

# **Attachment C4**

## **Proponent Flooding and Stormwater Assessment**



# **CIVIL ENGINEERING & STORMWATER MANAGEMENT ASSESSMENT REPORT**

## **PLANNING PROPOSAL 1-3 BURROWS ROAD ALEXANDRIA NSW**

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## 1 INTRODUCTION & SCOPE

Costin Roe Consulting Pty Ltd has been commissioned by Goodman Property Services (Aust) Pty Ltd to undertake a site conditions and infrastructure services assessment to assist in the Planning Application for a change of building height at 1-3 Burrows Road, Alexandria.

The information provided in this report is intended to inform the DPIE and Council Planners of the opportunities and constraints associated with the civil engineering requirements relating to the site. The purpose of the report is to also consider the Stormwater Management for the property and intended redevelopment, and to confirm that a solution will meet City of Sydney Councils specific stormwater management objectives for stormwater quality and quantity, and flooding.

Civil engineering, stormwater management and flood planning considerations include:

- Site Works (Erosion and Sediment Control and Earthworks);
- Management of stormwater quantity (on-site detention) and quality (WSUD); and
- Flood planning considerations.

Consultation with Council has been completed by the proponent to confirm the expectations and information to be submitted as part of the planning application. A Planning Proposal Checklist has been provided by Council (ref: X019338, dated 9 December 2019) – refer **Appendix B**.

This report includes information to confirm the Flooding, Stormwater and Water Quality sections of the checklist have been addressed. As required of the checklist the following items are to be considered in the application:

*Develop a flood risk assessment for the site, with reference to the City of Sydney's Interim Floodplain Management Policy, the Alexandra Canal Flood Study and Alexandra Canal Floodplain Risk Management Plan*

*Work with the City of Sydney to locate built form massing and sensitive uses with reference to 5% Annual Exceedance Probability, 1% Annual Exceedance Probability and Probable Maximum Flood mapping and data.*

*Develop a Water Sensitive Urban Design (WSUD) to meet the objectives of:*

- *Capturing and slowing down water movement during heavy downpour events*
- *Capture rainwater for use on the site to reduce use of potable water*
- *Meeting the water quality requirements of Sydney DCP 2012:*
  - *Reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%*
  - *Reduce the baseline annual pollutant load for total suspended solids (TSS) by 85%*
  - *Reduce the baseline annual pollutant load for total phosphorus (TP) by 65%*
  - *Reduce the baseline annual pollutant load for total nitrogen (TN) by 45%*

## 2 SITE CHARACTERISTICS & PROPOSED DEVELOPMENT

### 2.1 Site Description

The site is located at 1-3 Burrows Road, Alexandria, on the western side of Burrows and northern side of Canal Road. The site area is approximately 3.5 Ha.

The site is surrounded by existing industrial and commercial development on the north-east, south-east and south-west, and currently under construction Canal Road Interchange being as part of the new WestConnex tunnel project on the north and north-west of the site.

The site is located 85m to the north-west of The Alexandra Canal. The Alexandra Canal is a tributary of the Cooks River, and leads to Botany Bay, approximately 4.5km south of the site.

Four large format steel framed warehouse/ distribution type buildings are currently present on the site. Access is made via various driveways on the Canal Road and Burrows Road frontages.

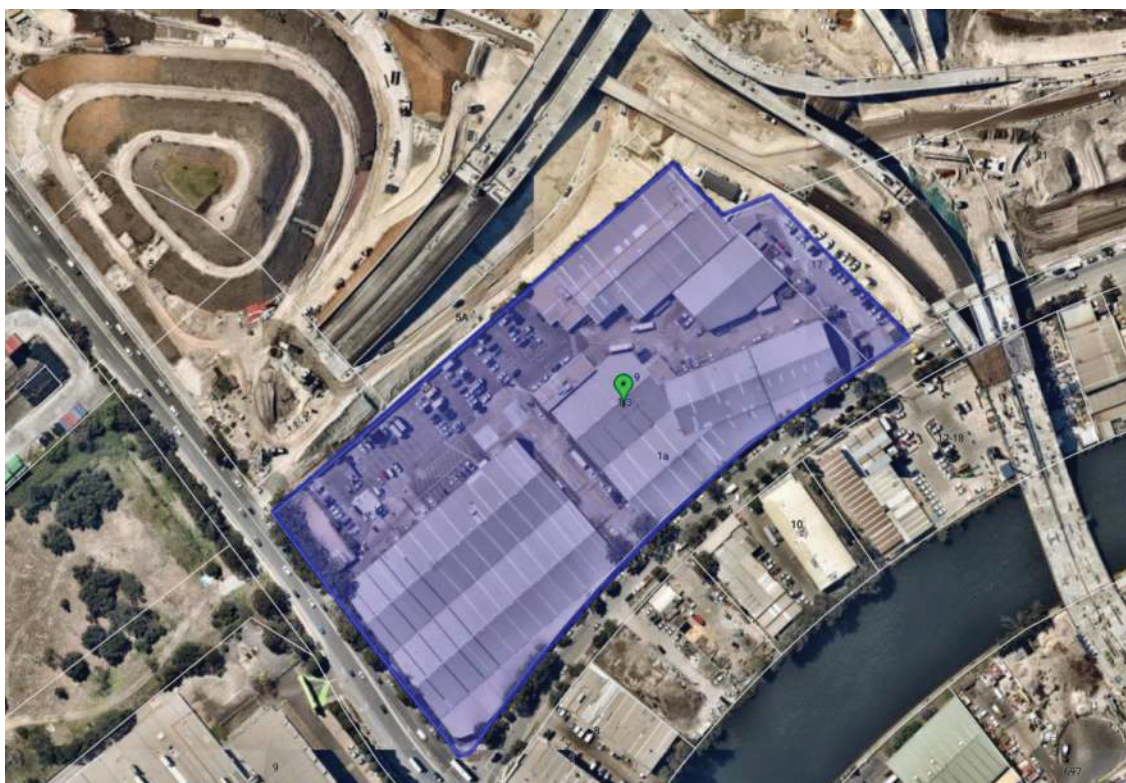
A detail survey of the property and existing building has been completed by Cardno Hard & Forester (117708001 Sheets 1 to 6 dated 19 August 2015) – refer **Appendix C**. The existing buildings are noted to have a floor levels which vary between RL 2.66m and RL 5.0m AHD, and surrounding site levels are in the range of RL 2.25m to RL 5.0m AHD.

Levels within Burrows Road (along the gutter adjacent to the site boundary) vary between RL 2.5m AHD to RL 1.88m AHD. A low point (RL 1.88m AHD) is present in Burrows Road approximately 100m from its intersection with Canal Road.

Significant construction works are currently underway as part of the Canal Road Interchange and new WestConnex tunnel project on the north and north-west of the site. Newly installed drainage system will collect and convey runoff from all areas north and west of this project areas, and pre and post development impact assessments have been modelled which confirm there are no adverse impacts on the development site or surrounding road networks.

Reference to **Figure 1.1** should be made for a visual review of the site and **Appendix C** for the detail site survey.





**Figure 1.1. Site Location**

## **2.2 Proposed Development**

The proposed development comprises a multi-level warehouse facility, undercroft parking areas and office space.

The proposed layout of the development is shown in **Figure 2.1** below. Reference to the Development Approval Application drawings prepared by SBA Architecture should be made pertaining to undercroft layout, elevations and aspect of the building.

Truck access is proposed on the Burrows Road frontage at the north-east corner of the site. Car park access to the undercroft parking area is proposed mid-way along Burrows Road, and office areas are also located on the north-east of the property. Emergency/fire access is proposed from Canal Road, however will not allow for any normal operational egress from this point.

The office floor level is proposed at RL 3.8m AHD, ground floor at RL 5.5m and undercroft parking area at RL 2.3m.



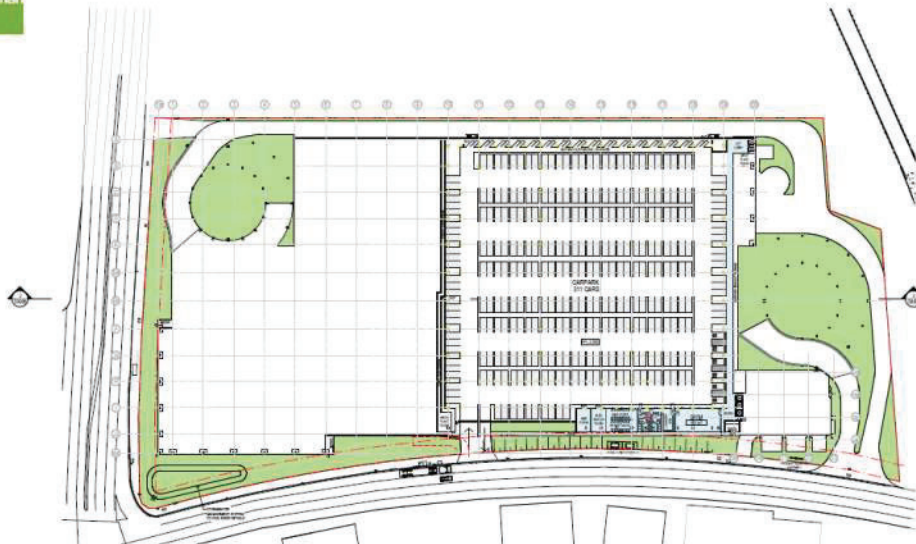
PRELIMINARY  
SBA

Burrows Industrial Estate Multilevel Industrial Facility  
1 - 3 Burrows Road, Alexandria

GROUND FLOOR

T300 @ A1  
1:1000 @ A3  
12/11/19 DA201 (R)  
JWB No 19211

Figure 2.1. Proposed Development Layout (Ground Floor)



SBA

Burrows Industrial Estate Multilevel Industrial Facility  
1 - 3 Burrows Road, Alexandria

UNDERCROFT CARPARK

10/02/20 DA101 (R)  
JWB No 19211

Figure 2.2 Undercroft Parking Level

### 3 SITE WORKS

#### 3.1 Erosion and Sediment Control

##### 3.1.1 Background

During the construction phase of the development, an Erosion and Sediment Control Program will be implemented to minimise water quality impacts. A detailed Erosion and Sediment Control Program will be employed throughout the construction works and a concept for this will be defined during the Development Application stage of the development site. The Erosion and Sediment Control Program will be defined based on normal engineering guidelines including The Landcom publication, *Managing Urban Stormwater: Soils and Construction (The Blue Book)* and the requirements of City of Sydney Council. It is expected that the program will include measure such as temporary sediment basins, silt fences, cut-off drains for polluted stormwater and diversion channels for clean stormwater run-off.

The following sections provide information to identify controls and procedures that will be incorporated into the Erosion and Sediment Control program at Development Application Stage of the project.

##### 3.1.2 Pre-Construction

The following minimum requirements are to be met prior to commencement of construction:

- Protection of downstream receiving waters. The proximity to Alexandra Canal will require additional considerations to ensure that receiving waters are protected.
- Sediment fences are to be constructed on the upstream edges of the designated buffer strips and at the base of fill embankments.
- Areas for plant and construction material storage are to be designated along with associated drains and spillage holding ponds.
- Diversion banks are to be created at the upstream boundaries of construction activities to ensure upstream runoff is diverted around any exposed areas. Catch drains are to be created at the downstream boundary of construction activities.
- Silt fences and/or sandbags are to be placed along the catch drains to slow flow, reduce scour and capture some sediment from runoff.
- Construction of temporary sediment basins.
- Site personnel are to be educated to the sediment and erosion control measures implemented on site.

