



20 February 2025

241798

Cushman & Wakefield  
Level 22, 1 O'Connell Street  
Sydney NSW 2000

Attention: Michael Bryant

## **SES ICC Upgrades - Goulburn**

### **Water Cycle Management Study**

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Dear Michael,

This report has been prepared to demonstrate that the SES ICC building upgrades for the NSW SES South-Eastern Zone Headquarters building located at 56-58 Knox St, Goulburn will result in a Neutral or Beneficial Effect (NorBE) on water quality. Note that the proposed scope of development works is limited to reconstruction of the existing main building structure to accommodate an additional floor.

This document has been prepared in consultation with the Water NSW Neutral or Beneficial Effect on Water Quality Assessment Guideline 2022, as well as relevant Goulburn Mulwaree Council requirements.

#### **Stormwater Quality**

Stormwater quality modelling has been performed using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) as approved for use by Water NSW when assessing NorBE requirements. The model has been prepared by modelling the pre-development and post-development catchments as separate nodes.

The following four catchment types have been accommodated in the NorBE modelling:

- Carparking catchments incorporate all impervious pavement areas associated with vehicular movements. These have been modelled as sealed roadway land usage for pollutant loading generation.
- Roof catchments are all impervious catchments associated with roof extents from the redeveloped works, as well as the existing carport and shed.
- Impervious landscaping incorporates all on-grade pavement and is primarily associated with hardstand not accessible to vehicles.
- Pervious landscaping incorporates all remaining softscape works and plantings.

A summary of land use catchment changes from pre-development to post-development works is summarised in **Table 1** below. Note there is no net increase to impervious area under post-development conditions.

**Table 1 – Land Use Catchments Adopted for MUSIC Modelling**

Catchment Type	Pre-Development Area (m <sup>2</sup> )	Post-Development Area (m <sup>2</sup> )	Net Increase (m <sup>2</sup> )
Carpark (Sealed Road)	590	572	-18
Roof	723	783	+60
Impervious Landscape (Mixed)	80	38	-42
Pervious Landscape (Mixed)	595	595	+ 0
Site Total	1,988	1,988	NA

In order to satisfy NorBE water quality parameters, a downstream existing 600x600 stormwater pit located at the north-east corner of the carpark will be retrofitted with an OceanGuard Gross Pollutant Trap (GPT) pit insert or approved equivalent. Refer Appendix A for the proposed Siteworks Plan.

It is to be noted that, for the purpose of simplicity, the MUSIC model has only accommodated the upstream catchment associated with the carparking land use. All other catchments have been modelled as bypass and thus is representative of a worst-case scenario than what would occur on site. During an actual site storm event, downpipes from the retained carport roof would also discharge to kerb and gutter and be treated by the GPT, thus resulting in even higher pollutant reduction rates than what has been modelled.

The modelled MUSIC treatment train and catchment nodes are demonstrated in **Figure 1**. **Figure 2** demonstrates that the residual pollutant loads are reduced under post-development conditions and therefore satisfy the requirements for NorBE water quality targets.

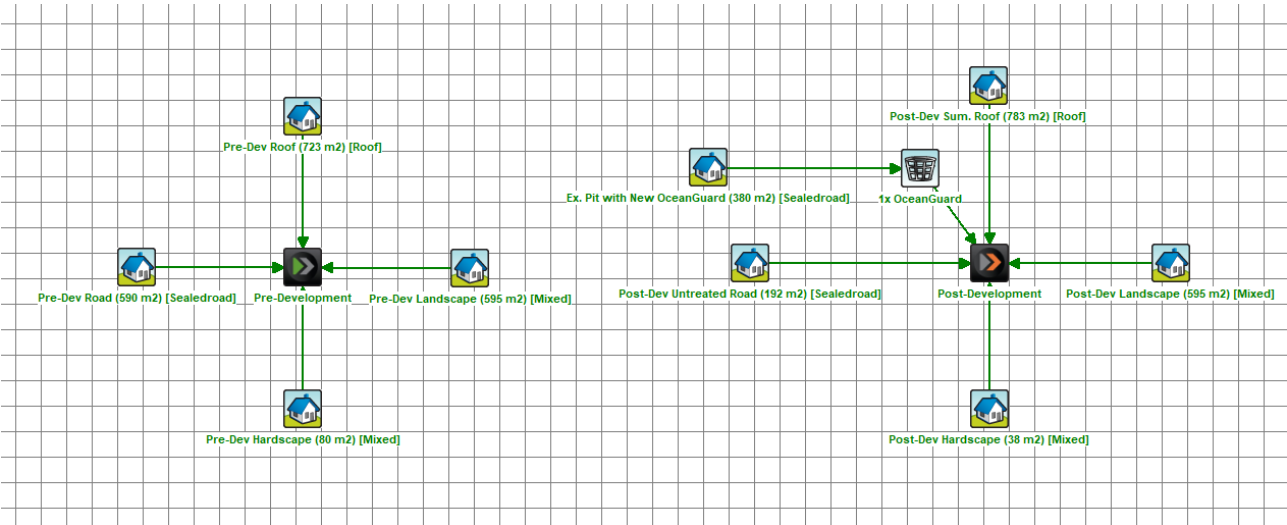


Figure 1 – Pre-Development and Post-Development Catchment Nodes and Treatment Train

Treatment Train Effectiveness - Post-Development						
	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	0.714	0.719	0.714	0.719	0	0
Total Suspended Solids (kg/yr)	114	117	114	61.7	0	47.3
Total Phosphorus (kg/yr)	0.239	0.237	0.239	0.204	0	13.9
Total Nitrogen (kg/yr)	1.65	1.67	1.65	1.58	0	5.39
Gross Pollutants (kg/yr)	23.4	23.6	23.4	17.2	0	27.1

☒ Include Pre-Development

Figure 2 – MUSIC Modelling Outputs Demonstrating Post-Development Residual Loads are Reduced (NorBE)

### **Erosion & Sediment Control**

During the construction stages of the project, an erosion and sediment control plan is to be implemented to prevent sediment laden stormwater from flowing into adjoining properties, bushland, roadways or receiving water bodies.

Erosion and Sediment stormwater controls has been prepared in support of the Development Application (DA). All stormwater controls works are detailed in accordance with relevant regulatory authority guidelines including Council requirements and the Landcom NSW's Managing Urban Stormwater, Soils and Construction ("Blue Book").

Refer Appendix A for the proposed Sediment and Erosion Control work demonstrating NorBE targets are satisfied post-development.

Should you require anything further please contact the undersigned.

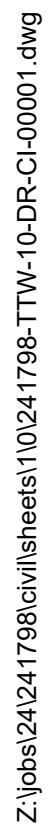
Yours faithfully,  
**TTW (NSW) PTY LTD**

**Grace Carpp**  
**Associate**


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**APPENDIX A**

**CIVIL SITEWORKS PLANS**



NOT FOR CONSTRUCTION

												Client:				Engineer:				Project:		SES ICC UPGRADES 56-58 KNOX STREET GOULBURN		Drawing Title:		GENERAL COVER SHEET		Scale at A1		Drawn		Designed		Approved			
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A ISSUE FOR APPROVAL												GC ES 15.11.2024																									
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GENERAL

- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE SUPERINTENDENT.
- STRIP ALL TOPSOIL FROM THE CONSTRUCTION AREA. ALL STRIPPED TOPSOIL SHALL BE DISPOSED OF OFF-SITE UNLESS DIRECTED OTHERWISE.
- MAKE SMOOTH CONNECTION WITH ALL EXISTING WORKS.
- COMPACT SUBGRADE UNDER BUILDINGS AND PAVEMENTS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.1.1. COMPACTION UNDER BUILDINGS TO EXTEND 2M MINIMUM BEYOND BUILDING FOOTPRINT.
- ALL WORK ON PUBLIC PROPERTY, PROPERTY WHICH IS TO BECOME PUBLIC PROPERTY, OR ANY WORK WHICH IS TO COME UNDER THE CONTROL OF THE STATUTORY AUTHORITY; THE CONTRACTOR IS TO ENSURE THAT THE DRAWINGS USED FOR CONSTRUCTION HAVE BEEN APPROVED BY ALL RELEVANT AUTHORITIES PRIOR TO COMMENCEMENT SITE.
- ALL WORK ON PUBLIC PROPERTY, PROPERTY WHICH IS TO BECOME PUBLIC PROPERTY, OR ANY WORK WHICH IS TO COME UNDER THE CONTROL OF THE STATUTORY AUTHORITY IS TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT AUTHORITY. THE CONTRACTOR SHALL OBTAIN THESE REQUIREMENTS FROM THE AUTHORITY. WHERE THE REQUIREMENTS OF THE AUTHORITY ARE DIFFERENT TO THE DRAWINGS AND SPECIFICATIONS, THE REQUIREMENTS OF THE AUTHORITY SHALL BE APPLICABLE.
- FOR ALL TEMPORARY BATTERS REFER TO GEOTECHNICAL RECOMMENDATIONS.

