

INTEGRATED WATER CYCLE MANAGEMENT REPORT

HUNTINGWOOD PROCESSING EXPANSION

65 HUNTINGWOOD DRIVE, HUNTINGWOOD

Date: 13 September 2021

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Prepared for: Charter Hall Holdings Pty Ltd

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Document Control

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Prepared by	Daniel Drewitt	Revision	5
Approved by	Benjamin Barrett	Revision	5

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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.

2. INTRODUCTION

2.1 Existing Site

The site is located at 65 Huntingwood Drive, Huntingwood and has an approximate total area of 163,933m². 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 its 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 is spread across several areas within the site. The main development is located within the north-western corner of the existing site and consists of a processing facility, hardstand for loading, a multistorey car park, ingredient silo and landscaping. The new main processing building occupies 25,667m², silos 324m² and ancillary buildings occupying 1,790m², the pavement area occupies 10,074m² and the new landscaping occupies 2,088m². There are ancillary developments outside of the new processing facility including relocations of an existing storage building and a new warehouse. The ancillary buildings have a total roof area of 1,466m² and the hardstand totaling 313m². The proposed development will require the demolition of the existing OSD basin and reconstruction as a below ground 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) and gross pollutant trap (GPT) 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 (12,232m²). 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/m² 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

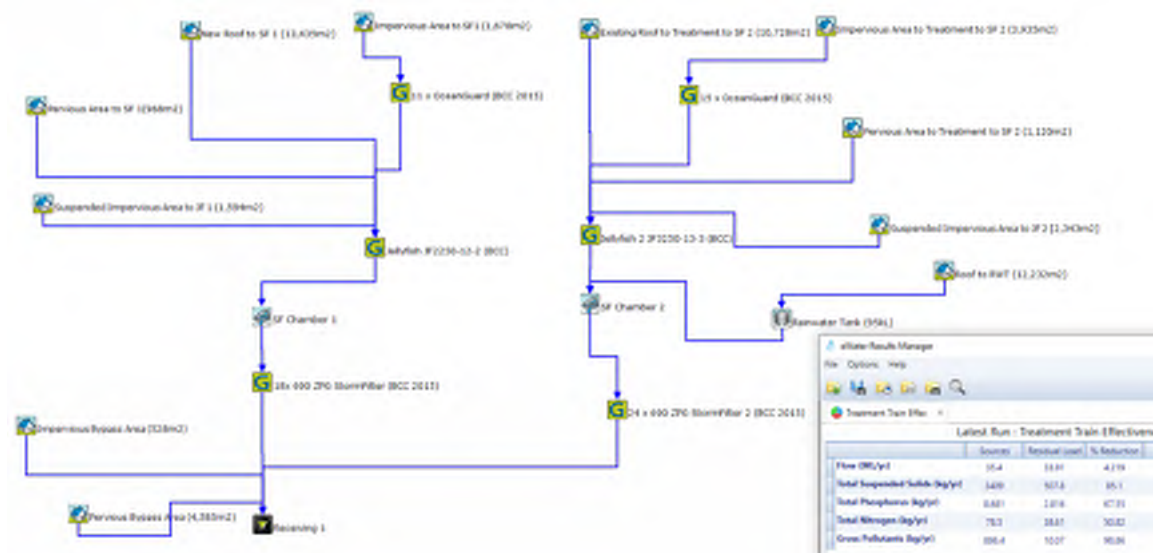
The development is located within Section 7.11 Contributions Plan No. 19 Voluntary Contribution Scheme Boundary as per BCC mapping within Part J of their DCP. However, it is proposed that the development will not enter into a Voluntary Planning Agreement (VPA) with Blacktown Council. As per Council's 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.

Modelling of the proposed treatment measures has been undertaken using the MUSICX software package version 1.1.0. 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 – MUSICX 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)	886.4	10.07	98.86	90	Y
Total Suspended Solids (kg/yr)	3409	507.8	85.10	85	Y
Total Phosphorous (kg/yr)	8.681	2.816	67.55	65	Y
Total Nitrogen (kg/yr)	78.5	38.61	50.82	45	Y

Table 1. MUSICX 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 processing facility, surrounding areas and upstream catchments, form an area of 53,144m², which is the assumed catchment of the existing OSD basin that is being demolished and occupying the north-west corner of the site. This area predominately drains to the proposed on-site detention (OSD) facility, with some areas bypassing the OSD, but have been included in the OSD calculations. Catchment areas includes new and existing hardstand (9,549m²), existing building roof (10,727m²), new processing building roof (25,667m²) and new landscaped areas (2,088m²). Bypassing areas totaling 5,113m² consist of landscaping (4,585m²) and hardstand (528m²). Ancillary structures such as the new silo, storage building and new warehouse south-east of the existing building drain to the existing stormwater drainage system and separate OSD basin. 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 1594.3m³ and 2418.1m³ respectively. The maximum proposed permissible discharge rate for 50% and 1% AEP storm events is 181.9L/s and 723.4L/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 D 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, DA4301, DA4701, 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, 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, DA4701, 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.

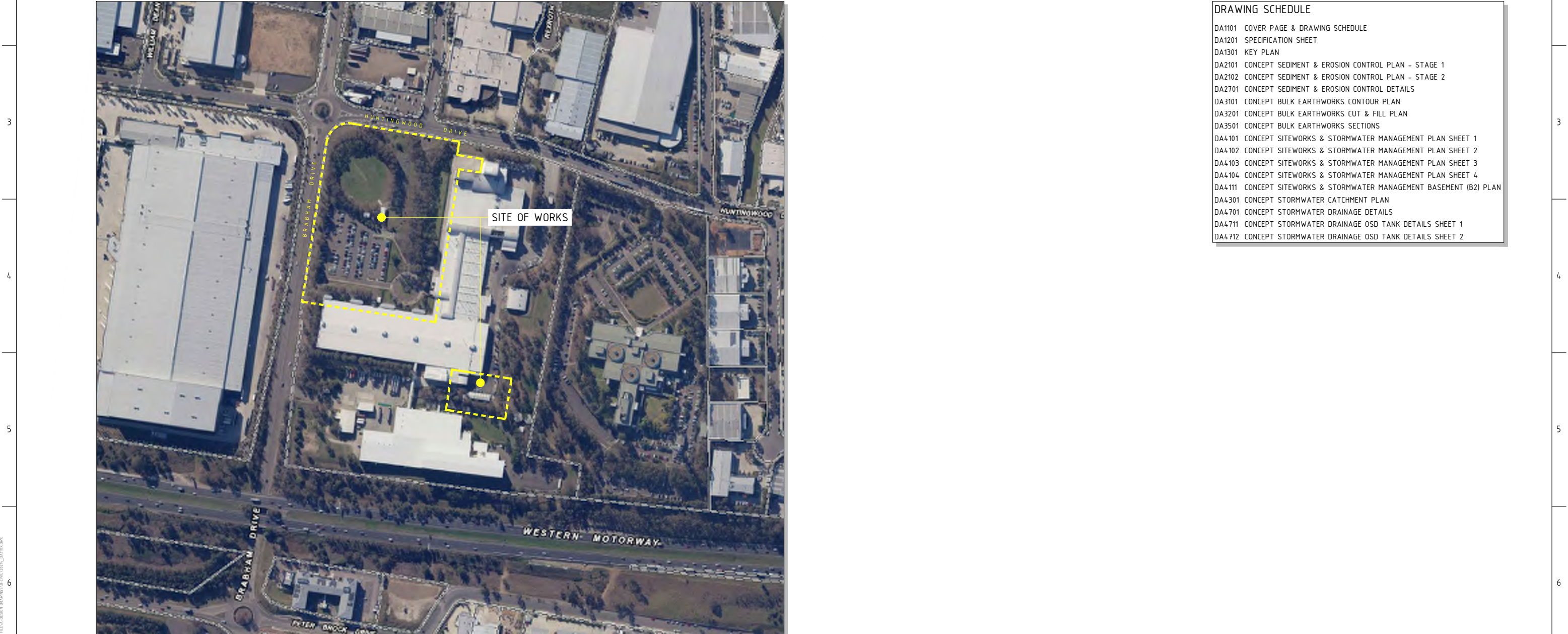
CONCLUSION

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.

APPENDIX A. CONCEPT DRAINAGE PLANS

1	2	3	4	5	6	7	8	9	10	
1	<i>PROPOSED INDUSTRIAL WAREHOUSE 65 HUNTINGWOOD DRIVE, HUNTINGWOOD CIVIL ENGINEERING PACKAGE</i>									1



