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INTEGRATED WATER CYCLE MANAGEMENT REPORT

HUNTINGWOOD PROCESSING EXPANSION

65 HUNTINGWOOD DRIVE, HUNTINGWOOD

Date:	17 December 2021
Revision:	006
Issue:	SSDA ISSUE
Ref. No.:	20214

Prepared for: **Charter Hall Holdings Pty Ltd**

Disclaimer

Document Control

Revision	Date	Description	Prepared	Reviewed	Approved
1	12.03.21	Preliminary Issue	DD	BB	BB
2	30.03.21	SSDA Issue	DD	BB	BB
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6	17.12.21	SSDA Issue	DD	BB	BB

Prepared by	Daniel Drewitt	Revision	6
Approved by	Benjamin Barrett	Revision	6

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1. EXECUTIVE SUMMARY

Sparks & Partners have been engaged by FDC on behalf of Charter Hall Holdings Pty Ltd, to provide civil engineering services to support the proposed State Significant Development Application (SSDA) for 65 Huntingwood Drive, Huntingwood. The engineering services include the design and documentation of the stormwater drainage infrastructure and finished pavement levels for the proposed development.

The Department of Planning, Infrastructure and Environment (DPIE) being the approval authority for the proposed development, require a report to address requirements of the Secretary's Environmental Assessment Requirements (SEARs) dated 12th May 2021. Consideration has also been given to the agency comments from the NSW Environment Protection Authority (EPA) and Blacktown City Council (BCC). In response to this requirement Sparks and Partners has undertaken modelling of the proposed integrated water management measures and prepared this report to demonstrate that the proposed development identifies and incorporates water conservation and stormwater management measures into its design and operation in accordance with the SEARs and Blacktown City Council Development Control Plan 2015 Part J.

This revision addressed Blacktown Council objections as noted in the letter issued to NSW Department of Planning, Industry and Environment dated 16th November 2021.

2. INTRODUCTION

2.1 Existing Site

The site is located at 65 Huntingwood Drive, Huntingwood and has an approximate total area of 163, 933m^2. The property is bounded by Huntingwood Drive along its northern boundary, Brabham Drive along its western boundary, neighbouring industrial lots along its eastern boundary and the M4 motorway along it southern boundary. The site is occupied by Arnotts Biscuits Limited and is used for their Australian manufacturing operations. The site consists of several large industrial buildings, asphalt parking, concrete hardstand and landscaping. A playing field also acts as an above ground on-site detention (OSD) tank for a portion of the existing site. A copy of the existing site survey is provided in Appendix A for reference, along with an aerial image in Figure 1 below.

Figure 1. Figure 1. Site Locality Plan (Source: Near Maps)

2.2 Proposed Development

The proposed development consists of a new processing facility, ancillary buildings, hardstand for loading, a multistorey car park and landscaping. The new main processing building occupies 25,660m², ancillary buildings occupying 1,790m^2, the pavement area occupies 10,322m² and 6,635m² of landscaping area. The proposed development will require the demolition of the existing OSD basin and reconstruction as a below ground tank. Approximately 10,875m^2 of existing roof area currently drains into the existing OSD basin and will be redirected to the new OSD tank. Detailed architectural plans of the proposed development have been prepared by HLA Architects and are to be read in conjunction with this report.

3. INTEGRATED WATER MANAGEMENT

3.1 General

The objective of integrated water management is to provide a strategy that brings together the different aspects of the water cycle as a whole rather than an ad hoc approach to water management. This includes the management aspects of freshwater, wastewater and stormwater. The following integrated water management strategies have been considered and addressed for the proposed development:

1. Employ an integrated water collection and recycling system for capturing and recycling roofwater;
2. Control the quality of stormwater that is disposed from the site;
3. Control the quantity of stormwater that is discharged for the site.

To demonstrate the above concept stormwater drainage plans and associated details have been prepared along with detailed modelling using the BCC endorsed MUSIC software package. The concept stormwater drainage plans detail the location of the water management infrastructure including pits, pipes, on-site stormwater (OSD) tank, rainwater tank (RWT), OceanGuard filter baskets, Stormfilter cartridges and Jellyfish filters and are included in Appendix A.

3.2 Water Conservation

Water usage reduction is to be achieved throughout the development through the use of water use fittings which comply with the minimum standards defined by the Water Efficiency Labelling and Standards (WELS) scheme.

3.3 Rainwater Reuse

Through the reuse of collected roofwater for non-potable reuse the proposed demand on potable water resources is reduced. The proposed development will capture roof water from part of the processing building roof area (12,380m²). This collected roofwater will be conveyed to an 95,000 litre tank for storage and reuse throughout the development. Re-use purposes will primarily include toilet flushing and irrigation uses. A water balance of the proposed reuse system has been completed to model the effectiveness and efficiency of the system. The water balance model was constructed using the MUSIC software package with the following inputs:

- Blacktown Rainfall data.
- Total approximate non-potable reuse based on:
    - 28 toilets allowing 0.1kL/day per toilet and assuming the site is occupied seven (7) days per week equates to 2.8kL/day

- 2,093m2 of irrigated area requiring 0.4kL/year/m^2 which equates to approximately 837.2kL per year.

Using the above determined non-potable demand the MUSIC model determines the rainwater tank has an approximate efficiency of 80.73%. This efficiency results in an approximate reduction in the proposed demand on potable water supplies of 1,493,600 litres per year.

3.4 Stormwater Quality

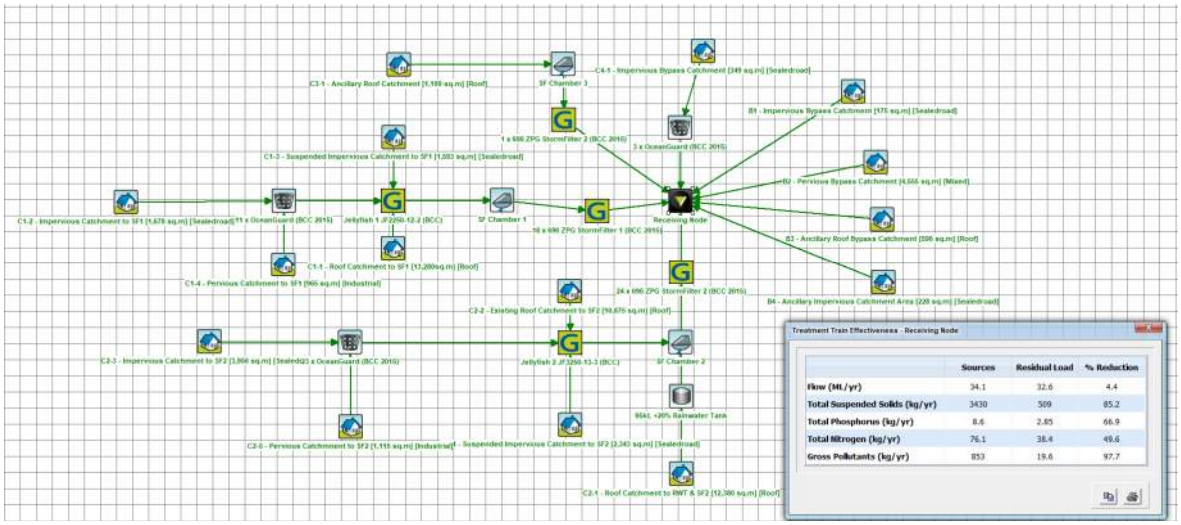
The development is located within Section 7.11 Contributions Plan No. 19 Voluntary Contribution Scheme Boundary as per BCC mapping within Part J of their DCP. However, it is proposed that the development will not enter into a Voluntary Planning Agreement (VPA) with Blacktown Council. As per Council's WSUD Developer Handbook 2020 the development is treatment stormwater runoff to achieved Council's pollution reduction targets for gross pollutants, suspended solids, phosphorous, nitrogen and hydrocarbons.

A treatment train of a 26 x Ocean Protect 'OceanGuard' pit inserts, a JF2250-12-2 and JF3250-13-3 Ocean Protect Jellyfish units and 42 x 690 ZPG Ocean Protect 'StormFilter' cartridges have been proposed for use within the development to achieve 90% reduction in gross pollutants, 85% reduction in total suspended solids, 65% reduction in total phosphorous and 45% reduction in total nitrogen. A 90% reduction in hydrocarbons within the system is to be achieved through the installation of oil baffles within jellyfish diversion pits and stormfilter chambers. Design drawings and a WSUD catchment plan are attached in Appendix A.

Modelling of the proposed treatment measures has been undertaken using the MUSIC software package version 6. The modelling inputs have been based on the pre-loaded BCC nodes using MUSIC-link. The modelling results of the water quality achieved for the site is detailed in Table 1 – MUSIC Model Results below, along with a figure of the prepared model.

	Source Load	Residual Load	% Reduction Achieved	BCC % Reduction Requirement	Compliance with BCC Requirement
Gross Pollutants (kg/yr)	853	19.6	97.7	90	Y
Total Suspended Solids (kg/yr)	3430	509	85.20	85	Y
Total Phosphorous (kg/yr)	8.6	2.85	66.9	65	Y
Total Nitrogen (kg/yr)	76.1	38.4	49.6	45	Y

Table 1. MUSIC Model Results



3.5 Stormwater Quantity

The proposed development requires the implementation of on-site detention (OSD) as per the BCC Engineering Guide for Development to control stormwater discharge from the site. The assumed catchment area of the existing OSD basin that is to be demolished is 53,264m^2. The proposed OSD tank has been designed to predominately collect all runoff from the same catchment as the existing OSD basin however, there are some areas that bypass the OSD tank. The proposed ancillary buildings around the site did not originally drain to the existing OSD basin but are proposed to be included as bypass for the design of the new OSD tank. These additional areas result in a total catchment area of 55,287m^2. This catchment area includes new and existing hardstand (9,570m²), existing building roof (10,875m^2), new processing building roof (25,660m²) and new landscaped areas (2,080m²). Bypassing areas totaling 7,102m^2 consist of landscaping (4,555m^2), hardstand (752m^2) and ancillary buildings (1,795m^2). A catchment plan of the proposed development is included in the Appendix A.

The BCC – On-site Detention Deemed to Comply Tool has been utilised to determine the required volume and discharge rate for proposed development. Based on Council Deemed to Comply Tool the proposed OSD has a minimum site storage capacity for the 50% and 1% AEP storm event of 1,659m^3 and 2,516m^3 respectively. The maximum proposed permissible discharge rate for 50% and 1% AEP storm events is 178.5L/s and 652.7L/s respectively. A copy of Council's Deemed to Comply Tool has been provided in Appendix B for review.

3.6 Maintenance and Monitoring

To ensure the continued efficient and correct operation of the proposed integrated water management infrastructure a 'maintenance and monitoring schedule' is included in the Appendix C of this plan. The schedule details the frequency of inspections, what is to be inspected and what rectifications to make if required for the water management infrastructure located within the proposed development. The schedule is to be implemented upon commissioning of the water management infrastructure and remain in place for the life of the development; with all records kept on site for inspection should the approval authority deem it necessary.

4. RESPONSE TO SEARS REQUIREMENTS

4.1 DPIE

4.1.1 Water Resources

Surface runoff will generally be captured into the proposed stormwater management system. As the area is currently landscaping, the proposed development will reduce the volume of water seeping into the groundwater system.

