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# ANGAU MEMORIAL HOSPITAL\_ FACILITIES MASTER PLAN

Volume 1  
Draft Summary



Prepared for Government of Papua New Guinea  
and Department of Foreign Affairs and Trade  
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**HASSELL** + FRAMEWORKS

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# Contents

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## Section

### Volume 1 Summary

01	Vision	3
02	Demand for Health Services	4
03	Facilities Master Plan	7
04	Health Services Priorities	9
05	Opportunities	10
06	The Existing Site	11
07	Preferred Facilities Master Plan Strategy	12
08	Brief outline of the Capital Cost	16
09	Brief outline of the Program	17
10	Project Staging Strategy	19
11	Procurement Strategy	21
12	Recommendation	22

# Contents

## Volume 2 Report

<b>02</b>	<b>Introduction</b>	<b>3</b>
	2.1 Expected outcomes	3
	2.2 Vision	4
	2.3 Strategies	4
<b>03</b>	<b>Master plan context</b>	<b>6</b>
	3.1 Locality	6
	3.2 Site description	11
	3.3 Building history	18
	3.4 Existing built environment	20
	3.5 Development proposals	21
	3.6 Site constraints	23
	3.7 Stakeholder consultation	25
<b>04</b>	<b>Health services</b>	<b>26</b>
	4.1 Facility design and functionality	26
	4.1.1 Current service provision	26
	4.2 Future health services	27
	4.3 Infrastructure gaps	28
	4.4 Health services priorities	32
	4.5 Culture and climate	37
<b>05</b>	<b>Function/area allocation</b>	<b>40</b>
	5.1 Proposed area summary	40
	5.2 Functional briefs summary	45
<b>06</b>	<b>Inspection summary reports</b>	<b>47</b>
	6.1 Current site and infrastructure condition	47
	6.2 Building condition appraisal	50
	6.3 Building engineering services	51
	6.4 Civil & structural engineering	53
	6.5 Asset appraisal	54
	6.6 Building viability	55
	6.7 Environmental and Social Impact Assessment (EIA)	58
	6.8 PAAS Report Conclusions	60
<b>07</b>	<b>Emerging infrastructure issues</b>	<b>61</b>
	7.1 Access	61
	7.2 Linkages - Frameworks - Circulation and spatial organisation	63
	7.3 Modularity (Flexibility) & Materiality	63
	7.4 Clinical clustering	64
	7.5 Functional relationships - Self Care	65
	7.6 Family patient focus	67
	7.7 Staff facilities - Recognition	67
	7.8 Integrated design - Embodiment of culture and custom	68
	7.9 Model of care	69
	7.10 Emerging infrastructure issues	73
<b>08</b>	<b>Development options</b>	<b>76</b>
	8.1 Development framework	76
	8.2 Options overview	80
	8.2.1 Development framework options	81
	8.2.2 Facility master plan options	85
	8.3 Master Plan Option 1	87
	8.3.1 Scope - Option 1	87
	8.3.2 Advantages	97
	8.3.3 Disadvantages	97
	8.4 Master Plan Option 2	98
	8.4.1 Scope - Option 2	98
	8.4.2 Advantages	100
	8.4.3 Disadvantages	100
	8.5 Master Plan Option 3	101

8.5.1	Scope - Option 3	101
8.5.2	Advantages	104
8.5.3	Disadvantage	104
8.6	Master Plan Option 4	105
8.6.1	Scope - Option 4	105
8.6.2	Advantages	107
8.6.3	Disadvantages	107
8.7	Master plan options analysis	108
8.7.1	Assessment criteria	108
8.7.2	Assessment criteria analysis	109
8.7.3	Option analysis assumptions	110
<b>09</b>	<b>Capital cost estimates</b>	<b>111</b>
9.1	Capital costs	111
9.1.1	Cost plan scope	111
9.1.2	Summary area schedule	113
9.1.3	Summary of capital costs	117
<b>10</b>	<b>Recurrent cost estimates</b>	<b>121</b>
<b>11</b>	<b>Preferred development option</b>	<b>126</b>
11.1	Visualisations	127
11.2	Detailed redevelopment strategies	133
11.3	Access Strategy	134
11.4	Block drawings - Stacking diagrams	135
11.5	Departmental floor layouts	137
11.6	Expansion possibilities	142
11.7	Broad staging strategies	143
11.7.2	Possible phased redevelopment of the facility	145
11.8	Cost estimates & cash flows	148
11.8.1	The summary of the capital costs	148
11.8.2	The capital cost breakdown	149
<b>12</b>	<b>Program</b>	<b>156</b>

## Volume 3 Appendices

A	Existing site plans
B	FMP Option drawings
C	Engineering Services Report
D	Environmental and Social Impact Assessment (EIA)
E	Functional Briefs
F	Risk management issues
G	Procurement strategy
H	Cost estimates and cash flow
I	Schedule of Accommodation
J	Facility-wide Operation Policy
K	Furniture, Fittings and Equipment (FF&E) List
L	Compliance Schedule
M	Geotechnical Investigations Report
N	Project stakeholders and meetings
O	Additional options
P	Independent Audit Review



# 01 Vision



Aerial view from the south-west. Imagery by HASSELL.

## Vision

The vision for the ANGOU Memorial Hospital, as a regional Referral Hospital and National Cancer Care Services and Orthotics and Prosthetics service centres that:

- \_ Deliver quality sustainable health services in alignment with:
  - \_ The National Vision 2050
  - \_ The National Health Plan 2011-2020
  - \_ The Health Services Planning Report 2015
- \_ Enables an alignment of affordable, accessible and appropriate health services
- \_ Provide collaborative and networked health services locally, provincially, regionally and nationally, which integrates NGO'S, FBO's and public health services
- \_ Develops a strategic and built framework that aligns with the health service's needs, with the appropriate and efficient use of resources now and into the future
- \_ Encompasses facilities and place making that reflect the aspirations, culture and pride of the people within PNG
- \_ Establishes integrated services delivery with education and training that can be networked across PNG
- \_ Provides an ability to educate the population in general, in health promotion, wellness, immunization and illness prevention
- \_ Aligns resource planning where facility development is contagious with appropriate and skilled staff allocation, medical technology and supplies



Local population of Lae, Papua New Guinea.

