



CONCEPT STORMWATER DESIGN REPORT

Catherine Field Public School

O'Keefe Drive, Catherine Fields NSW

PREPARED FOR
Hansen Yuncken Pty Ltd

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Concept Stormwater Design Report

Revision Schedule

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1. Executive Summary

The findings of our concept stormwater design review and report has identified there is limited existing stormwater infrastructure in the surrounding area until the proposed residential subdivision, east of the proposed Catherine Field Public School is constructed. This is known as the Oran Park South Development Tranche 33, designed by Calibre. As part of the Oran Park South Development Tranche 33 a combined On-site Stormwater Detention (OSD) and Bio-retention Basin (Water Quality) is proposed to cater for the upstream catchment. The proposed Catherine Field Public School is located within this catchment. This Basin is called an interim basin until Basin 2 (regional basin is constructed downstream).

1.1 Civil Engineering

Civil Engineering services include site grading to correspond with the proposed Architectural Scheme. The current site grading scheme has been undertaken with consideration to relevant NSW School Infrastructure requirements for hardstand areas, carparks and landscape areas which will be further developed as the project progresses.

All proposed car parking areas will be designed as flexible pavements and the playing fields designed in accordance Educational Facilities Standards and Guidelines.

Based on our discussions with Council, the site is not affected by flooding.

The local stormwater network for the site incorporates a series of pits and pipes capable of conveying the 1 in 10-year storm event below ground and the 1 in 100-year storm event overland. As mentioned above On-site Stormwater Detention (OSD) and Water Quality has been considered and incorporated in the design of a basin downstream of the new subdivision known as the Oran Park South Development Tranche 33, designed by Calibre. This is outlined in Calibre's Tranche 33 Stage 1 Stormwater Management Report, dated 8 February 2018. Therefore, additional OSD and Water Quality measures is not proposed on-site as part of the Catherine Field Public School development. We understand that this interim basin will be constructed prior to the Catherine Field Public School development.

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2. Introduction

2.1 General

This Concept Stormwater Design Report has been prepared by Northrop Consulting Engineers Pty Ltd (Northrop), the Engineering Consultants for the new Public School at Catherine Fields.

2.2 Site Description



Figure 1 - Site Aerial Image

The site is approximately 2.08ha, which is bounded by O'Keefe Drive to the west, Future Roads to the east with future residential subdivision, designed by Calibre, known as Oran Park South Development Tranche 33. This greenfield site generally falls to the north eastern corner, where there is a stormwater connection from the Oran Park South Development Tranche 33. The proposed Catherine Field Public School is proposed with module classrooms and buildings with associated carparking and playing fields.

3. Civil Engineering

3.1 General

The proposed Catherine Field Public School is currently a greenfield site located within the Camden Council Local Government Area. Below is the Architectural Site Plan of the proposed development.

