

STORMWATER REPORT

STATE SIGNIFICANT DEVELOPMENT APPLICATION

Pathways Cremorne – Residential Aged Care and Independent Living Units

Prepared for: Pathways

Issue no: J

Revision	Date	Purpose	Prepared By	Reviewed By
A	24/05/23	Draft Issue to Client	N.Pearce	
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This report has been prepared by Nathan Pearce (NER 4425065) who is a chartered engineer on the national engineering register in the field of Civil Engineering and is a suitably qualified person to be providing stormwater drainage and flooding advice for this project.

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1 Introduction

ENTEC Consultants have been engaged by Pathways as the Civil Stormwater consultant on the Residential Aged Care and Independent Living Unit development at 50-88 Parraween Street and 59-67 Gerard Street, Cremorne NSW 2090.

This report has been prepared to outline the State Significant Development Application (SSDA) stormwater requirements for the project which have been noted in the Planning Secretary's Environmental Assessment Requirements (SEARs), as outlined in Section 1.3 below.

The civil stormwater design and report have been amended to incorporate the required planning and architectural changes for the SSDA resubmission.

1.1 Project Scope

The proposed development consists of a Residential Aged Care Facility (RACF) and Independent Living Units (ILU) complex which includes 2 levels of basement carparking and 4 new multistorey buildings.

Ancillary uses include Pool, Dining areas, Lounge areas, Mens shed & Beauty/hair area

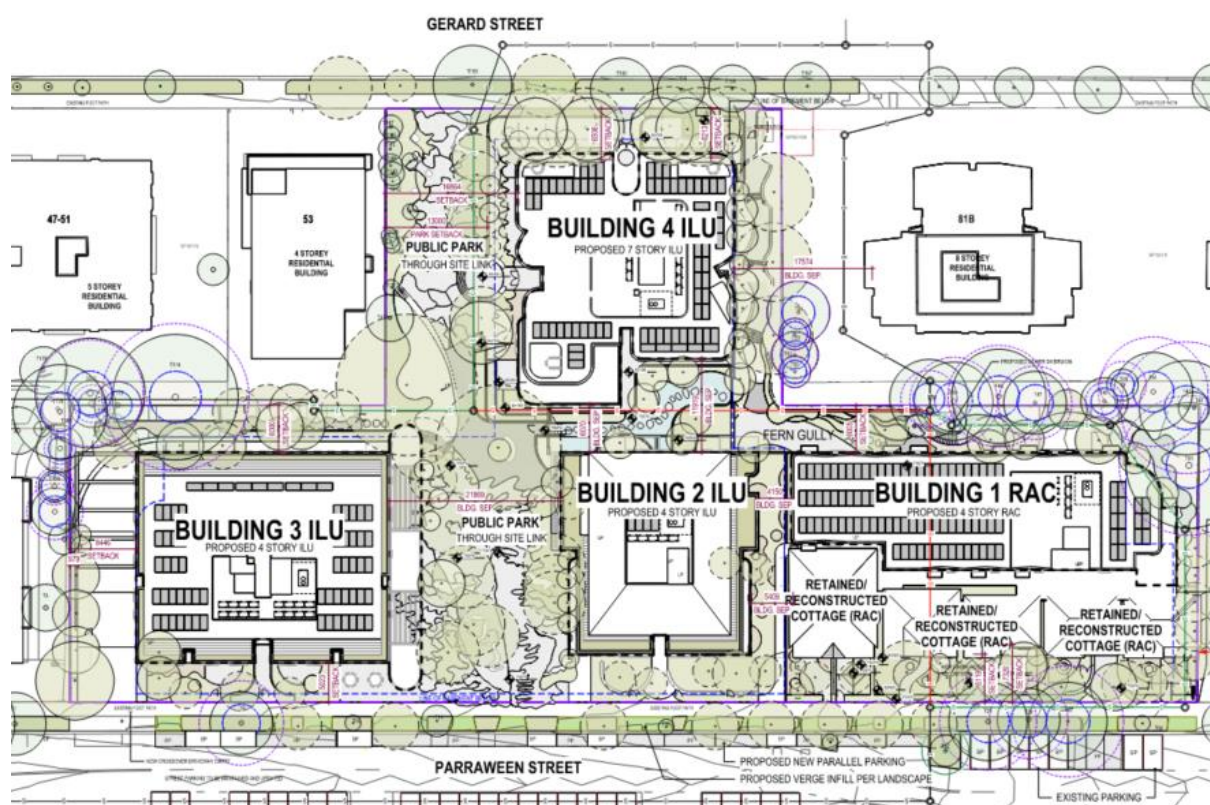


Figure 1 – Architectural site plan

1.2 Existing Site Description

The Pathways development is to be located on 24 existing residential lots encompassing properties 50-88 Parraween Street as well as 59-67 Gerard Street, Cremorne NSW 2090. These lots will be consolidated to allow the development of the Pathways complex. The site is bounded by Parraween Street to the south and Gerard Street to the north and is surrounded by existing large scale apartment complexes to the east and west along Gerard Street. Mixed use commercial buildings are located on the south side of Parraween Street which also have street frontage to Military Road

The existing site area is 7,355.3m² and is located near the top of the crest in Parraween Street. The site generally falls to the northeast from the Parraween Street frontage (Approx. RL85) towards Gerard Street (Approx. RL82.10). The site is relatively built up with standard single-dwelling residential homes with additional features at the rear such as granny flats, sheds, and decking.

Preliminary dial before you dig and survey information shows that Authority service infrastructure are present within both Parraween Street and Gerard Street. This includes inground HV, High Pressure Gas mains, NBN and trunk watermain. Sydney Water sewer assets also traverse the site and will be required to be diverted to facilitate the construction of the basement. Further information on Authority infrastructure can be found in the site Utility and Servicing report.

Council stormwater infrastructure is not present along the site boundary and it appears that the existing residential properties generally discharge to the kerb and gutter in Parraween Street and Gerard Street. Existing stormwater pits are located on the south side of Parraween Street which drains the road and presumably the commercial properties. Further information regarding the existing stormwater infrastructure can be found in section 2.2 of this report.



Figure 2 - Site aerial image (Source: Mecone Mosaic)

1.3 SEARs Requirements

SEARs requirements for the preparation of an Environmental Impact Statement (EIS) for the SSDA submission (Application No.:SSD-49472213) and the applicable Civil items are summarised in Table 1 below.

Table 1 – SEAR’s Requirements

SEARs Requirements	Relevant Section of Report
14. Water Management ■ Provide an Integrated Water Management Plan for the development that: ▪ is prepared by a suitably qualified person in consultation with Council and any other relevant drainage authority. ▪ outlines the water-related servicing infrastructure required by the development (informed by the anticipated annual and ultimate increase in servicing demand) and evaluates opportunities to reduce water demand (such as recycled water provision). ▪ details the proposed drainage design (stormwater and wastewater) for the site including any on-site treatment, reuse and detention facilities, water quality management measures, and nominated discharge points ▪ demonstrates compliance with Council or other drainage authority requirements and avoids adverse downstream impacts ■ Where drainage infrastructure works are required that would be handed over to Council, provide full hydraulic details and detailed plans and specifications of proposed works that have been prepared in consultation with Council and comply with Council’s relevant standards.	Section 2 Refer Utility Infrastructure Report Section 2.3 Section 2.3 Section 2.3 31
15. Flooding ■ Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the <i>NSW Floodplain Development Manual</i> ■ Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required.	Section 3 Section 3

2 Stormwater Drainage

2.1 Design Requirements

All stormwater drainage design will be in accordance with the following:

- Australian Rainfall and Runoff (2019) – with AR&R (2016) rainfall datasets sourced from the ARR Data Hub and Bureau of Meteorology (BOM);
- North Sydney Council Development Control Plan (DCP) 2013
 - Part A – General Requirements
 - Part B – Section 1 – Residential Development
 - Part B – Section 17 – Erosion and Sediment Control
 - Part B – Section 18 – Stormwater Management
- AS3500.3 Plumbing and Drainage: Stormwater Drainage
- Managing Urban Stormwater: Soils and Construction, “The Blue Book” – 4th edition 2004.

Liaison and consultation with Council has not been undertaken as part of this concept design and will be completed in the next phase of work.

2.1.1 Stormwater Quantity

The stormwater drainage for the development will need to be designed in accordance with North Sydney Council DCP Part B – Section 1 and Section 18, which states that the post-development stormwater discharge rates should be less than the pre-development discharge rates. On-site stormwater detention should be pursued where practical to minimise stormwater runoff.

The inground civil stormwater drainage is designed for the 10% Annual Exceedance Probability (AEP) minor storm. Setting this as the minor design storm means that rainfall runoff from all storm events up to and including the 10% AEP design storm are conveyed through in-ground drainage structures to onsite detention. This site’s drainage system is designed as per Council’s stormwater design requirements, Australian Rainfall and Runoff, and AS3500.3

The major overland stormwater drainage system is designed for flows above the 10% AEP storm event, up to and including the 1% AEP storm event. Where there is no available overland flow path to direct surface flows to the OSD, the pipe network has been sized to cater for up to the 1% AEP event.

Proposed roofs will collect stormwater via gutters and downpipes which will be connected to the inground drainage system. The hydraulic consultant will document the building’s stormwater drainage, including roof gutters, downpipes, roof overflow measures and internal courtyards to ground level.

2.1.2 Stormwater Quality

The development will be required to meet Stormwater Quality Control targets to reduce pollutants and sediments discharged offsite via the stormwater system as stated in Part B – Section 1 of the Council DCP.

Council stormwater reduction targets from the baseline annual pollutant loads are as follows;

- 90% reduction of Gross Pollutants (Litter and vegetation larger than 5mm)
- 85% reduction of Total Suspended Solids (TSS)
- 65% reduction of Total Phosphorus (TP)
- 45% reduction of Total Nitrogen (TN)

2.2 Existing Stormwater Infrastructure

The site is located near the top of the crest with both Parraween Street and Gerard Street falling to the east. There is no Council inground stormwater along the site frontage, as shown in the Council planning mapping below, and as such the existing properties generally discharge directly to the kerb with flows either collected by the downstream pit or travelling further overland within the kerb.

Overland flows generally travel along Parraween Street and Gerard Street to a low point on the eastern end of Gerard Street before heading towards to Willoughby Bay. As such the entire site generally falls to the same precinct wide overland flow catchment, as shown by the Council flood maps in figure 3 below, however it is split into smaller sub-catchments for the Council drainage infrastructure in Parraween and Gerard Street.



Figure 3 – Existing council stormwater drainage network – Council GIS Mapping

Council 300mm diameter stormwater drainage is located on the south side of Parraween Street. This drainage is shallow with less than 600mm to the invert and therefore cannot be extended across the road to the site boundary. A 225 diameter drain is located to the east of the property which travels north through the footpath easement and connects to the drainage in Gerard Street. This drainage is also shallow, 400mm to the invert, but is proposed to be extended to the site boundary to service the proposed development.



Figure 5 – Existing catchment plan

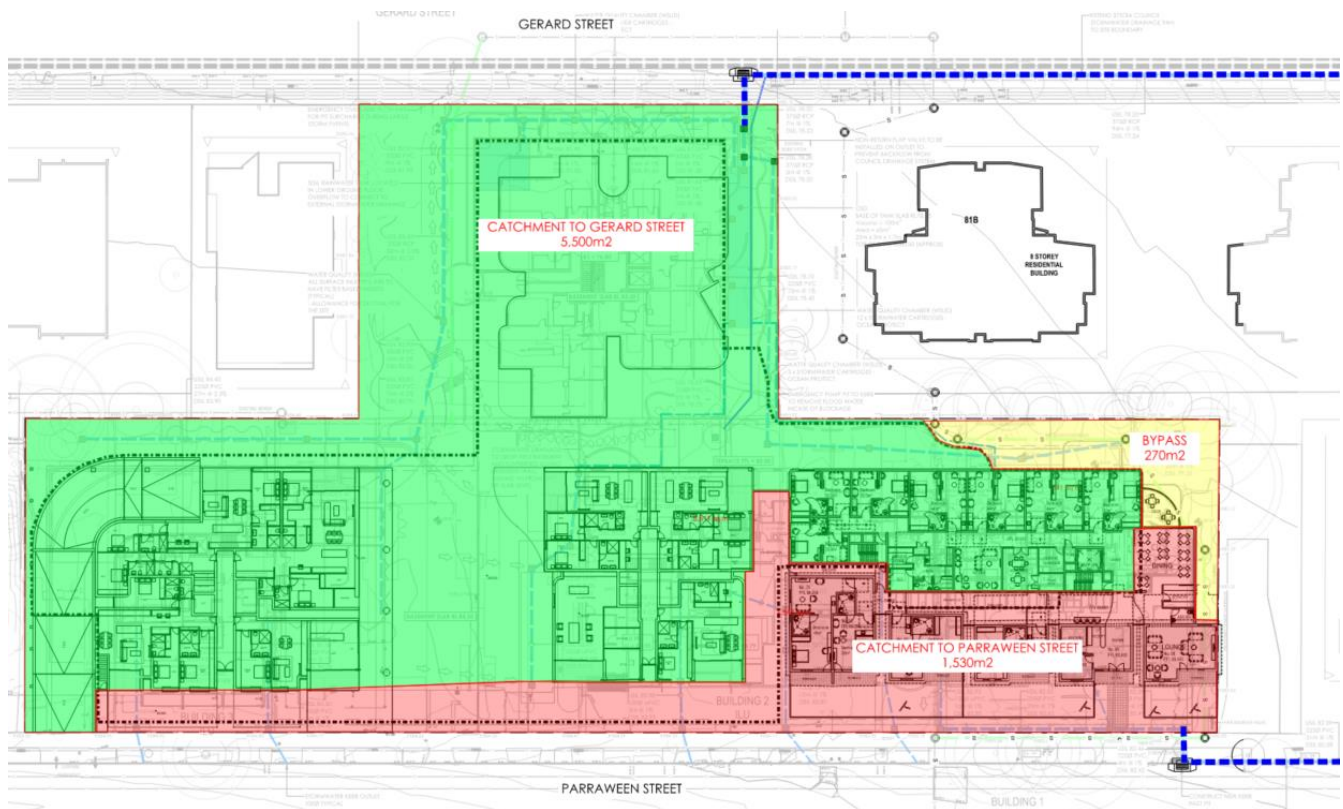


Figure 6 – Proposed catchment plan

2.3.1 Council Stormwater Extension

The existing Council drainage assets in Gerard Street and Parraween Street are proposed to be extended to allow for a drainage point of connection for the site. This involves the following;

- Extending the existing 375mm diameter pipe in Gerard Street by approximately 100m
- Extending the existing 225mm diameter pipe in Parraween Street by approximately 30m.