### 3.1.3 During Construction

The following minimum requirements are to be met during construction:

- Progressive re-vegetation of filled areas and filled batters.
- Construction activities are to be confined to the necessary construction areas.
- The provision of a construction exit (truck shaker) to minimise the tracking of debris from tyres of vehicles leaving the site onto public roads. Only one construction exit will be nominated to limit the movement of construction equipment.
- Topsoil and temporary stockpile location will be nominated to coincide with areas already disturbed. A sediment fence is to be constructed around the downstream side of the stockpile and a diversion drain at the upstream side if required.
- Regular inspection and maintenance of silt fences, sediment basins and other erosion control measures are to be made. These should be undertaken weekly, monthly and following major rainfall events. Following rainfall events greater than 50mm inspection of erosion control measures and removal of collected material should be undertaken. Replacement of any damaged measures should be performed immediately.

### 3.1.4 Post Construction

The following minimum requirements are to be met post construction:

- The contractor/ developer will be responsible for the maintenance of erosion and sediment control devices from the possession of the site until the site is accepted “Off Maintenance” or until stabilisation has occurred to the satisfaction of the superintendent and council.
  - Key stormwater areas requiring maintenance for operational phase of the project following construction are piped stormwater system, bio-retention areas, field inlet pit inserts and rainwater tanks.

## 3.2 **Earthworks**

### 3.2.1 General

Bulk earthworks will be required to facilitate the development of the site for multi-level industrial use. The earthworks will be undertaken to provide large flat building pads for the warehouse and parking levels, facilitate site access from Burrows Road, to drain the site stormwater via gravity, and to keep building levels at or above the 1% AEP (1 in 100 year ARI) flood level.

All geotechnical testing and inspections performed during the earthwork’s operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-2007.

To assist in maintaining embankment stability, permanent batter slopes will be no steeper than 3-horizontal to 1 vertical while temporary batters will be no steeper than

2 horizontal to 1 vertical. This is in accordance with the recommended maximum batter slopes for residual clays and shale which are present in the area.

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 Landcom Blue Book requirements and recommendation of the geotechnical engineers.

### 3.2.2 Earthworks Volume Estimate

High level earthworks and volume estimates have been completed and are shown on drawing in **Appendix A**. The earthworks volume estimates are based on a site with flat building pads.

The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate for the planning application. Furthermore detailed assessments would be completed as part of future development application and construction certificate phases of the development.

The earthworks volume estimates are as follows:

Cut	- 14,900 m <sup>3</sup>
Fill	+43,600 m <sup>3</sup>
Difference	+22,700 m <sup>3</sup> <i>(excess fill over cut)</i>

The volume estimate is based on 6,000 m<sup>3</sup> of removal and crushing of existing slabs on the site. This could be reused on site subject to suitable assessments and confirmation of suitability.

An import of cut and fill earthworks of 22,700 m<sup>3</sup> has been shown in the concept analysis. Allowances for service excavation during infrastructure and future building developments should also be made to avoid excessive exports during later stages of the project. Allowances in the range of 500-1500m<sup>3</sup>/Ha can be expected depending on the type of development and final site layouts. An allowance for service spoil should be made to ensure no export from site, and a reduction of the noted difference would be realised.

## 4 STORMWATER DRAINAGE

### 4.1 Site Drainage

#### 4.1.1 Existing Drainage System

As part of the existing industrial/ commercial development on the property, an extensive in-ground drainage system is present. This system comprises grated inlet pits, sealed junction pits, down pipe connections and in-ground pipes which convey stormwater from buildings, car parks, hardstand areas and other extensive paved areas to the legal point of discharge in Burrows Road and ultimately to the Alexandra Canal.

As discussed in **Section 2** of this report, a low point is present in Burrows Road at RL 1.8m, aligning approximately with the existing driveway access to the site. A Council drainage line conveys stormwater from the low point in the road, toward the Alexandra Canal to the south-east of the development.

#### 4.1.2 Proposed Drainage System

As per general engineering practice and the guidelines of City of Sydney Council, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge. Details of the proposed system for the development will be defined during the Development Application Stage of the project.

The minor system will consist of a piped drainage system designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system has been designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). This major system employs overland flow paths to safely convey excess run-off from the site.

As part of the new development, the existing drainage system will be made redundant and new system constructed. The new system will comprise management measures to address the objectives set out in Councils Planning Checklist and referenced in Section 1 of this document. An indicative concept stormwater management plan has been provided in **Appendix A**.

A more detailed concept drainage plan would be required at development application stage which should be based on the concept and objectives included in this document. The future design of the stormwater system for the site should also consider the following documents:

- 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” (1988 Edition), Volumes 1 and 2 (AR&R).
- Design recurrence intervals for major and minor storms will be in accordance with City of Sydney Development Control Plan 2012; and
- Stormwater harvesting is based on the requirement of City of Sydney Development Control Plan 2012 and the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*.

### 4.1.3 Legal Point of Discharge

The legal point of discharge is located in conjunction with the existing site and council inter-allotment drainage line on the south-east corner of the site. It is expected that the existing outlet will be able to be utilised for the future design of the site.

A legal point of discharge for the site will be made to the existing drainage infrastructure in Burrows Road and Canal Road. These drainage systems discharge to the nearby Alexandra Canal, approximately 85m south/ south-east of the development site.

## 4.2 Stormwater Management

### 4.2.1 Stormwater Management Objectives

Consideration to management of stormwater from the development site has been made per the concept management plans by Costin Roe Consulting included in **Appendix A**.

Management of Stormwater Quality will be completed such that councils load based stormwater pollutant loads are met through MUSIC.

Consideration to pollutant reductions and water quantity requirements included in the *Botany Bay Water Quality Improvement Plan* and City of Sydney DCP 2012 have been made.

The requirements of the City of Sydney, included in their Planning Application Checklist are to “*Develop a Water Sensitive Urban Design (WSUD) to meet the objectives of:*

- *Capturing and slowing down water movement during heavy downpour events*
- *Capture rainwater for use on the site to reduce use of potable water*
- *Meeting the water quality requirements of Sydney DCP 2012:*
  - *Reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%*
  - *Reduce the baseline annual pollutant load for total suspended solids (TSS) by 85%*
  - *Reduce the baseline annual pollutant load for total phosphorus (TP) by 65%*
  - *Reduce the baseline annual pollutant load for total nitrogen (TN) by 45%”*

The pollutant reductions included in the *Botany Bay Water Quality Improvement Plan* are as follows:

- Gross pollutants (GP's) – 90%
- Total Suspended Solids (TSS) – 85%
- Total Phosphorous (TP) – 60%
- Total Nitrogen (TN) – 45%
- Hydrocarbons and oil – 90%

Noting that the City of Sydney DCP water quality objectives are slightly higher than the *Botany Bay Water Quality Improvement Plan*, the former objectives will be adopted for the development.

#### 4.2.2 Stormwater Quantity

Management of Stormwater Quantity has been considered for the site, and it is noted that the development will not adversely impact flooding upstream or downstream of the property without OSD and as such none is proposed for this development.

The site is located in the lower end of the catchment and discharge to tidally influenced Alexandra Canal. Given the position in the catchment, local un-attenuated flows will peak well in advance of the main flood hydrograph in Alexandra Canal coming from the upstream catchments. The combined hydrograph in this situation will result in a double peak (small initial peak followed by larger extended peak) in the shorter duration storms. If traditional OSD were to be included, although local flows from the site would be reduced, the peak of flow from the site is drawn out over a longer period which would coincide with that of the larger and delayed peak flow within the Alexandra Canal. This will result in an overall increase in peak flows, hence an adverse effect would be achieved.

Furthermore, as the site is currently predominately comprised of existing impermeable surfaces, the overall change in peak flows due to the new development will be negligible, further lending weight to not requiring OSD.

It is considered that the combined peak flow runoff (from the local site catchment and larger Alexandra Canal catchment) in the Alexandra Canal will not increase as a result of the development (with the proposed flood management measures and without traditionally sized on-site detention), hence none is proposed for the development.

Rainwater reuse is proposed for the development as shown in concept drawing included in **Appendix A**. It is proposed that reuse will be provided for non-potable uses including toilet flushing, vehicle washing (if required) and landscape irrigation. The intent will be to reduce non-potable demands in the range of 50-80%, subject to detail design.

#### 4.2.3 Water Quality

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 whole catchment area of the development. The STM's for the development shall be based on a treatment train approach to ensure that all of the objectives above are met in line with the principles of Water Sensitive Urban Design (WSUD) considerations.

Stormwater quality objectives, listed in **Section 4.2.1**, will be met via a treatment train which comprises a combination of proprietary and/ or WSUD measures. A treatment solution has been represented on drawing included in **Appendix A**, whereby a proprietary filtration system has been proposed as the primary treatment measure. An alternate bio-retention system has also been included as another option which could be considered for the site. The nominated system has been provided in the planning application to show that a solution is available for the development, noting the adopted system would be subject to a development application design as part of a future



development application. Reference to **Appendix A** shows the indicative location and configuration of the stormwater management plan for the development.

The final solution would need to be confirmed on individual development application and detail MUSIC modelling at development approval time. The measures would need to be able to be integrated into the overall public domain and recreation zones prior to discharge to the Alexandra Canal.

## 5 FLOODING

### 5.1 Introduction

A desktop review of overland flow and flooding in relation to the proposed development, and confirmation of that the requirements of City of Sydney's *Floodplain Management Policy* have been met.

Our review and assessment have been based, review of detail survey (refer **Appendix C**), the proposed development (as shown in SBA Architects Masterplan) and a desktop assessment of the site in relation to the flood modelling and documented flood behaviour included *Alexandra Canal Catchment Flood Study Report Final* (Ref: W4785). This report was prepared by Cardno on behalf of the City of Sydney Council dated 20 May 2014. This report will be referred to as the *Alexandra Canal Flood Study* from hereon.

It is noted that Costin Roe Consulting has been in contact with The City of Sydney Council to obtain formal flood advise letter pertaining to this site. It is noted that Council has not provided any formal information however has directed our office to the *Alexandra Canal Flood Study* as being the appropriate document showing flooding which affects the site.

Further reference to the flooding assessments completed as part of the *WestConnex New M5 EIS Technical Working Paper: Flooding (EIS Appendix P) (Lyall and Associates 2015)*, has been included as part of our assessment. As the subject development is located adjacent to the Canal Road Interchange, the flooding assessment included in the RMS work is more detailed in proximity to the site than the regional council study and as such is considered to be more relevant to the development and assessment contained herein.

Costin Roe Consulting Pty Ltd have prepared this letter and associated drawings, being engineers who specialise in stormwater engineering and flooding assessments.