The volume, frequency and quality of stormwater runoff will be controlled by the stormwater management system, in accordance with BCC requirements. Refer to design drawings DA4101-DA4104, DA4111, DA4312, DA4701, DA4702, DA4711 & DA4712 and section 3 of this report for details of stormwater management measures.

4.1.2 Water Quality

During construction stormwater runoff will be managed in accordance with the Landcom "Blue Book" Refer to plans DA2101, DA2102 & DA2701 for Sediment & Erosion Control measures.

Stormwater runoff from the development is collected within the proposed stormwater management system and directed through several pollution treatment devices. These devices reduce the gross pollutant, suspended solids, phosphorous, nitrogen and hydrocarbon pollution loads for the development. Refer to design drawings DA4101-DA4104, DA4111, DA4301, DA4701, DA4702, DA4711 & DA4712 section 3.4 of this report for details of stormwater management measures.

4.1.3 Hydrology

A water balance of rainwater reuse to supply toilet flushing and landscaping irrigation. Refer to design drawings DA4101-DA4104, DA4111, DA4301, DA4701 & DA4711 and section 3.5 of this report for details of stormwater management measures.

4.2 EPA

The development includes rainwater reuse and water quality improvement devices to minimise pollution in stormwater runoff from the development. Refer to design drawings DA4101-DA4104, DA4111, DA4301, DA4312, DA4701, DA4702, DA4711 & DA4712 for details of stormwater management measures. Management of stormwater during construction is in accordance with the Landcom "Blue Book" Refer to plans DA2101, DA2102 & DA2701 for Sediment & Erosion Control measures.

4.3 BCC

4.3.1 On-site Stormwater Detention (OSD)

OSD has been provided and designed to Council's spreadsheet and requirements. Refer to Section 3.5 of this report for further details.

4.3.2 Water Quality

A water quality treatment design has been developed to achieve Council's pollution reduction targets as per Council's requirements. Refer to Section 3.4 of this report for further details.

4.3.3 Water Conservation

A rainwater tank has been provided for reuse for toilet flushing and irrigation. MUSIC modelling confirms 80% reuse efficiency. Refer to Section 3.3 of this report for further details.

CONCLUSION

Based on the preparation of the concept stormwater drainage plans and MUSIC modeling results it is demonstrated that the principles of integrated water management have been incorporated into the design and operation of the proposed development at 65 Huntingwood Drive, Huntingwood in accordance with BCCDCP 2015 Part J. It is demonstrated that the proposed development achieves reductions in potable water import by capturing rainwater on site and reusing this for non-potable uses including irrigation and toilet flushing, achieves pollution reduction targets set by council, and employs OSD for the control of stormwater discharge from the site in accordance with targets set by council. It is also demonstrated that the proposed development employs water conservation measures that will continue to operate effectively and efficiently through the implementation and use of a monitoring and maintenance schedule ensuring the integrity of the system is maintained.

The proposed stormwater quantity and quality control measures has been assessed in relation to the soil and water section of the Local Secretary's Environmental Assessment Requirements (SEARs) Letter set by the Department of Planning and Environment. Other requirements from the EPA and BCC have similarly been addressed in this report and accompanying design drawings. It is demonstrated that the mitigation measures and stormwater infrastructure design of the proposed development meets all the requirements set by the SEAR's. It is also demonstrated that the design satisfies Blacktown Council objections noted in the letter issued to NSW Department of Planning, Industry and Environment dated 16th November 2021.

APPENDIX A. CONCEPT DRAINAGE PLANS

PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

LOCALITY PLAN

NOT TO SCALE - COURTESY OF SIX MAPS

DRAWING SCHEDULE

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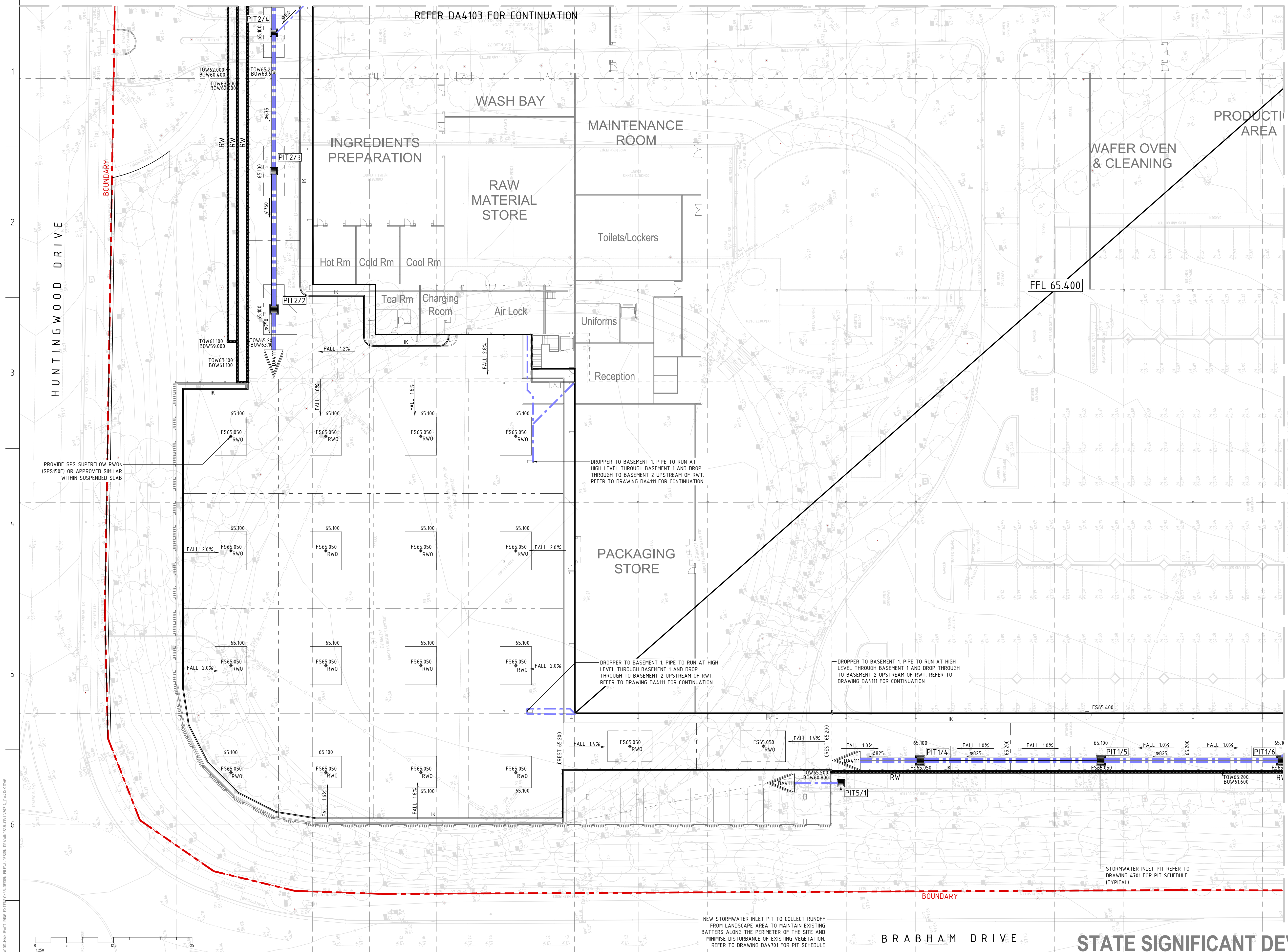
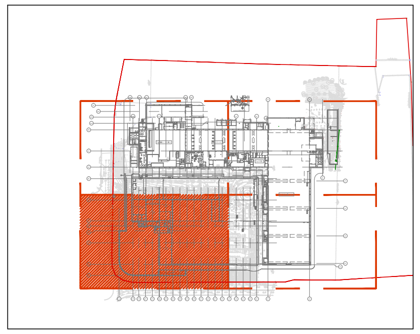


LEGEND

	PROPOSED STORMWATER PIPE (≤ø300)
	PROPOSED STORMWATER PIPE (≥ø375)
	TEMPORARY STORMWATER DIVERSION LINE
ø225	PIPE FLOW DIRECTION AND SIZE
	PROPOSED STORMWATER PIT (900x900 U.N.O)
PIT1/1	PIT TAG
	ONSITE DETENTION TANK
	RAINWATER TANK
	TREATMENT CHAMBER/DEVICE
21.00	FINISHED SURFACE MAJOR CONTOUR LINE
21.10	FINISHED SURFACE MINOR CONTOUR LINE
21.10	FINISHED SURFACE CREST LINE
	PROPOSED KERB
FFL 555.555	FINISHED FLOOR LEVEL OF PROPOSED BUILDING
+ FS55.555	FINISHED SURFACE LEVEL
+ eRL55.555	EXISTING SURFACE LEVEL
FALL 1.28%	DIRECTION OF SURFACE FALL
	HIGH VOLTAGE LINE
	TEMPORARY STORMWATER DIVERSION LINE
RW	RETAINING WALL
+ TOW55.555	TOP OF WALL LEVEL
+ BOW55.555	BOTTOM OF WALL LEVEL
eKG	EXISTING KERB AND GUTTER
KG	PROPOSED KERB AND GUTTER
IK	PROPOSED INTEGRAL KERB
DD	PROPOSED DISH DRAIN
	OVERLAND FLOW PATH
DP	PROPOSED DOWNPIPE
RWO	RAINWATER OUTLET
+ IOK55.555	INVERT OF KERB LEVEL

NOTES

1. REFER TO DA1201 FOR GENERAL NOTES AND SPECIFICATIONS
2. REFER TO DA4102-DA4104 FOR CONTINUATION OF STORMWATER PLAN
3. REFER TO DA4111 FOR BASEMENT STORMWATER PLAN
4. REFER TO DA4701-402 FOR PIT SCHEDULE & STORMWATER DETAILS
5. PRELIMINARY PIPE SIZES SHOWN.



