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TOWN PLANNING ISSUE

Water Sensitive Urban Design (WSUD) Response

PROPOSED EDUCATION CENTRE

51 Centre Road, Vermont, VIC

PREPARED FOR

Harmer Architecture Pty Ltd

PROJECT ID

MAK2387

DATE

30 August 2023



51 CENTRE ROAD, VERMONT, VIC – CONCEPT PERSPECTIVE (SOURCE: HARMER ARCHITECTURE)

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Document Control

Report History and Status

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Report Issued To

Key Contact	Company / Entity	Distribution
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Introduction

Harmer Architecture Pty Ltd engaged Makao to prepare a WSUD Response for the proposed development at 51 Centre Road, Vermont, VIC.

This report showcases how this development implements water sensitive urban design initiatives, and how it complies with the objectives set out in *Clause 53.18: Stormwater Management Policy* of the **Whitehorse City Council's** Planning Scheme.

In brief, the proposed development:

- Meets best practice stormwater quality performance objectives set out in the *Urban Stormwater Best Practice Environmental Management Guidelines*, CSIRO 1999
- Features extensive landscape areas that allow site permeability.

The information in this report is based on close collaboration with relevant stakeholders, as well as careful review of relevant project documents and correspondence.

TABLE 1 KEY STAKEHOLDERS

Key Contact	Role	Company/Entity
Sophie Coissieux	Senior Planner	Hansen Partnership Pty Ltd

GENERAL NOTE:

The ESD assessment and results presented herein are based on:

- Architectural Drawings – prepared by **Harmer Architecture (dated 19.04.23)**

1.1 Summary

In summary, the proposed development:

- Achieves the best practice stormwater quality performance objectives set out in the Urban Stormwater Best Practice Environmental Management Guidelines, CSIRO 1999
- Promotes water sensitive urban design, including rainwater harvesting and re-use.

1.2 Tools and Guidelines

Here are the guidelines/tools used in the assessment presented in this report:

- Sustainable Design Assessment in the Planning Process (SDAPP) framework
- Melbourne Water STORM Calculator and Guidelines

Project Overview

2.1 Site Description

Below is a summary of the subject site and an image showing the existing conditions along with the surrounding locale:

TABLE 2 SUBJECT SITE AND PROJECT OVERVIEW

Site element	Description	
Site area	21,010m ² – However the proposed works (the new Administration Building) are within a smaller section of the total site area, approx. 4377.9 m ²	
Local Government Authority	City of Whitehorse	
Existing conditions	An existing gravel driveway, landscaping, and shaded sandpit (new Admin Building).	
Proposed development	Proposed Building use	NON-RESIDENTIAL New Administration Building (295 m ²)
	Number of Buildings (onsite)	1 (Proposed works only, existing buildings to be retained)
	Number of Storeys above ground (max)	1
Site access	Vehicular access via existing driveway off <i>Centre Road</i> to the Southeast	



FIGURE 1 SITE LOCATION (IMAGE ACCESSED AUGUST 2023)

2.2 Building Use

Upon completion, the new development will contain the following building uses:

TABLE 3 BUILDING USE WITHIN THE PROPOSED DESIGN

Building Level	Building Use
Ground floor (New Admin Building)	Porch, foyer, meeting room, sick bay, reception, four office areas, copy area, corridor, WCs, mezzanine
<p>OF NOTE:</p> <ul style="list-style-type: none"> Existing impervious structures (e.g., weatherboard building and shipping containers) have been excluded from this assessment as they will remain unchanged. 	

2.3 Urban Stormwater Quality

To meet minimum State Environment Protection Policy (SEPP) requirements, developments need to attain Best-Practice Environmental Guidelines for Urban Stormwater, CSIRO 1999 as outlined below (post-construction phase):

- 80% reduction in the mean annual load of Total Suspended Solids (TSS)
- 45% reduction in the mean annual load of Total Phosphorus (TP)
- 45% reduction in the mean annual load of Total Nitrogen (TN)
- 70% reduction in the mean annual load of Gross Pollutants or Litter (GP) – where litter is defined as anthropogenic material larger than 5mm

Preliminary compliance with the above targets can be demonstrated using either of the following tools:

- Melbourne Water's online STORM rating tool (proposed development required to attain a minimum score of 100%) – ideal for small developments
- Model for Urban Stormwater Improvement Conceptualisation (MUSIC) – ideal for larger developments or where treatment trains are required.
- **The Melbourne Water STORM Calculator was used in this assessment.**

Water Sensitive Urban Design Initiatives

The proposed development has been designed to contribute to the broader City of Whitehorse stormwater management objectives.

