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Ref: WTJ20-472
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via NSW Planning Portal

SECTION 4.55(2) APPLICATION FOR MODIFICATION OF DA2019/1346
ALTERATIONS AND ADDITIONS TO AN EXISTING INDUSTRIAL FACILITY
4 – 10 INMAN ROAD, CROMER (LOT 1 DP 1220196)

1. INTRODUCTION

Dear Sir/Madam,

Reference is made to development consent **DA2019/1346** granted on 17 August 2020 for alterations and additions to an existing industrial facility at 4 – 10 Inman Road, Cromer, more formally described as Lot 1 DP 1220196 (subject site).

This statement has been prepared in support of a Section 4.55(2) Modification Application (MA) submitted to Northern Beaches Council, seeking to modify to development consent **DA2019/1346** (**Appendix 1**) which granted consent for:

> *Demolition works and alterations and additions to an existing industrial facility, including new warehouse, and self-storage, office premises and ancillary café.*

This application is made pursuant to Section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), on behalf of EG. The following supporting documentation has been provided as part of this application:

- **Appendix 1** Development Consent (**DA2019/1346**)
- **Appendix 2** Updated Architectural Plans
- **Appendix 3** Updated Civil Engineering Plans and Report
- **Appendix 4** Addendum Transport Impact Assessment
- **Appendix 5** Addendum Groundwater Assessment
- **Appendix 6** Preliminary Geotechnical Investigation
- **Appendix 7** VMP Approval
- **Appendix 8** Site Audit Report

The overall intent of the proposed modifications is to resolve the configuration of the approved self-storage facility at the basement level, which would align with the requirements of the intended end user.

This MA constitutes the first modification sought to **DA2019/1346**.

2. SITE LOCATION AND CHARACTERISTICS

The subject site is located at 4 – 10 Inman Road, Cromer, also known as 100 South Creek Road, Cromer. The subject site is bound by South Creek Road to the south and Inman Road to the west. The north-western corner of the site is bound by Orlando Road, which connects to Parkes Road. The subject site also has frontage to Campbell Avenue, however the proposed development does not extend to this part of the site. The remainder of the subject site shares a common boundary with existing residential dwellings and childcare centre to the north.

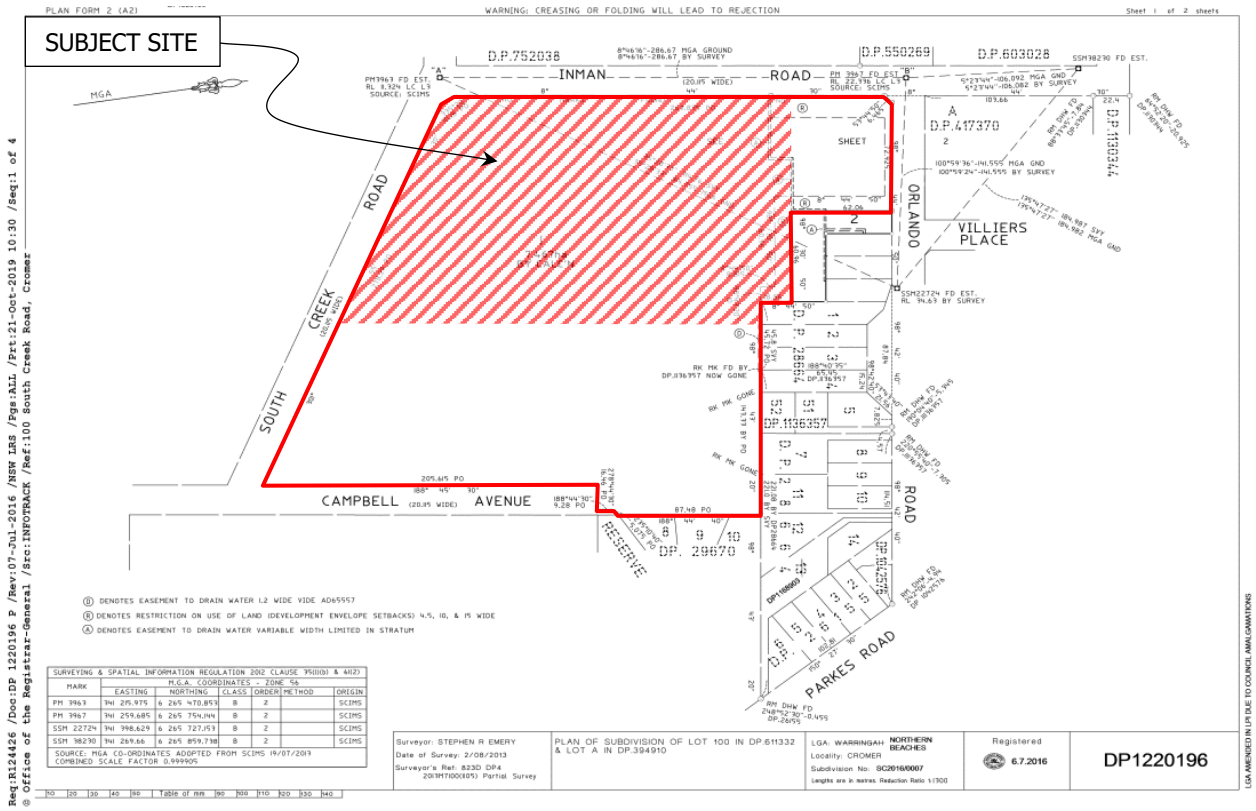


Figure 1 **Cadastral Map** (Source: InfoTrack, 2019)

The subject site is zoned IN1 General Industrial, pursuant to the *Warringah Local Environmental Plan 2011* (WLEP2011) and includes mostly office buildings and large warehouse/manufacturing buildings. Zones surrounding the subject site include RE1 – Public Recreation, RE2 – Private Recreation, SP2 – Infrastructure, and R2 – Low Density Residential.

The subject site has been significantly development and includes a variety of buildings and structures, ranging in age from the 1920s through to 2006. Three (3) separate heritage listings apply to the subject site, under the WLEP 2011, being;

- Item 52: 'Roche Building'
- Item 53: 'Givaudan-Roure Office'
- Item 38: 'Trees'

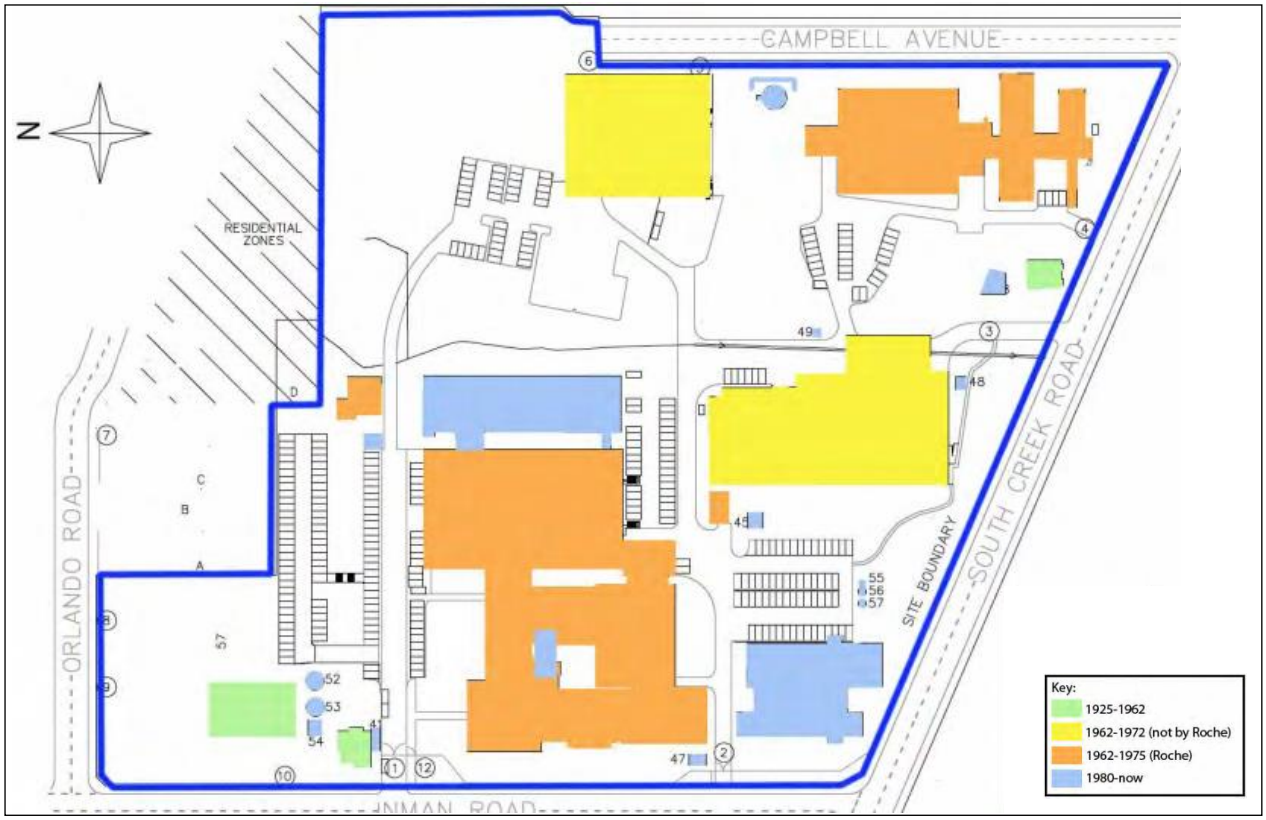


Figure 2 **Current Site Diagram** (Source: Heritage 21, 2019)



Figure 3 **Aerial Map** (Source: InfoTrack, 2019)

3. PROPOSED MODIFICATIONS

The proposed modification seeks to change the double height basement to a single level with a larger footprint.

A summary of the proposed modifications includes:

- Self-storage units level raised by 2.85m (new RL: 13.85)
- Access ramp from South Creek Road adjusted to suit new level
- Self-storage units area increased from 3,902m^2 to 7,000m^2
- Parking spaces at the basement level are increased from 159 to 203 spaces
- Parking spaces at the ground floor are increased from 72 to 76
- 40 new bicycle spaces are provided
- New plant room provided
- Increased car parking area and layout reconfiguration to accommodate the existing tower location and heritage courtyard
- Lift and stairs relocated into existing tower

The following table provides a comparison of (only) the development parameters that are sought to be modified as part of this MA.

Table 1: Development Statistics Comparison

Development parameter	Approved	Proposed
Self-storage facility	3,902m^2	7,000m^2
Total site gross floor area (GFA)	24,560m^2	27,654m^2
Car parking	237 spaces	279 spaces

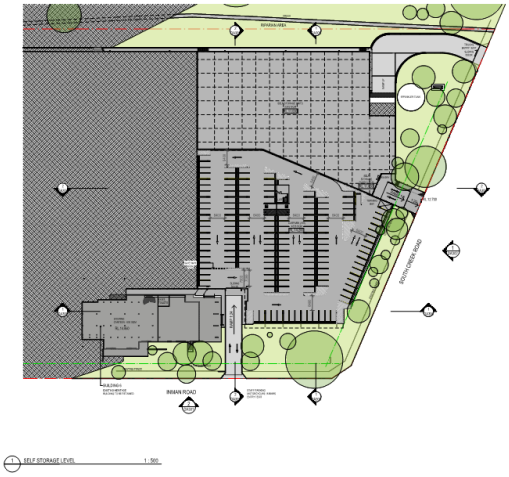
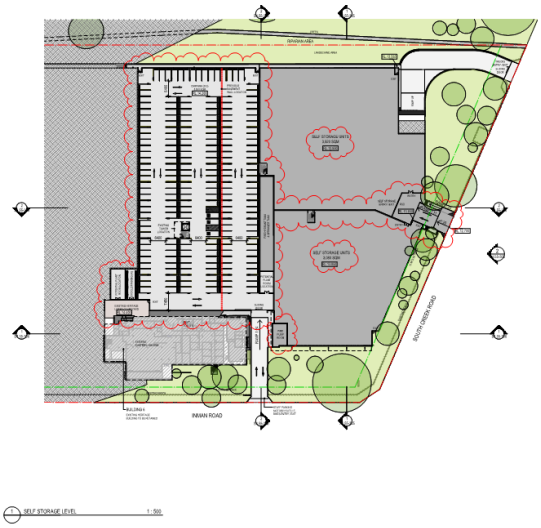
The modifications sought to development consent **DA2019/1346**, and approved plans (**Appendix 2**), relates to design modifications only.

The following images demonstrate the differences in the approved development versus that proposed as part of this modification. The proposed modifications are highlighted by red bubbling.

Table 2: Development Images Comparison

Approved	Proposed
	

Table 2: Development Images Comparison

Approved	Proposed
	
	
	

4. AMENDED DEVELOPMENT CONSENT

The desired development outcome as outlined above requires the following modifications to development consent **DA2019/1346**.

The proposed amendments are demonstrated in red, with deletions as a ~~strikethrough~~ and additions as underlined.

4.1 Proposed Conditions

Condition No. 1

Approved Plans and Supporting Documentation

The development must be carried out in compliance (except as amended by any other condition of consent) with the following:

a) Approved Plans

Architectural Plans - Endorsed with Council's stamp		
Drawing No.	***Dated***	***Prepared By***
DA101-C Rev.12 (Image 01 - External Finishes)		*SBA Architects*
DA201 Rev.12 (Site Plan)	*12.11.2019*	*SBA Architects*
~~DA202 Rev.12~~ S4.55-202 Rev.1 (Ground Floor Plan)	*~~06.11.2019~~ 12.10.2020*	*SBA Architects*
~~DA203 Rev.12~~ S4.55-203 Rev.4 (Basement Plan)	*~~12.11.2019~~ 12.10.2020*	*SBA Architects*
DA204 Rev.12 (Level 1 Floor Plan)	*12.11.2019*	*SBA Architects*
DA205 Rev.12 (Typical Offices 150sqm Plans and Elevations)	*12.11.2019*	*SBA Architects*
DA206 Rev.12 (Typical Offices 250sqm Plans and Elevations)	*12.11.2019*	*SBA Architects*
DA207 Rev.12 (Roof Plan)	*12.11.2019*	*SBA Architects*
DA208 Rev.12 (Demolition Plan)	*12.11.2019*	*SBA Architects*
DA301 Rev.12 (Elevations)	*12.11.2019*	*SBA Architects*
~~DA302 Rev.12~~ S4.55-302 Rev.4 (Elevations 2)	*~~12.11.2019~~ 12.10.2020*	*SBA Architects*
~~DA305 Rev.12~~ S4.55-305 Rev.4 (Sections)	*~~12.11.2019~~ 12.10.2020*	*SBA Architects*
~~DA306 Rev.~~12 S4.55-306 Rev.4 (Sections 2)	*~~12.11.2019~~ 12.10.2020*	*SBA Architects*

Engineering Plans		
Drawing No.	***Dated***	***Prepared By***
C013674.01 - DA20 Issue ~~B~~ C (Erosion & Sediment Control Plan)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA25 Issue ~~A~~ B (Erosion & Sediment Control Details - Sheet 1)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA26 Issue ~~A~~ B (Erosion & Sediment Control Details - Sheet 2)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA41 Issue ~~C~~ D (Stormwater Drainage Plan - Ground Level)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA42 Issue ~~B~~ C (Stormwater Drainage Plan - Basement)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA45 Issue ~~B~~ C (Stormwater Details - Sheet 1)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA46 Issue ~~B~~ C (Stormwater Details - Sheet 2)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA47 Issue ~~B~~ C (Stormwater Details - Sheet 3)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA48 Issue ~~A~~ B (Stormwater Details - Sheet 4)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA51 Issue ~~C~~ D (Finished Levels Plan - Ground Level)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA52 Issue C (Finished Levels Plan -	*28.02.20*	*Costin Roe Consulting*

Basement)		*Pty Ltd*
C013674.01 - DA55 Issue ~~B~~ C (Typical Sections - Sheet 1)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA56 Issue ~~A~~ B (Typical Sections - Sheet 2)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA57 Issue ~~A~~ B (Typical Sections - Sheet 3)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA65 Issue ~~A~~ B (Retaining Wall Details)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA70 Issue ~~A~~ B (Overland Flow Catchment Plan)	*~~26.11.19~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA71 Issue ~~A~~ B (Pre-development Overland Flow Depth & Extent)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*
C013674.01 - DA72 Issue ~~A~~ B (Post-development Overland Flow Depth & Extent)	*~~28.02.20~~ 21.10.20*	*Costin Roe Consulting Pty Ltd*

Reports / Documentation – All recommendations and requirements contained within:		
Report No. / Page No. / Section No.	***Dated***	***Prepared By***
Schedule of Conservation Works (Job No. 8851)	*July 2020*	*Heritage 21 Pty Ltd*
BCA Statement	*13/11/2019*	*SBA Architects*
Civil Engineering Report Rev.~~A~~ B	*~~26/11/2019~~ 21/10/2020*	*Costin Roe Consulting Pty Ltd*
Conservation Management Plan Issue 7	*17/05/2019*	*Heritage 21 Pty Ltd*
Statement of Heritage Impact Issue 4	*11/11/2019*	*Heritage 21 Pty Ltd*
Transport Impact Assessment Issue ~~A~~ B	*~~21/11/2019~~ 22/10/2020*	*GTA Consultants*
Acoustic Assessment Report	*20/11/2019*	*Acoustic Dynamics*
Biodiversity Constraints Assessment	*16/08/2017*	*Eco Logical Australia*
Biodiversity Development Assessment Report (REF: 18EG02BDAR)	*07/04/2020*	*Travers bushfire & ecology*
Tree Assessment Report (REF: 18EG03T)	*10 August 2018*	*Travers bushfire & ecology*
Preliminary Geotechnical Assessment Rev.1 (Ref: 30766ZRrpt)	*18 August 2017*	*JK Geotechnics*
Report on Desktop Groundwater Assessment (R.001.Rev~~13~~)	*~~25 October 2019~~ 5 November 2020*	*Douglas Partners*
Urban Design and Heritage Report Rev.2	*1 November 2019*	*dfp planning consultants*
Site Audit Report Rev.A	*20 April 2018*	*AECOM Australia Pty Ltd*
Overland Flow Report Rev.A	*28 February 2020*	*Costin Roe Consulting Pty Ltd*

Condition No. 13

On-site Stormwater Detention Details

The Applicant is to provide a certification of drainage plans detailing the provision of on-site stormwater detention in accordance with Northern Beaches Council's Warringah Water Management Policy PL850, and generally in accordance with the concept drainage plans prepared by Costin Roe Consulting, drawing number C013674.01 - ~~DA10, DA41, DA51,~~ DA52, issue C, dated 28/2/20, drawing number C013674.01 – DA42, DA45, DA46, DA47, DA48, DA55, issue C, dated 21/10/20, drawing number

C013674.01 – DA10, DA41, DA51, issue D, dated 21/10/20, ~~drawing number drawing number C013674.01 - DA55, issue B, dated 28/2/20, drawing number C013674.01 - DA42, DA45, DA46, DA47, DA48, issue B, dated 26/11/19~~, drawing number C013674.01 - DA65, issue A, dated 26/11/19, and drawing number C013674.01 – DA65, DA70, DA71, DA72, issue ~~A~~ B, dated ~~20/2/20~~ 21/10/20. Detailed drainage plans are to be prepared by a suitably qualified Civil Engineer, who has membership to the Institution of Engineers Australia, National Professional Engineers Register (NPER) and registered in the General Area of Practice for civil engineering.

The drainage plans must address the following:

i. The stormwater outlet connection to Council's drainage channel shall be amended to discharge

Detailed drainage plans, including engineering certification, are to be submitted to the Certifying Authority for approval prior to the issue of the Construction Certificate.

Reason: To ensure appropriate provision for the disposal of stormwater and stormwater management arising from the development.

Condition No. 18

Stormwater Drainage Application

The applicant is to provide a stormwater drainage application under Section 68 of the Local Government Act 1993 to Council for approval. The submission is to include four (4) copies of Civil Engineering plans for the design of the stormwater drainage channel which are to be generally in accordance with the civil design prepared by Costin Roe Consulting, drawing number C013674.01 - ~~DA10, DA41, DA51,~~ DA52, issue C, dated 28/2/20, drawing number C013674.01 – DA42, DA45, DA46, DA47, DA48, DA55, issue C, dated 21/10/20, drawing number C013674.01 – DA10, DA41, DA51, issue D, dated 21/10/20, ~~drawing number drawing number C013674.01 - DA55, issue B, dated 28/2/20, drawing number C013674.01 - DA42, DA45, DA46, DA47, DA48, issue B, dated 26/11/19~~, drawing number C013674.01 - DA65, issue A, dated 26/11/19, and drawing number C013674.01 – DA65, DA70, DA71, DA72, issue ~~A~~ B, dated ~~20/2/20~~ 21/10/20 and Council's specification for engineering works - AUS-SPEC #1.

The form can be found on Council's website at www.northernbeaches.nsw.gov.au > Council Forms > Stormwater Drainage Application Form. The drainage plans must address the following:

i. Certification that the stormwater channel has been designed in accordance with the Overland Flow Report prepared by Costin Roe Consulting, project number Co13674.01, revision A, dated 28/2/20.

ii. An easement for drainage purposes shall be shown on the submitted plans over the drainage channel the greater of five metres wide or a minimum 1 metre from the outside wall of the top of the stormwater channel.

iii. A clear access way shall be provided a minimum of 3.5 metres wide along the adjoining driveway to the east to access the top bank of the channel for the full length for operational and maintenance purposes. A Right of Access shall be shown on the submitted plans over the access way, and shall be created in favour of Council.

The fee associated with the assessment and approval of the application is to be in accordance with Council's Fees and Charges. Details demonstrating compliance are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: To ensure appropriate provision for disposal and maintenance stormwater management arising from the development.

Condition No. 77

Certification for the Installation of Stormwater Treatment Measures

A certificate from a Civil Engineer, who has membership to Engineers Australia and the National Engineers Register must be provided, stating that the stormwater treatment measures have been installed in accordance with the plans prepared by Costin Roe dated ~~26 November 2019~~ 21 October 2020. The certificate must confirm that stormwater treatment devices are completed, online, in good condition and are not impacted by sediment.

The certificate shall be submitted to the Principal Certifying Authority prior to the release of the Occupation Certificate.

Reason: Protection of the receiving environment

5. STATUTORY PLANNING FRAMEWORK

5.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the principle planning and development legislation in New South Wales. Pursuant to Part 4, the proposal is local development. The modifications sought to the development consent **DA2019/1346** warrants consideration of the provisions of Section 4.55(2) of the EP&A Act. The provisions of Clause 4.55 of the EP&A Act provided in **Table 3** below require consideration in this instance.

Table 3: Section 4.55(2) – (3) Assessment	
Clause	**Response**
*(2) **Other modifications** A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—*	
(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and	The proposed modification will result in the same ultimate development outcome to that previously approved. The main modification sought relates to the reconfiguration of the already approved basement level. **Section 5.1.1** of this statement demonstrates that the development as modified would result in substantially the same development as the development for which consent was granted under **DA2019/1346**.
(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and	It is acknowledged that Council must consider any general terms of approval, concerning the proposed modifications.
(c) it has notified the application in accordance with— *(i) the regulations, if the regulations so require, or* *(ii) (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*	It is understood that the application will be renotified in accordance with the *Northern Beaches Community Participation Plan.*
(d) it has considered any submissions made concerning the proposed modification within the	It is acknowledged that Council must consider any submissions received, concerning the proposed modifications.

period prescribed by the regulations or provided by the development control plan, as the case may be.	
(3) In determining an application for modification of a consent under this section, the consent authority must take into consideration such of the matters referred to in section 4.15(1) as are of relevance to the development the subject of the application. The consent authority must also take into consideration the reasons given by the consent authority for the grant of the consent that is sought to be modified.	The proposed modifications are consistent with the matters referred to in Section 4.15(1) of the EP&A Act. Refer to **Section 5.1.2** of this statement.

5.1.1 Section 4.55(2)(a) – Substantially the same

The NSW Land and Environment Court has established several precedents as to what may be considered substantially the same development, and what should be factored into the consideration of this threshold test.

The scope of a maximum modification of a consent without constituting assessment as a standalone application can be analysed through the ambit of *Michael Standley & Associates Pty Ltd v North Sydney Council [2005] NSWLEC 358*, whereupon Commissioner Mason P. found in relation to modification of development consents that the word "modify" was given the ordinary meaning of "to alter without radical transformation". Therefore, the extent to which a consent may be modified is that to which the consent, as modified, is as approved without radical transformation or alteration.

The development, as modified, is substantially the same development and will not result in a radical transformation of **DA2019/1346** for the following reasons:

- The modification remains as alterations and additions to an existing industrial facility, which retains the approved land uses for warehouse, self-storage, office premises and ancillary café, and proposes no substantial change to this fundamental element of the development consent;
- There are no substantial quantitative changes proposed to the approved building bulk or scale above ground level;
- The function, form, operations, business logistics, and importantly, public perception of the site, as an industrial development, remains largely unchanged, with the modifications retaining the original intent of the development as approved.
- There is an increase in parking spaces, from 237 car parking spaces to 279 car parking spaces, which maintains the efficiency of the site.

In light of the above, the proposal as amended, is not considered to result in a "radical transformation" of the consent, as currently approved, satisfying the radical transformation test pursuant to *Michael Standley & Associates Pty Ltd v North Sydney Council [2005] NSWLEC 358*.

Whilst the proposal seeks to alter the configuration of the basement level, this is not considered to be material or essential elements of the approved development which would constitute a radical change to the ultimate development outcome of the subject site. This is further analysed in *Moto Projects (No 2) Pty Ltd v North Sydney Council [1999] NSWLEC 280* which applies a quantitate and qualitative test to determined what qualifies a development as being "substantially the same".

Moto Projects (No 2) Pty Ltd v North Sydney Council [1999] NSWLEC 280 provides that a comparison of the development as approved, and the development as proposed to be modified. The result of the comparison must be a finding that the modified development is "essentially or materially" the same as the approved development. The comparison involves an appreciation, qualitative, as well as quantitative, of the developments being compared in their proper contexts (including the circumstances in which the development consent was granted).

Whilst it is acknowledged that the proposal does include some quantitative changes to the approved development, these are not considered to be substantial or comprise a critical element of the development. Further, from a qualitative perspective, the development retains its identity as an existing industrial facility, and retains the approved land uses for warehouse, self-storage, office premises and ancillary café.

Therefore, the proposal, as amended, will be substantially the same development as approved, and satisfies the requirements for the application to be assessed and approved pursuant to Section 4.55(1A) of the EP&A Act.

5.1.2 Section 4.15 – Reasons given by the consent authority for the grant of the consent

Section 4.15(1) of the EP&A Act specifies the matters which a consent authority must consider when determining a development application. The relevant matters for consideration under Section 4.15(1) of the EP&A Act are provided in **Table 4** below.

Table 4: Section 4.15(1)(A) Considerations	
Section	**Response**
Section 4.15(1)(a)(i) any environmental planning instrument, and	Refer to **Section 5.4** of this statement.
Section 4.15(1)(a)(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and	There are no applicable draft instruments for consideration.
Section 4.15(1)(a)(iii) any development control plan, and	Refer to **Section 6.1** of this statement.
Section 4.15(1)(a)(iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and	Not applicable.
Section 4.15(1)(a)(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),	Refer to **Section 5.2** of this statement.
Section 4.15(1)(b)-(c)	Refer to **Section 7** of this statement.

5.1.2 Section 4.46 – Integrated Development

Section 4.46 of the EP&A Act defines 'integrated development' as matters which require consent from Council and one or more authorities under related legislation.

Pursuant to Clause 91 of the *Water Management Act 2000* (WM Act) the proposed development requires an aquifer interference approval, and as such is considered integrated development.

5.2 Environmental Planning & Assessment Regulation 2000

This application has been prepared in accordance with the provisions of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). Further, the proposed modification does not trigger 'Designated Development' pursuant Schedule 3 of the EP&A Regulation.

5.3 State Environmental Planning Policies

5.3.1 State Environmental Planning Policy (Infrastructure) 2007

Among other functions, *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) provides for certain proposals, to be referred for concurrence.

Clause 45 of the ISEPP requires the Consent Authority to consider any DA (or an application for modification of consent) for any development carried out:

- Within or immediately adjacent to an easement for electricity purposes (whether or not the electricity infrastructure exists);
- Immediately adjacent to an electricity substation;
- Within 5m of an overhead power line;
- Includes installation of a swimming pool any part of which is: within 30m of a structure supporting an overhead electricity transmission line and/or within 5m of an overhead electricity power line.

As such, the modification will require referral to Ausgrid.

Clause 104 of ISEPP applies to development listed in Schedule 3 as 'Traffic Generating Development. Pursuant to this Clause, referral to Transport for NSW will be required.

5.3.2 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The proposal, as modified, does not involve the storage and/or handling of potentially dangerous goods or materials. As such, further assessment and consideration under *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* is not warranted.

5.3.3 State Environmental Planning Policy No. 55 – Remediation of Land

The proposal, as modified, does not seek to change the use or developable area of the premises.

The subject site contains three (3) contaminated areas:

1. Part A – Unregulated Area – asbestos impacted fill material;
2. Part B – Regulated Area – TCE and benzene present in groundwater both on and off-site; these impacts are regulated by the NSW Environment Protection Authority (EPA), via a Voluntary Management Proposal (VMP) under the provisions of the Contaminated Land Management Act 1997 (CLM Act);
3. Part B – Unregulated Area – petroleum hydrocarbon plume from former underground storage tanks, removed in 1997.

The process of undertaking the necessary remediation works is being implemented in consultation with NSW EPA. The original application was also referred to Council's Environmental Health Officer and NSW EPA who raised no objection to the proposal subject to conditions. Accordingly, the land is considered suitable (following remediation) for the proposed use and development subject to conditions.

A copy of the Site Audit Report prepared by AECOM (**Appendix 8**), and the NSW EPA VMP Approval (**Appendix 7**) have been included for clarity.

It is noted that no changes to the site remediation works are proposed as part of this MA.

5.4 Warringah Local Environmental Plan 2011

The *Warringah Local Environmental Plan 2011* (WLEP2011) is the primary environmental planning instrument that applies to the subject site. The relevant provisions of WLEP2011 as they relate to the subject site are considered below.

5.4.1 Zoning and Permissibility

The subject site is zoned IN1 General industrial, pursuant to the WLEP2011.

The proposal, as modified, is consistent with the objectives of the zone as it will continue to deliver alterations and additions to the existing industrial facility. Further, the proposed modification does not seek to alter those uses that rely upon Clause 5.10(10) of the WLEP2011. Given the minor nature of the changes sought under this application, the proposed modification does not result in any of the objectives of the zone being compromised.

The development will continue to be capable of achieving these objectives to the same capacity as the development approved under **DA2019/1346**.

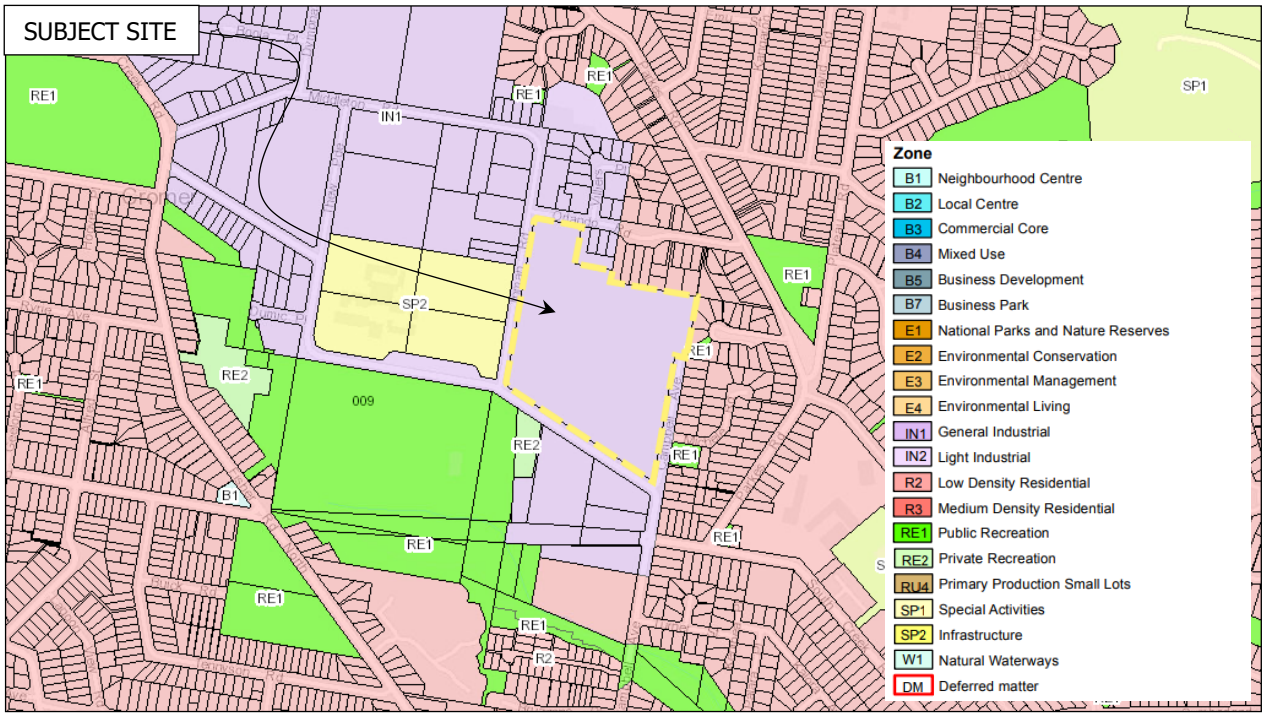


Figure 4 **WLEP2011 Zoning Map** (Source: NSW Legislation, 2019)

Table 5 outlines the developments consistency and compliance with the relevant development standards and controls under WLEP2011.

Table 5: WLEP2011 Development Standards	
Clause	**Comment**
Principal development standards	
Clause 4.1 – Minimum Lot Size	The subject site is not restricted to a minimum lot size.
Clause 4.3 – Height of Buildings	The proposed modification does not seek to alter the approved building height.
Clause 4.4 – Floor Space Ratio	The subject site is not restricted to a maximum floor space ratio.
Clause 4.6 – Exceptions to development standards	The proposal, as modified, does not seek to contravene any additional development standards.
Miscellaneous provisions	
Clause 5.9 – Preservation of trees or vegetation	The proposal, as modified, would not involve any additional clearing.

Clause 5.10 – Heritage conservation	The subject site contains three (3) items of heritage, listed under the WLEP2011. The proposed modifications are clear of the listed heritage items, as depicted in the revised plans, included in **Appendix 2**. As such, no further reporting is considered necessary for this MA.
Additional local provisions	
Clause 6.2 – Earthworks	The proposal includes earthworks, that are ancillary to the proposed development, pursuant to Clause 6.2(1)(b) and (2)(b). Costin Roe have updated the Civil Engineering Report and Drawings (**Appendix 3**), to reflect the proposed modifications and ensure that the earthworks will not have detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land, in accordance with Clause 6.2(1)(a).
Clause 6.4 – Development of sloping land	The subject site is identified as being within 'Areas A, D and E' on Council's Landslip Risk Map, and Clause 6.4 is relevant as the proposal includes excavation works. The Preliminary Geotechnical Report remains current and has been included in **Appendix 6** for clarity.

6. NON-STATUTORY PLANNING FRAMEWORK

6.1 Warringah Development Control Plan 2011

The proposal, as modified, is generally consistent with the relevant provisions of the *Warringah Development Control Plan 2011* (WDCP2011). Given the proposed modifications are mostly limited to the basement level works, only a handful of controls under the WDCP2011 require further consideration. These applicable controls are assessed in **Table 6** below, with all other controls remaining unchanged.

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
PART C SITING FACTORS		
C3 Parking Facilities		
1. The following design principles shall be met: ▪ Garage doors and carports are to be integrated into the house design and to not dominate the façade. Parking is to be located within buildings or on site.; ▪ Laneways are to be used to provide rear access to carparking areas where possible; ▪ Carparking is to be provided partly or fully underground for apartment buildings and other large scale developments; ▪ Parking is to be located so that views of the street from front windows are not obscured; and ▪ Where garages and carports face the street, ensure that the garage or	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
carport opening does not exceed 6 metres or 50% of the building width, whichever is the lesser.		
2. Off street parking is to be provided within the property demonstrating that the following matters have been taken into account: ▪ the land use; ▪ the hours of operation; ▪ the availability of public transport; ▪ the availability of alternative car parking; and ▪ the need for parking facilities for courier vehicles, delivery / service vehicles and bicycles.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
3. Carparking, other than for individual dwellings, shall: ▪ Avoid the use of mechanical car stacking spaces; ▪ Not be readily apparent from public spaces; ▪ Provide safe and convenient pedestrian and traffic movement; ▪ Include adequate provision for manoeuvring and convenient access to individual spaces; ▪ Enable vehicles to enter and leave the site in a forward direction; ▪ Incorporate unobstructed access to visitor parking spaces; ▪ Be landscaped to shade parked vehicles, screen them from public view, assist in micro-climate management and create attractive and pleasant places; ▪ Provide on site detention of stormwater, where appropriate; and ▪ Minimum car parking dimensions are to be in accordance with AS/NZS 2890.1.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
4. Carparking is to be provided in accordance with Appendix 1 which details the rate of car parking for various land uses. Where the carparking rate is not specified in Appendix 1 or the WLEP, carparking must be adequate for the development having regard to the objectives and requirements of this clause. The rates specified in the Roads and Traffic Authority's Guide to Traffic Generating Development should be used as a guide where relevant.	**ALTERNATE PROPOSED**	Based on the parking assessment carried out by GTA Consultants (**Appendix 4**), the WDCP2011 requires a total of 411 parking spaces. However, the proposal, as modified, seeks to maintain application of the *Transport for NSW Guide to Traffic Generating Developments 2002* (TfNSW Guide). The rates adopted in TfNSW Guide for factory and warehouse uses better reflect

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
		the intended site occupancy/operation compared with the single rate adopted in the WDCP2011. The WDCP2011 rate is considered an over-estimation of parking requirements as per above, also noting the size of facility offers economies of scale given the parking rates used would apply to a single warehouse/factory unit as well as larger facilities such as this one. Further, it is noted that both Council and Planning Panel supported adopting TfNSW rates in determining the DA. For the purposes of this assessment, a likely split of 70 per cent warehouse tenants to 30 per cent light industrial tenants has been assumed for the units based on advice from EG that it will be more skewed towards warehouse. Self-storage facilities typically require less staff than traditional warehouse facilities, whilst users have access to the facility 24 hour/seven days a week. These facilities do not have defined peak parking demand, with user arrivals dispersed across the day. In addition, such facilities are not a high traffic and parking generator as users typically leave their goods stored for extended periods of time without accessing. All of the above suggests that a more suitable car parking provision would be aligned with the TfNSW Guide rate for warehouse uses. Alternatively, a comparison of similar sites can be referenced. In this regard, the parking provision for self-storage facilities have been sourced from the *Aurecon Self Storage Facility Traffic and Parking Study 2009* and *SSAA Supplementary Australian Traffic and Parking Study 2017*. Based on the parking assessment carried out by GTA Consultants (**Appendix 4**), the anticipated parking demand for the proposal, as modified, suggests that development could generate demand of 226 car parking spaces. The proposal, as modified, provides provision for 279 car parking spaces, which is considered sufficient to cater for the anticipated demand.

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
		Further justification is provided within the Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
5. Adequate provision for staff, customer and courier parking, and parking and turning of vehicles with trailers must be provided if appropriate to the land use.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
6. For bulky goods premises adequate on-site parking spaces for service/delivery vehicles at a convenient location, separated from customer parking must be provided.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
7. Where appropriate, car parking which meets the needs of people with physical disabilities must be provided in accordance with the relevant Australian Standard.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
8. For Forest Way Village car parking at ground level is to be provided for individual units.	**N/A**	The subject site is not part of the Forest Way Village.
C3(A) Bicycle Parking and End of Trip Facilities		
1. Bicycle parking facilities must be provided for new buildings and for alterations or additions to existing buildings. In the case of alterations or additions to existing buildings bicycle parking facilities are required for the additional floor area only.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
2. Bicycle parking shall be designed and constructed in accordance with Australian Standard AS 2890.3 – Bicycle Parking Facilities.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
3. Bicycle parking facilities shall be designed to be an integral part of the development and where visible from public places or streets, will complement the visual quality of the public domain.	**YES**	Refer to addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).
4. Bicycle parking shall be provided in accordance with the generation rates in the following table and is determined by adding Column 1 and Column 2 requirements and rounding up.	**ALTERNATE PROPOSED**	The proposal, as modified, increases the overall GFA of the development, which in turn increases the number of bicycle parking spaces required to service the development. The bicycle parking requirements are set out in the WDCP2011. The parking assessment, carried out by GTA Consultants (**Appendix 4**), recommends that a total of 44 bicycle parking spaces be provided. However, the proposal, as modified, accommodates

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
		for 40 bicycle parking spaces within the basement car parking area. Given the car parking provided is in surplus of the anticipated parking demand, the slight deficit of bicycle parking is requested as an acceptable outcome.
5. End of trip facilities must be provided for new buildings and for alterations or additions to existing buildings. In the case of alterations or additions to existing buildings end of trip facilities are required for the additional floor area only. End of trip facilities are not required for schools, wholly residential buildings or residential components of mixed use buildings.	**YES**	Refer to updated Architectural Plans, prepared by SBA Architects (**Appendix 2**). End of trip facilities form part of each individual warehouse unit.
6. End of trip facilities shall be provided in accordance with the following: a) Bathroom/ change area(s) shall be provided and shall contain: i) At least one toilet, wash basin, mirror, clothing hooks and power points (including shaving plugs). ii) A minimum of one shower cubicle per seven (7) required bicycle parking spaces. iii) Each shower cubicle shall include a private clothes changing area with a bench and a minimum of two (2) clothing hooks. b) Clothes Lockers shall be: i) Provided at the rate of one clothes locker for every required bicycle parking space. ii) Secure, ventilated and large enough to store cycling gear (such as panniers, shoes, towels and clothing). Suggested minimum dimensions of a clothes locker are 900mm (height), 350mm (width) and 500mm (depth).	**YES**	Refer to updated Architectural Plans, prepared by SBA Architects (**Appendix 2**). End of trip facilities form part of each individual warehouse unit.
C4 Stormwater		
1. Stormwater runoff must not cause downstream flooding and must have minimal environmental impact on any receiving stormwater infrastructure, watercourse, stream, lagoon, lake and waterway or the like.	**YES**	The proposal, as modified, seeks amendments to the architectural design approved under **DA2019/1346**, which in turn triggers the need for the following civil and stormwater considerations. As a result of the reconfiguration of the basement level, the stormwater drainage layout has been revised. There are no

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
		expected changes required to the overall stormwater detention or treatment for the site, but rather stormwater layout. This has been explored by Costin Roe Consulting, and the Civil Engineering Plans and Report amended accordingly (**Appendix 3**).
2. The stormwater drainage systems for all developments are to be designed, installed and maintained in accordance with Council's Water Management Policy.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**).
C5 Erosion and Sedimentation		
1. All developments which involve the disturbance of land must install and maintain erosion and sediment controls until the site is fully stabilised.	**YES**	The proposal, as modified, includes erosion and sediment control measures. Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**).
2. Any erosion and sedimentation is to be managed at the source.	**YES**	The proposal, as modified, includes erosion and sediment control measures. Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**).
3. Erosion, sediment and pollution controls including water discharge from the site must comply with Council's Water Management Policy.	**YES**	The proposal, as modified, includes erosion and sediment control measures. Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**).
4. An Erosion and Sediment Control Plan must be prepared in accordance with Landcom's Managing Urban Stormwater: Soil and Construction Manual (2004) for all development which involves the disturbance of up to 2500m^2 of land.	**YES**	The proposal, as modified, includes erosion and sediment control measures. Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**).
5. Soil and Water Management Plan must be prepared in accordance with Landcom's Managing Urban Stormwater: Soil and Construction Manual (2004) for all development which involves the disturbance of more than 2500m^2 of land.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**).
C7 Excavation and Landfill		
1. All landfill must be clean and not contain any materials that are contaminated and must comply with the relevant legislation.	**YES**	Understood and noted.
2. Excavation and landfill works must not result in any adverse impact on adjoining land.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**), addendum Desktop Groundwater Assessment, prepared by

Table 6: WDCP2011 Development Controls		
Control	**Compliance**	**Comment**
		Douglas Partners (**Appendix 5**) and Preliminary Geotechnical Assessment, prepared by JK Geotechnics (**Appendix 6**).
3. Excavated and landfill areas shall be constructed to ensure the geological stability of the work.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**), addendum Desktop Groundwater Assessment, prepared by Douglas Partners (**Appendix 5**) and Preliminary Geotechnical Assessment, prepared by JK Geotechnics (**Appendix 6**).
4. Excavation and landfill shall not create siltation or pollution of waterways and drainage lines, or degrade or destroy the natural environment.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**), addendum Desktop Groundwater Assessment, prepared by Douglas Partners (**Appendix 5**) and Preliminary Geotechnical Assessment, prepared by JK Geotechnics (**Appendix 6**).
5. Rehabilitation and revegetation techniques shall be applied to the fill.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**), addendum Desktop Groundwater Assessment, prepared by Douglas Partners (**Appendix 5**) and Preliminary Geotechnical Assessment, prepared by JK Geotechnics (**Appendix 6**).
6. Where landfill is necessary, it is to be minimal and shall have no adverse effect on the visual and natural environment or adjoining and surrounding properties.	**YES**	Refer to updated Civil Engineering Report, prepared by Costin Roe (**Appendix 3**), addendum Desktop Groundwater Assessment, prepared by Douglas Partners (**Appendix 5**) and Preliminary Geotechnical Assessment, prepared by JK Geotechnics (**Appendix 6**).

We note that any control, not detailed in **Table 6**, remains unchanged from the original DA assessment.

7. LIKELY IMPACTS OF DEVELOPMENT

7.1 Context and Setting

The subject site comprises one large allotment, including laboratory, factory, warehouse buildings, administrative offices and stores, previously occupied by Roche. The buildings are predominantly located in the south western portion of the subject site and are accessible via Inman Drive and South Creek Road.

The approved development involves the construction of multi-unit warehouse, self-storage facilities, including ancillary works, and the adaptive re-use of the former Roche office building and heritage cottage.

The proposal, as modified, maintains the abovementioned development, with the most significant modifications being to the approved basement level, and therefore would not alter the context or setting of the subject site and its intended operations.

The proposed design modifications ensure the functional operation of the subject site in accordance with the needs of the end users, whilst not impacting on any other operations. The proposal, as modified, would not exhibit any significant environmental impacts and will not adversely impact on the amenity or operations of any adjoining sites. Therefore, the proposal is considered compatible with the site context and setting.

7.2 Built Form

The proposal, as modified, does not intensify the visible built form of the development.

We note that whist there is an increase in GFA proposed, this increase is limited to the basement level only. As such, the built form modifications are limited to the carparking and self-storage units at the basement level, and do not present as a modification to the built form from a streetscape perspective.

7.3 Traffic and Transport

The proposal, as modified, seeks to change the double height basement to a single level with a larger footprint, which results in an increased car parking area and layout reconfiguration, with the following amendments:

- Parking spaces at the basement level are increased from 159 to 203 spaces
- Parking spaces at the ground floor are increased from 72 to 76
- 40 new bicycle spaces are provided

GTA Consultants have prepared an addendum to their Transport Impact Assessment (**Appendix 4**), to reflect the proposed design changes.

7.3.1 Parking Assessment

7.3.1.1 Bicycle parking

The proposal, as modified, increases the overall GFA of the development, which in turn requires a reassessment of the number of bicycle parking spaces required to service the development. The bicycle parking requirements are set out in the WDCP2011.

The parking assessment, carried out by GTA Consultants (**Appendix 4**), recommends that the modified design should provide a total of 44 bicycle parking spaces. However, the proposal, as modified, accommodates for 40 bicycle parking spaces within the basement car parking area.

Given the car parking provided is in surplus of the anticipated parking demand (refer to **Section 7.3.1.2** below), the slight deficit of bicycle parking is requested as an acceptable outcome.

7.3.1.2 Car parking

As outlined above, the proposal, as modified, increases the overall GFA of the development, which in turn requires a reassessment of the number of car parking spaces required to service the development.

In establishing the appropriate parking supply for the proposal, GTA Consultants have considered both the WDCP2011 and the TfNSW Guide.

The rates adopted in TfNSW Guide for factory and warehouse uses better reflect the intended site occupancy/operation compared with the single rate adopted in the WDCP2011. The WDCP2011 rate is considered an over-estimation of parking requirements as per above, also noting the size of facility offers economies of scale given the parking rates used would apply to a single warehouse/factory unit as well as

larger facilities such as this one. Further, it is noted that both Council and Planning Panel supported adopting TfNSW rates in determining the DA.

Self-storage facilities typically require less staff than traditional warehouse facilities, whilst users have access to the facility 24 hour/ seven days a week. These facilities do not have defined peak parking demand, with user arrivals dispersed across the day. In addition, such facilities are not a high traffic and parking generator as users typically leave their goods stored for extended periods of time without accessing. All of the above suggests that a more suitable car parking provision would be aligned with the TfNSW Guide rate for warehouse uses. Alternatively, a comparison of similar sites can be referenced.

In this regard, the parking provision for self-storage facilities have been sourced from the *Aurecon Self Storage Facility Traffic and Parking Study 2009* and *SSAA Supplementary Australian Traffic and Parking Study 2017*.

The proposal, as modified, includes a self-storage facility of 7,000m^2, for which GTA Consultants consider up to 11 parking spaces would be sufficient, including one space for vehicle/trailer parking. It should also be noted that many self-storage facilities also have parking spaces within the tenancy area to allow the direct transfer of goods to internal lifts and the like.

Based on their assessment, GTA Consultants consider the following rates sufficient to cater for the demand of the proposed development.

Table 7: Anticipated Parking Demand

Land use	Adopted parking rate	Parking requirement	Proposed provision
Self-storage	As per Table 4.5 of the Transport Impact Assessment (**Appendix 4**)	11 spaces	
Warehouse (70% of units)	Warehouse – 1 space per 300m^2 (TfNSW rate) Ancillary office – 1 space per 40m^2 (WDCP2011 rate)	68 spaces * (36 + 32 spaces)	
Industry (30% of units)	1.3 spaces per 100m^2 (incl. ancillary office) (WDCP2011 rate)	68 spaces *	
Office	1 space per 40m^2 (WDCP2011 rate)	79 spaces *	
Café	Ancillary to overall development (infrequent external trips expected)	0 spaces *	
Total		**226 spaces**	**279 spaces**

* indicates no change from original DA

The parking assessment, carried out by GTA Consultants (**Appendix 4**), determines that modified design is anticipated to generate demand for 226 car parking spaces. The proposal, as modified, accommodates for 279 car parking spaces, which is considered appropriate.

By comparison, the approved development proposed a supply of 231 car parking spaces, with expected parking demand of 228 spaces. As such, the proposed modification decreases the expected demand, but increases the total parking provision.

The car parking, as modified, is therefore considered appropriate. Further detailed justification is included in the addendum Transport Impact Assessment, prepared by GTA Consultants (**Appendix 4**).

7.3.2 Site Layout Assessment

The proposal, as modified, is largely similar to the approved layout, with proposed site layout is generally consistent with the dimensional requirements as set out Australian Standard for Off Street Parking Facilities (AS/NZS2890.1:2004, AS2890.2:2002 and AS/NZS2890.6:2009).

7.3.3 Traffic Assessment

The proposal, as modified, is expected to generate up to 168 and 181 vehicle movements in the AM and PM peak hours respectively, which is at least 40 per cent less vehicles than estimated for the previous site uses, and consistent with the approved development.

Further, intersection analysis carried out by GTA Consultants (**Appendix 4**), suggests that the surrounding intersections would continue to operate satisfactorily during the road network peak periods post development and the anticipated traffic volumes associated with the proposal could not be expected to compromise the safety or function of the surrounding road network.

7.4 Heritage

The proposed modifications are clear of the listed heritage items, as depicted in the revised plans, included in **Appendix 2**. As such, no further reporting is considered necessary for this MA.

7.5 Stormwater

The proposal, as modified, seeks amendments to the architectural design approved under **DA2019/1346**, which in turn triggers the need for the following civil and stormwater considerations.

As a result of the reconfiguration of the basement level, the stormwater drainage layout has been revised. There are no expected changes required to the overall stormwater detention or treatment for the site, but rather stormwater layout. This has been explored by Costin Roe Consulting, and the Civil Engineering Plans and Report amended accordingly (**Appendix 3**).

8. SUITABILITY OF THE SITE FOR DEVELOPMENT

The suitability of the subject site for the development has been established through the approval of **DA2019/1346**. The proposal, as modified, does not alter the nature of the development or its operations, such that it would become unsuitable for the subject site.

9. CONCLUSION

This application seeks consent for modifications to development consent **DA2019/1346**, pursuant to Section 4.55(2) of the EP&A Act. The proposal has been prepared after taking into consideration the following key issues:

- Development history of the subject site;
- Development Consent **DA2019/1346**;
- Site context and locality;
- Relevant heads of consideration under Section 4.55(2) of the EP&A Act; and
- Relevant statutory and non-statutory planning instruments.

The proposed modifications are considered acceptable, and worthy of support by Northern Beaches Council, for the following reasons:

- The proposed modifications reflect ongoing design refinements on behalf of the landowners and project team to ensure that the end development is responsive to the needs of the end users;

- The proposed modifications maintain compliance with the key development standards contained within WLEP2011 and WDCP2011; and,
- The development, as modified, will remain substantially the same, and will not result in additional environmental impacts.

In light of the above, the modifications proposed to development consent **DA2019/1346** are considered worthy of support by Northern Beaches Council and the Sydney North Planning Panel.

Should you require additional information, please do not hesitate to contact the undersigned.

Yours faithfully,



Andrew Cowan
Director
Willowtree Planning Pty Ltd
ACN 146 035 707

WILLOW TREE PLANNING

Appendix 1

Development Consent
(**DA2019/1346**)

19 August 2020

EG
Level 21 Governor Phillip Tower 1 Farrer Place
Sydney NSW 2000

Dear Sir/Madam

Application Number:	**DA2019/1346**
Address:	**Lot 1 DP 1220196 , 4 - 10 Inman Road, CROMER NSW 2099**
Proposed Development:	**Demolition works and alternations and additions to an existing industrial facility, including new warehouse, and self-storage, office premises and ancillary café.**

Please find attached the Notice of Determination for the above mentioned Application.

Please be advised that a copy of the Assessment Report associated with the application is available on Council's website at www.northernbeaches.nsw.gov.au

Please read your Notice of Determination carefully and the assessment report in the first instance.

If you have any further questions regarding this matter please contact the undersigned on 1300 434 434 or via email quoting the application number, address and description of works to council@northernbeaches.nsw.gov.au

Regards,

Peter Robinson
Executive Manager Development Assessment

northern beaches council

NOTICE OF DETERMINATION

Application Number:	DA2019/1346
Determination Type:	Development Application

APPLICATION DETAILS

Applicant:	EG
Land to be developed (Address):	Lot 1 DP 1220196 , 4 - 10 Inman Road CROMER NSW 2099
Proposed Development:	Demolition works and alternations and additions to an existing industrial facility, including new warehouse, and self-storage, office premises and ancillary café.

DETERMINATION - APPROVED

Consent Authority	Sydney Planning Panel - North
Made on (Date)	17/08/2020
Consent to operate from (Date):	17/08/2020
Consent to lapse on (Date):	17/08/2025

Detail of Conditions

The conditions, which have been applied to the consent, aim to ensure that the Environmental Impacts of Development are minimised and the Health and Safety of the community is maintained in accordance with the relevant standards and the Building Code of Australia.

Note:

If the works are to be certified by a Private Certifying Authority, then it is the certifier's responsibility to ensure all outstanding fees and bonds have been paid to Council prior to the issue of the Construction Certificate or as otherwise specified by Consent conditions.

DEVELOPMENT CONSENT OPERATIONAL CONDITIONS

1. **Approved Plans and Supporting Documentation**
The development must be carried out in compliance (except as amended by any other condition of consent) with the following:

a) Approved Plans

Architectural Plans - Endorsed with Council's stamp		
Drawing No.	**Dated**	**Prepared By**
DA101-C Rev.12 (Image 01 - External Finishes)		SBA Architects
DA201 Rev.12 (Site Plan)	12.11.2019	SBA Architects
DA202 Rev.12 (Ground Floor Plan)	06.11.2019	SBA Architects
DA203 Rev.12 (Basement Plan)	12.11.2019	SBA Architects
DA204 Rev.12 (Level 1 Floor Plan)	12.11.2019	SBA Architects
DA205 Rev.12 (Typical Offices 150sqm Plans and Elevations)	12.11.2019	SBA Architects
DA206 Rev.12 (Typical Offices 250sqm Plans and Elevations)	12.11.2019	SBA Architects
DA207 Rev.12 (Roof Plan)	12.11.2019	SBA Architects
DA208 Rev.12 (Demolition Plan)	12.11.2019	SBA Architects
DA301 Rev.12 (Elevations)	12.11.2019	SBA Architects
DA302 Rev.12 (Elevations 2)	12.11.2019	SBA Architects
DA305 Rev.12 (Sections)	12.11.2019	SBA Architects
DA306 Rev.12 (Sections 2)	12.11.2019	SBA Architects

Engineering Plans		
Drawing No.	**Dated**	**Prepared By**
C013674.01 - DA20 Issue B (Erosion & Sediment Control Plan)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA25 Issue A (Erosion & Sediment Control Details - Sheet 1)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA26 Issue A (Erosion & Sediment Control Details - Sheet 2)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA41 Issue C (Stormwater Drainage Plan - Ground Level)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA42 Issue B (Stormwater Drainage Plan - Basement)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA45 Issue B (Stormwater Details - Sheet 1)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA46 Issue B (Stormwater Details - Sheet 2)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA47 Issue B (Stormwater Details - Sheet 3)	26.11.19	Costin Roe Consulting Pty Ltd

C013674.01 - DA48 Issue A (Stormwater Details - Sheet 4)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA51 Issue C (Finished Levels Plan - Ground Level)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA52 Issue C (Finished Levels Plan - Basement)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA55 Issue B (Typical Sections - Sheet 1)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA56 Issue A (Typical Sections - Sheet 2)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA57 Issue A (Typical Sections - Sheet 3)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA65 Issue A (Retaining Wall Details)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA70 Issue A (Overland Flow Catchment Plan)	26.11.19	Costin Roe Consulting Pty Ltd
C013674.01 - DA71 Issue A (Pre-development Overland Flow Depth & Extent)	28.02.20	Costin Roe Consulting Pty Ltd
C013674.01 - DA72 Issue A (Post-development Overland Flow Depth & Extent)	28.02.20	Costin Roe Consulting Pty Ltd

Reports / Documentation – All recommendations and requirements contained within:		
Report No. / Page No. / Section No.	**Dated**	**Prepared By**
Schedule of Conservation Works (Job No. 8851)	July 2020	Heritage 21 Pty Ltd
BCA Statement	13/11/2019	SBA Architects
Civil Engineering Report Rev.A	26/11/2019	Costin Roe Consulting Pty Ltd
Conservation Management Plan Issue 7	17/05/2019	Heritage 21 Pty Ltd
Statement of Heritage Impact Issue 4	11/11/2019	Heritage 21 Pty Ltd
Transport Impact Assessment Issue A	21/11/2019	GTA Consultants
Acoustic Assessment Report	20/11/2019	Acoustic Dynamics
Biodiversity Constraints Assessment	16/08/2017	Eco Logical Australia
Biodiversity Development Assessment Report (REF: 18EG02BDAR)	07/04/2020	Travers bushfire & ecology
Tree Assessment Report (REF: 18EG03T)	10 August 2018	Travers bushfire & ecology
Preliminary Geotechnical Assessment Rev.1 (Ref: 30766ZRrpt)	18 August 2017	JK Geotechnics
Report on Desktop Groundwater Assessment (R.001.Rev1)	25 October 2019	Douglas Partners
Urban Design and Heritage Report Rev.2	1 November 2019	dfp planning consultants

Site Audit Report Rev.A	20 April 2018	AECOM Australia Pty Ltd
Overland Flow Report Rev.A	28 February 2020	Costin Roe Consulting Pty Ltd

b) Any plans and / or documentation submitted to satisfy the Conditions of this consent.

c) The development is to be undertaken generally in accordance with the following:

Landscape Plans		
Drawing No.	**Dated**	**Prepared By**
001 Issue B (Landscape Master Plan)	04.11.2019	Site Image
102 Issue B (Landscape Plan)	04.11.2019	Site Image
103 Issue B (Landscape Plan)	04.11.2019	Site Image
104 Issue B (Landscape Plan)	04.11.2019	Site Image
501 Issue C (Landscape Details)	06.11.2019	Site Image

Waste Management Plan		
Drawing No/Title.	**Dated**	**Prepared By**
Waste Management Plan Rev.2	30 October 2019	MRA Consulting Group

In the event of any inconsistency between conditions of this consent and the drawings/documents referred to above, the conditions of this consent will prevail.

Reason: To ensure the work is carried out in accordance with the determination of Council and approved plans.

2. **Compliance with Other Department, Authority or Service Requirements**
The development must be carried out in compliance with all recommendations and requirements, excluding general advice, within the following:

Other Department, Authority or Service	**EDMS Reference**	**Dated**
Ausgrid	Response Ausgrid Referral	17/01/2020
TfNSW	Response TfNSW (SYD20/00225/03)	28 April 2020
NSW EPA	DOC19/1061459-3	8 January 2020
Water NSW	Integrated Development Referral – General Terms of Approval Ref. IDAS1121681	26 February 2020

(NOTE: For a copy of the above referenced document/s, please see Application Tracking on Council's website www.northernbeaches.nsw.gov.au)

Reason: To ensure the work is carried out in accordance with the determination and the statutory requirements of other departments, authorities or bodies.

3. **Approved Land Use**
Nothing in this consent shall authorise the use of site/onsite structures/units/tenancies as detailed on the approved plans for any land use of the site beyond the definition of a:

- **Warehouse or distribution centre** means a building or place used mainly or exclusively for storing or handling items (whether goods or materials) pending their sale, but from which no retail sales are made.
- **Storage premises** means a building or place used for the storage of goods, materials, plant or machinery for commercial purposes and where the storage is not ancillary to any industry, business premises or retail premises on the same parcel of land, and includes self-storage units, but does not include a heavy industrial storage establishment or a warehouse or distribution centre.
- **Office premises** means a building or place used for the purpose of administrative, clerical, technical, professional or similar activities that do not include dealing with members of the public at the building or place on a direct and regular basis, except where such dealing is a minor activity (by appointment) that is ancillary to the main purpose for which the building or place is used.
- **Restaurant or cafe** means a building or place the principal purpose of which is the preparation and serving, on a retail basis, of food and drink to people for consumption on the premises, whether or not liquor, take away meals and drinks or entertainment are also provided.

(development is defined by the Warringah Local Environment Plan 2011 (as amended) Dictionary)

Any variation to the approved land use and/occupancy of any unit beyond the scope of the above definition will require the submission to Council of a new development application.

Reason: To ensure compliance with the terms of this consent.

4. **Prescribed Conditions**

(a) All building works must be carried out in accordance with the requirements of the Building Code of Australia (BCA).

(b) BASIX affected development must comply with the schedule of BASIX commitments specified within the submitted BASIX Certificate (demonstrated compliance upon plans/specifications is required prior to the issue of the Construction Certificate);

(c) A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:

(i) showing the name, address and telephone number of the Principal Certifying Authority for the work, and

(ii) showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and

(iii) stating that unauthorised entry to the work site is prohibited.

Any such sign is to be maintained while the building work, subdivision work or demolition work is being carried out, but must be removed when the work has been completed.

(d) Residential building work within the meaning of the Home Building Act 1989 must not be carried out unless the Principal Certifying Authority for the development to which the work relates (not being the Council) has given the Council written notice of the following information:

(i) in the case of work for which a principal contractor is required to be appointed:

A. the name and licence number of the principal contractor, and

B. the name of the insurer by which the work is insured under Part 6 of

that Act,

(ii) in the case of work to be done by an owner-builder:

A. the name of the owner-builder, and

B. if the owner-builder is required to hold an owner-builder permit under that Act, the number of the owner-builder permit.

If arrangements for doing the residential building work are changed while the work is in progress so that the information notified under becomes out of date, further work must not be carried out unless the Principal Certifying Authority for the development to which the work relates (not being the Council) has given the Council written notice of the updated information.

(e) Development that involves an excavation that extends below the level of the base of the footings of a building on adjoining land, the person having the benefit of the development consent must, at the person's own expense:

(i) protect and support the adjoining premises from possible damage from the excavation, and

(ii) where necessary, underpin the adjoining premises to prevent any such damage.

(iii) must, at least 7 days before excavating below the level of the base of the footings of a building on an adjoining allotment of land, give notice of intention to do so to the owner of the adjoining allotment of land and furnish particulars of the excavation to the owner of the building being erected or demolished.

(iv) the owner of the adjoining allotment of land is not liable for any part of the cost of work carried out for the purposes of this clause, whether carried out on the allotment of land being excavated or on the adjoining allotment of land.

In this clause, allotment of land includes a public road and any other public place.

Reason: Legislative requirement.

5. **General Requirements**

(a) Unless authorised by Council:
Building construction and delivery of material hours are restricted to:

- 7.00 am to 5.00 pm inclusive Monday to Friday,
- 8.00 am to 1.00 pm inclusive on Saturday,
- No work on Sundays and Public Holidays.

Demolition and excavation works are restricted to:

- 8.00 am to 5.00 pm Monday to Friday only.

(Excavation work includes the use of any excavation machinery and the use of jackhammers, rock breakers, excavators, loaders and the like, regardless of whether the activities disturb or alter the natural state of the existing ground stratum or are breaking up/removing materials from the site).

(b) Should any asbestos be uncovered on site, its demolition and removal must be carried out in accordance with WorkCover requirements and the relevant Australian Standards.

(c) At all times after the submission the Notice of Commencement to Council, a copy of the

Development Consent and Construction Certificate is to remain onsite at all times until the issue of a final Occupation Certificate. The consent shall be available for perusal of any Authorised Officer.

(d) Where demolition works have been completed and new construction works have not commenced within 4 weeks of the completion of the demolition works that area affected by the demolition works shall be fully stabilised and the site must be maintained in a safe and clean state until such time as new construction works commence.

(e) Onsite toilet facilities (being either connected to the sewer or an accredited sewer management facility) for workers are to be provided for construction sites at a rate of 1 per 20 persons.

(f) Prior to the release of the Construction Certificate, payment of the Long Service Levy is required. This payment can be made at Council or to the Long Services Payments Corporation. Payment is not required where the value of the works is less than $25,000. The Long Service Levy is calculated on 0.35% of the building and construction work. The levy rate and level in which it applies is subject to legislative change. The applicable fee at the time of payment of the Long Service Levy will apply.

(g) The applicant shall bear the cost of all works associated with the development that occurs on Council's property.

(h) No skip bins, building materials, demolition or excavation waste of any nature, and no hoist, plant or machinery (crane, concrete pump or lift) shall be placed on Council's footpaths, roadways, parks or grass verges without Council Approval.

(i) Demolition materials and builders' wastes are to be removed to approved waste/recycling centres.

(j) No trees or native shrubs or understorey vegetation on public property (footpaths, roads, reserves, etc.) or on the land to be developed shall be removed or damaged during construction unless specifically approved in this consent including for the erection of any fences, hoardings or other temporary works.

(k) Prior to the commencement of any development onsite for:

i) Building/s that are to be erected

ii) Building/s that are situated in the immediate vicinity of a public place and is dangerous to persons or property on or in the public place

iii) Building/s that are to be demolished

iv) For any work/s that is to be carried out

v) For any work/s that is to be demolished

The person responsible for the development site is to erect or install on or around the development area such temporary structures or appliances (wholly within the development site) as are necessary to protect persons or property and to prevent unauthorised access to the site in order for the land or premises to be maintained in a safe or healthy condition. Upon completion of the development, such temporary structures or appliances are to be removed within 7 days.

(l) A "Road Opening Permit" must be obtained from Council, and all appropriate charges paid, prior to commencement of any work on Council property. The owner/applicant shall be responsible for all public utilities and services in the area of the work, shall notify all relevant Authorities, and bear all costs associated with any repairs and/or adjustments as those Authorities may deem necessary.

(m) The works must comply with the relevant Ausgrid Network Standards and SafeWork NSW Codes of Practice.

(n) Requirements for new swimming pools/spas or existing swimming pools/spas affected

by building works.

(1) Child resistant fencing is to be provided to any swimming pool or lockable cover to any spa containing water and is to be consistent with the following;

Relevant legislative requirements and relevant Australian Standards (including but not limited) to:

(i) Swimming Pools Act 1992

(ii) Swimming Pools Amendment Act 2009

(iii) Swimming Pools Regulation 2008

(iv) Australian Standard AS1926 Swimming Pool Safety

(v) Australian Standard AS1926.1 Part 1: Safety barriers for swimming pools

(vi) Australian Standard AS1926.2 Part 2: Location of safety barriers for swimming pools.

(2) A 'KEEP WATCH' pool safety and aquatic based emergency sign, issued by Royal Life Saving is to be displayed in a prominent position within the pool/spa area.

(3) Filter backwash waters shall be conveyed to the Sydney Water sewerage system in sewered areas or managed on-site in unsewered areas in a manner that does not cause pollution, erosion or run off, is separate from the irrigation area for any wastewater system and is separate from any onsite stormwater management system.

(4) Swimming pools and spas must be registered with the Division of Local Government.

Reason: To ensure that works do not interfere with reasonable amenity expectations of residents and the community.

FEES / CHARGES / CONTRIBUTIONS

6. **Policy Controls**

Northern Beaches 7.12 Contributions Plan 2019

A monetary contribution of $445,900.00 is payable to Northern Beaches Council for the provision of local infrastructure and services pursuant to section 7.12 of the Environmental Planning & Assessment Act 1979 and the Northern Beaches Section 7.12 Contributions Plan 2019. The monetary contribution is based on a development cost of $44,590,000.00.

The monetary contribution is to be paid prior to the issue of the first Construction Certificate or Subdivision Certificate whichever occurs first, or prior to the issue of the Subdivision Certificate where no Construction Certificate is required. If the monetary contribution (total or in part) remains unpaid after the financial quarter that the development consent is issued, the amount unpaid (whether it be the full cash contribution or part thereof) will be adjusted on a quarterly basis in accordance with the applicable Consumer Price Index. If this situation applies, the cash contribution payable for this development will be the total unpaid monetary contribution as adjusted.

The proponent shall provide to the Certifying Authority written evidence (receipt/s) from Council that the total monetary contribution has been paid.

The Northern Beaches Section 7.12 Contributions Plan 2019 may be inspected at 725 Pittwater Rd, Dee Why and at Council's Customer Service Centres or alternatively, on Council's website at www.northernbeaches.nsw.gov.au

This fee must be paid prior to the issue of the Construction Certificate. Details demonstrating compliance are to be submitted to the Principal Certifying Authority.

Reason: To provide for contributions in accordance with the Contribution Plan to fund the provision of new or augmented local infrastructure and services.

7. **Security Bond**

A bond (determined from cost of works) of $10,000 and an inspection fee in accordance with Council's Fees and Charges paid as security are required to ensure the rectification of any damage that may occur to the Council infrastructure contained within the road reserve adjoining the site as a result of construction or the transportation of materials and equipment to and from the development site.

An inspection fee in accordance with Council adopted fees and charges (at the time of payment) is payable for each kerb inspection as determined by Council (minimum (1) one inspection).

All bonds and fees shall be deposited with Council prior to Construction Certificate or demolition work commencing, and details demonstrating payment are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

To process the inspection fee and bond payment a Bond Lodgement Form must be completed with the payments (a copy of the form is attached to this consent and alternatively a copy is located on Council's website at www.northernbeaches.nsw.gov.au).

Reason: To ensure adequate protection of Council's infrastructure.

8. **Construction, Excavation and Associated Works Bond (Drainage works)**
The applicant is to lodge a bond of $550,000 as security against any damage or failure to complete the construction of stormwater drainage works as part of this consent.

Details confirming payment of the bond are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: Protection of Council's Infrastructure.

9. **Construction, Excavation and Associated Works Security Bond (Crossing / Kerb)**
The applicant is to lodge a Bond of $200,000 as security against any damage or failure to complete the construction of any vehicular crossings, kerb and gutter, any footpath works and removal of any redundant driveways required as part of this consent.

Details confirming payment of the bond are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: Protection of Council's Infrastructure.

CONDITIONS TO BE SATISFIED PRIOR TO THE ISSUE OF THE CONSTRUCTION CERTIFICATE

10. **Structures Located Adjacent to Council Pipeline or Council Easement**

All structures are to be located clear of any Council pipeline or easement. The Applicant is to ensure footings of any new development within this development consent adjacent to an easement or pipeline are to be designed in accordance with Northern Beaches Council's Warringah Water Management Policy PL850. Details and certification prepared by a suitably qualified Civil Engineer demonstrating compliance are to be submitted to the Certifying Authority for approval prior to the issue of the Construction Certificate.

Reason: Protection of Council's infrastructure.

11. **Traffic Management and Control**

The Applicant is to submit an application for Traffic Management Plan to Council for approval prior to issue of the Construction Certificate. The Traffic Management Plan shall be prepared to RMS standards by an appropriately certified person.

Reason: To ensure appropriate measures have been considered for site access, storage and the operation of the site during all phases of the construction process.

12. **Photographic Archival Record**

A simple photographic heritage record of the site is to be made of all buildings and structures, as a record of the site prior to works.

This record must be submitted and approved by the Principal Certifying Authority prior to commencement of any demolition or works on-site.

This photographic record should be made using digital technology and should include:

- Location of property, date of survey and author of survey;
- A site plan at a scale of 1:200 showing all structures and major landscape elements;
- Existing plans of any buildings (floor plans and elevations);
- Photographs of all elevations, interiors and key features (including gardens, fences, architectural details such as windows, joinery etc.) as well as a number of contextual shots depicting the sites surrounding environment.

Note: All images should be cross-referenced to a catalogue sheet.

Reason: To provide an historical photographic record of the site, including any buildings and landscape elements, prior to any works.

13. **On-site Stormwater Detention Details**

The Applicant is to provide a certification of drainage plans detailing the provision of on-site stormwater detention in accordance with Northern Beaches Council's Warringah Water Management Policy PL850, and generally in accordance with the concept drainage plans prepared by Costin Roe Consulting, drawing number C013674.01 - DA10, DA41, DA51, DA52, issue C, dated 28/2/20, drawing number drawing number C013674.01 - DA55, issue B, dated 28/2/20, drawing number C013674.01 - DA42, DA45, DA46, DA47, DA48, issue B, dated 26/11/19, drawing number C013674.01 - DA65, issue A, dated 26/11/19, and drawing number C013674.01 - DA70, DA71, DA72, issue A, dated 20/2/20. Detailed drainage plans are to be prepared by a suitably qualified Civil Engineer, who has membership to the Institution of Engineers Australia, National Professional Engineers Register (NPER) and registered in the General Area of Practice for civil engineering.

The drainage plans must address the following:

i. The stormwater outlet connection to Council's drainage channel shall be amended to discharge

Detailed drainage plans, including engineering certification, are to be submitted to the Certifying Authority for approval prior to the issue of the Construction Certificate.

Reason: To ensure appropriate provision for the disposal of stormwater and stormwater management arising from the development.

14. **Submission Roads Act Application for Civil Works in the Public Road**
The Applicant is to submit an application for approval for Infrastructure works on Councils roadway. Engineering plans for the new development works within the road reserve and this development consent are to be submitted to Council for approval under the provisions of Sections 138 and 139 of the Roads Act 1993.

The application is to include four (4) copies of Civil Engineering plans for the design of vehicle crossing and footpath which are to be generally in accordance with the Council's specification for engineering works - AUS-SPEC #1. The plan shall be prepared by a qualified civil engineer. The design must include the following information:

1. The Applicant is to construct three vehicle crossings in Inman Road (i) 6.2 metres wide, (ii) 10 metres wide at the boundary and 12.8 metres wide at the kerb, and (iii) 7 metres wide and two vehicle crossings in South Creek Road (i) 8 metres wide at the boundary and 12.3 metres wide at the kerb and (ii) 7.7 metres wide at the boundary and 14.5 metres wide at the kerb in accordance with Northern Beaches Council Drawing No A4-3330/1 N. The vehicle crossing shall be design for the largest service vehicle and supported by turning path templates.
2. Provision of a 1.5 metre wide footpath and upgrade of any associated pram ramps for the entire development frontage.

The fee associated with the assessment and approval of the application is to be in accordance with Council's Fee and Charges.

An approval is to be submitted to the Certifying Authority prior to the issue of the Construction Certificate

Reason: To ensure engineering works are constructed in accordance with relevant standards and Council's specification.

15. **Tanking of Basement Level**
The basement area is to be permanently tanked. The Applicant is to submit structural details of the tanking, prepared by a suitably qualified Engineer. Where temporary dewatering works are required on the development site during construction, the developer/applicant must apply for and obtain a bore license from the NSW Office of Environment and Heritage. The bore license must be obtained prior to commencement of dewatering works. All requirements of the NSW Office of Water are to be complied with and a copy of the approval must be submitted to the Certifying Authority. Details demonstrating compliance are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: To prevent ingress of sub-surface flows into the basement area and to comply with State Government Requirements.

16. **Structural Adequacy and Excavation Work**
Excavation work is to ensure the stability of the soil material of adjoining properties, the protection of adjoining buildings, services, structures and / or public infrastructure from damage using underpinning, shoring, retaining walls and support where required. All retaining walls are to be structurally adequate for the intended purpose, designed and certified by a Structural Engineer, except where site conditions permit the following:

(a) maximum height of 900mm above or below ground level and at least 900mm from any property boundary, and
(b) Comply with AS3700, AS3600 and AS1170 and timber walls with AS1720 and AS1170.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of the Construction Certificate.

Reason: To provide public and private safety.

17. **Shoring of Council's Road Reserve (Temporary road anchors)**
Should the proposal require shoring to support an adjoining property or Council land, the Applicant shall provide the adjoining properties with engineering drawings, detailing the proposed shoring works for their consideration and approval.

Written approval from Council under Section 138 of the Roads Act 1993 is required if temporary ground anchors are to be used within Council's road reserve. The Owner's approval is to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: To ensure that owners consent is obtained for ancillary works, and to ensure the protection of adjoining properties and Council land.

18. **Stormwater Drainage Application**

The applicant is to provide a stormwater drainage application under Section 68 of the Local Government Act 1993 to Council for approval. The submission is to include four (4) copies of Civil Engineering plans for the design of the stormwater drainage channel which are to be generally in accordance with the civil design prepared by Costin Roe Consulting, drawing number C013674.01 - DA10, DA41, DA51, DA52, issue C, dated 28/2/20, drawing number drawing number C013674.01 - DA55, issue B, dated 28/2/20, drawing number C013674.01 - DA42, DA45, DA46, DA47, DA48, issue B, dated 26/11/19, drawing number C013674.01 - DA65, issue A, dated 26/11/19, and drawing number C013674.01 - DA70, DA71, DA72, issue A, dated 20/2/20 and Council's specification for engineering works - AUS-SPEC #1.

The form can be found on Council's website at www.northernbeaches.nsw.gov.au > Council Forms > Stormwater Drainage Application Form. The drainage plans must address the following:
i. Certification that the stormwater channel has been designed in accordance with the Overland Flow Report prepared by Costin Roe Consulting, project number Co13674.01, revision A, dated 28/2/20.
ii. An easement for drainage purposes shall be shown on the submitted plans over the drainage channel the greater of five metres wide or a minimum 1 metre from the outside wall of the top of the stormwater channel.
iii. A clear access way shall be provided a minimum of 3.5 metres wide along the adjoining driveway to the east to access the top bank of the channel for the full length for operational and maintenance purposes. A Right of Access shall be shown on the submitted plans over the access way, and shall be created in favour of Council.

The fee associated with the assessment and approval of the application is to be in accordance with Council's Fees and Charges. Details demonstrating compliance are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: To ensure appropriate provision for disposal and maintenance stormwater management arising from the development.=

19. **Schedule of Conservation Works**
The applicant shall undertake the works outlined within the 'Schedule of Conservation Works' prepared by Heritage 21 (Job No. 8851), dated July 2020. The works shall be included in amended plans/schedule and submitted to Council for approval prior to the issue of the Construction Certificate.

Reason: To ensure the conservation of the heritage item .

20. **Temporary Protection Measures**
Temporary protection measures are to be developed which identify potential risks and outline methodologies to negate any physical impact upon significant heritage fabric located in the vicinity of works. This includes any impacts upon the retained hexagonal tower and retained original office buildings. These measures are to be prepared by a suitably qualified contractor and submitted to the Certifying Authority for approval prior to the issue of a Construction Certificate. Measures are to be implemented prior to any works and monitored by the project architect.

Reason: To ensure that any original heritage fabric to be retained, is not damaged during construction.

21. **Interpretation Strategy and Plan**
An Interpretation Strategy is to be prepared by a suitable qualified heritage professional along with an Interpretation Plan outlining how this interpretation will be incorporated into the site development. This Interpretation Strategy and Plan are to be submitted to Council's Heritage Advisor for approval prior to the issue of a Construction Certificate.

Reason: To ensure that the history of the site and its use by Roche is interpreted and incorporated into the site development.

22. **Kitchen Design, construction and fit out of food premises**
The construction fit-out and finishes of the food premises must comply with Standard 3.2.3 of the Australian and New Zealand Food Standards Code, the Food Act 2003 and Australian Standard AS 4674 ‘Design, construction and fit out of food premises’. Prior to any Construction Certificate being issued certification is to be provided by a suitably qualified person to the principal certifying authority identifying that the fit-out complies with the above requirement.

Reason: To ensure that the kitchen complies with the design requirements.

23. **Plans of Mechanical ventilation**
Prior to any Construction Certificate (CC) being issued, detailed plans that demonstrate compliance with the Australian Standard (AS) 1668.2 “The use of ventilation and air-conditioning in buildings - Mechanical ventilation in buildings”, must be approved by the Certifying Authority for any cooking equipment with an individual or combined power rating level that triggers the requirement for mechanical ventilation under AS1668.2 including any deep frying equipment.

Reason: To ensure that the design, construction and installation requirement for mechanical ventilation complies with the Australian Standard 1668.2.

24. **Tree Protection Plan**
In order to protect and enhance onsite vegetation and trees the following applies to the development site:

(a) A Tree Protection Plan prepared by a AQF Level 5 Arborist (or equivalent) showing the following:

- Layout of the approved development
- Location of trees identified for retention with species and tree number allocated
- Extent of canopy spread
- Location of tree protection fencing / barriers in accordance with AS2470 – 2009 Protection of trees on development sites
- General tree protection measures and inspection hold points

(b) The Tree Protection Plan is to be submitted to the Principal Certifying Authority for approval prior to issue of a Construction Certificate.

(c) Tree protection measures identified on the plan are to be in place prior to commencement of works.

Reason: To ensure compliance with the requirement to retain and protect significant planting on the site.

25. **Amended Landscape Plans**
Landscape Plans are to be amended to substitute the proposed *Cupaniopsis anacardioides* trees with an alternate native species not listed ans an exempt species under WDCP E1 Preservation of Trees or Bushland Vegetation

Reason: Environmental amenity

26. **Pre-Construction Stormwater Assets Dilapidation Report**

The Applicant is to submit a pre-construction/demolition Dilapidation Survey of Council's Stormwater Assets is to be prepared by a suitably qualified person in accordance with Council's Guidelines for Preparing a Dilapidation Survey of Council Stormwater Asset, to record the existing condition of the asset prior to the commencement of works. Council's Guidelines are available at:

https://files.northernbeaches.nsw.gov.au/sites/default/files/documents/general-information/engineering-specifications/preparingdilapidationsurveyforcouncilstormwaterassets.pdf

The pre-construction/demolition dilapidation report must be submitted to Council for written approval and the written approval is then to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: Protection of Council's infrastructure.

