NORTHROP

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2nd September 2014

Development Manager – Matthew Twohill
Ionic Management Pty Ltd
Level 37, Chifley Tower
2 Chifley Square
Sydney NSW 2000

email: mtwohill@imanage.net.au

Dear Matthew,

Re: Mixed Use Development at Burroway Road, Wentworth Point (SSD 6387)

Response to Relevant 'Water Management and Flooding' Matters in Auburn City Council Comments (c/- NSW Planning & Environment, 31 July 2014)

Reference is made to the proposed mixed use (residential and retail) development at Burroway Road, Wentworth Point. This is with regard to the stakeholder submissions to NSW Government Planning & Environment – as part of the development assessment process. In particular this relates to Northrop offering response to the 'Water Management and Flooding' matters raised in the (supplied) 'Auburn City Council Comments'.

Northrop provides the following comments to the relevant items as *quoted*:

44. The submitted report indicates that the adopted PMF flood level is 2.30m AHD, however, Council's information shows the PMF flood level is 2.41m AHD. This has significant design implications and needs to be addressed.

[Northrop] Northrop acknowledges the Probable Maximum Flood (PMF) Level to be potentially RL 2.41m AHD. We understand the design implications are as follows:

Flood Protection - levels to habitable floor areas and basement entry levels are to be set at (or above) the PMF level. That is, the proposed minimum level for critical areas is to be RL 2.41m AHD.

Flood Evacuation – any evacuation from the site in times of flooding should be directed to the southern-east of the site. The existing level of Burroway Road is approximately 300mm lower than the PMF level. Preliminary design levels for the Perimeter Road are up to RL 2.8m AHD (approx.) along the eastern leg, connecting back to Burroway Road.

45. The impacts of a development should be mitigated within the site, rather than relying on the neighbouring site. There is a strong argument for providing the overland flow path through 1 Burroway Rd.

[Northrop] The subject development site will not contribute runoff to the existing low point in Burroway Road. The development will manage and collect on-site runoff prior to discharging via a new piped stormwater drainage system directly to the Parramatta River.

The overland flow path from the existing low point in Burroway Road can be directed along Hill Road extension, and to Parramatta River. Refer to previous correspondence issued to Council (Attachment A).

46. *The submitted documents state the overland flow path will be provided through the UAP site to the west of the 1 Burroway Rd site. The documents submitted relating to water management for the UAP were prepared in March 2014 and there has been further development on their designs. More importantly, they are only concept plans, as no DA has yet been submitted to Council in relation to the UAP. There is no certainty that the overland flow path will be provided on the UAP site.*

[Northrop] Last review of the design being prepared on behalf of UrbanGrowth NSW indicated the proposed road grading for Burroway Road will relocate the low point further west. This is considered to be the ultimate condition.

In the interim the overland flow path from the existing low point in Burroway Road can be directed along Hill Road extension, and to Parramatta River. Refer to previous correspondence to Council (Attachment A).

47. *If the overland flow path is to be provided within the UAP site, any consent should require an easement to be created for the overland flow route, and a deed of agreement between the two parties in relation to the construction and management of the overland flow path.*

[Northrop] The overland flow path from the existing low point in Burroway Road can be directed along Hill Road extension, and to Parramatta River. Refer to previous correspondence issued to Council (Attachment A). It is expected this will not require any easement / deed of agreement – on the basis that it will use the existing shared path corridor.

48. *The intended set down adjacent to the western boundary requires a road reserve for a footpath. Again, the proposal appears to rely on the UAP to provide this. This will also affect the intended (if any) flow path.*

[Northrop] The proposed set down adjacent to the western boundary has been provided in accordance with requirements of TfNSW. It has been located with reference to the continuation of the western kerb alignment along Hill Road (i.e. south of the Burroway Road intersection). This results in no width for creating a footpath within the subject site boundary – but enables use of the existing shared path until development of the UAP site (west).

The overland flow path from the existing low point in Burroway Road can be directed along Hill Road extension, and to Parramatta River. Refer to previous correspondence issued to Council (Attachment A). It is anticipated this will not require altering the levels or condition of the existing shared path.

It is expected the integration of any future overland flow route and footpath in this vicinity will be addressed by the UAP work by UrbanGrowth NSW.

49. *Council would prefer that the footpath reserve be provided within the SOPA site, however, the inclusion of the footpath in the easement and deed of agreement discussed above would be acceptable.*

[Northrop] The footpath associated with the western set down area constitutes the existing shared path – that is, until the UAP development works by UrbanGrowth NSW.

On this basis, it is expected no easement / deed of agreement would be required for the footpath as part of this particular development.

50. *Please note that the submitted landscape plan does not show the extent of works west of the centre median.*

[Northrop] Response is deferred to the Landscape Architect (Context).

51. *Water quality measures must be provided to the runoff generated from the road network prior to discharge to Parramatta River.*

[Northrop] Sydney Olympic Park Authority (SOPA) has also confirmed the requirement for water quality control measures for proposed roads. These measures will be documented prior to Construction Certificate – in consultation with SOPA (as the ultimate road and stormwater drainage assets owner).

52. *The submitted report states that water quality measures will be incorporated in accordance with the requirement/prescribed by the Road Authority. Council would like to know who the Road Authority will be.*

[Northrop] We understand the Authority for roads, drainage, utility services and associated infrastructure within the new road corridors (comprising 'Hill Road Extension', 'Foreshore Road' and 'New Road') will be SOPA.

We trust this response is sufficient to address the relevant matters raised by Auburn City Council - and support Development Consent.

Yours faithfully,

NORTHROP

Mathew Richards

Principal – Civil Engineer

NORTHROP

Attachment A – Northrop Correspondence (dated 1 May 2014)

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Sydney NSW 2000

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1st May 2014

Louis Goulimis
Ionic Management Pty Ltd
Level 37, Chifley Tower
2 Chifley Square
Sydney NSW 2000

email: lgoulimis@imanage.net.au

Dear Louis,

RE: SOPA Wentworth Point- Mixed Use Development

Advice on Stormwater Management at Burroway Road / Hill Road Intersection

Reference is made to the proposed mixed-use (residential and retail) development at Burroway Road, Wentworth Point. This is with regard to the perimeter road proposed as part of the SOPA Wentworth Point development. In particular this is in response to recent queries from Auburn Council in relation to managing overland flow in vicinity of the intersection of Burroway Road and Hill Road.

Northrop has reviewed background information (including the calculations for the existing contributing catchments, prepared by Brown Consulting – copy attached). The following comments are provided to confirm design measures to convey runoff from the north-eastern corner of the subject intersection to the Parramatta River. We refer also to the attached marked-up sketch diagram, prepared by Northrop.

1. The design proposes a conventional road intersection (in lieu of the existing layback and driveway). This will improve the levels for passage of overland flow north of Burroway Road – along the proposed extension to Hill Road.
2. The longitudinal section of the proposed extension to Hill Road (attached) promotes overflow in a northerly direction from the intersection – to a point approximately 50m north of the intersection.
3. The calculations by Brown Consulting indicate the total flow from the existing catchment to the intersection of Burroway and Hill Road. Northrop estimates approximately 50% of this flow will affect the north-eastern corner of the subject intersection. The remaining 50% has been deemed to remain west (or on the western side) of Hill Road – and therefore not affect the eastern side of the intersection.
4. Overland flow into the Hill Road extension will occur in the event of blockage of the existing pit (located on the north-eastern corner of the intersection), and in the event it ponds up to approximately 210mm.
5. The proposed road cross-section has capacity to convey approximately 2.8m^3/s of overland flow. This equates to the gap flow Brown Consulting has calculated for the 100-year ARI event

– allowing for a 1-year ARI capacity (only) for the existing pit / pipe system. Again, we note this is based on 50% of the total flows calculated by Brown Consulting affecting the (subject) eastern side of the intersection.

6. The relief point for overflow from the proposed Hill Road extension to the River is at proposed Road Chainage 50 (approx.). Intermittent kerbs along the western edge of the parking / set-down area (in lieu of continuous, full-height kerb) present an opportunity to enable overflow at pavement level (rather than top of kerb, i.e. 150mm higher). This would be subject to SOPA accepting intermittent kerbs (in lieu of barrier kerb), adjacent the set-down area.

To this end, this brief analysis by Northrop has concluded:

- The current design incorporates measures to manage overflow away from the north-eastern corner of the Burroway / Hill Road intersection.
- The incorporation of intermittent kerbs along the western side of the parking / set-down area to the proposed Hill Road extension will lower the level before overflow will continue to the Parramatta River.
- These principles will need to be considered in the stormwater management strategy for the overall Wentworth Point UAP – being developed by Brown Consulting (on behalf of UrbanGrowth NSW). In this regard we note the current design information indicates Burroway Road will continue to drain further west to the proposed overland flow path (west of Hill Road) – thereby further relieving stormwater runoff from the subject intersection.

Northrop remains available to provide further information / details to support Development Application – at your discretion.

