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CONSULT AUSTRALIA
Member Firm

WATER CYCLE MANAGEMENT PLAN

FOR SUBDIVISION & NEW

EDUCATIONAL ESTABLISHMENT

EILEEN O'CONNOR

CATHOLIC SCHOOL

84 GAVENLOCK ROAD,

MARDI NSW 2259

Prepared by James McCallum B.E.(Hons) GIEAust

Reviewed by Richard Yates B.E.(Hons) MIEAust CPEng NER 620330

Date: 14 March 2025

Revision: C

Ref: 6588 SW REPORT REV C

Planning Secretary's Environmental Assessment Requirements

Development Details

Application No:	SSD-67173718
Project Name:	New Eileen O'Connor Catholic School
Location:	84 Gavenlock Road, Mardi NSW 2259 Lot 9 Section 4 DP3368 within Central Coast
Applicant:	Catholic Schools Broken Bay

The following documentation has been prepared to support the State Significant Development Application for the above project and in accordance with the Planning Secretary's Environmental Assessment Requirements (SEARS) dated 19th February 2024 as follows:

	Issue and Assessment Requirements	Relevant Section of this Report
12	**Ground and Water Conditions:**	
	Assess potential impacts on soil resources and related infrastructure and riparian lands on and near the site, including soil erosion, salinity and acid sulfate soils.	Elements of this requirement are covered in this report. Refer to Section 3 and 8 of this report.
	Provide a Surface and Groundwater Impact Assessment that assesses potential impacts on: • surface water resources (quality and quantity) including related infrastructure, hydrology, dependent ecosystems, drainage lines, downstream assets and watercourses. • groundwater resources in accordance with the Groundwater Guidelines.	Elements of this requirement are covered in this report. Refer to Section 5, 6, 7 and 8 of this report.
13	**Water Management:**	
	Provide an Integrated Water Management Plan for the development that: • is prepared in consultation with the local council and any other relevant drainage or water authority. • outlines the water-related servicing infrastructure required by the development (informed by the anticipated annual and ultimate increase in servicing demand) and evaluates opportunities to reduce water demand (such as recycled water provision). • details the proposed drainage design (stormwater and wastewater) for the site including any on-site treatment, reuse and detention facilities, water quality measures, and nominated discharge points. • demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse downstream impacts.	Elements of this requirement are covered in this report. Refer to Section 5, 6, 7 and 8 of this report. Wastewater is not included in this report.
	Where water and drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards of, the local council or other drainage or water authority.	Elements of this requirement are covered in this report. Refer to Appendix 2 of this report.
27	**Subdivision Details:**	
	Provide details of the dimensions and areas of: • the existing lot; • proposed lot of the new subdivision; and • proposed lot of the St Peter's Catholic College land.	Elements of this requirement are covered in this report. Refer to Appendix 2 of this report.

	If the proposed development involves any subdivision work, preliminary engineering drawings (preliminary services plans) of the work to be carried out (i.e. roads, stormwater drainage, sewer, natural and proposed earthworks etc.) must be provided. Cross sections of the proposed works must also be provided. Address any existing Conveyancing Act 1919 instruments that apply to the land that are proposed to be retained, extinguished or amended.	Elements of this requirement are covered in this report. Refer to Appendix 2 of this report.

DOCUMENT CONTROL

Revision	Description	Date	Prepared By	Reviewed By
A	For Review	29/11/2024	JM	RY
B	For Review	19/12/2024	JM	RY
C	For SSDA	14/03/2025	JM	RY

EXECUTIVE SUMMARY

James Taylor & Associates have prepared a Water Cycle Management Plan (WCMP) for the proposed 2 lot subdivision and construction of a new education establishment, Eileen O'Connor Catholic School (EOCCS), located currently within Lot 9/4 DP 3368, 84 Gavenlock Road, Mardi NSW 2259. The preparation of the report is to accompany a State Significant Development (SSD) application required for the proposed development.

The proposed stormwater system for EOCCS introduces stormwater quality and quantity control devices to appropriately manage runoff before it drains from the site. Runoff from the St Peter's Catholic College (SPCC) site is managed, treated and attenuated before it is discharged into Keefers Glen. Runoff from majority of the EOCCS site is managed, treated and attenuated before it is discharged into Keefers Glen. The existing pipes in Keefers Glen have been checked and have adequate capacity. The rest of the runoff from the EOCCS site is managed, treated and attenuated before it is discharged via a level spreader into a bioretention swale. This runoff is not discharged via the infrastructure in 8 The Sheiling as the easement was refused by the property owner. This bioretention swale, which has been designed with erosion and sediment control measures directs overland flow towards the Council wetlands. This bioretention swale is within the SPCC site and will require an easement. The Council wetlands are located to the north east of the site, adjoining SPCC. These wetlands are inundated by flooding during the PMF and 1% AEP storm event, serving as flood storage.

MUSIC modelling has been undertaken to assess the stormwater system against Council's water quality targets. The treatment trains for the proposed development were modelled using proprietary filtration devices, gross pollutant traps and a bioretention swale. The results meet the requirements in Chapter 3.1.11.3 of DCP 2022.

DRAINS modelling has been undertaken to assess the stormwater system against Council's water quantity targets. The results from the models show that peak flows for the post development site for the 1% AEP storm event do not exceed pre development peak flows. These results meet the requirements in Chapter 3.1.11.4 of DCP 2022.

DRAINS modelling has been undertaken to assess the stormwater system against Council's overland flow controls. The results from the model show that overland flow from the level spreader and bioretention swale are safe and will not negatively impact the Council wetlands. These results meet the requirements in Chapter 3.1.11.5 of DCP 2022.

An erosion and sedimentation control plan has also been prepared to meet Councils requirements in regards to pollution protection during construction of the proposed development.

The stormwater management system for the proposed development meets Council's requirements and guidelines.

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1. INTRODUCTION

This report has been prepared for the State Significant Development (SSD) application submission for the 2 lot subdivision and the construction of an educational establishment, Eileen O'Connor Catholic School (EOCCS). The proposed site is located within Lot 9/4 DP 3368, 84 Gavenlock Road, Mardi NSW 2259.

This report:

- Describes the water cycle management for the proposed development. This report has been prepared to address the requirements of the Central Coast Council (CCC) Development Control Plan (DCP) 2022 Chapter 3.1, Central Coast Local Environment Plan (LEP) 2022 and NSW Department of Planning & Environment SEARS Issue 13 Water Management.
- Describes the assessment methods for determining the quantity of stormwater affected by the development and the quality of the stormwater discharged from the site.
- Describes the strategy for improving the quality of the discharged water in line with the requirements of the pollution reduction targets nominated in the DCP.
- Describes the On Site Detention (OSD) requirements outlined in the DCP in accordance with current CCC requirements.
- Details how part of the stormwater from St Peter's Catholic School (SPCC) will be managed.
- Has been prepared for SSD application submission. This report and the attached documents may require refinement during detailed design however the basic concept should remain unchanged.
- Shall be read in its entirety including appendices.

1.1 Reference Documents

The following documents have been referenced in the design of the stormwater management for the site:

- Architectural Drawings prepared by Stanton Dahl Architects.
- Surveys prepared by Degotardi Smith & Partners.
- Stormwater Design Drawings prepared by James Taylor & Associates.
- Flood Emergency Response Plan prepared by Tooker & Associates.
- Pre DA reference notes from CCC (Ref: PDA/127/2024 & PDA/175/2023).
- Flood Information Certificate prepared by CCC.
- CCC DCP Chapter 3.1.
- CCC Works Specification - Design Guideline.
- CCC Civil Works Specification - Standard Drawings.
- CCC Wyong River Catchment Floodplain Risk Management Study and Plan
- Civil Drawings for SPCC prepared by ACOR Consultants.
- SAQP and Preliminary Site Investigation prepared by Raw Earth Environmental.

2. SITE DESCRIPTION

2.1 General Site Information

The site is located within Lot 9/4 DP 3368, 84 Gavenlock Road, Mardi NSW 2259 (refer Figure 1). The subject site is rectangular in shape and has an approximate area of 13.17 hectares. The site falls from the south west corner to the north east corner by approximately 18 metres over a distance of approximately 700 metres.

Figure 1: Lot and Site Boundaries - North up the page
Source: CCC 2024 Online Mapping

The site:

- Is occupied by an existing educational establishment, SPCC, which caters for years 7 to 12.
- Adjoins existing residential development to the west, south and north of the site and industrial development to the east of the site.
- Fronts Gavenlock Road and Keefers Glen.
- Adjoins Council wetlands located to the north of the site. These wetlands are inundated by flooding during the PMF and 1% AEP storm event, serving as flood storage.

The existing stormwater management system for the SPCC site captures stormwater runoff from roofs and the impervious ground surface. Stormwater collected on roofs is directed into a network of pits and pipes that directs flows throughout the site. This network of pits and pipes also collects ground surface runoff from localised low points. Stormwater that is collected and transported via the network of pits and pipes is directed into the main stormwater pipeline which runs west to east along the northern side of the site. Stormwater is transported via this pipeline into the dam/bioretention basin located northeast of the site near the sports fields. The dam/bioretention basin stores, filters and throttles stormwater before directing overland flow towards the vegetated wetlands to the north of the site. Stormwater which is collected on the library roof is directed into a network of pits and pipes that directs flows towards the dam/bioretention basin located in the north west corner at the proposed location of EOCCS. The dam/bioretention basin stores, filters and throttles stormwater before directing overland flow towards the Council wetlands to the north of the site.

2.2 Proposed Development

The proposed site is within the north-western corner of the existing SPCC site (refer Figure 2). The proposed EOCCS site (identified in red) will have an area of 1.284 hectares, with frontage to Keefers Glen. The site falls from the south west corner to the north east corner by approximately 6 metres over a distance of approximately 190 metres.

Figure 2: Proposed Lot and Site Boundaries
Source: Nearmap 2024

Catholic Schools Broken Bay (CSBB) is proposing construction of a new school for students with a disability at the purpose-built K-12 EOCCS. The school will have capacity for 200 students and will provide education and allied health facilities.

The proposed development involves:

- Tree removal and infill of existing dam
- Site establishment and benching
- Construction of a part-two, part-three storey school campus comprising 20 General Learning Areas (GLA), flexible specialist learning areas, library, multipurpose hall, administration, staff facilities, storage, landscaping and playspaces
- Construction of two (2) new vehicle accessways from Keefers Glen and at-grade carpark (including bus parking) and covered drop off/pick up area
- Subdivision of land to create a new allotment for the school
- Widening of a portion of Keefers Glen

2.3 Easement Refusal from 8 The Sheiling

The stormwater system for the proposed development will manage, treat and attenuate flows before discharging stormwater from the EOCCS site. A majority of the site will discharge into the existing Council trunk drainage in Keefers Glen. Due to topography, some of the site is unable to drain to Keefers Glen and must discharge to the north east of the site, mirroring the current site discharge from the existing dam. There is existing stormwater infrastructure to the north east within private property at Lot 1821 DP 857182, 8 The Sheiling, Mardi NSW 2259. This system drains runoff from the nearby neighbouring residential properties from the west and discharges into the Council open channel to the north within the private property. This open channel then directs stormwater towards the Council wetlands to the east. Figure 3 in the red box shows the Council trunk drainage within 8 The Sheiling, which Council has easements over.

Figure 3: Council Trunk Drainage within 8 The Sheiling - North up the page
Source: BYDA 2024

Two drainage options are considered appropriate for the water that cannot drain directly to the existing Council trunk drainage. Option 1 includes discharging into the existing pit in 8 The Sheiling and upgrading any infrastructure as necessary to meet capacity requirements. This will require an easement to drain water from the property owner of 8 The Sheiling. If an easement is refused then option 2 is to discharge overland flow via a level spreader and bioretention swale into the Council wetlands, mimicking pre development conditions from the dam. This will require an easement to drain water from the property owner of SPCC as the current discharge point is contained within the SPCC site.

Representatives from CSBB have attempted to engage in discussions with the property owner of 8 The Sheiling. The property owner of 8 The Sheiling is Cobbs Village Management. The representatives from CSBB have contacted the property owner multiple times using various communication modes over a period of 3 months but have been unsuccessful in receiving a response regarding the easement request. On this basis it has been determined that the easement request through 8 The Sheiling has been refused. Refer to Appendix 4 for the communication log with the property owners of 8 The Sheiling.

Therefore, option 2 will be used. Discharging from the level spreader and bioretention swale will be designed to mitigate impacts to the Council wetlands and to comply with Council's requirements regarding water quality, quantity and overland flow. This will be discussed later in Section 6, 7 and 8 of this report. An easement will be required for the swale within the SPCC site. Refer to Appendix 2 for the stormwater concept drawings, which includes plans showing the proposed easement location and dimensions.

3. COUNCIL GUIDELINES

3.1 General Guidelines

The CCC LEP 2022 and CCC DCP Chapter 3.1 Floodplain Management/Water Cycle Management nominates controls for the site generally and specifically relating to stormwater management.

3.2 CCC LEP 2022

The SPCC site is zoned as R2 Low Density Residential to the southwest and C3 Environmental Management to the northeast (refer Figure 4). The EOCCS site is zoned as R2 Low Density Residential. The EOCCS site is located upstream of 100 Gavenlock Road, which is land zoned as C2 Environmental Conservation which is vegetated wetlands managed by CCC.

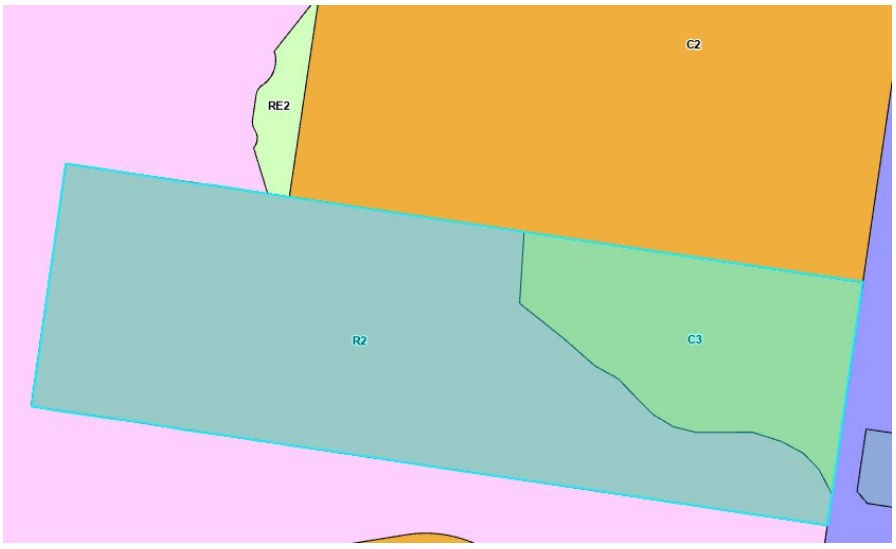

Figure 4: Mapping of Land Zoning
Source: CCC 2024 Online Mapping

The SPCC site contains 2 identified dams, located in the northwest and southeast corners of the site (refer Figure 5). The EOCCS site contains 1 of these identified dams, which is proposed to be decomissioned and filled. This dam is significantly smaller in size compared to what is displayed in Figure 5, refer to survey for dam extents.

Figure 5: Mapping of Identified Dams
Source: CCC 2024 Online Mapping

Clause 5.21 Flood Planning of CCC LEP 2022 nominates the following controls which apply for development sites located at or below the flood planning level (FPL):

a) is compatible with the flood function and behaviour on the land, and
b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and
c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and
d) incorporates appropriate measures to manage risk to life in the event of a flood, and
e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.

CCC DCP Chapter 3.1 defines the FPL as the 1% AEP flood level plus 500mm freeboard. A flood information certificate has been provided by CCC for the EOCCS site to determine applicable flood levels. Figure 6 shows the flood information provided from the certificate.

Flood Level Information Table

Flood Event	Minimum Level (m AHD)	Maximum Level (m AHD)
PMF	6.27	6.49
1% AEP	4.24	4.25
5% AEP	3.05	3.72

Planning Information Table

Flood Control Lot	☒
Minimum Habitable Floor Level	4.75m AHD
Complying Development: Flood Exclusionary Categories	
(a) Flood Storage Area	☒
(b) Floodway Area	☐
(c) Flow Path	☐
(d) High Hazard Area (H3, H4, H5, H6 Hazard Categorisation)	☒
(e) High Risk Area	☐

Figure 6: Extract from Flood Information Certificate
Source: CCC

The FPL for the EOCCS site is 4.75m AHD. The lowest building finished floor level for the proposed development is 7.10m AHD, which is 2.35m above the FPL. The lowest point on the site is 5.60m AHD, which is 0.85m above the FPL. Therefore, the development site is above the FPL.

Refer to Appendix 3 for the FERP, which further addresses *Clause 5.21 Flood Planning* of CCC LEP 2022.

Refer to Appendix 4 for the flood information certificate.

3.3 CCC DCP 2022

The SPCC site is partially contained within the 1% AEP flood level (refer Figure 7). The northeast corner of the site is below the 1% AEP flood level, containing 25% of the total site area. The EOCCS site is above the 1% AEP flood level.

Figure 7: Mapping of 1% AEP Flood Level - North up the page
Source: CCC 2024 Online Mapping

The SPCC and EOCCS sites are partially contained within Flood Precinct 1 FPL to PMF (refer Figure 8). The northeast corner of the SPCC site is below the Probable Maximum Flood (PMF) level, containing 41% of the total site area. The northern boundary of the EOCCS site is below the PMF level, containing 2% of the total site area. The buildings for the proposed development are located above the PMF level.

Figure 8: Mapping of Precinct 1 FPL to PMF - North up the page
Source: CCC 2024 Online Mapping

The SPCC site is partially contained within Flood Precinct 2 Below FPL (refer Figure 9). The northeast corner of the SPCC site is below the FPL, containing 32% of the total site area. The EOCCS site is above the FPL.

Figure 9: Mapping of Precinct 2 Below FPL - North up the page
Source: CCC 2024 Online Mapping

The SPCC site is partially contained within Flood Precinct 3 Flood Storage (refer Figure 10). The northeast corner of the SPCC site is below the flood storage level, containing 16% of the total site area. The EOCCS site is above the flood storage level.

Figure 10: Mapping of Precinct 3 Flood Storage - North up the page
Source: CCC 2024 Online Mapping

The SPCC site is partially contained within Flood Precinct 4 High Hazard (refer Figure 11). The northeast corner of the SPCC site is below the high hazard level, containing 16% of the total site area. The EOCCS site is above the high hazard level.

Figure 11: Mapping of Precinct 4 High Hazard - North up the page
Source: CCC 2024 Online Mapping

The SPCC and EOCCS sites are located upstream of 100 Gavenlock Road, which contains ecologically endangered communities (refer Figure 12). This land contains swamp mahogany-paperbark forest.

Figure 12: Mapping of Ecologically Endangered Communities - North up the page
Source: CCC 2024 Online Mapping

The EOCCS site contains class 5 and 4 acid sulfate soils with a low probability of occurrence according to the SAQP prepared by Raw Earth Environmental (refer Figure 13). The class 4 acid sulfate soils cover most of the site and are typically found 2 metres below the natural ground surface. The deepest excavations for the proposed development include the OSD tanks and the lift pits. It is anticipated that these excavations will not exceed 2 metres below natural ground surface. Therefore, the acid sulfate soils will not be disturbed.

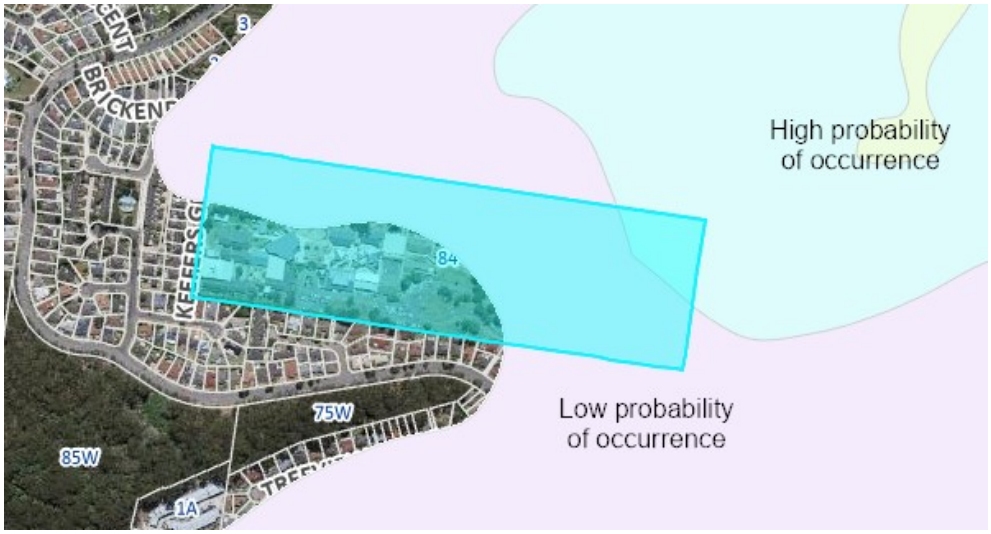

Figure 13: Mapping of Acid Sulfate Soils - North up the page
Source: CCC 2024 Online Mapping

Chapter 3.1.4 Development Provisions outlines the requirements which apply for each flood planning precinct (refer Figure 14). The EOCCS site is partly contained within Flood Precinct 1 (2% of the total site area) and is considered a critical or sensitive facility.

Proposed Land use	Precinct 1 FPL to PMF	Precinct 2 Below FPL	Precinct 3 Flood Storage and Flow Paths (up to 10% AEP)	Precinct 4 High Hazard (up to 50% AEP)
1 Single Dwelling Houses		1, 9	2, 5, 7	
2 Agriculture & Recreation		2	2, 5, 7	
3 Sheds / Garages / ancillary Residential		1	2, 5, 7	
4 Commercial and Industrial Uses		2, 6		
5 Medium to High Density Residential				
6 Critical or Sensitive Facilities	3			
7 Land Subdivision	4			
8 Tourist Development				
9 Caravan parks - short-term sites		6	5, 6	
10 Permissible Earthworks		8		

	Flood related development controls do not apply
	Flood related development controls apply (refer to numbered prescriptive criteria below)
	If the proposal is to be pursued further, a performance based assessment is to be provided demonstrating that the proposed development is compatible with the flooding characteristics of the site (refer to Section 3.2 and Appendix C).

Figure 14: Flood Planning Precincts
Source: CCC DCP Chapter 3.1

Table 1 outlines the assessment of the proposed development against the criteria for Flood Precinct 1.

Flood Precinct 1 Criteria	**Assessment**
(1) Minimum floor levels = PMF level plus mine subsidence allowance, if applicable.	The maximum PMF level is 6.49m AHD. The lowest building floor level for the proposed development is 7.10m AHD, which is 0.61m above the maximum PMF level. Therefore, criteria 1 has been addressed. The site is not located within a Mine Subsidence District as per the NSW Planning Portal online mapping.
(2) Low flood hazard access and egress for pedestrians during a PMF flood to an appropriate area of refuge located above the PMF.	All buildings for the proposed development are located above the maximum PMF level. Only a small portion of the northern driveway (2% of total site) is below the PMF level. The proposed development allows for low flood hazard access and egress of pedestrians to appropriate refuge above the PMF. Therefore, criteria 2 has been addressed. Refer to Appendix 3 for the FERP, which addresses this criteria.
(3) Low flood hazard emergency vehicle road access (Ambulance, SES, RFS) during a PMF flood event.	Refer to Appendix 3 for the FERP, which addresses this criteria.
(4) Consideration of the impacts of climate change.	Refer to Appendix 3 for the FERP, which addresses this criteria.

Table 1: Flood Planning Precinct 1 Criteria Assessment

CCC have provided commentary on the conceptual stormwater design following pre DA consultation meetings. Refer to Appendix 5 for the pre DA meeting notes.

4. WATER CYCLE MANAGEMENT OBJECTIVES

4.1 General Strategy

In accordance with the requirements outlined in CCC DCP *Chapter 3.1.10 Water Cycle Management Plan*, the conceptual stormwater management strategy has considered the following requirements which will be discussed further in this report:

- Site analysis
- Stormwater retention
- Stormwater quality
- Onsite detention
- Local overland drainage
- Flooding

4.2 Site Analysis

The EOCCS site has been analysed to determine the existing and proposed site conditions for the development. This information will be used for calculations later on in the report to determine stormwater management requirements.

Existing Site Conditions

Area Calculations for Development Site:

Total Site Area (S)	= 1.2838 ha
Roof Area (R)	= 0.0457 ha
Paved/Impervious Area (P)	= 0.1573 ha
Pervious Area (PA)	= 1.0808 ha
Total Impervious Area (I)	= 0.2030 ha or 16%

Proposed Site Conditions

Area Calculations for Development Site:

Total Site Area (S)	= 1.2838 ha
Roof Area (R)	= 0.4436 ha
Paved/Impervious Area (P)	= 0.4033 ha
Pervious Area (PA)	= 0.3239 ha
Total Impervious Area (I)	= 0.8808 ha or 69%

Therefore, the proposed development will increase total impervious area by 53% for the developed site.

Refer to Appendix 2 for the stormwater concept drawings, which includes catchment plans of the existing and proposed development sites.

4.3 Stormwater Retention

To comply with the water retention targets in DCP Chapter 3.1.11.2, the stormwater retention volume for the proposed development can be calculated by using the below formula (refer Figure 13).

$V = 0.01A(0.02F)^2$

V = Stormwater Retention Volume (m^3)

A = Total Site Area (m^2)

F = Fraction Impervious (%)

Figure 13: Stormwater Retention Volume Formula
Source: CCC DCP Chapter 3.1

Retention Calculations for Development Site

Total Site Area (A)	= 12838 m^2
Fraction Impervious (F)	= 69% (proposed development)
Retention Volume Required (V)	= 245 m^3 or 245,000 L

According to the above calculations, 245,000 L of retention volume is required for the proposed development. These retention requirements will be met with On Site Detention (OSD) storage.

4.4 Stormwater Quality

To comply with the stormwater quality targets in Chapter 3.1.11.3, the minimum reductions in total pollutant load, compared to untreated runoff from the developed impervious areas of the site must be achieved.

To comply with the water quality targets the following must be demonstrated:

- Site Discharge Index (SDI): To reduce the directly connected impervious area to 10% or less.
- Details of appropriately placed and sized landscaping measures to treat the runoff from impervious areas.

SDI Calculations for Existing Site Conditions

Area Calculations for Development Site:

Total Site Area (S)	= 1.2838 ha
Roof Area (R)	= 0.0457 ha
Paved/Impervious Area (P)	= 0.1573 ha
Pervious Area (PA)	= 1.0808 ha
Total Impervious Area (I)	= 0.2030 ha or 16%
Managed Impervious Area (M)	= 0.2030 ha
DC = I - M	= 0 ha
SDI = DC/S	= 0% < 10%

SDI Calculations for Proposed Site Conditions

Area Calculations for Development Site:

Total Site Area (S)	= 1.2838 ha
Roof Area (R)	= 0.4436 ha
Paved/Impervious Area (P)	= 0.4033 ha
Pervious Area (PA)	= 0.3239 ha
Total Impervious Area (I)	= 0.8808 ha or 69%
Managed Impervious Area (M)	= 0.8808 ha
DC = I - M	= 0 ha
SDI = DC/S	= 0% < 10%

The proposed development is located upstream of vegetated wetlands which manages the runoff from the impervious surfaces.

The performance of the proposed stormwater management strategy has been assessed against the stormwater quality targets using the conceptual design software MUSIC. Refer to Section 6 of this report for more information.

4.5 Onsite Detention

The intent of the stormwater detention targets in Chapter 3.1.11.4 of DCP 2022 is to protect downstream properties and infrastructure from increased stormwater flows from the new development. The objective of these targets are to ensure future development does not increase the impact of rainfall events and that stormwater management design considers the existing capacity of the public drainage system.

In accordance with Chapter 3.1.11.4 of DCP 2022, to comply with the stormwater detention targets the following must be demonstrated:

- Limit post development flow from the proposed development site to less than or equal to predevelopment flows for all storm events up to and including the 1% AEP storm event.
- Overland flows must not intensify, concentrate or inappropriately flow into neighbouring properties.
- OSD is to be integrated into Water Sensitive Urban Design (WSUD) measures, where possible.

