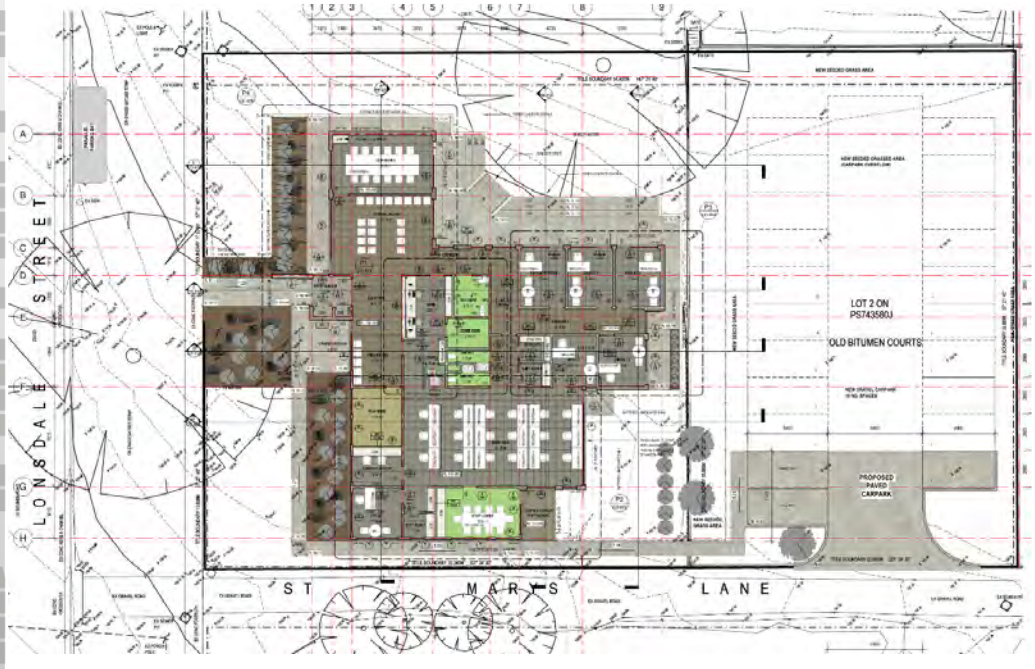
PM DESIGN | GROUP
Engineering Solutions

20/04/2023

Our ref: **15718**
Doc rev: **A**

Stormwater Management System Report

122/124 Lonsdale Street, Hamilton



MELBOURNE
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Document Revision Summary

Revision	Date	Section	Description	Authorized
A	20/04/2023		Issued for Approval.	DC

PM DESIGN GROUP
Engineering Solutions

1 CONTENT

2 INTRODUCTION

This report has been prepared by PM Design Group for the construction of a new medical facility namely the South West Hospital, at 122/124 Lonsdale St, Hamilton. An aerial view of the locality is shown as Figure 1.

Figure 1: Aerial View

3 THE DEVELOPMENT

The site is approximately 1 857m², comprising the consolidation of 122 and 124 Lonsdale Street. These existing sites comprise two existing structures and an existing asphalt playing court area together with paved walkways. The remainder the site areas has an established grassed covering.

It is proposed to demolish the existing structures and undertake the construction of 1 new single storey building and a new parking area, along with minimal paving of the site for walkways on the Eastern and Western building envelopes. ***Appendix A*** contains the proposed overall post development site plan.

In accordance with the IDM it is proposed to limit site discharge to the predevelopment flow for a 10% AEP storm.

To facilitate this outcome a combination of two new 5 000lt above ground rainwater water storage tanks and on surface detention at the proposed new carpark will be used to catch roof and paved area water flows for the sub-catchments, this captured water will then be discharged at a reduced flow rate via. orifice pipes and plates in each system thereby limiting the overall post development flow to the overall site predevelopment flow. Overflow will be provided via DN100 PVC to the LPOD.

Water Sensitive Urban Design best practice procedures will also be adopted to minimise pollutant impact to receiving waterways.

Overall site pavement levels and grading will be determined by PM Design Group. For the purposes of restricted flow calculations, all pavement and landscaped areas are considered as either infiltrating or discharging unrestrained to the surrounding Road Reserves

2 INTRODUCTION

This report has been prepared by PM Design Group for the construction of a new medical facility namely the South West Hospital, at 122/124 Lonsdale St, Hamilton. An aerial view of the locality is shown as Figure 1.

Figure 1: Aerial View

5 POST DEVELOPMENT FLOWS

Post development restrained flow catchments have been calculated as per the site plan attached as ***Appendices A and B***. These catchments are summarised below:

Table 2: Post-Development Restrained Catchment Summary

Location	Area (A) ha	Co-efficient (C_w)	Effective Area (AC_w)
Roof West	0.017900	0.95	0.01701
Roof East	0.034400	0.95	0.03268
Parking areas	0.051000	0.95	0.04845
Total	**0.103300**	**∑ Ae (ha)**	**0.098135**

It is proposed that the post-development driveways and front landscaped areas discharge unrestrained. The resultant flow has been calculated below, using 1in5 ARI, Time of Concentration of 10 minutes and the Rational Method:

Table 3: Post-Development Un-Restrained Catchment Summary

Location	Area (A) ha	Co-efficient (C_w)	Effective Area (AC_w)	$\sum(AC_w)$ ha	I mm/hr	Q m^3/s
Landscape	0.0660	0.25	0.016500			
Paving	0.0164	0.95	0.015580			
Total	**0.0824**			**0.03208**	**90.8**	**0.008091**

Removing this flow from the adopted pre-development discharge gives a resultant discharge limit for the restrained catchments as follows:

Pre-development flow - Unrestrained Post Development Flow = Q restrict
0.011709 - 0.008091 = ***0.003618 m^3/s***

Therefore, allowable discharge from the catchment post-development will be limited to 3.618 l/s, for the 10% AEP design storm. These have been distributed proportionally within the different internal catchment zones and each has been restrained via. the use of either orifice pipes or orifice plates. These overall restrictions will limit post development flows to the predevelopment flow for the site. The overall system will allow for the surcharge flows to be directed to the Lonsdale Street Road Reserve in a safe manner. Refer to the calculations in Appendix D of this report for the relevant storage requirements and control measures.

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It is proposed to demolish the existing structures and undertake the construction of 1 new single storey building and a new parking area, along with minimal paving of the site for walkways on the Eastern and Western building envelopes. ***Appendix A*** contains the proposed overall post development site plan.

In accordance with the IDM it is proposed to limit site discharge to the predevelopment flow for a 10% AEP storm.

To facilitate this outcome a combination of two new 5 000lt above ground rainwater water storage tanks and on surface detention at the proposed new carpark will be used to catch roof and paved area water flows for the sub-catchments, this captured water will then be discharged at a reduced flow rate via. orifice pipes and plates in each system thereby limiting the overall post development flow to the overall site predevelopment flow. Overflow will be provided via DN100 PVC to the LPOD.

Water Sensitive Urban Design best practice procedures will also be adopted to minimise pollutant impact to receiving waterways.