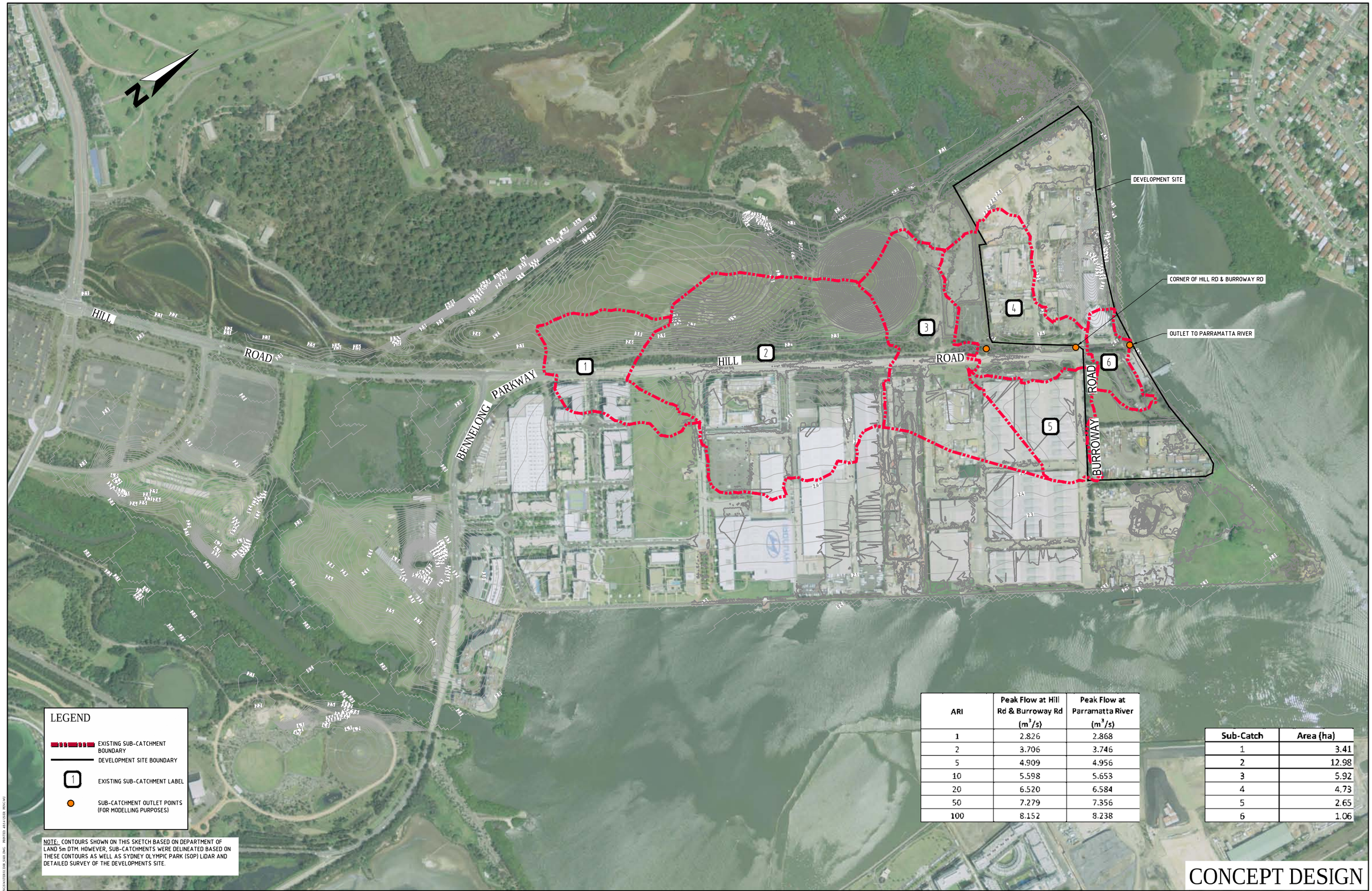
Yours faithfully,

NORTHROP

Mathew Richards

Principal – Civil Engineer

ATTACHMENT A – 'BROWN CONSULTING' CATCHMENT PLAN / CALCULATIONS



LEGEND

- EXISTING SUB-CATCHMENT BOUNDARY
- DEVELOPMENT SITE BOUNDARY
- [1] EXISTING SUB-CATCHMENT LABEL
- SUB-CATCHMENT OUTLET POINTS (FOR MODELLING PURPOSES)

NOTE: CONTOURS SHOWN ON THIS SKETCH BASED ON DEPARTMENT OF LAND 5m DTM. HOWEVER, SUB-CATCHMENTS WERE DELINEATED BASED ON THESE CONTOURS AS WELL AS SYDNEY OLYMPIC PARK (SOP) LiDAR AND DETAILED SURVEY OF THE DEVELOPMENTS SITE.

ARI	Peak Flow at Hill Rd & Burroway Rd (m^3/s)	Peak Flow at Parramatta River (m^3/s)
1	2.826	2.868
2	3.706	3.746
5	4.909	4.956
10	5.598	5.653
20	6.520	6.584
50	7.279	7.356
100	8.152	8.238

Sub-Catch	Area (ha)
1	3.41
2	12.98
3	5.92
4	4.73
5	2.65
6	1.06

CONCEPT DESIGN

Revisions						
First Issue	PW	CS	PB	RP	15/10/2013	Revision Details
	Drawn	Design	Check	Appd.	Date	

A1 PLOT 3000 — 0 20 40 60 80 100 120 — A3 PLOT 6000
60 40 20

Approval:
BY:
SIGN:
DATE:

Client: URBAN GROWTH NSW

Project: WENTWORTH POINT

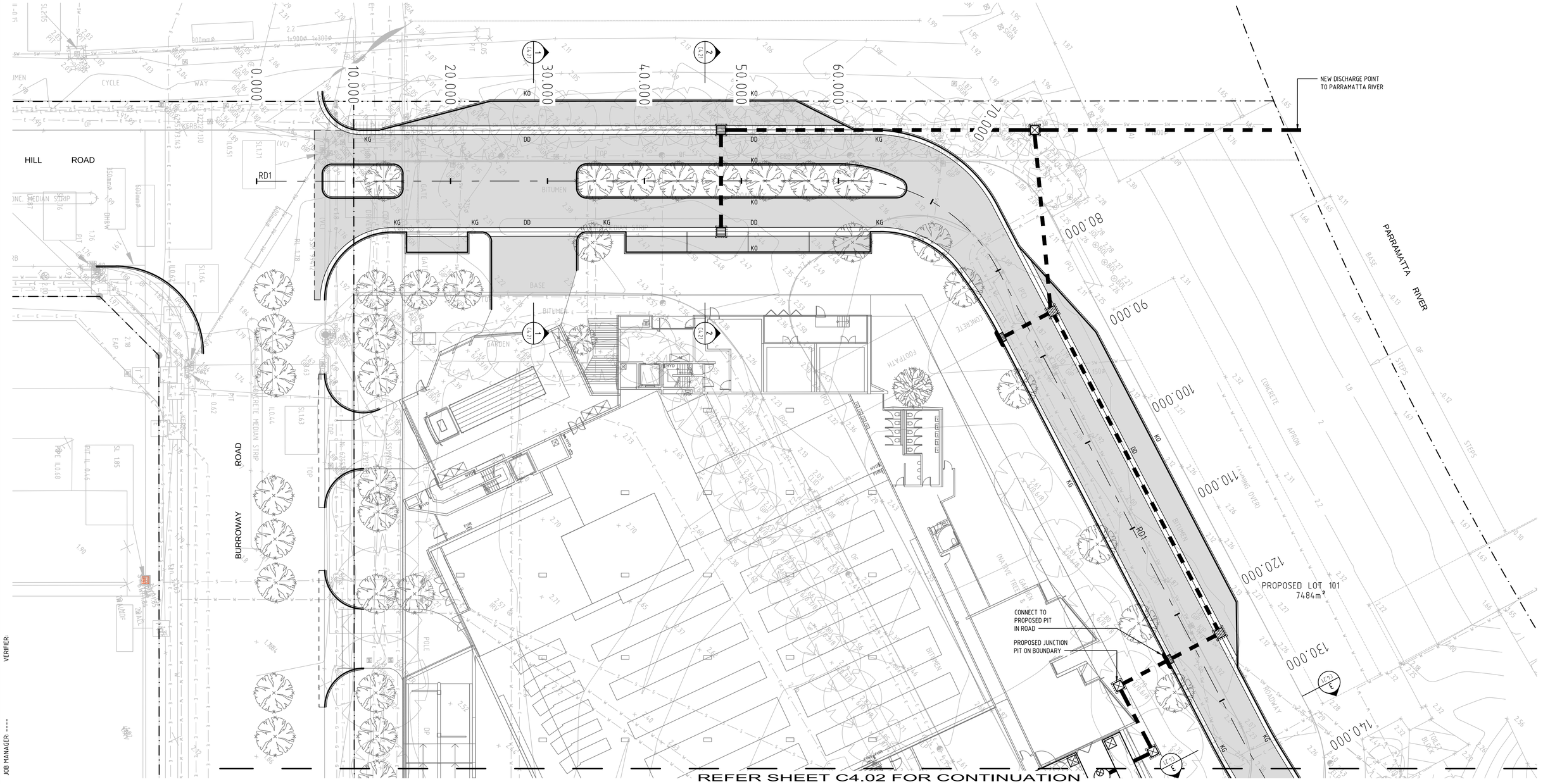
BROWN Smart Consulting

www.brownconsulting.com.au

Drawing Title: EXISTING CATCHMENT PLAN

Project No.:	Stage:	Milestone:	Dwg No.:	Revision:
X13308			SK01	

ATTACHMENT B – HILL ROAD LONGITUDINAL SECTION



LEGEND

- DENOTES PROPOSED SITE BOUNDARY LOCATION
- KG — DENOTES PROPOSED KERB & GUTTER - REFER KERB DETAIL 'KG'
- KO — DENOTES PROPOSED KERB ONLY - REFER KERB DETAIL 'KO'
- DD — DENOTES PROPOSED 900mm WIDE DISH DRAIN - REFER KERB DETAIL 'DD'
- DENOTES PROPOSED ROAD PAVEMENT
- DENOTES PROPOSED STORMWATER DRAINAGE PIT(s)
- DENOTES PROPOSED STORMWATER DRAINAGE LINE
- RWT — RAINWATER HARVESTING TANK
- GROSS POLLUTANT TRAP (CDS0506 OR APPROVED EQUIVILENT)

NOTES

1. REFER C1.01 FOR DA AND STORMWATER NOTES.
2. ROOF AREA TO DRAIN TO PROPOSED RAINWATER TANK. INTERNAL SITE DRAINAGE TO DRAIN VIA STORMWATER TREATMENT TRAIN (GPT AND STORMFILTERS) PRIOR TO LEAVING SITE.
3. STORMWATER DRAINAGE AND ROADWORKS ARE TO BE IN ACCORDANCE WITH SOPA POLICY AND GUIDELINES.