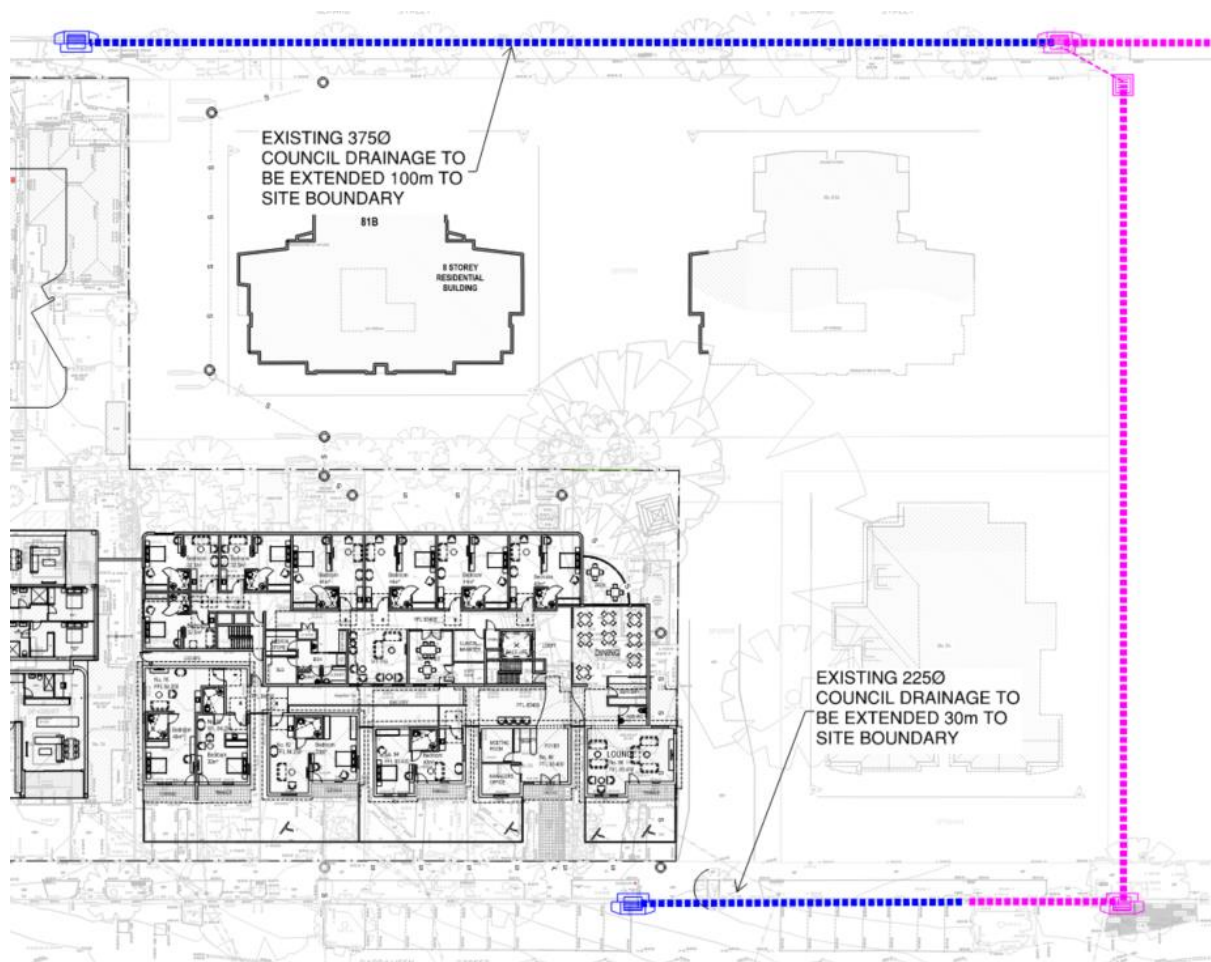


Figure 7 – Proposed Council stormwater drainage extension

2.3.1.1 Parraween Street

There is currently no stormwater drainage along the site frontage on Parraween Street.

An existing 300dia pipe is located on the south side of the road however the pipe is very shallow with only 300mm cover to the road surface. The road cross fall on the development side is steep coupled with how shallow the pipe is would mean it is unable to be extended across the road as the top of the pipe would be exposed.

The design intent is therefore to extend the existing 225dia pipe located approximately 30m to the east to the site boundary. This pipe is also shallow with only 100mm cover however it can be graded at 1% to the boundary and achieve approximately 220mm cover.

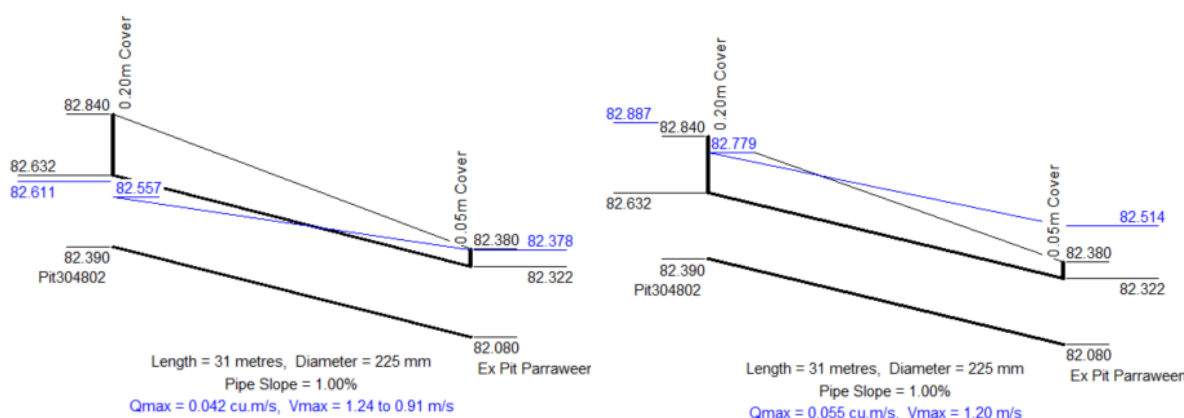


Figure 8 – Parraween Street drainage extension longitudinal section – 10% AEP and 1% AEP

2.3.1.2 Gerard Street

There is currently no stormwater drainage along the site frontage in Gerard Street.

An existing 375dia pipe is located approximately 100m east of the site near the intersection of Bennelong Road. It is proposed to extend this pipe to the property boundary to provide a point of discharge to the development.

The design intent is to extend the drainage at 1% minimum grade to ensure that the connection point is at depth to allow for the lower terrace within the development to freely drain via gravity to reduce the risk of surcharge on site. The Council pit at the boundary will therefore be approximately 3.8m deep.

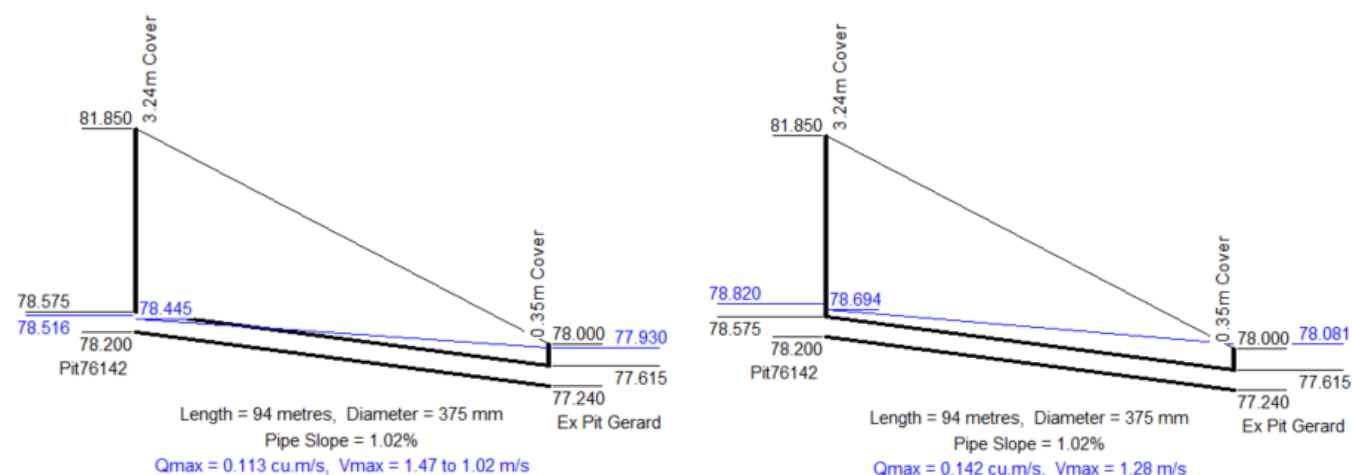


Figure 9 – Gerard Street drainage extension longitudinal section – 10% AEP and 1% AEP

2.3.2 Onsite Detention

Onsite detention (OSD) has been designed in accordance with Council requirements to reduce the post-development stormwater runoff to the pre-development 20% AEP flows for all storms up to and including the 1% AEP.

It has been assumed that the podium-level landscape area above the basement is considered impervious for the onsite detention sizing. The existing cottages to be retained proposed to connect directly to the kerb, as per existing conditions, and as such bypass the OSD.

The OSD has been designed to reduce the stormwater discharge flows, up to and including the 1% AEP, to ensure that they are within the capacity of the Council drainage system. Overland flow paths around the site will ensure that any additional flows can safely be conveyed to the Parraween and Gerard Street road reserves. The post-development stormwater discharge from the site is significantly reduced, as shown in the Table 2 below, and as such has a net positive effect on both decreasing the flow in Council drainage as well as effects on downstream flooding.

The required onsite detention storage volume for the site has been determined to be 136m³

Table 2 – Site stormwater discharge rates

AEP Rainfall Event	Pre-Development Discharge (L/s)	Post Development Discharge (L/s)
20% (5 Year)	228	141
10% (10 Year)	278	163
5% (20 Year)	330	183
1% (100 year)	442	228

2.3.3 Rainwater Reuse

A rainwater reuse tank is proposed to be located inground and will capture roof water to be used for landscaping irrigation purposes only.

2.3.4 Stormwater Quality

A summary of the North Sydney Council WSUD requirements as described in the Development Control Plan (DCP) has been provided in Section 2.1.2.