We have included the following items as part of our review:

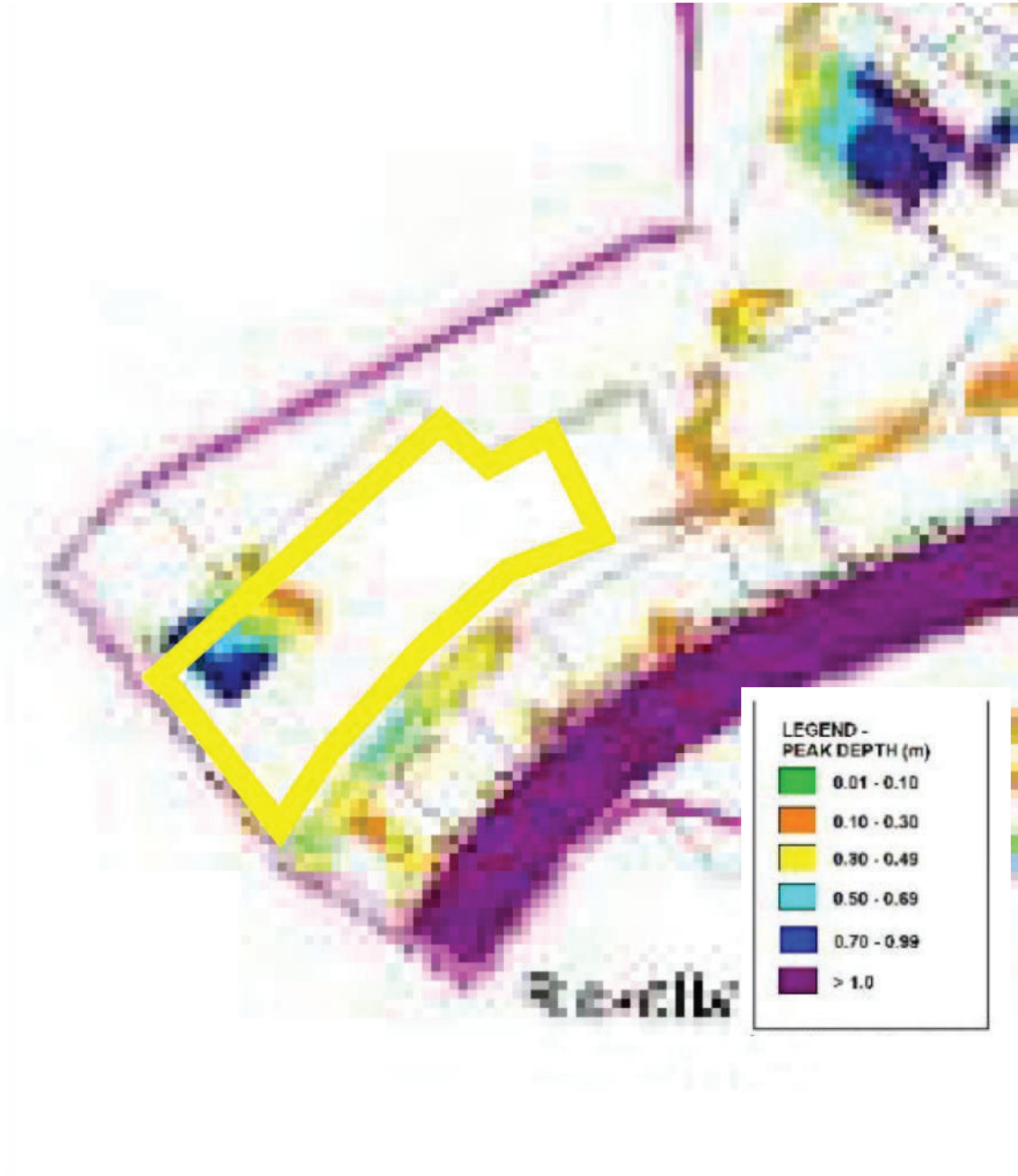
- Review of the Alexandra Canal Catchment Flood Study Report Final (Ref: W4785);
- Review of the WestConnex New M5 EIS Technical Working Paper: Flooding (EIS Appendix P) (Lyall and Associates 2015);
- Review of Councils Floodplain Management Policy in relation to the development including review of potential impacts of the development on existing flooding, and potential impacts on the development from flooding;

### 5.2 Alexandra Canal Flood Study

A flood study of the Alexandra Canal catchment was undertaken by Cardno for The City of Sydney Council in 2014. The study involved a hydrological and hydraulic assessment of the catchment at a regional level. The hydraulic model utilising the two-dimensional hydraulic model (TUFLOW), including one-dimension pits and pipes for the significant council pipe infrastructure. Flow output from contributing catchments is based on "rain-on-grid" and it is noted that no drainage infrastructure in individual lots

has been included in the model, unless this forms part of council trunk or significant inter-allotment drainage infrastructure.

We provide excerpts of flooding associated with the 1% AEP storm event from the Alexandra Canal Flood Study in **Figures 5.1** and **5.2** below. **Figure 5.1** is noted to be an excerpt of *Flood Study Figure 6.13* and **Figure 5.2** an excerpt of *Flood Study Figure 6.20*.



**Figure 5.1. Alexandra Canal - 1% AEP Flood Extent and Depths**



**Figure 5.2. Alexandra Canal - 1% AEP Flood Velocity**

With reference to **Figures 5.1 & 5.2**, ponding water (with velocity below 0.5m/s) is shown in councils regional flood study to be present adjacent to the site in Burrows Road centred around the low point in the road (approx. 100m east of the intersection of Canal Road) during the 1% AEP (1 in 100-year ARI storm).

Some flooding is also shown to be present on the north-west of the site associated with “rain on grid” runoff (which don’t include individual site drainage) from previous landform north of the site. It is our opinion that had the original regional flood model included local site drainage for both the adjacent and development site, the ponding water shown on the site would not be present. This is further corroborated in the modelling completed for the Canal Road Interchange discussed below.

The ponding water within Burrows Road can be seen to be up to 0.5m as shown in **Figure 5.1**. The 1% AEP flood level is estimated to be RL 2.3m AHD. The 1% AEP

level of RL 2.3m AHD is based on the noted modelled flood depths applied to the respective detail surveyed levels in Burrows Road of RL 1.8m AHD.

The site is shown to be clear of any significant flow paths and is not affected by mainstream flooding associated with the Alexandra Canal.

Review of *Flood Study Figure 4.3* shows there have been no pits and pipes within the site included in the Alexandra Canal Flood model. This would mean that the model would show ponding water where low spots in the model DTM are present (i.e. at the north-west corner of site). It is noted that as part of the current Canal Road Interchange Construction significant drainage works are expected and any potential for runoff from the properties to the west of this site (as indicated in the Alexandra Canal Study) would not be present. As such we do have not included any provision for flooding on the west of the site as shown in the Alexandra Canal Study.

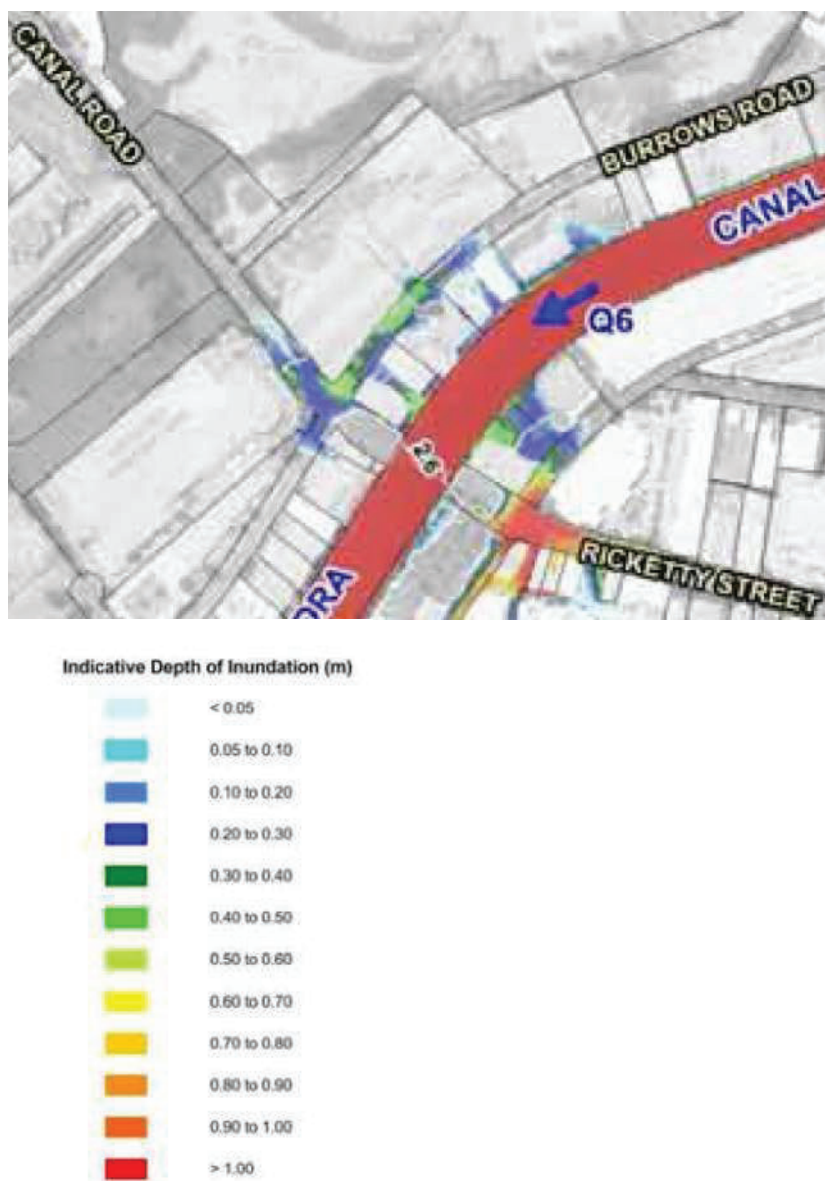
The Alexandra Canal Flood Study shows water depths in the 5% (1 in 20year ARI) flood event to be similar to those of the 1% AEP, however the ponding area is shown to be approximately 30% less. This suggests the 5% AEP water level would be approximately 0.1-0.2m less than the 1% AEP, i.e. between RL 2.1m to RL 2.2m AHD.

### **5.3 New M5 WestConnex**

A flood study “*WestConnex New M5 EIS Technical Working Paper: Flooding (EIS Appendix P)*” has been completed by Layall and Associates as part of the for NSW RMS in 2015.

The study involved a hydrological and hydraulic assessment of the area, although at a regional level this study is more area specific than the Alexandra Canal Study completed by council. The hydraulic model utilising the two-dimensional hydraulic model (TUFLOW), including one-dimension pits and pipes for the significant council pipe infrastructure. Flow output from contributing catchments is based on “rain-on-grid” and it is noted that no drainage infrastructure in individual lots has been included in the model, unless this forms part of council trunk or significant inter-allotment drainage infrastructure.

We provide excerpts of flooding associated with the 1% AEP storm event in **Figure 5.3** below. **Figure 5.3** is noted to be an excerpt of *RMS Flood Study Figure 4.8*.



**Figure 5.3. 1% AEP Flood Extent at site**

With reference to **Figure 5.3**, ponding water is shown to be present adjacent to the site in Burrows Road centred around the low point in the road (approx. 100m east of the intersection of Canal Road) during the 1% AEP (1 in 100-year ARI storm). The extent and depth are seen to be generally consistent with that included in the Alexandra Canal Study.

No flooding is shown to be present on the north-west of the site which differs to the Alexandra Canal Study and lends weight to our opinion that the flooding shown in the Alexandra Canal Study is anomalous and should not require any consideration in the flood planning for this development.

The ponding water within Burrows Road can be seen to be up to 0.5m as shown in **Figure 5.3**. Similar to the Alexandra Canal Study, the **1% AEP flood level is estimated to be RL 2.3m AHD**. The 1% AEP level of RL 2.3m AHD is based on the

noted modelled flood depths applied to the respective detail surveyed levels in Burrows Road of RL 1.8m AHD.

The PMF flood model shows the flood level around this site to be approximately RL 4.5m AHD.

The site is shown to be clear of any significant flow paths and is not affected by mainstream flooding associated with the Alexandra Canal.

#### **5.4 City of Sydney Floodplain Management Requirements & NSW Floodplain Management Manual Requirements**

Councils *Floodplain Management Policy* provides relevant policy requirements relating to development in and around identified flood affected development sites.

The intent of the document is to ensure that new developments do not experience undue flood risk and that existing development is not adversely flood affected through increased damage or hazard as a result of new development.