Overall site pavement levels and grading will be determined by PM Design Group. For the purposes of restricted flow calculations, all pavement and landscaped areas are considered as either infiltrating or discharging unrestrained to the surrounding Road Reserves

7 MAJOR STORM MANAGEMENT

The finished site grading is being determined by others and shall be set such that the major storm flows are directed to a grated pits around the site, then piped to the front of the property where it may surcharge and flow overland to the nominated Legal Point of Discharge. The existing topography of the site facilitates the draining to the Lonsdale Steet Road reserve. The site shall be graded such that these natural surface flows are maintained.

8 WATER SENSITIVE URBAN DESIGN

WSUD criteria will be met by the following methodology:

- Additional treatment for the paved walkways, parking and roof areas will be via. the adoption of rainwater tanks and onsite carpark detention.
- Use of pit(s) with silt sumps, sized as below.

In accordance with the requirements of the planning permit we have used the results of the STORM tool calculations with a resultant STORM rating of 121%. The output from the STORM tool which is included in ***Appendix E***.

Pit Sump Sizing:

2/No. 600 x 600mm Grated Sump Pits will be installed to collect silt from the surface water flows. These pits will have a minimum 300 mm deep sump for silt collection, sized as follows:

- Roof water is considered fully treated and is included in the calculation.
- Post Development Un-Treated Surface Area totals 0.1172 ha
- Sediment Accumulation Rate of 1.6m³/ha/annum (WSUD Engineering Procedures, CSIRO 2006)
- Annual Accumulation = 0.1172 x 1.6 = 0.1875 m³
- Target Cleaning Frequency = Once a Year
- Pit Sump Dimensions: 0.60m W x 0.60m L x 0.3m D; Volume = 0.108m³ x 2/No. = 0.216m³

Sump Capacity = Cleaning Frequency Accumulation

0.216/0.1875 = Every 1.152 Years

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Alternatively, onsite tank gauges can help those familiar with the tank know if the tank is not working correctly.

Pumps

Maintenance should occur as per the chosen Manufacturer's specifications. All strainers and filters should be cleaned every 6 months. Good quality pump should provide trouble free service for up to 10 years.

Commissioning

Rainwater Tank

All rainwater tanks should be washed or flushed out prior to use. All inlets and outlets should be correctly sealed to prevent insects entering. Connection to all toilets and laundry in the development should be tested (dye test or equivalent).

Please note if new roof coating or paint is to be installed then the first few run-offs after installation need to be discarded.

Pumps

Commissioning should occur as per the chosen Manufacturer specifications.

Summary

The following needs to occur onsite to ensure compliance with WSUD requirements and maintain operation of rainwater tank and connections onsite.

Task	When?	Requirement
Inspect Rainwater tanks	Every 6 months	• Check for any damage/compression • Mosquitoes infestation
	Every 2 years	• Sludge Build up — if sludge build up occurs a vacuum tank needs to be called out to site.
Inspect roofs & gutters	Every 6 months	• Clean out of leaves / debris. • Remove any overhanging branches onsite.

10 CONCLUSION

This Stormwater Management Plan outlines the methods by which the site may be drained, in support of the planning application.

- Design Storm nominated as 10% AEP.
- Minor storm managed using storage and a dual chamber orifice pit.
- Major storm discharge to LPOD without affecting other properties.
- WSUD criteria has been considered.

Report Prepared By:

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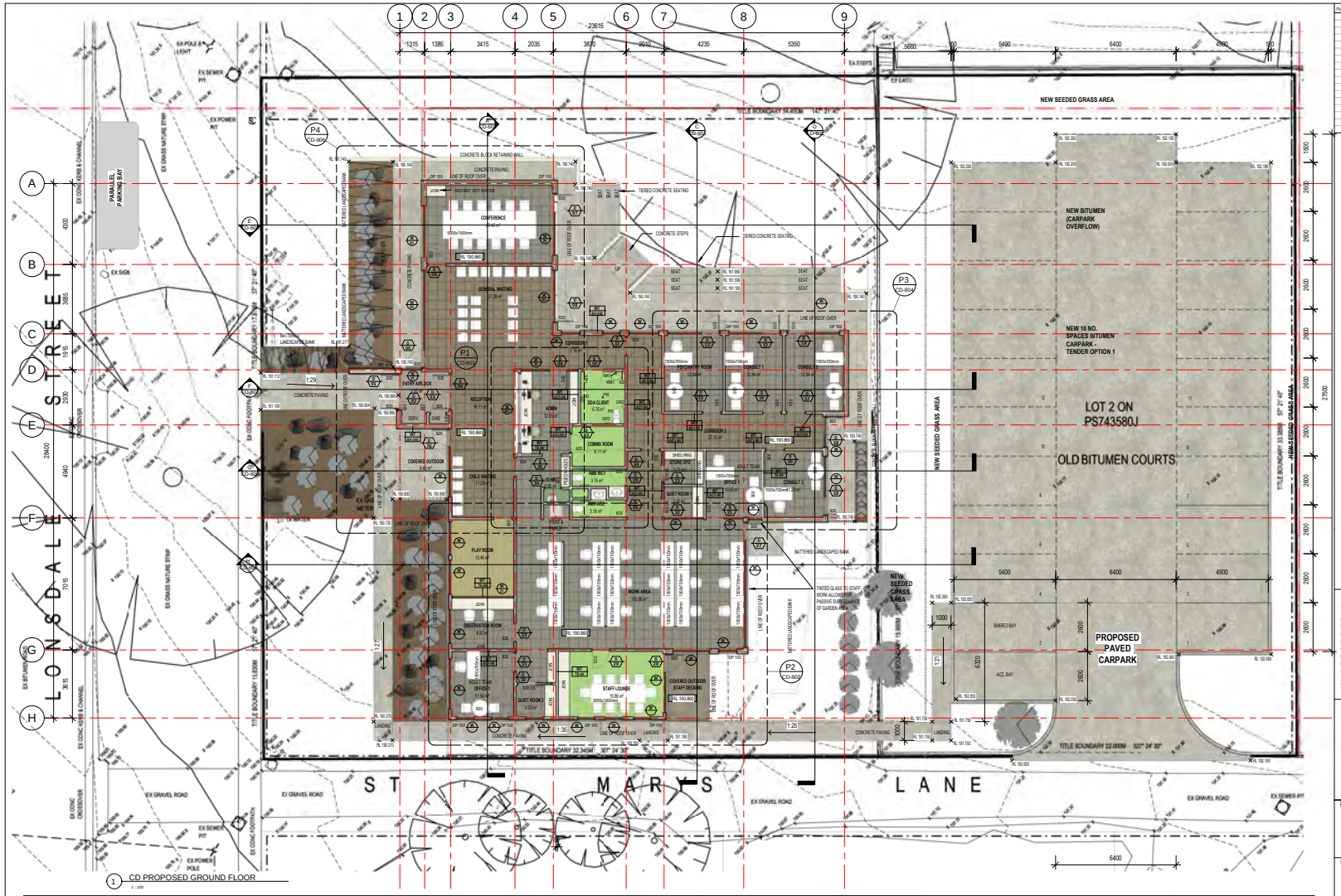
11 APPENDIX A

