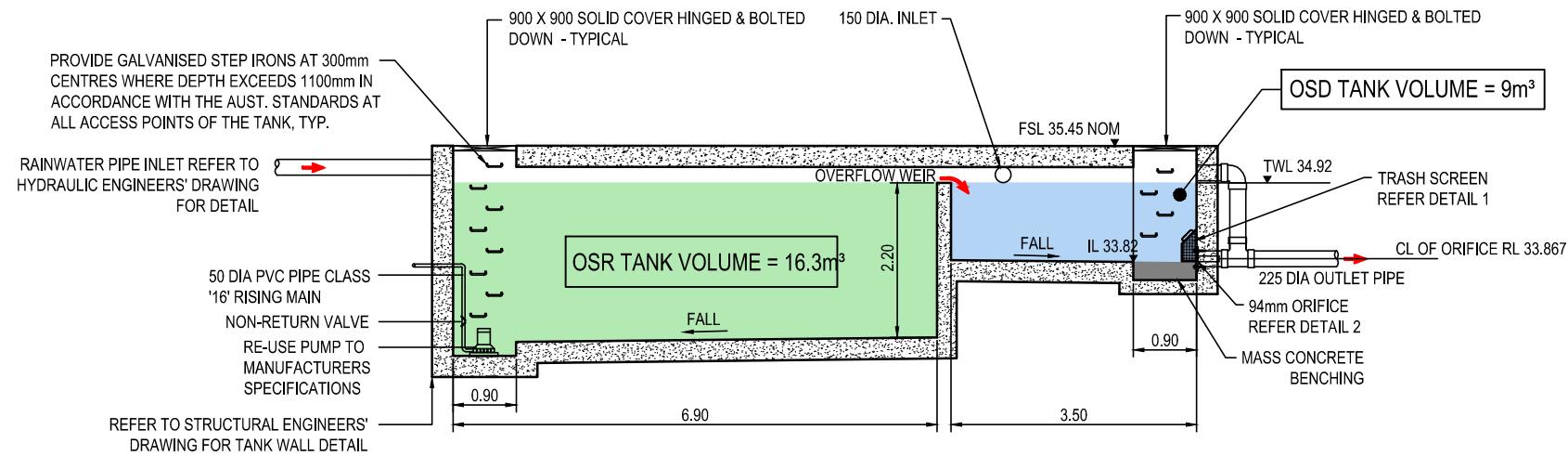
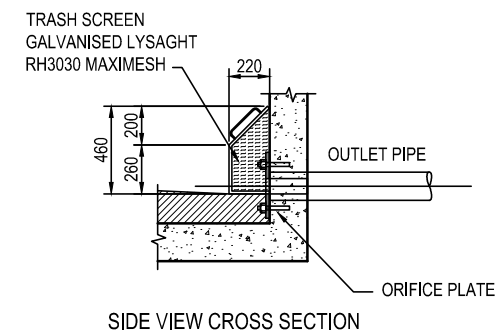
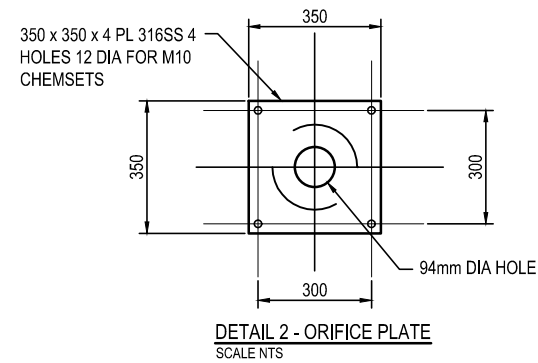
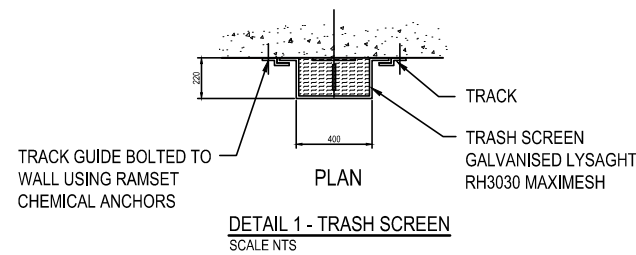
CLIENT	UNIVERSITY OF SYDNEY	ARCHITECT	ALLEN JACK & COTTIER
PROJECT	DARLINGTON ROAD TERRACES MIXED USE DEVELOPMENT		
DRAWN	R.J./C.B.	DRAWING CHECK	REVIEWED
DESIGNED	R.J.	DESIGN REVIEW	DATE
		APPROVED	DATE

TITLE		
STORMWATER MANAGEMENT DETAILS		
SHEET 2		
SCALE	DRAWING No	REV
	C6	A

ORIFICE DISCHARGE CALCULATION - TANK 3

$$Q = C.A. (2gh)^{1/2} \quad PSD = 19l/s$$
$$d = \sqrt{\frac{4.Q}{C.(2gh)^{1/2} \times \pi}} = \sqrt{\frac{4 \times 0.019}{0.6 (2 \times 9.81 \times 1.053)^{1/2} \times 3.14}} = 94mm$$

ORIFICE SIZE = 94mm



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		DATE	DATE

TITLE		STORMWATER MANAGEMENT DETAILS SHEET 3	
SCALE	AS SHOWN	DRAWING No	C7
REV	A		

ORIFICE DISCHARGE CALCULATION - TANK 4

$$Q = C.A. (2gh)^{1/2}$$
$$d = \sqrt{\frac{4.Q}{C.(2gh)^{1/2} \times \pi}} = \sqrt{\frac{4 \times 0.022}{0.6 (2 \times 9.81 \times 2.5)^{1/2} \times 3.14}} = 80\text{mm}$$

ORIFICE SIZE = 80mm

TUBULAR MESH SCREEN
IN ACCESS RISER, TYP.
HEAVY DUTY
SEALED LID, TYP.

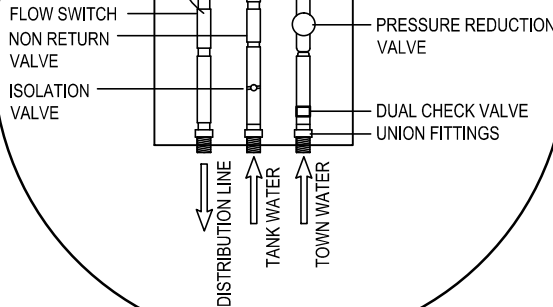
FINAL TANK LEVEL TO BE CONFIRMED ON
SITE AND CO-ORDINATED WITH
LANDSCAPE REQUIREMENTS

RAINWATER INLET
FROM DOWNPIPES.
REFER TO 'FULLY
SEALED ROOF
DRAINAGE SYSTEM'
REFER HYDRAULIC
ENGINEERS DETAIL

WALL MOUNTED
CONTAINMENT
BOX

RL 171.780

ELECTRICAL
CONTROL BOX



STORMWATER OVERFLOW TO
APPROVED STORMWATER
DISCHARGE POINT

OSD CONTROL
PROVIDE 80mm DIA ORIFICE PLATE. FINAL SIZE
OF ORIFICE PLATE SHALL BE VERIFIED BY
JACOBS GROUP (AUSTRALIA) FOLLOWING
CONFIRMATION OF TANK SIZE. REFER DETAIL 2

CL. OF ORIFICE
RL 28.720

BEDDING MATERIAL & EXCAVATION
BACKFILL TO BE IN ACCORDANCE
WITH TANK MANUFACTURER'S
SPECIFICATION

SUBMERSIBLE CONSTANT PRESSURE
PUMP. TO MANUFACTURER'S
SPECIFICATION FINAL DESIGN BY
OTHERS.