*Section 5 of the Floodplain Management Policy* notes the flood planning level for business/ industrial to be at or above the 1% AEP (1 in 100-year ARI) flood level.

*Section 5 of the Floodplain Management Policy* notes the flood planning level for enclosed car parks as being the 1% AEP flood level. The policy also requires a basement or below ground parking areas needs to be at or above the 1% AEP (1 in 100-year ARI) flood level plus 0.5m freeboard, or the PMF event, whichever is higher. The requirement for a basement is noted to apply to areas which are more than 1m below ground and/ or where the inflow capacity is much higher than the outflow capacity. The undercroft car parking area for this development (being sited at the 1% AEP level, being above the adjacent roadway, being free draining) is considered as an enclosed parking area, and not a basement level parking area. As such the 1% AEP flood level applies to the undercroft parking area and has been set at RL 2.3m AHD accordingly.

The PMF or extreme event provides an upper limit of flooding and associated consequences for the problem being investigated. It is used for emergency response planning purposes to address the safety of people.

As discussed in earlier sections of this letter, flooding shown on Burrows Road has been estimated to have a 1% AEP level of approximately RL 2.3m AHD. The FFL of the proposed office and building is RL 3.8m AHD and 5.5m AHD respectively, hence is higher than the modelled 1% AEP flood level and meets councils minimum flood planning level.

The proposed level of the undercroft parking area is RL 2.3m AHD, hence will be equal to the 1% AEP, and meets councils flood planning requirements.

In relation to flood impact on the development or impact from the development on flooding, it is noted that the modelled 1% AEP flood extent does not encroach the subject property, hence no adverse impact to existing flood conditions or surrounding developments are associated with the proposed development.

The area shown as being flood affected on the north-west of the property in the Alexandra Canal is considered to be a modelling anomaly, given there is no opportunity for overland flow to enter the site from the north, and that current RMS construction works have significant drainage infrastructure in place that would collect and convey stormwater runoff from this area.

Overall flood risk for the development, and from the development is considered low to negligible, and the development meets all current council flood policy.



## 6 CONCLUSION

This Civil Engineer Report has been prepared to support a planning application associated with the development of 1-3 Burrows Road, Alexandria, NSW. The proposed planning changes is in relation to an increase in the maximum building height to allow for the development of the land as a multi-level industrial facility.

An overview of stormwater management and flooding considerations has been provided to assist in the stage one due diligence and planning application process for the proposed development of the site.

The review shows that a Stormwater Management System can be employed on the site which addresses management of stormwater quantity and stormwater quality, allowing for a reduction in base pollutant loads prior to discharge from the site.

The review of available flood studies also shows that flood risk on the property is low, and that there is no impact on flooding from the development.

Accordingly, based on the site conditions of the land and the availability of an appropriate stormwater and flood management strategy, there is good opportunity to develop the site and meet current market and social demands in the area.

## 7 REFERENCES

- Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);  
Managing Urban Stormwater: Source Control – 1998 (NSW EPA);  
Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);  
Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);  
*Floodplain Management Policy*, City of Sydney Council  
*Alexandra Canal Catchment Flood Study Report Final* (Ref: W4785). 20 May 2014  
*WestConnex New M5 EIS Technical Working Paper: Flooding (EIS Appendix P)* (Lyll and Associates 2015),  
Water Sensitive Urban Design – “Technical Guidelines for Western Sydney” by URS Australia Pty Ltd, May 2004

## 8 APPENDICES

*Appendix A - Drawings by Costin Roe Consulting*

*Appendix B - City of Sydney Council Planning Application Checklist*

*Appendix C – Existing Site Survey*

# **Appendix A**

## **Drawings by Costin Roe Consulting**

# BURROWS INDUSTRIAL ESTATE

## 1-3 BURROWS ROAD, ALEXANDRIA

### CONCEPT CIVIL DRAWINGS

#### DRAWING LIST

DRAWING NO.	DRAWING TITLE
C011035-03-SK10	DRAWING LIST & GENERAL NOTES
C011035-03-SK11	BULK EARTHWORKS PLAN
C011035-03-SK12	BULK EARTHWORKS SECTIONS
C011035-03-SK40	CONCEPT STORMWATER PLAN
C011035-03-SK41	FLOODING CONCEPT PLAN

#### STORMWATER DRAINAGE NOTES:

- ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD ASS5003 PLUMBING AND DRAINAGE, PART 3 STORMWATER DRAINAGE.
- THE MINOR (RIPPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVER AND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
- ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS.
- PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
- EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFERRED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
- ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
- ALL PIPES UP TO AND INCLUDING Ø300 TO BE UPVC GRADE SN8 UNO.
- PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
- 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 FC 25 MPA PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER. IN ADDITION TO ITEM 8 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
- PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAIN AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAULETS, WITH NARROW EDGE RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
- WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 UPVC TO LENGTH SIDE OF PIPE.
- ALL SLOTTED DRAINAGE LINES SHALL BE Ø100 SLOTTED UPVC WITH APPROVED FILTER WEAIR LAID IN 300mm WIDE GRANULATED FILTER UNLESS NOTED OTHERWISE. LAY SUBSOL LINES TO MATCH FALLS OF LAND AND/OR IN 200 MINIMUM. PROVIDE CARPED CLEANING EYE ROUNDING POINT AT UPSTREAM END OF LINE AND AT 200 MAX CLS PROVIDE SUBSOL LINES TO ALL PAVEMENT/300M CARPED INTERFACES. TO REAR OF RETAINING WALLS (AS NOMINATED) BY STRUCTURAL ENGINEER AND AS SHOWN ON PLAN.
- ALL PIPE GRADES IN 100 MINIMUM UNO.
- PROVIDE STEEP SLOPES IN PITS DEEPER THAN 1000mm.
- MIN 800 COVER TO PIPE OVERSTRENGTH ROADS & MIN 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
- PIT COVERS IN TRADEABLE PAVEMENT SHALL BE CLASS D HEAVY DUTY. THOSE LOCATED IN NON-TRADEABLE AREAS SHALL BE CLASS B. PROVIDE 100mm UNO RAINHOLE CLEANING EYES ROUNDING POINTS TO PIPES AT 2000 MAX CLS AND 1-JUNCTIONS WHERE NO PITS ARE PROVIDED.
- DOWNPIPES (DPI) TO BE AS PER HYDRAULIC ENGINEERS DETAIL WITH CONNECTOR TO MATCH PIPE SIZE UNO. PLAN PROVIDE CLEANING EYE ON GROUND LEVEL. PIPE LENGTHS NOMINATED ON PLAN OR, UNLESS OTHERWISE STATED, MEASURED FROM CENTER OF PITS TO THE NEAREST 0.50m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

#### ELECTRONIC INFORMATION NOTES:

- THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
- 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.
- 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.
- 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.

#### GENERAL NOTES:

- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT AND OTHER CONDITIONS, DRAWINGS AND SPECIFICATIONS AND THE 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.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS, AUSTRALIAN CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARYED BY THE PROJECT SPECIFICATION.
- 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.
- 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.
- UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
- 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.

ARCHITECT		CLIENT		PRODUCT		CONSULTING ENGINEERING		DRAWING TITLE	
ISSUED FOR PLANNING APPROVAL	21/12/20	LEVEL 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	BURROWS INDUSTRIAL ESTATE	1-3 BURROWS ROAD, ALEXANDRIA	Level 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	Civil Engineering	CONCEPT CIVIL DRAWINGS	DRAWING LIST & GENERAL NOTES	
ISSUED FOR INFORMATION	14/12/20	Level 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	BURROWS INDUSTRIAL ESTATE	1-3 BURROWS ROAD, ALEXANDRIA	Level 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	Civil Engineering	CONCEPT CIVIL DRAWINGS	DRAWING LIST & GENERAL NOTES	
AMENDMENTS	DATE	ISSUE	DATE	ISSUE	DATE	ISSUE	DATE	ISSUE	DATE



LOCALITY PLAN  
NOT TO SCALE

#### SITE PREPARATION NOTES:

- ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT UNDER LEVEL 1 SUPERVISION.
- EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY CARON HARD & FORESTER TITLED PLAN SHOWING DETAIL, LEVELS AND CONTOURS OVER LOT 11 & 12 DP 606737 DATED 19 08 15.
- STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
- COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +10mm/-10mm PREPARE BUILDING PADS/PAVEMENTS AND +10mm/-20mm ELSEWHERE.
- TO FACILITATE FILL PLACEMENT AND COMPACTION.
- AREAS IN CUT SHALL BE PROPOSED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF-BOLTING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
- SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILE DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILE MOISTURE IMPROVED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILE DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILE MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
- 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 (AS 1289 5.4.1) OR HILE TEST METHOD (AS 1289 5.1). THESE METHODS REQUIRE LESS THAN 20% BE 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 STILL BE ADOPTED AND TEST REPORTS AND YATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION.
- ALL EARTHWORKS SHALL BE COMPLETED UNDER LEVEL 1 CONTROL IN ACCORDANCE WITH AS 3798-2007.
- PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
- EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
- MATCH EXISTING LEVELS AT BATTER INTERFACE.
- CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO BATTERING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.

## FOR PLANNING PROPOSAL

Coslin Role Consulting

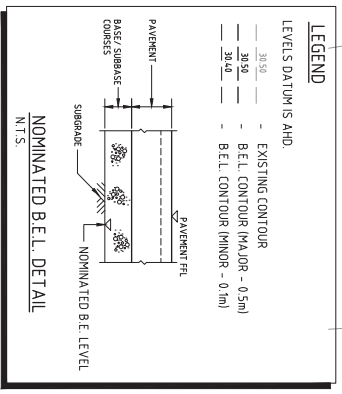
PRECISION | COMMUNICATION | ACCOUNTABILITY

Coslin Role Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY



PRELIMINARY BULK EARTHWORKS PLAN  
1:500 SCALE



**EARTHWORK ESTIMATES**

STRIP = 6,900m<sup>2</sup> (BLEND OR DISPOSE)

CUT = -11,900m<sup>3</sup>

FILL = 43,600m<sup>3</sup>

DET. EXCAV. = - 6,000m<sup>3</sup> (1,500m<sup>3</sup> / 4)

BALANCE = +22,700m<sup>3</sup> (ie. IMPORT)

VOLUMES BASED ON AVERAGE 200mm STRIP OVER SITE EARTHWORK VOLUMES ARE APPROXIMATE ONLY AND ALLOW FOR A 200mm STRUCTURAL PAVEMENT. NO ALLOWANCES HAS BEEN MADE FOR DELTA OF CONTRACTUAL, FROST AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS.

**DEPTH RANGE**

No.	FROM DEPTH	TO DEPTH	COLOR
1	-3.00	-2.00	Blue
2	-2.00	-1.00	Orange
3	-1.00	0.00	Green
4	0.00	1.00	Light Green
5	1.00	2.00	Yellow
6	2.00	3.00	Light Blue
7	3.00	4.00	Dark Blue

**CONTAMINATION NOTE:**

THE SUBJECT PROPERTY HAS BEEN IDENTIFIED TO CONTAIN CONTAMINATED MATERIAL. CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS ARE TO BE RETAINED ON SITE AND A CAPPING LAYER CONSISTING OF COMPACTED CLAY FILL TO A MINIMUM DEPTH OF 500mm IS TO BE PROVIDED OVER THE SITE TO ALL EXTERNAL AREAS.