REFERENCE DRAWINGS

- THESE DRAWINGS HAVE BEEN BASED FROM, AND TO BE READ IN CONJUNCTION WITH THE FOLLOWING CONSULTANTS DRAWINGS. ANY CONFLICT TO THE DRAWINGS MUST BE NOTIFIED IMMEDIATELY TO THE ENGINEER.

CONSULTANT	DRAWING TITLE	DRAWING NUMBER	REVISION	DATE
LEAD ARCHITECTS	PROPOSED GROUND FLOOR PLAN	24013-A07	A5	14.12.2024

BOUNDARIES AND EASEMENTS

- THE PROPERTY BOUNDARY AND EASEMENT LOCATIONS SHOWN ON TAYLOR THOMSON WHITTING DRAWING'S HAVE BEEN BASED ON INFORMATION RECEIVED FROM : COOPER AND RICHARDS SURVEYORS
- TAYLOR THOMSON WHITTING MAKES NO GUARANTEES THAT THE BOUNDARY OR EASEMENT INFORMATION SHOWN IS CORRECT. TAYLOR THOMSON WHITTING WILL ACCEPT NO LIABILITIES FOR BOUNDARY INACCURACIES. THE CONTRACTOR/BUILDER IS ADVISED TO CHECK/CONFIRM ALL BOUNDARIES IN RELATION TO ALL PROPOSED WORK PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. BOUNDARY INACCURACIES FOUND ARE TO BE REPORTED TO THE SUPERINTENDENT PRIOR TO CONSTRUCTION STARTING.

SURVEY

- ORIGIN OF LEVELS:  
DATUM OF LEVELS:  
COORDINATE SYSTEM:  
SURVEY PREPARED BY:  
SETOUT POINTS:

PM 8770 WITH A VALUE OF 670.453 (AHD)  
AHD  
MGA55 GDA2020  
COOPER AND RICHARDS SURVEYORS  
CONTACT SURVEYOR
- TAYLOR THOMSON WHITTING DOES NOT GUARANTEE THAT THE SURVEY INFORMATION SHOWN ON THESE DRAWINGS IS ACCURATE AND WILL ACCEPT NO LIABILITY FOR ANY INACCURACIES IN THE SURVEY INFORMATION PROVIDED TO US FROM ANY CAUSE WHATSOEVER.

UNDERGROUND SERVICES - WARNING

- THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ON TAYLOR THOMSON WHITTINGS DRAWINGS HAVE BEEN PLOTTED FROM DIAGRAMS PROVIDED BY SERVICE AUTHORITIES. THIS INFORMATION HAS BEEN PREPARED SOLELY FOR THE AUTHORITIES OWN USE AND MAY NOT NECESSARILY BE UPDATED OR ACCURATE.
- THE POSITION OF SERVICES AS RECORDED BY THE AUTHORITY AT THE TIME OF INSTALLATION MAY NOT REFLECT CHANGES IN THE PHYSICAL ENVIRONMENT SUBSEQUENT TO INSTALLATION.
- THE CONTRACTOR MUST CONFIRM THE EXACT LOCATION AND EXTENT OF SERVICES PRIOR TO CONSTRUCTION AND NOTIFY ANY CONFLICT WITH THE DRAWINGS IMMEDIATELY TO THE ENGINEER/SUPERINTENDENT.
- THE CONTRACTOR IS TO GET APPROVAL FROM THE RELEVANT STATE SURVEY DEPARTMENT, TO REMOVE/ADJUST ANY SURVEY MARK. THIS INCLUDES BUT IS NOT LIMITED TO: STATE SURVEY MARKS (SSM), PERMANENT MARKS (PM), CADASTRAL REFERENCE MARKS OR ANY OTHER SURVEY MARK WHICH IS TO BE REMOVED OR ADJUSTED IN ANY WAY.
- TAYLOR THOMSON WHITTING PLANS DO NOT INDICATE THE PRESENCE OF ANY SURVEY MARK. THE CONTRACTOR IS TO UNDERTAKE THEIR OWN SEARCH.

BEFORE YOU DIG AUSTRALIA (BYDA)

- PUBLIC SERVICE UTILITY INFORMATION SHOWN ON PLAN HAS BEEN COMPLIED FROM INFORMATION RECEIVED FROM BEFORE YOU DIG AUSTRALIA INQUIRY. REFERENCE NUMBER 37967586. OBTAINED ON 04.11.2024 UNLESS SPECIFICALLY SHOWN OTHERWISE, THIS LOCATION AND DEPTH OF SERVICES SHOWN ON THIS PLAN HAVE NOT BEEN VERIFIED.
- THE LOCATION OF SERVICES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED AS ACCURATELY AS POSSIBLE FROM DIAGRAMS PROVIDED BY SERVICE AUTHORITIES AND SHOULD BE CONFIRMED BY SITE INSPECTION.\*

SITE WORKS

- ALL BASECOURSE MATERIAL TO COMPLY WITH RMS SPECIFICATION NO 3051 AND COMPACTED TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
- ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL
- ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH AN APPROVED SELECT MATERIAL AND COMPACTED TO A MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1

PUBLIC DOMAIN WORKS

- PUBLIC DOMAIN WORKS ARE NOT TO COMMENCE UNTIL THESE DRAWINGS ARE STAMPED AS APPROVED.

SAFETY IN DESIGN

CONTRACTOR TO REFER TO APPENDIX B OF THE CIVIL SPECIFICATION FOR THE CIVIL RISK AND SOLUTIONS REGISTER.

- EXISTING SERVICES  
CONTRACTOR TO BE AWARE EXISTING SERVICES ARE LOCATED WITHIN THE SITE. LOCATION OF ALL SERVICES TO BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORKS. CONTRACTOR TO CONFIRM WITH RELEVANT AUTHORITY REGARDING MEASURES TO BE TAKEN TO ENSURE SERVICES ARE PROTECTED OR PROCEDURES ARE IN PLACE TO DEMOLISH AND/OR RELOCATE.
- EXISTING STRUCTURES  
CONTRACTOR TO BE AWARE EXISTING STRUCTURES MAY EXIST WITHIN THE SITE. TO PREVENT DAMAGE TO EXISTING STRUCTURE(S) AND/OR PERSONNEL, SITE WORKS TO BE CARRIED OUT AS FAR AS PRACTICABLY POSSIBLE FROM EXISTING STRUCTURE(S).
- EXISTING TREES  
CONTRACTOR TO BE AWARE EXISTING TREES EXIST WITHIN THE SITE WHICH NEED TO BE PROTECTED. TO PREVENT DAMAGE TO TREES AND/OR PERSONNEL, SITE WORKS TO BE CARRIED OUT AS FAR AS PRACTICABLY POSSIBLE FROM EXISTING TREES. ADVICE NEEDS TO BE SOUGHT FROM ARBORIST AND/OR LANDSCAPE ARCHITECT ON MEASURES REQUIRED TO PROTECT TREES.
- GROUNDWATER  
CONTRACTOR TO BE AWARE GROUND WATER LEVELS ARE CLOSE TO EXISTING SURFACE LEVEL. TEMPORARY DE-WATERING MAY BE REQUIRED DURING CONSTRUCTION WORKS.
- EXCAVATIONS  
DEEP EXCAVATIONS DUE TO STORMWATER DRAINAGE WORKS IS REQUIRED. CONTRACTOR TO ENSURE SAFE WORKING PROCEDURES ARE IN PLACE FOR WORKS. ALL EXCAVATIONS TO BE FENCED OFF AND BATTERS ADEQUATELY SUPPORTED TO APPROVAL OF GEOTECHNICAL ENGINEER.
- GROUND CONDITIONS  
CONTRACTOR TO BE AWARE OF THE SITE GEOTECHNICAL CONDITIONS. REFER TO GEOTECHNICAL REPORT BY
  - NO GEOTECH REPORT HAS BEEN PROVIDED FOR DA. CIVIL AND STRUCTURAL HAVE UTILISED SURROUNDING GEOTECH FROM NEARBY JOBS FOR DA
- HAZARDOUS MATERIALS  
EXISTING ASBESTOS PRODUCTS & CONTAMINATED MATERIAL MAY BE PRESENT ON SITE. CONTRACTOR TO ENSURE ALL HAZARDOUS MATERIALS ARE IDENTIFIED PRIOR TO COMMENCING WORKS. SAFE WORKING PRACTICES AS PER RELEVANT AUTHORITY TO BE ADOPTED AND APPROPRIATE PPE TO BE USED WHEN HANDLING ALL HAZARDOUS MATERIALS. REFER TO GEOTECHNICAL/ENVIRONMENTAL REPORT BY
  - NO GEOTECH REPORT HAS BEEN PROVIDED FOR DA. CIVIL AND STRUCTURAL HAVE UTILISED SURROUNDING GEOTECH FROM NEARBY JOBS FOR DA