The performance of the proposed stormwater management strategy has been assessed against the stormwater detention targets using the design software DRAINS. Refer to Section 7 of this report for more information.

4.6 Local Overland Drainage

The intent of the local overland drainage targets in Chapter 3.1.11.5 of DCP 2022 is to manage local overland drainage problems. The objective of these targets is to effectively manage local overland drainage problems which occur in urban areas and are not considered flooding. Flooding, which has specific targets outlined in Chapter 3.1.11.6 of DCP 2022, is defined as overland flows during the 1% AEP storm event which exceed a flow rate of $0.5m^3/s$ or exceed a velocity of 2m/s or are greater than 0.3m deep. Flooding targets are discussed later in this report.

The performance of the proposed stormwater management strategy has been assessed against the overland flow targets using the design software DRAINS. Refer to Section 8 of this report for more information.

4.7 Flooding

The intent of the flooding targets in Chapter 3.1.11.6 of DCP 2022 is to reduce the impact of flooding on flood prone property. The objective of these targets is to reduce loss from floods, to enable safe access during flooding, maintain existing flood regime and avoid significant adverse effects on the environment.

In accordance with Chapter 3.1.11.6 of DCP 2022, to comply with the flooding targets the requirements linked to the flood control matrix in Table 2 must be met. The development type for this site is 'Group homes, seniors housing, emergency facilities' as the development is an educational establishment.

Development	Development Types					
Control Targets	Pools & Spas	Residential Buildings (Rural)	Residential Buildings (Urban)	Group homes, seniors housing, emergency facilities	Commercial, Industrial	Subdivisions (Urban & Rural)
Floor levels	-	B	B	A	B	-
Flood Impacts	C	C	C	C	C	C
Subdivisions	-	-	-	-	-	D
Access Parking	-	E	-	F	E	E
Fencing	-	G	G	G	G	G

Table 2: Flood Control Target Matrix
Source: Central Coast Council 2024

Table 3 outlines the assessment of the proposed development against the flood control targets.

Flood Control Criteria	**Assessment**
(A) - Floor Levels	All floor levels are located above the PMF flood level.
(C) - Flood Impacts (i) Floodplain Risk Management	Site is located within Wyong River Catchment Floodplain Risk Management Plan. Refer to Appendix 3 for the FERP, which addresses this criteria.
(C) - Flood Impacts (ii) Flood Impacts	The development does not raise the predevelopment flood level by more than 10mm. Refer to Appendix 3 for the FERP, which addresses this criteria.
(C) - Flood Impacts (iii) Building Components	All buildings for the proposed development are located above the maximum PMF level.
(C) - Flood Impacts (iv) Local Overland Flooding	Overland flow paths for the proposed development has been designed to limit flows during the 1% AEP storm event to not exceed 2m/s, $0.5m^3/s$ or 0.3m in depth. Refer to Section 8 of this report for more information.
(F) - Access and Parking in PMF Event	Refer to Appendix 3 for the FERP, which addresses this criteria.
(G) - Fencing	Fencing over the overland flow path is permeable and will not impede flows.

Table 3: Flood Control Criteria Assessment

5. CONCEPT STORMWATER DESIGN

5.1 General

The onsite stormwater management system for the EOCCS site has been designed to replicate the processes which would occur naturally on the site. The majority of the site will drain via gravity to the existing Council trunk drainage in Keefers Glen. The remainder of the site that isn't able to drain to Keefers Glen, will drain to the north east corner of the site. This stormwater will discharge as overland flow from a level spreader into a bioretention swale within the SPCC site. This swale will direct overland flow towards the Council wetlands located at 100 Gavenlock Road. The proposed development will incorporate a number of devices and measures aimed at providing adequate and responsible management of stormwater runoff for minor and major storm events. Concept stormwater management plans have been prepared for the proposed development and are included in Appendix 2 of this report. The methods of stormwater capture and disposal are outlined below and have been designed in accordance with AS3500.3 and CCC Civil Works Specification - Design Guideline.

Stormwater which is currently collected on the SPCC library roof and discharged into the dam/bioretention basin that is proposed for removal, shall be redirected to discharge into the existing Council trunk drainage in Keefers Glen. This stormwater is collected and conveyed via a new network of pits and pipes to a below ground OSD tank located near the boundary. This OSD tank includes proprietary filtration devices and a gross pollutant trap to treat the stormwater before flows are throttled. These devices have been included to meet Council water quality and quantity requirements for the SPCC library roof catchment. After the flows have been treated and attenuated, they are discharged into the trunk drainage in Keefers Glen. The capacity of the existing Council trunk drainage system has been checked during peak storm events to ensure the system has sufficient capacity for the SPCC library roof catchment. The new connection will require upgrading of the trunk drainage in Keefers Glen with a new pit and pipe to ensure minimum falls are achieved to the new pit.

For the new EOCCS site, stormwater is collected on the surface of the western car park and the roofs of the secondary school wing (west) and the admin wing (south). This stormwater is conveyed via a new network of pits and pipes to a below ground OSD tank located near the entrance to the site. This OSD tank includes proprietary filtration devices and a gross pollutant trap to treat the stormwater before flows are throttled. These devices have been included to meet Council water quality and quantity requirements for part of the EOCCS catchment. After the flows have been treated and attenuated, they are discharged into the trunk drainage in Keefers Glen. The capacity of the trunk drainage system has been checked during peak storm events to ensure the system has sufficient capacity for the SPCC library roof catchment and part of the EOCCS catchment. The new connection does not require upgrading of the trunk drainage in Keefers Glen.

Stormwater is collected on the roof of the primary school wing (east) and the impervious surfaces of the playground. This stormwater is conveyed via a network of pits and pipes to a below ground OSD tank located in the north eastern corner of the site. The pervious surfaces of the playground (grass) and the eastern car park (permeable paving) bypass this network of pits and pipes. These bypass areas soak up stormwater and direct overland flow towards the north eastern corner of the site. The OSD tank includes proprietary filtration devices and a gross pollutant trap to treat the stormwater before flows are throttled. These devices have been included to meet Council water quality and quantity requirements for part of the EOCCS catchment. After the flows have been treated and attenuated, they are discharged as overland flow from a level spreader into a bioretention swale with erosion protection measures. This swale continues into the SPCC site, directing overland flow towards the Council wetlands located downstream of the site. The new level spreader and swale has been designed to mimic pre development discharge conditions as the existing dam currently discharges via overland flow towards the wetlands. The new level spreader and swale improves the existing conditions by dispersing stormwater flows evenly so flows are not concentrated and do not scour the local environment. The new level spreader and bioretention swale meet Council requirements for water quality and overland flow.

6. STORMWATER QUALITY CONTROL

6.1 General

To comply with the stormwater quality targets in Chapter 3.1.11.3 of DCP 2022, the minimum reductions in total pollutant load, compared to untreated runoff from the developed impervious areas of the site must be achieved. These reductions are summarised in the table below (refer Figure 15).

Pollutant	Performance Requirements (Targets)
Total Suspended Solids (TSS)	80% reduction in the post-development mean annual load
Total Nitrogen (TN)	45% reduction in the post-development mean annual load
Total Phosphorous (TP)	45% reduction in the post-development mean annual load
Gross Pollutants	90% reduction in the post-development mean annual load (for pollutants greater than 5mm in diameter
Hydrology	The post-development peak discharge must not exceed the pre-development peak discharge for flows for the 5, 20 and 100% AEP event

Figure 15: Minimum Pollutant Removal Performance Targets
Source: CCC Civil Works Specification 2020

The proposed stormwater system as discussed in Section 5 of this report, will introduce stormwater quality devices within both the EOCCS and SPCC sites to treat runoff. For the EOCCS and SPCC sites, proprietary filter devices AtlanFilters (formerly SPEL Filter) and gross pollutant traps Atlan Stormsacks have been introduced into the treatment trains. These devices have been introduced to meet Council's pollutant reduction requirements for the increase in impervious area with the proposed development. These Water Sensitive Urban Design (WSUD) elements remove nutrients and sediments from the stormwater system prior to runoff leaving the sites. These products are SQIDEP verified, refer to Appendix 15 and 16.

For pollution protection during construction, a silt and sedimentation plan is provided to isolate the excavated works that are prone to silt laden runoff.

6.2 Modelling

The treatment train for the proposed development was modelled using MUSIC software version 6.4 (Model for Urban Stormwater Conceptualisation) provided by ewater.

The MUSIC modelling parameters were implemented using the MUSIC-LINK feature for a lowland site (slopes <5%).

The rainfall and evaporation inputs as outlined in CCC's Design Guideline were implemented in the model. The rainfall station used for the rainfall data was 066062 Sydney Observatory with a 6 minute time step. The modelling period of 1/01/1974 to 31/12/1993 was used. The average Sydney potential evapotranspiration (PET) data was used in the model.

The rainfall runoff parameters as outlined in CCC's Design Guideline were implemented in the model.

The pollutant generation parameters as outlined in CCC's Design Guideline were implemented in the model.

The treatment node inputs for the Atlan StormSack and AtlanFilter were implemented from the Atlan Stormwater website from the Music Modelling section for ATLAN NSW & ACT.

Refer to Appendix 8 for the MUSIC-LINK report.

6.2.1 Catchment Data

Catchment data for the existing and proposed development site was determined based on information provided in the detailed survey, aerial imagery and in the architectural drawings.

Refer to Appendix 2 of this report for the concept stormwater management plans, which includes the existing, proposed and upstream catchment boundaries.

Table 4 shows a summary of the source node parameters which were adopted for the MUSIC model for the proposed development site.

Post Development Source Nodes			
Catchment	**Total Area (ha)**	**Impervious (%)**	**Pervious (%)**
Upstream Catchment 1 (UC1)	0.3040	95%	5%
Catchment 1 (C1)	0.2159	100%	0%
Catchment 2 (C2)	0.1280	100%	0%
Catchment 3 (C3)	0.0997	100%	0%
Catchment 4 (C4)	0.2295	71%	29%
Catchment 5 (C5)	0.1222	75%	25%
Catchment 6 (C6)	0.1991	36%	64%
Catchment 7 (C7)	0.0674	83%	17%
Catchment 8 (C8)	0.2220	25%	75%
Total	1.2838	69%	31%

Table 4: Post Development Source Node Parameters

6.3 Results

To demonstrate compliance with the stormwater quality targets in Chapter 3.1.11.3 of DCP 2022, MUSIC modelling has been undertaken for the proposed development. Figure 16 shows the layout for the MUSIC model.

The post development EOCCS site consists of 8 source nodes and an upstream source node for the SPCC library roof. The upstream source node is treated within the SPCC site. This treatment train contains 1 Stormsack and 2 Full Height AtlanFilters before stormwater is discharged from site. The portion of the EOCCS site which discharges into Keefers Glen consists of 3 source nodes. This treatment train contains 1 Stormsack and 4 Full Height AtlanFilters before stormwater is discharged into Keefers Glen. The portion of the EOCCS site which discharges to the Council wetlands consists of 5 source nodes. This treatment train contains 1 Stormsack and 12 Half Height AtlanFilters before stormwater is discharged into a bioretention swale.

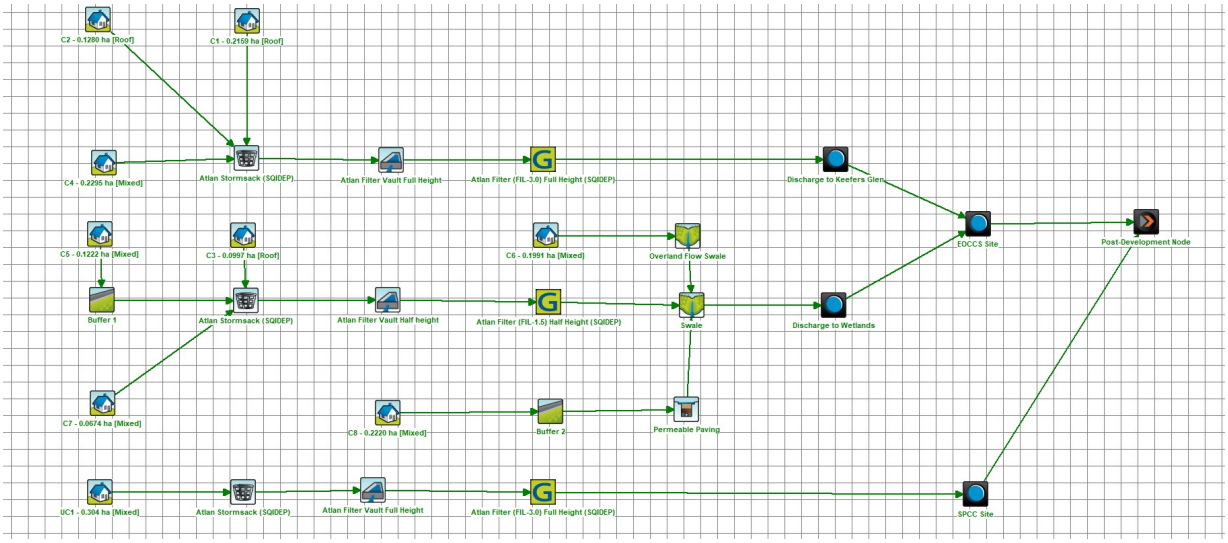

Figure 16: MUSIC Model

Table 5 shows the treatment train effectiveness for the SPCC Site.

Treatment Type	Sources	Residual Load	Modelled Reduction (%)	Target Reduction (%)
Total Suspended Solids (kg/yr)	632	114	82	80
Total Phosphorus (kg/yr)	1.02	0.239	76.6	45
Total Nitrogen (kg/yr)	7.56	3.18	57.9	45
Gross Pollutants (kg/yr)	85	0	100	90

Table 5: Treatment Train Effectiveness for the SPCC Site

Table 6 shows the treatment train effectiveness for the EOCCS site, discharging into Keefers Glen.

Treatment Type	Sources	Residual Load	Modelled Reduction (%)	Target Reduction (%)
Total Suspended Solids (kg/yr)	477	91.2	80.9	80
Total Phosphorus (kg/yr)	1.23	0.31	74.8	45
Total Nitrogen (kg/yr)	13.4	5.61	58.2	45
Gross Pollutants (kg/yr)	154	0	100	90

Table 6: Treatment Train Effectiveness for part of the EOCCS site

Table 7 shows the treatment train effectiveness for the EOCCS site, discharging into the Council wetlands.

Treatment Type	Sources	Residual Load	Modelled Reduction (%)	Target Reduction (%)
Total Suspended Solids (kg/yr)	708	84.4	88.1	80
Total Phosphorus (kg/yr)	1.37	0.568	58.7	45
Total Nitrogen (kg/yr)	11.6	5.63	51.4	45
Gross Pollutants (kg/yr)	137	0	100	90

Table 7: Treatment Train Effectiveness for part of the EOCCS site

Where modelled reduction figures exceed target reduction figures, pollutant reduction targets have been met. The results from the model demonstrate that all targets have been met. These results confirm that the introduction of Atlan StormSacks and AtlanFilters into the treatment trains meets Council's water quality requirements.

Refer to Appendix 7 of this report for the results of the MUSIC model.

7. STORMWATER QUANTITY CONTROL

7.1 General

To comply with the requirements in Chapter 3.1.11.4 of DCP 2022, the proposed development is required to limit post-development critical peak flows to less than or equal to pre-development flows for all storm events up to and including the 1% AEP.

7.2 Modelling

To determine the stormwater quantity requirements, hydraulic models were created to analyse post-development peak flows for a range of storm events using computer modelling software. The software used for this analysis was DRAINS Version 2024, which uses the runoff routing method.

7.2.1 Catchment Data

Catchment data for the existing and proposed development site was determined based on information provided in the detailed survey, aerial imagery and in the architectural drawings.

Refer to Appendix 2 of this report for the concept stormwater management plans, which includes the existing, proposed and upstream catchment boundaries.

Table 8 shows the upstream catchment parameters for the development site. Upstream catchment 1 consists of the SPCC library roof, which discharges into the existing dam that is to be removed. Upstream catchment 2, 3 and 4 are catchments for the existing Council trunk drainage in Keefers Glen. These catchments consist of road reserve areas and private residential areas. In accordance with CCC Civil Works Specification - Design Guideline, the road reserve areas were assumed to be 70% impervious. In accordance with DCP 2022 Chapter 3.1, it was assumed that the private residential areas meet Council's water quantity requirements to reduce post development flows to pre development conditions. The pre development conditions for these private residential areas was assumed to be 100% pervious. The upstream catchment parameters have been calculated following this reasoning.

Upstream Catchments							
Catchment	**Total Area (ha)**	**Impervious (%)**	**Impervious Area (ha)**	**Time of Concentration (mins)**	**Pervious (%)**	**Pervious Area (ha)**	**Time of Concentration (mins)**
Upstream Catchment 1 (UC1)	0.3040	95%	0.2888	2	5%	0.0152	12
Upstream Catchment 2 (UC2)	2.5100	13%	0.3263	4	87%	2.1837	25
Upstream Catchment 3 (UC3)	0.667	25%	0.1668	3	75%	0.5002	15
Upstream Catchment 4 (UC4)	6.2765	12%	0.7532	10	88%	5.5233	28.5
Total	9.7575	16%	1.5351	N/A	84%	8.2224	N/A

Table 8: Upstream Catchments Parameters

Table 9 shows the pre development catchment parameters for the development site.

Pre Development Catchments							
Catchment	**Total Area (ha)**	**Impervious (%)**	**Impervious Area (ha)**	**Time of Concentration (mins)**	**Pervious (%)**	**Pervious Area (ha)**	**Time of Concentration (mins)**
Existing Catchment 1 (EC1)	0.6897	7%	0.0483	2	93%	0.6414	13
Existing Catchment 2 (EC2)	0.3921	0%	0	3	100%	0.3921	15
Existing Catchment 3 (EC3)	0.2020	78%	0.1581	1.5	22%	0.0439	8.5
Total	1.2838	16%	0.2064	N/A	84%	1.0774	N/A

Table 9: Pre Development Catchments Parameters

Table 10 shows the post development catchment parameters for the development site.

Post Development Catchments							
Catchment	**Total Area (ha)**	**Impervious (%)**	**Impervious Area (ha)**	**Time of Concentration (mins)**	**Pervious (%)**	**Pervious Area (ha)**	**Time of Concentration (mins)**
Catchment 1 (C1)	0.2159	100%	0.2159	1.5	0%	0	0
Catchment 2 (C2)	0.1280	100%	0.1280	1	0%	0	0
Catchment 3 (C3)	0.0997	100%	0.0997	1	0%	0	0
Catchment 4 (C4)	0.2295	71%	0.1627	1	29%	0.0668	0
Catchment 5 (C5)	0.1222	75%	0.0917	3	25%	0.0305	18
Catchment 6 (C6)	0.1991	36%	0.0711	1.5	64%	0.1280	7.5
Catchment 7 (C7)	0.0674	83%	0.0559	2.5	17%	0.0115	10
Catchment 8 (C8)	0.2220	25%	0.0558	4	75%	0.1662	7.5
Total	1.2838	69%	0.8808	N/A	31%	0.4030	N/A

Table 10: Post Development Catchments Parameters

7.2.2 Model Parameters and Rainfall Data

The hydrological model used for the analysis was the Horton/ILSAX rainfall-runoff model. In accordance with the CCC Civil Works Design Guideline and current AR&R guidelines, the following parameters were utilised for the DRAINS model:

Impervious Depression Storage = 1 mm
Supplementary Depression Storage = 1 mm
Pervious Depression Storage = 5 mm
Soil Type = 3

Rainfall data for the model was sourced via the AR&R Data Hub from the Bureau of Meteorology. The time of concentration for each catchment was determined using the kinematic wave equation.

7.3 Results

To comply with the requirements in Chapter 3.1.11.4 of DCP 2022 and CCC's Design Guideline, modelling was performed to demonstrate compliance of the post development peak flows from the site being less than or equal to the pre development flows.

Refer to Appendix 9, 10, 11, 12, 13 and 14 for the results and data of DRAINS model 1, 2 and 3.

7.3.1 Results for Model 1: Pre Development Site

To determine the maximum allowable post development peak flows from the site, we must determine the pre development peak flows for the site. Figure 15 shows the layout for DRAINS model 1. The pre development site consists of 3 catchment areas and an upstream catchment area for the SPCC library roof. The upstream catchment and 1 catchment area drain to the dam on the site. The dam is modelled at full capacity during all storm events because the dam only discharges via an overland flow path. The remaining 2 catchments bypass the dam.

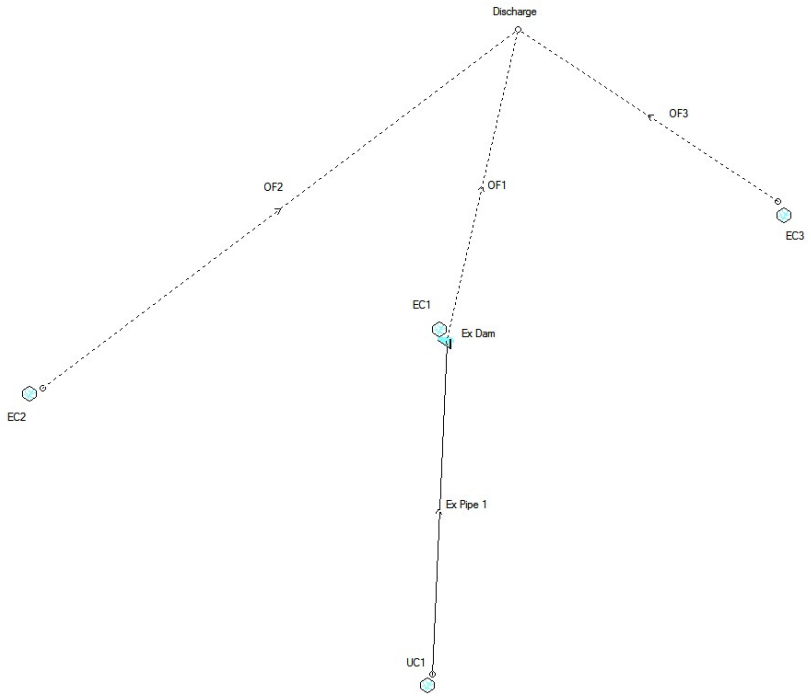

Figure 15: DRAINS Model 1

Table 11 shows the results of the DRAINS model 1, when considering total site discharge.

Pre Development - Total Site Discharge	
AEP Event (%)	**Total Site Discharge (L/s)**
1%	658
20%	302

Table 11: DRAINS Model 1 Results for Total Site Discharge

As per the results from DRAINS model 1, the pre development flows for the 1% AEP storm event are 646 L/s. To comply with Council's water quantity requirements, the post development peak flows cannot exceed this flow rate.

7.3.2 Results for Model 2: Existing Council Trunk Drainage

To determine if the existing Council trunk drainage in Keefers Glen has sufficient capacity to cater for the discharge from our site, we must determine the existing flow rates within the pipes and overland flow paths. Figure 18 shows the layout for DRAINS Model 2. The model contains the trunk drainage that will be impacted by the discharge from our site. The 'Ex Pipe 2-2' will be impacted by the SPCC site discharge. This pipe and overland flow path drain upstream catchment 2. The 'Ex Pipe 2-4' will be impacted by the SPCC site discharge and the EOCCS site discharge. This pipe and overland flow path drains upstream catchment 2 and 3. The 'Ex Pipe 2-5' will be impacted by the SPCC site discharge and the EOCCS site discharge. This pipe and overland flow path drains upstream catchment 2, 3 and 4. The overland flow path 'Ex OF 2-3' drains to the node instead of pit 'EP2-5' to ensure stability of the model. The model was analysed with a 50% blockage factor to comply with Council's requirements for trunk drainage capacity.

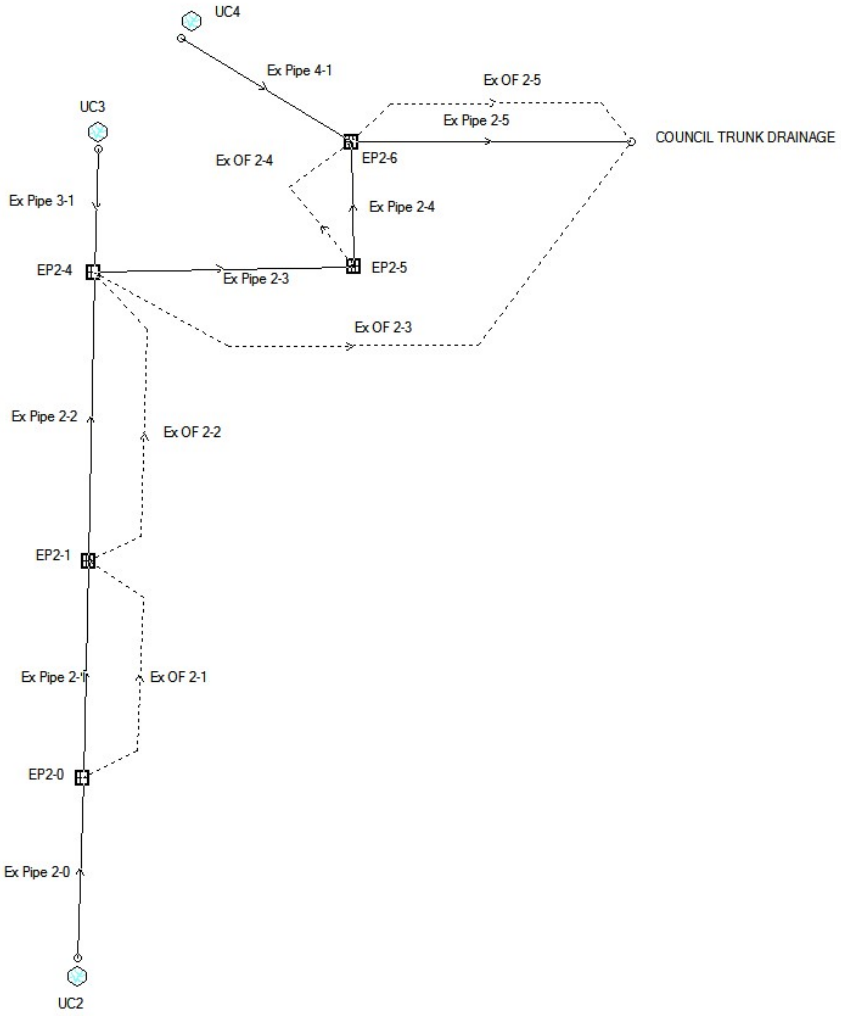

Figure 18: DRAINS Model 2

Table 12 shows the pipe capacities for the existing Council trunk drainage. The pipe capacities were determined using manning's equation.

It should be noted that there are limitations to using manning's equation as it is a theoretical equation which does not account for friction loss for long sections of pipe. This was considered to be acceptable as only Ex Pipe 2-2 exceeds 30m in length and this pipe has a significant amount of available capacity.

Pipe Name	Pipe Diameter (mm)	Pipe Grade (%)	Roughness (n)	Max Flow Rate (L/s)
Ex Pipe 2-2	900	2.9	0.012	3590
Ex Pipe 2-4	900	1.3	0.012	2400
Ex Pipe 2-5	1050	1.9	0.012	4380

Table 13: Pipe Capacity Calculations

Table 13 shows the results of the DRAINS model 2 for the 1% AEP storm event. The table compares the existing flow rates within the pipes against the maximum flow rates to determine how much additional flow the pipes can cater for.

Site Impacting Capacity	Pipe/Overland Flow Path Name	Existing Flow Rate (L/s)	Resultant Capacity: Max Flow Rate - Existing Flow Rate (L/s)
SPCC	Ex Pipe 2-2	932	2658
	Ex OF 2-2	0	-
SPCC & EOCCS	Ex Pipe 2-4	1180	1220
	Ex OF 2-4	80	-
SPCC & EOCCS	Ex Pipe 2-5	3360	1020
	Ex OF 2-5	80	-

Table 13: DRAINS Model 2 Results for Existing Trunk Drainage

As per the results from DRAINS model 2, the existing trunk drainage has capacity to cater for additional flows from the SPCC and EOCCS sites. The additional flows being discharged into the pipes must not exceed the resultant capacities shown in Table 13. The model also suggests that during the 1% AEP storm event, existing conditions result in some overland flow within the road, particularly in the low lying areas.

