Sub-Acute Bed Program
Schematic Design Report
Moruya Rehabilitation Unit

Eurobodalla Local Health District
Moruya Local Hospital

September 2012

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Moruya Sub Acute Rehab Health Facility

Schematic Design Report

VERSION	DATE	DISTRIBUTION
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01 Executive Summary

The strategic vision for the Moruya Hospital site is to provide enhanced sub-acute services for the local community, within the peninsula. A key objective to deliver this vision is to improve the access to health services within the peninsula by minimising unnecessary travel.

This project is being delivered under the Council of Australian Government's (COAG) funded Sub-acute Beds Program. The program's 'Sub-acute' title is used generically across the whole of the Program, which will deliver a total of 459 new beds across 29 sites in NSW.

As part of the Council of Australian Governments (COAG) funded Subacute Beds Program, 20 subacute beds are to be opened at Moruya District Hospital. The new beds are to be operational in the 2013/ 14 financial year. The additional 20 beds will be provided within a new facility which is collocated and functionally integrated with the existing main hospital building.

The proposed design responds to the site context, the endorsed masterplan zoning study, the model of care and the functional brief. In working towards the agreed design outcome, the design team has worked in close consultation with project stakeholders to define an appropriate outcome for the project.

Building Structure and Services Consultants, Building Code Compliance Consultants, Landscape Architects, a Quantity Surveyor, Town Planner, Flood Engineer, Aviation Consultant, Geotechnical Engineers and Ecologists have all been engaged in the production of this design outcome and to ensure that the design is functional, cost effective and sensitive to the environment.

The new 20 bed Sub-Acute Rehabilitation Ward is proposed to be collocated and integrated with the existing hospital facilities, however, to operate as a stand-alone building. The new unit will require access to support services and other spaces within the existing facilities; as well some whole of hospital facilities are to be located in the new facility.

The building design reflects the desire in the model of care to provide a home where support is provided to the residents in a way that encourages independence of the patient and facilitate family/support person involvement in working towards rehabilitation goals. Patients will be encouraged to dress in day clothes and spend the majority of their day outside their bedroom, participating in therapy, group activities, recreational activity or meeting with other patients for main meals within the dining room. Rest during the day will also be encouraged where appropriate.

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02 Introduction

02.01 Project Description

Cluster	Eurobodalla Health Service Cluster
Local Health District	Southern NSW Local Health District
Site	Moruya District Hospital
Project	20 bed Rehabilitaion Unit
New/ Refurbishment	New building & Limited Refurbishment of Existing
Beds Delivery Date	2013/14 FY

The purpose of the design study was to determine the best architectural solution within the parameters of the brief and funding for the provision of an additional 20 bed Sub-Acute Rehabilitation facility for the Moruya Hospital.

Moruya District Hospital is a 65 bed level three hospital located within the Southern NSW Local Health District. It provides acute and community health care services including emergency, high dependency medical, surgical, pediatric and obstetric care.

Currently there are no rehabilitation beds within the Eurobodalla Shire and as a result, Eurobodalla residents travel to Nowra, the ACT or Sydney to access rehabilitation services. Some rehabilitation services are provided to inpatients at Moruya District Hospital within the general ward.

Subacute ambulatory services are currently provided at Moruya District Hospital through the Pathways Building and include the following:

- Cardiac and pulmonary rehabilitation;
- Physiotherapy; and
- Transitional Aged Care Service (TRACS – including OT ADL training).

In addition to the ambulatory services provided from the Pathways Building, subacute services are available through Eurobodalla Community Health Service (based at Moruya, Batemans Bay and Narooma).

The COAG Subacute Beds Program will provide 20 subacute rehabilitation and GEM beds at Moruya District Hospital. The service will provide inpatient rehabilitation and GEM services as follows:

- 20 inpatient beds comprising a mix of single and two bed rooms;
- Support areas typical of an inpatient unit;

- Clinical and therapeutic treatment spaces including multi-function spaces for activities of daily living;
- Day spaces for patients to utilise when they are not participating in therapy
- sessions which facilitate socialisation and typical activities of daily living;
- Staff areas (separate to patient care areas); and
- Education, training and research facilities.

Care provided within this ward will be for the provision of inpatient rehabilitation services at the Moruya District Hospital within the following service principles:

- Provide integrated patient focused medical and therapeutic services for
- adults of all ages in a purpose built rehabilitation and GEM unit.
- Be responsive to the rehabilitation and restorative needs of the ageing
- community with complex conditions and co-morbidities.
- Incorporate the principles of the NSW Health Rehabilitation Redesign Project
- Model of Care (leadership; equitable access; multi-disciplinary care teams;
- care coordination; patient centred care; evidence based care; appropriate
- care setting; clinical process and outcome indicators).
- Incorporate Australian Faculty of Rehabilitation Medicine (AFRM) standards
- (re governance; staffing, facilities and equipment; policies and procedures;
- quality improvement and risk management activities; and education and
- research).

The sub-acute Rehabilitation Ward will be collocated with other services on the Moruya Hospital site and share whole of hospital support services with the existing facilities.

02.02 Project Stakeholders

The PUG Membership for the Mona Vale Hospital Rehabilitation Unit is:

Name	Position / Organisation
Michael Brooks	Project Director, Health Infrastructure
Len Dorkill	Clinical Advisor, Health Infrastructure
Carol Callaghan	Clinical Advisor, Health Infrastructure
Barry Tam	Services Advisor, Health Infrastructure
Ian Jackson	Structure & Buildability Advisor, Health Infrastructure
Bruce Judd	Cost Advisor, Health Infrastructure
Richard Siedmann	BCA and HFG Compliance, Health Infrastructure

Frank Desensi	Project Manager, Project Services
Gemma Hepple	Health Planner & Advisory, Aurora Projects
Lisa Kennedy (Part)	General Manager, EHD
Jillian Rheinberger	Senior Project Officer, Capital Works
Catherine Barkley	Allied Health Manager
Jim Herford	NUM Acute Ward
Penni - Lee Boudet	Supervisor Food & Hotel Services –Moruya
Peter Downie	Manager Engineering Services
Tim Barton	Assistant Hospital Engineer
Monica Jones	Chief Pharmacist
Tuija Kostiainen	NUM -Renal
Sue Rice	Oncology
Ruth Snowball	Nurse manager - Oncology
John Norman	Architect Woods Bagot (WB)
Matt Williams	Architect Woods Bagot (WB)
Colleen Hart	Clinical Planner Woods Bagot (WB)
David Song	Engineer (AECOM)
Gary Lyle	Engineer (AECOM)
Frank Caristo	Engineer (AECOM)
Shannon Chamberlain	Sector Manager Food & Hotel Services – Ill & Shoalhaven
Genevieve Maguire	Infection Control & Control CNC
Kylie Belcher	Infection Prevention & Control
Elizabeth Huppatz	Area CNC Rehabilitation

The consultant team for the project is:

Name	Position / Organisation
David Tregoning	Woods Bagot, Director
Domenic Alvaro	Woods Bagot, Principal
John Norman	Woods Bagot, Technical Design Leader
Matt Williams	Woods Bagot, Project Leader
Sonny Oh	Woods Bagot, Architecture Team
Kim Tanh	Woods Bagot, Architecture Team
Kim Tanh	Woods Bagot, Architecture Team
Colleen Hart	Woods Bagot, Lead Clinical Planner
Martyn Vaughan	Woods Bagot Architects, Clinical Planner
Barry Woollam	Altus Page Kirkland, Cost Planner
Nam Nguyen	Altus Page Kirkland, Cost Planner
John Riordan	Architectus, Town Planning
Jane Fielding	Architectus, Town Planning
David O'Neill	Aecom, Building Services Engineering
Gary Lyle	Aecom, Project Manager Aecom, Electrical Services
David Song	Aecom, Mechanical Services
Frank Caristo	Aecom, Fire Services
Thierry Melis	Aecom, Hydraulic Services
Brendan Fehon	Aecom, Structural Engineering
Joe Spatola	Aecom, Structural Engineering
Robbie Williams	Aecom, Principal Engineer, Civil
Dan Riley	Aecom, Principal Engineer, Traffic
Dean Morton	Vic Lilli, BCA Consultant

Greg Evans	Vic Lilli, BCA Consultant
Tim Fowler	360, Landscape Architect
Ryan Smithers	Eco Logical, Ecologist
TBA	Acoustic Consultant
Conrad Shultz	Douglas Partners, Geotechnical Engineers
Jim Olive	JCL Development Solutions, Site Services Investigation
Matthew Richards	Northrop, Flood Engineers
Ryan Heckenberg	Clearsafe, Hazardous Materials
Ben Hargreaves	Lambert & Rehbein, Aviation Consultant

02.03 Consultation Process

The Moruya Sub-Acute Rehab cExistingonsultation process has been positive and we believe the outcomes derived from the various meetings have influenced the creation of a successful design solution.

The following User Group Consultation Stages have been completed:

Stage 1 Start up Workshops

- Workshops focused on the review of information prepared in the Project Brief to define the Functional Brief;
- These workshops were undertaken in tandem with development of architectural sketch planning, to investigate impacts of key strategic decisions within the functional brief on the likely design outcome;
- Consideration of existing hospital function impacted by the likely design outcome were considered and appropriate responses defined;
- Consideration of future stages of work (expressed in the Hospital masterplan) impacted by the likely design outcome were considered and appropriate responses defined;
- A key output of the Start Up phase was the output of an agreed Schedule of Areas descriptive of both rehabilitation and whole of hospital areas forming part of the project scope; for this purpose Aurora Projects were involved; and
- A preliminary design strategy was agreed that expressed the clinical intent of the functional brief in line with the Hospital Masterplan

Stage 2 Schematic Design Review and Approval

- The second stage of the process focused on the development of the Concept Design through to an agreed Schematic Design.
- During this stage the consultation process involved several on site presentations of the design to the User Group and discussion as required to develop the internal planning of the facility.
- The final stage of this phase involved a site visit and presentation of the final Schematic Design to the User Group for sign off and agreement to progress to the Design Development Phase.
- The consultant team for the site visits comprised Project Services as Project Managers, Architectural Staff Members from Woods Bagot and AECOM Consulting Engineers;
- The outcome has been a Schematic Design agreed by the user group as is described by this Report; and
- This Schematic Design will form the basis for the Design Development phase of the work.

An initial review of design activities and user consultation was generated to ensure that key decisions were made in a timely manner. This review resulted in the following agenda schedule for User Group Meetings, which was followed in as close an order as possible during the concept and schematic design phase:

User Group meeting	Allocation	Submit	Review
UGM1 **Concept Design**			
Briefing			
Confirm Functional Brief	Aur	12.03.12	17.03.12
Confirm SoA	Aur	12.03.12	17.03.12
Confirm Staffing Profiles	Aur	12.03.12	17.03.12
Architecture			
Context	WB	12.03.12	17.03.12
Siting options	WB	12.03.12	17.03.12
Existing Roads and Car Parking	WB	12.03.12	17.03.12
Pedestrian Networks	WB	12.03.12	17.03.12
Shadow Effects	WB	12.03.12	17.03.12
Microclimate Effects	*WB*	*12.03.12*	*17.03.12*
Facilities Management			
Admissions (Site)	WB	12.03.12	17.03.12
Domestic Management (Site)	WB	12.03.12	17.03.12
Emergency Management (Site)	WB	12.03.12	17.03.12
Infection Control (Site)	WB	12.03.12	17.03.12
Kitchen Services (Site)	WB	12.03.12	17.03.12
Linen (Site)	WB	12.03.12	17.03.12
Medication (Site)	WB	12.03.12	17.03.12

Staff Movement (Site)	WB	12.03.12	17.03.12
Infrastructure			
Parking strategies	HI/WB	12.03.12	17.03.12
Helipad	HI/WB	12.03.12	17.03.12
Flood Levels	WB	12.03.12	17.03.12
Site Services	WB/Aec	12.03.12	17.03.12
Clinical (Functional Planning)			
Clinical Workflows	WB	12.03.12	17.03.12
Internal Flow Diagrams	WB	12.03.12	17.03.12
Zonal Organisation	WB	12.03.12	17.03.12
12 / 24hr split	WB	12.03.12	17.03.12
Clinic Adjacencies Matrix	WB	12.03.12	17.03.12
FM Diagrams Internal	WB	12.03.12	17.03.12

UGM2 Concept Design			
Briefing			
Confirm Functional Brief	HI/Aur	26.04.12	01.05.12
Confirm SoA	HI/Aur	26.04.12	01.05.12
Confirm Staffing Profiles	HI/Aur	26.04.12	01.05.12
Architecture			
Confirm UGM1 outcomes	WB	26.04.12	01.05.12
Model of Care Response	WB	26.04.12	01.05.12
Operations Response	WB	26.04.12	01.05.12
Context	WB	26.04.12	01.05.12
PARTI Diagram	WB	26.04.12	01.05.12
Module / Grid	WB	26.04.12	01.05.12
Functional Plan Rev 1	WB	26.04.12	01.05.12
Reconciliation to SoA.	WB	26.04.12	01.05.12
FM			
Confirm UGM1 outcomes	WB	26.04.12	01.05.12
Infrastructure			
Confirm UGM1 outcomes	WB/Aec	26.04.12	01.05.12
Clinical (Separate Meeting)			
Standard Rooms Handover	WB	26.04.12	01.05.12

UGM 3 Concept Design			
Briefing			
Confirm Functional Brief	HI/Aur	10.05.12	15.05.12
Confirm SoA	HI/Aur	10.05.12	15.05.12
Confirm Staffing Profiles	HI/Aur	10.05.12	15.05.12
Functional Brief User Endorsement	HI/Aur	10.05.12	15.05.12
External Areas Functional Briefing	WB	10.05.12	15.05.12

Architecture			
Confirm UGM2 outcomes	WB	10.05.12	15.05.12
PARTI Diagram update	WB	10.05.12	15.05.12
Module / Grid update	WB	10.05.12	15.05.12
Functional Plan Rev 2	WB	10.05.12	15.05.12
Reconciliation to SoA.	WB	10.05.12	15.05.12
FM			
Admissions (Internal)	WB	10.05.12	15.05.12
Domestic Management (Internal)	WB	10.05.12	15.05.12
Emergency Management (Internal)	WB	10.05.12	15.05.12
Infection Control (Internal)	WB	10.05.12	15.05.12
Kitchen Services (Internal)	WB	10.05.12	15.05.12
Linen (Internal)	WB	10.05.12	15.05.12
Medication (Internal)	WB	10.05.12	15.05.12
Staff Movement (Internal)	WB	10.05.12	15.05.12
Clinical			
Return UGM2 Markup & review	Users/WB	10.05.12	15.05.12

UGM4 Concept Design			
Architecture			
Review UGM 3 outcomes	WB	31.05.12	05.06.12
Functional Plan Users Endorsement	HI/ Users		05.06.12
Outline Shell Concept Review	WB	31.05.12	05.06.12
ESD strategy Review	WB	31.05.12	05.06.12
Landscape Concepts Review	360	31.05.12	05.06.12
FM			
Review outcomes UGM 3	WB	31.05.12	05.06.12
FM Endorsement	HI/ Users	31.05.12	05.06.12
Structure			
Structures Concept outline	Aec	31.05.12	05.06.12
Services			
Services outline design update	Aec	31.05.12	05.06.12
Clinical			
Update to standard rooms - review	WB	31.05.12	05.06.12

UGM 5 Schematic Design			
Architecture			
Review outcomes UGM 4	WB	14.06.12	19.06.12
Shell Design Endorsement	WB	14.06.12	19.06.12
Constructability	WB	14.06.12	19.06.12
Future Expansion	WB	14.06.12	19.06.12
Materials	WB	14.06.12	19.06.12
Business Continuity	WB	14.06.12	19.06.12

Landscape Design endorsement	360	14.06.12	19.06.12
FM			
Review outcomes UGM4	WB	14.06.12	19.06.12
Structure			
Structures Concept Endorsement	Aec	14.06.12	19.06.12
Services			
Services outline design endorsement	Aec	14.06.12	19.06.12
Clinical			
Review non-typical rooms (50%)	WB	14.06.12	19.06.12

UGM 7 Schedmatic Design			
Clinical			
Tabling of SD Report	WB	28.06.12	03.07.12
Review non-typical rooms (100%)	WB	28.06.12	03.07.12
SD Signoff and PEG Endorsement	HI/ Users	28.06.12	03.07.12
Endorsement All Rooms	WB	28.06.12	03.07.12

Project coordination meetings commenced after UGM4 and were held at Woods Bagot Offices. These coordination meetings focused on implementation of the functional objectives of the project, and definition of key technical and aesthetic objectives for the project.

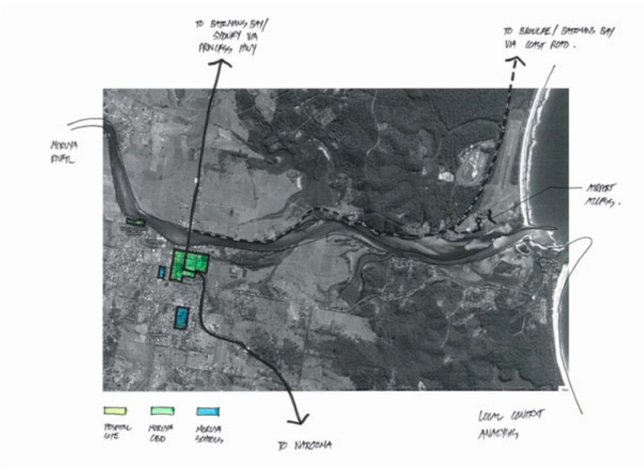
These technical objectives for this project are reasonably complex and are detailed further in Section 05 *Architectural Design*.

The level of resolution at the completion of SD includes the Functional Plan at 1:200 scale, endorsed by users, finishes intent external and internal, allowing for a preliminary level of coordination and technical resolution and costing in order to prove the design meets the project budget.

03 Masterplan Review

03.01 Campus Masterplan

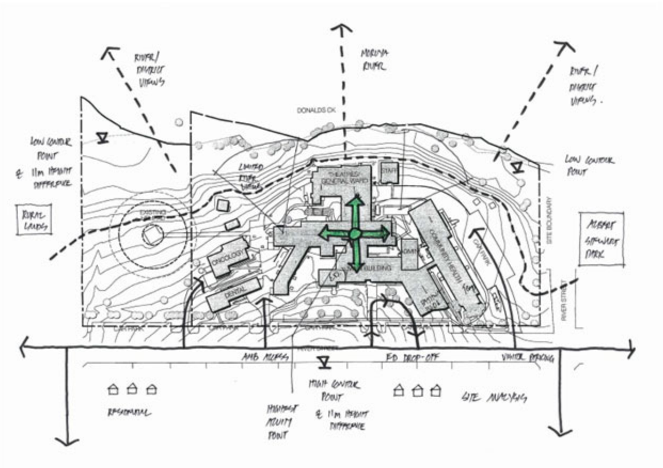
Health Infrastructure provided an interim analysis of the Masterplanning Options for the Moruya Hospital as part of the Schematic Design process for the Moruya Sub Acute Project. This section provides an overview of key masterplanning issues addressed as part of this stage of the design.



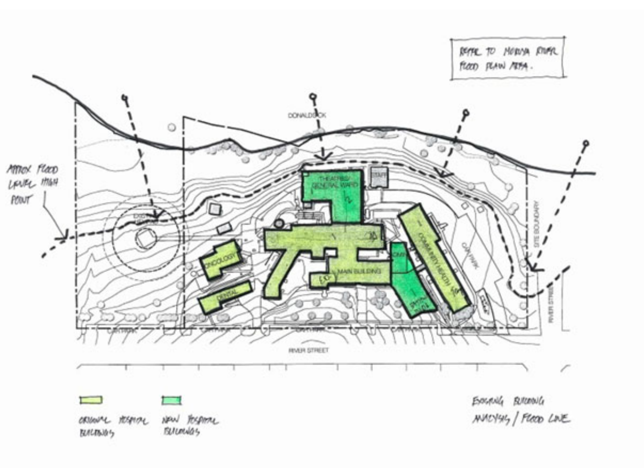
SITE LOCALITY

CONTEXT ANALYSIS

The Moruya Hospital is located between existing low height (1 and 2 storey) residential structures to the south of River Road, and the Moruya River to the north.

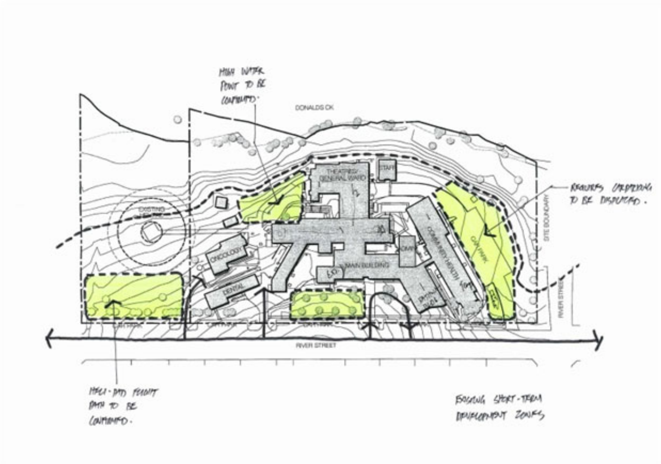


SITE ANALYSIS

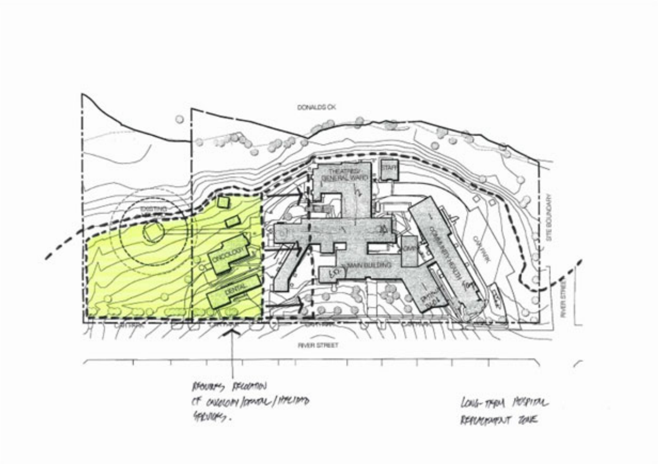


EXISTING BUILDING AND FLOOD LINE

The Hospital is accessed from River Road. There are currently 5 vehicle transitions across the southern boundary of the Hospital Site from River road, 3 of these are shared ingress and egress, one is dedicated ingress and 1 is dedicated egress. The dedicated routes are associated with the new drop off to the main Hospital building.



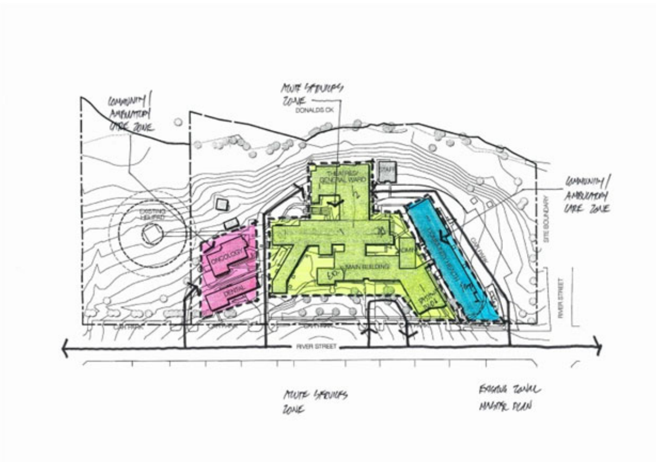
SHORT TERM DEVELOPMENT ZONES



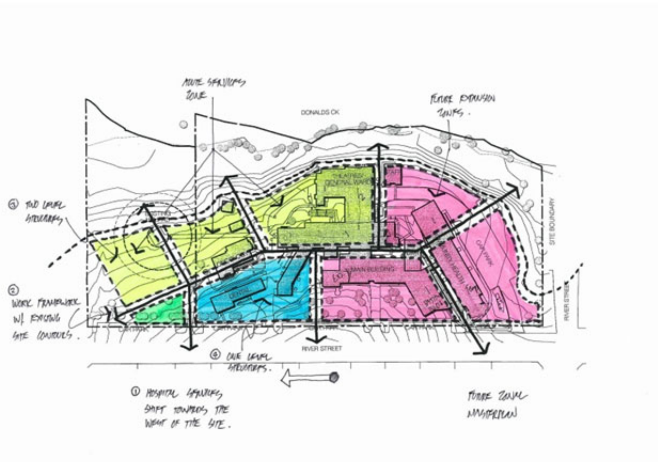
LONG TERM DEVELOPMENT ZONES

Available sites for new buildings are relatively limited. The Woods Bagot Masterplan, undertaken in the PDP stage of this project, identified the site indicated above as to the north east of the existing hospital as the preferred site for the Sub Acute facility. This site afforded least impact to the existing hospital operation.

In the longer term, and considering such changes as relocation or redundancy of the Helipad, and replacement of existing Renal, Oncology and Dental services realised the western section of the site as the likely long term development opportunity for the Hospital.



EXISTING ZONAL MASTERPLAN



FUTURE ZONAL MASTERPLAN

The Future Zonal Masterplan diagram outlined above identified both the impact of the constraining Flood Planning Level, and the likely integration of a major cross link through the site to the west of the existing hospital, and connecting with the existing east west link within the existing hospital.

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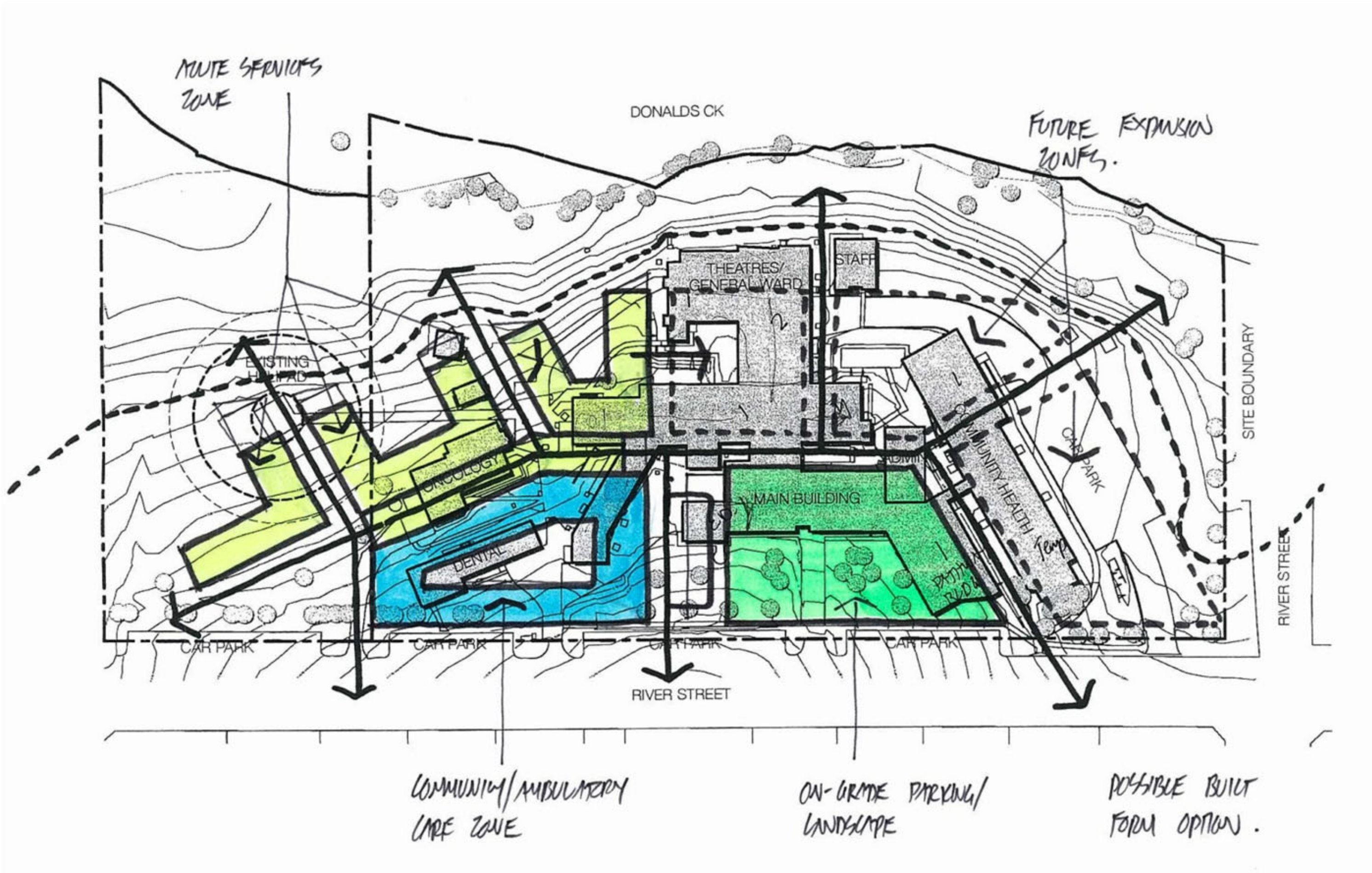
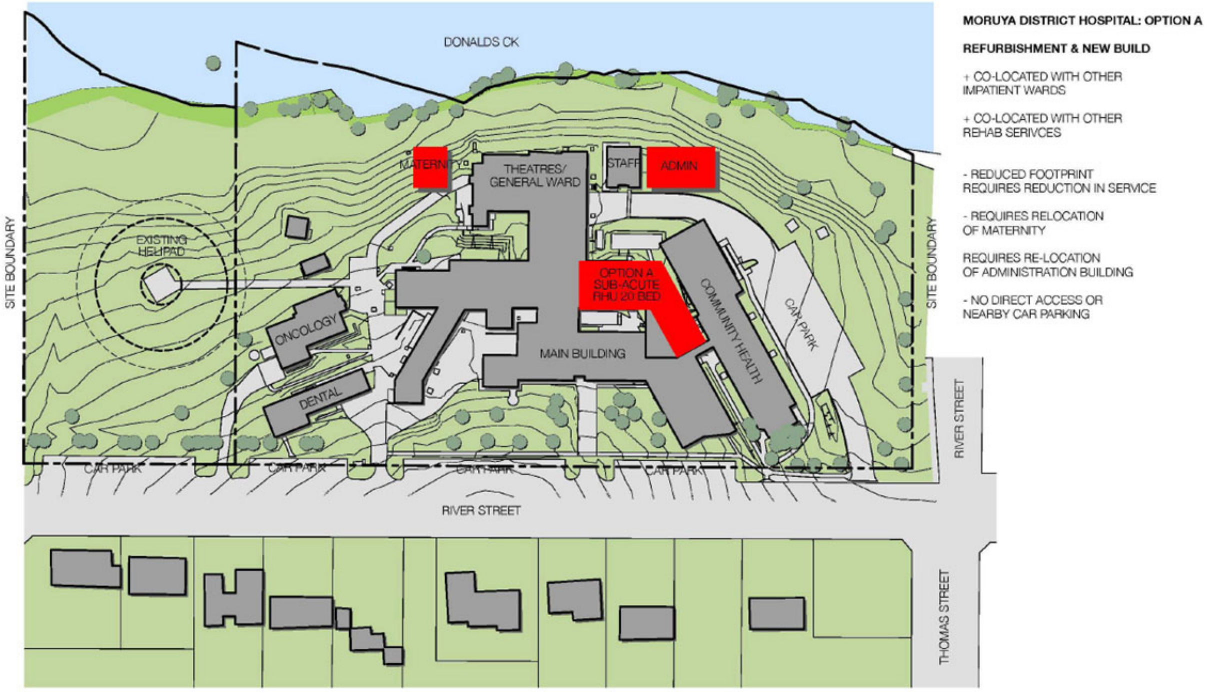


POSSIBLE BUILT FORM OPTIONS

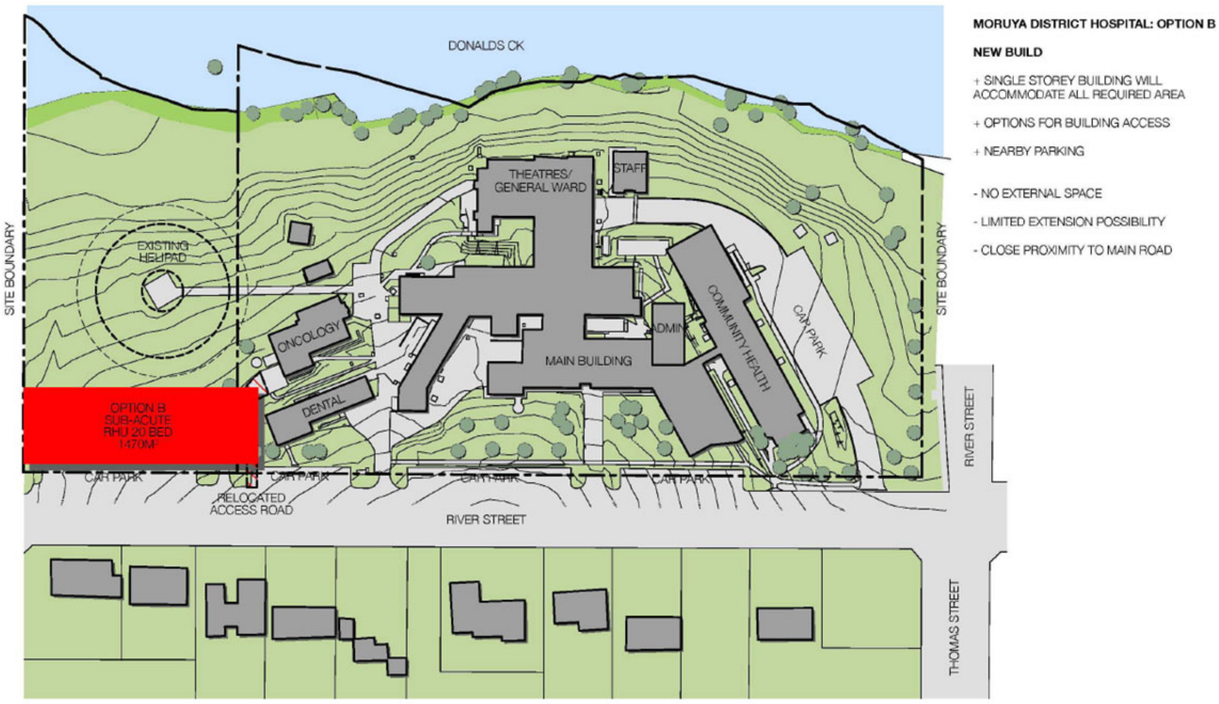
Based on the proposed site structure diagram outlined in the preceeding set of diagrams, possible built forms were identified that provided for reasonable ward and departmental setouts and dimension, access to views, implementation of the east west site link and integration of proposed new buildings to the existing.

03.02 Schematic Design Response to Masterplan

The Woods Bagot Masterplan as undertaken in the PDP stage of this Project, identified 3 prospective sites as available for development of the Sub Acute facility within the Moruya Hospital Site. Whilst this Masterplan Document provides further detail as to the outcomes of that phase of Design, the below provides a summary as is relevant to the Schematic Design Response to Masterplan.



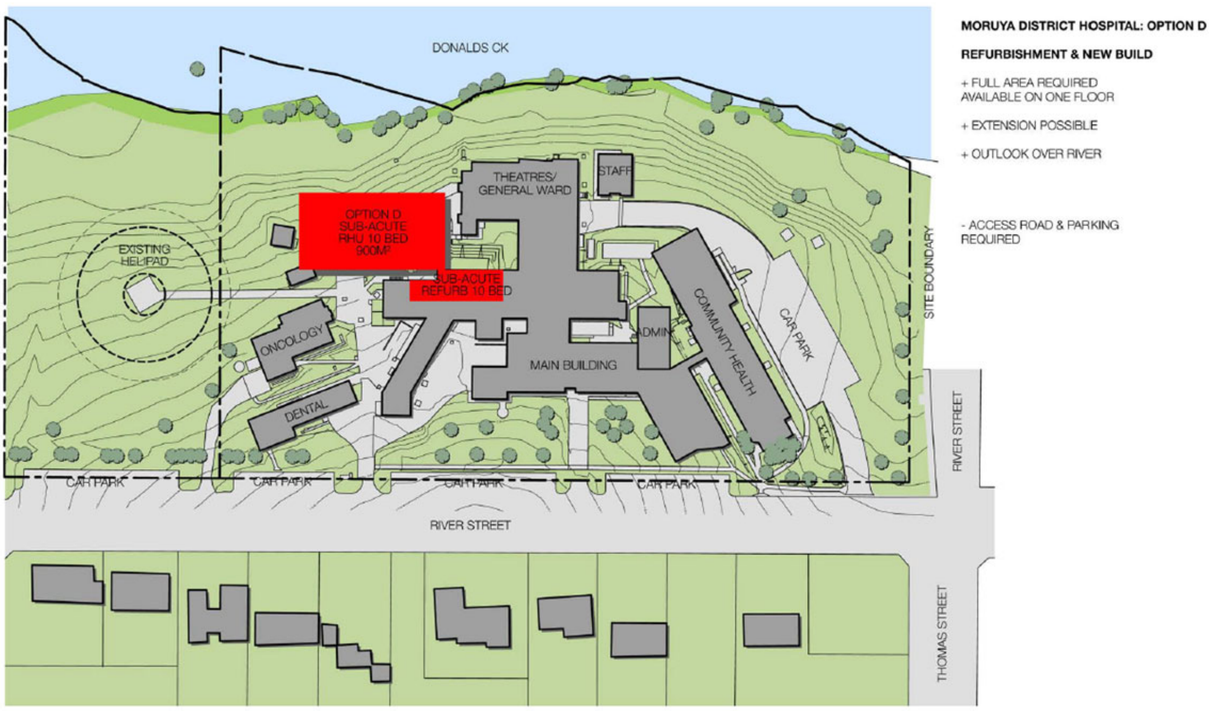
Option A provides for colocation with other impatient existing wards and rehabilitation services. Due to constraints to the functional planning of the design outcome, this option was discarded.



Option B provides for location of the Sub Acute Facility on vacant site area, at the south western end of the site. Whilst this option provided for complete flexibility in the functional planning of the proposed Facility, remoteness from the main Hospital building and limited possibility to extend or enhance the existing service in comparison to other options triggered the dismissal of this particular option.

Option C investigated the option of locating the proposed Sub Acute to the north west of the existing Hospital building, on a single floor. This option provided for the required flexibility in functional planning of the proposed Sub Acute and the required level of connectivity to the existing hospital service. However the site area taken up by a single floor option was extensive, blocking views from the existing Renal and Oncology building and requiring extensive piering and structure in the subfloor, due to ground levels falling away to the riverbank. Of the options available, this option was determined as the most feasible during the Master planning phase of the project.

As per diagram above, *Option C* was investigated as a 'test fit' on the site, utilizing a generic Schedule of Areas and set of Functional Requirements to generate a predictive floor plan. This test fit of the likely sub-acute functionality to the proposed site led to the identification of the *Option C* location as the preferred position for the proposed Sub Acute facility within the Hospital grounds.



Option D was investigated as a derivative of *Option C*, assuming the resumption of existing non utilized beds within the existing Hospital building as part of the functional area of the proposed Sub Acute. Whilst this reduced the size of the proposed rehab building, functionality of the rehab unit was compromised and as such this option was abandoned.

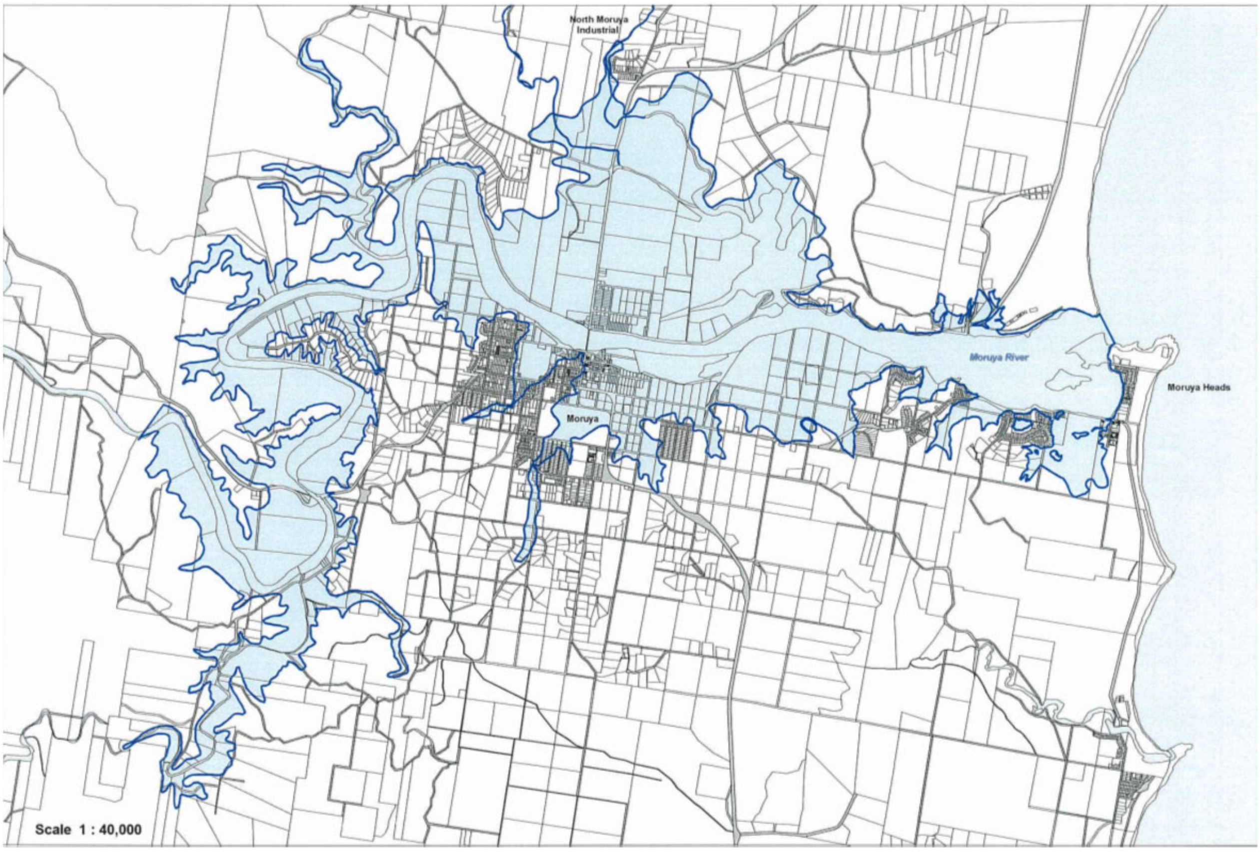
During the Schematic Design Phase, outcomes of the Masterplanning phase were again reviewed and tested against identified site constraints, overall long term development opportunities for the Hospital and the optimal clinical functionality of the proposed Sub Acute facility.

Flood planning levels within the Moruya Shire Council Development Control Plan were identified as a major constraint for the design of the proposed Sub Acute Facility. Reference is made to the *Moruya Flood Plain Development Control Plan*, as came into force 28 April 2006, and the Memorandum by Northrop Engineers dated 27.07.12. This DCP conditions against construction of new buildings with floor levels below the *Flood Planning Level*, defined by the DCP as the 1 in 100 year flood event +500mm freeboard. This level identifies at RL 6.19 at the position of the Moruya Hospital. The lower level of the existing Hospital is at RL6.25 is noted by the *Northrop* Memorandum, as above the FPL by an acceptable level. Accordingly, any lower floor considered as part of the Sub Acute facility, can link to and provide level access to the existing lower floor level of the Moruya Hospital.

FSRL AHD 5.69

FPL AHD 6.19 (FSRL + 500mm FREEBOARD)

In addition to planning constraints against design floor levels, built elements designated as within the effective **flood volume** zone are equally controlled. The FSRL the DCP defines a *Flood Standard Reference Level*, being defined as the flood level in the 1 in 100 year flood event as is relative to the site of development and caters for anomalies in flood profile, wave action and tidal effect. This flood volume is defined by the relative contours and existing ground condition prevalent at the site. The FSRL line is marked on the Architectural SD drawings for reference.



1% Flood Line of Moruya River Flood Plain Area

Any structure built within the flood zone will have the effect of reducing the effective flood volume capacity at that part of the river catchment; as such any reduction must be offset by equivalent volume additions in other parts of the site. Due to the complexity in planning for and construction costs associated with providing such an offset, HI instructed that the building design for the Sub Acute facility must not reduce the effective flood volume. It is allowable for structure to be located below the FSRL, however this effectively negated the opportunity to locate any proposed enclosed elements (eg. retaining walls, stair shafts, landfill) below the FSRL. This has had the effect of allowing the building to be designed over, but not within the effective flood volume.

The Hospital site was interpreted to be in a **Floodway**, designated category 'high hazard'. This category permits development under certain conditions and based on a detailed review by an appropriate consulting engineer, of the impact of the development in respect to flood hazard to adjacent existing development and the cost to emergency services should evacuation of the premises be required. One such condition on development is that any building below the FSRL is wherever possible to remain unencumbered by enclosing of vertical areas and infill walls. If such elements are essential design considerations such vertical infill panels shall be aligned with the predominant flood flow vector. The sub floor support structure shall render the least impedance to the flow of flood waters, and that structure built within the flood zone meets certain conditions as set out by the Local Authority. Reference is made to the *Moruya Valley Flood Plain Development Control Plain,* last amendment April 2006.

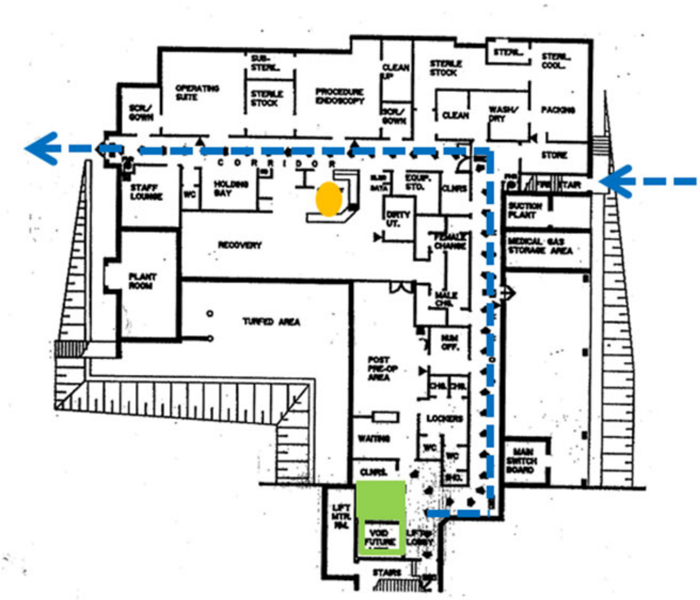
Flood Levels review by Northrop Engineers, 27 July 2012

Existing car parking provision at the Hospital was noted as likely to be impacted by the proposed works, as such strategies were developed as part of the schematic design process to ensure that the existing hospital service was not diminished or reduced. Existing hospital car parking was assessed against current Local Authority requirements for car parking and the projected FTEs and likely visitor ratios, to establish requirements for additional car spaces to be constructed as part of the proposed works.

Riparian vegetation adjoining the river was identified as being potentially part of an Endangered Environmental Community (EEC) and comprising River-flat Eucalypt Forest on Coastal Floodplains. Guidance from the ecologist provided that the proposal should incorporate measures to improve the integrity and ideally the width of the existing riparian vegetation within the hospital site, weed control and plantings of trees and shrubs characteristic of local riparian vegetation.

A **riparian zone** was identified as active over the site, and defined as being set at 40mtrs from the top of bank line identified in the site survey. The Hospital building is exempted from compliance from this requirement, so long as the proposed works do not compromise bank stability, riparian vegetation or water quality. Accordingly the ongoing design considered an equivalent proximity to the riverbank as existing hospital buildings.

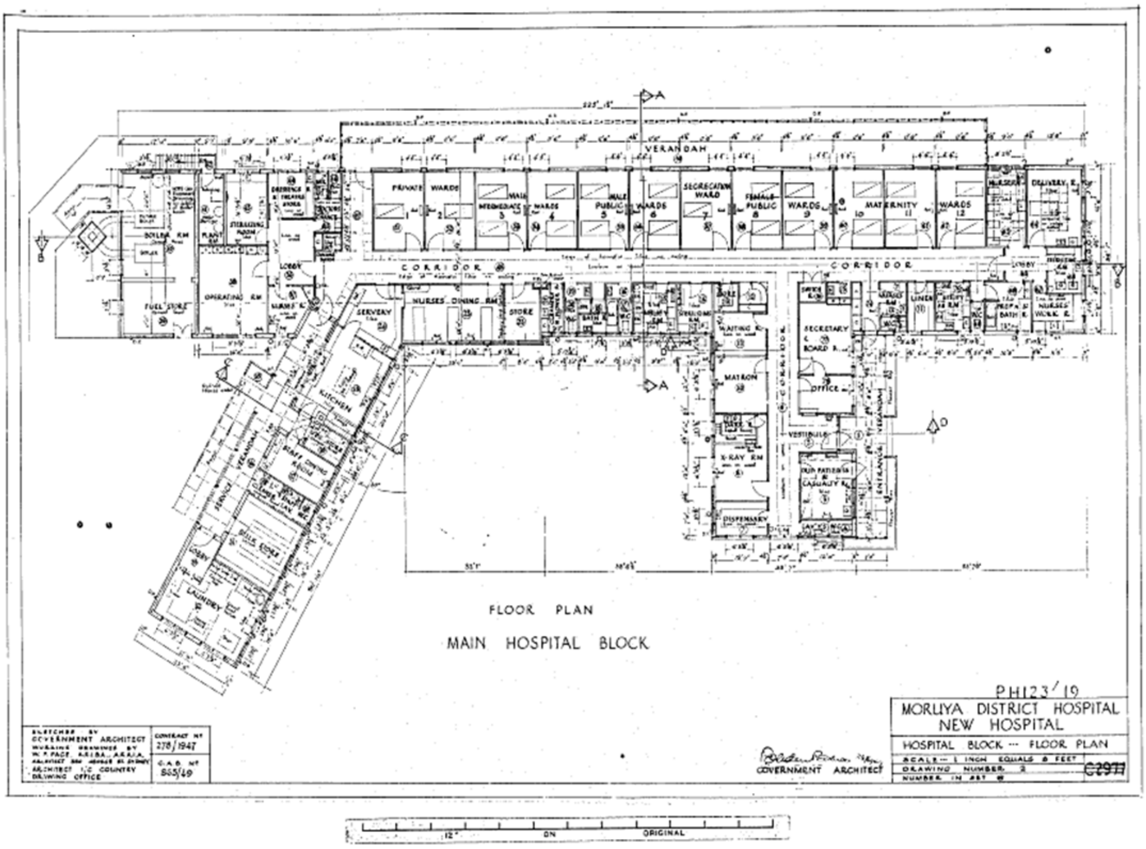
Existing hospital floor levels were defined as relevant to the design of the proposed sub acute facility as well as for site works in maintaining existing connectivity throughout the hospital site. As such detailed survey levels were obtained for the Main hospital Building, Dental, Oncology and Rehab, as well as pedestrian and vehicular links defined as likely to be impacted by the proposed works.



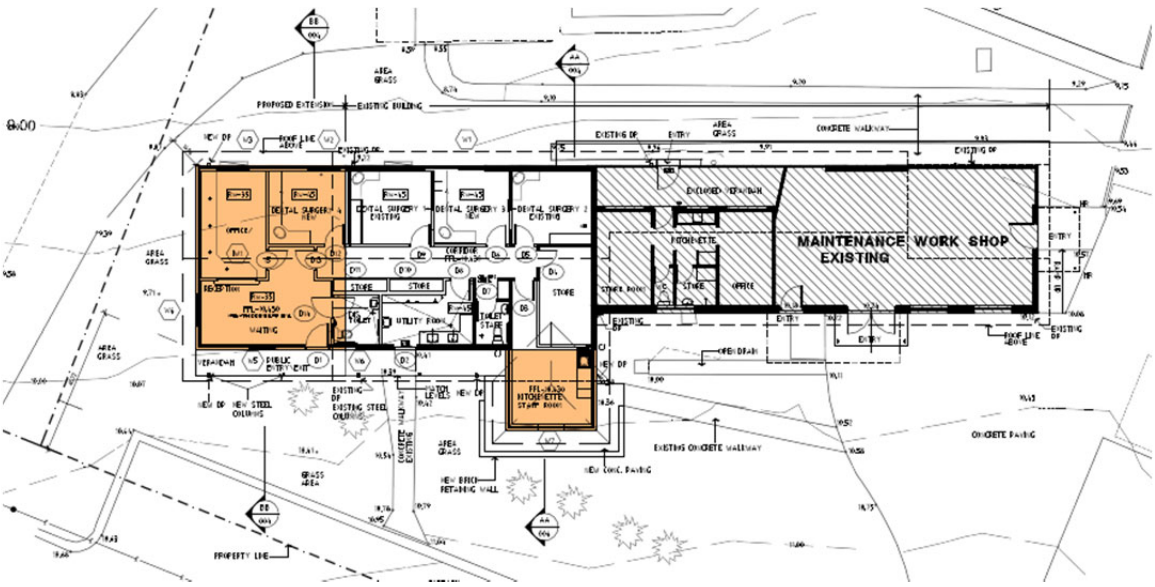
Existing Main Hospital Lower Floor RL 6.25

Existing Main Hospital Upper Floor RL 10.5

Drawings of existing buildings were also available to the design team and utilized to inform the development of the schematic design and resolution of site planning issues. Photographic survey of existing buildings was undertaken to verify the accuracy of these drawings to the actual site condition. Such photographic survey was used to determine the range of constraints that might impact the planning of the new facility, including awnings, entry points, existing ramps, undercroft areas and access points, and such detail was included where required to the architectural drawings.

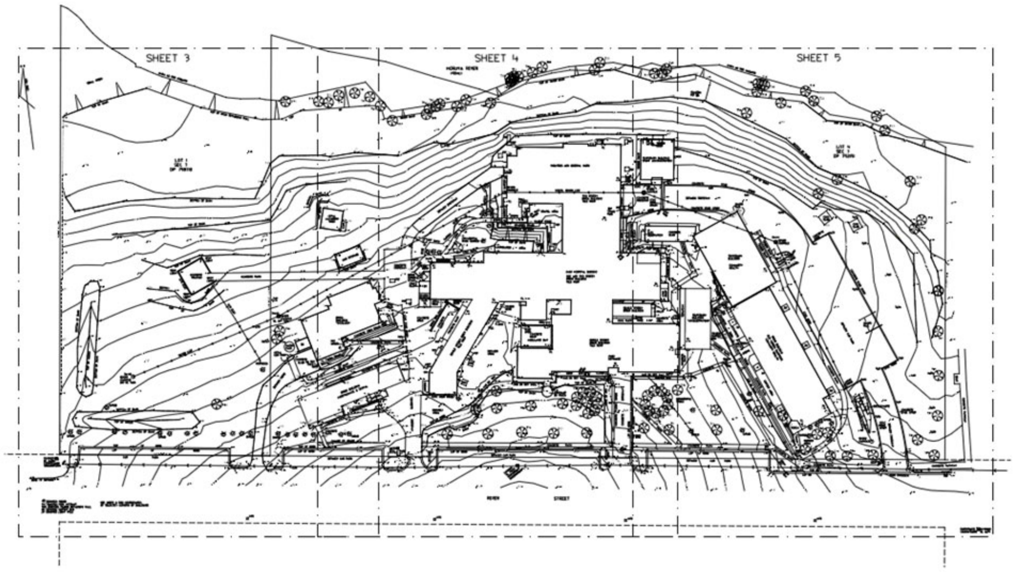


Example Existing Hospital Building Plans

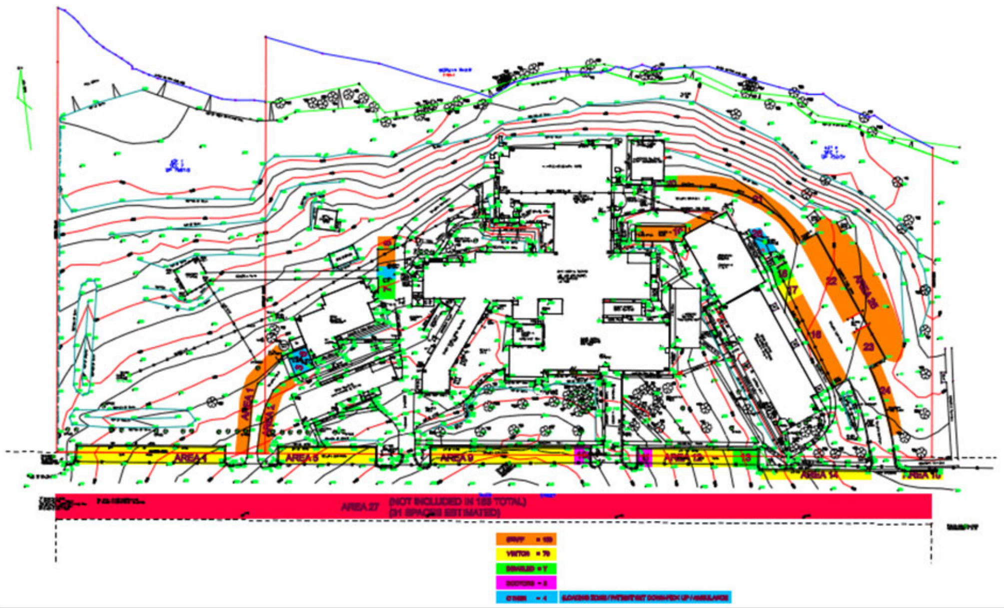


Dental and Workshop Building

Topographical surveys were obtained and updated to provide information as may be relevant to the design, including existing ground levels, parapet and eave heights, existing building floor levels, existing services access points, etc. New survey work was undertaken of the identified project site that also included preliminary information regarding in ground services.



Original Hand Drawn Site Survey



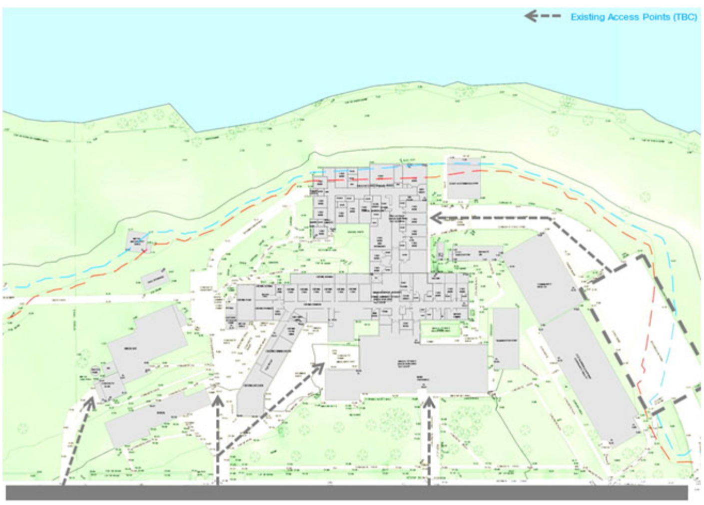
Cad Survey of the Hospital Site, dated April 2007

Aerial photographs were referenced to correctly interpret site information as required.

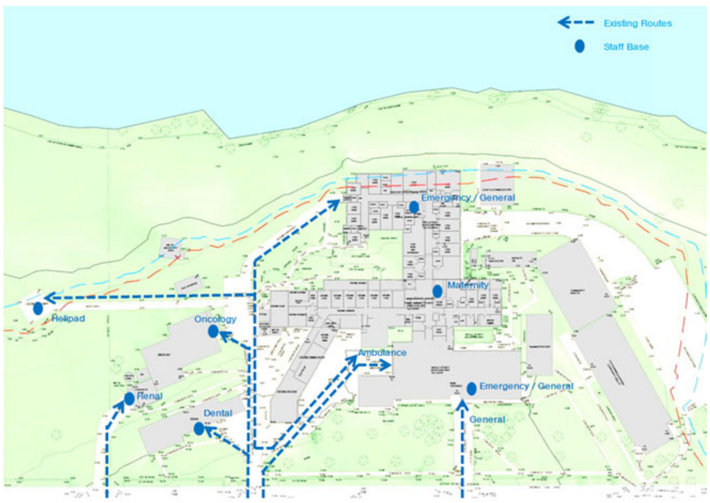
Aerial Photograph

Existing hospital infrastructure and services as may be impacted by the proposed works were reviewed in detail by the services engineers and strategies for maintaining continuity of service to the existing hospital developed as part of the progress of the schematic design phase.

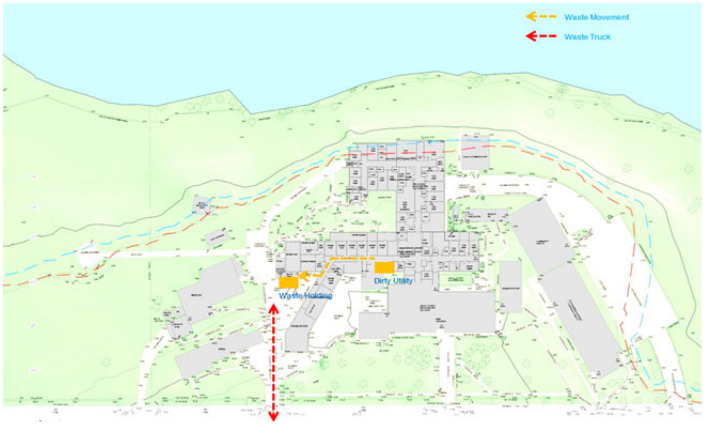
Existing hospital functionality that may be impacted by the proposed works were progressively reviewed and integrated to the scope of the design proposal, such that whole of hospital functionality would not be impacted by the proposed works. One exception to this constraint was the Tutorial Room, which will not be available during the construction works period, but was agreed to be managed via facilities available elsewhere within the existing Hospital.



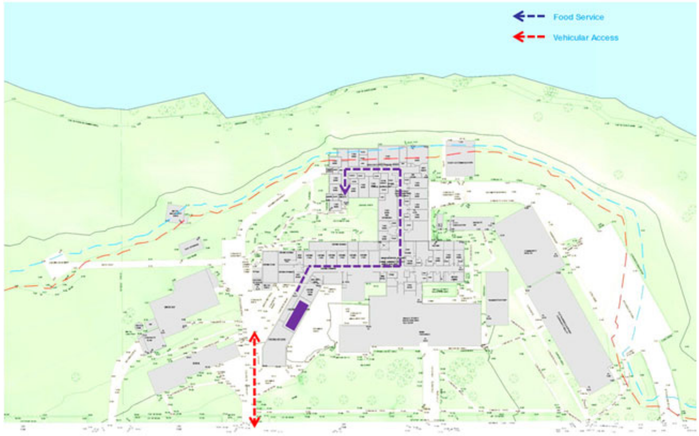
Existing Hospital Access



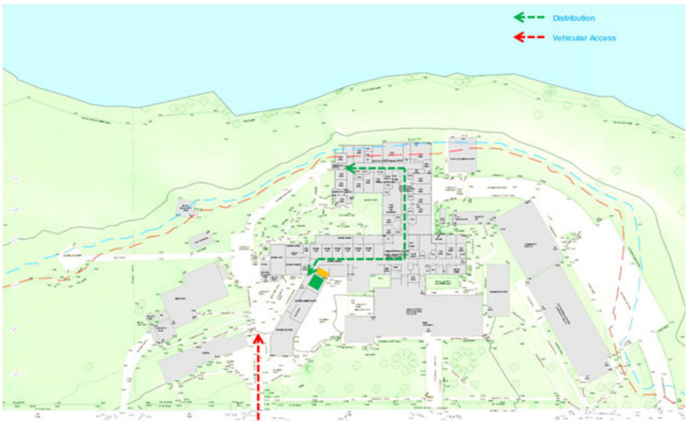
Existing Admissions



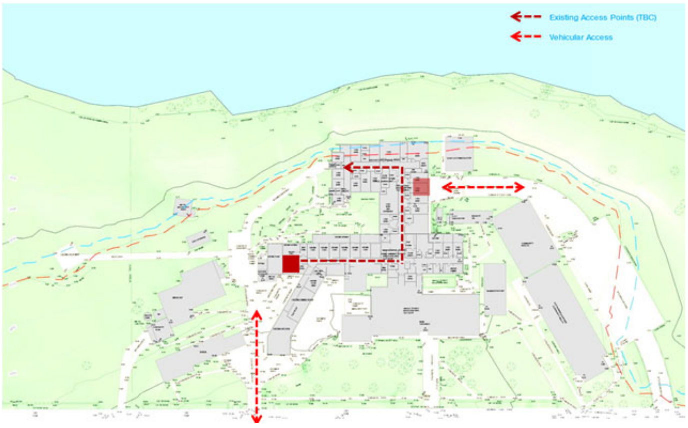
Existing Waste Management



Existing Kitchen Service



Existing Clean and Dirty Linen Service

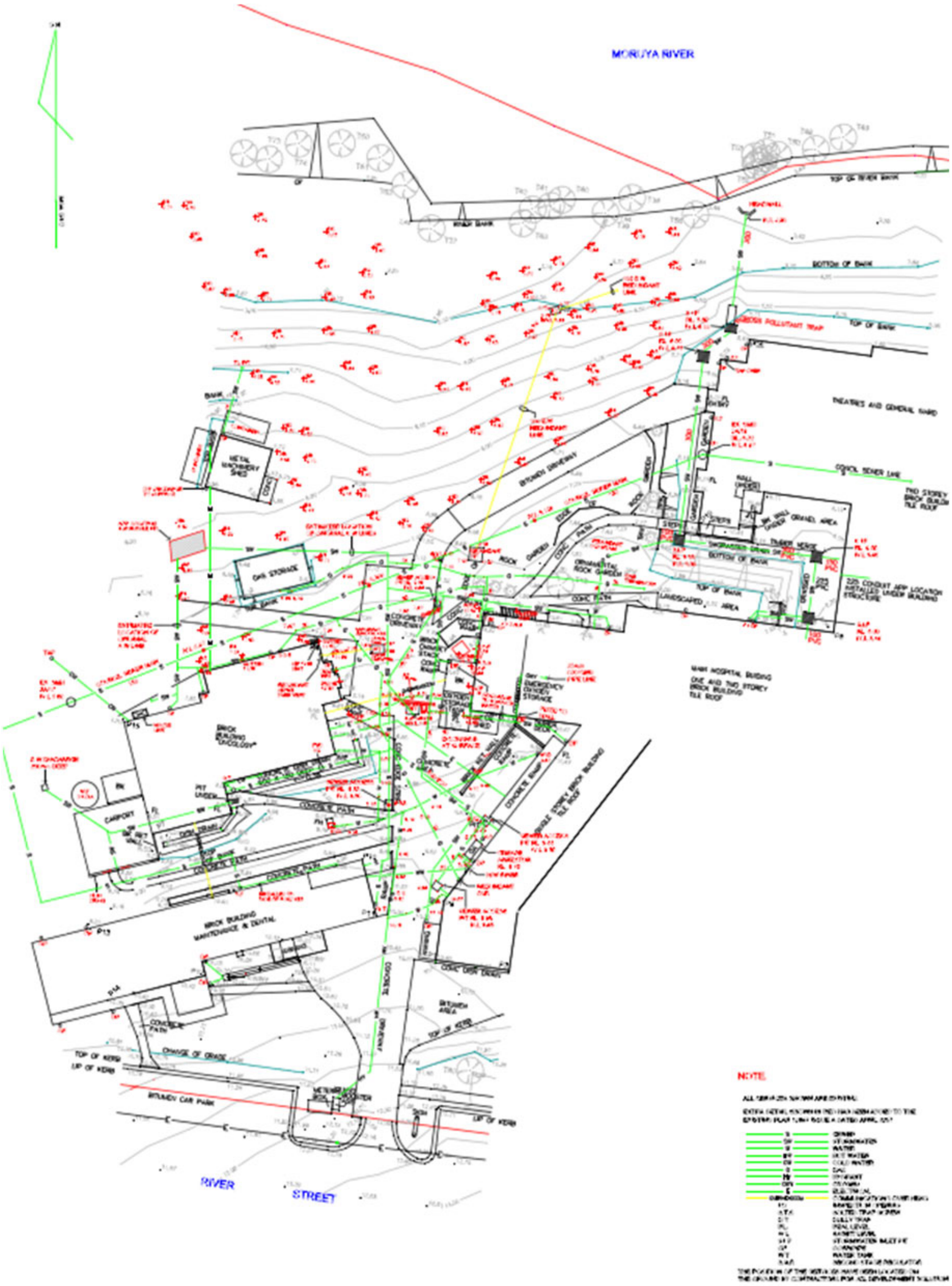


Existing Medical Service

Hazardous Materials were identified as being present on the site. Requirements for removal and remediation as part of the major works was provided by Clearsafe Environmental Solutions and will inform the scope of the construction works package. Refer Report in Appendicies.

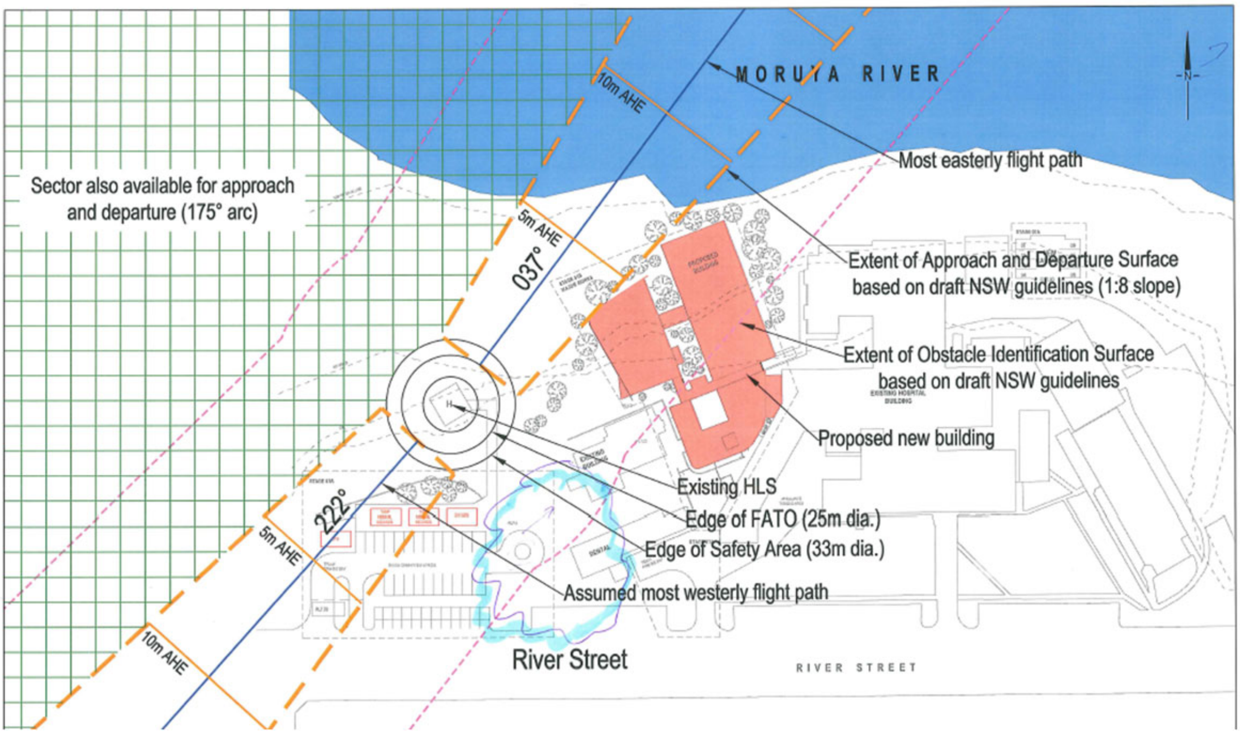
The **existing soil condition** was surveyed by Douglas Partners, report dated 30.07.12. Rock was identified as present at the site and this informed the ideal in-ground structure design. Refer Report in Appendicies.

Existing in-ground services within the proposed site area of the Sub Acute facility and as may be impacted by the works were surveyed and identified by Conway Burrows and Hancock Survey dated 25 April 2012. Again strategies as to the removal and relocation of these services, without impacting existing hospital operations were developed as part of the schematic design process. Refer Report in Appendicies.



Updated Survey by Conway Burrows and Hancock 25 June 2012

The existing **Helipad** position was also identified as a planning constraint. There was no consideration given to relocating the existing Helipad position, however the helicopter flight path was identified as a likely constraint for the design and planning of the Sub Acute facility. Reference is made to the *Moruya Hospital HLS Aeronautical Assessment* prepared by Lambert and Rehbein, dated 20th August 2012. This assessment verified the registered flight path for the existing Helipad position and this volume limitation was included to the site controls drawings considered in the designing the proposed Sub Acute facility. Refer Report in Appendicies.



Designated Flight Path as per Rehbein Report 21 August 2012

The existing **hospital logistics** service (deliveries, collections and waste management) were briefed by the Hospital Facilities Managers, as well as confirmed via site inspections.

04 Functional Brief & Schedule of Accommodation

04.01 Model of Care

Rehabilitation needs to be considered as a **service delivery continuum** which varies in terms of intensity, duration and location according to the individual needs and circumstances of each patient. Rehabilitation services provide specialised assessment, management and care coordination for patients with the aim of preventing, reversing or minimising the impact of illness or injury.

Inpatient rehabilitation services will be provided at Moruya District Hospital will be an integral part of the rehabilitation continuum of care which includes the following;

- Early commencement of rehabilitation (in an acute setting, either at Moruya
- District Hospital or at other acute facilities);
- Fast stream and slow stream inpatient care (within the subacute ward); and
- Ambulatory/ community services (provision of ambulatory and community
- rehabilitation services through local community health services).

As per **Caring Together**, there will be no mixed gender rooms within the facility. Inpatient rehabilitation services at Moruya District Hospital will be comprehensive and multidisciplinary, provided to a range of patients. Care provision will be of a high standard in a safe, welcoming and therapeutic environment which meets the specific needs of individual patients. Referrals and admissions to the subacute will be as described in section 4.4. The average length of stay for rehabilitation inpatients at Moruya will depend upon the individual needs of patients and will be in line with the rehabilitation plan, patient goals, DRG and estimated discharge date (EDD). It is anticipated that some patients may be admitted for months due to the nature of their condition (e.g. non weight bearing on lower limbs whilst awaiting fracture healing).

The majority of care for patients will be provided within the ward. Patient transport to other areas of the facility will be minimised, however may be necessary to access general X-ray, facilities within the Pathways Building, or if the patient becomes acutely unwell.

Different cohorts of patients within the subacute ward may be clustered or separated if necessary (e.g. slow stream and fast stream patients, infectious patients, those who are at risk of wandering). The ward design will promote the grouping of like patients to optimise care delivery through high observation, the allocation of specialist staffing and informal interaction of patients. The facility will provide a choice of spaces for patients to spend time during the day (e.g. lounge/ dining area, access to a courtyard).

The provision of rehabilitation will focus upon providing **patient centred care** which is aligned to each patient's individualised rehabilitation goals. Such rehabilitation plans will be developed upon admission through multi-disciplinary assessment and consultation with the patient and their family/support people to identify rehabilitation goals and timeframes for each patient. Regular case conferences will be undertaken during the course of each patient's rehabilitation program to monitor and update progress towards achieving goals.

Care provision will aim to optimise the independence of the patient and facilitate family/support person involvement in working towards rehabilitation goals.

Patients will be encouraged to dress in day clothes and spend the majority of their day outside their bedroom, participating in therapy, group activities, recreational activity or consuming main meals within the dining room. Rest during the day will also be encouraged where appropriate. A daily timetable for each patient may be used to outline daily activities and facilitate appropriate visit time for family/ support people and adequate rest time between therapy sessions. Following a period of inpatient rehabilitation it may be necessary to allow for a graded discharge to enable the patient and their family/ support people to adjust to being based back at home and to facilitate a successful discharge. Graded discharge may include trials of overnight leave.

Following a period of inpatient rehabilitation a patient may be referred for ongoing ambulatory, community rehabilitation services or TRACS. If a patient is identified as not being able to manage independently or with support at home, the patient may be discharged to a Residential Aged Care Facility via referral to ACAT.

It is important to note that the care for carers is a vital aspect of the Model of Care. Carers will be welcomed and encouraged to be involved in the patient's care. As such, amenities will be provided for carers (toilets, lounge space and access to beverage preparation).

The **GEM model of care** provides an effective, early multi-disciplinary rehabilitation/ restorative intervention model for assessment, management and treatment of geriatric syndromes of older people. GEM services within the sub acute ward will be provided for geriatric patients once their medical condition is stabilised.

The GEM model will aim towards reducing functional decline in the older patient, reducing mortality and reducing the need for long term care, including reduced lengths of stay and readmission rates.

The introduction of this model is an effective way of preventing functional decline for conditions which are reversible. GEM services will support and promote independence and self-management for the older patient with a view to enabling patients to live independently in the community for as long as possible.

Medical, nursing and therapeutic services will include functional retraining through activities of daily living, reconditioning and the establishment of appropriate support services. Family and other support people will be integral to each patient's treatment and care plan and to ongoing support following a period of inpatient sub acute care.

Care for GEM patients may include the management of patients with acute delirium. Patients accommodated within the sub acute ward who experience an episode of acute delirium will be cared for within the sub acute so as to minimise disruption and possible added confusion by change to the environment for which the patient is accommodated. GEM patients will be accommodated in beds which can be closely observed from the staff station. It may be necessary to secure a section of the ward to care for patients who may wander off the ward. As noted above for rehabilitation patients, following a period of inpatient care, it may be necessary to provide graded discharge for GEM patients to facilitate a successful return to living within the community.

Detailed information regarding the functional requirements is provided within the Functional Brief.

04.02 Future Stages

Consideration of the relocation of renal and oncology as a future stage was considered during this consultation process. The design outcome allows for the infill of the undercroft level, to suit Renal and Oncology departments. The design outcome considered the staging of this work, as well as the design and construction impacts of that future stage of work on the current design. This option is discussed in more detail in Section 5.09.

A preliminary Schedule of Areas was defined and circulated within the design team for reference, however this requires detailed review before the final design for these future stages can be endorsed by the users.

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04.03 Summary Schedule of Accommodation

2-20-2164 Sub Acute Beds Program_Moruya

20 BED Scheme — SCHEMATIC DESIGN 27.06.2012

	Original Brief				Latest Arch. Dwg		
	AHFG	Functional Brief (V1)			Current Plan		
Room	Size m²	No.	Size m²	Total Area	No.	Size m²	Total Area
Patient Accommodation (1st Floor)							
1 Bed Room - Standard	15	6	15	90	6	15.4	92.4
Ensuite - Standard	5	6	5	30	6	6.1	36.6
1 Bed Room - Special	18	2	18	36	2	18.3	36.6
Ensuite - Special	6	2	6	12	2	6.1	12.2
2 Bed Rooms	28	6	28	168	6	28.3	169.8
Ensuite - 2 Bed Room	5	6	5	30	6	5.6	33.6
Bay - Handwash / PPE	1.5	4	1.5	6	4	1.5	6.0
Write-up Bay	5	2	5	10	2	5.0	10.0
Sitting alcove	1	4	1	4	0	0.0	0.0
Upstairs Lounge	20	1	20	20	1	20	20.0
Toilet - Disabled Access	5	1	5	5	1	6.0	6.0
Clinical / Support (1st Floor)							
Meeting Interview	12	1	12	12	1	13.8	13.8
Clean Utility	14	1	14	14	1	16.7	16.7
Dirty Utility	12	1	12	12	1	12.1	12.1
Bay - Linen	2	2	2	4	2	2.0	4.0
Bay - Beverage	4	1	4	4	1	4.0	4.0
Bay - Mobile Equipment	2	2	4	8	1	8.2	8.2
Bay - Resus Trolley	1	1	2	2	1	2.0	2.0
Bay - Computer on Wheels	2	1	2	2	1	2.0	2.0
Disposal (This is for 'whole of hospital')	8	1	8	8	1	9.6	9.6
Store - Equipment	/	1	10	10	1	10.2	10.2
Store - General	9	1	9	9	1	9.6	9.6
Cleaners Room	5	1	5	5	1	5.0	5.0
Main Entry & Staff Areas							
Staff Station / Reception	14	1	14	14	1	18.3	18.3
Office - Clinical Handover	15	1	15	15	1	15.5	15.5

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Office - Single Person NUM	9	1	9	9	1	9.2	9.2
Waiting	10	1	10	10	1	10.0	10.0
Patient Accommodation - 12 Hour Zone							
Dining Room / Activity	/	1	48	48	1	48.0	48.0
Bay - Meal Trolley	4	1	4	4	1	4.0	4.0
Gym	/	1	80	80	1	80.2	80.2
Store - Gym Equipment	8	1	8	8	1	9.8	9.8
ADL Kitchen	12	1	12	12	1	12.0	12.0
Main Entry & Staff Areas - 12 Hour Zone							
Office - Workstations	5.5	6	4.4	26.4	1	46.0	46.0
Functional Area (1st Floor)				**727**			**773**
Circulation as percentage (32%)	32%		32%	233			
Circulation as drawn (Non-public)							233
Circulation as drawn (Public Street)							110.5
Gross Internal Floor Area (1st Floor)				**987**			**1117**

Clinical / Support Areas - 24 Hour Zone							
Store - Equipment	20	1	20	20	1	20.3	20.3
Main Entry & Staff Areas - 24 Hour Zone							
Store - Photocopy / Stationery	8	1	8	8	1	13.5	13.5
Staff Room	12	1	12	12	1	14.2	14.2
Staff Lockers	2	1	2	2	1	4.7	4.7
Toilet - Staff	3	1	3	3	1	4.5	4.5
Shower - Staff	3	1	3	3	1	4.6	4.6
Patient Accommodation - 12 Hour Zone							
Lounge	/	1	20	20	1	19.7	19.7
ADL Laundry	8	1	8	8	1	10.0	10.0
ADL Bathroom	15	1	15	15	1	15.6	15.6
Toilet - Disabled Access	5	1	5	5	1	6.0	6.0
Clinical / Support Areas - 12 Hour Zone							
Consult Room	12	2	12	24	2	12.5	25.0
Group / Meeting Room	20	1	20	20	1	20.3	20.3

Meeting / Interview Room	12	1	12	12	1	11.8	11.8
Treatment Room	16	1	16	16	1	17.4	17.4
Bay - Resus Trolley	2	1	2	2	0	0	0
Main Entry & Staff Areas - 12 Hour Zone							
Store - File	10	1	10	10	1	10.1	10.1
Office - Single Person	9	1	9	9	1	9.6	9.6
Office - Workstations	5.5	3	5.5	16.5	0	0	0
Office - Workstations	4.4	7	4.4	30.8	1	74.4	74.4
Toilet - Staff	3	1	3	3	1	4.5	4.5
Functional Area				**239**			**286**
Circulation (32%)	32%		32%	77			
Circulation as drawn							191.0
Gross Internal Floor Area (Ground Floor)				**350**			**556**
Gross Construction Area				**1336**			**1673**

Replacement Areas (Internal)							
Existing Pharmacy (Proposed L1)	10	1	31.2	31.2	1	47.9	47.9
IV Store	/				1	8.5	8.5
Existing Pharmacy Office (Store)	9	1	8	8			
Existing Tutorial (Proposed L1)	5.5	1	28.8	28.8	1	30.3	30.3
Existing Clean Linen (Proposed L1)	4.4	1	27	27	1	24.7	24.7
Existing Dirty Linen (Proposed L1)	3	1	9	9	1	17.1	17.1
Existing Plant Part A	5.5	1	54.6	54.6			
Existing 2 Person Office	4.4	1	19.2	19.2			
Stress Test	3	1	17	17			
Existing Veranda (Store & HITH Area)	3	1	70	70			
Replacement Areas (External)							
Existing Medical Records (Proposed L0)	/	1	36	36	1	33.3	33.3
BK Store (Adjacent to Brick Chimney Stack)	/	1	11.5	11.5			
Oxygen Storage Tank Store	/	1	12.8	12.8			
Metal Shed	/	1	7	7			
Additional Areas							
HITH Room (Proposed L0)	/	1	10	10	1	15.5	15.5
CNE Office (Proposed L0)	9	1	9	9	1	11.3	11.3

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04.04 Functional Brief

Refer to the *Moruya District Hospital SubAcute Ward Functional Brief* Version 1.2 as issued 12 April 2012.

04.05 Analysis of Context

Eurobodalla Shire is a Local Government Area in the state of New South Wales, Australia. It is located in a largely mountainous coastal region on the South Coast of New South Wales. It is on the Pacific Ocean, the Princes Highway and the Kings Highway.

The shire chambers are located in the town of Moruya in the central part of the Shire. Other major towns within the shire include Batemans Bay and Narooma. Smaller towns and hamlets include Durras, Nelligen, Mogo, Malua Bay, Broulee, Mossy Point, Rosedale, Bodalla, Potato Point, Nerrigundah, Mystery Bay, Central Tilba, and Wallaga Lake Koori Village.

The Council administers only about 30% of the area of the Shire as the remaining 70% is non-rateable crown land held as national park and state forest: 40% of the shire is national park, 30% is state forest, 20% is productive farmland and 10% is urban settlement.

The Shire is unusual in that nearly half of ratepayers are non-residents. Just over 17% of ratepayers are residents of Canberra. Although the permanent population is around 34,100, the visiting population (who stay more than 3 nights) is 3.1 million per year.

The main growth industries in the area are Construction, Government Services, Real Estate, Retail, Retirement, Aged Care, Tourism, while dairy farming, forestry, sawmilling and commercial fishing are traditional industries in decline. Eurobodalla Shire is serviced by two highways - the Princes Highway between Sydney and Melbourne (part of the renowned Highway One around Australia), and the Kings Highway (National Route 52) linking Batemans Bay to Canberra, the national capital. Moruya Airport, just east of the township of Moruya, is serviced by regular scheduled commuter flights to Sydney and Melbourne. There are no railways or major seaports in Eurobodalla Shire.

Moruya is a town in New South Wales, Australia, situated on the Moruya River, on the far south coast situated on the Princes Highway 305 kilometres (190 mi) south of Sydney and 175 kilometres (109 mi) from Canberra. At the 2006 census, Moruya had a population of 2,432 people. The town relies predominantly on agriculture, aquaculture, and tourism.

The average maximum temperature ranges from 24°C in summer to 17°C in winter, average minimum temperatures range between 16°C in summer and 7°C during winter and the average annual rainfall in the Eurobodalla is around 963mm.

Moruya Hospital is a 69-bed level three hospital and provides acute and community health care services, comprising accident and emergency services, cancer treatment, dialysis, elective surgery including general, gynaecological and other elective surgeries, palliative care, geriatric assessment, obstetrics and outpatient services. The hospital provides emergency, high dependency medical, surgical, paediatrics and obstetric care. Patients are referred to Moruya Hospital from Batemans Bay Hospital for obstetric and most general surgical procedures. Bed numbers in a hospital vary with seasonal demand — for example, flu season or holiday periods.

Access to the Hospital is generally from the Pacific Highway to the East, and along River Street. Patients are linked to Canberra Hospital via helicopter transfer. Occassionally patients arrive to the Moruya Hospital via helicopter, as a consequence of emergency airlift.

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04.06 Architectural Intent - Value Proposition

The proposal's primary concept is the creation of a "Green Core".

Rehabilitation is understood as a process of 'bringing back to health', that is supported by both the clinical function and physical environment of the Rehabilitation Centre.

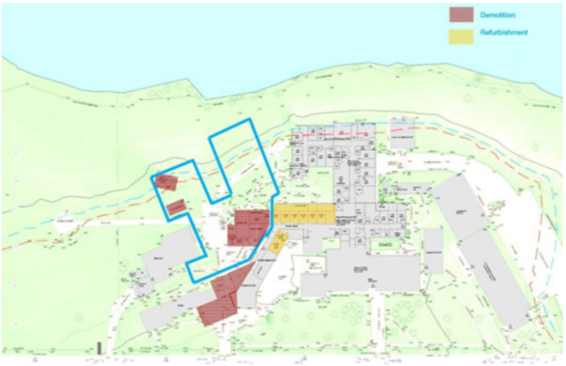
The Rehabilitation Centre is sited in a position of significant natural beauty. Accordingly the deisgn intends to Bring inside the building the wonderful natural surrounds to enhance its contribution to the recovery process.

By defining an enclosure and holding in of nature, the building design intends to form a **green 'core'**,

That defines a healing community, and underlines the importance of patient and staff participation in the rehabilitation process.

04.07 Siting

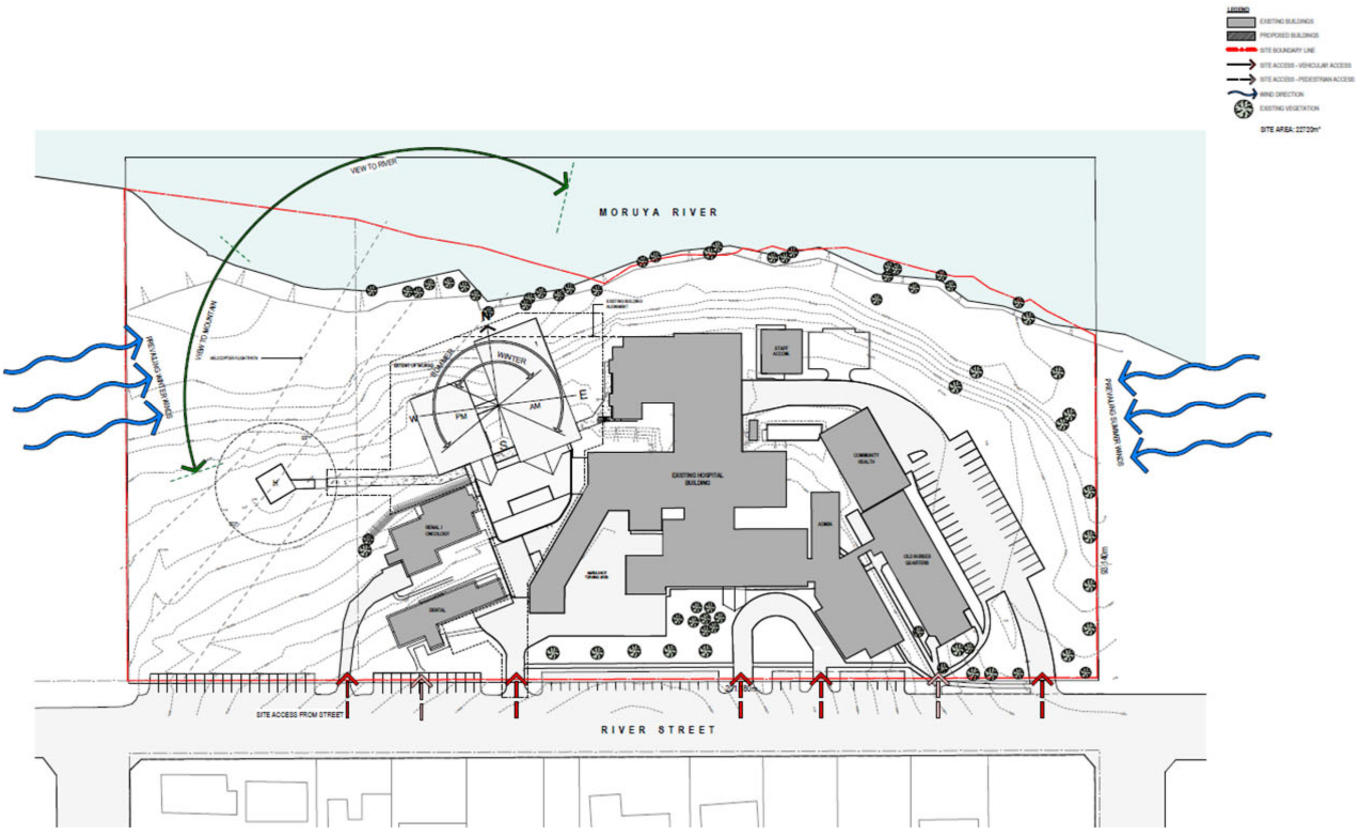
The Moruya Hospital is located on the southern bank of the Moruya River.



As discussed in Section 3.02, the building site identified for the Rehabilitation Project during the masterplanning phase is the land area between the existing Major Hospital Building and the Renal and Oncology Building, and north toward the riverbank.

This site location effectively constrained the available land area for the Project, as existing buildings are located to the south, east and west of the existing project site, and the river to the north. This restriction on available land area had the effect of inducing a two storey solution.

Site Microclimate



The site is afforded excellent views to the north of the Moruya River and farmlands beyond, and distant views to Wandera State Forest to the North and West and the Mungerarie State Forest to the west.

A minor complexity for consideration by the design team is the desire to view in a westerly direction, but also the incidence of peak heat loads to this west façade occurring in the afternoon.

Existing vegetation is generally limited to within the riverbank riparian zone, existing within the waterline and top of bank alignments, a zone of about 4 metres or so in width.

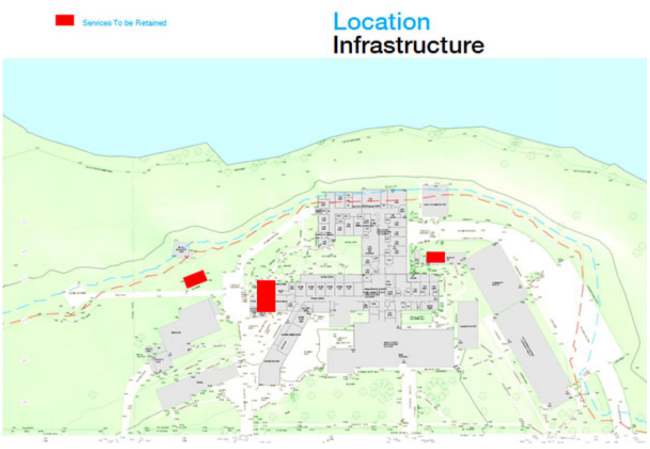
Due to the location of the site in close proximity to the coast, breezes are predominantly on-shore (blowing toward the west) in the mornings or off-shore (blowing toward the east) in the late afternoons.

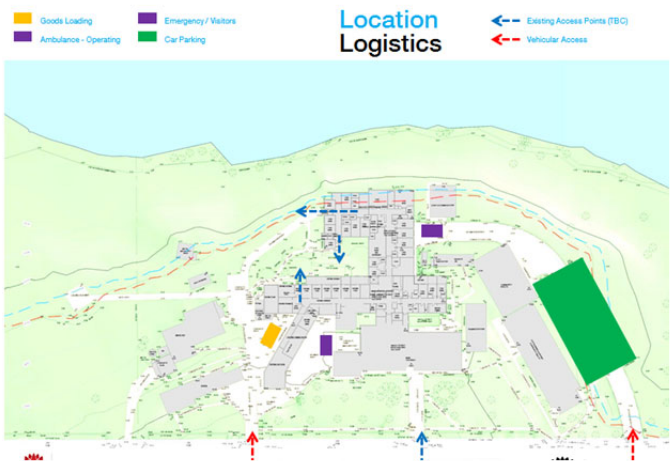
River Road to the south is the only point of access to the site but this road runs the entire length of the southern boundary of the site and provides many access points and opportunity for access.

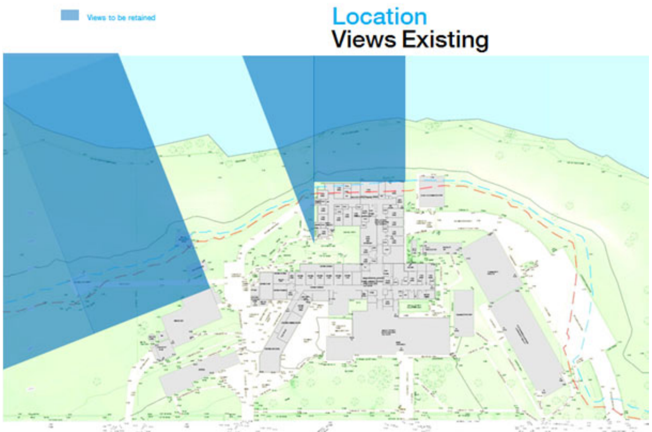
An existing community garden is located within the proposed Rehabilitation site.

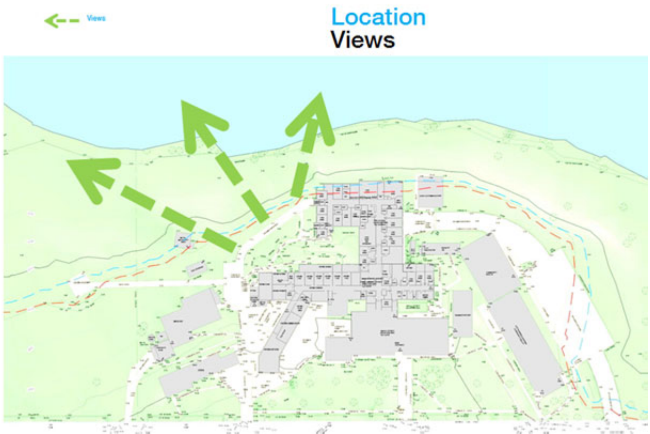
The following key diagrams provide an overview of existing site constraints.

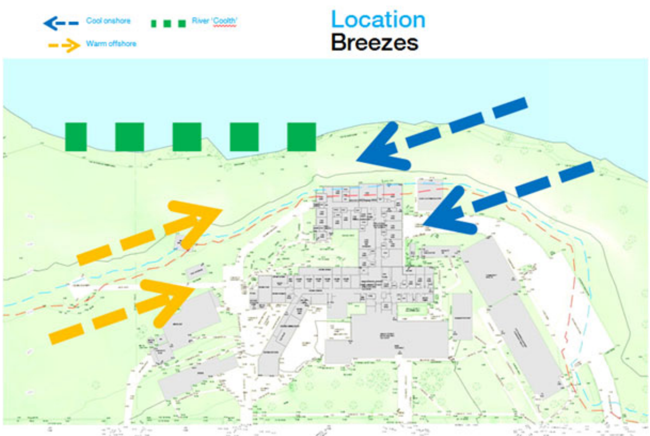
Infrastructure

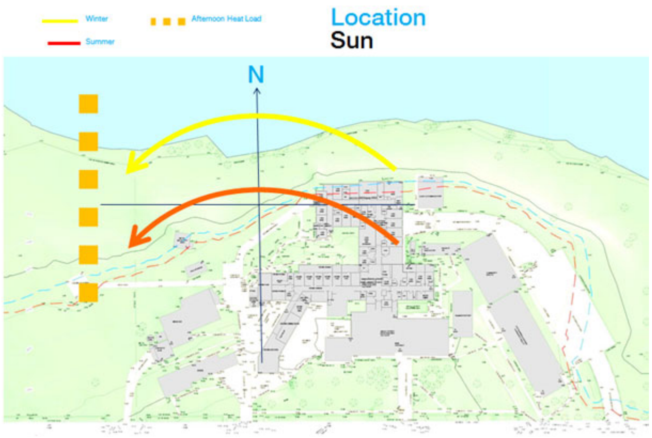


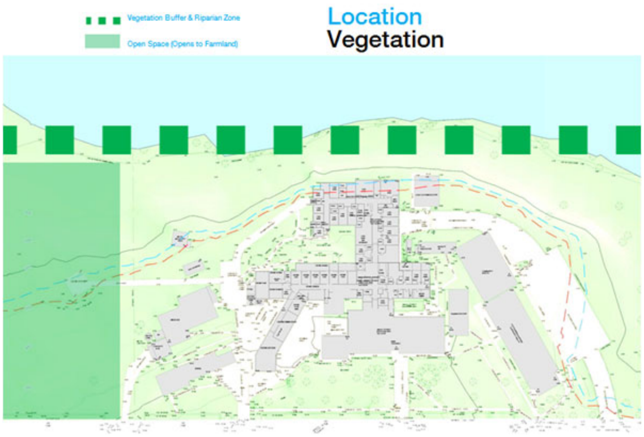


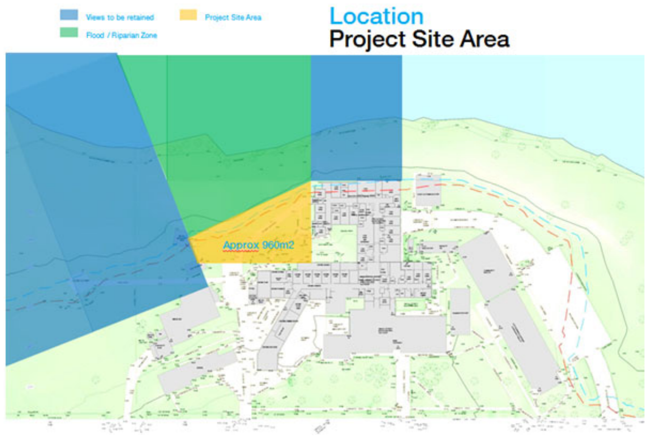






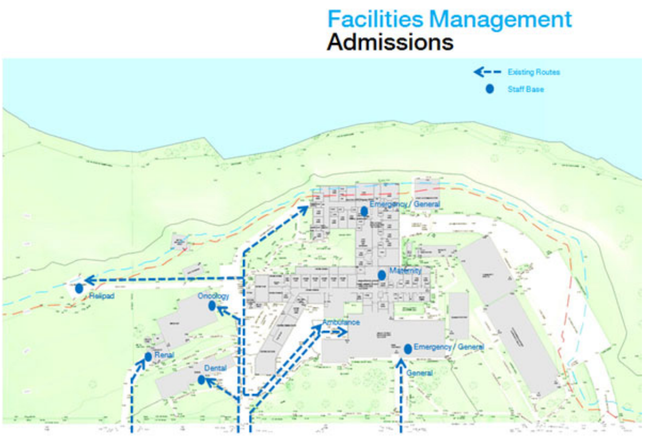


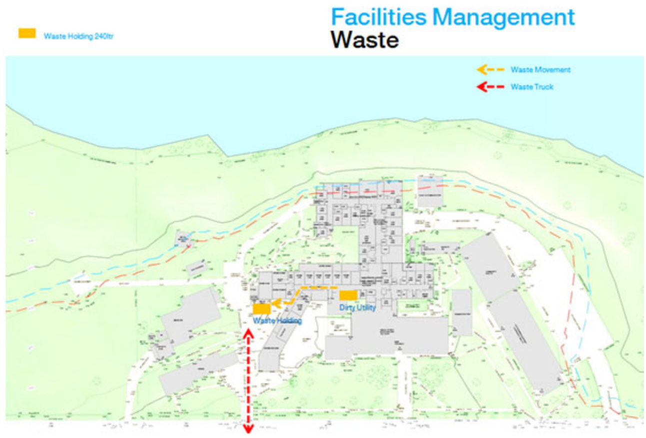


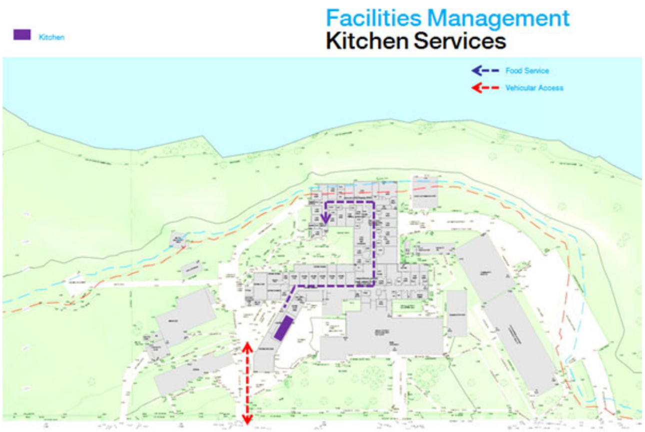


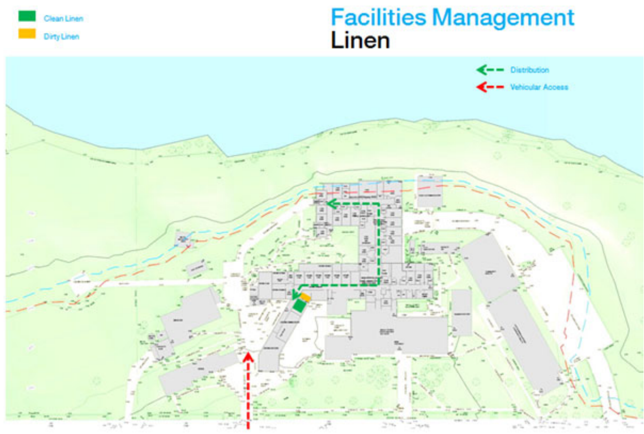
Site Wide Facilities Management

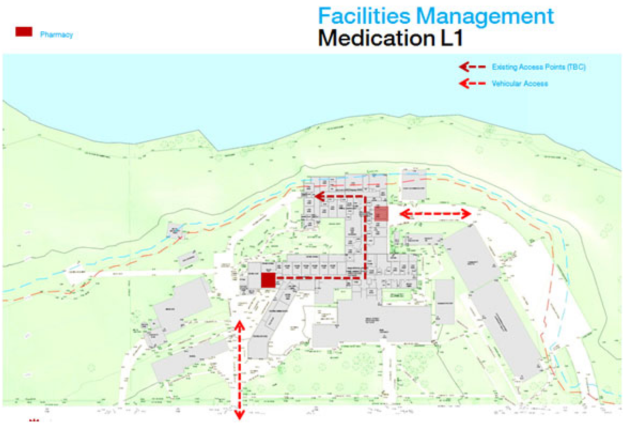
Site Logistics were assessed in terms of Admissions, Waste, Kitchen Services, Linen Services, Medication Delivery and Staff Access. The following diagrams were developed after site visits and review of the existing building documentation accessible to the design team.

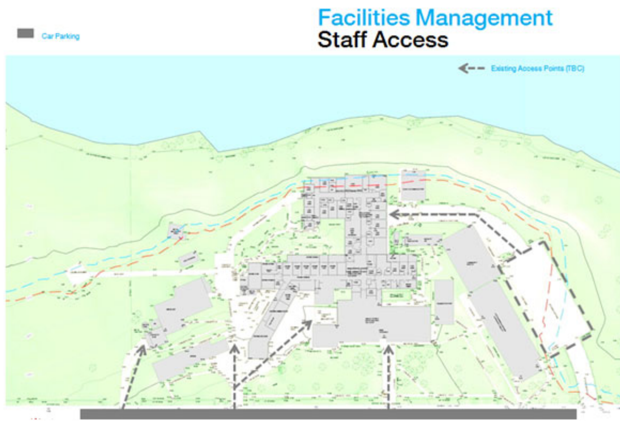












Flood Constraints

The Moruya River drains a catchment of some 1500 square kilometers. In the main, the catchment is rugged and steep, rising to 1000metres above sea level only 40 kilometres inland. As a consequence, catchment runoff is swift and the Moruya River develops large floods in a relatively short space of time. By comparison, the 1% flood discharge of the Moruya River is almost as great as that of the Hunter River, despite the latter having a catchment nearly fifteen times greater. Because the flood flows of the Moruya River debouch rapidly from the steep upper catchment, the great depth of flood water, during major floods, can be relatively fast moving.

Due to the proximity of the Moruya Hospital to the Moruya River, the proposed Site falls within the Moruya River Floodway. As a guide the Project has referenced the Eurobodalla Shire Council Local Environmental Plan 2012 and Moruya Floodplain Code July 2012.

The data from the Eurobodalla Shire Council indicates the Flood Hazard Category of the flood liable land associated with Moruya Hospital site varies from ‘very high’ to ‘extreme’. Risk mitigation requirements are defined within the Moruya Floodplain Code July 2012.

The floodplain code requires that for allowable building work, the finished floor level of that part of a structure which is, to its greater extent enclosed with walls of impervious material, is above the FPL and that the underside of any horizontal support structure, beams, floor support, etc, and service ductwork are above the FSRL.

The FSRL is defined by the Code as the ‘Flood Standard Reference Level’, and for the Lower Moruya River Estuary this has been adopted by Council as at the 1% AEP level, or the probability of a given flood height being equaled or exceeded in any one year. For example, a 1% AEP flood has a 1% probability or a 1 in 100 chance of occurring or being exceeded in any given year. The FSRL for this project is defined as RL 5.69 AHD.

The FPL is defined by the Code as the ‘Flood Planning Level’ or the level used for planning purposes. For most developments this level is set at 500mm above the 1% AEP level. The FPL for this project is defined as RL 6.19 AHD.

The PMF is defined by the Code as the Probably Maximum Flood or the the flood situation, calculated to be the maximum which is likely to occur. For the Moruya River catchment this is calculated at a peak discharge three (3) times that of the 1%AEP. (The PMF defines the maximum or full extent of the floodplain, the extreme limits of flood behaviour, and the extent of the associated flood risk. Storm events with rainfall of the order of the PMP, although extremely rare, do occur. The behaviour and potential consequences of floods up to the PMF event need to be given consideration in determining the FPL. It will generally be impossible, in either a physical or economic sense, to provide general protection against such an event). The PMF for this project is defined as RL 7.90 AHD.

The Hospital is designated as 'Vulnerable Developments' within the Moruya Floodplain Code. This code requires that emergency response and recovery facilities can fulfill their functions after a flood event, and as such that essential services functions within the hospital are located above the PMF level.

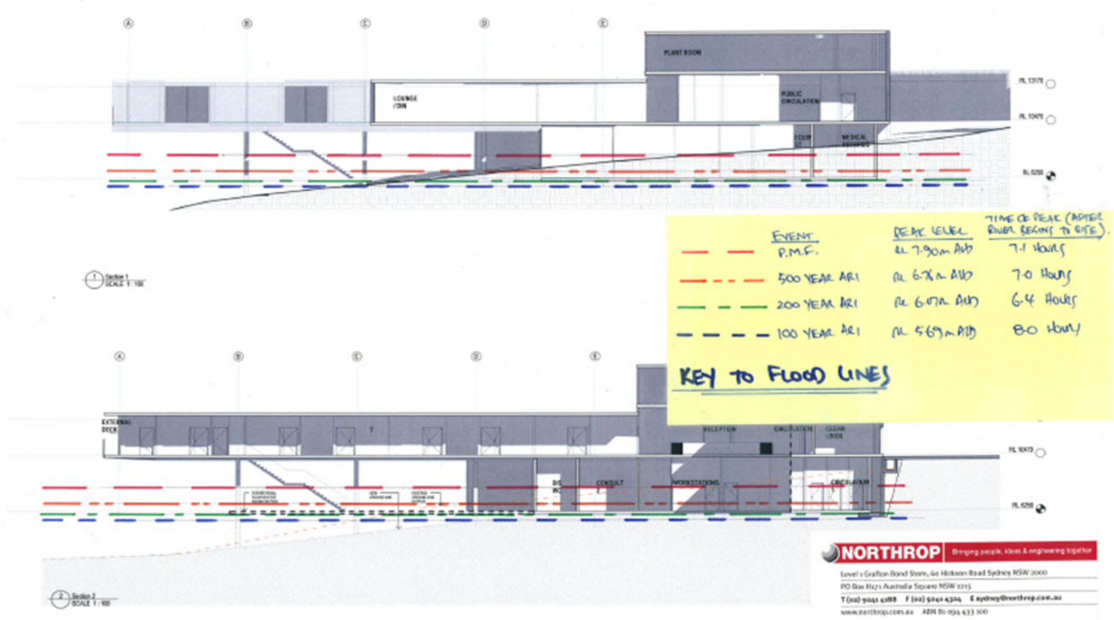
Guidelines for the design of building structures within the flood zone are referenced by the Code and will be considered in the ongoing design development for this project. Additional constraints are imposed by the Moruya Floodplain DCP, including requirements that the supporting structure of any building below the FSRL w wherever possible to remain unencumbered by enclosing of vertical areas and infill walls. If such elements are essential design considerations such vertical infill panels shall be aligned with the predominant flood flow vector. The sub floor support structure shall render the least impedance to the flow of flood waters. The structure must withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A detailed report from an appropriate consulting structural engineer will be required in support of a development application.

As an adjunct to this limitation, advice from the Civil Engineer provided that any built work that imposes on the calculated flood volume at the site, as defined by the FSRL, must be compensated for elsewhere on the site.

In terms of ongoing management of the facility, the Code requires that where structures could be used by people, even if only for short periods; such as amenities buildings and shelters, the applicant will need to demonstrate that permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people from the area, should a design flood or greater occur. It would also be appropriate that the property have in place a site specific flood warning and evacuation process which can be implemented without delay should a flood event be imminent.

A detailed report has been compiled by Northrop consulting Engineers on the above risks for this Project; this is included in the Appendicies.

Site Plan showing FSRL, FPL and PMF Flood Planning Levels on Site



Section showing Flood Levels relative to the proposed Development

Riparian and Ecological Zones

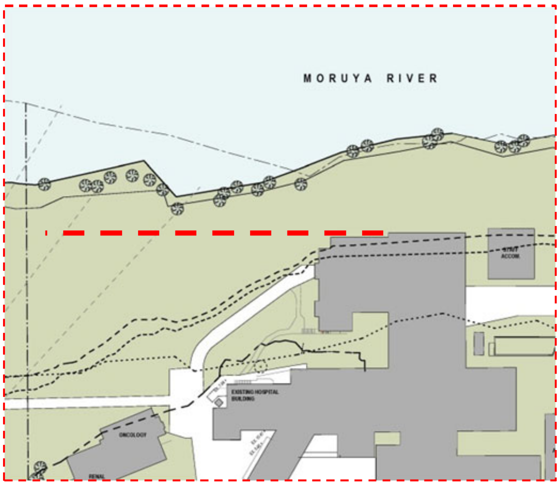
As can be seen from the above diagram, the proposed area of works is within 40 metres of the top of bank line for the Moruya River as shown on the site survey. Moruya is designated a Category 1 watercourse. As such, development within the Riparian Zone is prohibited, however the Water Management Regulation 2011 provides exemptions for public authorities. The Moruya LHD is one such public authority.

An Ecological Report has been prepared to assess the impacts of the proposed development on the Riparian area and flaura and fauna generally that may inhibit the river corridor. Generally, The remnant riparian vegetation within the study area is characterized by a narrow strip of Swamp Oak *Casuarina glauca* on the top of bank, with a few Coastal Grey Box *Eucalyptus bosistoana* individuals, above a very weedy understorey and groundcover. The remainder of the vegetated areas of the hospital support well maintained lawn with scattered ornamental plantings of mainly exotic species.

Accordingly the proposed development was found to not encroach on the existing ecological vegetation as is found on site currently.

Diagram showing extent of Remnant Native Riparian Vegetation at the proposed site

Site Photos of the Existing Riverbank Vegetation



A key constraint agreed by the design team was to not impose on the riparian or ecological constraints any more than the existing buildings do currently.

As such the alignment of existing buildings on the site, particularly the northern frontage of the existing building, became a constraining line for the design, in that no built work would occur be proposed north of that line.

This assumption was reported to HI and the Local Authorities and became a key constraint in developing the schematic design.

Geotechnical Advice and Bank Stability

A concern that arose from early site visits was the potential for major excavation works to undermine stability of the riverbank. For this and reasons associated with information requirements for the structural design, a comprehensive geotechnical assessment was completed at the site that investigated the ground condition and any potential instability of the river bank.

Natural alluvial soils were encountered for depths up to 2.8mtrs at the riverbank that would otherwise be prone to erosion if large, fast flowing flood events occurred. However, the geotechnical investigation also discovered underlying weathered rock that would otherwise provide good stability for structure.

As a consequence of these discoveries, the building is designed to be founded on piles socketed to this underlying weathered rock, thus obviating any structural stability problems that may be associated with the loading of the building to the identified unstable alluvial soil.

Excavation works are limited to areas above the FPL, this also serves to constrain the impact of any excavation works on the stability of the existing riverbank, as the FPL is set back from the riverbank by an adequate distance.

Existing Site Services

Because of proposals to undertake excavation works at the site, in-ground services investigation works were completed to ascertain the impact of the proposed excavation works on existing hospital services as well as reduce risk that those services may be interrupted as works progress.

Services identified and the method by which they will be diverted or replaced is dealt with in the Services Schematic Design report.

Demolition Works

As is discussed in Section 5.06 *Response to Model of Care*, the optimal site location involves the demolition of parts of the existing main hospital. These works have an impact to the following existing hospital service:

- Tutorial Room
- Existing Office Space
- Pharmacy
- IV Store
- Plant Room – comprising Central Heating and Hotwater, & Oxygen Supply
- Existing Brick Chimney
- Cytoxic Waste Store
- Partial demolition and Reinstatement of the Loading Dock
- LPG Tank
- Large Shed – comprising equipment storage and medical records

This design consideration had an impact on the functional operations of the hospital as well as the operation of existing services.

In terms of impacts to existing services, AECOM provided an Audit of the existing plant, evaluating their condition and replacement cost. These costs were incorporated to ongoing Services Design SD cost review to ensure that the proposed demolition works were appropriately managed as part of the design proposal.

The functional spaces associated with the demolition works were accounted for as an update to the Functional Brief and incorporated to the Schedule of Areas. This allowed for various options for their relocation to be considered by the design team as is discussed in later sections.

Operations in the Loading Dock have been considered as part of staging of works and are defined as a consequence of alternative logistics options on site that are currently available. These stages of works are discussed in more detail in later sections of this Report.

Overall it can be said that:

- In terms of existing services, there will be no interruption to the current service during construction or commissioning of the new building;
- In terms of existing hospital function or areas, at completion of the rehabilitation building there will be no loss of function or area by the existing hospital; and
- In terms of the existing loading dock, during construction works all current services will be accommodated and managed, and at completion the loading dock will provide an equivalent service to the existing condition.

Aviation

The proposed building site is in relatively close proximity to the existing Moruya LHD Helipad. As such Rehbein Airport Consulting was commissioned to provide an assessment of the proposed development on the existing helicopter service.

This report found that there are 2-3 flights a week and that all helicopter movements are retrievals. Final Approach and Take-off Areas (FATO) as well as existing obstacle restrictions were investigated and identified, as well as constraints on the proposed building design. The identified Helicopter Flight Path was then located on the design proposal site plan, to act as a constraint on the design.

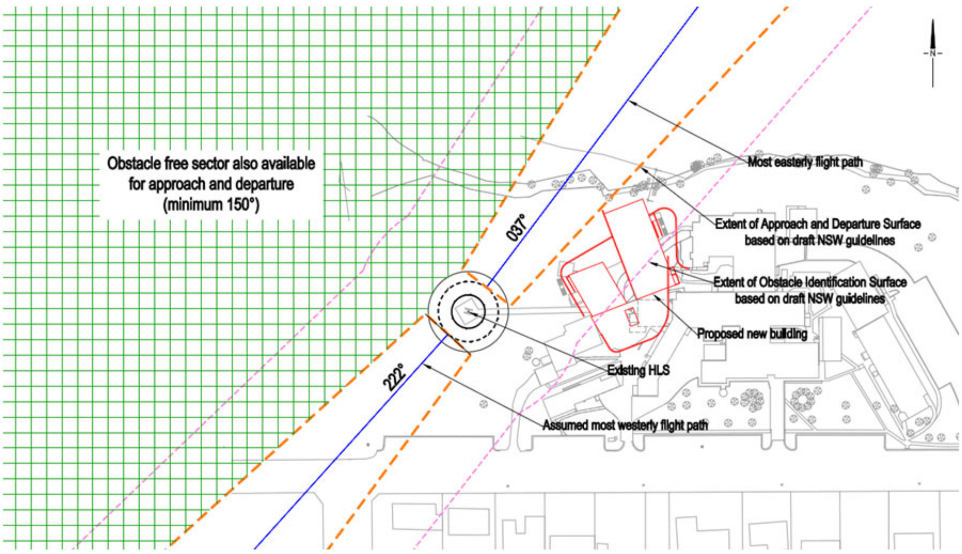


Diagram showing the agreed Flight Path and relationship to the proposed building

Flight operators using the site were also consulted to ensure their agreement with the flight path restrictions. Further detail is provided in the Rehbein Report included in the Appendicies.

Hazardous Materials

As a consequence of the proposed Demolition and Excavation Works, an investigation of Hazardous Materials present on site that may be effected by the proposed scope of building work was investigated and a report provided by Clearsafe Environmental Solutions.

This report identified the presence of asbestos, Synthetic Mineral Fibres (SMF), Polychlorinated Biphenyls (PCBs) and Lead materials on site as well as provided safe working methods for their removal as part of the major works.

04.08 Building Form / Height

Site Area

As can be seen from analysis in Section 5.04, the available site area is restricted. The land area available as defined by site constraints of viewlines from Dental and the existing Main Hospital Bed Wing, the existing Main hospital Building to the south and the FPL alignment on the site to the north, leave a site area of approximately 800m2. This led the design team to consider various strategies to overcome the limited site area.

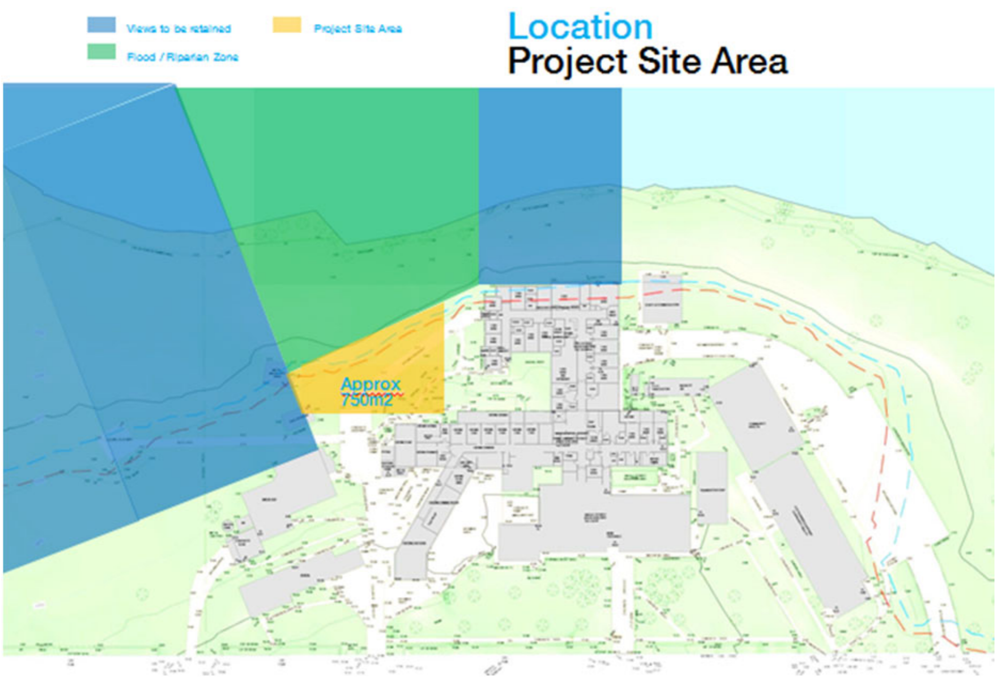
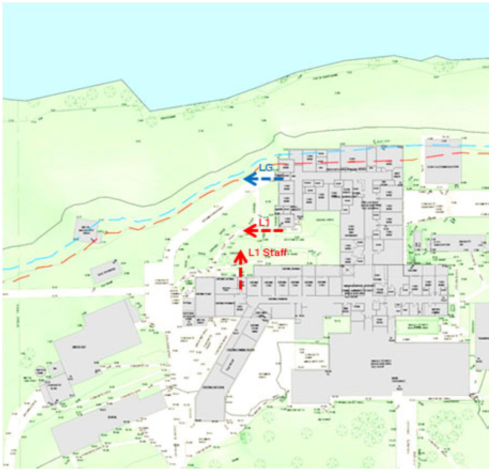


Diagram showing available site area and agreed constraints

Site Access



The existing site can be accessed from the existing hospital via the main building at either the lower or upper level. At the upper level, at grade access would occur at RL 10.5 AHD, and at the lower level, at grade access would occur at RL 6.25 AHD.

The diagram at left indicates the location and level of access points easily achievable from the existing hospital. Each access option was considered in consultation with the users.

Hospital 'Street'

As can be seen in Section 3.01, a key future proofing consideration for the whole of hospital is the creation of a hospital street which has the effect of consolidating access to future buildings from one hospital axis and splits the site horizontally to provide allotments for future works of reasonable depth.

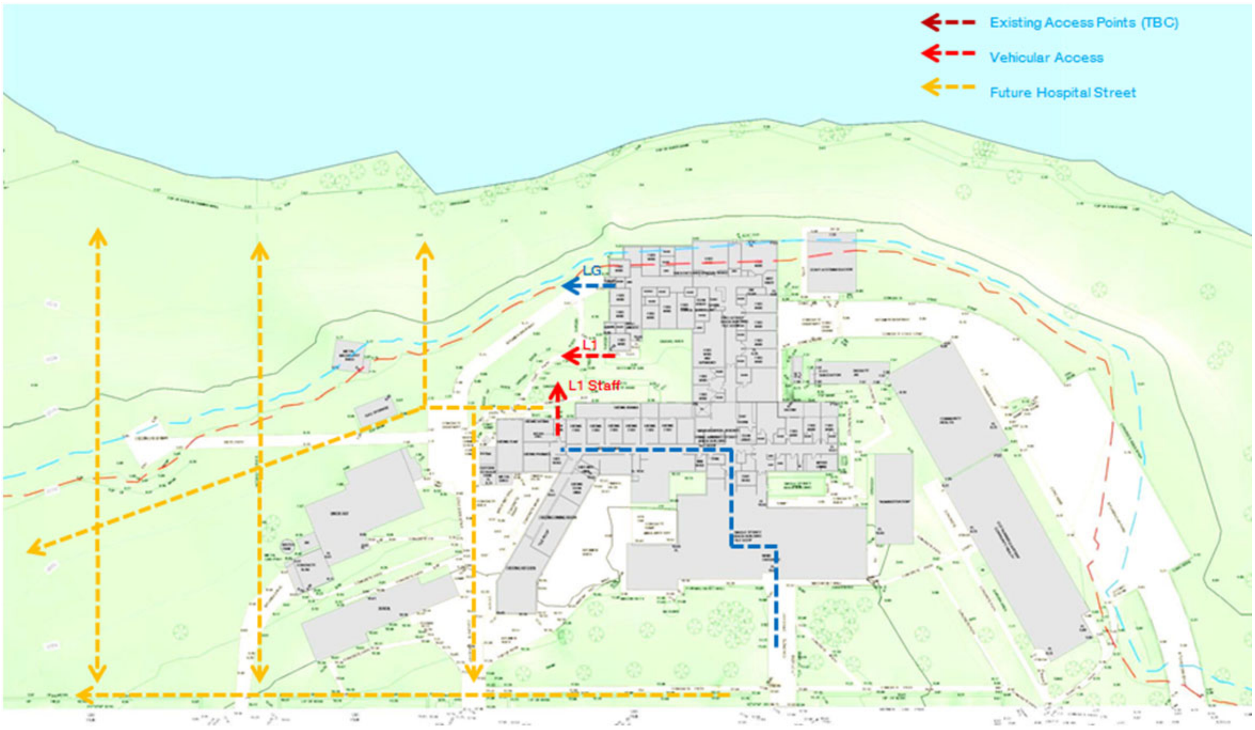


Diagram Showing Proposed alignment of future Hospital Street

It was envisaged that this street would connect to and feed from the existing main hospital east west corridor. The manner in which this hospital street connected to the existing hospital was considered in detail by the design team to come up with the ideal solution.

