Stormwater Management Plan Report

Residential Housing Development

38-42 Gerathy Street, Goulburn

Prepared for: Homes NSW

Issue no: C

Revision	Date	Purpose	Prepared By	Reviewed By
A	11/02/25	Issue for Draft Part 5 Submission	N.Pearce	
B	28/02/25	Issue for Part 5 Submission	N.Pearce	
C	17/03/25	Issue for Part 5 Submission	N.Pearce	

Table of Contents

1 Introduction

This Stormwater Management Plan (SWMP) report has been written to support the Part 5 submission for the residential housing development, which is located at 38-42 Gerathy Street, Goulburn

In the preparation of this report, the following reference information has been used:

- Architectural plans prepared by DEM Architects
- AS 3500.3 – Plumbing and Drainage – Stormwater Drainage
- Goulburn Mulwaree Development Control Plan 2009
  - Chapter 7 – Engineering Requirements
  - Design Specification
- Neutral or Beneficial Effect on Water Quality Assessment Guideline
- Water NSW Using MUSIC is Sydney Drinking Water Catchments

2 Site Description

The development is proposed to be located on 3 existing residential lots which are to be consolidated to allow for the construction of a new 2 storey residential buildings consisting of 14 units and an on-grade carpark.

The site area is approximately 1,981m2 and falls 1-2% from west to east towards the Gerathy Street road frontage.

The proposed carpark is located in the rear southwest corner of the site and is accessed via a new driveway from Gerathy Street

There is no existing Council in-ground stormwater drainage property frontage within Gerathy Street. The closest Council stormwater pit is located approximately 30m north of the site at the intersection of Gerathy Street and Meehan Street. The existing residential property roof downpipes seem to be directed inground and discharge to the kerb in Gerathy Street.

Existing site aerial (Mosaic)

3 Council Requirements

The proposed residential development is located in 38-42 Gerathy Street, Goulburn is to be designed in accordance with Goulburn Mulwaree Council's DCP and Civil Works Specification for on-site detention and water-sensitive design requirements.

The Council DCP states that OSD will be required for the site to limit site discharge so as not to adversely impact downstream drainage system or adjacent properties. As such, the post-development discharge from the site should not be greater than the pre-development discharge for all storm events up to the 1 in 100-year ARI storm event.

Site drainage system must be designed to the major/minor system. The pit and pipe drainage system is to be designed for the 1 in 5-year ARI storm event, with larger storm events up to the 1% AEP to be conveyed as overland flows.

Water Sensitive Urban Design (WSUD) principles are to be implemented in accordance with WaterNSW standards. Goulburn Council is within the NSW Drinking Water catchment area and as such the development must comply with the 'neutral or beneficial effect on water quality' in accordance with Water NSW Using MUSIC is Sydney Drinking Water Catchments guidelines.

4 Site Stormwater Layout

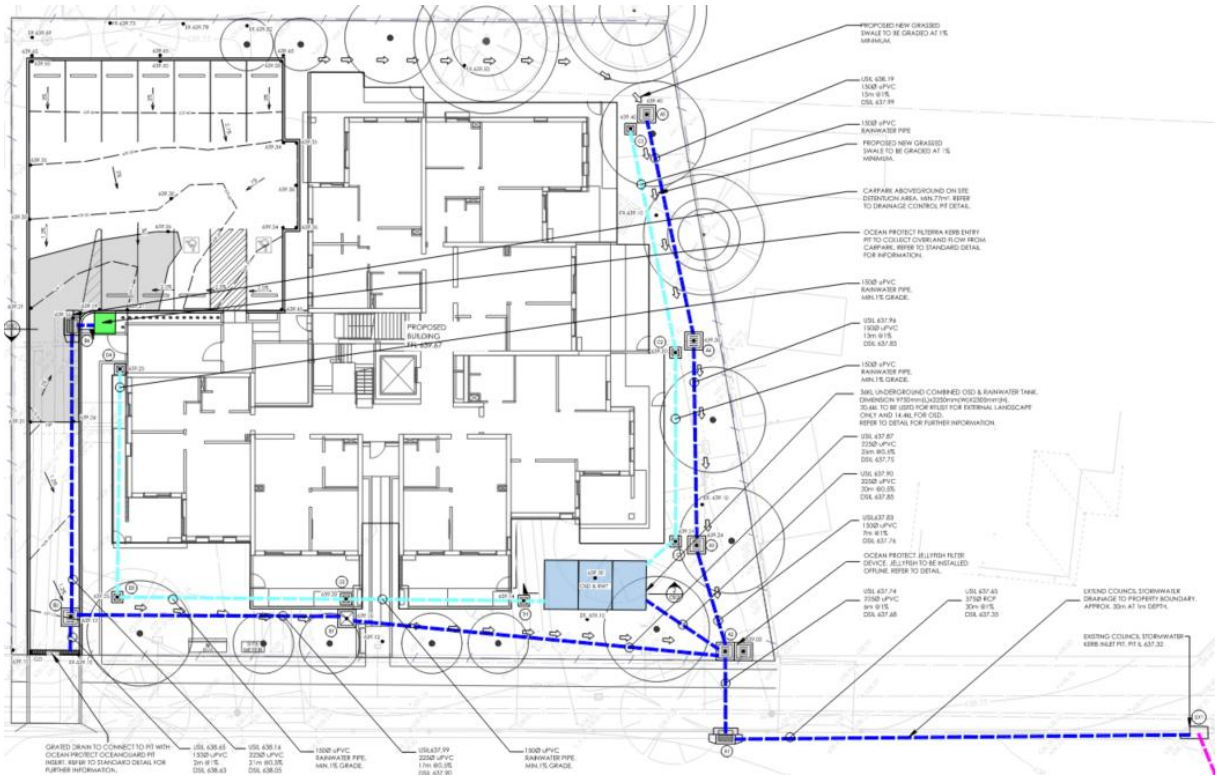
The proposed site generally falls at 1% towards Gerathy Street. The levels along Gerathy Street are flat and have a relatively consistent level of 369.10 along the frontage of the site. The finished floor level of the building is set at RL639.50 and is based on compliant pedestrian access from the Gerathy Street frontage. To achieve the required freeboard levels the carpark has been set at RL369.20 which means that existing conditions of connection to the kerb is not possible.

It is therefore proposed that a new inground Council stormwater drainage system will be extended approximately 30m from the intersection of Gerathy Street and Meehan Street to the northern site boundary.

A stormwater pit and pipe network will be installed to ensure that the development is adequately drained in accordance with Council requirements with overland flow paths provided directed to Gerathy Street for large storm flows.

Onsite detention is required for the site and it is proposed that this be in the form of a combined below ground rainwater retention and onsite detention tank.

Water Sensitive Urban Design (WSUD) measures have been implemented in the design. Stormwater litter baskets are proposed to be added to the grated pits and grated drain in the carpark and driveway to collect gross pollutants. A bio-retention tree pit is proposed in the carpark along with a tertiary propriety filter downstream prior to discharge to Council drainage in the form of a 'jellyfish' supplied by Ocean Protect. These systems act to remove both nitrogen and phosphorous from the stormwater in accordance with NorBE requirements. This is discussed further in the section 5 of this report.



Stormwater Management Plan – Refer to Appendix A

5 Stormwater Quality and MUSIC Modelling

A MUSIC model has been undertaken to represent the water quality measures required to meet the Council and Water NSW NorBE reduction targets. All node parameters have been obtained from the Water NSW Using MUSIC is Sydney Drinking Water Catchments guidelines as stated above and have been used as the basis for the design model.

The MUSIC model, shown below, has been provided as part of the Part 5 submission for Councils review.

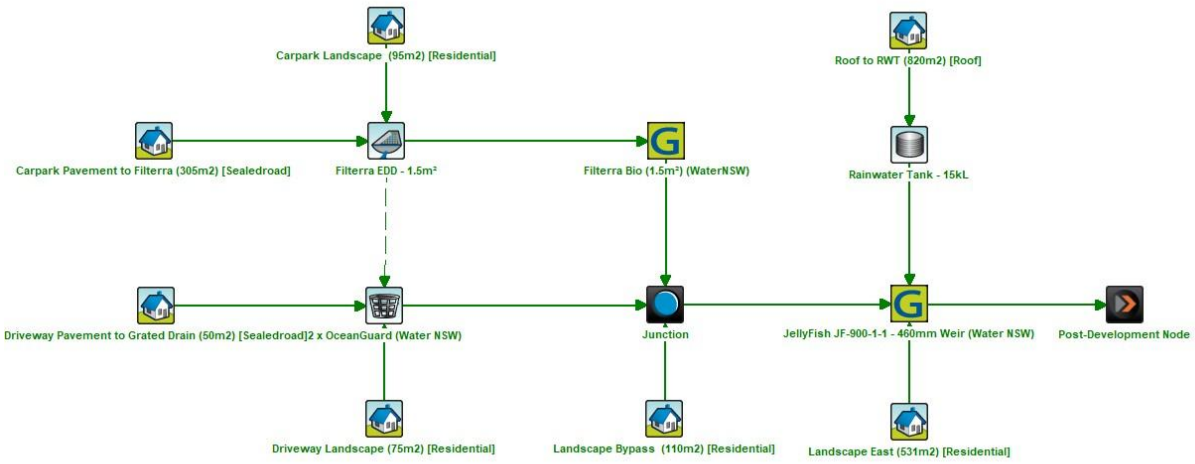
The proposed site has been split into catchments to reflect the different source pollutant source nodes for MUSIC modelling purposes. These are represented below with the impervious areas nominated for each catchment.

Site Catchment Plan

It is proposed to use a mixture of rainwater tanks and proprietary water treatment devices supplied by Ocean Protect to meet the NorBE requirements.

These are namely as below and as shown in the MUSIC model;

- 15kl rainwater tank to treat the roof area
  - Reuse is for irrigation purposes only
- Ocean Protect 'Filterra Tree Pit' located in the carpark to treat runoff from the surrounding area
- Ocean Protect 'Ocean Guard' pit inserts within the carpark and driveway to treat runoff
- Ocean Protect 'Jellyfish' tertiary filter to treat all flows prior to discharge to Council drainage



Site MUSIC Model

The results of the MUSIC model and the comparison to NORBE results are shown in the table below. Reduction targets are satisfied for all pollutants, including the 10% reduction from pre-development and as such are compliant with NORBE requirements. A copy of the MUSIC model has been provided as part of this submission.

	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	0.425	0.832	0.425	0.595	0	28.5
Total Suspended Solids (kg/yr)	54.3	110	54.3	13.5	0	87.7
Total Phosphorus (kg/yr)	0.111	0.239	0.111	0.0849	0	64.5
Total Nitrogen (kg/yr)	0.933	1.87	0.933	0.819	0	56.2
Gross Pollutants (kg/yr)	8.96	25.2	8.96	0.0691	0	99.7

SITE INPUTS			
PRE-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.425	0.425	0
TOTAL SUSPENDED SOLIDS (kg/yr)	54.3	54.9	0
TOTAL PHOSPHORUS (kg/yr)	0.111	0.111	0
TOTAL NITROGEN (kg/yr)	0.933	0.933	0
GROSS POLLUTANTS (kg/yr)	8.96	8.96	0
POST-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.832	0.595	28.5
TOTAL SUSPENDED SOLIDS (kg/yr)	110	13.5	87.7
TOTAL PHOSPHORUS (kg/yr)	0.239	0.0849	64.5
TOTAL NITROGEN (kg/yr)	1.87	0.819	56.2
GROSS POLLUTANTS (kg/yr)	25.2	0.0691	99.7

NORBE - RESIDUAL LOAD COMPARISON			
NORBE	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.425	0.595	-40.0%
TOTAL SUSPENDED SOLIDS (kg/yr)	54.3	13.5	75.1%
TOTAL PHOSPHORUS (kg/yr)	0.111	0.0849	23.5%
TOTAL NITROGEN (kg/yr)	0.933	0.819	12.2%
GROSS POLLUTANTS (kg/yr)	8.96	0.0691	99.2%

Site MUSIC Model Results

6 Onsite Detention

As per councils DCP, OSD system is required for the site to ensure that the post-development peak flows do not exceed pre-development flows.