There are limitations in the model detail associated with Ex Pipe 2-5. This pipe drains a large (6.2765 ha) and complex catchment (upstream catchment 4). This pipe is located within 15m and 120m of the PMF and 1% AEP flood extents for the natural ground surface. The PMF and 1% AEP flood levels are located at 6.49m and 4.25m AHD respectively according to Council's flood certificate. The upstream invert of this pipe is 5.03m AHD and is fully inundated in some flood scenarios. During the 1% AEP flood event, the pipes downstream of this pipe are partially submerged which reduces the capacity of this pipe and leads to overland flows in the current situation. The model has assumed that all water from the upstream catchment is contained within the pipe which is a conservative (and potentially unrealistic) scenario. This was included in the model to create a worst case scenario for the existing conditions, which is further limited by tail water effects. Therefore, it must be noted that Ex Pipe 2-5 currently contributes to overland flow more than what is represented in the model. Further increase in flows into this pipe from the SPCC and EOCCS sites must be limited to ensure overland flow is kept within Council's targets.

7.3.3 Results for Model 3: Post Development Site

To determine the OSD requirements for the post development site, the total site discharge must not exceed pre development flows and the flows discharged into the existing trunk drainage must not exceed the available capacity. Figure 19 shows the layout for DRAINS model 3. The model contains the proposed stormwater management system for the SPCC and EOCCS site. For the SPCC site, runoff from upstream catchment 1, which is the library roof, drains to OSD 1 where flows are attenuated before being discharged into the trunk drainage in Keefers Glen. The existing pipe in Keefers Glen that drains these flows is Ex Pipe 2-2. For the EOCCS site, the system is split for runoff that drains to the trunk drainage and runoff that drains to the Council wetlands. For the system that drains to the trunk drainage, 3 catchments are directed to OSD 2 where flows are attenuated before being discharged into the trunk drainage in Keefers Glen. The existing pipe in Keefers Glen that drains these flows is Ex Pipe 2-4 and Ex Pipe 2-5. The overland flow path from OSD 2 drains to the level spreader due to topography of the EOCCS site. For the system that drains to the Council wetlands, 3 catchments are directed to OSD 3 where flows are attenuated before being discharged to a level spreader. The level spreader disperses flows into a bioretention swale that drains flows to the wetlands. 2 catchments bypass OSD 3 and discharge overland flow into the bioretention swale. The model was analysed with a 50% blockage factor to comply with Council's requirements for trunk drainage capacity.

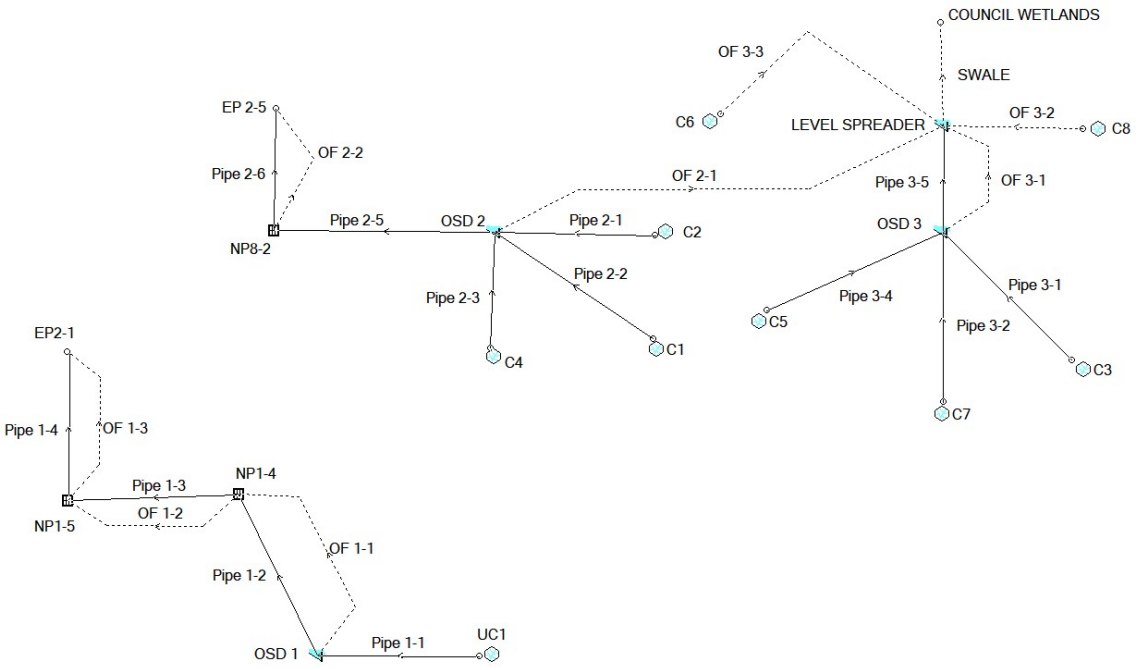

Figure 19: DRAINS Model 3

Table 14 shows the results of the DRAINS model for OSD 1 during the 1% AEP storm event.

OSD 1 Results during 1% AEP Event		
OSD Flows	**Pipe Flow into OSD**	266 L/s
	Pipe Flow out of OSD	115 L/s
	Overland Flow out of OSD	0 L/s
Pipe Capacity for Ex Pipe 2-2	**Pipe Flow into Ex Pipe 2-2**	115 L/s
	Overland Flow into Ex OF 2-2	0 L/s
	Resultant Capacity of Ex Pipe 2-2	2658 L/s
	Resultant Capacity - Pipe Flow	2543 L/s
OSD Parameters	**OSD Volume (m^3)**	70 m^3
	OSD Min Depth (m)	2.6 m
	Orifice Size (mm)	185 mm
Site Discharge	**SPCC Discharge to Keefers Glen**	115 L/s

Table 14: DRAINS Model 3 Results for OSD 1

As per the results from DRAINS model 3 for OSD 1, the OSD tank has been designed to significantly reduce the flow rate of runoff leaving this system. The OSD volume, min depth and orifice size have been designed to reduce the flow rate within tolerance of the resultant capacity of Ex Pipe 2-2. These results show that Ex Pipe 2-2 has sufficient capacity to cater for the flow rate from OSD 1.

Table 15 shows the results of the DRAINS model for OSD 2 during the 1% AEP storm event.

OSD 2 Results during 1% AEP Event		
OSD Flows	**Pipe Flow into OSD**	474 L/s
	Pipe Flow out of OSD	115 L/s
	Overland Flow out of OSD	0 L/s
Pipe Capacity for Ex Pipe 2-4	**Pipe Flow into Ex Pipe 2-4**	119 L/s
	Overland Flow into Ex OF 2-4	0 L/s
	Resultant Capacity of Ex Pipe 2-4	1220 L/s
	Resultant Capacity - Pipe Flow	1101 L/s
Pipe Capacity for Ex Pipe 2-5	**Pipe Flow into Ex Pipe 2-5**	119 L/s
	Overland Flow into Ex OF 2-5	0 L/s
	Resultant Capacity of Ex Pipe 2-5	1020 L/s
	Resultant Capacity - Pipe Flow	901 L/s
OSD Parameters	**OSD Volume (m^3)**	245 m^3
	OSD Min Depth (m)	1.8 m
	Orifice Size (mm)	200 mm
Site Discharge	**EOCCS Discharge to Keefers Glen**	119 L/s

Table 15: DRAINS Model 3 Results for OSD 2

As per the results from DRAINS model 3 for OSD 2, the OSD tank has been designed to significantly reduce the flow rate of runoff leaving this system. The OSD volume, min depth and orifice size have been designed to reduce the flow rate within tolerance of the resultant capacity of Ex Pipe 2-4 and Ex Pipe 2-5. These results show that Ex Pipe 2-4 and Ex Pipe 2-5 have sufficient capacity to cater for the flow rates from OSD 2 and OSD 1.

The increase in flow into Ex Pipe 2-5 of 119 L/s, represents an increase in pipe flow of approximately 3.6%. This is considered a minor increase (based on conservative assumptions) in flow which will not significantly increase overland flow for this area. This increase is within Council's targets for trunk drainage capacity and overland flow control.

Table 16 shows the results of the DRAINS model for OSD 3 during the 1% AEP storm event.

OSD 3 Results during 1% AEP Event		
OSD Flows	**Pipe Flow into OSD**	232 L/s
	Pipe Flow out of OSD	129 L/s
	Overland Flow out of OSD	0 L/s
OSD Parameters	**OSD Volume (m^3)**	60 m^3
	OSD Min Depth (m)	0.7 m
	Orifice Size (mm)	165 mm
Site Discharge	**EOCCS Discharge to Wetlands**	355 L/s

Table 16: DRAINS Model 3 Results for OSD 3

As per the results from DRAINS model 3 for OSD 3, the OSD tank has been designed to significantly reduce the flow rate of runoff leaving this system. The OSD volume, min depth and orifice size have been designed to reduce the flow rate within tolerance of the allowable site discharge.

Table 17 shows the results of the DRAINS model for the post development total site discharge during the 1% and 20% AEP storm event.

Post Development - Total Site Discharge		
Discharge System	**Flow Rate (L/s) for 1% AEP Event**	**Flow Rate (L/s) for 20% AEP Event**
SPCC Discharge to Keefers Glen	115	65
EOCCS Discharge to Keefers Glen	119	72
EOCCS Discharge to Wetlands	355	158
Post Development - Total Site Discharge	589	295
Pre Development - Total Site Discharge	658	302

Table 17: DRAINS Model 3 Results for Total Site Discharge

As per the results from DRAINS model 3, the total site discharge for the post development does not exceed the pre development conditions for all storm events up to the 1% AEP. This complies with the requirements in Chapter 3.1.11.4 of DCP 2022 and CCC's Design Guideline.

The total OSD volume storage for the EOCCS site is 305 m^3, which exceeds the retention volume requirement of 245 m^3. This volume storage complies with the requirements in Chapter 3.1.11.2 of DCP 2022.

8. OVERLAND FLOW CONTROL TO WETLANDS

8.1 General

To comply with the requirements in Chapter 3.1.11.5 of DCP 2022, the proposed development is required to achieve overland drainage targets. These targets apply for the level spreader and bioretention swale which discharge overland flow into the Council wetlands. To comply with these requirements, overland flow paths during the 1% AEP storm event must not exceed a velocity of 2 m/s, a depth of 0.3m or a flow rate of 0.5m^3/s.

8.2 Modelling

To determine if the level spreader and swale meet the overland drainage targets, a hydraulic model was created using computer modelling software. The software used for this analysis was DRAINS Version 2024.

DRAINS model 3, which was discussed earlier in Section 7 of this report was used to analyse the discharge from the level spreader and swale. Refer to Section 7 of this report for the catchment data, modelling parameters, rainfall data and general arrangement of the model.

8.3 Results

Table 18 outlines the overland flow controls the level spreader and swale must achieve.

Overland Flow Controls	
Max Flow Rate	0.5 m^3/s
Max Velocity	2 m/s
Max Depth	0.3 m
Max Velocity x Depth	0.6 m^2/s

Table 18: Overland Flow Controls

Table 19 shows the results of the DRAINS model for the level spreader and swale during the 1% AEP storm event. Refer to Appendix 11 and 14 for the results and data of DRAINS model 3.

DRAINS Results for 1% AEP Event	
Peak Flow Rate	0.355 m^3/s
Peak Velocity	1.1 m/s
Peak Depth	0.167 m
Peak Velocity x Depth	0.18 m^2/s
Peak Width	4.00 m

Table 19: DRAINS Model 3 Results

As per the results from DRAINS model 3, the overland flow within the level spreader and bioretention swale does not exceed the overland flow controls. This complies with the requirements in Chapter 3.1.11.5 of DCP 2022 as overland flow within the level spreader and swale is safe. The peak width for the swale is 4.00m, meaning the level spreader should be a minimum of 4m wide. The bioretention swale has been designed to include erosion and sediment control measures to ensure the Council wetlands are not impacted from the overland flow.

9. CONCLUSION

To comply with CCC DCP Chapter 3.1 and the Civil Works Design Guideline, the stormwater management system for the proposed development has been assessed against the relevant controls.

The proposed stormwater system for EOCCS introduces stormwater quality and quantity control devices to appropriately manage runoff before it drains from the site. Runoff from the SPCC site is managed, treated and attenuated before it is discharged into Keefers Glen. Runoff from majority of the EOCCS site is managed, treated and attenuated before it is discharged into Keefers Glen. The existing pipes in Keefers Glen have been checked and have adequate capacity. The rest of the runoff from the EOCCS site is managed, treated and attenuated before it is discharged via a level spreader into a bioretention swale. This runoff is not discharged via the infrastructure in 8 The Sheiling as the easement was refused by the property owner. This bioretention swale, which has been designed with erosion and sediment control measures directs overland flow towards the Council wetlands. This bioretention swale is within the SPCC site and will require an easement.

MUSIC modelling has been undertaken to assess the stormwater system against Council's water quality targets. The treatment trains for the proposed development was modelled using proprietary filtration devices, gross pollutant traps and a bioretention swale. The results meet the requirements in Chapter 3.1.11.3 of DCP 2022.

DRAINS modelling has been undertaken to assess the stormwater system against Council's water quantity targets. The results from the models show that peak flows for the post development site for the 1% AEP storm event do not exceed pre development peak flows. These results meet the requirements in Chapter 3.1.11.4 of DCP 2022.

DRAINS modelling has been undertaken to assess the stormwater system against Council's overland flow controls. The results from the model show that overland flow from the level spreader and bioretention swale are safe and will not impact the Council wetlands. These results meet the requirements in Chapter 3.1.11.5 of DCP 2022.

An erosion and sedimentation control plan has also been prepared to meet Councils requirements in regards to pollution protection during construction of the proposed development.

The stormwater management system for the proposed development meets Council's requirements and guidelines.

APPENDIX

1. SURVEY
2. STORMWATER CONCEPT DRAWINGS
3. FERP
4. COMMUNICATION LOG WITH 8 THE SHEILING
5. COUNCIL PRE DA NOTES
6. FLOOD INFORMATION CERTIFICATE
7. MUSIC RESULTS
8. MUSIC-LINK REPORT
9. DRAINS MODEL 1 RESULTS
10. DRAINS MODEL 2 RESULTS
11. DRAINS MODEL 3 RESULTS
12. DRAINS MODEL 1 DATA
13. DRAINS MODEL 2 DATA
14. DRAINS MODEL 3 DATA
15. SQIDEP FOR STORMSACK
16. SQIDEP FOR ATLANFILTER

APPENDIX 1

SURVEY

A1

Note:
•PLEASE REFER TO SHEET 3 FOR LEGEND.

0m 5 10 15 20m
SCALE 1:200

MGA2020

RICHMOND MEWS

THE SHELLING

BRICKENDON AVENUE

GLENFERS

1278
D.P. 860543
PARK

D. P. 851197

S. P. 52119

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.17

TWO STOREY BRICK RESIDENCES TILE ROOF No.31

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.23

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.25

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.27

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.29

129

130

131

132

TWO STOREY BRICK RESIDENCE TILE ROOF No.2

TWO STOREY BRICK RESIDENCE TILE ROOF No.4

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.6

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.10

TWO STOREY BRICK RESIDENCES TILE ROOF No.20A No.20B

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.22A No.22B

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.24

SINGLE STOREY BRICK RESIDENCES TILE ROOF No.26A No.26B

TWO STOREY BRICK RESIDENCES TILE ROOF No.28A No.28B

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.30A No.30B

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.32

SINGLE STOREY BRICK RESIDENCES TILE ROOF No.34A No.34B

S.P. 52621
S.P. 52307
154
D.P. 851197
S.P. 52175
S.P. 52174
S.P. 52172
S.P. 54660
150
D.P. 851197
S.P. 52117

98"
17'
660.78
30"
48'
201.02
8"

9
SECTION 4
D.P. 3368

DAM

ADJOINS SHEET 2

HORIZONTAL DATUM:

CO-ORDINATE SYSTEM: MGA2020

MARKS ADOPTED:
S.S.M. 88814 S.S.M. 93455

VERTICAL DATUM:

DATUM: A.H.D.
B.M. ADOPTED: S.S.M. 88814
R.L. 38.121
SOURCE: S.C.I.M.S.

REV.	AMENDMENTS	DATE
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w. www.degotardi.com.au

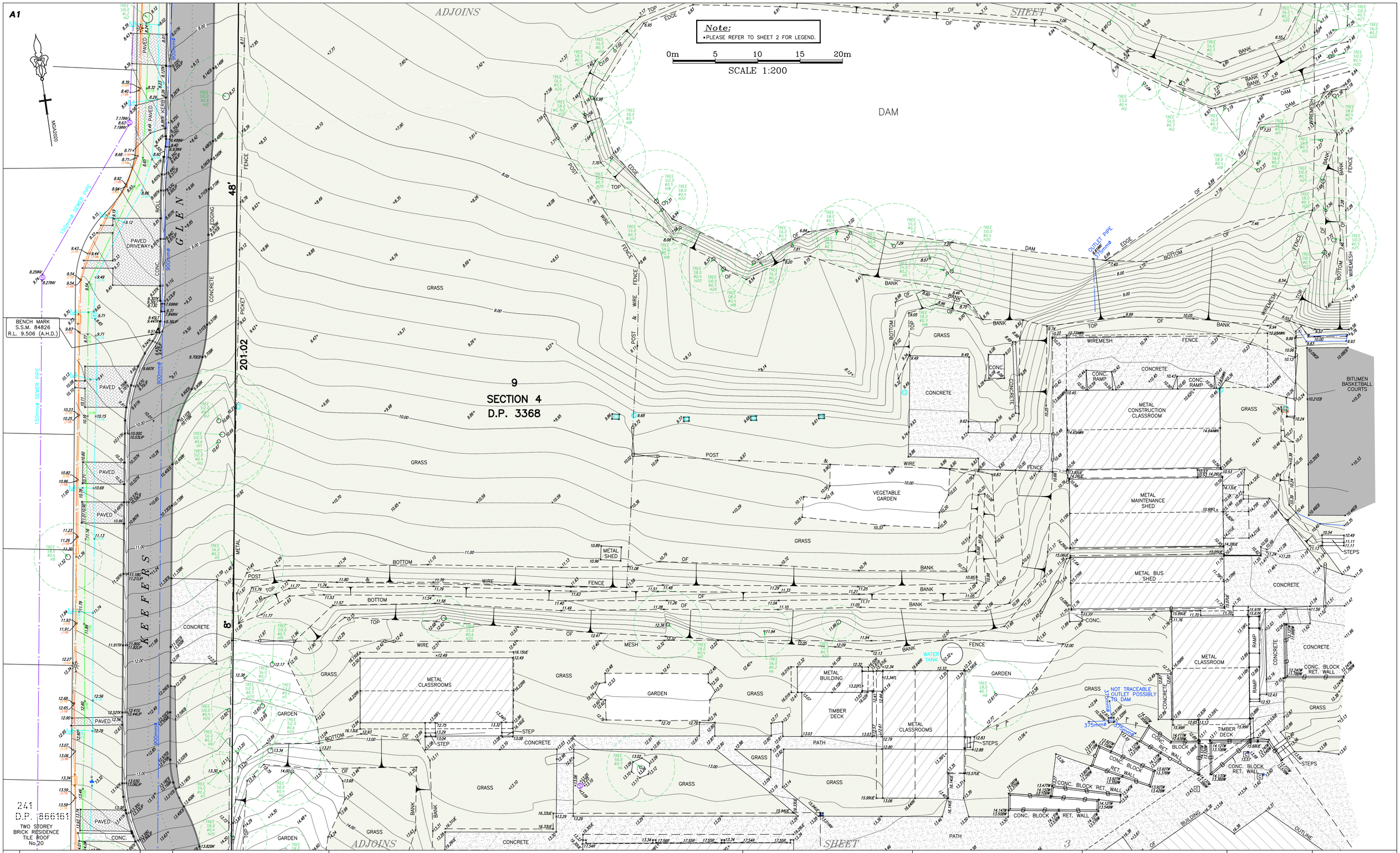
L.G.A. CENTRAL COAST | SHEET 1 OF 4

SURVEYED	DRAWN	CHECKED	APPROVED
B.T./J.B.	P.R.G.	B.T./J.B.	G.S./L.B.

SURVEY REFERENCE	SCALE	DATE
36347	1:200	09/09/2023

DRAWING NUMBER: 36347A01.DWG
REV.: B

A1



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SURVEY REFERENCE 36347		SCALE 1:200	DATE 09/09/2023
DRAWING NUMBER 36347A01.DWG			REV. B

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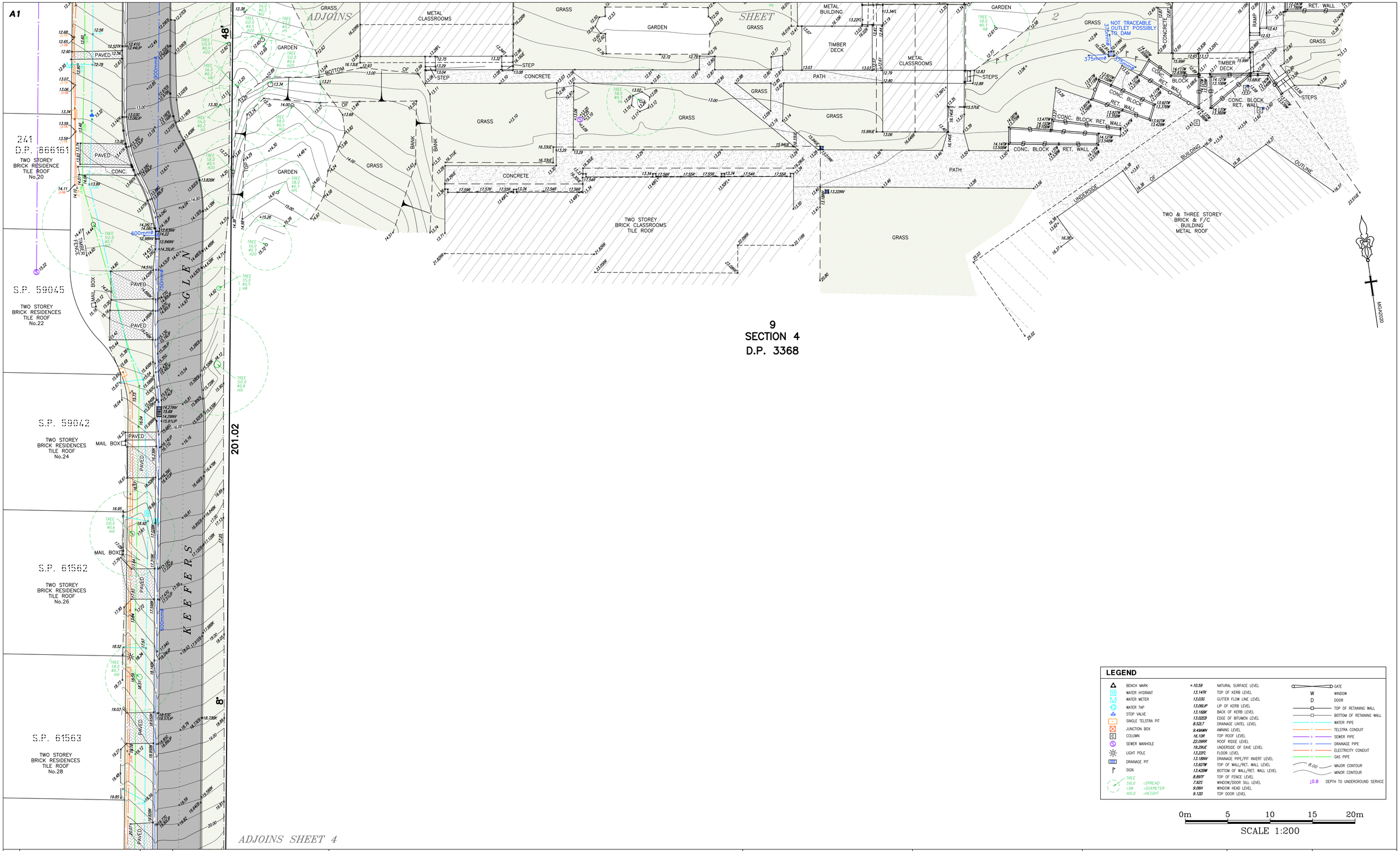

LEGEND

BENCH MARK	× 10.59	NATURAL SURFACE LEVEL		GATE
WATER HYDRANT	13.140K	TOP OF KERB LEVEL	W	WINDOW
WATER METER	13.03G	GUTTER FLOW LINE LEVEL	D	DOOR
WATER TAP	13.06LIP	LIP OF KERB LEVEL		TOP OF RETAINING WALL
STOP VALVE	13.169K	BACK OF KERB LEVEL		BOTTOM OF RETAINING WALL
SINGLE TELSTRA PIT	13.02EB	EDGE OF BITUMEN LEVEL	W	WATER PIPE
JUNCTION BOX	8.52LT	DRAINAGE LINTEL LEVEL	T	TELSTRA CONDUIT
COLUMN	9.49AWN	AWNING LEVEL	S	SEWER PIPE
SEWER MANHOLE	16.10R	TOP ROOF LEVEL	D	DRAINAGE PIPE
LIGHT POLE	22.09RR	ROOF RIDGE LEVEL	E	ELECTRICITY CONDUIT
DRAINAGE PIT	19.29UE	UNDERSIDE OF EAVE LEVEL	G	GAS PIPE
SIGN	13.22FL	FLOOR LEVEL	6.00	MAJOR CONTOUR
TREE SXD.D ØD.D HXD.D +SPREAD +DIAMETER +HEIGHT	13.18INV	DRAINAGE PIPE/PIT INVERT LEVEL		MINOR CONTOUR
	13.927TW	TOP OF WALL/RET. WALL LEVEL	↓0.8	DEPTH TO UNDERGROUND SERVICE
	13.42BW	BOTTOM OF WALL/RET. WALL LEVEL		
	8.69TF	TOP OF FENCE LEVEL		
	7.92S	WINDOW/DOOR SILL LEVEL		
	9.06H	WINDOW HEAD LEVEL		
	9.12D	TOP DOOR LEVEL		

0m 5 10 15 20m

SCALE 1:200

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SURVEY REFERENCE 36347		SCALE 1:200	DATE 09/09/2023
DRAWING NUMBER 36347A01.DWG			REV. B