KEY PLAN
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REFER DA4104 FOR CONTINUATION

EX. PACKAGING HALL

PRODUCTION AREA

REFER DA4101 FOR CONTINUATION

STORMWATER JUNCTION PIT. REFER TO DRAWING DA4701 FOR PIT SCHEDULE (TYPICAL)

JUNCTION PITS TO BE CONSTRUCTED OVER EXISTING DRAINAGE PIPES TO INTERCEPT STORMWATER RUNOFF FROM ADJACENT BUILDING DIVERT IT AROUND THE NEW BUILDING

STORMWATER INLET PIT. REFER TO DRAWING DA4701 FOR PIT SCHEDULE (TYPICAL)

TEMPORARY DIVERSION LINE TO BE CONSTRUCTED. DIVERSION LINE TO BE PARTIAL DEMOLISHED UPON COMPLETION OF OSD TANK AND OUTLET TO HUNTINGWOOD DRIVE

EXISTING UTILITIES TO BE POTHOLED IN VICINITY OF PIPELINE

TEMPORARY DIVERSION LINE TO DISCHARGE INTO EXISTING KERB INLET PIT WITHIN BRABHAM DRIVE

BOUNDARY

BRABHAM DRIVE

eF

eG

eH

eHa

NOTES

1. REFER TO DA4101 FOR LEGEND AND NOTES

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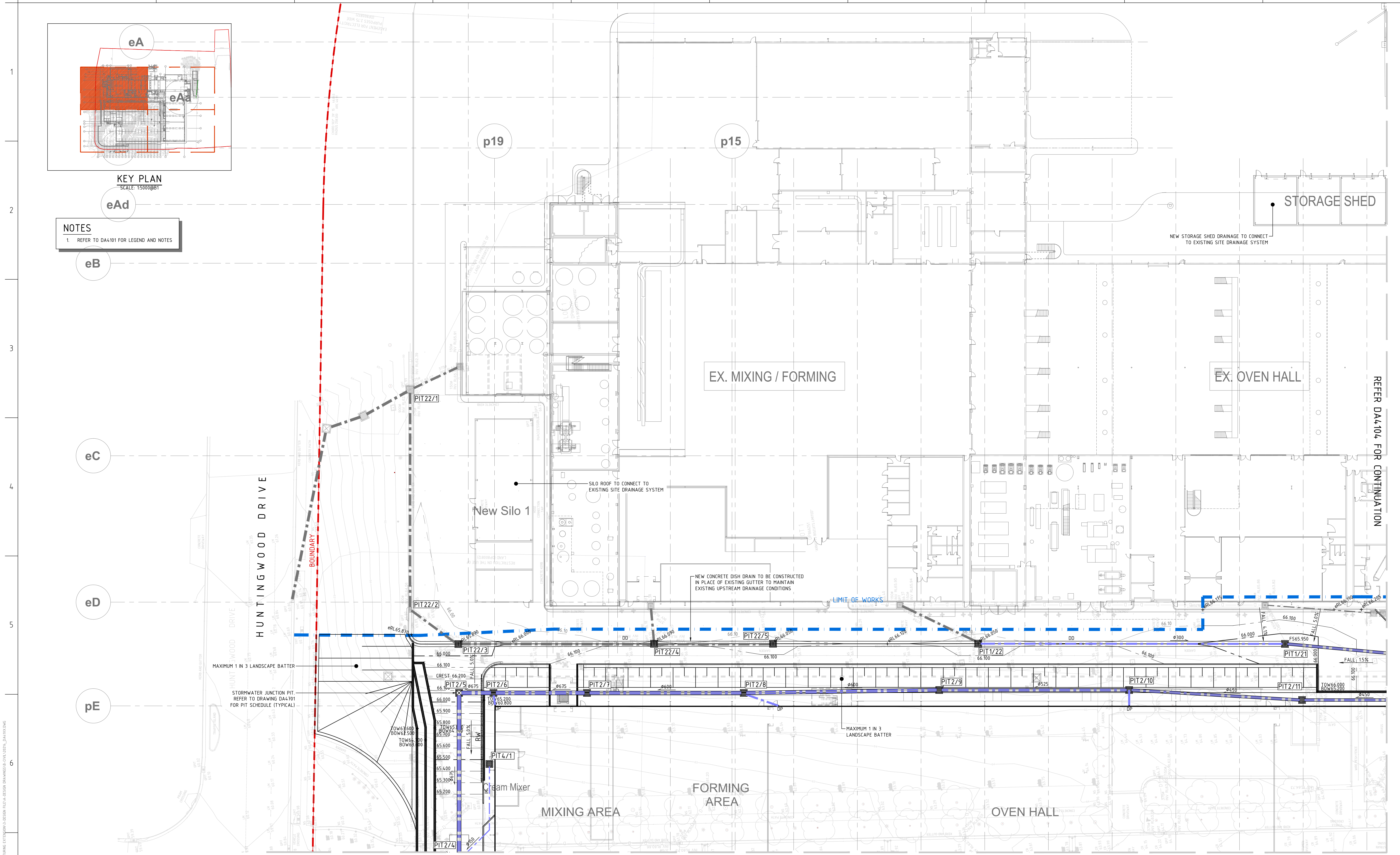

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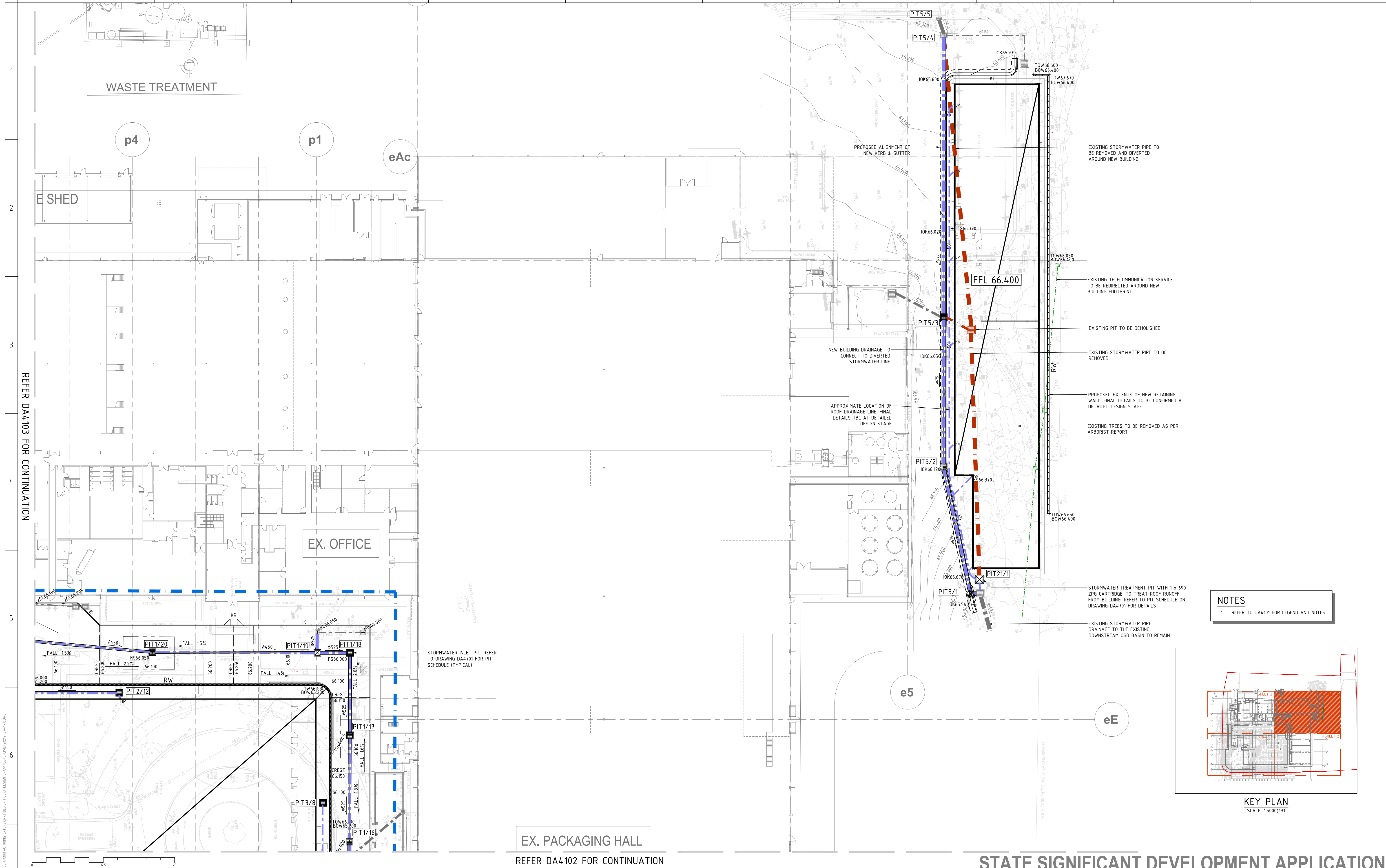

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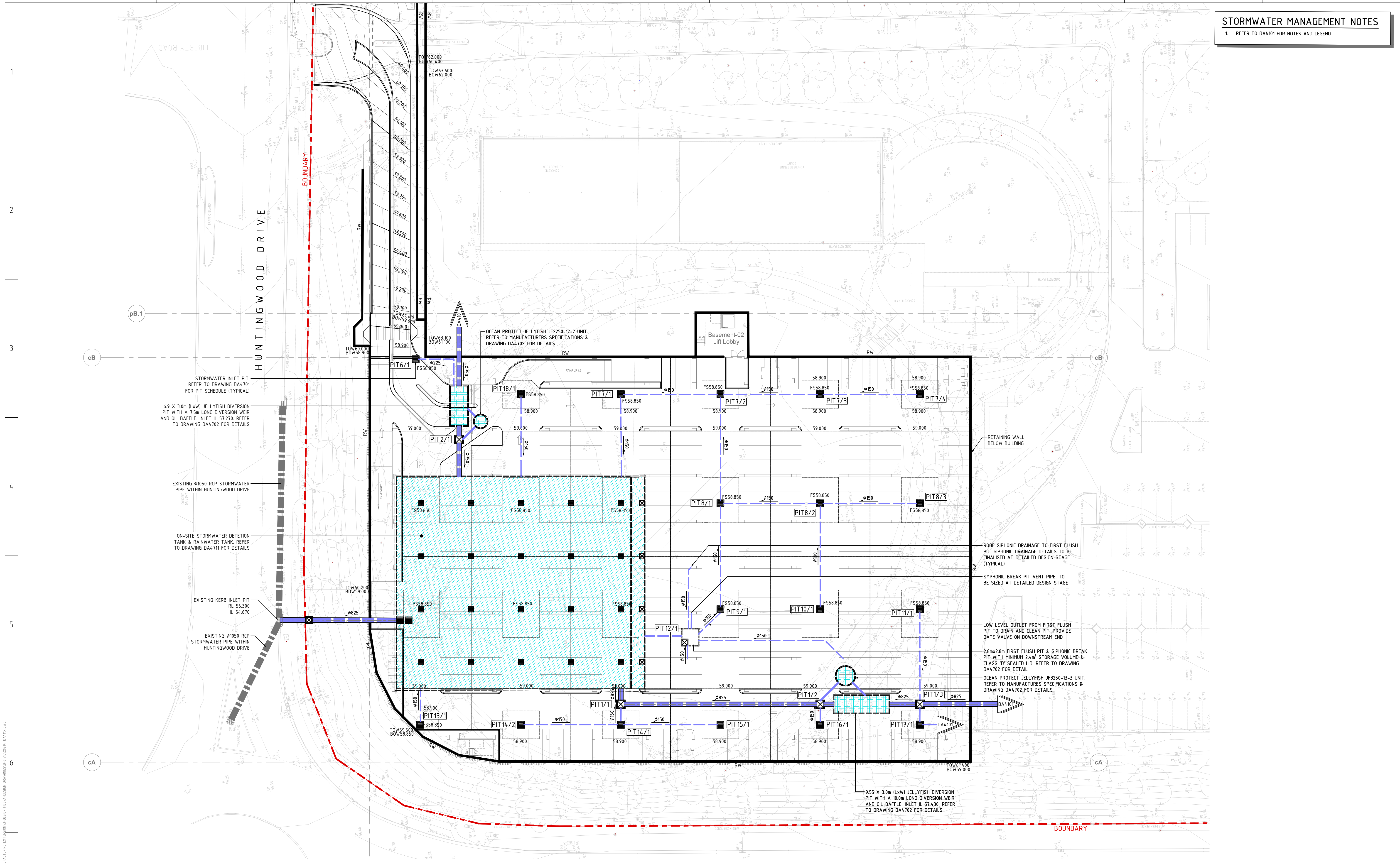
STORMWATER MANAGEMENT NOTES

