Warren Smith
Consulting Engineers

19 October 2021

CIVIL ENGINEERING SERVICES

Western Sydney University Bankstown City Campus

Soil and Water Management Plan

Revision 3

DOCUMENT CONTROL

01	30th June 2021	For Information
02	2nd July 2021	For Approval
03	19th October 2021	For Approval
Rev #	**Date**	**Description of Change**

APPROVALS

01	Edward Berry *Intern – Civil and Water Engineering*	James Georgiades *Team Leader – Civil and Water Engineering*
02	Isabella Oke *Engineer – Civil and Water Engineering*	James Georgiades *Team Leader – Civil and Water Engineering*
03	Isabella Oke *Engineer – Civil and Water Engineering*	James Georgiades *Team Leader – Civil and Water Engineering*
Rev #	**Author**	**Reviewer**

PREPARED BY:

WARREN SMITH CONSULTING ENGINEERS PTY LTD
Consulting Engineers
ACN 002 197 088 **ABN** 36 300 430 126
9th Floor, 233 Castlereagh Street
Sydney 2000 NSW Australia
T 02 9299 1312 **F** 02 9290 1295

PREPARED FOR:

BUILT HOLDINGS PTY LTD
c/o Shane Tozer
ABN 47 108 928 409
Level 4, 185 Clarence Street,
Sydney 2000 NSW Australia
T 02 8332 4111

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CIVIL ENGINEERING SERVICES

1. INTRODUCTION

Warren Smith Consulting Engineers (WSCE) has been engaged by Built Holdings Pty Ltd to prepare a sediment and erosion control plan for the new Western Sydney University Bankstown City Campus development in Bankstown as part of the submission for the Risk Assessment and Environment Factors analysis. This report outlines the sediment and erosion control measures associated with the proposed development.

1.1 BACKGROUND

The existing site is located at 74 Rickard Road, Bankstown, NSW, approximately 20km west of the Sydney CBD. The development site is bounded by Canterbury-Bankstown City's Council administration building to the east, Library and Knowledge Centre to the west, Rickard Road on the north and Paul Keating Park on the south. Refer to Figure 1 below shows the extent of the development site area in which the proposed works will be carried out.

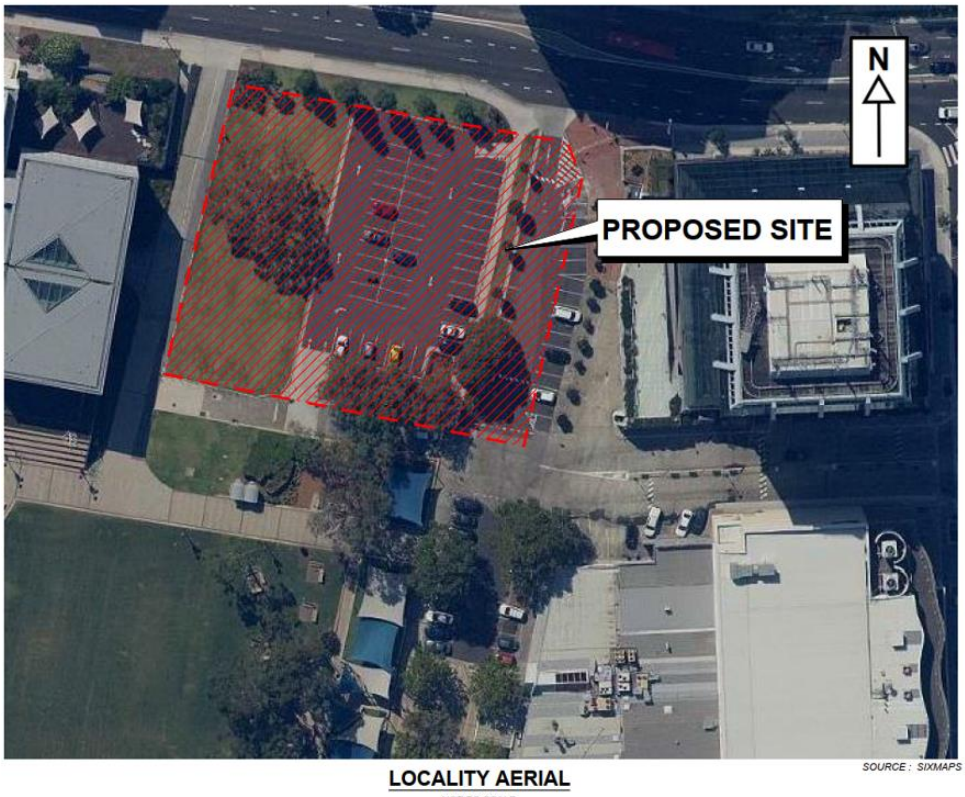


Figure 1: Aerial View of Development Site Area (Source: SixMaps)

2. EXISTING SITE CONDITIONS AND STORMWATER INFRASTRUCTURE

A desktop review of the existing survey and a site inspection was carried out in order to determine the existing site conditions and drainage infrastructure within the proposed development site. These investigations revealed the following: -

- The development area grades in a general south-easterly direction at varying grades.
- There exists a number of smaller in-ground pits and pipes along the south and south-east of the site to convey the existing site stormwater towards the public infrastructure.
- An existing Sydney Water stormwater culvert traverses along the east of the site in a north to south direction. This culvert extends further south beyond the site extents.
- Existing council pits and pipes within Rickard Road reticulate to the aforementioned culvert system including twin 1200mm diameter stormwater pipes beneath the Rickard Road public domain.

Refer to Figure 2 below for an illustration of the site grading and the location of the existing stormwater infrastructure.