Due to the basement area, there is limited surface area available on the site for bio-retention and/or infiltration basins and other natural water quality treatment. As such, water quality treatment is generally undertaken through propriety products such as filter basket pit inserts and filter cartridges which are able to be incorporated into the inground stormwater drainage network

MUSIC Modelling has been undertaken for the site to ensure that the proposed water quality treatment train is meeting the Council pollutant reduction targets. Figure 10 shows the treatment train set up in MUSIC and the results in table 3

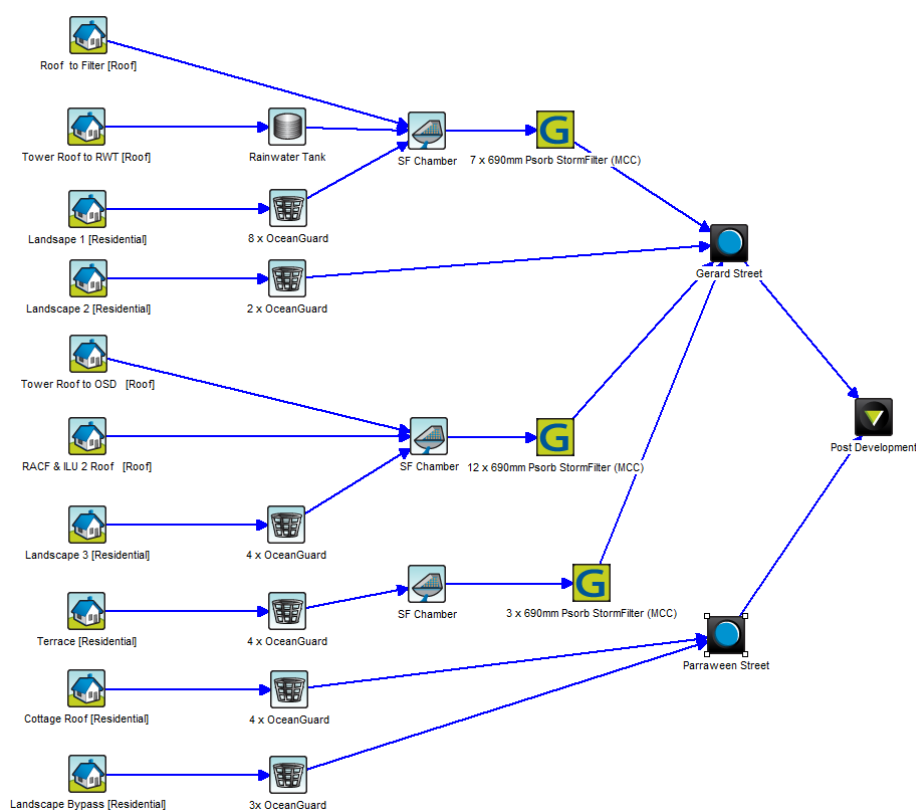


Figure 10 – MUSIC Model

Table 3 – Stormwater quality reduction results

Stormwater Pollutant	Council Target %	Site Reduction %
Gross Pollutants	90	100
Total Suspended Solids (TSS)	85	87.3
Total Phosphorus (TP)	65	65.2
Total Nitrogen (TN)	45	47.8

4 Soil Erosion and Sedimentation Control

4.1 General Principles

The following general principles of soil and water management have been developed and will be applied to the re-development works:

- Minimise the area of soil disturbed and exposed to erosion
- Conserve topsoil for later site rehabilitation/revegetation
- Control water flow from the top of, and through the development area
- Rehabilitate disturbed lands quickly
- Maintain soil and water management measures appropriately during the construction phase

4.2 Sources of Pollution

Based on the proposed development activities, the following sources of pollution during construction that could lead to earthworks erosion, sediment and silt transportation and contamination of downstream stormwater systems have been considered:

- Earthworks undertaken prior to rainfall events without sufficient auxiliary measures to manage drainage
- Earthworks areas that have not been stabilised or are exposed prior to temporary or permanent ground cover
- Establishment time for rehabilitation / revegetation of exposed earthworks
- Localised groundwater dewatering activities during earthworks excavations
- Construction works to existing stormwater pipelines and overland flow paths
- Vehicle entry and exit to the construction site and associated tracking of debris out of the site
- Clearing and grubbing of vegetation / organic matter and stripping of topsoil
- Stockpiling of excavated materials or construction materials (e.g. road base, ordinary and select fill, etc)
- Re-fuelling and general maintenance of construction plant and equipment
- Storage of chemicals, fuel and other hazardous materials
- Ineffective / incorrect installation or maintenance of soil erosion and sedimentation control measures

4.3 Soil and Water Management Strategy

The following construction management methodology has been developed for the re-development works and should be included in the soil erosion and sediment control for the site:

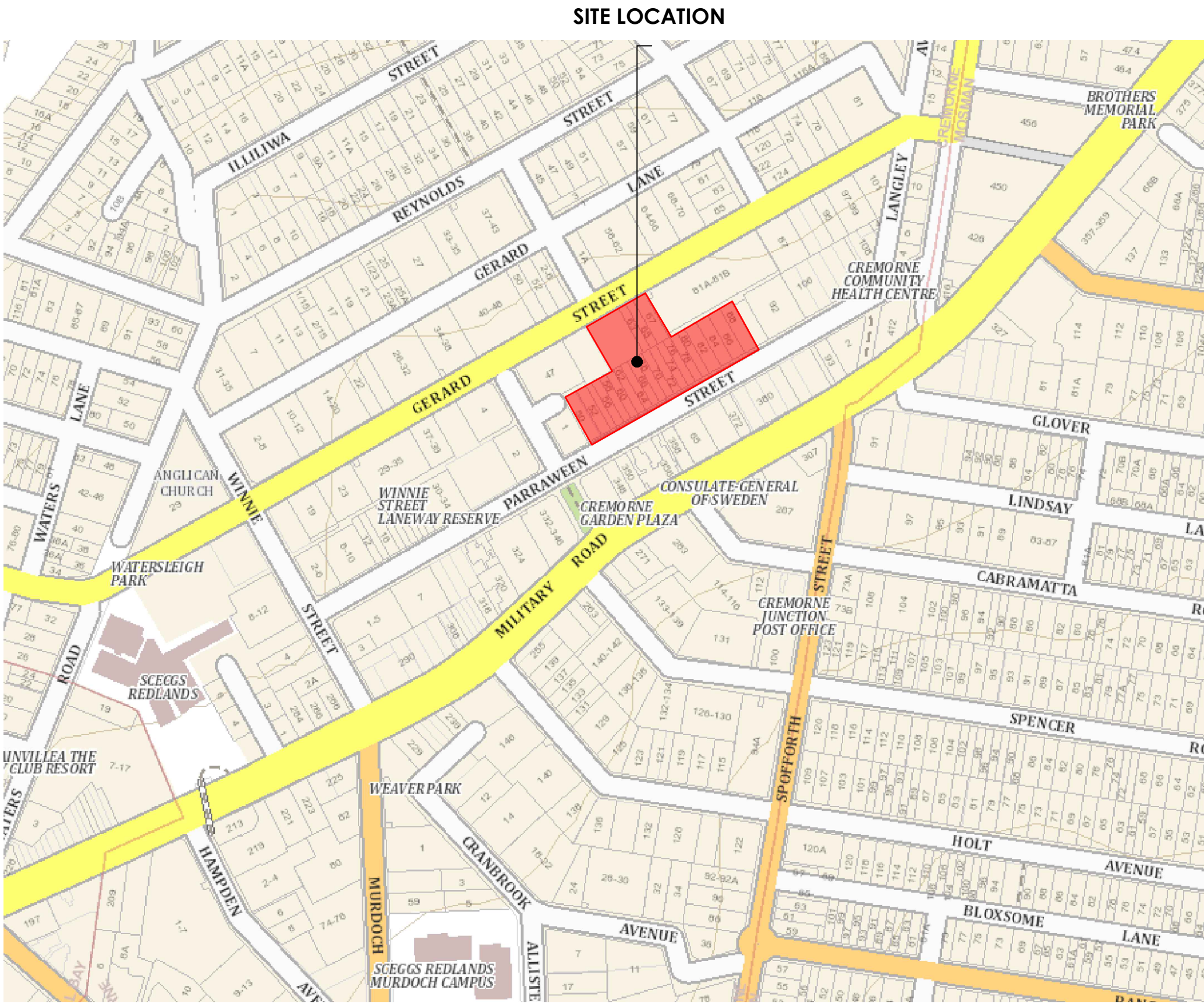
- Establish sediment fencing to the downstream perimeter of the zone of disturbed works to protect downstream assets and properties
- Installation of stabilised construction entry and exit grids to prevent construction vehicles tracking debris into adjacent Authority roadways and stormwater systems
- Construction of “clean water” diversion drains with rock check dams to divert unpolluted water to the existing stormwater system in a controlled manner
- Construction of “dirty water” catch drains with rock check dams to divert sediment-laden and silt-laden water to proposed sedimentation basins

- Construction of appropriately sized and maintained sedimentation basins to promote settling of gross pollutants and suspended solids. Dosing and flocculation of fine suspended particulates will also be undertaken depending on tested water quality profiles within the sedimentation basin
- Protection of materials stockpiles by suitable wind protection fencing and / or temporary covering of stockpiles
- Protection of existing and recently constructed surface inlet pits with temporary sediment traps using geotextile filter fabric and sandbags
- Protection of existing and recently constructed overland flow paths with vegetated ground cover
- General expedited revegetation and stabilisation of exposed earthworks to prevent sedimentation of stormwater runoff

Appendix A – Civil Stormwater Management Plan

PATHWAYS RESIDENCES CREMORNE
50-88 PARRAWEEN STREET
AND 59-67 GERARD STREET,
CREMORNE, NSW

CIVIL LEGEND	
PIPELINES	
	PROPOSED STORMWATER DRAINAGE
	PROPOSED BASEMENT STORMWATER DRAINAGE
	PROPOSED EMERGENCY PUMP LINE
	PROPOSED SEWER DRAINAGE
	EXISTING SEWER DRAINAGE
	EXISTING WATER
	EXISTING GAS
	EXISTING ELECTRICAL
	EXISTING COMMS
	EXISTING HIGH VOLTAGE CABLE
	REDUNDANT SERVICE
	PROPOSED SEWER MANHOLE
	EXISTING SEWER MANHOLE
	STORMWATER OVERLAND FLOW PATH
	GRASS LINED SWALE DRAIN (GRASS TO BE LAID KIKUYU OR EQUAL)
	• P56.20 FINISHED SURFACE LEVEL
	• EX56.20 EXISTING SURFACE LEVEL
	GRATED DRAIN
	SUBSOIL DRAINAGE LINE
	IR SUBSOIL HIGH END RISER AND INTERMEDIATE RISER
	HER SUBSOIL HIGH END RISER AND INTERMEDIATE RISER
	DP DOWNPIPE CONNECTION (Ø150 uPVC UNO)
	STORMWATER DRAINAGE STRUCTURE WITH NUMBER (REFER STORMWATER DRAINAGE STRUCTURES SCHEDULE)
	STORMWATER DRAINAGE LINE WITH: IL 25.30 INVERT LEVEL UPSTREAM Ø375 RCP '2' PIPE SIZE AND MATERIAL CLASS 13.30m @ 1.0% PIPE GRADE 10m PIPE LENGTH IL 25.10 INVERT LEVEL DOWNSTREAM



DRAWING SCHEDULE	
C01	COVER SHEET
C02	NOTES SHEET
C03	EROSION AND SEDIMENT CONTROL PLAN
C04	EROSION AND SEDIMENT CONTROL DETAILS
C05	STORMWATER MANAGEMENT PLAN
C06	STORMWATER MANAGEMENT DETAILS
C07	SEWER DIVERSION PLAN

					CLIENT		ARCHITECT		CIVIL CONSULTANT		PROJECT		NORTH POINT		DRAWING TITLE CIVIL SERVICES COVER SHEET, LEGEND & DRAWING SCHEDULE			
					PATHWAYS RESIDENCES		CHROFI architecture		ENTEC CONSULTANTS		PATHWAYS RESIDENCES CREMORNE 50-88 PARRAWEEN STREET and 59-67 GERARD STREET, CREMORNE, N.S.W.							
C	ISSUE FOR REVISED SSDA	12.07.24	JL	NP														
B	ISSUE FOR REVISED SSDA	14.06.24	JL	NP														
A	ISSUE FOR SSDA	16.06.23	SM	NP														
ISSUE	AMENDMENT	DATE	DRAWN	APP														

2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK.
3. ALL WORK IS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS, THE SPECIFICATIONS AND THE DIRECTIONS OF THE PRINCIPAL'S REPRESENTATIVE.
4. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE PRINCIPAL'S REPRESENTATIVE. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
5. WHERE NEW WORKS ABOUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
7. CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER COMMUNICATIONS OR ELECTRICAL SERVICES. HAND EXCAVATE IN THESE AREAS.
8. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH AN APPROVED NON-NATURAL GRANULAR MATERIAL AND COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS.1289.5.1.1.
9. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
10. ON COMPLETION OF PIPE INSTALLATION ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS.
11. PROVIDE 10mm WIDE EXPANDING CORK JOINTS BETWEEN CONCRETE PAVEMENTS AND ALL BUILDINGS, WALLS, FOOTINGS, COLUMNS, KERBS, DISH DRAINS, GRATED DRAINS, BOLLARD FOOTINGS ETC
12. CONTRACTOR TO OBTAIN ALL AUTHORITY APPROVALS.
13. ALL BATTERS TO BE GRASSED LINED WITH MINIMUM 100 TOPSOIL AND APPROVED COUCH LAID AS TURF.
14. MAKE SMOOTH TRANSITION TO EXISTING SERVICES AND MAKE GOOD.
15. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY DIVERSION DRAINS AND MOUNDS TO ENSURE THAT AT ALL TIMES EXPOSED SURFACES ARE FREE DRAINING AND WHERE NECESSARY EXCAVATE SUMPS AND PROVIDE PUMPING EQUIPMENT TO DRAIN EXPOSED AREAS.
16. THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
17. TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MIN 50mm IN BITUMINOUS PAVING.
18. ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN Ø80 uPVC SEWER GRADE CONDUITS EXTENDING A MIN OF 500mm PAST PAVING.
19. ON COMPLETION OF WORKS ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL INCLUDING, BUT NOT LIMITED TO, KERBS, FOOTPATHS, CONCRETE AREAS, GRASS AND LANDSCAPED AREAS.