1. REFER TO DA4101 FOR NOTES AND LEGEND



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BASEMENT (B2) PLAN

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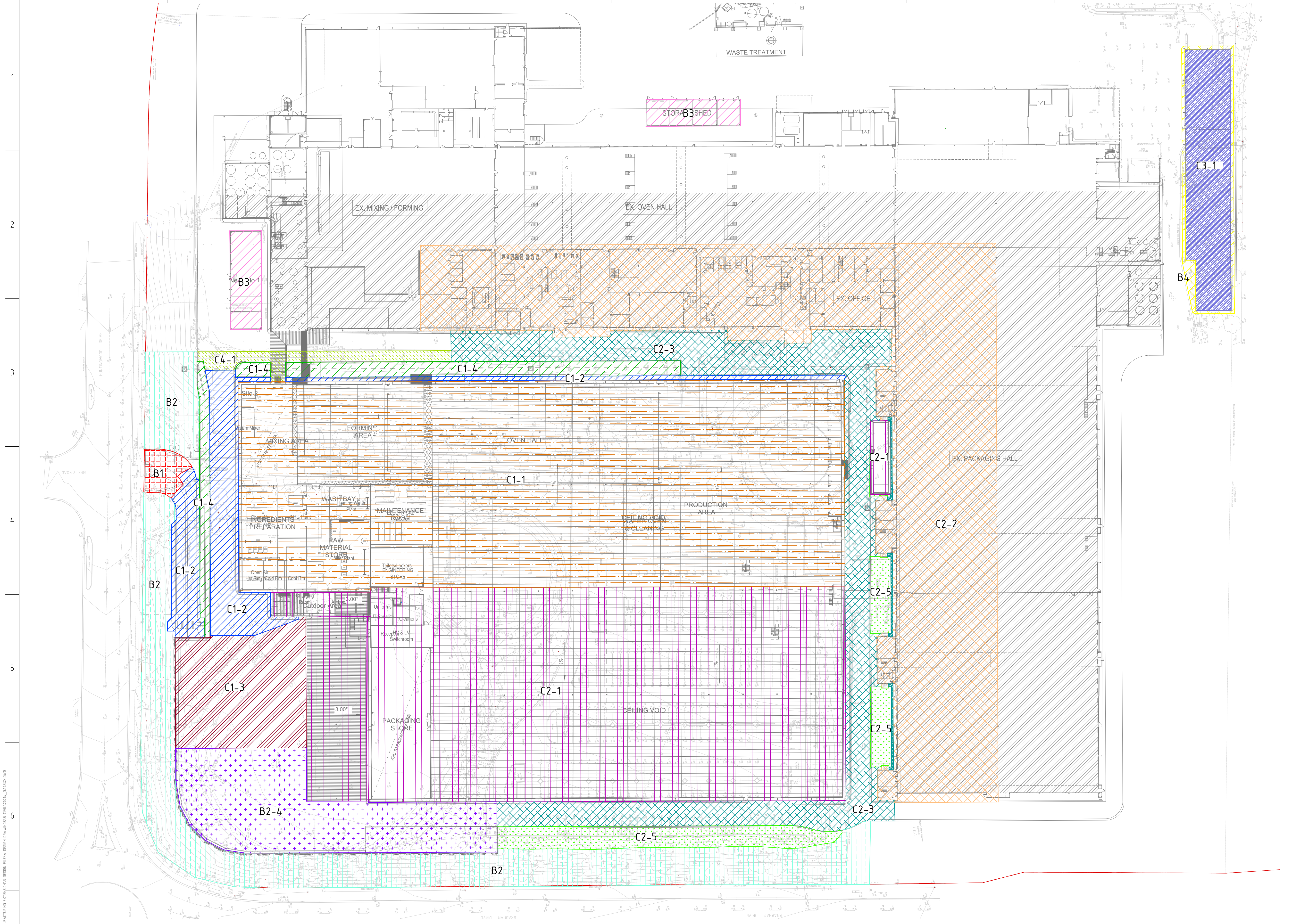

LEGEND

- C1-1 - PROPOSED ROOF CATCHMENT AREA TO SF CHAMBER 1 (13,280m²)
- C1-2 - IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 1 (1,678m²)
- C1-3 - SUSPENDED IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 1 (1,593m²)
- C1-4 - PERVIOUS CATCHMENT AREA TO SF CHAMBER 1 (965m²)

TOTAL CATCHMENT AREA TO SF1 = 17,516m²

- C2-1 - PROPOSED ROOF CATCHMENT AREA TO RWT & SF 2 (12,380m²)
- C2-2 - EXISTING ROOF CATCHMENT AREA TO SF CHAMBER 2 (10,875m²)
- C2-3 - IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 2 (3,956m²)
- C2-4 - SUSPENDED IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 2 (2,343m²)
- C2-5 - PERVIOUS CATCHMENT AREA TO SF CHAMBER 2 (1,115m²)

TOTAL CATCHMENT AREA TO SF2 = 30,669m²

- C3-1 - ANCILLARY ROOF CATCHMENT AREA TO SF PIT (1,199m²)
- C4-1 - IMPERVIOUS BYPASS CATCHMENT AREA TO OCEAN GUARDS (349m²)
- B1 - IMPERVIOUS BYPASS CATCHMENT AREA (175m²)
- B2 - PERVIOUS BYPASS CATCHMENT AREA (4,555m²)
- B3 - ANCILLARY ROOF CATCHMENT AREA (596m²)
- B4 - ANCILLARY IMPERVIOUS CATCHMENT AREA (228m²)

TOTAL BYPASS AREA = 5,554m²

TOTAL SITE CATCHMENT AREA = 55,287m²

NOTES

1. REFER TO DRAWING DA1201 FOR NOTES AND SPECIFICATIONS

0 10 25 50
1:500

IMPORTANT
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REFERENCES

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12.03.21	90% ISSUE	DD	2
29.03.21	SSDA ISSUE	DD	3
04.06.21	SSDA ISSUE	DD	4
10.09.21	SSDA ISSUE	DD	5
17.12.21	SSDA ISSUE	DD	6

STATE SIGNIFICANT DEVELOPMENT APPLICATION

STRUCTURAL -
MECHANICAL -
ELECTRICAL -
CIVIL SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

BUILDER FDC

PROJECT
PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

ARCHITECT hlc architects

SPARKS + PARTNERS CONSULTING ENGINEERS HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au
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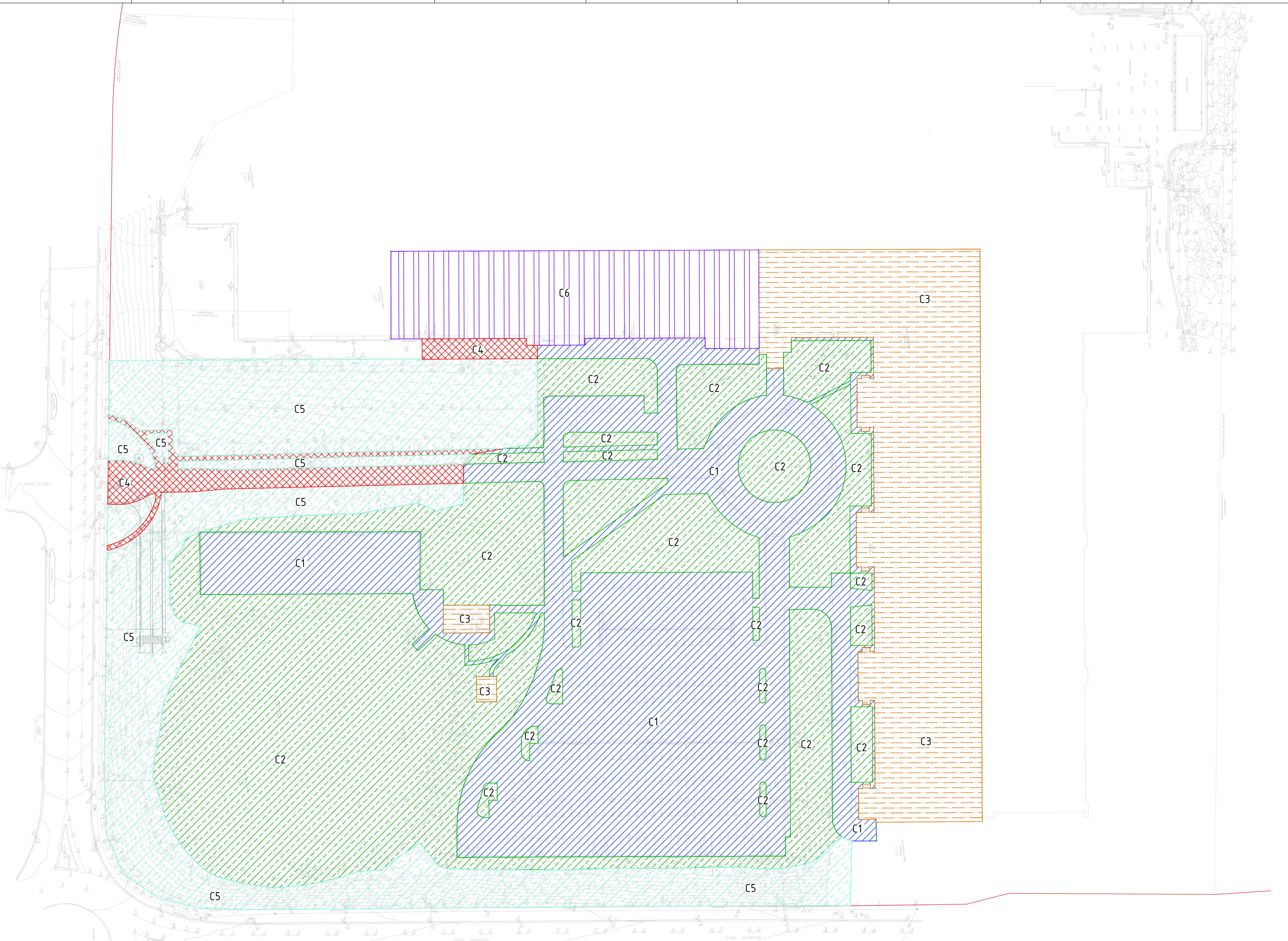
DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER WSUD
CATCHMENT PLAN

DATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB

PROJECT No	SCALE	SIZE	DRAWING No	REVISION
20214	1:500	B1	DA4301	6

W:\2 - PROJECTS\2020\20214 - ARNOTTS HUNTINGWOOD-MANUFACTURING EXTENSION\



LEGEND

- C1 – PRE DEVELOPMENT OSD IMPERVIOUS AREA (13,840m²)
- C2 – PRE DEVELOPMENT OSD PERVIOUS AREA (16,840m²)
- C3 – PRE DEVELOPMENT OSD ROOF AREA (7,750m²)
- C4 – PRE DEVELOPMENT OSD IMPERVIOUS BYPASS AREA (1,285m²)
- C5 – PRE DEVELOPMENT OSD PERVIOUS BYPASS AREA (10,210m²)
- C6 – PRE DEVELOPMENT OSD ROOF BYPASS AREA (3,338m²)