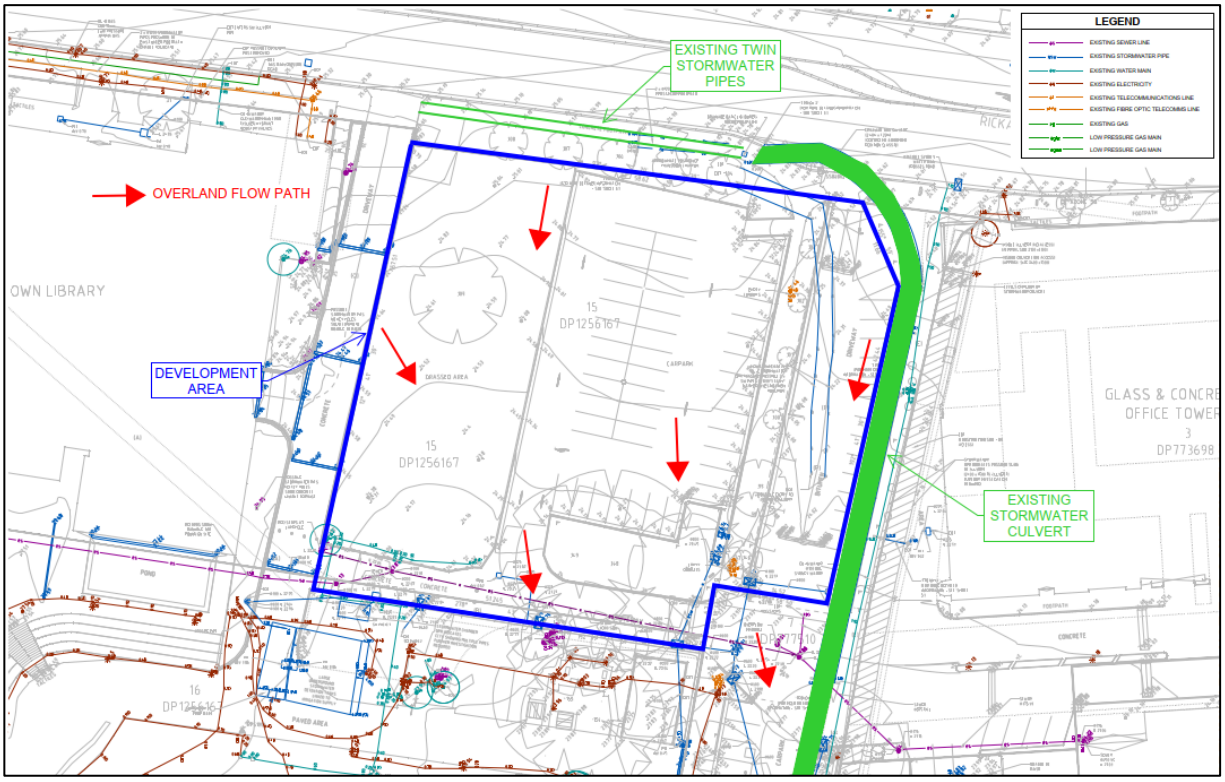


Figure 2: Existing Onsite Conditions

3. SEDIMENT AND EROSION CONTROL

The Contractor for the works is required to provide Sedimentation and Erosion Control in accordance with the guidelines set out in Landcom's Managing Urban Stormwater Soils & Construction Guidelines and the general requirements outlined below.

3.1 SITE PROTECTION MEASURES

Stabilisation of the site is to be as per structural engineer's details and specifications.

It is proposed to provide the following in order to inhibit the movement of sediment off the site during the demolition and construction phases.

3.1.1 SITE ACCESS

During excavation works, construction vehicles leaving the site shall be required to pass over a Temporary Construction Vehicle Entry consisting of a 1.5m long by 3m wide 'cattle rack'. The Vehicle Entry will be located at the north western corner of the site with access from Rickard Road. As excavation is completed, all site deliveries will be via the driveway on Rickard Road and this driveway will be maintained without the need for cattle racks.

3.1.2 FLOODING CONTROL

Provision shall be made at the base of the site hoarding, or other approved measures, to accommodate overland stormwater flow. Installation shall accommodate the 1-in-100 year flood water levels without increasing flood risks to adjacent properties, to authority approval. Nominally, provide openings at the bottom of the hoarding or ATF style fencing at the low points along the site frontages to allow for a provision of unimpeded overland flow. Refer Figure 3 below for example of ATF fencing at the low point.

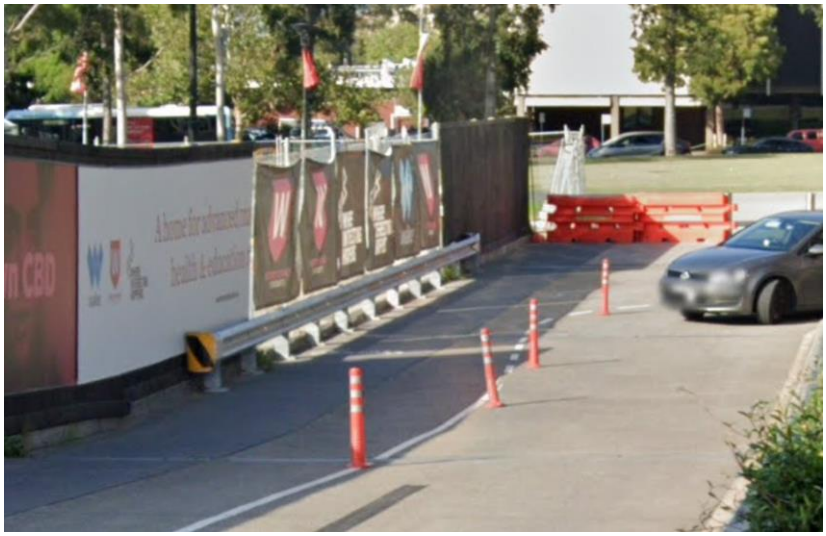


Figure 3: Overland Flow During Construction

Refer to Figure 4 below for an illustration of overland flow direction during construction.

