



ENGINEERING

Stormwater Management Plan

**52 Golf Rd – Proposed 91 Lot
Subdivision**

JOB NUMBER: S42623 - 263744
CLIENT: Golf Road Project Development Pty Ltd
SITE: 52 Golf Road, OAKLEIGH SOUTH, VIC 3167
DATE: 30 January 2020
REVISION: 5

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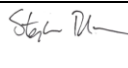
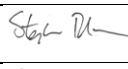
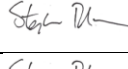
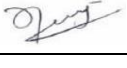
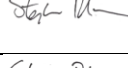
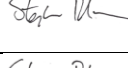
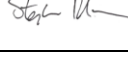
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1 Introduction

FMG Engineering have been engaged by VIMG to prepare a stormwater management plan (SWMP) for the proposed 91 lot subdivision at 52 Golf Road, Oakleigh South. The site property description is Lot 41/LP13217.

This SWMP outlines the conceptual stormwater design for the proposed subdivision and has been prepared to accompany a town planning application for the site being lodged with the Monash City Council

This plan should ensure that the stormwater and drainage discharge from the development site meets current best practice performance objectives for stormwater, demonstrates the application of Water Sensitive Urban Design (WSUD) and complies with City of Monash Council Standard.

1.1 Purpose

The purpose of this SWMP is to evaluate the quantity and quality of stormwater associated with the proposed development plan to demonstrate to City of Monash Council that an appropriate stormwater management strategy has been adopted.

The SWMP specifically addresses the following items for both the construction and operational phases of the development:

- Stormwater runoff volumes and detention (Stormwater Quantity); and
- Stormwater quality treatment measures (Stormwater Quality);

The following will be achieved with the correct application of this SWMP report:

- Appropriate standards to be maintained on all aspects of stormwater within the site,
- Pollution control to be maintained,
- Examination of the surrounding area and properties to ensure they will not be adversely affected nor unduly disrupted by stormwater, and
- Establishment of a unified, clear and concise stormwater management strategy.

1.2 Existing Site Conditions

1.2.1 Property Details

Address:	52 Golf Road, Oakleigh South
Lot and Plan Number:	Lot 41 LP13217
Zoning:	General Residential Zone (GRZ) Design Plan Overlay – No.5
Site Area:	1.826ha

As shown in in Figure 1, the site has street frontages to Golf Road, Beryl Avenue and Barkers Road. The north boundary is shared with existing single level dwellings and the north east is the edge of the Metropolitan Golf Club.



Figure 1 – Site Location Plan

1.3 Development Summary

The site at 52 Golf Road, Oakleigh South is to be developed for a residential development. The total number of dwellings is expected to be 89 with a combination of 2, 3 and 4 bedroom townhouses. For the purpose of any planning permit applications made, this report will focus solely on the stormwater management strategy and management of the proposed development. A summary of the site is shown in Table 1.

Figure 3 shows the proposed development.



Figure 3 – Proposed Development

1.4 Flooding

Reference to the City of Monash Council Planning Overlay mapping indicates that the development site is not subject to any Special Building Overlays (SBO) or Land Subject to Inundation (LSIO). This indicates that the site should not be prone to storm water overflow that would result in a 1 in 100 year storm. Appropriate measures should still be put in place to ensure the development does not flood in storm events.

Figure 2 shows the planning overlay relative to the proposed site



Figure 2 – Special Building Overlay

1.5 Overland Flow Path

City of Monash council engineers have indicated that the development site has been referred as subject to overland flows during storm events. The runoff comes from the intersection of Bakers Road and Beryl Avenue and travels in a north/west direction where it has been captured in the existing channel along the northern boundary to avoid discharging into the Barholme Court properties. These overland flows are to be controlled and not to discharge into the Barholme Court properties. The existing channel along the northern boundary was constructed to divert the runoff away from these court bowl properties.

The overland flow is expected to flow across the site as shown in Figure 3, with a flow rate of approximately 1.5m³/s. The floor levels are to be designed to prevent stormwater from discharging into habitable areas. This is a minimum freeboard for main buildings of 300mm and for outbuildings is 150mm.

Application will be made with Melbourne Water for property flood levels.



Figure 2 – Overland Flow Paths

2 Stormwater Management

The stormwater management for the development will be based on water sensitive urban design (WSUD) principles and will be consistent with Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO 2006). The following key items will be considered:

- Adequate drainage to ensure a free draining development.
- Pavement, road and drainage levels designed to ensure surrounding properties are not adversely affected.
- The discharge volumes of the development are stored to pre-development levels.
- The pollutant discharge from the site is minimised to meet Best Practice.
- Overland flow paths are considered in the design. Refer to the report (memorandum) dated 17 May 2019, prepared by Water Technology for safe diversion of overland flow paths through the site to Golf Road.

The proposed development has a total catchment area of approximately 18,260m². For the purpose of water quality, the site is separated into three elements. The three elements are summarised in Table 2.