27. **Pre-commencement Dilapidation Report**
The applicant must prepare and submit a pre-commencement dilapidation report providing an accurate record of the existing condition of adjoining public property and public infrastructure (including roads, gutter, footpaths, etc). A copy of the report must be provided to Council, any other owners of public infrastructure and the owners of adjoining and affected private properties. The pre-construction / demolition dilapidation report must be submitted to Council for written approval and the written approval is then to be submitted to the Certifying Authority prior to the issue of the any Construction Certificate and the commencement of any works including demolition.
Reason: Protection of Council's Infrastructure during construction.

28. **Like for like credit retirement conditions - Ecosystem credit retirement conditions**
Prior to issue of the relevant Construction Certificate the class and number of ecosystem credits in Table 1 must be retired to offset the impacts of the development.

The requirement to retire credits outlined in Table 1 may be satisfied by payment to the Biodiversity Conservation Fund of an amount equivalent to the class and number of ecosystem credits, as calculated by the Biodiversity Offsets Payment Calculator.

Evidence of the retirement of credits or payment to the Biodiversity Conservation Fund in satisfaction of Table 1 requirements must be provided to the Manager Bushland and Biodiversity of Northern Beaches Council prior to release of construction certification.

Table 1 Ecosystem credits required to be retired – like for like

Impacted Plant Community Type	**TEC**	**Number of ecosystem credits**	**Conta HBT**
1841-Smooth-barked Apple - Turpentine - Blackbutt tall open forest on enriched sandstone slopes and gullies of the Sydney region	N/A	Nine (9)	YES

Reason: To offset the residual biodiversity impacts of the development in accordance with the NSW Biodiversity Offset Scheme

29. **Detailed Design of Stormwater Treatment Measures**
A certificate from a Civil Engineer, stating that the stormwater treatment measures have been designed in accordance with the plans prepared by Costin Roe dated 26 November 2019 and Council's Water Management Policy.

The certificate shall be submitted to the Certifying Authority prior to the release of the Construction Certificate.

Reason: Protection of the receiving environment

30. **Like for like credit retirement conditions - Species credit retirement conditions**
Prior to issue of the relevant Construction Certificate the class and number of species credits in Table 2 must be retired to offset the impacts of development.

The requirement to retire credits outlined in Table 2 may be satisfied by payment to the Biodiversity Conservation Fund of an amount equivalent to the class and number of ecosystem credits, as calculated by the Biodiversity Offsets Payment Calculator.

Evidence of the retirement of credits or payment to the Biodiversity Conservation Fund in satisfaction of Table 2 requirements must be provided to the Manager Bushland and Biodiversity of Northern Beaches Council prior to release of construction certification.

Table 2 Species credits required to be retired – like for like

Impacted species credit species	Number of species credits	IBRA sub-region
Chalinolobus dwyeri/ Large-eared Pied Bat	Fourteen (14)	Any in NSW

Reason:To offset the residual biodiversity impacts of the development in accordance with the NSW Biodiversity Offset Scheme.

31. **Engagement of a Project Ecologist**
A Project Ecologist is to be employed for the duration of the approved works to ensure all biodiversity protection measures are carried out in accordance with these conditions of consent and the approved Biodiversity Development Assessment Report (BDAR) (Travers Bushfire & Ecology dated 7 April 2020).

The Project Ecologist must have one of the following memberships / accreditation:
- Practising member of the NSW Ecological Consultants Association (https://www.ecansw.org.au/find-a-consultant/) OR
- Biodiversity Assessment Method Accredited Assessor under the NSW Biodiversity Conservation Act 2016 (https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor)

Evidence of engagement of the Project Ecologist is to be provided to the Principal Certifying Authority Prior to issue of Construction Certificate.

Reason: To protect native vegetation and wildlife in accordance with relevant Natural Environment LEP/DCP controls.

32. **Compliance with approved BDAR impact mitigation measures – Prior to Construction**
All pre-construction biodiversity-related measures specified in section 5.4 the approved BDAR and these conditions of consent are to be implemented at the appropriate stage of the development. Compliance with pre-construction measures are to be certified by the Project Ecologist prior to issue of the Construction Certificate.

Reason: To confirm compliance with wildlife and habitat protection/replacement measures in accordance with relevant Natural Environment LEP/DCP controls.

33. **Notification of determination to which the Biodiversity Offset Scheme applies**
The applicant or Project Ecologist, on behalf of the applicant, must download and complete the “Biodiversity Offsets Scheme – Notification of Determination” form.

The completed form and attachments, including a copy of the determination and any conditions of approval, must be emailed to the LMBC Service Centre <bam.support@environment.nsw.gov.au>. The LMBC Service Centre arranges for determination outcomes to be recorded in the Biodiversity Offset and Agreement Management System (BOAMS).

Council's Manager Bushland and Biodiversity and the Principal Certifying Authority must be copied into the notification email to confirm compliance.

Reason: To ensure the NSW Department of Planning, Industry and Environment are notified of determinations where the Biodiversity Offsets Scheme applies and Council are notified for compliance.

34. **Compliance with Standards**
The development is required to be carried out in accordance with all relevant Australian Standards.

Details demonstrating compliance with the relevant Australian Standard are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: To ensure the development is constructed in accordance with appropriate standards.

35. **External Finishes to Roof**
The external finish to the roof shall have a medium to dark range in order to minimise solar reflections to neighbouring properties. Any roof with a metallic steel finish is not permitted.

Details demonstrating compliance are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Reason: To ensure that excessive glare or reflectivity nuisance does not occur as a result of the development.

36. **Construction Traffic Management Plan.**
As a result of the site constraints, limited vehicle access and parking, a Construction Traffic Management Plan (CTMP) and report shall be prepared by an RMS accredited person and submitted to and approved by the Northern Beaches Council Traffic Team prior to issue of any Construction Certificate.

The CTMP must address following:-
• The proposed phases of construction works on the site, and the expected duration of each construction phase;
• The proposed order in which works on the site will be undertaken, and the method statements on how various stages of construction will be undertaken;
• Make provision for all construction materials to be stored on site, at all times;
• The proposed areas within the site to be used for the storage of excavated materials, construction materials and waste containers during the construction period;
• The proposed method of access to and egress from the site for construction vehicles, including access routes and truck rates through the Council area and the location and type of temporary vehicular crossing for the purpose of minimising traffic congestion and noise in the area, with no access across public parks or reserves being allowed;
• The proposed method of loading and unloading excavation and construction machinery, excavation and building materials, formwork and the erection of any part of the structure within

the site. Wherever possible mobile cranes should be located wholly within the site;
• Make provision for parking onsite. All Staff and Contractors are to use the basement parking once available.
• Temporary truck standing/ queuing locations in a public roadway/ domain in the vicinity of the site are not permitted unless approved by Council prior.
• Include a Traffic Control Plan prepared by a person with suitable RMS accreditation for any activities involving the management of vehicle and pedestrian traffic.
• The proposed manner in which adjoining property owners will be kept advised of the timeframes for completion of each phase of development/construction process. It must also specify that a minimum Fourteen (14) days notification must be provided to adjoining property owners prior to the implementation of any temporary traffic control measure.
• Include a site plan showing the location of any site sheds, location of requested Work Zones, anticipated use of cranes and concrete pumps, structures proposed on the footpath areas (hoardings, scaffolding or shoring) and any tree protection zones around Council street trees.
• Take into consideration the combined construction activities of other development in the surrounding area. To this end, the consultant preparing the CTMP must engage and consult with developers undertaking major development works within a 250m radius of the subject site to ensure that appropriate measures are in place to prevent the combined impact of construction activities, such as (but not limited to) concrete pours, crane lifts and dump truck routes. These communications must be documented and submitted to Council prior to work commencing on site.
• The proposed method/device to remove loose material from all vehicles and/or machinery before entering the road reserve, any run-off from the washing down of vehicles shall be directed to the sediment control system within the site;
• Specify that the roadway (including footpath) must be kept in a serviceable condition for the duration of construction. At the direction of Council, undertake remedial treatments such as patching at no cost to Council.
• The proposed method of support to any excavation adjacent to adjoining properties, or the road reserve. The proposed method of support is to be designed and certified by an appropriately qualified and practising Structural Engineer, or equivalent;
• Proposed protection for Council and adjoining properties;
• The location and operation of any on site crane; and

The CTMP shall be prepared in accordance with relevant sections of Australian Standard 1742 – “Manual of Uniform Traffic Control Devices”, RMS’ Manual – “Traffic Control at Work Sites”.

All fees and charges associated with the review of this plan is to be in accordance with Council’s Schedule of Fees and Charges and are to be paid at the time that the Construction Traffic Management Plan is submitted.

Reason: To ensure public safety and minimise any impacts to the adjoining pedestrian and vehicular traffic systems. Confirming appropriate measures have been considered for site access, storage and the operation of the site during all phases of the construction process in a manner that respects adjoining owner’s property rights and protects amenity in the locality, without unreasonable inconvenience to the community. The CTMP is intended to minimise impact of construction activities on the surrounding community, in terms of vehicle traffic (including traffic flow and parking) and pedestrian amenity adjacent to the site. (DACTRCPCC1)

37. **Submission of Engineering Plans**
The submission is to include four (4) copies of Civil Engineering plans for the design of:

- A Shared User Path along all frontages of the site

These are to be generally in accordance with the civil design approved with the Development Application and Council's specification for engineering works - AUS-SPEC #1 and or Council's Minor Works Policy. Details demonstrating compliance are to be submitted to the Certifying Authority prior to the issue of the Construction Certificate.

Section 138 and/or 139 applications are to be submitted to Council for Local Traffic Committee approval.

Reason: To ensure compliance with Council's specification for engineering works (DACTRCPCC2)

CONDITIONS THAT MUST BE ADDRESSED PRIOR TO ANY COMMENCEMENT

38. **Public Liability Insurance - Works on Public Land**
Any person or contractor undertaking works on public land must take out Public Risk Insurance with a minimum cover of $20 million in relation to the occupation of, and approved works within Council's road reserve or public land, as approved in this consent. The Policy is to note, and provide protection for Northern Beaches Council, as an interested party and a copy of the Policy must be submitted to Council prior to commencement of the works. The Policy must be valid for the entire period that the works are being undertaken on public land.

Reason: To ensure the community is protected from the cost of any claim for damages arising from works on public land.

39. **Prior to commencement - Land Contamination**
Prior to the commencement of construction, the Applicant must engage an auditor accredited under the Contaminated Land Management Act 1997 (Site Auditor) throughout the duration of works to ensure that any work required in relation to soil and/or groundwater contamination is appropriately managed.

The Applicant must conduct site investigations to determine the full nature and extent of the contamination at the project area. The site investigations must be undertaken, and the subsequent report/s, must be prepared in accordance with relevant guidelines made or approved by the EPA under section 105 of the *Contaminated Land Management Act* 1997.

At the completion of the site investigations, the Applicant must provide a Remediation Action Plan to ensure the site will be suitable for the proposed use when the RAP is implemented. The Remediation Action Plan must be prepared in accordance with relevant guidelines made or approved by the EPA under section 105 of the *Contaminated Land Management Act* 1997.

Prior to commencing the remediation, the Applicant must submit Interim Audit Advice or a Section B Site Audit Statement from the Site Auditor that certifies that the site can be made suitable for the proposed use subject to the implementation of the Remediation Action Plan.
The applicant must adhere to the management measures in the Remediation Action Plan which were approved by the Site Auditor.

Any variations to the approved Remediation Action Plan must be approved in writing by the Site Auditor.

If work is to be completed in stages, the Site Auditor must confirm satisfactory completion of each stage by the issuance of Interim Audit Advice/s.

Reason: To ensure all site contamination is managed to protect public and environmental health.

40. **Tree trunk, branch and root protection**

(a)Existing trees which must be retained

i) All trees not indicated for removal on Landscape Plans Dwg Nos. 101B, 102B, 103B and 104B dated 04.11.2019 prepared by Site Image, unless exempt under relevant planning instruments or legislation

ii) Trees located on adjoining land

(b) Tree protection

i) No tree roots greater than 25mm diameter are to be cut from protected trees unless authorised by the Project Arborist on site.

ii) All structures are to bridge tree roots greater than 25mm diameter unless directed otherwise by the Project Arborist on site.

iii) All tree protection to be in accordance with the approved Tree Protection Plan and AS4970-2009 Protection of trees on development sites, with particular reference to Section 4 Tree Protection Measures.

iv) All tree pruning within the subject site is to be in accordance with WDCP2011 Clause E1 Private Property Tree Management and AS 4373 Pruning of amenity trees

v) All tree protection measures, including fencing, are to be in place prior to commencement of works.

Reason: To ensure compliance with the requirement to retain and protect significant planting on the site.

41. **Project Arborist**

i) A Project Arborist with minimum qualification AQF Level 5 is to be appointed prior to commencement of works.

ii) The Project Arborist is to oversee all tree protection measures, removals inspection hold points and works adjacent to protected trees as outlined in the approved Tree Protection Plan and AS4970-2009 Protection of trees on development sites.

iii) The Project Arborist is to ensure compliance as relevant with any other environmental requirements conditioned under this consent.

Reason: to ensure protection of vegetation proposed for retention on the site.

42. **Installation and Maintenance of Sediment and Erosion Controls**

Sediment and erosion controls must be installed in accordance with Landcom's 'Managing Urban Stormwater: Soils and Construction' (2004) and the Erosion and Sediment Control Plan prior to commencement of any other works on site.

Erosion and sediment controls are to be adequately maintained and monitored at all times, particularly after periods of rain, and shall remain in proper operation until all development activities have been completed and vegetation cover has been re-established across 70 percent of the site, and the remaining areas have been stabilised with ongoing measures such as jute mesh or matting.

Reason: Protection of the receiving environment

43. **Compliance with approved BDAR impact mitigation measures – During Construction**
The approved BDAR includes f mitigation measures (section 5.4), which must to be implemented before, during and after construction to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility.

All biodiversity-related measures are to be implemented during construction, as specified in the approved BDAR and these conditions of consent.

The Project Ecologist is required to provide details of compliance, including written and photographic evidence, and provide to the Principal Certifying Authority and Council prior to issue of Occupation Certificate.

Reason: To ensure measures required to avoid and minimise residual biodiversity impacts are undertaken in accordance with the approved BDAR

CONDITIONS TO BE COMPLIED WITH DURING DEMOLITION AND BUILDING WORK

44. **Road Reserve**
The applicant shall ensure the public footways and roadways adjacent to the site are maintained in a safe condition at all times during the course of the work.

Reason: Public Safety.

45. **Removing, Handling and Disposing of Asbestos**
Any asbestos material arising from the demolition process shall be removed and disposed of in accordance with the following requirements:
- Work Health and Safety Act;
- Work Health and Safety Regulation;
- Code of Practice for the Safe Removal of Asbestos [NOHSC:2002 (1998)];
- Guide to the Control of Asbestos Hazards in Buildings and Structures [NOHSC: 3002 (1998);
- Clause 42 of the Protection of the Environment Operations (Waste) Regulation 2005; and
- The demolition must be undertaken in accordance with Australian Standard AS2601 – The Demolition of Structures.

Reason: For the protection of the environment and human health.

46. **Survey Certificate**
A survey certificate prepared by a Registered Surveyor at the following stages of construction:

(a) Commencement of perimeter walls columns and or other structural elements to ensure the wall or structure, to boundary setbacks are in accordance with the approved details.

(b) At ground level to ensure the finished floor levels are in accordance with the approved levels, prior to concrete slab being poured/flooring being laid.

(c) At completion of the roof frame confirming the finished roof/ridge height is in accordance with levels indicated on the approved plans.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority.

Reason: To determine the height of buildings under construction comply with levels shown on approved plans.

47. **Installation and Maintenance of Sediment Control**
Prior to any works commencing on site, including demolition, sediment and erosion controls must be installed in accordance with Landcom's 'Managing Urban Stormwater: Soils and Construction' (2004). Techniques used for erosion and sediment control on site are to be adequately maintained and monitored at all times, particularly after periods of rain, and shall remain in proper operation until all development activities have been completed and the site is sufficiently stabilised with vegetation.

Reason: To protect the surrounding environment from the effects of sedimentation and erosion from the site.

48. **Property Boundary Levels**
The Applicant is to maintain the property boundary levels. No approval is granted for any change to existing property alignment levels to accommodate the development except where necessary to facilitate the provision of vehicular crossings approved within this consent.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority.

Reason: To maintain the existing profile of the nature strip/road reserve.

49. **Civil Works Supervision**
The Applicant shall ensure all civil works approved in the Section 138 approval / Section 68 are supervised by an appropriately qualified and practising Civil Engineer.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority and/or Roads Authority.

Reason: To ensure compliance of civil works with Council's specification for engineering works.

50. **Trees Condition**
During the construction period the applicant is responsible for ensuring all protected trees are maintained in a healthy and vigorous condition. This is to be done by ensuring that all identified tree protection measures are adhered to. In this regard all protected plants on this site shall not exhibit:

(a) A general decline in health and vigour.
(b) Damaged, crushed or dying roots due to poor pruning techniques.
(c) More than 10% loss or dieback of roots, branches and foliage.
(d) Mechanical damage or bruising of bark and timber of roots, trunk and branches.
(e) Yellowing of foliage or a thinning of the canopy untypical of its species.
(f) An increase in the amount of deadwood not associated with normal growth.
(g) An increase in kino or gum exudation.
(h) Inappropriate increases in epicormic growth that may indicate that the plants are in a stressed condition.
(i) Branch drop, torn branches and stripped bark not associated with natural climatic conditions.

Any mitigating measures and recommendations required by the Arborist are to be implemented.

The owner of the adjoining allotment of land is not liable for the cost of work carried out for the purpose of this clause.

Reason: Protection of Trees.

51. **Protection of rock and sites of significance**

a) All rock outcrops outside of the area of approved works are to be preserved and protected at all times during demolition excavation and construction works.

b) Should any Aboriginal sites be uncovered during the carrying out of works, those works are to cease and Council, the NSW Office of Environment and Heritage (OEH) and the Metropolitan Local Aboriginal Land Council are to be contacted.

Reason: Preservation of significant environmental features.

52. **Substitution of Stormwater Treatment Measure**

The substitution of an "equivalent" device for the stormwater treatment measure approved in the Development Application process must first be approved by the Principal Certifying Authority.

Details must be submitted to the Principal Certifying Authority for approval prior to installation.

Reason: To ensure stormwater is appropriately managed and in accordance with the Water Management Policy.

53. **Dewatering Management**

Dewatering of groundwater or tailwater must be carried out according to a dewatering management plan approved by Council, Council's dewatering permit, the General Terms of Approval/Controlled Activity permit issued by WaterNSW and the EPA, and legislation including Protection of the Environment Operations Act 1997 and Contaminated Lands Act 1997.

Council's Catchment Team must be notified of your intention to discharge and the expected time of discharge via the Team's email address - catchment@northernbeaches.nsw.gov.au

All records of approvals, water discharges and monitoring results are to be documented and kept on site. Copies of all records shall be provided to the appropriate regulatory authority, including Council, upon request.

Reason: Protection of the receiving environment

54. **Aboriginal Heritage**

Site A

Any proponent proposing to carry out future development works on the Property should initiate dialogue with the MLALC and Council about the prudence of developing appropriate management measures during the construction period for Site A (AHIMS Site #45-6-1760) that occurs on the footpath on Inman Road

Area C

Any proponent proposing to carry out future development works on the Property should consider undertaking an investigation to determine whether **Area C** has any Aboriginal heritage values given its potential connection with **Site B.**

Site B

Consultation with the **MLALC** should be initiated to seek approval from the **OEH** for an **AHIP** to allow the investigation of the suspected site of **Site B** (AHIMS Site #45-6-1851) to be carried out should future development of the Property be proposed in this area.

Reason: Aboriginal Heritage Protection. (DACAHE01)

55. **Installation and Maintenance of Sediment Control**
Measures used for erosion and sediment control on building sites are to be adequately maintained at all times and must be installed in accordance with Council's Specifications for Erosion and Sediment Control. All measures shall remain in proper operation until all development activities have been completed and the site fully stabilised.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority.

Reason: To protect the environment from the effects of sedimentation and erosion from development sites.

56. **Implementation of Construction Traffic Management Plan.**
All works and construction activities are to be undertaken in accordance with the approved Construction Traffic Management Plan (CTMP). All controls in the CTMP must be maintained at all times and all traffic management control must be undertaken by personnel having appropriate RMS accreditation. Should the implementation or effectiveness of the CTMP be impacted by surrounding major development not encompassed in the approved CTMP, the CTMP measures and controls are to be revised accordingly and submitted to Council for approval. A copy of the approved CTMP is to be kept onsite at all times and made available to Council on request.

Reason: to ensure compliance of the developer/builder in adhering to the Construction Traffic Management procedures agreed and are held liable to the conditions of consent. (DACTREDW1)

57. **Ongoing Management.**
The applicant shall be responsible in ensuring that the road reserve remains in a serviceable state during the course of the project. (DACTREDW2)

CONDITIONS WHICH MUST BE COMPLIED WITH PRIOR TO THE ISSUE OF THE OCCUPATION CERTIFICATE

58. **Landscape completion certification**
a) Prior to the issue of an Occupation Certificate, a landscape report prepared by a landscape architect or landscape designer shall be submitted to the Certifying Authority, certifying that the landscape works have been completed in accordance with the approved landscape plan and inclusive of any conditions of consent.
b) Prior to the issue of an Occupation Certificate, a landscape report prepared by a landscape architect or landscape designer shall be submitted to the Certifying Authority, certifying that the landscape works have been established and maintained in accordance with the approved landscape plan.

Reason: To ensure that the landscape treatments are installed to provide landscape amenity.

59. **Condition of retained vegetation**
Prior to the issue of an Occupation Certificate, a report prepared by the Project Arborist shall be submitted to the Principal Certifying Authority, assessing the health and impact of trees and

vegetation required to be retained as a result of the proposed development, including the following information:

a) Compliance with all conditions for tree protection and excavation works.
b) Extent of damage sustained by vegetation as a result of the construction works.
c) Any subsequent remedial works required to ensure the long term retention of the vegetation.

Reason: To ensure compliance with the requirement to retain and protect significant planting on development sites.

60. **Stormwater Disposal**
The stormwater drainage works shall be certified as compliant with all relevant Australian Standards and Codes by a suitably qualified person. Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of any interim / final Occupation Certificate.

Reason: To ensure appropriate provision for the disposal of stormwater arising from the development.

61. **Post- Construction Stormwater Assets Dilapidation Report (Council stormwater assets)**

The Applicant shall submit a post-construction Dilapidation Survey of Council's Stormwater Assets is to be prepared by a suitably qualified person in accordance with Council's Guidelines for Preparing a Dilapidation Survey of Council Stormwater Asset in order to determine if the asset has been damaged by the works. Council's Guidelines are available at

https://files.northernbeaches.nsw.gov.au/sites/default/files/documents/general-information/engineering-specifications/preparingdilapidationsurveyforcouncilstormwaterassets.pdf

The post-construction / demolition dilapidation report must be submitted to Council for review Any damage to Council's stormwater infrastructure is to be rectified prior to the release of any Drainage security bonds.
Reason: Protection of Council's infrastructure.

62. **Certification of Structures Located Adjacent to Council Pipeline or Council Easement**

The Applicant shall submit a suitably qualified Civil Engineer's certification that the completed footing works have been constructed in accordance with this consent, Northern Beaches Council's Warringah Water Management Policy PL850 and the approved Construction Certificate plans. Civil Engineer demonstrating compliance is to be submitted to the Principal Certifying Authority prior to the issue of the Occupation Certificate.

Reason: Protection of Council's Infrastructure.

63. **Positive Covenant and Restriction as to User for On-site Stormwater Disposal Structures**
The Applicant shall lodge the Legal Documents Authorisation Application with the original completed request forms (NSW Land Registry standard forms 13PC and/or 13RPA) to Council and a copy of the Works-as-Executed plan (details overdrawn on a copy of the approved

drainage plan), hydraulic engineers' certification.

The Applicant shall create on the Title a restriction on the use of land and a positive covenant in respect to the ongoing maintenance and restriction of the on-site stormwater disposal structures within this development consent. The terms of the positive covenant and restriction are to be prepared to Council's standard requirements at the applicant's expense and endorsed by Northern Beaches Council's delegate prior to lodgement with the NSW Land Registry Services. Northern Beaches Council shall be nominated as the party to release, vary or modify such covenant.
A copy of the certificate of title demonstrating the creation of the positive covenant and restriction for on-site storm water detention as to user is to be submitted.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of final Occupation Certificate.

Reason: To ensure the on-site stormwater disposal system is maintained to an appropriate operational standard.

64. **Retaining wall**
The retaining wall works shall be certified as compliant with all relevant Australian Standards and Codes by a Structural Engineer. Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of any final Occupation Certificate.

Reason: Public and Private Safety

65. **Post-Construction Dilapidation Report (Major Development)**
The applicant must bear the cost of all restoration works to Council's road, footpath and drainage assets damaged during the course of this development.
A Post Construction Dilapidation Report after the completion of all building works is to demonstrate that there is no damage to Council infrastructure prior to the refund of any security deposits.
Reason: To ensure security against possible damage to Council property.

66. **Certification of Council Drainage Works and Works as Executed Data within Private Land**
The Applicant shall submit a suitably qualified Civil Engineer's certification that the completed works have been constructed in accordance with this consent and the approved Section 68 approved plans. Works as Executed data certified by a registered surveyor prepared in accordance with Council's requirements is to be provided to Council. Full details of the information to be submitted to Council, as part of the Works as Executed Data, are outlined in Council's 'Guideline for preparing Works as Executed data for Council stormwater assets' which is available from Council's Environment Unit. The Works as Executed data is to be verified by the Principal Certifying Authority prior to submission of any documentation.

The Works as Executed Data is to include but not be limited to the following:
- Works As Executed (WAE) plan,
- a Spreadsheet Schedule of all stormwater asset attributes and
- a CCTV Report of the completed pipeline/channel

Reason: To ensure compliance of drainage works with Council's specification for engineering works.

67. **Easement for Drainage**
The Applicant shall create an easement for drainage (under the provisions of Section 88B of the

Conveyancing Act) the greater of five metres wide or a minimum 1 metre from the outside wall of the top of the stormwater channel to ensure all drainage infrastructure is located within the appropriate easement(s).

Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of the Occupation Certificate.

Reason:To ensure access to Council stormwater infrastructure.

68. **Right of Access**
The Applicant shall create a right of access (under the provisions of Section 88B of the Conveyancing Act) a minimum 3.5 metres wide for Council to access stormwater infrastructure for operational and maintenance purposes.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of the Occupation Certificate.

Reason: To ensure access to Council stormwater infrastructure.

69. **Positive covenant - Heritage conservation**
Positive Covenant (under the provisions of Section 88B of the Conveyancing Act 1919 (NSW)) shall be created on the title of the land to ensure the on-going conservation of the heritage item in accordance with works outlined within the 'Schedule of Conservation Works' prepared by Heritage 21 (Job No. 8851), dated July 2020.

Northern Beaches Council shall be nominated in the instrument as the only party authorised to release, vary or modify the instrument. Northern Beaches Council's delegate shall sign these documents prior to the submission to the NSW Land Registry Services.

Evidence of the registration of the Positive Covenant on the title of the land shall be submitted to the Principal Certifying Authority prior to the issue of the relevant Occupation Certificate.

Reason: To ensure the required conservation actions are undertaken with works outlined within the 'Schedule of Conservation Works.

70. **Registration of Food Business**
The food business must be registered with the Appropriate Regulatory Authority, prior to Occupation Certificate being issued.

Reason: Food premises are required to be registered with the Appropriate Regulatory Authority.

71. **Prior to Occupation Certificate - Cooling Tower Risk Management Plan**
Prior to the issuing of any interim / final occupation certificate, a risk management plan is to be completed before the cooling water system commences operation. The risk management plan must be conducted and reported to Council in accordance with Clause 13M and 13N of the Public Health Regulation 2012 NSW.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority.

Reason: To ensure compliance with the Public Health Act 2010 NSW(DACHPFPOC7)

72. **Prior to Occupation ertification - Land Contamination**

The applicant must obtain a Section A1 Site Audit Statement - *or* a Section A2 Site Audit Statement accompanied by an Environmental Management Plan - from a Site Auditor and submit it to the principal certifying authority prior to commencement of occupation. The Site Audit Statement must certify the site is suitable for its use.

Reason: To protect public and environmental health.

73. **Prior to occupation certificate - Cooling Tower Notification**
Prior to the issue of the Occupation Certificate, notification of any cooling tower/s on the property must be submitted to Council by completing NSW Health approved form 6 Notification of installation or change in particulars.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority.

Reason: Compliance with the Public Health Act 2010 NSW

74. **Required Planting**
Trees shall be planted in accordance with the Landscape Plans Dwg Nos. 101B, 102B, 103B and 104B dated 04.11.2019 prepared by Site Image

Reason: To maintain environmental amenity.

75. **Works as Executed Drawings - Stormwater Treatment Measures**
Works as Executed Drawings for the stormwater treatment measures must be prepared in accordance with Council's Guideline for Preparing Works as Executed Data for Council Stormwater Assets.

The drawings shall be submitted to the Principal Certifying Authority prior to the release of the Occupation Certificate.

Reason: Protection of the receiving environment

76. **Compliance with approved BDAR impact mitigation measures – Occupation Construction**

The approved BDAR includes mitigation measures (section 5.4), which must to be implemented before, during and after construction to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility.

All biodiversity-related measures are to be implemented immediately after construction, as specified in the approved BDAR and these conditions of consent.

The Project Ecologist is required to provide details of compliance, including written and photographic evidence, and provide to the Principal Certifying Authority and Council prior to issue of Occupation Certificate.

Reason: To ensure measures required to avoid and minimise residual biodiversity impacts are undertaken in accordance with the approved BDAR

77. **Certification for the Installation of Stormwater Treatment Measures**
A certificate from a Civil Engineer, who has membership to Engineers Australia and the National Engineers Register must be provided, stating that the stormwater treatment measures have been installed in accordance with the plans prepared by Costin Roe dated 26 November 2019. The certificate must confirm that stormwater treatment devices are completed, online, in good

condition and are not impacted by sediment.

The certificate shall be submitted to the Principal Certifying Authority prior to the release of the Occupation Certificate.

Reason: Protection of the receiving environment

78. **Positive Covenant, Restriction as to User and Registration of Encumbrances for Stormwater Treatment Measures**
A positive covenant shall be created on the title of the land requiring the proprietor of the land to maintain the stormwater treatment measures in accordance with the standard requirements of Council, the manufacturer and as required by the Stormwater Treatment Measures Operation and Maintenance Plan.

A restriction as to user shall be created on the title over the stormwater treatment measures, restricting any alteration to the measures.

The terms of the positive covenant and restriction as to user are to be prepared to Council's standard requirements (available from Council) at the applicant's expense and endorsed by the Northern Beaches Council's delegate prior to lodgement with the Department of Lands. Northern Beaches Council shall be nominated as the party to release, vary or modify such covenant.

A copy of the certificate of title demonstrating the creation of the positive covenant and restriction as to user is to be submitted to the Principal Certifying Authority prior to the issue of any interim / final Occupation Certificate.

Reason: To identify encumbrances on land, ensure ongoing maintenance, and ensure modification to the stormwater treatment measures is not carried out without Council's approval.

79. **Stormwater Treatment Measure Operation and Maintenance Plan**
An Operation and Maintenance Plan is to be prepared to ensure the proposed stormwater treatment measures remain effective.

The Plan must be attached to the Positive Covenant (and the community or strata management statement if applicable) and contain the following:
1. Detail on the stormwater treatment measures:
a) Work as executed drawings
b) Intent of the stormwater treatment measures including modelled pollutant removal rates
c) Site detail showing catchment for each device
d) Vegetation species list associated with each type of vegetated stormwater treatment measure
e) Impervious area restrictions to maintain the water balance for the site
f) Funding arrangements for the maintenance of all stormwater treatment measures
g) Identification of maintenance and management responsibilities
h) Maintenance and emergency contact information

2. Maintenance schedule and procedure - establishment period of one year following commissioning of the stormwater treatment measure
a) Activity description, and duration and frequency of visits
Additionally for vegetated devices:
b) Monitoring and assessment to achieve an 80 percent survival rate for plantings

c) Management of weeds, pests and erosion, with weed and sediment cover limited to a maximum of 5 percent of the total area of the stormwater treatment measure

3. Maintenance schedule and procedure - ongoing
a) Activity description, and duration and frequency of visits
b) Routine maintenance requirements
c) Work Health and Safety requirements
d) Waste management and disposal
e) Traffic control (if required)
f) Renewal, decommissioning and replacement timelines and activities of all stormwater treatment measures (please note that a DA may be required if an alternative stormwater treatment measure is proposed)
g) Requirements for inspection and maintenance records, noting that these records are required to be maintained and made available to Council upon request.

Details demonstrating compliance shall be submitted to the Principal Certifying Authority prior to the release of the Occupation Certificate.

Reason: Protection of the receiving environment.

80. **Removal of All Temporary Structures/Material and Construction Rubbish**
Once construction has been completed all silt and sediment fences, silt, rubbish, building debris, straw bales and temporary fences are to be removed from the site.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of any interim / final Occupation Certificate.

Reason: To ensure bushland management. (DACPLF01)

81. **Waste Management Confirmation**
Prior to the issue of a Final Occupation Certificate, evidence / documentation must be submitted to the Principal Certifying Authority that all waste material from the development site arising from demolition and/or construction works has been appropriately recycled, reused or disposed of generally in accordance with the approved Waste Management Plan.

Reason: To ensure demolition and construction waste is recycled or reused and to limit landfill.

82. **Sydney Water**
A Section 73 Compliance Certificate under the Sydney Water Act 1994 must be obtained from Sydney Water Corporation.

Application must be made through an authorised Water Servicing Co-ordinator. Please refer to the Building Developing and Plumbing section of the web site www.sydneywater.com.au <http://www.sydneywater.com.au> then refer to “Water Servicing Coordinator” under “Developing Your Land” or telephone 13 20 92 for assistance.

Following application a “Notice of Requirements” will advise of water and sewer infrastructure to be built and charges to be paid. Please make early contact with the Co-ordinator, since building of water/sewer infrastructure can be time consuming and may impact on other services and building, driveway or landscape design.

Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of any interim / final Occupation Certificate.

Reason: To ensure compliance with the statutory requirements of Sydney Water.

83. **Fire Safety Matters**
At the completion of all works, a Fire Safety Certificate will need to be prepared which references all the Essential Fire Safety Measures applicable and the relative standards of Performance (as per Schedule of Fire Safety Measures). This certificate must be prominently displayed in the building and copies must be sent to Council and Fire and Rescue NSW.

Details demonstrating compliance are to be submitted to the Principal Certifier prior to the issue of a part Occupation Certificate or Occupation Certificate.
Each year the Owners must send to the Council and Fire and Rescue NSW, an annual Fire Safety Statement which confirms that all the Essential Fire Safety Measures continue to perform to the original design standard.

Reason: Statutory requirement under Part 9 Division 4 & 5 of the Environmental Planning and Assessment Regulation 2000.

84. **Loading Dock Management Plan.**
A Loading Dock Management Plan shall be prepared by the applicant and submitted to and approved by the accredited certifier prior to the issue of any Occupation Certificate. The Plan will need to demonstrate how loading dock will be managed to ensure that there will be only one vehicle entering and exiting the loading dock access in any period and how safe servicing arrangements including waste collection will be undertaken without interrupting general traffic. Vehicle queuing on public road(s) is not permitted.

Reason: to ensure the loading dock is managed appropriately and that tenants are aware of the conditions of use.
(DACTRFPOC1)

85. **Shared User Path Construction.**
The Shared User Path, in accordance with approved plans and Council's standard specifications, shall be constructed along the property frontage to Council's satisfaction. Details demonstrating compliance are to be submitted to the Principal Certifying Authority prior to the issue of any Occupation Certificate.

Reason: To provide pedestrian access to and from the property.
(DACTRFPOC2)

ON-GOING CONDITIONS THAT MUST BE COMPLIED WITH AT ALL TIMES

86. **Undesirable Trees**
Leighton Green Cypress Cupressocyparis leylandii or any of its cultivars, must not be planted on the site for the life of the development. In the event of any inconsistency between this condition and the development application documents, this condition will prevail to the extent of the inconsistency.

Reason: To reduce the potential for adverse amenity effects such as overshadowing, loss of views, and loss of plant diversity.

87. **On going - Noise**

The acoustic assessment prepared by Acoustic Dynamics dated 20 November 2019 for EC Funds Management is to be implemented into the development and all recommendations within section 5.1 and 5.2 of the report are to be implemented into the operation of the site at all times.

Reason: To protect the amenity of the area and nearby residential receivers. (DACHPGOG5)

88. **Landscape maintenance**
i) Trees shrubs and groundcovers required to be planted under this consent are to be mulched, watered and fertilized as required at the time of planting.
ii) If any tree, shrub or groundcover required to be planted under this consent fails, they are to be replaced with similar species to maintain the landscape theme and be generally in accordance with the approved Landscape Plan.

Reason: To maintain local environmental amenity.

89. **Control of Weeds**
Prior to the completion of works, all priority weeds (as listed under the Biosecurity Act 2015) are to be removed/controlled within the subject site using an appropriately registered control method. Information on weeds of the Northern Beaches can be found at the NSW WeedWise website (http://weeds.dpi.nsw.gov.au/). All environmental weeds are to be removed and controlled. Refer to Council website
http://www.pittwater.nsw.gov.au/environment/noxious_weeds

Reason: Weed management.

90. **Maintenance of Stormwater Treatment Measures**
Stormwater treatment measures must be maintained at all times in accordance with the Stormwater Treatment Measure Operation and Maintenance Plan, manufacturer's specifications and as necessary to achieve the required stormwater quality targets for the development.

Vegetated stormwater treatment measures must maintain an 80 percent survival rate of plantings and limit weed cover to no more than 10 percent of the total area of the stormwater treatment measure.

Northern Beaches Council reserves the right to enter the property and carry out appropriate maintenance of the device at the cost of the property owner.

Reason: Protection of the receiving environment

91. **Installation of Water Efficient Fittings**
The following Water Efficiency Labelling and Standards (WELS) Scheme rated fittings must be installed:

a) 4 star dual-flush toilets
b) 3 star showerheads
c) 4 star taps (for all taps other than bath outlets and garden taps)
d) 3 star urinals
e) 3.5 star washing machines
f) 4 star dishwashers

A certificate from a licenced plumber demonstrating compliance shall be submitted to the

Principal Certifying Authority prior to the release of the Occupation Certificate.

Reason: To conserve potable water

92. **Works to cease if item found**
If any Aboriginal Engravings or Relics are unearthed all work is to cease immediately and the Aboriginal Heritage Office (AHO) and Office of Environment and Heritage (OEH) are to be notified.

Reason: To protect Aboriginal Heritage.

93. **Dead or Injured Wildlife**
If construction activity associated with this development results in injury or death of a native mammal, bird, reptile or amphibian, a registered wildlife rescue and rehabilitation organisation must be contacted for advice.

Reason: To mitigate potential impacts to native wildlife resulting from construction activity.

94. **Hours of Operation**
The hours of operation are to be restricted to:

- Warehouse, office and café - 7am to 6pm
- Storage facility – 7am to 10pm

Upon expiration of the permitted hours, all service (and entertainment) shall immediately cease, no patrons shall be permitted entry and all customers on the premises shall be required to leave within the following 30 minutes.

Reason: Information to ensure that amenity of the surrounding locality is maintained.

95. **No Illumination**
No consent is given or implied for any form of illumination or floodlighting to any sign or building or other external areas other than that approved.

Reason: To ensure appropriate forms of illumination that are consistent with Council's controls, and do not interfere with amenity of nearby properties. (DACPLG13)

96. **Commercial Waste Collection (DACPLG18)**
Waste and recyclable material, generated by this premises, must not be collected between the hours of 10pm and 6am on any day.

Reason: To protect the acoustic amenity of surrounding properties.(DACPLG18)

Right to Review by the Council

You may request Council to review this determination of the application under Division 8.2 of the Environmental Planning & Assessment Act 1979. Any Division 8.2 Review of Determination application should be submitted to Council within 3 months of this determination, to enable the assessment and determination of the application within the 6 month timeframe.

NOTE: A fee will apply for any request to review the determination.

Right of Appeal

If you are dissatisfied with this decision Division 8.3 of the Environmental Planning & Assessment Act 1979 may give you the right to appeal to the Land and Environment Court within 6 months after the date on which you receive this notice.

Signed On behalf of the Consent Authority

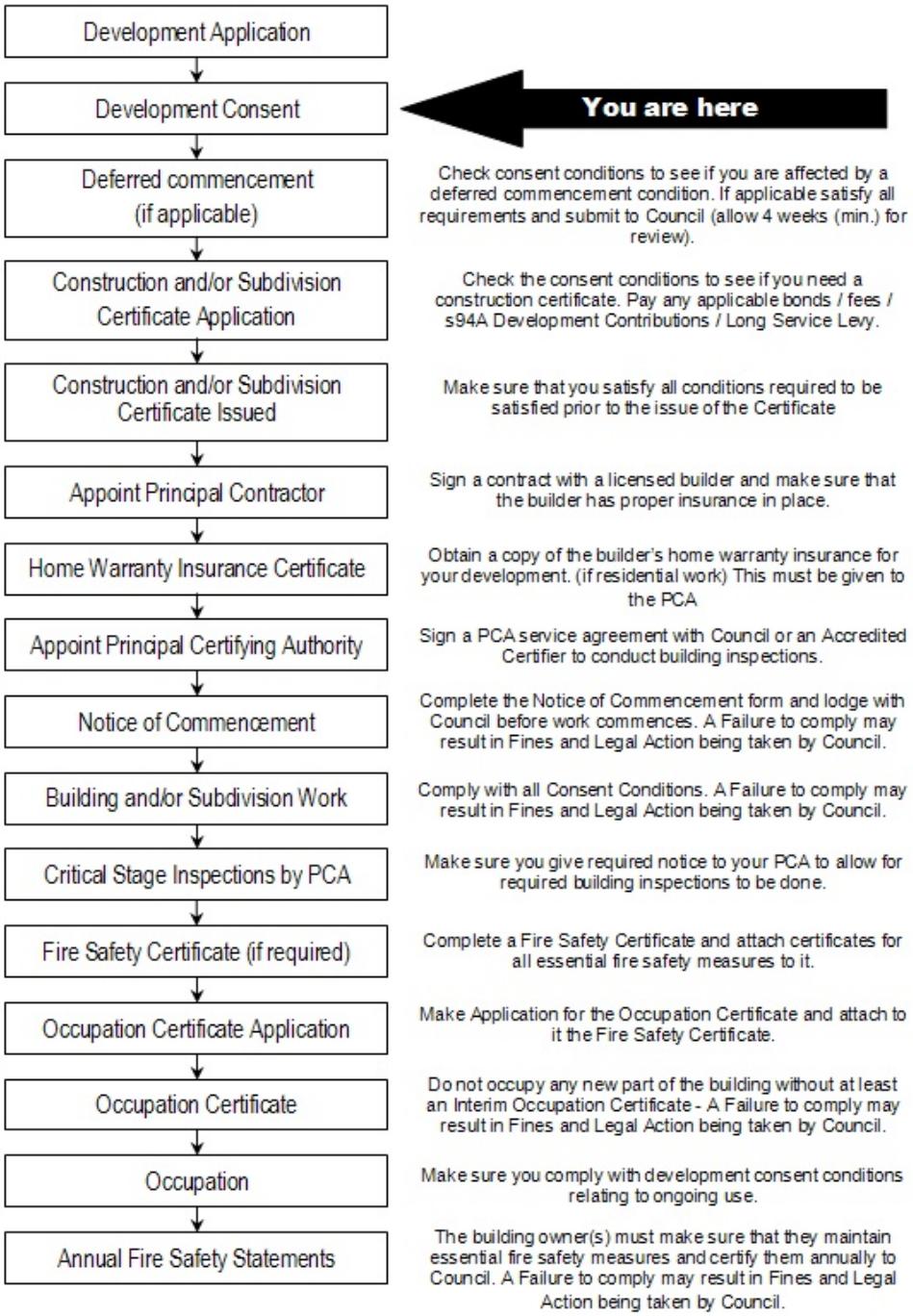
Name	Peter Robinson **Executive Manager Development Assessment**
Date	17/08/2020

NOTE: Signed by Northern Beaches Council in accordance with the Environmental Planning and Assessment Act 1979 and EP&A Regulation 2000 as determined by the Sydney North Planning Panel on 17/08/2020.

GENERAL ADVICE

Advisory Notes (General)

Where are you in the development process?



***Note:** The advice within this document is provided in good faith as a guide to assist applicants understand the broad process and will not detail every step or every requirement for demolition, building construction works or subdivision required or business operating requirements under New South Wales or Commonwealth Legislation. If you require clarification or have any questions, please contact your Certifier or Council's Planning and Development Enquiries Team.*

The attached Notice of Determination includes conditions of consent which must be complied with.

(Note: A failure to gain approval prior to the works being carried out is a serious breach of the Environmental Planning & Assessment Act 1979 which attracts penalties and may also result in legal action.)

Building Certification
The Environmental Planning and Assessment Act 1979 provides that:

- Building work cannot occur unless a construction certificate has been issued;
- Occupation of building works cannot occur unless an occupation certificate has been issued
- Subdivision cannot be registered until a subdivision certificate has been issued
- Mandatory Inspection for building work must be completed

Please refer to process chart for more detail.

(Note: A failure to gain approval prior to the works being carried out is a serious breach of the Environmental Planning & Assessment Act 1979 which attracts penalties and may also result in legal action.)

Certification Services
Construction Certificates / Occupation Certificates / Subdivision Certificates / Strata Certificates, can be issued by Council or an accredited private certifier (Note Council must be the Principal Certifying Authority (PCA) for subdivisions).

Council is well placed to provide Certification Services. Council can issue Construction Certificates and act as your Principle Certifying Authority at competitive rates. Please visit our web site www.northernbeaches.nsw.gov.au or speak to our Customer Service Officers if you have any further questions about our Certification Services or if you wish to use Council as your certifier.

Charges Associated with the Development Consent
All bonds, fees, Development Contributions or the Long Service Levy detailed within the Notice of Determination are required to be paid prior to the issuing of any Construction Certificate.

Bonds are released after:

1. 'Final Occupation Certificate' has been received by Council; and
2. Final inspection by a Council Officer where:
    - the development is complete
    - damage has not been caused to council assets during the works
    - conditions of development consent have been met.

    The bond will be released to the person or business who paid the bond to Council (The name that appears on the original receipt)

Acceptable Form of Security Bonds
Council will accept bank guarantee (in a form acceptable to Council) in lieu of cash and is required prior to the issue of a construction certificate.

Modifications to the consent
If you seek to make any changes to the development (which may include internal / external configuration of the building, variation to facades, site layout or any changes to the proposed operation or use), the modifications may require the submission and approval of an application to modify the development consent prior to the issuing of a Construction Certificate and prior to the works being

carried out. The proposed changes should be discussed with the PCA.

(Note: A failure to gain approval prior to the works being carried out is a serious breach of the Environmental Planning & Assessment Act 1979 which attracts penalties and may also result in legal action.)

Other Matters not detailed within the Notice of Determination
The Notice of Determination does not stipulate every requirement that must be completed to satisfy New South Wales and Commonwealth legislation.

You should check, as may be relevant, with other authorities including but not limited to:

- Workcover NSW for work safety and asbestos requirements
- Sydney Water – Quick Check Agent for the provision of water and sewer services
- Energy & Gas suppliers for utility services
- Department of Fair Trading for advice about builders and licensing
- Building Professionals Board for advice about private certifiers
- NSW Roads and Maritime Services for works on state roads only
- Human Rights and Equal Opportunity Commission for access issues
- NSW Land and Property Information for Land Title matters
- Australia Post for the positioning and dimensions of mail boxes in new commercial and residential developments;

Dial Before You Dig
Underground assets may exist in the area that is subject to your application. In the interests of health and safety and in order to protect damage to third party assets please contact Dial before you dig at www.1100.com.au or telephone on 1100 before excavating or erecting structures (This is the law in NSW). If alterations are required to the configuration, size, form or design of the development upon contacting the Dial before You Dig service, an amendment to the development consent (or a new development application) may be necessary. Individuals owe asset owners a duty of care that must be observed when working in the vicinity of plant or assets. It is the individual's responsibility to anticipate and request the nominal location of plant or assets on the relevant property via contacting the Dial before you dig service in advance of any construction or planning activities.

Telecommunications Act 1997 (Commonwealth)
Telstra (and its authorised contractors) are the only companies that are permitted to conduct works on Telstra's network and assets. Any person interfering with a facility or installation owned by Telstra is committing an offence under the Criminal Code Act 1995 (Cth) and is liable for prosecution. Furthermore, damage to Telstra's infrastructure may result in interruption to the provision of essential services and significant costs. If you are aware of any works or proposed works which may affect or impact on Telstra's assets in any way, you are required to contact :Telstra's Network Integrity Team on Phone Number 1800810443.
(1) if the development is likely to disturb or impact upon telecommunications infrastructure, written confirmation from the service provider that they have agreed to the proposed works must be submitted

to the Principal Certifying Authority prior to the issue of a Construction Certificate or any works commencing, whichever occurs first; and
(2) The arrangements and costs associated with any adjustment to telecommunications infrastructure shall be borne in full by the applicant/developer.

Model
If you submitted a model with the application it must be collected from the Council offices within fourteen (14) days of the date of this determination. Models not collected will be disposed of by Council.

Trade waste agreement
A Trade Waste Agreement must be obtained from Sydney Water prior to the discharge of trade wastewater to the sewer system. Trade wastewater is defined as 'discharge water containing any substance produced through industrial or commercial activities or operation on the premises'.

Waste collection
Liquid and solid wastes generated on the site must be collected, transported and disposed of in accordance with the requirements of the Protection of the Environment Operations Act 1997. Records must be kept of all waste disposal from the site.

Material to be removed from the site must be source separated on site to maximise recycling, and the material disposed of to an appropriate disposal and recycling facility in accordance with the approved Waste Management Plan.

Aboriginal Heritage
If in undertaking excavation or works and any Aboriginal site or object is, or is thought to have been found, all works are to cease immediately and the applicant is to contact the Aboriginal Heritage Officer for Warringah Council, and the Cultural Heritage Division of the Department of Environment and Climate Change (DECC).

On-Site Sewage Management System
This approval does not authorise the installation or operation of a new or modification of an existing on-site wastewater management system. An On-Site Sewage Management System must not be installed or operated unless an 'Approval to Install an On Site Sewage Management System' is obtained from Warringah Council.

Cost of Works
The applicant shall bear the cost of all works associated with the development that occurs on Council's property.

Relocation of stormwater drainage
Council is not responsible for the cost of relocating Council's stormwater drainage pipes through the subject property.

Tree preservation
Where tree work has not been approved by this Development Consent the developer is notified that a general Tree Preservation Order applies to all trees in the Northern Beaches Local Government Area. This order prohibits the ringbarking, cutting down, topping, lopping, pruning, transplanting, injuring, or wilful destruction of such trees except without the prior written consent of Council.

Storage bins on footpath and roadway
Approval is required from Council prior to the placement of any storage bin on Council's footpath and/or roadway.

Protection of Public Places
(1) If the work involved in the erection or demolition of a building:
(a) is likely to cause pedestrian or vehicular traffic in a public place to be obstructed or rendered inconvenient; or
(b) building involves the enclosure of a public place,

a hoarding and site fencing must be erected between the work site and the public place.

(2) If necessary, an awning is to be erected, sufficient to prevent any substance from, or in connection with, the work falling into the public place.
(3) The work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place.
(4) Any such hoarding, fence or awning is to be removed when the work has been completed.
(5) No access across public reserves or parks is permitted.
Note: Prior to the erection of any temporary fence or hoarding over property owned or managed by Council, written approval must be obtained.

Road Opening Permit
The developer/applicant is to obtain a "Road Opening Permit" from Council and pay all appropriate charges prior to commencement of any work on Council property. The developer/applicant shall be responsible for all public utilities and services in the area of the work, and as such shall notify all relevant Authorities, and bear all costs associated with any repairs and/or adjustments as those Authorities may deem necessary.

Special Permits
Unless otherwise specifically approved in writing by Council, all works, processes, storage of materials, loading and unloading associated with the development are to occur entirely on the property. The applicant, owner or builder must apply for specific permits available from Council. A minimum of forty-eight (48) hours notice is required for all permits except work zones, which may require additional assessment time.

- Permit for on-street mobile plant

Restrictions apply to the hours of operation and the area of operation for on street mobile plant equipment (for example cranes, concrete pumps, cherry pickers). Separate permits are required for each occasion and each piece of equipment. It is the responsibility of the applicant, owner and builder to take whatever steps are necessary to ensure that the use of any equipment does not violate adjoining property owner's rights.

- Hoarding Permit

Permits are required to erect Class A, Class B and Class C hoardings. If an 'A' Class hoarding is to alienate a section of Council's property, that section will require a permit for the occupation of Council's property.

- Storage of building materials and building waste containers (skips) on Council's property

Permits to utilise Council property for the storage of building materials and building waste containers (skips) are required for each location. Failure to obtain the relevant permits will result in the building materials or building waste containers (skips) being impounded by Council with no additional notice being given.

- Kerbside restrictions, work zones

Existing kerbside restrictions apply. An application must be made to Council for the alteration of existing kerbside restrictions or the provision of a construction zone.
Other permits may include out of construction hours permits.

Licensing requirements for removal of bonded asbestos
Anyone who removes, repairs or disturbs bonded asbestos must hold a bonded or a friable asbestos licence, or a demolition licence in accordance with Workcover requirements and the Occupational Health and Safety Act 2000.

Pool Access
Access to pools are required to be restricted by a child resistant barrier in accordance with the regulations prescribed in all relevant Acts, Regulations and Australian Standards including:

(i) Swimming Pools Act 1992;
(ii) Swimming Pools Amendment Act 2012;
(iii) Swimming Pools Regulation 2008
(iv) Australian Standard AS1926 Swimming Pool Safety
(v) Australian Standard AS1926.1 Part 1: Safety barriers for swimming pools
(vi) Australian Standard AS1926.2 Part 2: Location of safety barriers for swimming pools

It is your responsibility as a land owner to ensure any fencing is maintained.

Dewatering
Where dewatering works are required on the development site during construction, the developer/applicant must apply for and obtain a bore license from the NSW Department of Water and Energy. The bore license must be obtained prior to commencement of dewatering works.

Requirement to Notify about New Contamination Evidence
Any new information revealed during works that has the potential to alter previous conclusions about site contamination or hazardous materials shall be immediately notified to Council and the Principal Certifying Authority.

Flood Evacuation Plan
If your site is on flood prone land you may wish to consider the preparation of a flood evacuation plan.

Generally a Flood Evacuation Plan would be prepared by suitably qualified Engineer (e.g. Hydraulic) with a number of years experience in flood management and who is eligible for Membership to the Australian Institute of Engineers.

Some matters that you may wish to consider (but not limited to) include:

(i) a route of evacuation to higher ground and / or point of shelter
(ii) depth of water for a Possible Maximum Flood event surrounding the building
(iii) details of ‘last chance’ evacuation water levels / times for evacuation prior to floodwaters surrounding the building
(iv) provide details of flood warning systems and protocols
(v) details of how this information will be distributed and people educated for users of the site.

You may seek to discuss this with the State Emergency Service of NSW.

Utility Service Requirements

Where development requires the installation of, or the relocation of utility services being (but not limited to) gas, water, electricity and telecommunications, the installation of, or the relocation of utility services shall be conducted in accordance with the requirements of the relevant service provider / authority (unless stipulated by any other condition of the consent or will result in damage to threatened or endangered species defined under the Threatened Species Conservation Act 1995).

Plant & Equipment Kept Within Site
All plant and equipment used in the erection of the building, including concrete pumps, wagons, lifts, mobile cranes, etc, shall be situated within the boundaries of the site and so placed that all concrete slurry, water, debris and the like shall be discharged onto the building site, and is to be contained within the site boundaries. This does not prevent any requirement to comply with the Protection of the Environment Operations Act.

Lighting
Illumination of the site is to be arranged in accordance with the requirements of Australian Standard 4282 - 1997 Control of the obtrusive effects of outdoor lighting so as not to impact upon the amenity of the occupants of adjoining and nearby residential premises.

Silt and Sediment Control
During any onsite demolition, excavation and construction works, the site should be maintained in accordance with “The Blue Book - Managing Urban Stormwater (MUS): Soils and Construction”.

In managing the site provision shall be made throughout the period of works to prevent transmission of soil to the public road, drainage system, any riparian lands or off site in any manner. Upon completion of the development, any measures to prevent the transition of soil off site to remain in place until the site is stabilised.

A failure to prevent the transmission of silt and sediment and / or causing, water pollution, air pollution, noise pollution or land pollution may result in a breach of the Protection of the Environment Operations Act and orders, penalties and prosecutions may occur.

Maintenance of Sediment and Erosion Control Erosion and sediment controls are to be adequately maintained and monitored at all times, particularly after periods of rain.

Reason: To avoid erosion and sedimentation impacts that will result in an adverse change in watercourse or riparian land condition

Installation and Maintenance of Sediment and Erosion Control
Sediment and erosion controls must be installed in accordance with Landcom’s ‘Managing Urban Stormwater: soils and construction (2004).

Techniques used for erosion and sediment control on site are to be adequately maintained and monitored at all times, particularly after periods of rain, and shall remain in proper operation until all development activities have been completed and the site is sufficiently stabilised with vegetation.

Reason: To protect the surrounding environment from the effects of sedimentation and erosion from the site

Dividing Fences Act 1991
The construction and maintenance of side boundary fences is to be agreed upon by all adjoining property owners of the fence. Works are to be in accordance with the Dividing Fences Act 1991.

OTHER MATTERS

Child Care Centres
A license to operate a child care centre must be obtained from the NSW Department of Community Services prior to the commencement of the use of the child care centre.

Disability Access
This decision does not ensure compliance with the Commonwealth Disability Discrimination Act 1992. Applicants are strongly advised to investigate their requirements under that Act

Food Premises
Food premises are required to comply with the requirements of the Food Act 2003, the Food Standards Code and Australian Standards.

The proprietor of a food business must notify the NSW Food Authority of the details of the business. Notification may be done either online at www.foodnotify.nsw.gov.au or by lodging a completed NSW Food Authority notification form to the NSW Food Authority or Council.

Wheel washing facility
All trucks leaving the site, having had access to unpaved or contaminated areas, shall depart via a wheel wash facility in order to prevent mud, dust or debris from being deposited on Council's roads. The wheel wash facility shall be constructed prior to any truck movements occurring. Water from the wheel wash facility must not cause pollution. Any direction of Council with regard to cleaning trucks or the clean up of road pavements adjoining the site shall be complied with immediately.

Monitoring State of Roadways
The applicant shall monitor the state of roadways leading to and from the site and shall take all necessary steps to clean up any adversely impacted road pavements as directed by Council.

Storage of Dangerous Goods
Prior to the storage of any "dangerous goods" on the premises, a copy of a license obtained from the Chemical Safety Branch of Work Cover Authority must be submitted to Council.

Storage of Flammable and Combustible Liquids
Flammable and combustible liquids must be stored in accordance with Australian Standard 1940 The Storage and Handling of Flammable and Combustible Liquids.

Noise and Vibration
The premises, including operation of vehicles, shall be conducted so as to avoid offensive noise or vibration and cause no interference to adjoining or nearby occupants. Special precautions must be taken to avoid nuisance in neighbouring residential areas, particularly from machinery, vehicles, warning sirens, public address systems and the like.

Hairdressing/Beauty Treatment/ Skin penetration Requirements
The premises must comply with the following requirements before the commencement of business:
i) A hand wash basin with warm water delivered through a common spout must be provided in the treatment area. The hand wash basin must be provided with liquid soap and paper towel.
ii) The wall behind the hand wash basin from the floor to a height of 450mm above the top of the washbasin and from the centre of the washbasin to a distance of 140mm beyond each side of the wash basin, must be finished with a material that is durable, smooth, impervious to moisture and capable of being easily cleaned (eg tiles).
iii) The premises must be provided with washing, drainage, ventilation and lighting that are adequate for the carrying out of hairdressing/beauty treatment/skin penetration procedures.
iv) The floor coverings must be smooth and impervious.

v) All furniture, shelves and fittings must be constructed of, or covered with a material that is smooth, impervious to moisture and capable of being easily cleaned.
vi) Adequate lockers must be provided for the storage of employees clothing and personal effects.
vii) The premises must be provided with facilities that are adequate for the purpose of storing of hairdressing/beauty treatment/skin penetration appliance and utensils.
viii) The premises must be provided with a sink sullied with hot and cold water for washing equipment.

Food Premises Construction Requirements
The food premises must comply with the following specific construction requirements:
Solid walls must be provided in all food handling areas (solid includes brick, cement and foam filled preformed panels);
ix) Walls in food preparation and wash up areas must be finished with a smooth and impervious surface to a height of at least 2 metres.
x) Hand wash basins must be provided with warm water delivered through a common spout with taps that are hands free operation;
xi) Coving with a radius of 25mm must be provided between all floor and wall joints in food handling areas;
xii) The open space between the top of the coolroom and the ceiling must be fully enclosed and kept insect and pest proof;
xiii) The coolroom must be able to be opened from the inside with out a key and fitted with an alarm that can only be operated from within the coolroom;
xiv) The doors to the toilet air lock and toilet compartment must be tight fitting and self closing;
xv) The rear external door must be self closing or be provided with a fly screen that is self closing;
xvi) Where cooking or extensive heating processes or such other processes as may be specified are carried out in food preparation areas, an approved mechanical ventilation system shall be installed and operated in accordance with AS 1668 part 1 & 2.

Legionella Control
Cooling towers, warm water systems, water cooling systems must be registered with the Council. Details of registration are to be provided to the Council prior to operation.
Pool/Spa Safety
Owners of properties with swimming pools and spa's must meet safety compliance and registration requirements. Provisions also apply when renting/selling properties. Details are available from the Division of Local Government.
Grease Trap
Contact Sydney Water to determine what trade waste provisions you are required to provide to your food premises. Should a grease trap be required by Sydney Water, it must be located in an area that is easily accessible for the removal of waste water and must not be installed in any kitchen, food preparation or food stage area. The design and location of the grease trap should also not impede on any commercial right of way or pedestrian access.

Bandicoot/Penguin
Long-nosed Bandicoots & Little Penguins – Best Practices for Residents Residents are encouraged to follow a number of *Best Practices* to assist with the protection and management of the endangered populations of Long-nosed Bandicoots and Little Penguins:

- Long-nosed Bandicoots, Little Penguins and other native animals should never be fed as it may cause them nutritional problems, hardship if supplementary feeding is stopped, and it may increase predation.
- Feral cats or foxes should never be fed or food left out where they can access it, such as rubbish bins without lids or pet food bowls, as these animals present a significant threat to Long-nosed Bandicoots, Little Penguins and other wildlife.
- The use of insecticides, fertilisers, poisons and/or baits should be avoided on the property.

Garden insects will be kept in low numbers if Long-nosed Bandicoots are present.

- When the North Head Long-nosed Bandicoot Recovery Plan is released it should be implemented where relevant.
- Dead Long-nosed Bandicoots or Little Penguins should be reported by phoning Manly Council on 9976 1500 or Department of Environment and Conservation on 9960 6266.
- Please drive carefully as vehicle related injuries and deaths of Long-nosed Bandicoots and Little Penguins have occurred in the area. Care should also be taken at night in the drive way when moving cars as bandicoots will seek shelter beneath vehicles.
- Cat/s and or dog/s that currently live on the property should be kept indoors at night to avoid disturbance/death of native animals. Ideally, when the current cat/s and/or dog/s that live on the property no longer reside on the property it is recommended that they not be replaced by new dogs or cats.
- Report all sightings of feral rabbits, feral or stray cats and/or foxes to N B Council.

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

EG - PROPOSED INDUSTRIAL BUILDING

100 SOUTH CREEK ROAD, CROMER, NSW 2099

DEVELOPMENT APPLICATION

DRAWING LIST		
Sheet Number	Sheet Name	Current Revision
DA000	COVERPAGE	12
DA101	IMAGE 01	12
DA101-B	IMAGE 01 - NOTES	12
DA101-C	IMAGE 01 - EXTERNAL FINISHES	12
DA102	IMAGE 02	12
DA102-B	IMAGE 02 - NOTES	12
DA103	IMAGE 03	12
DA103-B	IMAGE 03 - NOTES	12
DA104	IMAGE 04	12
DA105	IMAGE 05	12
DA106	IMAGE 06	12
DA107	IMAGE 07	12
DA108	IMAGE 08	12
DA201	SITE PLAN	12
DA202	GROUND FLOOR PLAN	12
DA203	BASEMENT PLAN	12
DA204	LEVEL 1 FLOOR PLAN	12
DA205	TYPICAL OFFICES 150 Sqm PLANS AND ELEVATIONS	12
DA206	TYPICAL OFFICES 250 Sqm PLANS AND ELEVATIONS	12
DA207	ROOF PLAN	12
DA208	DEMOLITION PLAN	12
DA301	ELEVATIONS	12
DA302	ELEVATIONS 2	12
DA305	SECTIONS	12
DA306	SECTIONS 2	12
DA400	SHADOW DIAGRAMS_1	12
DA401	SHADOW DIAGRAMS_2	12
DA500	NOTIFICATION PLAN_1	12
DA501	NOTIFICATION PLAN_2	12



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12	ISSUE FOR DA	12.11.2019
11	ISSUE FOR DA	01.11.2019
10	ISSUE FOR REVISION	25.10.2019
9	UPDATED SET FOR CONSULTANTS-DRAFT	18.10.2019
8	MARKETING PLAN ISSUED FOR INFORMATION	11.10.2019
7	FOR CLIENT REVIEW	09.09.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE: COVERPAGE

DATE: 12.11.2019 SCALE: 1 : 500 @ A1 JOB NO: 19110 DWG NO: DA000 REVISION: 12

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northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

EG



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E: info@sbaarch.com.au W: www.sbaarch.com.au

12	ISSUE FOR DA	12.11.2019
11	ISSUE FOR DA	01.11.2019
10	ISSUE FOR REVISION	25.10.2019
9	UPDATED SET FOR CONSULTANTS-DRAFT	18.10.2019
8	MARKETING PLAN ISSUED FOR INFORMATION	11.10.2019
7	FOR CLIENT REVIEW	09.09.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 01

DATE 12.11.2019 SCALE @ A1 JOB NO 19110 DWG NO DA101 REVISION 12

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northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

EG

RETRENTION AND CONSERVATION OF POST WWII COTTAGE AND LANDSCAPE. POTENTIAL FOR ADAPTIVE RE-USE INCLUDING CAFE / KIOSK

IN-SITU RETENTION, CONSERVATION AND ADAPTIVE RE-USE OF THE FORMER ROCHE MAIN OFFICE BUILDINGS

EXISTING HEXAGONAL TOWER ELEMENT. POTENTIAL FOR ADAPTIVE RE-USE AT BASE OF TOWER, I.e. WAREHOUSE OFFICES, SUBJECT TO FURTHER INVESTIGATION.

POTENTIAL INTERPRETATIVE FACADE TREATMENT + ARTWORK, SUBJECT TO FURTHER INVESTIGATION.



POSSIBLE LOCATION FOR PERMANENT CULTURAL HERITAGE INTERPRETATIVE DISPLAY AND ARTWORK

RETENTION, CONSERVATION AND SYMPATHETIC EMBELLISHMENT OF EXISTING LANDSCAPE SETTING ALONG INMAN ROAD FRONTAGE

RETENTION, CONSERVATION AND SYMPATHETIC EMBELLISHMENT OF EXISTING LANDSCAPE SETTING ALONG SOUTH CREEK ROAD FRONTAGE

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12	ISSUE FOR DA	12.11.2019
11	ISSUE FOR DA	01.11.2019
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8	MARKETING PLAN ISSUED FOR INFORMATION	11.10.2019
7	FOR CLIENT REVIEW	09.09.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE

IMAGE 01 - NOTES

DATE 12.11.2019 SCALE @ A1 JOB NO 19110 DWG NO DA101-E REVISION 12

12/11/2019 10:13:22 AM C:\Users\ESER\Documents\19110_Cromer_BASE_R18_OPTION4_SBA_Gonzalo.rvt

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THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

EG

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



Indicative External Finishes Legends

1 Precast Concrete Panel. Natural Finish
2 Precast Concrete Panel. Paint Finish 01
3 Brick Wall to Match Heritage Building Brick Walls
4 Concrete Beam. Paint Finish to Match Heritage Building Beams
5 Solid Aluminium Cladding in Light Grey Tone, Three Different Greys
6 Solid Aluminium Cladding in Dark Grey Tone, Three Different Greys
7 Metal Louvre / Screen. Powdercoated Black Finish on Carpark
8 Palisade / Diplomat Fencing. Powdercoated Finish
9 Powdercoated Aluminium Windows Frames with Tone Glazing and Powdercoated Metal Solar Control
10 Powdercoated Aluminium Windows Frames with Tone Glazing
11 Danpalon Traslucent Sheet With Vertical Louvre
12 Profiled Metal Roofing in Selected Colorbond Colours

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 01 - EXTERNAL FINISHES

DATE 12.11.2019 SCALE 1 : 200 @ A1 JOB NO 19110 DWG NO DA101-C REVISION 12

12/11/2019 10:13:32 AM C:\Users\SEBR\Documents\19110_Cromer_BASE_R18_OPTION4_SBA_Gonalo.rvt

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 02

DATE 12.11.2019 | SCALE 1 : 200 @ A1 | JOB NO 19110 | DWG NO DA102 | REVISION 12

12/11/2019 10:13:48 AM C:\Users\USER\Documents\19110_Cromer_BASE_R19_CPTK24.4_SBA_Gonzalez.rvt

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IN-SITU RETENTION, CONSERVATION AND ADAPTIVE RE-USE OF THE FORMER ROCHE MAIN OFFICE BUILDINGS - BUILDING 2

EXISTING HEXAGONAL TOWER ELEMENT. POTENTIAL FOR ADAPTIVE RE-USE AT BASE OF TOWER, I.e. WAREHOUSE OFFICES, SUBJECT TO FURTHER INVESTIGATION

IN-SITU RETENTION, CONSERVATION AND ADAPTIVE RE-USE OF THE FORMER ROCHE MAIN OFFICE BUILDINGS - BUILDING 1



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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 02 - NOTES

DATE 12.11.2019 SCALE 1 : 200 @ A1 JOB NO. 19110 DWG NO. DA102-E REVISION 12

12/11/2019 10:14:08 AM C:\Users\SDERDoumani\19110_Cromer_BASE_R19_OPTION 4_SBA_Gonzalo.rvt

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 03

DATE 12.11.2019 SCALE @ A1 JOB NO. 19110 DWG NO. DA103 REVISION 12

12/11/2019 10:14:29 AM C:\Users\USER\Documents\19110_Cromer_BASE_R19_OPTION4.4_SBA_Donatas.rvt

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EG

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IN-SITU RETENTION, CONSERVATION AND ADAPTIVE RE-USE OF THE FORMER ROCHE MAIN OFFICE BUILDINGS - BUILDING 2

EXISTING HEXAGONAL TOWER ELEMENT. POTENTIAL FOR ADAPTIVE RE-USE AT BASE OF TOWER, I.e. WAREHOUSE OFFICES, SUBJECT TO FURTHER INVESTIGATION

IN-SITU RETENTION, CONSERVATION AND ADAPTIVE RE-USE OF THE FORMER ROCHE MAIN OFFICE BUILDINGS - BUILDING 1



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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 03 - NOTES

DATE 12.11.2019 | SCALE 1 : 200 @ A1 | JOB NO 19110 | DWG NO DA103-B | REVISION 12

12/11/2019 10:14:42 AM C:\Users\USER\Documents\19110_Cromer_BASE_R18_OPTION4_SBA_Gonzalez.rvt

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EXISTING BUILDING OUTLINE SHOWN DOTTED IN RED. IT IS APROX. 4m IN FRONT OF THE PROPOSED BUILDING



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ISSUE	DESCRIPTION	DATE

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE

IMAGE 04

DATE 12.11.2019 SCALE 1 : 200 @ A1 JOB NO 19110 DWG NO DA104 REVISION 12

12/11/2019 10:15:03 AM C:\Users\USER\Documents\19110_Cromer_BASE_R18_OPTION 4_SBA_Gonalan.rvt

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EG



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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 05

DATE 12.11.2019 SCALE @ A1 JOB NO 19110 DWG NO DA105 REVISION 12

12/12/2019 10:15:20 AM C:\Users\SEBR\Documents\19110_Cromer_BASE_R18_OPTION4_SBA_Gonzalo.rvt

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 06

DATE 12.11.2019 SCALE @ A1 JOB NO. 19110 DWG NO. DA106 REVISION 12

12/11/2019 10:15:32 AM C:\Users\SERENDoucments\19110_Cromer_BASE_R19_OPTION 4_SBA_Gonzalo.rvt

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EG



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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 07

DATE 12.11.2019 SCALE @ A1 JOB NO. 19110 DWG NO. DA107 REVISION 12

12/11/2019 10:15:44 AM C:\Users\USER\Documents\19110_Cromer_BASE_R19_OPTION 4_SBA_Gonzalo.rvt

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EG



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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
IMAGE 08

DATE 12.11.2019 SCALE @ A1 JOB NO. 19110 DWG NO. DA108 REVISION 12

12/11/2019 10:16:52 AM C:\Users\SERVDocuments\19110_Cromer_BASE_R18_OPTION 4_SBA_Gonzalo.rvt

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EG

NOTE:

- AREA BETWEEN 0 AND 1 mt ABOVE 11 MTS HEIGHT
- AREA BETWENN 1 AND 2 mts ABOVE 11 MTS HEIGHT
- AREA BETWEEN 2 AND 3 mts ABOVE 11 MTS HEIGHT

DP 29670

DP 28664

DP 1136357

1
DP 1220196
FUTURE DEVELOPMENT APPLICATION

DP 28664

TEMPERATE NORTH EAST BREEZE

SITE BOUNDARY

BUILDING 2

TEMPERATE SOUTH EASTERLY BREEZE

SITE BOUNDARY

SOUTH CREEK ROAD

2
DP 1220196
FUTURE DEVELOPMENT APPLICATION

SITE BOUNDARY

NORTH

BUILDING 1

EXISTING BUILDING

WINTER SUN

SITE BOUNDARY

INMAN ROAD

SUMMER SUN

SOUTH WESTERLY WINTER WINDS

1 SITE PLAN 1 : 1000

0m 20m 40m 60m 80m 100m

VISUAL SCALE 1:1000 @ A1

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
SITE PLAN

DATE 12.11.2019 SCALE As indicated @ A1 JOB NO 19110 DWG NO DA201 REVISION 12

12/11/2019 10:09:07 AM C:\Users\SBADocuments\19110_Cromer_BASE_RVT_OPTION 4_SBA_Gonzalo.rvt

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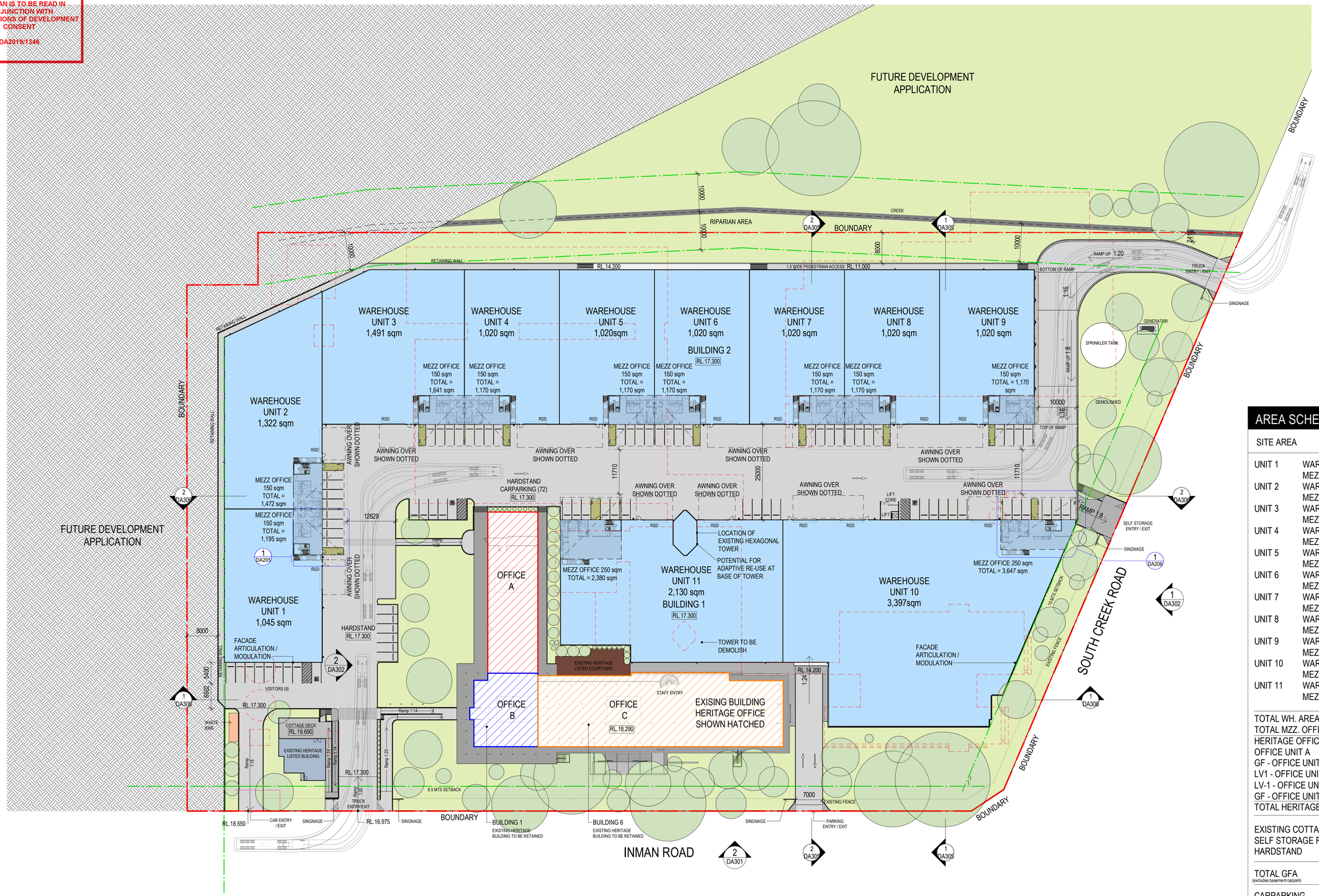
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DA2019/1346

EG

DEMOLITION LEGEND:

WALL TO BE DEMOLISH



1 GROUND LEVEL 1 : 500

AREA SCHEDULE

SITE AREA		37,031 sq.m
UNIT 1	WAREHOUSE	1,045 sq.m
	MEZZ 1	150 sq.m
UNIT 2	WAREHOUSE	1,322 sq.m
	MEZZ 2	150 sq.m
UNIT 3	WAREHOUSE	1,491 sq.m
	MEZZ 3	150 sq.m
UNIT 4	WAREHOUSE	1,020 sq.m
	MEZZ 4	150 sq.m
UNIT 5	WAREHOUSE	1,020 sq.m
	MEZZ 5	150 sq.m
UNIT 6	WAREHOUSE	1,020 sq.m
	MEZZ 6	150 sq.m
UNIT 7	WAREHOUSE	1,020 sq.m
	MEZZ 7	150 sq.m
UNIT 8	WAREHOUSE	1,020 sq.m
	MEZZ 8	150 sq.m
UNIT 9	WAREHOUSE	1,020 sq.m
	MEZZ 9	150 sq.m
UNIT 10	WAREHOUSE	3,397 sq.m
	MEZZ 10	250 sq.m
UNIT 11	WAREHOUSE	2,130 sq.m
	MEZZ 11	250 sq.m
TOTAL WH. AREA		15,501 sq.m
TOTAL MZZ. OFFICE AREA		1,850 sq.m
HERITAGE OFFICE		
OFFICE UNIT A		570 sq.m
GF - OFFICE UNIT B		309 sq.m
LV1 - OFFICE UNIT B		401 sq.m
LV-1 - OFFICE UNIT C		775 sq.m
GF - OFFICE UNIT C		1,124 sq.m
TOTAL HERITAGE OFFICE AREA		3,179 sq.m
EXISTING COTTAGE		124 sq.m
SELF STORAGE FACILITY		3,902 sq.m
HARDSTAND		5,621 sq.m
TOTAL GFA (excludes basement carpark)		24,560 sq.m
CARPARKING		237 cars
SITE COVERAGE		66%

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE

GROUND FLOOR PLAN

DATE 06.11.2019 SCALE As indicated @ A1 JOB NO 19110 DWG NO DA202 REVISION 12

12/11/2019 10:16:14 AM C:\Users\BSERS\Documents\19110_Cromer_BASE_R18_OPTION 4_SBA_Gonadis.rvt

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DA2019/1346

EG



1 SELF STORAGE LEVEL 1 : 500

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
BASEMENT PLAN

DATE 12.11.2019 SCALE 1 : 500 @ A1 JOB NO 19110 DWG NO DA203 REVISION 12

12/11/2019 10:16:21 AM C:\Users\USER\Documents\19110_Cromer_BASE_R18_OPTION4_SBA_Gonadis.rvt

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EG



1 LEVEL 1 FLOOR PLAN 1 : 500

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
LEVEL 1 FLOOR PLAN

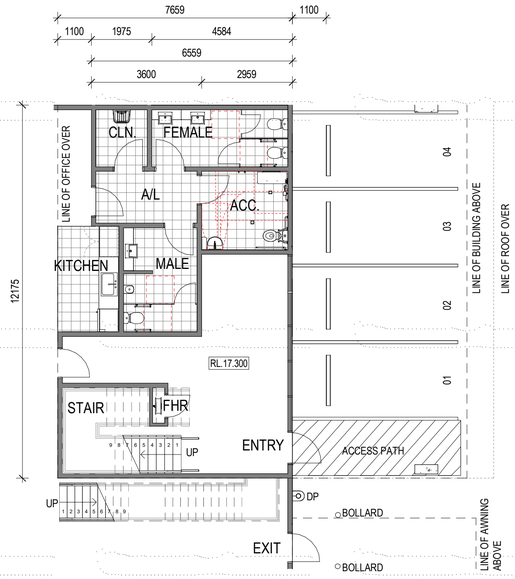
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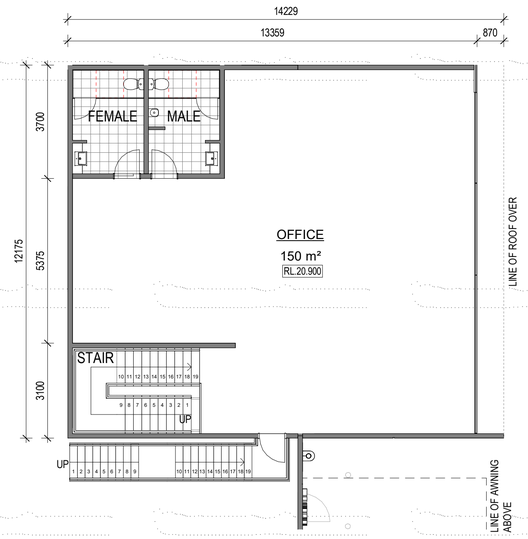
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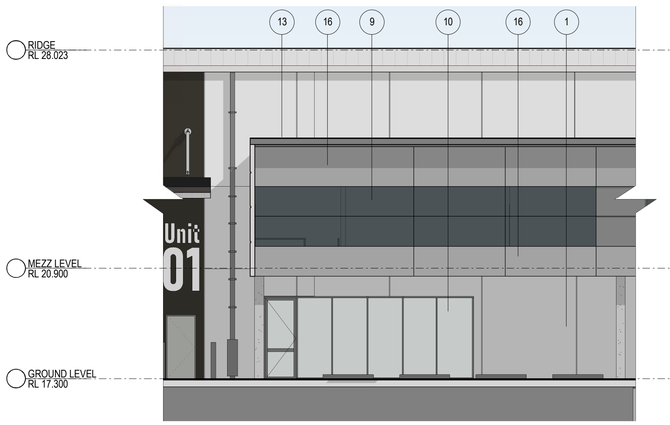
DA2019/1346