Post Development Site Plan



1 CD PROPOSED GROUND FLOOR
1 : 100

GENERAL NOTES

ALL DRAWINGS TO BE READ IN CONJUNCTION WITH BOTH THE STRUCTURAL ENGINEER'S DRAWINGS AND COMPUTATIONS AND WITH THE SOIL REPORT.
WORKS TO COMPLY WITH RELEVANT SAA CODES, LOCAL BYLAWS, BUILDING CODE OF CODE OF AUSTRALIA AND RELEVANT AUTHORITIES.
REFER STRUCTURAL ENGINEERS DRAWINGS & COMPUTATIONS FOR DESIGN OF ALL RC SLABS, BEAMS AND LINTELS.
ALL DRAWINGS MUST BE READ IN CONJUNCTION WITH: CIVIL, MECHANICAL, ELECTRICAL, AND HYDRAULIC DRAWINGS AND SPECIFICATIONS
BUILDER TO CHECK AND VERIFY ALL DIMENSIONS & LEVELS PRIOR TO COMMENCEMENT OF WORK.
PROVIDE BRICKWORK ARTICULATION JOINTS AS RECOMMENDED BY THE CEMENT AND CONCRETE ASSOCIATION TECHNICAL NOTE No. 61 IE. ARTICULATION JOINTS TO BE AT MAX 6 METER SPACINGS UNLESS ADVISED OTHERWISE BY ENGINEER OR SOIL ENG.
ALL WINDOW SIZES ARE NOMINAL, CONTRACTOR MUST CHECK ALL WINDOW OPENINGS ON SITE PRIOR TO WINDOW MANUFACTURE AND INSTALLATION.

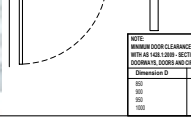
ALL GLAZING TO COMPLY WITH AS 1288 & AS 2047 COMPLYING WITH U & SHGC VALUES AS NOMINATED BY THE GLAZING CALCULATOR.
ALL EXTERNAL DOORS & OPENABLE WINDOWS SHALL BE FITTED WITH FOAM/RUNNER COMPRESSIBLE STRIP OF FIBROUS WEATHER SEAL
ALL FRAMING AND FIXINGS TO BE IN ACCORDANCE WITH AS 1684 NATIONAL TIMBER FRAMING CODE 1990
ALL EXPOSED STEEL LINTELS TO BE HOT DIPPED GALVANISED. PROVIDE TERMITE PROTECTION IN ACCORDANCE WITH AS3660 2000 (REFER TO SPEC)
PROVIDE PERMANENT NANOTECHNOLOGY ECO BARRIER ANTI GRAFFITI CLEAR COAT WITH MATT FINISH TO ALL NON PAINTED SURFACES UP TO 2M HIGH. REFER TO SPECIFICATION.
THE CONTRACTOR MUST PROVIDE PORTABLE FIRE EXTINGUISHERS AS REQUIRED AND IN ACCORDANCE WITH AS 2444 - 2001 & AS 1851.1 - 1995. FINAL NUMBER & LOCATION OF FIRE EXTINGUISHERS TO BE CONFIRMED ON SITE PRIOR TO OCCUPANCY

PROPOSED AIR CONDITIONING & VENTILATION SYSTEMS ARE TO COMPLY WITH PART J5 OF THE NCC
PROPOSED ARTIFICIAL LIGHTING SYSTEM ARE TO COMPLY WITH PART J6 OF THE NCC
THE CONTRACTOR MUST PROVIDE A SIGNAGE SCHEDULE INCLUDING; FIRE EXTINGUISHERS, ROOM NAMES ETC & TO PROVIDE BRAILLE TYPE SIGNS & TACTILE INDICATORS TO ALL SANITARY FACILITIES TO COMPLY WITH STATUTORY SIGNAGE REQUIREMENTS. TOILET SEATS TO ACCESSIBLE AND AMBULANT TOILETS ARE TO BE 30% LUMINANCE CONTRASTING COLOUR
DOOR HARDWARE, SANITARY FITTINGS & FIXTURES ALL IN ACCORDANCE WITH AS 1428.1:2009
DOOR TO DS WC/SHR TO HAVE REMOVABLE HINGES SO THAT THE DOOR CAN BE OPENED IN AN EMERGENCY.
PRIVACY SNIBS TO ACCESSIBLE TOILETS ARE TO BE 45MM AS PER AS. 1428.1:2009
CONTRACTOR TO PROVIDE 3 SETS OF TRUSS ROOF & WALL DESIGN & ERECTION DETAILS ON SITE PRIOR TO FRAMING INSPECTION AS A CONDITION ATTACHED TO THE BUILDING PERMIT

INSULATION NOTES

REFER TO THE SECTION J COMPLIANCE REPORT FOR THE PERFORMANCE REQUIREMENTS OF BUILDING FABRIC, INCLUDING GLAZING.
REFER TO ACOUSTIC REPORT FOR ACOUSTIC REQUIREMENTS
ALL INSULATION MUST COMPLY WITH AS/NZS 4859.1 THE INSULATION MUST BE INSTALLED SO THAT IT ABUTS AND OVERLAPS MEMBERS
REFLECTIVE INSULATION MUST OVERLAP BY MIN 50mm
BULK INSULATION MUST NOT BE COMPRESSED EXCEPT OVER BATTENS ETC.) AND SHALL OVERLAP THE TOP OF WALLS BY AT LEAST 50MM
ROOF AND CEILINGS TO ACHIEVE A TOTAL R-VALUE (min R0.2) WHEN MEASURED DOWNWARDS OR AS SPECIFIED.
EXTERNAL WALLS REQUIRE SUFFICIENT INSULATION TO ACHIEVE A TOTAL R-VALUE (min R1.8) OR AS SPECIFIED.
INTERNAL ENVELOPE WALLS REQUIRE SUFFICIENT INSULATION TO ACHIEVE A TOTAL R-VALUE (min R1.8) OR AS SPECIFIED.
PROVIDE ACOUSTIC WALL INSULATION TO INTERNAL WALLS WHERE INDICATED. REFER TO WALL TYPES SCHEDULE

DOOR CLEARANCES



NOTE:
MINIMUM DOOR CLEARANCES TO BE IN ACCORDANCE WITH AS 1428.1:2009 - SECTION 13:
DOORWAYS, DOORS AND CIRCULATION SPACE AT DOORWAYS

Dimension D	Dimension WH	Dimension WL
850	110	530
900	110	530
950	110	530
1000	110	530

TERMITE CONTROL MANAGEMENT

NOTE:
CONTRACTOR TO PROVIDE A TERMITE MANAGEMENT SYSTEM IN ACCORDANCE WITH AS3660.1 TO ALL PRIMARY BUILDING ELEMENTS THAT ARE SUSCEPTIBLE TO TERMITE ATTACK. PLEASE REFER ALSO TO THE ARCHITECTURAL SPECIFICATION SECTION 02360

Rev.	Date	Description

ABBREVIATION LEGEND

DP 100	
FW	
GRD	GUARD RAIL TYPE 2 AS SPECIFIED
GRO	
HD	HAND DRYER AS SELECTED
MIX1	
PD	
SD	
WB1	

MINIMUM ROOF/CEILING INSULATION REQUIREMENTS
PROPOSED METAL SHEET ROOFING.
MINIMUM R2.72 INSULATION REQUIRED.

MINIMUM EXTERNAL WALL INSULATION REQUIREMENTS
PROPOSED BRICK WALL/FIBRE CEMENT CLADDING
MINIMUM R1.50 INSULATION REQUIRED.

MINIMUM INTERNAL WALL INSULATION REQUIREMENTS
PROPOSED STUD WALL
MINIMUM R1.50 INSULATION REQUIRED.