VERIFIER:
JOB MANAGER: ----
DESIGNED: S. NAUMOSKI
DRAWN: R. GRIEVE

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	RG		SN	07.02.14

CLIENT: PAYCE

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ARCHITECT: HDR RICE DAUBNEY

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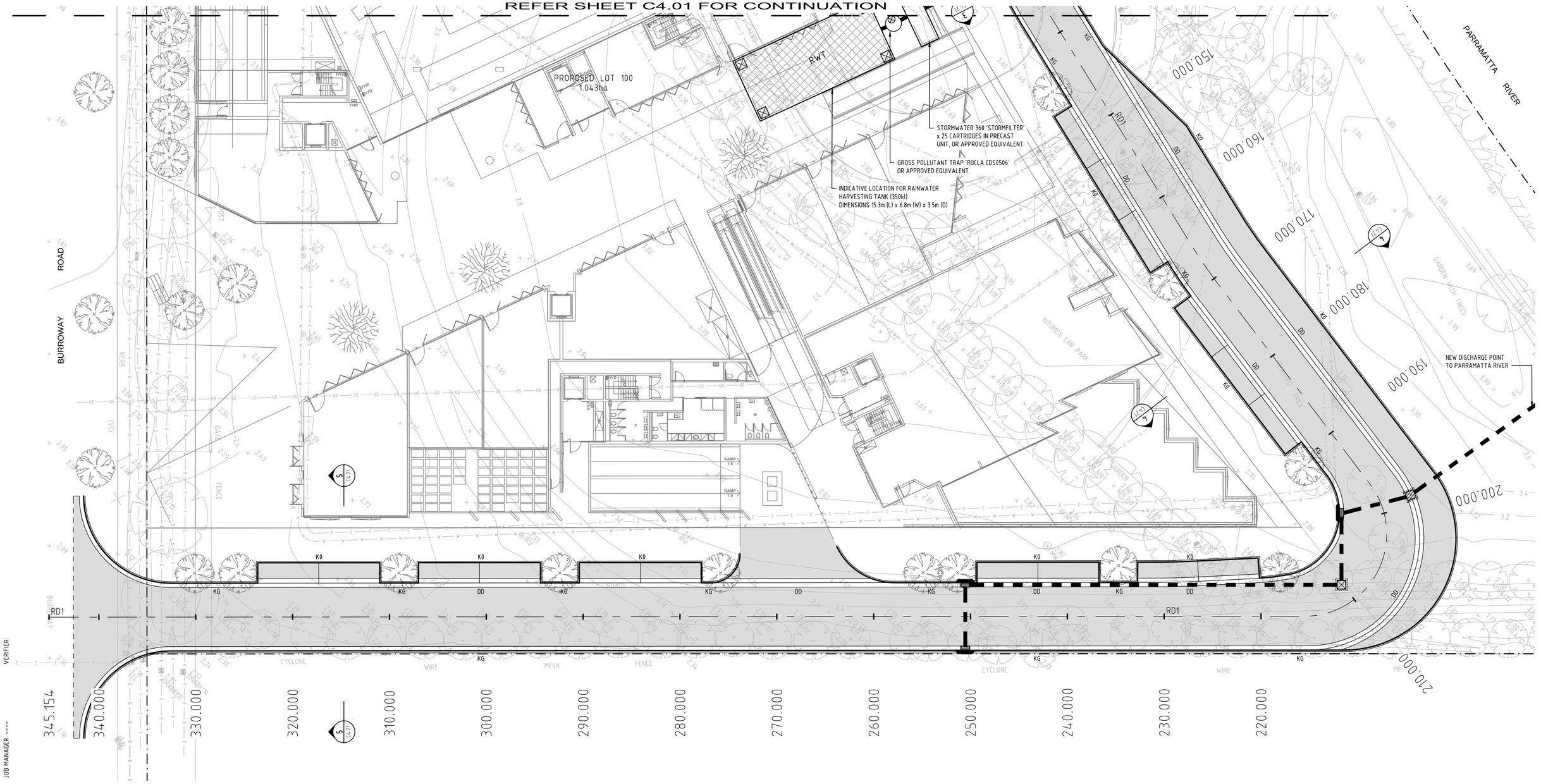
PROJECT: **SOPA FERRY WHARF**

DRAWING TITLE: **CIVIL DESIGN**
ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 1

JOB NUMBER: **130648**
DRAWING NUMBER: **C4.01**
REVISION: **1**
DRAWING SHEET SIZE = A1

Date: 07-2-14 12:38pm Plotted By: Robert.Grieve#Found : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\d-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C4.01-C4.02.dwg

REFER SHEET C4.01 FOR CONTINUATION



LEGEND

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- DENOTES PROPOSED STORMWATER DRAINAGE PIT(s)
- DENOTES PROPOSED STORMWATER DRAINAGE LINE
- RWT — RAINWATER HARVESTING TANK
- GROSS POLLUTANT TRAP (CDS0506 OR APPROVED EQUIVILENT)

NOTES

1. REFER C1.01 FOR DA AND STORMWATER NOTES.
2. ROOF AREA TO DRAIN TO PROPOSED RAINWATER TANK. INTERNAL SITE DRAINAGE TO DRAIN VIA STORMWATER TREATMENT TRAIN (GPT AND STORMFILTERS) PRIOR TO LEAVING SITE.
3. STORMWATER DRAINAGE AND ROADWORKS ARE TO BE IN ACCORDANCE WITH SOPA POLICY AND GUIDELINES.

VERIFIER:
JOB MANAGER: ----
DESIGNED: S. NAUMOSKI
DRAWN: R. GRIEVE

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PROJECT: **SOPA FERRY WHARF**

DRAWING TITLE: **CIVIL DESIGN**

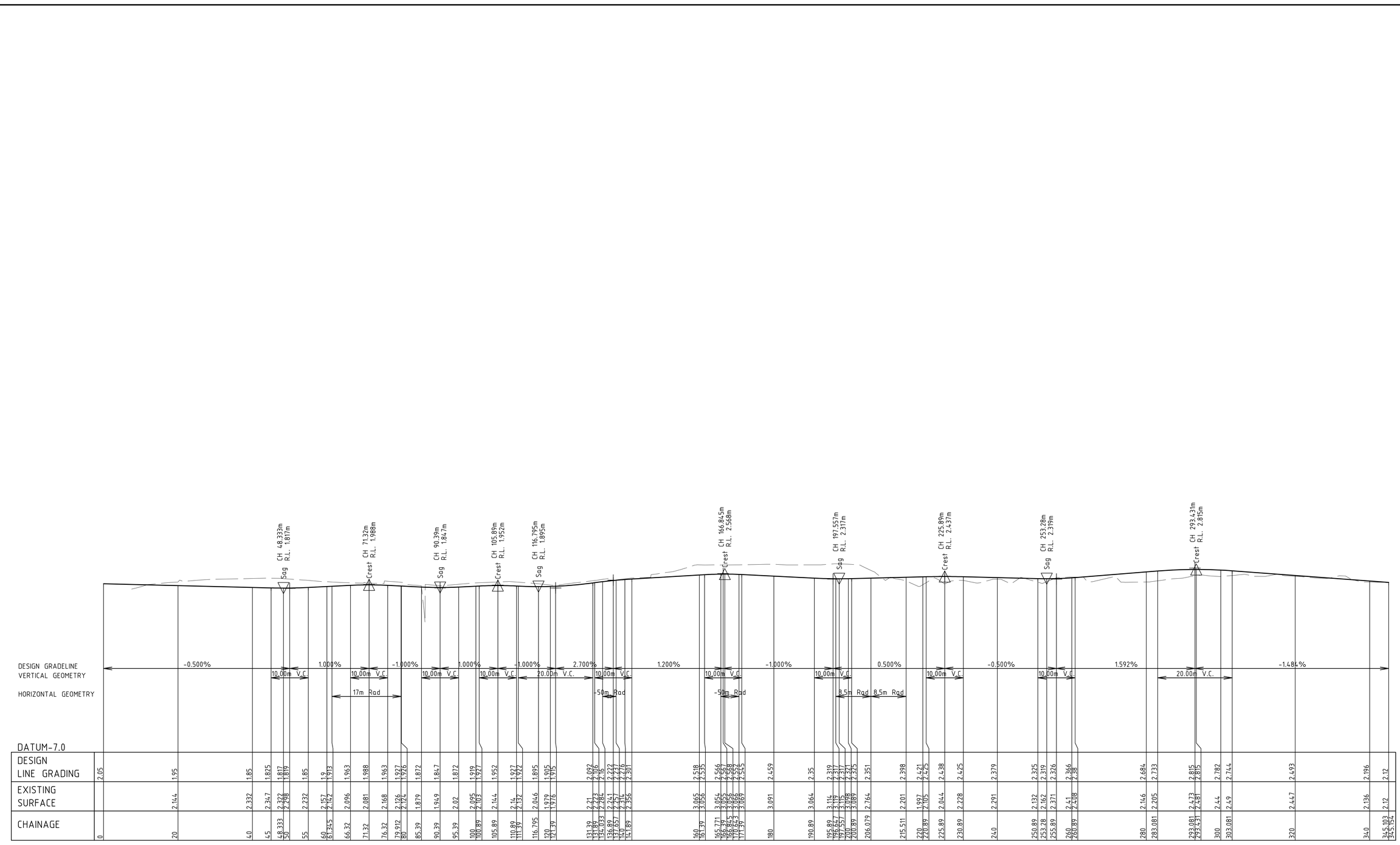
ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 2

JOB NUMBER: **130648**

DRAWING NUMBER: **C4.02** REVISION: **1**

DRAWING SHEET SIZE = A1

Date : 07-2-14 12:38pm Plotted By Robert.Grieve@found : C:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\d-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C4.01-C4.02.dwg



LONGITUDINAL SECTION RD1

Horizontal scale 1:500
Vertical scale 1:100

NOT FOR CONSTRUCTION

VERIFIER:
JOB MANAGER: ----
DESIGNED: S. NAUMOSKI
DRAWN: R. GRIEVE

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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ARCHITECT: HDR RICE DAUBNEY

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PROJECT: **SOPA FERRY WHARF**

DRAWING TITLE: **CIVIL DESIGN**
LONGITUDINAL SECTION

JOB NUMBER: **130648**
DRAWING NUMBER: **C4.11**
REVISION: **1**
DRAWING SHEET SIZE = A1

Date : 07-2-14 12:38pm Plotted By Robert.Grieve@ound : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\dr\northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C4.11.dwg

ATTACHMENT C – 'NORTHROP' MARKED-UP STORMWATER MANAGEMENT SKETCH

OPTION to CONSTRUCT KERB AS INTERMITTENT KERB TO REDUCE LEVEL OF OVERFLOW

ULTIMATE OVERFLOW POINT & LEVEL.
- RL 1.72 (PAVEMENT)
- RL 1.85 (TOP OF KERB)

NEW DISCHARGE POINT TO PARRAMATTA RIVER

HILL ROAD

RL 2.05 RD1 (EX.)

DIRECTION FOR OVERFLOW AFTER 210mm DEEP BUND-UP

EXISTING ROAD CROWN RL 1.81

EXISTING PIT RL 1.59.