The pre-development condition has a characteristic of 450m^2 (23%) impervious area and 1,531m^2 (71%) pervious area with total site area of 1,981m^2. Modelling has been completed in DRAINS and has calculated flows of 59L/s leaving the existing site for 1% AEP rainfall event.

The post-development condition has a characteristic of 1,300m^2 (70%) impervious area and 681m^2 (30%) pervious area. This results in total runoff from the site of 66l/s during the 1% which is an increase of just 7l/s. This increase in flow during the 1% AEP is relatively minor and is expected given the site area for the development is less than 2,000m^2 and that the rainfall intensity in Goulburn is low compared to other areas of Sydney.

PRE - DEVELOPMENT	FLOWS (L/s)
Q_5 = 20% AEP	28
Q_{10} = 10% AEP	36
Q_{20} = 5% AEP	43
Q_{100}= 1% AEP	59
POST - DEVELOPMENT	FLOWS (L/s)
Q_5 = 20% AEP	27
Q_{10} = 10% AEP	33
Q_{20} = 5% AEP	37
Q_{100}= 1% AEP	51

PRE - DEVELOPMENT AREA (m^2)

TOTAL SITE AREA = 1981
IMPERVIOUS AREA = 450 (23%)
PERVIOUS AREA = 1531 (77%)

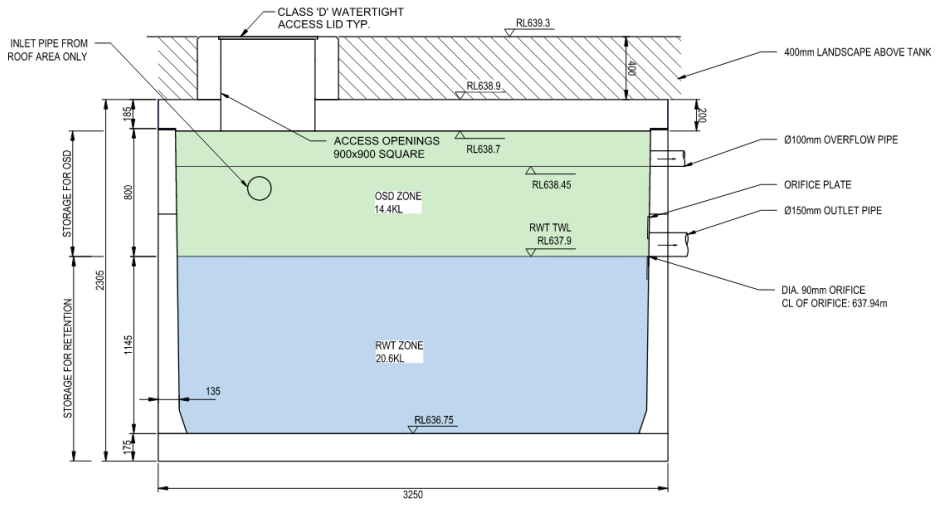
POST - DEVELOPMENT AREA (m^2)

TOTAL SITE AREA = 1981
IMPERVIOUS AREA = 1300 (65%)
PERVIOUS AREA = 681 (35%)

OSD has been implemented on the site to reduce the post-development flows back to the pre-development in accordance with the Council DCP.

The OSD volume required is 14kL and is proposed to be combined with the inground 15kl rainwater tank with a total volume.

The depth of the OSD is restricted to 800mm due to the invert level of the Council stormwater connection. It is therefore proposed that a 35kL concrete tank be provided with the top 800mm being utilised for OSD and the remaining depth of the tank be used for rainwater reuse, refer to the detail below.

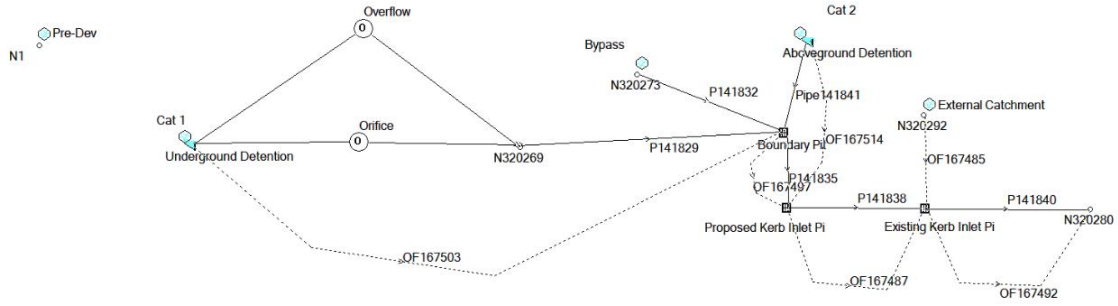


UNDERGROUND COMBINED TANK DETAIL 2
1:20

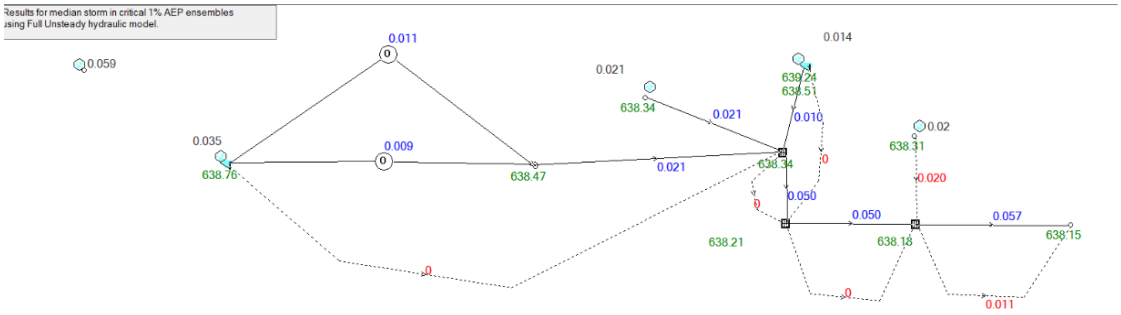
The combined reuse and OSD increases the depth of the tank which allows for easy and safe access for ongoing maintenance. Roof water only is therefore directed to the tank to ensure that the water is the required quality for reuse for irrigation.

Above-ground OSD is also provided in the carpark to restrict flows from the increased impervious areas. A discharge control pit with an orifice plate is located in the carpark to restrict the large storm events.

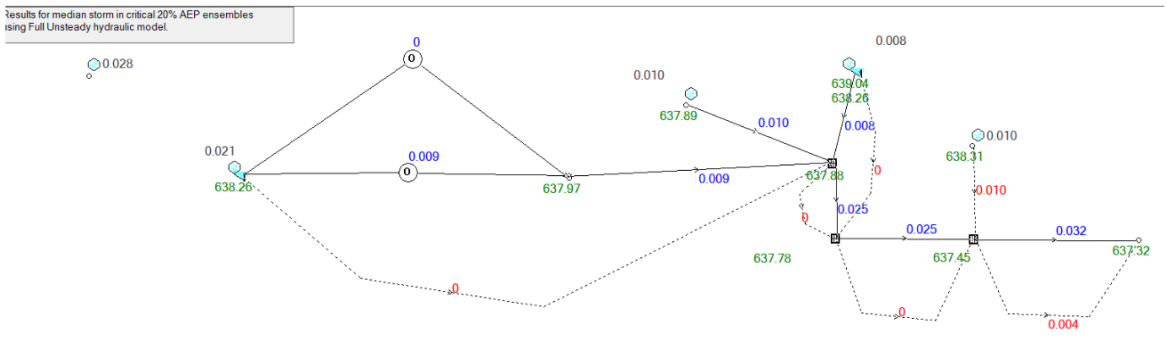
A DRAINs model has been setup to reflect a rainwater tank with a low-level orifice of 90mm diameter and a 100mm high-level overflow pipe. The above ground storage in the carpark has been design to restrict flows during the larger storm events using a 70mm orifice.



DRAINS MODEL



DRAINS MODEL FOR 1% AEP



DRAINS MODEL FOR 20% AEP

Appendix A – Stormwater Management Plans

MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET, GOULBURN NSW 2540
CIVIL SERVICES

SITEWORKS NOTES

1. ORIGIN OF LEVELS :- AUSTRALIAN HEIGHT DATUM (A.H.D.)
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 ABUT 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 ABELFLEX 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. 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.

EXISTING SERVICES AND FEATURES

1. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION, REMOVAL AND DISPOSAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY WORKS WITHIN THE CONTRACT AREA, AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT.
2. THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
3. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN WRITTEN APPROVAL OF HIS PROGRAMME FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
4. EXISTING BUILDINGS, EXTERNAL STRUCTURES, AND TREES SHOWN ON THESE DRAWINGS ARE FEATURES EXISTING PRIOR TO ANY DEMOLITION WORKS.
5. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
6. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL. CONTRACTOR TO GAIN APPROVAL OF SUPERINTENDENT FOR TIME OF INTERRUPTION.

GENERAL NOTES

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED.
2. ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION
3. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
4. ALL DIMENSIONS ON DETAILS ARE IN MILLIMETRES UNLESS STATED OTHERWISE. ALL PLANS AND LEVELS ARE EXPRESSED IN METRES.
5. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURAL STABILITY OF THE WORKS AND ENSURE NO PARTS BE OVER STRESSED UNDER CONSTRUCTION ACTIVITIES.
6. WORKMANSHIP AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE RELEVANT CURRENT AUSTRALIAN STANDARDS INCLUDING ALL AMENDMENTS, AND THE LOCAL STATUTORY AUTHORITIES, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
7. THE APPROVAL OF A SUBSTITUTION SHALL BE SOUGHT FROM THE ENGINEER BUT IS NOT AN AUTHORISATION FOR A VARIATION. ANY VARIATIONS INVOLVED MUST BE TAKEN UP WITH THE ARCHITECT OR PROJECT MANAGER BEFORE THE WORK COMMENCES.
8. ANY DISCREPANCIES OR OMISSIONS SHALL BE REFERRED TO THE ENGINEER FOR A DECISION BEFORE PROCEEDING WITH THE WORK.
9. THE BUILDER SHALL GIVE 48 HOURS NOTICE FOR ALL ENGINEERING INSPECTIONS.
10. BUILDING FROM THESE DRAWINGS IS NOT TO COMMENCE UNTIL APPROVED BY THE LOCAL AUTHORITIES
11. THE WORD 'ENGINEER' USED IN THESE NOTES REFER TO AN EMPLOYEE OR NOMINATED REPRESENTATIVE OF **ENTEC CONSULTANTS PTY.LTD.**

STORMWATER NOTES

1. ALL 300 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 IN ACCORDANCE WITH AS/NZS 3500.3-2018 TABLE 6.3.4. (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 SUPERINTENDENT.
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 TYPE HS1, IN ACCORDANCE WITH CURRENT RELEVANT AUSTRALIAN STANDARDS.
10. WHERE uPVC STORMWATER LINES PASS UNDER FLOOR SLABS, SEWER GRADE RUBBER RING JOINTS ARE TO BE USED.
11. 100 DIA SLOTTED uPVC SUBSOIL DRAINAGE LINES SHALL BE INSTALLED BEHIND ALL RETAINING WALLS, KERBS AND WITHIN PLANTERS.
12. WHERE SUBSOIL DRAINAGE LINES PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS UNSLOTTED UPVC SEWER GRADE PIPE SHALL BE USED.
13. PROVIDE 3.0M LENGTH OF 100 DIA. SUBSOIL DRAINAGE PIPE WRAPPED IN FABRIC SOCK, AT UPSTREAM END OF EACH PIT.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

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 SITE SUPERINTENDENT WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THIS SPECIFICATION.