TWO (2) x 10,000 litre BELOW GROUND RAINWATER
TANK INSTALLED TO MANUFACTURER'S
SPECIFICATIONS.
TYPE; 'RAINCYCLE TYPE A 10,000L' BELOW GROUND
CONCRETE TANK OR APPROVED EQUAL
(2540mm DIA. x 2540mm HIGH)

DETAIL 1 - BELOW GROUND ON-SITE DETENTION/RAINWATER RE-USE TANK ELEVATION

NOT TO SCALE

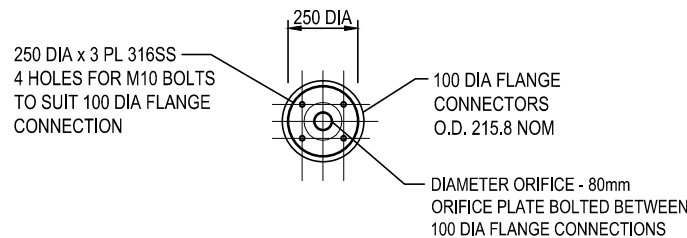
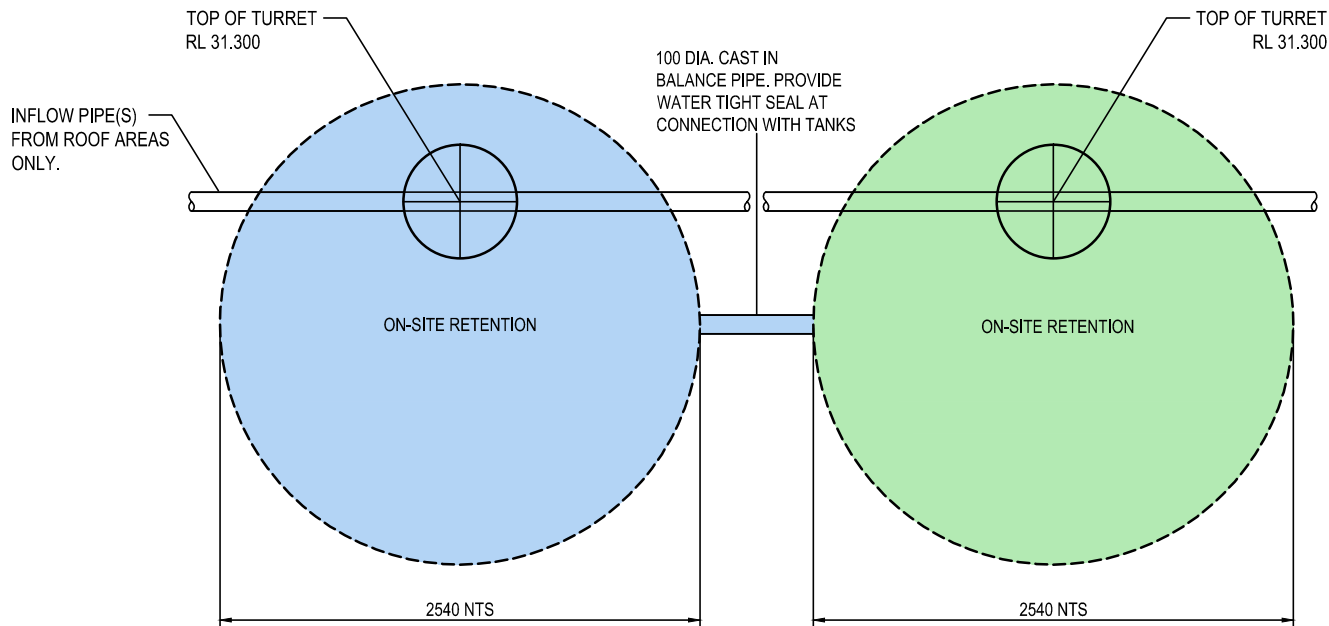
* DIMENSIONS TO BE CONFIRMED WITH MANUFACTURER, VARIATION TO
BE REFERRED TO THE DESIGN ENGINEER FOR VALIDATION



TYPICAL WARNING SIGN

SCALE N.T.S.

* EVERY EXTERNAL SUPPLY OUTLET FROM
RAINWATER RE-USE TANK TO BE LABELED
WITH METALLIC WARNING SIGN



DETAIL 2 - ORIFICE PLATE DETAIL

NTS

ON-SITE DETENTION/RAINWATER RE-USE TANK 4 PLAN

NOT TO SCALE

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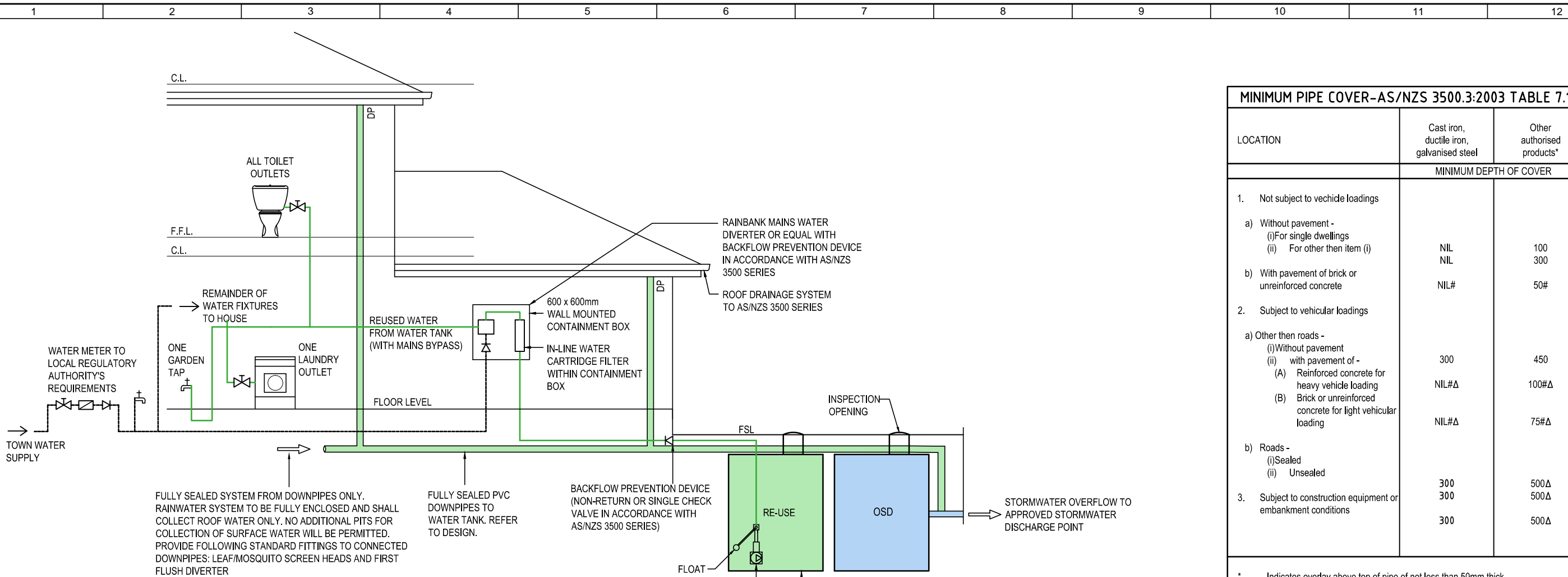
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R.J.			

