

Our Ref 80816199 IMPv02

Contact Peter Waugh



14 July 2016

HEALTH INFRASTRUCTURE
C/- ROOT PROJECTS AUSTRALIA PTY LTD
Level 5 Kyle House
27-31 Macquarie Place
SYDNEY NSW 2000

Attention: Mr John Cole Clark – Project Manager

Dear Sir

RE: FORENSIC PATHOLOGY AND CORONER COURT (FPCC)
SEAR APPLICATION – INTEGRATED WATER CYCLE MANAGEMENT PLAN
(CIVIL AND STORMWATER)

Cardno (NSW/ACT) Pty Ltd
ABN 95 001 145 035

Level 9, The Forum
203 Pacific Highway
St Leonards New South Wales 2065
PO Box 19
St Leonards New South Wales 1590
Australia

Telephone: 02 9496 7700
Facsimile: 02 9439 5170
International: +61 2 9496 7700

Web: www.cardno.com.au

At your request Cardno has prepared an integrated Civil & Stormwater Management Plan to be read in conjunction with the following:

- Warren Smith + Partners Hydraulic and Fire Services Infrastructure Management Plan.
- Jacobs SEAR application of key issues item 10 “utilities” describing electrical, communications and proposed ICT Infrastructure.

Civil Infrastructure

The 7.71 ha site is currently serviced by aged open channel drainage infrastructure which discharges under Joseph Street into Carnarvon Golf Course. The proposed FPCC site is 1.75ha of which 1.3ha is developed with approximately 125m of access road off Weeroona Road.

- The site is not flood affected as advised by others but has significant overland flow traversing through it. It is within the Haslams Creek Catchment Creek which is locally flood affected closer to its outlet and has been subject to a number of flood assessments so development upstream is sensitive to downstream flooding impacts. PMF flood level has been estimated as RL24.98 at Carnarvon Golf Course Basin from flood contour maps developed by Bewsher Consulting Pty Ltd, and unverified Council update by Haskoning Australia.
- Storm water to be collected and controlled within the development property for major and minor events prior to entering Council system. Detention requested by Council *“to ensure peak flow rates at any point within the downstream drainage system do not increase as a result of the development during all storm events up to the 100 year ARI”*. As the site is to be consolidated, drainage easements and/or controls would be limited to inter-allotment flows and ultimate discharge point(s).

Australia • Belgium • Canada • Colombia • Ecuador • Germany • Indonesia •
Kenya • New Zealand • Nigeria • Papua New Guinea • Peru • Philippines • Singapore •
United Arab Emirates • United Kingdom • United States • Operations in over 100 countries

- The site drains to Nottingham Road local drainage system via the Carnarvon Golf Course where a detention pond exists. A critical culvert under Joseph Street exists which our new drainage will be directed to and we will ensure the culvert does not need to be upgraded. Detailed survey and hydraulic analysis has confirmed capacity and performance in the design events of 1 in 20 year and 1 in 100 year AEP storms
- Cardno Water Engineering consultants have performed an overland flow flood analysis for the 1 in 20, 1 in 100 years and PMF flows for the catchment upstream of Joseph Street which includes the following contributory areas:

Botanica site immediately to the East of the precinct

Weeroona Road pit inlet discharge

Juniperina Juvenile Justice Centre and Sunning Hill School

Portion of adjacent railway corridor.

Both existing and future conditions have been checked and the results of this analysis are available.

The recommendations of this overland flow flood study note that after extension of the existing RMS box culvert underneath Joseph Street (existing 1500 x 600) with a 1500mm wide x 600mm high (clear) box culvert within the site, no significant alteration in overland flow flood levels exist at the southern end of the FPCC development provided it is not filled. The future precinct stormwater strategy is to be ascertained with options presented to check extent of future proofing in the current stage to facilitate the next stages with minimal or no disruption to the FPCC drainage infrastructure. Detention maybe required for the full Stage 3 Precinct development.

Overland flow from the north of the site for events up to the 1:100 year storm will be diverted around the new development building and carpark with the help of drainage kerbs, swales and diversion channels to ensure overland flow protection up to extreme events for the adopted building level of RL35.85.

The Staged Precinct Infrastructure Plan would dictate the following civil stormwater approach:

- **Stage 1**

Constructing an underground pipe network from the FPCC development site via a stormwater quality treatment discharge device to the new 1500mm x 600mm deep box culvert extension from Joseph Street box culvert inlet.