In summary, the WSUD initiatives integrated into the development aim to:

- Minimise onsite potable water consumption
- Contribute to the protection of waterways by improving stormwater quality

Accordingly, the analysis presented in this report demonstrates that the proposed development meets these objectives by incorporating the following measures:

- ✓ Attain the *best practice standard* for urban stormwater quality
- ✓ Integrating permeable landscape elements
- ✓ Rainwater harvesting and reuse

Focus Area	Water Efficiency
Objective	To reduce potable water use within the proposed development.

Fixtures and Fittings

To ensure efficient use of water within the proposed development, water efficient fixtures and fittings will be specified and installed as follows:

- WELS 5-star kitchen taps
- WELS 5-star basin taps
- WELS 4-star toilets
- WELS 4-star dishwashers

Water Efficient Landscape

The landscaping features integrated into the development will incorporate either of the following water-saving principles to conserve potable water use:

- Specify landscaping plants suitable for the local micro-climate; and/or
- Specify landscaping plant species that are low water use

Focus Area	Stormwater Management
Objective	To reduce peak stormwater flows and pollution from stormwater runoff that may cause negative impacts on waterways.

3.1 Construction Site Management Plan

During construction phase, the builder/general contractor will prepare and implement a *construction site management plan*. The plan will outline how the stormwater system shall be protected from erosion and pollution during construction works and will generally meet the guidelines set out in [Melbourne Water's 'Keeping our stormwater clean: Builders Guidelines'](#). The final site management plan can be included within the builder’s broader Construction Environment Management Plan (CEMP).

Refer to for the preliminary Site Management Plan.

3.2 Urban Stormwater Quality

The online STORM Rating Tool developed by Melbourne Water was used to assess how that the project meets best practice standards for urban stormwater quality. As shown below, the proposed development attains an overall STORM rating of **123%**:

STORM Rating Report

TransactionID: 1626584
 Municipality: WHITEHORSE
 Rainfall Station: WHITEHORSE
 Address: 51 Centre Road
 Vermont
 VIC 3133
 Assessor: KM
 Development Type: Other
 Allotment Site (m2): 4,377.90
 STORM Rating %: 123

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
RAINWATER CATCHMENT AREAS CONNECTED TO RWT (NEW ADMIN BUILDING TOP ROOFS)	311.10	Rainwater Tank	5,000.00	15	128.00	70.00
UNTREATED ADMIN BUILDING ROOF AREAS	12.40	None	0.00	0	0.00	0.00

FIGURE 2 MELBOURNE WATER STORM RATING REPORT. THE STORM RATING ATTAINED ABOVE DEMONSTRATE THAT THE PROPOSED DEVELOPMENT WILL MEET THE BEST PRACTICE OBJECTIVES FOR STORMWATER QUALITY AS CONTAINED IN THE URBAN STORMWATER - BEST PRACTICE ENVIRONMENTAL MANAGEMENT GUIDELINES (VICTORIAN STORMWATER COMMITTEE).

This STORM rating result is based on the following stormwater management measures incorporated into the development:

3.3 Stormwater Management System

Below is a breakdown of the proposed onsite stormwater management strategies:

TABLE 4 PROPOSED STORMWATER MANAGEMENT SYSTEM

WSUD Strategy	Description	Details
Stormwater Retention & Reuse	Rainwater Catchment:	Rainwater harvesting from approx. 311.1 m ² of <u>new roof</u> areas
	Rainwater Storage	Total storage volume of 5,000 litres <ul style="list-style-type: none"> — RWTs can be located above or below ground — Downpipes to be connected to the RWT via gravity fed or charged system (appropriate system to be determined by hydraulic or drainage engineer/contractor during Design Development). — Tank overflow connected to stormwater system
	Water Re-use	Captured rainwater to be re-used for: <ul style="list-style-type: none"> — Toilet flushing in all toilets
	Impact	Onsite rainwater harvesting and re-use is envisaged to: <ul style="list-style-type: none"> — Promote stormwater retention and divert runoff from the stormwater system — Reduce potable water use from the mains for non-potable purposes (such as flushing) — Assist with attenuation during storm events
Stormwater Infiltration	Permeable area (vegetated)	The remainder of the site area will be permeable, including: <ul style="list-style-type: none"> — Pervious existing lawns — Pervious existing staff only gravel carpark
	Stormwater impact	Site permeability will reduce stormwater run-off leaving the site by allowing stormwater to drain directly into in situ soil.