RL 1.80

Flow

Flow

PROPOSED GUTTER RL 1.80 (APPROX)

RL 1.65

RL 1.74

RL 1.65

RL 1.74

BURROWAY ROAD

PARRAMATTA RIVER

000 08

000 06

100 000

110 000

120 000

130 000

140 000

PROPOSED LOT 101
7484m²

CONNECT TO PROPOSED PIT IN ROAD

PROPOSED JUNCTION PIT ON BOUNDARY

REFER SHEET C4.02 FOR CONTINUATION

LEGEND

- DENOTES PROPOSED SITE BOUNDARY LOCATION
- KG — DENOTES PROPOSED KERB & GUTTER - REFER KERB DETAIL 'KG'
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- DENOTES PROPOSED STORMWATER DRAINAGE LINE
- RWT — RAINWATER HARVESTING TANK
- GROSS POLLUTANT TRAP (CDS0506 OR APPROVED EQUIVILENT)

NOTES

1. REFER C101 FOR DA AND STORMWATER NOTES
2. ROOF AREA TO DRAIN TO PROPOSED RAINWATER TANK. INTERNAL SITE DRAINAGE TO DRAIN VIA STORMWATER TREATMENT TRAIN (GPT AND STORMFILTERS) PRIOR TO LEAVING SITE
3. STORMWATER DRAINAGE AND ROADWORKS ARE TO BE IN ACCORDANCE WITH SOPA POLICY AND GUIDELINES

MARKED-UP BY NORTHROP (16.04.14)

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DESIGNED S NAUMOSKI
DRAWN R GRIEVE
JOB MANAGER ----
VERIFIER

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PROJECT: SOPA FERRY WHARF

DRAWING TITLE: CIVIL DESIGN
ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 1

JOB NUMBER: 130648
DRAWING NUMBER: C4.01
REVISION: 1
DRAWING SHEET SIZE = A1

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Job No:	Job Name:	Pages:
130648	SOPA FERRY WHARF	1 OF 2

From	Northrop Engineers

Description	Date													
ISSUED FOR INFORMATION	D	07	28	07	12	20	23	30	**05**					
	M	02	03	05	05	05	05	05	**09**					
	Y	14	14	14	14	14	14	14	**14**					

Doc No.	Document Title	Current Revision	Revision											
C1.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN	**2**	1							**2**				
C2.01	CONCEPT SEDIMENT AND EROSION CONTROL PLAN	**2**	1							**2**				
C2.11	CONCEPT SEDIMENT AND EROSION CONTROL DETAILS	**2**	1							**2**				
C4.01	ROAD AND CONCEPT DRAINAGE LAYOUT – SHEET 1	**2**	1							**2**				
C4.02	ROAD AND CONCEPT DRAINAGE LAYOUT – SHEET 2	**3**	1			2				**3**				
C4.11	LONGITUDINAL SECTION	**2**	1							**2**				
C4.21	TYPICAL CROSS SECTIONS	**2**	1							**2**				
C5.01	DETAILS SHEET	**1**								**1**				
C11.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN	**2**		1	2									
C12.01	CONCEPT SEDIMENT AND EROSION CONTROL PLAN AND DETAILS	**2**		1	2									
C14.01	CONCEPT SITEWORKS AND DRAINAGE PLAN	**2**		1	2									
C14.11	COMBINED SERVICES RELOCATION PLAN	**3**					1	2	**3**					
C14.12	COMBINED SERVICES RELOCATION PLAN WITH FUTURE ROAD	**2**						1	**2**					
C14.13	DISPLAY SUITE AND PARKING	**1**						1						
C14.14	COMBINED SERVICES TRENCH DETAILS	**1**							**1**					
C14.15	ELECTRICAL SERVICES RELOCATION PLAN	**1**							**1**					
C14.16	COMMUNICATIONS SERVICES RELOCATION PLAN	**1**							**1**					
C14.17	WATER SERVICES RELOCATION PLAN	**1**							**1**					
C14.18	SEWER SERVICES RELOCATION PLAN	**1**							**1**					
C14.51	TURNING PATH PLAN 12.5m SINGLE UNIT BUS	**2**		1	2									
C14.52	TURNING PATH PLAN 14.5m LONG RIGID BUS	**2**			2									

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Job No:	**Job Name:**	**Pages:**
130648	SOPA FERRY WHARF	2 OF 2

From	Northrop Engineers

Description	**Date**													
	D	07	28	07	12	20	23	30	**05**					
ISSUED FOR INFORMATION	M	02	03	05	05	05	05	05	**09**					
	Y	14	14	14	14	14	14	14	**14**					

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LOUIS GOULIMIS	3	1	1	1	1	1	1						
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PURPOSE	I = Information A = Approval T = Tender C = Construction M = Amendment	A	A	A	A	I	I	I	**A**						
FORMAT	P = Print D = Disc E = Electronic	P	E	E	E	E	E	E	**E**						
SIZE	A0/A1/A2/A3/A4 etc	A3	A1	A1	A1	A1	A1	A1	**A1**						
METHOD	C = Courier H = Hand E = Email F = Facsimile P = Post	H	E	E	E	E	E	E	**E**						
SENT BY		SN	MR	SW	SW	MR	MR	RH	**RH**						

QA Form No:

SOPA FERRY WHARF WENTWORTH POINT

MIXED USE DEVELOPMENT

DEVELOPMENT APPLICATION PACKAGE

LOCALITY MAP

SOURCE : MAPS.GOOGLE.COM (©2013)

DRAWING SCHEDULE

DRG No.	DRAWING TITLE
C1.01	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
C2.01	CONCEPT SEDIMENT AND EROSION CONTROL PLAN
C2.11	CONCEPT SEDIMENT AND EROSION CONTROL DETAILS
C4.01	ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 1
C4.02	ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 2
C4.11	LONGITUDINAL SECTION
C4.21	TYPICAL CROSS SECTIONS
C5.01	DETAILS SHEET

GENERAL NOTES

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH OTHER SUCH WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES, UNO (UNLESS NOTED OTHERWISE).
3. NO DIMENSION SHALL BE OBTAINED BY SCALING THE DRAWINGS.
4. ALL LEVELS AND SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORK.
5. DETAIL SURVEY DATA WAS SUPPLIED BY TEAM 2, DRAWING DATED 18TH FEBRUARY 2009.
6. EXISTING SERVICES WHERE SHOWN HAVE BEEN PLOTTED FROM SUPPLIED DATA AND SUCH THEIR ACCURACY CAN NOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORK.
7. ON COMPLETION OF STORMWATER INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS, UNLESS DIRECTED OTHERWISE.

RAINWATER RE-USE NOTES

1. PROVIDE RAINWATER RE-USE SYSTEM TO SUPPLY WATER FOR IRRIGATION AND TOILET FLUSHING.
2. GUTTER GUARD TO BE INSTALLED ON ALL EAVES GUTTERS.
3. A PERMANENT SIGN IS TO BE LOCATED IN THE VICINITY OF THE TANK STATING THE WATER IS "NON POTABLE WATER" WITH APPROPRIATE HAZARD IDENTIFICATION.
4. PIPEWORK USED FOR RAINWATER SERVICES SHALL BE COLOURED LILAC IN ACCORDANCE WITH AS1345.
5. ALL VALVES AND APERTURES SHALL BE CLEARLY AND PERMANENTLY LABELLED WITH SAFETY SIGNS TO COMPLY WITH AS1319.
6. RAINWATER TANK RETICULATION SYSTEM AND MAINS WATER BYPASS ARRANGEMENT TO BE INSTALLED IN ACCORDANCE WITH AS/NZS 3500.1.2-2003 AND THE NSW CODE OF PRACTICE : PLUMBING AND DRAINING.
7. A FIRST FLUSH FILTRATION DEVICE IS TO BE PROVIDED AT RAINWATER TANK.

STORMWATER DRAINAGE NOTES

1. ALL STORMWATER MANAGEMENT MEASURES SHOWN ON THE DRAWINGS HAVE BEEN PREPARED FOR DEVELOPMENT APPLICATION PURPOSES TO DEMONSTRATE FEASABILITY. ALL MEASURES WILL BE SUBJECT TO DETAIL DESIGN AT THE CONSTRUCTION CERTIFICATE STAGE AND MAY BE SUBJECT TO VARIATION PROVIDED THAT THE DESIGN INTENT IS MAINTAINED.
2. THE FOLLOWING DRAWINGS SHOULD BE REVIEWED IN CONJUNCTION WITH THE INTEGRATED WATER CYCLE MANAGEMENT REPORT PREPARED BY NORTHROP ENGINEERS
3. ALL DRAINAGE LINES SHALL BE UPVC (CLASS SN4) SEWER GRADE DRAINAGE PIPE, U.N.O.
4. ALL DRAINAGE LINES SHALL BE LAID AT 1% MIN. FALL, UNO.
5. ALL LEVELS ARE AUSTRALIAN HEIGHT DATUM (AHD).
6. ALL DOWNPIPES GUTTERS TO BE DESIGNED IN ACCORDANCE WITH AS/NZS 3500.3.2 - 2003 'STORMWATER' DRAINAGE.
7. THE STORMWATER DRAINAGE DESIGN HAS BEEN CARRIED OUT IN ACCORDANCE WITH AS/NZS 3500.3.2-2003 'STORMWATER' DRAINAGE.
8. ANY VARIATIONS TO THE NOMINATED LEVELS SHALL BE REFERRED TO ENGINEER IMMEDIATELY.
9. SUBSOIL DRAINAGE SHALL BE PROVIDED TO ALL RETAINING WALLS & EMBANKMENTS, WITH THE LINES FEEDING INTO THE STORMWATER DRAINAGE SYSTEM.
10. ALL GRATES TO BE GALVANISED STEEL WITH HINGES AND CHILD PROOF LOCK.