LOCALITY PLAN

NOT TO SCALE - COURTESY OF SIX MAPS

3

BRABHAM DRIVE

HUNTINGWOOD DRIVE

SITE OF WORKS

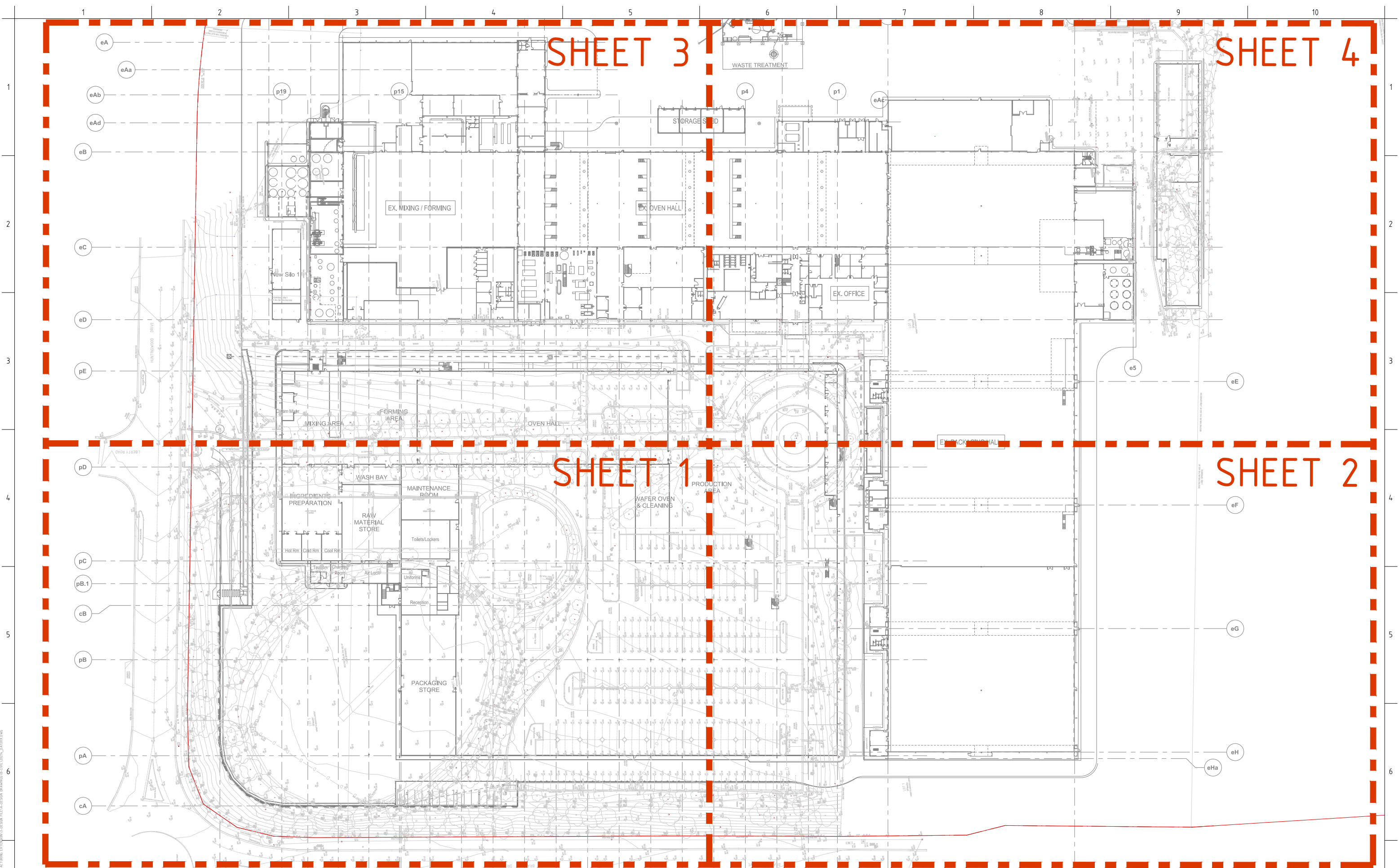
HUNTINGWOOD DRIVE

DRAWING SCHEDULE

DA1101	COVER PAGE & DRAWING SCHEDULE
DA1201	SPECIFICATION SHEET
DA1301	KEY PLAN
DA2101	CONCEPT SEDIMENT & EROSION CONTROL PLAN - STAGE 1
DA2102	CONCEPT SEDIMENT & EROSION CONTROL PLAN - STAGE 2
DA2701	CONCEPT SEDIMENT & EROSION CONTROL DETAILS
DA3101	CONCEPT BULK EARTHWORKS CONTOUR PLAN
DA3201	CONCEPT BULK EARTHWORKS CUT & FILL PLAN
DA3501	CONCEPT BULK EARTHWORKS SECTIONS
DA4101	CONCEPT SITEWORKS & STORMWATER MANAGEMENT PLAN SHEET 1
DA4102	CONCEPT SITEWORKS & STORMWATER MANAGEMENT PLAN SHEET 2
DA4103	CONCEPT SITEWORKS & STORMWATER MANAGEMENT PLAN SHEET 3
DA4104	CONCEPT SITEWORKS & STORMWATER MANAGEMENT PLAN SHEET 4
DA4111	CONCEPT SITEWORKS & STORMWATER MANAGEMENT BASEMENT (B2) PLAN
DA4301	CONCEPT STORMWATER CATCHMENT PLAN
DA4701	CONCEPT STORMWATER DRAINAGE DETAILS
DA4711	CONCEPT STORMWATER DRAINAGE OSD TANK DETAILS SHEET 1
DA4712	CONCEPT STORMWATER DRAINAGE OSD TANK DETAILS SHEET 2

3

[illegible]



SHEET 3

SHEET 4

SHEET 1

SHEET 2

STATE SIGNIFICANT DEVELOPMENT APPLICATION

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29.03.21	SSDA ISSUE	DD	3				
04.06.21	SSDA ISSUE	DD	4				

STRUCTURAL	-	CLIENT	PROPOSED INDUSTRIAL WAREHOUSE 65 HUNTINGWOOD DRIVE, HUNTINGWOOD CIVIL ENGINEERING PACKAGE
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ELECTRICAL	-	ARCHITECT	hla architects
CIVIL	SPARKS AND PARTNERS CONSULTING ENGINEERS		

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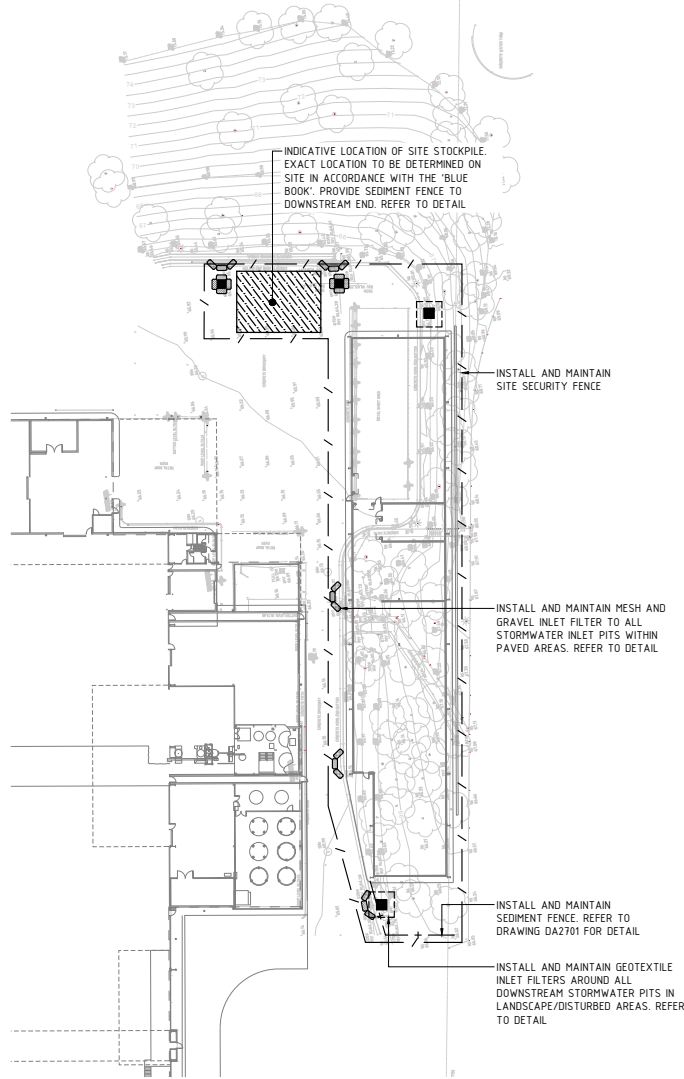
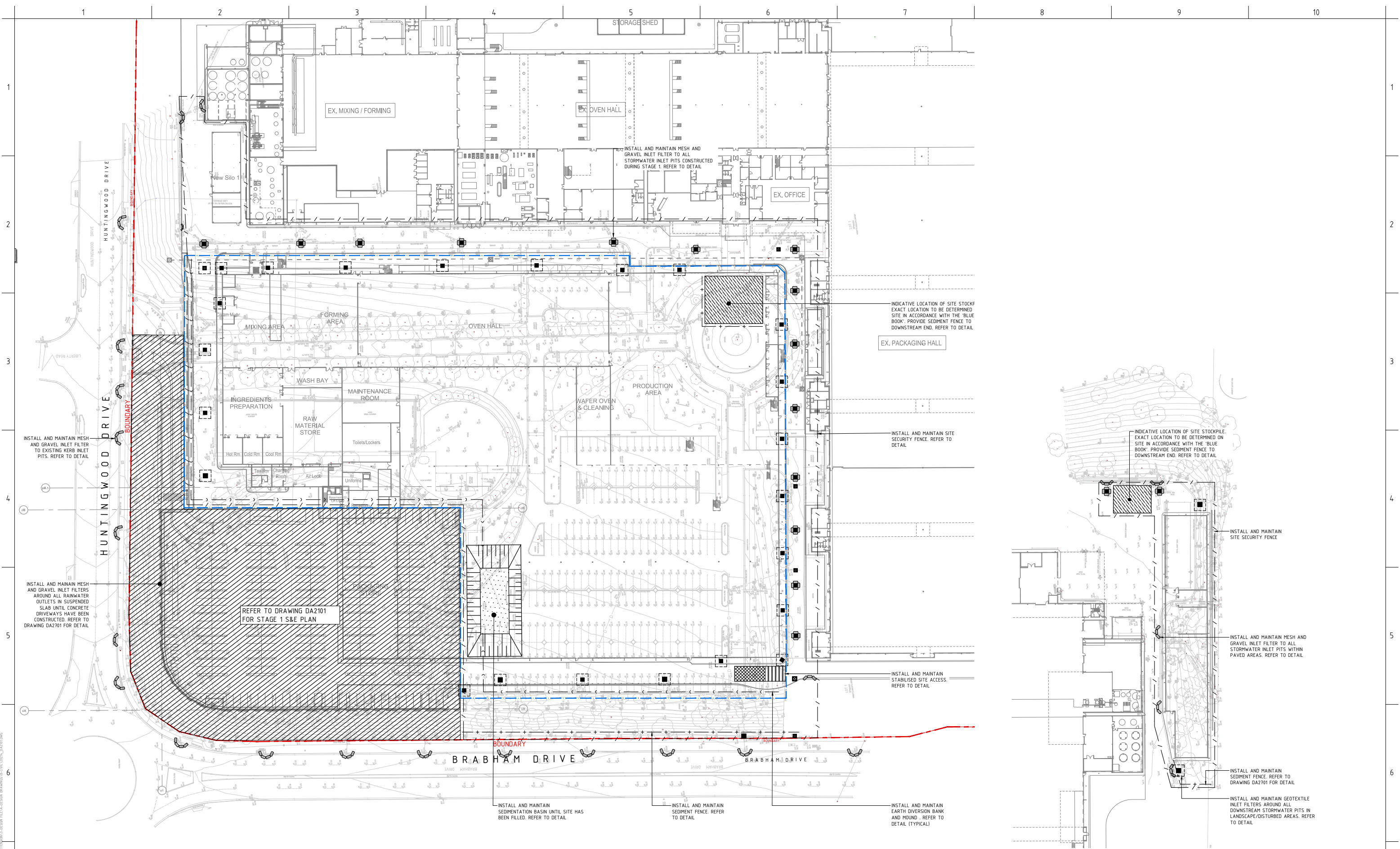
Level 1, 51 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au
https://sparksandpartners.com.au/

