

Stormwater Upgrade Report for Overlander Hotel Development

New Carpark Extension

80216097

Prepared for
Briscoe Hotel Group

19 July 2016



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Executive Summary

Cardno has been engaged by Briscoe Hotel Group to provide report on the drainage aspect in support of a Development Application (DA) for the proposed carpark extension as part of the Overlander Hotel Development.

The focus of this report is the work required for extension of existing carpark including stormwater drainage, on-site detention, erosion and sediment control, and water quality. This report excludes drainage for new building, site grading, landscaping and carpark layout.

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1 Introduction

Cardno has been engaged by Briscoe Hotel Group to provide report on the drainage aspect in support of a Development Application (DA) for the proposed carpark extension as part of the Overlander Hotel Development. The site is located within the Penrith City Council (Council) Local Government Area (LGA).

1.1 Site Overview

The site located at 180 Richmond Road, Cambridge Garden. It is bounded to Richmond road on west, Boomerang Place on north and east, and Lewis Road on south as shown in Figure 1. The new carpark extension is proposed on western side of the lot.

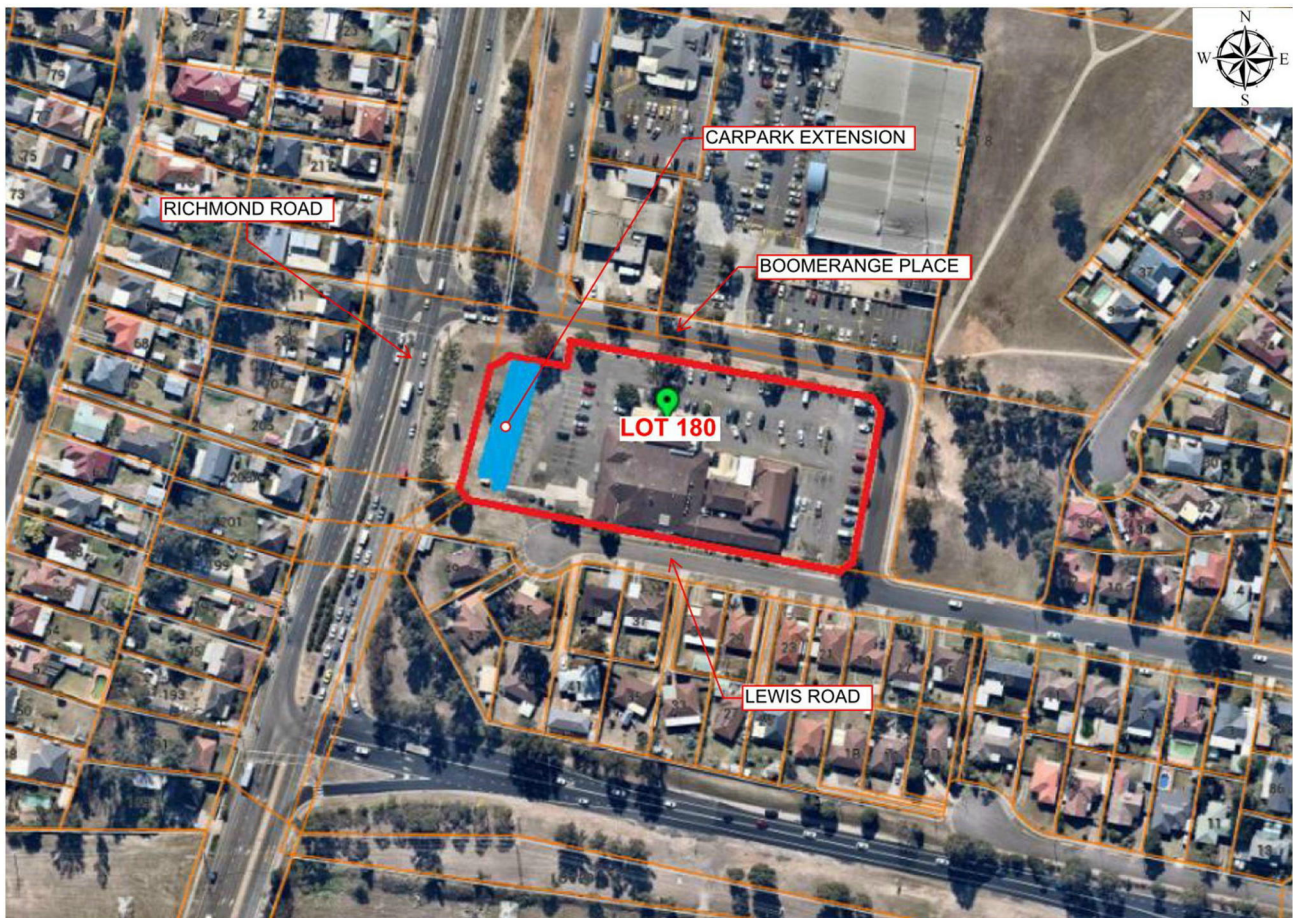


Figure 1: Locality Plan

2 Drawing List

This report is to be read in conjunction with the following drawings in Appendix A:

- 80216097-CI-1001 Cover sheet, Locality Plan and Notes
- 80216097-CI-1005 Erosion and Sediment Control Plan & Details
- 80216097-CI-1010 Drainage Detail Plan
- 80216097-CI-1015 Detention Tank and Drainage Details
- 80216097-CI-1020 Catchment Plan

3 Erosion and Sediment Control

Erosion and sedimentation controls will be installed and maintained in accordance with the council requirements and the NSW Department of Housing Manual, “Managing Urban Stormwater Soils & Construction” 2004 (i.e., the Blue Book) prior to any earthworks commencing on site.

The full sedimentation and erosion control strategy is presented within the Cardno drawing set *Overlander Hotel Stormwater Upgrade – New Carpark Extension*, Cardno, July 2016 (refer **Appendix A**).

Prior to any further earthworks commencing on site, all erosion and sediment control measures will be put in place generally in accordance with the above specifications. These measures will include:

- Establishment of a perimeter fence around the site as required;
- Installation of a temporary construction exit at the construction vehicle access point to the site;
- Installation of sediment fencing around disturbed areas;
- Installation of sandbag sediment traps in gutters and geotextile “filters” around stormwater inlet pits in the roads surrounding the site
- Catchment Plan

4 Stormwater Drainage

The existing carpark catchment is currently falling towards north-west of the lot and discharging to existing kerb inlet pit at Boomerang place. In the proposed drainage layout, this connection will remain. In addition, the stormwater from new carpark extension will be directed to OSD and will be discharged directly to existing kerb and gutter at Boomerang Place.

4.1 Stormwater Design Standards

The stormwater drainage system has been designed in accordance with the following guidelines and standards:

- Australian Rainfall and Runoff, 1999;
- Penrith City Council's Development Control Plan (DCP), 2014
- Penrith City Council's guideline 'Stormwater Drainage for Building Developments', 2013.
- AS/NZS 3500.3:2015

4.2 Stormwater Drainage System

The DCP requires on site detention facilities to be installed to reduce the peak flow leaving the site. The additional surface runoff generated as the result of the proposed development will be directed to a below ground OSD tank before discharging to Boomerang Place via a kerb outlet.

Following pre-lodgement advice from PCC Principal Planner Gavin Cherry (refer to Appendix E for pre-da minutes of meeting) OSD is provided for proposed carpark extension despite the fact that additional hardstand is less than 10% of the site impervious area. *PCC Stormwater Drainage for Building Developments* states 'once off minor works or additions that result in an increase in site impervious area of less than 10% or 100m² will not require OSD.', however, PCC have stated that if no OSD is provided, downstream network must be analysed to ensure there is no impact on drainage network. To avoid analysing the downstream network, OSD is provided for additional impervious area created by carpark extension.

The proposed works are categorised as 'Parking Areas' with following criteria:

- PSD 120L/s/ha
- SSD 280m³/ha

Therefore, considering the area of the carpark extension is 0.0566ha, the required site storage volume is 15.85m³; and permissible site discharge rate is 6.8L/s. Refer to Appendix C for OSD calculations.