The treatment device would reduce gross pollutants suspended solids, total phosphorus and total nitrogen and to acceptable council requirements. Maintenance access to the device is required to remove and clean collected solids. Please refer to attached Appendix 'A' for stormwater quality MUSIC modelling proposed for the development.

The new culvert will have 6 drainage inlet points and overland flow inlet pits incorporated for this and future development.

- **Future Stages**

Construction of a network of drainage pits and pipes as the development proceeds with amplification of the proposed culvert on a pre-determined route and detention as required for the future impermeable areas.

A treatment device would form part of the layout servicing total precinct inflows. Maintenance access to the device is also required as noted in Stage 1.

The remaining portions of the aged open channel drainage infrastructure would be renewed as a box culvert and covered designed for a 1% average exceedance probability storm (1 in 100 year recurrence interval) and overland flow strategy for blockage and extreme events including ponding areas or enclosed storage .

Roads

Roads and carpark will be engineered flexible pavements, (asphalt wearing surface and unbound/bound base courses) bearing on compacted subgrade with select concrete areas or asphalt covered concrete sub bases. They will be graded to drain to kerb, gutters and pits to the precinct drainage network.

A commercial crossover at the boundary with Weeroona will be required up to 12.2m wide with general internal private road width 6.5 m suitable for cars, rigid trucks and occasional 19m long semi-trailers. Heavy Vehicle 12.5 m long truck access and occasional 19 m long semi-trailer usage. This assumes two way and inter-visibility possible throughout with nominal road widening to 7.4 m (or larger) for radius curves less than 49 m.

Public access from Main Avenue is proposed through dedicated cross overs into the front main entrance of the new FPCC facility.

Car parking and Back of House (BOH)

The public carpark will be compliant with AS 2890.1 off Street Car parking Code and will be a Class 3 carpark (short term city and town center parking, parking stations, hospitals and medical centers) for 90 degree car parking 2.6 m wide spaces x 5.4 m long with 5.8 m wide aisles. Disabled spaces to comply with AS 2890.6. Envisaged usage of up to 100 cars per day.

Dedicated staff car parking can be Class 1 with 2.4 m wide spaces x 5.4 m long with 6.2 m wide aisles.

The Staff carpark driveway and spaces immediately adjacent to the BOH area will be used temporarily for semi-trailer turning paths and therefore this pavement is locally upgraded for this proposed function.

The container storage area will be broom finished concrete to receive container foot seats to maximum 2% gradients.

Edge protection of all roads and car parking areas will be provided for vertical drops in excess of 600mm.

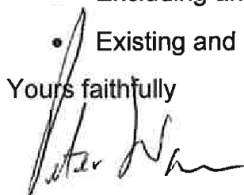
Disabled access will be compliant with the provisions of AS 2890.6. All pavements to be designed in accordance with Austroads guidelines

The Hydraulic Management Plan indicates a Sydney Water Sewer affects a portion of the site and a strategy is articulated to construct adjacent to or provide a new service to maintain adjacent hole. The Utilities management plan indicates existing, substations exist with easements and proposed kiosk substation will be required in the FPCC precinct with Right of Way to service same.

Reference to the in divided reports by WSP and Jacobs should be made to identify the following infrastructure

- Sewer Drainage Service
- Domestic Cold Water Service
- Natural Gas
- Existing and Proposed Electrical Site Articulate
- Existing and Proposed ICT Infrastructure.

Yours faithfully



Peter Waugh
Senior Partner
for **Cardno (NSW/ACT) Pty Ltd**

APPENDIX A

Stormwater Quality Report

Forensic Pathology and Coroners
Court

80816199

Prepared for
Health Infrastructure

23 June 2016



Contact Information

Cardno (NSW/ACT) Pty Ltd
Trading as Cardno
ABN 95 001 145 035

Level 3, Suite 34
207 Albany Street North
GOSFORD NSW 2250

Telephone: 02 4320 1000
Facsimile: 02 4324 3251

gosford@cardno.com.au
www.cardno.com

Author(s):

Jason Stewart
Environmental Engineer

Approved By:

Scott Brisbin
Civil Design Manager

Document Information

Prepared for Health Infrastructure
Project Name Forensic Pathology and Coroners Court
Job Reference 80816199
Date 23 June 2016

Version Number 1

Effective Date 23 June 2016

Date Approved: 23 June 2016

Document History

Version	Effective Date	Description of Revision	Prepared by:	Reviewed by:
1	23 Jun 16	For approval	Jason Stewart	Scott Brisbin

© Cardno. Copyright in the whole and every part of this document belongs to Cardno and may not be used, sold, transferred, copied or reproduced in whole or in part in any manner or form or in or on any media to any person other than by agreement with Cardno.