Further it was agreed during the design process to align to the FPL line, to ensure that resulting land plots were equally affected by flood constraints. This change in direction formed part of the consideration by the design team as to where it should be located.

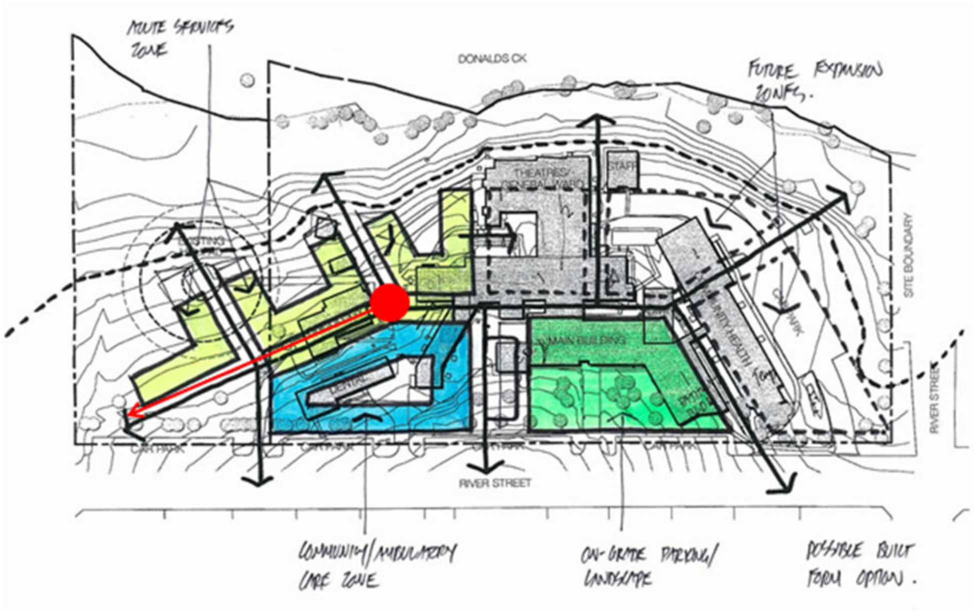


Diagram showing change in alignment for the proposed Hospital Street Concept

It is assumed that the existing Renal and Oncology Building and the Dental Building will be demolished and reconstructed as part of the longer terms masterplan strategy for this Hospital.

Whole of Hospital Services impacted by the proposed Works

During the consultation process with the users, a number of rooms were identified as being impacted either by Demolition Works, identified as being considered for alteration as part of the proposed scope of the Rehabilitation project.

As discussed earlier, rooms impacted by the demolition works include:

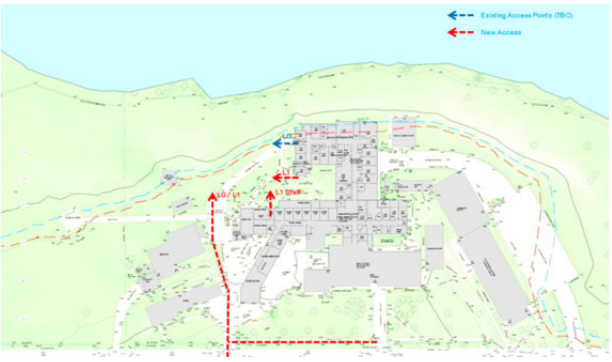
- Tutorial Room
- Pharmacy
- IV Store
- Medical Records Store (As is currently located in the Plant Room)
- Office adjacent Bedrooms

Rooms identified as being considered as beneficial to alter or relocate as part of the Rehabilitation project scope is as follows:

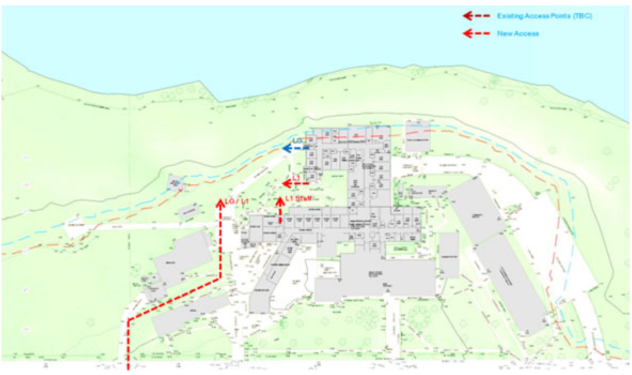
- Existing non utilised Bedrooms
- Stress Test (Currently located on the Balcony)
- HITH (Currently located to one of the non utilized Bedrooms)
- Patient and ADL Toilets
- Staff Toilets
- Clean Linen
- Dirty Linen
- Dining Room

Site Access Constraints

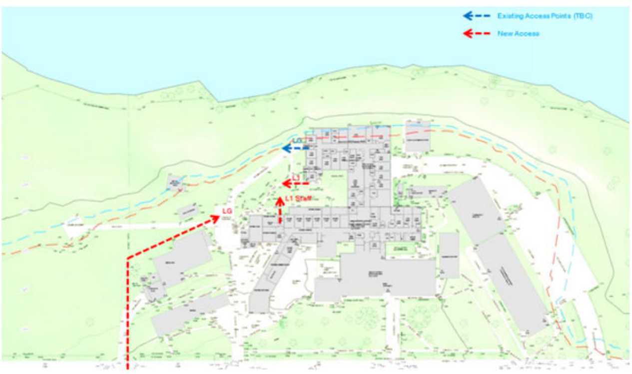
A range of options for accessing the new Rehabilitation Building were considered as part of the Concept Design and Response to Masterplan phase.



Project Site Access Option 1 considers the main arrival to the project site along the existing driveway servicing Oncology. The connection back to the main hospital was defined as being along the existing footpath along the River Road frontage.



Project Site Access Option 2 considers entry to the hospital site via the location of the existing Renal drop off driveway, then along a proposed path between Oncology and Renal Building and the Dental Building, arriving at the southern side of the project site.



Project Site Access Option 3 identifies a route from the Renal driveway and along a future path to the north of the Renal and Oncology building.

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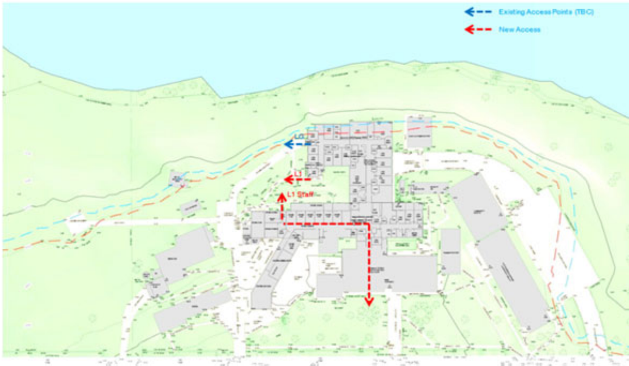
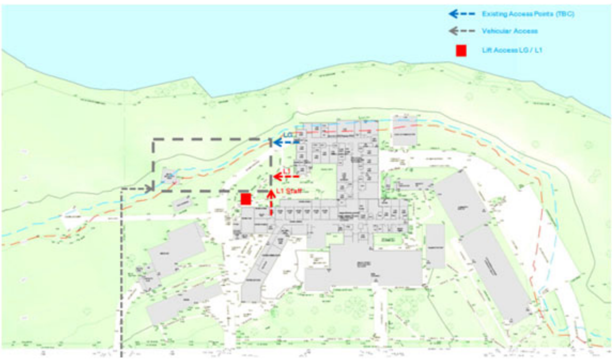


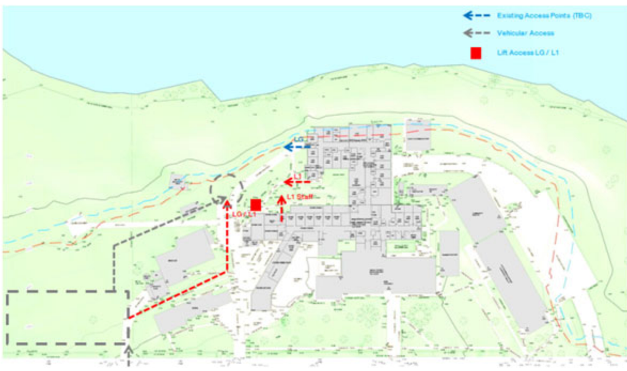
Project Site Access Option 4assumes travel through the existing Main Hospital Building.

Car Parking Requirements

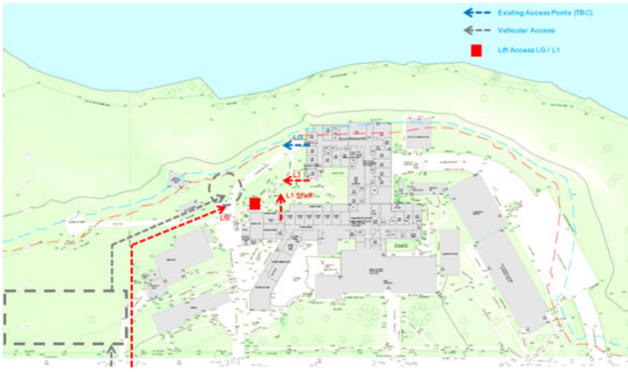
Additional Car parking is designated as required as a consequence of either the likely demand for car spaces arising from the new unit or the impact to the existing car parking configuration of the Hospital. It was observed during site visits that a number of informal spaces are utilised by staff working at the hospital and within the hospital site. Consideration was given in the design phase to the best location of the new car park.



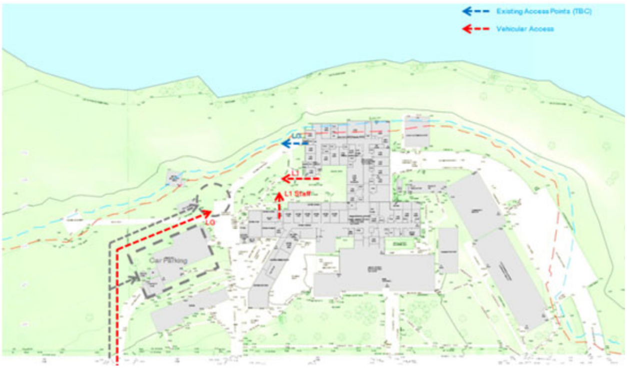
Option 1 considers car parking to the undercroft of the proposed two level rehabilitation facility. This option would require construction of retaining walls and land fill within the flood zone and as such was discarded.



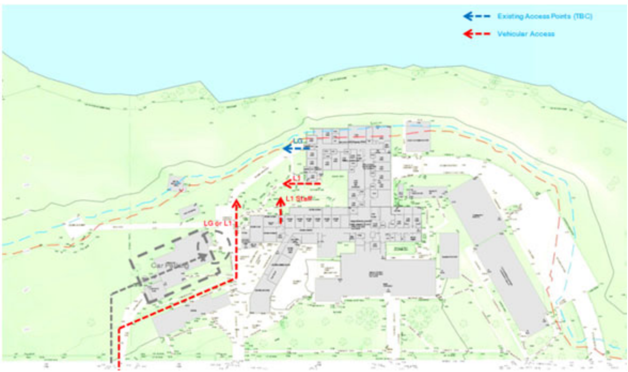
Option 2A locates the proposed car park to the western and southern corner of the site with a new vehicular drop off in front of the Renal / Oncology building at the lower level RL 6.25 AHD. Option 2A considers pedestrian access to the site between the existing Renal / Oncology Building and Dental Building, arriving at the project site at the proposed upper Level at RL 10.5 AHD. It is worth noting that as part of this proposal, the newly constructed widening of the ambulance bay has displaced some fill to this part of the Hospital site.



Option 2B considers a similar car park location and vehicular drop off to Option 2a, however pedestrian access is in front of the Renal / Oncology building and accessing the Project Site from the lower level at RL 6.25 AHD.

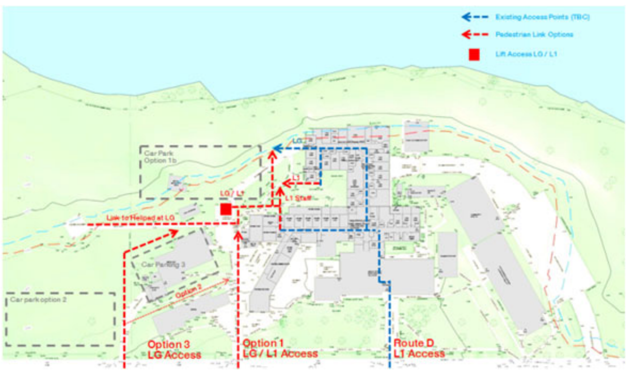


Option 3A assumes the demolition of the Renal / Oncology building as part of the main works, allowing for the location of a car park in this location. Vehicular drop off and pedestrian access are similar to Option 2B.



Option 3B is as per Option 3A, except that pedestrian access is proposed as per Option 2A.

Pedestrian Link Options



The diagram at left summarises the three potential pedestrian access points to the Project Site, and the level of arrival at the Project Site.

Route D is through the existing Main hospital Building and arrives at the upper level RL 10.5 AHD. Option 1 also arrives at the upper level RL 10.5 AHD. Option 2 arrives at the lower level RL 6.25 AHD.

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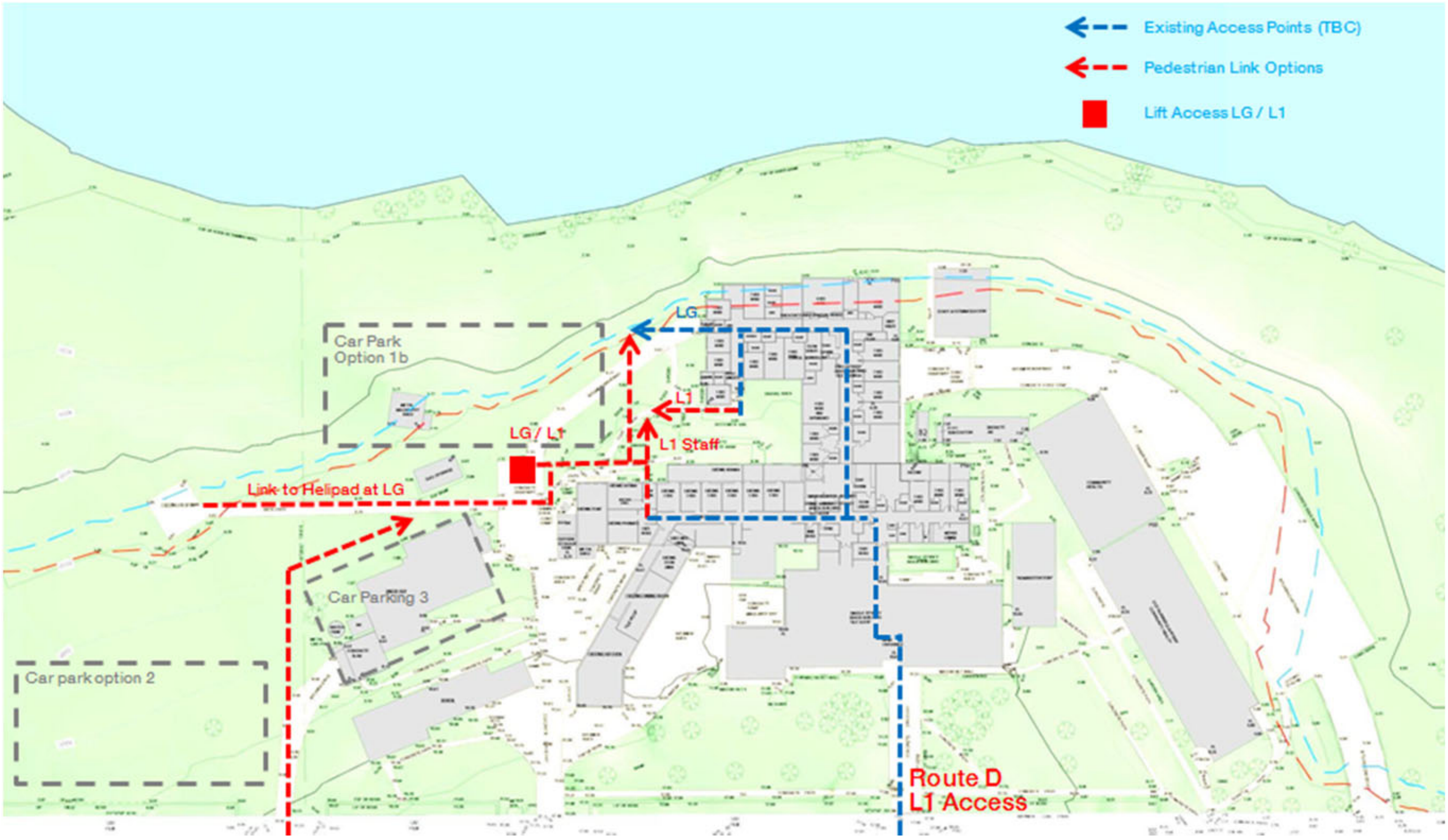

The above Diagram shows the preferred site access configuration as agreed with the Users. This allows for access to the project Site through the Main Hospital to the Upper Level, or via a new footpath to the west from the proposed Car Park arriving at the Lower Level. A requirement of the design was agreed that the Helipad Access Route in its current alignment is required to be maintained.

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04.09 Response of Model Care

During the user groups consultation process, key design drivers were identified for consideration of the design of the patient areas:

1. High Patient Observation

Design of the facility is to optimise the line of sight from the staff station to a specific number of patient bedrooms in which patients who are higher risk of falls can more readily be observed. Observation and surveillance into patient bedrooms from the corridor is high priority and can be achieved through corridor/observation windows and room layouts, as is the location of staff sub write up bays along the corridor close to the bedroom areas.

2. Patient Safety

Patients with multi-dimensional medical conditions will be the main users of the new facility and therefore falls prevention is of particular importance in this group. The new facilitiy is designed at the same floor level as the existing, avoiding the use of ramps or stairs internal to the facility.

3. Daylight, External Views

The bedroom layouts, building orientation, and its external facade treatment have been developed to maximise access to natural light and external views to landscaped courtyards. Access to natural light in the common corridors and living areas is acheived through strategically positioned clerestories in the roof structure.

Models of Care

Incorporate the Rehabilitation Model of Care:
- Accessible
- Patient-centred care that involves the patient and the carer
- Multi-disciplinary care teams
- Patient centred care
- Evidence based care
- Appropriate care setting

Intuitive Way finding Strategy
- Establish clear departmental zones and circulation paths
- Combined Entry/ Identify for new Entrance

Separation Of Flows
- Establish clear departmental zones and circulation paths
- Provide safe and secure environment
- 24 hour/12 hour zones

Operational Efficiencies
- Enable services to be provided efficiently
- Short patient and staff journeys

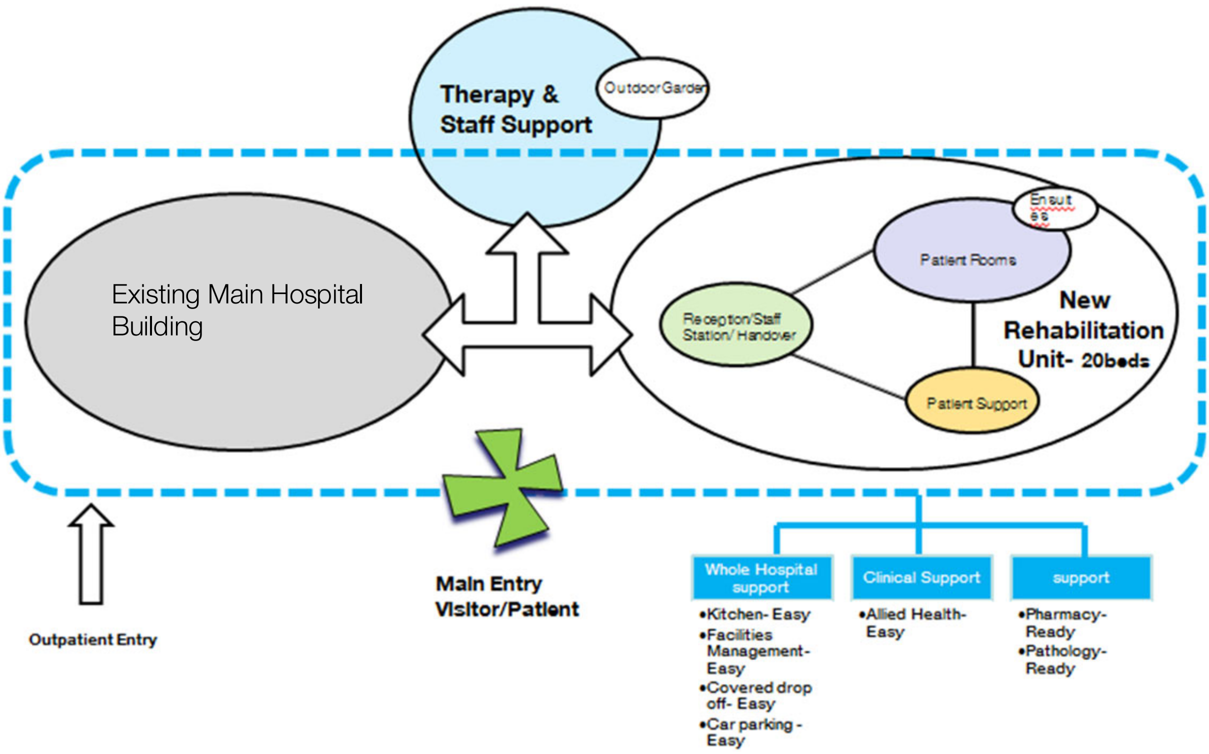
Site Constraints/ Opportunities
- Respond to the site and maximize opportunities
- Create opportunity, renewal and buffer zones

Links, Connections & Entries
- Identify a long term strategy for circulation

Quality environment
- Natural daylight and optimum views
- Establish social and or community zones
- Non institutional feel
- Design for the aging population
- Community space
- Observation

Adjacencies – Whole of Hospital

The Schedule of Areas provides an outline set of requirements of various rooms included to the brief to meet the Model of Care. The brief does include information regarding key functional relationships and these are summarized by the below bubble diagram:



It can be seen from the above diagram that the existing Main hospital building is key to the functional relationships described above as well as key design requirements of limited staff travel distances and proximity to existing whole of hospital facilities.

Adjacencies – Within Unit

Preferred adjacencies were considered in a User Group Meeting and summarized in the schedule:

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Summary
Adjacency Matrix

Room Type (Ranked closest to 24 hour areas)	UP	Room Type (Ranked closest to lift)	DOWN
ADL Kitchen	1	Consult Suite	2
Consult Suite		Offices	3
Gym+ Staff work space	3	Lounge	4
Dining Room	1	ADL	2
Living Room	2	Pharmacy	1
		Conference Room	4

Prioritise: What '12 hour' function needs to be closest to the '24 hour' zone?

In this table it can be seen that in terms of proximity to the Bed Wing (24 Hour Zone), the Users preference is that the ADL Kitchen and Dining Room is closest, the Living Room is next closest and the Gym and associated Staff Areas is the least proximal.

As a consequence of considering the two level designs, key functional zones were also considered in terms of their proximity to the lift. The Users preference in this regard is that the Pharmacy is the closest, Consult Suites next closest, followed by Offices, Lounge and Conference Room in that order.

Access to Views

Access to views were identified in the Briefing stage as being of concern to the Users, given that the project site has access to high quality views this was accepted into the requirements of the clinical planning.

However it is not possible to achieve views from every space accordingly rooms were prioritized in terms of their requirements for views, for reference by the design team in moving forward.

Room type		Comments
Consult Suite	2	
Offices		Requires windows
Lounge	1	
ADL		Courtyard
Pharmacy		A small window is required
Conference		Requires windows

The above table relates to spaces agreed to be located downstairs, refer discussion in section *Two Level Solution* below.

Design Precedent

A review of other Rehabilitation Units was undertaken with the users to consider various functional configurations available. Mona Vale, Golbourn and Woy Woy Rehabilitation projects were referenced. All were noted as having various site constraints and opportunities that also influenced the clinical outcome.

Diagram showing Mona Vale Plan and Key Functional Groupings

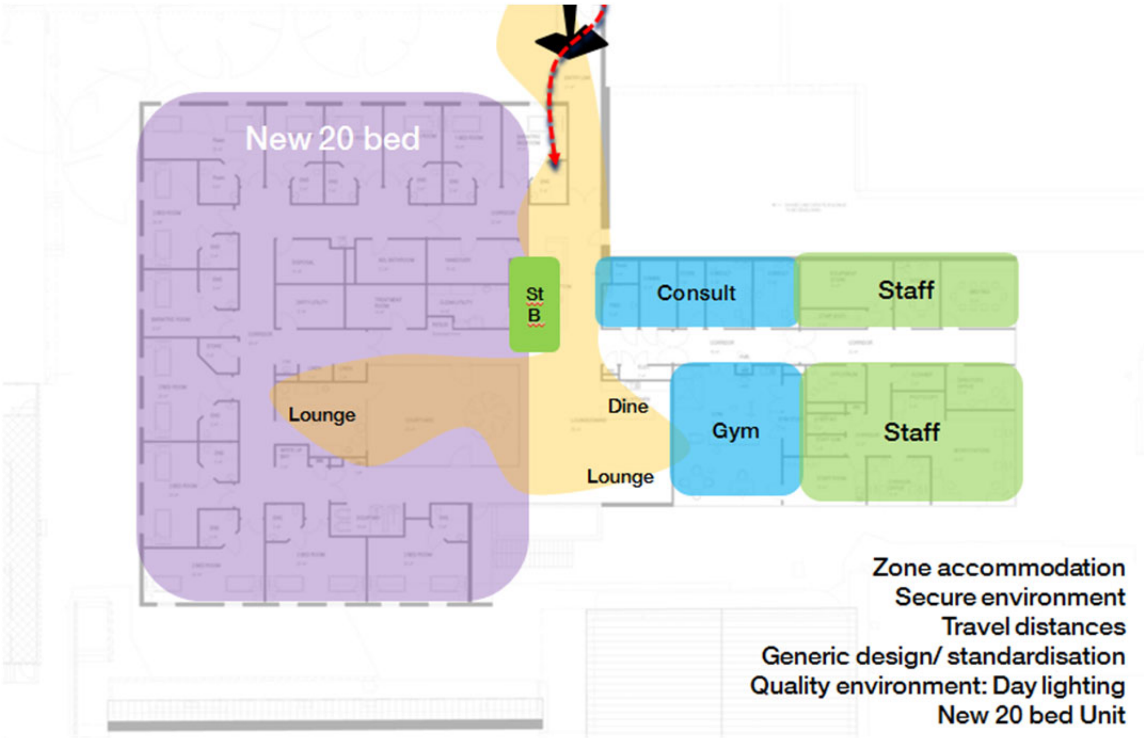


Diagram showing Goulbourn Plan and Key Functional Groupings

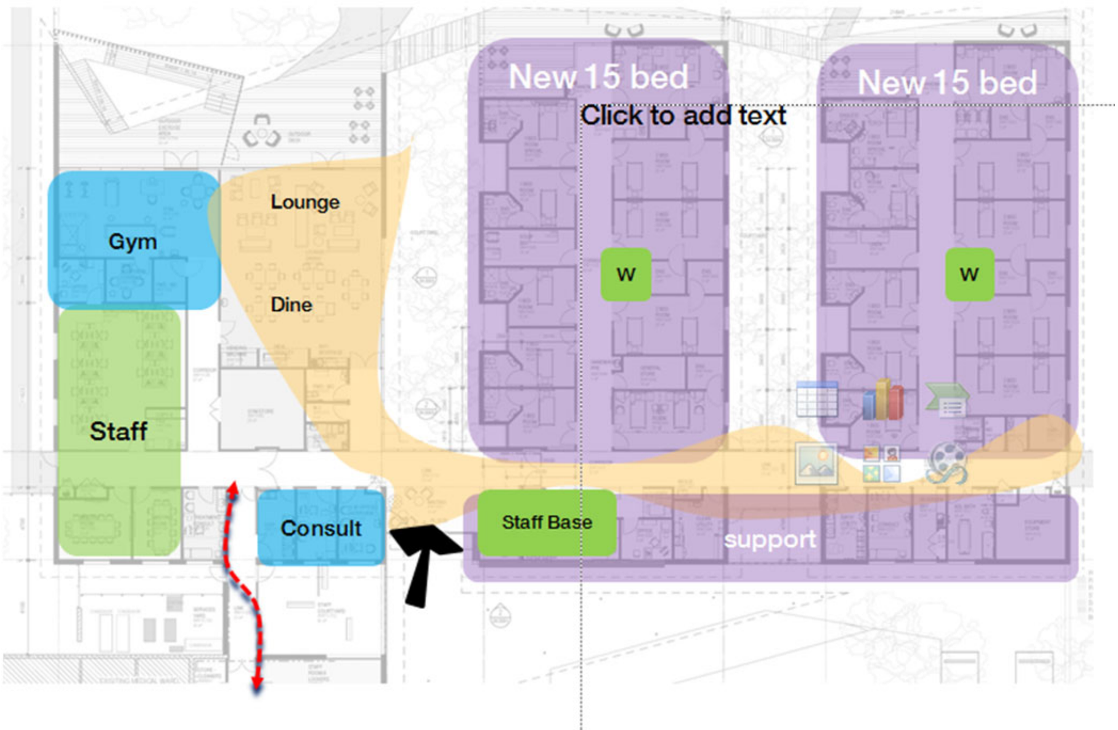


Diagram showing Goulbourn Plan and Key Functional Groupings

Two Level Solution

Early in the design process, options for the composition of this two level solution were considered in consultation with the users to define the optimal upper floor and lower floor service groupings.

The design team was able to review the Schedule of Areas as contained in the Functional Brief and defined in the PDP stage in order to assess the relative footprints of various functional configurations. As a consequence of the preferred functional groupings on each level, the upper floor typically had a larger floor area than the lower floor, leaving an undercroft space available for future fit out and expansion. The undercroft was also seen by HI as a low cost future expansion zone for the Renal and Oncology service.

Two key options were defined for the up / down split to the Schedule of Areas and are outlined below:

Option 1: Upstairs: Gym, ADL, Therapy, Allied Health and associated workstations all locate to Level 1.
Downstairs: Staff Areas, Consult Suites, Replacement Staff Room, Outdoor Therapy
Provides 720sqm available footprint to the undercroft

Option 2: Upstairs: Staff Areas, Consult Suites, Replacement Staff Room, Outdoor Therapy
Downstairs: Gym, ADL, Therapy, Allied Health and associated workstations all locate to Level 1
Provides 470sqm available footprint to the undercroft

Areas for the two options and as derived from available Schedules of Areas are as follows:

Opt 1			Opt 1			renal + oncology		
L1	Net	843	LG	Net	149	LG	Net	487
	Circ	269.76		Circ	47.68		Circ	229.1456
	Ext	200		Plant	200		Check	716
	TOTAL	1112.76		TOTAL	397		TOTAL	716
Opt 2			Opt 2			oncology		
L1	Net	656	LG	Net	338	LG	Net	319
	Circ	209.92		Circ	108.16		Circ	150.3232
	Void	50		Plant	100		Check	470
	Ext	50						
	Plant	100						
	TOTAL	1015.92		TOTAL	546.16		TOTAL	469.76

Option 1 was defined as the preferred configuration by the Users as it provided for grouping of all indoor therapy activities at the same level as the bedrooms.

Accordingly the two storey option, in being adopted, added a new lift to the hospital service. A key consideration therefore was ensuring that the new lift would be accessible by whole of hospital to ensure that the existing lift and new lift were provided with a redundancy.

Future Expansion Renal and Oncology

A benefit flowing on to the hospital from this design option is the opportunity to relocate the existing Renal and Undercroft service into the undercroft space of the Rehabilitation project. This is a relatively low cost opportunity to provide new facilities for the existing Renal and Oncology service, as well as making available the land area currently occupied by the Renal and Oncology building. This opportunity is discussed in more detail in Section 5.02.

The available undercroft spaces were assessed against the draft Renal and Oncology schedule of areas and resulted in the following opportunities. This schedule required 11 chairs for Oncology and 9 chairs for Renal.

Future Expansion Renal and Oncology under Two Storey Option 1

Brief			
oncology	300	11 beds	27.27 m2 per bed
Renal	338	9 beds	37.56 m2 per bed

Available Net Opt 1		
oncology	243.47	9 Beds
Renal	243.47	6 beds

Option 1 provided the larger undercroft area and potentially 9 beds Oncology and 6 beds to Renal.

Future Expansion Renal and Oncology under Two Storey Option 2

Brief			
oncology	300	11 beds	27.27 m2 per bed
Renal	338	9 beds	37.56 m2 per bed

Available Net Opt 2a		
oncology only	319.44	11 Beds

Available Net Opt 2b		
oncology	159.72	6 Beds
Renal	159.72	4 beds

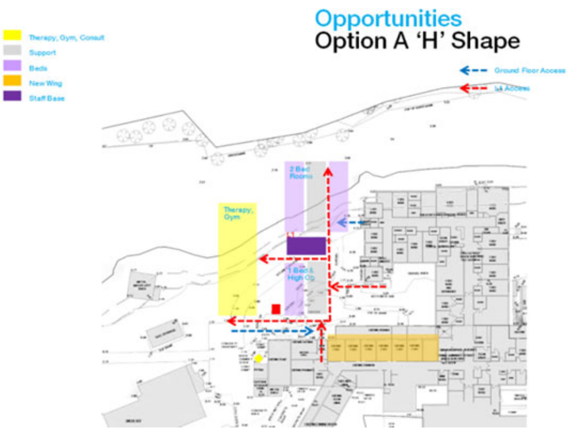
Option 2 provided the lesser undercroft area and was considered inadequate for both Oncology and Renal expansion (6 beds Oncology in lieu of 11 briefed and 4 beds Renal in lieu of 9 briefed).

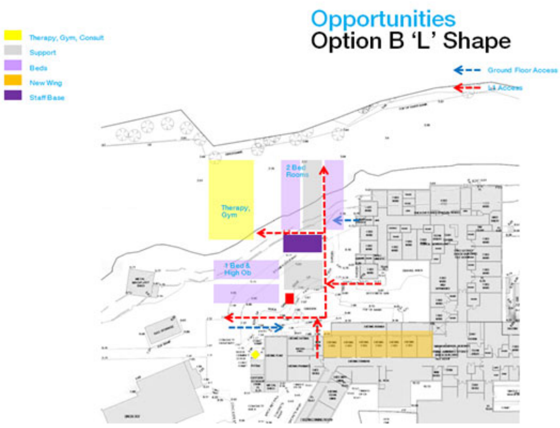
As a sub option, Option 2a considered allocation of only one of Renal or Oncology for Future expansion to the undercroft of Oncology only, assuming that Renal would not relocate but expand into the space vacated by Oncology. This option was not preferred due to the condition of the existing Renal and Oncology building and it reaching the end of its effective life.

Accordingly on the basis of assessment against the preferred undercroft areas available under Options 1 and 2, Option 1 is supported by the preferred configuration and relocation strategy for the Oncology and Renal service.

Early Planning Concepts

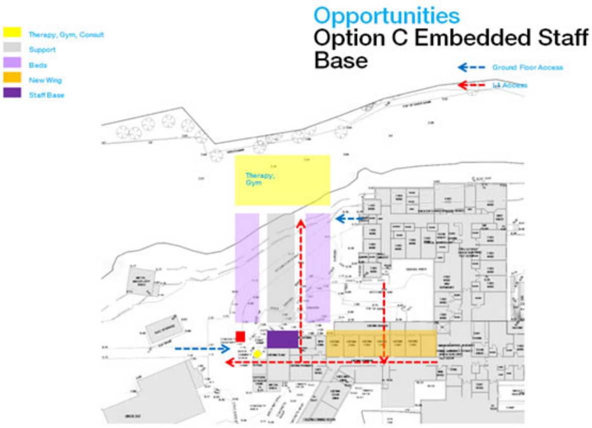
Planning Options
Working within the two storey constraint, various functional configurations were reviewed by the design team as below:

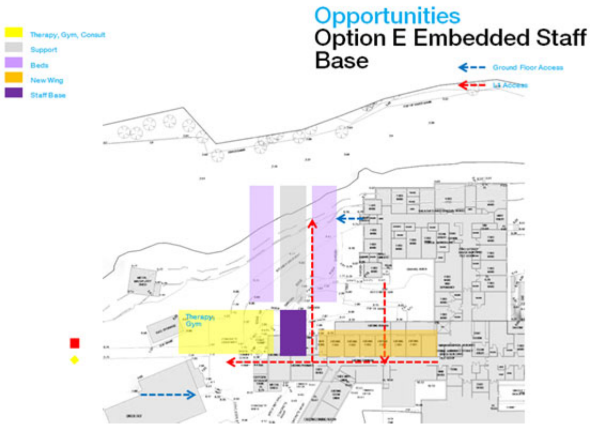




Option A provided for a centralized staff base position (shown in purple) and service core (shown in light grey) to the bed wing and therapy spaces aligned to the western side of the project site. This option was seen as constraining views to the bed wing, as well as making more remote the services core from the existing hospital.

Option B concentrated staff support areas to the area south east corner and bed wings extending out in 2 pods, in an easterly and northern direction. This option was seen as making too remote the therapy wing and the staff base from the main hospital.

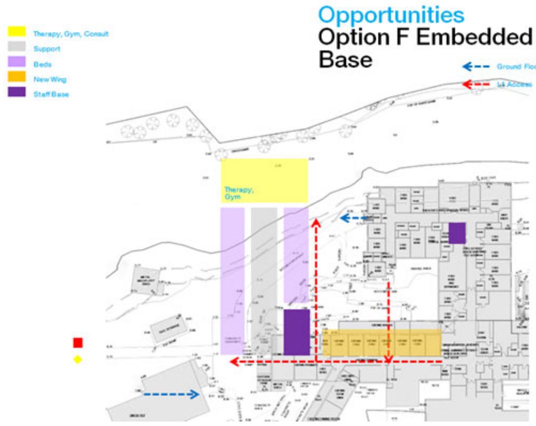


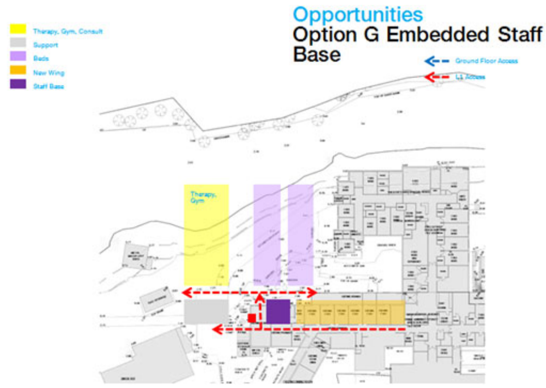


Option C investigated the option of activating the existing 6 beds in the south east wing of the existing hospital by embedding the staff base between these existring bedroom and the proposed 20 bed wing. This required the staff base to locate immediately adjacent the existing beds, to ensure good surveillance. A central service core was provided to a single consolidated bed wing and therapy spaces located at the northern end. This option was deemed to be too long for the site and encroaching unacceptably on the river corridor. However the activation of the bed wing was seen as a positive outcome.

Option D was not included.

Option E provides a similar configuration to the bed wing, staff base and staff support, however the therapy space is located to the east and extending out. However it was deemed that there was inadequate area available for the therapy wing in this lateral configuration, as it was constrained between the width of the proposed bed wing and the existing renal and oncology building.





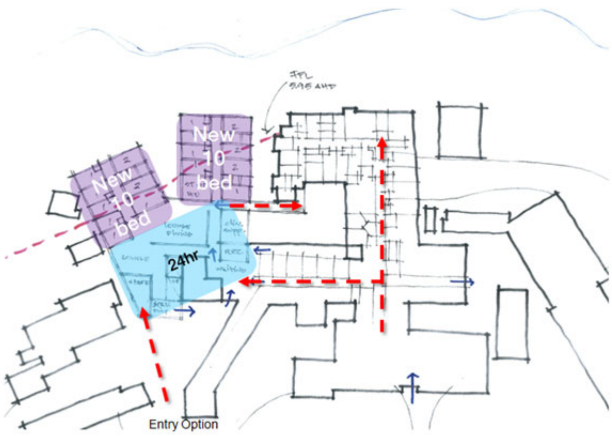
Option F is a variant of Option E and again was deemed to be too long a building for the site.

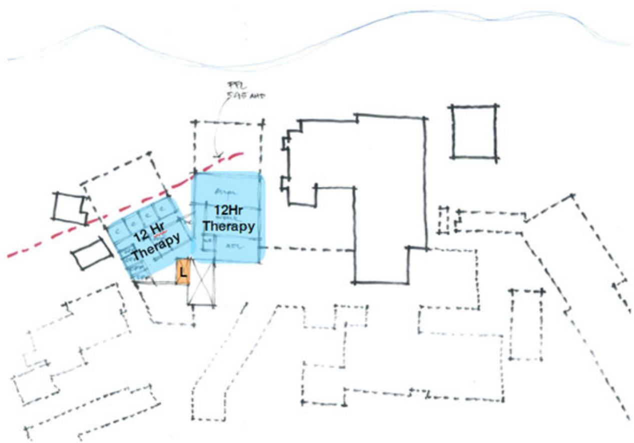
Option G provided for an embedded staff base as per Option C, however located the therapy space along the western side of the project site. This resolved the issue of Option E as the therapy space had adequate space to accommodate the functional areas. This option was seen as being the optimal configuration.

Sketch Planning

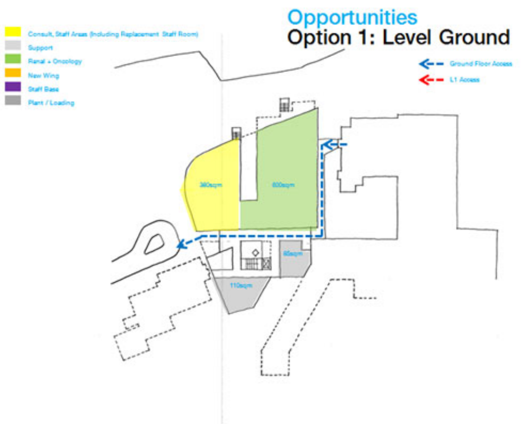
Iteration 1

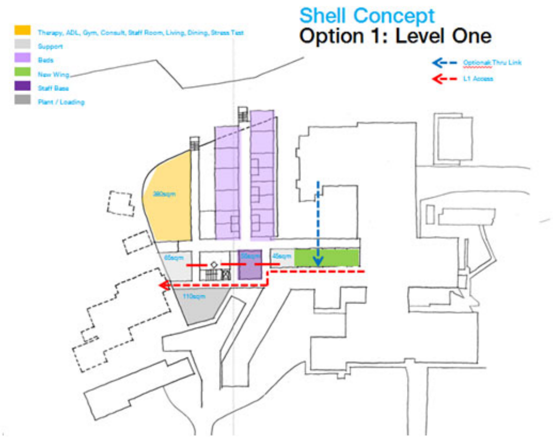
This early planning option investigated the two storey option and utilized two seperate 10 bed wings. The lower floor was constrained behind the flood line.



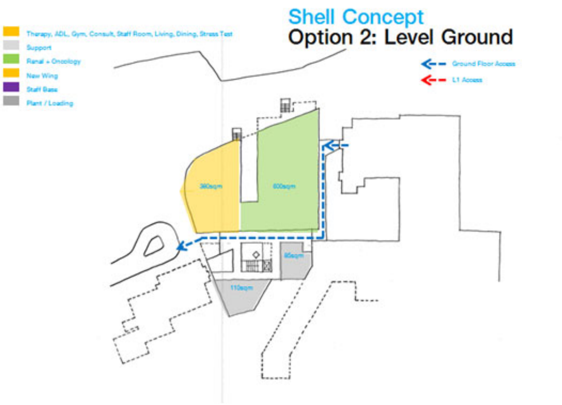


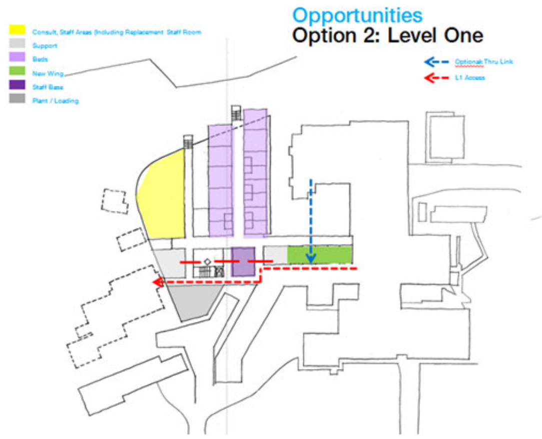
Iteration Two





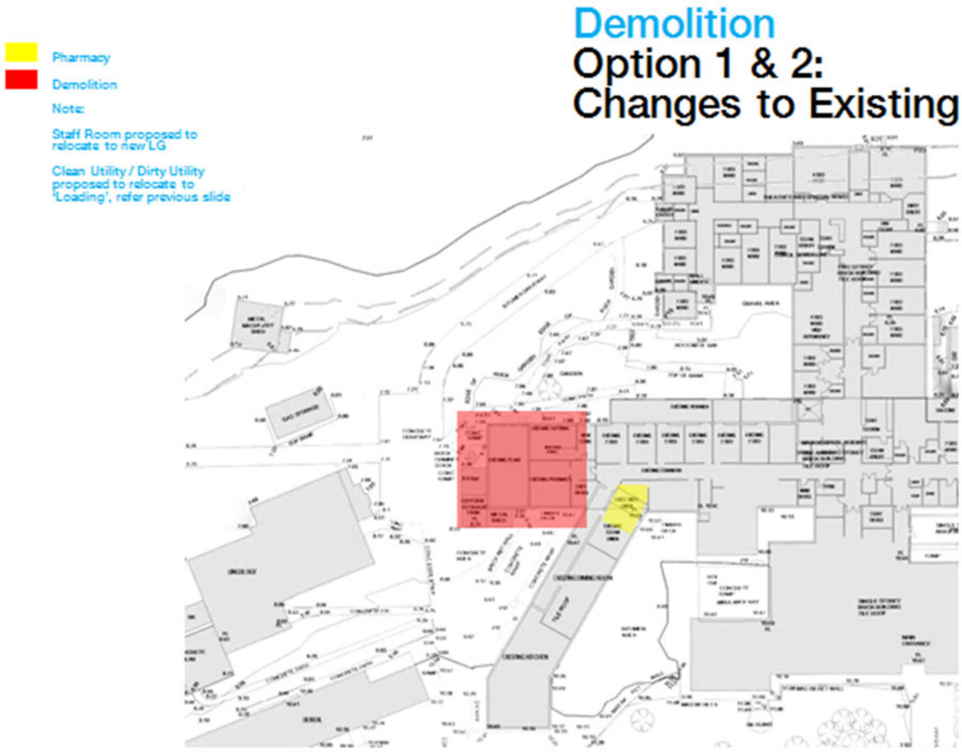
Option 1 provides for Consult and Staff Areas, Renal and Oncology and BOH located at ground floor, and Therapy, Gym, Allied Health and ADL to be located upstairs with the bed wing;





Option 2 provides for Therapy, Gym, Allied Health and ADL, Renal and Oncology and BOH located at ground floor, with Consult and Staff Areas located upstairs with the bed wing.

Of the two options, Option 1 was preferred by the Users as it located the Therapy spaces in closer proximity to the patient beds.



As a consequence of adopting the embedded staff base, and the available site area, it was necessary to reclaim the site area currently occupied by the most westerly end of the existing Main Hospital building.

This proposed demolition displaced rooms as outlined in Section 5.04 Siting above, and are repeated here for clarity;

- Tutorial Room
- Pharmacy
- IV Store
- Medical Records Store (As is currently located in the Plant Room)
- Office adjacent Bedrooms

Cost Review Option 1

Due to the increased and previously unforeseen complexity of the project scope arising from the preferred functional outcome, a high level cost review of Option 1 was undertaken and provided the following considerations as variations to the scope of work considered at the PDP stage of this project:

Cost Review
Option 1
Gym Upstairs, Renal + Oncology Shared Areas

The building has increase by approx $90m2 excl the renal / oncology which adds approx - $365K.

Additional costs of the lift and carpark works - $180K
additional Mech plant required, as advised by Aecom - $305K

Demo of existing buildings - $95K

Renal & Oncology Shell and Core (including Façade) - $906K

Undercroft works for plant - $100K
SAVING in escalation - $500K

Revised Building Cost totals $7,920,033 which is an uplift of $1.45M from project brief.

Updated Schedule of Areas

The Schedule of Areas as completed in the Briefing phase in consultation with the users, was updated to include all of the existing spaces proposed to be altered or deleted as a consequence of this preferred functional outcome. Some spaces were defined as 'above the line', being rooms directly referenced by the functional brief, other items were referenced as 'below the line' being rooms indirectly affected by the functional requirements and agreed functional planning concept.

This updated schedule is provide below for reference and became the basis for ongoing design work in the Schematic Design phase.

WOODS BAGOT

Woods Bagot
MORUYA HOSPITAL
2 story option (20 Bed Subacute GEM/ Rehabilitation Ward)

		HFBS	Functional Brief				WB Schematic Design			
no.	Rooms	HFBS	Qty	Size (m2)	Total Area (m2)	Comments	Qty	Size (m2)	Total Area (m2)	Comments
	Main Entry - Level 00									
1001	Waiting	10	1	10	10	2m2 per person	1	0.0	0	combined with 1002
1002	Lounge - Families / Carers	12	1	12	12		1	23.8	23.8	
1003	Disposal	8	1	10	10		1	11.0	11	
1004	Cleaners Room	5	1	5	5		1	8.5	8.5	
1005	Toilet - Staff	3	1	3	3		1	4.4	4.4	
1006	Shower - Staff	3	1	3	3		1	5.9	5.9	
1007	Toilet - Disabled Access	6	1	6	6		1	6.2	6.2	
	Functional Area	**47**			**49**				**59.8**	
	Circulation (40%)	19			20				24	
	Floor Area	**66**			**69**				**84**	
	12 hour pod Staff Areas									
1008	Store - File	8	1	10	10	Confirm this requirement	1	8.7	8.7	
1009	Store - Photocopy / Stationery	8	1	8	8		1	13.8	13.8	
1010	Office	9	1	9	9	Doctor	1	9.1	9.1	Doctor
1011	Office	9	1	9	9	CNE	1	9.1	9.1	CNE
1012	Office	9	1	9	9	To be aligned with staff profile	1	9.1	9.1	
1013	Workstation	4.4	10	4.4	44	as per MB email Sent: Wednesday, 2 May 2012 10:19 PM	1	82.3	82.3	10 workstations - includes circ for office suite
1014	Workstation	5.5	0	5.5	0	as per MB email Sent: Wednesday, 2 May 2012 10:19 PM	0	0.0	0	
	Functional Area	**52.9**			**89**				**132.1**	
	Circulation (25%)	13			22				33	
	Floor Area	**66**			**111**				**165**	
	12- hour pod Consultation suite									
1015	Consult / Interview	12	1	14	14	locate one on uper level outside IPU	1	13.9	13.9	
1016	Consult / Interview/ exam	12	1	14	14		1	13.9	13.9	
1017	Consult / Interview/ exam	12	1	14	14		1	13.9	13.9	
1018	ADL Laundry	8	1	8	8		1	8.0	8	
1019	ADL Bathroom	12	1	15	15		1	14.9	14.9	
2066	Treatment Room	14	1	16	16	includes plaster / splints	1	15.9	15.9	located on level G
1020	Group / Meeting Room	20	1	20	20		1	20.2	20.2	
1021	Meeting / Interview Room	12	1	12	12		1	12.0	12	
	Functional Area	**102**			**113**				**112.7**	
	Circulation (40%)	41			45				45	
	Floor Area	**143**			**158**				**158**	
	Level 01 (12- hour pod Patient Therapy Support Areas)									
2001	ADL Kitchen	12	1	12	12	Locate adjacent to dining room	1	14.1	14.1	
2002	Dining Room/ Activity	40	1	48	48	AHFG allows 2m2 pp for dining space = 40m2. Moruya - assumes all patients + 3 - 4 seated carers access this space.	1	50.4	50.4	
2003	Bay - Beverage	4	1	4	4	Locate between lounge and dining spaces	1	4.0	4	
2004	Bay - Meal Trolley	4	1	4	4	Adjacent to dining space	1	4.1	4.1	
2005	Lounge	30	1	15	15	AHFG allows 2m2 pp based on 7 person per lounge	1	9.0	9	
2006A	Lounge	30	1	15	15	AHFG allows 2m2 pp based on 7 person per lounge	1	9.1	9.1	
2006B	Lounge	0	0	0	0		1	10.9	10.9	split into three locatoins
2007	Toilet - Disabled Access	6	1	6	6	Adjacent to lounge / dining 29/3 UGM - agreed 2 disabled toilets req.	1	6.1	6.1	
2008	Toilet - Disabled Access	6	1	6	6	Adjacent to lounge / dining 29/3 UGM - agreed 2 disabled toilets req.	1	6.1	6.1	
2009	Gym	80	1	80	80		1	80.0	80	
2010	Workstation	5.5	2	5.5	11	as per MB email Sent: Wednesday, 2 May 2012 10:19 PM	2	11.2	22.4	include copy / store area
2011	Workstation	4.4	4	4.4	17.6	as per MB email Sent: Wednesday, 2 May 2012 10:19 PM	4	17.0	68	include copy / store area
2012	Store - Equipment	10	0	10	0	split equipment store 2070	1	10.1	10.1	
	Functional Area	**231.9**			**218.6**				**294.3**	
	Circulation (40%)	93			87				118	
	Floor Area	**325**			**306**				**412**	

	Patient Accommodation / Areas Rehabilitation 10 beds									
2013	1 Bed Room	15	1	15	15		1	19.8	19.8	
2014	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2015	1 Bed Room	15	1	15	15		1	19.8	19.8	
2016	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2017	1 Bed Room	15	1	15	15		1	19.8	19.8	
2018	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2019	1 Bed Room - Special	18	1	18	18	therapy	1	20.4	20.4	
2020	Ensuite - Special	6	1	6	6		1	5.8	5.8	
2021	2 Bed Rooms	28	1	28	28		1	29.2	29.2	
2022	Ensuite - Standard	5	1	5	5		1	5.1	5.1	
2023	2 Bed Rooms	28	1	28	28		1	29.2	29.2	
2024	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2025	2 Bed Rooms	28	1	28	28		1	29.2	29.2	
2026	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2027	Bay - Handwash / PPE	1.5	1	1.5	1.5		1	1.6	1.6	
2028	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2029	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2030	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2031	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2032	Bay - Linen	2	1	2	2		1	1.5	1.5	
2033	Bay - Handwash	1	1	1	1		1	0.0	0	combined with PPE 2027
2034	Bay - Computer on Wheels	1	1	1	1	Requires GPO	1	1.6	1.6	
2035	Bay - Mobile Equipment	1	1	4	4		1	4.5	4.5	combined with 2059
	Functional Area	**153.5**			**196.5**				**214**	
	Circulation (40%)	61			79				50	actual
	Floor Area	**215**			**275**				**264**	
	Patient Accommodation / Areas Gem 10 beds									
2037	1 Bed Room	15	1	15	15		1	19.7	19.7	
2038	Ensuite - Standard	5	1	5	5		1	5.1	5.1	
2039	1 Bed Room	15	1	15	15		1	19.7	19.7	
2040	Ensuite - Standard	5	1	5	5		1	5.1	5.1	
2041	1 Bed Room	15	1	15	15		1	19.7	19.7	
2042	Ensuite - Standard	5	1	5	5		1	5.1	5.1	
2043	1 Bed Room - Special	18	1	18	18		1	20.4	20.4	
2044	Ensuite - Special	6	1	6	6		1	5.9	5.9	
2045	2 Bed Rooms	28	1	28	28		1	29.2	29.2	
2046	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2047	2 Bed Rooms	28	1	28	28		1	29.2	29.2	
2048	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2049	2 Bed Rooms	28	1	28	28		1	29.2	29.2	
2050	Ensuite - Standard	5	1	5	5		1	5.3	5.3	
2051	Bay - Handwash / PPE	1.5	1	1.5	1.5		1	1.6	1.6	
2052	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2053	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2054	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2055	Sitting alcove	1	1	1	1		1	0.0	0	located in single patient room
2056	Bay - Linen	2	1	2	2		1	1.5	1.5	
2057	Bay - Handwash	1	1	1	1		1	0.0	0	combined with 2051
2058	Bay - Computer on Wheels	1	1	1	1	Requires GPO	1	1.6	1.6	
2059	Bay - Mobile Equipment	4	1	4	4		1	4.5	4.5	combined with 2035
	Functional Area	**156.5**			**196.5**				**213.4**	
	Circulation (40%)	63			79				50	actual
	Floor Area	**219**			**275**				**263**	

WOODS BAGOT

	Level 01 Patient Accomodation /IPU'a									
2061	Reception	10	1	8	8		1	9.3	9.3	
2062	Staff Station	14	1	14	14	Includes ward clerk.	1	14.3	14.3	
2063	Office - Clinical / handover	15	1	15	15		1	14.8	14.8	
2064	Office	9	1	9	9	NUM	1	9.2	9.2	NUM
2065	Consult / Interview	12	1	14	14		1	14.0	14	
2067	Clean Utility	14	1	14	14		1	14.1	14.1	
2068	Dirty Utility	12	1	12	12		1	12.0	12	
2069	Bay - Resus Trolley	2	1	2	2		1		0	
2070	Store - Equipment	30	1	30	30	10m2 adjacent to gym	1	21.0	21	10m2 adjacent to gym
2071	Store - General	9	1	9	9		1	9.1	9.1	
2072	Disposal	8	1	10	10		1	10.8	10.8	
2073	Cleaners Room	5	1	5	5		1	7.4	7.4	
2074	Staff Room	12	1	12	12		1	27.0	27	includes staff lockers and bev bay
2075	Staff Lockers	3	1	2	2		1	0.0	0	included in 2075
2076	Toilet - Staff	3	1	3	3		1	3.0	3	
2077	Toilet - Staff	3	1	3	3		1	3.0	3	
	Functional Area	**151**			**162**				**169**	
	Circulation (40%)	60			65				68	
	Floor Area	**211**			**227**				**237**	
	Displaced Areas									
3001	Existing Pharmacy	31.1	1	31.1	31.1	locate one on uper level outside IPU	1	34.0	34.0	Level 01
3002	IV Store	exist	0	15	0	long linear space with room to turn crates. Exisitng to remain	1	0.0	0.0	existing to remain in current location level 01
3003	Existing Pharmacy Office	9	1	9	9	provide new locaton	1	8.5	8.5	Level 01
3004	Existing Tutorial	36	1	36	36	provide new locaton	1	36.0	36.0	Level 02
3005	Existing 2 Person Office	12	1	14	14	provide new locaton	1	13.7	13.7	Level 01
3006	Stress Test	16	1	18	18	provide new locaton	1	17.0	17.0	Level 01
3007	HITH Room	18	1	18	18	provide new locaton	1	17.8	17.8	Level 00
	Functional Area	**122.1**			**126.1**				**127.0**	
	Circulation (40%)	49			50				51	
	Floor Area	**171**			**177**				**178**	
	Displaced Areas-Whole of Hospital Support									
3008	Hospital Street	100	1	100	100		1	72.1	72.1	Whole hospital circ
3009	Existing Clean Linen WHS	27	1	27	27	locate near loading dock	1	26.6	26.6	
3010	Existing Dirty Linen WHS	20	1	20	20	locate near loading dock	1	22.6	22.6	
3011	Disposal Hold WHS	20				recycle, waste, clinical, cardboard, general, secrete				outside fenced in
3012	Cytoxic Store	10	1	10	10		1	10.9	10.9	collected once a week
9001	Loading dock- clean		0			outdoor space				outdoor space
9002	Loading dock- dirty		0			outdoor space				outdoor space
	Functional Area	**177**			**157**				**132.2**	
	Circulation (32%)	57			50				42	
	Floor Area	**234**			**207**				**175**	
	Functional Area	**1649**			**1805**				**1935**	
	Travel (10%)	165			180				193	
	Engineering incl. Plant (15%)	247			271				290	
	Gross Floor Area	**2062**			**2256**				**2419**	

	Displaced Areas-Whole of Hospital Support									
9003	Existing Plant Part A	55	1	55	55		1			
9004	Existing Medical Records (Proposed L	36	1	36	36		1			new shed adjacent to parking lot
9005	BK Store (Adjacent to Brick Chimney	11.5	1	11.5	11.5		1			new shed adjacent to parking lot
9006	Metal Shed	7	1	7	7		1			new shed adjacent to parking lot
9007	Oxygen Storage Tank Store	12.8	1	12.8	12.8		1		0	
	Functional Area	**54.5**			**55**				**0**	
	Circulation (23%)	13			13				0	
	Floor Area	**67**			**67**				**0**	

Draft Schedule of Areas Renal and Oncology Expansion

As a consequence of confirming the intent to relocate the Oncology and Renal buildings as a future stage to the proposed Rehabilitation Project, a draft Schedule of Accommodation was provided by HI and adopted as the reference

Total:		
Oncology:	11 Patient Bays + 1 Iso Bed	(12 Total)
Renal:	9 Treatment Bays + 2 Iso Bed	(11 Total)

Renal:

		Room Name:	No:	Briefed Area (m^2):	Total:
Shared	*24	Main Entry / Waiting Area	1	24	24
	8	Reception / Clerical	1	8	8
	8	Store / Doc Prod	1	8	8
	9	Office (NUM)	1	9	9
Shared	*24	Meeting Room	1	24	24
Shared	12	Consult / Interview	0	12	0
Shared	3	Toilet - Public	0	3	0
	5	Toilet - Public (1428.1)	1	5	5
Reduce?	12	Staff Station	1	9	9
	9	Treatment Bays	9	9	81
	5	Toilet - Public (1428.1)	1	5	5
	5	Shower - Public (1428.1)	1	5	5
	12	Isolation Rooms	2	12	24
	2	PPE Bay	1	2	2
	5	Ensuite - Isolation Rm	2	5	10
	1	Handwash Bays	4	1	4
	4	Kitchenette / Meal Bay	1	4	4
Shared	12	Staff Room	0	12	0
	3	Toilet Staff	1	3	3
	2	Property Bay - Staff	1	2	2
	12	Clean Utility	1	12	12
	8	Equipment Clean-up	1	8	8
	10	Dirty Utility	1	10	10
	12	Water Treatment Plant	1	12	12
	2	Bay - Resus Trolley	1	2	2
Reduce?	21	Main Store Room	1	15	15
	2	Bay - Linen	1	2	2
Shared	3	Disposal Room	0	3	0
	3	Bay - Mobile Equipment	1	3	3
Shared	5	Cleaner's Room	0	5	0
	1	Bay - Storage (Cleaner's)	1	1	1
	1	Bay - Storage (Dialysis Fluid)	1	1	1
	1	Bay - Utility (Dialysate Prep)	1	1	1
					294
				35%	396.9

Onocology:

		Room Name:	No:	Briefed Area (m^2):	Total:
	9	Clerical / Med Rec	1	9	9
Shared	12	Lobby / Airlock	0	12	0
Shared	9	Reception	0	9	0
Shared	5	Toilet - Public (1428.1)	0	5	0
	3	Toilet - Public	2	3	6
	12	1 Bed Room (Class S Iso)	1	12	12
	2	Bay - Resus Trolley	1	2	2
	12	Consult Room	1	12	12
	5	Ensuite - Isolation Rm	1	5	5
	12	Lounge - Patient	1	12	12
	12	Meeting Room (Small)	1	12	12
	9	Patient Bay - Acute Treatment	11	9	99
	4	Toilet - Patient	1	4	4
	14	Treatment Room	1	14	14
	4	Bay - Beverage, Opening Plan	1	4	4
	2	Bay - Linen	1	2	2
	3	Bays - Pathology	1	3	3
	1	Blood Store	1	1	1
	5	Cleaner's Room	1	5	5
	12	Clean Utility	1	12	12
	8	Cytotoxics Room	1	8	8
	14	Dirty Utility	1	14	14
	9	Office - Single Person	1	9	9
	2	Property Bay - Staff	1	2	2
Reduce?	12	Staff Station	1	9	9
	12	Store - Equipment / General	1	12	12
	3	Toilet - Staff	1	3	3
					271
				32%	357.72

Total for both departments	754.62

Iteration 3

Iteration 3 explored Option 1 as per above, showing rooms as included to the updated Schedule of Areas.

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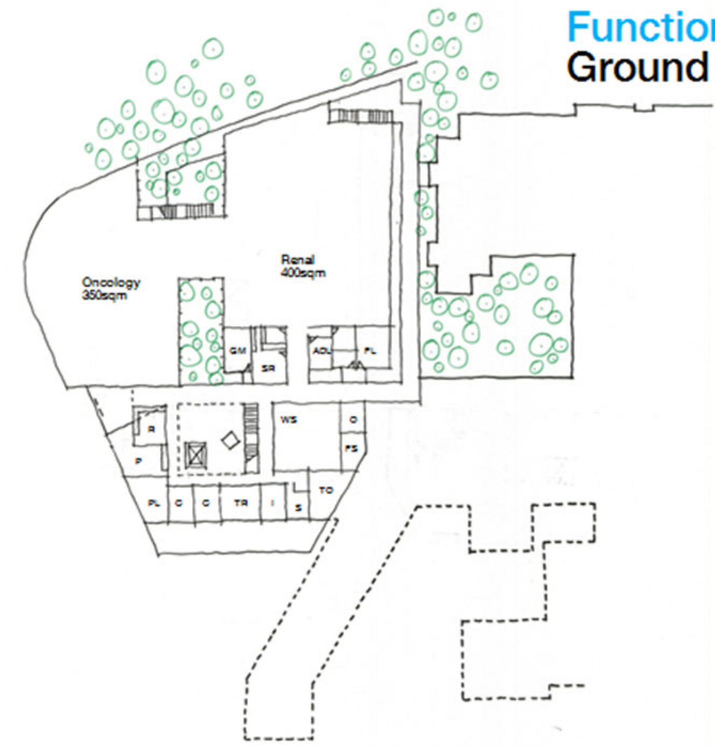
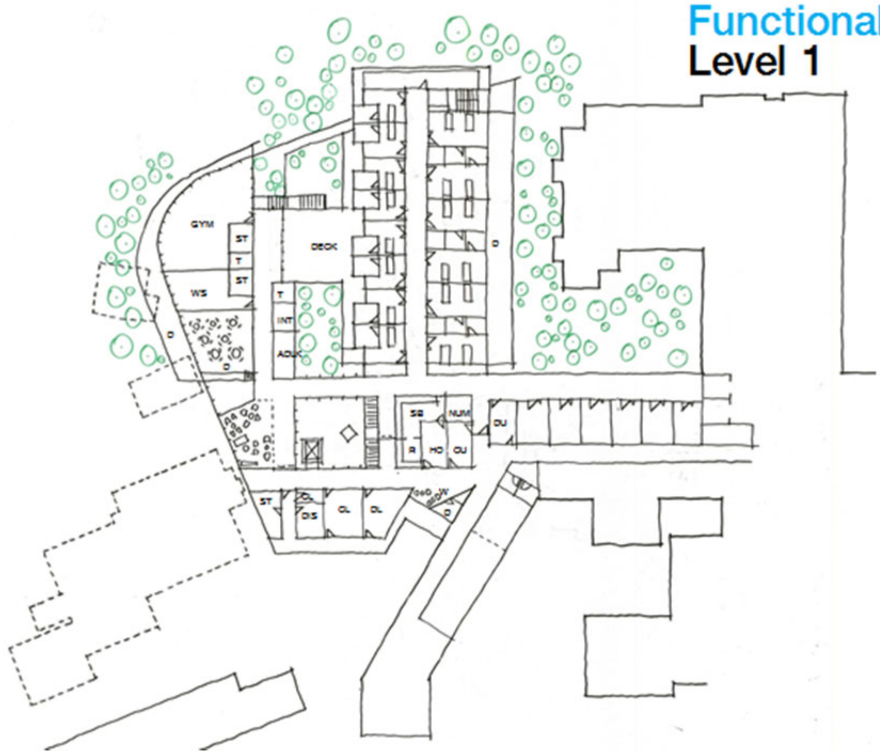
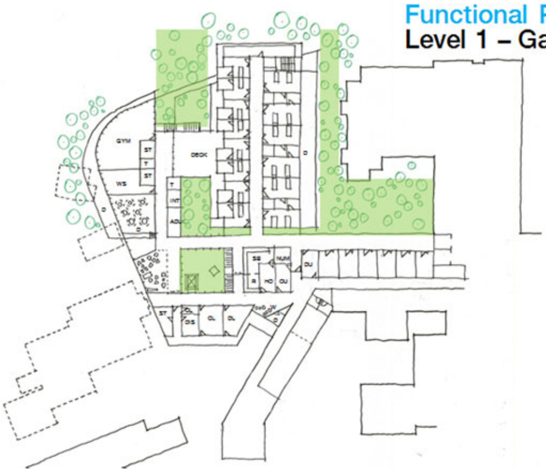
Functional Plan
Ground Floor



Functional Plan
Level 1





A key concept as defined in the Value Proposition for this project is a 'green core' – as such the space between the therpay and bed wings arising from this functional plan was seen as a key opportunity to deploy the 'green core' concept.

The above image was provided to users as indicative of intent for this concept and after its endorsement, and was integrated to the landscape concept planning ongoing at this time.

Facilities management as relates to this planning iteration was defined in broad brush terms as follows:

Red line – Staff movement

Blue Line – Whole of Hospital and Hospital Street

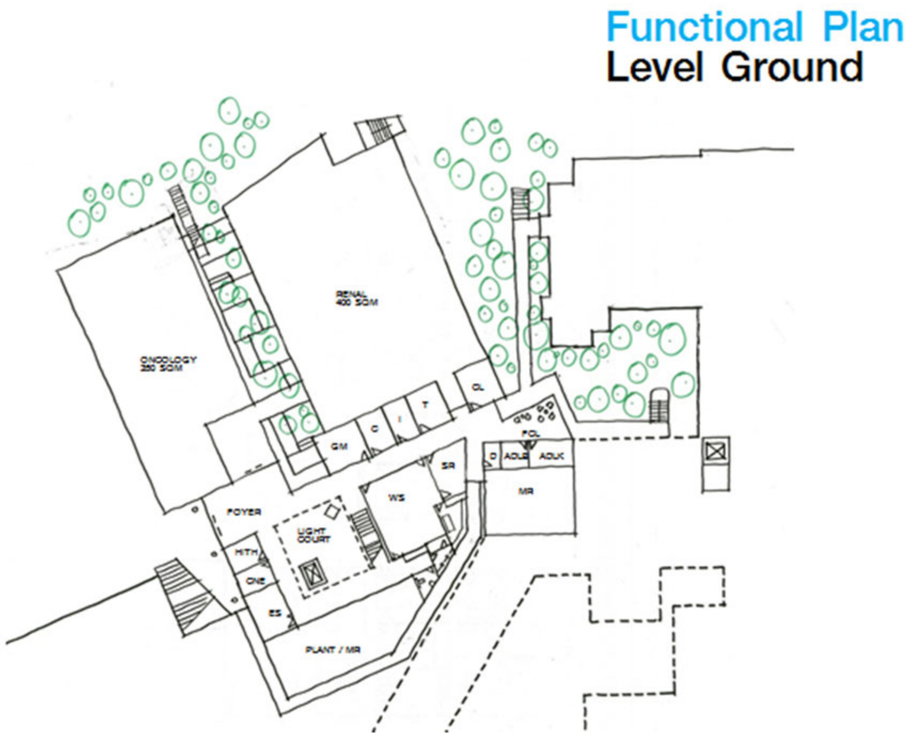
Green Line – Facilities Management Routes

As part of this option a few key planning constraints were defined and were carried through to subsequent iterations, as follows:

Two storeys: That the rehabilitation functional areas be spread over two levels, with functional spaces as per Option 1 above;
Garden Voids: that the scheme utilise the concept of a central garden or green space between the therapy and bed wings;
Activation of Existing Beds: provide direct access corridors form the staff base to the existing beds of the main hospital south west wing, and that the staff base be positioned in such a way to provide views into each of those corridors;

Lift position: The lift must be accessible from the hospital street, in order to allow it to have whole of hospital use, and provide redundancy to the existing hospital lift;
Central Void Space: At the users request, a void space is to be included to improve visual connectivity between upstairs and downstairs rehabilitation functions;
Replaced loading dock: As the design proposal takes up some of the existing loading dock space, a reconstructed loading dock is proposed;
Seperated clean and dirty flows: that the design proposal provides for separated routes from the loading dock for clean and dirty flows;
Plant Room; given constraints of site area that the plant room be located on an upper level for the project;
Helipad Access: At the ground floor that the access from the existing Main Hospital to the helipad was preserved in more or less its current route; and
Medical Records: That the design of the Rehab Centre would incorporate some level of storage for Medical Records.

Iteration 4
A key challenge to the design that arose from the Users was the issue of maintaining views from bedrooms located along the western frontage of the main hospital building.
Iteration 4 responded to this request by rotating the entire building anticlockwise and away from the existing hospital; this had the effect of preserving views to the river from this western frontage as well as retaining an orthogonal planning alignment for internal rooms, important to maintain the efficiency of the internal spaces.



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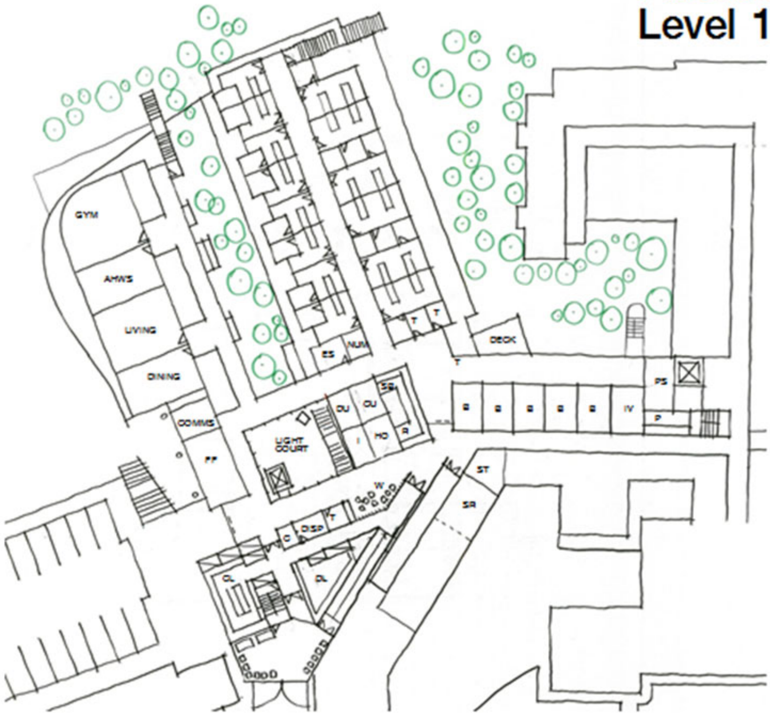
Functional Plan
Level 1



Iteration 5

At the ground floor more information is provided about the likely layout and configuration of the renal and oncology departments; this had the effect of reconfiguring the consult suites. Medical records was enlarged, as well the requirement for plant area at the ground floor was reduced.

At the upper level the key change was reverting from the ‘stacked’ configuration of the therapy wing to a split configuration, providing views to the river for both the living/dining area and the gym.

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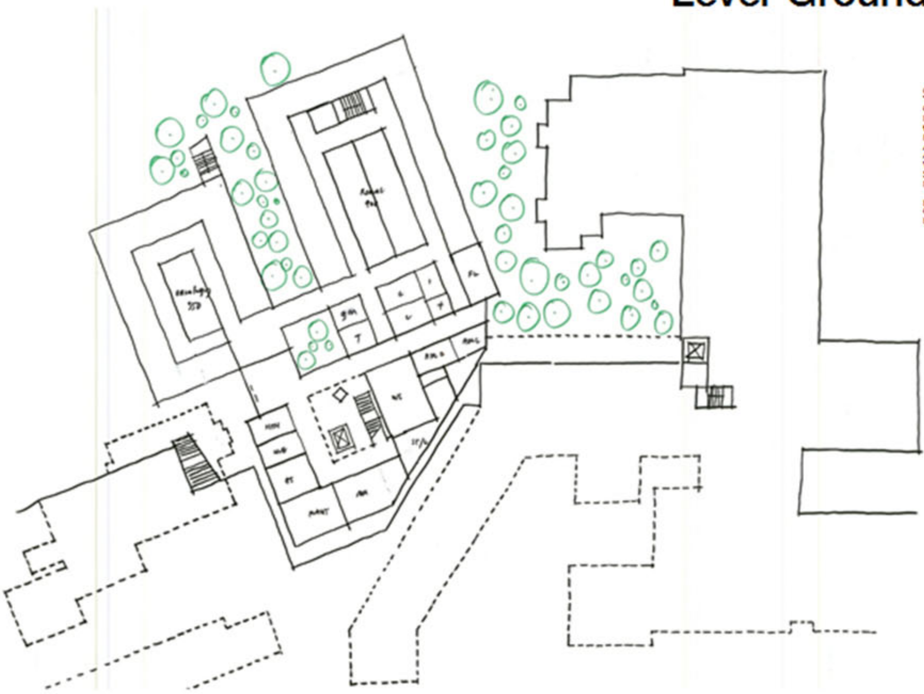
Functional Plan
Level Ground RL 6.2

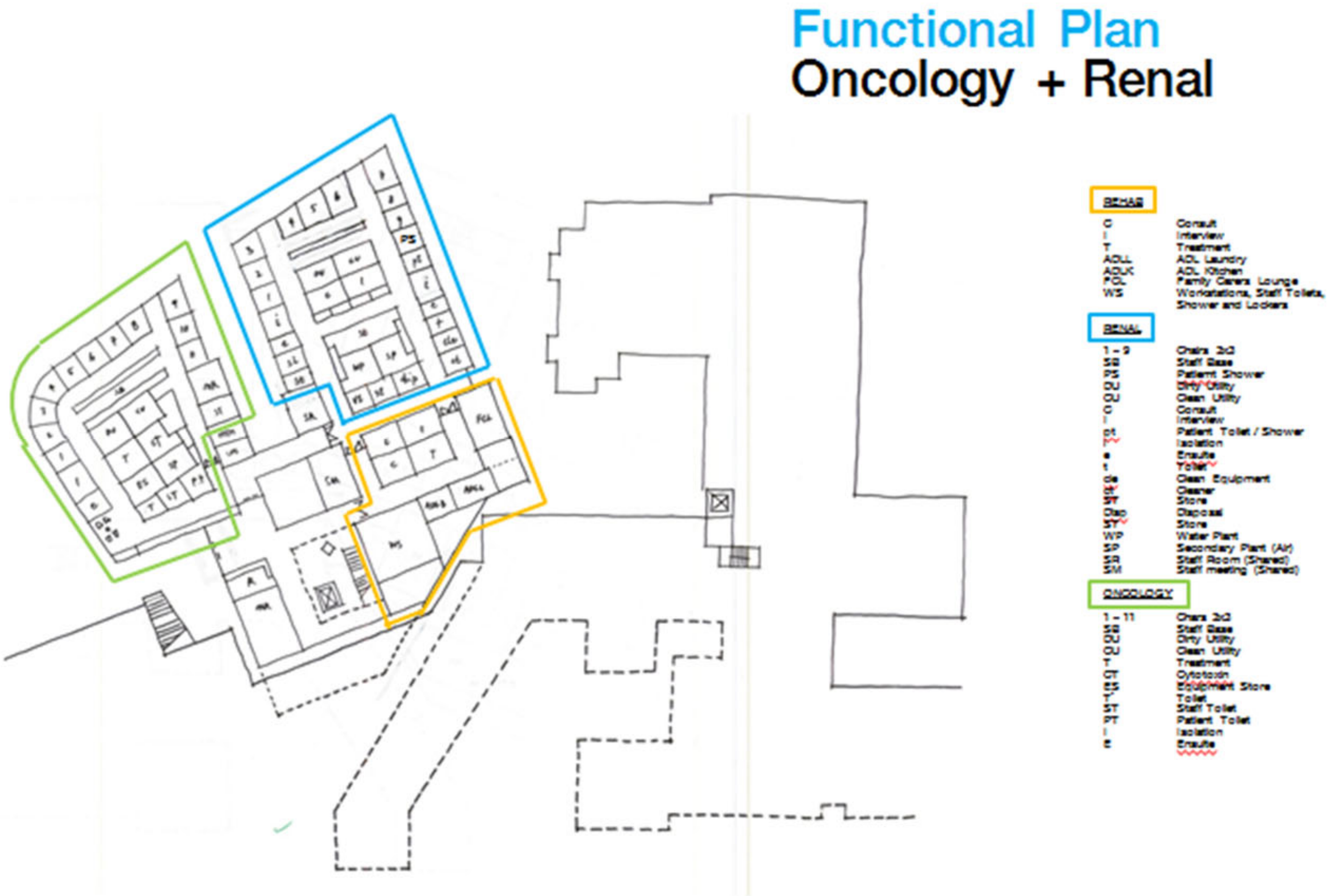


GM	Group Meeting
T	Treatment
C	Consult
I	Interview
t	Toilet
FCL	Family Carer's Lounge
ADLB	ADL Bath
ADLL	ADL Laundry
WS	Workstations
ST/L	Staff Toilet / Lockers
MR	Medical Records
	Plant
ES	Equipment Store
CNE	Clinical Nurse Educator
HITH	Hospital in the Home

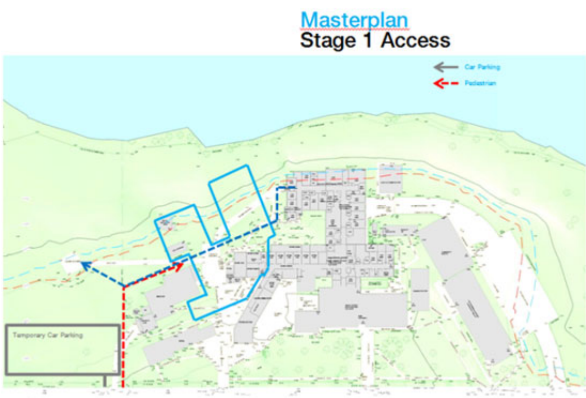
Functional Plan
Level 1 RL 10.5

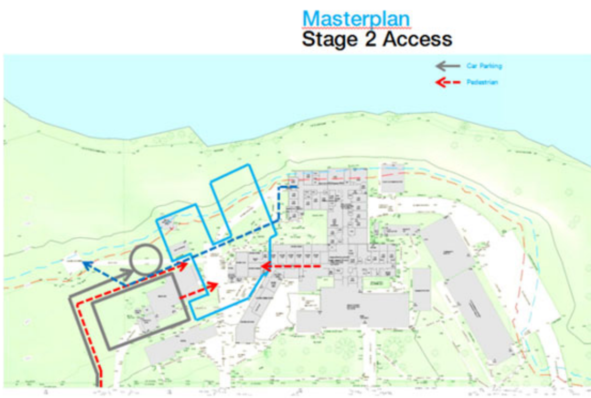
GYM	Gym
DIN	Dining
GS	Gym Store
L	Living
D	Dining
BB	Bev Bay
T	Toilet
ADLK	ADL Kitchen
COMMS	Communications Room
LAUGH	Laughter Room
CL	Clean Linen, Consolidated
DISP	Disposal
CL	Cleaner
DL	Dirty Linen
T	Toilet
I	Interview
HO	Handover
SB	Staff Base
NUM	Nurse Unit Manager
CU	Clean Utility
DU	Dirty Utility
e	Ensuite
B	Bedroom
T	Toilets
PS	Pharmacy Store
P	Pharmacy
SR	Staff Room
ST	Staff Toilet

Test Fit Oncology and Renal
Coordinating to Iteration 5, a test fit of the Renal and oncology department was provided to verify the expected footprint of these departments against the draft Schedule of Accommodation.



Proposed Access Configurations
At this stage site wide access to the rehab was clarified in terms of the two proposed major stages of work, being Stage 1: Rehabilitation Facility, Stage 2: Oncology and Renal Addition. These proposed access configurations are summarised by diagrams provided below:



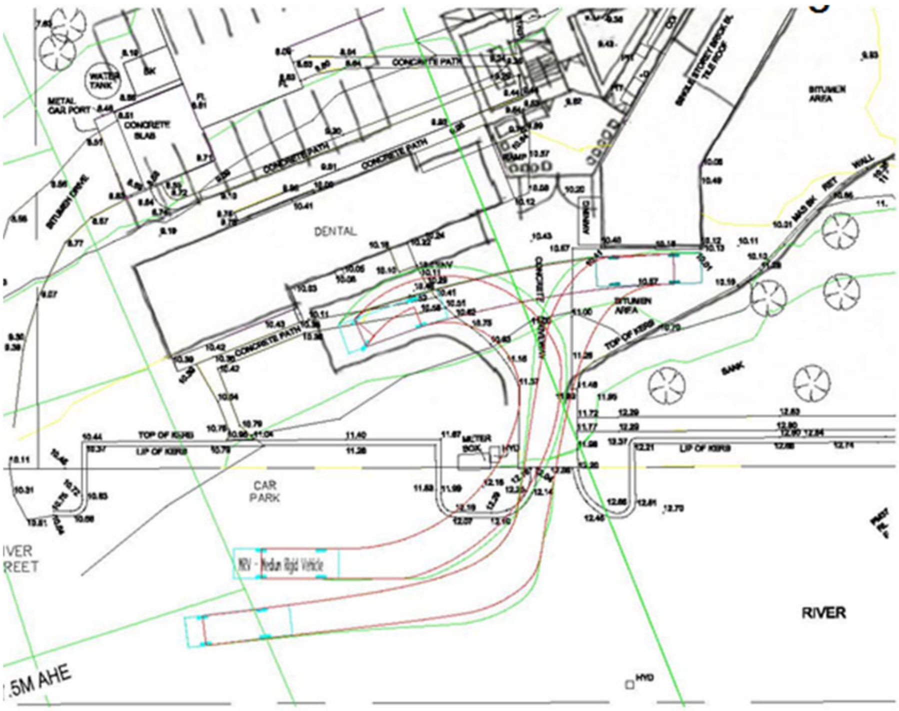


Stage 1 access provides for a new, temporary car park at the western end of the hospital site, with a pedestrian link to the ground floor of the proposed rehab. Helipad acces sis reinstated approximately as per current alignment.
Stage 2 access provides for a car park located in the position of the Oncology and Renal building (now relocated to the undercroft) and a new car drop off at the lower level. The pedestrian path and helipad access remain as per Stage 1.

It is worth noting that following the introduction of an Earlly works stage, subsequent documentation refers to this early works stage as Stage 1, the Rehabilitation works phase as Stage 2 or Major Works, and the Renal and Oncology Fitout works as Stage 3.

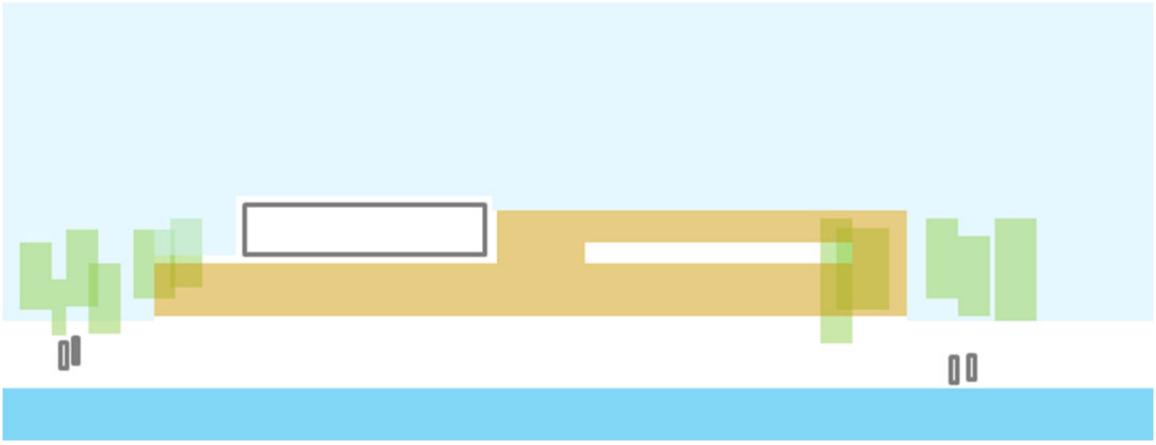
Upgrade Works to the Loading Dock
Working to the Logistics Brief provided by the Users, it was agreed during discussions at the User Group Meetings to provide a single level, flat floor loading dock with roll through access to the main hospital building. This was agreed as it provided the most flexibility for the range of truck types that arrive at and use the loading dock, as well

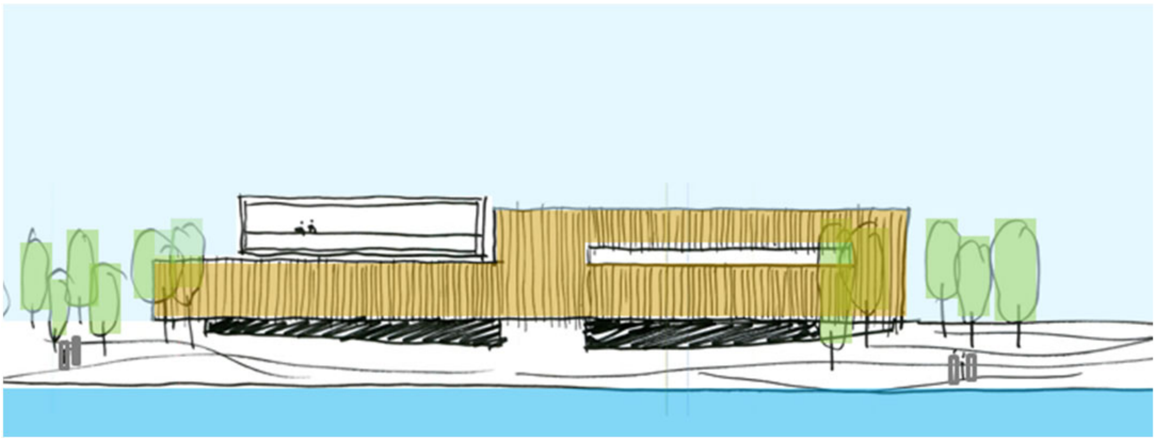
The existing loading dock does not provide for truck turning on site; accordingly a congruent requirement for the upgrade works was to provide for truck turning on site. Because the proposed building constrains the size of the loading dock in its existing position, truck turning was verified by the traffic engineer as possible in front of the Dental building and at the existing ground level.



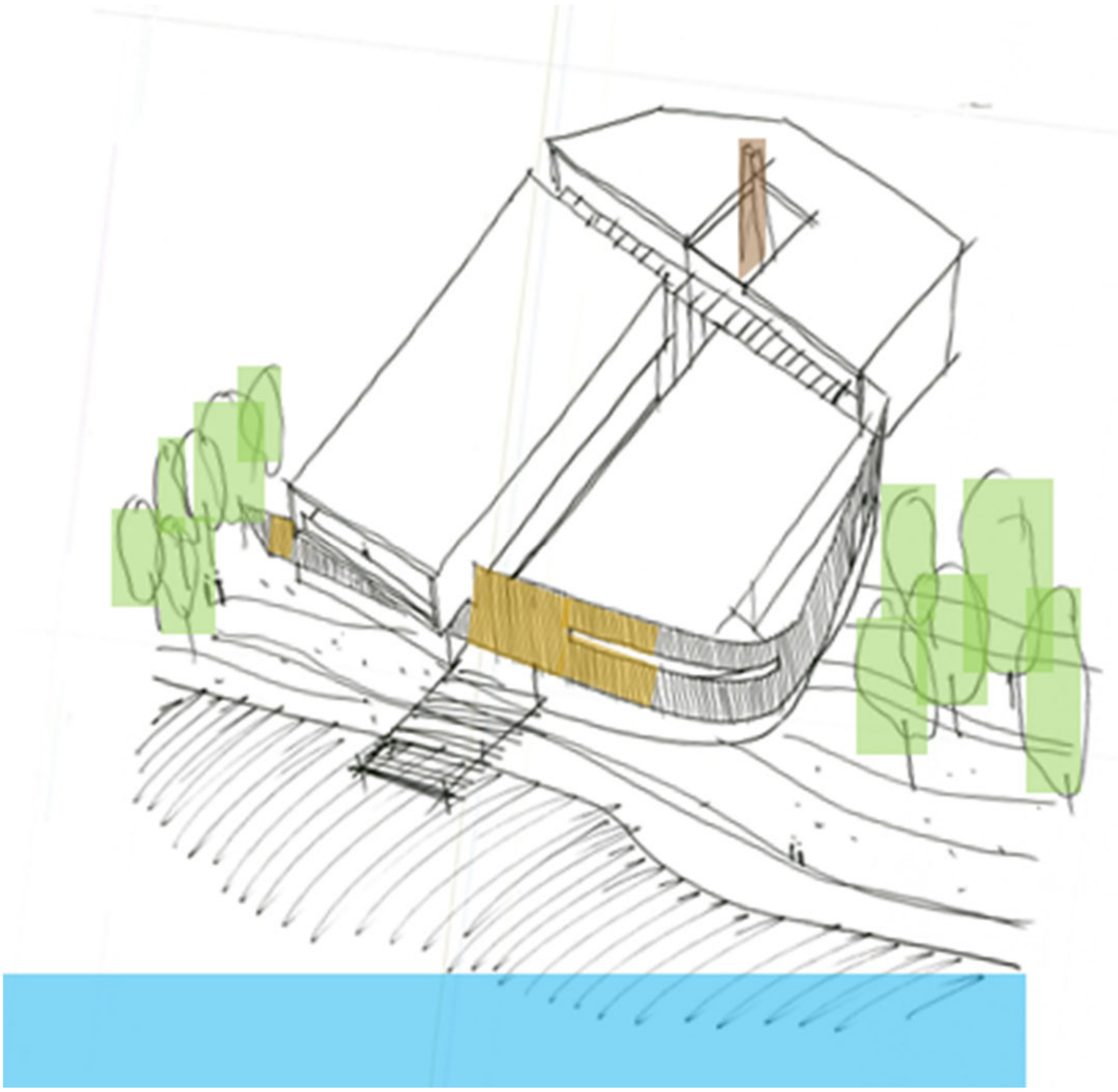
The diagram at left shows the vehicle movement for the design vehicle as being possible in front of the existing dental hospital.

Preliminary Shell Concept
With the endorsement of Iteration 5, the design team advanced a shell concept for proposal to the HI and the Users.

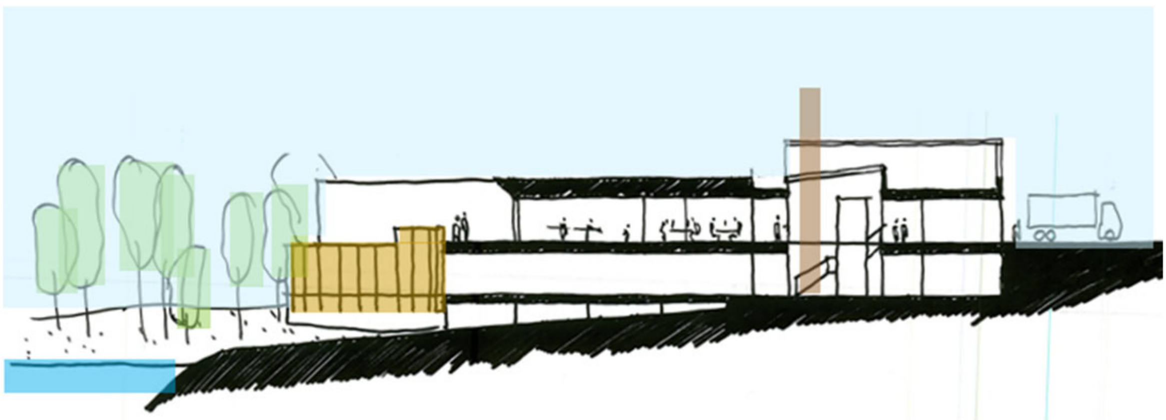




River Elevation Concept



Sketch Axonometric



Long Section from River Road to Moruya River

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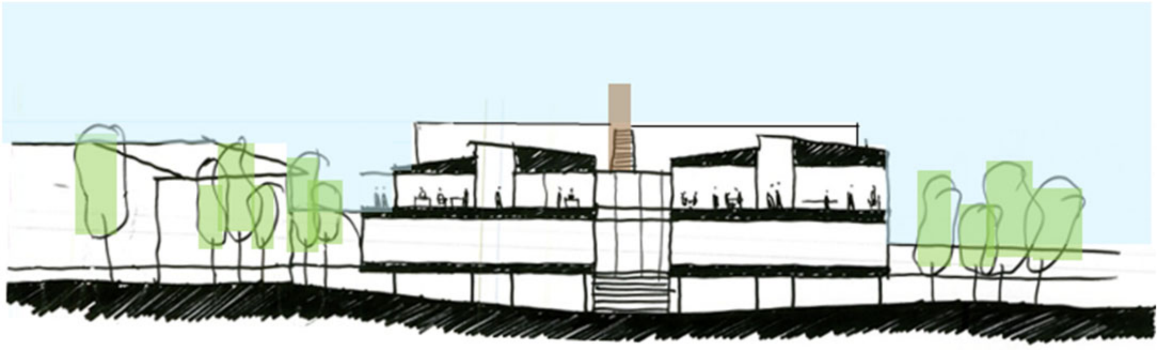
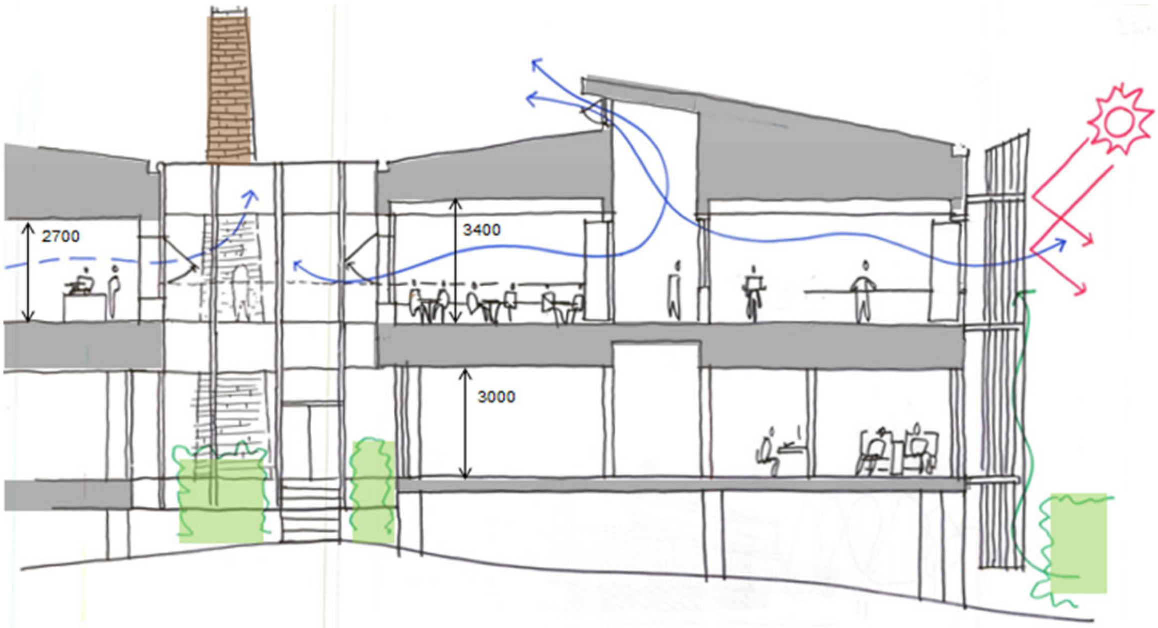
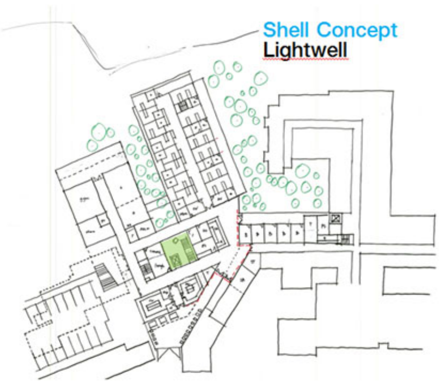
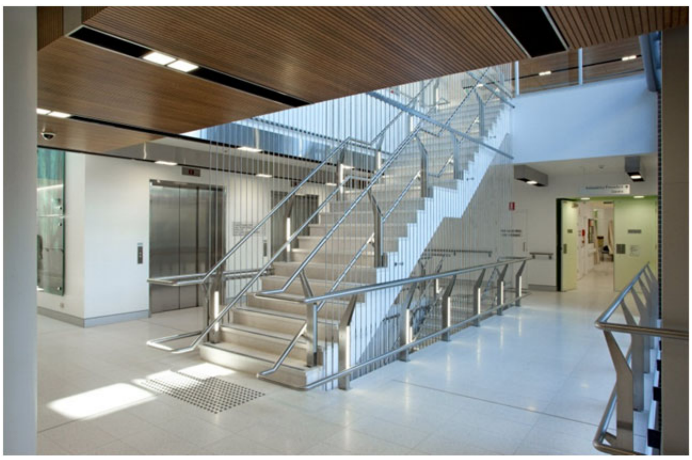


Cross Section in an East / West Direction

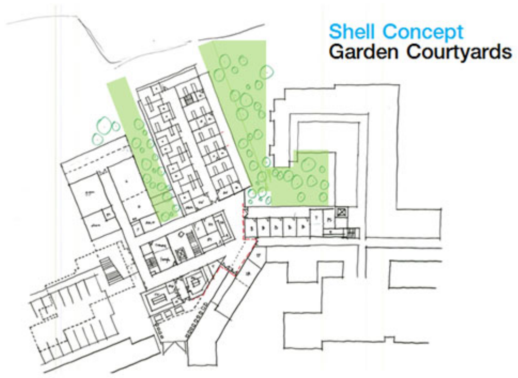


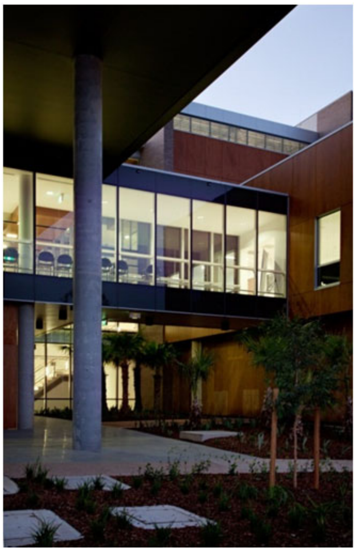
Detail Section East West through the Therapy Wing



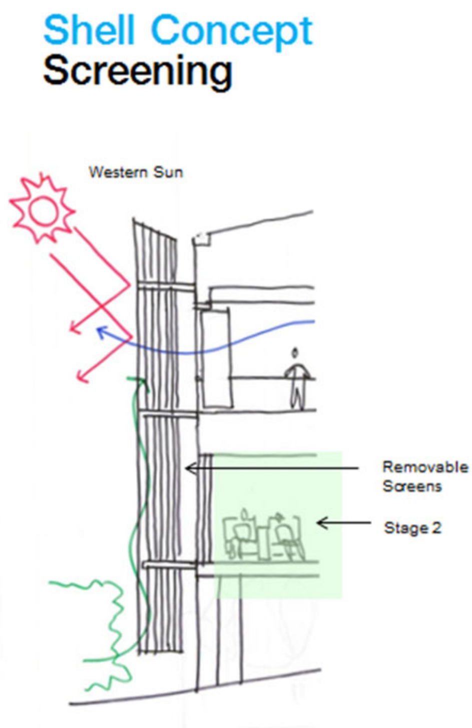


Lightwell Concept Image

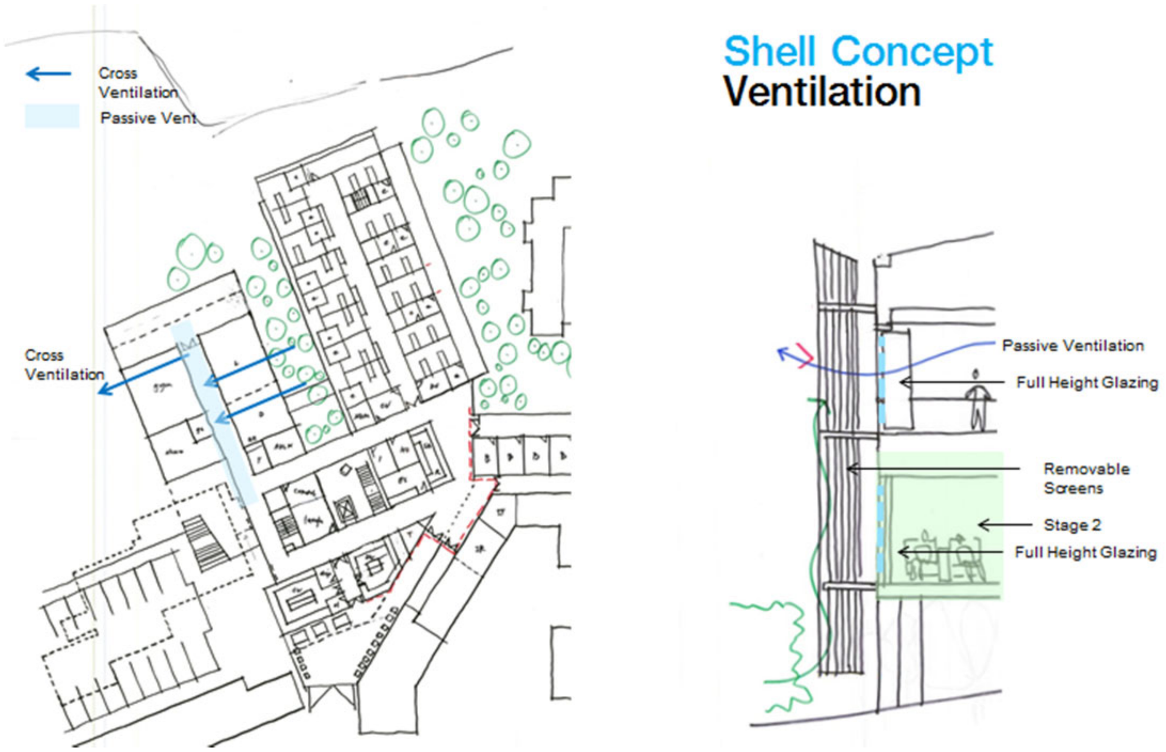




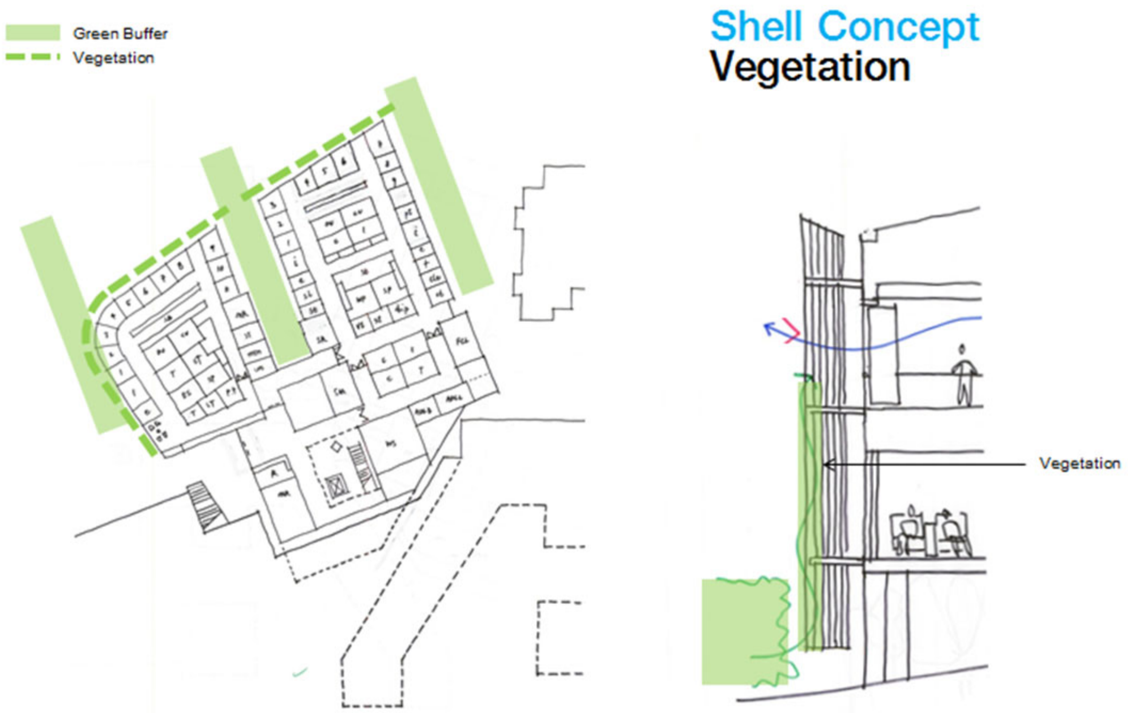
Landscape Courtyard Concept Image



Screening Concepts



Ventilation Concepts



Vegetation and Screening Concepts

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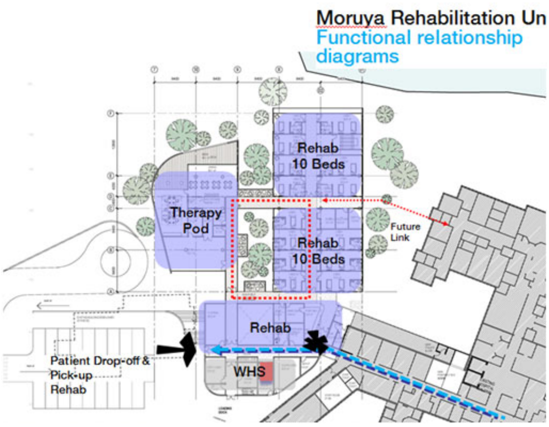
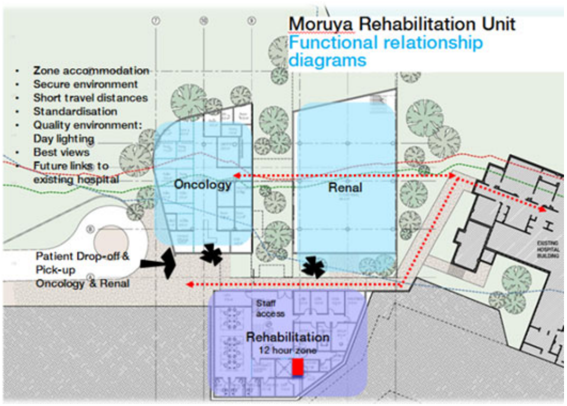
Clinical Review
As a consequence of achieving an endorsed sketch plan and shell concept, clinical planning was introduced to the project to verify room sizes and positions, and confirm compliance with the functional brief and schedule of areas.

This resulted in a few changes to assumptions around the functional planning as is summarised below;

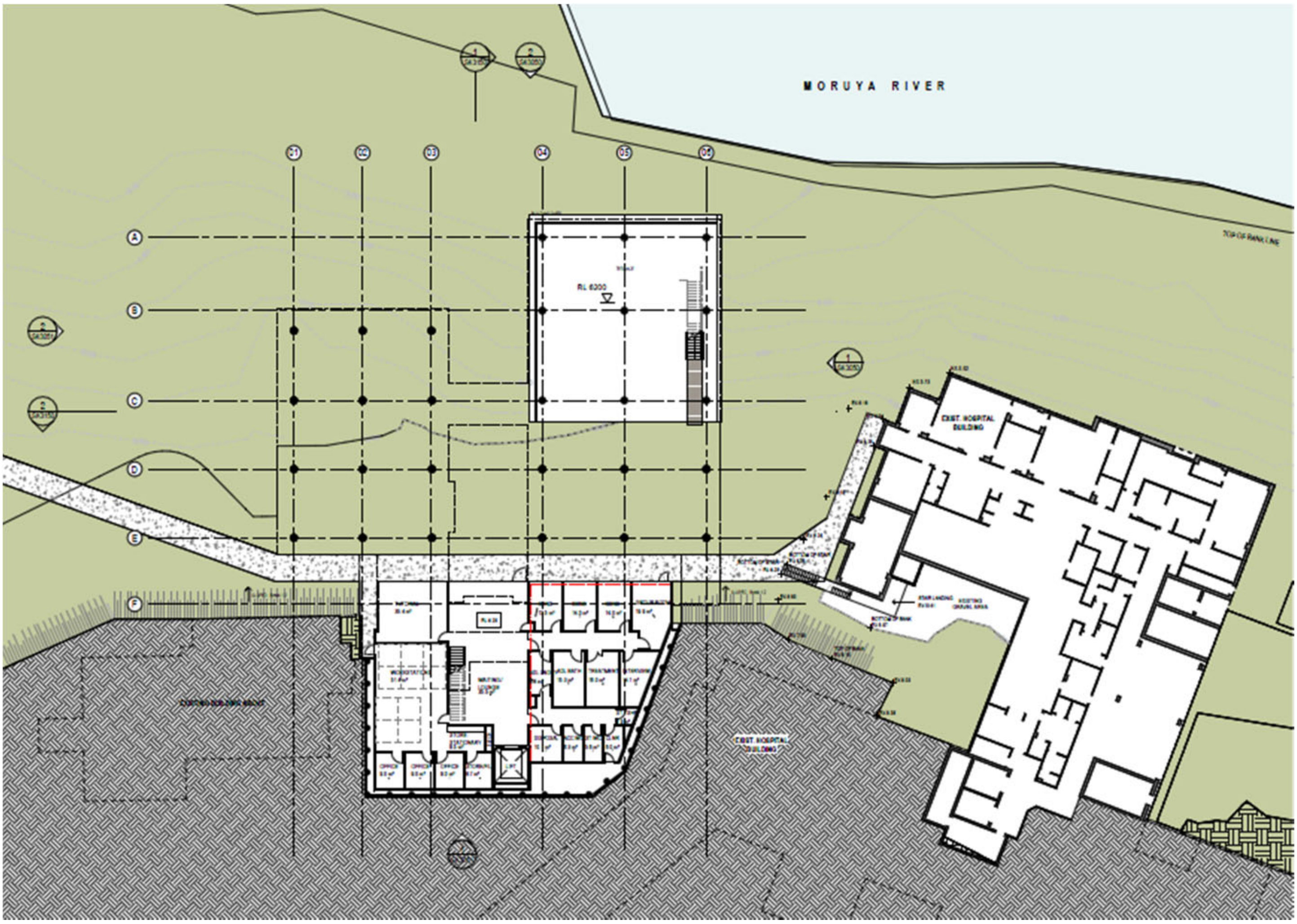


Upper Level
Integration of a future Bridge Link at the upper level and connecting to the existing Main Hospital in the location indicated at left, and a bridge link connecting to the therapy wing from this alignment; consolidation of staff support areas as central to the bed wing, separation of the bed wing into high and low observation zones of 10 beds each, providing for outboard ensuites to the high observation zone, and inboard ensuites to the low observation zone. This dual zoning of the bed wing reflected the separation of the bed classifications as articulated in the Functional Brief for GEM and Rehab focussed beds.

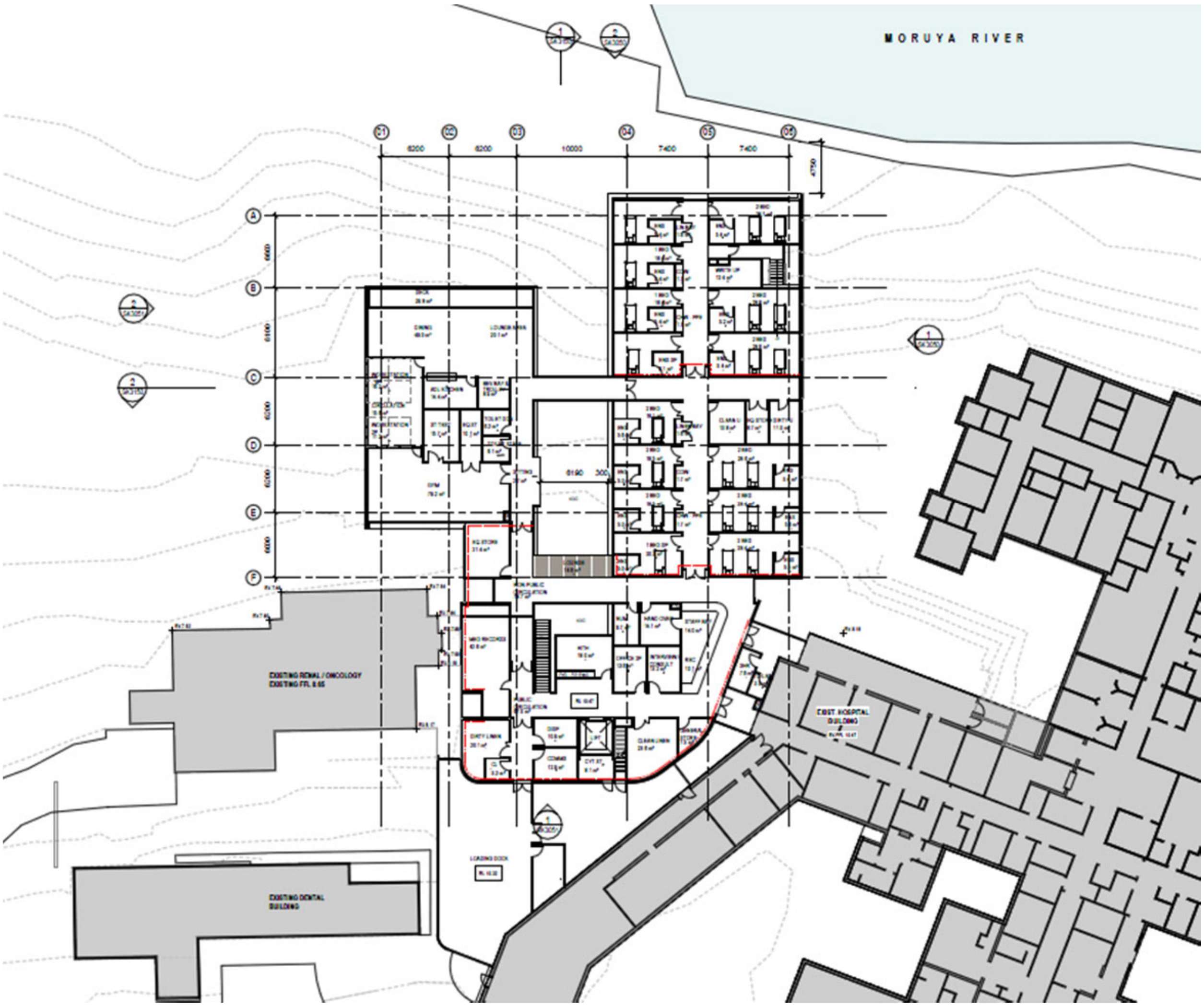


Lower Level
Consolidation of Rehabilitation, Oncology and Renal into three completely separate departments, and creation of a hospital 'street; at the lower level from which access is provided to each department. The rehabilitation functions at this level were consolidated to the south of the proposed linkway.

Iteration 6
This iteration picked up design review comments received from Clinical and as described above. Several variations occurred in this period and the ultimate configuration is incorporated here for reference. Information on interim planning changes is available from the Architects at request and a full set of SD drawings is available in the Appendicies. The below plans represent the endorsed plan at the completion of Schematic Design:



Lower Floor Plan



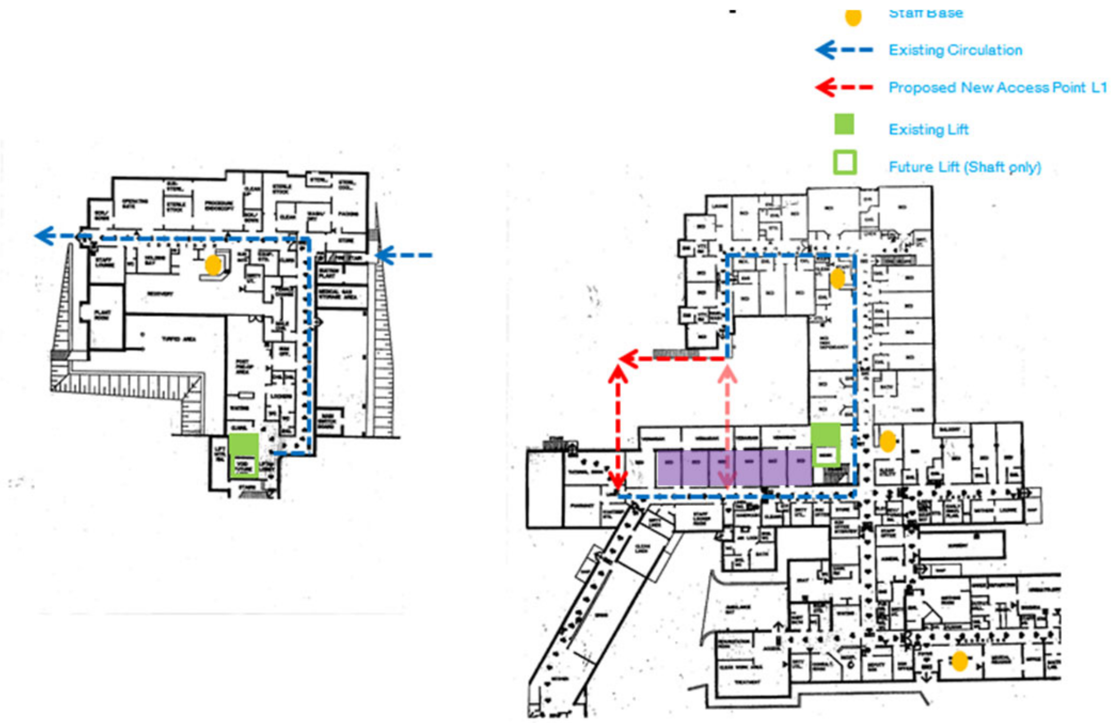
Upper Floor Plan

04.10 Integration with Other On-Site Facilities/Services

The project has been reviewed with the staff associated with the on-site facilities / services and provision has been made to integrate with the existing systems and services. Connections to the main hospital facilities have been provided and security / communication / IT services have been reviewed – refer also services consultant reports. Hospital Maintenance staff have provided lists of existing services and material to guide the selection of services and material that integrate into the existing facility.

Whole of Hospital Facilities

The existing Main Hospital Building is set over Two levels. The upper level is set at RL 10.5 AHD and the lower level is set at RL 6.25 AHD. The below diagram summarises the operation configuration and existing egress points from the main hospital building.



Ground Level Plan   Level 1 Plan

As can be seen from the Diagram, the major public entry to the hospital is at the southern side of the Main Hospital Building, accessible from River Road. A drop off bay and ambulance stopping bay has been provided at this drop off. It is assumed for the purpose of design work completed in the Schematic Design phase that entry to the Main is compliant with current Access to Premises standards with respect to Disabled Design.

The Main Hospital Building is provided with one operational lift. Comments received through the User Group Meetings indicated rpoblems with the existing lift service, particularly in terms of there being no redundancy lift service if the lift is out of service, as well as frequent breakdowns. It became apparent during site visits and inspection of existing building drawings that a second lift shaft is available within the main hospital building but that it has not been utilised for a lift service. The shaft is in fact in use for storage on the lower level and the Ladies' Auxiliary at the upper level.

In the main hospital, there exists 6 bedrooms not currently in use in the eastern wing due to their remoteness from a staff base. These bedrooms are highlighted in purple on the above diagram.

As a consequence of the above analysis, two key issues arose for consideration by the design team in the design of the proposed rehabilitation building that are raised here in circumspect form and dicsussed in more detail later in this report; that of;

- The potential benefit of an additional lift service to the existing hospital
- The potential benefit to the hospital to activating these currently non utilised bedrooms

Site Wide Logistics

The designers recorded a detailed brief for logistics associated with the existing Loading Dock Facility. This arose from inspection of services on site as well as detailed briefing provided by Facilities Management Staff at the Moruya LHD.

An output of that review is the below summary of logistics services currently in operation at the Hospital Site:

- 2x General waste skip bin, front loading, front opening
- 1x Paper waste skip bin, front loading, front opening
- 12x 240 litre wheelie bins, general waste, Side lifter truck type
- Linen delivery & collection. 4 tonne truck assumed tbc, trolley sizes vary
- 3 or 4 pallettes serving food to kitchen, 4 tonne truck assumed tbc, trolley sizes vary
- Trolley delivery food in bain maries, reheat and plating service in existing kitchen
- Cytoxic waste – 6 240 litre wheelie bins, secure store.
- Preference to have option for unloading at ground level or to a dock, either acceptable in final solution
- Covered holding area required
- Ramp access back to main hospital level
- Provide bump in / out area – temp storage of deliveries while transported into / out of hospital
- Medical stores delivery via east dock to lower level
- Current service allows 1 truck at a time, reverse in / forward out motion

The proposed loading dock will accommodate the above service.

04.11 Constructability (Staging, Vehicular Access, Security, OH&S)

Refer Section 4.17 for discussion under Staging and Vehicular Access.

Security and OHS requirements will be reviewed and incorporated during the DD phase,

04.12 Future Expansion Capabilities

Early in the design phase for this project the integration of a future stage to the Undercroft space of the Rehabilitation building was endorsed as a requirement of the Design. This therefore anticipated the demolition of the existing Renal and Oncology building. Woods Bagot understand that the funding source for this future stage is not yet committed., accordingly the timing for this works is as yet unknown.

The Hospital Street concept, as arose from the Response to Masterplan phase, is a key commitment of the Rehabilitation project to future stages of work at the Moruya Hospital. This is detailed further in the *Response to Masterplan* Section above.

The Rehabilitation building itself has been designed on a regular and standardized building grid and module; accordingly the building may be refitted in the future to suit an alternative hospital use.

The linkway to the existing hospital at the northern end of the project site is something that may occur in the future and will integrate is easily accommodated to the current design of the Rehabilitation project.

04.13 Landscape Design

The Moruya Hospital site offers a series of distinct opportunities and constraints for the landscape planning and design. Situated on the south side of the Moruya River, the site falls partially within a flood zone, impacting upon building constraints and presenting opportunities for site specific landscape responses. Therein the proposed landscape aims to reflect the local character, and site surrounds with appropriate consideration to existing vegetation, natural slope and visual aspect, especially where it can be attributed to the holistic care and consideration of patients and staff.

The landscape design hinges on a number of strong principles. These principles, formed through a combination of site and design analysis illustrates that the sites relationship with an existing landscape character and coastal location is key in determining and conceptualising the overall landscape strategy. Principles include; the preservation of existing character and trees, creation of useable and elevated landscape spaces above the flood line and therefore close to the building, creating a landscape link between existing and new facilities and water sensitive urban design principles all combine to develop an ecologically and culturally responsible design for the site.

The existing riverbank on which the building sits will be complemented through introduction of low maintenance native grass and shrub species, held in place by a series low river stone gabion walls. The gabion walls are positioned to assist the storm water management plan with the aim to offset future development costs. Stands of native trees including *Corymbia maculata, Euclyptus bosistoana, Banksia intergrifolia* and *Banksia serrata* will be loosely placed across the plain of native grasses to offer protection from the western sun and help settle the buildings elevated appearance.