## 02 Demand for Health Services



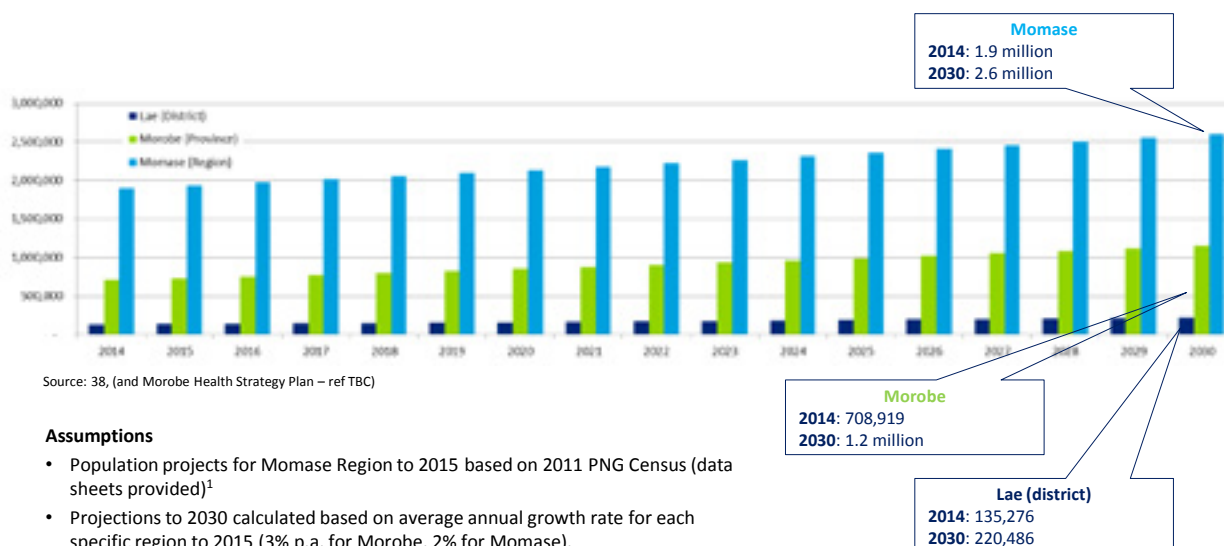
Lae and the river.

### Demand for Health Services

ANGAU Memorial General Hospital (MGH) is located in the city of Lae, Papua New Guinea (PNG). Lae is both a city and district within the Morobe Province, which is one of four provinces that together comprise the Momase Region. ANGAU Hospital serves as a district hospital for the 149,000 residents of Lae, a provincial hospital for the 675,000 residents of Morobe and a

regional referral hospital for the 1.9 million residents of the Momase Region. In addition, given its location and transport linkages, ANGAU MGH will also provide services to the highlands and the PNG Pacific islands.

Population growth in Lae and Morobe is assumed to be 3.1% annually; and, 2.8% for the population of Momase – this is based on the annual growth rate for each geographic area provided in the annual projections to 2015.



Source: 38, (and Morobe Health Strategy Plan – ref TBC)

#### Assumptions

- Population projects for Momase Region to 2015 based on 2011 PNG Census (data sheets provided)<sup>1</sup>
- Projections to 2030 calculated based on average annual growth rate for each specific region to 2015 (3% p.a. for Morobe, 2% for Momase).

Morobe Population by Religion (people) 2014 -2030

Source: Government of Papua New Guinea, 2010, 'National Health Service Standards 2011 - 2020 – Executive Summary', accessed at: [http://www.adi.org.au/wp-content/uploads/2013/06/2011\\_PNGDeptHealth\\_National-Health-Plan-2011\\_Part1.pdf](http://www.adi.org.au/wp-content/uploads/2013/06/2011_PNGDeptHealth_National-Health-Plan-2011_Part1.pdf), last accessed, 11/07/2014.



## 02 Demand for Health Services

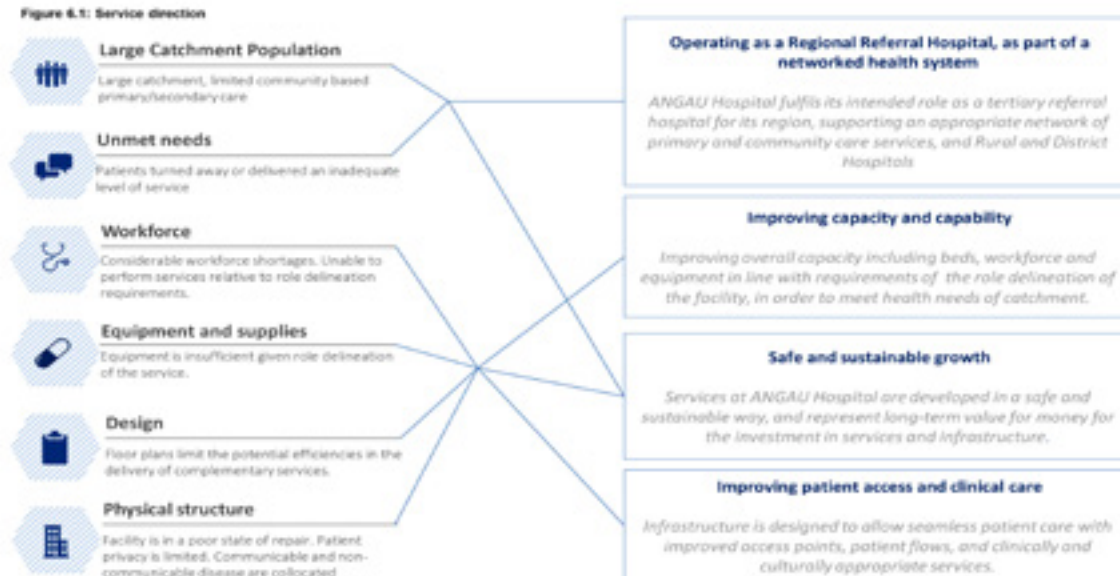
The health services planning highlighted the key challenges and the services provision approach to improve health services delivery.

