FRASERS PUTNEY
VICTORIA ROAD, RYDE, NSW

Civil Engineering Design Report - Stage 1 Phase 1

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Project no: 104479-04
Revision: 01
Date of Issue: 17 February 2011

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Document status

Rev. no.	Document purpose	Project Engineer(s) / Scientist(s)	Reviewer	Approved for issue		
				Approved by	Signature	Date
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1 INTRODUCTION

1.1 Purpose of Report

Meinhardt Infrastructure and Environment Pty Ltd have been engaged by Frasers Putney Pty Ltd to undertake the design and documentation of the civil engineering works for the proposed redevelopment at the Frasers Putney, Ryde, NSW.

1.2 The Site

Royal Rehabilitation Centre Sydney (RRCS) currently occupies a 17.8 ha site bounded by Morrison Road, Princes Street, Victoria Road and generally Charles Street Ryde.

The site is generally undulating terrain however generally falls to the middle of the site near Linley Way, where the land then falls south towards the lowest point of the site near Charles Street and Henry Street. The highest parts of the site are generally located near Victoria Road and also near the intersection of Princes Street and Morrison Road.

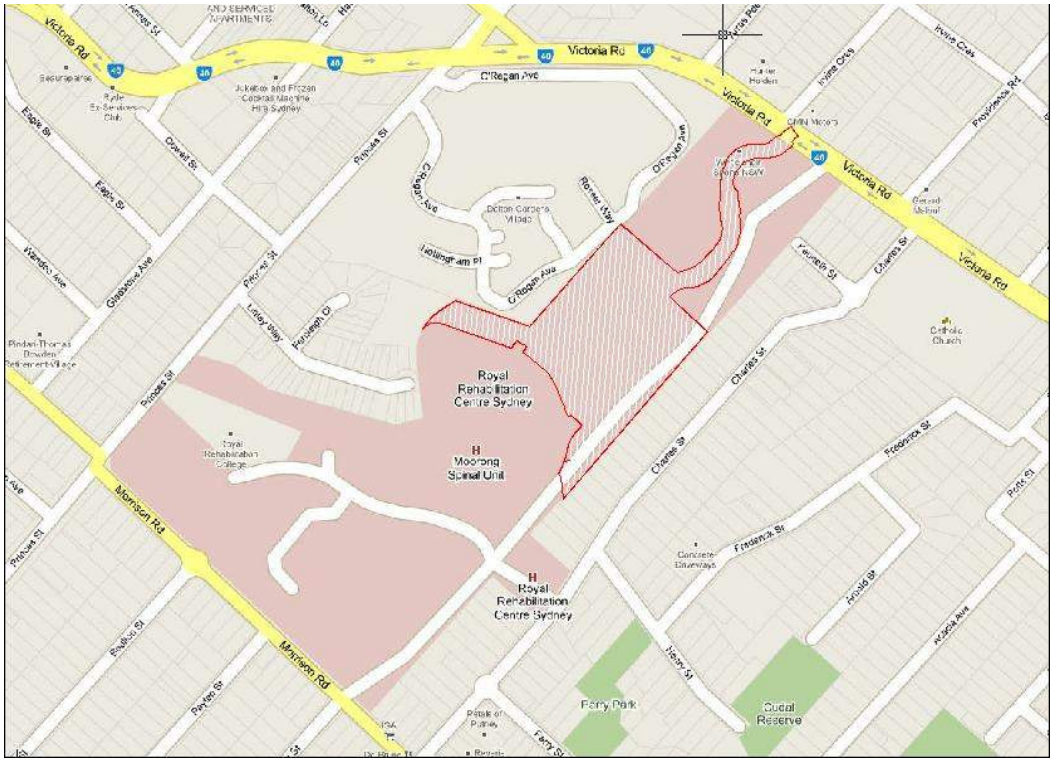

Figure 1 – Locality Plan

1.3 Project Background

Frasers Putney is located on the former Ryde Rehabilitation Centre Sydney, on Victoria Road Ryde which comprises a site area of around 17.8 ha. The site has been in operation as a rehabilitation centre since 1899, and RRCS are proposing to relocate into new premises on a 2 ha facility on the site near Morrison Road.

To date RRCS has undertaken extensive planning and consultation to conceptually plan the site into a residential community with mixed use of medical and community facilities. Concept Plan approval was obtained from the Minister for Planning on 23 March 2006 and the Part 3A approval on the 16 December 2008.

Frasers Putney Pty. Ltd propose to develop the remainder of the RRCS site which comprises 15.8 ha of proposed residential development consisting of approximately 791 dwellings. The development of 15.8ha will be known as Frasers Putney and will include residential buildings and infrastructure works for associated future residential occupancy.

1.4 The Development

The proposed development comprises residual land of 15.8 hectares being developed into a residential subdivision for up to 791 dwellings including roads, parkland, community and recreation centre and infrastructure services.

The residential component will:
- Apartment buildings
- Townhouse developments:
- Detached Houses

It is envisaged the development will be constructed in several stages with stage 1 being the eastern precinct located between Victoria Road and the central park. This stage will further then be developed in 4 phases. Construction of the first stage of the residential development will include about 118 dwellings comprising 60 apartments, 58 townhouses and detached dwellings.