TOTAL CATCHMENT AREA = 53,263m²

NOTES

1. REFER TO DRAWING DA1201 FOR NOTES AND SPECIFICATIONS

0 10 25 50
1:500

STATE SIGNIFICANT DEVELOPMENT APPLICATION

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PROPOSED INDUSTRIAL WAREHOUSE
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DRAWING TITLE
CIVIL DESIGN
CONCEPT EXISTING OSD
CATCHMENT PLAN

DATE	DRAWN	DESIGNED	CHECKED
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PROJECT No	SCALE	SIZE	DRAWING No	REVISION
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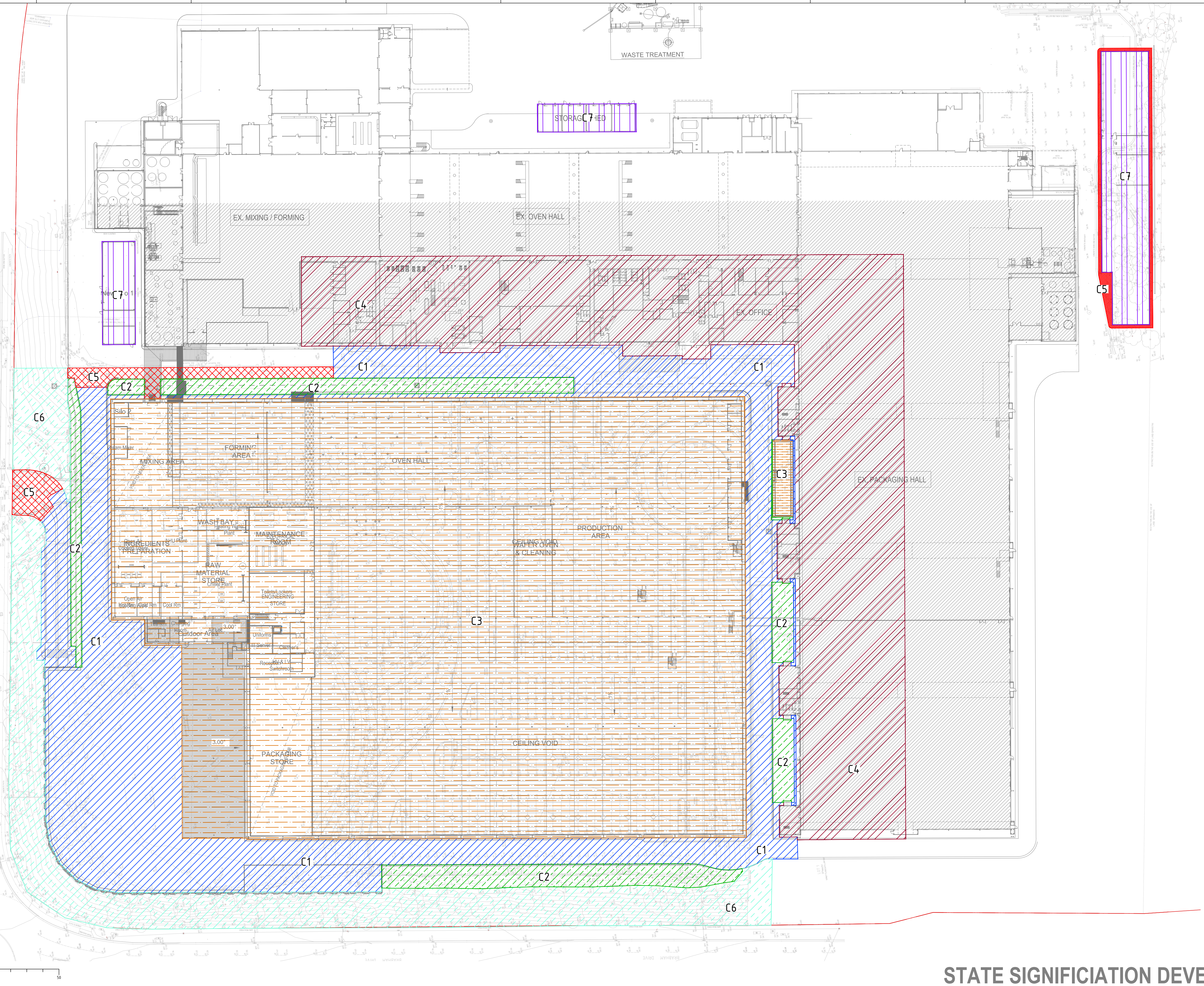

LEGEND

- C1 - PROPOSED DEVELOPMENT IMPERVIOUS CATCHMENT AREA (9570m²)
- C2 - PROPOSED DEVELOPMENT PERVIOUS CATCHMENT AREA (2,080m²)
- C3 - PROPOSED DEVELOPMENT ROOF CATCHMENT AREA (25,660m²)
- C4 - EXISTING ROOF CATCHMENT AREA (10,875m²)
- C5 - PROPOSED DEVELOPMENT IMPERVIOUS BPYASS CATCHMENT AREA (752m²)
- C6 - PROPOSED DEVELOPMENT PERVIOUS BYPASS CATCHMENT AREA (4,555m²)
- C7 - PROPOSED DEVELOPMENT ROOF BYPASS CATCHMENT AREA (1,795m²)

TOTAL CATCHMENT AREA = 55,287m²
TOTAL BYPASS AREA = 7,102m²

NOTES

1. REFER TO DRAWING DA1201 FOR NOTES AND SPECIFICATIONS

STATE SIGNIFICIATION DEVELOPMENT APPLICATION

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DRAWING TITLE
CIVIL DESIGN
CONCEPT PROPOSED OSD
CATCHMENT PLAN

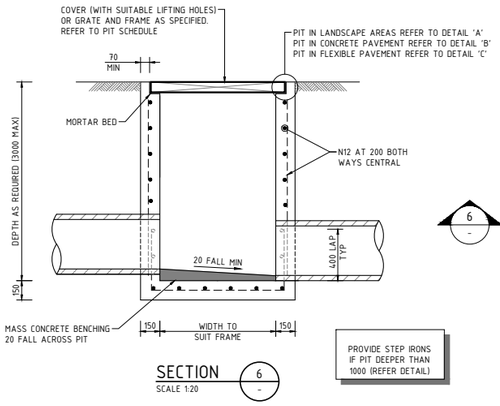
DATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB

PROJECT No	SCALE	SIZE	DRAWING No	REVISION
20214	1:500	B1	DA4312	1

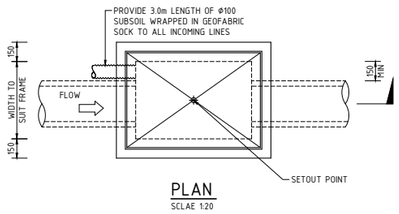
W:\2 - PROJECTS\2020\20214 - ARNOTTS HUNTINGWOOD-MANUFACTURING EXTENSION

PIT SCHEDULE

PIT No.	PIT TYPE	CHAMBER SIZE	COVER TYPE	COVER RL	COMMENTS
1/1	JUNCTION PIT	900x900	CLASS 'D' SEALED	58.930	
1/2	JUNCTION PIT	900x900	CLASS 'D' SEALED	58.930	
1/3	JUNCTION PIT	900x900	CLASS 'D' SEALED	58.930	
1/4	INLET PIT	900x900	CLASS 'D' GRATED	65.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/5	INLET PIT	900x900	CLASS 'D' GRATED	65.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/6	INLET PIT	900x900	CLASS 'D' GRATED	65.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/7	JUNCTION PIT	900x900	CLASS 'D' SEALED	65.900	
1/8	INLET PIT	900x900	CLASS 'D' GRATED	65.900	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/9	INLET PIT	900x900	CLASS 'D' GRATED	65.900	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/10	JUNCTION PIT	900x900	CLASS 'D' SEALED	65.950	
1/11	INLET PIT	900x900	CLASS 'D' GRATED	65.900	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/12	JUNCTION PIT	900x900	CLASS 'D' SEALED	66.030	
1/13	INLET PIT	900x900	CLASS 'D' GRATED	66.000	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/14	INLET PIT	900x900	CLASS 'D' GRATED	66.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/15	JUNCTION PIT	900x900	CLASS 'D' SEALED	66.050	
1/16	INLET PIT	900x900	CLASS 'D' GRATED	66.000	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/17	INLET PIT	900x900	CLASS 'D' GRATED	66.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/18	INLET PIT	900x900	CLASS 'D' GRATED	66.000	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/19	JUNCTION PIT	900x900	CLASS 'D' SEALED	66.050	
1/20	INLET PIT	900x900	CLASS 'D' GRATED	66.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/21	INLET PIT	900x900	CLASS 'D' GRATED	65.950	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
1/22	INLET PIT	900x900	CLASS 'D' GRATED	66.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/1	JUNCTION PIT	900x900	CLASS 'D' SEALED	58.980	
2/2	INLET PIT	900x900	CLASS 'D' GRATED	65.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/3	INLET PIT	900x900	CLASS 'D' GRATED	65.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/4	INLET PIT	900x900	CLASS 'D' GRATED	65.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/5	JUNCTION PIT	900x900	CLASS 'D' SEALED	66.060	
2/6	INLET PIT	900x900	CLASS 'B' GRATED	65.200	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/7	INLET PIT	900x900	CLASS 'B' GRATED	65.200	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/8	INLET PIT	900x900	CLASS 'B' GRATED	65.200	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/9	INLET PIT	900x900	CLASS 'B' GRATED	65.200	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/10	INLET PIT	900x900	CLASS 'B' GRATED	65.200	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/11	INLET PIT	900x900	CLASS 'B' GRATED	65.200	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
2/12	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/1	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/2	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/3	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/4	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/5	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/6	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/7	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
3/8	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
4/1	INLET PIT	900x900	CLASS 'B' GRATED	65.100	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
5/1	INLET PIT	900x900	CLASS 'B' GRATED	60.400	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
6/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
7/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
7/2	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
7/3	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
7/4	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
8/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
8/2	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
8/3	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
9/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
10/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
11/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
12/*1	JUNCTION PIT	2400x2400	CLASS 'D' SEALED	58.950	FIRST FLUSH PIT/SIPHONIC BREAK PIT
13/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
14/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
14/2	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
15/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
16/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
17/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
18/1	INLET PIT	900x900	CLASS 'D' GRATED	58.850	
19/1	KERB INLET PIT	900x900	CLASS 'D' GRATED	65.600	PROVIDE 2.4m LINTEL
19/2	INLET PIT	900x900	CLASS 'D' GRATED	66.120	
19/3	INLET PIT	900x900	CLASS 'D' GRATED	66.050	
19/4	INLET PIT	900x900	CLASS 'D' GRATED	65.720	
19/5	KERB INLET PIT	900x900	CLASS 'D' GRATED	65.650	EXISTING KERB INLET PIT
20/1	KERB INLET PIT	900x900	CLASS 'D' GRATED	56.300	EXISTING KERB INLET PIT WITHIN HUNTINGWOOD DRIVE
20/2	JUNCTION PIT	900x900	CLASS 'B' SEALED	56.600	
21/1	JUNCTION PIT	1200x1200	CLASS 'B' SEALED	65.500	STORMWATER TREATMENT PIT WITH 1 x 690 ZPG CARTRIDGE
22/1	INLET PIT	900x900	CLASS 'D' GRATED	65.990	EXISTING INLET PIT
22/2	INLET PIT	900x900	CLASS 'D' GRATED	65.800	EXISTING INLET PIT
22/3	INLET PIT	900x900	CLASS 'D' GRATED	65.890	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
22/4	INLET PIT	900x900	CLASS 'D' GRATED	66.090	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT
22/5	INLET PIT	900x900	CLASS 'D' GRATED	66.050	FITTED WITH AN OCEAN PROTECT 'OCEANGUARD' PIT INSERT



