

New Maitland Hospital Stage 1 (Concept Design and Early Works) Environmental Impact Statement

transport | community | mining | industrial | food & beverage | energy



Prepared for:

Date:

Revision:

Health Infrastructure

7 June 2018

Rev 2

Table of Contents

Glossary and Abbreviations	i
Statement of Authorship	iii
 Executive Summary	 4
1. Introduction	8
1.1 Proponent identification	8
1.2 Need for the Proposal	8
1.3 Site Selection and Identification	9
1.4 Approvals strategy	11
1.5 Offsite Works Approved Under Part 5	11
1.6 Planning Pathway	13
1.7 Proposal Objectives	13
1.8 Alternatives	13
1.9 EIS Structure	14
1.10 Secretary's Environmental Assessment Requirements	16
2. Site Analysis	24
2.1 Regional context	24
2.2 Site location	26
2.3 Land tenure and zoning	29
2.4 Surrounding land use	29
2.5 Historical land use	30
2.6 Site suitability	30
3. Proposal Description	35
3.1 Overview – Staged State Significant Infrastructure	35
3.2 Timing	36
3.3 Health Services Planning Principles	36
3.4 Key features	37
3.5 Design outcomes	37
3.6 Clinical Servicing Offering	39
3.7 Access and Parking	39
3.8 Outline Construction Methodology (Stage 1 Early Works)	40
4. Urban Design and Concept Built Form	48
4.1 Built Form	48
4.2 Landscaping and tree planting	53
4.3 Crime Prevention Through Environmental Design (CPTED)	55
4.4 Social considerations	56
5. Consultation	57
5.1 Overview	57
5.2 Identified Stakeholders	57
5.3 Government Agency Consultation	59
5.4 Maitland City Council	71
5.5 Aboriginal Consultation	73
5.6 Community Engagement	75
5.7 Media	83
5.8 Summary of Actions	83
5.9 Changes in Design	86
5.10 Ongoing Community Engagement	86
6. Planning Context and Regulatory Framework	87
6.1 Consistency with Strategic Planning Framework	87
6.2 Consistency with Regulatory Planning Framework	95
6.3 New South Wales Legislation	97

6.4	Summary of external approvals/licenses potentially required.....	105
6.5	Planning instruments and polices	105
6.6	Local Environment Plans	108
6.7	Approval pathway	111
7.	Environmental Risk Analysis.....	113
7.1	Objective	113
7.2	Methodology.....	113
7.3	Summary of environmental risk analysis outcomes	119
8.	Traffic and Transport.....	120
8.1	Introduction	120
8.2	Offsite works	120
8.3	Existing Environment	120
8.4	Impact Assessment	126
8.5	Mitigation Measures.....	137
8.6	Recommendations	137
8.7	Commitments	139
9.	Noise and Vibration.....	140
9.1	Introduction	140
9.2	Existing Environment	141
9.3	Noise Criteria	143
9.4	Impact Assessment	148
9.5	Mitigation Measures.....	155
10.	Biodiversity.....	157
10.1	Introduction	157
10.2	Existing Environment	159
10.3	Impact Assessment	164
10.4	Biodiversity Offsets	167
10.5	Mitigation Measures.....	168
11.	Aboriginal Heritage	170
11.1	Introduction	170
11.2	Existing Environment	172
11.3	Impact Assessment (Stage 1 Early Works and Concept Hospital)	176
11.4	Mitigation Measures.....	176
12.	Historic Heritage.....	177
12.1	Introduction	177
12.2	Existing Environment	178
12.3	Impact Assessment	178
12.4	Mitigation measures	179
13.	Soils and Geology	180
13.1	Introduction	180
13.2	Existing Environment	180
13.3	Impact Assessment	184
13.4	Mitigation Measures.....	186
14.	Contamination.....	187
14.1	Introduction	187
14.2	Existing Environment	187
14.3	Impact Assessment	190
14.4	Mitigation Measures.....	191
15.	Hydrology (Surface water, groundwater and flooding)	191
15.1	Introduction	191
15.2	Existing Environment	192
15.3	Impact Assessment	206
15.4	Mitigation Measures.....	214
16.	Bushfire	215