OF NOTE:

- Existing impervious structures (e.g. weatherboard building and shipping containers) have been excluded from this assessment as they will remain unchanged.
- Building owner to notify property manager or maintenance team about the rainwater harvesting system during project handover to ensure its maintenance (see the next section of this report for the preliminary WSUD Maintenance Manual).
- The measures listed above will help reduce stormwater runoff from the site, minimise potable water use, attenuate stormwater during storm events. And most importantly, help achieve Best Practice targets for Urban Stormwater Quality.

3.4 Stormwater Treatment Areas

Here is the breakdown of the stormwater management measures in the proposed development at 51 Centre Road, Vermont, VIC:

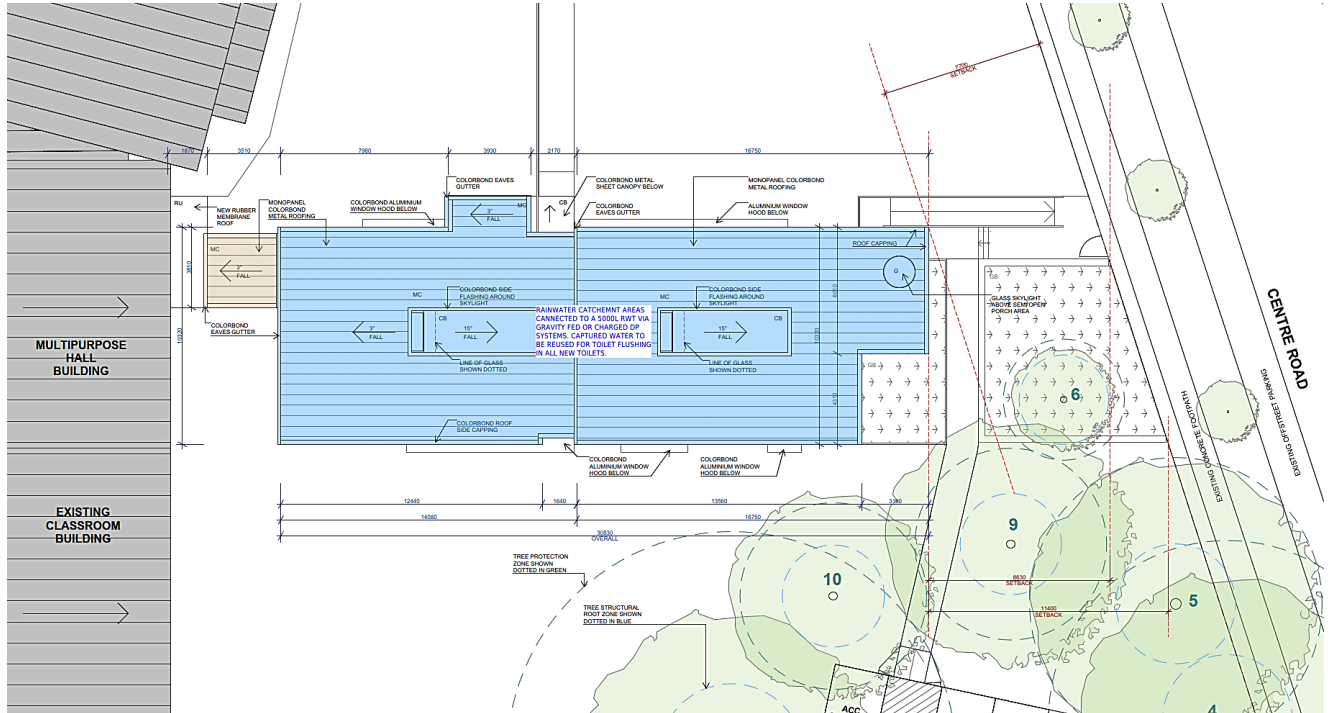


FIGURE 3 PROPOSED WSUD STRATEGY—STORMWATER TREATMENT AREAS. ROOF AREAS (BLUE) TO RWT; BROWN AREAS SHOW UNTREATED ROOF SECTION; AND GREEN AREAS SHOW LANDSCAPE ZONES BELOW. PLEASE NOTE THAT EXISTING AREAS THAT WILL REMAIN UNCHANGED HAVE BEEN EXCLUDED FROM THIS ANALYSIS.