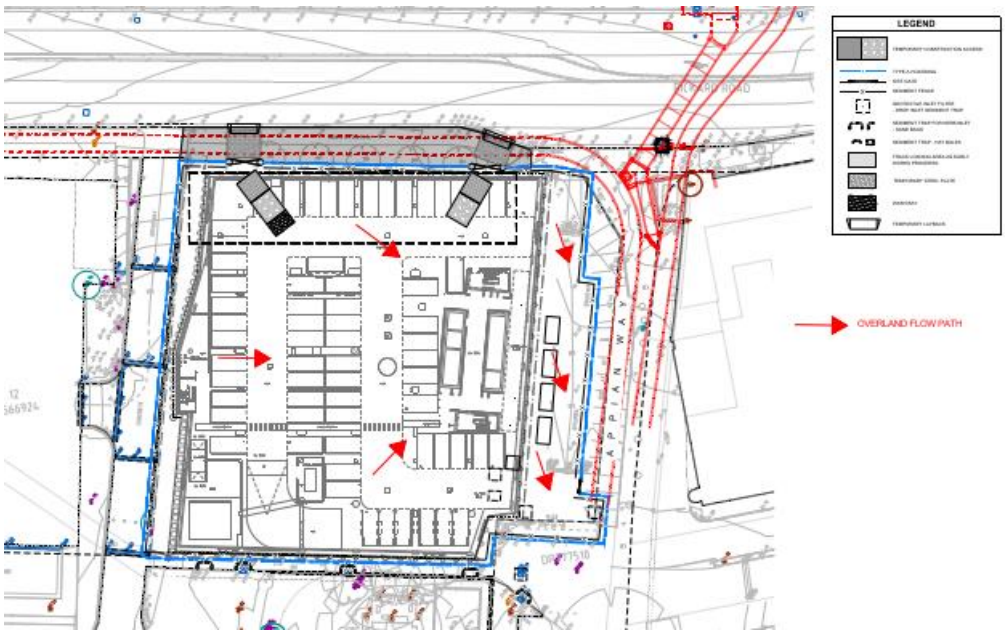


Figure 4: Overland Flow During Construction

3.1.3 SEDIMENT CONTROL

All exposed earth areas where it may be possible for runoff to transport silt down slope shall be protected with a sediment and erosion control silt fence generally installed along the boundaries of the site.

The fence will be constructed in accordance with details provided by the Department of Conservation and Land Management incorporating geotextile fabric which will not allow

suspended particles greater than 50mg/L non-filterable solids to pass through, and as such comply with the appropriate provisions of the Clean Waters Act 1970.

Where required to control the risk of runoff, the construction of the silt fence will include the following: -

- Geotextile fabric buried to a maximum of 100mm below the surface;
- Overlapping any joins in the fabric;
- Turning up on the ends for a length of 1 metre in order to prevent volumes of suspended solids escaping in a storm event;
- Any Council owned road kerb entry and or gully pits will be protected by Atlantis Filter Bales and EcoSock. Additional protection will be provided by inserting Water Clean Filter Cartridges into the gully opening, and;
- Internal site drainage pits shall be protected by Sediment Traps consisting of hay bales.

3.1.4 SEDIMENT BASIN

The site will require a small sediment basin located in the base of the proposed lift shaft location, the low point of the site. The contractor is to ensure that overland flows are directed to the sediment basin during construction. A pump out is to be provided at the sediment basin as per detail shown on C2.02 Soil and Water Management Details. Following construction of the basement, dewatering of the site is to be undertaken after being collected by the permanent subsoil drainage system. Pumping out will follow pH and turbidity testing of the water. Please refer to C2.01 Soil and Water Management Plan and C2.02 for details.

3.1.5 DUST CONTROL

The following dust control procedures will be adhered to:

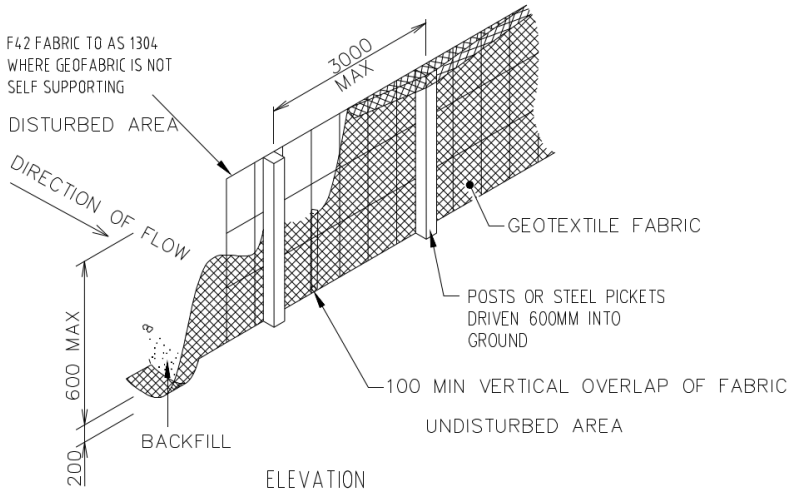
- Loose loads entering or leaving the site will be securely covered by a tarpaulin or like material in accordance with RMS and local Council Guidelines.
- Soil transport vehicles will use the single main access to the site.
- There will be no burning of any materials on site.
- Water sprays will be used across the site to suppress dust. The water will be applied either by water sprinklers or water carts across ground surfaces whenever the surface has dried out and has the potential to generate visible levels of dust either by the operation of equipment over the surface or by wind. The watercraft will be equipped with a pump and sprays.