- E1. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING PLANS, AND ANY OTHER PLANS OR WRITTEN INSTRUCTIONS THAT MAY BE ISSUED AND RELATING TO DEVELOPMENT AT THE SUBJECT SITE.
- E2. THE PRINCIPAL'S REPRESENTATIVE WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE UNDERTAKEN AS INSTRUCTED IN THIS SPECIFICATION AND CONSTRUCTED FOLLOWING THE GUIDELINES OF "MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION", DEPT OF HOUSING, 2004 (BLUE BOOK).
- E3. ALL BUILDERS AND SUB-CONTRACTORS WILL BE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.

E4. THE SOIL EROSION POTENTIAL ON THIS SITE SHALL BE MINIMISED. HENCE WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE :

- a. INSTALL SEDIMENT FENCES, TEMPORARY CONSTRUCTION EXIT AND SANDBAG KERB INLET SEDIMENT TRAP.
- b. UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

- E5. DURING WINDY CONDITIONS, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
- E6. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

47. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.

E8. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.

E9. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.

E10. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

E11. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.

E12. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER ARE TO BE EMPTIED AS NECESSARY. DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE PRINCIPAL'S REPRESENTATIVE.

E13. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AFTER RAINFALL EVENTS TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIR AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED.

1. ALL 375 DIA. DRAINAGE PIPES AND LARGER SHALL BE CLASS "2" APPROVED SPIGOT AND SOCKET FRC OR RCP PIPES WITH RUBBER RING JOINTS. (U.N.O.) ALL DOWNPIPE DRAINAGE LINES SHALL BE SEWER GRADE uPVC WITH SOLVENT WELD JOINTS. (U.N.O.)
2. EQUIVALENT STRENGTH REINFORCED CONCRETE PIPES MAY BE USED.
3. ALL PIPE JUNCTIONS UP TO AND INCLUDING 450 DIA. AND TAPERS SHALL BE VIA PURPOSE MADE FITTINGS.
4. MINIMUM GRADE TO STORMWATER LINES TO BE 1%. (U.N.O.)
5. CONTRACTOR TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.

6. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.

7. PRECAST PITS SHALL NOT BE USED UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER.

8. 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. IN OTHER THAN ROCK, PIPES SHALL BE LAID ON A 75MM THICK SAND BED. IN ALL CASES BACKFILL THE TRENCH WITH SAND TO 200MM ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH WITH SAND OR APPROVED GRANULAR BACKFILL COMPACTED IN 150MM LAYERS TO 98% STANDARD MAX. DRY DENSITY.

9. BEDDING SHALL BE (U.N.O.) TYPE HS2, IN ACCORDANCE WITH CURRENT RELEVANT AUSTRALIAN STANDARDS.

10. WHERE STORMWATER LINES PASS UNDER FLOOR SLABS
SEWER GRADE RUBBER RING JOINTS ARE TO BE USED.

11. WHERE SUBSOIL DRAINAGE LINES PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS UNSLOTTED UPVC SEWER GRADE PIPE SHALL BE USED.

12. PROVIDE 3.0M LENGTH OF 100 DIA. SUBSOIL DRAINAGE PIPE WRAPPED IN FABRIC SOCK, AT UPSTREAM END OF EACH PIT.

1. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS, SERVICES AND STRUCTURES ON SITE PRIOR TO COMMENCEMENT OF WORK.
2. ALL WORK SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS AND THE SPECIFICATION.
3. ON COMPLETION OF PROPOSED WORKS ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL, GRASSED & LANDSCAPE AREAS AND ROAD PAVEMENTS. (U.N.O.)
4. CONTRACTOR TO OBTAIN ALL AUTHORITY APPROVALS.
5. MAKE SMOOTH TRANSITION TO EXISTING SERVICES AND MAKE GOOD.
6. WHERE NEW WORKS ABOUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED.
7. CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER THESE SERVICES. HAND EXCAVATE IN THESE AREAS.
8. THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED ARCHITECTURAL, STRUCTURAL, HYDRAULIC, AND OTHER SERVICES DRAWINGS AND SPECIFICATIONS.
9. EQUIVALENT STRENGTH FRC PIPES MAY BE USED.

10. ALL PIPE JUNCTIONS, BENDS AND TAPERS UP TO AND INCLUDING 450 DIA SHALL BE VIA PURPOSE MADE FITTINGS.

11. MINIMUM GRADE TO STORMWATER LINES TO BE 1%.
(U.N.O.)

12. CONTRACTOR TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.

13. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.

14. 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. IN OTHER THAN ROCK, PIPES SHALL BE LAID ON A 75mm THICK SAND BED. IN ALL CASES BACKFILL THE TRENCH WITH SAND TO 200mm ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH WITH SAND OR APPROVED GRANULAR BACKFILL COMPACTED IN 150mm LAYERS TO 98% STANDARD MAX. DRY DENSITY.

15. BEDDING SHALL BE (U.N.O.) TYPE H1, IN ACCORDANCE WITH CURRENT RELEVANT AUSTRALIAN STANDARDS.

16. WHERE STORMWATER LINES PASS UNDER FLOOR SLABS
SEWER GRADE RUBBER RING JOINTS ARE TO BE USED.

17. PROVIDE 3.0m LENGTH OF 100 DIA. SUBSOIL DRAINAGE PIPE WRAPPED IN FABRIC SOCK, AT UPSTREAM END OF EACH PIT.

1. THE WATER SUPPLY SYSTEM FROM A RAINWATER TANK SHALL BE CLEARLY MARKED 'RAINWATER' AT INTERVALS NOT EXCEEDING 1m WITH CONTRASTING COLOURED WORDING. WATER OUTLETS SHALL BE IDENTIFIED AS 'RAINWATER' WITH A LABEL OR A RAINWATER TAP IDENTIFIED BY A GREEN COLOURED INDICATOR WITH THE LETTERS 'RW'.

2. HOSE TAP OUTLETS SHALL:
 - a. BE CLEARLY MARKED 'WARNING: NOT FOR DRINKING' IN ACCORDANCE WITH THE REQUIREMENTS OF AS 1319.
 - b. BE OF A TYPE THAT HAS A REMOVABLE HANDLE.

3. THE FOLLOWING APPLIES:

- a. ABOVEGROUND INSTALLATION OF NON-DRINKING WATER SERVICES SHALL NOT BE INSTALLED WITHIN 100mm OF ANY PARALLEL DRINKING WATER SERVICE, EXCEPT WHEN INSTALLED IN PIPE DUCT OR STRUCTURALLY SEPARATED.
- b. BELOW-GROUND INSTALLATIONS OF NON-DRINKING WATER SERVICES SHALL NOT BE INSTALLED WITHIN 300mm OF ANY PARALLEL DRINKING WATER SUPPLY.

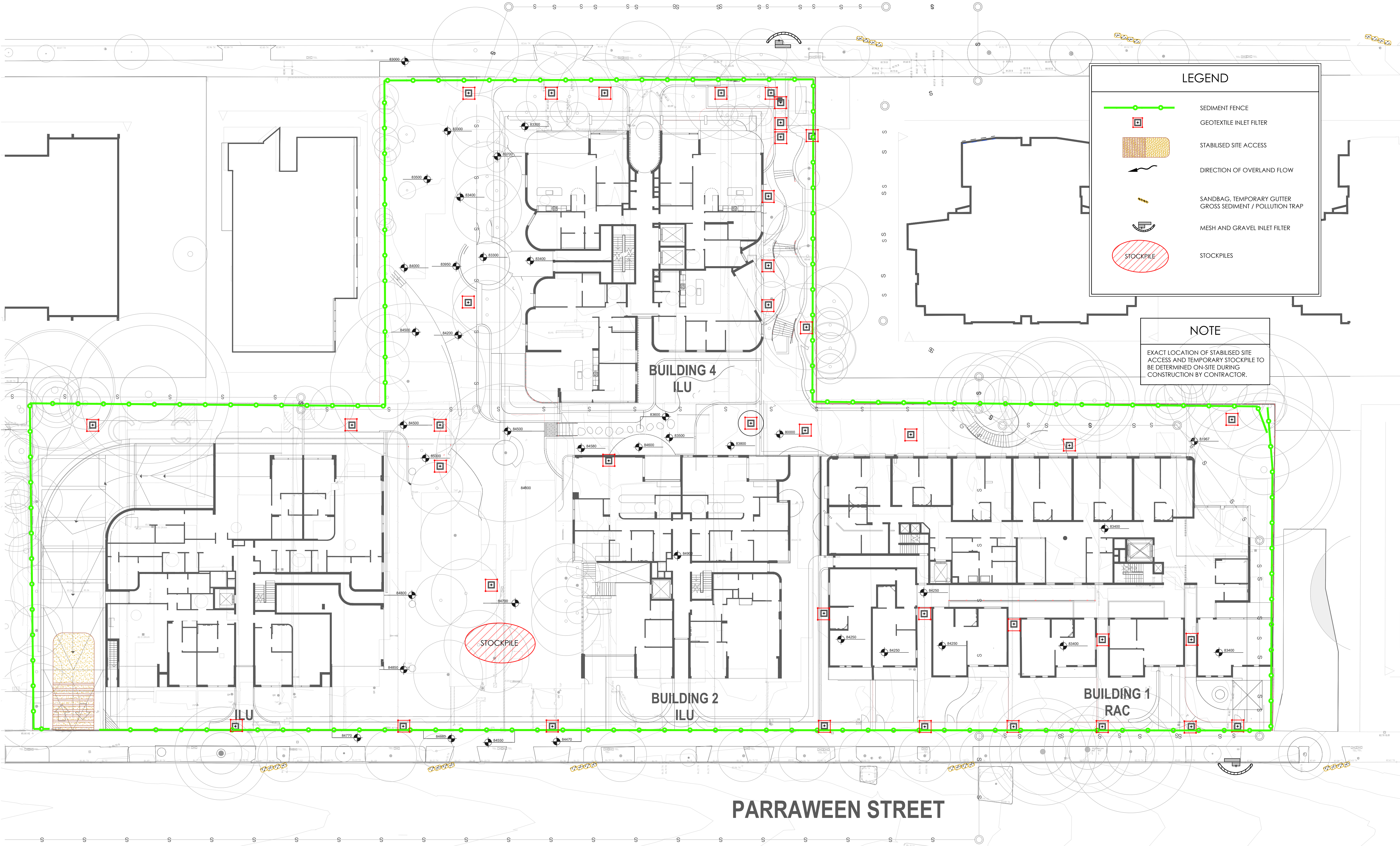
- a. ALL PIPES, PIPE SLEEVES, IDENTIFICATION TAPES, & OUTLETS SHALL BE COLOURED LILAC (P23) IN ACCORDANCE WITH AS 2700
- b. ALL PIPES, PIPE SLEEVES & IDENTIFICATION TAPES, IN ACCORDANCE WITH AS 1345, SHALL BE MARKED WITH THE FOLLOWING, WARNING: RECYCLED OR RECLAIMED - WATER - DO NOT DRINK

c. ALL BELOW GROUND PIPES SHALL HAVE AN IDENTIFICATION TAPE IN ACCORDANCE WITH CLAUSE GENERAL INSTALLED ON TOP OF THE WATER PIPELINE, RUNNING LONGITUDINALLY, & FASTENED TO THE PIPE AT NOT MORE THAN 3m INTERVALS.

a. ALL OUTLET POINTS SHALL BE CLEARLY & PERMANENTLY MARKED 'WARNING: NOT FOR DRINKING' WITH SAFETY SIGNS TO COMPLY WITH AS 1319 & AS 1345.

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GERARD STREET



LEGEND

- SEDIMENT FENCE
- GEOTEXTILE INLET FILTER
- STABILISED SITE ACCESS
- DIRECTION OF OVERLAND FLOW
- SANDBAG, TEMPORARY GUTTER
GROSS SEDIMENT / POLLUTION TRAP
- MESH AND GRAVEL INLET FILTER
- STOCKPILE

NOTE

EXACT LOCATION OF STABILISED SITE ACCESS AND TEMPORARY STOCKPILE TO BE DETERMINED ON-SITE DURING CONSTRUCTION BY CONTRACTOR.

