MAIN WORKS: STORMWATER MANAGEMENT REPORT

SINSW - Bankstown North Public School

322 Hume Hwy, Bankstown NSW 2200

PREPARED FOR
School Infrastructure NSW (SINSW)
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Main Works: Stormwater Management Report

Revision Schedule

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1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Schools Infrastructure NSW care/of JDH Architects (JDH) to prepare the Civil Engineering design and documentation in support of an SSDA submission for the proposed SINSW - Bankstown North Public School development at 322 Hume Hwy, Bankstown NSW 2200.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Stormwater Drainage;
- Stormwater Detention;
- Stormwater Quality / Integrated Water Management;
- Flooding

1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

1. Schematic Architectural Plans provided by JDH Architects, dated 14.02.2020
2. City of Canterbury Bankstown Development Control Plan 2015
3. City of Canterbury Bankstown Development Engineering Standards
4. Site survey prepared by C.M.S. Surveyors, dated 8.10.2018
5. NSW Department of Education – Educational Facilities Standards and Guidelines (EFSG)
6. Australian and New Zealand Standard AS/NZS 3500.3:2018 Plumbing and Stormwater Drainage.
7. Civil Engineering Main Works drawings prepared by Northrop; Job Number 181004, dated 05.03.2020.

1.3 The Development

The proposed development site is located at 322 Hume Highway, Bankstown NSW 2200, legally described as Lot 14 DP 1000689 & Lot 11, 12, 13 & 14 DP 132498 within the City of Canterbury Bankstown Local Government Area (LGA). The school site has an area of 27,645m^2, bounded by Stacey Street to the north, Beresford Avenue to the east, Hume Highway to the south and a mixture of commercial and residential properties to the west. The main site access for vehicles and pedestrians is via Beresford Avenue, with additional pedestrian access points via Hume Highway to the south-east of the site and Davis Lane to the west. The existing site currently contains 16 teaching spaces (8 permanent and 8 demountables), a large external play including multiple sports fields/courts (both soft and hard surfaced areas), canteen, library and a carpark/shared space. The site locality is depicted in Figure 1 below.

Figure 1 – Site Locality

1.3.1 Proposed Development

The proposed main site works consists of a new building, made up of two blocks (Block 2 and Block 4), an assembly court, associated open space and pedestrian paths, a new games court and a kiss and drop access road. Block's 2 and 4 are proposed to be linked at the upper levels by bridging balconies. Block 2, which is the westernmost block, will be a 4-storey building consisting of 24 home-base units and student amenities. Block 4, the easternmost block, will be a 3-storey building for staff, administration, library and specific purpose rooms. The works will be delivered in two stages (Stage 1A and 1B), the new building, kiss and drop road and majority of the podium will be carried out as Stage 1A and the new games court and connecting paths and podium will be Stage 1B. A new 56 space carpark is being provided in the north-eastern corner of the site as part of a separate package. The proposed Stage 1A and 1B site plans is depicted in Figures 2 and 3 respectively.