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ELECTRICAL	-				
CIVIL	SPARKS AND PARTNERS CONSULTING ENGINEERS				

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PROJECT No: 20214

DRAWN: MG
SCALE: 1:500

DESIGNED: DD
SIZE: B1

CHECKED: BB
REVISION: 4

SPARKS+PARTNERS
CONSULTING ENGINEERS
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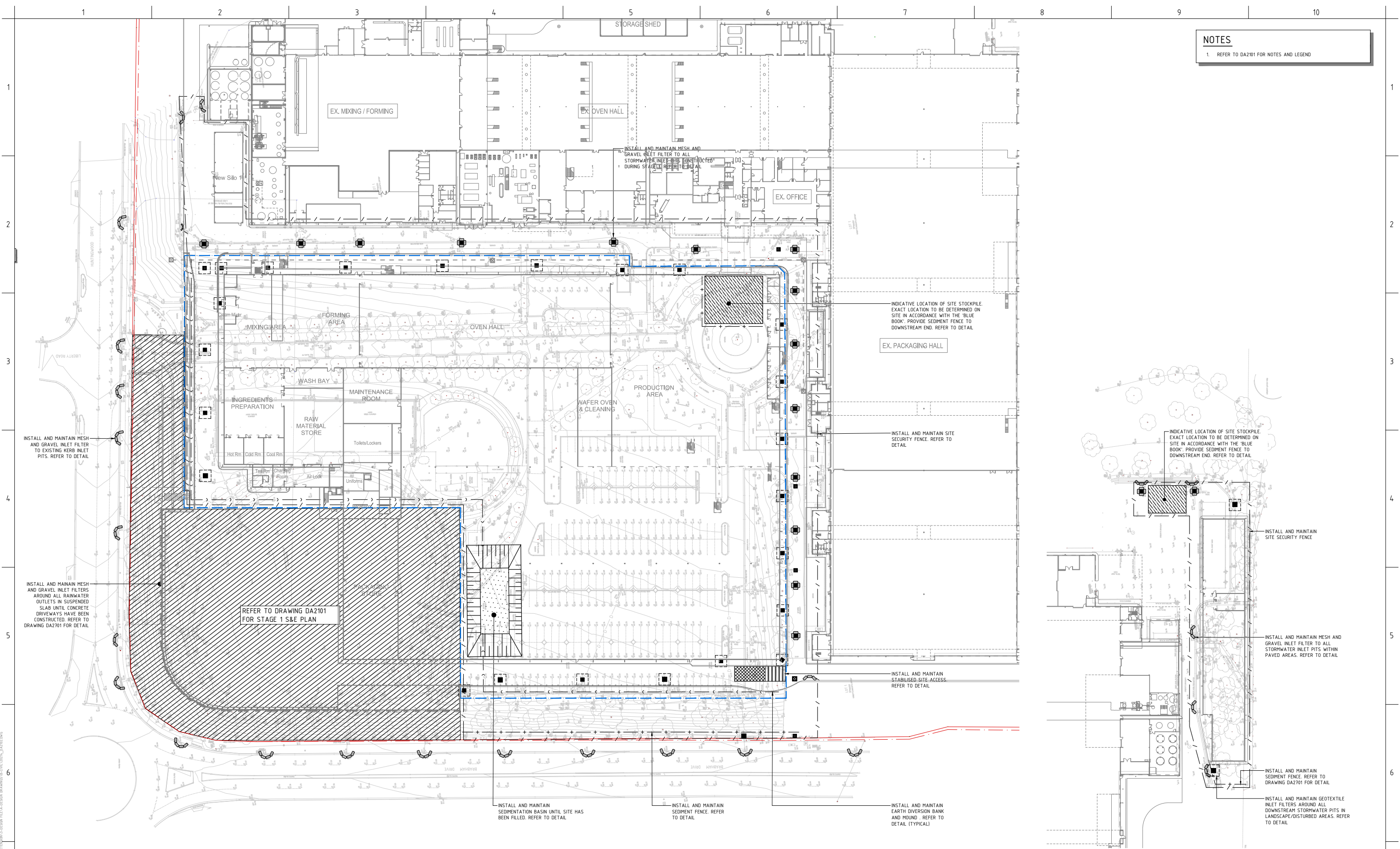
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P 02 9891 5033 | F 02 9891 3888 | E admin@sparksandpartners.com.au
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DESIGN VERIFICATION

HCAA
HYDROLOGICAL & CIVIL ASSOCIATION OF AUSTRALIA

DRAWING TITLE: CIVIL DESIGN
CONCEPT SEDIMENT & EROSION
CONTROL PLAN - STAGE 1



NOTES
1. REFER TO DA2101 FOR NOTES AND LEGEND

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29.03.21	SSDA ISSUE	DD	3				
04.06.21	SSDA ISSUE	DD	4				

STRUCTURAL

MECHANICAL

ELECTRICAL

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

BUILDER

FDC

PROJECT

PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

ARCHITECT

hla architects

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Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3888 | E admin@sparksandpartners.com.au
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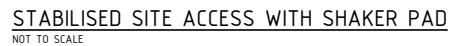
DRAWING TITLE

CIVIL DESIGN
CONCEPT SEDIMENT & EROSION
CONTROL PLAN - STAGE 2

DATE	DRAWN	DESIGNED	CHECKED	BB
FEB 2021	MG	DD		

PROJECT No	SCALE	AS SHOWN	SIZE	B1	REVISION
20214					4

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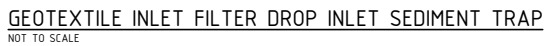
- THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY.
- THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
- INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
- INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.



1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.



1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 500 LITRES PER SECOND. DESIGN THE FENCE TO LAST 10-YEAR EVENT CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
2. DRIVE 150mm LONG STAKE PICTETS INTO GROUND AT 2.0m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAKE PICTETS ARE FITTED WITH SAFETY CAPS.
3. FIX THE SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
4. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
5. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 100mm LONG STAIR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS.
4. ENSURE ALL STAIR PICKETS ARE FITTED WITH SAFETY CAPS.
5. SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
6. JOINTS OF FABRIC AT A SUPPORT POST WITH A 200mm OVERLAP.
7. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA
2. CONSTRUCT A CUT-OFF TRENCH 500mm DEEP AND 1200mm WIDE ALONG THE CENTERLINE OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST
3. MAINTAIN THE TRENCH FREE OF WATER AND PROTECT THE MATERIAL WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95% STANDARD PROCTOR DENSITY
4. SELECT FILL FOLLOWING THE SWMP THAT IS FREE OF ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND COMPACT FILL TO THE EXISTING SUBSTRATE
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP
7. CONSTRUCT THE EMERGENCY SPILLWAY
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP

SEDIMENT BASIN CATCHMENT AREA	= 5.4Ha
REQUIRED SETTLING ZONE	= 917m³
REQUIRED STORAGE VOLUME	= 658m³
REQUIRED BASIN VOLUME	= 1375m³
BASE DIMENSION	= 23m (L) x 10m (W)
TOP DIMENSION	= 39m (L) x 19m (W)
MAX SIDE SLOPE	= 1V:1H
BASIN STORAGE VOLUME PROVIDED	= 1404m³
DESIGN STORM	= 80th PERCENTILE

[illegible]

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

CLIENT	
BUILDER	

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

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE

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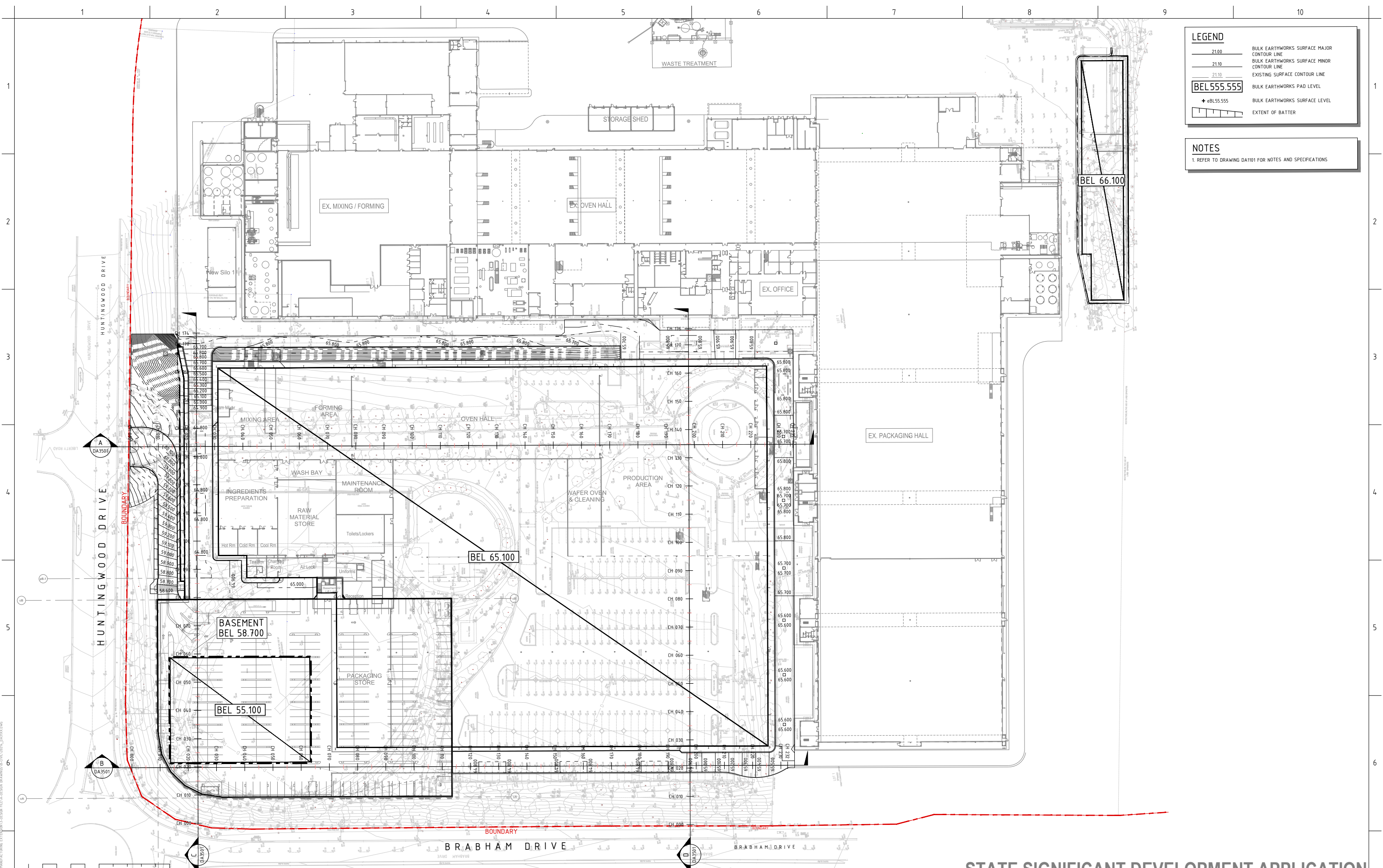
 **FPA**
AUSTRALIA
Fire Protection Association Australia