The landscape above the flood line aims to complement the buildings palette, accentuate the sense of arrival, settle the buildings elevated mass, and maximise vistas from patient bedrooms and terraces. The link at the lower level will create a generous and useable access to the various therapy gardens situated along its northern edge, whilst creating a distinct separation between the building and the riverbanks below, augmenting the buildings central access point.

Within the building envelope a fully accessible healing garden provides excellent place for respite and healing. The central courtyard, nestled between the buildings fingers takes advantage of its shaded position offering a cooler environment. Scattered with *Cyathea australis, Asplenium australasicum,* and other native shade tolerant species. An informal path with small areas for seating create a physical connection to the surrounding landscape, while its level and elevated position above the flood line maximise visual links to the river and views beyond.

04.14 Schematic Design Plans

Refer to Appendicies.

04.15 Signage Schemes

Signage for the building will be developed in accordance with the existing signage system used in the hospital.

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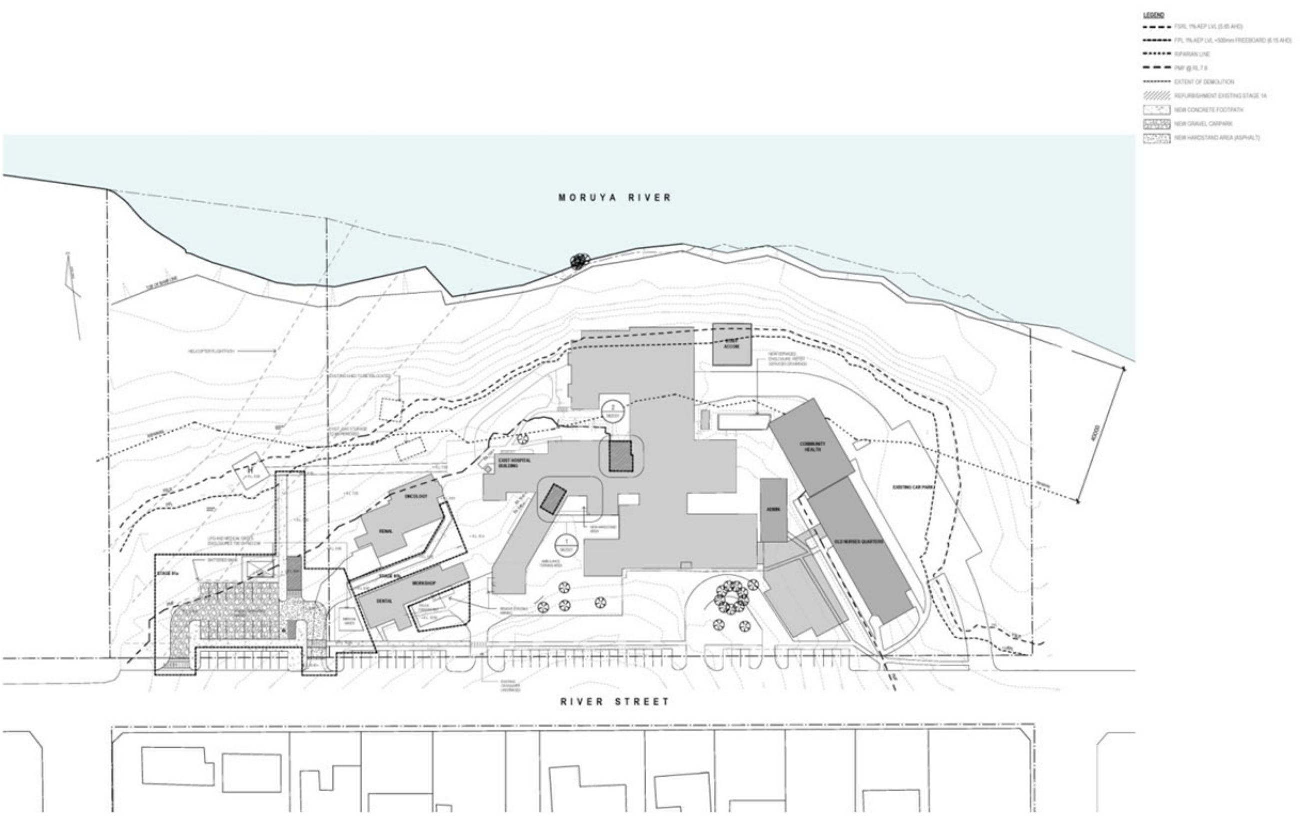
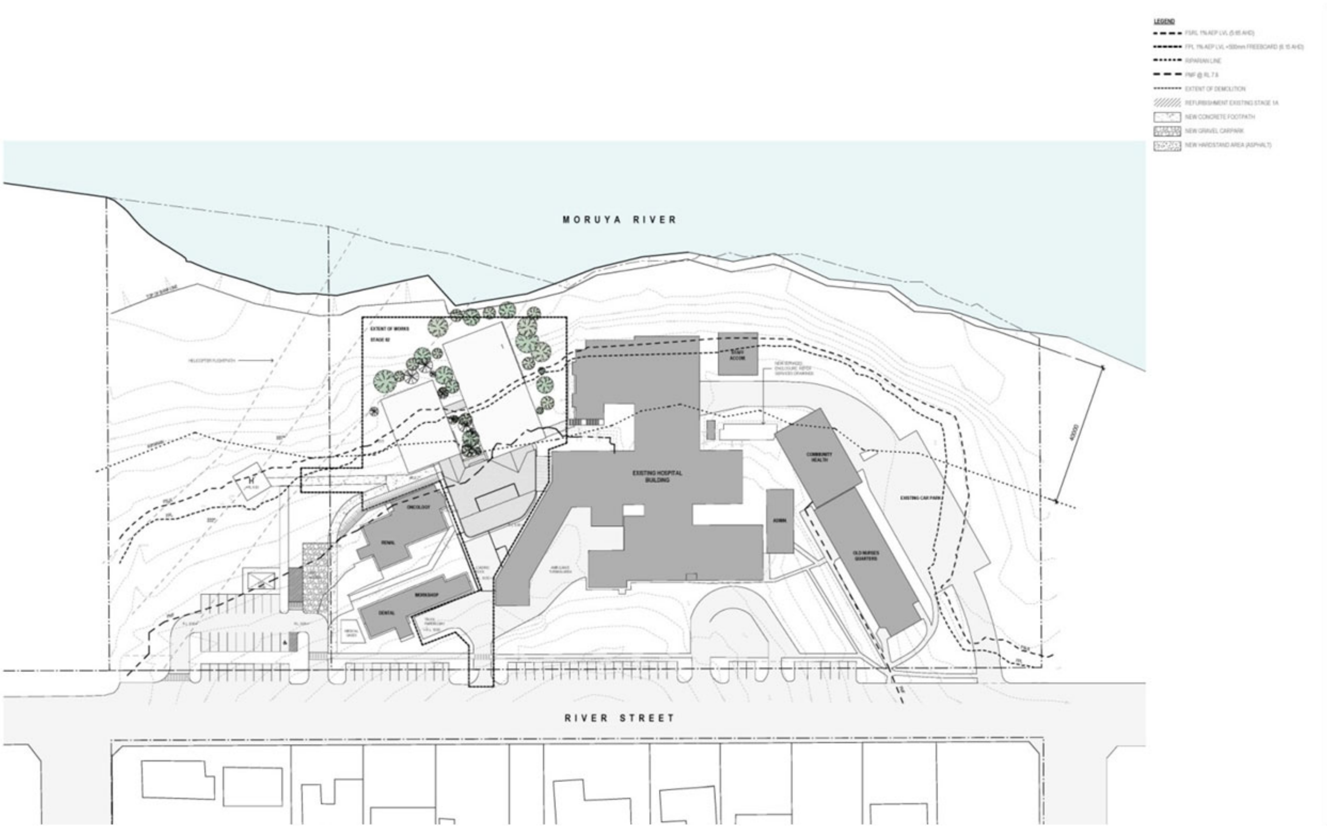
04.16 Business Continuity and Staging Diagrams

Staging of the works received a considerable amount of attention by the design team as the design proposal impacted existing car parking, departmental access routes, vegetation, in ground services, key hospital staff access routes and services plant and equipment. The design team committed to no interruption to the current service and no reduction in the existing service and facility as a consequence of the new works being effected.

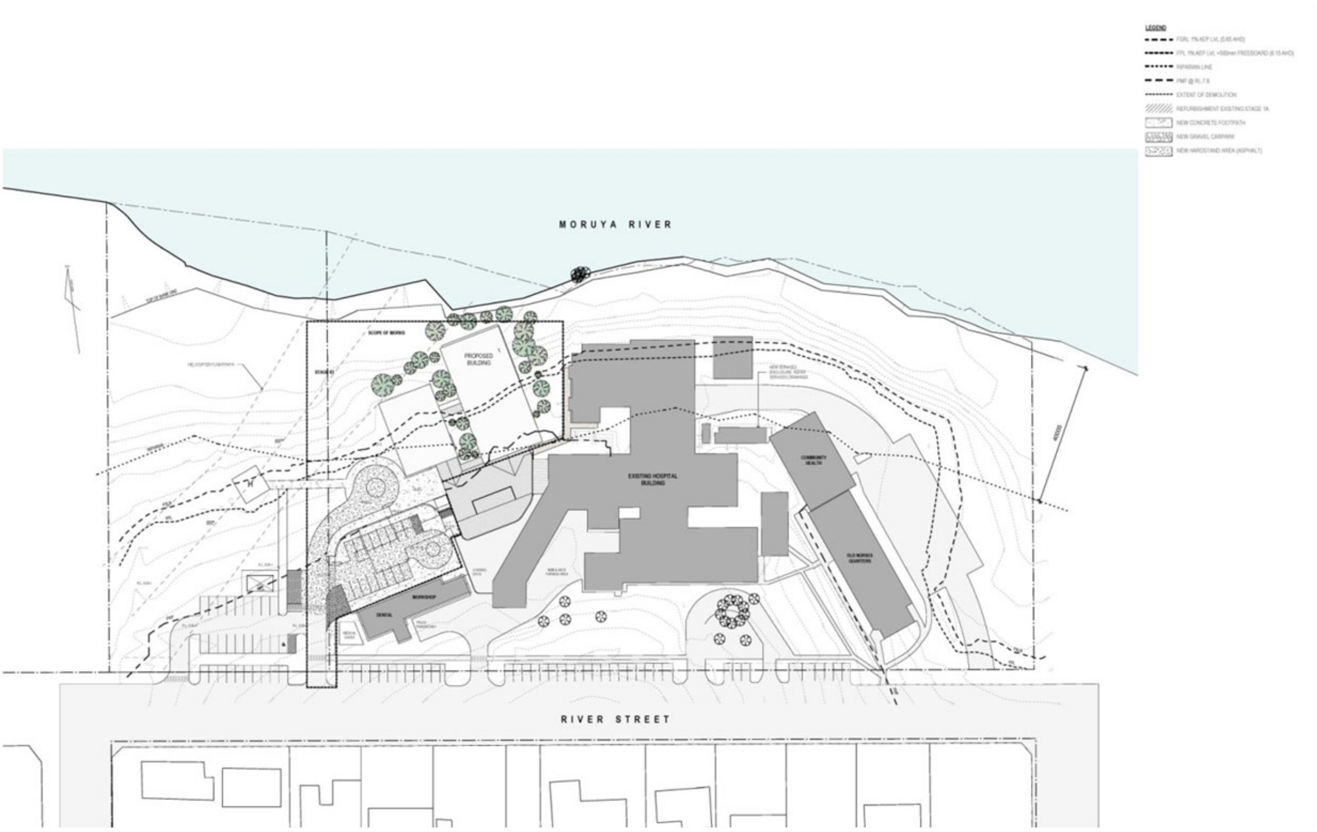
Early Works Drawings for the three major stages of work were coordinated by the Architects, and are referenced below;



Stage 1: Early or Enabling Works



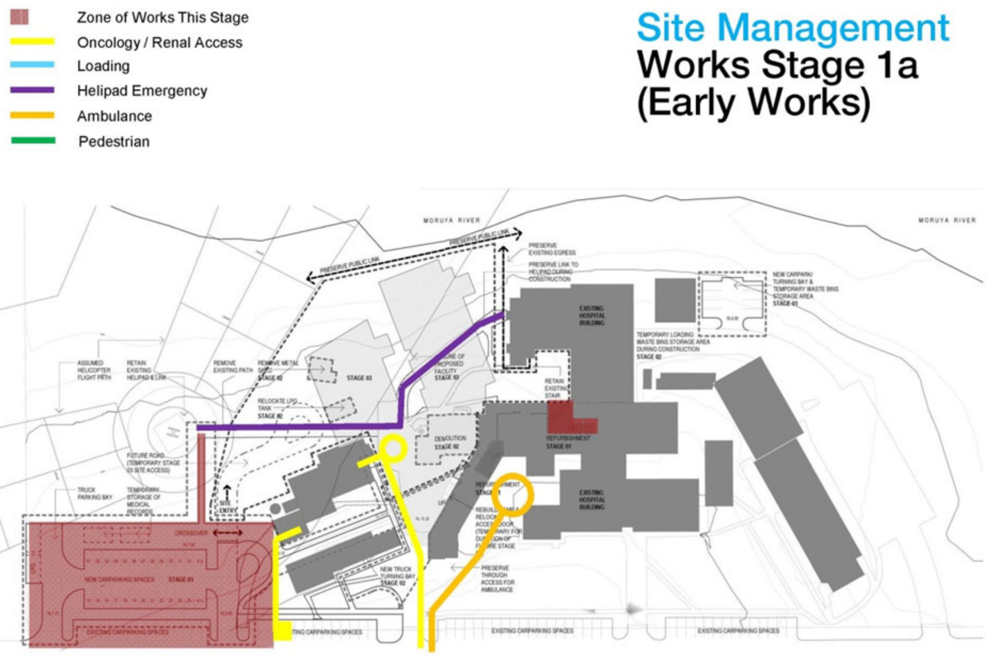
Stage 2: Major Works (Rehabilitation Centre)



Stage 3: Fitout Works (Ongcology and Renal)

These drawings were broken down into a series of diagrams for presentation to Hospital Staff. These diagrams are provided below as a summary record of outcomes of that discussion.

Stage 1 is defined as an enabling stage allowing for the relocation of existing hospital services that will be impacted by the proposed works. The stage is divided into 2 minor stages.



Stage 1a provides for the construction of the new car park to the west and services relocations as required.

Summary of impacts to users by this stage are summarised below.

<u>Stage 1a Early Works</u>

Access

Helipad Link remains operational as existing.

Oncology drop off remains operational as existing.
Ambulance drop off remains operational as existing.
New pathway link constructed from existing renal drop off to oncology entry, compliant to AS1428.1.

Facilities

Provision of 2x shipping containers to serve as temporary secondary Medical Records storage.
Refurbishment of existing bedrooms to suit Pharmacy.
New gravel car park at western end of hospital for 16 car spaces compliant to AS2890.1, serving new rehab building.

Logistics

Clean Loading remains as existing.
Dirty Loading remains as existing.
Food Loading remains as existing.
General Loading remains as existing.
Waste Loading remains as existing.
Cytotoxic waste is stored and collected as existing.

Services

New hardstand areas as required for LG and Medical Gases, and installation and commissioning of same.

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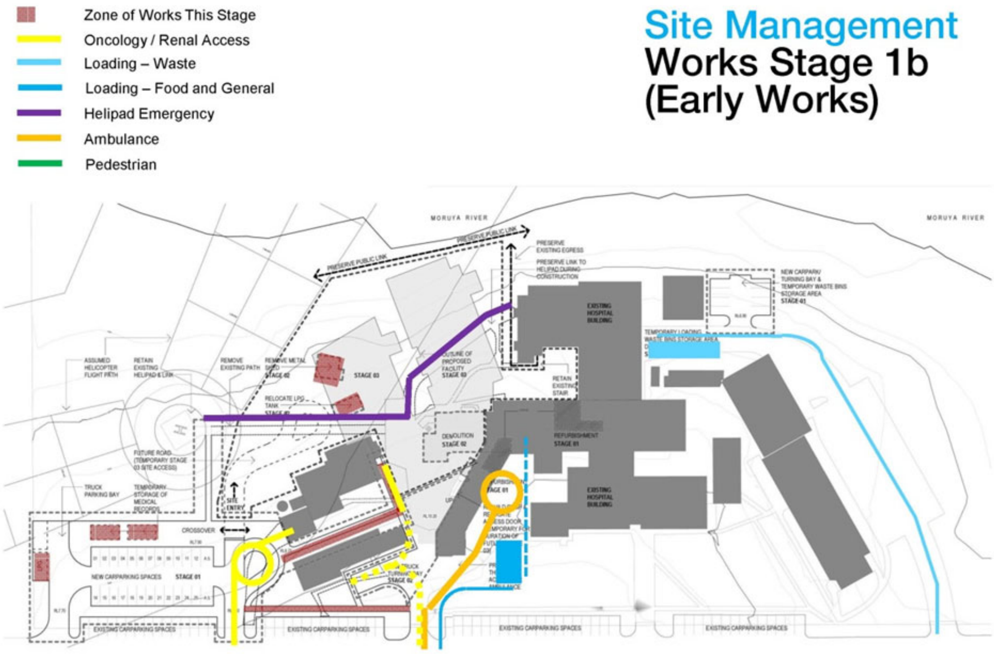
Site Management
Works Stage 1b (Early Works)

Stage 1b involves construction of new pathways, relocation of medical records and some demolition.



<u>Stage 1b Early works</u>

Access

Helipad Link remains operational as existing.
Ambulance drop off remains operational as existing. The scope of work in this stage is proposed to avoid any impact to the existing ambulance cross over.
Renal to use existing drop off.
Oncology to utilise new path constructed in Stage 1a between Renal and Oncology Buiding and Dental building, with drop off located at the existing Renal drop off.

Facilities

Garden Shed disassembled and relocated. Position tba.

Logistics

Clean Loading redirected to Ambulance Car Park, access via existing corridor to main hospital with new landing ramp for trolley access.
Dirty Loading redirected to Ambulance Car Park, access via new corridor to main hospital with new landing ramp for trolley access.
Food Loading redirected to Ambulance Car Park, access via new corridor to main hospital with new landing ramp for trolley access.
General Loading redirected to Ambulance Car Park, access via new corridor to main hospital with new landing ramp for trolley access.
Waste Loading redirected to lower east road end, access via existing corridors. No truck turning provided for as per existing.
Cytotoxic waste collection redirected to lower east road end, access via existing corridors. No truck turning provided for as per existing.

Services

LPG tank existing decommissioned and removed.
Existing garden shed relocated.

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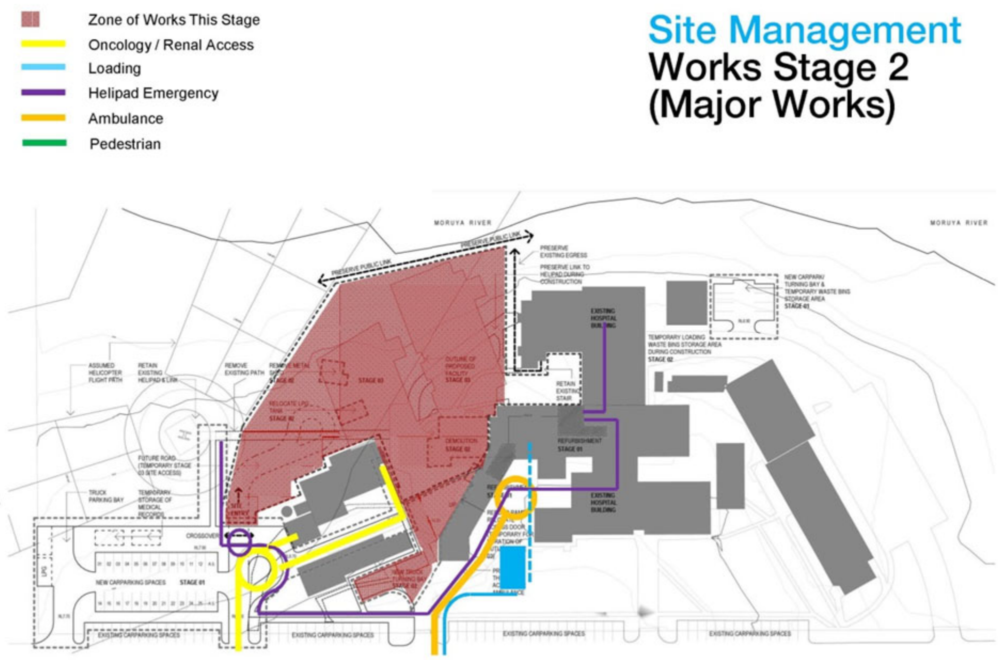


Stage 2 incorporates the construction of the Rehabilitation Facility, new Loading Dock and Loading Dock turning area.

Stage 2 Major Works (During Construction)

Access

Helipad access is rerouted through main hospital, using existing lift, exiting through existing ambulance bay. There is the option of either walking the stretcher bed or using an ambulance to reach the helipad from this position. If walking the stretcher bed, the route uses the new pathway built along the road frontage, through the existing car park, then a new path constructed to the helipad. Ambulance drop off if used can occur in the new renal turnaround.

Ambulance drop off remains operational as existing.

Renal to use new drop off and turn around constructed in Stage 1a.

Oncology drop off is via the new renal drop off constructed in Stage 1a. As an option, where a patient may face mobility issues, the new loading dock can be used.

Facilities

The tutorial room, CNE office, Pharmacy, IV Store, Medical Records and Cytotoxic Store will be impacted by the proposed demolition works. Stress Test and HITH are unaffected by the scope of work this stage and remain operational as per existing.

The tutorial room will be constructed as part of the main works, but there is no temporary accommodation proposed to be built for the duration of the major works. It is assumed the Hospital will provide equivalency through its management of existing facilities.

The CNE office will be constructed as part of the main works, but there is no temporary accommodation proposed to be built for the duration of the major works. It is assumed the Hospital will provide equivalency through its management of existing facilities.

Pharmacy will relocate into the refurbished space as constructed in Stage 1a.

IV Store will relocate into the refurbished space as constructed in Stage 1a.

Medical records as is currently stored within the existing boiler room will relocate permanently to the shipping containers provided at the new western car park constructed in Stage 1a.

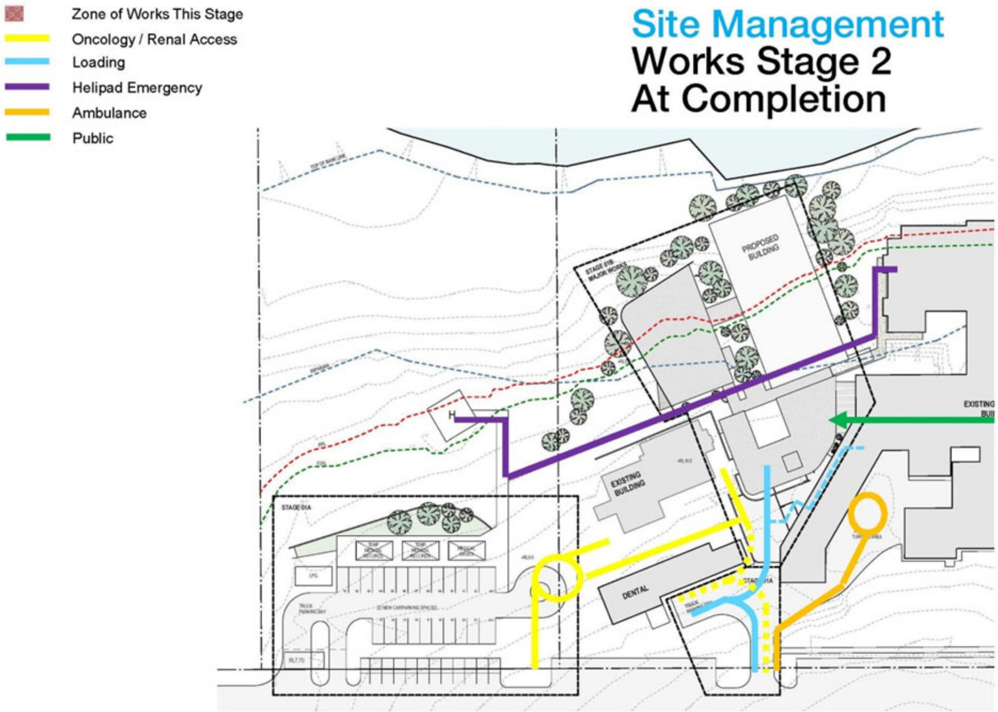
Clean linen and Dirty Linen in the existing hospital are unchanged for the duration of the Stage 2 works. At handover, the new clean and dirty linen stores will be used and the existing will be refurbished to provide the new staff room and IV store.

Cytotoxic store will locate to a temporary storage on the new loading dock constructed in stage 1b.

Logistics

Clean Loading is re-established in the same position as existing but uses the new loading dock constructed in stage 1b.
Dirty Loading is re-established in the same position as existing but uses the new loading dock constructed in stage 1b.
Food Loading is re-established in the same position as existing but uses the new loading dock constructed in stage 1b.
General Loading is re-established in the same position as existing but uses the new loading dock constructed in stage 1b.
Waste Loading is re-established in the same position as existing but uses the new loading dock constructed in stage 1b.
Cytotoxic waste will collect from the new loading dock constructed in stage 1b.

On site truck turning is now provided.



Stage 2 at completion provides the new Rehabilitation Facility and Loading Dock, and refurbished rooms internal to the Main Hospital.

Stage 2 Major Works (At Completion)

Access

Helipad access is through the new rehab building at the ground floor. The new route approximately follows the existing route and is at roughly the same level.
Ambulance drop off remains operational as existing.
Renal to use new drop off and turn around constructed in Stage 1a.
Oncology drop off is via the new renal drop off constructed in Stage 1a. As an option, where a patient may face mobility issues, the new loading dock can be used.
Public access to the new Rehab Facility is via the main Hospital.
Staff Access to the new Rehab Facility is via the main Hospital or via a ground level entry connected by footpath to the new western car park constructed in stage 1a.

Facilities

At conclusion of Stage 2 works, the new works will provide accommodation as per the plans and Schedule of Accommodation. This provides for replacement Tutorial room, CNE office, Pharmacy, IV Store, Medical Records (Primary), Cytotoxic Store, Clean and Dirty Linen Stores, HITH and CNE.
Within the existing hospital, refurbishment works will provide a new Staff Room, Staff Toilets, Pharmacy and IV store.

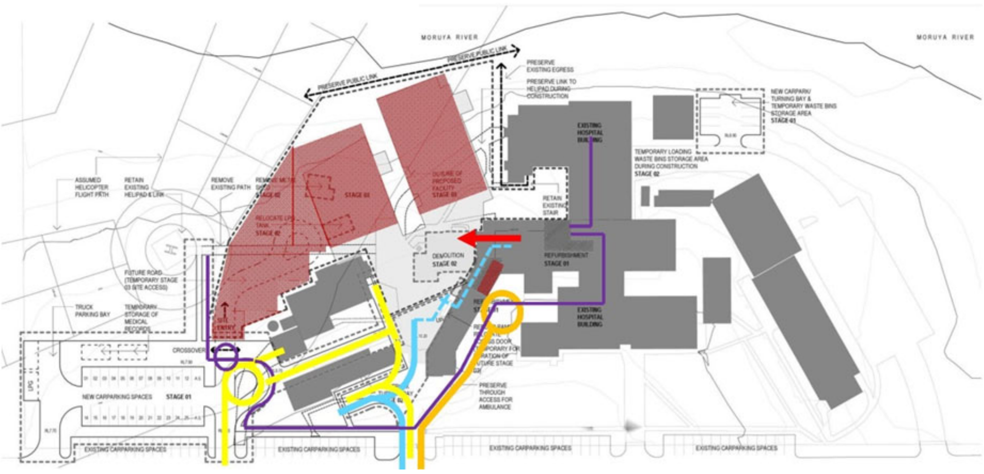
Logistics

Clean Loading is via the new loading dock.
Dirty Loading is via the new loading dock.
Food Loading is via the new loading dock.
General Loading is via the new loading dock.
Waste Loading is via the new loading dock.
Cytotoxic Loading is via the new loading dock.

- Zone of Works This Stage
- Oncology / Renal Access
- Loading
- Helipad Emergency
- Ambulance
- Pedestrian
- Rehab Unit Entry

Site Management
Works Stage 3a (Major Works – Oncology & Rehab)

Stage 3 is undertaken in two minor stages. Stage 3a incorporates the construction of the new renal and oncology departments in the undercroft.



Stage 3a Major Works

Access

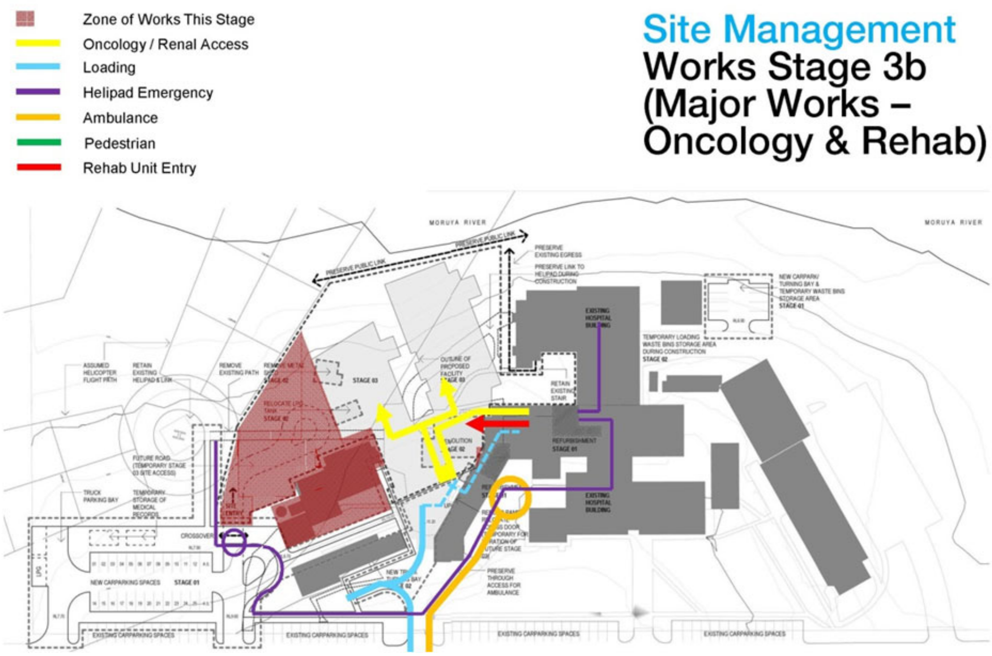
Helipad access is rerouted through main hospital, using existing lift, exiting through existing ambulance bay. There is the option of either walking the stretcher bed or using an ambulance to reach the helipad from this position. If walking the stretcher bed, the route uses the new pathway built along the road frontage, through the existing car park, then a new path constructed to the helipad. Ambulance drop off if used can occur in the new renal turnaround.
Ambulance drop off remains operational as existing.
Renal to use new drop off and turn around constructed in Stage 1a.
Oncology drop off is via the new renal drop off constructed in Stage 1a. As an option, where a patient may face mobility issues, the new loading dock can be used.
Public access to the Rehab Facility, Renal and Oncology is via the main Hospital only.
Staff Access to the Rehab Facility is via the main Hospital only.

Facilities

No existing facilities are impacted except that views from the existing Renal and Oncology will be restricted for the duration of the works.

Logistics

Loading arrangements remain as per Stage 2 (At Completion).



Stage 3b incorporates the demolition of the existing renal and oncology building, and construction of new roadways and access paths as required by the Masterplan.

<u>Stage 3b Major Works</u>

Access

Helipad access is rerouted through main hospital, using existing lift, exiting through existing ambulance bay. There is the option of either walking the stretcher bed or using an ambulance to reach the helipad from this position. If walking the stretcher bed, the route uses the new pathway built along the road frontage, through the existing car park, then a new path constructed to the helipad. Ambulance drop off if used can occur in the new renal turnaround.

Ambulance drop off remains operational as existing.

Renal to use new drop off and turn around constructed in Stage 1a.

Oncology drop off is via the new renal drop off constructed in Stage 1a. As an option, where a patient may face mobility issues, the new loading dock can be used.

Staff and Public access to the Rehab Facility is via the main Hospital only for the duration of this stage of the works.

Staff and Public access to the new Renal and Oncology departments is via the main Hospital only for the duration of this stage of the works.

Facilities

Oncology and Renal take up occupation of the new departments.

The existing Renal and Oncology Building is demolished.

A new car park is built in the location of the existing Renal and oncology Building, car numbers to be determined.

Logistics

Loading arrangements remain as per Stage 2 (At Completion).

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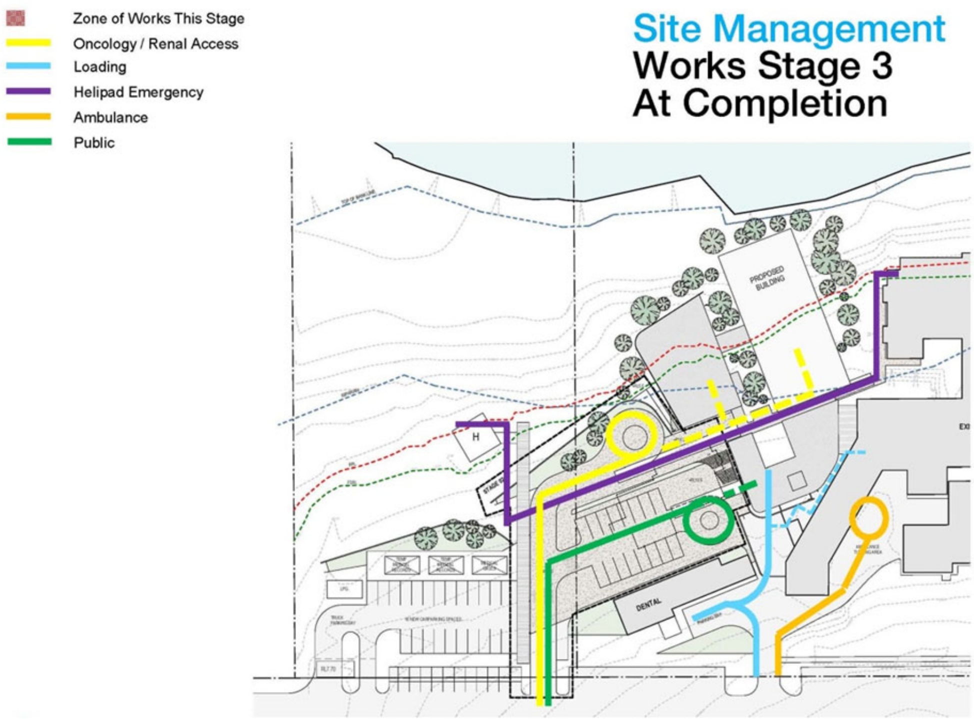

Stage 3 at completion incorporates the Rehabilitation Facility, Oncology and Renal, Car Park and Vehicular Drop Off to upper and lower floors.

Stage 3 Major Works – At Completion

Access

Helipad access is through the new rehab building at the ground floor. The new route approximately follows the existing route and is at roughly the same level.

Ambulance drop off remains operational as existing.

Oncology and Renal to use new drop off and turn around constructed in Stage 3b. Alternatively access can be gained through the main hospital and down the new lift.

Rehab to use new car park and drop off constructed in Stage 3b. Alternatively access can be gained through the main hospital.

Facilities

No change to composition of departments outlined in Stage 3b.

Logistics

Loading arrangements remain as per Stage 2 (At Completion).

04.17 Infection Control drawings and Management Strategy integrating Engineering Services Infection Control Measure

Infection control procedures and measures have been reviewed with the hospital and will be in accordance with NSW Health policies. Personal hygiene and infection control measures will be promoted as part of daily living skills and rehabilitation programs. Provision of single bed rooms have been incorporated to deal with potential infection control issues.

Further detail on infection control measures will be integrated to the project during the Detailed Design phase, and summarized in the Design Development report.

04.18 Architectural Sketch Diagrams and Renders

View from North West

View from River

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External Finishes

Internal Finishes

Moruya Interior Concepts

Use Evidence Based Design to create:

- Warm and healing environments that will help people return to good health
- A connection and to celebrate the local landscape and environment
- A calm and inviting place for recovery
- Legible spaces

Concept Images

Connect with place

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Look and Feel

Living Room


Seating


Lounge


Accent Wallpaper

Natural - Peaceful - Link to Local Environment

Note images are to convey look & feel only these do not reference furniture selection.

Floor Finishes

Ground Floor

LEGEND:
- RE:01 Lithos Stone Phyllite vinyl - public & corridors
- RE:02 Lithos Stone Bojite - main entrance, link to level 1
- CA:01 Atmosphere Pagoda Gold carpet - work areas
- RE:05 Aquarius Swan vinyl - ensuites & WCs
- RE:07 Aquarius Cygnet vinyl - service areas

Floor Finishes

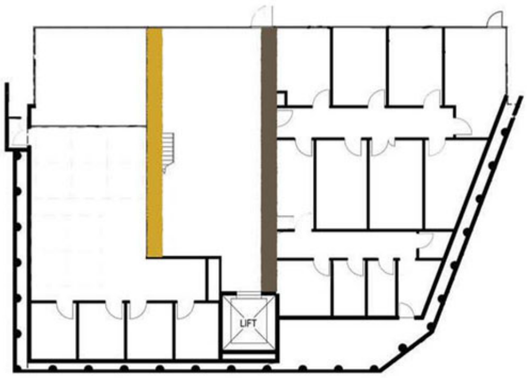
First Floor

LEGEND:

- RE:01 Lithos Stone Phyllite vinyl - public & corridors
- RE:02 Lithos Stone Bojite vinyl - linking internal courtyard
- RE:03 Timberline Rustic Beech vinyl - bedrooms
- CA:01 Atmosphere Pagoda Gold carpet - work areas & lounge
- RE:04 Anti-static vinyl
- RE:05 Aquarius Swan vinyl - ensuites & WCs
- RE:06 Tapiflex Dark Grey vinyl - gym floor
- RE:07 Aquarius Cygnet vinyl - service areas

Wall Finishes

Ground Floor



- TV:01 Timber Veneer Larice Natural
- RE:08 Six Hands Blue Gum Wallpaper

Wall Finishes

First Floor

LEGEND:

- CT:01 Grey tile in nooks
- CT:02 Orange tile in nooks
- TV:01 Timber Veneer Larice Naturale
- RE:08 Six Hands Blue Gum Wallpaper
- PA:01 A & B Dulux Terracotta Chip & Orangeade
- PA:02 Dulux Apparition

Indicative Interior Perspective

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05 Cost Planning

05.01 Cost Plan C1 Summary

Altus Page Kirkland has prepared Scheme Design Cost Plan No.01 for the Moruya Subacute Rehabilitation Unit project. The Gross Construction Cost as at September 2012 for the current scheme design is **$8,560,864** (excluding GST), as per the summary below.

Item	Element	Cost (Excl GST)
1	Site Preparation	158,120
2	Piling	173,261
3	Substructure	226,065
4	Columns	147,945
5	Upper Floors	552,384
6	Staircase	43,575
7	Roofing	373,590
8	External Walls	447,227
9	Windows	205,013
10	Internal Walls & Screens	404,723
11	Internal Doors	134,978
12	Wall Finishes	79,774
13	Floor Finishes	178,936
14	Ceiling Finishes	199,253
15	Fitments	270,176
16	Hydraulic Services	412,268
17	Medical Services	22,825
18	Mechanical Services	783,309
19	Fire Protection	103,067
20	Electrical Services	629,130
21	Communications & Security	199,950
22	Lift	135,188
23	Special Provisions	150,000
24	External Services	824,000
25	External Works	184,737
26	Enabling Works	245,112
	NETT NEW BUILDING WORK COST	**7,284,601**
27	Preliminaries (13%)	946,998
28	Margin (4%)	329,264
	GROSS BUILDING COST	**8,560,864**

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7.2 Reconciliation to Budget

Scheme Design Cost Plan No.1 equates to a budget overrun of **$1,024,726** with all contingencies and escalation intact, as per the summary below. This overrun can be reduced through the partial release of Design Contingency to reflect the current design status.

Cost Centre	Project Brief Budget	SD Cost Plan No.01	Variance
Building Works	$5,988,781	$8,560,864	-$2,572,083
Gross Building Cost (G.B.C.)	**$5,988,781**	**$8,560,864**	**-$2,572,083**
Locality Factor	$479,100	INCL	$479,100
Staging	INCL	$50,000	-$50,000
Planning Contingency	$299,400	$299,400	$0
Design Contingency	$299,400	$299,400	$0
Construction Contingency	$299,400	$299,400	$0
Contingency	EXCL	EXCL	$0
TOTAL BUILDING COST (T.B.C.)	**$7,366,081**	**$9,509,064**	**-$2,142,983**
Professional Fees	$1,234,600	$1,350,000	-$115,400
Authority Fees	$119,500	$119,500	$0
Client Costs	$119,500	$119,500	$0
LHD Costs	$119,500		$119,500
Commissioning / Relocation	$79,700	$79,700	$0
NETT PROJECT COST (N.P.C.)	**$9,038,881**	**$11,177,764**	**-$2,138,883**
Furniture, Fittings and Equipment	$700,000	$600,000	$100,000
TOTAL PROJECT COST (T.P.C.)	**$9,738,881**	**$11,777,764**	**-$2,038,883**
Escalation	$1,143,000	$128,843	$1,014,157
TOTAL END COST (T.E.C.) (Excl. GST)	**$10,881,881**	**$11,906,607**	**-$1,024,726**

06 Recurrent Cost Impacts

06.01 Staffing/Operational

Staffing and operational Recurrent Cost Impacts have been provided in the FIS prepared by the Local Health District and submitted separately to Health Infrastructure.

06.02 Funding Requirements

This project is being delivered under the Council of Australian Governments (COAG) funded Sub-acute Beds Program.

06.03 Energy

Energy Recurrent Cost Impacts have been provided in the FIS prepared by the Local Health District and submitted separately to Health Infrastructure.

Passive Design Strategies have been implemented as per the AECOM Services Report included in the Appendicies.

06.04 Maintenance

The Moruya Sub Acute Rehabilitation Facility is located within close proximity to the coastline. As a consequence, materials selection and the building design must consider the local environmental conditions. These relates to higher rates of corrosion and stronger winds.

The site is exposed to the weather as it is not protected by adjacent buildings or vegetation.

Metalwork

Metal elements are provided as either structural elements or nonstructural (mild steel). Additional, various fittings and fixtures installed to the building are manufactured from metal, such as window frames, door hardware, locks and closing mechanisms, handrails and balustrades, as well as various fixing elements throughout the building.

Most metals slowly oxidise when exposed to atmospheric conditions, changing to another form such as the mineral ore from which they were produced. Rusting iron and steel produce reddish iron oxide. Some metals such as gold and certain stainless steels are more resistant than others to this process (or more noble) and remain largely unaffected. The process of chemical reversion, or corrosion, is accelerated by air pollutants, acid rain, salts and the presence of dissimilar metals. In coastal environments metals corrode rapidly under the influence of airborne salts and high humidity.

Rainwashing is a critical factor in the cleaning of metals.

Corrosion
In the most common use of the word, this means electrochemical oxidation of metals in reaction with an oxidant such as oxygen. Rusting, the formation of iron oxides, is a well-known example of electrochemical corrosion. This type of damage typically produces oxide(s) or salt(s) of the original metal. Corrosion can also occur in materials other than metals, such as ceramics or polymers, although in this context, the term degradation is more common.

Chlorides present in the atmosphere in coastal areas are highly aggressive and they lower the critical percentage humidity. This greatly increases the rate of onset of corrosion.

Many structural alloys corrode merely from exposure to moisture in the air, but the process can be strongly affected by exposure to certain substances. Corrosion can be concentrated locally to form a pit or crack, or it can extend across a wide area more or less uniformly corroding the surface. Because corrosion is a diffusion controlled process, it occurs on exposed surfaces. As a result, methods to reduce the activity of the exposed surface, such as passivation and chromate-conversion, can increase a material's corrosion resistance. However, some corrosion mechanisms are less visible and less predictable.

Galvanising
Galvanising is an acceptable process for protecting steelwork (structural and mild steel). Thickness of the galvanising is the key factor in determining the performance of the galvanising. The BCA establishes requirements for the protection of structural steel.

As a consequence of Cutting and drilling on site will reduce the effectiveness of the galvanising, however touch ups can be applied on site as part of the construction works.

SE3 is the classification for the majority of Sydney, however some areas of Sydney require a C4 classification. Accordingly it is appropriate to consider a C4 classification. A 6mm coating would last around 20 to 40 years in a C4 environment. For improved performance of the coating wash down with a hose on a 6 to 12 months basis to remove salt layers.

Painting
Rust prevention with paint containing rust inhibiting pigments that chemically alter the conditions at the surface of the metal and resist corrosion of the metal. Such paints contain zinc or zinc chromate. Surface preparation is critical in rust prevention. Epoxy paints are used to assist in corrosion resistance.

Micaceous Iron Oxide paint also reduces corrosion, however exhibit higher brush marking roller marking and stipple than other paints.

Resistant Metalwork
Stainless steel inherently resists corrosion, however is not cost feasible for structural steelwork.
It can be used for non-structural elements. Marine grade resistant stainless steel is described as SAE 316.

Aluminium is inherently resistant to corrosion due to passivation. Natural anodising is a form of passivation.

Building Sealing
Maintaining a dry, clean environment using suitable moisture marriers will improve the longevity of steelwork. These barriers are usually specified as part of the building envelope design. Careful installation can maximise their protective benefits.

Cladding
Pre-finished (Vitrapanel Vitraflon 700): standard module sizes, broad colour range, precoated 2 pack polyurethane, chemical resistance, resistance to abrasion, accommodates expansion of the substrate, mould, graffiti & dirt resistant, self cleaning, accepts overpainting if required.

Timber
Timber is an environmentally responsible material option if recycled or obtained from a sustainably managed resource. It is particularly attractive since it has low embodied energy and is virtually 'carbon neutral' (apart from transport and processing). In addition, all forests sequester carbon from the atmosphere both in living biomass and in forest soils. Living forests also have important functions in the regulation of other cyclical processes important to the earth's climate – particularly air quality and the water cycle.

Treatment depends on maintenance requirement. Pre-oiling penetrates and stabilises the material. The wood product will 'grey off' over time. Teak shrinkage calculates at 2%. Expected lifespan of the material is 40+ years. If it is determined to treat the timber, the timber is pre-oiled and then regularly oiled with UV treated pigment (eg Cutek) every 8 – 12 months initially.

Timber generally possesses a critical value of moisture content below which corrosion of metal fasteners will not proceed. Thus, moisture content is the main factor in controlling corrosion in timber fasteners.

Fasteners in enclosed positions in dry timbers (moisture content 18% and below) generally perform satisfactorily.

Final materials selections for the Scheme are summarized in Section 4.19 above.

06.05 Cleaning, Security etc.

Hotel services Recurrent Cost Impacts have been provided in the FIS prepared by the Local Health District and submitted separately to Health Infrastructure.

Cleaning and Security issues will be further investigated during the DD phase and the DD report will summarise this information.

07 Programme

The project is programmed for completion in the 2013/14 FY. Completion will rely on an accelerated scheme design process achieved by frequent design team attendance, early contractor appointment and the consideration of efficient construction methods

The key milestones of the program are:

– Construction Tender call	Mid October 2012
– Main Construction Award	Mid December 2012
– Handover of building	Mid January 2014
– Final clean and FFE placement	Mid February 2014
– Occupation	Late February 2014

Design and Construction Programs are included in the Appendicies.

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08 Value Management

08.01 Value Management Study Objectives

Value Management was undertaken prior to the conclusion of the SD phase of work and targeted savings to the overall design of the building. The cost plan report above incorporates Value Management objectives undertaken in the SD phase.

Further cost savings measures will be reviewed and incorporated through Design Development.

08.02 Value Management Study Outcomes

As a consequence of the value management the drawings were amended and the drawing set and cost plan included to this Report represents the outcome of the SD Value Management Study.

08.03 Response to Outcomes

Value Management Study Outcomes are not seen as compromising the clinical functionality of the facility, as they have not altered the clinical layout and have focused on the building envelope and site works.

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09 Appendix A: Schedule of Accommodation

Woods Bagot
MORUYA HOSPITAL
2 story option (20 Bed Sub acute GE

no.	Rooms	HFBS	unctional Bri	WB Schematic Design_Sign-off 23 Aug. 2012			
		HFBS	Total Area (m2)	Qty	Size (m2)	Total Area (m2)	Comments
	Lower Entry - Level 00						
1001	Waiting	10	10	1	0.0	0	combined with 1002
1002	Lounge - Families / Carers	12	12	1	31.9	31.9	include circulation
1003	Disposal	8	10	1	10.0	10	
1004	Cleaners Room	5	5	1	6.4	6.4	shape of room is odd therefore more area required to make functional
1005	Toilet - Staff	3	3	1	5.6	5.6	
1006	Shower - Staff	3	3	1	3.0	3	
1007	Toilet - Disabled Access	6	6	1	6.0	6	
	Functional Area	**47**	**49**			**62.9**	
	Circulation (40%)	19	20			25	
	Floor Area	**66**	**69**			**88**	
	12 hour pod Staff Areas- Level 00						
1008	Store - File	8	10	1	8.8	8.8	
1009	Store - Photocopy / Stationery	8	8	1	10.2	10.2	includes circulation
1010	Office- single person	9	9	1	9.1	9.1	Doctor
1011	Office- single person	9	9	1	9.1	9.1	CNE
1012	Office- single person	9	9	1	9.1	9.1	
1013	Workstation	4.4	44	1	64.8	64.8	10 workstations - includes circ for office suite
1014	Workstation	5.5	0	0	0.0	0	
	Functional Area	**52.9**	**89**			**111.1**	
	Circulation (25%)	13	22			28	
	Floor Area	**66**	**111**			**139**	
	12- hour pod Consultation suite- Level 00						
1015	Consult / Interview	12	14	1	13.9	13.9	
1016	Consult / Interview/ exam	12	14	1	13.7	13.7	
1017	Consult / Interview/ exam	12	14	1	13.7	13.7	
1018	ADL Laundry	8	8	1	11.3	11.3	
1019	ADL Bathroom	12	15	1	15.3	15.3	
2066	Treatment Room	14	16	1	16.0	16	located on level G
1020	Group / Meeting Room	20	20	1	19.7	19.7	
1021	Meeting / Interview Room	12	12	1	14.3	14.3	
	Functional Area	**102**	**113**			**117.9**	
	Circulation (40%)	41	45			47	
	Floor Area	**143**	**158**			**165**	
	Level 01 (12- hour pod Patient Therapy Support Areas)- Level 01						
2001	ADL Kitchen	12	12	1	14.3	14.3	
2002	Dining Room/ Activity	40	48	1	49.0	49	
2003	Bay - Beverage	4	4	1	4.4	4.4	
2004	Bay - Meal Trolley	4	4	1	4.5	4.5	
2005	Lounge	30	15	1	19.6	19.6	
2006	Lounge	30	15	1	10.8	10.8	

2007	Toilet - Patient Disabled Access	6	6	1	6.2	6.2	
2008	Toilet - Staff Disabled Access	6	6	1	6.1	6.1	
2009	Gym	80	80	1	80.6	80.6	
2010	Workstation	5.5	11	2	11.2	22.4	include copy / store area
2011	Workstation	4.4	17.6	4	17.2	68.8	include copy / store area
2012	Store - Equipment	10	0	1	10.1	10.1	
	Functional Area	**231.9**	**218.6**			**296.8**	
	Circulation (40%)	93	87			119	
	Floor Area	**325**	**306**			**416**	
	Patient Accommodation / Areas Rehabilitation 10 beds						
2013	1 Bed Room	15	15	1	18.1	18.1	
2014	Ensuite - Standard	5	5	1	5.3	5.3	
2015	1 Bed Room	15	15	1	18.5	18.5	
2016	Ensuite - Standard	5	5	1	5.3	5.3	
2017	1 Bed Room	15	15	1	18.5	18.5	
2018	Ensuite - Standard	5	5	1	5.3	5.3	
2019	1 Bed Room - Special	18	18	1	20.3	20.3	
2020	Ensuite - Special	6	6	1	5.0	5	
2021	2 Bed Rooms	28	28	1	28.6	28.6	
2022	Ensuite - Standard	5	5	1	5.5	5.5	
2023	2 Bed Rooms	28	28	1	28.5	28.5	
2024	Ensuite - Standard	5	5	1	5.5	5.5	
2025	2 Bed Rooms	28	28	1	28.5	28.5	
2026	Ensuite - Standard	5	5	1	5.5	5.5	
2027	Bay - Hand wash / PPE	1.5	1.5	1	1.7	1.7	
2028	Sitting alcove	1	1	1	0.0	0	
2029	Sitting alcove	1	1	1	0.0	0	
2030	Sitting alcove	1	1	1	0.0	0	
2031	Sitting alcove	1	1	1	0.0	0	
2032	Bay - Linen	2	2	1	1.6	1.6	
2033	Bay - Hand wash	1	1	1	0.0	0	combined with PPE 2027
2034	Bay - Computer on Wheels	1	1	1	1.7	1.7	
2035	Bay - Mobile Equipment	1	4	1	4.3	4.3	combined with 2059
	Functional Area	**153.5**	**196.5**			**207.7**	
	Circulation (40%)	61	79			50	actual
	Floor Area	**215**	**275**			**258**	
	Patient Accommodation / Areas Gem 10 beds						
2037	1 Bed Room	15	15	1	18.4	18.4	
2038	Ensuite - Standard	5	5	1	5.4	5.4	
2039	1 Bed Room	15	15	1	18.4	18.4	
2040	Ensuite - Standard	5	5	1	5.4	5.4	
2041	1 Bed Room	15	15	1	18.4	18.4	
2042	Ensuite - Standard	5	5	1	5.4	5.4	
2043	1 Bed Room - Special	18	18	1	19.3	19.3	
2044	Ensuite - Special	6	6	1	6.1	6.1	
2045	2 Bed Rooms	28	28	1	28.6	28.6	
2046	Ensuite - Standard	5	5	1	5.4	5.4	
2047	2 Bed Rooms	28	28	1	28.6	28.6	
2048	Ensuite - Standard	5	5	1	5.2	5.2	
2049	2 Bed Rooms	28	28	1	28.6	28.6	
2050	Ensuite - Standard	5	5	1	5.4	5.4	
2051	Bay - Hand wash / PPE	1.5	1.5	1	1.7	1.7	
2052	Sitting alcove	1	1	1	2.9	2.9	
2053	Sitting alcove	1	1	1	2.8	2.8	
2054	Sitting alcove	1	1	1	0.0	0	combined with 2052
2055	Sitting alcove	1	1	1	0.0	0	combined with 2053
2056	Bay - Linen	2	2	1	1.6	1.6	
2057	Bay - Hand wash	1	1	1	0.0	0	combined with 2051
2058	Bay - Computer on Wheels	1	1	1	1.6	1.6	

2059	Bay - Mobile Equipment	4	4	1	4.4	4.4	combined with 2035
	Functional Area	**156.5**	**196.5**			**213.6**	
	Circulation (40%)	63	79			50	actual
	Floor Area	**219**	**275**			**264**	
	Level 01 Patient Accommodation /IPU'a						
2061	Reception	10	8	1	10.0	10	include rescus trolley
2062	Staff Station	14	14	1	14.0	14	
2063	Office - Clinical / handover	15	15	1	14.1	14.1	
2064	Office	9	9	1	9.7	9.7	NUM
2065	Consult / Interview	12	14	1	13.2	13.2	
2067	Clean Utility	14	14	1	13.8	13.8	
2068	Dirty Utility	12	12	1	11.5	11.5	
2069	Bay - Resus Trolley	2	2	1	0.0	0	located between reception and staff base
2070	Store - Equipment	30	30	1	19.3	19.3	10m2 adjacent to gym
2071	Store - General	9	9	1	8.2	8.2	
2072	Disposal	8	10	1	10.9	10.9	
2073	Cleaners Room	5	5	1	5.2	5.2	
2074	Staff Room	12	12	1	22.7	22.7	includes staff lockers and bev bay
2075	Staff Lockers	3	2	1	0.0	0	included in 2075
2076	Toilet - Staff	3	3	1	45.1	45.1	existing patient toilets to be refurbished into staff toilet/ shower and lockers
2077	Toilet - Staff	3	3	1	0.0	0	
2078	Toilet - Patient			1	3.5	3.5	
2079	Shower- Patient			1	6.8	6.8	
2080	Toilet - Patient			1	4.9	4.9	
2081	Shower- Patient			1	5.2	5.2	
	Functional Area	**151**	**162**			**197.7**	
	Circulation (40%)	60	65			79	
	Floor Area	**211**	**227**			**277**	
	Displaced Areas						
3001	Existing Pharmacy	31.1	31.1	1	44.6	44.6	Level 01
3002	IV Store	exist	10	1	12.6	12.6	new IV store- plus existing to remain in current location
3003	Existing Pharmacy Office	9	9	1	8.5	8.5	Level 01
3004	Existing Tutorial	36	36	1	35.5	35.5	Level 00
3005	Existing 2 Person Office	12	14	1	13.7	13.7	Level 01
3006	Stress Test	16	18	1	15.7	15.7	Level 01
3007	HITH Room	18	18	1	17.8	17.8	Level 01
3013	Refurbished toilet- patient			1	7.7	7.7	existing staff toilet and shower to be refurbished into the new patient toilet and shower
	Functional Area	**122.1**	**136.1**			**156.1**	
	Circulation (40%)	49	54			62	
	Floor Area	**171**	**191**			**219**	
	Displaced Areas-Whole of Hospital Support						
3008	Hospital Street	100	100	1	72.1	72.1	Whole hospital circ
3009	Existing Clean Linen WHS	27	27	1	26.6	26.6	
3010	Existing Dirty Linen WHS	20	20	1	22.6	22.6	
3011	Disposal Hold WHS	20					outside fenced in
3012	Cytoxic Store		8	1	8.1	8.1	collected once a week, 2x bins large, secured
9001	Loading dock- clean						outdoor space
9002	Loading dock- dirty						outdoor space
	Functional Area	**167**	**155**			**129.4**	
	Circulation (32%)	53	50			41	
	Floor Area	**220**	**205**			**171**	
	Functional Area	**1636**	**1816**			**1995**	
	Travel (10%)	164	182			199	
	Engineering incl. Plant (15%)	245	272			299	
	Gross Floor Area	**2045**	**2270**			**2494**	

	Displaced Areas-Whole of Hospital Support						
9003	Existing Plant Part A	55	55	1			
9004	Existing Medical Records (Proposed I	36	36	1	42.1	42.6	
9005	BK Store (Adjacent to Brick Chimney	11.5	11.5	1	0.0	0	new shed adjacent to parking lot
9006	Metal Shed	7	7	1	0.0	0	new shed adjacent to parking lot
9007	Oxygen Storage Tank Store	12.8	12.8	1	0.0	0	
9007	Communications room	12	12	1	12.9	12.9	
	Functional Area	**54.5**	**55**			**0**	
	Circulation (23%)	13	13			0	
	Floor Area	**67**	**67**			**0**	

10 Appendix B: Preliminary Furniture, Fitout and Equipment Schedules and Room Data Sheets

10.01 Preliminary Concept Furniture

Please refer section *Interiors Concepts* earlier in the Report.

10.02 Fitout & Equipment Schedule

TO BE PROVIDED.

10.03 Room Data Sheets

TO BE PROVIDED.

11 Appendix C: Building Services Schematic Design Report

AECOM

Sub Acute - Moruya Hospital
NSW Health Infrastructure
18 September 2012
Document No. SDR_01

Commercial-in-Confidence

Schematic Design Report

Moruya New Rehabilitation Unit

Schematic Design Report

Moruya New Rehabilitation Unit

HI10060SER

Prepared for

NSW Health Infrastructure

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

18 September 2012

60164756

AECOM in Australia and New Zealand is certified to the latest version of ISO9001 and ISO14001.

Quality Information

Document	Schematic Design Report
Ref	60164756
Date	18 September 2012
Prepared by	Brendan Fehon, Robbie Williams, David Song, Gary Lyle, Frank Caristo
Reviewed by	Joe Spatola, John Verrell, Scott Martin, Matt Burke

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	18-June-2012	Schematic Design	David O'Neill Technical Director	
B	13-Sep-2012	Schematic Design	David O'Neill Technical Director	
C	18-Sep-2012	Schematic Design	David O'Neill Technical Director	

Table of Contents

Executive Summary

This report is provided to Health Infrastructure to define the Scheme Design provisions for the Engineering Services Systems for the proposed development of Moruya Hospital 20 Bed Rehabilitation ward.

The engineering services covered in this report include:

- Early Works
- Structural Engineering
- Civil Engineering including stormwater
- Mechanical Engineering Services comprising air conditioning and ventilation
- Electrical Engineering Services comprising LV Supply, LV distribution, general light and power,
- Security and communications
- Dry Fire Services comprising fire detection, fire alarms, extinguishers etc.
- Hydraulic Services comprising hot and cold water, sanitary waste, fire hydrant and hose reel system

Meetings have been held with Woods Bagot (Architect) to discuss and develop these systems as well as presentations and meetings with the users.

Progress has been made with the Statutory Authorities with regards to preliminary applications for new supplies, relocations and record information.

The proposals within this report will be developed with Woods Bagot during subsequent design stages of the design process.

1.0 Introduction

1.1 General

Moruya Hospital is a 69 bed level three hospital and provides acute and community health care services. The hospital provides emergency, high dependency medical, surgical, paediatrics and obstetric care servicing the Southern Coast part of the Eurobodalla Shire. It is also one of the major referral centres in the area for surrounding communities, receiving patients.

The Sub Acute Beds Program project at Moruya Hospital is to provide a new 20 bed sub-acute Rehab unit.

The works in relation to services connections and preparing the ground at the new location will be included as part of this design.

The engineering services will be designed with reference to the following:

- NSW Service and Installation Rules
- NSW Health Engineering Services and Sustainable Development Guidelines TS-11
- Building Code of Australia with relevant State and Territory amendments
- Minimum Energy Performance Standards (MEPS) as outlined by the appropriate Australian Standards
- Local Council
- Water Authority
- Gas supply authority
- Workplace Health and Safety
- Environment Protection Act and Authority
- The Local Fire Service
- Essential Energy Network Standards
- This engineering Services Return Brief and associated comments/clarifications
- Communications provider standards and requirements
- Any other Authority having jurisdiction over this installation.
- Relevant Australian Standard specifications or Codes, except where such specifications or codes shall be varied by any governing authority. Such compliance shall in all cases be with the current edition or issue of the specification or code concerned.

Where requirements of any governing authority or any applicable Australian or British Standard specification or Code differ from the requirements specified herein, the more stringent requirements will prevail unless expressly stated otherwise or agreed.

2.0 Structural Design

2.1 Description of Proposed Structural Scheme

The proposed building consists of two floor levels covered with a metal deck roof. The facade will be a mixture of light weight cladding such as painted CFC, Kliplok metal panel cladding and masonry.

The building is located on a sloping site. This means that the northern portion of the Ground Floor will be suspended and the southern portion will be built as slab on grade. At this stage only two small portions of the Ground Floor will be built. The two portions are the slab on grade area to the south and a 2 bay by 2 bay zone to the north of the site below the larger wing. Provision will be made to build the remainder of the floor at a later date.

The first floor will be framed using a reinforced concrete slab and beam structure. The columns will be reinforced concrete columns on a maximum 8m x 8m grid. The foundations will consist of bored piers / piles founded on high strength rock. The piles will be designed as predominately end bearing to avoid having to bore through the high strength rock.

The roof over the smaller wing will be designed using structural steel sections due to the open plan design of this wing. The remainder of the roof will be framed using light gauge steel supported on the internal walls and the external façade. This portion of the roof will be designed by specialist contractors.

2.2 Design Life

The design life of the building will be 50 years in accordance with the BCA, AS3600 Concrete Structures and AS4100 Steel Structures.

2.3 Design Loads

2.3.1 Dead Loads

The design dead loads shall be in accordance with Section 2.0 of AS1170 Part 1 and shall be the total weight of all structural components, empty weight of equipment, and piping, insulation and miscellaneous permanent loads.

2.3.2 Live Loads

Live loads shall comply with Section 3 of AS1170 Part 1.

Except where equipment loads produce more severe loading, the following live loads shall be applied:

Live Load	Loading
Hospital Wards	2.0
Office Areas	3.0
Communal Kitchens	3.0
Communal corridors and stairs	4.0

2.3.3 Wind Loads

Wind loadings shall be determined in accordance with AS/NZS1170.2:

Parameter	Value
Importance level	2
Wind speed region	A2

Parameter	Value
Terrain category	3
Regional wind speed, V_R = V500	45
Serviceability wind speed, V_R = V25	37

2.3.4 Earthquake Loads

Earthquake loads on building structure shall be calculated in accordance with AS/NZS1170.0 and AS/NZS1170.4. The following seismic design factors shall be used:

Parameter	Value
Seismic design category – normal structures	k_p = 1.0
Acceleration coefficient	z = 0.08
Soil class	C_e
Importance level	2

Earthquake loads calculated in terms of the above codes are ultimate limit state loads. For permissible stress design these loads shall be divided by 1.4.

2.4 Concrete

All concrete work shall be designed in accordance with the requirements of AS3600.

Unless stated otherwise concrete shall be as follows:

Parameter	Value
Blinding concrete	10 MPa
Plain concrete	20 MPa
Reinforced concrete	32/40 MPa

2.5 Reinforcing Steel

- bars 6mm and 10mm diameter shall be hot rolled plain round bars grade R250N
- bars 12mm diameter and greater shall be hot rolled ribbed grade D500N
- cold drawn and ribbed wire shall be grade R500L and D500L respectively
- welded wire fabric shall be grade D500L.

2.6 Steelwork

Structural steel shall be to the following grades:

Steel	Grade
Universal Beam, Universal Column	Grade 300
Angles, Channels	Grade 300
Welded Beams, Welded Columns	Grade 300
Flat Bar, Plate	Grade 250
Plain Round Bar	Grade 300
Circular and Rectangular Hollow Sections (CHS, RHS)	Grade 250, 350, 400

Steel	Grade	
Structural steel bolts – all galvanised - commercial grade - high-strength bolts	F_{uf} 400 MPa 830 MPa	Grade 4.6 8.8

2.7 Design Procedure and Stresses

2.7.1 Steelwork

2.7.1.1 General

Design and stresses shall conform to AS4100. Corrosion protection for the steelwork shall be in accordance with AS2312. All steelwork connections shall be designed in accordance with requirements of the AISC Standardised Structural Connections Parts A and B.

2.7.1.2 Connections

- For main beam connections, flexible end plate connections shall generally be used and for secondary beams web side plate connections. All connection plates shall be 10mm except as noted on drawings.
- The minimum bolt diameter for primary structural members shall be 20mm and each individual member shall be connected with at least two bolts per connection.
- Grade 8.8 high strength bolts shall be used for connecting all main structural members and all platforms. The bolts shall be snug tightened in bearing type mode unless otherwise indicated on the drawings.
- All bolted connections of members subject to dynamic loads or reversal of stresses and shall be bolted with Grade 8.8 high strength bolts and shall be fully tensioned conforming to the requirements of AS 4100 to form a friction type joint.
- Connections for purlins, girts, door and window frames, handrails, ladders, stairs and other minor members may be designed using snug tightened commercial class Grade 4.6 mild steel bolts.
- Minimum welds shall be 6mm fillet and the capacity of welds shall be at least to the equivalent value of connecting bolts.
- Roof and wall cladding and floor grating shall not be considered to provide any lateral restraint to supporting members.
- Purlins and girts may be considered as providing lateral restraint to the connecting flange of supporting members and to the other flange when fly braces are employed.
- Weld category SP shall be used for structural welds and category GP for non-structural welds.
- Shear keys shall be used under all columns where the shear force is greater than 50 kN.

2.7.1.3 Deflections

Deflections for beams shall be limited to those suggested in Appendix B of AS4100. and Table C1 of AS1170.0.

2.7.1.4 Grouting

Grouting of structural steelwork and mechanical equipment shall be in accordance with the manufacturer's instructions.

Base plates shall be grouted with 50mm thickness typically unless noted otherwise.

2.7.2 Reinforced Concrete

2.7.2.1 General

The design of all concrete work shall conform to the requirements of AS3600 using the ultimate strength design method.

Concrete strength and reinforcing bar grades shall be in accordance with Section 6.2 of AS3600.

2.7.2.2 Paved Areas

Contraction and expansion joints should be provided to control and accommodate shrinkage and thermal movement. For general paved areas, joints should be spaced such that the distance between them is approximately 10m. The ratio of longer to shorter panel dimension shall not exceed 1.5. Slabs may be designed without control joints if the minimum area of welded wire fabric or reinforcing bar provided is greater than 0.6 per cent of the gross cross-sectional area. The reinforcement must be continuous through construction joints.

Pavement designs shall minimise the use of movement joints in areas subject to exposure to aggressive contaminants. Designs shall consider the use of additional reinforcement, concrete additives, low heat cement or other proven methods in order to limit crack widths in the concrete to 0.1mm for highly aggressive areas and to 0.2mm for mildly aggressive areas.

2.7.2.3 Cover to Reinforcement

Cover to reinforcement shall be as follows as a minimum:

Parameter	Value
Cast against ground	40 mm
Cast against blinding or membrane	30 mm
Cast in formwork and all other surfaces	20 mm
Temporary formwork for suspended slabs	20mm
Temporary formwork for suspended beams	20mm

Table 1 – Cover to reinforcement

2.7.2.4 Deflections

Deflections of beams and slabs shall comply with the requirements of AS3600.

2.7.3 Masonry

The design and documentation of all masonry structures shall conform to the requirements of AS 3700 Masonry structures.

2.8 Footings

Footings to be designed strictly in accordance with the recommendations set out in the project geotechnical report prepared by Douglas Partners, Reference number 50668.01 dated August 2012.

The foundations for the unit will consist of bored piers or piles socketed into the medium to high strength granodiorite. This rock layer was found at approximately 3.7 – 5.8m below the natural ground surface.

The design of the footings shall take into account the effects of existing and new trees in accordance with Appendix H of AS2870.

2.8.1 Adjacent Foundations

Adjacent foundations at different levels shall be built in a way that the vertical angle between two adjacent foundation edges is not steeper than 30° where possible. This may require lean concrete fill below the higher foundation.

Where the excavation is adjacent to an existing building and the excavation does not exceed 3m, a cantilevered piled wall will be used to support the face of the excavation. The design parameters for the cantilevered pile retaining wall are set out in the geotechnical report. We propose using 600mm diameter piers at 2m centers with 125mm thick infill shotcrete panels.

2.8.2 Settlement

Differential and total short and long term settlement of foundations shall be calculated and reviewed to ensure that it is within the acceptable limits for the intended use of the structure.

2.8.3 Stability of Footings

Footings shall be designed to prevent instability due to overturning, uplift and sliding in accordance with AS/NZS1170.0 Section 4.2.1, and AS3600 Section 3.2 and 3.3.

Piled foundations shall be checked to ensure that the maximum allowable pile tension load is not exceeded.

The following combinations shall be used to check the footing stability for each stage of the life of the structure. Combinations of loads to give the most adverse overturning effect shall be analysed.

Stage	Load combinations
Erection	Dead (minimum) and wind or seismic (for temporary structure recurrence interval)
Testing	Dead (minimum) and wind (for temporary structure recurrence interval)
Operating	Dead, live, thermal and wind or seismic or bundle pull loads (for normal recurrence intervals as appropriate)

Table 2 – Load combinations

2.9 Retaining Walls

Earth retaining structures including loads and load combinations shall be designed in accordance with AS 4678 and the parameters set out in the project geotechnical report.

Surcharge live loading shall be a minimum of 5.0kPa for all areas including medium vehicle traffic areas not exceeding 10,000kg. Areas subject to heavy vehicle loading shall be designed for a surcharge live loading as detailed in AS5100.

Horizontal loads shall include pressure effects of compaction of back fill behind wall during construction.

As described in section 2.8.1 retaining walls adjacent to buildings and within the zone of influence of existing foundations will be designed as cantilevered retaining walls as long as the height of the retaining wall does not exceed 3m. Temporary anchors and permanent propping of the top of the wall will be required if the height exceeds 3m.

2.10 Geotechnical Parameters

The geotechnical parameters for the site are set out in the geotechnical report prepared by Douglas Partners, Reference number 50668.01 dated August 2012.

3.0 Civil Design

3.1 Scope of Work

- General Earthworks and Site Grading
- Access Road and Car Park Design
- Pavement Design
- Stormwater Management

3.2 General Earthworks and Site Grading

3.2.1 General Description

The general earthworks philosophy will make use of the existing site topography in order to minimise the amount of earthworks associated with the project.

A bulk earthworks plan will be prepared to match the proposed building footprint, proposed new car park and or any additional car parking required. A model will be created in the 12D civil design software package and from this model volumes of cut and fill will be determined. The aim will be to optimise the cut and fill balanced volume where the least material will be moved around site. The constraint of flood levels must be accounted for.

If a balance cannot be achieved, areas will need to be identified where spoil can be disposed of on site or fill sourced. Failing this an appropriate location off site would need to be sourced by the Contractor. In either case the material will need to be tested to ensure that it is not contaminated and if so what the appropriate method of disposal would be.

A site information indicates that the site generally falls towards the river in a south to north direction from approximately 12.20m to 4.00m. There will be existing overflow drainage paths that will be accommodated in the earthworks design. The earthworks design should not have a detrimental effect on the local floodway or flooding to adjacent properties and if possible should improve flow where feasible.

3.2.2 Design Inputs

This section provides a list of standards and codes and other additional design related documents that will be used in the preparation of the detailed general earthworks and site grading design. While this list is not exhaustive, further investigation and review of the documents listed herein will be undertaken during detailed design stage in order to confirm the exact site specific requirements.

Table 3: Earthworks Design Reference Documents and Standards

Reference Number	Title
RTA R41	RTA Specification R41 – Clearing and Grubbing
RTA R44	RTA Specification R44 – Earthworks
RTA R50	RTA Specification R50 – Stabilisation of Earthworks
AS 3798	Australian Standard AS 3798 – Guidelines On Earthworks For Commercial and Residential Developments
"The Blue Book"	Soils and Construction – Managing Urban Stormwater Volume 1, 4th Edition, March 2004 by Landcom
Eurobodalla Residential Zones DCP	Section 7.2 - Earthworks

3.2.3 Design Criteria

It is envisaged that the following design criteria will be reviewed and confirmed after receipt of the geotechnical report.

Table 4: Earthworks Design Criteria

Item	Adopted	Comment
General		
Batter Slopes	1 (V) in 4 (H) Assumed	This is to be verified by the geotechnical report
General Surface Grading	Min 1% Max 6%	
Finished Floor Level		To be optimised for earthworks and access criteria.

3.2.4 Design Assumptions

The following assumptions will be reviewed and confirmed during the detailed earthworks design:

- Erosion and sediment control plans will be prepared for the proposed construction works in accordance with Landcom's Managing Urban Stormwater: Soils & Construction manual.

Further investigation into the suitability of the concept design is required during the detailed design stage to ensure the proposal meets the maintenance and operational requirements of the development.

3.2.5 Non-Compliance and Departures

There are no expected non-compliances or departures from the above codes, standards, guidelines and design criteria at this time.

3.2.6 Design Methodology and Basis of Design

This section provides an indication of the design methodology to be used in preparation of the detailed earthworks design.

- Site Visit to identify opportunities and constraints
- Desktop review of design criteria and associated literature
- Preliminary potential bulk earthworks options
- A detailed 3d AutoCAD (.dwg) file or 12 Model (.12da) file of the survey that includes correct survey triangles is required to ensure that the earthworks volumes are accurate. This is to be provided by a registered surveyor engaged by the client separate to this engagement.
- Any spoil to be removed from the site is to be tested to ensure that there are no contaminants prior to commencement of construction. This testing is to be sourced by the client separate to this engagement.

3.3 Proposed Car Parks

3.3.1 General Description

The amount of parking that will need to be provided is to be determined in the traffic engineers report and incorporated in the architectural drawings.

3.3.2 Design Inputs

This section provides a list of standards and codes and other additional design related documents that will be used in the preparation of the detailed parking layout and general design. While this list is not exhaustive, it is noted that further investigation and review of the documents listed herein will be undertaken as the detailed design progresses in order to confirm the exact site specific requirements.

Table 5: Car Parking Reference Documents and Standards

Reference Number	Title
AS 2890.1 2004	Parking Facilities - Off Street Car Parking
AS 2890.2 2002	Parking Facilities - Off Street Commercial Vehicle Facilities
AS 2890.6 2004	Parking Facilities - Off-Street parking for People with disabilities
Eurobodalla DCP - Parking Code	Eurobodalla DCP - Parking Code

3.3.3 Design Criteria

The following design criterion will be reviewed with Eurobodalla Council and confirmed as the detailed design road layout progresses.

Table 6: Road Design Criteria

Item	Standard	Adopted	Comment
Horizontal Road Alignment			
Turning Paths	Austroads 2006	Emergency response vehicles L= 7.6m	Access Road
		B99 Sedan	Staff / Visitor Car Park/ Access Road
Vehicle Design Speed	-	5km/hr	
Access Road Width	AS 2890.1 2004	6.2m	based on 2 way road
Car Parking Spaces	AS 2890.1 2004	5.4 x 2.4	90 degree parking
Aisle width	AS 2890.1 2004	Min 5.8m	
Kerb Type	RTA	150mm Integral Kerb and Gutter or 150mm Kerb only	For All internal roads and parking
Vertical Road Alignment			
Maximum Grade	AS 1428.1 2009	1 (v) in 14 (h) ≈ 7.14%	To also allow for Disabled Access
Minimum Desirable Grade	RTA RDG	1%	Grades less than 1% can only be used where it can be demonstrated that no other options are viable.
Road Cross fall	RTA RDG	3% typical	

3.3.4 Design Assumptions

The following assumptions should be reviewed and confirmed during the detailed design stage:

- The new loading bay access will not have a detrimental effect on the existing access to the ambulance bay area.
- New access for the proposed car park will allow for service vehicles to accommodate the proposed new maintenance locations.

3.3.5 Non-Compliance and Departures

There are minor new road works in the form of new vehicle ingress and egress points on River Street to accommodate the new car park located on the west side of the site.

3.4 Pavement Design

3.4.1 General Description

Site specific pavement designs are required for the proposed Car Parks given the specific vehicular loading and the existing geotechnical conditions. On receipt of this information, the pavement designs will be undertaken to confirm assumptions made during the early design process. Furthermore, as the design progresses, the pavement design is to be reviewed to ensure it meets the operational requirements of the site.

3.4.2 Design Inputs

This section provides a list of standards and codes and other additional design related documents that will be used in the preparation of the pavement design. While this list is not exhaustive, it is anticipated that further investigation and review of the documents listed herein will be undertaken during future design stages in order to confirm the exact site specific requirements.

Table 7: Pavement Design Reference Documents and Standards

Reference Number	Title
AUR GPT	Austroads Guide to Pavement Technology – Part 2: Pavement Structural Design

3.4.3 Design Criteria

The pavement design will be undertaken in accordance with the Austroads Guide to Pavement Design. The pavement types will be based on the anticipated vehicular loading.

Given the anticipated vehicular loading will differ depending on the end use, the use is to accommodate large or heavy vehicles for maintenance and deliveries and the significant movement anticipated to occur on a daily basis as result of staff, visitors and daily hospital operation hence a minimum of a medium duty flexible pavement is proposed.

3.4.4 Design Assumptions

The following preliminary design criterion would be reviewed and confirmed in preparation of the detailed pavement designs.

Table 8: Pavement Design Criteria

Medium Duty Pavement			
	Standard	Adopted	Comment
Equivalent Standard Axles (ESA)	RTA RDG	5 x10^4 ESA	
Sub grade Strength		CBR 3%	Pending confirmation of strength of the existing sub grade
Design Life	20 year	20 year	20 year

3.4.5 Non-Compliance and Departures

There are no expected non-compliances or departures from the above codes, standards, guidelines and design criterion at this time.

3.4.6 Design Methodology and Basis of Design

The following design methodology will be used in the preparation of the detailed pavement design:

- Determine operational requirements of the proposed building
- Determine the class of vehicle given the operational requirements above
- Determine the anticipated frequency of loading i.e. Equivalent Standard Axles (ESA) in accordance with the RTA RDG and AUR GPT.
- Assume sub-grade strength. Given the limited information received to date, generally a pavement design will be based on a minimum CBR value of 3%. In anticipation of the geotechnical survey results. Further review of the pavement design is recommended during detailed design.
- Undertake pavement design to achieve a design life of 20 years is considered appropriate.
- Determine Pavement type upon further clarification of user requirements and receipt of geotechnical site investigation report.

3.5 Stormwater Management

3.5.1 General Description

This section of the report will cover only stormwater works outside the proposed building envelope. Any drainage from the roof or internal courtyards has been addressed in the Building Hydraulics section of this report.

A detailed topographic survey has been received, including existing services information. This has formed the basis of the stormwater management strategy along with the architectural and building hydraulics drawings.

3.5.1.1 Design Requirements

There will be an increase in stormwater runoff due to an increase to the impervious area. Onsite detention is not required as we are discharging into the river. The stormwater drainage will be a gravity system maintaining self-cleansing velocity. The site is currently served by existing stormwater outlet discharging to the riverbank, due to the site contouring and the proximity of the building to the river, an additional stormwater outlet will be required. The outlet will be in the form if a concrete headwall and rip rap distributor to dissipate the energy and prevent any river bank scouring. This will be subject to approval from the relevant authority and will need to be reviewed with regard to flooding by the appointed flood consultant. The location of the outlet is within the riparian boundary, however the project is exempt from permit under the Fisheries Act because the project is a government department project. The design is still subject to the requirements of the Act and therefore a gross pollutant trap will be provided to ensure the water quality is improved before discharge onto the river bank.

3.5.1.2 Overland Flow

There is an existing overland flow path between the existing buildings. This overland flow path drains the upstream catchment of the site to the south.

The proposed Sub Acute building footprint is located within the current existing overland flow path. It is proposed that gap remain between the existing buildings and the new building to allow the flow path to be unimpeded.

Any existing issues of flooding of the existing building are not part of the scope of this engagement.

3.5.2 Soil and Water Management Plan Silt and Erosion Control Plan

Under the Protection of the Environment Operations Act (1997) it is an offence to pollute any waters or to place any material in a position where it is likely to pollute any waters.

Any form of construction works where the surface of the land is disturbed will result in erosion and sedimentation rates increases unless adequate safeguards are put in place. Accordingly the Council requires preparation and approval of a site specific Erosion and Sediment Control Plan (ESCP) or Soil and Water Management Plan (SWMP) for each new development. These plans are to outline the staging of works, sediment and erosion control measures, rehabilitation strategies and other works to be implemented to address the above concerns.

3.5.3 Design Inputs

This section provides a list of standards and codes and other additional design related documents that will be reviewed when undertaking the detailed stormwater drainage design. While this list is not exhaustive, further investigation and review of the documents listed herein should be undertaken during the detailed design stage in order to confirm the site specific requirements:

Table 9: Drainage Design Reference Documents and Standards

Reference Number	Title
Eurobodalla Residential DCP	Section 7.3 Stormwater Management
Moruya River Floodpain Management Plan	Reference
Eurobodalla Floodplains DCP	Reference
RTA R11	RTA Specification R11
CPA	Concrete Pipe Association's "Concrete Pipe Selection and Installation" Guide
AR&R Vol 1	Australian Rainfall and Runoff "A Guide to Flood Estimation" Volume 1, 2003
AR&R Vol 2	Australian Rainfall and Runoff "A Guide to Flood Estimation" Volume 2, 2003
"The Blue Book"	Soils and Construction – Managing Urban Stormwater Volume 1, 4th Edition, March 2004 by Landcom
AS 3500.3	Australian Standard AS3500.3: Plumbing and Drainage Code – Stormwater Drainage (2003)
AS 3725	Australian Standards AS3725: Design for Installing of Buried Concrete Pipes
WATERWAY DESIGN	Waterway Design – A Guide to the Hydraulic Design of Bridges, Culverts and Waterways (AUSTROADS 1994)
DECCW ECR	Department of Environment, Climate Change and Water - Environmental Compliance Report - Liquid Chemical Storage, Handling and Spill Management
DECCW PM	Department of Environment, Climate Change and Water - Storing and Handling Liquids Environmental Protection - Participants Manual

The following Eurobodalla Council Engineer will be contacted when undertaking the site stormwater drainage design:

Table 10: Eurobodalla Council Engineering Contacts

Name	Position	Contact Number
Mike Mcilveen	Senior Engineer	(02) 4474 1015

3.5.4 Design Criteria

It is envisaged that the following design criterion would be reviewed and confirmed for the stormwater drainage design once DA conditions have been received.

Table 11: Drainage Design Criteria

Item	Standard	Adopted	Comment
On-Site Stormwater Detention (OSD)	Eurobodalla Council	Not required	
Design Storm	ARR	20 year ARI TBC	Minor System
	ARR	100 year ARI TBC	Major Storm for Overland Flow paths
Minimum Pipe Size		375mm	
Minimum Pipe Type	CPA	RCP Class 2	
Minimum Pipe Installation	CPA	HS3	
Minimum Pipe Grade		1% Desirable	
Pit Blockage Factors		50%	Grated Sag and continuous grade pits
Minimum Pipe Cover Requirements	Pittwater Council	Aus-Spec #1,	C221 specifications
Gutter Flow Spread	Pittwater Council	2.75 m	10 Year ARI
Depth Velocity Product	ARR	$0.4m^2/sec$	Not to be exceeded.
Pit Freeboard	ARR	0.15m to top of grate for road drainage	For Minor Design Storm
Minimum Grade of open channels		Side Slopes 1in 4	Design to be in accordance with Volume 1, Chapter 14, of AR&R
Habitable Freeboard	Pittwater Council	0.5m	To Finished Floor Level

3.5.5 Design Assumptions

The following assumptions should be reviewed and confirmed during the detailed design stage:

- The existing downstream drainage system is sufficient to for the proposed flows.
- Any additional flow will not have a detrimental impact on the property and adjacent properties in terms of flood impact.
- Current stormwater egress from site will be utilized, therefore any current water quality controls will be reviewed for suitability of the additional flows.

3.5.6 Non-Compliance and Departures

There are no expected non-compliances or departures from the above codes, standards, guidelines and design criterion at this time.

3.5.7 Design Methodology and Basis of Design

Liaison with Eurobodalla Council Engineers will be undertaken throughout the detailed design phase to ensure the development complies with the relevant local standards (as described above).

The site stormwater drainage design will be modelled using a suitable hydraulic analysis program (i.e. DRAINS or similar).

3.6 Clarification Items

There are certain items which will need to be clarified as listed below before detailed design can progress.

Table 12: Items for Clarification

Item	Reason For Clarification	Required
Determine the location and size of all existing storm water drainage pipes, pipe connectivity, pipe invert and surface levels of pits including the discharge point to the Council network.	To enable design of new drainage pipes and relocation of existing pipes within the extents of the building.	Prior to commencement of detailed design.
Determine location of all existing services/ utility pipes and cables within the area of all proposed works. These will need to be determined on site and locations surveyed for both position on the ground as well as level and size.	To ensure that the building works do not impact existing utilities and services thus minimising interruption to operations of the hospital during the construction phase.	Prior to commencement of detailed design.
Geotechnical report	To determine extent of earthworks and pavement thicknesses	Prior to commencement of detailed design.

4.0 Mechanical Design

4.1 General

This section of the report outlines the mechanical services schematic design (SD) for the proposed new Moruya Rehabilitation Unit at the existing Moruya Hospital. The various systems that comprise the mechanical services are described together with details of the scope of work for each system.

As part of the design of mechanical services for this new development, the following design strategies and methodologies will be adopted:

- Systems design with fit for purpose philosophy.
- Flexibility in design to allow for future modifications with minimal disruption to services and clinical functions
- Allow for future expansion on the site and the ability to upgrade systems and incorporate advances in technology which may affect the services infrastructure.
- Innovation in design to maximise efficiency and decrease recurrent costs.
- Maximise system life.
- Establish optimal relationship between capital and life cycle costs.
- Efficiency in services designs to achieve value for money in capital and recurrent costs without compromising operational reliability.
- Ready maintainability of services by providing services access within suitable areas.
- Mitigate the spread of odours and other air borne contaminants
- Consideration of ESD initiatives for a sustainability strategy.

In assessing spatial requirements and suitability of the proposed mechanical systems, the SD architectural drawings and Revit model as received on the 31st August 2012 has been used to obtain the building areas served:

The report should also be read in conjunction with AECOM preliminary mechanical services drawings.

4.2 Referenced Documents

Details of documents applicable to this project include:

AS/NZS 1668.1-1998/Amdt 1-2002	The use of ventilation and airconditioning in buildings - Fire and smoke control in multi-compartment buildings
AS 1668.2-1991	The use of ventilation and airconditioning in buildings - Ventilation design for indoor air contaminant control
AS 2625.1-2003	Mechanical vibration - Evaluation of machine vibration by measurements on non-rotating parts - General guidelines
AS/NZS 3000-2007	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3008.1.1-1998	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical Australian installation conditions
AS/NZS 3013-2005	Electrical installations - Classification of the fire and mechanical performance of wiring systems
AS 3500.1.1-1998	National plumbing and drainage - Water supply - Performance requirements
AS/NZS 3500.2-2003	Plumbing and drainage - Sanitary plumbing and drainage
AS/NZS 3666.1-2011	Air-handling and water systems of buildings - Microbial control - Design, installation and commissioning
AS 4072.1-2005	Components for the protection of openings in fire-resistant separating elements - Service penetrations and control joints
AS/NZS 4252.1-1994	Electromagnetic compatibility - Generic immunity standard - Residential, commercial and light industry
AS/NZS 2243.8 - 2006	Safety in laboratories - Fume cupboards
AS4254-2002	Ductwork for air-handling systems in buildings
NCC 2011	National Construction Code (Building Code of Australia)
TS11-2007 Ver 2.0	NSW Health Technical Series – Engineering Services and Sustainable Development Guidelines
Australasian HFG	Australasian Health Facility Guidelines, Revision v.4.0

4.3 Coordination of Services

The coordination of services shall include the following:

- Common routes for services reticulation. Confined where possible to corridors or other common access areas with access panels as required.
- Coordination of services in ceiling spaces to minimise the number of access panels where fixed ceilings are unavoidable.
- Services ducts, both vertical and horizontal to have designated sections of the ducts or ceiling space for each service to assist in installing those services and avoid clashing.

4.4 Engineering Principles

The following principles should form the basis for the engineering services design:

- Standardisation: Components and methods of installation shall be documented as being the same across the engineering services wherever practicable. Methods of labelling and identifying plant shall be the same across the disciplines; e.g. Fan Coil Units shall be labelled to reflect the area they control with all associated controls and equipment referring to the same number in accordance with the NSW Health standard assets management system.
- Adequate and appropriate access shall be provided for isolation and maintenance of all services. Access to service areas should not require scaffolding. Hinged access panels with a common key shall be required for all services. Access to fire rated equipment requires proper consideration by means of adequately rated fire doors or hinged access panels. Where plant is located at height suitable means/methods shall be provided to allow plant to be lowered to ground level for replacement.
- Functional areas within reason shall be separately supplied with services so that failure in or isolation of one area shall not affect another. This shall also enable various areas to be isolated during out of hours or low occupancy to enable energy conservation.
- Service ducts and/or areas where it is expected that maintenance work shall be performed shall be provided with a light and power point.
- Centralised systems shall be provided for controls, alarms and energy monitoring. Systems shall be web based to allow remote access.
- Reasonable provision shall be allowed to measure energy consumption of equipment that shall provide useful data to the hospital for energy management.
- The installation of plant in ceiling spaces in occupied areas or in patient areas which could inhibit the day to day function of the facilities which requires maintenance, or which could leak fluids shall be avoided.
- Provision shall be made in relevant services to allow for performance testing and balancing both at commissioning stage and as part of the ongoing plant management process.
- All mechanical services proposed for the development shall comply with the relevant Australian Standards, Australian Building Codes, State Regulations, architectural Room Data Sheets, and other authorities having jurisdiction over the design. The design shall also be based on guidance and recommendations published by professional institutions such as the Chartered Institution of Building Services Engineers (CIBSE) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

4.5 Design Criteria

The mechanical air conditioning systems are designed to meet the indoor temperature requirements at the designated outdoor design conditions.

Should the ambient temperature exceed the designated outdoor design conditions, indoor temperatures may be expected to rise in summer and fall in winter.

Parameter		**Design Criteria**
External Ambient Conditions		*Summer* 33.2 °C dry bulb maximum 22.5°C wet bulb maximum *Winter* 4.4°C dry bulb minimum with 80% Relative humidity
Ventilation	Outside Air:	AS 1668.2-1991 and NSW Health TS11
Exhaust Air	General Requirements:	AS 1668.2-1991 and NSW Health TS11

Parameter	Design Criteria
Hours of Operation	Mixed (Also to be confirmed by the UG)

Refer to Appendix A for detail design conditions for internal load and ventilation requirement for air conditioned spaces.

The design criteria as set-out in Appendix A have been analysed using a variety of differing credible sources where appropriate. This has been carried out so that the chosen conditions are based on informed decisions made by the engineers. Where no information is provided by the publications, an engineered assumption has been made and identified within the table.

- Internal Design Temperature and Relative Humidity
- External Ambient Conditions
- Ventilation Rates
- Air Change Rates (ACH) for Air Distribution and Circulation Purposes
- Pressurisation Regimes, to this end negative pressure within dirty areas e.g. Toilets, Dirty Utility rooms and Kitchens, other general areas will be positive.
- Internal Design Loads

4.6 System Selection

4.6.1 Estimated Cooling and Heating Load Required

Based on the latest SD architectural and Revit Model received on the 31st August 2012 the preliminary heating and cooling load estimate for the new Rehabilitation Unit is summarised in the table below.

Table 13 Estimated Cooling and Heating Loads

Estimated Cooling Load (kWr)	Estimated Heating Load (kW)
171	110

4.6.2 Existing Services and Early Works

The existing hospital is served by two hydronic boilers, one rated at approximately 250kW and the other at 500kW. They are approximately 20 years old and past their commercial life.

To make way for the new Rehabilitation Unit, the existing boiler house (plantroom) will be demolished. This provides the opportunity to replace the old existing boilers serving the existing hospital.

As part of the early works (when the existing boiler room is demolished) two (2) of 500kW forced draft none condensing boilers shall be installed temporarily next to the existing substation and connected to the existing heating water infrastructure.

Once the new Rehabilitation Unit building is constructed, these two boilers shall be moved into the new plantroom located on the roof and be re-connected to the existing heating water infrastructure.

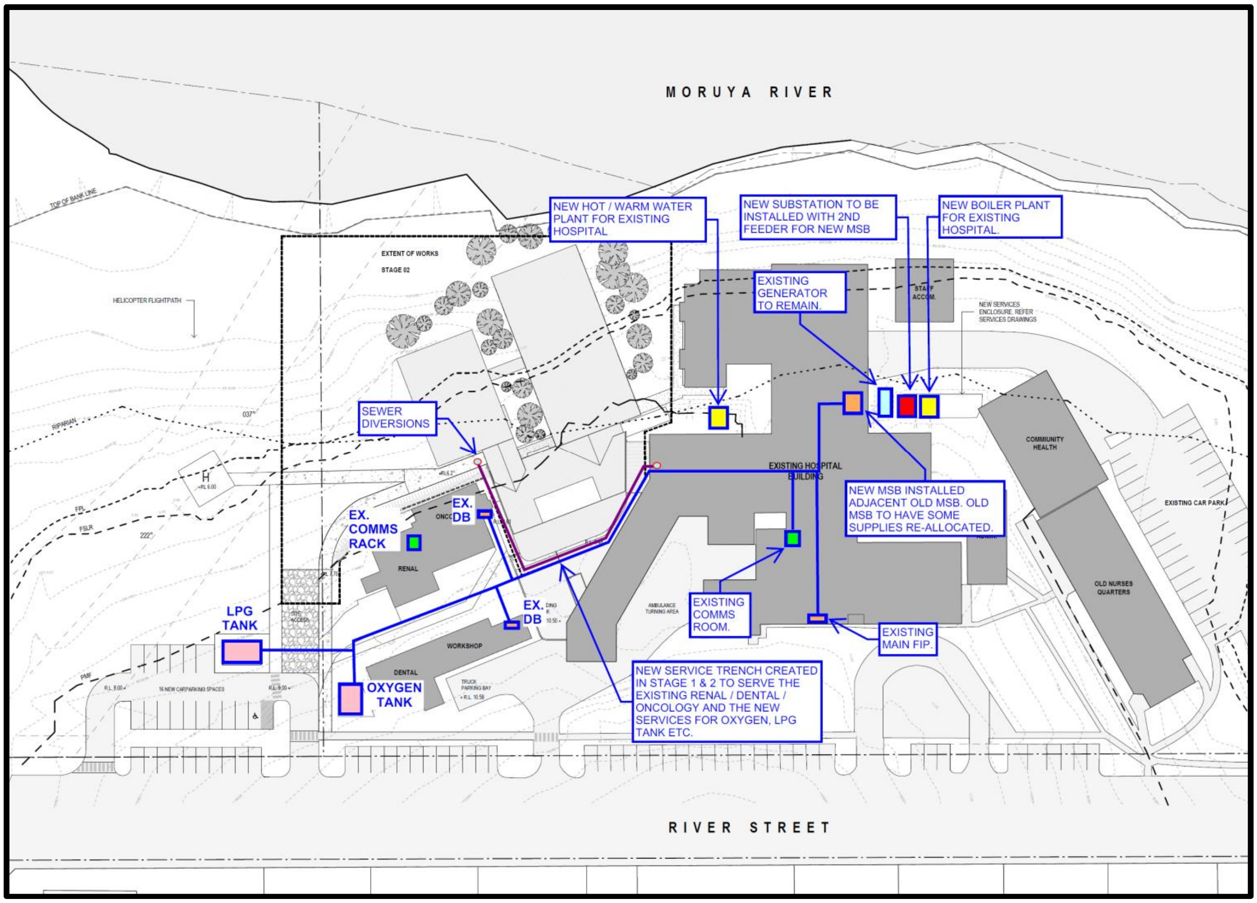


Figure 1 **Combined Early Works Overview**

4.6.3 Air Conditioning Options

In considering appropriate heating and cooling options for the proposed development, we have examined a number of different types of air conditioning systems that operate in a mixed mode fashion with natural ventilation that could be suitable for the building operational and thermal requirements.

In assessing appropriate heating and cooling options, we have based our assessment on the following factors –

- Internal environmental condition that must be maintained
- Operating hours
- The building internal heat load and required cooling load
- Population occupying the conditioned space at any one time
- Net floor area
- Constraints imposed by proposed building structure
- The location of the building and surrounding environment
- The intended use of the proposed building
- Existing services infrastructure available to support the proposed heating and cooling systems.
- Design life of equipment
- Value Engineering Initiatives

Due to the relatively low cooling and heating load requirement, the option of providing heating and cooling using air cooled air conditioning systems such as VRF (Variable Refrigerant Flow) with heat recovery or roof top packaged air conditioning systems shall be used for this application.

4.6.4 Mixed Mode Operation Options

It was made clear early in the concept and feasibility stage that natural ventilation was a key request of the users to be implemented throughout the building where it was deemed both practical and financially viable.

It was determined in conjunction with the users, HI, the architect and the project manager that the below areas highlighted in green would operating in a mixed mode fashion and those highlighted in red would not. It was made clear to the users that the air conditioning will only operate when the windows are closed, to ensure energy efficiency.

For the bedrooms, it was agreed at the UGM that in the instance when a window was opened, a visual alarm signal would appear on a panel at the Nurses' station. The panel will be provided with on/off switches for the associated FCUs serving the bedrooms. It will then be within the nurses' responsibility to control the operation of the associated FCU serving the bedroom

Figure 2 Areas in which Mixed Mode is to be implemented

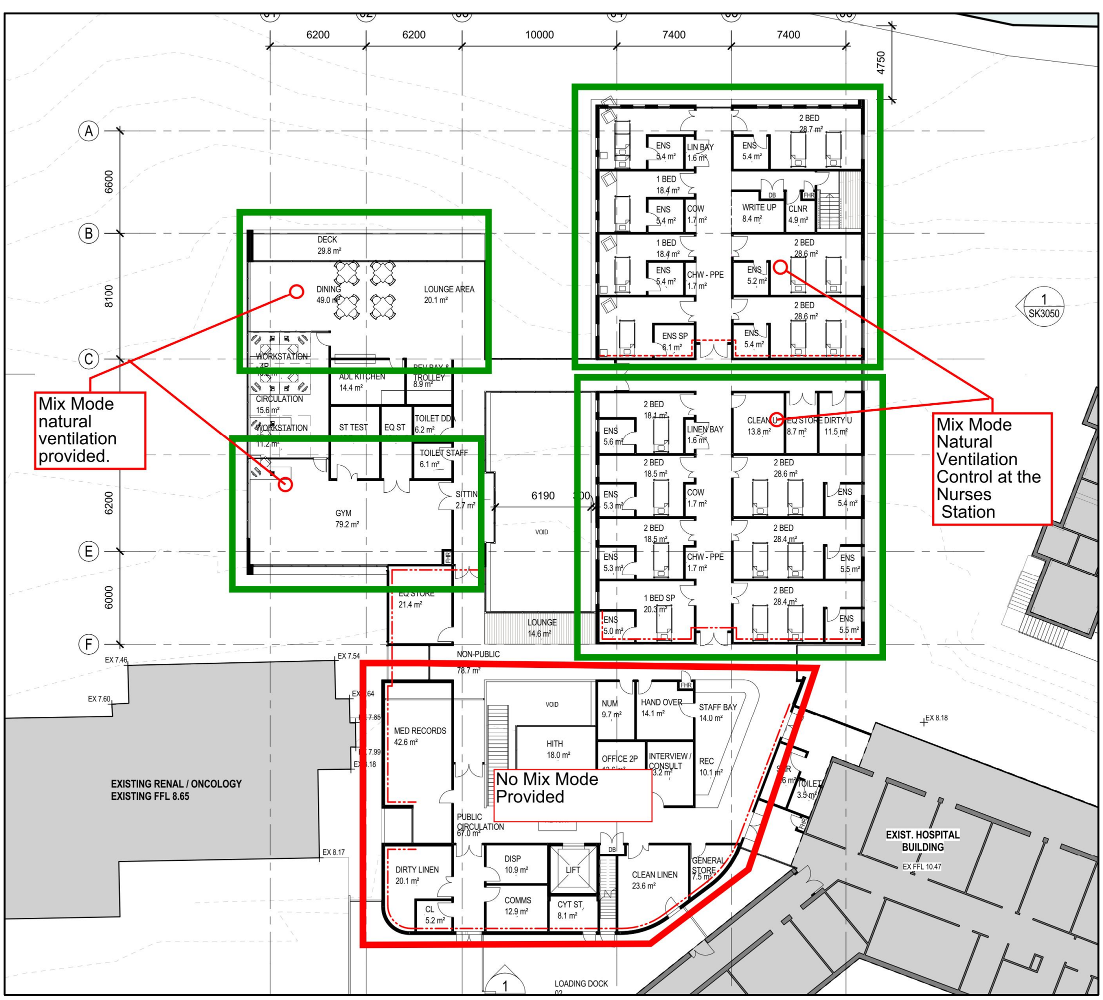


Figure 3 Areas in which Mixed Mode is to be implemented – First Floor

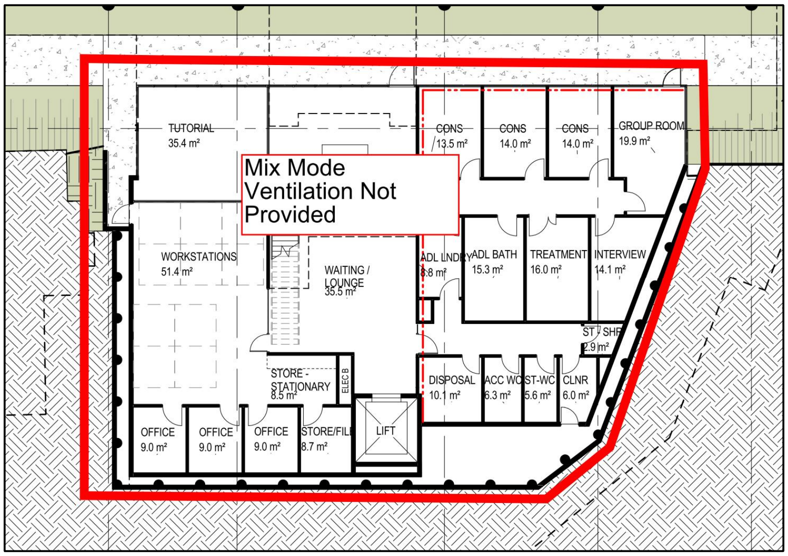


Figure 4 Areas in which Mixed Mode is to be implemented – Ground Floor

4.6.5 Building Zones

In order to provide maximum comfort and temperature control for the space, the building has been thermally zoned and each thermal zone is proposed to be controlled by an individual VRV/VRF system.

The thermal zones are outlined in the table below:

Zone	Functional Spaces within	Comment
First Floor North	Single and Double Bedrooms	Group of rooms shall be served by individual FCUs for simultaneous cooling and heating
First Floor East Wing	Single Bedrooms	Group of rooms shall be served by individual FCUs for simultaneous cooling and heating
First Floor West Wing	Double Bedrooms	Group of rooms shall be served by individual FCUs for simultaneous cooling and heating
First Floor Common Area	Dining and Lounge Area	Rooms shall be served by individual FCUs for simultaneous cooling and heating
First Floor Common Area	Gym	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Staff Areas	Work stations	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Equipment Rooms	Communication Room	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Staff Areas	Med Records	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Staff Areas	Nurse Station and Associated Rooms	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Ground Floor Staff Areas	Workstations	Rooms shall be served by individual FCUs for simultaneous cooling and heating

Ground Floor Staff Areas	Tutorial	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Ground Floor Staff Areas	Staff Office	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Ground Floor Staff Areas	Consultant Rooms	Rooms shall be served by individual FCUs for simultaneous cooling and heating
Ground Floor Staff Areas	Treatment and Interview Room	Rooms shall be served by individual FCUs for simultaneous cooling and heating

4.7 Proposed Mechanical Systems

4.7.1 Description of DX Heat Relcaim Reverse Cycle VRV/VRF Systems

Variable refrigerant volume/flow (VRV/VRF) uses refrigerant as the cooling/heating medium, and allows one outdoor condensing unit to be connected to multiple indoor units (FUCs), where each FCU is individually controllable by its user while modulating the amount of refrigerant being sent to each evaporator coil in the FCU. This technology enables the output of the outdoor unit to be “varied” modulated by the cooling or heating demands of the zone/room that it controls.

A heat recovery VRV/VRF system allows individual indoor units to heat or cool simultaneously, this is achieved by using the extracted internal heat from the areas that requires cooling and utilised to provide heating to other spaces. By doing so it allows the outdoor unit compressor to do less work, thus it provides a contribution to overall energy efficiency of the system.

4.7.1.1 Space Cooling and Heating

Cooling and heating shall be provided by a VRV/VRF system as prescribed above. Generally similar functional spaces shall be controlled and served by indiviudal FCUs, such as the Patient Rooms, Acitvity Rooms, Dining/Lounge, Meeting Rooms and Office Rooms. Further to this, the FCUs will provide heating and cooling based on individual thermal zones such as perimeter and internal zones.

The heat recovery VRV/VRF system will provide simulatenous heating and cooling between functional zones where required. As such each FCU can be in heating or cooling mode as required for the zone/space that it is serving. This flexibilty in the system not only provides greater thermal comfort but also higher energy efficiencies in performance.

The FCUs will be generally located within the corridors complete with insulated rigid metal ductwork, retrun air box and flexible ductwork connections to ceiling supply air diffusers within the rooms to condition the space. Special proprietry perforated diffusers shall be used within the patients rooms for anti-ligature requirements.

Transfer ducts (acousticlly treated if required) shall be provided between the rooms and the corridors to return the air back to the FCUs through ceiling return air grilles.

4.7.1.2 Heat Rejection Plant

The heat extracted from the rooms during cooling mode is rejected through outdoor condensing units which are located on the roof. The hot refrigeration gas is condensed into a liquid state to remove the heat extracted from the rooms by means of heat transfer to the air which is then discharged.

The units are of modular construction will be mounted on a plinth or proprietary anti-vibration support. Based on the cooling capacities, the configuration of the units will normally be vertical discharge and contain two (2) off compressors for staged operations.

The condensing units will be connected to FCUs in the building through insulated refrigeration pipework.

Drainage is provided in the plantroom for condensate during reverse cycle operation.

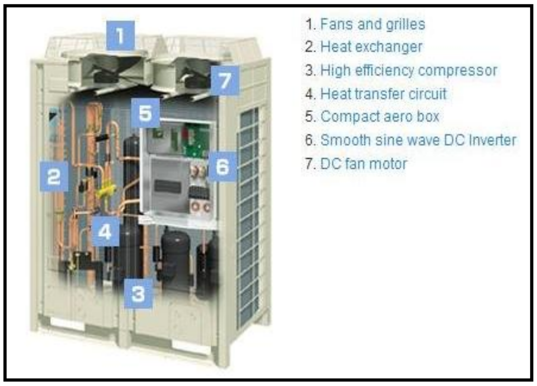


Figure 5 *: Typical Vertical Discharge Condensing Unit and Ducted Discharge*

4.7.1.3 Fan Coil Units

In the areas of high occupancies fan coil units will provide increased ventilation requirements to meet the intended number of people occupying the rooms. For areas with intermittent use, energy savings are achieved as the air conditioning can be switched off locally whenever the rooms are not in use. Typically the fan coil units are provided with the following main components:

- Ducted Outside & Return air connection c/w control dampers
- Centrifugal Fan
- Common Cooling Coil
- Common Heating Coil
- Single duct takeoff

Figure 6, ***Typical Fan Coil Unit***

The zones are made up of areas of similar characteristics. Therefore, the cooling and heating coils will modulate to provide the correct supply air temperature based on an averaging return air temperature sensor mounted within the a room within the zone in order to adequately deal with the heating or cooling loads.

Common controller will be provided for all the FCU systems with programmable functionality for 7days/365 day operation.

4.7.1.4 Summary of Air conditioning Systems

The following table summarises the proposed systems and the estimated supply air flow rate. Refer to the schematic design drawings for details of air handling and fan coil unit locations

Table 14 Preliminary Schedule of Fan Coil and Air Handling Units

Air Handling System	Air Handling System Type *1	Areas Served	Hours of Operation *2	Estimated Supply Air *3 (l/s)
FCU-L1-1	Fan Coil Unit	L1 North Bedrooms	24/7	500
FUC-L1-2	Fan Coil Unit	L1 West Bedrooms		450
FCU-L1-3	Fan Coil Unit	L1 West Bedrooms	24/7	600
FCU-L1-4	Fan Coil Unit	L1 East Bedrooms	24/7	450
FCU-L1-5	Fan Coil Unit	L1 East Bedrooms	24/7	600

Air Handling System	Air Handling System Type *1	Areas Served	Hours of Operation *2	Estimated Supply Air*3 (l/s)
FCU-L1-6	Fan Coil Unit	L1 Nurse Station and Staff Rooms	12	300
FCU-L1-7	Fan Coil Unit	L1 Medical Records	12	145
FCU-L1-8	Fan Coil Unit	L1 GYM	12	790
FCU-L1-9	Fan Coil Unit	L1 Kitchen Area	12	200
FCU-L1-10	Fan Coil Unit	L1 Dining and Lounge	12	700
FCU-L1-11	Fan Coil Unit	L1 Work Station	12	42
FCU-G-1	Fan Coil Unit	G Tutorial	12	150
FCU-G-2	Fan Coil Unit	G Workstations	12	260
FCU-G-3	Fan Coil Unit	G Office	12	150
FCU-G-4	Fan Coil Unit	G Waiting/Lounge	12	150
FCU-G-5	Fan Coil Unit	G Treatment/Interview	12	230
FCU-G-6	Fan Coil Unit	G Consultation	12	250

*1 CV=Constant Volume Supply Air.

*2 Hours of operation assumed.

*3 Supply air quantities based on preliminary estimated rates only and subject to confirmation when architectural elements fully detailed and load calculations completed.

4.7.2 Air Distribution

4.7.2.1 Ductwork Reticulation

The air distribution systems will be of the low pressure type. All ductwork shall be designed in accordance with the current applicable Australian Standards. The ductwork system will be aerodynamically formed and designed making use of transition pieces, bends and elbows where required.

Supply air will be delivered to the occupied spaces via internally insulated sheet metal ductwork to flexible ducting. Air is typically returned to the fan coil units via a series of hard ducted transfer grilles and a common return air path.

Flexible ductwork will not be used on proposed exhaust or return air systems, this is to minimise build-up of mould growth when moist air is trapped within the insulation and spiral connection of flexible ductwork resulting in potential contamination issue.

Minimum duct dimensions: ∅150mm or 150mm x 150mm.

4.7.2.2 Diffusers and Grilles

The proposed air diffusion systems will be designed to introduce air in a draft free manner under all operating conditions.

All diffuser and grilles will be suitably sized to perform as per design requirement and will be selected for suitability to operate in a hospital environment.

4.7.3 Infection Control

Due to absence of isolation rooms, morgues, operating theatres or other rooms where life threatening bacteria may be present, the risk of contracting serious infection among staff and patients is considered low or unlikely. Provision of infectious control for mechanical services is limited to controlling air pressure between adjoining spaces where the building supply air system will be designed to operate in a slight positive air pressure overall.

This provision will also assist in the mitigation of controlling odours or other air borne contaminates.

4.7.4 General Exhaust Air System

Exhaust system must comply with AS 1668.2 – 1991, as such, common exhaust systems will be reticulated throughout the facility connecting the toilets and other general dirty areas. All toilet facilities will be provided with exhaust at flow rates no less than 10l/s/m².

The exhaust fans will be controlled by the Building Management System and set to operate on a time schedule.

4.7.5 Print/Photocopier Exhaust

A dedicated exhaust system will be provided to the printer utility rooms. The exhaust system will be monitored by the BMCS and set to operate on a time schedule.

4.7.6 Smoke Management Systems

All Handling systems will shut down in accordance with Section E2.2 of the NCC 2011 and shall be a “Shutdown System”

4.7.7 Stair Pressurisation Systems

No Stair pressurisation system is required to serve this building.

4.7.8 Toilet and General Exhaust Air System

The toilet exhaust and general exhaust systems will all be provided with a ducted exhaust fan arrangement. All exhaust will be discharged vertically through the roof with weather proof cowls. The fan will be located generally in corridors and/or above wet areas with associated access panels for maintenance and servicing. Where space is limited the fans shall be installed in the vertical position.

The exhaust fans will be controlled by the Building Management System and set to operate 24 hours per day (adjustable).

4.7.9 Electrical Power for Mechanical Service

Provision of electrical power for mechanical plant and equipment will be served by a mechanical switchboard located within the roof plantroom. The switchboard will be provided with a fire trip to the building FIP. In fire mode, the signal from the FIP will trip the electrical supply from the mechanical switchboard and hence will shutdown the non-essential mechanical plant.

On resumption of normal operating mode, electrical power will be restored to the mechanical switchboard and hence will allow for the continued operation of mechanical plant and equipment within the building without the need to perform a manual reset. Staging of the mechanical equipment upon restart will be such that an over draw of start up current will not occur.

Power for the mechanical switchboard is fed through non fire resistant cables from non essential power supply from the electrical distribution board.

Provision will also be made to provide generator back for those mechanical plants required to operate in the event of power outage.

It is understood from the BCA report to date that no mechanical items of equipment are to be placed on Fire Essential circuits.

4.7.10 Noise

Where applicable the mechanical services system will be designed and specified to achieve the acoustic criteria nominated by relevant Australian Standards and acoustic consultant, whichever is the more stringent requirement.

4.7.11 Air Quality

The system design will take account of requirement to maintain a quality indoor environment at all times. Air intakes shall be located in accordance with AS 1668. – 1991.

4.7.12 Filtration Systems

Filters shall be dry media disposable panel filters for fan coil units.

Particular attention will be taken towards the safe and easy removal of air filters.

This shall include:

- provisions of ceiling access panels which are 100 mm larger than filter panel dimensions; and
- an on-site demonstration of filter removal for both supply air system and ceiling fan coil units to ensure no obstructions exist will be required prior to Practical Completion

Access panels (within the fan coil units) to filters shall be of rigid metal construction, fitted with captured latches. Screw fixings shall not be permitted.

4.7.13 System Operation and Facility Management

The design of mechanical services systems shall ensure that the provisions in the mechanical systems themselves and their integration with the building fabric allow ready access for routine maintenance and repair. Requirements for equipment removal and replacement shall be taken into account and plant arrangement and access shall facilitate these requirements at all stage during the life of the complex.

The mechanical services installer shall be required to provide all detailed drawings, equipment specifications and details of operating and maintenance procedures in electronic form as well as hard copy. The electronic format shall be established during the design period to facilitate the incorporation of this material into an overall Facilities Management System for the complex. This information shall include a comprehensive set of commissioning data confirming that the plant and equipment has been commissioned to meet the established design intent.

The contract for the mechanical installation shall include the requirement for servicing the plant during the 12 months defect liability period and where applicable for providing spare parts to be maintained in store at the centre for items of equipment and selected systems as determined during the design phase.

5.0 Spatial Requirements and Criteria

5.1 Design Criteria for Mechanical Plant

The following below criteria have been analysed using a variety of differing credible sources where appropriate. This has been carried out so that the chosen conditions are based on informed decisions made by the engineers. Where no information is provided by the publications, an engineered assumption has been made and identified within the table. The criteria have been listed below and fully developed within the appendices.

- Internal Design Temperature and Relative Humidity
- External Ambient Conditions
- Ventilation Rates
- Air Change Rates (ACH) for Air Distribution and Circulation Purposes
- Internal Noise Criteria
- Internal Design Loads
- Specialist Requirements

Whilst the above have been chosen and recommended by AECOM (within the appendices), it should be noted that the systems are designed to ensure the end user is content with the deliverable, as such, the users should take the opportunity now between schematic design and detailed design phases to request any specific requirements.

6.0 Building Management and Control System (BMCS)

The building services control and monitoring functions will be provided by a stand-alone new digital control system which shall be monitored by the site head end computer.

The system will only monitor the AC system for any system fault back to the head end. Details of the fault can then be determined at the localised controller which will be installed within the plantroom adjacent to the mechanical switchboard.

It may also be used to monitor other services within the facility such as external lighting, standby generator, UPS equipment, power system infrastructure and hydraulic system pump. Unless specifically requested. The following control functions will be available from the BMCS:

- Manually and automatically control plant and systems programmed into the localised controller
- Monitor and store alarm information and print-out as required at the head end
- Allow manual adjustment of system set points at the localised controller.
- Control building cooling and heating loads using outside modulating air economy cycles where required
- Control air conditioning zone systems by time of day start and stop at the localised controller
- Programs with local override for time scheduling at the localised controller
- Control the cascade start up of plant following restoration of normal or emergency power
- Automatic dialling and modem interfacing as required.
- Remote alarm to SMS pages (call out to maintenance contractors) at the head end.

All controls shall optimise the capabilities of the system and provide necessary control functionality (e.g. PID).

The BMCS will be required to monitor (but not be limited to) the following:-

- Mechanical AC and Ventilation Systems
- Hydraulic services

- Electrical services
- Fire alarm monitoring
- Energy monitoring

6.1.1 Specific Requirements

The BMCS shall be built on and incorporate:

- Remote capability/Alarm communication
- Capability to interact with maintenance management programmes such as Maximo
- Generation defects of lights during Defect Liability Period and beyond to track non-performance of equipment

6.1.2 System Architecture

Open system architecture shall be provided to enable the integration of all sub systems using international building services BACNet Standards.

6.2 Proposed BMCS Points Schedule

The following table lists the principal items to be monitored and defines the level of monitoring included:

Table 7.1 – Identification of typical monitored plant items

No.	Item	DI	DO	AI	AO	Comment
1	AC System Fault	x				Relay in MCC
2	Ventilation System Fault	x				Relay in MCC
22	General Fire Trip	x				Volt free contact
23	Sub Fire Indicator Panel Fault	x				Volt free contact
24	EWIS fault	x				Volt free contact
25	HW circulating pump run	x				Volt free contact
26	HW circulating pump fail	x				Volt free contact
28	Normal Power Supply	x				Current relay
39	Drug fridges	x				Volt free contact
40	Max demand in kW at main			x		Watt meter
41	Max demand in kW at generator			x		Watt meter
42	Lighting control		x			
43	Nurse call		x			

6.2.1 BMCS Points Description

DI- Digital Input

DO- Digital Output

AI – Analogue Input

AO – Analogue Output

Please note the above list is not exhaustive and is not intended as a detailed points list but only to indicate the general intent of the BMCS control and monitoring.

In the event of fire, the BMCS will provide monitoring only and the ventilation systems will be controlled by the Fire Fan Control Panel.

7.0 PROJECT RISKS

The following risks exist at this stage of the mechanical services development of the design and should be addressed as the project proceeds through documentation.

Risk	Mitigation
Contractors not having previous experiences with health infrastructure projects which potentially leads to poor project delivery	A requirement shall be set within the tendering process to ensure that contractors engaged for the project is proficient and have a good understanding of the level of works involved for health infrastructure projects.
Input from ERG group could propose alternative system to that outlined within this report.	This is unlikely to happen, as the system championed within the report is the most cost effective versus performance and energy efficiency as outline in our Options Report. Any alternative system outside of the Options report would not be suitable and fit for purpose for this kind of building. A VRV/VRF system has also already been installed in other Rehabilition buildings within NSW.
No calculations or modeling carried out for the façade and glazing to meet BCA section J. This affects the mechanical services design as cooling and heating load calculations are based on the U and SHCG performance values of the façade and glazing	For the SD stage, the heat and cooling loads have been based on a W/m^2 values drawn from pervious experiences. However consultation is required with the Arhitect to clearly define the façade and glazing performance values for the DD stage.
The UG have advised that currently there is a very limited use for medical air by means of portable bottles. As such they are inclined not to have any medical air for the new Rehabilitation Unit. However if medical air is not provided, or the infrastructure provisions, the risk is that there will be limitation for any future upgrade to a full medical ward.	Consultation shall be made with HI to address this issue.

8.0 Medical Gas Systems

8.1 Scope

The Medical Gas Services for the new development will comprise Oxygen and Suction.

8.2 Referenced Documents

Details of documents applicable to this project include:

AS 2896-2011	Medical gas systems - Installation and testing of non-flammable medical gas pipeline systems
AS/NZS 3000-2007	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3666.2-2011	Air-handling and water systems of buildings - Microbial control - Operation and maintenance
AS 2625.1 - 2003	Mechanical vibration - Evaluation of machine vibration by measurements on non-rotating parts - General guidelines
AS 60529 - 2004	Degrees of protection provided by enclosures (IP Code)

8.3 Services

It has been determined that there is adequate capacity to connect into the existing liquid Oxygen systems. However the existing Oxygen vessel will need to be relocated as the plant facility housing the system is to be demolished to make way for the new Rehabilitation Unit.

A new suction and receiver system shall be provided to serve the Rehabilitation Unit. The UG has advised that no medical air required for the new Rehabilitation Unit.

8.3.1 Oxygen

The existing oxygen supply is provided by a cryogenic vessel located to next to the boiler room on site. The liquid oxygen must pass through a vaporiser before entering the main oxygen pipe line as a gas. The backup cylinders are located within the boiler room adjacent to the main vessel. Oxygen is supplied to the existing hospital centre via pipework running under the building through a services tunnel.

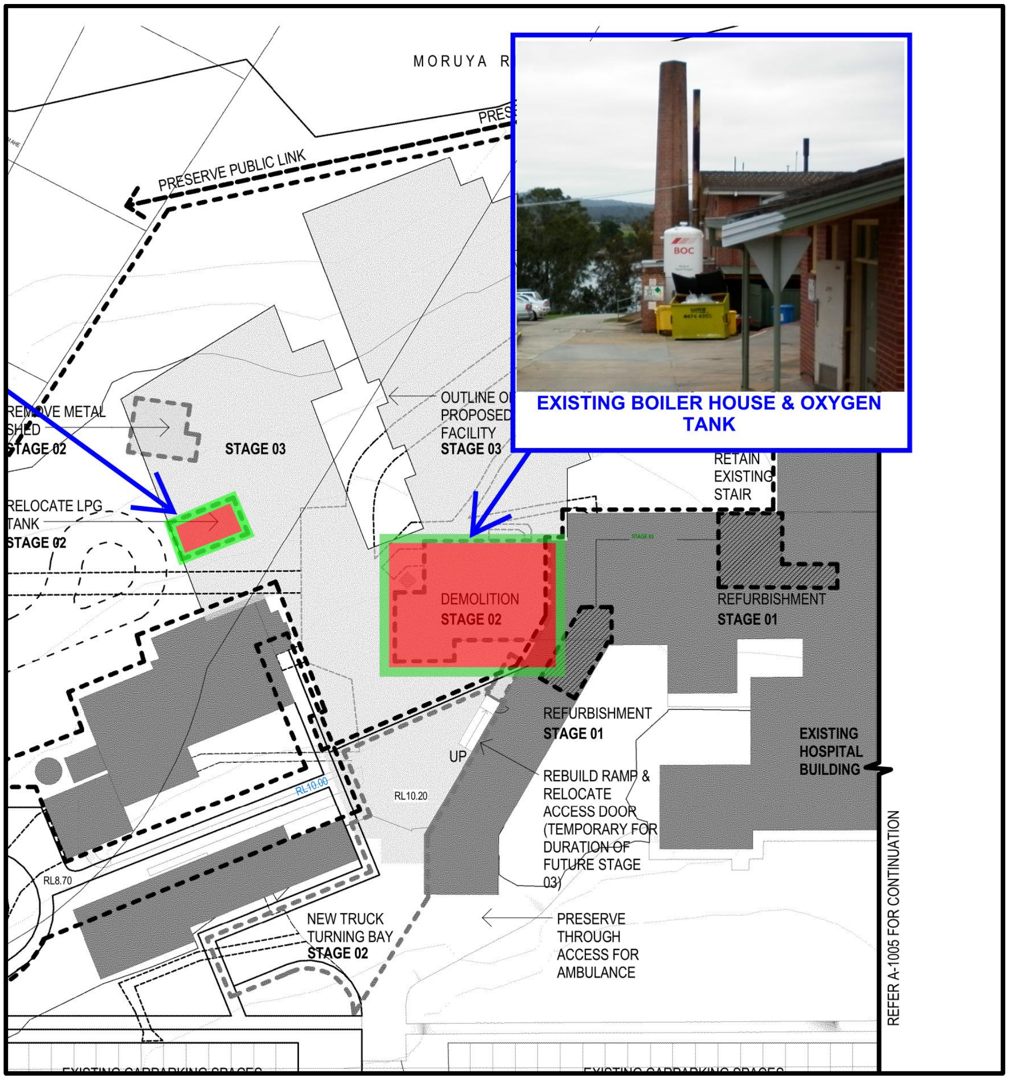


Figure 7, *Site Plan location of existing Oxygen Tank*

Figure 8 & 9, *Existing onsite Oxygen Cryogenic vessel and backup bottles*

The compound is being demolished to make way for the Rehabilitation Unit. The cryogenic vessel and the backup bottles shall be relocated as part of the early works adjacent to the new carpark. A new services trench shall be provided in Stage 1 and 2 to serve the existing Theatres/Renal/Dental/Oncology and the new Rehabilitation Unit. Please refer to section 4.6.2 and Figure 1.