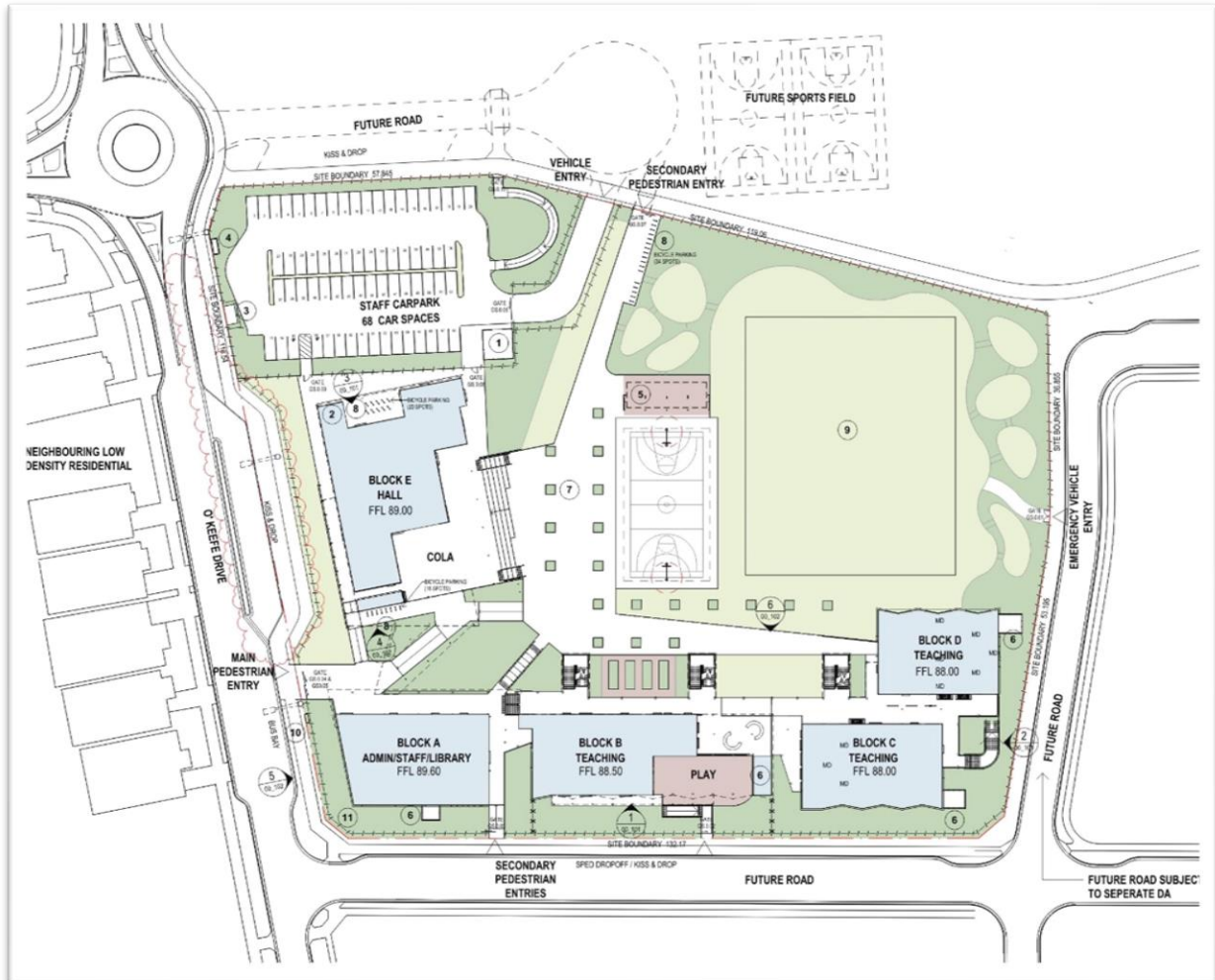


Figure 2 - Proposed Development

3.2 Referenced Standards and Guidelines

All Civil Engineering shall be in accordance to the following standards:

3.2.1 General:

NCC 2019	National Construction Code of Australia 2019
EFSG	NSW Department of Education Educational Facilities Standards and Guidelines
AS 2890.1	Parking facilities Part 1: Off-street car parking
AS 2890.2-2002	Parking facilities Part 2: Off-street commercial vehicle facilities
AS 2890.6-2009	Parking facilities Part 6: Off-street parking for people with disabilities
AS 3500.3-2018	Plumbing and Drainage Part 3: Stormwater Drainage

3.3 Design Criteria & Methodology

The Civil Engineering design is based on review of the relevant documents and reports provided to date. Our investigations included the following;

- Discussions with Camden Council regarding flooding, stormwater, On-site Stormwater Detention (OSD) and Stormwater Quality.
- Review of Oran Park Precinct DCP, Oran Park Precinct Planning Policies and discussions with Council's Engineering Officer Mr. Greg Cattarin.
- Review of all Council's Masterplan Reports provided for the precinct
- Review of Calibre's Tranche 33 Stage 1 Stormwater Management Plan dated 8 February 2018.
- Review of Camden Council's Development Consent Conditions 2018/147/1 for the adjoining subdivision (Tranche 33 Stage 1)

Below is the Calibre's Engineering Plan for the Oran Park South Development Tranche 33 which shows the proposed school stormwater Legal Point of Connection.