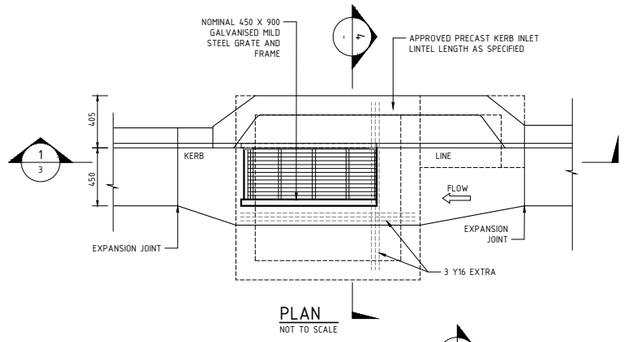
SECTION 6 / SCALE 1:20



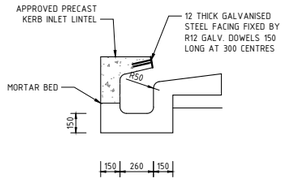
PLAN / SCLAE 1:20

SURFACE INLET / JUNCTION PIT

(PIPE SIZES ≤ Φ450)



PLAN / NOT TO SCALE



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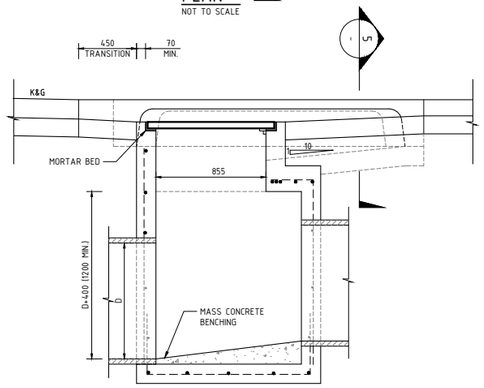

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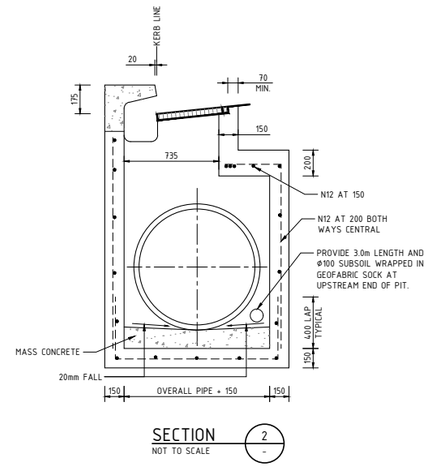

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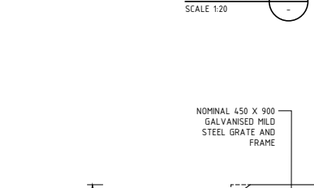
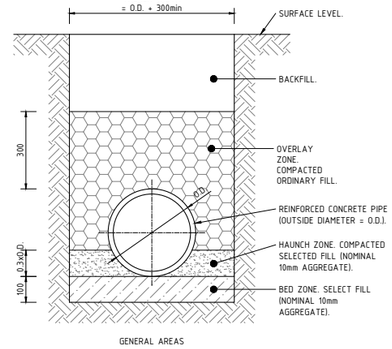


DETAIL 'A' / SCLAE 1:10

KERB INLET PIT TYPE "B" (PIPE SIZE > Φ450)

NOT TO SCALE

1. PROVIDE STEP IRONS FOR ALL PITS > 1200mm DEEP



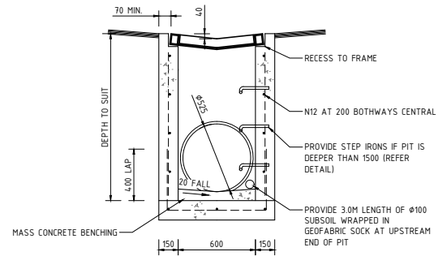
GENERAL AREAS

1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING ADEQUATE COMPACTION.
2. = MINIMUM PIPE COVER NOT UNDER ROADS
3. = 300mm UNO
4. THE CONTRACTOR SHALL ENSURE THAT THE SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
5. ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS

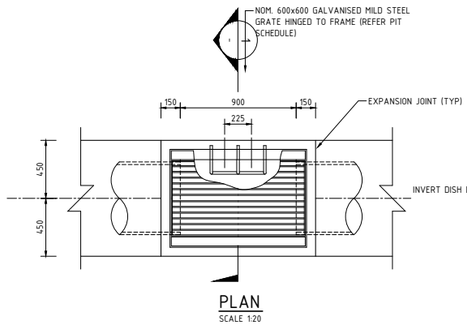
A) TRENCHES UNDER PAVED AREAS & BUILDINGS - 100% SMDD
TRENCHES NOT UNDER PAVEMENTS - 90% SMDD

TYPICAL PIPE TRENCH

SCALE 1:10



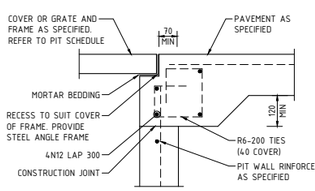
SECTION 1 / SCALE 1:20



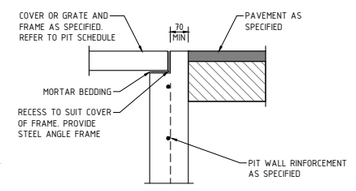
PLAN / SCALE 1:20

DISH DRAIN PIT

SCALE 1:20



DETAIL 'B' / SCLAE 1:10



DETAIL 'C' / SCLAE 1:10

AS SHOWN

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STRUCTURAL -
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CIVIL DESIGN
CONCEPT STORMWATER DRAINAGE
DETAILS SHEET 1

DATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB

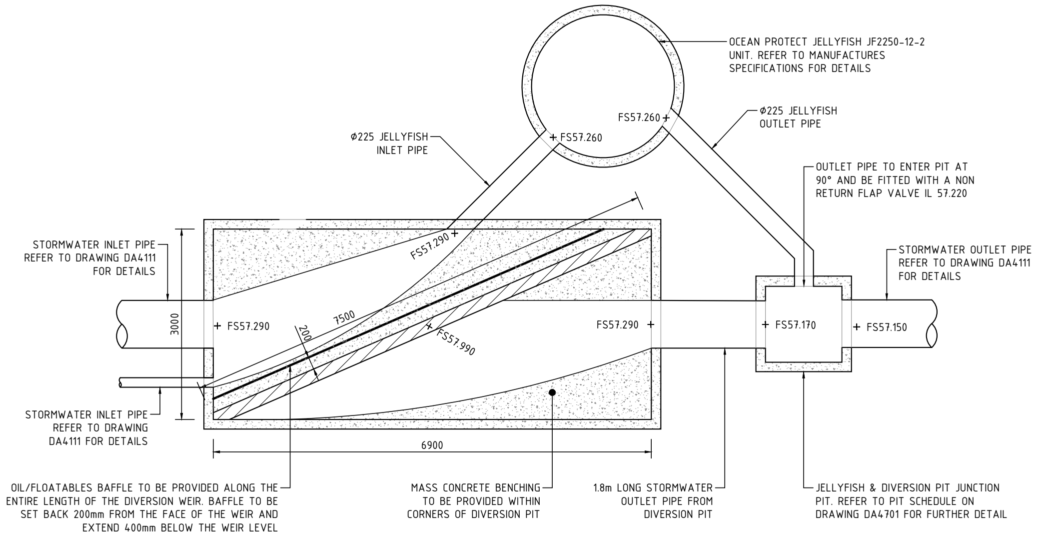
SCALE	SIZE	REVISION
AS SHOWN	B1	5

PROJECT No 20214
DRAWING No DA4701

CALCULATIONS

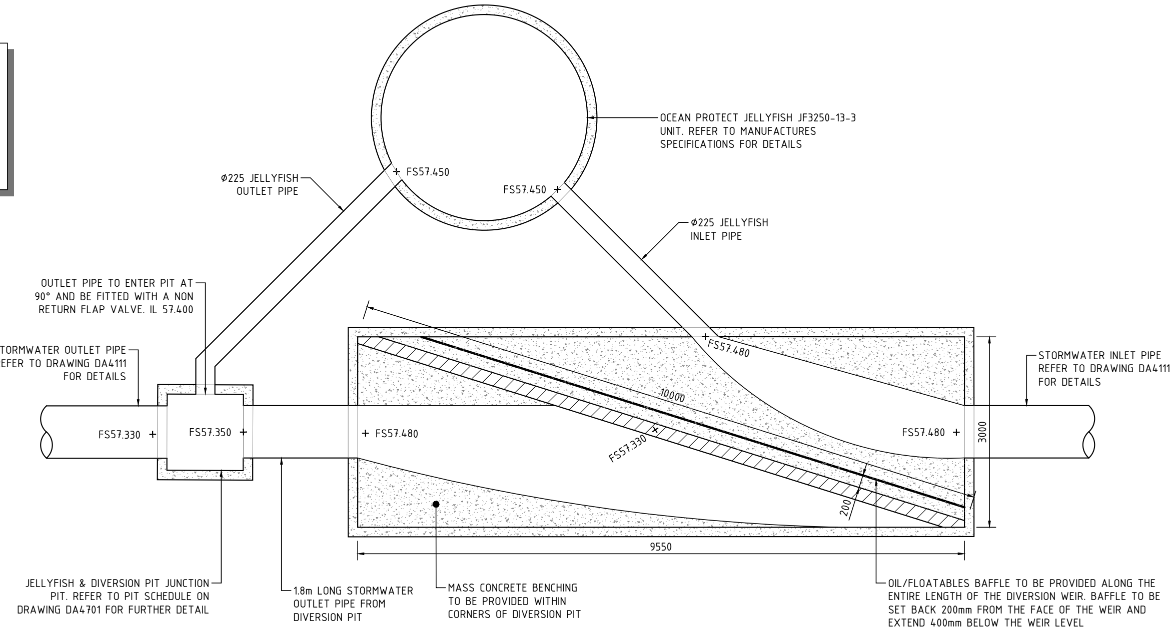
JF2250-12-2 DIVERSION WEIR LENGTH = Q_{20} (m^3/s) x 10
= 0.75 x 10
= 7.5m

JF3250-13-3 DIVERSION WEIR LEGNTH = Q_{20} (m^3/s) x 10
= 1.0 x 10
= 10m



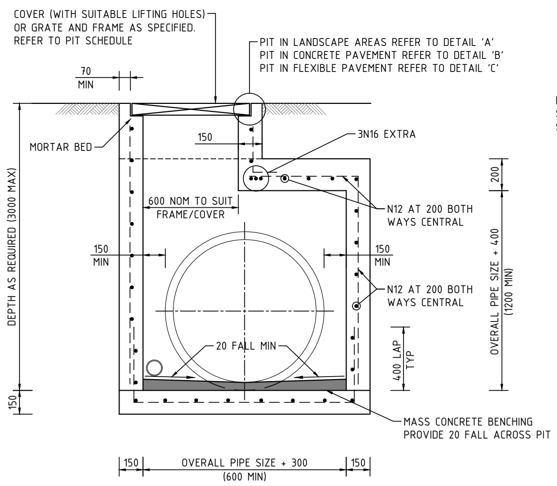
JELLYFISH JF2250-12-2 & DIVERSON PIT - DETAIL