NOT FOR CONSTRUCTION

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR REVISED SSDA	12.07.24	JL	NP
B	ISSUE FOR REVISED SSDA	14.06.24	JL	NP
A	ISSUE FOR SSDA	16.06.23	SM	NP

CLIENT

PATHWAYS
RESIDENCES

ARCHITECT

CHROFI **mop**
architecture

CIVIL CONSULTANT

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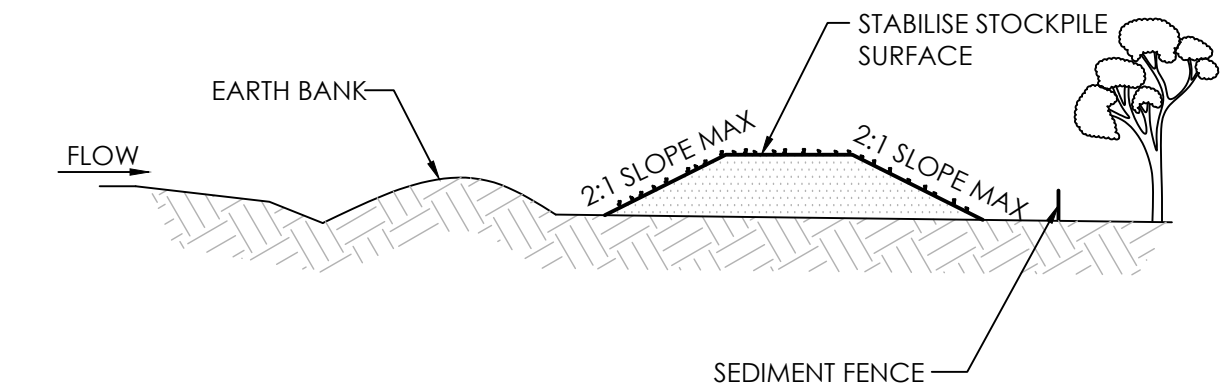
PROJECT

**PATHWAYS RESIDENCES
CREMORNE**
50-88 PARRAWEE STREET
and 59-67 GERARD STREET,
CREMORNE, N.S.W.

NORTH POINT

DRAWING TITLE CIVIL SERVICES EROSION AND SEDIMENT CONTROL PLAN					
DRAWN	DATE	SCALE	A1	QA CHECK	DATE
JL	JUNE 24	1:200		NP	12.07.24
DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE		
NP	220059	C03	C		

SOURCE: MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
THIRD EDITION, AUGUST 1998
PRODUCED BY THE DEPARTMENT OF
HOUSING.

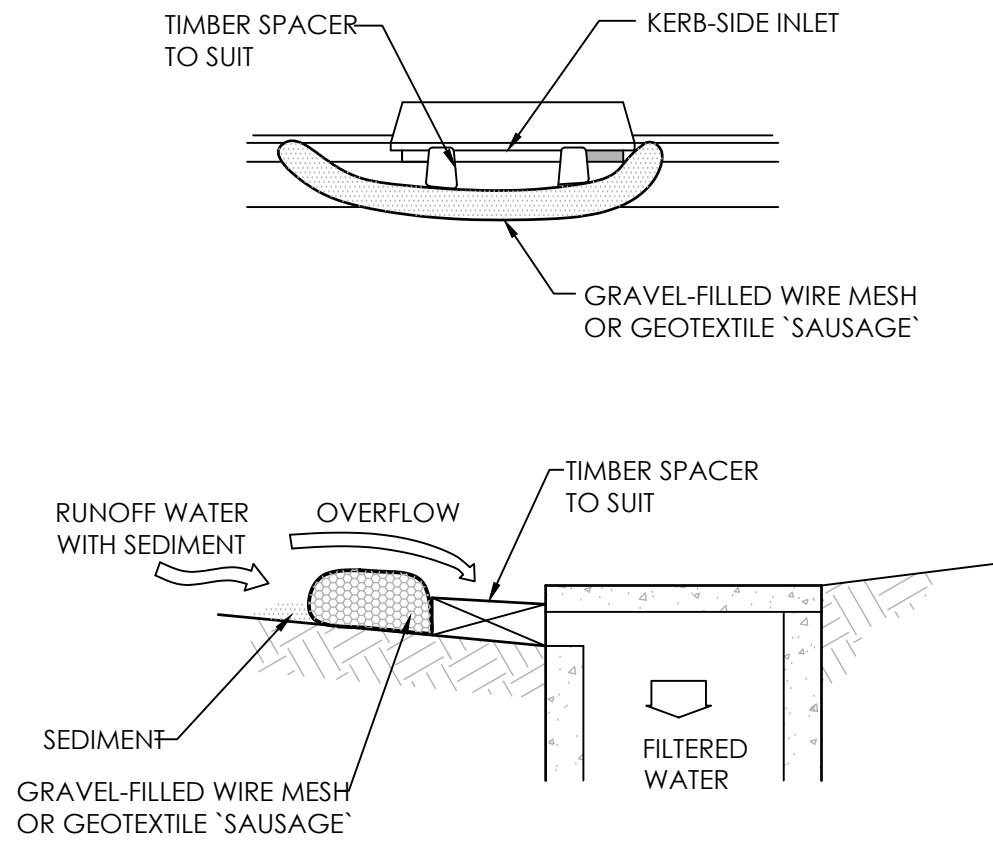


CONSTRUCTION NOTES:

1. LOCATE STOCKPILE AT LEAST 5 METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOWS, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS A LOW, FLAT, ELONGATED MOUND.
3. WHERE THERE IS SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METERS IN HEIGHT.
4. REHABILITATE IN ACCORDANCE WITH THE SWMP/ESCP.
5. CONSTRUCT EARTH BANK (STANDARD DRAWING 5-2) ON THE UPSLOPE SIDE TO DIVERT RUN OFF AROUND THE STOCKPILE AND A SEDIMENT FENCE (STANDARD DRAWING 6-7) 1 TO 2 METRES DOWNSLOPE OF STOCKPILE.

STOCKPILES

SOURCE: MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
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HOUSING.



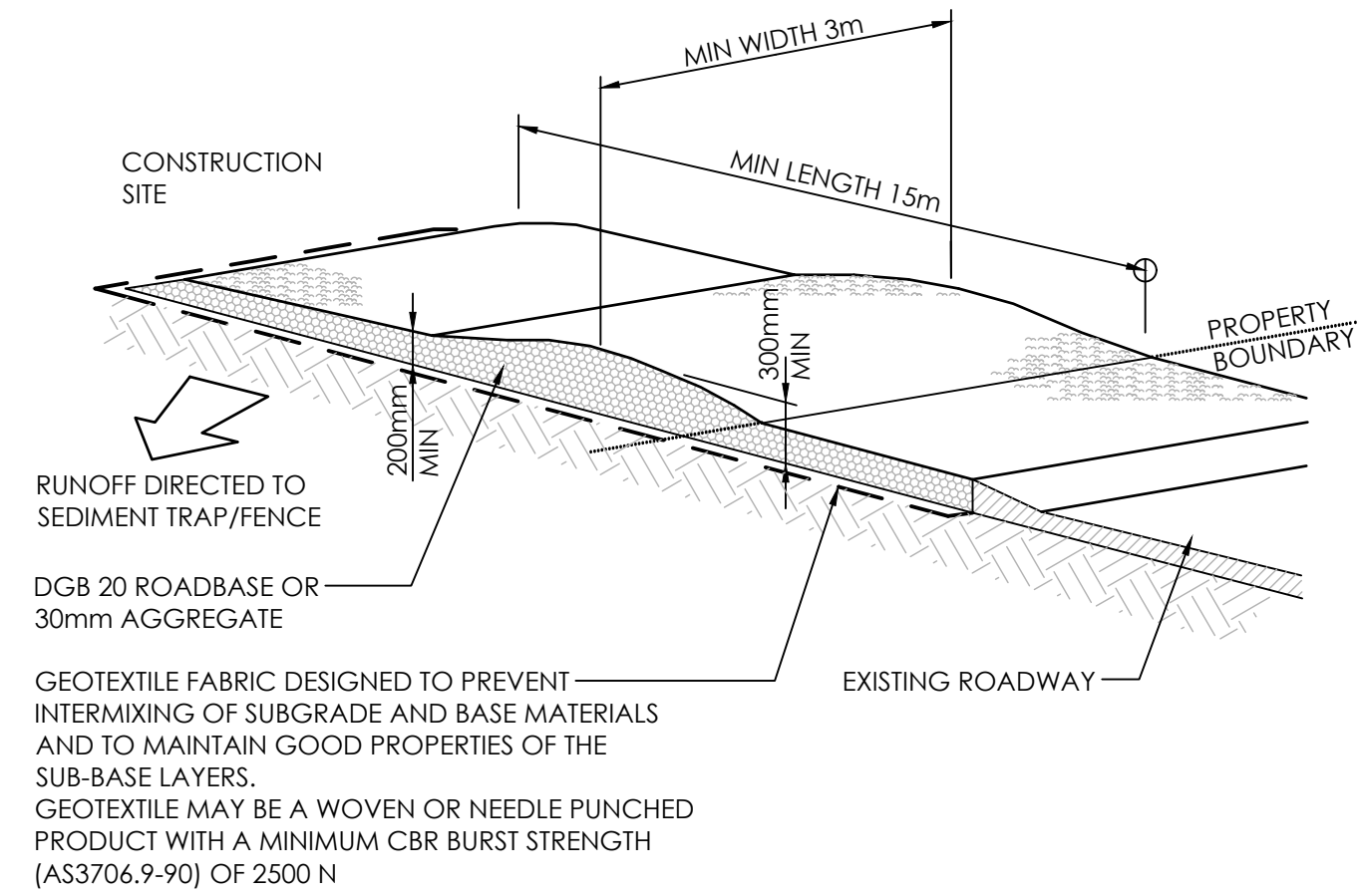
NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES:

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT.
2. FILL THE SLEEVE WITH 25MM TO 50MM GRAVEL.
3. FORM AN ELLIPTICAL CROSS SECTION ABOUT 150MM HIGH X 400MM WIDE.
4. PLACE THE FILTER AT THE OPENING OF THE KERB INLET LEAVING A 100MM GAP AT THE TOP TO ACT AS AN EMERGENCY SPILLWAY.
5. MAINTAIN THE OPENING WITH SPACER BLOCKS.
6. FORM A SEAL WITH THE KERBING AND PREVENT SEDIMENT BYPASSING THE FILTER.
7. FIT TO ALL KERB INLETS AT SAG POINTS.

MESH AND GRAVEL INLET FILTER

SOURCE: MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
THIRD EDITION, AUGUST 1998
PRODUCED BY THE DEPARTMENT OF
HOUSING.

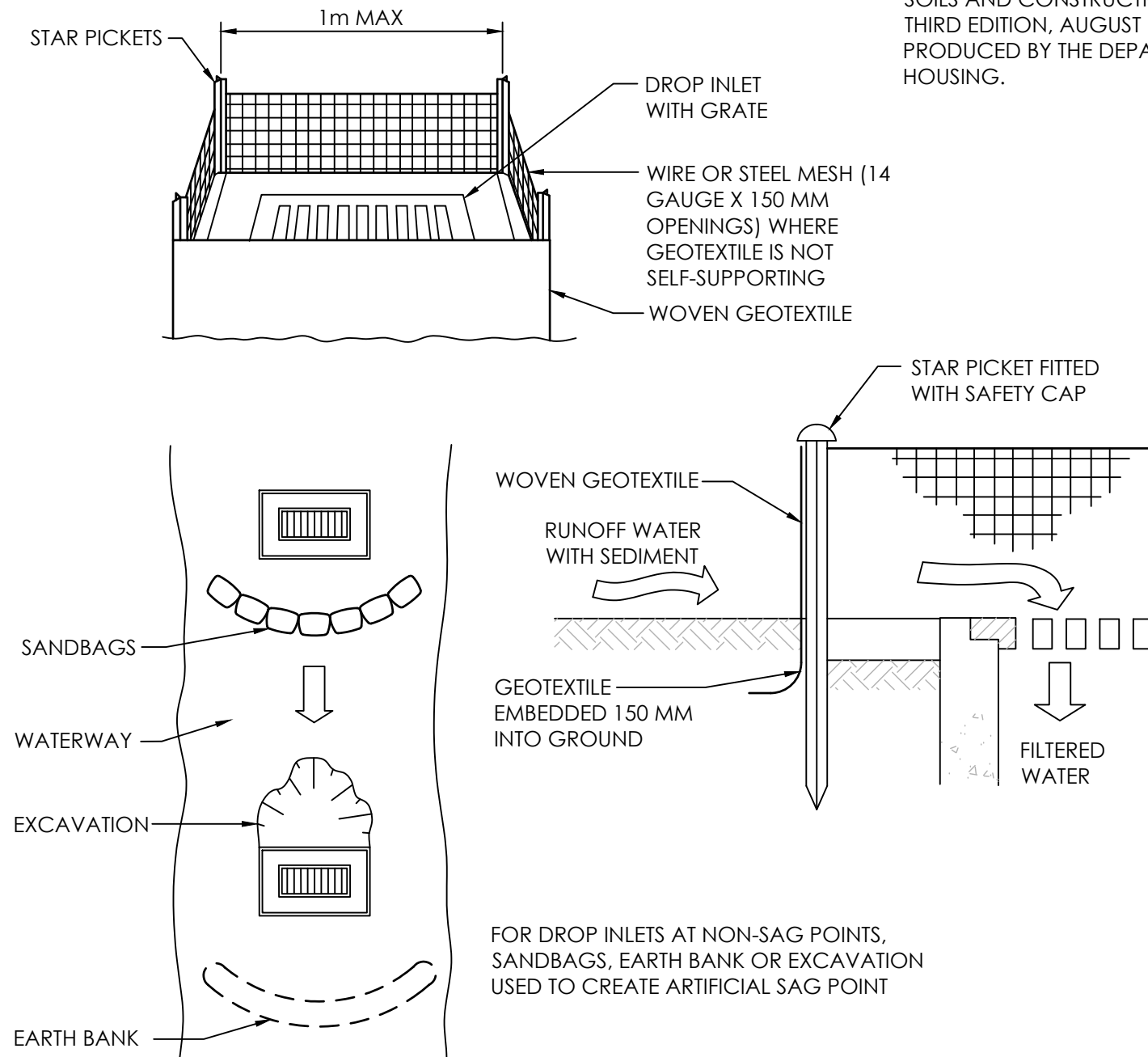


CONSTRUCTION NOTES:

1. STRIP TOPSOIL AND LEVEL SITE.
2. COMPACT SUBGRADE.
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200MM THICK PAD OVER GEOTEXTILE USING ROADBASE OR 30MM AGREGATE. MINIMUM LENGTH 15M OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN BUANDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.