A1

ADJOINS SHEET 3

MGA2020

S.P. 61563

TWO STOREY BRICK RESIDENCES TILE ROOF No.28

TWO STOREY BRICK RESIDENCE TILE ROOF No.30

246
D.P. 866161

9
SECTION 4
D.P. 3368

201.02

FENCE 48' PICKET

EDGING 8' METAL

FENCE

CONCRETE METAL

D. P. 8 6 3 0 3 5

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.1

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.2

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.3

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.4

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.5

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.6

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.7

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.8

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.9

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.10

SINGLE STOREY BRICK RESIDENCE TILE ROOF No.11

TWO STOREY BRICK RESIDENCE TILE ROOF No.12

TWO STOREY BRICK RESIDENCE TILE ROOF No.13

TWO STOREY BRICK RESIDENCE TILE ROOF No.14

TWO STOREY BRICK RESIDENCE TILE ROOF No.15

TWO STOREY BRICK RESIDENCE TILE ROOF No.16

TWO STOREY BRICK RESIDENCE TILE ROOF No.138

TWO STOREY BRICK RESIDENCE TILE ROOF No.4

518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 508 509 510

WAGNERS PLACE

DELORAINE

GLEN KEEFERS GLEN

600mmø 375mmø 450mmø 525mmø UNK.ø

0m 5 10 15 20m
SCALE 1:200

LEGEND

BENCH MARK	×10.59	NATURAL SURFACE LEVEL	GATE
WATER HYDRANT	13.141K	TOP OF KERB LEVEL	W WINDOW
WATER METER	13.03G	GUTTER FLOW LINE LEVEL	D DOOR
WATER TAP	13.06LIP	LIP OF KERB LEVEL	TOP OF RETAINING WALL
STOP VALVE	13.166K	BACK OF KERB LEVEL	BOTTOM OF RETAINING WALL
SINGLE TELSTRA PIT	13.02ED	EDGE OF BITUMEN LEVEL	WATER PIPE
JUNCTION BOX	8.52LT	DRAINAGE LINTEL LEVEL	TELSTRA CONDUIT
COLUMN	9.49AWN	AWNING LEVEL	SEWER PIPE
SEWER MANHOLE	16.10R	TOP ROOF LEVEL	DRAINAGE PIPE
LIGHT POLE	22.09RR	ROOF RIDGE LEVEL	ELECTRICITY CONDUIT
DRAINAGE PIT	19.29UE	UNDERSIDE OF EAVE LEVEL	GAS PIPE
SIGN	13.22FL	FLOOR LEVEL	8.00 MAJOR CONTOUR
TREE	13.18INV	DRAINAGE PIPE/PIT INVERT LEVEL	MINOR CONTOUR
S10.0 =SPREAD	13.187W	TOP OF WALL/RET. WALL LEVEL	↓0.8 DEPTH TO UNDERGROUND SERVICE
L0# =DIAMETER	13.428W	BOTTOM OF WALL/RET. WALL LEVEL	
H10.0 =HEIGHT	8.89TF	TOP OF FENCE LEVEL	
	7.925	WINDOW/DOOR SILL LEVEL	
	9.08H	WINDOW HEAD LEVEL	
	9.12D	TOP DOOR LEVEL	

REV.	AMENDMENTS	DATE
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CO-ORDINATE SYSTEM: MGA2020

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SURVEYED B.T./J.B.	DRAWN P.R.G.	CHECKED B.T./J.B.	APPROVED G.S./J.B.
SURVEY REFERENCE 36347		SCALE 1:200	DATE 09/09/2023
DRAWING NUMBER 36347A01.DWG			REV. B

APPENDIX 2

STORMWATER CONCEPT DRAWINGS

DOCUMENTATION OF STORMWATER DESIGN

NEW DEVELOPMENT
EILEEN O'CONNOR CATHOLIC SCHOOL

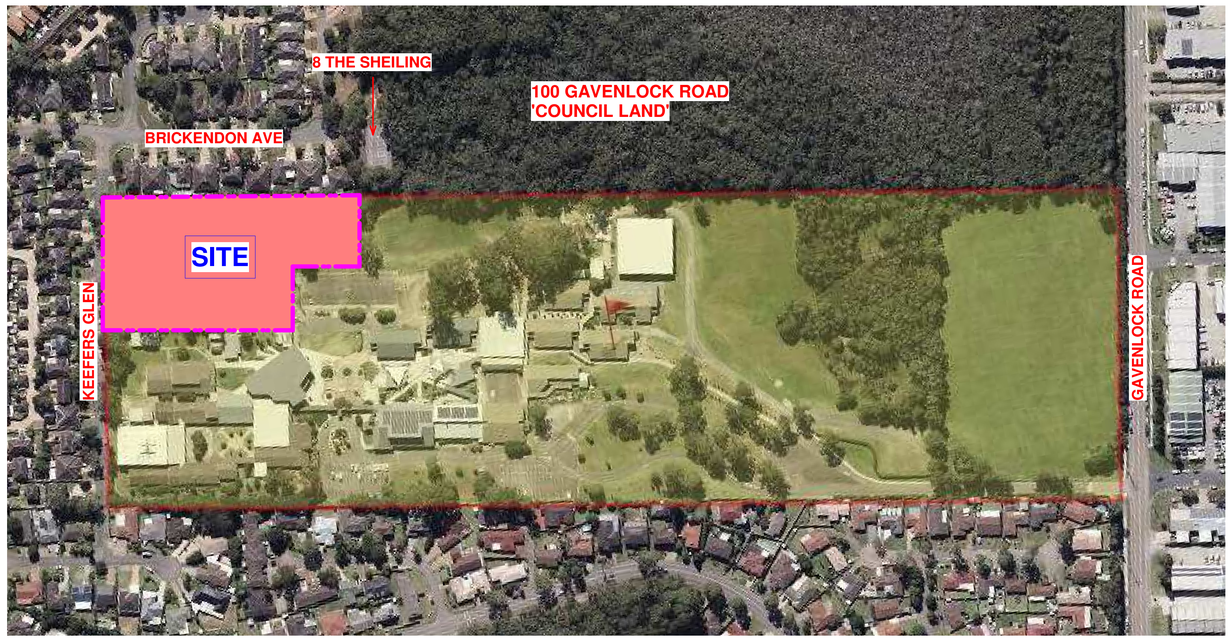
84 GAVENLOCK ROAD, MARDI, NSW

JAMES TAYLOR AND ASSOCIATES

SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2089 A.C.N. 002 376 454
Tel: (02) 9969 1999 Email: mail@jamestaylorassociates.com.au

STORMWATER DRAWING LIST

Sheet No.	Sheet Name
SW.1	STORMWATER DESIGN - COVER SHEET
SW.2	STORMWATER DESIGN - GENERAL NOTES
SW.3	STORMWATER CATCHMENT PLAN - EXISTING SITE
SW.4	STORMWATER CATCHMENT PLAN - PROPOSED SITE
SW.5	STORMWATER CATCHMENT BOUNDARIES - EXISTING SITE
SW.6	STORMWATER CATCHMENT BOUNDARIES - PROPOSED SITE
SW.7	STORMWATER UPSTREAM CATCHMENT BOUNDARIES
SW.9	EXISTING SERVICES PLAN - OVERVIEW
SW.20	STORMWATER CONCEPT PLAN
SW.21	STORMWATER CONCEPT PLAN - DISCHARGE VIA ST PETER'S CATHOLIC COLLEGE
SW.22	STORMWATER CONCEPT PLAN - DISCHARGE VIA KEEFERS GLEN FOR EILEEN O'CONNOR SITE
SW.23	STORMWATER CONCEPT PLAN - DISCHARGE VIA KEEFERS GLEN FOR ST PETER'S CATHOLIC COLLEGE
SW.24	STORMWATER CONCEPT PLAN - SHEET 1
SW.25	STORMWATER CONCEPT PLAN - SHEET 2
SW.26	STORMWATER CONCEPT PLAN - SHEET 3
SW.27	STORMWATER CONCEPT PLAN - SHEET 4
SW.28	STORMWATER CONCEPT PLAN - SHEET 5
SW.29	STORMWATER CONCEPT PLAN - SHEET 6
SW.30	STORMWATER TYPICAL DETAILS
SW.31	STORMWATER SECTIONS SHEET 1
SW.32	STORMWATER SECTIONS SHEET 2
SW.33	STORMWATER SECTIONS SHEET 3
SW.40	SILT & SEDIMENTATION PLAN
SW.45	VEHICLE SWEPT PATH



LOCALITY PLAN
SCALE 1 : 2000 @A1

REFERENCE DOCUMENTS

1. SURVEY DRAWING PREPARED BY:
   Degotardi Smith & Partners
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   SURVEY REFERENCE: 36347
   DRAWING NUMBER: 36347A01.DWG
   REV. B
   DATED: 09/09/2024
2. SURVEY DRAWING PREPARED BY:
   Degotardi Smith & Partners
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   SURVEY REFERENCE: 36347
   DRAWING NUMBER: 36347A02.DWG
   REV. E
   DATED: 12/06/2023
3. ARCHITECTURAL DRAWINGS PREPARED BY:
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   Project No. 2637.20
4. GEOTECHNICAL REPORT PREPARED BY:
   NEPEAN GEOTECHNICS
   PH: 0447 280 042
   Report No. R23169.Rev0
   DATED: 04/09/2023
5. STORMWATER ASSET PLANS PREPARED BY:
   CENTRAL COAST COUNCIL
   Job No. 36418098
   DATED: 06/05/2024
6. NSW DEPOSITED PLAN BY:
   OFFICE OF THE REGISTRAR-GENERAL
   REF: EC2251
   DOC: DP 0857182
   REV: 27-FEB-1996
7. CIVIL WORKS ROAD RESERVE BY:
   JAMES TAYLOR & ASSOCIATES
   PROJECT NO. 6588
   DRAWING NO. C.1-C.103

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BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	D
HL	JM	FOR REVIEW	19.12.2024	C
HL	JM	FOR REVIEW	29.11.2024	B
HL	JM	DRAFT FOR DISCUSSION	30.05.2024	A

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STORMWATER DESIGN - COVER SHEET

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DESIGN JM	DRAWN HL	PROJECT NO. 6588
CHKD.		
APPRD.		DRAWING NO. SW.1 / REV D
SCALE As indicated	DATE	

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GENERAL

G1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DOCUMENTS INCLUDING ALL WORKING DRAWINGS, MAIN CONTRACT, SPECIFICATIONS AND WRITTEN INSTRUCTIONS AS MAY BE ISSUED PRIOR TO OR DURING THE COURSE OF CONSTRUCTION. ALL DISCREPANCIES AND VARIATIONS SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2. ALL STORMWATER WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ALL RELEVANT AND CURRENT S.A.A. CODES.

G3. CIVIL DRAWINGS SHALL NOT BE SCALED IN ORDER TO OBTAIN DIMENSIONS. DIMENSIONS WHERE SHOWN ON CIVIL DRAWINGS SHALL BE CO-ORDINATED WITH ALL OTHER RELEVANT DRAWINGS.

EARTHWORKS

1. THE CONTRACTOR SHALL PROVIDE PROPER FENCING, GUARDING, LIGHTING AND OBSERVATION OF ALL EARTHWORKS, TEMPORARY ROADWAYS, FOOTWAYS, GUARDS AND FENCES AS MAY BE RENDERED NECESSARY FOR THE ACCOMMODATION AND PROTECTION OF PEDESTRIANS, VEHICLES, ANIMALS AND THE PUBLIC.
2. DURING THE EXECUTION OF WORKS, THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING SERVICES. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO THE EXISTING SERVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE RELEVANT SERVICE AUTHORITY, AT NO COST TO THE PRINCIPAL.
3. WHERE IT IS NECESSARY TO REMOVE, DIVERT OR CUT INTO ANY EXISTING SERVICE, THE CONTRACTOR SHALL GIVE AT LEAST THREE (3) DAYS NOTICE OF ITS REQUIREMENTS TO THE SUPERINTENDENT, WHO WILL ADVISE WHAT ARRANGEMENTS SHOULD BE MADE FOR THE ALTERATION OF SUCH EXISTING WORKS
4. THE EXCAVATION SHALL BE CARRIED OUT IN THE LOCATIONS SHOWN AND TO THE LEVELS, WIDTHS AND BATTER SLOPES INDICATED ON THE DRAWINGS.
5. EXCAVATED MATERIAL NOT MEETING THE SPECIFICATION FOR FILL MATERIAL SHALL BE DISPOSED OF OFF SITE IN AN APPROPRIATE MANNER.
6. WHERE EXCAVATION WORK IS REQUIRED IN THE VICINITY OF EXISTING SERVICES, THE CONTRACTOR SHALL SUPPORT ALL SERVICES DURING THE WORKS.
7. WHERE EXCAVATED MATERIAL IS TO BE USED FOR FILLING, THE MATERIAL SHALL BE INSPECTED AND APPROVED BY THE SUPERINTENDENT PRIOR TO USE.
8. UNLESS SPECIFIED OTHERWISE ALL FILL SHALL BE COMPACTED TO A STANDARD MAXIMUM DRY DENSITY RATIO BETWEEN 98% - 102% MAXIMUM AT -1% TO +3% OF STANDARD OPTIMUM MOISTURE CONTENT AS DETERMINED BY AS1289.5.4.1 (LATEST ADDITION)
9. ALL WASTE MATERIALS SHALL BE DISPOSED OFF-SITE IN AN APPROPRIATE MANNER.
10. WHERE ROCK IS EXPOSED DURING EXCAVATION, THE CONTRACTOR SHALL CEASE EXCAVATION AT THIS LOCALITY AND CONTACT THE SUPERINTENDENT WHO WILL THEN ADVISE ON THE LEVEL TO WHICH EXCAVATION IS TAKEN.
11. THE CONTRACTOR SHALL AT ITS OWN EXPENSE DO ALL THINGS NECESSARY TO DIVERT ANY WATER INTERFERING WITH THE PROGRESS OF WORKS, KEEP THE EXCAVATIONS AND TRENCHES FREE FROM WATER WHILE THE WORKS ARE IN PROGRESS AND PREVENT ANY DAMAGE TO THE WORKS BY WATER DUE TO FLOODS OR OTHER CAUSES. THE CONTRACTOR SHALL HAVE PUMPING EQUIPMENT FOR KEEPING THE EXCAVATION OR TRENCHES CONSTANTLY DEWATERED DURING THE TIMES THE WORKS ARE IN PROGRESS. ANY WORK OR MATERIAL DAMAGED BY WATER SHALL BE MADE GOOD BY THE CONTRACTOR.
12. WHERE DIRECTED BY THE SUPERINTENDENT THE BOTTOM OF TRENCHES OR EXCAVATIONS SHALL BE COMPACTED PRIOR TO THE PLACING OF ANY BEDDING OR CONCRETE MATERIALS.SHOULD, IN THE OPINION OF THE SUPERINTENDENT, THE FOUNDATION MATERIAL BE INCAPABLE OF EFFECTIVE COMPACTION, THE MATERIAL SHALL BE REMOVED AND REPLACED WITH APPROPRIATE MATERIAL.

GENERAL COMPACTION NOTES

1. FOUNDATION MATERIAL DEEMED BY THE SUPERINTENDENT AS UNSUITABLE TO BE REMOVED AS DIRECTED BY THE SUPERINTENDENT AND REPLACED WITH APPROVED MATERIAL SATISFYING THE REQUIREMENTS LISTED BELOW.
2. UNLESS OTHERWISE APPROVED OR SPECIFIED. ALL FILL MATERIAL SHALL BE FROM A SOURCE APPROVED BY THE SUPERINTENDENT AND SHALL COMPLY WITH THE FOLLOWING:
   A) FREE FROM ORGANIC AND PERISHABLE MATTER
   B) MAXIMUM PARTICLE SIZE 75MM
   C) PLASTICITY INDEX BETWEEN 2% AND 20%
   D) CBR > 10
3. SELECT FILL MATERIAL SHALL BE PLACED IN MAXIMUM 200MM LOOSE THICK LAYERS AND COMPACTED AT OPTIMUM MOISTURE CONTENT (+ OR - 2%) TO ACHIEVE A DRY DENSITY DETERMINED IN ACCORDANCE WITH AS1289E3.1 OF NOT LESS THAN THE FOLLOWING STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS1289E1.1:
4. LOCATION STANDARD DRY DENSITY
   -AREAS OF SERVICE TRENCHES 98%
   -EMBANKMENTS 100%
   -LANDSCAPED AREAS 90%
   -CONCRETE FOUNDATIONS 100%
5. THE CONTRACTOR SHALL PROGRAMME THE EARTHWORKS OPERATION SO THAT THE WORKING AREAS ARE ADEQUATELY DRAINED DURING THE PERIOD OF CONSTRUCTION. THE SURFACE SHALL BE GRADED AND SEALED OFF TO REMOVE DEPRESSIONS. ROLLER MARKS AND SIMILAR WHICH WOULD ALLOW WATER TO POND AND PENETRATE THE UNDERLYING MATERIAL. ANY DAMAGE RESULTING FROM THE CONTRACTOR NOT OBSERVING THESE REQUIREMENTS SHALL BE RECTIFIED BY THE CONTRACTOR AT HIS COST.
6. COMPACTION CONTROL TESTING SHALL BE CARRIED OUT BY AND AT THE COST OF THE CONTRACTOR TO CONFORM WITH LEVEL 1. AS DEFINED IN AS3798 (LATEST EDITION).

SOIL EROSION AND SEDIMENT CONTROL

1. THESE NOTES ARE TO BE READ IN CONJUNCTION WITH THE DRAWINGS.
2. THE CONTRACTOR SHALL CONSTRUCT OR INSTALL SOIL AND SEDIMENT CONTROL MEASURES TO THE SATISFACTION OF THE SUPERINTENDENT PRIOR TO ANY DISTURBANCES TO THE SITE. SOIL AND SEDIMENT CONTROL DEVICES SHALL BE AS SHOWN THE DRAWINGS. THE CONTRACTOR SHALL REGULARLY MAINTAIN ALL SEDIMENT AND EROSION CONTROL DEVICES AND REMOVE ACCUMULATED SEDIMENT FROM SUCH DEVICES BEFORE 50% CAPACITY IS USED. ALL THE ACCUMULATED SEDIMENT SHALL BE RE-SPREAD OR REMOVED IN ACCORDANCE WITH THE SUPERINTENDENTS INSTRUCTIONS. THE DEVICES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL SUCH TIME AS THE DISTURBED AREAS HAVE BEEN REHABILITATED TO A CONDITION SATISFACTORY TO THE SUPERINTENDENT.
3. THE CONTRACTOR SHALL MAINTAIN ALL REVEGETATED AREAS INCLUDING WATERING AND FERTILISING UNTIL SUCH TIME AS THE VEGETATION HAS STABILISED (MINIMUM TIME IS AT LEAST UNTIL THE END OF THE WORKS).
4. VEHICULAR ACCESS TO THE SITE SHALL BE CONTROLLED THROUGH THE ACCESS POINTS IDENTIFIED ON THE DRAWINGS. VEHICLES NOT REQUIRED IN THE PERFORMANCE OF THE WORKS SHALL BE PARKED OFF SITE AWAY FROM DISTURBED AREAS.
5. A VEHICLE WASHDOWN BAY FOR ALL SITES INCLUDING A 25mm DIAM. HOSE SHALL BE PROVIDED.
6. THE CONTRACTOR SHALL ENSURE TEMPORARY CONTROLS DO NOT DAMAGE EXISTING STRUCTURES.
7. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED PRIOR TO SITE DISTURBANCE.
8. ALL SEDIMENT CONTROL STRUCTURES TO BE INSPECTED FOLLOWING EACH RAINFALL EVENT FOR STRUCTURAL DAMAGE AND ALL TRAPPED SEDIMENT TO BE REMOVED TO A NOMINATED SITE.
9. THE CONTRACTOR SHALL INFORM ALL SUB-CONTRACTORS OF THEIR OBLIGATIONS UNDER THE EROSION AND SEDIMENT CONTROL PLAN
10. ALL FILLS ARE TO BE LEFT WITH A LIP AT THE TOP OF THE SLOPE AT THE END OF THE DAYS ACTIVITIES.
11. THE CONTRACTOR MUST ENSURE THE STABILITY AND INTEGRITY OF ALL WORKS AT THE END OF EACH DAYS WORK
12. NOMINATED UNDISTURBED AREAS SHALL BE BARRICADED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
13. PUBLIC ROADS ARE TO BE SWEPT FREE OF DEBRIS RESULTING FROM CONSTRUCTION ACTIVITIES. SWEEPING SHALL BE UNDERTAKEN AT A MINIMUM TWICE WEEKLY.
14. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LOCATED ON EXISTING ACCESS TRACKS OR ROADWAYS SO AS NOT TO ENCROACH ON TRAFFIC. ALL EROSION CONTROL MEASURES PLACED SHALL BE CLEARLY IDENTIFIABLE DURING BOTH DAY AND NIGHT. EROSION CONTROL MEASURES SHALL BE COORDINATED WITH THE CONTRACTORS TRAFFIC MANAGEMENT PLANS IN ORDER TO LIMIT 'CLUTTERING' OF THE EXISTING TRAFFICABLE AREAS.
15. ALL DISTURBED AREAS ARE TO BE HYDRO MULCHED ON COMPLETION OF THE ROAD CONSTRUCTION WORKS.
16. TURFED AREAS ADJACENT TO CONSTRUCTION AREA ARE TO BE MAINTAINED TO PROVIDE A VEGETATED BUFFER STRIP.
17. THE CONTRACTOR SHALL STRIP AND STOCKPILE TOPSOIL PRIOR TO EXCAVATION OR FILLING. TOPSOIL SHALL BE RESPREAD ON THE COMPLETION OF EARTHWORKS.
18. THE CONTRACTOR SHALL STABILISE ALL DISTURBED AREAS AND STOCKPILES WITHIN 14 DAYS.
19. THE CONTRACTOR SHALL TAKE CARE NOT TO DISTURB ANY PORTION OF THE SITE OTHER THAN IN THE IMMEDIATE AREA OF WORKS.

EXISTING SERVICES

1. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA. THE ACCURACY IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORK. ALL CLEARANCES AND APPROVALS SHALL ALSO BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY PRIOR TO THE COMMENCEMENT OF WORK.
2. ALL NEW AND EXHUMED SERVICES THAT CROSS EXISTING AND FUTURE ROADS/PAVEMENTS WITHIN THE SITE SHALL BE BACKFILLED WITH DGB20 MATERIAL TO SUBGRADE LEVEL AND COMPACTED TO 98% STANDARD DENSITY RATIO. SUBJECT TO PRIOR APPROVAL FROM RELEVANT AUTHORITY.
3. ON COMPLETION OF SERVICES INSTALLATION. ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS,CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.
4. CARE TO BE TAKEN WHEN EXCAVATING NEAR UTILITY SERVICES. NO MECHANICAL EXCAVATION TO BE UNDERTAKEN OVER UTILITIES SERVICES. LIAISE WITH RELEVANT AUTHORITY.
5. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY THE WORKS WITHIN THE CONTRACT AREA AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT. ALL TO REGULATORY AUTHORITY STANDARDS AND APPROVAL.
6. THE CONTRACTOR IS TO MAINTAIN EXISTING STORMWATER DRAINAGE FLOWS THROUGH THE SITE AT ALL TIMES. MAKE DUE ALLOWANCE FOR ALL SUCH FLOWS AT ALL TIMES.
7. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN THE SUPERINTENDENT'S APPROVAL OF THE PROGRAMME FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
8. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES AS REQUIRED TO MAINTAIN EXISTING SUPPLY TO ADJOINING PROPERTIES IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
9. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE OR DAMAGE TO THE ADJACENT RESIDENCES. CONTRACTOR TO GAIN APPROVAL OF THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
10. THE CONTRACTOR SHALL UNDERTAKE A DIAL BEFORE YOU DIG (DBYD 1100) SERVICES SEARCH IN ADDITION TO PHYSICAL FIELD LOCATION BEFORE THE COMMENCEMENT OF ANY WORKS.

SUBSOIL DRAINAGE

1. ALL STORMWATER WORKS ARE TO BE UNDERTAKEN GENERALLY IN ACCORDANCE WITH AS 3500 (LATEST EDITION) STORMWATER DRAINAGE.
2. ALL PIPEWORK SHALL BE BEDDED ON A CONTINUOUS UNDERLAY OF SAND, NOT LESS THAN 75mm THICK IN OTHER THAN ROCK AND 200mm THICK IN ROCK AFTER COMPACTION. THE SAND SHALL BE GRADED IN ACCORDANCE WITH AS3500 (LATEST EDITION) AND COMPACTED TO AT LEAST 90% OF THE MAXIMUM DRY DENSITY AND SHALL BE GRADED EVENLY TO THE REQUIRED GRADIENT OF THE PIPELINE.
3. IN WET OR UNSTABLE GROUND CONDITIONS WHERE THE TRENCH BOTTOM REQUIRES FURTHER STABILIZING, ADDITIONAL BEDDING OF 20mm AND/OR 30mm NOMINAL SIZE AGGREGATE (AS DIRECTED BY THE SUPERINTENDENT), SHALL BE PLACED BELOW THE STANDARD BEDDING TO A DEPTH DETERMINED BY THE SUPERINTENDENT. WHERE ORDERED BY THE SUPERINTENDENT AN APPROVED FILTER FABRIC SHALL BE USED IN CONJUNCTION WITH THE ADDITIONAL BEDDING.
4. THE BED MATERIAL SHALL BE COMPACTED FOR THE FULL WIDTH OF THE TRENCH BY A MINIMUM OF TWO PASSES OF A VIBRATING PLATE OR HAND TAMPING METHOD TO THE SATISFACTION OF THE SUPERINTENDENT.
5. CHASES SHALL BE FORMED WHERE NECESSARY TO PREVENT SOCKETS, FLANGES OR THE LIKE FROM BEARING ON THE TRENCH BOTTOM OR THE UNDERLAY.
6. THE CONTRACTOR SHALL ENSURE THAT ANY EXISTING STRUCTURES LOCATED ADJACENT TO EXCAVATED TRENCHES ARE SUPPORTED OR PROTECTED TO PREVENT DAMAGE TO OR MOVEMENT OF THESE STRUCTURES
7. THE CONTRACTOR MUST LEAVE ALL SUBSOIL DRAINAGE WORKS UNCOVERED UNTIL ANY TESTING DEEMED NECESSARY BY THE SUPERINTENDENT HAS BEEN PERFORMED.
8. PIPE LAYING SHALL BEGIN AT THE DOWNSTREAM END OF THE LINE.
9. JOINTS SHALL NOT BE MADE UNDERWATER. THE TRENCH SHALL BE DEWATERED TO FACILITATE JOINT MAKING AND INSPECTION. PRECAUTIONS SHALL BE TAKEN TO PREVENT EROSION OF JOINT MATERIAL BY MOVING CURRENTS OF WATER.
10. DRAINAGE LINES SHALL BE CONSTRUCTED TO THE TOLERANCES AS FOLLOWS:

PIPELINE GRADING	LINE TOLERANCE (mm)	LEVEL TOLERANCE (mm)
- LESS THAN 0.6%	50	10
- 0.6% TO 1%	50	20
- GREATER THAN 1%	50	40

NOT WITHSTANDING THE TOLERANCES ABOVE EACH SUBSOIL DRAIN SHALL HAVE A MINIMUM FALL (OF 0.5%) IN THE DIRECTION OF FLOW.
11. BACKFILL MATERIAL SHALL BE INSPECTED AND APPROVED BY THE SUPERINTENDENT PRIOR TO PLACING AND COMPACTION.
12. ALL BACKFILL FOR SUBSOIL DRAINAGE WORKS IS TO BE COMPACTED IN LAYERS NOT EXCEEDING 300mm LOOSE THICKNESS AND COMPACTED WITHOUT DAMAGING OR DISPLACING THE PIPEWORK.
13. BACKFILL FOR SUBSOIL PIPES SHALL BE COMPACTED TO AT LEAST 95% (98% UNDER ROADS) OF THE MAXIMUM DRY DENSITY AT -2% TO +2% OF OPTIMAL MOISTURE CONTENT AND GRADED IN ACCORDANCE WITH AS 3500.3 (LATEST EDITION).
14. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL CEMENT RENDERED WITH AN EPDXY GROUT TO ENSURE A SMOOTH FINISH.

QUALITY ASSURANCE

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN A QUALITY ASSURANCE SYSTEM MEETING THE REQUIREMENTS OF AS 9002 (LATEST EDITION). THE QUALITY SYSTEM SHALL BE SUCH THAT RECORDS ARE KEPT OF ALL ASPECTS AND STAGES OF THE WORK.
2. THE RECORDS FOR EACH CONSTRUCTION TASK SHALL BE STAGED AND ITEMISED TO THE SATISFACTION OF THE CONTRACTOR ADMINISTRATOR. THE PROFORMAS FOR RECORDS SHALL BE SUBMITTED TO THE CONTRACTOR ADMINISTRATOR FOR APPROVAL AND WORK SHALL NOT COMMENCE UNTIL SUCH APPROVAL HAS BEEN GIVEN.
3. DURING THE COURSE OF CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN ACCURATE AND UP TO DATE RECORDS AND SHALL MAKE SUCH RECORDS AVAILABLE TO THE CONTRACTOR ADMINISTRATOR IF REQUESTED. FAILURE TO MAINTAIN RECORDS AS SPECIFIED WILL RESULT IN THE CONTRACTOR RE- INSPECTING COMPLETED WORKS IF INSTRUCTED TO DO SO BY THE CONTRACTOR ADMINISTRATOR.
4. AT THE COMPLETION OF EACH STAGE OF THE WORKS THE CONTRACTOR SHALL CERTIFY THAT THOSE WORKS HAVE BEEN UNDERTAKEN AND COMPLETED IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATION AND INSTRUCTIONS ISSUED DURING THE COURSE OF THE CONTRACT.