8.3.2 Medical Air

Currently the existing hospital has very limited use of medical air by means of portable bottles. It has been confirmed by the UG that medical air is not required to be provided at this point in time for the new extension,

8.3.3 Venturi Suction

The existing suction and receiver system is approximately 20 years old and located near the substation. Due to the age of the system and its distant location to the new rehabilitation unit, it is proposed that a new suction and receiver system be provided for the rehabilitation unit. The system shall be housed in the new plantroom on the roof.

8.3.4 Pipework Reticulation

The suction system will be reticulated throughout the new Rehabilitation Unit via copper pipework. Outlet locations will be determined with the Design Development phase once the Room Data Sheets are more defined.

8.3.5 Medical Gas Alarm Panels and System Control

A single medical gas alarm panel will be located at the staff station. The medical gas system will be controlled in accordance to AS2896 requirements.

9.0 Electrical Services Design

9.1 Scope of Works

The main features included within the electrical systems for the rehabilitation unit are as follows:

- Power Supply
- Distribution Boards
- Metering
- Power Reticulation
- General Power and Specialty Equipment Power
- Uninterruptable Power Supply (UPS)
- Standby Power Supply (Including Load Shedding)
- Surge Protection
- Lighting
- Exterior Lighting
- General Power and Specialty Equipment Power
- Emergency Lighting and Exit Signage

9.2 Early Works

As part of the works to facilitate the demolition of the existing plant room there are a series of items that are required to be diverted & relocated prior to the demolition and construction work taking place.

These include:

- Renal / Oncology / Dental – Power Supplies, Fire Alarm Links, Comms Links
- New Power associated with new plant items such as heating & hot water plant.
- New power associated with new Oxygen Tank

These works are shown on the SD drawings and shall be designed and coordinated further during the next design phase, with the architect and the staging plans.

9.3 Existing Site services

There is an existing 500kVA kiosk substation on site which feeds a Main Switchboard which in turn feeds the main hospital with power.

The existing substation is unable to support the additional load of the new Sub Acute, Renal and Oncology and thus it will require to be upgraded as part of this project. At present this upgrade is likely to increase the substation to a 750kVA which will serve the new additional loads of Sub Acute, Renal & Oncology, plus provide spare for future development.

The existing MSB is currently at full capacity with no spare ways and some reconfiguration will be required to allow the new and old MSB's to work together.

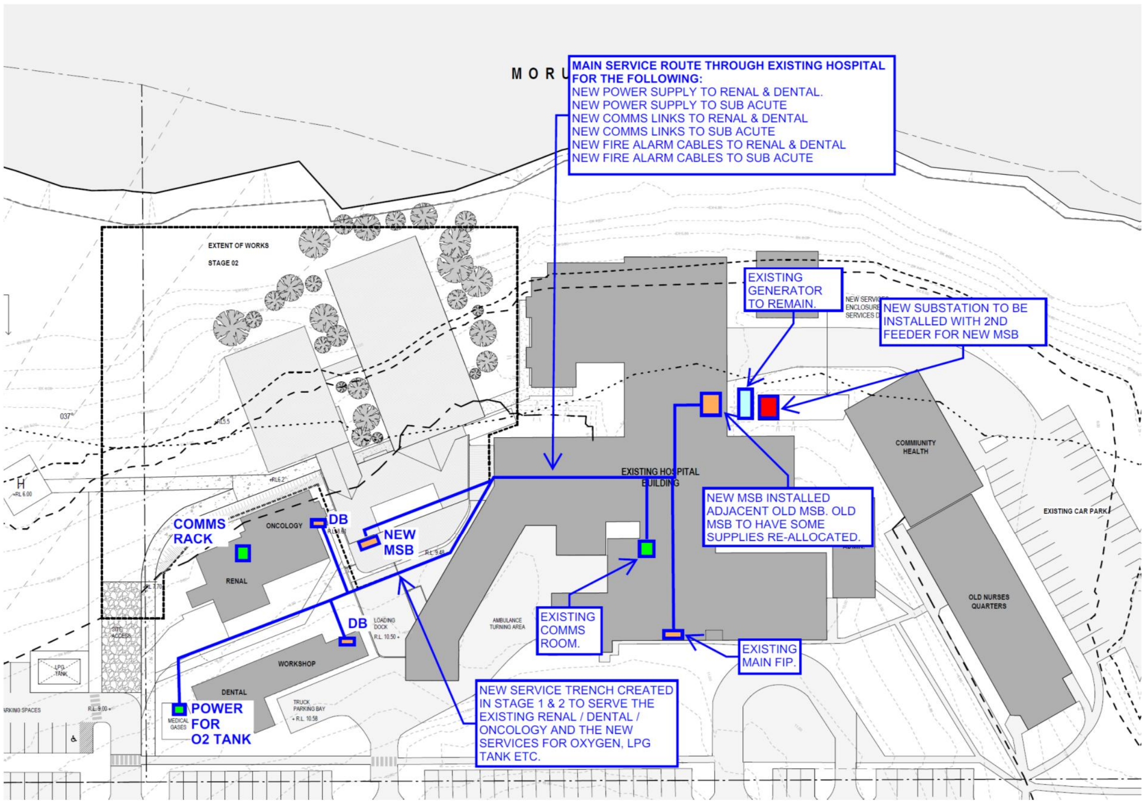
The existing Diesel Generator is a 380kVA unit with a maximum current rated at 528Amps.

This currently feeds the MSB via a transfer switch and from the documented readings on site, the hospital has a demand of around 240Amps.

It should be noted that the generator tests are carried out early in the morning and may not represent the maximum demand that the generator may be required to support, however it does suggest that there is a reasonable degree of spare capacity available.

From initial assessment it is assumed that the generator requirement for the new facility will be around 100Amps, thus the existing generator should be capable of supporting the new facility.

The figure below shows the approximate locations of the main electrical switchgear and the new facility.



ELECTRICAL SITE LAYOUT

9.4 Low Voltage Distribution

It is intended to take a new feed from the new proposed substation to a new MSB located adjacent the existing MSB within the switchroom. Some degree of re-allocating circuits will be carried out at the MSB's to ensure the load is correctly configured and balanced.

The new MSB will be used to serve the Sub Acute, Renal & Oncology works as well as providing some spare capacity on site for future works.

A switchboard will be located within the plantroom of the sub acute unit which will feed the DB's for the Rehab, Oncology & Renal units.

9.5 Submains and Distribution Boards

It is proposed to install the following distribution board (DBs) to the new sub acute rehab unit.

- UPS DB for critical systems (located in communications room)
- DB LP1 which will serve the general lighting & power within the Ground Floor
- DB LP2 which will serve the general lighting & power within the Lower Floor

Distribution boards are to be Form 1 Type construction to AS3439 complete with hinged lockable door with standard locking system.

The distribution board will be equipped with the following components:

- Main switch
- Combination RCD / MCB’s for final subcircuits to comply with the requirements of AS3000
- Space for DIN rail mounted contactors and filtering equipment
- Lighting control contacts and equipment
- Surge protection
- Private Metering of Lighting & Power (where required)
- Load Shedding Contactors (where required)

“Worksafe” type switchboards that enable additional circuits or maintenance to be carried out on live switchboards are not considered necessary for this installation.

Distribution boards will incorporate lighting control equipment including relays and contactors.

Submains will be provided to these distribution boards as well as a mechanical switchboard, hydraulic services and fire services panels. They shall conform to AS 3000 and AS3008. Maximum voltage drop permissible for the submains shall be calculated at 3% based on an allowable total of 7% using a dedicated site substation scenario.

Supplies to non-safety services loads will be XLPE/PVC cabling. Supplies to safety services loads shall be 2 hour fire rated (Triangle FR Series) type.

Submains to be labelled at each end via stamped cable tag and shall indicate the following:

- Cable size
- Type
- Purpose
- Origin
- Destination

Subcircuit cabling shall be a minimum size of 2.5mm^2 Cu PVC/PVC or increased to compensate for voltage drop and earth fault limitations. Power and lighting circuits shall be designed to accommodate the specific demands for the equipment served by the circuit.

9.6 Power Outlet Provisions

Provisions for power outlets will be designed in accordance with the NSW HFG with input from the Architect and the users.

These will be developed through the user group process in conjunction with the architect creating the room data sheets and room layout sheets.

Within patient areas Body Protection will generally be provided in accordance with AS3003 with RCD protection provided locally at the bedhead protecting all outlets within the patient area.

Medical Service Panels will be considered for the bed locations where multiple services are to be installed such as power, comms, medical gases & nurse call.

Generally there will be no requirement for any Cardiac Protected areas within the sub-acute unit.

The following GPO provisions are put forward for discussion:

Table 15 Power Outlet Provisions

Area	Provision
Ensuite	1 x single GPO (optional)

Area	Provision
Single bedroom	3 x double GPO's
Double bedroom	6 x double GPO's
Bariatric bedroom	3 x double GPO's
Group Meeting	6 x double GPO's
ADL Kitchen	3 x double GPO's
Living/Dining	3 x double GPO's
WC	1 x single GPO
Consulting Room	3 x double GPO's
Waiting	1 x double GPO
Equipment Store and workshop	2 x double GPO's
Store	1 x single GPO
Gym	4 x double GPO's plus Two floor boxes with 2xdouble GPOs
Cleaners room	1 x single GPO
Staff Station	3 x double GPO's
Office	3 x double GPO's
Workstation	2 x double GPOs per workstation
Dirty Utility	1 x single GPO
Clean Utility	1 x single GPO
DISP	1 x single GPO
Circulation	1 x single GPO every 20m
External	No provision

In addition to these will be power supplies for specific equipment such as Sanitisers, Washers, Hoists, Beds etc. and these will be detailed following the Room Data Sheet & Room Layout Sheet discussions with the users.

9.7 Standby Power

Standby power will be provided by the existing diesel generator. This will be extended from the existing MSB to the new facility by new sub-mains and switchboards / DB's.

The extent of coverage within the facility will be determined through discussion with the users and engineering staff.

9.8 Uninterruptible Power Supply (UPS)

The requirement for an uninterruptible power supply (UPS) is proposed to supply the following:

- Security systems
- Communication systems
- Nurse Call System

A UPS shall be provided within the communications room to supply these critical systems only. The system shall be designed to supply critical equipment from a loss of supply scenario (before generator power is available).

On this basis a UPS rating of approximately 5-10kVA (3 phase in, 3 phase out) with a battery autonomy of 5-7 minutes for maintenance of power supply is available in the event of mains failure before generator supply.

An external maintenance bypass switch will be provided should UPS require testing or maintenance. The UPS power will be distributed via a small output distribution board or load centre to the critical systems.

9.9 Lighting

The internal lighting is to provide the quality of lighting required to undertake the tasks required for operation and maintenance. All lighting will at a minimum achieve the value of maintenance illuminance recommended in AS1680. Energy saving initiatives will be utilised where possible and all lighting shall be designed in accordance with BCA Section J6.

Comfort Criteria

The design shall provide safe and comfortable lighting by ensuring the following aspects are considered:

- Avoidance of excessive illuminance variations
- Absence of direct glare
- An appropriate luminance distribution on interior surfaces
- Use of suitable colours on the interior surfaces
- Use of light sources with suitable colour characteristics

Day lighting is to be utilised where possible.

Specific lighting requirements will be developed in conjunction with Health Infrastructure and the Architect.

Corridors

Generally, corridors will be illuminated with compact fluorescent downlights or linear fluorescent fittings with an alternate selection of the lighting being on separate circuit to allow low level lighting at night periods.

The lighting control system will provide motion detection to assist in reducing the energy consumption of this component.

Back of house areas

The back of house areas to unit will be illuminated with fluorescent luminaires complete with polycarbonate diffusers. Local control will be provided to assist in reducing the energy consumption associated with this area.

Bedrooms and Ensuites

Recessed compact fluorescent downlights with sensor controls to en-suites and supplementary night lighting will be installed installed to bed areas.

Meeting rooms

A combination of recessed continuous linear fluorescent luminaires and recessed compact fluorescent downlights will be provided. The main meeting room will be provided with dimming capability.

External lighting will consist of the following:

- Perimeter security and access lighting
- Landscape lighting

The external lighting will be controlled via an automatic, electronic lighting control system supporting preset ‘modes’, internal timeclock routines and daylight sensors.

It is not intended to provide ‘façade lighting’ to the building.

9.9.1 Exit and emergency lighting

Exit and emergency lighting will be provided in accordance with BCA and AS2293 requirements and is proposed to be self contained exit and emergency fittings utilising LEDs where practical.

A testing system will be provided to ensure testing is carried out automatically in accordance with the standards. The system will provide summary reports of the results allowing the maintenance team to review and act accordingly.

10.0 Communication Services Design

10.1 Cabling Infrastructure Scope

The communications cabling provisions for the building is comprised of:

- Campus connection back to existing facility (copper and fibre) infrastructure
- Horizontal field outlet cabling infrastructure

10.1 Acronyms, Abbreviations and Definitions

Table 16 Acronyms

Acronym	Full Text
AV	Audio Visual
CCM	Communications Cabling Manual
CCTV	Close Circuit Television
DAS	Distributed Antenna System
dB	Decibel
EMI	Electromagnetic Interference
FOBOT	Fibre Optic Break Out Tray
MATV	Master Antenna Television
MMOF	Multi Mode Optical fibre
OM1	Optical Multi mode - 1
OM3	Optical Multi mode - 3
OS1	Optical Single Mode - 1
PABX	Private Automatic Branch eXchange
PVC	Polyvinyl Chloride
RF	Radio Frequency
RU	Rack Unit
RMS	Root Mean Square
SMOF	Single Mode Optical Fibre
TV	Television
UPVC	Underground Polyvinyl Chloride
UTP	Unshielded Twisted Pair
VoIP	Voice over Internet Protocol
WAP	Wireless Access Points

10.2 Standards and Regulations

All work covered shall be implemented and completed in strict compliance with regulations of statutory bodies and the applicable standards and codes. A cabling infrastructure as specified shall be capable of receiving certification, and as implied must conform to all accepted design and installation guidelines set forth by the cabling infrastructure manufacturer as part of a certified site.

Additional infrastructure works undertaken as expansion or modification shall be compliant with the existing cabling infrastructure (unless otherwise stated) and shall therefore be required to form part of the certified system.

The following standards apply; in all cases the latest version is applicable. If there is a conflict between any of these documents and this specification: the order of application shall be AS/ACIF standards, Australian Standards, Manufacturers' recommendations, this Specification, International Standards:

Table 17 Australian Standards

Standard/ Specification or Technical Bulletin Number	Description
	Greater Western Area Health Integrated Cabling Standards
AS 1049	Telecommunication Cables Insulation and Sheath Polyethylene
AS 1882	Earth and Bonding Clamps
AS 2053	Conduits and fittings for electrical installations
AS 2834	Computer Accommodation
AS/NZS 3000	Wiring Rules
AS/NZS 3080 incl Amd 1	Telecommunications Installation – Generic cabling for commercial premises.
AS/NZS 3085.1	Telecommunications Installations – Administration of Communications Cabling Systems
AS 3594	Information processing systems interface connector and contact assignments for ISDN basic interface located at reference points S and T
AS 3548	Electrical Interference – Limits and Methods of Measurements of IT Equipment
AS 3996	Access Covers and Grates
AS 4251.1	Electromagnetic Compatibility – Generic Emission Standard – Residential, Commercial & Light Industry
AS/NZS 61935-1	Telecommunications installations – Generic cabling systems – Specification for the testing of balanced communication cabling
AS/NZS 61935-2	Telecommunications installations – Generic cabling systems – Specification for the testing of patch cords in accordance with values set out in AS/NZS 3080:2003
ISO 14763-3	Telecommunications installations – Generic cabling systems – Specification for the testing of optical fibre communication cabling
ISO/IEC TR 24704	Information Technology – Customer premises cabling for wireless access points

Table 18 AS/ACIF Technical Standards and Codes

Standard/ Specification or Technical Bulletin Number	Description
	Telecommunications Act (1997)
CCM	ACMA Communications Cabling Manual (Volume 1 and 2).

Standard/ Specification or Technical Bulletin Number	Description
AS/ACIF S008	Requirements for authorised cabling products
AS/ACIF S009	Installation requirements for customer cabling (wiring rules)
ACA TCPR 2000	Communications Cabling Provider Rules 2000

Table 19 International Standards

Standard/ Specification or Technical Bulletin Number	Description
IEC 297	Dimensions of mechanical structures of the 482.6 mm (19 inch) series
ISO/IEC 11801	Telecommunications installations-Integrated Telecommunications Cabling Systems for Commercial Premise
ISO TR 24750	IT - Assessment and mitigation of installed balanced cabling channels in order to support of 10GBASE-T
IEEE 802.3	Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications
IEEE 802.3an	Standard for Information technology— Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Physical Layer and Management Parameters for 10 Gb/s Operation, Type 10GBASE-T
IEEE 802.3af	Power over Ethernet
IEEE 802.3at	Power over Ethernet enhancements
IEEE 802.3az	IEEE Standard for Local and Metropolitan Area Networks - Specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment 5: Media Access Control Parameters, Physical Layers, and Management Parameters for Energy-Efficient Ethernet
IEEE 802.5	Token Ring Access Method and Physical Layer Specification
IEEE 802.11a/b/g/n	Wireless Ethernet
EIA 310 D	Cabinets, Racks, Panels and Associated Equipment
TIA/EIA 758	Customer owned Outside Plant Telecommunications Infrastructure Standard

10.3 Design Criteria

10.3.1 Structured Cabling System

The structured cabling system will be based on the following structured cabling system:

Table 20 Structured Cabling System

Type	Description
Manufacturer	Channel Certified and Warranted – Min 25 yrs parts and labour
Systems Installer	To be advised

Category/ Type	Copper – Shielded Category 6A Optical – MMOF (OM1) Optical – SMOF (OS2)
Termination	Modular System and RJ45 Outlets
Termination Sequence	T568A configuration

10.4 Cabling Topology

The cabling topology is based upon the horizontal outlet cabling from each floor terminating into a Telecommunications Room. Horizontal cable runs shall NOT exceed 90 metres in length, where the total cable run shall not exceed 100 metres including patch panels, system cables and fly leads. Proprietary based fixings and support, J-hooks and plastic mesh cable baskets systems are strictly prohibited (even if they are permitted by the manufacturer).

There is a mandatory requirement for the separation of communications and power cables where cables are installed within the ceiling space with the use of dedicated communications cable trays.

10.4.1 Telecommunications Outlet Provisions

Provisions for telecommunications outlets to be reviewed with Health Infrastructure and Architect.

These will be developed through the user group process in conjunction with the architect creating the room data sheets and room layout sheets.

The proposed criteria are put forward for discussion.

Table 21 Telecommunications Outlet Provisions

Area	Provision
Ensuite	No provision
Single bedroom	2 outlets
Double bedroom	4 outlets
Bariatric bedroom	2 outlets
Group Meeting	Projectors - 2 Outlets per projector Lectern – 2 outlets Floor Box – 2 (10 outlets per floor box)
ADL Kitchen	No provision
Living/Dining	2 outlets
WC	No provision
Consulting Room	3 outlets
Reception	6 outlets
Waiting	1 outlet
Equipment Store and workshop	1 outlet
Store	No provision
Gym	1 outlet
Cleaners room	No provision
Staff Station	6 outlets

Area	Provision
Office	1 outlet for Phone or Computer 1 outlet for Laptop 1 outlet for Printer
Workstation	2 outlets per workstation
Dirty Utility	No provision
Clean Utility	No provision
DISP	No provision
Circulation	No provision
External	No provision
Wireless Access Points	Provided throughout – based on LHD requirements
Other Services	Security Controllers CCTV Cameras

10.4.2 Provisions for Wireless Access Point

Field outlets will be provided for Wireless access point connections throughout the facility.

During the next stage of the design the scheme will be developed with the LHD to ensure the correct number and location of outlets are placed within the facility.

Generally the following will apply.

- WAP outlets will be powered by Power over Ethernet (PoE);
- Cabling to WAP outlets will be as per horizontal outlets; and
- Cabling to WAP outlets will be terminated on separate RJ45 patch panels

Final location of outlets shall be the result of RF testing.

10.5 Infrastructure

Table 22 Infrastructure

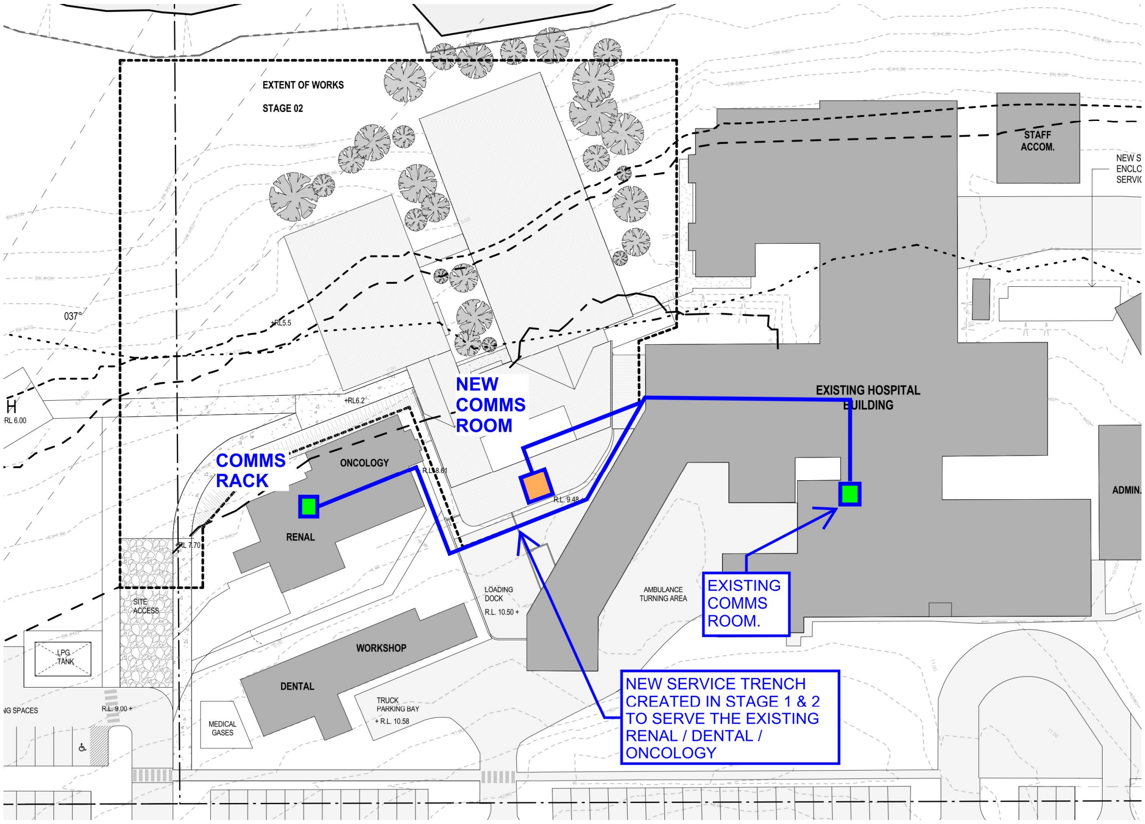
TYPE	PROVISIONS
Campus Cabling	Connection to existing facilities for voice, data and facilities systems

The existing Campus Distributer and PABX are located in the Main Building. Fibre and copper backbone cables will be run from here to the new Sub-acute unit communications room and terminated into the new communications racks.

The following cables are suggested as the required level of capacity:

- 1 x 12 core Single Mode OS1 cable
- 1 x 100 pair Category 3 copper cables on divers feed paths

The exact details and routes of these will be finalised & developed through the next stage of the design process. The general site layout is shown below.



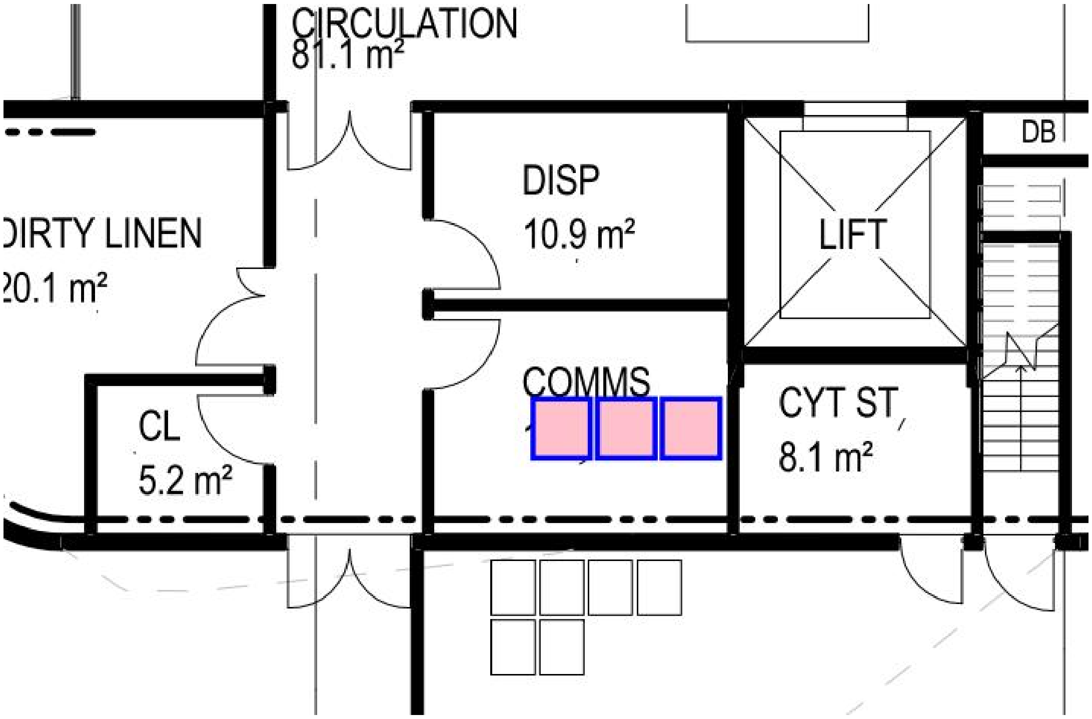
COMMS SITE LAYOUT

10.6 Building Infrastructure Spatial Requirements

Communication room requirements have been identified and are summarised below:

- Connection space for campus cabling
- Connection space for backbone
- Floor Comms outlets
- Nurse Call head end
- Security (i.e. CCTV, Access Control)
- MATV
- AV

The detail below shows a possible layout for the comms room which will be developed through the next stage of the design process.



Comms Room Layout

10.7 MATV System

A Master Antenna Television Aerial System (MATV) shall be provided for Free to Air (FTA) services

It shall be capable of distributing the following:

- Free to Air Television including digital television transmissions (HD Digital TV signals)
- Free to Air FM Radio Channels (Full Band II)
- Free to Air AM Radio Channels (through re-modulation into FM signal bands)
- In House Video and Audio Channels
- Pay TV options are to be considered & discussed during the DD phase of the works

10.7.1 TV Outlet Provisions

RG6 Coaxial horizontal cabling shall be distributed from the wall mounted structured communications wiring cabinet to F type connectors. Outlets will be provided in accordance with the following schedule, and final location of outlets to be coordinated in conjunction with the Architect:

Table 23 TV Outlet Provisions

Room Location	Outlet Provision
Single bedroom	1 MATV Outlet, 1 x F Connector
Double bedroom	2 MATV Outlet, 2 x F Connector
Gym	1 MATV Outlet, 1 x F Connector
Living/Dining	1 MATV Outlet, 1 x F Connector
Waiting	1 MATV Outlet, 1 x F Connector

Room Location	Outlet Provision
Staff Room	1 MATV Outlet, 1 x F Connector
Group Meeting	1 MATV Outlet, 1 x F Connector

10.8 Audio Visual system

An AV system will be installed in the relevant rooms only for teleconferencing and video purposes.

The final details of these systems will be subject to user group discussion and we will provide the necessary services of power & comms to allow the operation of these systems.

As a guide the following items will be confirmed during the DD phase of the design:

- Ceiling mounted projector
- A motorised projection screen
- An AV control system
- Room microphone system (dual, wireless, ceiling or combination)
- LCD / Plasma Screens
- Floor Box provisions for services to the main table

11.0 Security Services Design

11.1 Design Criteria

Security mitigation strategies will reflect the outcomes of a security risk management process based on AS/NZS: ISO31000 – 2009 (Risk Management) and feedback from Health Infrastructure.

Design principles will include both CPTED (Crime Prevention through Environmental Design) and Defence in Depth which provides a layered approach to protecting assets at risk In this application this will include the segregation of public space from staff only spaces and to restricted spaces within treatment areas.

Security treatments will include the appropriate mix of physical security (including passive security measures), electronic security, man power services and security management.

The integrated security systems will be designed to be reliable and robust, incorporating software, hardware and components that are easy to operate and maintain to continuously support the important security functions within the Department.

The fundamental principles of the security design are:

- To provide an appropriate security service concept that is reliable in operation and flexible in application.
- To achieve a high standard of control and a record of activity.
- To maintain user confidence in the systems and harmonise with other operational requirements.
- To design systems with due consideration to safety, reliability and maintainability.
- To protect the personal and private information of patients and employees.
- To protect patients, visitors, staff and carers and Hospital assets.
- To deter inappropriate, offensive, dangerous and unlawful behaviour.
- To provide a high level of audit and surveillance to allow prompt action.
- To adapt to special needs.
- To enhance the quality and effectiveness of Hospital services.

11.2 Compliance

Compliance with Australian Standards and Occupational Health and Safety regulations will be mandatory for the security works including Codes of Practice, Industry Guidelines and Commonwealth and State requirements including but not limited to.

- Australian Standard AS 3000:2007 Wiring Rules
- Australian Standard AS 3008.1.1:1998
- Australian Standard AS 2201, Parts 1, 3, 4 & 5
- Australian Standard AS 4806, Parts 1, 2, 3 & 4 (CCTV)
- Australian Standards 4405
- New South Wales Health Security Guidelines
- Building Code of Australia (BCA)
- Telecommunications Wiring Rules (AS/ACIF S009-2006

The security system installation will be performed only by an experienced licensed specialist security integrator that possesses the product manufacturer's accreditation on all prescribed systems

11.3 CPTED Principles

The use of clear lines of sight from reception areas through to lobbies and waiting areas is a positive application of CPTED principles. We also encourage the use of visual aids (security signage) where legitimate users have a perception of safety and where those with any ill intent may are deterred from actioning any harmful intent

Throughout the facility, good way finding signage is an essential component of passive security

11.4 Electronic Security System

The Security System will include an Access Control and Intruder Detection Systems (ACID) and CCTV Surveillance Cameras.

11.4.1 System Requirements

This will include:

a) Access Control Readers on security controlled doors compatible with the current Hospital Security System

b) Electronic Security locking devices

c) Remote field security panels interfaced with the current Security System;

d) Reed switches to ground floor perimeter doors, including fire doors;

e) Visual and audible warning annunciation devices at selected doors;

f) CCTV Cameras viewing Fire Doors, entrances and any areas of High Risk interfaced to the current Hospital CCTV System

g) Duress alarm button in high risk areas

11.5 Duress Alarms

There is a requirement for Duress Alarm for the Rehab Unit and AECOM recommends that duress buttons are at a minimum installed in staff base areas. This will be discussed further during the user group process.

Mobile Duress will also be considered as part of the works and will be determined and developed during discussions with the users and engineering staff.

11.6 Access Control System and Intruder Detection (ACID)

11.6.1 General

The design specification will call for the supply, installation and commissioning of a complete, integrated, access control and security system in accordance with appropriate Australian Standards and the performance and design criteria that will provide for a cost effective, secure and highly reliable, unobtrusive installation.

The ACID System will include a security control panels that will be interfaced back to the security room in the existing main hospital building. All system programming and activity reporting will be carried out from the security control room.

An integrated ACID System will allow for both on-site and remote administration. Integration includes future connectivity for a full IP solution.

Access Control readers will be provided at the following locations to provide delineation between public and restricted spaces:

1) Perimeter entry doors;

2) Communications room;

3) Clean Utility room

11.6.2 Access Cards

Proximity access cards shall be compatible with the current Hospital Security System to ensure interoperability between Rehab Department and other buildings.

50 access cards would be supplied at handover.

The access cards will be suitable for printing to the surface to facilitate dual use as staff identification. The security system will include an ID Software Module to allow cards to be produced on site. A card printer will be provided.

11.6.3 Emergency Fire Routes

Electronic ally controlled doors shall be coordinated between the security contractor and fire services contractor. All electronic controlled access doors installed as part of a required emergency egress path, will be configured as ‘fail-secure’ and shall include an emergency break glass located in a secure area to meet BCA (D22) compliance for means of egress.

11.6.4 Door Hardware

Door control hardware will be discussed with the architect and selected appropriate to the door configuration.

11.7 Closed Circuit Television (CCTV) System

11.7.1 General

An IP Digital CCTV system is proposed with video recording and playback equipment. The CCTV system will be designed in accordance with Australian Standard AS 4806.

11.7.2 Recording

The CCTV system will include digital recording using Network Video Technology. Local recording based on the use of IP digital centralised storage array or Network Video Recorder (NVR) technology is proposed. The System shall be able to store digital images for a minimum of 31 days, based on full viewing frame rates, recording frame rates and 4 CIF video resolutions.

11.7.3 CCTV Cameras

Dome Day/Night CCTV cameras are proposed for external perimeter door and main entrances and will be fixed-view suitable for low-light conditions, surface mounted within weatherproof, vandal resistant enclosures and provided with tamper alarm contacts.

11.8 Manpower Systems

The Moruya Hospital will be responsible for the provision of any on-site security personnel however AECOM can provde input as to recommended duties, policy & procedure.

12.0 Nurse Call Service

12.1 Scope of work

A new nurse call system will be installed to serve the sub-acute facility.

The new nurse call system will support the following elements:

- Nurse call system base station.
- Call prioritising
- Bedside pendant handsets where required
- Nurse Assist buttons at bed-head call stations or wards
- Emergency call stations
- Over door indicators. (utilising LED lights)
- Corridor annunciators.
- Staff radio pocket pager interface.
- Battery backed power supply
- Interface with TV/Music/Video

12.2 Nurse Call

Emergency call buttons will be provided at the following locations:

- bedrooms
- consult rooms,
- gym
- bathroom

The operation of the nurse call station will activate:

- Re-assurance light where provided.
- Over door indicator light forward or room.
- Appropriate corridor annunciators.
- Audible alarm and visual display at nurse station.

12.3 Staff Assist Call Station

Operation of a staff assist button will activate:

- Over door indicator light forward or room.
- Audible and visual alarm at nurse station.

12.4 Bathrooms And Showers

Waterproof wallplates will be provided within ensuites one adjacent to the WC, and one adjacent to the shower.

Stations within bathrooms and showers shall be waterproof, IP67 rated.

12.5 Integration with Existing

This will be determined through discussion with the users and based on the condition and age of the existing systems.

13.0 Dry Fire Services

13.1 Scope of Works

The work will be carried out by a specialist fire protection contractor and will include, but not be limited to, the design, supply, delivery, installation, testing, commissioning and maintenance of the following fire systems:-

The building requires the following fire services systems:

- Fire Detection and Alarm System
- Sound Systems and Intercom Systems for Emergency Purposes (EWIS)
- Portable Fire Extinguishers

13.2 Extent

Include the following:

- Detailed system design.
- Manufacture, supply and installation.
- Testing and commissioning.
- Operating and maintenance manuals.

13.3 Design Criteria

The Fire Services systems will be designed to the requirements of all applicable local authority and code requirements, and represent a co-ordinated scheme to accepted industry standards.

In particular, the systems will be designed and installed to conform with/to the approval of:-

- AS 1670.1 – 2004 Fire Detection, Warning, Control and Intercom Systems
- AS1670.4 – 2004 Sound Systems and Intercom Systems for Emergency Purposes
- AS 2444 – 2001 Portable Fire Extinguishers and Fire Blankets
- Bush Fire Risk Assessment Report
- Building Code of Australia 2010
- NSW/Rural Fire Brigade
- Goulburn Hospital standard practice
- Any other authorities having jurisdiction.
- AS 1851 Maintenance of Fire Protection Equipment - Parts as applicable.
- AS/NZS 3000 SAA Wiring Rules.
- AS 3013 Electrical Installations - Wiring Systems for Specific Applications.
- All existing Fire Engineering Reports.
- AS 1603 Automatic Fire Detection and Alarm Systems - Parts as applicable.

13.4 Fire Detection and Alarm System

The detection system will comply with AS 1670.1 - 2004 and all relevant authorities.

The system will be designed to allow for a minimum of 20% additional capacity for future requirements.

The following items/works associated with this Section are as follows:-

- Fire Indicator Panel (To match existing main system)
- Analogue Addressable Photo-Optical detectors.
- Addressable manual call points.
- Fire alarm bells/indicators.
- Interface for Mechanical shutdown (fire contractor to terminate cabling).
- High level interface including wiring, relays and terminations to the M.E.C.P and Main Hospital FIP
- High level interface including wiring, relays and terminations for BMS monitoring in compliance with AS 1670.1 Clause 2.2.
- All necessary circuit wiring, conduit, fittings and equipment.
- Connection to power supply provided and final cabling protection.
- Provide all necessary equipment required for the transmission of an alarm to the NSW fire brigade by means of a direct brigade alarm and via an alarm monitoring service, and pay all charges incurred thereby for a period of 12 months.

13.5 Sound System and Intercom System for Emergency purposes (EWIS)

The EWIS system will comply with AS 1670.4 - 2004 and all relevant authorities.

The system will be designed to allow for a minimum of 20% additional capacity for future requirements.

The following items/works associated with this Section are as follows:-

- Main Evacuation Control Panel (MECP) (To match existing main system)
- EWIS amplifier.
- Warden intercommunication points (WIP's).
- Loudspeakers
- Emergency alarm initiating devices.
- Visual alarm devices.
- Wiring, mountings etc.

13.6 Portable Fire Extinguishers

The portable fire extinguishers will match existing hospital equipment where possible.

Portable fire extinguishers will be provided per requirements of the Building Code of Australia. They will be located and installed per the requirements of AS2444.

Fire blankets will be provided near any locations where flammable liquids are stored or used.

13.7 Operating and Maintenance Manuals

Provide a minimum of 3 copies of Operating and Maintenance Manuals bound in hard covers with spines and covers labelled with name of project and contractor's name.

Include in the manuals:

- As-installed drawings.
- Instructions for operation of all equipment.
- Instructions for maintenance of all equipment.
- Copies of certificates, installer's statements, testing and commissioning data.
- Information to AS 1670.1, AS 1670.4 and AS 1851 requirements.

13.8 Dry Fire Services Testing and Commissioning

Arrange inspections and testing as required during and upon completion, including full functional testing of the installation of the works and pay all associated costs for:

- Fire detection system
- Sound Systems and Intercom Systems for Emergency Purposes (EWIS)
- Building fire mode control testing
- Pay all fees associated with these inspections and tests

Advise the Superintendent of all dates and times of inspections and tests with sufficient notice to enable representatives of the Superintendent to be present.

On completion of each system or sub-system, and before practical completion, satisfactorily complete the commissioning tests as noted below.

All testing to be completed in sufficient time to allow for a fourteen (14) day trial period prior to building occupation, during which no fault or instability occurs.

Record, sign and date all test results. A copy of the results to be forwarded to the Superintendent.

Provide all programs and passwords in hard copy and on disk.

13.9 Certificate of Compliance

Forward to the Chief Officer of the local fire authority, with a copy to the Superintendent, a certificate stating that the installed fire services system complies in full with the Codes and authority requirements. Provide it prior to practical completion and in the form required by the Authority.

13.10 Integration with Existing

The new fire alarm & EWIS systems will be integrated with the existing on site campus wide systems. The final details of the integration will be determined by discussion with the on-site engineering staff and assessment of the existing equipment on campus.

14.0 Hydraulic Services Design

14.1 Scope of Work

The scope of works for the hydraulic services includes

- Sewer Drainage and Sanitary Plumbing
- Stormwater Drainage System
- Rain Water Harvesting and Rainwater Downpipes
- Domestic Cold Water Service
- Domestic Hot Water and Warm Water Service
- LPG System
- Fire Hydrant System
- Fire Hose Reel System

14.2 Reference Documents

The hydraulic services systems will be designed in accordance with the following design standards and documents:

- NCC of Australia 2011
- AS 3500 – National Plumbing and Drainage Code
- AS 5601 – Gas Installations
- AS 2419 – Fire Hydrant Installations
- AS 2441 – Fire Hose Reels
- NSW Code of Practice for Plumbing and Drainage
- AS 5601 Gasfitting rules
- Council requirements
- NSW Department of Health TS11 Guidelines

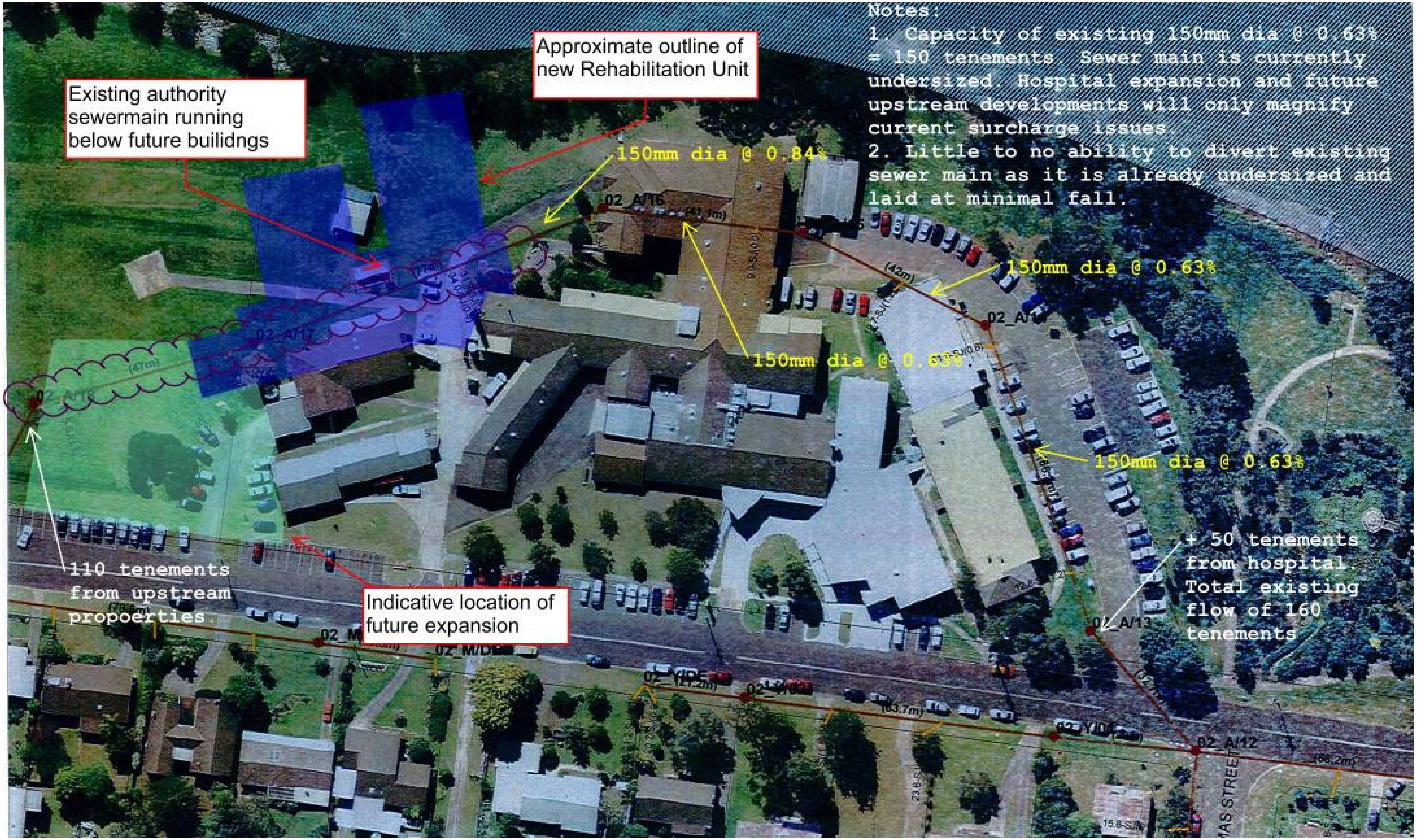
14.3 Sewer Drainage and Sanitary Plumbing

14.3.1 Existing Infrastructure

There is an existing Ø150mm Council sewer main which runs through the property.

Refer sketch plan 14.3.1.1 below for indicative location of Councils' existing sewer main.

14.3.1.1 Sketch Plan of Councils' Existing Sewer Main



Investigations indicate that the building envelope of the new Rehabilitation Unit will be located over Councils' existing Ø150mm sewer main. The hospital master plan also indicates that Councils' Ø150mm sewer main will be affected by future buildings. In addition the existing sewer main has been identified as currently being above its maximum peak flow capacity, and requiring to be either amplified, or diverting upstream flows to lessen the load.

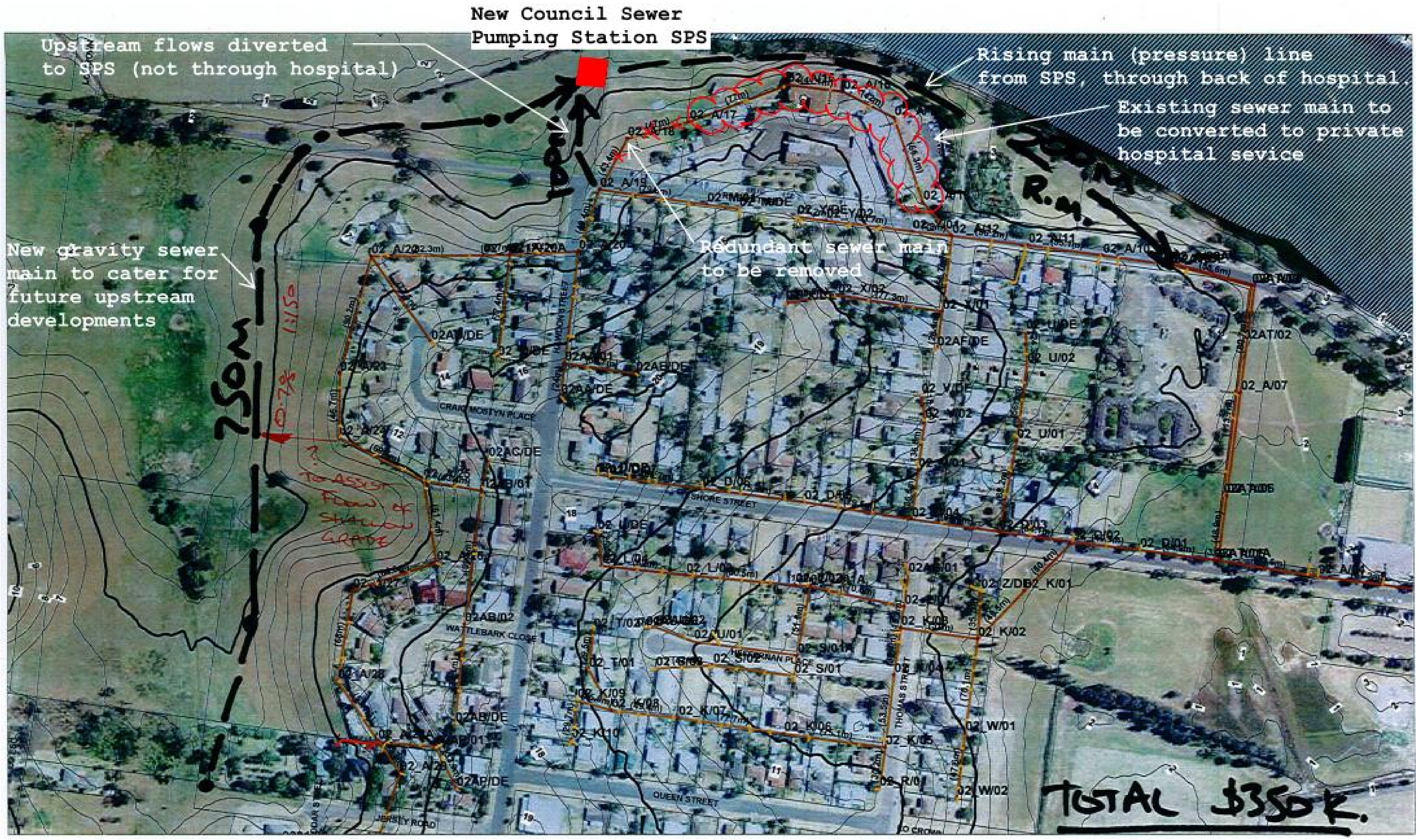
Based on the above, the amplification and diversion works to the sewer main will be required, in order to have the capacity for the new Rehabilitation Unit, future hospital expansion and future upstream developments.

Council has indicated that their preferred method for resolving the under capacity issue is to build a new Sewer Pumping Station (SPS), on the reserve (directly west of the hospital). The SPS will receive all sewer discharges upstream of the hospital, and then pump out to Councils gravity sewer main located on the eastern side of River Street. The SPS rising main (pump out line) is proposed to run along the northern boundary of the hospital site.

Council's existing Ø150mm sewer main currently located in the hospital site will then be classified as a private house drainage line, and remain in its current configuration. The proposed Rehabilitation Unit, and future hospital expansion will connect to the current Council Ø 150mm sewer main

Refer sketch plan 14.3.1.2 below for sketch plan of Councils' preferred amplification and diversion works.

14.3.1.2 Sketch Plan of Amplification and Diversion Works



14.3.2 Sewer Drainage

All new sanitary fixtures shall be conveyed to the converted private house drainage service (currently Councils' existing Ø150mm sewer main), via a new gravitational sewer drainage system.

14.3.3 Sanitary Plumbing

Sanitary fixtures located above ground shall be designed as aerial drainage services, including adequate ventilation, connecting into the new gravitation sewer drainage system.

Inspection cleaning access clear outs will be provided at the base of all droppers and next to each toilet suite to provide rodding access to the sanitary plumbing system.

14.3.4 Materials

Sewer drainage and sanitary plumbing pipe to be installed in the following materials:

- In ground pipe and fittings to be sewer grade SN10 uPVC pipe, with rubber ring or solvent cement joints.
- Above ground pipe and fittings to be sewer grade SN4 uPVCpipe, with solvent cement joints.
- All pipe work and fittings receiving high temperature water discharge will be installed in epoxy lined cast iron pipe (Crevet).
- All solvent cement shall be low VOC type.

14.4 Stormwater Drainage System

As covered in the Civil section of this report.

14.5 Domestic Cold Water Service

14.5.1 Existing Infrastructure

Domestic cold water is currently supplied to the hospital via two authority water meter assemblies, which include reduced pressure zone devices (backflow prevention).

The two authority water meter assemblies can be summarised as follows:

Meter No.	Size	Supply Point/s
Meter 1	Ø50mm	Entire Hospital Site
Meter 2	Ø20mm	Emergency by-pass Supply

14.5.2 Domestic Cold Water Supply

Domestic cold water supply to the new Rehabilitation Unit will be connected to the existing Meter 1 water supply. The capacity of the hospitals' supply pipe and size of Meter 1 will need to be checked to ensure that it is adequate to cater for the additional flows from the new Rehabilitation Unit.

The cold water supply will extend from the Meter 1 supply pipe, before entering the new building and reticulating within the ceiling void. Reticulation pipe work will connect to bathroom and wet areas, via group isolation valves, for isolation and maintenance of grouped fixtures.

Backflow prevention devices will be installed within each dirty utility and other areas, required to satisfy the local water authority's requirements.

14.5.3 Materials

Domestic cold water pipe to be installed in the following materials:

- In ground pipe and fittings to be polyethylene PN16 pipe with electro fusion joints.
- Reticulated above ground pipe and fittings to be copper type 'B' with silver soldered joints.

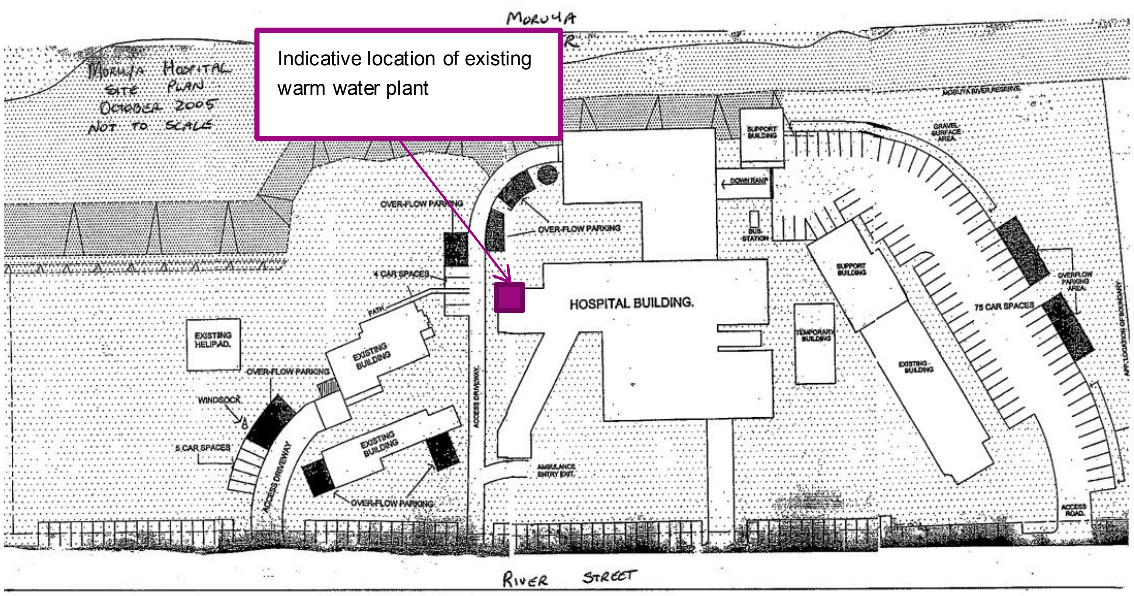
14.6 Domestic Hot Water and Warm Water Service

14.6.1 Existing Infrastructure

Domestic hot water is currently provided to the existing hospital via localised hot water units, which are combination of electric storage and instantaneous gas fired units.

Warm water to the existing hospital is provided via a centralised gas fired Boilerland warm water system. The existing system is located within a plant room, at the western side of the newer portion of the hospital. Refer sketch plan below for indicative location of the existing warm water plant.

14.6.1.1 Sketch Plan- Indicative Location of Existing Warm Water Plant



The existing plant room is to be relocated to accommodate the new Rehabilitation Unit building.

Investigations indicate that the manufacturer of the existing warm water system is no longer in operation and replacement parts are not readily available. Due to construction sequencing the existing warm water plant will not be used for the new Rehabilitation Unit.

14.6.2 Domestic Hot Water Supply

A new centralised gas fired hot water system plant will supply domestic hot water to the new Rehabilitation Unit.

The domestic hot water service will be a flow and return system, reticulating within the ceiling void via a new set of hot water circulating pumps. The hot water plant, circulating pumps and associated equipment will be located within the new roof plant room.

Warm water to the new Rehabilitation Unit will be provided from the reticulated hot water service, via thermostatic mixing valves (TMV's). TMV's will be positioned in recessed access boxes, and serve localised bathroom groups. The recessed access box will also include a cold water by-pass isolation valve, to facilitate maintenance of sanitary fixtures.

14.6.3 Existing Domestic Warm Water Supply

A new warm water plant will be provided and new pipework will connect to the existing supply points, to ensure continuation of the current warm water supply to the existing hospital.

In order to minimise disruption of warm water supply to the existing hospital, during the construction of the new Rehabilitation Unit, a permanent new plant room within the Landscape courtyard of the old hospital will be built to house the warm system.

14.6.4 Materials

Domestic hot and warm water pipe to be installed in the following materials:

- Reticulated above ground pipe and fittings to be copper type"B" with silver soldered joints, and 30mm thick insulation.
- Rough- in pipe and fittings to be peroxide-cross linked Polyethylene (PE-Xa), with compression sleeve connections.

14.7 LPG System

14.7.1 Existing Infrastructure

A 7.5kL centralised bulk storage LPG tank supplies gas, via reticulated pipe work to gas consuming appliances in the existing hospital. The bulk LPG tank is the property of Elgas, who are responsible for periodically filling the tank.

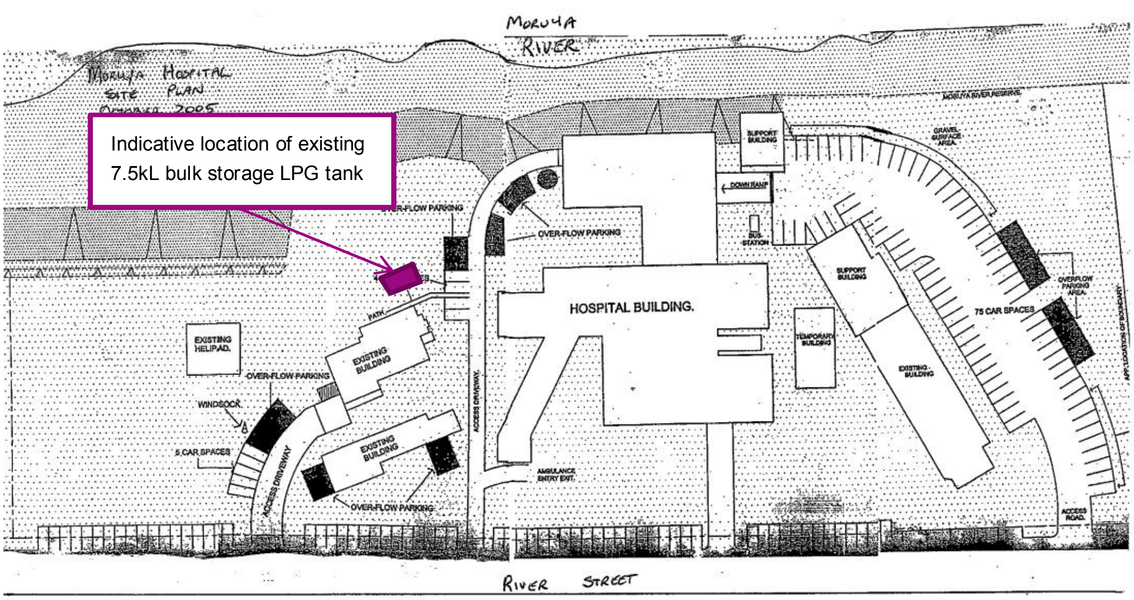
The bulk LPG tank supplies gas to domestic hot water heater, domestic warm water heaters and mechanical boilers used for room heating.

A secondary smaller 135kg in-situ LPG cylinder supplies gas to the domestic hot water unit, serving the community health and maternity ward.

The existing 7.5kL centralised bulk storage tank will need to be relocated to accommodate the new Rehabilitation Unit building.

In order to minimise disruption of gas supply to the existing hospital, during the construction of the new Rehabilitation Unit, a new bulk LPG tank, and supply pipe will be permanently installed, to supply gas to the existing hospital and the new Rehabilitation Unit. Discussions with Elgas have confirmed that one tank will be suitable for the development with spatial allowance for a second tank in the future. The existing bulk LPG tank can be removed from site, upon completion of the switch over.

14.7.2 Sketch Plan - Indicative location of existing LPG tank



14.7.3 LPG Supply

The new LPG tank shall be located adjacent the new western carpark. The designated area will allow for 2 x 7.5 kl tanks, however only one tank is required for this stage of development.

The new bulk LPG tank will supply gas, via reticulated pipe work to all new gas consuming appliances, located in the new Rehabilitation Unit.

The gas supply will be reticulated to the hospital at 100kPa to minimise pipe sizes. Second stage regulators will be used to reduce pressures to a maximum of 5kPa, prior to entering the building.

14.7.4 Materials

Gas pipe to be installed in the following materials:

- Polyethylene PN20 pipe work with electro fusion joints will be used for in- ground pipe work.
- Type “A” Copper pipe with silver soldered joints will be used for above ground pipe work.

14.8 Rain Water Collection System

The design team has considered the incorporation of a rainwater collection tank, however after a risk analysis it was decide not to include a rainwater collection system. The main risk is the for bacterial contamination of the facility from the stored rainwater. Additionally, budgetary constraints, expensive and labour intensive maintenance regime, all had an influence in the decision.

14.9 Fire Hydrant System

14.9.1 Existing Infrastructure

The existing hospital is currently protected by an ordinance 70 fire hydrant system, which does not meet current code requirements

14.9.2 Fire Hydrant Service

A new independent fire hydrant service will be provided to protect the new Rehabilitation Unit. The new service will be complete with backflow prevention device and suction/ booster assembly, to satisfy the requirements of Council and the local fire bridge. The new service will be independently connected to the authority’s water main.

The new Rehabilitation Unit will be supplied from a ring main service, installed around the perimeter of the new building. The system shall provide coverage to all parts of the building via a combination of both internal and external Hydrants.

Internal fire hydrants shall be positioned within fire stairs or within 4m of exit doors, so that entire building is within reach of a 10 metre spray, extending from a 30 metres hose.

Coverage to the existing Hospital shall be maintained by relocating and adding new Fire Hydrants to ensure coverage is maintained in accordance with the regulations at the time of the installation.

14.9.3 Materials

Fire hydrant pipe to be installed in the following materials:

- In ground pipe to be polyethylene PVC-O, PN20, with rubber ring joints, and cast iron fittings.
- Above ground pipe and fittings to be copper type ”A” with silver soldered joints.

14.10 Fire Hose Reel System

14.10.1 Existing Infrastructure

The existing hospital has fire hosereel coverage via two different supplies. Some are fed from the domestic cold water and others are fed from the Fire Hydrant system.

14.10.2 Fire Hose Reel Service

All new fire hose reels will be supplied from the domestic cold water service.

Internal fire hose reels will be provided within the new Rehabilitation Unit, to provide protection to all parts of the new building. Internal fire hose reels shall be located, within 4 metres of exits, so that all parts of the new building are within reach of a 4 metre spray, extending from 36 metres hose.

Coverage to the existing Hospital shall be maintained by relocating and adding new Fire Hosereels to ensure coverage is maintained in accordance with the regulations at the time of the installation

14.10.3 Materials

Fire hose reel pipe to be installed in the following materials:

- In ground pipe and fittings to be polyethylene PN16 pipe with electro fusion joints.
- Above ground pipe and fittings to be copper type ”B” with silver soldered joints.

ppendix A

Design Criteria for Air Handling Systems

Internal Design Temperature and Relative Humidity

Area	TS 11 [*1]			2007 ASHRAE Handbook 'HVAC Applications' [*2]			HTM 03-01 [*3]			Engineers Chosen Value			
	Summer (ºC)	Winter (ºC)	RH (%)	Summer (ºC)	Winter (ºC)	RH (%)	Summer (ºC)	Winter (ºC)	RH (%)	Summer (ºC)	Winter (ºC)	RH (%)	Based On
Patient Bedrooms	23	20	50 ±10	21-24 (Annually)		30 -50	18-28 (Annually)		No Ref	22 ±1		50 ±10	TS 11
Consultation Rooms and Offices Type Areas	25	20	No Specific Ref	21-24 (Annually)		No Specific Ref	No Ref	No Ref	No Ref	24±1	21 ±1	50 ±10	Engineered Assumption
Comms & UPS Rooms	No Specific Ref	No Specific Ref	No Specific Ref	20-25 (Annually)		No Specific Ref	No Ref	No Ref	No Ref	22 ±1		50 ±10	Engineered Assumption
General Circulation & Waiting Areas	25	20	No Specific Ref	No Ref	No Ref	No Specific Ref	18-28 (Annually)		No Ref	24±1	21 ±1	Not controlled	TS 11
Photocopy rooms	No Specific Ref	No Specific Ref	No Specific Ref	No Ref	No Ref	No Specific Ref	No Ref	No Ref	No Ref	Free float	Free float	Not controlled	These areas will be ventilated only, no temperature control required. Acceptable conditions will be apparent due to temperature of make-up air
Clean Utility	No Specific Ref	No Specific Ref	No Specific Ref	No Ref	No Ref	No Specific Ref	18-28 (Annually)		No Ref	Free float	Free float	Not controlled	Ventilated only, no temperature control required. Acceptable conditions will be apparent due to temperature of make-up air
Dirty Utility	No Specific Ref	No Specific Ref	No Specific Ref	No Ref	No Ref	No Specific Ref	18-28 (Annually)		No Ref	Free float	Free float	Not controlled	Ventilated only, no temperature control required. Acceptable conditions will be apparent due to temperature of make-up air

Area	TS 11 [*1] Summer (ºC)	TS 11 Winter (ºC)	TS 11 RH (%)	2007 ASHRAE Handbook 'HVAC Applications' [*2] Summer (ºC)	Winter (ºC)	RH (%)	HTM 03-01 [*3] Summer (ºC)	Winter (ºC)	RH (%)	Engineers Chosen Value Summer (ºC)	Winter (ºC)	RH (%)	Based On
Food Preparation Areas	25	20	No Specific Ref	30 ±1	22 ±1	No Specific Ref	No Ref	No Ref	No Ref	24±1	21 ±1	Not controlled	TS 11
Toilet Areas & Changing Rooms	No Specific Ref	No Specific Ref	No Specific Ref	No Ref	No Ref	No Specific Ref	No Ref	No Ref	No Ref	Free float	Free float	Not controlled	These areas will be ventilated only, no temperature control required. Acceptable conditions will be apparent due to temperature of make-up air
Cleaners Rooms & General Stores	No Specific Ref	No Specific Ref	No Specific Ref	No Ref	No Ref	No Ref	No Ref	No Ref	No Ref	Free float	Free float	Not controlled	These areas will be ventilated only, no temperature control required. Acceptable conditions will be apparent due to temperature of make-up air
Stairs	No Specific Ref	No Specific Ref	No Specific Ref	No Ref	No Ref	No Specific Ref	No Ref	No Ref	No Ref	Free float	Free float	Not controlled	Transient space requiring no heating or cooling

*1 Engineering Services and Sustainable Development Guidelines 'TS 11', December 2007 Version 2.0

*2 HVAC Applications '2007 ASHRAE Handbook', SI Edition

*3 Heating and Ventilation Systems 'Health Technical Memorandum 03-01: Specialised Ventilation for Healthcare premises

Those Areas throughout the Rehabilitation Unit which have not been specifically covered above will comply with TS 11 Category requirements as listed below.

Area	TS 11		
	Summer (°C)	Winter (°C)	RH (%)
Category 1	(TS 11 references Summer = 24°C & Winter = 20°C no bandwidth is provided) Thus, chosen value = 22 ± 2		50 ±10
Category 2	(TS 11 references Summer = 25°C & Winter = 20°C no bandwidth is provided) Thus, chosen values, Summer = 23 ±1, Winter = 21 ±1		50 ±10

External Ambient Conditions

The mechanical air conditioning systems are designed to meet the indoor temperature requirements at the designated outdoor design conditions.

Should the ambient temperature exceed the designated outdoor design conditions, indoor temperatures may be expected to rise in summer and fall in winter.

The designated external ambient conditions are based on the values provided within the AIRAH DA 09 Applications Manual.

Parameter	Design Criteria
External Ambient Conditions *(for air conditioning plant full load performance, based on 24 hours critical process)*	Summer 33.2 °C dry bulb maximum 22.5°C wet bulb maximum Winter 4.4°C dry bulb minimum

Internal Heat Gains

Parameter		Design Criteria
Occupancy	Rehabilitation Centre	24 hours/7 days
	Staff Station	24 hours/7 days
	Consultation Rooms and Offices Type Areas	9.00 am to 5.00 pm Monday to Friday
	Meeting Rooms	Intermittently Monday to Friday
	Back of House	9.00 am to 5.00 pm Monday to Friday
Infiltration	Perimeter Façade:	1 air changes per hour
	Internal Areas:	0.5 air change per hour
People		70 Watts/person sensible 70 Watts/person latent
Lighting		12 Watts/m²
Equipment		15 Watts/m² NLA

Ventilation Rates

Outside Air Flow Requirements

Area	AS1668.2 – 1991	TS 11	2007 ASHRAE Handbook 'HVAC Applications'	HTM 03-01	Chosen Value	
					Value	Based On
Patient Bedrooms	10 l/s.p	10 l/s.p	2ACH	No Specific Reference (Supply Only)	10 l/s.p	TS 11 & AS 1668.2 - 1991
Consultation Rooms and Offices Type Areas	10 l/s.p	10 l/s.p	5ACH	No Specific Reference	10 l/s.p	TS 11 & AS 1668.2 - 1991
Comms & UPS Rooms	No Reference	No Reference	No Reference	No Reference	5% of Total Supply Air	Engineered Assumption
General Circulation & Waiting Areas	1 L/s.m²	No Specific Reference	No Reference	No Reference	1 L/s.m²	1668.2 - 1991
Clean Utility	1 L/s.m²	No Specific Reference	No Specific Reference	No Specific Reference	1 L/s.m²	1668.2 - 1991
Dirty Utility	Exhausted System using make up air from surrounding areas					
Food Preparation Areas	10 l/s.p	10 l/s.p	2ACH	No Specific Reference	10 l/s.p	TS 11 & AS 1668.2 - 1991
Stairs	No Specific Reference	No Specific Reference	No Specific Reference	No Specific Reference	No Mechanical Ventilation Provided	Engineered Assumption

Exhaust Air Flow Requirements

Area	AS1668.2 – 1991 *1	TS 11 *2	2007 ASHRAE Handbook 'HVAC Applications' *3	HTM 03-01 *4	Chosen Value	
					Value	Based On
Toilet Areas & Changing Rooms	Shall Comply with the specific Requirements of AS 1668.2-1991					
Cleaners Rooms & General Stores	Shall Comply with the specific Requirements of AS 1668.2-1991					
Photocopy rooms	Shall Comply with the specific Requirements of AS 1668.2-1991					

Air Change Rates (ACH) for Air Distribution and Circulation Purposes

Area	TS 11	2007 ASHRAE Handbook 'HVAC Applications'	HTM 03-01	Chosen Value	
				Value	Based On
Patient Bedrooms	No Specific Requirement	6 (Minimum)	6	6 (Minimum)	TS 11 & HTM 03-01
Consultation Rooms and Offices Type Areas	No Specific Requirement	6 (Minimum)	No Specific Requirement	6 (Minimum)	Engineering Good Practice and ASHRAE
General Circulation & Waiting Areas	No Specific Requirement	6 (Minimum)	No Specific Requirement	6 (Minimum)	Engineering Good Practice and ASHRAE
Photocopy rooms	No Specific Requirement	No Specific Requirement	No Specific Requirement	6 (Minimum)	Engineering Good Practice
Clean Utility	No Specific Requirement	2 (Minimum)	No Specific Requirement	2 (Minimum)	Engineering Good Practice and ASHRAE
Food Preparation Areas	No Specific Requirement	10	No Specific Requirement	10	Engineering Good Practice and ASHRAE

Pressurisation Regimes

General Areas

Area	Pressure	Comments
General Circulation	Neutral	Allows for the transfer of make-up air to dirty areas.
Cleaners, Dirty Utility, Toilets and Photocopy Rooms	-ve	Make up air will be provided by the outside air introduced by the buildings air conditioning systems.

12 Appendix D: Helicopter Report

20 August, 2012
Our File Ref: S12040AL001.docx
Contact: Michael Ward

Project Manager
NSW Public Works
Level 3, Block E State Office Block
84 Crown Street
Wollongong NSW 2500

Attention: Frank DeSensi

RE: MORUYA HOSPITAL HLS AERONAUTICAL ASSESSMENT

1. INTRODUCTION

REHBEIN Airport Consulting was commissioned by NSW Health Infrastructure (HI) to assess the impact a proposed new building at Moruya Hospital will have on the existing Helicopter Landing Site (HLS). The relocation of existing LPG and oxygen tanks as a result of the new building has also been considered as part of this assessment.

This assessment is based on Drawing SK1001_A directly to REHBEIN Airport Consulting by NSW Public Works.

A site visit was conducted by Michael Ward of REHBEIN Airport Consulting on 31 July 2012 with the Moruya Hospital Assistant Engineer. Additionally, as primary users of the Moruya Hospital HLS the following helicopter operators were consulted:

- Ambulance Service of New South Wales (ASNSW);
- Westpac Life Saver Rescue Helicopter (WLSRH);
- CareFlight; and
- Telstra Child Flight.

2. MORUYA HOSPITAL HLS

Moruya Hospital is located approximately 1km west of the Moruya, NSW CBD on River Street. There is open pasture to the west of the hospital and parkland to the east, the Moruya River is to the north and there is residential development to the south.

The existing HLS is located on the western portion of the campus. The existing HLS consists of a sealed surface approximately 9m x 9m, which is shown in **Figure 1** attached.

The ground slopes upwards to the south. Additionally, there are tall power poles and lines to the south of the HLS running parallel to River Street and trees which are shown in **Figure 2** attached.

Discussions with the Moruya Hospital Assistant Engineer and helicopter operators suggests pilots approach and depart from the west and north east.

Moruya Hospital advised that helicopter movement number records are unavailable but estimate there are approximately 2-3 movements a week at times and all helicopter movements are retrievals.

The highest users of the HLS are ASNSW and Telstra Child Flight. The ASNSW utilise Augusta Westland AW139 helicopter types. Child Flight's fleet consists of a Kawasaki BK117, a Eurocopter AS365 N2 'Dauphin', and a Bell 412 EP. The WLSRH exclusively use Kawasaki BK117 B2 helicopter types. CareFlight have a BK117 B2 and August A109E Power.

3. APPLICABLE STANDARDS

The State Government of New South Wales Department of Health has developed NSW Health Policy Directive PD2005_128 (25 January 2005) incorporating Circular 98/61 *Guidelines for Medical Helipads*. At present it is a requirement of NSW Health for hospital HLS in NSW to comply with criteria within this document. However, this document is set to be superseded by a more comprehensive set of guidelines being developed by NSW Health for the planning, design, operation and management of Department of Health HLS and is currently in draft form.

The existing HLS appears to have been designed to comply with the existing NSW Health Policy Directive PD2005_128. However, as meeting the criteria in the draft NSW guidelines will be a requirement of NSW Health when they are finalized, the draft NSW guidelines criteria for physical dimensions and obstacle restriction have been used as the primary relevant guidance material for assessment purposes.

4. PHYSICAL CHARACTERISTICS

Elements of a surface level hospital HLS and minimum required dimensions based on the draft NSW Guidelines are described in the following sections.

4.1 GEA/TLOF

The Ground Effect Area (GEA) or Touchdown and Lift-off Area (TLOF) is a load bearing generally sealed surface capable of supporting the dynamic loads of the helicopters intended to use the HLS and providing ground effect. Additionally, the GEA/TLOF should provide a firm smooth working surface for hospital personnel and the wheeled equipment used for moving patients on gurneys. The draft NSW guidelines state the minimum dimension of the GEA/TLOF is 14m diameter or square.

4.2 LLA

The Landing and Lift-off Area (LLA) is a load bearing generally sealed surface normally centred within the GEA/TLOF on which helicopters land and lift-off. The draft NSW guidelines state the minimum dimensions of the LLA are determined as 6.35m diameter or 6.35m x 6.35m square. The NSW Health Policy Directive

PD2005_128 standard for an LLA is a hard stand surface with minimum dimension is 9m diameter or square, which is what is currently in place.

4.3 FATO

The Final Approach and Take-off Area (FATO) contains the GEA/TLOF and is the area on which arriving helicopters terminate their approach and from where departing helicopters take-off. The FATO outside of the TLOF does not have to be load bearing. The draft NSW guidelines state the minimum dimension of the FATO is 25m diameter or square.

4.4 Safety Area

The Safety Area is an area required around the FATO which is to be free of all obstacles and intended to reduce the risk of damage to helicopters accidentally diverging from the FATO. The draft NSW guidelines state the minimum dimension of the Safety Area is 4m around the FATO or 33m diameter or square.

5. OBSTACLE RESTRICTIONS

In addition to the provision of physical facilities for the helipad, flight path envelopes that are clear of obstacles need to be provided. These are referred to as Obstacle Limitation Surfaces (OLS) and are based around the proposed flight path centre line.

The OLS consist of several sections each with differing requirements in terms of horizontal and vertical geometry.

5.1 Approach and Departure Surfaces

The approach and departure surfaces provide sufficient airspace clear of hazards for the safe approach and departure of helicopters from an HLS.

For a non-instrument FATO an Approach and Departure Surface starts at the edge of the FATO and slopes upwards at 8:1 for a distance of 1,219m while to a height of 152m above the elevation of the HLS. The surface also diverges away from the flight path centreline to a width of 152m.

5.2 Transitional Surfaces

In addition to the approach and departure surfaces the draft NSW guidelines allow for transitional surfaces. Transitional surfaces start from the edge of the FATO parallel to the flight path centre line and from the outer edges of the approach and departure surfaces and extend outwards at a slope of 2:1 for a distance of 62.5m from the edge of the FATO.

However, the transitional surfaces can be overlooked if lateral extensions of the approach and departure surface on each side are provided for a distance of 610m. For assessment purposes lateral extensions have been applied.

5.3 Object Identification Surfaces

The draft NSW guidelines also allow for an Object Identification Surface (OIS) within which the marking and lighting of obstacles is recommended. The OIS starts at the Safety Area perimeter and extends outwards horizontally in all directions for 30m except under the approach and departure surface. Under the approach and departure surface the OIS starts from the edge of the FATO and extends horizontally out for a distance of 250m. From this point the OIS extends outwards for an additional distance of 1,000m while sloping upwards at 8:1.

6. FLIGHT PATHS

The draft NSW guidelines recommend that a surface level HLS has at least two flight paths separated by an obstacle free sector not less than 150 degrees and that flight paths should be oriented such that the usability factor is 95% for the helicopters the HLS is intended to serve.

7. HAZARD ASSESSMENT

The proposed new building would infringe the obstacle limitation surfaces if helicopters approached and departed over the proposed building. However, discussions with Moruya Hospital and helicopter operators suggest helicopters do not currently approach or depart over the existing hospital buildings or proposed building area and there is no evidence to suggest that this will change or is required. The proposed building is located within the OIS and obstacle lighting is required on the corners to outline the shape of the building and on the highest point in accordance with the draft NSW guidelines.

With regard to obstacle avoidance, preliminary assessment suggests helicopters could continue to approach and depart from the west and north east between 222° - 000° and from 001° - 037° as illustrated in **Figure 3** attached. This represents a 175° obstacle free sector.

Analysis of historical wind data has been conducted to assess the sectors usability. The wind data was obtained from the Bureau of Meteorology records for Moruya Heads Pilot Station (WS 069018) for the period 01 January 1990 to 30 April 2011. A 10 knot crosswind and 0 knot tailwind limit was selected for assessment purposes based on the helicopter types that use the HLS. The usability for the 222° - 000° and 001° - 037° obstacle free sector was calculated to be approximately 87%. This is less than the minimum usability of 95% recommended by the draft NSW guidelines. However, the flight paths identified in **Figure 3** attached are similar to the existing flight paths and usability has not appeared to be an issue in the past. Additionally, ASNSW advise that an obstacle free sector greater than 150° provides their aircraft with close to 100% usability.

The proposed LPG tank is within the obstacle free sector and under flight paths identified in **Figure 3** attached. Consultation with the helicopter operators concludes that the proposed location of the LPG is unacceptable as this area may be used for an emergency landing in the event of engine failure and the LPG tank presents a hazardous materials risk.

Additionally, although the proposed oxygen tank is outside the assumed flight paths identified in **Figure 3** attached and in an area less likely to be used in the event of an emergency the helicopter operators request that the oxygen tank is also located further away and to the east of the HLS similar to the existing layout.

Discussions with the helicopter operators conclude they have no issues with the proposed new car park. However, height data for proposed infrastructure in the car park area such as light poles have not been provided and will need to be considered by the design team to avoid infringing the OLS.

8. CONCLUSIONS AND RECOMMENDATIONS

The assessment has drawn the following conclusions and recommendations:

- The proposed new building or car park will not have an unacceptable impact on the existing HLS and the existing HLS should be able to continue to operate as normal.
- The OLS will need to be protected when considering the height, if any, of car park lighting and other supporting infrastructure;
- The proposed building will require obstacle lighting in accordance with the draft NSW guidelines;
- The proposed LPG tank needs to be relocated; and
- It is recommended that the proposed oxygen tank is relocated.

Yours faithfully
For and on behalf of
LAMBERT & REHBEIN (SEQ) PTY LTD

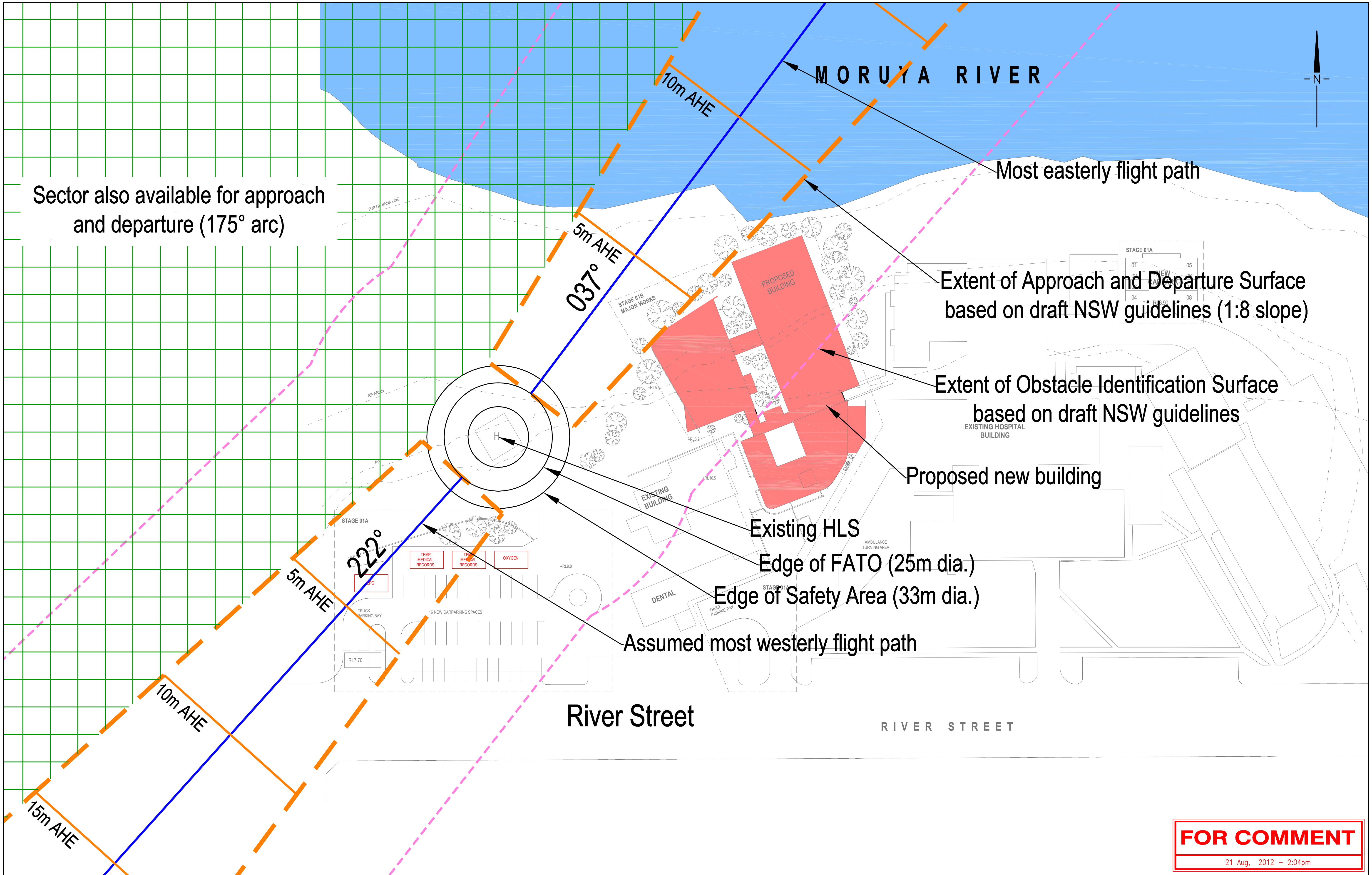
M. WARD DIP, M.Sc, MILTA
SENIOR AVIATION CONSULTANT

Enc: Figure 1
Figure 2
Figure 3

Figure 1 – Existing HLS with 9m x 9m LLA in accordance with the superseded NSW Health Policy Directive PD2005_128

Figure 2 – Looking South from the HLS

(Note residences, large trees, and power lines)



Project:

MORUYA HOSPITAL

Client:

NSW HEALTH INFRASTRUCTURE

Title:

MORUYA HOSPITAL HLS
PRELIMINARY FLIGHT PATHS AND OBSTACLE LIMITATION SURFACES

REHBEIN Airport Consulting

CBD House, level 3 Wickham Street
Fortitude Valley QLD 4006
PO Box 112, Fortitude Valley QLD 4006
L&R (SEQ) Pty Ltd
A.C.N. 126 939 768
A.B.N. 77 126 939 768

TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lar.net.au

The Association of Consulting Engineers Australia

Rev.	Date
1	21/08/2012
0	07/08/2012

Drawn: MMW | Checked: BJH | Approved: BJH

Figure No: FIGURE 3

Scale: 1,1:000 @ A3

A3 Sheet Size

File Ref: S12040FIG003Rev0

13 Appendix E - Fire Engineer's Report

No Fire engineering is required for this project at this time as the design proposes a DTS outcome. Further coordination and review of DTS outcomes will be carried through during the Design Development phase.

14 Appendix E1: Energy and Sustainability Report

14.01 Energy & Environmental Outcomes

The key ESD objective for the project is to integrate ecologically sustainable initiatives into the design, construction and operation of the building is achieved by:

- Passive solar design principles
- Sun shading devices
- High quality level of thermal insulation for the facades and roof elements
- Efficient and sustainable heating and cooling systems
- Natural lighting
- Glare control
- Dual flush wc's and water efficient hydraulic fittings
- Energy efficient lighting, lighting control systems and equipment selection
- Sustainable selection of materials
- Low VOC paint

A key strategy for this project is the implementation of a natural ventilation strategy fot the therapy areas; a report of this design feature has been prepared by the Mechanical Engineers for the project (AECOM) and this report is included in the Appendicies.

14.02 Energy Sustainable Services Design

The following is intended to provide possible energy sustainable design initiatives to be utilised in the project.

16.02.01 Structural

Strategy	Description
Use recycled construction materials.	Reinforcement is to have a minimum of 95% of recycled steel. Concrete mix design to utilise fly ash.
Design structure for adaptability of use.	Design the structure to allow for changes in occupancy and usage throughout the design life of 50 years.

16.02.02 Mechanical

Strategy	Description
High efficiency motors	Reduce the overall energy consumption
Refrigerants	Low ozone depletion potential

16.02.03 Hydraulics

Strategy	Description
Avoid dead legs in water system	Dead legs increase the overall energy consumption

Water efficient appliances	Install 3 star rated appliances that reduce water consumption
Boiling water units	Low energy and time switched boilers can reduce energy consumption
Waterless urinals	Reduce water usage
Low flow tapware	Install 3 star WELS rated tapware
Dual flush WC	Reduce water consumption
Gas boosted solar domestic hot water system	Reduce energy consumption

16.02.04 Electrical and associated services

Strategy	**Description**
Energy efficient light sources	Utilise linear T5 fluorescent and compact fluorescent lights
Electronic ballasts	More efficient than conventional ballasts and allow fluorescent lights to be dimmed
PVC minimisation	Use XLPE cabling where possible to reduce PVC cabling
Occupancy sensors	Employ infrared sensors in less frequently used rooms
Maximise daylight/electrical lighting control	Comply with Section J of the BCA

15 16 Appendix F - Infrastructure Risk Assessment

15.01 Alternative Engineering Systems Considered

Refer AECOM Services Design Report in the Appendicies for more information.

15.02 Condition and Age

Refer AECOM Services Design Report in the Appendicies for more information.

15.03 Capacity Vs Demand

Refer AECOM Services Design Report in the Appendicies for more information.

15.04 Likelihood of Failure

Refer AECOM Services Design Report in the Appendicies for more information.

15.05 Consequences/Impacts of Failure

Refer AECOM Services Design Report in the Appendicies for more information.

15.06 Single Points of Failure

Refer AECOM Services Design Report in the Appendicies for more information.

15.07 Infection Control Drawings and Measures

Refer AECOM Services Design Report in the Appendicies for more information.

15.08 Business Continuity Issues and Staging methodologies

Refer AECOM Services Design Report in the Appendicies for more information.

15.09 Integrated Services Review

Refer AECOM Services Design Report in the Appendicies for more information.

15.10 Back-up

The following services will be battery backed:

- emergency evacuation lighting
- fire alarm system
- Emergency warning and intercom system
- nurse call

- security

Refer AECOM Services Design Report at Appendix C for more information.

15.11 Maintenance and Maintainability review

Refer AECOM Services Design Report at Appendix C for more information.

16 Appendix G - Cost Plan Report

Street Smart. World Wise.

Scheme Design Cost Plan No.1

Subacute Bed Program:

Moruya Hospital

Rehabilitation Unit

Prepared for

NSW Health / Health Infrastructure

c/o NSW Public Works – Project Management

Reviewed by: Barry Woollam	**Job No.** 139.CMS031
ISSUE SCHEDULE	
Document Title	**Issue Date**
Scheme Design Cost Plan No. 1	05th September 2012

Research, Valuation & Advisory | Cost Consulting & Project Management | Realty Tax Consulting | Geomatics
Altus Group Cost Management Pty Ltd (formerly Page Kirkland Cost Management Pty Ltd) ABN 96 093 302 455
The Podium Building 1 Market Street Sydney NSW 2000 Australia
T 61 2 9283 7311 **F** 61 2 9283 7322 **E** sydney@altusgroup.com altusgroup.com

CONTENTS

1.0 INTRODUCTION

Altus Page Kirkland has been requested by NSW Health / Health Infrastructure to prepare a Scheme Design Cost Plan for Moruya Hospital Rehabilitation Unit project, which forms part of the Sub Acute Bed Program. The Total End Cost as at September 2012 is **$11,906,607** (Excl. GST) including Contingencies, Professional Fees and Escalation. This represents an overrun of approximately $1,024,726 against the project budget with all contingencies intact.

Altus Page Kirkland do note however that, upon Health Infrastructures instruction, this overrun could be reduced through the realisation of a proportion of Planning and Construction Contingencies, to reflect the current design status.

Please refer to Section 3.0 & 4.0 of this report for a full summary of costs and Sections 6 and 7 for our Exclusions and Assumptions.

2.0 BASIS OF ESTIMATE

The following information via email received on 31st August 2012 (unless noted otherwise) was used in the preparation of this estimate:

ARCHITECTURAL DRAWINGS

SK001 (A)	Cover Sheet
SK1001 (D)	Proposed Site Plan – Stage 1
SK1002 (C)	Proposed Site Plan – Stage 2
SK1003 (C)	Proposed Site Plan – Stage 3
SK1010 (B)	Proposed Demolition Site Plan – Stage 1
SK1011 (B)	Proposed Demolition Site Plan – Stage 2
SK1012 (B)	Proposed Demolition Site Plan – Stage 2
SK1050 (A)	Proposed Demolition Site Plan (DA submission)
SK1051 (B)	Proposed Site Plan (DA submission)
SK2210 (F)	Ground Floor Plan – Stage 2
SK2211 (H)	First Floor Plan – Stage 2
SK2212 (G)	Plant Floor Plan – Stage 2
SK2213 (G)	Roof Plan – Stage 2
SK3000 (D)	Elevations 01
SK3001 (B)	Elevations 02
SK3100 (D)	Sections 01

SERVICES ESTIMATE

External Services Estimates as provided by AECOM received 29th August 2012

There was no building services estimate provided by the Engineer / Consultant. APK has allowed reasonable amount for services including hydraulics, fire protection, electrical, communication and mechanical services

We highlight that this is an estimate only based on above schematic design drawings. We recommend that more accurate costings be prepared as the design, including services and geotechnical reports, progresses.

AltusPageKirkland

3.0 SUMMARY OF COSTS

Item	Element	Cost (Excl GST)
1	Site Preparation	158,120
2	Piling	173,261
3	Substructure	226,065
4	Columns	147,945
5	Upper Floors	552,384
6	Staircase	43,575
7	Roofing	373,590
8	External Walls	447,227
9	Windows	205,013
10	Internal Walls & Screens	404,723
11	Internal Doors	134,978
12	Wall Finishes	79,774
13	Floor Finishes	178,936
14	Ceiling Finishes	199,253
15	Fitments	270,176
16	Hydraulic Services	412,268
17	Medical Services	22,825
18	Mechanical Services	783,309
19	Fire Protection	103,067
20	Electrical Services	629,130
21	Communications & Security	199,950
22	Lift	135,188
23	Special Provisions	150,000
24	External Services	824,000
25	External Works	184,737
26	Enabling Works	245,112
	NETT NEW BUILDING WORK COST	**7,284,601**
27	Preliminaries (13%)	946,998
28	Margin (4%)	329,264
	GROSS BUILDING COST	**8,560,864**

4.0 COST COMPARISON TO BUDGET

Cost Centre	Project Brief Budget	SD Cost Plan No.01	Variance
Building Works	$5,988,781	$8,560,864	-$2,572,083
Gross Building Cost (G.B.C.)	**$5,988,781**	**$8,560,864**	**-$2,572,083**
Locality Factor	$479,100	INCL	$479,100
Staging	INCL	$50,000	-$50,000
Planning Contingency	$299,400	$299,400	$0
Design Contingency	$299,400	$299,400	$0
Construction Contingency	$299,400	$299,400	$0
Contingency	EXCL	EXCL	$0
TOTAL BUILDING COST (T.B.C.)	**$7,366,081**	**$9,509,064**	**-$2,142,983**
Professional Fees	$1,234,600	$1,350,000	-$115,400
Authority Fees	$119,500	$119,500	$0
Client Costs	$119,500	$119,500	$0
LHD Costs	$119,500		$119,500
Commissioning / Relocation	$79,700	$79,700	$0
NETT PROJECT COST (N.P.C.)	**$9,038,881**	**$11,177,764**	**-$2,138,883**
Furniture, Fittings and Equipment	$700,000	$600,000	$100,000
TOTAL PROJECT COST (T.P.C.)	**$9,738,881**	**$11,777,764**	**-$2,038,883**
Escalation	$1,143,000	$128,843	$1,014,157
TOTAL END COST (T.E.C.) (Excl. GST)	**$10,881,881**	**$11,906,607**	**-$1,024,726**

5.0 SUMMARY OF AREAS

Item	Gross Floor Area (GFA)	Area (m^2)
1	Fully Enclosed Covered Area (FECA)*	2,187
2	Unenclosed Covered Area (UCA)	320
	GFA (FECA + UCA)	2,507

Note: (*) total FECA includes 156m2 refurbished areas

6.0 LIST OF EXCLUSIONS

The following items have been excluded from our Scheme Design Cost Estimate:

1. Land acquisition cost
2. Latent site conditions, etc.
3. GST

7.0 LIST OF ASSUMPTIONS

The following items have been assumed within our Scheme Design Cost Estimate:

1. Allowance made for demolition of existing building and site remediation ($100k)
2. No allowance for concrete slab and external walls to future Renal and Oncology at Ground Floor
3. Allowance for metal roof cover (approx. 50m2) to rubbish bin area only at Loading Dock
4. No allowance made for Prodema cladding
5. Vinyl flooring generally
6. Non-slip vinyl flooring to wet areas
7. Carpet tile flooring to all office areas
8. Allowance for minor refurbishment to existing hospital ($150k)
9. Allowance for make-good existing driveway ($20k)
10. Allowance made for Preliminaries (13%)
11. Allowance made for Builder's Margin (4%)

Appendix A

ESTIMATE SUMMARY & DETAILS

AltusPageKirkland

Elemental Summary

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Auto code	Description	Trade %	Total
1	LIST OF ASSUMPTIONS	0.00	0
2	KEY DATA	0.00	0
3	SITE PREPARATION	1.33	158,120
4	PILING	1.46	173,261
5	SUBSTRUCTURE	1.90	226,065
6	COLUMNS	1.25	147,945
7	UPPER FLOORS	4.64	552,384
8	STAIRCASE	0.37	43,575
9	ROOFING	3.14	373,590
10	EXTERNAL WALLS	3.76	447,227
11	WINDOWS	1.73	205,013
12	INTERNAL WALLS & SCREENS	3.40	404,723
13	INTERNAL DOORS	1.14	134,978
14	WALL FINISHES	0.67	79,774
15	FLOOR FINISHES	1.51	178,936
16	CEILING FINISHES	1.68	199,253
17	FITMENTS	2.27	270,176
18	HYDRAULIC SERVICES	3.47	412,268
19	MEDICAL SERVICES	0.20	22,825
20	MECHANICAL SERVICES	6.58	783,309
21	FIRE PROTECTION	0.87	103,067
22	ELECTRICAL SERVICES	5.29	629,130
23	COMMUNICATIONS & SECURITY	1.68	199,950
24	LIFT	1.14	135,188
25	SPECIAL PROVISIONS	1.26	150,000
26	EXTERNAL SERVICES	6.93	824,000
27	EXTERNAL WORKS	1.56	184,737
28	ENABLING WORKS	2.06	245,112
	NETT NEW BUILDING WORK COST		**7,284,601**
29	PRELIMINARIES (13%)	7.96	946,998
30	MARGIN (4%)	2.77	329,264
	GROSS BUILDING COST		**8,560,864**
31	CONTINGENCY - Locality Factor (2.5%)	0.00	INCL
32	CONTINGENCY - Staging	0.42	50,000
33	CONTINGENCY - Planning Contingency	2.52	299,400
34	CONTINGENCY - Design Contingency	2.52	299,400
35	CONTINGENCY - Construction Contingency	2.52	299,400
36	CONTINGENCY - Client Contingency	0.00	EXCL

Elemental Summary

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Auto code	Description	Trade %	Total
	SUBTOTAL		948,200
37	PROFESSIONAL FEES	11.34	1,350,000
38	AUTHORITY FEES	1.01	119,500
39	CLIENT COSTS	1.01	119,500
40	LHD COSTS	0.00	0
41	COMMISSIONING / RELOCATION COSTS	0.67	79,700
	SUBTOTAL		1,668,700
42	FURNITURE, FITTINGS & EQUIPMENT	5.04	600,000
43	ESCALATION	1.09	128,843
	TOTAL END COST		11,906,607
		100.00	**11,906,607**

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Autocode	Description	Quantity	Unit	Rate	Total
1	**LIST OF ASSUMPTIONS**				
1	No allowance for roof cover to loading dock areas, assume roof to bin areas (say 50m2) only				
2	No allowance made for concrete slab for future Oncology and Renal Areas				
3	No allowance made for external wall for future Oncology and renal Areas				
4	Louvre to plant room at North Elevation only				
5	No allowance for suspended ceiling or soffit lining to Plant Room				
6	Suspended ceiling tile to Office and Corridor areas, plasterboard ceiling to the rest areas				
7	No allowance made for Prodema Cladding - APK allows for CFC cladding only				
	LIST OF ASSUMPTIONS				**0**
2	**KEY DATA**				
	New Building				
1	Ground Floor GFA (incl Loading Dock)	689	m2		
2	Ground Floor FECA	446	m2		
3	Level 1 GFA (excl courtyard)	1,491	m2		
4	Level 1 FECA	1,461	m2		
5	Plant Room FECA	124	m2		
6	Plant Room GFA	171	m2		
7	Roof Areas	1,460	m2		
8	I Bed Ward	8	No		
9	2 Bed Ward	6	No		
	Refurbished Areas				
10	Refurbished areas	156	m2		
	KEY DATA				**0**
3	**SITE PREPARATION**				
1	Allow for clearance	1,491	m2	10.00	14,910
2	Demolition of existing building	1	Item	100,000.00	100,000
3	Bulk excavation to new BOH area (allow average 2.00m depth as shown on Dwg SK3100)	892	m3	40.00	35,680
4	Allowance for sundries (5%)	1	Item	7,529.50	7,530
	SITE PREPARATION				**158,120**
4	**PILING**				
1	Allowance for piling rig establishment	1	Item	30,000.00	30,000
2	Allowance for shotcrete infill including reinforcement and drainage cell to piled retaining walls	236	m2	185.00	43,660

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD

Building: Moruya_SD

Autocode	Description	Quantity	Unit	Rate	Total
4	**PILING**				*(Continued)*
3	Allowance for bored piers to piled retaining wall - say 300mm dia x 5,000 depth bored piers @ 2,000 centre :[28 no]	140	m	120.00	16,800
4	Allowance for bored piers to support building structure	1,491	m2	50.00	74,550
5	Allowance for sundries (5%)	1	Item	8,250.50	8,251
	PILING				**173,261**
5	**SUBSTRUCTURE**				
1	Reinforced concrete lift pit including tanking	1	No	18,000.00	18,000
2	Reinforced concrete fire stair base	2	No	8,000.00	16,000
3	Reinforced concrete pile cap including excavation, concrete, formwork and reinforcement	1,491	m2	30.00	44,730
4	Slab on ground including excavation, concrete, formwork and reinforcement - say 150 thick slab	446	m2	120.00	53,520
5	Slab on ground including excavation, concrete, formwork and reinforcement to Loading Dock - say 150 thick slab	243	m2	200.00	48,600
6	Extra over for footing and ground beam	689	m2	50.00	34,450
7	Allowance for sundries (5%)	1	Item	10,765.00	10,765
	SUBSTRUCTURE				**226,065**
6	**COLUMNS**				
1	Allowance for reinforced concrete column to Ground Level (suspended areas)	425	m2	50.00	21,250
2	Allowance for reinforced concrete column to Ground Level (including future areas)	1,424	m2	50.00	71,200
3	Allowance for reinforced concrete column to Level 1	1,491	m2	30.00	44,730
4	Allowance for steel column to Roof Plant Room	124	m2	30.00	3,720
5	Allowance for sundries (5%)	1	Item	7,045.00	7,045
	COLUMNS				**147,945**
7	**UPPER FLOORS**				
	Ground Level				
1	Suspended concrete slab including concrete, formwork and reinforcement at Ground Level - say 200 thick slab		m2		EXCL
2	Extra over for attached beam and edge beam		m2		EXCL
	Level 1				
3	Suspended concrete slab including concrete, formwork and reinforcement - say 200 thick slab	1,441	m2	220.00	317,020
4	Extra over for attached beam and edge beam	1,441	m2	50.00	72,050
5	Extra over for steel framed bondek slab to wing areas as AECOM's advice dated 29/08/2012	979	m2	30.00	29,370

Autocode	Description	Quantity	Unit	Rate	Total
7	**UPPER FLOORS**				*(Continued)*
6	Waterproofing to external deck areas	31	m2	35.00	1,085
7	Allowance for fire insulation to soffit of suspended concrete slab (allow to Wings Areas only)	979	m2	60.00	58,740
	Plant Room				
8	Suspended concrete slab including concrete, formwork and reinforcement - say 200 thick slab	171	m2	220.00	37,620
9	Extra over for attached beam and edge beam	171	m2	50.00	8,550
10	Waterproofing to external deck areas	47	m2	35.00	1,645
	General				
11	Allowance for sundries (5%)	1	Item	26,304.00	26,304
	UPPER FLOORS				**552,384**
8	**STAIRCASE**				
1	Staircase including balustrades and finishes	9	m/rise	3,500.00	31,500
2	Staircase including balustrades and finishes to Plant Room	4	m/rise	2,500.00	10,000
3	Allowance for sundries (5%)	1	Item	2,075.00	2,075
	STAIRCASE				**43,575**
9	**ROOFING**				
	Main Roof				
1	Allow for roof structural steel - say 20kg/m2 :[1,460 m2]	29.20	t	6,500.00	189,800
2	Metal roof sheeting including flashing and capping	1,460	m2	60.00	87,600
3	Insulation and sarking	1,460	m2	20.00	29,200
4	Allowance for roof plumbing	1,460	m2	20.00	29,200
5	Allowance for making good connection to existing roof structure	1	Item	10,000.00	10,000
	Loading Dock				
6	Allowance for roof over rubbish bin areas - say 50m2	50	m2	200.00	10,000
	General				
7	Allowance for sundries (5%)	1	Item	17,790.00	17,790
	ROOFING				**373,590**
10	**EXTERNAL WALLS**				
	External Wall				
1	Allowance for facade to future Oncology and Renal at Ground Floor		m2		EXCL
2	Allowance for external wall / fence to Loading Dock	138	m2	150.00	20,700
3	Reinforced concrete block wall (adjacent to piled retaining wall) including waterproofing	244	m2	215.00	52,460

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Autocode	Description	Quantity	Unit	Rate	Total
10	**EXTERNAL WALLS**				*(Continued)*
4	Plasterboard on furring channel to concrete block wall	157	m2	80.00	12,560
5	Brick veneer wall including dry pressed brick external and plasterboard on stud frame internal to South Block	261	m2	270.00	70,470
6	External wall comprising Bondor Equitilt Citi cladding and plasterboard on stud frame internal to Wing Blocks	328	m2	360.00	118,080
7	External wall comprising Prodema / CFC cladding and plasterboard on stud frame internal to Wing Blocks - APK rate allows for CFC cladding only	274	m2	360.00	98,640
8	Dry pressed bick wall to Plant Room - allow average height of 3,000mm as shown on Dwg SK3100	159	m2	180.00	28,620
9	Allowance for making good connetion / integration to existing building	1	Item	10,000.00	10,000
	Balustrade / Handrail				
10	Balustrade to external deck (allow for glazed balustrade)	14	m	600.00	8,400
11	Balustrade to Plant Deck	20	m	300.00	6,000
	General				
12	Allowance for sundries (5%)	1	Item	21,296.50	21,297
	EXTERNAL WALLS				**447,227**
11	**WINDOWS**				
	External Doors & Windows				
1	Allowance for external glazing - say 30% facade areas (except plantroom areas)	361	m2	450.00	162,450
2	Allowance for automatic door at Main Entrance	1	Item	10,000.00	10,000
	Metal Lourves				
3	Metal lourves including doors to Roof Plan Room - allow to North Elevation only	60	m2	380.00	22,800
	General				
4	Allowance for sundries (5%)	1	Item	9,762.50	9,763
	WINDOWS				**205,013**
12	**INTERNAL WALLS & SCREENS**				
	Lift Shaft				
1	200 thick reinforced concrete wall to Lift Shaft	108	m2	360.00	38,880
	Internal Partitions				
2	Wall comprising steel stud frame with insulation and 13mm plasterboard lining to both sides	1,823	m2	110.00	200,530
3	Plasterboard on furring channel to concrete block wall	162	m2	80.00	12,960

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Autocode	Description	Quantity	Unit	Rate	Total
12	**INTERNAL WALLS & SCREENS**				*(Continued)*
4	Extra over for impact resistant plasterboard lining (say 50%)	1,823	m2	20.00	36,460
5	Extra over for moisture resistant plasterboard to wet areas	806	m2	20.00	16,120
6	Internal partition to Plant Room	21	m2	200.00	4,200
7	Allow for internal feature wall to Corridor and Reception	1	Item	25,000.00	25,000
8	Allowance for fire rated wall	1	Item	15,000.00	15,000
	Internal Screens				
9	Internal glazing partition (assume 900 high partition + glazing above)	57	m2	300.00	17,100
10	Extra over for glazed door including frame and hardware	2	No	1,500.00	3,000
11	Internal window to Bed Ward	36	m2	450.00	16,200
	General				
12	Allowance for sundries (5%)	1	Item	19,272.50	19,273
	INTERNAL WALLS & SCREENS				**404,723**
13	**INTERNAL DOORS**				
1	Single door including frame and hardware	53	No	1,000.00	53,000
2	Uneven double door including frame and hardware	18	No	1,300.00	23,400
3	Double door including frame and hardware	11	No	1,600.00	17,600
4	Extra over for observation panels - say 50%	41	No	250.00	10,250
5	Extra over for door protection	81	No	300.00	24,300
6	Allowance for sundries (5%)	1	Item	6,427.50	6,428
	INTERNAL DOORS				**134,978**
14	**WALL FINISHES**				
1	Paint to wall linings	3,247	m2	10.00	32,470
2	Wall vinyl	561	m2	70.00	39,270
3	Waterproofing to wall to shower areas only	121	m2	35.00	4,235
4	Allowance for sundries (5%)	1	Item	3,798.75	3,799
	WALL FINISHES				**79,774**
15	**FLOOR FINISHES**				
	External				
1	Allowance for epoxy / concrete screed to external Loading Dock	243	m2	50.00	12,150
2	Allowance for floor finishes to external deck - say floor tile	31	m2	120.00	3,720
	Internal				
3	Concrete finishes	124	m2	10.00	1,240

Autocode	Description	Quantity	Unit	Rate	Total
15	**FLOOR FINISHES**				*(Continued)*
4	Carpet	151	m2	60.00	9,060
5	Timber floor		m2		N/A
6	Vinyl floor finish	1,524	m2	65.00	99,060
7	Extra over for non-slip vinyl floor finish to wet areas	213	m2	10.00	2,130
8	Extra over for cushion vinyl to Gym	80	m2	20.00	1,600
9	Vinyl skirting	1,360	m	25.00	34,000
10	Waterproofing to floors	213	m2	35.00	7,455
	General				
11	Allowance for sundries (5%)	1	Item	8,520.75	8,521
	FLOOR FINISHES				**178,936**
16	**CEILING FINISHES**				
	External				
1	FC soffit lining on furring channel fixed to roof structure	31	m2	95.00	2,945
	Internal				
2	Suspended ceiling tile system including suspension system to Office & Corridor Areas	628	m2	70.00	43,960
3	Suspended flush set plasterboard ceiling including suspension systems and trims	1,247	m2	90.00	112,230
4	Extra over for moisture resistant plasterboard ceiling to wet areas	213	m2	10.00	2,130
5	Allowance for plasterboard bulkheads	1	Item	10,000.00	10,000
6	Allowance for access panels	34	No	250.00	8,500
7	Allowance for feature ceiling to Reception and Lobby Areas	1	Item	10,000.00	10,000
	General				
8	Allowance for sundries (5%)	1	Item	9,488.25	9,488
	CEILING FINISHES				**199,253**
17	**FITMENTS**				
1	Allowance for fitments	1,906	m2	135.00	257,310
2	Allowance for sundries (5%)	1	Item	12,865.50	12,866
	FITMENTS				**270,176**
18	**HYDRAULIC SERVICES**				
1	Allowance for hydraulic services	1,906	m2	200.00	381,200
2	Allowance for BWIC (3%)	1	Item	11,436.00	11,436
3	Allowance for sundries (5%)	1	Item	19,631.80	19,632
	HYDRAULIC SERVICES				**412,268**
19	**MEDICAL SERVICES**				

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Autocode	Description	Quantity	Unit	Rate	Total
19	**MEDICAL SERVICES**				*(Continued)*
1	Allowance for medical services (allow to Bed Areas only)	603	m2	35.00	21,105
2	Allowance for BWIC (3%)	1	Item	633.15	633
3	Allowance for sundries (5%)	1	Item	1,086.91	1,087
	MEDICAL SERVICES				**22,825**
20	**MECHANICAL SERVICES**				
1	Allowance for mechanical services	1,906	m2	380.00	724,280
2	Allowance for BWIC (3%)	1	Item	21,728.40	21,728
3	Allowance for sundries (5%)	1	Item	37,300.42	37,300
	MECHANICAL SERVICES				**783,309**
21	**FIRE PROTECTION**				
1	Allowance for fire protection	1,906	m2	50.00	95,300
2	Allowance for BWIC (3%)	1	Item	2,859.00	2,859
3	Allowance for sundries (5%)	1	Item	4,907.95	4,908
	FIRE PROTECTION				**103,067**
22	**ELECTRICAL SERVICES**				
1	Allowance for electrical services	1,906	m2	300.00	571,800
2	Allowance for electrical services to roof plant room	124	m2	50.00	6,200
3	Allowance for electrical services to external areas	31	m2	120.00	3,720
4	Allowance for BWIC (3%)	1	Item	17,451.60	17,452
5	Allowance for sundries (5%)	1	Item	29,958.58	29,959
	ELECTRICAL SERVICES				**629,130**
23	**COMMUNICATIONS & SECURITY**				
1	Allowance for communications	1,906	m2	42.00	80,052
2	Allowance for BMS	1,906	m2	20.00	38,120
3	Allowance for security services	1,906	m2	35.00	66,710
4	Allowance for BWIC (3%)	1	Item	5,546.46	5,546
5	Allowance for sundries (5%)	1	Item	9,521.42	9,521
	COMMUNICATIONS & SECURITY				**199,950**
24	**LIFT**				
1	Allowance for lift (serving 1 floor)	1	Item	125,000.00	125,000
2	Allowance for BWIC (3%)	1	Item	3,750.00	3,750
3	Allowance for sundries (5%)	1	Item	6,437.50	6,438
	LIFT				**135,188**
25	**SPECIAL PROVISIONS**				

Project: Moruya Subacute Rehab **Details:** Moruya_100% SD
Building: Moruya_SD

Autocode	Description	Quantity	Unit	Rate	Total
25	**SPECIAL PROVISIONS**				*(Continued)*
1	Allowance for refurbished areas (156m2) - assume minor refurbishment only	1	Item	150,000.00	150,000
	SPECIAL PROVISIONS				**150,000**
26	**EXTERNAL SERVICES**				
1	Allowance for site infrastructure as per advice from AECOM dated 29/08/2012				
	Electrical				
2	New MSB	1	Item	30,000.00	30,000
3	New substation	1	Item	100,000.00	100,000
4	New comms links fibre & copper to Sub Acute	1	Item	45,000.00	45,000
5	Renewal of power supplies to Renal / Oncology / Dental	1	Item	20,000.00	20,000
6	Renewal of fire alarms links & EWIS links to Renal / Oncology / Dental	1	Item	10,000.00	10,000
7	Renewal of comms links to Renal / Oncology / Dental	1	Item	15,000.00	15,000
8	New power supplies to new warm water plant and new boiler plant (for existing hospital)	1	Item	20,000.00	20,000
	Mechanical				
9	Provisions of new boiler plant (for existing hospital)	1	Item	150,000.00	150,000
	Hydraulic				
10	Sewer diversions within the site	1	Item	80,000.00	80,000
11	Council sewer main	1	Item	160,000.00	160,000
12	New water connection	1	Item	35,000.00	35,000
13	Extend & magnify hydrant system	1	Item	100,000.00	100,000
14	Warm water plant (of existing hospital)	1	Item	80,000.00	80,000
	Civils				
15	New stormwater drainage to river	1	Item	100,000.00	100,000
	VM Savings				
16	Change from chiller system to VRF system	1	Item	-65,000.00	-65,000
17	Reduction in BMCS Controls	1	Item	-50,000.00	-50,000
18	Hydraulics - reduce hot water plant to allow for sub-acute only	1	Item	-6,000.00	-6,000
	EXTERNAL SERVICES				**824,000**
27	**EXTERNAL WORKS**				
	List of Assumptions				
1	No allowance made for Carpark & Roadwork shown in Stage 03				
2	No allowance made for helipad				

Autocode	Description	Quantity	Unit	Rate	Total
27	**EXTERNAL WORKS**				*(Continued)*
3	Early work (Stage 1A) measured in Enabling Work Section				
	Site Preparation				
4	Allowance for site clearance	1,188	m2	5.00	5,940
	Footpath				
5	Allowance for concrete paving as shown on SK1002 (Stage 02 work only)	375	m2	80.00	30,000
6	Extra over for concrete step and paving		m	250.00	N/A
7	Balustrade / Handrail to external concrete step		m	250.00	N/A
	Carparking & Road				
8	Allowance for making good existing driveway	1	Item	20,000.00	20,000
	External Services				
9	Allowance for serviced relocation including boiler, O2 tank, gas bottles / tank etcs. - included in Enabling Work Section	1	Item		INCL
10	Allowance for external lighting	1	Item	40,000.00	40,000
	Landscaping				
11	Allowance for landscaping	1	Item	80,000.00	80,000
12	Allowance for overland flow - assumed not required		Item		EXCL
	General				
13	Allowance for sundries (5%)	1	Item	8,797.00	8,797
	EXTERNAL WORKS				**184,737**
28	**ENABLING WORKS**				
	Site Preparation				
1	Allowance for remove existing gas storage as shown on Dwg SK1010	1	Item	1,000.00	1,000
2	Allowance for relocate existing shed as shown on Dwg SK1010	1	Item	1,000.00	1,000
3	Allowance for battered bank to carpark and footpath areas	83	m	150.00	12,450
	Carparking & Road				
4	Allowance for concrete paving as shown on SK1001 (Stage 01 work only, Stage 02 external work measured in External Work Section)	345	m2	80.00	27,600
5	Allowance for temporary footpath	79	m2	50.00	3,950
6	Allowance for gravel carpark	814	m2	60.00	48,840
7	Extra over for hardstand areas (asphalt)	250	m2	50.00	12,500
8	Allowance for line marking (to handstand areas only)	250	m2	10.00	2,500
	Outbuildings				

Autocode	Description	Quantity	Unit	Rate	Total
28	**ENABLING WORKS**				*(Continued)*
9	Allowance for new services enclosure including concrete slab / plinth and fence	68	m2	200.00	13,600
	External Services				
10	External early services work as per AECOM's advice dated 29/08/2012		Note		
11	Relocation of oxygen tank (pipework and connection)	1	Item	35,000.00	35,000
12	Relocation of oxygen tank (BOC works - note the tank is owned by BOC)	1	Item	25,000.00	25,000
13	Relocate LPG tanks (pipework & connection)	1	Item	35,000.00	35,000
14	Relocate LPG tanks (PLG works - note tank is owned by LPG Co.)	1	Item	15,000.00	15,000
	General				
15	Allowance for sundries (5%)	1	Item	11,672.00	11,672
	ENABLING WORKS				**245,112**
	NETT NEW BUILDING WORK COST				
	NETT NEW BUILDING WORK COST				**7,284,601**
29	**PRELIMINARIES (13%)**				
	PRELIMINARIES (13%)				**946,998**
30	**MARGIN (4%)**				
	MARGIN (4%)				**329,264**
	GROSS BUILDING COST				
	GROSS BUILDING COST				**8,560,864**
31	**CONTINGENCY - Locality Factor (2.5%)**				
	CONTINGENCY - Locality Factor (2.5%)				**INCL**
32	**CONTINGENCY - Staging**				
	CONTINGENCY - Staging				**50,000**
33	**CONTINGENCY - Planning Contingency**				
	CONTINGENCY - Planning Contingency				**299,400**
34	**CONTINGENCY - Design Contingency**				
	CONTINGENCY - Design Contingency				**299,400**
35	**CONTINGENCY - Construction Contingency**				
	CONTINGENCY - Construction Contingency				**299,400**
36	**CONTINGENCY - Client Contingency**				
	CONTINGENCY - Client Contingency				**EXCL**

Autocode	Description	Quantity	Unit	Rate	Total
	SUBTOTAL				*(Continued)*
	SUBTOTAL				**948,200**
37	**PROFESSIONAL FEES**				
	PROFESSIONAL FEES				**1,350,000**
38	**AUTHORITY FEES**				
	AUTHORITY FEES				**119,500**
39	**CLIENT COSTS**				
	CLIENT COSTS				**119,500**
40	**LHD COSTS**				
	LHD COSTS				**0**
41	**COMMISSIONING / RELOCATION COSTS**				
	COMMISSIONING / RELOCATION COSTS				**79,700**
	SUBTOTAL				
	SUBTOTAL				**1,668,700**
42	**FURNITURE, FITTINGS & EQUIPMENT**				
	FURNITURE, FITTINGS & EQUIPMENT				**600,000**
43	**ESCALATION**				
1	Construction start Feb 2013 (1%)	0.5	Item	8,561,000.00	42,805
2	Mid point construction Jun 13 (2%)	0.5	Item	8,603,805.00	86,038
	ESCALATION				**128,843**
	TOTAL END COST				
	TOTAL END COST				**11,906,607**

17 Appendix H - Statutory Report

REPORT

PREPARED FOR

LendLease

BUILDING CODE OF AUSTRALIA ASSESSMENT REPORT

PREMISES

LIVERPOOL HOSPITAL ACUTE MENTAL HEALTH UNIT

Reference: J120061

Date: 9 September 2012

TABLE OF CONTENTS

Page No.

1.0 - Executive Summary

1.1 Introduction

The purpose of this report is to assess the documentation as provided (and referenced) within this report against the 'deemed-to-satisfy' provisions of the Building Code of Australia 2012 (BCA) including any NSW variations.

1.2 Summary

The following matters have been identified as non-compliances or potential non-compliances with the 'deemed-to-satisfy' provisions of the BCA from the drawings referred to below

1. travel distances are subject to a fire engineered solution to address staged evacuation and use of the roof as open space with extended distance between alternate exists of up to 81m (45m max) and extended travel distance of up to 31m (12m max) to reach a point in choice in travel from the plant room and up to 48m to enter an exit from the plant room (30m max)

2. the glass sides of the existing enclosed fire isolated stairs are exposed to the building within 6m and not currently protected as per clause C3.8, the form of protection afforded to egressing occupants is subject to a fire engineered solution

3. smoke and fire doors are not to be dual swing and subject to a fire engineering solution

4. the proposed level 02 addition will not meet strict compliance with Table 3 of Specification C1.1 in relation to the FRL of load bearing elements and materials of construction and will be subject to a fire engineered solution

5. the form of protection afforded to the occupants egressing via the external stair to the north east corner of the building will not meet DTS provisions and is subject to a fire engineered solution

6. the Patient Care areas (being the entire third floor) is to be have fire compartmentation formed at maximum 2000m^2 compartment size with construction to achieve a FRL of 120/120/120.

7. fire separation for ward areas is to be maximum 1000m^2 and achieve a FRL of 60/60/60 and smoke compartments are to 500m^2 maximum and formed by minimum 13mm standard grade plasterboard

8. the omission of sprinklers to the ground and first floors are to be subject to a dispensation from the relevant authority

9. spandrels will be required for this stage as the building is not fully sprinkler protected, external walls bounding the internal courtyard voids and north facade are to incorporate spandrel panels accordingly

10. the omission of stair pressurization to the existing enclosed stairs is subject to a fire engineered solution on the basis of access from the level 02 floor via an open access balcony equivalent arrangement

11. it is recommended to migrate the hydrant service from the current Ordinance 70 booster arrangement to the recently installed AS 2419.1-2005 compliant service as system coverage to the new floor is to be compliant with AS 2419.1 and would be subject to a dispensation form the relevant authority otherwise

2.0 – Property Description

2.1 – Location and description: The building development, the subject of this report, is located at the Liverpool Hospital site at the corner of Goulburn and Elizabeth Streets, Liverpool.

The building development, the subject of this report, comprises of an existing 2 storey hospital building for mental health care having an additional storey constructed taking the building to a three storey hospital building. the additional storey will be used for acute mental health care

2.2 - Building Description

Use/Classification	Class 9a
Rise in Storeys	Three (3)
Type of Construction	Type A Construction required
Floor Area/Volume limitations	The building is subject to maximum floor area and volume limits of:- Class 9a Maximum Floor Area 5,000m^{2*} Maximum Volume 30,000 m^{2*}
Populations	It is noted that table D1.13 does not populate hospital buildings which would normally be assessed by way of patient and staff numbers. in this regard there are 24 patient rooms indicated. staffing numbers are to be nominated by the hospital however it is noted there are sufficient exits to accommodate a population of over 300
Effective Height	The building will have an effective height of less than 25m

* - within patient care areas of a Class 9a building the floor are and volume limitations of Table C2.2 do not apply as the floor area of compartments in patient care areas is subject to Clause C2.5 to limit compartment sizes to 2000m^2 (volume limitations are not imposed)

2.3 – Drawings & Information

This report is prepared on the assessment of architectural drawings provided by Woods Baggot

Drawing No	*Rev*	*Date*	*Title*

3.0 - Building Code of Australia Assessment

3.1 – Structure (Section B, BCA)

Clause	BCA Matter	Comment
B1.1 to B1.4	Structural Provisions The development is to be designed so the structure will resist loads determined AS 1170.1 – Dead and live loads and load combinations, AS 1170.2 – Wind Loads and AS1170.4 – Earthquake loads.	Structural engineer's certification is to be provided confirming that their design meets all the relevant provisions of the BCA as well as all relevant structural standards. All such certification is to be relevant to the Importance Levels and Design Events specified under this section of the BCA.

3.2 – Fire Resistance (Section C, BCA)

3.2.1 – Fire Resistance and Stability (Part C1, BCA)

Clause	Item	Comment
C1.1	Type of Construction	All building elements are required to be constructed in Type A construction Refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 for matters relating to required extent and form of protection of structural elements
C1.2	Rise in Storeys	The building has a rise in storeys of 3
C1.3	Buildings of Multiple classifications	All building elements are to achieve the fire resistance levels (FRLs) as required relevant to class 9a for Type A construction (refer to Spec C1.1 section for guidance).
C1.4	Mixed Type of Construction	All building elements are to achieve the fire resistance levels (FRLs) as required relevant to class 9a for Type A construction (refer to Spec C1.1 section for guidance).
C1.5	Two Storey Class 2, 3 and 9c Buildings	Not applicable to this building
C1.6	Class 4 Parts of Buildings	Not applicable to this building
C1.7	Open Spectator Stands and Indoor Sports Stadiums	Not applicable to this building

C1.8	<u>Lightweight fire rated construction to walls and columns</u> Walls are to be constructed in accordance with Spec C1.8 of BCA and the manufacturer's specifications. Columns are to be constructed in accordance with the manufacturer's specifications and the gap between the column and protective board filled to a height not less than 1.2m	Where proposing to use lightweight fire rated materials compliance with this part and also the specific manufacturers installation requirements are to be complied with
C1.10	<u>Fire Hazard Properties</u> All floor, wall and ceiling linings are to have fire hazard properties in accordance with Specification C1.10 of the BCA – these relate to minimum 'critical radiant flux' not the traditional indices. <u>Floors</u> not < 1.2 Sprinkler protected areas not < 2.2 No sprinkler protection not <2.2 Fire Isolated exits not <2.2 Lift cars Floor materials in areas with no sprinkler protection are to also have a maximum smoke development rate of 750 percent-minutes Wall and ceiling lining materials are to have the following 'group number' as determined under AS ISO 9705 <u>Location</u> — <u>Group No</u> Fire isolated exits — 1 Public Corridors — 1, 2 (walls with sprinklers) 1, 2 (ceilings with sprinklers) Patient care areas — 1, 2, 3 (walls with sprinklers) 1, 2, 3 (ceilings with sprinklers) Other Areas — 1, 2, 3 (walls with sprinklers) 1, 2, 3 (ceilings with sprinklers) Lift cars — 1, 2 (walls and ceilings) Air handling duct work is to comply with AS4254.	Note that any material specified for Construction Certificate is to have been suitably tested for their 'critical radiant heat flux' and 'group numbers' as defined. Note that some exemptions are applicable under Clause C1.10 of the BCA.
C1.11	<u>Performance of external walls in fire</u>	Not applicable to this building
C1.12	<u>Non-combustible materials</u>	To be noted in reference to other comments in this report.