- CONFINED SPACES  
CONTRACTOR TO BE AWARE OF POTENTIAL HAZARDS DUE TO WORKING IN CONFINED SPACES SUCH AS STORMWATER PITS, TRENCHES AND/OR TANKS. CONTRACTOR TO PROVIDE SAFE WORKING METHODS AND USE APPROPRIATE PPE WHEN ENTERING CONFINED SPACES.
- MANUAL HANDLING  
CONTRACTOR TO BE AWARE MANUAL HANDLING MAY BE REQUIRED DURING CONSTRUCTION. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ENSURE MANUAL HANDLING PROCEDURES AND ASSESSMENTS ARE IN PLACE PRIOR TO COMMENCING WORKS.
- WATER POLLUTION  
CONTRACTOR TO ENSURE APPROPRIATE MEASURES ARE TAKEN TO PREVENT POLLUTANTS FROM CONSTRUCTION WORKS CONTAMINATING THE SURROUNDING ENVIRONMENT.
- SITE ACCESS/EGRESS  
CONTRACTOR TO BE AWARE SITE WORKS OCCUR IN CLOSE PROXIMITY TO FOOTPATHS AND ROADWAYS. CONTRACTOR TO ERECT APPROPRIATE BARRIERS AND SIGNAGE TO PROTECT SITE PERSONNEL AND PUBLIC.
- VEHICLE MOVEMENT  
CONTRACTOR TO SUPPLY AND COMPLY WITH TRAFFIC MANAGEMENT PLAN AND PROVIDE ADEQUATE SITE TRAFFIC CONTROL INCLUDING A CERTIFIED TRAFFIC MARSHALL TO SUPERVISE VEHICLE MOVEMENTS WHERE NECESSARY.

BOUNDARIES

EXISTING	REMOVED	PROPOSED	
			BLOCK BOUNDARY
			BLOCK BOUNDARY EXTINGUISHED



BUILDINGS

EXISTING	REMOVED	PROPOSED	
			BUILDING ENVELOPE
			FUTURE BUILDING ENVELOPE
			BASEMENT OUTLINE
			BUILDING AWNING
			BUILDING DOUBLE DOOR ENTRY
			BUILDING SINGLE DOOR ENTRY
			BUILDING SLIDING DOOR ENTRY

LANDSCAPE

EXISTING	REMOVED	PROPOSED	
			FENCE LINE
			FENCE LINE ON BOUNDARY
			PROPERTY ACCESS GATE
			BUILDING SLIDING DOOR ENTRY TREE REPRESENTATION MAY VARY BASED ON LANDSCAPE CONSULTANT OR SURVEY INFORMATION
			PAVEMENT
			SOFT LANDSCAPE
			TREE PROTECTION ZONE
			STRUCTURAL ROOT ZONE

NOT FOR CONSTRUCTION

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EROSION AND SEDIMENT CONTROL NOTES

1. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH:-
- LOCAL AUTHORITY REQUIREMENTS,
  - EPA POLLUTION CONTROL MANUAL FOR URBAN STORMWATER, LANDCOM NSW - MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION ("BLUE BOOK").
2. EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES ARE PROVIDED FOR THE WHOLE OF THE WORKS. SHOULD THE CONTRACTOR STAGE THESE WORKS THEN THE DESIGN MAY BE REQUIRED TO BE MODIFIED. VARIATION TO THESE DETAILS MAY REQUIRE APPROVAL BY THE RELEVANT AUTHORITIES. THE EROSION AND SEDIMENT CONTROL PLAN SHALL BE IMPLEMENTED AND ADAPTED TO MEET THE VARYING SITUATIONS AS WORK ON SITE PROGRESSES.
3. MAINTAIN ALL EROSION AND SEDIMENT CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED PREVENT SITE RUNOFF ENTERING THE PITS UNLESS SILT FENCES ARE ERECTED AROUND PITS.
5. MINIMISE THE AREA OF SITE BEING DISTURBED AT ANY ONE TIME.
6. PROTECT ALL STOCKPILES OF MATERIALS FROM SCOUR AND EROSION. DO NOT STOCKPILE LOOSE MATERIAL IN ROADWAYS, NEAR DRAINAGE PITS OR IN WATERCOURSES.
7. ALL SOIL AND WATER CONTROL MEASURES ARE TO BE PUT BACK IN PLACE AT THE END OF EACH WORKING DAY, AND MODIFIED TO BEST SUIT SITE CONDITIONS.
8. CONTROL WATER FROM UPSTREAM OF THE SITE SUCH THAT IT DOES NOT ENTER THE DISTURBED SITE.
9. ALL CONSTRUCTION VEHICLES SHALL ENTER AND EXIT THE SITE VIA THE TEMPORARY CONSTRUCTION ENTRY/EXIT.
10. ALL VEHICLES LEAVING THE SITE SHALL BE CLEANED AND INSPECTED BEFORE LEAVING.
11. MAINTAIN ALL STORMWATER PIPES AND PITS CLEAR OF DEBRIS AND SEDIMENT. INSPECT STORMWATER SYSTEM AND CLEAN OUT AFTER EACH STORM EVENT.
12. CLEAN OUT ALL EROSION AND SEDIMENT CONTROL DEVICES AFTER EACH STORM EVENT.

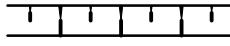
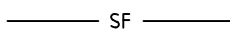