 **DNV-GL**

 **HCAA**

DRAWING TITLE			
CIVIL DESIGN CONCEPT SEDIMENT & EROSION CONTROL DETAILS			
GATE	DRAWN	DESIGNED	CHECKED
FEB 2021	MG	DD	BB
SCALE		SIZE	REVISION
AS SHOWN		B1	
PROJECT No		DRAWING No	
20201		DA2301	

STATE SIGNIFICANT DEVELOPMENT APPLICATION



LEGEND

- 21.00 BULK EARTHWORKS SURFACE MAJOR CONTOUR LINE
- 21.10 BULK EARTHWORKS SURFACE MINOR CONTOUR LINE
- 21.10 EXISTING SURFACE CONTOUR LINE
- BEL 555.555 BULK EARTHWORKS PAD LEVEL
- + eBL 55.555 BULK EARTHWORKS SURFACE LEVEL
- EXTENT OF BATTER

NOTES

1. REFER TO DRAWING DA1101 FOR NOTES AND SPECIFICATIONS

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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				

STRUCTURAL
MECHANICAL
ELECTRICAL
CIVIL
SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT
BUILDER
FDC

PROJECT
PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE
ARCHITECT
hla architects

SPARKS + PARTNERS
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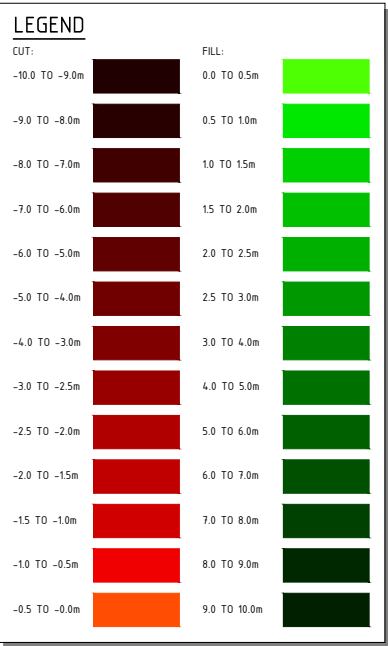
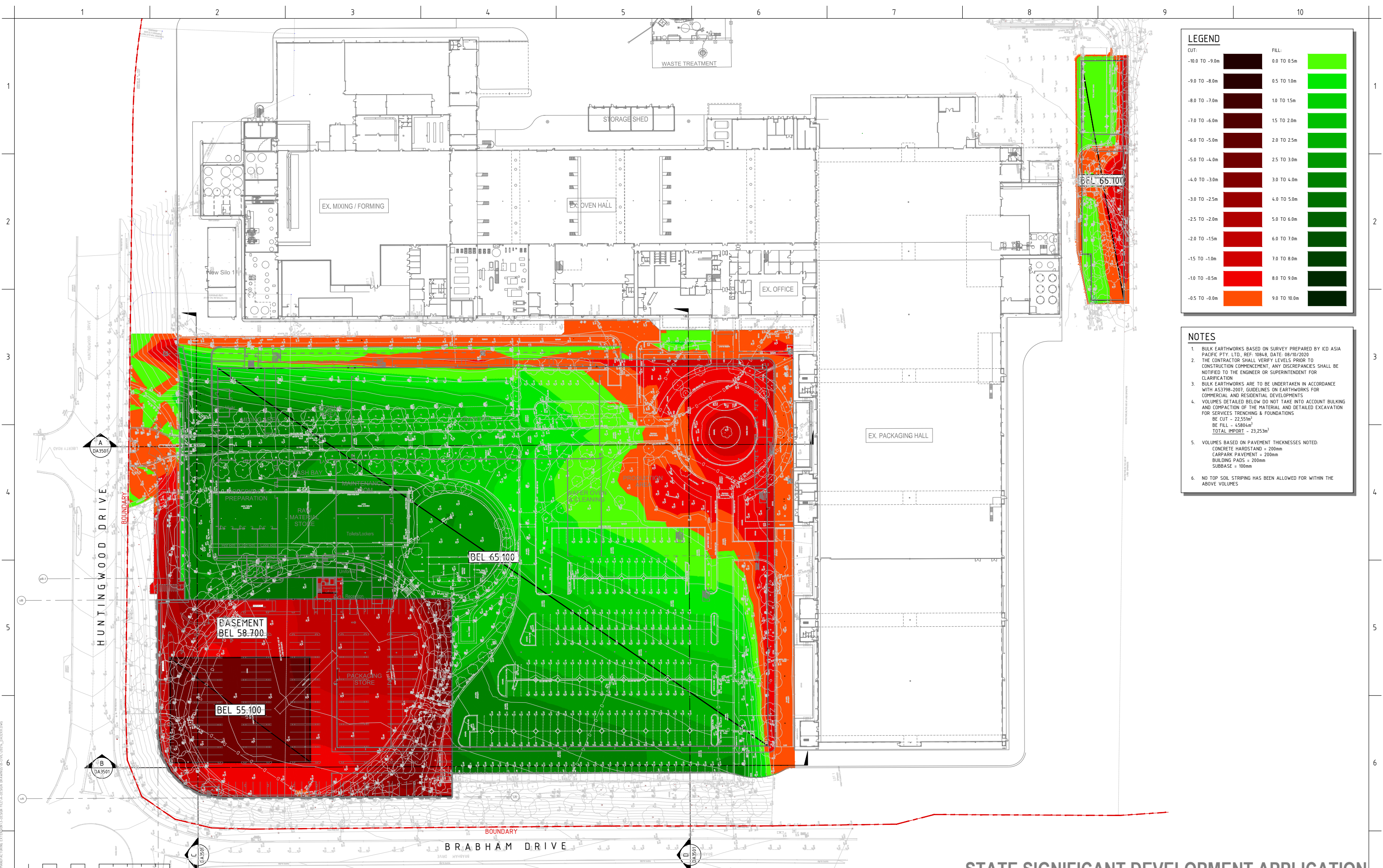
FPA
FIRE PROTECTION ASSOCIATION
CORPORATE MEMBER

DNV
DNV GL

HCAA
HYDRAULIC CONSULTANTS ASSOCIATION

DRAWING TITLE
CIVIL DESIGN
CONCEPT BULK EARTHWORKS
CONTOUR PLAN

DATE	DRAWN	DESIGNED	CHECKED	BB
FEB 2021	MG	DD		
PROJECT No	SCALE	1:500	SIZE	B1
20214	DRAWING No	DA3101	REVISION	4



- NOTES**
1. BULK EARTHWORKS BASED ON SURVEY PREPARED BY ICD ASIA PACIFIC PTY. LTD., REF: 10848, DATE: 08/10/2020
 2. THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION
 3. BULK EARTHWORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH ASS398-2007, GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS
 4. VOLUMES DETAILED BELOW DO NOT TAKE INTO ACCOUNT BULKING AND COMPACTION OF THE MATERIAL AND DETAILED EXCAVATION FOR SERVICES TRENCHING & FOUNDATIONS
BE CUT - 22,551m³
BE FILL - 4,5804m³
TOTAL IMPORT - 23,253m³
 5. VOLUMES BASED ON PAVEMENT THICKNESSES NOTED:
CONCRETE HARSTAND = 200mm
CARPARK PAVEMENT = 200mm
BUILDING PADS = 200mm
SUBBASE = 100mm
 6. NO TOP SOIL STRIPING HAS BEEN ALLOWED FOR WITHIN THE ABOVE VOLUMES

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04.06.21	SSDA ISSUE	DD	4				

STRUCTURAL -

MECHANICAL -

ELECTRICAL -

CIVIL -

SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

BUILDER

FDC

PROJECT

PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

ARCHITECT

hla architects

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CONSULTING ENGINEERS
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FPA
FIRE PROTECTION ASSOCIATION
CORPORATE MEMBER

DNVGL
DESIGN VERIFICATION
CORPORATE MEMBER

HCAA
HUMAN CAPITAL ASSOCIATION
CORPORATE MEMBER

DRAWING TITLE

CIVIL DESIGN
CONCEPT BULK EARTHWORKS CUT
& FILL PLAN

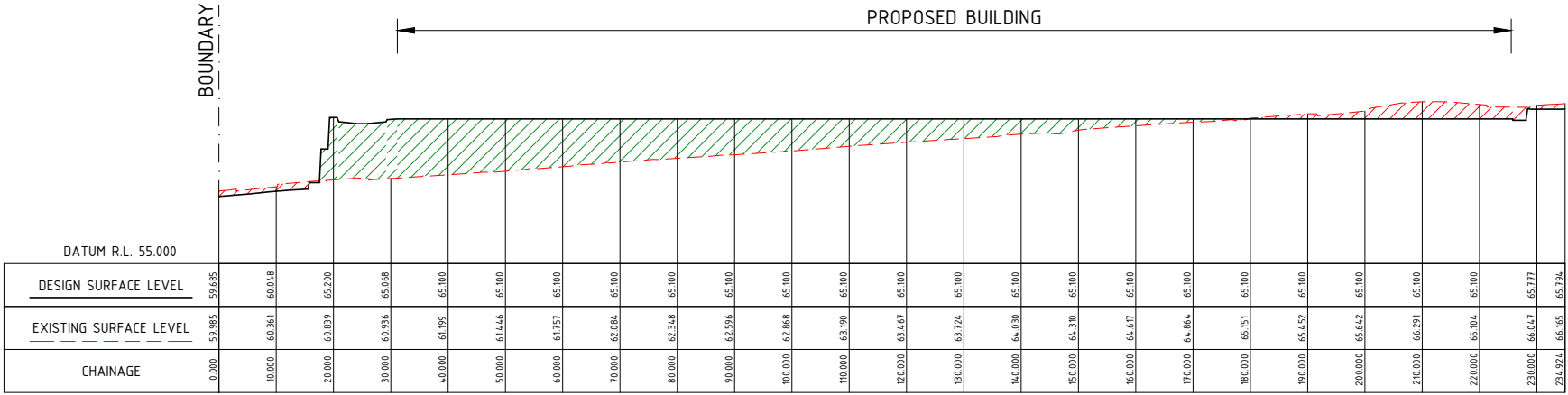
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FEB 2021	MG	DD	BB	
PROJECT No	SCALE	1:500	SIZE	B1
20214	DRAWING No	DA3201		4