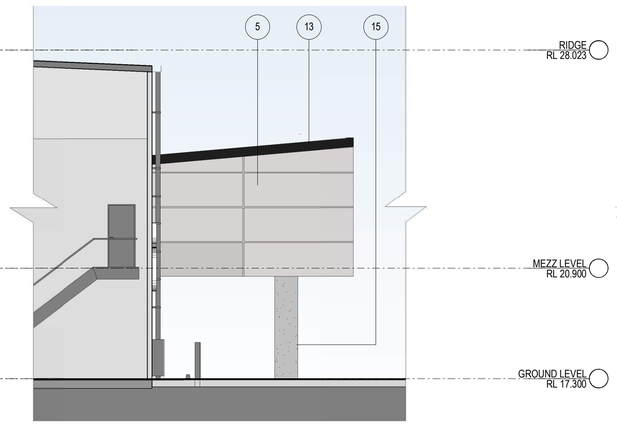
1 150 Sqm OFFICE GROUND FLOOR PLAN 1 : 100



2 150 Sqm OFFICE FIRST FLOOR PLAN 1 : 100



3 150 Sqm OFFICE SOUTH ELEVATION 1 : 100



4 150 Sqm OFFICE WEST ELEVATION 1 : 100

Indicative External Finishes Legends

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4 Concrete Beam. Paint Finish to Match Heritage Building Beams
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10 Powdercoated Aluminium Windows Frames with Tone Glazing
11 Danpalon Traslucent Sheet With Vertical Louvre
12 Profiled Metal Roofing in Selected Colorbond Colours
13 Fascia Dark Grey
14 Fascia Light Grey
15 Concrete Column
16 Color Back Gloss - Spandrel

0m 2m 4m 6m 8m 10m

VISUAL SCALE 1:100 @ A1

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12	ISSUE FOR DA	12.11.2019
11	BOUNDARY LINE MODIFIED	06.11.2019
10	ISSUE FOR REVISION	25.10.2019
9	UPDATED SET FOR CONSULTANTS-DRAFT	18.10.2019
8	MARKETING PLAN ISSUED FOR INFORMATION	11.10.2019
7	FOR CLIENT REVIEW	09.09.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
TYPICAL OFFICES 150 Sqm PLANS AND ELEVATIONS

DATE 12.11.2019 | SCALE As indicated @ A1 | JOB NO. 19110 | DWG NO. DA205 | REVISION 12

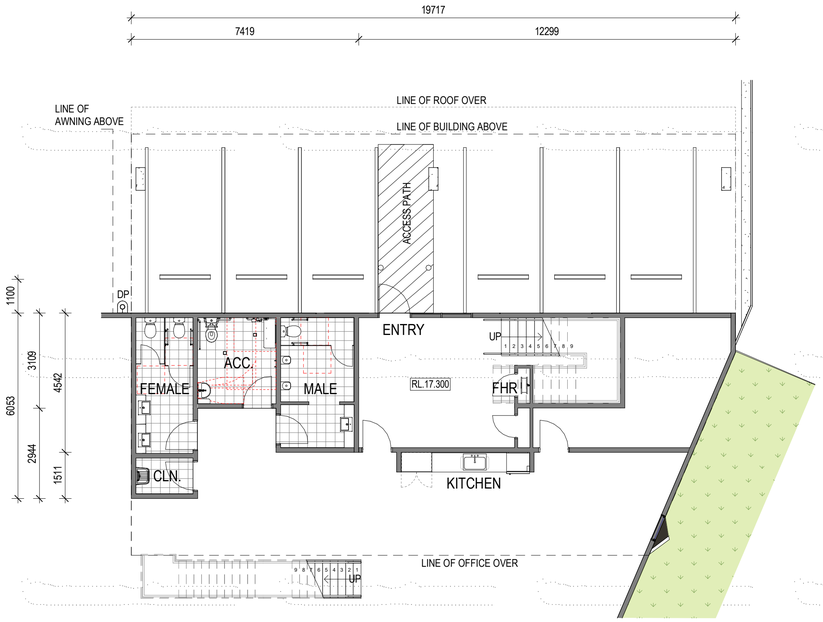
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DA2019/1346

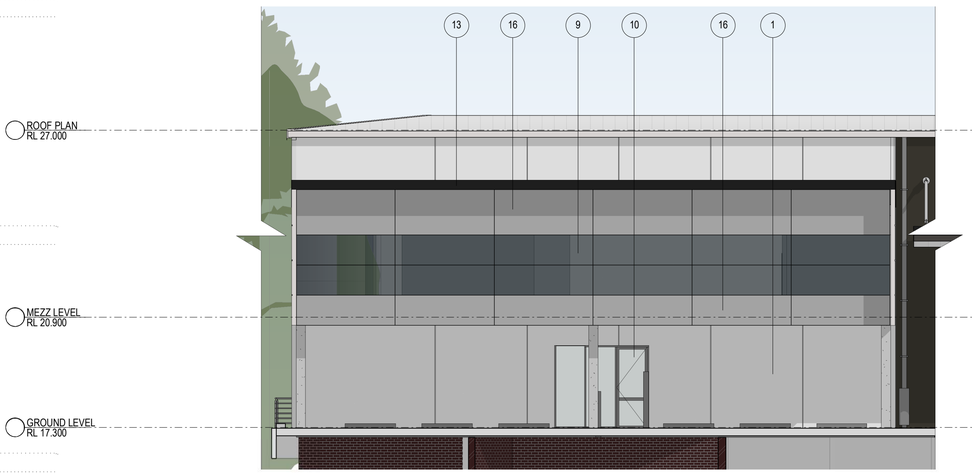
EG



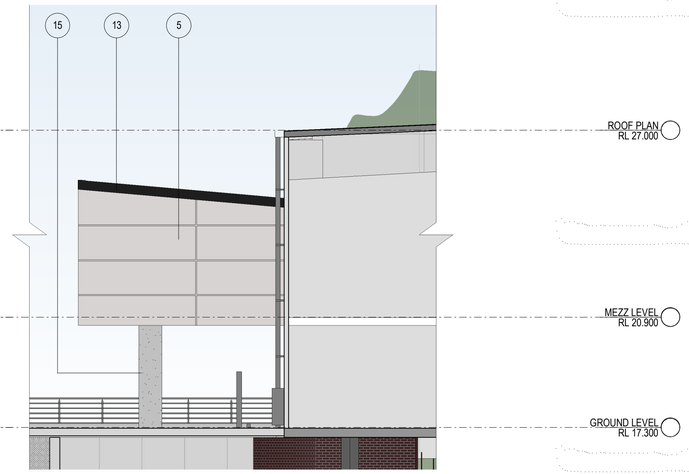
1 250 Sqm OFFICE GROUND FLOOR PLAN 1 : 100



2 250 Sqm OFFICE FIRST FLOOR PLAN 1 : 100



3 250 Sqm OFFICE EAST ELEVATION 1 : 100



4 250 Sqm OFFICE NORTH ELEVATION 1 : 100

Indicative External Finishes Legends

1 Precast Concrete Panel. Natural Finish
2 Precast Concrete Panel. Paint Finish 01
3 Brick Wall to Match Heritage Building Brick Walls
4 Concrete Beam. Paint Finish to Match Heritage Building Beams
5 Solid Aluminium Cladding in Light Grey Tone, Three Different Greys
6 Solid Aluminium Cladding in Dark Grey Tone, Three Different Greys
7 Metal Louvre / Screen. Powdercoated Black Finish on Carpark
8 Palisade / Diplomat Fencing. Powdercoated Finish
9 Powdercoated Aluminium Windows Frames with Tone Glazing and Powdercoated Metal Solar Control
10 Powdercoated Aluminium Windows Frames with Tone Glazing
11 Danpalon Traslucent Sheet With Vertical Louvre
12 Profiled Metal Roofing in Selected Colorbond Colours
13 Fascia Dark Grey
14 Fascia Light Grey
15 Concrete Column
16 Color Back Gloss - Spandrel

0m 2m 4m 6m 8m 10m

VISUAL SCALE 1:100 @ A1

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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
TYPICAL OFFICES 250 Sqm PLANS AND ELEVATIONS

DATE 12.11.2019 | SCALE As indicated @ A1 | JOB NO. 19110 | DWG NO. DA206 | REVISION 12

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northern beaches council

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DA2019/1346

EG



1 ROOF PLAN 1 : 500

LEGEND	
BG	BOX GUTTER
EG	EAVES GUTTER
MDR	METAL DECK ROOFING
TRS	TRANSLUCENT ROOF SHEET

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
ROOF PLAN

DATE 12.11.2019 SCALE 1 : 500 @ A1 JOB NO. 19110 DWG NO. DA207 REVISION 12

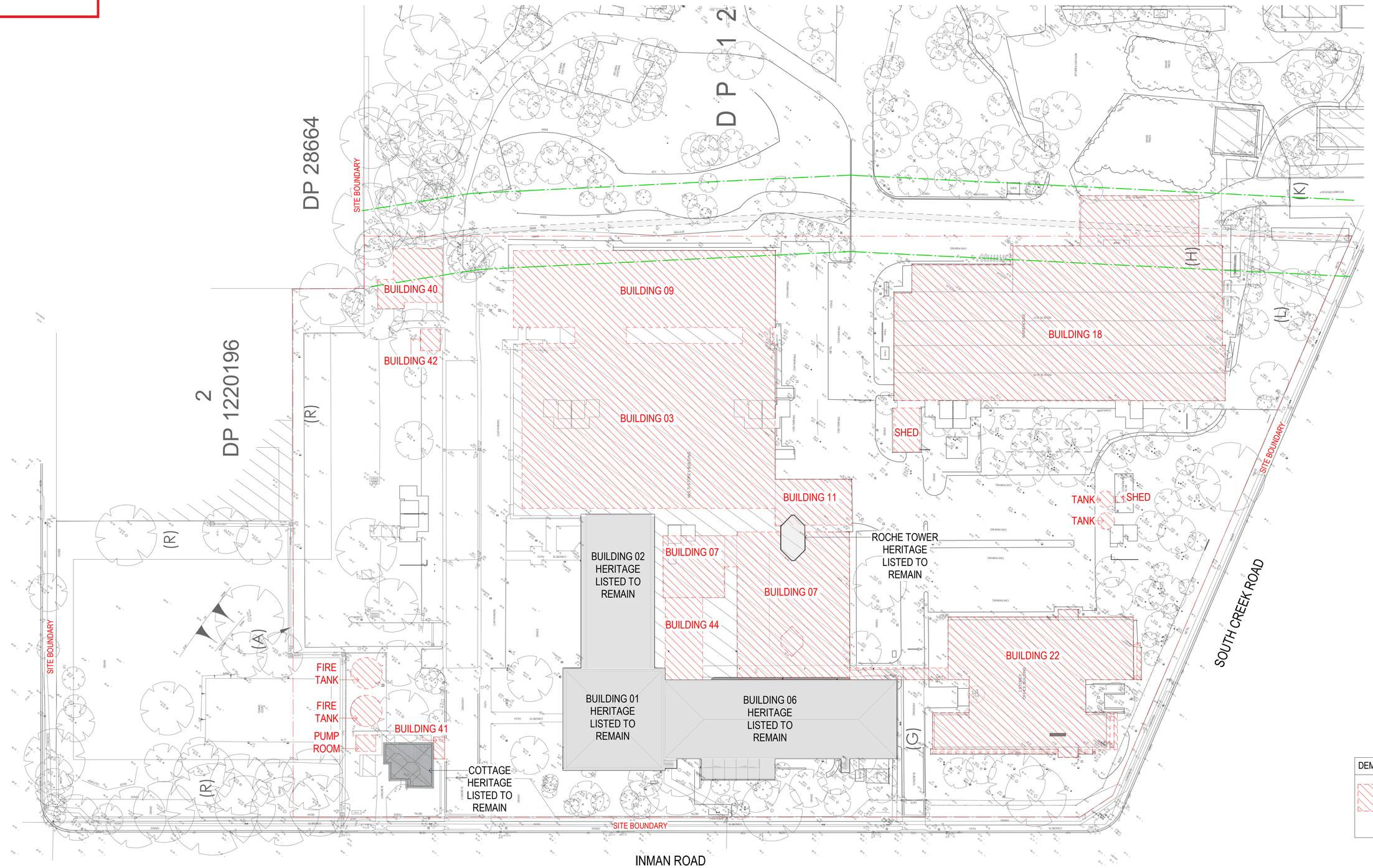
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northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

EG



DEMOLITION LEGEND:

BUILDING TO BE DEMOLISH

1 DEMOLITION PLAN 1 : 500

0m 10m 20m 30m 40m 50m

VISUAL SCALE 1:500 @ A1

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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE

DEMOLITION PLAN

DATE 12.11.2019 SCALE As indicated @ A1 JOB NO. 19110 DWG NO. DA208 REVISION 12

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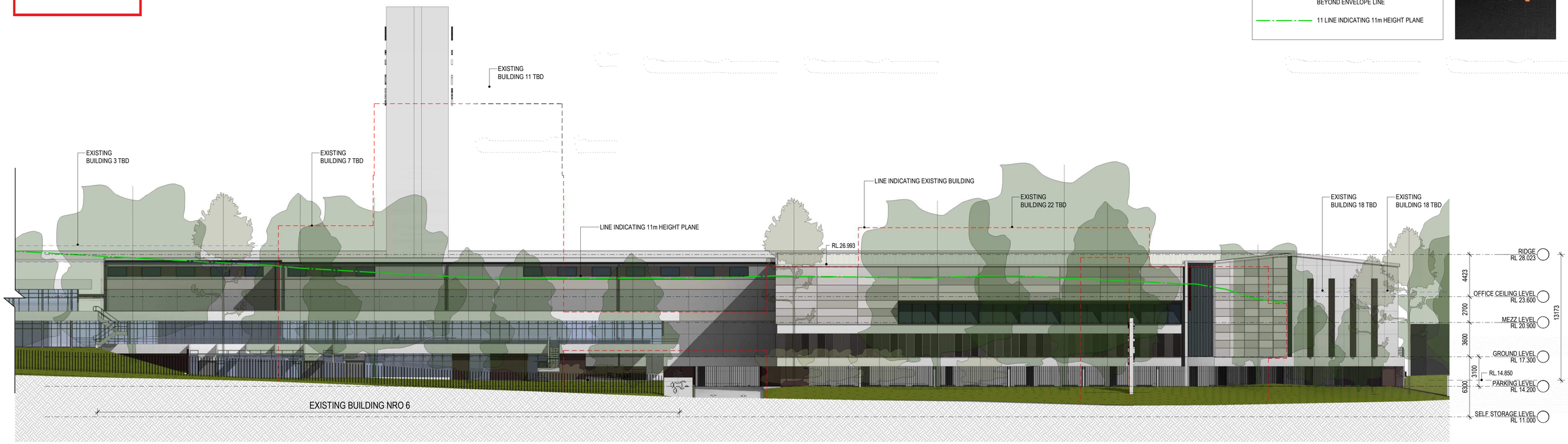
THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE

EG



1 INMAN RD ELEVATION SOUTHERN CORNER 1 : 200



2 INMAN RD ELEVATION NORTHERN CORNER 1 : 200

0m 4m 8m 12m 16m 20m

VISUAL SCALE 1:200 @ A1

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Issue Revision Title Date

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
ELEVATIONS

DATE 12.11.2019 | SCALE 1 : 200 @ A1 | JOB NO. 19110 | DWG NO. DA301 | REVISION 12

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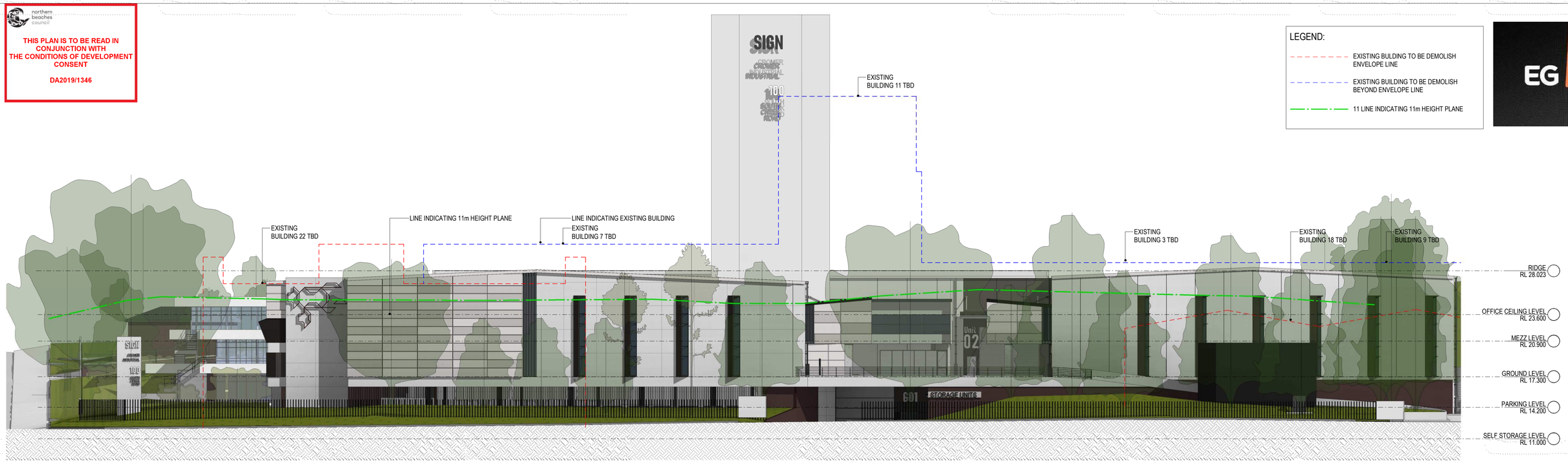
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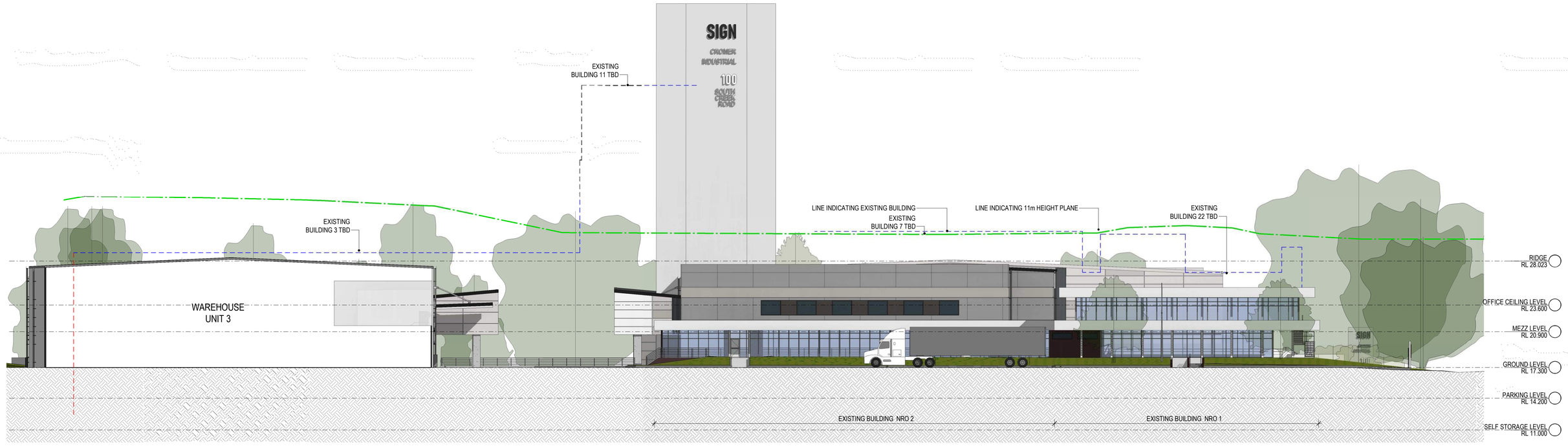
DA2019/1346

LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE



1 SOUTH CREEK RD ELEVATION 1 : 200



2 NORTH ELEVATION 1 : 200

0m 4m 8m 12m 16m 20m

VISUAL SCALE 1:200 @ A1

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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

TITLE
ELEVATIONS 2

DATE 12.11.2019 | SCALE 1 : 200 @ A1 | JOB NO 19110 | DWG NO DA302 | REVISION 12

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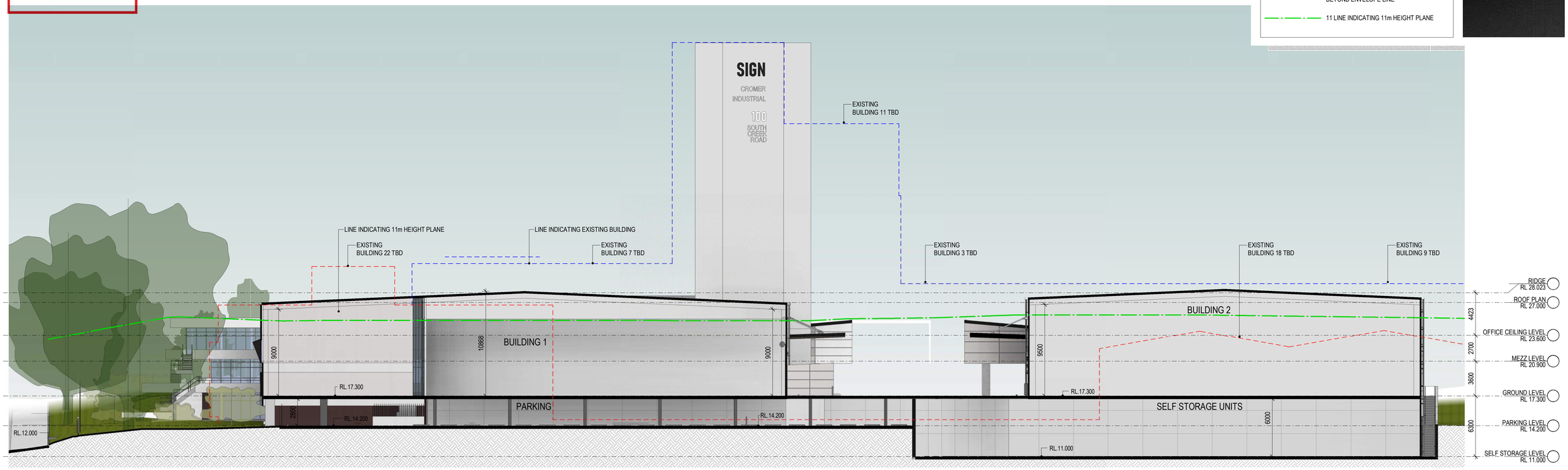
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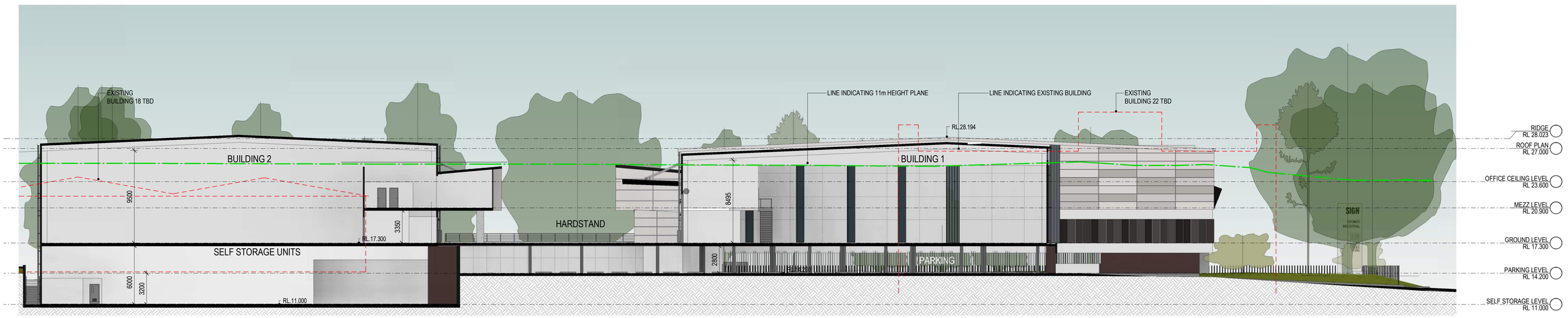
LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE

EG



1 Section A 1 : 200



2 Section B 1 : 200

0m 1m 2m 3m 4m 5m

VISUAL SCALE 1:50 @ A1

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CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
SECTIONS

DATE 12.11.2019 SCALE 1 : 200 @ A1 JOB NO 19110 DWG NO DA305 REVISION 12

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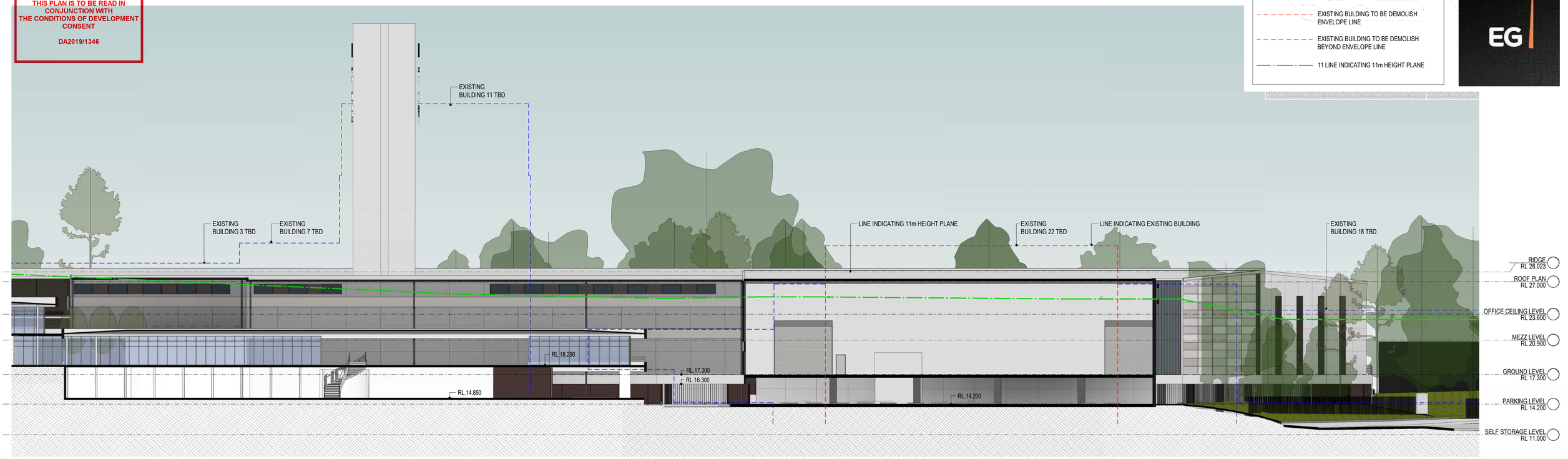
THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE

EG



1 Section C

1 : 200



2 Section D

1 : 200

0m 4m 8m 12m 16m 20m

VISUAL SCALE 1:200 @ A1

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD, CROMER

TITLE

SECTIONS 2

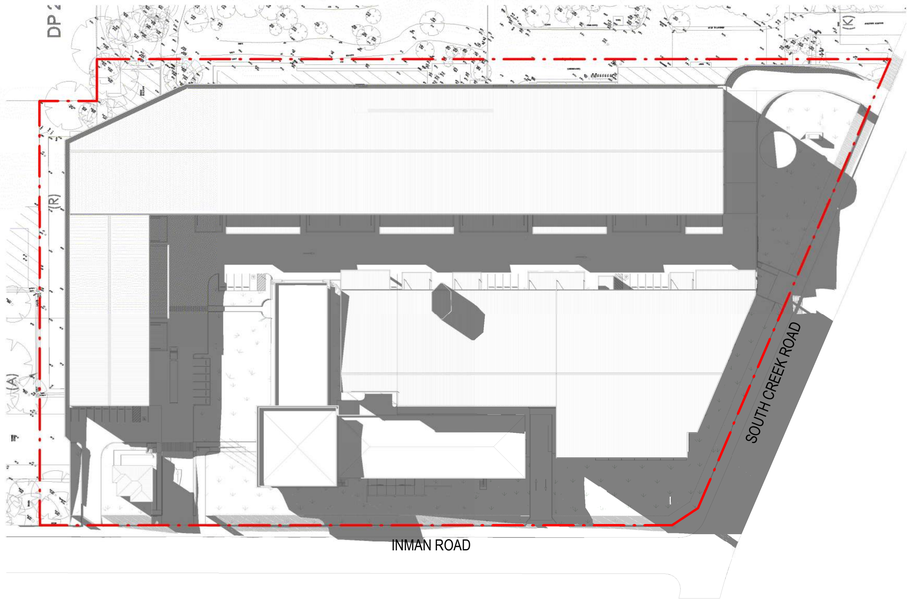
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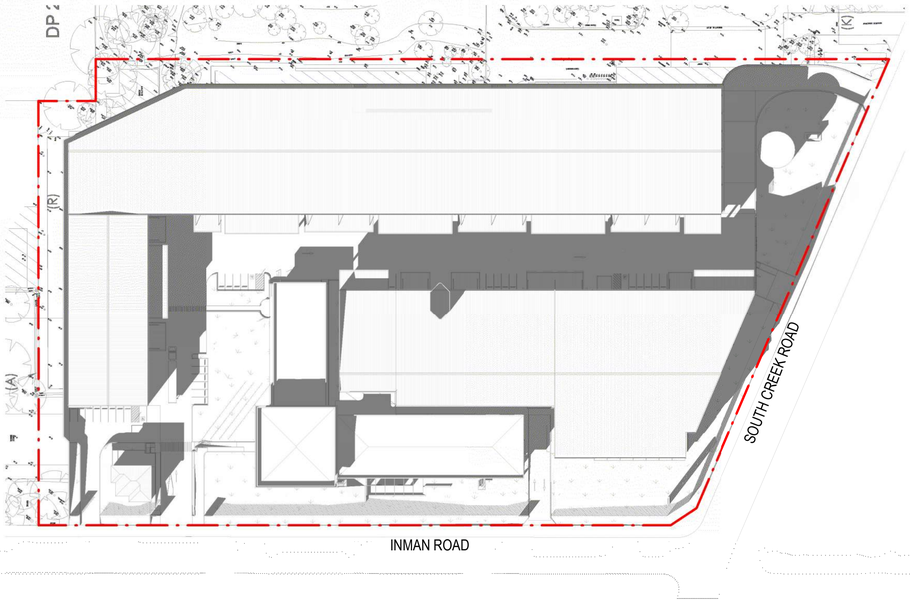
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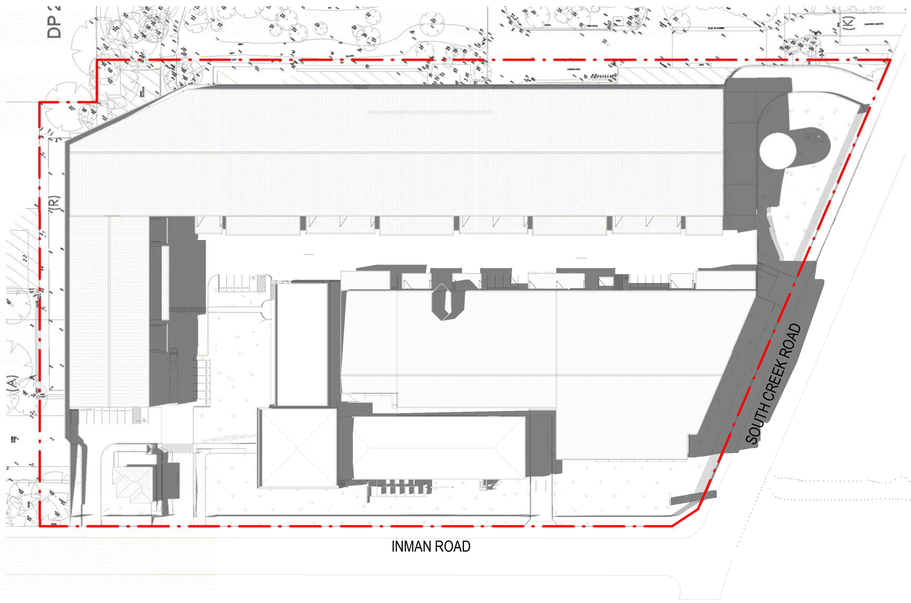
DA2019/1346



1 21-06 9.00AM



3 21-06 3.00PM



2 21-06 12.00PM

WINTER SOLSTICE SHADOW DIAGRAMS

0m 20m 40m 60m 80m 100m

VISUAL SCALE 1:1000 @ A1

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7	FOR CLIENT REVIEW	09.09.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
SHADOW DIAGRAMS_1

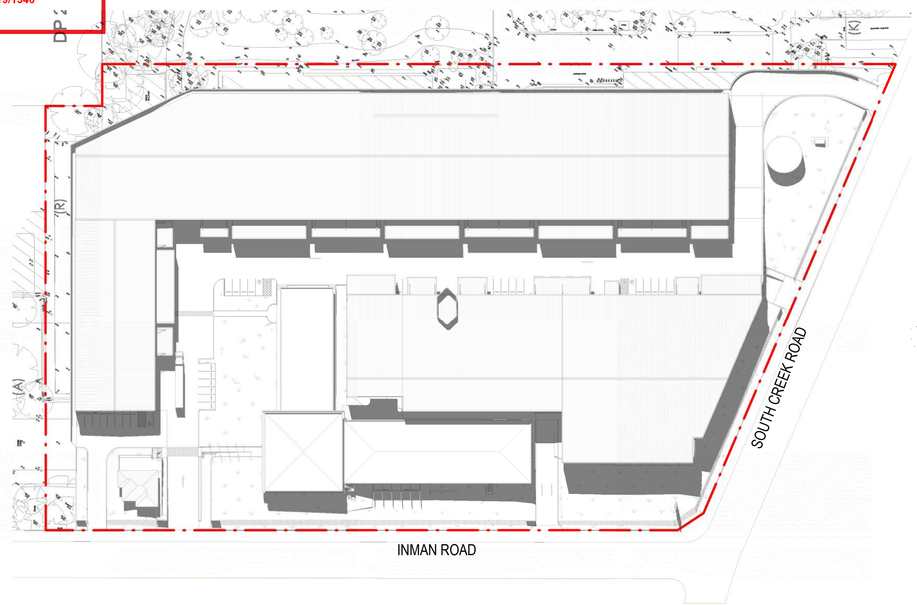
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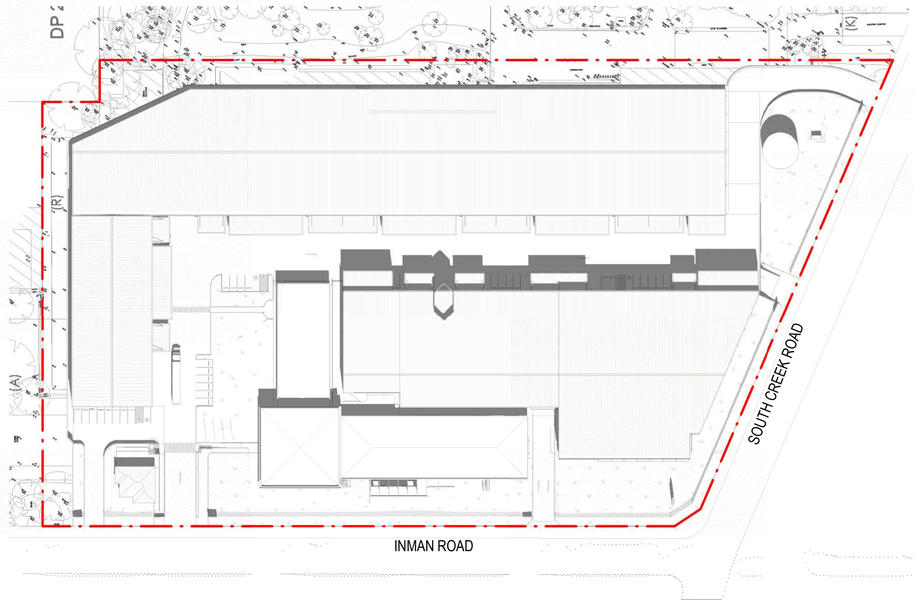
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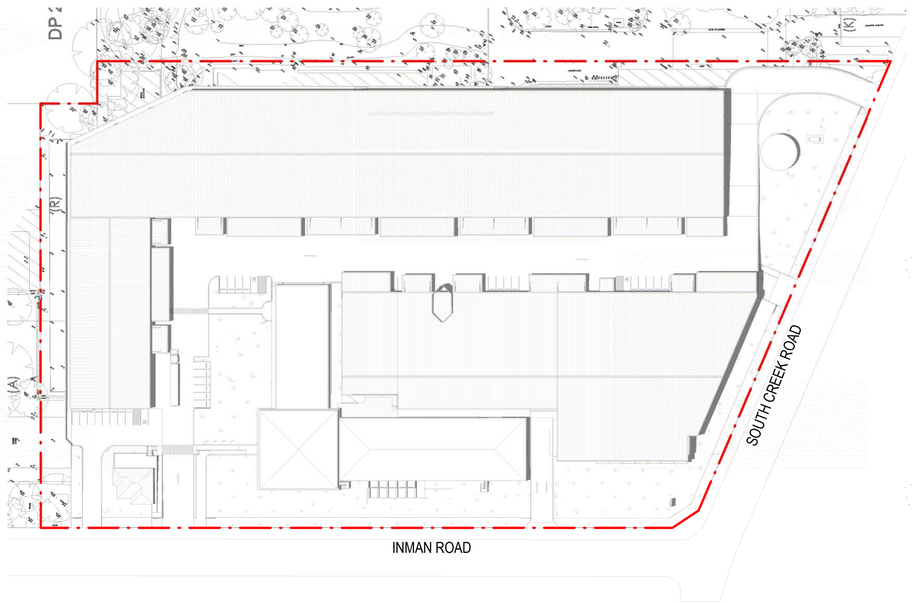
DA2019/1346



1 21-12 9.00AM



3 21-12 3.00PM



2 21-12 12.00PM

SUMMER SOLSTICE SHADOW DIAGRAMS

0m 20m 40m 60m 80m 100m

VISUAL SCALE 1:1000 @ A1

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NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

TITLE
SHADOW DIAGRAMS_2

DATE 12.11.2019 SCALE 1 : 1000 @ A1 JOB NO 19110 DWG NO DA401 REVISION 12

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EG



01 SITE PLAN

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7	FOR CLIENT REVIEW	09.09.2019
6	AMENDMENTS FOR PRE DA MEETING	06.08.2019
5	LEVELS DROPPED	01.08.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

CONCEPT DESIGN

NORTH

TITLE
NOTIFICATION PLAN_1

DATE Type model issue | SCALE 2000 @A3 | JOB NO. 19110 | DWG NO. DA500

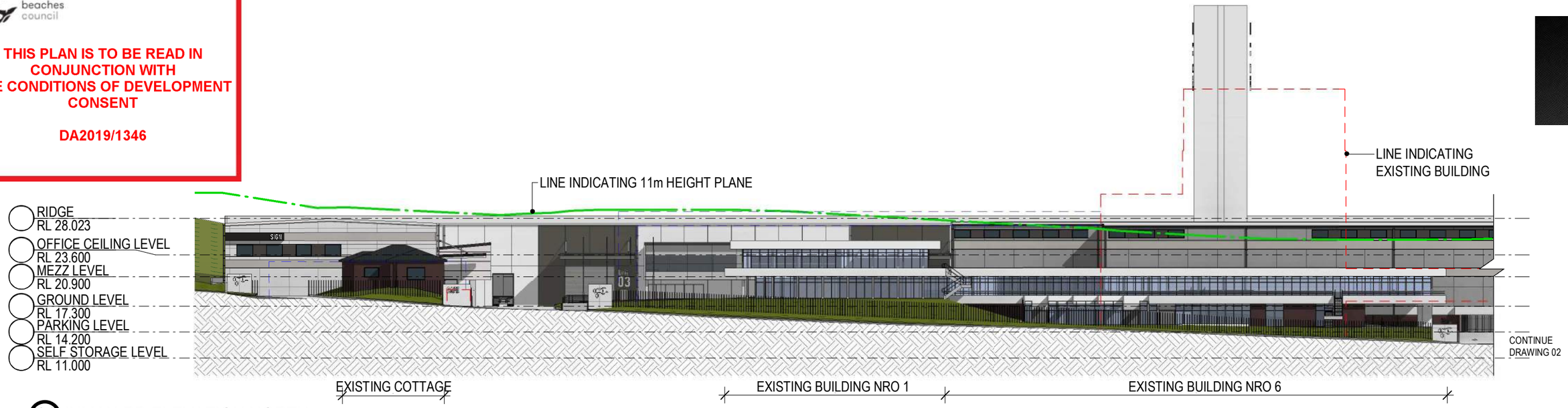
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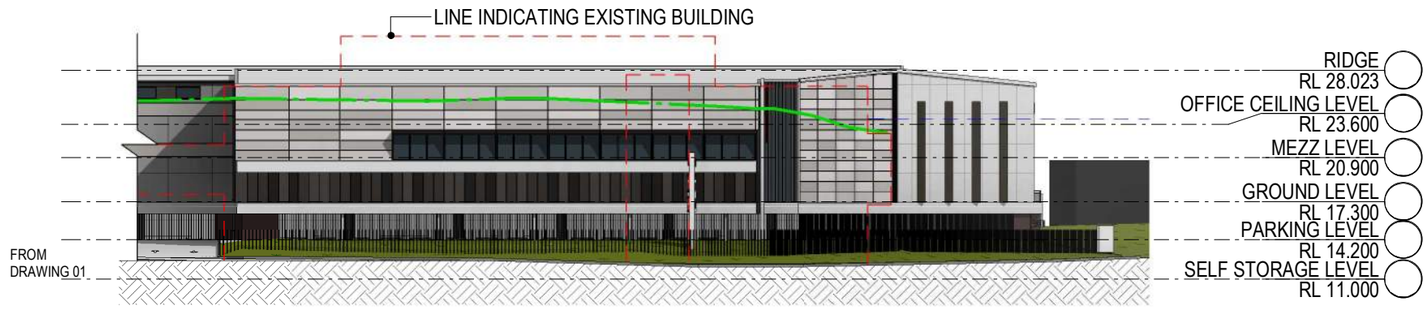
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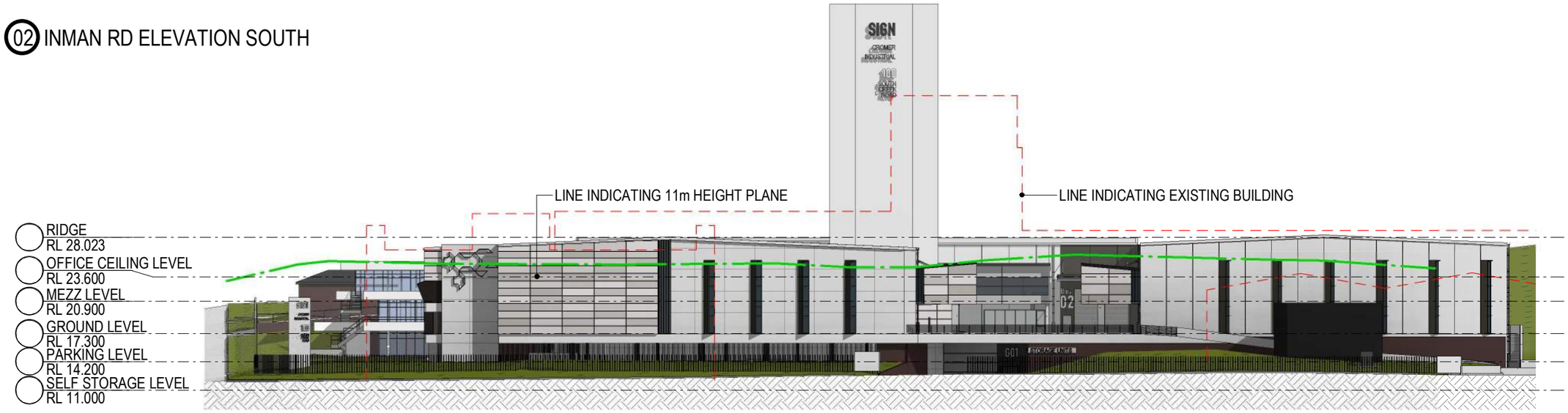
EG



01 INMAN RD ELEVATION NORTH



02 INMAN RD ELEVATION SOUTH



03 SOUTH CREEK RD ELEVATION

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6	AMENDMENTS FOR PRE DA MEETING	06.06.2019
5	LEVELS DROPPED	01.06.2019

CLIENT

NORTHEN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD, CROMER

CONCEPT DESIGN

NORTH

TITLE
NOTIFICATION PLAN_2

DATE Type model issue800 @A3 | SCALE | JOB NO. 19110 | DWG NO. DA501 | 12

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DA2019/1324

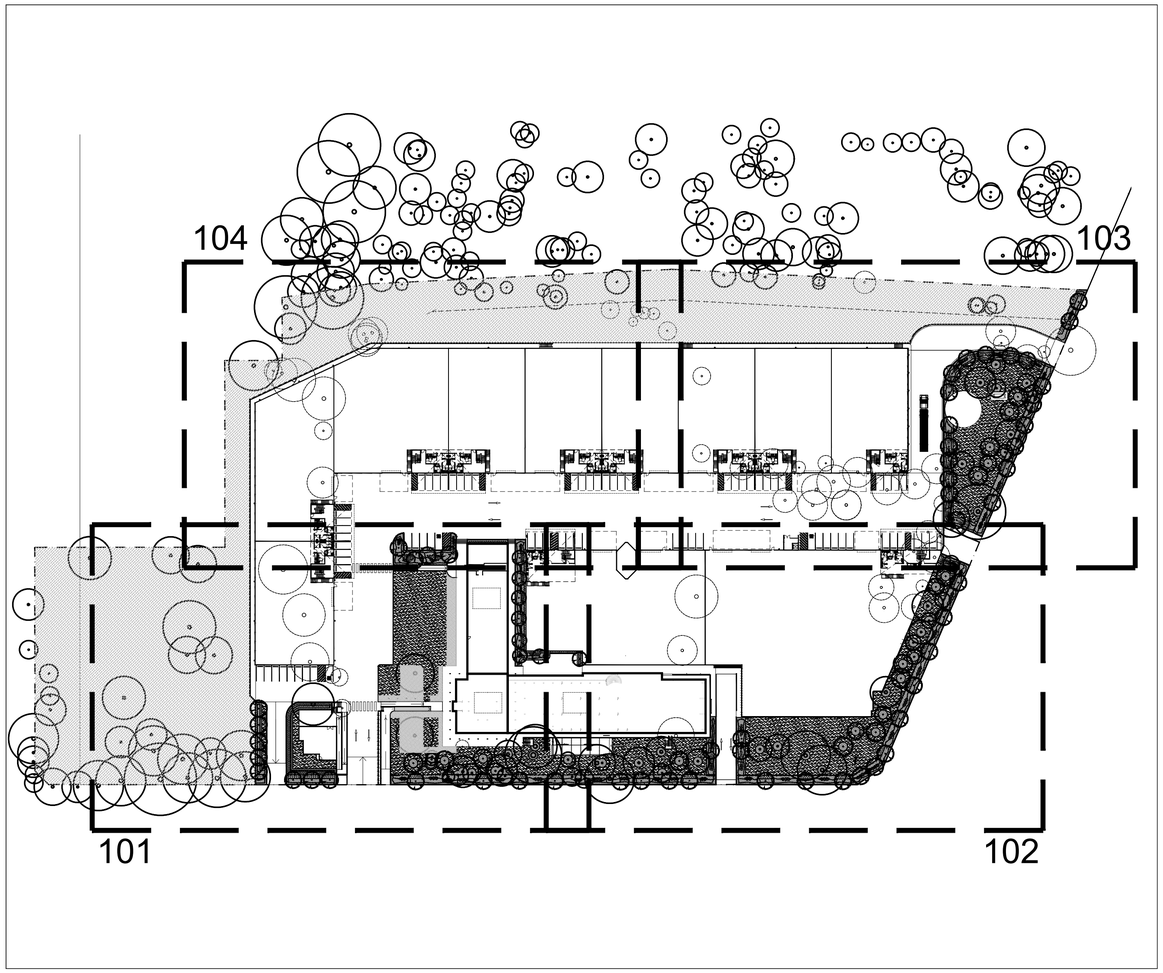
NORTHERN BEACHES BUSINESS PARK

100 South Creek Road, Cromer

DEVELOPMENT APPLICATION

Drawing Schedule

Drawing Number	Drawing Title	Scale
000	Landscape Coversheet	1:1000
001	Landscape Master Plan	1:500
101	Landscape Plan	1:200
102	Landscape Plan	1:200
103	Landscape Plan	1:200
104	Landscape Plan	1:200
501	Landscape Details	As Shown



Site Plan | Scale 1:1000

NOT FOR CONSTRUCTION

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LEGEND

Issue	Revision Description	Drawn	Check	Date
B	Revised For Comment	JW	NM	04.11.2019
A	For Comment	JW	NM	30.10.2019

A1

Key Plan:

SITE IMAGE

Landscape Architects

Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia

Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Cover Sheet

PRELIMINARY

Scale:

Job Number: SS19-4248

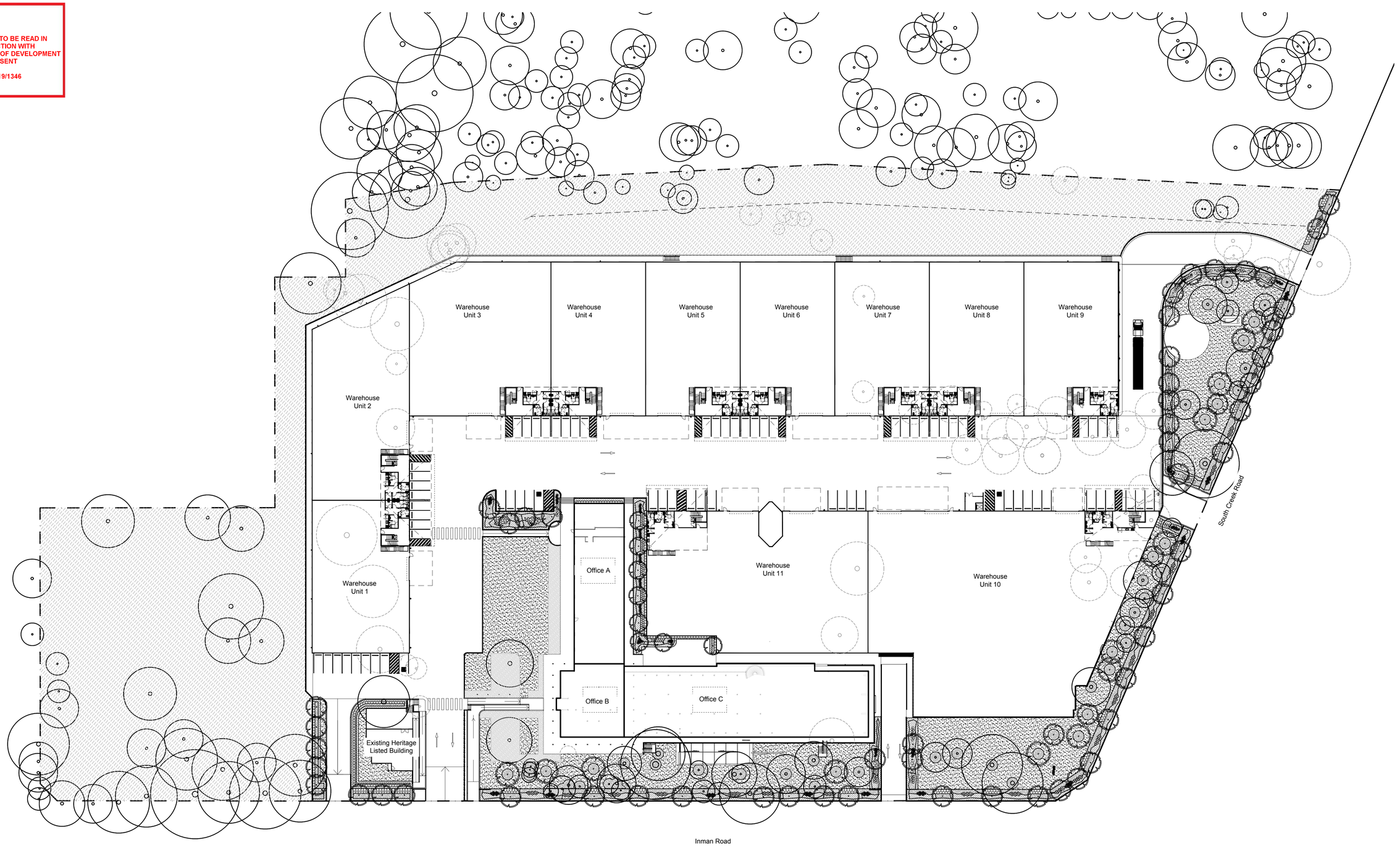
Drawing Number: 000

Issue: B

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346



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Issue	Revision Description	Drawn	Check	Date
B	Revised For Comment	JW	NM	04.11.2019
A	For Comment	JW	NM	30.10.2019

LEGEND

- Site Boundary
- Existing Tree to be Retained
- Existing Tree to be Removed
- Existing Landscaping
- Proposed Tree
- Proposed Shrubs and Accents
- Proposed Grasses and Ground Covers
- Turf
- Hard Garden Edging
- Future Development Application

Key Plan:

SITE IMAGE

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www.siteimage.com.au

Client:
Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Landscape Master Plan

PRELIMINARY

Scale: 1:500 @ A1

0 2 5 10 15 25m

Job Number: SS19-4248

Drawing Number: 001

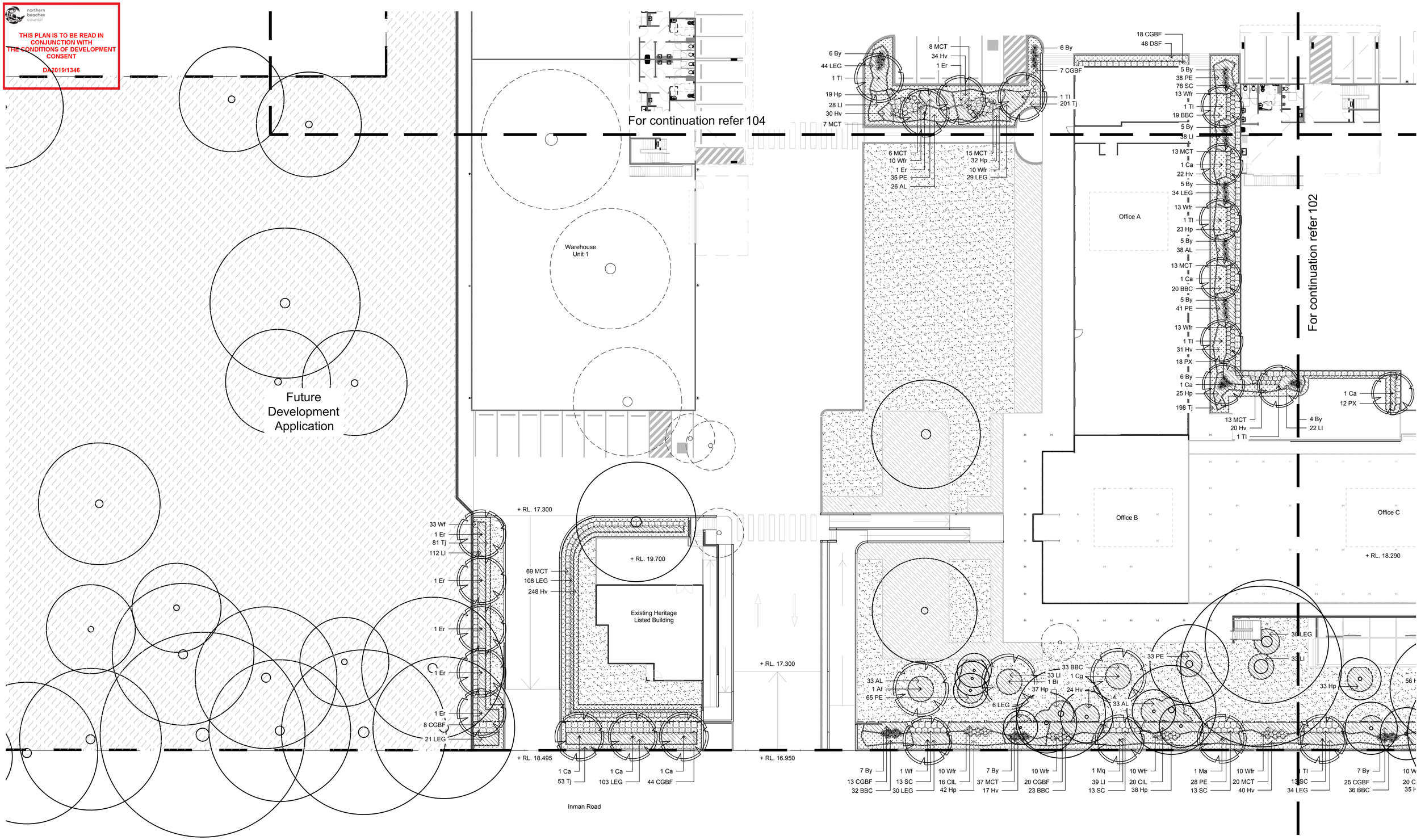
Issue: B

A1

northern beaches council

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Key Plan:

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Redfern NSW 2016
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www.siteimage.com.au

Client:
Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Landscape Plan

PRELIMINARY

Scale: 1:200 @ A1
0 1 2 4 6 10m

Job Number: SS19-4248
Drawing Number: 101
Issue: B

A1

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

For continuation refer 104

For continuation refer 103

For continuation refer 101

Warehouse Unit 11

Warehouse Unit 10

+ RL. 17.300

+ RL. 14.200

+ RL. 18.290

+ RL. 12.700

Office C

Inman Road

South Creek Road

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A1

LEGEND

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Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Landscape Plan

PRELIMINARY

Scale: 1:200 @ A1 (0 1 2 4 6 10m)

Job Number: SS19-4248

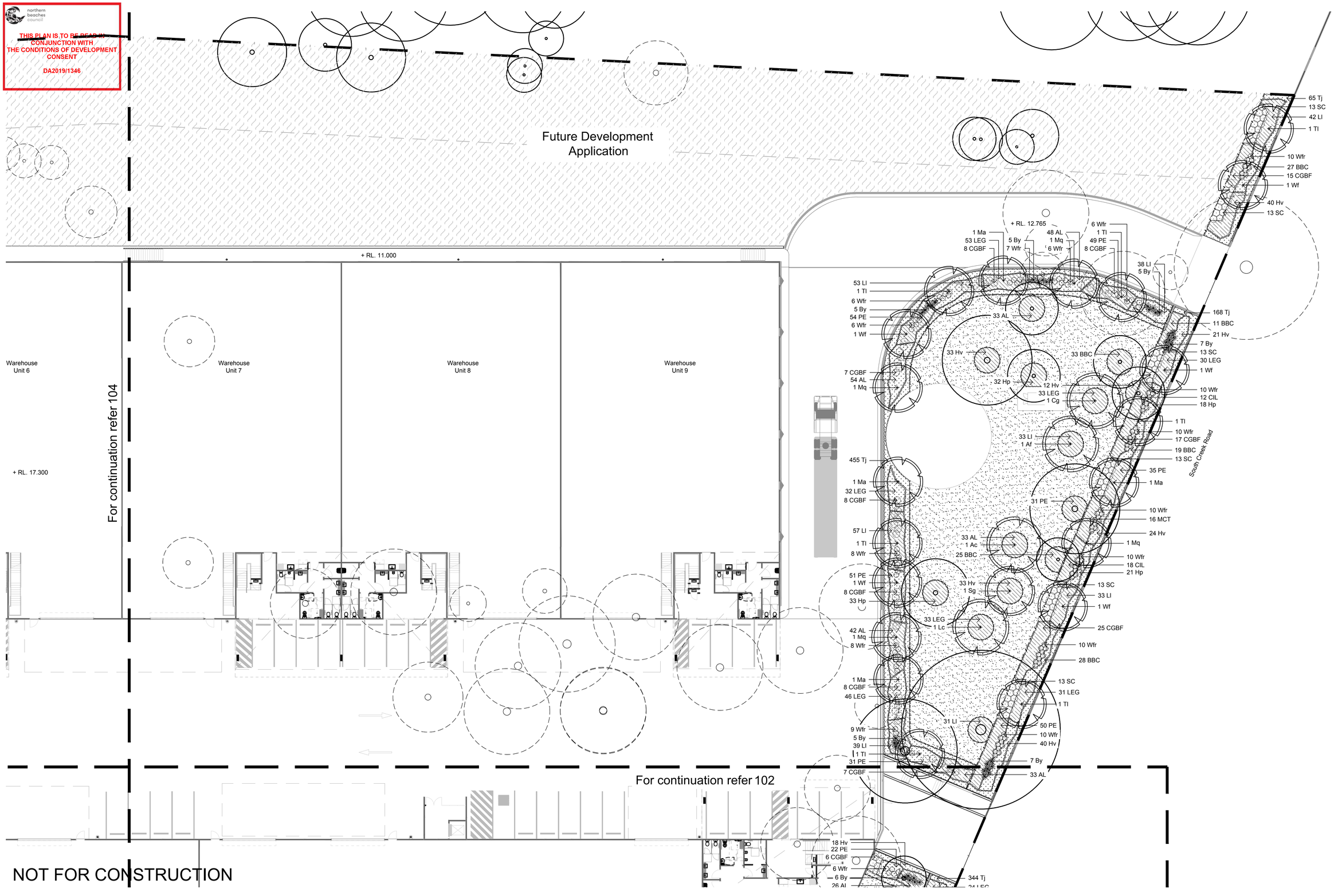
Drawing Number: 102

Issue: B

northern beaches council

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DA2019/1346



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B	Revised For Comment	JW	NM	04.11.2019
A	For Comment	JW	NM	30.10.2019

LEGEND

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Key Plan:

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Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Landscape Plan

PRELIMINARY

Scale: 1:200 @ A1
0 1 2 4 6 10m

Job Number: SS19-4248
Drawing Number: 103
Issue: B

A1

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

Future Development Application

+ RL. 14.200

For continuation refer 103

Warehouse Unit 3

Warehouse Unit 4

Warehouse Unit 5

Warehouse Unit 6

+ RL. 17.300

Warehouse Unit 2

For continuation refer 101

+ RL. 17.300

For continuation refer 102

6 By
44 LEG
1 Tl
19 Hp
28 Ll
30 Hv
7 MCT

8 MCT
34 Hv
1 Er
7 CGBF
6 By
1 Tl
201 Tj

18 CGBF
48 DSF
5 By
38 PE
78 SC
13 Wfr
1 Tl
19 BBC
5 By

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A	For Comment	JW	NM	30.10.2019

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Client:
Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Landscape Plan

PRELIMINARY

Scale: 1:200 @ A1
0 1 2 4 6 10m

Job Number: SS19-4248

Drawing Number: 104

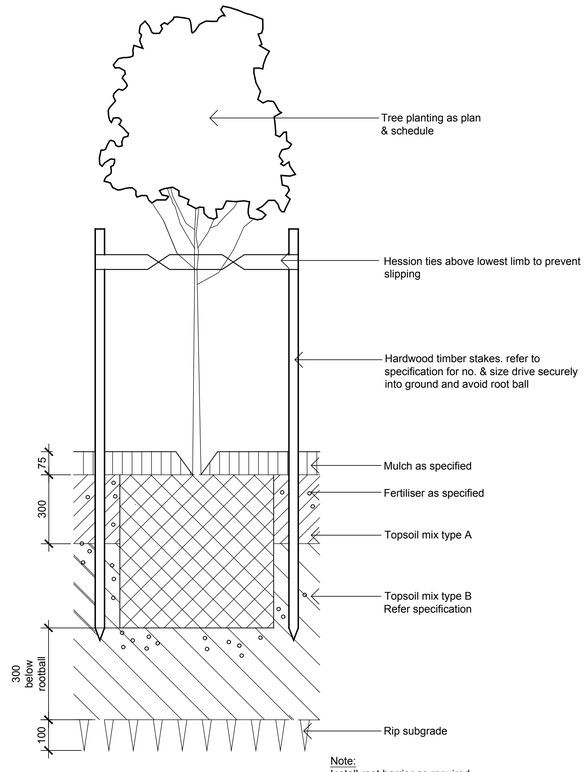
Issue: B

A1

northern beaches council

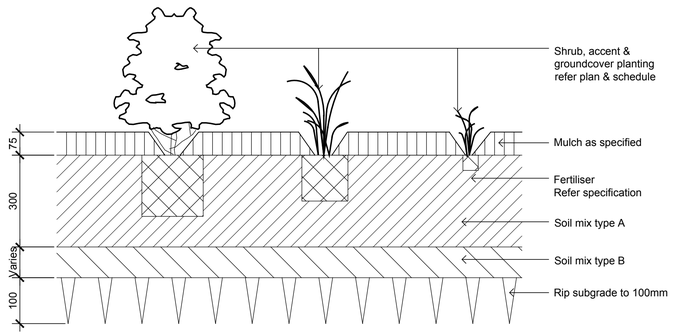
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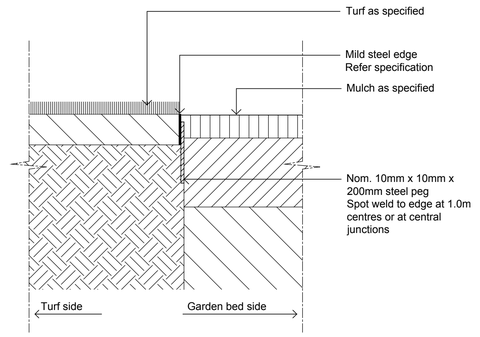


Note:
Install root barrier as required.
Refer specification.

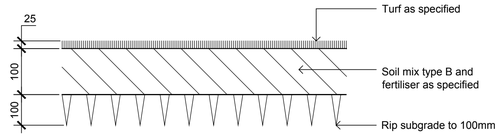
DETAIL - 75-200L TREE PLANTING ON GRADE
1:10



DETAIL - SHRUB, ACCENT & GROUNDCOVER PLANTING ON GRADE
1:10



TYPICAL MILD STEEL EDGE
SCALE 1:10



DETAIL -TURF ON EVEN GRADE
1:10

PLANT SCHEDULE

Symbol	Botanical Name	Common Name	Height Metres	Width	Pot Size	Spacing
	Trees					
Ac	*Angophora costata*	Sydney Red Gum	30	10	75L	As Shown
Af	*Angophora floribunda*	Rough Bark Angophora	20	6	75L	As Shown
Bi	*Banksia integrifolia*	Coastal Banksia	20	6	75L	As Shown
Cg	*Corymbia gummifera*	Bloodwood	40	7	75L	As Shown
Ca	*Cupaniopsis anacordioides*	Tuckeroo	7	5	75L	As Shown
Er	*Elaeocarpus reticulatus*	Blueberry Ash	7	5	75L	As Shown
Eh	*Eucalyptus haemastoma*	Scribbly Gum	15	5	75L	As Shown
Ep	*Eucalyptus punctata*	Grey Gum	30	7	75L	As Shown
Lc	*Lophostemon confertus*	Brushbox	15	10	75L	As Shown
Ma	*Melaleuca armillaris*	Bracelet Honey Myrtle	8	6	75L	As Shown
Mq	*Melaleuca quinquenervia*	Paperbark	8	4	75L	As Shown
Sg	*Syncarpia glommulifera*	Turpentine	50	7	75L	As Shown
Tl	*Tristaniopsis laurina*	Water Gum	5	3	75L	As Shown
Wf	*Waterhousia floribunda*	Weeping Lilly Pilly	12	8	75L	As Shown
	Shrubs and Accents					
By	*Beschorneria yuccoides*	Mexican Lily	1	2	200mm	As Shown
CGBF	*Callistemon 'Great Balls of Fire'*	Bottlebrush	1.5	1.5	200mm	As Shown
CIL	*Correa glabra 'Ivory Lantern'*	Ivory Lantern	0.6	0.6	200mm	As Shown
MCT	*Melaluca 'Claret Tops'*	Honey Myrtle	1	1	200mm	As Shown
PX	*Philodendron 'Xanadu'*	Xanadu	0.4	0.4	200mm	As Shown
SC	*Syzygium 'Cascade'*	Lily Pily	2	2	200mm	As Shown
Wfr	*Westringia fruticosa*	Coastal Rosemary	2	2	200mm	As Shown
	Groundcovers					
AL	*Acacia 'Limelight'*	Bower Wattle	0.8	1.2	Tube	5/m2
BBC	*Banksia 'Birthday Candles'*	Birthday Candles	0.4	1	Tube	5/m2
DSF	*Dichondra 'Silver Falls'*	Silver Falls	0.2	3	Tube	5/m2
Hv	*Hardenbergia violacea*	Happy Wanderer	1	1	Tube	5/m2
Hp	*Helichrysum petiolatum*	Licorice Plant	0.4	1	Tube	5/m2
LEG	*Liriope Evergreen Giant*	Evergreen Giant	0.6	0.5	Tube	5/m2
Ll	*Lomandra longifolia*	Mat Rush	0.7	0.7	Tube	5/m2
PE	*Poa labillardieri 'Eskdale'*	Eskdale Poa	0.8	0.5	Tube	5/m2
Tj	*Trachelospermum jasminoides*	Star Jasmine	7	Spreading	Tube	5/m2

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LEGEND

Issue	Revision Description	Drawn	Check	Date
C	Plant Schedule Amendments	JW	NM	06.11.2019
B	Revised For Comment	JW	NM	04.11.2019
A	For Comment	JW	NM	30.10.2019

Key Plan:

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www.siteimage.com.au

Client:
Northern Beaches Business Park

Project:
Northern Beaches Business Park
100 South Creek Road
Cromer

Drawing Name:
Landscape Details

PRELIMINARY

Scale:

Job Number: SS19-4248

Drawing Number: 501

Issue: C

A1

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346

PROPOSED INDUSTRIAL DEVELOPMENT
100 SOUTH CREEK ROAD, CROMER, NSW
CIVIL ENGINEERING DRAWINGS FOR DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C013674.01-DA10	DRAWING LIST & GENERAL NOTES
C013674.01-DA20	EROSION & SEDIMENT CONTROL PLAN
C013674.01-DA25	EROSION & SEDIMENT CONTROL DETAILS - SHEET 1
C013674.01-DA26	EROSION & SEDIMENT CONTROL DETAILS - SHEET 2
C013674.01-DA41	STORMWATER DRAINAGE PLAN - GROUND LEVEL
C013674.01-DA42	STORMWATER DRAINAGE PLAN - BASEMENT
C013674.01-DA45	STORMWATER DETAILS - SHEET 1
C013674.01-DA46	STORMWATER DETAILS - SHEET 2
C013674.01-DA47	STORMWATER DETAILS - SHEET 3
C013674.01-DA48	STORMWATER DETAILS - SHEET 4
C013674.01-DA51	FINISHED LEVELS PLAN - GROUND LEVEL
C013674.01-DA52	FINISHED LEVELS PLAN - BASEMENT
C013674.01-DA55	TYPICAL SECTIONS
C013674.01-DA65	RETAINING WALL DETAILS



LOCALITY PLAN
NOT TO SCALE

GENERAL NOTES:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.

G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE.
ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT.
REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.

G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

G6 ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED IN THE GEOTECHNICAL REPORT.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50384001DT DATED 21/06/16.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 MM SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 MM SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 MM SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS (IN THE STATED PERIOD) ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION (EG. COSTIN ROE SITE PREPARATION NOTES IN DWG C013003.01-EWC10)
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS A.H.D.
2. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
3. THE MAJOR CONTOUR INTERVAL IS 0.5m
4. THE MINOR CONTOUR INTERVAL IS 0.1m.
5. MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
6. MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
7. MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
8. PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEDE 1:20 (5%).
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. THE ACCESS ROAD TO THE HARDSTAND AREA IS TO HAVE A CROSSFALL OF 2% AS INDICATED ON PLAN.
12. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL. GRADE.
13. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

EROSION CONTROL NOTES

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200MM.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS DA51 & DA52.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Φ375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Φ300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 25 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Φ100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Φ100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. ALL PIPE GRADES 1 IN 100 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
21. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
ISSUED FOR INFORMATION ONLY	01.11.19	A
AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT
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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA10

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DRAWING LIST & GENERAL NOTES

DRAWING No C013674.01-DA10

ISSUE B

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

LEGEND:

- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE
- DENOTES DIVERSION DRAIN
- DENOTES DIRECTION OF OVERLAND FLOW

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013674.01-C25 & C26.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (44.0mm).

APPROXIMATE AREA OF DISTURBED SITE = 4.45Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

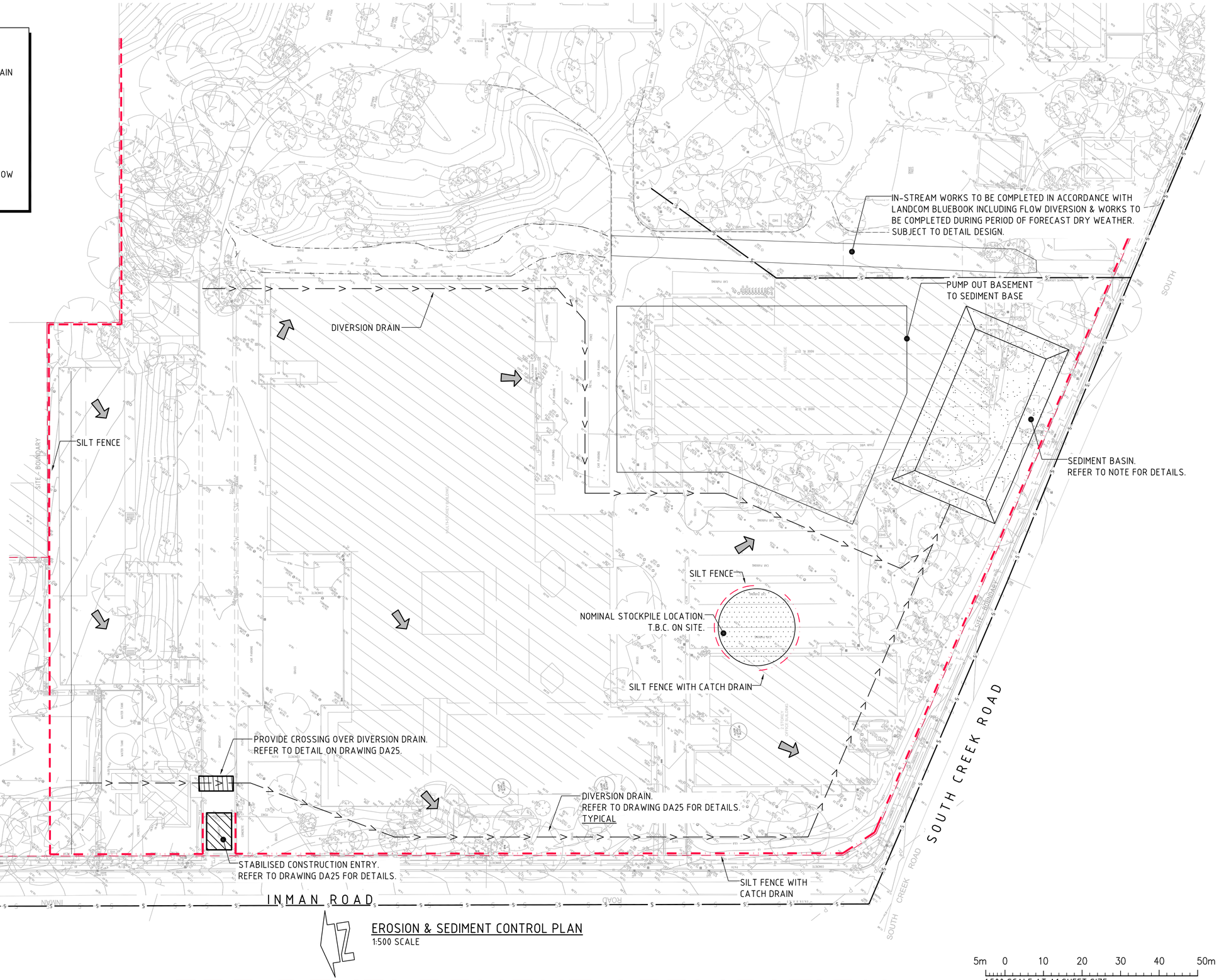
EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DE-WATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SEDIMENT BASIN:

CATCHMENT AREA	= 4.45ha
REQUIRED BASIN VOLUME	= 1,469m³
BASE DIMENSION (LxB)	= 40.0m x 20.0m
TOP DIMENSION (LxB)	= 49.0m x 29.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 1,644m³



EROSION & SEDIMENT CONTROL PLAN
1:500 SCALE

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

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ARCHITECT

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PROPOSED DEVELOPMENT
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CROMER, 2099, NEW SOUTH WALES

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EROSION & SEDIMENT CONTROL PLAN

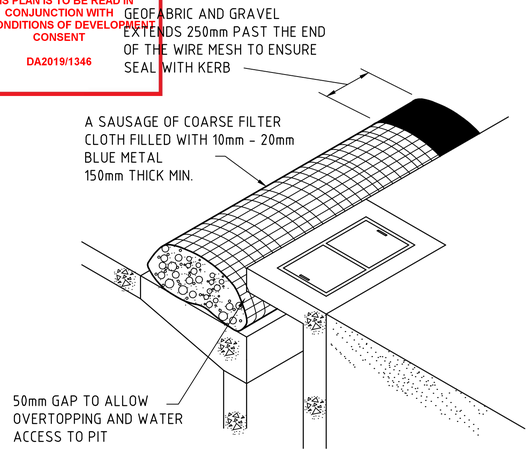
DRAWING No C013674.01-DA 20

ISSUE A

northern beaches council

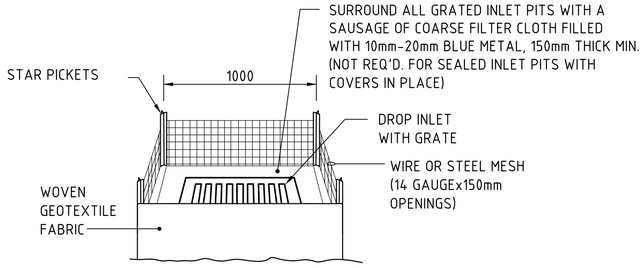
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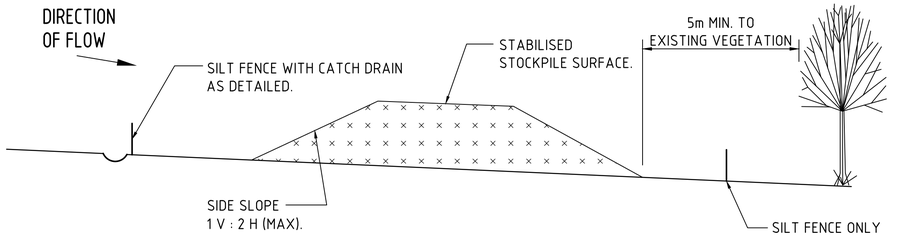
KERB INLET PIT CONTROL

N.T.S



GRATED INLET PIT FILTER DETAIL

N.T.S



TYPICAL STOCKPILE DETAIL

N.T.S.

NOTE : ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.

STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.

NOTES:

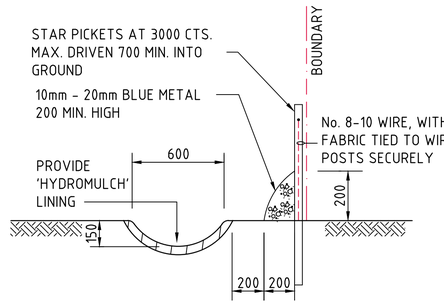
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEPT DAILY.

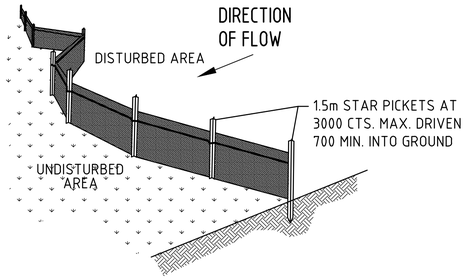
1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.



TYPICAL OPEN DRAIN & SILT FENCE

SCALE 1:20

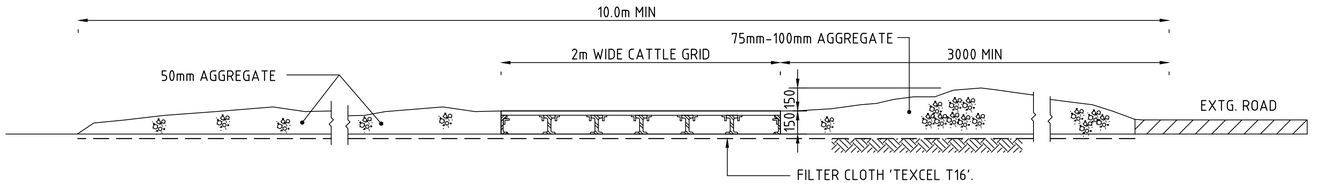


TYPICAL SILT FENCE DETAIL

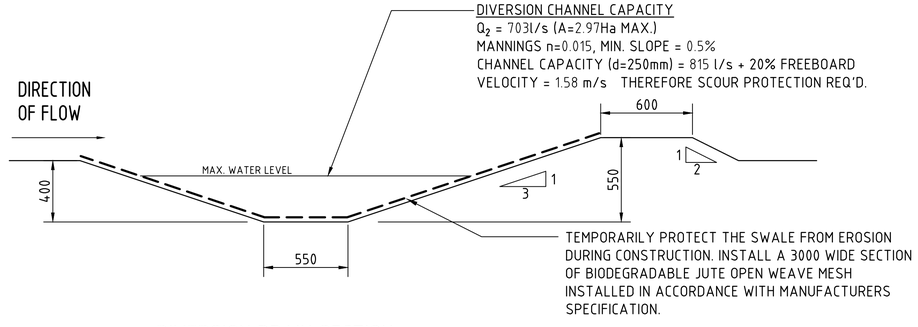
N.T.S.

PROVIDE 1m RETURNS AT 30m INTERVALS.

