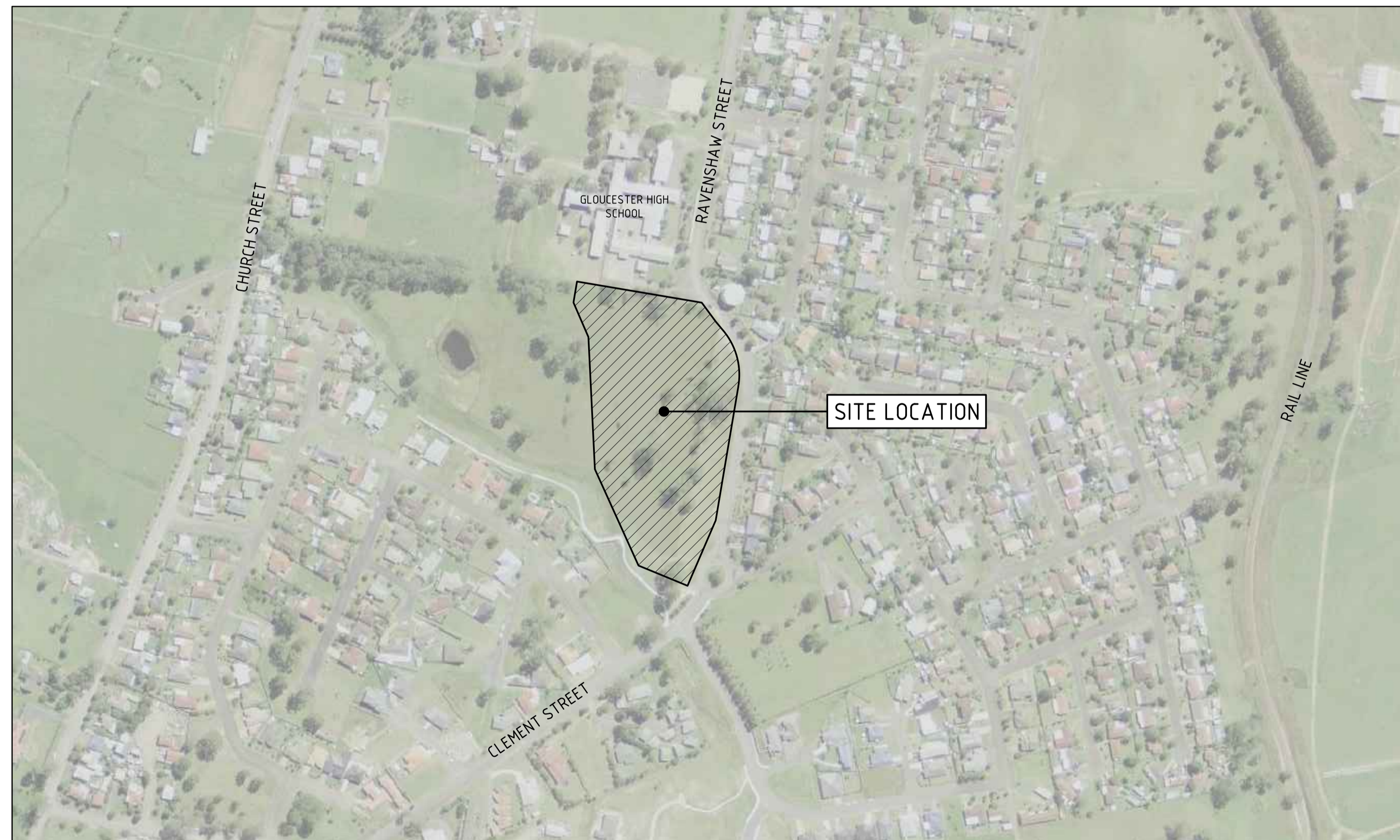


# GLOUCESTER RACF AND ILU CLEMENT STREET, GLOUCESTER CIVIL WORK DRAWINGS



## DRAWING SCHEDULE

DRG No.	DRAWING TITLE
DA-C01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
DA-C02	CONCEPT SEDIMENT AND EROSION CONTROL PLAN
DA-C06	CONCEPT STORMWATER AND GRADING PLAN
DA-C07	TYPICAL SECTIONS AND DETAILS



LOCALITY PLAN

SOURCE: NEARMAPS

DRAWN: R. GRIEVE  
DESIGNED: S. GROFT  
JOB MANAGER: C. PIPER  
VERIFIER:



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1	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	04.05.18
2	ISSUED FOR APPROVAL	RG	CP	SC	11/05/18

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PROJECT

**GLOUCESTER RACF AND ILU  
CLEMENT STREET, GLOUCESTER**

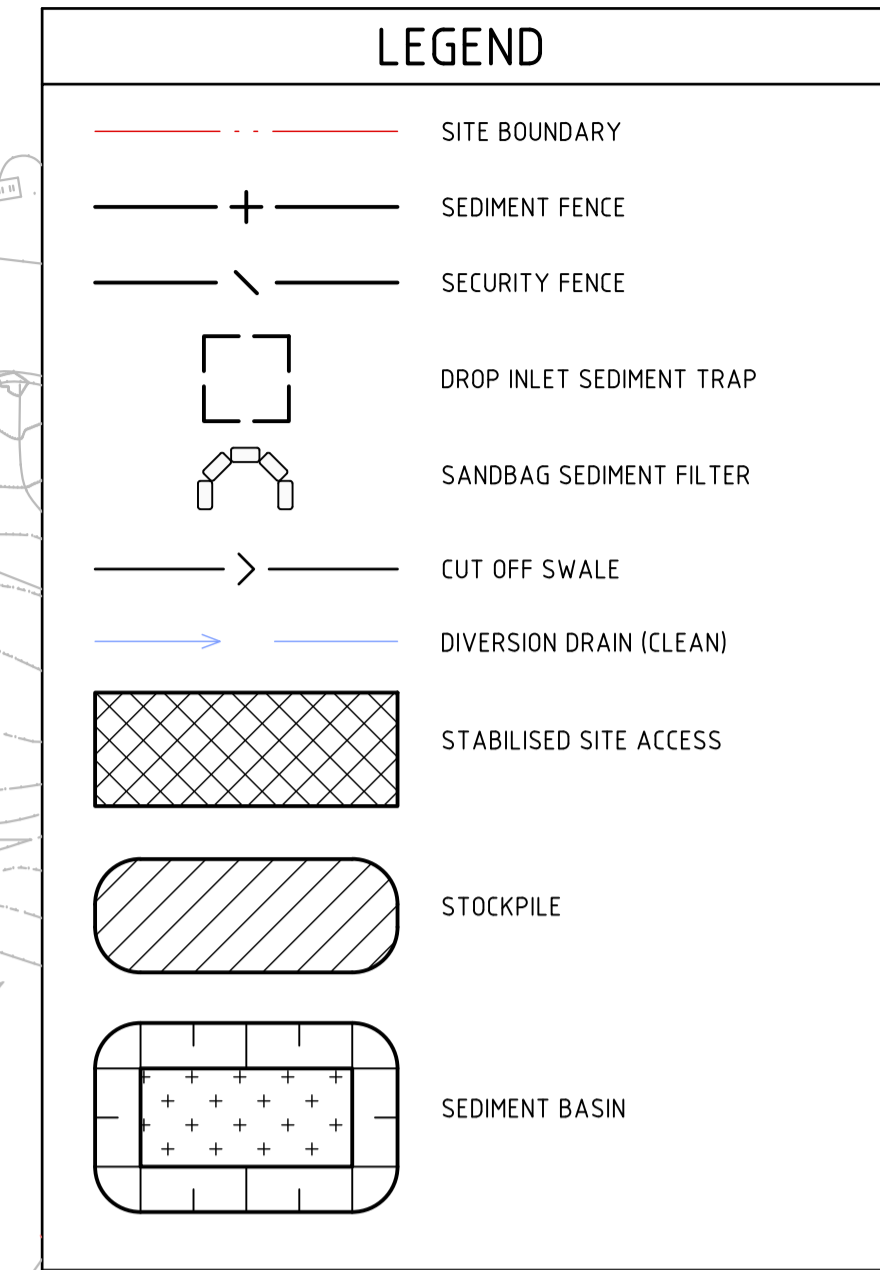
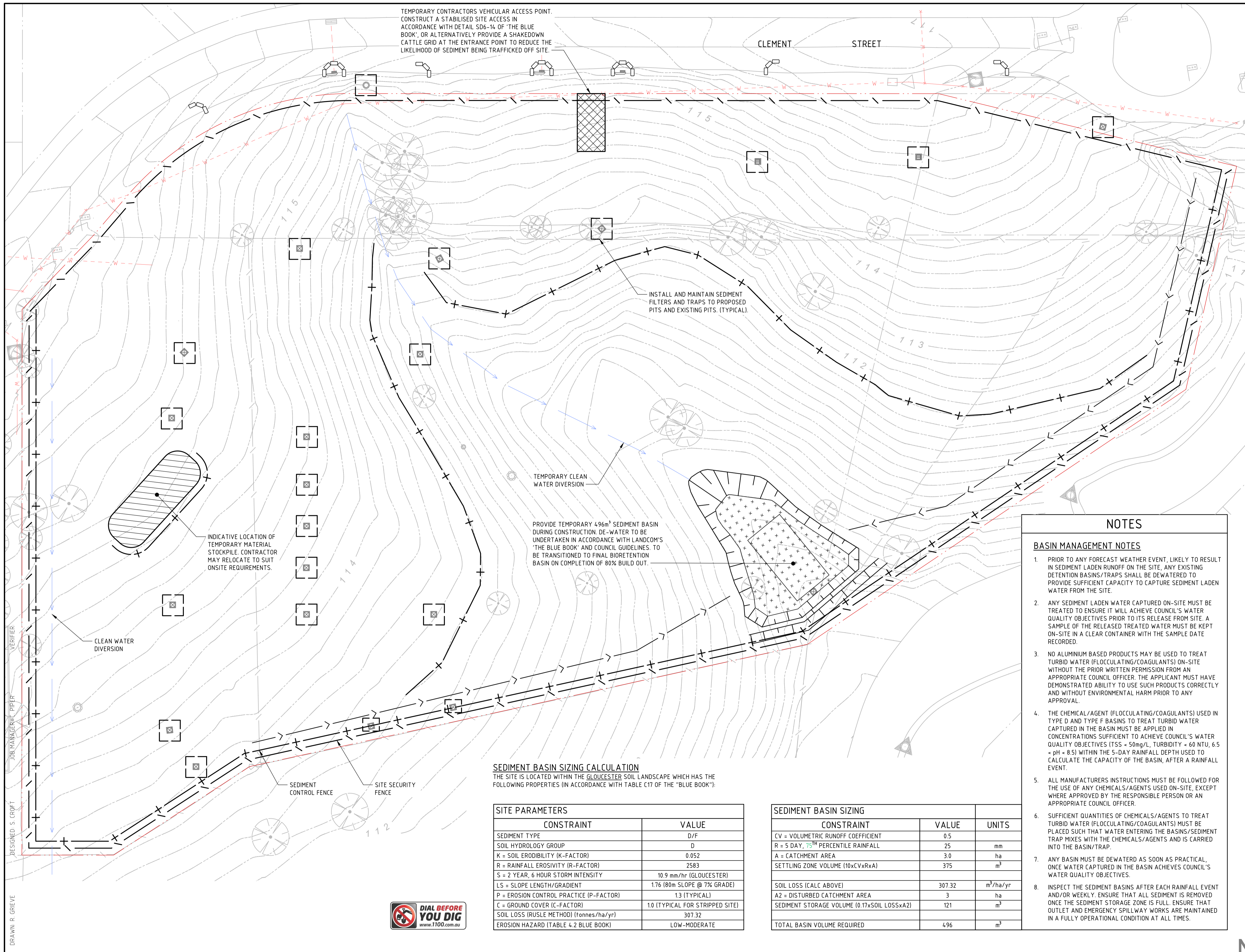
DRAWING TITLE