1.5 Proposed Design

Meinhardt have completed preliminary design of the roads, earthworks, footpaths and stormwater system within the roadways to enable spatial planning of the site. For further information please refer to the drawings attached in Appendix A. Further detail design of these elements will be required in the future to finalise road geometry and levels; earthworks; cut and fill volumes as well as stormwater pipe and pit sizes and levels.

1.6 Statutory Requirements & Standards

The Civil works have been designed in accordance with the following relevant legislation, acts, standards and references:

- AMCORD - A National resource document for residential development referenced in the Deed of Agreement between RRCS and Ryde Municipal Council
- RTA Road Design Guide, all parts
- AUSTROADS – Guide to Traffic Engineering Practice
- AUSTROADS – Design Vehicles and Turning Path Templates

- Australian Standards:
  - AS2890. 1 – Off Street Parking
  - AS2890. 2 – Commercial Vehicle Facilities
  - AS2890. 5 – On-Street Parking
- Australian Rainfall and Runoff (AR&R) 4th Edition.
- Managing Stormwater: Soils and Construction 4th Edition Volume 1, Landcom 2004 (Blue Book)
- Managing Urban Stormwater Guidelines, Department of Housing (2004)
- Ryde Council's Development Control Plan 2010, and Engineering Requirements.

2 PROPOSED DESIGN

2.1 Erosion & Sediment Control

The erosion and sediment controls for the development will be designed in accordance with the following documents - “Managing Urban Stormwater – Soils and Construction” NSW Department of Housing (1998), and Ryde City Council’s Engineering Requirements.

As a guide the contractor will install the erosion and sediment controls in accordance with the preliminary drawings attached in Appendix A.

It is proposed the following erosion and sedimentation facilities will be provided during construction.

Erosion prevention

- Diversion drains will be provided on the perimeter of the site to divert upstream flows around the site and work area in order to prevent soil loss on site.
- Topsoil stockpile locations will be located to minimise soil loss and will also be surrounded by sediment fences.
- Batter lengths and slopes will be constructed and stabilised to reduce erosion potential.
- Check dams will be used to reduce runoff velocities.
- Existing trees to be retained will be protected.
- Exposed soils will be revegetated.
- Disturbed areas will be revegetated and stabilised according to landscaping details.

Sediment control

- Silt fences around the perimeter of and through the site will be used to minimise soil disturbance and will contain sediment within the site.
- A stabilised site access point including a shaker grid will minimise soil loss from vehicles exiting the site.
- Proposed stormwater inlet pits will be protected with inlet filters.
- Catch drains will be provided on site to direct stormwater runoff to the sediment basin.
- Temporary sediment basins will be provided during construction to reduce the potential for sediment pollution being transported to the adjacent pond.
- Gross Pollutant Traps (GPT) will be installed in the stormwater system so as to reduce litter, sediment and pollutants leaving the development.
- A large portion of the site will drain to the proposed central pond which will allow finer sediments to settle as well as removal of some nutrients.

2.2 Earthworks

The site generally grades towards the centre of the site, near Linley Way and the proposed park and pond.

Bulk earthworks will be undertaken to:

- Remove and reconsolidate uncontrolled fill on site.
- Balance, cut and fill volumes to where possible to minimise the export of material
- Regrade the site to ensure all stormwater over land flows are directed to the detention basin and wetlands, and preserve existing overland flow paths in their current location.
- Regrade the site to provide effective grades for vehicular, pedestrian movements and disabled access.
- Provide embankments/batters at maximum slope of 1V in 4H for roadways.
- Regrade the site to provide benched areas for building construction.

It should be noted however that due to the topography of the site, roads have generally been graded to a maximum of 12% and a minimum grade of 1% with appropriate vertical and horizontal curvature for transitioning of grades and to ensure appropriate sight distances are provided to drivers for safety. As a result of this site topography and the need to meet certain road vertical geometry, these design criteria have dictated where cut and fill will be required. Early analysis of the cut and fill of the site indicates that it will be necessary to export fill from the site and this is compounded by the need to excavate for basement car parks.

A preliminary bulk earthworks plan is included in the preliminary plans attached in Appendix A and shows indicative cut and fill areas. Detailed plans and sections will be provided with the Construction Certificate documentation, indicating the final cut and fill volumes, and final design levels for Stage 1 and the remainder of the site at the relevant time.

2.3 Stormwater

Site Drainage

All stormwater drainage infrastructures will be designed in accordance with AS3500.3, City of Ryde Council's specifications, Concrete Pipe Association of Australia guidelines and the Australian Rainfall and Runoff publication (ARR).

The site drainage system will comprise a minor / major system in accordance with ARR. In particular the minor system comprises a pit and pipe system whilst the major system relies on surface overland flows and pond.

The stormwater system for Royal Rehabilitation Centre will consist of a piped drainage system through the development with overland flow paths provided over roads, paths and open space areas. The stormwater drainage system will then drain to Gross Pollutant Traps (GPT's) prior to being discharged into the proposed detention basin located the centre of the site.

