



CIVIL ENGINEERING REPORT: SOIL & WATER MANAGEMENT  
PLAN

# New Primary School in Murrumbateman

Fairley Street, Murrumbateman NSW

**PREPARED FOR**  
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Ref: MURR-CR01-2  
Rev: 2  
Date: 07.12.21

# Civil Engineering Report: Soil & Water Management Plan

## Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
01.11.21	1	Draft	N.Sutherland	J. Gilligan
07.12.21	2	Final	N.Sutherland	J.Gilligan

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# 1. General

## 1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Hansen Yuncken to prepare the Civil Engineering design and documentation in support of a Construction Certificate for the New Primary School in Murrumbateman at 2 Fairley Street, Murrumbateman.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Erosion and Sediment control;

## 1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

1. Detailed Design Phase Civil Documentation prepared by Northrop:
  - MURR-CV-DD-DWG-101.11 Specification Notes – Sheet 01
  - MURR-CV-DD-DWG-101.12 Specification Notes – Sheet 02
  - MURR-CV-DD-DWG-102.01 Sediment and Soil Erosion Control Plan
  - MURR-CV-DD-DWG-102.11 Sediment and Soil Erosion Control Details
  - MURR-CV-DD-DWG-202.01 Sediment and Soil Erosion Control Plan
2. NSW Department of Housing Manual, “Managing Urban Stormwater Soil & Construction” 2004 (Blue Book)
3. Yass Valley Council Engineering Design Guidelines

## 1.3 The Development

### 1.3.1 Precinct and Surrounds

The site is located at 2 Fairley Street, Murrumbateman, in the local government area of Yass Valley Council. The site is formally described as Lot 302 DP1228766 (refer to Figure 1). The site is irregular in shape and has an area of 15,434.92m<sup>2</sup>.

The site is located at the northern end of the Murrumbateman village, which is characterised by a mix of uses including low density residential and some commercial.

Immediately surrounding development includes a tourist hotel to the north across Fairley Street, Murrumbateman Library (located in the former Murrumbateman schoolhouse, a local heritage item) to the south, a medical centre and childcare centre to the west, and rural land and equestrian facilities to the east across Barton Highway. There is also a cycling and equestrian pathway to the south between the site and library.

The site contains an existing parking lot in its northern end and a driveway along its western boundary. There is also a mound of soil at the southern end of the site. The site is otherwise cleared and vacant.

## 2. Erosion and Sediment Control

The objectives of the erosion and sediment control for the development site are to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with Yass Valley Council requirements.

As part of the works, the erosion and sedimentation control will be constructed in accordance with Council requirements and the NSW Department of Housing Manual, "Managing Urban Stormwater Soil & Construction" 2004 (Blue Book) prior to any earthworks commencing on site. The Concept Sediment and erosion control measures are documented in Northrop's detailed design drawings MURR-CV-DD-DWG-101.11, 101.12, 102.01, 102.11, 202.01

### 2.1 Sediment Basin

A temporary sediment basin has been designed to capture site runoff during construction and has been located towards the north eastern side of the site, in the lowest point. The construction of the basin will be undertaken in stages to enable maximum runoff capture assisted by diversion swales and direct runoff to the basin.

Calculations to determine the concept design basin size have been based on available geotechnical information regarding soil types and through the use of the Soils and Construction Volume 1 Manual.

To ensure the sediment basin is working effectively it will be maintained throughout the construction works. Maintenance includes ensuring adequate settlement times or flocculation and pumping of clean water to reach the minimum storage volume at the lower level of the settling zone. The settling zone will be identified by pegs to clearly show the level at which design storage capacity is available.

The pumped water from the sediment basin can be reused for dust control during construction, refer Section 2.1.1 for Maintenance of the sediment basin.

Overflow weirs are to be provided to control overflows for rainfall events in excess of the design criteria which caters for a storm event up to and including the 1% AEP storm event.

The concept sediment basin sizing is summarised in the table below. Detailed sediment basin sizing, configuration and location shall form part of the Construction Certificate application.

The sediment basin has been located for future conversion into the permanent water quality and OSD tank.

#### 2.1.1 Maintenance of Sediment Basin

Prior to any forecast weather event, likely to result in sediment laden runoff on the site, dewatering is to be undertaken to provide sufficient capacity to capture sediment laden water from the site. Any sediment laden water captured on site must be treated to ensure it will achieve Council's water quality objectives prior to its release from site. A sample of the released treated water must be kept on site in a clear container with the sample date recorded.

- No aluminum based products may be used to treat turbid water (flocculating/coagulants) on site without the prior written permission from an appropriate Council Officer. The applicant must have demonstrated ability to use such products correctly and without environmental harm prior to any approval.
- The chemical/ agents (Flocculating/coagulants) used in Type D and Type F Basins to treat turbid water captured in the basin must be applied in concentrations sufficient to achieve Council's

water quality objectives (TSS <50mg/L Turbidity <60 NTU 6.5 <ph <8.5) within the 5 day rainfall depth used to calculation the capacity of the basin, after a rainfall event.

- All manufacturers instructions must be followed for the use of any chemicals/agents used on site except where approved by the responsible person or an appropriate Council Officer.
- Sufficient quantities of chemicals/agents to treat turbid water (Flocculating/coagulants) must be placed such that water entering the basin mixes with the chemical/agents and is carried into the basin/trap.
- The sediment basin to be dewatered as soon as practical once water captured in the basin achieves Council's water quality objectives
- Inspect the sediment basin after each rainfall events and/or weekly. Ensure that all the sediment is removed once the sediment storage zone is full. Ensure that outlet and emergency spillway works are maintained in a fully operational condition at all times.

## **2.2 Sediment and Erosion Control Measures**

Prior to any earthworks commencing on site, sediment and erosion control measure shall be implemented generally in accordance with the Construction Certificate drawings and the “Blue Book”. The measures shown on the drawings are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction program, sequencing and techniques. These measures will include:

- A temporary site security/safety fence is to be constructed around the site, the site office area and the proposed sediment basin;
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles;
- Dust control measures including covering stockpiles, installing fence hessian and watering exposed areas;
- Placement of hay bales or mesh and gravel inlet filters around and along proposed catch drains and around stormwater inlets pits within the site and Fairley Street;
- The construction of a temporary sediment basin as noted above in Section 2.1;
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, shall be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations shall be stabilised by hydroseeding or hydro mulching on formation.

## **2.3 Wet Weather Management**

In circumstances of heavy rain sufficient to affect site access and ground conditions the Site Manager and Site HSE Committee representative should complete a site inspection before work commences. The inspection needs to focus on;

- The suitability of pedestrian access to the amenities and into the construction work areas
- The suitability of access for plant and equipment
- The suitability of ground conditions for plant and equipment to operate
- Nominate the construction zones suitable for work to commence
- Actions to remediate those areas not suitable for work to commence (de-water; prepare ground conditions and access ways etc.)

## 3. Further Commentary

### 3.1 SSD Conditions

The Minister for Planning and Open Spaces has provided Conditions of Consent (Application Number: SSD 11233241) for the New Primary School at Murrumbateman. Conditions associated with the Construction Soil and Water Management Plan have been provided below with further commentary for consideration by School Infrastructure NSW and the Certifying Authority.

#### **B18. Construction Soil and Water Management Sub-Plan (CSWMSP)**

**The Applicant must prepare a Construction Soil and Water Management Sub-Plan (CSWMSP) and the plan must address, but not be limited to the following:**

- (a) be prepared by a suitably qualified expert, in consultation with Council;**
- (b) measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site;**
- (c) Describe all erosion and sediment controls to be implemented during construction, including as a minimum, measures in accordance with the publication Managing Urban Stormwater: Soils & Construction (4<sup>th</sup> edition, Landcom 2004) commonly referred to as the 'Blue Book';**
- (d) provide a plan of how all construction works will be managed in a wet-weather events (i.e. storage of equipment, stabilisation of the Site);**
- (e) detail all off-Site flows from the Site; and**
- (f) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to, 1 in 5-year ARI.**



### Northrop Commentary

The following comments have been provided with respect to Condition B18 for consideration by School Infrastructure NSW and the Certifying Authority.

#### Northrop Commentary

- (a) Please refer to the CV of the designer provided in Appendix D. The project design team have approached Yass Valley Council to initiate discussions regarding the proposed measures to control soil erosion and sedimentation during construction including proposed methods of discharging stormwater from the site. Refer Consultation Record Attached, Appendix D.
- (b) A temporary stabilised construction access is proposed for a minimum 120m length and cattle grid prior to vehicles leaving the site. This is outlined on the Civil Engineering drawings.
- (c) Please refer to Section 2 of this report and associated Civil Engineering drawings MURR-CV-DD-DWG-101.11, 101.12, 102.01, 102.11, 202.01
- (d) Please refer to Civil Engineering drawing MURR-CV-DD-DWG-101.11, 101.12, 102.01, 102.11, 202.01
- (e) Clean water from the Sediment Basin is discharged to Council's stormwater system located on the Barton Highway table drain. Refer Section 2.1.1 for methodology prior to site stormwater during construction. Prior written approval from Council must be obtained to connect or discharge site stormwater to Council's stormwater drainage system or street gutter. Refer Northrop's detailed stormwater plans for compliance of Condition C23.
- (f) Please refer to Section 2 of this report and associated Civil Engineering drawings MURR-CV-DD-DWG-101.11, 101.12, 102.01, 102.11, 202.01. The erosion and sediment control plans have been designed in accordance with the requirements of NSW Department of Housing Manual, "Managing Urban Stormwater Soil & Construction" 2004 (Blue Book).

## Appendix A – Soil & Water Management Plans



NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH YASS VALLEY COUNCIL DEVELOPMENT GUIDELINES. READ IN CONJUNCTION WITH THE NOTES PROVIDED BELOW. IF CONFLICT ARISE, YASS VALLEY COUNCIL GUIDELINES AND SPECIFICATIONS TAKE PRECEDENCE. WHERE YASS VALLEY COUNCIL GUIDELINES AND SPECIFICATIONS ARE SILENT, THE SPECIFICATION NOTES BELOW TAKE PRECEDENCE

ACCESS AND SAFETY
1. THE CONTRACTOR SHALL COMPLY WITH ALL STATUTORY AND INDUSTRIAL REQUIREMENTS FOR PROVISION OF A SAFE WORKING ENVIRONMENT INCLUDING TRAFFIC CONTROL.
2. <u>THE CONTRACTOR SHALL PROVIDE TRAFFIC MANAGEMENT PLANS FOR THE PROPOSED WORKS COMPLETED BY A SUITABLY QUALIFIED PERSON AND APPROVED BY COUNCIL / REGULATORY AUTHORITY. WORK IS NOT TO COMMENCE ON SITE PRIOR TO APPROVAL OF TRAFFIC MANAGEMENT SCHEME.</u>
3. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES ACCESS TO BUILDINGS ADJACENT THE WORKS IS NOT DISRUPTED.
4. WHERE NECESSARY THE CONTRACTOR SHALL PROVIDE SAFE PASSAGE OF VEHICLES AND/OR PEDESTRIANS THROUGH OR BY THE SITE.
5. THE CONTRACTOR SHALL ENSURE PUBLIC ACCESS EXTERNAL TO THE SITE IS IN ACCORDANCE WITH COUNCILS REQUIREMENTS.

TREE PROTECTION
1. REFER TO LANDSCAPE / ARCHITECTS PLAN FOR TREES TO BE RETAINED AND PROTECTED.
2. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN SHALL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY: 2.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE 2.2. ENSURING THAT NOTHING IS NAILED TO ANY PART OF THE TREE. 2.3. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY. COUNCILS AND/OR INDEPENDENT ARBORISTS TO BE CONSULTED WHERE TREE ROOTS ARE TO BE REMOVED AND/OR CUT.