**FILL IMPORT NOTE:**

ALL FILL IMPORT MATERIAL SHALL BE VEMM OR ERM

**FOR PLANNING PROPOSAL**



ISSUED FOR PLANNING APPROVAL	27/12/20	C	ARCHITECT
ISSUED FOR INFORMATION	04/2/20	B	
ISSUED FOR INFORMATION	01/1/19	A	
AMENDMENTS	DATE	ISSUE	

**CLIENT**

**BURROWS INDUSTRIAL ESTATE**  
1-3 BURROWS ROAD, ALEXANDRIA  
NEW SOUTH WALES

**LEVEL 11**  
Level 11, Burrows Industrial Estate  
New, 200, Australia  
Tel: 002 929 1144  
Fax: 002 929 1144

**PROJECT**

**BURROWS INDUSTRIAL ESTATE**  
1-3 BURROWS ROAD, ALEXANDRIA  
NEW SOUTH WALES

**Costin Roe Consulting Pty Ltd**  
Consulting Engineering  
Level 11, 8 Mitchell Street  
North Sydney NSW 2060  
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www.croconsulting.com.au

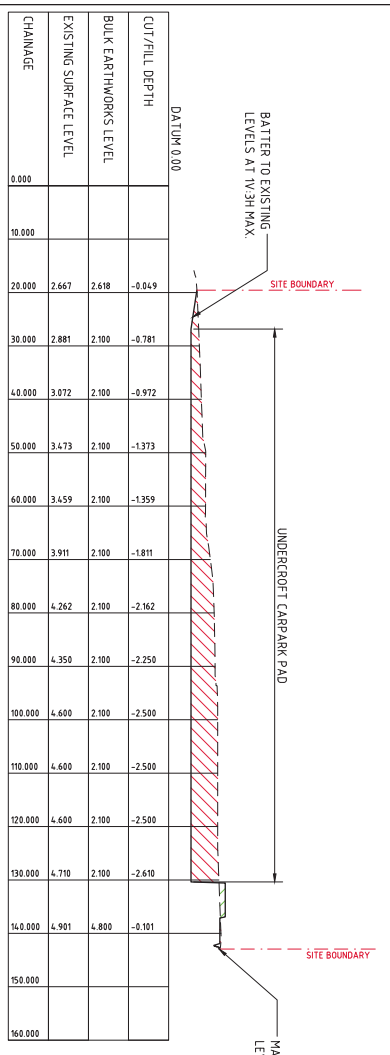
**PRECISION | COMMUNICATION | ACCOUNTABILITY**

**BULK EARTHWORKS PLAN**

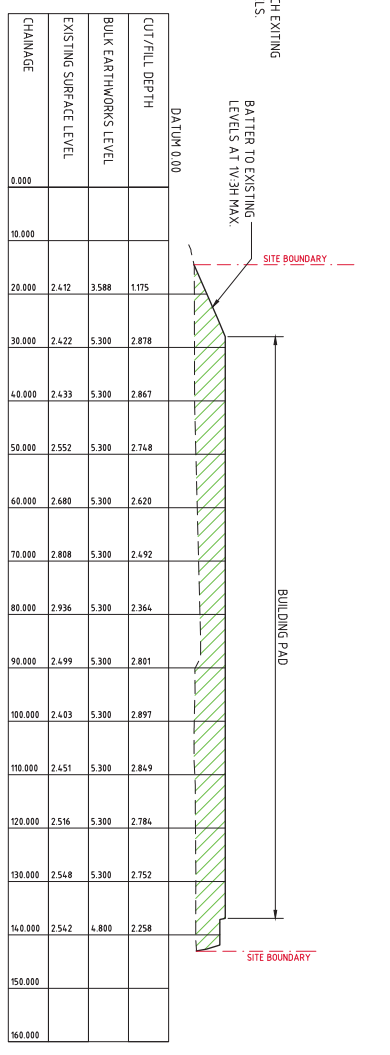
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DATE: 27/12/20

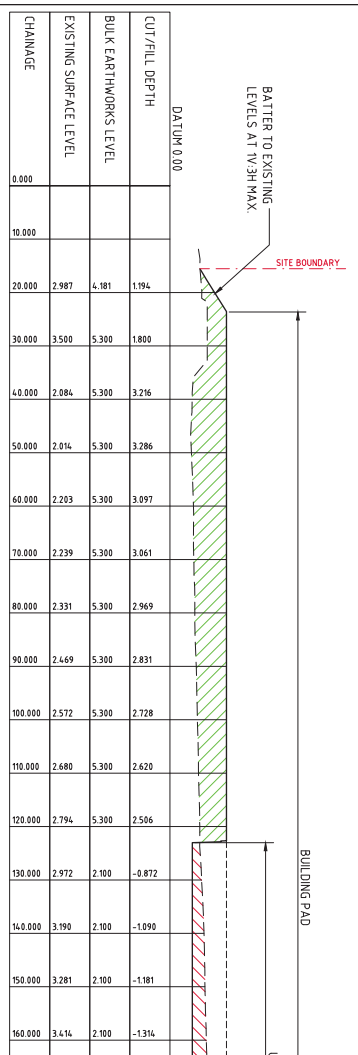
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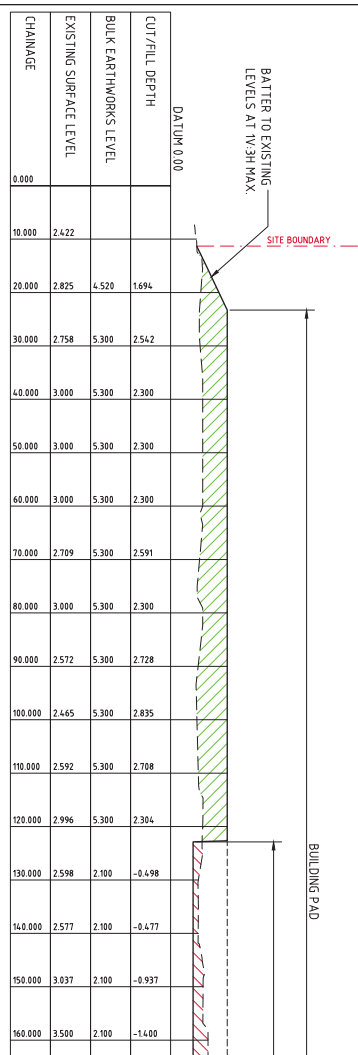
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HORIZONTAL SCALE 1:500  
VERTICAL SCALE 1:250



SECTION 4  
HORIZONTAL SCALE 1:500  
VERTICAL SCALE 1:250



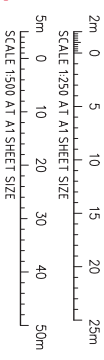
SECTION 2  
HORIZONTAL SCALE 1:500  
VERTICAL SCALE 1:250



SECTION 1  
HORIZONTAL SCALE 1:500  
VERTICAL SCALE 1:250

**LEGEND:**

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING SURFACE PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL



**FOR PLANNING PROPOSAL**

**COSTIN ROE CONSULTING**

**PRECISION | COMMUNICATION | ACCOUNTABILITY**

**BURROWS INDUSTRIAL ESTATE**  
1-3 BURROWS ROAD, ALEXANDRIA  
NEW SOUTH WALES

**COSTIN ROE CONSULTING PTY LTD**  
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Sydney NSW 2000  
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www.croconsulting.com.au

**ARCHITECT**  
ISSUED FOR PLANNING APPROVAL: 27/12/20 C  
ISSUED FOR INFORMATION: 04/02/20 B  
ISSUED FOR INFORMATION: 01/11/19 A  
AMENDMENTS: DATE ISSUE

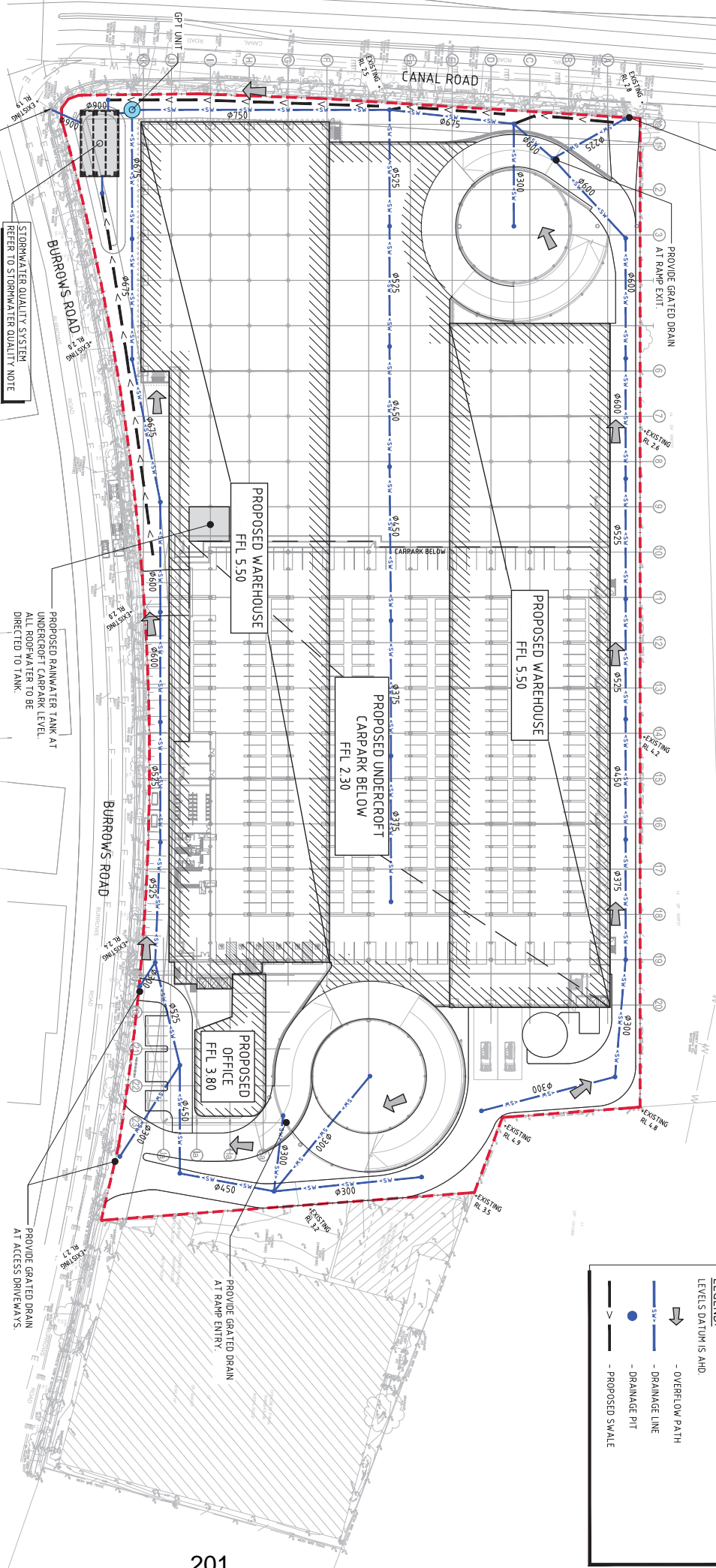
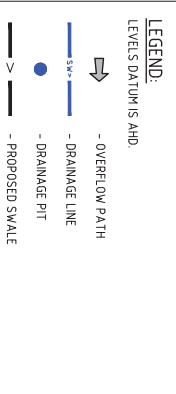
**CLIENT**  
LEVEL 11, 8 MACQUARIE STREET  
SYDNEY NSW 2000  
Tel: (02) 9250-9999 Fax: (02) 9250-9798  
www.croconsulting.com.au

**PROJECT**  
ISSUED FOR PLANNING APPROVAL: 27/12/20 C  
ISSUED FOR INFORMATION: 04/02/20 B  
ISSUED FOR INFORMATION: 01/11/19 A  
AMENDMENTS: DATE ISSUE

**DRAWING TITLE**  
BULK EARTHWORKS SECTIONS  
DRAWING NO: C011035\_03\_SK12

PROVIDE GRATED DRAIN AT ACCESS DRIVEWAYS

PROVIDE GRATED DRAIN AT RAMP EXIT.



