

Civil Engineering Design Report
Fairy Meadow Site
Innovation Way, Fairy Meadow, NSW, 2519
Lot 11: DP1172135 **Revision C**

NSW RAIR PROGRAM
Project Reference #12537-01

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Prepared For:

Health-Infrastructure
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1 Introduction

This report is intended to provide civil engineering design information to Rural Ambulance Infrastructure Program (RAIR II) R23 Fairy Meadow Site stakeholders.

Civil works will include the construction of proposed buildings and ambulance access driveways to allow access from Innovation Way into the proposed establishment.

The strategic plan for the management of stormwater drainage is to generally maintain the existing catchment runoff volume and stormwater quality by providing stormwater bioretention. Stormwater detention basin is proposed, as impervious surface areas is increased.

It is the design intent that all existing overland flow rates and discharge points are preserved.

2 Site Description

The site is situated along of Innovation Way with existing footpath crossing an open grass area. The site is flat and is sloping 1.6% from southwest to northeast towards site low point where existing drainage is located.

2.1 Existing Services

A site survey has been conducted by Monteath & Powys in June 2022 that that shows existing electrical line were found within the site boundary.

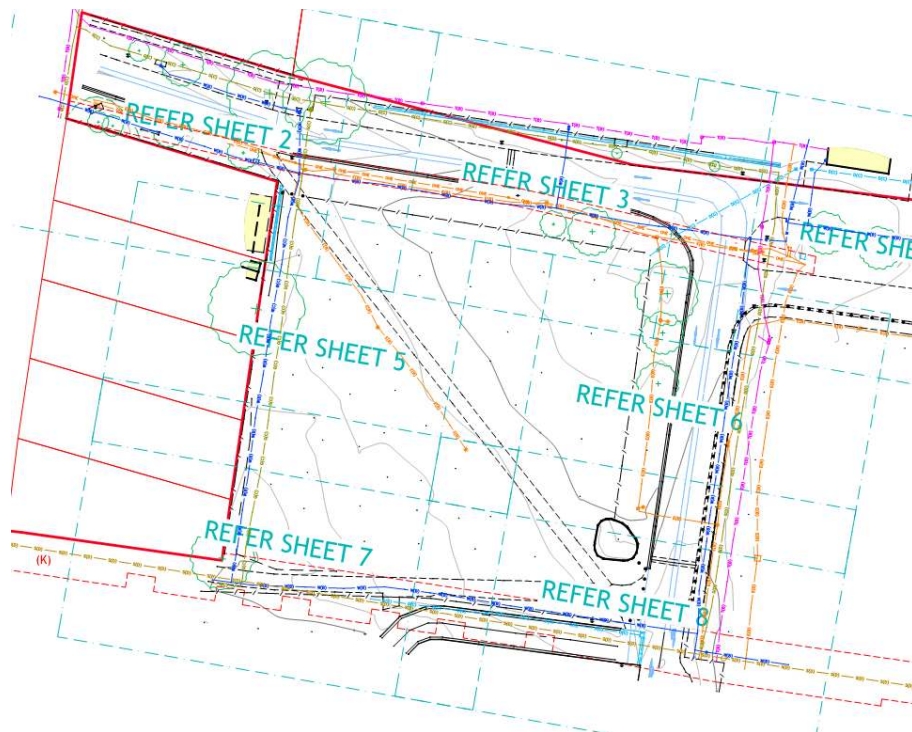


Figure 2-1: Existing Site Survey

2.2 Existing Flooding Conditions

Flood Assessment Summary:

Wollongong City Council Flood Certificate 202100599 issued on June 2021 indicates that the site is flood affected but below the proposed FFL during 20% and 1% AEP storm events. See Flood Map on Figure 2-2 and 2-3 below.

Proposed Building FFL is RL 5.0, which is above 20% and 1% AEP Storm event flood level.