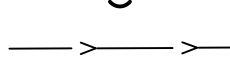

SEQUENCE OF WORKS

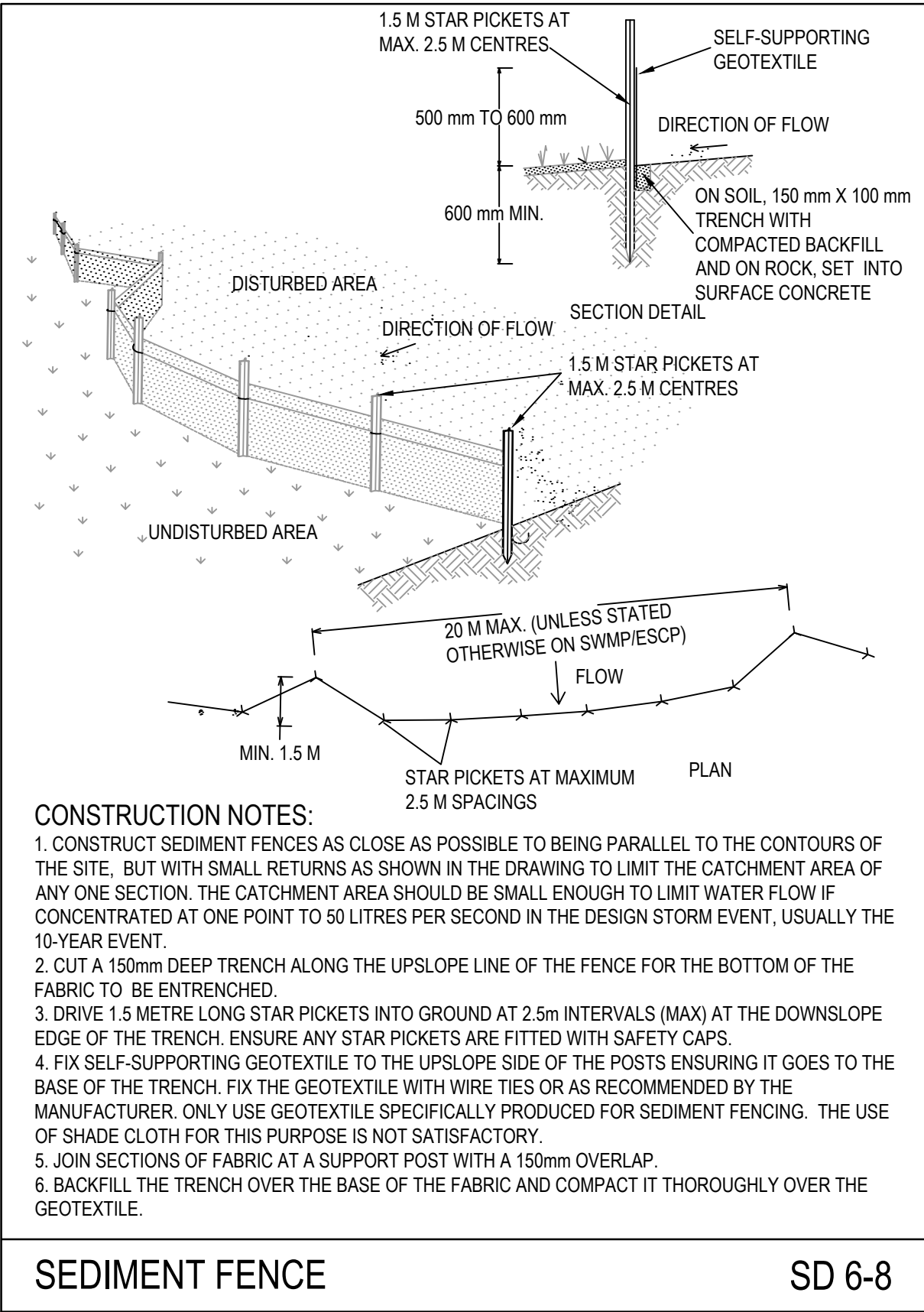
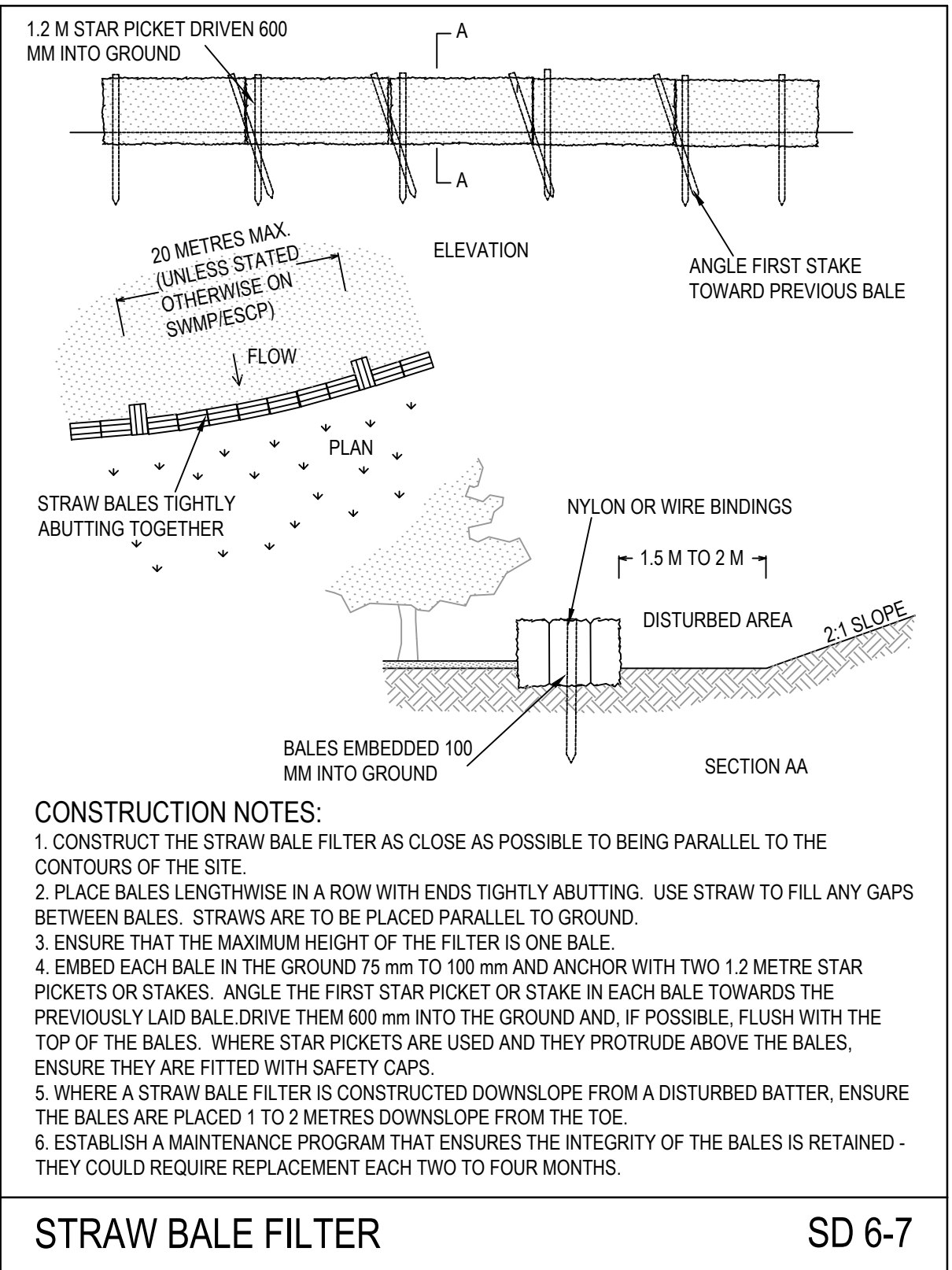
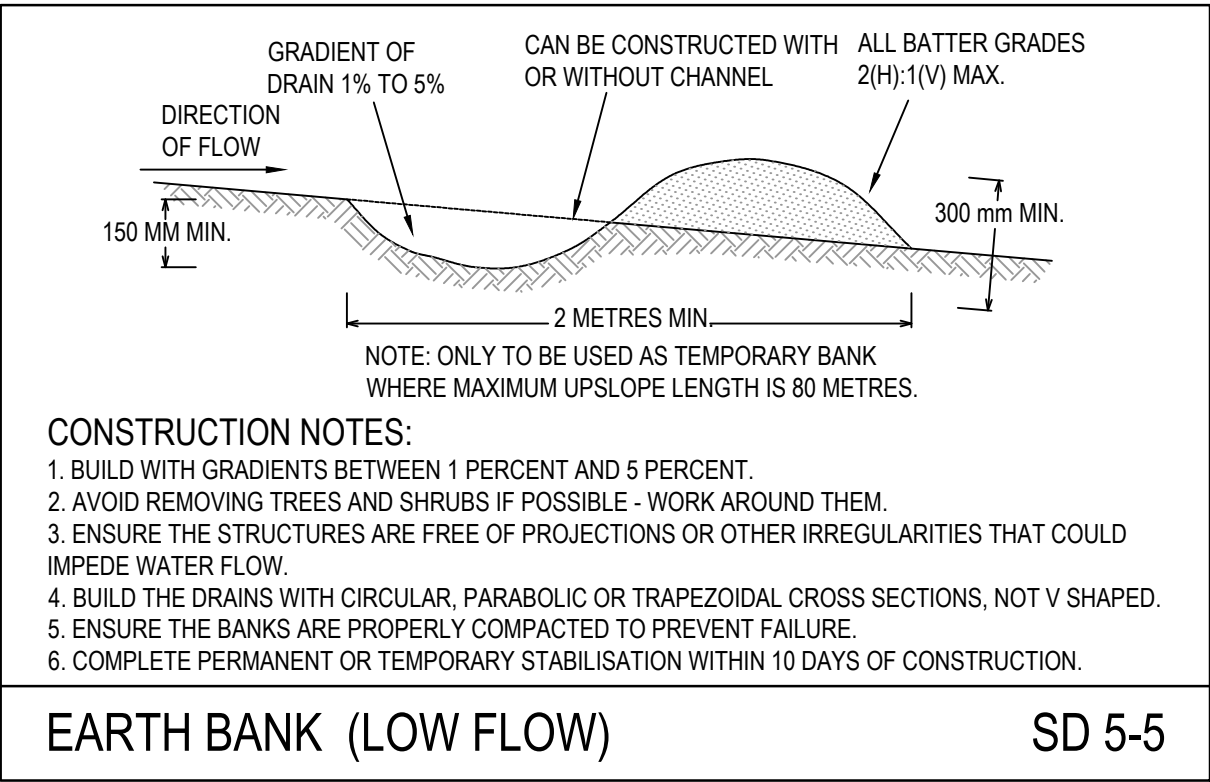
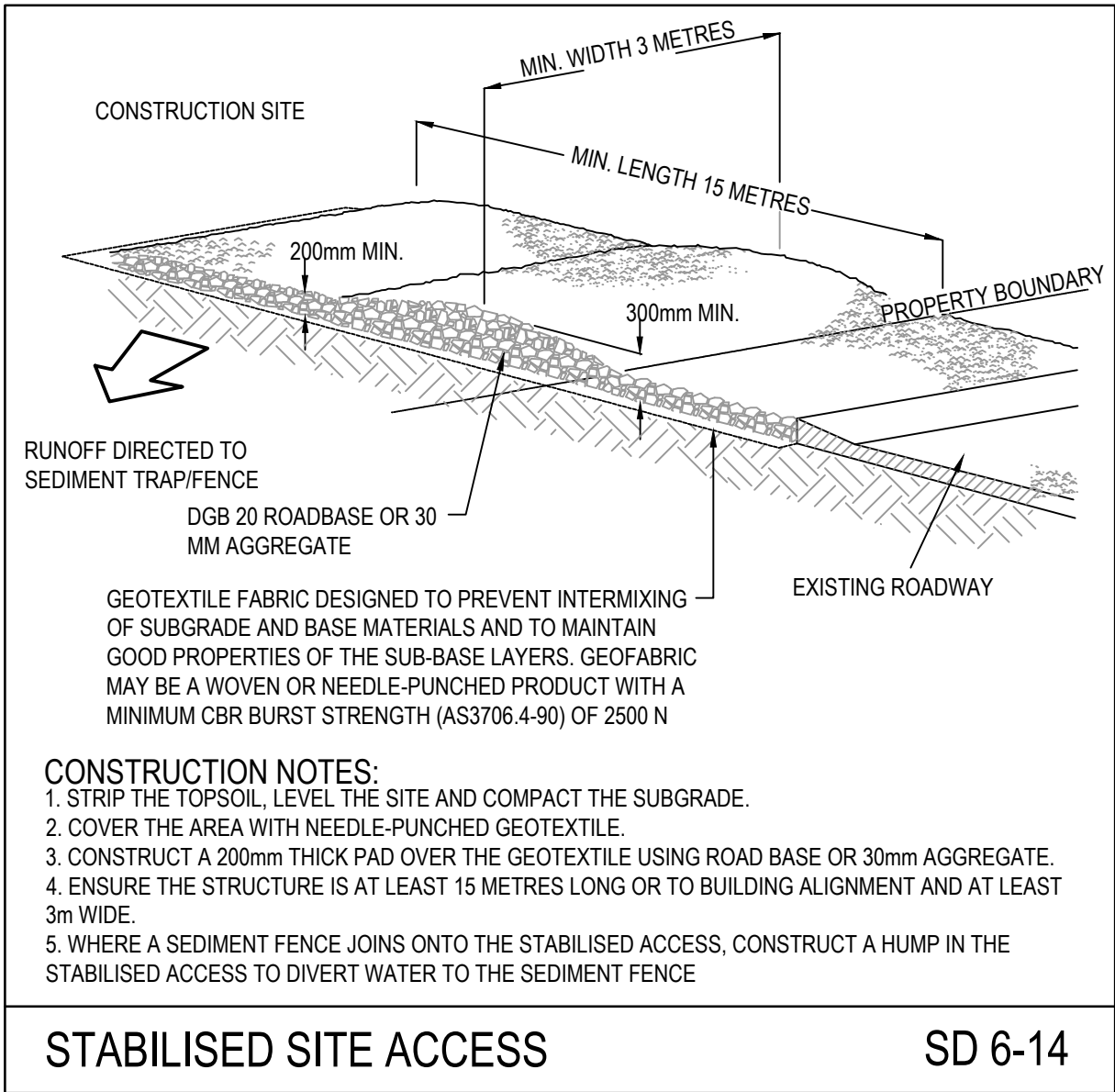
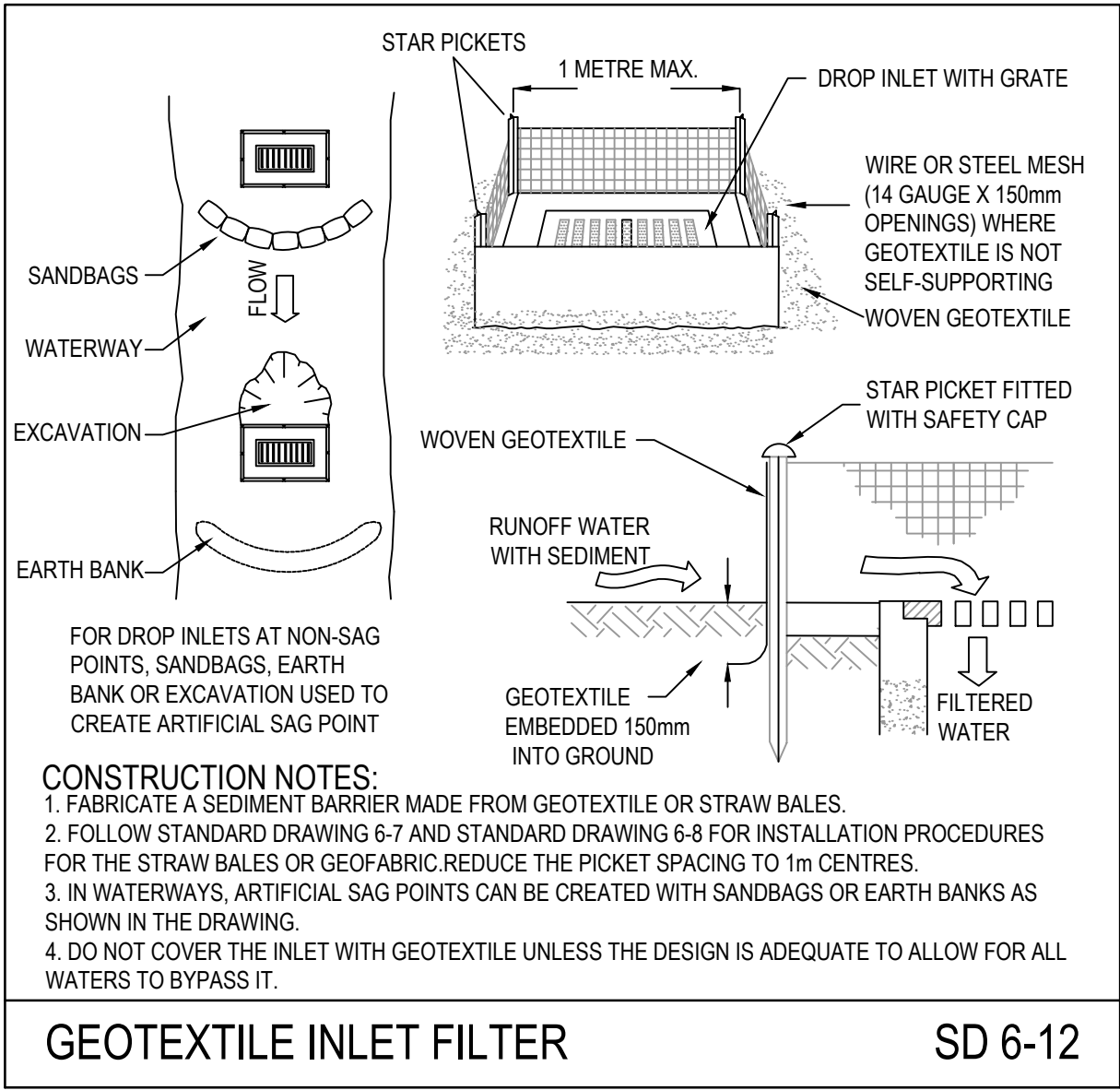
1. PRIOR TO COMMENCEMENT OF EXCAVATION THE FOLLOWING SOIL MANAGEMENT DEVICES MUST BE INSTALLED.
- 1.1. CONSTRUCT SILT FENCES BELOW THE SITE AND ACROSS ALL POTENTIAL RUNOFF SITES.
  - 1.2. CONSTRUCT TEMPORARY CONSTRUCTION ENTRY/EXIT AND DIVERT RUNOFF TO SUITABLE CONTROL SYSTEMS.
  - 1.3. CONSTRUCT MEASURES TO DIVERT UPSTREAM FLOWS INTO EXISTING STORMWATER SYSTEM.
  - 1.4. CONSTRUCT SEDIMENTATION TRAPS/BASIN INCLUDING OUTLET CONTROL AND OVERFLOW.
  - 1.5. CONSTRUCT TURF LINED SWALES.
  - 1.6. PROVIDE SANDBAG SEDIMENT TRAPS UPSTREAM OF EXISTING PITS.
2. CONSTRUCT GEOTEXTILE FILTER PIT SURROUND AROUND ALL PROPOSED PITS AS THEY ARE CONSTRUCTED.
3. ON COMPLETION OF PAVEMENT PROVIDE SAND BAG KERB INLET SEDIMENT TRAPS AROUND PITS.
4. PROVIDE AND MAINTAIN A STRIP OF TURF ON BOTH SIDES OF ALL ROADS AFTER THE CONSTRUCTION OF KERBS.