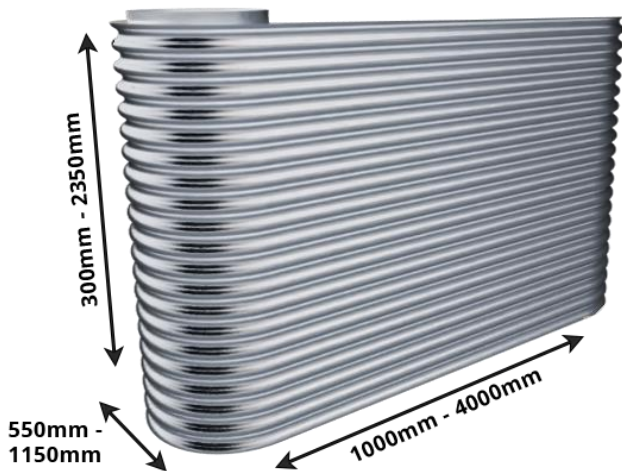


FIGURE 4 TYPICAL ABOVE GROUND 5000L SLIMLINE WATER TANKS

WSUD Maintenance Manual

The Water Sensitive Urban Design (WSUD) Maintenance Manual is a crucial document that provides comprehensive guidelines for the ongoing care and upkeep of WSUD elements within a project. It details the specific maintenance tasks, their frequency, and the procedures for routine inspection and problem resolution for each WSUD feature, such as water tanks, rain gardens, swales, permeable pavements, and stormwater harvesting systems.

The manual assigns responsibility for these tasks, ensuring that the WSUD features continue to function optimally, thereby enhancing water quality, reducing flood risk, promoting biodiversity, and contributing to overall urban sustainability.

4.1 Maintenance Manual: Rainwater Tank

To ensure the rainwater harvesting system described in this report operates as designed and that the water quality is maintained during the life span of the tank, the building owner or operator will implement the maintenance program outlined below:

Every Six Months

Tank Element		Action Required	Additional Comments
<input type="checkbox"/>	Gutters	<ul style="list-style-type: none"> — Visual inspection — Clean gutters if needed 	If large amounts of leaf material and other debris are found during inspection, then the inspection and cleaning frequency may need to be increased. Alternatively, gutter leaf screens may be installed.
<input type="checkbox"/>	Pipework	<ul style="list-style-type: none"> — Visual inspection — Check for structural drainage issues — Repair any issues if necessary 	
<input type="checkbox"/>	Tank filters and first flush diverters	<ul style="list-style-type: none"> — Visual inspection — Check for obstruction issues — Clean or repair as necessary 	
<input type="checkbox"/>	Pumps	<ul style="list-style-type: none"> — Inspection and maintenance as per manufacturer's guidelines 	

Every 2-3 Years

Tank Element	Action Required	Additional Comments
<input type="checkbox"/> Rainwater Tank	<ul style="list-style-type: none"> — Visual inspection — Check for structural drainage issues — Check for sediment accumulation — Repair any issues if necessary — Clean/ de-sludge the tanks if necessary 	

The rainwater harvesting system will be installed in accordance with the guidelines set out in the Rainwater Design & Installation Handbook published by the National Water Commission.

Rainwater Harvesting System—Indicative Schematic

An indicative schematic diagram of the rainwater tank installation is provided below. Further specification to be confirmed during design development.