- Spraying water at the rate of not less than three (3) L/s and not less than 700kPa pressure. The area covered will be small enough that surfaces are maintained in a damp condition and large enough that runoff is not generated. The water spray equipment will be kept on site during the construction of the works or until excavated surfaces are sealed with concrete slabs.
- During excavation all trucks/machinery leaving the site will have their wheels washed and/or agitated prior to travelling on Council Roads.
- Fences will have shade cloth or similar fabric fixed to the inside of the fence.

3.1.6 MAINTENANCE

- It will be the responsibility of the site foreman for the building contractor to ensure sediment and erosion control devices on site are maintained. The devices shall be checked daily and the appropriate maintenance undertaken as necessary.
- Prior to the closing of the site each day, subject to the condition of the road, any material tracked off the site shall be swept and materials deposited back onto the site.
- Gutters and roadways will be kept clean regularly to maintain them free of sediment.
- Appropriate covering techniques, such as the use of plastic sheeting will be used to cover excavation faces, stockpiles and any unsealed surfaces;
- If dust is being generated from a given surface, and water sprays fail; a new work method statement must be provided by the contractor to ensure levels are reduced to a manageable level;;
- If fugitive emissions have the potential to foul the ambient air quality, measures must be taken in order to safely enclose emissions or implement a local extraction ventilation system;
- The area of soils exposed at any one time will be minimised wherever possible by excavating in a localised progressive manner over the site; and,

It is considered that by complying with the above, appropriate levels of protection are afforded to the site and the adjacent public roads, footpaths and environment. Refer to drawings C2.01 – Soil and Water Management Plan and C2.02 – Soil and Water Management Details attached to this report for specifications and details.



SEDIMENT FENCE

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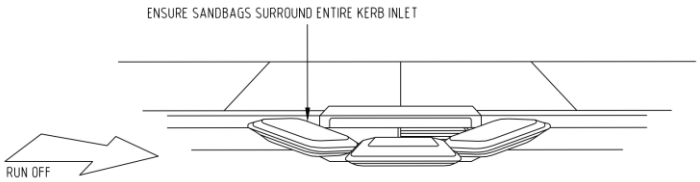

SANDBAG KERB INLET SEDIMENT TRAP

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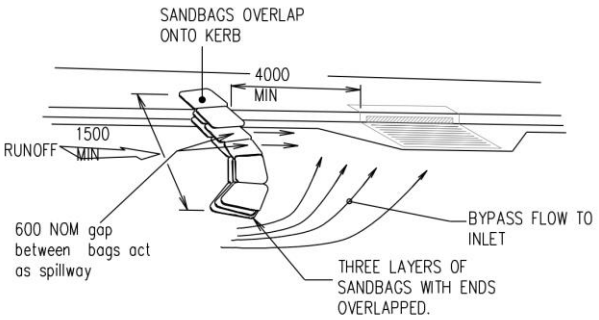

ON GRADE KERB INLET SEDIMENT TRAP

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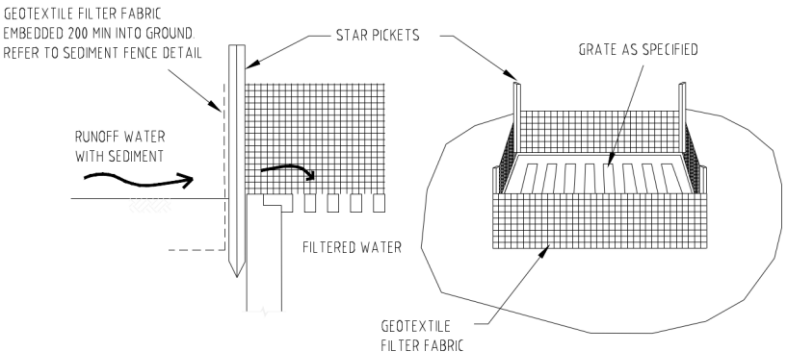

GEOTEXTILE PIT FILTER 1

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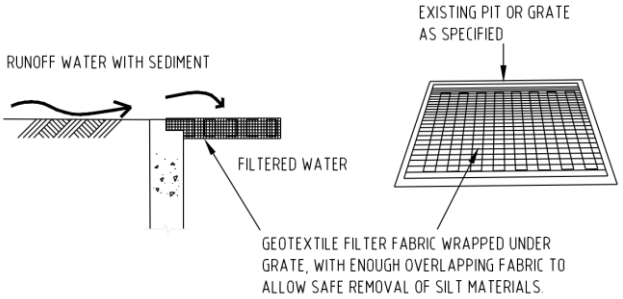


GEOTEXTILE PIT FILTER 2

NOT TO SCALE

Atlantis Sediment Control Filter Bales

What are FilterBales?

Water Clean FilterBales are a unique new patented 7 stage sediment filter device developed to substantially reduce the migration of sediment and contaminants into drainage systems while allowing filtered water to easily pass through. FilterBales reduce customers' time and money by providing solutions to comply witht environmental and regulatory requirements.

Durable, Dependable, Reusable.
Replacing hay bales and other inadequate attempts to stop sediment run-off, FilterBales are durable and re-useable, effectively stopping your money from "pouring down the drain". They are also lightweight and easy to handle. Replaceable Water Clean Filter Cartridges guarantee peak performance is maintained.

Ask your local FilterBales stockist about replacement frequencies in your area. Cartridges and filter covers should be changed when the infiltration rate decreases. Water Clean FilterBales are suitable for a wide range of sediment and water management situations and can be easily secured in place for long term use. The unique multi-directional filter system allows you to position Water Clean FilterBales in any direction without reducing performance.

