



Taronga Institute of Science & Learning

Stormwater Management Report

Prepared for:

Client name
Taronga Conservation
Society

Date:
18 April 2015

Prepared by:

Tim Fitzhardinge
Project No. 27581-SYD-C
P:\27581\PROJECT DOCUMENTATION\CIVIL\27581-SYD-C-R-SMP.DOCX

Level 6, Building B, 207 Pacific Highway, St Leonards NSW 2065
T: (02) 8484 7000 F: (02) 8484 7100 E: sydney@wge.com.au W: www.wge.com.au

Revision

Site Address: Taronga Zoo, Bradleys Head Road, Mosman NSW 2088
Real Property Description: Lot 22 on DP843294
Proposed Development: Education and Research Development

Client: Taronga Conservation Society
Local Authority: Mosman Council
Authority Reference #: N/A
Wood & Grieve Reference: 27581-SYD-C-R-SWMP



Tim Fitzhardinge BE (Civil) & ME (Water)
For and on behalf of
Wood & Grieve Engineers

REVISION	DATE	COMMENT	APPROVED BY
A	02.11.15	DA Issue	IH
B	10.11.15	DA Issue	IH
C	24.11.15	DA Issue	IH
D	18.04.15	DA Issue	IH

COPYRIGHT ©

This report is the property of Wood & Grieve Engineers, and is licensed to the Client for use on this project. Reproduction of this document for this project shall only be undertaken in full. Reproduction for other purposes without the permission of Wood & Grieve Engineers is prohibited.

Contents

1.	INTRODUCTION	1
2.	EXISTING SITE CHARACTERISTICS	2
2.1	Property Detail	2
2.2	Topography	3
2.3	Stormwater Catchments	3
2.4	Existing Stormwater Discharge	3
3.	LOCAL AUTHORITY REQUIREMENTS	4
3.1	Stormwater Conveyance Requirements	4
4.	FLOOD IMPACT ASSESSMENT	5
4.1	Existing Flooding	5
5.	STORMWATER CONVEYANCE	6
5.1	External Catchments	6
5.2	Roof Drainage	6
5.3	Surface Drainage	6
5.4	Legal Point of Discharge	7
6.	WATER QUALITY TREATMENT	8
6.1	Potential Pollutants	8
6.2	Stormwater Treatment Train	9
6.3	EPA Approval	9
7.	EROSION & SEDIMENTATION CONTROL	11
	APPENDIX A – CIVIL DRAWINGS	12

Introduction

1. Introduction

Wood & Grieve Engineers have been commissioned by Taronga Conservation Society to prepare this Stormwater Management Plan (SMP) in support of the Development Application for the proposed development at Taronga Institute of Science and Learning Building at Taronga Zoo. The works is a portion of the Taronga Zoo site of existing Lot 22 on DP 843294.

This SMP outlines the conceptual DA level stormwater design for the proposed development of the Taronga Institute of Science and Learning Building.

This SMP demonstrates the application of Water Sensitive Urban Design (WSUD) principles and illustrates that the proposed development complies with the Mosman Council Standards and Guidelines for stormwater, Australian Rainfall and Runoff, Australian Standards and best engineering practise.

The purpose of this SMP is to evaluate the quantity of stormwater associated with the proposed development plan so as to demonstrate to Council that an appropriate stormwater management strategy has been adopted.

The SMP specifically addresses the following items for both the construction and operational phases of the development:

- Flooding Impacts on the development
- Stormwater runoff volumes (Stormwater Quantity);
- Erosion and Sedimentation Control.

The following will be achieved with the correct application of this SMP report:

- Appropriate standards to be maintained on all aspects of stormwater within the site,
- Examination of the surrounding area and properties to ensure they will not be adversely affected nor unduly disrupted by stormwater, and
- Establishment of a unified, clear and concise stormwater management strategy.

Existing Site Characteristics

2. Existing Site Characteristics

2.1 Property Detail

Address: Taronga Zoo, Bradleys Head Road, Mosman NSW 2088
Real Property Description: Lot 22 on DP843294
Total Site Area: 7,700m² (0.77Ha)

The proposed development can be seen on the concept design drawings in Appendix A of this report.

The proposed development will consist of the Taronga Institute of Science and Learning building, with associated access pathways and landscaping.

As can be seen in the site location aerial photo below, the proposed building lies within the Taronga Zoo site, adjacent to the Sky Safari Building and overflow car park.