TITLE		STORMWATER MANAGEMENT DETAILS SHEET 4	
SCALE	DRAWING No	REV	
NTS	C8	A	

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BELOW GROUND DETENTION/RETENTION TANK - SCHEMATIC
LAYOUT
NTS

PIT SCHEDULE				
PIT No.	TYPE	SIZE	TOP GRATE	INVERT
P1	SOLID COVER JUNCTION PIT - 900 ENVIROPOD	900 x 900	39.00	35.46
P2	LD GRATED INLET - 900 ENVIROPOD	900 x 900	35.45	32.52
P3	LD GRATED INLET - 900 ENVIROPOD	450 x 450	35.45	33.79
K1	1.8m EKI	900 x 600	36.03	34.70
K2	1.8m EKI	900 x 600	33.47	31.94
K3	SOLID COVER JUNCTION PIT	900 x 600	33.55	31.57
K4	SOLID COVER JUNCTION PIT	900 x 600	32.60	30.30
K5	1.8m EKI	900 x 600	31.98	30.12
K6	1.8m EKI	900 x 600	31.68	29.66
K7	1.8m EKI	900 x 600	29.57	29.30
PROPOSED PIT SURFACE LEVELS AND INVERTS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION				

MINIMUM PIPE COVER-AS/NZS 3500.3:2003 TABLE 7.1

LOCATION	Cast iron, ductile iron, galvanised steel	Other authorised products*
MINIMUM DEPTH OF COVER		
1. Not subject to vehicle loadings		
a) Without pavement - (i) For single dwellings (ii) For other than item (i)	NIL NIL	100 300
b) With pavement of brick or unreinforced concrete	NIL#	50#
2. Subject to vehicular loadings		
a) Other than roads - (i) Without pavement (ii) with pavement of - (A) Reinforced concrete for heavy vehicle loading (B) Brick or unreinforced concrete for light vehicular loading	300 NIL#Δ NIL#Δ	450 100#Δ 75#Δ
b) Roads - (i) Sealed (ii) Unsealed	300 300	500Δ 500Δ
3. Subject to construction equipment or embankment conditions	300	500Δ

* Indicates overlay above top of pipe of not less than 50mm thick
Below underside of pavement
Δ Subject to compliance with AS1762, AS2033, AS/NZS2566.1, AS3725, AS4060

MINIMUM INTERNAL DIMENSIONS FOR STORMWATER AND INLET PITS - AS/NZS 3500.3:2003 TABLE 8.2

DEPTH TO INVERT OF OUTLET	MINIMUM INTERNAL DIMENSION (mm)		
	RECTANGULAR		CIRCULAR
	WIDTH	LENGTH	DIAMETER
≤ 600	450	450	600
> 600 ≤ 900	600	600	900
> 900 ≤ 1200	600	900	1000
> 1200	900	900	1000

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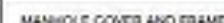
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		DATE	DATE

TITLE	STORMWATER MANAGEMENT DETAILS SHEET 5		
SCALE	NTS	DRAWING No	C9
REV	A		



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EROSION & SEDIMENT LEGEND

1

INSTALL SEDIMENT FENCING REFER DETAIL SD 6-8, SHEET C13. WHERE UNDER CANOPY AREAS OF TREES TO BE RETAINED, FENCING NOT TO BE DUG INTO THE GROUND BUT INSTEAD ATTACHED TO GROUND BY TIGHTLY PACKED SANDBAGS.

2

NOTE: PROVIDE PROTECTION TO DRAINAGE PITS FOLLOWING PIT INSTALLATION. REFER DETAIL SD6-9 ON SHEET C13

3

SITE ACCESS PROVIDE LARGE COARSE DIA AGGREGATE OR RECYCLED CONCRETE. IN ACCORDANCE WITH DETAIL SD 6-14, SHEET C13

4

STOCKPILE WITH SED FENCE IN ACCORDANCE WITH DETAIL SD 4-1, REFER TO SHEET C13

5

WASTE STORAGE AREA PROVIDE SOLID AND LIQUID WASTE RECEPTACLE BINS

6

BARRIER FENCING OR UTILISE EXISTING BOUNDARY FENCE

7

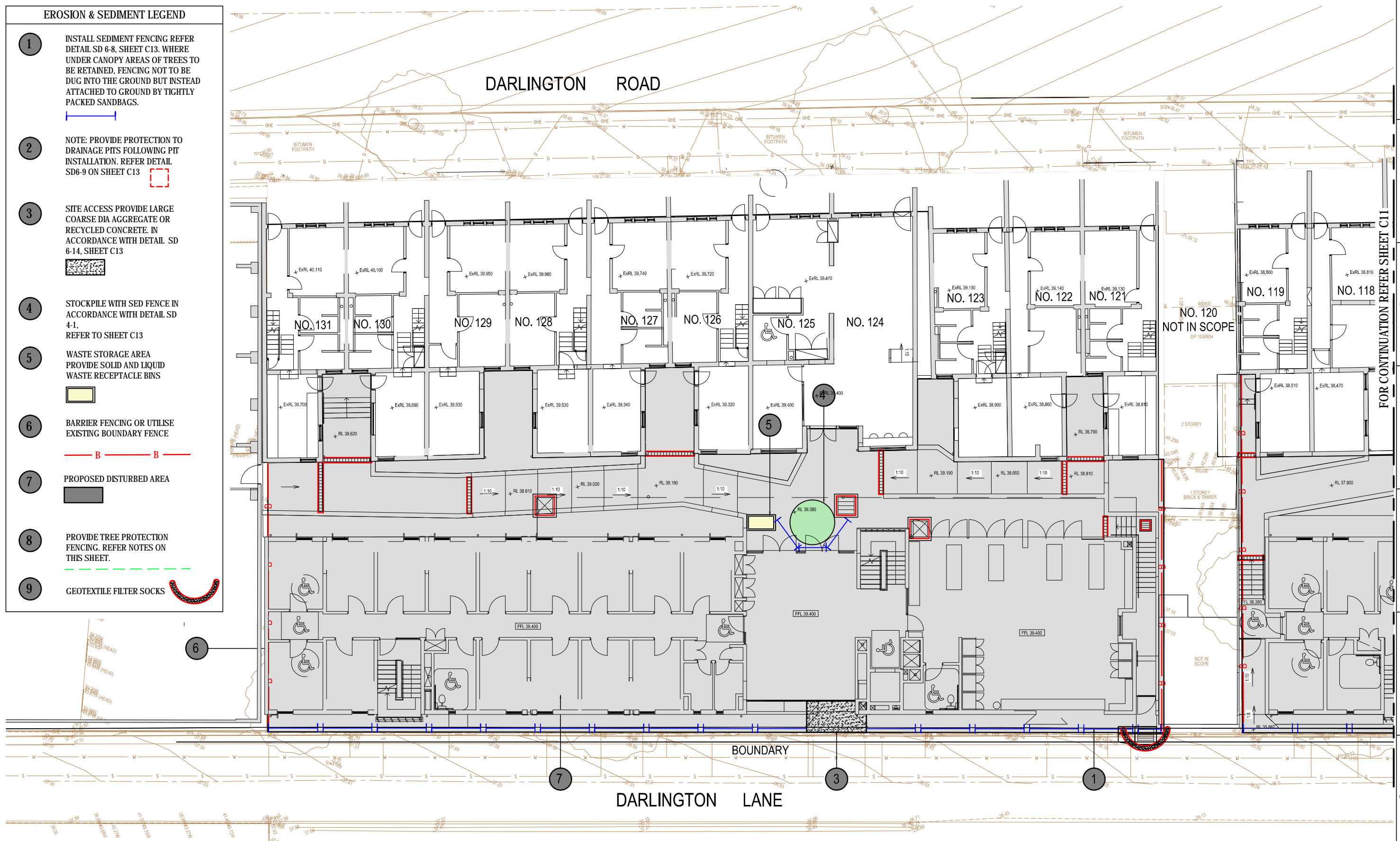
PROPOSED DISTURBED AREA

8

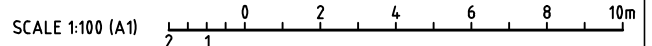
PROVIDE TREE PROTECTION FENCING. REFER NOTES ON THIS SHEET.