SCALE 1:50



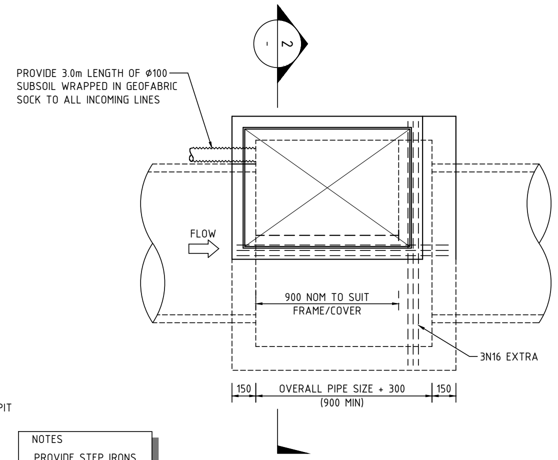
JELLYFISH JF3250-13-3 & DIVERSON PIT - DETAIL

SCALE 1:50



SECTION 2

SCALE 1:20

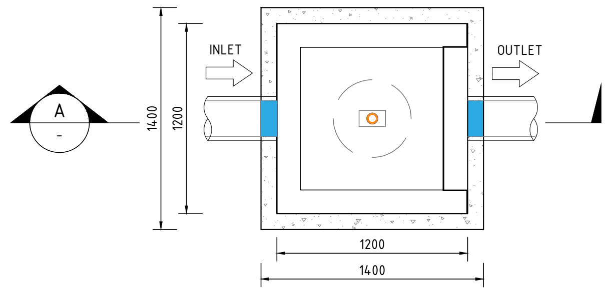


NOTES

PROVIDE STEP IRONS IF PIT DEEPER THAN 1000 (REFER DETAIL)

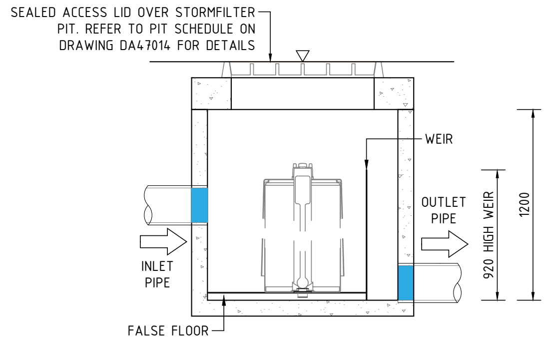
PLAN

SCLAE 1:20



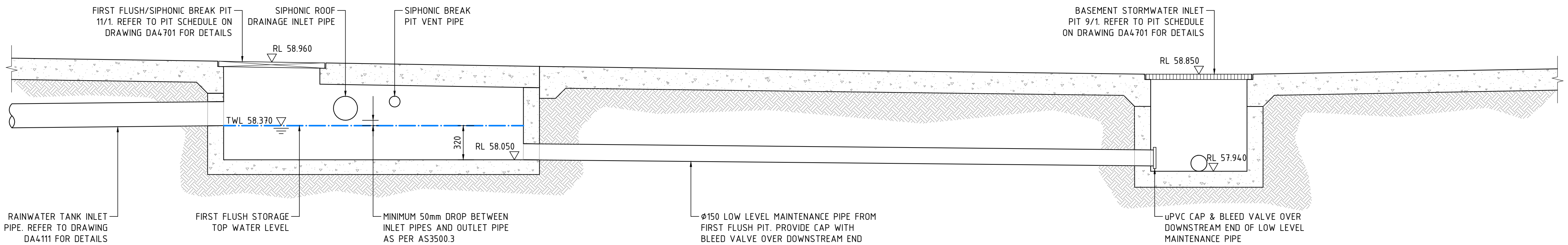
STORMFILTER PIT - PLAN

SCALE 1:25



STORMFILTER PIT - SECTION

SCALE 1:25



FIRST FLUSH/SIPHONIC BREAK PIT DETAIL

SCALE 1:25

AS SHOWN

STATE SIGNIFICANT DEVELOPMENT APPLICATION

NORTH POINT

REFERENCES

DATE	AMENDMENT	INIT	REV	DATE	AMENDMENT	INIT	REV
17.12.21	SSDA ISSUE	DD	1				

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PROJECT
PROPOSED INDUSTRIAL WAREHOUSE
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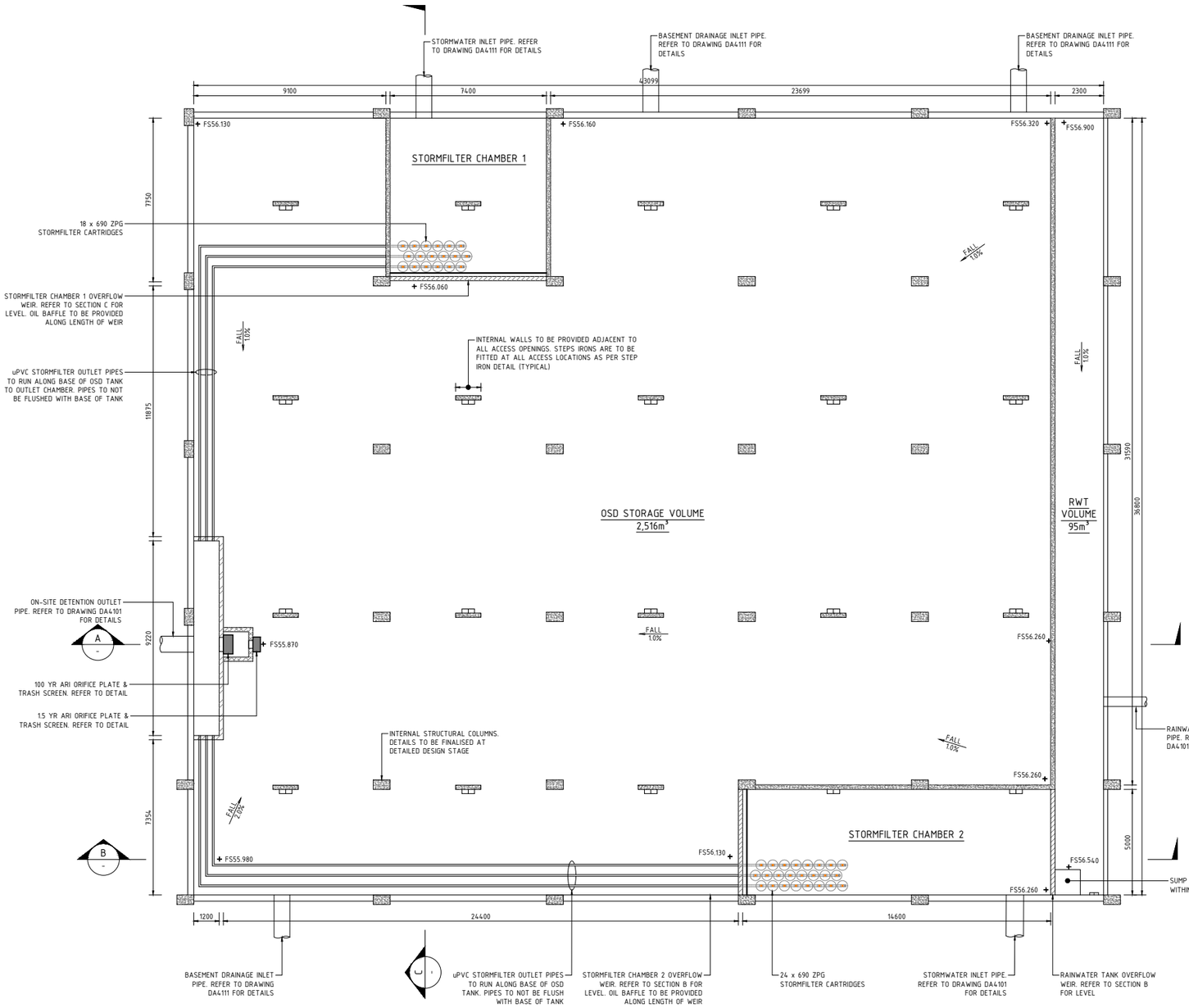
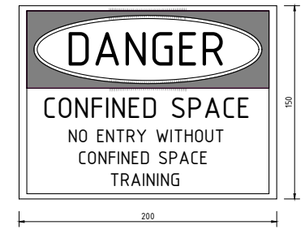
DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER DRAINAGE
DETAILS SHEET 2

DATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB

PROJECT No	SCALE	SIZE	DRAWING No	REVISION
20214	AS SHOWN	B1	DA4702	1



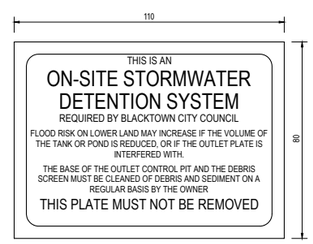
OSD BASE PLAN
SCALE 1:100 @ B1 (A)



CONFINED SPACE WARNING SIGN TO BE LOCATED AT EACH PIT ENTRANCE OF UNDERGROUND TANK INCLUDING CONTROL PIT.

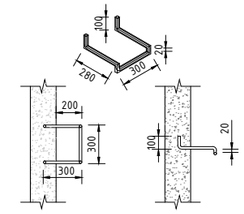
COLOURS:	"DANGER" AND BACKGROUND	WHITE
	ELLIPTICAL AREA	RED
	RECTANGLE CONTAINING ELLIPSE	BLACK
	OTHER LETTERING AND BORDER	BLACK
MATERIAL:	POLYPROPYLENE	

CONFINED SPACE WARNING SIGN
NOT TO SCALE



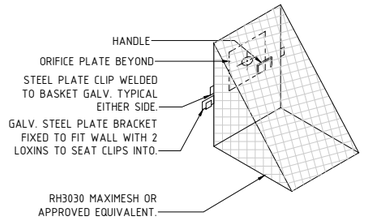
NOTES:
1. CORNERS SQUARE
2. COLOURS:
   ETCHED AND FILLED BLACK LEGEND ON A NATURAL SILVER BACKGROUND
3. CONSTRUCTED FROM ALUMINIUM 0.9mm MILL
4. THIS SIGN SHALL BE PLACED IN A VISIBLE LOCATION NEAR A DISCHARGE CONTROL PIT OR AT THE ACCESS TO ONE.
5. SIGN FIXED USING HILTI CHEMSETS OR EPOXY

OSD SIGN
NOT TO SCALE

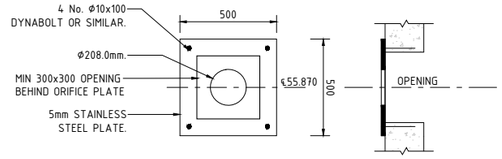


STEP IRON DETAIL
NOT TO SCALE

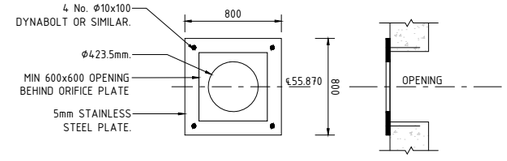
STEP IRON OF 20mm GALVANIZED STEEL MADE TO SHAPE AND DIMENSIONS SHOWN AND PLACED AT 300 CENTRES AND STAGGERED HORIZONTALLY FOR PITS DEEPER THAN 1.0m.