SEDIMENT AND SOIL EROSION
1. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY. THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCILS DESIGN. OTHER REGULATORY AUTHORITY REQUIREMENTS AND MAKE GOOD PAYMENT OF ALL FEES.
2. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH STATUTORY REQUIREMENTS AND IN PARTICULAR THE 'BLUE BOOK' (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION), PRODUCED BY THE DEPARTMENT OF HOUSING AND COUNCILS POLICIES. THESE MEASURES ARE TO BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
3. THE SITE SUPERINTENDENT SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THE DRAWINGS AND ADHERE TO ALL REGULATORY AUTHORITY REQUIREMENTS.
4. <u>THE CONTRACTOR SHALL INFORM ALL SUB CONTRACTORS OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.</u>
5. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE; 5.1 <u>CONSTRUCT TEMPORARY STABILISED SITE ACCESS INCLUSIVE OF SHAKE DOWN / WASH PAD.</u> 5.2 <u>INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES, WHERE FENCES ADJACENT EACH OTHER, THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.</u> 5.3 <u>INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THE APPROVED PLANS.</u>
6. UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
7. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL ENSURING CONFORMITY TO REGULATORY AUTHORITY REQUIREMENTS.
8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
9. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT BEEN FILTERED OUT.
10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
11. ALLOW FOR GRASS STABILISATION OF EXPOSED AREAS, OPEN CHANNELS AND ROCK BATTERS DURING ALL PHASES OF CONSTRUCTION.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING RAIN EVENTS.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. CONTRACTOR TO PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.
14. IF A TEMPORARY SEDIMENT BASIN IS REQUIRED, ENSURE SAFE BATTER SLOPES IN ACCORDANCE WITH THE GEOTECHNICAL REPORT. MAINTAIN ADEQUATE STORAGE VOLUME IN ACCORDANCE WITH PLANS. TEMPORARY PUMP 'CLEAN FLOCCULATED' WATER TO COUNCILS STORMWATER SYSTEM. ENSURE WHOLE SITE RUN-OFF IS DIRECTED TO TEMPORARY SEDIMENT BASIN.

EXISTING SERVICES
1. ALL UTILITY SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.
2. CARE TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS AREA TO BE UNDERTAKEN OVER COMMUNICATION, GAS OR ELECTRICAL SERVICES. HAND EXCAVATION ONLY IN THESE AREAS.
3. THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING SERVICES THAT ARE TO BE RETAINED IN THE VICINITY OF THE PROPOSED WORKS. ANY AND ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT <u>AT THE CONTRACTORS EXPENSE.</u>
4. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE ADJUSTMENT (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS.
5. THE CONTRACTOR SHALL ALLOW IN THE PROGRAM FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF EXISTING SERVICES IN AREAS AFFECTED BY WORKS UNLESS DIRECTED OTHERWISE ON THE DRAWINGS OR BY THE SUPERINTENDENT.
6. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED AND MAINTAINED.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF THE PROGRAM FOR THE RELOCATION AND/OR CONSTRUCTION OF TEMPORARY SERVICES AND FOR ANY ASSOCIATED INTERRUPTION OF SUPPLY.
8. THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

# EARTHWORKS

1. AT THE COMMENCEMENT OF FILLING OPERATIONS FOR BULK EARTHWORKS A GEOTECHNICAL ENGINEER IS TO VISIT THE SITE & CONFIRM THE SUITABILITY OF THE METHODOLOGY OF ACHIEVING THE REQUIRED COMPACTION REQUIREMENTS.
2. STRIP TOPSOIL, VEGETABLE MATTER AND RUBBLE TO EXPOSE NATURALLY OCCURRING MATERIAL AND STOCKPILE ON SITE AS DIRECTED BY THE SUPERINTENDENT.
3. WHERE FILLING IS REQUIRED TO ACHIEVE DESIGN SUBGRADE, PROOF ROLL EXPOSED NATURAL SURFACE WITH A MINIMUM OF TEN PASSES OF A VIBRATING ROLLER (MINIMUM STATIC WEIGHT OF 10 TONNES) IN THE PRESENCE OF THE SUPERINTENDENT.
4. THE CONTRACTOR IS TO ALLOW FOR A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO PROVIDE ADVICE AND CERTIFICATION OF ANY WORKS ASSOCIATED WITH TREATING OR MANAGING UNSUITABLE GROUND CONDITIONS THROUGHOUT THE CONTRACT (e.g. STABILITY OF EXCAVATIONS, POOR SUBGRADE, etc).
5. ALL SOFT, WET OR UNSUITABLE MATERIAL IS TO BE REMOVED AS DIRECTED BY THE SUPERINTENDENT AND REPLACED WITH APPROVED MATERIAL SATISFYING THE REQUIREMENTS BELOW.
6. PROVIDE CERTIFICATES VERIFYING THE QUALITY OF IMPORTED MATERIAL FOR THE SUPERINTENDENTS APPROVAL.
7. ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 200mm THICK LAYERS (LOOSE) AND COMPACTED AT OPTIMUM MOISTURE CONTENT (+ OR - 2%) TO ACHIEVE A DRY DENSITY DETERMINED IN ACCORDANCE WITH AS1289 2.1.1, AS1289 5.7.1 AND AS1289 5.8.8 OF NOT LESS THAN THE FOLLOWING STANDARD MINIMUM DRY DENSITY:

LOCATION	COMPACTION REQUIREMENT
LANDSCAPED AREAS	98% SHMD
ROADS	100% SHMD (IN ACCORDANCE WITH COUNCIL SPECIFICATIONS)
PAVED AREAS	100% SHMD (IN ACCORDANCE WITH COUNCIL SPECIFICATIONS)
8. TESTING OF THE SUBGRADE FOR BUILDINGS SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY.
9. ALLOW THE FOLLOWING COMPACTION TESTING BY N.A.T.A. REGISTERED LABORATORY FOR PLATFORMS AND FILL LAYERS IN ACCORDANCE WITH THE LATEST VERSION OF AS3798. (MINIMUM 3 TESTS PER LAYER) OR 1 TEST PER MATERIAL TYPE PER 2500sqm OR 1 TEST.
10. WHERE TEST RESULTS ARE BELOW THE SPECIFIED COMPACTION, RECOMPACT AND RETEST UNTIL SPECIFIED COMPACTION STANDARDS ARE ACHIEVED, OTHERWISE SUBGRADE REPLACEMENT IS REQUIRED IF COMPACTION STANDARDS ARE NOT ACHIEVED.
11. ALLOW FOR EXCAVATION IN ALL MATERIALS AS FOUND U.N.O. NO ADDITIONAL PAYMENTS WILL BE MADE FOR EXCAVATION IN WET OR HARD GROUND.
12. WHERE THERE IS INSUFFICIENT EXCAVATED MATERIAL SUITABLE FOR FILLING OR SUBGRADE REPLACEMENT, THE CONTRACTOR IS TO ALLOW TO IMPORT FILL. IMPORTED FILL SHALL COMPLY WITH THE FOLLOWING:
  - 12.1. BE OF VIRGIN EXCAVATED NATURAL MATERIAL OR
  - 12.2. CONTRACTOR TO PROVIDE EVIDENCE IMPORT IS SUITABLE USE
  - 12.3. PLASTICITY INDEX BETWEEN 2-15% AND CBR > 8
  - 12.4. FREE FROM ORGANIC AND PERISHABLE MATTER
  - 12.5. MAXIMUM SIZE 50mm, PASSING 75 MICRON SIEVE (<25%)

EARTHWORKS (cont)
13. THE CONTRACTOR SHALL PROGRAM THE EARTHWORKS OPERATION SO THAT THE WORKING AREAS ARE ADEQUATELY DRAINED DURING THE PERIOD OF CONSTRUCTION. THE SURFACE SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS, ROLLERS MARKS AND SIMILAR WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM THE CONTRACTOR NOT OBSERVING THESE REQUIREMENTS SHALL BE RECTIFIED AT THEIR COST.
14. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE AND MAINTAIN THE INTEGRITY OF ALL SERVICES, CONDUITS AND PIPES DURING CONSTRUCTION, SPECIFICALLY DURING THE BACKFILLING AND COMPACTION PROCEDURE. ANY AND ALL DAMAGE TO NEW OR EXISTING SERVICES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST.
15. TESTING OF THE SUBGRADE SHALL BE CARRIED OUT BY AN APPROVED N.A.T.A. REGISTERED LABORATORY AT THE CONTRACTORS EXPENSE.
<u>DEEP EXCAVATIONS</u>
16. <u>PRIOR TO THE COMMENCEMENT OF EXCAVATION WORKS GREATER THAN 15m IN DEPTH, THE CONTRACTOR SHALL OBTAIN THE SERVICES OF A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO DETERMINE THE STABILITY OF A NATURAL MATERIAL AND BENCHING REQUIREMENTS.</u>
17. <u>THE CONTRACTOR MUST PROVIDE THE SUPERINTENDENT AND OR THE DESIGN ENGINEER WITH A COPY OF THE GEOTECHNICAL ENGINEERS REPORT.</u>
18. THE CONTRACTOR IS TO PROVIDE SAFETY BARRIERS / FENCING IN ACCORDANCE WITH OH&S AND REGULATORY AUTHORITY REQUIREMENTS.
<u>SERVICE TRENCHES</u>
19. SAWCUT EXISTING SURFACES PRIOR TO EXCAVATION. BACKFILL ALL TRENCHES UNDER EXISTING ROADS, PAVEMENTS AND PATHS WITH STABILISED SAND 5% CEMENT OR DGS40 MATERIAL (5% CEMENT) COMPACTED IN 200mm THICK LAYERS TO 98% MHDD TO UNDERSIDE OF PAVEMENT.
20. BACKFILL ALL TRENCHES NOT UNDER ROADS, PAVEMENTS, PATHS AND BUILDINGS WITH APPROVED EXCAVATED OR IMPORTED MATERIAL COMPACTED TO 95% SHMD.

SITWORKS
1. ALL WORKS TO BE IN ACCORDANCE WITH RELEVANT LOCAL COUNCIL / REGULATORY AUTHORITIES REQUIREMENTS. ALL SPECIFICATIONS AND AUSTRALIAN STANDARDS <u>CONFLICTS BETWEEN SAID DOCUMENTS SHALL BE REFERRED TO THE SUPERINTENDENT FOR DIRECTION.</u>
2. THE CONTRACTOR IS TO DESIGN, OBTAIN APPROVALS AND CARRY OUT REQUIRED TEMPORARY TRAFFIC CONTROL PROCEDURES DURING CONSTRUCTION IN ACCORDANCE WITH <u>ALL REGULATORY AUTHORITIES</u> , INCLUSIVE OF LOCAL COUNCIL REGULATIONS AND REQUIREMENTS.
3. THE CONTRACTOR IS TO OBTAIN ALL AUTHORITY APPROVALS AS REQUIRED <u>PRIOR TO COMMENCEMENT OF WORKS.</u>
4. RESTORE ALL PAVED, COVERED, GRASSED AND LANDSCAPED AREAS TO THEIR ORIGINAL CONDITION <u>OR AS DIRECTED BY THE SITE SUPERINTENDENT</u> ON COMPLETION OF WORKS. WHERE PLANTING OF NEW GRASS IS NECESSARY REFER TO LANDSCAPE ARCHITECT AND / OR ARCHITECT DOCUMENTATION.
5. ON COMPLETION OF ANY TRENCHING WORKS, ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION <u>OR AS DIRECTED BY THE SITE SUPERINTENDENT</u> , INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL, GRASSED AREAS AND ROAD PAVEMENTS.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR <u>PRIOR TO COMMENCEMENT OF WORKS.</u>
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING LEVELS ONSITE PRIOR TO LODMENT OF TENDER AND ONSITE WORKS. THE PRICE AS TENDERED SHALL BE INCLUSIVE OF ALL WORKS SHOWN ON THE TENDER PROJECT DRAWINGS. ADDITIONAL PAYMENTS FOR WORKS SHOWN ON THE TENDER PROJECT DRAWINGS WILL NOT BE APPROVED.
8. DO NOT OBTAIN DIMENSIONS BY SCALING DRAWINGS.
9. IN CASE OF DOUBT OR DISCREPANCY REFER TO SUPERINTENDENT FOR CLARIFICATION OR CONFIRMATION PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
10. WHERE NEW WORKS ABOUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED. MAKE SMOOTH TRANSITION TO EXISTING FEATURES AND MAKE GOOD WHERE JOINED.
11. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
12. ALL CIVIL ENGINEERING DESIGN HAS BEEN DOCUMENTED UNDER THE ASSUMPTION THAT ALL NECESSARY SITE CONTAMINATION REMEDIATION WORKS HAVE BEEN SATISFACTORILY COMPLETED (IF APPLICABLE) AND THAT THE SITE IS NOT AFFECTED BY ANY SOIL STRATA OR GROUNDWATER TABLE CONTAMINATION.