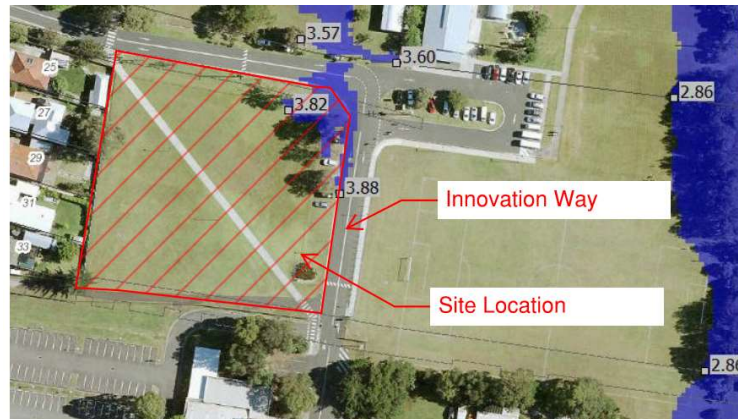


Figure 2-2: Fairy Meadow Flood Certificate #202100599, 20% AEP Flood Levels, June 2021

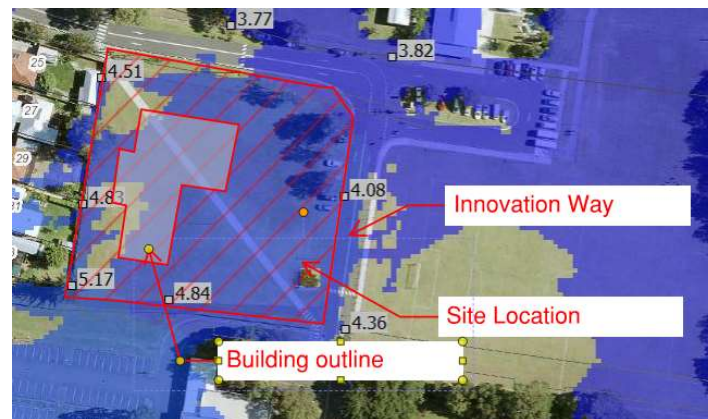


Figure 2-3: Fairy Meadow Flood Certificate #202100599, 1% AEP Flood Levels, June 2021

3 Proposed Development

The proposed development consists of the construction of new building, carparks, driveways and associated site infrastructure. The development is shown in Figure 3-1 below.