Table 1: Stormwater Treatment

Area Description	Catchment Area	Discharge
Dwellings	9,152m ²	To rainwater tanks with overflows to LPD via Gross Pollutant Trap
Pavement	4,200m ²	Discharge to bio-retention then to LPD via Gross Pollutant Trap
Landscape	4,908m ²	Discharge to bio-retention with overflow to LPD via Gross Pollutant Trap
Total	18,260m²	

Runoff from the surrounding areas have not been considered in this analysis as the drainage systems for these areas will not be modified as part of the proposed development works.

2.1 Stormwater Design

Drainage infrastructure will be required to collect flow from downpipes and runoff from hard pavement areas. Details of the drainage strategy are still in development and will be coordinated closely with the architectural and infrastructure design.

2.2 Legal Point of Discharge

A Legal Point of Discharge (LPD) application will need to be made with City of Monash Council to determine the location of the connection point for the development. There are existing council pits and pipes located along Beryl Avenue and Golf Road. Preliminary advice from City of Monash has indicated that the LPD will be located in the north/west corner of the site. This will need to be confirmed once LPD is received from council.

3 Stormwater System On-site Water Quality Treatment

3.1 On-site Treatment Elements

The strategy for on-site treatment of the stormwater runoff is to provide treatment of the roof and surface runoff from the developed site through on-site reuse and a system of raingardens located in green areas of the development.

Runoff from each lot is proposed to be collected and discharged to the stormwater system. The roads within the development will discharge via a combination overland flows and into the stormwater system and diverted through nominated bio-retention / raingardens swales located in key areas within the road reserves then through the gross pollutant trap before discharging to the nominated LPD.

The treatment system is shown in Appendix A

3.2 Music Model

The MUSIC model has been set up based on Melbourne Water guidelines.

Rainfall parameters are based on Oakleigh with 6-minute steps.

The best practice water quality objectives based on the CSIRO (and Victorian Stormwater Committee) guidelines are:

- 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).

The assumed discharge point to the existing drainage is shown in Appendix A. The results of the model are shown in Table 2

Table 2: MUSIC Model results

Standard	Pollution Reduction Target	Reduction Required	Results Achieved
'Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) 2006	Gross Pollutants	70%	100%
	TSS	80%	93%
	TP	45%	70%
	TN	45%	58%

The models for the above set of results are shown in Appendix A.

4 On-site Detention System

The whole site has been considered as a single catchment discharging to the council drain at the intersection of Cameron and Beryl Avenue. Appendix A shows the catchment area plan discharging to the LPD.

4.1 Detention System

On-site detention has been proposed on site to restrict the flow to pre-development conditions for the LPD.

The permissible site discharge was modelled using an OSD4W model for a 5-year ARI design standard permissible site discharge and the on-site storage standard of 20-year ARI. Time of concentration for the catchment outlet was assumed to be the worst case which was found to be 10 minutes with a time from site to outlet of 5 minutes.

To calculate the on-site detention volume for the catchment discharging to the existing council drain, City of Monash may nominate a permissible site discharge (PSD) but this will only be given when the LPD is received. Until then, it is assumed that the PSD will be calculated using OSD4W with the allowable discharge used to create the required storage volume. Table 3 shows the preliminary OSD4W results with Appendix B showing the model print out.

Table3: OSD4W Model results

Catchment	PSD	Storage
Council Drainage	136.32 L/s	188.12 cub.m.