STORMWATER DRAINAGE
1. <u>ALL STORMWATER PIPES TO CONFORM WITH ENVIRONMENTAL PRODUCT DECLARATION (EPD) IE uPVC PIPES ARE NOT TO BE USED UNLESS APPROVED BY NORTHROP AND ESD CONSULTANT. BLACKMAX PIPES CAN BE USED FOR THE PROPOSED IN-GROUND STORMWATER SYSTEM.'</u>
2. STORMWATER LINES PASSING UNDER FLOOR SLABS TO BE CONCRETE ENCASED.
3. PIPES EQUAL TO THAT OF THE STEEL REINFORCED CONCRETE PIPE CLASS SPECIFIED ON THE DRAWINGS MAY BE USED SUBJECT TO APPROVAL FROM THE SUPERINTENDENT.
4. ALL PIPE ARE TO BE LAID AT 1.0% MIN GRADE U.N.O.
5. <u>COVERS</u> 5.1. USE NOT DIPPED GALVANISED COVERS AND GRATES COMPLYING WITH RELEVANT COUNCIL AND AUSTRALIAN STANDARDS. 5.2. ALL COVERS AND GRATES TO BE POSITION IN A FRAME AND MANUFACTURED AS A UNIT. 5.3. ALL COVERS AND GRATES TO BE FITTED WITH POSITIVE COVER LIFTING KEYS 5.4. OBTAIN SUPERINTENDENTS APPROVAL FOR THE USE OF CAST IRON SOLID COVERS AND GRATES. CAST IRON SOLID COVERS (IF APPROVED) TO CONSIST OF CROSS-WEBBED, CELLULAR CONSTRUCTION WITH THE RIBS UPPERMOST TO ALLOW INFILLING WITH CONCRETE. INSTALL POSITIVE COVER LIFTING KEYS AND PLASTIC PLUGS. 5.5. UNLESS DETAILED OR SPECIFIED OTHERWISE, COVERS AND GRATES TO BE CLASS 'D' IN VEHICULAR PAVEMENTS AND CLASS 'B' ELSEWHERE. 5.6. ALL GRATED TRENCH DRAINS SHOULD BE 'CLASS D' CAST IRON WITHIN VEHICULAR PAVEMENTS AND CLASS 'B' HEEL SAFE WITHIN PEDESTRIAN PAVEMENTS.
6. ALL PIPE BENDS, JUNCTIONS, ETC ARE TO BE PROVIDED USING PURPOSE MADE FITTINGS OR STORMWATER PITS.
7. ALL CONNECTIONS TO EXISTING DRAINAGE STRUCTURES SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
8. STORMWATER PIPEWORK TO FINISH FLUSH WITH INTERNAL PIT WALLS AND MUST NOT PROTRUDE. CONNECTION TO BE NEATLY RENDER AND MADE NEAT.
9. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
10. U.N.O MATERIAL USED FOR BEDDING OF PIPES SHALL BE APPROVED NON-COHESIVE GRANULAR MATERIAL HAVING HIGH PERMEABILITY AND HIGH STABILITY WHEN SATURATED AND FREE OF ORGANIC AND CLAY MATERIAL.
11. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN 50mm CONCRETE BED (OR 75mm THICK BED OF 12mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK.
12. BEDDING SHALL BE U.N.O TYPE H52 UNDER ROADS AND H2 UNDER GENERAL AREAS IN ACCORDANCE WITH CURRENT RELEVANT INDUSTRY STANDARDS AND GUIDELINES.
13. THE CONTRACTOR SHALL ENSURE AND PROTECT THE INTEGRITY OF ALL STORMWATER PIPES DURING CONSTRUCTION. ANY AND ALL DAMAGE TO THESE PIPES AS A RESULT OF THESE WORKS SHALL BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE SUPERINTENDENT AND AT NO EXTRA COST.
14. NOTE THAT THE PIT COVER LEVEL NOMINATED IN GUTTERS ARE TO THE INVERT OF THE GUTTER WHICH ARE 40mm LOWER THAN THE PAVEMENT LEVEL AT LIP OF GUTTER. REFER KERB DETAILS FOR CONFIRMATION.
<u>SUBSOIL DRAINAGE</u>
15. $\varnothing$ 100mm SUBSOIL DRAINAGE LINES WITH NON-WOVEN GEOTEXTILE FILTER SOCK SURROUND SHALL BE CONNECTED TO A STORMWATER DRAINAGE PIT (AT MIN 1% LONGITUDINAL GRADE) AND PROVIDED IN THE FOLLOWING LOCATIONS; 15.1. THE HIGH SIDE OF PROPOSED TRAFFICKED PAVEMENT AREAS. 15.2. ALL PLANTER AND TREE BEDS PROPOSED ADJACENT TO PAVEMENT AREAS. 15.3. BEHIND RETAINING WALLS (IN ACCORDANCE WITH RETAINING WALL DETAILS). 15.4. ALL OTHER AREAS SHOWN ON DRAWINGS. 15.5. CONTRACTOR IS TO MAKE ALLOWANCE IN BOTH TENDER AND CONSTRUCTION COSTING TO ALLOW FOR SUBSURFACE DRAINAGE <u>BEHIND ALL RETAINING WALLS / ABOVE LOCATIONS AND TO MAKE CONNECTION TO STORMWATER SYSTEM.</u>
16. WHERE SUBSOIL DRAINAGE PASSES BENEATH BUILDINGS / PAVED AREAS AND/OR PAVEMENTS, CONTRACTOR TO ENSURE $\varnothing$ 100mm CLASS 'SMI' uPVC DRAINAGE LINE IS USED AND THAT APPROPRIARY FITTINGS ARE USED TO RECONNECT SUBSOIL DRAINAGE LINE.
17. THE CONTRACTOR SHALL INSTALL INSPECTION OPENINGS / CLEAROUTS TO ALL SUBSOIL DRAINAGE LINES AND DOWNPIPE LINES AS SPECIFIED ON DRAWINGS AND IN ACCORDANCE WITH COUNCIL SPECIFICATIONS AT MAXIMUM 30m CENTRE AND AT ALL UPSTREAM ENDPOINTS.
18. PROVIDE 3.0m LENGTH OF $\varnothing$ 100 SUBSOIL DRAINAGE LINE WRAPPED IN NON-WOVEN GEOTEXTILE FILTER FABRIC TO THE UPSTREAM SIDE OF STORMWATER PITS, LAID IN STORMWATER PIPE TRENCHES AND CONNECTED TO DRAINAGE PIT.
19. IN AREAS WHERE DUMPED / HAND PLACED ROCK IS USED AS A MEANS OF SCOUR PROTECTION, CONTRACTOR IS TO EXCAVATE A MINIMUM OF 100mm FROM PROPOSED SURFACE, LEVEL AND COMPACT SUBGRADE AS SPECIFIED. ROCK TO THEN BE PLACED ON GEOTEXTILE FILTER FABRIC.

PRECAST STORMWATER PITS
1. THE USE OF PRE-CAST STORMWATER DRAINAGE PITS IS NOT ACCEPTED WITHOUT CONFIRMATION BETWEEN NORTHROP ENGINEERS AND THE CONTRACTOR REGARDING QUALITY CONTROL AND CERTIFICATION OF FINISHES.
2. REFER MANUFACTURERS SPECIFICATIONS FOR INSTALLATION GUIDELINES.
3. PRECAST PIT TO BE PLACED ON MINIMUM 150mm THICK CONCRETE PAD AND BED MINIMUM 50mm WHILST CONCRETE IS STILL PARTIALLY WET.
4. ENSURE PENETRATION IS CORED THROUGH PIT FACE TO ALLOW CONNECTION.
5. ENSURE A SMOOTH SEALED FINISH AT PIPE CONNECTIONS BY HAND APPLYING CONCRETE AROUND THE PIPE ON THE INTERNAL FACE OF THE PIT TO FILL IN ANY VOIDS CREATED WHEN PENETRATION FOR THE PIPE WAS CORED.
6. ENSURE A SEALED FINISH AT PIPE CONNECTIONS BY HAND-APPLYING MINIMUM 150mm THICK CONCRETE AROUND PIPE AT THE EXTERNAL FACE OF THE PIT. ENSURE CONCRETE DOES NOT AFFECT THE INTEGRITY OF THE SUBSOIL DRAINAGE CONNECTED TO THE PIT.
7. ENSURE PIPEWORK DOES NOT PROTRUDE INTO THE BEYOND THE WALL. PIPEWORK IS TO FINISH FLUSH WITH INTERNAL WALL (UNLESS OTHERWISE NOTED OR DETAILED).
8. ENSURE THE OUTLET PIPE IS CONNECTED AT THE INVERT LEVEL OF THE PIT TO DRAIN. ALTERNATIVELY FILL THE BASE OF THE PIT WITH MASS CONCRETE (MIN 50mm THICK) OR APPROVED GROUTING COMPOUND (LESS THAN 50mm THICK) TO DRAIN.
9. PROVIDE CONCRETE BENCHING TO SIDES OF PIT TO SUIT PIPE DIAMETER. HEIGHT TO MATCH MINIMUM 1/3 PIPE DIAMETER.

RAINWATER REUSE
1. REFER HYDRAULICS DRAWINGS FOR SPECIFICATIONS AND DETAILS OF RW.T.
2. GUTTER GUARD TO BE INSTALLED ON ALL EAVES GUTTERS.
3. PRESSURE PUMP / TAP TO BE PROVIDED FOR THE REUSE OF CAPTURED TANK WATER.
4. A PERMANENT SIGN IS TO BE LOCATED IN THE VICINITY OF THE TANK STATING THE WATER IS 'NON POTABLE WATER' WITH APPROPRIATE HAZARD IDENTIFICATION.
5. ALL RAINWATER SERVICES SHALL BE CLEARLY LABELLED "NON POTABLE WATER" WITH APPROPRIATE HAZARD IDENTIFICATION.
6. PIPEWORK USED FOR RAINWATER SERVICES SHALL BE COLOURED LILAC IN ACCORDANCE WITH AS1345.
7. ALL VALVES AND APERTURES SHALL BE CLEARLY AND PERMANENTLY LABELLED WITH SAFETY SIGNS TO COMPLY WITH AS1319.
8. AN AIR GAP OR RPD2 TO ENSURE BACKFLOW PREVENTION (IF MAINS 'TOP UP' / BYPASS UTILISED)
9. RAINWATER TANK RETICULATION SYSTEM AND MAINS WATER BYPASS ARRANGEMENT TO BE INSTALLED IN ACCORDANCE WITH AS/NZS 3500.12-2003 AND THE NSW CODE OF PRACTICE - PLUMBING AND DRAINAGE.
10. A FIRST FLUSH FILTRATION DEVICE IS TO BYPASS THE FIRST 1mm OF RAINWATER.

SIGNAGE AND LINEMARKING
1. ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH AUSTRALIAN STANDARDS 1742 / RMS STANDARDS AND SPECIFICATIONS.
2. LINE MARKING AND PAINT SHALL BE IN ACCORDANCE WITH AS1742.3 AND RMS STANDARDS.
3. PAINT SHALL BE TYPE 3 CLASS 'A' AND THE COLOUR SHALL BE WHITE AND NOT SUBJECT TO DISCOLOURATION BY BITUMEN FROM ROAD SURFACE. ALL PAINT TO BE APPLIED BY MECHANICAL SPRAYER.
4. LINE MARKING SHALL BE SPOTTED OUT AND APPROVED PRIOR TO SPRAYING.
5. PAINT SHALL BE APPLIED AT A WET THICKNESS OF BETWEEN 0.35mm AND 0.40mm.
6. CARPARK LINEMARKING TO BE 80mm WIDE.

LANDSCAPING
1. REFER TO DRAWINGS BY OTHERS FOR DETAILS OF PROPOSED LANDSCAPING TREATMENT.
2. ALL DISTURBED SURFACE TO BE TEMPORARILY STABILISED WITH HYDROMULCH UPON COMPLETION OF WORKS.