WATER QUALITY TESTING REQUIREMENTS

1. PRIOR TO DISCHARGE OF SITE STORMWATER, GROUNDWATER AND SEEPAGE WATER INTO COUNCIL'S STORMWATER SYSTEM, CONTRACTORS MUST UNDERTAKE WATER QUALITY TESTS IN CONJUNCTION WITH A SUITABLY QUALIFIED ENVIRONMENT CONSULTANT OUTLINING THE FOLLOWING: -
- COMPLIANCE WITH THE CRITERIA OF THE AUSTRALIAN AND NEW ZEALAND GUIDELINES FOR FRESH AND MARINE WATER QUALITY (2000)
  - IF REQUIRED SUBJECT TO THE ENVIRONMENTAL CONSULTANTS ADVICE, PROVIDE REMEDIAL MEASURES TO IMPROVE THE QUALITY OF WATER THAT IS TO BE DISCHARGED INTO COUNCILS STORM WATER DRAINAGE SYSTEM.THIS SHOULD INCLUDE COMMENTS FROM A SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANT CONFIRMING THE SUITABILITY OF THESE REMEDIAL MEASURES TO MANAGE THE WATER DISCHARGED FROM THE SITE INTO COUNCILS STORM WATER DRAINAGE SYSTEM. OUTLINING THE PROPOSED, ONGOING MONITORING, CONTINGENCY PLANS AND VALIDATION PROGRAM THAT WILL BE IN PLACE TO CONTINUALLY MONITOR THE QUALITY OF WATER DISCHARGED FROM THIS SITE. THIS SHOULD OUTLINE THE FREQUENCY OF WATER QUALITY TESTING THAT WILL BE UNDERTAKEN BY A SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANT.