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.

CONSTRUCTION SEQUENCE

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.

EROSION CONTROL

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.

FENCING

E7. 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.

OTHER MATTERS

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 SITE SUPERINTENDENT.

SITE INSPECTION & MAINTENANCE

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.

LOCALITY PLAN

CIVIL LEGEND

- 1% — FALL ARROW
- • 639.23 — PROPOSED SURFACE LEVEL
- • EX 56.20 — EXISTING SURFACE LEVEL
- A5 EX1 — STORMWATER DRAINAGE STRUCTURE WITH NUMBER (REFER TO PLANS AND STORMWATER DRAINAGE STRUCTURES SCHEDULE)
- GD — PROPOSED GRATED DRAIN
- STORMWATER DRAINAGE LINE WITH:
  - USIL 10.00 ..... INVERT LEVEL UPSTREAM
  - Ø150 uPVC ..... PIPE SIZE AND MATERIAL CLASS
  - 10m @ 1% ..... PIPE LENGTH AND GRADE
  - DSIL 9.90 ..... INVERT LEVEL DOWNSTREAM
- EXISTING STORMWATER DRAINAGE LINE
- HIGH POINT
- RAINWATER DRAINAGE LINE

DRAWING LIST

DWG No.	DESCRIPTION	REVISION
C100	COVER SHEET, LEGENDS AND NOTES	C
C101	EXISTING SERVICES PLAN	C
C200	SEDIMENT AND EROSION CONTROL PLAN	C
C201	SEDIMENT AND EROSION CONTROL DETAILS	C
C300	CIVIL WORKS PLAN	C
C400	STORMWATER MANAGEMENT PLAN	C
C500	DETAILS - SHEET 1	C
C501	DETAILS - SHEET 2	C
C502	ONSITE DETENTION ANALYSIS	C
C503	MUSIC MODEL RESULTS	C
C600	CATCHMENT PLAN	C
C700	CUT & FILL PLAN	C
C800	PAVEMENT PLAN	C
C900	PUBLIC DOMAIN PLAN	C

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	17.01.25	YS	NP
A	ISSUE FOR REVIEW	07.01.25	YS	NP

CLIENT: NSW GOVERNMENT / Homes NSW

ARCHITECT: dem

CIVIL CONSULTANT: ENTEC CONSULTANTS

PROJECT: MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: COVER SHEET, LEGENDS AND NOTES

DRAWN	DATE	SCALE AT	QA CHECK	DATE
YS	DEC 24	N/A		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C100	C

LEGEND

- WATER LINE
- ELECTRICAL LINE
- GAS LINE
- COMMUNICATION LINE
- SEWER LINE
- STORMWATER LINE

EXISTING AUTHORITY SEWER TO BE RETAINED.

EXISTING TELSTRA PIT TO BE PROTECTED AND RETAINED.

EXISTING SERVICES AT PROPOSED DRIVEWAY AND CROSSING TO BE PROTECTED TO CONFIRM DEPTH.

EXISTING GAS SUPPLY TO BE MADE REDUNDANT (TYPICAL).

EXISTING JEMENA LOW PRESSURE GAS MAIN.

EXISTING AUTHORITY WATERMAIN TO BE RETAINED.

EXISTING ESSENTIAL ENERGY OVERHEAD ELECTRICAL AND POLE TO BE RETAINED.

EXISTING COUNCIL STORMWATER PIT

GERATHY STREET

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	07.01.25	YS	NP

CLIENT: NSW GOVERNMENT, Homes NSW

ARCHITECT: dem

CIVIL CONSULTANT: ENTEC CONSULTANTS

PROJECT: MULTI-DWELLING DEVELOPMENT

38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: EXISTING SERVICES PLAN

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	1:100		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C101	C

LEGEND

- SEDIMENT FENCE
- GEOTEXTILE INLET FILTER
- STABILISED SITE ACCESS
- 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.

ISSUE	AMENDMENT	DATE	DRAWN	APP
D	ISSUE FOR PART 5 SUBMISSION	17.03.25	YS	NP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT, Homes NSW

ARCHITECT: dem

CIVIL CONSULTANT: ENTEC CONSULTANTS

PROJECT: MULTI-DWELLING DEVELOPMENT

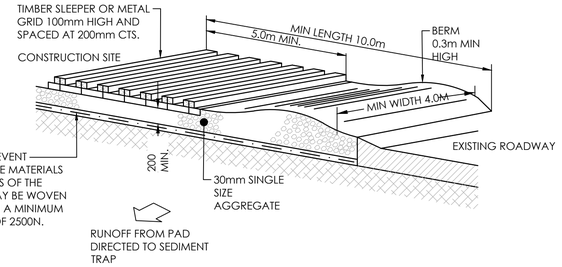
38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: SEDIMENT AND EROSION CONTROL PLAN

DRAWN	DATE	SCALE	A1	QA CHECK	DATE
YS	DEC 24	1:100			
DESIGNED	PROJECT NO.			DRAWING NO.	ISSUE
NP	240208			C200	D

NOTE
ENSURE THAT ALL UTILITY ASSETS ARE MAINTAINED AND PROTECTED AT ALL TIMES IN THE VICINITY OF THE TEMPORARY CONSTRUCTION EXIT



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 30mm SINGLE SIZE AGGREGATE.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP WHERE THE SEDIMENT IS COLLECTED AND REMOVED.

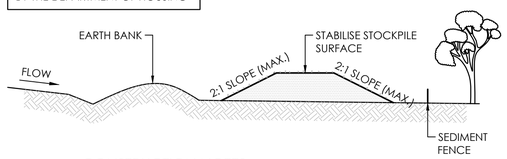
MAINTENANCE NOTES

THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH PREVENTS TRACKING OR FLOWING OF SEDIMENT OFF THE CONSTRUCTION SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED OFF THE CONSTRUCTION SITE MUST BE REMOVED IMMEDIATELY.

TEMPORARY STABILISED CONSTRUCTION EXIT

N.T.S.

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

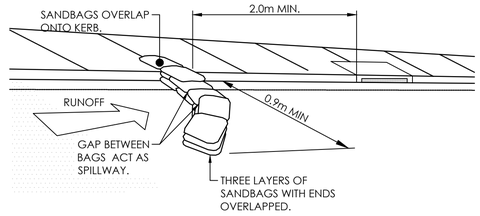


CONSTRUCTION NOTES

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.

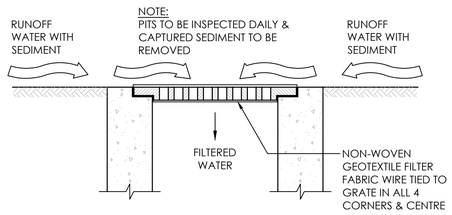
STOCKPILES

N.T.S.



SANDBAG KERB INLET SEDIMENT TRAP

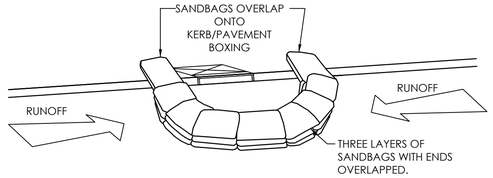
N.T.S.



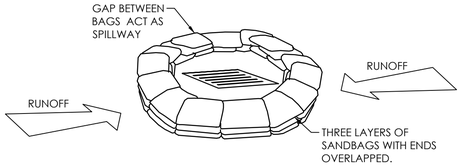
INLET TRAP

N.T.S.

NOTE
TO BE USED IN PAVED AREAS WHERE TRAFFIC ACCESS IS REQUIRED



SANDBAG SEDIMENT TRAP - AT KERB SAG PIT

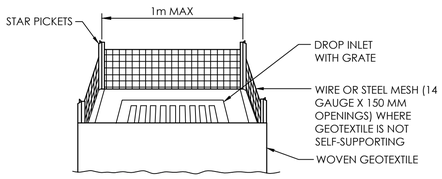


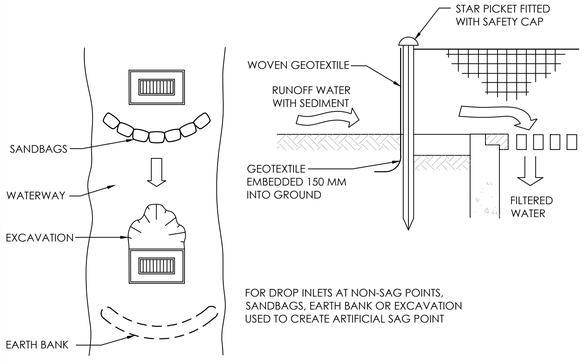
SANDBAG SEDIMENT TRAP - AT OTHER THAN KERB SAG PIT

SANDBAG SEDIMENT TRAP DETAILS

NTS

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





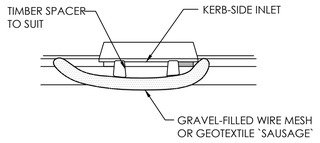
FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION USED TO CREATE ARTIFICIAL SAG POINT

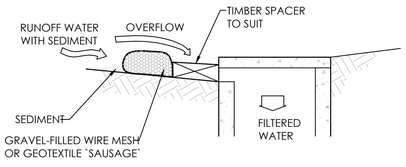
CONSTRUCTION NOTES:

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.



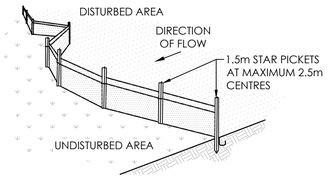


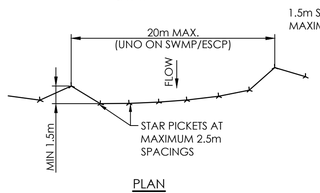
NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES:

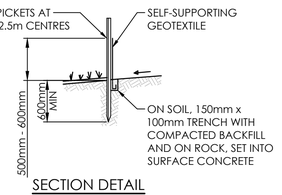
1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT.
2. FILL THE SLEEVE WITH 25MM TO 50MM GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150MM HIGH X 400MM WIDE.
4. PLACE THE FILTER AT THE OPENING OF THE KERB INLET LEAVING A 100MM GAP AT THE TOP TO ACT AS 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





PLAN



SECTION DETAIL

CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND, 2.5 METRES APART (MAX). ENSURE STAR PICKETS ARE FITTED WITH SAFETY CAPS.
3. DIG A 150mm 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 150mm OVERLAP.

