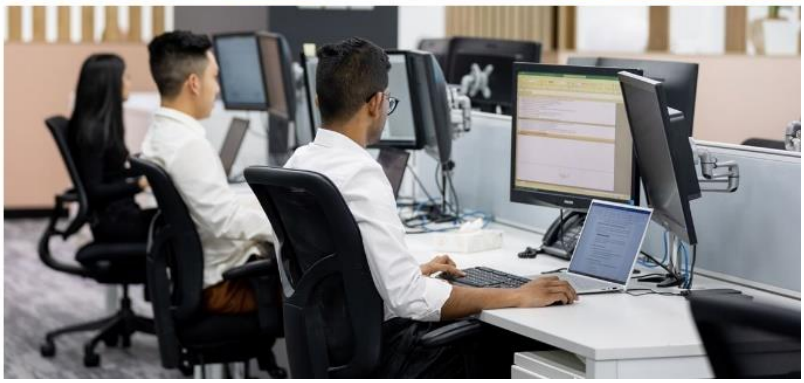
Integrated Water Cycle Management Memorandum

Mirvac Residential - COBBITTY

Lot 1, 3, 4, 5 & 6 in DP 1276275
No. 501, 585, 589, 591 & 593 Cobbitty Road



15/08/2023	Mirvac	Revision 01	21-0258-08

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Effective Date: 15/08/2023

Document Control

Revision	Prepared	Reviewed	Approved	Date	Description
Rev 01	Christopher Scholes	Mariano Polisciuk	Mariano Polisciuk	15/08/2023	Uncontrolled - Issued for Client Review

1 Introduction

This memorandum has been prepared to demonstrate that the IWCM controls proposed under this Development Application are in accordance with the submitted and peer reviewed IWCM Masterplan previously prepared for the subject site.

1.1 Site Description

The subject site is located within the Camden Council LGA and sits centrally within the Masterplan prepared for the site previously known as Lot 2005 (DP 1162239) No. 531 Cobbitty Road. Since the masterplan has been prepared the site has been subdivided to create a number of residue lots under DP 1276275.

This Development Approval aims to provide some of the permanent water quantity and water quality management infrastructure proposed in the Masterplan IWCM Report (Orion Consulting Reference 21-0258-04).

The site extents for this Development approval are shown in the figure below:

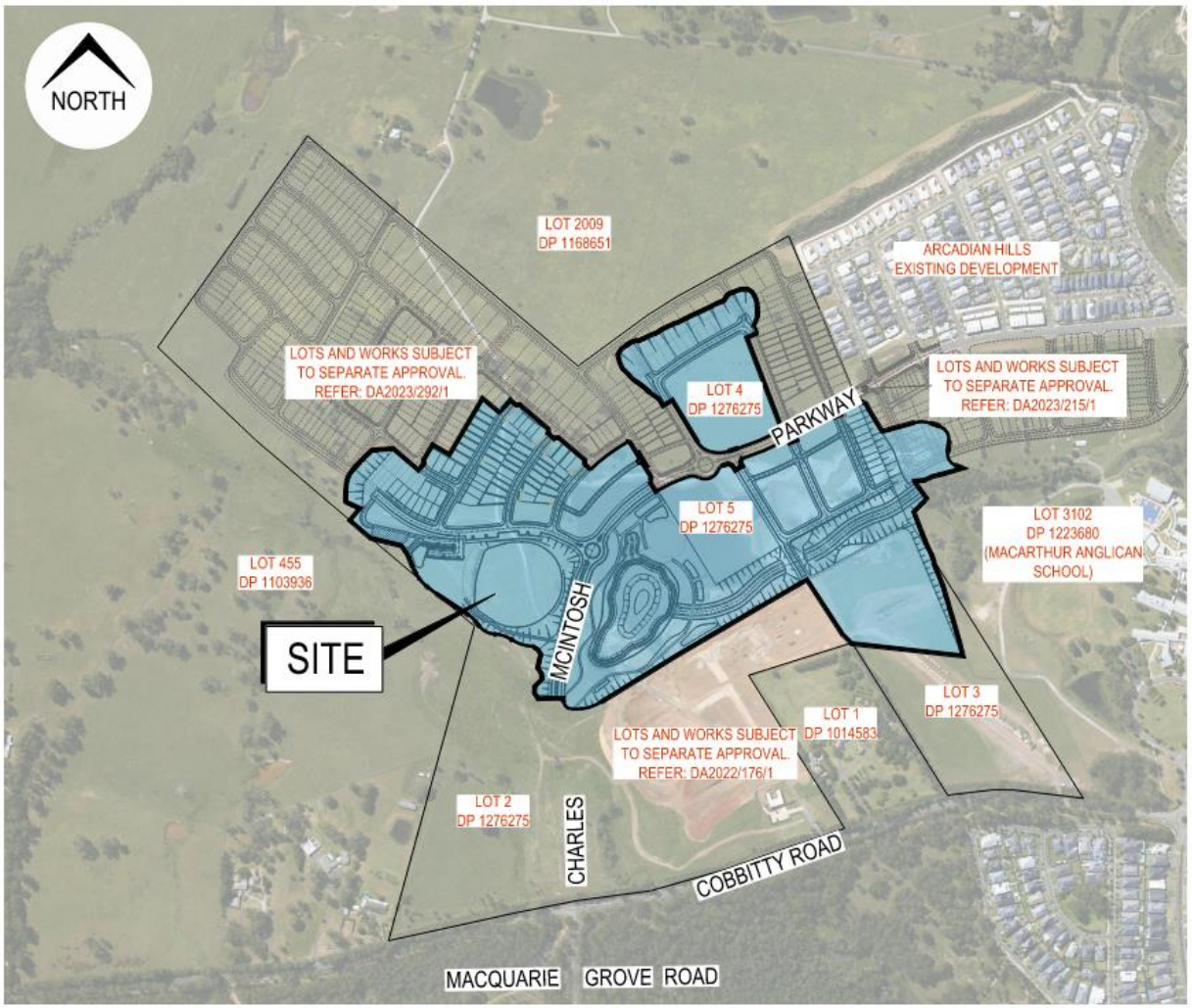


Figure 1 – Site Extents (Imagery courtesy of Metromap ©)

1.2 Proposed IWCM Infrastructure

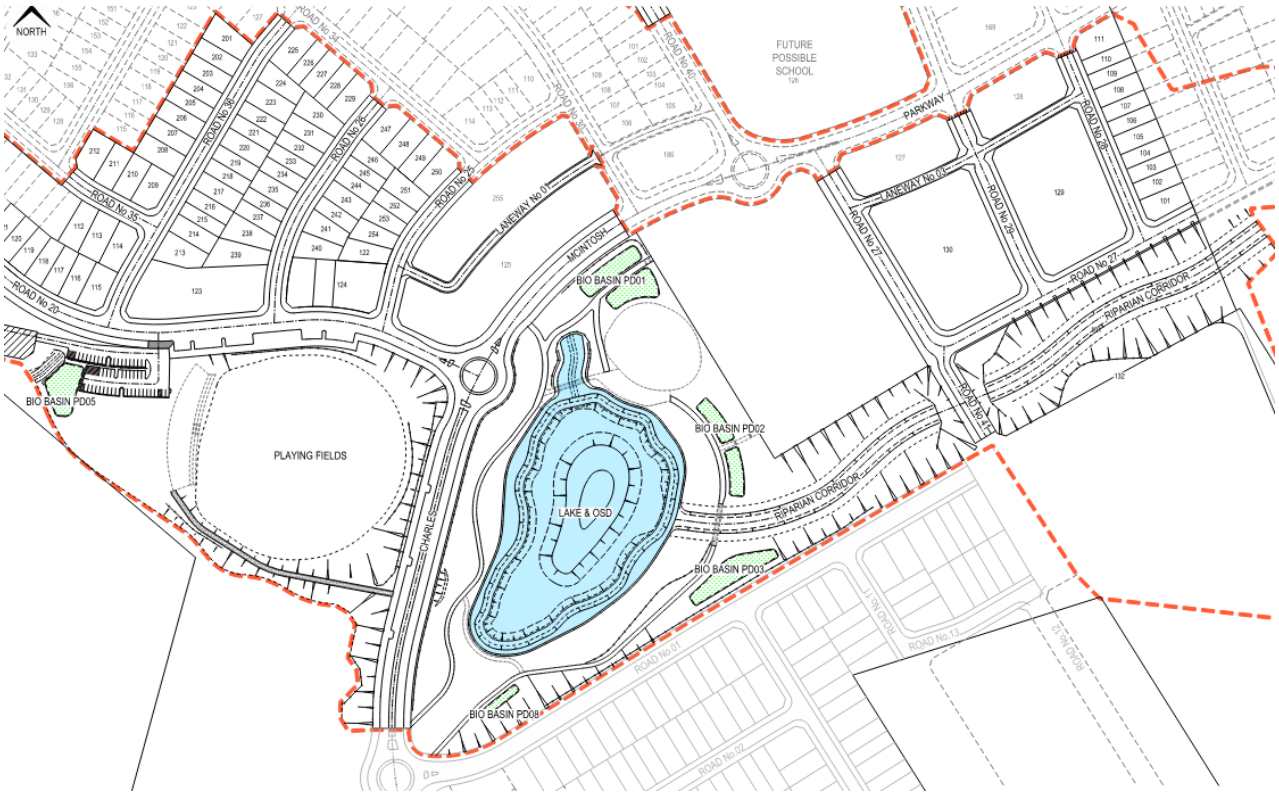
The proposed Development Approval seeks to deliver the following infrastructure:

1. A new riparian corridor, entering the site along the eastern common boundary shared with Macarthur Anglican School and runs east to west into a new Lake – Defined as a 'Category 2 Watercourse Terrestrial and Aquatic Habitat' under the Oran Park and Turner Road Waterfront Land Strategy (2009).

2. A new Lake and surrounding active and passive open space. The lake features significant active flood storage above the permanent water level. The lake also features passive lake health controls in the form of a submerged wetland and perimeter planting. These lake health controls proposed have been provided to reduce algal bloom risk for the lake only; the urban development surrounding the lake does not rely on these controls.

3. Playing Fields, located on the western side of Charles McIntosh parkway. The playing fields provide some flood storage that overflows from the lake for the major storm events (50 Year ARI / 2% AEP events and rarer). The playing fields and the flood storage system has been designed to not feature any active flood storage for more frequent events below the 50 Year ARI / 2% AEP over the sportsfields.

4. Five (5) permanent Bio-filtration basins and GPTs to treat the urban sub catchment and to achieve the stormwater quality performance targets required. In accordance with the Masterplan and Open Space strategy, a proprietary biofiltration media is proposed to maximise hydraulic efficiency and concentrate the ongoing maintenance requirements into a smaller footprint.



2 Water Quantity Infrastructure

2.1 Required Water Quantity Infrastructure (Masterplan)

As documented under the Mirvac Masterplan IWCM Report and Study prepared for the subject site, the following infrastructure is required to meet the pre-versus-post no net negative design objectives.

Table 1 - Masterplan IWCM Water Quantity Controls

Storage Structure	1% AEP WSL (m AHD)	1% AEP Volume to WSL (m^3)	Outlet Structure Configuration
Lake (PD-L)	74.25	101,600	2 x 900 Ø RCP Weir 1 – 7.0m @ RL 73.35 Weir 2 – 25m @ RL 74.05
Playing Fields	71.6	9,000	525 Ø RCP Weir 1 – 3.6m @ RL68

2.2 Provided Water Quantity Infrastructure (Proposed DA)

Table 2 - Provided IWCM Water Quantity Controls

Storage Structure	1% AEP WSL (m AHD)	1% AEP Volume to WSL (m^3)	Outlet Structure Configuration
Lake	74.277	103,000	First Stage - 2 x 900 Ø RCP Second Stage - 8 x 1.2 x 1.2 Surface Inlet Pits @ RL 73.35 Third Stage - Weir – 25m @ RL 74.05
Playing Fields	72.16	11,750	525 Ø RCP Weir 1 – 3.6m @ RL72.1

Key points in relation to the proposed provided infrastructure are as follows:

1. From the masterplan design, the Playing fields have been lifted slightly to allow for future sub-soil drainage considerations if required. As a result, the outlet structures and storage zone has all been lifted within the development approval design. The storage volume, configuration and outlet structure remains the same as that proposed in the Masterplan.