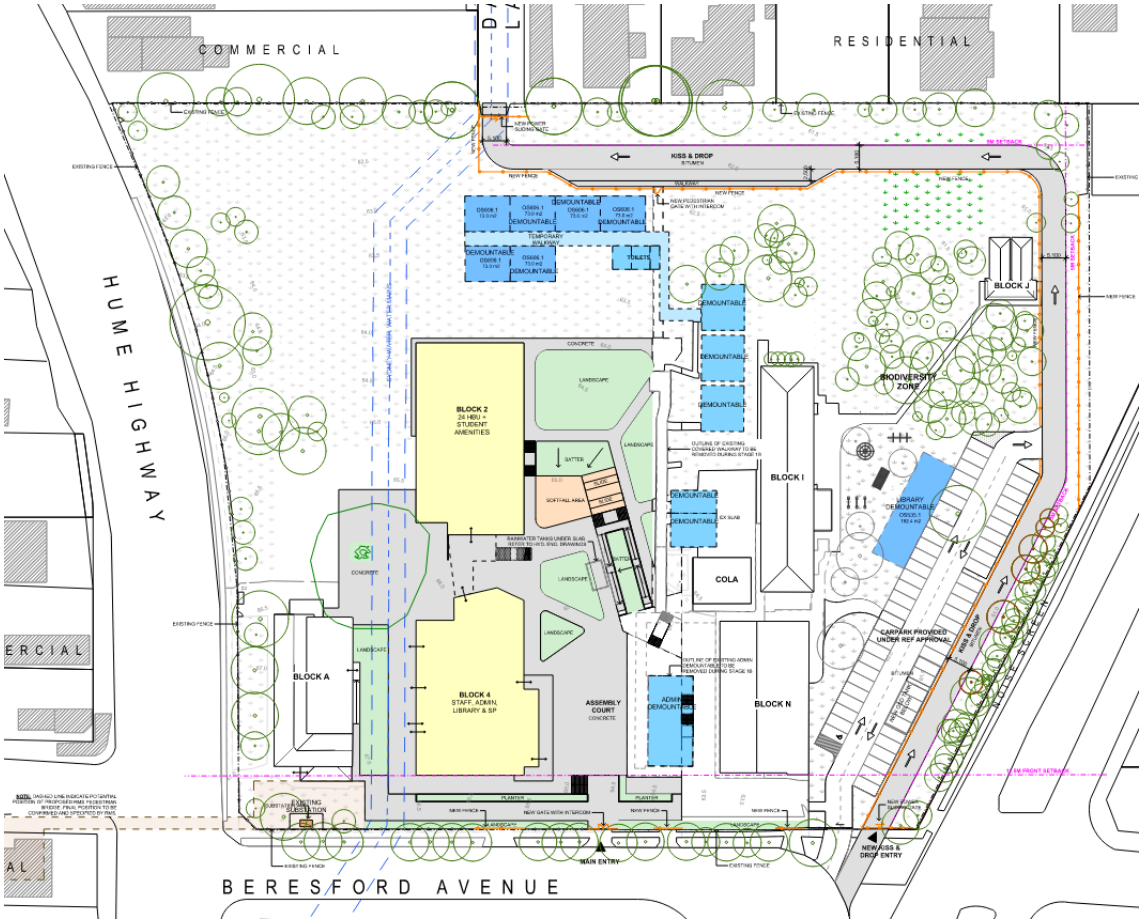

Figure 2 - Proposed Site Plan (Stage 1A)