**SITE DISCHARGE POINT**  
TREATED FLOWS DISCHARGE TO BURROWS ROAD DRAINAGE DISCHARGE POSITION TO BE CONFIRMED IN DA CONCEPT STAGE

**STORMWATER QUALITY SYSTEM**  
REFER TO STORMWATER QUALITY NOTE

**PROPOSED RAINWATER TANK AT UNDERROFT CARPARK LEVEL.**  
ALL ROOF WATER TO BE DIRECTED TO TANK

**STORMWATER MANAGEMENT NOTE:**  
STORMWATER UP TO THE 5% ANNUAL EXCEEDANCE PROBABILITY (AEP) ARE CONVEYED BY MINOR DRAINAGE SYSTEM  
STORMWATER ABOVE THE 1% ANNUAL EXCEEDANCE PROBABILITY (AEP) ARE CONVEYED BY MAJOR DRAINAGE SYSTEM  
ON-SITE DETENTION (OSD) SYSTEM NOT REQUIRED  
PROPOSED DEVELOPMENT WILL NOT INCREASE IMPERVIOUS AREAS  
SITE IS SITUATED AT END OF CATCHMENT ADJACENT TO ALEXANDRA CANAL

**STORMWATER QUALITY NOTE:**  
CITY OF SYDNEY COUNCIL DCP 2012 CLAUSE 3.1.3 STORMWATER QUALITY - REDUCE BASELINE ANNUAL POLLUTANT LOAD FOR: LITTER & VEGETATION LARGER THAN 5mm (GP) BY 90%  
TOTAL SUSPENDED SOLIDS (TSS) BY 85%  
TOTAL PHOSPHOROUS (TP) BY 65%  
TOTAL NITROGEN (TN) BY 45%  
**OPTION 1**  
PROVIDE END OF LINE GROSS POLLUTANT TRAP OR SURFACE INLET PIT INSERTS TO ALL GRATED PITS  
BIO-RETENTION BASIN, FILTRATION AREA 400m<sup>2</sup>  
**OPTION 2**  
PROVIDE END OF LINE GROSS POLLUTANT TRAP OR SURFACE INLET PIT INSERTS TO ALL GRATED PITS  
PROPRIETARY FILTRATION TANK, 80 CARTRIDGES

ALEXANDRA CANAL

CONCEPT STORMWATER DRAINAGE  
SCALE 1:500

FOR PLANNING PROPOSAL



ARCHITECT	CLIENT	PROJECT	DATE
ISSUED FOR PLANNING APPROVAL 27.12.20 C	LEVEL 11, 12 STREETWORKS NEW, 280, ALEXANDRA RD, 2008, SYDNEY NSW TEL: 002 9291 7144 FAX: 002 9291 7144	BURROWS INDUSTRIAL ESTATE 1-3 BURROWS ROAD, ALEXANDRIA NEW SOUTH WALES	DATE
ISSUED FOR INFORMATION 04.02.20 B	LEVEL 11, 12 STREETWORKS NEW, 280, ALEXANDRA RD, 2008, SYDNEY NSW TEL: 002 9291 7144 FAX: 002 9291 7144	1-3 BURROWS ROAD, ALEXANDRIA NEW SOUTH WALES	DATE
ISSUED FOR INFORMATION 14.11.19 A	LEVEL 11, 12 STREETWORKS NEW, 280, ALEXANDRA RD, 2008, SYDNEY NSW TEL: 002 9291 7144 FAX: 002 9291 7144	1-3 BURROWS ROAD, ALEXANDRIA NEW SOUTH WALES	DATE
AMENDMENTS	LEVEL 11, 12 STREETWORKS NEW, 280, ALEXANDRA RD, 2008, SYDNEY NSW TEL: 002 9291 7144 FAX: 002 9291 7144	1-3 BURROWS ROAD, ALEXANDRIA NEW SOUTH WALES	DATE

**Costin Roe Consulting**  
PRECISION | COMMUNICATION | ACCOUNTABILITY

Costin Roe Consulting Pty Ltd  
Consulting Engineers  
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North Sydney NSW 1585  
Tel: (02) 9291 7144 Fax: (02) 9291 7144  
www.croconsulting.com.au

DRAWING TITLE  
CONCEPT STORMWATER PLAN

DATE  
COT11035\_03\_SK4.0





# **Appendix B**

## **City of Sydney Planning Application Checklist**

# Planning Proposal Lodgement Checklist

Site: 1-3 Burrows Road, St Peters  
Applicant: Goodman  
Date: 9 December 2019  
TRIM: X019338

Lodgement Documents	Applicant Supplied	Planner Check
<b>Lodgement Form</b> <ul style="list-style-type: none"> <li>Applicant's signature on form</li> </ul>		
<b>Lodgement letter from the City of Sydney Council</b>		
<b>Planning Proposal Fee</b> <ul style="list-style-type: none"> <li>Major Fee</li> </ul> <p>Fees listed under "Request to prepare a planning proposal" in Council's Fees and Charges Revenue Policy, available at <a href="http://www.cityofsydney.nsw.gov.au">www.cityofsydney.nsw.gov.au</a> under Council, Our Responsibilities, Fees and charges.</p>		
<b>Plans and accompanying documents</b> <ul style="list-style-type: none"> <li>1x colour hard copy set in two-ring binder folders</li> <li>1x USB containing Word and PDF versions of documents</li> </ul>		
<b>Planning Justification</b>		
<b>Planning Proposal Justification Report</b> <p>Planning proposals must be prepared in accordance with section 3.33 of the Environmental Planning and Assessment Act 1979, and the Guide to Preparing Planning Proposals issued by the Department of Planning, Industry and Environment.<sup>i</sup></p> <p>In the planning proposal justification report, the proponent is to:</p> <ul style="list-style-type: none"> <li>Outline the vision for the proposal</li> <li>Justify the proposal with reference to alternative options</li> <li>Outline how the planning proposal complies with and gives effect to the Greater Sydney Region Plan<sup>ii</sup> and the Eastern City District Plan<sup>iii</sup></li> <li>Outline interactions with other key City of Sydney and NSW Government strategic documents, such as: <ul style="list-style-type: none"> <li>Sustainable Sydney 2030<sup>iv</sup></li> <li>Environmental Action 2016-2021 Strategy and Action Plan<sup>v</sup></li> <li>Future Transport 2056<sup>vi</sup></li> <li>Better Placed<sup>vii</sup></li> <li>Draft Greener Places<sup>viii</sup></li> </ul> </li> <li>Assess the planning proposal's compliance against existing planning controls, including:</li> </ul>		

<ul style="list-style-type: none"> <li>○ Sydney Local Environmental Plan 2012</li> <li>○ Sydney Development Control Plan 2012</li> <li>○ State Environmental Planning Policy (State and Regional Development) 2011</li> <li>○ State Environmental Planning Policy (Infrastructure) 2007</li> <li>● Provide draft planning controls for incorporation into Sydney LEP 2012, including: <ul style="list-style-type: none"> <li>○ Zoning</li> <li>○ Maximum building height</li> <li>○ ESD targets</li> </ul> </li> <li>● Develop a design excellence strategy in line with the requirements of section 3.3.2 of Sydney DCP 2012 and the City of Sydney Competitive Design Policy<sup>ix</sup></li> <li>● Prepare an ecologically sustainable development (ESD) strategy with: <ul style="list-style-type: none"> <li>○ Commitments to achieve sustainability ratings benchmarks (Green Star, etc.)</li> <li>○ Specific energy efficiency and on-site renewable power initiatives</li> <li>○ Specific initiatives to achieve thermal comfort without reliance on heating or air conditioning</li> <li>○ Specific water saving and rainwater capture initiatives</li> <li>○ Consideration of the large rooftop area in achieving ESD outcomes.</li> </ul> </li> </ul>		
<p><b>Mapping</b></p> <ul style="list-style-type: none"> <li>● LEP mapping sheet – current and proposed</li> </ul>		
<b>Urban Design</b>		
<p><b>Urban Design Report</b></p> <p>The built form should be developed in line with the design process described in the NSW Government Architect Better Placed strategy.</p> <p>An urban design report should be provided to show how the design process resulted in the built form outcome, and specifically incorporate the following aspects:</p> <ul style="list-style-type: none"> <li>● A detailed site and context analysis</li> <li>● Opportunities and constraints mapping</li> <li>● A full review of design options</li> <li>● The urban design principles that underpin the proposed development</li> <li>● An assessment of the built form against the seven design objectives in Better Placed: <ul style="list-style-type: none"> <li>○ Better fit: Contextual, local and of its place</li> <li>○ Better performance: Sustainable, adaptable and durable</li> <li>○ Better for community: Inclusive, connected and diverse</li> <li>○ Better for people: Safe, comfortable and liveable</li> </ul> </li> </ul>		

<ul style="list-style-type: none"> <li>○ Better working: Functional, efficient and fit for purpose</li> <li>○ Better value: Creating and adding value</li> <li>○ Better look and feel: Engaging, inviting and attractive</li> <li>● A landscape concept plan, detailing the location and site coverage of deep soil, canopy cover and other landscaping. The landscape plan should have special consideration for rooftop uses, detailing any green roof plantings, solar panels, rainwater capture and passive recreation facilities</li> <li>● A view and visual impact assessment. Use eye level views from public parks and footpaths and compare to existing views. Include a map identifying all chosen view lines.</li> <li>● Proposed distribution of gross floor area, development yields, building typologies, building envelopes and heights.</li> <li>● Floor plans and built form detail to support gross floor area and development yield calculations</li> </ul> <p>The following urban design analysis should also be supplied to the City:</p> <ul style="list-style-type: none"> <li>● 3D CAD models to fit the City of Sydney's 3D CAD model. Consult with the City of Sydney to confirm technical requirements.</li> </ul>		
<p><b>Scale Drawings</b></p> <ul style="list-style-type: none"> <li>● Plans</li> <li>● Sections</li> <li>● Elevations</li> <li>● Perspectives</li> <li>● Envelope drawings</li> <li>● Indicative internal layout</li> <li>● Massing and structure plan options</li> </ul>		
<p><b>Survey Plan</b></p> <p>The survey plan needs to be to scale, showing relative levels to AHD and include details of adjoining development.</p>		
<p><b>Physical and Digital Models</b></p> <ul style="list-style-type: none"> <li>● CAD model compatible with the City's digital model</li> </ul> <p>Further information at:  <a href="http://www.cityofsydney.nsw.gov.au/development/application-guide/application-process/model-requirements">http://www.cityofsydney.nsw.gov.au/development/application-guide/application-process/model-requirements</a></p> <p>Contact the City's model team for further information:  <a href="mailto:model@cityofsydney.nsw.gov.au">model@cityofsydney.nsw.gov.au</a></p>		
<b>Technical Studies</b>		
<p><b>Traffic and Transport</b></p> <p>Prepare a transport impact assessment to understand the transport network context, service and network limitations. The assessment should include:</p>		