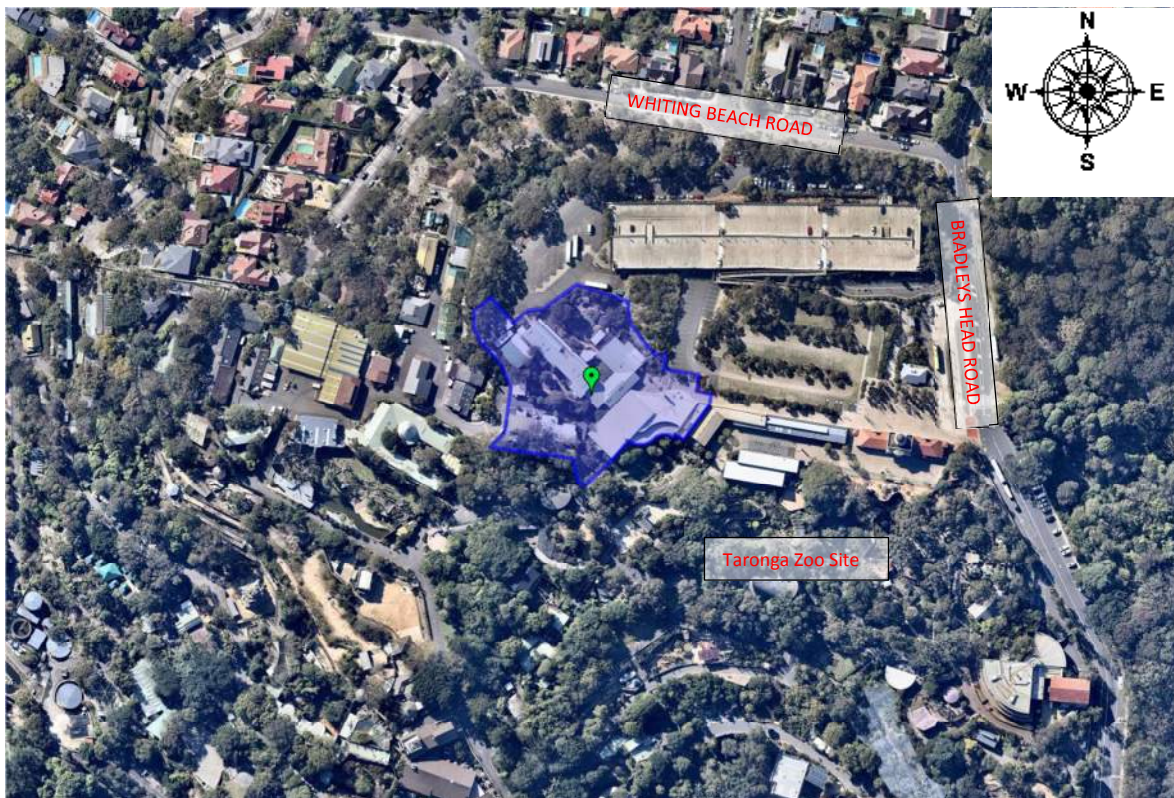


Figure 1: Site Location Plan (Source: Nearmaps 2015)

Existing Site Characteristics

2.2 Topography

The existing site is fully developed and consists of the existing Zoo Education Centre, CWI Building, records building, discovery host building, a carport structure, a demountable and the existing service road. The site generally falls from north to south. The majority of the Taronga Zoo site is steep.

2.3 Stormwater Catchments

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site.

The northern upstream catchments on the site flow overland to the south to the water treatment and reticulation plant (refer below for details). The overland flows are generally managed and directed by swales and existing topography. There is existing local nuisance flooding near the existing Zoo Educational Building. Refer also to section 4.1.2.

2.4 Existing Stormwater Discharge

There is existing in-ground drainage that runs adjacent to the existing buildings. These lines service the adjacent existing buildings and a portion of the overflow carpark.

On the eastern side of the Zoo Education Building there is an existing 225/300mm diameter reinforced concrete pipe (RCP) that discharges into the Crocodile Enclosure. To the south west of the Crocodile Enclosure there is also an existing 225/300 mm diameter RCP.