Water Clean FilterBales can be fixed to concrete or bitumen surfaces using an epoxy mortar-binder or fixed to earth surfaces using 6-10 mm pegs or stakes. When positioning, the side with the red reflective marker should be facing traffic.

www.atlantiscorp.com.au

1. FilterBales frames are a perforated plastic structure made from recycled wheelie bins, battery cases, milk bottles etc.

2. Filter medium (bio engineered soil media) used in the filter cartridges is made from a special blend of recycled organic (RO) materials from kerbside and vegetation drop off centres. The RO hosts enhanced naturally occurring micro-organisms. The blend also contains natural minerals to capture nutrients. The filter medium is as safe as normal soil.

3. FilterBales have a seven (7) stage filtration system:

1. In through the filter bag
2. Through the perforated plastic structure wall
3. In through the filter cartridge bag
4. Through the bio engineered filter medium
5. Out through the filter cartridge bag
6. Out through the perforated plastic structure wall
7. Out through the filter bag

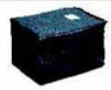
4. The filter bag is made from 300-micron (one third of a millimetre) pore size geotextile. This is the first stage that filters much of the sediment and other suspended solids from the run-off water. The geotextile is designed to stop sediment and reduce clogging but allow water to pass through easily. The filter cartridge bags are made from a similar geotextile.

5. FilterBales work effectively up to "a one-in-one-year 48 hours, 100 mm "storm events". This is the largest storm event experienced since the commercialisation of FilterBales. Having handled this easily, Filter Bales are considered capable of handling much greater "storm events'. During these storm events FilterBales were used inside gully pits in one application and on the ground surrounding the gully pit in another application.

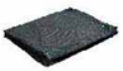
6. EcoSocks are made from a similar geotextile to the filter cartridge bags and contain the same bio engineered soil media as the FilterBales. They appear able to stand up to as much wear and tear as a sandbag.

7. FilterBales are much lighter (at around 15 kgs dry weight) than hay bales. This reduces exposure to Occupational Health and Safety problems

Product Range

Item No.	Description	
HFB001	**High FilterBale,** suitable for high flow situations and higher retention time applications. Contains two standard size WaterClean Filter Cartridges in upright formation to treat contaminated waters. (605mm x 485mm x 460mm)	
LFB002	**Low FilterBale,** suitable for low flow situations and kerb & gutter applications. Multi-directional module containing two standard size WaterClean Filter Cartridges. (605mm x 485mm x 220mm)	
ESF004	**Directional EcoSock,** can be used in conjunction with FilterBales to direct water. Will also provide some sediment filtration from seepage through bio-remediating media contained within the EcoSock (1135mm x 160mm x 30mm)	

Accessories

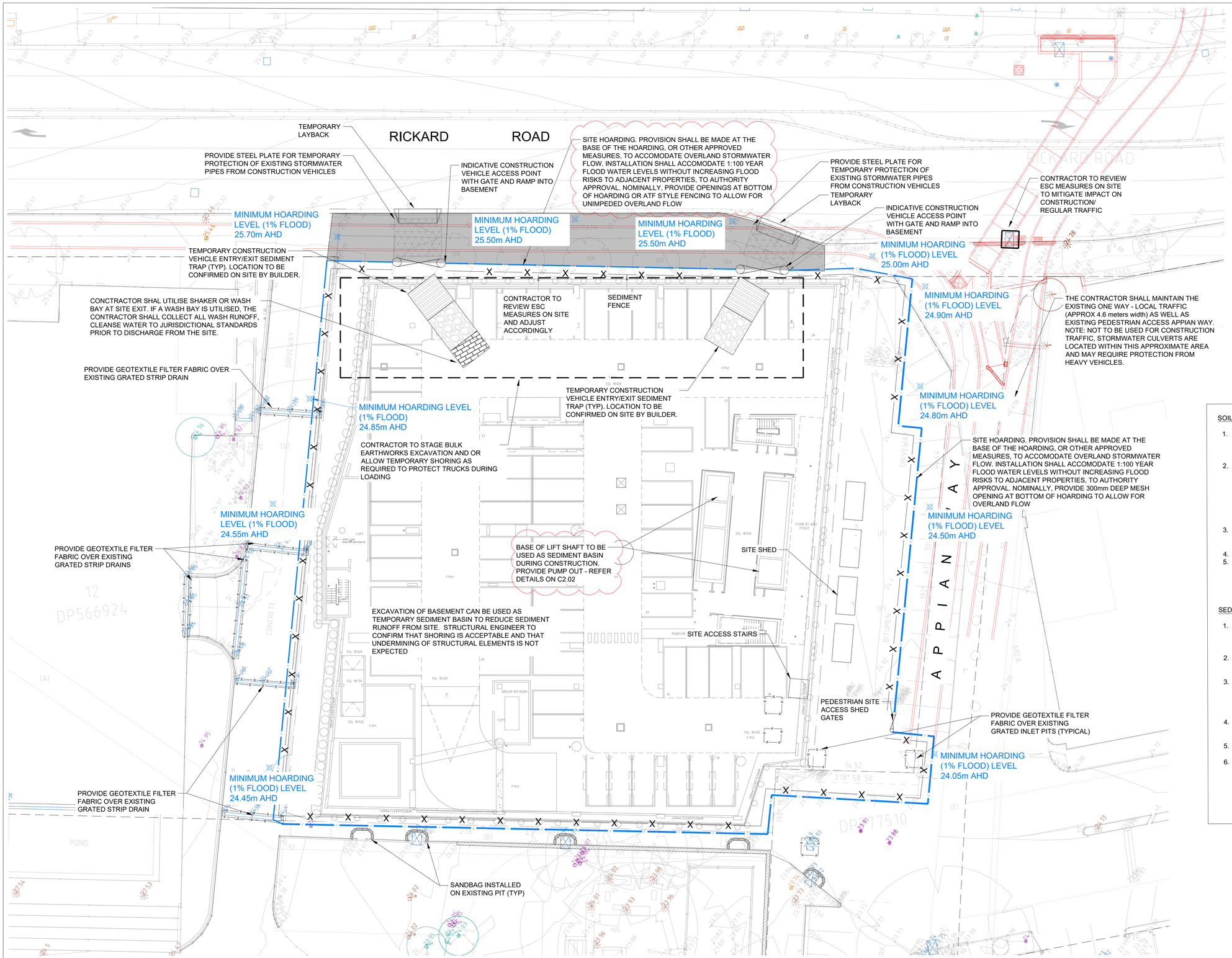
Item No.	Description	
FCR004	**WaterClean Filter Cartridges** contain a unique blend of fixating and bio-remediating products that treat common pollutants. To achieve maximum performance, each FilterBale uses two WaterClean Filter Cartridges. (440mm x 400mm x 100mm)	
HBC005 (High bale)	**Replaceable FilterBale covers,** made from specially designed geotextile. FilterBale covers have a standard aperture of 300 microns.	
HBC006 (Low bale)	**Replaceable FilterBale covers,** made from specially designed geotextile. FilterBale covers have a standard aperture of 300 microns.	