TYPICAL

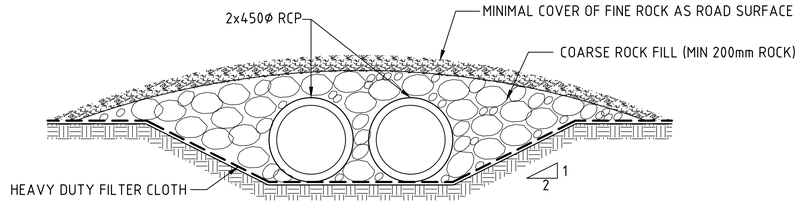


SECTION 1:20 (1 / DA20) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



DIVERSION DRAIN SECTION

SCALE 1:20



TYPICAL CROSSING OVER DIVERSION CHANNEL

SCALE 1:20

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	A
AMENDMENTS	DATE	ISSUE

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CROMER, 2099, NEW SOUTH WALES

CONSULT AUSTRALIA

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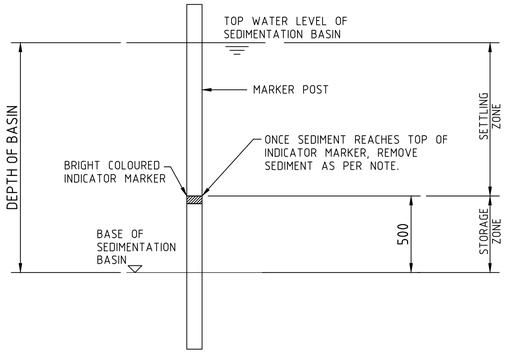
DRAWING TITLE
EROSION & SEDIMENT CONTROL DETAILS - SHEET 1

DRAWING No C013674.01-DA 25

ISSUE A

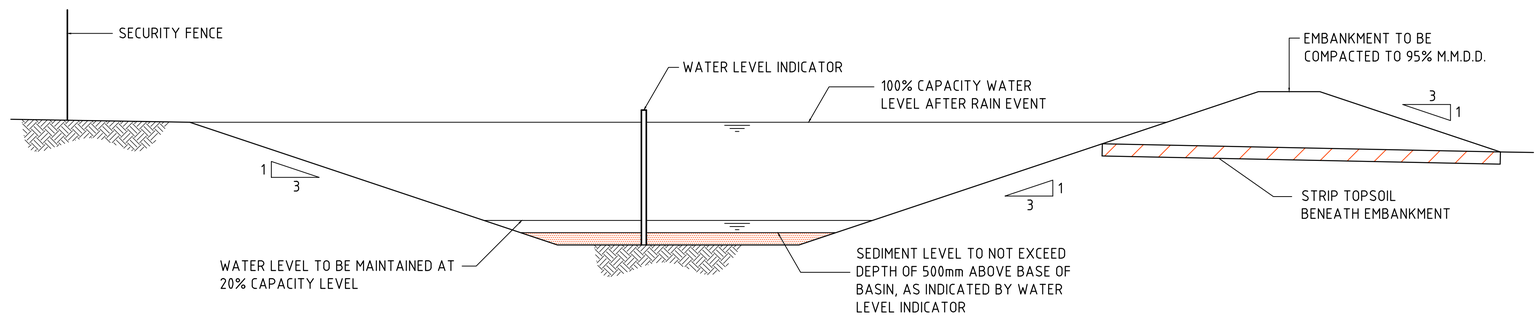
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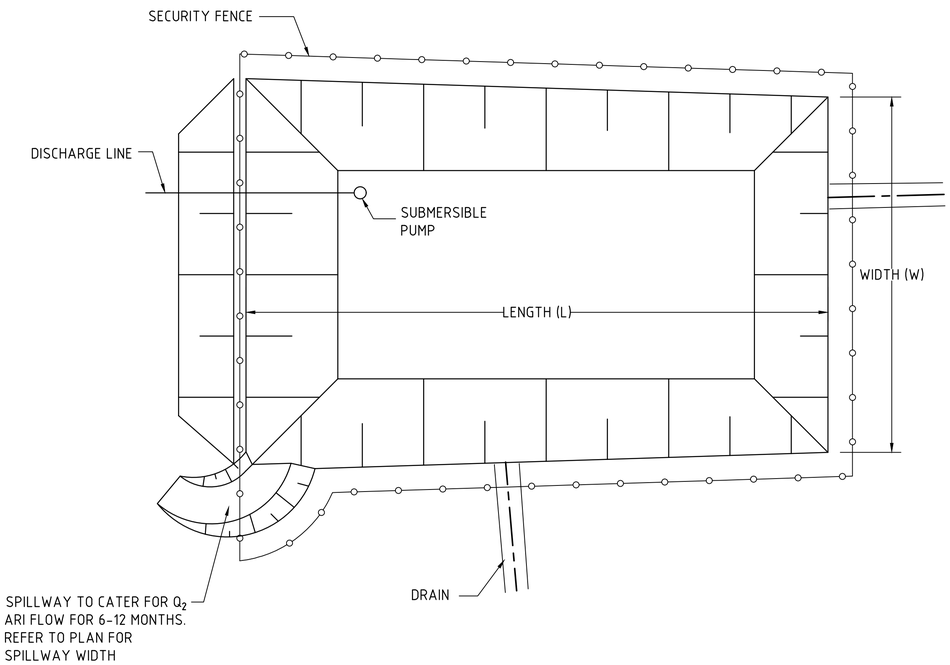
SEDIMENT STORAGE MARKER

SCALE 1:20



TYPICAL SEDIMENT CONTROL BASIN SECTION

SCALE 1:50



TYPICAL SEDIMENT CONTROL POND PLAN

SCALE 1:250

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A1 SHEET SIZE

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A1 SHEET SIZE

2m 0 5 10 15 20 25m
SCALE 1:250 AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
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PROPOSED DEVELOPMENT
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EROSION & SEDIMENT CONTROL DETAILS - SHEET 2

DRAWING No C013674.01-DA 26

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northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W × 200D U.N.O.)
- DRAINAGE LINE
- ROOFWATER LINE
- EXISTING SEWER MAIN
- 50.00 FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF EXISTING WATERWAY

LOCATION OF EXISTING CULVERT DISCHARGE INTO CHANNEL VIA 2×Ø600 PIPES TO BE MAINTAINED

STORMWATER LINE EXPECTED TO PASS ABOVE EXISTING Ø225 SEWER. SEWER TO BE POT-HOLE SURVEYED TO CONFIRM CLEARANCE TO PROPOSED STORMWATER.

APPROXIMATE EXTENT OF WATERWAY TO BE REINSTATED. REMOVE EXISTING CULVERTS & PAVEMENT AND CONSTRUCT WATERWAY.

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

EXISTING HEADWALL & CULVERT UNDER EXISTING DRIVEWAY TO BE DEMOLISHED

EXISTING 2×Ø825 PIPES TO BE DEMOLISHED

RETAINING WALL 2

DISCHARGE TO REINSTATED CHANNEL AT I.L.10.85 APPROX.

EXISTING HEADWALL & 2×Ø900 PIPES TO BE PRESERVED

RETAINING WALL 3

PROPOSED BUILDING FFL 17.30

EXISTING BUILDING FFL 18.29

PROVIDE DROPPER

PROVIDE DROPPER. STORMWATER PIPES TO DISCHARGE INTO BASEMENT IN-GROUND DRAINAGE SYSTEM.

PROVIDE HAVESTOCK FLOOR DRAINS ALONG SUSPENDED SLAB. PIPES TO BE SLUNG UNDER SLAB AND TO DISCHARGE INTO BASEMENT IN-GROUND DRAINAGE SYSTEM. REFER TO DRAWINGS DA42 & DA45 FOR DETAILS.

RETAINING WALL 1. REFER TO DRAWING DA51 FOR DETAILS. TYPICAL

Ø450 US IL 15.65 DS IL 15.62 3.0m @ 1.0%

Ø450 US IL 15.59 DS IL 15.15 44.0m @ 1.0%

Ø450 US IL 15.12 DS IL 14.68 44.0m @ 1.0%

Ø450 US IL 13.10 DS IL 12.68 21.0m @ 2.0%

Ø525 US IL 12.65 DS IL 12.60 10.0m @ 0.5%

Ø525 US IL 15.58 DS IL 15.53 10.0m @ 0.5%

Ø600 US IL 15.50 DS IL 15.30 40.0m @ 0.5%

Ø675 US IL 15.27 DS IL 15.07 40.0m @ 0.5%

Ø825 US IL 15.04 DS IL 14.97 13.0m @ 0.5%

Ø300 US IL 16.10 DS IL 16.07 5.5m @ 0.5%

Ø300 US IL 16.10 DS IL 15.92 34.5m @ 0.5%

Ø525 US IL 15.75 DS IL 15.61 34.0m @ 0.5%

Ø450 US IL 15.90 DS IL 15.78 22.5m @ 0.5%

Ø375 US IL 16.05 DS IL 15.93 22.5m @ 0.5%

Ø375 US IL 16.05 DS IL 16.00 10.0m @ 0.5%

PIT C01 PIT C02 PIT C03 PIT C04 PIT C05 PIT D01 PIT A01 PIT A02 PIT A03 PIT A04 PIT A05 PIT A06 PIT A07 PIT A08 FD 01 FD 02

2 DA55 1 DA55

ORLANDO ROAD INMAN ROAD SOUTH CREEK ROAD SITE BOUNDARY

STORMWATER MANAGEMENT BASIN
F.S.L. = 12.00m
OSD STORAGE = 1,325m³
FILTER MEDIA AREA = 663m²
MEDIA DEPTH = 500mm
EXTENDED DETENTION DEPTH = 300mm
BIO-RETENTION FILTRATION AREA EXCLUSIVE OF SCOUR PROTECTION, INLET STRUCTURES & OUTLET STRUCTURES.

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING DA10 FOR STORMWATER DRAINAGE NOTES

STORMWATER PIT SCHEDULE:
REFER TO DRAWING DA42 FOR STORMWATER PIT SCHEDULE

STORMWATER DRAINAGE PLAN - GROUND FLOOR
1:500 SCALE

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
ISSUED FOR INFORMATION ONLY	01.11.19	A

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA41

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DRAWING TITLE
STORMWATER DRAINAGE PLAN
GROUND FLOOR

DRAWING No C013674.01-DA41 ISSUE B

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

LEGEND:

~~DA317/2019~~

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W × 200D U.N.O.)
- SW> - DRAINAGE LINE
- RW> - ROOFWATER LINE
- S - EXISTING SEWER MAIN

PIT SCHEDULE

NETWORK A

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT A 01	17.05	SGGP	900×900	⊕
PIT A 02	17.05	SGGP	900×900	⊕
PIT A 03	17.05	SGGP	900×900	⊕
PIT A 04	17.05	SGGP	900×900	⊕
PIT A 05	17.12	SJP	900×900	
PIT A 06	17.00	SGGP	900×900	⊕
PIT A 07	17.00	SGGP	900×900	⊕
PIT A 08	17.00	SGGP	900×900	⊕

NETWORK B

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT B 01	14.05	SGGP	900×900	⊕
PIT B 02	14.05	SGGP	900×900	⊕
PIT B 03	14.05	SGGP	900×900	⊕
PIT B 04	14.05	SGGP	900×900	⊕
PIT B 05	14.05	SGGP	900×900	⊕
PIT B 06	14.05	SGGP	900×900	⊕
PIT B 07	14.05	SGGP	900×900	⊕
PIT B 08	14.05	SGGP	900×900	⊕
PIT B 09	14.05	SGGP	900×900	⊕
PIT B 10	14.05	SGGP	900×900	⊕
PIT B 11	14.05	SGGP	900×900	⊕
PIT B 12	14.05	SGGP	900×900	⊕
PIT B 13	14.05	SGGP	900×900	⊕
PIT B 14	14.05	SGGP	900×900	⊕
PIT B 15	14.05	SGGP	900×900	⊕
PIT B 16	14.05	SGGP	900×900	⊕
PIT B 17	14.05	SGGP	900×900	⊕
PIT B 18	14.05	SGGP	900×900	⊕
PIT B 19	13.70	SJP	900×900	

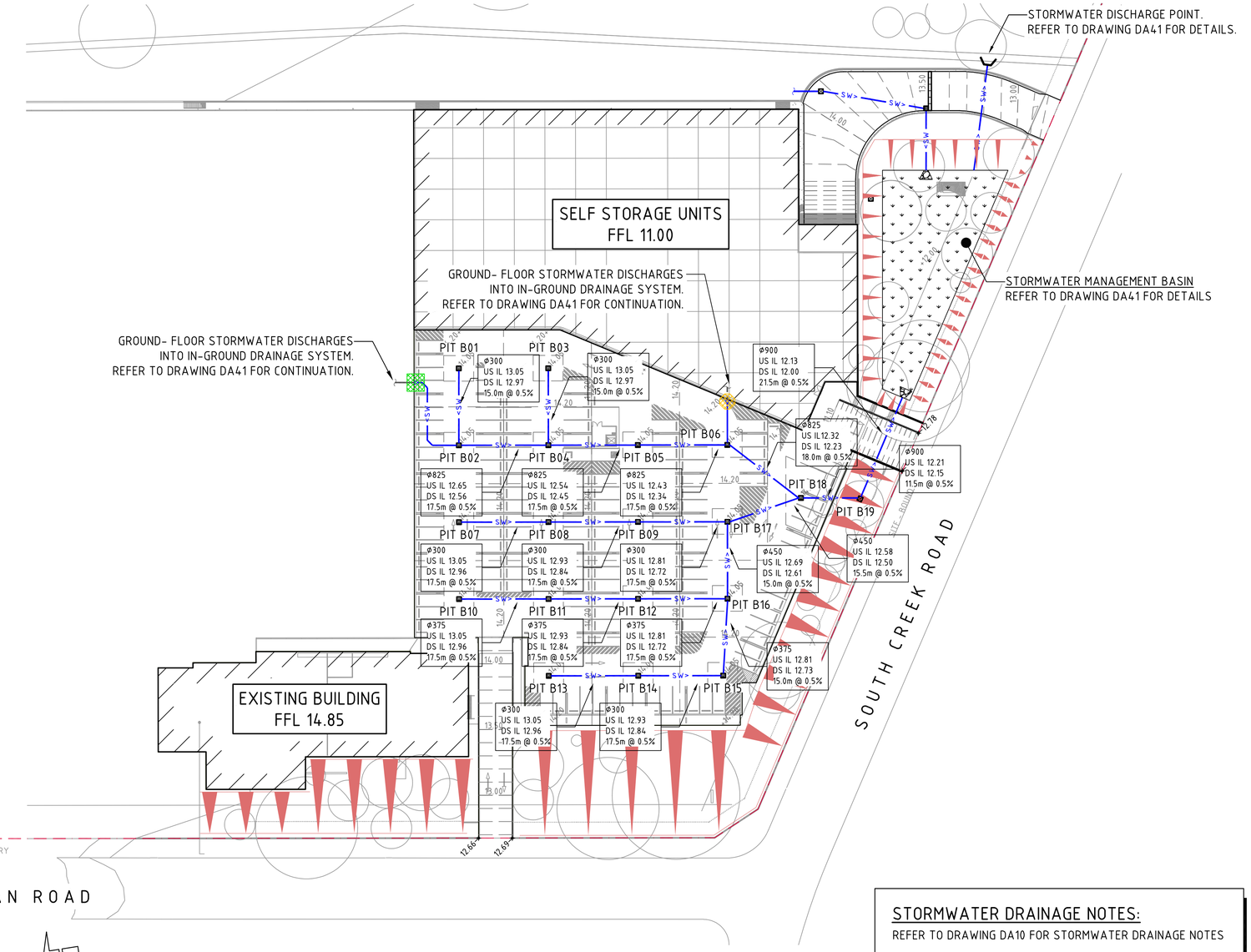
NETWORK C

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT C 01	17.25	SJP	900×900	
PIT C 02	17.00	SJP	900×900	
PIT C 03	15.00	SJP	900×900	
PIT C 04	13.92	SJP	900×900	
PIT C 05	13.50	SGGP	900×900	⊕

NETWORK D

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT D 01	12.45	BIP	1200×1200	

⊕ DENOTES PIT TO BE FITTED WITH OCEANGUARD OCEANPROTECT PIT INSERT



STORMWATER DRAINAGE PLAN - BASEMENT

1:500 SCALE

STORMWATER DRAINAGE NOTES:

REFER TO DRAWING DA10 FOR STORMWATER DRAINAGE NOTES

5m 0 10 20 30 40 50m

1:500 SCALE AT A1 SHEET SIZE

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DRAWING TITLE
STORMWATER DRAINAGE PLAN
BASEMENT

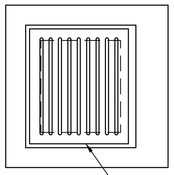
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ISSUE B

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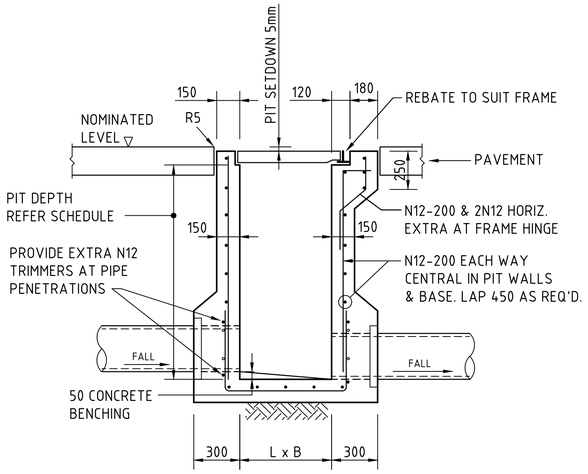
THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

DA2019/1346



H.D. CAST IRON GRATE & TEE BAR FRAME 'GATIC' OR EQUAL SEE SCHEDULE

PLAN
SCALE 1:20



SEE SCHEDULE
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

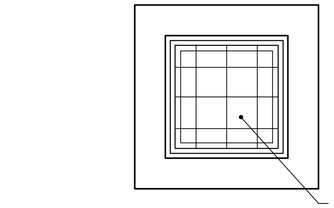
SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

NOTES:

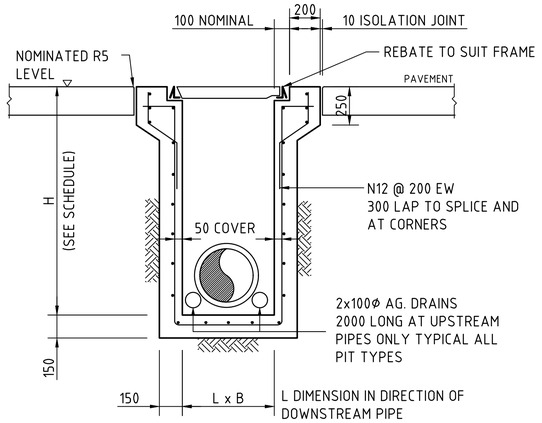
1. WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
2. SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
3. ALL REINFORCING TO HAVE 30 MIN. CLEAR CONCRETE COVER.
4. FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.

CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	25



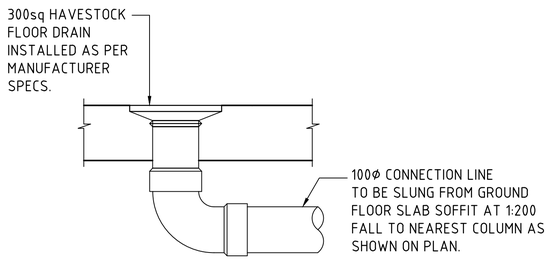
CONCRETE FILLED CAST IRON COVER & FRAME (GATIC OR EQUAL) SEE SCHEDULE

PLAN
1:20

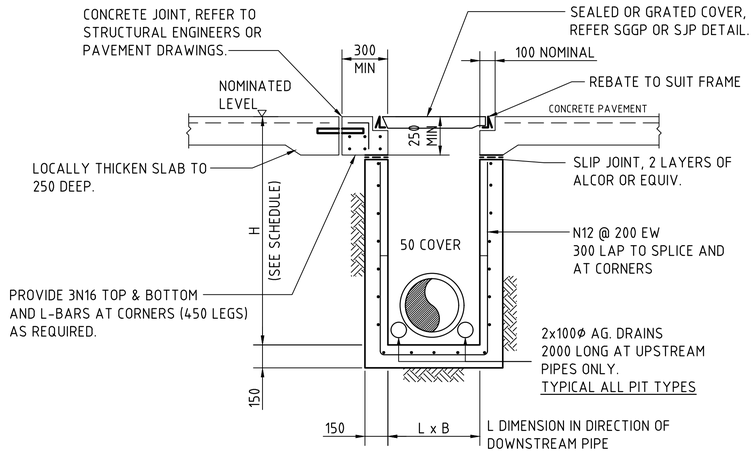


SECTION
SCALE 1:20

SEALED JUNCTION PIT - SJP



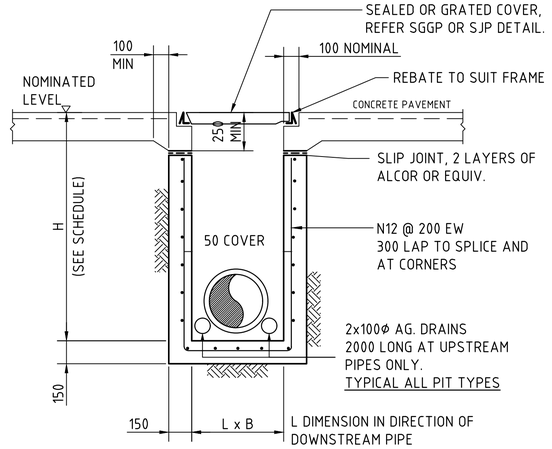
FLOOR DRAIN - FD
SCALE 1:10
(FOR USE IN SUSPENDED SLABS)



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's, WHERE PITS ARE LOCATED IN THE CORNER OF SLAB PANELS OR ADJACENT TO SLAB PANEL JOINTS)



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A1 SIZE SHEET

100mm 0 200 400 600 800 1000mm
SCALE 1:10 AT A1 SIZE SHEET

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DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 1

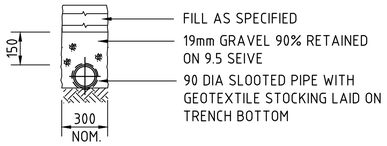
DRAWING No C013674.01-DA 45

ISSUE B

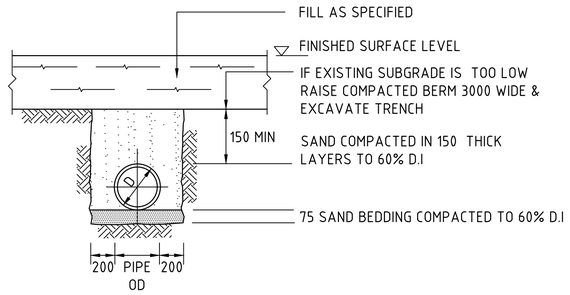
northern beaches council

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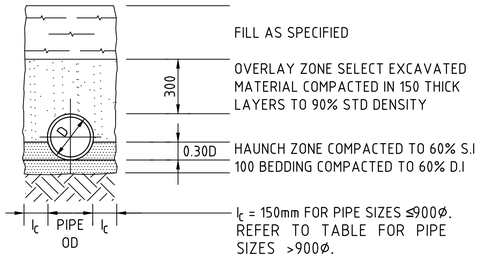
DA2019/1346



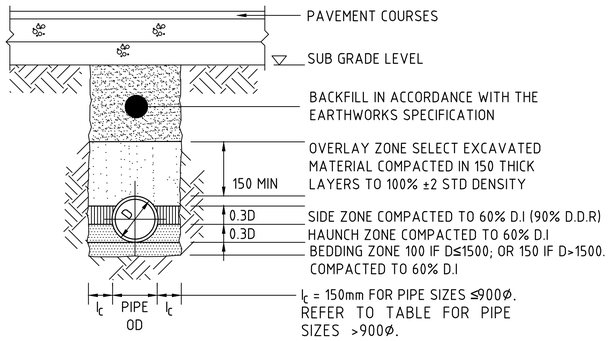
SUPPORT TO AG. DRAIN



SUPPORT TO uPVC PIPES



TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

D≤ 1350, MAX FILL = 4.0m
D> 1350, MAX FILL = 3.0m

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
19	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
75	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

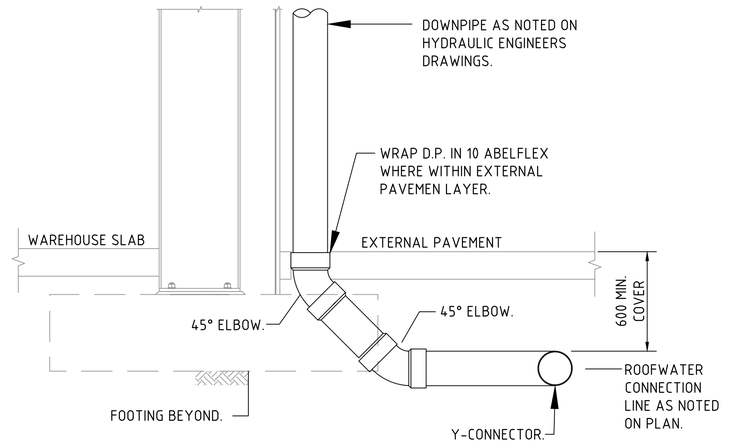
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

SIDE ZONE WIDTH	
PIPE SIZE	l_c (mm)
≤900ø	150
1050ø	175
1200ø	200
1350ø	225
1500ø	250
1650ø	275
1800ø	300

REFER TO ENGINEER FOR TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800ø

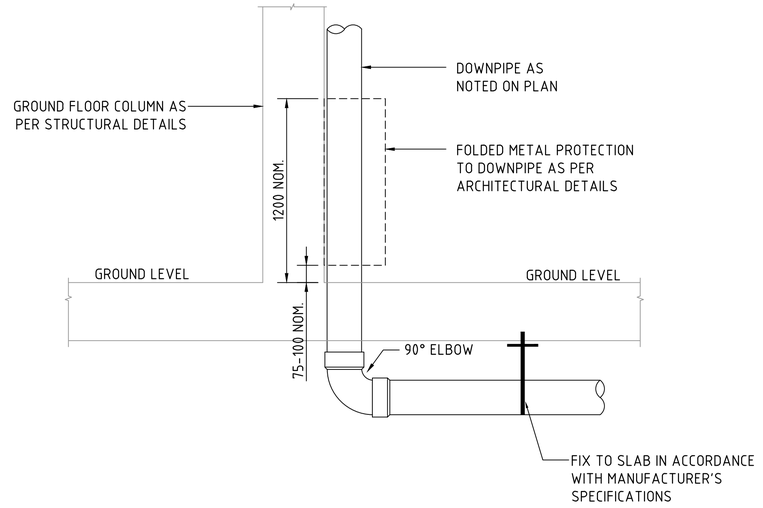
PIPE LAYING DETAILS

SCALE 1:20



DOWNPIPE TURN-UP DETAIL

(CLEAR OF FOOTING)
SCALE 1:20



DOWNPIPE TURN-UP DETAIL

(AT COLUMN LOCATION)
SCALE 1:20

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

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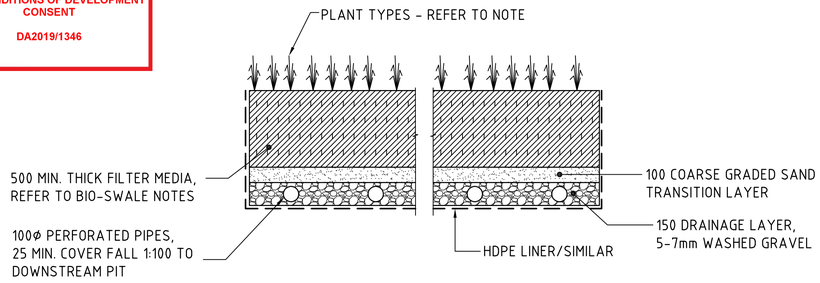
DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 2

DRAWING No C013674.01-DA46

ISSUE B

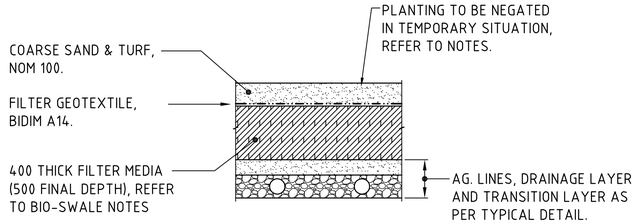
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DA2019/1346



TYPICAL BIO-RETENTION DETAIL

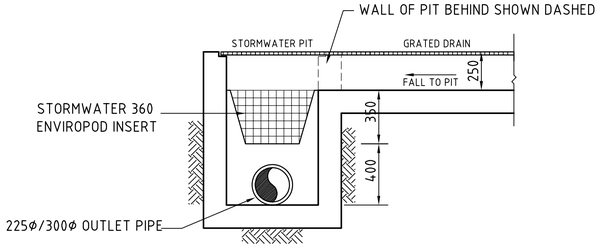
SCALE 1:20



TEMPORARY BIO-RETENTION PROTECTION DETAIL

SCALE 1:20

TEMPORARY CONSTRUCTION REQUIREMENT DETAIL - REFER TO NOTES FOR IMPLEMENTATION PERIODS.



GRATED DRAIN/STORMWATER PIT WITH ENVIROPOD CONFIGURATION

SCALE 1:20

BIO-RETENTION NOTES:

FILTER MEDIA TO BE LOAMY SAND WITH A PERMEABILITY NOT LESS THAN 200mm/hr. FILTER MEDIA TO BE FREE OF RUBBISH, DELETERIOUS MATERIAL, TOXICANTS, DECLARED PLANTS AND LOCAL WEEDS, AND IS TO NOT BE HYDROPHOBIC.

FILTER MEDIA TO HAVE THE FOLLOWING COMPOSITION RANGE:

CLAY & SILT (<0.05mm)	<3%
VERY FINE SAND (0.05-0.15mm)	5-30%
FINE SAND (0.15-0.25mm)	10-30%
MEDIUM TO COARSE SAND (0.25-1.00mm)	40-60%
COARSE SAND (1.0-2.0mm)	7-10%
FINE GRAVEL (2.0-3.4mm)	<3%

FILTER MEDIA THAT DOES NOT MEET THE FOLLOWING CRITERIA SHALL BE REJECTED:

a. ORGANIC MATTER CONTENT TO BE IDEALLY WITHIN 1% TO 3% (W/W) AND TO BE NO GREATER THAN 5%(W/W).
b. PH TO BE BETWEEN 5.5 AND 7.5
c. PHOSPHOROUS CONTENT TO BE NO GREATER THAN 35mg/kg

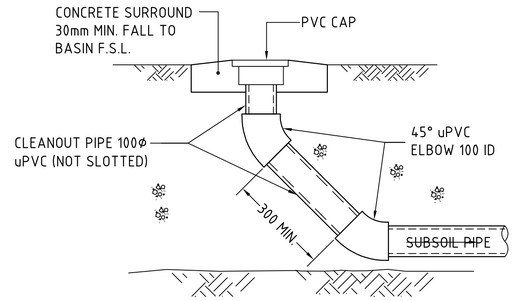
FILTER MEDIA TO BE ASSESSED BY QUALIFIED HORTICULTURALIST TO ENSURE CAPABILITY OF SUPPORTING PLANT LIFE.

DRAINAGE LAYER TO BE CLEAN GRAVEL 5-7mm.

PLANTS TO BE IN ACCORDANCE WITH NORTHERN BEACHES CITY COUNCIL REQUIREMENTS.

PROVIDE 100mm TOPSOIL AND TEMPORARY EROSION PROTECTION (JUTEMASTER OR EQUIV) TO SWALE BATTER SLOPES AND ADJACENT LANDSCAPED AREAS. NOTE THAT NO TOPSOIL IS TO BE PLACED OVER FILTRATION MEDIA. PROVIDE SILT FENCE TO TOP OF BANK UNTIL SUCH TIME AS THIS STABILISING AND VEGETATION HAS BEEN COMPLETED.

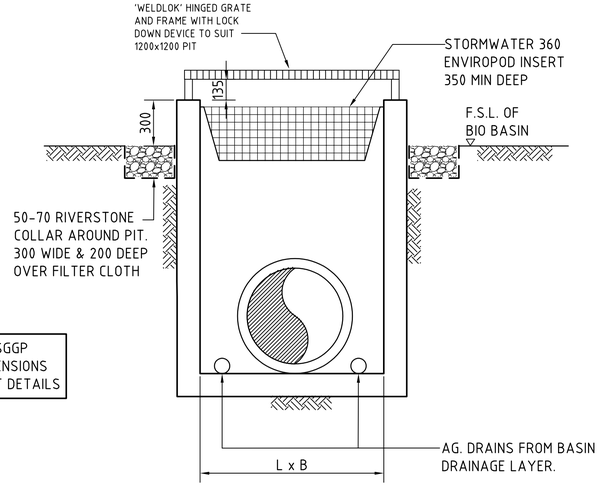
BIO-RETENTION TO BE PARTIALLY INSTALLED, FOLLOWING COMPLETION OF THE ROAD, WITH THE TOP 75-100mm OF FILTER MEDIA REPLACED WITH A FINE TO COARSE SAND UNDERLAIN WITH A GEOTEXTILE LAYER (REFER TO DETAIL). FOLLOWING COMPLETION OF THE UPSTREAM DEVELOPMENT AND SITE STABILISATION, THE SAND IS TO BE REMOVED, REPLACED WITH FILTER MATERIAL AND PLANTED OUT. REFER TO TEMPORARY BIO-BASIN DETAIL



BIORETENTION CLEANOUT EYE ELEVATION

SCALE 1:20

DENOTED C.E. ON PLAN



REFER TO TYPICAL SGGP DETAIL FOR PIT DIMENSIONS AND REINFORCEMENT DETAILS

SECTION

SCALE 1:20

BASIN INLET PIT - BIP

BIO-RETENTION BASIN DETAILS

SCALE 1:20

FOR DEVELOPMENT APPLICATION

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

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DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 3

DRAWING No C013674.01-DA47

ISSUE B

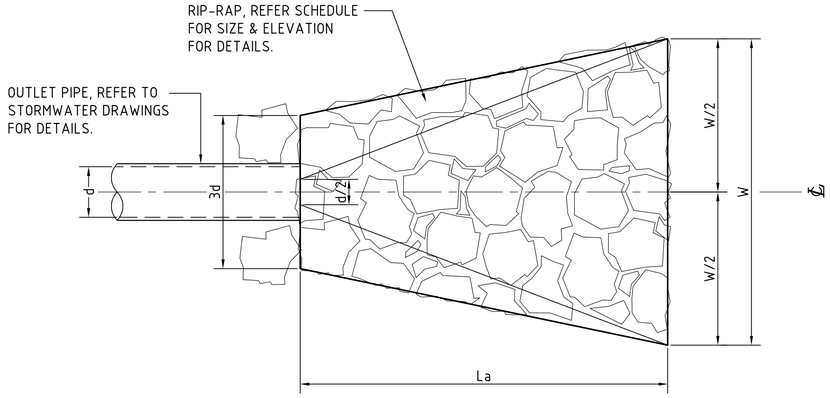
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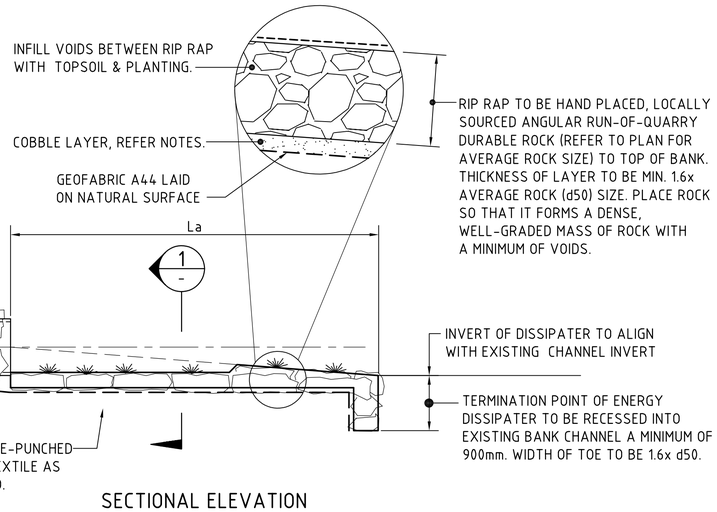
DA2019/1346

DISSIPATER NOTES :

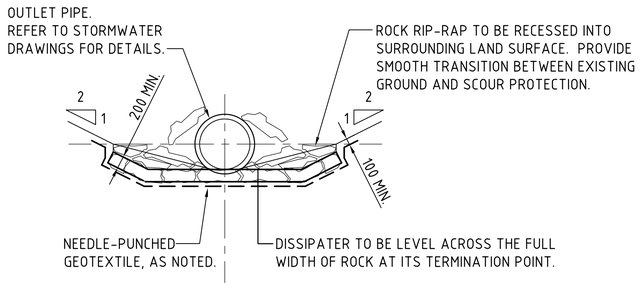
1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50= 150mm MINIMUM) AS NOTED ON THE PLAN. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 1.6x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.



PLAN



SECTIONAL ELEVATION



SECTION 1:50 (1/-)

STORMWATER OUTLET DISSIPATER

SCALE 1:50

500mm 0 1 2 3 4 5m

SCALE 1:50 AT A1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	A
AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

CONSULT AUSTRALIA

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA48

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DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 4

DRAWING No C013674.01-DA48

ISSUE A

northern beaches council

THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT
DA2019/1346

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY SURVEYORS TITLED 05384 001DT DATED 21/06/2018.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W x 200D U.N.O.)
- EXISTING SEWER MAIN
- 50.00 FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF WATERWAY TO BE REINSTATED. REMOVE EXISTING CULVERTS & PAVEMENT AND CONSTRUCT WATERWAY.

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF EXISTING WATERWAY

PROVIDE BATTERS TO TOP EXISTING WATERWAY

PROVIDE BATTERS TO TOP OF REINSTATED WATERWAY. MAX. 1V:3H.

RETAINING WALL 2
HEIGHT = 4.2m MAX.
LENGTH = 76m APPROX.

END OF WALL 1

START OF WALL 2

START OF WALL 3

END OF WALL 2

END OF WALL 3

2 DA55

1 DA55

PROPOSED BUILDING
FFL 17.30

PROVIDE MAX. 1V:3H BATTER TO TOP OF WALL WITH BERMS AT TOP & BOTTOM

RETAINING WALL 3
HEIGHT = 1.5 MAX.
LENGTH = 74m APPROX.

STORMWATER MANAGEMENT BASIN
REFER TO DRAWING DA41 FOR DETAILS

RETAINING WALL 1
HEIGHT = 6.0m MAX.
LENGTH = 170m APPROX.
REINFORCED EARTH WALL.

RETAINING WALL 4
REFER TO DRAWING DA52 FOR DETAILS

PROPOSED BUILDING
FFL 17.30

EXISTING BUILDING
FFL 18.29

START OF WALL 1

PROVIDE MAX. 1V:3H BATTERS WITH BERMS AT TOP & BOTTOM. TYPICAL

ORLANDO ROAD

INMAN ROAD

SOUTH CREEK ROAD

SITE BOUNDARY

FINISHED LEVELS PLAN - GROUND FLOOR

1:500 SCALE

5m 0 10 20 30 40 50m

1:500 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
ISSUED FOR INFORMATION ONLY	01.11.19	A

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21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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DRAWING TITLE
FINISHED LEVELS PLAN
GROUND FLOOR

DRAWING No C013674.01-DA51

ISSUE B

northern beaches council

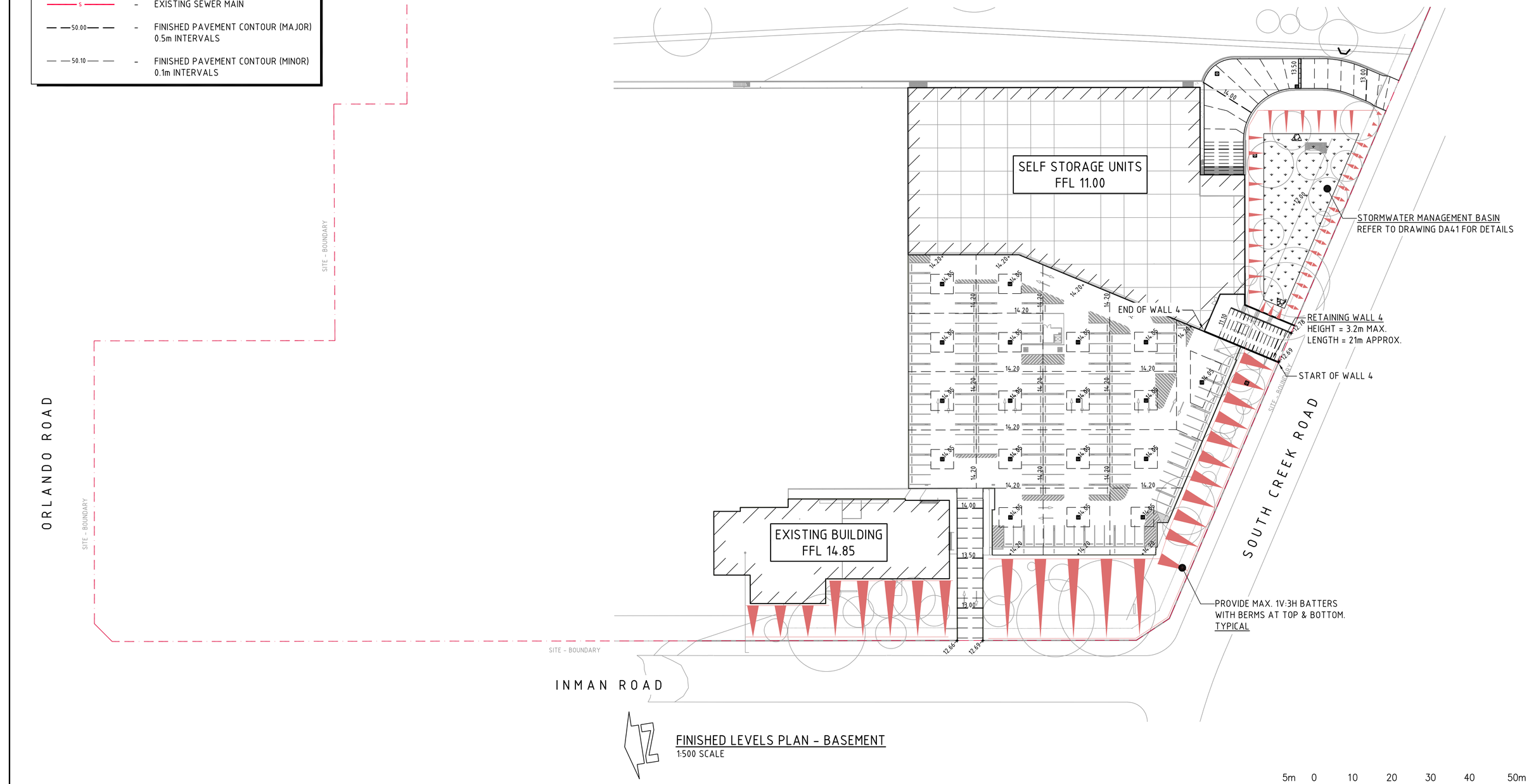
THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

LEGEND:

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- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W x 200D U.N.O.)
- S — EXISTING SEWER MAIN
- 50.00 — FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 — FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS



FINISHED LEVELS PLAN - BASEMENT
1:500 SCALE

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
ISSUED FOR INFORMATION ONLY	01.11.19	A

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SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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DRAWING TITLE
FINISHED LEVELS PLAN
BASEMENT

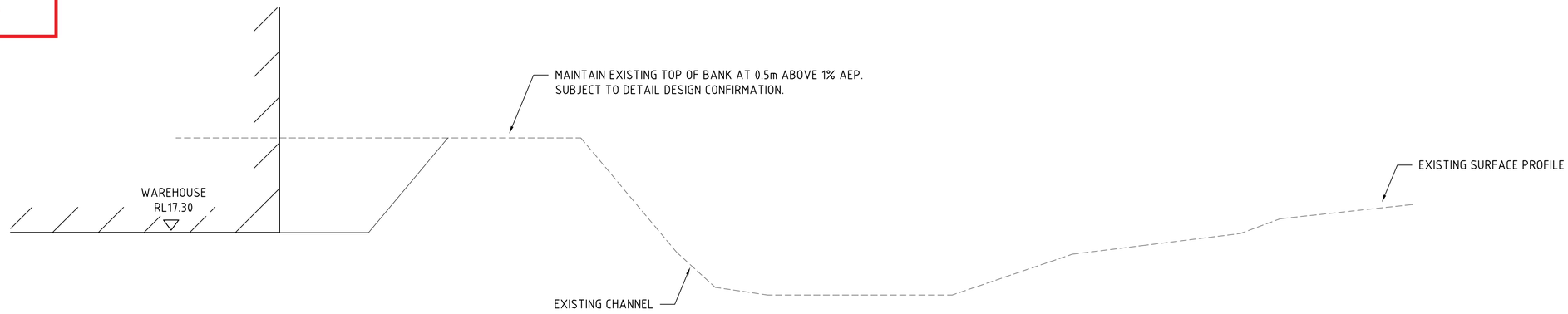
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ISSUE B

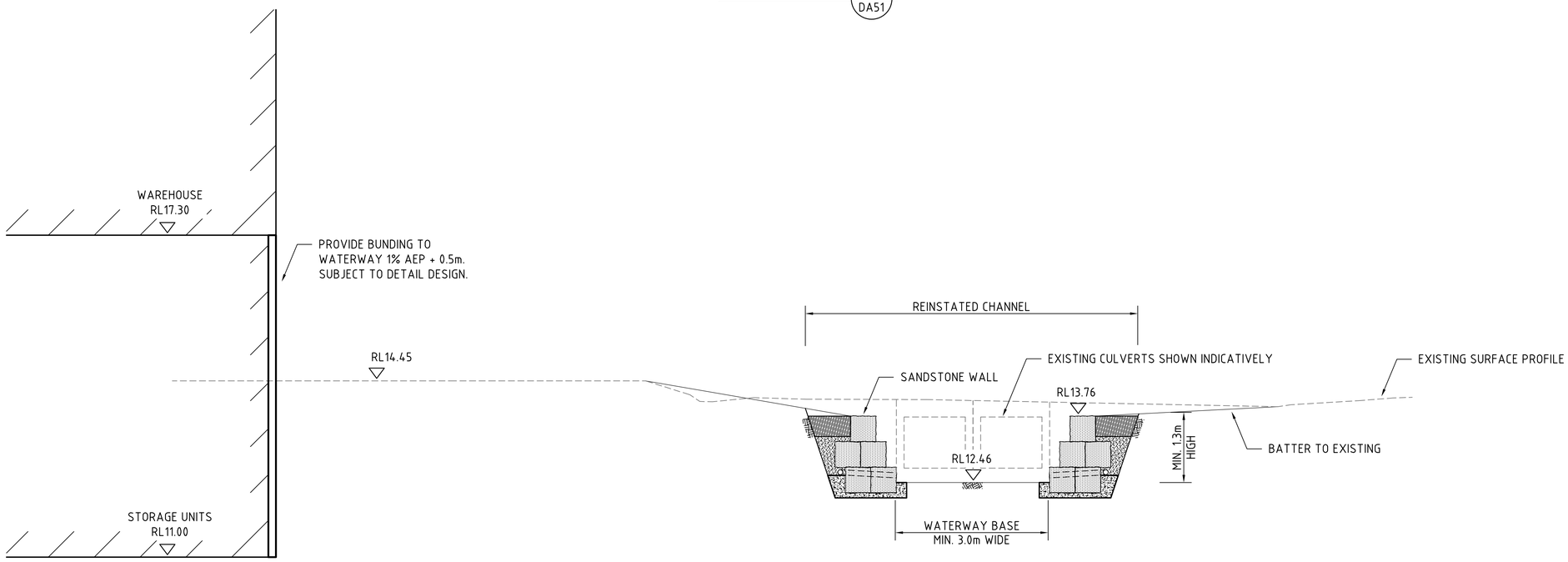
northern beaches council

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DA2019/1346



SECTION 1:50 — 2 / DA51



SECTION 1:50 — 1 / DA51

500mm 0 1 2 3 4 5m
1:50 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	A
AMENDMENTS	DATE	ISSUE

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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

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TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA55

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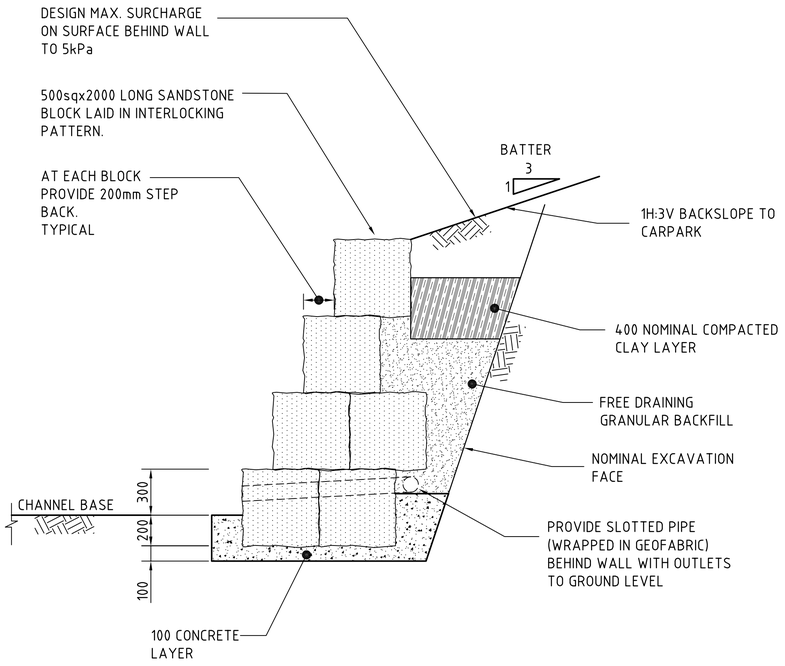
DRAWING TITLE
TYPICAL SECTIONS

DRAWING No C013674.01-DA55

ISSUE A

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DA2019/1346



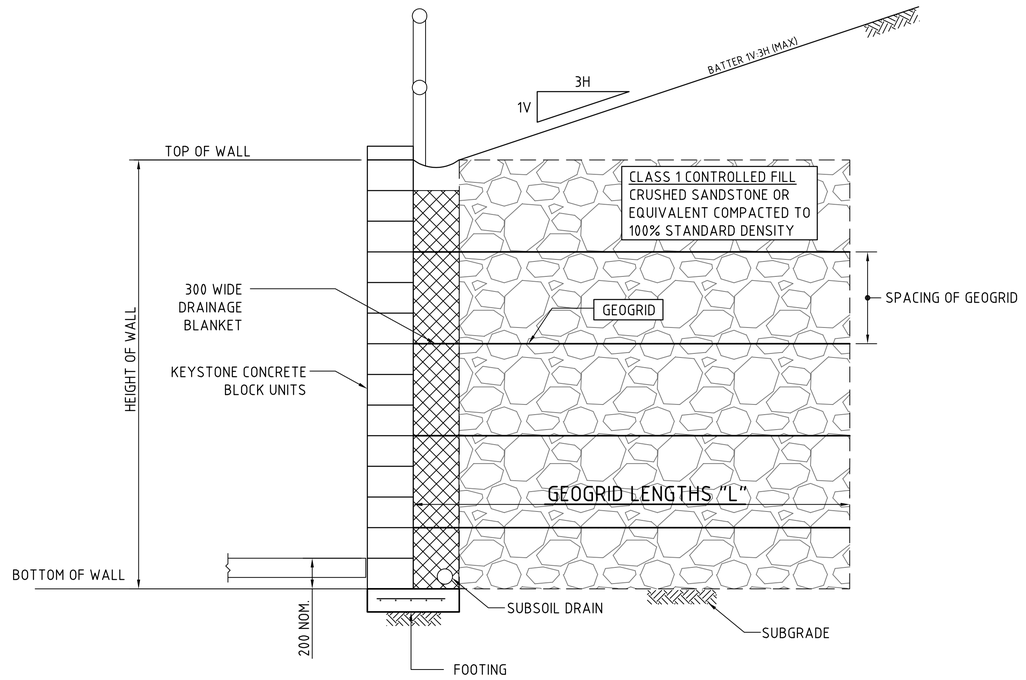
SANDSTONE WALL DETAIL

SCALE 1:20

NOTE:

BASED ON 500x500x2000 LONG STANDARD CUT SANDSTONE BLOCKS LAID IN INTERLOCKING BRICK PATTERN:

- FIRST TWO COURSES TO BE 2xSANDSTONE BLOCKS IN 100 MASS CONCRETE BEDDING.
- THIRD & FOURTH COURSE TO BE 1 SANDSTONE BLOCK.
- STEP EACH SUCCESSIVE COURSES 200mm BACK



REINFORCED EARTH RETAINING WALL

SCALE 1:20

WALL HEIGHT "H"	GEOGRID LENGTH "L"	GEOGRID TYPE
2300	2600	GX50/30
3300	3500	GX50/30
4300	4700	GX50/30
5300	5800	GX50/30
6400	6900	GX50/30
7400	7600	GX50/30

NOTE :
INDICATIVE DETAIL ONLY. DESIGN TO BE CONFIRMED / PROVIDED BY D+C CONTRACTOR.

REINFORCED EARTH RETAINING WALL NOTES:

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH AS4678 AND THE STANDARDS REFERRED TO THEREIN.
2. MINIMUM HEIGHT (H) TO GEOGRID REINFORCEMENT LENGTH (L) TO BE 1.0.
3. MINIMUM BEARING CAPACITY OF FOUNDATION (BASED ON MINIMUM H/L RATIO OF 1.0) TO BE AS FOLLOWS:
   a. H MAX. 2.0m = 100 kPa
   b. H MAX. 3.5m = 150 kPa
   c. H MAX. 5.0m = 200 kPa

   BEFORE COMMENCEMENT OF CONSTRUCTION THE FOUNDATION SHALL BE INSPECTED AND VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER.
4. WHERE MINIMUM BEARING IS NOT ACHIEVABLE OR NOT MEETING DESIGN REQUIREMENT, THE FOUNDATION MATERIAL IS TO BE EXCAVATED AND REPLACED WITH APPROVED MATERIAL PLACED IN ACCORDANCE WITH THE FILLING SPECIFICATION TO A MINIMUM COMPACTION OF 100% SMDD AND PLACED WITHIN 2% OF OMC.
5. MINIMUM SURCHARGE LOADS TO BE APPLIED AS FOLLOWS U.N.O. ON PLAN:
   a. LIVE LOAD = 20 kPa
   b. DEAD LOAD = 5 kPa
   c. CONSTRUCTION TRAFFIC LIVE LOAD = 10 kPa
6. THE GEOGRIDS SHALL BE OF THE TYPE AND INDEX STRENGTH NOMINATED ON THE DRAWINGS. THE MINIMUM GEOGRIDS SHALL BE A SINGLE LENGTH IN THE DIRECTION OF DESIGN TENSION, NOT LAPPED, MAKING PROVISION FOR CONNECTION TO THE FACING ACROSS THE WHOLE WIDTH OF THE FACING AND PROVIDING FOR THE SPECIFIED ANCHORAGE WITHIN THE DESIGNATED ANCHORAGE ZONE. GEOGRIDS SHALL COVER THE WHOLE OF THE PLAN AREA BEHIND THE WALL FOR THE SPECIFIED ANCHORAGE LENGTH AND SHALL BE LAPPED WITH ADJACENT SECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. MINIMUM WALL EMBEDMENT AT THE TOE OF THE WALL TO BE 300mm.
8. DESIGN LIFE OF STRUCTURE IS TO BE 100 YEARS.
9. SELECT BACKFILL MATERIAL WITHIN THE REINFORCED SOIL BLOCK SHALL BE SOUND GRANULAR MATERIAL OF NATURAL OR INDUSTRIAL ORIGIN, NON-EXPANSIVE, FREE FROM ORGANIC OR OTHER DELETERIOUS MATERIAL CONFORMING TO THE PHYSICAL, CHEMICAL AND ELECTROCHEMICAL LIMITS AS SPECIFIED AND SHALL NOT BE SUBJECT TO BREAKDOWN UNDER COMPACTION. THE SELECT BACKFILL MATERIAL IS TO HAVE THE FOLLOWING PARAMETERS:
   a. MINIMUM INTERNAL FRICTION, Ø = 34°
   b. EFFECTIVE COHESION, C'= 0 kPa
   c. UNIT WEIGHT = 21 kN/m^3
   d. PH BETWEEN 4 AND 9.
10. SELECT BACKFILL IS TO BE PLACED AND COMPACTED IN LAYERS NOT MORE THAN 300mm (LOOSE). COMPACTION TO NOT LESS THAN 100% SMDD WILL BE ACHIEVED AND MATERIAL PLACED WITHIN 2% OF OMC. DENSITY TESTING SHALL BE PERFORMED IN EACH COMPACTED LIFT IN ACCORDANCE WITH AS3798.
11. PROVIDE A DRAINAGE LAYER DIRECTLY BEHIND THE FACING UNITS IN A MINIMUM 300mm WIDE 12-20mm AGGREGATE LAYER. FACING UNIT VOIDS TO BE FILLED WITH AGGREGATE. PROVIDE 100mm MINIMUM AG. DRAIN IN GEOTEXTILE SOCK AT TOE OF WALL FACING AND CONNECT TO DRAINAGE SYSTEM AT 30m MAX. SPACING.
12. THE NEED FOR A CHIMNEY DRAIN OR DRAINAGE AT THE REAR OF THE MASS SOIL BLOCK IS TO BE CONFIRMED ON SITE BY THE GEOTECHNICAL ENGINEER AND DESIGNER FOLLOWING PREPARATION OF THE FOUNDATION AND PRIOR TO CONSTRUCTION OF THE MASS SOIL BLOCK.
13. CONSTRUCTION EQUIPMENT WEIGHING MORE THAN 500kG STATIC WEIGHT IS TO BE KEPT BACK 1.5m FROM THE REAR FACE OF THE WALL FACING UNITS. COMPACTION OF THE SELECT FILL MATERIAL WITHIN THE 1.5m STRIP ADJACENT TO THE WALL SHALL BE ACHIEVED BY LIGHT MECHANICAL TAMPERS (VIBRATING PLATE, TRENCH COMPACTOR OR SIMILAR) TO GIVE THE SAME DENSITY AS IN THE REMAINDER OF THE SELECT FILL.
14. ALL DESIGN AND CONSTRUCT WALL SYSTEM TO BE COMPLETED IN ACCORDANCE WITH THESE NOTES.

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	A
AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

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DRAWING TITLE
RETAINING WALL DETAILS

DRAWING No C013674.01-DA65

ISSUE A

WILLOW TREE PLANNING

Appendix 2

Updated Architectural Plans

EG - PROPOSED INDUSTRIAL BUILDING

100 SOUTH CREEK ROAD, CROMER, NSW 2099

ISSUE FOR SECTION 4.55 APPLICATION

DRAWING LIST S4.55	
Sheet Number	Sheet Name
S4.55-000	COVERPAGE
S4.55-202	GROUND FLOOR PLAN
S4.55-203	BASEMENT PLAN
S4.55-302	ELEVATIONS 2
S4.55-305	SECTIONS
S4.55-306	SECTIONS 2



SECTION 4.55 **PRELIMINARY**

SBA ARCHITECTS
Commercial Industrial Residential Retail Interior Design
Phone: 02 9929 9988 Web: www.sbaarch.com.au

#	DESCRIPTION	DATE
4	ISSUE FOR S4.55 SUBMISSION	12/10/2020
3	ISSUE FOR S4.55 SUBMISSION	08/10/2020
2	ISSUE FOR S4.55 SUBMISSION	25/09/2020
1	ISSUE FOR S4.55 SUBMISSION	17/09/2020

CLIENT EG

NORTHERN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

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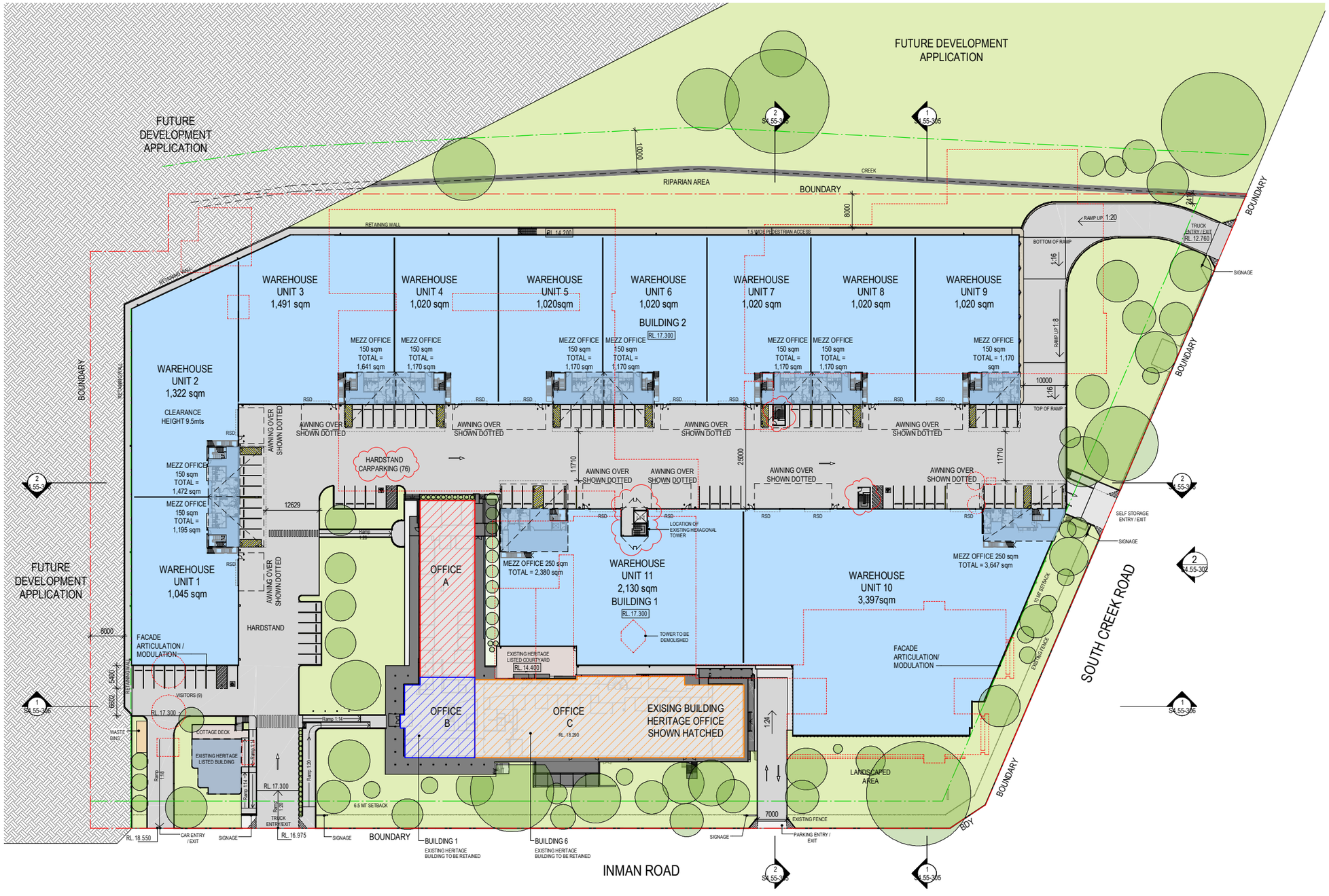
TITLE COVERPAGE

DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	As indicated @ A1	19110	S4.55-000	4

EG

DEMOLITION LEGEND:

WALL TO BE DEMOLISH



1 GROUND LEVEL 1 : 500

AREA SCHEDULE

SITE AREA		37,031 sq.m
UNIT 1	WAREHOUSE	1,045 sq.m
	MEZZ 1	150 sq.m
UNIT 2	WAREHOUSE	1,322 sq.m
	MEZZ 2	150 sq.m
UNIT 3	WAREHOUSE	1,491 sq.m
	MEZZ 3	150 sq.m
UNIT 4	WAREHOUSE	1,020 sq.m
	MEZZ 4	150 sq.m
UNIT 5	WAREHOUSE	1,020 sq.m
	MEZZ 5	150 sq.m
UNIT 6	WAREHOUSE	1,020 sq.m
	MEZZ 6	150 sq.m
UNIT 7	WAREHOUSE	1,020 sq.m
	MEZZ 7	150 sq.m
UNIT 8	WAREHOUSE	1,020 sq.m
	MEZZ 8	150 sq.m
UNIT 9	WAREHOUSE	1,020 sq.m
	MEZZ 9	150 sq.m
UNIT 10	WAREHOUSE	3,397 sq.m
	MEZZ 10	250 sq.m
UNIT 11	WAREHOUSE	2,130 sq.m
	MEZZ 11	250 sq.m
TOTAL WH. AREA		15,501 sq.m
TOTAL MZZ. OFFICE AREA		1,850 sq.m
HERITAGE OFFICE		
OFFICE UNIT A		570 sq.m
GF - OFFICE UNIT B		309 sq.m
LV1 - OFFICE UNIT B		401 sq.m
LV-1 - OFFICE UNIT C		775 sq.m
GF - OFFICE UNIT C		1,124 sq.m
TOTAL HERITAGE OFFICE AREA		3,179 sq.m
EXISTING COTTAGE		124 sq.m
SELF STORAGE FACILITY		7,000 sq.m
HARDSTAND		5,621 sq.m
TOTAL GFA (excludes basement carpark)		27,654 sq.m
CARPARKING		279 cars
SITE COVERAGE		66%

SECTION 4.55 **PRELIMINARY**

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#	DESCRIPTION	DATE
1	ISSUE FOR S4.55 SUBMISSION	12/10/2020

CLIENT EG

NORTHERN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

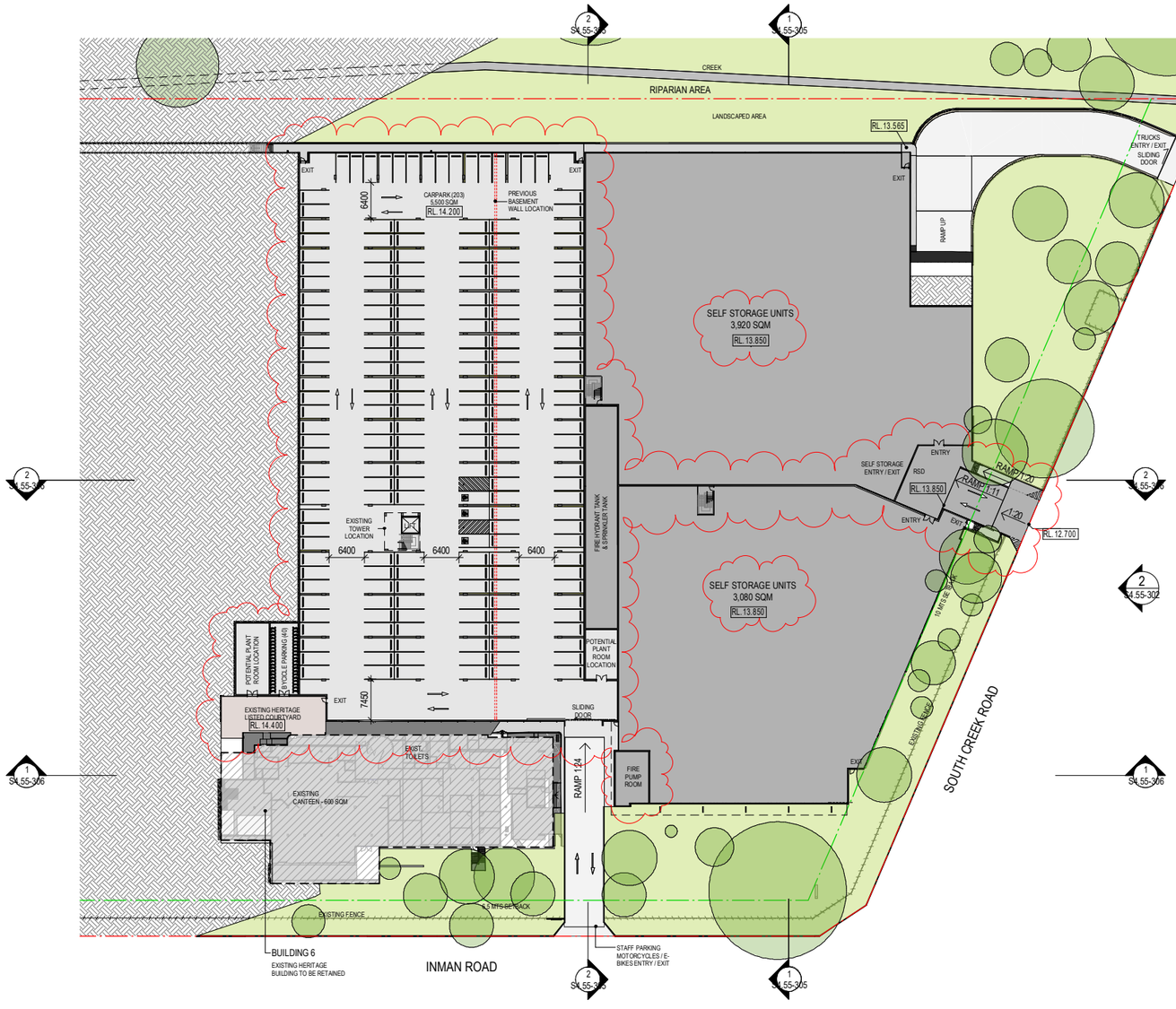
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TITLE GROUND FLOOR PLAN

DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	As indicated @ A1	19110	S4.55-202	1



1 SELF STORAGE LEVEL 1 : 500

SUMMARY OF S4.55 MODIFICATIONS:

-SELF STORAGE UNITS LEVEL RAISED 2.85m (NEW RL: 13.85)
-ACCESS RAMP FROM STH CREEK RD ADJUSTED TO SUIT NEW LEVEL
-SELF STORAGE UNITS AREA INCREASED FROM 3,902 TO 7,000 SQM
-PARKING SPACES PROVIDED ON BASEMENT INCREASED FROM 159 TO 203
-PARKING SPACES PROVIDED ON GROUND FLOOR INCREASED FROM 72 TO 76
-NEW 40 BICYCLES SPACES PROVIDED
-NEW PLANT ROOM PROVIDED
-INCREASED CARPARK AREA AND LAYOUT RECONFIGURATION TO ACCOMMODATE THE ABOVE
-EXISTING TOWER LOCATION AND HERITAGE COURTYARD NOW SHOWN IN PLANS
-LIFT AND STAIRS RELOCATED INTO EXISTING TOWER

SECTION 4.55 **PRELIMINARY**

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#	DESCRIPTION	DATE
4	ISSUE FOR S4.55 SUBMISSION	12/10/2020
3	ISSUE FOR S4.55 SUBMISSION	08/10/2020
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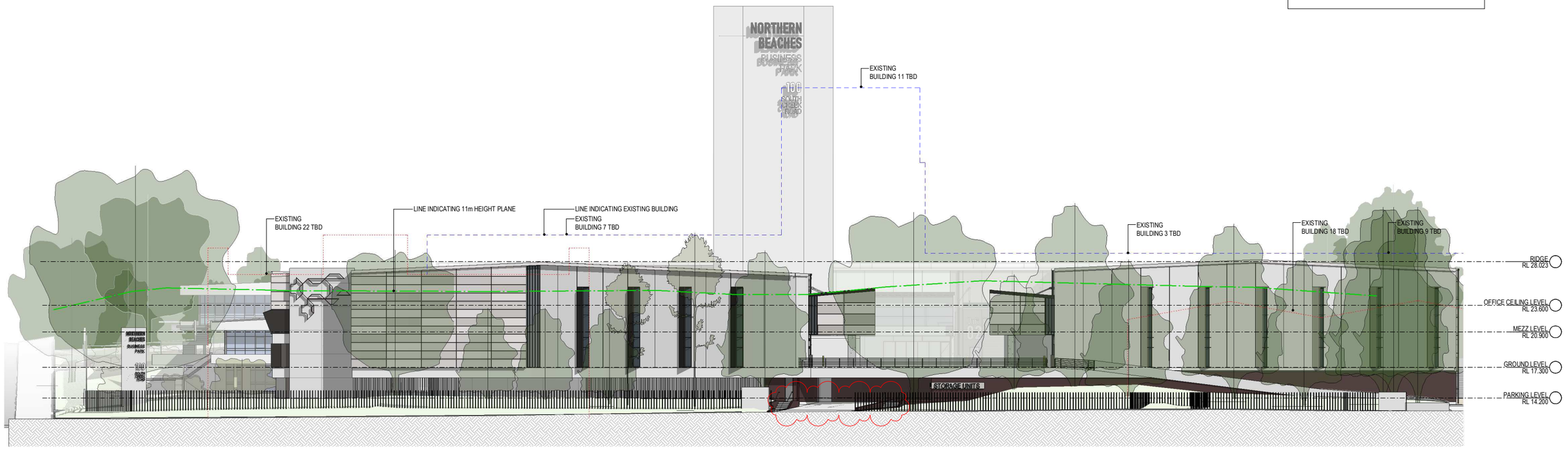
NORTH

TITLE BASEMENT PLAN

DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	1 : 500 @ A1	19110	S4.55-203	4

LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE



2 SOUTH CREEK RD ELEVATION 1 : 200

SECTION 4.55 **PRELIMINARY**

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4	ISSUE FOR S4.55 SUBMISSION	13/10/2020
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2	ISSUE FOR S4.55 SUBMISSION	25/09/2020
1	ISSUE FOR S4.55 SUBMISSION	17/09/2020

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NORTHERN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

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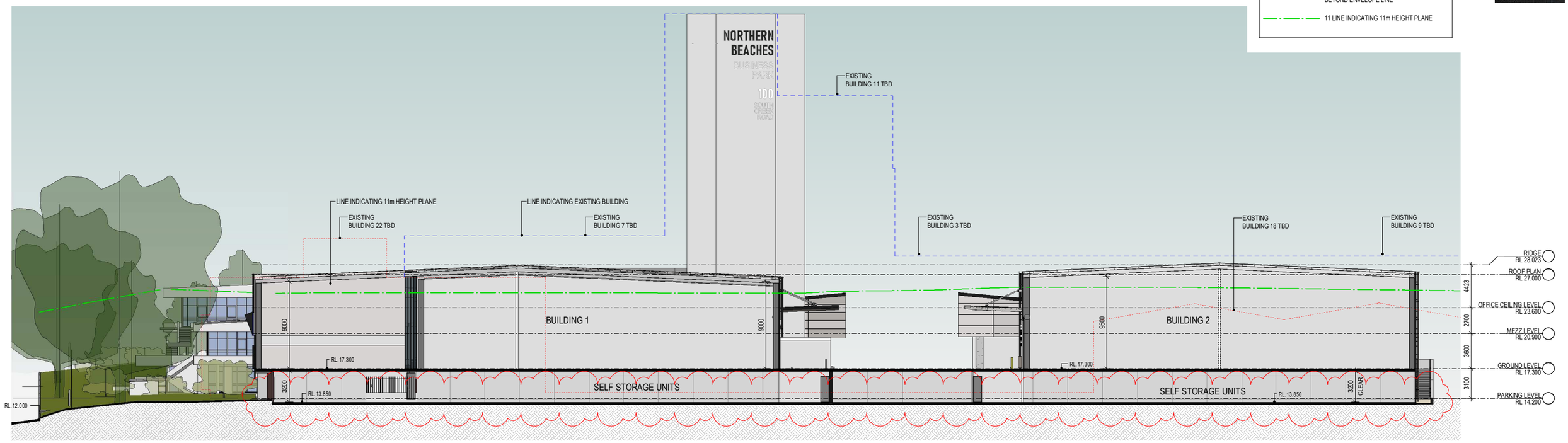
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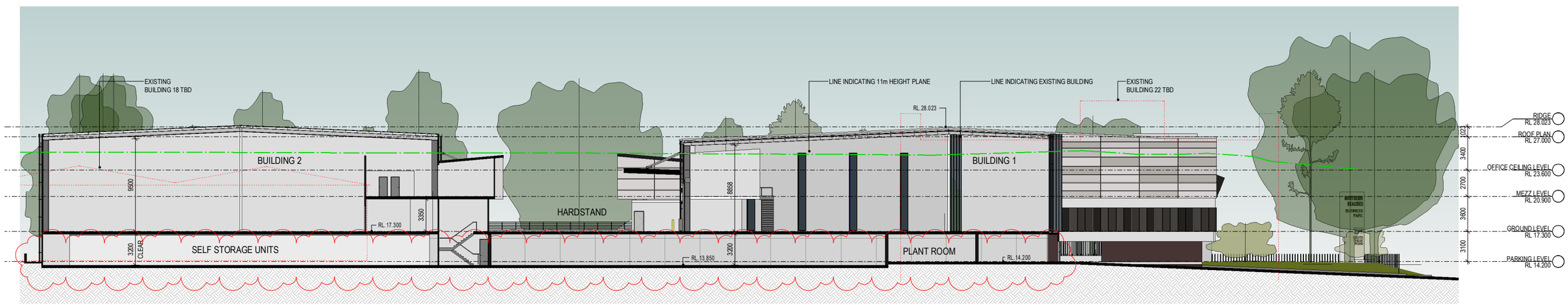
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LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE



1 Section A 1 : 200



2 Section B 1 : 200

SECTION 4.55 **PRELIMINARY**

SBA ARCHITECTS
Commercial Industrial Residential Retail Interior Design
Phone: 02 9929 9988 Web: www.sbaarch.com.au

#	DESCRIPTION	DATE
4	ISSUE FOR S4.55 SUBMISSION	12/10/2020
3	ISSUE FOR S4.55 SUBMISSION	08/10/2020
2	ISSUE FOR S4.55 SUBMISSION	25/09/2020
1	ISSUE FOR S4.55 SUBMISSION	17/09/2020

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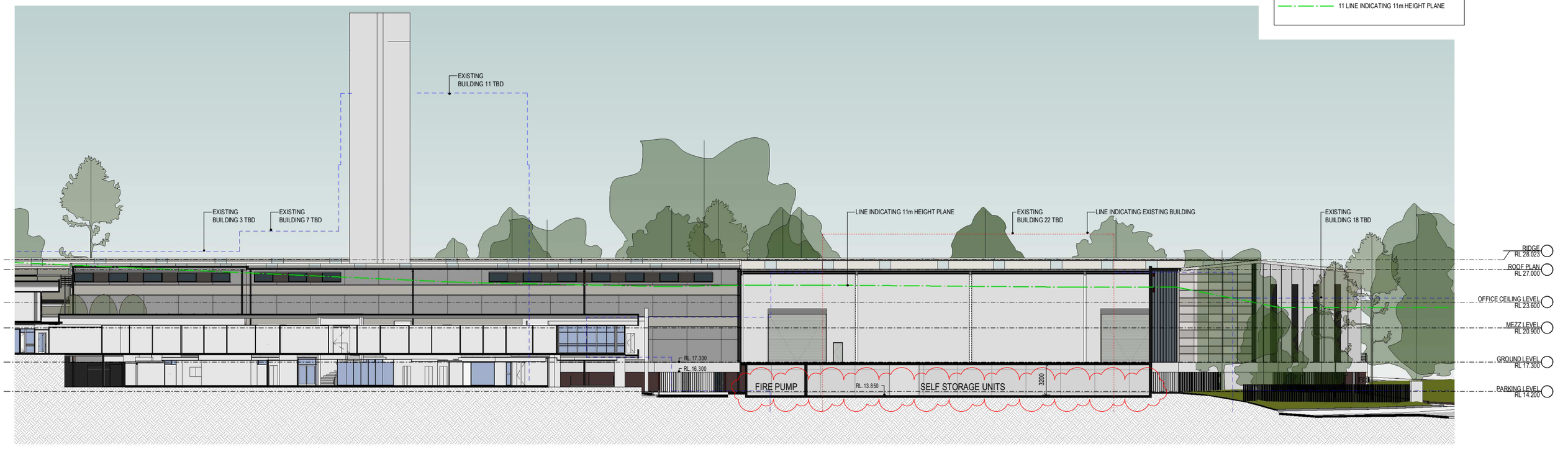
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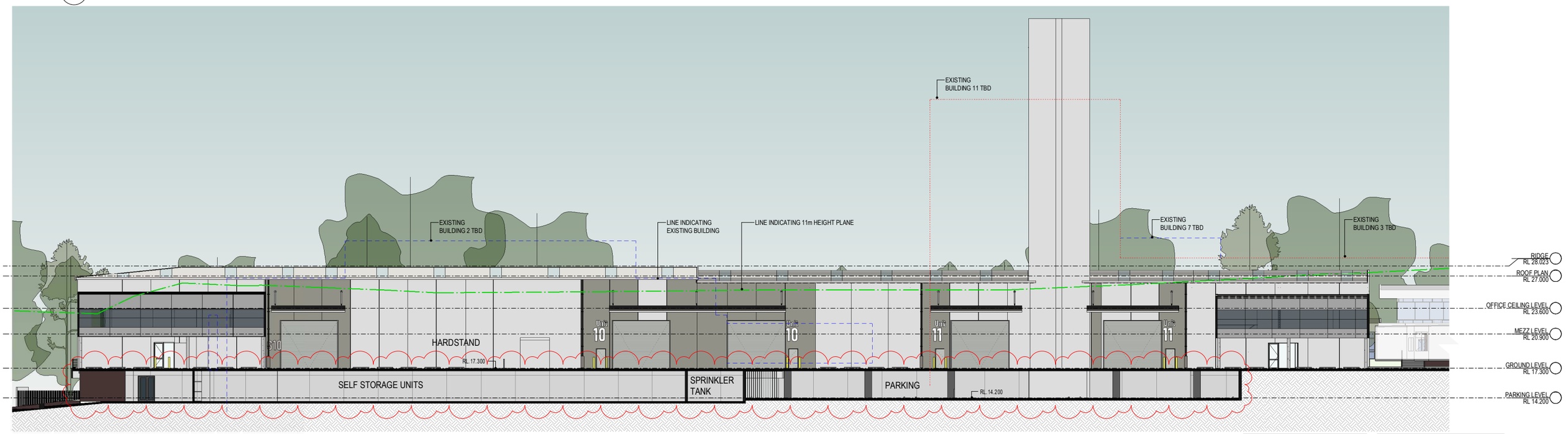
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2 Section D 1 : 200

SECTION 4.55 **PRELIMINARY**

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WILLOW TREE PLANNING

Appendix 3

Updated Civil Engineering Plans and Report

A national town planning consultancy
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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

CIVIL ENGINEERING REPORT FOR DEVELOPMENT APPLICATION

PROPOSED DEVELOPMENT AT 100 SOUTH CREEK ROAD CROMER

Prepared For:
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***Rev*: B**

DOCUMENT VERIFICATION

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Document Title	Civil Engineering Report for Development Application
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Client Contact	Mr Grant Flannigan, EG Funds Management Pty Ltd

	Name	**Signature**
Prepared by	Darcy Medway	
Reviewed by	Mark Wilson	
Issued by	Thilini Wagasooriya	
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1 INTRODUCTION

1.1 Introduction

EG Funds Management Pty Ltd proposes to develop 100 South Creek Road, Cromer, NSW as a warehouse & distribution facility. The site consists of a total area of 7.47Ha approximately and is currently developed. The proposed development consists of an approximate area of 4.45Ha.

1.2 Scope

Costin Roe Consulting Pty Ltd has been commissioned by EG Funds Management Pty Ltd to prepare this Engineering Report in support of the proposed Development Application for the site.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Earthworks & Retaining Walls;
- Stormwater Management; and
- Erosion Control.

The engineering objectives for the development are to create a site which, based on the proposed architectural layout, responds to the topography and site constraints and to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design and is consistent with the requirements of council's water quality objectives.

A set of drawings have been prepared to show the proposed finished levels, retaining walls, stormwater drainage and water quality requirements for the development. These drawings are conceptual only and subject to change during detail design.

1.3 Authority Jurisdiction

The site is located within the Northern Beaches Council area and the requirements of the former *Warringah DCP 2011* and *PL 850 WATER – Water Management Policy* apply.

2 DEVELOPMENT SITE

2.1 Location

The proposed development is located in the suburb of Cromer, at the intersection of Inman Road and South Creek Road as shown in **Figure 2.1**.