SEDIMENT CONTROL FENCE

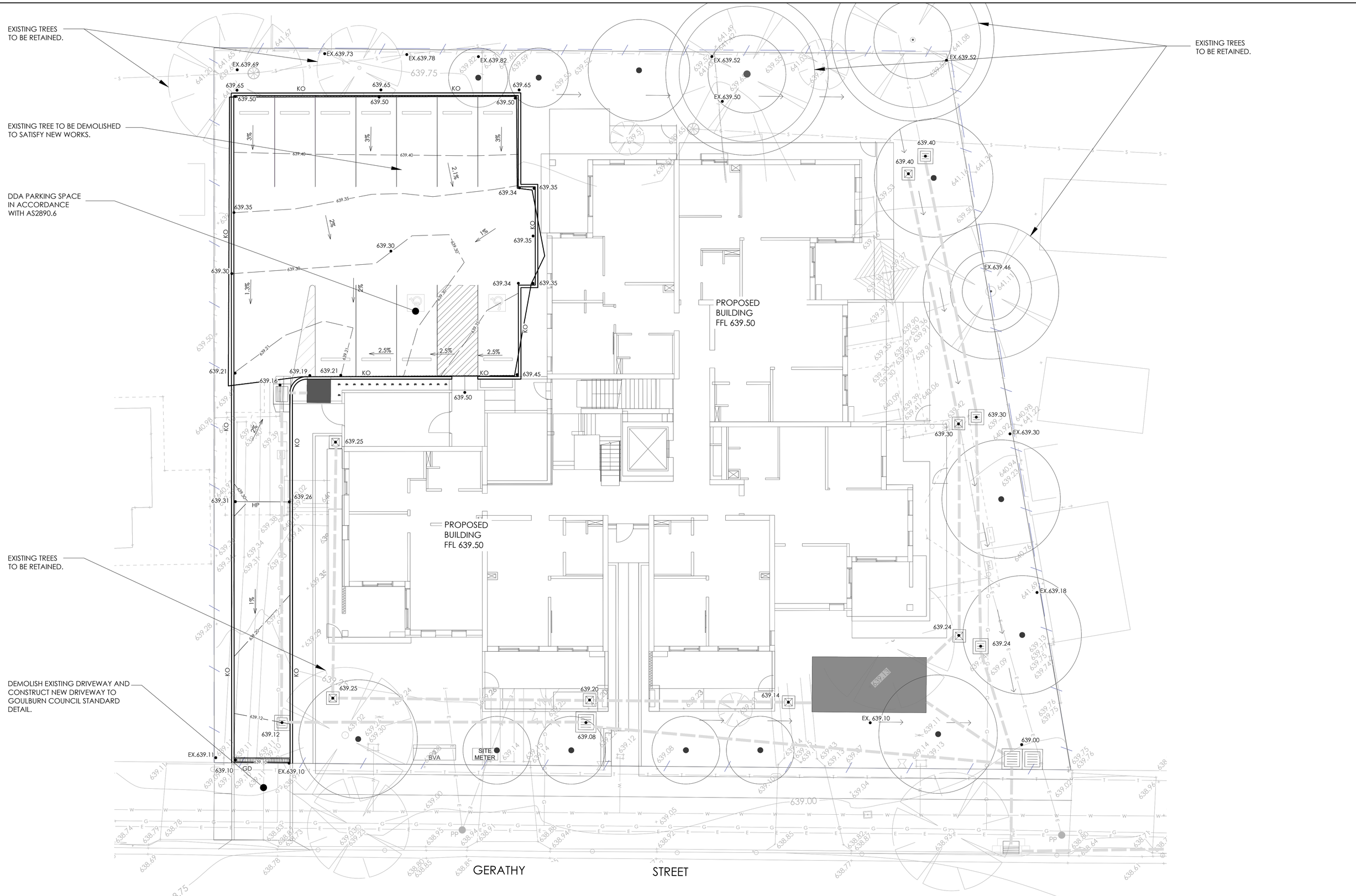
N.T.S.

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT Homes NSW
ARCHITECT: dem
CIVIL CONSULTANT: ENTEC CONSULTANTS
PROJECT: MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580
NORTH POINT

DRAWING TITLE: SEDIMENT AND EROSION CONTROL DETAILS

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	N.T.S		
DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE
---	---	---	---
NP	240208	C201	C



ISSUE	AMENDMENT	DATE	DRAWN	APP
D	ISSUE FOR PART 5 SUBMISSION	17.03.25	YS	NP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT
NSW GOVERNMENT
Homes NSW

ARCHITECT
dem

CIVIL CONSULTANT
ENTEC CONSULTANTS

PROJECT
MULTI-DWELLING DEVELOPMENT

38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE
CIVIL WORKS PLAN

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	1:100		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C300	D

PROPOSED NEW GRASSED SWALE TO BE GRADED AT 1% MINIMUM.

USIL 638.19
150Ø uPVC
15m @1%
DSIL 637.99

150Ø uPVC
RAINWATER PIPE

PROPOSED NEW GRASSED SWALE TO BE GRADED AT 1% MINIMUM.

CARPARK ABOVEGROUND ON SITE DETENTUON AREA. MIN.77m³. REFER TO DRAINAGE CONTROL PIT DETAIL.

OCEAN PROTECT FILTERRA KERB ENTRY PIT TO COLLECT OVERLAND FLOW FROM CARPARK. REFER TO STANDARD DETAIL FOR INFORMATION.

150Ø uPVC
RAINWATER PIPE.
MIN.1% GRADE.

USIL 637.96
150Ø uPVC
13m @1%
DSIL 637.83

150Ø uPVC
RAINWATER PIPE.
MIN.1% GRADE.

36KL UNDERGROUND COMBINED OSD & RAINWATER TANK.
DIMENSION 9750mm(L)x2250mm(W)X2305mm(H).
20.6kL TO BE USED FOR REUSE FOR EXTERNAL LANDSCAPE ONLY AND 14.4kL FOR OSD.
REFER TO DETAIL FOR FURTHER INFORMATION.

USIL 637.87
225Ø uPVC
25m @0.5%
DSIL 637.75

USIL 637.90
225Ø uPVC
20m @0.5%
DSIL 637.85

USIL637.83
150Ø uPVC
7m @1%
DSIL 637.76

OCEAN PROTECT JELLYFISH FILTER DEVICE. JELLYFISH TO BE INSTALLED OFFLINE. REFER TO DETAIL.

USIL 637.74
225Ø uPVC
6m @1%
DSIL 637.68

USIL 637.65
375Ø RCP
30m @1%
DSIL 637.35

EXTEND COUNCIL STORMWATER DRAINAGE TO PROPERTY BOUNDARY. APPROX. 30m AT 1m DEPTH.

EXISTING COUNCIL STORMWATER KERB INLET PIT. PIT IL 637.32

GRATED DRAIN TO CONNECT TO PIT WITH OCEAN PROTECT OCEANGUARD PIT INSERT. REFER TO STANDARD DETAIL FOR FURTHER INFORMATION.

USIL 638.65
150Ø uPVC
2m @1%
DSIL 638.63

USIL 638.16
225Ø uPVC
21m @0.5%
DSIL 638.05

150Ø uPVC
RAINWATER PIPE.
MIN.1% GRADE.

USIL637.99
225Ø uPVC
17m @0.5%
DSIL 637.90

150Ø uPVC
RAINWATER PIPE.
MIN.1% GRADE.

PROPOSED BUILDING FFL 639.67

OSD & RWT

SITE METER

BVA

GD

HP

GERATHY STREET

ISSUE	AMENDMENT	DATE	DRAWN	APP
D	ISSUE FOR PART 5 SUBMISSION	17.03.25	YS	NP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT
NSW GOVERNMENT
Homes NSW

ARCHITECT
dem

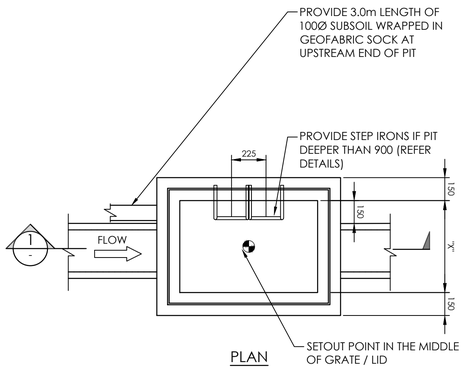
CIVIL CONSULTANT
ENTEC CONSULTANTS

PROJECT
MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580

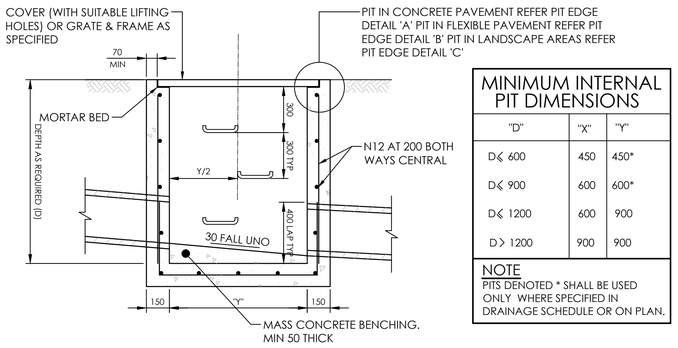
NORTH POINT

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	1:100		
DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE
NP	240208	C400	D



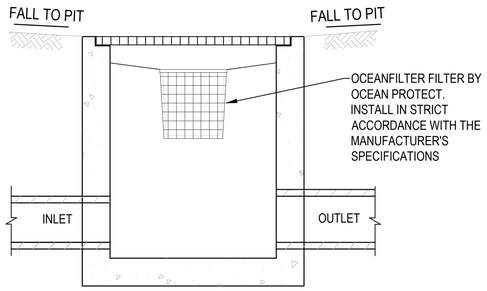
SURFACE INLET/JUNCTION PIT
SCALE 1:20



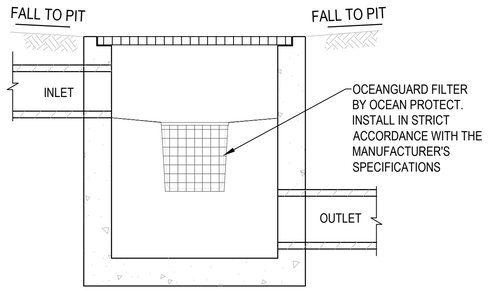
SECTION 1
SCALE 1:20

MINIMUM INTERNAL PIT DIMENSIONS		
"D"	"X"	"Y"
D⩽ 600	450	450*
D⩽ 900	600	600*
D⩽ 1200	600	900
D⩾ 1200	900	900

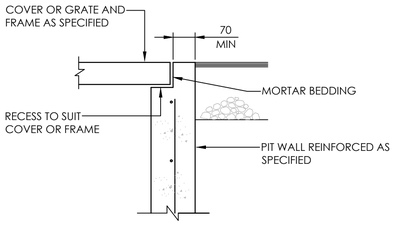
NOTE
PITS DENOTED * SHALL BE USED ONLY WHERE SPECIFIED IN DRAINAGE SCHEDULE OR ON PLAN.