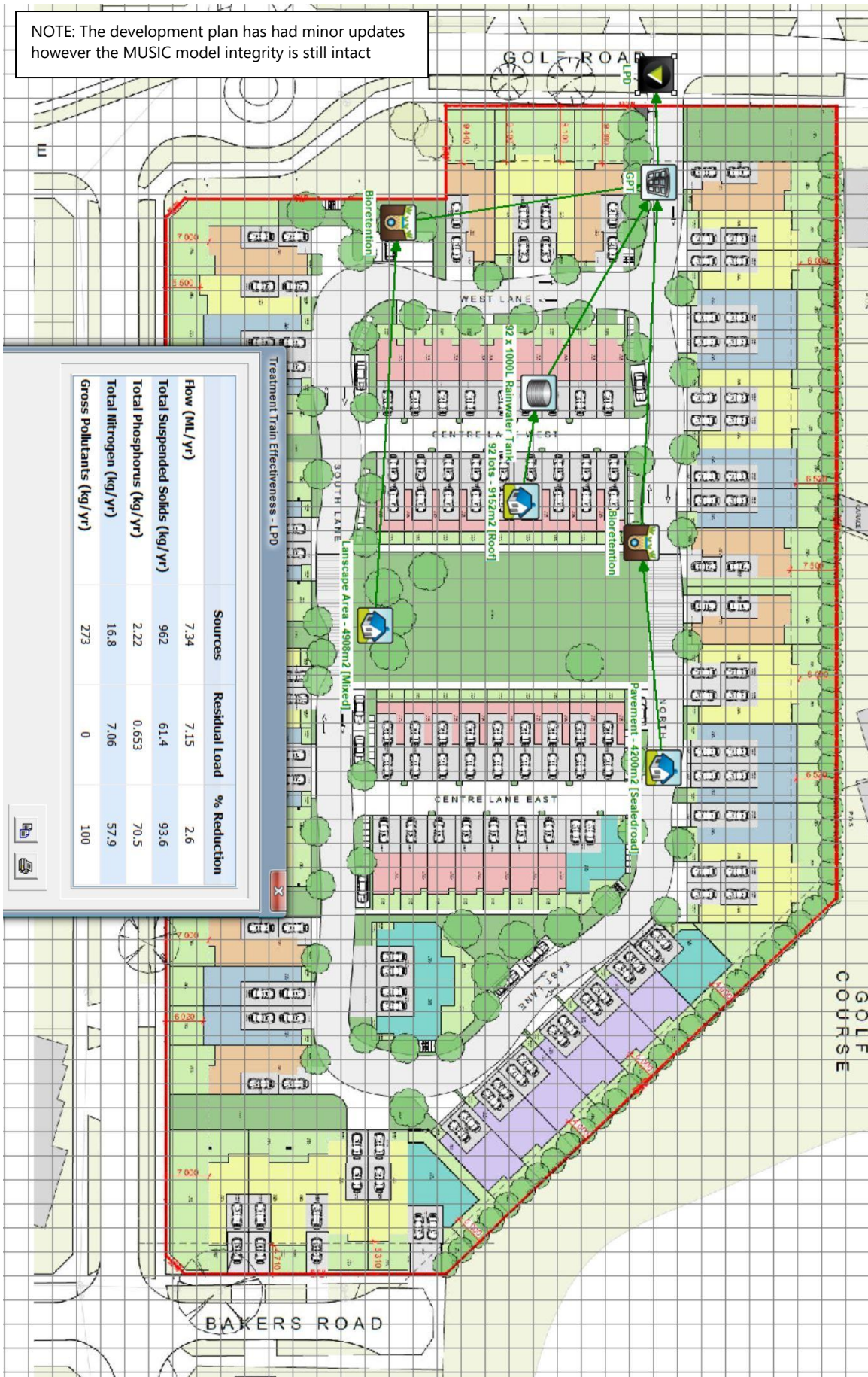
Stormwater pits and pipes and tanks for each proposed lot are proposed to store the required volume of water. An orifice pit with the calculated orifice diameter is proposed to restrict the flow to permissible site discharge.

5 Limitations

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NOTE: The development plan has had minor updates however the MUSIC model integrity is still intact



Appendix A

MUSIC Model Results / Catchment Area / LPD

Printed from *OSD4W* version 1.07.4 S/N # W8-05201
 Licensed to : FMG Engineering
 Prepared by : FMG Engineering
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1. CLIENT DETAILS

CliName :
 CliDet1 :
 CliDet2 :
 CliDet3 :

2. JOB NAME AND REFERENCE

OSD4W-2008-001 : OSD4W-2008-001
 JobName..... : JobName.....
 CliDet1 : JobAddress1.....
 CliDet2 : JobAddress2.....
 CliDet2 : JobAddress2.....

3. AREAS (sq.m.) & RUN-OFF COEFFICIENTS

Total Site area : 18260

4. EXISTING SITE DETAILS

Aes1 : 1567 Ces1 : 0.90
 Aes2 : 16693 Ces2 : 0.30
 Aes3 : 0 Ces3 : 0.15
 Aes4 : 0 Ces4 : 0.12
 Weighted C - site Cew : 0.35

5. PROPOSED SITE DETAILS

Aps1 : 13352 Cps1 : 0.90
 Aps2 : 4908 Cps2 : 0.30
 Aps3 : 0 Cps3 : 0.15
 Aps4 : 0 Cps4 : 0.12
 Weighted C - site Cpw : 0.74
 Uncontrolled portion(s) UPfrac : 0.00

6. CATCHMENT TIMES (minutes)

Time of concentration : 10.00
 Travel time from discharge point
 to catchment outlet : 5.00

7. OSD DESIGN

Flow Control Device : MC2 Multi-Cell
 Storage type : Pipe
 Rainfall zone : OAKLEIGH
 ARI for OUTFLOW (years) : 5
 ARI for STORAGE (years) : 20
 Qptot (L/s) : 113.16
 Qu (L/s) : 0.00
 Qp (L/s) : 0.00
 Calculated PSD (L/s) : 136.32
 Nominated PSD (L/s) : ----
 Adopted PSD (L/s) : 136.32

8. STORAGE DETAILS

Volume (cub.m.) : 188.12
 Time to fill storage (mins) : 21.8
 Time to empty storage (mins) : 38.6
 Critical storm duration (mins) : 28.5

9. STORM DURATIONS & RAINFALL INTENSITIES

PSD Duration : 10.0 min. Intensity : 63.5 mm/hr
 MAX. STORAGE Duration : 28.5 min. Intensity : 51.4 mm/hr


10. ZERO IMPACT VOLUME

The additional runoff volume generated by the site redevelopment is 252.5 cub.M.

Generated at : 4/12/2018 14:59:43

Appendix B

OSD4W Results



F&M
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