**COVER SHEET,  
DRAWING SCHEDULE  
AND LOCALITY PLAN**

JOB NUMBER  
**NL180351**

DRAWING NUMBER	REVISION
<b>DA-C01</b>	<b>2</b>

DRAWING SHEET SIZE = A1



### NOTES

#### EROSION AND SEDIMENTATION CONTROL NOTES

- ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE APPROPRIATE FOR THE SEDIMENT TYPE(S) OF THE SOILS ON-SITE, IN ACCORDANCE WITH THE 'BLUE BOOK' (MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION LANDCOM, 2004), OR OTHER CURRENT RECOGNISED INDUSTRY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR AUSTRALIAN CONDITIONS. THIS INCLUDES SEDIMENT TRAPS AND LINING OF CHANNELS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION AND SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS AND SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ALL MAINTENANCE, CLEANING AND BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.
- INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
- ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
- INSTALL SEDIMENT FENCING, OR OTHER SEDIMENT CONTROL DEVICES, AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT OR APPROPRIATE COUNCIL OFFICER.
- ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAY'S WORK.
- THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB & GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION.
- ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ON-SITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.
- STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE SPREAD ON-SITE AS DIRECTED BY THE SUPERINTENDENT OR REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.
- CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
- ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.
- PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
- ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.

### NOTES

#### BASIN MANAGEMENT NOTES

- PRIOR TO ANY FORECAST WEATHER EVENT, LIKELY TO RESULT IN SEDIMENT LADEN RUNOFF ON THE SITE, ANY EXISTING DEFENTION BASINS/TRAPS SHALL BE DEWATERED TO PROVIDE SUFFICIENT CAPACITY TO CAPTURE SEDIMENT LADEN WATER FROM THE SITE.
- ANY SEDIMENT LADEN WATER CAPTURED ON-SITE MUST BE TREATED TO ENSURE IT WILL ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES PRIOR TO ITS RELEASE FROM SITE. A SAMPLE OF THE RELEASED TREATED WATER MUST BE KEPT ON-SITE IN A CLEAR CONTAINER WITH THE SAMPLE DATE RECORDED.
- NO ALUMINIUM BASED PRODUCTS MAY BE USED TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) ON-SITE WITHOUT THE PRIOR WRITTEN PERMISSION FROM AN APPROPRIATE COUNCIL OFFICER. THE APPLICANT MUST HAVE DEMONSTRATED ABILITY TO USE SUCH PRODUCTS CORRECTLY AND WITHOUT ENVIRONMENTAL HARM PRIOR TO ANY APPROVAL.
- THE CHEMICAL/AGENT (FLOCCULATING/COAGULANTS) USED IN TYPE D AND TYPE F BASINS TO TREAT TURBID WATER CAPTURED IN THE BASIN MUST BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES (TSS < 50mg/L, TURBIDITY < 60 NTU, 6.5 < pH < 8.5) WITHIN THE 5-DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.
- ALL MANUFACTURERS INSTRUCTIONS MUST BE FOLLOWED FOR THE USE OF ANY CHEMICALS/AGENTS USED ON-SITE, EXCEPT WHERE APPROVED BY THE RESPONSIBLE PERSON OR AN APPROPRIATE COUNCIL OFFICER.
- SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) MUST BE PLACED SUCH THAT WATER ENTERING THE BASINS/SEDIMENT TRAP MIXES WITH THE CHEMICALS/AGENTS AND IS CARRIED INTO THE BASIN/TRAP.
- ANY BASIN MUST BE DEWATERED AS SOON AS PRACTICAL, ONCE WATER CAPTURED IN THE BASIN ACHIEVES COUNCIL'S WATER QUALITY OBJECTIVES.
- INSPECT THE SEDIMENT BASINS AFTER EACH RAINFALL EVENT AND/OR WEEKLY. ENSURE THAT ALL SEDIMENT IS REMOVED ONCE THE SEDIMENT STORAGE ZONE IS FULL. ENSURE THAT OUTLET AND EMERGENCY SPILLWAY WORKS ARE MAINTAINED IN A FULLY OPERATIONAL CONDITION AT ALL TIMES.