3.2.2 – Fire Compartmentation and Separation (Part C2, BCA)

Clause	Item	Comment
C2.2	Floor Area and Volume Limitations *Floor area* Maximum of 5000m^2 for the fire compartments containing Class 9a *Volume* Maximum of 30000m^3 for the fire compartments containing Class 9a * note patient care areas limited to 2000m^2 fire compartments, no volume limitations	The additional storey is considered to be all patient care area and therefore limited to 2000m^2 floor area fire compartment, the design is considered compliant
C2.3	Large Isolated Buildings	Not applicable to this building
C2.4	Requirement for open spaces and vehicular access	Not applicable to this building
C2.5	Class 9a and 9c Buildings For Class 9a: Patient care areas to be fire separated to form maximum 2000m^2 fire compartments, minimum FRL of 120/120/120 Ward areas to be fire separated to maximum 1000m^2 with minimum FRL of 60/60/60 Ward areas to be smoke separated at maximum 500m^2 smoke compartments, smoke separation to comply with Specification C2.5 Treatment areas are to be smoke separated at maximum 1000m^2 smoke compartments Ancillary use areas such as kitchens greater than 30m^2, record storage rooms greater than 10m^2, rooms containing hyperbaric chambers or laundries with gas fired dryers are to be fire separated with a minimum FRL of 60/60/60	It is noted the size of the additional floor in total is less than 2000m^2 therefore as a single fire compartment of a patient care area the separation is compliant The entire floor area is also to be treated as a ward area and requires additional compartmentation to separate the floor area into areas less than 1000m^2 with a FRL of minimum 60/60/60. Smoke compartmentation of the ward area (entire floor) is to be formed with maximum 500sqm smoke compartments Plans are to detail the location of fire and smoke walls accordingly It is noted that all smoke and fire/smoke doors are required to be dual swing however Refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 addressing the door swing of fire and smoke doors

C2.6	<u>Spandrel Separation</u> Fire rated vertical separations are required to be provided between openings on different storeys in the external walls of the building. To be achieved by: 1. Spandrels of 900mm in height with a minimum 600mm above the floor slabs with an FRL not less than 60/60/60; or 2. Slab projections of FRL 60/60/60 extending 1100mm out from the openings concerned and minimum 450mm either side. Notes: • Not required where sprinklers installed *throughout* the building. • Not required to open deck car parks. • Where the construction is behind a curtain wall the gap between the spandrel and curtain is to be packed with a non-combustible material that will withstand expansion and structural movement without loss of seal against fire and smoke	Not applicable where a building is fully sprinkler protected It is noted that the existing two storey part is not proposed to be provided with sprinklers at this time and therefore spandrels are to be provided where external walls are located in the same vertical plane of opening to the level 01 below or not set back minimum 1100mm from the vertical plane
C2.7	<u>Firewalls</u> Fire walls installed for fire compartmentation purposes are required have the higher FRL as specified under Specification C1.1 for the classifications concerned, extend to the underside of a floor/roof slab of an equivalent FRL or the underside of a roof covering.	Fire walls are proposed to form fire compartments for horizontal exits, compliance with method of construction through roof void and to the existing roof slab is required
C2.8	<u>Separation of classifications in same storey</u> Parts of the building of different classifications are to fire separated by a fire wall of the higher FRL specified under Specification C1.1 for the classifications concerned or the entire storey is to be constructed of the higher FRL	Not applicable, class 9a throughout
C2.9	<u>Separation of classification is different storeys</u> The FRL specified for 'floors' for the lower storey classification is to be applied to the floor separating the classifications.	As above.
C2.10	<u>Separation of lift shafts</u> The lifts of the building are to be fire isolated from the storeys of the building. Emergency lifts are to be separated with by construction having a minimum FRL of 120/120/120.	The shaft enclosing the lift is to be of fire isolating with construction having a minimum FRL of 120/120/120 as an emergency lift is required. Where bounding the existing storeys the construction is to achieve 120/120/120 with -/60/- fire rated landing doors

C2.12	<u>Separation of equipment</u> The following equipment is to be fire isolated from the building with construction having an FRL not less than 120/120/120, doors accessing the spaces are to be self closing –/120/30 fire doors: • Lift motors and lift control panels • Emergency generators or central smoke control plant • Boilers • Batteries	Any such equipment must be separated from remainder of the building. No such equipment is currently detailed to plans
C2.13	<u>Electricity supply system</u> Substations, electrical conductors and main switchboards that are required to sustain power to essential equipment operating in emergency mode is to be fire isolated from the remainder of the building with construction having a minimum of FRL of 120/120/120.	Not applicable, no substation detailed to plans
C2.14	<u>Public Corridors in Class 2 and 3 buildings</u> Corridors are not to exceed 40m in length between smoke separating construction	Not applicable to this building

3.2.3 – Protection of Openings (Part C3, BCA)

Clause	Item	Comment
C3.1	<u>Application of Part</u> This part is applicable to all openings in the external walls of the building (e.g. doors, windows, etc) and includes openings formed in the vertical plane of the building between floors and columns. This part also applies to penetrations in fire rated elements of the building (e.g. bounding fire rated construction and floors) except for penetrations between floors of car park levels	To be noted
C3.2	<u>Protection of openings in external walls</u> Openings in the external walls of the building are required to be 'protected' per C3.4 below where they are located within 3.0m of the allotment boundary or 6.0m of the far boundary of a road adjoining the allotment. Openings requiring protection are not occupy greater than 1/3 of the area of the external wall of the storey concerned.	No openings are currently exposed to fire source features

C3.3	<u>Separation of external wall and opening in different fire compartments</u> Wall and opening elements of external walls of the building are required to be protected with construction having an FRL not less than 60/60/60 or the openings are required to be protected as per C3.4	Not applicable
C3.4	<u>Acceptable methods of protection</u> Doors – external wall wetting sprinklers to a self closing door or a –/60/30 self closing fire door. Windows – external wall wetting sprinklers over fixed or automatic closing windows, fixed fire rated windows (FRL –/60/–) or fire shutters. Other openings – external wall wetting drenchers or construction with FRL –/60/–	Not applicable
C3.5	<u>Doors in fire walls</u> Doors in fire walls are required to occupy no more than ½ the total area of the wall and be protected with self or automatic fire doors or fire rated shutter of –/(FRL)/30 or 2 doors facing one another of –/(½ FRL)/30.	Doors in fire walls for horizontal exits are to be minimum -/120/30 FRL
C3.7	<u>Protection of doorways in horizontal exits</u> Protection to be provided by a fire door which is either self or automatic closing. Automatic closing is to be caused by the activation of smoke detectors located not greater than 1.5m from both sides of the door as well as any other fire system (e.g. sprinklers, smoke detection systems, etc)	Doors forming horizontal exits to be operated as noted
C3.8	<u>Openings in fire isolated exits</u> Doors into fire isolated stairs are to be –/60/30 fire doors which are either self or automatic closing. Automatic closing is to be caused by the activation of smoke detectors located not greater than 1.5m from both sides of the door as well as any other fire system (e.g. sprinklers, smoke detection systems, etc). Windows in fire isolated exits are to protected as per C3.4 if they are located within 6.0m of another opening in the same building.	All doors into fire isolated exits are to be self or automatic closing –/60/30 fire doors.

C3.9	<u>Service penetrations into fire isolated exits</u> No services are permitted to penetrate into the fire isolated exits except for those directly related to the 'operation' of the stair such as wiring emergency lighting and exit signage, pressurizing systems or water pipes for fire services Note that some security, surveillance and other hydrant/sprinkler monitoring electrical wiring can be installed in the fire isolated exit.	Details in this regard are to ensure that no services except for those nominated under C3.9 and D2.7 of the BCA.
C3.10	<u>Openings in fire isolated lift shafts</u> All doors to fire isolated lift shafts are to be protected by FRL –/60/– fire doors complying with AS1735.11 which remain closed except for when persons are entering or exiting the lift car. All panels (lift call, indicator, etc) are to be backed by construction with FRL –/60/60 if > 35000mm^2 in area.	Design details are to include for the provision of compliant fire protected openings. Landing doors are to be -/60/- fire rated
C3.11	<u>Bounding construction: Class 2, 3 and 4 buildings</u> Doorways to class 2 & 3 buildings are to be protected if access from a SOU is to a public corridor, a room not within a SOU, landing of internal non fire-isolated stairway serving as a required exit, another SOU.	Not applicable
C3.12	<u>Openings in floors and ceilings for services</u> All penetrations through the floors and fire rating ceilings (if any) of the building are to be contained within fire isolated shafts or installed in accordance with C3.15 of the BCA.	Services must be within shafts achieving an FRL for 120/90/90. Where services are not contained within a shaft they are to be protected in accordance with C3.15 of the BCA.
C3.13	<u>Openings in shafts</u> Openings into shaft walls containing garbage, ventilating, pipe or other service are to be provide with self closing –/60/30 fire door or hopper, –/60/30 access panel or if in a sanitary compartment a door or panel of –/30/30 or a door and frame of non-combustible construction	Design details are to include for the provision of compliant fire protected openings.
C3.15	<u>Openings for service installations</u> This clause and it's specification offer a range of suitable protections to be installed about service penetrations through fire rated elements (e.g. fire collars, fire dampers, etc). Reference should be made to this clause for detail.	Design details are to include for the provision of compliant fire protected openings.

3.2.4 – Fire Resisting Construction (Spec C1.1, BCA)

Clause	Item	Comment
Spec C1.1	<u>Fire Resisting Construction</u> Type A buildings are required to be of fire resisting compartmentalized construction. For the most part a building of concrete floor and column with masonry wall (internal and external) construction will generally comply. (Note Fire Source Features (FSF) in this instance are to the boundaries of the site and the far boundary of the adjacent public roadways) <u>Loadbearing Ext Walls</u> <1.5m to FSF 120/120/120 1.5 to 3.0m to FSF 120/90/90 3.0m or > to FSF 120/60/30 <u>Non-loadbearing Ext Walls</u> <1.5m to FSF –/120/120 1.5 to 3.0m to FSF –/90/90 3.0m or > to FSF –/–/– <u>External Columns</u> <3.0m to FSF 120/–/– 3.0m or > to FSF –/–/– <u>Fire Walls</u> 120/120/120 <u>Internal Walls</u> *Lift and fire stair shafts* Loadbearing 120/120/120 Non-loadbearing –/120/120 *Service shafts* Loadbearing 120/90/90 Non-loadbearing –/90/90 <u>Other internal load bearing wall and columns</u> Loadbearing 120/–/– <u>Floors</u> 120/120/120 (not on ground) <u>Roof</u>- concession for roof if non-combustible as the building is required to be fitted with a sprinkler system complying with BCA Spec E1.5. **NOTE: Refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 in relation to the form and extent of fire rating of structural elements**	All designs are to ensure that the necessary FRLs are attained subject to the following notes. Notes: • Any building elements that support another required to have an FRL is to have the same FRL. • Non-combustible structures on the roof for the plant such as ventilation and air conditioning, window cleaning equipment, other non-combustible service units not containing combustible liquids or gases, etc are not required to be fire rated. • All shafts are to be enclosed top and bottom by construction with FRL not less than –/90/90 except if the shaft extends through the roof covering. Exemption does not apply to fire isolated stairs. • External walls, fire walls and the floor and floor framing are to be non-combustible. • All internal walls requiring an FRL are to extend to the underside of the floor above or to or through the roof (see above shafts). • All loadbearing internal walls and fire walls are to be of concrete or masonry. • Non-loadbearing internal walls and shaft walls are to be of non-combustible construction.

3.3 – Access & Egress (Section C, BCA)

3.3.1 – Provision for escape (Part D1, BCA)

Clause	Item	Comment
D1.2	Number of exits required The minimum number of exits required to each storey is (1). Minimum 2 are required for Class 2-8 with effective height exceeding 25m and class 9c and 9a containing patient care areas	The building requires a minimum of 2 exits from each storey. Plans are currently compliant
D1.3	Fire Isolation of Exits Stairs/Exits passing through > 2 storeys (no sprinklers) or > 3 storeys (sprinklers) are required to be contained within fire isolated shafts. Exits serving patient care areas are to be fire isolated	Exits are to be isolated with shaft walls to ground floor achieving an FRL of 120/120/120
D1.4	Exit travel Distances All points on the floor of the building are to be no greater than 20m to a single exit or point of choice to two (2) or more exits. Where two (2) or more exits are available then a maximum distance of 40m in total distance is permitted and must be measured through the point of choice. For class 9a the maximum travel distance to a point in choice in travel is not to exceed 12m and the total travel to one of those exits is not to exceed 30m	It is noted that in general travel distances are compliant however Refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 in respect of travel distances associated with the existing enclosed plant room utilizing egress through the new level 02 parts
D1.5	Distance between alternate exits Exits to the floors are to be distributed as uniformly as practicable, not < 9.0m apart, not > 60m apart and the paths of travel to exits are not to converge so that they become less than 6.0m apart. In class 9a patient care areas exits are not be further than 45m apart	It is noted that in general travel distances between alternate exits are compliant however Refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 in respect of distances up to 81m where egress across the open roof to access the fire isolated stairs is required
D1.6	Dimensions of exits and paths of travel All paths of travel and exit routes are to be: 1. 2.0m in clear height (noting ceiling height requirements under F3.1 below) 2. A minimum 1.0m in clear unobstructed width. In relation to the unobstructed width of stairs, it is to be the dimension between the handrail and the opposing wall/handrail. Doors may reduce egress widths to 1980mm in height and 750mm of clear unobstructed width.	Plans appear to note 1200mm wide doorways with 2200mm wide corridors, to be confirmed however. Where there is leaf normally fixed closed the minimum width of the operable leaf is to be minimum 850mm clear

	Note that where disabled access is required this is to be 850mm of clear width. For class 9a patient care areas with a corridor width less than 2.2m the doorways are to be minimum 1200mm wide, where the corridor is greater than 2.2m then doors are to be minimum 1070mm where patients are normally transported in beds.	
D1.7	<u>Fire isolated exits</u> Doors to fire isolated stairs are not to directly open to stairs unless from public corridors, sanitary facilities or tenancies that occupies the entire storey. Each fire isolated exit must provided independent egress from each storey to a point of open space or covered areas of uses and open perimeters, as nominated. Where discharge from exits require passage within 6.0m of walls and/or openings in the external façade the walls are to have minimum FRL of 60/60/60 and the openings are to be protected internally as C3.4. No greater than two (2) doors are to open into a fire isolated stair without smoke lobbies or stair pressurization.	The existing fire stairs are to act as fire isolated stair with the exception of the east stair that is proposed as an external stair in lieu of a fire isolated stair In this regard the method of protection of the occupants where passing within 6m of the building at ground floor once discharging the exit is non compliant however refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 which addresses the form of protection afforded to the discharge of the fire isolated stairs
D1.8	<u>External Stairs in Lieu of Fire Isolated Stairs</u> There are to be no openings formed within 3m of the egress path to the stair and openings located between 3-6m are to be protected as per clause C3.4. Bounding walls are to achieve a minimum FRL of 60/60/60	The east stair is to non compliance with DTS provisions for protection to the stair, refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 which addresses the form of protection at level 02
D1.10	<u>Discharge from exits</u> Bollards or other suitable barriers are to be provided to ensure that exits must are not blocked by parked vehicles. Be located as far apart as practical. Required exit widths must be maintained between the discharge point of the exits and the roadway and the path connecting the exit to the road must have stairs and/or ramps connecting it.	Not applicable, exists are in locations that cannot be obstructed
D1.11	<u>Horizontal Exits</u> Horizontal Exits are not to occupy greater than ½ the required exits to a storey of the building and are to have sufficient area (as determined under this clause) to accommodate persons escaping from one side of the wall to the other.	Plans are generally compliant in this regard, horizontal exits are incorporated for travel distances only and not for aggregate egress width provisions

	For class 9a and 9c there is to be a clear space of not less than 2.5m^2 per person within the adjoining fire compartment	
D1.12	Non Required, Ramps, Stairs and Escalators Not permitted to be used in class 9a and 9c buildings	Plans do not indicate non required exits
D1.13	Populations	See earlier comments in this report.
D1.14	Measurement of Distances	Note only
D1.15	Method of Measurement	Note only
D1.16	Plant rooms and lift machine rooms- concessions Ladders may be used for plant rooms less than 100m^2 in area or all but one access point for plant rooms up to 200m^2	Not applicable
D1.17	Access to Lift Pits Where the pit depth is greater than 3.0m access to the pit must be provided in accordance with the provisions of clause D1.17 (b) – Further details on request	All detail drawings are to ensure compliance in this regard.

3.3.2 – Construction of Exits (Part D2, BCA)

Clause	Item	Comment
D2.2	Fire-isolated stairs and ramps Stairs and ramps within fire isolated shafts are to be of non-combustible materials and be constructed so that if there is local failure it will not cause structural damage or impair the fire resistance of the shaft.	All detail drawings are to ensure compliance in this regard to the east stair extension
D2.3	Non Fire-isolated stairs and ramps Materials are to be either reinforced concrete, steel with a minimum finished thickness of 6mm or timber with a minimum finished thickness of 44mm has an average density of not less than 800 kg/m^3 at a moisture content of 12%; and (iii) has not been joined by means of glue unless it has been laminated and glued with resorcinol formaldehyde or resorcinol phenol formaldehyde glue	Not applicable, external stairs proposed in lieu of fire isolated stairs or fire isolated stairs only proposed
D2.4	Separation of rising and descending flights Where flights of stairs rising from lower levels meet flights of stairs descending from upper levels, the smoke separating construction is to be provided between the two (2) areas.	Not applicable, rising and descending stairs are not detailed

D2.5	<u>Open Access Ramps and Balconies</u> have ventilation openings to the outside air which— (i) have a total unobstructed area not less than the floor area of the ramp or balcony; and (ii) are evenly distributed along the open sides of the ramp or balcony; and (b) not be enclosed on its open sides above a height of 1 m except by an open grille or the like having a free air space of not less than 75% of its area.	Not applicable
D2.6	<u>Smoke Lobbies</u> (a) have a floor area not less than 6 m^2; and (b) be separated from the occupied areas in the storey by walls which are impervious to smoke, and— (i) have an FRL of not less than 60/60/– (which may be fire-protective grade plasterboard, gypsum block with set plaster, face brickwork, glass blocks or glazing); and (ii) extend from slab to slab, or to the underside of a ceiling with a resistance to the incipient spread of fire of 60 minutes which covers the lobby; and (iii) any construction joints between the top of the walls and the floor slab, roof or ceiling must be smoke sealed with intumescent putty or other suitable material; and (c) at any opening from the occupied areas, have smoke doors complying with Clause 3 of Specification C3.4 except that the smoke sensing device need only be located on the approach side of the opening; and	Not applicable
D2.7	<u>Installations in exits and paths of travel</u> Access to service shafts and services other than fire fighting equipment is not permitted from fire isolated exits. Gas or other fuel services must not be installed within 'required exits'. Where electricity meters, distribution boards or ducts, central telecommunication distribution boards or equipment or electrical or other motors serving the building are located in corridors, hallways or the like leading to an exit they are to be enclosed in non-combustible construction or a fire protective covering with doorways and openings suitably sealed against smoke spreading from the enclosure.	All detail drawings are to ensure compliance in this regard.
D2.8	<u>Enclosures under stairs and ramps</u> The enclosure of spaces under in fire isolated stairs is prohibited.	All detail drawings are to ensure compliance in this regard.

D2.9	<u>Width of stairs.</u> The required width of a stair is measured between the handrail and the opposing wall or handrail. Minimum unobstructed height of 2m is required measured from the nosing line of the treads.	All detail drawings are to ensure compliance in this regard.
D2.11	<u>Fire Isolated Passageways</u> The enclosing construction of the fire isolated passageways serving the fire isolated stairs is to have the same FRLs and construction as that required for the stair.	Not applicable .
D2.12	<u>Roof as Open Space</u> If an exit discharges to a roof of a building, the roof must— (a) have an FRL of not less than 120/120/120; and (b) not have any rooflights or other openings within 3 m of the path of travel of persons using the exit to reach a road or open space.	The roof is proposed to act as open space in part under an alternate solution assessment refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 in relation to assessment of the distance between alternate exits
D2.13	<u>Goings and Risers</u> The goings and risers of the stairs to: 1. Be within the dimensional limitations of Table D2.13 of the BCA. 2. Have not > 18 risers per flight 3. If open risers have not >125mm between treads. 4. Be of solid construction. 5. Have a non-slip finish or be provided with non-skid strips near the edge of the nosings.	All detail drawings are to ensure compliance in this regard.
D2.14	<u>Landings</u> The landings of stairs are to: 1. Have a cross fall not greater than 1 in 50 2. Be not less than 750mm long. 3. Have a non-slip finish or be provided with non-skid strips near the edge of the nosings. in a Class 9a building— (i) the area of any landing must be sufficient to move a stretcher, 2 m long and 600 mm wide, at a gradient not more than the gradient of the stairs, with at least one end of the stretcher on the landing while changing direction between flights; or (ii) the stair must have a change of direction of 180°, and the landing a clear width of not less than 1.6 m and a clear length of not less than 2.7 m.	It is noted the existing stairs to the south are not proposed to be altered. the extension of the north east will achieve compliance

D2.15	<u>Thresholds</u> Steps at doorways from internal spaces on the building to external areas are to be not greater than 190mm (step permitted only where the internal space is higher). Note that some doors require AS1428.1 compliant threshold ramps may be required where disabled access is required. No threshold step or ramp of any dimension is permitted to internal doorways at point from the doorway less than the width of the door leaf. For class 9a and 9c there is not to be a step more than 25mm and in class 9c there is a 1:8 ramp at the threshold	All detail drawings are to ensure compliance in this regard.
D2.16	<u>Balustrades</u> Balustrades are required where the height change between to levels is greater than 1000mm. Balustrades to the building are to be as follows: *Fire Isolated Stairs* 1. Be not less than 1000mm high above landings and 865mm above the nosings of stairs. 2. Have balusters not > 300mm apart or where rails are used a rail not less than 150mm above the nosing of the stairs and the gap between the rails is to be not > 460mm *Balconies, non-fire isolated stairs and other locations* 1. Be not less than 1000mm high above landings and 865mm above the nosings of stairs. 2. Have openings not > 125mm. 3. Where the change in level is >4.0m it must not contain horizontal elements between 150mm and 760mm above the floor level that can facilitate climbing. 4. Windows to floors where the change in level is >4.0m must not have openable portions less than 865mm above the floor level. All balustrades are to be designed to ensure compliance with AS1170.1 or AS/NZS 1170.1. Furthermore, we note that particular requirements are applicable under D2.16 (h) and Table D2.16 in relation to wire balustrades. Loading docks are exempted from needing to meet these requirements.	All detail drawings are to ensure compliance in this regard. Note that compliance with AS1288 – 2006 in this regard is required for glass balustrades

D2.17	<u>Handrails</u> Each flight of stairs are to be fitted with at least one (1) handrail For class 9a handrails are to be provided along corridors to one side in patient use areas and both sides in resident use areas of class 9c	Plans are to detail handrails to one side of corridors in patient use areas
D2.18	<u>Fixed platforms, walkways, stairways and ladders</u> All platforms, walkways, stairways and ladders within the plant areas are to be designed in accordance with AS1657 or the stair, landing and balustrade requirements as above.	All detail drawings are to ensure compliance in this regard.
D2.19	<u>Doorways and doors</u> Doors serving as exits are to be swinging doors except that power sliding doors can be used where it opens directly to a road or open space, capable of being manually opened under a force not > 110N upon a power malfunction and will automatically open on power failure or activation of the fire services in the building.	Details generally indicate that the exits to be the building will be served by swinging doors.
D2.20	<u>Swinging doors</u> All exit doors are required to swing in the direction of egress. Any swinging door must not encroach into the required width of an exit by more than 500mm and when fully open encroach by greater than 100mm.	Swinging exit doors to the building appear to swing in the direction of egress. As noted it appears the doors will not encroach beyond permitted however door handles are to be selected to not encroach more than 100mm when fully open.
D2.21	<u>Operation of latch.</u> All exit doors and doors in the path of travel to exits are to be provided with lever action door furniture or panic bars located 900mm to 1.2m above the floor level which do not require a key to operate them on the side that a person would be seeking egress from the building. Where security is required to the doors there may be locked provided that they are fitted with a 'fail safe' device (e.g. an electronic strike) which opens/releases on activation of the smoke detection or sprinkler systems installed throughout the building.	As a mental health facility it is permitted to have doors locked that are in the path of travel provided they are unlocked by hand of an authorized and trained person

D2.22	<u>Re-entry from fire isolated exits</u> Doors of a fire isolated exit must not be locked from the inside in a Class 9a building, 9c aged care building or exit serving any storey above a effective height of 25m. Doors may be locked if the automatically unlock by a fail-safe device by activation of a fire alarm, however least every forth storey doors are not locked and signed that re-entry is available, or intercommunication system is provided with signage explaining its purpose and method of operation is provided.	Re-entry is required from isolated stairs. All detail drawings or specifications are to ensure compliance in this regard.
D2.23	<u>Signs on doors</u> Doors accessing fire isolated exits and in horizontal exits are to be provided with 20mm high lettering of a colour contrasting to it's background stating 'FIRE DOOR, DO NOT OBSTRUCT, DO NOT KEEP OPEN'. Doors discharging fire isolated stairs are to be provided with 20mm high lettering of a colour contrasting to it's background stating 'FIRE SAFETY DOOR, DO NOT OBSTRUCT'.	All detail drawings or specifications are to ensure compliance in this regard.

3.3.3 – Construction of Exits (Part D3, BCA)

Clause	Item	Comment
D3.1, D3.2 & D3.3	<u>General access requirements & parts required to be accessible</u> AS1428.1-2009 compliant access is required to be provided: • to all parts used by the occupants	Access appears generally compliant, all doors are to have a minimum 850mm clear opening for disabled access Stairs provided to access exits externally are to have handrail compliant with clause 11 and 12 of AS 1428.1-2009
D3.5	<u>Car parking</u> One (1) AS2890.1 compliant car park space is required to be provided per 100 car parking spaces or part there of.	There is no additional parking indicated as part of the works .
D3.6	<u>Identification of accessible facilities, services and features</u> Specification D3.6 compliant Braille and tactile signage is required to be installed to all sanitary facilities.	All detail drawings or specifications are to ensure compliance in this regard.

D3.8	<u>Tactile indicators</u> AS1428.4 tactile ground surface indicators are to be provide to all public accessible stairs, ramps and where overhead obstructions reduce below 2000mm in height.	Class 9a buildings may be provided with raised dome buttons to handrails in lieu of tactile ground surface indicators

3.4 – Services and Equipment (Section E, BCA)

3.4.1 – Fire Fighting Equipment (Part E1, BCA)

Clause	Item	Comment
E1.3	<u>Fire Hydrants</u> A hydrant system is required to protect the development in accordance with Clause E1.3 of the BCA & AS 2419.1 - 2005.	Compliant coverage in accordance with BCA cl E1.3 and AS2419.1-2005 is required to new areas, this is to be confirmed by the hydraulic consultant. It is noted the hydrant service is currently served form the Ordinance 70 booster located on Elizabeth St. it is recommended to re-configure the system to be service from the newly installed AS 2419.1-2005 compliant system Hydrants are to be located to each fire compartment
E1.4	<u>Fire Hose Reels</u> A fire hose reel system is required to protect the development in accordance with Clause E1.4 of the BCA & AS 2441 - 2005.	Compliant designs are to be provided from the relevant services consultant. All designs are to be certified as being in accordance with BCA cl E1.4 and AS2441-2005. Hose reels are to be located within each fire and smoke compartment such that they do not have to pass through fire or smoke separating walls
E1.5	<u>Sprinklers</u> Sprinklers are required to be installed throughout the building and car parking levels of the building.	Compliant designs are to be provided from the relevant services. All designs are to be certified as being in accordance with BCA cl E1.5 and AS2118.1-1999. It is noted that the existing two storey part does not currently have a sprinkler system provided, it is proposed to provide the sprinkler to the additional floor only and seek and dispensation for the relevant authority for the existing two floors.

E1.6	Portable Fire Extinguishers Portable fire extinguishers are required to protect the development in accordance with Clause E1.6 of the BCA & AS 2444 - 2001.	All detail drawings or specifications are to ensure compliance in this regard.
E1.8	Fire control centres A fire control facility must be provided for a building with an effectively height of more than 25m and for Class6,7,8 or 9 with a total floor area of more than 18,000 m^2	A fire control centre or room is not required
E1.9	Precautions during construction During construction the building is to be provided with not less than one (1) extinguisher suitable for Class A, B & C fire and electrical fires located near exits or temporary stairs. When the building reaches twelve (12) metres in effective height the required fire hydrants and fire hose reels must be operational in every storey covered by a roof or the floor above.	Construction details to confirm compliance.

3.4.2 – Smoke Hazard Management (Part E2, BCA)

Clause	Item	Comment
E2.2	Smoke Hazard Management In addition to the sprinkler system indicated above 1. BCA Specification E2.2a AS1670.1 compliant smoke detection and alarm system, 2. An automatic air pressurization system within the fire isolated stairs is to comply with AS/NZS1668.1. 3. Any air handling equipment is to shutdown upon activation of the fire services in the building (other than miscellaneous systems) 4. system monitoring to be provided to AS 1670.3-2004	Compliant designs are to be provided from the relevant services. All designs are to be certified as being in accordance with BCA cl E2.2, BCA Specification E2.2a, AS1670.1, and AS/NZS1668.1. Refer to fire engineering report from Exova Warringtonfire report 2706000-PRT02-2 dated 29 August 2012 for the assessment to delete the stair pressurization system from the fire isolated stairs

3.4.3 – Lift Installations (Part E3, BCA)

Clause	Item	Comment
E3.2	Stretcher facility in lifts At least one (1) lift which serves all storeys is to be of sufficient dimension to accommodate the passage of a raised stretcher with a patient lying on it horizontally be proving a clear space 600mm wide x 2000mm long x 1400mm high.	Any design is to accommodate for the provision of the required lift car dimensions. The proposed lift is to be an emergency lift.

E3.3	<u>Warning against the use of the lift</u> Adjacent to the call buttons of all passenger and goods lifts signage 10mm high stating 'DO NOT USE LIFTS IF THERE IS A FIRE' is to be provided.	All detail drawings or specifications are to ensure compliance in this regard.
E3.4	<u>Emergency lift</u> Buildings over 25m in effective height and class 9a with patient care areas not provided with direct egress to a road or open space are to have emergency lifts In class 9a the lift to have minimum dimensions as per table E3.4 and be connected to a standby power system where such a system is provided to the building	All detail drawings or specifications are to ensure compliance in this regard, the proposed lift is to be an emergency lift
E3.6	<u>Facilities for people with disabilities</u> Every passenger lift is to be provided with handrails, minimum internal floor dimensions, clear door opening dimensions and car control buttons in accordance with AS1735.12 and be fitted with a series of sensory devices per clause E3.6 of the BCA.	Compliant designs are to be provided from the relevant services consultant. All designs are to be certified as being in accordance with BCA cl E3.6, cl E3.7, AS1735.1/2 and AS1735.12.
E3.7	<u>Fire Service Controls</u> All passenger lifts designed in accordance with AS1735 Part 1 or 2 are to be fitted with fire service controls (as building>12.0m in effective height).	Compliant designs are to be provided from the relevant services consultant – No designs have been made available to date. All designs are to be certified as being in accordance with BCA cl E3.6, cl E3.7, AS1735.1/2 and AS1735.12 as an emergency lift (building under 12m effective height)

3.4.4 – Emergency Lighting, Exit Signs and Warning Systems (Part E4, BCA)

Clause	Item	Comment
E4.2, E4.3 & E4.4	<u>Emergency Lighting</u> An AS 2293.1 – 2005 compliant system of emergency lighting is to be provided through the building.	Compliant designs are to be provided from the relevant services. All designs are to be certified as being in accordance with BCA clauses E4.2, E4.3 & E4.4 and AS 2293.1-2005.
E4.5, E4.6 & E4.8	<u>Exit Signage</u> An AS 2293.1 – 2005 compliant system of illuminated exit signage is to be provided through the building.	Compliant designs are to be provided from the relevant services. All designs are to be certified as being in accordance with BCA clauses E4.5, E4.6 & E4.8 and AS 2293.1 – 2005.

E4.9	Sound systems and intercom systems for emergency purposes in a Class 9a building having a floor area of more than 1000 m^2 or a rise in storeys of more than 2, and the system— (i) must be arranged to provide a warning for occupants; and (ii) in a ward area, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of patients	An SSISEP is to be provided throughout the floor compliant with AS 1670.4-2004

3.5 – Health and Amenity (Section F, BCA)

3.5.1 – Damp and Weatherproofing (Part F1, BCA)

Clause	Item	Comment
F1.1	Stormwater All storm water will be disposed of in accordance with AS3500.3	Compliant designs are to be provided from the relevant services consultant. All designs are to be certified as being in accordance with AS3500.3 – 2003.
F1.5	Roof Coverings All metal roofing is to comply with AS1562.1	All detail drawings or specifications are to ensure compliance in this regard.
F1.6	Sarking Any sarking is to comply with AS/NZS 4200 Parts 1 & 2 – 1994	All detail drawings or specifications are to ensure compliance in this regard.
F1.7	Waterproofing of wet areas in buildings. All bathroom and sanitary compartments are to be water resistant and waterproof in accordance with AS3740 as though they were in a residential building.	Design specifications are to include the need for water proofing to be carried out in accordance with AS3740 – 2004
F1.8 & F1.9	Dampproofing The building is to be provided with damp proofing in accordance with AS2870, AS2904, etc.	All designs are to be certified as being provided with a system of damp proofing in accordance with AS2870 – 1996, AS 2904 – 1995, etc
F1.13	Glazed Assemblies All glass to the building is to comply with AS2047 and AS1288.	Design specifications are to include the need for all glazing systems to be constructed, glazed and fitted in accordance with AS1288 – 2006 and AS2047 – 1999.

3.5.2 – Sanitary Facilities (Part F2, BCA)

Clause	Item	Comment
F2.2	Calculation of occupants The number of occupants used for the determination of the number of sanitary facilities required to the building has been determined in accordance with table D1.13 of the BCA.	Note population numbers nominated earlier in the report.
F2.3	Facilities in class 3 to 9 buildings This clause offers the required ratios of sanitary facilities required to a building depending upon the respective populations	For a class 9a building the following is required: - a kitchen or place for re-heating of food, including a sink and wash basin - laundry facilities or space for the hold of clean and soiled linen and clothing - 1 shower for each 8 patients - an island type plunge bath to each storey containing ward areas - facilities for employees, the number of employees is to be advised by the facility operator
F2.4	Facilities for People Disabilities The BCA requires 1 disabled facility for up to 100 WCs and urinals (added together).	One (1) facility has been provided to the floor. It is noted the entire area is considered a ward area therefore an accessible facility is not required All designs are to be in accordance with AS1428.1 – 2009
F2.5	Construction of sanitary compartments Any fully enclosed sanitary facility, where an inward swinging door is less than 1.2m from the WC pan, the door leaf is to be provided with lift off hinges that facilitate the removal of the door from outside the enclosure.	All detail drawings or specifications are to ensure compliance in this regard.

3.5.3 – Room Sizes (Part F3, BCA)

Clause	Item	Comment
F3.1	<u>Heights of rooms and other spaces</u> All areas of the building are required to have a minimum ceiling height of 2.4m including corridors except for the sanitary facilities which are permitted to be 2.1m in height.	Details are to achieve compliance.

3.5.4 – Light and Ventilation (Part F4, BCA)

Clause	Item	Comment
F4.1	<u>Provision of natural light</u> Natural lighting must be provided in: • Class 2 and Class 4 parts of buildings to all habitable rooms. • Class 3 buildings to all bedrooms and dormitories. • Class 9a & 9c buildings to all rooms used for sleeping purposes. • Class 9b buildings to all general purpose classrooms in primary and secondary schools and playrooms or the like in early childhood centres.	Natural lighting appears compliant to habitable rooms of residential areas. Bathrooms are to be provided with artificial lighting as per F4.4.
F4.2	<u>Methods and extent of natural lighting</u> Natural lighting must be provided by windows with an aggregate light transmitting area of not less than 10% of the floor area of the room and are open to the sky or open verandah etc. For Class 2,3 9 (excluding 9c) of Class 4 parts: If facing the boundary of an adjoining allotment or another building on the allotment windows are to be a horizontal distance of not less than 1m away or 50% of the square root of the exterior height of the wall (which contains the window) measured in metres from the sill whichever is the greater.	Design appears to comply, however window schedules are to be provided to confirm compliance
F4.4	<u>Artificial Lighting</u> The building is required to be provided with artificial lighting in accordance with AS1680.0 - 1998	Compliant designs are to be provided from the relevant services consultant. All designs are to be certified as being compliant with AS1680.0-1998.

F4.5	Ventilation of rooms The building is required to be provided in mechanical ventilation is accordance with AS1668.2 or natural ventilation complying with Part F4.6.	Compliant designs are to be provided from the relevant services consultant. All designs are to be certified as being compliant with AS1668.2 - 1991.
F4.6	Natural ventilation Ventilation to be by permanent openings, windows, doors or other openable devices with an aggregate opening size of minimum 5% of the floor area of the room to be ventilated.	All detail drawings or specifications are to ensure compliance in this regard. If not otherwise providing mechanical ventilation as per F4.5.
F4.8 & F4.9	Restriction on position of water closets and urinals A room containing a WC or urinal must not open directly into a workplace occupied by more than one person without the provision of an airlock or mechanical exhaust and a wall screening the door accessing the space.	Design appears to comply
F4.11	Car parks Car parks are to be provided with a system of ventilation complying with AS1668.2.	Parking is not proposed as part of these works

3.5.5 – Sound Transmission and Insulation (Part F5, BCA)

Clause	Item	Comment
F5.2	Determination of airborne sound insulation ratings A form of construction required to have airborne sound insulation rating must have the required weighted sound reduction index (Rw) or weighted sound reduction index with spectrum adaptation term (Rx + Ctr) determined in accordance with AS/NZS 1276.1 or ISO 717.1 or comply with BCA Spec F5.2	Not applicable to class 9a buildings or parts
F5.3	Determination of impact sound insulation ratings A floor in building required to have an impact sound insulation rating must have a impact sound pressure level (Ln,w + Cl) determined in accordance with AS/ISO 717.2 or comply with BCA Spec F5.2. A wall in a building required to have an impact sound insulation ratings must for Class 2 & 3 building be discontinuous construction. Discontinuous construction being a wall of two separate leaves with 20mm cavity between.	Not applicable to class 9a buildings or parts

F5.4	Sound insulation of floors A floor in a class 2 or 3 building must have an Rw + Ctr (airborne) of not less than 50 and an Ln,w + Cl (impact) of not less than 62 if it separates (i) Sole-occupancy units: or (ii) a sole-occupancy from a plant room, lift shaft, stairway, public corridor/lobby or parts of a different classification.	Not applicable to class 9a buildings or parts
F5.5	Sound insulation rating of walls A wall in a class 2 or 3 building must: (I) Have an Rw + Ctr (airborne) not less than 50 if it separates sole-occupancy units (SOU). (II) Have an Rw (airborne) not less than 50 between sole-occupancy units from plant rooms, lift shafts, stairways, public corridors or parts of a different class. (III) Have impact sound insulation as per F5.3 if it separates a bathroom, sanitary compartment, laundry or kitchen in one SOU from a habitable room (other than a kitchen) in an adjoining SOU, or between a SOU and a plant room or lift shaft.	Not applicable to class 9a buildings or parts

3.6 – Ancillary Provisions (Section G, BCA)

Clause	Item	Comment
NSW G1.101	Provision for the cleaning of windows A building must be provided with a system of cleaning windows located 3 or more storeys above ground level by a system provided in accordance with the Occupation Health and Safety Act 2000 or by having the design facilitate the cleaning of the windows from wholly within the building.	Compliant designs are to be provided from the relevant services. All designs are to be certified as being compliant with the relevant provisions of the Occupational Health and Safety Act 2000 and standards.

3.7 – Special Use Buildings (Section H, BCA)

These provisions are not applicable to the subject building

3.8 – Maintenance (Section I, BCA)

These provisions are not applicable to the subject building, the obligation to maintain safety measures is imposed under the Environmental Planning and Assessment Regulations 2000.

3.9 – Energy Efficiency (Section J, BCA)

3.9.1 – Building Fabric (Part J1, BCA)

Clause	Item	Comment
J1.1	Application of Part	This part is applicable to class 9a
J1.2	Thermal Construction General General requirements for the installation of insulation to maintain R values	To be noted
J1.3	Roof and Ceiling Construction Minimum R values to envelope construction	Minimum R3.2 (down) for roof/ceiling construction is to be achieved
J1.4	Roof Lights Minimum efficiency requirements for glazed roof lights	Not applicable, no roof lights indicated
J1.5	Walls Minimum R values to envelope construction	Minimum R2.8 for wall construction to be achieved (or where reduced due to orientation)
J1.6	Floors Minimum R values to envelope construction	Minimum R1.0 to the suspended floor provided the sub floor is enclosed and ventilated at not more than 1.5 air changes per hour, where unclosed minimum R2.0 to be achieved

3.9.2 – Glazing (Part J2, BCA)

Clause	Item	Comment
J2.1	Application of Part	This part is applicable to class 9a
J2.4	Glazing Minimum requirement for glazing forming the envelope to conditioned space	Glazing calculator provided by the ABCB to be used to determine minimum efficiency requirements for SHGC and U Values for glazing
J2.5	Shading Minimum requirements for shading elements where required under clause J2.4	To be noted where shading is relied upon

3.9.3 – Building Sealing (Part J3, BCA)

Clause	Item	Comment
J3.1	Application of Part	This part is applicable to class 9a
J3.2	Chimneys & flues Dampers to be provided to chimneys/flues serving open fire places	Not applicable
J3.3	Roof Lights Roof lights to habitable rooms in climate zones 4-8 or conditioned spaces to be able to be sealed	Not applicable
J3.4	External Windows and Doors Doors and windows are to be suitably sealed to prevent air leakage	To be noted, windows constructed to comply with AS 2047 are deemed compliant. external doors to have draft stops to bottom and including seals to all sides
J3.5	Exhaust Fans Miscellaneous exhaust fans are to have self closing dampers	To be noted for all minor exhaust systems serving ensuites, toilets and kitchen areas
J3.6	Construction of Roofs, Walls and Floors Construction of internal parts to minimise air leakage with tight fitting junctions, skirting boards, architraves and cornices	To be noted in general
J3.7	Evaporative coolers Dampers are to be provided where serving a heated space or habitable room/public space in climate zones 4-8	Not applicable

3.9.4 – Air Conditioning and Ventilation Systems (Part J5, BCA)

Clause	Item	Comment
J5.0	Deemed-to-Satisfy Provisions	This part is applicable to class 9a
J5.2	Air-conditioning and Ventilation Systems Efficiency controls including limitations to fan power, outdoor air economy cycles and exhaust operations	Compliance to be certified by the relevant mechanical consultant as to compliance

J5.3	<u>Time Switch</u> A time switch in accordance with Specification J6 must be provided to control each of the following: (i) An *air-conditioning* system of more than 10 kWr. (ii) A ventilation system with an air flow rate of more than 1000 L/s. (iii) A heating system of more than 10 $kW_{heating}$.	Compliance to be certified by the relevant mechanical consultant as to compliance
J5.4	<u>Heating and Cooling Systems</u> Maximum pump power for water circulating systems and limitations on heating system energy sources	Compliance to be certified by the relevant mechanical consultant as to compliance
J3.5	<u>Miscellaneous exhaust systems</u> A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand such as a stove in a commercial kitchen or a chemical bath in a factory, must— (i) have the means for the operator to— (A) reduce the energy used, such as by a variable speed fan, and (B) stop the motor when the system is not needed; and (ii) be designed to minimise the exhausting of conditioned air.	Not applicable

3.9.5 – Artificial Lighting and Power (Part J6, BCA)

Clause	**Item**	**Comment**
J6.1	<u>Application of part</u>	This part is applicable to class 9a
J6.2	<u>Artificial lighting</u> Maximum illumination power densities	In general lighting to ward areas to be $7W/m^2$ and examination areas $10W/m^2$ office areas to be maximum $9W/m^2$. Certification from the relevant consultant to be provided to confirm compliance
J6.3	<u>Interior artificial lighting and power control</u> Maximum area of lighting controlled by a single switch and requirement to be able to see the room controlled by a switch	Certification from the relevant consultant to be provided to confirm compliance
J6.4	<u>Interior decorative and display lighting</u> Lighting to be controlled by time switch where exceeding 1kW or otherwise separately controlled from other lighting	Not applicable

J6.5	Artificial lighting around the perimeter of a building External perimeter lighting to be controlled by a daylight sensor or time switch and where exceeding 100W have a light source efficacy of not less than 60 Lumens/W or controlled by motion sensor	Certification from the relevant consultant to be provided to confirm compliance
J6.6	Boiling water & chilled water systems Time switch required for boiling/chilling water systems (including instant hot water units in kitchen areas etc)	Certification from the relevant consultant to be provided to confirm compliance

3.9.6 – Hot Water Supply and Swimming Pool and Spa Pool Plant (Part J7, BCA)

Clause	Item	Comment
J7.0	Deemed-to-Satisfy provisions	This part is applicable to class 9a
J7.2	Hot water supply A hot water supply system for food preparation and sanitary purposes, other than a solar hot water supply system in climate zones 1, 2 and 3, must be designed and installed in accordance with Section 8 of AS/NZS 3500.4.	Insulation to be provided to the inlet and outlet lines as detailed to the standard, confirmation by way of certification from the relevant hydraulic consultant to be provide to ensure compliance
J7.3	Swimming pool heating and pumping Acceptable energy sources for pool heating including heat pump, where a heat pump is used a cover must be provide to the pool	Not applicable
J7.4	Spa pool heating and pumping Acceptable energy sources for pool heating including heat pump, where a heat pump is used a cover must be provide to the pool	Not applicable

3.9.7 – Access for Maintenance and Facilities for Monitoring (Part J8, BCA)

Clause	Item	Comment
J8.0	Deemed-to-satisfy provisions	This part is applicable to class 9a
J8.1	Application of part	This part is applicable to class 9a
J8.2	Access for maintenance Access to be provided to shading devices, time switches, motion sensors, thermostats, motorised dampers etc	To be detailed where applicable

J8.3	Facilities for energy monitoring (a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m^2 must have the facility to record the consumption of gas and electricity. (b) A building with a *floor area* of more than 2,500 m^2 must have the facility to record individually the energy consumption of— (i) *air-conditioning* plant including, where appropriate, heating plant, cooling plant and air handling fans; and (ii) artificial lighting; and (iii) appliance power; and (iv) central hot water supply; and (v) internal transport devices including lifts, escalators and travelators where there is more than one serving the building; and (vi) other ancillary plant.	To be certified by the relevant electrical consultant to confirm compliance

17.01 Disability Discrimination Act.

The project will comply with the reqirements of the Disability Discrimination Act.

17.02 OH&S

The project will comply with the relevant reqirements of The Occupational Health and Safety Act.

17.03 Fire Engineering Report

Refer Section 13.

17.04 Town Planning

17.05 Authorities Pre-Lodgement Advice

eurobodalla shire council

Our Ref: 82.6608.D

23 August 2012

Frank Desensi
NSW Public Works
Frank.desensi@services.nsw.gov.au

Dear Mr Desensi

Proposed hospital addition (sub-acute unit) at
Moruya Hospital, Lot 47 DP 758710 River Street Moruya

Applicant:	Frank Desensi – Project Manager NSW Public Works Michael Brooks – NSW Health Infrastructure Matthew Williams – Woods Bagot Jane Fielding – Architectus
Staff:	Brett Corven – Divisional Manager Water and Sewer Lauren Barnett - Acting Divisional Manager Development Services Geoff Armstrong – Traffic Officer Aaron Dunne – Development Engineer
Property:	Lot 47 DP 758710, River Street Moruya
Bushfire Prone Land:	No
Size of Property:	2.24Ha
LEP2012 Zone:	R3 – Medium Density Residential
Existing Use:	Hospital
Proposed Development:	Addition of sub-acute unit to existing hospital
Relevant DCP:	Residential Zones

I refer to our meeting on 7 August 2012 regarding proposed additions to Moruya Hospital. The following advice is provided as a summary of our discussion:

Land Use, Legislation & Planning Policy
The land is zoned R3 – Medium Density and the proposed use is permissible in the zone.

89 vulcan street moruya
po box 99 moruya nsw 2537
t 02 4474 1000 | f 02 4474 1234
council@eurocoast.nsw.gov.au | www.esc.nsw.gov.au

The development will be assessed in accordance with DCP Residential Zones. Many of the controls are performance based, and the Statement of Environmental Effects accompanying the application will need to make claims against the relevant development standards and objectives. The table of contents at the front of the DCP can be used as a guide for issues that need to be addressed in the application.

Early Stages

It is noted that early stages of this proposal will be undertaken under the provisions of the Infrastructure SEPP and therefore will not form part of the Development Application. The proposed early works include: demolition, carparking, relocation of LPG and existing shed.

Development Standards

The concept proposes a variation to the maximum permitted height in the Eurobodalla Local Environmental Plan 2012 (ELEP2012). The Development Application will need to make a claim to justify the contravention of the Development Standards in accordance with Clause 4.6 'exceptions to development standards' in the ELEP 2012. Council is required to refer the application to the Director-General for concurrence prior to granting any consent.

Flood & Sea Level Rise

The proposed additions are located on flood affected land. Emergency service facilities are required to design to the Probable Maximum Flood (PMF) level as outlined in the recently adopted Council's Moruya Floodplain Code 2012 (Refer to Section 2.0). It is noted the emergency services functions within the hospital are located on the first floor well above the PMF level. It is also noted that the first floor level is set to maintain direct connectivity with the existing hospital infrastructure.

The ground floor will house ancillary medical services including day rooms, which is proposed to be below the PMF level, but above the 1 in 100 year flood level, including freeboard. It is noted that the building footprint will intrude into the floodplain planning area, however no filling will occur within the flood area (i.e. below the 1 in 100 year flood planning level), with the building to be built on piers. As the structure is within the flood area the building must be designed to cater for the flood loads. Council's Moruya Floodplain Code 2012 was prepared in accordance with the principles and strategies of the DIPNR Flood Development Manual (FDM) 2005 relating to the management of flood liable land in accordance with Section 733 of the Local Government Act 1993. Consistent with the FDM, restrictions on critical emergency response and recovery facilities and infrastructure are included in the Code. These aim to ensure that these facilities and the infrastructure can fulfil their emergency response and recovery functions during and after a flood event. Examples include evacuation centres and routes, hospitals and major utility facilities.

As the ground floor level is below the PMF, the proposal will need to be assessed by the applicant having regard to the objectives of the Moruya Floodplain Code. The applicant should include information that demonstrates that these facilities and the infrastructure can fulfil their emergency response and recovery functions or demonstrate that the facilities below the PMF are not applicable to these functions. The applicant should refer to the risk management framework in accordance with the NSW Flood Development Manual 2005, including an emergency management plan for the evacuation of the ground floor (people and property) in the event of a major flood. To ensure the emergency management operations of the first floor are maintained during the PMF, the applicant should also consider the structural design of the building is compliant with the PMF event.

Sewer, Water, Stormwater,

The sewer is currently located within the footprint of the proposed additions and will need to be relocated to accommodate the new works. Council's Infrastructure Department have provided separate advice regarding available options and these works may occur independent of any Development Application.

Concepts for stormwater management will be required to be submitted with the Development Application. The development may be integrated with NSW Fisheries for any in-stream works that may be required to return stormwater to the river.

Contributions

In order to meet the increased demand for services attributable to the development, Section 64 water and sewer headworks will apply. The rate of contribution can be determined by the assumed annual water consumption of the development. Where possible the assumed water consumption should be based on historic consumption of the existing or similar developments. Details of the assumed water consumption shall be submitted with the Development Application. In this regard, 1 equivalent tenement (ET) is equal to an assumed annual water consumption of 180,000 litres. The current contribution unit rate is specified on page 40 in Council's Fees and Charges 2012-2013.

Carparking & Access

Carparking demand should be calculated for the whole site noting that not all uses on the site are captured within the total bed count for the hospital. Table 1 in Council's Parking and Access Code should be used to calculate the demand for separate uses such as community services, physiotherapy, health consulting rooms and the dental clinic. The nose to kerb parking spaces on the north side of River Street are attributed to the hospital, however the parallel parking on the south side of River Street are excluded.

Please note, any road openings associated with the carpark constructed pursuant to the I-SEPP will require a Section 138 Road Permit. The Existing hospital has 3 driveways with the current proposal introducing a further 2. Council does not support the total number of driveways in the street frontage due to the potential conflict with parking and safety at the street frontage. This opportunity should be taken to rationalise the total openings.

The proposed carpark will be required to provide for pedestrian connectivity to the existing network.

The additional carparking numbers may require the provisions of an additional accessible space. Please note, from 1 May 2011 where building works or upgrades are required to the existing building, the building will need to comply with the Premises Standard as required by the Building Code of Australia.

Riparian:

The proposed additions are located within the Riparian Buffer of the Moruya River. As a major waterbody a buffer of 40m (measured from the top of bank) is required. Riparian buffers need to be retained as fully structured native vegetation. It is noted the existing hospital encroaches this buffer and except for the fringe of vegetation at the top of bank, the riparian zone is largely managed. The proposal will need to address clause 6.7 'Riparian Lands and Watercourses' in the ELEP 2012. The riparian clause is objective based and will be assessed on merits. Please ensure the watercourse, top of bank and relevant buffers are clearly identified on the site plan and site analysis.

Endangered Ecological Communities:

The riparian vegetation adjoining the river is potentially EEC. New development must be designed, located and managed to avoid impacts on EEC. Where an ECC is potentially present, accurate definition of boundaries is required to be determined with reference to Biometric procedures (Gibbons *et. al.* 2008), definitions and vegetation class benchmarks and Final Determinations of the NSW Scientific Committee. An assessment is required in accordance with Section 5A of the *Environmental Planning & Assessment Act* to assess the potential impacts of the development on the EEC.

Development Application Form & Checklist

A Development Application form is available for download from Council's website:
http://www.esc.nsw.gov.au/site/Publications/Brochures/BuildDev/development_application.pdf

The following checklist specifies all of the information that is required to be submitted with the application.
http://www.esc.nsw.gov.au/media/395900/Checklist_for_other_DAs.pdf
http://www.esc.nsw.gov.au/media/407186/preparing_plans_for_development_applications.pdf

Prior to lodgement please contact Council to confirm the details of the project, at which time we will formalise a fee estimate and provide you with a detailed breakdown.

Note: The above advice is given without prejudice to the final decision of Council and nothing in the advice should be interpreted to mean that consent will be given to the proposal.

If you require any further information please do not hesitate to contact me on (02)4474-1273.

Yours faithfully

L Barnett

Lauren Barnett
Acting Divisional Manager Development Services

architectus™

Wednesday, 25th July, 2012

Eurobodalla Shire Council
PO Box 99,
Moruya
NSW 2537

Architecture
Urban Design
Planning
Interior Architecture

RE: Pre-lodgement meeting for Moruya District Hospital Expansion

2-10 River Street, Moruya

To whom concerned

We write on behalf of NSW Health Infrastructure with respect to the pre-lodgement meeting for Moruya District Hospital Expansion. The pre-lodgement meeting is to be held at Eurobodalla Shire Council on Tuesday 31st July 2012. The Applicant for the project is NSW Health Infrastructure.

Below is an overview of the proposed development; planning approval pathway; proposed specialist studies; key planning controls; and departures from planning controls.

Architectus Sydney
Level 3 341 George Street
Sydney NSW 2000 Australia
T 61 2 8252 8400
F 61 2 8252 8600
sydney@architectus.com.au
www.architectus.com.au

Auckland
Brisbane
Melbourne
Shanghai
Sydney

Proposed Development

The proposed development comprises an addition to the main building of the existing Hospital to accommodate a new rehabilitation unit. The scope of work also includes internal upgrades to existing buildings, demolition works, relocation of oxygen and gas tanks, and landscaping.

The existing hospital complex contains 85 patient beds. The proposed expansion will add a further 20 patient beds to the rehabilitation building. The Capital Investment Value is approximately $8.5 Million.

Planning Approval Pathway and Staging

The building expansion will be a Crown Development Application lodged with Council and determined by the Joint Regional Planning Panel (Southern Region).

Separately, NSW Health Infrastructure will self-approve works to enable the project. These enabling Early Works will be undertaken through under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in accordance with Clause 58 of the *State Environmental Planning Policy (Infrastructure) 2007*, and include:

- New car parking and loading areas (permanent and temporary) – including to serve the proposed beds for the rehabilitation unit building;
- Internal refurbishment to part of existing main hospital building;
- Other temporary works to facilitate on-going operation of hospital while other construction works are carried out; and
- Landscaping.

Enclosed DA documentation

For the purposes of the pre-lodgement meeting we enclose the following documentation:

Architectus Group Pty Ltd
ABN 90 131 245 684

Managing Director:
David Sainsbery
Nominated Architect
NSWARB 5551
ARBV 13176

- Site survey; and
- Working architectural plans, sections and elevations.

Specialist Studies

The specialist reports / plans that will be prepared to inform and accompany the Crown Development Application for the project include:

- Statement of Environmental Effects;
- Architectural Plans – plans, elevations, sections, photomontages, materials and finishes schedule;
- Landscape Plan;
- Flood Impact Assessment;
- Civil works (engineering) plans;
- Contamination and Acid Sulfate Soils Statement;
- Geotechnical Report;
- Transport and Parking Study;
- Stormwater Concept Plan and Sediment and Erosion Control Plan;
- BCA Capability Report;
- Services and Utilities Statement;
- Arborist Report (if required);
- Acoustic Assessment;
- Waste Management Plan;
- Certificate of Cost;
- Accessibility Report; and
- Ecological / Riparian Assessment.

Key planning controls

The key planning controls pertaining to the site include:

<u>Draft Eurobodalla Local Environmental Plan 2011:</u>

- Zone R3 Medium Density Residential;
- Height limit: 8.5m above existing ground level;
- Flood planning;
- Acid Sulfate Soils (Class 1 and Class 2 – northern part of site);
- Category 1 watercourse – 40m (riparian land and waterways).

Note: we are aware that Eurobodalla Local Environmental Plan 2012 has been made and is waiting to be published on the NSW legislation website which will enable its commencement. Therefore we have not addressed the provisions of Eurobodalla Urban Local Environmental Plan 1999.

<u>Eurobodalla Parking Development Control Plan (DCP):</u>

Hospital:

- The number of spaces shall equal 60% of the total number of beds.

The proposed development under Part 5 of the EP&A Act will deliver the required number of parking spaces in relation to the 20 beds proposed

Note: It is anticipated once Eurobodalla Local Environmental Plan 2012 commences that an accompanying new comprehensive Development Control Plan will come into effect.

Departures from planning controls

The key proposed departures to planning controls relate to:

- o Exceedance of the maximum Building Height development standard under the draft *Eurobodalla Local Environmental Plan 2011*;
- o Encroachment of building into the 40 metres Riparian Zone of Moruya River from 'top of bank'. Clause 6.6 'Riparian Land and Waterways' of the Draft LEP applies.

<u>Building height</u>

The proposed maximum building height of the rehabilitation facility building expansion is 8.5 metres above existing ground level in accordance with *Draft Eurobodalla Local Environmental Plan 2011*. The building exceeds the building height development standard, as shown on the architectural elevations and sections.

The site is located within a residential zone and therefore it is subject to the same building height controls as nearby residential development that is currently of low density scale. Existing residential development is situated at a much higher elevation than the hospital, and the hospital site slopes down to the river. The implication of the site's topography for compliance with the building height control is that without stepping the building down the slope the building will exceed the building height control. It is important for the hospital to be situated all at one level, from an accessibility point of view and to allow for optimum functionality of the hospital (for functional relationships of services).

The hospital expansion is a regionally significant development with significant public benefit and therefore we believe the contravention of the development standard is reasonable and warranted in this instance.

Photomontages will be prepared to support the Development Application and an assessment of visual amenity impacts will be included in the SEE.

<u>Riparian Zone</u>

Clause 38 of the Water Management (General) Regulation 2011 provides exemptions for public authorities in seeking controlled activity approval on waterfront land in accordance with the *Water Management Act 2000*. This includes buildings, outlets and spillways.

Draft Eurobodalla Local Environmental Plan 2011 contains a clause (Clause 6.6 'Riparian Land and Waterways') relating to riparian areas and the area of works is located within the 40 metres wide riparian area from the 'top of bank' shown on the site survey. On this basis an Ecological Assessment report has been prepared to assess the impacts of the proposed development on the riparian area and flora and fauna generally that may inhabit the river corridor. Details from the assessment will be provided in the pre-lodgement meeting.

We look forward to meeting with you in person to discuss the project in more detail.

Yours sincerely,

Jane Fielding

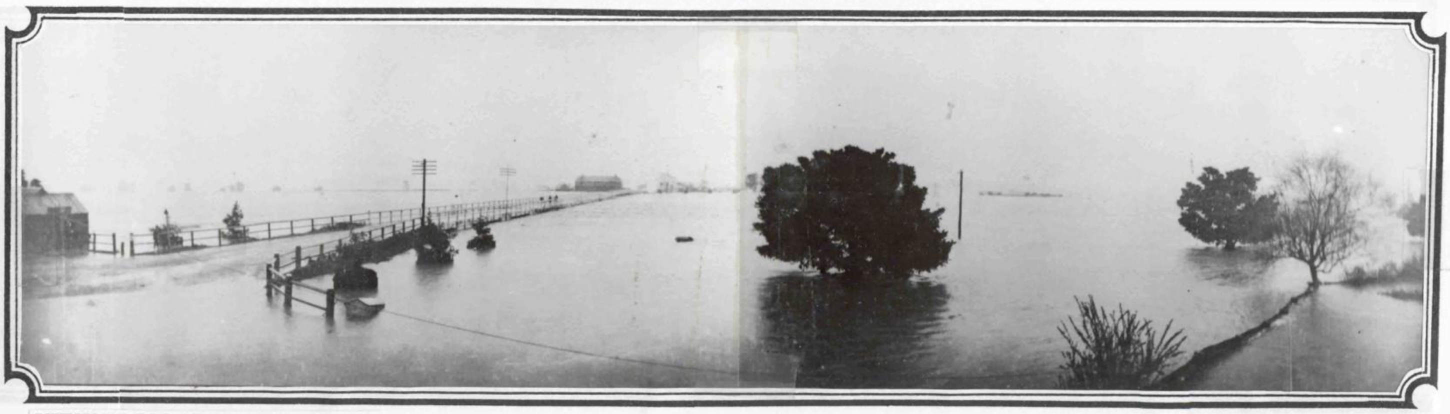
Jane Fielding
Senior Urban Planner

John Riordan
Associate Director,
Urban Design and Planning

WOODS BAGOT™

17.06 Authorities Flood Control Documents

MORUYA FLOODPLAIN CODE


VIEW FROM ADELAIDE HOTEL.
(NOTE : CRITERIAN HOTEL OVER BRIDGE)
1925 MORUYA FLOOD

DRAFT

(July 2012)

CONTENTS

1.0 MORUYA FLOODPLAIN CODE

This Development Code has been prepared in accordance with the principles of the *NSW Flood Prone Land Policy* and strategies contained in the *Moruya River Floodplain Management Plan (2004)* and the *State Floodplain Management Manual (2005)*. The primary objective of the NSW Flood Prone Land Policy is to reduce the potential loss of life from flooding, the impact of flooding and flood liability on individual owners and occupiers, and to reduce private and public losses resulting from flooding.

1.1 **Aim of Code**

The aim of this Code is to inform the community about Council's requirements in relation to the use and development of land potentially affected by floods.

Objectives

a) To give effect to the Moruya River Floodplain Management Plan 2004;
b) To support the Moruya Township Development Control Plan
c) To minimise the impact of flooding and flood liability on individual owners and occupiers;
d) To reduce private and public losses resulting from flooding;
e) To ensure every application for construction and development is given a consistent, equitable and merit based assessment that is compatible with the identified flood risk of the area;
f) To ensure that development does not adversely affect flood behaviour;
g) To recognise and consider the cumulative impact of development within the floodplain;
h) Reduce un-necessary risk to life, emergency services or unwarranted public cost;
i) To ensure that all development identified by this Development Code is complimented by the preparation of a flood evacuation plan.

1.2 **Where does this Code apply?**

This Code applies to all land identified in Figure 1 (*All Flood Liable Land – Moruya River Floodplain area*) attached to this Development Code.

This area includes all *flood liable land* up to and including the Probable Maximum Flood and some adjacent lands which become isolated during flooding of the Moruya River.

Note: the extent of Flood liable land has been identified through updated modelling prepared in 2011 to consider the NSW Sea Level Rise Policy Statement 2009.

1.3 Relation to Other documents

This Development Code should be read in conjunction with the Moruya Township Development Control Plan 2011 and any associated Codes applying to the land.

1.4 How to use this Code

Applicants must first determine if their property is flood liable land shown in Figure 1 (*All Flood Liable Land – Moruya River Floodplain area*) attached to this Development Code.

Where a flood hazard is identified the relevant development controls outlined in Table 1: Development Requirements must be applied.

1.5 Information to support Development Applications on Flood Liable Land

As a minimum and in addition to the standard DA requirements applicants need to provide the following information:

- The level of the 1% AEP flood event;
- The hydraulic category;
- The flood hazard category;
- A survey plan prepared by a registered surveyor showing the ground levels, floor level and location of any existing or proposed buildings;
- The relevant Flood Planning Level (floor heights);
- Consideration of cumulative impacts on the floodplain and surrounding developments.

You may need to employ a surveyor/engineer to determine these details if they are not available for your proposed development site. Council Staff will inform applicants if there is a requirement for additional information.

Depending on the site specific requirements, applicants may be required to engage a suitably qualified consultant to assess:

- The structural integrity and ability of the development to cope with the physical forces of flooding;
- That the development will not adversely affect flood behaviour or increase the flood hazard, flood level or flood damage to other properties;
- Impacts of any fill proposed to be used at the development site;
- Evidence of a flood evacuation plan.

It is recommended that all development proposals on flood liable land have a pre-lodgement meeting to identify and confirm any issues that will need to be addressed prior to lodging a development application.

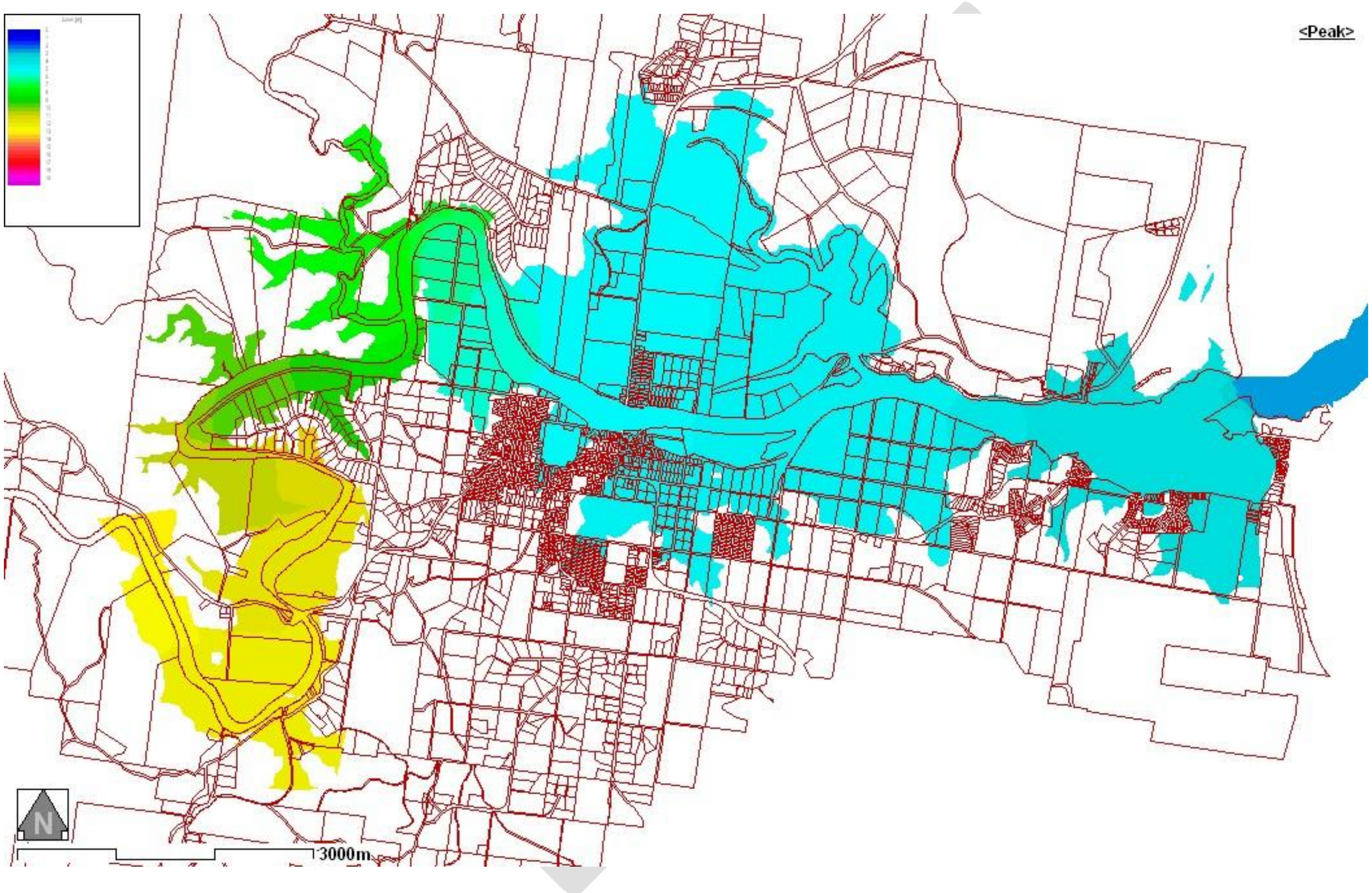
A pre-lodgement meeting can be arranged by contacting a Duty Development Officer on 4474 1231.

2.0 DEVELOPMENT REQUIREMENTS

	FLOOD HAZARD CATEGORIES - Rural Floodplain/Non – Rural flood plain			
TYPE OF DEVELOPMENT	**LOW**	**HIGH**	**VERY HIGH**	**EXTREME**
New Dwellings	Consider on Merits – common controls apply.	Consider on Merits - Low hazard conditions apply plus: report from a qualified consultant detailing impacts on flood behaviour	Inappropriate Development	
Replacement of existing lawful dwellings	Consider on Merits – common controls apply.	Consider on Merits - Low hazard conditions apply plus: report from a qualified consultant detailing impacts on flood behaviour.	Consider on merits - Replacement to original building footprint and resident capacity only. Building must be raised to 500mm above 1% AEP Must not be flood free land available elsewhere on property.	
Additions and renovations to lawful dwellings*	Consider on Merits – common controls apply.	Consider on Merits – conditions apply: Permitted providing no increase in resident capacity*		
Town Centre: as defined in Moruya Township DCP - residential accommodation	Inappropriate Development			
Town Centre: as defined in Moruya Township DCP - Tourist & visitor accommodation	Consider on Merits – common controls apply.	r on merits - Low hazard conditions apply plus: report from a qualified consultant detailing impacts on flood behaviour.	Inappropriate Development	
New Commercial Development	Consider on Merits – conditions apply: FPL 300mm above 5%AEP	Consider on Merits – Low hazard conditions apply plus: report from a qualified consultant detailing impacts on flood behaviour	Consider on Merits – Low hazard conditions apply plus: report from a qualified consultant detailing impacts on flood behaviour	Inappropriate Development
Farm Buildings	Consider on Merits – conditions apply	Consider on Merits – conditions apply	Consider on Merits – conditions apply: open storage sheds	Inappropriate Development
Greenfields Sub-Divisions	Consider on Merits – subject to adequate evacuation & consultant's report detailing impact on flood behaviour. Must have building envelope above 1% flood level.	Inappropriate Development		

<table>
<tr><td>Aged Care, places of public assembly and emergency management facilities below the PMF</td><td>Inappropriate Development</td></tr>
<tr><td>Development of heritage items where floor level is below the FPL</td><td>• Consider on merits
• Proponent to demonstrate the need to maintain heritage significance to avoid planning controls outlined in this Code; otherwise
• Conditions outlined in this Code will apply.</td></tr>
<tr><td>Other development requiring consent: e.g. access roads</td><td>Consider on Merits</td></tr>
<tr><td colspan="2">Common Controls Applying to ALL Developments:
1. All building materials (including flooring) below the FPL must be flood compatible (refer to Appendix 1)
2. New buildings will not have any adverse or cumulative impact on flood behaviour
3. All residential development must have a FPL of 500mm above 1% AEP
4. All commercial development must have a FPL 300mm above 5%AEP
5. A survey plan prepared by a registered surveyor showing the ground levels, floor level and location of any existing or proposed buildings
6. A certificate from a registered surveyor is required certifying that floor heights are at the required FPL. This certificate must be produced prior to proceeding beyond construction of the floor level. No building may continue beyond this stage until Council has received this certification.
7. Buildings must be designed to withstand the impacts of flood waters and associated debris concurrent with the flood hazard identified at the proposed development site. A report or building design from a qualified structural engineer demonstrating the ability of the building to cope with a 1% AEP flood event must accompany each application.
8. All developments will demonstrate that adequate flood evacuation procedures are in place.</td></tr>
<tr><td colspan="2">Notes: FPL = Flood Planning Level</td></tr>
<tr><td>* Additions and renovations</td><td>Approved additions and renovations must not increase the resident capacity of the building. The following additions and renovations will not be permitted:
• Bedrooms
• Additional bathrooms (other than ensuites) and kitchens
• Increase to original gross floor area over $30m^2$
• Re-cladding other than with original materials or equivalent or a more flood compatible material.</td></tr>
<tr><td>Merit Based Assessment</td><td>• A merit based assessment does not guarantee approval
• All development must comply with the Local Environmental Plan current at the time</td></tr>
</table>

Map 1: Flood Liable Land



3.0 DEFINITIONS

3.1 Flood Standard

A Flood Standard is a bench mark flood event that Council uses for planning purposes. Council has adopted the following flood standards for the Moruya town ship:

- 1% Annual Exceedance Probability (AEP) flood event - The 1% Annual Exceedance Probability (AEP) is sometimes referred to as a 1 in 100 year flood. However, it is more accurately described as a percentage meaning that there is a 1% chance of a flood of that size occurring in any one year.; and
- 5% AEP flood event – a flood event that has a 5% chance of occurring in any one year, or sometimes referred to as the 1 in 20 year flood; and
- Probable Maximum Flood (PMF) - the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation coupled with the worst flood producing catchment conditions.

3.2 Application of Flood Planning Level

3.2.1 Residential Developments

The 1% AEP is the Flood Planning Level for the purposes of assessing residential development in New South Wales. A 500mm freeboard will apply to all residential properties within the flood planning area.

In accordance with Direction Number 15 – Flood Prone Land; issued under Section 117 of the *Environmental Planning & Assessment Act 1979*, flood related development controls will not be applied to residential developments above the 1%Flood Planning Level.

3.2.2 Commercial Developments

The Flood Planning Level for commercial properties will be set at the 5% AEP Flood Planning Levels. A 300mm freeboard will apply to all commercial properties within the flood planning area

3.2.3 Vulnerable Developments

In accordance with the *Guideline on Development Controls on Low Flood Risk Areas – Floodplain Development Manual,* restrictions on the types of developments above the FPL and up to the PMF will apply. These restrictions will apply to vulnerable developments such as: aged care facilities; hospitals; emergency evacuation services, centres and routes; and utility facilities.

3.3 Hydraulic Categories

In line with the NSW State Government *Floodplain Development Manual 2005'* this code will apply three hydraulic categories:

- *Floodway* - where the flood is conveying significant velocity and flow volumes;
- *Flood storage* - area where there is temporary storage of flood waters. (These areas could be subject to high velocity and flows during initial capture and release);
- *Flood fringe* - remaining areas of flood affected land. (These areas could be subject to varying boundary definition subject to differing flood events).

3.4 Hazard category

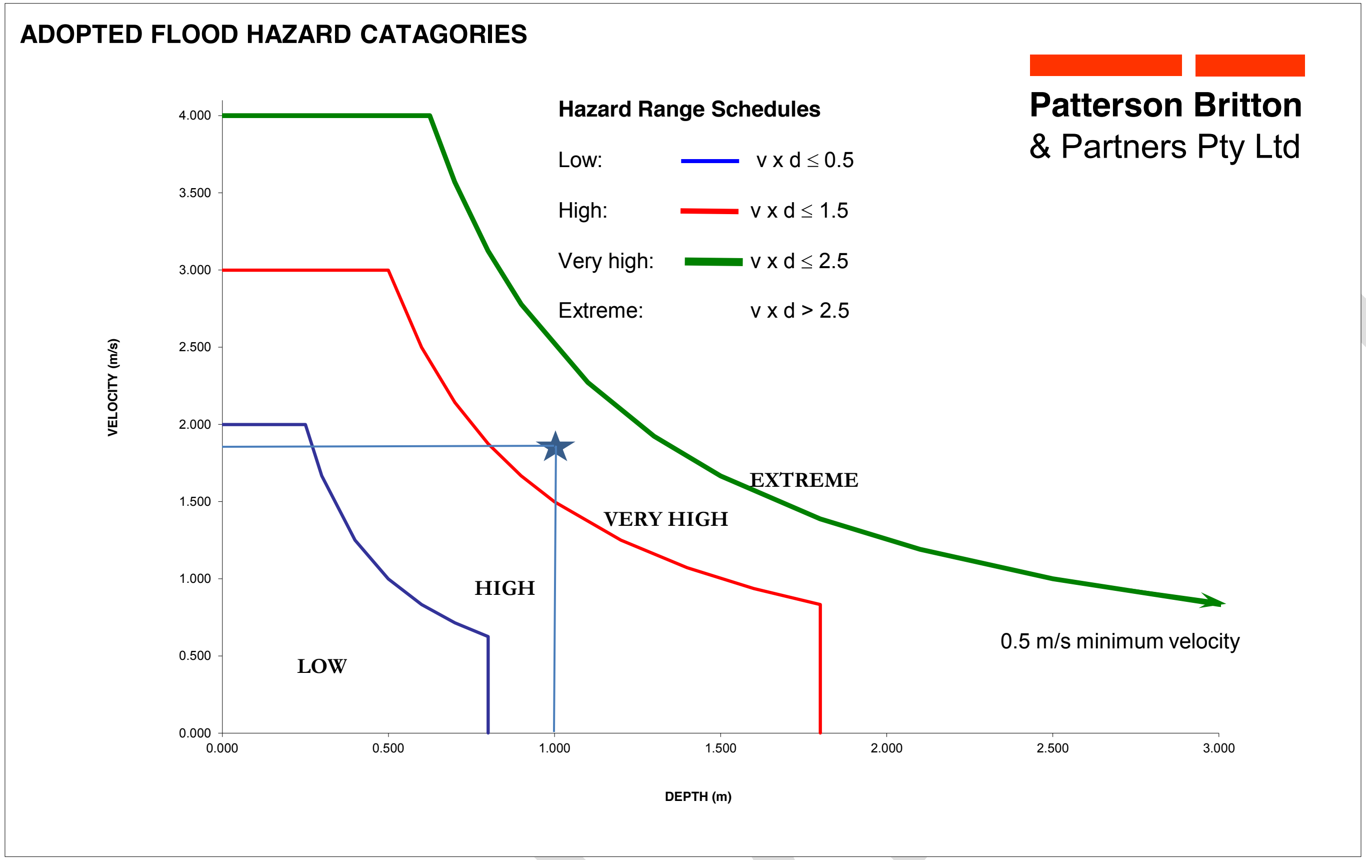
The hazard associated with a particular flood event is a function of the depth and velocity of floodwater. The Flood Hazard is used as an indicator of risk associated with potential land use and includes the implications for evacuation.

The *NSW Floodplain Development Manual (2005)* recommends the adoption of two hazard categories: High and Low. Council has adopted an additional two flood hazards categories for the Moruya floodplain in line with recommendations from the Moruya River Floodplain Management Study: Very High and Extreme.

Council considers the following four hazard categories for planning purposes on the Moruya River Floodplain:

- Extreme
- Very High
- High
- Low.

Figure 1: Adopted Flood Hazard Categories for Moruya River Floodplain



Note: *‘v’ = velocity, ‘d’ = depth, ‘<’ = less than, ‘>’ = greater than, ‘≤’ = less than or equal to, ‘≥’ = greater than or equal to, ‘v’ x ‘d’ = velocity multiplied by depth.*

Example: If you have a velocity (v) of 1.8m/s and a depth (d) of 1m you would calculate your hazard as follows:

H = v x d
H = 1.8 x 1
H = 1.8
H = Very High

Table 1: Hazard Description

Hazard Category	Hazard Description
Extreme	Water depths and flow velocities render any form of egress through the flood path extremely hazardous. Conventional structures, mobile homes, caravans can become buoyant and contribute to flood debris.
Very High	Possible danger to personal safety on entering flow path. Evacuation only possible by watercraft. Conventional structures would suffer structural damage.
High	Possible danger to personal safety. Evacuation by any vehicle could be suspect. Able bodied adults would experience difficulty in wading to safety. Potential for significant structural damage to buildings.
Low	Should it be necessary, people and their possessions could be evacuated by higher axle vehicles. Able bodied adults would have little difficulty wading to higher ground.

APPENDIX A – FLOOD COMPATIBLE MATERIALS

TABLE 2 – Flood Compatible Materials

Building Component	Flood Compatible Material
Flooring and Subfloor Structure	• concrete slab-on-ground monolith construction • suspension reinforced concrete slab • marine ply on hardwood bearers • marine ply on H5 treated pine bearers in fresh water reaches of river • marine ply on H6 treated pine bearers in salt water reaches of river • all bearers on brick peers.
Doors	• solid panel with waterproof adhesives • flush door with marine ply filled with closed cell foam • painted metal construction • aluminium or galvanised steel frame
Floor Covering	• clay tiles • concrete, precast or in situ • concrete tiles • epoxy, formed-in-place • mastic flooring, formed in-place • rubber sheets or tiles with chemical-set adhesives • silicone floors formed-in place • vinyl sheets or tiles with chemical-set adhesive • ceramic tiles, fixed with mortar or chemical-set adhesive • asphalt tiles, fixed with water resistant adhesive
Wall & Ceiling Linings	• fibro-cement board • brick, face or glazed • clay tile glazed in waterproof mortar • concrete • concrete block • steel with waterproof applications • stone, natural solid or veneer, waterproof grout • glass blocks • glass • plastic sheeting or wall with waterproof adhesive
Wall Structure	• solid brickwork, block work, reinforced concrete or mass concrete
Insulation	• foam (closed cell types)

Windows	• aluminium frame with stainless steel rollers or similar corrosion and water resistant material.
Roofing Structure (for situations where the relevant flood level is above the ceiling)	• reinforced concrete construction • galvanised metal construction
Nails, Bolts , Hinges and Fittings	• brass, nylon or stainless steel • removable pin hinges • hot dipped galvanised steel wire nails or similar
Electrical and Mechanical Equipment	For dwellings constructed on land to which this Policy applies, the electrical and mechanical materials, equipment and installation should conform to the following requirements.
Heating & Air Conditioning Systems	Heating and air conditioning systems should, to the maximum extent possible, be installed in areas and spaces of the house above the relevant flood level. When this is not feasible every precaution should be taken to minimise the damage caused by submersion according to the following guidelines.
Fuel	Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off.
Installation	The heating equipment and fuel storage tanks should be mounted on and securely anchored to a foundation pad of sufficient mass to overcome buoyancy and prevent movement that could damage the fuel supply line. All storage tanks should be vented to an elevation of 600 millimetres above the relevant flood level.
Wiring	All wiring, power outlets, switches, etc., should, to the maximum extent possible, be located above the relevant flood level. All electrical wiring installed below the relevant flood level should be suitable for continuous submergence in water and should contain no fibrous components. Earth core linkage systems (or safety switches) are to be installed. Only submersible-type splices should be used below the relevant flood level. All conduits located below the relevant designated flood level should be so installed that they will be self-draining if subjected to flooding.
Ducting	All ductwork located below the relevant flood level should be provided with openings for drainage and cleaning. Self-draining may be achieved by constructing the ductwork on a suitable grade. Where duct work must pass through a watertight wall or floor below the relevant flood level, the ductwork should be protected by a closure assembly operated from above relevant flood level.
Equipment	All equipment installed below or partially below the relevant flood level should be capable of disconnection by a single plug and socket assembly.
Main Power Supply	Subject to the approval of the relevant authority the incoming main commercial power service equipment, including all metering equipment, shall be located above the relevant flood level.

	Means shall be available to easily disconnect the dwelling from the main power supply.
Reconnection	Should any electrical device and/or part of the wiring be flooded it should be thoroughly cleaned or replaced and checked by an approved electrical contractor before reconnection.

APPENDIX B – GLOSSARY OF TERMS

Annual Exceedance Probability (AEP) – the probability of a given flood height being equalled or exceeded in any one year. For example, a 1% AEP flood has a 1% probability or a 1 in 100 chance of occurring or being exceeded in any given year.

Australian Height Datum (AHD) – a common national plane of level corresponding approximately to mean sea level, (the mean between average low and high tides).

Communal Flood Refuge – a flood free area capable of providing communal flood refuge facilities, shelter and emergency assistance for occupants of surrounding flood bound areas. The refuge should be capable of being practically provided with basic needs such as food and clothing from outside the flood affected area.

Development Control Plan– refers to the Eurobodalla Development Control Plan

Development Code - when referred to in this document means the Moruya Floodplain Code.

Extreme Hazard – a situation where water depths and flow velocities render any form of egress through the flood-path extremely hazardous; conventional structures, mobile homes, caravans could become buoyant and contribute to flood debris.

Flood - relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage (refer Section C6 – NSW Floodplain Development Manual 2005) before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.

Flood Liable Land - is synonymous with flood prone land (ie) land susceptible to flooding by the PMF event. Note that the term flood liable land covers the whole floodplain, not just that part below the Flood Planning Level (see flood planning area).

Flood Planning Area - the area of land below the Flood Planning Level and thus subject to flood related development controls.

Flood Behaviour – refers to the characteristics of flooding at a particular location and includes the level of flooding, flood flow velocity and the direction of flood flow.

Flood Planning Level (FPL) – are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs – e.g. 1%, 5%) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans.

Flood Proofing- a combination of measures incorporated in the design, construction and alteration of individual buildings or structures subject to flooding, to reduce or eliminate flood damages.

Flood Storage Area – those parts of the floodplain lying outside of the designated floodway (refer figure 4.0) but are at a level below the FSRL. These areas are important for the temporary storage of floodwaters during the passage of a flood.

Floodway – those areas of the floodplain where a significant volume of water flows during a flood event, (refer figure 2). Floodways are distinct water flow paths which, even if only partially blocked, would cause a significant redistribution of flood flow, which may in turn adversely affect other areas. Floodways are often, but not necessarily, the areas of deeper flow or the areas where higher velocities occur.

Freeboard – a factor of safety added to the flood standard to achieve the flood planning level. Freeboard provides a factor of safety to compensate for uncertainties in the setting of floor levels. Such uncertainties could include wave action, boat wash, local hydraulic behaviour, levee bank settlement and more ethereal events such as climate change and greenhouse effect.

High Hazard – a situation which could give rise to possible danger to personal safety. Evacuation by any vehicle could be suspect; able-bodied adults would experience difficulty in wading to safety; potential for significant structural damage to buildings.

Low Hazard – a situation where, should it be necessary, people and their possessions could be evacuated by higher axle vehicles. Able-bodied adults would have little difficulty wading to higher ground.

Merit Approach – The merit approach operates at two levels. At the strategic level it allows for the consideration of social, economic, ecological, cultural and flooding issues to determine strategies for the management of future flood risk which are formulated into council plans, policy, and Environmental Planning Instruments. At a site specific level, it involves consideration of the best way of conditioning development allowable under the floodplain risk management plan, local flood risk management policy and Environmental Planning Instruments.

Probable Maximum Flood – the flood situation, calculated to be the maximum which is likely to occur. For the Moruya River catchment this is calculated at a peak discharge three (3) times that of the 1%AEP. (The PMF defines the maximum or full extent of the floodplain, the extreme limits of flood behaviour, and the extent of the associated flood risk. Storm events with rainfall of the order of the PMP, although extremely rare, do occur. It will generally be impossible, in either a physical or economic sense, to provide general protection against such an event).

Probable Maximum Precipitation – the rainfall event likely to precipitate the probable maximum flood situation.

Resident Capacity – the number of people who can reside at a dwelling. This figure can generally be related to the number of bedrooms within a dwelling.

Replacement – the re-building of a lawful dwelling.

Survey Plan - a plan prepared by a registered surveyor.

Very High Hazard – a situation which could give rise to possible danger to personal safety on entering the flood flow path; evacuation only possible by water craft; conventional structures would suffer structural damage.

Attic - means any habitable space, but not a separate dwelling, contained wholly within a roof above the ceiling line of the storey immediately below, except for minor elements such as dormer windows and the like.

Basement - means the space of a building where the floor level of that space is predominantly below ground level (existing) and where the floor level of the storey immediately above is less than 1 metre above ground level (existing).

Business premises - means a building or place at or on which:
(a) an occupation, profession or trade (other than an industry) is carried on for the provision of services directly to members of the public on a regular basis, or
(b) a service is provided directly to members of the public on a regular basis, and may include, without limitation, premises such as banks, post offices, hairdressers, dry cleaners, travel agencies, internet access facilities, medical centres, betting agencies and the like, but does not include sex services premises.

Caravan park - means land (including a camping ground) on which caravans (or caravans and other moveable dwellings) are, or are to be, installed or placed.

Council - means the Eurobodalla Shire Council.

dual occupancy - means 2 dwellings (whether attached or detached) on one lot of land (not being an individual lot in a strata plan or community title scheme), but does not include a secondary dwelling.

Dwelling - means a room or suite of rooms occupied or used or so constructed or adapted as to be capable of being occupied or used as a separate domicile.

dwelling house - means a building containing only one dwelling.

farm building - means a structure the use of which is ancillary to an agricultural use of the landholding on which it is situated and includes a hay shed, stock holding yard, machinery shed, shearing shed, silo, storage tank, outbuilding or the like, but does not include a dwelling.

Fill - means the depositing of soil, rock or other similar extractive material obtained from the same or another site, but does not include:
(a) the depositing of topsoil or feature rock imported to the site that is intended for use in garden landscaping, turf or garden bed establishment or top dressing of lawns and that does not significantly alter the shape, natural form or drainage of the land, or
(b) the use of land as a waste disposal facility.

Flood Planning Map - means the Flood Liable Land Map in this Code.

residential accommodation - means a building or place used predominantly as a place of residence, but does not include tourist and visitor accommodation.

tourist and visitor accommodation- means a building or place that provides temporary or short-term accommodation on a commercial basis, and includes hotel or motel accommodation, serviced apartments, bed and breakfast accommodation and backpackers' accommodation.

EUROBODALLA SHIRE COUNCIL

Good Government, better living

MORUYA VALLEY FLOODPLAIN

DEVELOPMENT CONTROL PLAN

(AS AMENDED APRIL 2006)

MORUYA RIVER FLOODPLAIN MANAGEMENT

DEVELOPMENT CONTROL PLAN

This Development Control Plan – Moruya River Floodplain DCP (as amended) has been made persuant to section 72 of the Environmental Planning and Assessment Act, 1979 and approved by Council at its meeting on 26 April 2006.

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Record of Amendments

Amendment	Date approved by Council	Date Plan Came into Force
Original Plan	23 November 2004	1 December 2004
General review, Updating to State Floodplain Manual 2005, Updating hazard mapping	26 April 2006	28 April 2006

CONTENTS

1.0 MORUYA FLOODPLAIN MANAGEMENT

1.1 **Introduction**

The town and precinct of Moruya enjoys a range of benefits associated with its location in the lower Moruya River valley. However the Moruya River as well as a number of tributaries and natural drainage gullies all present a hazard to development in times of flood. It is important that any potential developer or user of land and Council, as the consent authority, and custodian of land, acknowledge the risks associated with flooding and consider its economic, environmental, social and safety implications and seek to mitigate the effect of development on flooding and conversely flood on development.

This Development Control Plan (DCP) provides detailed controls to assist developers to achieve the aims and objectives of the Eurobodalla Urban Local Environmental Plan 1999 (Urban LEP) and Eurobodalla Rural Local Environmental Plan 1987 (Rural LEP), in relation to development in and around lands affected by flooding of the Moruya River and its tributaries. This plan forms part of the planning framework for the Eurobodalla Shire.

With these considerations in mind this DCP has been prepared with the aim of setting out Council's requirements for subdivision, building and other development proposals where they are proposed on flood affected land in the lower Moruya River estuary. Council has adopted the 1 in 100 year flood as a development constraint – that is the 1 in 100 year flood (or 1% AEP) is the *flood standard reference level* (FSRL) for the area covered by this plan. To cater for anomalies in the flood profile, wave action and the tidal effect, the level to be used for planning purposes in the floodplain is 500mm above the 1% AEP level. This level is denoted as the *flood planning level* (FPL), refer also section 5.0 Variations and Exceptions. All lands identified in figure 1 that are located below the FPL are subject to flood related planning requirements through this DCP.

Section 3.0 of this DCP explains how to determine whether a site is in the area subject to controls and if so how to determine the appropriate flood levels. The controls that apply depend in part upon which hydraulic category and which hazard category and so the DCP also explains the basis used to determine the 'hazard category' for a site.

Section 4.0 then sets out the planning requirements that apply to a particular site and for the different areas of flood affected land. These requirements will need to be read in conjunction with the attached maps and the flood hazard as assessed by Council's development staff.

Section 5.0 of the DCP identifies those areas and sites that have been identified as exceptions or eligible to a variation from the implementation of the Floodplain Management Plan and details the unique requirements for development of these areas.

Compliance with the provisions of this plan does not imply any obligations upon Council to approve development applications, as all applications will be assessed and determined in accordance with Section 79C of the Environmental Planning and Assessment Act 1979.

1.2 The context of this DCP

This DCP has been prepared having regard to the principles and strategies contained in the Moruya River Floodplain Management Plan 1999 (MFMP)and the State Floodplain Management Manual 2005. Any proposed changes to this DCP should be in accordance with the principles and objectives of the MFMP. In accordance with State Government policy, each application or proposal for development on flood affected land will be considered on it's merits, having regard to the 2005 State Floodplain Management Manual, the intent of the MFMP, the requirements of Council's Urban and Rural LEP's, this DCP and those of other relevant DCP's, which have been adopted by Council.

1.3 Land to which this DCP applies

This Plan applies to all those areas enclosed within the *'thin blue line'* as indicated in figure 1 attached to this DCP. This area includes all *flood affected land* (up to and including an extreme event) and some adjacent lands which become isolated during flooding of the Moruya River.

1.4 Aims and Objectives of the DCP

The aim of this DCP is to clearly set out Council's flood related requirements for sub-division, building, land development and other land use activities, proposed for land that is flood affected in the Lower Moruya River estuary.

The objectives of this DCP are:-

a) To give statutory effect to the objectives contained in Council's Moruya River Floodplain Management Plan 1999,
b) To minimise the impact of flooding and flood liability on individual owners and occupiers, and reduce private and public losses resulting from flooding,
c) To ensure construction and development is compatible with the risk of the area,
d) To ensure that buildings and other structures built on *flood affected land*, where permitted, are designed and constructed to withstand the likely stresses of the attributed flood hazard and not impede the flow of floodwater in high risk areas, including the impact of debris,
e) To ensure that development on *flood affected land* does not, singularly or in concert with other development, adversely affect flood behaviour.
f) To recognise and consider the cumulative impact of development within the floodplain.
g) To ensure that development is not permitted on *flood affected land* where that development would result in un-necessary risk to emergency services or unwarranted public cost, in the event of these services being called upon during a flood event,
h) To ensure that all development permitted within *flood affected land* and where identified by this DCP, is complimented by the preparation of a flood evacuation plan,
i) To acknowledge the river corridor as an ecologically sensitive area and ensure adjoining development recognises and enhances the high visual and biological quality of the river corridor.

1.5 Application of the DCP

In processing building, development and sub-division applications, Council will apply the principles outlined in the 2005 State Floodplain Management Manual, the Moruya River Floodplain Management Plan and the objectives of this DCP, as relevant. In most cases the identification of flood hazard applicable to any one property will be determined by Council with reference to flood modelling and the mapping provided in the Flood Study. (The flood hazard can vary greatly as a consequence of both natural and artificial factors which may occur within the specific location).

Note: The requirements of this DCP are in addition to the requirements of the Eurobodalla Urban and Rural LEP's and those requirements of any other DCP's applying to the land.

2.0 DEFINITIONS

Key terms and levels that are fundamental to this DCP are shown in boxes.

Annual Exceedance Probability (AEP) – the probability of a given flood height being equaled or exceeded in any one year. For example, a 1% AEP flood has a 1% probability or a 1 in 100 chance of occurring or being exceeded in any given year.

Australian Height Datum (AHD) – a common national plane of level corresponding approximately to mean sea level, (the mean between average low and high tides).

Communal Flood Refuge – a flood free area capable of providing communal flood refuge facilities, shelter and emergency assistance for occupants of surrounding flood bound areas. The refuge should be capable of being practically provided with basic needs such as food and clothing from outside the flood affected area.

Development Control Plan (DCP) – when referred to in this plan means the Moruya River Floodplain Management – Development Control Plan.

Design Floor Level – means a minimum floor level specified as part of a building programme.

Flood Planning Level (FPL) – is the level used for planning purposes and for most development in this DCP defined *flood affected land*, is set at 500mm above the 1% AEP level. (Refer to section 5.0 Exemptions and Variations where other FPL's may apply).

Extreme Hazard – a situation where water depths and flow velocities render any form of egress through the flood-path extremely hazardous; conventional structures, mobile homes, caravans could become buoyant and contribute to flood debris.

Flood Affected Land – means the land susceptible to inundation by the Probable Maximum Flood (PMF) event [i.e. the flood plain].

Flood Standard Reference Level (FSRL) – for the Lower Moruya River Estuary this has been adopted by Council at the 1% AEP level.

Flood Behaviour – refers to the characteristics of flooding at a particular location and includes the level of flooding, flood flow velocity and the direction of flood flow.

Flood Fringe Area – those areas of the floodplain, in horizontal terms, that lie between the FSRL and the FPL.

Flood Storage Area – those parts of the floodplain lying outside of the designated floodway (refer figure 4.0) but are at a level below the FSRL. These areas are important for the temporary storage of floodwaters during the passage of a flood.

Floodway – those areas of the floodplain where a significant volume of water flows during a flood event, (refer figure 2). Floodways are distinct water flow paths which, even if only partially blocked, would cause a significant redistribution of flood flow, which may in turn adversely affect other areas. Floodways are often, but not necessarily, the areas of deeper flow or the areas where higher velocities occur.

Freeboard – a factor of safety added to the flood standard reference level to achieve the flood planning level. Freeboard provides a factor of safety to compensate for uncertainties in the setting of floor levels. Such uncertainties could include wave action, boat wash, local hydraulic behaviour, levee bank settlement and more ethereal events such as climate change and greenhouse effect.

High Hazard – a situation which could give rise to possible danger to personal safety. Evacuation by any vehicle could be suspect; able-bodied adults would experience difficulty in wading to safety; potential for significant structural damage to buildings.

Low Hazard – a situation where, should it be necessary, people and their possessions could be evacuated by higher axle vehicles. Able-bodied adults would have little difficulty wading to higher ground.

Probable Maximum Flood – the flood situation, calculated to be the maximum which is likely to occur. For the Moruya River catchment this is calculated at a peak discharge three (3) times that of the 1%AEP. (The PMF defines the maximum or full extent of the floodplain, the extreme limits of flood behaviour, and the extent of the associated flood risk. Storm events with rainfall of the order of the PMP, although extremely rare, do occur. The behaviour and potential consequences of floods up to the PMF event need to be given consideration in determining the FPL. It will generally be impossible, in either a physical or economic sense, to provide general protection against such an event).

Probable Maximum Precipitation – the rainfall event likely to precipitate the probable maximum flood situation.

Resident Capacity – The number of people who can reside at a dwelling. This figure can generally be related to the number of bedrooms within a dwelling.

Very High Hazard – a situation which could give rise to possible danger to personal safety on entering the flood flow path; evacuation only possible by water craft; conventional structures would suffer structural damage.

3.0 DETERMINING THE FLOOD HYDRAULIC CATEGORY AND HAZARD CATEGORY.

To determine the potential impacts of flooding in the lower Moruya River Estuary, two categories of flood characteristic have been produced. These categories represent the predicted hazards for both a frequent flood event and the more severe flood event for assessing management options. The frequent flood event acknowledges the existing community awareness for such events however, a more severe event is not of recent occurrence and would present response scenarios lacking historical experience.

The frequent flooding event is represented by a number of such occurrences experienced by the Moruya Township over the last fifty years. Sufficient water level data and historic information has been collated to define the flood behaviour and extent to generate actual flood mapping. The more severe flood scenarios, (an event not experienced by the current community) have been developed based on hydrologic modelling to predict flood behaviour.

3.1 **Hydraulic category**

There are varying degrees of risk associated with different flood events, the rarer the flood event the larger the scale and extent of flooding and the greater the danger and potential for damage. For the Moruya township, Council has adopted the 1% AEP (1 in 100 year) flood event for residential purposes and the 5% AEP (1 I 20year) flood event for commercial purposes..

In line with the NSW State Government '2001 State Floodplain Management Manual' this policy adopts the three hydraulic categories, as listed below, associated with flooding in a typical coastal barrier estuary.

- Floodway An area of flood effect, where hydraulic activity is conveying significant flow volumes.
- Flood storage Backwater or area where there is temporary storage of flood waters. (These areas could be subject to high flows during initial capture and release).
- Flood fringe Remaining areas of flood affected land. (These areas could be subject to varying boundary definition subject to differing flood events).

Due to the topography of the lower Moruya River Estuary and the nature of the flow path, there is little opportunity for flood storage. During a severe event or greater much of the floodplain performs as a floodway, (refer figure 4).

3.2 **Hazard category**

The hazard associated with a particular flood event is represented by the static and dynamic energy of the flow, (refer figure 2). In essence, this refers to the depth and velocity of floodwater and is used as an indicator of the potential danger of using the land and the implications for evacuation.

Graphically depicting flood hazard areas will always be problematic, in that the factors that contribute to the hazard category depend heavily on natural topography and flood behaviour at a particular location. Therefore Council will rely upon topographical information provided by the applicant and flood modelling to ascertain the relevent flood hazard.

Council has adopted four flood hazards applicable within the floodplain. The 2005 State Floodplain Management Manual suggests the adoption of two hazard categories (i.e. low hazard and high hazard) however, due to the characteristic of a Moruya River 'severe flood event' the Moruya River Floodplain Management Study suggests the incorporation of a further two hazard categories – very high hazard and extreme hazard, identified as:-

- **Low hazard** Should it be necessary, people and their possessions could be evacuated by higher axle vehicles. Able-bodied adults would have little difficulty wading to higher ground. ($d \leq 0.8$, $v \leq 2$ & $v \times d \leq 0.5$).
- **High hazard** Possible danger to personal safety; evacuation by any vehicle could be suspect; able-bodied adults would experience difficulty in wading to safety; potential for significant structural damage to buildings. ($0.8 < d \leq 1.8$, $2 < v \leq 3$ & $0.5 < v \times d \leq 1.5$)
- **Very high hazard** Possible danger to personal safety on entering flow path; evacuation only possible by water craft; conventional structures would suffer structural damage. ($d > 1.8$, $3 < v \leq 4$ & $1.5 < v \times d \leq 2.5$)
- **Extreme hazard** Water depths and flow velocities render any form of egress through the flood-path extremely hazardous; conventional structures, mobile homes, caravans could become buoyant and contribute to flood debris. ($v > 4$ & $v \times d > 2.5$)

Note: 'v' = velocity, 'd' = depth, '<' = less than, '>' = greater than, '≤' = less than or equal to, '≥' = greater than or equal to, 'v' x 'd' = velocity times depth.

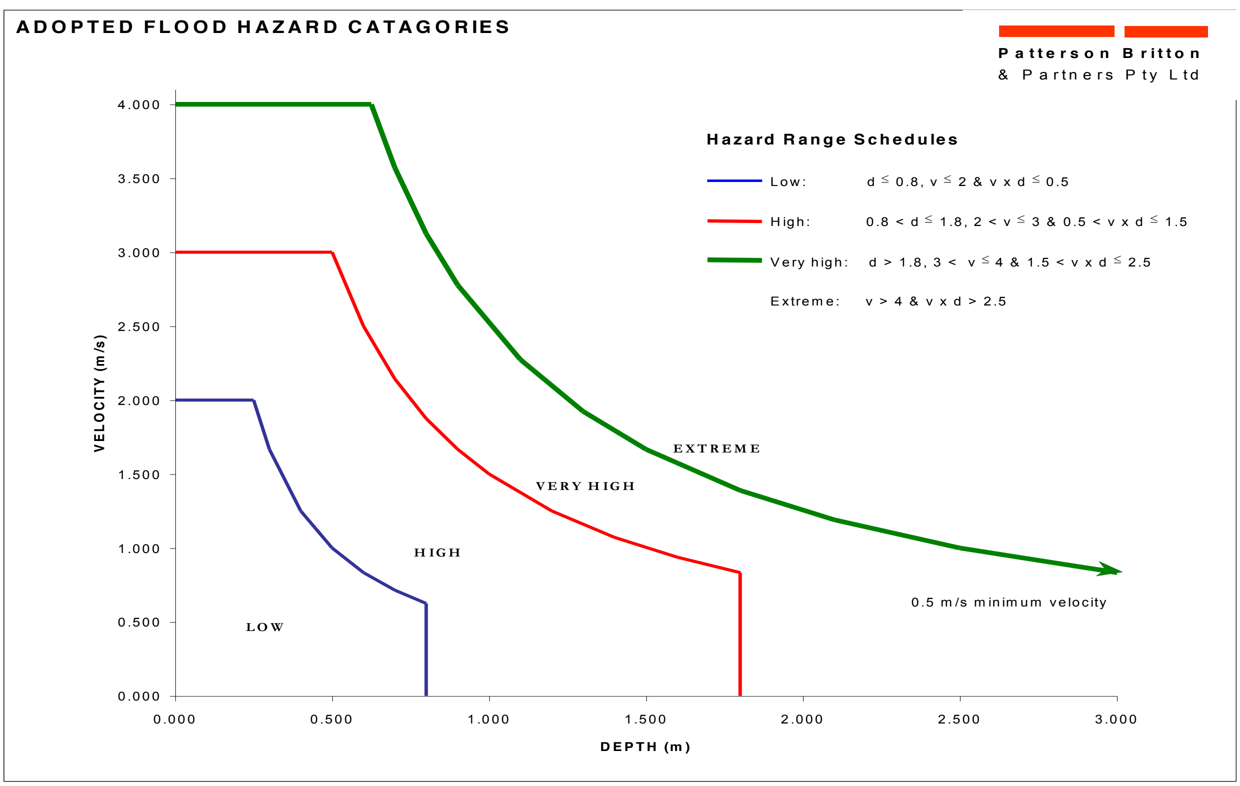

Figure 2 Determining hazard zones

3.3 Limits of flooding

Council has prepared maps for the purpose of this DCP that indicate the hydraulic category for most areas of the lower Moruya River Estuary and floodplain. This information is necessary to determine which development requirements in section 4.0 will be appropriate to any particular site.

Flood hazard, as defined by the modelling and the Flood Study, does not however extend over the entire area of the *flood affected land,* nor does it take into consideration the local flooding which can occur in upper natural drainage channels. This is due to the unreliability of predicting flood behaviour in levels between the FSRL and the PMF levels. In the case of land lying between the FSRL and the PMF level, Council will assume the hazard to be in the low range. Conversely, in the absence of information identifying land that is below the FSRL as either high or low hazard, Council will assume the applicable hazard to be in the high range, see also section 5.0 – Exceptions and Variations. It will be incumbent upon the proponent to demonstrate otherwise, in accordance with the definitions and procedures in the 2001 State Floodplain Manual and the objectives of the Moruya River Floodplain Management Plan.

The limits of flood affected land are primarily based on the modelled limits of the extreme event, (PMF) as shown in figure 3. However, there are areas of the floodplain and upper drainage lines not included in the study and these have been mapped at the limit of the 1% AEP level. It must be kept in mind that properties and infrastructure within these limits have the potential to be directly affected by flood waters. In addition, some facilities outside these limits may be indirectly affected. The inundation limits adopted in figure 3 are based on ortho-photo and topographic contours, and have not been ground-surveyed, and as such cannot be assumed definitive.

3.4 Determining flood behaviour

The combination of flood hydraulic category and hazard category is understood to be the flood behaviour. The relationship of the two categories relative to a specific site, will determine the appropriate development requirements, (section 4).

It is likely that each individual property may have slightly differing flood behaviour characteristics. For most 'open' areas of the flood plain, (not heavily modified by built form) identifying both the hydraulic and hazard categories will be possible from information readily available from both the applicant and Council assessment staff. However, other more complex areas where topographic irregularities, such as roadways, channels, etc, or areas impacted by built structures, will require further analysis. Certainly, areas adjacent to the river channel and within the Moruya township, will require individual engineering determination of flood behaviour. This is mainly due to the channeling effect of these built forms where flood flow can be redirected and sometimes intensified by structures.

The resultant combination of the hydraulic category and hazard category, will determine those development requirements, (section 4) which will be appropriate.

4.0 DEVELOPMENT REQUIREMENTS

4.1 **Floodway (extreme hazard) areas**

Only certain essential structures for open space and rural/agricultural use will be permitted within the extreme risk area of the floodway.

4.1.1 Development Standards

1) Every effort should be explored for development on an alternate area of the subject site that is of lesser hazard.

2) The finished floor level of that part of a structure which, is to its greater extent enclosed with walls of impervious material, is above the FPL and that the underside of any horizontal support structure, beams, floor support, etc, and service ductwork are above the FSRL.

3) The supporting structure of any building below the FSRL is wherever possible to remain unencumbered by enclosing of vertical areas and infill walls. If such elements are essential design considerations such vertical infill panels shall be aligned with the predominant flood flow vector. The sub floor support structure shall render the least impedance to the flow of flood waters.

4) The development is designed in accordance with the Guidelines for 'Flood Compatible Materials' as set out in Appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

5) The applicant will be required to demonstrate that the structure can withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A detailed report from an appropriate consulting structural engineer will be required in support of a development application.

4.1.2 Development Considerations

A. Where structures could be used by people, even if only for short periods; such as amenities buildings and shelters, the applicant will need to demonstrate that permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people from the area, should a design flood or greater occur

B. The applicant will be required to demonstrate that the development will not increase the flood hazard or flood damage to other properties or adversely affect flood behavior. A detailed report by an appropriate consulting engineer and a detailed study assessing the social, environmental and ecological impacts will be required in support of a development application.

C. Where existing uses occur within the Floodway – Extreme hazard area (e.g. caravan parks) no new sites or structures should be established. Existing park development is subject to Council's Guidelines for development of Flood Liable Caravan/Camping Parks.

4.1.3 Notes

It would also be appropriate that the property have in place a site specific flood warning and evacuation process which can be implemented without delay should a flood event be imminent.

4.2 Floodway (very high hazard) areas

Generally only development involving existing structures, i.e. minor refurbishment and/or modification and structures in open space areas will be permitted in very high hazard areas of the floodway.

4.2.1 <u>Development Standards</u>

1) Every effort should be explored for development on an alternate area of the subject site that is of lesser hazard.

2) The finished floor level of that part of a structure which is, to its greater extent enclosed with walls of impervious material, is above the FPL and that the underside of any horizontal support structure, beams, floor support, etc, and service ductwork are above the FSRL.

3) The supporting structure of any building below the FSRL is wherever possible to remain unencumbered by enclosing of vertical areas and infill walls. If such elements are essential design considerations such vertical infill panels shall be aligned with the predominant flood flow vector. The sub floor support structure shall render the least impedance to the flow of flood waters.

4) The development is designed in accordance with the Guidelines for 'Flood Compatible Materials' as set out in Appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

5) The applicant will be required to demonstrate that the structure can withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A detailed report from an appropriate consulting structural engineer will be required in support of a development application.

4.2.2 <u>Development Considerations</u>

A. Generally new structures and major additions and or expansion of existing developments will not be considered appropriate in high hazard areas of the floodway. However certain agricultural and open space structures could be acceptable under certain conditions. Such conditions should be justified in terms of impact of the development on flood behaviour and flood hazard.

B. The applicant will need to demonstrate that permanent, fail-safe, maintenance-free measures are incorporated in the existing and new development to ensure the timely, orderly and safe evacuation of people from the area, should a sever event or greater be imminent. In addition, it should also be demonstrated that the displacement of these people will not significantly add to the overall cost and community disruption caused by the flood. A detailed report from an appropriate consulting structural engineer to that effect will be required in support of the development application.

C. The applicant will be required to demonstrate that the development will not increase the flood hazard or flood damage to other properties or adversely affect flood behavior. Also, that a report be prepared assessing the social, environmental and ecological impacts of the development application.

4.2.3 Notes

It would be appropriate that the property have in place a site specific flood warning and evacuation process which can be implemented without delay should a flood event be imminent.

4.3 Floodway (high hazard) areas

New development and infill development will generally be considered NOT appropriate in high hazard 'floodway' areas. However, it may be acceptable under certain conditions. Such conditions should be based on a detailed review by an appropriate consulting engineer, of the impact of the development in respect to flood hazard to adjacent existing development and the cost to emergency services should evacuation of the premises be required.

4.3.1 Development Standards

1) There is no alternate area for the development on the subject site that is of lesser hazard.

2) The finished floor level of that part of a structure which is, to its greater extent enclosed with walls of impervious material, is above the FPL and that the underside of any horizontal support structure, beams, floor support, etc, and service ductwork are above the FSRL.

3) The development is designed in accordance with the Guidelines for 'Flood Compatible Materials' as set out in appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

4) The applicant will be required to demonstrate that the structure can withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A detailed report from an appropriate consulting structural engineer will be required in support of a development application.

5) The installation of electrical equipment, including motors, generators, air conditioning units, data communication networks, etc is to be located in accordance with Country Energy requirements for electric installation within flood prone areas.

4.3.2 Development Considerations

A. The applicant will need to demonstrate that permanent, fail-safe, maintenance-free measures are incorporated in the development to ensure the timely, orderly and safe evacuation of people from the area, should a design flood or greater occur. In addition, it should also be demonstrated that the displacement of these people will not significantly add to the overall cost and community disruption caused by the flood. A detailed report from an appropriate consulting structural engineer to that effect will be required in support of the development application.

B. The applicant will be required to demonstrate that the development will not increase the flood hazard or flood damage to other properties or adversely affect flood behavior. Also that a report be prepared assessing the social, environmental and ecological impacts the development.

4.3.3 Notes

It would also be appropriate that the premises have in place a site specific flood warning and evacuation process which can be implemented without delay should a flood event be imminent.

4.4 Flood Storage (very high hazard) areas

Generally only development involving existing structures, i.e. minor refurbishment and/or modification and structures in open space areas will be permitted in very high hazard areas of the flood storage zone.

4.4.1 Development Standards

1) Every effort should be explored for development on an alternate area of the subject site that is of lesser hazard.

2) The finished floor level of that part of a structure which is, to its greater extent enclosed with walls of impervious material, is above the FPL and that the underside of any horizontal support structure, beams, floor support, etc, and service ductwork are above the FSRL.

3) The supporting structure of any building below the FSRL is wherever possible to remain unencumbered by enclosing of vertical areas and infill walls. If such elements are essential design considerations such vertical infill panels shall be aligned with the predominant flood flow vector. The sub floor support structure shall render the least impedance to the flow of flood waters.

4) The development is designed in accordance with the Guidelines for 'Flood Compatible Materials' as set out in Appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

5) The applicant will be required to demonstrate that the structure can withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A detailed report from an appropriate consulting structural engineer will be required in support of a development application.

4.4.2 Development Considerations

A. Generally new structures and major additions and or expansion of existing developments will not be considered appropriate in high hazard areas. However certain agricultural and open space structures could be acceptable under certain conditions. Such conditions should be justified in terms of impact of the development on flood behaviour and flood hazard.

B. The applicant will need to demonstrate that permanent, fail-safe, maintenance-free measures are incorporated in the existing and new development to ensure the timely, orderly and safe evacuation of people from the area, should a severe event or greater be imminent. In addition, it should also be demonstrated that the displacement of these people will not significantly add to the overall cost and community disruption caused by the flood. A detailed report from an appropriate consulting structural engineer to that effect will be required in support of the development application.

C. The applicant will be required to demonstrate that the development will not increase the flood hazard or flood damage to other properties or adversely affect flood behavior. Also, a report be prepared assessing the social, environmental and ecological impacts the development application.

4.4.3 Notes

It would be appropriate that the property have in place a site specific flood warning and evacuation process which can be implemented without delay should a flood event be imminent.

4.5 Flood storage (high hazard) areas

4.5.1 Development Standards

1) Any portion of a building or structure below the FPL is designed in accordance with the 'Guidelines for Flood Compatible Materials' as set out in appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

2) The habitable floors of any new residential developments, together with occupied floors of special use developments, should be located at or above the FPL.

3) The finished floor level of new commercial and industrial developments can be considered at not less than the 5% FPL unless otherwise determined by sub cls 5. However, the lowest point of the finished floor level must be 0.3m above the highest elevation of the adjoining road formation.

4) Proposals for the additions to, or re-development of, existing structures or sites will require the applicant to demonstrate either through the nature of the development or due to topographical reasons why the proposal will not require implementation of this policy.

5) Where the finished floor level of the existing structure is below the FSRL and the proposed addition is also proposed to be located below the FSRL – the applicant will need to justify why the floor should not be raised to the FPL, and if justified the maximum increase in floor area is not to exceed 10% of the floor area of the original building, or 30 square meters, whichever is the lesser.

6) In the case of proposed works to an identified heritage structure or item, floor levels will need to be sited above the FPL except where this would be contrary to recognised heritage practice.

7) The applicant will need to demonstrate that the building or structure can withstand the force of flowing floodwaters, including debris and buoyancy forces, as appropriate. Building works/structures undertaken below the design floor level shall comply with Council's 'Guidelines for Flood Compatible Materials' (refer Appendix A)

8) Vehicular access to the development shall be constructed to a level not less than the highest point of the adjoining road formation unless such access is at or above the 1% AEP. Level.

9) Parking areas, but only those parking areas specifically associated with the proposed development, may be constructed at a level below the 1% AEP. Where such parking areas are located at a level below the 1% AEP the egress

from the parking area must be constructed such that the roadway incorporates a continuous rise to the 1% AEP level or where the egress connects to the highest point of the adjacent public roadway.

10) The installation of electrical equipment, including motors, generators, air conditioning units, data communication networks, etc is to be located in accordance with Country Energy requirements for electric installation within flood prone areas.

4.5.2 Development Considerations

A. For new development within the flood storage and fringe areas the applicant is to demonstrate that the development will not adversely contribute to the flood risk as defined within the Floodplain Risk Management Plan either as sole contributor or cumulatively with other developments. If the development will cause a significant additional risk, the applicant shall provide for adequate and acceptable compensating works to offset the added risk.

4.5.3 Notes

Development in the flood storage areas may be suitable for that location. However, such development will be subject to evaluation of singular and cumulative impact to flood behaviour, except for some special use developments which by their nature are non-sensitive to flooding or where the use is especially necessary in times of flooding.

4.6 Flood storage (low hazard) areas

4.6.1 Development Standards

1) Any portion of a building or structure below the FPL is designed in accordance with the Guidelines for 'Flood Compatible Materials' (as set out in Appendix A), so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

2) The habitable floors of new residences and additions which fall outside the criteria as defined in sub cls 3, together with occupied floors of special use developments, should either be at or above the FPL or be flood proofed to this level.

- Whilst this condition would generally apply to new development and/or extension of existing developments, the merits of the individual proposal should determine the need for, and height of, freeboard and flood-proofing. Where the finished floor level of the existing structure is below the FSRL and the proposed addition is also proposed to be located below the FSRL – the applicant will need to justify why the floor should not be raised to the FPL, and if justified the maximum increase in floor area is not to exceed 10% of the floor area of the original building, or 30 square meters, whichever is the lesser.

3) The finished floor level of new commercial and industrial developments can be considered at not less than the 5% FPL unless otherwise determined by sub cls. 5. However, the lowest point of the finished floor level must be above the highest elevation of the adjoining road formation.

4) Proposals for the additions to, or re-development of, existing structures or sites will require the applicant to demonstrate either through the nature of

the development or due to topographical reasons why the proposal will not require implementation of this policy.

5) The installation of electrical equipment, including motors, generators, air conditioning units, data communication networks, etc is to be located in accordance with Country Energy requirements for electric installation within flood prone areas.

6) Minor developments and agricultural uses;

- Although under other circumstances some minor uses may be deemed exempt or complying development, all development identified on *flood affected land* will require development consent in accordance with cls, 2.3 Development Control Plan – Exempt and Complying Development.
- Consideration will need to be given to the potential for certain land uses to contribute to cumulative induced damage or adverse impacts on flood behaviour, and will be treated on merit.

7) The applicant will need to demonstrate that the building or structure can withstand the force of flowing floodwaters, including debris and buoyancy forces, as appropriate. Building works/structures undertaken below the design floor level shall comply with Council's 'Guidelines for Flood Compatible Materials' (refer Appendix A)

8) Vehicular access to the development shall be constructed to a level not less than the highest point of the adjoining road formation unless such access is at or above the 1% AEP. Level.

9) Parking areas, but only those parking areas specifically associated with the proposed development, may be constructed at a level below the 1% AEP. Where such parking areas are located at a level below the 1% AEP the egress from the parking area must be constructed such that the roadway incorporates a continuous rise to the 1% AEP level or where the egress connects to the highest point of the adjacent public roadway.

4.6.2 Development Considerations

A. If in the carrying out of a particular development, there is likely to result a significant reduction in flood storage capacity, the applicant will be required to demonstrate, that any variation to development standards either by the development itself or in concert with other and future development, will not lead to an increase to the flood hazard. If the development will cause such an increase to flood hazard, the applicant shall provide for compensating works to offset the increased hazard. The applicant shall submit a report by a suitably qualified engineer assessing the environmental and social impacts of such works.

4.6.3 Notes

Flood storage areas are identified as areas of shallow water depth with little or no flow velocity. Able-bodied adults would have little difficulty in wading to land at higher elevation.

Development in the flood storage areas may be suitable for that location. However, such development will be subject to evaluation of singular and cumulative impact to flood behaviour, except for some special use developments which by their nature are non-sensitive to flooding or where the use is especially necessary in times of flooding.

4.7 Flood Fringe (very high hazard) areas

Generally only development involving existing structures, i.e. minor refurbishment and/or modification and structures in open space areas will be permitted in very high hazard areas of the flood fringe zone.

4.7.1 Development Standards

1) Every effort should be explored for development on an alternate area of the subject site that is of lesser hazard.

2) The finished floor level of that part of a structure which is, to its greater extent enclosed with walls of impervious material, is above the FPL and that the underside of any horizontal support structure, beams, floor support, etc, and service ductwork are above the FSRL.

3) The supporting structure of any building below the FSRL is wherever possible to remain unencumbered by enclosing of vertical areas and infill walls. If such elements are essential design considerations such vertical infill panels shall be aligned with the predominant flood flow vector. The sub floor support structure shall render the least impedance to the flow of flood waters.

4) The development is designed in accordance with the Guidelines for 'Flood Compatible Materials' as set out in Appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

5) The applicant will be required to demonstrate that the structure can withstand the force of flowing floodwaters, including debris and buoyancy forces as appropriate. A detailed report from an appropriate consulting structural engineer will be required in support of a development application.

4.7.2 Development Considerations

A. Generally new structures and major additions and or expansion of existing developments will not be considered appropriate in high hazard areas. However certain agricultural and open space structures could be acceptable under certain conditions. Such conditions should be justified in terms of impact of the development on flood behaviour and flood hazard.

B. The applicant will need to demonstrate that permanent, fail-safe, maintenance-free measures are incorporated in the existing and new development to ensure the timely, orderly and safe evacuation of people from the area, should a sever event or greater be imminent. In addition, it should also be demonstrated that the displacement of these people will not significantly add to the overall cost and community disruption caused by the flood. A detailed report from an appropriate consulting structural engineer to that effect will be required in support of the development application.

C. The applicant will be required to demonstrate that the development will not increase the flood hazard or flood damage to other properties or adversely affect flood behavior. Also, a report be prepared assessing the social, environmental and ecological impacts the development.

4.7.3 Notes

It would be appropriate that the property have in place a site specific flood warning and evacuation process which can be implemented without delay should a severe flood event be imminent.

4.8 Flood fringe (high hazard) areas

4.8.1 Development Standards

1) Any portion of a building or structure below the FPL is designed in accordance with the 'Guidelines for Flood Compatible Materials' as set out in appendix A, so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

2) The habitable floors of any new residential developments, together with occupied floors of special use developments, should be located at or above the FPL.

3) The finished floor level of new commercial and industrial developments can be considered at not less than the 5% FPL unless otherwise determined by sub cls 5. However, the lowest point of the finished floor level must be 0.3m above the highest elevation of the adjoining road formation.

4) Proposals for the additions to, or re-development of, existing structures or sites will require the applicant to demonstrate either through the nature of the development or due to topographical reasons why the proposal will not require implementation of this policy.

5) Where the finished floor level of the existing structure is below the FSRL and the proposed addition is also proposed to be located below the FSRL – the applicant will need to justify why the floor should not be raised to the FPL, and if justified the maximum increase in floor area is not to exceed 10% of the floor area of the original building, or 30 square meters, whichever is the lesser.

6) In the case of proposed works to an identified heritage structure or item, floor levels will need to be sited above the FPL except where this would be contrary to recognised heritage practice.

7) The applicant will need to demonstrate that the building or structure can withstand the force of flowing floodwaters, including debris and buoyancy forces, as appropriate. Building works/structures undertaken below the design floor level shall comply with Council's 'Guidelines for Flood Compatible Materials' (refer Appendix A)

8) Vehicular access to the development shall be constructed to a level not less than the highest point of the adjoining road formation unless such access is at or above the 1% AEP. Level.

9) Parking areas, but only those parking areas specifically associated with the proposed development, may be constructed at a level below the 1% AEP. Where such parking areas are located at a level below the 1% AEP the egress from the parking area must be constructed such that the roadway

incorporates a continuous rise to the 1% AEP level or where the egress connects to the highest point of the adjacent public roadway.

10) The installation of electrical equipment, including motors, generators, air conditioning units, data communication networks, etc is to be located in accordance with Country Energy requirements for electric installation within flood prone areas.