This document is produced by Cardno solely for the benefit and use by the client in accordance with the terms of the engagement. Cardno does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by any third party on the content of this document.

Table of Contents

1	Stormwater Targets	1
2	MUSIC Model	2
2.1	Base Information	2
2.2	Source Nodes	2
2.3	Treatment Nodes	2
2.4	Humes Humegard	2
2.5	Humes Humeceptor	2
2.6	Humes JellyFish	2
2.7	Rainwater Tank	3
2.8	Results	3

Tables

Table 1-1	Pollutant Removal Rates	1
Table 2-1	Summary of MUSIC Model Results	3

1 Stormwater Targets

Auburn Council's stormwater requirements are detailed in 'Stormwater Drainage' chapter of the Auburn Development Control Plan 2010.

Section 2.4 notes that silt arrestors are required within car parking areas and oil arrestors are required in industrial and commercial car parks where 10 or more parking spaces are provided.

Section 7.1 notes that for all developments, rainwater tanks or a water reuse device must be incorporated into the stormwater drainage system with a minimum storage size of 10,000L for a site area greater than 1,500sqm.

Specific pollutant removal rates for developments are not provided within DCP2010. It is typical, however, to achieve, as a minimum, the following pollutant removal rates as presented in Table 1-1.

Table 1-1 Pollutant Removal Rates

Pollutant	Minimum Reduction
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	45%
Total Nitrogen (TN)	45%
Gross Pollutants	80%

2 MUSIC Model

2.1 Base Information

The MUSIC model was prepared in computer model Version 6.1 (Build 0.767) in accordance with the Draft NSW MUSIC Modelling Guidelines, August 2010.

Meteorological stations near the development site were reviewed in reference to distance from the development site, completeness of data record, dates of data record and type of data record.

Historical pluviograph data was taken from Meteorology Station Number 067035 at Liverpool (Whitlam Centre) via the Parramatta Council 'MUSIC-Link' data. The station is approximately 13km from the site and includes 10 years of 6 minutes rainfall data from 1/1/1967 to 31/12/1976. Evapotranspiration was adopted per the MUSIC-LINK data.

2.2 Source Nodes

Pollutant loads for source nodes were adopted from Table 3-9 and 3-10 of the NSW MUSIC Modelling Guidelines.

Stochastic pollutant generation was selected.

2.3 Treatment Nodes

Three treatment nodes are proposed as part of the water cycle treatment train:

- > Humes Humegard
- > Humes Humeceptor
- > Humes Jellyfish

2.4 Humes Humegard

A Humes Humegard primary treatment device is proposed for the main car park areas (staff and public) to target gross pollutants, coarse sediments and attached TN and TP. The Humegard treatment node within the MUSIC model was provided by Humes.

2.5 Humes Humeceptor

A Humes Humeceptor secondary treatment device is proposed for the northern car park to target hydrocarbons, fine suspended solids and attached TN and TP. The Humes Humeceptor treatment node within the MUSIC model was provided by Humes.

2.6 Humes JellyFish

A Humes 'JellyFish' stormwater treatment device is proposed to reduce suspended solids and nutrient levels in the site's stormwater runoff. The JellyFish product provides effective treatment over a very small footprint.

The JellyFish is available in a number of configurations. The JellyFish treatment node within the MUSIC model was provided by Humes. A JellyFish model JF3600-24-5 was selected to provide suitable treatment of stormwater.

2.7 Rainwater Tank

As noted above, Auburn Council requires the provision of a 10,000L rainwater tank for sites greater than 1,500sqm. Due to ongoing maintenance costs the inclusion of a rainwater tank has been omitted at the instruction of Health Infrastructure. The above treatment devices have been sized appropriately to meet the nominated water quality treatment targets without the need for a rainwater tank.

2.8 Results

Results of the MUSIC model show the nominated treatment train exceed the nominated pollutant removal targets. The table below presents a summary of the MUSIC model results.

Table 2-1 Summary of MUSIC Model Results

Pollutant	Minimum Reduction	Achieved Reduction	Comments
Total Suspended Solids (TSS)	80%	81.5%	Treatment exceeds minimum
Total Phosphorus (TS)	45%	63.7%	Treatment exceeds minimum
Total Nitrogen (TN)	45%	53.8%	Treatment exceeds minimum
Gross Pollutants	80%	81.5%	Treatment exceeds minimum

The above results demonstrate compliance with the minimum pollutant reduction targets.