\\12 - PROJECT\2020\2021 - 65 HUNTINGWOOD DRIVE\ACTING EXTENSIVE DESIGN\REVISED DRAWINGS\CIVIL\DA3201.DWG

LEGEND

CUT AREA

FILL AREA

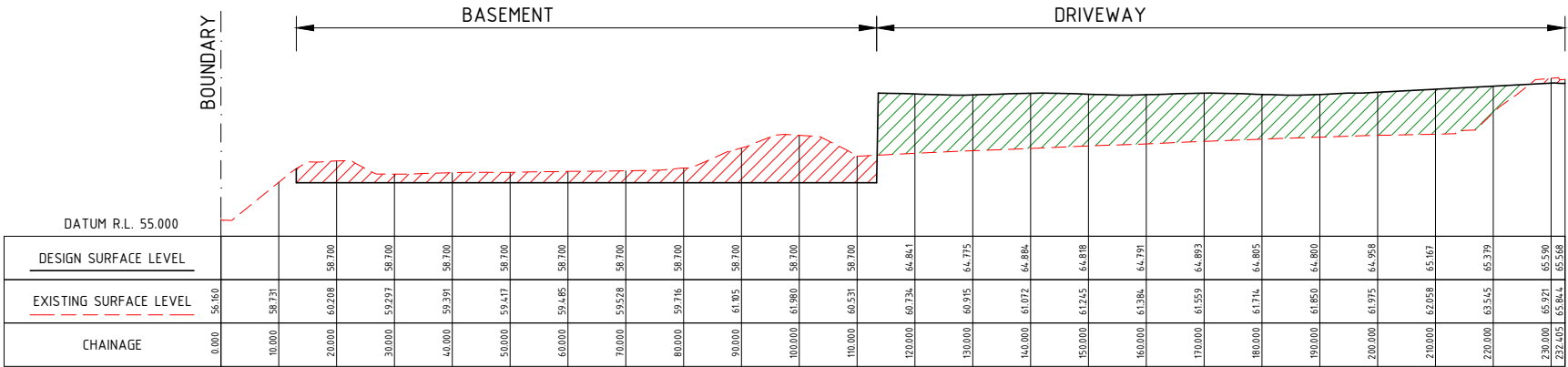


BULK EARTHWORKS - SECTION A

HORIZONTAL SCALE 1:500

VERTICAL SCALE 1:200

DA3101

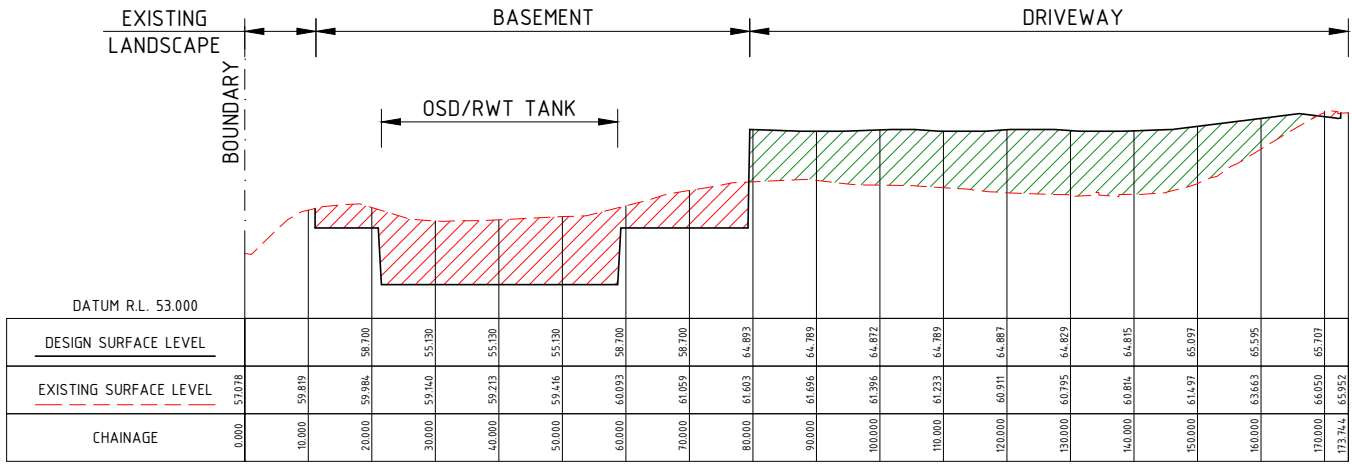


BULK EARTHWORKS - SECTION B

HORIZONTAL SCALE 1:500

VERTICAL SCALE 1:200

DA3101

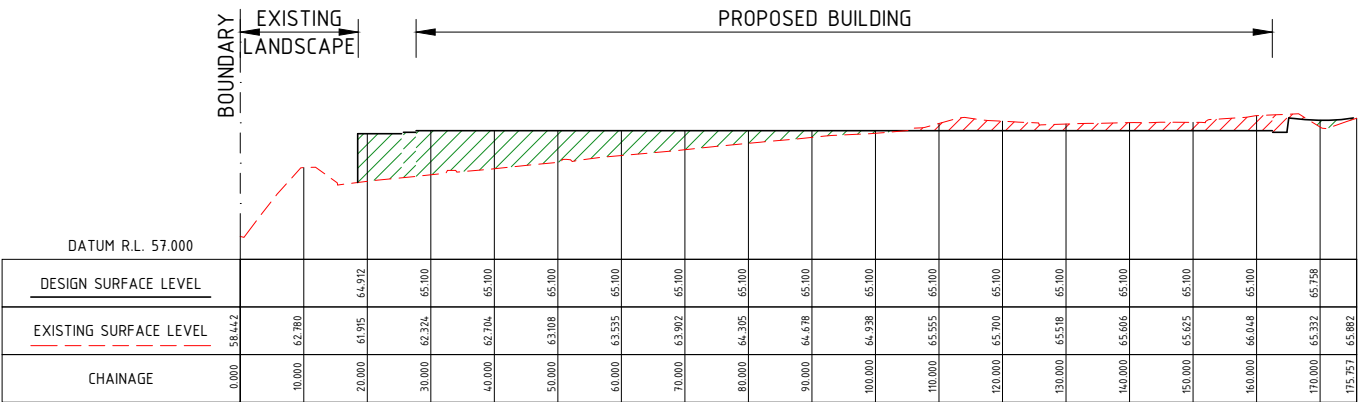


BULK EARTHWORKS - SECTION C

HORIZONTAL SCALE 1:500

VERTICAL SCALE 1:200

DA3101



BULK EARTHWORKS - SECTION D

HORIZONTAL SCALE 1:500

VERTICAL SCALE 1:200

DA3101

STATE SIGNIFICANT DEVELOPMENT APPLICATION

AS SHOWN

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REFERENCES

DATE

AMENDMENT

INIT

REV

DATE

AMENDMENT

INIT

REV

STRUCTURAL

MECHANICAL

ELECTRICAL

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

BUILDER

FDC

PROJECT

PROPOSED INDUSTRIAL WAREHOUSE

65 HUNTINGWOOD DRIVE, HUNTINGWOOD

CIVIL ENGINEERING PACKAGE

ARCHITECT

hla architects

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FPA

DNV-GL

HCAA

DRAWING TITLE

CIVIL DESIGN

CONCEPT BULK EARTHWORKS

SECTIONS

DATE

FEB 2021

SCALE

AS SHOWN

DESIGNED

MG

CHECKED

DD

REVISION

B1

PROJECT No

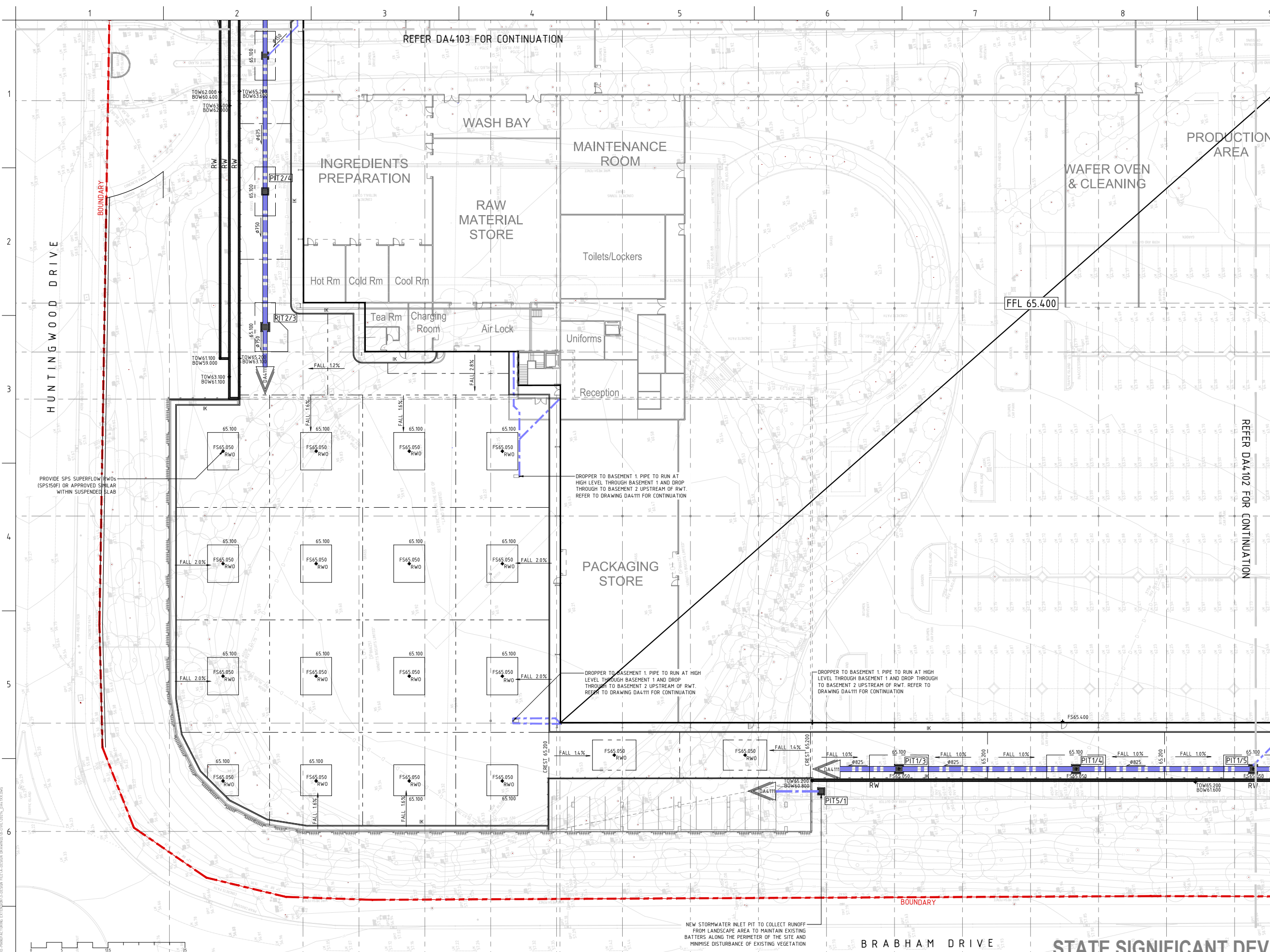
20214

DRAWING No

DA3501

REVISION

4



LEGEND

PROPOSED STORMWATER PIPE (±Ø300)

