GUARDIAN
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Stormwater Management Plan

Engineer's Report for 42 Woodhams Lane, Mortlake

SMP2024138 Rev 4.0

04/03/2026

Document Control

Signed:

MEng (Struct), BEng (Civil)

RPENG (VIC)

Senior Engineer

Revision/Issue	Comments	Date
1.0	PRELIMINARY	19-Dec-24
2.0	FINAL	20-Jan-25
3.0	FINAL REVISED AS PER RFI	07-Mar-25
4.0	REVISED AS PER STAGING CONSTRUCTION	04-Mar-26

Contents

1. Introduction

Guardian Consulting Engineers is commissioned by Parvish Siroha to establish a Stormwater Management Plan (SMP) for the proposed subdivision of 42 Woodhams Lane, Mortlake into 26 lots of each with minimum size of 1 hectare in accordance with clause 35.03 of the RURAL LIVING ZONE regulations.

This report has been developed for planning application purposes for this site. The report discusses the pre-existing and proposed conditions, in an attempt to provide council with some confidence for neighbour and/or surrounding agricultural use are not adversely affected by the proposed development.

2. Site Characteristics

The site is located besides Hamilton highway and corner of Woodhams lane entering Mortlake Victoria. A site locality plan is shown on Figure 1. The site occupies an area of approximately 28.16 ha with 26 lots of each with minimum size of 1 hectare, with a 0.5% slope towards the south. The stormwater generated under existing conditions is overland flow from pervious areas and a proposed road pavement, directed onto adjoining properties to the south.

It is proposed to develop approximately 2.16 hectares of the site for the proposed road network of the proposed subdivision. The remaining 26ha will remain undeveloped at this stage. Refer to site plan in Appendix A.

FIGURE 1: SITE LOCATION PLAN

Vegetation on site consists of weeds and patches of bare soil. Site soils include 600 mm of sandy loam which allows good permeability. Site runoff will consist of surface and sub-surface flows, with significant flow occurring within the sands above the clay layer.

3. Catchment Characteristics

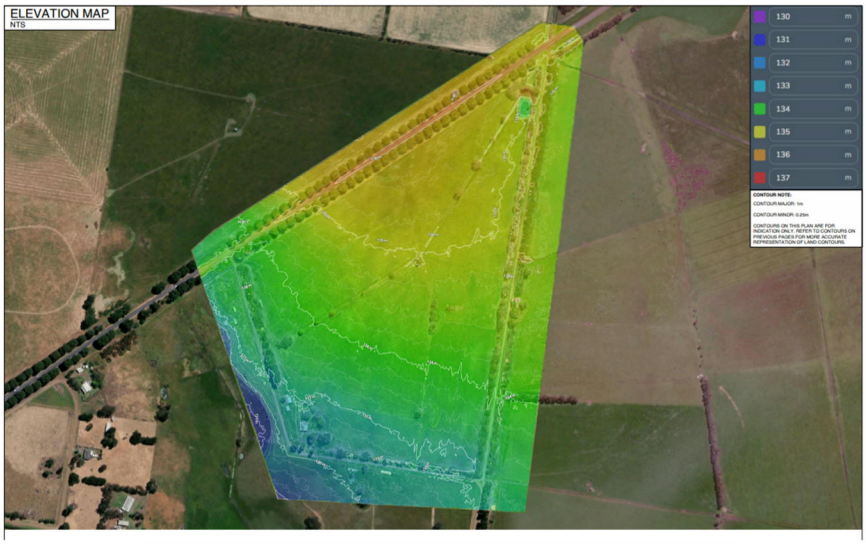
The site is discharging further lower downslope into the waterway on the opposite side of the Old Depot Lane as shown below on the south east. Council is currently creating an easement drain through No. 106 Old Depot Lane to accommodate an open drain through the property which is where the road currently discharges to. This development provide drains to this point from the basin outfall as shown in the drawings on Appendix A.

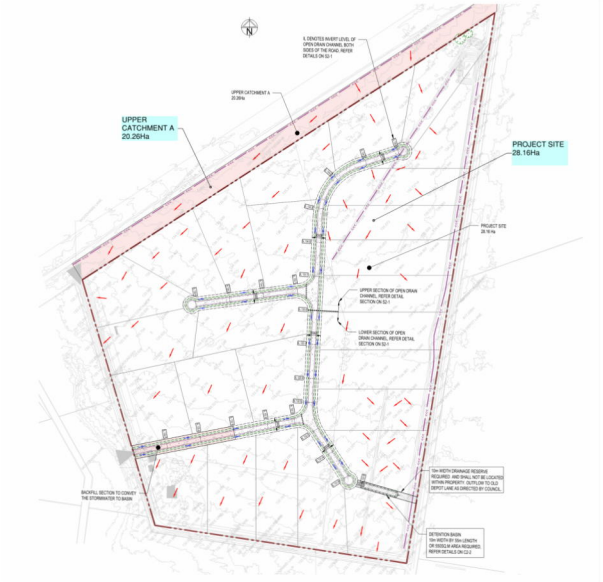
A. Catchment A

Catchment A is the upper catchment area whereby the stormwater is collected in the roadside swale drain along Hamilton Highway is around (20.26ha). Refer to plans on Appendix A.

B. Project Site

Total project site development consists of (28.16ha) whereby the overland flow considered to occur into the properties prior to entering into the waterway on the opposite side of the Old Depot Lane.





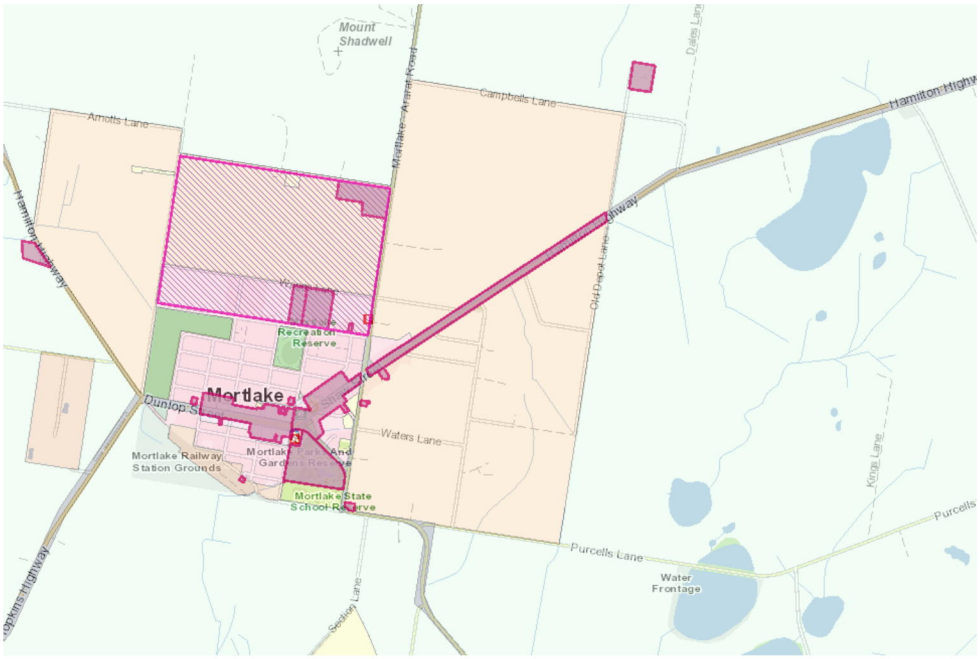


FIGURE 2: WATERWAYS, DAM/CATCHMENT PLAN

4. Runoff Coefficient

Runoff coefficients of 0.35 have been adopted in accordance with AS3500.3 for (1 in 5 yr ARI) and (1 in 100 yr ARI). Allowance of road reserves taken as 0.75 runoff coefficients. When assessing the volumetric runoff coefficients, the adopted coefficient is the weighted mean considering existing upstream overland flow from Upper Catchment A (0.35), the vacant land (0.35) and road reserve (0.75). The output is adopted for sizing the sedimentation basin for 1 in 5 yr ARI and 1 in 100 yr ARI event. The computation is shown on Appendix B.

5. Rainwater Storage and Reuse

Reuse for the proposed development will include rainwater tank storage for reuse for toilet flushing, irrigation and site maintenance.

Toilet Flushing	
8 (max)	People per household
26	No. of Residence
16	Usages per day
4	Estimated Litres per use
1664	Litres per day
Estimated Volume for Toilet Flushing 50,000L per month	

Irrigation	
26	No. of Residence
30	L/min flow
3	Times a week
2340	Estimated Litres per week
9364	Litres per month
Estimated Volume for Irrigattion 10,000L	

The roof area per residence assumed to be 400m2 with single 5kl rainwater tank (total of 130kl rainwater tank for 26 lots) is sufficient to provide a reliable supply for both irrigation and toilet flushing.

6. Stormwater Detention

The Urban Stormwater Best Practice Environmental Management Guidelines for stormwater treatment provides objectives for on-site treatment, including limiting discharges for up to 5yr ARI (Average Recurrence Interval) be maintained at pre-development levels.

Hydraulic modelling to determine the peak stormwater flow rates and detention requirements for the development have been completed, based on the Rational Analysis Method which is shown on Appendix B. Proposed works would consider a 10m Width x 55m Length sedimentation basin as shown on Appendix A drawing C1-1 and details on C2-2.
Detention systems are required to restrict flow rates to the pre-development levels to Q_5=0.82L/s for 5 year ARI event and Q_{100}=1.77L/s for 100 year ARI event. Refer to calculations in Appendix B, providing detention volume sizing, based on both the IDM and for the critical 5 & 100 year ARI event.