9

GEOTEXTILE FILTER SOCKS

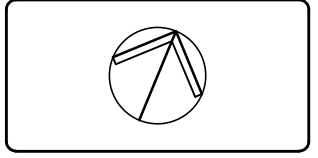


EROSION & SEDIMENT CONTROL PLAN
SCALE 1:100



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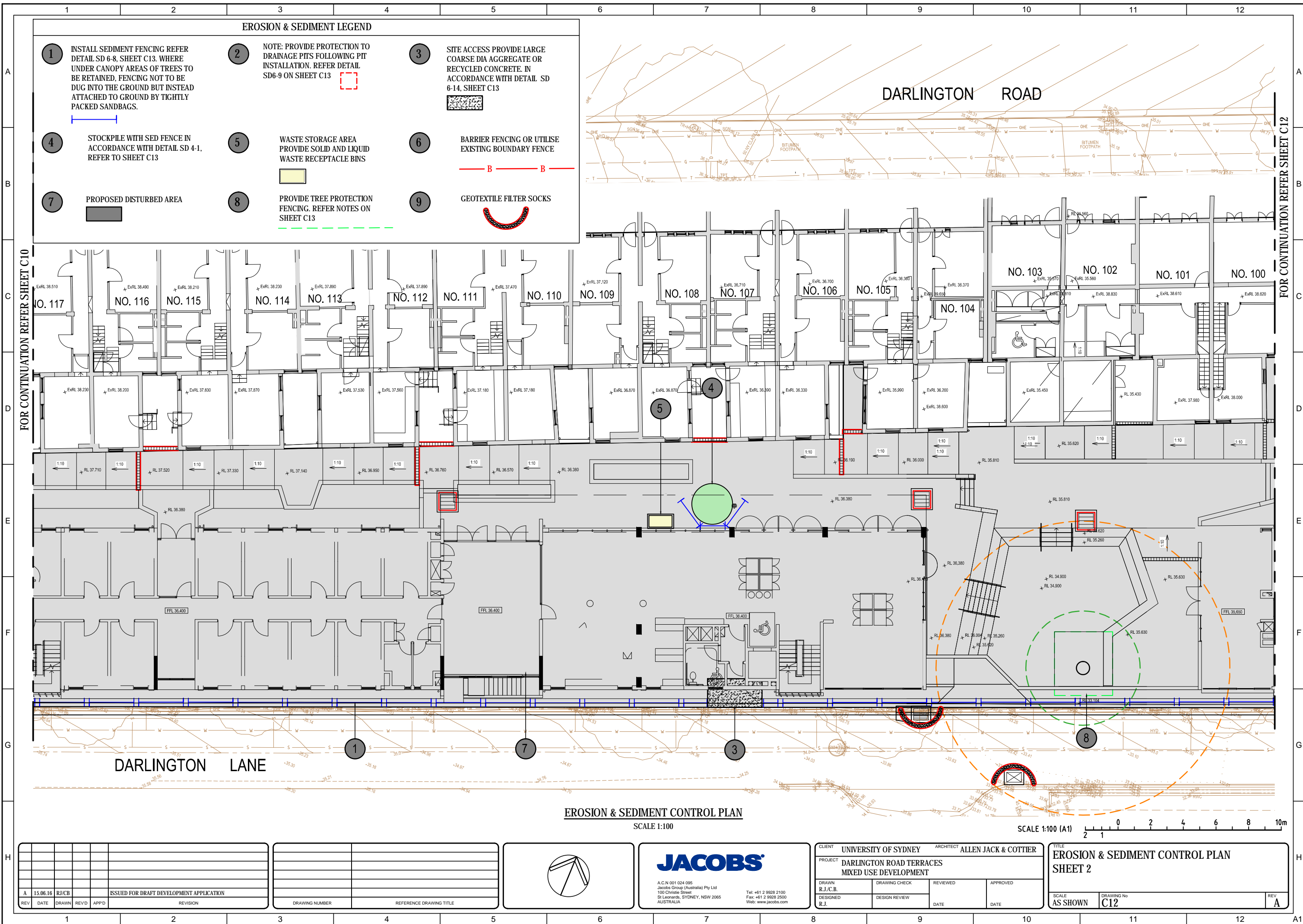
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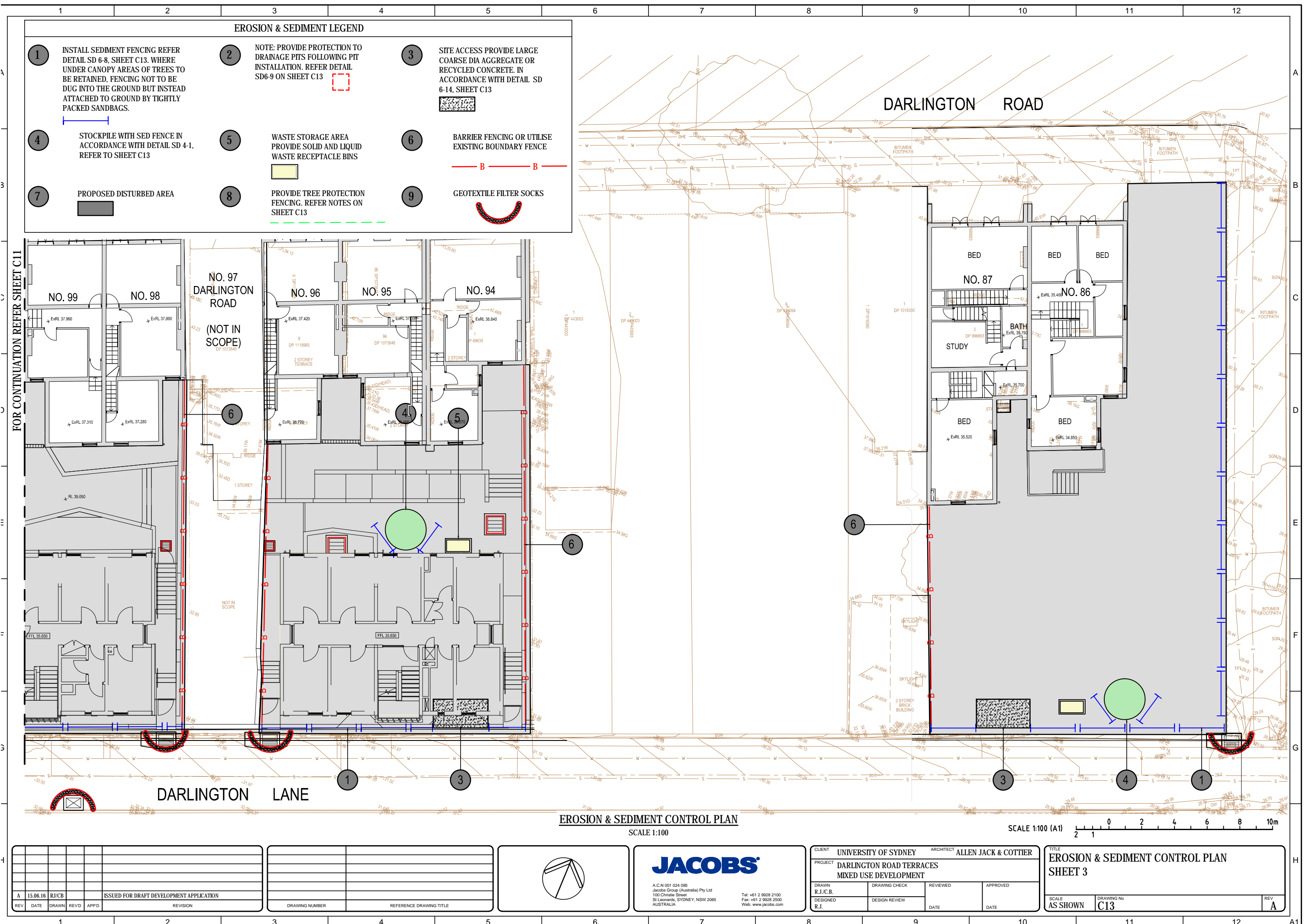
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TITLE		
EROSION & SEDIMENT CONTROL PLAN NOTES & DETAILS - SHEET 1		
SCALE	DRAWING No C14	REV A

A

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C

- D

1. THE TREE PROTECTION FENCE SHALL BE A MINIMUM OF

- AND INCLUDING CONTACT DETAILS OF THE SITE

11. **RESEARCH DESIGN**—The study was a descriptive, cross-sectional study. The study was conducted in the Department of Health Services, University of California, San Francisco, from 1997 to 1999. The study was approved by the Institutional Review Boards at the University of California, San Francisco, and the University of California, Los Angeles.