The Taronga Zoo site contains its own water treatment and reticulation plant at the southern downstream end of the site (at the foreshore). Generally all stormwater eventually drains to the plant. This system also has capacity to manage some excessive flows (that is on-site detention) to minimise discharge into Sydney Harbour.

Local Authority Requirements

3. Local Authority Requirements

Mosman Council set the design requirements for any new stormwater management system associated with new development in their Stormwater Management Code. A summary of the key requirements for the development of the Stormwater management system for this development are summarized below.

3.1 Stormwater Conveyance Requirements

Council's Stormwater Management Code states that the following design storm Average Recurrence Intervals ARI's should be allowed for when designing the Stormwater runoff conveyance systems for the development.

Design Parameter	Design Storm ARI (Years)	Conveyance Method
Minor Drainage System	20	In Ground (Piped)
Major Drainage System	100	Overland

Table 1: Stormwater Drainage Serviceability

Flood Impact Assessment

4. Flood Impact Assessment

When considering a new development it is important to assess the impact of existing flooding on the proposed development and also the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

4.1 Existing Flooding

4.1.1 Flood Related Development Controls

Wood & Grieve Engineers have assessed all publically available documentation regarding flooding and since the site is near the top of the catchment and contains steep topography, the site is not subjected to major flooding.

4.1.2 Local Flooding

Local or Nuisance flooding describes flooding occurring due to site specific constraints. Local flooding is often caused by local topographical constraints and stormwater drainage system capacity restrictions.

There is currently nuisance flooding to the north east end of the Zoo Educational Building (expressed by Taronga Zoo personnel). The upstream catchment flowing from the western portion of the overflow carpark and adjacent footpath is creating nuisance flooding in the area. The rectification works are currently being undertaken to capture the overland flow and discharge it to the existing swales. As part of the project there will also be a re-grading of the front entry to fall away from the new doors preventing overland flow heading towards the new building.

Stormwater Conveyance

5. Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in section 3.1 of this report council have set minimum design parameters for the flows they require to be conveyed through the in ground drainage system and what they will allow to be conveyed in a controlled manner overland across the site.

5.1 External Catchments

As discussed in section 4.1.2 there are upstream catchments (from the north) draining to the existing Zoo Educational Building. This is creating local nuisance flooding and will be rectified as part of the works as described in section 4.1.2. The external drainage around the buildings has a 20yr ARI capacity. Once full, surface runoff flows overland to the water treatment and reticulation plant as described in section 2.4.

5.2 Roof Drainage

All roof areas will be drained through a conventional gutter and downpipe system. The drainage system will be designed in accordance with AS3500.3:2003 to convey the major design storm runoff from the roof to the in ground drainage system. Flows in excess of the design flows will surcharge the roof drainage system and discharge onto the surrounding ground where it will then be conveyed overland to the surrounding in ground drainage network within the roads. Refer to Hydraulic documentation for details on the roof drainage.

5.3 Surface Drainage

The surface areas will be drained through a variety of methods, discussed below, in accordance with AS3500.3:2003 and council's stormwater drainage guidelines.

5.3.1 In Ground Drainage

The in ground drainage has been designed to meet the following criteria:

- In the minor design storm event (20 year) there will be no surcharging of the in ground drainage system and;
- In the major design storm event (100 year) there will be no uncontrolled discharge from the Taronga site into the downstream Harbour foreshore.

Surface runoff from the footpaths and landscapes areas will be directed to stormwater inlet structures using the design topography of these elements. The inlet structures have been designed to adequately convey the surface runoff into the in ground drainage network.

The building drainage will be connected to the in ground drainage system as discussed in section 5.2.

The runoff will then be conveyed underground across the site to the legal point of discharge using gravity and the geometric falls of the pipe system.

Stormwater Conveyance

5.4 Legal Point of Discharge

There are existing in-ground drainage pipes adjacent to the Crocodile Enclosure as previously described in section 2.4. The north eastern portion of the roof and surrounding areas will connect into the existing 225mm diameter RCP pipe (which discharges into the Crocodile Enclosure). The remaining roof and surrounding area connects into an existing 225mm diameter RCP that runs to the south of the Crocodile Enclosure.