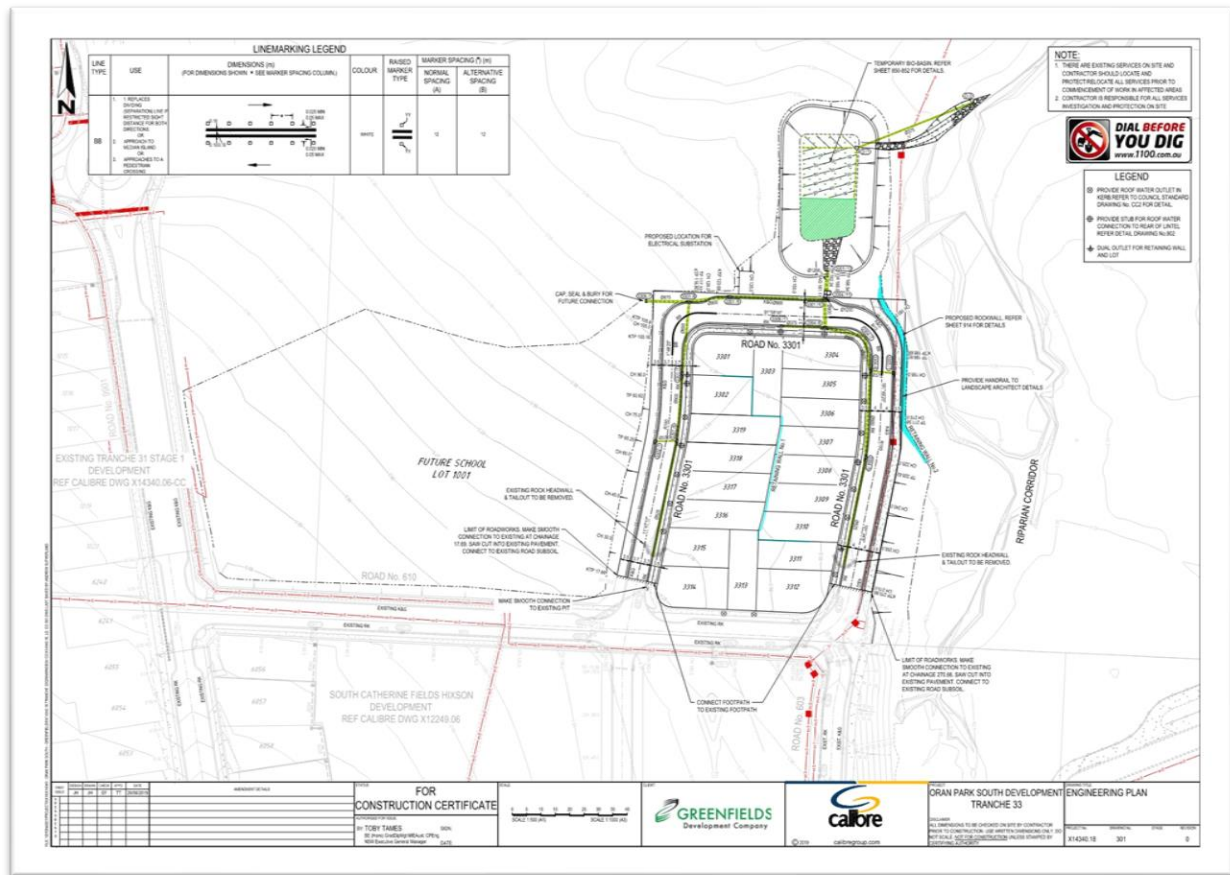


Figure 3 - Proposed Development

The Civil Engineering design considers the Educational Facilities Standards and Guidelines as well as Local Government / Council requirements appropriate to the development site.

3.4 Siteworks Grading and Earthworks

The general grading scheme will be developed to best utilise the natural fall across the site with consideration to accessibility requirements in accordance with relevant carparking and access Australian Standards.

We have developed a preliminary bulk earthworks scheme for the proposed development with volumes noted below:

- Cut = 560 m³
- Fill = 13,477m³
- Balance = 12,917m³ (Import)

A 34mm site strip has been allowed for equating to approximately 2,800m³. This is to be utilised in the following areas subject to testing and amelioration as advised by SESL.

- Planting Areas = 1553m³
- Turfed Areas = 818m³
- Sports field = 226m³

3.5 Sediment and Erosion Control

The objectives of the erosion and sediment control for the development site are to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with Camden Council requirements.