16.1	Introduction	215
16.2	Existing Environment	215
16.3	Impact Assessment	217
16.4	Mitigation Measures.....	220
17.	Visual Amenity.....	221
17.1	Introduction	221
17.2	Existing Environment	221
17.3	Impact Assessment	227
17.4	Mitigation Measures.....	230
18.	Air Quality.....	230
18.1	Introduction	230
18.2	Existing Environment	230
18.3	Impact Assessment	234
18.4	Mitigation Measures.....	235
19.	Waste	235
19.1	Policy Setting.....	235
19.2	Impact Assessment	236
19.3	Mitigation Measures.....	240
20.	Health and Safety	240
20.1	Introduction	240
20.2	Existing Environment	240
20.3	Impact Assessment	242
20.4	Mitigation Measures.....	244
21.	Socioeconomic, Land Use and Property.....	244
21.1	Introduction	244
21.2	Existing Environment	245
21.3	Impact Assessment	246
21.4	Mitigation Measures.....	248
22.	Climate Change and Sustainability.....	248
22.1	Existing Environment	248
22.2	Climate Change Predictions	249
22.3	Impact Assessment	250
22.4	Mitigation Measures.....	251
23.	Aviation	252
23.1	Introduction	252
23.2	Helicopter Frequency at NMH	252
23.3	Regulatory Framework.....	253
23.4	Flight Path Selection	253
23.5	Impacts.....	255
23.6	Mitigation Measures.....	255
24.	Cumulative Impacts.....	256
24.1	Introduction	256
24.2	Impacts Assessment.....	256
24.3	Mitigation Measures.....	259
25.	Consolidated Management and Mitigation Measures	260
25.1	Stage 1 Management and Mitigation Measures	260
25.2	Stage 2 Management Measures for Consideration	266
25.3	Health Infrastructure Project Commitments	268
26.	Conclusion	270
26.1	Justification for the development.....	270
26.2	Benefits of the proposal.....	270
26.3	Ecologically sustainable development	270
27.	References.....	272

List of figures

Figure 2-1	Locality Map (Note - the red line shows the NMH boundary)	25
Figure 2-2	Hunter New England Local Health District	26
Figure 2-3	The NMH Site	27
Figure 2-4	Site plan and surrounding land uses (Note - the red boundary is the NMH Site boundary) ..	28
Figure 2-5	Extract of the Land Zoning Map, NMH site outlined in red (Source: Maitland LEP 2011)	29
Figure 2-6	Local topography map	33
Figure 3-1	NMH Concept Plan	38
Figure 3-2	Project Influence Area for Stage 1 Early Works.....	41
Figure 3-3	Area of influence (building footprint).....	42
Figure 3-4	Indicative plan for Stage 1 storm water management and Site Environmental Controls.....	44
Figure 4-1	Indicative building massing	50
Figure 4-2	Proposed Vehicular Circulation	52
Figure 4-3	Landscape Zonal Plan	54
Figure 5-1	Map of residents and business located in close proximity to the NMH. The area within the red received a flyer.	58
Figure 5-2	Map of residents and businesses located in close proximity to the existing Maitland Hospital. The area within the yellow line received a flyer.	58
Figure 5-3	Graph of key concerns raised by the community through formal engagement (feedback forms). Other concerns include: helicopter noise, parking fee structure, access, a railway station for NMH and hospital ownership and operation (government owned and operators).	77
Figure 5-4	Graph of the percentage of formal engagement respondents from each location.....	78
Figure 6-1	Health precinct identified in the draft Greater Newcastle Metropolitan Plan (dGNMP), extract of figure 15 of the dGNMP (NB: the dashed yellow line is the approximate location of the site for the NMH). 90	
Figure 8-1	Context Plan showing existing local road network.....	121
Figure 8-2	Off-street parking supply.....	125
Figure 8-3	Proposed vehicular circulation	130
Figure 8-4	Pedestrian circulation.....	136
Figure 8-5	Proposed layout of Chelmsford Drive/ Metford Road roundabout	138
Figure 8-6	Proposed layout of Metford Road/ Raymond Terrace Road roundabout	139
Figure 9-1	Site map and locations of measurements and receivers (Source: Wood & Grieve Engineers NVIA Report 2018).....	142
Figure 9-2	Worst case construction noise emission contour map for earthworks, stabilisation and inground infrastructure works	150
Figure 9-3	Worst case operational noise emission contour map for External facade noise levels due to helicopter movements - North.....	154
Figure 10-1	Existing environment and Patch Size mapping (Figure 6 of the BAR, pitt&sherry 2018).....	160
Figure 10-2	Vegetation zones (Figure 7 of the BAR, pitt&sherry 2018)	161
Figure 10-3	Threatened fauna locations (Figure 8 of the BAR, pitt&sherry 2018).....	162
Figure 11-1	AHIMS search results showing 4 Aboriginal Heritage Sites within 1km of the NMH Site (Figure 4.1 of the ATR , Umwelt 2018)	173
Figure 11-2	Aboriginal Heritage Survey Units (Figure 5.1 of the ATR, Umwelt 2018).....	175
Figure 13-1	Soil landscapes of the site, (Note - the red line shows the site boundary, the solid line shows Lot 7314 and the dotted line showing the area of Part Lot 401, the dark green shading is the Beresfield soil landscape and the grey is the disturbed terrain landscape (Source: Douglas and Partners, 2018)).	181
Figure 15-1	Site drainage (GHD, 2018)	194
Figure 15-2	Drainage catchments (GHD, 2018)	195
Figure 15-3	Internal catchment map (Wood &Grieve, 2018).....	196
Figure 15-4	Hydraulic Categorisation for a PMF flood event, the green area represents the NMH site (Source: Hunter River Floodplain Risk Management Study and Plan, 2015)	198
Figure 15-5	Water monitoring locations	200
Figure 15-6	Groundwater Contours.....	204
Figure 15-7	Conceptual Groundwater model – Cross Section 1.....	209