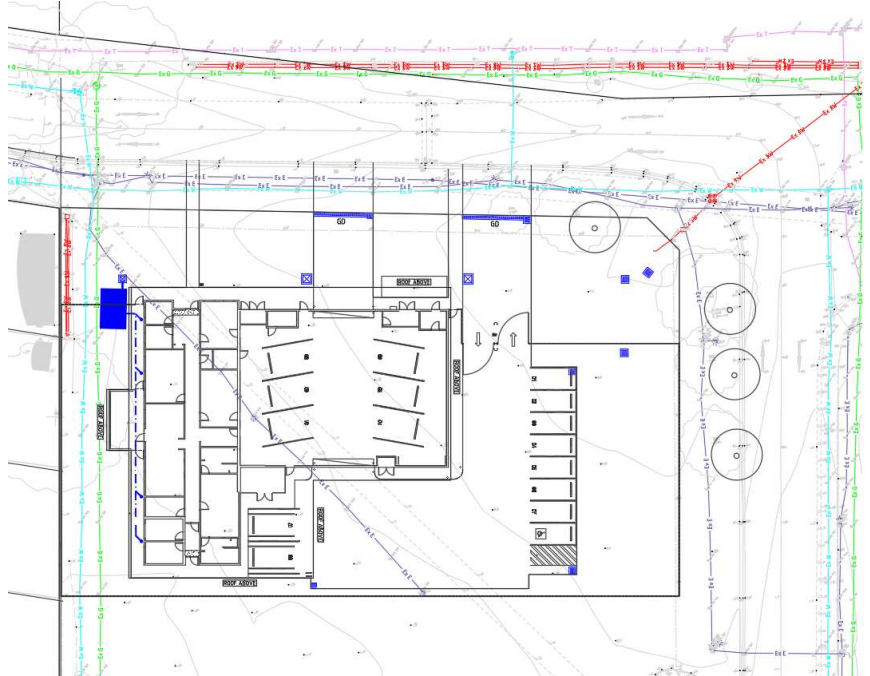


Figure 3-1: Proposed Development

3.1 Earthworks

The earthwork quantities associated with the proposed development are provided in the figures below:

- Cut – 78 m³
- Fill – 1154 m³

Majority of the earthworks involve fill and will require import of approximately 1075 m³ of fill material.

3.2 Stormwater Drainage Strategy

In accordance with Wollongong Development Control Plan 2009 (WDCP), the design of stormwater drainage systems shall be carried out in accordance with the Australian Rainfall and Runoff (1987 and 2019 versions), Australian Standard AS3500.0 – Stormwater Drainage, Wollongong City Council DCP Chapter E13: Floodplain Management, and the requirements of Wollongong City Council DCP Chapter E15: Water Sensitive Urban Design.

Stormwater detention system is required for any developments with additional impervious surface area to ensure there is no adverse impact from increased stormwater runoff on downstream properties as a result of new developments or redevelopments during all storm events up to and including the 100-year Annual Recurrence Interval (ARI) event. A basin storage is to be designed to ensure that stormwater targets, as indicated in WDCP Chapter 10 and NSW Ambulance, Rural Ambulance Station Facilities ESD Design (RASPED) Guideline, Credit 26: Stormwater – Peak Discharge, are achieved.

The existing site is 5% impervious. This will increase to approximately 59% impervious based on the proposed concept design details. A bioretention basin will be required to limit the post-development flows to the pre-development conditions as outlined in WDCP 2009 and NSW Ambulance, RASPED Guideline.

A 9000L inground rainwater tank is added based on NSW Ambulance, RASPED Guideline. Collected roof water will be used for irrigation within site.

The preliminary analysis undertaken using DRAINS computer software indicates a volume of approximately 49m³ of detention storage is required. Please refer Figure 3-3 for the preliminary DRAINS layout and estimated stormwater flows for the site.



A major system is also required for the proposed development in the form of overland flow paths. The major system should be designed to convey flows surcharged from the underground drainage system for storm events up to 100-year ARI. The overland flow is to be directed away from the buildings and carparks and towards north where forest is located.

3.3 Stormwater Drainage Strategy DCP assessment

The Wollongong City Council DCP Chapter E14 10.2.4 & Appendix 1 – OSD Design has formulas for the determination of the size of the OSD required. During a 100-year ARI event the determined OSD size is 37.66m³ and therefore the drains calculated size of 49m³ provides a greater factor of safety on the site and to help keep the discharge rates from the site to below the pre-existing conditions.

The drainage strategy and stormwater quantity (on site detention) design mentioned in section 3.2 has been assessed against the Wollongong DCP chapter E14 and has been determined to be in accordance with the conditions of chapter E14 as the proposed development:

- Controls the peak discharge using the basin. We are decreasing the site discharge in comparison to pre-existing conditions. The sizing of the OSD is greater than the minimum requirements of the DCP.
- Discharges to council drains

3.4 Stormwater Quality Management Strategy

To protect the existing ecology, the development will be required to satisfy the water quality requirements over the full range of rainfall events to maintain the long-term protection of the pre-determined Environmental Values. Chapter E15: Water Sensitive Urban Design, Wollongong Development Control Plan 2009, demonstrate that the development will achieve the post development pollutant load standards indicated in Figure 3-4 below.

Treatments were determined in accordance with which is more conservative between WDCP Table 2, WSUD Stormwater Quality Performance Targets (Figure 3-4) and NSW Ambulance Water Quality Set B Targets (Figure 3-5).