- ### 8. THE SITE SUPERINTENDENT WILL KEEP A LOGBOOK

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- OF HAZARD AREAS INCLUDING AREAS OF HIGH VELOCITY

1.2. **PLACEMENT OF LUMINOUS SIGNALS FOR COLLISION-AVOIDANCE SYSTEMS: A CASE STUDY**

- ## 17. ALL WATERWAYS, DRAINS, SPILLWAYS AND THEIR

1. **THE STATE OF TEXAS, COUNTY OF DALLAS, ss. I, _____, Clerk of the County Court, do hereby certify that the foregoing is a true and correct copy of the original as the same appears in the records of the County Court of Dallas County, Texas.**

- MONITORED TO ENSURE THAT WATER IS NOT POLLUTED

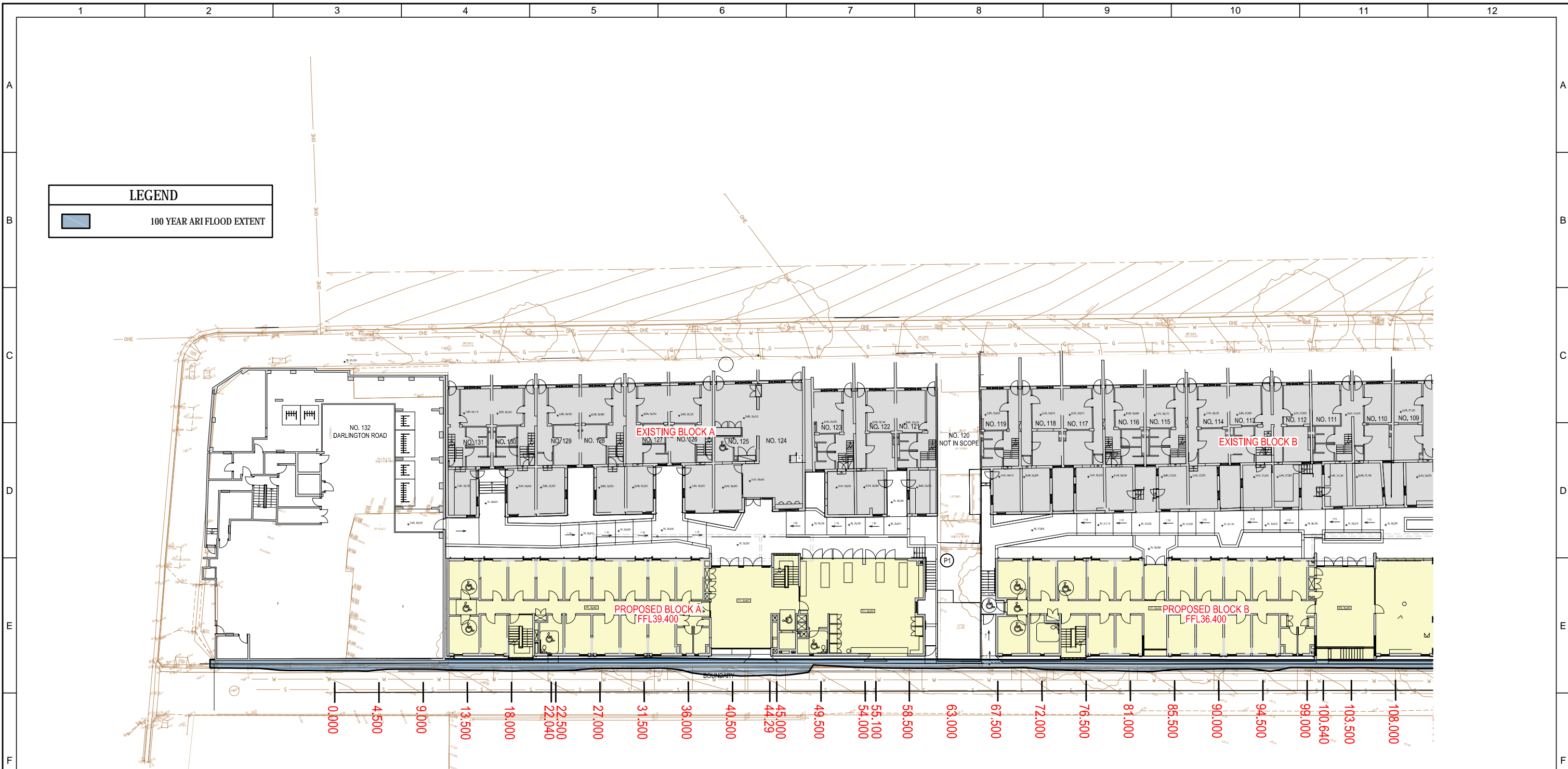
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PROJECT DABINGTON ROAD TERRACES

EROSION & SEDIMENT CONTROL PLAN



100 YEAR ARI FLOOD EXTENT PLAN
SCALE 1:200

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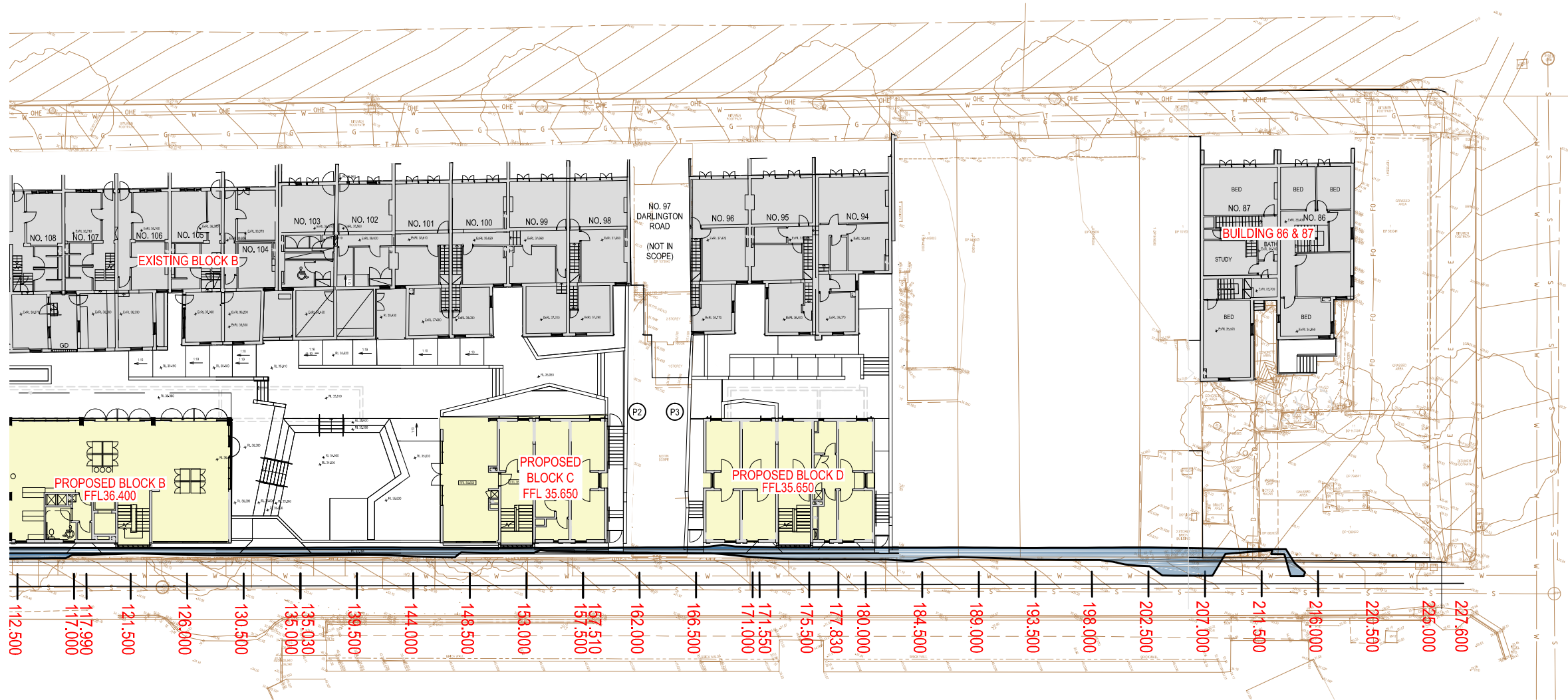
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R.J./C.B.			
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100 YEAR ARI FLOOD EXTENT SHEET 1	
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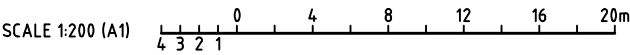
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LEGEND