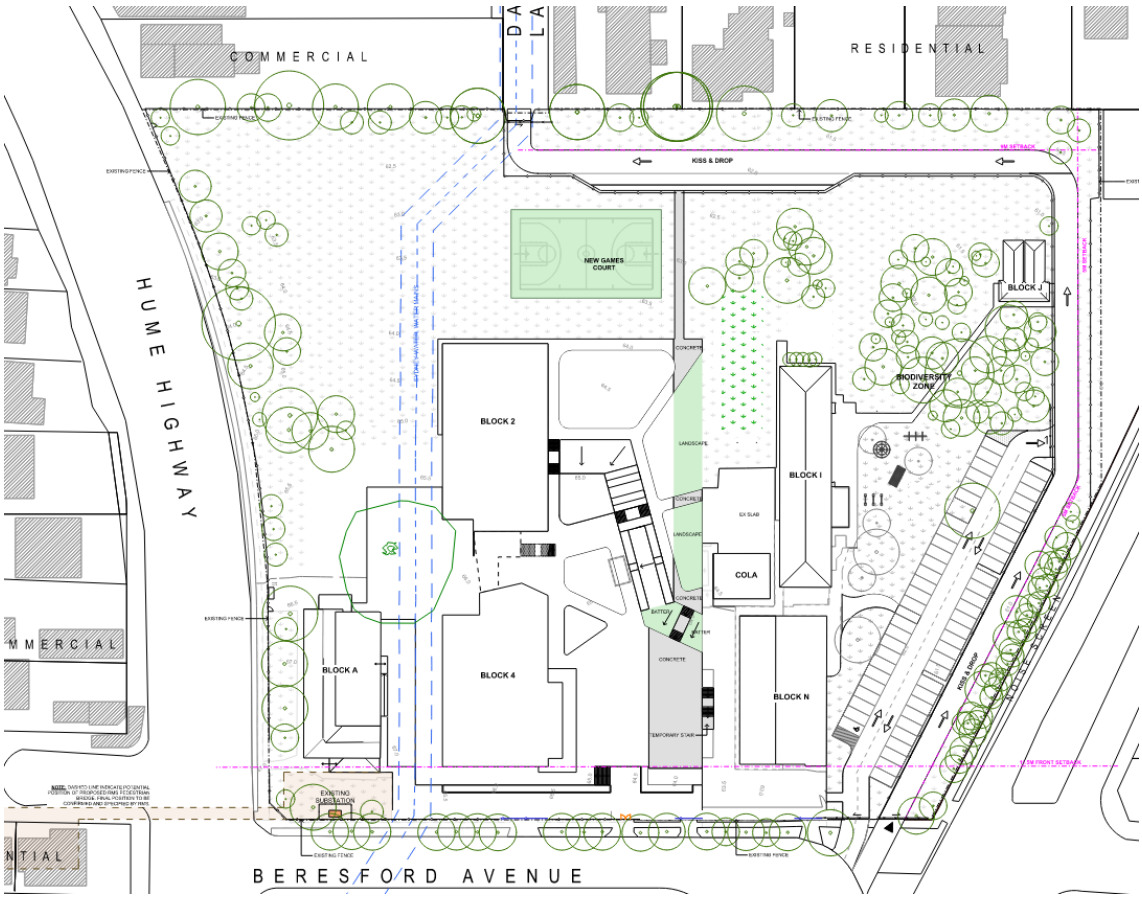

Figure 3 - Proposed Site Plan (Stage 1B)

2. Stormwater Management

2.1 Objectives and Controls

The stormwater strategy for the SINSW - Bankstown North Public School development has been developed in accordance with Canterbury Bankstown Council Development Engineering Standards.

The DCP outlines the following aims:

a) A high standard of stormwater drainage infrastructure is established within the development site.
b) The proposed and constructed stormwater drainage system has no adverse impact on Council's stormwater drainage system, the development itself and adjoining properties.
c) Buildings are not affected by inundation from stormwater runoff resulting from the 100 year ARI storm event
d) Any proposed stormwater drainage works are designed to minimise any nuisance caused by stormwater drainage flows from local catchment flooding or mainstream flooding from the Georges River.
e) Special consideration will be given to developments requiring the submission of BASIX Certificate where domestic water supply may be supplemented by the use of rainwater storage tanks fitted into stormwater drainage systems.

2.2 Existing Stormwater Infrastructure

The majority of the existing buildings and hardstand are on the eastern portion of the site and are drained via an in-ground stormwater system to the north-east of the site to an existing kerb inlet pit within Beresford Avenue. Overland flow, for runoff in excess of the piped system, is naturally directed to the north-western corner of the site. There is currently no existing formal stormwater infrastructure to the west of the site, with runoff sheeting off overland.

2.3 Proposed Stormwater System

As is shown on the Civil Site Plan, the proposed runoff from Block 4 and the assembly court drain to the existing sites stormwater system which discharges to a kerb inlet pit in Beresford Avenue. There is no increase in runoff and the existing network has been analysed and determined to have sufficient capacity.

Stormwater runoff from Block 2 and the associated lower level landscaping, and the new kiss and drop road will be conveyed by a new in-ground pit and pipe system which is conveyed to the OSD tank (located under the carpark) prior to discharging to an existing kerb inlet pit in Stacey Street. Note, the OSD tank and carpark are designed and will be constructed as part of a separate early works package, this is discussed in further detail in section 2.4 of this report.