### Service direction – link with service delivery challenges

#### Alignment with current state assessment

Figure 6.1 illustrates how the service direction for ANGAU Hospital aligns with the key service delivery challenges identified in the current state assessment.

Figure 6.1: Service direction



Source: Deloitte ANGAU Memorial General Hospital redevelopment master plan Health Service Planning Report - Draft Report, 4 December 2014.

ANGAU Hospital has a built capacity of 320 beds; with a further 150 temporary beds under construction and due for progressive commissioning from February 2015.

The current state assessment key findings identified that ANGAU Hospital is currently not able to function in accordance with its role delineation. In part, this is due to capacity and capability limitations with the facility itself:

- \_Physical structure – the current physical structure of the Hospital is in disrepair. Large parts of the current facility is unusable or unfit for purpose
- \_Workforce – the hospital is currently understaffed and faces challenges in recruitment, retention and staff absenteeism
- \_Equipment and supplies – current stock of equipment is inadequate to provide complex services. Supply of critical inputs or support services such as pharmaceuticals is unreliable and/or inadequate
- \_Design – complementary services are not located next to each other, leading to inefficiencies in service delivery. Conversely, services and patients who should be separated – be it for clinical or cultural reasons – are not, which creates unsafe or inappropriate service environments.

However, the assessment further concluded that ANGAU Hospital's capacity is also stretched on account of the catchment population's limited access to healthcare outside of the facility. Rather than acting as a referral hospital, ANGAU Hospital operates as an entry point for many patients into the health system. This places significant strain on the hospital's already limited resources.

The Health Services Planning confirms that ANGAU Hospital will remain a Level 6, Regional Referral Hospital, meeting the needs of the Momase Region. Further, the National Cancer, and Orthotics and Prosthetics Services will have the infrastructure and resources to operate effectively as level 7 services and fulfil their role as national services.

## 02 Demand for Health Services

To achieve this, the service must:

- \_ Improve capacity and capability – beds, workforce and equipment in line with the requirements of the role delineation of the facility and to meet the health needs of the catchment
- \_ Improve patient access and clinical care – to allow seamless patient care with improved access points, patient flows and clinically and culturally appropriate services
- \_ Operate as a Regional Referral Hospital, as part of a networked health system – fulfil its role as a tertiary referral hospital for its region, supported by a network of level 1 to 5 services
- \_ Achieve safe and sustainable growth – services at ANGAU Hospital are developed in a safe and sustainable way, and represent long-term value for money in the investment in services and infrastructure

It was determined that the optimal path (preferred strategy option) for ANGAU Hospital is to gradually shift to the provision of increasingly specialised care as lower level facilities develop around it within the regional, provinces and districts.

The implementation of the preferred service strategy option, will require a phased or staged redevelopment over the period from now to 2030.

The preferred service strategy option is dependent on three key requirements

- \_ Training a workforce
- \_ Securing funding (capital and operational), and
- \_ Developing services outside of ANGAU Hospital

The following recommendations are made following consultation with the ANGAU Hospital CEO, Board Chair, senior clinical stakeholders, and in discussions with representatives of PNG NDoH and DFAT:

- \_ The ANGAU Hospital Master Plan is progressed based on service strategy Option 2
- \_ A commitment is made to progress Option 2.1 as the preferred implementation sub-option, based on the long-term uncertainty regarding the workforce and recurrent funding requirements and the dependency on developing additional capacity outside of ANGAU Hospital, required to meet Option 2.3
- \_ ANGAU Hospital and the PNG Government continue to work towards the implementation of Option 2.3 by 2030

A key dependency of any future development is the ability to attract and retain an appropriately-trained workforce, and to provide adequate facilities, equipment and funding to ensure safe, quality services. In the absence of these, there is a risk to patient safety and quality. It is noted however, that these are key areas of focus for the PNG Government and the NDOH, as outlined in policy documents such as the National Health Plan and Vision 2050.

This approach maximises the flexibility of the ANGAU Hospital site by planning for the long-term development of Option 2.3 to fully realise the future vision of the service; while facing the realities of the key dependency on training a sufficiently qualified workforce, securing the required capital and recurrent funding, and progressing the development of health services outside of ANGAU Hospital.



Images of Lae, Papua New Guinea.



## 03 Facility Master Plan



ANGAU MGH aerial view. Imagery by HASSELL.

### Facility Master Plan

The facility Master Plan for ANGAU Memorial General Hospital is redevelopment framework strategy that provides the ability to:

- \_ Implement Physical facilities for all current health services planning strategic options
- \_ Implement the physical requirements for all the current preferred implementation health services options. Options that allow a staged redevelopment.
- \_ Enable the continued delivery of health services, some with

improved functionality and conductivity due to the emergency and priority works (Early Works), from the existing ANGAU MGH facilities during the redevelopment of hospital

- \_ Provide staged developments and/or combination of facilities under varying project timeframes and procurements
- \_ Increase services delivery at ANGAU MGH beyond its current projected capacity
- \_ Incorporate areas for integrated care with NGOs, FBOs or private health/hospital providers
- \_ Permit the early redevelopment of key services, for example the National Cancer Care Institute and Self-Care facilities, or the Staff Accommodation



## 03 Facility Master Plan

This Redevelopment Framework aims to provide:

- \_ Built physical infrastructure that is capable of being up to 4 or more storeys high and that the structure should be constructed to allow for vertical expansion as well as horizontal expansion;
- \_ A building structure where the roof should be reinforced concrete to be capable of the expansion and be resistant to seismic actions and durable;
- \_ A consistent modular framework, or structural grid is recommended that is highly flexible for all proposed functions;
- \_ Zones for specialist area where modular framework is not achievable. For example the Radiation oncology bunkers that are approximately 11 metres by 11 metres for each bunker;
- \_ Zones where the existing hospital can maintain its functions whilst the hospital is redeveloped;
- \_ Zones where access, entries and car parking is provided that focuses on family/patient focused care;
- \_ Integrated landscaping and external areas that enhance health services delivery;
- \_ Spaces that integrate the PNG lifestyles and culture within a healing environment;



ANGOU MGH view from east. Imagery by HASSELL.