MINIMUM FLOOR INSULATION REQUIREMENTS
PROPOSED CONCRETE SLAB ON GROUND
MINIMUM R0.50 INSULATION REQUIRED.

GLAZING VALUES

GROUND WINDOWS - DOUBLE GLAZING
- AVERAGE GLAZING U VALUE: 4.60
- AVERAGE GLAZING SHGC: 0.31

HIGHLIGHT WINDOWS - DOUBLE GLAZING
- AVERAGE GLAZING U VALUE: 3.15
- AVERAGE GLAZING SHGC: 0.39

AIR CONDITIONING & VENTILATION
TO COMPLY WITH PART J5

LIGHTING
TO COMPLY WITH PART J6
SYSTEM ILLUMINATION POWER LOAD ALLOWANCE
- 7: 472W
- 7:110W
- 7: 110W
- 7: 7W
- 7: 24 W

PRELIMINARY

AVOR
AVOR ARCHITECTURE PTY. LTD.
P.O. BOX 6420
MELBOURNE
VICTORIA 3004
w: www.avor.com.au
e: contact@avor.com.au
p: 0408 366 358
ABN: 48 621 788 403

Project
SOUTH WEST HEALTH

Project address
122 LONSDALE ST,
HAMILTON, VIC 3300

Title
PROPOSED FLOOR PLAN

Drawn by: ABS	Designed by: ABS
Checked by: OM	Project No: AV0068
Scale: As indicated @ A1	Date started: APRIL 2022
Drawing No: CD-302	Revision No:

11 APPENDIX A

Post Development Site Plan

PM DESIGN GROUP Engineering Solutions

Project:	15718
Date:	24/03/2023
Engineer:	A.Singh

Intensity, Frequency and Duration (IFD) Table

122/124 Lonsdale Street ,
Location: HAMILTON
Date: 24/03/2023
Units: mm/hr

Duration (mins)	Annual Exceedence Probability (AEP)						
	63.20%	50%	20%	**10%**	5%	2%	1%
1	79.7	90.3	127.0	154.0	184.0	226.0	262.0
2	68.8	77.7	108.0	130.0	154.0	188.0	215.0
3	61.1	69.1	96.2	116.0	138.0	168.0	194.0
4	55.3	62.6	87.4	106.0	126.0	154.0	178.0
5	50.7	57.4	80.4	97.7	116.0	143.0	165.0
6	47.0	53.2	74.6	**90.8**	108.0	133.0	154.0
10	36.9	41.9	58.9	71.8	85.6	106.0	123.0
15	29.8	33.8	47.5	57.9	69.0	85.3	99.0
20	25.3	28.7	40.3	49.1	58.4	72.2	83.8
25	22.1	25.1	35.2	42.9	51.0	63.0	73.0
30	19.8	22.4	31.4	38.2	45.5	56.1	65.0
45	15.3	17.3	24.2	29.4	35.0	43.0	49.8
60	12.7	14.3	20.0	24.3	28.8	35.4	40.9
90	9.7	10.9	15.2	18.5	21.9	26.9	31.0
120	8.0	9.0	12.5	15.2	18.0	22.1	25.5
180	6.0	6.8	9.5	11.5	13.7	16.8	19.4
270	4.6	5.1	7.2	8.7	10.4	12.8	14.8
360	3.7	4.2	5.9	7.2	8.5	10.5	12.2
540	2.8	3.2	4.5	5.4	6.5	8.0	9.3
720	2.3	2.6	3.7	4.5	5.3	6.6	7.7
1080	1.7	2.0	2.8	3.4	4.0	5.0	5.8
1440	1.4	1.6	2.3	2.7	3.3	4.1	4.7
1800	1.2	1.4	1.9	2.3	2.8	3.4	4.0
2160	1.1	1.2	1.7	2.0	2.4	3.0	3.5
2880	0.9	1.0	1.3	1.6	1.9	2.4	2.8
4320	0.6	0.7	1.0	1.2	1.4	1.7	1.9
5760	0.5	0.6	0.8	0.9	1.1	1.3	1.5
7200	0.4	0.5	0.6	0.8	0.9	1.0	1.2
8640	0.4	0.4	0.6	0.6	0.7	0.9	1.0
10080	0.3	0.4	0.5	0.6	0.6	0.8	0.9

Source: ***http://www.bom.gov.au/water/designRainfalls/revised-ifd/*** ***Accessed: 24/03/2023***

Site Address: 122/124 Lonsdale St , HAMILTON

Single Point Map Co-Ordinates: -37.739658, 142.026701

PM DESIGN GROUP Engineering Solutions

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Date:	24/03/2023
Engineer:	A.Singh

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4	55.3	62.6	87.4	106.0	126.0	154.0	178.0
5	50.7	57.4	80.4	97.7	116.0	143.0	165.0
6	47.0	53.2	74.6	**90.8**	108.0	133.0	154.0
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20	25.3	28.7	40.3	49.1	58.4	72.2	83.8
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90	9.7	10.9	15.2	18.5	21.9	26.9	31.0
120	8.0	9.0	12.5	15.2	18.0	22.1	25.5
180	6.0	6.8	9.5	11.5	13.7	16.8	19.4
270	4.6	5.1	7.2	8.7	10.4	12.8	14.8
360	3.7	4.2	5.9	7.2	8.5	10.5	12.2
540	2.8	3.2	4.5	5.4	6.5	8.0	9.3
720	2.3	2.6	3.7	4.5	5.3	6.6	7.7
1080	1.7	2.0	2.8	3.4	4.0	5.0	5.8
1440	1.4	1.6	2.3	2.7	3.3	4.1	4.7
1800	1.2	1.4	1.9	2.3	2.8	3.4	4.0
2160	1.1	1.2	1.7	2.0	2.4	3.0	3.5
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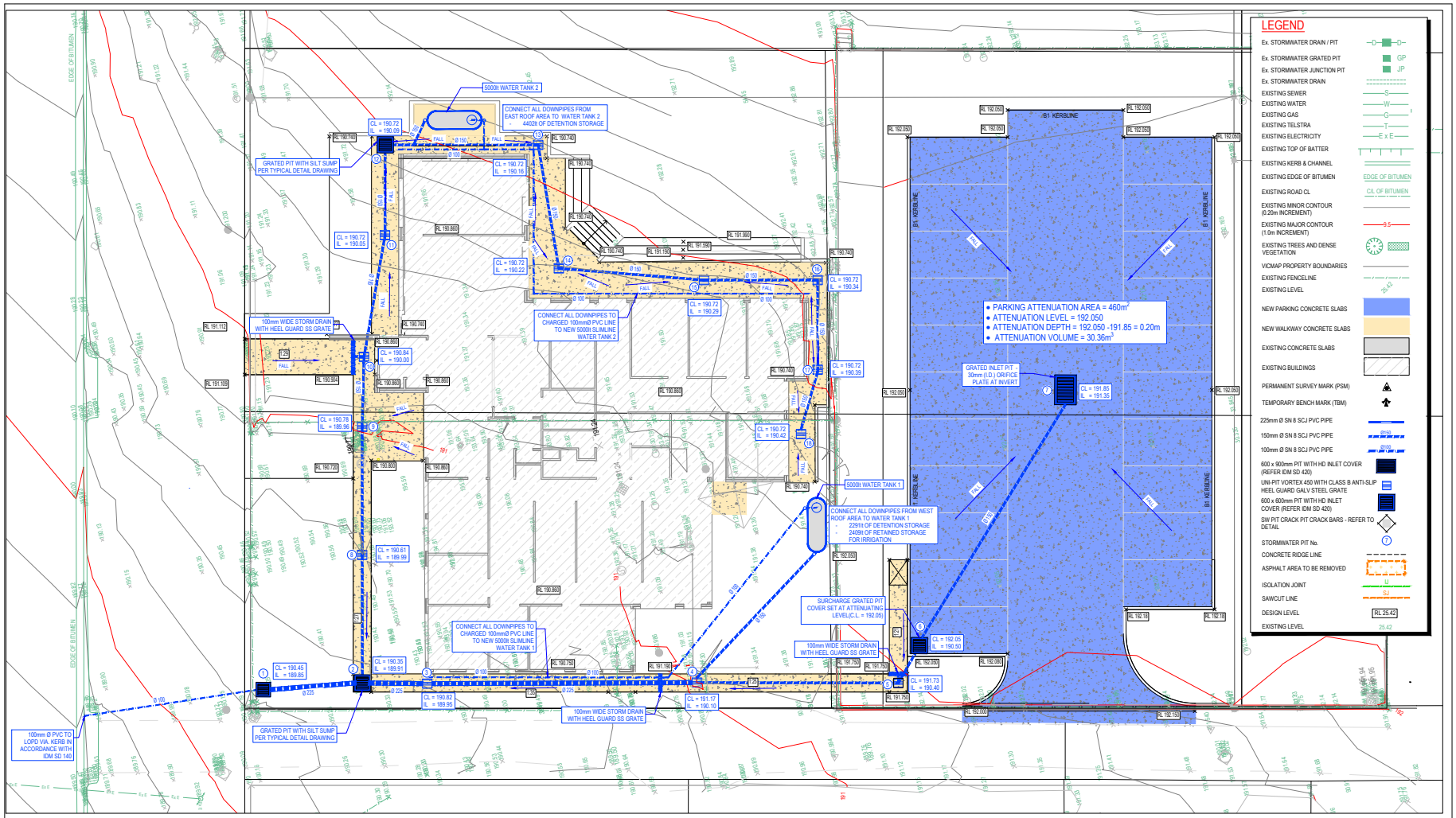