Atlantis Water Management Rebirth Pty Ltd trading as Atlantis Water Management

Suite 402/781 Pacific Highway Chatswood NSW, 2067 Australia
Phone • + 61 2 9419 6000 **Fax** • + 61 2 9419 6710
Email • info@atlantiscorp.com.au **Web Site** • www.atlantiscorp.com.au

Atlantis Water Management

V3-20/06/01



LEGEND

- TEMPORARY CONSTRUCTION ACCESS
- TYPE A HOARDING
- SITE GATE
- SEDIMENT FENCE
- GEOTEXTILE INLET FILTER - DROP INLET SEDIMENT TRAP
- SEDIMENT TRAP FOR KERB INLET - SAND BAGS
- SEDIMENT TRAP - HAY BALES
- TRACK LOADING AREA AS EARLY WORKS PROGRESS
- TEMPORARY STEEL PLATE
- WASH BAY
- TEMPORARY LAYBACK

SOIL AND WATER MANAGEMENT NOTES

1. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH DEVELOPMENT CONSENT B20 (SSD 9631) TO ADDRESS ITEMS RELATING TO PREPARATION OF A CONSTRUCTION SOIL & WATER MANAGEMENT PLAN.
2. IT HAS BEEN ASSUMED THAT SEDIMENT FENCING BE WILL PROVIDED TO THE STAGE BOUNDARY SUFFICIENT TO PREVENT SEDIMENT RUNOFF FROM LEAVING SITE (EXCEPT IN THE CASE OF ENTRY/EXIT LOCATIONS WHERE TEMPORARY CONSTRUCTION ENTRY/ EXIT SEDIMENT TRAP ARE PROVIDED). IF THIS IS NOT THE CASE, PROVIDE SEDIMENT FENCE TO STANDARD DETAIL AS REQUIRED TO PREVENT SEDIMENT FROM LEAVING SITE, DIRECT RUNOFF TO SEDIMENT BASIN.
3. ALL EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH LANDCOM MANAGING URBAN STORM WATER "BLUE BOOK"
4. MINIMISE CLEARING OUTSIDE BASEMENT EXTENT.
5. SEDIMENT CONTROL FOR LANDSCAPED WORKS DOWNSTREAM OF THE BUILDING TO INCLUDE A SILT FENCE AND SANDBAGS AS REQUIRED. TO BE MANAGED AT A RATE OF 50L/s BY THE CONTRACTOR ON SITE. INSTALL CATCH DRAIN TO DIVERT UPSTREAM CATCHMENT AWAY FROM DISTURBED SOIL AREA.

SEDIMENT CONTROL CONDITIONS

1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN AND ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER TO CONTAIN COARSER SEDIMENT FRACTIONS INCLUDING AGGREGATED FINES AS NEAR AS POSSIBLE TO THE SOURCE.
2. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS CANNOT OCCUR.
3. STOCKPILES WILL BE PLACED WHERE SHOWN ON DRAWING OR ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER NOT WITHIN 5m OF HAZARD AREAS INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS & DRIVEWAYS.
4. WATER WILL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM WITH INLET FILTERS (SEE DETAILS) UNLESS IT IS SEDIMENT FREE.
5. TEMPORARY SEDIMENT TRAPS WILL BE RETAINED UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.
6. CONTRACTOR TO DESIGN/SIZE CONSTRUCT TEMPORARY SEDIMENT BASIN. WATER SHOULD BE ALLOWED TO SETTLE BEFORE DISCHARGE. CONTRACTOR MUST VERIFY THAT WATER QUALITY MEETS AUTHORITIES REQUIREMENTS PRIOR TO DISCHARGE. ACCUMULATED SEDIMENT SHOULD THEN BE REMOVED & DISPOSED OF IN ACCORDANCE WITH ENVIRONMENTAL MANAGEMENT PROCEDURES.