7. Water Quality Management

A. Best Practice Environmental Management Guidelines

The Urban Stormwater Best Practice Environmental Management Guidelines for stormwater treatment provides objectives for on-site treatment, including:

- 80% retention of the typical urban annual load for Total Suspended Solids (TSS)
- 45% retention of the typical urban annual load for Total Phosphorus (TP)
- 45% retention of the typical urban annual load for Total Nitrogen (TN)
- 70% retention of the typical urban annual load for gross pollutants (litter).

B. Pollutants typically generated during the operational phase of the development are shown below.

Pollutant	Potential Source
Litter	Construction packaging, construction waste materials, paper, food packaging
Sediment	Exposed soils and stockpiles
Oxygen demanding substances (organic & chemical matter)	Organic or chemical matter
Nutrients	Nitrogen, phosphorus

Pathogens / Faecal coliforms (bacterial & viruses)	Sewage
Heavy metals (often associated with fine sediment)	Sediment runoff

C. Treatment system

A Water Sensitive Urban Design (WSUD) treatment train has been selected to meet the reduction criteria defined in the Urban Stormwater Best Practice Environmental Management Guidelines; to treat stormwater flows from the operational phase of the development.

The WSUD treatment train consists of:

- Rainwater tanks (reuse/removal, nutrient removal, settling of solids)
- Retardation Basin for retention
- Sedimentation Basins for water quality treatment

Rainwater tanks have been proposed to provide a storage for reuse for toilet flushing, landscaping and site maintenance. Rainwater tanks provide excellent attenuation of stormwater flows and reductions in nutrient loadings (through gaseous exchange and settlement of suspended solids) when water is reused in building / landscaping. Reuse from rainwater tanks will also reduce the demand on mains potable water supply for the development.

8. Discussion & Recommendations

This Site Stormwater Management Plan has been developed to support the planning application for the site; to provide Council with confidence that surrounding agricultural properties are not adversely affected by the proposed development as shown on Appendix A "Stormwater Drainage Plan". The proposed development will provide a reduction in pollutant loadings and limit flows to pre-development discharge rates entering the downslope waterway. To achieve these improvements, stormwater flows from assumed roof and road network areas have been directed to:

- Rainwater tanks with reuse for toilet flushing & irrigation
- Retardation Basin for retention, refer drawing C2-2.
- Sedimentation Basins and wetlands for water quality treatment, see drawing C1-1 for plan and C2-2 for details.

This approach provides attenuation of stormwater flows and a reduction in pollutants to Urban Stormwater Best Practice Environmental Management Guidelines.

Appendix A: Stormwater Drainage Plan

Appendix B: Computations

PROPOSED RESIDENTIAL SUBDIVISION @

PARVESH SIROHA

42 WOODHAMS LANE, MORTLAKE, VIC 3272

DRAWING INDEX

SHEET	TITLE
C0-1	GENERAL NOTES
C1-1	STORMWATER DRAINAGE PLAN 1
C2-1	STORMWATER DRAINAGE DETAILS
C2-2	INFILTRATION BED DETAILS

REFERENCED CODES AND STANDARDS

1. AS 3500.3-2018
2. AS3600

REFERENCED DOCUMENTS

1. ARCHITECTURAL DRAWINGS

THESE DESIGNS ARE BASED ON

TITLE: ARCHITECTURAL/WORKING DRAWINGS
REFERENCE: -
BY: -

2. SOIL REPORT

THESE DESIGNS ARE BASED ON

TITLE: SOIL REPORT
REFERENCE: N/A
BY: ENPROVE AG AND ENVIRONMENT

SIGNED:

MUNICIPALITY COUNCIL/CITY

FOR CONSTRUCTION SUBJECT TO APPROVAL BY THE RELEVANT BUILDING SURVEYOR OR STATUTORY AUTHORITY.

BRADLEY MAGOCHA
MIE AUST, MACSEV, RPENG (VIC)
M.ENG (STRUCT), B.ENG (CIVIL)
ENGINEERS AUSTRALIA MEMBERSHIP #: 5335870
VICTORIAN PROFESSIONAL ENGINEER REGISTRATION #: PE0002781

G. GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUCTION WITH ALL OTHER DRAWINGS.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CIVIL SPECIFICATION , APPROVED PLANS AND TO THE SATISFACTION OF THE SUPERINTENDENT.
3. ALL CONSTRUCTION TO BE THE SPECIFICATION AND STANDARDS OF WYNDHAM CITY COUNCIL AND WEST WATER.
4. SURVEY BACKGROUND INFORMATION SUPPLIED BY :
5. EXISTING COUNTOURS SHOWN REFLECT SITE CONDITION AT TIME OF SURVEY.
6. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
7. LEVELS ARE TO AUSTRALIAN HEIGHT DATUM.
8. ALL DIMENSIONS RELEVANT TO SETTING OUT SHALL BE CONFIRMED AND VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION IS COMMENCED.
9. PRIOR TO COMMENCEMENT OF WORKS ON SITE , THE CONTRACTOR MUST ENSURE THAT ALL MATTERS RELATING TO THE OCCUPATIONAL HEALTH AND SAFETY ACT 2004 , HAVE BEEN AND WILL BE COMPLIED WITH.
10. ON COMMENCEMENT OF CONSTRUCTION WORKS , THE CONTRACTOR MUST COMPLY WITH THE RECOMMENDATIONS OF THE ENVIRONMENT PROTECTION AUTHORITY PUBLICATION *APPROPRIATE SILTSATION CONTROL IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION AND MAINTANANCE PERIOD OF THE WORKS.
11. THE CONTRACTOR MUST ARRANGE THE REQUISITE INSPECTIONS OF THE WORKS WITH THE SUPERINTENDENT/OR THEIR REPRESENTATIVE.
12. ALL TREES AND SHRUBS ARE BE RETAINED UNLESS OTHERWISE SHOWN OR DIRECTED BY THE SUPERINTENDENT / OR THEIR REPRESENTATIVE.
13. AT THE COMPLETION OF ALL WORKS , ALL RUBBISH , DEBRIS AND SURPLUS SPOIL SHALL BE REMOVED AND THE SITE SHALL BRE CLEARED TO THE SATISIFACTION OF THE SUPERINTENDENT /OR REPRESENTATIVE.
14. ALL REDUNDANT ASSETS AND THEIR ASSOCIATED INFRASTRUCTURE (I.E PIPE WORK/MANHOLE ETC) ARE TO BE REMOVED AND DISPOSED OF OFF SITE AT THE CONTRACTORS EXPENSE. 15.CONTRACTOR IS TO BE ALLOW FOR BACK FILLING ASSOCIATED TRENCHES IN ACCORDANCE WITH THE CIVIL SPECIFICATION / RELEVANT DRAWINGS.
15. CONTRACTOR IS TO BE ALLOW FOR BACK FILLING ASSOCIATED TRENCHES IN ACCORDANCE WITH THE CIVIL SPECIFICATION / RELEVANT DRAWINGS.

E. EXISTING SERVICES

1. 1.IRWINCONSULT ACCEPTS NO RESPONSIBILITIES IN RELATION TO EXTENT AND LOCATION OF EXISTING SERVICES IN THE VICINITYOF THE SITE.
2. CONTRACTORS MUST ASCERTAIN THE PRECISE LOCATION AND DEPTH OF ALL EXISTING SERVICES WHICH COULD BE AFFECTED BY THE WORKS.WHERE EXISTING SERVICES ARE FOUND TO BE IN CLASH OF THE WORKS THE CONTRACTOR SHOULD NOTIFY THE SUPERINTENDENT ACCORDINGLY.
3. THE CONTRACTOR SHALL LIAISE WITH ALL RELEVANT SERVICES AUTHORITIES WITH RESPECT TO ANY SERVICE ALTERATIONS OR FOR WORKS IN VICINITY OR CLOSE PROXIMITY TO EXISTING SERVICES.THE CONTRACTOR SHALL BE REQUIRED TO SEEK CLEARANCE, PROGRAM AND COORDINATE THESEWORKS WITH THE RELEVANT SERVICE AUTHORITY AND THEIR CONTRACTORS.
4. ANY INFRASTRUCTURE DAMAGE DURING THE DEFECTS LIABILITY PERIOD IS THE RESPONSIBILITY OF THE CONTRACTOR AND IS TO BE REINSTATED TO THE SATISFACTION OF THE SUPERINTENDENT OR THEIR REPRESENTATIVE.
5. ALL SERVICES CONDUITS TRENCHES UNDER ROAD PAVEMENTS ARE TO BE BACKFILLED WITH 20mm 3% CEMENT TREATED CLASS 3 CRUSHED ROCK COMPACTED TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY VALUE DETERMINED BY THE MODIFIED COMPACTION TEST IN ACCORDANCE WITH A.S.1289.5.2.1-2003.
6. ALL TABLE DRAINS AND VERGES ARE TO BE REINTATED UPON COMPLETION OF WORKS TO THE SUPERINTENDENT.
7. CONTRACTOR TO IMPLEMENT SEDIMENT CONTROL BARRIERS / METHODS TO ENSURE SEDIMENT TRANSFER TO DOWNSTREAM DRAINS/SURFACES FROM SITE DOES NOT OCCOUR.SHOULD TRANSFER OF SEDIMENT OCCOUR IT IS THE CONTRACTORS RESPONSIBLITY TO REMOVE AND MAKE GOOD ALL DISTURBED AREAS AT THE DISCRETION OF THE SUPERINTENDENT.
8. ALL TRENCHING WORKS TO BE IN ACCORDANCE WITH THE RELEVANT ACT AND REGULATIONS.
9. ALL EXISTING ASSETS AFFECTED BY THE WORKS ; EG SIGNS , VEHICLE CROSSING , FOOTPATHS , KERB AND LINEMARKING SHALL BE REINSTATED BY THE COMPLETION OF THE WORKS TO THE SATISFACTION OF THE SUPERINTEDENT /OR THEIR REPRESENTATIVE.