In accordance with both the EFSG and the Bankstown Development Engineering Standards, the inground piped drainage system has been designed convey the 1 in 20-year ARI storm. The minimum pipe diameter for the proposed system within the site is 225mm in accordance with EFSG requirements, and the proposed pipe within Council's road reserve is a 375mm reinforced concrete pipe in accordance with the Bankstown Development Engineering Standards. Overland has also been considered for events greater than the design event or in the occurrence of blockage, with overland flow routes provide away from building and structures.

For more details refer to Northrop's Main Works civil design Drawings (**Attachment A**).

2.4 Stormwater Quantity Management

The DRAINS software package has been used to model the hydrologic and hydraulic characteristics of stormwater runoff and flow across the site and determine the storage requirements for On-site Detention (OSD). This model has been prepared to assess the 5- and 100-year ARI storm events and determine the OSD size by restricting post development discharge to less than or equal to that of the pre development discharge.

2.4.1 Proposed OSD

In accordance with the Bankstown Development Engineering Standards, OSD is required to control stormwater runoff from developed sites to ensure peak flows for the 5 to 100-year ARI events do not exceed pre-development discharges. The proposed OSD systems has been modelled and optimised using the DRAINS hydrological software as part of the design development process.

The OSD system servicing this stage of works will be approved and constructed as an early works package under an REF approval; however, the system has been sized to account for the development proposed under this package of works.

Rainfall IFD data was obtained from the Bureau of Meteorology's 2016 data and an ILSAX model set up using the parameters given in the Council's OSD technical specification as seen below:

Table 1 – DRAINS model parameters

DRAINS parameter	Value
Paved storage	1 mm
Supplementary storage	1 mm (Not used in this model)
Pervious storage	5 mm
Soil type	3
Overland flow method	Kinematic Wave

The pre-development and post-development catchments are both comprised of roofed structures, carparking area, paving and landscaped areas. A catchment plan for both pre- and post-development scenarios can be seen below in Figures 4 and 5.