EROSION AND SEDIMENT CONTROL LEGEND

	BATTER
	SEDIMENT FENCE (6-8)
	STORMWATER PIT WITH GEOTEXTILE INLET FILTER (SD6-12)
	STRAW BALE FILTERS (SD6-7)
	SANDBAG SEDIMENT FILTER (SD6-11)
	CATCH DRAIN (SD5-5)
	LEVEL SPREADER (SD5-6)



This drawing is copyright and is the property of TTW and must not be used without authorisation. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES AND LEGENDS

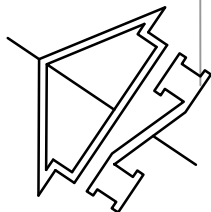
NOT FOR CONSTRUCTION

																				 www.ttwingeneers.com										Project: SES ICC UPGRADES 56-58 KNOX STREET GOULBURN										Drawing Title: EROSION AND SEDIMENT CONTROL NOTES AND LEGEND										Scale at A1 NTS				Drawn ES				Designed ML				Approved GC																															
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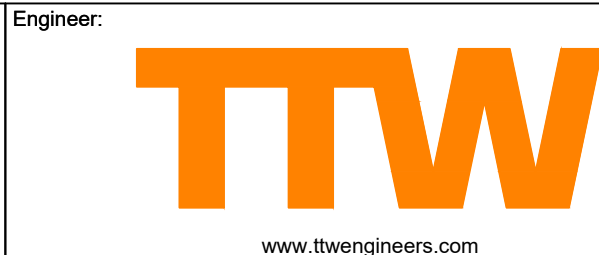


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1:100 A1 1:200 A3



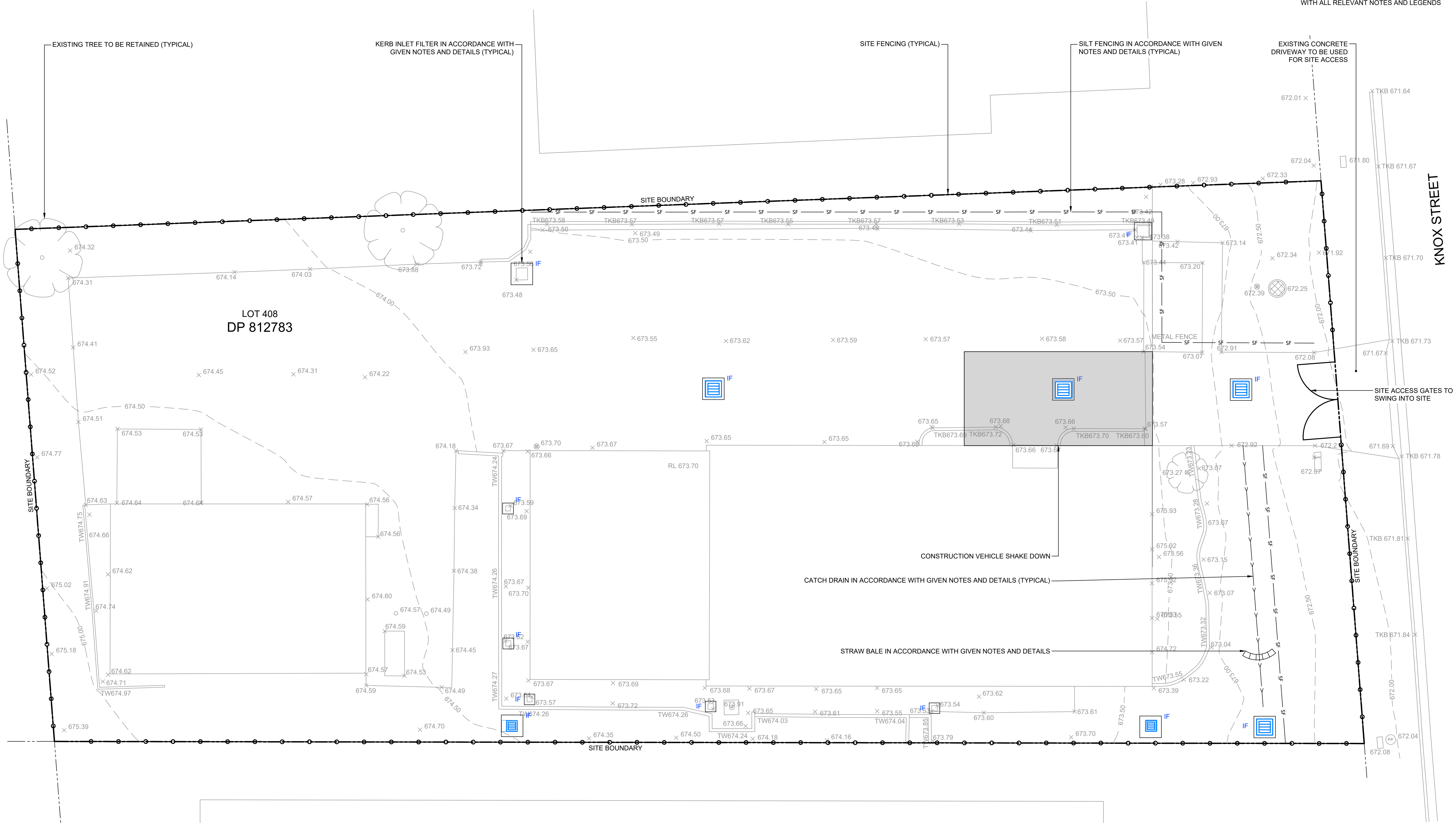
B ISSUE FOR APPROVAL			ML ES 19.12.2024					
A ISSUE FOR APPROVAL			GC ES 15.11.2024					
Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date	Rev



Project:  
SES ICC UPGRADES  
56-58 KNOX STREET  
GOULBURN

Drawing Title:  
EROSION AND SEDIMENT  
CONTROL PLAN

Scale at A1	Drawn	Designed	Approved
1:100	ES	ML	GC
Project No	Originator	Zone	Type
241798-TTW-10-DR-CI-02101-B			
20.12.2024	1:12 PM		



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STORMWATER DRAINAGE

1. STORMWATER DESIGN CRITERIA

(A) AVERAGE EXCEEDANCE PROBABILITY: -

- 1% AEP FOR ROOF DRAINAGE TO FIRST EXTERNAL PIT
- 5% AEP FOR PAVED AND LANDSCAPED AREAS

(B) RAINFALL INTENSITIES: -

- TIME OF CONCENTRATION: 5 MINUTES
- 1% AEP = 152mm/hr
- 5% AEP = 118mm/hr

(C) RAINFALL LOSSES: -

- IMPERVIOUS AREAS: IL = 1.00mm CL = 0.00mm/hr
- PERVIOUS AREAS: IL = 13.30mm CL = 1.32mm/hr

- PIPES 300 DIA AND LARGER TO BE REINFORCED CONCRETE CLASS D APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS U.N.O.
- PIPES UP TO 300 DIA MAY BE SEWER GRADE UPVC WITH SOLVENT WELDED JOINTS, SUBJECT TO APPROVAL BY THE ENGINEER
- EQUIVALENT STRENGTH VCP OR FRP PIPES MAY BE USED SUBJECT TO APPROVAL.
- PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY ENGINEER.
- ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE MANUFACTURED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
- WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED UPVC SEWER GRADE PIPE IS TO BE USED.
- GRATES AND COVERS SHALL CONFORM WITH AS 3996-2006, AND AS 1428.1 FOR ACCESS REQUIREMENTS.
- PIPES ARE TO BE INSTALLED IN ACCORDANCE WITH AS 3725, ALL BEDDING TO BE TYPE H2 U.N.O.
- CARE IS TO BE TAKEN WITH INVERT LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
- ALL STORMWATER PIPES TO BE 150 DIA AT 1.0% MIN FALL U.N.O.
- SUBSOIL DRAINS TO BE SLOTTED FLEXIBLE UPVC U.N.O.
- ADOPT INVERT LEVELS FOR PIPE INSTALLATION (GRADES SHOWN ARE ONLY NOMINAL).