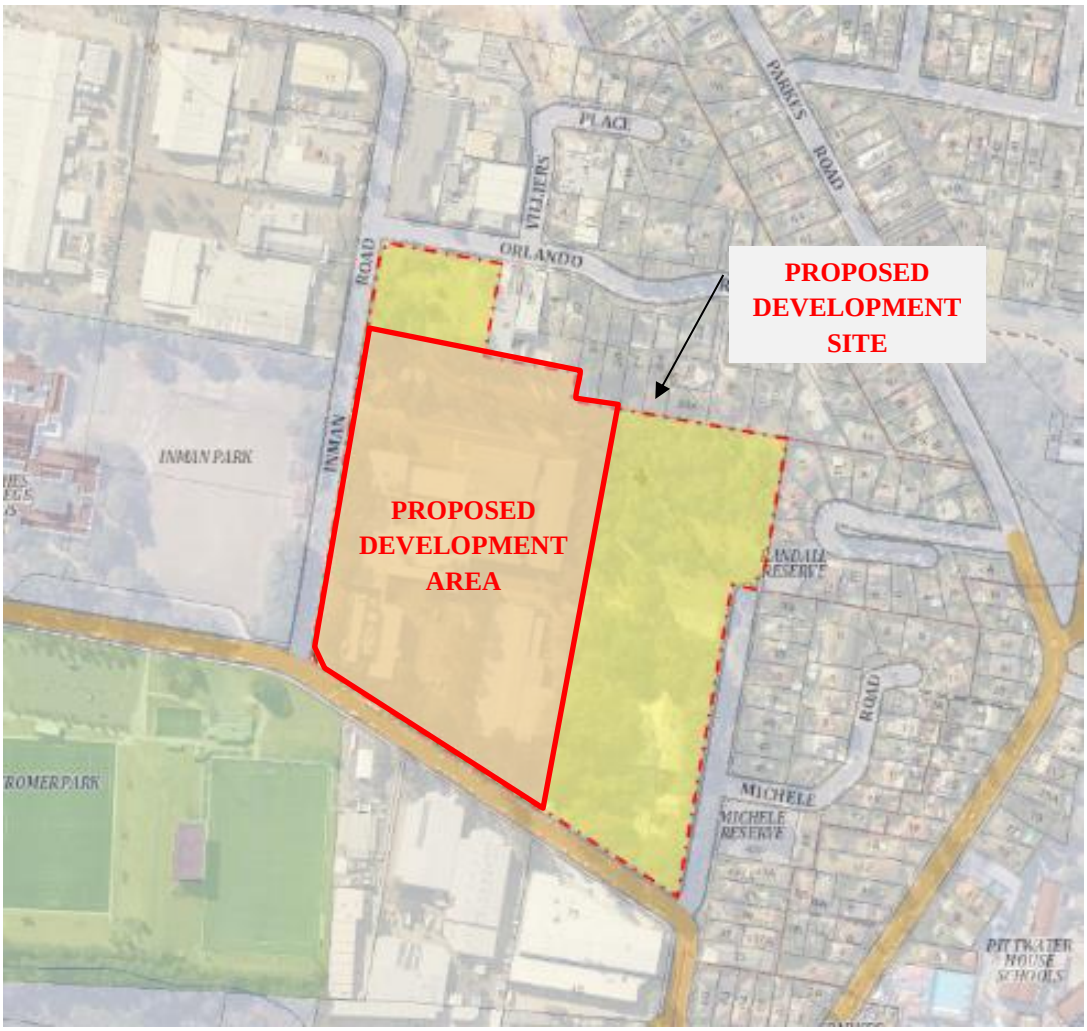


Figure 2.1. Locality Map (Source: SIX Maps 2019)

2.2 Existing Site

The site, being Lot 1 DP1220196, encompasses a total area of 7.47 Ha. The proposed development is estimated to consist of an area of 4.45Ha.

The site is bounded by Orlando Road on the north, South Creek on the south, Inman Road on the west and Campbell Avenue and existing residential and commercial lots to the east.

The site is currently developed with multiple industrial building and car parking facilities. It is noted that there is existing heritage listed buildings located to the west of the site and a heritage listed tower. There is an existing open channel and culvert system running from the north to the south along the eastern extent of the development area draining an upstream urban catchment through the property.

Falls over the site are generally from north to south. The highest level on the site is at RL29.5m AHD at the north- eastern corner, directly adjacent to Orlando Road. The lowest level is located at the south- western corner of the site, at the intersection of Inman Road and South Creek Road, at RL11.8m AHD.

2.3 Proposed Development

The total development area does not encompass the whole site. It is bounded by the existing eastern channel, a portion of the western boundary and the northern and southern boundaries. However, the development area does not comprise of the north-western portion of the site.

The proposed development is for a multi-level warehouse, office and storage facility. The development layout is based on the architectural layout by SBA Architects as shown in **Figures 2.2** & **2.3**.

The proposed warehouse buildings consist of 11 warehouse units with a total area of 15,489m^2 and encompasses a suspended portion. Suspended offices are also proposed at each warehouse unit and consists of a total area of 1,850m^2. Basement level car parking areas and self- storage units are proposed in the southern portion of the development area. Truck loading/ circulation areas are provided from Inman Road and South Creek Road and through the central hardstand. The existing heritage listed buildings are proposed to be utilised as offices and a café.

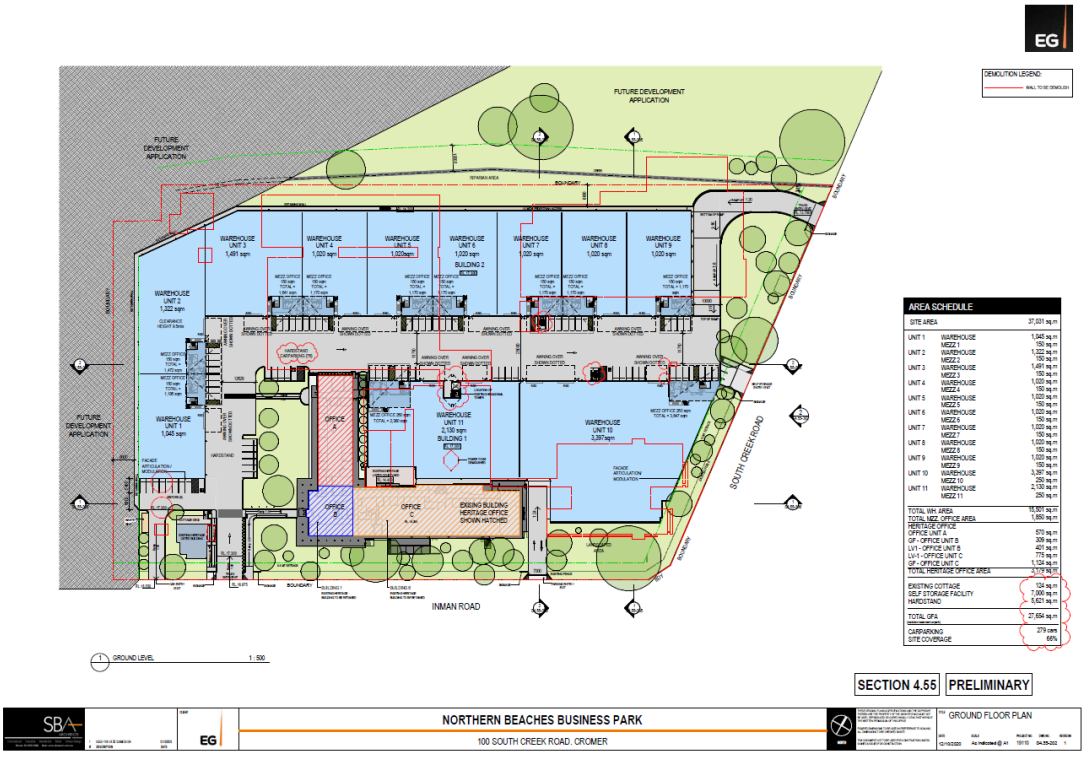


Figure 2.2. Development Layout – Ground Floor

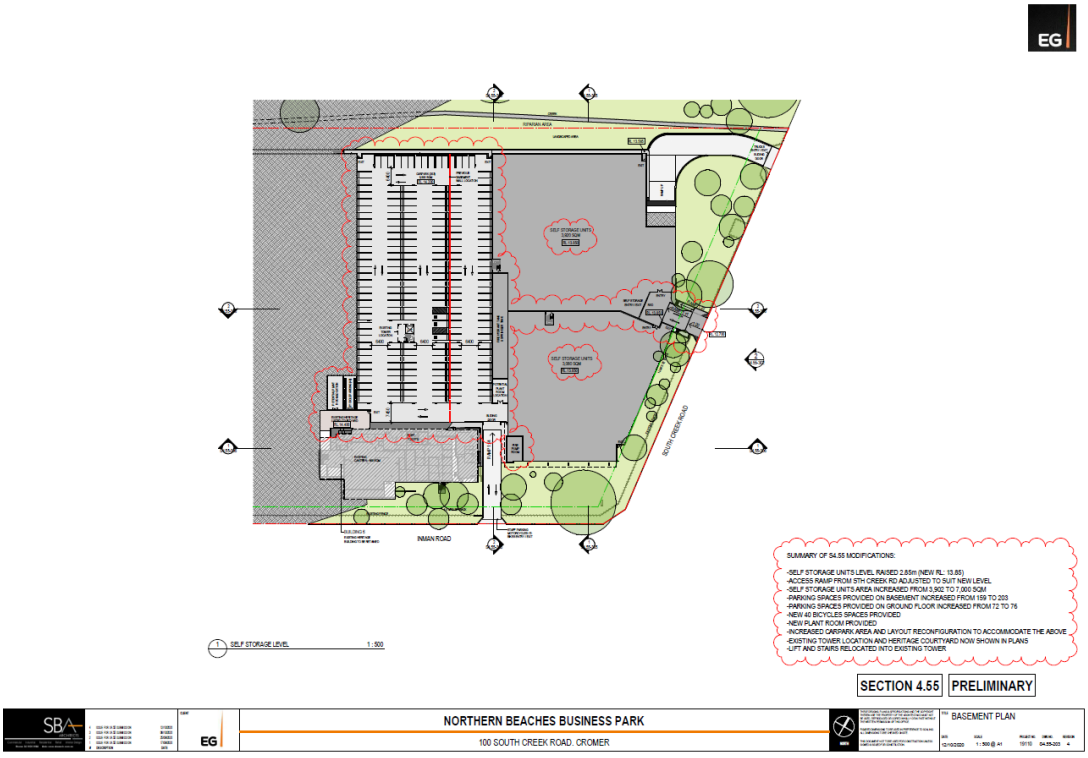


Figure 2.3. Development Layout – Basement Floor

3 SITE WORKS

3.1 Bulk Earthworks & Retaining Walls

Earthworks will be required through the site to facilitate the construction of the new warehouse and self-storage units and the basement car parking area. The final levels over the site will be subject to detailed earthworks modelling and volume. The existing and proposed levels are shown on the Costin Roe drawings in **Appendix A**.

Soil Erosion and Sediment Control measures including sedimentation basins area to be provided during the construction phase in accordance with the approved drawings and the Soil and Water Management Plan in **Section 5** of this report.

3.2 Embankment Stability

To assist in maintaining embankment stability permanent batters' slopes will be no steeper than 3- horizontal to 1- vertical while temporary batters will be no steeper than 2- horizontal to 1- vertical.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 5** of this report.

3.3 Supervision of Earthworks

All geotechnical testing and inspections performed during the filling operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-1996.

3.4 Retaining Walls

The civil engineering objective is to minimise retaining walls within the constraints of the architectural layout and allowable grading (as per AS2890.1 and AS2890.2) through paved areas and batters in landscaped areas.

Given the existing falls and nature of the industrial development, retaining walls will be required. Where possible, landscaped batters are proposed to limit and reduce retaining wall construction.

Location and indicative heights of retaining walls are shown on drawing **Co13674.01-DA50** in **Appendix A**.

4 STORMWATER MANAGEMENT

4.1 Hydrologic Modelling and Analysis

4.1.1 General Design Principles

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Northern Beaches Council and accepted engineering practice.

Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.

Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1987 Edition), Volumes 1 and 2 (AR&R).

Storm events for the 5, 20- & 100-Year ARI event have been assessed.

4.1.2 Minor/ Major System Design

The piped stormwater drainage (minor) system has been designed to accommodate the 20-year ARI storm event (Q20). Overland flow paths (major) which will convey all stormwater runoff up to and including the Q100 event have also been provided which will limit major property damage and any risk to the public in the event of a piped system failure.

4.1.3 Rainfall Data

Rainfall intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling for the 5 to 100 Year ARI events, was taken from Northern Beaches Council *On-site Stormwater Detention Technical Specification*.

4.1.4 Runoff Models

In accordance with the recommendations and standards of Northern Beaches Council, the calculation of the runoff from storms of the design ARI has been calculated with the catchment modelling software DRAINS.

The design parameters for the DRAINS model are to be based on the recommendations as defined by Northern Beaches Council and parameters for the area and are as follows:

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	ARR87	
	Soil Type	2.5	
	Paved (Impervious) Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition	3.0	

Table 4.1: DRAINS Parameters

4.2 Hydraulics

4.2.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

4.2.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground/grate level, for the peak runoff from the Minor System runoff.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 300mm below the finished floor level of the building.

4.2.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

4.2.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

4.2.5 Overland Flow

Dedicated flow paths have been designed to convey all storms up to and including the 100-year ARI. These flow paths will convey stormwater from the site to the estate road system and to the regional water quality/ detention basin.

4.3 Site Drainage

4.3.1 Existing Site Drainage

The property is currently developed with in-ground drainage throughout the site. The site has an existing culvert and an open channel trunk drainage system which runs along the east from the north to the south. Upstream flows discharge into the channel at the northern end via two ø600 RCP. The flows are then conveyed along the open channel and culvert towards the downstream discharge point which consists of two ø900 RCP which cross under South Creek Road.

4.3.2 Proposed Site Drainage

The proposed stormwater system consists of a major/ minor system which conveys surface water from the warehouse roof areas, hardstand, parking areas and truck circulation areas to a stormwater management basin prior to discharge from the site via the existing trunk drainage.

The existing culvert consisting of two ø825 RCP running under the existing driveway to the east and the associated headwall is to be demolished. The channel is to be reinstated to allow flows to effectively be conveyed from the north to the south as discussed further in **Section 4.4**.

Reference to drawings **Co136741.01-DA41** & **DA42** shows the proposed drainage layout including the stormwater management measures. Further discussion on the stormwater management measures are made in **Sections 5** and **6** of this report.

4.4 External Catchments and Flooding

The site is subject to overland flow from an upstream catchment to the north of the property. The existing catchment is approximately 18.5 Ha and comprises residential and urbanised surfaces of approximately 75-80% impervious. Reference to Figure 4.1 shows the approximate catchment extent and location.

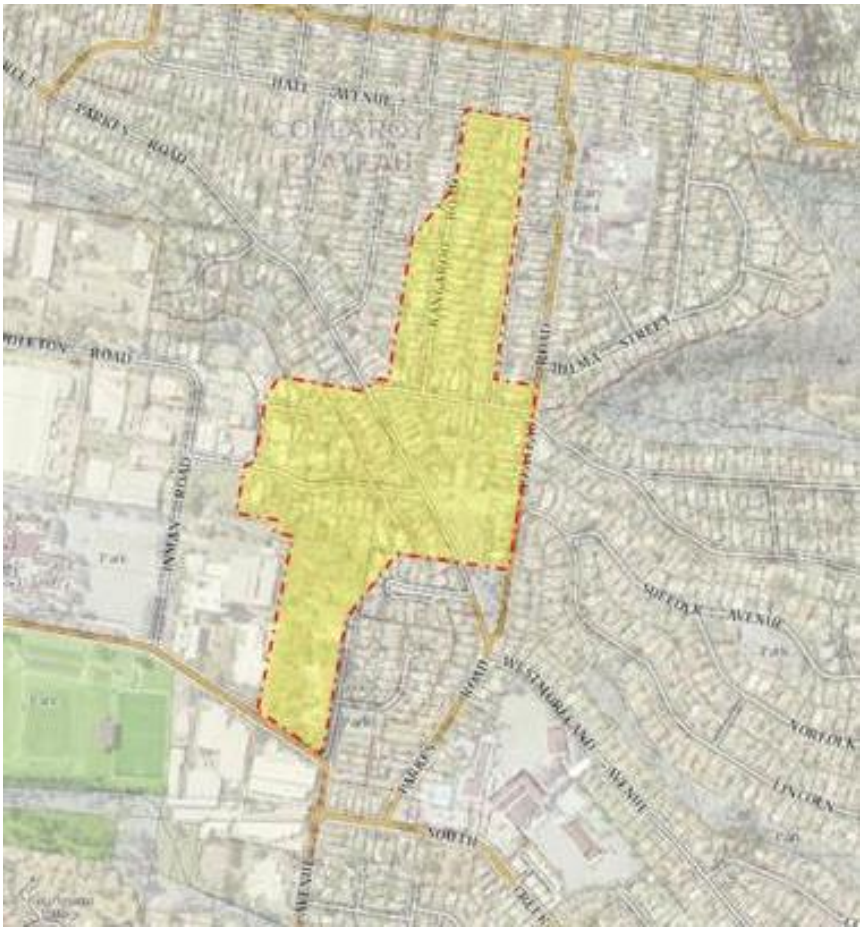


Figure 4.1. Upstream Catchment (Source: SIX Maps 2019)

Given the urban environment and relatively small upstream catchment, storms which would produce overland flow would be intense and short in duration. The catchment is sensitive to intense storms of short duration which result in rapidly increasing and decreasing flows and peak flows (and hence maximum flood depths) occurring over short durations.

Based on a conservative rational method calculation, the 1% AEP flow is estimated to be 8-9 m^3/s.

The existing flow path comprises open channel of:

- Sandstone bedrock
- Vegetated and rock lined base with stabilised sandstone banks and vegetated overbanks,
- box culvert and pavements.

Figure 4.2 shows a typical existing cross section with vegetated and rock lined base with stabilised sandstone banks and vegetated overbank areas adjacent to South Creek Road.



Figure 4.2. Typical Channel

As part of the development it is proposed to complete rehabilitation works on the flow path. The proposed works include removal of the existing culvert system and pavements and reinstatement of the channel. The proposed channel reinstatement will maintain the conveyance of the external catchment through the site and have adequate capacity as per the existing stormwater open channel and culverts.

The proposed development will be site at a level greater than 0.5m above the 1% AEP overland flow level. Basement areas will be bunded to meet the flood planning requirements.

In sizing the stormwater management system and erosion control for the development, only flows from within the development site have been considered as per the requirements of Northern Beaches Council, with upstream catchment and flow path bypassing any development management systems.

5 WATER QUANTITY MANAGEMENT

5.1 Onsite Stormwater Detention

Northern Beaches Council requires on-site detention to be provided to limit the runoff discharged from private property into the underground piped drainage system to pre-developed flow and to assist in mitigating the increased stormwater runoff generated by the development.

Northern Beaches Council adopts the principles of water quantity management, also known as "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental effect on the existing stormwater infrastructure and watercourses located within their LGA downstream from the development site.

Section 4 of Northern Beaches Council's *On-Site Stormwater Detention Technical Specification* states "The general requirement of Council's OSD Specification is to ensure that the site's stormwater runoff after any development does not exceed the runoff prior to the development."

5.2 Methodology

A hydrological analysis was undertaken to estimate the impact o the site development on the peak flows at the downstream extent of the site. Modelling of the stormwater quantity was considered from the pre-existing case and for the operational phase of the development.

As the site area is greater than 1200m^2, the simplified method consisting of PSD/SSR rates as described in Section 4.2.2. of the Warringah Council's *On-site Stormwater Detention Technical Specification* cannot be used in calculating the storage and discharge relationship for the site. Council's preferred modelling software, DRAINS has been used to assess the site detention and storage relationship.

In order to assess the existing and operational phase perk discharges from the development site, a DRAINS hydrological model was used to estimate peak flows from the catchments on site from various storm durations for Q5 year ARI to Q100 year ARI events.

5.3 Existing & Post Development Peak Flows

Table 5.1. shows the existing and developed flows at the downstream discharge point.

ARI	Design Storm Duration	Peak Flow (m^3/s)		
		Undeveloped	Developed	
			Site (no attenuation)	Site (+ attenuation)
5	5	0.585	1.630	0.538
	10	0.835	1.520	0.639
	20	1.150	1.750	0.766
	30	1.260	1.660	0.785
	60	1.270	1.610	0.805
	120	1.370	1.660	0.821
20	5	1.090	2.140	1.130
	10	1.310	1.980	0.789
	20	1.780	2.290	0.958
	30	1.800	2.200	0.976
	60	1.820	2.140	1.009
	120	1.940	2.210	1.034
100	5	1.750	2.800	0.834
	10	1.870	2.460	0.968
	20	2.370	2.820	1.469
	30	2.240	2.640	1.455
	60	2.350	2.670	1.788
	120	2.470	2.730	1.841

Table 5.1. Q5, Q20 & Q100 ARI Peak Flows from Development

The post development (with site attenuation flows can be seen to be lower than the pre-developed flows. The required detention storage for the development site is discussed in the following section.

5.4 Proposed Water Quantity Management

As previously discussed, detention storage on the development site is required to reduce local outflows. The proposed site layout allows for an OSD system to be located at the south-east landscaped zone. The discharge location will be via a pipe into the eastern channel, prior to discharge from the site.

The proposed OSD will be provided within an above ground, combined water quantity and water quality management basin.

A number of combinations of storage and outlet arrangements have been modelled. The adopted arrangement models the basin configuration as shown in **Table 5.2.** and the proposed layout can also be observed on drawing **Co13674.01-DA40** with details on drawing **DA43**.

ARI	Duration (mins)	Peak Flow (m^3/s)					Depth (mm)	Storage (m^3)
		No. Atten.	With Attenuation					
			Low	High	Bypass	Total		
5	120	1.370	0.656	-	0.165	0.821	1160	615
20	120	1.940	0.804	-	0.230	1.034	1730	917
100	120	2.470	0.884	0.666	0.291	1.841	2010	1100

Table 5.2. OSD Characteristics (Post Developed)

The hydrologic analysis shows that, with the provision of the on-site detention system detailed above, the post development peak flows from the site will be attenuated to less than pre-development; hence the requirements of Northern Beaches Council have been met.

6 STORMWATER QUALITY CONTROLS

6.1 Regional Parameters

There is a need to provide a design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater and minimise the adverse impact these pollutants could have on receiving waters, and to also meet the requirements specified by Northern Beaches Council.

Northern Beaches Council has nominated, in *Section 8.1.1* of their *PL 850 WATER – Water Management Policy*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	65%
Total Nitrogen	45%
pH	6.5-8.5

6.2 Proposed Stormwater Treatment System

Developed impervious areas including roof, hardstand, car parking, roads and other extensive paved areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the catchment area of the developed site. The STM's for the development shall be based on a treatment train approach to ensure that all of the objectives are met.

Components of the treatment train for the development are as follows:

- Primary treatment to parking and hardstand areas is to be performed via the provision of Ocean Protect OceanGuard Pit Inserts. Pre-treatment of stormwater will assist in mitigating the potential for early onset sedimentation of the bio-retention system;
- Tertiary treatment to the warehouse roof areas, the hardstand and car parking areas is to be performed via 663m^2 of bio-retention located towards the south- eastern corner of the site, adjacent to the access ramp off South Creek Road.
- A portion of the roof will also be treated via rainwater reuse and settlement within the rainwater tank.

6.3 Stormwater Quality Modelling

6.3.1 Introduction

The MUSIC model was chosen to model water quality. This model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC (the Model for Urban Stormwater Improvement Conceptualisation) is suitable for simulating catchment areas of up to 100 km^2 and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set out in *Section 8.1.1* of their *PL 850 WATER – Water Management Policy* and nominated in Section 6.1 of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*13674.01Cromer DA_Rev1.sqz*" was set up to examine the effectiveness of the water quality treatment train and to predict if Northern Beaches Council's requirements have been achieved. The model was set up using the Northern Beaches Council parameters from the *WSUD and MUSIC Modelling Guidelines (2016)* and the layout of the MUSIC model is presented in **Appendix B**.

6.3.2 Rainfall Data

Six-minute pluviographic data was provided by Northern Beaches Council which has been sourced from the Bureau of Meteorology (BOM) as nominated below. Evapo-transpiration data for the period was sourced from the Sydney Monthly Areal PET data set supplied with the MUSIC software.

Input	**Data Used**
Rainfall Station	066062 Sydney Observatory
Rainfall Period	1981 – 1985 (5 years)
Mean Annual Rainfall (mm)	857
Evapotranspiration	Sydney Monthly Areal PET
Model Timestep	6 minutes

6.3.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold (Roads/Paths)	1.50
Rainfall Threshold (Roofs)	0.30
Sand	
Soil Storage Capacity (mm)	350
Initial Storage (% capacity)	30
Field Capacity (mm)	144
Infiltration Capacity Coefficient a	360
Infiltration Capacity Coefficient b	0.5
Initial Depth (mm)	10
Daily Recharge Rate (%)	100
Daily Baseflow Rate (%)	50
Daily Seepage Rate (%)	0
Sandy Clay Loam	
Soil Storage Capacity (mm)	108
Initial Storage (% capacity)	30
Field Capacity (mm)	73
Infiltration Capacity Coefficient a	250
Infiltration Capacity Coefficient b	1.3
Initial Depth (mm)	10
Daily Recharge Rate (%)	60
Daily Baseflow Rate (%)	45
Daily Seepage Rate (%)	0

6.3.4 Pollutant Concentrations & Source Nodes

Pollutant concentrations for source nodes are based on Northern Beaches Council land use parameters as per the **Table 6.1.**:

Flow Type	Surface Type	TSS (log_{10} values)		TP (log_{10} values)		TN (log_{10} values)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Baseflow	Roof	-	-	-	-	-	-
	Roads	-	-	-	-	-	-
	Landscaping	1.20	0.17	-0.85	0.19	0.11	0.12
Stormflow	Roof	1.30	0.32	-0.89	0.25	0.30	0.19
	Roads	2.43	0.32	-0.30	0.25	0.30	0.19
	Landscaping	2.15	0.32	-0.60	0.25	0.30	0.19

Table 6.1. Pollutant Concentrations

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 6.1.** above and the catchments shown in **Table 6.2**.

The relevant stormwater catchment sizes are listed below in **Table 6.2.** and shown in **Appendix B**.

Catchment	Area (Ha)	Source Node	% Impervious	Stormwater Treatment
R1	0.442	Roof	100	Bio-retention & Rainwater Tank
R2	0.556	Roof	100	Bio-retention
R3	0.551	Roof	100	Bio-retention
R4	0.209	Roof	100	Bio-retention
R5	0.018	Roof	100	Bio-retention
H1	0.967	Sealed Road	100	Bio-retention
L1	0.157	Mixed	0	Bio-retention
L2	0.081	Mixed	0	Bio-retention
LB1	0.204	Mixed	0	Bypass
LB2	0.166	Mixed	0	Bypass
LB3	0.160	Mixed	0	Bypass
Total	3.511			

Table 6.2. Music Model Source Nodes

6.3.5 Treatment Nodes

Rainwater tank and bio-retention nodes have been used in the modelling of the development.

6.3.6 Results

Table 6.3. shows the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

	Source	Residual Load	% Reduction	Target Met
Flow (ML/yr)	41.8	38.5	8	N/A
Total Suspended Solids (kg/yr)	5580	826	85.2	85
Total Phosphorus (kg/yr)	12.1	3.78	68.7	65
Total Nitrogen (kg/yr)	91.4	37.1	59.4	45
Gross Pollutants (kg/yr)	940	0	100	90

Table 6.3. MUSIC analysis results

The model results indicate that, through the use of the STM's in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the requirements of Northern Beaches Council – Water Management Policy on an overall catchment basis.

6.3.7 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements of *Section 8.1.1* of Northern Beaches Council *PL 850 WATER – Water Management Policy* have been met.

The MUSIC modelling has shown that the proposed treatment train of SQID's will provide stormwater treatment which will meet the Northern Beaches Council requirements in an effective and economical manner.

Hydrocarbon removal cannot be modelled with MUSIC software. The proposed distribution/ storage facility would be expected to produce low source loadings of hydrocarbons. Potential sources of hydrocarbons would be limited to leaking engine sumps or for accidental fuel spills/leaks and leaching of bituminous pavements (carparking only). The potential for hydrocarbon pollution is low and published data from the CSIRO indicates that average concentrations from Industrial sites are in the order of 10mg/L and we would expect source loading from this site to be near to or below this concentration. Hydrocarbon pollution would also be limited to surface areas which will be treated via bio-retention swales which are predicted to achieve a 90% reduction of this pollutant.

Given the expected low source loadings of hydrocarbons and removal efficiencies of the treatment devices we consider that the requirements of the Northern Beaches Council have been met.

6.4 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the development's internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater where the flow is from roof areas, or stormwater where the flow is from all areas of the development.

For the purposes of this development, we refer to a rainwater harvesting system, where benefits of collected stormwater from roof areas over a stormwater harvesting system can be made as rainwater is generally less polluted than stormwater drainage.

Rainwater harvesting is proposed for this development with re-use for non-potable applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the water demand for the development and to satisfy the requirements of Northern Beaches Council.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand and to provide a reduction in non-potable water.

6.4.1 Internal Base Water Demand

Indoor water demand has been estimated for an industrial/ commercial development of an allowance of 0.1kL/day/ toilet or urinal. No allowance is required for disable toilets.

The above rates result in the following internal non-potable demand:

Estimate	12 Toilets	1.2 kL/day

6.4.2 External Base Water Demand

The external base water demand has been estimated for an industrial/ commercial development of 0.3kL/year/m^2 as PET-Rain for subsurface irrigation.

The above regime for the landscaped area for the site gives the following yearly outdoor water demand:

Irrigated Area (0.3kL/year/m^2)	7000m^2	2000 kL/year
TOTAL		**2000 kL/year**

6.4.3 Rainwater Tank Sizing

The use of rainwater reduces the mains water demand and the amount of stormwater runoff. By collecting the rainwater run-off from roof areas, rainwater tanks provide a valuable water source suitable for flushing toilets and landscape irrigation.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the calculated base water demands and proposed roof catchment areas. Allowances in the MUSIC model have been made for high flow bypass which will be managed by a high flow and low flow roofwater collection configuration along a portion of the southern elevation of the warehouse.

Roof Catchment (m^2)	High-Flow Bypass (l/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
4420	100	50	67	60

Table 6.4. Rainwater Reuse Requirements

The MUSIC model, results summarised in **Table 6.4**, predicts that there will be a 67% reduction in non-potable water demand for the development with the provision of a minimum 60 kL rainwater tank.

We note that the final configuration and sizing of the rainwater tanks is subject to detail design considerations and optimum site utilisation.

6.5 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table 6.5.** below) to assist in the effective operation and maintenance of the various water quality components.

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the below nominated frequency it is recommended that inspections are made following large storm events.

Table 6.5. Indicative Maintenance Schedule

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six- monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six- monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six- monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three- Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six- Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
BIO-RETENTION BASIN			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above
Check for sediment accumulation at inflow points	Six- monthly/ After Major Storm	Maintenance Contractor	Maintenance Contractor Remove sediment and dispose in accordance with local authorities' requirements.
Check for erosion at inlet or other key structures.	Six- monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed profile is maintained
Check for evidence of dumping (litter, building waste or other).	Six- monthly	Maintenance Contractor	Remove waste and litter and dispose in accordance with local authorities' requirements.
Check condition of vegetation is satisfactory (density, weeds, watering, replating, mowing/ slashing etc)	Six- monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Check for evidence of prolonged ponding, surface clogging or clogging of drainage structures	Six- monthly/ After Major Storm 5-10 years	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements. Replace filter media & planting – refer to appropriately qualified engineer or stormwater specialist
Check stormwater pipes and pits	Six- monthly/ After Major Storm	Maintenance Contractor	Refer to INLET/ JUNCTION PIT section.
INLET & JUNCTION PITS			
Inside of pits	Six- Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four- Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
OCEANGUARD PIT INSERTS			
As per manufacturer's Operation and Maintenance Manual	Six- Monthly & after major storm events. As per manufacturer's Operation and Maintenance Manual	Maintenance Contractor	As per manufacturer's Operation and Maintenance Manual

7 EROSION & SEDIMENT CONTROLS

An erosion and sediment control plan (ESCP) is included on drawings **Co13674.01-DA20** & **DA25**. These plans show the works can proceed without polluting the receiving waters. A detailed plan will be prepared after development consent is granted and before works commence.

7.1 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and Northern Beaches Council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

7.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 7.1**.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

Table 7.1. Limitations to access

7.3 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.

2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.

3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.

4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.

5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.

6. Where practical, foot and vehicular traffic will be kept away from all recently established areas

7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:

    - 2H:1V where slope length is less than 7 metres
    - 2.5H:1V where slope length is between 7 and 10 metres
    - 3H:1V where slope length is between 10 and 12 metres
    - 4H:1V where slope length is between 12 and 18 metres
    - 5H:1V where slope length is between 18 and 27 metres
    - 6H:1V where slope length is greater than 27 metres

8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.

9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used, or the surface will be left in a cloddy state that resists removal by wind.

7.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.

2. Sediment fences will:

   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.

   b) Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and

   c) Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.

3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.

4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.

5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

7.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

7.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:

   - At least weekly.
   - Immediately before site closure.
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

The self-audit will include:

- Recording the condition of every sediment control device
- Recording maintenance requirements (if any) for each sediment control device
- Recording the volumes of sediment removed from sediment retention systems, where applicable
- Recording the site where sediment is disposed
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

2. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report. The responsible person will ensure that:

    - The plan is being implemented correctly
    - Repairs are undertaken as required
    - Essential modifications are made to the plan if and when necessary

The report shall carry a certificate that works have been carried out in accordance with the plan.

3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.

4. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,

    - No low points exist that can overtop in a large storm event
    - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
    - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).

5. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.

6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.

7. Excessive vegetation growth will be controlled through mowing or slashing.

8. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:

    a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them

b) Degradable products to ensure they are replaced as required, and

c) Sediment removal, to ensure the design capacity or less remains in the settling zone.

9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.

11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised

12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

8 CONCLUSION

This Civil Engineering Report has been prepared to support the Development Application for the proposed warehouse and storage facilities at 100 South Creek Road, Cromer, NSW.

A civil engineering strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout. Within this strategy a stormwater quality management strategy has been developed to reduce pollutant loads in the stormwater leaving this site. The stormwater management for the development has been designed in accordance with *Section 8.1.1* of the Northern Beach Council's *PL 850 WATER – Water Management Policy*.

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

During the operational phase of the development, a bio-retention basin is proposed to mitigate any increase in stormwater pollutant load generated by the development. MUSIC modelling results indicate that the proposed STM are effective in reducing pollutant loads in stormwater discharging from the site and meet the requirements of Council's pollution reduction targets. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

9 REFERENCES

- Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book, Landcom
- Northern Beaches Council WSUD & MUSIC Modelling Guidelines (2016)
- PL 850 WATER – Water Management Policy (2017), Warringah
- Warringah Council On-site Stormwater Detention Technical Specification
- Warringah Development Control Plan (2011)

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

PROPOSED INDUSTRIAL DEVELOPMENT
100 SOUTH CREEK ROAD, CROMER, NSW
CIVIL ENGINEERING DRAWINGS FOR DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C013674.01-DA10	DRAWING LIST & GENERAL NOTES
C013674.01-DA20	EROSION & SEDIMENT CONTROL PLAN
C013674.01-DA25	EROSION & SEDIMENT CONTROL DETAILS - SHEET 1
C013674.01-DA26	EROSION & SEDIMENT CONTROL DETAILS - SHEET 2
C013674.01-DA41	STORMWATER DRAINAGE PLAN - GROUND LEVEL
C013674.01-DA42	STORMWATER DRAINAGE PLAN - BASEMENT
C013674.01-DA45	STORMWATER DETAILS - SHEET 1
C013674.01-DA46	STORMWATER DETAILS - SHEET 2
C013674.01-DA47	STORMWATER DETAILS - SHEET 3
C013674.01-DA48	STORMWATER DETAILS - SHEET 4
C013674.01-DA51	FINISHED LEVELS PLAN - GROUND LEVEL
C013674.01-DA52	FINISHED LEVELS PLAN - BASEMENT
C013674.01-DA55	TYPICAL SECTIONS - SHEET 1
C013674.01-DA56	TYPICAL SECTIONS - SHEET 2
C013674.01-DA57	TYPICAL SECTIONS - SHEET 3
C013674.01-DA65	RETAINING WALL DETAILS
C013674.01-DA70	OVERLAND FLOW CATCHMENT PLAN
C013674.01-DA71	PRE-DEVELOPMENT OVERLAND FLOW DEPTH & EXTENT
C013674.01-DA72	POST-DEVELOPMENT OVERLAND FLOW DEPTH & EXTENT



LOCALITY PLAN
NOT TO SCALE

GENERAL NOTES:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.

G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE.
ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT.
REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.

G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

G6 ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED IN THE GEOTECHNICAL REPORT.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY LTS LOCKLEY TITLED 50384001DT DATED 21/06/16.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 MM SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 MM SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 MM SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS (IN THE STATED PERIOD) ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION (EG. COSTIN ROE SITE PREPARATION NOTES IN DWG C013003.01-EWC10)
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS A.H.D.
2. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
3. THE MAJOR CONTOUR INTERVAL IS 0.5m
4. THE MINOR CONTOUR INTERVAL IS 0.1m.
5. MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
6. MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
7. MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
8. PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEDE 1:20 (5%).
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. THE ACCESS ROAD TO THE HARDSTAND AREA IS TO HAVE A CROSSFALL OF 2% AS INDICATED ON PLAN.
12. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL. GRADE.
13. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

EROSION CONTROL NOTES

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200MM.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS DA51 & DA52.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 25 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. ALL PIPE GRADES 1 IN 100 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
21. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
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REVISED AS CLOUDED	28.02.20	C
ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
ISSUED FOR INFORMATION ONLY	01.11.19	A

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA10

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DRAWING TITLE
DRAWING LIST & GENERAL NOTES

DRAWING No C013674.01-DA10
ISSUE D

LEGEND:

- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE
- DENOTES DIVERSION DRAIN
- DENOTES DIRECTION OF OVERLAND FLOW

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013674.01-C25 & C26.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (44.0mm).

APPROXIMATE AREA OF DISTURBED SITE = 4.45Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

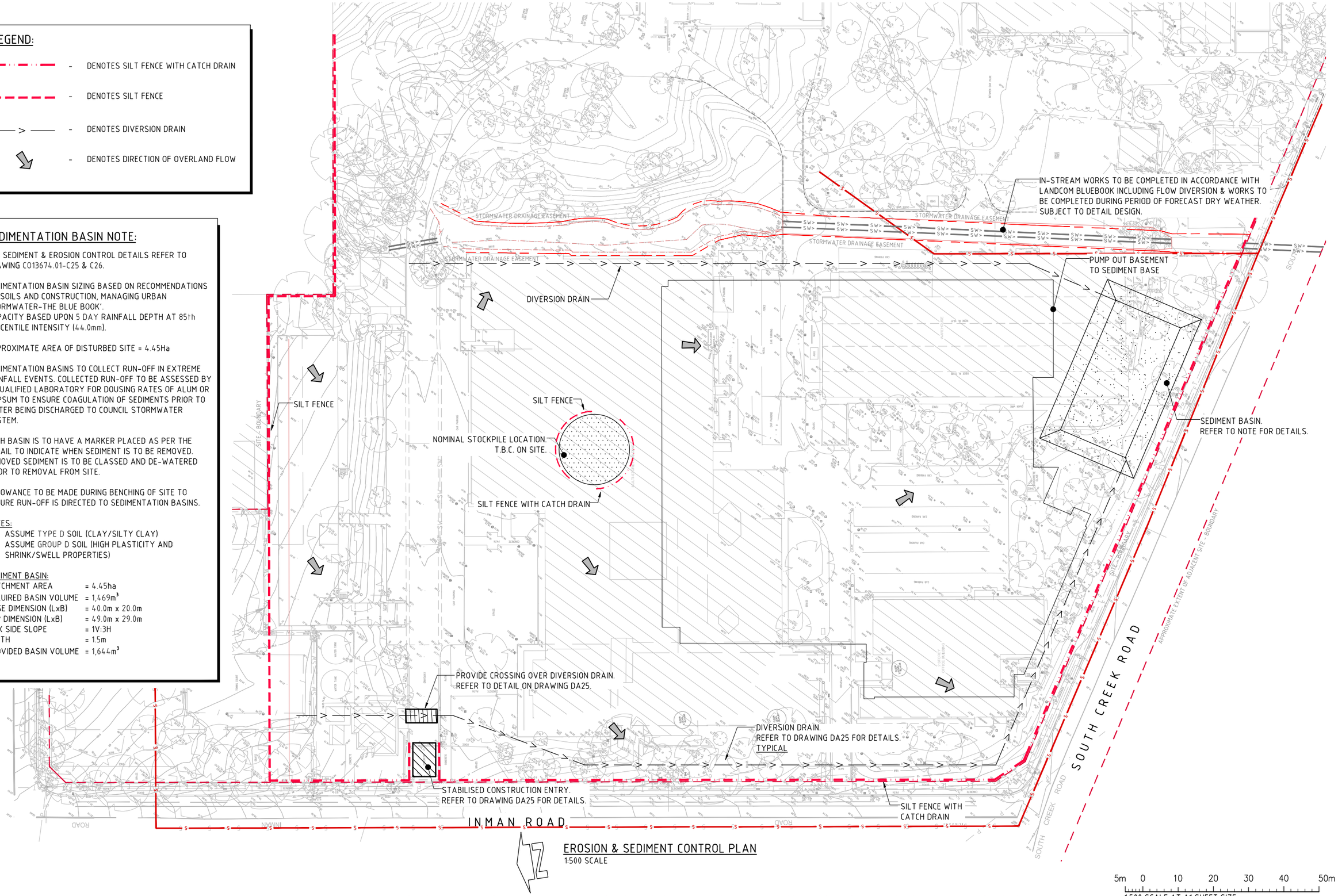
EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DE-WATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SEDIMENT BASIN:

CATCHMENT AREA	= 4.45ha
REQUIRED BASIN VOLUME	= 1,469m³
BASE DIMENSION (LxB)	= 40.0m x 20.0m
TOP DIMENSION (LxB)	= 49.0m x 29.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 1,644m³



EROSION & SEDIMENT CONTROL PLAN
1:500 SCALE

FOR DEVELOPMENT APPLICATION

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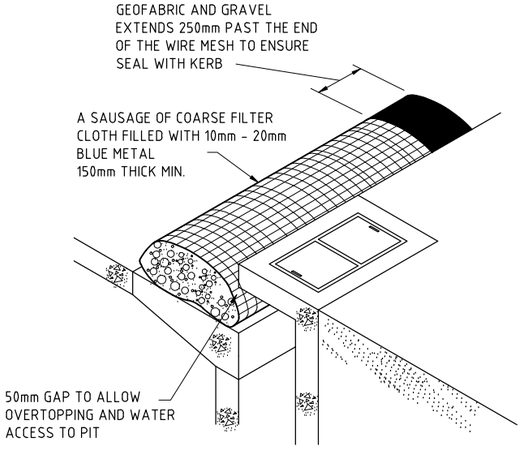
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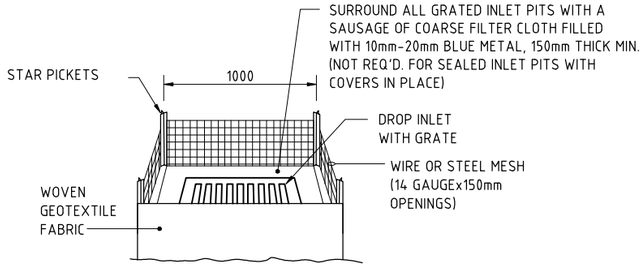
DRAWING TITLE
EROSION & SEDIMENT CONTROL PLAN

DRAWING No C013674.01-DA20

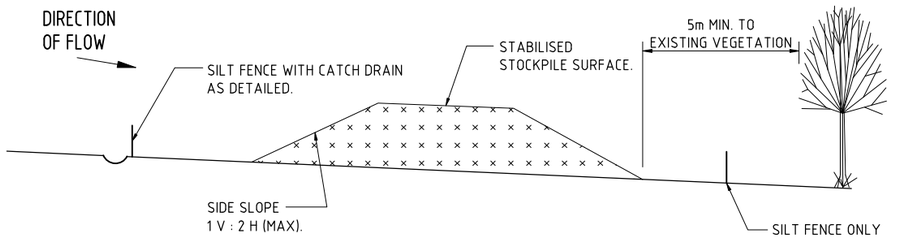
ISSUE C



KERB INLET PIT CONTROL
N.T.S



GRATED INLET PIT FILTER DETAIL
N.T.S



TYPICAL STOCKPILE DETAIL
N.T.S.

NOTE : ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.

STOCKPILE NOTES
1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.

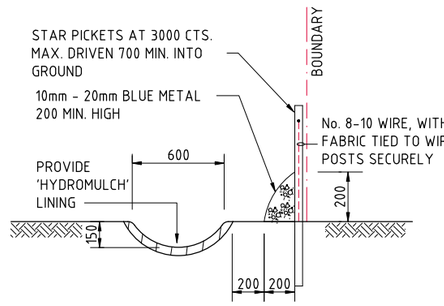
NOTES:
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

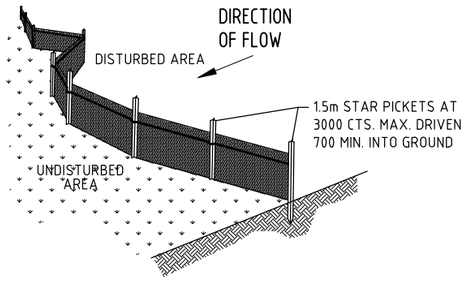
ROADS & FOOTPATHS TO BE SWEPT DAILY.

1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

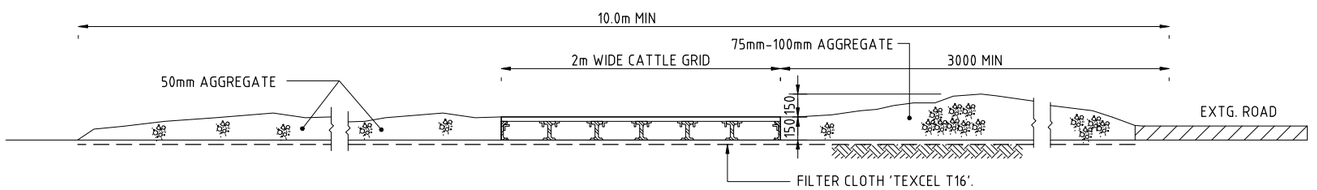


TYPICAL OPEN DRAIN & SILT FENCE
SCALE 1:20

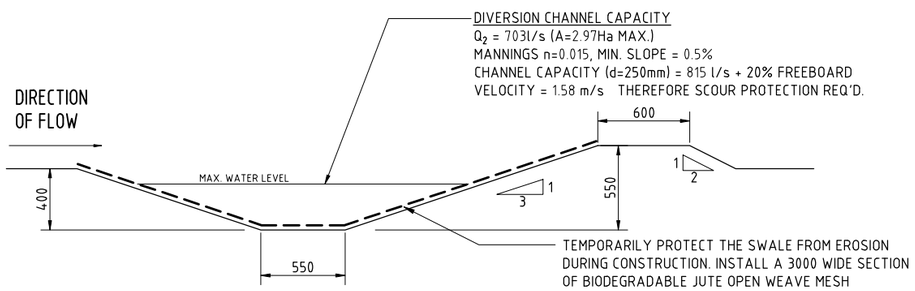


TYPICAL SILT FENCE DETAIL
N.T.S.

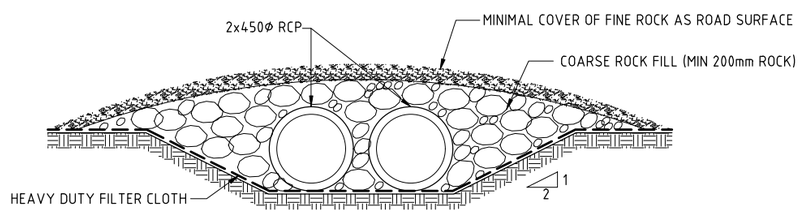
PROVIDE 1m RETURNS AT 30m INTERVALS.
TYPICAL



SECTION 1:20 (1 / DA20) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



DIVERSION DRAIN SECTION
SCALE 1:20



TYPICAL CROSSING OVER DIVERSION CHANNEL
SCALE 1:20

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SHEET SIZE

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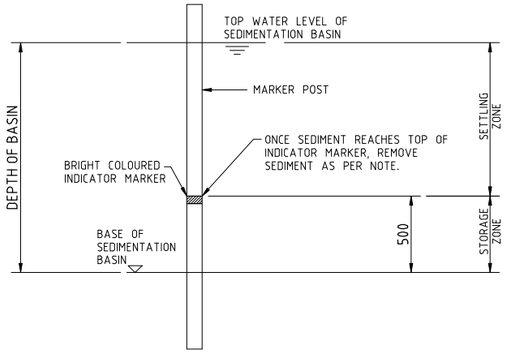
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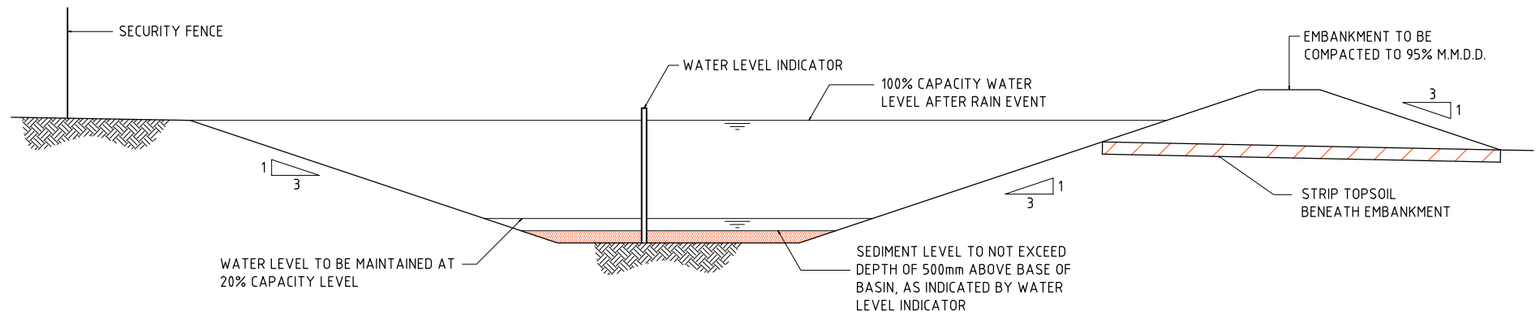
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EROSION & SEDIMENT CONTROL
DETAILS - SHEET 1

DRAWING No C013674.01-DA25 ISSUE B



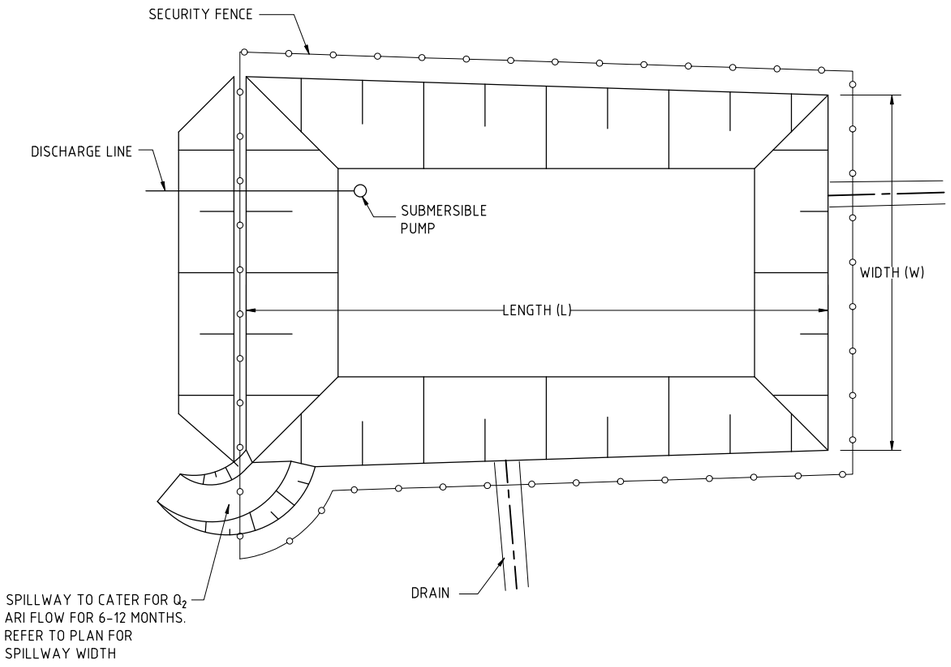
SEDIMENT STORAGE MARKER

SCALE 1:20



TYPICAL SEDIMENT CONTROL BASIN SECTION

SCALE 1:50



TYPICAL SEDIMENT CONTROL POND PLAN

SCALE 1:250

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A1 SHEET SIZE

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A1 SHEET SIZE

2m 0 5 10 15 20 25m
SCALE 1:250 AT A1 SHEET SIZE

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DRAWING TITLE
EROSION & SEDIMENT CONTROL DETAILS - SHEET 2

DRAWING No C013674.01-DA26

ISSUE B

LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W × 200D U.N.O.)
- SW> DRAINAGE LINE
- RW> ROOFWATER LINE
- S EXISTING SEWER MAIN
- 50.00 FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF EXISTING WATERWAY

LOCATION OF EXISTING CULVERT DISCHARGE INTO CHANNEL VIA 2×Ø600 PIPES AT I.L.16.27 & I.L.16.26 TO BE MAINTAINED

STORMWATER LINE EXPECTED TO PASS ABOVE EXISTING Ø225 SEWER. SEWER TO BE POT-HOLE SURVEYED TO CONFIRM CLEARANCE TO PROPOSED STORMWATER.

APPROXIMATE EXTENT OF WATERWAY TO BE REINSTATED. REMOVE EXISTING CULVERTS & PAVEMENT AND CONSTRUCT WATERWAY.

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

EXISTING HEADWALL AND 2×Ø825 PIPES AT I.L.13.58 & I.L.13.39 UNDER EXISTING DRIVEWAY TO BE DEMOLISHED

EXISTING HEADWALL AND 2×Ø825 PIPES AT I.L.11.57 & I.L.11.52 TO BE DEMOLISHED

RETAINING WALL 2

DISCHARGE TO REINSTATED CHANNEL AT I.L.10.85 APPROX. PROVIDE RIP-RAP AS PER DETAIL ON DRAWING DA48.

EXISTING HEADWALL AND 2×Ø900 PIPES AT I.L.10.67 TO BE PRESERVED

RETAINING WALL 3

PROPOSED BUILDING FFL 15.78

BASEMENT BELOW

STORMWATER PIPE TO CONTINUE IN BASEMENT IN-GROUND DRAINAGE SYSTEM.

PIPES SLUNG TO UNDERSIDE OF SLAB. FINAL CONFIGURATION TO BE COORDINATED WITH STRUCTURAL AND ARCHITECTURAL DURING DETAIL DESIGN.

PROVIDE DROPPER

PROVIDE DROPPER

PROPOSED BUILDING FFL 17.55

PROVIDE HAVESTOCK FLOOR DRAINS ALONG SUSPENDED SLAB. PIPES TO BE SLUNG UNDER SLAB AND CONTINUE INTO BASEMENT IN-GROUND DRAINAGE SYSTEM. REFER TO DRAWINGS DA42 & DA45 FOR DETAILS.

EXISTING BUILDING FFL 18.24

RETAINING WALL 1. REFER TO DRAWING DA51 FOR DETAILS. TYPICAL

STORMWATER MANAGEMENT BASIN
F.S.L. = 12.00m
OSD STORAGE = 1,325m³
FILTER MEDIA AREA = 663m²
MEDIA DEPTH = 500mm
EXTENDED DETENTION DEPTH = 300mm
BIO-RETENTION FILTRATION AREA EXCLUSIVE OF SCOUR PROTECTION, INLET STRUCTURES & OUTLET STRUCTURES.

STORMWATER PIPE FROM BASEMENT DRAINAGE TO CONTINUE INTO IN-GROUND DRAINAGE SYSTEM.

ORLANDO ROAD

SOUTH CREEK ROAD

INMAN ROAD

SITE BOUNDARY

APPROXIMATE EXTENT OF 100 YEAR ARI FLOOD

PIT C01 Ø450 US IL 15.65 DS IL 15.62 3.0m @ 1.0%
PIT C02 Ø450 US IL 15.59 DS IL 15.15 44.0m @ 1.0%
PIT C03 Ø450 US IL 15.12 DS IL 14.68 44.0m @ 1.0%
PIT C04 Ø450 US IL 13.10 DS IL 12.68 21.0m @ 2.0%
PIT C05
PIT D01 Ø525 US IL 12.65 DS IL 12.60 10.0m @ 0.5%
FD 01 Ø300 US IL 16.40 DS IL 16.30 19.0m @ 0.5%
FD 02 Ø300 US IL 16.40 DS IL 16.34 11.5m @ 0.5%
FD 03 Ø300 US IL 16.40 DS IL 16.25 28.5m @ 0.5%
PIT A01 Ø375 US IL 16.05 DS IL 15.93 22.5m @ 0.5%
PIT A02 Ø375 US IL 16.05 DS IL 16.00 10.0m @ 0.5%
PIT A03 Ø450 US IL 15.90 DS IL 15.78 22.5m @ 0.5%
PIT A04
PIT A05 Ø525 US IL 15.58 DS IL 15.53 10.0m @ 0.5%
PIT A06 Ø600 US IL 15.50 DS IL 15.30 40.0m @ 0.5%
PIT A07 Ø675 US IL 12.82 DS IL 12.65 33.0m @ 0.5%
Ø525 US IL 15.75 DS IL 15.61 34.0m @ 0.5%

STORMWATER DRAINAGE NOTES:

REFER TO DRAWING DA10 FOR STORMWATER DRAINAGE NOTES

STORMWATER PIT SCHEDULE:

REFER TO DRAWING DA42 FOR STORMWATER PIT SCHEDULE

STORMWATER DRAINAGE PLAN - GROUND FLOOR

1:500 SCALE

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	21.10.20	D
ISSUED FOR DEVELOPMENT APPLICATION	28.02.20	C
ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
ISSUED FOR INFORMATION ONLY	01.11.19	A

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA41

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DRAWING TITLE
STORMWATER DRAINAGE PLAN
GROUND FLOOR

DRAWING No C013674.01-DA41

ISSUE D

LEGEND:

LEVELS DATUM IS AHD.

- ⊟ – SGGP, SINGLE GRATED GULLY PIT
- ⊠ – SJP, SEALED JUNCTION PIT
- ▭▭▭ – GRATED DRAIN (300W × 200D U.N.O.)
- sw> – DRAINAGE LINE
- rw> – ROOFWATER LINE
- s – EXISTING SEWER MAIN

PIT SCHEDULE
NETWORK A

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT A 01	17.05	SGGP	900×900	⊕
PIT A 02	17.05	SGGP	900×900	⊕
PIT A 03	17.05	SGGP	900×900	⊕
PIT A 04	17.05	SGGP	900×900	⊕
PIT A 05	17.12	SJP	900×900	
PIT A 06	17.00	SGGP	900×900	⊕
PIT A 07	17.00	SGGP	900×900	⊕

NETWORK B

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT B 01	14.05	SGGP	900×900	⊕
PIT B 02	14.05	SGGP	900×900	⊕
PIT B 03	14.05	SGGP	900×900	⊕
PIT B 04	14.05	SGGP	900×900	⊕
PIT B 05	14.05	SGGP	900×900	⊕
PIT B 06	14.05	SGGP	900×900	⊕
PIT B 07	14.20	SJP	900×900	⊕
PIT B 08	13.85	SJP	900×900	⊕

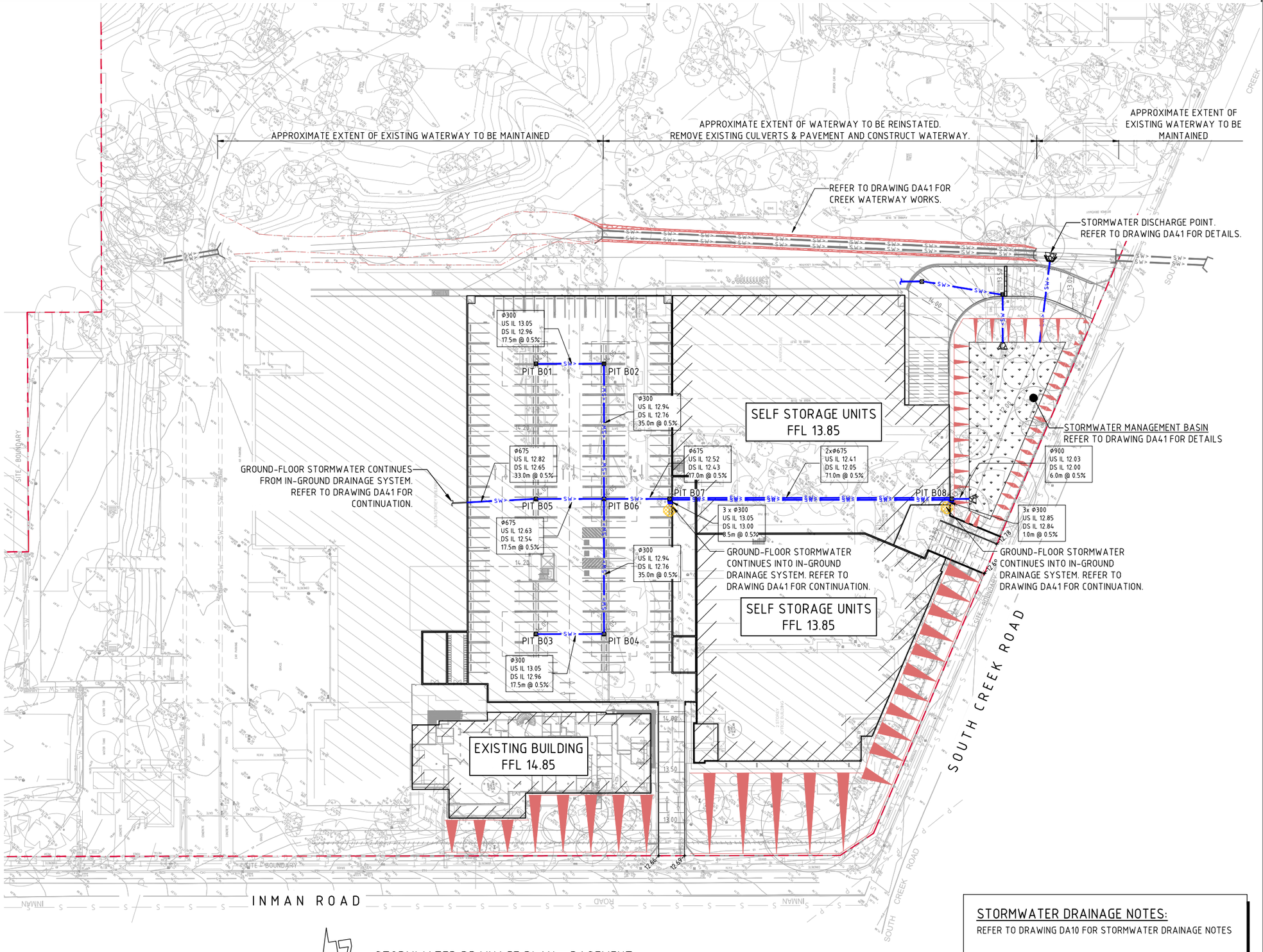
NETWORK C

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT C 01	17.25	SJP	900×900	
PIT C 02	17.00	SJP	900×900	
PIT C 03	15.00	SJP	900×900	
PIT C 04	13.92	SJP	900×900	
PIT C 05	13.50	SGGP	900×900	⊕

NETWORK D

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT D 01	12.45	BIP	1200×1200	

⊕ DENOTES PIT TO BE FITTED WITH OCEANGUARD OCEANPROTECT PIT INSERT



STORMWATER DRAINAGE PLAN - BASEMENT
1:500 SCALE

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING DA10 FOR STORMWATER DRAINAGE NOTES

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SHEET SIZE

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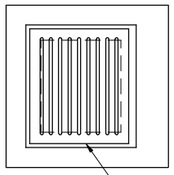
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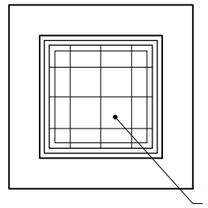
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STORMWATER DRAINAGE PLAN BASEMENT

DRAWING No C013674.01-DA42

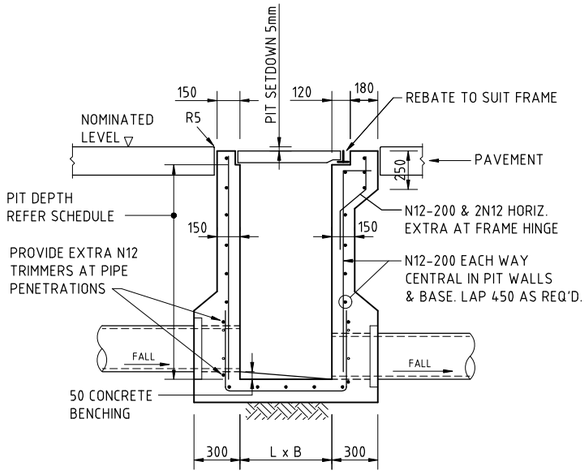
ISSUE C



PLAN
SCALE 1:20



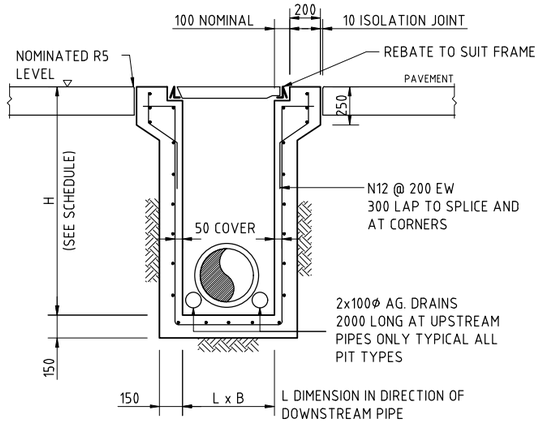
PLAN
1:20



SEE SCHEDULE
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP



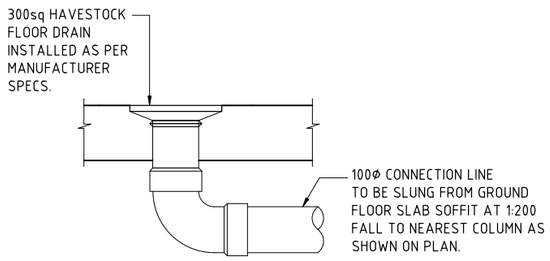
SECTION
SCALE 1:20

SEALED JUNCTION PIT - SJP

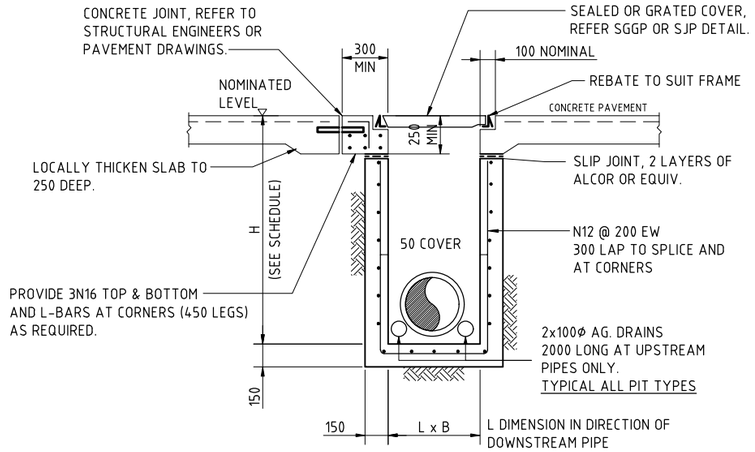
NOTES:

1. WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
2. SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
3. ALL REINFORCING TO HAVE 30 MIN. CLEAR CONCRETE COVER.
4. FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.

CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	25



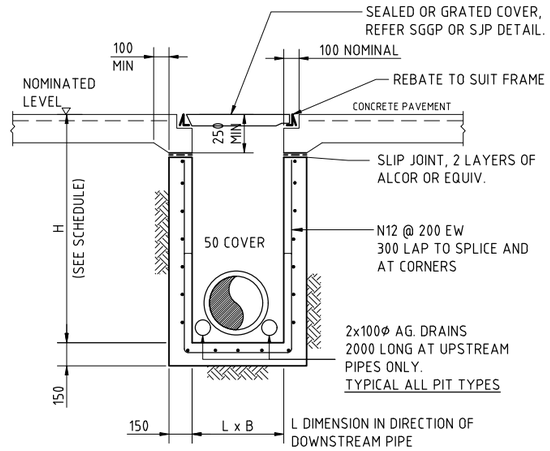
FLOOR DRAIN - FD
SCALE 1:10
(FOR USE IN SUSPENDED SLABS)



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's, WHERE PITS ARE LOCATED IN THE CORNER OF SLAB PANELS OR ADJACENT TO SLAB PANEL JOINTS)



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A1 SIZE SHEET

100mm 0 200 400 600 800 1000mm
SCALE 1:10 AT A1 SIZE SHEET

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CROMER, 2099, NEW SOUTH WALES

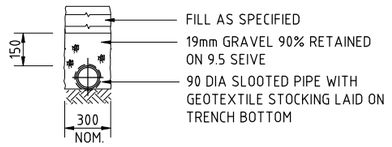
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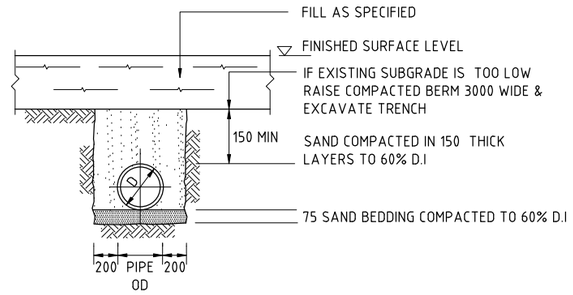
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DRAWING TITLE
STORMWATER DRAINAGE DETAILS
SHEET 1

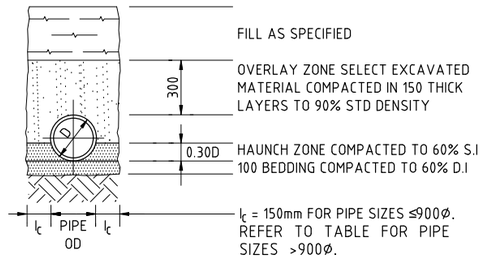
DRAWING No C013674.01-DA45
ISSUE C



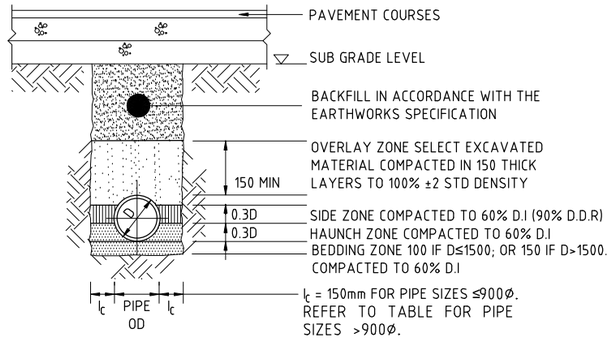
SUPPORT TO AG. DRAIN



SUPPORT TO uPVC PIPES



TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

D≤ 1350, MAX FILL = 4.0m
D> 1350, MAX FILL = 3.0m

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
19	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
75	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

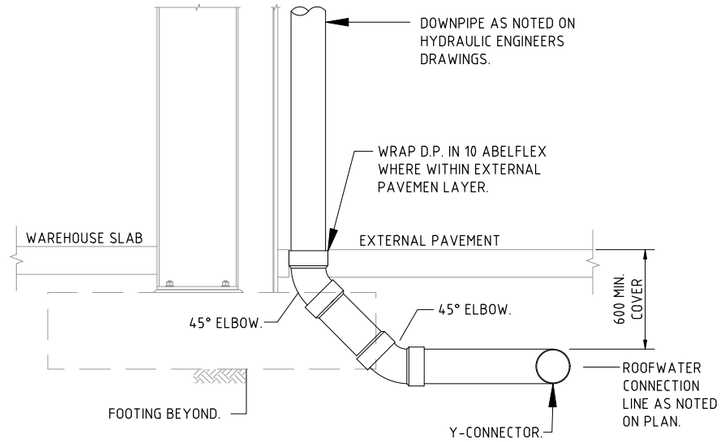
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

SIDE ZONE WIDTH	
PIPE SIZE	l_c (mm)
≤900ø	150
1050ø	175
1200ø	200
1350ø	225
1500ø	250
1650ø	275
1800ø	300

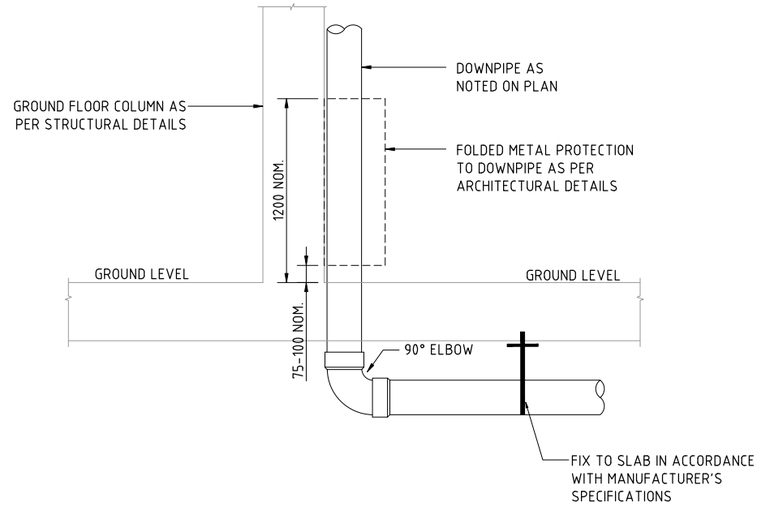
REFER TO ENGINEER FOR TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800ø

PIPE LAYING DETAILS

SCALE 1:20



DOWNPIPE TURN-UP DETAIL
(CLEAR OF FOOTING)
SCALE 1:20



DOWNPIPE TURN-UP DETAIL
(AT COLUMN LOCATION)
SCALE 1:20

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

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CROMER, 2099, NEW SOUTH WALES

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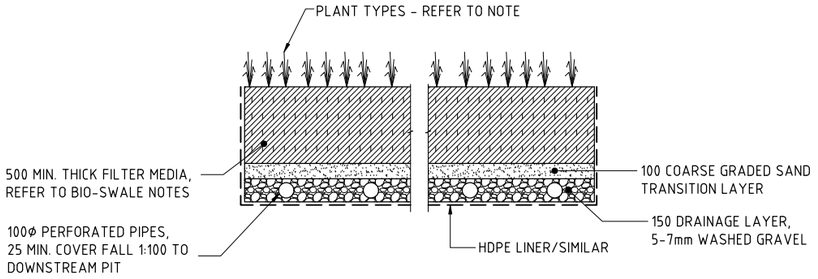
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DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 2

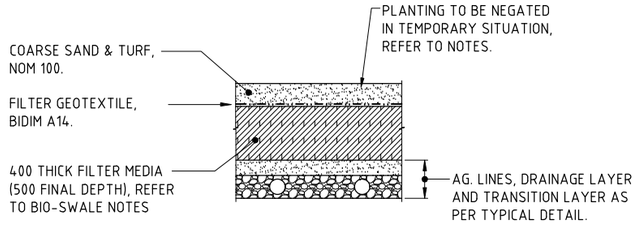
DRAWING No C013674.01-DA46

ISSUE C



TYPICAL BIO-RETENTION DETAIL

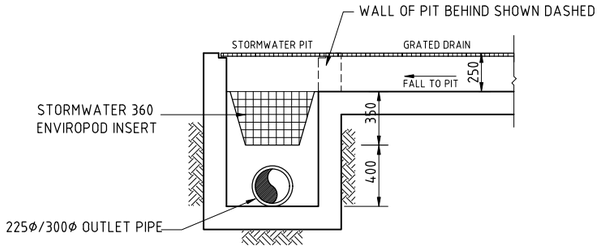
SCALE 1:20



TEMPORARY BIO-RETENTION PROTECTION DETAIL

SCALE 1:20

TEMPORARY CONSTRUCTION REQUIREMENT DETAIL - REFER TO NOTES FOR IMPLEMENTATION PERIODS.



GRATED DRAIN/STORMWATER PIT WITH ENVIROPOD CONFIGURATION

SCALE 1:20

BIO-RETENTION NOTES:

FILTER MEDIA TO BE LOAMY SAND WITH A PERMEABILITY NOT LESS THAN 200mm/hr. FILTER MEDIA TO BE FREE OF RUBBISH, DELETERIOUS MATERIAL, TOXICANTS, DECLARED PLANTS AND LOCAL WEEDS, AND IS TO NOT BE HYDROPHOBIC.

FILTER MEDIA TO HAVE THE FOLLOWING COMPOSITION RANGE:

CLAY & SILT (<0.05mm)	<3%
VERY FINE SAND (0.05-0.15mm)	5-30%
FINE SAND (0.15-0.25mm)	10-30%
MEDIUM TO COARSE SAND (0.25-1.00mm)	40-60%
COARSE SAND (1.0-2.0mm)	7-10%
FINE GRAVEL (2.0-3.4mm)	<3%

FILTER MEDIA THAT DOES NOT MEET THE FOLLOWING CRITERIA SHALL BE REJECTED:

a. ORGANIC MATTER CONTENT TO BE IDEALLY WITHIN 1% TO 3% (W/W) AND TO BE NO GREATER THAN 5%(W/W).
b. PH TO BE BETWEEN 5.5 AND 7.5
c. PHOSPHOROUS CONTENT TO BE NO GREATER THAN 35mg/kg

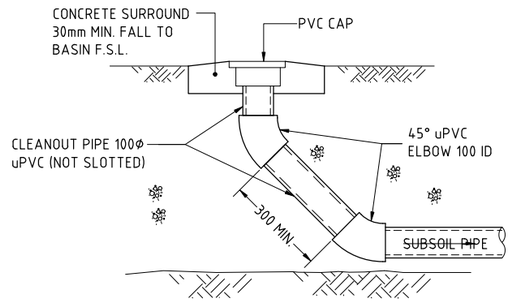
FILTER MEDIA TO BE ASSESSED BY QUALIFIED HORTICULTURALIST TO ENSURE CAPABILITY OF SUPPORTING PLANT LIFE.

DRAINAGE LAYER TO BE CLEAN GRAVEL 5-7mm.

PLANTS TO BE IN ACCORDANCE WITH NORTHERN BEACHES CITY COUNCIL REQUIREMENTS.

PROVIDE 100mm TOPSOIL AND TEMPORARY EROSION PROTECTION (JUTEMASTER OR EQUIV) TO SWALE BATTER SLOPES AND ADJACENT LANDSCAPED AREAS. NOTE THAT NO TOPSOIL IS TO BE PLACED OVER FILTRATION MEDIA. PROVIDE SILT FENCE TO TOP OF BANK UNTIL SUCH TIME AS THIS STABILISING AND VEGETATION HAS BEEN COMPLETED.

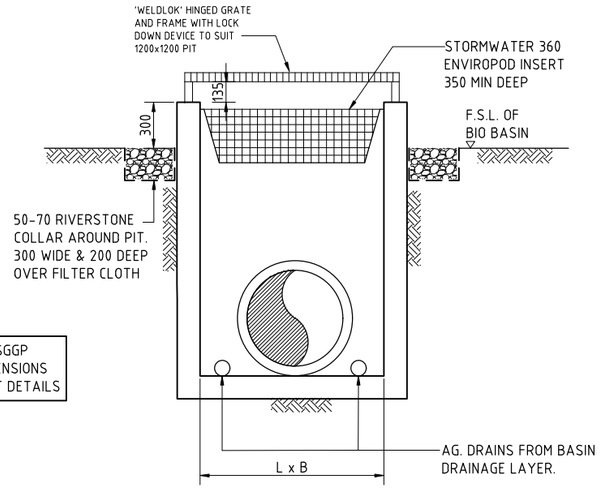
BIO-RETENTION TO BE PARTIALLY INSTALLED, FOLLOWING COMPLETION OF THE ROAD, WITH THE TOP 75-100mm OF FILTER MEDIA REPLACED WITH A FINE TO COARSE SAND UNDERLAIN WITH A GEOTEXTILE LAYER (REFER TO DETAIL). FOLLOWING COMPLETION OF THE UPSTREAM DEVELOPMENT AND SITE STABILISATION, THE SAND IS TO BE REMOVED, REPLACED WITH FILTER MATERIAL AND PLANTED OUT. REFER TO TEMPORARY BIO-BASIN DETAIL



BIORETENTION CLEANOUT EYE ELEVATION

SCALE 1:20

DENOTED C.E. ON PLAN



REFER TO TYPICAL SGGP DETAIL FOR PIT DIMENSIONS AND REINFORCEMENT DETAILS

SECTION

SCALE 1:20

BASIN INLET PIT - BIP

BIO-RETENTION BASIN DETAILS

SCALE 1:20

FOR DEVELOPMENT APPLICATION

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

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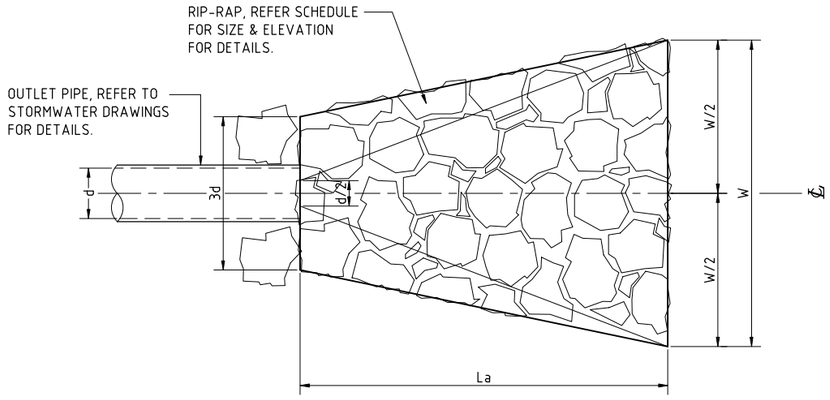
DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 3

DRAWING No C013674.01-DA47

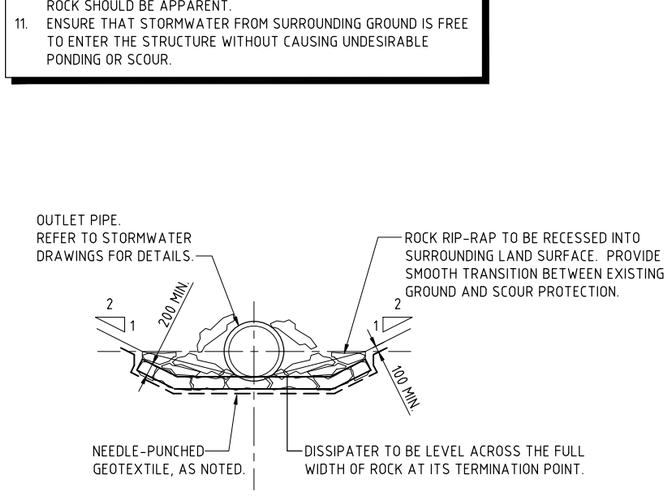
ISSUE C

DISSIPATER NOTES :

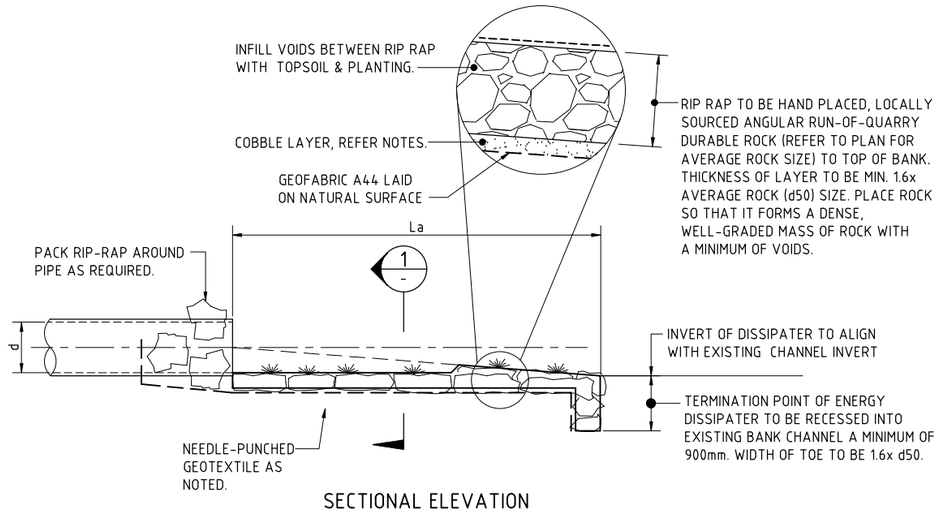
1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50= 150mm MINIMUM) AS NOTED ON THE PLAN. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 1.6x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.



PLAN



SECTION 1:50 (1/-)



SECTIONAL ELEVATION

STORMWATER OUTLET DISSIPATER

SCALE 1:50

500mm 0 1 2 3 4 5m

SCALE 1:50 AT A1 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	21.10.20	B
ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	A

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA48

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DRAWING TITLE
STORMWATER DRAINAGE DETAILS SHEET 4

DRAWING No C013674.01-DA48

ISSUE B

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY SURVEYORS TITLED 05384 001DT DATED 21/06/2018.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W × 200D U.N.O.)
- EXISTING SEWER MAIN
- 50.00 FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF WATERWAY TO BE REINSTATED. REMOVE EXISTING CULVERTS & PAVEMENT AND CONSTRUCT WATERWAY.