4.8.2 Development Considerations

A. For new development within the flood storage and fringe areas the applicant is to demonstrate that the development will not adversely contribute to the flood risk as defined within the Floodplain Risk Management Plan either as sole contributor or cumulatively with other developments. If the development will cause a significant additional risk, the applicant shall provide for adequate and acceptable compensating works to offset the added risk.

4.8.3 Notes

Development in the flood storage areas may be suitable for that location. However, such development will be subject to evaluation of singular and cumulative impact to flood behaviour, except for some special use developments which by their nature are non-sensitive to flooding or where the use is especially necessary in times of flooding.

4.9 Flood fringe (low hazard) areas

4.9.1 Development Standards

1) Any portion of a building or structure below the FPL is designed in accordance with the Guidelines for 'Flood Compatible Materials', (as set out in Appendix A) so as to ensure that the risks of structural failure or damage in the event of flood, including damage to other property, is minimised.

2) The habitable floors of any new residences and new commercial and industrial developments, together with occupied floors of special use developments, should either be at or above the FPL or be flood proofed to this level.

- Whilst this condition would generally apply to new development and/or extension of existing developments, the merits of the individual proposal should determine the need for and height of freeboard and flood-proofing.

3) Where the finished floor level of the existing structure is below the FSRL and the proposed addition is also proposed to be located below the FSRL – the applicant will need to justify why the floor should not be raised to the FPL, and if justified the maximum increase in floor area is not to exceed 10% of the floor area of the original building, or 30 square meters, whichever is the lesser.

4) The finished floor level of new commercial and industrial developments can be considered at not less than the 5% FPL unless otherwise determined by sub cls. 5. However, the lowest point of the finished floor level must be above the highest elevation of the adjoining road formation.

5) Proposals for the additions to, or re-development of, existing structures or sites will require the applicant to demonstrate either through the nature of

the development or due to topographical reasons why the proposal will not require implementation of this policy.

6) The installation of electrical equipment, including motors, generators, air conditioning units, data communication networks, etc is to be located in accordance with Country Energy requirements for electric installation within flood prone areas.

7) Minor developments and agricultural uses;
   - Although under other circumstances some minor uses may be deemed exempt or complying development, all development identified on *flood affected land* will require development consent in accordance with cls, 2.3 Development Control Plan – Exempt and Complying Development.
   - Consideration will need to be given to the potential for certain land uses to contribute to cumulative induced damage or adverse impacts on flood behaviour, and will be treated on merit.

8) In the case of proposed works to an identified heritage structure or item, floor levels will need to be sited above the FPL except where this would be contrary to recognised heritage practice.

9) In low hazard areas the Council will require the applicant to demonstrate that the building or structure can withstand the force of flowing floodwaters, including debris and buoyancy forces, as appropriate. Building works/structures undertaken below the design floor level shall comply with Council's Guidelines for Flood Compatible Materials (refer Appendix A)

4.9.2 Development Considerations

A. For new development within the floodplain and fringe areas the applicant is to demonstrate that the development will not adversely contribute to the flood risk as defined within the Floodplain Risk Management Plan either as sole contributor and cumulatively in concert with similar developments. If the development will cause a significant additional risk, the applicant shall provide for adequate and acceptable compensating works to offset the added risk.

4.9.3 Notes

Low hazard flood storage and fringe areas may be suitable for development. However, such development will be subject to evaluation of singular and cumulative impact, except for some special use developments which by their nature are sensitive to flooding or where the use is especially necessary in times of flooding.

5.0 EXCEPTIONS AND VARIATIONS

Despite any other requirements contained within this DCP the following exceptions shall apply to the extent to which they apply to the proposed development.

5.1 **Development on properties with multiple (split) zoning.**

Where an existing lot is partially affected by differing zonings and the lot is also partially flood affected, the land uses permissible in the primary zone can also be extended to other areas of the lot down to but not including an area of higher hazard.

5.2 **Commercial development within the Moruya CBD**

Development of land within the Moruya township zoned - Business 3(a) (refer to figure 6) for commercial purposes will be permitted with Council consent but only where the development is in accordance with the criteria listed in section 4.0 and Council is satisfied that:

- the development proposal complements and enhances the aims and objectives of the Moruya Town Centre Development Guidelines; and
- the development is consistent with the provisions for carparking and landscaping as outlined in DCP 130; and
- appropriate and adequate measures are taken in the design of structures and the management and use of land in respect to the flood hazard category; and
- any building upon the subject land is to be constructed such that the finished floor level is above the 5% FPL and any elements of the structure below the 5% FPL are appropriately designed for the applicable flood hazard category; and
- any development upon the land will not have adverse effect on the immediate and accumulated flood effect to the adjacent and adjoining properties.

Council has adopted a policy of additional freeboard height above the flood standard reference level. For residential development a freeboard height of 0.5metres applies. For the commercial and industrial development particularly those areas within the Moruya Township a freeboard height of 0.3metres will be applied.

The purpose of setting a freeboard is to allow for such matters as local turbulence and level differences, wave action from a combination of flood flow, wind, passing boats or vehicles, and the impact of climate change and sea level rise. A freeboard also provides some measure of protection against floods resulting in water levels greater than the flood standard.

5.3 Development affecting heritage items

Where it is proposed to carry out development, which affects an item or site of heritage significance, and the existing floor level of the building is below the FPL, Council will adopt a merit based approach to the application. Proposals for the addition to or re-development of, existing heritage structures will require the applicant to demonstrate either through the nature of the development or the need to maintain historical integrity why the proposal will not require implementation of this policy.

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GUIDELINES FOR FLOOD COMPATIBLE MATERIALS

August 2000

Adopted by Council at its meeting dated 26 September 2000

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

PREAMBLE

All buildings constructed on flood liable land should conform to these guidelines.

Where part or all of the premises may be inundated by floodwaters, the following recommendations are made on the suitability of materials, components and fittings so that these are not adversely affected by flooding. The term 'D.F.L.' means Designated Floor Level.

Issue of these guidelines is not to be taken as an indication that Council will approve any building or development in flood liable areas. The guidelines serve to assist in the minimisation of flood damage and losses - they do not preclude building work requiring prior approval through the Development Consent process.

CONSTRUCTION METHODS & MATERIALS

Construction methods and materials are graded into four classes according to their resistance to floodwaters (see **Table 1**).

Commercial and industrial developments shall use either '1st Preference' or '2nd Preference' methods and materials only, recognising the greater level of risk associated with the '2nd Preference' option.

Materials listed as '3rd Preference' may be used in residential buildings if there are sound practical or economic reasons for their use. Designers, builders and owners should be aware of the higher level of risk and potential damage that will result from this compromise. Table 1 refers to the following classes:

Most Suitable (1st Preference)	The materials are relatively unaffected by submersion and flood exposure and are the best available for the particular application.
2nd Preference	Where the "most suitable" materials or products are unavailable or economic considerations prohibit their use, these materials are considered the next best choice to minimise the damage caused by flooding.
3rd Preference	Not suitable for commercial or industrial applications.
To be Avoided	The use of materials or products in this category is inappropriate for any area subject to inundation. In general any material that can absorb moisture and expand/contract excessively or disintegrate shall be avoided. If in doubt, check with the manufacturer.

GUIDELINES FOR FLOOD COMPATIBLE MATERIALS

SUB-FLOOR AREA

Sub-floor ventilation should be provided to the flooring manufacturer's recommendations. Allowance for free drainage by suitably grading the sub-floor area to a suitable drainage outlet is necessary to prevent ponding. The use of a sump drained by submersible pumps may be necessary.

The clearance distance from finished ground level to any structural flooring component shall comply with the Building Code of Australia.

ELECTRICAL SERVICES

Main Power Supply

As required by the New South Wales Service and Installation Rules, service and metering equipment must not be installed in a location liable to be affected by floods that may cause deterioration of equipment.

If metering equipment is mounted in an elevated position access may be required as specified in AS 1657 "Fixed platforms, walkways, stairways and ladders - Design, construction and installation".

Means shall be available to easily disconnect the building from the main power supply.

Wiring and fixed electrical equipment

Wiring standard AS/NZS 3000 requires that all parts of an electrical installation shall be designed to be adequately protected against damage that might reasonably be expected from environmental and other external influences, which includes exposure to weather and water. All wiring, power outlets, switches etc. should, to the maximum extent possible, be located above the D.F.L. All electrical wiring installed below the D.F.L. should be suitable for continuous submergence in water and should contain no fibrous components. Only submersible-type splices or connections should be used below the D.F.L. All conduits located below the D.F.L. should be so installed that they will be self-draining if subjected to floodwaters.

Reconnection

Should any electrical device and/or part of the wiring be affected by floodwaters, it should be thoroughly cleaned or replaced, checked and thoroughly tested by an approved electrical contractor before reconnection.

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

MECHANICAL SERVICES

Heating and Air-Conditioning Systems

Heating and air-conditioning systems should, to the maximum extent possible, be installed in areas and spaces of the building above the D.F.L. When this is not feasible every precaution should be taken to minimise the damage caused by submersion by using non-corrosive materials.

Fuel Supply

Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off.

Installation

Fuel storage tanks should be mounted on and securely anchored to a foundation pad to prevent movement that could damage the fuel supply line. A mass concrete foundation may be necessary to overcome the buoyancy of empty tanks submerged by floodwaters to the DFL.

All storage tanks should be vented to an elevation of at least 600mm above the DFL.

Ducting

All ductwork located below the D.F.L. should be provided with openings for drainage and cleaning. Self-draining should be achieved by constructing ductwork on suitable grades. Where ductwork must pass through a watertight wall or floor below the D.F.L., the ductwork should be protected by a closure assembly.

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

Table 1

COMPONENT	MOST SUITABLE	SECOND PREFERENCE	THIRD PREFERENCE	TO BE AVOIDED
Flooring and sub-floor structure	• concrete slab-on-ground monolithic construction Note: Clay filling is not permitted beneath slab-on-ground construction subject to inundation. • suspended reinforced concrete slab with sub-surface free draining	• timber floor (T & G boarding, marine plywood) full epoxy sealed, on joints • fibre-cement sheets	• timber floor (T & G boarding, marine plywood) with ends only epoxy sealed on joints and provision of side clearance for board swelling	• timber floor close to ground with surrounding base • timber flooring with ceilings or soffit linings • timber flooring with seal on top only • T & G radiata pine
Floor covering	• clay tile • concrete, precast or in situ • concrete tiles epoxy formed-in-place • Mastic flooring formed-in-place • silicone floors formed-in-place	• cement/bituminous formed-in-place • cement/latex formed-in-place • rubber tiles with chemical-set adhesive • terrazzo • vinyl tile with chemical-set adhesive • vinyl-asbestos tiles asphaltic adhesives • loose rugs • ceramic tiles with acid and alkali-resistant grout	• asphalt tiles with asphaltic adhesive • loose fit nylon or acrylic carpet with closed cell rubber underlay	• asphalt tiles • carpeting, glue-down type or fixed with smooth edge on jute felts • ceramic tiles • chipboard (particle board) • cork • linoleum • PVA emulsion cements • rubber sheets or tiles • vinyl sheets or tiles • vinyl sheets or tiles coated on cork or wood backing • fibre matting

GUIDELINES FOR FLOOD COMPATIBLE MATERIALS

Table 1 (continued)

COMPONENT	MOST SUITABLE	SECOND PREFERENCE	THIRD PREFERENCE	TO BE AVOIDED
Wall structure (at least up to the D.F.L.)	• solid brickwork, blockwork, reinforced, concrete or mass concrete	• two skins of brickwork or blockwork (both with inspection openings)	• brick or blockwork veneer construction with inspection openings • galvanised steel framing ** • hardwood, cypress (Class 1 or 2) **	• inaccessible cavities • large window openings
Roofing structure (for situations where D.F.L. is above the ceiling)	• reinforced concrete construction • galvanised metal construction • galvanised steel	• timber trusses with galvanised fittings • cypress (Class 1 or 2 durability), hardwood or treated pine	• traditional timber roof construction	• inaccessible flat roof construction • ungalvanised steel work e.g. lintels, arch bars, tie rods, beams etc. • unsecured roof tiles
Doors	• solid core with water proof adhesives • flush door with marine ply filled with closed cell foam • painted metal construction • aluminium or galvanised steel frame	• flush panel or single panel with marine plywood and water proof adhesive • T & G lined door, framed ledged and braced • painted steel • timber frame fully epoxy sealed before assembly	• fly-wire doors • standard timber frame	• hollow core ply with PVA adhesives and honeycomb paper core • radiata pine frames or T & G linings

** Wall linings should be screwed onto frames to allow removal for drying

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

Table 1 (continued)

COMPONENT	MOST SUITABLE	SECOND PREFERENCE	THIRD PREFERENCE	TO BE AVOIDED
Wall and ceiling linings	• cement board • brick, face or glazed • clay tile glazed in waterproof mortar • concrete • concrete block • steel with waterproof applications • stone, natural solid or veneer, waterproof grout • glass blocks • glass • plastic sheeting with waterproof adhesive	• brick, common • plastic wall tiles • metals, non ferrous • rubber mouldings and trim • wood, solid or exterior grade plywood fully sealed	• chipboard exterior grade • hardboard exterior grade • wood, solid (boards or trim) with allowance for swelling • wood, plywood exterior grade • fibrous plaster board	• chipboard • fibreboard panels • mineral fibreboard • paperboard • plaster-board, gypsum plaster • wall coverings (paper, burlap cloth types) • standard plywood strawboard • radiata pine lining
Insulation	• foam or closed cell types	• reflective insulation	• bat or blanket types	• open cell fibre types
Windows	• aluminium frame with stainless steel or brass rollers	• epoxy sealed timber waterproof glues with stainless steel or brass fittings • galvanised or painted steel		• timber with PVA glues • mild steel fittings (untreated)
Nails, bolts, hinges and fittings	• brass, nylon or stainless steel • removable pin hinges	• galvanised steel • aluminium		• mild steel (untreated)

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GUIDELINES FOR

FLOOD COMPATIBLE MATERIALS

August 2000

Adopted by Council at its meeting dated 26 September 2000

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

PREAMBLE

All buildings constructed on flood liable land should conform to these guidelines.

Where part or all of the premises may be inundated by floodwaters, the following recommendations are made on the suitability of materials, components and fittings so that these are not adversely affected by flooding. The term 'D.F.L.' means Designated Floor Level.

Issue of these guidelines is not to be taken as an indication that Council will approve any building or development in flood liable areas. The guidelines serve to assist in the minimisation of flood damage and losses - they do not preclude building work requiring prior approval through the Development Consent process.

CONSTRUCTION METHODS & MATERIALS

Construction methods and materials are graded into four classes according to their resistance to floodwaters (see **Table 1**).

Commercial and industrial developments shall use either '1st Preference' or '2nd Preference' methods and materials only, recognising the greater level of risk associated with the '2nd Preference' option.

Materials listed as '3rd Preference' may be used in residential buildings if there are sound practical or economic reasons for their use. Designers, builders and owners should be aware of the higher level of risk and potential damage that will result from this compromise. Table 1 refers to the following classes:

Most Suitable (1st Preference)	The materials are relatively unaffected by submersion and flood exposure and are the best available for the particular application.
2nd Preference	Where the "most suitable" materials or products are unavailable or economic considerations prohibit their use, these materials are considered the next best choice to minimise the damage caused by flooding.
3rd Preference	Not suitable for commercial or industrial applications.
To be Avoided	The use of materials or products in this category is inappropriate for any area subject to inundation. In general any material that can absorb moisture and expand/contract excessively or disintegrate shall be avoided. If in doubt, check with the manufacturer.

GUIDELINES FOR FLOOD COMPATIBLE MATERIALS

SUB-FLOOR AREA

Sub-floor ventilation should be provided to the flooring manufacturer's recommendations. Allowance for free drainage by suitably grading the sub-floor area to a suitable drainage outlet is necessary to prevent ponding. The use of a sump drained by submersible pumps may be necessary.

The clearance distance from finished ground level to any structural flooring component shall comply with the Building Code of Australia.

ELECTRICAL SERVICES

Main Power Supply

As required by the New South Wales Service and Installation Rules, service and metering equipment must not be installed in a location liable to be affected by floods that may cause deterioration of equipment.

If metering equipment is mounted in an elevated position access may be required as specified in AS 1657 "Fixed platforms, walkways, stairways and ladders - Design, construction and installation".

Means shall be available to easily disconnect the building from the main power supply.

Wiring and fixed electrical equipment

Wiring standard AS/NZS 3000 requires that all parts of an electrical installation shall be designed to be adequately protected against damage that might reasonably be expected from environmental and other external influences, which includes exposure to weather and water. All wiring, power outlets, switches etc. should, to the maximum extent possible, be located above the D.F.L. All electrical wiring installed below the D.F.L. should be suitable for continuous submergence in water and should contain no fibrous components. Only submersible-type splices or connections should be used below the D.F.L. All conduits located below the D.F.L. should be so installed that they will be self-draining if subjected to floodwaters.

Reconnection

Should any electrical device and/or part of the wiring be affected by floodwaters, it should be thoroughly cleaned or replaced, checked and thoroughly tested by an approved electrical contractor before reconnection.

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

MECHANICAL SERVICES

Heating and Air-Conditioning Systems

Heating and air-conditioning systems should, to the maximum extent possible, be installed in areas and spaces of the building above the D.F.L. When this is not feasible every precaution should be taken to minimise the damage caused by submersion by using non-corrosive materials.

Fuel Supply

Heating systems using gas or oil as a fuel should have a manually operated valve located in the fuel supply line to enable fuel cut-off.

Installation

Fuel storage tanks should be mounted on and securely anchored to a foundation pad to prevent movement that could damage the fuel supply line. A mass concrete foundation may be necessary to overcome the buoyancy of empty tanks submerged by floodwaters to the DFL.

All storage tanks should be vented to an elevation of at least 600mm above the DFL.

Ducting

All ductwork located below the D.F.L. should be provided with openings for drainage and cleaning. Self-draining should be achieved by constructing ductwork on suitable grades. Where ductwork must pass through a watertight wall or floor below the D.F.L., the ductwork should be protected by a closure assembly.

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

Table 1

COMPONENT	MOST SUITABLE	SECOND PREFERENCE	THIRD PREFERENCE	TO BE AVOIDED
Flooring and sub-floor structure	• concrete slab-on-ground monolithic construction Note: Clay filling is not permitted beneath slab-on-ground construction subject to inundation. • suspended reinforced concrete slab with sub-surface free draining	• timber floor (T & G boarding, marine plywood) full epoxy sealed, on joints • fibre-cement sheets	• timber floor (T & G boarding, marine plywood) with ends only epoxy sealed on joints and provision of side clearance for board swelling	• timber floor close to ground with surrounding base • timber flooring with ceilings or soffit linings • timber flooring with seal on top only • T & G radiata pine
Floor covering	• clay tile • concrete, precast or in situ • concrete tiles epoxy formed-in-place • Mastic flooring formed-in-place • silicone floors formed-in-place	• cement/bituminous formed-in-place • cement/latex formed-in-place • rubber tiles with chemical-set adhesive • terrazzo • vinyl tile with chemical-set adhesive • vinyl-asbestos tiles asphaltic adhesives • loose rugs • ceramic tiles with acid and alkali-resistant grout	• asphalt tiles with asphaltic adhesive • loose fit nylon or acrylic carpet with closed cell rubber underlay	• asphalt tiles • carpeting, glue-down type or fixed with smooth edge on jute felts • ceramic tiles • chipboard (particle board) • cork • linoleum • PVA emulsion cements • rubber sheets or tiles • vinyl sheets or tiles • vinyl sheets or tiles coated on cork or wood backing • fibre matting

GUIDELINES FOR FLOOD COMPATIBLE MATERIALS

Table 1 (continued)

COMPONENT	MOST SUITABLE	SECOND PREFERENCE	THIRD PREFERENCE	TO BE AVOIDED
Wall structure (at least up to the D.F.L.)	• solid brickwork, blockwork, reinforced, concrete or mass concrete	• two skins of brickwork or blockwork (both with inspection openings)	• brick or blockwork veneer construction with inspection openings • galvanised steel framing ** • hardwood, cypress (Class 1 or 2) **	• inaccessible cavities • large window openings
Roofing structure (for situations where D.F.L. is above the ceiling)	• reinforced concrete construction • galvanised metal construction • galvanised steel	• timber trusses with galvanised fittings • cypress (Class 1 or 2 durability), hardwood or treated pine	• traditional timber roof construction	• inaccessible flat roof construction • ungalvanised steel work e.g. lintels, arch bars, tie rods, beams etc. • unsecured roof tiles
Doors	• solid core with water proof adhesives • flush door with marine ply filled with closed cell foam • painted metal construction • aluminium or galvanised steel frame	• flush panel or single panel with marine plywood and water proof adhesive • T & G lined door, framed ledged and braced • painted steel • timber frame fully epoxy sealed before assembly	• fly-wire doors • standard timber frame	• hollow core ply with PVA adhesives and honeycomb paper core • radiata pine frames or T & G linings

** Wall linings should be screwed onto frames to allow removal for drying

GUIDELINES FOR
FLOOD COMPATIBLE MATERIALS

Table 1 (continued)

COMPONENT	MOST SUITABLE	SECOND PREFERENCE	THIRD PREFERENCE	TO BE AVOIDED
Wall and ceiling linings	• cement board • brick, face or glazed • clay tile glazed in waterproof mortar • concrete • concrete block • steel with waterproof applications • stone, natural solid or veneer, waterproof grout • glass blocks • glass • plastic sheeting with waterproof adhesive	• brick, common • plastic wall tiles • metals, non ferrous • rubber mouldings and trim • wood, solid or exterior grade plywood fully sealed	• chipboard exterior grade • hardboard exterior grade • wood, solid (boards or trim) with allowance for swelling • wood, plywood exterior grade • fibrous plaster board	• chipboard • fibreboard panels • mineral fibreboard • paperboard • plaster-board, gypsum plaster • wall coverings (paper, burlap cloth types) • standard plywood strawboard • radiata pine lining
Insulation	• foam or closed cell types	• reflective insulation	• bat or blanket types	• open cell fibre types
Windows	• aluminium frame with stainless steel or brass rollers	• epoxy sealed timber waterproof glues with stainless steel or brass fittings • galvanised or painted steel		• timber with PVA glues • mild steel fittings (untreated)
Nails, bolts, hinges and fittings	• brass, nylon or stainless steel • removable pin hinges	• galvanised steel • aluminium		• mild steel (untreated)

17.07 Flood Report

NORTHROP

Level 1, Grafton Bond Store, 60 Hickson Road
Sydney NSW 2000
PO Box H171 Australia Square NSW 1215
T (02) 9241 4188 F (02) 9241 4324
E sydney@northrop.com.au

Associate Director - John Riordan
Architectus Sydney
Level 3, 341 George Street
Sydney NSW 2000

MEMO

Job No:	Job Name:	Date:	27.07.12
120413	Sub-Acute Rehab Unit – Moruya Hospital	Pages:	4 (including this page)

From	Mathew Richards

Cc	Company	Attention	
	NSW Government – Public Works Project Management	Frank DeSensi	
	Woods Bagot	Matt Williams	

Subject	Flood Management – Preliminary Advice

Hi John,

Reference our recent emails and conversations. This is with regard to the Sub-Acute Rehabilitation Unit Project at Moruya Hospital. In particular this relates to Northrop providing initial advice on the effects of flooding on the proposed development.

1. Northrop received flood information from Eurobodalla Shire Council – Coastal and Flood Management Planner (Norm Lenehan) – emails dated 25.07.12.

2. The information provided from Council provides data for peak flood levels and flood timing - associated with the Probable Maximum Flood (PMF), 500-year ARI, 200-year ARI and 100-year ARI events.

3. The attached marked-up sections have been prepared to indicate the flood levels – with respect to the current design for the proposed building works.

4. The plans indicate:

   i. The proposed Ground Floor Level (RL 6.25m AHD) is higher than the flood levels for the 100-year ARI (RL 5.69m AHD) and 200-year ARI (6.07m AHD).

   ii. The proposed First Floor Level (RL 10.47m AHD) is higher than all events.

   iii. The proposed Ground Floor Level is submerged by the 500-year ARI event (by 510mm) and the PMF event (by 1.65m)

5. The data from Eurobodalla Shire Council indicates the Flood Hazard Category of the flood liable land associated with the Moruya Hospital site varies from “very high” to “extreme” across the flood events.

6. The Moruya Floodplain Code (dated July 2012) indicates the following:

i. “Aged Care, places of public assembly and emergency management facilities below the PMF” are classed as “Inappropriate Development” for any Flood Hazard Category – [Section 2.0]

ii. Hospitals are considered to be “Vulnerable Developments”. This has implications when applying the Flood Planning Level. The Code applies restrictions on these types of developments above the FPL and up to the PMF – [Section 3.2.3]

Northrop offers the following preliminary comments with regard to flood management measures for the proposed development.

- The proposed Ground Floor Level (RL 6.25m AHD) provides 560mm freeboard to the 100-year ARI flood level and is 180mm higher than the 200-year ARI flood level.

- The suspended nature of the building minimises any potential disturbance of 100-year and 200-year ARI flows in Moruya River.

- The proposed Ground Floor Level is susceptible to inundation in the 500-year ARI and PMF events. At this (design development) stage, we would recommend the works consider a suitably designed (sealed) barrier / wall system comprising flood-compatible material to be incorporated for the full perimeter of the proposed building - from Ground Floor Level to PMF Level (i.e. from RL 6.25 to RL 7.90m AHD). This could include solid balustrade walls and / or appropriate design of the external building walls. This is with a view to addressing the provisions of Section 3.2.3 of the Moruya Floodplain Code – to isolate the building from potential inundation up to the PMF event.

- It is noted the proposed building works encroach into the floodway of the 500-year ARI and PMF events.

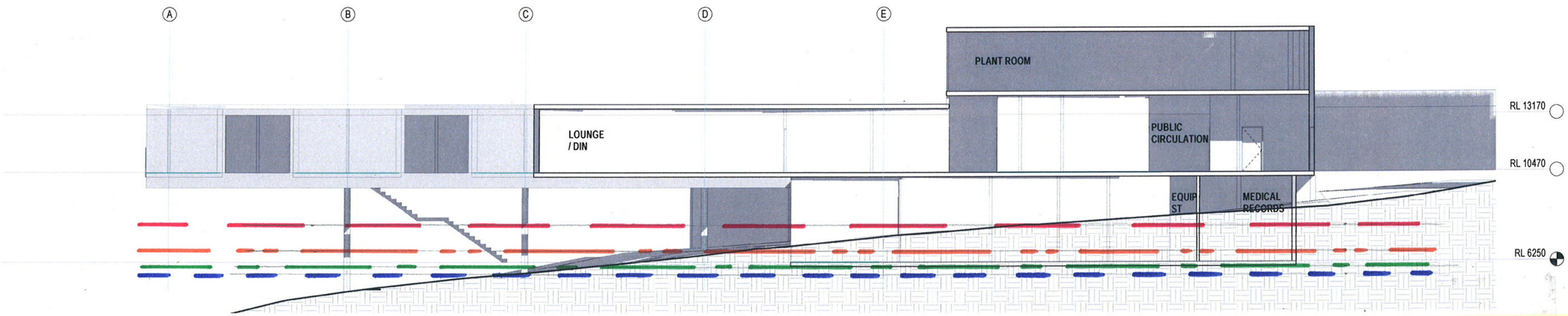
- Flood evacuation and emergency response plans associated with the proposed building works will need to be considered in conjunction with existing plans for the Hospital. It is anticipated the plans may need to be reviewed in light of the latest information from Council.

This initial feedback is provided for review and consideration by the Project Team. In this regard, we attach a copy of the Moruya Floodplain Code – where Appendix A provides a list of flood-compatible materials that could be considered for the flood barrier system to isolate flooding up to the PMF event levels.

We look forward to discussing and developing these outcomes in detail.

Regards,

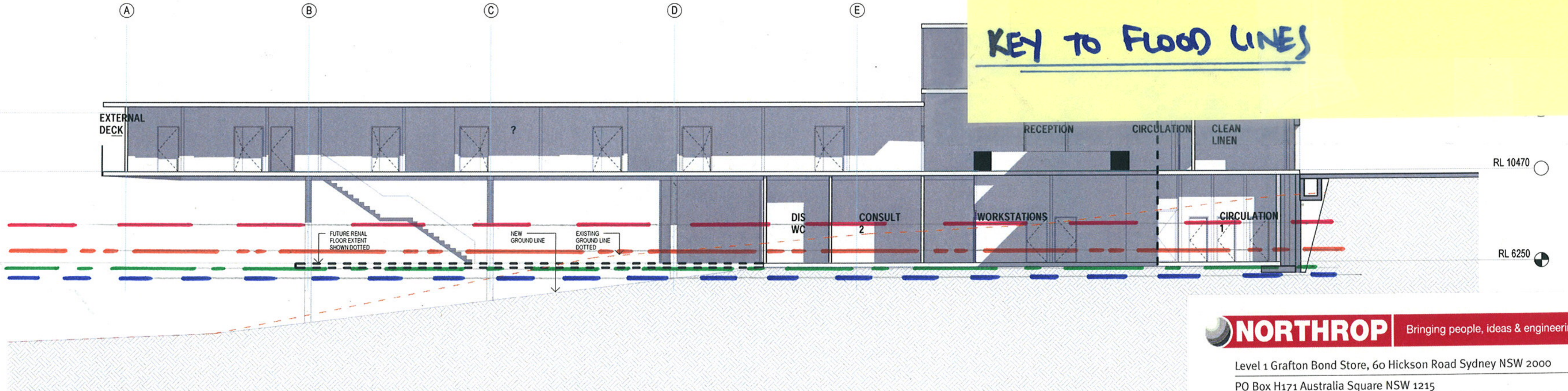
Mat Richards



1 Section 1
SCALE 1 : 100

EVENT	PEAK LEVEL	TIME OF PEAK (AFTER RIVER BEGINS TO RISE).
P.M.F.	RL 7.90m AHD	7.1 Hours
500 YEAR ARI	RL 6.76m AHD	7.0 Hours
200 YEAR ARI	RL 6.07m AHD	6.4 Hours
100 YEAR ARI	RL 5.69m AHD	8.0 Hours

KEY TO FLOOD LINES



2 Section 2
SCALE 1 : 100

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T (02) 9241 4188 F (02) 9241 4324 E sydney@northrop.com.au
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Rev Description Date App'd Rev Description Date App'd Rev Description Date App'd

Client
HEALTH INFRASTRUCTURE

Drawing title
SECTIONS

Project
Moruya Sub-Acute Rehab Unit

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WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 00-20-2164
Drawing number A3101
Revision
Status

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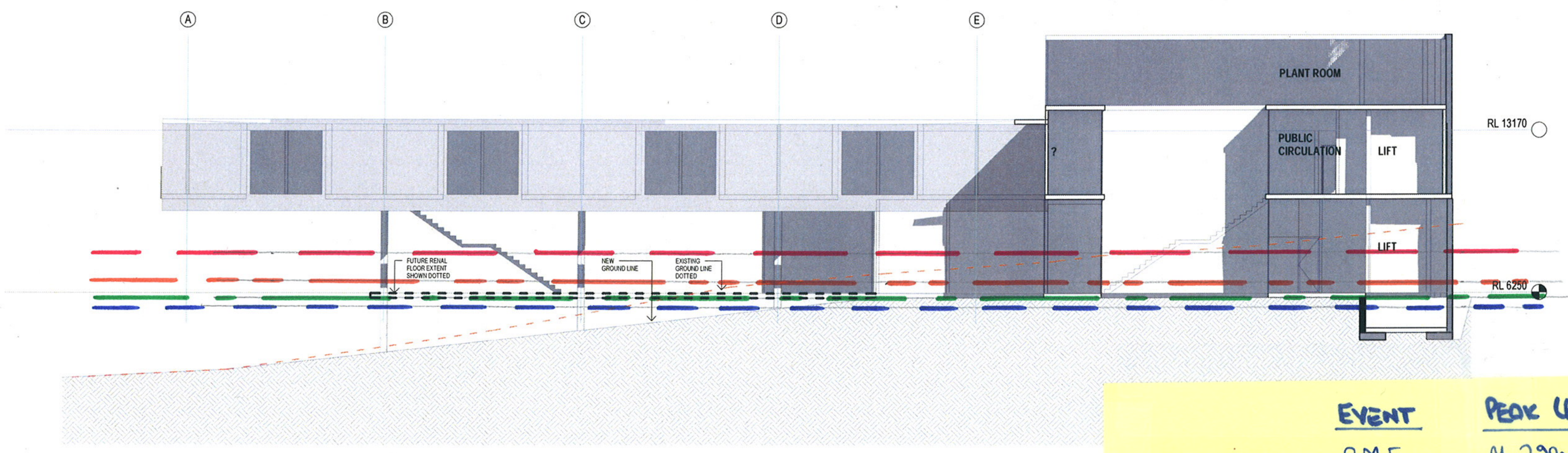
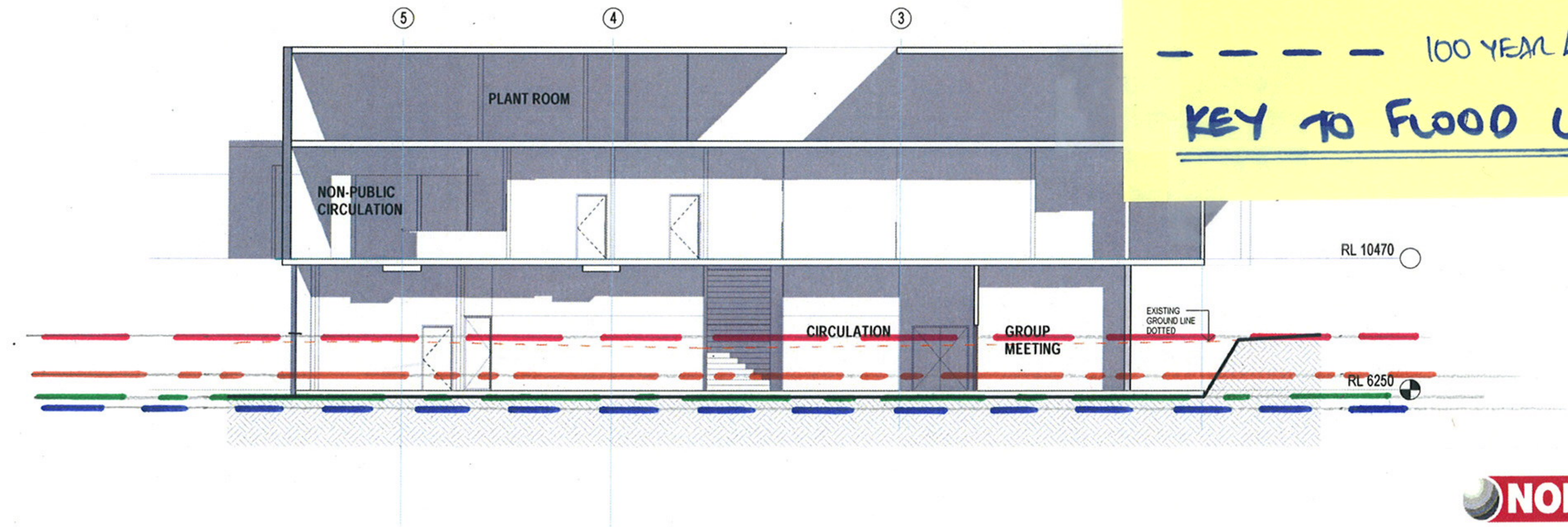


1 Section 3
SCALE 1 : 100

	EVENT	PEAK LEVEL	TIME OF PEAK (AFTER RIVER BEGINS TO RISE)
red long dash	P.M.F.	RL 7.90m AHD	7.1 HRS
orange dash-dot	500 YEAR ARI	RL 6.76m AHD	7.0 HRS
green dash-dot	200 YEAR ARI	RL 6.07m AHD	6.4 HRS
blue short dash	100 YEAR ARI	RL 5.69m AHD	8.0 HRS

KEY TO FLOOD LINES



2 Section 4
SCALE 1 : 100

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Level 1 Grafton Bond Store, 60 Hickson Road Sydney NSW 2000
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Rev	Description	Date	App'd	Rev	Description	Date	App'd	Rev	Description	Date	App'd

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Drawing title: SECTIONS
Project: Moruya Sub-Acute Rehab Unit
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Approved: JN
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WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number: 00-20-2164
Status
Drawing number: A3102
Revision

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NORTHROP

Level 1, Grafton Bond Store, 60 Hickson Road
Sydney NSW 2000

PO Box H171 Australia Square NSW 1215

T (02) 9241 4188 F (02) 9241 4324

E sydney@northrop.com.au

10th September 2012

Project Manager - Mr Frank DeSensi
NSW Government – Public Works Project Management
Level 3, Block E State Office Block
84 Crown Street
Wollongong NSW 2500

Dear Frank,

RE: Moruya Hospital - Proposed Sub-Acute Rehabilitation Units

Flood Impact Assessment and Management Report

NSW Government Health intends to establish a new Sub-Acute Rehabilitation Unit facility at Moruya Hospital. The proposed works incorporate construction of a new building. This Report has been prepared to support Development Application – to assess the impact of potential flooding on the proposed facility, and to describe site-specific flood protection and management measures.

This Report has not been prepared to assess (or comment on) the impact of flooding on the buildings and facilities comprising the existing Moruya Hospital complex.

1. The Site

The proposed development is located within the existing Moruya Hospital complex. The portion of the site intended for development of the Sub-Acute Rehabilitation Units is situated in primarily vacant land (adjacent to Moruya River). This part of the site falls within the Moruya River Floodway.

2. Existing Flood Conditions

Northrop received flood information from Eurobodalla Shire Council – Coastal and Flood Management Planner (Norm Lenehan), via emails dated 25.07.12. This information is provided in Appendix A. The following peak flood levels for the respective events (and associated timing for these levels) have been interpreted from the Council flood data.

Flood Event	Peak Flood Level	Time of Peak Level (i.e. from time river begins to rise)
Probable Maximum Flood (PMF)	RL 7.90m AHD	7.1 hrs
500-year ARI	RL 6.76m AHD	7.0 hrs
200-year ARI	RL 6.07m AHD	6.4 hrs
100-year ARI	RL 5.69m AHD	8.0 hrs

The data from Eurobodalla Shire Council indicates the Flood Hazard Category of the flood-liable land associated with Moruya Hospital site varies from "very high" to "extreme" across the range of flood events.

3. Moruya Floodplain Code – July 2012

The Moruya Floodplain Code indicates the following general provisions (with respect to hospitals).

- "Aged Care, places of public assembly and emergency management facilities below the PMF" are classed as "Inappropriate Development" for any Flood Hazard Category. Refer to Section 2.0 of the Code.
- Hospitals are considered to be "Vulnerable Developments". The Code applies restrictions on these types of development above the Flood Planning Level (FPL) and up to the PMF event. Refer to Section 3.2.3 of the Code.

4. Eurobodalla Shire Council Pre-Development Application (Pre-DA) Meeting – 07.08.12

A pre-DA meeting was held between Project Stakeholders and Eurobodalla Shire Council on 7th August 2012. The outcomes of the meeting were recorded and circulated in Council correspondence dated 23 August 2012. The following points summarise the notes relating to "Flood and Sea Level Rise" – to be considered as part of this assessment of flood impacts.

- The proposed additions are located on flood affected land.
- The Moruya Floodplain Code 2012 (Section 2.0) requires emergency service facilities to be designed above the PMF level.
- The emergency services functions within the hospital are located on the first floor.
- The proposed level of the ground floor will be below PMF level – but above the 100-year ARI flood level plus 500mm freeboard.
- The proposed ground floor level will house ancillary medical services (including day rooms).
- The Moruya Floodplain Code aims to ensure emergency response and recovery facilities (and the infrastructure) can fulfill their functions during and after a flood event.
- The applicant should include information that demonstrates that these facilities and the infrastructure can fulfill their emergency response and recovery functions or demonstrate that the facilities below the PMF are not applicable to these functions.

5. Proposed Development

The proposed Sub-Acute Rehabilitation Unit comprises a two (2)-storey building, with Plant Room at higher level (located below the roof at the southern side). Architectural Plans have been prepared by Woods Bagot to support Development Application – refer to Appendix B. In general, the plans indicate the following for the respective levels of the proposed building:

- The Main Internal Plant Room (RL 14.07m AHD and higher) includes electrical switchboard, mechanical switchboard, and air-conditioning condensing unit (within roof space).
- The First Floor (RL 10.47m AHD) comprises predominantly bedroom suites and the associated main service areas to the new building (e.g. reception, storage, cleaning, kitchen, medical records, linen and communications room).

- The Ground Floor (RL 6.25m AHD) comprises consultation rooms, offices, workstations and associated service areas (e.g. storage, cleaning, etc.). It is noted a lift services this level. A separate terrace is also proposed to be located over the Moruya River 'overbank' area – at RL 6.25m AHD.

  The activities on this floor have been described as 'ancillary' (refer Section 4. – above), and will be supervised and only occupied during 'normal working hours' (e.g. there is no overnight stay).

6. Potential Flood Impacts on Development

The Architectural Sections in Appendix C have been marked-up to indicate the respective flood levels, and their relationship to the proposed building levels. The plans indicate:

6.1 Main Internal Plant Room

The proposed Main Internal Plant Room Level (RL 14.07m AHD and higher) is higher than the flood levels provided by Council for all flood events up to (and including) the PMF event (RL 7.90m AHD).

6.2 First Floor

The proposed First Floor Level (RL 10.47m AHD) is higher than the flood levels provided by Council for all flood events up to (and including) the PMF event (RL 7.90m AHD).

6.3 Ground Floor

The proposed Ground Floor Level (RL 6.25m AHD) is higher than the flood levels provided by Council for the 100-year ARI (RL 5.69m AHD) and 200-year ARI (6.07m AHD) events. This level is also higher than the 100-year ARI flood + 500mm freeboard level (RL 6.19m AHD).

The proposed Ground Floor Level would be submerged by events exceeding the 200-year ARI event. It is 1.65m lower than the PMF level.

7. Flood Protection Measures

7.1 Main Internal Plant Room

The Main Internal Plant Room is higher than any flood level up to (and including) the PMF event. The Architectural Plans show this area includes electrical and mechanical switchboards, and plant. This infrastructure will need to incorporate isolation from flood-liable areas – so as to remain operational to the flood-free areas in times of flood.

7.2 First Floor

The First Floor level is higher than any flood level up to (and including) the PMF event. The Architectural Plans show this area incorporates a communications room and lift to Ground Floor Level.

The communications infrastructure at this level will need to incorporate isolation from flood-liable areas – so as to remain operational to the flood-free areas in times of flood.

The proposed lift will suffer inundation in floods exceeding the 1:200-year ARI event (via the Ground Floor) – unless physical barrier controls are implemented to protect the lift at

Ground Floor Level. In any case, it is noted the First Floor Level has been set to maintain direct connectivity with the existing hospital infrastructure – and does not rely on access from this lift during a flood event.

7.3 Ground Floor

The Ground Floor Level is proposed at RL 6.25m AHD. This would be inundated during floods exceeding the 1:200-year ARI event. The planning of uses / spaces for the proposed building has responded to the potential impact of flooding at this level. This is with a view to reducing the risk to people, and maintaining the overall emergency response and recovery function of Moruya Hospital during and after a flood event.

The following points summarise the principles for flood protection of specific aspects of the Ground Floor Level.

- The activities on the Ground Floor Level have been described as 'ancillary' (refer Section 4. – above), and will be supervised and only occupied during 'normal working hours' (e.g. there is no overnight stay). This will promote readily monitoring the potential threats of flooding, and taking action in advance of a flood event (in accordance with the Flood Evacuation Management Plan).
- Cleaners rooms, storerooms and the terrace located at Ground Floor Level will be subject to inundation in floods exceeding the 200-year ARI event. No potentially hazardous or significant pollutant materials should be stored at this level.
- The proposed lift will suffer inundation in floods exceeding the 200-year ARI event unless physical barrier controls are implemented to protect the lift at Ground Floor Level (up to PMF level - RL 7.90m AHD). The design and construction / installation of the lift (including associated structure and plant) should consider the potential for inundation up to PMF level.
- All equipment, plant and finishes at Ground Floor Level (e.g. working stations, etc.) are susceptible to inundation by floods exceeding the 200-year ARI event. Where no physical flood-barrier controls are proposed, the Proponent should accept the inherent risk associated with locating the Ground Floor facilities within the Moruya River flood-path. This should also consider limiting the potential for loose / buoyant material to become debris in times of flood (as part of the design, construction and fit-out process), to avoid causing downstream flood damage.
- All utility services infrastructure and bedrooms for longer-term stays are located on First Floor Level (or above). The infrastructure at First Floor Level will need to provide for isolation from flood-liable areas (e.g. the Ground Floor) – so as to remain operational to the flood-free areas in times of flood.

7.4 General Development Controls to Address Flooding

The following controls have been identified as relevant to flood protection and flood management strategies for the new building work. These will complement the principles for planning building spaces (as outlined in Sections 7.1, 7.2 and 7.3 - above).

- Suspended Building - The northern portion of the proposed building has been designed to project over the embankment of the Moruya River. This serves to generally maintain floodway capacity within the River, particularly up to the 100-year ARI flood event (i.e. approximately the underside of the building structure). Supporting columns / foundations shall be designed to minimise the impact to flooding and flow movement - and withstand the forces of floodwater, flood debris and buoyancy up to and including the PMF event.

- Structural Soundness – Structure is to be capable of withstanding forces of floodwater, flood debris and buoyancy up to and including the PMF event.
- Building Materials – All building materials below the PMF level shall be flood compatible (i.e. less susceptible to damage by flood waters, or easier to clean after a flood). Appropriate materials are listed in the Moruya Floodplain Code.
- Fencing – No fencing has been identified on the current Architectural Plans however any fencing proposed as part of this development within flood-liable land shall be constructed in a manner that does not obstruct floodwaters, and withstands the forces of floodwaters (or collapses in a controlled manner that does not become debris, an obstruction or cause unsafe conditions).

8. Flood Emergency Response Plan

A site-specific Flood Emergency Response Plan will need to be implemented prior to operation of the proposed Sub-Acute Rehabilitation Unit development. The following items will form the basis of the Plan. This is in conjunction with, and with reference to, the principles of the "Floodplain Development Manual", NSW Government, April 2005; and "Moruya Floodplain Code", Eurobodalla Shire Council, July 2012:

- Integrate proposed flood evacuation practices with existing procedures and Plans at site, local or regional levels. Specifically this will include Local SES Plans and the "Eurobodalla Health Service - Disaster Response Plan", NSW Government Health - Southern NSW Local Health Network, May 2011.
- Nominate personnel responsible for maintaining and implementing the Flood Plan for the Moruya Hospital Sub-Acute Rehabilitation Unit.
- Maintain constant access to early flood warning systems by Authorities (e.g. Bureau of Meteorology).
- Installing flood detection switches to initiate warning lights and alarms to alert Hospital staff and local rescue teams (e.g. within stormwater drainage pits located on the bank of the Moruya River).

  The level of the flood detection switch would be subject to the timing required for evacuation. As a guide, the PMF is an event that would 'breach' the Ground Floor Level, and rises at a rate of approx. 500mm per hour. On this basis, switches could be installed in pits located approx. 2.0m lower than Ground Floor Level (e.g. RL 4.25m AHD) to provide four (4) hours evacuation time.
- Restrict access to the Ground Floor Level (e.g. close off all doorway and lift entries) in times of flood warning.
- Educating Hospital Staff on the flood-susceptibility, evacuation and management practices for the development using operating manuals, induction procedures, etc.
- Communicate flood-susceptible areas to visitors to the proposed development (e.g. using signage / evacuation maps).
- Clearly communicate / delineate evacuation paths from the Ground Floor Level to flood-free areas. This includes incorporating evacuation routes on maps and utilising 'exit' signage to

direct evacuees to refuge areas above the PMF level (i.e. First Floor Level). This would also include coordinating the use of fire stairs to obtain access from the Ground Floor to First Floor Level.

- Incorporating any specific requirements / procedures into the Plan – for example, outlining methods for installing physical flood barriers (if proposed as part of the final design).

9. Conclusion

Northrop has prepared this Flood Impact Assessment and Management Report to support Development Application for the proposed Sub-Acute Rehabilitation Unit at Moruya Hospital. The area of proposed development is subject to flooding – up to and including the Probable Maximum Flood event. This assessment has been prepared to respond to the general requirements of Eurobodalla Shire Council, and particularly address the objective to:

Demonstrate that the critical "emergency response and recovery facilities and the infrastructure" [provided by Moruya Hospital] can fulfill its function or demonstrate that the proposed facilities below the PMF are not applicable to these functions – in times of flood.

i. The Ground Floor Level is susceptible to flooding in events greater than the 200-year ARI event. For this reason, only 'ancillary' uses are proposed on this level – incorporating consultation rooms, offices, workstations and associated service areas (e.g. storage, cleaning, etc.). The nature of these uses will be fully supervised and only occupied during 'normal working hours' (e.g. there is no overnight stay).

ii. The First Floor Level is free from inundation for all floods up to and including the Probable Maximum Flood event. The First Floor Level has been set to maintain direct connectivity with the existing hospital infrastructure.

iii. All proposed utility services infrastructure and bedrooms for longer-term stays are to be located on First Floor Level (or above). The infrastructure at First Floor Level will need to provide for isolation from flood-liable areas (e.g. the Ground Floor) – so as to remain operational to the flood-free areas in times of flood.

iv. A portion of the proposed building has been designed to project over the 100-year ARI flood level of the Moruya River. Supporting columns / foundations shall be designed to minimise the impact to flooding and flow movement - and withstand the forces of floodwater, flood debris and buoyancy up to and including the PMF event. Similarly, it is proposed all structure is to be capable of withstanding the forces of floodwater, flood debris and buoyancy up to and including the PMF event – to maintain integrity of the building during flooding.

v. A site-specific Flood Emergency Response Plan will need to be implemented prior to operation of the proposed facility. This will be prepared to integrate with existing (site, local and regional) Disaster Response Plans. In particular, the Plan shall be prepared to promote:

   - Early warning flood protection (e.g. using access to Authority warning systems (Bureau of Meteorology), physical on-site alarm systems, etc.);
   - Education and communication to visitors and staff (e.g. evacuation maps, signage, staff inductions, etc.), and
   - Restrictions on access to flood-susceptible areas in times of flood warning (i.e. the Ground Floor Level).

Northrop remains available to offer further advice throughout the progress of the project – including this Development Application (assessment) process.

Yours faithfully,

NORTHROP

Mathew Richards

Principal – Civil Engineer

BE(Civ) GradDipLGE MIEAust CPEng NPER GAICD

17.08 Ecological Report

RIPARIAN ASSESSMENT

Moruya Hospital 20 Bed Sub Acute Unit

Prepared for
NSW Government Health Infrastructure

3 September 2012

DOCUMENT TRACKING

ITEM	DETAIL
Project Name	Riparian Assessment - Moruya Hospital 20 Bed Sub Acute Unit
Project Number	12NARECO-0017
File location	T:\Projects\12NARECO\12NARECO-0017 Moruya Hospital Expansion\Report\12NARECO-0017 Riparian Assessment - Moruya Hospital 20 Bed Sub Acute Unit DRAFT.docx
Prepared by	Ryan Smithers
Reviewed by	David Coombes
Status	DRAFT
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This report should be cited as 'Eco Logical Australia 2012. *Riparian Assessment: Moruya Hospital 20 Bed Sub Acute Unit*. Prepared for NSW Government Health Infrastructure.'

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This document has been prepared by Eco Logical Australia Pty Ltd with support from Jane Fielding at Architectus.

Contents

List of Figures

1 Introduction

Eco Logical Australia (ELA) was engaged by NSW Government Health Infrastructure to undertake a riparian assessment of the proposed 20 Bed Sub Acute Unit at Moruya Hospital.

This assessment examines the consistency of the proposal with the requirements of the *Water Management Act 2000*, *Marine Parks Act 1997*, *Fisheries Management Act 1994* and the objectives for riparian corridors identified in the *Eurobodalla Local Environment Plan 2012*. The report also includes an assessment of the proposal pursuant to pursuant to Section 79C of the *NSW Environmental Planning & Assessment Act 1979* (EP&A Act) and Section 5A of the EP&A Act.

1.1 DESCRIPTION OF PROPOSAL

The proposed development comprises the provision of a new sub-acute rehabilitation facility at the Moruya District Hospital, internal upgrades to existing buildings, new car-parking and loading areas, demolition works, relocation of gas tanks and part of the existing sewerage system, excavation and landscaping, as shown in Figure 1.

The ground floor of the proposed additions will be in part below the probably maximum flood level but will be above the 1 in 100 year flood level. However there will be no filling within the 1 in 100 year flood level and the building will be built on piers, as shown in Figure 2.

The proposal does not involve any direct impacts on the remnant native riparian vegetation fringing the Moruya River. However it does involve excavation for the footings of the proposed new sub-acute rehabilitation facility within approximately 10-12 m of the top of bank of the Moruya River. It may also includes some additional shading of remnant native riparian vegetation where the second floor of the proposed facility will be cantilevered and extend to within 5-6 m of the remnant native riparian vegetation.

1.1.1 Environmental Safeguards

Specific environmental safeguards have been incorporated into the proposal to minimise impacts on water quality, flora and fauna, community safety and on the environment generally. These safeguards or mitigating measures include:

1. All remnant native riparian vegetation will be retained and protected during the construction phase of the proposal.
2. Fill used for the proposal will be clean fill collected on site and consistent with relevant regulations so as to avoid any potentially adverse impacts on receiving waters.
3. Appropriate sediment control measures will be implemented prior to the commencement of construction work and retained in place until exposed areas are stabilised and/or revegetated.
4. The stormwater management system for the proposal will be designed and maintained so as to avoid any potentially adverse impacts on the environment and particularly on receiving waters.
5. Measures will be in place during the construction phase to avoid any discharges to the Moruya River which may have adverse impacts on water quality or aquatic habitats.

1.2 CONSULTATION

Consultation for the preparation of this riparian assessment has been as follows:

1. A phone conversation with David Zarafa of the NSW Office of Water (NoW) on 13 July 2012. David confirmed that if the proposal is undertaken by or on behalf of a public authority, then it is exempt from the requirement to obtain a controlled activity approval under Part 3, Chapter 3 of the *Water Management Act 2000*. However, David indicated that the proposal still needed to comply with the objectives and principles of the *Water Management Act 2000*.

2. A phone conversation with Mr Trevor Daly from NSW Fisheries on 13 July 2012. Trevor indicated that the proposal was unlikely to trigger the *Fisheries Management Act 1994* unless it included actions with the potential to result in adverse impacts on water quality or fish habitats within the Moruya River. These actions include adverse impacts on bank stability or actions which divert effluent or stormwater to the Moruya River. Trevor was supportive of any actions as part of the proposal which would enhance the riparian vegetation fringing the Moruya River.
3. A phone conversation with Shamaram Eichmann of the NSW Marine Parks Authority on 13 July 2012. Shamaram indicated that the proposal needed to demonstrate that there would be no adverse impacts on the Batemans Marine Park General Use Zone, which covers the tidal areas of the Moruya River including the waters immediately adjacent to the Moruya Hospital. Shamaram was supportive of any actions as part of the proposal which would enhance the riparian vegetation fringing the Moruya River.
4. Consultation with Eurobodalla Shire Council – The project team met with representatives of Eurobodalla Shire Council on 7 August 2012. Eurobodalla Shire Council identified that the proposal would need to address clause 6.7 “Riparian Lands and Watercourses” of the Eurobodalla Local Environmental Plan 2012. It was also confirmed that an assessment of significance in accordance with Section 5A of the EP&A Act, was required to assess the impacts on the proposal on endangered ecological communities.

Figure 1: The proposal site plan

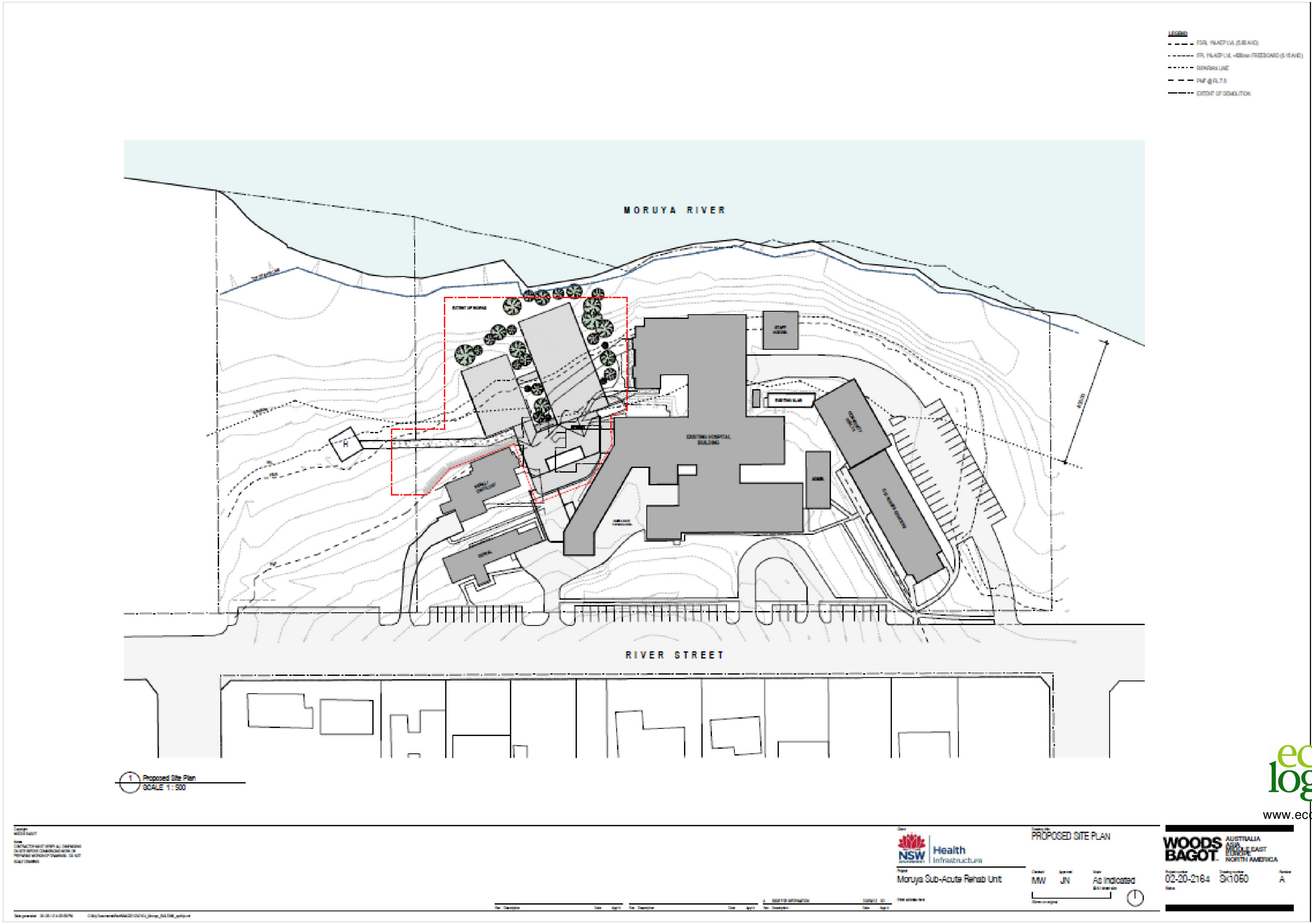

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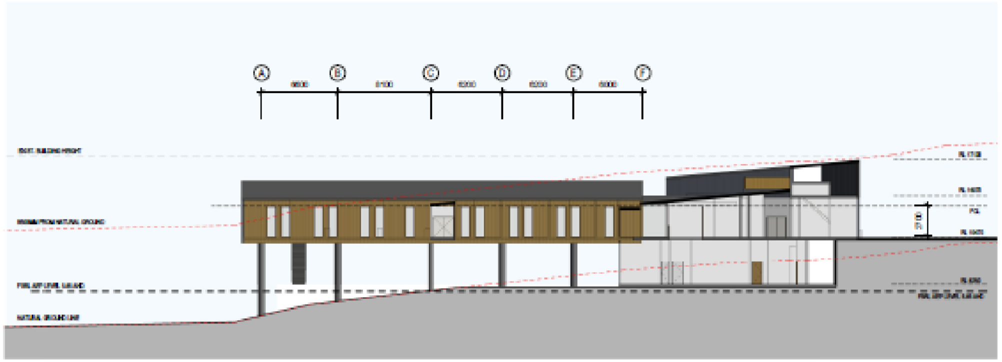
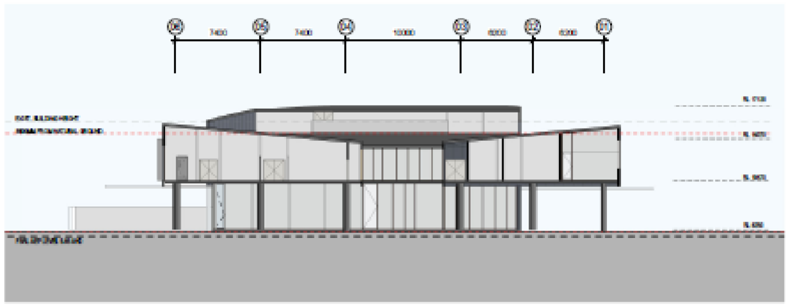
Figure 2: Section of the proposed Sub Acute Unit



Section 01
SCALE 1 : 200



Section 02
SCALE 1 : 200

Data Sources:
Woods Bagot

www.ecoaus.com.au

NSW Health Infrastructure

Moruya Sub-Acute Rehab Unit

SECTIONS 01 (STAGE 02)

MW JN 1 : 200

WOODS BAGOT. AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

02-20-2164 SK3100 C

2 Methods

2.1 REVIEW OF EXISTING DATA

A review of relevant information was undertaken prior to the commencement of field studies, which involved reviewing the concept drawings, topographic maps, the NSW Office of Water "Guidelines for riparian corridors", and the riparian category layer on Eurobodalla Shire Council's (ESC) public Geographic Information System (GIS).

2.2 RIPARIAN ASSESSMENT METHODS

A site inspection of the Moruya Hospital site was undertaken over a period of approximately two hours on 6 August 2012.

The Moruya River was classified according to the Strahler System of ordering watercourses and relevant watercourse morphology, such as the top of bank, were confirmed and photographs taken at various points within and surrounding the hospital.

An assessment of the riparian vegetation was undertaken with reference to Tozer *et. al.* (2006) and the Final Determinations of the NSW Scientific Committee to ascertain whether it comprised a listed threatened ecological community.

The impacts of the proposal in relation to the relevant objectives and principles of the *Water Management Act,* clause 6.7 of the Eurobodalla LEP 2012 and Section 5A of the EP&A Act are assessed in Section 4.

3 Results

3.1 RIPARIAN CLASSIFICATION

The NSW hydrology mapping, which is reflected in the watercourse mapping on the Moruya 1: 25000 topographic map, identifies the Moruya River as a fourth order watercourse according to the Strahler System of ordering watercourses. As such, the NoW guidelines for riparian corridors recommend a 40 m vegetated riparian zone (VRZ).

According to the Eurobodalla LEP 2012 layers available on the ESC public GIS, the Moruya River is classified as a Category 1 watercourse. In accordance with clause 6.7 of Eurobodalla LEP 2012, a category 1 watercourse requires a 40 m core riparian zone (CRZ).

3.2 TOP OF BANK

The top of bank of the Moruya River within the study area was assessed against the top of bank identified on the site plan prepared by Woods Bagot. The top of bank was found to correlate well with the mapping on the site plan.

Photo 1: The top of bank of the Moruya River in the vicinity of Moruya Hospital is very well defined.

3.3 RIPARIAN VEGETATION

The riparian vegetation within the hospital site and immediate surrounds was assessed. The study area was found to support two vegetation communities; Remnant Riparian Vegetation and Lawn with Scattered Plantings, as shown in Figure 3.

Figure 3: The vegetation within the Moruya Hospital site

Subject Land

Cadastre

Lawn with scattered plantings

Remnant Native Riparian Vegetation

0 15 30 60
Meters

Datum/Projection:
GDA 1994 MGA Zone 56

Data Sources:
Bing Aerials

N

eco logical AUSTRALIA

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3.3.1 Remnant Riparian Vegetation

The remnant riparian vegetation within the study area is characterized by a narrow strip of Swamp Oak *Casuarina glauca* on the top of bank, with a few Coastal Grey Box *Eucalyptus bosistoana* individuals, above a very weedy understorey and groundcover. It is difficult to predict the pre-European vegetation given the degree of disturbance however it is considered likely that, given the outcropping granite, that most of the Moruya Hospital site would have supported the Southeast Lowland Grassy Woodland of Tozer *et. al.* (2006), with those areas with deeper alluvial soils on the floodplain supporting either the Southeast Lowland Swamp Woodland of Tozer *et. al.* (2006), or the Floodplain Swamp Forest of Tozer *et. al.* (2006). The heavily disturbed narrow strip of remnant vegetation currently supports elements of each of the communities.

The remnant riparian vegetation comprises a dense canopy of Swamp Oak to 10-15 m in height with three emergent mature and three young Coastal Grey Box individuals in the central parts of the study area, immediately adjacent to the existing hospital building. There is a patchy midstorey of Sweet Pittosporum *Pittosporum undulatum* and Black Wattle *Acacia mearnsii* to a height of approximately 4 m, which also includes one Kurrajong *Brachychiton populneus* individual.

The understorey is very weedy and is dominated by shrub weeds such as Large Leaved Privet *Ligustrum lucidum*, African Boxthorn *Lycium ferocissimum*, Small Leaved Privet *Ligustrum sinense*, New Zealand Laurel *Coprosma repens*, Canary Island Date Palm *Phoenix canariensis*, and Wild Tobacco Bush *Solanum mauritianum*, with occasional natives such as Coffee Bush *Breynia oblongifolia* and Native Peach *Trema aspera*.

The groundcover is also very weedy, with extensive infestations of intractable weeds such as Cape Ivy *Delairea odorata*, Turkey Rhubarb *Acetosa sagittata*, Trad *Tradescantia fluminensis,* Kikuyu *Pennisetum clandestinum* and Japanese Honeysuckle *Lonicera japonica*. A range of other problematic environmental weeds occur less abundantly including Asparagus Fern *Asparagus aethiopicus*, Mother-of-millions *Bryophyllum delagoense*, Cape Daisy *Dimorphotheca ecklonis*, and Stonecrop *Crassula multicava*. Ubiquitous environmental weeds such as Panic Veldt Grass *Ehrharta erecta*, Purpletop *Verbena bonariensis*, Spear Thistle *Cirsium vulgare*, Dandelion *Taraxacum officinale*, Flatweed *Hypochaeris radicata* and Lamb's Tongues *Plantago lanceolata* are scattered throughout.

The only common native groundcovers are those which are very tolerant of, and often an artifact of disturbance, such as Common Bracken Fern *Pteridium esculentum*, Stinging Nettle *Urtica inciza* and Weeping Meadow Grass *Microlaena stipoides*. Other native groundcovers which occur in very low numbers include *Austrodanthonia racemosa*, Scrambling Lily *Geitonoplesium cymosum* and along the waters edge, Warrigal Greens *Tetragonia tetragonioides*.

A few individuals of Grey Mangrove *Avicennia marina* occur in places below the high tide mark.

3.3.2 Lawn with Scattered Plantings

The remainder of the vegetated areas of the hospital support well maintained lawn with scattered ornamental plantings of mainly exotic species. The lawn is dominated by Kikuyu, but also includes a range of exotic grasses and forbs such as Narrow-leafed Carpet Grass *Axonopus fissifolius*, Paspalum *Paspalum dilatatum*, and White Clover *Trifolium repens*.

Photo 2: A few Coastal Grey Box trees occur where granite outcrops within the riparian zone.

Photo 3: Swamp Oak dominates where there are deeper alluvial soils in association with the floodplain.

Photo 4: The understorey and groundcover of the remnant riparian vegetation is typically very weedy.

Photo 5: The bulk of riparian zone within the hospital and surrounds comprises well maintained lawn with scattered ornamental plantings.

4 Riparian Assessment

The following sections assess the impacts of the proposal in relation to the relevant objectives and principles of the *Water Management Act* and clause 6.7 of the Eurobodalla LEP 2012, and pursuant to Section 5A of the EP&A Act.

4.1 WATER MANAGEMENT ACT

As identified in Section 1.2, as the proposal will be undertaken by or on behalf of NSW Health Infrastructure it is exempt from the requirement to obtain a controlled activity approval under Part 3, Chapter 3 of the *Water Management Act 2000*. However, the proposal must still comply with the objectives and principles of the Act. In this context, the proposal is assessed below against the NoW guidelines for riparian corridors.

As a fourth order watercourse according to the Strahler System of ordering watercourses, the NoW guidelines for riparian corridors recommend a 40 m VRZ for the Moruya River.

The relevant objectives for riparian corridor management include:

- Seek to maintain the VRZ with fully structured native vegetation.
- Seek to minimize disturbance and harm to the recommended VRZ.
- Locate services and infrastructure outside the VRZ.
- Treat stormwater runoff before discharging into the VRZ.

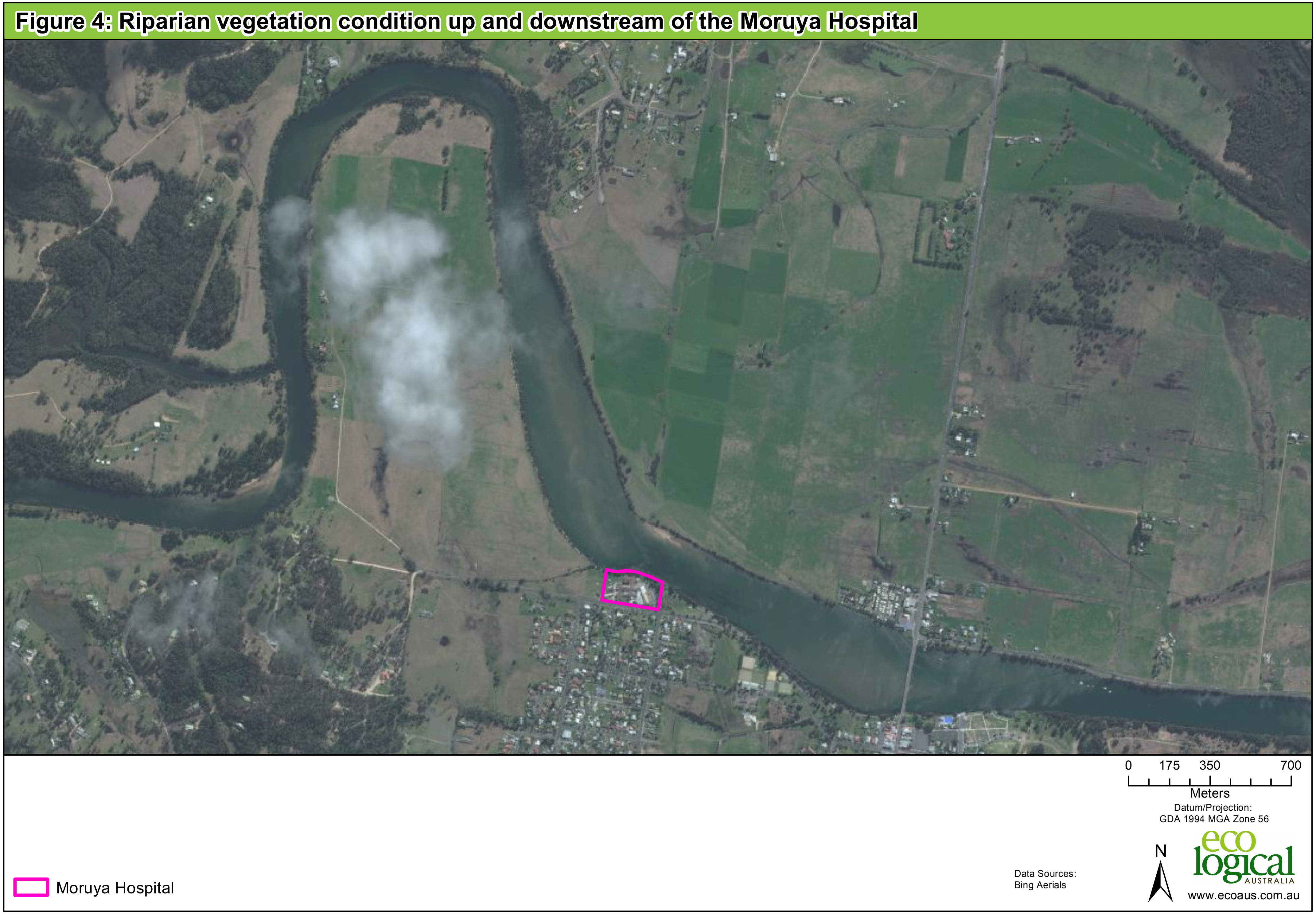
The proposal is assessed below against each of these objectives.

4.1.1 Maintain the VRZ with fully structured native vegetation

This objective is considered inappropriate for the Moruya Hospital site given the highly modified nature of the native vegetation within the VRZ within the site and both up and downstream. Whilst the proposal includes the protection of the existing remnant native vegetation within the VRZ, enhancement through plantings of trees and shrubs characteristic of the remnant native vegetation, and enhancement through weed control, rehabilitating the VRZ with fully structured native vegetation would potentially substantially constrain the future development and operation of the hospital. Furthermore it is considered that rehabilitating the VRZ with fully structured native vegetation would have negligible benefit to the environmental functions provided by the riparian zone, given the highly modified nature of the VRZ on both banks of the Moruya River for several kilometers up and downstream of the hospital .

The existing hospital and the proposed additions extend well into the VRZ, as shown in Figure 1, which predominately comprises buildings, hard surfaces, or lawn with scattered plantings, apart from a narrow, typically 5 m wide, fringe of remnant vegetation on the top of bank and river bank. This is typical of the VRZ on both banks of the Moruya River for several kilometers up and downstream of the hospital, as shown in Figure 4. Under these circumstances, rehabilitating the VRZ within the Moruya Hospital with fully structured native vegetation is inappropriate given the negligible benefits and potential constraints on the operation of the hospital.

Figure 4: Riparian vegetation condition up and downstream of the Moruya Hospital



Furthermore, the remnant riparian vegetation within the Moruya Hospital, as with vast majority of the riparian vegetation within the tidal parts of the river, is very heavily infested with weeds. As such, any attempts to re-establish fully structured native vegetation would be compromised by weed invasion from the large source of weed propagules both within the hospital site, and upstream. An extensive ongoing weed control program would be required to manage the impacts of weeds at considerable expense.

Given the relative isolation of the remnant riparian vegetation within the hospital from any substantial patches of riparian vegetation upstream, there is little benefit, from a fauna habitat or connectivity perspective in establishing fully structured native vegetation within the VRZ.

The bank of the Moruya River within and immediately adjacent to the hospital appears, given the size of the remnant trees, to have been relatively stable in recent decades at least. The bank has also been stabilised through the addition of granite boulders as has the entirety of the banks of the Moruya River for several kilometers up and downstream of the hospital. In this context, establishing fully structured native vegetation within the VRZ is unlikely to contribute and any significant way to bank stability.

4.1.2 Seek to minimize disturbance and harm to the recommended VRZ

The proposal achieves this objective. Whilst the existing hospital and the proposed additions extend well into the VRZ, the proposed additions will not have any direct impacts on the remnant riparian vegetation. On the contrary, the proposal includes the protection of the existing remnant riparian vegetation within the VRZ, enhancement through plantings of trees and shrubs characteristic of the remnant native vegetation, and enhancement through weed control.

Similarly, whilst the proposal includes excavation and some filling within the VRZ, the proposal is not considered likely to result in adverse impacts on bank stability or water quality within the Moruya River. The proposed excavations will be into granite bedrock and there will be no filling within the 1 in 100 year flood level. The fill will use the weathered granite material excavated on site. It is considered unlikely that the weathered rock materials which will be affected by the proposal would erode significantly as a result of short term flood events (Douglas Partners 2012). The excavation and filling will be accompanied by sediment control measures which mitigate the risk of water quality impacts if rainfall events occur during the construction phase of the proposal.

The treatment of stormwater from the site will be improved as a result of the proposal which includes appropriate stormwater control and treatment measures. The site does not include acid sulphate soils so the impacts on water quality in the Moruya River are expected to be negligible.

4.1.3 Locate services and infrastructure outside the VRZ

The proposal achieves this objective. With the exception of the discharge of stormwater, new services and infrastructure associated with the proposal will be located outside of the VRZ. Whilst the piers for the proposed additions will be located within the VRZ, the building will be cantilevered such that the direct disturbance footprint within the VRZ will be limited primarily to the piers supporting the first floor of the additions, as shown in Figure 3.

4.1.4 Treat stormwater runoff before discharging into the VRZ

The proposal achieves this objective. The treatment of stormwater from the site will be improved as a result of the proposal which includes appropriate stormwater control and treatment measures. The site does not include acid sulphate soils so the impacts on water quality in the Moruya River are expected to be negligible.

Photo 6: Granite boulders as bank stabilization immediately adjacent to the Moruya Hospital.

Photo 7: Granite boulders have been used for bank stabilization along most of the tidal sections of the Moruya River including between the hospital and the town centre.

4.2 EUROBODALLA LEP 2012

Clause 6.7 of Eurobodalla LEP 2012, Riparian Lands and Watercourses, has the objective to protect and maintain:

a) Water quality within watercourses;

b) The stability of the bed and banks of watercourses;

c) Aquatic and riparian habitats; and

d) Ecological processes within, and continuity and connectivity between, waterways and riparian areas.

The proposal is assessed below against each of these objectives.

4.2.1 Protect and maintain water quality within watercourses

The proposal is consistent with this objective. The proposal will not result in the removal or other adverse impacts on remnant native riparian vegetation. Whilst some areas of lawn will be removed, there will be no adverse impact on water quality. Whilst the area of hard surfaces and runoff will increase modestly as a result of the proposal, the treatment of stormwater from the site will be improved as a result of the proposal which includes appropriate stormwater control and treatment measures.

The site does not include acid sulphate soils so impacts on water quality in the Moruya River as a result of acid sulphate soils are not expected.

The excavation and filling for the proposed additions will be accompanied by sediment control measures which mitigate the risk of water quality impacts if rainfall events occur during the construction phase of the proposal. Similarly, control measures will be in place during the construction phase to minimize the likelihood of any discharges to the Moruya River.

Under these circumstances the proposal is considered to have been designed so as to protect and maintain water quality within the Moruya River.

4.2.2 Protect and maintain stability of the bend and banks of watercourses

The proposal is consistent with this objective. The proposal will not affect the bed and banks of the Moruya River. The bank of the Moruya River within and immediately adjacent the hospital appears to have been relatively stable in recent decades at least, and has been stabilized through the addition of granite boulders, as has the entirety of the banks of the Moruya River for several kilometers up and downstream of the hospital.

Furthermore, the proposal will include excavations and filling into the granite bedrock which outcrops within the hospital and in the river bed immediately adjacent to the hospital, and does not include excavation of the alluvium on the lower parts of the site.

Douglas Partners (2012) assessed the likelihood of river bank erosion as a result of the proposal and concluded that it is unlikely that the weathered rock materials which will be affected by the proposal would erode significantly as a result of short term flood events.

Photo 7: Granite bedrock outcropping in the Moruya River immediately adjacent to the hospital.

4.2.3 Protect and maintain aquatic and riparian habitat

The proposal is consistent with this objective. Whilst the existing hospital and the proposed additions extend well into the CRZ, the proposed additions will not have any direct impacts on the remnant native riparian vegetation. On the contrary, the proposal includes the protection of the existing remnant native vegetation within the CRZ, enhancement through plantings of trees and shrubs characteristic of the remnant native vegetation, and enhancement through weed control.

Whilst the proposal includes excavation and some filling within the CRZ, and some additional stormwater discharges, the proposal is not considered likely to result in adverse impacts on the bank stability or water quality within the Moruya River, and thus is considered highly unlikely to have adverse impacts on aquatic habitats.

Control measures will be in place during the construction phase of the proposal to minimize the likelihood of any discharges to the Moruya River. The proposal will be designed so as to improve stormwater management within the site.

Under these circumstances the proposals is considered to have been designed so as to protect and maintain aquatic and riparian habitat within the Moruya River.

4.2.4 Protect and maintain ecological processes within, and continuity and connectivity between, waterways and riparian areas

The proposal is consistent with this objective. Whilst the existing hospital and the proposed additions extend well into the CRZ, the proposed additions will not have any direct impacts on the remnant native riparian vegetation. On the contrary, the proposal includes the protection of the existing remnant native vegetation within the CRZ, enhancement through plantings of trees and shrubs characteristic of the remnant native riparian vegetation, and enhancement through weed control.

The proposal will not disrupt or otherwise adversely affect continuity and connectivity between, waterways and riparian areas. On the contrary, by including plantings of trees and shrubs characteristic of the remnant native riparian vegetation, the proposal will improve continuity and connectivity.

Under these circumstances the proposals is considered to have been designed so as to protect and maintain ecological processes within, and continuity and connectivity between, waterways and riparian areas within the Moruya River.

4.2.5 No adverse impacts on riparian land and watercourses

Section 3 of Clause 6.7 of Eurobodalla LEP 2012, Riparian Lands and Watercourses, states that before determining a development application the consent authority must consider whether or not the development will cause any adverse impact on:

- **a)** Water quality and flows within watercourse.
- **b)** Aquatic and riparian species, habitats and ecosystems.
- **c)** The stability of the bed, shore and banks of a watercourse.
- **d)** The free passage of fish and other aquatic organisms within or along a watercourse.
- **e)** Any future rehabilitation of a watercourse and riparian areas.

The assessment outlined above in Section 4 clearly identifies that the proposal will not cause adverse impacts on the matters identified in point's a-c.

Given the proposal does not include any actions likely to affect the bank, bed or channel of the Moruya River or which are considered likely to have adverse impacts on watercourses, it is clear that the proposal will not adversely affect the free passage of fish and other aquatic organisms within or along the Moruya River.

Whilst the proposal will prevent the rehabilitation of the entire CRZ within the Moruya Hospital, the encroachment into the VRZ of the existing hospital already prevents the rehabilitation of the entire CRZ. The majority of the CRZ with the Moruya Hospital could still be rehabilitated even after the implementation of the proposal. However this is unlikely ever to be a desirable objective for the use of the Moruya Hospital site given its importance to the local community as a regional health facility. As evidenced by the existing use of much of the CRZ immediately up and downstream of the Moruya Hospital, the CRZ is more typically valued by the community for its grazing, scenic and recreational values.

4.2.6 The development is well sited to avoid and minimize impacts

Section 4 of Clause 6.7 of Eurobodalla LEP 2012, Riparian Lands and Watercourses, states that before determining a development application the consent authority must be satisfied that:

a) The development is designed, sited and will be managed to avoid any significant adverse environmental impact.

b) If the impact cannot be reasonably avoided by adopting feasible alternatives, the development is designed, sited and will be managed to minimize that impact.

c) If that impact cannot be minimized, the development will be managed to mitigate that impact.

The assessment outlined above in Section 4 clearly identifies that the proposal will not cause adverse environmental impacts.

Whilst the development encroaches upon the CRZ, the CRZ is already highly modified and is already encroached upon by the existing hospital buildings. The Moruya Hospital site is small, and is already located within the CRZ, so the capacity to site the proposed additions outside of the CRZ is heavily constrained.

In any case, the proposal has been well sited and designed to avoid adverse impacts on the environment and will be managed to avoid any ongoing adverse impacts on riparian or aquatic habitats. By including measures to enhance and rehabilitate the remnant native riparian vegetation within the CRZ, the proposal will result in a net positive environmental impact.

4.3 ASSESSMENT OF SIGNIFICANCE

An assessment of significance under Section 5A of the *Environmental Planning and Assessment Act 1979* was undertaken on the *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (Swamp Oak Floodplain Forest) and the *Lowland Grassy Woodland in the South East Corner Bioregion* (Lowland Grassy Woodland) endangered ecological communities which are listed on the *NSW Threatened Species Conservation Act 1995.* The remnant native riparian vegetation fringing the Moruya River within the site may comprise these communities.

The outcome of this assessment was that it is highly unlikely that the development would significantly impact on the endangered ecological communities assessed (Appendix A).

A Species Impact Statement is not required for the proposal.

Recommendations have been provided in Section 5 to ameliorate the potential impacts of the proposal.

5 Recommendations

To further ameliorate the potential impacts of the proposal and to improve environmental outcomes, the following recommendations for impact mitigation and amelioration are suggested as modifications to the proposal and/or as conditions of consent.

Vegetation and Habitat Management

6. All vegetation to be retained will need to be appropriately protected during the construction phase of the proposal.
7. Plantings of Swamp Oak, Coastal Grey Box, Sweet Pittosporum, Kurrajong and other suitable trees and shrubs characteristic of the Lowland Grassy Woodland and Swamp Oak Floodplain Forest should be planted, where suitable, within the VRZ. The plantings should be essentially ornamental in nature, however they will contribute to the integrity of the VRZ and the existing remnant riparian vegetation. It is not intended that the entire VRZ be planted, rather that some plantings are included for ecological and aesthetic reasons.
8. Weed control activities should be undertaken within the remnant riparian vegetation in the VRZ. Weed control should prioritise the shrub weeds Large Leaved Privet, African Boxthorn, Small Leaved Privet, New Zealand Laurel, Canary Island Date Palm, and Wild Tobacco Bush and in the groundcover Trad, Japanese Honeysuckle, Asparagus Fern, Mother-of-millions, Cape Daisy and Stonecrop. The other weeds are already too prolific to be manageable without a massive effort and are already widespread in adjoining lands. The objective of the weed control is to remove or control serious noxious and environmental weeds which are not yet prolific within the site and are manageable within the medium term.

Filling

9. The fill used for the proposal should be clean fill consistent with relevant regulations so as to avoid any potentially adverse impacts on the environment and particularly on receiving waters.

Sediment Control

10. Appropriate sediment control measures should be implemented prior to the commencement of construction work for the proposal and retained in place until exposed areas of soil are stabilised and/or revegetated.

Stormwater

11. The stormwater management system for the proposal should be designed and maintained so as to avoid any potentially adverse impacts on the environment and particularly on receiving waters.

Landscaping

12. Known weed or invasive species should not be planted for landscaping purposes.

6 Conclusion

The riparian zone within the Moruya Hospital site was found to be highly modified with only a very narrow strip of very weedy remnant vegetation remaining on the top of the river bank. The river bank was found to have been relatively stable in recent decades at least and to have already been stabilised through the emplacement of granite boulders.

The proposed Sub Acute Unit and associated works has been designed to avoid impacts on remnant vegetation and is highly unlikely to adversely affect bank stability. It will not have any adverse impacts on the remnant riparian vegetation within the Moruya Hospital and in fact will result in a net benefit given the proposed plantings and weed management actions.

The proposal will not have any significant impacts on any endangered ecological communities and subsequently a Species Impact Statement is not required for the proposal.

The proposal will include appropriate stormwater control and treatment measures and measures to prevent any other adverse discharges to the Moruya River during or post construction.

In this context, this assessment demonstrates that the proposal is highly unlikely to result in any adverse impacts on the riparian zone or the Moruya River or on water quality within the river or aquatic habitats.

The proposal is consistent with the relevant objectives and principles of the *Water Management Act* 2000 and clause 6.7 of the Eurobodalla LEP 2012.

7 References

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Appendix A: Assessment of Significance

EP&A Act Assessment of Significance (7-Part Test)

The Assessment of Significance (7-part test) is applied to species, populations and ecological communities listed on Schedules 1, 1A and 2 of the TSC Act and Schedules 4, 4A and 5 of the Fisheries Management Act. The assessment sets out 7 factors, which when considered, allow proponents to undertake a qualitative analysis of the likely impacts of an action and to determine whether further assessment is required via a Species Impact Statement (SIS). All factors must be considered and an overall conclusion made based on all factors in combination. An SIS is required if, through application of the 7-part test, an action is considered likely to have a significant impact on a threatened species, population or ecological community.

Threatened species, populations and ecological communities which may be directly or indirectly affected by the proposal include:

ENDANGERED ECOLOGICAL COMMUNITIES

- Lowland Grassy Woodland
- Swamp Oak Floodplain Forest

An assessment of the effects of the proposal on the Lowland Grassy Woodland and Swamp Oak Floodplain Forest may be carried out by applying the seven factors from Section 5A of the amended *NSW Environmental Planning and Assessment Act 1979*. This Assessment of Significance is presented below for the proposed additions to Moruya Hospital.

Part a)

In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

This factor does not apply to endangered ecological communities.

Part b)

In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

This factor does not apply to endangered ecological communities.

Part c)

In the case of an endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(i) Effects on Extent

The action proposed will not affect the extent of either the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest.

Under these circumstances, the action proposed will not adversely effect the extent of the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest such that their local occurrence is likely to be placed at risk of extinction

(ii) Effects on Composition

The remnant riparian vegetation within the Moruya Hospital site is highly modified and weed infested. The action proposed does not include any adverse impacts on this vegetation, and on the contrary, includes measures to enhance and rehabilitate it, and in particular strategic weed control and planting of characteristic species of the Lowland Grassy Woodland and the Swamp Oak Floodplain Forest.

Under these circumstances, the action proposed will not substantially or adversely modify the composition of the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest such that their local occurrence is likely to be placed at risk of extinction.

Part d)

In relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed.

The action proposed will not remove or modify any habitat for the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action.

The action proposed will not fragment or isolate any habitat for the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

The action proposed will not remove modify, fragment or isolate any area of habitat for the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest. In any case, the remnant riparian vegetation within the Moruya Hospital site is not important to the local occurrence of either community.

Part e)

Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

The proposal will not affect critical habitat as none has been declared in the Eurobodalla LGA.

Part f)

Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

Recovery Plans

A recovery plan has not been prepared to date for the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest.

Threat Abatement Plans

There are no threatening processes that are relevant to the proposal.

Priority Action Statements

The priority actions for the Lowland Grassy Woodland and the Swamp Oak Floodplain Forest have been reviewed. The action proposed is consistent with all the listed priority actions for these communities.

Part g)

Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

There are no threatening processes that are relevant to the proposal. As such, the proposal will not result in the operation of, or increase the impact of any key threatening process.

Conclusion

It is concluded that the action proposed will not have a significant effect on the Lowland Grassy Woodland or the Swamp Oak Floodplain Forest pursuant to Section 5A of the *NSW Environmental Planning and Assessment Act 1979*.

HEAD OFFICE
Suite 4, Level 1
2-4 Merton Street
Sutherland NSW 2232
T 02 8536 8600
F 02 9542 5622

CANBERRA
Level 2
11 London Circuit
Canberra ACT 2601
T 02 6103 0145
F 02 6103 0148

COFFS HARBOUR
35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
F 02 6651 6890

PERTH
Suite 1 & 2
49 Ord Street
West Perth WA 6005
T 08 9227 1070
F 08 9322 1358

DARWIN
16/56 Marina Boulevard
Cullen Bay NT 0820
T 0488 050 916

SYDNEY
Level 6
299 Sussex Street
Sydney NSW 2000
T 02 9993 0566
F 02 9993 0573

NEWCASTLE
Suite 17, Level 4
19 Bolton Street
Newcastle NSW 2300
T 02 4910 0125
F 02 4910 0126

ARMIDALE
92 Taylor Street
Armidale NSW 2350
T 02 8081 2681
F 02 6772 1279

WOLLONGONG
Suite 204, Level 2
62 Moore Street
Austinmer NSW 2515
T 02 4201 2200
F 02 4268 4361

BRISBANE
51 Amelia St
Fortitude Valley QLD 4006
T 07 3503 7192

ST GEORGES BASIN
8/128 Island Point Road
St Georges Basin NSW 2540
T 02 4443 5555
F 02 4443 6655

NAROOMA
5/20 Canty Street
Narooma NSW 2546
T 02 4476 1151
F 02 4476 1161

MUDGEE
Unit 1, Level 1
79 Market Street
Mudgee NSW 2850
T 02 4302 1230
F 02 6372 9230

GOSFORD
Suite 5, Baker One
1-5 Baker Street
Gosford NSW 2250
T 02 4302 1220
F 02 4322 2897

B4.14 Development in the Vicinity of Wetlands

Land to which this control applies

- Land adjacent to freshwater wetlands, including Sydney Freshwater Wetland, Swamp Sclerophyll Forest, Swamp Oak Forest. - P21DCP-BCMDCP066

Uses to which this control applies

- Attached Dual Occupancy
- Attached dwellings in non-urban areas
- Business Development - New Construction or Alterations and Additions
- Detached Dual Occupancy
- Dwelling House - Alterations and Additions
- Dwelling House - New
- Earthworks/Landfill
- Group Building
- Hospital/Nursing Home
- Inclinator (ancillary to a dwelling)
- Industrial Development - New Construction or Alterations and Additions
- Jetty, ramp, pontoon (ancillary to a dwelling)
- Multi-Unit Housing
- Other Development/Land Use
- Pool (ancillary to a dwelling)
- Residential Flat Building (2 storey)
- Residential Flat Building (3 storey)
- Rural Industry
- Secondary Dwelling
- Seniors Housing - SEPP (Housing for Seniors or People with a Disability) 2004
- Shop-Top Housing
- Subdivision (Additional Lots - Excludes Dual Occupancy)
- Tennis court (ancillary to a dwelling)

Outcomes

Development in the catchment of a wetland is to result in wetland conditions being maintained or enhanced (En)
The physical, chemical and biological processes of wetland habitats in Pittwater are improved, maintained or restored. (En)
The social and cultural values of wetland areas are conserved and enhanced (S)
Biodiversity, ecological processes and other wetland values are conserved (En).

Controls

Development in a wetlands catchment shall not adversely impact on the wetlands.

Development shall dispose of stormwater, wastewater and other drainage in a manner that will not adversely impact on wetlands.

Development must minimise changes to the following:

- local surface runoff, groundwater flows and water flow regimes to the wetland;
- temperature, salinity, chemical makeup and sediment loads

Stormwater is to mimic natural conditions.

Development shall provide adequate buffering to wetlands

Existing wildlife corridors are to be maintained and functional habitat links provided wherever possible.

Development shall ensure 60% of the area that is not covered by approved buildings or associated structures, is native vegetation either through retention of existing bushland or planting with locally native plant species (as per species found on the site or those listed in 'Native Plants for your Garden' on Pittwater webpage)

Variations

Provided the outcomes of this control are achieved, Council may consider variation to this control for:

- Environmental restoration projects whose sole objective is the restoration and regeneration of wetlands.
- Development that demonstrates it will not affect wetland values and functions.
- Maintenance of existing structures.

A minimum setback of 10m may be considered for development where there will be no adverse impact on the wetland and there is an adequate zone for wildlife.

Any activities which form part of an adopted Plan of Management for the subject land.

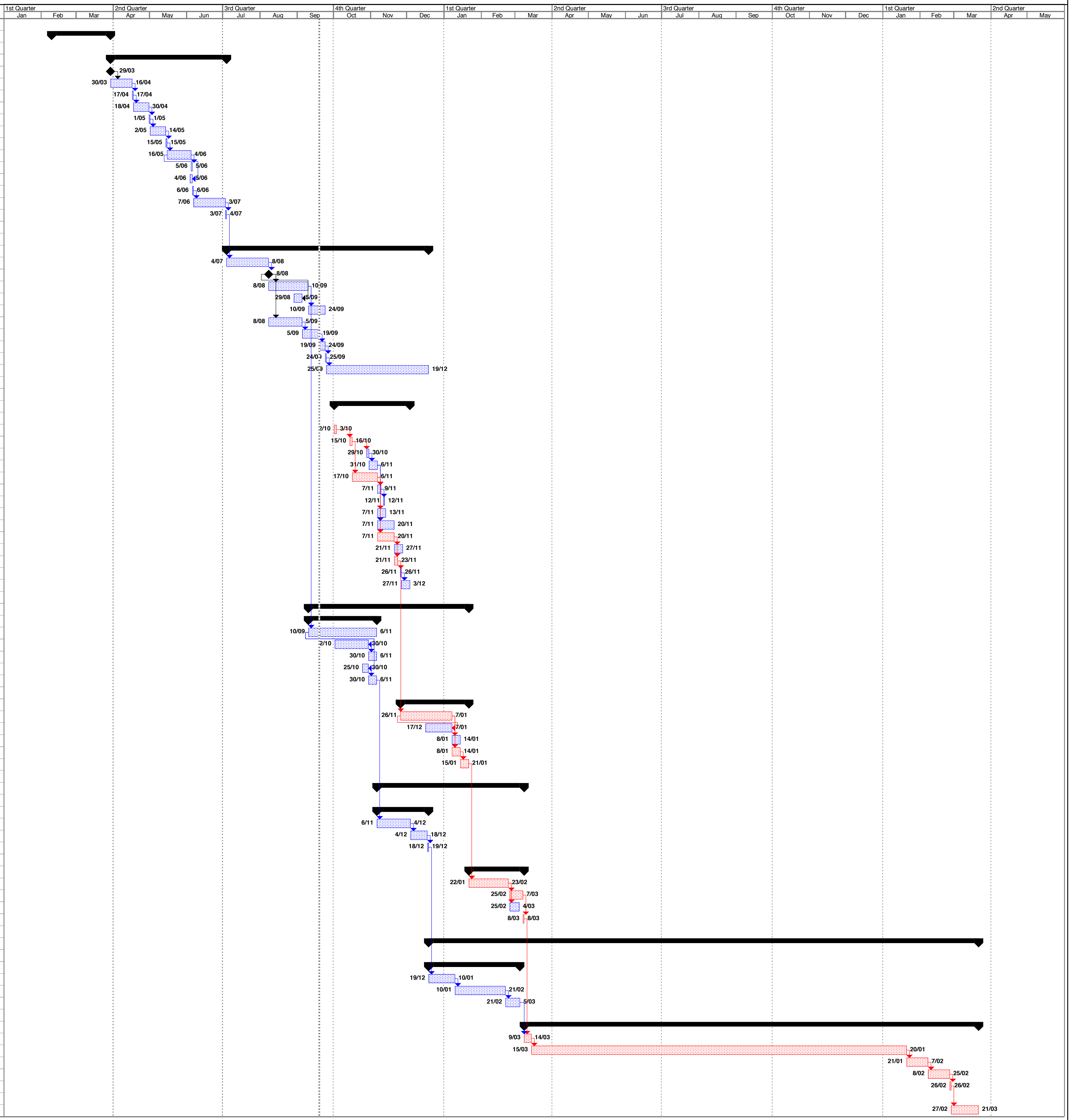
Where fencing is required to contain domestic animals and that fencing is located on a part of the site that does not impede native fauna from traversing the site.

In Bushfire Asset Protection Zones- vegetation species need not be native to the site but are to be native to Pittwater.

18 Appendix I - Program

Moruya Hospital 20 Bed Sub Acute

ID		Task Name	Duration	Start	Finish	Predecessors
1						
2		**Preliminary stage**	**35 days**	**Fri 10/02/12**	**Thu 29/03/12**	
5						
6		**Confirmation/Finalisation of Functional Brief and Concept Plan**	**64.5 days**	**Thu 29/03/12**	**Wed 4/07/12**	
7		Develop, review and endorsement of function brief - User group Meeting 1	0 days	Thu 29/03/12	Thu 29/03/12	4
8		Develop, review functional brief	2 wks	Fri 30/03/12	Mon 16/04/12	7
9		User group Meeting 2	1 day	Tue 17/04/12	Tue 17/04/12	8
10		Develop, review functional brief	8 days	Wed 18/04/12	Mon 30/04/12	9
11		User group/ PCG Meeting No. 3	1 day	Tue 1/05/12	Tue 1/05/12	10
12		Develop proposal - Finalise SOA and FTE	9 days	Wed 2/05/12	Mon 14/05/12	11
13		User group/ PCG Meeting No. 4	1 day	Tue 15/05/12	Tue 15/05/12	12
14		Finalise SOA , FTE, functional relationships, floor plans	14 days	Wed 16/05/12	Mon 4/06/12	13
15		User group/ PCG Meeting No. 5	1 day	Tue 5/06/12	Tue 5/06/12	14
16		Cost estimate	2 days	Mon 4/06/12	Tue 5/06/12	14SF+15 days
17		Engage Town Planner	1 day	Wed 6/06/12	Wed 6/06/12	
18		Finalise functional relationships, floor plans	3.5 wks	Thu 7/06/12	Tue 3/07/12	17
19		User group/ PCG Meeting No. 6	1 day	Tue 3/07/12	Wed 4/07/12	18
20						
21						
22		**Schematic Design Phase**	**119 days**	**Wed 4/07/12**	**Wed 19/12/12**	
23		Develop 1:200 Plans	5 wks	Wed 4/07/12	Wed 8/08/12	19
24		Pre SD presentation User Group/ PPT review meeting	0 days	Wed 8/08/12	Wed 8/08/12	23
25		Develop SD to final sign-off stage	4.6 wks	Wed 8/08/12	Mon 10/09/12	24
26		QS Estimate	5 days	Wed 29/08/12	Wed 5/09/12	24SF+20 days
27		Finalise Schematic Design Report / ERG review	10 days	Mon 10/09/12	Mon 24/09/12	25
28		Prepare DA pre-lodgement documents for Council	4 wks	Wed 8/08/12	Wed 5/09/12	24
29		Finalise submission DA to council	2 wks	Wed 5/09/12	Wed 19/09/12	28
30		submit SEE/ DA documents to HI for review	3 days	Wed 19/09/12	Mon 24/09/12	29
31		Submit DA to council	1 day	Mon 24/09/12	Tue 25/09/12	30
32		DA - Consideration by Council (JRPP)	12 wks	Tue 25/09/12	Wed 19/12/12	31
33						
34						
35		**Design Development Phase**	**45 days**	**Tue 2/10/12**	**Mon 3/12/12**	
36						
37		DD User group Meeting No. 1	2 days	Tue 2/10/12	Wed 3/10/12	
38		DD User Group Meeting No. 2/ Engineering	2 days	Mon 15/10/12	Tue 16/10/12	37FS+7 days
39		DD User group Meeting No. 3 - user Group RLS sign-off	2 days	Mon 29/10/12	Tue 30/10/12	38FS+8 days
40		60% Architectural Issue	1 wk	Wed 31/10/12	Tue 6/11/12	39
41		60% Engineering Services Issue	3 wks	Wed 17/10/12	Tue 6/11/12	38
42		QS estimate	3 days	Wed 7/11/12	Fri 9/11/12	40,41
43		DD VE Workshop	1 day	Mon 12/11/12	Mon 12/11/12	42
44		Presentation to HI/ ERG	5 days	Wed 7/11/12	Tue 13/11/12	40,41
45		100% Architectural Issue	2 wks	Wed 7/11/12	Tue 20/11/12	40
46		100% Engineering Services issue	2 wks	Wed 7/11/12	Tue 20/11/12	41
47		Prepare DD report	5 days	Wed 21/11/12	Tue 27/11/12	46
48		QS estimate	3 days	Wed 21/11/12	Fri 23/11/12	46
49		Presentation to HI/ ERG	1 day	Mon 26/11/12	Mon 26/11/12	48
50		PDC Endorsement of DD report	1 wk	Tue 27/11/12	Mon 3/12/12	49
51						
52		**Contract Documentation**	**83.5 days**	**Mon 10/09/12**	**Mon 21/01/13**	
53		**Early Works**	**40 days**	**Mon 10/09/12**	**Tue 6/11/12**	
54		Prepare Tender docs	8 wks	Mon 10/09/12	Tue 6/11/12	25
55		REF Report	4 wks	Tue 2/10/12	Tue 30/10/12	54SF+35 days
56		HI Assessment of REF	5 days	Tue 30/10/12	Tue 6/11/12	55
57		Pre-tender estimate	3 days	Thu 25/10/12	Tue 30/10/12	54SF+35 days
58		Document review and sign-off/ approval	5 days	Tue 30/10/12	Tue 6/11/12	57
59						
60		**Main Contract**	**30 days**	**Mon 26/11/12**	**Mon 21/01/13**	
61		Completion of contract Documentation	4 wks	Mon 26/11/12	Mon 7/01/13	48
62		PW to prepare Commercial conditions and establish tender panel	1 wk	Mon 17/12/12	Mon 7/01/13	61SF+20 days
63		Pre-tender Estimate	5 days	Tue 8/01/13	Mon 14/01/13	61
64		Obtain approval to proceed to tender/ Document Review	5 days	Tue 8/01/13	Mon 14/01/13	61
65		Design Period Float	1 wk	Tue 15/01/13	Mon 21/01/13	64
66						
67		**Tender period**	**79.5 days**	**Tue 6/11/12**	**Fri 8/03/13**	
68						
69		**Early Works**	**31 days**	**Tue 6/11/12**	**Wed 19/12/12**	
70		Tender Period	4 wks	Tue 6/11/12	Tue 4/12/12	58
71		Evaluate	2 wks	Tue 4/12/12	Tue 18/12/12	70
72		Approval to award contract	1 day	Tue 18/12/12	Wed 19/12/12	71
73						
74		**Main Contract Works**	**36 days**	**Tue 22/01/13**	**Fri 8/03/13**	
75		Tender period	5 wks	Tue 22/01/13	Sat 23/02/13	65
76		Receive, review and recommend approved tender	2 wks	Mon 25/02/13	Thu 7/03/13	75
77		Approval to award contract	7 days	Mon 25/02/13	Mon 4/03/13	75
78		Issue LOA	1 day	Fri 8/03/13	Fri 8/03/13	76
79						
80		**Construction Period**	**354.5 days**	**Wed 19/12/12**	**Fri 21/03/14**	
81						
82		**Early Works**	**45 days**	**Wed 19/12/12**	**Tue 5/03/13**	
83		Off Site Start-up	1 wk	Wed 19/12/12	Thu 10/01/13	72
84		Construction	6 wks	Thu 10/01/13	Thu 21/02/13	83
85		Construction Float	2 wks	Thu 21/02/13	Tue 5/03/13	84
86						
87		**Main Works**	**306 days**	**Sat 9/03/13**	**Fri 21/03/14**	
88		Off Site Start-up	1 wk	Sat 9/03/13	Thu 14/03/13	78,85
89		Construct	50 wks	Fri 15/03/13	Mon 20/01/14	88
90		Construction Float - variations	3 wks	Tue 21/01/14	Fri 7/02/14	89
91		Construction Float - Inclement Weather	3 wks	Sat 8/02/14	Tue 25/02/14	90
92		Handover	1 day	Wed 26/02/14	Wed 26/02/14	91
93						
94		Health Commissioning	4 wks	Thu 27/02/14	Fri 21/03/14	92



Project: Moruya Sub Acute Current Pr
Date: Wed 19/09/12

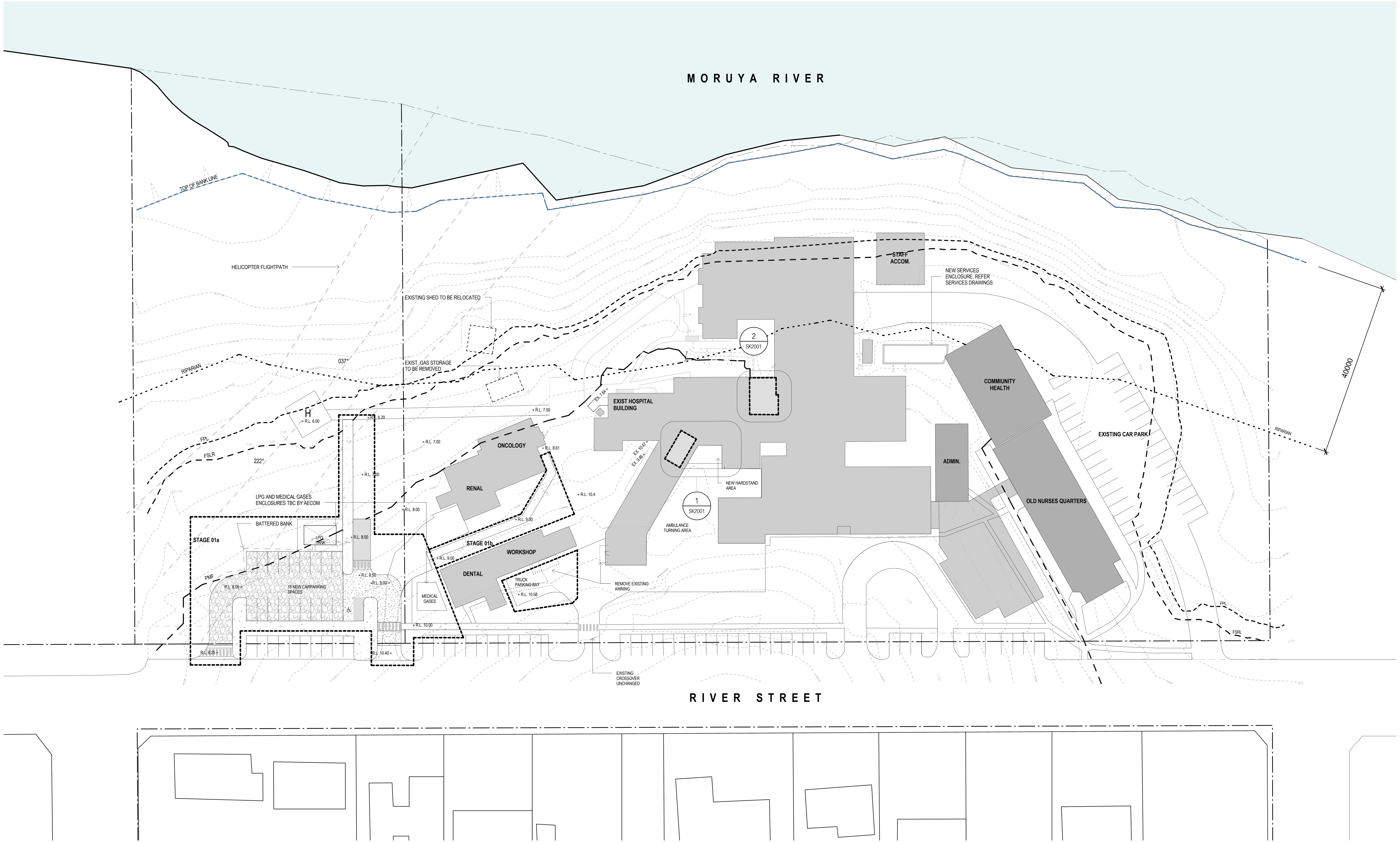
Task | Progress | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks | Group By Summary
Critical Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary | Deadline

19 Appendix J - Architectural Drawings

19.01 Early Works

LEGEND

- FSRL 1% AEP LVL (5.65 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- REFURBISHMENT EXISTING STAGE 1A
- NEW CONCRETE FOOTPATH
- NEW GRAVEL CARPARK
- NEW HARDSTAND AREA (ASPHALT)



1 SITE PLAN - STAGE 01
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
D	ISSUED FOR COORDINATION	31/08/12	SO
C	REVISED LPG TANK LOCATION	31/08/12	KT
B	REVISED COORDINATION	30/08/12	KT
A	ISSUE FOR COORDINATION	29/08/12	KT

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
PROPOSED SITE PLAN - STAGE 01

Checked MW | Approved JN | Scale As indicated @ A1 sheet size

50mm on original

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Project number 02-20-2164 | Drawing number SK1001 | Revision D

Status

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LEGEND

FSRL 1% AEP LVL (5.65 AHD)

FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)

RIPARIAN LINE

PMF @ RL 7.8

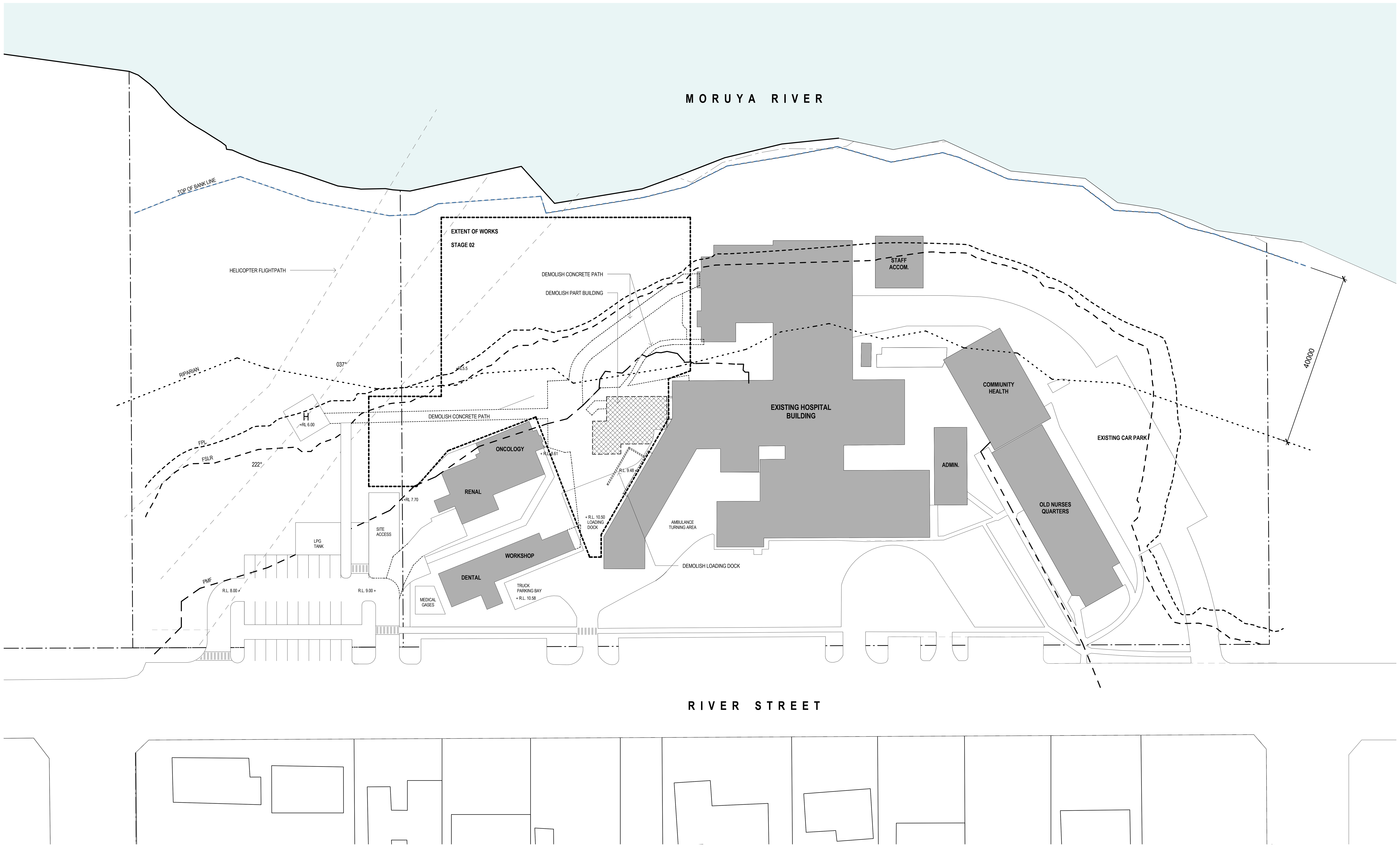
EXTENT OF DEMOLITION

EXISTING BUILDINGS/ BUILT STRUCTURES TO REMAIN AS IS

EXISTING EXISTING BUILDINGS / BUILT STRUCTURES TO BE REMOVED AND/OR RELOCATED (REFER TO NOTES ON PLAN)

EXISTING BUILDINGS TO BE REFURBISHED

NOTES:
1. FOR LOCATION OF ALL EXISTING SITE SERVICES AND CONDITIONS, REFER TO SURVEY DOCUMENTATIONS



1 DEMOLITION SITE PLAN - STAGE 02
SCALE 1 : 500

Notes
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Rev	Description	Date	App'd
B	ISSUED FOR COORDINATION	31/08/12	SO
A	ISSUE FOR COORDINATION	31/08/12	KT

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
DEMOLITION SITE PLAN - STAGE 2

Checked MW
Approved JN
Scale As indicated
@ A1 sheet size

50mm on original

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Project number 02-20-2164
Drawing number SK1011
Revision B
Status

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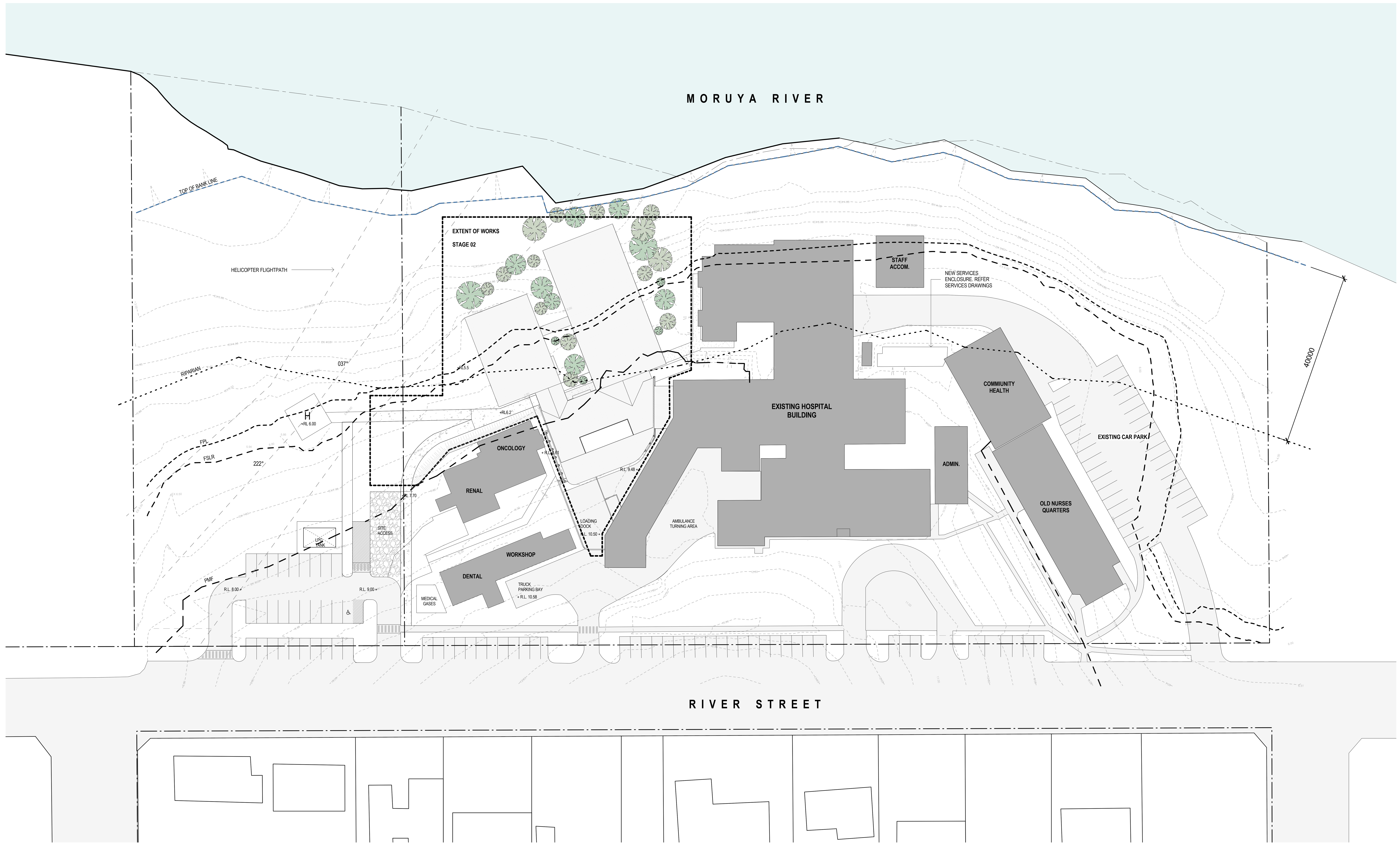
19.02 Schematic Design Drawings

MORUYA HOSPITAL - SUB CAUTE UNIT
2-20-2164

WOODS BAGOT

Drawing Schedule

Sheet No.	Sheet Name	Rev
SK0001	COVERSHEET	A
SK1001	PROPOSED SITE PLAN - STAGE 01	D
SK1002	PROPOSED SITE PLAN - STAGE 02	C
SK1003	PROPOSED SITE PLAN - STAGE 03	C
SK1010	DEMOLITION SITE PLAN - STAGE 1	B
SK1011	DEMOLITION SITE PLAN - STAGE 2	B
SK1012	DEMOLITION SITE PLAN - STAGE 3	B
SK1050	DEMOLITION SITE PLAN	A
SK1051	PROPOSED SITE PLAN	B
SK2000	REFURBISHMENT WORKS - DEMOLITION	A
SK2001	REFURBISHMENT WORKS - PROPOSED	A
SK2210	GROUND FLOOR PLAN - STAGE 02	F
SK2211	FIRST FLOOR PLAN - STAGE 02	H
SK2212	PLANT FLOOR PLAN - STAGE 02	G
SK2213	ROOF PLAN - STAGE 02	G
SK3000	ELEVATIONS 01 - STAGE 02	D
SK3001	ELEVATIONS 02 - STAGE 02	B
SK3100	SECTIONS 01 - STAGE 02	D



1 SITE PLAN - STAGE 02
SCALE 1 : 500

LEGEND

- FSRL 1% AEP LVL (5.65 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- REFURBISHMENT EXISTING STAGE 1A
- NEW CONCRETE FOOTPATH
- NEW GRAVEL CARPARK
- NEW HARDSTAND AREA (ASPHALT)

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
C	ISSUED FOR COORDINATION	31/08/12	SO
B	REVISED COORDINATION	30/08/12	KT
A	ISSUE FOR COORDINATION	29/08/12	KT

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
PROPOSED SITE PLAN - STAGE 02

Checked MW
Approved JN
Scale As indicated @ A1 sheet size
50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK1002
Revision C
Status

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1 SITE PLAN - STAGE 03
SCALE 1 : 500

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Rev	Description	Date	App'd
C	ISSUED FOR COORDINATION	31/08/12	SO
B	REVISED COORDINATION	30/08/12	KT
A	ISSUE FOR COORDINATION	29/08/12	KT

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
PROPOSED SITE PLAN - STAGE 03

Checked	Approved	Scale
MW	JN	As indicated @ A1 sheet size

50mm on original

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Project number	Drawing number	Revision
02-20-2164	SK1003	C

Status

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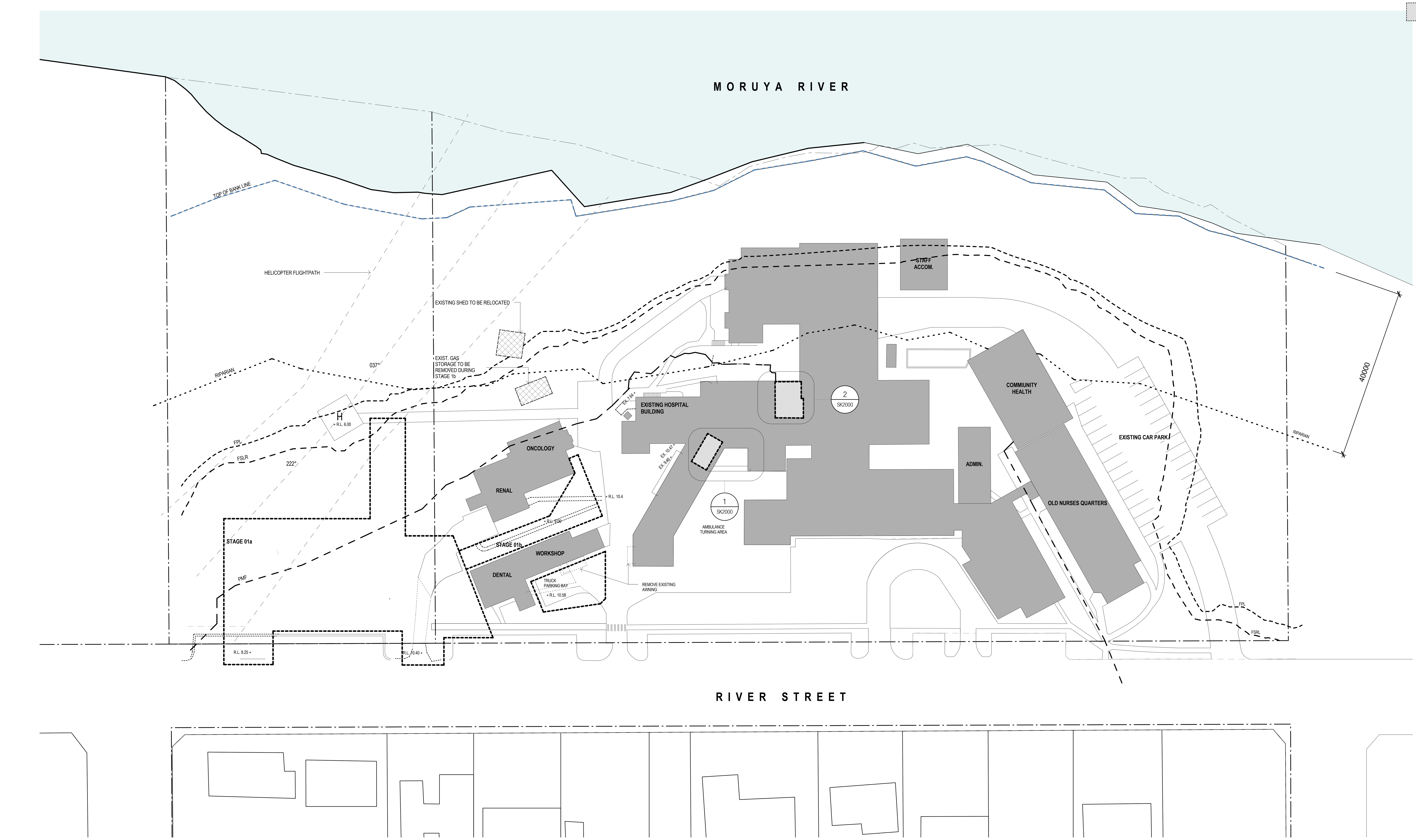
LEGEND

- FSRL 1% AEP LVL (5.65 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- EXISTING BUILDINGS/ BUILT STRUCTURES TO REMAIN AS IS
- EXISTING EXISTING BUILDINGS / BUILT STRUCTURES TO BE REMOVED AND/OR RELOCATED (REFER TO NOTES ON PLAN)
- EXISTING BUILDINGS TO BE REFURBISHED

NOTES:
1. FOR LOCATION OF ALL EXISTING SITE SERVICES AND CONDITIONS, REFER TO SURVEY DOCUMENTATIONS



1 DEMOLITION SITE PLAN - STAGE 01
SCALE 1 : 500

Notes
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Rev	Description	Date	App'd
B	ISSUED FOR COORDINATION	31/08/12	SG
A	ISSUE FOR COORDINATION	31/08/12	KT

Client: NSW GOVERNMENT Health Infrastructure

Project: Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title: DEMOLITION SITE PLAN - STAGE 1

Checked: MW | Approved: JN | Scale: As indicated @ A1 sheet size

50mm on original

WOODS BAGOT — AUSTRALIA, ASIA, MIDDLE EAST, EUROPE, NORTH AMERICA

Project number: 02-20-2164 | Drawing number: SK1010 | Revision: B

Status

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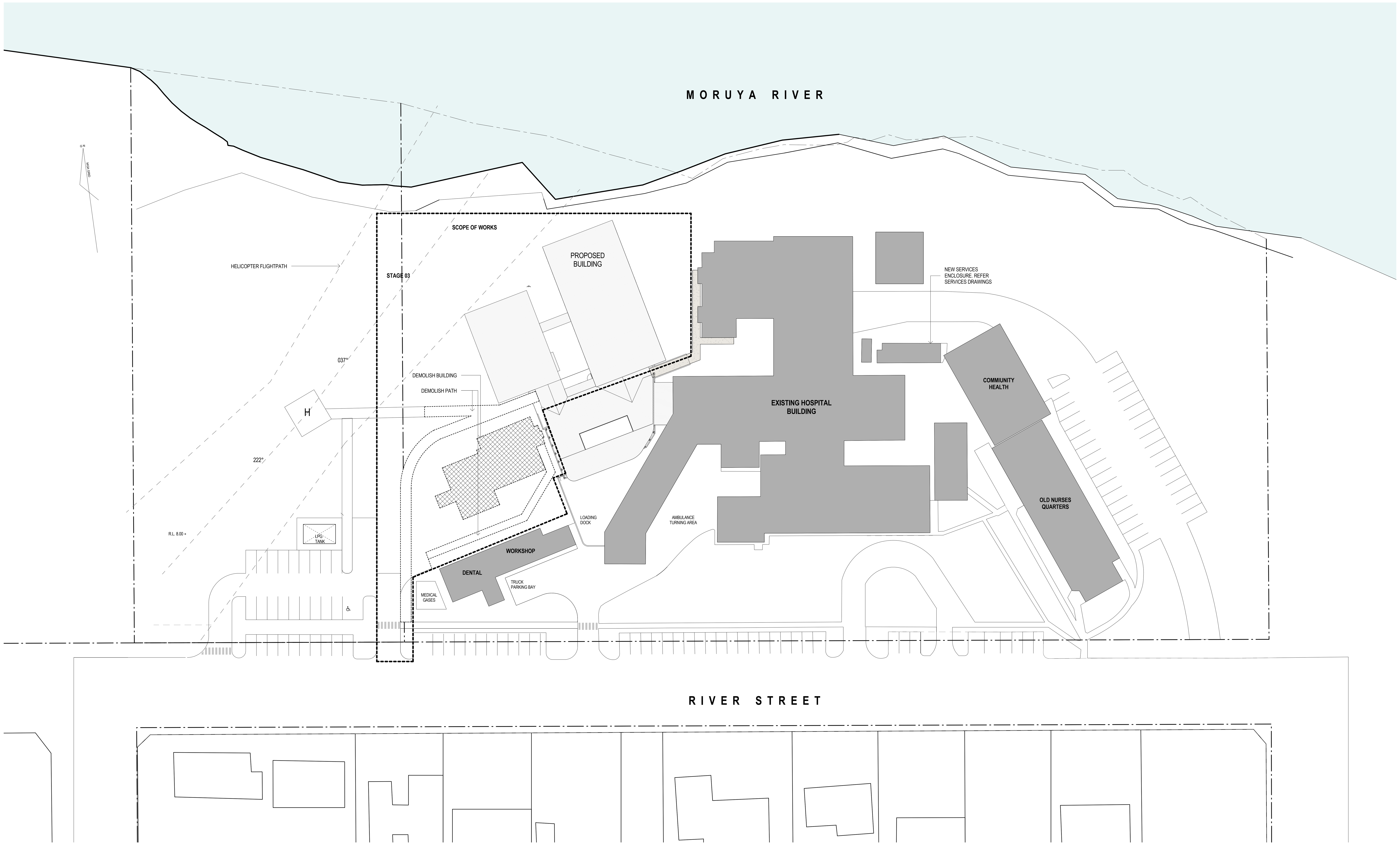

1 DEMOLITION SITE PLAN - STAGE 03
SCALE 1 : 500

LEGEND

- FSRL 1% AEP LVL (5.65 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- EXISTING BUILDINGS/ BUILT STRUCTURES TO REMAIN AS IS
- EXISTING EXISTING BUILDINGS / BUILT STRUCTURES TO BE REMOVED AND/OR RELOCATED (REFER TO NOTES ON PLAN)
- EXISTING BUILDINGS TO BE REFURBISHED

NOTES:
1. FOR LOCATION OF ALL EXISTING SITE SERVICES AND CONDITIONS, REFER TO SURVEY DOCUMENTATIONS

Notes
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Rev	Description	Date	App'd
B	ISSUED FOR COORDINATION	31/08/12	SO
A	ISSUE FOR COORDINATION	31/08/12	KT

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

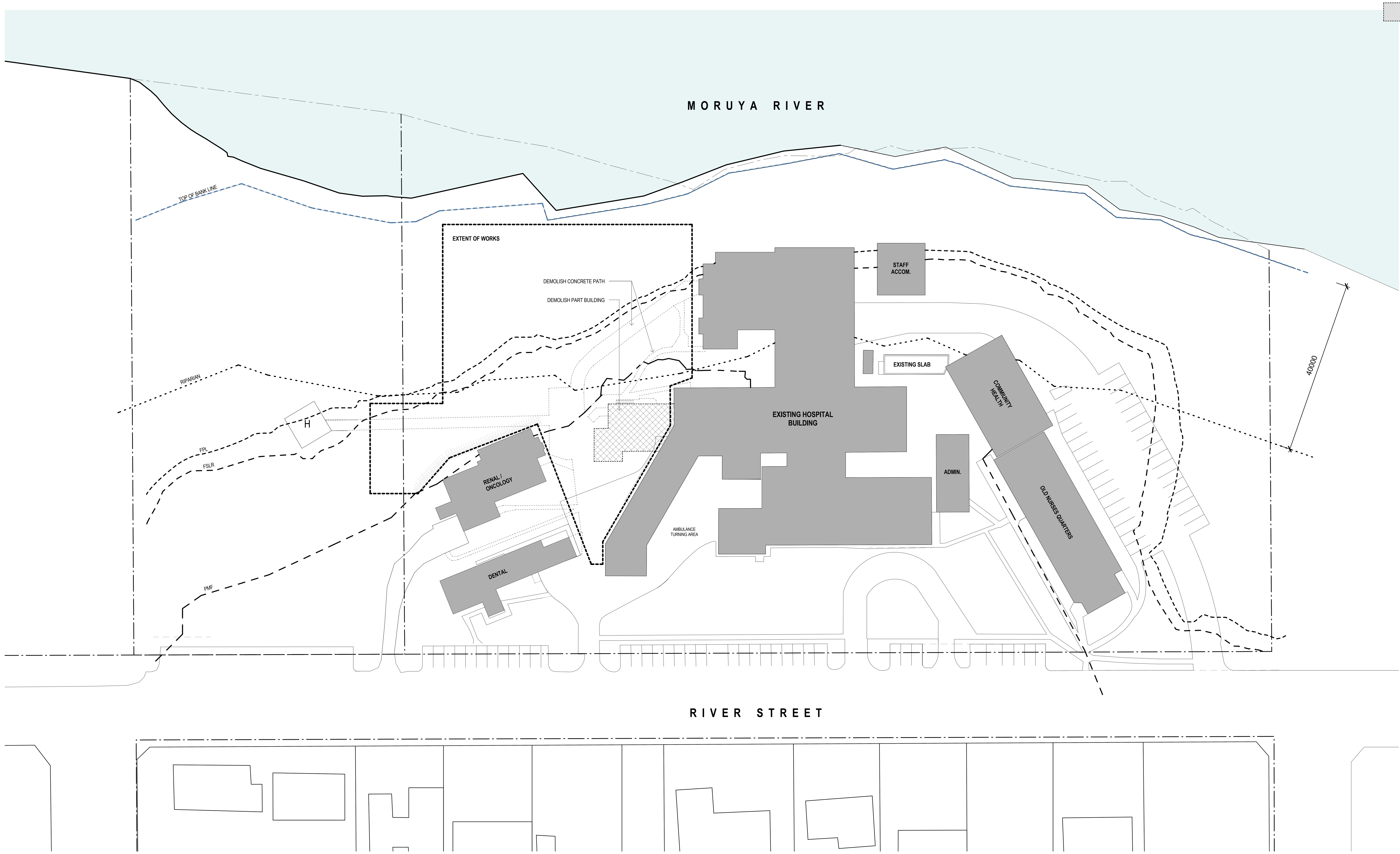
Drawing title
DEMOLITION SITE PLAN - STAGE 3

Checked MW
Approved JN
Scale As indicated @ A1 sheet size
50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK1012
Revision B
Status

Date generated 31-08-12 5:17:22 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



LEGEND

- FSRL 1% AEP LVL (5.65 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- EXISTING BUILDINGS/ BUILT STRUCTURES TO REMAIN AS IS
- EXISTING EXISTING BUILDINGS / BUILT STRUCTURES TO BE REMOVED AND/OR RELOCATED (REFER TO NOTES ON PLAN)
- EXISTING BUILDINGS TO BE REFURBISHED

NOTES:
1. FOR LOCATION OF ALL EXISTING SITE SERVICES AND CONDITIONS, REFER TO SURVEY DOCUMENTATIONS

1 DEMOLITION SITE PLAN
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
A	ISSUED FOR COORDINATION	31/08/12	SO

Client: NSW GOVERNMENT Health Infrastructure

Project: Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title: DEMOLITION SITE PLAN

Checked: MW | Approved: JN | Scale: As indicated @ A1 sheet size

50mm on original

WOODS BAGOT — AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number: 02-20-2164 | Drawing number: SK1050 | Revision: A

Status

Date generated 31-08-12 5:17:29 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt

LEGEND

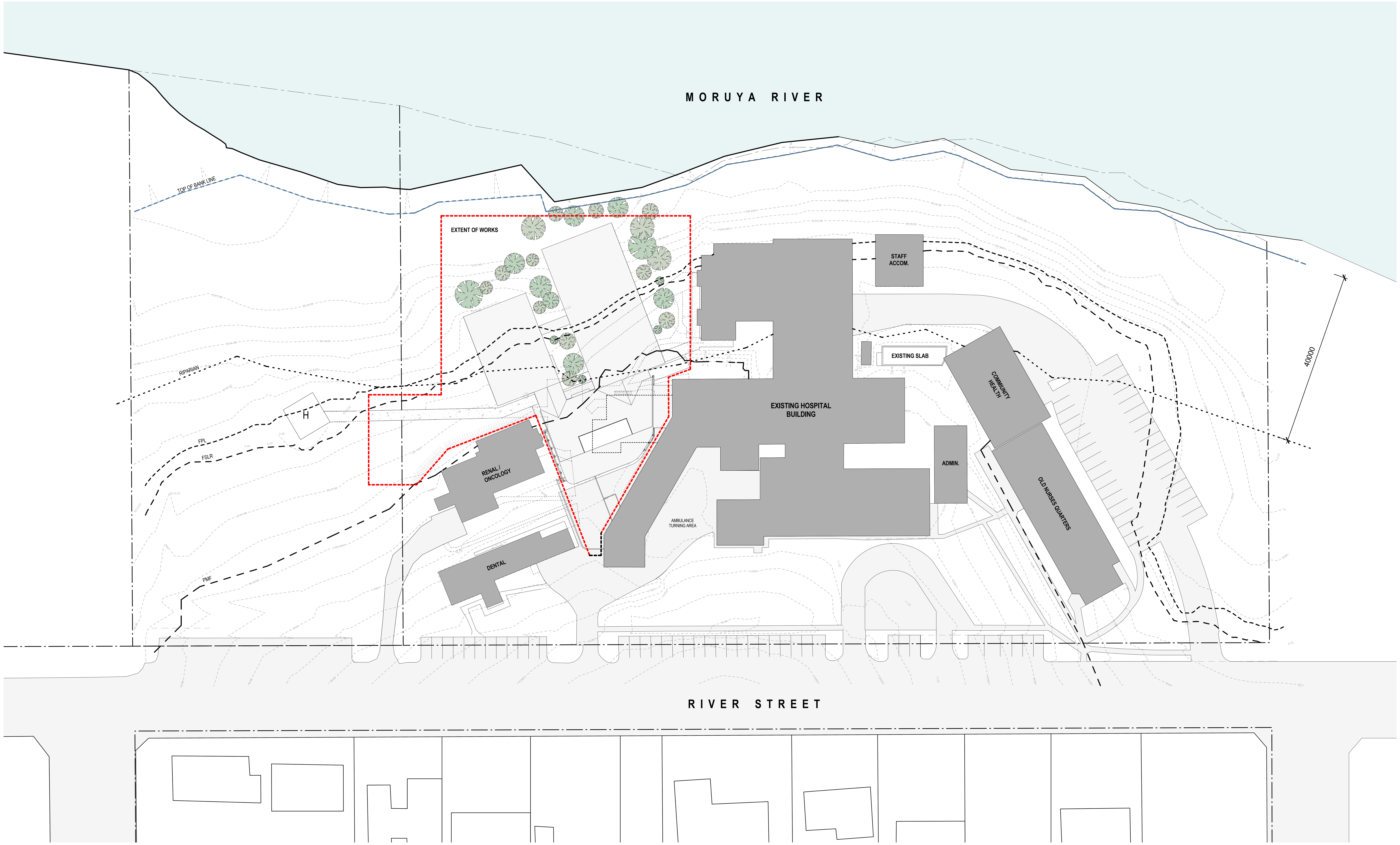
FSRL 1% AEP LVL (5.65 AHD)

FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)

RIPARIAN LINE

PMF @ RL 7.8

EXTENT OF DEMOLITION



1 PROPOSED SITE PLAN
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUED FOR COORDINATION	31/08/12	SO
A	ISSUE FOR INFORMATION	30/08/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
PROPOSED SITE PLAN

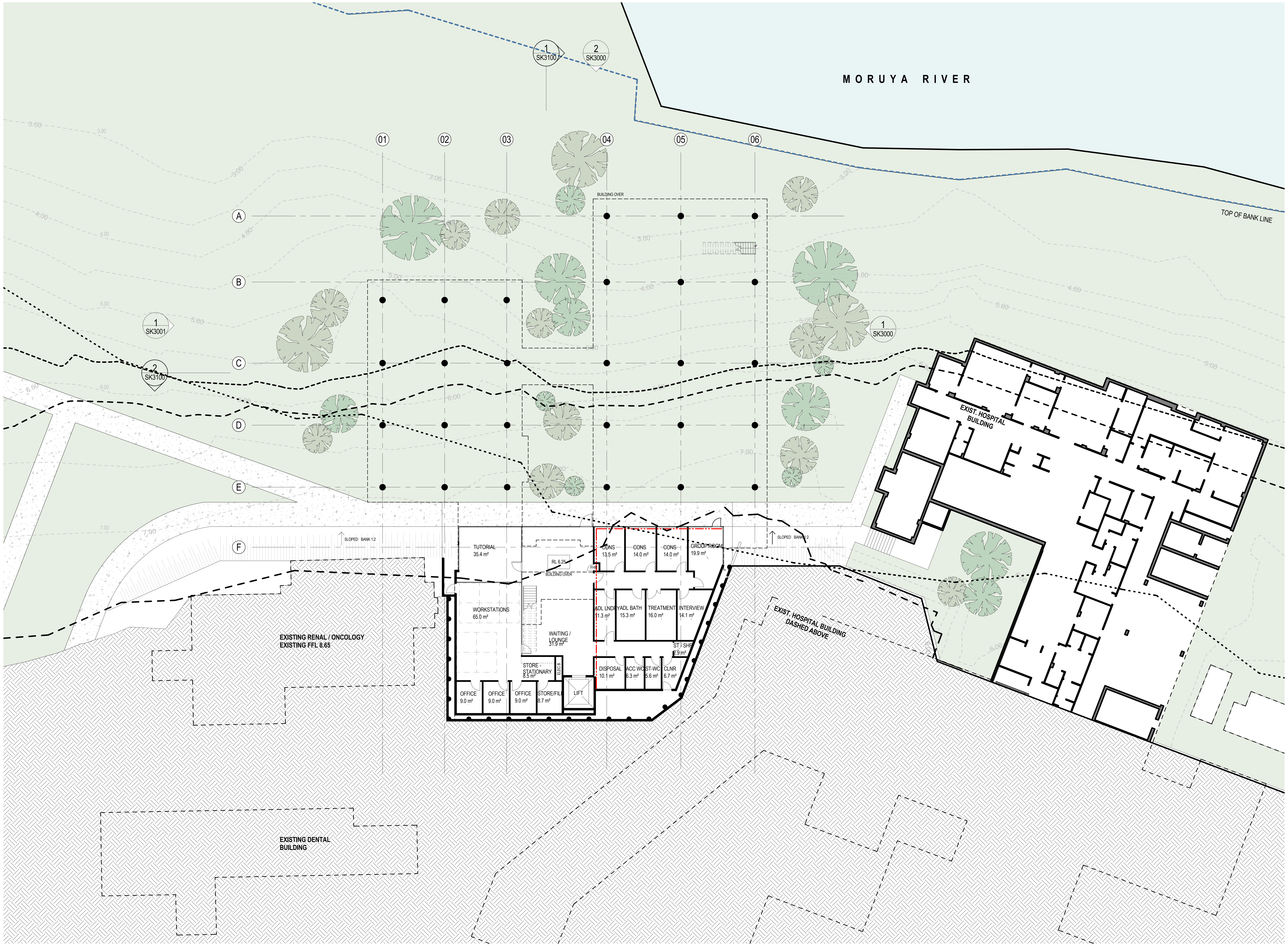
Checked MW
Approved JN
Scale As indicated @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK1051
Revision B
Status

Date generated 31-08-12 5:17:36 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



1 RL 6.25 - Ground Floor Plan (Stage 02)
SCALE 1 : 200

SCHEMATIC DESIGN SIGN-OFF

THE DESIGN AS DRAWN IS IN LINE WITH THE BRIEF AND AHFG.