**SEDIMENT BASIN SIZING CALCULATION**  
THE SITE IS LOCATED WITHIN THE GLOUCESTER SOIL LANDSCAPE WHICH HAS THE FOLLOWING PROPERTIES (IN ACCORDANCE WITH TABLE C17 OF THE "BLUE BOOK"):

SITE PARAMETERS	
CONSTRAINT	VALUE
SEDIMENT TYPE	D/F
SOIL HYDROLOGY GROUP	D
K = SOIL ERODIBILITY (K-FACTOR)	0.052
R = RAINFALL ERODIVITY (R-FACTOR)	2583
S = 2 YEAR, 6 HOUR STORM INTENSITY	10.9 mm/hr (GLOUCESTER)
LS = SLOPE LENGTH/GRADIENT	1.76 (80m SLOPE @ 7% GRADE)
P = EROSION CONTROL PRACTICE (P-FACTOR)	1.3 (TYPICAL)
C = GROUND COVER (C-FACTOR)	1.0 (TYPICAL FOR STRIPPED SITE)
SOIL LOSS (RUSLE METHOD) (tonnes/ha/yr)	307.32
EROSION HAZARD (TABLE 4.2 BLUE BOOK)	LOW-MODERATE

SEDIMENT BASIN SIZING		
CONSTRAINT	VALUE	UNITS
CV = VOLUMETRIC RUNOFF COEFFICIENT	0.5	
R = 5 DAY, 75 <sup>TH</sup> PERCENTILE RAINFALL	25	mm
A = CATCHMENT AREA	3.0	ha
SETTLING ZONE VOLUME (10xCVxRxA)	375	m³
SOIL LOSS (CALC ABOVE)	307.32	m³/ha/yr
A2 = DISTURBED CATCHMENT AREA	3	ha
SEDIMENT STORAGE VOLUME (0.17xSOIL LOSSxA2)	121	m³
TOTAL BASIN VOLUME REQUIRED	496	m³

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3	ISSUED FOR APPROVAL	RG	CP	SC	17/05/18	

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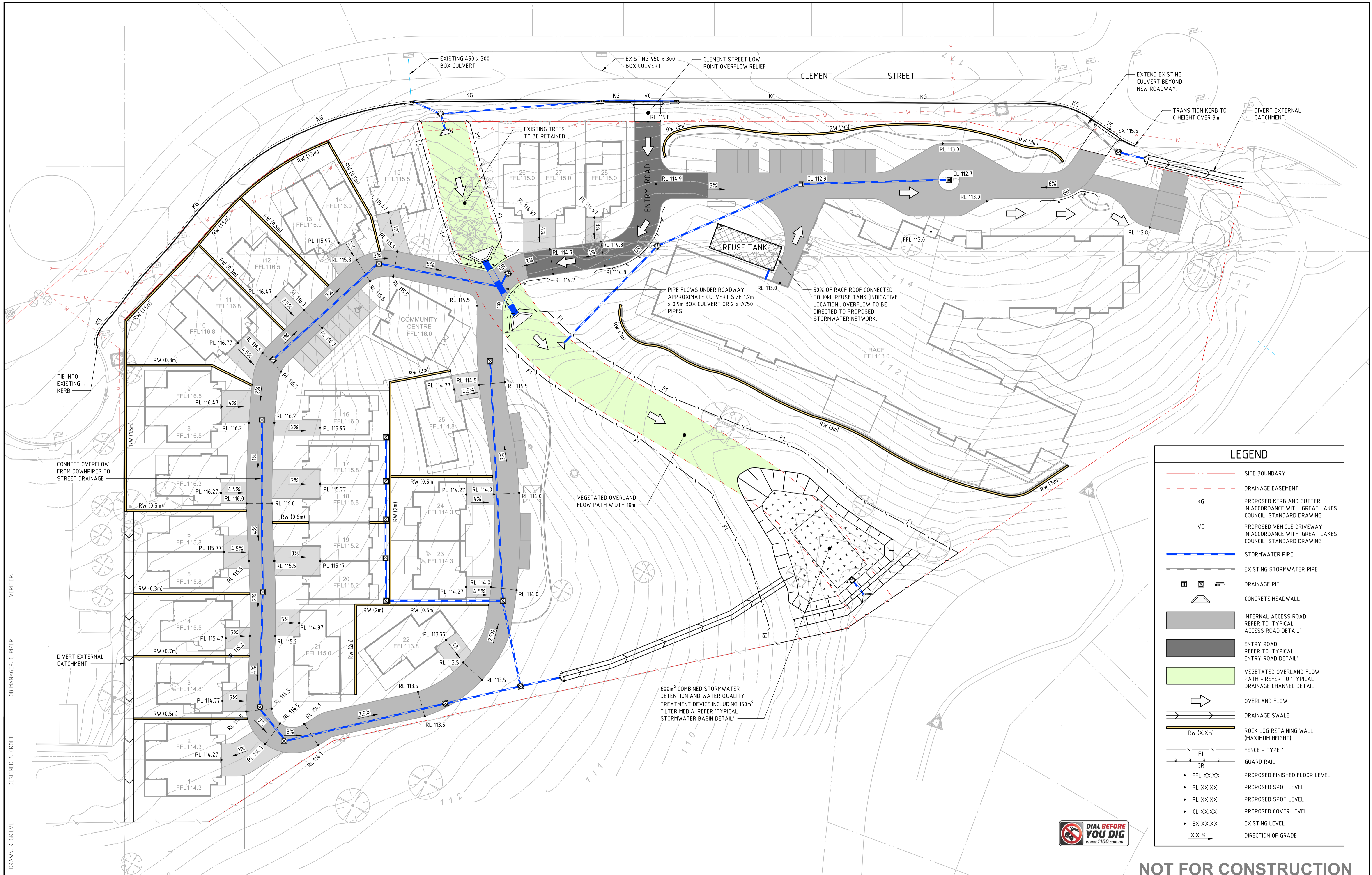
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PROJECT  
**GLOUCESTER RACF AND ILU  
CLEMENT STREET, GLOUCESTER**

DRAWING TITLE  
**CONCEPT SEDIMENT AND  
EROSION CONTROL PLAN**

JOB NUMBER  
**NL180351**  
DRAWING NUMBER  
**DA-C02**  
REVISION  
**3**  
DRAWING SHEET SIZE = A1

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LEGEND	
	SITE BOUNDARY
	DRAINAGE EASEMENT
KG	PROPOSED KERB AND GUTTER IN ACCORDANCE WITH 'GREAT LAKES COUNCIL' STANDARD DRAWING
VC	PROPOSED VEHICLE DRIVEWAY IN ACCORDANCE WITH 'GREAT LAKES COUNCIL' STANDARD DRAWING
	STORMWATER PIPE
	EXISTING STORMWATER PIPE
	DRAINAGE PIT
	CONCRETE HEADWALL
	INTERNAL ACCESS ROAD REFER TO 'TYPICAL ACCESS ROAD DETAIL'
	ENTRY ROAD REFER TO 'TYPICAL ENTRY ROAD DETAIL'
	VEGETATED OVERLAND FLOW PATH - REFER TO 'TYPICAL DRAINAGE CHANNEL DETAIL'
	OVERLAND FLOW
	DRAINAGE SWALE
RW (X.Xm)	ROCK LOG RETAINING WALL (MAXIMUM HEIGHT)
F1	FENCE - TYPE 1
GR	GUARD RAIL
• FFL XX.XX	PROPOSED FINISHED FLOOR LEVEL
• RL XX.XX	PROPOSED SPOT LEVEL
• PL XX.XX	PROPOSED SPOT LEVEL
• CL XX.XX	PROPOSED COVER LEVEL
• EX XX.XX	EXISTING LEVEL
X.X %	DIRECTION OF GRADE

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1	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	27/04/18
2	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	04/05/18
3	ISSUED FOR APPROVAL	RG	CP	SC	11/05/18
4	ISSUED FOR APPROVAL	RG	CP	SC	17/05/18

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SCALE 1:400@A1

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**GLoucester RACF AND ILU**  
CLEMMENT STREET, GLOUCESTER

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DRAWING TITLE

**CONCEPT STORMWATER AND GRADING PLAN**

JOB NUMBER

**NL180351**

DRAWING NUMBER

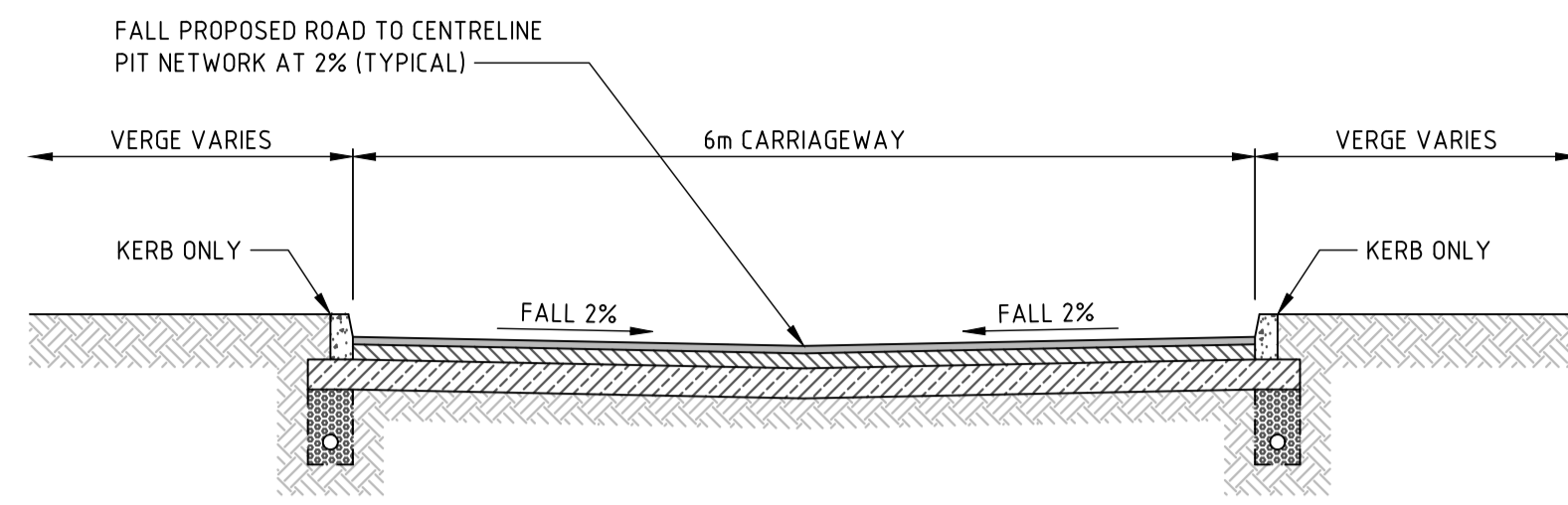
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REVISION