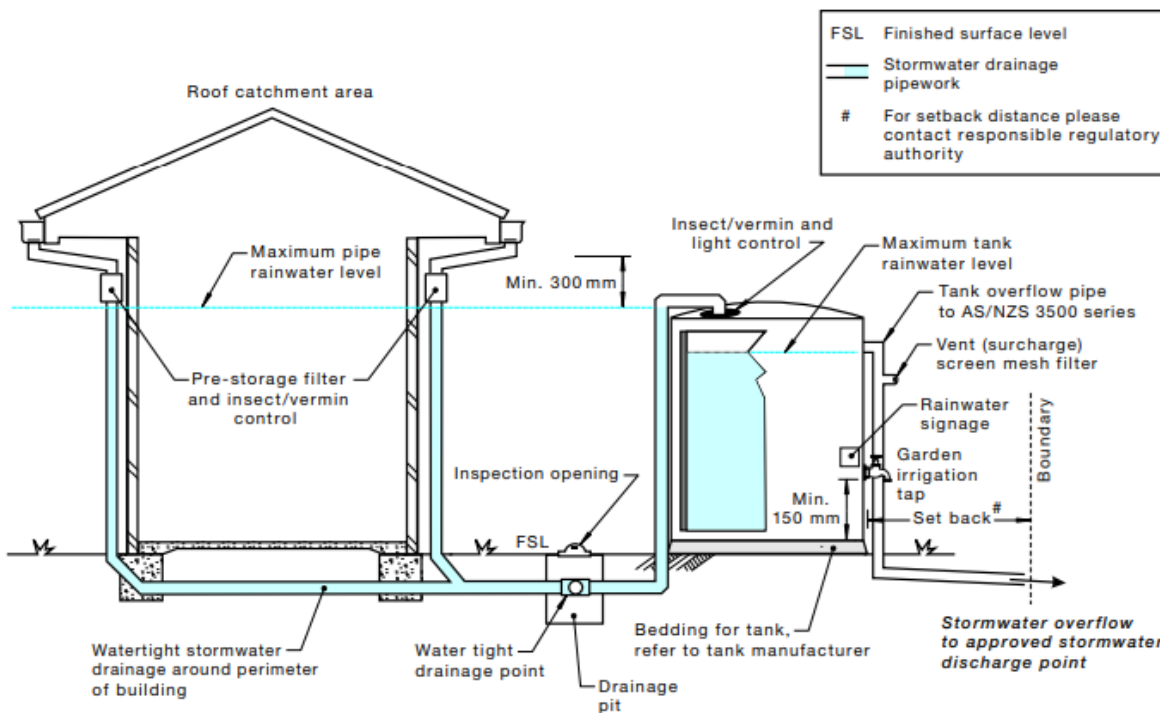


FIGURE 5 INDICATIVE RAINWATER TANK INSTALLATION SCHEMATIC

Summary & Conclusion

5.1 Summary

The intent of this report was to investigate the stormwater management measures needed to show that discharge from the proposed development (situated at 51 Centre Road, Vermont, VIC) meets best practice standard for urban stormwater quality. The stormwater quality assessment, results, and outcomes presented in this report demonstrate how the proposed development incorporates water sensitive urban design initiatives into project.

mu was used to verify the effectiveness of the proposed measures; and confirm that the development meets the urban stormwater quality targets.

As confirmed by the analysis presented in this report, the proposed development will:

- ✓ Achieve the best practice objectives for stormwater quality as contained in the *Urban Stormwater - Best Practice Environmental Management Guidelines (Victorian Stormwater Committee, 1999)*, including:
- ✓ Attain these outcomes by integrating the following initiatives into the design:
 - Permeable landscape areas that promote onsite infiltration of stormwater (and improve the ecological value of the site)
 - Rainwater harvesting and reuse.
- ✓ Reduce potable water use by installing water efficient fixtures and fittings.

5.2 Conclusion

The proposed development therefore meets the policy objectives set out in *Clause 53.18: Stormwater Management Policy* of the Whitehorse Planning Scheme. And the initiatives proposed in this report and development application are deemed to be suitable for a development of this type and scale.

Appendix A: Construction Site Management Plan

Overview

This preliminary site management plan outlines how the proposed development will reduce the risks and impacts of stormwater pollution on nearby waterways during construction works.

The measures presented herein are considered suitable at this stage of the project.

Note that this site management plan is in accordance with the objectives set out in Clause 53.18-6 of the Whitehorse Planning Scheme.