O. OH&S DRAINAGE

1. CONTRACTOR TO INTRODUCE MANUAL PROCEDURES PRIOR TO CONSTRUCTION AND MAINTENANCE WORKS
2. CONTRACTOR TO INTRODUCE SAFE MAINTENANCE PROCEDURES PRIOR TO UNDERTAKE MAINTENANCE WORKS ON THES ASSETS.

P. PAVEMENTS, KERBING AND ANCILLARY WORKS

1. WHERE NEW ASPHALT, CONCRETE K&C, PATHS AND DRIVEWAYS MATCHING INTO EXISTING. THE EXISTING SURFACE IS TO BE SAW CUT AND MATCHED NEATLY.
2. PAVEMENT DEPTH SPECIFIED IS A MINIMUM DEPTH AND MAY BE VARIED BY THE SUPERINTENDENT/OR THEIR REPRESENTETIVE. SOFT SPOTS SHALL BE EXCAVETED TO A PROOF ROLLED BASE AND BACKFILLED WITH APPROVED MATERIAL COMPACTED IN 150MM LAYERS TO ACHIEVE TO A DENSITY NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY VALUE DETERMINED BY THE STANDARD COMPACTION TEST IN ACCORDANCE WITH AS 1289.5.1.1.2003.
3. AGRICULTURAL DRAINS ARE TO BE PLACED BEHIND ALL KERB AND CHANNEL. KERB ONLY AND EDGE STRIPS IN ACCORDANCE WITH STANDARD DRAWINGS.
4. SET OUT DIMENSIONS GIVEN TO KERBING ARE TO THE LIP OF KERB.
5. PEDESTRAIN CROSSING TO CONFORM TO AS 1428.1 AND RELEVENT AUTHORITIES STANDARDS DETAILS WHERE APPLICABLE.

D. DRAINAGE

1. 1. ALL STORMWATER DRAINS ARE TO BE CLASS 2 RC OR FCR PIPES UNLESS NOTED OTHERWISE.
2. ALL PIPES ARE TO BE RUBBER RING JOINTED. ALTERNATIVE PIPE MATERIALS MAY BE USED SUBJECT TO APPROVAL BY THE SUPERINTENDENT.
3. ALL STORMWATER DRAINAGE PIPES 150 DIAMETER OR LESS TO BE SEWER QUALITY UPVC WITH SOLVENT WELDED JOINTS, UNLESS NOTED OTHERWISE.
4. ALL DRAINS BEHIND KERB AND CHANNEL SHALL BE BACKFILLED TO MATCH PAVEMENT SUBGRADE LEVEL WITH 20MM CLASS 2 FCR COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY VALUE.
5. ALL TRENCHING WORKS TO BE IN ACCORDANCE WITH THE RELEVENT ACT AND REGULATIONS. DRAINAGE TRENCHES AND EXCAVATIONS BENEATH PAVEMENTS ARE TO BE BACKFILLED ITH CLASS 2 CRUSHED ROCK(20MM SIZE) AND COMPACTED TO 98% MODIFIED DRY DENSITY OR AS SPECIFIED.
6. SUBSOIL DRAINS LAID BEHIND ALL KERB AND CHANNEL TO BE 90MM DIAMETER PERFOATED CORRUGATED CLASS 1000.
7. PIT COVER LEVELS TO MATCH SURROUNDING FINISHED LEVELS.
8. 7. ALL DOWN PIPE CONNECTIONS TO BE MINIMUM 100 DIAMETER OR EQUAL DOWN PIPE DIAMETER UNLESS OTHERWISE NOTED. ALL PIPES TO BE SEWER QUALITY UPVC, WITH SOLVENT WELDED JOINS AT 1 IN 100 MINIMUM GRADE
9. EXISTING STORM WATER PIPE TO BE ABONDONED IS TO BE CUT AND SEALED WITH CONCRETE AT BOTH ENDS.
10. ALL PIT SETOUT CO0RDINATES ARE AT THE CENTRE THE PIT.

E. EARTHWORKS

1. TOP SOIL TO BE STRIPPED ACROSS THE DEVELOMENT SITE AS REQUIRED.
2. ALL EXCAVATED AND FILLED BATTER AREAS SHALL BE SURFACED WITH A 150MM LAYER OF APPOVED TOPSOIL OR AS SHOWN OTHERWISE ON THE DRAWINGS.
3. LEVELS PROVIDED ARE FINISHED SURFACE LEVELS. EARTHWORKS SHOULD THEREFORE BE FINISHED ATH THE APPRORIATE LEVELS TO ALLOW FOR THE CONSTRUCTION OF PAVEMENTS AND SHOULDERS AS DOCUMENTED.
4. EARTHWORK SPOIL IN EXCESS OF SITE FILL REQUIREMENTS SHALL BE DISPOSED OFF SITE.
5. TOPSOIL TO BE STOCKPILLED FOR FUTURE LANDSCAPING USE. THE LOCATION OF TOPSOIL STOCKPILE SHALL BE AS APPOVED OR DIRECTED BY THE SUPERINTENDENT. SUBJECT TO THE SUPERINTENDENTS APPROVAL TOPSOIL IN EXCESS TO SITE RQUIREMENTS SHALL BE DISPOSED OFF SITE.
6. PRIOR TO EARTH FILLING WORKS ALL VGETATION AND TOPSOIL SHALL BE STRIPPED. THE EXPOSED EM EMBANKMENT FOUNDATION SHALLBE MOISTURE CONDITIONED AND COMPACTED TO A MINIMUM OF 98% STANDARD COMPACTION PRIOR FILLING OR PAVEMENT CONSTRACTION.
7. A SUITABLY QUALIFIED GEOTECHNICAL ENGINEER (AT CONTRACTOR EXPENSE) IS O BE ENGAGED BY THE CONTRACTOR TO WITNESS AND APPROVE THE SUBGRADE PREPARATION WORKS AND AND FINAL PROFF ROLLING AS ADEQUATE FOR CONSTRUCTION.
8. ANY SOFT, WET OR UNSUITABLE SUBGRADE MATERIALS, AS DEFINED IN THE SPECIFICATION, SHALL BE REMOVED AND REPLACED WITH AN APPROVED MATERIAL.
9. EXCAVATED MATERIAL WICH WICH CONFORMSWITH THE SPECIFICATION REQUIREMENTS FOR FILL MAY BE USED AS BACKFILL.
10. DURING CONSTRUCTION THE CNTRACTOR SHALL BE RESPONSIBLE FOR CONDUCTIONG AND MANTAINING A TEMPORARY SITE DRAINAGE SYSTEM AND TO MAINTAIN THE STE IN A DRY AND STABLE CONDITION.DETAILS OF THE THE DRAINAGE SYSTEM SHALL BE SUBMITTED FOR THE APPROVAL OF THE SUPERINTENDENT.
11. ALL COMPACTION TO BE CARRIED OUT IN ACCORDANCE WITH COMPACTION PROCEDURES AND DEFINEDIN AS-1289.5.2.1 TEST PROCEDURE.CERTIFICATION IS TO BE AN INDEPENDENT GEOTECHNICAL ENGINEER (AT CONTRACTOR'S EXPENSE).
12. BENEATH PAVEMENTS A NON-EXPENSIVE APPROVED SELECT FILL SHALL BE PLACED WHERE REQUIRED IN UNIFORM LAYERS NOT TO EXCEEDING 200MM.LOOSE THICKNESS AND COMPACTED TO ACHIEVE A MINIMUM DRY DENSITY RATIO OF 98%,REFER TO RELEVANT SECTION IN CIVIL SPECIFICATION.
13. THE CONTRACTOR IS TO REVIWE THE GEOTECHNICAL REPORT AND CIVIL SPECIFICATION FOR SUBGRADE PREPARATION, SOIL PARAMETERS AND CONSTRUCTION METHODOLOGY TO SUIT THE CONDITIONS ONSITE.THE CONTRACTOR'S ATTENTION IS DRAWN TO THE REQUIREMENT TO STRIP THE EXISTING NATURAL TOPSOIL / FILLING AND FOUND WORKS ON NATURAL UNDISTURBED STIFF CLAY.

L. LINEMARKING & SIGNAGE

1. ALL TRAFIC CONTROL MEASURES, PROPOSED SIGNS AND LINEMARKING SHALL BE IN ACCORDANCE WITH AS1742 PARTS 1,2 &3.
2. ALL SIGNS TO BE CLASS 1 HIGH INTENSITY TYPE AND COMPLY WITH THE REQUIREMENTS OF A.S. 1743-2001.
3. ALL LINE MARKING TO BE ACCORDANCE WITH AS1742.
4. ALL LINE MARKING TO BE SOLVENT BASED PAINT OF LONG LIFE QUALITY IN ACCORDANCE WITH VIC ROADS REQUIREMENTS AND AUSTRALIAN STANDARDS.
5. ROAD PAVEMENT MARKINGS TO BE MARKED OUT WITH 100MM WHITE LINS UNLESS DENOTED OTHERWISE.
6. CAR PARKING BAYS MARKINGS ARE TO BE 80MM WIDE LINES.

G. GABIONS

GENERAL NOTES

1. ALL DIMESIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.
2. REFER TO GEOTECHINICAL FUCTUSL REPORT AND OR GEOTECHCHINICAL INTERPRETIVE REPORT FOR BOREHOLE (BH) AND SUBSURFACE INFORMATION.
3. ROAD SIDE STORMWATER DRAINAGE TO BE DESIGNED BY OTHERS.
4. ALL SUBSURFACE DRAINAGE SHALL BE PROPERLY DISCHARGED TO THE NEARBY PIT/ DAINAGE SYSTEM.