Entry Portico. Imagery by HASSELL.



Access to all areas. Imagery by HASSELL.



Proposed Emergency. Imagery by HASSELL.

## 04 Health Services Priorities

### Health Services Priorities

Critical to the health services delivery is the parallel development of health services and their associated facilities within each of the districts within the Provinces that make up the Momase Region.

Within workshops with key stakeholders, the priority clinical service areas were agreed and it was recommended that the redevelopment of ANGAU MGH within its initial phase of redevelopment should provide the required services and thus resources to meet the services requirements and demands.

The three priority clinical services highlighted by the key stakeholders that should form part of the initial redevelopment are:

- \_Emergency services
- \_Obstetrics and Gynaecology
- \_The National Cancer service

With each priority service, there is also the other associated clinical services requirements.

- \_For Emergency Services to meet its requirements we must have:
  - \_The required diagnostic services of Medical Imaging and Pathology
  - \_The procedural services of Operating Theatres and Day Procedures
  - \_The increased specialist patient care facilities of Critical Care including Intensive Care, High Dependency and Coronary Care
- \_For Obstetrics and Gynaecology to meet its requirements we must have:
  - \_The required Birthing facilities
  - \_The required Neonatal and Special Care Nursery areas
  - \_The required pre and antenatal services and facilities
  - \_The network of increased capacity for obstetric services across the province and the region
- \_For the National Cancer Care services to meet its national requirements we would recommend that we have an institute that has:
  - \_Screening centres across all provinces in PNG that provide early diagnosis
  - \_A national Immunisation Scheme that can reduce the incidences of particular cancers, e.g. cervical cancers
  - \_The development of Self-Care Accommodation in association with the National Cancer Care Institute to ensure people from rural district have accommodation while undergoing treatment. Accommodation should allow for the family/guardian/carer to stay and take care of the patients
  - \_The Pathology and Pharmacy services required to deliver the cancer treatment
  - \_The integrated training and further education programs and resources needed to support the cancer care services
  - \_The Research and Clinical Trials areas for selected cancer care treatments

For each of the priority services we also need the clinical, clinical support services and hotel services to deliver the required services outcomes.

The ability to deliver improved health services revolves around providing the right services and thus functional areas/spaces with the right functional adjacency.

The development of clinical clusters or precincts is key to the delivery of modern health services, particularly as the services become tertiary and referral services. The model of care and operational policies recommend improved functional clustering, with the clusters/precinct divided as follows:

- \_Acute Care services:
  - \_Acute Care
  - \_Sub-Acute care
- \_Ambulatory Care services: Polyclinic /Outpatients/Ambulatory Care services
  - \_Day Therapy and treatment services
  - \_Integrated NGO and FBO Services
  - \_National Cancer Care Institute services and the Self-Care facilities
- \_Support services
  - \_Hotel Services including Food Services, Stores, Domestic Services
  - \_Pathology and Pharmacy
  - \_Mortuary
- \_Accommodation services:
  - \_Staff Accommodation
  - \_Student or trainee accommodation
  - \_Visiting special accommodation
- \_Educational services:
  - \_Unitech School of Nursing
  - \_Educational and training facilities



Hobu aerial view.



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## 05 Opportunities

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### Opportunities

The redevelopment of the ANGAU MGH Regional Referral Hospital, which embodies the PNG National Health Plan 2011-2020 strategies, offers the ability to align service and design principles with strategies to ensure which ANGAU MGH will deliver sustainable family/patient focused care to people within PNG that incorporates the culture, place, family and community values.

Strategies for improved health services delivery that incorporate:

- \_ Access Strategies to provide clarity and legibility to users and processes;
- \_ Circulation and spatial organisational strategy that provides intuitive and logical orientation, wayfinding and directions for all;
- \_ Modularity and Materiality that provides excellent durability, flexibility and adaptability;
- \_ Clinical clustering that enables improved operational efficiency in all services;
- \_ Functional clustering strategies that enables safe care
- \_ Family patient focused care that incorporate guardian involvement and training to ensure the continuum of care
- \_ Workplace and staff facilities strategies that provide the framework for a quality workplace, urban environment and culture that attracts and retains the staff
- \_ Integrated design principles and strategies that aim to transform healthcare into:
  - \_ a welcoming place;
  - \_ a healing space;
  - \_ a place that responds to PNG cultures and lifestyles; and
  - \_ a user learning centre and education.
- \_ Services delivery and model of care strategies that are based on proven clinical pathways and operational efficiencies

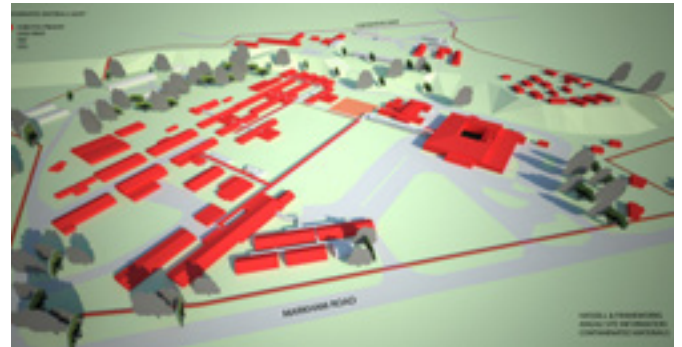
## 06 The Existing Site

### The Existing Site

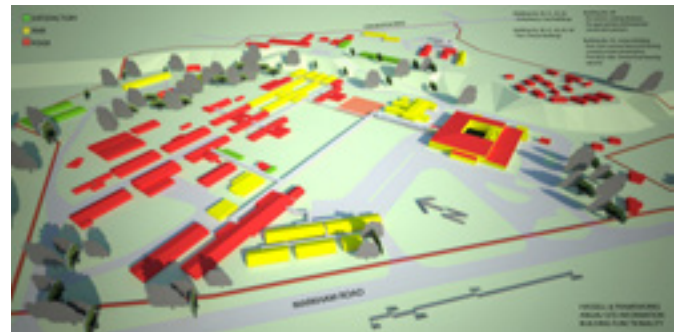
The existing health campus analysis has the following attributes:

- \_ Large campus. of 19.6 Hectares, with a usable area of 12.5 hectares for the hospital due to site topography
- \_ Poor building conditions and functionality
- \_ Majority of facilities in poor condition and single storey
- \_ Various ground levels and separated area across the campus
- \_ Limited landscaping, trees and spaces suitable for people
- \_ Majority of facilities have small footprints and are in poor condition

The Property Appraisal and Asset Survey identified the existing campus characteristics.



