Appendix K

Civil Engineering Brief

CIVIL ENGINEERING BRIEF

For

MILESTONES 5 & 6 (CONCURRENT WORKS)
LIVERPOOL HOSPITAL REDEVELOPMENT

REPORT NO. R00218.A

REVISION A

AUGUST 2008

PROJECT DETAILS

Property Address:	Liverpool Hospital Elizabeth St, Liverpool, NSW
Development Proposal:	Milestones 5 & 6 (Concurrent Works) Liverpool Hospital Redevelopment

REPORT CERTIFICATION

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DOCUMENT CONTROL

REVISION	ISSUE DATE	ISSUED TO	ISSUED FOR
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1. INTRODUCTION

1.1. General

This engineering report has been prepared to supplement the proposed Project Application for Concurrent Works (Milestones 5 and 6) to the Department of Planning.

This report addresses civil engineering design aspects of the re-development, including geometric road design, on-grade car parks, pavement, site grading, stormwater, water quality controls, and other works external works associated with the hospital re-development.

1.2. Design Standards and Codes

The concurrent works will be designed in accordance with the latest issue of all relevant design standards, codes and other statutory and authority requirements. As a minimum requirement, the design will be based on but not limited to:

- Liverpool City Council's Guidelines for Engineering Works for Subdivisions and Developments – Part 1 (Design)
- Liverpool City Council's Guidelines for Engineering Works for Subdivisions and Developments – Part 2 (Construction)
- Managing Urban Stormwater: Soils and Construction Manual
- Australian Rainfall & Runoff
- Australian Water Quality Runoff
- AS 3500.3 Stormwater Drainage
- AS 2890.1 Off Street Car Parking
- AS 1428.1 Design for Access and Mobility
- AS 2890.2 Commercial Parking Facilities
- AS 1742 Manual of Uniform Traffic Control Devices
- New South Wales Roads & Traffic Authority (RTA) – Road Design Guides
- New South Wales Roads & Traffic Authority (RTA) Traffic Control at Worksites manual
- AustRoads - *Guide to Traffic Engineering Practice*

- Austroads – Pavement Design, A Guide to the Structural Design of Road Pavements
- Austroads – Pavement Design for Light Traffic: Supplement to Austroads Pavement Design Guide

2. THE DESIGN BRIEF

2.1. Bulk Earthworks and Retaining Walls

Bulk earthworks will be designed to achieve as close to a balanced cut to fill as practical given the final building and road levels.

Retaining walls and batter slopes (permanent and temporary) will be designed based on the recommendations contained with the project's geotechnical report.

2.2. Accesses and Carparks

Design and document the new external roads (within the hospital site) adopting the approved masterplan arrangement but revised so that the road geometry generally complies with Liverpool Council's standard and roundabout geometry to generally comply with Austroads standards.

Roads and carpark areas will be designed to comply with the requirements of Council, AS2890.1 Off Street Parking Facilities and AS2890.2 Commercial Parking Facilities.

Swept turning paths of Heavy Rigid Vehicle (HRV) have been applied in the design of the roads. No Articulated Vehicles (AV) are considered in the design.

Design and document traffic control staging plans will be prepared in accordance with the RTA's Traffic Control at Worksites manual, as part of the civil works design. This will allow staging of the construction works while maintaining vehicular access to hospital facilities during construction of the civil works.

2.3. Pedestrian Walkways and Site Grading

The external work also includes design and documentation of the proposed pedestrian walkways and footways within the hospital site. Locations and surface treatments of these features are as per the plans prepared by architect and landscape architect.

Design of these footpaths will be in accordance with AS 1428.1 – Design for access and Mobility and in consideration of disable access requirements. The grading of the site will also to ensure that the areas are adequately drained.

The work also includes design and documentation of pedestrian control staging plans in accordance with the RTA's Traffic Control at Worksites

manual, as part of the civil works design. This will allow staging of the construction works while maintaining pedestrian access to hospital facilities during construction of the civil works.

2.4. Pavement Design

Flexible (Asphaltic Concrete) pavements are proposed for the road and carpark areas. Rigid (Concrete) pavements will be considered for ramps and other areas with regular heavy vehicle activity and turning movements.

Other pavement types such as pavers and decorative finish as proposed by the architect will be structurally design to withstand the designated traffic loadings.

All pavement thicknesses will be designed in accordance with Austroads – Pavement Design, A Guide to the Structural Design of Road Pavements including the supplementary guide; as appropriate, and in conjunction with the recommendations contained within the project's geotechnical report.

Pavements will be designed for the following loadings and design life:

	Equivalent Standard Axles (ESA's)	Design Life (Years)
Road – Light Traffic (Flexible Pavement)	5×10^5	20
Road – Heavy Traffic (Rigid Pavement)	2×10^6	40
Carpark (Flexible Pavement)	1×10^5	20

2.5. Stormwater Drainage

Stormwater drainage for the site will be designed to collect and convey stormwater drainage via a conventional piped stormwater drainage system for storm events up to and including a 1 in 20 year Average Recurrence Interval (ARI) storm event.

Provision will be made for the safe conveyance of storms via overland flow paths for storm events up to the 1 in 100 year ARI storm event.

Adequate freeboard will be provided within the overland flowpaths to allow some protection from overland flows generated from storm events larger than a 1 in 100 year ARI event.

Stormwater pollution control devices will be incorporated into the site stormwater drainage system to assist with the removal of sediment, oils and hydrocarbons from stormwater runoff from the road and carpark areas.

2.6. Flooding

A Section 149 Flood Certificate has been applied for with Liverpool Council to verify that the Georges River flood levels that SKM's report "Liverpool Hospital Redevelopment Stage 2 – Stormwater & Flooding Assessment Report (5 November 2007)" stated are appropriate and consistent with Council's flood information for the hospital site.

It was confirmed that the following are the flood levels at the Liverpool Hospital Site:

- Probable Maximum Flood (PMF) RL 10.9 (AHD)
- 1 in 100 ARI Flood (1%AEP Flood) RL 8.8 (AHD)

Finished floor levels for all proposed buildings will be reviewed to confirm that they are sufficiently higher (i.e. adequate freeboard) than either the PMF or 1%AEP Flood as appropriate as per the recommendations made in SKM's report "Liverpool Hospital Redevelopment Stage 2 – Stormwater & Flooding Assessment Report (5 November 2007)"

All openings to basement and undercroft areas will be reviewed and the external civil works will be designed to sufficient reduced levels, providing bunding, to ensure that these areas are protected from inundation during flood events.

The civil engineering design will consider the effects of the proposed development on existing flood regimes within the catchment. A review of the available flood studies, flood plain risk management plans and other literature will be conducted in the design and if considered appropriate, compensatory measures will be recommended and provided for within the design to minimise (i) loss of flood storage and (ii) changes to flood levels and velocities within the catchment.

2.7. Sediment and Erosion Control

Temporary sediment and erosion control measures will be designed to be incorporated into the construction works and sequencing of the project to ensure that the proposed construction activities on site to not pollute local drainage systems nor have a detrimental effect on downstream waterways.