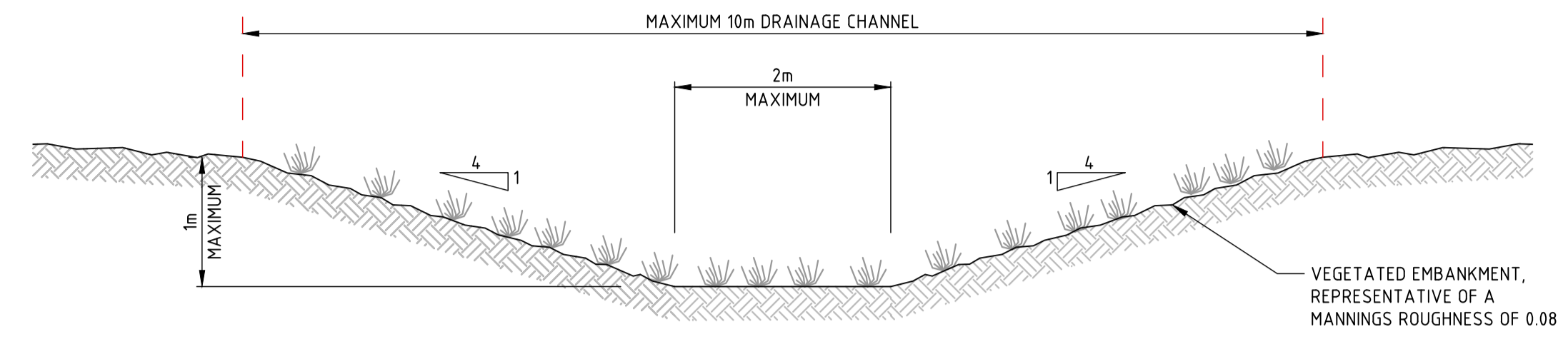
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DRAWING SHEET SIZE = A1

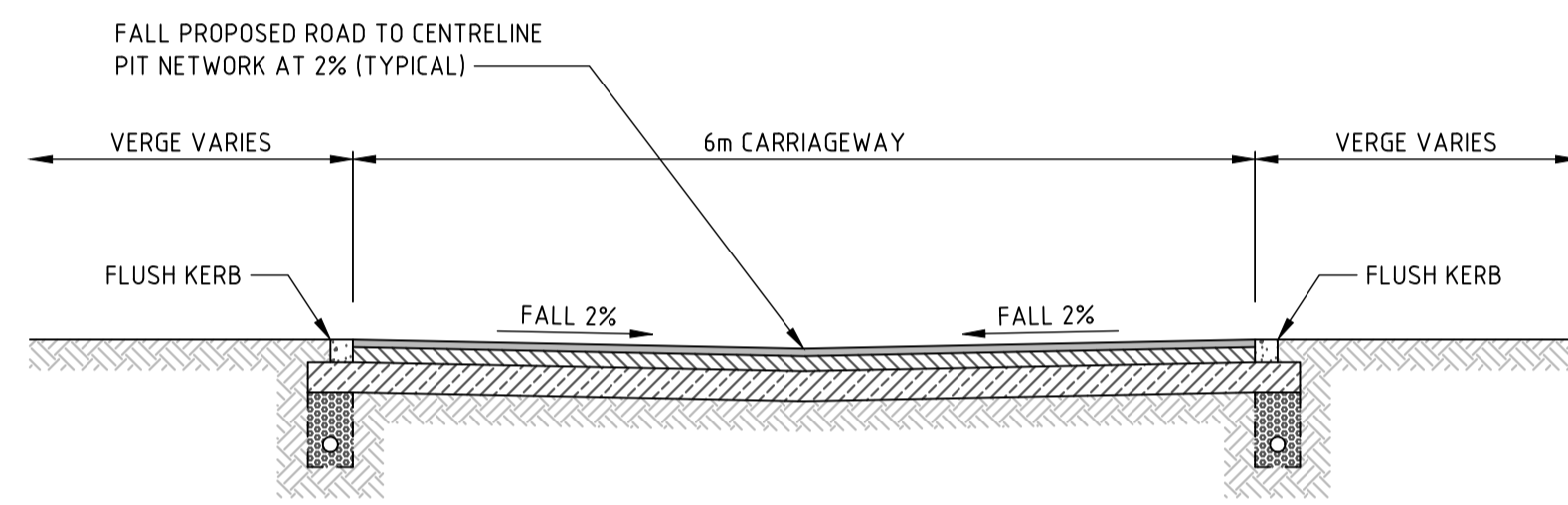
DRAWN: R. GRIEVE  
DESIGNED: S. GROFT  
JOB MANAGER: C. PIPER  
VERIFIER:



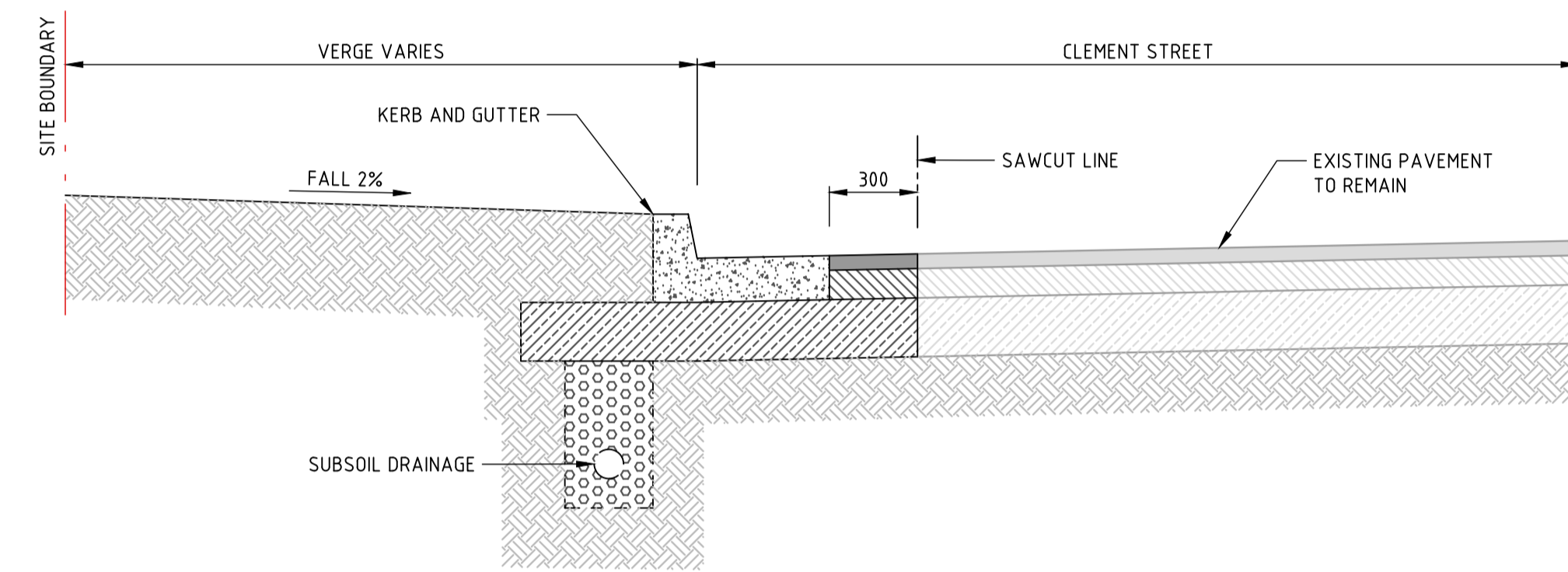
TYPICAL ENTRY ROAD DETAIL



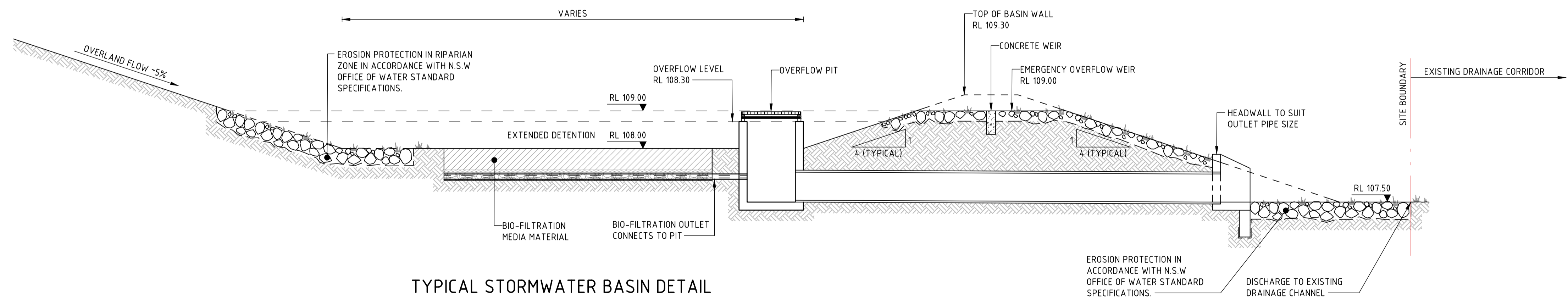
TYPICAL DRAINAGE CHANNEL DETAIL



TYPICAL ACCESS ROAD DETAIL



TYPICAL VERGE DETAIL - CLEMENT STREET



TYPICAL STORMWATER BASIN DETAIL

VERIFIER: C. PIPER  
JOB MANAGER:  
DESIGNED: S. GROFT  
DRAWN: R. GRIEVE



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PROJECT

GLoucester RACF AND ILU  
CLEMENT STREET, GLOUCESTER

DRAWING TITLE

TYPICAL SECTIONS AND DETAILS

JOB NUMBER

NL180351

DRAWING NUMBER

DA-C07

REVISION

3

DRAWING SHEET SIZE = A1

# CONCEPT STORMWATER MANAGEMENT PLAN

at

**1-25 Clement Street, Lot 40 DP 1227815, Gloucester**

for

**Anglican Care**



Job No: NL180351  
Revision: B  
Date: 18/05/2018

	BY	DATE
Prepared	SC	18/05/2018
Checked	CP	18/05/2018
Admin	LD	18/05/2018



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## **1. Introduction**

### **1.1 General**

Northrop Consulting Engineers have been engaged by Anglican Care to undertake a Concept Stormwater Management Plan for the proposed development located at 1-25 Clement Street, Gloucester (Lot 40 DP 1227815).

This report has been prepared with consideration to and generally in accordance with the State Environmental Planning Policy - Housing for Seniors or People with a Disability 2004 (SEPP HSPD), which is the code that the development is to be assessed against. In the absence of specific design information within SEPP HSPD, we have referred to Gloucester Shire Council Draft Development Control Plan 2010 and Greater Taree Council's Development Design Specifications - Stormwater Drainage Design.

The purpose of this report is to address the issues associated with the proposed development of the site, in particular:

- Flooding Assessment
- Management of Stormwater Quantity
- Management of Stormwater Quality
- Roadways and pavement

This report intends to discuss issues relating to the site at a level appropriate for a Development Application submission and should be read in conjunction with drawings DA-C01– DA-C07 (refer Appendix A). It does not attempt to provide detailed design solutions to all issues; rather it will investigate the feasibility of solutions based on information that we have gathered to date from a number of sources and provide outcomes which will be developed further at Construction Certificate and Construction phases of the project.

### **1.2 Site Description**

The site is located on the western side of Clement Street, with an existing educational facility to the north and an existing residential subdivision to the south. The site is undeveloped and covers approximately 3.0 Ha.

A natural swale runs from north-east to south-west through site, eventually reaching an existing 1<sup>st</sup> order watercourse on the south-western section. The site generally slopes towards the swale at grades varying between 1 and 10%.

As a part of the new development it is proposed that a Residential Aged Care Facility (RACF), 28 Independent Living Units and a Community Centre will be constructed.











100% blocked. The scenario was modelled using the DRAINS software package. A summary of the data and results is provided below.

Catchment Area	1.8Ha
1% AEP flow	0.81m <sup>3</sup> /s
Flow depth	0.1m
Velocity	1.96m/s
Velocity x Depth	0.2m <sup>2</sup> /s

Figure L2 Appendix L of the Floodplain Development Manual provides advice on hydraulic and hazard categorization based on flooding depth and velocity. The results above can be classified as 'Low Hazard'.

### **3.4 Overland Flow Paths**

A key feature of the proposed development is the retention of the existing drainage channel alignment through the centre of the site. The channel has been sized to accommodate the 1% AEP event with 500mm freeboard. The scenario was modelled using the DRAINS software package. A summary of the data and results is provided below.

Catchment Area	5.2Ha
1% AEP flow	2.51m <sup>3</sup> /s
Flow depth	0.5m
Velocity	1.31m/s
Velocity x Depth	0.64m <sup>2</sup> /s

The results above are situated within the transition zone between 'Low Hazard' and 'High Hazard' of Figure L2 Appendix L of the Floodplain Development Manual. It is therefore proposed that pool fencing be provided to prevent pedestrian access to the central channel.

Noting the vulnerability of the intended residents, consideration was given the effect of the Probable Maximum Flood (PMF) event on the channel. The PMF was calculated nominally as 3 x 1%AEP, and gave the results below:

1% AEP flow	7.53m <sup>3</sup> /s
Flow depth	0.82m
Velocity	1.75m/s
Velocity x Depth	1.43m <sup>2</sup> /s

The flow above can be contained within the channel, with a freeboard of approximately 180mm. The results above can be classified as 'high hazard' in Figure L2, which further supports the proposed safety fencing.

Consideration has also been given to overland flow through the site during major storm events, to ensure no trapped low points, and that stormwater can be conveyed safely through the development. The intended overland flow paths are shown on Northrop drawing DA-C06.





The treatment train incorporates:

- Primary treatment via a 10kL rainwater tank connected to the RACF; and
- Secondary treatment via a bioretention basin and two vegetated swales.

Treatment nodes were created within the MUSIC model to represent the water quality treatment devices. A description of each of these measures is included below.

### 4.3 Rainwater Tank

Runoff from approximately 50% of the RACF roof will be collected and diverted to a 10kL rainwater tank located adjacent to the building. The only re-use demand for input in the MUSIC model was external re-use. A re-use demand of 151kL/yr was adopted, based on the “NSW MUSIC Modelling Guidelines” (BMT WBM, 2015) for outdoor uses for a single dwelling. The proposed system satisfies 84% of re-use demand which is considered an acceptable design outcome.

All downpipes reporting to the tank will be connected to a first flush device located prior to the tank inlet.

### 4.4 Bioretention Basin

To attain the stormwater quality targets, a bioretention basin will be located within the proposed detention basin. The basin will direct water to the bioretention trench where, through infiltration, it will collect and treat stormwater runoff from the proposed development, before discharging treated stormwater to the existing channel.

The bioretention basin has been modelled with a filter area of 150m<sup>2</sup>, a filter depth of 0.4m and an extended detention depth of 0.3m. Parameters for the bioretention basin were adopted in accordance with the “NSW MUSIC Modelling Guidelines” (BMT WBM, 2015).

### 4.5 Vegetated Swales

Two trapezoidal shaped open channels are proposed at the stormwater outlets to convey runoff to the bioretention basin. A typical section can be seen in drawing DA-C07.

### 4.6 Results

The MUSIC modeling results for the receiving node are shown in Table 3 below.

Table 3 - MUSIC Model Result Summary (outlet node)

	Source Load (kg/yr)	Residual Loads (kg/yr)	Percentage Reduction	Target Objectives
<b>Total Suspended Solids (TSS)</b>	2270	250	89.0	85
<b>Total Phosphorous (TP)</b>	4.11	1.34	67.4	45
<b>Total Nitrogen (TN)</b>	29.5	15.2	48.4	45
<b>Gross Pollutants</b>	359	8.06	97.8	

Table 3 shows that the proposed storm water quality management strategy is predicted to achieve the load reduction targets, as estimated by MUSIC. MUSIC data files can be provided upon request.