GABION NOTES

5. THE GABION MUST BE IN ACCORDANCE RMS QA SPECIFICATION R55.
6. GEOTEXTILES MUST BE IN ACCORDANCE WITH RMS QA SPECIFICATION R63.
7. A NON WOVEN GEOTEXTILES SHALL BE INCPORATED AT THE REAR FACE OF THE GIBION UNITS.
8. GABION BASKETS MUST BE GALVANISED AND FULLY LACED TO BOTH UPPER AND LOWER NEIGHBOURING BASKETS.
9. GABION MUST BE DIVIDED INTO CELL OF LENGTH NOT GRATER THAN 2M.
10. THE FRONT FACE AND ALL OTHER EXPOSED FACES IN GABION SHALL BE HAND PACKED WITH ROCKS SO AS TO PRODUCE A SMOTH FINISH.

FOUNDATION NOTES

12. THE MINIMUM ALLOWABLE BEARING PREASURE OF FOUNDATION IS 150 KPA.
13. UNSUITABLE MATERIALS BELOW THE FOUNDATION LEVEL OF THE GABION WALLSHALL BE REMOVED AND REPLACED WITH SELECT FILE. FOUNDATION MATERIAL MUST BE VARIED BY SUITABLY QUALIFIED GEOTCHINICAL ENGINEER ON SITE TO CONFIRM THE DESIGN.
14. FOUNDATION BASE MUST BE LEVEL PRIOR TO REPLACE THE GABION WALL.

DESIGN CRITERIA

15. 15. FOR EARTHQUAKE ACCELERATION CO-EFFICIENT= REFER TO AS 5100.2 AND AS 1170.4 FOR SPECTRAL SHAPE FACTOR=REFER TO AS 1170.4.
16. SURCHARGE LOADING IS 5 kPa (FOR NON-TRAFFIC).
17. SURCHARGE LOADING IS 20KPa FOR TRAFFIC LOADING.

CONSTRUCTION SEQUENCE

20. ANY UTILITIES WITHIN THE VACINITY MUST BE RELOCATED PRIOR TO EXCAVATION.
21. EXCAVATE DOWN TO TH GABION WALL FOUNDATION LEVEL ANY TEMPORARY EXCAVATION PROFILES STABILITY TO BE ASSESSSED BY SUITABLY QUALIFIED GEOTECHNICAL ENGINEER.
22. PLACE 50MM OF MASS CONCRETE.
23. INSTALL THE FIRST LAYER OF GABION ON THE FOUNDATION.
24. INSTALL THE GEOTEXTILE AND DRAINAGE LAYER.
25. PLACE THE BACKFILL AND COMPACT TO MEET THE REQUIREMENT OF SPECIFICATION R44.
26. REPEAT STEPS 25 AND 26 UP TO THE TOP LAYER.

NB. NOTES FOR USE OF THES DRAWINGS

1. THIS STANDARD DRAWING SHALL NOT BE USED FOR THESE CASE WHERE TRAFFIC LIVE LOADS (NOT REFER TO SHORT TERM MAINTANCE) ARE DIRECTLTY ABOVE THWE WALL AND WALL SHALL BE LOCATED OUTSIDE THE ACTIVE BEARING PRESSURE INFLUENCE ZONE FROM LIVE TRAFFIC.
2. THIS IS A STANDARD DRAWING IT IS USER RESPONSIBILITY TO ASSESSTHE DRAWING AND ENSURE ITS APPLICABILITY TO THR SITE.
3. THE DESIGN SET IS LIMITED TO WALL HEIGHT ≤ 3500mm (REFER TO TABLE 2 , SHEET 5).FOR WALL HEIGHTS BEYOND 3500 mm A SEPERATE DESIGN MUST BE DEVELOPED BY A SUITABLY QUALIFIED DESIGNER.
4. THIS DESIGNER LIMITED TO 2H:1V SLOPING GROUND.
5. THE DESIGNER MUST TAKE INTO CONSIDERATION SAFE ACCESS FOR MAINTENCE INSPECTION OF THE WALL AND CLEANING OF THE DISH DRAIN AND OVERALL ACCESS BY THE PUBLIC TO THE TOP OF THE WALL.RISK ASSEMENT MUST BE CONSIDERE IN THE DESIGN PROCEDURE AND DOCUMENTED IN TH DESIGN REPORT.SAFETY ELEMENTS DETAILED IN THE REPORT MUST BE INCLUDED ON THE DESIGN DRAWINGS WITH APPOPRIATE NOTES.(THIS NOTE TO BE REMOVED FOR AS COSTRUCTION DRAWINGS).
6. THSE DRAWINGS MUST BE READ IN CONJUCTION WITH OTHER DRAWINGS.
7. THESE GABION WALL DRAWING ARE TO BE USED ON DOWNSLOPE ONLY WHERE THEY ARE TO BE USED ON THE ONSLOPE SECTIONS AND ARE EXPOSED TO TRAFFIC IMPACTS , APPROPRIATEIMPACT BARRIERS ARE TO BE PROVIDED.

NOTES:

A	PRELIMINARY	MD	18/10/2024
B	PRELIMINARY	MD	19/12/2024
1.0	CONSTRUCTION ISSUE	MD	27/01/2025
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GUARDIAN
Consulting Engineers
Structural | Geotechnical | Civil
1a/242 Ryrie Street, Geelong, VIC 3220
+61 (3) 4206 6242
admin@guardcon.com.au
www.guardcon.com.au
A.B.N. 71 673 368 502

Client:

Project Name:
42 WOODHAMS LANE, MORTLAKE, VIC 3272

Drawing:
C0-1

Job Number:	2024138
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	CONSTRUCTION ISSUE		

LEGEND

DO NOT SCALE FROM THIS DRAWING. REFER TO TITLE BOUNDARY DRAWINGS FOR DETAIL DIMENSIONS.

BUILDING ORIENTATION SHALL BE OBTAINED FROM ARCHITECTS DRAWINGS FOR POST DEVELOPMENT.

SITE FEATURES PLAN HAS BEEN SUPPLIED BY OTHERS AND TO BE CONFIRMED ON SITE

- TRAFFICABLE CONCRETE PAVEMENT FOR FUTURE DEVELOPMENT BY OTHERS
- RL 133.xxx — EXISTING SURVEY LEVEL
- IL 132.xx — DESIGN PIPE INVERT LEVEL TBC ONSITE
- EARTH SWALE DRAINAGE DEPRESSION & DIRECTION OF FALL
- STORMWATER PIPE SIZE & GRADE AS NOTED
- 1 — DRAINAGE PIT AND DESIGNATION
- GENERAL FALL DIRECTION IN FINISHED SURFACE
- GENERAL FALL DIRECTION IN OVERLAND SURFACE
- DENOTES DRAINAGE RESERVE
- DENOTES OPEN DRAIN CHANNEL

GUARDIAN
Consulting Engineers
Structural | Geotechnical | Civil
1a/242 Ryrie Street, Geelong, VIC 3220
+61 (3) 4206 6242
admin@guardcon.com.au
www.guardcon.com.au
A.B.N. 71 673 368 502

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Sheet Size:	A1
No. of sheets:	6
Title:	STORMWATER DRAINAGE PLAN
Date:	5/03/2025
Engineer:	MD
Checked:	BJM
Drawn:	MD
Scale:	1:1500

Revision: 3.0

LEGEND

DO NOT SCALE FROM THIS DRAWING. REFER TO TITLE BOUNDARY DRAWINGS FOR DETAIL DIMENSIONS.

BUILDING ORIENTATION SHALL BE OBTAINED FROM ARCHITECTS DRAWINGS FOR POST DEVELOPMENT.

SITE FEATURES PLAN HAS BEEN SUPPLIED BY OTHERS AND TO BE CONFIRMED ON SITE

- TRAFFICABLE CONCRETE PAVEMENT FOR FUTURE DEVELOPMENT BY OTHERS
- RL 133.xxx — EXISTING SURVEY LEVEL
- IL 132.xx — DESIGN PIPE INVERT LEVEL TBC ONSITE
- EARTH SWALE DRAINAGE DEPRESSION & DIRECTION OF FALL
- STORMWATER PIPE SIZE & GRADE AS NOTED
- 1 — DRAINAGE PIT AND DESIGNATION
- GENERAL FALL DIRECTION IN FINISHED SURFACE
- GENERAL FALL DIRECTION IN OVERLAND SURFACE
- DENOTES DRAINAGE RESERVE
- DENOTES OPEN DRAIN CHANNEL

NOTES:

A	PRELIMINARY	MD	18/10/2024
B	PRELIMINARY	MD	19/12/2024
1.0	CONSTRUCTION ISSUE	MD	27/01/2025
2.0	REVISED AS PER RFI	MD	07/03/2025
3.0	REV. AS PER STAGING	MD	04/03/2026
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1a/242 Ryrie Street, Geelong, VIC 3220
+61 (3) 4206 6242
admin@guardcon.com.au
www.guardcon.com.au
A.B.N. 71 673 368 502

Client:

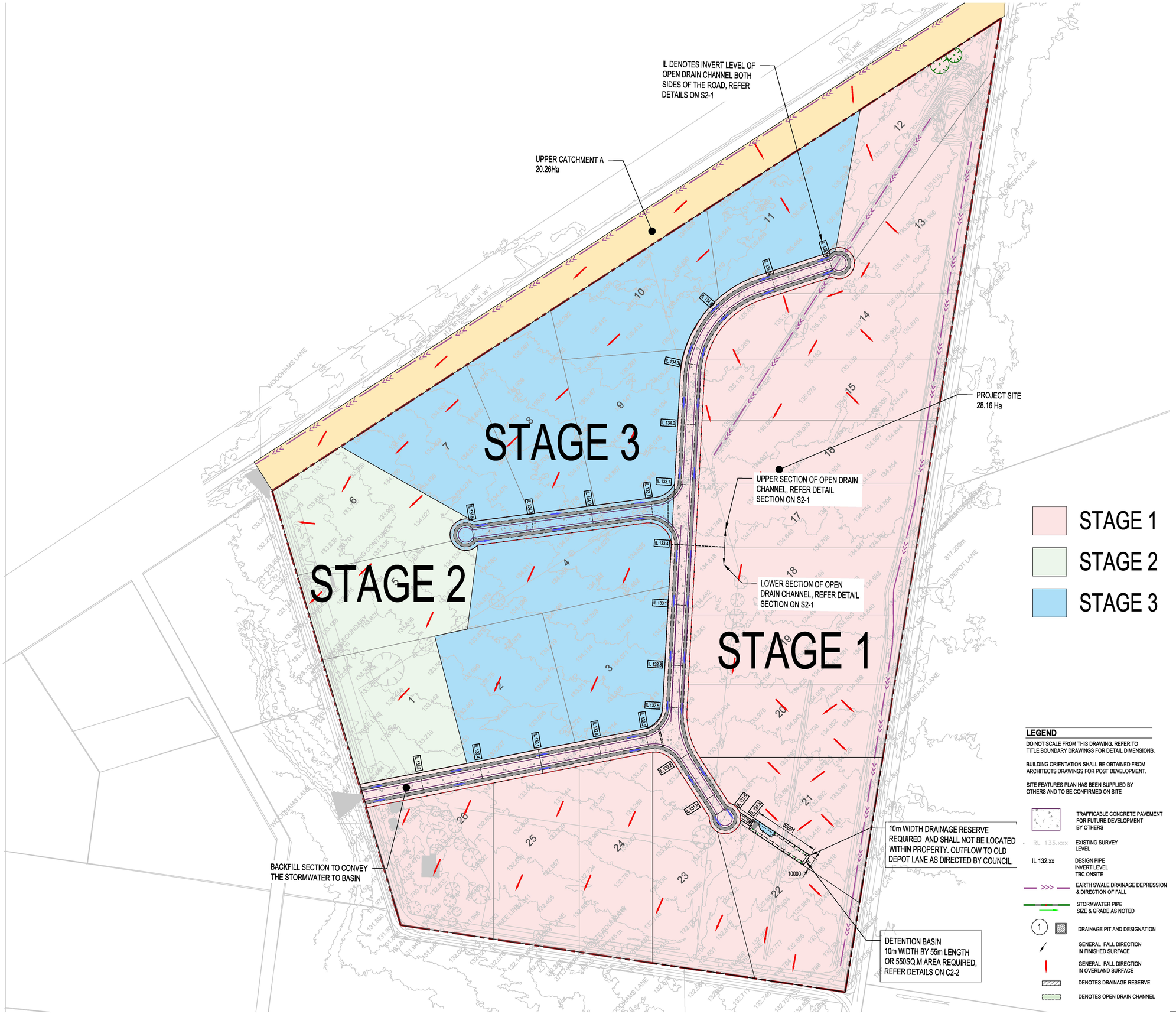
Project Name:
42 WOODHAMS LANE, MORTLAKE, VIC 3272

Drawing:
C1-2

Job Number:	2024138
Sheet Size:	A1
No. of sheets:	6
Title:	STORMWATER DRAINAGE PLAN 2

Date:	5/03/2025
Engineer:	MD
Checked:	BJM
Drawn:	MD
Scale:	1:1500

Revision:
3.0



LEGEND

DO NOT SCALE FROM THIS DRAWING. REFER TO TITLE BOUNDARY DRAWINGS FOR DETAIL DIMENSIONS.

BUILDING ORIENTATION SHALL BE OBTAINED FROM ARCHITECTS DRAWINGS FOR POST DEVELOPMENT.

SITE FEATURES PLAN HAS BEEN SUPPLIED BY OTHERS AND TO BE CONFIRMED ON SITE

- TRAFFICABLE CONCRETE PAVEMENT FOR FUTURE DEVELOPMENT BY OTHERS
- RL 133.xxx — EXISTING SURVEY LEVEL
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- GENERAL FALL DIRECTION IN FINISHED SURFACE
- GENERAL FALL DIRECTION IN OVERLAND SURFACE
- DENOTES DRAINAGE RESERVE
- DENOTES OPEN DRAIN CHANNEL

NOTES:

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2.0	REVISED AS PER RFI	MD	07/03/2025
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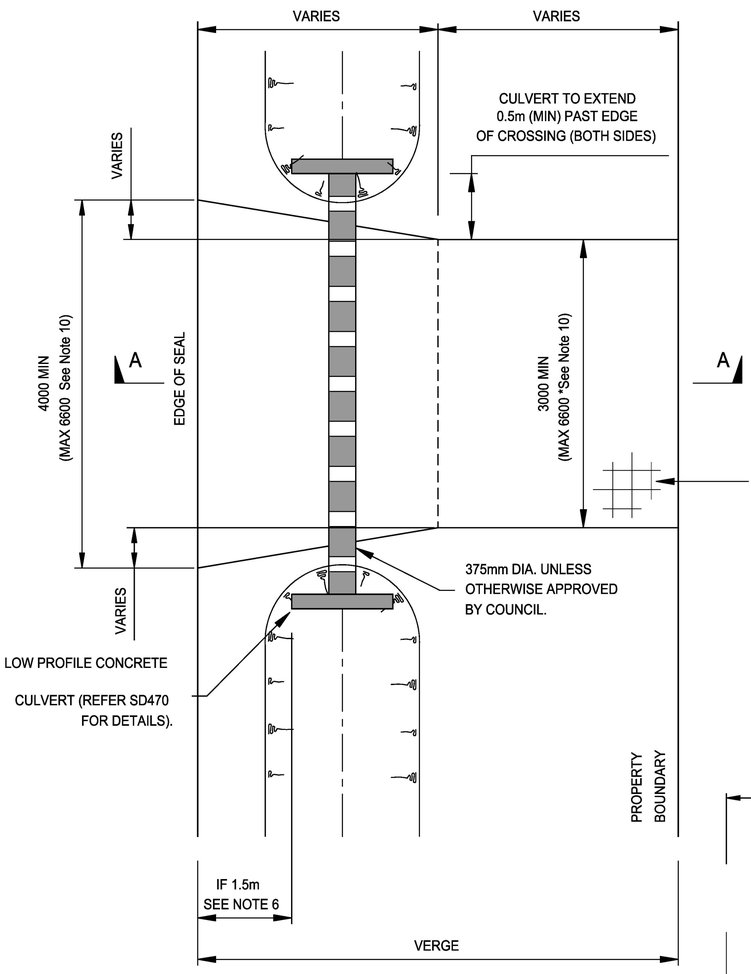
Client:

Project Name:
42 WOODHAMS LANE, MORTLAKE, VIC 3272

Drawing: C1-3

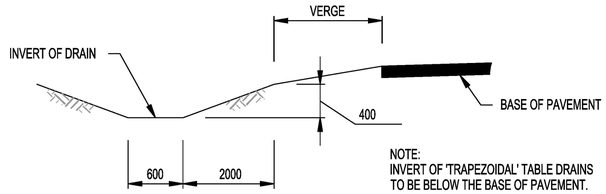
Job Number:	2024138
Sheet Size:	A1
No. of sheets:	6
Title:	STORMWATER DRAINAGE PLAN 3
Date:	5/03/2025
Engineer:	MD
Checked:	BJM
Drawn:	MD
Scale:	1:1500
Revision:	3.0



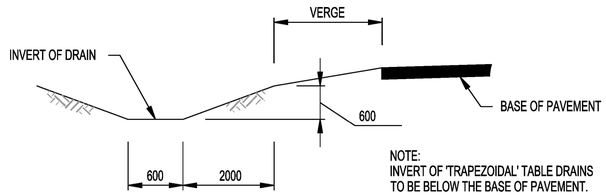
PLAN

NOTES:

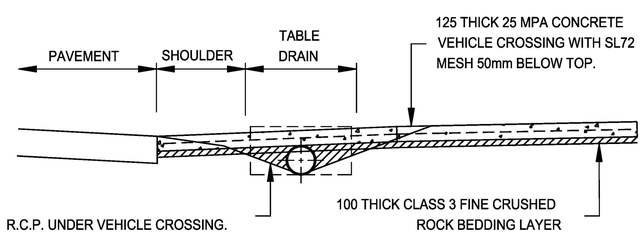
1. COUNCIL RESERVES THE RIGHT TO DIRECT THE USE OF CULVERT END WALL TYPE.
2. THIS IS A TYPICAL CROSSING PLAN. SLIGHT VARIATIONS MAY OCCUR AFTER INSPECTION AND APPROVAL OF LOCATION BY COUNCIL.
3. PRIOR TO THE CONSTRUCTION, THE CROSSING LOCATION SHALL BE APPROVED BY COUNCIL.
4. ALL WORKS TO BE COMPLETED TO THE SATISFACTION OF COUNCIL.
5. MAINTENANCE OF THE CROSSOVER REMAINS THE RESPONSIBILITY OF THE LAND OWNER.
6. DRIVEABLE ENDWALLS TO BE USED WITHIN 1.5m OF THE EDGE OF SEAL OR IF DESIGN SPEED IS GREATER THAN 60KMH
7. REFER SD255 FOR ADDITIONAL CLEAR ZONE DETAILS
8. TABLE DRAINS ARE NOT TO BE CLOSER THAN 1.0m FROM FENCE LINES OR SERVICES.
9. CULVERT TO BE LOCATED AT LEAST 600mm FROM EDGE OF SEAL
10. MAXIMUM DRIVEWAY WIDTH MAYBE INCREASED UPON COUNCIL APPROVAL