STORMWATER NOTES

1. ALL STORMWATER WORKS ARE TO BE UNDERTAKEN GENERALLY IN ACCORDANCE WITH AS 3500 (LATEST EDITION) STORMWATER DRAINAGE.
2. UNLESS OTHERWISE APPROVED ALL DRAINAGE PIPES SHALL BE APPROVED SPIGOT AND SOCKET RCP PIPES WITH RUBBER RING JOINTS, CLASS '2'.
3. ALL PIPE JUNCTIONS UP TO AND INCLUDING 450DIA AND ALL TAPERS SHALL BE VIA PURPOSE MADE FITTINGS.
4. THE CONTRACTOR IS TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION TO DISSIMILAR PIPEWORK.
5. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED WITH A NON SHRINK EPDXY GROUT TO ENSURE A SMOOTH FINISH.
6. STEP IRONS AT SPACINGS OF 0.3M ARE TO BE PROVIDED IN DRAINAGE PITS MORE THAN 1.0M DEEP.
7. PROVIDE 3.0M LENGTH OF 100DIA SUBSOIL DRAINAGE PIPE WRAPPED IN FABRIC SOCK AT UPSTREAM END OF EACH PIT.
8. ALL CONCRETE USED IN DRAINAGE PITS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 32MPA.
9. THE EXCAVATED TRENCH WIDTH FOR PIPE LAYING MUST BE AT LEAST 300mm WIDER THAN THE OUTER DIAMETER OF THE PIPE. PIPES ARE TO BE LAID CENTRALLY WITHIN THE EXCAVATED TRENCH.
10. ALL PIPES ARE TO BE LAID ON A MINIMUM BEDDING OF 75mnn OF SAND GRADED IN ACCORDANCE WITH AS 3500.3 (LATEST EDITION). BEDDING SHALL BE COMPACTED TO AT LEAST 90% OF THE MAXIMUM DRY DENSITY.
11. BACKFILL FOR STORMWATER PITS AND PIPES SHALL BE COMPACTED TO AT LEAST 95% (98% UNDER ROADS) OF THE MAXIMUM DRY DENSITY AND GRADED IN ACCORDANCE WITH AS 3500.3 (LATEST EDITION).
12. BACKFILL MATERIAL SHALL BE INSPECTED AND APPROVED BY THE SUPERINTENDENT PRIOR TO PLACING AND COMPACTION.
13. UNLESS OTHERWISE SPECIFIED PIPE TRENCH TO BE TYPE H2.
14. THE CONTRACTOR SHALL ENSURE THAT ANY EXISTING STRUCTURES LOCATED ADJACENT TO EXCAVATED TRENCHES ARE SUPPORTED OR PROTECTED TO PREVENT DAMAGE TO OR MOVEMENT OF THESE STRUCTURES
15. UNLESS SPECIFIED ALL DRAINAGE GRATES TO BE CLASS C HEAVY DUTY GALVANISED MILD STEEL TO AS 3996 (LATEST EDITION).
16. CHASES SHALL BE FORMED WHERE NECESSARY TO PREVENT SOCKETS, FLANGES OR THE LIKE FROM BEARING ON THE TRENCH BOTTOM OR THE UNDERLAY.
17. MATERIAL SHALL BE PLACED IN THE PIPE SURROUND IN LAYERS NOT MORE THAN 200mnn LOOSE THICKNESS AND COMPACT WITHOUT DAMAGING OR DISPLACING THE PIPEWORK. CARE TO BE TAKEN IN VICINITY OF EXISTING SERVICES.
18. UPVC PIPES SHALL CONFORM IN ALL RESPECTS WITH THE REQUIREMENTS OF AS1254 (LATEST EDITION). THE CLASS OF PIPES SHALL BE UPVC "STORMWATER HD" DESIGNED FOR SOLVENT WELD SPIGOT AND SOCKET CONNECTION UNLESS NOTED OTHERWISE.
19. UPVC PIPES SHALL BE SUPPLIED WITH SUFFICIENT QUANTITIES OF SOLVENT FOR MAKING OF THE PIPE JOINTS.
20. UPVC PIPES SHALL BE TRANSPORTED, HANDLED AND STACKED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
21. UPVC PIPE LAYING SHALL BEGIN AT THE DOWNSTREAM END OF THE LINE WITH THE SOCKET END OF THE PIPE FACING UPSTREAM. WHEN THE PIPES ARE LAID, THE BARREL OF EACH PIPE SHALL BE IN CONTACT WITH THE BEDDING MATERIAL THROUGHOUT ITS FULL LENGTH.
22. THE UPVC PIPE ENDS SHALL BE THOROUGHLY CLEANED BEFORE THE JOINT IS MADE. JOINTING SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS DIRECTIONS USING JOINTING SOLVENT AND PRIMER.

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A

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STORMWATER DESIGN - GENERAL NOTES

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DESIGN JM	DRAWN HL	PROJECT NO. 6588
CHKD.		
APPRD.		DRAWING NO. SW.2 / REV C
SCALE 1 : 1	DATE	

LEGEND

- ROOF AREA
- PAVED/IMPERVIOUS AREA
- GRASSED/PERVIOUS AREA

REFER DRAWING SW.1 FOR REFERENCE DOCUMENTS.

EXISTING SITE CONDITIONS

TOTAL SITE AREA = 1.2838 ha

ROOF AREA = 0.0457 ha

PAVED/IMPERVIOUS AREA = 0.1573 ha

GRASSED/PERVIOUS AREA = 1.0808 ha

TOTAL IMPERVIOUS AREA = 0.2030 ha OR 16%

STORMWATER CATCHMENT PLAN - EXISTING SITE

SCALE1 : 250 @A1

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COLOUR REPRODUCTION WARNING: ELEMENTS OF THIS DRAWING ARE PRINTED IN COLOUR.

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A

A1

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STORMWATER CATCHMENT PLAN - EXISTING SITE

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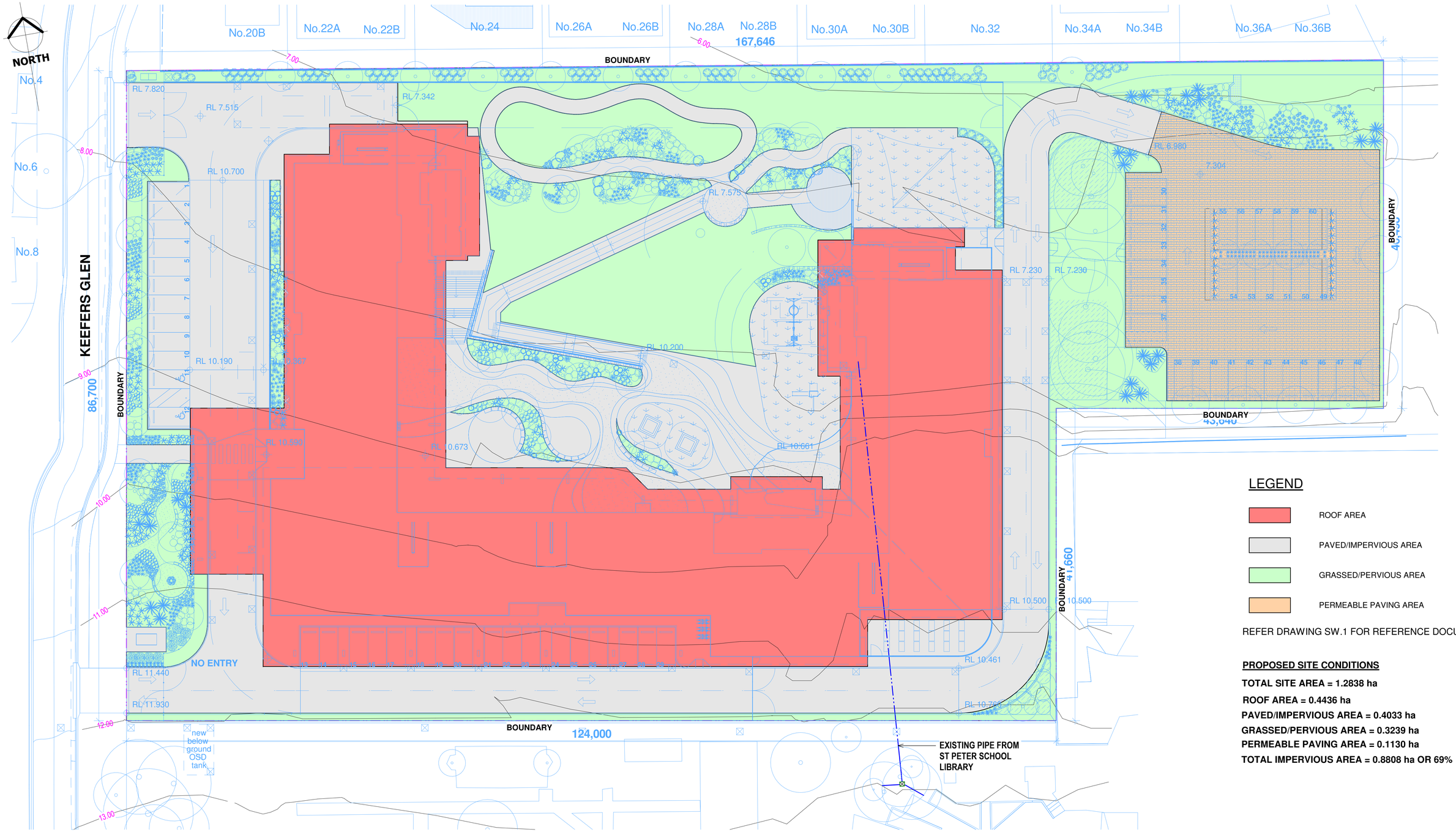
DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.3 / REV C
SCALE 1 : 250	DATE	



LEGEND

- ROOF AREA
- PAVED/IMPERVIOUS AREA
- GRASSED/PERVIOUS AREA
- PERMEABLE PAVING AREA

REFER DRAWING SW.1 FOR REFERENCE DOCUMENTS.

PROPOSED SITE CONDITIONS

TOTAL SITE AREA = 1.2838 ha

ROOF AREA = 0.4436 ha

PAVED/IMPERVIOUS AREA = 0.4033 ha

GRASSED/PERVIOUS AREA = 0.3239 ha

PERMEABLE PAVING AREA = 0.1130 ha

TOTAL IMPERVIOUS AREA = 0.8808 ha OR 69%

STORMWATER CATCHMENT PLAN - PROPOSED SITE

SCALE1 : 250 @A1

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BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A

A1

ARCHITECT
STANTON DAHL ARCHITECTS
PO BOX 833 EPPING NSW 1710
PHONE+61 2 8876 5300

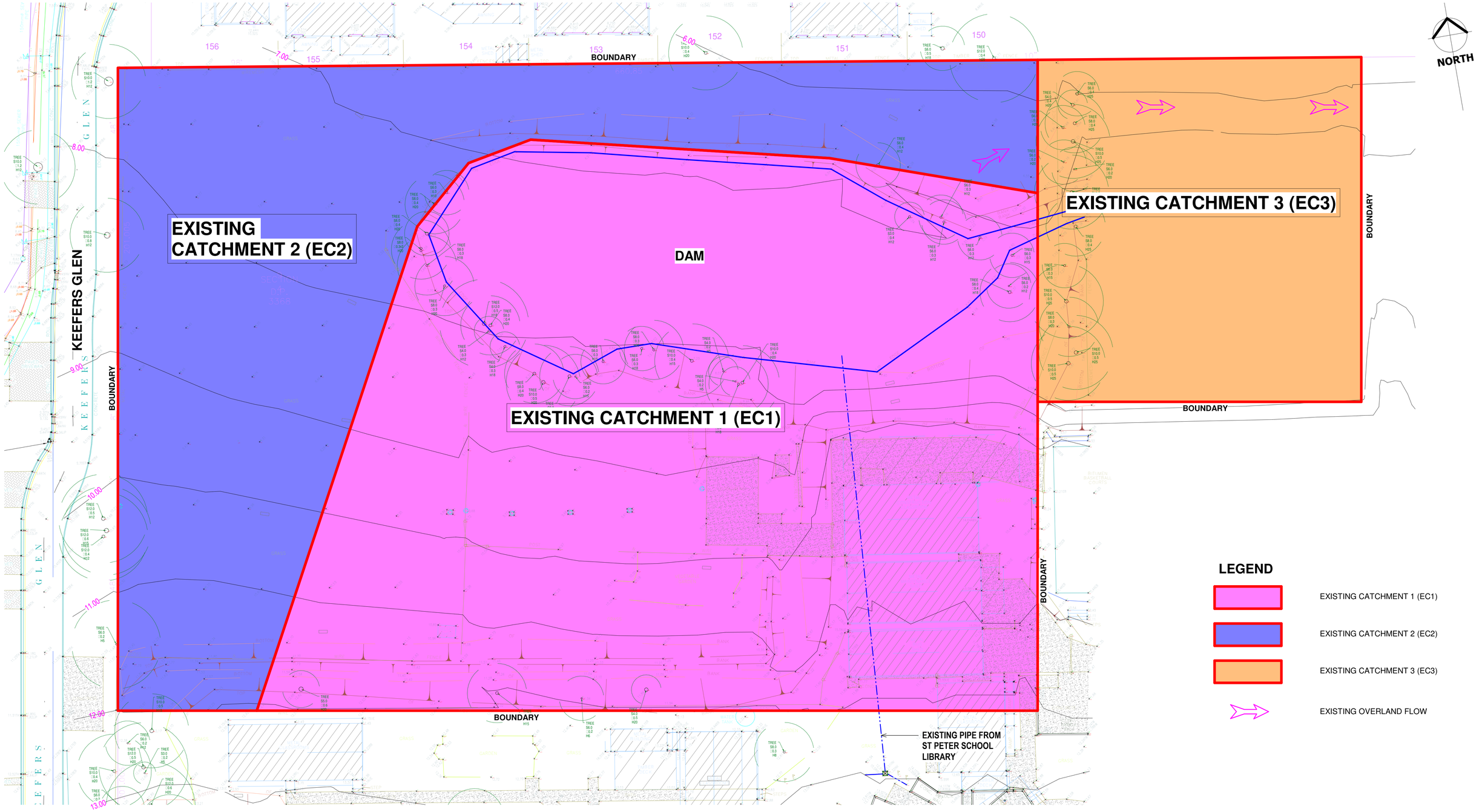
CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

STORMWATER CATCHMENT PLAN - PROPOSED SITE

James Taylor & Associates
Civil & Structural Consulting Engineers
SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2089
A.B.N. 33 102 603 558
TEL: 02 99691999 EMAIL: mail@jamestaylorassociates.com.au

DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.4 / REV C
SCALE 1 : 250	DATE	



STORMWATER CATCHMENT BOUNDARIES - EXISTING SITE

SCALE1 : 250 @A1

CATCHMENT SITE CONDITIONS

CATCHMENT	TOTAL AREA	IMPERVIOUS AREA	% IMPERVIOUS	PERVIOUS AREA	% PERVIOUS
EC1	0.6897 ha	0.0449 ha	7%	0.6448 ha	93%
EC2	0.3921 ha	0 m²	0%	0.3921 ha	100%
EC3	0.2020 ha	0.1581 ha	78%	0.0439 ha	22%
TOTAL	1.2838 ha	0.2030 ha	16%	1.0808 ha	84%

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STORMWATER CATCHMENT BOUNDARIES - EXISTING SITE

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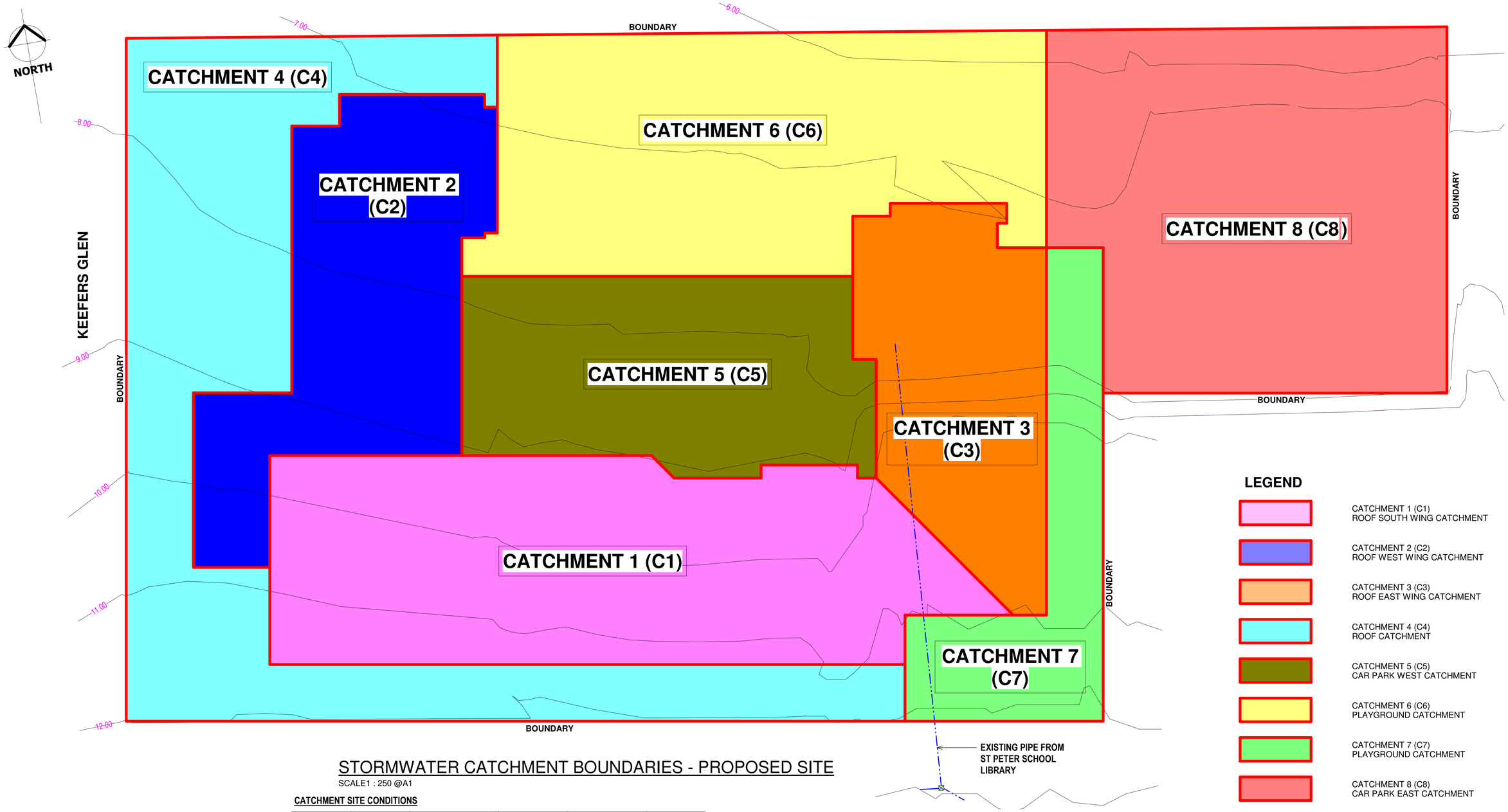
DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.5 / REV C
SCALE As indicated	DATE	



LEGEND

- CATCHMENT 1 (C1) ROOF SOUTH WING CATCHMENT
- CATCHMENT 2 (C2) ROOF WEST WING CATCHMENT
- CATCHMENT 3 (C3) ROOF EAST WING CATCHMENT
- CATCHMENT 4 (C4) ROOF CATCHMENT
- CATCHMENT 5 (C5) CAR PARK WEST CATCHMENT
- CATCHMENT 6 (C6) PLAYGROUND CATCHMENT
- CATCHMENT 7 (C7) PLAYGROUND CATCHMENT
- CATCHMENT 8 (C8) CAR PARK EAST CATCHMENT

STORMWATER CATCHMENT BOUNDARIES - PROPOSED SITE

SCALE1 : 250 @A1

CATCHMENT SITE CONDITIONS

CATCHMENT	TOTAL AREA	IMPERVIOUS AREA	% IMPERVIOUS	PERVIOUS AREA	% PERVIOUS
C1	0.2159 ha	0.2159 ha	100%	0 ha	0%
C2	0.1280 ha	0.1280 ha	100%	0 ha	0%
C3	0.0997 ha	0.0997 ha	100%	0 ha	0%
C4	0.2295 ha	0.1627 ha	71%	0.0668 ha	29%
C5	0.1222 ha	0.0917 ha	75%	0.0305 ha	25%
C6	0.1991 ha	0.0711 ha	36%	0.1280 ha	64%
C7	0.0674 ha	0.0559 ha	83%	0.0115 ha	17%
C8	0.2220 ha	0.0558 ha	25%	0.1662 ha	75%
TOTAL	1.2838 ha	0.8808 ha	69%	0.4030 ha	31%

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HL	JM	FOR REVIEW	29.11.2024	A

A1

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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CATCHMENT BOUNDARIES - PROPOSED SITE

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DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.6 / REV C
SCALE As indicated	DATE	

NORTH

BACKGOURND IMAGE SOURCED FROM
CENTRAL COAST COUNCIL 2024

STORMWATER UPSTREAM CATCHMENT BOUNDARIES

SCALE1 : 1500 @A1

LEGEND

- UPSTREAM CATCHMENT 1 (UC1)
- UPSTREAM CATCHMENT 2 (UC2)
- UPSTREAM CATCHMENT 3 (UC3)
- UPSTREAM CATCHMENT 4 (UC4)

UPSTREAM CATCHMENT SITE CONDITIONS

CATCHMENT	TOTAL AREA	IMPERVIOUS AREA	% IMPERVIOUS	PERVIOUS AREA	% PERVIOUS
UC1	0.3040 ha	0.2888 ha	95%	0.0152 ha	5%
UC2	2.5100 ha	0.3164 ha	13%	2.1936 ha	87%
UC3	0.6670 ha	0.1680 ha	25%	0.4990 ha	75%
UC4	6.2765 ha	0.7679 ha	12%	5.5086 ha	88%

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CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER UPSTREAM CATCHMENT BOUNDARIES

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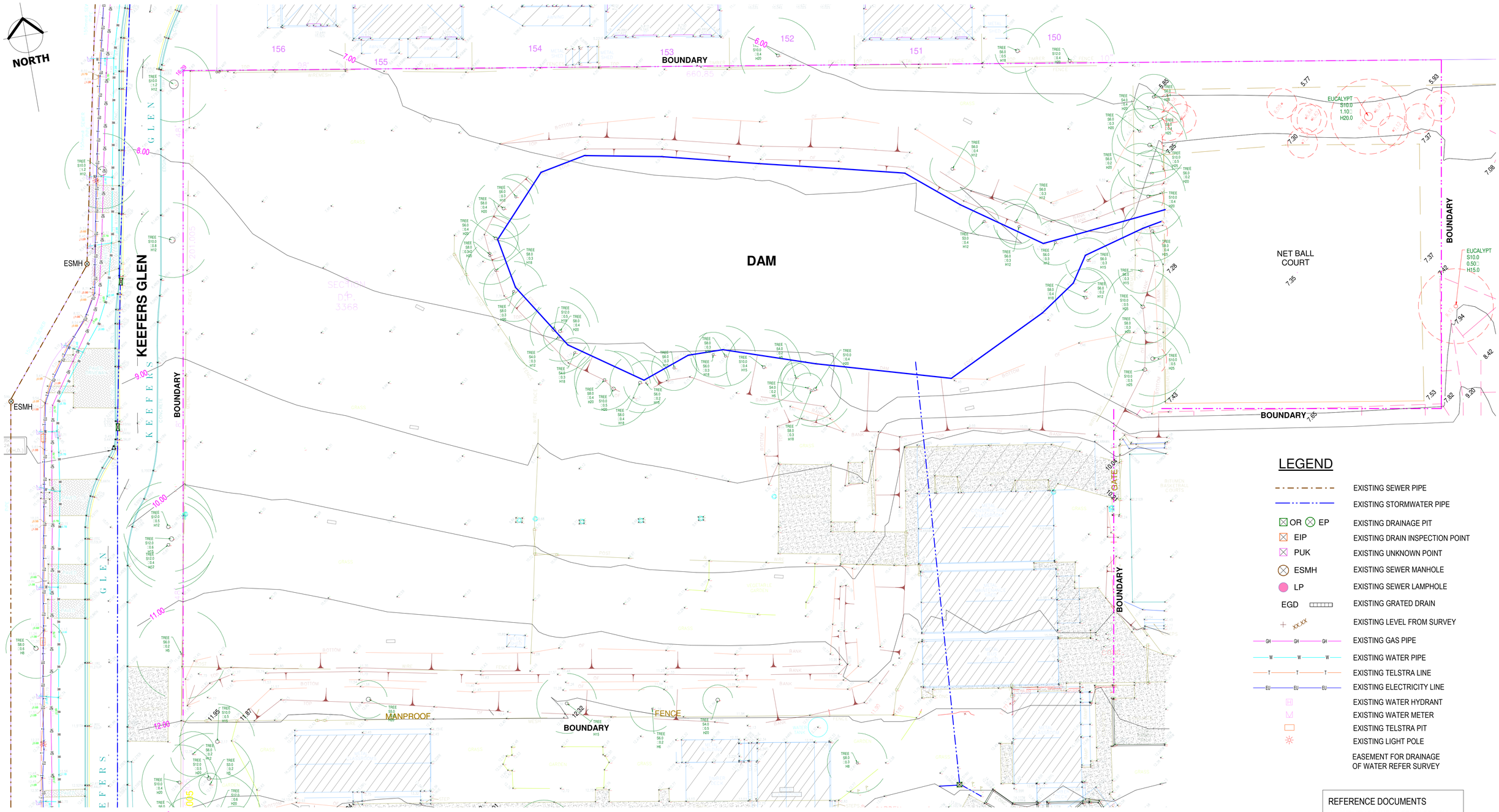
DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.7 / REV C
SCALE As indicated	DATE	

A1



LEGEND

- EXISTING SEWER PIPE
- EXISTING STORMWATER PIPE
- OR / EP — EXISTING DRAINAGE PIT
- EIP — EXISTING DRAIN INSPECTION POINT
- PUK — EXISTING UNKNOWN POINT
- ESMH — EXISTING SEWER MANHOLE
- LP — EXISTING SEWER LAMPHOLE
- EGD — EXISTING GRATED DRAIN
- XX.XX — EXISTING LEVEL FROM SURVEY
- GH — EXISTING GAS PIPE
- W — EXISTING WATER PIPE
- T — EXISTING TELSTRA LINE
- EU — EXISTING ELECTRICITY LINE
- EXISTING WATER HYDRANT
- EXISTING WATER METER
- EXISTING TELSTRA PIT
- EXISTING LIGHT POLE
- EASEMENT FOR DRAINAGE OF WATER REFER SURVEY

EXISTING SERVICES PLAN - OVERVIEW

SCALE1 : 250 @A1

REFERENCE DOCUMENTS

1. SURVEY DRAWING PREPARED BY:
   Degotardi Smith & Partners
   Ph. +61 2 9440 1100
   SURVEY REFERENCE: 36347
   DRAWING NUMBER: 36347A01.DWG
   REV. B
   DATED: 09/09/2024

2. SURVEY DRAWING PREPARED BY:
   Degotardi Smith & Partners
   Ph. +61 2 9440 1100
   SURVEY REFERENCE: 36347
   DRAWING NUMBER: 36347A02.DWG
   REV. E
   DATED: 12/06/2023

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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

EXISTING SERVICES PLAN - OVERVIEW

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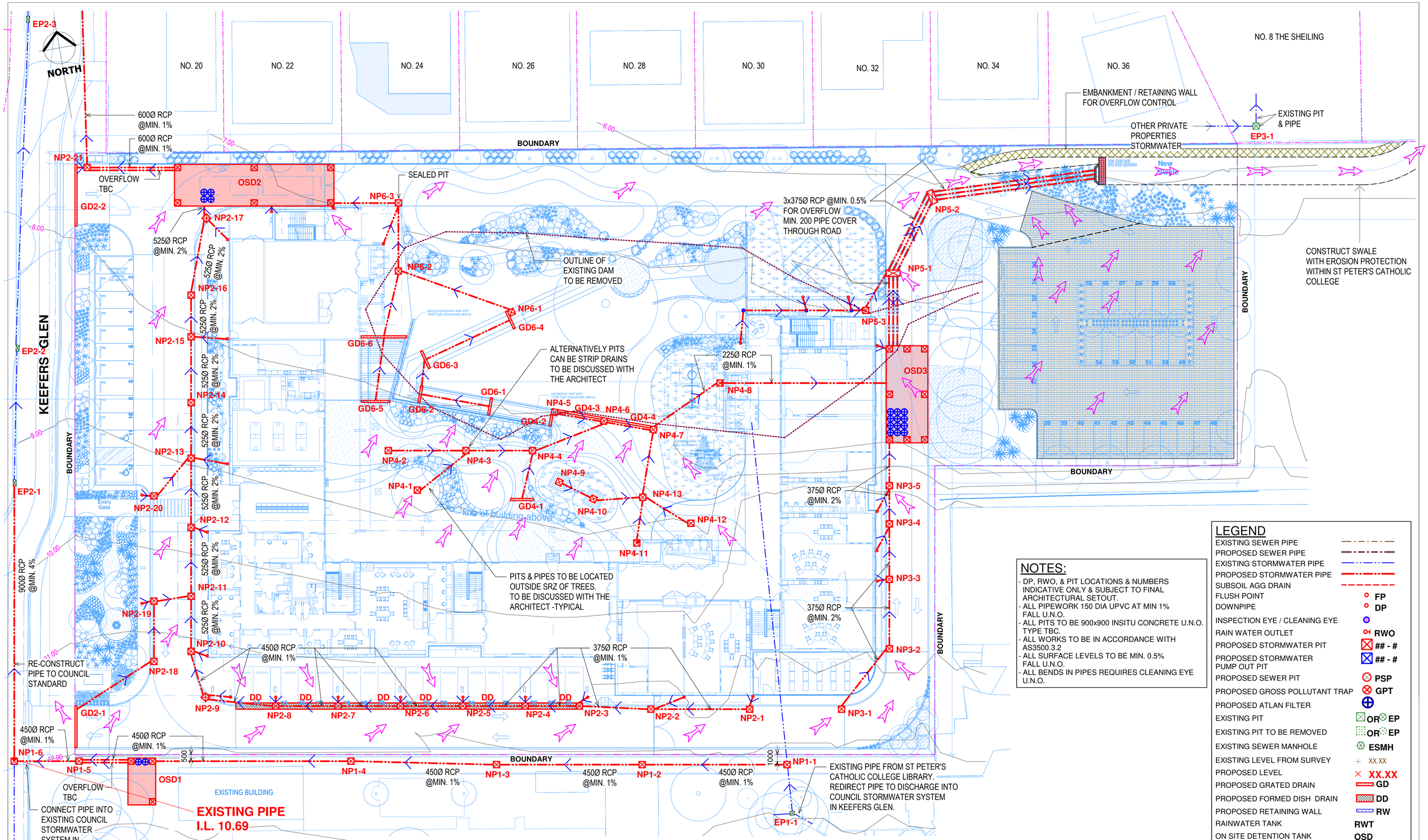
DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.9 / REV C
SCALE As indicated	DATE	

A1



STORMWATER CONCEPT PLAN

SCALE1 : 250 @A1

NOTES:

- DP, RWO, & PIT LOCATIONS & NUMBERS INDICATIVE ONLY & SUBJECT TO FINAL ARCHITECTURAL SETOUT.
- ALL PIPEWORK 150 DIA UPVC AT MIN 1% FALL U.N.O.
- ALL PITS TO BE 900x900 INSITU CONCRETE U.N.O. TYPE TBC.
- ALL WORKS TO BE IN ACCORDANCE WITH AS3500.3.2
- ALL SURFACE LEVELS TO BE MIN. 0.5% FALL U.N.O.
- ALL BENDS IN PIPES REQUIRES CLEANING EYE U.N.O.

LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

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CONTRACTOR TO LOCATE & VERIFY THE LOCATION, SIZE & DEPTH OF ALL EXISTING UTILITY SERVICES PRIOR TO CARRYING OUT THE WORKS. ADJUST / RELOCATE EXISTING UTILITY SERVICES IN ACCORDANCE WITH THE RELEVANT UTILITY AUTHORITY REQUIREMENTS.

HL	JM	FOR SSDA	13.03.2025	D
HL	JM	FOR REVIEW	19.12.2024	C
HL	JM	FOR REVIEW	29.11.2024	B
HL	JM	DRAFT FOR DISCUSSION	30.05.2024	A
BY	CHKD	DESCRIPTION	DATE	REV

A1

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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CONCEPT PLAN

James Taylor & Associates
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DESIGN JM	DRAWN HL	PROJECT NO.	6588
CHKD.			
APPRD.		DRAWING NO.	SW.20
SCALE 1 : 250	DATE	REV	D

NORTH

THE SHEILING

NO. 31

NO. 32

NO. 34

NO. 36

NO. 8 THE SHEILING

EXISTING OPEN CHANNEL
EASEMENT IN FAVOUR OF COUNCIL

EASEMENT REFER TO
REFERENCE DOCUMENT 6
DWG SW.1

100 GAVENLOCK ROAD
'COUNCIL WETLAND'

EP2-8

EP2-9

EP3-1

NEW LEVEL SPREADER
TO COUNCIL STANDARDS
HEADWALL DISCHARGE
TO LEVEL SPREADER

EMBANKMENT / RETAINING WALL
FOR OVERFLOW CONTROL

OPENING IN KERB & GUTTER
TO DIRECT OVERLAND FLOW
TO SWALE
MIN. 1500 WIDE

3x3750Ø RCP @MIN. 0.5%
FOR OVERFLOW
MIN. 200 PIPE COVER
THROUGH ROAD

NP5-1

NP5-2

NP5-3

OSD3

REMOVE TREES
AS REQUIRED
SUBJECT TO COUNCIL
APPROVAL

NEW SWALE WITH EROSION PROTECTION
& SEDIMENT CONTROL THROUGH ST PETER'S SCHOOL.
DISCHARGE REQUIRES EASEMENT FOR SITE
THROUGH ST PETER'S CATHOLIC COLLEGE.

APPROX EASEMENT
EXTENTS

6500

30000

7,304

BOUNDARY
40,490

ST PETER'S
CATHOLIC COLLEGE

LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

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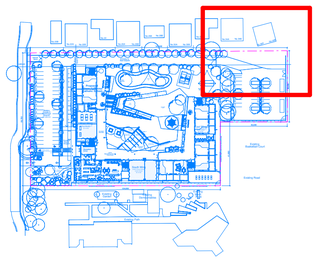

KEY PLAN
SCALE 1 : 2000 @A1

STORMWATER CONCEPT PLAN - DISCHARGE VIA ST PETER'S CATHOLIC COLLEGE

SCALE 1 : 200 @A1

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A1

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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CONCEPT PLAN - DISCHARGE VIA ST PETER'S CATHOLIC COLLEGE

James Taylor & Associates
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A.B.N. 33 102 603 558
TEL: 02 99691999 EMAIL: mail@jamestaylorassociates.com.au

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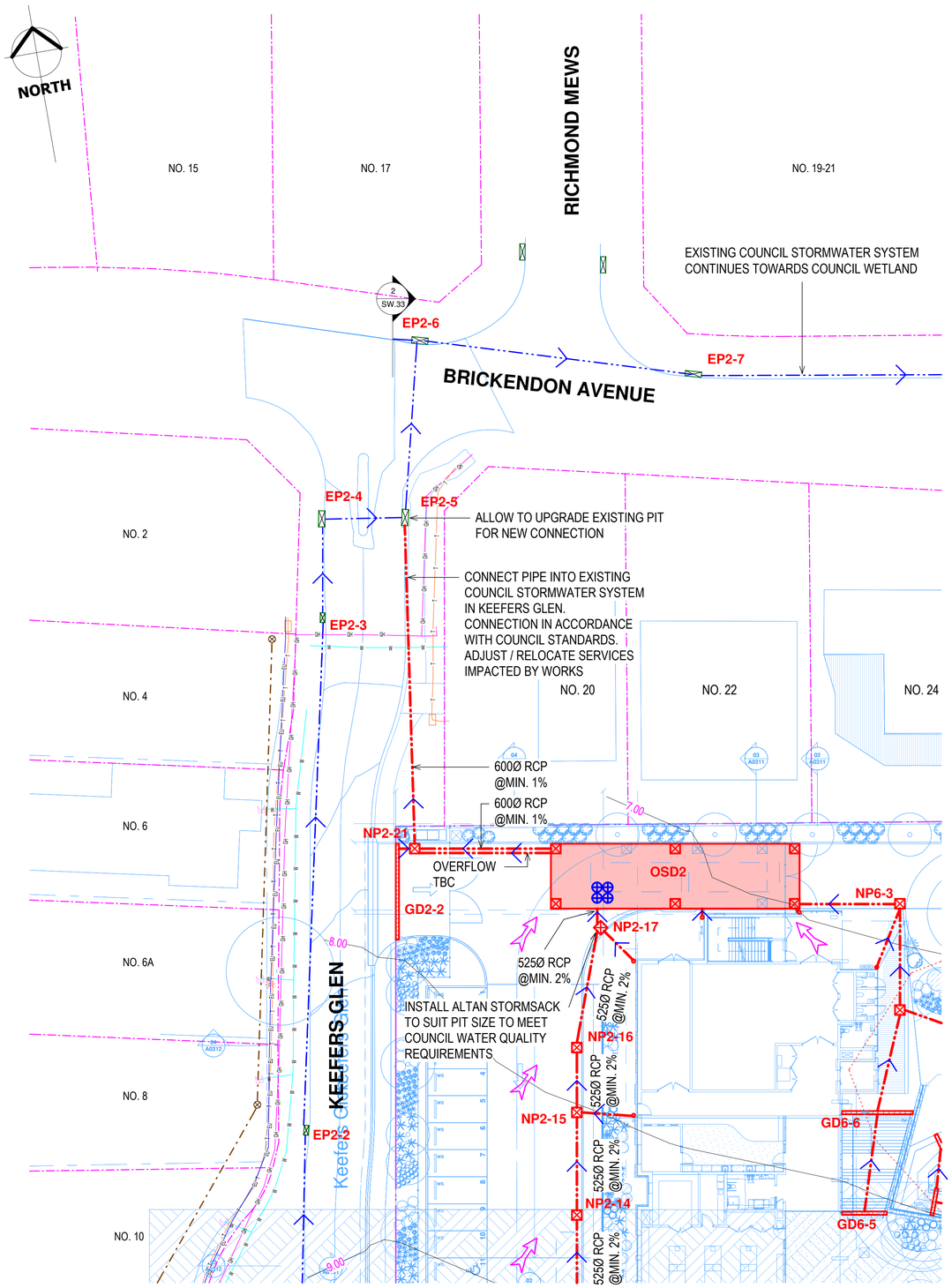
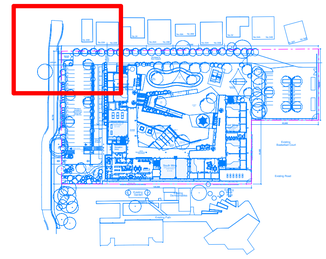
CHKD.	
APPRD.	
SCALE As indicated	DATE

PROJECT NO. 6588
DRAWING NO. SW.21
REV D



STORMWATER CONCEPT PLAN - DISCHARGE VIA KEEFERS GLEN FOR SITE

SCALE1 : 250 @A1



KEY PLAN

SCALE 1 : 2000 @A1

LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

EXISTING GAS PIPE	GH
EXISTING WATER PIPE	W
EXISTING TELSTRA LINE	T
EXISTING ELECTRICITY LINE	EU
EXISTING WATER HYDRANT	
EXISTING WATER METER	
EXISTING TELSTRA PIT	
EXISTING LIGHT POLE	
STOP VALVE	

NOTES:

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- ALL BENDS IN PIPES REQUIRES CLEANING EYE U.N.O.

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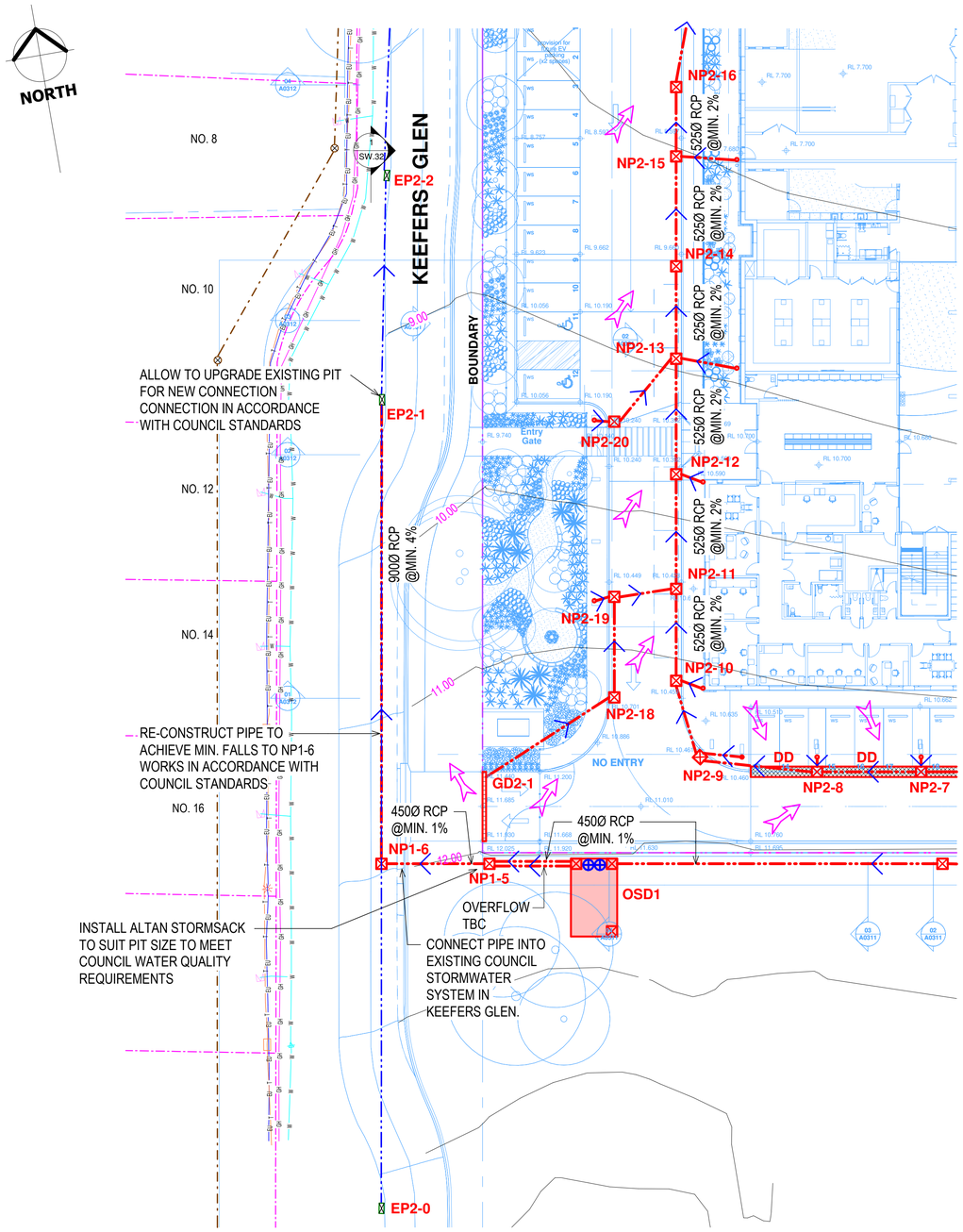
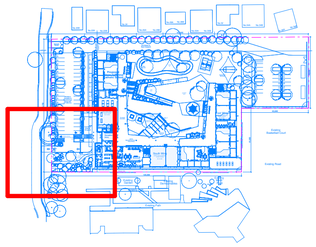
CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CONCEPT PLAN - DISCHARGE VIA KEEFERS GLEN FOR EILEEN O'CONNOR SITE

James Taylor & Associates
Civil & Structural Consulting Engineers
SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2089
A.B.N. 33 102 603 558
TEL: 02 99691999 EMAIL: mail@jamestaylorassociates.com.au

DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.22	D





KEY PLAN

SCALE 1 : 2000 @A1

LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

EXISTING GAS PIPE	GH
EXISTING WATER PIPE	W
EXISTING TELSTRA LINE	T
EXISTING ELECTRICITY LINE	EU
EXISTING WATER HYDRANT	
EXISTING WATER METER	
EXISTING TELSTRA PIT	
EXISTING LIGHT POLE	
STOP VALVE	

NOTES:

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- ALL WORKS TO BE IN ACCORDANCE WITH AS3500.3.2
- ALL SURFACE LEVELS TO BE MIN. 0.5% FALL U.N.O.
- ALL BENDS IN PIPES REQUIRES CLEANING EYE U.N.O.

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STORMWATER CONCEPT PLAN - DISCHARGE VIA KEEFERS GLEN FOR ST PETER'S CATHOLIC COLLEGE

SCALE1 : 250 @A1

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BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	D
HL	JM	FOR REVIEW	19.12.2024	C
HL	JM	FOR REVIEW	29.11.2024	B
HL	JM	DRAFT FOR DISCUSSION	30.05.2024	A

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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CONCEPT PLAN - DISCHARGE VIA KEEFERS GLEN FOR ST PETER'S CATHOLIC COLLEGE

James Taylor & Associates
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DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.23	D

A1

building setback

NORTH

INSTALL 4 x FULL HEIGHT ALTAN FILTERS TO MEET COUNCIL WATER QUALITY REQUIREMENTS

BOUNDARY

7.00

NP2-21

OVERFLOW PIPE TBC ALTERNATIVELY WEIR WITHIN OSD TANK

OSD2

BELOW GROUND OSD TANK TO MEET COUNCIL WATER QUANTITY REQUIREMENTS
MIN VOLUME 245m³
MIN DEPTH 1.8m
ORIFICE SIZE 200mm
DETAILS TBC

GD2-2

NP6-3

03
A0301

NP2-17

INSTALL ALTAN STORMSACK TO SUIT PIT SIZE TO MEET COUNCIL WATER QUALITY REQUIREMENTS

8.00

provision for future EV parking (x2 spaces)

ws 1 2 3 4 5 6 7 8 9 10 11 12

NP6-2

NP2-16

raking sandstone wall with 1500 high balustrade above

NP6-1

GD6-4

NP2-15

GD6-6

tgsi hr

GD6-3

NP2-14

GD6-5

GD6-2

GD6-1

BOUNDARY

9.00

02
A0301

NP2-13

NP4-2

NP4-3

NP4-4

LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

NOTES:

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STORMWATER CONCEPT PLAN - SHEET 1

SCALE 1 : 100 @A1 1:200 @A3

KEY PLAN

SCALE 1 : 2000 @A1

BEFORE YOU DIG www.byda.com.au

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A

A1

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CLIENT
Eileen O'Connor Catholic School
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PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CONCEPT PLAN - SHEET 1

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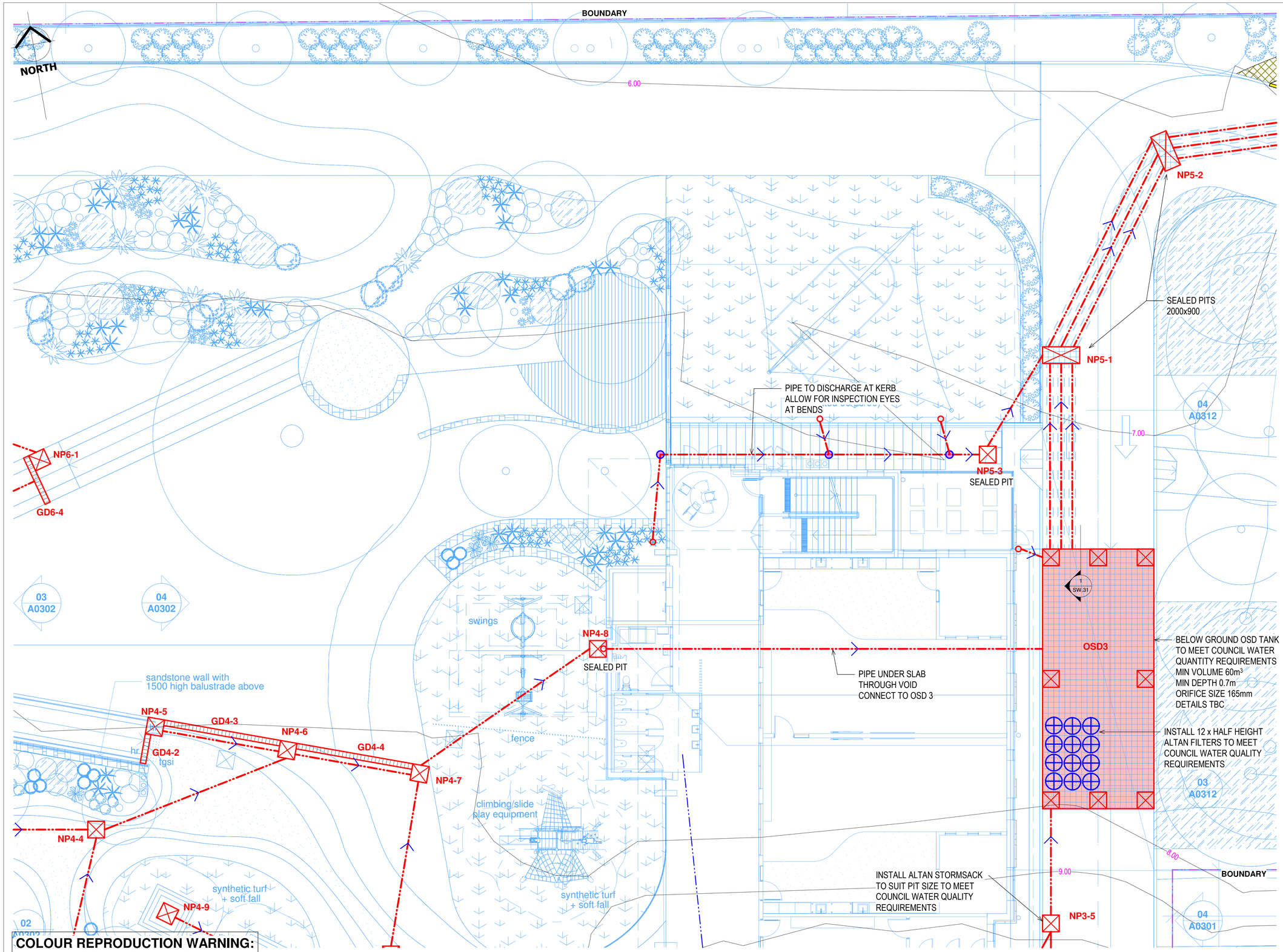
DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.24	C



LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

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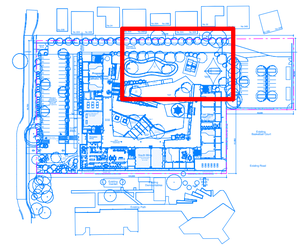

KEY PLAN

SCALE 1 : 2000 @A1

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STORMWATER CONCEPT PLAN - SHEET 2

SCALE 1 : 100 @A1 1:200 @A3

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HL	JM	FOR SSDA	13.03.2025	C
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HL	JM	FOR REVIEW	29.11.2024	A

A1

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CLIENT
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CATHOLIC SCHOOLS Broken Bay

PROJECT
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STORMWATER CONCEPT PLAN - SHEET 2

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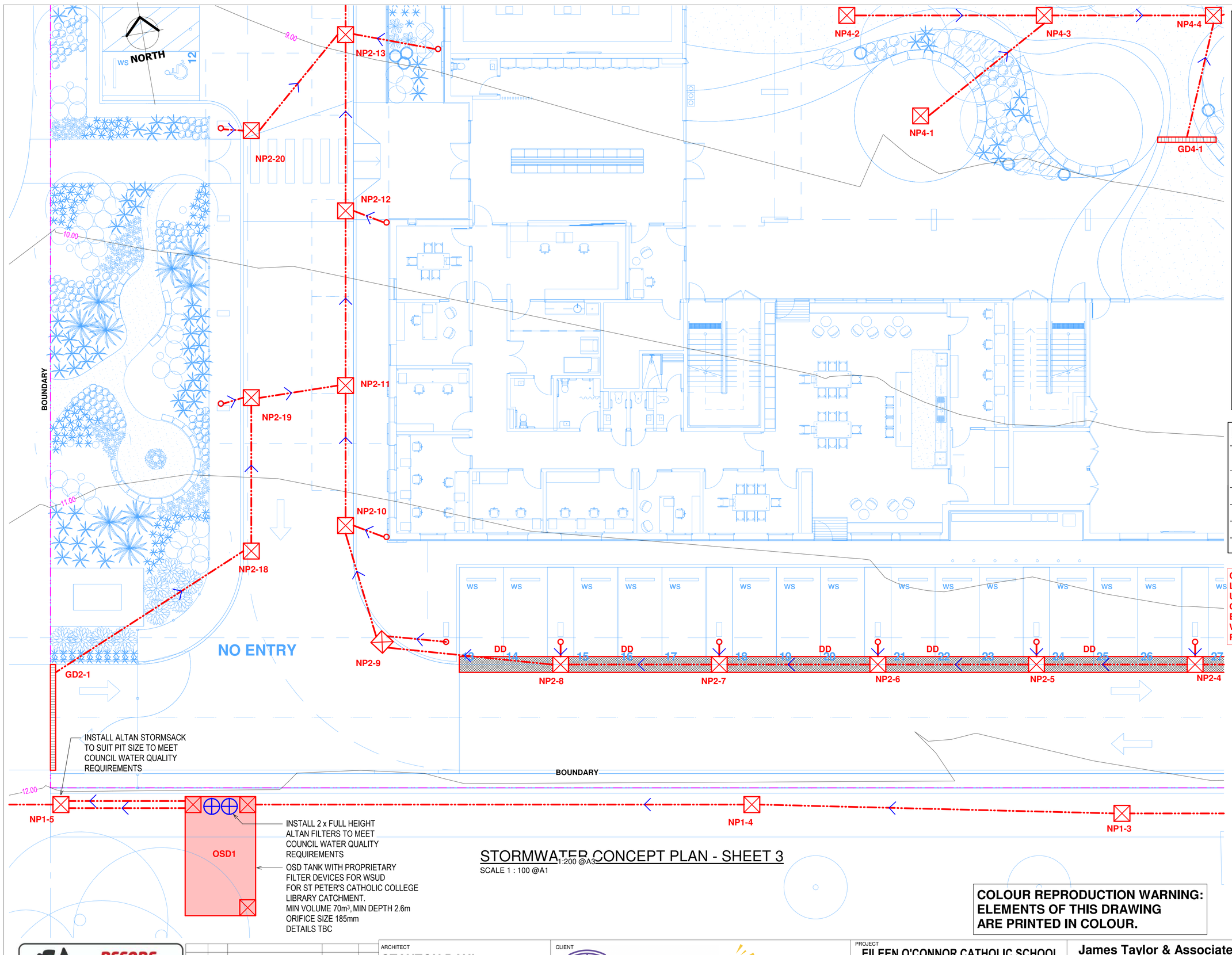
DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.25	C