PRELIMINARY

DIAL BEFORE YOU DIG www.1100.com.au

WARNING
BEWARE OF UNDERGROUND / OVERHEAD SERVICES
THE LOCATION OF SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. SPECIAL CONSIDERATION SHOULD BE GIVEN TO CONSTRUCTION PROCEDURES UNDER OVERHEAD ELECTRICITY TRANSMISSION LINES.

STORMWATER PLAN
(SCALE: 1:100@A1)

NOTE: UNDERGROUND SERVICES IN AREA OF CONSTRUCTION, CONTRACTOR TO LOCATE & VERIFY ALL SERVICES PRIOR TO CONSTRUCTION

Horizontal Scale 1:100,A1 Vertical 0 1 2 3 4 5

SCALE @ A1

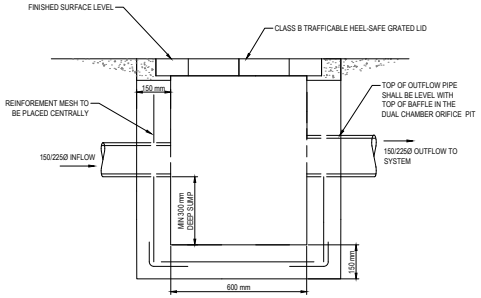
REV	DATE	BY	APP	REVISION DESCRIPTION
B	19/04/2023	AS	TB	ARCHITECT'S COMMENTS INCORPORATED
A	11/04/2023	AS	TB	PRELIMINARY DRAWING

ENGINEER AS
DESIGNER AS
DRAWN AS
CHECKED TB
APPROVED DC

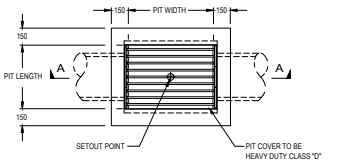
PM DESIGN GROUP Engineering Solutions
MULTI DISCIPLINE CONSULTING ENGINEERS
GEELONG • HORSHAM • PORTLAND • WARRNAMBOOL
PHONE: 1300 02 02 84
WEB: www.pmdesign.com.au

PROJECT: SOUTH-WEST HEALTH FACILITY, 112-124 LONSDALE ST, HAMILTON
South West Healthcare
PM PROJECT No. : 15718
CLIENT: SOUTH WEST HEALTHCARE

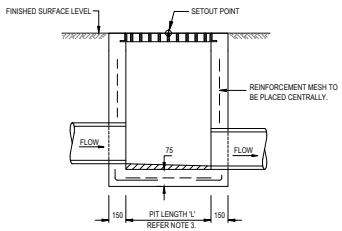
DWG No. : 03
TITLE : STORMWATER PLAN
C:\AUTODESK\ASHEEN\15718 - 112-124 LONSDALE ST, HAMILTON - SWH\15718-CIVIL_DRAWING\SET-REV-B_14.04.2023.DWG
REV: B



GRATED PIT WITH SILT SUMP
NOT TO SCALE



PLAN

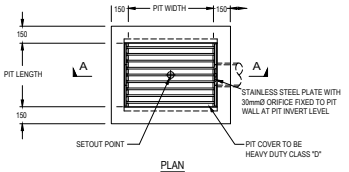


SECTION A-A

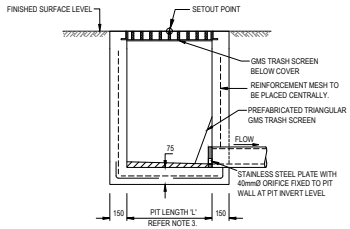
GRATED PIT
REFER IDM SD420
(ALL MEASUREMENTS IN MILLIMETRES)
(NTS)

NOTES:

1. HEAVY DUTY COVERS TO BE USED WHEN SUBJECT TO TRAFFICABLE LOADS (AS3996 CLASS D - 240kN) OR APPROVED EQUIVALENT. MEDIUM DUTY COVERS TO BE USED IN OFF ROAD USE (AS3996 CLASS B - 80kN) OR APPROVED EQUIVALENT.
2. CONCRETE STRENGTH F'C = 25MPa. (MIN) AT 28 DAYS.
3. FOR TOP OF PIT DETAILS AND CHAMBER DIMENSIONS, REFER TO SPECIFIC DESIGN PIT SCHEDULE AND RELEVANT STANDARD DRAWINGS.



PLAN

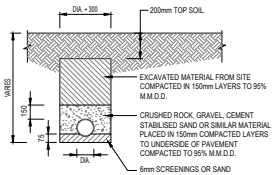


SECTION A-A

GRATED ORIFICE PIT AT PARKING
REFER IDM SD420
(ALL MEASUREMENTS IN MILLIMETRES)
(NTS)

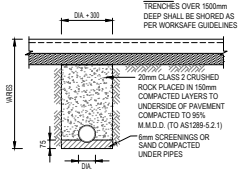
NOTES:

1. HEAVY DUTY COVERS TO BE USED WHEN SUBJECT TO TRAFFICABLE LOADS (AS3996 CLASS D - 240kN) OR APPROVED EQUIVALENT. MEDIUM DUTY COVERS TO BE USED IN OFF ROAD USE (AS3996 CLASS B - 80kN) OR APPROVED EQUIVALENT.
2. CONCRETE STRENGTH F'C = 25MPa. (MIN) AT 28 DAYS.
3. FOR TOP OF PIT DETAILS AND CHAMBER DIMENSIONS, REFER TO SPECIFIC DESIGN PIT SCHEDULE AND RELEVANT STANDARD DRAWINGS.