NORTH

2.5 0 2.5 5.0 7.5 10.0m
PLAN SCALE 1:200 A1 SHEET

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
A1

REVISION	AMENDMENT	DATE
1	ISSUE FOR CONSTRUCTION CERTIFICATE	19/03/21
2	ISSUE FOR CONSTRUCTION CERTIFICATE	01/04/21
3	ISSUE FOR CONSTRUCTION CERTIFICATE	24/05/21
4	ISSUE FOR CROWN CERTIFICATE	02/07/21
A	ISSUE FOR CONSTRUCTION	29/09/21
B	REVISED NOTES AS CLOUDED	19/10/21

CLIENT
walker
Level 21 Governor Macquarie Tower 1 Farrer Place Sydney NSW 2000 T +61 2 8273 9900 F +61 2 8252 1500
WESTERN SYDNEY UNIVERSITY
Locked Bag 1797, Penrith NSW 2751 T +61 2 9852 5222

PROJECT
BANKSTOWN CITY CAMPUS DEVELOPMENT

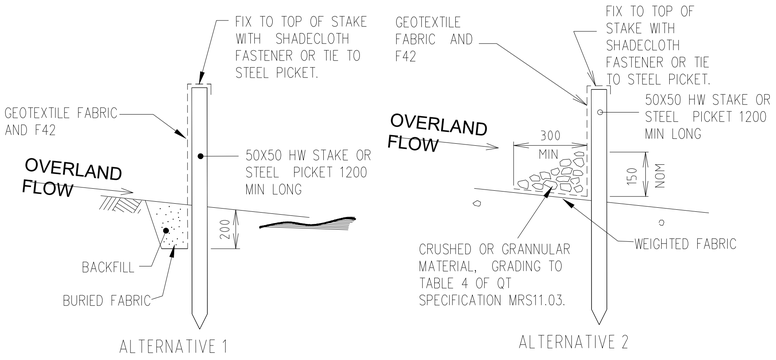
PREPARED BY
Warren Smith Consulting Engineers
WARREN SMITH CONSULTING ENGINEERS PTY LTD
SINCE 1981.
NSW 9/233 Castlereagh St, Sydney 2000 NSW Australia
VIC 20/485 La Trobe St, Melbourne 3000 VIC Australia
PH +61 (2) 9299 1312 PH +61 (3) 8648 9942
wsp@warrensmith.com.au
www.warrensmith.com.au
ACN 002 197 088 ABN 36 300 430 126
Hydraulic Fire Civil Utilities Infrastructure
GCC ISO 9001 Certified

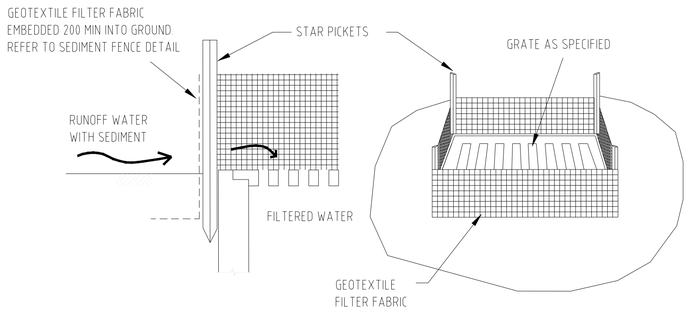
TITLE
CONSTRUCTION AND SOIL WATER MANAGEMENT PLAN

SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
AS SHOWN	N.G.	I.O.	J.G.	M.C.

JOB No.	DRAWING No.	ISSUE
7207000	C2.01	B

DATE	STATUS
MARCH 2021	FOR CONSTRUCTION





GEOTEXTILE PIT FILTER 1

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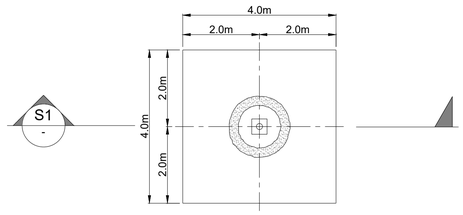
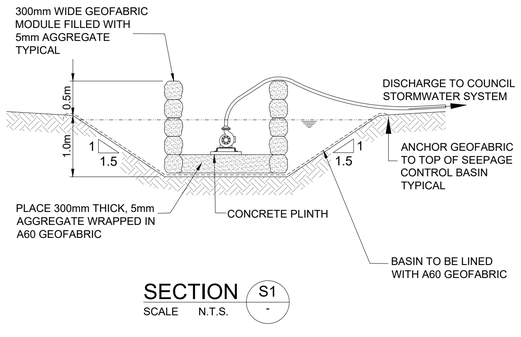


CONSTRUCTION NOTES:

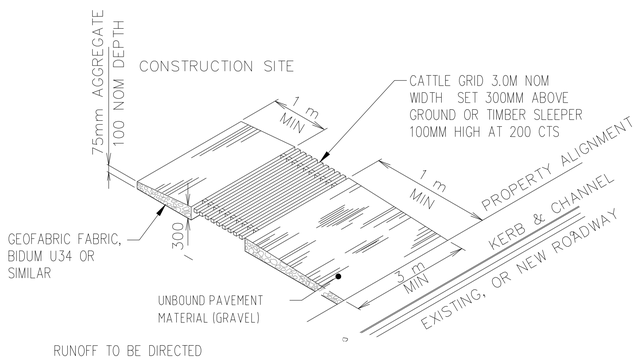
1. REFER TO THE SOIL AND WATER MANAGEMENT PLAN FOR BASIN MANAGEMENT AND WATER TREATMENT

TEMPORARY SEDIMENT BASIN DETAIL - PLAN

NOT TO SCALE



SECTION S1 - SCALE N.T.S.