100 YEAR ARI FLOOD EXTENT



100 YEAR ARI FLOOD EXTENT PLAN
SCALE 1:200



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R.J.C.B.			
DESIGNED	DESIGN REVIEW	DATE	DATE
R.J.			

TITLE	
100 YEAR ARI FLOOD EXTENT SHEET 2	
SCALE	DRAWING No
AS SHOWN	C17
REV	A

PROPOSED RESIDENTIAL DEVELOPMENT

No. 86-131 DARLINGTON ROAD, DARLINGTON

STORMWATER QUALITY REPORT

CONTENTS:

COVER SHEET

1.0 INTRODUCTION

2.0 STUDY METHODOLOGY

3.0 RAINFALL AND EVAPOTRANSPIRATION DATA

4.0 STORMWATER QUALITY MODELLING

4.1 GENERAL

4.2 RAINFALL/RUNOFF AND EVAPOTRANSPIRATION

4.3 CATCHMENT DEFINITION

5.0 MUSIC MODEL

5.1 WATER QUALITY PARAMETERS

5.2 STORMWATER TREATMENT

5.3 MODEL DEFINITION

6.0 RESULTS AND CONCLUSION

7.0 PRE-DEVELOPMENT & POST-DEVELOPMENT MUSIC MODEL

SHEET No.

1.01

1.02

1.02

1.02

1.02

1.03

1.03

1.03

1.04

1.04

1.05

LOCALITY MAP



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		DATE	DATE

TITLE	STORMWATER QUALITY REPORT SHEET 1		
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B	<div><div><div><div><div>1. INTRODUCTION</div><div>A CATCHMENT BASED WATER QUALITY MODEL WAS DEVELOPED TO INVESTIGATE STORMWATER RUNOFF QUALITY FROM THE SUBJECT SITE IN ACCORDANCE WITH SYDNEY CITY COUNCIL'S "DCP 2012 - WATER AND FLOOD MANAGEMENT." THE REQUIREMENTS ARE TABLED FOLLOWING:</div><table><tr><td>POLLUTANT</td><td>% RETENTION OF THE ANNUAL AVERAGE LOAD (kg/ha/yr)</td></tr><tr><td>GROSS POLLUTANT</td><td>90%</td></tr><tr><td>TOTAL SUSPENDED SOLIDS</td><td>85%</td></tr><tr><td>TOTAL PHOSPHORUS</td><td>65%</td></tr><tr><td>TOTAL NITROGEN</td><td>45%</td></tr></table></div><div><div>2. STUDY METHODOLOGY</div><div>THE OBJECTIVES OF THIS REPORT ARE TO:</div><ul style="list-style-type: none">ASSESS THE EXISTING RUNOFF QUALITY ON THE PRE-DEVELOPMENT SCENARIO AND IDENTIFY STORMWATER QUALITY CONTROLS LIKELY TO IMPACT ON RUNOFF QUALITY.ASSESS THE STORMWATER QUALITY ON THE POST DEVELOPMENT SCENARIO AND PROVIDE RECOMMENDATIONS TO ENSURE THE DEVELOPMENT MEETS FLOOD RUNOFF QUALITY STANDARDS WHERE REQUIRED.<div>THE REPORT IS BASED ON THE APPLICATION OF MUSIC (MODEL FOR URBAN STORMWATER IMPROVEMENT CONCEPTUALISATION) MODELLING PROGRAMS:</div><ul style="list-style-type: none">A STORMWATER QUALITY MODEL TO CONVERT RAINFALL AND EVAPOTRANSPIRATION ON THE CATCHMENT INTO RUNOFF.ESTIMATE STORMWATER FLOW AND POLLUTION GENERATION BY SIMULATING THE PERFORMANCE OF STORMWATER TREATMENT DEVICES INDIVIDUALLY AND AS PART OF A TREATMENT TRAIN.<div>THE MODEL DEFINES WATER QUALITY PROFILES FOR THE PRE AND POST DEVELOPED SCENARIOS. THE POST DEVELOPED MODEL INCLUDES POLLUTANT REDUCTION PERCENTAGES, WHICH REFLECT WORKS THAT ARE ESSENTIAL TO MEET THE RELEVANT REQUIREMENTS PRESCRIBED BY COUNCIL FOR A PROJECT OF THIS NATURE.</div></div></div><div><div>3. RAINFALL AND EVAPOTRANSPIRATION DATA</div><div>FOR THE PURPOSE OF THIS REPORT DATA HAS BEEN OBTAINED FROM NUMEROUS SOURCES, INCLUDING eWATER PLUVIOGRAPH RAINFALL DATA, BUREAU OF METEOROLOGY, ETC. THIS DATA IS REQUIRED FOR INPUT INTO THE STORMWATER QUALITY ASSESSMENT MODELS.</div><div>4. STORMWATER QUALITY MODELLING</div><div>4.1 GENERAL</div><div>THE FOLLOWING PARAMETERS WERE ASSESSED IN THE HYDROLOGICAL MODELLING ASSOCIATED WITH THE CATCHMENT.</div><ul style="list-style-type: none">RAINFALL/RUNOFF AND EVAPOTRANSPIRATION.SUB CATCHMENT DIVERSIONS.LAND USE (PERVIOUS AND IMPERVIOUS)<div>4.2 RAINFALL/RUNOFF AND EVAPOTRANSPIRATION</div><div>THE DEFAULT MONTHLY AVERAGE POTENTIAL EVAPOTRANSPIRATION DATA IN MUSIC MODEL OF SYDNEY WAS UTILISED IN THIS STUDY IN THE ABSENCE OF THE LOCAL DATA.</div><div>THE DETAILS ARE SUMMARISED IN TABLE 4.1 AND 4.2 FOLLOWING:</div><table><tr><th colspan="4">TABLE 4.1 - DETAILS OF DAILY RAINFALL DATA</th></tr><tr><th>STATION</th><th>NAME</th><th>PERIOD</th><th>TIMESTEP</th></tr><tr><td>066062</td><td>SYDNEY OBSERVATORY HILL</td><td>05/01/1962-31/12/1966</td><td>6 min</td></tr></table><table><tr><th colspan="6">TABLE 4.2 - SUMMARY OF POTENTIAL EVAPOTRANSPIRATION (PET)</th></tr><tr><th>JAN</th><th>FEB</th><th>MAR</th><th>APR</th><th>MAY</th><th>JUN</th></tr><tr><td>180.11</td><td>134.96</td><td>128.03</td><td>84.90</td><td>57.97</td><td>42.90</td></tr><tr><th>JUL</th><th>AUG</th><th>SEP</th><th>OCT</th><th>NOV</th><th>DEC</th></tr><tr><td>43.09</td><td>57.97</td><td>87.90</td><td>127.10</td><td>152.10</td><td>163.06</td></tr></table></div></div></div>												POLLUTANT	% RETENTION OF THE ANNUAL AVERAGE LOAD (kg/ha/yr)	GROSS POLLUTANT	90%	TOTAL SUSPENDED SOLIDS	85%	TOTAL PHOSPHORUS	65%	TOTAL NITROGEN	45%	TABLE 4.1 - DETAILS OF DAILY RAINFALL DATA				STATION	NAME	PERIOD	TIMESTEP	066062	SYDNEY OBSERVATORY HILL	05/01/1962-31/12/1966	6 min	TABLE 4.2 - SUMMARY OF POTENTIAL EVAPOTRANSPIRATION (PET)						JAN	FEB	MAR	APR	MAY	JUN	180.11	134.96	128.03	84.90	57.97	42.90	JUL	AUG	SEP	OCT	NOV	DEC	43.09	57.97	87.90	127.10	152.10	163.06
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TABLE 5.2 - ADOPTED MUSIC WATER QUALITY PARAMETERS