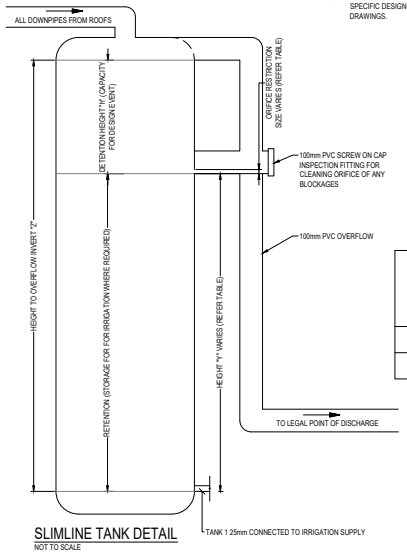


PIPE TRENCH DETAIL
(UNDER LANSCAPE)
NTS

NOTE:
TRENCHES OVER 1500mm DEEP SHALL BE SHORED AS PER WORKSAFE GUIDELINES



PIPE TRENCH DETAIL
(UNDER PAVEMENT)
NTS



SLIMLINE TANK DETAIL
NOT TO SCALE

ROOF No.	TANK MODEL NUMBER	TOTAL TANK STORAGE (L)	HEIGHT TO OVERFLOW INVERT "Z" (mm)	REQUIRED TANK STORAGE FOR DETENTION (L)	% STORAGE DETENTION	DETENTION STORAGE HEIGHT "H" (mm)	RETENTION STORAGE HEIGHT - TO RESTRICTED OUTFLOW INVERT "Y" (mm)	RESTRICTED OUTFLOW INTERNAL DIAMETER REQUIRED (mm)	RESTRICTED OUTFLOW SPECIFICATION
ROOF WEST	BUSHMAN TSL1100	5000	1700	2290.4	45.81	779	921	14	VINIDEX PE100 DN20 SDR7.4
ROOF EAST	BUSHMAN TSL1100	5000	1700	4401.6	88.03	1500	200	19	VINIDEX PE100 DN25 SDR9

LEGEND

- Ex. STORMWATER DRAIN / PIT
- Ex. STORMWATER GRATED PIT (GP)
- Ex. STORMWATER JUNCTION PIT (JP)
- Ex. STORMWATER DRAIN
- EXISTING SEWER (S)
- EXISTING WATER (W)
- EXISTING GAS (G)
- EXISTING TELSTRA (T)
- EXISTING ELECTRICITY (E x E)
- EXISTING TOP OF BATTER
- EXISTING KERB & CHANNEL
- EXISTING EDGE OF BITUMEN (EDGE OF BITUMEN)
- EXISTING ROAD CL (C/L OF BITUMEN)
- EXISTING MINOR CONTOUR (0.20m INCREMENT)
- EXISTING MAJOR CONTOUR (1.0m INCREMENT) (9.5)
- EXISTING TREES AND DENSE VEGETATION
- VICMAP PROPERTY BOUNDARIES
- EXISTING FENCELINE
- EXISTING LEVEL (25.42)
- NEW PARKING CONCRETE SLABS
- NEW WALKWAY CONCRETE SLABS
- EXISTING CONCRETE SLABS
- EXISTING BUILDINGS
- PERMANENT SURVEY MARK (PSM)
- TEMPORARY BENCH MARK (TBM)
- 225mm Ø SN 8 SCJ PVC PIPE (225)
- 150mm Ø SN 8 SCJ PVC PIPE (150)
- 100mm Ø SN 8 SCJ PVC PIPE (100)
- 600 x 900mm PIT WITH HD INLET COVER (REFER IDM SD 420)
- UNI-PIT VORTEX 450 WITH CLASS B ANTI-SLIP HEEL GUARD GALV STEEL GRATE
- 600 x 600mm PIT WITH HD INLET COVER (REFER IDM SD 420)
- SW PIT CRACK PIT CRACK BARS - REFER TO DETAIL
- STORMWATER PIT No. (7)
- CONCRETE RIDGE LINE
- ASPHALT AREA TO BE REMOVED
- ISOLATION JOINT (IJ)
- SAWCUT LINE (SL)
- DESIGN LEVEL (RL 25.42)
- EXISTING LEVEL (25.42)

WARNING
BEWARE OF UNDERGROUND / OVERHEAD SERVICES
THE LOCATION OF SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. SPECIAL CONSIDERATION SHOULD BE GIVEN TO CONSTRUCTION PROCEDURES UNDER OVERHEAD ELECTRICITY TRANSMISSION LINES.

DIAL BEFORE YOU DIG www.1100.com.au

NOTE: UNDERGROUND SERVICES IN AREA OF CONSTRUCTION, CONTRACTOR TO LOCATE & VERIFY ALL SERVICES PRIOR TO CONSTRUCTION

PRELIMINARY

Scale: AS SHOWN
SCALE @ A1

REV	DATE	BY	APP	REVISION DESCRIPTION
B	19/04/2023	AS	TB	ARCHITECT'S COMMENTS INCORPORATED
A	11/04/2023	AS	AS	PRELIMINARY DRAWING

ENGINEER AS
DESIGNER AS
DRAWN AS
CHECKED TB
APPROVED DC

PM DESIGN GROUP
Engineering Solutions
MULTI DISCIPLINE CONSULTING ENGINEERS
GEELONG • HORSHAM • PORTLAND • WARRNAMBOOL
PHONE: 1300 02 02 84
WEB: www.pmdesign.com.au

PROJECT: SOUTH-WEST HEALTH FACILITY, 112-124 LONSDALE ST, HAMILTON
South West Healthcare
PM PROJECT No. : 15718
CLIENT: SOUTH WEST HEALTHCARE

DWG No. : 04
TITLE : STORMWATER DETAIL PLAN
REV: B
C:\AUTODESK\ASHEEN\15718 - 112-124 LONSDALE ST, HAMILTON - SWH\15718-CIVIL_DRAWINGSET-REVB_14.04.2023.DWG

11 APPENDIX A

Post Development Site Plan

PM DESIGN | GROUP
Engineering Solutions

Project No.	15718
Date:	19/04/2023
Eng:	A.Singh

To be input by user

Area: **Carpark**

Item	A (ha)	C	Ae (ha)
Carpark	0.0510	0.9500	0.0485
Total	0.0510		0.0485

Design Storm: **10% AEP**
Effective Catchment Area (Ae) = **0.0485** **ha**
Restricted outflow requirement **0.001786** **m^3/s**

Storage requirement is highest value of S_{max} calculated in the table below
Critical storm duration is the storm duration when S_{max} occurs