STABILISED SITE ACCESS

SOURCE: MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
THIRD EDITION, AUGUST 1998
PRODUCED BY THE DEPARTMENT OF
HOUSING.

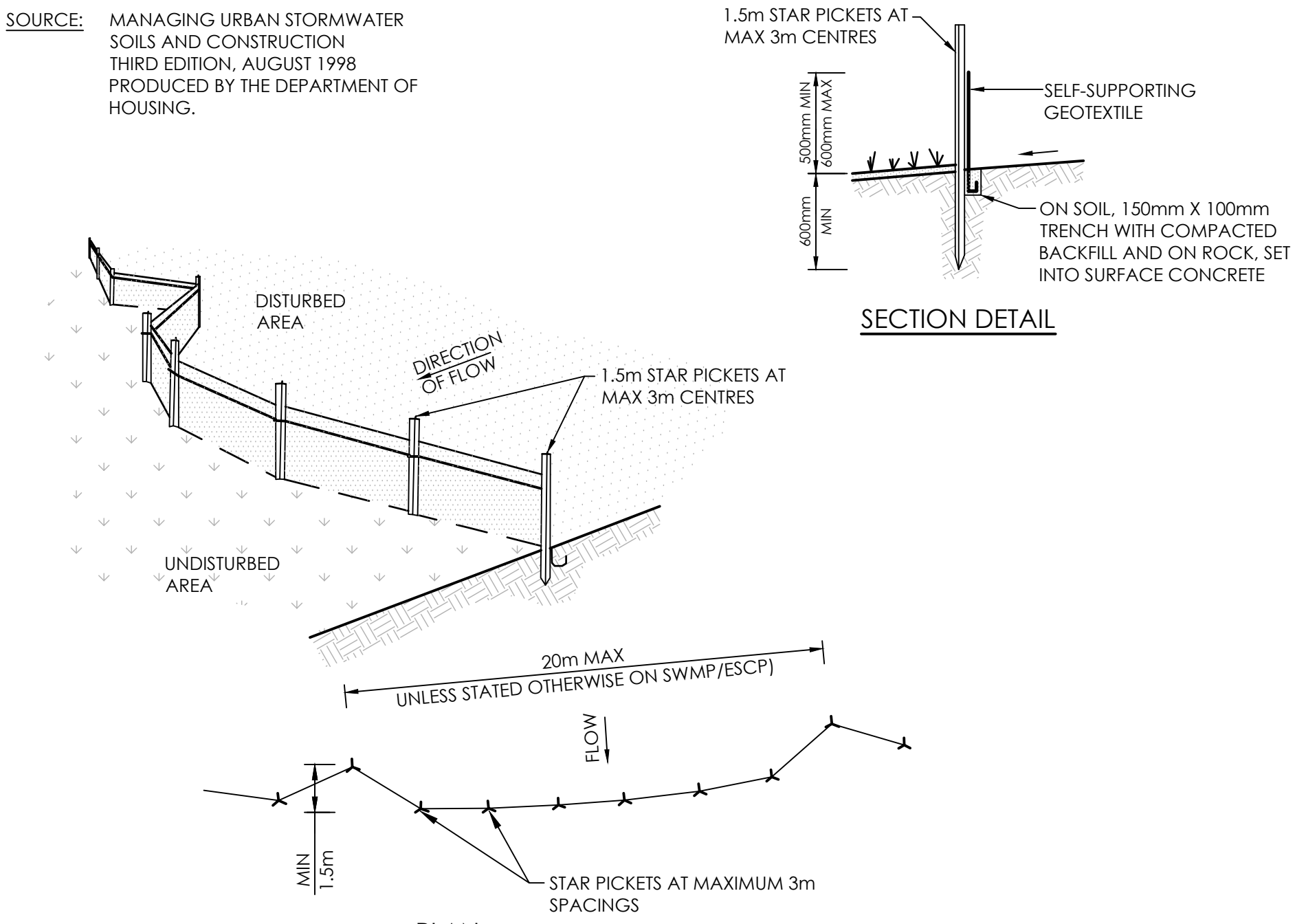


CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER FROM GEOTEXTILE OR STRAW BALES.
2. SUPPORT GEOTEXTILE WITH MESH TIED TO POSTS AT 1 METRE CENTRES.
3. DO NOT COVER INLET WITH GEOTEXTILE.
4. CONSTRUCTION DETAILS ARE SIMILAR TO TYPICAL SEDIMENT FENCING DETAIL.

GEOTEXTILE INLET FILTER

SOURCE: MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
THIRD EDITION, AUGUST 1998
PRODUCED BY THE DEPARTMENT OF
HOUSING.



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND, 3 METRES APART.
3. DIG A 150 MM DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150 MM OVERLAP.

SEDIMENT FENCE

NOT FOR CONSTRUCTION

C	ISSUE FOR REVISED SSDA	12.07.24	JL	NP
B	ISSUE FOR REVISED SSDA	14.06.24	JL	NP
A	ISSUE FOR SSDA	16.06.23	SM	NP
ISSUE	AMENDMENT	DATE	DRAWN	APP

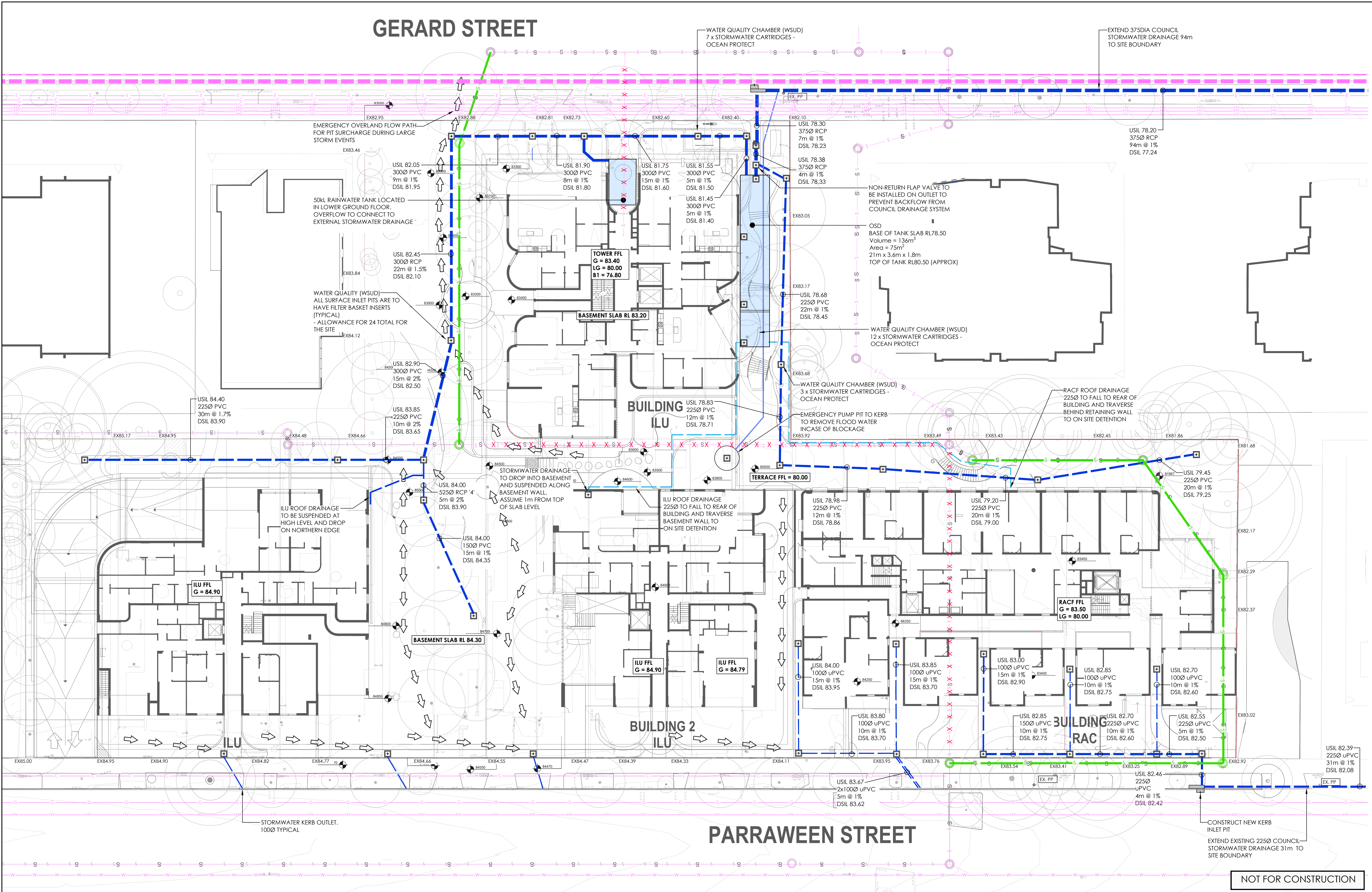
CLIENT
PATHWAYS RESIDENCES

ARCHITECT
CHROFI architecture

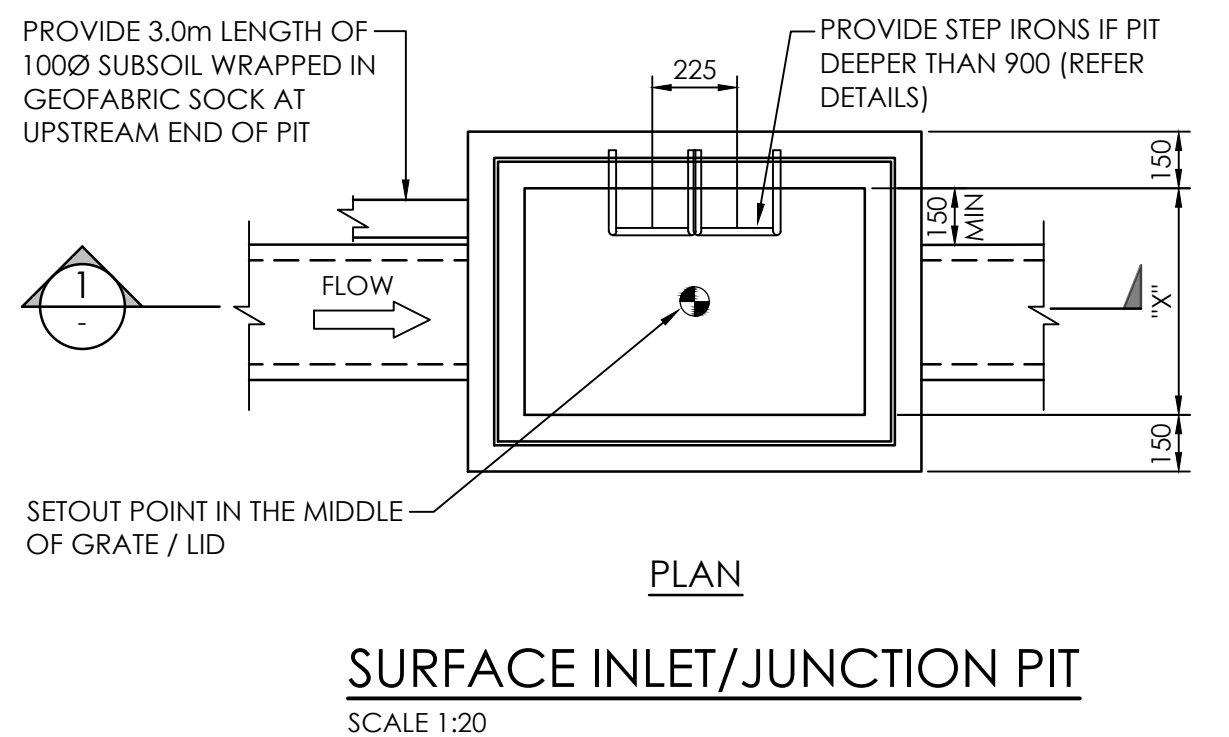
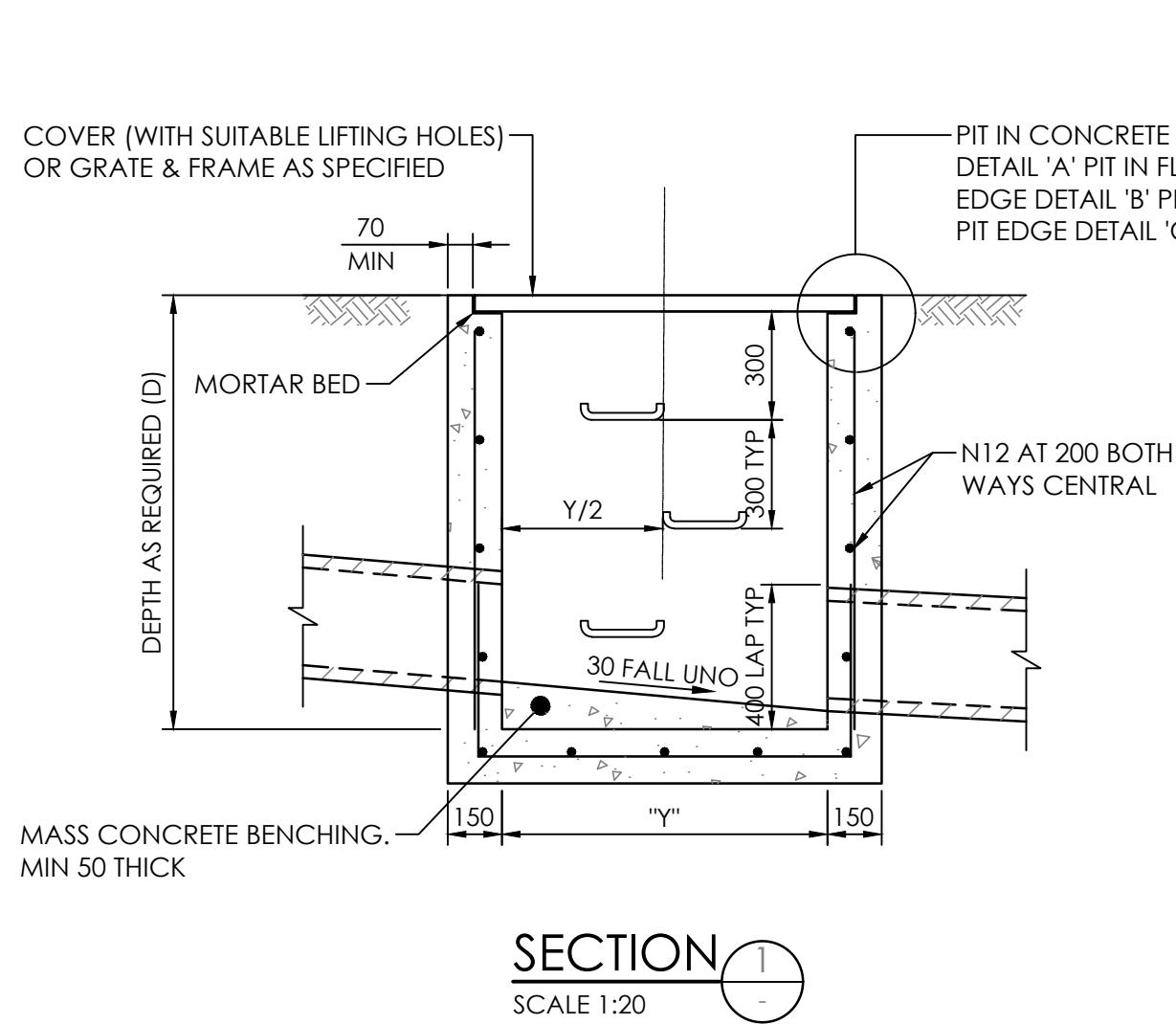
CIVIL CONSULTANT
ENTEC CONSULTANTS