PAVEMENTS
1. ALL PAVEMENT MATERIALS SHALL COMPLY WITH CURRENT RMS SPECIFICATIONS. PROVIDE MECHANICAL ANALYSIS FOR EACH BATCH OF PAVEMENT MATERIAL TO ENSURE CONFORMITY.
2. <u>COMPACTION STANDARDS</u> BASE 98% MODIFIED MAXIMUM DRY DENSITY SUBBASE 98% MODIFIED MAXIMUM DRY DENSITY SUBGRADE 100% STANDARD MAXIMUM DRY DENSITY
3. <u>THE CONTRACTOR SHALL CONFIRM THE DESIGN CBR WITH A MINIMUM OF 3 TESTS TAKEN AT SUBGRADE LEVEL, WHERE DISCREPANCY IS FOUND, CONTACT THE DESIGN ENGINEER.</u>
4. ALLOW FOR COMPACTION TESTING BY A N.A.T.A. REGISTERED LABORATORY FOR BASE LAYER, SUBBASE LAYER AND SUBGRADE LAYER IN ACCORDANCE WITH THE LATEST VERSION OF AS3798 FOR PAVEMENTS (MINIMUM 2 TESTS PER LAYER). ALLOW FOR AT LEAST TWO SUCCESSFUL COMPACTION TESTS IN EACH LAYER.
5. MATCH NEW PAVEMENTS NEATLY AND FLUSH WITH EXISTING
6. AFTER BASE IS APPROVED, SWEEP CLEAN AND PRIME AT NOMINAL RATE OF 1.0L PER 1.0 sq.m.
7. <u>PAVEMENT HOLD POINTS</u> 7.1. SUB-GRADE PROOF ROLL PRIOR TO SET-UP AND FORM FOR CONCRETE POUR. 7.2. INSPECTION OF FORMWORK / STEEL PRIOR TO CONCRETE POUR. 7.3. SUBMISSION OF SUB-GRADE AND BASE DENSITY TESTS.

ASPHALTIC CONCRETE
1. <u>GENERAL</u> 1.1. ALL ASPHALTIC CONCRETE (AC) WORK TO BE PREPARED AND CARRIED OUT IN ACCORDANCE WITH GOOD ASPHALTIC PAVING PRACTICE AS DESCRIBED IN AS2150-2005 "ASPHALT (HOT-MIXED) PAVING - GUIDE TO GOOD PRACTICE" AND CURRENT RMS SPECIFICATIONS.
2. <u>PAVEMENT PREPARATION</u> 2.1. THE FINISHED PAVEMENT SURFACE TO BE SEALED SHALL BE WITHIN +/- 2% OF THE OPTIMUM AND BROOMED BEFORE COMMENCEMENT OF WORK TO ENSURE COMPLETE REMOVAL OF ALL SUPERFICIAL FOREIGN MATTER. 2.2. PRIME ALL SURFACES TO BE SEALED. ALLOW PRIME TO SETTLE FOR A MINIMUM OF 3 DAYS BEFORE APPLYING TACK COAT AND ASPHALT. 2.3. SWEEP PRIMED SURFACES BEFORE APPLYING TACK COAT. 2.4. ALL DEPRESSIONS OR UNEVEN AREAS ARE TO BE TACK-COATED AND BROUGHT UP TO GENERAL LEVEL OF PAVEMENT WITH ASPHALTIC CONCRETE BEFORE LAYING OF MAIN COURSE. 2.5. ALL DEFECTS IN THE BASE COURSE INCLUDING CRACKS, SURFACE DEFORMATION AND THE LIKE SHALL BE REPAIRED AS DIRECTED BY THE SUPERINTENDENT PRIOR TO PLACEMENT OF TACK COAT AND/OR AC COURSES.
3. <u>PLACEMENTS</u> 3.1. ALL ASPHALT SHALL BE PLACED UTILISING APPROVED MECHANICAL PAVING MACHINES. DO NOT HAND PLACE ASPHALT WITHOUT PRIOR APPROVAL FROM ENGINEER.
4. <u>JOINTS</u> 4.1. THE NUMBER OF JOINTS BOTH LONGITUDINAL AND TRANSVERSE SHALL BE KEPT TO A MINIMUM. 4.2. THE DENSITY AND SURFACE FINISH AT JOINTS SHALL BE SIMILAR TO THOSE OF THE REMAINDER OF THE LAYER.
5. <u>COMPACTION</u> 5.1. ALL COMPACTION SHALL BE UNDERTAKEN USING SELF PROPELLED ROLLERS. 5.2. INITIAL ROLLING SHALL BE COMPLETED BEFORE THE MIX TEMPERATURE FALLS BELOW 105°C USING A STEEL DRUM ROLLER HAVING A MINIMUM WEIGHT OF 8 TONNES AND A MAXIMUM UNIT LOAD ON THE REAR DRUM EQUIVALENT TO 55kN/m WIDTH OF DRUM. 5.3. SECONDARY ROLLING SHALL BE COMPLETED BEFORE THE MIX TEMPERATURE FALLS BELOW 80°C USING A PNEUMATIC TYRED ROLLER OF AT LEAST 10 TONNES MASS. A MINIMUM TYRE PRESSURE OF 550kPa AND A MINIMUM TOTAL LOAD OF 1 TONNE ON EACH TYRE. 5.4. ROLLED SURFACES SHALL BE SMOOTH AND FREE OF UNDULATIONS. BONY AND/OR UNEVEN SURFACES WILL BE REJECTED. 5.5. PROVIDE 2 no. MINIMUM COMPACTION TESTS.
6. <u>FINISHED SURFACE PROPERTIES</u> 6.1. FINISHED SURFACES SHALL BE SMOOTH, DENSE AND TRUE OF SHAPE AND SHALL NOT VARY MORE THAN: 6.1.1. 3mm FROM THE SPECIFIED PLAN LEVEL AT ANY POINT. 6.1.2. 3mm FROM THE BOTTOM OF A STRAIGHT EDGE LAID TRANSVERSELY. 6.1.3. 5mm FROM THE BOTTOM OF A STRAIGHT EDGE LAID LONGITUDINALLY. 6.1.4. MINUS 0 TO PLUS 2mm ADJACENT TO OTHER ELEMENTS SUCH AS KERBS AND THE LIKE TO AVOID POOLING OF SURFACE WATER. 6.1.5. MINUS 0 FROM THE SPECIFIED THICKNESS.
7. DO NOT STORE PLANT EQUIPMENT OR TRAFFIC NEWLY LAID ASPHALTIC CONCRETE PAVEMENTS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
8. DO NOT APPLY MARKING PAINTS UNTIL ASPHALT HAS CURED IN ACCORDANCE WITH PAINT MANUFACTURERS SPECIFICATIONS.

NOT FOR CONSTRUCTION

AMENDMENTS			
REV	BY	DATE	DESCRIPTION
01	MM	21.06.21	ISSUED FOR DRAFT 50% DETAILED DESIGN
02	MM	08.07.21	ISSUED FOR 50% DETAILED DESIGN
03	MM	23.07.21	ISSUED FOR DRAFT 75% DETAILED DESIGN
04	MM	12.08.21	ISSUED FOR DRAFT 75% DETAILED DESIGN
05	MM	25.09.21	ISSUED FOR TENDER
06	MM	16.09.21	ISSUED FOR 100% DETAILED DESIGN
07	TB	12.10.21	ISSUED FOR CONTRACT DOCUMENTATION



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ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK.  
NORTHROP ACCEPTS NO RESPONSIBILITY FOR COMPLETION OR SCALE OF DRAWINGS.  
TRANSFERRED ELECTRONICALLY.  
THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE



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VINCE PEDAVOLI  
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DRAWING NAME  
SPECIFICATION NOTES - SHEET 01

PROJECT  
NEW PRIMARY SCHOOL IN  
MURRUMBATEMAN  
FAIRLEY STREET, MURRUMBATEMAN

PROJECT NORTH					
MM	NS	JG	12.10.21		
DRAWN	CHECKED	VERIFIED	DATE		REVISION
MURR-CV-DD-DWG-101.11					



NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH YASS VALLEY COUNCIL DEVELOPMENT GUIDELINES. READ IN CONJUNCTION WITH THE NOTES PROVIDED BELOW. IF CONFLICT ARISE, YASS VALLEY COUNCIL GUIDELINES AND SPECIFICATIONS TAKE PRECEDENCE. WHERE YASS VALLEY COUNCIL GUIDELINES AND SPECIFICATIONS ARE SILENT, THE SPECIFICATION NOTES BELOW TAKE PRECEDENCE

PAVEMENT JOINTS

1. PROVIDE 10mm ABLEFLEX BETWEEN NEW CONCRETE WORKS AND EXISTING STRUCTURES.

2. LOCAL AUTHORITY REQUIREMENTS SHALL TAKE PRECEDENCE WITHIN THE PUBLIC ROAD RESERVE.

3. DOWELS TO BE PLACED ON PROPRIETARY CRADLES TO ENSURE CORRECT SPACING AND ALIGNMENT.

4. PEDESTRIAN PAVEMENTS  
ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS U.N.O. ON THE DESIGN DRAWINGS.

5. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 6.0m CENTRES.

6. WEAKENED PLANE JOINTS (SAWN OR TOOL JOINTS) ARE TO BE LOCATED AT A MAX. SPACING OF 1.5m x WIDTH OF THE PAVEMENT.

7. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.

8. TYPICAL PEDESTRIAN PAVEMENT JOINT DETAIL

EJ

TJ

SJ

TJ

SJ

EJ

TJ

SJ

W

6.0m MAX.

1.5 x W

9. VEHICULAR PAVEMENTS  
ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS U.N.O. ON THE DESIGN DRAWINGS.

10. TIED KEYED CONSTRUCTION JOINTS SHOULD GENERALLY BE LOCATED LONGITUDINALLY AT A MAX. OF 6.0m CENTRES.

11. SAWN JOINTS SHOULD GENERALLY BE LOCATED Laterally AT A MAX. OF 6.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX. 18.0m CENTRES.

12. TYPICAL VEHICULAR PAVEMENT JOINT DETAIL.

EJ

SJ

SJ

SJ

SJ

EJ

SJ

SJ

18.0m MAX.

6.0m MAX.

6.0m MAX.

18.0m MAX.

13. KERB EXPANSION JOINTS SHALL BE FORMED FROM 10mm ABLEFLEX FOR FULL DEPTH OF SECTION.

14. KERB EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, TANGENT POINTS OF CURVES / CORNERS AND AT 12m MAX CENTRES.

15. KERB TOOLED JOINTS TO BE MIN 3mm WIDE AND LOCATED AT MAX 3m CENTRES.

16. INTEGRAL KERB JOINTS SHALL MATCH THE LOCATION OF PAVEMENT JOINTS.

GREEN STAR DESIGN & AS-BUILT v1.3 ASSESSMENT REQUIREMENTS

THIS SPECIFICATION SHALL BE READ IN CONJUNCTION WITH THE 'ESD MASTER SPECIFICATION' (140521 MONARO SPEC S02 ESD MASTER SPECIFICATION [A]). THE GREEN STAR CREDITS ASSOCIATED WITH THE CIVIL DESIGN WORKS ARE LISTED IN FOLLOWING TABLE:

CIVIL DESIGN GREEN STAR DESIGN & AS-BUILT CREDIT REQUIREMENTS

GREEN STAR DESIGN & AS-BUILT v1.3 CREDITS	CREDIT NO.	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
COMMISSIONING AND TUNING	2.0	ENVIRONMENTAL PERFORMANCE TARGETS	MAN.	MAN.
COMMISSIONING AND TUNING	2.1	SERVICES AND MAINTAINABILITY REVIEW	1	1
ADAPTATION AND RESILIENCE	3.1	IMPLEMENTATION OF CLIMATE ADAPTATION PLAN	2	2
POTABLE WATER	18B.4	LANDSCAPE IRRIGATION	1	1
LIFE CYCLE IMPACTS	19B.1	CONCRETE	3	2
LIFE CYCLE IMPACTS	19B.2	STEEL	1	1
RESPONSIBLE BUILDING MATERIALS	20.3	PERMANENT FORMWORK, PIPES, FLOORING BLINDS AND CABLES	1	1
SUSTAINABLE PRODUCTS	21.1	PRODUCT TRANSPARENCY AND SUSTAINABILITY	3	TBC
STORMWATER	26.1	STORMWATER PEAK DISCHARGE	1	1
STORMWATER	26.2	STORMWATER POLLUTION TARGETS	1	1

CONCEPT SOIL & WATER MANAGEMENT

1. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT ORDINANCES AND REGULATIONS; NOTE IN PARTICULAR THE REQUIREMENTS OF LANDCOMS MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION' (THE 'BLUE BOOK'). THIS SOIL AND WATER MANAGEMENT PLAN DETAILS THE ACTIONS TO BE TAKEN FOR THE MANAGEMENT AND DEWATERING OF STORMWATER DURING CONSTRUCTION OF THE PROPOSED BUILDING.

2. INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.

3. ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.

4. INSTALL SEDIMENT FENCING AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT.

5. ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.

6. THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB & GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION. REFER ARCHITECTS PLANS FOR TREES TO BE KEPT.

7. ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ONSITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.

8. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.

9. CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).

10. ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.

11. PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.

12. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION & SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS & SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ ALL MAINTENANCE, CLEANING & BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.

14. GROUNDWATER SEEPAGE RATES AND QUALITY TO BE MONITORED AND TREATED IF REQUIRED DURING CONSTRUCTION IN ACCORDANCE WITH REQUIREMENTS OF SUPERVISING GEOTECHNICAL ENGINEER.

BASIN MANAGEMENT NOTES

1. PRIOR TO ANY FORECAST WEATHER EVENT, LIKELY TO RESULT IN SEDIMENT LADEN RUNOFF ON THE SITE, ANY EXISTING DETENTION BASINS/TRAPS SHALL BE DEWATERED TO PROVIDE SUFFICIENT CAPACITY TO CAPTURE SEDIMENT LADEN WATER FROM THE SITE.

2. ANY SEDIMENT LADEN WATER CAPTURED ON-SITE MUST BE TREATED TO ENSURE IT WILL ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES PRIOR TO ITS RELEASE FROM SITE. A SAMPLE OF THE RELEASED TREATED WATER MUST BE KEPT ON-SITE IN A CLEAR CONTAINER WITH THE SAMPLE DATE RECORDED.

3. NO ALUMINIUM BASED PRODUCTS MAY BE USED TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) ON-SITE WITHOUT THE PRIOR WRITTEN PERMISSION FROM AN APPROPRIATE COUNCIL OFFICER. THE APPLICANT MUST HAVE DEMONSTRATED ABILITY TO USED SUCH PRODUCTS CORRECTLY AND WITHOUT ENVIRONMENTAL HARM PRIOR TO NAY APPROVAL.

4. THE CHEMICALS/AGENTS (FLOCCULATING/COAGULANTS) USED IN TYPE 'D' AND TYPE 'F' BASINS TO TREAT TURBID WATER CAPTURED IN THE BASIN MUST BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES (TSS <50 mg/L, TURBIDITY < 60 NTU, 6.5 < pH < 8.5) WITHIN THE 5-DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT.

5. ALL MANUFACTURERS INSTRUCTIONS MUST BE FOLLOWED FOR THE USE OF ANY CHEMICALS/AGENTS USED ON-SITE. EXCEPT WHERE APPROVED BY THE RESPONSIBLE PERSON OR AN APPROPRIATE COUNCIL OFFICER.

6. SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) MUST BE PLACED SUCH THAT WATER ENTERING THE BASINS/SEDIMENT TRAP MIXES WITH THE CHEMICALS/AGENTS AND IS CARRIED INTO THE BASIN/TRAP.

7. ANY BASIN MUST BE DEWATERED AS SOON AS PRACTICAL, ONCE WATER CAPTURED IN THE BASIN ACHIEVES COUNCIL'S WATER QUALITY OBJECTIVES.

8. INSPECT THE SEDIMENT BASINS AFTER EACH RAINFALL EVENTS AND/OR WEEKLY. ENSURE THAT ALL THE SEDIMENT IS REMOVED ONCE THE SEDIMENT STORAGE ZONE IS FULL. ENSURE THAT OUTLET AND EMERGENCY SPILLWAY WORKS ARE MAINTAINED IN A FULLY OPERATIONAL CONDITION AT ALL TIMES.

NOT FOR CONSTRUCTION

AMENDMENTS			
REV	BY	DATE	DESCRIPTION
01	MM	21.06.21	ISSUED FOR DRAFT 50% DETAILED DESIGN
02	MM	08.07.21	ISSUED FOR 50% DETAILED DESIGN
03	MM	23.07.21	ISSUED FOR DRAFT 75% DETAILED DESIGN
04	MM	12.08.21	ISSUED FOR DRAFT 75% DETAILED DESIGN
05	MM	25.09.21	ISSUED FOR TENDER
06	MM	16.09.21	ISSUED FOR 100% DETAILED DESIGN
07	TB	12.10.21	ISSUED FOR CONTRACT DOCUMENTATION

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NOMINATED ARCHITECT:  
VINCE PEDAVOLI  
NSW REG. No. 5045

DRAWING NAME

SPECIFICATION NOTES - SHEET 02

PROJECT

NEW PRIMARY SCHOOL IN MURRUMBATEMAN  
FAIRLEY STREET, MURRUMBATEMAN

PROJECT NORTH

MM

NS

JG

12.10.21

DRAWN

CHECKED

VERIFIED

DATE

REVISION

MURR-CV-DD-DWG-101.12

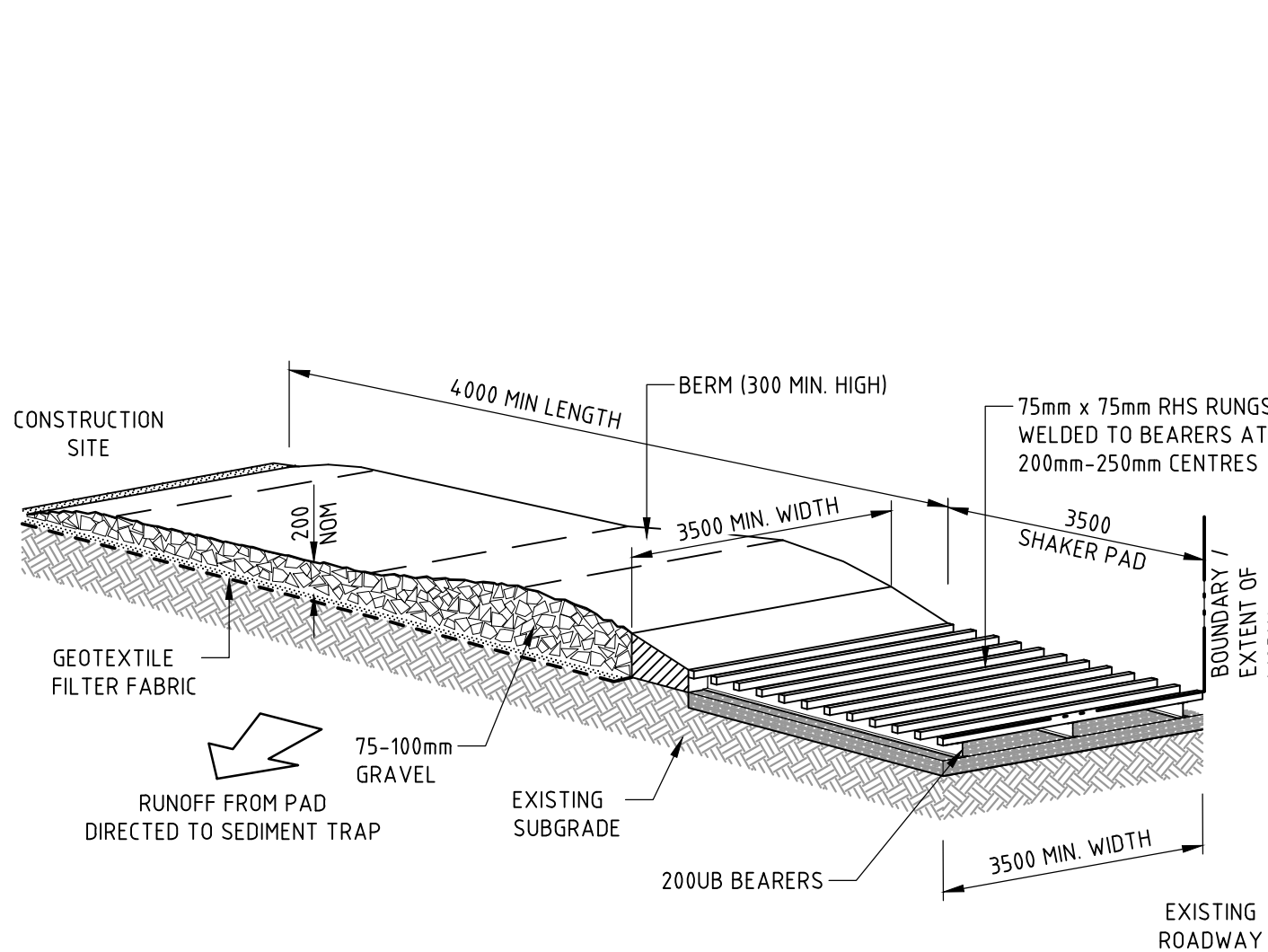
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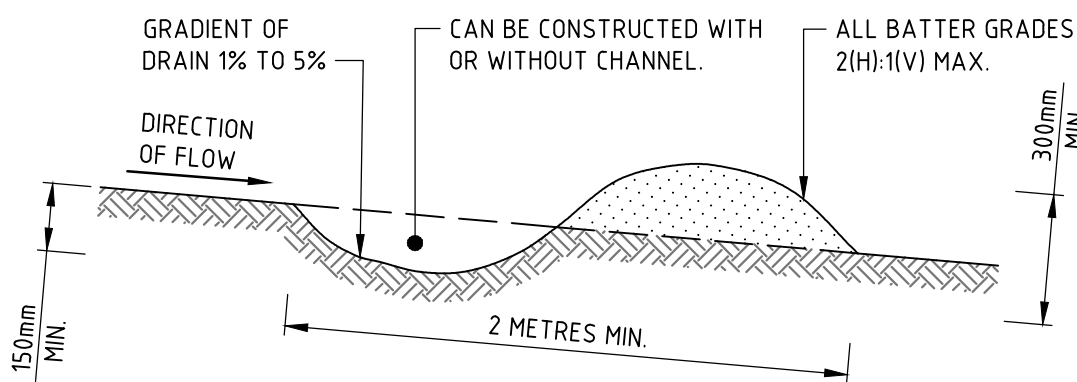
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#### CONSTRUCTION NOTES

1. 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.
2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
3. INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD. TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
4. INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.