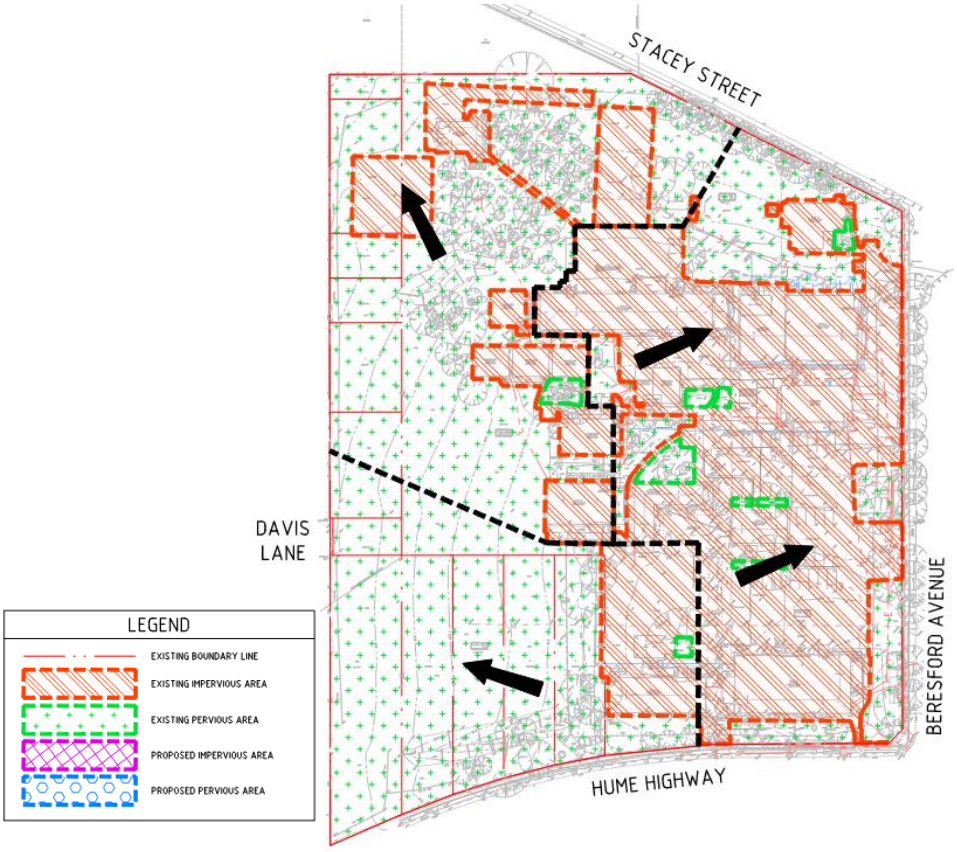

Figure 4 – Pre-Development Catchment Plan

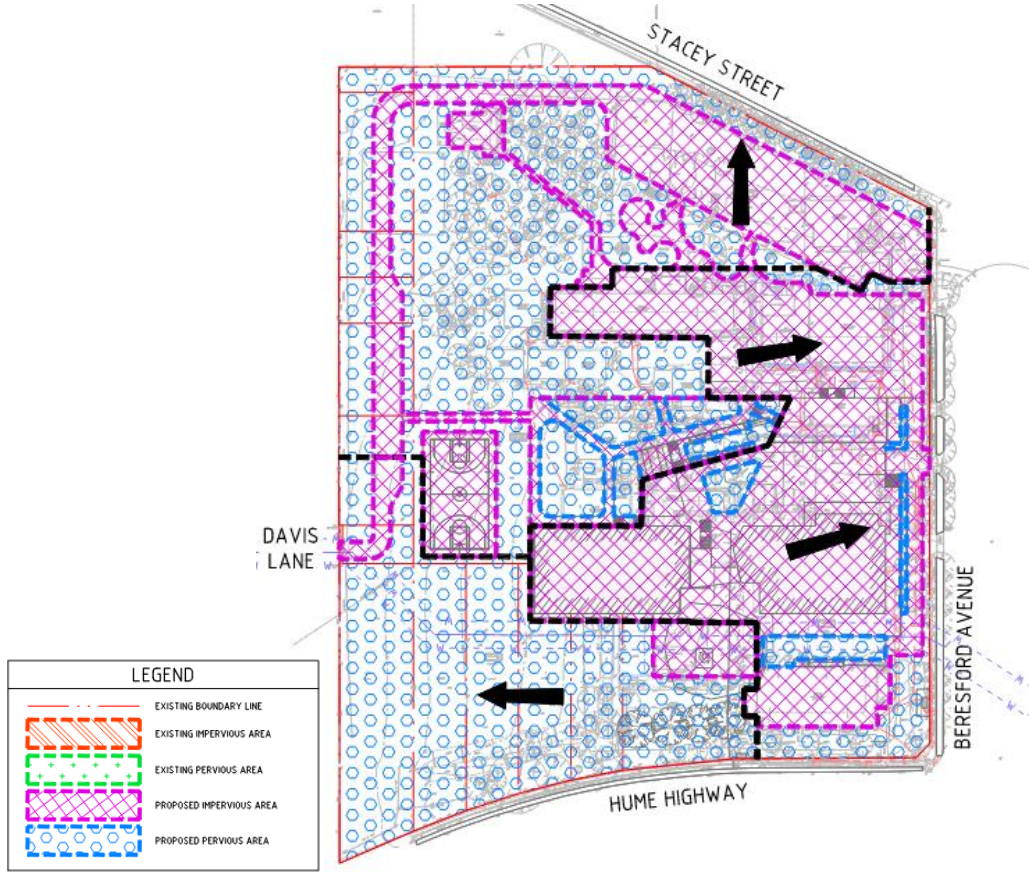

Figure 5 - Post-Development Catchment Plan

As illustrated in Figure's 4 and 5, both catchment plans have been divided (by the dashed black line) into 3 sub-catchments, representing the natural overland flow paths of the site. The total impervious and pervious areas for both pre and post-development for use in the DRAINS model are summarised in Table 2 below.