Continue table until a clear Smax is calculated

Storm Duration (min)	10% AEP Intensity (mm/hr)	Constant Input (m^3/s)	Rainfall Input (m^3/s)	I_p (m^3/s)	Q_p (m^3/s)	V_1 (m^3)	S_{max} (m^3)
5	97.7	0.00	0.0131	0.0131	0.0018	3.94	3.409
6	90.8	0.00	0.0122	0.0122	0.0018	4.40	3.756
10	71.8	0.00	0.0097	0.0097	0.0018	5.80	4.726
15	57.9	0.00	0.0078	0.0078	0.0018	7.01	5.405
20	49.1	0.00	0.0066	0.0066	0.0018	7.93	5.786
25	42.9	0.00	0.0058	0.0058	0.0018	8.66	5.981
30	38.2	0.00	0.0051	0.0051	0.0018	9.25	**6.039**
45	29.4	0.00	0.0040	0.0040	0.0018	10.68	5.860
60	24.3	0.00	0.0033	0.0033	0.0018	11.77	5.343
90	18.5	0.00	0.0025	0.0025	0.0018	13.44	3.799
120	15.2	0.00	0.0020	0.0020	0.0018	14.73	1.867
180	11.5	0.00	0.0015	0.0015	0.0018	16.72	-2.577

Storage Volume Required (m^3)		6.04		***Where B = Area(460m^2 of parking attenuation***
Critical Storm Duration (min)		30.00		
Storage Volume from Car Park =	***1/3 x B x H***	30.36	m^3	***Where H = 0.20m (height of attenuation at surface)***
Total Volume available =		30.36	m^3	> 6.039 m^3

NOTES:

$$Q = C_d A \sqrt{2gh}$$

Orifice Area=	Q/Cdv2gh	
Orifice Area=	0.0009	m^2
Orifice Diameter=	0.034	m
	34	therefore use 40mm dia.

OSD Head 0.50 m
OSD Restrict Outflow 0.0018 m^3/s

PM DESIGN | GROUP
Engineering Solutions

Project:	G.15718
Date:	19/04/2023
Engineer:	A.Singh

Storage Sizing - Roof East

Site: **122/124 Lonsdale St , HAMILTON**

Design Storm:	**10% AEP**	
Catchment Area (A) =	**0.0344**	**ha**
Restricted outflow requirement	**0.00120488**	**m³/s**

Storage requirement is highest value of S_{max} calculated in the table below

Critical storm duration is the storm duration when S_{max} occurs

Continue table until a clear S_{max} is calculated

Storm Duration (min)	10% AEP Intensity (mm/hr)	Rainfall Input (m³/s)	I_p (m³/s)	Q_p (m³/s)	V_1 (m³)	S_{max} (m³)
5	97.7	0.00934	0.00934	0.001205	2.80073	2.43927
6	90.8	0.00868	0.00868	0.001205	3.12352	2.68976
10	71.8	0.00686	0.00686	0.001205	4.11653	3.39361
15	57.9	0.00553	0.00553	0.001205	4.97940	3.89501
20	49.1	0.00469	0.00469	0.001205	5.63013	4.18428
25	42.9	0.00410	0.00410	0.001205	6.14900	4.34169
30	38.2	0.00365	0.00365	0.001205	6.57040	**4.40162**
45	29.4	0.00281	0.00281	0.001205	7.58520	4.33204
60	24.3	0.00232	0.00232	0.001205	8.35920	4.02165
90	18.5	0.00177	0.00177	0.001205	9.54600	3.03967
120	15.2	0.00145	0.00145	0.001205	10.45760	1.78250
180	11.5	0.00110	0.00110	0.001205	11.86800	-1.14465

$$Q = C_d A \sqrt{2gh}$$

Storage Required	**(m³)**	4.40162
Critical Storm Duration	**(min)**	30

Storage

Height (Z)	1.7	m	Invert of Overflow to Pump Outlet
Capacity	5000	L	Nominal, from supplier
Area	2.941176	m²	Cross sectional area of tank (Capacity divided by Height)
Detention Volume	4401.62	L	(from Storage Required)
Supply Volume	598.38	L	Capacity, less Storage Required - used for Treatment
Supply Depth (Y)	0.2	m	Height, less "Head" (Below)
Head (h)	1.5	m	Detention Volume divided by Area
Pipe Co-Efficient	0.8		
Area	0.00028	m²	Restricted Outflow Calculation
Internal Diameter	19	mm	

Adopt Bushman TSL1100

Adopt VINIDEX PE100 DN25 SDR9

PM DESIGN | GROUP
Engineering Solutions

Project:	G.15718
Date:	19/04/2023
Engineer:	A.Singh

Storage Sizing - Roof West

Site: **122/124 Lonsdale St , HAMILTON**

Design Storm:	**10% AEP**	
Catchment Area (A) =	**0.0179**	**ha**
Restricted outflow requirement	**0.00062696**	**m³/s**

Storage requirement is highest value of S_{max} calculated in the table below

Critical storm duration is the storm duration when S_{max} occurs

Continue table until a clear S_{max} is calculated

Storm Duration (min)	10% AEP Intensity (mm/hr)	Rainfall Input (m³/s)	I_p (m³/s)	Q_p (m³/s)	V_1 (m³)	S_{max} (m³)
5	97.7	0.00486	0.00486	0.000627	1.45736	1.26927
6	90.8	0.00451	0.00451	0.000627	1.62532	1.39962
10	71.8	0.00357	0.00357	0.000627	2.14203	1.76586
15	57.9	0.00288	0.00288	0.000627	2.59103	2.02677
20	49.1	0.00244	0.00244	0.000627	2.92963	2.17729
25	42.9	0.00213	0.00213	0.000627	3.19963	2.25919
30	38.2	0.00190	0.00190	0.000627	3.41890	**2.29038**
45	29.4	0.00146	0.00146	0.000627	3.94695	2.25417
60	24.3	0.00121	0.00121	0.000627	4.34970	2.09266
90	18.5	0.00092	0.00092	0.000627	4.96725	1.58169
120	15.2	0.00076	0.00076	0.000627	5.44160	0.92752
180	11.5	0.00057	0.00057	0.000627	6.17550	-0.59562

$$Q = C_d A \sqrt{2gh}$$

Storage Required	**(m³)**	2.29038
Critical Storm Duration	**(min)**	30

Storage

Height (Z)	1.8	m	Invert of Overflow to Pump Outlet
Capacity	3000	L	Nominal, from supplier
Area	1.666667	m²	Cross sectional area of tank (Capacity divided by Height)
Detention Volume	2290.38	L	(from Storage Required)
Supply Volume	709.62	L	Capacity, less Storage Required - used for Treatment
Supply Depth (Y)	0.43	m	Height, less "Head" (Below)
Head (h)	1.37	m	Detention Volume divided by Area
Pipe Co-Efficient	0.8		
Area	0.00015	m²	Restricted Outflow Calculation
Internal Diameter	14	mm	

Adopt Bushman TSL660

Adopt VINIDEX PE100 DN20 SDR7.4

15 APPENDIX E

Storm Tool Calculator

PM DESIGN GROUP
Engineering Solutions

Melbourne Water STORM Rating Report

TransactionID:	1565039
Municipality:	SOUTHERN GRAMPIANS
Rainfall Station:	HAMILTON
Address:	122/124 Lonsdale Street
	SWH
	Hamilton
	VIC
Assessor:	Asheen Singh
Development Type:	Commercial/Retail
Allotment Site (m2):	1,857.00
STORM Rating %:	121