### STABILISED SITE ACCESS

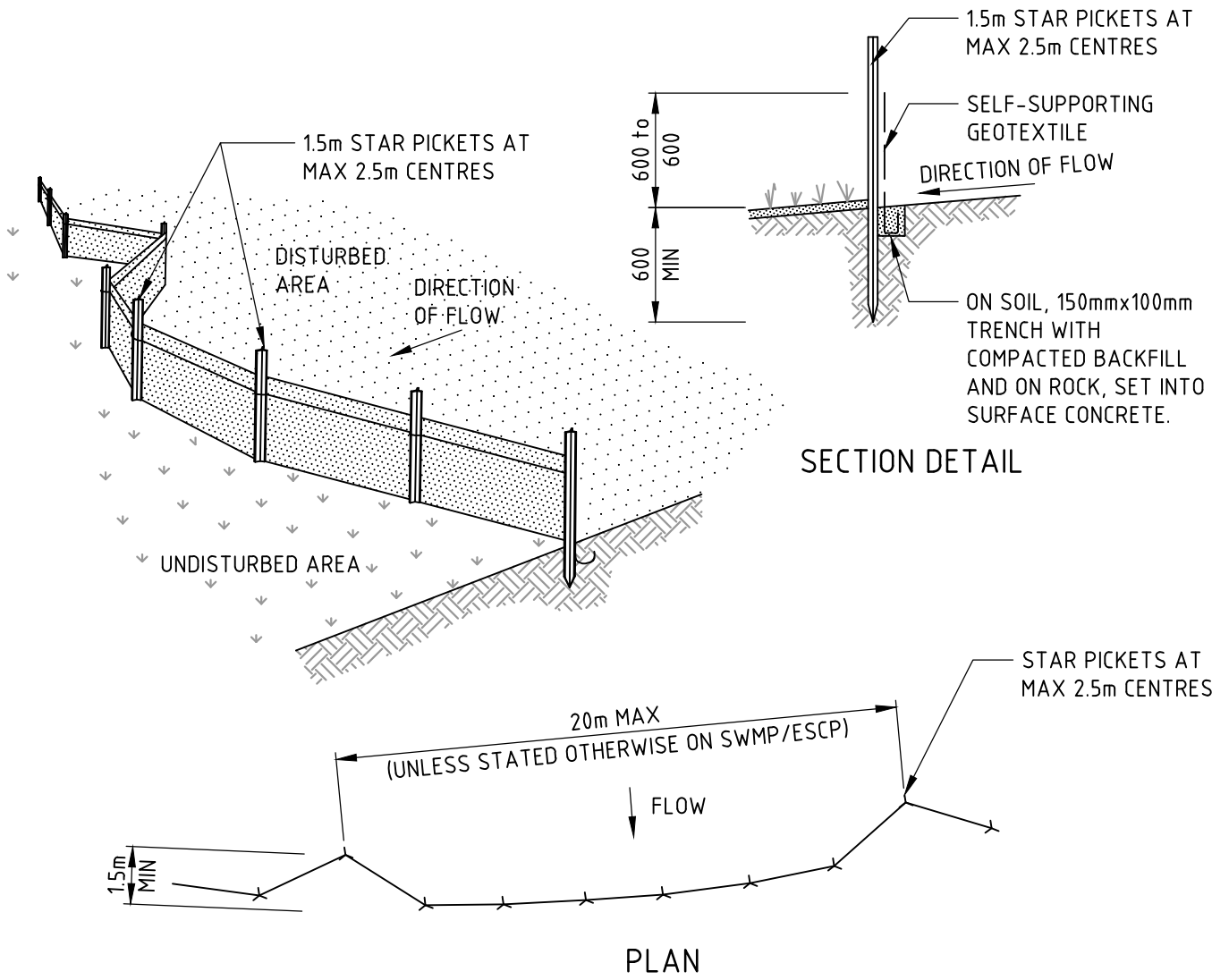


#### CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

### TEMPORARY DRAINAGE SWALE - LOW FLOW

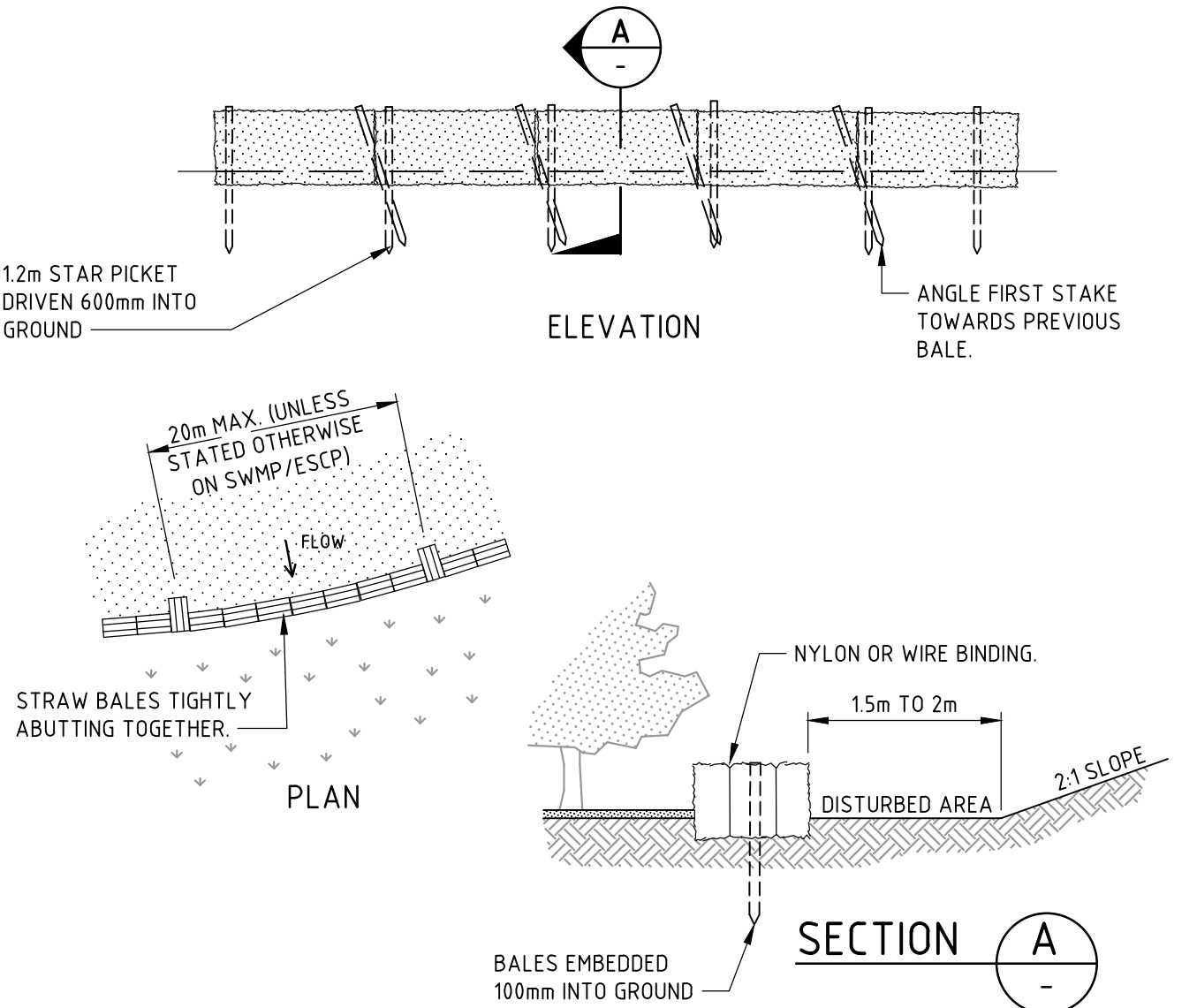
NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.



#### CONSTRUCTION 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 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE 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.

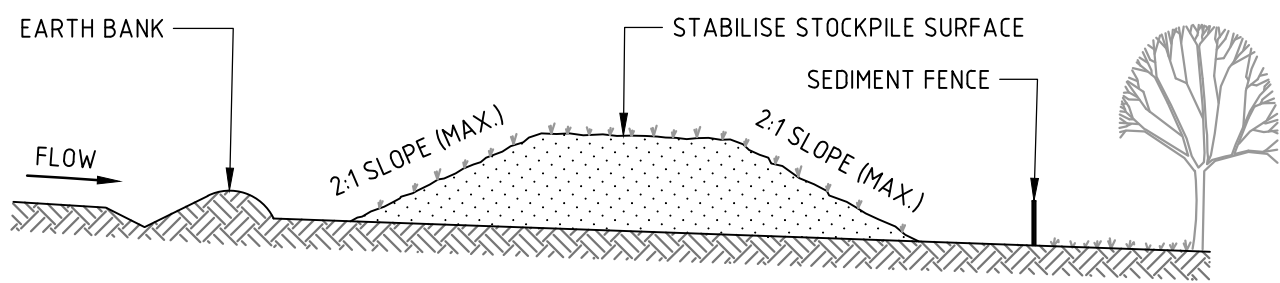
### SEDIMENT FENCE



#### CONSTRUCTION NOTES

1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 12 METRE STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THEM 600mm INTO THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACED 1 TO 2 METRES DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.

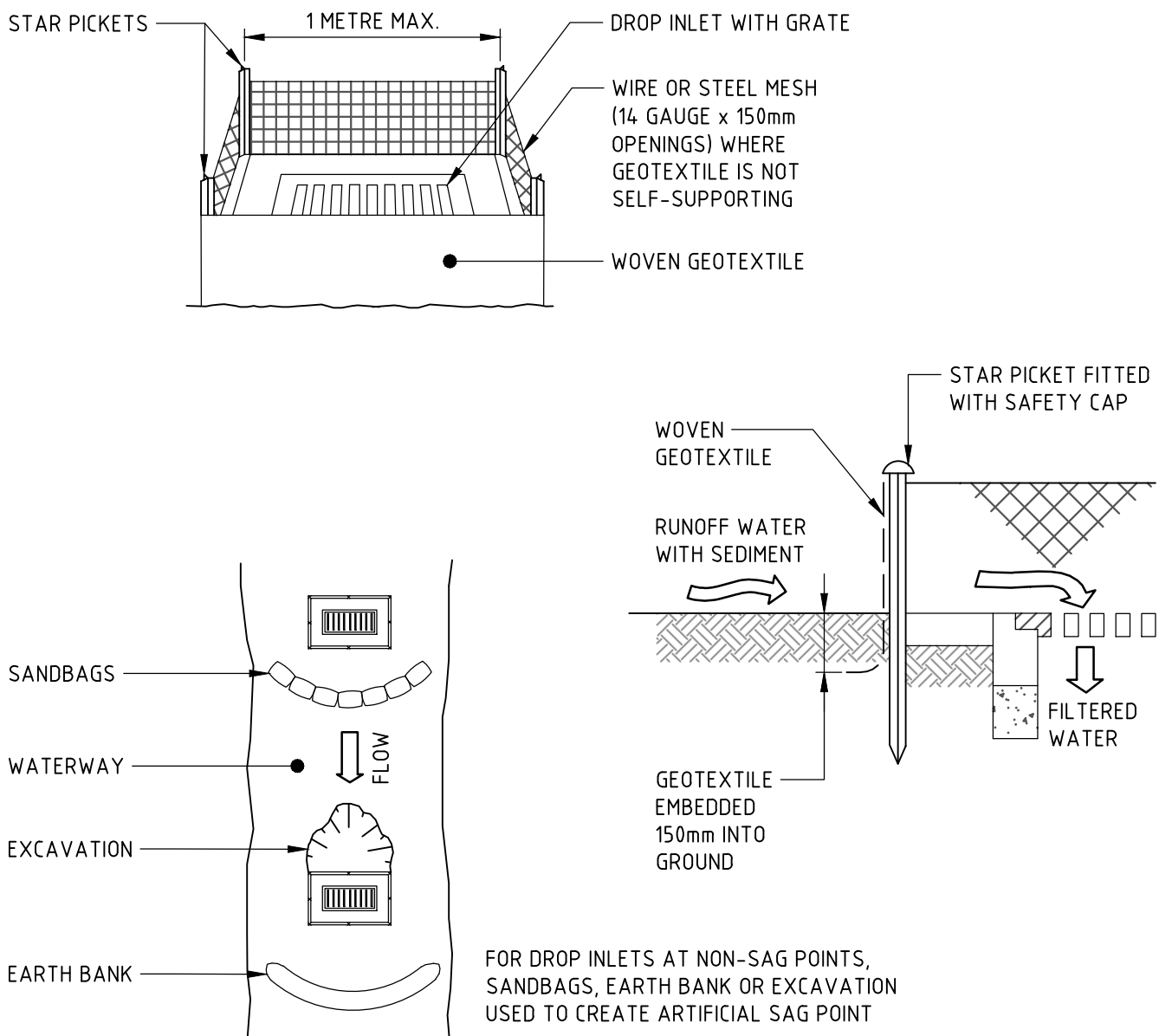
### STRAW BALE FILTER



#### CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) 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 2m 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 (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