TRASH SCREEN DETAIL
NOT TO SCALE



1.5 YR ORIFICE PLATE DETAIL
NOT TO SCALE



100 YR ORIFICE PLATE DETAIL
NOT TO SCALE

AS SHOWN

IMPORTANT
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REFERENCES

DATE	AMENDMENT	INIT	REV
19.02.21	50% ISSUE	DD	1
12.03.21	90% ISSUE	DD	2
29.03.21	SSDA ISSUE	DD	3
04.06.21	SSDA ISSUE	DD	4
10.09.21	SSDA ISSUE	DD	5
17.12.21	SSDA ISSUE	DD	6

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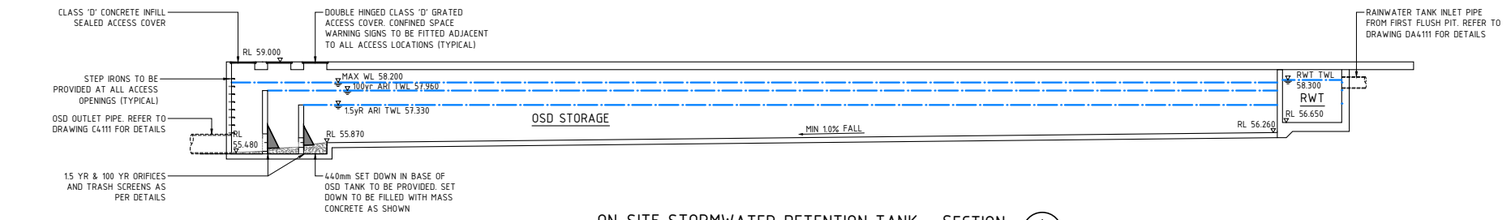
DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER DRAINAGE
OSD TANK DETAILS SHEET 1

DATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB
PROJECT No	SCALE	SIZE	REVISION
20214	AS SHOWN	B1	6
	DRAWING No	DA4711	

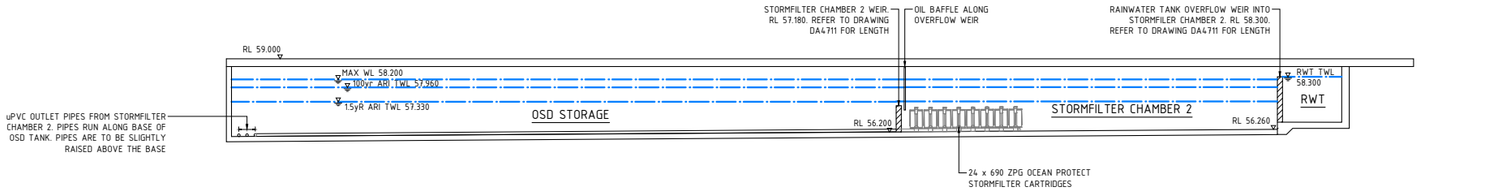
STATE SIGNIFICANT DEVELOPMENT APPLICATION



ON-SITE STORMWATER DETENTION TANK - SECTION A

SCALE 1:100 @ B1

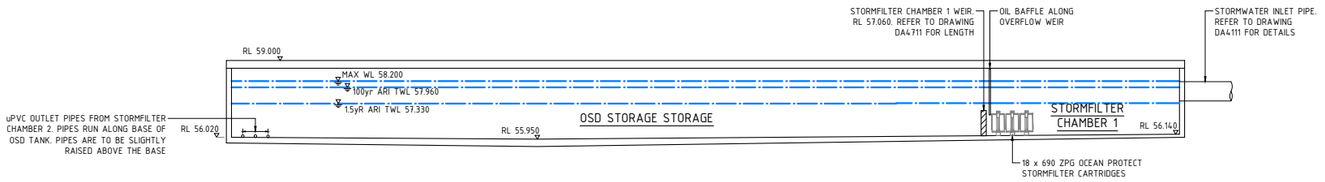
DA4711



ON-SITE STORMWATER DETENTION TANK - SECTION B

SCALE 1:100 @ B1

DA4711



ON-SITE STORMWATER DETENTION TANK - SECTION C

SCALE 1:100 @ B1

DA4711

AS SHOWN

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REFERENCES

DATE	AMENDMENT	INIT	REV
10.09.21	SSDA ISSUE	DD	1
17.12.21	SSDA ISSUE	DD	2

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DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER DRAINAGE
OSD TANK DETAILS SHEET 2

DATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB

SCALE	SIZE	REVISION
AS SHOWN	B1	2

PROJECT No 20214
DRAWING No DA4712

STATE SIGNIFICANT DEVELOPMENT APPLICATION

APPENDIX B. BCC OSD CALCULATION SUMMARY

Blacktown City C

Project Details:

Project Title	Arnotts, Huntingwood
Address	65 Huntingwood Drive, Hunting
Reference Number	20214

General Site Data:

Site Area (m^2)	55287 m²
Area Draining to OSD (m^2)	48185 m²

On-Site Detention Data:

OSD Location	Below Ground
OSD Discharge Location	Council Drainage Pit
RL of Bottom of OSD Storage Area	56.110
RL of Top of OSD Storage Area	58.200
Length of Emergency Overflow Weir (m)	11.50 m

Filter Cartridges:

Will filter cartridges be used to manage water quality?	Yes
Design flow from Filter Cartridges (L/s)	67.20 L/s
Filter Cartridges flow with 100 Year ARI Head (L/s)	103.10 L/s

Discharge Data:

RL of 1.5 Year ARI Orifice Centreline	55.870
Number of Orifices	1
RL of 100 Year ARI Orifice Centreline	55.870
Number of Orifices	1
RL of Invert of Discharge to Council Drainage Pit	54.780
RL of obvert of Pit outlet pipe	55.720

Below Ground OSD Summary with calculated values	
Site:	
Site Area	55287 m²

	Site Area NOT Draining to OSD	7102 m²
Reduced Levels (AHD):		
	RL of Top of Tank	58.2
	RL of Bottom of OSD Tank	56.11
	RL of 1.5 Year ARI Overflow Weir	57.33
	RL of Emergency Overflow Weir	57.96
	RL of 1.5 Year ARI Orifice Centerline	55.87
	RL of 100 Year ARI Orifice Centreline	55.87
	RL of Invert of Discharge to Council Drainage Pit	54.78
	RL of obvert of Pit outlet pipe	55.72
	Minium RL of Garage Floor	58.29
	Minium RL of House Floor	58.39
OSD Volume:		
	Required Storage BELOW 1.5 Year ARI Overflow Weir	1658.6 m³
	Required Storage BELOW Emergency Overflow Weir	2515.6 m³
Discharge Details:		
	Using Filter Cartridges to Manage Water Quality	Yes
	Discharge Location	Council Drainage Pit
	Length of Emergency Overflow Weir	11.50 m
	Maximum 1.5 Year ARI Site Discharge	178.54 L/s
	1.5 Year ARI Orifice Discharge	111.34 L/s
	Maximum 100 Year ARI Site Discharge	652.74 L/s
	100 Year ARI Orifice Discharge	549.64 L/s
	Filter Cartridges design flow	67.20 L/s
	Filter Cartridges Discharge with Additional Head	103.10 L/s
Orifice Details:		
	Number of 1.5 Year ARI Orifices	1
	Number of 100 Year ARI Orifices	1
	1.5 Year ARI Orifice Size (mm)	208.5 mm
	100 Year ARI Orifice Size (mm)	423.5 mm
Notifications:		
	Access grates to be provided such that the maximum reach from any point in the tank to the neaest grate is 3.0m.	

APPENDIX C. MAINTENANCE & MONITORING SCHEDULE

Job No.: 20214

Author Name: Daniel Drewitt

Date: 13 September 2021

Signature:

PROJECT ADDRESS: 65 HUNTINGWOOD DRIVE, HUNTINGWOOD

General Notes:

1. Maintenance is to be carried out with regard to relevant occupational health and safety guidelines and standards. This includes all confined space, traffic management, fall arrest and other requirements.
2. Initial monitoring and inspections of the stormwater system post commissioning are to be carried out every 3 months for the first year of operation. The amount and type of debris is to be noted and recorded. This information shall be used to determine if modification of the frequency of inspections is required.
3. The frequency of inspections shown in the stormwater maintenance schedule are the maximum periods. Inspection frequencies may be reduced upon completion of the initial monitoring and inspection program as noted in note 2.
4. Blank copies of the maintenance schedule are to be made and filled out during each subsequent inspection with the details kept on site for future reference.

Inspected by: ……

Date of Inspection: ……

Date of Next Inspection: ……

Item to be Inspected	Frequency	Performed by	Inspected	Maintenance Required	Maintenance Procedure	Maintenance Completed
			Yes/No	Yes/No		Date
General						
Eaves/Box Guttering System and Downpipes	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect and remove any build up of sediment, debris, litter and vegetation within gutter system.	
Stormwater surface inlet and junction pits	Four Monthly/ After Major Storm	Owner / Maintenance Contractor			Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter and vegetation. (e.g. Vacuum/eductor truck) Inspect and ensure grate is clear of sediment, debris, litter and vegetation. Ensure flush placement of grate on refitment	
General inspection of complete stormwater drainage system (that's visible)	Bi-annually	Owner / Maintenance Contractor			Inspect all drainage structures noting any dilapidation, carry out required repairs.	

Rainwater Tank						
First Flush Pit	6 Monthly	Owner / Maintenance Contractor			Inspect first flush pit to ensure correct operation. Flush pit dry and remove accumulated litter & debris. If pit is not functioning properly repair or replace.	
Internal Inspection	6 Monthly	Owner / Maintenance Contractor			Check for evidence of access by animals, birds or insects including the presence of mosquito larvae. If present, identify access point and close. If evidence of algal growth, find and close points of light entry.	
Tank and tank roof	6 Monthly	Owner / Maintenance Contractor			Check structural integrity of tank including roof and access covers. Any dilapidation including holes or gaps are to be noted and repaired.	
Treatment Devices						
Ocean Protect 'Jellyfish'	Refer Manufacturer's Manual	Maintenance / Specialised Contractor			Refer to manufacturer's operation and maintenance manual.	
Ocean Protect 'StormFilter' Cartridges	Refer Manufacturer's Manual	Maintenance / Specialised Contractor			Refer to manufacturer's operation and maintenance manual.	
Ocean Protect 'OceanGuard'	Refer Manufacturer's Manual	Maintenance / Specialised Contractor			Refer to manufacturer's operation and maintenance manual.	

On-Site Detention Tank						
Trash Screen	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect trash screen to ensure correct operation. Remove accumulated litter & debris. If device is not functioning properly repair or replace.	
Orifice Plate	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect orifice plate to ensure correct operation. Check orifice diameter size is correct and no damage is present to orifice edge. Check orifice plate is securely fastened to wall with no gaps present between plate and face of wall. If gaps are present fill with sealant or mortar to provide water tight seal.	
Weep Holes in base of sump	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect weep holes in base of sump. Ensure weep holes are able to drain effectively and remove accumulated sediment and debris if present.	
Tank and tank roof	6 Monthly	Owner / Maintenance Contractor			Check structural integrity of tank including roof and access covers. Any dilapidation including holes or gaps are to be noted and repaired.	