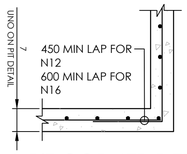
TYPICAL OCEANGUARD ARRANGEMENT DETAIL - SURFACE INLET TREATMENT
NOT TO SCALE
NOTE:
REFER TO MANUFACTURER'S DRAWINGS FOR OCEANGUARD FILTER ARRANGEMENT AND COMPONENTS DETAILS



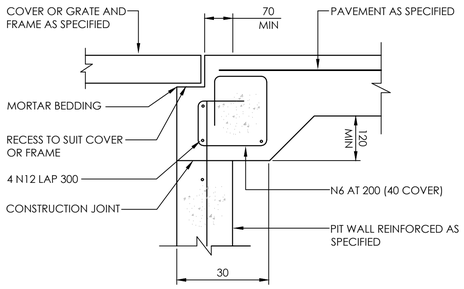
TYPICAL OCEANGUARD ARRANGEMENT DETAIL - DOWNPIPE CONNECTION / DROP PIT
NOT TO SCALE
NOTE:
REFER TO MANUFACTURER'S DRAWINGS FOR OCEANGUARD FILTER ARRANGEMENT AND COMPONENTS DETAILS



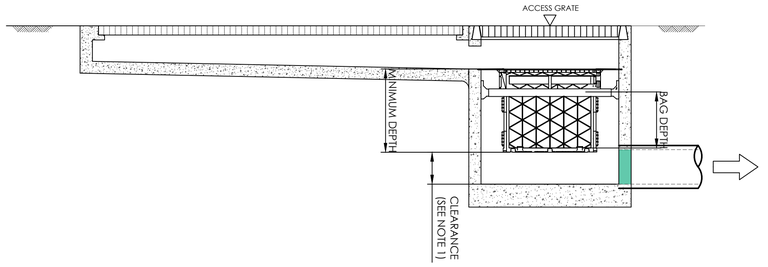
PIT EDGE DETAIL "B"
SCALE 1:10



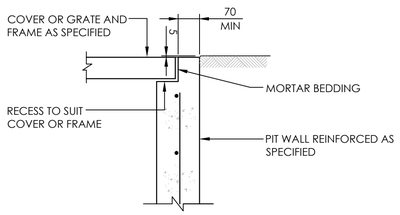
TYPICAL PIT CORNER DETAIL
SCALE 1:20



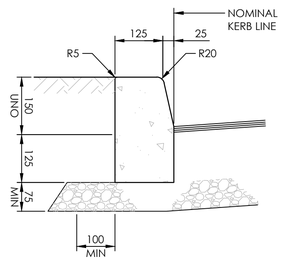
PIT EDGE DETAIL "A"
SCALE 1:10



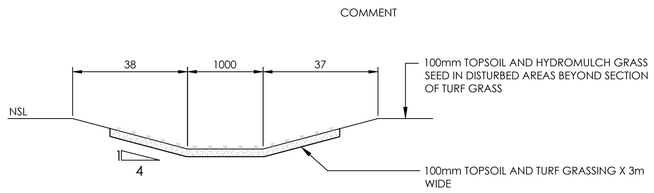
OCEANGUARD GRATED STRIP DRAIN CONFIGURATION



PIT EDGE DETAIL "C"
SCALE 1:10



KERB ONLY
SCALE 1:10
SHOWN AS "KO"



TYPICAL STORMWATER DRAINAGE SWALE
NTS

PIT SCHEDULE				
SIZE	PIT AND LID TYPE	CLASS	PIT NUMBER	COMMENT
450 x450	JUNCTION PIT WITH CONCRETE INFILL LID	B	C1,C2,C3,D1,D2,D3,D4	
900 x 900	JUNCTION PIT WITH CONCRETE INFILL LID	B	B1	
900 x 900	SURFACE INLET PIT	D	B3	GRATED STRIP DRAIN WITH OCEAN GUARD PIT BASKET. REFER TO DETAIL.
900 x 900	SURFACE INLET PIT WITH HEELSAFE GRATE	B	A2,A3,A4,A5	**A2** - JELLYFISH FILTER PIT BY OCEAN PROTECT. REFER TO DETAIL.
	KERB INLET PIT TO COUNCIL STANDARD DRAWING SD-D-02	D	EX1, A1, B4	**EX1** - MAKE NEW CONNECTION TO EXISTING STORMWATER PIT. EXISTING ASSUMED DOWNSTREAM INVERT LEVEL 21.15.

PIT SCHEDULE

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

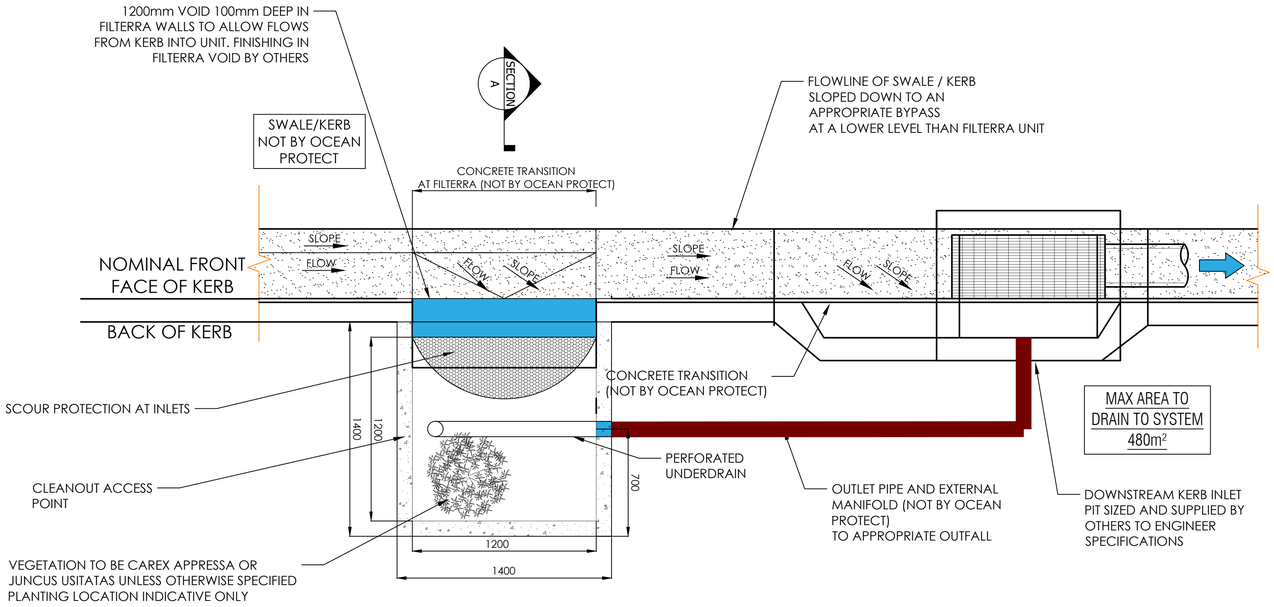
ISSUE	AMENDMENT	DATE	DRAWN	APP
D	ISSUE FOR PART 5 SUBMISSION	17.03.25	YS	NP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT Homes NSW
ARCHITECT: dem
CIVIL CONSULTANT: ENTEC CONSULTANTS
PROJECT: MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580
NORTH POINT

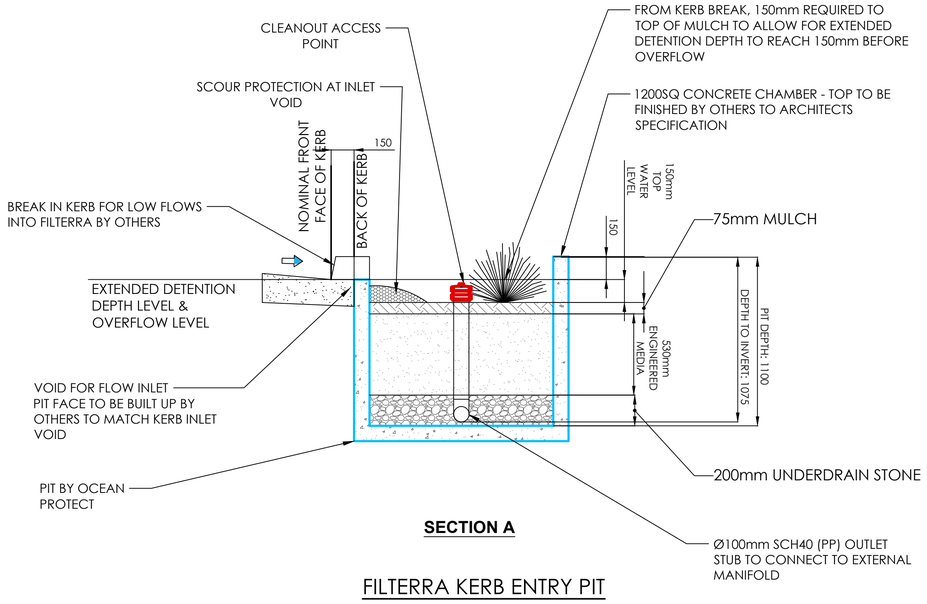
DRAWING TITLE: DETAILS SHEET 1

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 2024	NTS		

DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE
NP	240208	C500	D

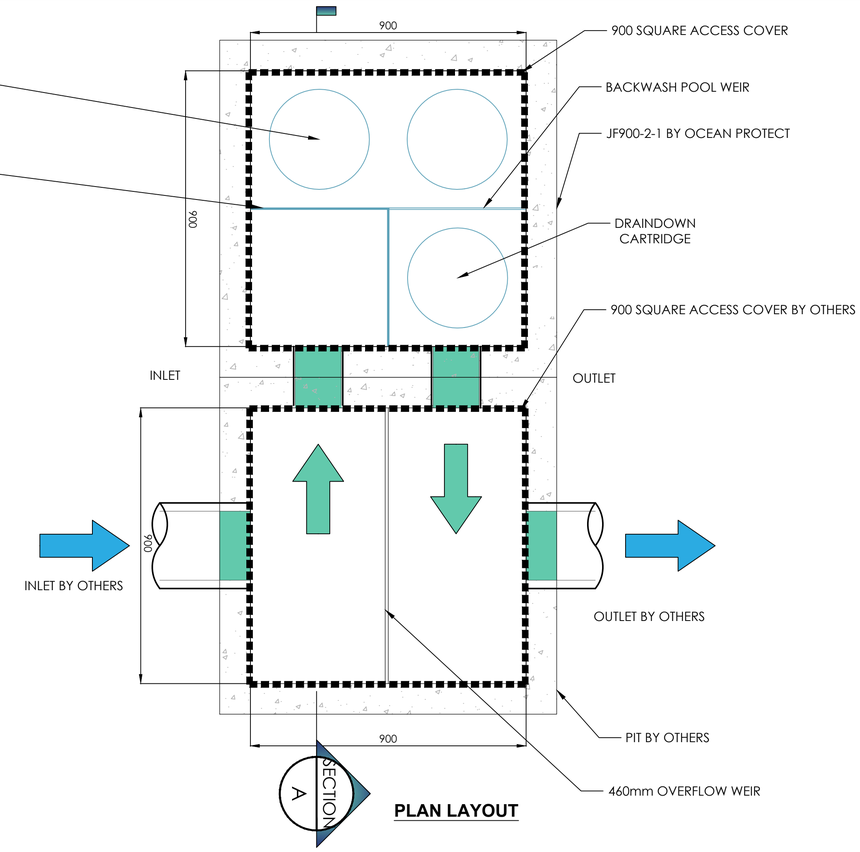


PLAN VIEW

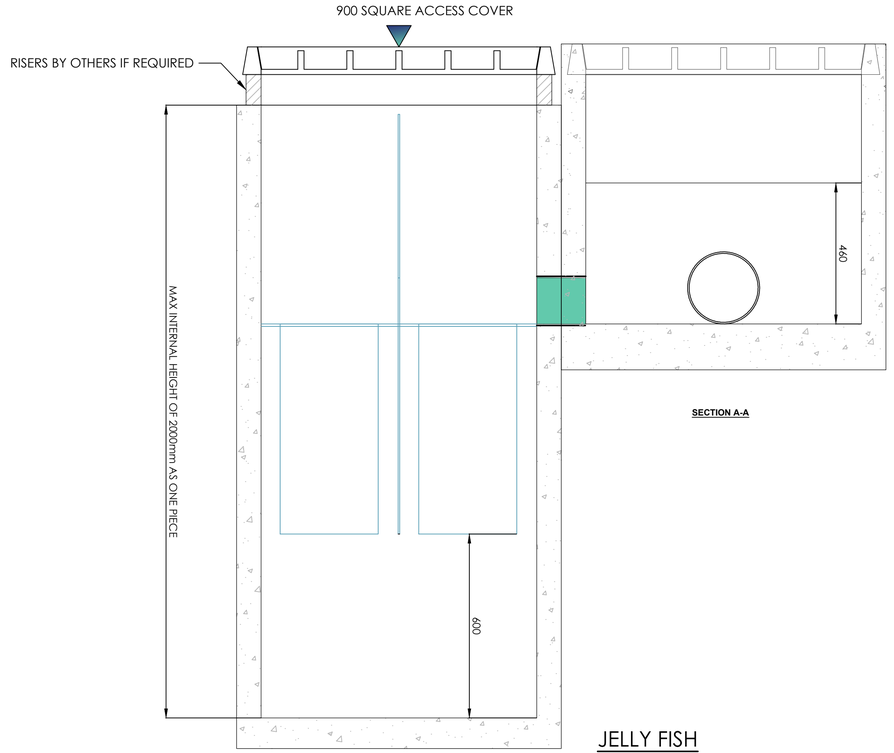


SECTION A

FILTERRA KERB ENTRY PIT



PLAN LAYOUT



SECTION A-A

JELLY FISH

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR DA	27.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT, Homes NSW