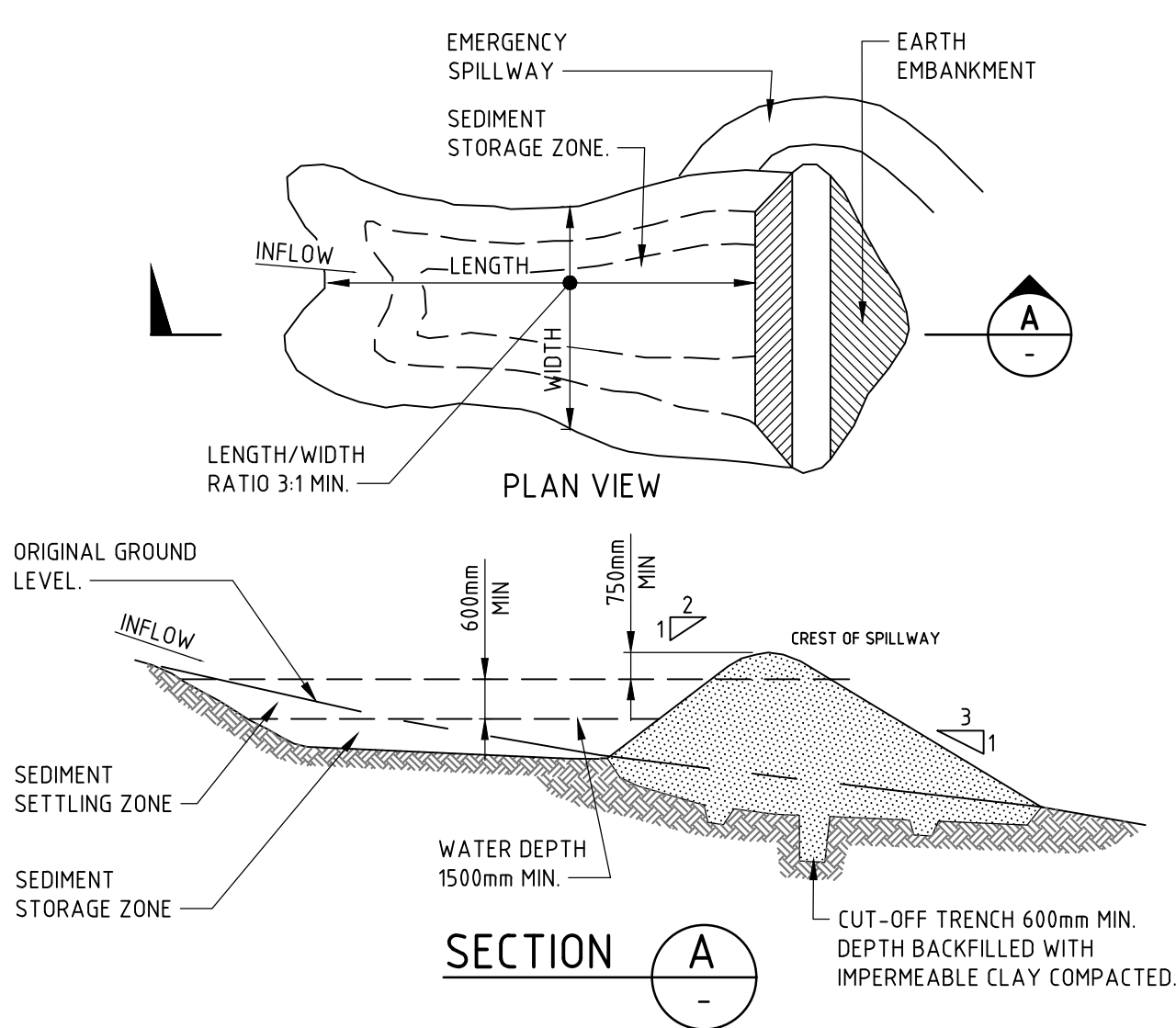
### STOCKPILE



#### CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

### GEOTEXTILE INLET FILTER TRAPS

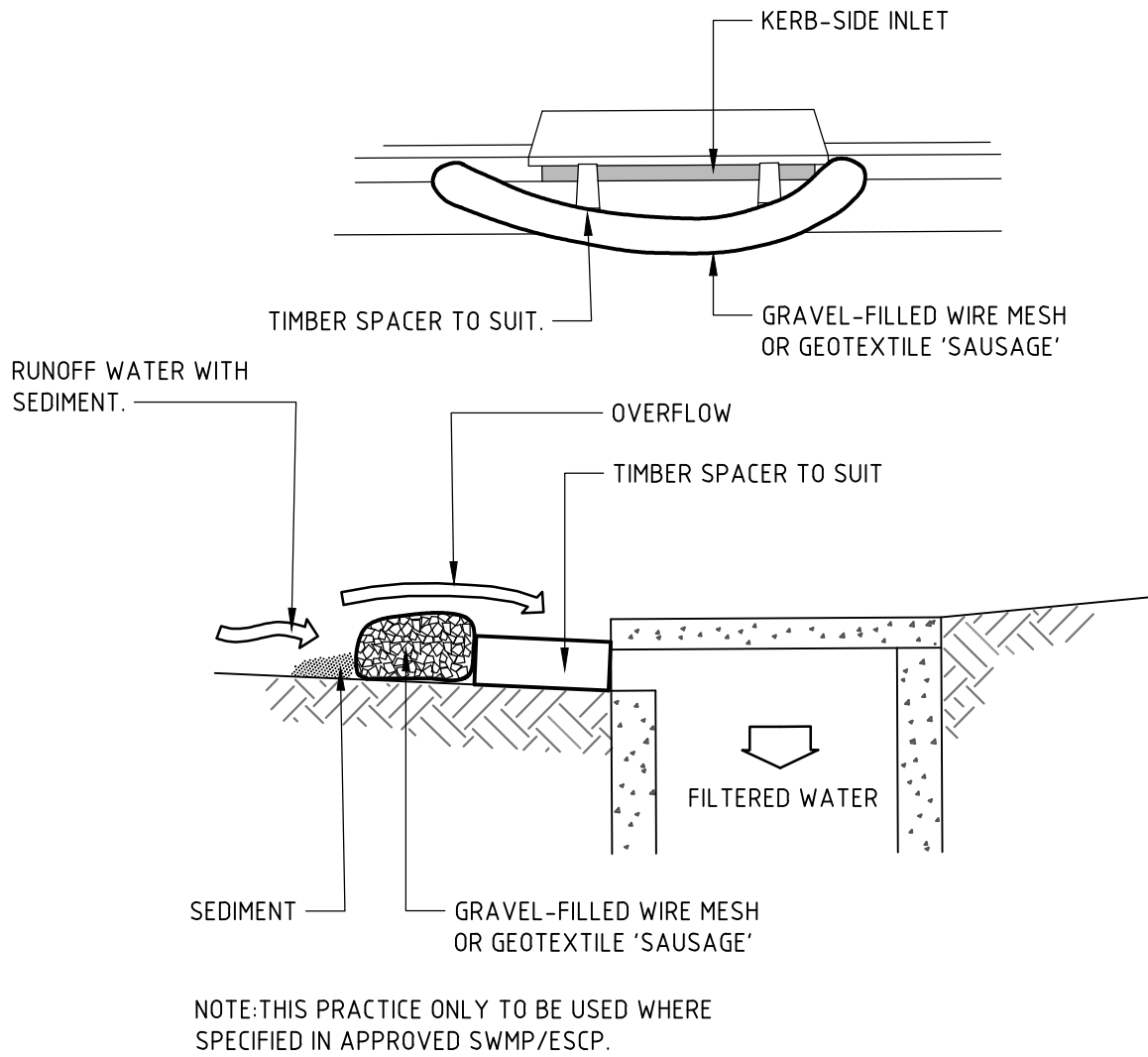


#### CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. CONSTRUCT A CUT-OFF TRENCH 500mm DEEP AND 1200mm WIDE ALONG THE CENTRELIN OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL FOLLOWING THE SWMP THAT IS FREE OF ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. CONSTRUCT THE EMERGENCY SPILLWAY.
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.

### SEDIMENT BASIN - WET (TYPE-F)

(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)



#### CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. 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.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. 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.

### WIRE MESH AND GRAVEL SEDIMENT FILTER

## NOT FOR CONSTRUCTION

AMENDMENTS			
REV	BY	DATE	DESCRIPTION
01	MM	21.06.21	ISSUED FOR DRAFT 50% DETAILED DESIGN
02	MM	08.07.21	ISSUED FOR 50% DETAILED DESIGN
03	MM	23.07.21	ISSUED FOR DRAFT 75% DETAILED DESIGN
04	MM	12.08.21	ISSUED FOR DRAFT 75% DETAILED DESIGN
05	MM	25.09.21	ISSUED FOR TENDER
06	MM	16.09.21	ISSUED FOR 100% DETAILED DESIGN
07	TB	12.10.21	ISSUED FOR CONTRACT DOCUMENTATION



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NOMINATED ARCHITECT:  
VINCE PEDAVOLI  
NSW REG. No. 5045



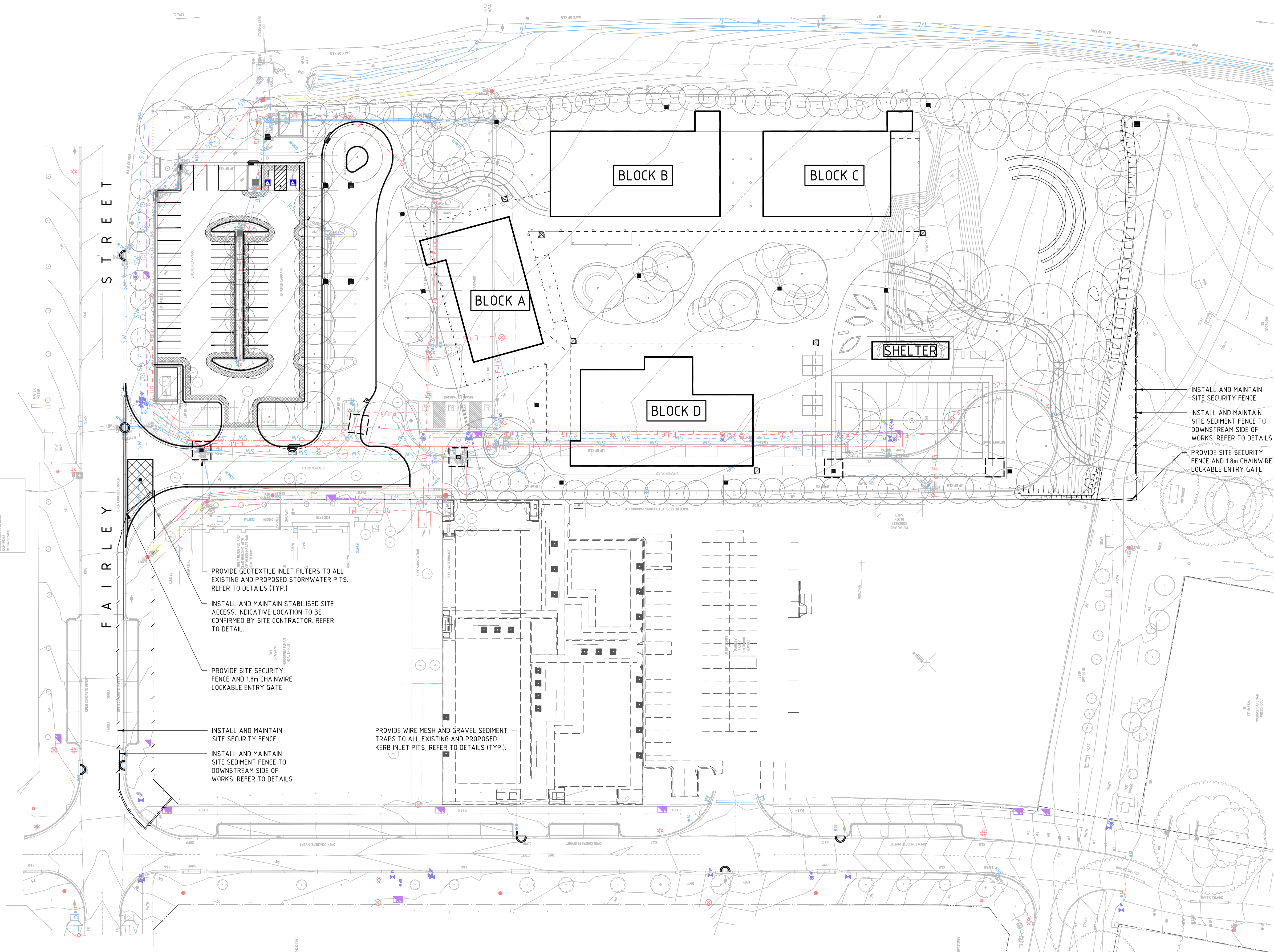
**PEDAVOLU**  
ARCHITECTS

### SEDIMENT & EROSION CONTROL DETAILS

### NEW PRIMARY SCHOOL IN MURRUMBATAMAN FAIRLEY STREET, MURRUMBATAMAN

PROJECT NORTH					
SCALE VARIES					
MM	NS	JG	12.10.21		
DRAWN	CHECKED	VERIFIED	DATE	REVISION	
MURR-CV-DD-DWG-102.11					





## LEGEND

	SITE BOUNDARY LINE
	ADJACENT BOUNDARY LINE
	EASEMENT LINE
	BUILDING LINE
	EXISTING ELECTRICITY
	EXISTING TELECOMMUNICATIONS
	EXISTING WATER
	EXISTING SEWER
	EXISTING STORMWATER
	EXISTING CONTOURS
	SEDIMENT FENCE
	SECURITY FENCE
	SECURITY GATE
	WIRE MESH AND GRAVEL SEDIMENT FILTER
	GEOTEXTILE INLET FILTER TRAP
	STABILISED SITE ACCESS

## NOTES

- ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
- ALL SEDIMENT AND EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE 'BLUE BOOK' CONTRACTOR TO ENSURE THESE MEASURES ARE IN PLACE AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION WORKS.