## 6. Conclusion

Given the results of the above investigations, it is reasoned that the development meets SEPP HSDP and MidCoast Council's requirements.

As confirmed by MidCoast Council, flooding from external waterways is not expected to impact the proposed development. Flooding from the upstream and internal catchments will be managed through the provision of a drainage channel through the centre of the site, sized to accommodate the 1% AEP with a 500mm freeboard. Consideration has been given to overland flow paths to ensure that there are not trapped low points within the development.

To comply with SEPP HSPD Clause 36 (a), the proposed development will control and minimise disturbance and impacts of stormwater runoff on adjoining properties and receiving waters, as follows:

- In collaboration with MidCoast Council, the pollutant load reduction targets have been established to comply with those nominated in Chapter 1, Section 1.4.3, Table 1.2 of Australian Rainfall Quality guidelines; and,
- The treatment of stormwater for waterborne pollutants to achieve the selected treatment targets is achieved through the proposed treatment train. This includes the use of a rainwater tank, a bioretention basin and three swales.

To comply with SEPP HSPD Clause 36 (b) the proposed development will include on-site stormwater detention and re-use for second quality water uses, as follows:

- Runoff from approximately 50% of the RACF roof will be connected to a 10kL tank for reuse in landscape irrigation;
- Stormwater from the ILUs, Community Centre and roadways will be conveyed to the combined stormwater detention and water quality treatment basin, before being discharged into the adjacent water; and,
- The proposed detention basins will reduce post-developed peak discharge to below the pre-developed peaks.

To comply with SEPP HSPD Clause 38 (b) the proposed development will provide attractive, yet safe, environments for pedestrians and motorists with convenient access and parking for residents and visitors, as follows:

- Building and ground levels throughout the site have been set to ensure that grades generally comply with AS1428.1, in all locations with pedestrian access.



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## APPENDIX A

### Concept Civil Design Drawings

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# GLOUCESTER RACF AND ILU CLEMENT STREET, GLOUCESTER CIVIL WORK DRAWINGS



DRAWING SCHEDULE

DRG No.	DRAWING TITLE
DA-C01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
DA-C02	CONCEPT SEDIMENT AND EROSION CONTROL PLAN
DA-C06	CONCEPT STORMWATER AND GRADING PLAN
UA-LU/1	TYPICAL SECTIONS AND DETAILS



LOCALITY PLAN

SOURCE: NEARMAPS

DRAWN: R. BRICVE  
DESIGNED: S. CROFT  
JOB MANAGER: C. PFER  
VERIFIER:



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Email newcastle@northrop.com.au ABRN 61 094 433 100

PROJECT

**GLOUCESTER RACF AND ILU  
CLEMENT STREET, GLOUCESTER**

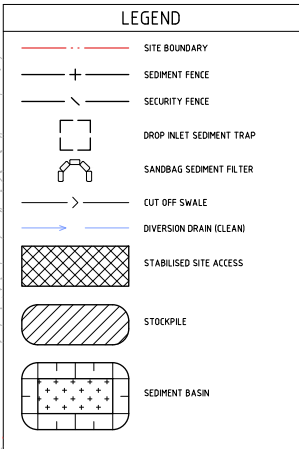
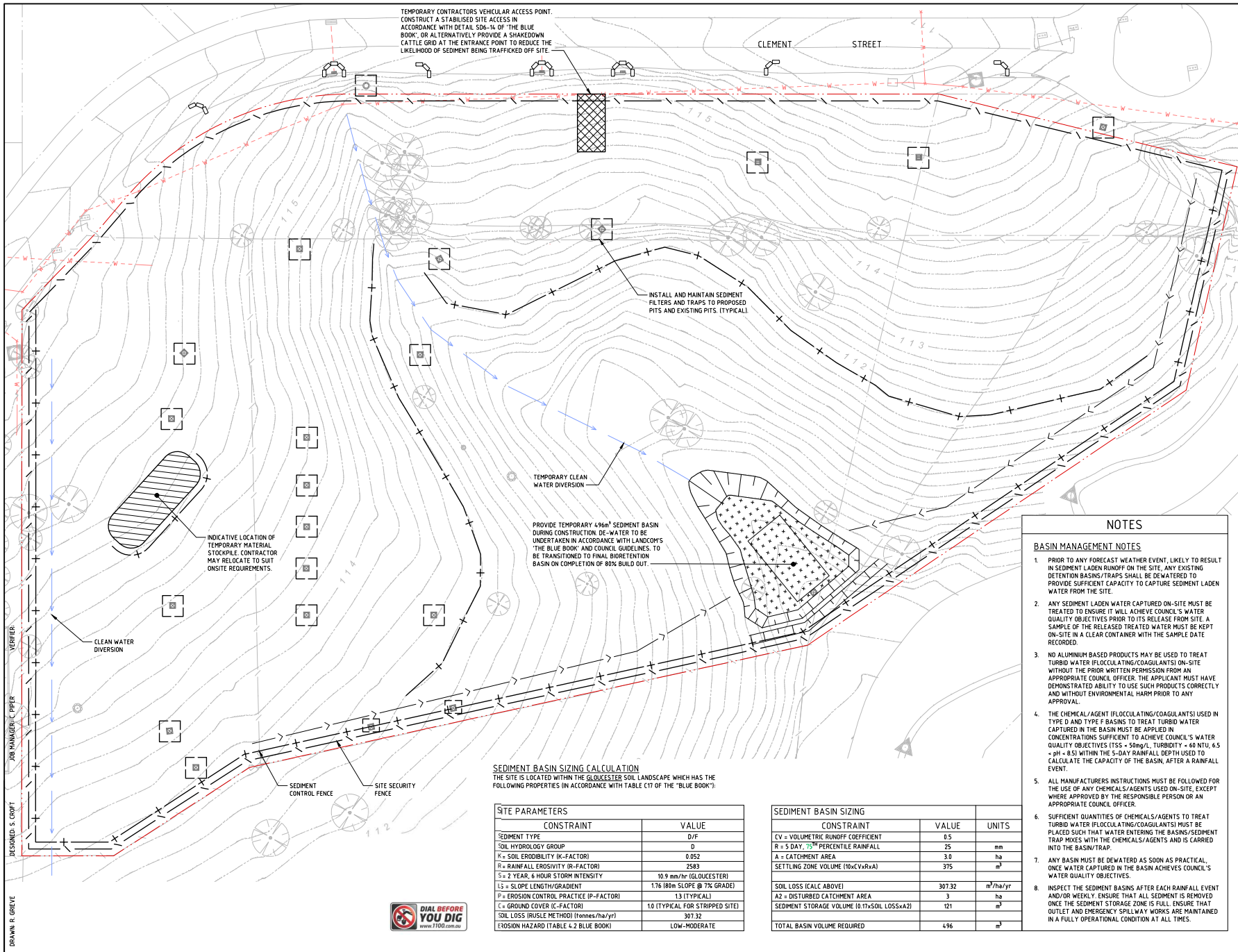
DRAWING TITLE

**COVER SHEET,  
DRAWING SCHEDULE  
AND LOCALITY PLAN**

JOB NUMBER  
**NL180351**

DRAWING NUMBER	REVISION
<b>DA-C01</b>	<b>2</b>

DRAWING SHEET SIZE = A1



### NOTES

#### EROSION AND SEDIMENTATION CONTROL NOTES

- ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE APPROPRIATE FOR THE SEDIMENT TYPE(S) OF THE SOILS ON-SITE, IN ACCORDANCE WITH THE 'BLUE BOOK' (MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION LANDCOP, 2004), OR OTHER CURRENT RECOGNISED INDUSTRY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR AUSTRALIAN CONDITIONS. THIS INCLUDES SEDIMENT TRAPS AND LINING OF CHANNELS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION AND SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS AND SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ALL MAINTENANCE, CLEANING AND BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.
- INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
- ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
- INSTALL SEDIMENT FENCING, OR OTHER SEDIMENT CONTROL DEVICES, AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT OR APPROPRIATE COUNCIL OFFICER.
- ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SHALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.
- THE CHEMICAL/AGENT FLOCCULATING/COAGULANTS USED IN TYPE D AND TYPE F BASINS TO TREAT TURBID WATER CAPTURED IN THE BASIN MUST BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES (TSS + 50mg/L, TURBIDITY + 40 NTU, 4.5 < pH < 8.5) WITHIN THE 5-DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.
- ALL MANUFACTURERS INSTRUCTIONS MUST BE FOLLOWED FOR THE USE OF ANY CHEMICALS/AGENTS USED ON-SITE, EXCEPT WHERE APPROVED BY THE RESPONSIBLE PERSON OR AN APPROPRIATE COUNCIL OFFICER.
- SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) MUST BE PLACED SUCH THAT WATER ENTERING THE BASINS/SEDIMENT TRAP MIXES WITH THE CHEMICALS/AGENTS AND IS CARRIED INTO THE BASIN/TRAP.
- ANY BASIN MUST BE DEWATER AS SOON AS PRACTICAL, ONCE WATER CAPTURED IN THE BASIN ACHIEVES COUNCIL'S WATER QUALITY OBJECTIVES.
- INSPECT THE SEDIMENT BASINS AFTER EACH RAINFALL EVENT AND/OR WEEKLY. ENSURE THAT ALL SEDIMENT IS REMOVED ONCE THE SEDIMENT STORAGE ZONE IS FULL. ENSURE THAT OUTLET AND EMERGENCY SPILLWAY WORKS ARE MAINTAINED IN A FULLY OPERATIONAL CONDITION AT ALL TIMES.
- PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
- ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.