UPPER SECTION OF OPEN DRAIN CHANNEL

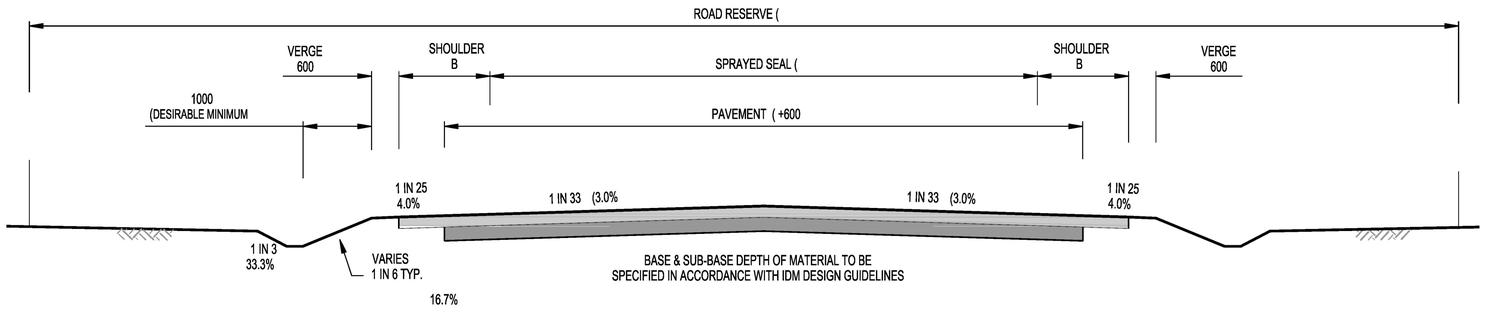


LOWER SECTION OF OPEN DRAIN CHANNEL



SECTION A-A

FOR DIMENSIONS (A)(B) & (C) REFER TO IDM DESIGN GUIDELINES:
CLAUSE 12.4 TABLE 6 - 'RURAL ROAD CHARACTERISTICS'.



TYPICAL CROSS SECTION
SEALED ROAD

ALL MEASUREMENTS IN MILLIMETRES

TYPICAL SWAL DRAIN VEHICLE CROSSING
NTS

NOTES:

A	PRELIMINARY	MD	18/10/2024
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www.guardioon.com.au
A.B.N. 71 673 368 502

Client:

Project Name:
42 WOODHAMS LANE, MORTLAKE, VIC 3272

Drawing:
C2-1

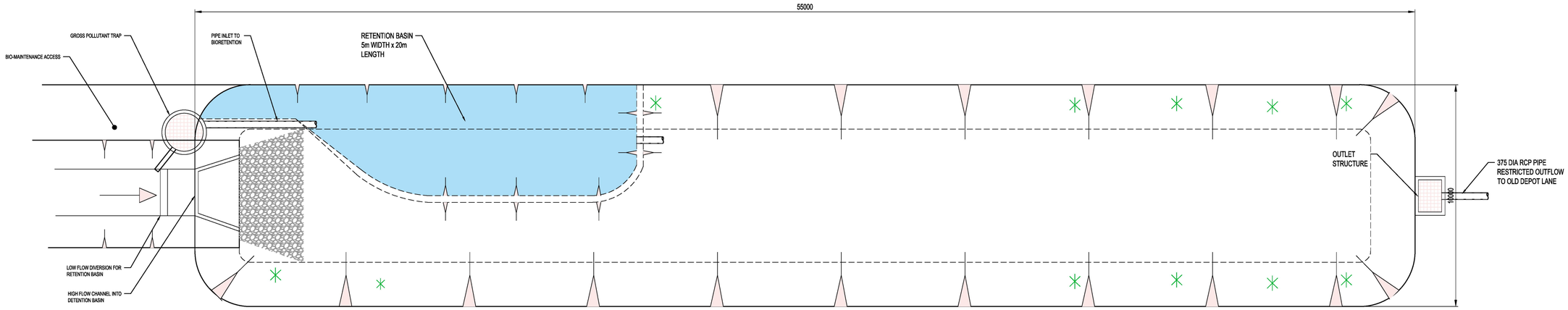
Job Number:	2024138
Sheet Size:	A1
No. of sheets:	6
Title:	STORMWATER DRAINAGE DETAILS

Date:	5/03/2025
Engineer:	MD
Checked:	BJM
Drawn:	MD
Scale:	1:10

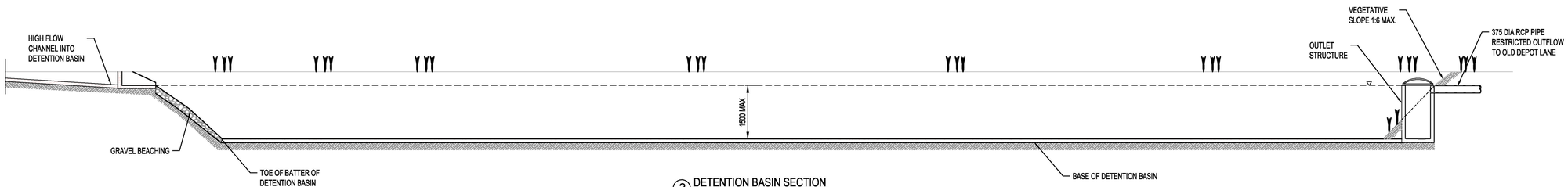
Revision: 3.0

NOTES:

1. ENGINEERING WORKS TO BE DESIGNED IN ACCORDANCE WITH COUNCIL'S ENGINEERING GUIDELINES.
2. SEDIMENTATION BASIN SHALL BE CONSTRUCTED WITH A COMPACTED CLAY BASE TO ASSIST WITH MAINTENANCE. THE BASE MUST HAVE A BEARNG CAPACITY TO SUPPORT MAINTENANCE MACHINERY WHEN ACCESS IS REQUIRED IN THE BASIN.



1 DETENTION BASIN PLAN
SCALE: 1:100



2 DETENTION BASIN SECTION
SCALE: 1:100

NOTES:

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Client:

Project Name:
42 WOODHAMS LANE, MORTLAKE, VIC 3272

Drawing:
C2-2

Job Number:	2024138
Sheet Size:	A1
No. of sheets:	6
Title:	INFILTRATION BED DETAILS

Date:	5/03/2025
Engineer:	MD
Checked:	BJM
Drawn:	MD
Scale:	1:50

Revision:
3.0

Appendix B: Computations

Duration	Duration in min	Annual Exceedance Probability (AEP) 63.2	50	20	10	5	2	1
		Average Recurrence Interval 1	1.44	4.48	9.49	20	50	100
	0	1	1.5	5	10	20	50	100
1 min	1	76.8	88.8	129.0	159.0	190.2	235.2	272.4
2 min	2	66.3	75.9	108.0	131.4	155.4	186.3	210.0
3 min	3	59.0	67.8	96.8	118.0	139.8	168.8	191.4
4 min	4	53.6	61.5	88.4	108.0	128.6	156.0	178.5
5 min	5	49.1	56.5	81.6	100.1	119.3	146.4	168.0
10 min	10	35.7	41.3	60.0	74.4	89.4	111.0	129.0
15 min	15	28.8	33.3	48.4	60.0	72.0	90.0	104.8
20 min	20	24.4	28.2	41.1	50.7	61.2	75.9	88.5
25 min	25	21.4	24.7	36.0	44.4	53.3	66.2	77.0
30 min	30	19.1	22.0	32.0	39.4	47.4	58.8	68.2
45 min	45	14.8	17.1	24.7	30.3	36.1	44.5	51.5
1 hour	60	12.4	14.2	20.3	24.9	29.7	36.4	42.0
1.5 hour	90	9.5	10.9	15.5	18.9	22.5	27.4	31.4
2 hour	120	7.9	9.1	12.8	15.6	18.4	22.4	25.7
3 hour	180	6.1	6.9	9.8	11.8	13.9	16.9	19.4
4.5 hour	270	4.7	5.3	7.5	9.0	10.6	12.9	14.8
6 hour	360	3.9	4.4	6.2	7.5	8.8	10.7	12.3
9 hour	540	3.0	3.4	4.7	5.7	6.7	8.2	9.5
12 hour	720	2.5	2.8	3.9	4.7	5.6	6.8	7.9
18 hour	1080	1.9	2.1	3.0	3.6	4.2	5.2	6.1
24 hour	1440	1.5	1.7	2.4	2.9	3.5	4.3	5.0
30 hour	1800	1.3	1.5	2.1	2.5	3.0	3.6	4.2
36 hour	2160	1.2	1.3	1.8	2.2	2.6	3.2	3.6
48 hour	2880	0.9	1.1	1.5	1.8	2.1	2.5	2.9
72 hour	4320	0.7	0.8	1.1	1.3	1.5	1.8	2.0
96 hour	5760	0.6	0.6	0.8	1.0	1.2	1.4	1.6
120 hour	7200	0.5	0.5	0.7	0.8	0.9	1.1	1.3
144 hour	8640	0.4	0.4	0.6	0.7	0.8	0.9	1.0
168 hour	10080	0.4	0.4	0.5	0.6	0.7	0.8	0.9

Sedimentation Sizing Computations

Upper Catchment A	=	20.26	ha
Distance	=	500	m
Site	=	28.16	ha
TOTAL	=	48.42	ha
		48420	m2
Velocity at table drain	=	1	m/s
tc (time of concentration)	=	(500)m/1m/s	
tc	=	500	s
tc	=	8.33	min
Rainfall Intensity (Mortlake	I1	35.7	mm/hr
	I5	60	mm/hr
	I100	129	mm/hr

From the Rational Method Design Procedure:

Q	=	CIA/360	
C road reserve	=	0.75	
C vacant land	=	0.35	includes upper catchment area
Project site	=	28.16	ha
Upper Catchment A	=	20.26	ha
Vacand land	=	26	ha
Road reserve	=	2.16	ha
Cmean	=	(project site x 0.35+upper catchment Ax0.35+Road reserve x 0.75)/total area	
Cmean	=	0.37	
Q5	=	0.82	l/s
Q100	=	1.77	l/s

Size and shape of sedimentation basin

The inlet zone is to be sized to remove at least 90% of 125 µm particles for the peak one-year flow.