Table 2 - Catchment Areas for Pre & Post-Development

		Total Area (m^2)	Impervious Area (m^2)	Pervious Area (m^2)
Davis Lane	**Pre-Development**	7,163	1,179	5,984
	Post-Development	6,349	570	5,779
Beresford Avenue	**Pre-Development**	11,113	8,165	2,948
	Post-Development	8,702	7,365	1,337
Stacey Street	**Pre-Development**	9,369	2,332	7,037
	Post-Development	12,594	4,496	8,098

OSD has been provided in the form of an under-ground tank, located under the new carpark – all constructed as part of the stearate REF approval. The OSD tank ultimately discharges into the existing Council street drainage system via a kerb inlet pit in Stacey Street. The proposed OSD tank is 5m x 16m internally with maximum water depth of 1.5m. The outflow is controlled by a low and high flow control measures as listed below:

- Orifice 1 (Ø325mm) – IL 59.00
- Internal Weir (0.9m wide) – RL 60.30

The site discharge results comparing the pre-development target flows and modelled post-development discharge is shown in the table below:

Table 3 – Site discharge summary

		5 Year ARI (L/s)	100 Year ARI (L/s)
Davis Lane	**Pre-Development**	139	285
	Post-Development	118	249
Beresford Avenue	**Pre-Development**	298	513
	Post-Development	256	435
Stacey Street	**Pre-Development**	191	380
	Post-Development	166	368

The results presented in Table 3 above indicate that the peak flows under proposed conditions can be appropriately managed to ensure that the peak stormwater flows do no exceed the pre-development conditions.

2.5 Flooding

Northrop have undertaken an investigation to understand the mainstream and local area flooding constraints associated with the site – for the purpose of this site 'Mainstream' & 'Overland Flow' flooding is been defined below.

1. Mainstream Flooding – flooding within the greater catchment area around the site which is defined by water that flows over banks of creeks and lagoons
2. Overland Flow Flooding – defines as surface runoff before it enters a water way. It is caused by rainfall which flows downhill and concentrates in catchment low points

Based on a review of publicly available Council Mapping and Flood Studies the site does not appear to be subject to mainstream or overland flooding.

Overland flow paths and site grading will also be designed to ensure that both existing and new building and habitable areas are not impacted in major storms or in the event of the piped system being blocked.

2.6 Integrated Water Management

A 50m^3 rainwater tank is proposed under the assembly court podium – refer Hydraulic drawings by Erbas. The rainwater tank captures roof runoff from the new building for landscape irrigation across the site.

There are no specific water quality targets required under Council's DCP; however, it is stipulated that the minimum requirement for developments other than single homes or dual-occupancies is to install pollution control pit baskets (pit inserts). Therefore, pit insert baskets are proposed for all new external stormwater pits and will be retrofitted to existing pits which are being retained.

During the construction phase erosion and sediment will be managed in accordance with Northrop's concept Erosion and Sediment Control Plan through implementing sediment fences, inlet pit traps, covering and revegetating disturbed areas and provision of a stabilised site access. The successful contractor should provide their own site specific erosion and sediment control plan to suit their intended methodology in accordance with Landcom's *Managing Urban Stormwater* (Blue Book).

3. Conclusion

The proposed stormwater layout has been designed in accordance with AS/NZS 3500.3:2018 Plumbing and Stormwater Drainage, the EFSG and Council's DCP. Stormwater runoff from the proposed development is conveyed by a new underground pit and pipe system to the OSD tank before entering the Council stormwater system. The 120m^3 OSD facility was sized using the DRAINS software package to limit the post-development discharge to the pre-development discharge rate.

There are no specific water quality targets applicable to this development, however a proprietary pit basket is proposed to be installed to each grated inlet pit.

Attachment A – Civil Main Works Drawings