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	RG		SN	07.02.14
2	RE-ISSUED FOR DA APPROVAL	UM		RH	05.09.14

CLIENT: PAYCE

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ARCHITECT: HDR RICE DAUBNEY

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PROJECT: SOPA WENTWORTH POINT

DRAWING TITLE: CIVIL DESIGN
COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

JOB NUMBER: 130648
DRAWING NUMBER: C1.01
REVISION: 2
DRAWING SHEET SIZE = A1

Found : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\d-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C1.01.dwg
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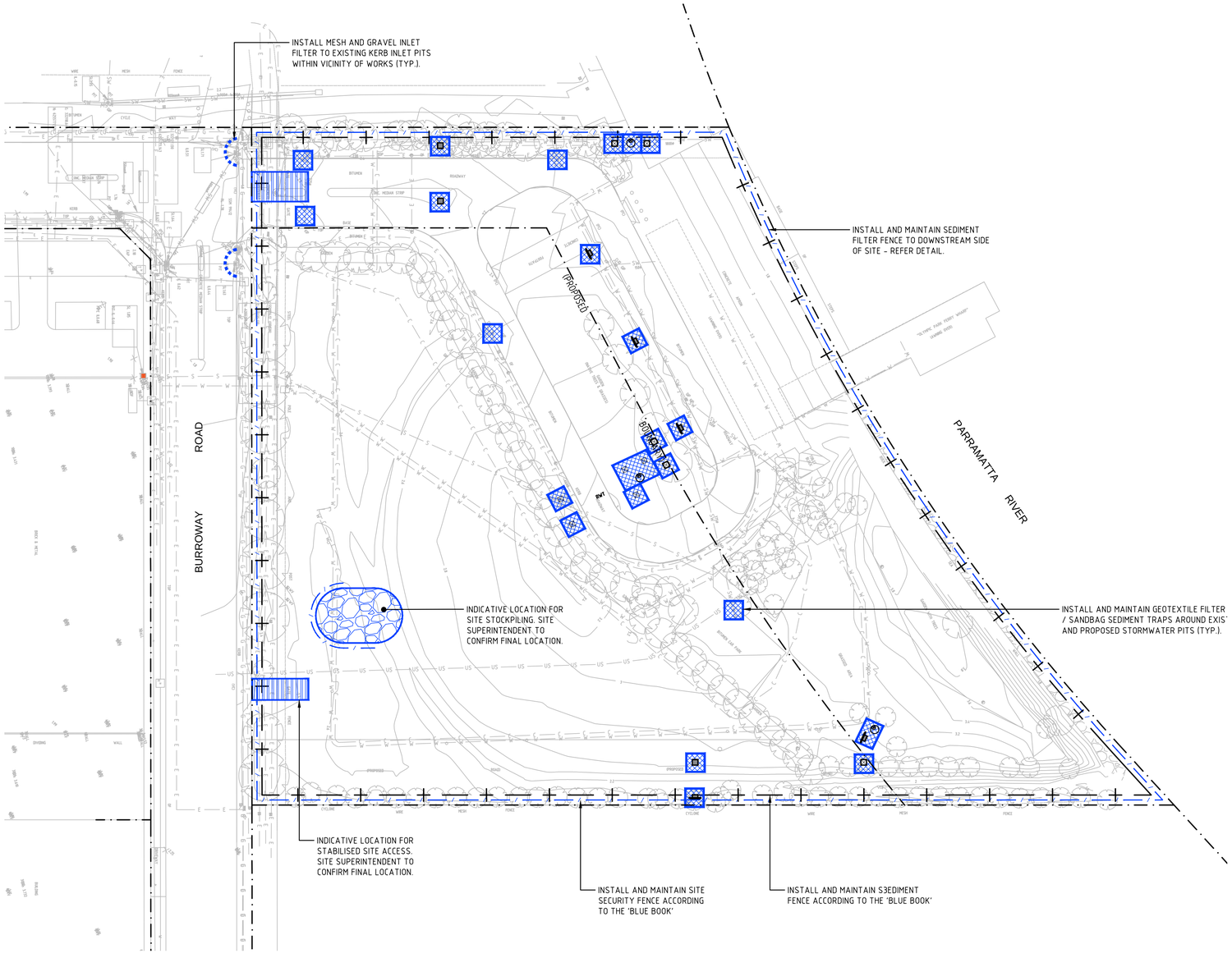

SEDIMENT AND EROSION LEGEND

- DENOTES SEDIMENT FILTER FENCE
- DENOTES SITE SECURITY FENCE
- DENOTES MESH AND GRAVEL FILTER ROLL
- DENOTES GEOTEXTILE FILTER DROP INLET / SEDIMENT TRAP
- DENOTES STABILISED SITE ACCESS / GRID
- DENOTES SITE STOCKPILE

NOTES

1. ALL SEDIMENT AND EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE 'BLUE BOOK' MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION.
2. SEDIMENT AND EROSION CONTROL MEASURES SHOWN ARE CONCEPT ONLY

DRAWN R. GRIEVE
DESIGNED S. NAUMOSKI
JOB MANAGER M. RICHARDS
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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2	RE-ISSUED FOR DA APPROVAL	UM		RH	05.09.14

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ARCHITECT: HDR | RICE DAUBNEY

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0 5 10 15 20 25m SCALE 1:500

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PROJECT: SOPA WENTWORTH POINT

DRAWING TITLE: CIVIL DESIGN
CONCEPT SEDIMENT AND EROSION CONTROL PLAN

JOB NUMBER: 130648
DRAWING NUMBER: C2.01
REVISION: 2
DRAWING SHEET SIZE = A1

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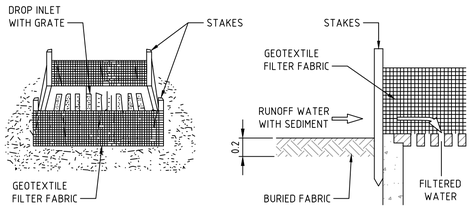
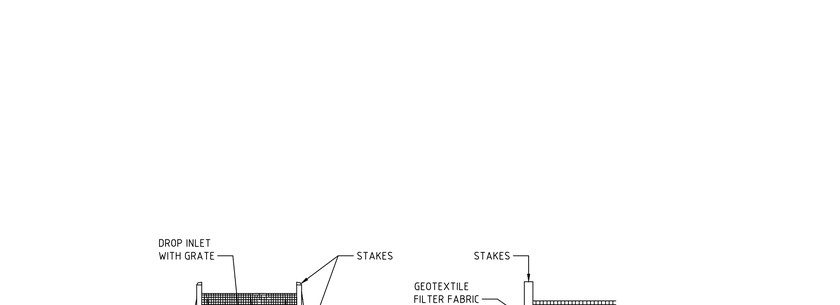


GEOTEXTILE INLET FILTER
DROP INLET SEDIMENT TRAP

NOT TO SCALE

NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.0m LONG STAR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

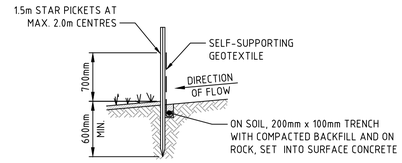


STABILISED SITE ACCESS

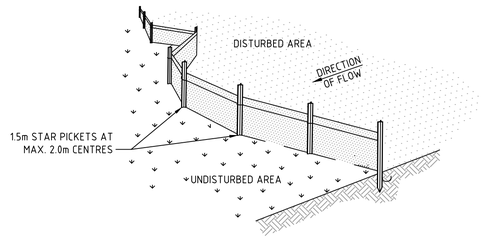
NOT TO SCALE

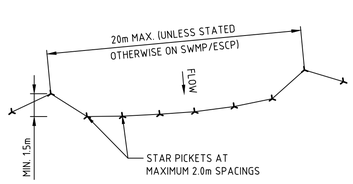
MAINTENANCE

- THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY,
- THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT,
- ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
- INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
- INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.



SECTION DETAIL





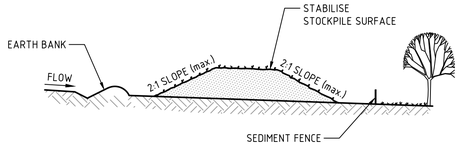
PLAN

SEDIMENT FENCE

NOT TO SCALE

NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.0m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

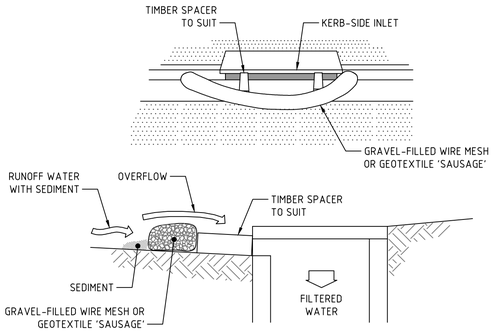


STOCKPILE

NOT TO SCALE

NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT. 4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.



MESH AND GRAVEL INLET FILTER

NOT TO SCALE

NOTES:

1. THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.
2. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
3. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
4. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
5. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100-mm SPACE BETWEEN IT AND THE KERB INLET . MAINTAIN THE OPENING WITH SPACE BLOCKS.
6. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
7. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	RG		SN	07.02.14
2	RE-ISSUED FOR DA APPROVAL	UM		RH	05.09.14