Pollutant removal is estimated using Equation 4.3:

$$R = 1 - \left[1 + \frac{1}{n} \times \frac{v_s}{Q/A} \times \frac{(d_e + d_p)}{(d_e + d^*)}\right]^{-n}$$

n	1.67		turbulence factor
λ	0.4		Hydraulic efficiency
dp	1.5	m	permanent pool depth
d*	1	m	
de	0.25	m	
vs	0.011	m/s	for 125 µm particles
Q	1.772854	m3/s	design operation flow rate
A	550	assume	

$$\left[1 + \frac{1}{n} \times \frac{v_s}{Q/A} \times \frac{(d_e + d_p)}{(d_e + d^*)}\right]^{-n}$$

0.10

R 0.90

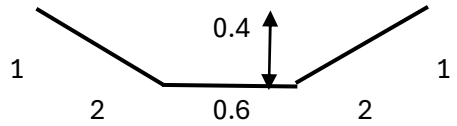
R 90 %

Sedimention Basin 10m Width x 55m Length

Manning's equation $Q = (AR^{2/3}S_o^{1/2})/n$

SEGMENT OF UPPER PORTION

n	=	0.04	at 0.2 depth
S	=	0.030	1/150
A	=	1.04	m2
R	=	0.209677	Ratio of area to wetted perimeter
Qcap	=	1.581152	m3/s



Upper Segment	=	20.26	ha
Distance	=	500	m
Site segment A	=	14.08	ha

Velocity at table drain	=	1	m/s
time of concentration)	=	=(500+30)m/1m/s	
tc	=	500	s
tc	=	8.33	min
fall Intensity (Mortlake	I1	35.7	mm/hr
	I5	60	mm/hr
	I100	129	mm/hr

Peak Design Flows

$$Q = 0.002788 \times C \times I \times A$$

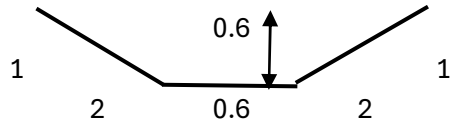
C	=	0.62
Q5	=	1.460287

Qcap is than Q5 therefore okay

SEGMENT OF LOWER PORTION

Manning's equation $Q = (AR^{2/3}S_o^{1/2})/n$

n	=	0.04	at 0.2 depth
S	=	0.030	1/150
A	=	1.56	m2
R	=	0.314516	Ratio of area to wetted perimeter
Qcap	=	3.112046	m3/s



Lower Segment	=	20.26	ha
Distance	=	500	m
Site segment A	=	28.16	ha

Velocity at table drain	=	1	m/s
time of concentration)	=	=(500+30)m/1m/s	
tc	=	500	s
tc	=	8.33	min
fall Intensity (Mortlake	I1	35.7	mm/hr
	I5	60	mm/hr
	I100	129	mm/hr

Peak Design Flows

$$Q = 0.002788 \times C \times I \times A$$

C	=	0.62
Q5	=	2.920575

Qcap is than Q5 therefore okay

Therefore, the nominated swale has sufficient capacity to convey the required peak Q5 flow without any requirement for an additional piped drainage system.

Stormwater Calculations

Report for **Moyne Council**

Date report printed: 26/03/2025

Project Details

Project Name	2024138-Detention		
Web files link			
Site Area (m2)	28160	Project ID	4805
Planning number			
Development type	Multi dwelling (dual occupancy, townhouse, villar unit etc)		
Existing site details	Residential >750m2 per dwelling		
Street address	42 Woodhams Lane, Mortlake VIC, Australia		

Results

VOLUME	FLOW	QUALITY	EFFICIENCY
Objective: Reduce annual average runoff volume by harvesting or infiltrating stormwater	**Objective**: Control peak discharge flow (litres per second) with adequate on site detention	**Objective**: Improve stormwater runoff water quality (Equivalent to STORM score)	**Objective**: Increase drought resilience
Target: No increase in pre-development annual average runoff volume (Up to a 10% increase is allowed to account for uncertainties)	**Target:** less than or equal to zero. If greater than zero this is the additional Site Storage Requirement (SSR) volume required	**Target**: Achieve a score of 100 or more This corresponds to a 45% reduction in nitrogen runoff	**Target**: Achieve greater than 25% potable water use reduction
VOLUME RESULT	**FLOW RESULT**	**QUALITY RESULT**	**EFFICIENCY RESULT**
-92.4	0.0	150	37.4
% change in annual average volume	m^3 of additional site storage required	Pollution reduction score (out of 100)	% water saving
VOLUME PASSES	FLOW PASSES	QUALITY PASSES	EFFICIENCY PASSES

Design Criteria

The items on this page must be reflected on other project plans, specifications and engineering drawings.
The development must be designed and constructed in accordance with the following:

Rainwater Tank Specifications

Total rainwater tank volume (L)	5000	*This is the rainwater tank volume retention + detention	
Total rainwater retention* tank volume (L)	2000	*This is the rainwater tank volume that is available for reuse	
Total rainwater detention* tank volume (L)	3000	*This is the rainwater tank volume that is reserved for slow release to stormwater	
Roof connected to rainwater tank (m^2)	400.0		
Rainwater tanks connected to	Toilet , Laundry , Irrigation		
Other rainwater tank end uses (L/day)		Irrigated Garden Area (m^2)	
% building rainwater end uses connected (to rainwater tanks)	100	First Flush Device?	0
Additional* Site Storage (L)		*Site storage added adjacent to the legal point of discharge for peak flow detention or volume infiltration	
Recycled water source (Yes/No)	Recycled water source		
Water tank reliability %	2.1		
Rainwater tank overflow %	45.9	*Note if this number is under 25%, then 30% of the tank's *retention* volume will be counted toward the *detention* volume	

Water Efficiency Specifications

Basin WELS star rating	> 4 Star WELS rating
Toilet WELS rating	> 4 Star WELS rating
Bath WELS star rating	Default or unrated
Washing Machine WELS star rating	Default or unrated
Kitchen Taps WELS rating	> 4 Star WELS rating
Urinal WELS rating	Not Applicable
Shower WELS star rating	3 Star WELS (> 7.5 but <= 9.0) (minimum requirement)
Dishwasher WELS star rating	> 3 Star WELS rating

Stormwater management measures selected are

This includes all impervious areas in the site connected to Council or Stormwater Authority drains. This excludes pervious areas like garden, gravel, and lawn areas)

- 2160m^2 of Other Road network draining to 550m^2 of treatment: Sedimentary Basin
-

For the 400m^2 roof area Roof area, Raintank Volume = 5000 litres connected to 400m^2 of roof, additional water tank based detention volume = 3000 litres. Total tank volume (retention + detention volumes) = 5000.0 litres

Building Occupancy Calculations

Building Spaces

•10400m^2 of Individual dwellings - BCA Class 1a with an average occupancy of 208.0 people

Estimated Total Building Occupancy	208.0

Stormwater VOLUME Calculations

Site Area (m^2)	28160
Post development total impervious area (m2)	2560.0
Rainwater Tank Overflow (kL/annum)	91.2
Pre-development Volume (kL/annum)	5036.5
Post-development Volume (kL/annum)	380.9
Change in volume %	-92.4

Stormwater QUALITY Calculations

Rainwater Tank Runoff reduction (%)	54.1
Rainwater Tank(s) Total Nitrogen (TN) reduction	480.9
Total Nitrogen (TN) % reduction	67.5
Equivalent STORM Score	150

Water EFFICIENCY Calculations

Benchmark water use (kL/year)	18144.7		
Predicted potable water use (kL/year)	11357.5		
Predicted potable water use (L/person/day)	216.3		
Water savings from tank (kL/year)	107.5		
Water saving from efficiency (kL/year)	1723.30		
Total water saving % (efficiency + tank + recycled water)	37.4	Water saving (kL/year)	6787.2

Stormwater FLOW Calculations - **Swinburne Method**

This section outlines rational method calculations for On Site Detention (OSD) and Site Storage Requirements (SSR)

Permissible Site Discharge (PSD) Calculations

Calculated PSD	116.0
PSD Override Value Used	

Site Storage Calculations

Preliminary On Site Detention (OSD) tank size required estimate (m^3)	Not Applicable	Swinburne Method On Ground formula
OSD and storages* provided (m^3)	3.7	Includes storages: rainwater tank retention allowance, rainwater tank detention, and additional added storage volumes
Additional detention / retention volume required (m^3)	0.0	
Base case (pre-development) fraction impervious (ratio)	0.40	
Base case runoff coefficient	0.40	
Post development total impervious area (in hectares)	0.2560	
Post development fraction impervious (ratio)	0.09	
Post development runoff coefficient	0.149	
Pre-development design storm	20% AEP (~1 in 5 year ARI) - default residential	
Post development detention required	10% AEP (~1 in 10 ARI) - default residential	
Critical Storm Duration - the Catchment time of concentration – Tc(catchment) in minutes	20	
Rainfall Depth (mm) for Critical Storm Duration - Tc(catchment)	11.44	
Rainfall intensity - i at Tc(catchment) (mm/h)	34.320	
Travel time from discharge point to catchment outlet (min) - Tcs	20.0	
Rainfall Depth (mm) for Tcs - (IFD at Tcs)	15.08	
Rainfall intensity - i at tc(site) (mm/h)	45.24	

OSD tank flow restrictor orifice diameter = 0 mm

OSD NOT REQUIRED This project does not increase runoff to the drainage system. The post development runoff coefficient from the proposed site (Cp) is less than the base case runoff coefficient from the existing site (Ce). Rational method: Weighted Cp < Weighted Ce

Detention Calculator - Site Storage Requirement (SSR)

Storm Duration (mins)	Rainfall Depth (mm)	Stored Volume (m^3)
5		
7.5		
10		
12.5		
15		
20		
30		
40		
60		

About In-Site Water

This report is generated by user inputs from the toolkit at InSite Water. In-Site water is an online Integrated Water Management tool designed for use on smaller sites (less than 2 hectares) in Australia that need quick and accurate stormwater engineering answers. InSite water is simple to use but provides robust stormwater design and engineering answers.