ARCHITECT: dem

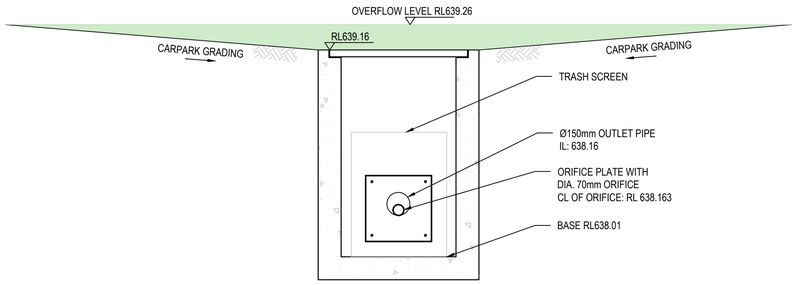
CIVIL CONSULTANT: ENTEC CONSULTANTS

PROJECT: MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: DETAILS SHEET 2

DRAWN	DATE	SCALE	QA CHECK	DATE
YS	DEC 2024	NTS A1		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C501	C

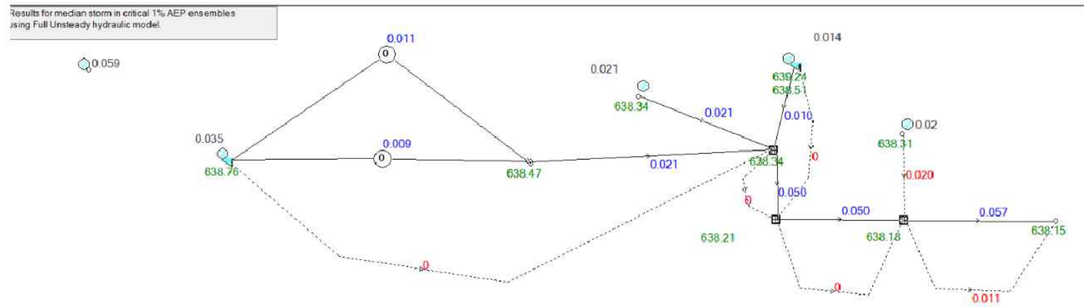


DRAINAGE CONTROL PIT

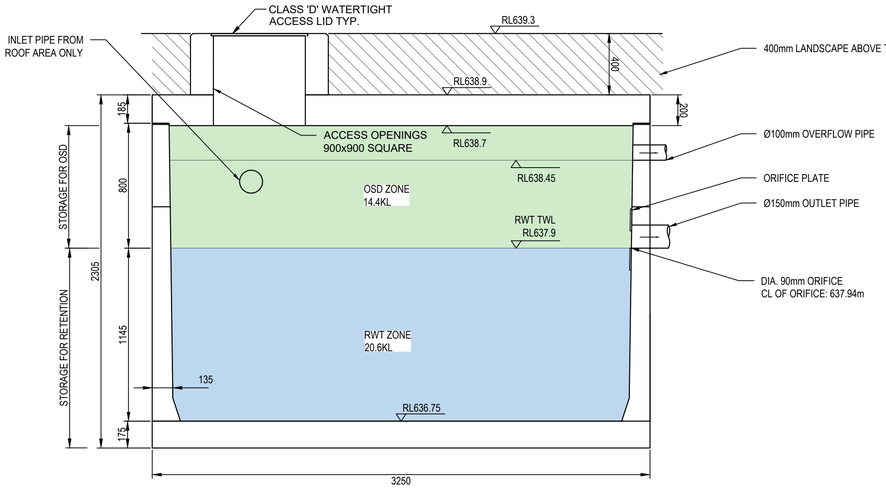
1:20

PRE - DEVELOPMENT	FLOWS (L/s)
Q_5 = 20% AEP	28
Q_{10} = 10% AEP	36
Q_{20} = 5% AEP	43
Q_{100}= 1% AEP	59
POST - DEVELOPMENT	FLOWS (L/s)
Q_5 = 20% AEP	27
Q_{10} = 10% AEP	33
Q_{20} = 5% AEP	37
Q_{100}= 1% AEP	51

DRAINS RESULT SUMMARY

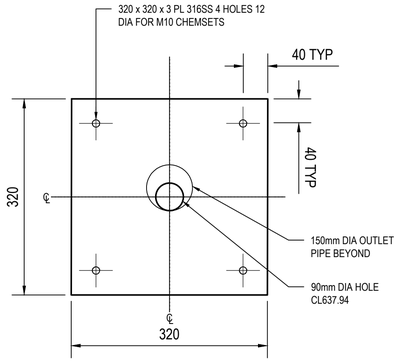


1% AEP RESULTS



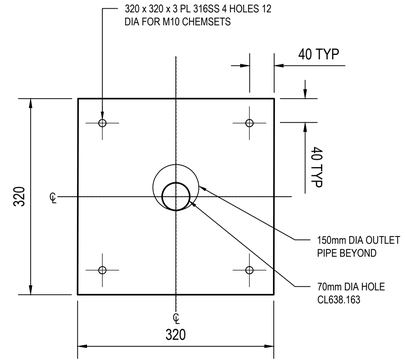
UNDERGROUND COMBINED TANK DETAIL

1:20



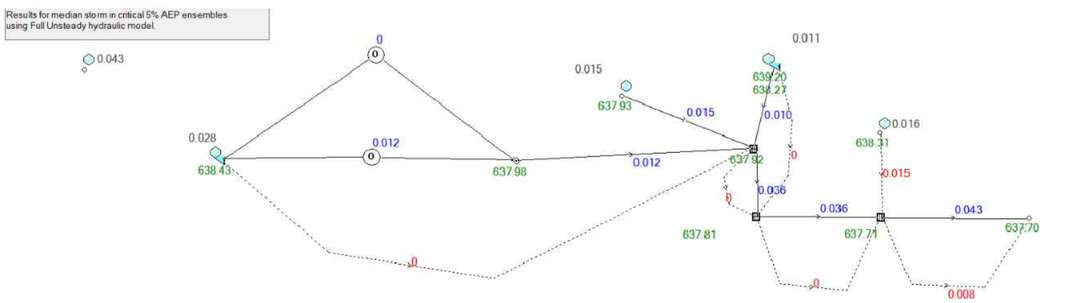
ORIFICE PLATE - OSD TANK

SCALE 1:10

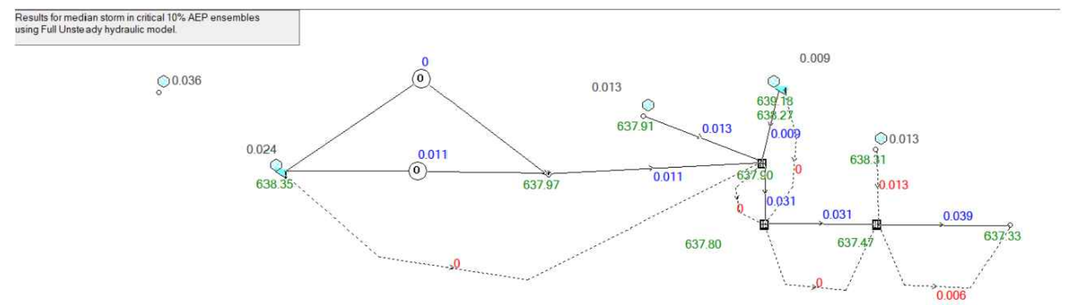


ORIFICE PLATE - DRAINAGE CONTROL PIT

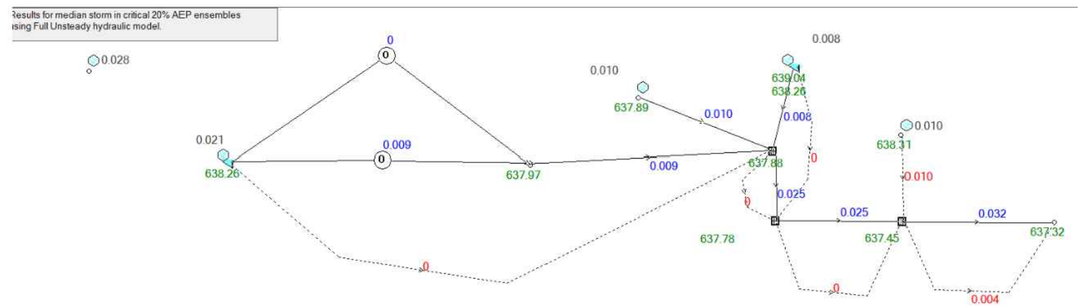
SCALE 1:10



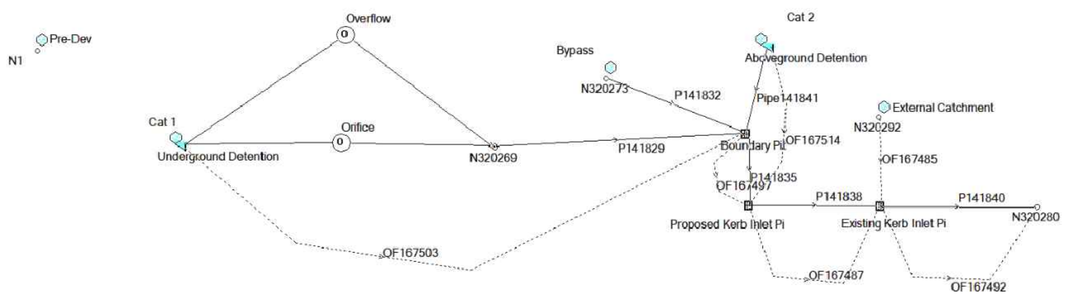
5% AEP RESULTS



10% AEP RESULTS



20% AEP RESULTS



DRAINS MODEL

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT, Homes NSW

ARCHITECT: dem

CIVIL CONSULTANT: ENTEC CONSULTANTS

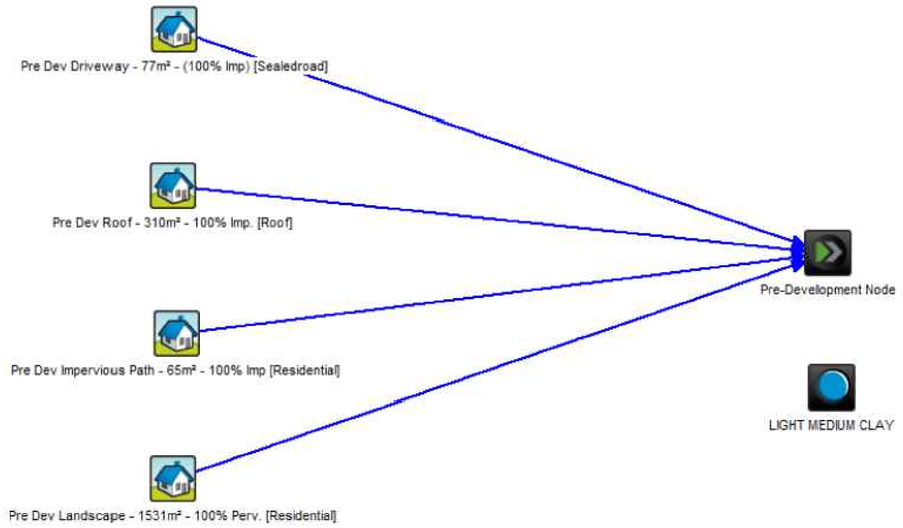
PROJECT: MULTI-DWELLING DEVELOPMENT

38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: ONSITE DETENTION ANALYSIS