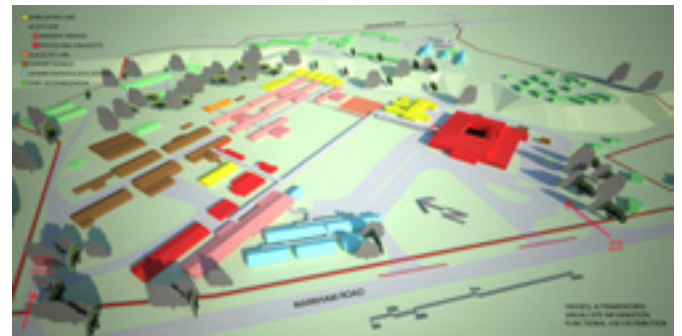
The extent of Contaminated Materials within buildings on the campus.



The Condition Audit of Facilities. Imagery by HASSELL.



ANGAU MGH Site, view from upper level. Imagery by HASSELL.



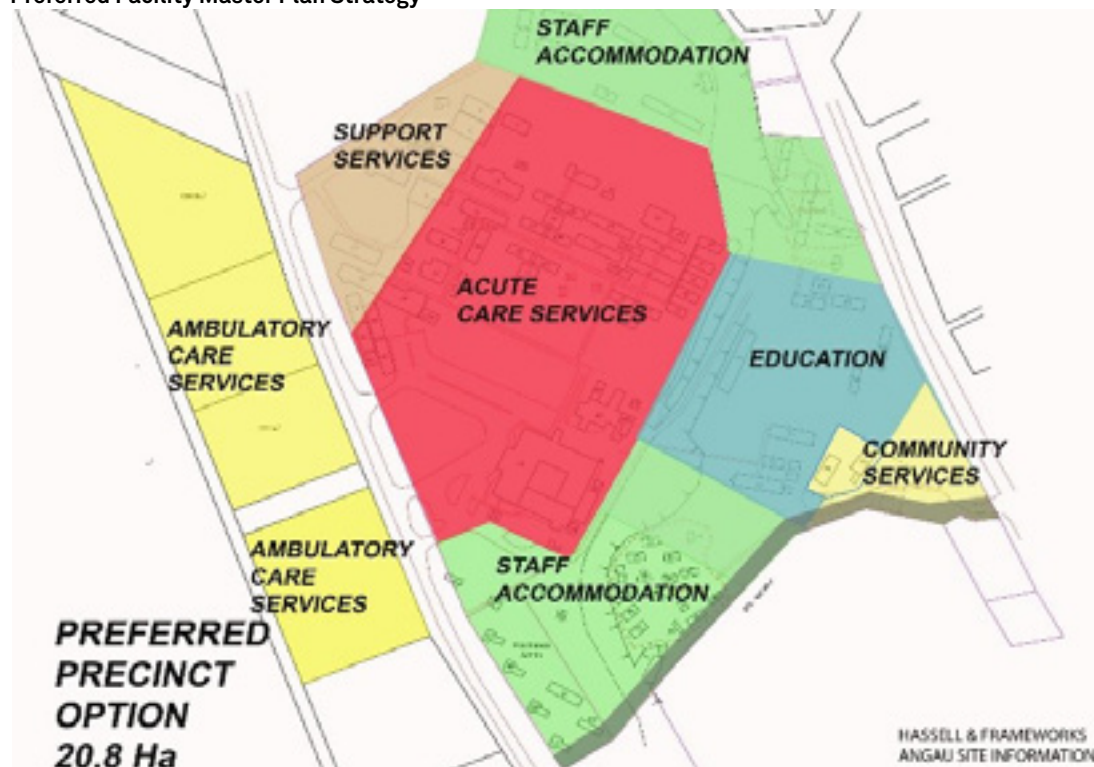
The Functional distribution. Imagery by HASSELL..



ANGAU MGH Site labelled. Imagery by HASSELL.

## 07 Preferred Facility Master Plan Strategy

### Preferred Facility Master Plan Strategy



Preferred Option- Option 1 provides 20.8 hectares. Diagram by HASSELL.

The facility master plan reviewed the campus and developed precinct master plan to provide improved functionality and enable improved operational efficiency. From these precinct plans additional Facility Master Plans have been developed. The preferred Precinct Master Plan is Option 1 (above)