This report includes outputs from the InSite tool that has investigated:

– water tank sizing
– detention tank sizing
– water savings through efficiency
– water WSUD treatments such as raingardens

For enquiries, contact us through www.insitewater.com.au

Disclaimer

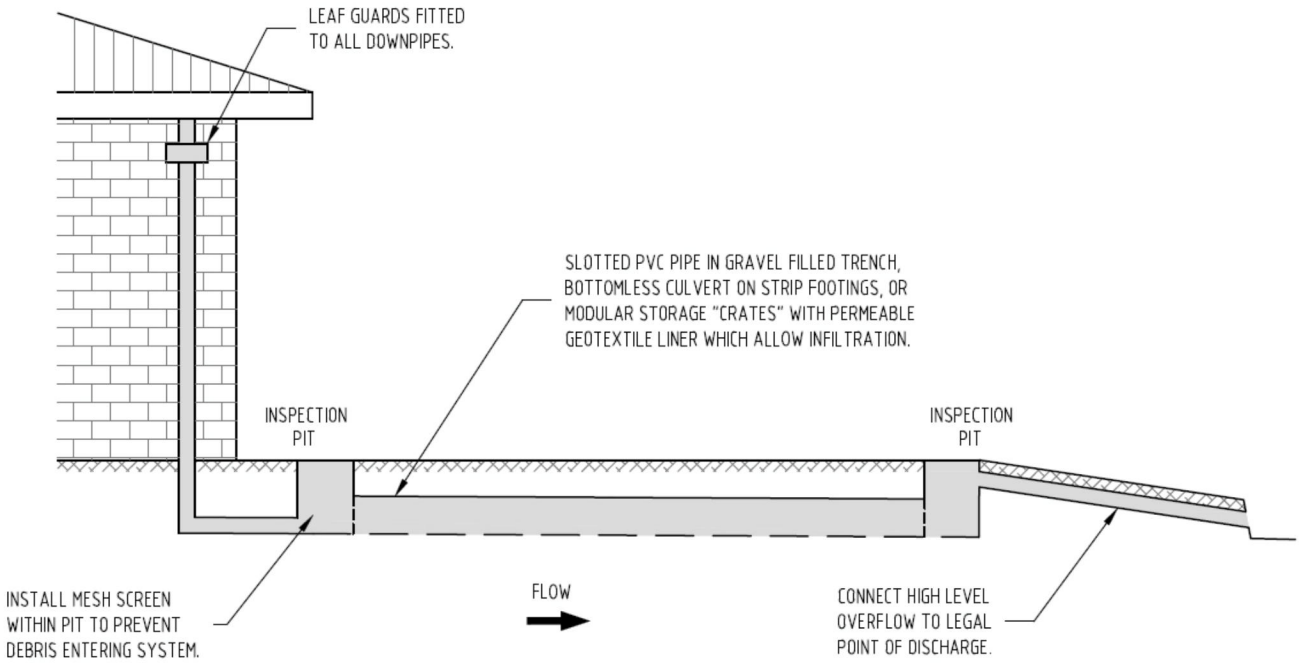
This guide is of a general nature only. Advice from a suitably qualified professional should be sought for your particular circumstances. Depending on each unique situation, there may be occasions where compliance is not achieved.

This report does not provide a detailed design and layout for the piping and general drainage system in your development, which should be prepared by a suitably qualified professional. In addition, InSite Water does not consider compliance for slope stability or foundation / slab / footing protection, which needs to come from a qualified geotechnical or structural engineer.

The following is outside the scope of InSite Water, however it is critical that all designers consider the following in drainage design and in using Water Sensitive Urban Design (WSUD) devices and approaches:

- *Manage expectations and risks around occasional surface water and ponding.*
- *Ensure that uncontrolled stormwater does not flow over property boundaries or otherwise cause a nuisance.*
- *Plan for major flood pathways – locate buildings away from, adapt (raise floors above predicted flood levels) and defend buildings against potential major flooding.*
- *Seek professional advice to reduce damage and safety risks.*
- *Design for local conditions such as vegetation, topography and soils (soil type, reactivity, permeability, water table level, salinity, dispersiveness, acid sulphate soils, contaminated land etc).*
- *Ensure that soil moisture and building clearance is considered in areas of reactive clays or where varying soil moisture levels could damage buildings or other infrastructure.*
- *For steeper sites, ensure the design includes geotechnical considerations such as slope stability with varying soil saturation levels.*
- *Ensure that a Stormwater Risk Assessment and Environmental Management Plan is undertaken for sites that pose a pollution risk.*
- *Ensure that a Construction Environmental Management Plan (CEMP) is implemented to control sediments and reduce stormwater pollution during construction.*
- *Compliance with ARR 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation* http://arr.ga.gov.au/
- *Compliance with NCC plumbing and building standards.*
- *Compliance with AS/NZS 3500.*
- *Compliance with EPA and other environmental regulations.*
- *Compliance with other relevant Australian Standards, regulations and Council requirements.*

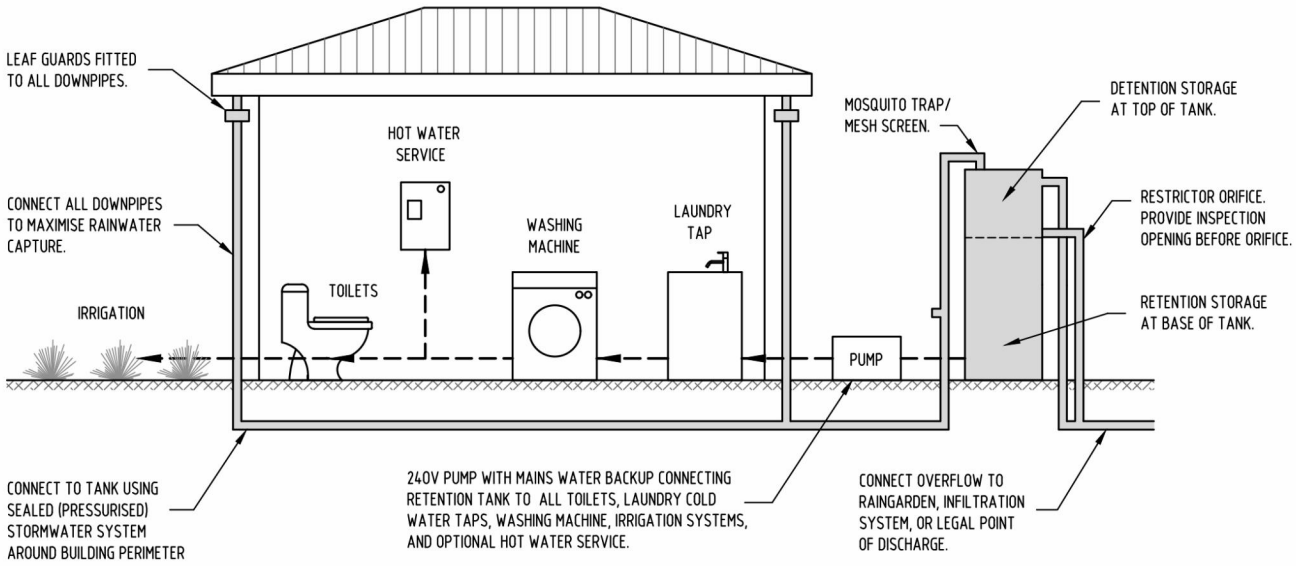
Appendix A: attach further details for this project (if applicable):



INFILTRATION TRENCH

N.T.S.
NOTE: THE DESIGN AND INSTALLATION OF ALL STORMWATER SYSTEMS SHALL COMPLY WITH AS/NZS 3500.3:2018 "STORMWATER DRAINAGE". (AND WITH "MINISTER'S SPECIFICATION SA78AA. SEPTEMBER 2003. ON-SITE RETENTION OF STORMWATER)

Above: Road network treatment drawing (draft for planning approvals only: not for construction, not to scale)



RETENTION TANK RETICULATION DETAIL

N.T.S.
NOTE: THE DESIGN AND INSTALLATION OF ALL STORMWATER SYSTEMS SHALL COMPLY WITH AS/NZS 3500.3:2018 "STORMWATER DRAINAGE".

Above: Roof area treatment drawing (draft for planning approvals only: not for construction, not to scale)