PROPOSED STORMWATER PIPE (±Ø375)

TEMPORARY STORMWATER DIVERSION LINE

PIPE FLOW DIRECTION AND SIZE

PROPOSED STORMWATER PIT (900x900 UNO)

PIT TAG

ONSITE DETENTION TANK

RAINWATER TANK

TREATMENT CHAMBER/DEVICE

21.00

FINISHED SURFACE MAJOR CONTOUR LINE21.1021.10PROPOSED KERBFFL 555.555+ F555.555+ eRL55.555FALL 1.28%TEMPORARY STORMWATER DIVERSION LINERW+ TOW55.555+ BOW55.555eKGKGIKDDDPRWO+ IOK55.555

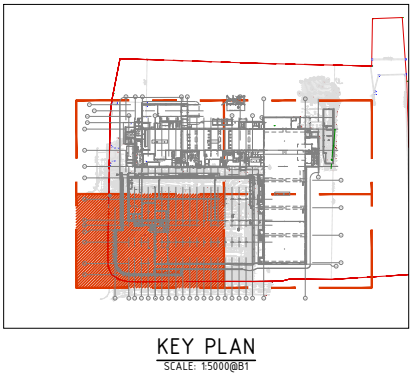
- NOTES**
1. REFER TO DA201 FOR GENERAL NOTES AND SPECIFICATIONS

2. REFER TO DA402-DA404 FOR CONTINUATION OF STORMWATER PLAN

3. REFER TO DA411 FOR BASEMENT STORMWATER PLAN

4. REFER TO DA4701-4702 FOR STORMWATER DETAILS INCLUDING OSD DETAILS

5. PRELIMINARY PIPE SIZES SHOWN.



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STRUCTURAL

MECHANICAL

ELECTRICAL

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

65 HUNTINGWOOD DRIVE, HUNTINGWOOD

CIVIL ENGINEERING PACKAGE

BUILDER

FDC

ARCHITECT

hla architects

PROJECT

PROPOSED INDUSTRIAL WAREHOUSE

65 HUNTINGWOOD DRIVE, HUNTINGWOOD

CIVIL ENGINEERING PACKAGE

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GRAPHIC TITLE

CIVIL DESIGN

CONCEPT SITEWORKS & STORMWATER MANAGEMENT PLAN

SHEET 1

DATE

FEB 2021

SCALE

1:250

SIZE

B1

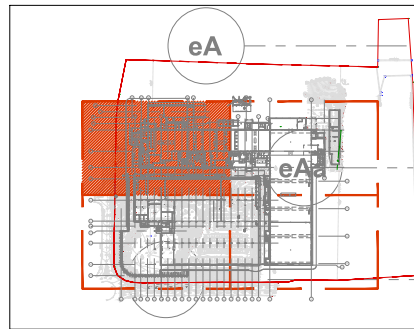
REVISION

20214

DRAWING No

DA4101

4



KEY PLAN
SCALE: 15000@BT

NOTES

- 1 REFER TO DA4101 FOR LEGEND AND NOTES

HUNTINGWOOD DRIVE

MAXIMUM 1 IN 3 LANDSCAPE BATTER

New Silo 1

EX. MIXING / FORMING

STORAGE SHED

NEW STORAGE SHED DRAINAGE TO CONNECT TO EXISTING SITE DRAINAGE SYSTEM

EX. OVEN HALL

REFER DA4101 FOR CONTINUATION

SILO ROOF TO CONNECT TO EXISTING SITE DRAINAGE SYSTEM

NEW CONCRETE DISH DRAIN TO BE CONSTRUCTED IN PLACE OF EXISTING GUTTER TO MAINTAIN EXISTING UPSTREAM DRAINAGE CONDITIONS

LIMIT OF WORKS

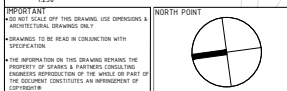
OVEN HALL

FORMING AREA

MIXING AREA

REFER DA4101 FOR CONTINUATION

STATE SIGNIFICANT DEVELOPMENT APPLICATION

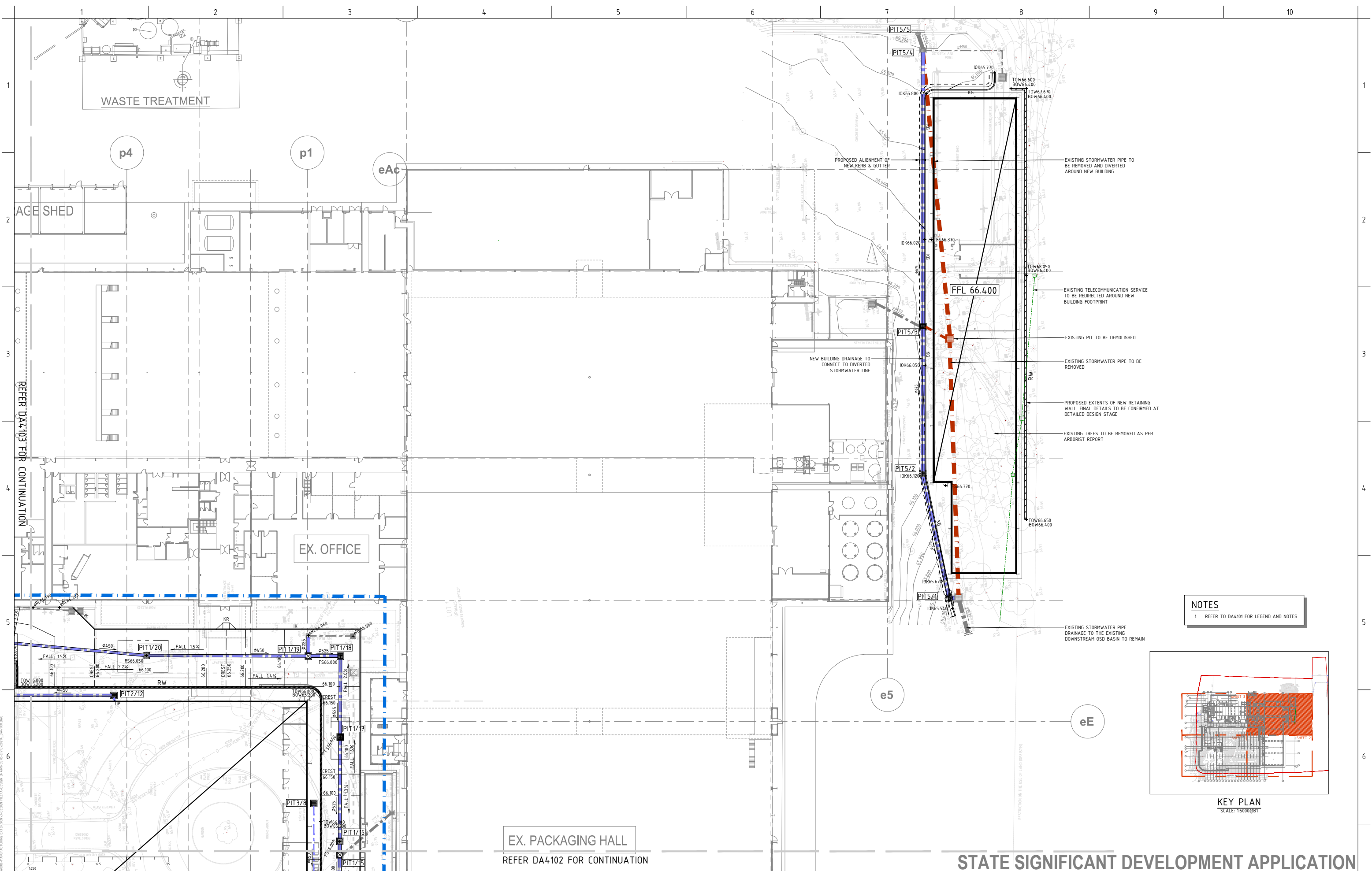


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12.03.21	90% ISSUE	DD	2				
29.03.21	SSDA ISSUE	DD	3				
04.06.21	SSDA ISSUE	DD	4				