WE ACCEPT THAT THIS DESIGN MEETS OUR SPATIAL REQUIREMENTS AND ROOM ADJACENCIES.
WE ARE AWARE THAT WE WILL HAVE FURTHER INPUT INTO THE NEXT STAGES OF DESIGN DEVELOPMENT WITHIN THE AGREED SPATIAL ALLOCATION.
THIS LAYOUT IS SUBJECT TO ENGINEERS, BCA, FIRE AND DDA REVIEW.

HEALTH INFRASTRUCTURE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

USERS

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

ARCHITECT

NAME/SIGNATURE/TITLE/DATE

CONTRACTOR

NAME/SIGNATURE/TITLE/DATE

ENGINEERS

NAME/SIGNATURE/TITLE/DATE

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
F	ISSUE FOR COORDINATION	31/08/12	KT
E	ISSUE FOR COORDINATION	30/08/12	SO
D	ISSUE FOR INFORMAITON	27/08/12	MW
C	ISSUE FOR INFORMATION	23/08/12	CH
B	ISSUE FOR INFORMATION	20/08/12	MW
A	ISSUE FOR COORDINATION	16/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
GROUND FLOOR PLAN - STAGE 02

Checked MW
Approved JN
Scale As indicated @ A1 sheet size
50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK2210
Revision F
Status

Date generated 31-08-12 5:18:04 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt

1 RL 10.47 - First Floor Plan (STAGE 02)
SCALE 1 : 200

SCHEMATIC DESIGN SIGN-OFF

THE DESIGN AS DRAWN IS IN LINE WITH THE BRIEF AND AHFG.

WE ACCEPT THAT THIS DESIGN MEETS OUR SPATIAL REQUIREMENTS AND ROOM ADJACENCIES.
WE ARE AWARE THAT WE WILL HAVE FURTHER INPUT INTO THE NEXT STAGES OF DESIGN DEVELOPMENT WITHIN THE AGREED SPATIAL ALLOCATION.
THIS LAYOUT IS SUBJECT TO ENGINEERS, BCA, FIRE AND DDA REVIEW.

HEALTH INFRASTRUCTURE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

USERS

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

ARCHITECT

NAME/SIGNATURE/TITLE/DATE

CONTRACTOR

NAME/SIGNATURE/TITLE/DATE

ENGINEERS

NAME/SIGNATURE/TITLE/DATE

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
H	ISSUED FOR COORDINATION	31/08/12	SO
G	ISSUE FOR COORDINATION	30/08/12	SO
F	ISSUE FOR COORDINATION	30/08/12	SO
E	ISSUE FOR COORDINATION	30/08/12	SO
D	ISSUE FOR INFORMAITON	27/08/12	MW
C	ISSUE FOR INFORMATION	23/08/12	CH
B	ISSUE FOR INFORMATION	20/08/12	MW
A	ISSUE FOR COORDINATION	16/08/12	MW

Client: NSW GOVERNMENT Health Infrastructure

Project: Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title: FIRST FLOOR PLAN - STAGE 02

Checked: MW | Approved: JN | Scale: As indicated @ A1 sheet size

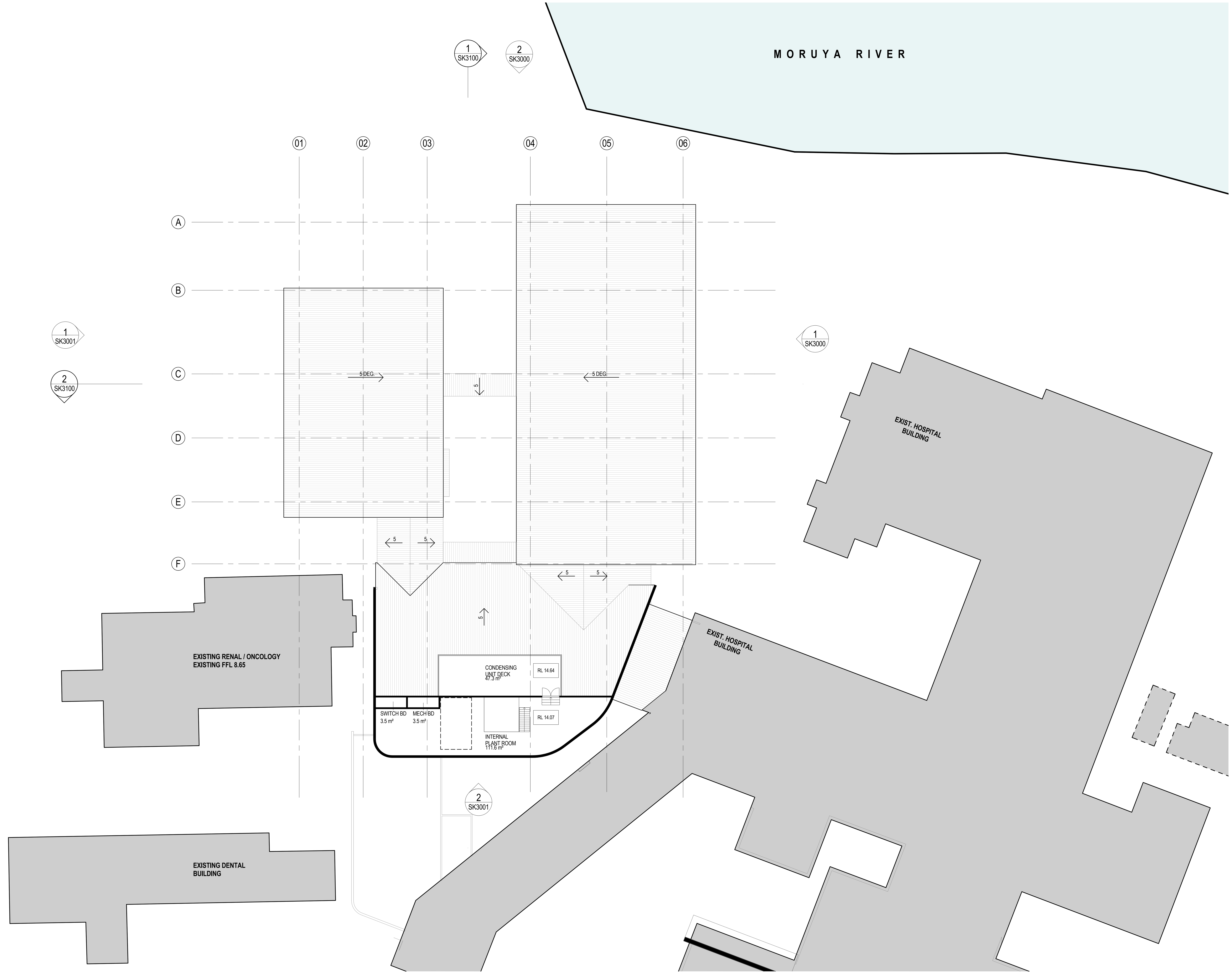
50mm on original

WOODS BAGOT — AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number: 02-20-2164 | Drawing number: SK2211 | Revision: H

Status

Date generated 31-08-12 5:18:38 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



1 RL 14.07 - Plant Floor Plan (Stage 02)
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
G	ISSUED FOR COORDINATION	31/08/12	SO
F	ISSUE FOR COORDINATION	30/08/12	SO
E	ISSUE FOR INFORMAITON	27/08/12	MW
D	ISSUE FOR INFORMATION	23/08/12	CH
C	ISSUE FOR INFORMATION	20/08/12	MW
B	ISSUE FOR COORDINATION	16/08/12	MW
A	PRESENTATION ISSUE	01/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
PLANT FLOOR PLAN - STAGE 02

Checked MW
Approved JN
Scale 1 : 200
@ A1 sheet size
50mm on original

WOODS BAGOT
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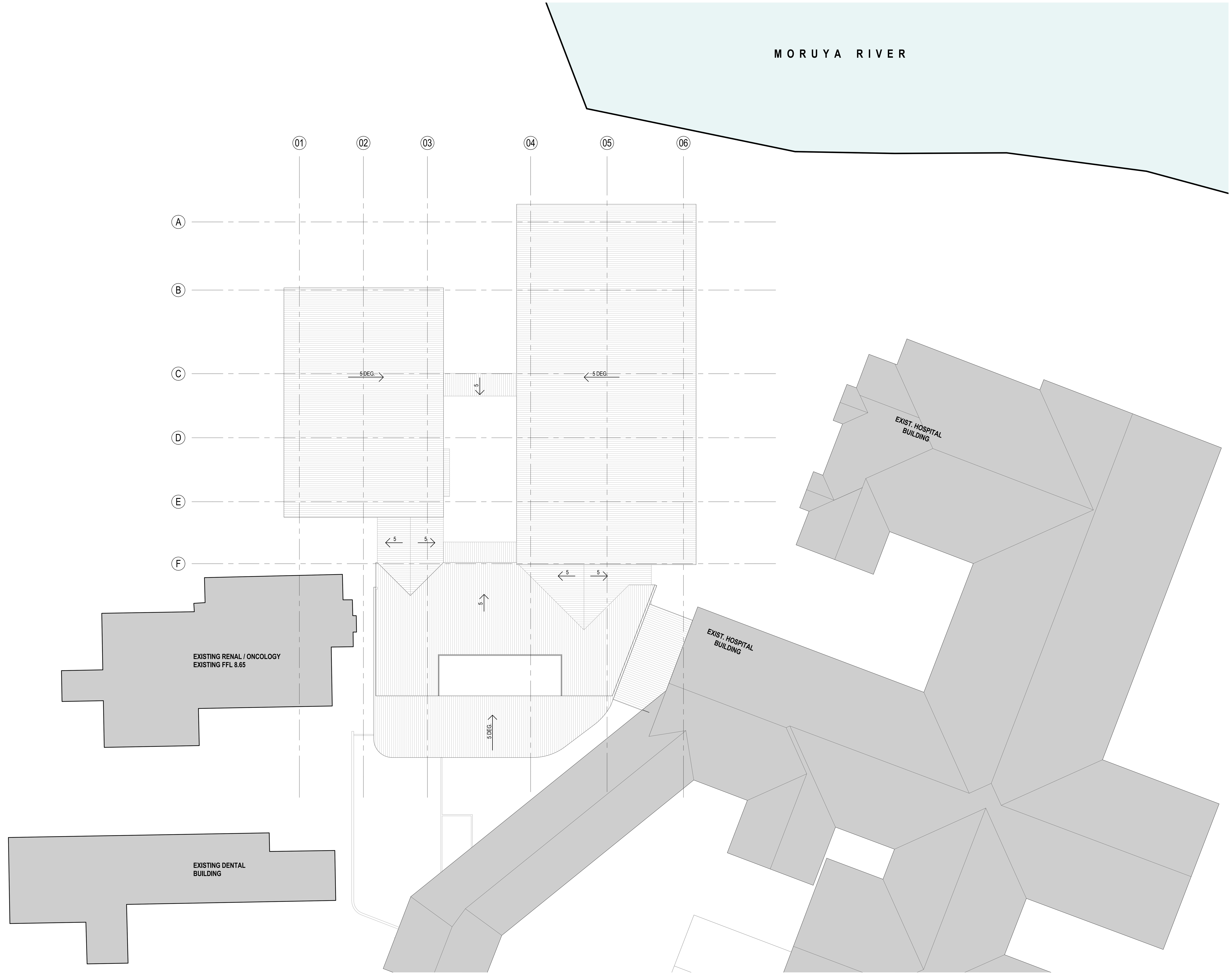
NORTH AMERICA

Project number 02-20-2164
Drawing number SK2212
Revision G
Status

Date generated 31-08-12 5:18:50 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



1 RL 17.27 - Roof Plan (Stage 02)
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd

Rev	Description	Date	App'd

Rev	Description	Date	App'd
G	ISSUED FOR COORDINATION	31/08/12	SO
F	ISSUE FOR COORDINATION	30/08/12	SO
E	ISSUE FOR INFORMAITON	27/08/12	MW
D	ISSUE FOR INFORMATION	23/08/12	CH
C	ISSUE FOR INFORMATION	20/08/12	MW
B	ISSUE FOR COORDINATION	16/08/12	MW
A	ISSUE FOR VALUE MANAGEMENT	15/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
ROOF PLAN - STAGE 02

Checked MW
Approved JN
Scale 1 : 200 @ A1 sheet size
50mm on original

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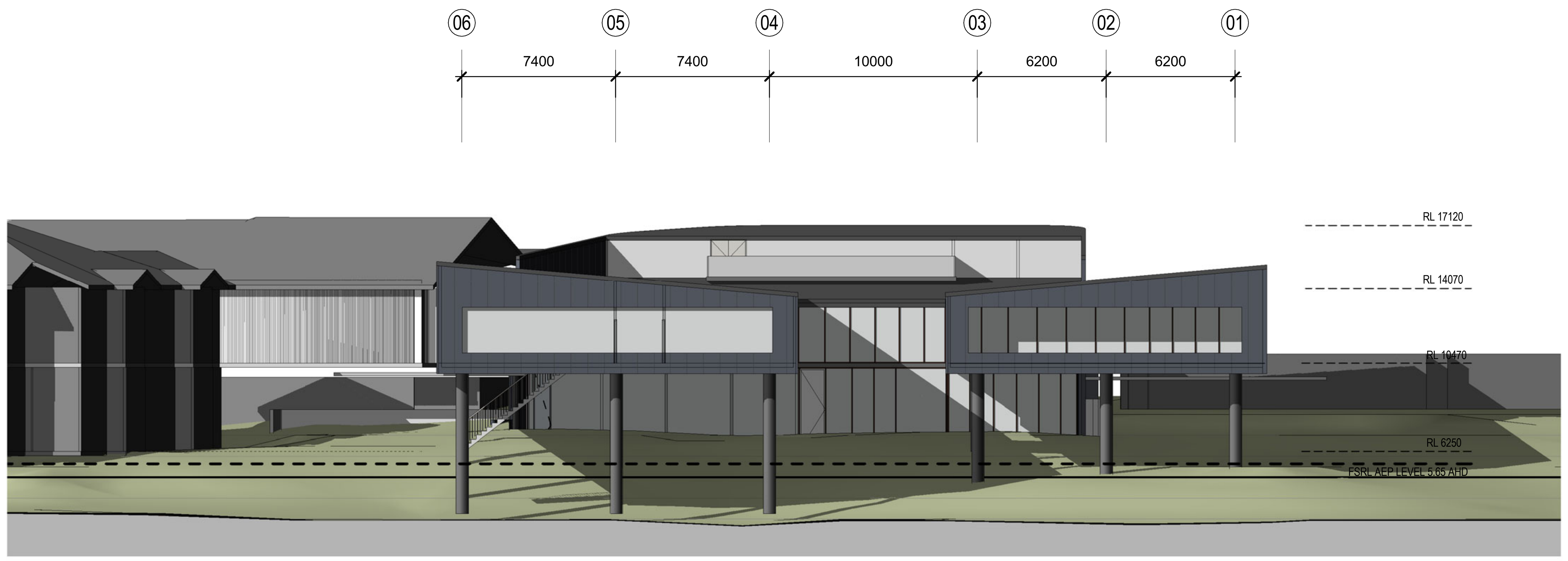
Project number 02-20-2164
Status
Drawing number SK2213
Revision G

Date generated 31-08-12 5:18:53 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt

1 East Elevation
SCALE 1 : 200



2 North Elevation
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
D	ISSUED FOR COORDINATION	31/08/12	SO
C	ISSUE FOR COORDINATION	30/08/12	SO
B	ISSUE FOR COORDINATION	16/08/12	MW
A	ISSUE FOR VALUE MANAGEMENT	15/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
ELEVATIONS 01 - STAGE 02

Checked MW
Approved JN
Scale 1 : 200
@ A1 sheet size

50mm on original

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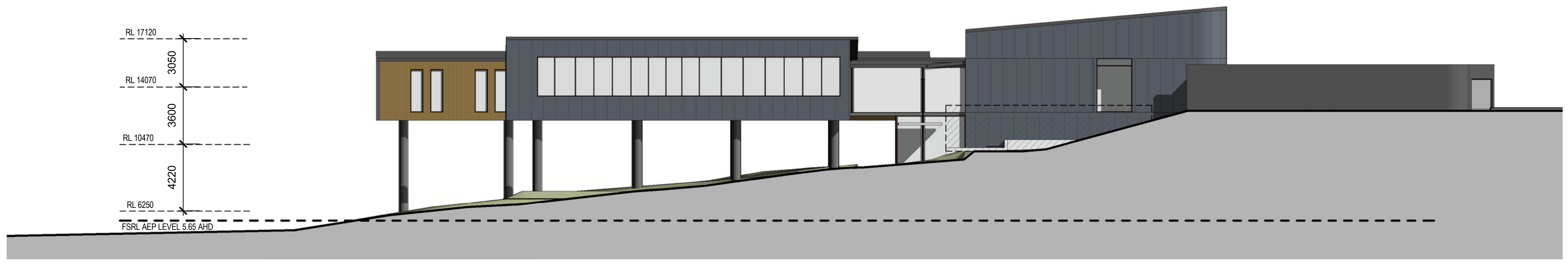
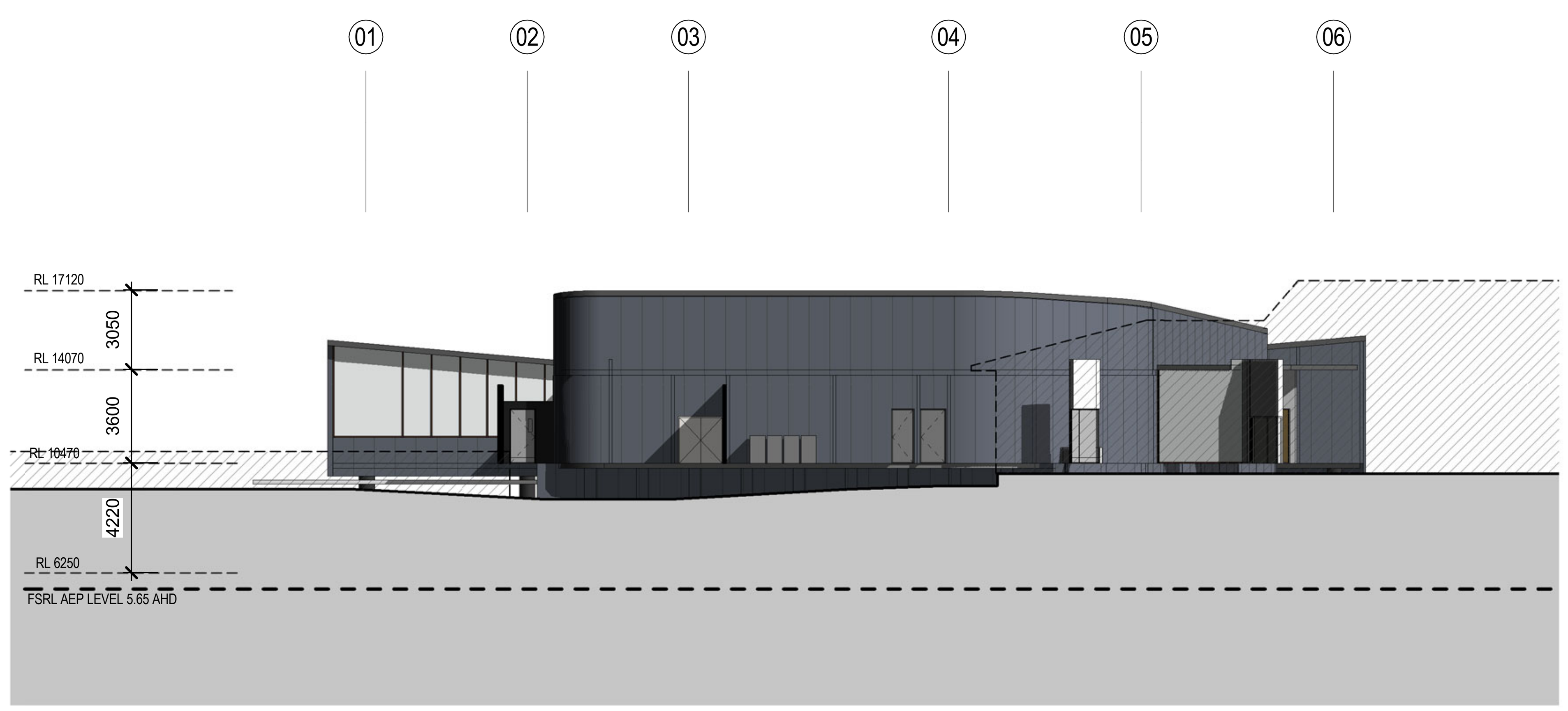
Project number 02-20-2164
Status
Drawing number SK3000
Revision D

Date generated 31-08-12 5:19:28 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



1 West Elevation
SCALE 1 : 200



2 South Elevation
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUED FOR COORDINATION	31/08/12	SO
A	ISSUE FOR COORDINATION	30/08/12	SO

Client
NSW GOVERNMENT | Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
ELEVATIONS 02 - STAGE 02

Checked MW
Approved JN
Scale 1 : 200 @ A1 sheet size

50mm on original

WOODS BAGOT
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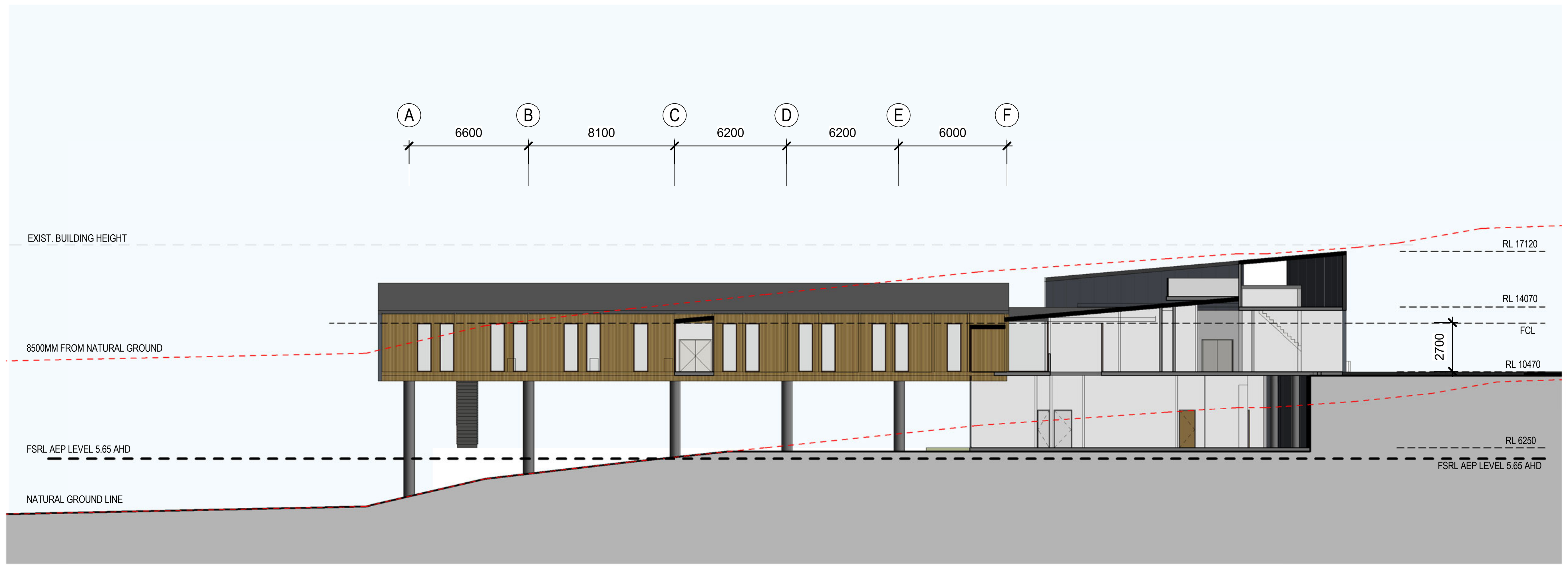
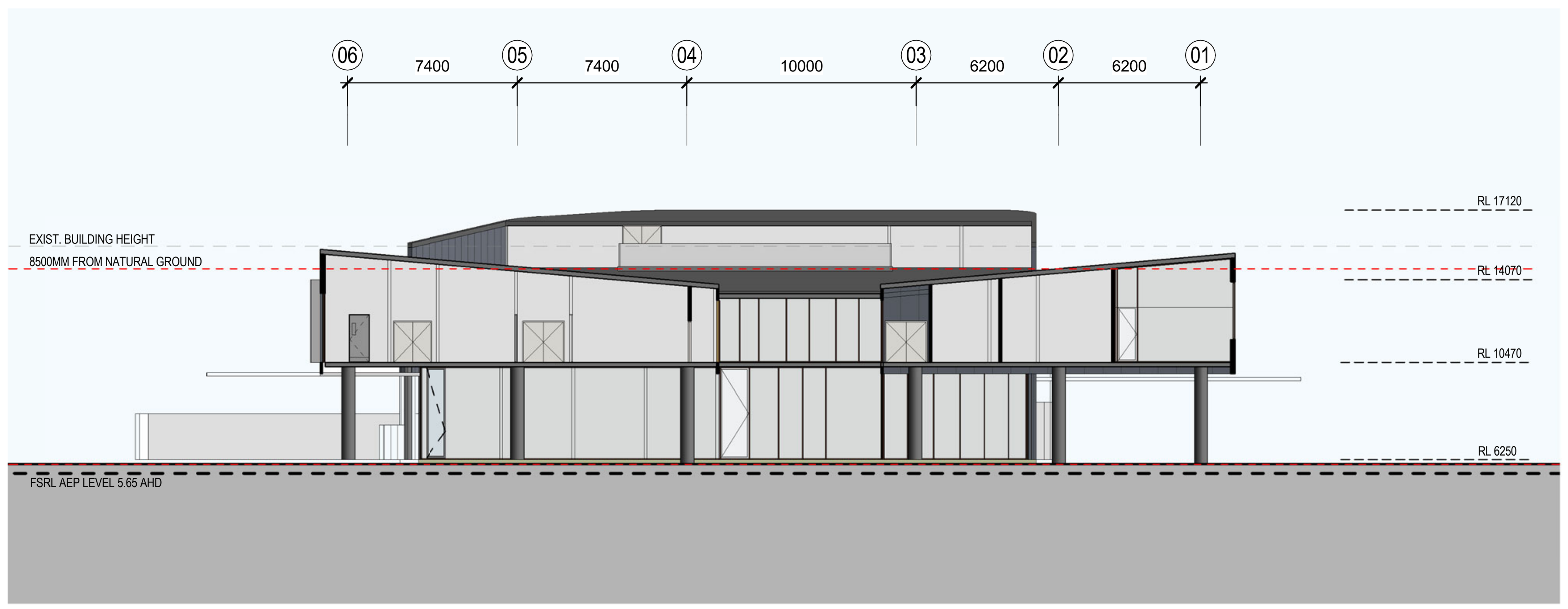
Project number 02-20-2164
Drawing number SK3001
Revision B
Status

Date generated 31-08-12 5:19:41 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



1 Section 01
SCALE 1 : 200



2 Section 02
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
D	ISSUED FOR COORDINATION	31/08/12	SO
C	ISSUE FOR COORDINATION	30/08/12	SO
B	ISSUE FOR COORDINATION	16/08/12	MW
A	PRESENTATION ISSUE	01/08/12	MW

Client
NSW GOVERNMENT | Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
SECTIONS 01 - STAGE 02

Checked MW
Approved JN
Scale 1 : 200 @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK3100
Revision D
Status

Date generated 31-08-12 5:19:50 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt

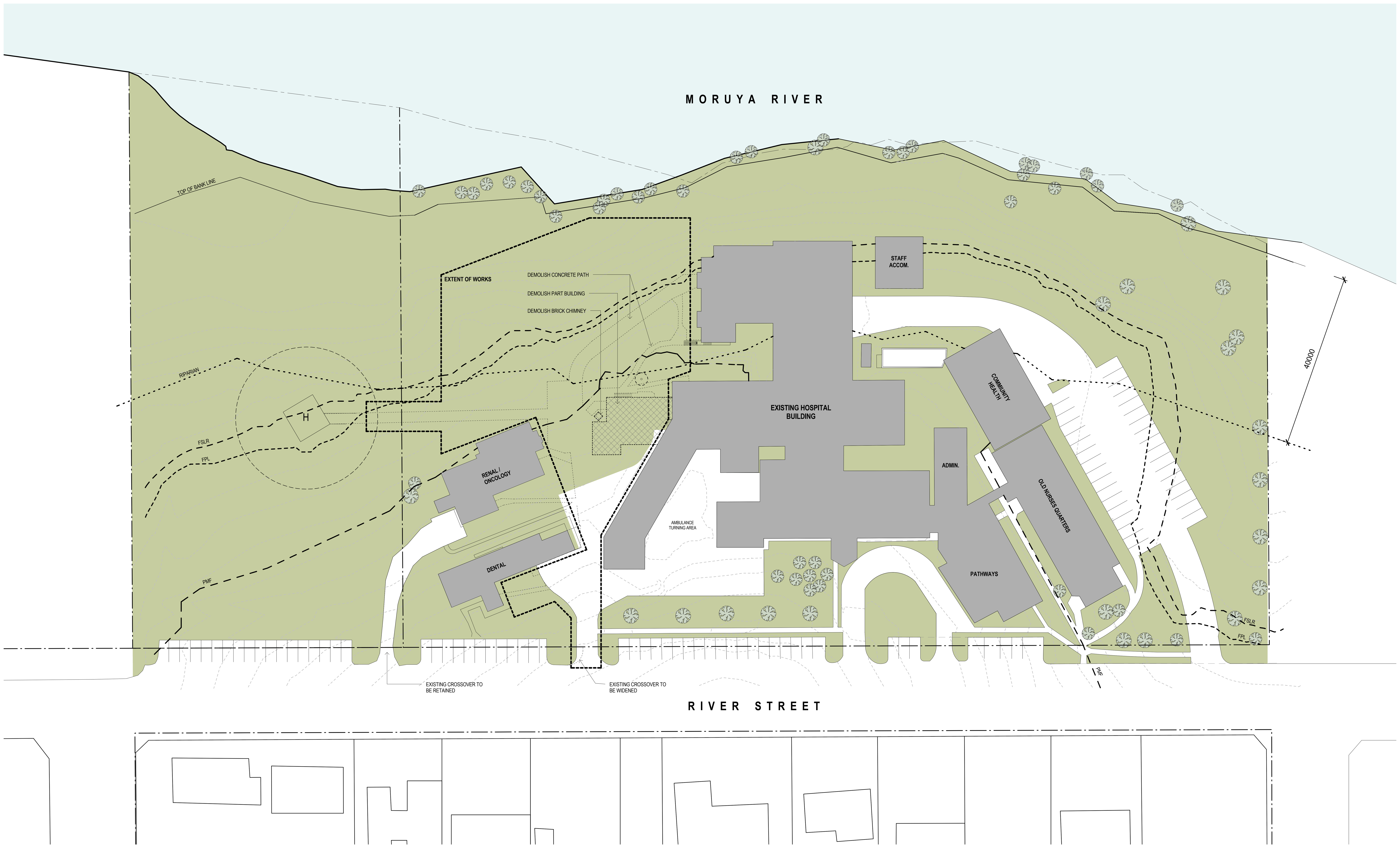
19.03 Development Application Drawings

WOODS BAGOT

MORUYA HOSPITAL - SUB ACUTE UNIT
2-20-2164

DA DRAWING SCHEDULE

Sheet No.	Sheet Name	Rev
SK0050	COVERSHEET	B
SK1050	DEMOLITION SITE PLAN	C
SK1051	PROPOSED SITE PLAN	E
SK1150	SITE ANALYSIS PLAN	B
SK1151	SHADOW DIAGRAMS - WINTER SOLSTICE 21st JUNE	B
SK2250	GROUND FLOOR PLAN	B
SK2251	FIRST FLOOR PLAN	B
SK2252	PLANT ROOM	B
SK2253	ROOF PLAN	B
SK3050	ELEVATIONS 01	B
SK3051	ELEVATIONS 02	B
SK3150	SECTIONS 01	B
SK9050	WEST PERSPECTIVE	A
SK9051	NORTH PERSPECTIVE	A
SK9052	TRUE WEST PERSPECTIVE	A



LEGEND

- FSRL 1% AEP LVL (5.65 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.15 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- EXISTING BUILDINGS/BUILT STRUCTURES TO REMAIN
- EXISTING BUILDINGS TO BE REFURBISHED
- EXISTING BUILDINGS/BUILT STRUCTURES REMOVED AND/OR RELOCATED
- EXISTING TREE TO BE REMOVED

NOTES:
FOR LOCATION OF ALL EXISTING SITE SERVICES AND CONDITIONS, REFER TO SURVEY DOCUMENTATIONS

1 DEMOLITION SITE PLAN
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
C	ISSUE FOR UPDATED DA	11/09/12	SO
B	ISSUE FOR DA	07/09/12	SO
A	ISSUED FOR COORDINATION	31/08/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
DEMOLITION SITE PLAN

Checked MW
Approved JN
Scale As indicated @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK1050
Revision C
Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:15:46 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

LEGEND

- FSRL 1% AEP LVL (5.69 AHD)
- FPL 1% AEP LVL +500mm FREEBOARD (6.19 AHD)
- RIPARIAN LINE
- PMF @ RL 7.8
- EXTENT OF DEMOLITION
- EXISTING BUILDINGS / BUILT STRUCTURES TO REMAIN
- H EXISTING HELIPAD

1 PROPOSED SITE PLAN
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
E	ISSUE FOR UPDATED DA	11/09/12	SO
D	ISSUE FOR DA	07/09/12	SO
C	ISSUED FOR COORDINATION	04/09/12	JW
B	ISSUED FOR COORDINATION	31/08/12	SO
A	ISSUE FOR INFORMATION	30/08/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

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Drawing title
PROPOSED SITE PLAN

Checked MW | Approved JN | Scale As indicated @ A1 sheet size

50mm on original

WOODS BAGOT
AUSTRALIA
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EUROPE
NORTH AMERICA

Project number 02-20-2164 | Drawing number SK1051 | Revision E

Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:18:29 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

LEGEND
- EXISTING BUILDINGS
- PROPOSED BUILDINGS
- SITE BOUNDARY LINE
- SITE ACCESS - VEHICULAR ACCESS
- SITE ACCESS - PEDESTRIAN ACCESS
- WIND DIRECTION
- EXISTING VEGETATION

SITE AREA: 22720m²

1 SITE ANALYSIS PLAN
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT | Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

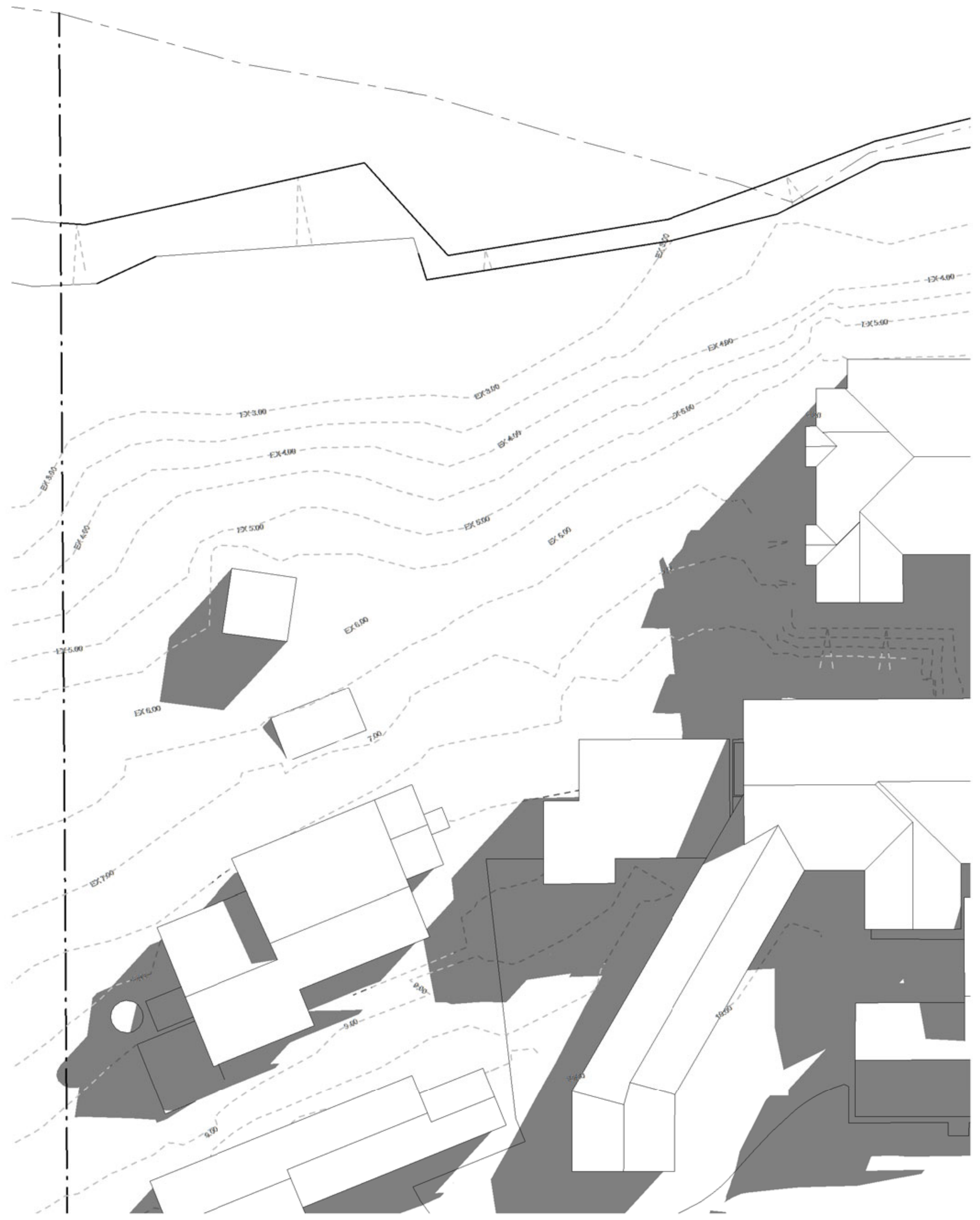
Drawing title
SITE ANALYSIS PLAN

Checked: MW
Approved: JN
Scale: As indicated @ A1 sheet size
50mm on original

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

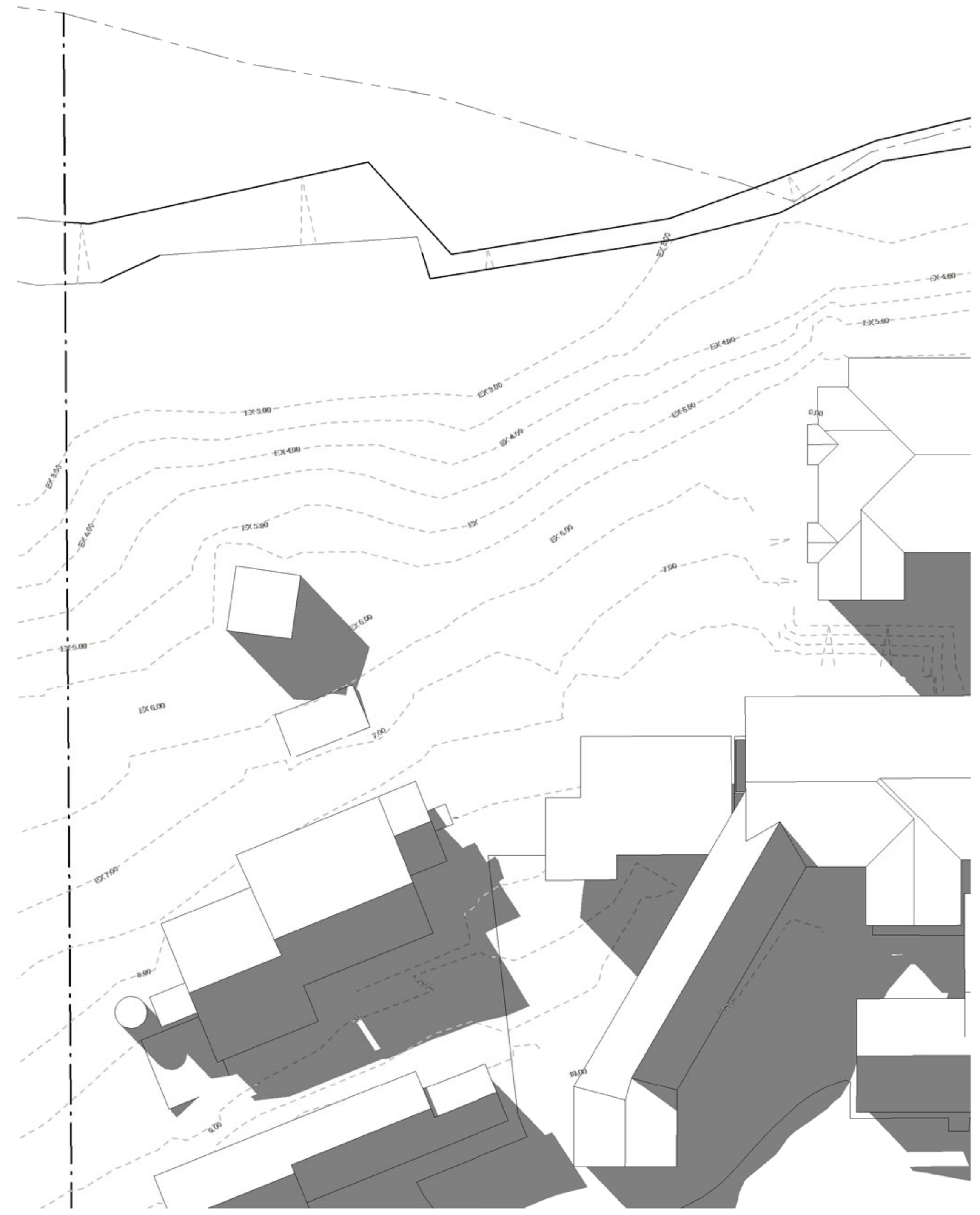
Project number: 02-20-2164
Drawing number: SK1150
Revision: B
Status: DEVELOPMENT APPLICATION

Date generated 11-09-12 4:25:20 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

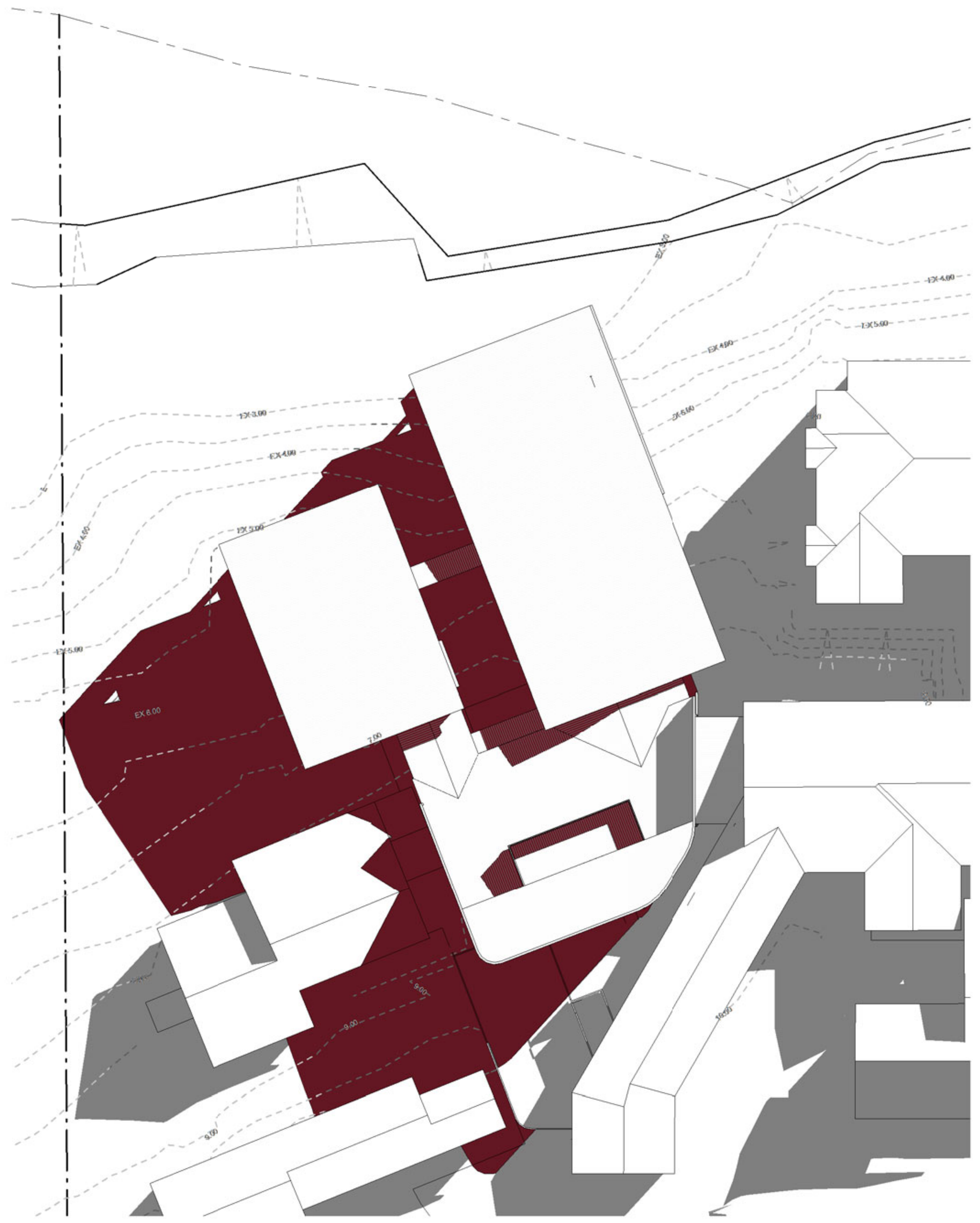


1 SHADOW DIAGRAM 9am - EXISTING
SCALE 1 : 500

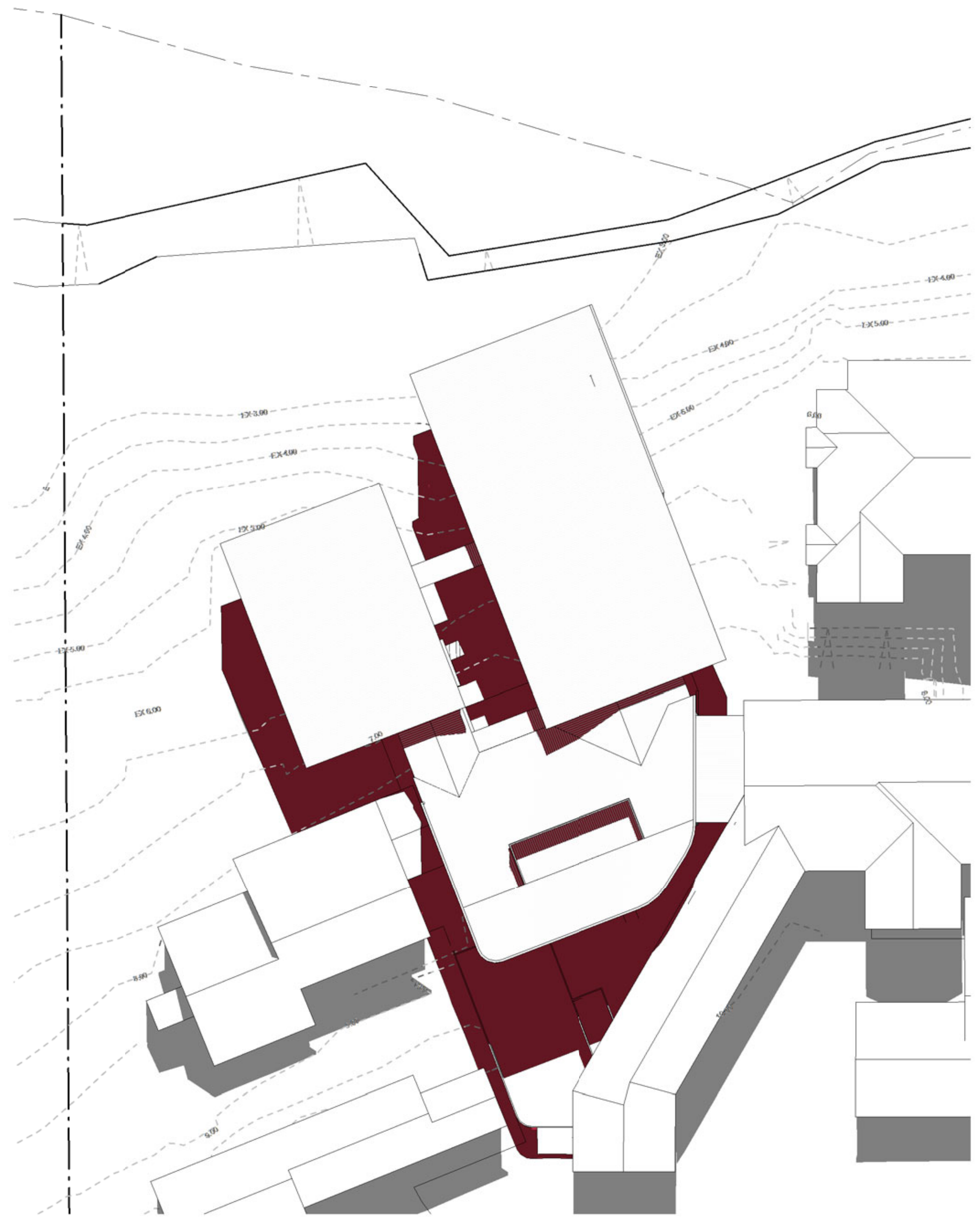
3 SHADOW DIAGRAM 12pm - EXISTING
SCALE 1 : 500



5 SHADOW DIAGRAM 3pm - EXISTING
SCALE 1 : 500



2 SHADOW DIAGRAM 9am - PROPOSED
SCALE 1 : 500



4 SHADOW DIAGRAM 12pm - PROPOSED
SCALE 1 : 500

6 SHADOW DIAGRAM 3pm - PROPOSED
SCALE 1 : 500

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
SHADOW DIAGRAMS - WINTER SOLSTICE 21st JUNE

Checked	Approved	Scale
MW	JN	1 : 500 @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number	Drawing number	Revision
02-20-2164	SK1151	B

Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:26:56 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

1 PROPOSED GROUND FLOOR PLAN
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
GROUND FLOOR PLAN

Checked MW
Approved JN
Scale As indicated @ A1 sheet size
50mm on original

WOODS BAGOT
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ASIA
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EUROPE
NORTH AMERICA

Project number 02-20-2164
Drawing number SK2250
Revision B
Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:29:27 PM
C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

LEGEND

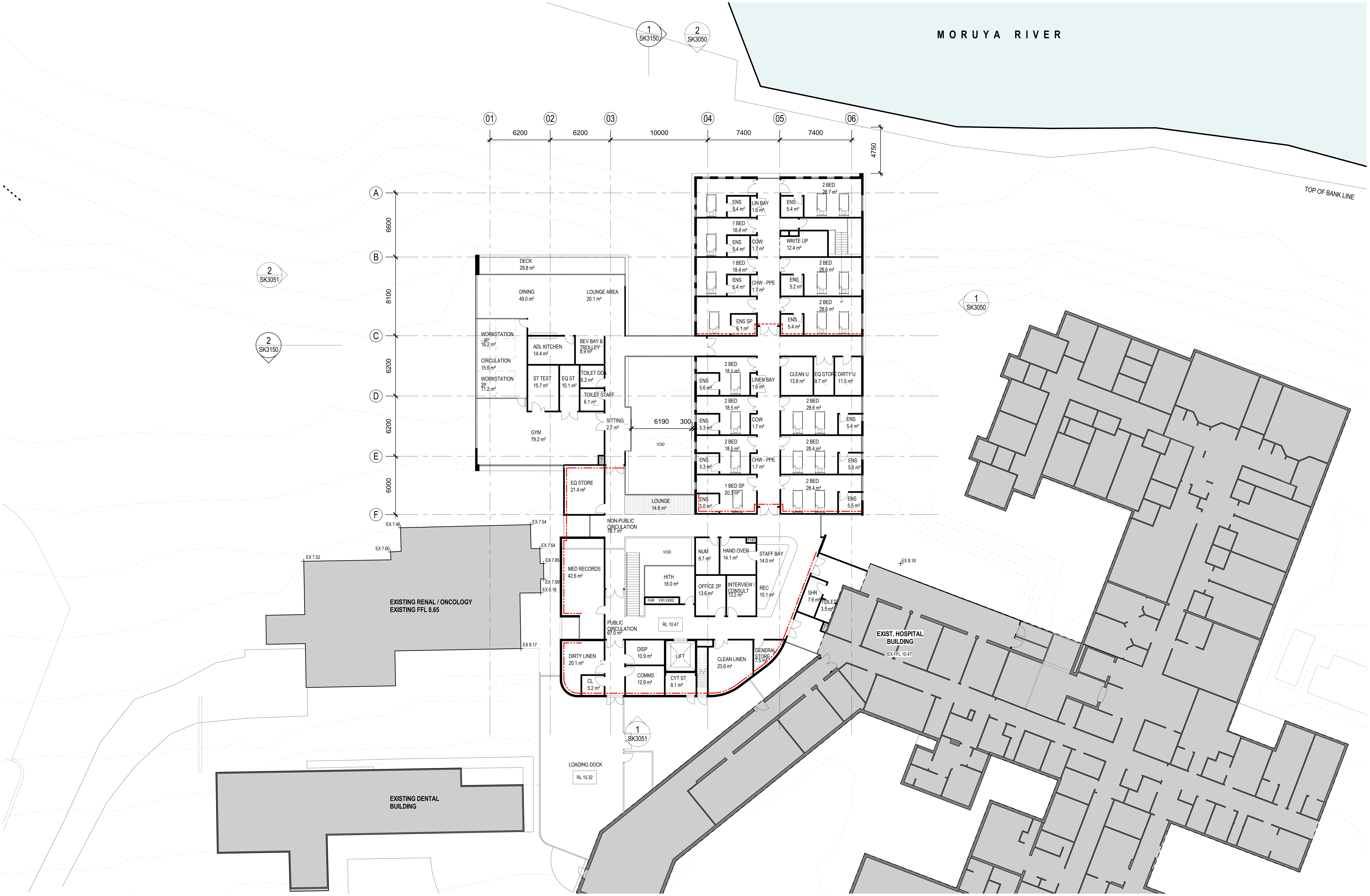
2 HOUR FIRE WALL

1 HOUR FIRE WALL

SMOKE WALL

EX X.XX INDICATES EXISTING LEVEL

RL X.XX INDICATES PROPOSED LEVEL



1 PROPOSED FIRST FLOOR PLAN

SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client: NSW GOVERNMENT Health Infrastructure

Project: Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title: FIRST FLOOR PLAN

Checked: MW | Approved: JN | Scale: As indicated @ A1 sheet size

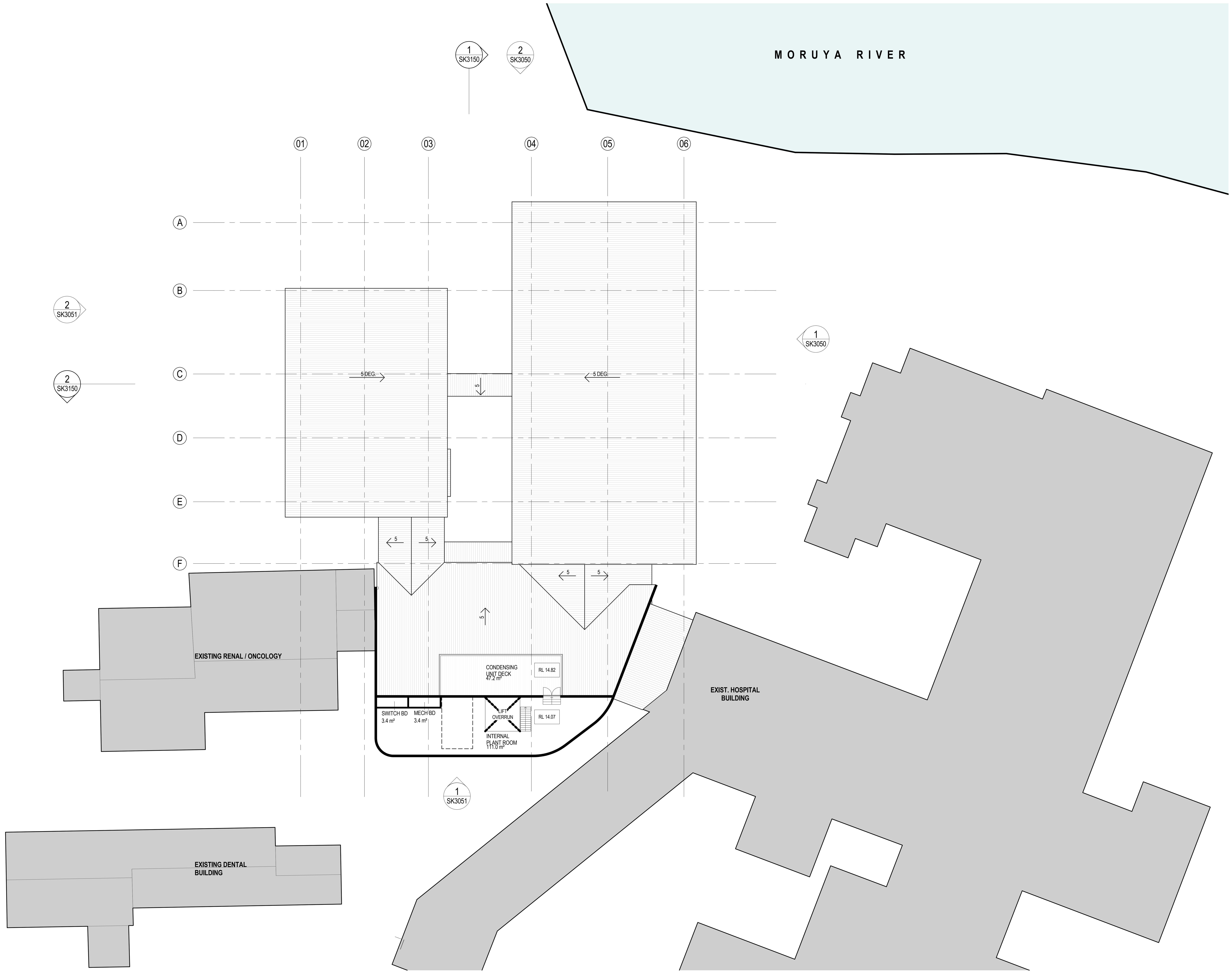
50mm on original

WOODS BAGOT — AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number: 02-20-2164 | Drawing number: SK2251 | Revision: B

Status: DEVELOPMENT APPLICATION

Date generated 11-09-12 4:32:07 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt



1 PROPOSED PLANT FLOOR PLAN
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

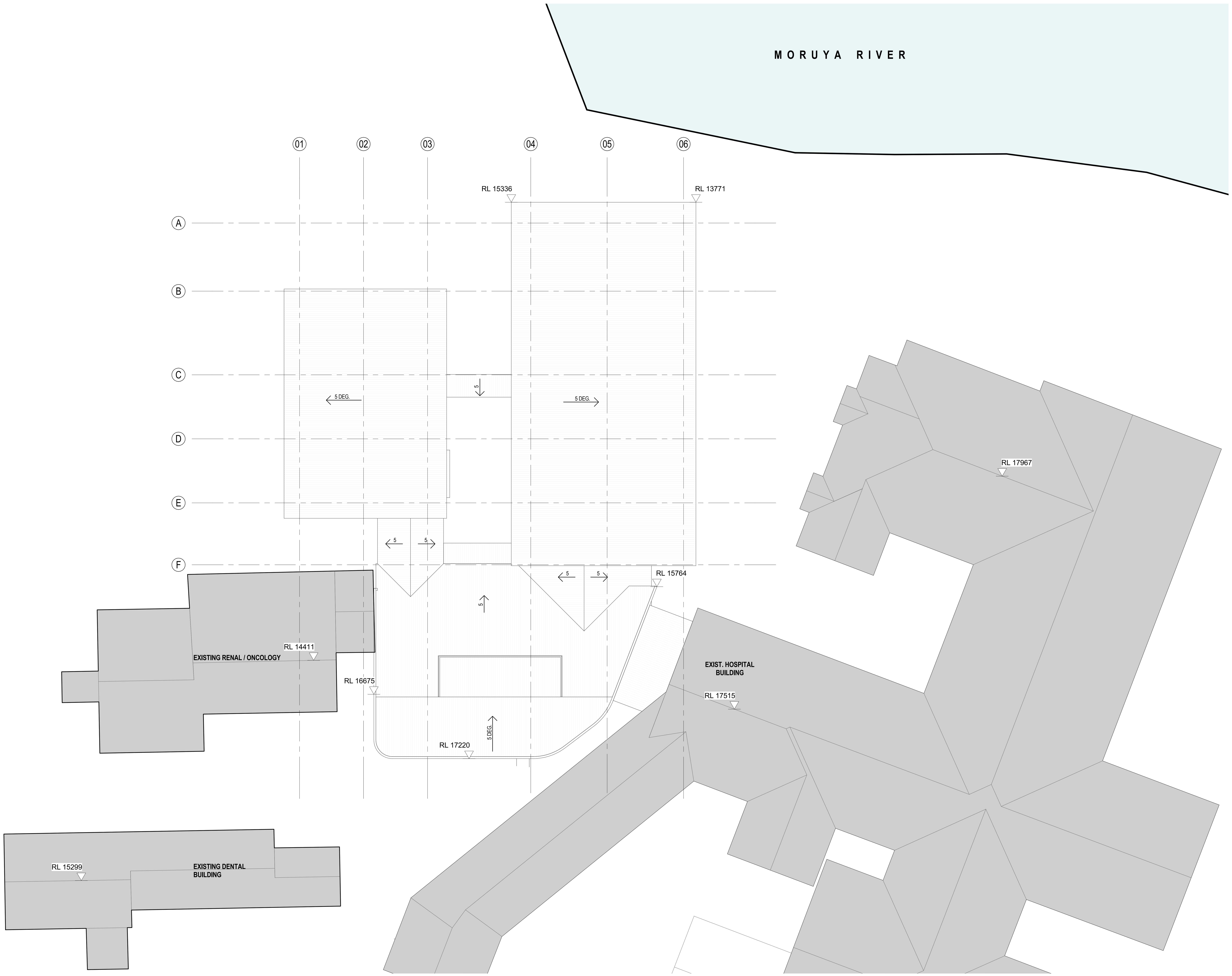
Drawing title
PLANT ROOM

Checked MW
Approved JN
Scale 1 : 200 @ A1 sheet size
50mm on original

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Project number 02-20-2164
Drawing number SK2252
Revision B
Status DEVELOPMENT APPLICATION

Date generated 11-09-12 4:33:00 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt



1 PROPOSED ROOF PLAN
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
ROOF PLAN

Checked MW
Approved JN
Scale 1 : 200
@ A1 sheet size

50mm on original

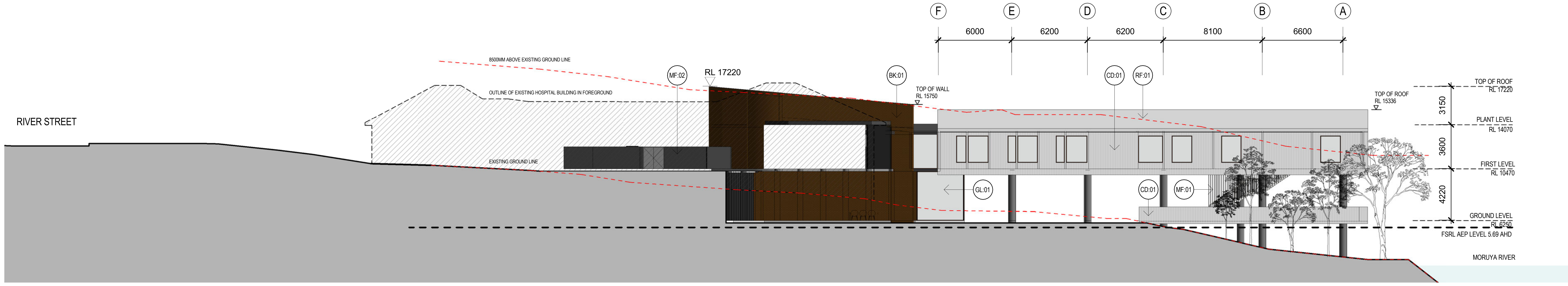
WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Project number 02-20-2164
Drawing number SK2253
Revision B
Status
DEVELOPMENT APPLICATION

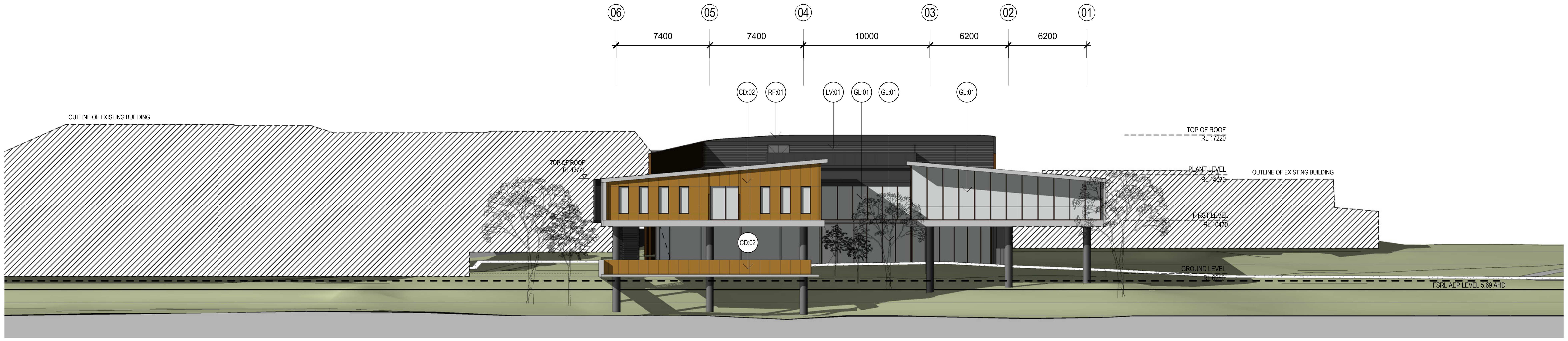
Date generated 11-09-12 4:35:52 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

LEGEND

CD:01	PREFABRICATED METAL CLADDING 01
CD:02	PREFABRICATED METAL CLADDING 02
BK:01	BRICK VENEER (SIMILAR TO EXISTING)
LV:01	PLANT LOUVRES
MF:01	METAL FINS (FIRE STAIR)
GL:01	GLAZING
RF:01	KLIPLOK ROOFING
MF:02	METAL FENCING (LOADING DOCK) 02



1 East Elevation (DA)
SCALE 1 : 200



2 North Elevation (DA)
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
ELEVATIONS 01

Checked MW | Approved JN | Scale As indicated @ A1 sheet size

50mm on original

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

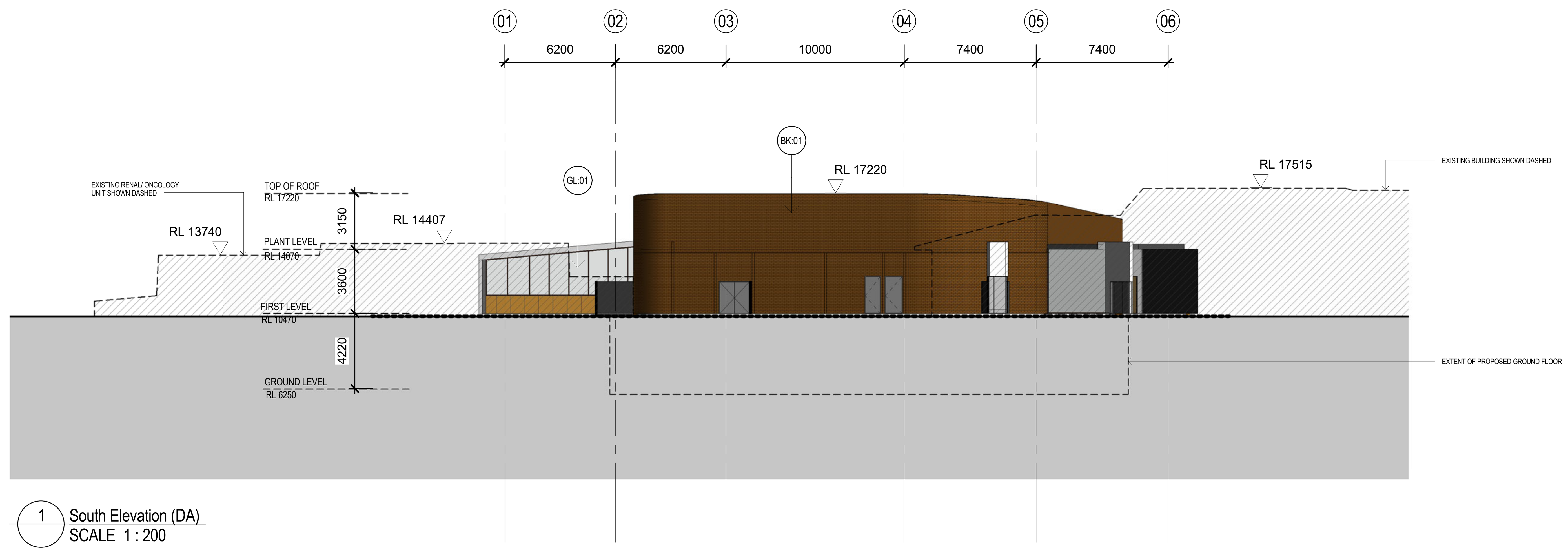
Project number 02-20-2164 | Drawing number SK3050 | Revision B

Status
DEVELOPMENT APPLICATION

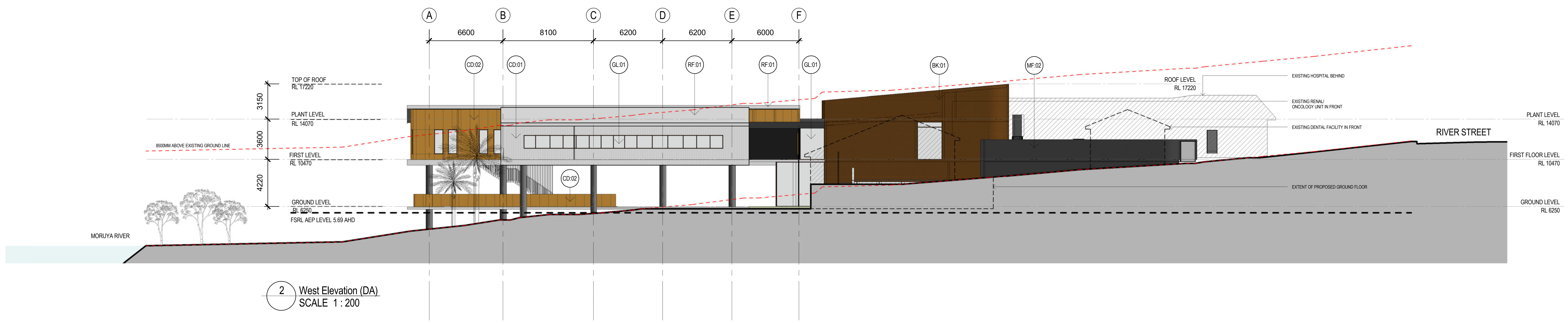
Date generated 11-09-12 4:39:47 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

LEGEND

CD:01	PREFABRICATED METAL CLADDING 01
CD:02	PREFABRICATED METAL CLADDING 02
BK:01	BRICK VENEER (SIMILAR TO EXISTING)
LV:01	PLANT LOUVRES
MF:01	METAL FINS (FIRE STAIR)
GL:01	GLAZING
RF:01	KLIPLOK ROOFING
MF:02	METAL FENCING (LOADING DOCK) 02



1 South Elevation (DA)
SCALE 1 : 200



2 West Elevation (DA)
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
ELEVATIONS 02

Checked	Approved	Scale
MW	JN	As indicated @ A1 sheet size

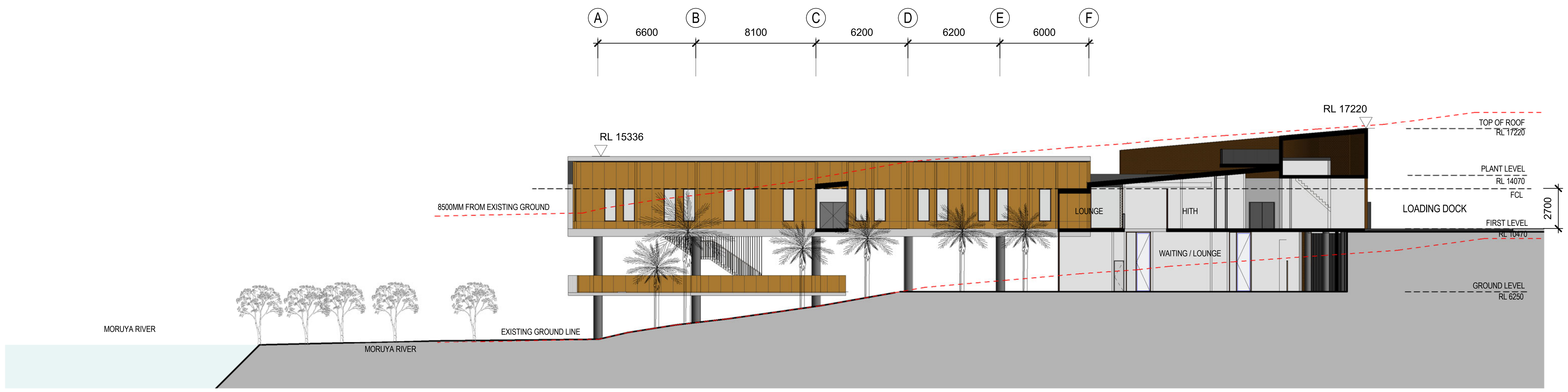
50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

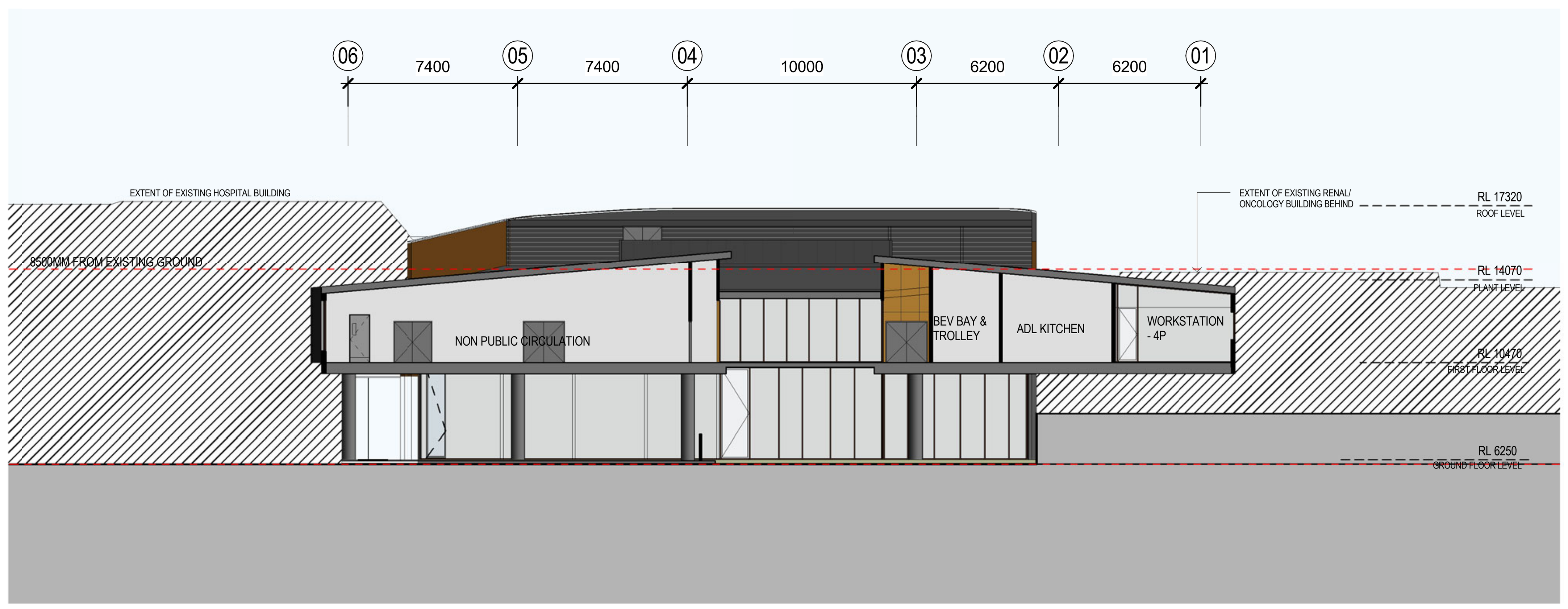
Project number	Drawing number	Revision
02-20-2164	SK3051	B

Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:49:44 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt



1 Section 01 (DA)
SCALE 1 : 200



2 Section 02 (DA)
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd

Rev	Description	Date	App'd

Rev	Description	Date	App'd
B	ISSUE FOR UPDATED DA	11/09/12	SO
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
SECTIONS 01

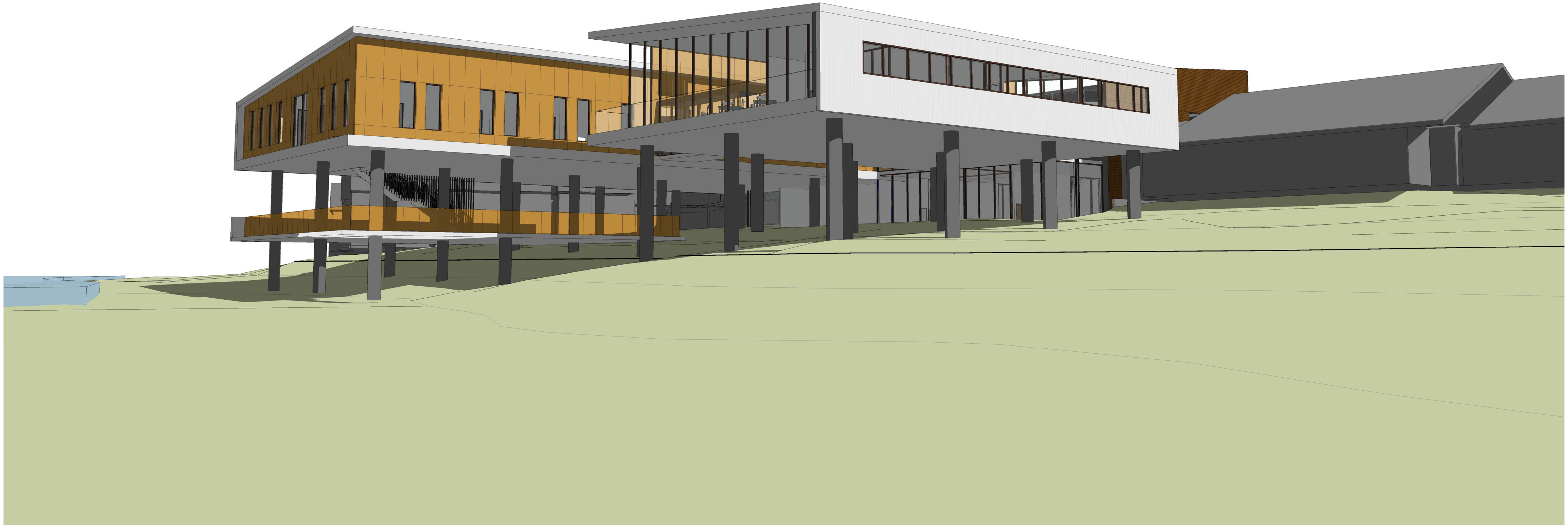
Checked MW
Approved JN
Scale 1 : 200 @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK3150
Revision B
Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:52:55 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt



Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd

Rev	Description	Date	App'd

Rev	Description	Date	App'd
A	ISSUE FOR UPDATED DA	11/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
WEST PERSPECTIVE

Checked MW
Approved JN
Scale
@ A1 sheet size
50mm on original

WOODS BAGOT
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NORTH AMERICA

Project number 02-20-2164
Drawing number SK9050
Revision A
Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:54:26 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd

Rev	Description	Date	App'd

Rev	Description	Date	App'd
A	ISSUE FOR UPDATED DA	11/09/12	SO

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
NORTH PERSPECTIVE

Checked	Approved	Scale
MW	JN	@ A1 sheet size

50mm on original

WOODS BAGOT
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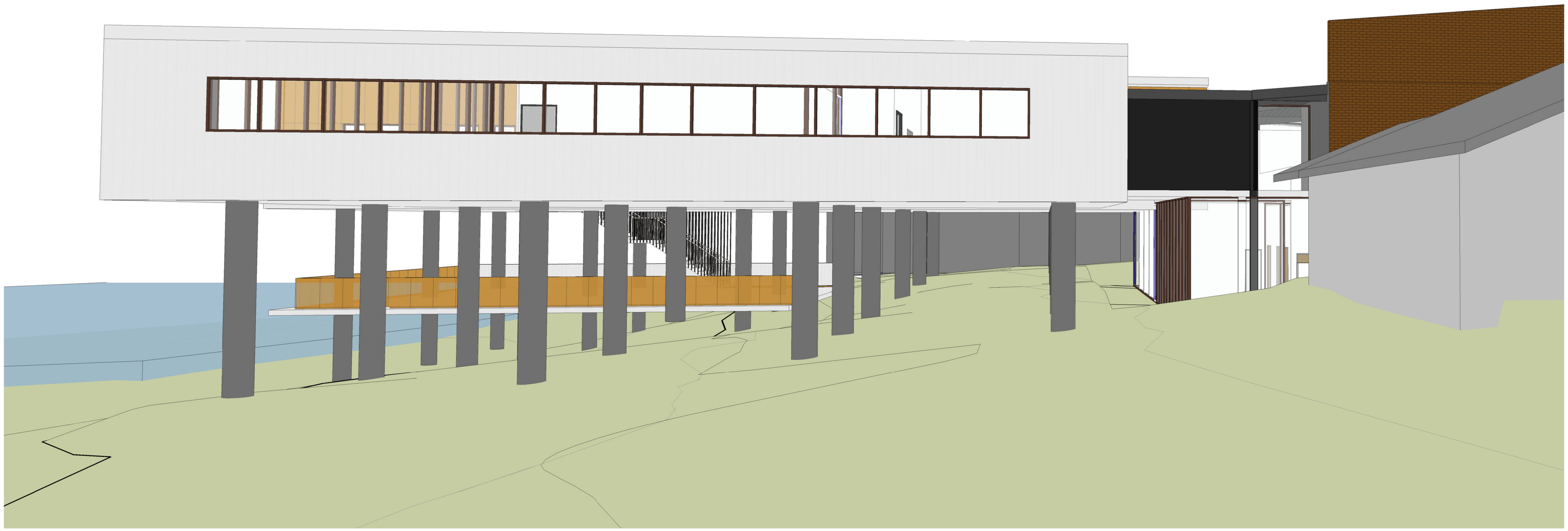
EUROPE
NORTH AMERICA

Project number	Drawing number	Revision
02-20-2164	SK9051	A

Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 4:55:31 PM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt



Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd

Rev	Description	Date	App'd

Rev	Description	Date	App'd
A	ISSUE FOR DA	07/09/12	SO

Client
NSW GOVERNMENT | Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
TRUE WEST PERSPECTIVE

Checked: MW
Approved: JN
Scale
@ A1 sheet size
50mm on original

WOODS BAGOT
AUSTRALIA
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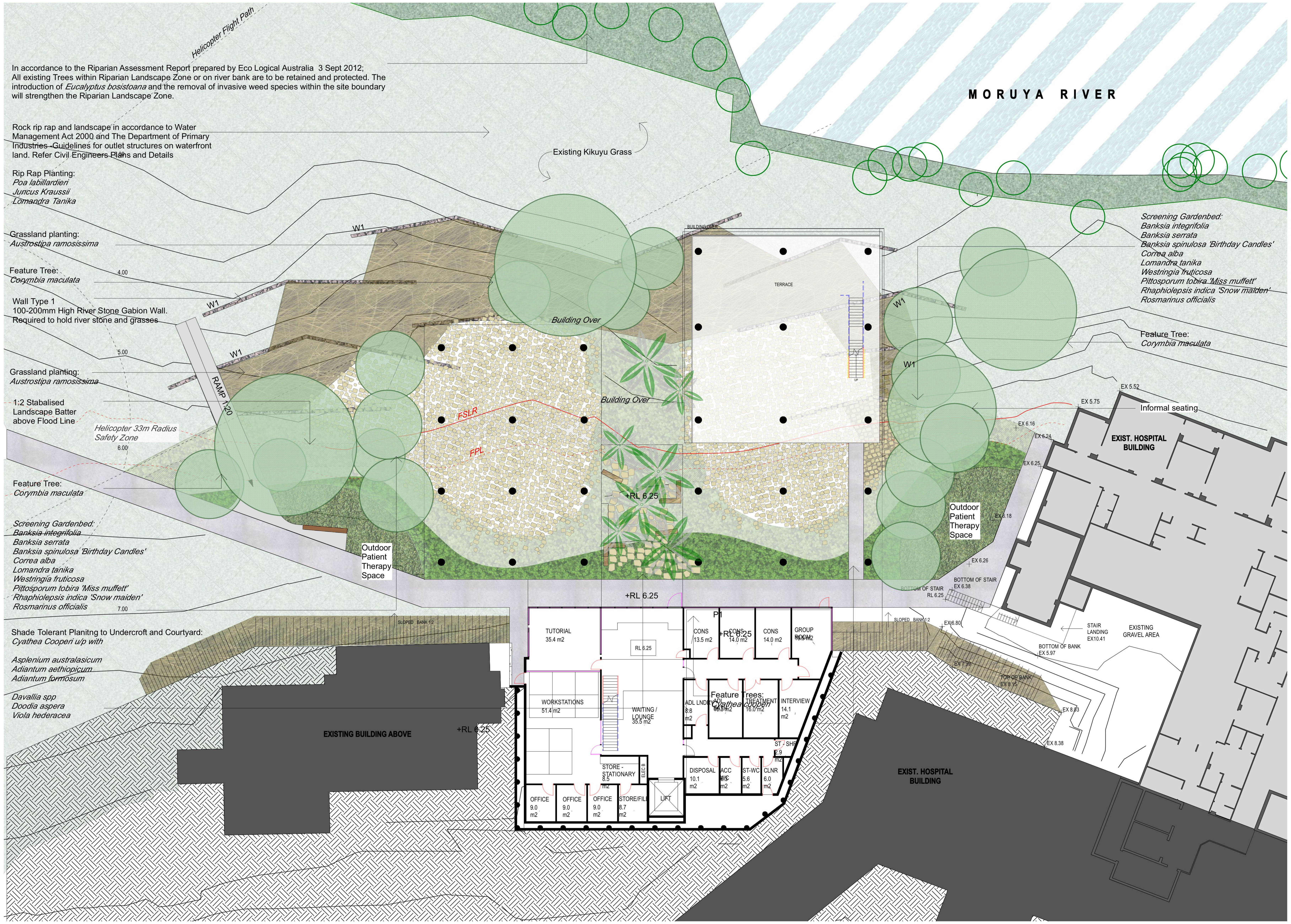
MIDDLE EAST
EUROPE
NORTH AMERICA

Project number: 02-20-2164
Drawing number: SK9052
Revision: A
Status
DEVELOPMENT APPLICATION

Date generated 11-09-12 5:08:58 PM
C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydjxw.rvt

20 Landscape Drawings



1 Ground Level Landscape Plan
Scale 1:100

KEY

- Existing tree — To be retained and protected
- Proposed trees — Species Vary — Refer Plan and Schedule
- W1 — Wall Type 1 - 100-200mm Stone Gabion Wall
- River Stones - Undercroft Random Sizes
- Stepping Stones - To Courtyard Garden
- GB — Gardenbed — Refer plan and planting schedule
- Turf
- P1 — Exposed Aggregate Concrete
- + ex 29.91 — Existing level
- +24.60 — Proposed level
- Timber Bench Seat

MORUYA SUB ACUTE INDICATIVE PLANT SCHEDULE

SPECIES NAME	COMMON NAME	IGHT/SPRE	POT SIZ
TREES			
Eucalyptus bosistoana	Coast Grey Box	25 x 10	200L
Banksia serrata	Old Man Banksia	10 x 8	100L
Banksia integrifolia	Coast Banksia	14 x 7	100L
Corymbia maculata	Spotted Gum	35 x 20	100L
PALMS/FERNS			
Adiantum aethiopicum	Common Maidenhair	0.4 x 0.4	200mm
Adiantum formosum	Black Stem Maidenhair	0.7 x 0.7	200mm
Adiantum hispidulum	Rough Maidenhair fern	0.5 x 0.5	200mm
Asplenium australasicum	Bird's Nest Fern	0.7 x 0.7	200mm
Chaemerops humilis	Mediterranean Fan Palm	4.5 x 4.5	100L
Cyathea cooperi	Tree Fern	10 x 4	100L
Davallia spp	Rabbits Foot Fern	0.6 x 1.5	200mm
Doodia aspera	Rasp Fern	0.3 x 0.3	200mm
SHRUBS			
Correa alba	White Correa	1.5 x 1.5	200mm
Pittosporum tobira 'Miss Muffett'	Miss Muffett Mock Orange	1 x 1	200mm
Rosmarinus officinalis	Rosemary	1 x 1	200mm
Rhaphiolepis indica	Indian Hawthorn	1.5 x 1.5	200mm
GRASSES			
Austrostipa ramosissima	Stout Bamboo Grass	2 x 1	100mm
Juncus Kraussii	Sea Rush	0.5 x 1	100mm
Lomandra 'Tanika'	Tanika Mat Rush	0.6 x 0.6	100mm
Poa labillardieri	Tussock Grass	0.7 x 0.5	100mm
GROUNDCOVERS/ CLIMBERS			
Banksia spinulosa 'Birthday Candles'	Birthday Candles Banksia	0.5 x 0.75	100mm
Viola hederacea	Native Violet	0.015 x 0.5	100mm

3 Indicative Plant Schedule

Asplenium australasicum *Adiantum aethiopicum* *Banksia integrifolia* *Banksia serrata* *Corymbia maculata* *Correa alba* *Cyathea cooperi* *Lomandra tanika* *Raphiolepis indica* *Westringia fruticosa* *Viola hederacea*

2 Indicative Plant Images

Iss.	Amendment	Date	By
A	Preliminary DA DRAFT	04/09/2012	CB
B	DA DRAFT	10/09/2012	TC
C	DA	12/09/2012	TC

N
0 2 4 6 8 10m

IMPORTANT NOTES:
Do not scale from drawings
All discrepancies to be brought to the attention of the Landscape Architect
Larger scale drawings and written dimensions take preferenceAll dimensions in mm unless otherwise stated.
All tree dimensions and RLs in metres.
Use figured dimensions only.
Verify all dimensions on site before the commencement of any works.
Contractors shall locate and protect all services prior to construction.
All work shall be carried out in accordance with ASA, BCA and Local Government Regulations.
Structural Details shall be subject to Engineer's Specifications.
Drainage & Water Feature Details shall be subject to Hydraulic Engineer's Specifications.
All work shall be carried out in a professional manner by Qualified Tradesman according to Landscape Drawings and Engineer's Specifications.
No responsibility will be taken by *360 degrees.* for any variations in design, construction method, materials specified, and general specifications without permission from the Project Engineer or Landscape Architect.

CLIENT NSW Government Health Infrastructure
SCALE 1:200 @ A1
SHEET 1 of 1
DRAWN TC
CHECKED TF
ISSUE DA

DWG. TITLE
LANDSCAPE PLAN
PROJECT
Moruya Sub-Acute Rehab Unit

360°
Level 5 Ballarat House
68-72 Wentworth Av.
Surry Hills NSW 2010
P 612 9212 2204
F 612 9212 2256
E 360@360.net.au
ABN 20 418 301 319

LAN-DA-001

21 Structure Drawings

MEMBER SCHEDULE

C1 – Column ∅750

C2 – Column ∅600

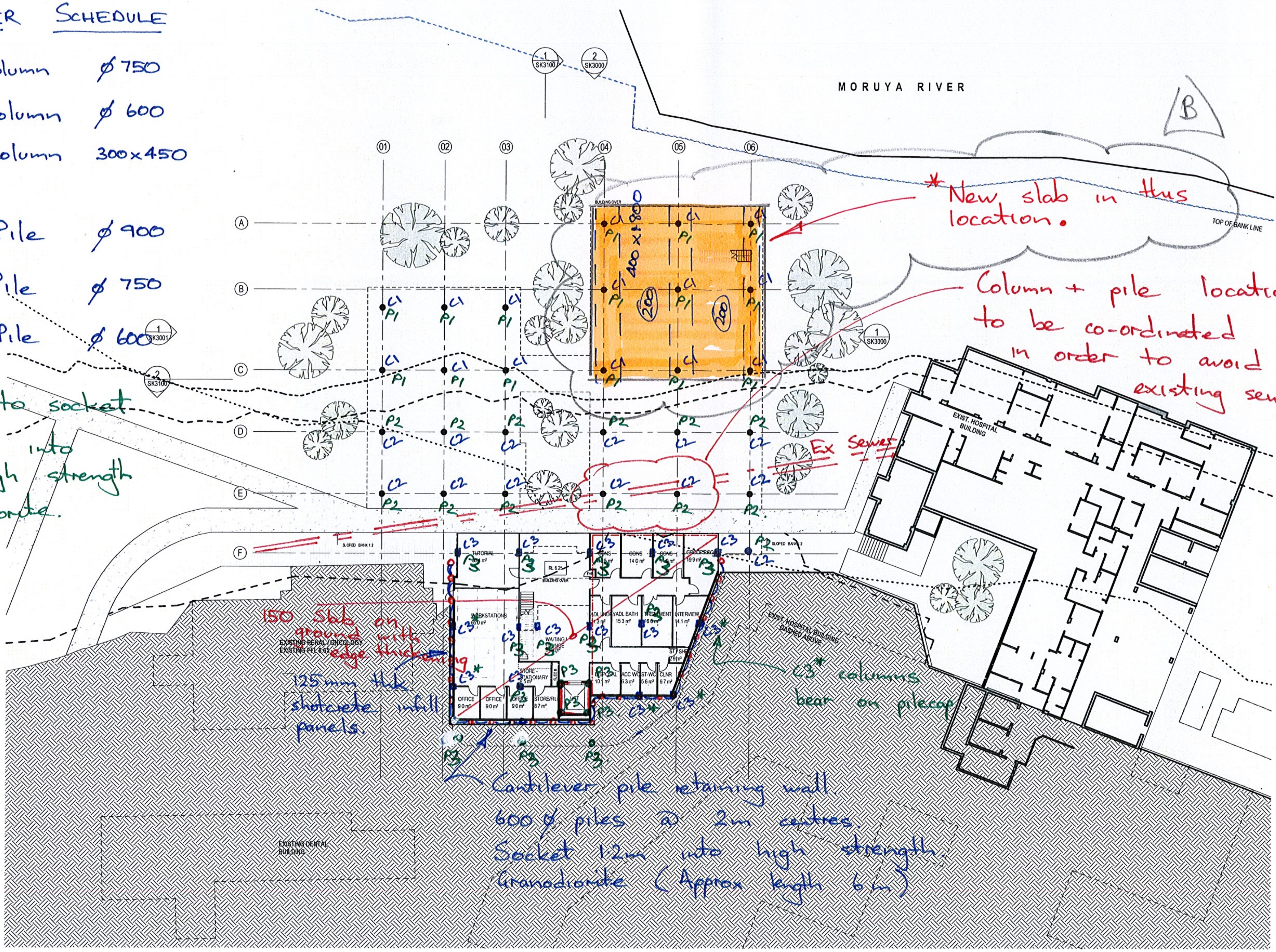
C3 – Column 300x450

P1 – Pile ∅900

P2 – Pile ∅750

P3 – Pile ∅600

Piles to socket 300 mm into med/high strength Granodiorite.



1 RL 6.25 - Ground Floor Plan (Stage 02)
SCALE 1 : 200

MORUYA SK 001

FOUNDATION LEVEL

AECOM REV B

DATE 07/09/12

SCHEMATIC DESIGN SIGN-OFF

THE DESIGN AS DRAWN IS IN LINE WITH THE BRIEF AND AHFG.

WE ACCEPT THAT THIS DESIGN MEETS OUR SPATIAL REQUIREMENTS AND ROOM ADJACENCIES.
WE ARE AWARE THAT WE WILL HAVE FURTHER INPUT INTO THE NEXT STAGES OF DESIGN DEVELOPMENT WITHIN THE AGREED SPATIAL ALLOCATION.
THIS LAYOUT IS SUBJECT TO ENGINEERS, BCA, FIRE AND DDA REVIEW.

HEALTH INFRASTRUCTURE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

USERS

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

ARCHITECT

NAME/SIGNATURE/TITLE/DATE

CONTRACTOR

NAME/SIGNATURE/TITLE/DATE

ENGINEERS

NAME/SIGNATURE/TITLE/DATE

Notes
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Rev	Description	Date	App'd
E	ISSUE FOR COORDINATION	30/08/12	SD
D	ISSUE FOR INFORMATION	27/08/12	MW
C	ISSUE FOR INFORMATION	23/08/12	CH
B	ISSUE FOR INFORMATION	20/08/12	MW
A	ISSUE FOR COORDINATION	16/08/12	MW

Client: NSW GOVERNMENT Health Infrastructure

Project: Moruya Sub-Acute Rehab Unit

Drawing title: GROUND FLOOR PLAN (STAGE 02)

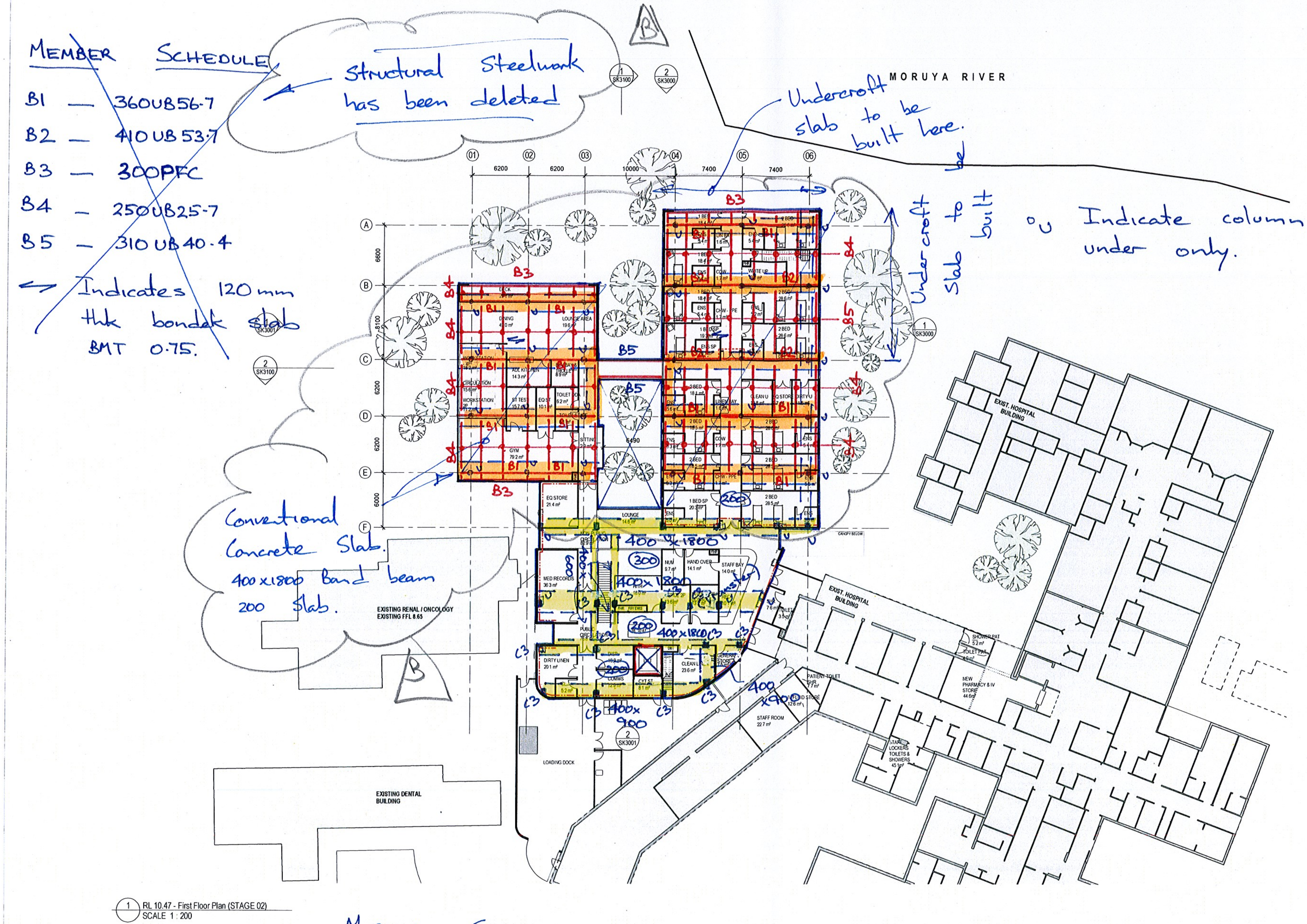
Checked: MW | Approved: JN | Scale: As indicated @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number: 02-20-2164 | Drawing number: SK2210 | Revision: E

Date generated 30-08-12 11:35:07 AM



1 RL 10.47 - First Floor Plan (STAGE 02)
SCALE 1 : 200

MORUYA SK002
FIRST FLOOR LEVEL
AECOM REV B
DATE 08/09/12

SCHEMATIC DESIGN SIGN-OFF

THE DESIGN AS DRAWN IS IN LINE WITH THE BRIEF AND AHFG.

WE ACCEPT THAT THIS DESIGN MEETS OUR SPATIAL REQUIREMENTS AND ROOM ADJACENCIES.
WE ARE AWARE THAT WE WILL HAVE FURTHER INPUT INTO THE NEXT STAGES OF DESIGN DEVELOPMENT WITHIN THE AGREED SPATIAL ALLOCATION.
THIS LAYOUT IS SUBJECT TO ENGINEERS, BCA, FIRE AND DDA REVIEW.

HEALTH INFRASTRUCTURE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

USERS

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

NAME/SIGNATURE/TITLE/DATE

ARCHITECT

NAME/SIGNATURE/TITLE/DATE

CONTRACTOR

NAME/SIGNATURE/TITLE/DATE

ENGINEERS

NAME/SIGNATURE/TITLE/DATE

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

Rev	Description	Date	App'd
G	ISSUE FOR COORDINATION	30/08/12	SO
F	ISSUE FOR COORDINATION	30/08/12	SO
E	ISSUE FOR COORDINATION	30/08/12	SO
D	ISSUE FOR INFORMATION	27/08/12	MW
C	ISSUE FOR INFORMATION	23/08/12	CH
B	ISSUE FOR INFORMATION	20/08/12	MW
A	ISSUE FOR COORDINATION	16/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
FIRST FLOOR PLAN (STAGE 02)

Checked	Approved	Scale
MW	JN	As indicated @ A1 sheet size

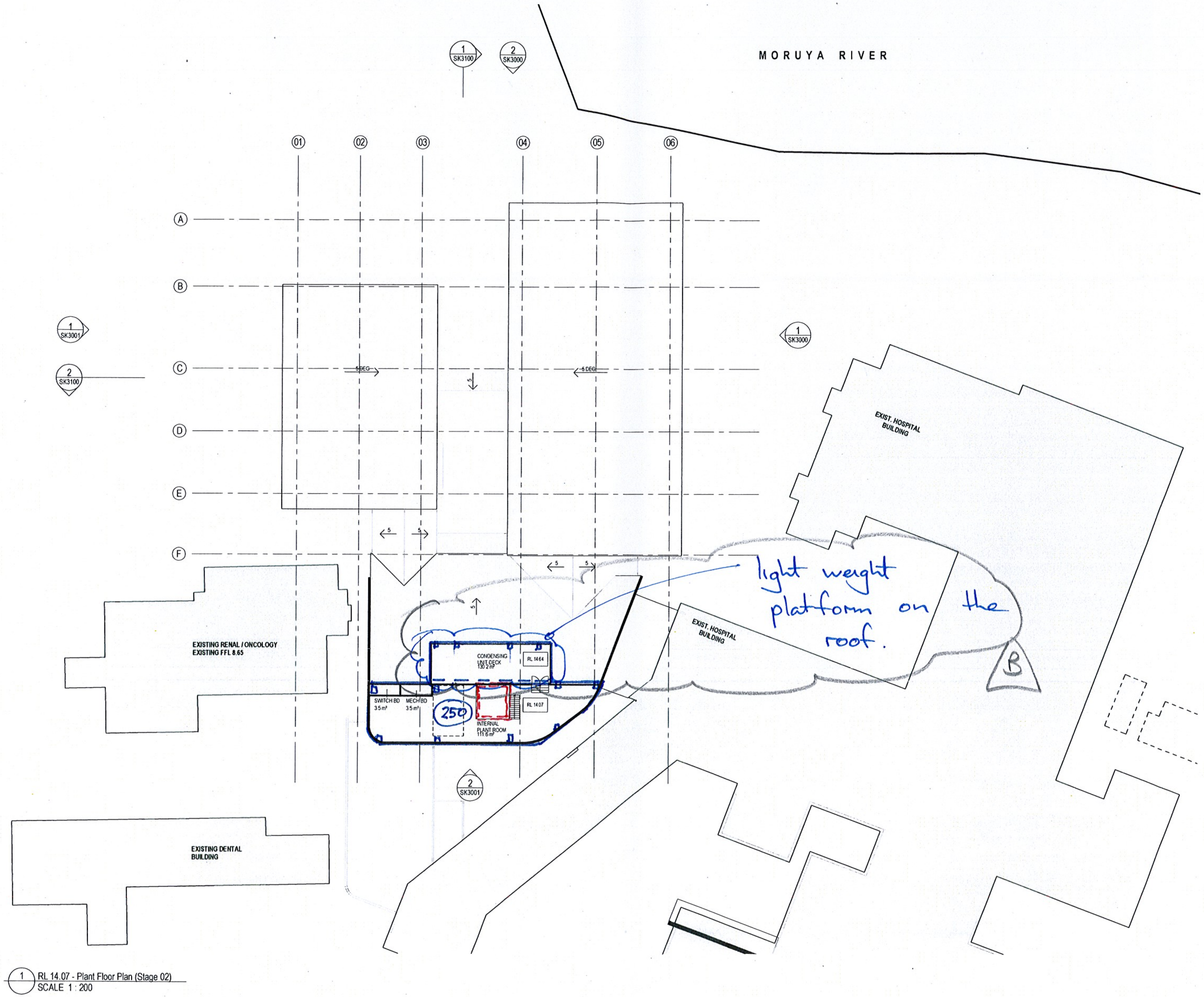
50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number	Drawing number	Revision
02-20-2164	SK2211	G

Status

Date generated 30-08-12 12:18:06 PM C:\My Documents\Revit RAC2012\2164_Moruya_BUILDING_sydhjo.rvt



1 RL 14.07 - Plant Floor Plan (Stage 02)
SCALE 1 : 200

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING.