STORMWATER PIPE INFORMATION

PIPE INFORMATION

USIL  
Ø000  
0.0m  
0.0 m/s  
%0.0  
DSIL

UPSTREAM INVERT LEVEL  
PIPE INTERNAL DIAMETER  
PIPE MATERIAL AND CLASS  
PIPE LENGTH  
HYDRAULIC FLOW RATE  
PIPE GRADE  
DOWNSTREAM INVERT LEVEL

TIE INFORMATION

SW  
L 10.0m  
D 1.0m  
Ø150

TIE LENGTH  
TIE DEPTH  
TIE DIAMETER

STORMWATER STRUCTURE IDENTIFICATION

SW1-2

LINE NUMBER 1 - STRUCTURE NUMBER 2

SUBSOIL DRAINAGE

- ALL SUBSOIL DRAINAGE WORKS ARE TO BE COMPLETED IN ACCORDANCE WITH THE RELEVANT STANDARDS AND SPECIFICATIONS OUTLINED IN THE PROJECT SPECIFICATION.
- WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
- SUBSOIL DRAINS TO BE Ø100 SLOTTED FLEXIBLE uPVC UNLESS NOTED OTHERWISE.
- ALL SUBSOIL DRAINS ARE TO BE AT MINIMUM 1% GRADE UNLESS NOTED OTHERWISE.
- ALL SUBSOIL DRAINS TO BE RODDED PRIOR TO THE PLACEMENT OF ASPHALT.
- ALL SUBSOIL DRAINS ARE DRAWN DIAGRAMMATICALLY FOR CLARITY. REFER TO TYPICAL DETAIL FOR SUBSOIL SETOUT.

STORMWATER LEGEND

- DP DOWN PIPE
- RP RODDING POINT
- PO PLANTER OUTLET
- RO RAINWATER OUTLET
- GPT GROSS POLLUTANT TRAP
- OVERLAND FLOW ARROW
- CONCRETE INCASED PIPE
- SWALE DRAIN

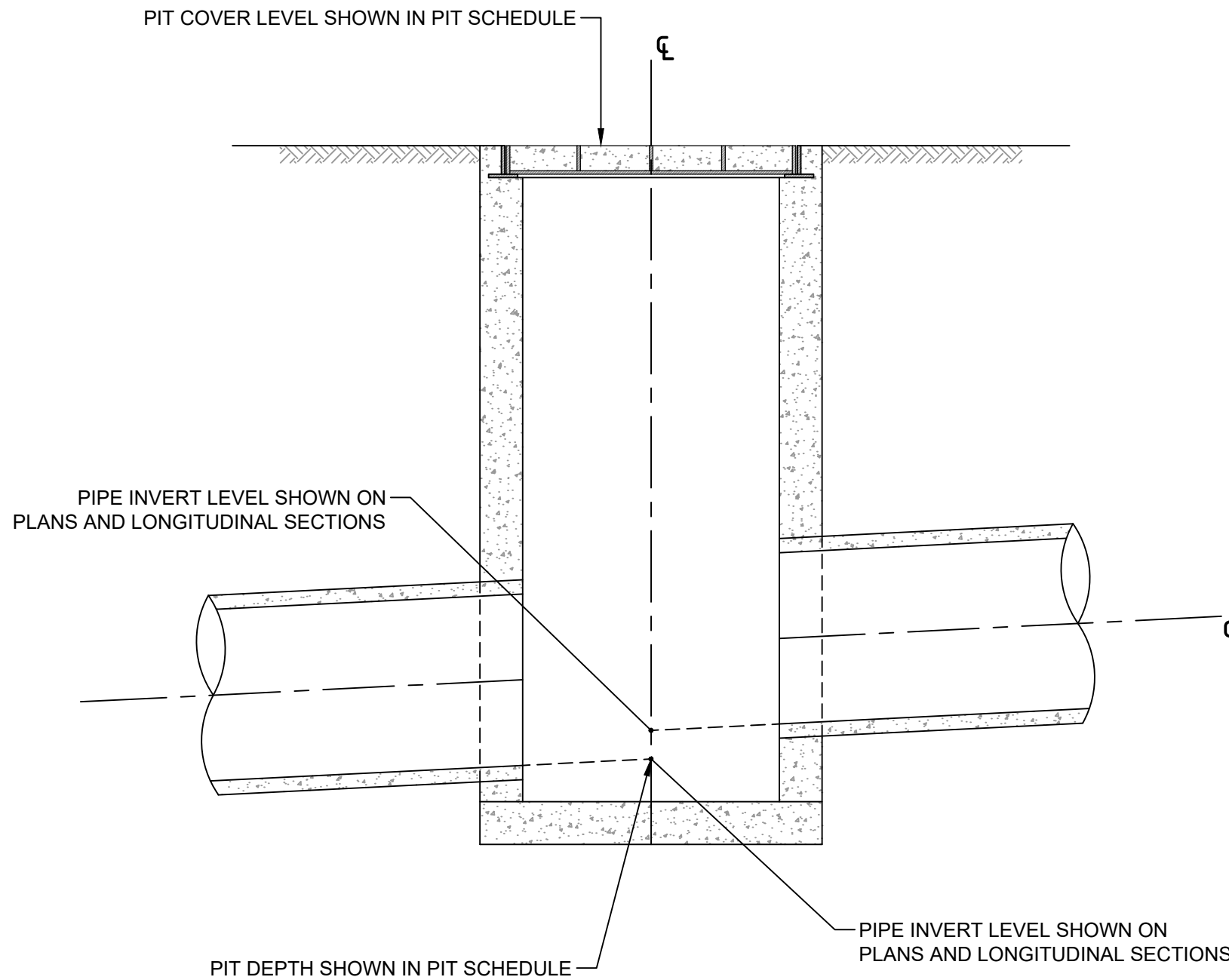
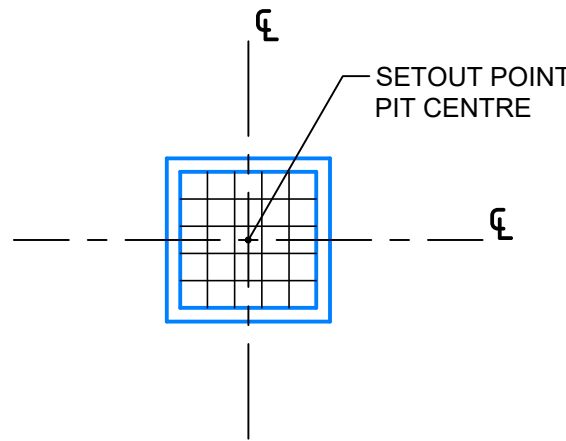
STORMWATER ANNOTATIONS