LEGEND

- EXISTING SEWER PIPE
- PROPOSED SEWER PIPE
- EXISTING STORMWATER PIPE
- PROPOSED STORMWATER PIPE
- SUBSOIL AGG DRAIN
- FLUSH POINT — FP
- DOWNPIPE — DP
- INSPECTION EYE / CLEANING EYE
- RAIN WATER OUTLET — RWO
- PROPOSED STORMWATER PIT — ## - #
- PROPOSED STORMWATER PUMP OUT PIT — ## - #
- PROPOSED SEWER PIT — PSP
- PROPOSED GROSS POLLUTANT TRAP — GPT
- PROPOSED ATLAN FILTER
- EXISTING PIT — OR EP
- EXISTING PIT TO BE REMOVED — OR EP
- EXISTING SEWER MANHOLE — ESMH
- EXISTING LEVEL FROM SURVEY — XX.XX
- PROPOSED LEVEL — XX.XX
- PROPOSED GRATED DRAIN — GD
- PROPOSED FORMED DISH DRAIN — DD
- PROPOSED RETAINING WALL — RW
- RAINWATER TANK — RWT
- ON SITE DETENTION TANK — OSD
- OVERLAND FLOW
- NEW KERB + GUTTER — K&G
- NEW KERB ONLY — KO
- PERMEABLE PAVING

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STORMWATER CONCEPT PLAN - SHEET 3

SCALE 1 : 100 @A1

1:200 @A3

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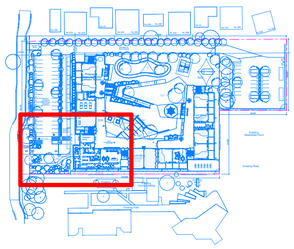

KEY PLAN

SCALE 1 : 2000 @A1

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HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A
BY	CHKD	DESCRIPTION	DATE	REV

A1

ARCHITECT
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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

STORMWATER CONCEPT PLAN - SHEET 3

James Taylor & Associates
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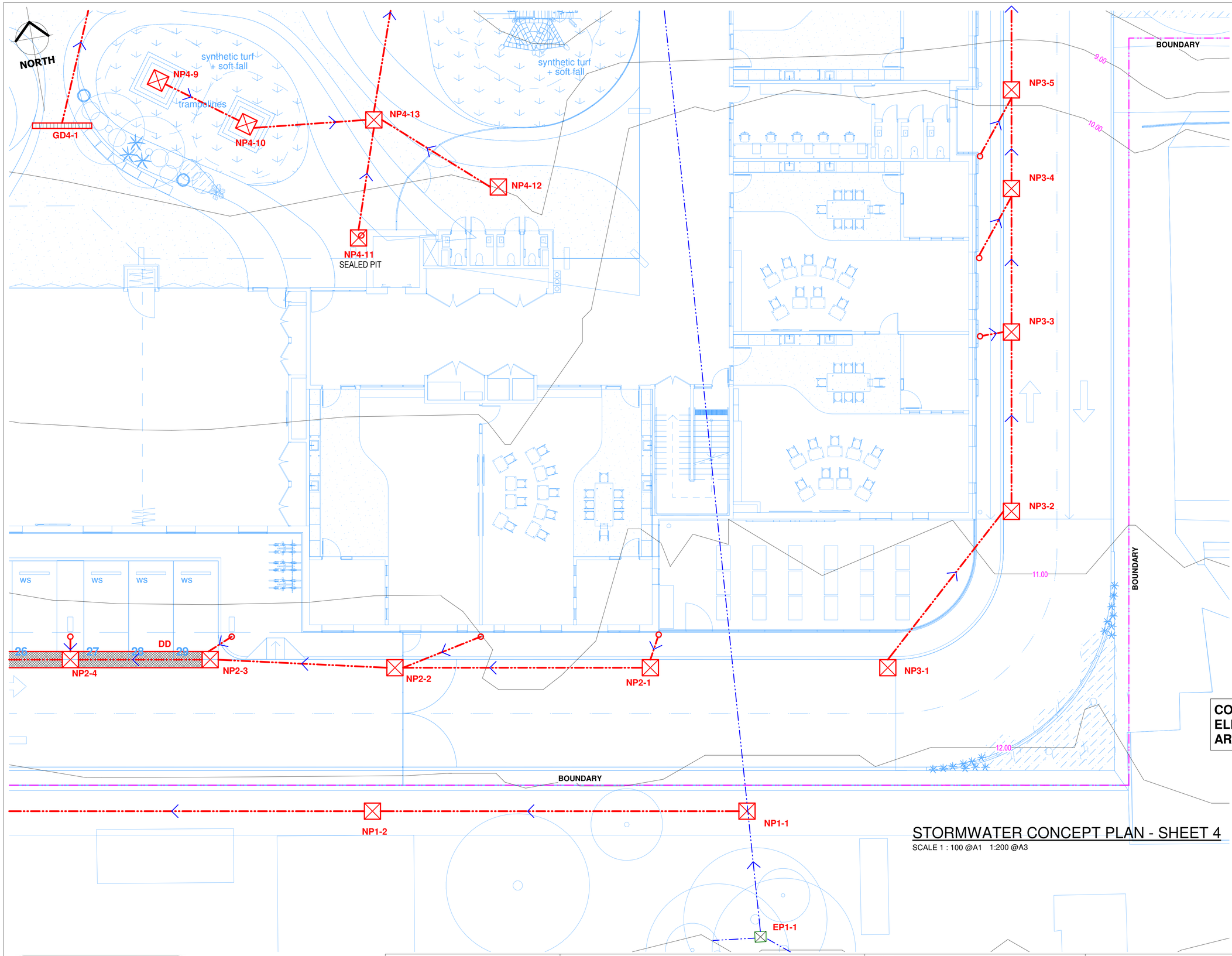
DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.26	C



LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

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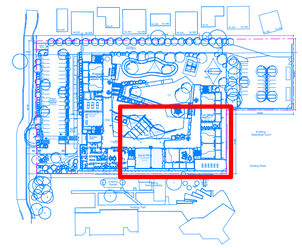
STORMWATER CONCEPT PLAN - SHEET 4

SCALE 1 : 100 @A1 1:200 @A3



KEY PLAN

SCALE 1 : 2000 @A1

BEFORE YOU DIG www.byda.com.au

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A

A1

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PROJECT
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STORMWATER CONCEPT PLAN - SHEET 4

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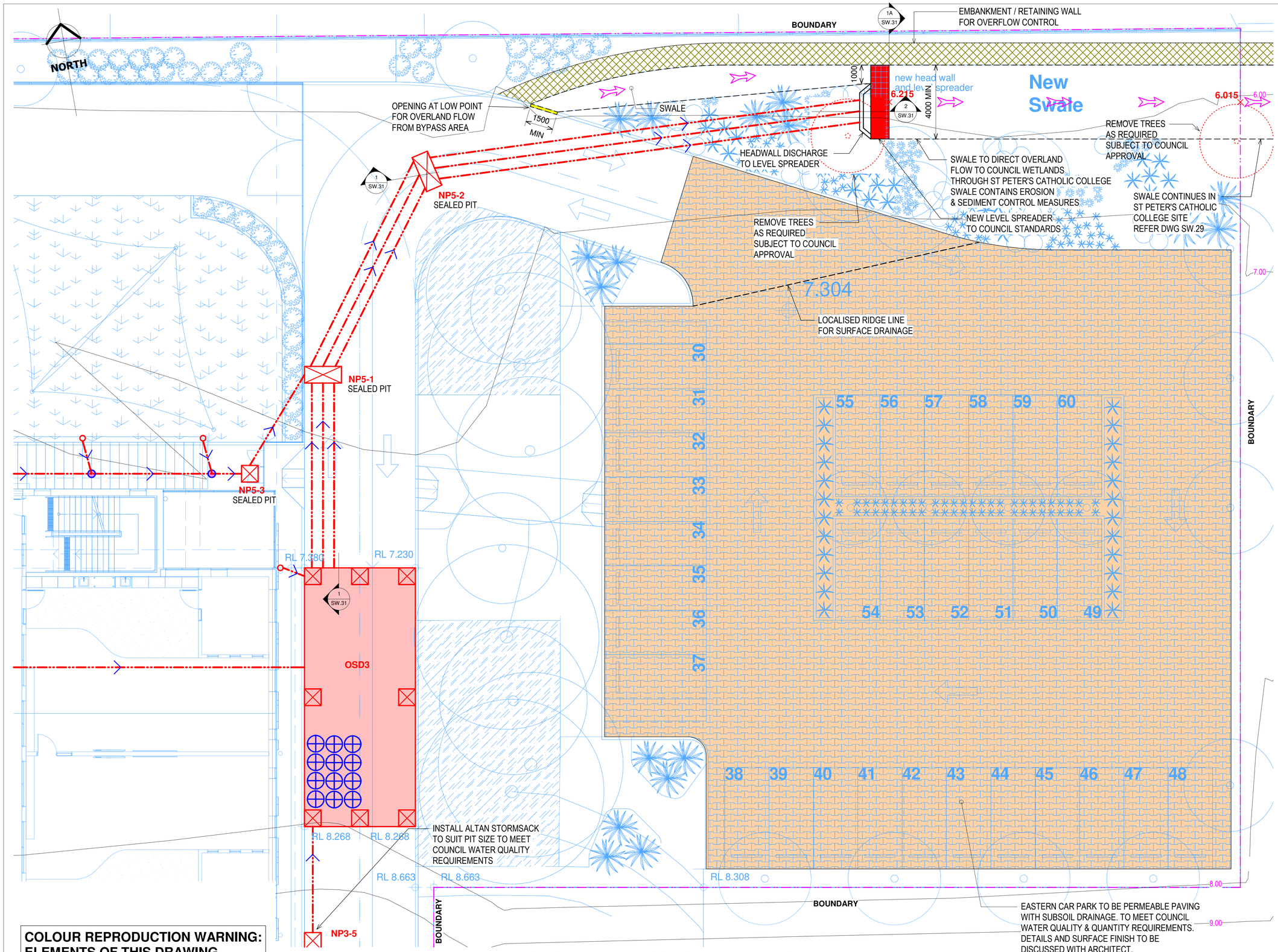
DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.27	C



LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
NEW KERB + GUTTER	K&G
NEW KERB ONLY	KO
PERMEABLE PAVING	

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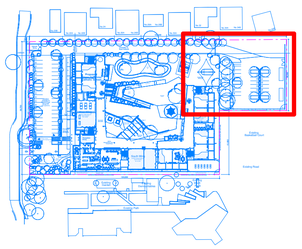

KEY PLAN

SCALE 1 : 2000 @A1

STORMWATER CONCEPT PLAN - SHEET 5

SCALE 1 : 100 @A1 1:200 @A3

BEFORE YOU DIG www.byda.com.au

HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A
BY	CHKD	DESCRIPTION	DATE	REV

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CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

STORMWATER CONCEPT PLAN - SHEET 5

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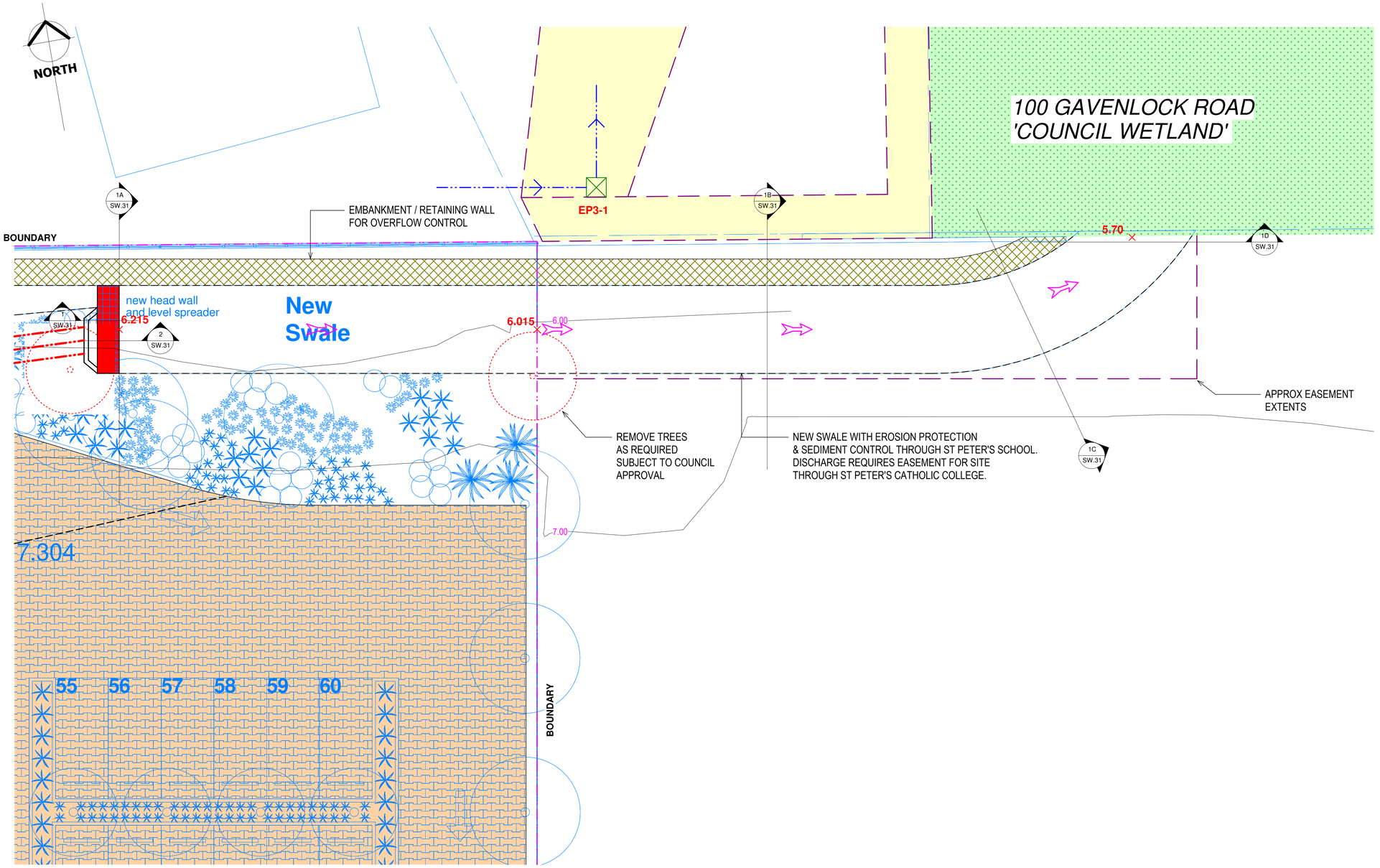
DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.28	C

A1



LEGEND

EXISTING SEWER PIPE	
PROPOSED SEWER PIPE	
EXISTING STORMWATER PIPE	
PROPOSED STORMWATER PIPE	
SUBSOIL AGG DRAIN	
FLUSH POINT	FP
DOWNPIPE	DP
INSPECTION EYE / CLEANING EYE	
RAIN WATER OUTLET	RWO
PROPOSED STORMWATER PIT	## - #
PROPOSED STORMWATER PUMP OUT PIT	## - #
PROPOSED SEWER PIT	PSP
PROPOSED GROSS POLLUTANT TRAP	GPT
PROPOSED ATLAN FILTER	
EXISTING PIT	OR EP
EXISTING PIT TO BE REMOVED	OR EP
EXISTING SEWER MANHOLE	ESMH
EXISTING LEVEL FROM SURVEY	XX.XX
PROPOSED LEVEL	XX.XX
PROPOSED GRATED DRAIN	GD
PROPOSED FORMED DISH DRAIN	DD
PROPOSED RETAINING WALL	RW
RAINWATER TANK	RWT
ON SITE DETENTION TANK	OSD
OVERLAND FLOW	
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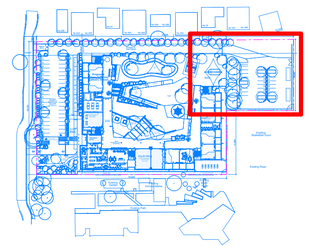
STORMWATER CONCEPT PLAN - SHEET 6

SCALE 1 : 100 @A1



KEY PLAN

SCALE 1 : 2000 @A1

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HL	JM	FOR REVIEW	29.11.2024	A

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CLIENT
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CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL
STORMWATER CONCEPT PLAN - SHEET 6

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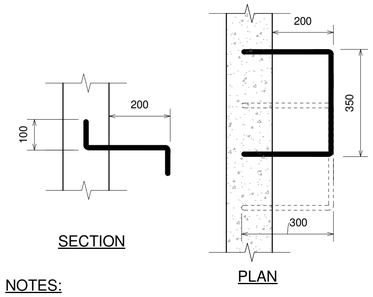
TEL: 02 99691999 EMAIL: mail@jamestaylorassociates.com.au

DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.29	C

A1



SECTION

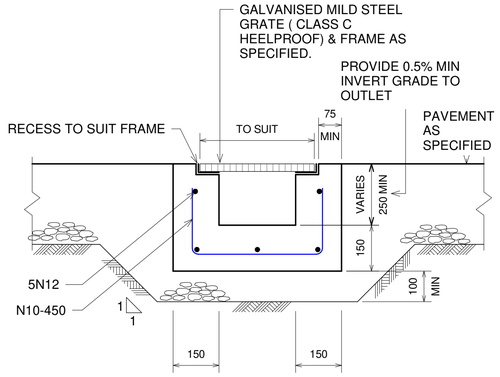
PLAN

NOTES:

1. WHEN POSITIONING IN STRAIGHT ALIGNMENT, STEP TO BE 400 WIDE.
2. STAGGERED STEPS TO BE 300 WIDE, STEPS TO BE STAGGERED 300 CENTRE TO CENTRE FOR ALTERNATE STEPS WITH MINIMUN 45 OVERLAP.
3. SPACING TO BE UNIFORM TO WITHIN +-8mm IN EACH PIT.
4. STEP IRONS TO BE H.D. GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH LOCAL GOVERNMENT'S CODES & REQUIREMENTS

STEP IRONS

NOT TO SCALE

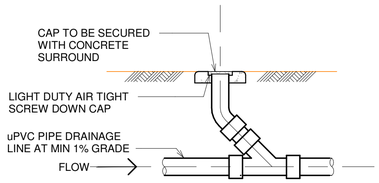


GRATED DRAIN PAVEMENT

SCALE 1:10

NOTES

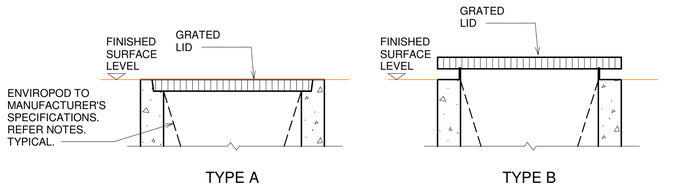
1. CONCRETE STRENGTH MINIMUM 25MPa AT 25 DAYS.
2. SIDE DIMENSIONS WILL VARY SUBJECT TO PIPE SIZE. SIDE DIMENSIONS ARE DETERMINED BY LARGEST OUTSIDE PIPE DIMENSIONS PLUS 200.
3. PIT DIMENSIONS ARE ALSO GOVERNED BY THE DEPTH OF THE PIT.
4. REINFORCEMENT IN WALLS/SLAB TO BE IN ACCORDANCE WITH LOCAL GOVERNMENT'S CODES & REQUIREMENTS
5. UNLESS NOTED OTHERWISE, PROVIDE ENVIROPODS TO ALL GRATED PITS.



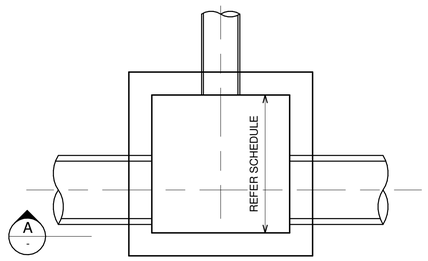
CLEANING EYE

NOT TO SCALE

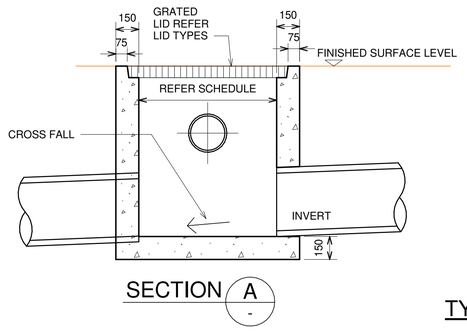
ALL STORMWATER DRAINAGE WORKS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH CENTRAL COAST COUNCIL CIVIL WORKS SPECIFICATIONS & STANDARD DRAWINGS AS REQUIRED

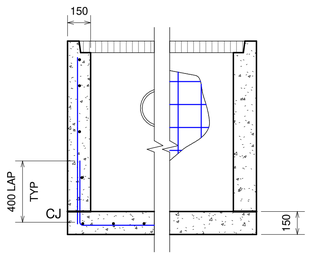


PIT LID TYPES



PLAN (LID REMOVED)





TYPICAL PIT REINFORCEMENT DETAIL

PIT SCHEDULE

PIT NO.	SIZE	GRATE CLASS	LID TYPE
EP1-1	EXISTING	EXISTING	EXISTING (A)
EP2-0	EXISTING	EXISTING	EXISTING (D)
EP2-1	EXISTING	EXISTING	EXISTING (D)
EP2-2	EXISTING	EXISTING	EXISTING (D)
EP2-3	EXISTING	EXISTING	EXISTING (D)
EP2-4	EXISTING	EXISTING	EXISTING (D)
EP2-5	EXISTING	EXISTING	EXISTING (D)
EP2-6	EXISTING	EXISTING	EXISTING (D)
EP2-7	EXISTING	EXISTING	EXISTING (D)
EP2-8	EXISTING	EXISTING	EXISTING (D)
EP2-9	EXISTING	EXISTING	EXISTING (D)
EP3-1	EXISTING	EXISTING	EXISTING (A)

GRATE DRAIN	GRATE CLASS	LID TYPE
GD2-1	C	A
GD2-2	C	A
GD4-1	A	A*
GD4-2	A	A*
GD4-3	A	A*
GD4-4	A	A*
GD6-1	A	A*
GD6-2	A	A*
GD6-3	A	A*
GD6-4	A	A*
GD6-5	A	A*
GD6-6	A	A*

PIT NO.	SIZE	GRATE CLASS	LID TYPE
NP1-1	900x900	A	A*
NP1-2	900x900	A	A*
NP1-3	900x900	A	A*
NP1-4	900x900	A	A*
NP1-5	900x900	A	A
NP1-6	900x900	C	A
NP2-1	900x900	C	V*
NP2-2	900x900	C	V*
NP2-3	900x900	C	V*
NP2-4	900x900	C	V*
NP2-5	900x900	C	V*
NP2-6	900x900	C	V*
NP2-7	900x900	C	V*
NP2-8	900x900	C	V*
NP2-9	900x900	C	D
NP2-10	900x900	C	D
NP2-11	900x900	C	D
NP2-12	900x900	C	D
NP2-13	900x900	C	D
NP2-14	900x900	C	D
NP2-15	900x900	C	D
NP2-16	900x900	C	D
NP2-17	900x900	C	D
NP2-18	900x900	C	D
NP2-19	900x900	C	D
NP2-20	900x900	C	D
NP2-21	900x900	C	C
NP3-1	900x900	C	D
NP3-2	900x900	C	D
NP3-3	900x900	C	D
NP3-4	900x900	C	D
NP3-5	900x900	C	D
NP4-1	900x900	A	A*
NP4-2	900x900	A	A*
NP4-3	900x900	A	A*
NP4-4	900x900	A	A*
NP4-5	900x900	A	A*
NP4-6	900x900	A	A*
NP4-7	900x900	A	A*
NP4-8	900x900	A	C
NP4-9	900x900	A	A
NP4-10	900x900	A	A
NP4-11	900x900	A	C
NP4-12	900x900	A	A*
NP4-13	900x900	A	A*
NP5-1	900x2000	C	C
NP5-2	900x2000	C	C
NP5-3	900x900	A	C
NP6-1	900x900	A	C
NP6-2	900x900	A	A*
NP6-3	900x900	C	C

NOTES

* HEEL SAFE GRATE TYPE REQUIRED FOR PEDESTRIAN SAFETY.

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A

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CLIENT
Eileen O'Connor Catholic School
CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

STORMWATER TYPICAL DETAILS

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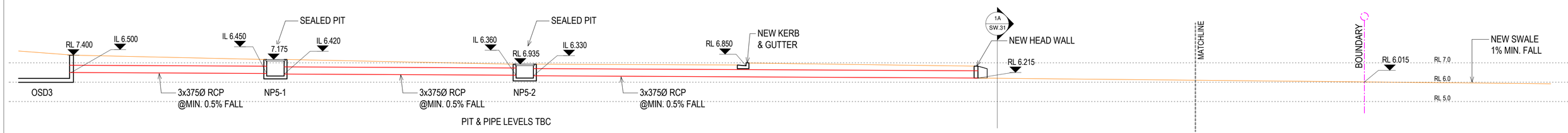
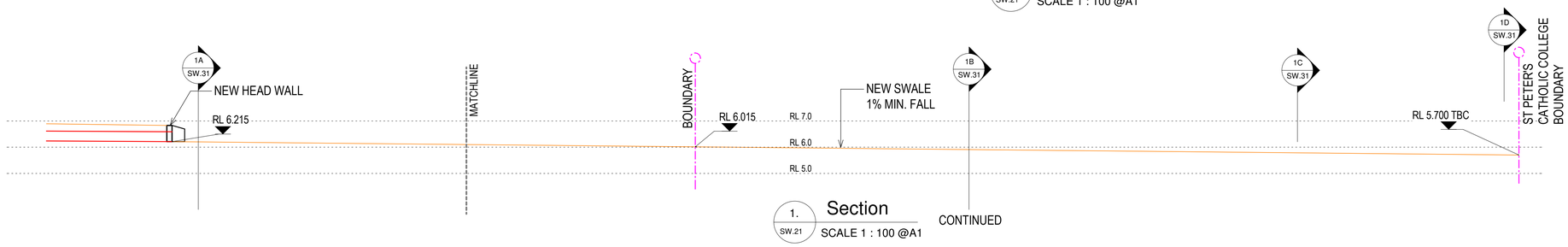
DESIGN JM	DRAWN HL	PROJECT NO. 6588
CHKD.		
APPRD.		DRAWING NO. SW.30 / REV C
SCALE As indicated	DATE	