<ul style="list-style-type: none"> <li>• Existing and future land use and transport context</li> <li>• The current staff and visitor mode share of the site and future mode share target</li> <li>• Performance of the existing and future road network surrounding the site, accounting for both staff travel and truck movements</li> <li>• Trip generation potential associated with the proposal, with reference to existing trip generation of uses on the site</li> <li>• An assessment of the impact of additional travel and freight movement demands on the road network, using benchmarks from existing development sites of a similar scale and geographic context</li> <li>• Recommended parking rates for staff and visitors to result in no net additional traffic impact from private vehicles on the local road network</li> <li>• An overview of potential impacts from construction traffic.</li> </ul>		
<p><b>Trees and Canopy Cover</b></p> <p>Provide a plan for the retention of existing and provision of new trees that demonstrates consideration of:</p> <ul style="list-style-type: none"> <li>• The capacity of the urban design approach to protect existing trees and allow the growth of new trees</li> <li>• The provision of sufficient soil volumes and quality to provide for long-term tree health</li> <li>• Compliance with City of Sydney and NSW Government policies regarding trees and urban forest, including draft Greener Places, Urban Forest Strategy, Tree Management Policy, Street Tree Master Plan, Urban Ecology Strategic Action Plan and Landscape code<sup>x</sup>.</li> </ul>		
<p><b>Flooding, Stormwater and Water Quality</b></p> <p>Develop a flood risk assessment for the site, with reference to the City of Sydney's Interim Floodplain Management Policy<sup>xi</sup>, the Alexandra Canal Flood Study and Alexandra Canal Floodplain Risk Management Plan<sup>xii</sup>.</p> <p>Work with the City of Sydney to locate built form massing and sensitive uses with reference to 5% Annual Exceedance Probability, 1% Annual Exceedance Probability and Probable Maximum Flood mapping and data.</p> <p>Develop a Water Sensitive Urban Design (WSUD) to meet the objectives of:</p> <ul style="list-style-type: none"> <li>• Capturing and slowing down water movement during heavy downpour events</li> <li>• Capture rainwater for use on the site to reduce use of potable water</li> </ul>		

<ul style="list-style-type: none"> <li>• Meeting the water quality requirements of Sydney DCP 2012: <ul style="list-style-type: none"> <li>○ Reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%</li> <li>○ Reduce the annual pollutant load for total suspended solids by 85%</li> <li>○ Reduce the baseline annual pollutant load for total phosphorus by 65%</li> <li>○ Reduce the baseline annual pollutant load for total nitrogen by 45%</li> </ul> </li> </ul>		
<p><b>Geotechnical and Contamination</b></p> <p>Provide an assessment of the local soil, outlining its suitability for the proposed uses with respect to erosion, salinity and acid sulphate soils.</p> <p>Provide an assessment of the proposed land uses in accordance with State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55).</p> <p><b>Note:</b> In cases where land is potentially contaminated, the investigation and any remediation and validation work is to be carried out in accordance with guidelines made or approved by the EPA under Section 105 of the Contaminated Land Management Act 1997 and be in accordance with the requirements and procedures in the Contaminated Land Management Act 1997, Contaminated Land Management Regulation 2013 and SEPP 55.</p>		
<p><b>Utility Services and Infrastructure</b></p> <p>Prepare a utilities and infrastructure servicing report that outlines the development yield, peak demand and generation forecasts, staging information and a high-level assessment of the capacity of:</p> <ul style="list-style-type: none"> <li>• The electrical network requirements to service the development (including on-site generation and storage) and outline the likely impacts on the broader Ausgrid electrical network. This will include direct engagement with Ausgrid to provide early input and understanding of energy requirements, planned on-site generation, energy storage, and the visibility and location of network augmentation requirements.</li> <li>• Sydney Water’s network to service the development and the proposed servicing options considered for the development. Outline integrated water cycle management and potable water use reduction initiatives proposed.</li> </ul> <p>This report should identify the location of Ausgrid, Sydney Water and other services, assets or easements on the site and identify how the proposal will relocate or incorporate these.</p>		

<p>Integrate outcomes of the ESD strategy for energy and water saving initiatives.</p> <p>Ensure compliance with current utility design standards, with respect to undergrounding new and existing power, communication and other utilities on or adjacent to the site.</p>		
<p><b>Public Art</b></p> <p>Prepare a Public Art Plan in accordance with the City of Sydney Interim Guidelines for Public Art in Private Developments<sup>xiii</sup>.</p>		
<b>Development Outcome Data</b>		
<p><b>Development outcomes</b></p> <p>Existing condition:</p> <ul style="list-style-type: none"> <li>• Floor space by square metres and use</li> <li>• Existing dwellings, serviced apartments and hotel rooms</li> <li>• Existing car parking spaces</li> </ul> <p>Proposed outcome:</p> <ul style="list-style-type: none"> <li>• Floor space by square metres and use</li> <li>• Total number and mix of residential apartments</li> <li>• Total number of hotel rooms or serviced apartments</li> <li>• Total number of car parking spaces proposed</li> <li>• Value of capital works.</li> </ul>		

## Glossary

<sup>i</sup> Guide to preparing planning proposals – Department of Planning, Industry and Environment - <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/guide-to-preparing-planning-proposals-2019-02-05.pdf>

<sup>ii</sup> A metropolis of three cities: Greater Sydney Region Plan – Greater Sydney Commission - <https://www.greater.sydney/metropolis-of-three-cities/introduction>

<sup>iii</sup> Eastern City District Plan – Greater Sydney Commission - <https://www.greater.sydney/eastern-city-district-plan/introduction>

<sup>iv</sup> Sustainable Sydney 2030: Community Strategic Plan 2017-2021 – City of Sydney [https://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0011/288173/Adopted-Sustainable-Sydney-2030\\_Accessible-Version.pdf](https://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0011/288173/Adopted-Sustainable-Sydney-2030_Accessible-Version.pdf)

<sup>v</sup> Environmental Action 2016-2021 Strategy and Action Plan – City of Sydney - <https://www.cityofsydney.nsw.gov.au/vision/sustainable-sydney-2030/sustainability>

<sup>vi</sup> Future Transport 2056 – Transport for NSW - <https://future.transport.nsw.gov.au/plans/future-transport-strategy>

<sup>vii</sup> Better Placed – Government Architect of NSW - <https://www.governmentarchitect.nsw.gov.au/policies/better-placed>

<sup>viii</sup> Draft Greener Places – Government Architect of NSW - <https://www.governmentarchitect.nsw.gov.au/policies/greener-places>

<sup>ix</sup> Competitive Design Policy – City of Sydney - [https://www.cityofsydney.nsw.gov.au/\\_data/assets/pdf\\_file/0004/128065/Competitive-design-policy-adopted-09-December-2013.pdf](https://www.cityofsydney.nsw.gov.au/_data/assets/pdf_file/0004/128065/Competitive-design-policy-adopted-09-December-2013.pdf)

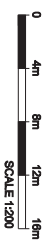
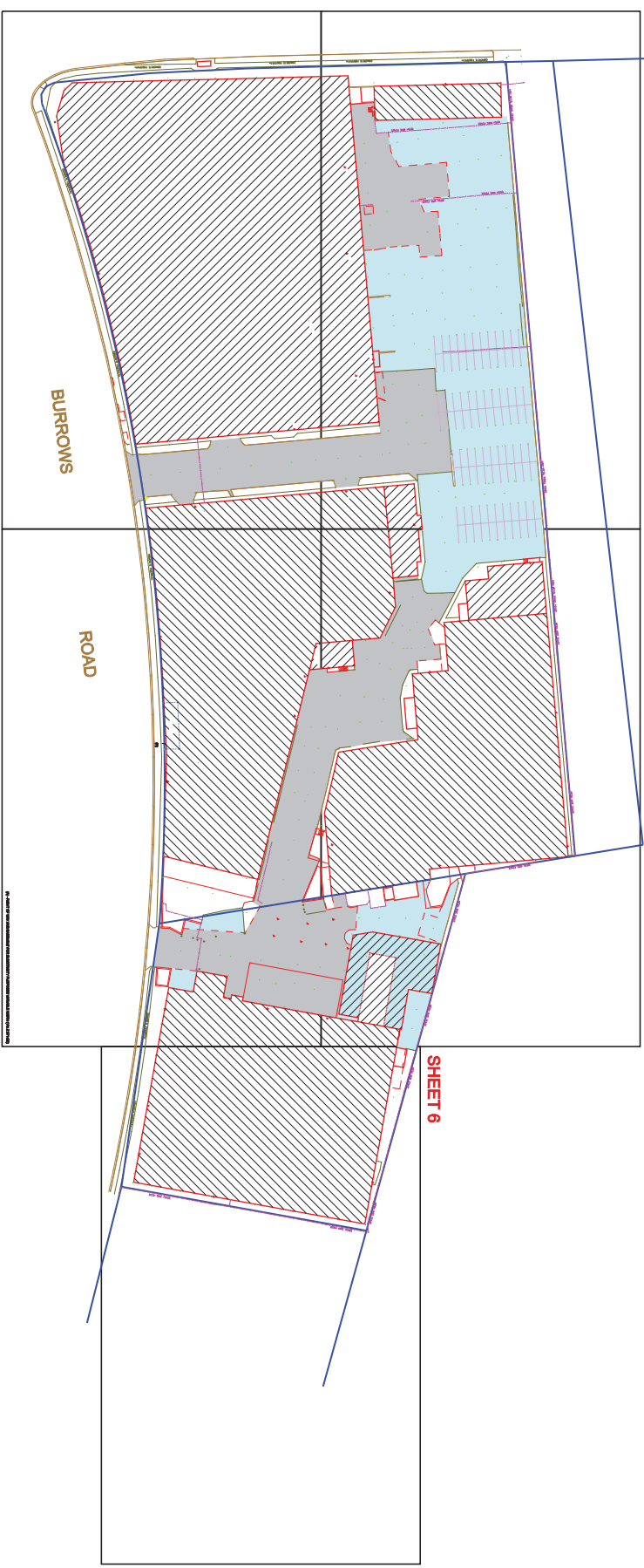
<sup>x</sup> City of Sydney tree policies <https://www.cityofsydney.nsw.gov.au/live/trees/urban-forest/tree-policies>



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- <sup>xi</sup> Interim Floodplain Management Policy – City of Sydney  
[cityofsydney.nsw.gov.au/ data/assets/pdf file/0004/157252/Interim Floodplain Management Policy.pdf](http://cityofsydney.nsw.gov.au/data/assets/pdf_file/0004/157252/Interim_Floodplain_Management_Policy.pdf)
- <sup>xii</sup> Alexandra Canal floodplain studies – City of Sydney  
<https://www.cityofsydney.nsw.gov.au/vision/better-infrastructure/floodplain-management/alexandra-canal-catchment>
- <sup>xiii</sup> Interim Guidelines for Public Art in Private Developments – City of Sydney  
- [https://www.cityofsydney.nsw.gov.au/ data/assets/pdf file/0005/139811/INTERIM GUIDELINES PUBLIC ART IN PRIVATE DEVELOPMENTS SEP2006.pdf](https://www.cityofsydney.nsw.gov.au/data/assets/pdf_file/0005/139811/INTERIM_GUIDELINES_PUBLIC_ART_IN_PRIVATE_DEVELOPMENTS_SEP2006.pdf)

# **Appendix C**

## **Existing Site Survey**



**IMPORTANT NOTE:**  
 This plan is prepared by CARDNO HARDS & FORESTAR from a combination of field survey and existing information. It is intended for use as a guide only and should not be used for any construction on the site. The relevant authorities should be consulted for any possible location of further underground services and detailed locations of all services shown on this plan. This note is an integral part of this plan.