Here are the pollutants likely to enter the stormwater system during the demolition and construction phase:

- Sediments such as soil, sand, gravel, mud, and concrete washings;
- Oil, foam, scum, grease, and other chemicals; and
- Litter, stones, debris etc.

Site Management Initiatives

These pollutants arise from several factors such as dirt from construction vehicles, stockpiles located close to surface runoff flow paths, surface runoff from disturbed areas during earthmoving and construction works. It is therefore important to have measures that either prevent or minimise the pollutant loads entering stormwater system during construction.

To mitigate the impacts of the above pollutants on the stormwater system, the following stormwater management strategies will be implemented during the construction phase as appropriate:

TABLE 5 CONSTRUCTION SITE MANAGEMENT INITIATIVES

Scope / Site Management Checklist	
<input type="checkbox"/>	Establish a single stabilised entry/exit point to the site
<input type="checkbox"/>	Ensure stockpiles are on the project site and not on footpaths, roadways, and neighbouring land
<input type="checkbox"/>	Only clear those lands that must be disturbed during the building works
<input type="checkbox"/>	Where necessary, put-up barrier fences around areas where vegetation/topsoil will not be disturbed
<input type="checkbox"/>	Installation of onsite erosion and sediment control measures e.g., silt fences, sediment traps, hay bales and geotextile fabrics
<input type="checkbox"/>	To prevent litter from getting blown away and potentially entering stormwater drains, waste bins with a lid shall be used where possible
<input type="checkbox"/>	Site induction by the general contractor/ builder to make personnel aware of stormwater management measures in place

Scope / Site Management Checklist	
<input type="checkbox"/>	Employ suitable measures to reduce mud being carried off-site into the roadways such as installing a rumble grid/ gravel/ crushed-rock driveway (or equivalent measure) to provide clean access for delivery vehicles, and removing mud from vehicle tyres with a shovel etc
<input type="checkbox"/>	Safe handling and storage of chemicals, paints, oils, and other elements that could wash off site to prevent them from entering stormwater drains
<input type="checkbox"/>	Where practicable, stockpiles will be covered, located within the site's fence and away from the lowest point of the site where surface runoff will drain to. This initiative will minimise erosion

Upon implementation, these measures shall deter the aforementioned pollutants from entering the stormwater system (and consequently downstream waterways) during the construction phase.