The proposed OSD tank has a volume of 16.56m³. 55mm orifice proposed to allow peak flow discharge of 6.62L/s when water level is as high as 100 years ARI storm event.

The details of the OSD tank are shown in Drawing 80216097-CI-1015 and the OSD design checklist is in Appendix C.

An overland bypass flow route considered as part of the drainage design for the storm event larger than 100 year ARI or for emergency flow in case of orifice blockage. The bypass is via kerb weir and directs overflow towards existing kerb and gutter within Boomerang Place.

5 Stormwater Quality

The stormwater runoff from the carpark extension will be diverted to western side of the lot where passes through proposed broken kerb into a grass swale. The grass swale drains to proposed WSUD Chamber. The pit is located at upstream of OSD, refer to drawing 80216097-CI-1001 for details.

The WSUD chamber includes:

- SPEL Stormsack: Designed for the capture of gross pollutants: sediment, litter, and oil and grease. Ideally suited for municipal storm drain retrofits, the SPEL StormSack's design allows maintenance to be performed using conventional vacuum suction equipment.
- SPEL Filter is a cartridge filter system that incorporates an upflow treatment process, through a spiral wrapped media configuration that maximises surface treatment area. Flow through the filter cartridges utilises a self-regulating siphon which results in a low maintenance and high performance stormwater treatment.

5.1 Stormwater Quality Design Standard

The water quality measures has been designed to comply with the following guidelines:

- Penrith City Council's WSUD Policy, 2013
- Penrith City Council's WSUD Technical Guidelines, 2015
- Australian Rainfall and Runoff, 1999;
- Penrith City Council's Development Control Plan, 2014
- Penrith City Council's guideline 'Stormwater Drainage for Building Developments, 2013.

5.2 Objectives

Based on *Penrith City Council's Development Control Plan*, the post development pollutant reduction targets are as follows:

- Gross Pollutants 90%
- Total Suspended Solids 85%
- Total Phosphorus 60%
- Total Nitrogen 45%.

5.3 MUSIC Modelling

MUSIC is a continual-run conceptual water quality assessment model developed by the Combined Research Centre for Catchment Hydrology. MUSIC is used to verify the stormwater quality management strategy for the development with following set up:

- The rainfall data used in the model is based on rainfall station 67113 Penrith Lakes AWS with time steps as low as 6 minutes to allow accurate modelling of treatment device.
- The details of industry treatment devices utilised in the model is supplied by manufacturer

MUSIC modelling parameters adopted from *PCC Water Sensitive Urban Design (WSUD) Policy*. The MUSIC file is provided as part of this report.

The pollutant reductions achieved at the outlet are:

- Gross Pollutants 100%
- Total Suspended Solids 96%
- Total Phosphorus 79%
- Total Nitrogen 61%.

6 Services

Based on the current site usage and information from service authorities, it is not anticipated servicing the development will require relocation works.

Following site inspection, an existing electrical pit identified outside the site boundary on north-west of the lot. This pit is not detected in DBYD information and requires further investigation.

7 Conclusion

A preliminary stormwater design has been undertaken. The design has been developed in accordance with discussion with council, the council guidelines and the relevant Australian Standards.

Stormwater runoff from the proposed carpark extension will be treated to achieve PCC water quality requirements and managed through a blow ground OSD tank to achieve PCC storage requirements.

The key outcomes documented within this report include:

- Proposed 16.56m³ OSD
- 15m of grass swale
- Water treatment units including:
 - SPEL Filter
 - SPEL Stormsack

Stormwater Upgrade Report for Overlander Hotel
Development – New Carpark Extension

APPENDIX

A

DRAWINGS

Stormwater Upgrade Report for Overlander Hotel
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APPENDIX

B

MUSIC MODEL

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APPENDIX

C

OSD CALCULATION

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APPENDIX

D

STORMWATER CONCEPT PLAN CHECK LIST

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APPENDIX

E

PRE-DA MINUTES OF MEETING