A portion of the site, namely areas southwest of Roads 3 and 2, and south of Roads 4, will drain through the proposed wetlands at the southern part of the site prior to connection in to the main drainage system.

The analysis of the on-site detention requirements for the development was undertaken and reported by Cardno in 2007, and revised in 2008.

Pit and Pipe system

It is proposed the minor system will collect the roof water, surface water from landscaped areas, pavements and roads and convey this to a pit and pipe system which discharges to the central pond.

Pits will comprise concrete inlet and junction pits at all junctions of pipelines. Inlet pits will include a class D (heavy duty) grates and covers in roadway areas and class B (medium duty) in other lightly trafficked areas. Heel safe grates will be provided in areas subject to pedestrian traffic.

The pipe system will be designed for a 10 year ARI and comprises mostly reinforced concrete pipes for pipes larger than 375mm and UPVC pipes for pipe sizes up to 300mm diameter. Pipelines will be designed for a minimum of 1% fall and a minimum cover of 600mm in trafficable areas and 300mm in garden areas.

Water treatment

In order to treat stormwater quality discharging from site it is proposed to install a gross pollutant trap near the pipe outlet to the pond to capture litter, coarse sediments and floating hydrocarbons emanating from site.

In accordance with NSW EPA recommendations GPT size has been designed for the Treatable Flow Rate (TFR) which is defined as the runoff from the peak storm expected to exceed four times per year (otherwise known as the “3 month return period”).

Major System

The major system comprises overland flow paths along roads and pathways and will be designed for storms up to the 100 year ARI. Overland flows will be directed to the central pond and detention basin. The size, depth and characteristics of ponding in the proposed basin and wetlands will be incorporated into the development as designed by Cardno.

2.4 Roads

Geometry

The roads have been designed as public access roads which will ultimately be owned and maintained by council.

As such all roads within the RRCS development have been designed in accordance with AMCORD, as referenced in the Deed of Agreement between RRCS and Ryde Municipal Council and AUSTROADS guidelines for a speed limit of up to 40 km/hr and up to 15km/h for road 8. In general the roads have been designed to comprise:

Access Street - Minimum road reserve width	=	12.0m
Access Street - Minimum trafficable lane width	=	2.75m
Access Street - Minimum verge width	=	3.25m
Minor Road - Minimum road reserve width	=	16.0m
Minor Road - Minimum trafficable lane width	=	3.0m
Minor Road - Minimum verge width	=	3.5m

Private Road - Minimum road width	=	6.0m
Minimum parking lane width	=	2.5m
Minimum footpath width	=	1.5m
Minimum grade of roads	=	1.0 %
Maximum grade of roads	=	12.5%
Minimum kerb radii	=	6m
Maximum road cross falls	=	3%
Desirable grades in intersections	=	3%
Maximum grades in intersections	=	9%

It is noted that the road geometry has considered retaining several significant trees on the site which has affected the road layout. In particular the trees to note are

- a large gum located near Victoria Road entry,
- two large figs near road 5 chainage 320
- two large trees near road 8, chainage 70 and 190

As such the roads have been designed around these trees with adequate road radii for safe stopping sight distances. The location of these trees is shown on the attached preliminary drawings in Appendix A.

All roads have been designed to accommodate the access for garbage trucks and large 12.5 long rigid vehicles (LRVs). Intersections within the development have been designed to enable a 9m single rigid truck to turn within trafficable lanes and have been designed such that 12.5m long rigid trucks will need to use additional lanes for turning however can be accommodated within the kerbs proposed.

Parking has been provided on selected sections of road 5 adjacent to the terrace houses to provide visitor parking. However no parking will be provided on the street in road 8, or 14 as off street visitor parking will be provided on each building site.

A deceleration lane is proposed in Victoria Road at the estate entry. This deceleration lane will be designed to RTA requirements and will be approximately 55m allowing for vehicles to stop safely at the entry in the event that pedestrians are crossing at the entry road.

Pavements

There are various types of proposed pavements to be constructed on site. These include:

- Kerb and gutters, which will be located throughout the site to direct stormwater flows towards the piped drainage system.
- Asphaltic Concrete (AC) road pavements, which will be implemented throughout the development to provide access for cars, emergency services and delivery vehicles. Construction of the roads shall be in accordance with City of Ryde specifications for each road category and subject to pavement subgrade testing by a registered National Association Testing Authorities, Australia Laboratory
- Concrete footpaths, pram ramps and other pedestrian facilities, which will be constructed through out the site to provide access for pedestrians and residents to traverse through and around the site.

2.5 Utility Services

Utility services such as potable water, sewerage, electrical reticulation, gas and telecommunications will be provided in the road reserves in accordance with the relevant authority's requirements.

It is also possible that the existing high pressure gas main running along the site's eastern boundary within the Road 5 road reserve will need to be relocated or adjusted.

3 REFERENCES

- AMCORD - A National resource document for residential development
- RTA Road Design Guide, all parts
- AUSTROADS – Guide to Traffic Engineering Practice
- AUSTROADS – Design Vehicles and Turning Path Templates
- Australian Standards:
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