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 2024	NTS		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C502	C



MUSIC MODEL PRE-DEVELOPMENT

NORBE ASSESSMENT

1. THE MAJOR POTENTIAL POLLUTANTS OF CONCERN ARE SEDIMENTS FROM EROSION EFFECTS AS WELL AS STORMWATER POLLUTANTS SUCH AS SUSPENDED SOLIDS, NITROGEN, PHOSPHORUS AND GROSS POLLUTANTS.

   SEDIMENTATION IS MOST LIKELY TO OCCUR DURING CONSTRUCTION WORKS FROM THE EROSION OF UNPROTECTED AND EXPOSED EARTHWORKS.

   STORMWATER POLLUTANTS ARE LIKELY TO OCCUR POST CONSTRUCTION AFTER BUILDING OCCUPATION AS THE PROPOSED DEVELOPMENT WILL INCREASE THE AMOUNT OF POLLUTION GENERATED FROM SITE.

2. SEDIMENT AND EROSION CONTROL MEASURES WILL BE IMPLEMENTED IN ACCRODNACE WITH THE 'BLUE BOOK' TO ENSURE ANY SEDIMENT GENERATED DURING CONSTRUCTION ARE CONTROLLED AND CONFINED TO THE SITE. THESE INCLUDE GEOTEXTILE PIT INLET FILTERS, SEDIMENT FENCES AND BASINS TO FILTER CONSTRUCTION SITE WATER PRIOR TO DISCHARGE TO COUNCIL DRAINAGE. REFER TO DRAWING C300 AND C310 FOR EROSION CONTROL PLAN AND DETAILS.

   STORMWATER POLLUTANTS SUCH AS SUSPENDED SOLIDS, NITROGEN AND PHOSPHORUS WILL BE REDUCED TO BELOW PRE-DEVELOPED LEVELS BY THE USE OF PROPRIETARY WATER QUALITY TREATMENT DEVICES SUPPLIED BY OCEAN PROTECT. THESE INCLUDE AT SOURCE LITTER BASKET PIT INSERTS AND FILTERRA BIOSCAPE BIO-RETENTION BASIN. THE POLLUTANT REMOVAL HAS BEEN MODELLED USING INDUSTRY STANDARD PROGRAM MUSIC AND USES ENDORSED WATER NSW TREATMENT NODES. REFER TO MUSIC MODEL OPPOSITE AND DETAILS ON DRAWING C421 FOR FURTHER INFORMATION.

3. ALL WATER QUALITY TREATMENT DEVICES HAVE BEEN DESIGNED FOR APPROPRIATE STORM EVENTS TO PREVENT DAMAGE TO THE ENVIRONMENT.

   SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSPECTED AFTER RAINFALL EVENTS TO ENSURE THAT THEY CONTINUE TO OPERATE EFFECTIVELY. REPAIR AND OR MAINTENANCE MAY BE REQUIRED TO RECTIFY ANY DAMAGED FILTERS OR FENCES AFTER SIGNIFICANT RAIN.

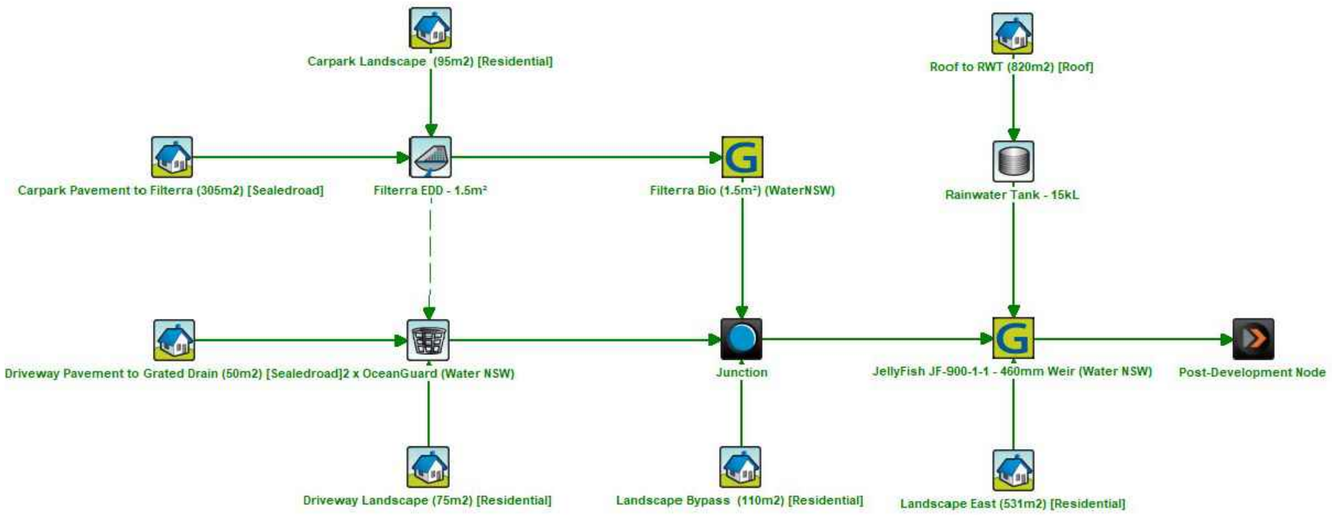
   STORMWATER QUALITY DEVICES SUCH AS THE OCEANGAURD AND FILTERRA SHOULD BE MAINTAINED IN IN ACCORDANCE WITH OCEAN PROTECTS MAINTENANCE SCHEDULE. GENERALLY, DEVICES SHOULD BE INSPECTED TO REMOVE DEBRIS AFTER EACH LARGE RAINFALL EVENT OR EACH 6 MONTHS.

4. THE ABOVE DESCRIBED ONSITE TREATMENT MEASURSES WILL ENSURE THAT POLLUTANTS ARE ADEQUATELY CONTAINED ON SITE AND PREVENT IMPACTS ON DOWNSTREAM STORMWATER DRAINAGE AND WATERWAYS.

5. A NORBE ASSESSMENT HAS BEEN UNDERTAKEN TO ENSURE THAT A BENEFICIAL EFFECT OF 10% POLLUTANT REDUCTION FROM PRE-DEVELOPED STATE OCCURS AS A RESULT OF THE WORKS. REFER TO DRAWING C420 FOR MUSIC AND NORBE RESULTS. A COPY OF THE MUSIC MODEL HAS BEEN PROVIDED AS PART OF THIS SUBMISSION.

	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	0.425	0.832	0.425	0.595	0	28.5
Total Suspended Solids (kg/yr)	54.3	110	54.3	13.5	0	87.7
Total Phosphorus (kg/yr)	0.111	0.239	0.111	0.0849	0	64.5
Total Nitrogen (kg/yr)	0.933	1.87	0.933	0.819	0	56.2
Gross Pollutants (kg/yr)	8.96	25.2	8.96	0.0691	0	99.7

MUSIC MODEL RESULTS



MUSIC MODEL POST-DEVELOPMENT

SITE INPUTS			
PRE-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.425	0.425	0
TOTAL SUSPENDED SOLIDS (kg/yr)	54.3	54.9	0
TOTAL PHOSPHORUS (kg/yr)	0.111	0.111	0
TOTAL NITROGEN (kg/yr)	0.933	0.933	0
GROSS POLLUTANTS (kg/yr)	8.96	8.96	0
POST-DEVELOPMENT	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.832	0.595	28.5
TOTAL SUSPENDED SOLIDS (kg/yr)	110	13.5	87.7
TOTAL PHOSPHORUS (kg/yr)	0.239	0.0849	64.5
TOTAL NITROGEN (kg/yr)	1.87	0.819	56.2
GROSS POLLUTANTS (kg/yr)	25.2	0.0691	99.7

NORBE - RESIDUAL LOAD COMPARISON			
NORBE	SOURCE	RESIDUAL	%
FLOW (ML/yr)	0.425	0.595	-40.0%
TOTAL SUSPENDED SOLIDS (kg/yr)	54.3	13.5	75.1%
TOTAL PHOSPHORUS (kg/yr)	0.111	0.0849	23.5%
TOTAL NITROGEN (kg/yr)	0.933	0.819	12.2%
GROSS POLLUTANTS (kg/yr)	8.96	0.0691	99.2%