6. Water Quality Treatment

6.1 Potential Pollutants

There are a wide range of potential stormwater pollutant sources which occur from urbanised catchments, many which can be managed through appropriate stormwater quality treatment. Typical urban pollutants may include:

- Atmospheric deposition
- Erosion (including that from subdivision and building activities)
- Litter and debris
- Traffic emissions and vehicle wear
- Animal droppings
- Pesticides and fertilisers
- Application, storage and wash-off of car oil, detergents and other household and commercial solvents and chemicals
- Solids accumulation and growth in stormwater systems
- Weathering of buildings

These pollutants in urban stormwater can be placed into various categories as follows. The pollutants underlined below are able to be readily modelled:

- Suspended Solids
- Litter
- Nutrients such as Nitrogen and Phosphorous
- Biological oxygen demand (BOD) and chemical oxygen demand (COD) materials
- Micro-organisms
- Toxic organics
- Trace metals
- Oils and surfactants

While only the key pollutants underlined above will be examined within the modelling, the stormwater Quality Improvement Devices implemented are expected to assist in reducing a wide range of pollutants. For example, heavy metals are commonly associated with, and bound to fine sediments. Thus reducing the discharge of fine sediment during the construction and operational phases will also reduce the discharge of heavy metals to existing stormwater systems.

Water Quality Treatment

6.2 Stormwater Treatment Train

As discussed in section 2.2, the existing site is fully development with the Zoo Education Centre, CWI Building, records building, discovery host building, a carport structure, a demountable and the existing service road. As part of the ESD Green Star Requirements for the development, the proposed stormwater system for will include treatment devices and rainwater reuse. This system consists of a 50kL rainwater tank used for irrigation and toilet flushing, Stormwater 360 Stormfilters and Enviropods. The pollutants targeted Quantity of units to be confirmed during detailed design.

Thus the proposed development will reduce stormwater pollutant load to the downstream receiving stormwater system, and water treatment and reticulation plant.

6.3 EPA Approval

The Zoo currently has an EPA license on the harbour outfall (or overflow line) from the downstream water treatment and reticulation plant. The Zoo undertakes monthly water testing for TSS (total suspended solids), pH and BOD (biochemical oxygen demand) and the results are published on their website for public assess.

As discussed in section 6.2, the proposed development will reduce stormwater pollutant load to the downstream receiving stormwater system, and water treatment and reticulation plant. With the reduced pollutant load entering the water treatment and reticulation plant, the plant will improve treatment efficiency and may reduce the pollutant load on the outfall.

During Construction erosion and sediment control measures will be in place, refer to section 7.

Water Quality Treatment

Erosion & Sedimentation Control

7. Erosion & Sedimentation Control

Landcom have published a design guide entitled “Managing Urban Stormwater - Soils and Construction” which is regarded as the standard to which erosion and sedimentation control should be designed to within NSW. Mosman Council specifies compliance with the Landcom design guide in there Stormwater Management Code.

The control of erosion and sedimentation describes the measures incorporated during and following construction of a new development to prevent the pollution and degradation of the downstream watercourse.

A Soil and Water Management Plan has prepared as part of the development application documentation and is included in Appendix A of this report.

Common control measures adopted are:

- Sedimentation fences;
- Sedimentation basins;
- Stormwater drainage inlet protection;
- Overland flow diversion swales;
- Shaker Grids and wash downs for vehicles leaving the construction site;
- Dust control measures.

The maintenance of these control measures throughout their intended lifespan will ensure that the risk of erosion and sedimentation pollution of the downstream watercourse will be minimized.

Appendix A – Civil Drawings

Appendix A – Civil Drawings

TARONGA INSTITUTE OF SCIENCE & LEARNING

BRADLEY HEADS, MOSMAN

CIVIL ENGINEERING WORKS



LOCALITY PLAN
N.T.S.

DRAWING SCHEDULE	
DRG No.	DRAWING TITLE
27581-SYD-C-001	COVER SHEET, LOCATION PLAN & DRAWING LIST
27581-SYD-C-100	STORMWATER DRAINAGE GENERAL ARRANGEMENT PLAN
27581-SYD-C-150	SEDIMENT & EROSION CONTROL PLAN
27581-SYD-C-151	SEDIMENT & EROSION CONTROL DETAILS

01	DRAFT DA ISSUE	IAH	IAH	30/10/15
REV.	DESCRIPTION	DRAWN	APPD	DATE

ARCHITECT:
NBRS + PARTNERS

CLIENT:
TARONGA CONSERVATION
SOCIETY AUSTRALIA



Wood & Grieve Engineers Ltd
A.C.N. 109 858 788
Level 6, BUILDING B 207 Pacific
Highway, St Leonards
NSW 1555
Phone: 02 8484 7000
Fax: 02 8484 7100
Email: sydney@wge.com.au
Web: www.wge.com.au