### NOTES

#### Basin Management Notes

- PRIOR TO ANY FORECAST WEATHER EVENT, LIKELY TO RESULT IN SEDIMENT LADEN RUNOFF ON THE SITE, ANY EXISTING DETENTION BASINS/TRAPS SHALL BE DEWATERED TO PROVIDE SUFFICIENT CAPACITY TO CAPTURE SEDIMENT LADEN WATER FROM THE SITE.
- ANY SEDIMENT LADEN WATER CAPTURED ON-SITE MUST BE TREATED TO ENSURE IT WILL ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES PRIOR TO ITS RELEASE FROM SITE. A SAMPLE OF THE RELEASED TREATED WATER MUST BE KEPT ON-SITE IN A CLEAR CONTAINER WITH THE SAMPLE DATE RECORDED.
- NO ALUMINIUM BASED PRODUCTS MAY BE USED TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) ON-SITE WITHOUT THE PRIOR WRITTEN PERMISSION FROM AN APPROPRIATE COUNCIL OFFICER. THE APPLICANT MUST HAVE DEMONSTRATED ABILITY TO USE SUCH PRODUCTS CORRECTLY AND WITHOUT ENVIRONMENTAL HARM PRIOR TO ANY APPROVAL.
- THE CHEMICAL/AGENT FLOCCULATING/COAGULANTS USED IN TYPE D AND TYPE F BASINS TO TREAT TURBID WATER CAPTURED IN THE BASIN MUST BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES (TSS + 50mg/L, TURBIDITY + 40 NTU, 4.5 < pH < 8.5) WITHIN THE 5-DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.
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#### SEDIMENT BASIN SIZING CALCULATION

THE SITE IS LOCATED WITHIN THE GLOUCESTER SOIL LANDSCAPE WHICH HAS THE FOLLOWING PROPERTIES (IN ACCORDANCE WITH TABLE C17 OF THE 'BLUE BOOK'):

SITE PARAMETERS	
CONSTRAINT	VALUE
SEDIMENT TYPE	D
SOIL HYDROLOGY GROUP	D
K = SOIL EROSION (K-FACTOR)	0.052
R = RAINFALL EROSION (R-FACTOR)	2583
S = 2 YEAR, 6 HOUR STORM INTENSITY	10.9 mm/hr (GLOUCESTER)
L = SLOPE LENGTH/GRADIENT	1.76 (80m SLOPE @ 7% GRADE)
P = EROSION CONTROL PRACTICE (P-FACTOR)	1.3 (TYPICAL)
C = GROUND COVER (C-FACTOR)	1.0 (TYPICAL FOR STRIPPED SITE)
SOIL LOSS (RUSLE METHOD) (Tonnes/ha/yr)	307.32
EROSION HAZARD (TABLE 4.2 BLUE BOOK)	LOW-MODERATE

SEDIMENT BASIN SIZING		
CONSTRAINT	VALUE	UNITS
CV = VOLUMETRIC RUNOFF COEFFICIENT	0.5	
R = 5 DAY, 75 <sup>TH</sup> PERCENTILE RAINFALL	25	mm
A = CATCHMENT AREA	3.0	ha
SETTLING ZONE VOLUME (10xVxRA)	375	m <sup>3</sup>
SOIL LOSS (CALC ABOVE)	307.32	m <sup>3</sup> /ha/yr
A2 = DISTURBED CATCHMENT AREA	3	ha
SEDIMENT STORAGE VOLUME (10.7xSOIL LOSSxA2)	121	m <sup>3</sup>
TOTAL BASIN VOLUME REQUIRED	496	m <sup>3</sup>

REVISION	DESCRIPTION	ISSUED	VERD	APP'D	DATE	CLIENT
1	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	04/05/18	
2	ISSUED FOR APPROVAL	RG	CP	SC	11/05/18	
3	ISSUED FOR APPROVAL	RG	CP	SC	17/05/18	

DESIGNED: S. CRISP  
DRAWN: R. GREBE  
JOB MANAGER: C. PFER  
VERIFIER:

ARCHITECT

ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VIEWED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.