NORBE MODEL RESULTS

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT Homes NSW

ARCHITECT: dem

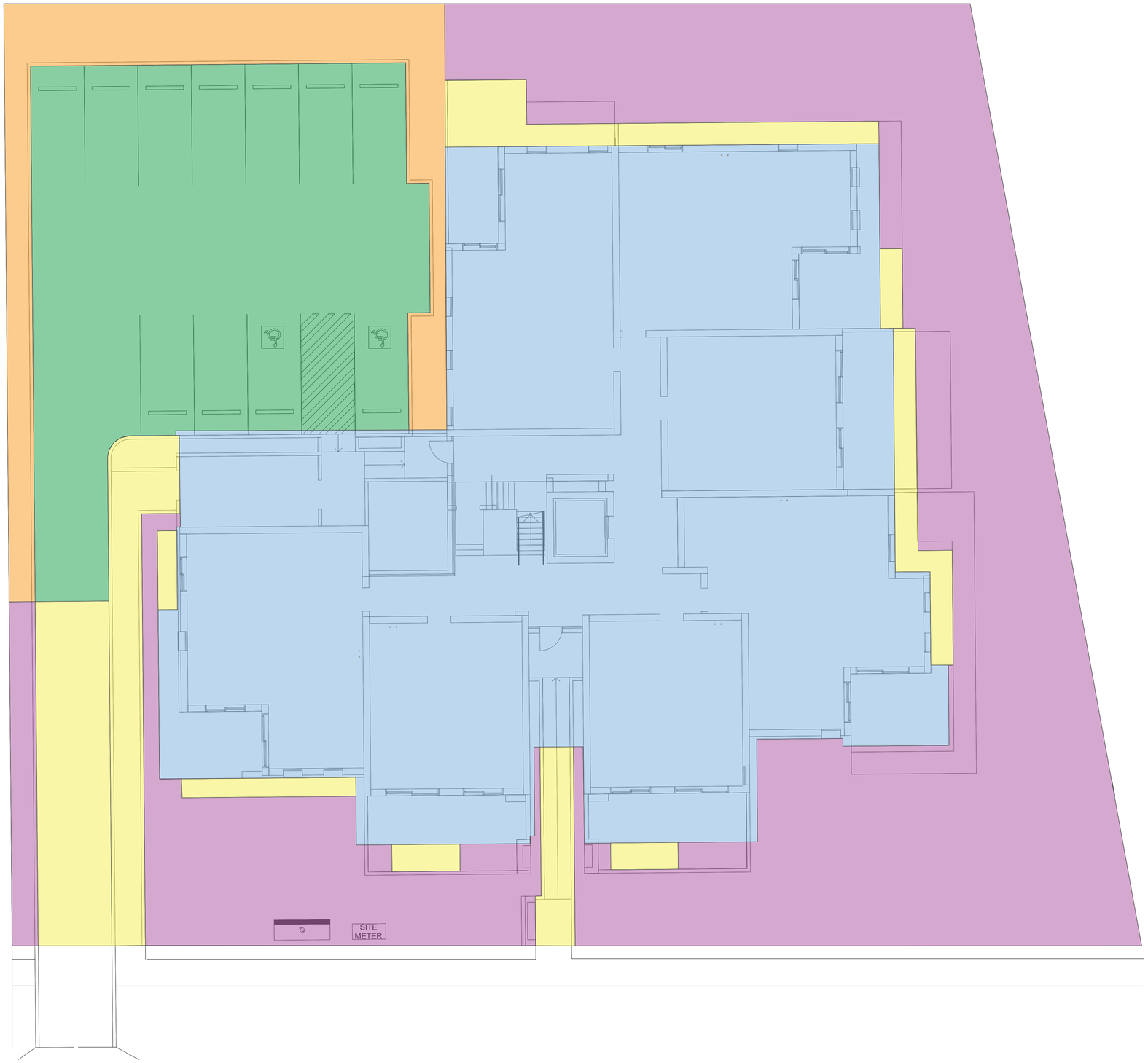
CIVIL CONSULTANT: ENTEC CONSULTANTS

PROJECT: MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: MUSIC MODEL RESULT

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 2024	NTS		
DESIGNED	PROJECT NO.	DRAWING NO.	ISSUE	
NP	240208	C503	C	



LEGEND

PRE - DEVELOPMENT AREA (m^2)

TOTAL SITE AREA = 1981
IMPERVIOUS AREA = 450 (23%)
PERVIOUS AREA = 1531 (77%)

POST - DEVELOPMENT AREA (m^2)

TOTAL SITE AREA = 1981
IMPERVIOUS AREA = 1300 (65%)
PERVIOUS AREA = 681 (35%)

UNDERGROUND OSD CATCHMENT (ROOF ONLY) (m^2)

TOTAL AREA=817
IMPERVIOUS AREA = 817 (100%)
PERVIOUS AREA = 0 (0%)

CARPARK DETENTION CATCHMENT (m^2)

TOTAL AREA=410

IMPERVIOUS AREA = 307 (77%)

PERVIOUS AREA = 103 (23%)

AREA BYPASS DETENTION (m^2)

TOTAL AREA=767

IMPERVIOUS AREA = 176 (17%)

PERVIOUS AREA = 591 (83%)

Location

Label: Not provided
Latitude: -34.7387 [Nearest grid cell: 34.7375 (S)]
Longitude: 149.7158 [Nearest grid cell: 149.7125 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 16 January 2025

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

Table | Chart

Unit: mm/h

	Annual Exceedance Probability (AEP)						
Duration	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	88.4	99.8	135	159	182	213	236
2 min	73.2	81.5	107	124	141	162	177
3 min	67.4	75.3	99.7	116	132	152	167
4 min	63.1	70.7	94.4	110	126	146	161
5 min	59.4	66.8	89.7	105	120	140	154
10 min	46.1	52.2	71.1	83.9	96.4	113	125
15 min	37.9	43.0	58.7	69.3	79.6	93.2	104
20 min	32.4	36.7	50.0	59.0	67.7	79.2	88.0
25 min	28.5	32.2	43.7	51.5	59.0	69.0	76.5
30 min	25.5	28.8	38.9	45.8	52.4	61.2	67.8

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT: NSW GOVERNMENT Homes NSW

ARCHITECT: dem

CIVIL CONSULTANT: ENTEC CONSULTANTS

PROJECT: MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE: CATCHMENT PLAN

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	1:100		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C600	C

CUT & FILL RANGE	
DEPTH (m)	COLOR
-2.6 ~ -2.7	
-0.6 ~ -0.5	
-0.5 ~ -0.4	
-0.4 ~ -0.3	
-0.3 ~ -0.2	
-0.2 ~ -0.1	
-0.1 ~ 0	
0 ~ .01	
0.1 ~ 0.2	

EARTHWORK QUANTITIES

TOTAL CUT = -283.7m²
TOTAL FILL = 11.3m²

BALANCE = -272.3m³
EXCESS CUT TO BE REMOVED FROM SITE = 272.3m³

NOTES

1. EARTHWORK QUANTITIES ARE THEORETICAL AND INDICATIVE ONLY.
2. VOLUMES HAVE BEEN CALCULATED BETWEEN THE EXISTING SURVEYED SURFACE AND DESIGN FINISHED SURFACE.
3. NO ALLOWANCE HAS BEEN MADE FOR STRIPPING OF TOPSOIL, BUILDING SLABS, PAVEMENTS OR LANDSCAPING DEPTHS.
4. VOLUME ALLOW 260mm FOR STRUCTURAL SLAB AND PAVEMENT DEPTH AS SPECIFIED ON PAVEMENT PLAN.
5. VOLUMES ARE BASED ON INSITU MATERIAL AND DO NOT ACCOUNT FOR MATERIAL BULKING FACTORS OR COMPACTION REQUIREMENTS.
6. IT IS ASSUMED THAT THE EXCAVATED MATERIAL CAN BE REUSED ONISTE AS ENGINEERED FILL AND IS REFLECTED IN THE CUT AND FILL BALANCE CALCULATION.

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT
NSW GOVERNMENT
Homes NSW

ARCHITECT
dem

CIVIL CONSULTANT
ENTEC CONSULTANTS

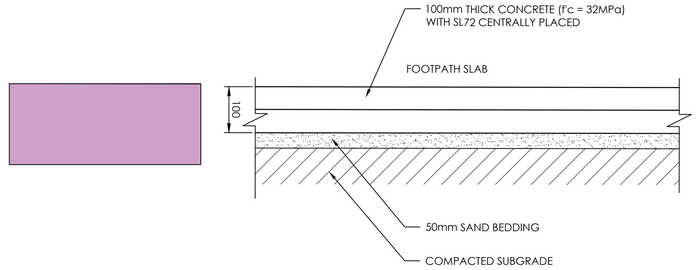
PROJECT
MULTI-DWELLING DEVELOPMENT
38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE
CIVIL SERVICES
CUT & FILL PLAN

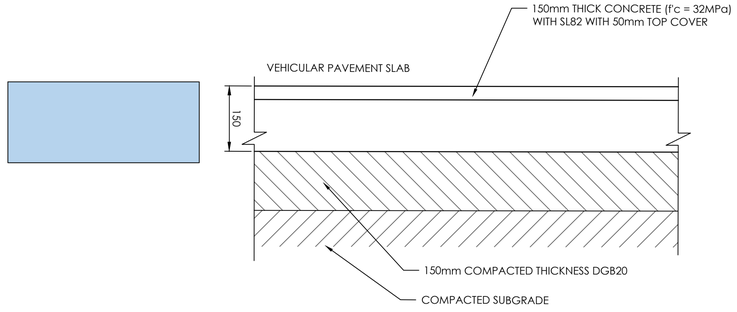
DRAWN	DATE	SCALE	A1	QA CHECK	DATE
YS	DEC 24	1:100			
DESIGNED	PROJECT NO.			DRAWING NO.	ISSUE
NP	240208			C700	C

LEGEND



CONCRETE PEDESTRIAN FOOTPATH

SCALE 1:10



CONCRETE VEHICULAR PAVEMENT

SCALE 1:10

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT

NSW GOVERNMENT

Homes NSW

ARCHITECT

dem

CIVIL CONSULTANT

ENTEC CONSULTANTS

PROJECT

MULTI-DWELLING DEVELOPMENT

38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE

CIVIL SERVICES

PAVEMENT PLAN

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	1:100		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C800	C

PROPOSED
BUILDING
FFL 639.67

PROPOSED
BUILDING
FFL 639.67

SITE
METER

0.6m

1.2m

3.4m

RECONSTRUCT
KERB AND GUTTER

CONSTRUCT NEW VEHICLE CROSSING
AND LAYBACK IN ACCORDANCE WITH
GOULBURN MULWAREE COUNCIL
DRAWING SD-R06

DEMOLISH EXISTING LAYBACK AND DRIVEWAY AND
RESINSTATE KERB AND GUTTER IN ACCORDANCE WITH
GOULBURN MULWAREE COUNCIL DRAWING SD-R10.
VERGE TO BE REINSTATED WITH GRASS TO MATCH EXISTING
(TYPICAL)

RECONSTRUCT
KERB AND GUTTER

CONSTRUCT NEW 1.5m WIDE CONCRETE
FOOTPATH IN ACCORDANCE WITH
GOULBURN MULWAREE COUNCIL
DRAWING SD-R04 AND SD-R12

RECONSTRUCT
KERB AND GUTTER

DEMOLISH EXISTING LAYBACK AND DRIVEWAY AND
RESINSTATE KERB AND GUTTER IN ACCORDANCE WITH
GOULBURN MULWAREE COUNCIL DRAWING SD-R10.
VERGE TO BE REINSTATED WITH GRASS TO MATCH EXISTING
(TYPICAL)

CONTRACTOR TO POTHOLE EXISTING
AUTHORITIES SERVICES ALLOW AND ADJUST TO
SUIT NEW DRAINAGE CONNECTION TO
PROPOSED KERB INLET PIT

CONNECT NEW STORMWATER TO NEW KERB
INLET PIT IN ACCORDANCE WITH COUNCIL
REQUIREMENTS

EXISTING COUNCIL PIT

PROPOSED STORMWATER PIPE CONNECTING TO
EXISTING COUNCIL KERB INLET PIT

LEGEND

CONCRETE PEDESTRIAN FOOTPATH
REFER TO GOULBURN MULWAREE
COUNCIL DRAWING SD-R04

CONCRETE VEHICULAR PAVEMENT
REFER TO GOULBURN MULWAREE
COUNCIL DRAWING SD-R06

ISSUE	AMENDMENT	DATE	DRAWN	APP
C	ISSUE FOR PART 5 SUBMISSION	28.02.25	YS	NP
B	ISSUE FOR REVIEW	07.01.25	YS	NP
A	ISSUE FOR REVIEW	20.12.24	YS	NP

CLIENT
NSW GOVERNMENT
Homes NSW

ARCHITECT
dem

CIVIL CONSULTANT
ENTEC CONSULTANTS

PROJECT
MULTI-DWELLING DEVELOPMENT

38-42 GERATHY STREET
GOULBURN, NSW 2580

NORTH POINT

DRAWING TITLE
CIVIL SERVICES
PUBLIC DOMAIN PLAN

DRAWN	DATE	SCALE A1	QA CHECK	DATE
YS	DEC 24	1:100		
DESIGNED	PROJECT NO.		DRAWING NO.	ISSUE
NP	240208		C900	C