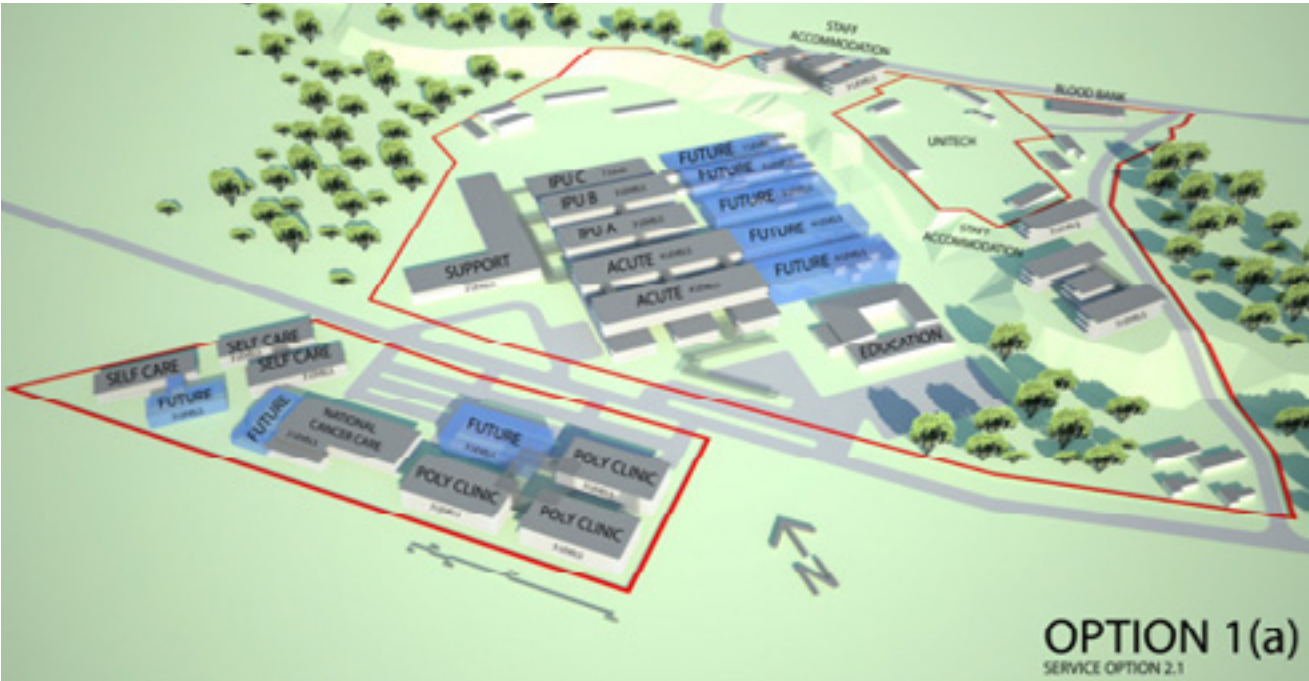
### Backup Strategy



Backup Strategy - Option 4 provides 16.4 hectares. Diagram by HASSELL.



07 Preferred Facility Master Plan  
Strategy



Option 1. Imagery by HASSELL.



Aerial view from the south-west. Imagery by HASSELL.



## 07 Preferred Facility Master Plan Strategy



Aerial view from the south and Helipad. Imagery by HASSELL.



Aerial view from the east and Helipad. Imagery by HASSELL.

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## 07 Preferred Facility Master Plan Strategy

The Facility Master Plan Option 1 was endorsed by the Steering Committee on the 26 March 2015. A Resources Strategy is required to be confirmed and agreed by the Steering Committee that is based on an agreed:

- \_Capital cost investment
- \_Recurrent cost investment
- \_Staff training and recruitment funding strategy



Aerial view from the north and Helipad. Imagery by HASSELL.



## 08 Brief outline of the Capital Cost

### Brief outline of the Capital Cost

A cost estimate has been prepared from the following information:

- \_Draft Schedules of Accommodation;
- \_Preliminary Master Plan Concept Layouts;
- \_Indicative Building and Site Services Strategies,
- \_Preliminary Geo-technical, Structural and Civil Engineering Strategies;
- \_Draft Schedules of Furniture, Fixtures and Fittings.

Facility Master Plan Redevelopment Option Costings to meet Health Services Implementation Option 2.1 and Facility Master Plan Option 1.

Description	Area m2	Estimate K 2014	Estimate K 2019	Recurrent Estimate K 2019
Acute Hospital	50,951	748,410,000	843,410,000	95,504,204
Education	1,410	15,413,000	17,320,000	Incl
Polyclinic	8,500	103,847,000	116,700,000	Incl
National Cancer care Centre/Institute	4,581	72,298,000	87,900,000	9,802,066
Self- Care Accommodation	3,291	31,795,000	35,729,000	8,033,064
Staff Accommodation	10,143	65,542,000	73,000,000	Incl
	77,503	1,037,305,000	1,174,059,000	113,339,334

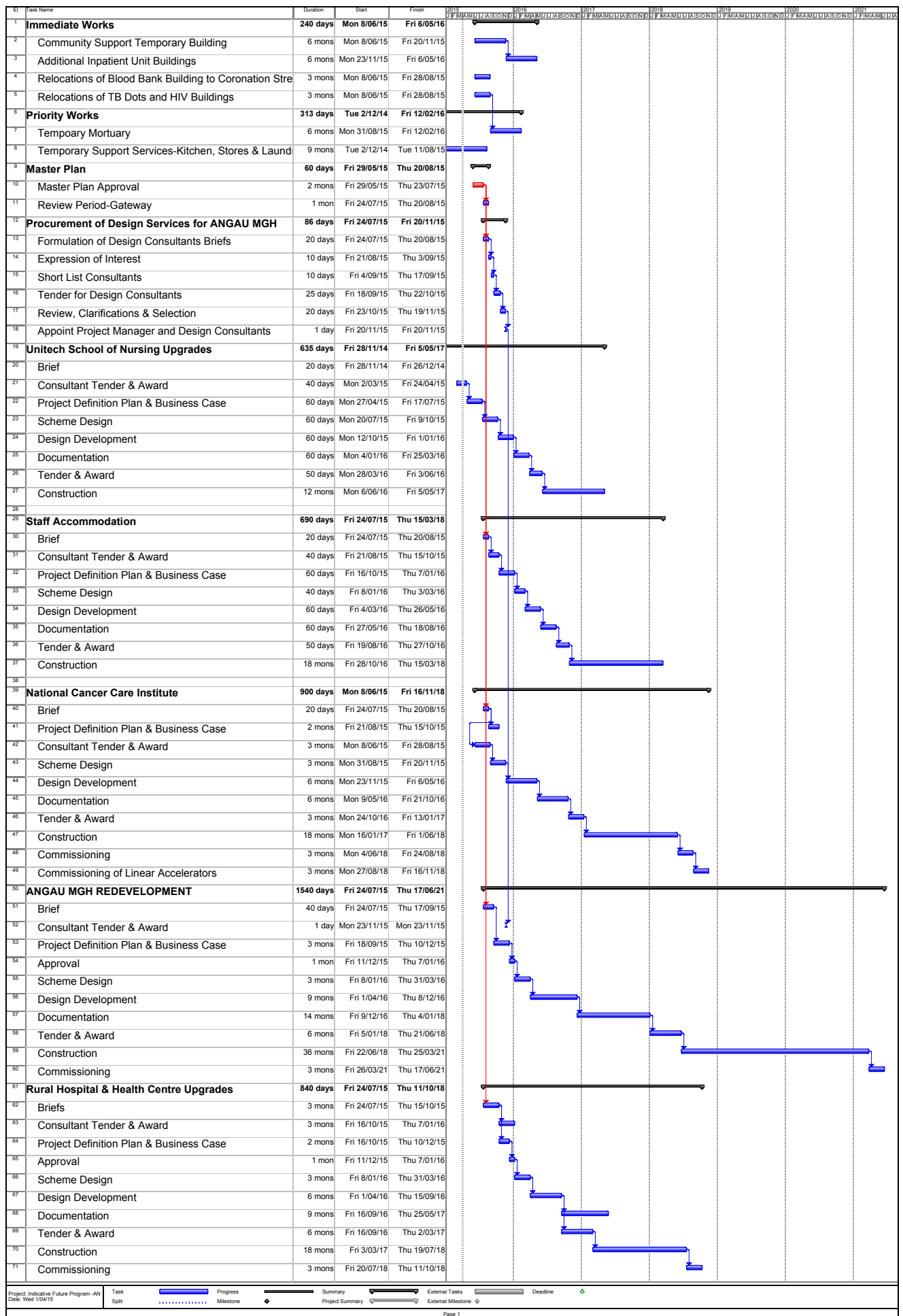
These costs exclude:

- \_Off-site Infrastructure upgrades to Water supply, Sewer, Electricity, Communications and Stormwater
- \_Emergency Works and early priority works
- \_Unitech School of nursing Redevelopment

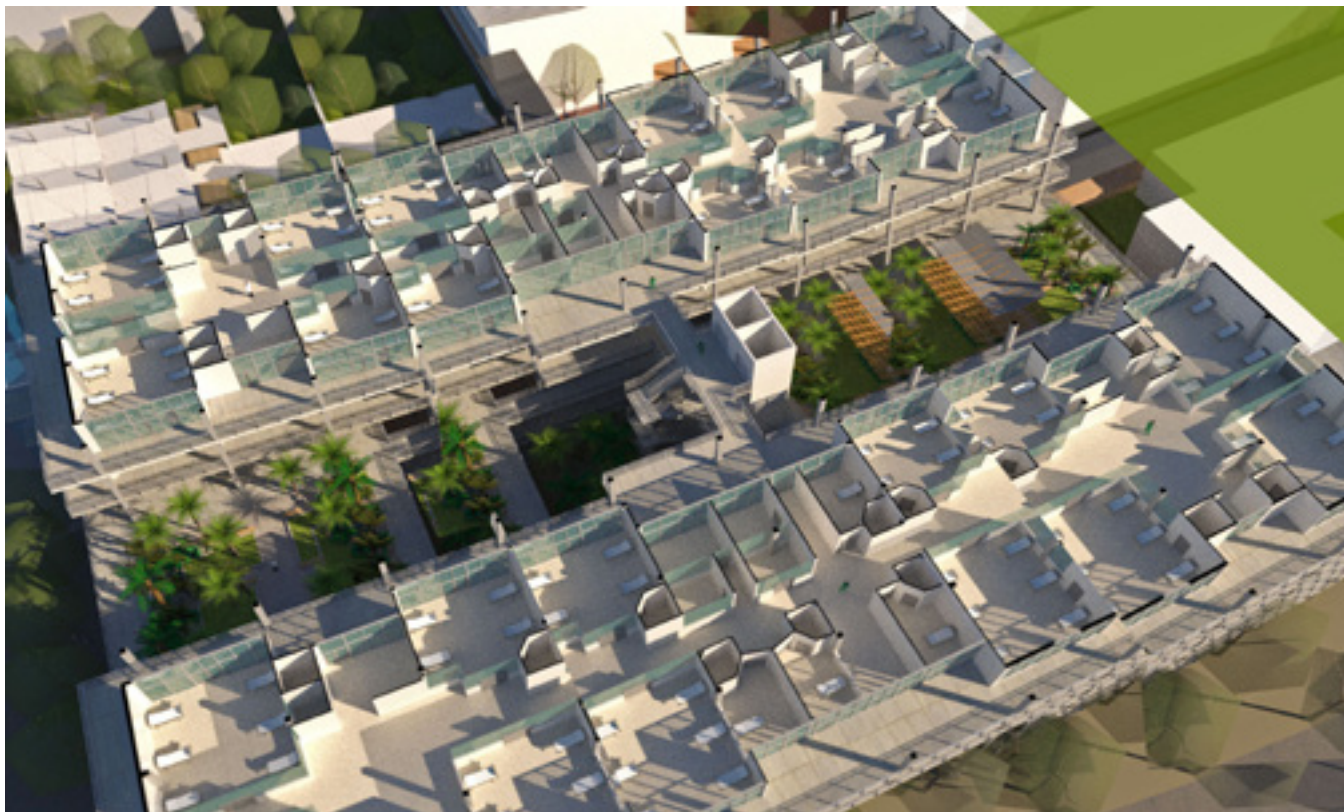


Artists impression NCCI. Imagery by HASSELL.