A1

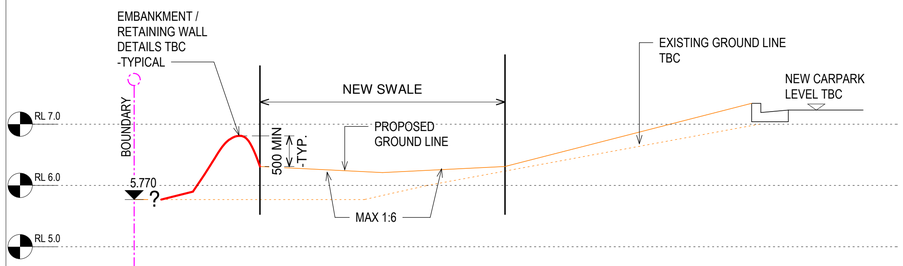


1 SW.21 **Section**
SCALE 1 : 100 @A1

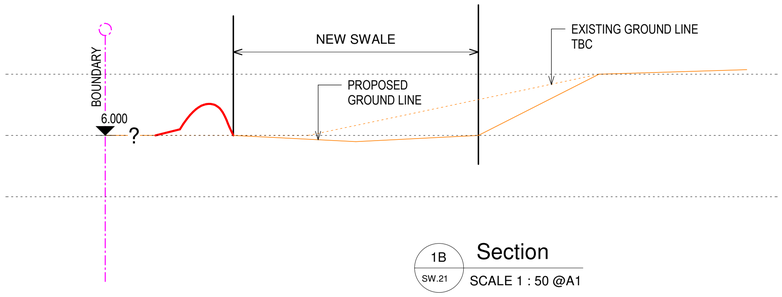


1. SW.21 **Section**
SCALE 1 : 100 @A1

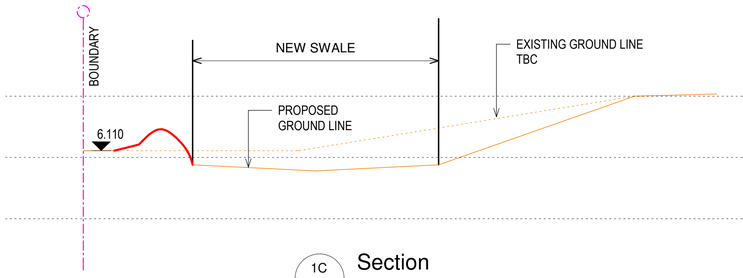
CONTINUED



1A SW.21 **Section**
SCALE 1 : 50 @A1



1B SW.21 **Section**
SCALE 1 : 50 @A1



1C SW.21 **Section**
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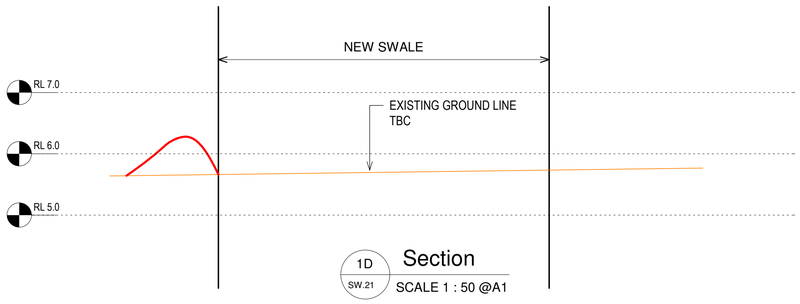
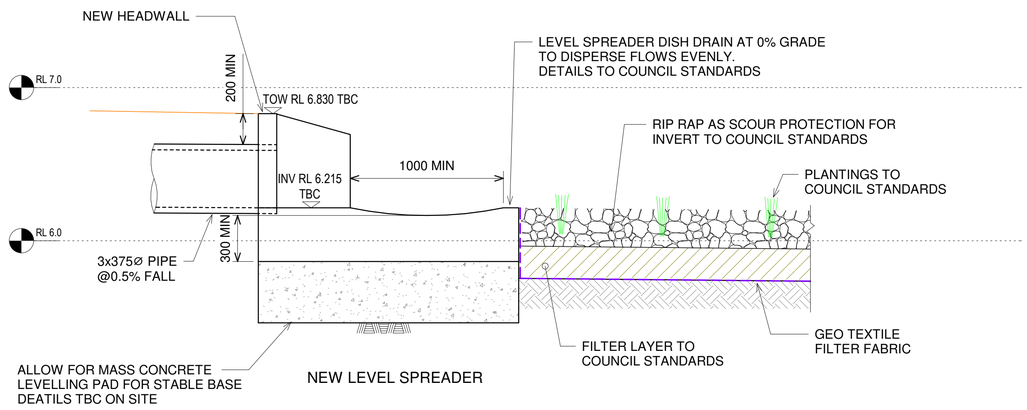


1D SW.21 **Section**
SCALE 1 : 50 @A1



2 SW.21 **Section**
SCALE 1 : 20 @A1

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
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CLIENT
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CATHOLIC SCHOOLS Broken Bay

PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

STORMWATER SECTIONS SHEET 1

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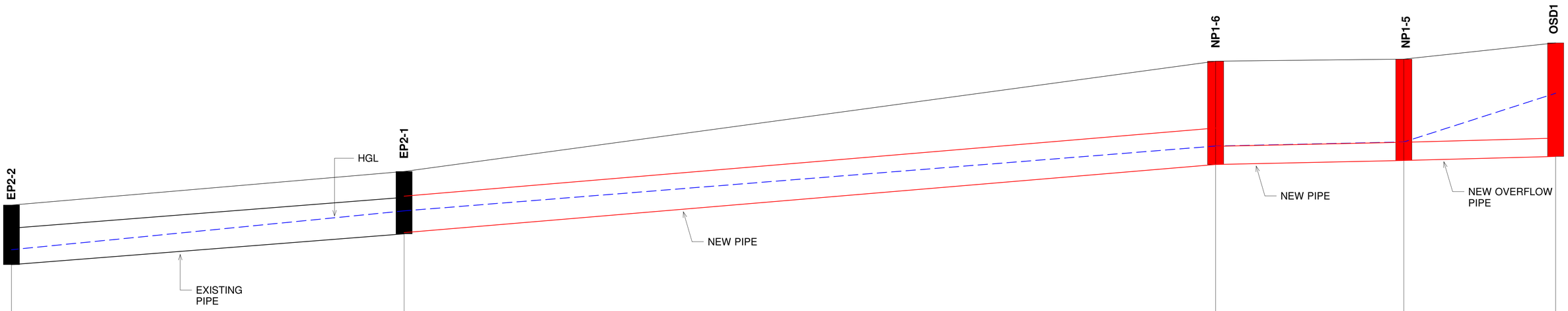
DESIGN JM	DRAWN HL	PROJECT NO. 6588	
CHKD.			
APPRD.		DRAWING NO. SW.31	REV C
SCALE As indicated	DATE		

A1



	CAPACITY = 3900 L/s DESIGN FLOW = 1047 L/s 1x900mm Ø	CAPACITY = 3890 L/s DESIGN FLOW = 1047 L/s 1x900mm Ø	CAPACITY = 300 L/s DESIGN FLOW = 115 L/s 1x450mm Ø	CAPACITY = 300 L/s DESIGN FLOW = 115 L/s 1x450mm Ø
	4.1%	4%	1%	1%
DATUM RL 0.0				
HGL	7.30 8.257	8.257 9.857	9.857 9.957	9.957 11.158
SURFACE LEVEL	8.40	9.23	11.95	12.00 12.40
INVERT LEVEL	6.93 7.69	7.72 9.40	9.40 9.50	9.50 9.60
CHAINAGE	0	19.40	59.50	68.80 76.30

1 / SW.23 LONGITUDINAL SECTION - EP2-2 TO OSD1

SCALE 1:100 @A1 HORIZONTAL
SCALE 1:50 @A1 VERTICAL

RESULTS FROM DRAINS MODEL FOR POST DEVELOPMENT CATCHMENTS
RESULTS FOR CRITICAL 1% AEP STORM EVENT

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	B
HL	JM	FOR REVIEW	19.12.2024	A

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PROJECT
EILEEN O'CONNOR CATHOLIC SCHOOL

STORMWATER SECTIONS SHEET 2

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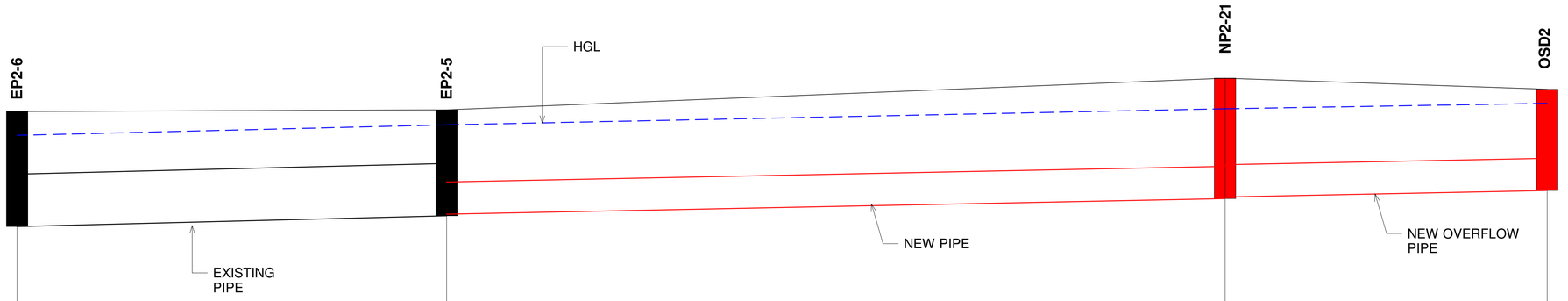
DESIGN JM | DRAWN HL | CHKD. | APPRD. | SCALE 1 : 100 | DATE

PROJECT NO. 6588
DRAWING NO. SW.32
REV B

A1



CAPACITY = 2400 L/s
DESIGN FLOW = 1298 L/s
1x975mm Ø
1.3%

CAPACITY = 660 L/s
DESIGN FLOW = 118 L/s
1x600mm Ø
1%

CAPACITY = 660 L/s
DESIGN FLOW = 115 L/s
1x600mm Ø
1%

DATUM RL 0.0

HGL	6.756			6.951	6.951			7.251	7.251		7.351
SURFACE LEVEL	7.20				7.23				7.82		7.614
INVERT LEVEL	5.06		5.26		5.29		5.58		5.61	5.73	
CHAINAGE	0				16.00				45.00		57.00

2
SW.22

LONGITUDINAL SECTION - EP2-6 TO OSD2

SCALE 1:100 @A1 HORIZONTAL
SCALE 1:50 @A1 VERTICAL

RESULTS FROM DRAINS MODEL FOR POST DEVELOPMENT CATCHMENTS
RESULTS FOR CRITICAL 1% AEP STORM EVENT

BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	B
HL	JM	FOR REVIEW	19.12.2024	A

A1

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Eileen O'Connor Catholic School
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PROJECT
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STORMWATER SECTIONS SHEET 3

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DESIGN JM	DRAWN HL	PROJECT NO.
CHKD.		6588
APPRD.		DRAWING NO. SW.33 / REV B
SCALE 1 : 100	DATE	

NORTH

SWALE BANK

SETTLING POND

STABILISED ACCESS LOCATION TBC

OUTLINE OF FUTURE BUILDING

DAM

NET BALL COURT

BOUNDARY

KEEFERS GLEN

WASTE

STOCK PILE

MATERIAL STORAGE

SITE VEHICLE EXIT & WASHDOWN BAY TBC
ALTERNATIVELY, EXIT CAN BE VIA ENTRY ACCESS WITH ADDITION OF TURN AROUND BAY. DETAILS TBC.

PROPOSED SEDIMENT FENCE

MANBROOF

DRAMA BUILDING

EUCALYPT S10.0 1.10□ H20.0

EUCALYPT S10.0 0.50□ H15.0

LEGEND

- EXISTING STORMWATER PIPE
- SEDIMENT FENCE
- EXISTING PIT ☒ OR ⊗ EP
- PIT PROTECTION - REFER NOTE BELOW
- OVERLAND FLOW

NOTE:
PROVIDE DOWNSTREAM PROTECTION OF EXISTING STORMWATER PITS. COVER WITH GEOFABRIC & PROTECT WITH AGGREGATE. PITS TO BE INSPECTED TWICE A WEEK AND AFTER RAIN. REFER GRAVEL KERB INLET SEDIMENT TRAP DETAILS.

* PROTECT ALL INLETS WITH GEOFABRIL FILTERS INSERTED UNDER GRATED LIDS. CLEAN / RENEW AFTER MAJOR STORM EVENTS.

LOCATION OF STABILISED ACCESS, MATERIAL STORAGE, STOCK PILE & WASTE TBC. LOCATIONS WILL VARY DURING EACH CONSTRUCTION STAGE. ALL EROSION & SEDIMENT CONTROL TO BE IN ACCORDANCE WITH COUNCIL STANDARDS.

SILT & SEDIMENTATION PLAN

SCALE1 : 250 @A1

COLOUR REPRODUCTION WARNING: ELEMENTS OF THIS DRAWING ARE PRINTED IN COLOUR.

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BY	CHKD	DESCRIPTION	DATE	REV
HL	JM	FOR SSDA	13.03.2025	C
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HL	JM	FOR REVIEW	29.11.2024	A

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SILT & SEDIMENTATION PLAN

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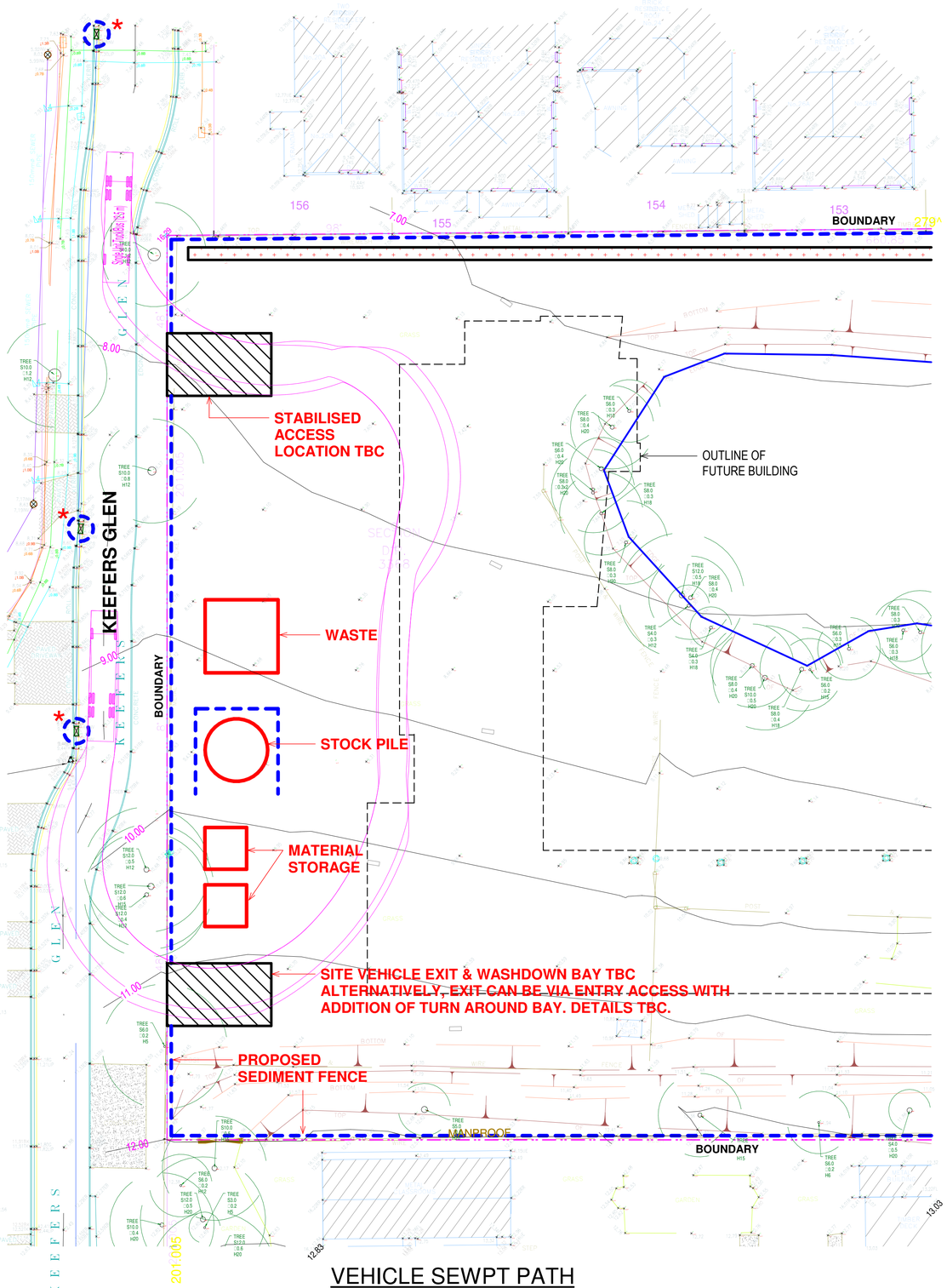
DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE As indicated	DATE	SW.40	C



VEHICLE SEWPT PATH

SCALE1 : 250 @A1

TRUCK (12.5m)
ENTERING AND EXITING SITE

HL	JM	FOR SSDA	13.03.2025	C
HL	JM	FOR REVIEW	19.12.2024	B
HL	JM	FOR REVIEW	29.11.2024	A
BY	CHKD	DESCRIPTION	DATE	REV

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PROJECT
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VEHICLE SWEPT PATH

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DESIGN JM	DRAWN HL	PROJECT NO.	
CHKD.		6588	
APPRD.		DRAWING NO.	REV
SCALE 1 : 250	DATE	SW.45	C

APPENDIX 3

FERP

Proposed New Eileen O'Connor Catholic School
Lot 9 Section 4 DP 3368
84 Gavenlock Road, Mardi
Catholic Schools Broken Bay

Environmental Impact Statement

SSD 67173718

FLOOD EMERGENCY RESPONSE PLAN

March 2025

m 0409 912 631 e mark.tooker@tookerandassociates.com.au a 30 Walworth Avenue, Newport abn 39 619 046 070

Planning Secretary's Environmental Assessment Requirements

Development Details

Application No:	SSD-67173718
Project Name:	New Eileen O'Connor Catholic School
Location:	84 Gavenlock Road, Mardi NSW 2259 Lot 9 Section 4 DP3368 within Central Coast
Applicant:	Catholic Schools Broken Bay

The following documentation has been prepared to support the State Significant Development Application for the above project and in accordance with the Planning Secretary's Environmental Assessment Requirements (SEARS) dated 19th February 2024 as follows:

	Issue and Assessment Requirements	Relevant Section of this Report
14	**Flooding Risk:**	
	Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required.	See this report - Flood Emergency Response Plan by Tooker and Associates, Jan 25

1. INTRODUCTION

Construction, subdivision and operation of a new Catholic school for 200 students with special needs, comprising 20 general learning areas, flexible specialist learning areas, administration and staff facilities, library, hall, amenities and associated site preparation works, landscaping, play space and on-site car parking and kiss and drop, together with road upgrades for Keefers Glen.

Tooker and Associates have been engaged to provide a Flood Emergency Response Plan (FERP) for the school based on the findings of the Flood Impact and Risk Management Assessment report, the Central Coast Council's Wyong River Floodplain Risk Management Study and Plan and the Wyong Local Flood Plan.

2. SITE DESCRIPTION

The proposed site is within the north-western corner of the existing St Peter's Catholic School site at 84 Gavenlock Road, Mardi (Lot 9, Section 4 in Deposited Plan (DP) 3368). The proposed Eileen O'Connor Catholic School site (identified in red) will have an area of 1.284 hectares, with frontage to Keefers Glen.

The site is located within the catchments of Mardi Creek and Wyong River.

The site has a frontage to Keefers Glen for vehicular and pedestrian access to and from the site.

3. PROPOSED DEVELOPMENT

Catholic Schools Broken Bay (CSBB) is proposing construction of a new school for students with a disability at the purpose-built K-12 Eileen O'Connor Catholic School using land located in the north-western corner of St Peter's Catholic School at 84 Gavenlock Road, Mardi. The school will have capacity for 200 students and will provide education and allied health facilities.

The proposed development involves:

- Site establishment and benching

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- Construction of a part-two, part-three storey school campus comprising 20 General Learning Areas (GLA), flexible specialist learning areas, library, multipurpose hall, administration, staff facilities, storage, landscaping and playspaces
- Construction of two (2) new vehicle accessways from Keefers Glen and at-grade carpark (including bus parking) and covered drop off/pick up area
- Subdivision of land to create a new allotment for the school
- Widening of a portion of Keefers Glen

The proposed development will have a ground floor and first floor at RL 10.7m AHD and RL 14.3m AHD. The lower ground floor will be at RL 7.7m AHD and will be used mainly for infrastructure, storage and maintenance equipment (refer Figures 1 to 3).

The school will have approximately 200 students with a range of disabilities. Approximately 85% of the students (170 students) will take advantage of the Department of Education Assisted School Travel Program involving a range of vehicles typically with an average of 4 students in each (approx. 40 vehicles). The remaining 30 students will be transported to and from the school via private vehicles.

The school will also purchase two 12 seater mini-vans to transport students to various school activities off the site.

4. FLOOD RISKS

The flood certificate provided by Central Coast Council nominates the following maximum flood levels at the site:

PMF	RL 6.49m AHD
1% AEP	RL 4.25m AHD
5% AEP	RL 3.72m AHD

The Council's Wyong River Floodplain Risk Management study and Plan prepared in January 2020 identified that the Wyong River catchment has been subjected to severe flooding since records began in 1949, 1964, 1977 and 2007. The highest peak flood level at Wyong Railway Bridge on the Wyong River occurred in the 1949 flood and was estimated to be RL 4.2m AHD. This was similar to the Council's estimated 1% AEP (on average once every 100 years) for the site. The Council's estimated PMF flood level for the subject site is RL 6.49m AHD which is 2.24m higher than the 1% AEP flood. A PMF flood is very rare with an approximate average occurrence of 100,000 years.

The flood planning level from the flood certificate is RL 4.75m AHD. The flood planning level is the Council recommended minimum floor level for the site however, the proposed development will have floor levels a minimum of 0.9m above the PMF. The development therefore is outside of all the flood risks including climate change effects.

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The Council's Wyong River Floodplain Risk Management Study and Plan was prepared by Catchment Simulations Solutions in January 2020 (**the FRMSP report**) and provides all the flood risk and management data required by the Flood Risk Management Guideline LU01.

The proposed Eileen O'Connor Catholic School is located out of the PMF flood lands and as such, will not have any significant impact on the flood behaviour or be inundated by flood waters (refer Figure 4 for the 1% AEP flood plus climate change and Figure 5 for the PMF flood extents).

The flood risk for the site is that it could be isolated for long periods during floods when roads are cut by flooding. It has been classified as "flood isolated elevated" by the FRMSP report.

There are two very different floods which can occur in the Mardi/Tuggerah area and these can impact on vehicular access to and from the proposed development. This is demonstrated by the plots of flood levels for the two very different PMF floods at Wyong Bridge – 2 hr and 24 hr (refer Figure 6). The flood level response times in the 2 hr PMF are much quicker than for the 24 hr PMF flood.

6. FLOOD RISKS AND HAZARDS

The FRMSP report noted that the BoM provide a 6 hour flood warning for minor flooding at the Wyong Bridge which is for flood waters to reach RL 2.8m AHD at the bridge.

The first flood type is a flood in the Mardi Creek catchment which has a relatively small catchment and hence has what is called fast acting floods or flash flooding (PMF 2 hr). These floods occur over a short duration. The draft NSW government Shelter in Place Guidelines indicate that a shelter in place response is appropriate when sheltering in place is no longer than 6 hours. The Mardi Creek flooding falls into this category (PMF 2 hrs).

The PMF 2hrs flood response and hazard times/durations that road access to the school is cut is between 1 and 2 hours. Based on this data, there is no sufficient time for evacuation of the site and the response for the school in the Mardi Creek floods (PMF 2hrs) should be to Shelter in Place at the school.

The flooding in the Wyong River is long duration (PMF 24 hrs) in which road access can be blocked for beyond 20 hrs. This duration is not appropriate for shelter in place at the school. Evacuation of the site is recommended to address the long duration flooding.

The flood hazard is defined as the flood depth multiplied by the flood velocity. Research has established recommended flood hazard values for safe evacuation on foot and in vehicles. The hazard levels are:

H1 – relatively benign flow conditions with no vulnerability constraints;

H2 – unsafe for small vehicles;

H3 – unsafe for all vehicles, children and elderly;

H4 – unsafe for all people and vehicles.

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7. FLOOD EMERGENCY RESPONSE PLAN

The current Wyong Local Flood Plan relies heavily on shelter in place as the flood emergency response however there is a potential for roads to remain blocked by flooding for up to 20 hours which would not be a suitable situation for school children. So, the recommended actions for flood response will be governed by whether it will be a short or long duration flood rather than the flood severity. It will be necessary to monitor the flood levels at Wyong Bridge to gauge whether it is a short or long duration flood.

The available flood evacuation refuges mentioned in the Wyong Local Flood Plan and the FRMSP report are the Wyong Golf Club, Wyong RSL Club and Wyong Bowling Club. These refuges would not be accessible from the school due to major flooding on access roads. The report also mentions the Woodbury Park Community Centre as a possible flood refuge. The clubs however, would not be accessible in a severe flood from the proposed school. The Woodbury Park Community Centre would be a suitable refuge for a group of 50 – 90 persons. The community centre is within walking distance of the school however, it is in the same position as the school in that it will become an elevated isolated flood area.

The likely refuge for a larger number of persons with access during floods would be the Westfield Shopping Centre. The evacuation route from the proposed school to the Westfield Shopping Centre would be to exit the school into Keefers Glen, head south along Woodbury Park Drive and turn left into Wyong Rd and then right into the shopping centre (refer Figure 7).

The flood hazard along the route to the school and to the Westfield shopping centre are presented for the locations on Figures 7. The durations until these flood hazard categories are exceeded are presented for Locations A to G in Attachment A. The flood hazard timing along the route from the school to Westfield Shopping Centre is detailed for locations B, C and E with plots of flood hazard in Attachment A.

BoM provide a flood warning 6 hours before the water level reaches RL 2.8m at the Wyong Bridge guage (http://www.bom.gov.au/nsw/flood/). The school needs to arrange for the BoM to include the school on the list of organisations to receive the flood warning alert directly. In order to differentiate between the short and long duration floods, the BOM provide water levels at the Wyong Bridge after the flood warning is given via their web site http://www.bom.gov.au/nsw/flood/). Water level information is also available from Manly Hydraulics Lab (http://www.mhl.nsw.gov.au) and NSW Office of Water (http://waterinfo.nsw.gov.au/).

If then, the water level at Wyong Bridge has risen to around RL 2.5m in the hour after the BOM warning, then the decision should be to shelter in place as the best approach. If there is at least 2 hours until the water level at the Wyong Bridge begins to rise, then an evacuation is considered to be the best response.

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Figure 7 Flood Hazard Locations

The recommended flood emergency responses in a long duration flood are to:

1. Non school hours – message all parents and Assisted School Travel Program (ASTP) once the BoM flood warning is provided to keep the school children at home;
2. School hours - message all parents and ASTP once the BoM flood warning is provided to collect the children as soon as possible within three to four hours;
3. School hours – those children remaining after the first two actions above are to be transported to the Westfield Shopping Centre and remain under supervision until collected by their parents or ASTP personnel.

The school will have access to their two 12 seat mini-vans for action 3 above as well as the ASTP which arrive after the decision is made to evacuate the school.

Location A on Figure 7 is at the location of the entry and exit to St Peters Catholic College. Locations B, C and E is the recommended vehicular route for access from the school to the Westfield shopping centre during duration floods. Locations D and F are related to access to the shopping centre from Tonkiss St.

The school will have a stringent management of students entering and leaving the school mostly by cars and buses. It will have five Drop off and Pick up (DOPU) zones and a queue capacity for eight vehicles at any one time. Staff will meet each vehicle with students and escort them to and from the classrooms. There will be approximately 71 staff at the school to manage any flood response.

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Flood wardens will be nominated from the staff and the Principal will designate a chief flood warden who will be responsible for annual training of staff in the flood responses, receiving flood warnings from the BOM, discussion with the senior school management team of the appropriate flood response and management of the flood response.

It is recommended that the chief flood warden and two other senior members of staff would have a direct line to receive the BoM flood warning and SES Commander which would provide a minimum warning time of 6 hours to notify parents and ASTP personnel outside of school times that the school would be closed and children should stay at home and if in school hours, that parents and ASTP personnel should collect their children within three to four hours. For those children remaining, they would be bused to the Westfield Shopping Centre so they could be collected by their parents and ASTP personnel.

The Plan would identify responsible persons and their roles with the evacuation route provided within the document.

8. CONCLUSIONS AND RECOMMENDATIONS

The proposed school is located outside flood affected lands and as such, will not be adversely affected by flood waters and will not adversely impact on flooding behaviour for adjacent sites.

The site has the potential for local roads to be flood affected and be isolated during severe floods. The response will be shelter in place at the school site for short duration flooding where there is limited flood warning time and the roads are cut for less than 6 hours. This is in accord with the NSW Draft Shelter in Place guidelines. BoM will recognise this flooding because the rainfall will be intense and the response at Wyong Bridge will be quick and within 2 hours.

For longer duration floods, the response for the proposed school will be to:

1. Non school hours – message all parents and ASTP personnel once the BoM flood warning is provided to keep the school children at home;
2. School hours - message all parents and ASTP personnel once the BoM flood warning is provided to collect the children as soon as possible within three to four hours;
3. School hours – those children remaining after the first two actions above are to be bused and driven by ASTP personnel to the Westfield Shopping Centre and remain under supervision until collected by their parents.

The access to roads along the evacuation route will be available for up to 5 hours longer than the minimum 6 hours warning time. These warning and road access availability times are the worst case for the most severe PMF flood.

The proposed school needs to prepare and implement a detailed flood evacuation flow chart for emergency responses in a flood event which includes annual training. Summary decision flow charts are attached at Attachment B.

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