RUNOFF TO BE DIRECTED TO SEDIMENT TRAP

TEMPORARY CONSTRUCTION VEHICLE ENTRY/EXIT SEDIMENT TRAP

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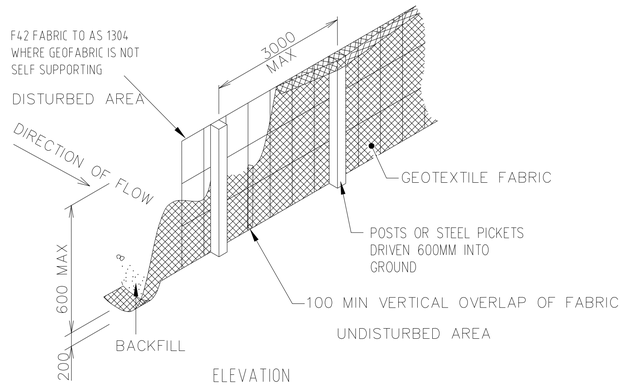

ELEVATION

SEDIMENT FENCE

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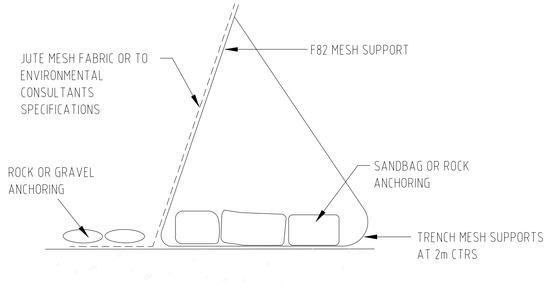

ALTERNATIVE SEDIMENT FENCE

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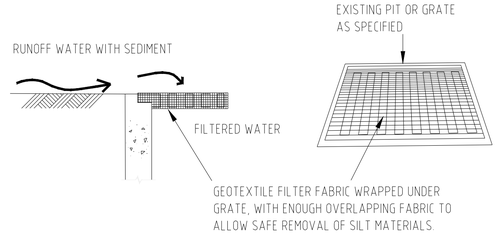

GEOTEXTILE PIT FILTER 2

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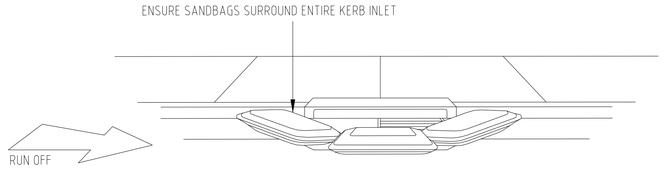

SANDBAG KERB INLET SEDIMENT TRAP

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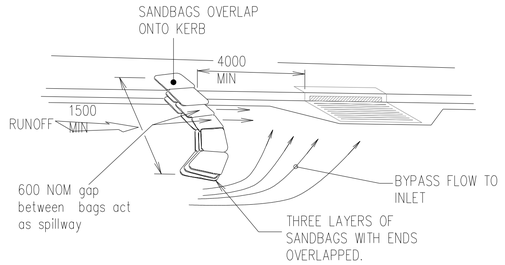

ON GRADE KERB INLET SEDIMENT TRAP

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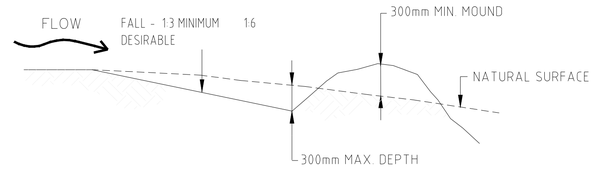

CATCH DRAIN

NOT TO SCALE

NOTES:

1. INSTALL THIS TYPE OF SEDIMENT FENCE WHEN USE OF SUPPORT POSTS IS NOT DESIRABLE OR NOT POSSIBLE. SUCH CONDITIONS MIGHT APPLY, FOR EXAMPLE, WHERE APPROVAL IS GRANTED FROM THE APPROPRIATE AUTHORITIES TO PLACE THESE FENCES IN HIGHLY SENSITIVE ESTUARINE AREAS.
2. USE BENT TRENCH MESH TO SUPPORT THE F82 WELDED MESH FACING AS SHOWN ON THE DRAWING ABOVE. ATTACH THE JUTE MESH TO THE WELDED MESH FACING USING UV-RESISTANT CABLE TIES.
3. STABILISE THE WHOLE STRUCTURE WITH SANDBAG OR ROCK ANCHORING OVER THE TRENCH MESH AND THE LEADING EDGE OF THE JUTE MESH. THE ANCHORING SHOULD BE SUFFICIENTLY LARGE TO ENSURE STABILITY OF THE STRUCTURE IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.

REVISION	AMENDMENT	DATE	REVISION	AMENDMENT	DATE
1	ISSUE FOR CONSTRUCTION CERTIFICATE	01/04/21			
2	ISSUE FOR CROWN CERTIFICATE	02/07/21			
A	ISSUE FOR CONSTRUCTION	29/09/21			

CLIENT: walker; Western Sydney University

PROJECT: BANKSTOWN CITY CAMPUS DEVELOPMENT

PREPARED BY: Warren Smith Consulting Engineers

WARREN SMITH CONSULTING ENGINEERS PTY LTD
SINCE 1981.
NSW 9/233 Castlereagh St, Sydney 2000 NSW Australia
VIC 20/485 La Trobe St, Melbourne 3000 VIC Australia
PH +61 (2) 9299 1312
PH +61 (3) 8648 9942
wsp@warrensmith.com.au
www.warrensmith.com.au
ACN 002 197 088 ABN 36 300 430 126
Hydraulic Fire Civil Utilities Infrastructure

GCC ISO 9001 Certified

TITLE: CONSTRUCTION AND SOIL WATER MANAGEMENT DETAILS

SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
AS SHOWN	N.G.	I.O.	J.G.	M.C.

JOB No.	DRAWING No.	ISSUE
7207000	C2.02	A

DATE: MARCH 2021 STATUS: FOR CONSTRUCTION

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