PERTH
WELLSBORO
SYDNEY
BRISSBAVE
GOLD COAST
ALBANY
BUNDELTON
SHEPHERTON
DARWIN

TARONGA INSTITUTE OF SCIENCE &
LEARNING
BRADLEY HEADS, MOSMAN

TITLE:
COVER SHEET, LOCATION
PLAN & DRAWING LIST

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGNED :	IAH	VERIFIED :	/ /
DRAWN :	IAH	APPROVED FOR TENDER :	/ /
SCALE :	NTS	APPROVED FOR CONSTRUCTION :	/ /

CAD FILE: 27581-SYD-C-001.dwg

PLOT DATE/TIME: 24/11/2015 3:02:06 PM

PROJECT No.	DRAWING No.	REVISION
27581-SYD	C-001	01



GENERAL NOTES

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER PROJECT DRAWINGS, SCHEDULE OF QUANTITIES, OR SPECIFICATIONS AND ANY OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE WORK. ALL DISCREPANCIES SHALL BE REFERRED TO THE SUPERINTENDENT FOR DISCUSSION BEFORE PROCEEDING WITH THE WORK.
2. THE CONTRACTOR SHALL NOT ENTER NEIGHBOURING PROPERTIES WITHOUT PRIOR WRITTEN APPROVAL FROM THE RELEVANT PROPERTY OWNER.
3. THE CONTRACTOR IS TO ENSURE SAFE PASSAGE OF TRAFFIC AND PEDESTRIANS IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY.
4. THE CONTRACTOR SHALL BE REQUIRED, AT ALL TIMES, DURING THE PERIOD OF CONSTRUCTION, TO CLEAN THOSE PARTS OF THE ACCESS ROUTE TO THE SITE THAT MAY BE AFFECTED BY ANY MATERIAL, DROPPED, DEPOSITED OR SPILLED ON THE ROADS AS A RESULT OF THE CONSTRUCTION PROCESSES ASSOCIATED WITH THE SITE.
5. SURVEY SETOUT INFORMATION IS TO BE ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR TO ENABLE THE CONTRACTOR TO ACCURATELY SETOUT THE WORKS TO THE CO-ORDINATES SHOWN. SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.

GENERAL STORMWATER NOTES

1. MANHOLES ARE TO BE CONSTRUCTED ON THE APPROPRIATE ALIGNMENTS IN ACCORDANCE WITH THE LOCAL AUTHORITY STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE SHOWN OR DIRECTED ON SITE. THE ALIGNMENT OF MANHOLES ARE TO BE SET-OUT FROM ACTUAL ALLOTMENT BOUNDARIES STAKED BY THE PROJECT SURVEYOR FROM THE FINAL LOT CALCULATIONS.
2. THE CONTRACTOR IS TO EXERCISE DUE CARE AND ATTENTION DURING PIPE INSTALLATION ENSURING PIPES ARE NOT DAMAGED DURING CONSTRUCTION AND CONSTRUCTION TRAFFIC DOES NOT EXCEED THE LOAD SPECIFIED FOR THE PIPE PROPOSED. IF THE PROPOSED PIPE CLASS WILL NOT WITHSTAND CONSTRUCTION LOAD, CONTRACTOR IS TO UPGRADE PIPE CLASSES TO SUIT AT NO COST TO THE PRINCIPAL.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE RELEVANT AUTHORITIES FOR ANY ADDITIONAL INSTALLATIONS NOT SHOWN ON THE DRAWINGS AND TO ENSURE THAT THE EXISTING SERVICES ARE NOT DAMAGED OR DISTURBED IN ANY WAY DURING CONSTRUCTION.
4. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMANLIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
5. ALL REINFORCED CONCRETE PIPES ARE TO BE INSTALLED USING TYPE 15S2 SUPPORT AS DEFINED IN AS 3725 - LOADS ON BURIED CONCRETE PIPES. IF ALTERNATIVE BEDDING METHODS ARE TO BE USED THE PIPE CLASS MUST BE REVIEWED.
6. CONTRACTOR IS TO ENSURE ALL STORMWATER DRAINAGE STRUCTURES ARE ADEQUATELY REINFORCED AND SHALL PROVIDE DESIGN CERTIFICATION FOR ALL REINFORCED CONCRETE LIDS, WHERE KERB ADAPTORS ARE TO BE CONSTRUCTED IN CONJUNCTION WITH A CONCRETE FOOTPATH IN THE VERGE, A PIPE CONNECTION SHALL BE SHALL EXTEND TO THE PROPERTY BOUNDARY.
7. ALL STORMWATER DRAINAGE PIPES TO BE UPVC UNLESS OTHERWISE SPECIFIED. ALL UPVC PIPES SHALL BE EITHER RUBBER RING OR SOLVENT WELD JOINTED.
8. MINIMUM DISTANCE BETWEEN ROOFWATER HOUSE CONNECTIONS AND SEWERAGE HOUSE CONNECTIONS IS 3.0m.
9. ALL UPVC ROOFWATER DRAINAGE PIPES TO BE MINIMUM CLASS S16.
10. DA REFERS TO NOMINAL INTERNAL PIPE DIAMETER.
11. ALL STORMWATER MATERIAL AND WORKMANSHIP IS TO BE SUPPLIED AND UNDERTAKEN IN ACCORDANCE WITH THE LOCAL AUTHORITY AND AUSTRALIAN STANDARD AS3000.3 AS APPLICABLE.
12. ALL GRATES SHALL BE HINGED CLASS 'C' GALVANISED MILD STEEL WITH FRAME AND 7' BOLT LOCK DOWN DEVICES.
13. ALL GRATES TO HAVE 150mm MINIMUM OF CONCRETE SURROUND.
14. MINIMUM SIZE FOR AN IN-GROUND PIPE RECEIVING A DOWNPIPE SHALL BE 150mm.

THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES AND ARRANGE FOR RELOCATION AND / OR PROTECTION OF EXISTING SERVICES AS REQUIRED TO SUIT SURROUNDING NEW WORK, CONSTRUCTION LOADINGS AND TO SUIT FINAL FINISHED SURFACE LEVELS.

PRIOR TO COMMENCEMENT OF NEW WORK THE CONTRACTOR SHALL CONFIRM LOCATIONS, LEVELS AND DETAILS OF EXISTING CONNECTION POINTS AND SERVICE CROSSINGS BY POT HOLING. IF A VARIATION OCCURS CONTACT THE ENGINEER PRIOR TO CONSTRUCTION.

DESIGN FINISHED SURFACE LEVELS OF STRUCTURES ARE FOR THE CONTRACTOR'S GUIDANCE ONLY. ACTUAL FINISHED LEVELS SHALL BE SET OUT AS DIRECTED ON-SITE IN KEEPING WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE LOCAL AUTHORITY AND ACTUAL FINISHED GROUND LEVELS.

REV.	DESCRIPTION	DRAWN	APPD	DATE
02	DRAFT DA ISSUE	IAH	IAH	24/11/15
01	DRAFT DA ISSUE	IAH	IAH	30/10/15

ARCHITECT:
NBRS + PARTNERS

CLIENT:
TARONGA CONSERVATION
SOCIETY AUSTRALIA



Wood & Grive Engineers Ltd
A.C.N. 109 899 708
Level 6, BUILDING 9 207 Pacific
Highway, St Leonards
NSW 2233
Phone: 02 9484 7000
Fax: 02 9484 7100
Email: sydney@wge.com.au
Web: www.wge.com.au

PERTH
WELLINGTON
SYDNEY
BREMEN
GOLD COAST
ALBANY
BUNDELTON
SPRINGFIELD
DARWIN

TARONGA INSTITUTE OF SCIENCE &
LEARNING
BRADLEY HEADS, MOSMAN

TITLE:
SEDIMENT & EROSION
CONTROL PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGNED : IAH	VERIFIED : / /
DRAWN : IAH	APPROVED FOR TENDER : / /
SCALE : 1:200 @ A1	APPROVED FOR CONSTRUCTION : / /