CLIENT
PAYCE
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ARCHITECT
HDR | RICE DAUBNEY
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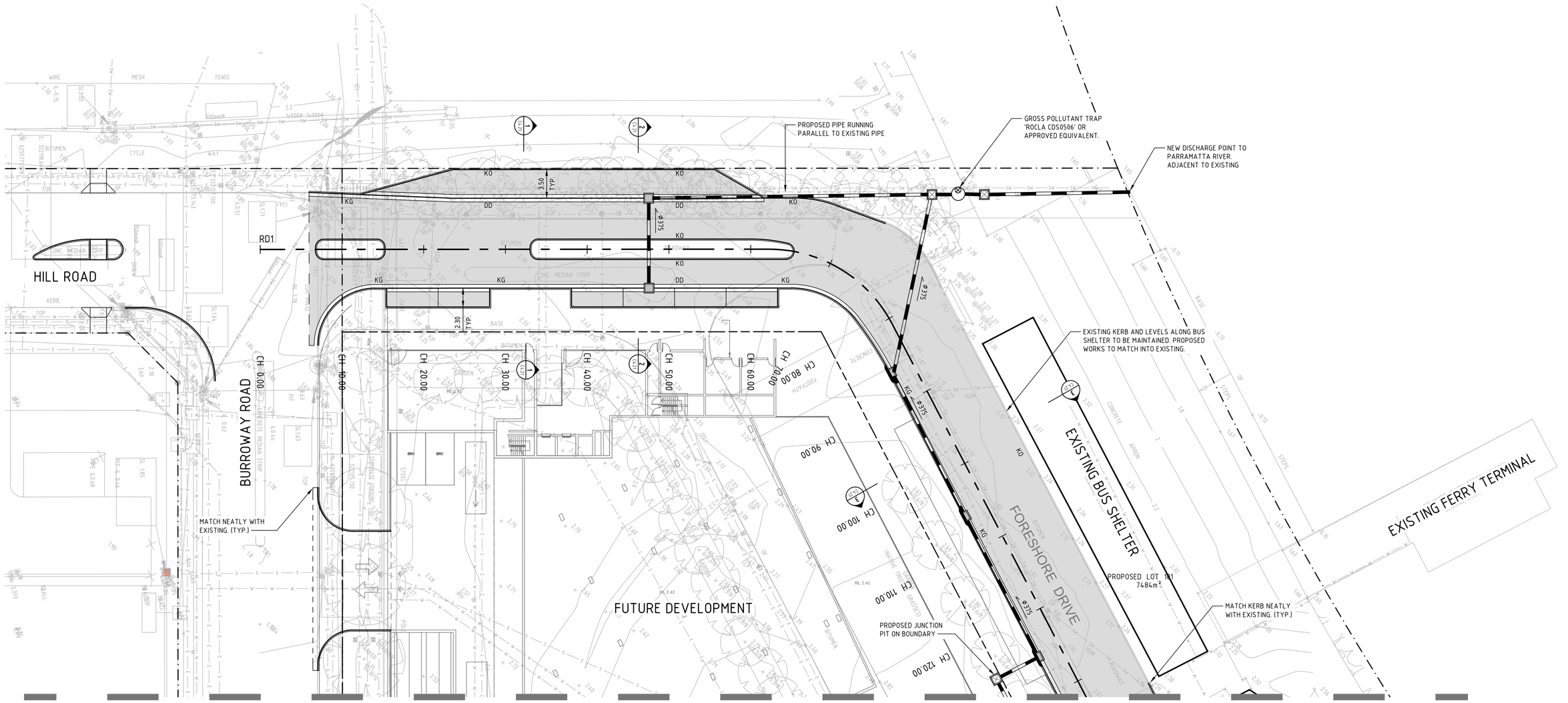
PROJECT
SOPA WENTWORTH POINT

DRAWING TITLE
CIVIL DESIGN
CONCEPT SEDIMENT AND EROSION CONTROL DETAILS

JOB NUMBER **130648**
DRAWING NUMBER **C2.11**
REVISION **2**
DRAWING SHEET SIZE = A1

Date : 05-9-14 2:22pm Plotted By umandal
Found : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use developments\c-drawings\d-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C2.11.dwg



REFER SHEET C4.02 FOR CONTINUATION

NOTES:

- KO — DENOTES PROPOSED SITE BOUNDARY
- KO — DENOTES PROPOSED KERB ONLY
- KG — DENOTES PROPOSED KERB AND GUTTER
- DD — DENOTES PROPOSED DISH DRAIN
- DENOTES PROPOSED ROAD PAVEMENT
- DENOTES PROPOSED STORMWATER PITS
- Φ375 — DENOTES PROPOSED STORMWATER PIPE
- RWT — RAINWATER HARVESTING TANK
- GROSS POLLUTANT TRAP (CDS0506 OR APPROVED EQUIVALENT

NOTES:

1. REFER TO DRAWINGS C1.01 FOR DA AND STORMWATER NOTES.
2. ROOF AREA TO DRAIN TO PROPOSED RAINWATER TANK. INTERNAL SITE DRAINAGE TO DRAIN VIA STORMWATER TREATMENT TRAIN (GPT AND STORMFILTERS) PRIOR TO LEAVING SITE.
3. STORMWATER DRAINAGE AND ROADWORKS ARE TO BE IN ACCORDANCE WITH SOPA POLICY AND GUIDELINES.

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	RG		SN	07.02.14
2	RE-ISSUED FOR DA APPROVAL	UM		RH	05.09.14

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

CLIENT: PAYCE
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ARCHITECT: HDR RICE DAUBNEY
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0 2 4 6 8 10 12m SCALE 1:250

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PROJECT: SOPA WENTWORTH POINT

DRAWING TITLE: CIVIL DESIGN
ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 1

JOB NUMBER: 130648
DRAWING NUMBER: C4.01
REVISION: 2
DRAWING SHEET SIZE = A1

Date : 05-9-14 3:09pm Plotted By umandal
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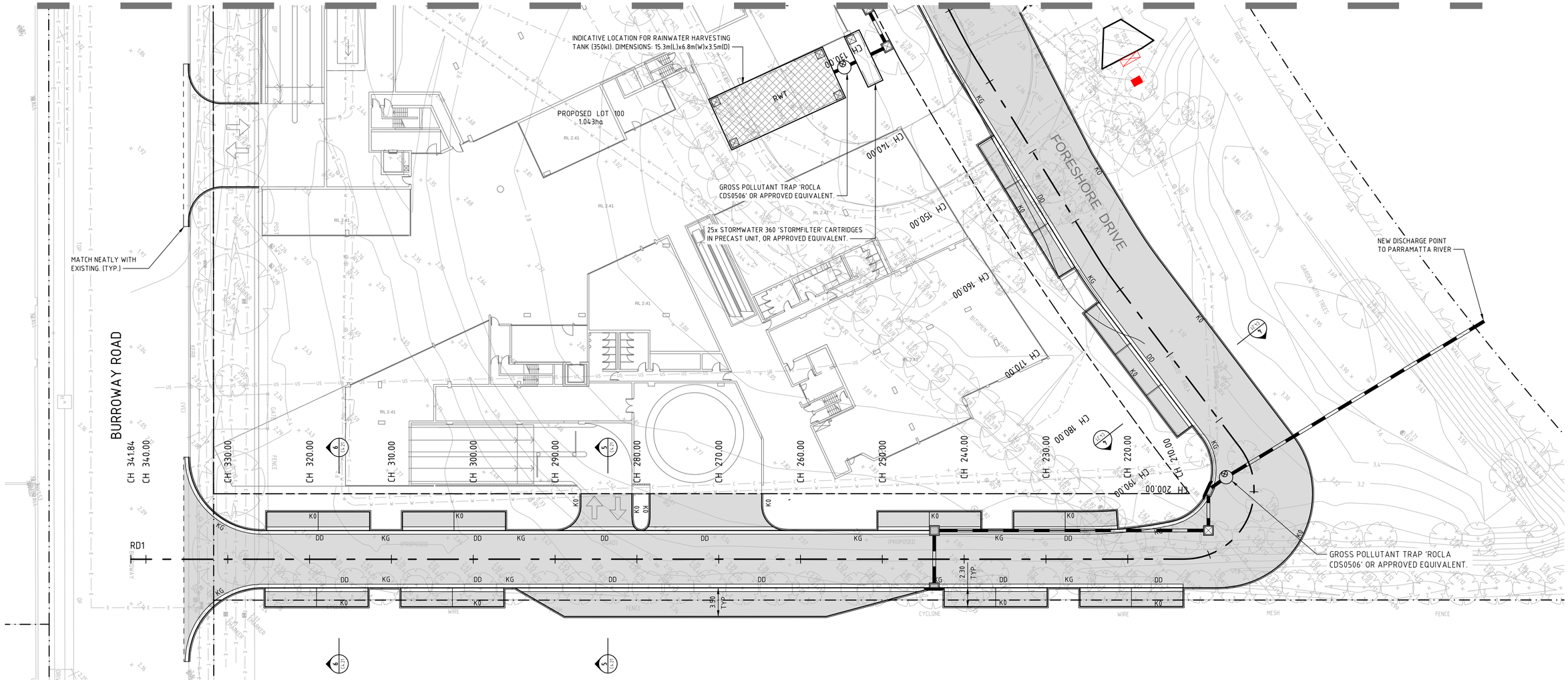
REFER SHEET C4.01 FOR CONTINUATION



NOTES:

- DENOTES PROPOSED SITE BOUNDARY
- K0 — DENOTES PROPOSED KERB ONLY
- KG — DENOTES PROPOSED KERB AND GUTTER
- DD — DENOTES PROPOSED DISH DRAIN
- DENOTES PROPOSED ROAD PAVEMENT
- DENOTES PROPOSED STORMWATER PITS
- ϕ375 — DENOTES PROPOSED STORMWATER PIPE
- RWT — RAINWATER HARVESTING TANK
- GROSS POLLUTANT TRAP (CDS0506 OR APPROVED EQUIVALENT

NOTES:

1. REFER TO DRAWINGS C1.01 FOR DA AND STORMWATER NOTES.
2. ROOF AREA TO DRAIN TO PROPOSED RAINWATER TANK. INTERNAL SITE DRAINAGE TO DRAIN VIA STORMWATER TREATMENT TRAIN (GPT AND STORMFILTERS) PRIOR TO LEAVING SITE.
3. STORMWATER DRAINAGE AND ROADWORKS ARE TO BE IN ACCORDANCE WITH SOPA POLICY AND GUIDELINES.

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	RG		SN	07.02.14
2	REISSUED FOR DA APPROVAL	SW		SN	12.05.14
3	RE-ISSUED FOR DA APPROVAL	UM		RH	05.09.14

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

CLIENT: PAYCE
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT: HDR RICE DAUBNEY
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0 2 4 6 8 10 12m
SCALE 1:250

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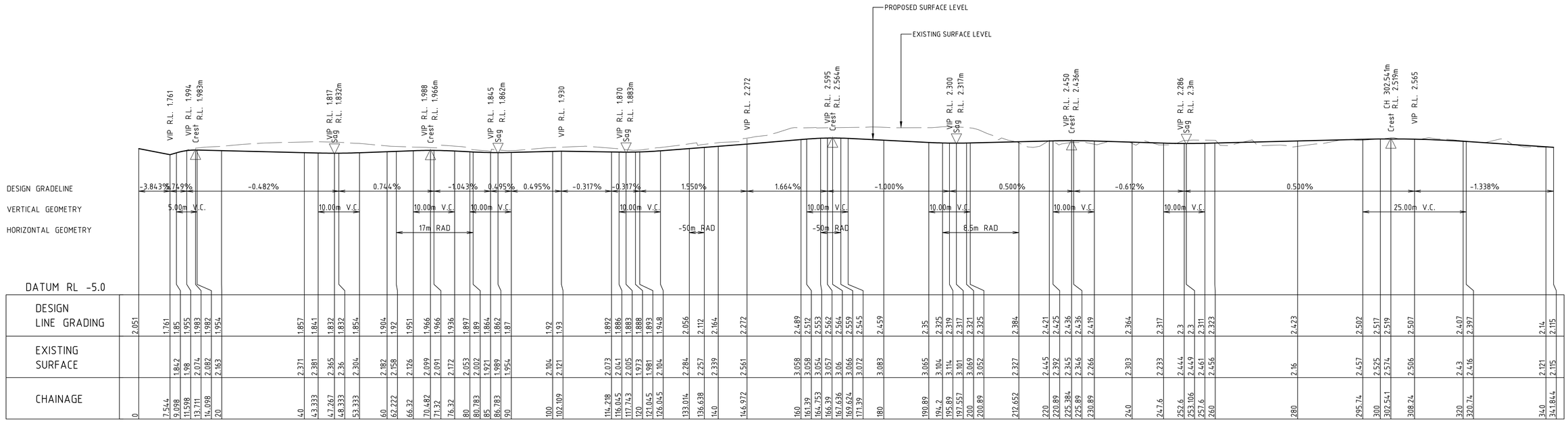
PROJECT: SOPA WENTWORTH POINT