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF EXISTING WATERWAY

PROVIDE BATTERS TO TOP EXISTING WATERWAY

RETAINING WALL 2
HEIGHT = 4.2m MAX.
LENGTH = 76m APPROX.

STORMWATER DRAINAGE EASEMENT

END OF WALL 1

START OF WALL 2

START OF WALL 3

END OF WALL 2

END OF WALL 3

PROPOSED BUILDING
FFL 15.78

BASEMENT BELOW

PROVIDE MAX. 1V:3H BATTER TO TOP OF WALL WITH BERMS AT TOP & BOTTOM

RETAINING WALL 3
HEIGHT = 1.5 MAX.
LENGTH = 74m APPROX.

STORMWATER MANAGEMENT BASIN
REFER TO DRAWING DA41 FOR DETAILS

RETAINING WALL 1
HEIGHT = 6.0m MAX.
LENGTH = 170m APPROX.
REINFORCED EARTH WALL.

PROPOSED BUILDING
FFL 17.55

RETAINING WALL 4
REFER TO DRAWING DA52 FOR DETAILS

EXISTING BUILDING
FFL 18.24

START OF WALL 1

PROVIDE MAX. 1V:3H BATTERS WITH BERMS AT TOP & BOTTOM. TYPICAL

ORLANDO ROAD

INMAN ROAD

SOUTH CREEK ROAD

SITE BOUNDARY

ADJACENT SITE BOUNDARY

APPROXIMATE

3 DA55 · 2 DA55 · 1 DA55 · 7 DA57 · 3 DA56 · 4 DA56

FINISHED LEVELS PLAN - GROUND FLOOR
1:500 SCALE

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	21.10.20	D
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ISSUED FOR DEVELOPMENT APPLICATION	26.11.19	B
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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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DRAWING TITLE
FINISHED LEVELS PLAN
GROUND FLOOR

DRAWING No C013674.01-DA51 ISSUE D

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY SURVEYORS TITLED 05384 001DT DATED 21/06/2018.

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- SJP, SEALED JUNCTION PIT
- GRATED DRAIN (300W × 200D U.N.O.)
- EXISTING SEWER MAIN
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

SELF STORAGE UNITS
FFL 13.85

STORMWATER MANAGEMENT BASIN
REFER TO DRAWING DA41 FOR DETAILS

RETAINING WALL 5
HEIGHT = 1.0m MAX.
LENGTH = 21m APPROX.

END OF WALL 4

RETAINING WALL 4
HEIGHT = 1.0m MAX.
LENGTH = 21m APPROX.

START OF WALL 4

5
DA56

SELF STORAGE UNITS
FFL 13.85

EXISTING BUILDING
FFL 14.85

PROVIDE MAX. 1V:3H BATTERS WITH BERMS AT TOP & BOTTOM.
TYPICAL

ORLANDO ROAD

INMAN ROAD

SOUTH CREEK ROAD

SITE BOUNDARY

CREEK

SOUTH

FINISHED LEVELS PLAN - BASEMENT

1:500 SCALE

6
DA57

5m 0 10 20 30 40 50m
1:500 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

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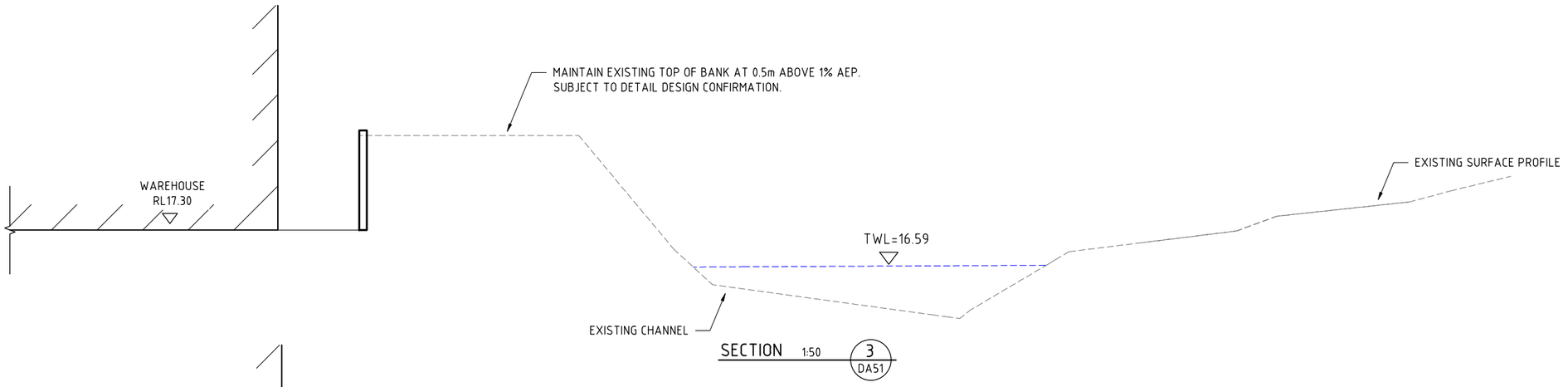
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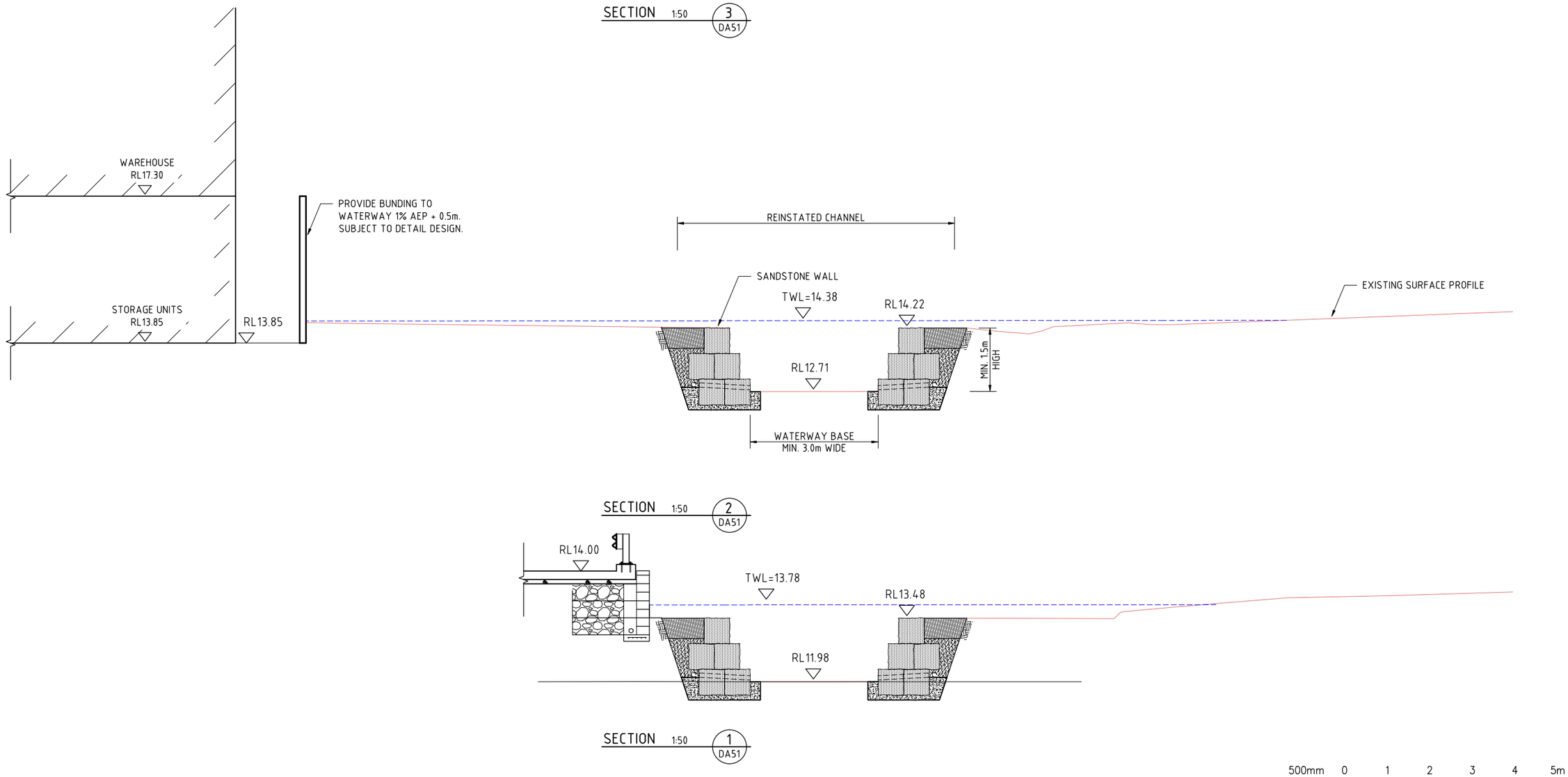
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DRAWING TITLE
FINISHED LEVELS PLAN
BASEMENT

DRAWING No C013674.01-DA52

ISSUE C





500mm 0 1 2 3 4 5m
1:50 SCALE AT A1 SCALE

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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

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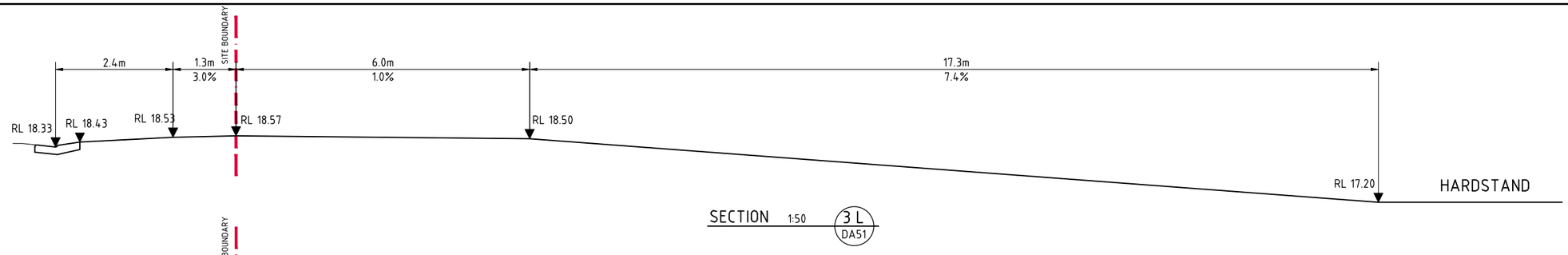
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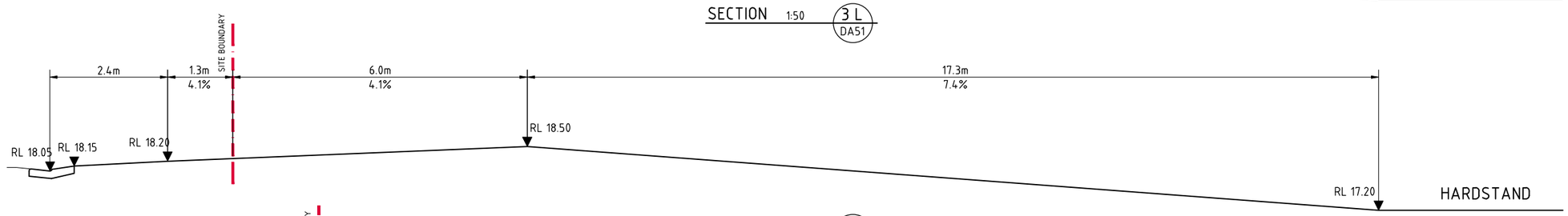
DRAWING TITLE
TYPICAL SECTIONS
SHEET 1

DRAWING No C013674.01-DA55

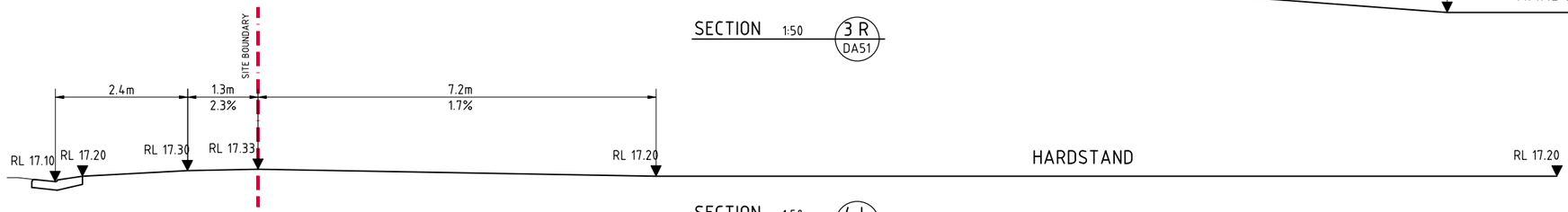
ISSUE C



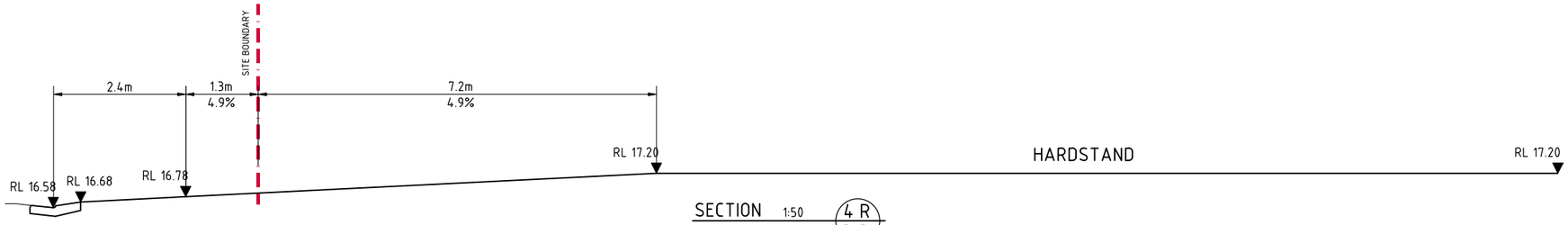
SECTION 1:50 3 L DA51



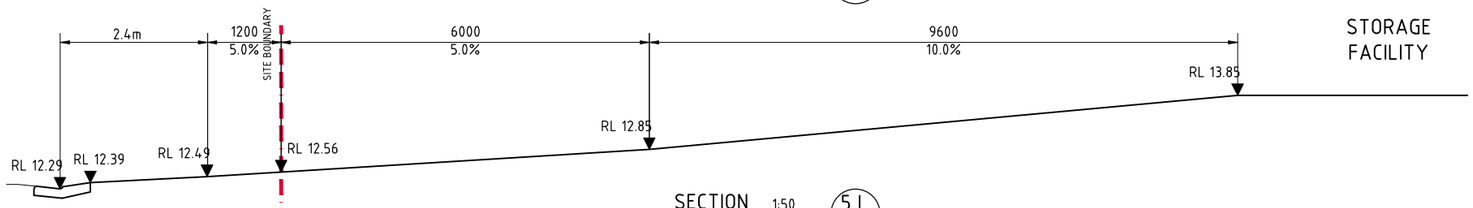
SECTION 1:50 3 R DA51



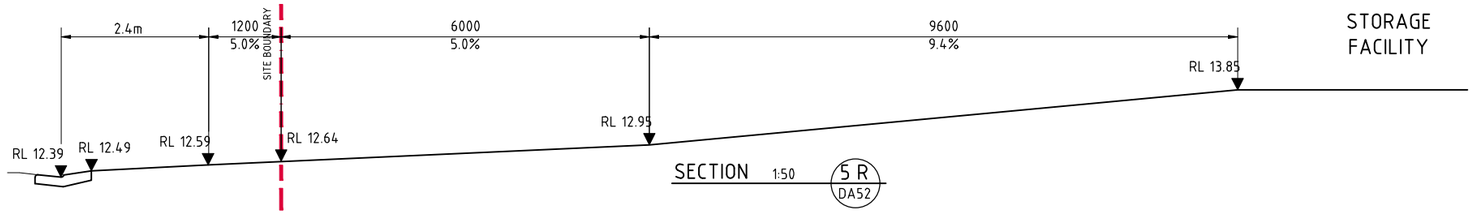
SECTION 1:50 4 L DA51



SECTION 1:50 4 R DA51



SECTION 1:50 5 L DA52



SECTION 1:50 5 R DA52

ACCESS NOTE:

VEHICULAR CROSSING TO BE IN ACCORDANCE WITH NORTHERN BEACHES COUNCIL NORMAL STANDARD VEHICLE CROSSING PROFILE.

500mm 0 1 2 3 4 5m
1:50 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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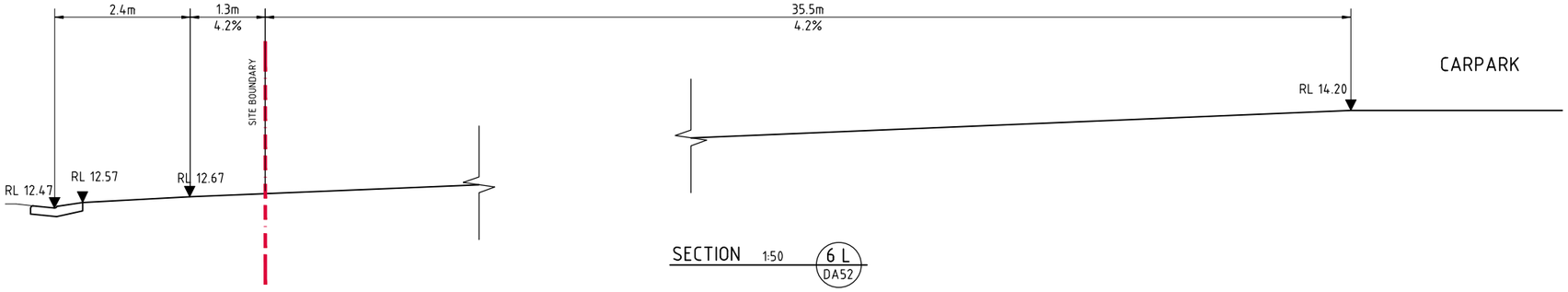
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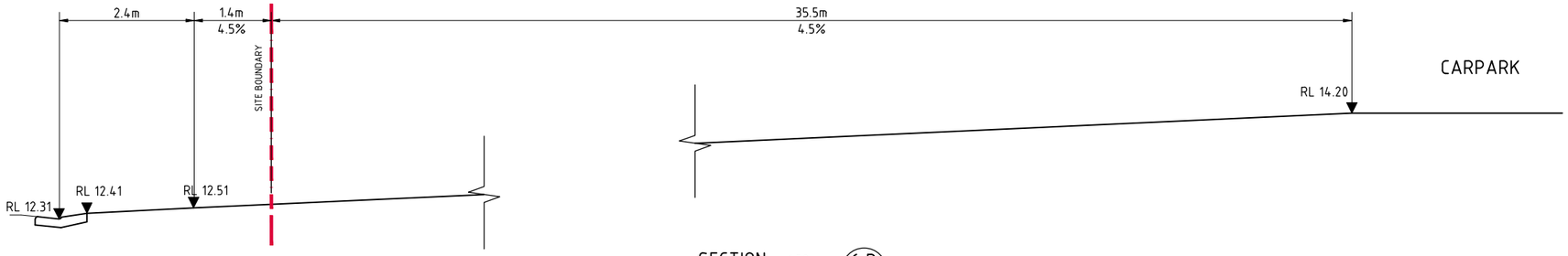
DRAWING TITLE
TYPICAL SECTIONS
SHEET 2

DRAWING No C013674.01-DA56

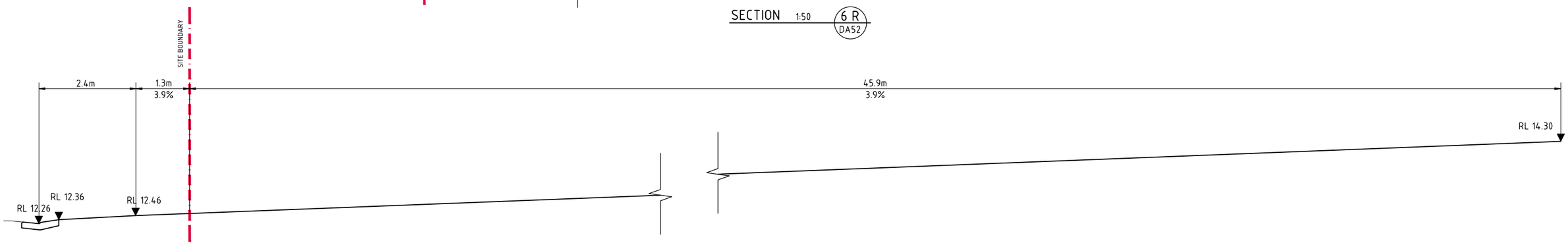
ISSUE B



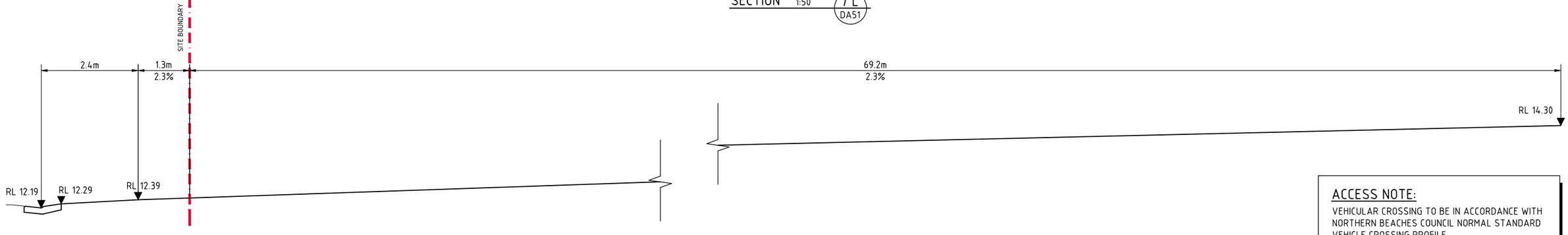
SECTION 1:50 — 6 L / DA52



SECTION 1:50 — 6 R / DA52



SECTION 1:50 — 7 L / DA51



SECTION 1:50 — 7 R / DA51

ACCESS NOTE:

VEHICULAR CROSSING TO BE IN ACCORDANCE WITH NORTHERN BEACHES COUNCIL NORMAL STANDARD VEHICLE CROSSING PROFILE.

500mm 0 1 2 3 4 5m
1:50 SCALE AT A1 SCALE

FOR DEVELOPMENT APPLICATION

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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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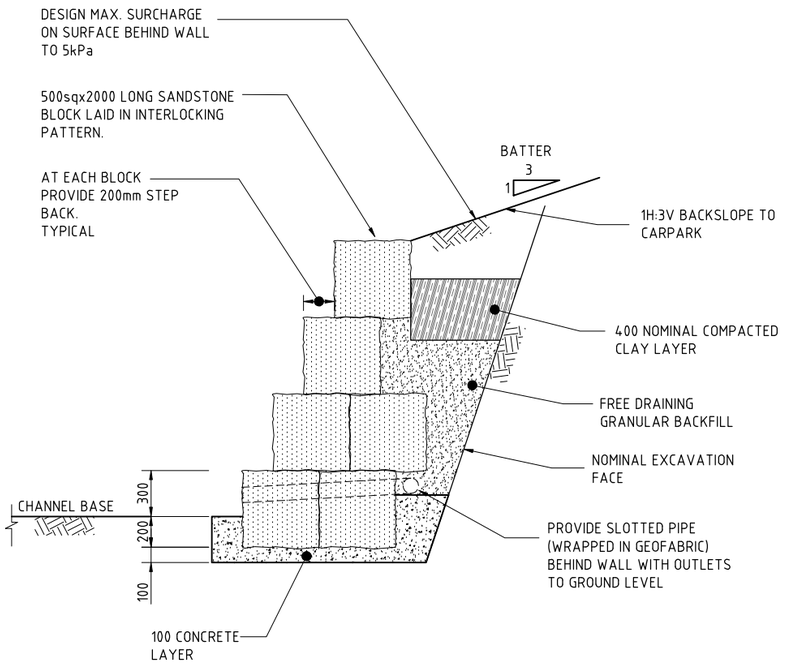
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DRAWING TITLE
TYPICAL SECTIONS
SHEET 3

DRAWING No C013674.01-DA57 ISSUE B



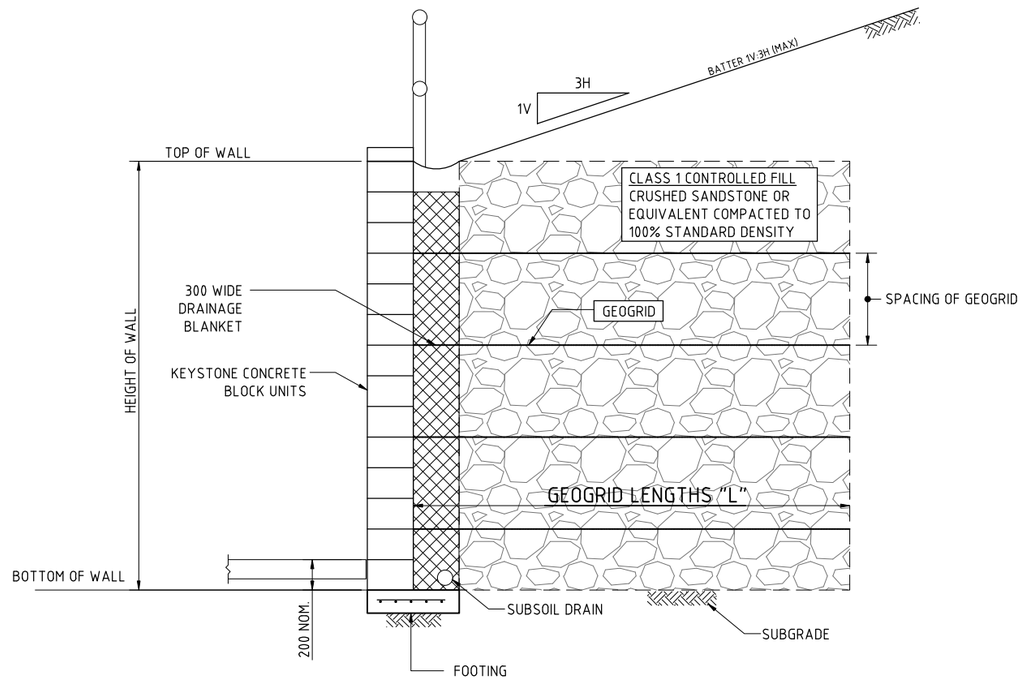
SANDSTONE WALL DETAIL

SCALE 1:20

NOTE:

BASED ON 500x500x2000 LONG STANDARD CUT SANDSTONE BLOCKS LAID IN INTERLOCKING BRICK PATTERN:

- FIRST TWO COURSES TO BE 2xSANDSTONE BLOCKS IN 100 MASS CONCRETE BEDDING.
- THIRD & FOURTH COURSE TO BE 1 SANDSTONE BLOCK.
- STEP EACH SUCCESSIVE COURSES 200mm BACK



REINFORCED EARTH RETAINING WALL

SCALE 1:20

WALL HEIGHT "H"	GEOGRID LENGTH "L"	GEOGRID TYPE
2300	2600	GX50/30
3300	3500	GX50/30
4300	4700	GX50/30
5300	5800	GX50/30
6400	6900	GX50/30
7400	7600	GX50/30

NOTE :
INDICATIVE DETAIL ONLY. DESIGN TO BE CONFIRMED / PROVIDED BY D+C CONTRACTOR.

REINFORCED EARTH RETAINING WALL NOTES:

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH AS4678 AND THE STANDARDS REFERRED TO THEREIN.
2. MINIMUM HEIGHT (H) TO GEOGRID REINFORCEMENT LENGTH (L) TO BE 1.0.
3. MINIMUM BEARING CAPACITY OF FOUNDATION (BASED ON MINIMUM H/L RATIO OF 1.0) TO BE AS FOLLOWS:
   a. H MAX. 2.0m = 100 kPa
   b. H MAX. 3.5m = 150 kPa
   c. H MAX. 5.0m = 200 kPa

   BEFORE COMMENCEMENT OF CONSTRUCTION THE FOUNDATION SHALL BE INSPECTED AND VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER.
4. WHERE MINIMUM BEARING IS NOT ACHIEVABLE OR NOT MEETING DESIGN REQUIREMENT, THE FOUNDATION MATERIAL IS TO BE EXCAVATED AND REPLACED WITH APPROVED MATERIAL PLACED IN ACCORDANCE WITH THE FILLING SPECIFICATION TO A MINIMUM COMPACTION OF 100% SMDD AND PLACED WITHIN 2% OF OMC.
5. MINIMUM SURCHARGE LOADS TO BE APPLIED AS FOLLOWS U.N.O. ON PLAN:
   a. LIVE LOAD = 20 kPa
   b. DEAD LOAD = 5 kPa
   c. CONSTRUCTION TRAFFIC LIVE LOAD = 10 kPa
6. THE GEOGRIDS SHALL BE OF THE TYPE AND INDEX STRENGTH NOMINATED ON THE DRAWINGS. THE MINIMUM GEOGRIDS SHALL BE A SINGLE LENGTH IN THE DIRECTION OF DESIGN TENSION, NOT LAPPED, MAKING PROVISION FOR CONNECTION TO THE FACING ACROSS THE WHOLE WIDTH OF THE FACING AND PROVIDING FOR THE SPECIFIED ANCHORAGE WITHIN THE DESIGNATED ANCHORAGE ZONE. GEOGRIDS SHALL COVER THE WHOLE OF THE PLAN AREA BEHIND THE WALL FOR THE SPECIFIED ANCHORAGE LENGTH AND SHALL BE LAPPED WITH ADJACENT SECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. MINIMUM WALL EMBEDMENT AT THE TOE OF THE WALL TO BE 300mm.
8. DESIGN LIFE OF STRUCTURE IS TO BE 100 YEARS.
9. SELECT BACKFILL MATERIAL WITHIN THE REINFORCED SOIL BLOCK SHALL BE SOUND GRANULAR MATERIAL OF NATURAL OR INDUSTRIAL ORIGIN, NON-EXPANSIVE, FREE FROM ORGANIC OR OTHER DELETERIOUS MATERIAL CONFORMING TO THE PHYSICAL, CHEMICAL AND ELECTROCHEMICAL LIMITS AS SPECIFIED AND SHALL NOT BE SUBJECT TO BREAKDOWN UNDER COMPACTION. THE SELECT BACKFILL MATERIAL IS TO HAVE THE FOLLOWING PARAMETERS:
   a. MINIMUM INTERNAL FRICTION, Ø = 34°
   b. EFFECTIVE COHESION, C'= 0 kPa
   c. UNIT WEIGHT = 21 kN/m^3
   d. PH BETWEEN 4 AND 9.
10. SELECT BACKFILL IS TO BE PLACED AND COMPACTED IN LAYERS NOT MORE THAN 300mm (LOOSE). COMPACTION TO NOT LESS THAN 100% SMDD WILL BE ACHIEVED AND MATERIAL PLACED WITHIN 2% OF OMC. DENSITY TESTING SHALL BE PERFORMED IN EACH COMPACTED LIFT IN ACCORDANCE WITH AS3798.
11. PROVIDE A DRAINAGE LAYER DIRECTLY BEHIND THE FACING UNITS IN A MINIMUM 300mm WIDE 12-20mm AGGREGATE LAYER. FACING UNIT VOIDS TO BE FILLED WITH AGGREGATE. PROVIDE 100mm MINIMUM AG. DRAIN IN GEOTEXTILE SOCK AT TOE OF WALL FACING AND CONNECT TO DRAINAGE SYSTEM AT 30m MAX. SPACING.
12. THE NEED FOR A CHIMNEY DRAIN OR DRAINAGE AT THE REAR OF THE MASS SOIL BLOCK IS TO BE CONFIRMED ON SITE BY THE GEOTECHNICAL ENGINEER AND DESIGNER FOLLOWING PREPARATION OF THE FOUNDATION AND PRIOR TO CONSTRUCTION OF THE MASS SOIL BLOCK.
13. CONSTRUCTION EQUIPMENT WEIGHING MORE THAN 500kG STATIC WEIGHT IS TO BE KEPT BACK 1.5m FROM THE REAR FACE OF THE WALL FACING UNITS. COMPACTION OF THE SELECT FILL MATERIAL WITHIN THE 1.5m STRIP ADJACENT TO THE WALL SHALL BE ACHIEVED BY LIGHT MECHANICAL TAMPERS (VIBRATING PLATE, TRENCH COMPACTOR OR SIMILAR) TO GIVE THE SAME DENSITY AS IN THE REMAINDER OF THE SELECT FILL.
14. ALL DESIGN AND CONSTRUCT WALL SYSTEM TO BE COMPLETED IN ACCORDANCE WITH THESE NOTES.

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A1 SIZE SHEET

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DRAWING TITLE
RETAINING WALL DETAILS

DRAWING No C013674.01-DA65

ISSUE B



OVERLAND FLOW CATCHMENT PLAN
1:2500 SCALE

NOTE:
DRAWINGS TO BE READ IN CONJUNCTION WITH OVERLAND FLOW REPORT C013674.01-02.rpt & CIVIL ENGINEERING REPORT FOR DEVELOPMENT APPLICATION C013674.01-01.rpt.

20m 0 50 100 150 200 250m
1:2500 SCALE AT A1 SHEET SIZE

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
OVERLAND FLOW CATCHMENT PLAN

DRAWING No C013674.01-DA70 ISSUE B

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY SURVEYORS TITLED 05384 001DT DATED 21/06/2018.

- 15.00 – OVERLAND FLOW LEVEL CONTOUR (MAJOR) 0.5m INTERVALS
- 15.10 – OVERLAND FLOW LEVEL CONTOUR (MINOR) 0.1m INTERVALS
- 15.50 – EXISTING LEVEL CONTOUR 0.5m INTERVALS
- 15.00 – EXISTING LEVEL SPOT HEIGHT
- 1% AEP FLOOD EXTENT & LEVELS

MODELED FLOW ENTRY POINT Q=8.52m³/s

EXISTING BUILDING FFL 21.23

EXISTING BUILDING FFL 19.16

EXISTING BUILDING FFL 14.60

EXISTING HEADWALL AND 2×Ø825 PIPES AT I.L.13.58 & I.L.13.39 UNDER EXISTING DRIVEWAY TO BE DEMOLISHED

EXISTING BUILDING FFL 14.45

EXISTING HEADWALL AND 2×Ø825 PIPES AT I.L.11.57 & I.L.11.52 TO BE DEMOLISHED

EXISTING SANDSTONE WALL

MODELED FLOW ENTRY POINT Q=2.21m³/s

EXISTING HEADWALL AND 2×Ø900 PIPES AT I.L.10.67 TO BE PRESERVED

SITE - BOUNDARY

ORLANDO ROAD

INMAN ROAD

SOUTH CREEK ROAD

APPROXIMATE EXTENT OF ADJACENT SITE - BOUNDARY

PRE-DEVELOPMENT OVERLAND FLOW DEPTH & EXTENT

1:500 SCALE

NOTES:

- DRAWINGS TO BE READ IN CONJUNCTION WITH OVERLAND FLOW REPORT C013674.01-02.rpt & CIVIL ENGINEERING REPORT FOR DEVELOPMENT APPLICATION C013674.01-01.rpt.
- FLOOD EXTENT REFLECTS 1% AEP DESIGN EVENT AT PEAK FLOW RATE.

5m 0 10 20 30 40 50m

1:500 SCALE AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	21.10.20	B
ISSUED FOR DEVELOPMENT APPLICATION	28.02.20	A

ARCHITECT

CLIENT
EG FUNDS MANAGEMENT
GOVERNOR PHILLIP TOWER
21/1 FARRER PLACE
SYDNEY, NSW 2000

PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA71

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
PRE-DEVELOPMENT OVERLAND FLOW DEPTH & EXTENT

DRAWING No C013674.01-DA71

ISSUE A

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS LOCKLEY SURVEYORS TITLED 05384 001DT DATED 21/06/2018.

- 15.00 – OVERLAND FLOW LEVEL CONTOUR (MAJOR) 0.5m INTERVALS
- 15.10 – OVERLAND FLOW LEVEL CONTOUR (MINOR) 0.1m INTERVALS
- 15.50 – EXISTING LEVEL CONTOUR 0.5m INTERVALS
- 15.00 – EXISTING LEVEL SPOT HEIGHT
- 1% AEP FLOOD EXTENT & LEVELS

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

APPROXIMATE EXTENT OF WATERWAY TO BE REINSTATED. REMOVE EXISTING CULVERTS & PAVEMENT AND CONSTRUCT WATERWAY.

APPROXIMATE EXTENT OF EXISTING WATERWAY TO BE MAINTAINED

MODELED FLOW ENTRY POINT Q=8.52m³/s

EXISTING HEADWALL AND 2×Ø825 PIPES AT I.L.11.57 & I.L.11.52 TO BE DEMOLISHED

SITE DISCHARGE POINT Q=1.11m³/s

EXISTING HEADWALL AND 2×Ø900 PIPES AT I.L.10.67 TO BE PRESERVED

PROPOSED STORMWATER MANAGEMENT BASIN. REFER TO DRAWING DA41 FOR DETAILS.

PROPOSED BUILDING FFL 15.78

PROPOSED BUILDING FFL 17.55

EXISTING BUILDING FFL 18.24

STORMWATER DRAINAGE EASEMENT

ORLANDO ROAD

SITE - BOUNDARY

INMAN ROAD

SOUTH CREEK ROAD

APPROXIMATE EXTENT OF ADJACENT SITE - BOUNDARY

POST-DEVELOPMENT OVERLAND FLOW DEPTH & EXTENT

1:500 SCALE

NOTES:

- DRAWINGS TO BE READ IN CONJUNCTION WITH OVERLAND FLOW REPORT C013674.01-02.rpt & CIVIL ENGINEERING REPORT FOR DEVELOPMENT APPLICATION C013674.01-01.rpt.
- FLOOD EXTENT REFLECTS 1% AEP DESIGN EVENT AT PEAK FLOW RATE.

5m 0 10 20 30 40 50m

1:500 SCALE AT A1 SHEET SIZE

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
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ISSUED FOR DEVELOPMENT APPLICATION	28.02.20	A

ARCHITECT

CLIENT
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PROJECT
PROPOSED DEVELOPMENT
100 SOUTH CREEK ROAD
CROMER, 2099, NEW SOUTH WALES

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
TW	TW	OCT 2019	MW	A1	AS SHOWN	C013674.01-DA72

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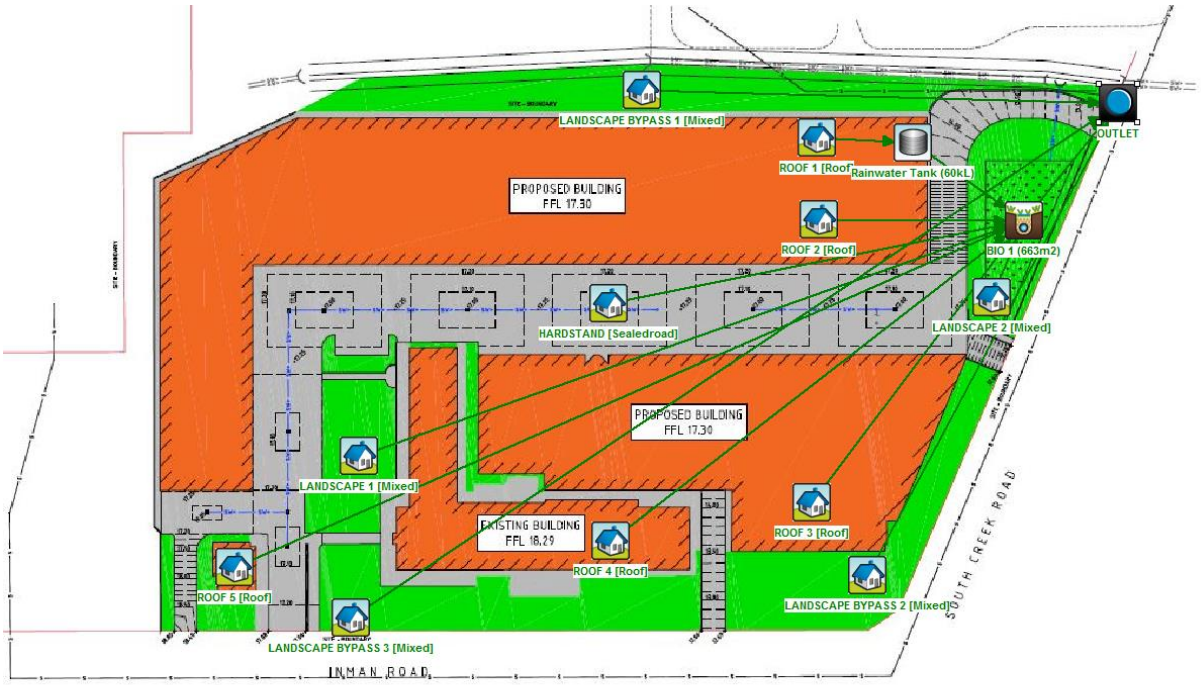
DRAWING TITLE
POST-DEVELOPMENT OVERLAND FLOW DEPTH & EXTENT

DRAWING No C013674.01-DA 72

ISSUE B

Appendix B

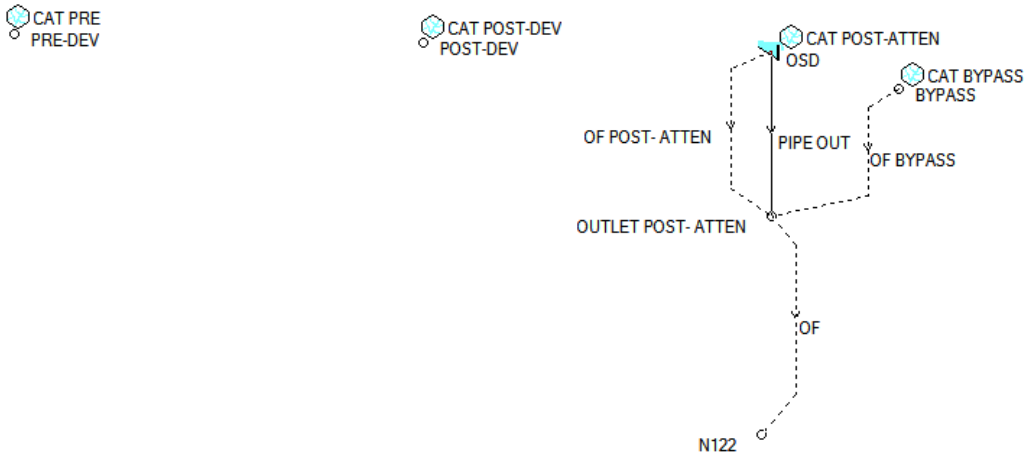
MUSIC MODEL CONFIGURATION



	Sources	Residual Load	% Reduction
Flow (ML/yr)	41.8	38.5	8
Total Suspended Solids (kg/yr)	5580	826	85.2
Total Phosphorus (kg/yr)	12.1	3.78	68.7
Total Nitrogen (kg/yr)	91.4	37.1	59.4
Gross Pollutants (kg/yr)	940	0	100

Appendix C

DRAINS MODEL CONFIGURATION



Appendix D

EROSION CONTROL CHECK SHEET

EROSION AND SEDIMENT CONTROL
WEEKLY SITE INSPECTION SHEET

LOCATION . . . . . .
INSPECTION OFFICER . . . . . **DATE** . . . . . .
SIGNATURE . . . . . .

Legend: □ OK □ Not OK N/A Not applicable

Item	Consideration	Assessment
1	Public roadways clear of sediment.	. . . . .
2	Entry/exit pads clear of excessive sediment deposition.	. . . . .
3	Entry/exit pads have adequate void spacing to trap sediment.	. . . . .
4	The construction site is clear of litter and unconfined rubbish.	. . . . .
5	Adequate stockpiles of emergency ESC materials exist on site.	. . . . .
6	Site dust is being adequately controlled.	. . . . .
7	Appropriate drainage and sediment controls have been installed prior to new areas being cleared or disturbed.	. . . . .
8	Up-slope "clean" water is being appropriately diverted around/through the site.	. . . . .
9	Drainage lines are free of soil scour and sediment deposition.	. . . . .
10	No areas of exposed soil are in need of erosion control.	. . . . .
11	Earth batters are free of "rill" erosion.	. . . . .
12	Erosion control mulch is not being displaced by wind or water.	. . . . .
13	Long-term soil stockpiles are protected from wind, rain and stormwater flow with appropriate drainage and erosion controls.	. . . . .
14	Sediment fences are free from damage.	. . . . .
15	Sediment-laden stormwater is not simply flowing "around" the sediment fences or other sediment traps.	. . . . .
16	Sediment controls placed up-slope/around stormwater inlets are appropriate for the type of inlet structure.	. . . . .
17	All sediment traps are free of excessive sediment deposition.	. . . . .
18	The settled sediment layer within a sediment basin is clearly visible through the supernatant prior to discharge such water.	. . . . .
19	All reasonable and practicable measures are being taken to control sediment runoff from the site.	. . . . .
20	All soil surfaces are being appropriately prepared (i.e. pH, nutrients, roughness and density) prior to revegetation.	. . . . .
21	Stabilised surfaces have a minimum 70% soil coverage.	. . . . .
22	The site is adequately prepared for imminent storms.	. . . . .
23	All ESC measures are in proper working order.	. . . . .

WILLOW TREE PLANNING

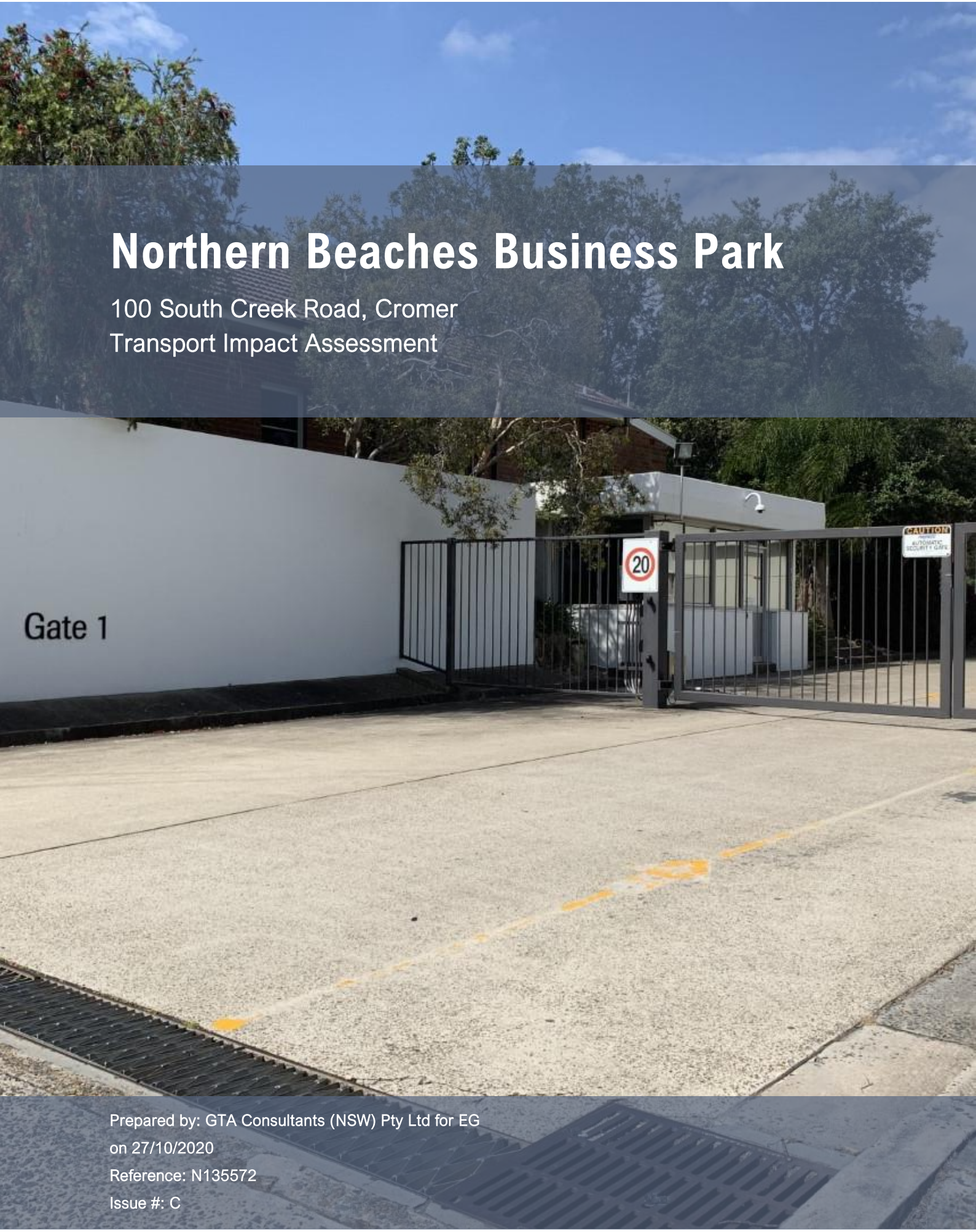
Appendix 4

Addendum Transport Impact Assessment

A national town planning consultancy
www.willowtreeplanning.com.au

Northern Beaches Business Park

100 South Creek Road, Cromer
Transport Impact Assessment



Prepared by: GTA Consultants (NSW) Pty Ltd for EG
on 27/10/2020
Reference: N135572
Issue #: C

GTAconsultants

Northern Beaches Business Park

100 South Creek Road, Cromer
Transport Impact Assessment

Client: EG

on 27/10/2020

Reference: N135572

Issue #: C

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	21/11/2019	Final	Sherry Merson Ashish Modessa	Brett Maynard	Brett Maynard	Brett Maynard
B	22/10/2020	Updated to reflect revised scheme	Sherry Merson Ashish Modessa	Ashish Modessa	Brett Maynard	Brett Maynard
C	27/10/2020	Minor further updates	Sherry Merson Ashish Modessa	Ashish Modessa	Brett Maynard	Brett Maynard

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1. INTRODUCTION

01

1.1. Background

It is understood that a development application is to be lodged with Northern Beaches Council (Council) for a proposed warehouse/ industrial and commercial development at 100 South Creek Road, Cromer. EG engaged GTA Consultants (GTA) to undertake a transport impact assessment for the proposed development.

The site is currently vacant, with existing light industrial/ warehouse facilities comprising approximately 13,450 square metres gross floor area (GFA) of warehouse use and 11,400 square metres GFA of office space (i.e. total GFA of approximately 24,850 square metres).

The proposed redevelopment of the site will include 11 warehouse units with mezzanine offices, a further five office tenancies, a self-storage facility and a café, totalling 27,658 square metres GFA. The proposed office space will only account for 18 per cent of the total GFA, compared to 46 per cent for the existing on-site facilities.

1.2. Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.3. References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Warringah Development Control Plan (DCP) 2011
- Warringah Local Environmental Plan (LEP) 2011
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2018
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- traffic and car parking surveys undertaken by Matrix as referenced in the context of this report
- plans for the proposed development prepared by SBA Architects, Drawing Number S4.55-202, Revision 1, dated 12 October 2020
- other documents and data as referenced in this report.

2. TRANSPORT CONTEXT

02

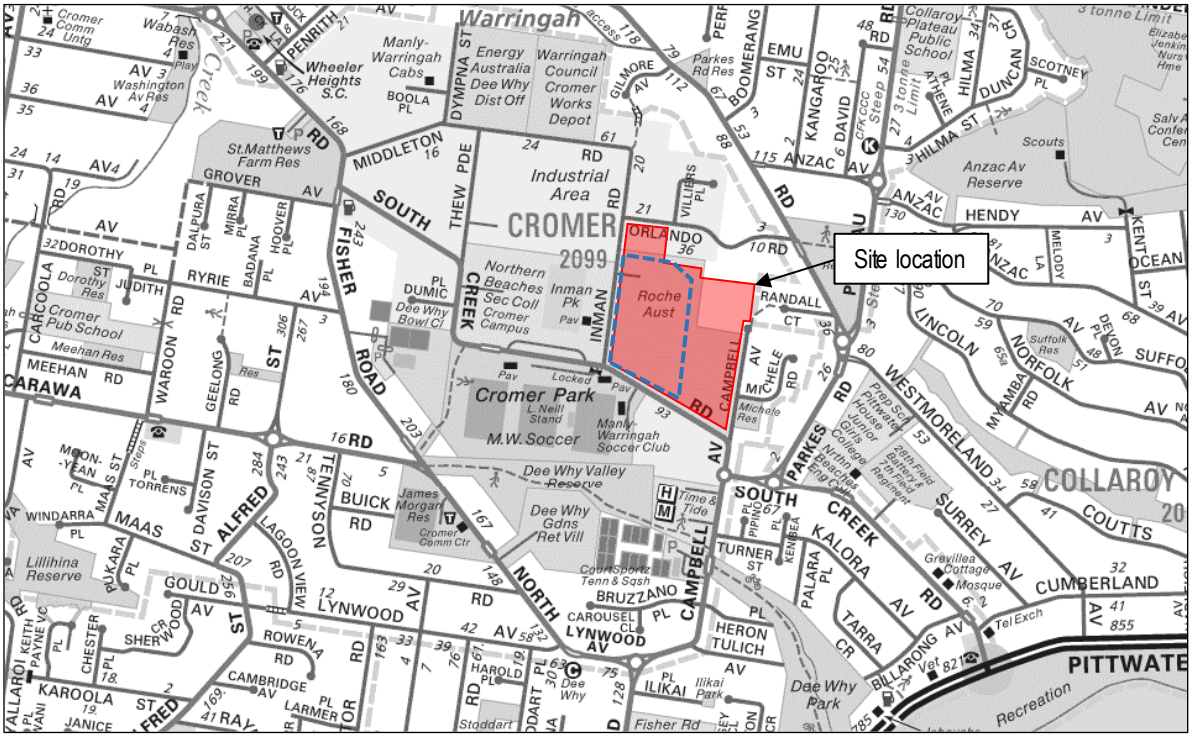
2.1. Location

The subject site is located at 100 South Creek Road, Cromer. The site of approximately 44,500 square metres has a frontage of 190 metres to South Creek Road and 210 metres to Inman Road. The site currently has a land use classification as IN1 General Industrial and is occupied by vacant industrial and commercial/ office facilities.

The surrounding properties predominantly include industrial developments to the north and south, Cromer Park sports fields to the southwest, Cromer High School to the west and residential uses to the east of the site.

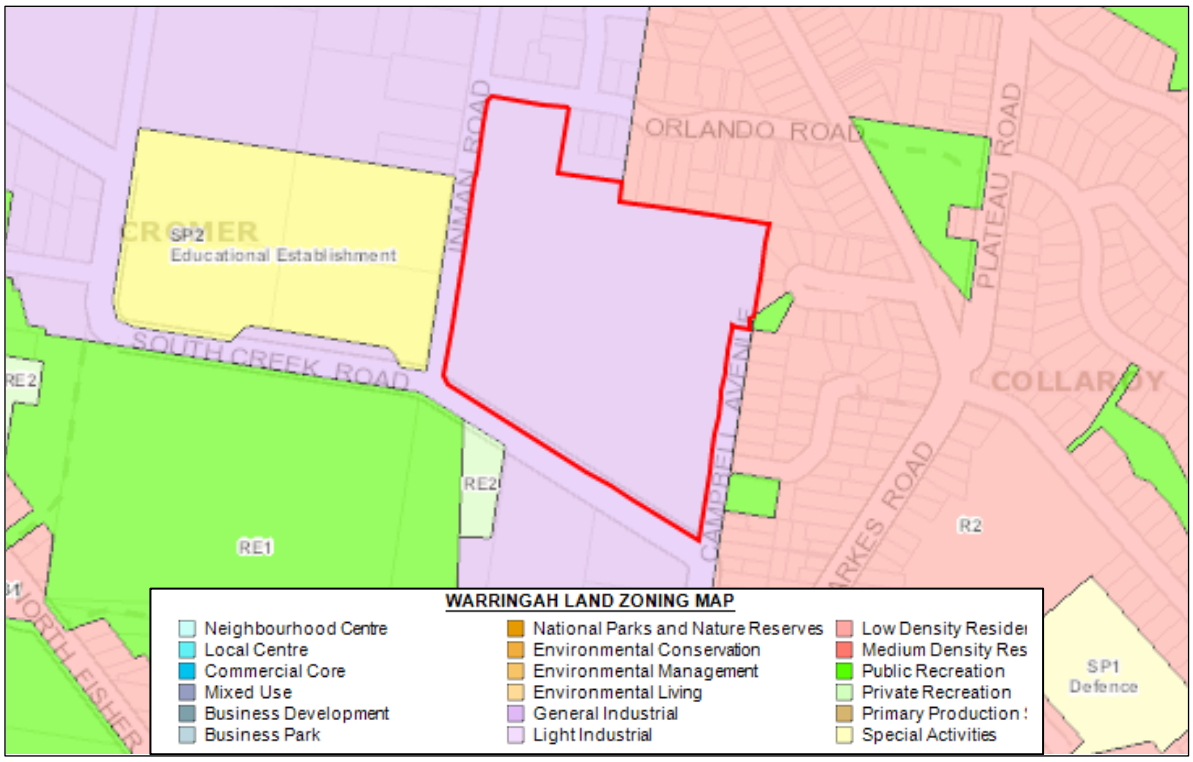
The location of the subject site and its surrounding environs is shown in Figure 2.1, while the Warringah LEP 2011 land use map is shown in Figure 2.2.

Figure 2.1: Subject site and its environs



Base image source: Sydway

Figure 2.2: Land use map



Base image source: Warringah LEP 2011

2.2. Transport Network

2.2.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Roads and Maritime Services (Roads and Maritime) responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

Roads and Maritime defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or Roads and Maritime under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2. Surrounding Road Network

Along the frontages of the site, South Creek Road, Inman Road, Orlando Road and Campbell Avenue function as local roads. South Creek Road and Campbell Avenue become sub-arterial roads south and east of where they intersect.

These roads have a posted speed limit of 50km/h, with one traffic lane and kerbside parking or parking lane in each direction. There is a combination of unrestricted and eight-hour time restricted kerbside parking near the site. Inman Road and Orlando Road have dedicated on-road bicycle shoulder lanes between the kerbside parking and the traffic lanes.

Pittwater Road is a 20-kilometre arterial road that generally aligns north-south linking Mona Vale to the north with Manly to the south. It is a two-way road configured with three traffic lanes in each direction, including peak direction kerbside bus lanes (southbound in the morning peak periods and northbound in the afternoon peak periods) with kerbside parking at other times. It has a posted speed limit of 60km/h.

The key roads are shown in Figure 2.3 to Figure 2.8.

Figure 2.3: Inman Road (looking north)



Figure 2.4: Inman Road (looking south)



Figure 2.5: South Creek Road (looking east)



Figure 2.6: South Creek Road (looking west)



Figure 2.7: Pittwater Road (looking east)



Figure 2.8: Pittwater Road (looking west)



2.3. Traffic Volumes

GTA commissioned vehicle turning movement counts at the South Creek Road intersections with Inman Road and Pittwater Road on Wednesday 16 October 2019, during the morning and afternoon peak periods:

The AM and PM peak hours were found to occur from 7.45am to 8.45am and 5:00pm to 6:00pm respectively, with full survey results contained in Appendix A.

2.4. Intersection Operation

The operation of the surveyed intersections has been assessed using SIDRA INTERSECTION[1], a computer based modelling package which calculates intersection performance.

[1] Program used under license from Akcelik & Associates Pty Ltd.

The commonly used measure of intersection performance, as defined by the Roads and Maritime, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.1: SIDRA INTERSECTION level of service criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2.2 presents a summary of the existing operation of the intersections, with full results presented in Appendix B. Signalised intersection results are based on the overall operation, whilst unsignalised intersection results are based on the worst movement.

Table 2.2: Existing operating conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Pittwater Road/ South Creek Road	AM	East	0.82	13	319	A
		North	0.80	60	119	E
		West	0.70	18	228	B
		Overall	**0.82**	**21**	**319**	**B**
	PM	East	0.55	11	100	A
		North	0.55	48	66	D
		West	0.78	14	203	A
		Overall	**0.78**	**16**	**203**	**B**
South Creek Road/ Inman Road	AM	East	0.14	6	4	A
		North	0.11	7	3	A
		West	0.11	5	0	A
	PM	East	0.17	6	5	A
		North	0.16	8	4	A
		West	0.14	6	0	A

Table 2.2 indicates that the study intersections currently operate satisfactorily during the peak periods. There is some queuing along Pittwater Road in the peak direction, which is expected along an arterial road. South Creek Road experiences some delays during the peak periods as the green time priority is given to Pittwater Road.

2.5. Car Parking

A review of publicly available car parking near site indicates that eight-hour restricted parking is available on both sides of Inman Road and South Creek Road, with unrestricted parking on Orlando Road.

Observations of on-street car parking suggest there is low demand during the afternoon peak period. There were less than 30 vehicles parked in the afternoon along Inman Road (19 spaces both sides) and South Creek Road (nine spaces both sides), which have kerbside supply of approximately 80 spaces and 75 spaces respectively on both sides. This suggests there are at least 120 spaces available.

Along the site frontages there are currently 45 spaces between Inman Road and South Creek Road.

2.6. Public Transport

Bus route 158 services link Cromer with Manly via Dee Why and Brookvale. Bus stops are located on South Creek Road adjacent to the site. Buses are infrequent with one service running in the morning and one in the evening.

There are further bus services (bus routes 151, 185, 188, 199, E60, E83, E85) on Pittwater Road, with the nearest bus stops a 12-minute walking distance from site. These services have 15-minute frequency during peak periods, providing access to Palm Beach, Mona Vale, Warriewood Valley, Elanor Heights and Manly.

The surrounding bus network is shown in Figure 2.9.

Figure 2.9: Surrounding public transport network



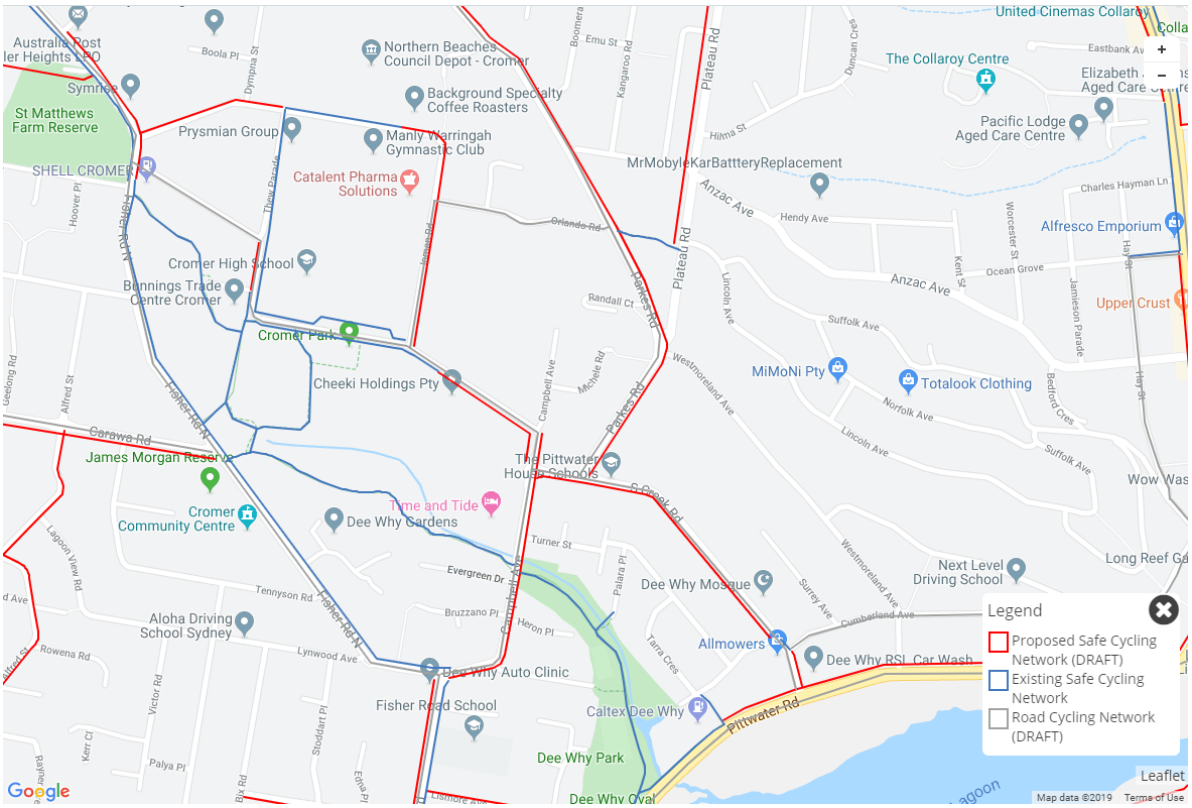
Base image source: https://transportnsw.info, accessed October 2019

2.7. Walking and Cycling Infrastructure

Footpaths are available on the south side of South Creek Road near the site and on the east side of Inman Road. The existing South Creek Road footpath ends at the bus stop adjacent to the site, with opportunity to extend the footpath to the South Creek Road/ Campbell Avenue roundabout.

On-road cycle shoulder lanes are located on both sides of Inman Road and Orlando Road, with off-road shared paths provided adjacent to Cromer Park and Cromer High School. The draft Northern Beaches Bike Plan proposes new and extended shared paths along Inman Road and South Creek Road towards Pittwater Road, illustrated in Figure 2.10.

Figure 2.10: Surrounding cycling network



Base image source: https://northernbeaches.mysocialpinpoint.com/northern-beaches-bike-plan?_ga=2.245940676.1585324789.1572220515-667743252.1572220515#/, accessed 28/10/19

3. DEVELOPMENT PROPOSAL

03

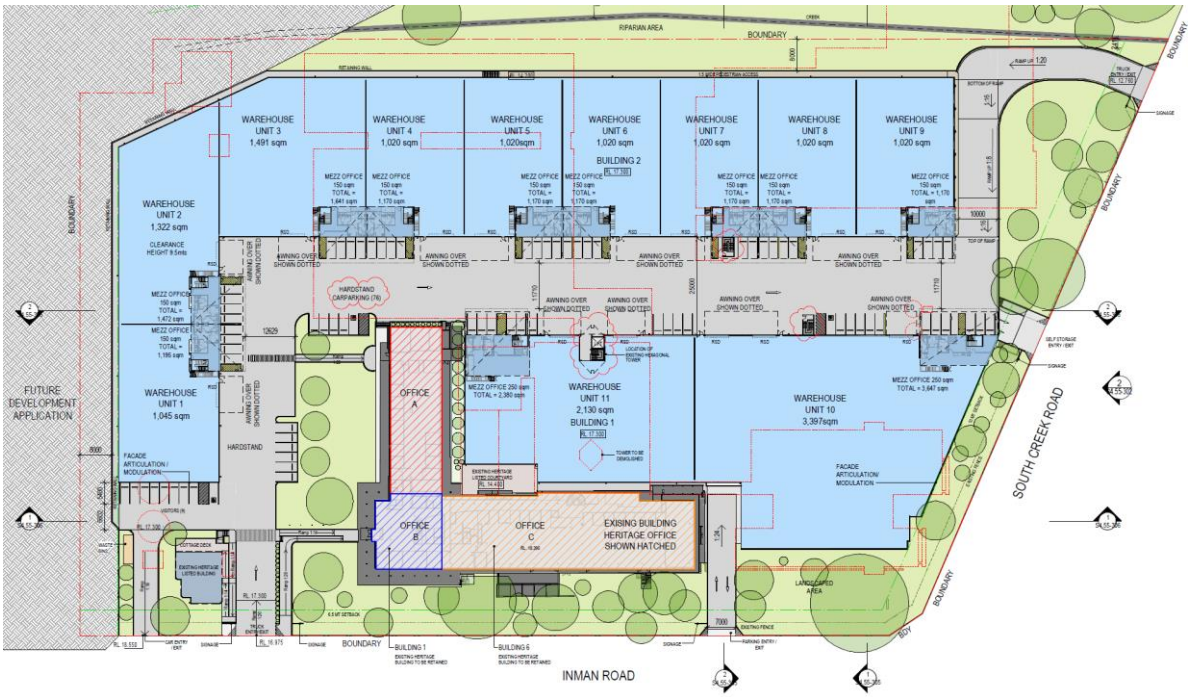
3.1. Land Uses

The proposed development incorporates light industrial, commercial and retail land uses fronting Inman Road. It intends to retain a heritage commercial building for five office tenancies, construct 11 warehouse units with mezzanine offices, a self-storage facility and a café also in a heritage building. The land use breakdown is summarised in Table 3.1, with the ground level site layout shown in Figure 3.1.

Table 3.1: Development schedule

Use	Description	Size (GFA)
Light Industrial/ Warehouse	Warehouse	15,505sq.m
	Mezzanine Office	1,850sq.m
Commercial		3,179sq.m
Self-storage facility		7,000sq.m
Café		124sq.m
Total		**27,658sq.m**

Figure 3.1: Proposed ground level site layout



Source: Ground Floor Plan, Drawing Number S4.55-202, Revision 1, prepared by SBA Architects, dated 12 October 2020

3.2. Vehicle Access and Parking

The proposal provides a total of 279 car parking spaces, with the breakdown of car parking spaces as follows:

- At-grade car parking – 76 spaces including nine visitor parking spaces
- Basement car parking – 203 spaces.

There are three separate site accesses proposed along Inman Road, as follows:

- a two-way visitor car park access (new driveway)
- an entry only at-grade car and truck access to the light industrial/ warehouse units (existing driveway location)
- a two-way basement car park access (existing driveway location).

A further two separate site accesses are proposed along South Creek Road, as follows:

- a two-way access to the self-storage facility (new driveway)
- an exit only access from the light industrial/ warehouse units (existing driveway location).

The at-grade circulation aisle that provides access to the light industrial/ warehouse units will be one-way, with clockwise circulation from Inman Road to South Creek Road.

4. PARKING ASSESSMENT

04

4.1. Bicycle Parking

The bicycle parking requirements for different development types are set out in Warringah DCP 2011. The DCP bicycle parking requirement for the proposal is summarised in Table 4.1, which indicates 44 bicycle spaces are required.

Table 4.1: Warringah DCP 2011 bicycle parking requirements

Use	Size	Bicycle parking rate	Bicycle parking requirement
Warehouse	15,505sq.m	1 per 600sq.m	26
Self-storage	7,000sq.m	1 per 600sq.m	12
Mezzanine	1,850sq.m	1 per 750sq.m	2
Office	3,179sq.m	1 per 750sq.m	4
Cafe	124sq.m	1 per 600sq.m	0
Total			**44 spaces**

40 bicycle parking spaces are currently shown on the architectural plans within the basement car park. The additional four spaces can be easily accommodated within a slightly larger bicycle parking facility that reduces the area designated as 'potential plant room location', as part of further design development.

4.2. Car Parking

In establishing the appropriate parking supply for the proposal, reference is made to both the Warringah Development Control Plan (DCP) 2011 and the Transport for NSW (formerly Roads and Maritime Services) *Guide to Traffic Generating Developments* 2002 (TfNSW Guide).

4.2.1. DCP Parking Requirements

The car parking requirements for different development types are set out in Warringah DCP 2011.

The Warringah DCP 2011 parking rates for warehouse and industry uses allows for up to 20 per cent office floor area within individual tenancies. A review of the area schedule suggests that the mezzanine office space for the 11 units will account for less than 15 per cent of the floor area, therefore no separate consideration of office floor area is required.

There are no specific rates for self-storage facilities, as such the warehouse rates have been applied.

The DCP car parking requirement for the proposal as summarised in Table 4.2.

Table 4.2: Warringah DCP 2011 car parking requirements

Use	Size	Car parking rate	Car parking requirement
Warehouse/ Factory	15,505sq.m	1.3 per 100sq.m	202
Self-storage	7,000sq.m	1.3 per 100sq.m	91
Mezzanine	1,850sq.m	1.3 per 100sq.m	24
Office	3,179sq.m	1 per 40sq.m	79
Cafe	124sq.m	12 per 100sq.m	15
Total			**411 spaces**

Table 4.2 suggests that the proposal requires 411 car parking spaces.

DCP 2011 also requires the proposal provides eight accessible spaces in accordance with the AS/NZ 2890.6.2009 – Parking facilities – Off-street parking for people with disabilities.

4.2.2. TfNSW Parking Requirements

The TfNSW Guide provides separate rates for factory and warehouse uses under the grouping of industry. The 20 per cent office floor area allowance also applies to the factory rate, however the warehouse rate does not specifically include this allowance and GTA typically considers ancillary office space separately for warehouses.

There are no specific rates for self-storage facilities, as such the warehouse rates have been applied.

The on-site café is ancillary to the overall development and surrounding area, and is not expected to be a destination in its own right. As such, any parking demand for the café (i.e. visitors not associated with other tenancies or immediate local area) would be minimal.

If the proposed warehouse component was considered to be all warehouse, the resulting car parking requirement is summarised in Table 4.3.

Table 4.3: TfNSW Guide 2002 – All Warehouse Rate

Use	Size	Car parking rate	Car parking requirement
Warehouse	15,505sq.m	1 per 300sq.m	52
Self-storage	7,000sq.m	1 per 300sq.m	23
Warehouse Mezzanine	1,850sq.m	1 per 40sq.m	46
Office	3,179sq.m	1 per 40sq.m	79
Cafe	124sq.m	-	-
Total			**200 spaces**

If the proposed warehouse component was considered to be all factory/ light industrial, the resulting car parking requirement is summarised in Table 4.4.

Table 4.4: TfNSW Guide 2002 – All Factory Rate

Use	Size	Car parking rate	Car parking requirement
Factory/ Light Industrial	15,489sq.m	1.3 per 100sq.m	202
Self-storage	7,000sq.m	1 per 300sq.m	23
Factory/ Light Industrial Mezzanine	1,850sq.m	1.3 per 100sq.m	24
Office	3,179sq.m	1 per 40sq.m	79
Cafe	124sq.m	-	-
Total			**328 spaces**

Table 4.3 and Table 4.4 suggests that the proposal requires between 200 and 328 car parking spaces with the proportion of factory and warehouse use to determine the requirement.

4.2.3. Empirical Assessment of Car Parking Demand

Warehouse/ Industry

There are no confirmed tenants for the individual units, however EG has advised that it is likely to include both warehouse and light industrial (e.g. medical equipment assembly) tenants. While the balance will vary over the life of the facility, it is unlikely that parking requirements will be skewed to either end of the range at a given point in time.

The rates adopted in TfNSW Guide for factory and warehouse uses better reflect the intended site occupancy/ operation compared with the single rate adopted in the Warringah DCP 2011. The DCP rate is considered an over-estimation of parking requirements as per above, also noting the size of facility offers economies of scale given the parking rates used would apply to a single warehouse/ factory unit as well as larger facilities such as this one. Further, it is noted that both Council and Planning Panel supported adopting TfNSW rates in determining the DA.

For the purposes of this assessment, a likely split of 70 per cent warehouse tenants to 30 per cent light industrial tenants has been assumed for the units based on advice from EG that it will be more skewed towards warehouse.

Self-storage Facility

Self-storage facilities typically require less staff than traditional warehouse facilities, whilst users have access to the facility 24 hour/ seven days a week. These facilities do not have defined peak parking demand, with user arrivals dispersed across the day. In addition, such facilities are not a high traffic and parking generator as users typically leave their goods stored for extended periods of time without accessing. All of the above suggests that a more suitable car parking provision would be aligned with the TfNSW Guide rate for warehouse uses. Alternatively, a comparison of similar sites can be referenced.

In this regard, the parking provision for self-storage facilities have been sourced from the Aurecon *Self Storage Facility Traffic and Parking Study* 2009 and *SSAA Supplementary Australian Traffic and Parking Study* 2017, reproduced in Table 4.5. These recommended parking rates are based on surveys of a range of self-storage facilities.

Table 4.5: Recommended number of parking spaces per maximum leasable area

Size	Office Parking	Storage Parking	Staff Parking	Vehicle/ Trailer Parking	Total
0m^2-3,000m^2	1	2	2	1	**6**
3,000m^2-6,000m^2	2	5	2	1	**10**
6,000m^2-9,500m^2	3	5	2	1	**11**

The proposal includes a self-storage facility of 7,000m^2, therefore up to 11 parking spaces would be sufficient, including one space for vehicle/ trailer parking. It should also be noted that many self-storage facilities also have parking spaces within the tenancy area to allow the direct transfer of goods to internal lifts and the like.

Anticipated Parking Demand

The anticipated car parking demand is provided in Table 4.6 and suggests that the proposal could generate a demand of 226 spaces.

Table 4.6: Anticipated Parking Demand

Land Use	Adopted Parking Rate	Parking Requirement	Proposed Provision
Self-Storage	as per Table 4.5 (Aurecon, 2009)	11 spaces	**279 spaces**
Warehouse (70% of units)	Warehouse - 1 space per 300 sqm (TfNSW Rate) Mezzanine Office - 1 space per 40 sqm (Warringah DCP rate)	68 spaces (36 + 32 spaces)	
Industry (30% of units)	1.3 spaces per 100 sqm (incl. mezzanine office, Warringah DCP rate)	68	
Office	1 space per 40 sqm (Warringah DCP rate)	79	
Café	*Ancillary to overall development (infrequent external trips expected)*		
Total		**226 spaces**	

Note: total parking requirement subject to rounding of requirements for each land use

4.2.4. Adequacy of Car Parking Supply

The most appropriate approach to understanding anticipated demand generated by the proposal is to consider a mix of warehouse and light industrial (factory) tenants. Adopting the higher Warringah DCP 2011 or solely adopting the TfNSW Guide factory parking rates is an over-estimation of parking requirements given the local leasing market, number of tenancies and size of the facility.

The adopted parking rate for self-storage is considered appropriate, based on comparison to similar sites and industry guidance.

The expected parking demand generated by the proposal (226 spaces) can be accommodated by the proposed supply (279 spaces). The balance of warehouse and light industrial/ factory uses will influence the demand, which could range between 188 spaces and 316 spaces when considering the relevant rates in the TfNSW Guide. However, as noted above, it is unlikely that parking requirements will be skewed to either end of the range at a given point in time.

As previously mentioned, the café is expected to be ancillary to the site and surrounding area (i.e. school, sports fields and other industrial uses), with a predominant walk-up catchment. As such, it is not expected to be a vehicle trip destination in itself.

The site has some 400 metres of frontages along South Creek Road and Inman Road. Discounting locations of proposed vehicle accesses, there is opportunity to park up to 40 vehicles directly adjacent to these site frontages. Site observations suggests that 21 spaces were occupied along the site frontages.

It is generally considered acceptable for a development to rely on 50 to 60 per cent of the available site frontage(s) to accommodate parking demand, which promotes on-street activation and traffic calming.

Therefore and notwithstanding the anticipated tenant mix (70% warehouse/ 30% light industrial), the proposed off-street provision of 279 spaces can accommodate a mix of up to 15% warehouse/ 85% light industrial tenants (~297 spaces) on the basis that on-street parking would be made available along the site frontage (40 spaces). It would be reasonable for this additional demand to use on-street parking noting the high parking availability along the site frontages since the closure of the previous on-site use and limited parking demand from other nearby uses (school and sports fields having different peaks).

4.3. Site Layout Review

The site layout has been reviewed against the requirements of the Australian Standard for Off Street Parking Facilities (AS/NZS2890.1:2004, AS2890.2:2002 and AS/NZS2890.6:2009). This assessment included a review of the following:

- bay and aisle width
- adjacent structures
- circulation roads and ramps
- ramp grades
- height clearances
- internal queuing
- parking for persons with disabilities.

Details of this review are provided below. This review indicates that the proposed site layout is expected to operate satisfactorily, subject to the adoption of recommendations discussed below and shown graphically at Appendix C.

The proposed car parking spaces will be designed as a User Class 2 facility with each space to be a minimum 2.5m wide and 5.4m long, with adjacent 5.8m wide aisles. Car parking spaces for people with disabilities will be designed as a User Class 4 facility with each a minimum 2.4m wide and 5.4m long, with a shared area 2.4m wide and 5.4m long on one side of the dedicated space, that includes a centrally located bollard.

It is recommended that the outer circulation aisles within the basement car park are one-way (either clockwise or counter-clockwise) with give-way control for the exiting aisle leading up to the ramp.

The site access driveways are designed to accommodate entry and/or exit movements for the largest design vehicle requiring access. Swept paths have been completed and show that vehicles up to and including Australian Standard 20-metre-long articulated vehicles can enter and exit the site in a forward direction.

5. TRAFFIC ASSESSMENT

05

5.1. Traffic Generation

Traffic generation estimates for the proposed development have been sourced from the Roads and Maritime Guide to Traffic Generating Developments 2002 (the Guide) and Technical Direction: Updated Traffic Surveys (TDT 2013/ 04a).

5.1.1. Existing Development

The existing site is currently unoccupied and therefore, not generating any traffic. The peak hour traffic volume estimates for the previous uses are set out in Table 5.1.

Table 5.1: Existing Use - Traffic generation estimates

Use	Size	Traffic generation rate (trips / hour)		Traffic generation estimates (trips / hour)	
		AM	PM	AM	PM
Warehouse	13,444sq.m	0.52 trips per 100sq.m	0.56 trips per 100sq.m	70	75
Office	11,407sq.m	2 trips per 100sq.m	2 trips per 100sq.m	228	228
Total				**298**	**303**

Table 5.1 indicates that the previous use on the site could have generated approximately 300 vehicle trips in any peak hour.

5.1.2. Proposed Development

The peak hour traffic volume estimates of the proposed use are set out in Table 5.2.

Table 5.2: Proposed Use - Traffic generation estimates

Use	Size	Traffic generation rate (trips / hour)		Traffic generation estimates (trips / hour)	
		AM	PM	AM	PM
Warehouse	15,505sq.m	0.52 trips per 100sq.m	0.56 trips per 100sq.m	81	87
Self-Storage	7,000sq.m	0.1 trip per 100sq.m	0.2 trips per 100sq.m	7	14
Mezzanine	1,850sq.m	0.52 trips per 100sq.m	0.56 trips per 100sq.m	10	10
Office	3,179sq.m	2 trips per 100sq.m	2 trips per 100sq.m	64	64
Café	124sq.m	5 trips per 10sq.m	5 trips per 100sq.m	6	6
Total				**168**	**181**

Table 5.2 indicates that the site could potentially generate 168 and 181 vehicle trips in the AM and PM peak hours respectively.

5.1.3. Summary

Whilst the previous use had similar overall GFA to the proposal, there was a higher proportion of office space. As a result, the proposal is expected to generate approximately 130 vehicles less during the peak hours, or at least 40 per cent less traffic compared with previous site operations.

Notwithstanding, the impact of the proposal on the surrounding road network has been reviewed in subsequent sections.

5.2. Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposal have been estimated based on a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households in the vicinity of the site
- likely distribution of employee's residences in relation to the site
- configuration of access points to the site.

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) for the proposal has been assessed as 80 percent entering and 20 per cent exiting during the AM with 30 per cent entering and 70 per cent exiting in the PM.

5.3. Traffic Impact

The study intersections have been reassessed to include traffic associated with the proposed development, with the SIDRA modelling results summarised in Table 5.3, with full results presented in Appendix B.

Table 5.3: Existing and development operating conditions

Intersection	Peak	Leg	Existing Level of Service (LOS)	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Pittwater Road/ South Creek Road	AM	East	A	0.85	16	343	B
		North	E	0.81	60	127	E
		West	B	0.74	19	245	B
		Overall	**B**	**0.85**	**23**	**343**	**B**
	PM	East	A	0.61	11	100	A
		North	D	0.71	52	92	D
		West	A	0.78	14	203	A
		Overall	**A**	**0.78**	**17**	**203**	**B**
South Creek Road/ Inman Road	AM	East	A	0.23	6	9	A
		North	A	0.13	8	4	A
		West	A	0.11	5	0	A
	PM	East	A	0.18	6	5	A
		North	A	0.22	9	6	A
		West	A	0.14	6	0	A

Table 5.3 indicates the proposed development would not affect the existing LoS for any movement such that it drops below an acceptable LoS D (note: South Creek Road is already LoS E in the AM peak under existing conditions).