MORUYA SK 003
PLANT FLOOR LEVEL
AECOM REV : B
DATE: 03/09/12

Rev	Description	Date	App'd
F	ISSUE FOR COORDINATION	30/08/12	SO
E	ISSUE FOR INFORMAITON	27/08/12	MW
D	ISSUE FOR INFORMATION	23/08/12	CH
C	ISSUE FOR INFORMATION	20/08/12	MW
B	ISSUE FOR COORDINATION	16/08/12	MW
A	PRESENTATION ISSUE	01/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit
Enter address here

Drawing title
PLANT FLOOR PLAN (STAGE 02)

Checked MW
Approved JN
Scale 1 : 200 @ A1 sheet size
50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164
Drawing number SK2212
Revision F
Status

Date generated 30-08-12 11:39:19 AM C:\My Documents\Revit\RAC2012\2164_Moruya_BUILDING_sydhjo.rvt

MEMBER SCHEDULE

B10 – 250UB37.3

B11 – 310 UB40.4

B12 – 200 UB25.4

B13 – 150×150×5 SHS

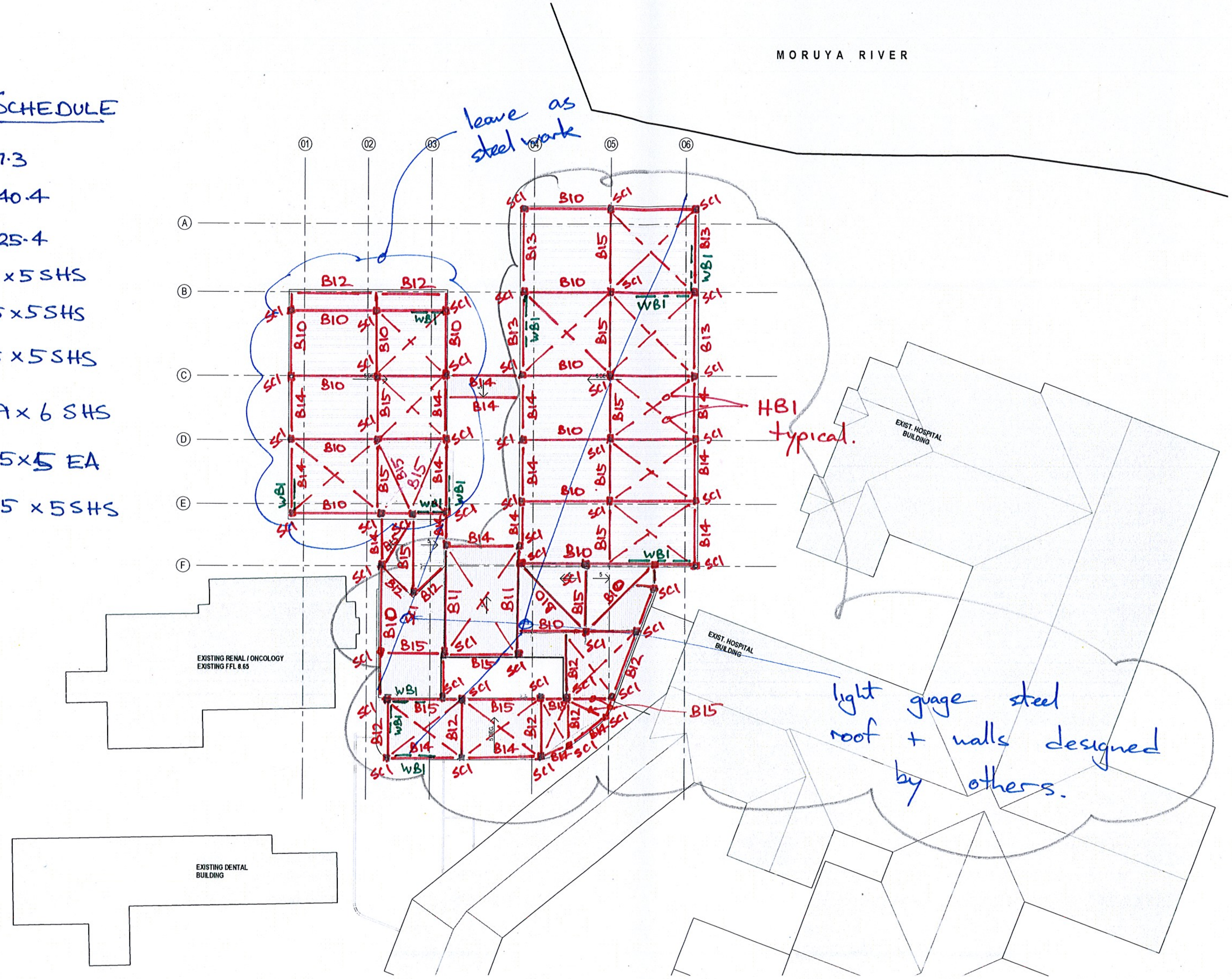
B14 – 125 × 125 × 5 SHS

B15 – 75 × 75 × 5 SHS

SC1 – 89 × 89 × 6 SHS

HB1 – 75 × 75 × 5 EA

WB1 – 75 × 75 × 5 SHS



1 RL 17.27 - Roof Plan (Stage 02)
SCALE 1 : 200

MORUYA SK 004
ROOF LEVEL
AECOM REV B
DATE 07/09/12.

Notes
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK OR PREPARING WORKSHOP DRAWINGS. DO NOT SCALE DRAWING

Rev	Description	Date	App'd
F	ISSUE FOR COORDINATION	30/08/12	SO
E	ISSUE FOR INFORMAITON	27/08/12	MW
D	ISSUE FOR INFORMATION	23/08/12	CH
C	ISSUE FOR INFORMATION	20/08/12	MW
B	ISSUE FOR COORDINATION	16/08/12	MW
A	ISSUE FOR VALUE MANAGEMENT	15/08/12	MW

Client
NSW GOVERNMENT Health Infrastructure

Project
Moruya Sub-Acute Rehab Unit

Enter address here

Drawing title
ROOF PLAN (STAGE 02)

Checked MW | Approved JN | Scale 1 : 200 @ A1 sheet size

50mm on original

WOODS BAGOT AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Project number 02-20-2164 | Drawing number SK2213 | Revision F

Status

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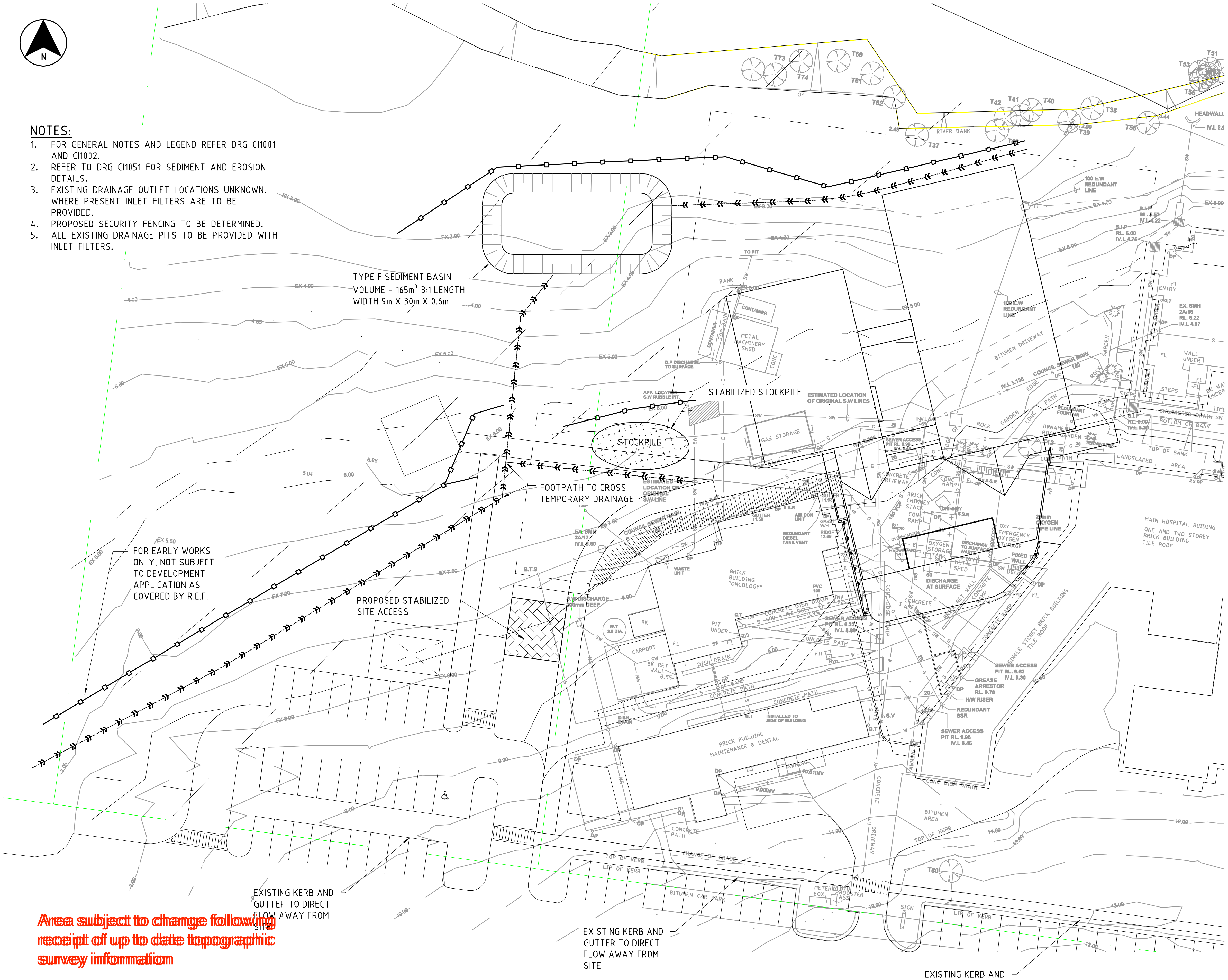
WOODS BAGOT

22 Services Drawings



NOTES:

1. FOR GENERAL NOTES AND LEGEND REFER DRG CI1001 AND CI1002.
2. REFER TO DRG CI1051 FOR SEDIMENT AND EROSION DETAILS.
3. EXISTING DRAINAGE OUTLET LOCATIONS UNKNOWN. WHERE PRESENT INLET FILTERS ARE TO BE PROVIDED.
4. PROPOSED SECURITY FENCING TO BE DETERMINED.
5. ALL EXISTING DRAINAGE PITS TO BE PROVIDED WITH INLET FILTERS.

Area subject to change following receipt of up to date topographic survey information

SCHEME DESIGN CIVIL DRAWINGS_120914

NOT FOR CONSTRUCTION

LEGEND:

- PROPOSED SEDIMENT FENCE
- PROPOSED CLEAN WATER DIVERSION SWALE
- PROPOSED EARTHEN LOW FLOW SWALE
- STABILIZED SITE ACCESS
- PROPOSED STOCKPILE
- PROPOSED SEDIMENT BASIN

No.	BY	DATE	DESCRIPTION	APPD
A	LM	5.9.12	DEVELOPMENT APPLICATION	RM

Scales: 2.5 0 2.5 5 7.5m
1 : 250 FULL SIZE A1

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DESIGNED	RW	CHECKED	RM
DRAWN	LM	CHECKED	
APPROVED		DATE	

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Contractor: WOODS BAGOT — AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Client: HEALTH INFRASTRUCTURE NSW HEALTH

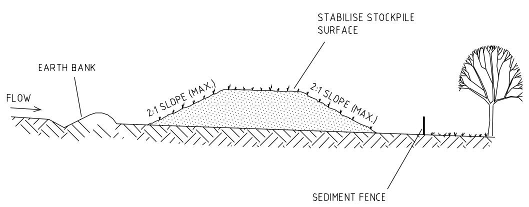
Designer: AECOM
AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project: SUB-ACUTE BED PROGRAM MORUYA REHAB

Title: CIVIL SERVICES SEDIMENT AND EROSION CONTROL PLAN

Status: DEVELOPMENT APPLICATION

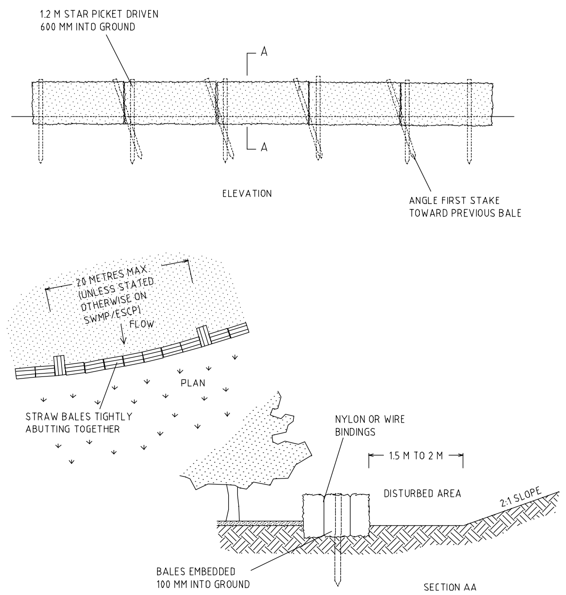
Drg No. 60164756-MO-RH-CI1050 Rev. A



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (LOW FLOW) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES ON THE DOWNSLOPE.

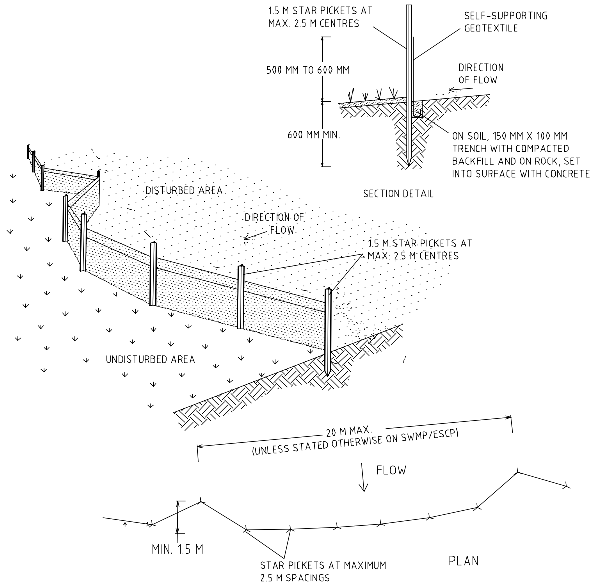
STOCKPILE



CONSTRUCTION NOTES

1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75 MM TO 100 MM AND ANCHOR WITH TWO 1.2 METRE STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THEM 600 MM INTO THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACED 1 TO 2 METRES DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.

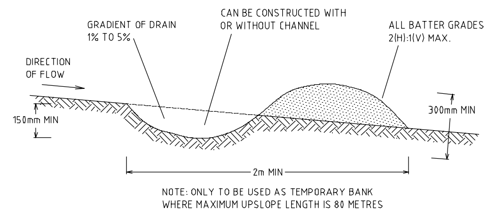
STRAW BALE FILTER



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENTS AREA OF ANY ONE SECTION. THE CATCHMENTS AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150-MM DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150-MM OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

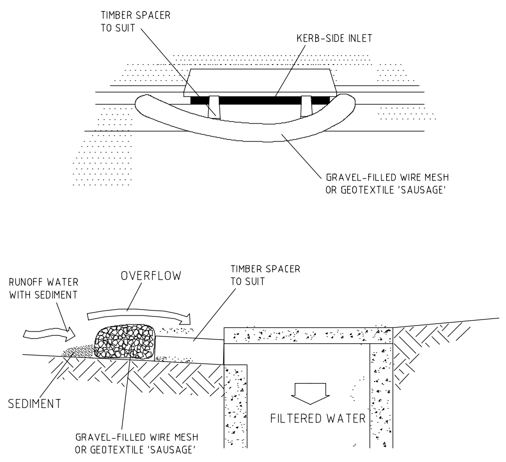
SEDIMENT FENCE



CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 PERCENT AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS, IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT 'V' SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

SWALE / EARTH BANK (LOW FLOW)

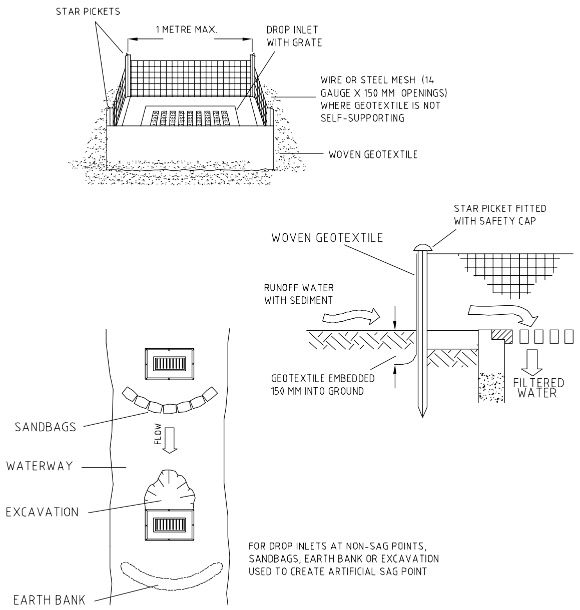


NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25 MM TO 50 MM GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150 MM HIGH X 400 MM WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100-MM SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH AND GRAVEL INLET FILTER

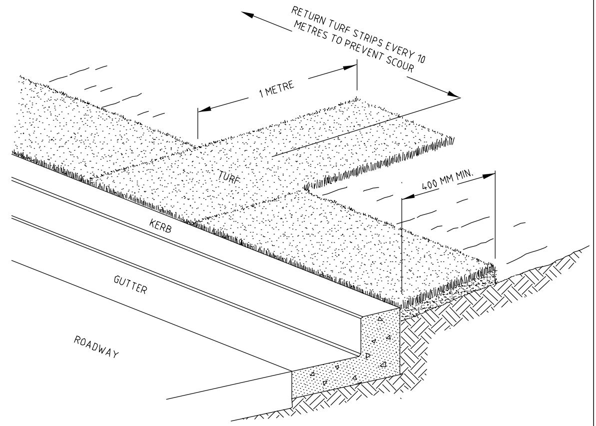


FOR DROP INLETS AT NON-SAG POINTS, SANDBAGS, EARTH BANK OR EXCAVATION USED TO CREATE ARTIFICIAL SAG POINT

CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STRAW BALE FILTER AND SEDIMENT FENCE FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

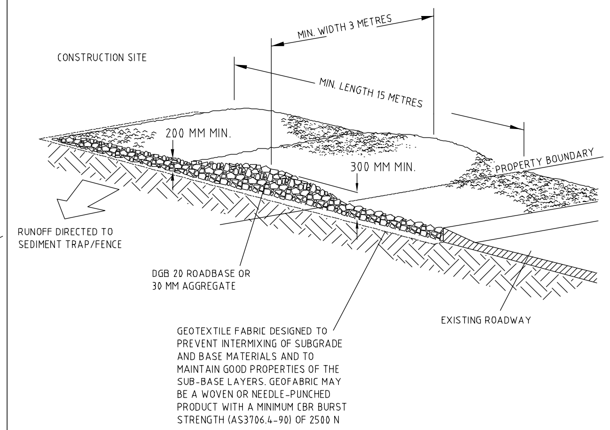
GEOTEXTILE INLET FILTER



CONSTRUCTION NOTES

1. INSTALL A 400 MM MINIMUM WIDE ROLL OF TURF ON THE FOOTPATH NEXT TO THE KERB AND AT THE SAME LEVEL AS THE TOP OF THE KERB.
2. LAY 1.4 METRE LONG TURF STRIPS NORMAL TO THE KERB EVERY 10 METRES.
3. REHABILITATE DISTURBED SOIL BEHIND THE TURF STRIP FOLLOWING THE ESCP/SWMP.

KERBSIDE TURF STRIP



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200 MM THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30 MM AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE

STABILISED SITE ACCESS

SCHEME DESIGN CIVIL DRAWINGS_120914

NOT FOR CONSTRUCTION

No.	BY	DATE	DESCRIPTION	APPD
A	LM	5.9.12	DEVELOPMENT APPLICATION	RM

Scales:

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DESIGNED	RW	CHECKED	RM
DRAWN	LM	CHECKED	
APPROVED		DATE	

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Contractor :

WOODS BAGOT
AUSTRALIA
ASIA
MIDDLE EAST
EUROPE
NORTH AMERICA

Client :

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer :

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project
SUB-ACUTE BED PROGRAM
MORUYA REHAB

Title
CIVIL SERVICES
SEDIMENT AND EROSION CONTROL DETAILS

Status
DEVELOPMENT APPLICATION

Drg No.
60164756-MO-RH-CI1051

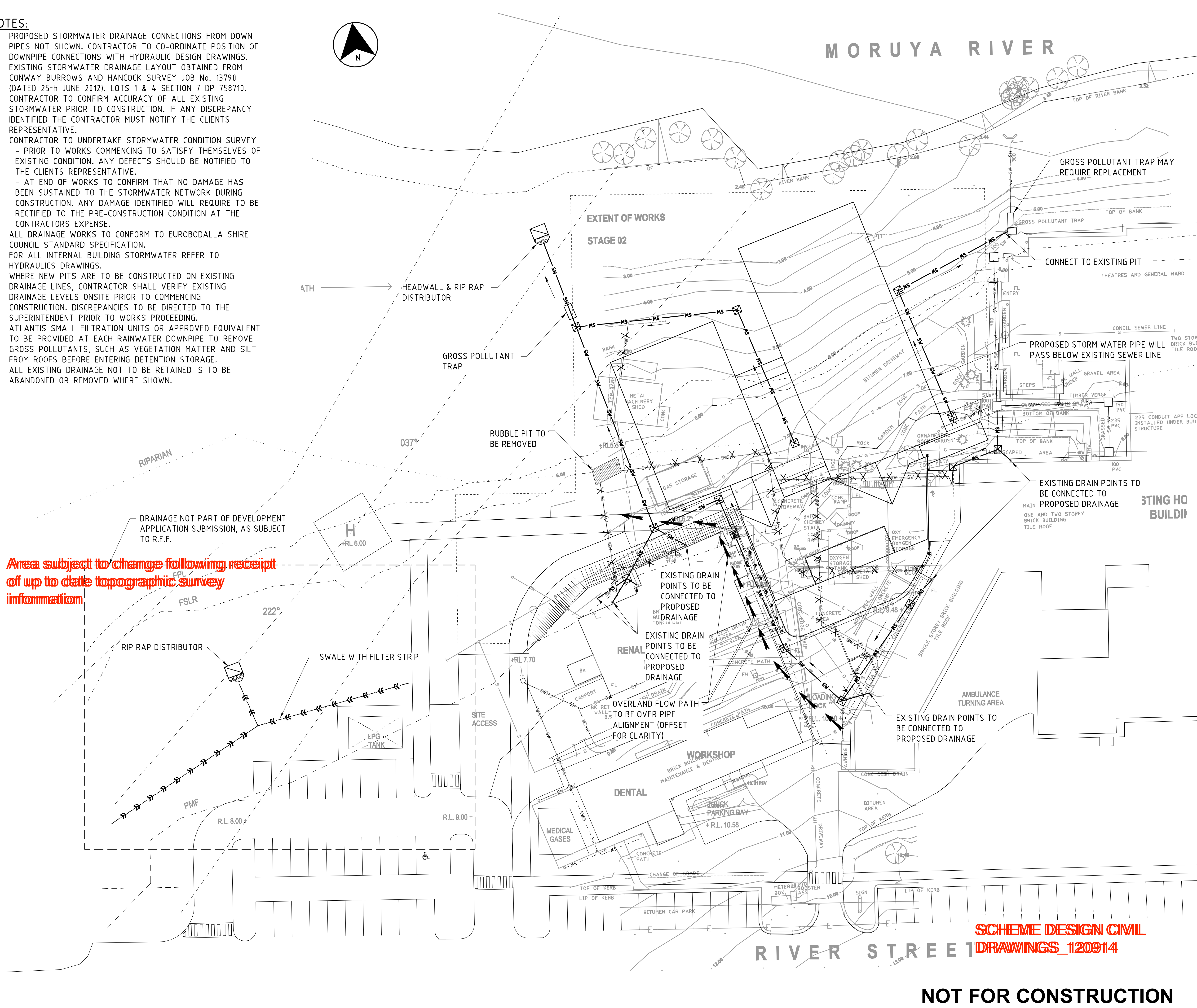
Rev.
A

05 Sep 12 - 17:38

60164756-MO-RH-CI1051.dwg

NOTES:

1. PROPOSED STORMWATER DRAINAGE CONNECTIONS FROM DOWN PIPES NOT SHOWN. CONTRACTOR TO CO-ORDINATE POSITION OF DOWNPIPE CONNECTIONS WITH HYDRAULIC DESIGN DRAWINGS.
2. EXISTING STORMWATER DRAINAGE LAYOUT OBTAINED FROM CONWAY BURROWS AND HANCOCK SURVEY JOB No. 13790 (DATED 25th JUNE 2012). LOTS 1 & 4 SECTION 7 DP 758710.
3. CONTRACTOR TO CONFIRM ACCURACY OF ALL EXISTING STORMWATER PRIOR TO CONSTRUCTION. IF ANY DISCREPANCY IDENTIFIED THE CONTRACTOR MUST NOTIFY THE CLIENTS REPRESENTATIVE.
4. CONTRACTOR TO UNDERTAKE STORMWATER CONDITION SURVEY
   - PRIOR TO WORKS COMMENCING TO SATISFY THEMSELVES OF EXISTING CONDITION. ANY DEFECTS SHOULD BE NOTIFIED TO THE CLIENTS REPRESENTATIVE.
   - AT END OF WORKS TO CONFIRM THAT NO DAMAGE HAS BEEN SUSTAINED TO THE STORMWATER NETWORK DURING CONSTRUCTION. ANY DAMAGE IDENTIFIED WILL REQUIRE TO BE RECTIFIED TO THE PRE-CONSTRUCTION CONDITION AT THE CONTRACTORS EXPENSE.
5. ALL DRAINAGE WORKS TO CONFORM TO EUROBODALLA SHIRE COUNCIL STANDARD SPECIFICATION.
6. FOR ALL INTERNAL BUILDING STORMWATER REFER TO HYDRAULICS DRAWINGS.
7. WHERE NEW PITS ARE TO BE CONSTRUCTED ON EXISTING DRAINAGE LINES, CONTRACTOR SHALL VERIFY EXISTING DRAINAGE LEVELS ONSITE PRIOR TO COMMENCING CONSTRUCTION. DISCREPANCIES TO BE DIRECTED TO THE SUPERINTENDENT PRIOR TO WORKS PROCEEDING.
8. ATLANTIS SMALL FILTRATION UNITS OR APPROVED EQUIVALENT TO BE PROVIDED AT EACH RAINWATER DOWNPIPE TO REMOVE GROSS POLLUTANTS, SUCH AS VEGETATION MATTER AND SILT FROM ROOFS BEFORE ENTERING DETENTION STORAGE.
9. ALL EXISTING DRAINAGE NOT TO BE RETAINED IS TO BE ABANDONED OR REMOVED WHERE SHOWN.



NOT FOR CONSTRUCTION

LEGEND:

- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER PIPE TO BE REMOVED
- PROPOSED STORMWATER PIT
- EXISTING STORMWATER PIT
- INDICATIVE OVERLAND FLOW PATH

No.	BY	DATE	DESCRIPTION	APPD
A	LM	5.9.12	DEVELOPMENT APPLICATION	RM

Scales: 1 : 250 FULL SIZE A1

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Architect: WOODS BAGOT — AUSTRALIA ASIA MIDDLE EAST EUROPE NORTH AMERICA

Client: HEALTH INFRASTRUCTURE NSW HEALTH

Designer: AECOM
AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project: SUB-ACUTE BED PROGRAM
MORUYA REHAB

Title: CIVIL SERVICES
DRAINAGE PLAN

Status: SCHEME DESIGN

Drg No. 60164756-MO-RH-CI1300 Rev. A

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Last modified: 05 Sep 12 - 17:39

SUB-ACUTE BED PROGRAM

MORUYA REHABILITATION UNIT

MECHANICAL SERVICES

REV	BY	DATE	DESCRIPTION	APPD
P1	TC	14.09.12	SCHEMATIC DESIGN ISSUE	RM

Scales:

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DRAWN	TC	CHECKED	RM
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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project
SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title
MECHANICAL SERVICES
COVER SHEET

Status
SCHEMATIC DESIGN

Drg No. 60164756-MY-ME001 Rev. P1

REV	BY	DATE	DESCRIPTION	APPD
P1	TC	14.09.12	SCHEMATIC DESIGN ISSUE	RM

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

MECHANICAL SERVICES
GROUND FLOOR LAYOUT

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-ME501

Rev.

P1

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

MECHANICAL SERVICES
FIRST FLOOR LAYOUT

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-ME502

Rev.

P1

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WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project
SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title
MECHANICAL SERVICES
PLANT ROOM LAYOUT

Status
SCHEMATIC DESIGN

Drg No.
60164756-MY-ME503

Rev.
P1

SUB-ACUTE BED PROGRAM

MORUYA REHABILITATION UNIT

ELECTRICAL SERVICES

REV	BY	DATE	DESCRIPTION	APPD
P1	TC	14.09.12	SCHEMATIC DESIGN ISSUE	GL

Scales:

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DESIGNED	GL	CHECKED	GL
DRAWN	TC	CHECKED	GL
APPROVED		DATE	

Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

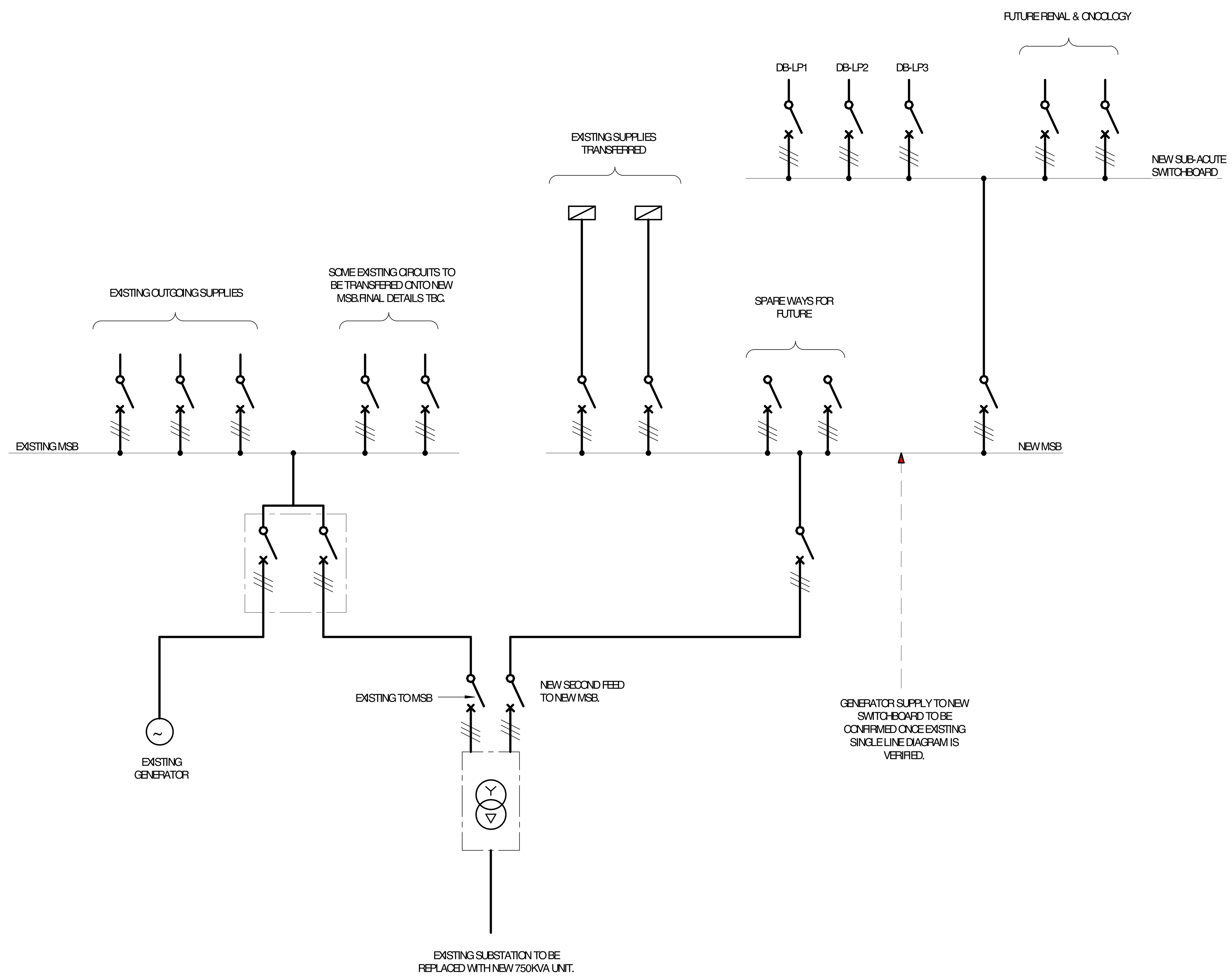
Project
SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title
ELECTRICAL SERVICES
COVER SHEET

Status
SCHEMATIC DESIGN

Drg No.
60164756-MY-EL001

Rev.
P1



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P1	TC	14.09.12	SCHEMATIC DESIGN ISSUE	GL

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

ELECTRICAL SERVICES
SINGLE LINE DIAGRAM

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-EL300

Rev.

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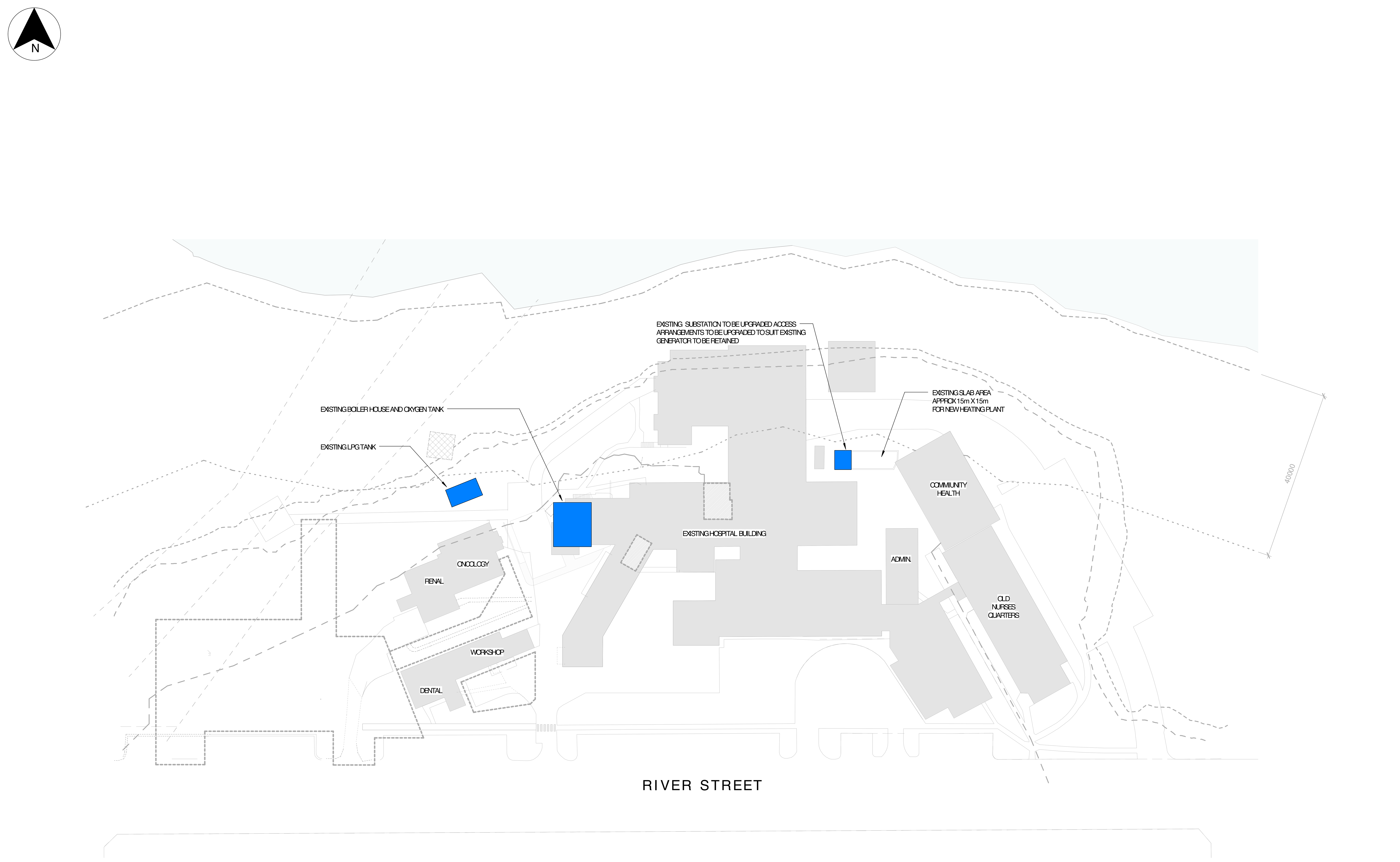

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

COMBINE SERVICES
SITE PLAN
EXISTING SERVICES

Status

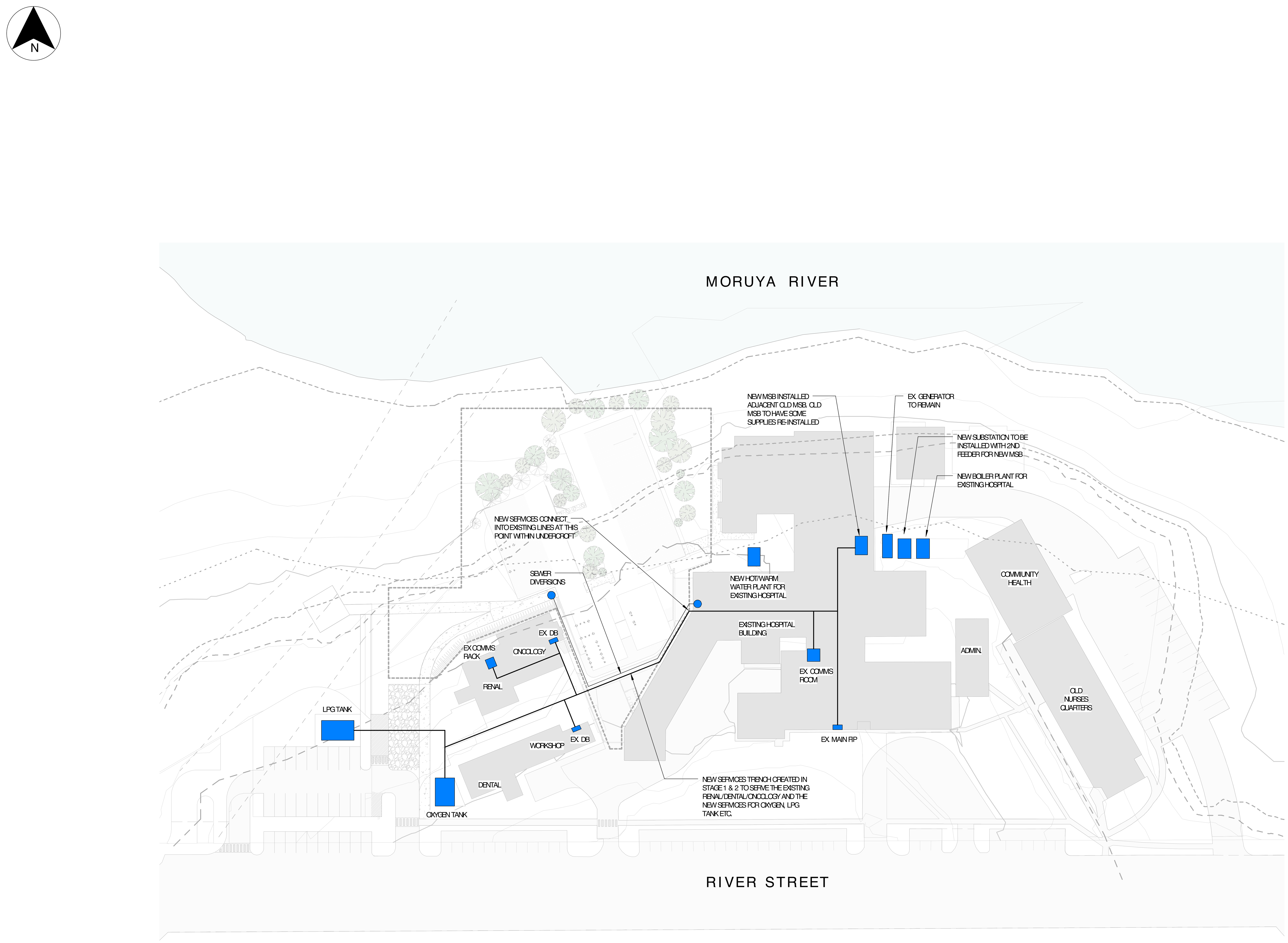
SCHEMATIC DESIGN

Drg No.

60164756-MY-EL501

Rev.

P1



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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project
SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title
COMBINE SERVICES
SITE PLAN
EARLY WORKS

Status
SCHEMATIC DESIGN

Drg No.	Rev.
60164756-MY-EL502	P1

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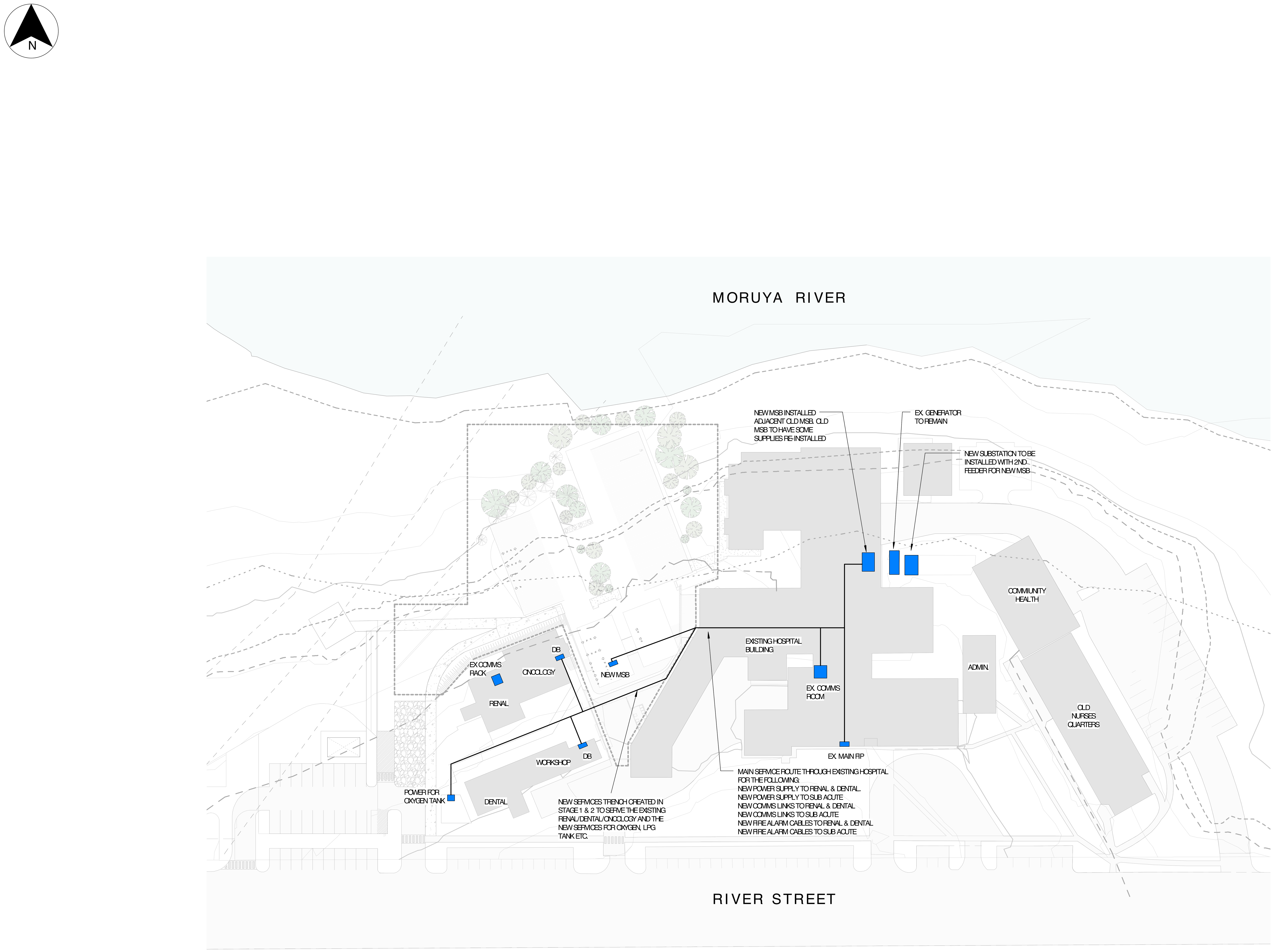

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DRAWN	TC	CHECKED	GL
APPROVED		DATE	

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

ELECTRICAL SERVICES
SITE PLAN
SITE INFRASTURE

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-EL503

Rev.

P1

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

ELECTRICAL SERVICES
GROUND FLOOR
DB RETICULATION

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-EL504

Rev.

P1

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WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

ELECTRICAL SERVICES
FIRST FLOOR
DB RETICULATION

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-EL505

Rev.

P1

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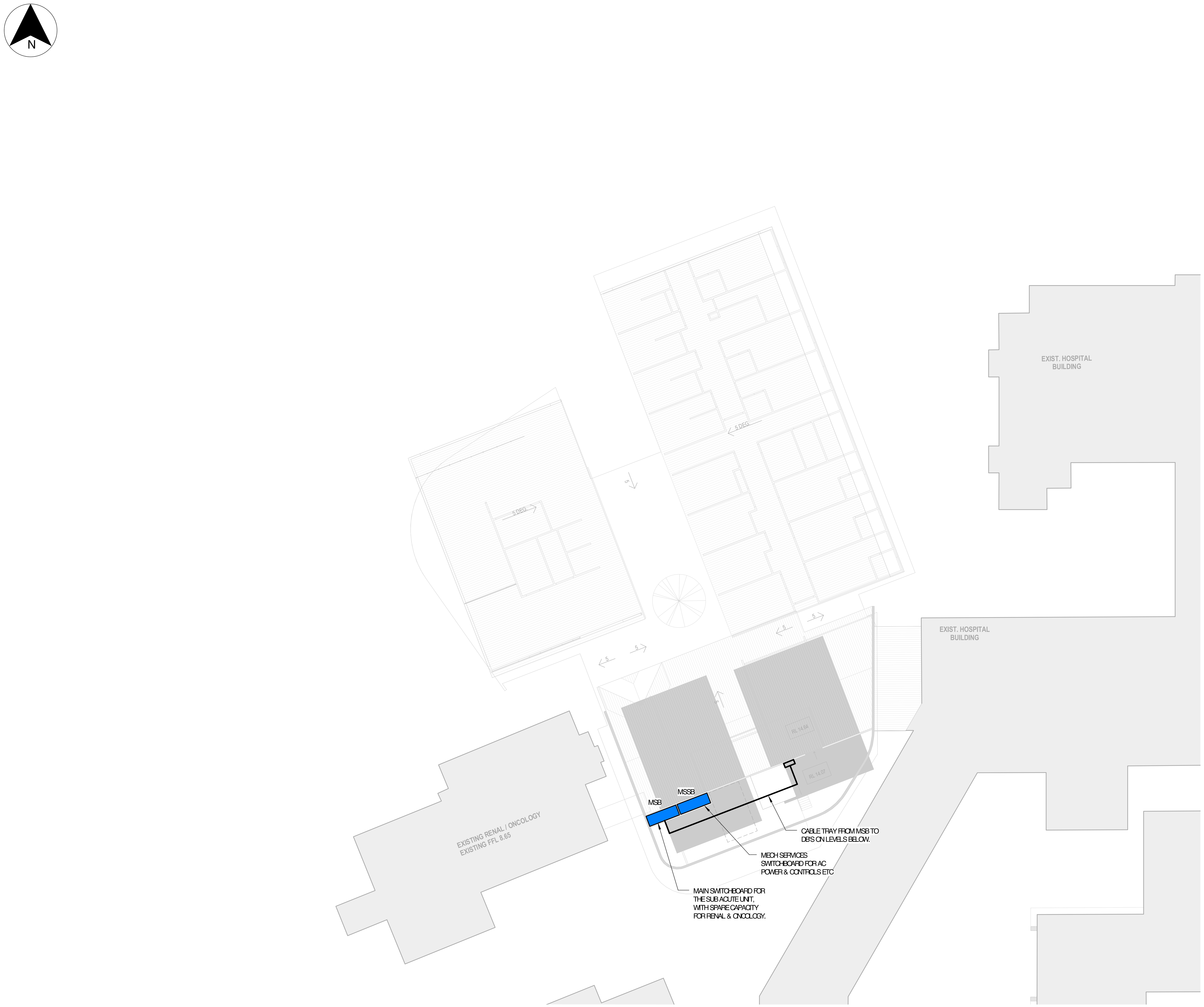

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P1	TC	14.09.12	SCHEMATIC DESIGN ISSUE	GL

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

ELECTRICAL SERVICES
PLANT ROOM
DB RETICULATION

Status

SCHEMATIC DESIGN

Drg No.

60164756-MY-EL506

Rev.

P1

SUB-ACUTE BED PROGRAM

MORUYA REHABILITATION UNIT

HYDRAULIC SERVICES

HY001	COVER SHEET
HY501	SITE PLAN SEWER, GAS, FIRE & HOT WATER LAYOUT
HY502	GROUND FLOOR SEWER & STORMWATER LAYOUT
HY503	FIRST FLOOR WATER & FIRE LAYOUT
HY504	PLANT ROOM SEWER & HOT WATER LAYOUT

REV	BY	DATE	DESCRIPTION	APPD
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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project
SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title
HYDRAULIC SERVICES
COVER SHEET

Status
SCHEMATIC DESIGN

Drg No.
60164756-MY-HY001

Rev.
P1

REV	BY	DATE	DESCRIPTION	APPD
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WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

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A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

HYDRAULIC SERVICES
SITE PLAN
SEWER, GAS, FIRE & HOT WATER LAYOUT

Status

SCHEMATIC DESIGN

Drg No. 60164756-MY-HY501

Rev. P1

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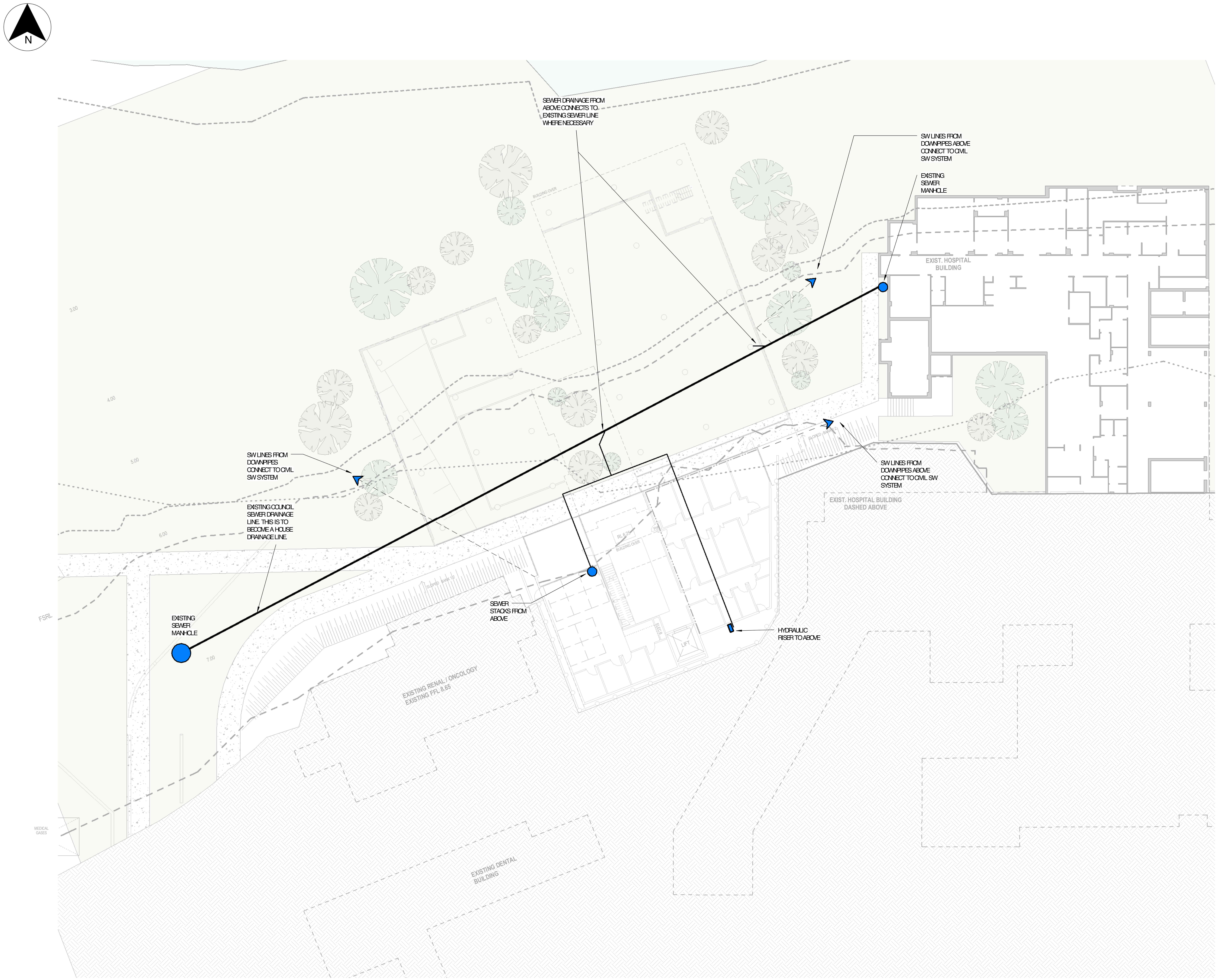

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

HYDRAULIC SERVICES
GROUND FLOOR
SEWER & STORMWATER LAYOUT

Status

SCHEMATIC DESIGN

Drg No. 60164756-MY-HY502

Rev. P1

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Architect

WOODS BAGOT

Client

HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

AECOM

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A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

HYDRAULIC SERVICES
FIRST FLOOR
WATER & FIRE LAYOUT

Status

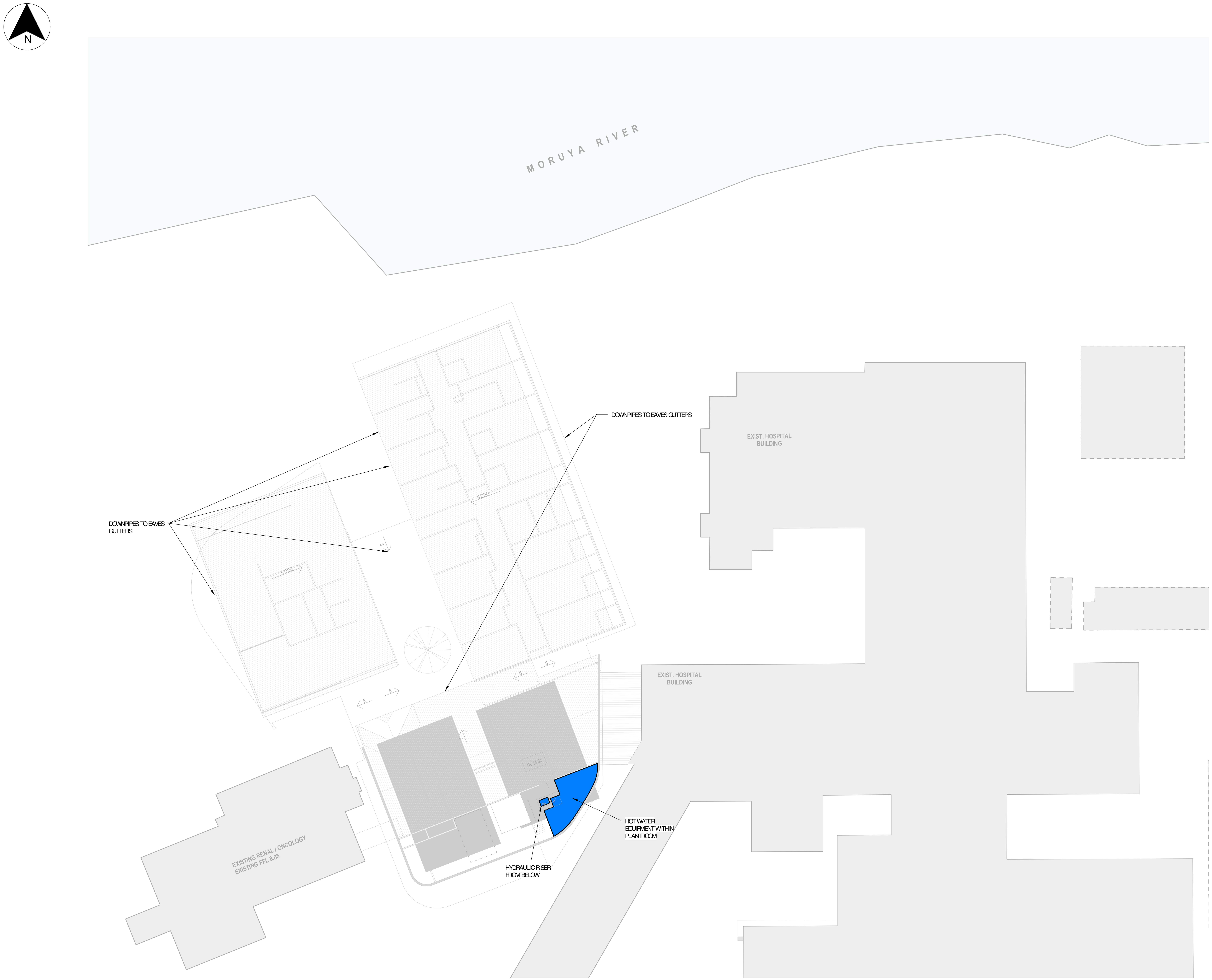
SCHEMATIC DESIGN

Drg No.

60164756-MY-HY503

Rev.

P1



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HEALTH INFRASTRUCTURE
NSW HEALTH

Designer

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AECOM Australia Pty Ltd
A.B.N. 20 093 846 925

Project

SUB-ACUTE BED PROGRAM
MORUYA REHABILITATION UNIT

Title

HYDRAULIC SERVICES
PLANT ROOM
SEWER & HOT WATER LAYOUT

Status

SCHEMATIC DESIGN

Drg No. 60164756-MY-HY504 | Rev. P1

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23 Services SD Presentation

Moruya Sub Acute Schematic Design Services Overview

Gary Lyle

David O'Neill

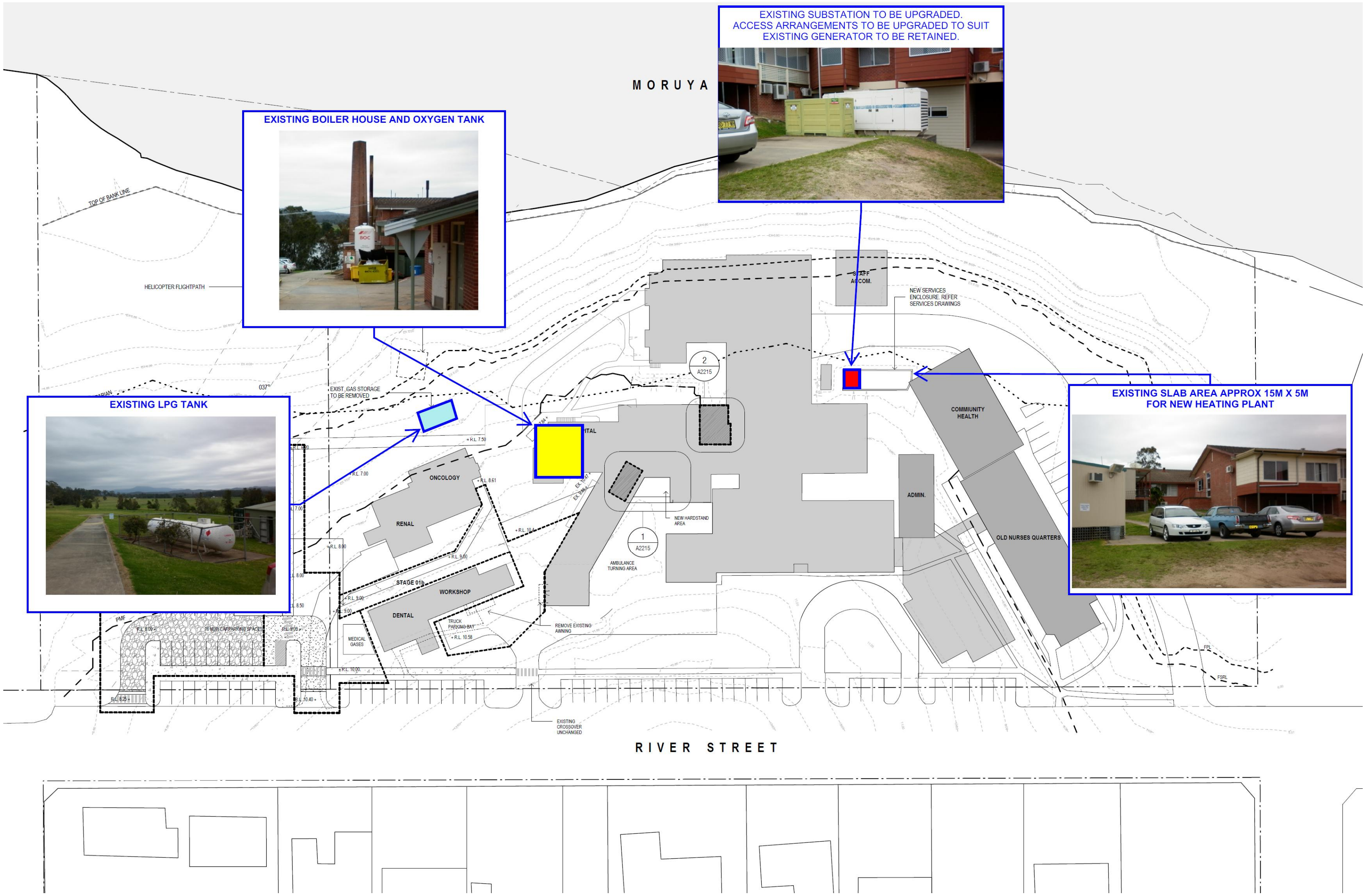
Robbie Williams

5 June 2012

AECOM

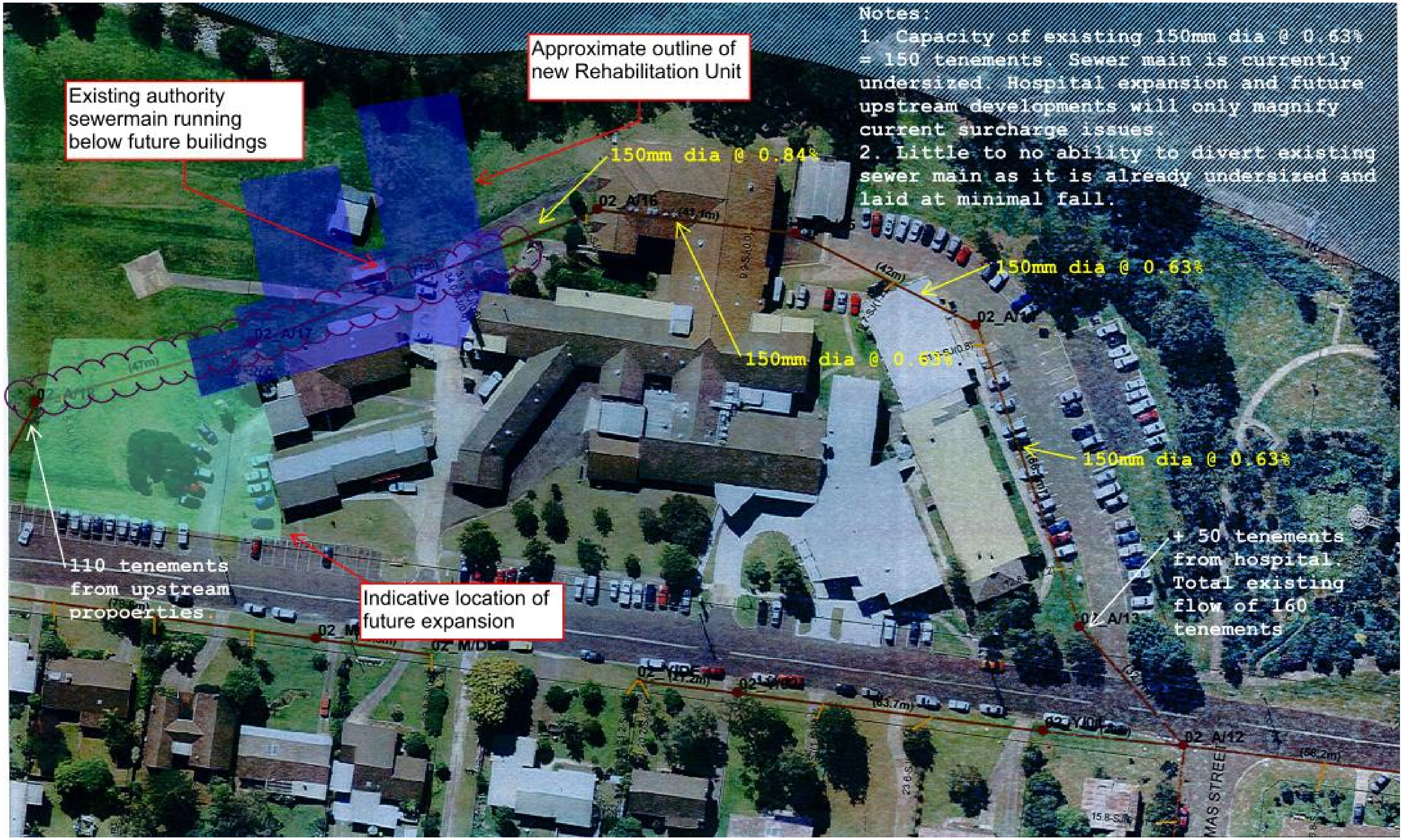
Early Works / Infrastructure

- Existing Boiler House to be Demolished
  - ➢ Boilers
  - ➢ Oxygen
  - ➢ Hot Water (warm water) Plant
- Temporary Boiler Plant for Main Hospital
- New Permanent Hot Water (warm water)Plant for existing Main Hospital
- Oxygen Storage Tank to be Relocated
- Main LPG Tank to be Relocated
- Existing Substation to be Upgraded
- Authority's sewer main to be acquired by Hospital and a new Council built /owned pumping station to be located to the west of the site


EXISTING SUBSTATION TO BE UPGRADED.
ACCESS ARRANGEMENTS TO BE UPGRADED TO SUIT
EXISTING GENERATOR TO BE RETAINED.
MORUYA
EXISTING BOILER HOUSE AND OXYGEN TANK
TOP OF BANK LINE
HELICOPTER FLIGHTPATH
STAFF ACCOM.
NEW SERVICES ENCLOSURE. REFER SERVICES DRAWINGS
EXIST. GAS STORAGE TO BE REMOVED
EXISTING LPG TANK
EXISTING SLAB AREA APPROX 15M X 5M
FOR NEW HEATING PLANT
COMMUNITY HEALTH
ONCOLOGY
RENAL
ADMIN.
OLD NURSES QUARTERS
NEW HARDSTAND AREA
AMBULANCE TURNING AREA
STAGE 01b
WORKSHOP
DENTAL
MEDICAL GASES
TRUCK PARKING BAY
REMOVE EXISTING AWNING
EXISTING CROSSOVER UNCHANGED
RIVER STREET

AECOM

Early Works – Existing Services Affected



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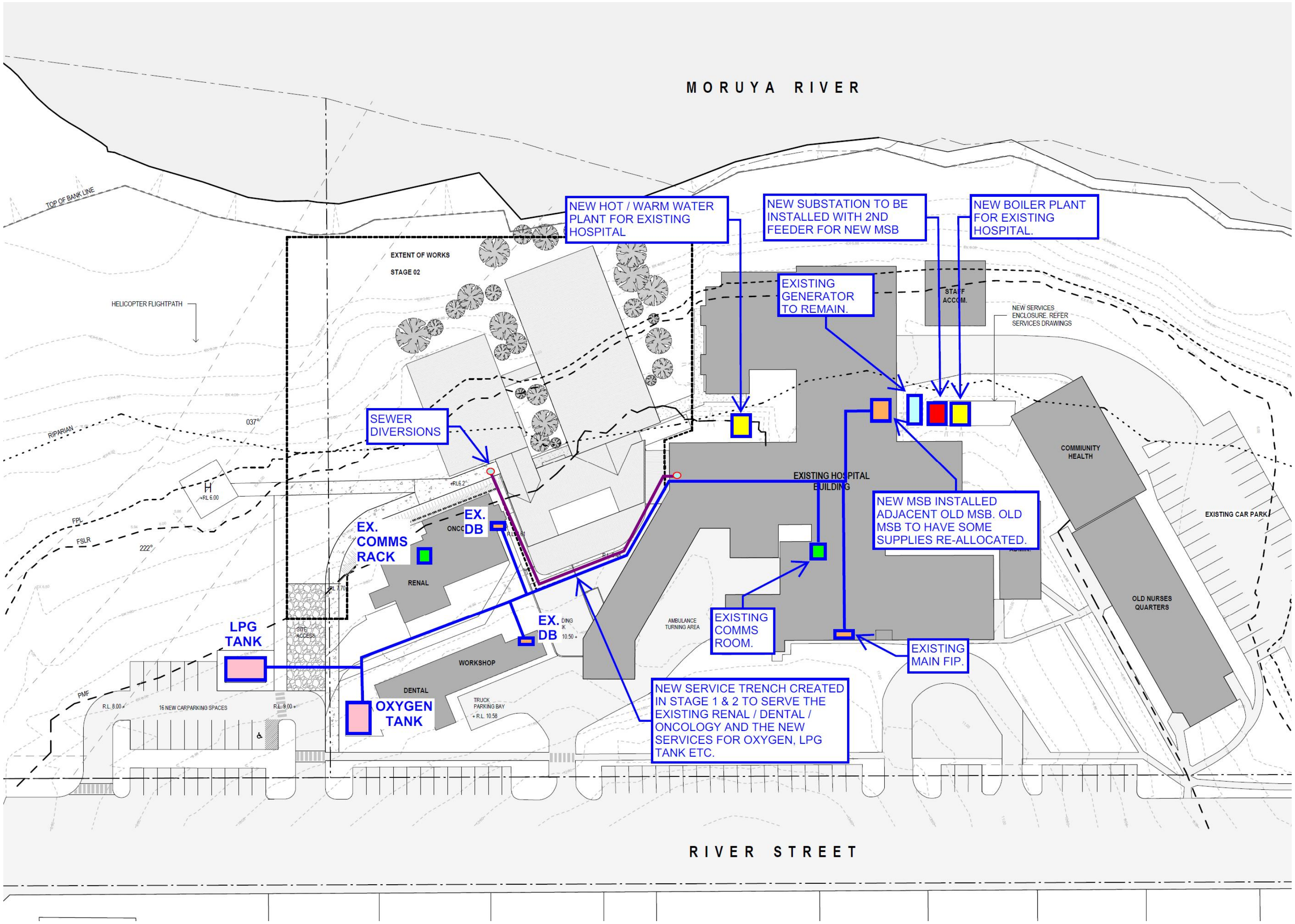
Early Works – Combined Services Overview



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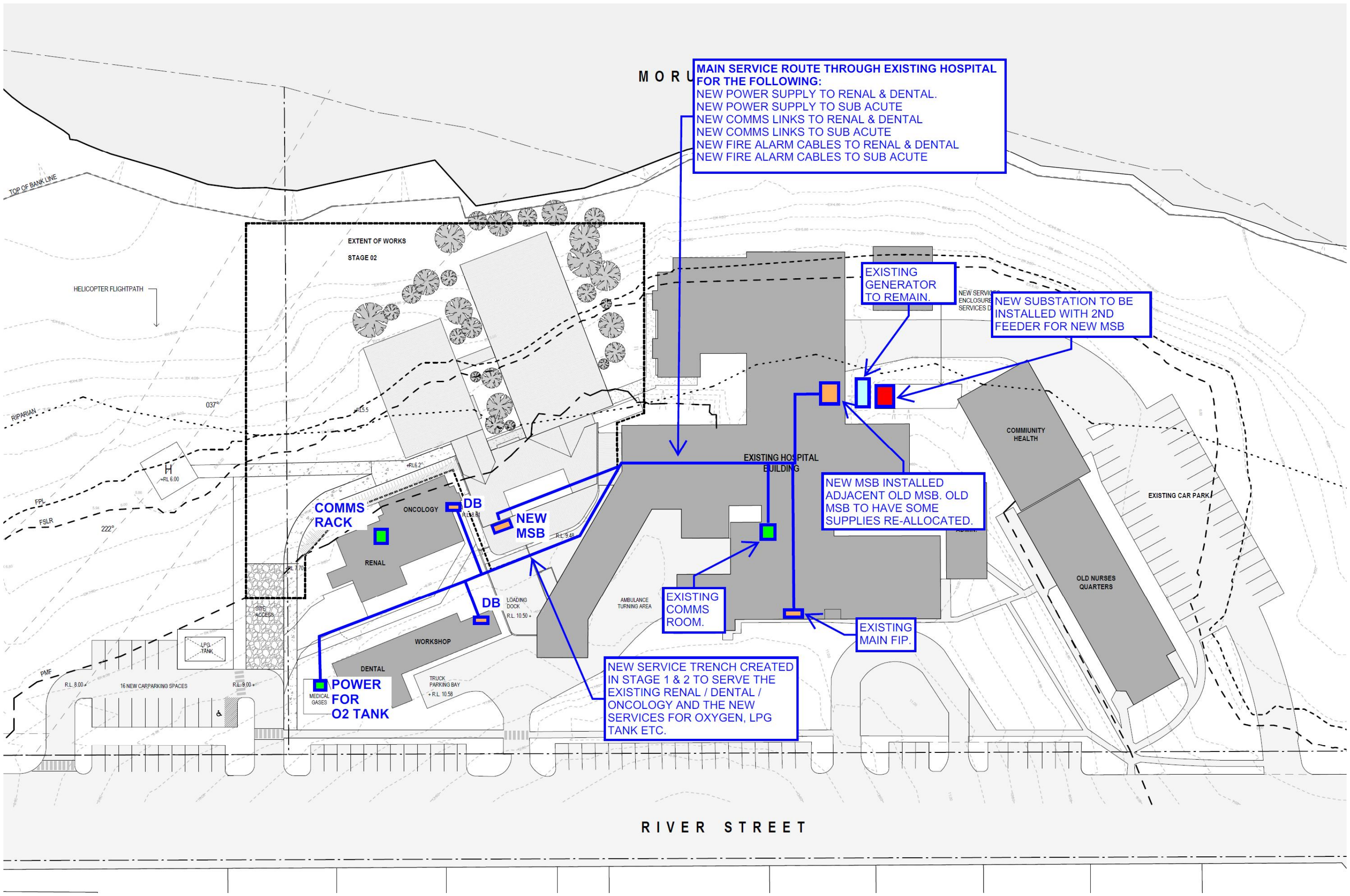
Electrical - Site Layout



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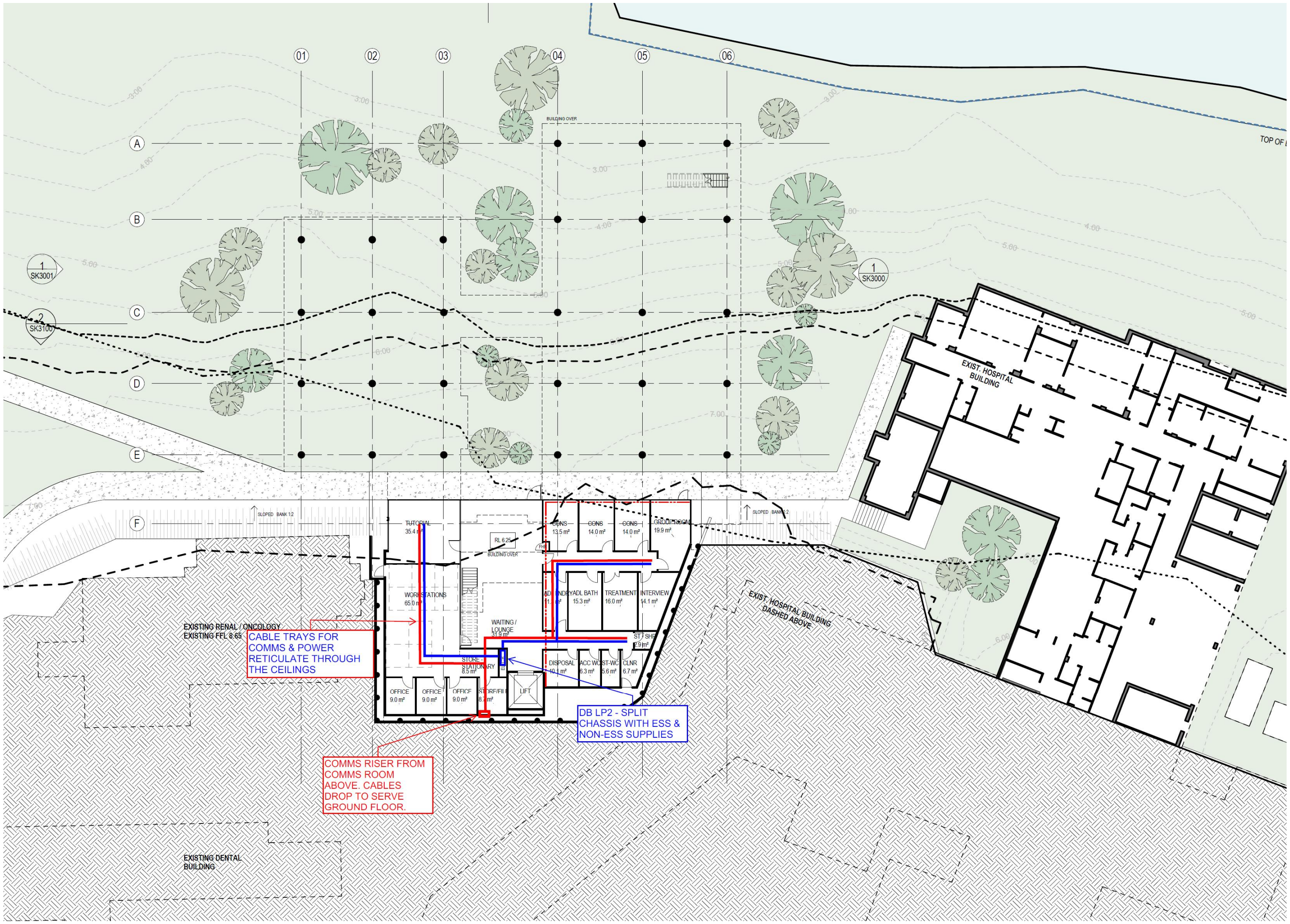
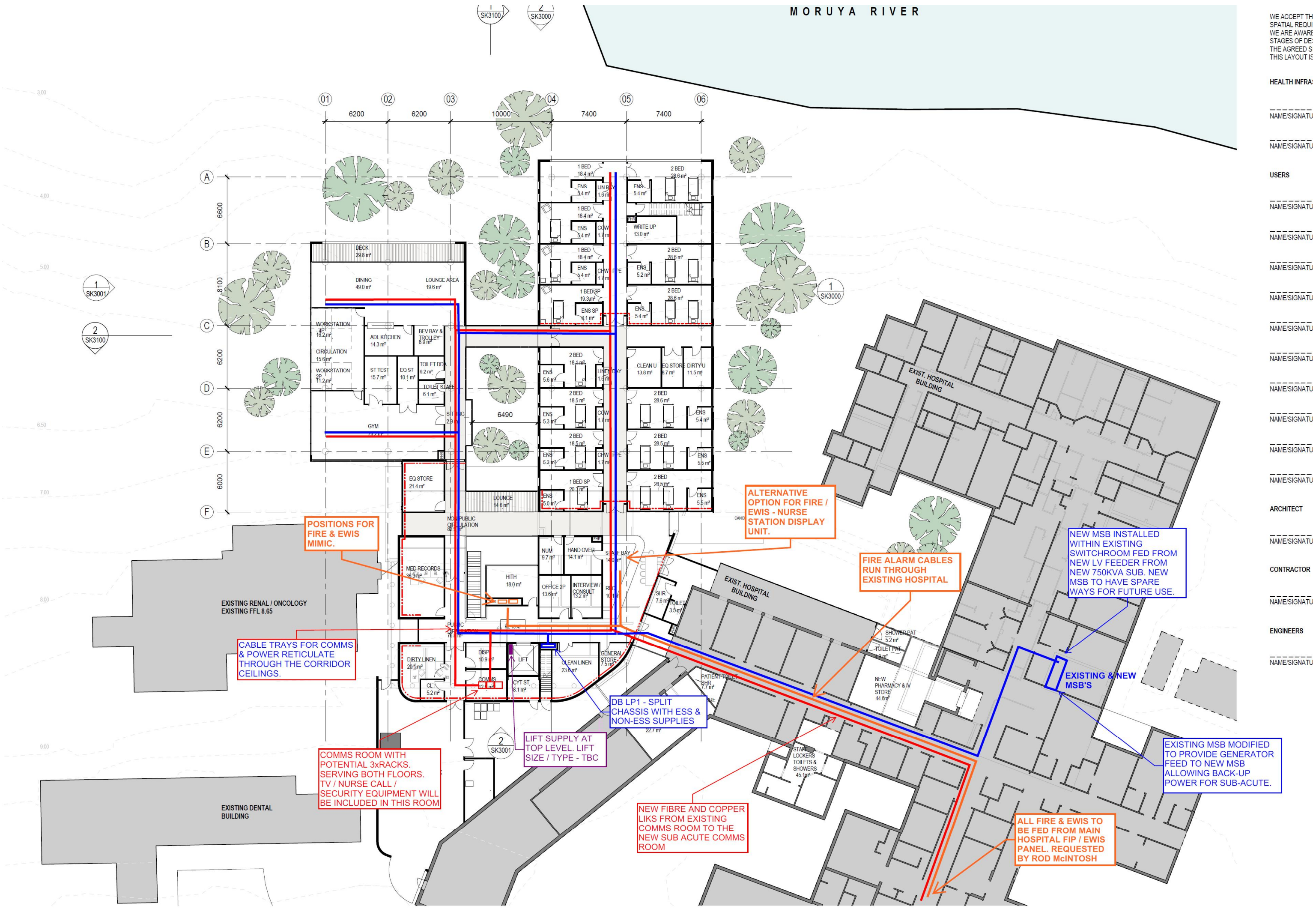
Electrical – Ground Floor



AECOM

Electrical – First Floor



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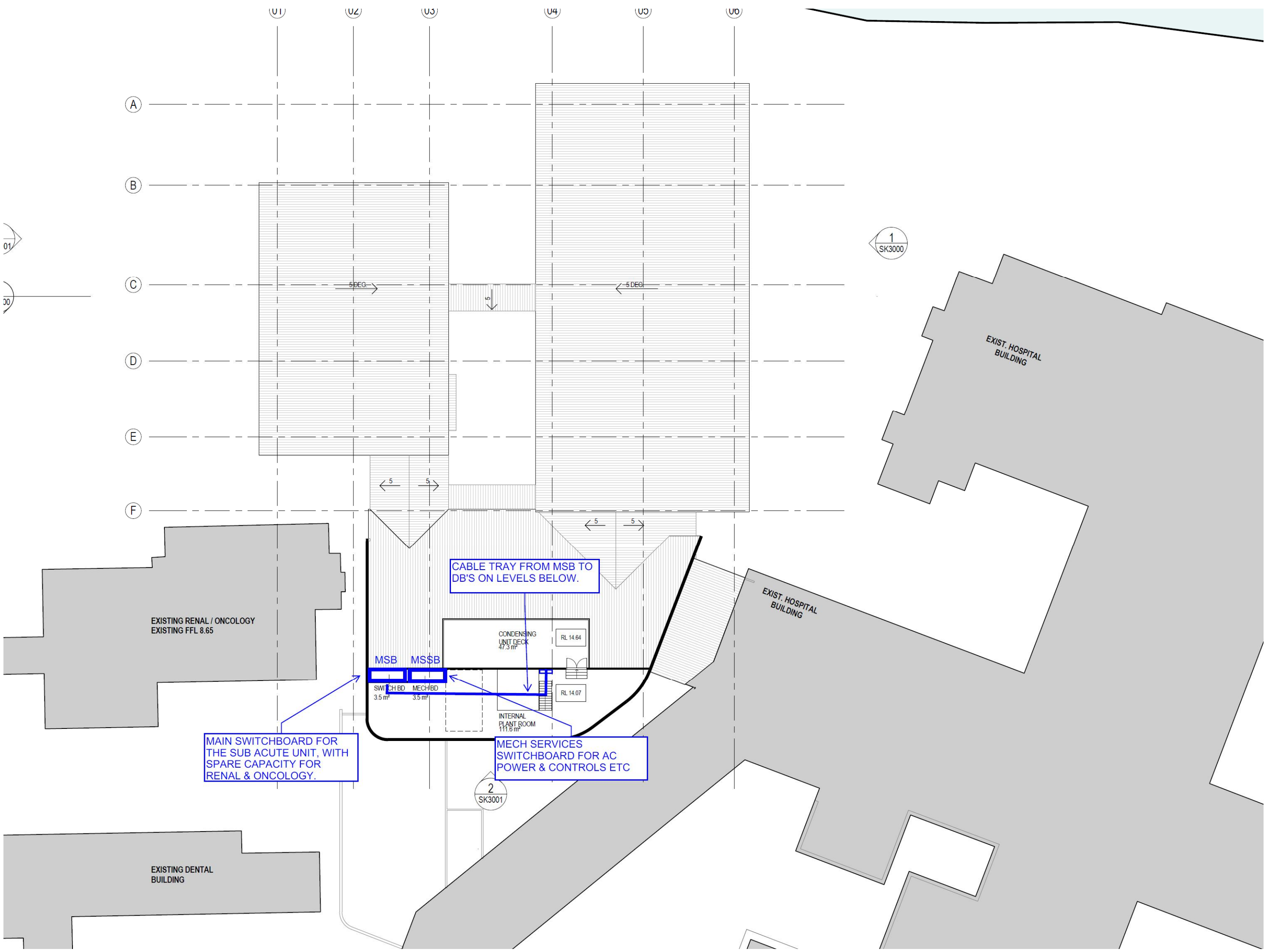
Electrical – Plant Room Level



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Electrical Services - General

- Main incoming supply
- Distribution Boards
- Stand-by Generator - Existing
- UPS System
- New Communications Room
- Lighting & Emergency Lighting
- Power outlets in line with AS3003
- Nurse Call System
- Cat 6A Screened Communications Cabling & Outlets
- Wireless Access
- Security / CCTV / Access Control / Duress
- MATV System
- Fire Detection & EWIS
- Lightning Protection

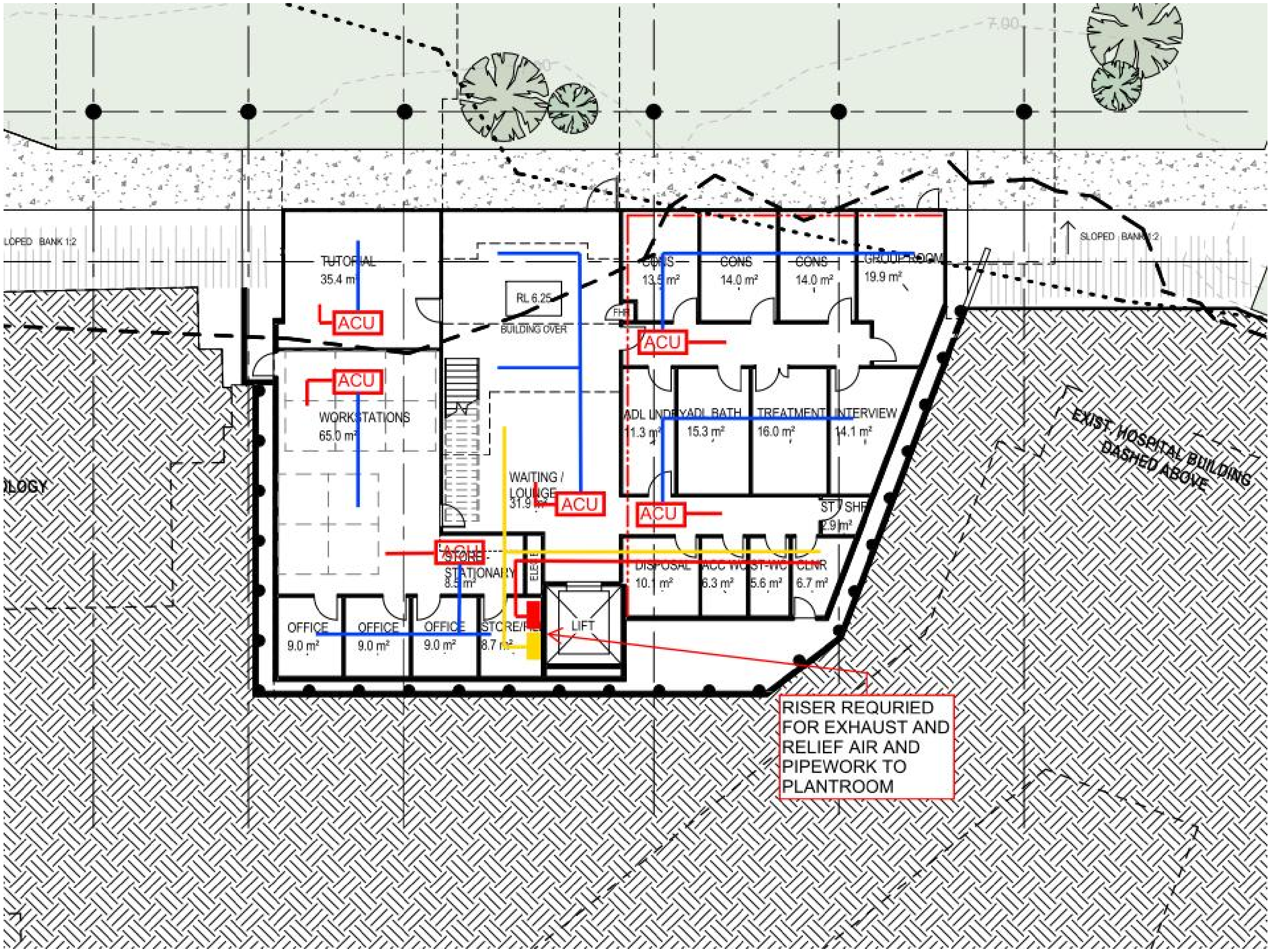
AECOM

Mechanical Services

- New high efficiency hot water boilers to replace the existing heating units
- Air conditioning provided by variable refrigerant volume units capable of cooling & heating used in the new building areas
- Outdoor air conditioning units located on the roof deck (external)
- Centralised plantroom located on the roof with louvered walls
- AC to be thermally zoned for temperature control and occupant comfort
- Air conditioning units (ACU) are located in accessible areas for ease of servicing

AECOM

Mechanical Services - Ground Floor



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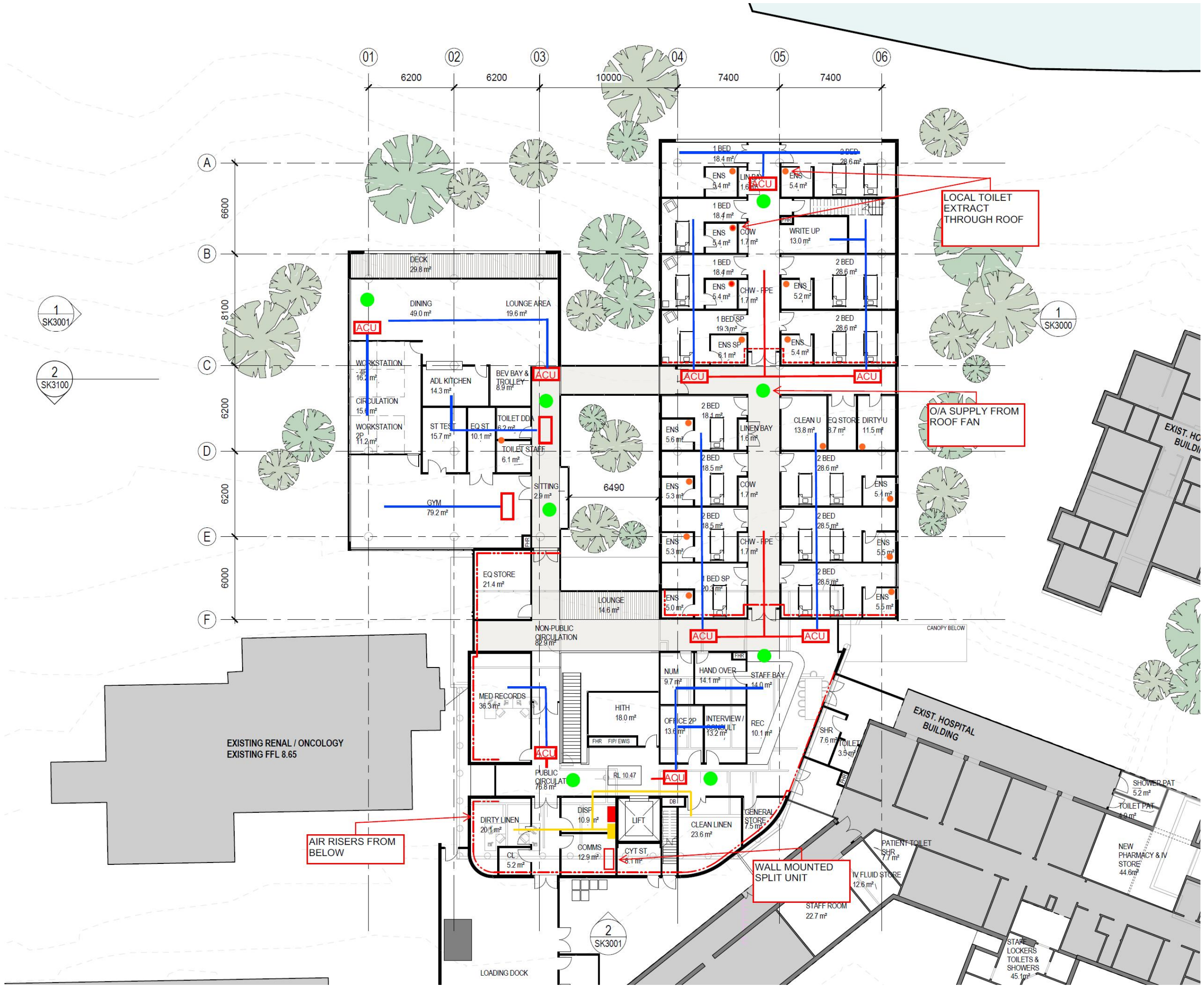
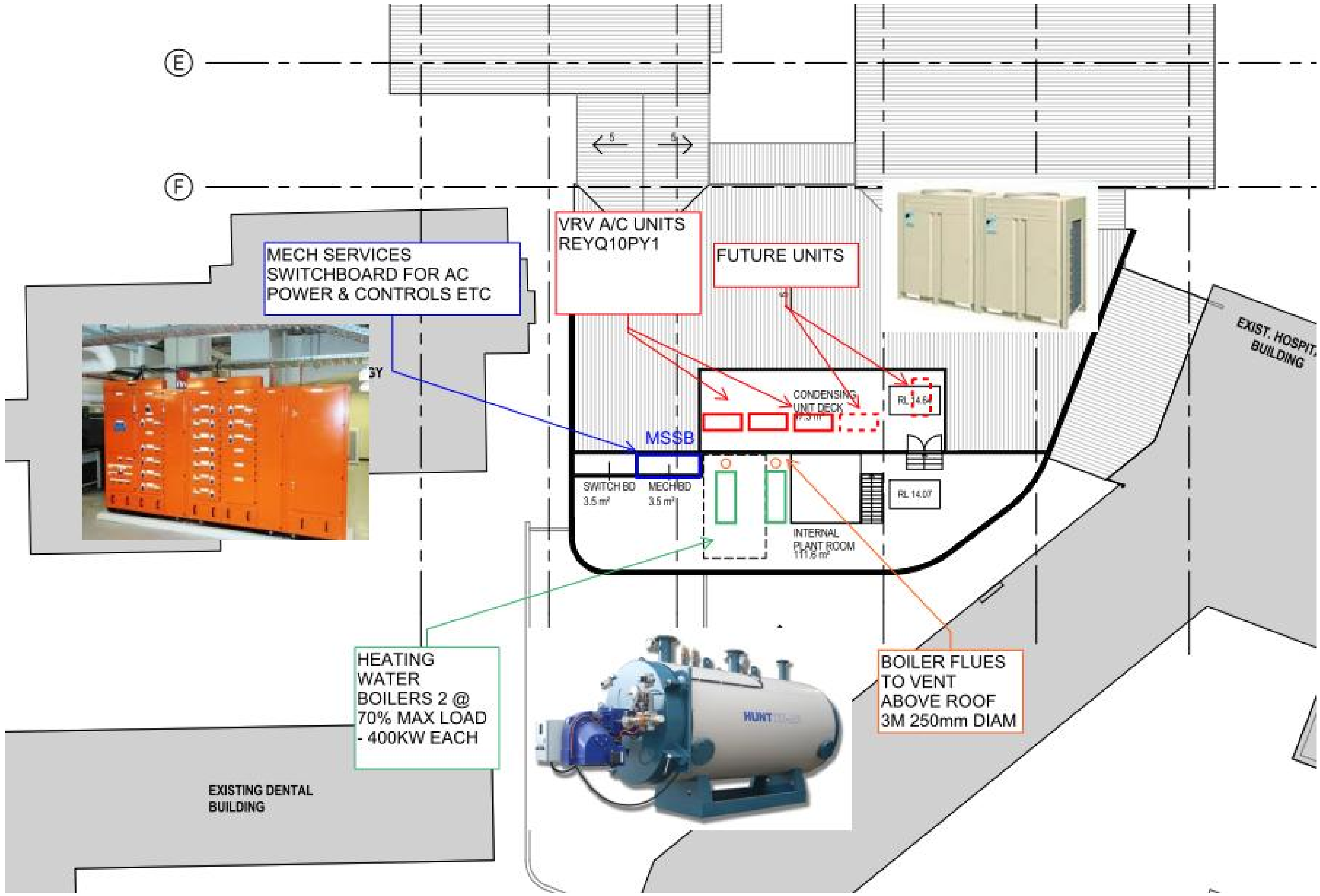
Mechanical Services - First Floor



AECOM

Mechanical Services - Roof



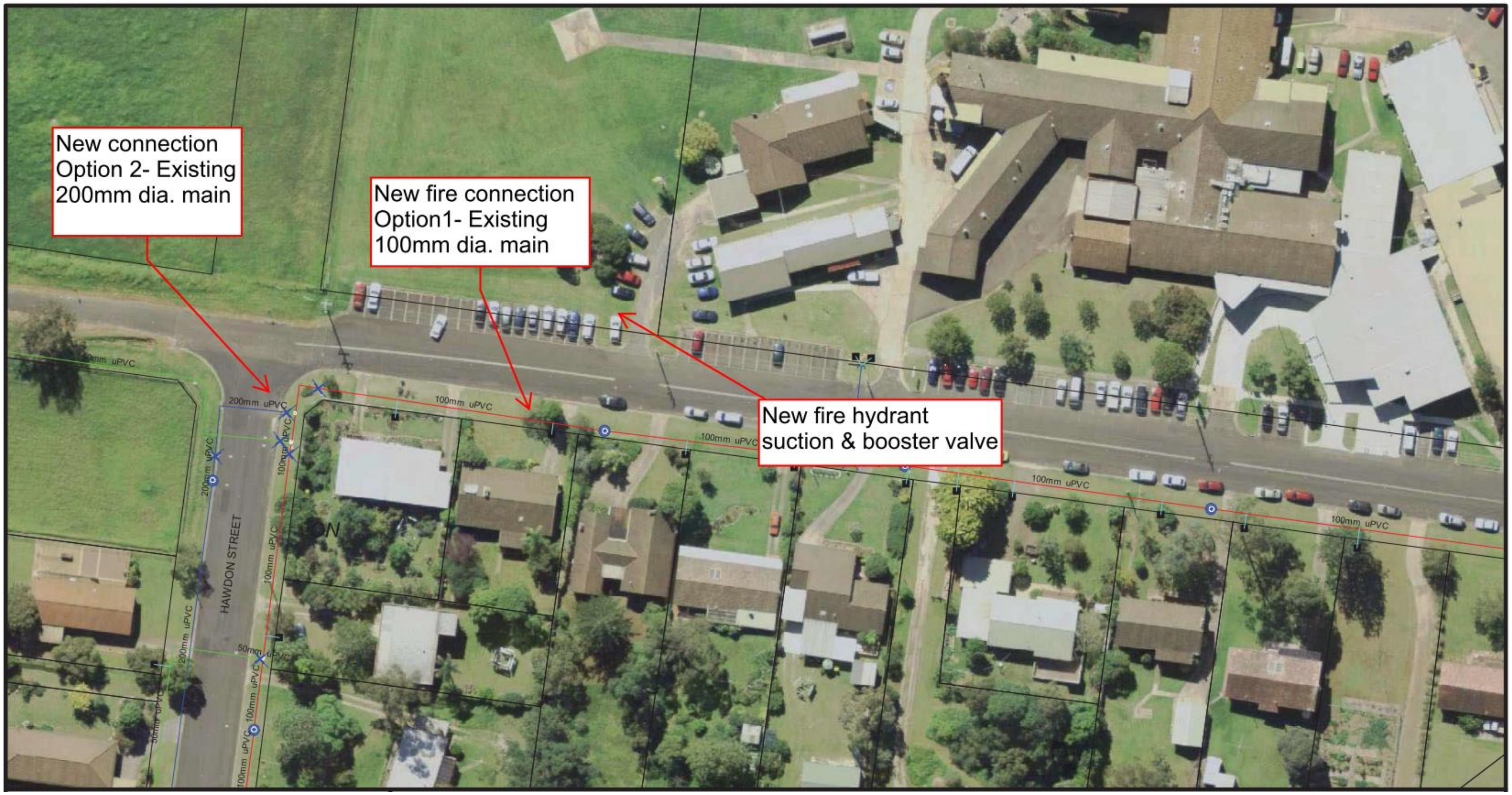
Medical Gases

- The existing building housing the centralised bulk and back up oxygen tanks is to be demolished.
- Relocate centralized oxygen tank to rear of the hospital and utilise existing slab area. A larger tank is likely to be required to cater for the sub-acute and future expansions. This is to be part of early works.
- Medical suction system for the sub- acute is to be connected to the existing system
- Provision of a new medical air system for the sub-acute. Compressors to be located in the roof plant room

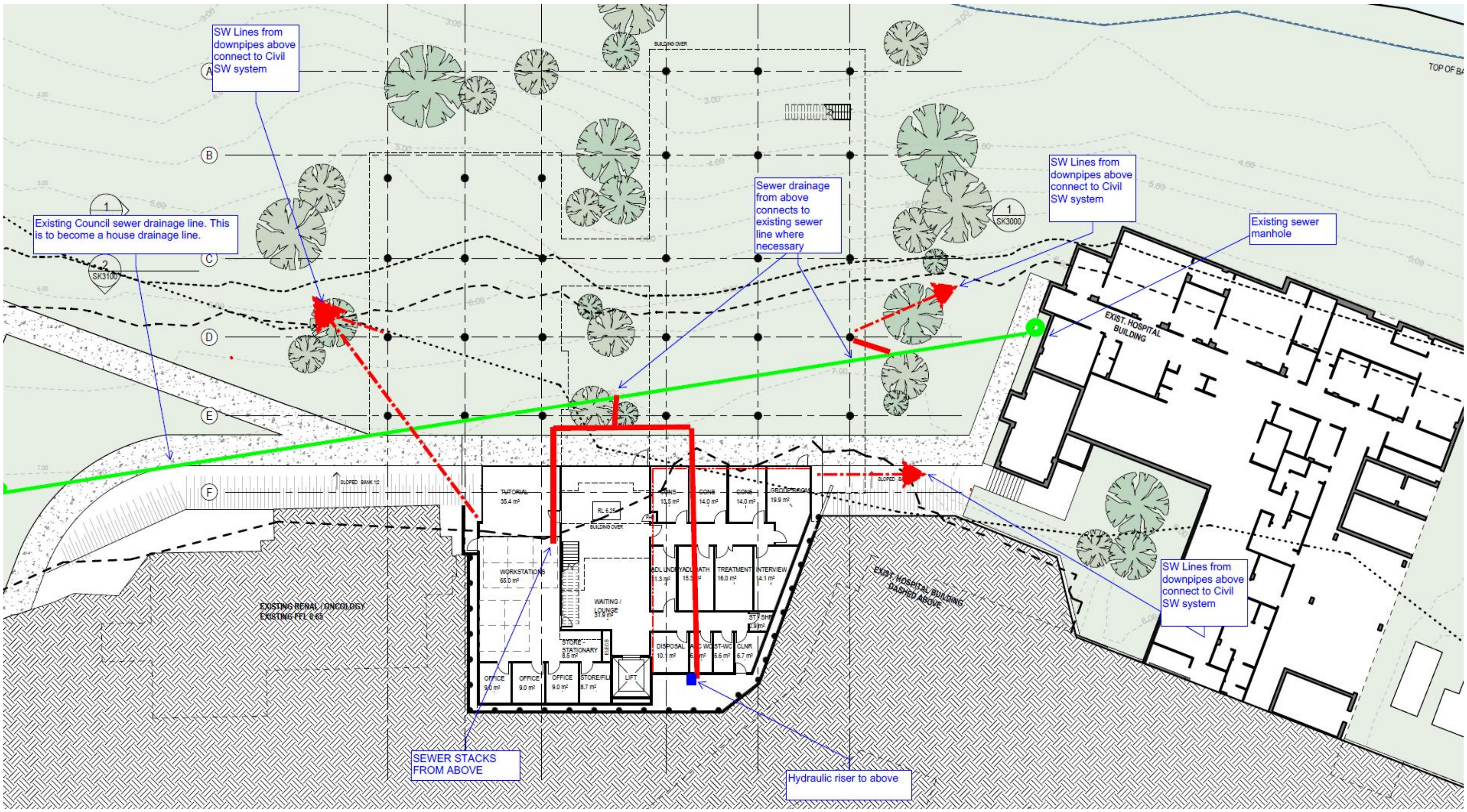
Wet Fire and Hydraulic Services

- New gas hot water plant to be provided to cater for the new Rehabilitation Unit. 4 x instantaneous gas fired units and 2 x 315 L storage tanks, located in the roof plant room.
- Warm water to be provided to new Rehabilitation Unit via localised Thermostatic Mixing Valves (TMV's).
- New Warm water plant to be provided serve existing hospital only
- New independent fire hydrant service to be provided to provide coverage to the new building. Performance shall be in accordance with current code requirements (AS2419.1 2005).
- System performance to be confirmed by BCA- Building classification, largest fire compartment size. This will determine the flow requirements, and whether the Ø100mm water main will be adequate

Fire Hydrant System Connection Options



Ground Floor Hydraulic Services



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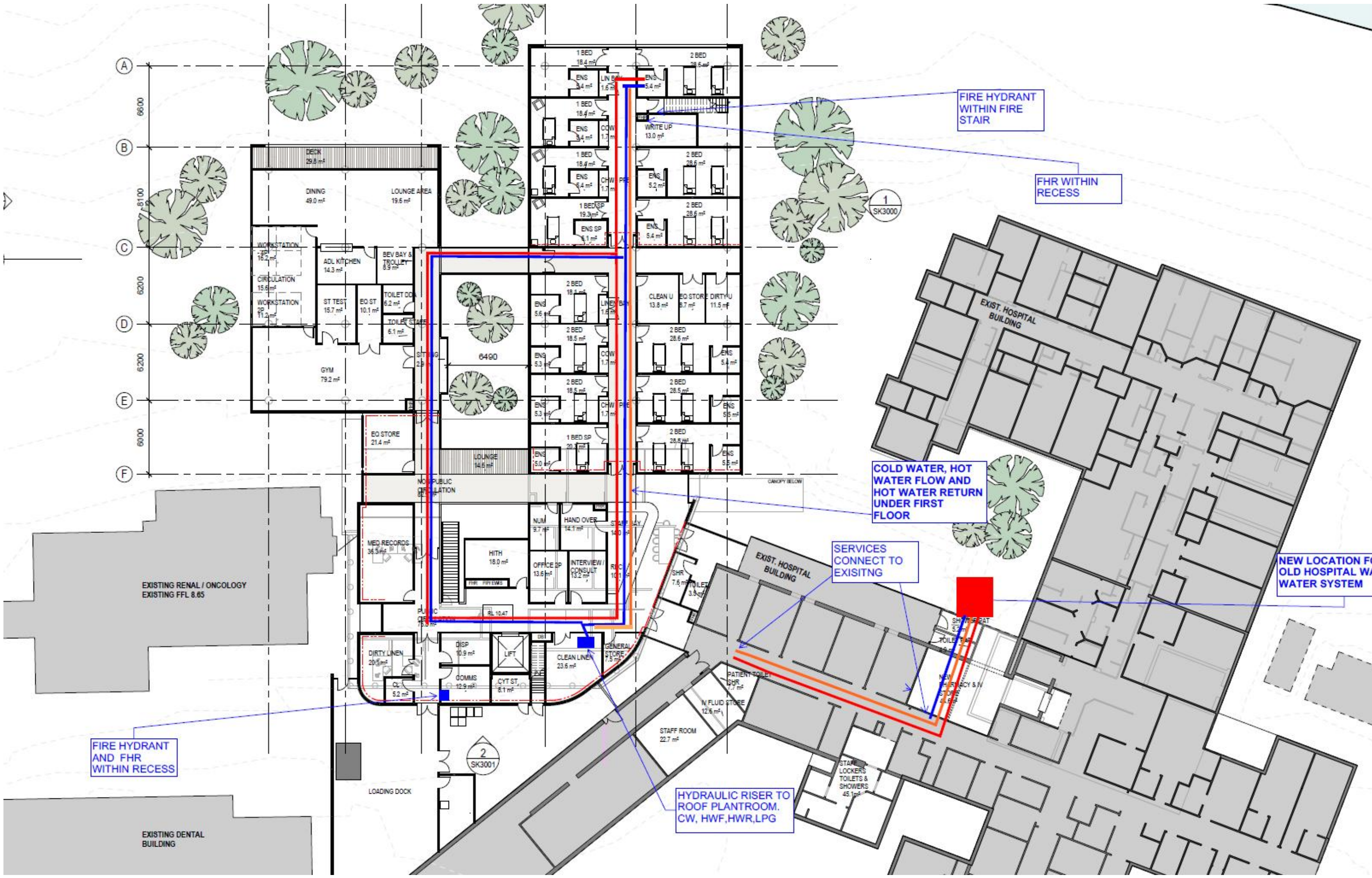
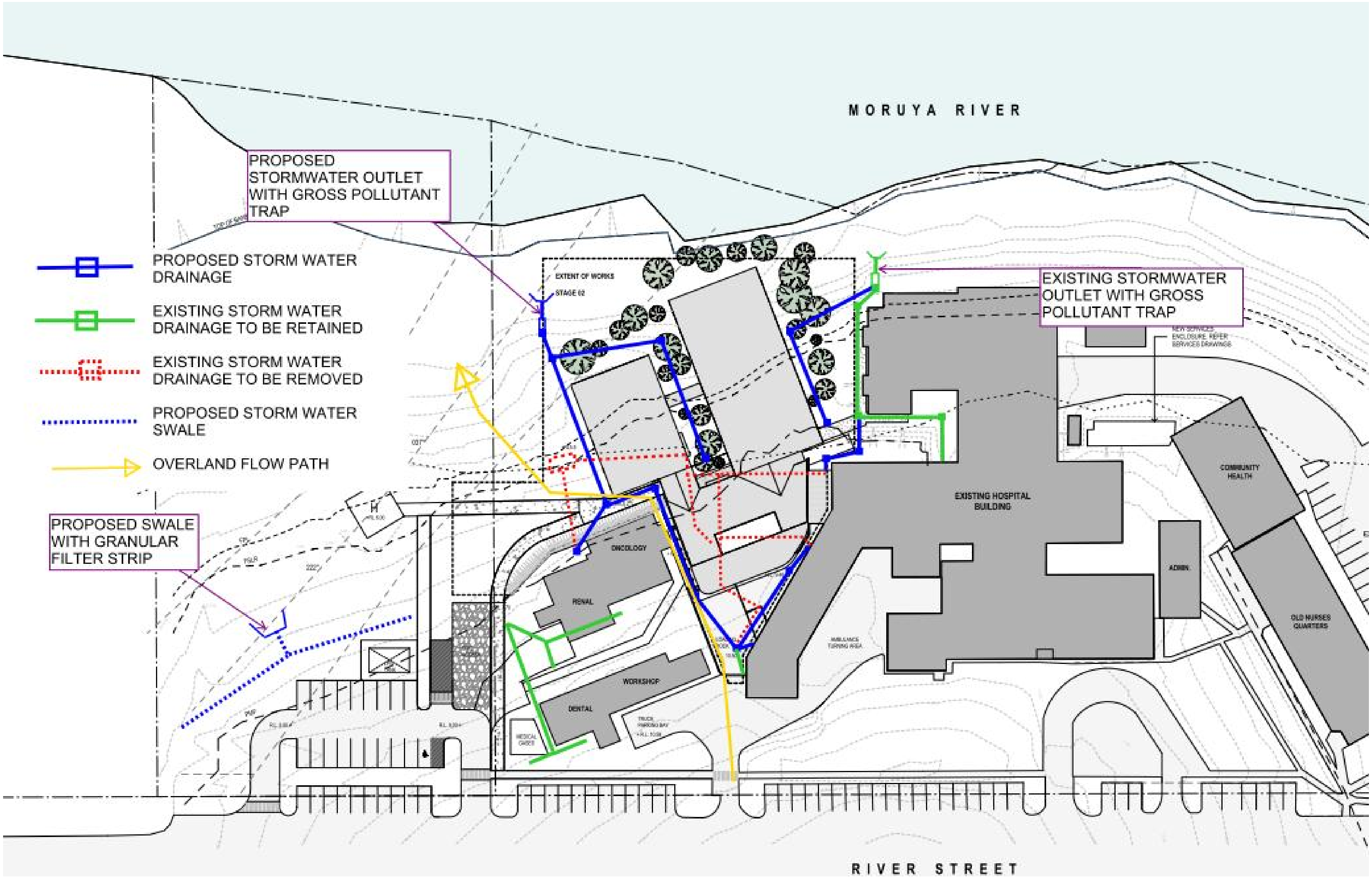
First Floor Hydraulics Layout



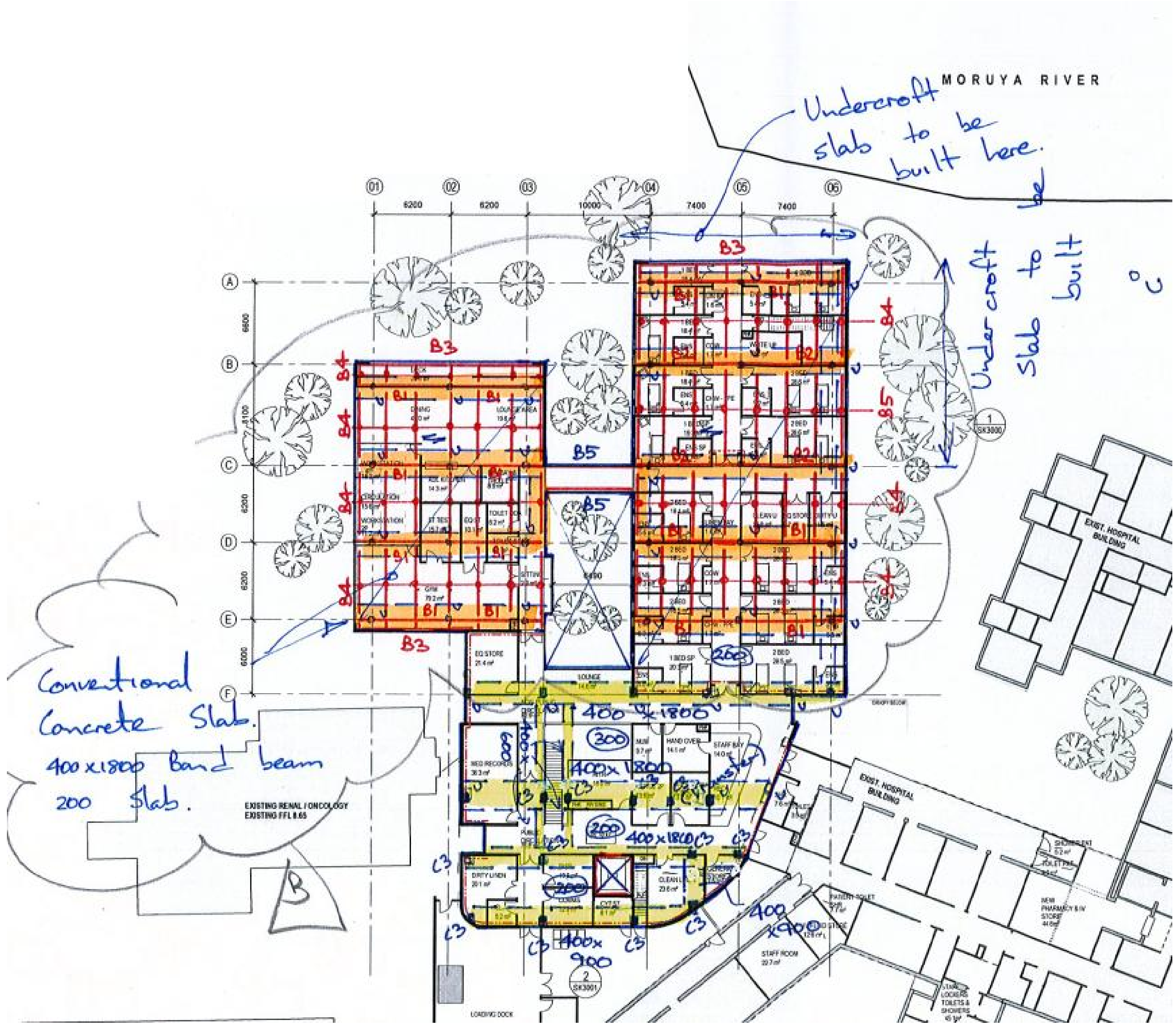
AECOM

Civils – Site Layout



AECOM

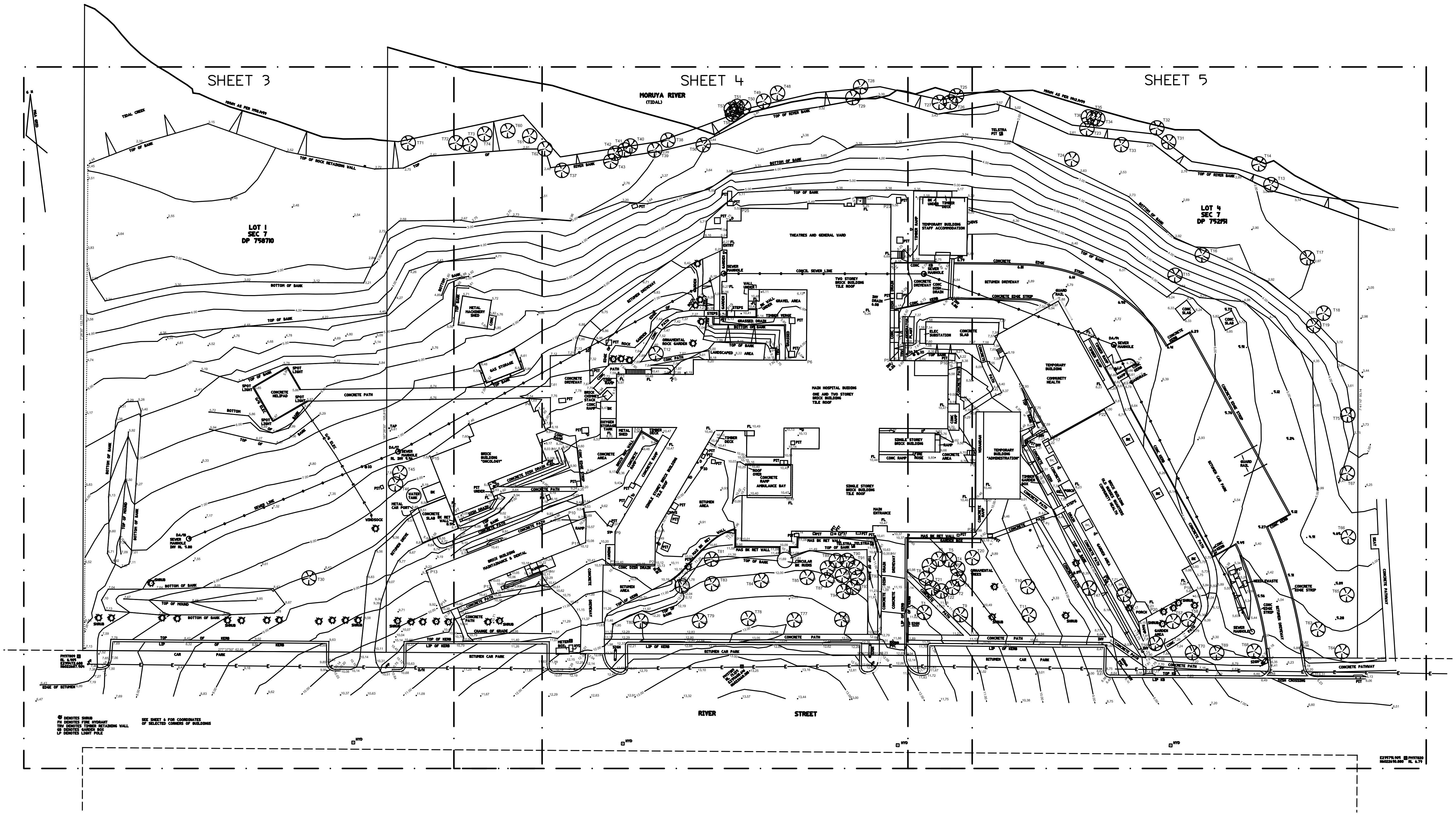
Structures - Summary



AECOM

Thank You

24 Site Survey



No.	AMENDMENT DETAILS	DATE

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DATE APRIL 2007
DRAWN CC
DISK A44
JOB No 10897

DATUM
AHD
ORIGIN OF LEVELS
PM 37819

REDUCTION RATIO
HORIZONTAL – 1:500 OR AS SHOWN
ORIGIN OF COORDINATES PM 37819

Conway Burrows + Hancock
Consulting Surveyors
Civil Engineering Consultants

126 BEACH ROAD
BATEMANS BAY NSW 2536
02 4472 5585

COURTHOUSE ARCADE
VULCAN STREET
MORUYA NSW 2537
02 4474 2663

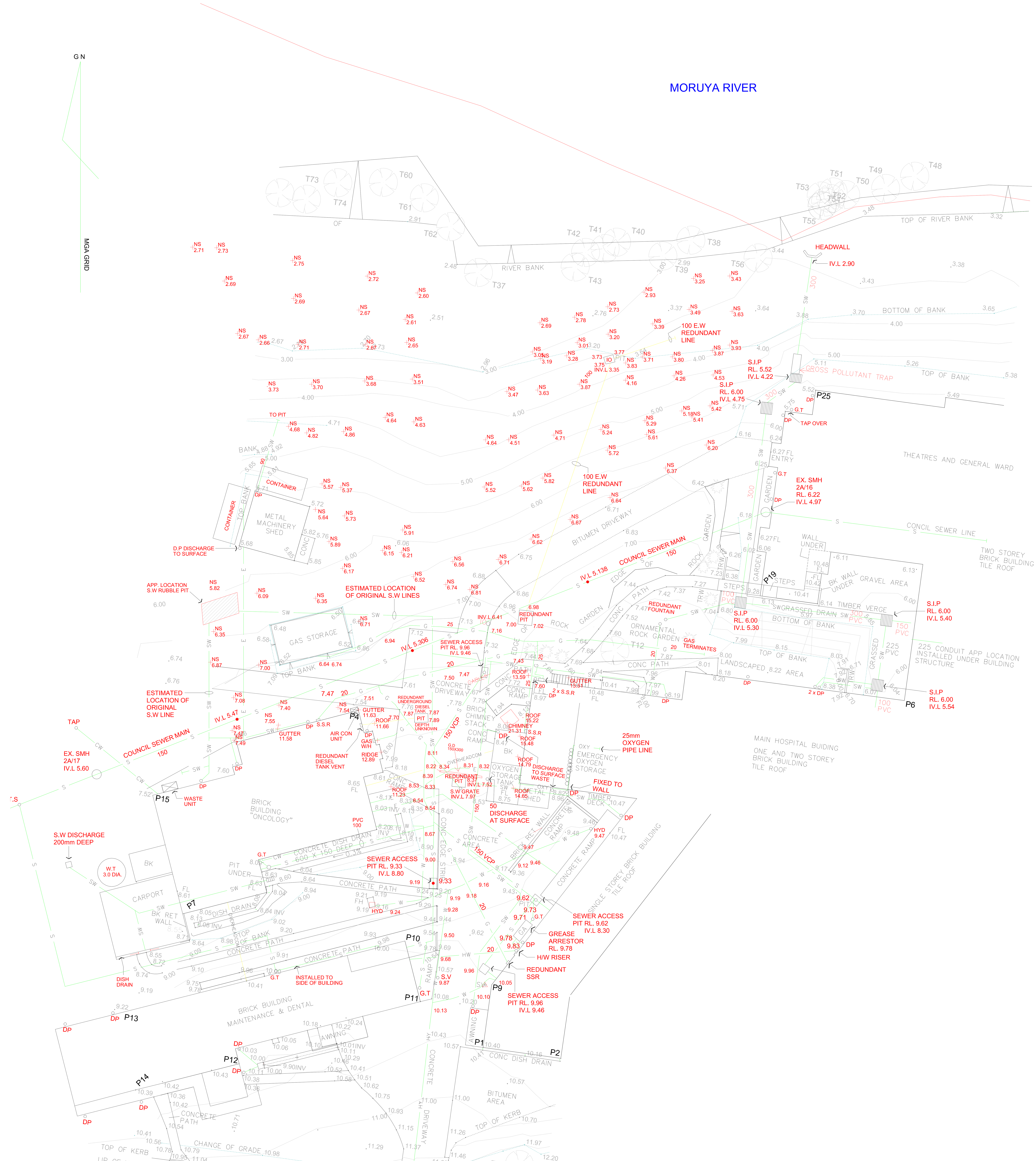
Land Development Consultants

MORUYA HOSPITAL
CONTOUR & DETAIL PLAN
LOTS 1 & 4 SECTION 7 DP 758710
RIVER STREET MORUYA

CLIENT: DEPT OF COMMERCE

ISSUE: A

SHEET	OF	SHEETS
1		6



NOTE:

ALL SERVICES SHOWN ARE EXISTING

EXTRA DETAIL SHOWN IN RED HAS BEEN ADDED TO THE EXISTING PLAN 10897 ISSUE A DATED APRIL 2007

S	SEWER
SW	STORMWATER
W	WATER
HW	HOT WATER
CW	COLD WATER
G	GAS
HY	HYDRANT
OXY	OXYGEN
E	ELECTRICAL
OVERHEADCOM	COMMUNICATIONS OVER HEAD
I.O	INSPECTION OPENING
B.T.S	BOLTED TRAP SCREW
G.T	GULLY TRAP
RL.	REAL LEVEL
IV.L	INVERT LEVEL
S.I.P	STORMWATER INLET PIT
DP	DOWNPIPE
W.T	WATER TANK
S.S.R	SECOND STAGE REGULATOR

THE POSITION OF THE SERVICES HAVE BEEN LOCATED ON THE GROUND BY CONTRACTORS FOR JCL DEVELOPMENT SOLUTIONS

DATE 25 JUNE 2012
DRAWN AB
DISK Z151
JOB No 13790

DATUM AHD

REDUCTION RATIO HORIZONTAL - 1:200

ORIGIN OF LEVELS PM 37819

ORIGIN OF MGA COORDINATES PM 37819

Conway Burrows + Hancock
Consulting Surveyors
Civil Engineering Consultants

126 BEACH ROAD
BATEMANS BAY NSW 2536
02 4472 5585

COURTHOUSE ARCADE
VULCAN STREET
MORUYA NSW 2537
02 4474 2663

Land Development Consultants

HYDRAULIC ENGINEER
JCL DEVELOPMENT SOLUTIONS
14 PAGE STREET
MORUYA
NSW 2537
PH 02 44742401
FAX 02 44744105

MORUYA HOSPITAL
SERVICE LOCATION PLAN
LOTS 1 & 4 SECTION 7 DP 758710
RIVER STREET MORUYA

ISSUE: A

SHEET 1 OF SHEETS 1