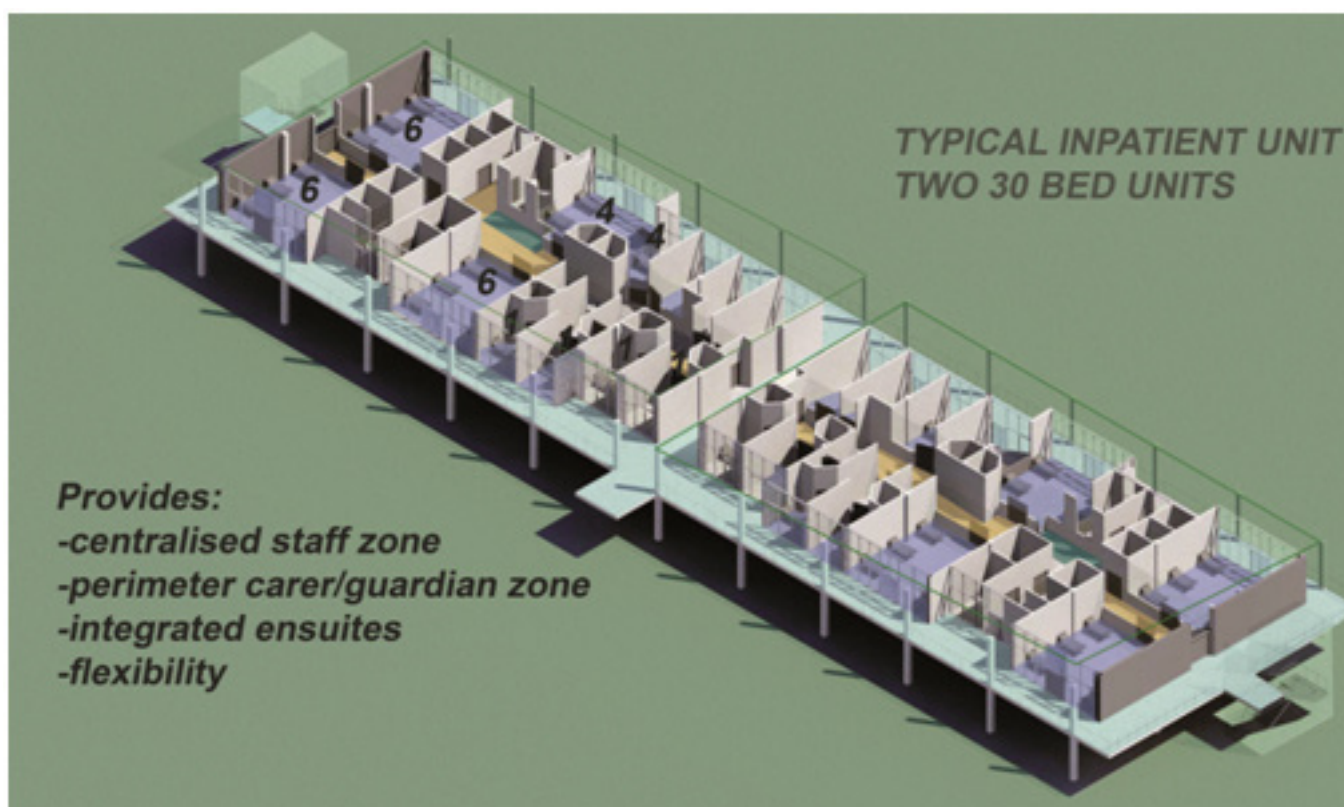
## 09 Brief outline of the Program



## 09 Brief outline of the Program



New wards - concept visual- 60 beds. Imagery by HASSELL.



Typical Inpatient Unit. Imagery by HASSELL.



## Project Staging Strategy

Key to the project redevelopment is the following strategy:

- The site relocation plan highlights buildings:

- [illegible]

\_\_\_\_\_



ANGAU Site Relocation. Imagery by HASSELL.



ANGAU Option2.1 Cost Stages/Site. Imagery by HASSELL.

Acute Hospital Phases	Site Preparation	Facility	Site works & External Services	Nett Construction Costs	Cost of Construction	Project Cost 2014	Escalation	Project Cost 2020
A1 - Clinical Services Building	2,085,000	148,497,000	19,302,000	169,884,000	247,700,000	400,876,000	51,088,000	451,964,000
A2 - 180 Beds IPU's	916,000	44,125,000	6,210,000	51,251,000	74,063,000	99,824,000	12,722,000	112,546,000
A3 - Support Services	1,270,000	52,447,000	7,205,000	60,922,000	88,038,000	126,136,000	16,075,000	142,211,000
A4 - 120 Beds IPU's	591,000	28,753,000	4,363,000	33,707,000	48,711,000	64,047,000	8,163,000	72,210,000

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## 11 Procurement Strategy

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### Procurement Strategy

A procurement approach for the preferred option recommends the following strategy:

- \_ Establishment of the a Project Governance and Communications strategy based on the Australian Government 2014 Commonwealth procurement rules. A strategy that provides a project team including Project Director, Deputy Project Director and Project manager with Project officers/ coordinators that are based in Lae for the duration of the project
- \_ Development of a preferred procurement strategy that enables the project design to progress from Master Plan to Schematic Design and then to Design Development in alignment with Australian Government procurement rules. An approach that could utilise the PNG Government's CSTB as Probity Advisors for the project
- \_ Developing and refining a preferred delivery strategy for the construction be developed based on the ability to provide a complex health care facility. Initial discussions have highlighted the benefits of a Construction Managed project approach with early contractor engagement during Design Development. Thus enabling buildability review, value engineering and Guarantee Maximum Price construction management contracting
- \_ Provide a clear scope definition to the project that establishes project standards and guidelines to ensure the best value for money and fit for purpose facility
- \_ The incorporation of a detailed Furniture, Fixtures and Fitting combined into the construction managed contract that requires a services contract and training and commissioning services to be provided as part of the capital purchase of each major medical equipment and engineering services



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## 12 Recommendation



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### Recommendation

The recommendation will be provided by the ANG AU Steering Committee to endorse the Facility Master Plan Strategy and request funding from the PNG Government and the Government of Australia to develop this strategy into reality for the people of the Morobe Province, Momase Region and PNG.

Given the operational nature of the hospital it is critical to ensure its services are maintained during the redevelopment. To this effect we recommend:

- \_ The continued completion of the Emergency works and the early development of relocations across the campus for improved operational services
- \_ The early development of the National Cancer Care Institute
- \_ The creation of a secure redevelopment site that is free of on-site infrastructure engineering services and health services facilities

The total value of the preferred redevelopment in 2020 is:

- \_ Capital Cost estimate of Kina 1,174,060,000, and
- \_ Recurrent Cost estimate of Kina 113,340,000 and provides
- \_ Provides 77,500 m2 gross floor area

The strategy provide:

- \_ Excellent future proofing with the ability for further expansion and adaption in the medium and long term
- \_ A facility that withstands major earthquakes and storms
- \_ A facility that aligns with the PNG national Standards
- \_ Provides a value for money proposition that can be phased over a number of years

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