- IL PIPE INVERT LEVEL
- OL PIPE OBVERT LEVEL
- CL PIT COVER LEVEL
- WL WATER LEVEL

NOTE

STORMWATER DRAINAGE NOTES AND LEGEND IS TO READ IN CONJUNCTION WITH GENERAL NOTES AND LEGEND. REFER DRAWING No. 00002

GRATED INLET SUMP  
SCALE 1:50

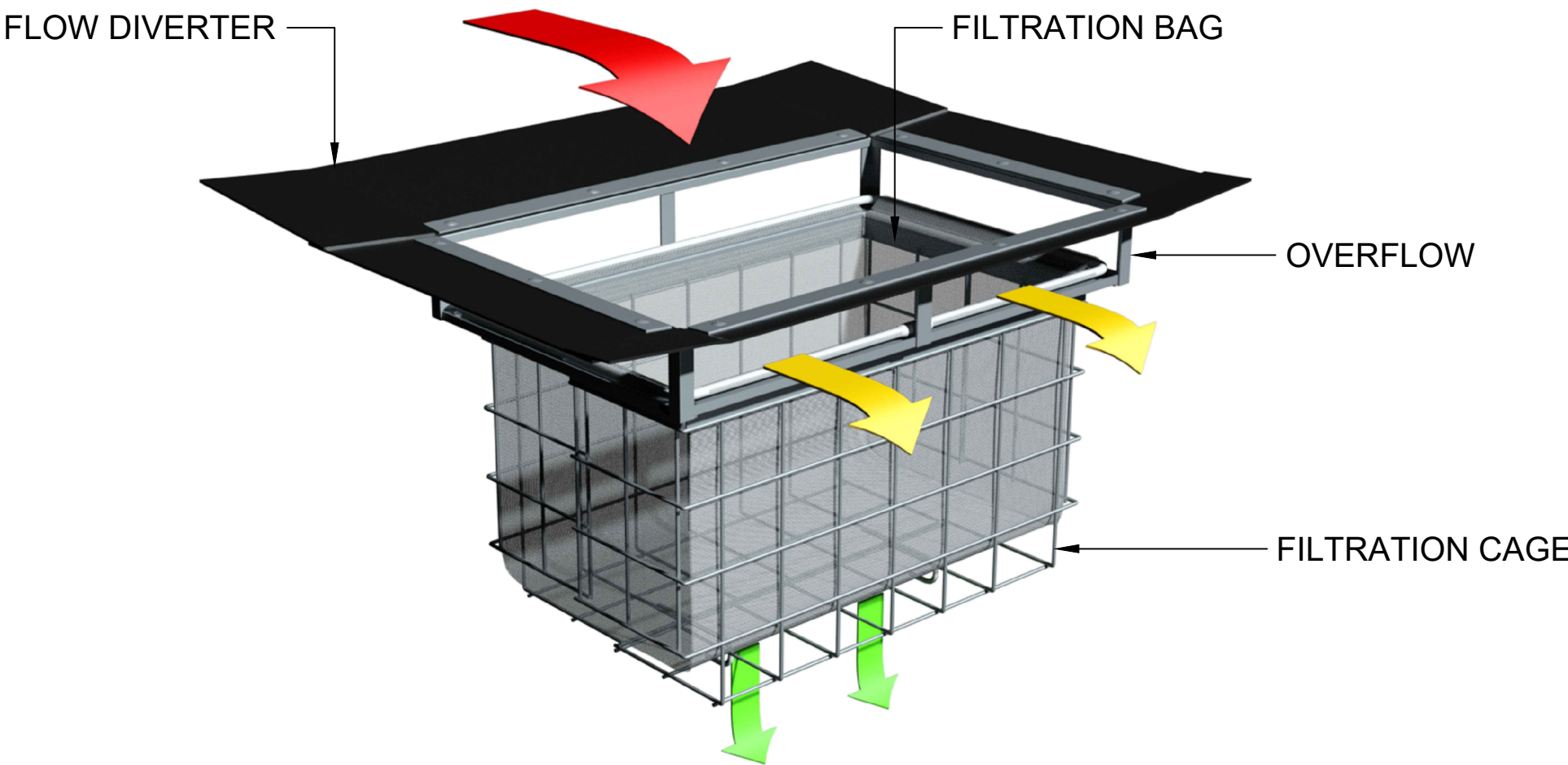


DESIGN INVERT LEVELS  
AT STORMWATER STRUCTURES  
SCALE 1:20

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

PLAN ID	DEPTH ID			
	S	1	2	3
	M	■	■	■
	L	■	■	■
	XL	■	■	■



GENERAL NOTES

- THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
- CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
- OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
- DRAWINGS NOT TO SCALE.



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			Client:			Engineer:			Project:			Drawing Title:			Scale at A1			Drawn			Designed			Approved		
									SES ICC UPGRADES			STORMWATER			NTS			ES			ML			GC		
									56-58 KNOX STREET			NOTES AND LEGEND			Project No			Originator			Zone			Type		
									GOULBURN			SHEET 1			241798-TTW-10-DR-CI-04001-B											
															20.12.2024											
															8:53 AM											

STORMWATER DRAINAGE

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			Ø150 STORMWATER LINE WITH GRATED INLET SUMP AND PIPE END CAP
			Ø300 STORMWATER LINE WITH KERB INLET SUMP (KIS) ON GRADE (KIS) AND DIRECTIONAL FLOW ARROW
			Ø375 STORMWATER LINE WITH KERB INLET SUMP (KIS) IN SAG (KIS) AND HEADWALL
			Ø225 STORMWATER LINE WITH KERB GRATED INLET SUMP AND TRENCH DRAIN
			Ø450 STORMWATER LINE WITH JUNCTION PIT AND KERB INLET SUMP ON GRADE (KIS) FOR PIPES > THAN Ø450 UP TO Ø750
			DISH DRAIN WITH DISH DRAIN INLET SUMP (DDIS) AND FLOW DIRECTIONAL ARROWS

SUBSOIL DRAINAGE

EXISTING	PROPOSED	
		SUBSOIL DRAINAGE WITH HIGH END RISER AND INTERMEDIATE RISER

SEWER

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			CAST IN-SITU REINFORCED DN1050 SEWER MAINTENANCE HOLE SEWERS ≤ DN350. DEPTH OF INVERT 1.2m TO 6.0m DEEP
			CAST IN-SITU REINFORCED DN1200 SEWER MAINTENANCE HOLE SEWERS ≤ DN450. DEPTH OF INVERT 1.6m TO 10m DEEP
			CAST IN-SITU REINFORCED DN1800 SEWER MAINTENANCE HOLE SEWERS DN500 - DN750. DEPTH OF INVERT 1.6m TO 10m DEEP
			PRECAST DN1050 SEWER MAINTENANCE HOLE SEWERS DN150 - DN225. DEPTH UP TO 6.0m
			PRECAST DN1200 SEWER MAINTENANCE HOLE SEWERS DN150 - DN225. DEPTH UP TO 6.0m
			PRECAST DN1050 SEWER MAINTENANCE HOLE SEWERS DN150 - DN225. DEPTH UP TO 6.0m WITH EXTERNAL DROP DN150 OR DN225

WATER

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			Ø150 WATER LINE WITH HYDRANT, STOP VALVE AND PIPE END CAP
			Ø150 WATER LINE WITH THRUST BLOCK, STOP COCK AND WATER METER
			Ø150 WATER LINE WITH REDUCER, PIERED THRUST BLOCK

GAS

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			110kPa Ø50 GAS LINE, WITH GAS MARKER AND GAS VALVE

TELECOMMUNICATIONS

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			TELECOMMUNICATIONS LINE WITH TELECOMMUNICATIONS PIT

ELECTRICAL

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			LOW VOLTAGE OVERHEAD ELECTRICAL LINE WITH POWER POLE
			LOW VOLTAGE BELOW GROUND ELECTRICAL CONDUIT WITH ELECTRICAL PIT
			HIGH VOLTAGE OVERHEAD ELECTRICAL LINE WITH POWER POLE
			HIGH VOLTAGE BELOW GROUND ELECTRICAL CONDUIT WITH ELECTRICAL PIT

LIGHTING

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			LIGHTING CONDUIT WITH SINGLE REACH LIGHT COLUMN
			LIGHTING CONDUIT WITH DUAL REACH LIGHT COLUMN
			LIGHTING CONDUIT PEDESTRIAN LIGHT COLUMN

SHARED UTILITIES TRENCH

EXISTING	EXHUMED OR ABANDONED	PROPOSED	
			SHARED UTILITIES TRENCH TYPE 1
			SHARED UTILITIES TRENCH TYPE 2
			SHARED UTILITIES TRENCH TYPE 3
			SHARED UTILITIES TRENCH TYPE 4
			SHARED UTILITIES TRENCH TYPE 5
REFER SHARED UTILITIES TRENCH	DETAILS		

CLASSIFICATION OF EXISTING UTILITY INFORMATION

- A - SIGHTED, MUST BE LOCATED, THEN POTHOLED. UTILITY MUST BE PHYSICALLY SIGHTED AND MEASURED.
- B - ELECTRONICALLY DETECTED AND LOCATED ON SITE USING VARIOUS TRACING METHODS.
- C - ALIGNED FROM SURFACE FEATURES AND DIGITISED DATA.
- D - DIGITISED DATA (DIAL BEFORE YOU DIG).

NOTE

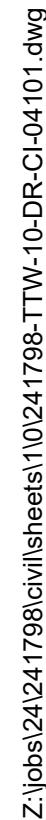
- BELOW GROUND SERVICES CAN BE REPRESENTED AS GREY FOR EXISTING AND BLACK FOR PROPOSED DEPENDING ON THE PLAN.
- EXISTING SERVICES PITS, STRUCTURES AND COLUMNS ARE ILLUSTRATED AS PER THE ORIGINAL SURVEY.

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			Client:		Engineer:	Project:	Drawing Title:	Scale at A1	Drawn	Designed	Approved
						SES ICC UPGRADES	STORMWATER	AS SHOWN	ES	ML	GC
						56-58 KNOX STREET	NOTES AND LEGEND	Project No	Originator	Zone	Type
						GOULBURN	SHEET 2	241798-TTW-10-DR-CI-04002-B			
								20.12.2024	1:13 PM		
B	ISSUE FOR APPROVAL	ML	ES	19.12.2024							
A	ISSUE FOR APPROVAL	GC	ES	15.11.2024							
Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date



KNOX STREET



Client: 

Project:  
SES ICC UPGRADES  
56-58 KNOX STREET  
GOULBURN

Drawing Title:

# STORMWATER DRAINAGE PLAN

Scale at A1	Drawn	Designed	Approved			
1:100	ES	ML	GC			
Project No	Originator	Zone	Type	Role	Sheet No.	Rev
241798-TTW-10-DR-CI-04101-B						
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