As part of the works, the erosion and sedimentation control will be constructed in accordance with Council requirements and the NSW Department of Housing Manual, "Managing Urban Stormwater Soil & Construction" 2004 (Blue Book) prior to any earthworks commencing on site. The Concept Sediment and erosion control measures are documented in Northrop's detailed design drawings NHQC2-CF-CV-S-DDC201.11, 201.13, 202.01, 202.11

3.5.1 Sediment Basin

A temporary sediment basin has been designed to capture site runoff during construction and has been located towards the north eastern side of the site, in the lowest point. The construction of the basin will be undertaken in stages to enable maximum runoff capture assisted by diversion swales and direct runoff to the basin.

Calculations to determine the concept design basin size have been based on available geotechnical information regarding soil types and through the use of the Soils and Construction Volume 1 Manual.

To ensure the sediment basin is working effectively it will be maintained throughout the construction works. Maintenance includes ensuring adequate settlement times or flocculation and pumping of clean water to reach the minimum storage volume at the lower level of the settling zone. The settling zone will be identified by pegs to clearly show the level at which design storage capacity is available.

The pumped water from the sediment basin can be reused for dust control during construction.

Overflow weirs are to be provided to control overflows for rainfall events in excess of the design criteria which caters for a storm event up to and including the 1% AEP storm event.

The concept sediment basin sizing is summarised in the table below. Detailed sediment basin sizing, configuration and location shall form part of the Construction Certificate application.

The sediment basin has been located for future conversion into the permanent water quality basin.

3.5.2 Sediment and Erosion Control Measures

Prior to any earthworks commencing on site, sediment and erosion control measure shall be implemented generally in accordance with the Construction Certificate drawings and the “Blue Book”. The measures shown on the drawings are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction program, sequencing and techniques. These measures will include:

- A temporary site security/safety fence is to be constructed around the site, the site office area and the proposed sediment basin;
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles;
- Dust control measures including covering stockpiles, installing fence hessian and watering exposed areas;
- Placement of hay bales or mesh and gravel inlet filters around and along proposed catch drains and around stormwater inlets pits; and
- The construction of a temporary sediment basin as noted above in Section 3.5.1;
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, shall be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations shall be stabilised by hydroseeding or hydro mulching on formation.

3.5.3 Wet Weather Management

In circumstances of heavy rain sufficient to affect site access and ground conditions the Site Manager and Site HSE Committee representative should complete a site inspection before work commences. The inspection needs to focus on;

- The suitability of pedestrian access to the amenities and into the construction work areas
- The suitability of access for plant and equipment
- The suitability of ground conditions for plant and equipment to operate
- Nominate the construction zones suitable for work to commence
- Actions to remediate those areas not suitable for work to commence (de-water; prepare ground conditions and access ways etc.)

3.6 Carpark Pavements

The design with respect to pavements to be trafficked by vehicles as follows:

- All pavements will need to be designed for a 25-year design life.
- Carpark pavements trafficked by lighter vehicles the design will consider 1×10^5 ESA's as defined by Aust roads.
- The pavement profile will be dependent on the CBR achieved post earthworks for flexible pavements. However, based on the Geotechnical Report, subgrade treatment (such as lime stabilization) maybe required in cut areas where the subgrade CBR value is less than 3%.
- We expect the profile will consist of DGS40 subbase, DGB20 base course, prime & tack coat and 40mm AC10 wearing course, after subgrade treatment. These elements will need to be considered as part of the project cost plan.

3.7 Stormwater Design

Hydrological modelling was undertaken to design and analyse the site stormwater system. The stormwater system was designed for the 1 in 10-year ARI storm event, with the 1 in 100-year storm event overland. The site is to connect to the legal point of discharge located at the north eastern corner from the Oran Park South Development Tranche 33, which discharges into the interim OSD stormwater quality basin, refer below Figure 7-1 from Calibre's Stormwater Management Report. We understand that this interim basin will be constructed prior to the Catherine Field Public School development. Refer Northrop's Development Application plans for stormwater details including long sections.