NOT FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION
01	MM	14.07.21	ISSUED FOR 50% DETAILED DESIGN



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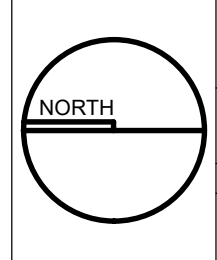
DRAWING NAME

CONCEPT SEDIMENT & EROSION  
CONTROL PLAN

PROJECT

NEW PRIMARY SCHOOL IN  
MURRUMBATAMAN  
FAIRLEY STREET, MURRUMBATAMAN

PROJECT NORTH



SCALE 1:400@A1  
0 4 8 12 16 20m

MM	PC	DATE	REVISION
DRAWN	CHECKED	VERIFIED	DATE

MURR-CV-DD-DWG-202.01

01



# Appendix B – Sediment Basin Calculations

If type D and F

Parameter	Adopted value
Total area (ha)	1.2
Soil Texture Group	F
Design rainfall depth (days)	5
Design rainfall depth (percentile)	80
x-day, y-percentile rainfall event	30
Cv	0.51
Settling zone volume (m <sup>3</sup> )	183,600
Sediment storage volume (m <sup>3</sup> )	91,800
Total basin volume (m <sup>3</sup> )	275,400

See 1) Soil Hydrological groups  
See 2) Rainfall depth (days)  
See 3) Rainfall depth (percentile)  
See Sheet x-day-y-p%  
See 4) Cv  
(calculated)  
(calculated)

Red means manually input

## 1) Soil Texture Group

Source: The Blue Book, Volume 1, 2004, Page 6-12.

Soil Type	Soil characteristics	Treatment process	Basin design capacity	
			Settling zone	Sediment storage zone
<b>Type D</b> (dispensable)	10 percent or more of the soil materials are dispensible. Particle size is irrelevant	Aided flocculation in wet basins	Capacity to contain all runoff expected from the y percentile, x-day rainfall depth where, depending on the sensitivity of the receiving waters and/or the duration that the structure is in use: x is 2, 5, 10 or 20 days y is the 75th, 80th, 85th or 90th percentile	Normally taken as 50 percent of the capacity of the settling zone. However, it can be taken as two months soil loss as calculated by the RUSIE
<b>Type C</b> (loose)	less than 33 percent finer than 0.02 mm and less than 10 percent of the soil materials are dispensible	Rapid settling in wet or dry basins	Surface area of 4,100 m <sup>2</sup> /m <sup>3</sup> /sec in the 3-month ARI flow, minimum depth of 0.6m, and length/width ratio of >3:1	Normally taken as 100 percent of the capacity of the settling zone. However, it can be taken as two months soil loss as calculated by the RUSIE
<b>Type F</b> (fine)	33 percent or more of the particles are finer than 0.02 mm and less than 10 percent of the soil materials are dispensible	Slow settling in wet basins	Capacity to contain all runoff expected from the y percentile, x-day rainfall depth where, depending on the sensitivity of the receiving waters and/or the duration that the structure is in use: x varies between 2 and 20 days y is the 75th, 80th, 85th or 90th percentile	Normally taken as 50 percent of the capacity of the settling zone. However, it can be taken as two months soil loss as calculated by the RUSIE

Table 6-1 Summary of selected sediment basin types and design criteria

For type D and F

V = settling zone + sediment storage zone

Settling Zone Type D/F =  $10 \times Cv \times A \times R (y \text{ } \%, 5 \text{ day})$

where:

- 10 is a unit conversion factor
- Cv is a volumetric runoff coefficient, defined as that proportion of rainfall that runs off as stormwater<sup>[13]</sup>
- A is the catchment area of the basin (hectares)
- Rly (%le, 5 day) is the 5-day total rainfall depth (mm) that is not exceeded in y percent of rainfall events. This figure can be determined from Appendix L. Rainfall depths corresponding to management period: more and less than 5 days can be adopted, as site characteristic allow and as detailed previously

## 2) Rainfall depth (days)

Source: The Blue Book, Volume 1, 2004, Page 6-15.

A 5-day rainfall depth can be adopted as standard in the design of the settling zone where the soils being disturbed are Type D or Type F. This assumes that five days or less are required following a rainfall event to achieve effective flocculation if necessary, settling and subsequent discharge of the supernatant stormwater (Appendix E and Section 6.3.3(d)).  
In certain conditions, basins can be designed for rainfall depths and management periods of between 2 and 20 days, to accommodate a range of site constraints and opportunities that may be present :

(i) Where the site area is insufficient to allow building structures as required for the y-percentile 5-day criterion, a 2, 3 or 4-day rainfall depth can be adopted providing flocculation, settlement and discharge can be achieved in that time. However, this will usually require the use of a special range of flocculants and specialised techniques that will achieve sufficiently fast settling (Section E4.2). Many such flocculants can cause environmental harm if not managed properly and the plans for sediment control must also include a detailed plan of management of these.  
(ii) Where site conditions permit the construction of extremely large structures, a 6 to 20-day rainfall depth can be adopted. These large structures allow longer periods for reuse (e.g. dust suppression) or flocculation, settling and discharge.

## 3) Design rainfall depth (percentile)

Source: The Blue Book, Volume 1, 2004, Page 6-21.

Unless Council's Stormwater Management Plan states differently<sup>[11]</sup>  
(i) on most sites the 75th percentile storm depth is recommended for use if the duration of disturbance is likely to be six months or less, while the 80th percentile storm depth is recommended if the duration of disturbance is likely to be more than six months;  
(ii) where receiving waters are considered particularly sensitive, either by the development proponent/designer, local council or other consent authority, a higher level of protection can be provided, e.g.: the 80th percentile storm depth is recommended for use if the duration of disturbance is likely to be six months or less, while the 85th percentile storm depth is recommended if the duration of disturbance is likely to be more than six months.  
Longer term land disturbances, such as waste depots, extractive sites and some road construction activities, warrant

## 4) Cv

Source: The Blue Book, Volume 1, 2004, Appendix F, Page F-4.

Table F2. Runoff coefficients (Cv) for volumetric data in disturbed catchments (adapted from USDA, 1996)

Soil Hydrologic Group	Design Rainfall depth (mm)							Runoff potential
	<20	21-25	26-30	31-40	41-50	51-60	61-80	
A	0.01	0.05	0.08	0.15	0.22	0.28	0.37	very low
B	0.10	0.19	0.25	0.34	0.42	0.48	0.57	low to moderate
C	0.25	0.35	0.42	0.51	0.58	0.63	0.70	moderate to high
D	0.39	0.50	0.56	0.64	0.69	0.74	0.79	high

Where the Soil Hydrologic Group is not known and/or cannot be found out without an additional soil survey (but see Appendix C), adopting a default volumetric runoff coefficient of 0.5 is reasonable. However, higher values should be considered for high-density development or other sites that can be subject to very high levels of surface sealing (e.g. wheel compaction). Alternatively, lower values can be adopted where a significant proportion of the site is to remain undisturbed (i.e. vegetated), if that value is properly justified. However, the correct Soil Hydrologic Group should be determined on all sites where design is to greater than the standard 85th percentile, x-day rainfall depth and/or where the receiving waters are deemed to be highly or extremely sensitive.

## Soil hydrological group

<b>A</b>	Group A – very low runoff potential. Water moves into and through these soil materials relatively quickly, when thoroughly wetted. Usually, they consist of deep (>1.0 metres), well-drained sandy loams, sands or gravels. They shed runoff only in extreme storm events.
<b>B</b>	Group B – low to moderate runoff potential. Water moves into and through these soil materials at a moderate rate when thoroughly wetted. Usually, they consist of moderately deep (>0.5 metres), well-drained soils with medium, loamy textures or clay loams with moderate structure. They shed runoff only infrequently.
<b>C</b>	Group C – moderate to high runoff potential. Water moves into and through these soil materials at slow to moderate rates when thoroughly wetted. Usually, they consist of soils that have: - moderately fine (clay loam) to fine (clay) texture - weak to moderate structure and/or - a layer near the surface that impedes free downward movement of water. They regularly shed runoff from moderate rainfall events.
<b>D</b>	Group D – very high runoff potential. Water moves into and through these soils very slowly when thoroughly wetted. Usually, they consist of soils: - that are fine-textured (clay), poorly structured, surface-sealed or have high shrink/swell properties, and/or - with a permanent high water-table, and/or - with a layer near the surface that is nearly impervious. They shed runoff from most rainfall events.



## Appendix C – CV



### **Nicole Sutherland**

Associate | Senior Civil Engineer

#### **BE (Civil) (Hons)**

Nicole started her engineering career as a Graduate in 2001; and joined Northrop as a young engineer in 2003. Nicole has gained over 16 years of valuable engineering experience at Northrop, providing technical and design expertise for clients externally and undertaking key roles internally to support the business. Nicole started working in the Sydney office initially, then relocated to our Wollongong office, and now pioneers our flexible working arrangements by working remotely from home.

Nicole enjoys getting involved in the early feasibility stages of a project, and seeing it evolve through the different phases of design development, right to construction. Early engagement, along with her utilisation of client-side thinking provides opportunity to create the best engineering solutions and project outcomes. Nicole is an Associate and is actively involved in our Diversity and Inclusion and our Technology and Innovation committees, which all work to develop and improve our overall business.

### **Project Experience**

#### **Industrial and Commercial**

- Bucher Municipal
- Flower Power, Erskine Park
- Axxess Business Park
- ALDI Stores Supermarkets, NSW
- Batemans Bay Shopping Centre
- Bathurst Correctional Centre
- Sydney Business Park, Marsden Park
  - Bucher Municipal
  - Iron Mountain
  - Tigerpak
  - Stage 3 Subdivision
  - Tradecentre

#### **Stormwater Management**

- RTA Rosehill
- Metella Road
- Riverstone Flood Study
- Norwest Business Park OSD Basin
- Gibson Avenue Padstow
- Howard Court Stage 2, Wollongong
- Dwyers Dealership, Wollongong

#### **Education**

- Meadowbank TAFE
- Edmondson Park Primary and High School
- East Leppington Primary School
- Catherine Field Primary School
- Monaro Schools – Murrumbateman and Googong Schools

#### **Residential and Aged Care**

- RSL Agris House
- UCA Mayflower, Gerringong
- Bowden Brae, Normanhurst
- The Arbour Aged Care Facility, Berry
- Treeview Estates Retirement Village, Lithgow
- Anglican Retirement Village, Pennant Hills
- Epping Road, Apartments
- Single Dwelling Houses in the Sydney area
- Dalmeny Road Subdivision

#### **Council**

- Blacktown City Council – International Centre of Training Excellence
- South Sydney Council – Green Square Public Domain
- City of Sydney Council- Glebe Foreshore Project
- Baulkham Hills Shire Council- Caddies Creek Reserve Sportsfields.
- Baulkham Hills Shire Council- Withers Road Reserve

## Appendix D – Consultation Record



### Post Approval Consultation Record

Identified Party to Consult:	Yass Council
Consultation type:	Conversation
When is consultation required?	During the SSDA Design and Documentation Phase
Why	Confirmation on Engineering requirements such as OSD, Water Quality and Soil and Water Management for the site
When was consultation scheduled/held	Phone call
When was consultation held	13 <sup>th</sup> May 2021
Identify persons and positions who were involved	Terry Cooper – Engineering Services Manager
Provide the details of the consultation	OSD, Water Quality and Soil and Water Management for the site
What specific matters were discussed?	Council advised that OSD would be required however Council do not have policies on OSD and Water Quality and the Soil and Water Management should be provided in accordance with 'The Blue Book'
What matters were resolved?	Council satisfied with our Engineering concepts of design.
What matters are unresolved?	N/A
Any remaining points of disagreement?	no
How will SINSW address matters not resolved?	N/A