The 95th percentile queuing from Pittwater Road into South Creek Road in the right turn bay is expected to increase marginally from 59 to 66 metres (one vehicle) and is therefore at the limit of the right turn bay and taper. Given this is an infrequent occurrence (statistically less than twice in the PM peak hour), GTA does not consider that this warrants mitigation. It is also noted that the filtered right turn allows at least the first vehicle to store in front of the stop line during the phase. This marginal increase in queue length is also within the tolerance/ accuracy of the intersection modelling, traffic generation estimates and traffic distribution.

On this basis, the anticipated traffic volumes associated with the proposal could not be expected to compromise the safety or function of the surrounding road network.

6. CONCLUSION

06

CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. The proposal incorporates 11 warehouse units with mezzanine offices, a further five office tenancies, a self-storage facility and a café. The overall gross floor area is similar to the existing on-site facilities, however with a lower proportion of office space.
2. Whilst the proposal generates a Warringah DCP 2011 car parking requirement of 411 spaces (as the DCP has a single rate for industrial and warehouse uses), an assessment based on likely tenants, Roads and Maritime Services *Guide to Traffic Generating Developments* 2002 and other industry guidance suggests that proposal would generate an expected parking demand of 226 spaces.
3. The proposed supply of 279 spaces is considered appropriate and will be able to accommodate the expected parking demand of 226 spaces.
4. Notwithstanding this, some use of available on-street parking along the site frontages is reasonable, to promote on-street activation and traffic calming, noting the high parking availability since the closure of the previous on-site use and limited parking demand from other nearby uses (school and sports fields having different peaks).
5. The proposed site layout is generally consistent with the dimensional requirements as set out Australian Standard for Off Street Parking Facilities (AS/NZS2890.1:2004, AS2890.2:2002 and AS/NZS2890.6:2009).
6. The proposed hardstand area has been designed to accommodate vehicles up to Australian Standard 20-metre-long articulated vehicles.
7. It is recommended that the proposal provides at least 44 bicycle spaces for use by staff and/ or visitors across the tenancies with end of trip facilities in accordance with DCP 2011.
8. The proposal is expected to generate up to 168 and 181 vehicle movements in the AM and PM peak hours respectively, which is at least 40 per cent less vehicles than estimated for the previous site uses.
9. Intersection analysis suggests that the surrounding intersections would continue to operate satisfactorily during the road network peak periods post development and the anticipated traffic volumes associated with the proposal could not be expected to compromise the safety or function of the surrounding road network.

A.SURVEY RESULTS

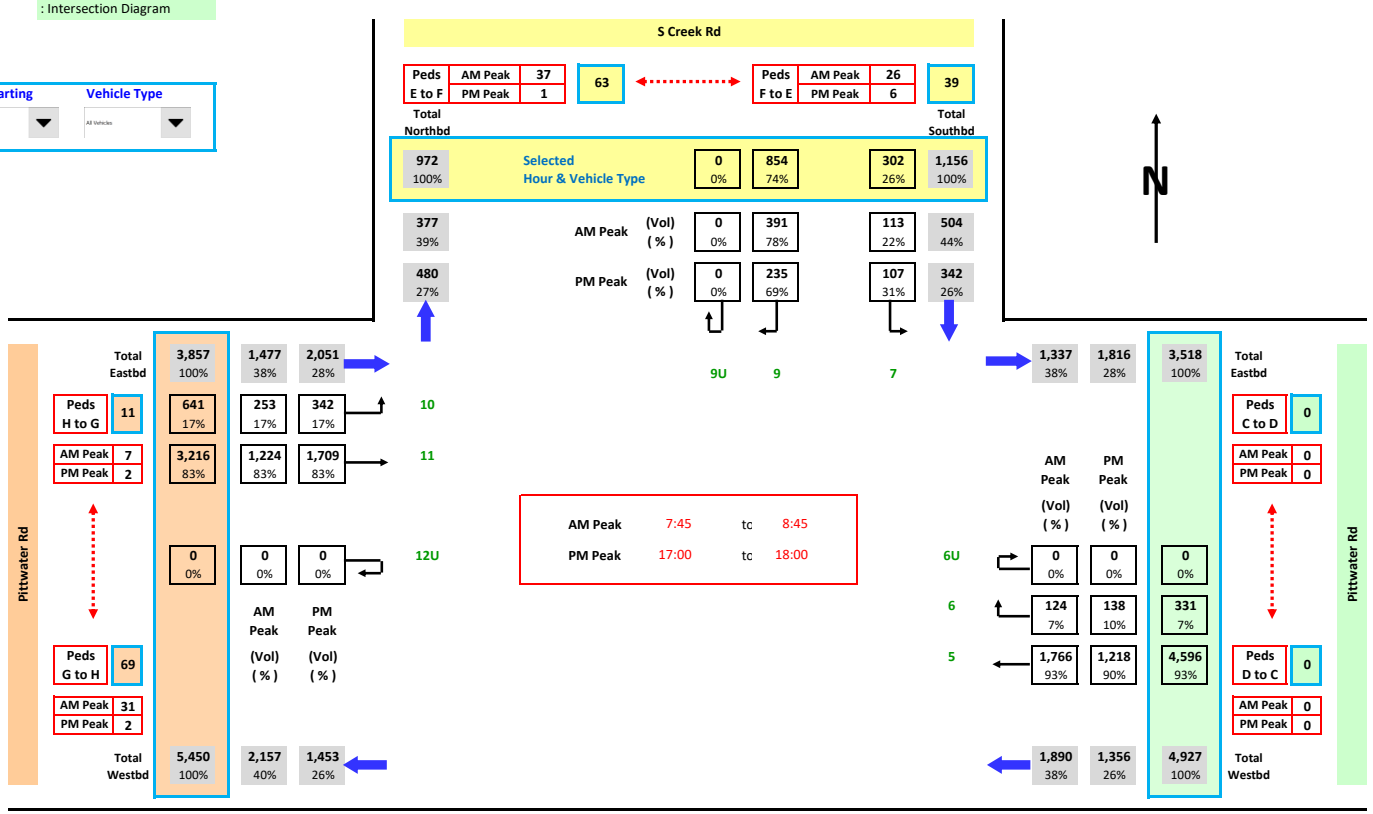
A

Job No. : N5364
Client : GTA
Suburb : Cromer
Location : 1. Pittwater Rd / S Creek Rd

Day/Date : Wed, 16th October 2019
Weather : Fine
Description : Classified Intersection Count
: Intersection Diagram

MATRIX Traffic and Transport Data

Hour Starting AM Totals **Vehicle Type** All Vehicles

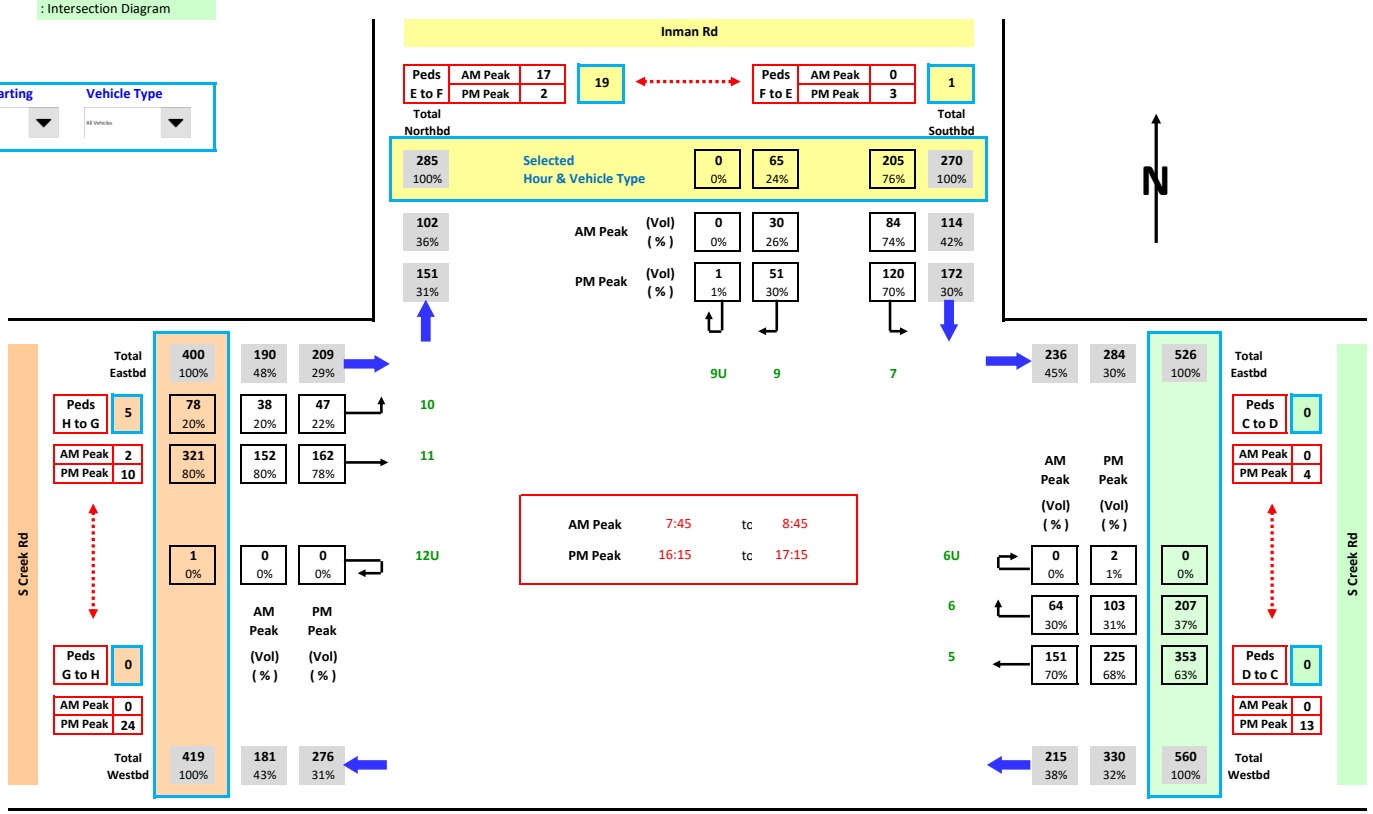


Job No. : N5364
Client : GTA
Suburb : Cromer
Location : 2. S Creek Rd / Inman Rd

Day/Date : Wed, 16th October 2019
Weather : Fine
Description : Classified Intersection Count
: Intersection Diagram

MATRIX Traffic and Transport Data

Hour Starting AM Totals **Vehicle Type** All Vehicles



B.SIDRA RESULTS

B

USER REPORT FOR SITE

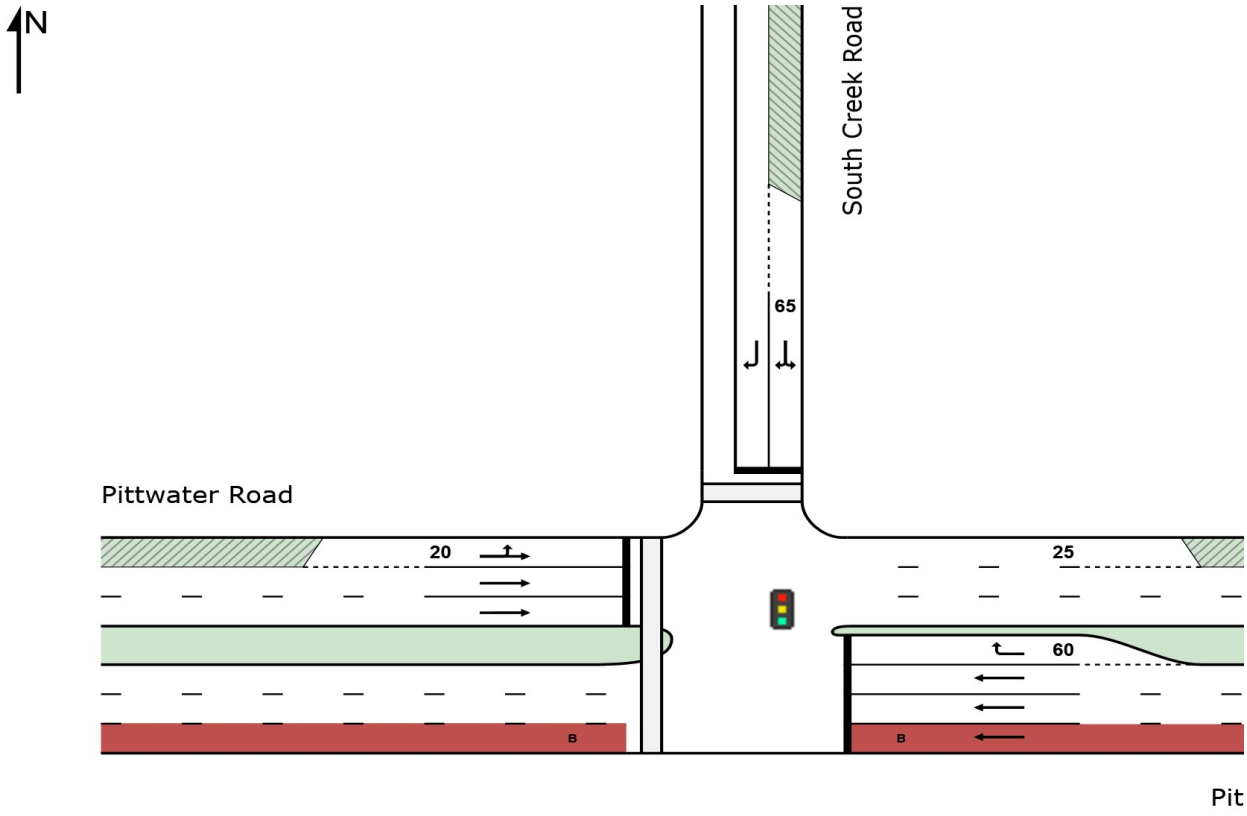
Project: 201008sid-N135572 100 South Creek Road, Cromer | **Template: Default Site User Report**

Site: [1 Pittwater Road/ South Creek Road - Ex AM]

Site Category: -
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

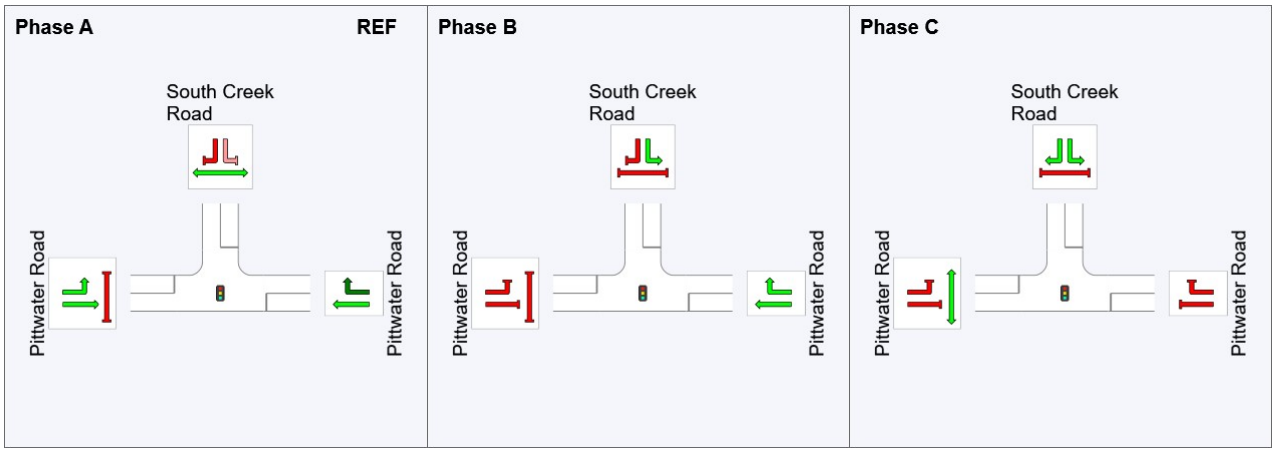


Movement Performance - Vehicles

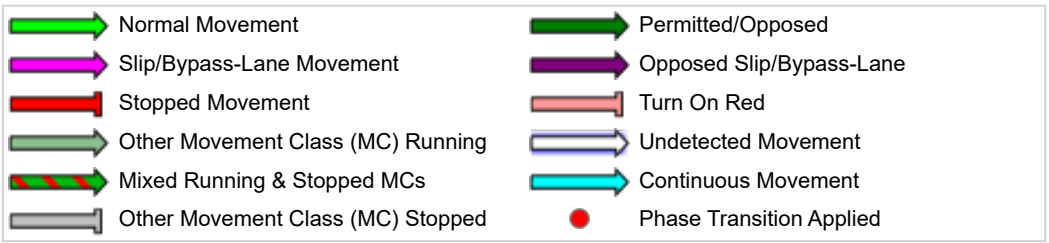
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pittwater Road												
5	T1	1859	4.2	0.822	11.7	LOS A	44.8	319.1	0.63	0.60	0.65	49.8
6	R2	131	9.7	0.449	37.7	LOS C	6.0	45.8	0.81	0.83	0.87	34.8
Approach		1989	4.6	0.822	13.4	LOS A	44.8	319.1	0.64	0.61	0.66	48.3
North: South Creek Road												
7	L2	119	18.6	0.798	59.5	LOS E	15.7	119.3	1.00	0.99	1.47	28.4
9	R2	412	3.1	0.798	60.2	LOS E	15.7	119.3	1.00	0.94	1.27	27.4
Approach		531	6.5	0.798	60.0	LOS E	15.7	119.3	1.00	0.95	1.31	27.6
West: Pittwater Road												
10	L2	266	8.7	0.576	19.0	LOS B	8.6	68.0	0.56	0.68	0.56	41.5
11	T1	1288	5.1	0.703	18.4	LOS B	31.5	227.5	0.72	0.65	0.72	45.3
Approach		1555	5.7	0.703	18.4	LOS B	31.5	227.5	0.69	0.66	0.69	44.6
All Vehicles		4075	5.2	0.822	21.4	LOS B	44.8	319.1	0.71	0.67	0.76	42.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	74	93
Green Time (sec)	68	13	21
Phase Time (sec)	74	19	27
Phase Split	62%	16%	23%

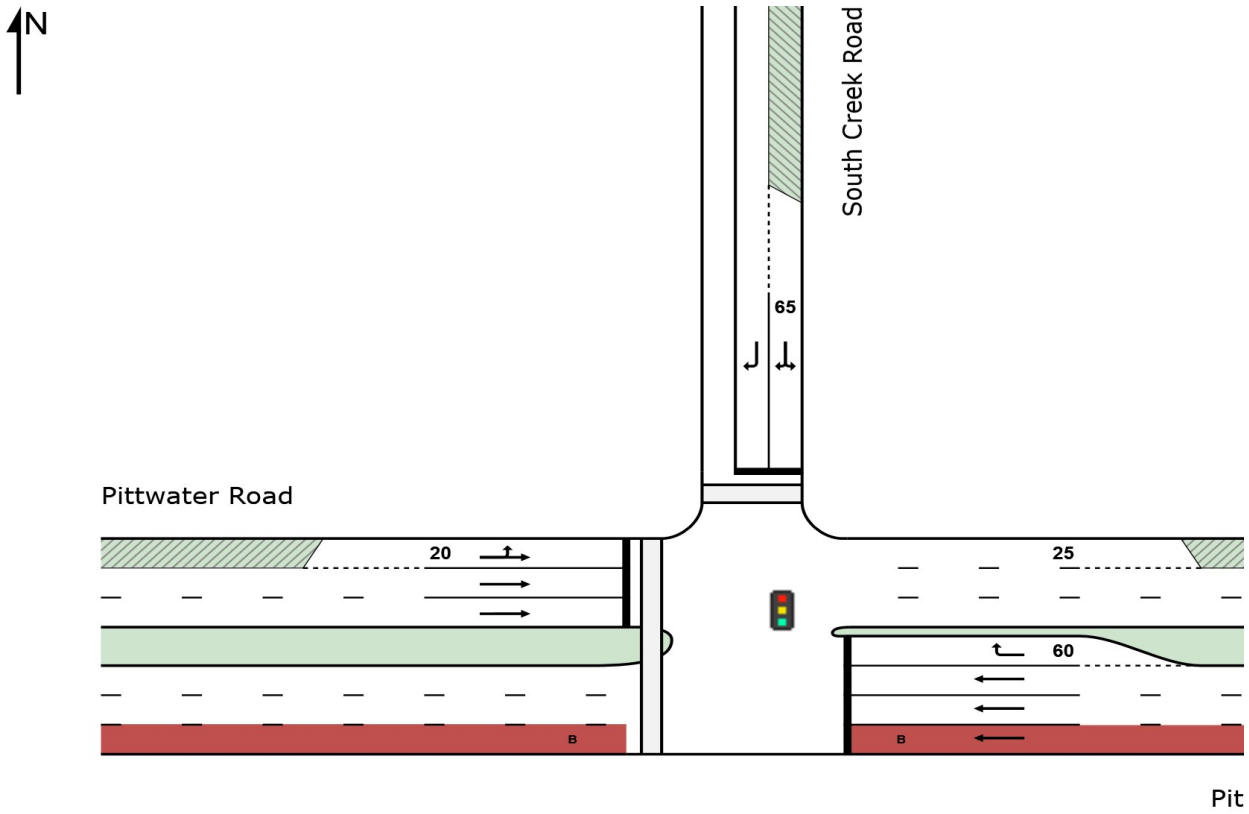
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [1 Pittwater Road/ South Creek Road - Dev AM - fixed Ex phase times]

Site Category: -
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

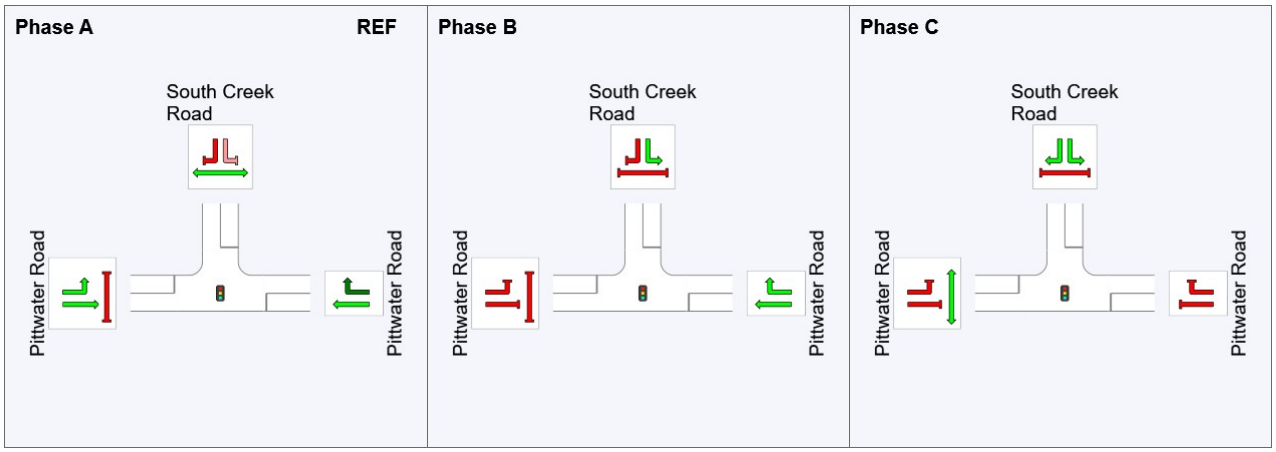


Movement Performance - Vehicles

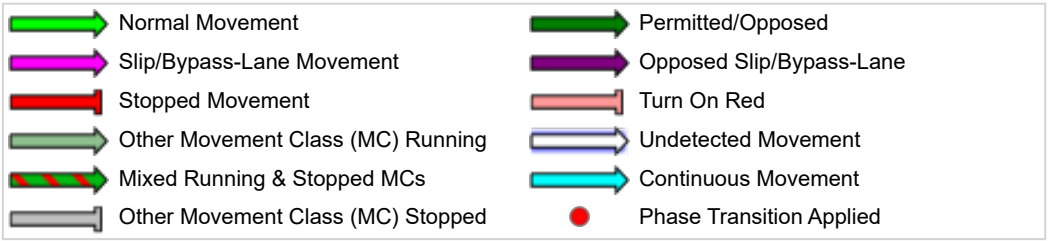
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East: Pittwater Road												
5	T1	1859	4.2	0.846	13.6	LOS A	48.2	343.1	0.65	0.63	0.68	48.5
6	R2	169	8.7	0.596	46.2	LOS D	8.3	62.8	0.88	0.93	1.16	32.2
Approach		2028	4.6	0.846	16.3	LOS B	48.2	343.1	0.67	0.66	0.72	46.4
North: South Creek Road												
7	L2	129	17.9	0.807	59.9	LOS E	16.8	127.1	1.00	1.00	1.50	28.3
9	R2	432	3.4	0.807	60.3	LOS E	16.8	127.1	1.00	0.95	1.28	27.3
Approach		561	6.8	0.807	60.2	LOS E	16.8	127.1	1.00	0.96	1.33	27.6
West: Pittwater Road												
10	L2	348	9.4	0.696	19.9	LOS B	11.8	92.4	0.59	0.71	0.59	40.9
11	T1	1288	5.1	0.734	18.7	LOS B	33.9	244.7	0.73	0.67	0.73	45.1
Approach		1637	6.0	0.734	18.9	LOS B	33.9	244.7	0.70	0.68	0.70	44.1
All Vehicles		4226	5.4	0.846	23.2	LOS B	48.2	343.1	0.73	0.70	0.80	41.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	73	92
Green Time (sec)	68	13	22
Phase Time (sec)	74	19	27
Phase Split	62%	16%	23%

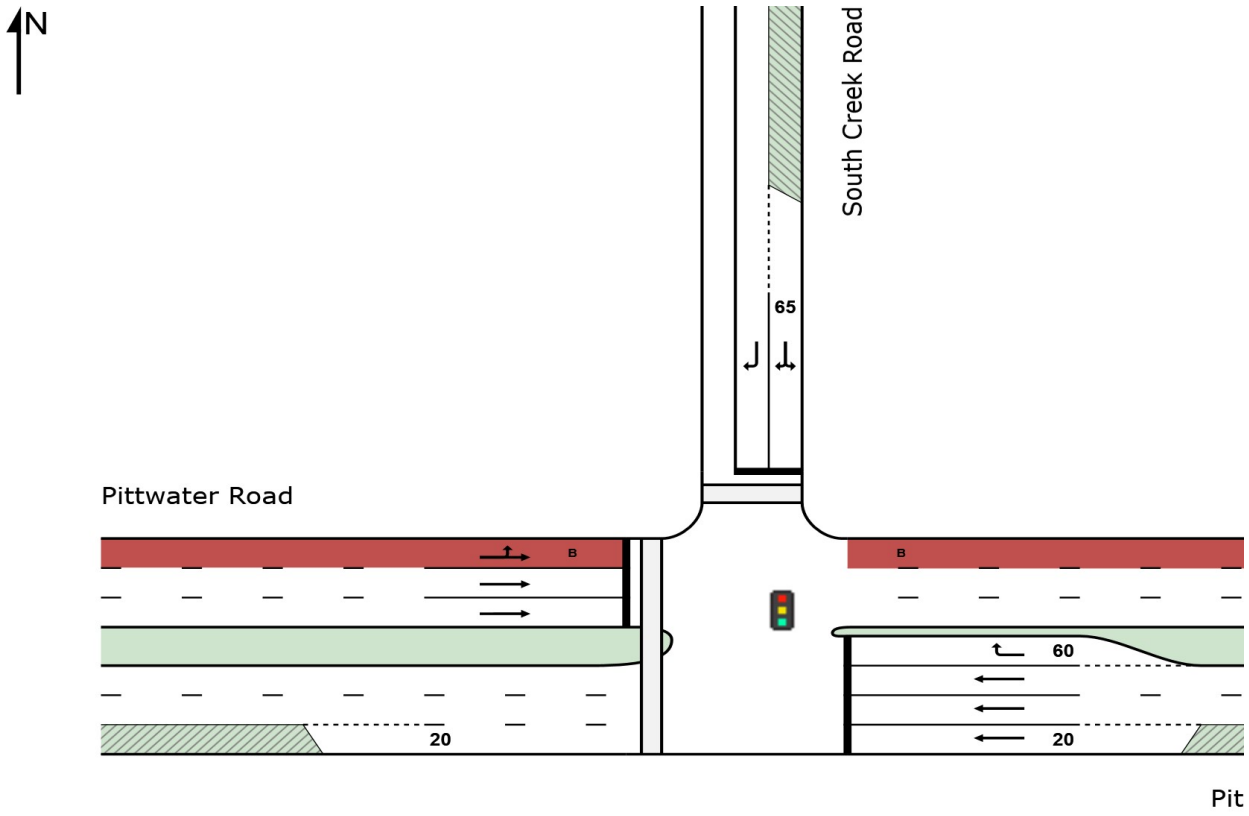
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [1 Pittwater Road/ South Creek Road - Ex PM]

Site Category: -
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

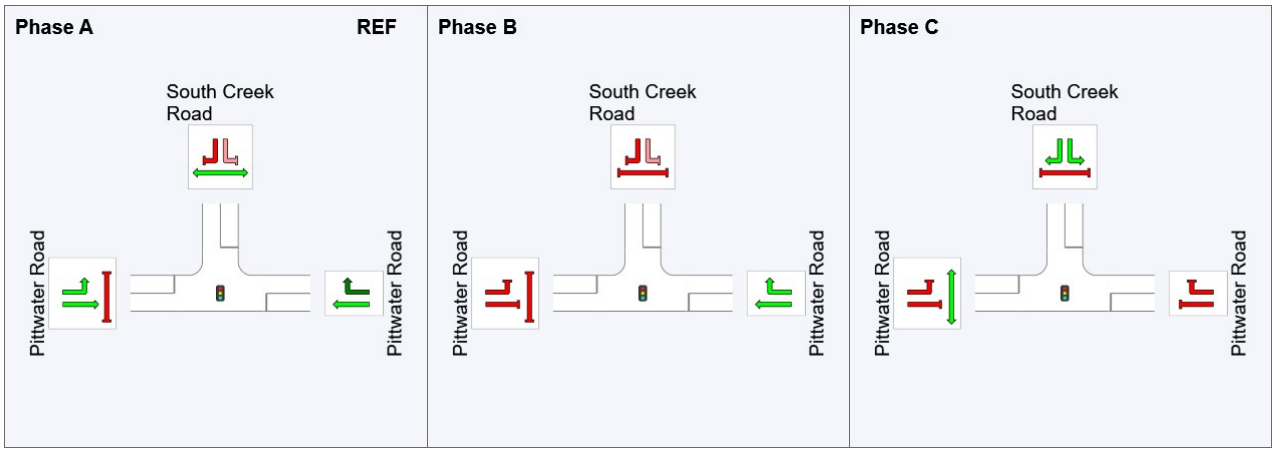


Movement Performance - Vehicles

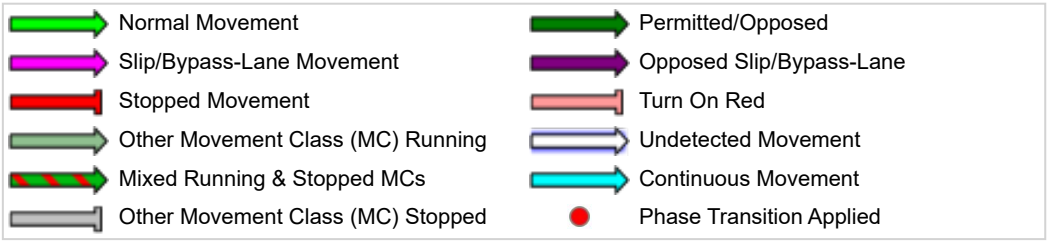
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pittwater Road												
5	T1	1282	3.4	0.440	6.3	LOS A	14.1	99.6	0.40	0.36	0.40	54.0
6	R2	145	2.2	0.547	47.5	LOS D	8.2	58.8	0.99	0.95	1.27	31.9
Approach		1427	3.3	0.547	10.5	LOS A	14.1	99.6	0.46	0.42	0.49	50.2
North: South Creek Road												
7	L2	113	0.9	0.551	41.7	LOS C	7.9	55.8	0.96	0.86	1.12	35.0
9	R2	247	2.1	0.551	51.4	LOS D	9.2	65.7	0.96	0.83	1.02	31.1
Approach		360	1.8	0.551	48.3	LOS D	9.2	65.7	0.96	0.84	1.05	32.3
West: Pittwater Road												
10	L2	360	1.5	0.392	19.3	LOS B	11.9	91.4	0.56	0.70	0.56	44.1
11	T1	1799	3.3	0.779	12.5	LOS A	28.7	202.5	0.61	0.57	0.61	49.2
Approach		2159	3.0	0.779	13.5	LOS A	28.7	202.5	0.60	0.59	0.60	48.2
All Vehicles		3946	3.0	0.779	15.7	LOS B	28.7	202.5	0.59	0.55	0.60	46.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	76	94
Green Time (sec)	70	12	20
Phase Time (sec)	76	18	26
Phase Split	63%	15%	22%

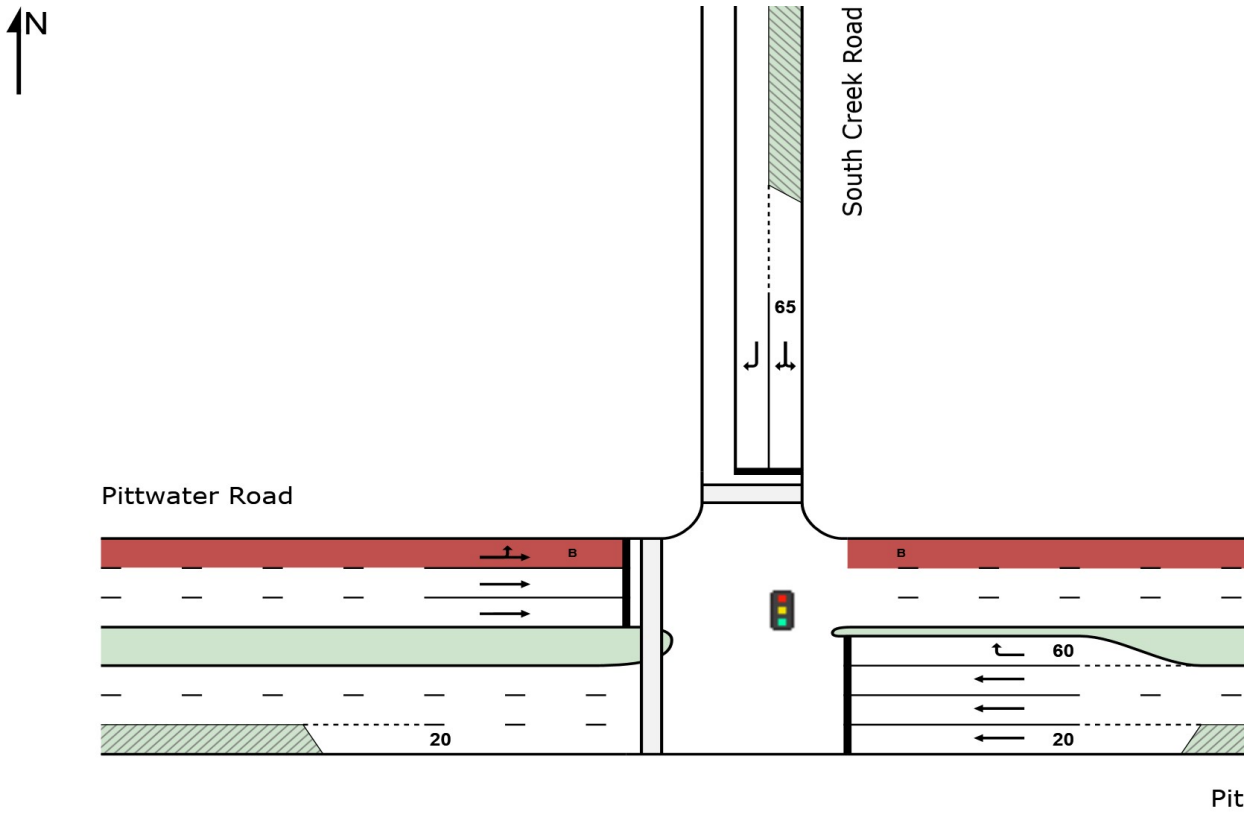
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [1 Pittwater Road/ South Creek Road - Dev PM - fixed Ex phase times]

Site Category: -
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

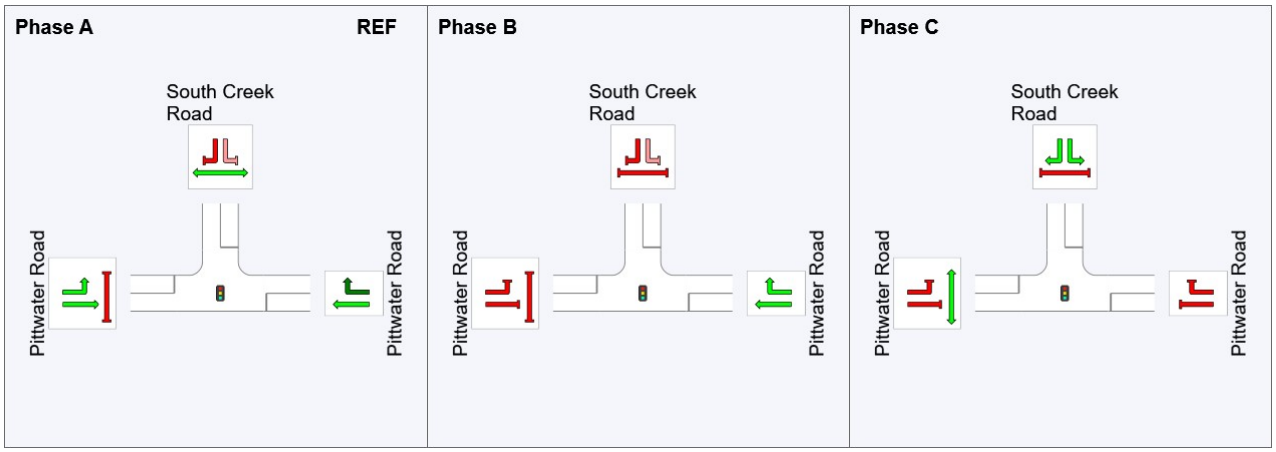


Movement Performance - Vehicles

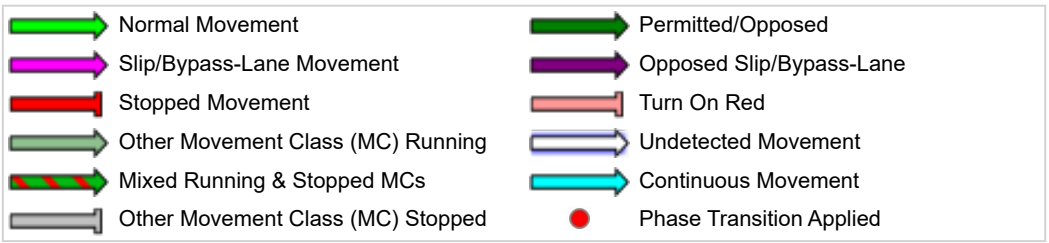
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pittwater Road												
5	T1	1282	3.4	0.440	6.3	LOS A	14.1	99.6	0.40	0.36	0.40	54.0
6	R2	161	2.6	0.610	50.1	LOS D	9.2	65.7	1.00	0.98	1.34	31.2
Approach		1443	3.4	0.610	11.2	LOS A	14.1	99.6	0.47	0.43	0.51	49.7
North: South Creek Road												
7	L2	149	2.1	0.702	47.0	LOS D	11.8	84.7	0.99	0.91	1.24	33.3
9	R2	325	4.2	0.702	54.3	LOS D	12.7	91.7	0.99	0.87	1.10	30.3
Approach		475	3.5	0.702	52.0	LOS D	12.7	91.7	0.99	0.88	1.14	31.2
West: Pittwater Road												
10	L2	393	2.1	0.424	19.7	LOS B	13.3	101.7	0.57	0.72	0.57	43.9
11	T1	1799	3.3	0.779	12.5	LOS A	28.7	202.5	0.61	0.57	0.61	49.1
Approach		2192	3.1	0.779	13.7	LOS A	28.7	202.5	0.61	0.60	0.61	48.1
All Vehicles		4109	3.2	0.779	17.3	LOS B	28.7	202.5	0.60	0.57	0.63	45.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

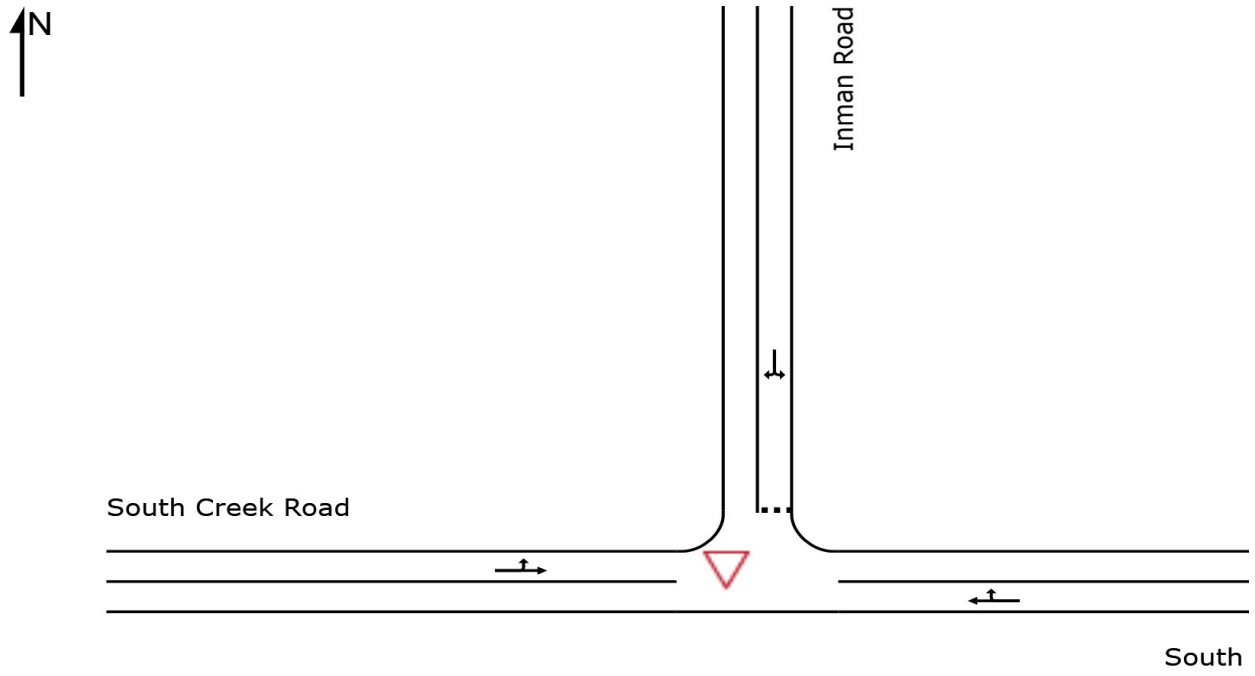
Phase	A	B	C
Phase Change Time (sec)	0	75	93
Green Time (sec)	70	12	21
Phase Time (sec)	76	18	26
Phase Split	63%	15%	22%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: [2 Inman Road/ South Creek Road - Ex AM]

Site Category: -
Giveway / Yield (Two-Way)

Site Layout



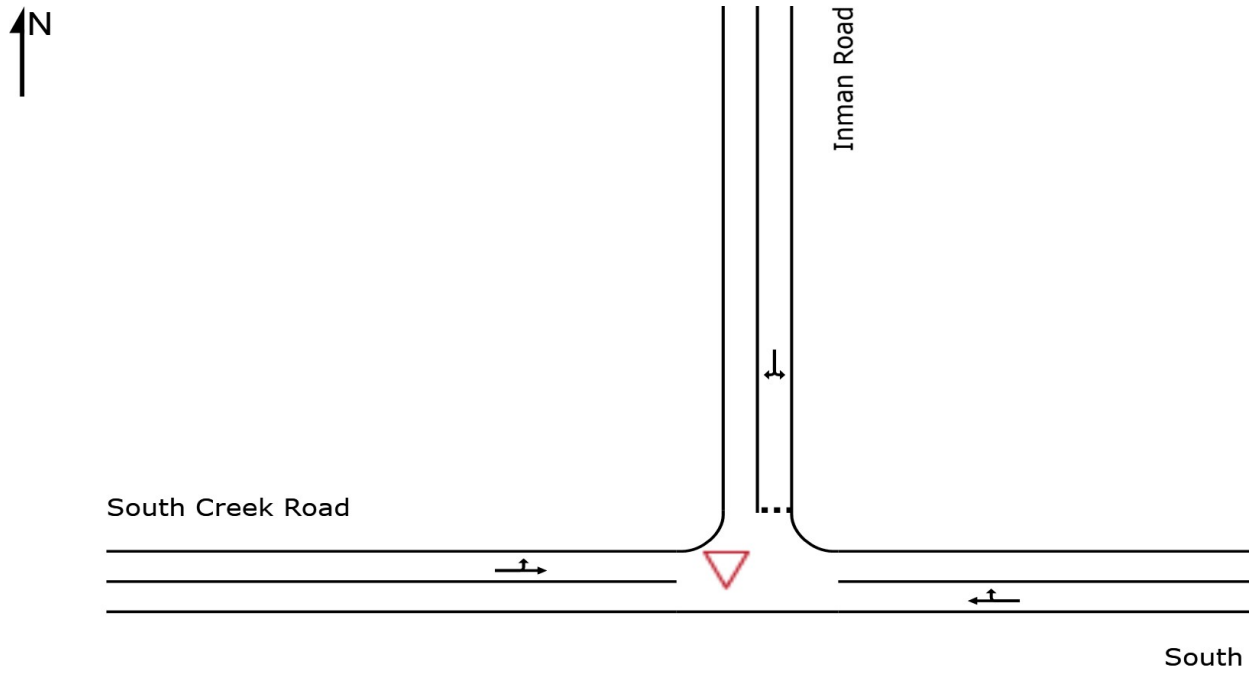
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: South Creek Road												
5	T1	159	6.6	0.135	0.4	LOS A	0.5	3.6	0.22	0.17	0.22	48.2
6	R2	67	10.9	0.135	5.5	LOS A	0.5	3.6	0.22	0.17	0.22	46.2
Approach		226	7.9	0.135	1.9	NA	0.5	3.6	0.22	0.17	0.22	47.7
North: Inman Road												
7	L2	88	15.5	0.107	5.3	LOS A	0.4	3.2	0.29	0.56	0.29	43.7
9	R2	32	10.0	0.107	6.7	LOS A	0.4	3.2	0.29	0.56	0.29	43.9
Approach		120	14.0	0.107	5.7	LOS A	0.4	3.2	0.29	0.56	0.29	43.7
West: South Creek Road												
10	L2	40	5.3	0.110	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	48.4
11	T1	160	10.5	0.110	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	49.2
Approach		200	9.5	0.110	0.9	NA	0.0	0.0	0.00	0.11	0.00	49.0
All Vehicles		546	9.8	0.135	2.4	NA	0.5	3.6	0.15	0.23	0.15	47.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Inman Road/ South Creek Road - Dev AM]

Site Category: -
Giveway / Yield (Two-Way)

Site Layout



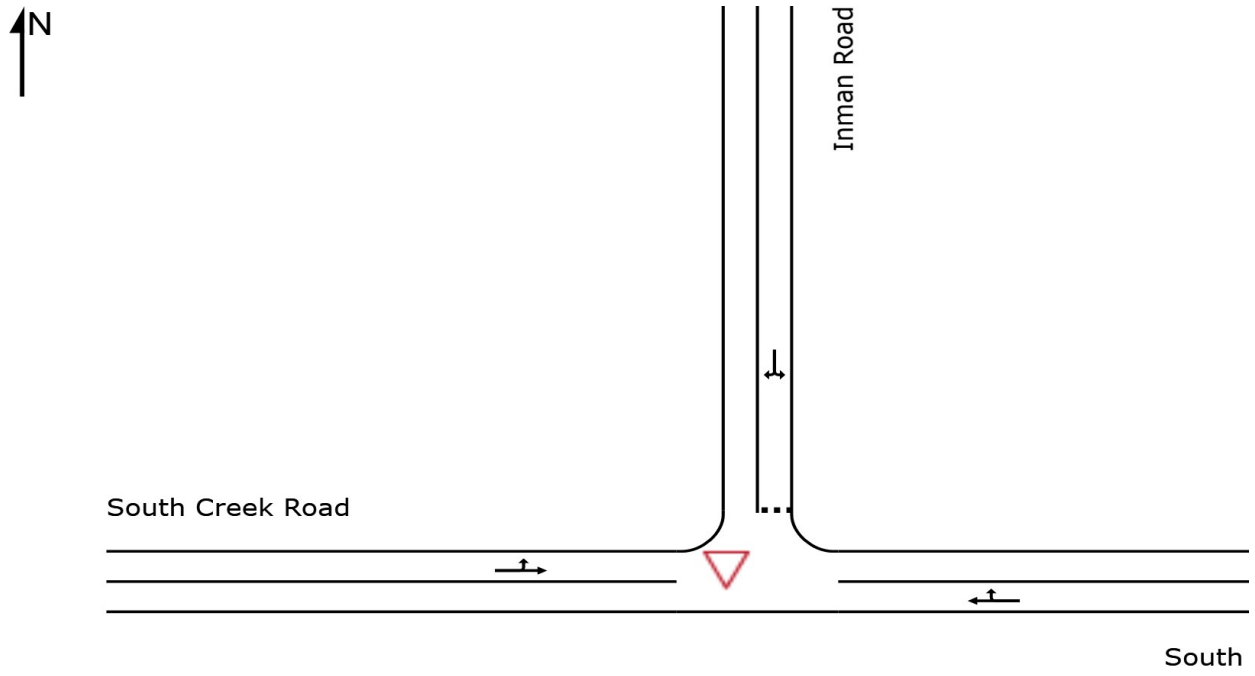
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: South Creek Road												
5	T1	159	6.6	0.227	0.8	LOS A	1.2	9.0	0.35	0.32	0.35	47.0
6	R2	193	10.4	0.227	5.6	LOS A	1.2	9.0	0.35	0.32	0.35	44.8
Approach		352	8.7	0.227	3.4	NA	1.2	9.0	0.35	0.32	0.35	45.9
North: Inman Road												
7	L2	108	12.6	0.129	5.3	LOS A	0.5	3.9	0.29	0.57	0.29	43.7
9	R2	33	9.7	0.129	7.8	LOS A	0.5	3.9	0.29	0.57	0.29	43.9
Approach		141	11.9	0.129	5.9	LOS A	0.5	3.9	0.29	0.57	0.29	43.7
West: South Creek Road												
10	L2	46	4.5	0.113	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.3
11	T1	160	10.5	0.113	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.1
Approach		206	9.2	0.113	1.0	NA	0.0	0.0	0.00	0.12	0.00	48.9
All Vehicles		699	9.5	0.227	3.2	NA	1.2	9.0	0.23	0.31	0.23	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Inman Road/ South Creek Road - Ex PM]

Site Category: -
Giveway / Yield (Two-Way)

Site Layout



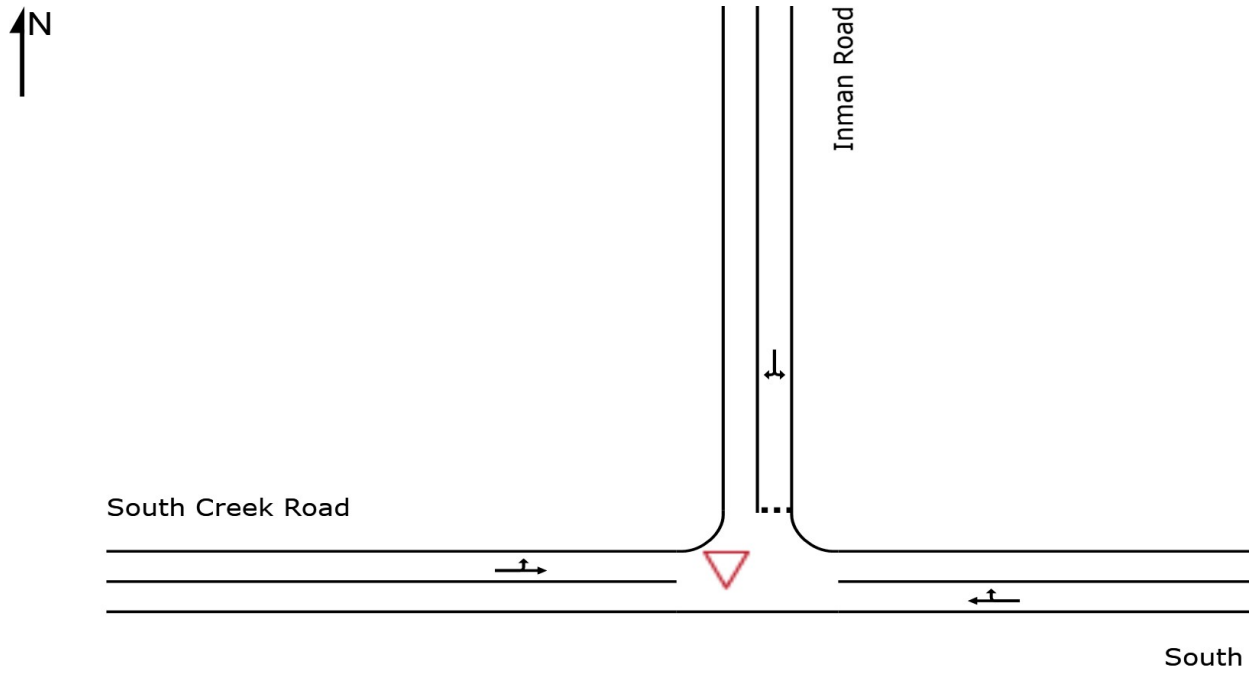
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: South Creek Road												
5	T1	213	2.0	0.171	0.5	LOS A	0.6	4.5	0.24	0.15	0.24	48.4
6	R2	73	14.5	0.171	5.9	LOS A	0.6	4.5	0.24	0.15	0.24	46.3
Approach		285	5.2	0.171	1.9	NA	0.6	4.5	0.24	0.15	0.24	47.9
North: Inman Road												
7	L2	101	2.1	0.157	6.3	LOS A	0.6	4.3	0.35	0.64	0.35	49.0
9	R2	62	3.4	0.157	8.2	LOS A	0.6	4.3	0.35	0.64	0.35	49.4
Approach		163	2.6	0.157	7.0	LOS A	0.6	4.3	0.35	0.64	0.35	49.2
West: South Creek Road												
10	L2	58	0.0	0.140	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	56.3
11	T1	211	1.5	0.140	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	58.5
Approach		268	1.2	0.140	1.2	NA	0.0	0.0	0.00	0.13	0.00	58.1
All Vehicles		717	3.1	0.171	2.8	NA	0.6	4.5	0.17	0.25	0.17	51.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Inman Road/ South Creek Road - Dev PM]

Site Category: -
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: South Creek Road												
5	T1	215	2.0	0.180	0.6	LOS A	0.7	5.1	0.25	0.15	0.25	48.3
6	R2	79	18.7	0.180	6.0	LOS A	0.7	5.1	0.25	0.15	0.25	46.1
Approach		294	6.5	0.180	2.0	NA	0.7	5.1	0.25	0.15	0.25	47.8
North: Inman Road												
7	L2	177	1.2	0.220	6.3	LOS A	0.9	6.4	0.35	0.63	0.35	49.1
9	R2	66	3.2	0.220	8.5	LOS A	0.9	6.4	0.35	0.63	0.35	49.5
Approach		243	1.7	0.220	6.9	LOS A	0.9	6.4	0.35	0.63	0.35	49.2
West: South Creek Road												
10	L2	60	0.0	0.141	5.6	LOS A	0.0	0.0	0.00	0.13	0.00	56.3
11	T1	211	1.5	0.141	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	58.5
Approach		271	1.2	0.141	1.2	NA	0.0	0.0	0.00	0.13	0.00	58.0
All Vehicles		807	3.3	0.220	3.2	NA	0.9	6.4	0.20	0.29	0.20	51.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

C. COMPLIANCE REVIEW AND SWEPT PATH ASSESSMENT

C

\\GTA.COM.AU\PROJECTFILES\PROJECTFILES\SYD\N13500-13599\N135573 100 SOUTH CREEK ROAD, CROMER - ADDITIONAL WORK\CAD\N135573-01-P3.DWG PLOTTED BY RAYMOND ZHANG ON 19/10/2020 AT 10:41

FUTURE DEVELOPMENT APPLICATION

FUTURE DEVELOPMENT APPLICATION

DRIVEWAY IS SUITABLE FOR ONE-WAY EXIT ONLY. NO APPROPRIATE PASSING OF ARTICULATED VEHICLES IS AVAILABLE, SEE SWEPT PATHS

TRUCK EXIT ONLY

RL12.760

RL13.550

PROPOSED LAYBACK TO ACCOMMODATE SWEPT PATH

WHEEL STOPS SHOULD BE LOCATED 0.9m FROM THE END OF SPACE WITH NO OR LOW KERB, OR 1.1m FROM A HIGH WALL FOR REAR IN PARKING. MEASURED TO THE POINT OF CONTACT WITH VEHICLE TYRE

RL14.175

RL16.675

RL17.300

CLARIFICATION OF GRADES/ RLS REQUIRED. GRADES CAN BE MADE TO COMPLY WITH AS2890.2:2018.
ENSURE 1:20 MAXIMUM GRADE IS PROVIDED FOR 10m PRIOR TO PROPERTY LINE ALONG BOTH KERBLINES AND CENTRELINE FOR AN ARTICULATED VEHICLE EXIT.

PROPOSED LAYBACK TO ACCOMMODATE SWEPT PATH

ENSURE 1:20 MAXIMUM GRADE IS PROVIDED FOR 6m PRIOR TO PROPERTY LINE ALONG BOTH KERBLINES AND CENTRELINE

INDICATIVE KERB LINE

INDICATIVE ROAD CENTRE LINE

INDICATIVE KERB LINE

PROPOSED LAYBACK TO ACCOMMODATE SWEPT PATH

DRIVEWAY IS SUITABLE FOR ONE-WAY ENTRY ONLY. NO APPROPRIATE PASSING OF ARTICULATED VEHICLES IS AVAILABLE, SEE SWEPT PATHS.

FOR ENTRY DRIVEWAY, ACCOMMODATING ARTICULATED VEHICLES, MAXIMUM CHANGE IN GRADE OF UP TO 1:16 ARE COMPLIANT. ENSURE A MAXIMUM GRADE OF 1:16 IS PROVIDED FROM PROPERTY LINE AND ALONG BOTH KERBLINES AND CENTRELINE.

ENSURE 1:20 MAXIMUM GRADE IS MAINTAINED FOR 6m PRIOR TO PROPERTY LINE ALONG BOTH KERBLINES AND CENTRELINE FOR A CAR EXIT

INMAN ROAD

SOUTH CREEK ROAD

BOUNDARY

BASE PLAN
DRAWING NO: S4.55-202, REVISION 1 BY SBA ARCHITECTS, DATED 12.10.2020

NOTES:
1. MINIMUM HEIGHT CLEARANCE OF 2.2m(TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE PARKING SPACES
2. MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
3. TO COMPLY WITH AS2890.2-2002 A MINIMUM HEIGHT CLEARANCE (TO SERVICES AND STRUCTURE) OF 4.5m SHOULD BE PROVIDED ABOVE FOR LOADING DOCKS AND ACCESS ROADWAYS FOR SERVICE VEHICLES LONGER THAN 6.4m RIGID VEHICLES

GTA consultants
www.gta.com.au

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED R.ZHANG	DESIGN CHECK H.OBERMAIER
APPROVED BY B.MAYNARD	DATE ISSUED 19 OCTOBER 2020
SCALE A3	0 5 10 20 1:1000
CAD FILE NO. N135573-01-P3.DWG	

100 SOUTH CREEK ROAD, CROMER

GROUND LEVEL
CAR PARK COMPLIANCE REVIEW

DRAWING NO. N135573-01-01 SHEET 01 OF 06 ISSUE P3

POTENTIAL TRIP HAZARD. RECOMMEND REMOVING WHEEL STOPS BETWEEN BACK-TO-BACK CAR PARKING BAYS.

WHEEL STOPS SHOULD BE LOCATED 0.9m FROM THE END OF SPACE WITH NO OR LOW KERB, OR 1.1m FROM A HIGH WALL FOR REAR IN PARKING. MEASURED TO THE POINT OF CONTACT WITH VEHICLE TYRE

BICYCLE PARKING PROVIDED AS VERTICAL BICYCLE PARKING. A MINIMUM OF 20% OF GROUND LEVEL (HORIZONTAL) BICYCLE PARKING SHOULD BE PROVIDED, IN ACCORDANCE WITH AS2890.3:2015.

RECOMMEND RELOCATION OF BICYCLE ACCESS OUTSIDE OF CAR TRAVEL PATHS.
RECOMMEND PROVIDING WIDER DOOR TO ACCOMMODATE ACCESS FOR CYCLIST OR PEDESTRIAN PUSHING A BICYCLE. MINIMUM 1.5m FOR ONE-WAY OR 2.5m FOR TWO-WAY ACCESS PATH, IN ACCORDANCE WITH AS2890.3:2015 FIGURE 2.4.

SECURITY DOOR HAS BEEN SHOWN. HOW WILL IT BE OPERATED? (DURING AND AFTER HOURS)
VEHICULAR CONTROL POINTS (SIGNALS / BOOMGATES / INTERCOMS) SHOULD HAVE A MAXIMUM GRADE OF 1:20 FOR 6m PRIOR TO CONTROL POINT

PROPOSED 'GIVE WAY' LINE

PROPOSED CIRCULATION

RECOMMEND PROVIDING A MIRROR TO IMPROVE VISIBILITY

SECURITY DOOR HAS BEEN SHOWN. HOW WILL IT BE OPERATED? (DURING AND AFTER HOURS). HOW WILL VISITORS GAIN ACCESS?

PROVIDE A MAXIMUM GRADE OF 1:20 FOR AT LEAST 6.6m (RECOMMEND 7m TO COMPLY WITH CHANGE IN GRADE TRANSITION LENGTH) PRIOR TO PROPERTY LINE / PEDESTRIAN WALKWAY FOR A 12.5m LARGE RIGID VEHICLE EXIT
MAXIMUM CHANGE IN GRADE FOR UP TO A 12.5m RIGID VEHICLE SHOULD BE 1:16 OVER 7m TO A MAXIMUM GRADE OF 1:6.5 (eg from a grade of 1:16 the maximum grade of the next transition should be 1:8), FROM A GRADE OF 1:20 TO 1:8.9.

CREEK
RIPARIAN AREA
LANDSCAPED AREA
EXISTING FENCE
10 MTS SETBACK
6.5 MTS SETBACK
EXISTING HERITAGE LISTED COURTYARD RL.14.400
EXISTING HERITAGE BUILDING TO BE RETAINED
BUILDING 6
CARPARK (203) 5,520SQM
PREVIOUS BASEMENT WALL LOCATION
RL.14.200
EXISTING TOWER LOCATION
POTENTIAL PLANT ROOM LOCATION
FIRE HYDRANT TANK & SPRINKLER TANK
FIRE PUMP ROOM
SLIDING DOOR
RAMP 1:24
RAMP UP
TRUCKS ENTRY / EXIT SLIDING DOOR
RL.13.565
SELF STORAGE UNITS 3,920 SQM
RL.13.850
SELF STORAGE UNITS 3,080 SQM
RL.13.850
SELF STORAGE ENTRY / EXIT
RSD
ENTRY
EXIT
RAMP 1:11
1:20
RL.12.700
STAFF PARKING MOTORCYCLES / E-BIKES ENTRY / EXIT
INDICATIVE KERB LINE
INDICATIVE ROAD CENTRE LINE
INDICATIVE KERB LINE
SOUTH CREEK ROAD
INMAN ROAD
INDICATIVE KERB LINE
INDICATIVE ROAD CENTRE LINE
INDICATIVE KERB LINE

BASE PLAN
DRAWING NO: S4.55-203, REVISION 4 BY SBA ARCHITECTS, DATED 12.10.2020

NOTES:
1. MINIMUM HEIGHT CLEARANCE OF 2.2m(TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE PARKING SPACES
2. MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES

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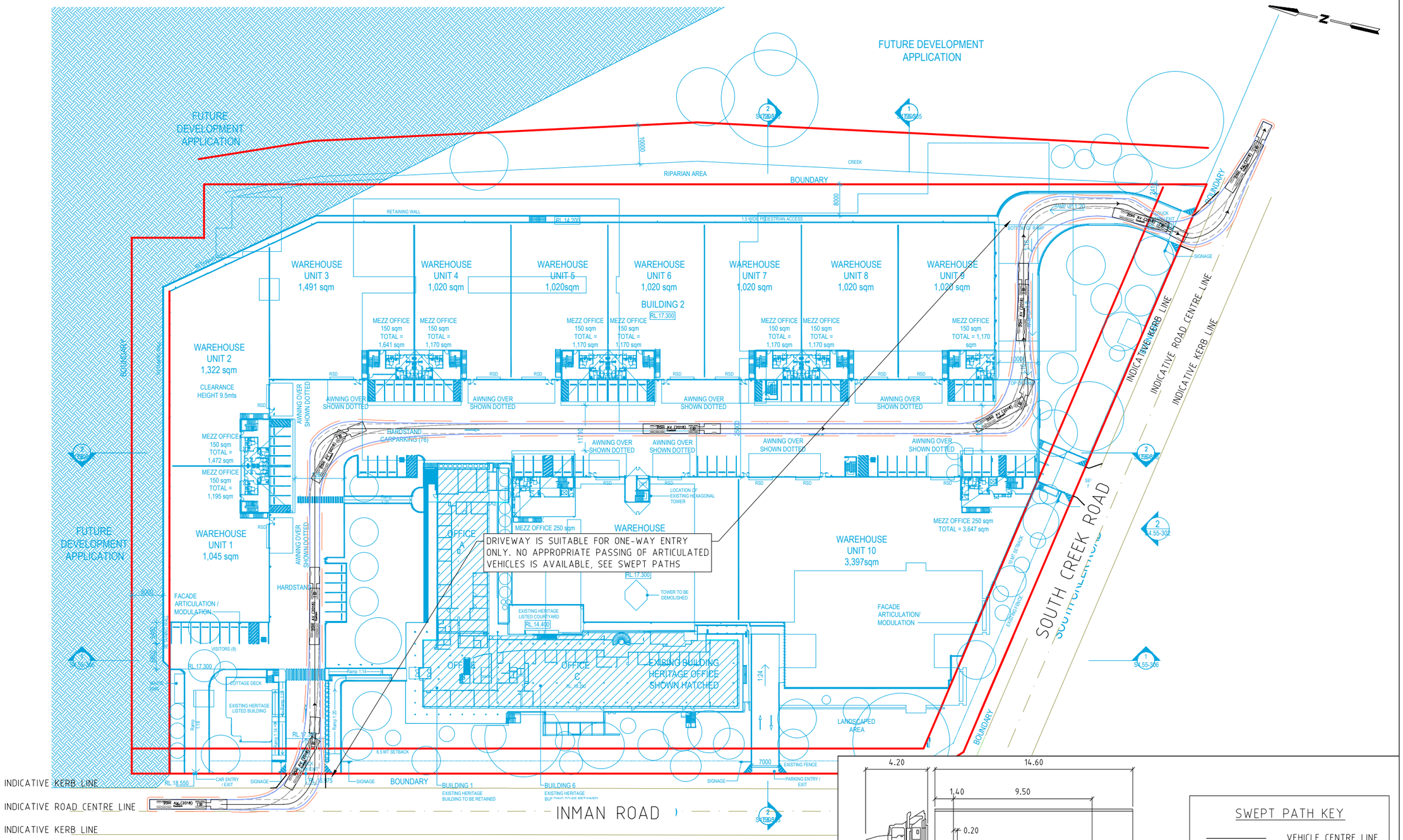
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DATE ISSUED 19 OCTOBER 2020
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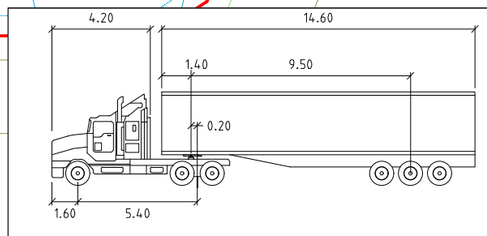
100 SOUTH CREEK ROAD, CROMER

BASEMENT LEVEL
CAR PARK COMPLIANCE REVIEW

DRAWING NO. N135573-01-02 SHEET 02 OF 06 ISSUE P3

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20m AV (2018)

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

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SCALE	A3 0 5 10 20 1:1000

100 SOUTH CREEK ROAD, CROMER

GROUND LEVEL
SWEPT PATH ASSESSMENT

DRAWING NO. N135573-01-03 SHEET 03 OF 06 ISSUE P3

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DEVELOPMENT APPLICATION

RIPARIAN AREA

CREEK

BOUNDARY

RETAINING WALL

RL 14.200

1.5 WIDE PEDESTRIAN ACCESS

WAREHOUSE UNIT 3 1,491 sqm

WAREHOUSE UNIT 4 1,020 sqm

WAREHOUSE UNIT 5 1,020sqm

WAREHOUSE UNIT 6 1,020 sqm

WAREHOUSE UNIT 7 1,020 sqm

WAREHOUSE UNIT 8 1,020 sqm

WAREHOUSE UNIT 9 1,020 sqm

BUILDING 2

RL.17.300

MEZZ OFFICE 150 sqm TOTAL = 1,641 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,170 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,170 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,170 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,170 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,170 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,170 sqm

WAREHOUSE UNIT 2 1,322 sqm

CLEARANCE HEIGHT 9.5mts

AWNING OVER SHOWN DOTTED

HARDSTAND CARPARKING (76)

MEZZ OFFICE 150 sqm TOTAL = 1,472 sqm

MEZZ OFFICE 150 sqm TOTAL = 1,195 sqm

WAREHOUSE UNIT 1 1,045 sqm

HARDSTAND

FACADE ARTICULATION / MODULATION

FUTURE DEVELOPMENT APPLICATION

OFFICE

MEZZ OFFICE 250 sqm TOTAL = 2,380 sqm

LOCATION OF EXISTING HEXAGONAL TOWER

WAREHOUSE UNIT 11 2,130 sqm BUILDING 1

RL.17.300

TOWER TO BE DEMOLISHED

EXISTING HERITAGE LISTED COURTYARD

RL 14.400

WAREHOUSE UNIT 10 3,397sqm

MEZZ OFFICE 250 sqm TOTAL = 3,647 sqm

FACADE ARTICULATION/ MODULATION

RAMP UP 1:20

BOTTOM OF RAMP

1:16

RAMP UP 1:8

TOP OF RAMP

TRUCK ENTRY / EXIT

RL 12.760

SIGNAGE

INDICATIVE KERB LINE

INDICATIVE ROAD CENTRE LINE

INDICATIVE KERB LINE

SOUTH CREEK ROAD

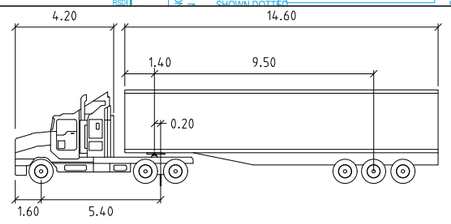
ENTRY

EXIT

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 600mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



20m AV (2018)

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

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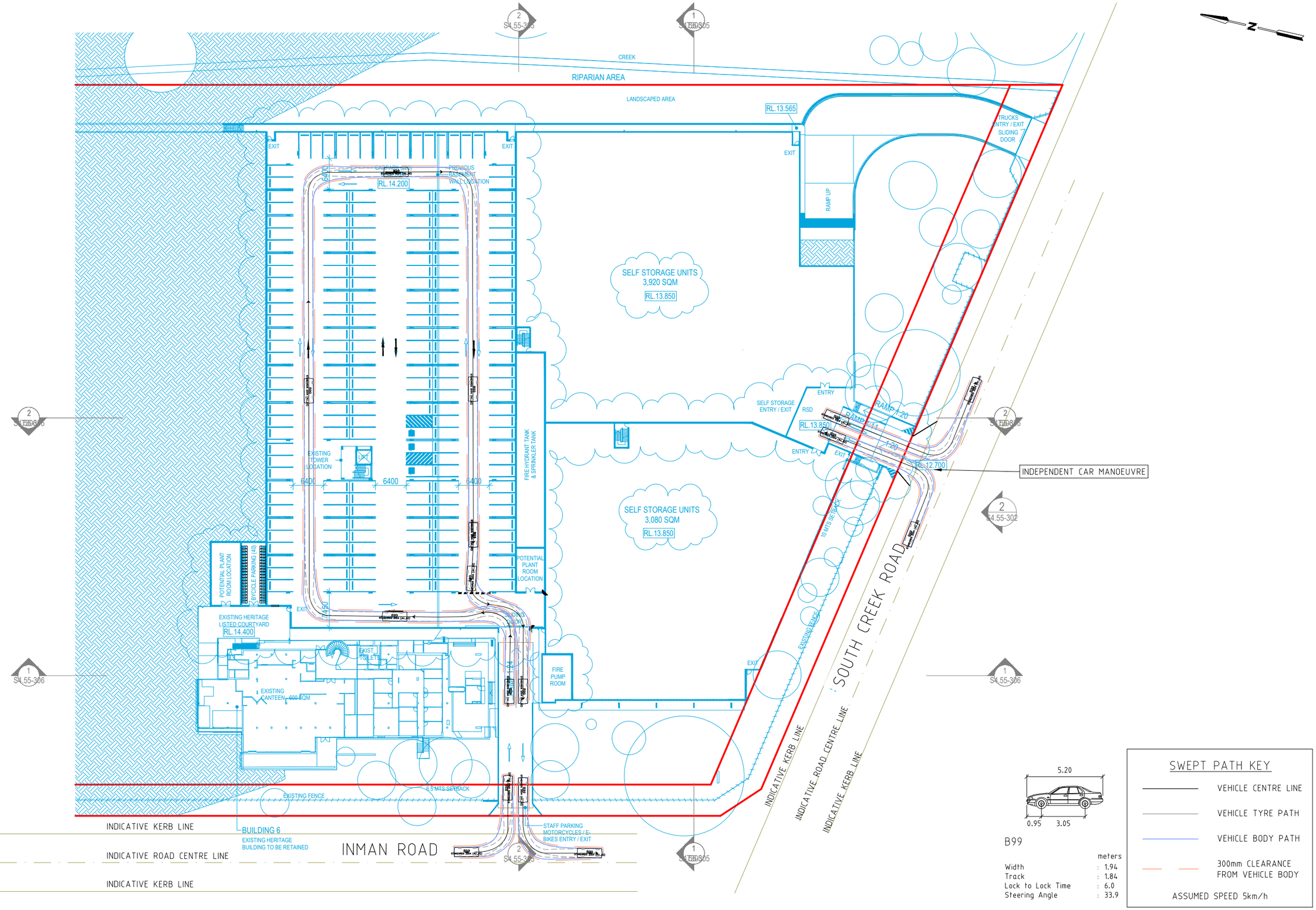
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100 SOUTH CREEK ROAD, CROMER

GROUND LEVEL
SWEPT PATH ASSESSMENT

DRAWING NO. N135573-01-04 SHEET 04 OF 06 ISSUE P3

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5.20

0.95 3.05

B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h

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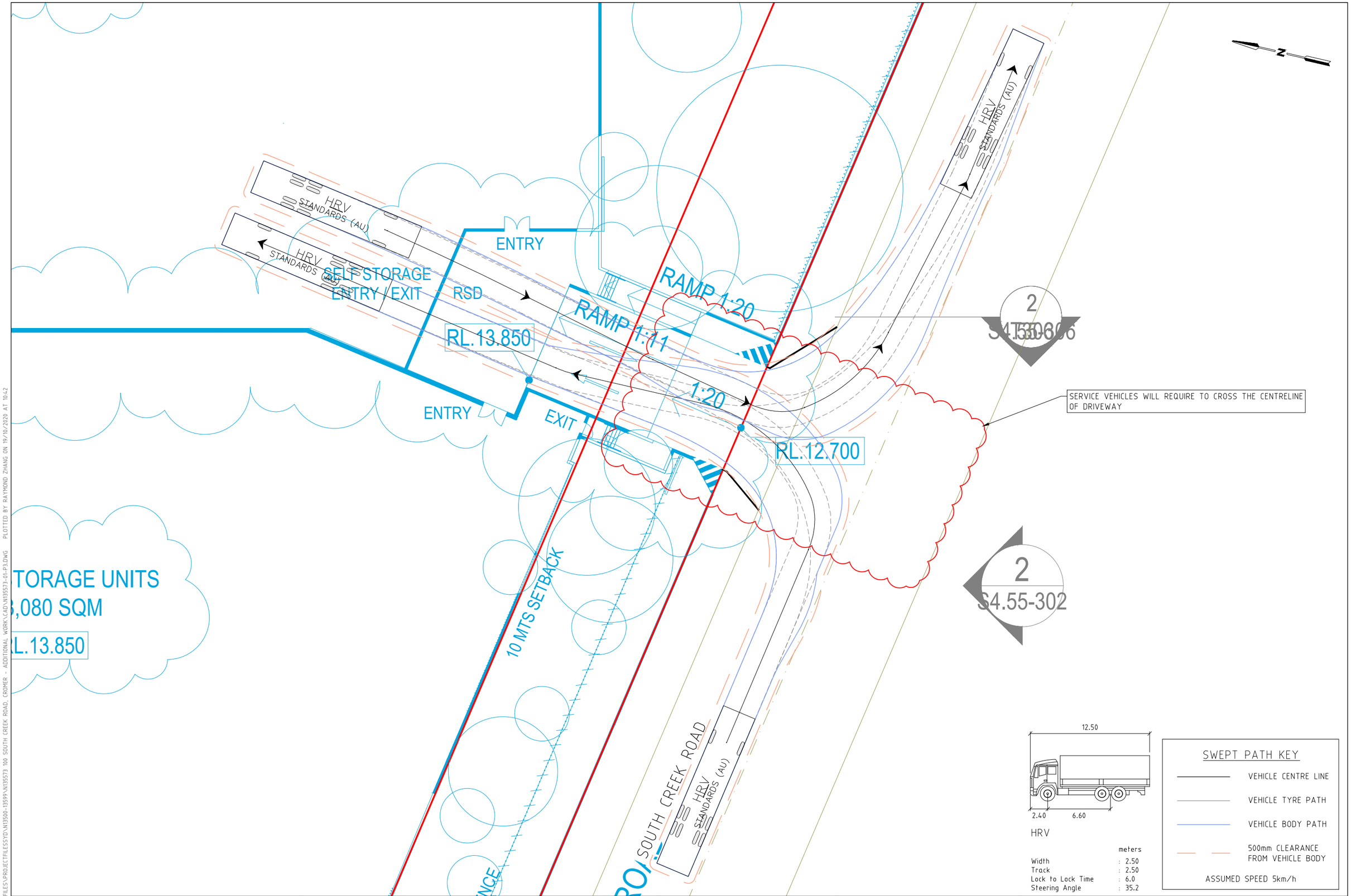
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100 SOUTH CREEK ROAD, CROMER

BASEMENT LEVEL SWEPT PATH ASSESSMENT

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100 SOUTH CREEK ROAD, CROMER

BASEMENT LEVEL SWEPT PATH ASSESSMENT

DRAWING NO. N135573-01-06 SHEET 06 OF 06 ISSUE P3

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WILLOW TREE PLANNING

Appendix 5

Addendum Groundwater Assessment

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Integrated Practical Solutions

Report on
Desktop Groundwater Assessment

Proposed Industrial Development
100 South Creek Road, Cromer

Prepared for
EG Funds Management Pty Ltd

Project 86951.00
November 2020



Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	86951.00	Document No.	R.001.Rev3
Document title	Report on Desktop Groundwater Assessment Proposed Industrial Development		
Site address	100 South Creek Road, Cromer		
Report prepared for	EG Funds Management Pty Ltd		
File name	86951.00.R.001.Rev3		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Osama Naushad	Bruce McPherson	22 October 2019
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Revision 3	Atha Kapitanof	Bruce McPherson	5 November 2020

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Status	Electronic	Paper	Issued to
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Revision 1	1	-	Will Clark, EG Funds Management Pty Ltd
Revision 2	1	-	Grant Flannigan, EG Funds Management Pty Ltd
Revision 3	1	-	Grant Flannigan, EG Funds Management Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		5 November 2020
Reviewer		5 November 2020

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   - 7.2 Applicable Legislation for Consideration of Dewatering 5
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Appendix A: About This Report

Appendix B: Section 4.55 Application Architectural Drawings by SBA

Report on Desktop Groundwater Assessment
Proposed Industrial Development
100 South Creek Road, Cromer

1. Introduction

This report presents the results of a revised desktop groundwater assessment undertaken by Douglas Partners Pty Ltd (DP) for a proposed industrial development at 100 South Creek Road, Cromer. The original assessment was commissioned by Will Clark of EG Funds Management Pty Ltd (EGFM) in an email dated 3 October 2019 and was undertaken in accordance with DP's proposal SYD191040.P.001.Rev0 dated 2 October 2019. This revised assessment was commissioned by Grant Flannigan of EGFM in an email dated 18 September 2020 and was undertaken in accordance with DP's proposal SYD201026 dated 14 September 2020. It is understood that the revised assessment is required for a Section 4.55 application by EGFM to Northern Beaches Council to modify the Council-approved development.

The scope of work included:

- Outlining the anticipated groundwater conditions at the site;
- Preliminary comments on groundwater management with reference to the applicable legislation; and
- Recommendations for intrusive geotechnical investigation

The desktop study did not involve any direct subsurface exploration or sampling and it draws upon information available in the public domain and an understanding of the subsurface conditions at the site based on a previous investigation performed by DP at the site and other investigations undertaken in the vicinity of the site.

This report must be read in conjunction with the notes *'About this Report'* located in Appendix A and other explanatory notes, and the report should be kept in its entirety without separation of individual pages or sections.

2. Proposed Development

The "Section 4.55 Application" Issue 4 of architectural drawings for the proposed development by SBA Architects Pty Ltd (dated 12 October 2020), included in Appendix B for reference, show a new light-industrial development over the western half of the broader property, referred to as 100 South Creek Road, Cromer. The new development involves 11 warehouse units with associated mezzanine offices distributed over two main buildings (Buildings 1 and 2), located on the western side of a riparian area and creek channel/culvert. The buildings are divided by a central driveway with parking on either side for the warehouses.

A part-basement carpark is indicated beneath the northern half of Building 1 and the central parts of the central driveway and Building 2, with a Finished Floor Level (FFL) at RL 14.200 m, relative to the Australian Height Datum (AHD). Beneath the southern ends of central driveway and both Buildings 1 and 2, over the southern half of the development site, "Self-Storage Units" are shown with a FFL of RL 13.850 m AHD. Based on contour plan information it would appear that the formation of the storage units will generally involve excavation depths in the order of 0.5 – 0.7 m below present ground surface levels. For the proposed part-basement carpark, it would appear that the excavation depths will increase from 0.3 m along its southern perimeter, to between 1.5 m and 2.8 m from east to west along its northern perimeter.

An existing heritage-listed building will be retained along the Inman Street frontage, together with its rear courtyard (also heritage-listed).

3. Sources of Information

Information on the likely subsurface conditions at the site and the surrounding area was sourced from the following:

- Geological maps published by Geological Survey New South Wales. The relevant map is the Sydney sheet 9130 (Edition 1, 1983) at a scale of 1:100 000;
- NSW government database of registered groundwater bores; and
- Previous geotechnical investigations undertaken by DP at and near the site. In particular, DP carried out a geotechnical investigation of the broader site in 1998 for Roche Products, the pharmaceutical and healthcare company.