Figure 4 – Figure 7-1 – Catchments – Tranche 33

3.8 Stormwater Quality Strategy

The first step to preventing stormwater pollution is to reduce the risk of pollutants being entrained in stormwater runoff. Good site design is important in reducing the risk profile of runoff from all developments. Roofs have a low risk profile for stormwater pollutants, and the simplest way to protect water quality at the ground level is to direct hardstand areas (paving and paths, etc.) to landscaped areas to provide passive irrigation.

As outlined in Calibre's Tranche 33 Stage 1 Stormwater Management Report (refer figure 5-2 below) – the bio-retention area provided within the OSD (interim) basin suffice Council's stormwater quality targets and therefore no other further treatment such as GPTs are required. We understand that this interim basin will be constructed prior to the Catherine Field Public School development.



Figure 5-2: Tranche 33 Temporary Basin catchments

Figure 5 – Figure 5-2 – Tranche 33 Temporary Basin Catchments

4. Flooding

We note that the proposed Catherine Field Public School is not flood affected. This is based on the review of the following;

- Calibre's Tranche 33 Stage 1 Stormwater Management Report,
- Brown's Water Cycle Management and Flooding Report (Catherine Fields Precinct), dated August 2013, and
- Discussions with Council's Engineering Officer Mr. Greg Cattarin

5. Sustainability Requirements – ESD Framework

This section shall be read in conjunction with the ESD Master Specification. The ESD master specification includes performance requirements and contractor roles and responsibilities.

Hansen Yuncken and the design team are committed to Sustainable design and have adopted an 'ESD Framework' to guide the design and construction of the Building. The ESD Framework has been prepared by Steensen Varming and draws upon the Green Star Rating System to focus on the inclusion of both relevant and appropriate ESD initiatives, in supporting the primary function of the school. The ESD framework prioritises initiatives that improve occupant comfort, wellbeing and indoor environment quality. In addition, other initiatives have also been targeted to conserve energy, water and material resources.

The ESD Framework utilises a point scoring system which is common to Environmental Rating Systems. The **Catherine Field Public School** design has targeted 'credits', to achieve an 'equivalent' level of performance with Australian Good Practice. The ESD framework addresses a broad array of sustainability issues and as such, a multitude of building attributes and systems.

The credits relevant to the Civils services design are shown in the following extract from the ESD Framework. A general description of how the credit has been achieved is also included in the table to assist in identifying the design feature and components proposed in achieving the credit.

Civils ESD Framework - Catherine Fields					
Issued:	31/07/2019	Rev 01			
Rating System	Concepts and Features	Total Points	Credit Requirements	Current Status (Achieved / Partially Achieved / TBC / Not Achieved)	For Pricing 1) Captured in current design. 2) TBC 3) Not Captured but contractor to allow for
Green Star	18B Potable Water - Prescriptive Pathway	3 (low risk) 2 (high risk) 5 points total	Up to 6 points are available based on the reduction of predicted potable water consumption when compared against a reference building or a building code benchmark. Points are awarded based on the proposed building's ability to reduce its predicted consumption to zero. This credit addresses the potable water consumption from the use of sanitary fixtures, appliances, HVAC, irrigation systems, and swimming pools (where present).	Achieved: Refer to the ESD Master Specification for WELS rated fixtures and fittings and water efficient appliance requirements. Architects will specify WELS rated fixtures. Confirmation as to whether rainwater tank will be installed and volume. No water is used for heat rejection. Drip irrigation is proposed for planted trees. Pitches will be sprinklered due to practicality issues for detecting leaks. Project does not include a water-based fire protection system.	1
Green Star	20.3 Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1 point is available where 90% (by cost) of all permanent formwork, pipes, flooring, blinds and cables in a project either: A. Do not contain PVC and have a recognised product declaration; OR B. Meet Best Practice Guidelines for PVC.	TBC: Civis specification to refer to the ESD Master Specification for product requirements in meeting no PVC content or Best Practice PVC. For Civil works, piping and cabling must comply with this credit.	3
Green Star	26.1 Stormwater Peak Discharge	0	1 point is awarded where the post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the predevelopment peak ARI event discharge	TBC	3
Green Star	26.2 Stormwater Pollution Targets	0	1 additional point is available. The first point must be awarded, and all stormwater discharged from site meets the Pollution Reduction Targets in Column A of Table 26.2;	TBC: requires achievement of 26.1	3