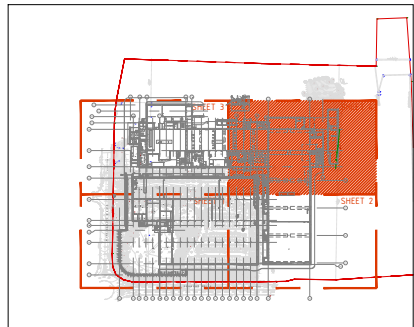
STRUCTURAL
MECHANICAL
ELECTRICAL
CIVIL
SPARKS AND PARTNERS CONSULTING ENGINEERS



DATE	SCALE	DESIGNED	CHECKED	REVISION
FEB 2021	1:250	DD	BB	
20214		DA4103	4	



NOTES
1. REFER TO DA4101 FOR LEGEND AND NOTES



KEY PLAN
SCALE: 1:5000@B1

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04.06.21	SSDA ISSUE	DD	4				

STRUCTURAL
-

MECHANICAL
-

ELECTRICAL
-

CIVIL
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hla architects

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

ARCHITECT
hla architects

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CORPORATE MEMBER

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CORPORATE MEMBER

HCAA
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CORPORATE MEMBER

DRAWING TITLE
CIVIL DESIGN
CONCEPT SITEWORKS &
STORMWATER MANAGEMENT PLAN
SHEET 4

DATE	DRAWN	DESIGNED	CHECKED	BB
FEB 2021	MG	DD		

PROJECT No
20214

DRAWING No
DA4104

REVISION
4

STORMWATER MANAGEMENT NOTES

1. REFER TO DA4101 FOR NOTES AND LEGEND

6.7 X 3.0m (LxW) JELLYFISH
DIVERSION PIT WITH A 7.3m LONG
DIVERSION WEIR AND OIL BAFFLE.
INLET IL 57.600

ON-SITE STORMWATER DETENTION
TANK & RAINWATER TANK. REFER
TO DRAWING DA4711 FOR DETAILS

EXISTING KERB INLET PIT
RL 56.350
IL 54.850

OCEAN PROTECT JELLYFISH
JF2250-12-2 UNIT

Basement-02
Lift Lobby

ROOF SIPHONIC DRAINAGE TO FIRST FLUSH
PIT. SIPHONIC DRAINAGE DETAILS TO BE
FINALISED AT DETAILED DESIGN STAGE
(TYPICAL)

LOW LEVEL OUTLET FROM FIRST FLUSH
PIT TO DRAIN AND CLEAN PIT. PROVIDE
GATE VALVE ON DOWNSTREAM END

2.4mx2.4m FIRST FLUSH PIT WITH
MINIMUM 2.4m³ STORAGE VOLUME

OCEAN PROTECT JELLYFISH
JF3250-13-3 UNIT

6.7 X 3.0m (LxW) JELLYFISH
DIVERSION PIT WITH A 7.3m LONG
DIVERSION WEIR AND OIL BAFFLE.
INLET IL 57.860

STATE SIGNIFICANT DEVELOPMENT APPLICATION

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04.06.21	SSDA ISSUE	DD	4				
10.09.21	SSDA ISSUE	DD	5				

STRUCTURAL
-
MECHANICAL
-
ELECTRICAL
-
CIVIL
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PROJECT
PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

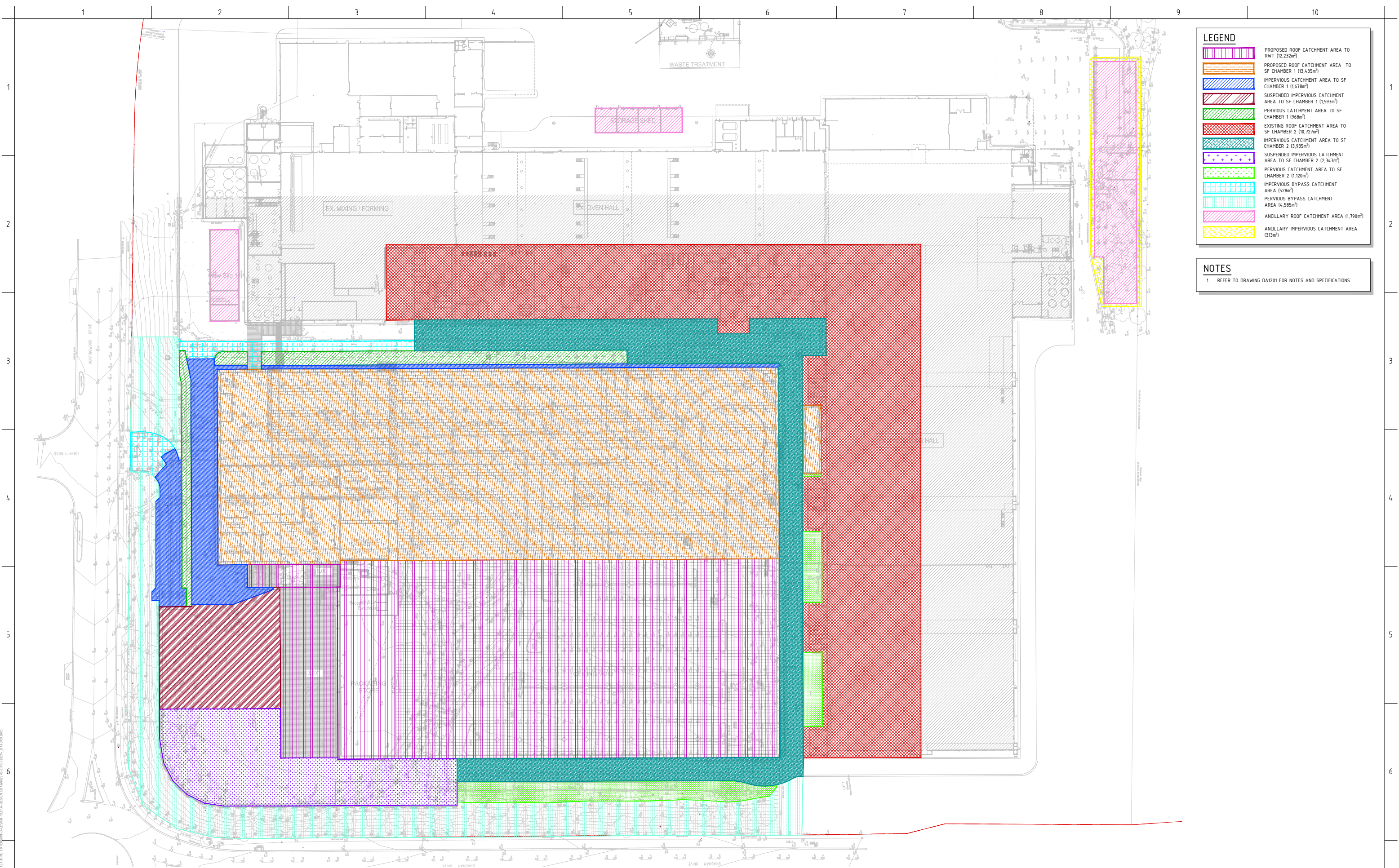
ARCHITECT



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DATE	SCALE	SIZE	REVISION
FEB 2021	MG	DD	BB
20214	1:250	B1	5



LEGEND

PROPOSED ROOF CATCHMENT AREA TO RWT (12,232m²)

PROPOSED ROOF CATCHMENT AREA TO SF CHAMBER 1 (13,435m²)

IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 1 (1,678m²)

SUSPENDED IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 1 (1,593m²)

PERVIOUS CATCHMENT AREA TO SF CHAMBER 1 (968m²)

EXISTING ROOF CATCHMENT AREA TO SF CHAMBER 2 (10,727m²)

IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 2 (3,935m²)

SUSPENDED IMPERVIOUS CATCHMENT AREA TO SF CHAMBER 2 (2,343m²)

PERVIOUS CATCHMENT AREA TO SF CHAMBER 2 (1,120m²)

IMPERVIOUS BYPASS CATCHMENT AREA (528m²)

PERVIOUS BYPASS CATCHMENT AREA (4,585m²)

ANCILLARY ROOF CATCHMENT AREA (1,790m²)

ANCILLARY IMPERVIOUS CATCHMENT AREA (373m²)

NOTES

1. REFER TO DRAWING DA1201 FOR NOTES AND SPECIFICATIONS

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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

STRUCTURAL

-

MECHANICAL

-

ELECTRICAL

-

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

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PROJECT

PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

ARCHITECT

SPARKS+PARTNERS CONSULTING ENGINEERS
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DATE

FEB 2021

SCALE

1:500

SIZE

B1

REVISION

5

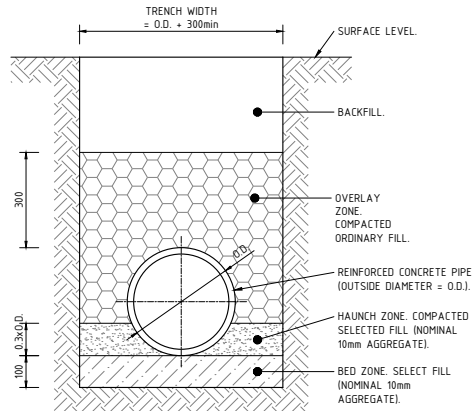
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20214

DRAWING No

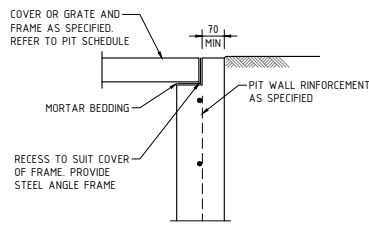
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STATE SIGNIFICANT DEVELOPMENT APPLICATION

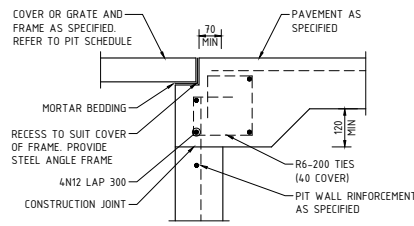


- NOTES**
- TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING ADEQUATE COMPACTION.
 - MINIMUM PIPE COVER NOT UNDER ROADS = 300mm UNO
 - THE CONTRACTOR SHALL ENSURE THAT THE SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
 - ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS
A) TRENCHES UNDER PAVED AREAS & BUILDINGS - 100% SMDD
TRENCHES NOT UNDER PAVEMENTS - 90% SMDD