DRAWING TITLE: CIVIL DESIGN
ROAD AND CONCEPT DRAINAGE LAYOUT - SHEET 2

JOB NUMBER: 130648
DRAWING NUMBER: C4.02
REVISION: 3
DRAWING SHEET SIZE = A1

Found : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\d-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C4.01-C4.02.dwg
Date : 08-9-14 3:10pm Plotted By umandal



LONGITUDINAL SECTION RD1

Horizontal scale 1:500
Vertical scale 1:100

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
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ARCHITECT: HDR RICE DAUBNEY

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NORTHROP
Sydney
Level 11, 345 George Street, Sydney NSW 2000
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

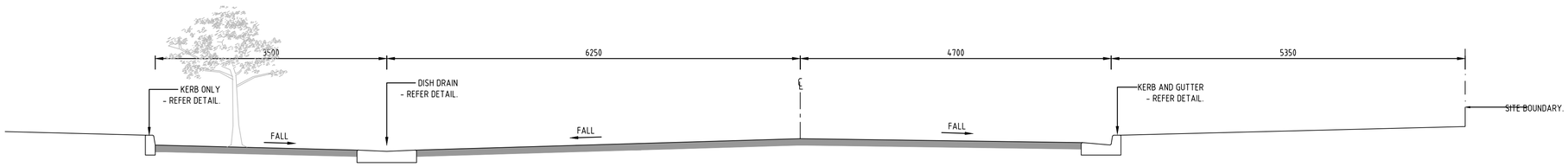
PROJECT: SOPA WENTWORTH POINT

DRAWING TITLE: CIVIL DESIGN
LONGITUDINAL SECTION

JOB NUMBER: 130648
DRAWING NUMBER: C4.11
REVISION: 2
DRAWING SHEET SIZE = A1

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

Found : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\st-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C4.11.dwg
Plotted By: umandal
Date : 05-9-14 2:22pm



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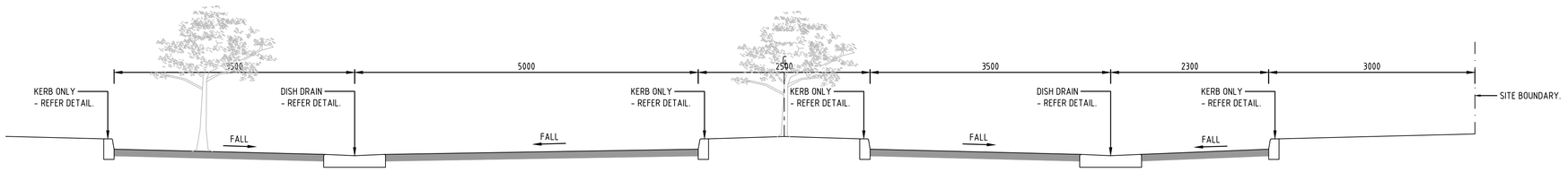
SCALE 1:40



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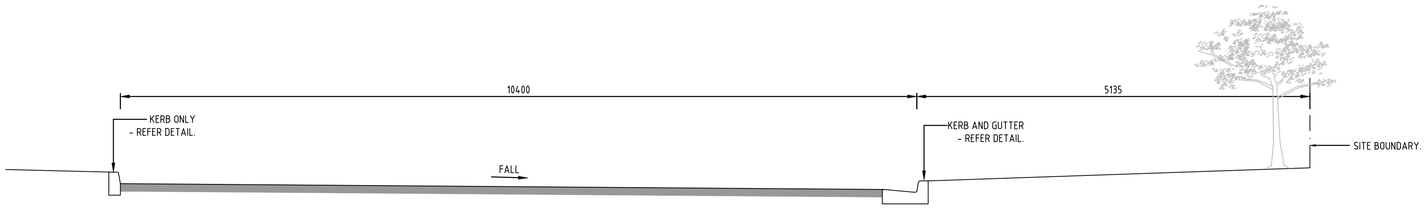
SCALE 1:40



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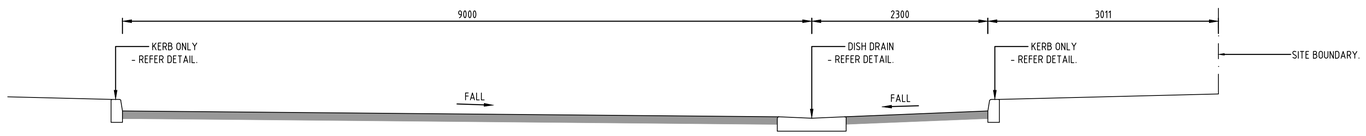
SCALE 1:40



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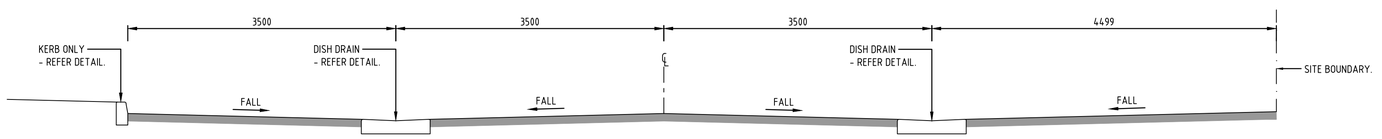

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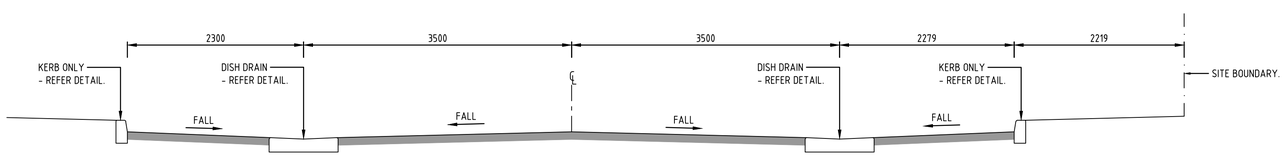

TYPICAL SECTION 6
SCALE 1:40

DESIGNED: S. NAUMOSKI
DRAWN: R. GREEVE
JOB MANAGER: M. RICHARDS
VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	RG		SN	07.02.14
2	RE-ISSUED FOR DA APPROVAL	UM		RH	05.09.14

CLIENT
PAYCE
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ARCHITECT
HDR | RICE DAUBNEY
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0.0 0.4 0.8 1.2 1.6 2.0m
SCALE 1:40

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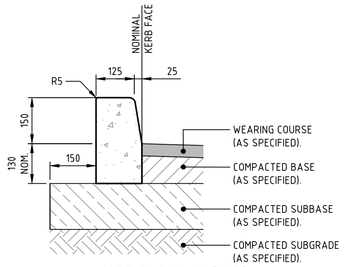
PROJECT
SOPA WENTWORTH POINT

DRAWING TITLE
CIVIL DESIGN
TYPICAL CROSS SECTIONS

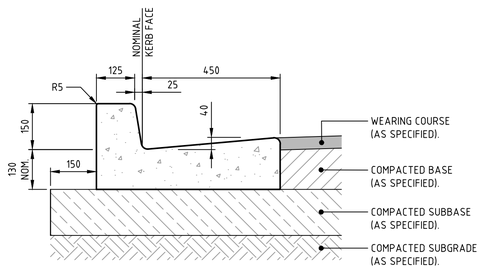
JOB NUMBER 130648
DRAWING NUMBER C4.21
REVISION 2
DRAWING SHEET SIZE = A1

Found : O:\2013 jobs\130648 - sopa ferry wharf, wentworth point - mixed use development\c-drawings\d-northrop\C-CIVIL\3-CURRENT CAD FILES\130648_C4.21.dwg
Date : 05-9-14 3:10pm Plotted By umandal



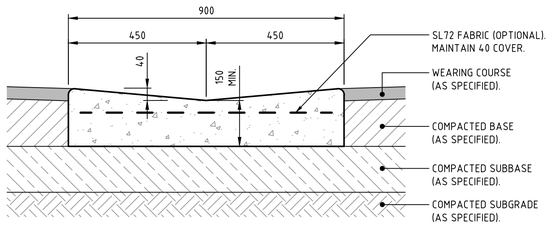
KERB ONLY (KO)

PROVIDE TOOL JOINTS @ MAX 3m CENTRES.
ALL RADII TO BE 20mm UNLESS NOTEDOTHERWISE.



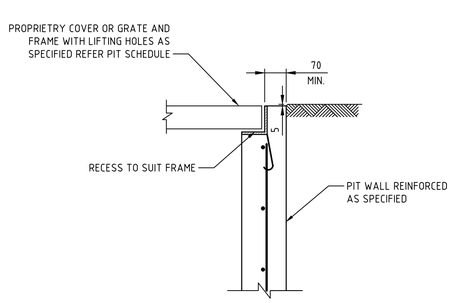
KERB & GUTTER (KG)

PROVIDE TOOL JOINTS @ MAX 3m CENTRES.
ALL RADII TO BE 20mm UNLESS NOTED OTHERWISE.



900 WIDE DISH DRAIN (DD)

ALIGN KERB TOOLED JOINTS @ MAX 3m CENTRES.
ALL RADII TO BE 20mm UNLESS NOTED OTHERWISE.