SCALE 14:00@A1

Newcastle

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PROJECT

GLOUCESTER RACF AND ILU  
CLEMENT STREET, GLOUCESTER

DRAWING TITLE

CONCEPT SEDIMENT AND  
EROSION CONTROL PLAN

JOB NUMBER

NL180351

DRAWING NUMBER

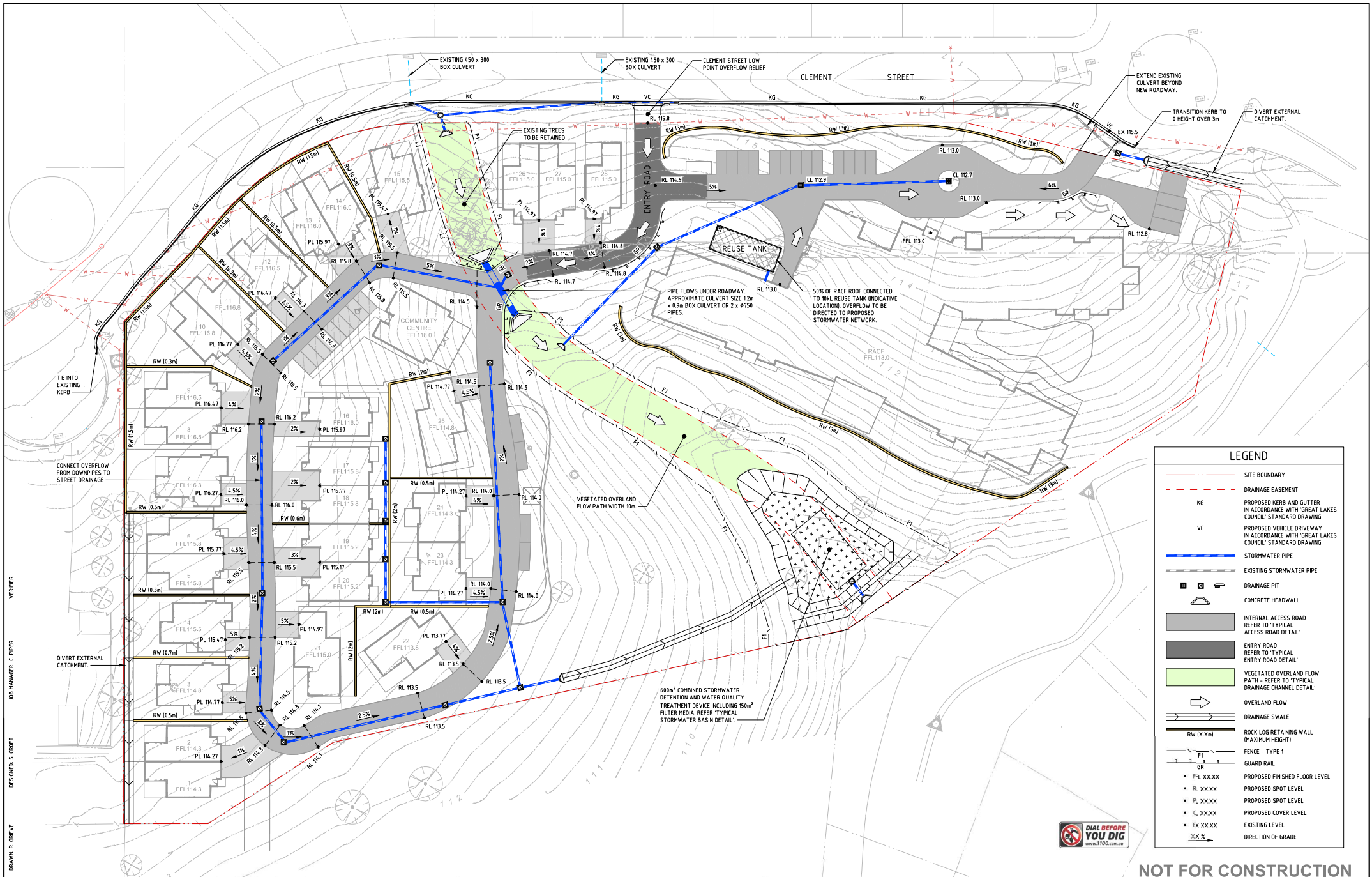
DA-C02

REVISION

3

DRAWING SHEET SIZE = A1

NOT FOR CONSTRUCTION



LEGEND	
	SITE BOUNDARY
	DRAINAGE EASEMENT
	PROPOSED KERB AND GUTTER IN ACCORDANCE WITH 'GREAT LAKES COUNCIL' STANDARD DRAWING
	PROPOSED VEHICLE DRIVEWAY IN ACCORDANCE WITH 'GREAT LAKES COUNCIL' STANDARD DRAWING
	STORMWATER PIPE
	EXISTING STORMWATER PIPE
	DRAINAGE PIT
	CONCRETE HEADWALL
	INTERNAL ACCESS ROAD REFER TO 'TYPICAL ACCESS ROAD DETAIL'
	ENTRY ROAD REFER TO 'TYPICAL ENTRY ROAD DETAIL'
	VEGETATED OVERLAND FLOW PATH - REFER TO 'TYPICAL DRAINAGE CHANNEL DETAIL'
	OVERLAND FLOW
	DRAINAGE SWALE
	ROCK LOG RETAINING WALL (MAXIMUM HEIGHT)
	FENCE - TYPE 1
	GUARD RAIL
	PROPOSED FINISHED FLOOR LEVEL
	PROPOSED SPOT LEVEL
	PROPOSED SPOT LEVEL
	PROPOSED COVER LEVEL
	EXISTING LEVEL
	DIRECTION OF GRADE



**NOT FOR CONSTRUCTION**

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT
1	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	27/04/18	
2	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	04/05/18	
3	ISSUED FOR APPROVAL	RG	CP	SC	11/05/18	
4	ISSUED FOR APPROVAL	RG	CP	SC	17/05/18	

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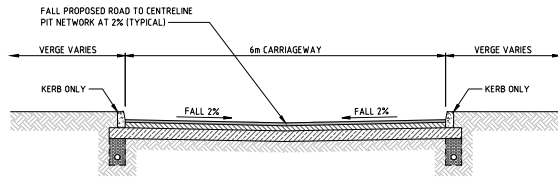
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PROJECT  
**GLOUCESTER RACF AND ILU  
CLEMENT STREET, GLOUCESTER**

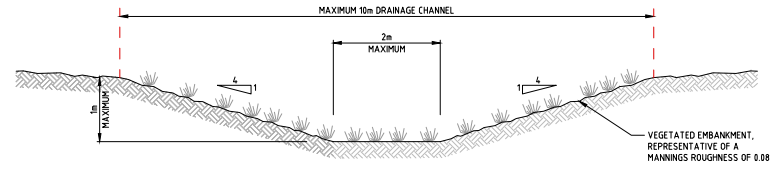
DRAWING TITLE  
**CONCEPT STORMWATER  
AND GRADING PLAN**

JOB NUMBER	REVISION
<b>NL180351</b>	
<b>DA-C06</b>	<b>4</b>
DRAWING SHEET SIZE = A1	

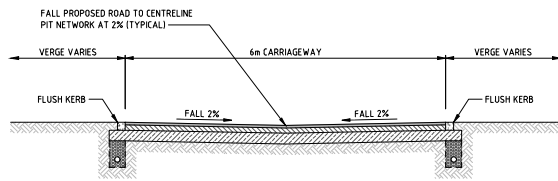
DRAWN: R. BRICKE  
 DESIGNED: S. CROFT  
 JOB MANAGER: C. PEPER  
 CHECKED:



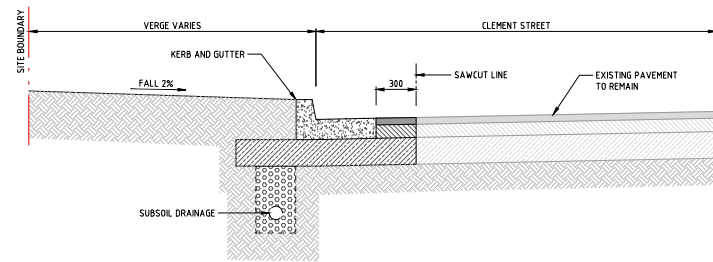
TYPICAL ENTRY ROAD DETAIL



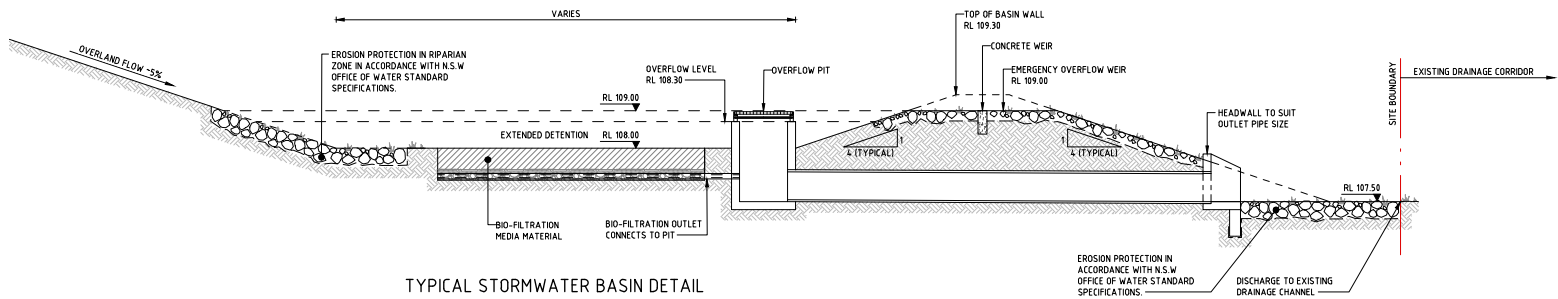
TYPICAL DRAINAGE CHANNEL DETAIL



TYPICAL ACCESS ROAD DETAIL



TYPICAL VERGE DETAIL - CLEMENT STREET



TYPICAL STORMWATER BASIN DETAIL

VERIFIER:   
 JOB MANAGER: C. PFER   
 DESIGNER: S. CROFT   
 DRAWN: R. BRICVE

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	PRELIMINARY ISSUE FOR COMMENT	RG	CP	SC	04/05/18
2	ISSUED FOR APPROVAL	RG	CP	SC	11/05/18
3	ISSUED FOR APPROVAL	RG	CP	SC	18/05/18

CLIENT

ARCHITECT

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PROJECT

GLoucester RACF AND ILU  
 CLEMENT STREET, GLOUCESTER

DRAWING TITLE

TYPICAL SECTIONS  
 AND DETAILS

JOB NUMBER	NL180351
DRAWING NUMBER	DA-C07
REVISION	3
DRAWING SHEET SIZE	A1



NOT FOR CONSTRUCTION





## Chris Piper

---

**From:** Chris Piper  
**Sent:** Tuesday, 13 March 2018 12:56 PM  
**To:** 'aaron.kelly@midcoast.nsw.gov.au'  
**Subject:** Gloucester RACF

Hi Aaron,

Thanks for the phone call just now, we'll progress with design based on our discussion, summarised below.

- The proposed site is well above PMF level and does not need to be investigated further;
- On site detention (OSD) is to limit post development flows to pre development flows.
- OSD should consider rain tanks / car park for storage opportunities, and avoid a damn where possible.
- Amenity of the OSD outcome is key.
- The site catchment falls within a drinking water catchment.
- While not explicitly described in the DCP, water quality will need to be considered. The central channel provides a good opportunity for treatment.
- There are not any documented treatment targets, however Northrop will undertake and provide the results of MUSIC modelling to identify the treatment achieved

Please let me know if I have misunderstood any of the above. Thanks again for your assistance.

 Kind regards  
**Chris Piper**  
Senior Engineer  
**Northrop Consulting Engineers Pty Ltd**  
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