PROJECT
PATHWAYS RESIDENCES CREMORNE
50-88 PARRAWEEEN STREET and 59-67 GERARD STREET, CREMORNE, N.S.W.

NORTH POINT	DRAWING TITLE CIVIL SERVICES EROSION AND SEDIMENT CONTROL DETAILS					
	DRAWN JL	DATE JUNE 24	SCALE NTS	A1	QA CHECK NP	DATE 12.07.24
	DESIGNED NP	PROJECT NO. 220059			DRAWING NO. C04	ISSUE C

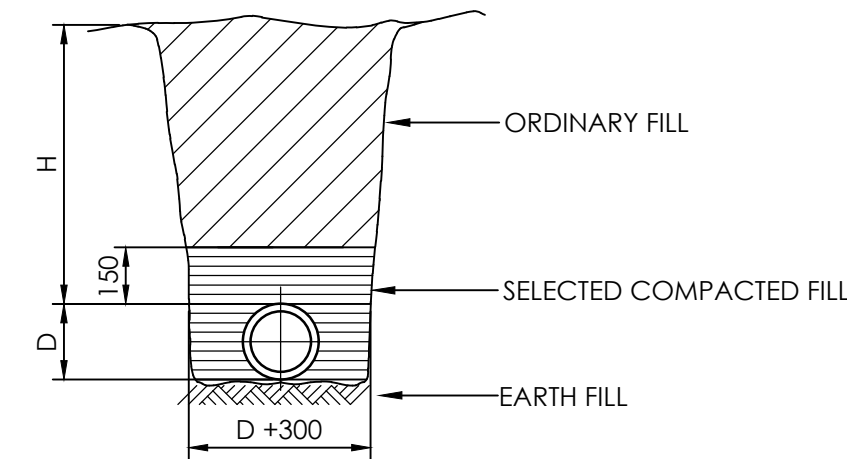
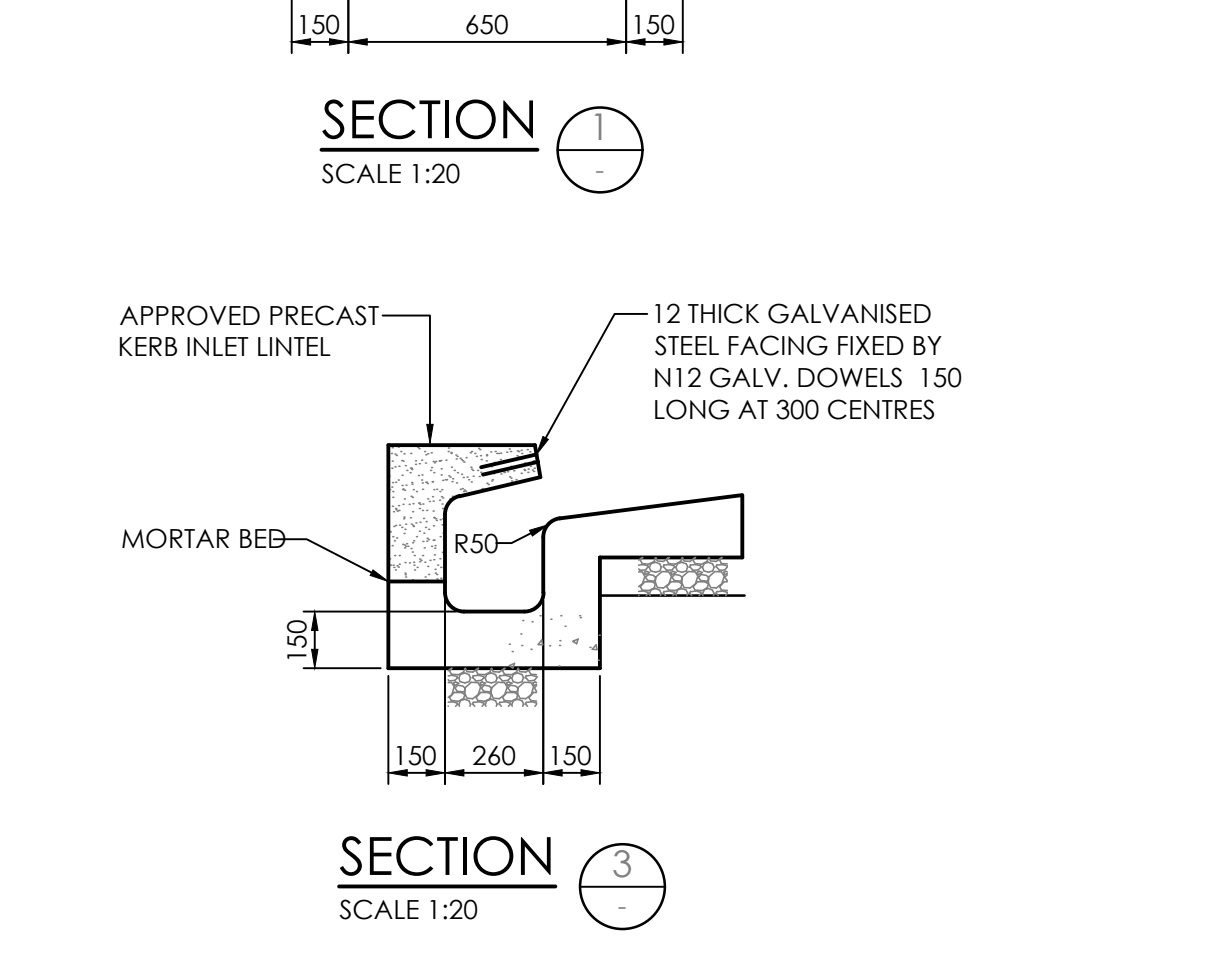
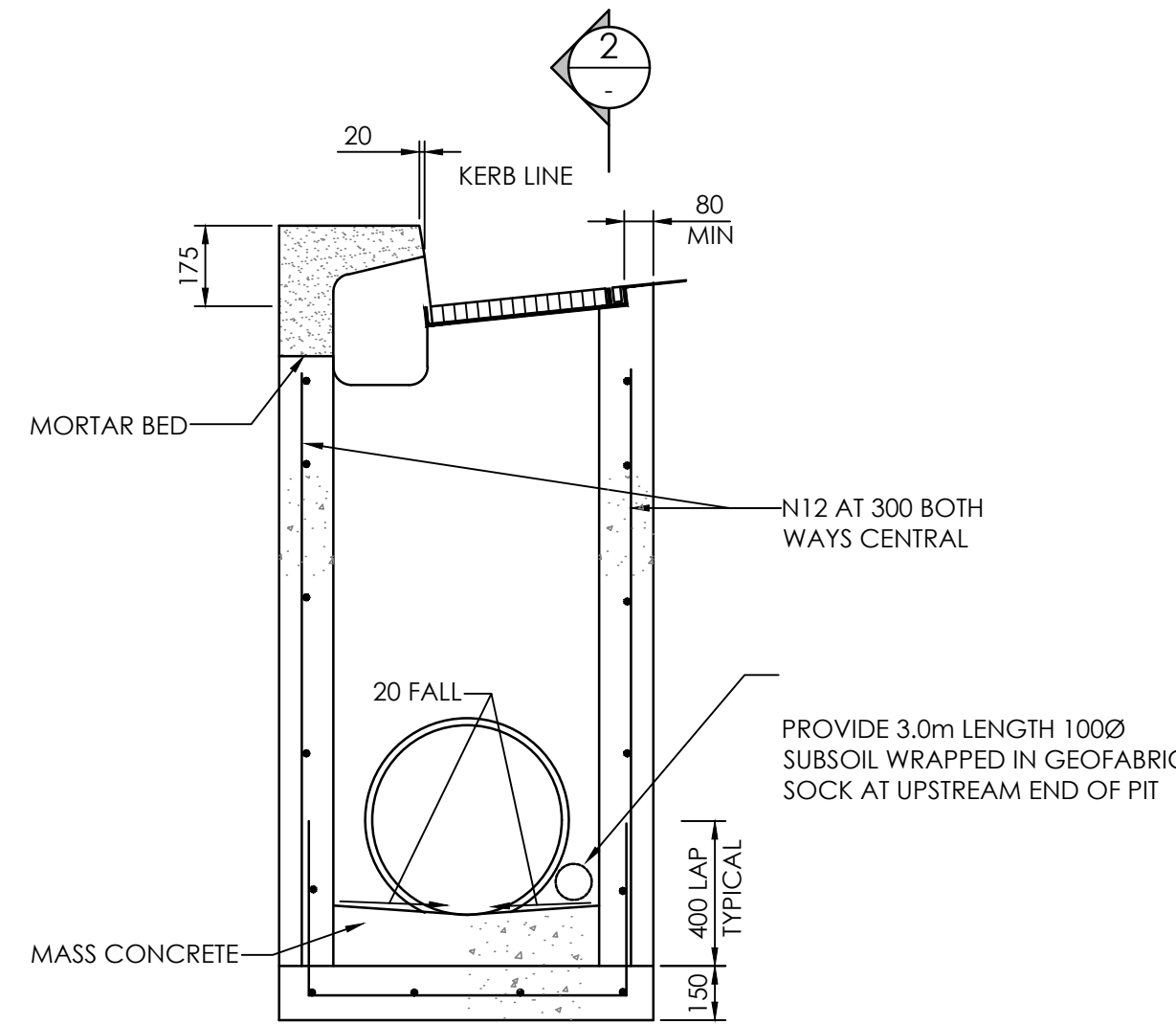
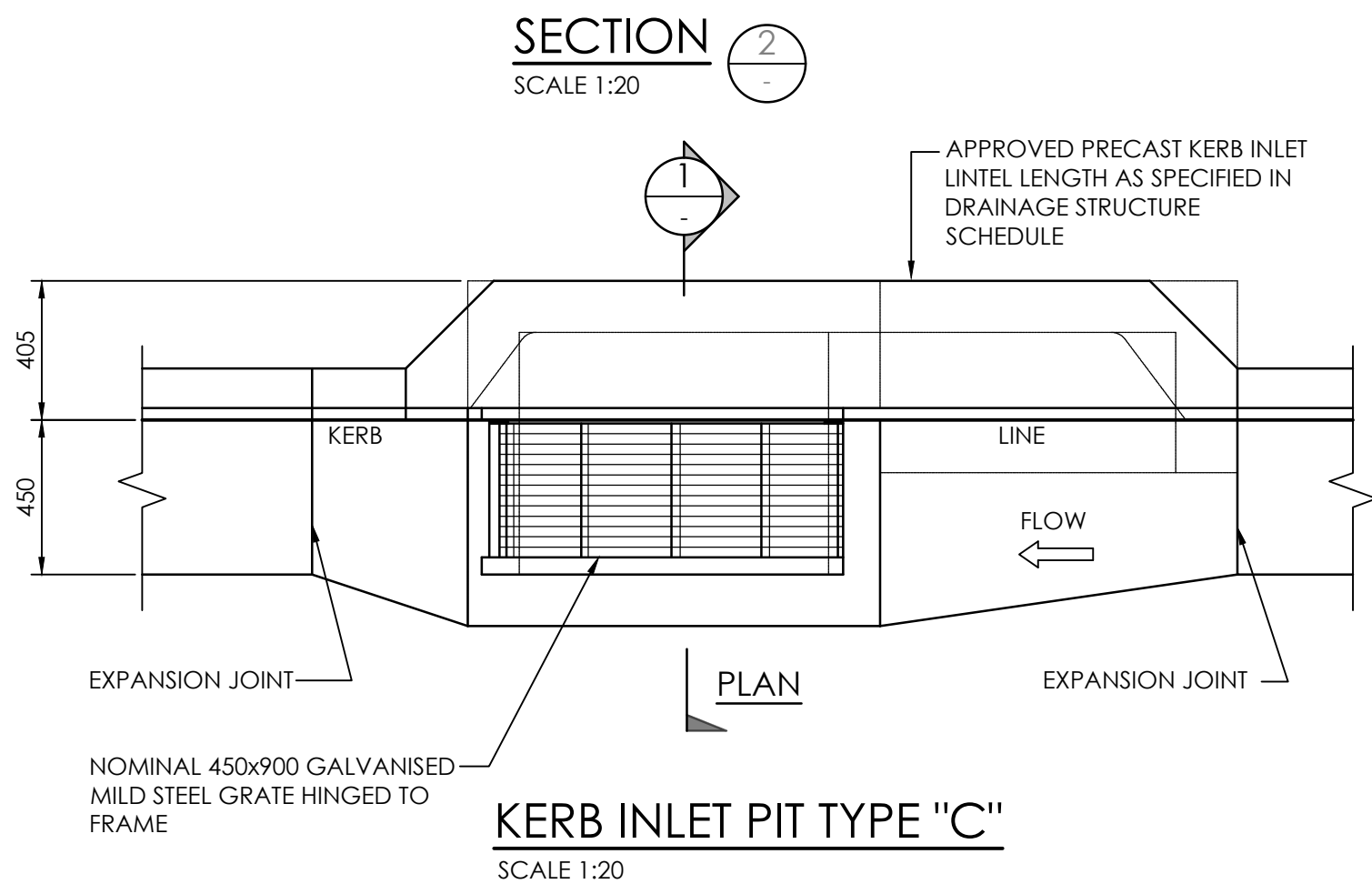
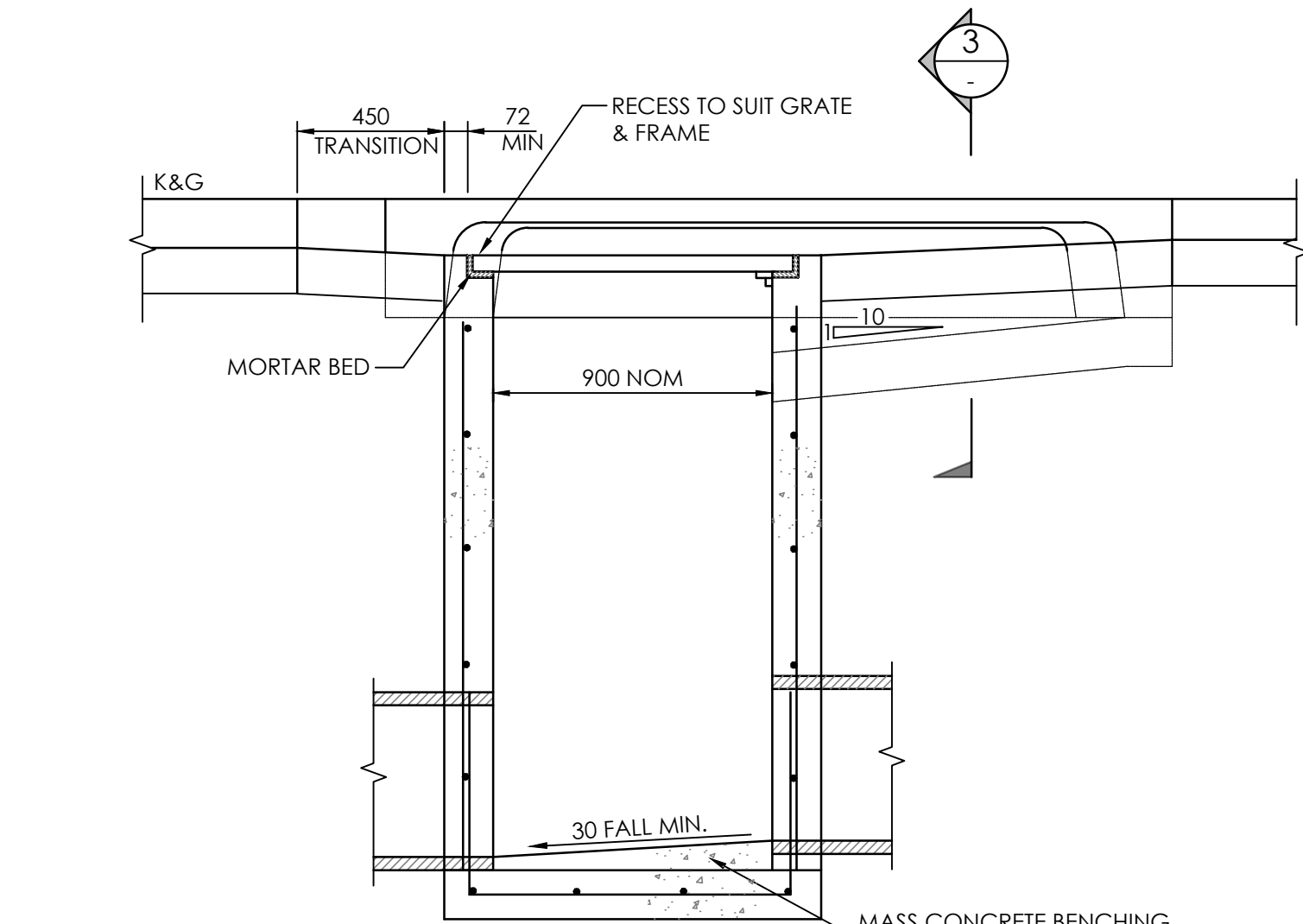
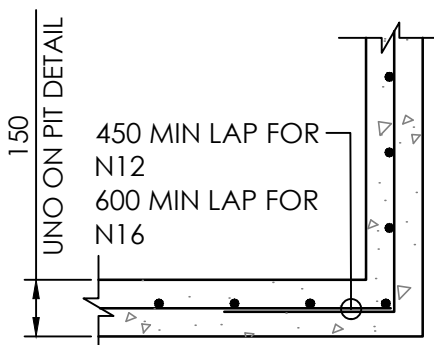