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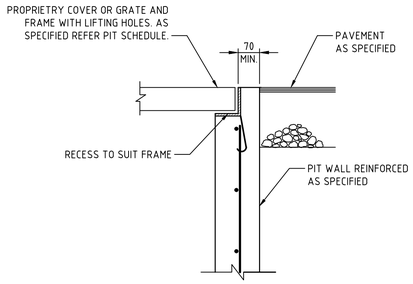

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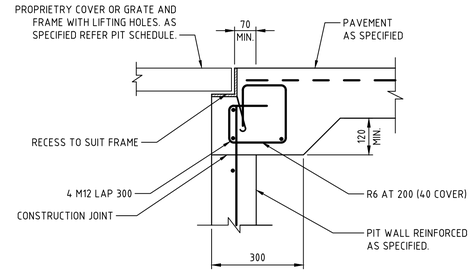

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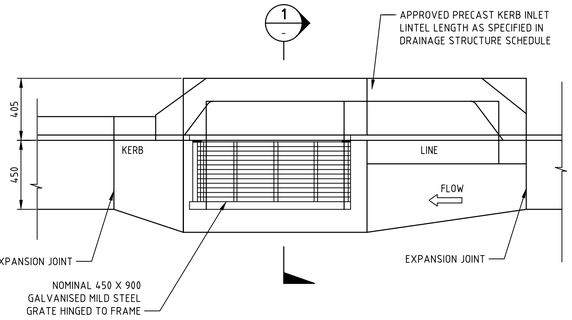
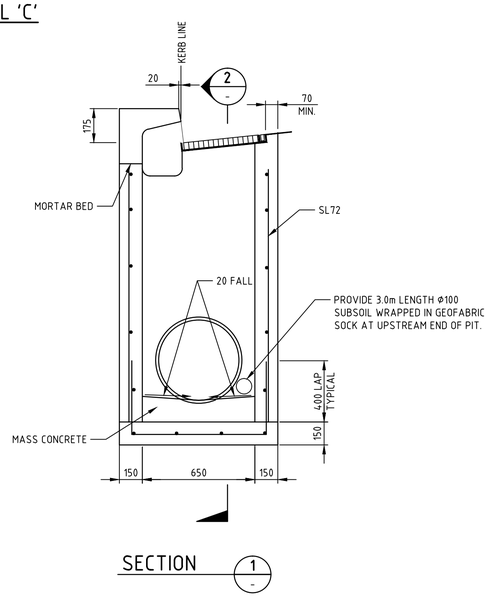
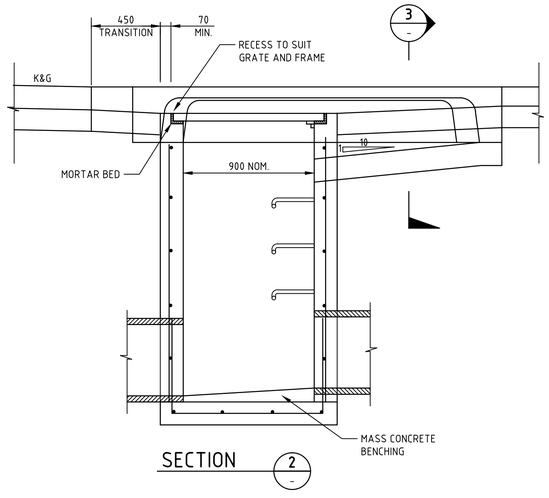


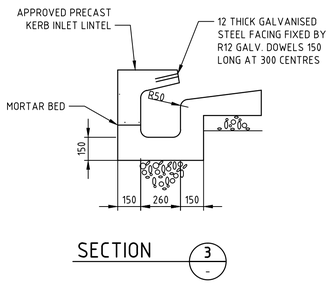
PLAN



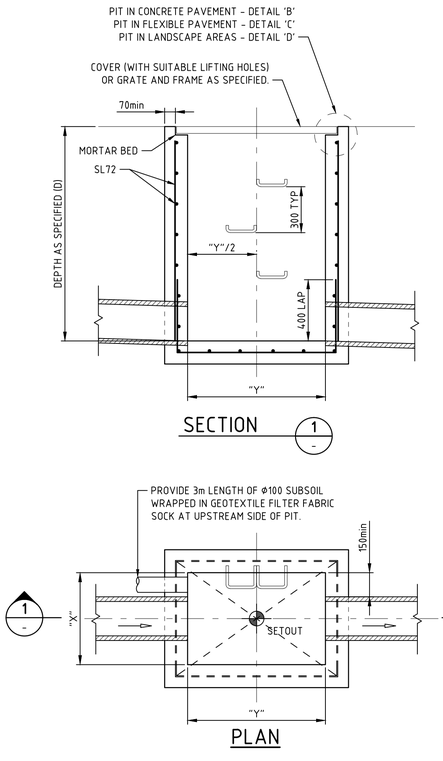
SECTION 1



SECTION 2



SECTION 3



SECTION 1

PLAN

KERB INLET PIT TYPE "A" (PIPE SIZES ≤ 450 ø)

PROVIDE STEP IRONS FOR ALL PITS FOR PITS >1200 DEEP

SURFACE INLET / JUNCTION PIT

- PIT STRUCTURE TO BE 150 THICK UNLESS NOTED OTHERWISE.
- PROVIDE STEP IRONS IF PIT DEEPER THAN 900mm IN ACCORDANCE WITH AUSTRALIAN STANDARDS.

NOT FOR CONSTRUCTION

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR DA APPROVAL	UM		RH	05.09.14

CLIENT: PAYCE

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ARCHITECT: HDR RICE DAUBNEY

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PROJECT: **SOPA WENTWORTH POINT**

DRAWING TITLE: **CIVIL DESIGN**

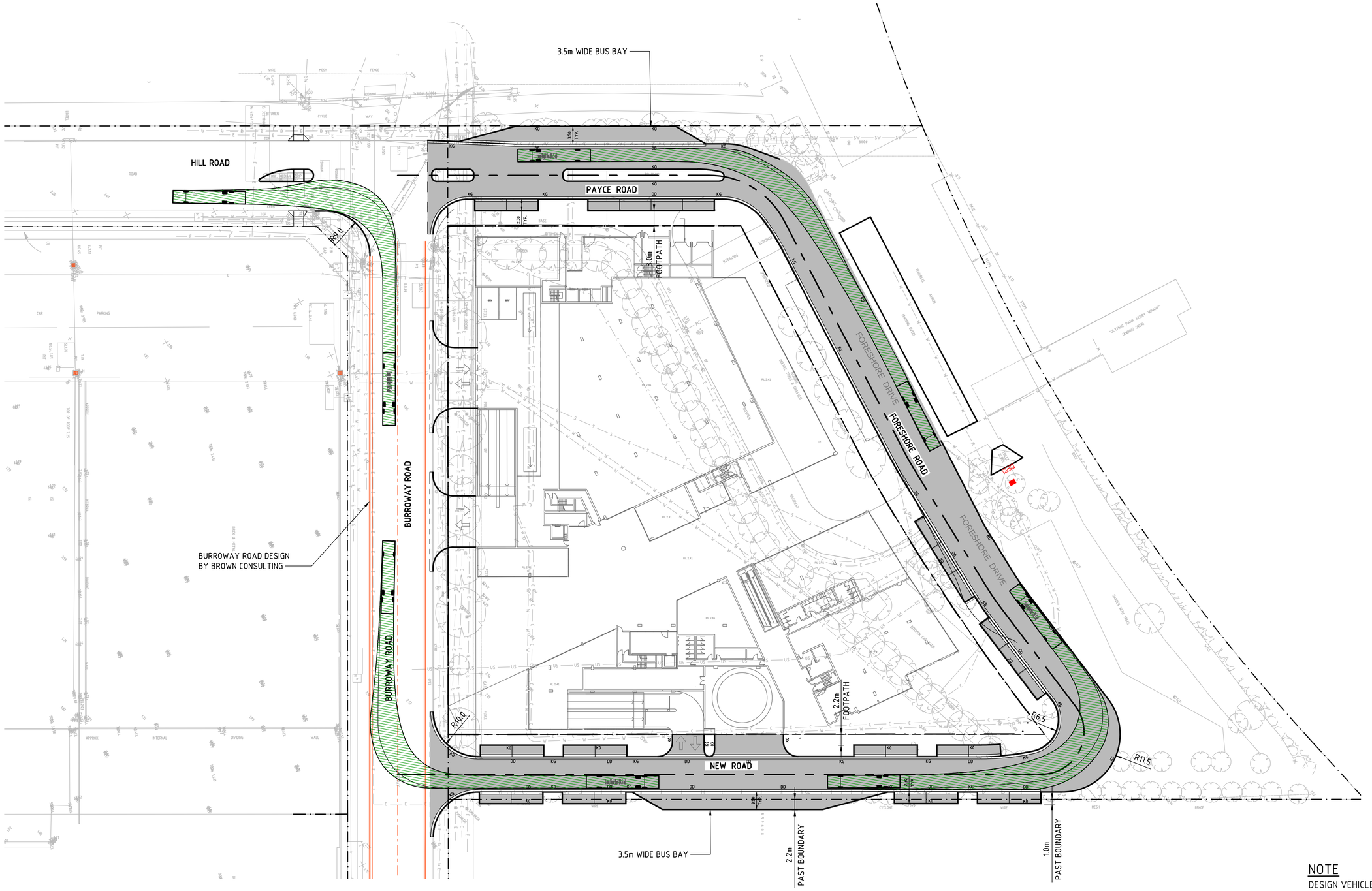
DETAILS SHEET

JOB NUMBER: **130648**

DRAWING NUMBER: **C5.01**

REVISION: **1**

DRAWING SHEET SIZE = A1



NOTE

DESIGN VEHICLE - 14.5m LONG RIGID BUS (AUSTROADS 2013).
DESIGN SPEED - 15kM/h.
CENTRE RADIUS - 14m.

NOT FOR CONSTRUCTION

DRAWN: R. GRIEVE
DESIGNED: S. NAUMOSKI
JOB MANAGER: M. RICHARDS
VERIFIER:

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	ISSUED FOR INFORMATION	UM		MR	05.09.14

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ARCHITECT: HDR RICE DAUBNEY

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0 4 8 12 16 20m SCALE 1:400

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PROJECT: **SOPA WENTWORTH POINT**

DRAWING TITLE: **SKETCHES**

VEHICLE TURN PATHS - 14.05M COACH

JOB NUMBER: **130648**

DRAWING NUMBER: **SK5.01**

REVISION: **1**

DRAWING SHEET SIZE = A1

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Plotted By umandal
Date : 05-9-14 3:26pm