LAND-USE CATEGORY		Log ₁₀ TSS (mg/L)		Log ₁₀ TP (mg/L)		Log ₁₀ TN (mg/L)	
		STORM FLOW	BASE FLOW	STORM FLOW	BASE FLOW	STORM FLOW	BASE FLOW
RESIDENTIAL	MEAN	2.15	1.20	-0.60	-0.85	0.30	0.11
	STD DEV	0.32	0.17	0.25	0.19	0.19	0.12
ROOFS	MEAN	1.30	N/A	-0.89	N/A	0.30	N/A
	STD DEV	0.32	N/A	0.25	N/A	0.19	N/A

Properties of Rainwater Tank A

Location: Rainwater Tank A

Inlet Properties

Low Flow Bypass (cubic metres per sec) 0.000000

High Flow Bypass (cubic metres per sec) 100.000000

Individual Tank Properties

Number of Tanks 1

Total Tank Properties

Storage Properties

Volume below overflow pipe (kL) 41.50

Depth above overflow (metres) 0.20

Surface Area (square metres) 36.9

Initial Volume (kL) 0.00

Outlet Properties

Overflow Pipe Diameter (mm) 225

Use Custom Outflow and Storage Relationship

Define Custom Outflow and Storage Not Defined

Re-use... Fluxes... Notes... More

Cancel Back Finish

Properties of Detention Basin A

Location: Detention Basin A

Inlet Properties

Low Flow Bypass (cubic metres per sec) 0.000000

High Flow Bypass (cubic metres per sec) 100.000000

Storage Properties

Surface Area (square metres) 10.9

Extended Detention Depth (metres) 2.20

Exfiltration Rate (mm/hr) 0.00

Evaporative Loss as % of PET 100.00

Outlet Properties

Low Flow Pipe Diameter (mm) 134

Overflow Weir Width (metres) 0.9

Natural Detention Time (hrs) 0.107

Use Custom Outflow and Storage Relationship

Define Custom Outflow and Storage Not Defined

Re-use... Fluxes... Notes... More

Cancel Back Finish

FIGURE 5.1 OSD/OSR TANK PARAMETERS

5.2 STORMWATER TREATMENT MEASURES

THE STORMWATER TREATMENT MEASURES THAT WERE

ASSESSED USING MUSIC INCLUDED FOUR OSD/OSR TANKS FOR

FUTURE DEVELOPMENT AND FOUR ENVIROPODS (GROSS

POLLUTANT TRAPS). THE CONCEPTUAL PLAN FOR THE PROPERTY

IS SHOWN IN 1.05. THE PROPERTIES OF THE ADOPTED DEVICES

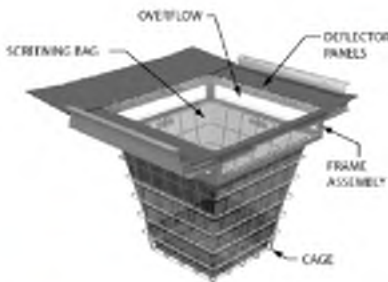
ARE LISTED IN TABLE 5.3, FIGURE 5.1 AND TABLE 5.4 FOLLOWING:

TABLE 5.3 - RAINWATER TANK AND OSD SIZES

LOT NUMBER	OSD VOLUME	OSR VOLUME
BLOCK A	24 KL	41.5 KL
BLOCK B & C	48 KL	72 KL
BLOCK D	9 KL	16.3 KL
BUILDING 86 & 87	10 KL	7 KL

EnviroPod
Cost-effective, Easily Maintained Catch Basin Insert

The EnviroPod™ is an effective best management practice (BMP) that removes a significant portion of trash, debris, and other pollutants from urban runoff. This catch basin insert can be installed in either a curb inlet or drop-in catch basin. With several mesh screen sizes and effective oil-absorbent media available, it can be customized to meet site-specific requirements. The EnviroPod is effective as a pretreatment device in a treatment train, and is often the most practical solution for retrofits.



EnviroPod Benefits

- Captures trash, debris, and other pollutants as runoff enters the storm drain system
- Constructed for easy access and maintenance
- Divertes high flows during peak storm events to prevent flooding
- Fits curb inlet and flat-grade catch basins
- Adjustable frame allows fine-tuning during installation

DETAIL OF ENVIROPOD

TABLE 5.4 - ENVIROPOD PARAMETERS

POLLUTANT	REMOVAL EFFICIENCY
TOTAL SUSPENDED SOLIDS	46%
TOTAL NITROGEN	79%
TOTAL PHOSPHORUS	70%
GROSS POLLUTANTS	100%

5.3 MODEL DEFINITION

THE MODEL LAYOUT FOR THE PRE AND POST DEVELOPED

SCENARIOS IS DEPICTED ON PLAN 1.05.

6. RESULTS & CONCLUSION

BASED ON THE FOREGOING THE PROPOSED NUTRIENT CONTROL

COMPRISING ENVIROPOD MEASURES ACHIEVE THE REQUIRED

NUTRIENT REMOVAL TARGET LEVELS. THE RESULTS OF MUSIC

MODELLING ARE SUMMARISED IN TABLE 6.1 FOLLOWING

TABLE 6.1 - SUMMARY OF MUSIC RESULTS

PARAMETER	SOURCE RUNOFF	DISCHARGE FROM SITE	REDUCTION
PRE-DEVELOPMENT			
FLOW (ML/y)	5.43	5.43	0%
TSS (kg/y)	966	966	0%
TP (kg/y)	1.59	1.59	0%
TN (kg/y)	11.8	11.8	0%
GROSS POLLUTANTS (kg/y)	131	131	0%
POST-DEVELOPMENT			
FLOW (ML/y)	5.86	2.99	49%
TSS (kg/y)	270	40	85.2%
TP (kg/y)	1	0.322	67.8%
TN (kg/y)	12.7	4.88	61.6%
GROSS POLLUTANTS (kg/y)	140	0	100%