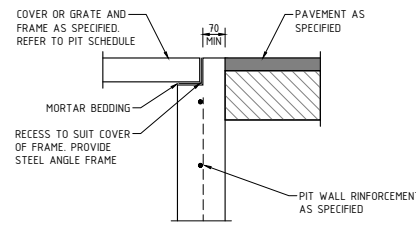
TYPICAL PIPE TRENCH
SCALE 1:10



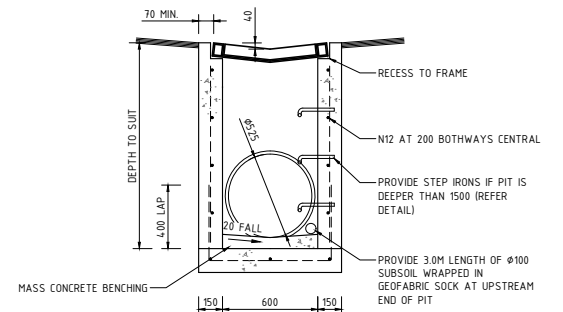
DETAIL 'A'
SCALE 1:10



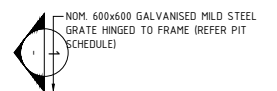
DETAIL 'B'
SCALE 1:10



DETAIL 'C'
SCALE 1:10

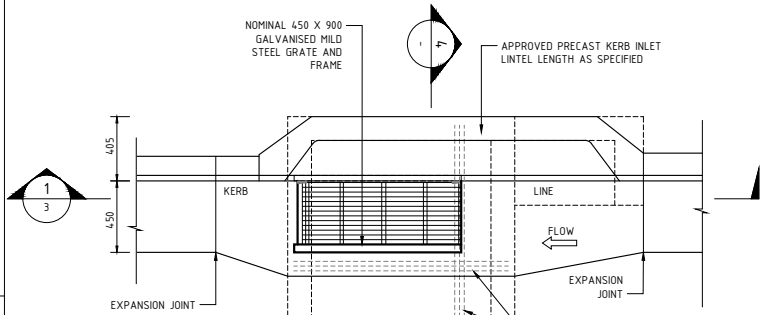


SECTION 1
SCALE 1:20

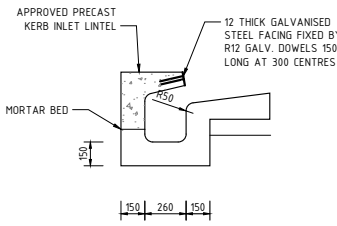


PLAN
SCALE 1:20

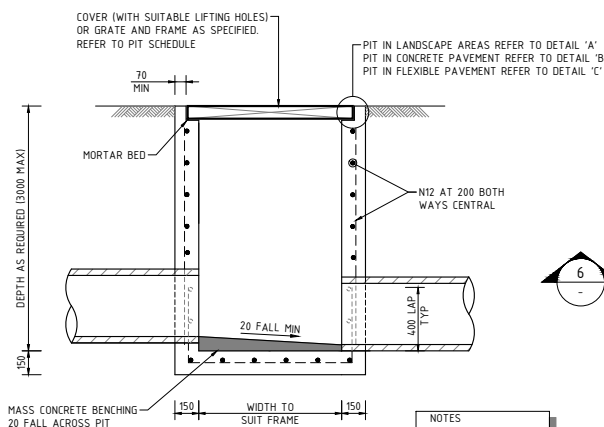
DISH DRAIN PIT
SCALE 1:20



PLAN
NOT TO SCALE

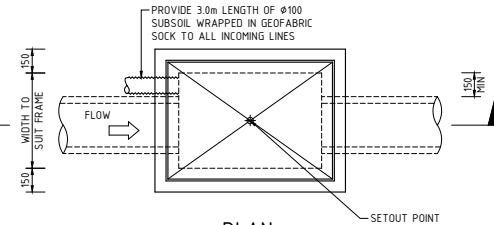


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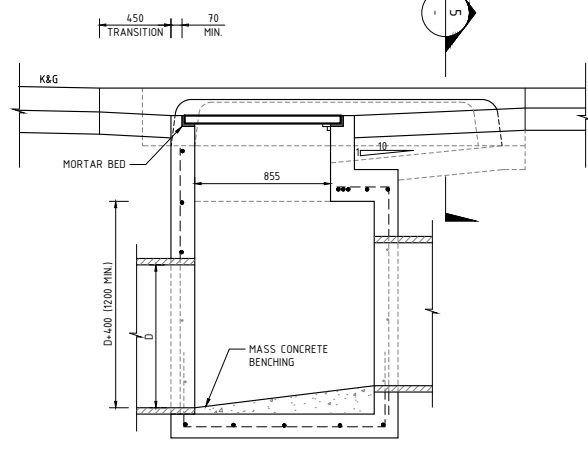


SECTION 6
SCALE 1:20

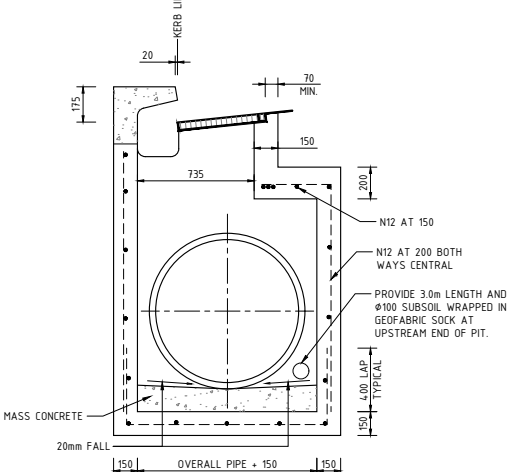
SURFACE INLET / JUNCTION PIT
(PIPE SIZES $\leq \phi 450$)



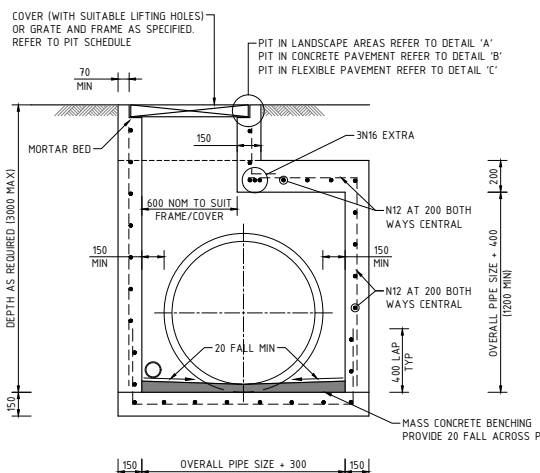
PLAN
SCALE 1:20



SECTION 3
NOT TO SCALE

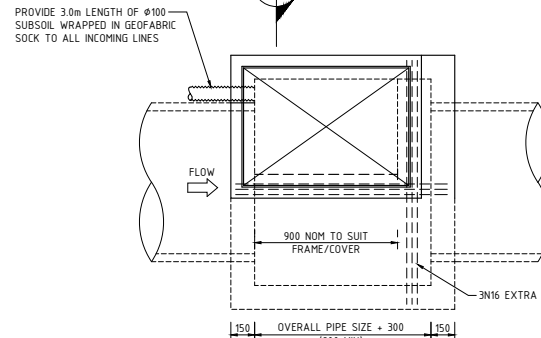


SECTION 2
SCALE 1:20

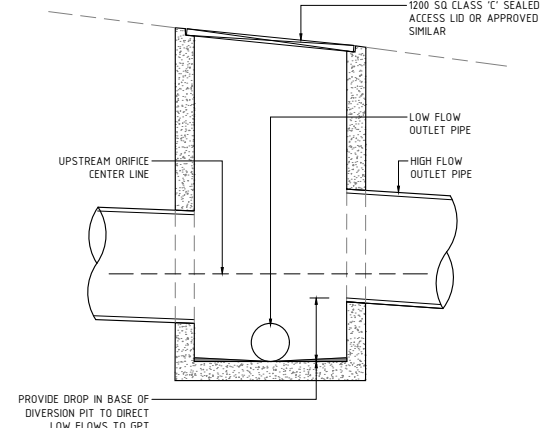


SECTION 2
SCALE 1:20

SURFACE INLET / JUNCTION PIT
(PIPE SIZES $> \phi 450$)



PLAN
SCALE 1:20



TYPICAL HIGH/LOW FLOW DIVERSION PIT - DETAIL
SCALE 1:25

DATE	AMENDMENT	INIT	REV	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				

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

CLIENT
FDC

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

SPARKS + PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3888 | E admin@sparksandpartners.com.au
https://sparksandpartners.com.au/

DATE	DRAWN	DESIGNED	CHECKED	BB
FEB 2021	MG	DD		
PROJECT No	SCALE	SIZE	REVISION	
20214	AS SHOWN	B1		
	DRAWING No	DA4.701		4



AS SHOWN

7

PROJECT 15/09/2021 - ASHBY STREET INDUSTRIAL ACTIVITY CENTRE EXTENSION DESIGN DRAWING DA4712_01A.DWG

NORTH POINT

DATE

AMENDMENT

INIT

REV

DATE

AMENDMENT

INIT

REV

10.09.21

SSDA ISSUE

DD

1

REFERENCES

STRUCTURAL

-

MECHANICAL

-

ELECTRICAL

-

CIVIL

SPARKS AND PARTNERS CONSULTING ENGINEERS

CLIENT

BUILDER

ARCHITECT

PROJECT

PROPOSED INDUSTRIAL WAREHOUSE
65 HUNTINGWOOD DRIVE, HUNTINGWOOD
CIVIL ENGINEERING PACKAGE

Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9691 5033 | F 02 9691 3898 | E admin@sparksandpartners.com.au
https://sparksandpartners.com.au/

Fire Protection Association of Australia
CORPORATE MEMBER

CORPORATE MEMBER

DRAWING TITLE

CIVIL DESIGN
CONCEPT STORMWATER DRAINAGE
OSD TANK DETAILS SHEET 2

DATE

DRAWN

DESIGNED

CHECKED

BB

FEB 2021

MG

DD

PROJECT No

SCALE

SIZE

REVISION

20214

AS SHOWN

B1

DRAWING No

DA4712

1

STATE SIGNIFICANT DEVELOPMENT APPLICATION

APPENDIX B. BCC OSD CALCULATION SUMMARY

Below Ground OSD Summary with calculated valuesSite:

Site Area	53144 m ²
Site Area NOT Draining to OSD	5113 m ²

Reduced Levels (AHD):

RL of Top of Tank	58.2
RL of Bottom of OSD Tank	56.25
RL of 1.5 Year ARI Overflow Weir	57.385
RL of Emergency Overflow Weir	57.97
RL of 1.5 Year ARI Orifice Centerline	55.7
RL of 100 Year ARI Orifice Centreline	55.7
RL of Invert of Discharge to Council Drainage Pit	54.78
RL of obvert of Pit outlet pipe	55.23
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	1594.3 m ³
Required Storage BELOW Emergency Overflow Weir	2418.1 m ³

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	181.90 L/s
1.5 Year ARI Orifice Discharge	114.70 L/s
Maximum 100 Year ARI Site Discharge	723.41 L/s
100 Year ARI Orifice Discharge	620.31 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)	204.0 mm
100 Year ARI Orifice Size (mm)	440.5 mm

Notifications:

Access grates to be provided such that the maximum reach from any point in the tank to the nearest grate is 3.0m.

APPENDIX C. MAINTENANCE & MONITORING SCHEDULE

Job No.: 20214

Date: 13 September 2021

Author Name: Daniel Drewitt

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.	