2. The first stage weir outlet for the Lake has been replaced with a series of grates, located and sized to mimic the 7.0m Weir that was proposed in the Masterplan IWCM. The drop structures and inlet grates and culverts as detailed within the Roads and Drainage Civil Engineering drawing set considers the following:

    a. The outlet discharge curve is governed by the 2 x 900 RCP culverts, the second stage bank of grates at RL 73.35 and the 25m weir at RL 74.05. These structures operate independently of the culverts under Charles McIntosh Parkway (culverts are inlet controlled).

    b. The 25m long weir operates in isolation of the inlet capacity of the drop structure that it feeds into. (ie – the capacity over the weir is less than the inlet capacity of the drop structure into the culverts)

As a result of the above points, this DA adequately provides an OSD and flood storage volume and configuration that is in accordance with the Masterplan IWCM report and study. As such, this DA adequately meets the requirement water quantity

management objectives to not adversely impact any adjoining sites with all lots located above the modelled 100 Year ARI (1% AEP) + 500mm freeboard Flood Planning Level.

3 Water Quality Infrastructure

3.1 Required Water Quality Infrastructure (Masterplan)

As documented under the Mirvac Masterplan IWCM Report and Study prepared for the subject site, the following infrastructure is required to meet the urban development water quality management objectives for the site.

Table 3 - Masterplan IWCM Water Quality Controls

Catchment	Controls
PD01	1 x GPT & 850 m^2 Filterra Biofiltration System
PD02	1 x GPT & 500 m^2 Filterra Biofiltration System
PD03	1 x GPT & 650 m^2 Filterra Biofiltration System
PD05	1 x GPT & 500 m^2 Filterra Biofiltration System
PD08	1 x GPT & 100 m^2 Filterra Biofiltration System

*The Filterra Biofiltration System is a proprietary tertiary water treatment device that is optimised for higher treatable flows in a smaller footprint than that observed for more conventional biofiltration systems. This minimises the land required for water quality infrastructure and concentrates the maintenance obligations into a smaller footprint (than conventional biofiltration). A key feature of this system is a mulch layer which extents the lifespan of the media material and improves planting conditions by trapping some moisture for the plants after a rainfall event. While the maintenance cycle of the mulch layer is 6-12 months, the longer term maintenance requirements for plants and the media material is significantly reduced.

3.2 Provided Water Quality Infrastructure (Proposed DA)

Table 4 - Provided IWCM Water Quality Controls

Catchment	Controls (Rounded / (Actual))
PD01	1 x GPT & 850 m^2 Filterra Biofiltration System / (857 m^2 Actual)
PD02	1 x GPT & 500 m^2 Filterra Biofiltration System / (503 m^2 Actual)
PD03	1 x GPT & 650 m^2 Filterra Biofiltration System / (601 m^2 Actual)
PD05	1 x GPT & 500 m^2 Filterra Biofiltration System / (510 m^2 Actual)
PD08	1 x GPT & 100 m^2 Filterra Biofiltration System / (117 m^2 Actual)

For the proposed development approval, additional detail has been provided around the geometric arrangement, inlet and outlet systems for each of the GPTs and Bio (filtration) basins within the Road and Drainage Civil Engineering drawing set.

3.3 Lake Health

As recommended by the IWCM Masterplan report and study, an independent lake health assessment and review by E2 Design lab (E2D) has been carried out in order to quantify any risks around nutrient loads within the lake and provide advice around appropriate control measures. As a result of this review by E2D the following elements have been integrated into the design of the lake for the proposed DA:

1. Reduction in the permanent lake storage volume to achieve a residence time of between 25 and 30 days. This volume reduction allows for more frequent water-turnover within the lake.

2. Introduction of a central wetland. Reduces the total dead storage volume required in point 1 above and acts as a passive lake health control to control nutrient loads within the lake. As it is centrally located, wind action provides passive circulation of water over the wetland mitigating the need for mechanical aeration or circulation of lake water.

3. All water quality management infrastructure required to achieve water management targets for the urban development are located fully offline and above the lake.

As a result of the above points, this DA adequately provides a water quality treatment train and a passive consideration to lake health that is in accordance with the Masterplan IWCM report and study. As such, this DA adequately meets the requirement water quality management objectives for the subject site.