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roofs	523.00	Rainwater Tank	10,000.00	25	150.20	79.00
Carpark	510.00	None	510.00	0	0.00	0.00
Landscaping	660.00	Infiltration Sand	660.00	0	222.00	0.00
Walkways	164.00	None	0.00	0	0.00	0.00

Date Generated: 20-Apr-2023 Program Version: 1.0.0

Tender 076-23 Supply of Road Making Materials		
QUARRY	**MATERIAL**	**AVAILABILITY (Notice period required for pick up)**
Rigby Bros Pty Ltd	20mm Crushed Rock (Class 2 & 3) 40mm Crushed Rock (Class 3 & 4) 5mm Dust (Blue) 100 / 200mm Metal (Blue) 100 / 200mm Metal (Brown) Sand (fine) Sand (course) Shot Rock	5 to 10 days 5 to 10 days 5 to 10 days 5 to 10 days 5 to 10 days 5 to 10 days 5 to 10 days 5 to 10 days
LK Earthmovers Pty Ltd	20mm Crushed Rock (class 3) 19mm Crusher Run 40mm Crusher Run	
Mooree Partnership	50mm Ballast 20mm Crushed Rock (Class 3 & 4) 20mm Crushed Rock (NDCR) 40mm Crushed Rock (NDCR) 40mm Crushed Rock (Class 3 & 4) 20 / 40mm Drainage 40 / 60mm Drainage Gravel loose at pit 100 / 200mm Metal (Blue) 100 / 200mm Metal (Brown) Shot Rock Spalls	2 weeks 2 weeks 2 weeks 2 weeks 2 weeks 2 weeks 2 weeks 1 month 2 weeks 2 weeks 2 weeks 2 weeks
Walkers Earthworks Pty Ltd	20mm Crushed Rock (Class 2, 3 & 4) 20mm Crushed Rock (NDCR) 40mm Crushed Rock (Class 3) 40mm Crushed Rock (NDCR) 20 / 40mm Drainage Gravel loose at pit Shot Rock Spalls	24 – 48 hours 24 – 48 hours 24 – 48 hours 24 – 48 hours 24 – 48 hours 24 – 48 hours 24 – 48 hours 24 – 48 hours
Tyrendarra Lime Pty Ltd	40mm Limestone crushed	
Peter Milne Earthmoving Pty Ltd	50mm Ballast 20mm Crushed Rock (Class 2, 3 & 4) 20mm Crushed Rock (NDCR) 40mm Crushed Rock (NDCR) 40mm Crushed Rock (Class 3)	2 days 2 days 2 days 2 days 2 days 2 days

	400mm Crushed Rock (class 3 Brown) 19mm Crusher Run 40mm Crusher Run 20 / 40mm Drainage 20 / 60mm Drainage Gravel loose at pit 100 / 200mm Metal (Blue) 100 / 200mm Metal (Brown) Shot Rock Spalls Top Soil	2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days
Aussie Rock Pty Ltd	50mm Ballast 20mm Crushed Rock (NDCR) 40mm Crushed Rock (NDCR) 14mm Crusher Run 20 / 40mm Drainage 40 / 60mm Drainage Sand (fine)	1 day 1 day 1 day 1 day 1 day 1 day 1 day
Moree Quarries	50mm Ballast 20mm Crushed Rock (Class 1, 2 & 3) 20mm Crushed Rock (NDCR) 5mm Blue Dust Shot Rock Spalls 14mm Sealing Aggregate (Class A, B) 14mm Sealing Aggregate (Pre-Coat) 10mm Sealing Aggregate (Class A, B) 10mm Sealing Aggregate (Pre-Coat) 10mm Sealing Aggregate (Class A, B) 10mm Sealing Aggregate (Pre-Coat)	2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days 2 days
WA Molan & Sons	20mm Crushed Rock (Class 2 & 3) 40mm Crushed Rock (Class 3) 20 / 40mm Drainage Sand (Coarse) Spalls	1 day 1 day 1 day 1 day 1 day
Western Quarries Pty Ltd	50mm Ballast 20mm Crushed Rock (Class 2, 3 & 4) 20mm Crushed Rock (NDCR)	

	40mm Crushed Rock (NDCR) 40mm Crushed Rock (Class 3) 5mm Blue Dust 20 / 40mm Drainage 20 / 60mm Drainage 100 / 200 Metal (Blue) Shot Rock Spalls Top Soil 14mm Sealing Aggregate (Class A) 14mm Sealing Aggregate (Pre-Coat) 10mm Sealing Aggregate (Class A) 10mm Sealing Aggregate (Pre-Coat) 10mm Sealing Aggregate (Class A) 10mm Sealing Aggregate (Pre-Coat)	
Mibus Bros (Aust) Pty Ltd	20mm Crushed Rock (Class 2, 3 & 4) 20mm Crushed Rock (NDCR) 40mm Crushed Rock (NDCR) 40mm Crushed Rock (Class 3 and 4) 19mm Crusher Run 40mm Crusher Run 5mm Blue Dust 20mm Limestone Crushed 40mm Limestone Crushed 100 / 200 Metal (Blue) 100 / 200 Metal (Brown) Shot Rock Spalls	4 weeks 2 days 2 days 1 week 2 days 2 days 2 days 2 days 2 days 1 week 1 week 2 days 2 days

Approximate required materials required per year;

50mm Ballast – 100tn
20mm Crushed Rock

- Class 1 - 50tn
- Class 2 – 10,000
- Class 3 – 100tn
- Class 4 – 100tn

20mm Crushed Rock (NDCR) – 100tn
40mm Crushed Rock (NDCR) – 10,000tn
40mm Crushed Rock (Class 3) – 100tn
Crushed Rock (Brown) Class 4 – 100tn
19mm Crusher Run – 100tn

40mm Crusher run – 100tn
5mm Blue Dust – 500tn
20 / 40mm Drainage – 100tn
20 / 60mm Drainage – 100tn
Gravel loose at the pit – 7,500tn
20mm Limestone Crushed – 2,500tn
40mm Limestone Crushed – 2,500tn
100 / 200 Metal (Blue) – 50tn
100 / 200 Metal (Brown) – 50tn
Sand (Fine) – 1000tn
Sand (Course) – 500tn
7mm Scoria – 100tn
10mm Scoria – 100tn
14mm Scoria – 200tn
50mm Scoria 100tn
19 / 40mm Scoria Lime – 100tn
Shot Rock – 100tn
Spalls – 500tn
Top Soil – 750tn
14mm Sealing Aggregate (Class A & B) – 5000tn
14mm Sealing Aggregate (Pre-Coat) – 50tn
10mm Sealing Aggregate (Class A & B) – 4000tn
10mm Sealing Aggregate (Pre-Coat) – 50tn
10mm Sealing Aggregate (Class A &B) – 1000tn
10mm Sealing Aggregate (Pre-Coat) – 50tn


Moree Quarries
Mooree partnership
Western Quarries Pty Ltd
Rigby Bros & Co PTY LTD
Peter Milne Earthmoving Pty Ltd
Aussie Rock Pty Ltd
HAMILTON
Walkers Earthworks Pty Ltd
LK Earthmovers Pty Ltd
Tyrendarra Lime Pty Ltd
WA Molan & Sons
Mibus Bros (Aust) Pty Ltd
0
10
20 km