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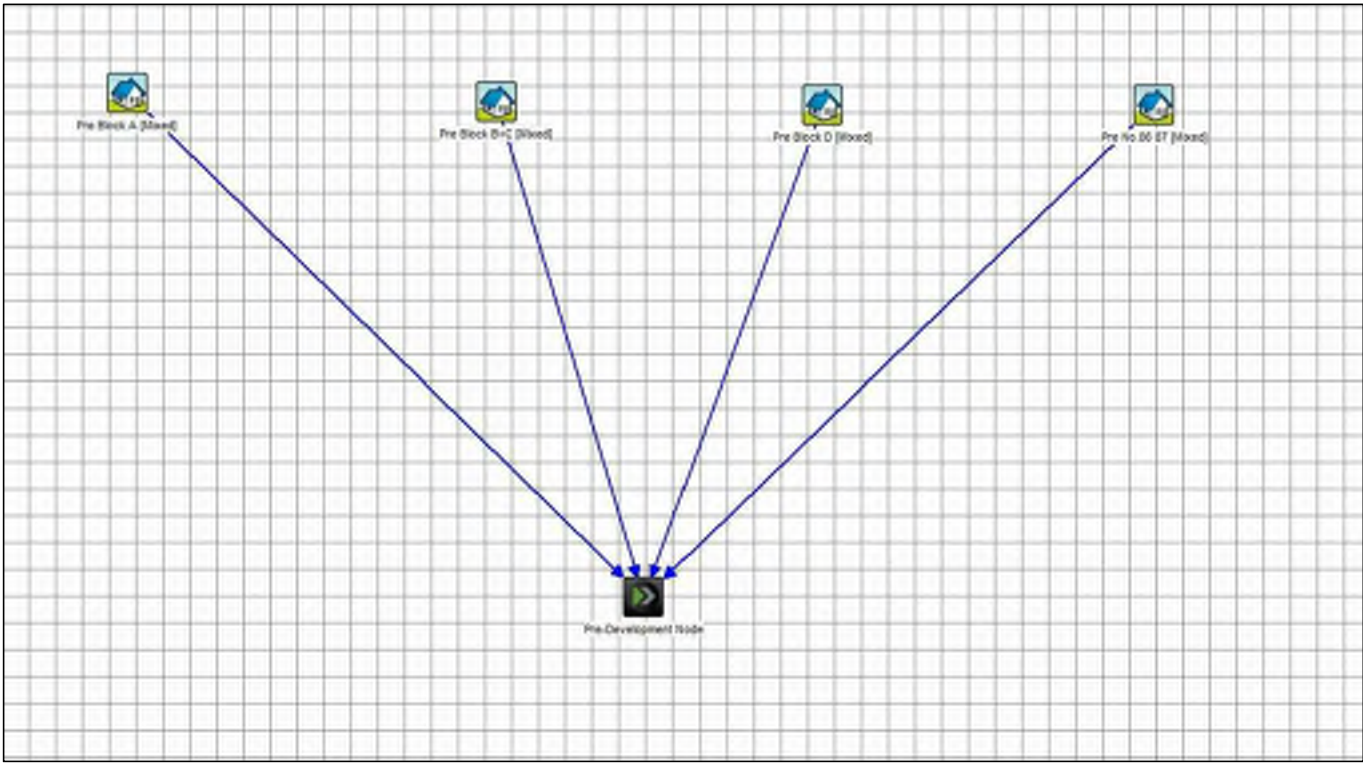
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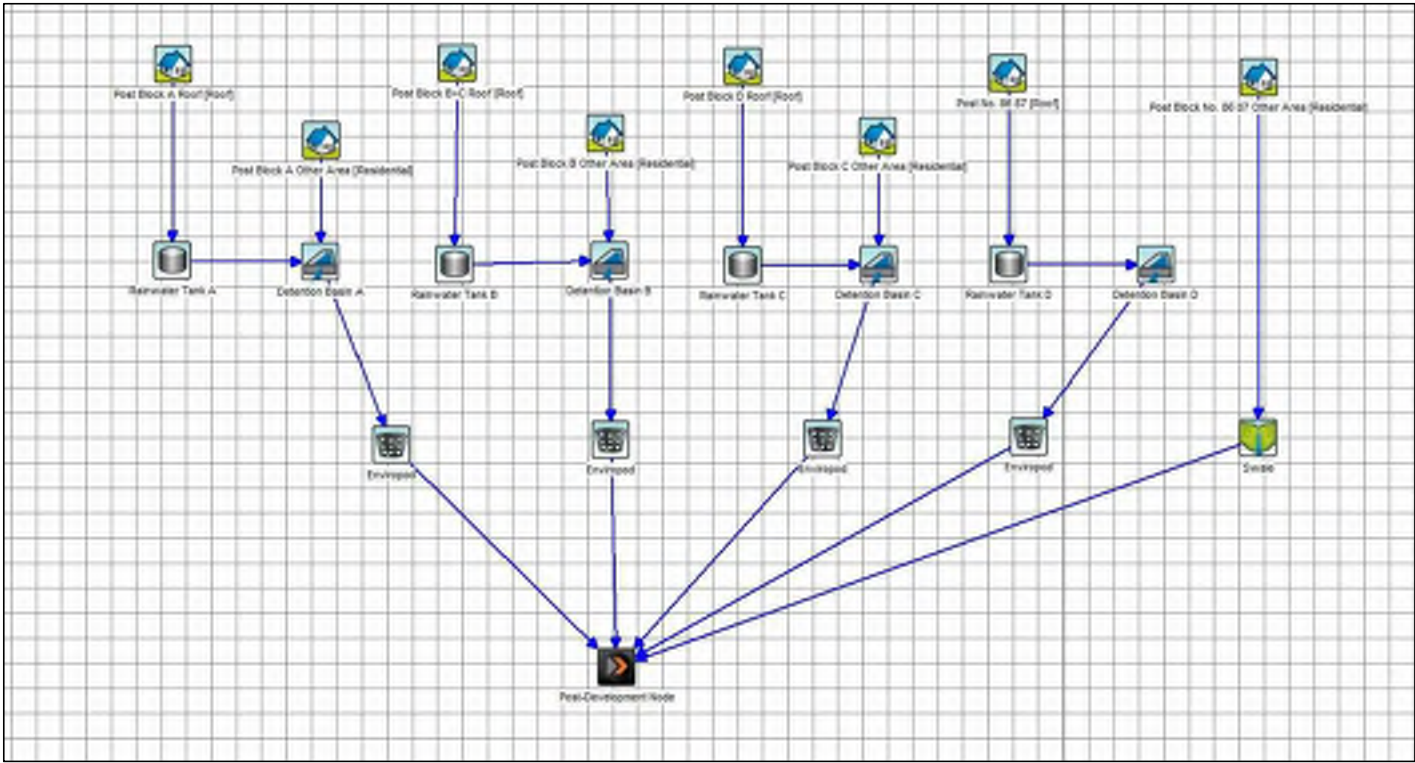
CLIENT	UNIVERSITY OF SYDNEY	ARCHITECT	ALLEN JACK & COTTIER
PROJECT	DARLINGTON ROAD TERRACES MIXED USE DEVELOPMENT		
DRAWN	R.J./C.B.	DRAWING CHECK	REVIEWED
DESIGNED	R.J.	DESIGN REVIEW	APPROVED
		DATE	DATE

TITLE			
STORMWATER QUALITY REPORT SHEET 4			
SCALE	DRAWING No	REV	
	Q4	A	

7. PRE DEVELOPMENT AND POST DEVELOPMENT MODLE



PRE-DEVELOPMENT MUSIC MODEL
SCALE - NTS



POST-DEVELOPMENT MUSIC MODEL
SCALE - NTS

REV	DATE	DRAWN	REVD	APPD	REVISION
A	15.06.16	RJ/CB			ISSUED FOR DRAFT DEVELOPMENT APPLICATION

DRAWING NUMBER	REFERENCE DRAWING TITLE

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DRAWN	R.J./C.B.	DRAWING CHECK	
DESIGNED	R.J.	DESIGN REVIEW	
		REVIEWED	APPROVED
		DATE	DATE

TITLE		STORMWATER QUALITY REPORT SHEET 5	
SCALE	DRAWING No	REV	
	Q5	A	