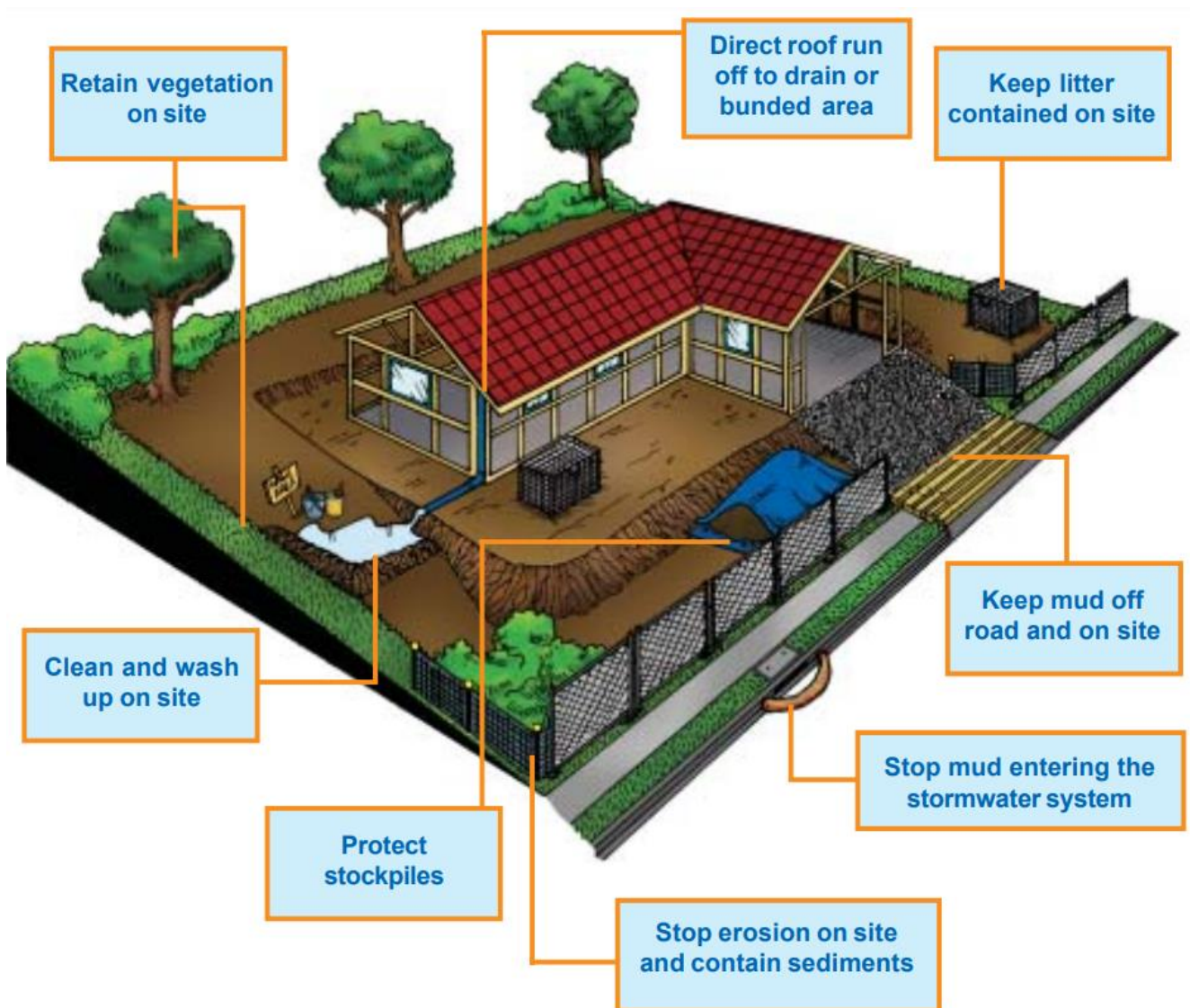


FIGURE 6 SITE MANAGEMENT STRATEGIES FOR SEDIMENT CONTROL AND STORMWATER POLLUTIUN PREVENTION.

Clean Site Checklist (to be Completed by Builder)¹

<h1 style="margin: 0;">CLEAN SITE CHECKLIST</h1> <p style="margin: 0;">Please photocopy to use on site</p>		
SITE DETAILS: Building Company: _____ Date: ____ / ____ / ____ Site Supervisor: _____ Site Address: _____ Client Name: _____ Contact Number: () _____		
SITE RULE	TASK	CHECK
SITE RULE 1 - Check Council requirements and plan before you start work on site.	Crossover away from lowest point Sediment control fence on lowest side Stockpiles away from lowest point Marked trees and vegetation to keep on site	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SITE RULE 2 - Stop erosion on site and contain sediments.	Sediment control fence in place Catch drains on high side of site Vegetation areas kept at boundary Gravel sausage at storm water pit Downpipes set up as early as possible	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SITE RULE 3 - Protect stockpiles.	Base and cover for stockpiles Gravel sausage at stormwater pit	<input type="checkbox"/> <input type="checkbox"/>
SITE RULE 4 - Keep mud off road and on site.	Crushed rock access point Vehicles keep to crushed rock areas Mud removed from tyres before leaving site Clean road if muddy Clean stormwater pit and maintain gravel sausage	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SITE RULE 5 - Keep litter contained on site.	Litter bins in place with lid closed Site fencing in place	<input type="checkbox"/> <input type="checkbox"/>
SITE RULE 6 - Clean and wash up on site.	Cutting and clean up area on site Clean equipment off before washing Sediment filters downslope Contain all washings on site	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

¹ SOURCE: [KEEPING OUR STORMWATER CLEAN: A BUILDERS GUIDE](#)

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Makao Group is a Melbourne-based sustainability engineering firm that specialises in handling complex building physics projects and providing environmentally sustainable design (ESD) solutions in the real estate industry. Our team of experts works closely with a wide range of clients, including property developers, architects, urban planners, homeowners, and business owners, to bring their projects to life with sustainable principles.

At Makao, we take a tailored approach to each project, leveraging our extensive design and construction experience to provide custom solutions that result in sustainable developments and improved human comfort in buildings. With us, you can expect a smooth and seamless experience as we work to turn your vision into a reality.