				CLIENT		ARCHITECT		CIVIL CONSULTANT		PROJECT		NORTH POINT		DRAWING TITLE	
				PATHWAYS		CHROFI		ENTEC		PATHWAYS RESIDENCES				CIVIL SERVICES	
				RESIDENCES		architecture		CONSULTANTS		50-88 PARRAWEE STREET				STORMWATER MANAGEMENT PLAN	
										CREMORNE				DRAWN	
										12.07.24		DATE		JL	
										and 59-67 GERARD STREET,		SCALE		JL	
										CREMORNE, N.S.W.		1:200		JL	
												A1		JL	
												QA CHECK		JL	
												NP		JL	
												DATE		JL	
												12.07.24		JL	
												PROJECT NO.		JL	
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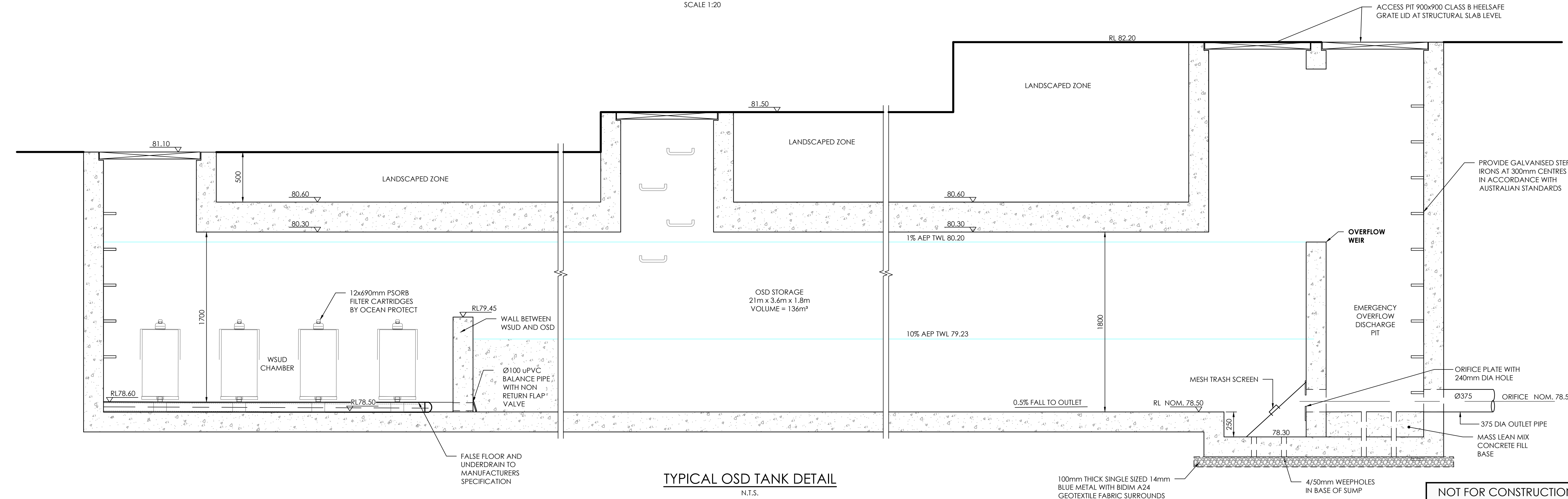
MINIMUM INTERNAL PIT DIMENSIONS		
"D"	"X"	"Y"
D ≤ 600	450	450*
D ≤ 900	600	600*
D ≤ 1200	600	900
D > 1200	900	900

NOTE
PITS DENOTED * SHALL BE USED ONLY WHERE SPECIFIED IN DRAINAGE SCHEDULE OR ON PLAN.



EARTH FOUNDATIONS TRENCH CONDITIONS
SCALE 1:20

DESIGN CRITERIA		
CATCHMENT AREA =	7355.3m ²	
PRE-DEVELOPMENT IMPERVIOUS AREA =	66%	
POST-DEVELOPMENT IMPERVIOUS AREA =	75%	
PRE-DEVELOPMENT FLOWS (L/s)		
1% AEP	442	
5% AEP	330	
10% AEP	278	
20% AEP	228	
POST-DEVELOPMENT FLOWS		
1% AEP	228	
5% AEP	183	
10% AEP	163	
20% AEP	141	
OSD STORAGE VOLUME =	136m ³	



ISSUE	AMENDMENT	DATE	DRAWN	APP
D	ISSUE FOR REVISED SSDA	08.08.24	JL	NP
C	ISSUE FOR REVISED SSDA	12.07.24	JL	NP
B	ISSUE FOR REVISED SSDA	14.06.24	JL	NP
A	ISSUE FOR SSDA	16.06.23	SM	NP

CLIENT

PATHWAYS
RESIDENCES

ARCHITECT

CHROFI **mop**
architecture

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CONSULTANTS

PROJECT

**PATHWAYS RESIDENCES
CREMORNE**
50-88 PARRAWEE STREET
and 59-67 GERARD STREET,
CREMORNE, N.S.W.

NORTH POINT

DRAWING TITLE

**CIVIL SERVICES
STORMWATER MANAGEMENT DETAILS**

DRAWN JL	DATE JUNE 24	SCALE NTS	AI	GA CHECK NP	DATE 12.07.24
DESIGNED NP	PROJECT NO. 220059	DRAWING NO. C06	ISSUE D		



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PATHWAYS

RESIDENCES

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NORTH POINT

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