Table 2: WSUD Stormwater Quality Performance Targets

Performance target reduction loads	Development Type	
	Residential Subdivisions greater than 20 lots	Multi-dwelling housing development
		Residential Flat Buildings
	Industrial Subdivision	Mixed Use Developments
		Minor Residential subdivisions (up to 20 lots)
	Business Parks	Commercial Office Development
		Industrial Development
Gross Pollutants	90%	90%
Total Suspended Solids	85%	80%
Total Phosphorus	60%	55%
Total Nitrogen	45%	40%

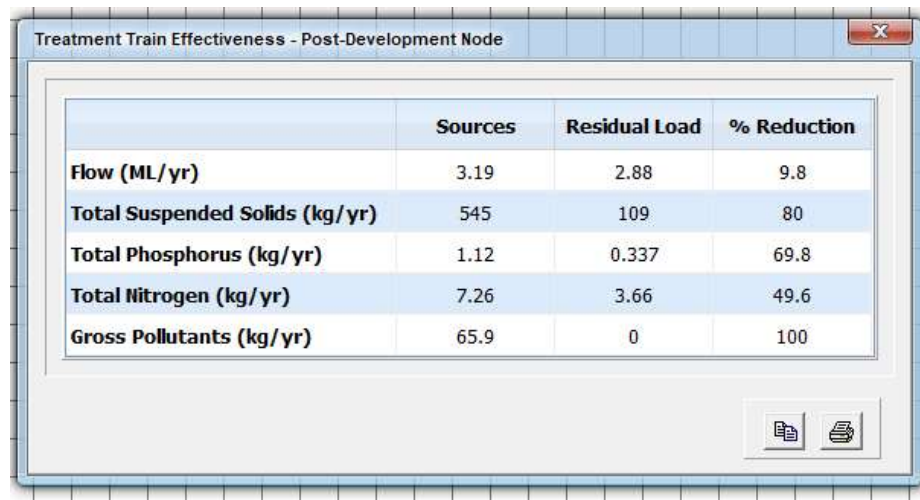
Figure 3-4: Table 2, WSUD Stormwater Quality Performance Targets
Chapter E15: Water Sensitive Urban Design, WDCP 2009

Table 11 Pollution Reduction Targets from Green Star Design & As Built v1.3 Submission Guidelines

POLLUTANT	REDUCTION TARGET (% OF THE TYPICAL URBAN ANNUAL LOAD)		
	A	B	C
Total Suspended Solids (TSS) ¹	80%	80%	90%
Gross Pollutants	85%	90%	95%
Total Nitrogen (TN) ²	30%	45%	60%
Total Phosphorus (TP) ²	30%	60%	70%
Total Petroleum Hydrocarbons ³	60%	90%	90%
Free Oils ³	90%	90%	98%

Figure 3-5: NSW Ambulance Water Quality Targets (Sept 2021)

A bioretention for water quality treatment is proposed. For the benefit of reducing the demand on water supply, a rainwater harvesting system can be proposed onsite via the provision of a rainwater tank, subject to confirmation by the Project Manager. See Figure 3-6 below for Music Analysis result.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.19	2.88	9.8
Total Suspended Solids (kg/yr)	545	109	80
Total Phosphorus (kg/yr)	1.12	0.337	69.8
Total Nitrogen (kg/yr)	7.26	3.66	49.6
Gross Pollutants (kg/yr)	65.9	0	100

Figure 3-6: Music Analysis result

4 Erosion & Sediment Control (During Construction)

The erosion and sediment control measures for the site will be implemented during construction. The design of these measures is to be in accordance with the Landcom "Blue Book". These will include:

- A sediment fence
- Temporary access to site with shaker pad
- An indicative stockpile area with sediment fence around it during construction.
- Geotextile inlet pit filters or sandbags to be placed around existing stormwater pits.