4. Geology and Hydrogeology

Reference to the Sydney 1:100 000 Series Geological Map Sheet (9130) indicates that the site is on or near a geological boundary. The upper portion of the site, over the northern half of the broader site, is shown to be underlain by Narrabeen Group rocks of Triassic age (comprising interbedded laminite, shale, quartz and sandstone) and the southern portion is underlain by alluvial stream deposits of Quaternary age (comprising silty to peaty quartz sand, silt and clay). An excerpt from the geological map is given in Figure 1.

Borehole and cone penetration test (CPT) investigations carried out at the site suggest that the geological boundary between areas underlain by bedrock and alluvium is located further to the north than shown on the geological map (and Figure 1), with relatively deep soils encountered over most of the proposed development footprint.

The location of Water NSW-registered groundwater wells is also shown in Figure 1. For the four registered wells located on the site (drilled in 2010), no measurement of the standing water level is recorded. All boreholes (i.e. wells) were drilled to a depth of 7.5 m.



Figure 1. Excerpt from geological map sheet 9130 for Sydney.

5. Site Description

The development site is bounded by commercial properties and a day-care centre to the north and further to the north, Orlando Road, Inman Road to west and South Creek Road to the south.

DP visited the site on 10 October 2019 to undertake a site walkover inspection. At the time of the visit, there were multiple commercial buildings and associated hardstand car parking across the site. A grassed area with a tennis court was located in the north-western part of the site. Numerous medium to large trees were located across the site. The northern end of the site (extending from Orlando Road to the carpark adjacent to Gate 1) has an approximate slope of 20 to 30 degrees. A relatively flat topography was observed from approximately the middle of the site all the way to South Creek Road.

A creek running from north to south was observed along the eastern boundary of the development site. At the northern end of the creek, a steep, high-strength sandstone rock face was also observed. The creek is not visible over the southern half of the site where it has been directed into a culvert that extends beneath the property. Minor creek flows were observed at the time of the inspection.

6. Anticipated Subsurface Conditions

6.1 Subsurface Soil and Rock Profile

Based on the previous DP investigation (1998) undertaken at the site, the subsurface conditions are expected to comprise the following general sequence, described in increasing depth order.

- FILL – silty clay, clayey sand, sand and some building rubble to variable depths of between 0.3 m and about 2 m;
- ALLUVIUM – of interlayered silty sand/sandy silt, organic clay, sand, silty clay and clay down to depths of 10 m to 15 m in the southern part of the site. The alluvium is typically stiff to hard cohesive soils or medium dense sand, but some layers of very soft clay and very loose to loose sand were also indicated.
- SANDSTONE/SHALE/SILTSTONE - Extremely to highly weathered, extremely low and very low strength rock, grading to a low and medium strength, moderately weathered sandstone with depth. The boreholes at the northern end of the proposed building footprint indicate rock depths vary between 2 m and 6 m depth, greatest towards the eastern side of the proposed building footprint.

No boreholes or CPTs were located over the south-western quadrant of the broader property and, as such, the above description is primarily based on the profile encountered in the central area, adjacent to the creek and culvert. It is possible that the depth of the rock reduces towards the west and towards South Creek Road.

6.2 Groundwater

The previous DP investigation at the site (i.e. borehole drilling and CPTs) encountered groundwater between RL 10.4 m and RL 20.3 m AHD for the broader site. It is inferred that the groundwater aquifer is fed by overland and subsurface flows from the elevated (higher ground) areas above, both on and surrounding the site.

Over the lower (southern) part of the site where excavations for the carpark and storage units are proposed, groundwater was typically encountered at depths of between 2.5 m and 4.5 m (i.e. between RL 10 m and RL 14 m AHD), from north to south. It is expected that following periods of prolonged rainfall, groundwater levels within the alluvial soil profile could rise significantly.

Groundwater levels can vary seasonally, due to climatic effects, following periods of rainfall and due to local factors, such as permeability of the soil, changes to drainage conditions and nearby underground services. Localised areas of perched water may also be present at shallow depths in some areas across the site, particularly in the vicinity of surface depressions or poorly drained areas.

7. Discussion

7.1 General

The referenced architectural drawings indicate the FFLs for the part-basement of the proposed development will step down to the south from RL 14.200 m AHD for the car park to RL 13.850 m AHD for the self-storage units. It is noted that this area is closest to the former creek channel and existing culvert, with the deepest soil profile (about 15 m) and a groundwater level that falls from RL 14.4 m at the northern end to RL 10.4m at the southern end of the footprint (from 2.5 m to 4.2 m depth) based on the field work in 1998.

While it is unlikely that excavation for the proposed self-storage units will encounter the groundwater table, some seepage from perched ephemeral water could impact the construction phase. The floor level of the proposed basement car park over the northern half of the development site, however, is shown at RL 14.200 m AHD. This is marginally lower than the groundwater levels recorded at the northern end of this part of the site for the investigations conducted (by DP) in 1998. So, it is possible that construction of the car park could occur without groundwater inflows due to seasonal and climatic variation, but it is likely that the design would need to accommodate water levels rising above RL 14.2 m for the permanent structure. Long-term (contemporary) groundwater level monitoring is recommended in this area of the site, as discussed in the following sections.

7.2 Applicable Legislation for Consideration of Dewatering

The construction of the part-basement car parking and self-storage units that form part of the proposed development constitute an “aquifer interference activity” within the definition of the NSW Water Management Act 2000. As a consequence, application for an aquifer interference approval will generally need to be made to Water NSW, who handle the licensing and assessment of aquifer interference activities in accordance with the “Aquifer Interference Policy “(AIP) of the NSW Department of Primary Industries (Office of Water) dated September 2012. Water NSW will not approve dewatering (if required), unless they are satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to the aquifer or its dependent ecosystems as a consequence of it being “interfered with” in the course of the activities to which the approval relates.

The taking of water from the groundwater source may be required for dewatering purposes during construction for the deeper cuts along the northern perimeter of the proposed carpark. In order to discharge construction water if it is encountered, a submission will need to be made to Water NSW for a Construction Dewatering License. A Dewatering Management Plan (DMP) will need to accompany the submission. Depending on the ecosystem and Council requirements, an environmental impact assessment may be required to accompany the License application submission. Approval will also be needed for construction water to be discharged into the stormwater system. Some Councils have advised that they are no longer issuing licenses for disposal to the stormwater system, but that such approval now also needs to be obtained from Water NSW. Treatment may be needed to achieve water quality requirements (e.g. clarity and possibly treatment for PH and metals).

An access licence would be required to take water from the groundwater source during construction, if groundwater is encountered. A separate Water Access Licence would also be necessary for permanent drained basements where the water would be taken from the groundwater source over the long-term.

7.3 Part-Basement Construction Options

It is considered that a 'tanked' basement may be required for the northern end of the car park, where deeper cuts may intersect the groundwater table. A tanked basement is one which is theoretically watertight, via the construction of a perimeter 'cut-off' wall (interlocking piles or diaphragm wall) around the basement with an integrated waterproof base slab and appropriate waterproof seals and linings or membranes. Even with good workmanship, however, some seepage is not uncommon and such seepage would need to be directed to drainage pits or similar. A Water Access Licence is unlikely to be required for the permanent case on this basis.

Alternatively, a drained basement could theoretically be adopted provided that 'cut-off' walls are installed around the northern perimeter of the part-basement to substantially reduce seepage inflows into the carpark under the differential 'head' (pressure) acting outside the basement. It is considered, however, that Water NSW is unlikely to approve a drained basement on the basis of the regulatory framework in play and the potential for 'inflows' of groundwater over the life of the car park structure. The accumulated water would need to be discharged into the stormwater system (under a license) and prior treatment of the groundwater may also be necessary so as not to cause pollution. Also, a long-term Water Access License would generally be required from Water NSW, which would require the acquisition of 'shares' sufficient to cover the expected annual 'take' of water from the aquifer.

Aside from regulations, it is noted that a drained basement will also generally require permanent drainage below the basement floor slab to direct any seepage to the stormwater drainage system. It is likely that iron oxides will precipitate from any such seepage, possibly leading to a build-up of an iron-oxide sludge that can lead to blockages of drainage lines and 'seizing' of the moving elements of pumps. Allowance should be made in the design of permanent drainage systems for removal of this sludge, long-term maintenance requirements, general cleaning and flushing of the drainage systems.

7.4 Further Investigation

The assessment of the type of basement (i.e. drained or tanked) should be made following an intrusive ground investigation of the site with a focus on groundwater monitoring. Given the likelihood that some form of perimeter 'cut-off' wall will be required for the part-basement car park, it will also be important to ascertain the depth to and nature of the bedrock. For the size and nature of the proposed development and expected subsurface conditions, the following ground and groundwater investigation is suggested:

- Drilling of 8 boreholes to depths of 15 – 20 m around the perimeter of the proposed basement excavation, including along the western side of the site (i.e. at Building 1) where no previous investigations (by DP in 1998) were undertaken;
- Installation of three or four groundwater monitoring wells in the drilled boreholes for monitoring, testing and sampling purposes;
- Installation of data loggers in all wells and monitoring for at least six, and preferably twelve, months;
- In situ permeability testing in all of the wells using either the falling or rising-head test method, as appropriate, to provide an indication of the seepage inflows to the basement excavation; and
- Chemical laboratory analysis of groundwater samples to assess likely treatment requirements and options for groundwater disposal.

For the rising head method, the groundwater table level in each well is first measured then groundwater is pumped out of each well so as to temporarily lower the water level in each well, whereupon its depth in each well is again measured to commence the test. The depth to the lowered water level in each well is then measured at regular time intervals as it rises back to the initial groundwater table levels. For the falling head test method, the groundwater table level in each well is first measured then water is poured into each well so as to temporarily increase the water level in each well, whereupon its depth in each well is again measured to commence the test. The depth to the water level in each well is then measured at regular time intervals as it falls back toward the initial groundwater levels.

Given the presence of the fill noted in some of the previous (1998) boreholes and considering the previous land-use of the site, the site should be investigated for contamination in respect of the proposed land-use for the site and also to classify the spoil to the derived from the excavation (for disposal purposes), in accordance with current EPA guidelines.

8. Limitations

Douglas Partners (DP) has prepared this revised report for this project at 100 South Creek Road, Cromer, in accordance with DP's proposal SYD201026 dated 14 September 2020 and acceptance received from Grant Flannigan of EG Funds Management Pty Ltd (EGFM) dated 18 September 2020. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of EGFM for this project only and for the purposes as described in the report. It should not be used by or be relied upon for other projects or purposes on the same or another site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site and nearby sites only at specific sampling and/or testing locations, and then only to the depths investigated and at the time the works were carried out (i.e. pre-2000). Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical and groundwater components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of filling of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such filling may contain contaminants and hazardous building materials.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Section 4.55 Application Architectural Drawings by SBA

EG - PROPOSED INDUSTRIAL BUILDING

100 SOUTH CREEK ROAD, CROMER, NSW 2099

ISSUE FOR SECTION 4.55 APPLICATION

DRAWING LIST S4.55	
Sheet Number	Sheet Name
S4.55-000	COVERPAGE
S4.55-202	GROUND FLOOR PLAN
S4.55-203	BASEMENT PLAN
S4.55-302	ELEVATIONS 2
S4.55-305	SECTIONS
S4.55-306	SECTIONS 2



SECTION 4.55 **PRELIMINARY**

SBA ARCHITECTS
Commercial Industrial Residential Retail Interior Design
Phone: 02 9929 9988 Web: www.sbaarch.com.au

#	DESCRIPTION	DATE
4	ISSUE FOR S4.55 SUBMISSION	12/10/2020
3	ISSUE FOR S4.55 SUBMISSION	08/10/2020
2	ISSUE FOR S4.55 SUBMISSION	25/09/2020
1	ISSUE FOR S4.55 SUBMISSION	17/09/2020

CLIENT EG

NORTHERN BEACHES BUSINESS PARK

100 SOUTH CREEK ROAD. CROMER

NORTH

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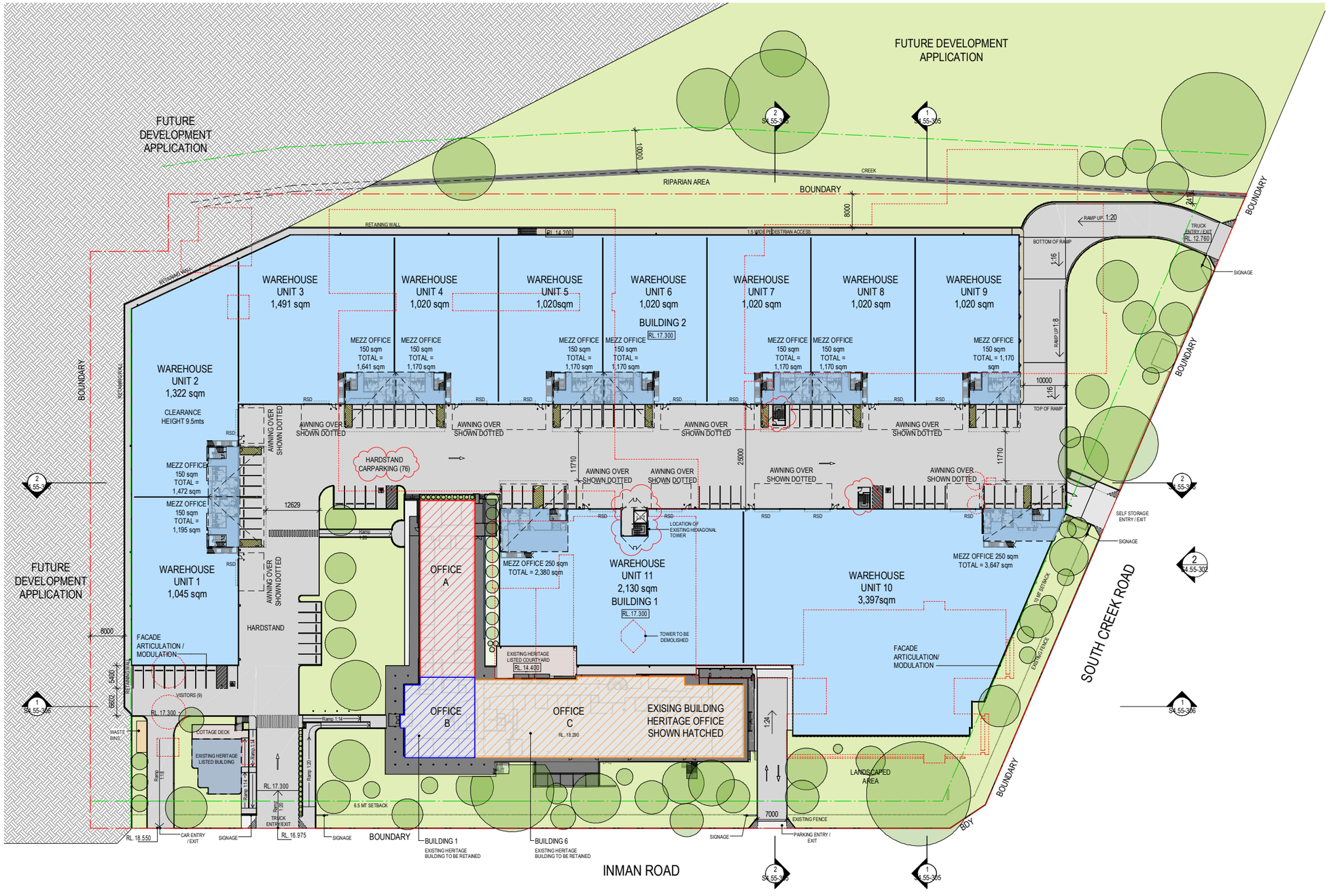
TITLE COVERPAGE

DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	As indicated @ A1	19110	S4.55-000	4

EG

DEMOLITION LEGEND:

WALL TO BE DEMOLISH



1 GROUND LEVEL 1 : 500

AREA SCHEDULE

SITE AREA		37,031 sq.m
UNIT 1	WAREHOUSE	1,045 sq.m
	MEZZ 1	150 sq.m
UNIT 2	WAREHOUSE	1,322 sq.m
	MEZZ 2	150 sq.m
UNIT 3	WAREHOUSE	1,491 sq.m
	MEZZ 3	150 sq.m
UNIT 4	WAREHOUSE	1,020 sq.m
	MEZZ 4	150 sq.m
UNIT 5	WAREHOUSE	1,020 sq.m
	MEZZ 5	150 sq.m
UNIT 6	WAREHOUSE	1,020 sq.m
	MEZZ 6	150 sq.m
UNIT 7	WAREHOUSE	1,020 sq.m
	MEZZ 7	150 sq.m
UNIT 8	WAREHOUSE	1,020 sq.m
	MEZZ 8	150 sq.m
UNIT 9	WAREHOUSE	1,020 sq.m
	MEZZ 9	150 sq.m
UNIT 10	WAREHOUSE	3,397 sq.m
	MEZZ 10	250 sq.m
UNIT 11	WAREHOUSE	2,130 sq.m
	MEZZ 11	250 sq.m
TOTAL WH. AREA		15,501 sq.m
TOTAL MZZ. OFFICE AREA		1,850 sq.m
HERITAGE OFFICE		
OFFICE UNIT A		570 sq.m
GF - OFFICE UNIT B		309 sq.m
LV1 - OFFICE UNIT B		401 sq.m
LV-1 - OFFICE UNIT C		775 sq.m
GF - OFFICE UNIT C		1,124 sq.m
TOTAL HERITAGE OFFICE AREA		3,179 sq.m
EXISTING COTTAGE		124 sq.m
SELF STORAGE FACILITY		7,000 sq.m
HARDSTAND		5,621 sq.m
TOTAL GFA (excludes basement carpark)		27,654 sq.m
CARPARKING		279 cars
SITE COVERAGE		66%

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NORTH

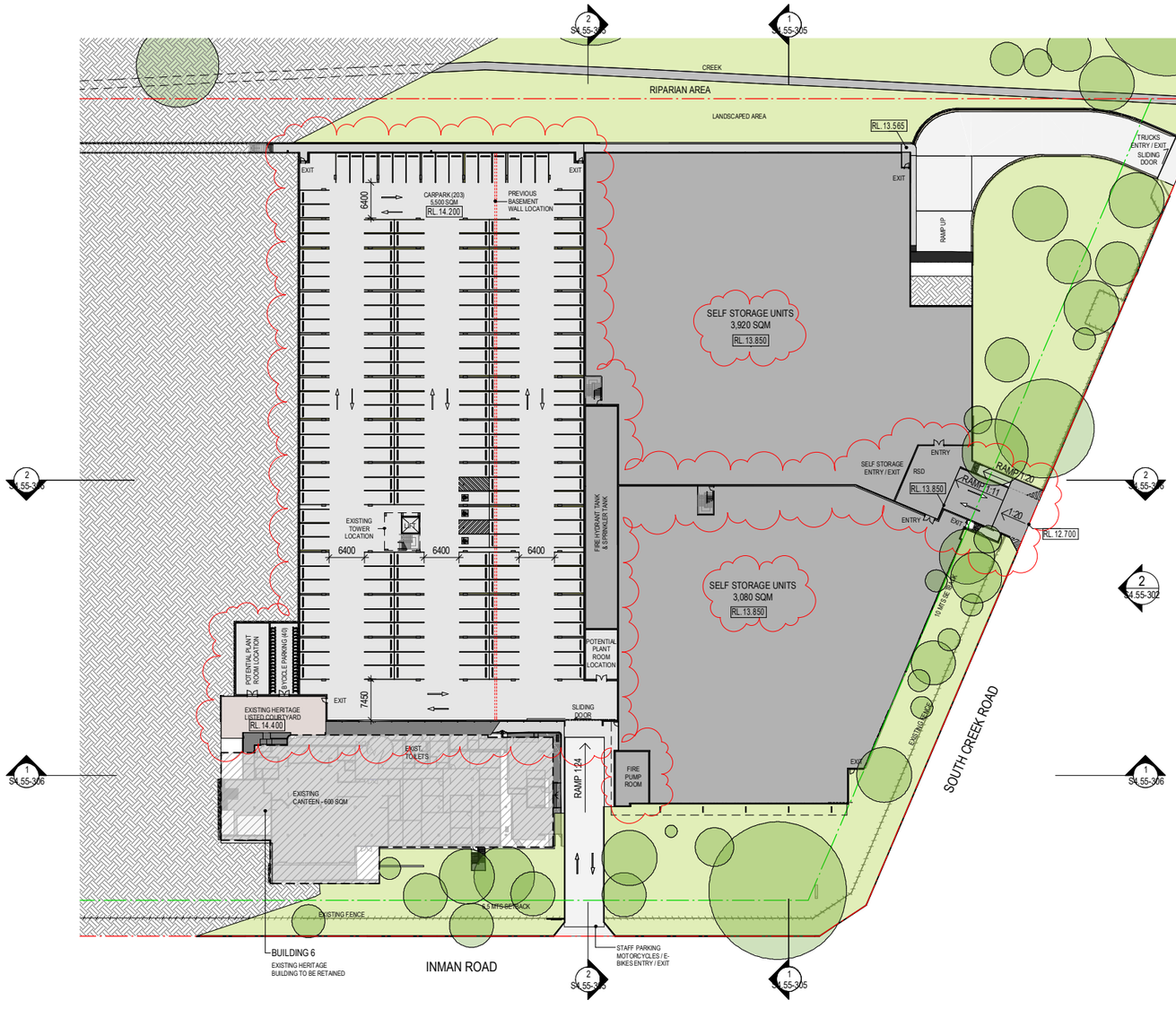
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TITLE GROUND FLOOR PLAN

DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	As indicated @ A1	19110	S4.55-202	1



1 SELF STORAGE LEVEL 1 : 500

SUMMARY OF S4.55 MODIFICATIONS:

-SELF STORAGE UNITS LEVEL RAISED 2.85m (NEW RL: 13.85)
-ACCESS RAMP FROM STH CREEK RD ADJUSTED TO SUIT NEW LEVEL
-SELF STORAGE UNITS AREA INCREASED FROM 3,902 TO 7,000 SQM
-PARKING SPACES PROVIDED ON BASEMENT INCREASED FROM 159 TO 203
-PARKING SPACES PROVIDED ON GROUND FLOOR INCREASED FROM 72 TO 76
-NEW 40 BICYCLES SPACES PROVIDED
-NEW PLANT ROOM PROVIDED
-INCREASED CARPARK AREA AND LAYOUT RECONFIGURATION TO ACCOMMODATE THE ABOVE
-EXISTING TOWER LOCATION AND HERITAGE COURTYARD NOW SHOWN IN PLANS
-LIFT AND STAIRS RELOCATED INTO EXISTING TOWER

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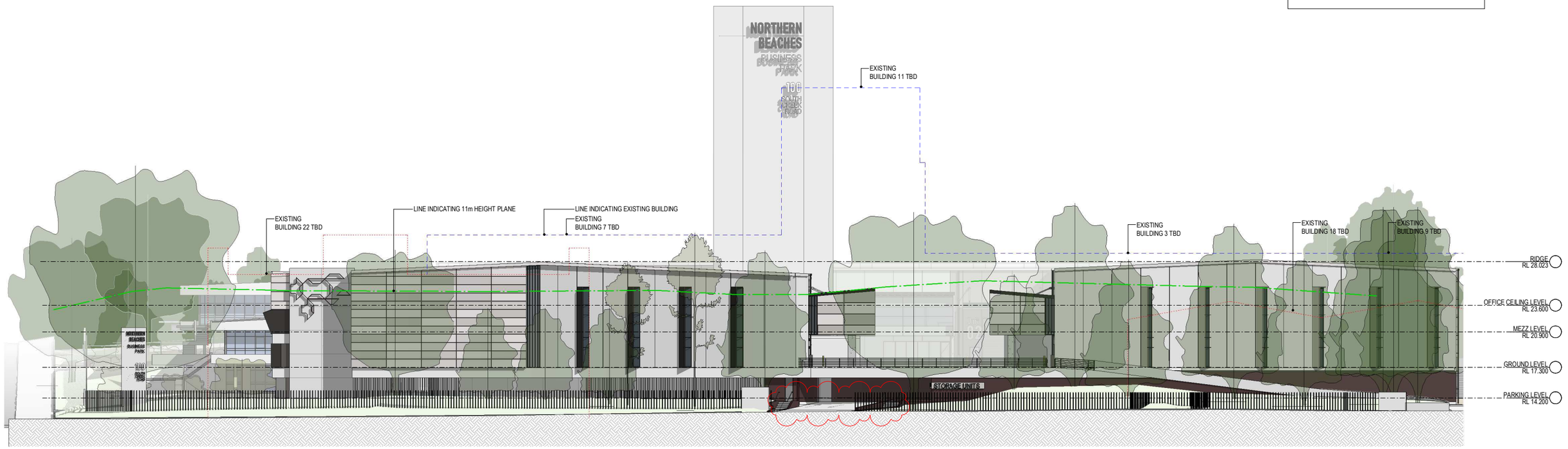
NORTH

TITLE BASEMENT PLAN

DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	1 : 500 @ A1	19110	S4.55-203	4

LEGEND:

- EXISTING BULDING TO BE DEMOLISH ENVELOPE LINE
- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE



2 SOUTH CREEK RD ELEVATION 1 : 200

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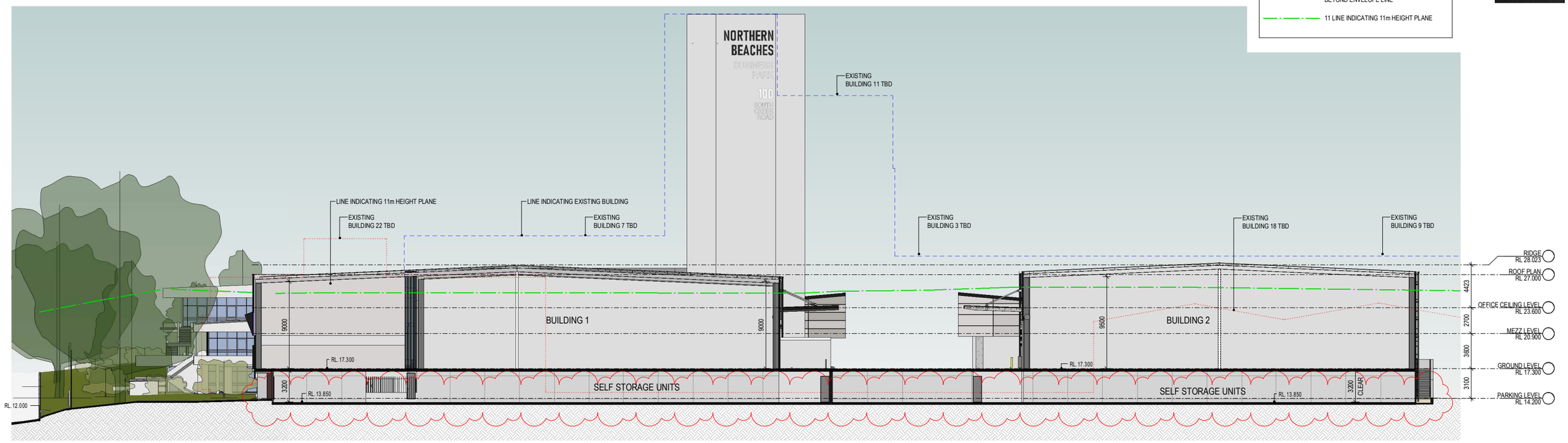
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TITLE ELEVATIONS 2

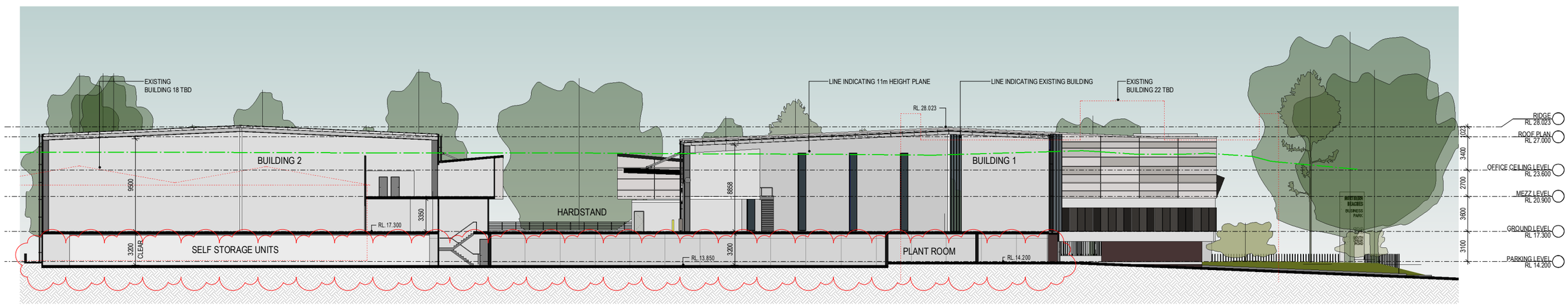
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12/10/2020	1 : 200 @ A1	19110	S4.55-302	4

LEGEND:

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- EXISTING BUILDING TO BE DEMOLISH BEYOND ENVELOPE LINE
- 11 LINE INDICATING 11m HEIGHT PLANE



1 Section A 1 : 200



2 Section B 1 : 200

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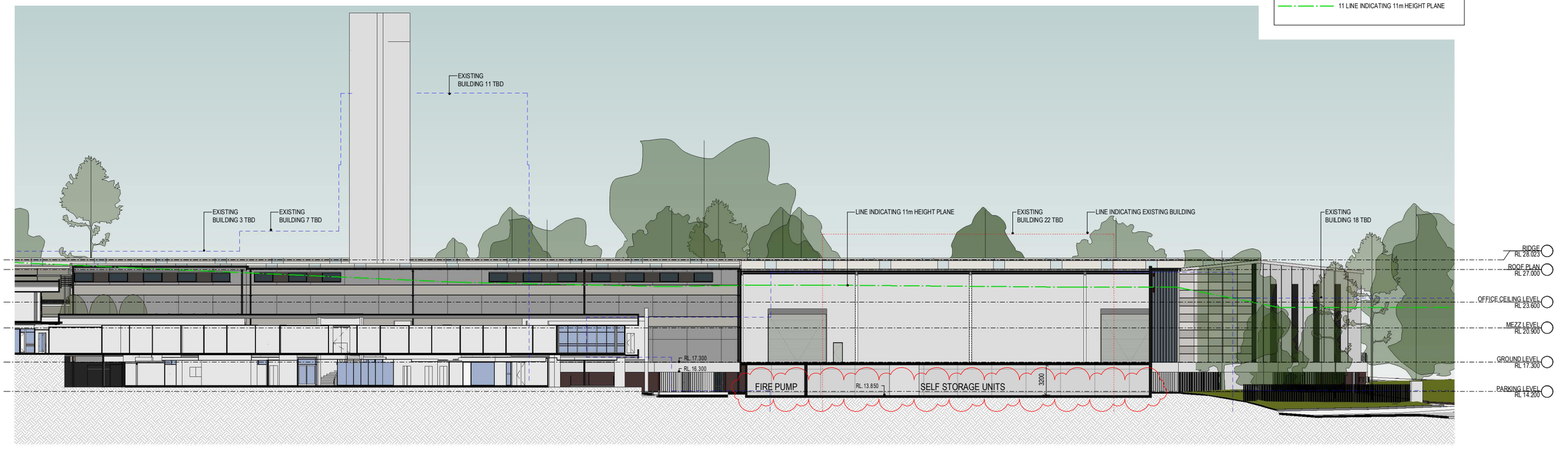
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TITLE SECTIONS

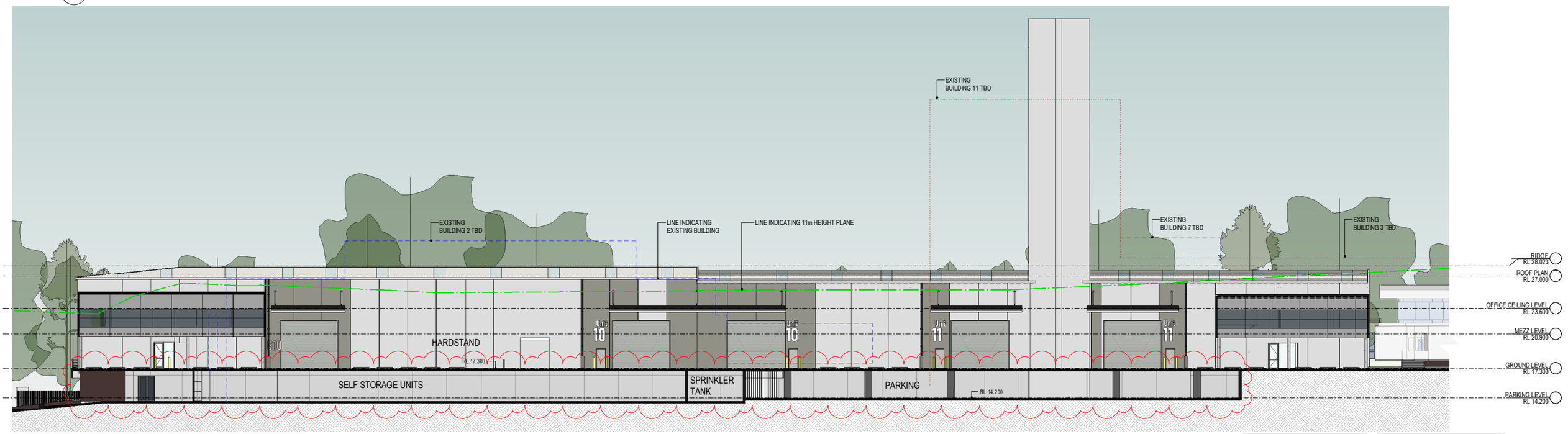
DATE	SCALE	PROJECT NO.	DWG NO.	REVISION
12/10/2020	1 : 200 @ A1	19110	S4.55-305	4

LEGEND:

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- 11 LINE INDICATING 11m HEIGHT PLANE



1 Section C 1 : 200



2 Section D 1 : 200

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TITLE SECTIONS 2

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WILLOW TREE PLANNING

Appendix 6

Preliminary Geotechnical Investigation

A national town planning consultancy
www.willowtreeplanning.com.au

DUE DILIGENCE REPORT

TO
EG

ON
PRELIMINARY GEOTECHNICAL ASSESSMENT

FOR
PROPOSED PROPERTY PURCHASE

AT
100 SOUTH CREEK ROAD, CROMER, NSW

18 August 2017
Ref: 30766ZRrpt

JK Geotechnics
GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

PO Box 976, North Ryde BC NSW 1670
Tel: 02 9888 5000 Fax: 02 9888 5003
www.jkgeotechnics.com.au

Jeffery & Katauskas Pty Ltd, trading as JK Geotechnics ABN 17 003 550 801

Date: 18 August 2017
Report No: 30766ZRrpt
Revision No: 1

Report prepared by:

Paul Roberts
Senior Associate I Engineering Geologist

Report reviewed by:

Agi Zenon
Principal I Geotechnical Engineer

For and on behalf of
JK GEOTECHNICS
PO Box 976
NORTH RYDE BC NSW 1670

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b) the limitations defined in the Client's brief to JKG;

c) the terms of contract between JK and the Client, including terms limiting the liability of JKG.

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FIGURE 1: SITE LOCATION PLAN

REPORT EXPLANATION NOTES

1 INTRODUCTION

This report presents the results of our 'due diligence' preliminary geotechnical assessment for the proposed purchase of the property at 100 South Creek Road, Cromer, NSW. A site location plan is presented as Figure 1. The assessment was commissioned by David Workman (EG) in an email dated 1 August 2017. The commission was on the basis of our fee proposal (Ref. P45237ZR) dated 26 June 2017.

We have been provided with the following information:

- An 'Information Memorandum' dated July 2015 prepared by Cushman & Wakefield.
- A geotechnical report (Project TGE21417, dated 21 May 2014) prepared by Taylor Geotechnical Engineering (TGE) for a neighbouring property at 38 Orlando Road, Cromer, NSW.
- A geotechnical report (Project 85003.00, dated 24 August 2015) prepared by Douglas Partners Pty Ltd (DP) for a neighbouring property at 75 South Creek Road, Cromer, NSW.
- An extract of the Warringah Council (now part of the Northern Beaches Council) LEP Landslip Risk Mapping.

Based on the provided information, we understand that the former Roche Australia Headquarters and Distribution Centre is to be sold. The majority of the site lies within an Area A landslip risk zone (slopes less than 5^{o}) and the northern portion of the site lies within an Area D landslip risk zone (Collaroy Plateau Flanking Area Slopes 5^{o} to 15^{o}). EG therefore requested a geotechnical stability assessment of the site with regard to its current condition and any potential future development.

2 ASSESSMENT PROCEDURE

The assessment was completed by a Senior Associate level engineering geologist on 9 August 2017. The assessment comprised a detailed inspection of the topographic, surface drainage and geological conditions of the site and its immediate environs. These features were compared to those of other similar lots in neighbouring locations to provide a comparative basis for assessing the risk of instability affecting the site. The attached Appendix A defines the terminology adopted for the risk assessment together with a flow chart illustrating the Risk Management Process based on the guidelines given in AGS 2007c (Reference 1).

A summary of our observations is presented in Section 3.1 below and have been measured by hand held inclinometer and tape measure techniques and hence are only approximate. Should any

of the features be critical to the future use and/or development of the site, we recommend they be located more accurately using instrument survey techniques.

A desk top review of our database of nearby geotechnical reports, available published geological information and the provided geotechnical reports to provide additional information on the likely subsurface conditions at the site. A summary of the expected subsurface conditions is presented in Section 3.2, below. In addition, a 'Dial Before You Dig' request was submitted.

Our preliminary geotechnical advice is provided in Section 5 following our geotechnical assessment.

3 RESULTS OF ASSESSMENT

3.1 Site Observations

The site is located towards the base of a hillside that slopes down to the south and west at a maximum of about 5^{o} and 10^{o}, respectively. The site has southern, western and northern frontages onto South Creek Road, Inman Road and Orlando Road, respectively.

The site was occupied by a number of concrete, concrete frame, brick and metal clad buildings with asphaltic concrete (AC) access roads and car parking areas, and landscaped surrounds. A number of trees were scatted across the site and a creek line (orientated approximately north-south) crossed the central-eastern portion of the site.

The creek line flowed into the site from a neighbouring sandstone rock face to the north; sandstone bedrock was outcropping over the base of the upper (northern) portion of the creek bed within the site. The creek line was generally vegetated, although the northern section was intermittently lined by stacked sandstone boulder retaining walls (maximum 2.5m high). The creek line was also culverted in places as it crossed the site.

There have been localised cut and fill earthworks across the site to form flat platforms. These areas have either been:

- Supported by retaining walls (rendered, brick or concrete block construction) ranging between about 0.5m and 2m height, or
- Graded to form vegetated batter slopes (maximum height about 3m) and formed at angles ranging between about 15^{o} and 30^{o}. The steeper slope face lining the southern side of the northern car parking area was uneven.

The north-eastern corner of the site was generally vegetated and traces of the top surfaces of sandstone outcrops and occasional sandstone boulders were noted, together with an overgrown stacked sandstone boulder retaining wall (maximum height about 2m). The vegetated surfaces sloped down to the south and west at between about 8^{o} and 30^{o}. The northern side of an AC paved recreation area over the north-eastern portion of the site was lined by a sub-vertical cut face (maximum, 2.5m high) which exposed residual clayey soils. The cut face was eroding and spalling, with clayey debris collecting at the toe of the cut face.

A neighbouring two level concrete framed brick building and the rear yards of residences respectively lined the central and eastern portion of the stepped northern site boundary. Occasional rendered rear yard retaining walls lined sections of the eastern portion of the northern site boundary.

The aforementioned neighbouring sandstone rock face to the north was about 4m to 5m high and had a concave face comprising a sub-vertical upper portion and a lower section which sloped down to the south-west at a maximum of about 30^{o}. Immediately to the west of the rock face, a sandstone boulder retaining wall (about 3m high) supported the neighbouring rear yard area. We understand from a representative of Roche that the retaining wall was constructed to support a past area of instability within the neighbouring site, but no further details were provided.

Based on a cursory inspection from within the site, the buildings and structures within and neighbouring the site were generally in good condition.

3.2 Subsurface Conditions

The 1:100,000 geological map of Sydney indicates that the northern portion of the site is underlain by Newport Formation close to the interface with the overlying Hawkesbury Sandstone, and Quaternary age alluvial sands, silts and clays are present below the central and southern portion of the site. Based on our site observations and a review of our database of nearby geotechnical reports and provided geotechnical reports, our assessment of the likely subsurface conditions beneath the site are as follows:

- Locally, sandy or clayey fill, which could be up to about 3m deep.
- Over the northern portion of the site, a maximum 2m thick layer of residual sandy clay or clayey either present from surface level or beneath the surficial fill. Locally, over the north-eastern corner of the site, some colluvial clays (including sandstone gravel, cobble and boulder sized inclusion) may be present close to sandstone outcrops within and neighbouring the site to the north.

- Over the central and southern portion of the site, from surface level or beneath the surficial fill, an interbedded sequence of alluvial sands and clays extending to at least 12m depth.
- Over the northern portion of the site, weathered sandstone bedrock exposed at surface level or a maximum depth of about 5m below the fill and/or residual soils. Over the central and southern portion of the site, we expect the weathered sandstone bedrock to be present below the alluvial soils at depths in excess of 12m. Based on the outcrop faces within and neighbouring the site, the sandstone over the northern portion of the site has been assessed to represent Hawkesbury Sandstone. The sandstone was assessed to be distinctly weathered and of at least low to medium strength. Over the central and southern portion of the site, we would expect interbedded sandstone, laminate and shale to be present beneath the alluvial soil profile.
- Groundwater may be encountered within the residual soil profile, but would be expected to be encountered within the alluvial soil profile at depths of around 3m.
- We note that the Sydney Water 'Dial Before You Dig' plan indicated that the groundwater at the site was '*contaminated with trichloroethene and benzene migrating off-site SWC Contaminated Land Mgt – 8849 5818'*.

4 GEOTECHNICAL ASSESSMENT

Based on our observations, the northern portion of the site is a Landslip Risk Class D (including a small zone of Landslip Risk Class E) and the remainder of the site Landslip Risk Class A; see Plate 1, below.

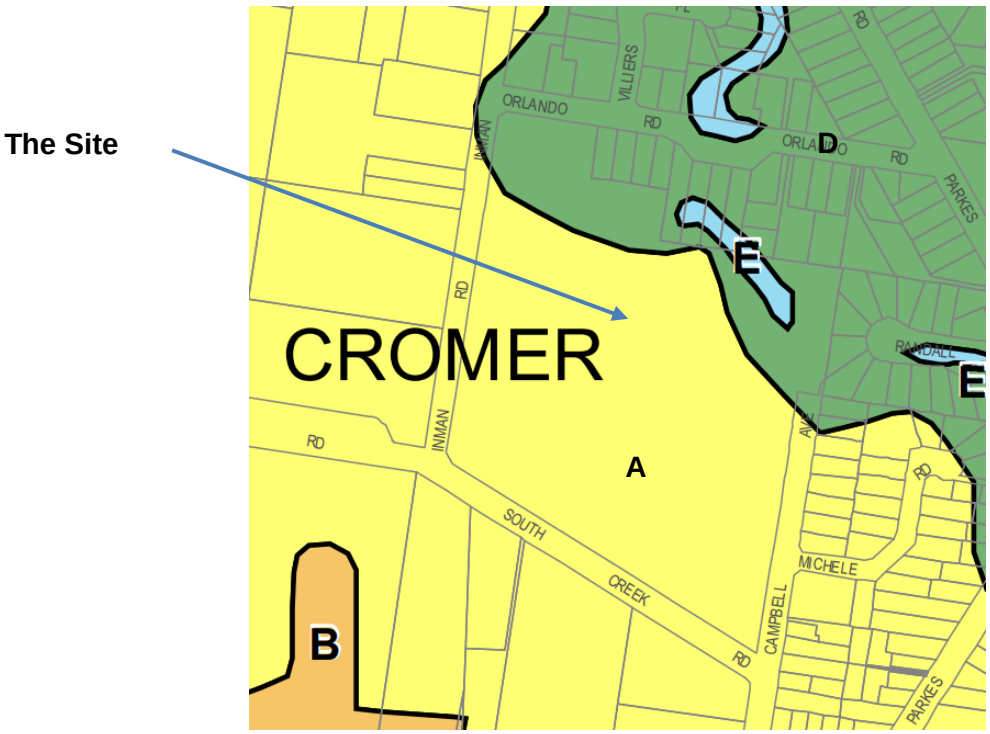


Plate 1: Extract of the Council Landslip Risk Map

EG are investigating the potential rezoning and re-development of the site, in particular east of the existing drainage line for residential purposes. This could include medium rise development, possibly including apartment buildings with basement level parking (1-2) levels. In this regard, we note that sites which lie within Landslip Risk Class D and E areas require a preliminary geotechnical assessment to be completed. Following the preliminary geotechnical assessment, Council may require that a geotechnical report be prepared for any future development. For sites within a Landslip Risk Class A. area, a geotechnical report may be required depending on Councils assessment of the proposed development.

Based on our preliminary assessment, we note the following:

- There were no obvious signs of slope instability such as leaning trees, curved tree bases, bulging slope toe areas, tension cracks etc.
- One sub-vertical clay soil cut face was showing signs of erosion and spalling but this was restricted to a localised area within the site.
- The sandstone outcrops within the site, and neighbouring the site to the north, did not show any obvious signs of instability such as open joint planes, overhanging sections etc. The inferred localised colluvial soils underlying the north-eastern corner of the site, if present, would indicate past slope instability during the recent geological time frame associated with rock falls from sandstone rock faces.
- There were no obvious signs of retaining wall instability such as leaning or bulging walls and/or tension cracks behind the crests of retaining walls.
- The site appeared to be well drained overall.
- Based on the condition of the existing buildings within the site, we assume that they have been founded in appropriate strength foundation materials.

Based on the above, the site may be regarded as ‘stable’ overall.

Assuming that all structures within the site have been engineer designed and constructed in accordance with the design, we consider that current levels of risk to property are at ‘acceptable’ levels. Furthermore assuming typical spatial, temporal, vulnerability and evacuation factors for this type of site, levels of risk to life under existing conditions are at ‘acceptable’ levels.

With regard to any proposed future development, assuming the design and construction is carried out in accordance with the preliminary advice provided below, we consider that the levels of risk to property during and following the development will be at ‘acceptable’ levels. Furthermore assuming typical spatial, temporal, vulnerability and evacuation factors for any future development of a site

such as this (including at least one level of basement excavation), levels of risk to life during and following the development will be at 'acceptable' levels.

The terminology adopted is in accordance with Reference 1.

5 PRELIMINARY COMMENTS AND RECOMMENDATIONS

The preliminary comments and recommendations which follow are based on our site observations and desk top review of available geotechnical information on nearby sites. Prior to detailed design of any proposed future development, a site specific geotechnical investigation is recommended and would need to comprise a combination of:

- Auger and/or core drilled boreholes over the northern portion of the site where bedrock is expected to be encountered at shallow to moderate depth.
- Cone Penetration Testing through the deeper soil profile over the central and southern portions of the site, possibly supplemented with boreholes, depending on the likely design requirements of any proposed development.

The geotechnical investigation scope of work would need to be confirmed once details of any proposed development were known.

The principal geotechnical issues that will need to be considered in relation to the likely future proposed development of the site will include some or all of the following:

- Excavations will extend through the soil profile and possibly sandstone bedrock, depending on the location within the site. There will be a need to maintain the stability of the temporary excavation batters. Proposed excavations close to site boundaries will require an engineer designed retention system, possibly requiring anchoring or propping.
- There will be a need to control ground vibrations associated with any rock excavation so as to reduce the likelihood of damage to surrounding buildings and structures. This may be of concern over the northern portion of the site.
- Over the central and southern portion of the site, proposed excavations may extend below the groundwater level and dewatering would then be required together with a tanked basement. Council may regard the proposed development as an Integrated Development and the requirements of NSW Office of Water would need to be addressed. Appropriate geotechnical investigation and modelling would be required to determine potential drawdown impacts on surrounding properties, and confirm the design of the basement shoring system. The modelling would assist in addressing the requirements of NSW Office of Water, such as estimation of

volumes of water to be extracted, applying for an extraction licence, the quality of the groundwater and whether or not it can be discharged into the stormwater drainage, sewer system, or require controlled disposal off-site. In this regard, we note that the Sydney Water 'Dial Before You Dig' plan indicated that the groundwater at the site was contaminated (as described in Section 3.2, above) and appropriate environmental engineering advice would need to be sought if dewatering was being considered.

- Depending on structural loadings and the results of any geotechnical investigations, high level footings founded in the soil profile or bedrock below bulk excavation level or design surface level may well be appropriate. If piled footings are required, over the central and southern portion of the site, auger grout injected piles or steel screw piles, rather than bored piles, would be required due to the presence of groundwater and the potentially collapsible nature of the soil profile.

We note that the above principal geotechnical issues may be regarded as relatively 'routine' for a site situated in this area of Sydney.

6 GENERAL COMMENTS

It is possible that the subsurface soil, rock or groundwater conditions encountered during construction may be found to be different (or may be interpreted to be different) from those inferred from our surface observations in preparing this report. Also, we have not had the opportunity to observe surface run-off patterns during heavy rainfall and cannot comment directly on this aspect. If conditions appear to be at variance or cause concern for any reason, then we recommend that you immediately contact this office.

A waste classification will need to be assigned to any soil excavated from the site prior to offsite disposal. Subject to the appropriate testing, material can be classified as Virgin Excavated Natural Material (VENM), General Solid, Restricted Solid or Hazardous Waste. Analysis takes seven to 10 working days to complete, therefore, an adequate allowance should be included in the construction program unless testing is completed prior to construction. If contamination is encountered, then substantial further testing (and associated delays) should be expected. We strongly recommend that this issue is addressed prior to the commencement of excavation on site.

This report has been prepared for the particular purpose described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any

change in the proposed purpose of this report then all recommendations should be reviewed. Copyright in this report is the property of JK Geotechnics. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

Reference 1: Australian Geomechanics Society (2007c) *'Practice Note Guidelines for Landslide Risk Management'*, Australian Geomechanics, Vol 42, No 1, March 2007, pp63-114.



AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.5.1557
AERIAL IMAGE ©: 2015 GOOGLE INC.

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SITE LOCATION PLAN**

Location: 100 SOUTH CREEK ROAD
CROMER, NSW

Report No: 30766ZR

Figure No: 1

JK Geotechnics

PLOT DATE: 11/08/2017 4:59:25 PM DWG FILE: S:\6 GEOTECHNICAL\6F GEOTECHNICAL JOBS\30000'S\30766ZR CROMER\CAD\30766ZR.DWG

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REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

SAMPLING

Sampling is carried out during drilling or from other excavations to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All except test pits, hand auger drilling and portable dynamic cone penetrometers require the use of a mechanical drilling rig which is commonly mounted on a truck chassis.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N>30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

Static Cone Penetrometer Testing and Interpretation: Cone penetrometer testing (sometimes referred to as a Dutch Cone) described in this report has been carried out using a Cone Penetrometer Test (CPT). The test is described in Australian Standard 1289, Test F5.1.

In the tests, a 35mm or 44mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm or 165mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

  The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between CPT and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of CPT values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a sliding hammer and counting the blows for successive 100mm increments of penetration.

Two relatively similar tests are used:

- Cone penetrometer (commonly known as the Scala Penetrometer) – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various Road Authorities.
- Perth sand penetrometer – a 16mm diameter flat ended rod is driven with a 9kg hammer, dropping 600mm (AS1289, Test F3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

LOGS

The borehole or test pit logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 *'Methods of Testing Soil for Engineering Purposes'*. Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed that at some later stage, well after the event.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document *'Guidelines for the Provision of Geotechnical Information in Tender Documents'*, published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Copyright in all documents (such as drawings, borehole or test pit logs, reports and specifications) provided by the Company shall remain the property of Jeffery and Katauskas Pty Ltd. Subject to the payment of all fees due, the Client alone shall have a licence to use the documents provided for the sole purpose of completing the project to which they relate. License to use the documents may be revoked without notice if the Client is in breach of any objection to make a payment to us.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer.

SITE INSPECTION

The company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

i) a site visit to confirm that conditions exposed are no worse than those interpreted, to

ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or

iii) full time engineering presence on site.

GRAPHIC LOG SYMBOLS FOR SOILS AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

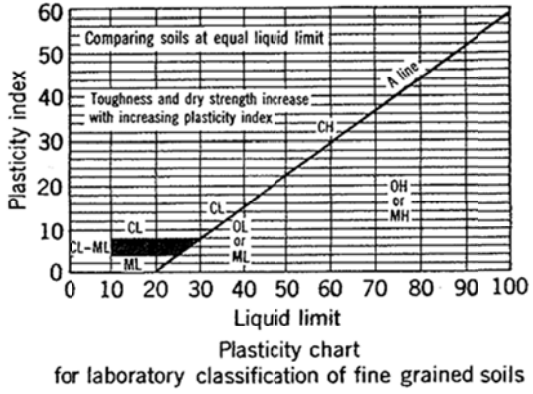
OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

Field Identification Procedures (Excluding particles larger than 75 μm and basing fractions on estimated weights)				Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than 75 μm sieve size[b] (The 75 μm sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than 75 μm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols $C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7 $C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
		Gravels with fines (appreciable amount of fines)	Predominantly one size or a range of sizes with some intermediate sizes missing	*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
			Nonplastic fines (for identification procedures see *ML* below)	*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)	*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	*SW*	Well graded sands, gravelly sands, little or no fines		
			Predominantly one size or a range of sizes with some intermediate sizes missing	*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)	*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)	*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils More than half of material is *smaller* than 75 μm sieve size (The 75 μm sieve size is about the smallest particle visible to naked eye)	Identification Procedures on Fraction Smaller than 380 μm Sieve Size						
		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)			
	Silts and clays liquid limit less than 50	None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)
		Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity	
	Silts and clays liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
		High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays	
		Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity	
Highly Organic Soils		Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils	



Plasticity chart
for laboratory classification of fine grained soils

Note: 1 Soils possessing characteristics of two groups are designated by combinations of group symbols (eg. GW-GC, well graded gravel-sand mixture with clay fines).
2 Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record	▼	Standing water level. Time delay following completion of drilling may be shown.
	C	Extent of borehole collapse shortly after drilling.
	▶	Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES	Soil sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos screening.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of Undrained Shear Strength.
	PID = 100	Photoionisation detector reading in ppm (Soil sample headspace test).
Moisture Condition (Cohesive Soils)	MC>PL	Moisture content estimated to be greater than plastic limit.
	MC≈PL	Moisture content estimated to be approximately equal to plastic limit.
	MC<PL	Moisture content estimated to be less than plastic limit.
(Cohesionless Soils)	D	DRY – Runs freely through fingers.
	M	MOIST – Does not run freely but no free water visible on soil surface.
	W	WET – Free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – Unconfined compressive strength less than 25kPa
	S	SOFT – Unconfined compressive strength 25-50kPa
	F	FIRM – Unconfined compressive strength 50-100kPa
	St	STIFF – Unconfined compressive strength 100-200kPa
	VSt	VERY STIFF – Unconfined compressive strength 200-400kPa
	H	HARD – Unconfined compressive strength greater than 400kPa
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)**
	VL	Very Loose <15 0-4
	L	Loose 15-35 4-10
	MD	Medium Dense 35-65 10-30
	D	Dense 65-85 30-50
	VD	Very Dense >85 >50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten carbide wing bit.
	T 60	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

LOG SYMBOLS continued

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered rock	XW	Rock is weathered to such an extent that it has "soil" properties, ie it either disintegrates or can be remoulded, in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining, Science and Geomechanics. Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL		Easily remoulded by hand to a material with soil properties.
----------	----------	0.03	
Very Low:	VL		May be crumbled in the hand. Sandstone is "sugary" and friable.
----------	----------	0.1	
Low:	L		A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
----------	----------	0.3	
Medium Strength:	M		A piece of core 150mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
----------	----------	1	
High:	H		A piece of core 150mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
----------	----------	3	
Very High:	VH		A piece of core 150mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
----------	----------	10	
Extremely High:	EH		A piece of core 150mm long x 50mm dia. is very difficult to break with hand-held hammer. Rings when struck with a hammer.

ABBREVIATIONS USED IN DEFECT DESCRIPTION

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to the long core axis (ie relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Ironstained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	

WILLOW TREE PLANNING

Appendix 7

VMP Approval

A national town planning consultancy
www.willowtreeplanning.com.au

DOC19/1061459-3

Mr Tim Woodhouse
Project Manager – Safety, Environment and Site Services,
Roche Products Pty Ltd

Email: tim.woodhouse@roche.com

Dear Mr Woodhouse

Approval of Voluntary Management Proposal
Roche Facility - 4-10 Inman Road, Dee Why,

I am pleased to inform you that the EPA has approved the Voluntary Management Proposal you submitted for management of the contamination at the former pharmaceuticals site at 4-10 Inman Street, Dee Why. The ongoing work includes the second injections for In-Situ-Chemical Oxidation, the pilot trial of soil vapour extraction and further monitoring and assessment of the groundwater contamination onsite and off the site.

A signed Notice of Approval of Voluntary Management Proposal (Notice No. 20191730) made under the *Contaminated Land Management Act 1997* (CLM Act) is enclosed. The EPA has also withdrawn its approval of the previous VMP, as we are satisfied that the works have been completed and the future management is captured under this recently approved one. A copy of these Notices has been placed on our website, and a copy has also been provided to Council.

If you are unable to meet any deadline identified in the proposal, a written request for an extension must be provided. The request must be made 21 days before the deadline, and must outline the reasons for the delay, a revised time within which the action will be achieved and a statement explaining why enforcement action should not be taken.

Section 34 of the CLM Act allows the EPA to recover its costs in relation to assessing and settling the terms of a VMP, monitoring action under an approved VMP, seeking compliance with an approved VMP or matters associated with, or incidental to, any of these matters. A draft Cost Recovery Notice associated with the VMP approval is attached. Please provide any comments on the Draft Cost Recovery Notice within 14 days of this letter, at which time it will be finalised.

If you wish to discuss any matters raised above, please contact Olivia Patterson on (02) 9995 5798 or at Olivia.patterson@epa.nsw.gov.au

Yours sincerely



8 January 2020

ROB HOGAN
Manager Contaminated Land Regulation
Environment Protection Authority

Encl. VMP Completion Notice Ref. 201917-7-18
VMP Approval Notice Ref. 20191730
Draft Cost Recovery Notice

Environment Protection Authority

Notice of completion of approved voluntary management proposal

(Section 17(7) of the *Contaminated Land Management Act 1997*)

Notice Number 201917-7-18; Area Number 3399

Background

The Environment Protection Authority (EPA) approved (Approval No.20181706) a voluntary management proposal (VMP) from Roche Products Pty Ltd (the proponent) in relation to the land to which this notice applies. The proponent carried out the management actions under the approved VMP. The management has been completed and the results have been made available to the EPA.

Land to which this notice applies

Description	Address
Lot 1 in DP 1220196 (proposed subdivision Lot 100 in DP 611332)	4-10 Inman Road, Dee Why, NSW 2099

Completion of approved VMP

Pursuant to 17(7) of the CLM Act, VMP No. 20181706 approved on 19 September 2018, ceases to be an approved proposal as the EPA is satisfied that the terms have been carried out. The ongoing management of the contamination at the site is captured under VMP Approval No.20191730.

Signed:



ROB HOGAN
Manager Contaminated Land Regulation
Environment Protection Authority

Date: 8 January 2020

(by delegation)

NOTE:

Information recorded by the EPA

Section 58 of the CLM Act requires the EPA to maintain a public record. A copy of this notice will be included in the public record.

Information recorded by councils

Section 59 of the CLM Act requires the EPA to give a copy of this notice to the relevant local council. The council may then make appropriate consequential modifications to the planning certificate issued in relation to the land to which this notice applies pursuant to s10.7 of the *Environmental Planning and Assessment Act 1979*.

Relationship to other regulatory instrument

This repeal notice does not affect the provisions of any relevant environmental planning instruments which apply to the land or provisions of any other environmental protection legislation administered by the EPA.

Previous regulatory instrument

As of 1 July 2009, all current declarations of investigation area and declarations of remediation site are taken to be declarations of significantly contaminated land, all current investigation orders and remediation orders are taken to be management orders and all current agreed voluntary investigation proposals and agreed voluntary remediation proposals are taken to be approved voluntary management proposals.

Environment Protection Authority (EPA)

NOTICE OF APPROVAL OF VOLUNTARY MANAGEMENT PROPOSAL

(Section 17 of the *Contaminated Land Management Act 1997*)

Approval No.: **20191730**

Approval Date: **8 January 2020**

Area No.: **3399**

The approved proposal consists of this approval document and the attached proposal, which comprises three Parts: Part 1 – Preliminary Details; Part 2 – Undertakings; and Part 3 – Performance Schedule.

Proponent: **Roche Products Pty Ltd**

Site: **Part of Lot 1 in DP 1220196 (proposed subdivision Lot 100 in DP 611332)**

Proposal Date: **4 November 2019**

BACKGROUND

The EPA is satisfied that the terms of the proposal, as modified by the conditions of this approval, are appropriate.

For the purposes of section 17(4) of the *Contaminated Land Management Act 1997* (CLM Act), the EPA is satisfied that the proponent has taken all reasonable steps to identify and find every owner and notional owner of the land and every person responsible for significant contamination of the land and given those parties identified an opportunity to participate in the formulation and carrying out of the proposal on reasonable terms.

The contents of Part 1, Part 2 and Part 3 of the attached proposal form part of the terms of the approved proposal.

For the purposes of section 9(1) of the CLM Act, the EPA has had regard to the principles of ecologically sustainable development in assessing and approving this Voluntary Management Proposal (VMP) and has also sought the implementation of those principles in the management of the site under this approved proposal.

APPROVAL AND CONDITIONS

The EPA approves the proposal subject to the following conditions. These conditions form part of the terms of the approved proposal.

1. Each feature and milestone of the proposal is to be completed by the date specified in the proposal. Failure to satisfactorily complete any component by the due date for that feature or milestone may be taken as a failure to carry out the terms of the proposal for the purposes of section 17(6) of the CLM Act.
2. The proponent cannot recover contributions under Part 3 Division 6 of the CLM Act.

3. Make available for inspection by any person, free of charge, and provide a copy to any person for a reasonable fee, any document required to be prepared and submitted to the EPA under this voluntary management proposal. It is not necessary to disclose:

    (i) any information contained in those documents that relates to any manufacturing or other industrial or commercial secrets or working processes; or

    (ii) any personal information, within the meaning of the *Privacy and Personal Information Protection Act 1998* contained in those documents.

4. Where this proposal requires the proponent or any other person to give a document to the EPA, that document may be given to the EPA:

    (i) By posting the document to Director of Contaminated Land Management PO Box A290, Sydney South, NSW 1232

    (ii) By emailing the document to contaminated.sites@epa.nsw.gov.au

5. Any report submitted to the EPA to comply with this Notice must be prepared, or reviewed and approved, by a practitioner certified by an EPA-recognised scheme. Further information, and a list of contaminated land consultant certification schemes recognised by the EPA is available on the EPA's website at: http://www.epa.nsw.gov.au/your-environment/contaminated-land/managing-contaminated-land/engaging-consultant.

ADDITIONAL INFORMATION

6. The EPA may still exercise any powers it has under the CLM Act, or any other legislation, in relation to the site.

7. The EPA may require the proponent to pay all or any costs incurred by the EPA in connection with any one or more of the following:

    a. Assessing and settling the terms of the approved voluntary management proposal;

    b. Monitoring action under the approved voluntary management proposal;

    c. Seeking the compliance of the proponent with the approved voluntary management proposal;

    d. Any other matter associated with, or incidental to, the matters set out in paragraphs a. to c. above.

Signed:



ROB HOGAN
Manager Contaminated Land Regulation
Environment Protection Authority

(by delegation)

VOLUNTARY MANAGEMENT PROPOSAL UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997

Part 1

Preliminary Details

1. Proponent's Details

(a) Name and contact details

Roche Products Pty Ltd

ABN:	70 000 132 865
Postal address:	Level 8, 30-34 Hickson Road Sydney NSW
Postcode:	2000

(b) Who the EPA should contact with technical enquiries about the proposal

Name:	Mr Tim Woodhouse
Employer/Company:	Roche Products Pty Ltd
Position title:	Project Manager - Safety, Environment and Site Services
Phone (business):	02 9454 9110
Email:	tim.woodhouse@roche.com

2. Site to which Proposal Applies

The site to which the proposal applies ("the Site") is a portion (the 'Regulated Area', as marked in attached survey plan) of the property located at 4-10 Inman Road, Dee Why NSW (part Lot 100 in DP 611332 within the local government area of Northern Beaches Council).

3. The Contamination

The Site was notified to the NSW EPA under section 60 of the CLM Act (1997) in November 2015. The notification was made based on the presence of Trichloroethene (TCE) and petroleum hydrocarbons in groundwater. The EPA determined that the contamination identified at the Site is significant and warrants regulation under the CLM Act. Since the initial declaration the EPA has approved three separate Voluntary Management Plans (VMP's) which have provided a framework for the management of the contamination at the Site to date. The staged approach to the VMPs has been required given the complexities of the issues at the Site and the related uncertainties around the progression of the remedial activities. A key commitment in the VMPs to date has been the final deliverable being a proposal for a VMP to cover the next phase of Site management. All tasks required by the most recent VMP (Remediation VMP #1, dated 4/7/18) has now been completed to the satisfaction of the Site Auditor and all deliverables have been submitted to the NSW EPA.

The Site has been used for the manufacture and / or storage of pharmaceutical products for approximately 40 years. A wire cable manufacturing facility also operated in a building onsite (Building 18) prior to acquisition by Roche Products. Various historical operations on the Site included the use of petroleum hydrocarbon products industrial solvents, including chlorinated volatile organic compounds (CVOCs). Investigations completed to date have determined that both CVOC and petroleum hydrocarbon impact is present in groundwater at the Site.

The identified CVOC impact to groundwater appears to be related to the historical wire cable manufacturing within Building 18. As noted above, Building 18 was previously owned and occupied by a company called Fibrecell Products Pty Ltd (Fibrecell) which manufactured wire cables. Roche's investigations indicate that Fibrecell was deregistered as a company in 1977. On this basis, it is noted that reasonable steps have been taken to identify persons previously responsible for contamination and it is also noted that Roche does not intend to seek to recover remediation costs from any other person.

The identified CVOC plume has been found to be present within three primary zones in the unconfined shallow aquifer at depths of up to 33 metres. Impact has been confirmed not to extend to the underlying sandstone bedrock. Investigations completed to date indicate that the plumes may extend as far as Dee Why Creek to the south of the Site at low concentrations, however concentrations do not extend beyond Dee Why Creek. Low level TCE concentrations at two orders of magnitude below the most conservatively applied screening criteria have been detected in surface water in Dee Why Creek.

The source of the identified petroleum hydrocarbon impact to groundwater is considered likely to be an unnamed former fuel UST located to the south of Building 7. The petroleum hydrocarbon plume extends beyond the southern Site boundary to Cromer Park, however it is fully delineated offsite.

In 2017, ERM completed a Human and Ecological Risk Assessment (HERA) conducted for the Site concluded that TCE concentrations in groundwater beneath the Site posed a potential vapour intrusion risk to onsite workers. However, the HERA noted that onsite indoor air sampling has confirmed that concentrations of CVOC's in indoor air are not above Tier 1 and therefore there is currently no risk present. The HERA did not identify any current offsite risk for human or ecological receptors.

Based on the conclusions of the HERA, a Remedial Action Plan (RAP) was produced which provides the goals for future Site remediation and recommended remedial options for the Site, which if implemented appropriately, are expected to achieve the remediation goals. The recommended remediation technology was ISCO for on-site areas, with institutional controls to be implemented within impacted off-site areas.

In order to assess the feasibility of ISCO as a remedial approach for the Site, an ISCO Pilot Trial was conducted during 2017. The Pilot Trial included the injection of sodium permanganate at a limited number of injection locations and subsequent groundwater monitoring over a three month period. The outcomes of the Pilot Trial indicated that the ISCO approach described in the RAP was feasible and likely to be effective in achieving the remedial objectives if appropriately implemented on a full scale basis.

A Full Scale ISCO Injection Program was subsequently implemented which targeted both the CVOC and petroleum hydrocarbon plumes. A total of 89 remedial injection locations were included in the overall system design, with 77 targeting the CVOC plume and 12 targeting the petroleum hydrocarbon plume. An extensive monitoring program was implemented for 12 months following the ISCO injections. Results indicated that both CVOC and petroleum hydrocarbon concentrations had been significantly reduced. However, further injections were required in the shallow and deep zones of the CVOC plume to further reduce concentrations and manage concentration rebound. Soil vapour concentrations were found to not reduce significantly as expected following the ISCO injections, which was attributed to lower than expected standing groundwater levels. On this basis, it has been recommended that contingency measures be considered to manage concentrations of CVOCs in soil vapour.

4. The Voluntary Management Proposal

This management proposal ("the proposal") comprises:

a) the information set out above;

b) the undertakings set out in Part 2 of this document; and

c) the performance schedule set out in Part 3 of this document.

Part 2

Undertakings Included in Voluntary Management Proposal

Explanatory Note:

Before the EPA can approve a voluntary management proposal under section 17 of the Contaminated Land Management Act 1997, it has a statutory obligation to satisfy itself that the terms of the proposal (as modified by any conditions to be imposed by the EPA) submitted to it under section 17 are appropriate. In addition to including an appropriate investigation plan, remedial action plan or other plan of management, to be acceptable to the EPA a proposal would usually include the undertakings set out below. These undertakings are important and will form part of the terms of the proposal. If the proposal is approved, they must be complied with in order for the EPA to be satisfied that the terms of the proposal have been carried out.

THE PROPOSAL INCLUDES THE FOLLOWING UNDERTAKINGS:

General

1. Works or activities carried out in connection with the proposal, including sampling and preparation of associated reports ("the activities"), will be carried out in accordance with applicable provisions of *State Environmental Planning Policy 55 – Remediation of Land* and any requirements imposed under it in relation to the activities.
2. Matters listed as relevant to a remedial action plan by the EPA's *Guidelines for Consultants Reporting on Contaminated Sites* (1997) will be taken into account in the carrying out of the activities.
3. Activities will be carried out consistently with guidelines made or approved under section 105 of the CLM Act. (See http://www.epa.nsw.gov.au/clm/guidelines.htm)
4. The activities will be carried out in compliance with applicable NSW environmental legislation, and in particular:
    i) Activities, including:
        (1) the processing, handling, movement and storage of materials and substances used to carry out the activities; and
        (2) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activities will be carried out in a competent manner;
    ii) Plant and equipment installed at the site or used in connection with the activities:
        (1) will be maintained in a proper and efficient condition; and
        (2) will be operated in a proper and efficient manner.
5. Activities at the site will be carried out in a manner that prevents or minimises

where practical the emission of dust, odour and noise from the site.

6. Waste generated or stored at the site will be assessed and classified in accordance with NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste*.

   (See http://www.epa.nsw.gov.au/resources/wasteregulation/140796-classify-waste.pdf)

7. Waste transported from the site that is required by the *Protection of the Environment (Waste) Regulation 2014* to be tracked must be tracked using NSW EPA's on-line tracking system or an alternative tracking system approved in writing by NSW EPA.

   (See http://www.epa.nsw.gov.au/wasteregulation/tracking-waste-mla.htm)

8. The proponent will make this voluntary management proposal available to the public free of charge and consents to the EPA placing this proposal on its public website.

9. The proponent will make all documents referred to in, and required to be prepared under, this proposal available to the public free of charge, unless the proponent identifies commercial-in-confidence or private/personal information (including information relating to a third party) within those documents. In these cases, the proponent will remove such information from the documents to make the documents suitable for public release.

10. The proponent will:

    i) prior to the implementation of the proposal provide for the EPA's approval a strategy for communicating about that implementation, particularly the actual management works, with members of the public who are likely to have a real interest in or be affected by that implementation; and

    ii) implement the strategy as approved in writing by the EPA.

Monitoring, Record Keeping & Reporting

11. At least until the EPA has notified the proponent that the EPA no longer considers that the contamination is significant enough to warrant regulation under the *Contaminated Land Management Act 1997*, record and retain all monitoring data and information and provide this record to the EPA at any reasonable time if so requested by the EPA and as specifically provided under the proposal.

12. The EPA will be informed within 7 days of the proponent becoming aware of information or data indicating a material change:

    a) in conditions at the site, or

    b) in its surrounding environment, which could adversely affect the prospects of successful management of the site or result in harm to the environment.

13. The EPA will be informed within 7 days of the proponent becoming aware of any failure, either by the proponent or any other person, to comply with any term of the proposal.

14. The EPA will be informed as soon as practicable of any notification by the proponent, its employees or its agents to an appropriate regulatory authority other than the EPA, of any pollution incident at the site within the meaning of the *Protection of the Environment Operations Act 1997*.

    (See http://www.epa.nsw.gov.au/licensing/dutytonotify.htm)

Performance Schedule

15. The performance schedule outlined in Part 3 of this document will be adhered to.

Part 3

Performance Schedule

1. Objectives of the Proposal

This proposal is intended to set out a course of actions which will facilitate the implementation and performance monitoring related to the second full scale ISCO injection in accordance with the RAP and the ISCO Injection 2 Technical Specification. Furthermore, options for supplemental remediation methods will be investigated for the reduction of CVOCs in soil vapour as per the contingency section of the RAP.

The overarching goal of the proposal is to set out a course of actions and appropriate timeline that will help achieve the following objectives:

- Investigate the feasibility of implementing Soil Vapour Extraction (SVE) as a remediation technology to potentially supplement the ISCO remediation works at the Site;
- Expand the existing ISCO Injection network to increase well density in the shallow CVOC zone;
- Implement a second ISCO injection program in accordance with the RAP and ISCO Injection 2 Technical Specification;
- Provide advice on the effectiveness of the ongoing ISCO remediation in reducing concentrations of chlorinated hydrocarbons and petroleum hydrocarbons; and
- Provide advice on whether remedial goals stated in the RAP have been achieved or if subsequent remediation works are required.

Specific activities addressed under this proposal are as follows:

1. Continue maintaining relations and communication with regulatory and other relevant stakeholders;
2. Undertake an SVE Pilot Trial;
3. Install additional injection wells targeting the shallow CVOC plume;
4. Continue to implement the full scale ISCO injection program at the Site in accordance with the ISCO Injection Technical Specification;
5. Undertake post injection monitoring; and
6. Continue to monitor both the onsite and offsite portions of the plumes as part of an ongoing assessment of offsite risk and plume stability.

2. Principal Features of this Proposal

The key activities that make up the principal features of this proposal include, but are not limited to, the following:

P1. Stakeholder Engagement and Consultation

Engagement with key project stakeholders (i.e., Site owner (EG Developments), relevant community members, Site Auditor, Northern Beaches Council, the NSW EPA, Water NSW, Site employees, owners and occupiers of down gradient sites) will continue during the future management of the Site. The regulatory authorities will be consulted regularly for input in the decision making process, and necessary regulatory permits and approvals will be obtained prior to undertaking site works.

P2. Shallow Injection Well Network Expansion

ERMs Remediation Progress Report #1 recommended that additional injection points should be installed targeting the shallow CVOC plume in order to increase the injection network density. This work was completed during April 2019. The increased density had a number of benefits, including increasing the distribution of oxidant through the plume following injection and also potentially enabling additional contaminated material to be treated. The additional wells were installed prior to the implementation of the second ISCO injection so that they could be utilised during the event.

The well network expansion included installation of 10 new shallow injection wells and two new shallow monitoring wells.

P3. Second Full Scale ISCO Injection Program

The RAP specified that groundwater remediation (for CVOCs particularly) may require up to three separate ISCO injections. Based on the monitoring results following the First Full Scale ISCO Injection, further injection was considered to be required for the shallow and deep zones of the CVOC plume. It was identified that the intermediate zone of the CVOC plume and the petroleum hydrocarbon plume do not require further remediation at this stage, however ongoing monitoring will be undertaken at locations targeting these plumes.

A Technical Specification was produced (ISCO Injection 2 Technical Specification) which provides overarching guidance on the procedures and risk mitigations to be used throughout the program, as well as specific guidance on the volumes of oxidant (sodium permanganate) required for the second ISCO injection event.

The second ISCO injection event was completed during June and July 2019. The injection event targeted a total of 71 injection wells which targeted the shallow and deep zones of the CVOC plume. As per the previous ISCO injections at the Site sodium permanganate was the selected oxidant injected. The sodium permanganate was injected as a 5% solution into the shallow zone, with a 15% solution used for the deep zone. The methodologies used to deliver the oxidant to the subsurface were

generally similar to previous events, where low pressure was used to deliver the oxidant to the subsurface via individual injection wells under controlled flow rates.

During the injection program a comprehensive monitoring program was undertaken. The objective of the monitoring during the program was to monitor for groundwater mounding and potential "daylighting" of injectate either as a result of unforeseen short circuiting or overflow of down gradient monitoring or injection wells.

The program is currently in a phase of remediation performance monitoring. It is expected that the sodium permanganate will remain active in the subsurface for up to 18-24 months. Additional applications will not be undertaken until the sodium permanganate in in the subsurface from the previous injection is oxidised.

P4. Post Injection Remediation Monitoring

Monitoring activities for the Second ISCO Injection will be as per the schedule specified in the ISCO Injection 2 Technical Specification.

In the four weeks following the completion of injections, weekly inspections will be undertaken to continue to assess whether any oxidant is surfacing at any location. Additional inspections will be undertaken at six weeks, eight and twelve weeks following injections. For these events a general inspection of the remediation area will be undertaken. Events at four and twelve weeks following injections will be shallow zone observation event, during which monitoring wells screened in the shallow zone will be gauged and sampled. Where sodium permanganate is observed (as indicated by colour) a field method will be used to estimate the concentration of sodium permanganate in groundwater.

Full post injection monitoring events will be undertaken at six months, twelve months, 18 months and 24 months following the completion of the injection program. The full monitoring events will include soil vapour and groundwater sampling across a comprehensive selection of monitoring locations. The purpose of these events will be to assess changes in groundwater and soil vapour conditions across the onsite plumes. The data will be used to assess the effect of the injection event in terms of CoPC concentration reductions and oxidant distribution.

The full post injection events will include offsite groundwater monitoring wells. The offsite data will used as part of the ongoing assessment of offsite risk and plume stability.

P5. SVE Pilot Trial

At the time of preparation of this VMP, groundwater levels at the Site were currently approximately 1 m below the levels upon which the ISCO approach was designed and a portion of the previously saturated CVOC impacts in the vadose zone have been exposed above the water table. Soil vapour data collected following the first ISCO injection indicated that CVOC impacted material in the vadose zone may be a contributing factor to the ongoing presence of significant CVOC concentrations in soil vapours at the source area of the CVOC groundwater plume. Based on the

potentially incomplete treatment of CVOCs, the contingency measures detailed in the RAP were considered. Based on this review, it was identified that an alternative approach to managing unsaturated impacts should be considered in the event that groundwater levels do not return to levels conducive to ISCO treatment. SVE was selected as an appropriate technology and therefore a Pilot Trial was scheduled.

The SVE Pilot Trial will be conducted in accordance with a SVE Pilot Trial Technical Specification, which will be produced prior to the works. The Pilot Trial period will involve active SVE at a single SVE well which was previously installed in the source area of the plume in 2017 as a potential contingency. The Pilot Trial will run for a period of three months, during which data will be collected from both the SVE system and surrounding monitoring locations. The data collected during the Pilot Trial will be used to assess the suitability and feasibility of the technology to effectively reduce soil vapour concentrations in a locally impacted portion of the Site, particularly within the source area.

P6. Reporting

The reporting requirements and timeframes for submission to EPA are presented in *Table 1* below.

3. Reporting Requirements and Timeframe for Submission of Reports

The NSW EPA will be provided with the following reports specified below in Tables 1 and 2. Prior to submission to the NSW EPA, these documents will undergo an independent review process by a NSW EPA accredited Site Auditor.

Table 1: Reporting Requirements and Expected Timing for Submission of Draft Document to the Site Auditor

Report	***Expected Timing (submission to Site Auditor)***
R1. ISCO Injection #2 Technical Specification	Completed
R2. SVE Pilot Trial Technical Specification	Completed
R3. SVE Pilot Trial Report	29 May 2020
R4. Remedial Progress Report #2	28 January 2022
R5. Updated VMP	29 April 2022

Table 2: Reporting Requirements and Expected Timing for Submission of Final Document to the NSW EPA

Report	***Expected Timing (submission to NSW EPA)***
R1. ISCO Injection #2 Technical Specification	1 week following VMP Approval
R2. SVE Pilot Trial Technical Specification	1 week following VMP Approval
R3. SVE Pilot Trial Report	31 July 2020
R4. Remedial Progress Report #2	31 March 2022
R5. Updated VMP	30 June 2022

Signature of Proponent

This application for approval of this voluntary management proposal may only be signed by a person(s) with the legal authority to sign it. The various ways in which the application may be signed, and the people who may sign the application, are set out in the categories below.

Please tick (✓) the box next to the category that describes how this application is being signed.

If the proponent is:		**The application must be signed and certified by one of the following:**
an individual	☐	the individual.
a company	☐	the common seal being affixed in accordance with the *Corporations Act 2001, or*
	☐	two directors, or
	☑	a director and a company secretary, or
	☐	if a proprietary company that has a sole director who is also the sole company secretary – by that director.
a public authority other than a council	☐	the chief executive officer of the public authority, or
	☐	by a person delegated to sign on the public authority's behalf in accordance with its legislation (Please note: a copy of the relevant instrument of delegation must be attached to this application).
a local council	☐	the general manager in accordance with s.377 of the *Local Government Act 1993* ('LG Act'), or
	☐	the seal of the council being affixed in a manner authorised under the LG Act.

I/We (the proponent):

- ***apply for approval of the voluntary management proposal set out in this proposal and in any documents referred to in Part 1.4 of this proposal***
- ***declare that the information in this proposal form (including any attachment or document referred to in Part 1.4 of this proposal) is not false or misleading.***

Signature		Signature	
Name (printed)	STEFAN PLATTNER	Name (printed)	ADRI DE VLEESCHAUWER
Position	DIRECTOR	Position	COMPANY SECRETARY
Date	04.11.19	Date	04.11.19

Seal (if signing under seal):

Our reference: DOC19/1061459-6

The Proper Officer
c/o Roche Products Pty Ltd

Attn: Tim Woodhouse

Service: *By email* - tim.woodhouse@roche.com

Cost Recovery Notice
Recovery of the EPA's Costs associated with approved Voluntary Management Proposals (VMP) numbers 20181706 and 20191730

Roche Products Pty Ltd, 4-10 Inman Street, DEE WHY NSW
NOVEMBER 2019 to DECEMBER 2019

In accordance with section 34 of *the Contaminated Land Management Act 1997* (CLM Act) the Environment Protection Authority (EPA), by this notice, requires Roche Products Pty Ltd (Roche), ACN: 000 132 865 to pay the costs incurred by the EPA in connection with Notice of approved voluntary management proposal (VMP) number 20181706 and VMP number 20191730.

The costs for the activities described in section 34(a)/(b)/(c), are charged at the rate of $80 per hour prescribed under cl 4(2) of the *Contaminated Land Management Regulation 2013*, which is adjusted on 1 September each year (cl 10) with movements in the Public Sector Wage Price Index. Details of the activities, costs and rates relevant to your site are provided in the table below.

The costs incurred by the EPA in connection with the VMPs are summarised as follows:

Section	Activity	Time Period	Rate/hour	Hours	Costs
s 34(a)	Assessing and settling the terms of the VMP	1 Sept 2019 to 31 Aug 2020	$96	8.75	$840.00
s 34(b)	Monitoring action taken under order/approved VMP	1 Sept 2019 to 31 Aug 2020	$96	3	$288.00
		Total	$	11.75	$1,128.00

An invoice is attached to this notice. Please note the payment terms are 30 days from the date of issue of the invoice.

If you have any questions regarding this matter please contact Olivia Patterson on (02) 9995 5798.

Yours sincerely

BEN LIVISSIANIS
Unit Head Regulation - Contaminated Land Management
Environment Protection Authority

Enclosed: invoice

DRAFT

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WILLOW TREE PLANNING

Appendix 8

Site Audit Report

A national town planning consultancy
www.willowtreeplanning.com.au