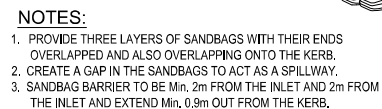
CAD FILE: 27581-SYD-C-150.dwg

PLOT DATE/TIME: 24/11/2015 3:02:24 PM

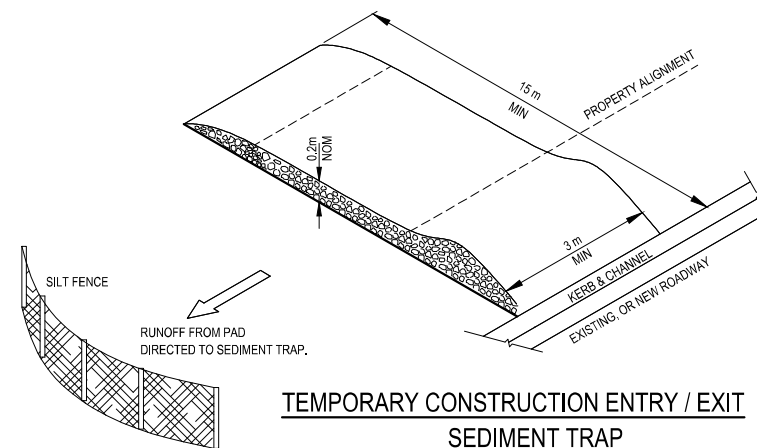
PROJECT No.	DRAWING No.	REVISION
27581-SYD	C-150	02

A1 DRAWING - BUILDING SERVICES GROUP





GULLY INLET SANDBAG PROTECTION DETAIL
N.T.S.



SEDIMENT FENCE DETAIL
N.T.S.

SEDIMENT FENCE NOTES

- SEDIMENT FENCE DESIGN: CONSTRUCTION & MAINTENANCE SHALL BE IN ACCORDANCE WITH ICA BEST PRACTICE, LOCAL AUTHORITY REQUIREMENTS AND ICA DWG SF-01 & SF-02.
- FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 600mm AT TOP OF EACH SECTION.
- WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THE FENCE SHOULD BE OVERLAPPED BY 50mm AND FOLDED.
- MAINTENANCE SHALL BE CONSIDERED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SEDIMENT FENCE.
- POSTS: STEEL EITHER T OR U TYPE OR 50mm HARDWOOD.
- FILTER CLOTH: FILTER AS SPECIFIED (TERRAM 1000, POLYFEST 500, BIDIM U20 OR EQUIVALENT).
- PRACTICE EQUIV. UNIT: GEOFAB, ENVROFENCE, OR APPROVED EQUIVALENT.
- 1m RETURNS ARE TO BE PROVIDED AT A MAXIMUM SPACING OF 20m. WHERE SEDIMENT FENCES ARE NOT RUNNING PARALLEL ALONG THE CONTOURS, A 1m RETURN IS REQUIRED EVERY 5-10m DEPENDS ON SLOPE, SURFACE ROUGHNESS AND SEDIMENT LOADINGS IN ACCORDANCE WITH ICA BEST PRACTICE.
- 30m SPALL-TYPE WIRE FENCE TO BE PROVIDED AT 20m SPACINGS FOR FENCES INSTALLED ALONG CONTOURS TO CONTROL OVERFLOW.

01	DRAFT DA ISSUE	IAH	IAH	30/10/15	
REV.	DESCRIPTION	DRAWN	APPD	DATE	

ARCHITECT:
NBRS + PARTNERS

CLIENT:
TARONGA CONSERVATION
SOCIETY AUSTRALIA



Wood & Grieve Engineers Ltd
A.C.N. 008 808 786
Level 6, BUILDING B 207 Pacific
Highway, St Leonards
NSW 2065
Phone: 02 8484 7000
Fax: 02 8484 7100
Email: sydney@wge.com.au
Web: www.wge.com.au

PERTH
MELBOURNE
SYDNEY
BRISBANE
GOLD COAST
ALBANY
BUSSETON
SHENZHEN
DAMEN

TARONGA INSTITUTE OF SCIENCE &
LEARNING
BRADLEY HEADS, MOSMAN

TITLE:
SEDIMENT & EROSION
CONTROL DETAILS

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGNED : IAH	VERIFIED : / /
DRAWN : IAH	APPROVED FOR TENDER : / /
SCALE : AS NOTED	APPROVED FOR CONSTRUCTION : / /

CAD FILE:27581-SYD-C-151.dwg

PLOT/DATE/TIME: 24/11/2015 3:02:31 PM

PROJECT No.	DRAWING No.	REVISION
27581-SYD	C-151	01

A1 DRAWING - BUILDING SERVICES GROUP