NO	REVISION	DATE	DESCRIPTION	APPROVED
00		16-08-2015		

SCALE: HORIZ TO SCALE VERT:	A1
CONTR. MATERIAL: MAJOR: 0.2 MINOR: 0.1	
HORIZONTAL ORIGIN: MARK ADOPTEE: SSN 80269	
COORD. SYSTEM: MGA	
VERTICAL DATUM: BM ADOPTEE: PM 4328 RL: 2.818	

70-20 Princes Street  
 PO Box 175  
 Rockdale NSW 2216  
 T: (02) 8899 2146  
 E: survey@hardfor.com.au  
 WWW: www.hardfor.com.au

PROJECT: 1-3 BURROWS ROAD ALEXANDRIA  
 PLAN SHOWING DETAIL, LEVELS AND CONTOURS OVER LOT 11 & 12 DP 606797  
 GOODMAN PROPERTY SERVICES

**AREA LEGEND:**

[Blue hatched box]	ENTRANCE
[Grey hatched box]	CONCRETE SERVICES

**LEGEND:**

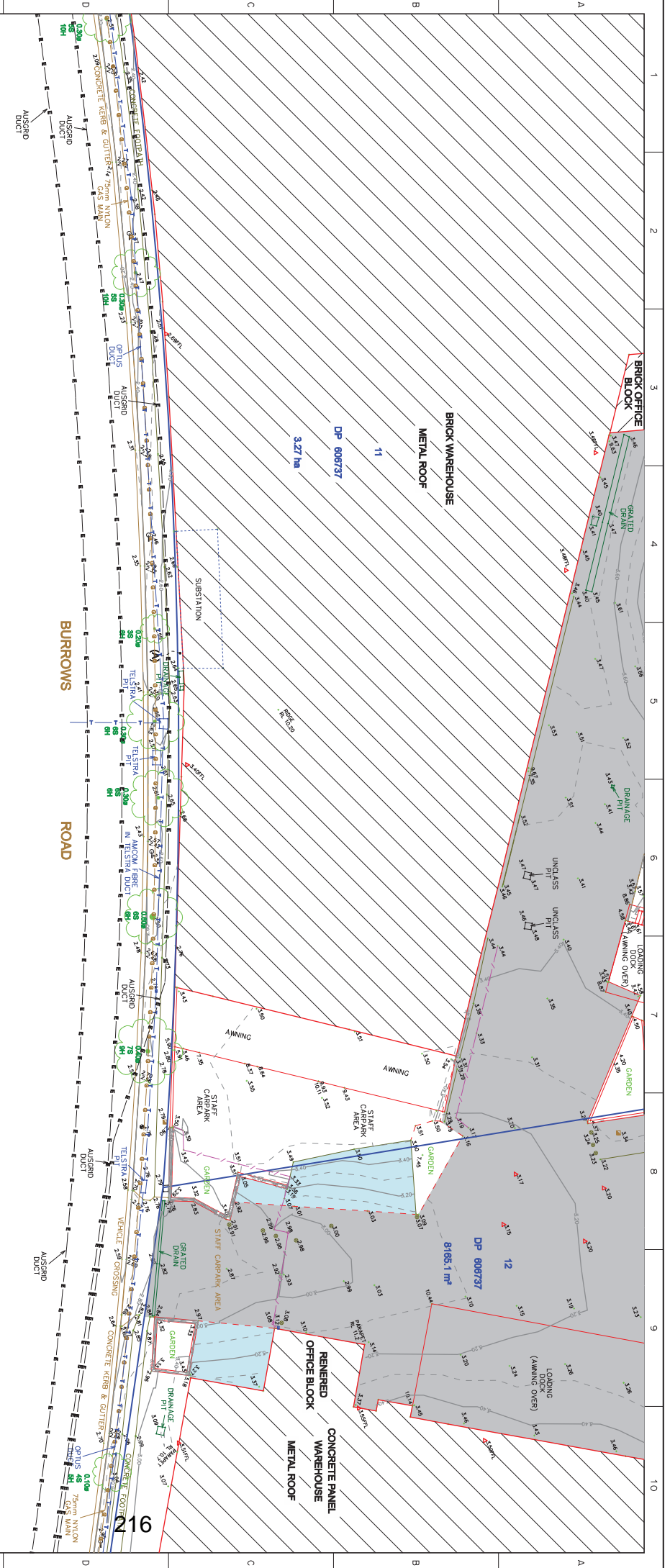
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[Symbol]	TELEPHONE
[Symbol]	UNDERGROUND
[Symbol]	VERTICAL

SHEET 1 OF 8	REV
DRAWING NUMBER	117708001
REV	00









**IMPORTANT NOTE:**  
 This plan is prepared by GOODMAN PROPERTY SERVICES from a combination of field survey and information provided by the owner. It is intended for use as a guide only and should not be used for any construction or other purpose. The site boundaries shown herein were not measured by the author of this plan and are shown for information only and not by field measurement.

A services search of the area surveyed has been conducted. No underground services were located. The plan is an integral part of this plan.

REVISION	DATE	DESCRIPTION	APPROVED
00	16-08-2015	ORIGINAL ISSUE	MC

SCALE	VERT.	HORIZONTAL
1:200	1:1	1:1

**Cardno**  
 Hard & Forestar  
 Shaping the Future

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PROJECT: 1-3 BURROWS ROAD ALEXANDRIA

PLAN SHOWING DETAIL, LEVELS AND CONTOURS OVER LOT 11 & 12 DP 606737

GOODMAN PROPERTY SERVICES

SHEET 5 OF 6  
 DRAWING NUMBER: REV  
 117708001 00

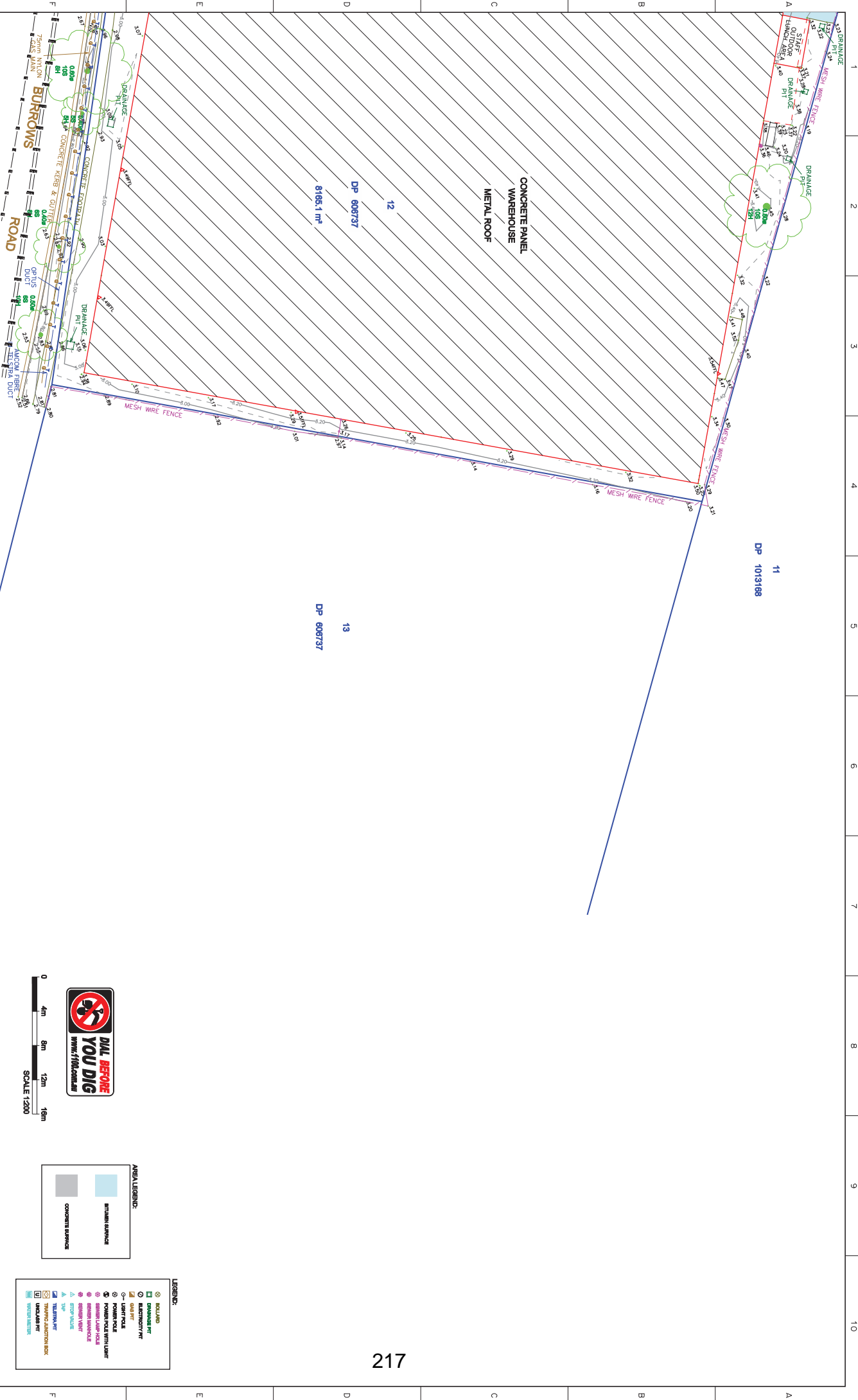
**AREA LEGEND:**

- INTHIN SURFACE
- CONCRETE SURFACE

**LEGEND:**

- BOUNDARY
- ELECTRICITY
- LIARTRIP
- POWER POLE
- SEWER
- SEWER MANHOLE
- SEWER VALVE
- STOP VALVE
- TELEPHONE
- TELEPHONE MANHOLE
- TELEPHONE VALVE
- UNCLASSED PIT
- UNCLASSED BOX
- UNCLASSED
- UNCLASSED

(A) - RIGHT OF WAY AND EASEMENT FOR ELECTRICITY PURPOSES VARIABLE WIDTH (VIA Z57482)



**IMPORTANT NOTE:**  
 This plan is prepared by GOODMAN PROPERTY SERVICES from a combination of field surveys and design. It is intended to be used for planning and design purposes only and should not be used for any other purpose. The site boundaries shown herein were not measured by the surveyor at the time of this plan. All dimensions are given as indicated.

A services search of the area surveyed has been conducted. While services shown herein have been provided where possible by field survey, the location of services shown is based on the best available information. The location of services and detailed locations of all services are shown as indicated on this plan. This note is an integral part of this plan.

REVISION	DATE	DESCRIPTION	APPROVED
00	16-08-2015		

SCALE: 1:200	VERT.:
CONTR. INTERVAL: 0.2	MINOR: 0.1
A1	
COORD. SYSTEM: MGA	MARK ADJUSTED: SSN 86269
VERTICAL DATUM: RL: 2.818	BM ADJUSTED: FM 4328

**Cardno**  
**Hard & Forestar**  
 Shaping the Future

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 E: survey@cardno.com.au, W: www.cardno.com.au

SUBMITTED: JJ  
 DRAWN: JC  
 CHECKED: JJ  
 PASSED: MC

PROJECT:  
**1-3 BURROWS ROAD ALEXANDRIA**  
**PLAN SHOWING DETAIL, LEVELS AND CONTOURS OVER LOT 11 & 12 DP 608737**  
 GOODMAN PROPERTY SERVICES

SHEET 6 OF 6  
 DRAWING NUMBER 117708001  
 REV 00



- AREA LEGEND:**
- ENTRANCE
  - CONCRETE SERVICE
- LEGEND:**
- BOUNDARY
  - ELECTRICITY
  - WATER
  - SEWER
  - TELEPHONE
  - POWER POLE WITH LIGHT
  - POWER POLE WITHOUT LIGHT
  - SEWER VALVE
  - STOP VALVE
  - TRIP VALVE
  - TELEPHONE CONNECTION BOX
  - WATER METER
  - VERTICAL METER