Figure 15-8	Conceptual Groundwater model – Cross Section 2.....	210
Figure 15-9	Proposed water Quality Treatment Train – Catchment A and Catchment B	213
Figure 16-1	Bushfire prone land map	216
Figure 16-2	Asset Protection Zone (APZ) map.....	219
Figure 17-1	Proposed NMH – Assessed potential viewpoints (Fitzpatrick and Partners, 2017	223
Figure 17-2	Viewpoint 1 – Views from Metford Road located north of the Site, facing south-east (Fitzpatrick and Partners, 2018)	224
Figure 17-3	Viewpoint 2 – Views from Fieldsend Oval located to the west of the Site, facing west (Fitzpatrick and Partners, 2018)	224
Figure 17-4	Viewpoint 3 – Views from Metford Road looking at ambulance entry, facing north-east (Fitzpatrick and Partners, 2018)	225
Figure 17-5	Viewpoint 4 – Views from Metford Road, located on the south corner of the Site, facing north (Fitzpatrick and Partners, 2018)	225
Figure 17-6	Viewpoint 5 – Views from Tennyson Street, located on the southern border of the site, facing north (Fitzpatrick and Partners 2018)	226
Figure 17-7	Viewpoint 6 – Views from Stradbroke Avenue, located south of the site, facing north-west (Fitzpatrick and Partners, 2018)	226
Figure 18-1	Ambient air quality monitoring locations (Todoroski Air Sciences, 2017)	232
Figure 18-2	24-hour average PM10 concentrations.....	234
Figure 23-1	Helicopter zone siting in relation to the hospital	254

List of tables

Table 1-1	Structure of the EIS.....	14
Table 1-2	Summary table of SEARs and where they have been addressed in the EIS	16
Table 2-1	Metford Rehabilitation domain area and proposed works.....	31
Table 3-1	Construction milestones.....	36
Table 5-1	Summary of agency consultation through the development phase	60
Table 5-2	Key concerns raised by MCC during engagement	71
Table 5-3	Summary of Aboriginal Heritage Consultation undertaken	74
Table 5-4	Key issues raised during informal communication with community members during the drop-in session	78
Table 5-5	Summary of actions taken to date to address key issues raised during engagement	83
Table 6-1	Better Placed Guidelines in relation to NMH	93
Table 6-2	Objectives of the EP&A Act in relation to the NMH.....	97
Table 6-3	Summary of approvals or licences that may be required for the NMH	105
Table 6-4	Proposed Maitland Hospital development's relationship to Schedule 4, Part 5 of the State and Regional Development SEPP	106
Table 6-5	Relevant provisions of the Maitland LEP.....	109
Table 7-1	Risk Analysis Consequence Definitions.....	113
Table 7-2	Risk Analysis Likelihood Definitions.....	114
Table 7-3	Risk matrix	114
Table 7-4	Risk assessment – Stage 1 Concept hospital, site clearance and preparatory works	115
Table 8-1	SIDRA level of service (LoS) criteria	123
Table 8-2	Existing operating conditions (May 2017).....	124
Table 8-3	Off-street Parking	124
Table 8-4	Public transport routes within the vicinity of the Proposal.....	125
Table 8-5	Daily construction traffic volumes (worst case)	127
Table 8-6	Traffic generation estimates.....	129
Table 8-7	Comparison of 2032 operations with and without the development.....	131
Table 8-8	Mid-Block Level of Service Criteria (based on Guide to Traffic Generating Developments (RMS, 2002))	132
Table 8-9	Summary of Traffic Capacity – 2032 growth scenario.....	133
Table 8-10	Traffic Mitigation Table	137

Table 9-1	Attended Background Noise Monitoring Summary (Source: Wood & Grieve Engineers NVIA Report 2017)	141
Table 9-2	Unattended background noise monitoring – L1 to measure traffic noise from Metford Road (Source: Wood & Grieve Engineers NVIA Report 2017)	141
Table 9-3	Unattended background noise monitoring – L2 to measure background and ambient noise of the nearest sensitive residential receiver (R2) (Source: Wood & Grieve Engineers NVIA Report 2017)	143
Table 9-4	Unattended background vibration monitoring at location V1 (Source: Wood & Grieve Engineers NVIA Report 2017)	143
Table 9-5	Noise management levels at residential receivers (Source: Wood & Grieve Engineers NVIA Report 2017)	143
Table 9-6	OEI ICNG Construction Noise Criteria	145
Table 9-7	Intrusiveness criteria, amenity criteria for operational noise levels and Project Specific Noise Levels	145
Table 9-8	NSW Road Noise Policy – Traffic Noise Assessment Criteria	146
Table 9-9	Construction vibration criteria summary for continuous and impulsive vibration (m/s ²)	147
Table 9-10	Predicted noise levels at location – R2 (Residential), S1 (Active Recreation) and I1 (industrial Premises)	148
Table 9-11	Predicted noise levels from operational activities	151
Table 9-12	Predicted Increase in Traffic Noise Levels (AM/PM Peak hours)	152
Table 9-13	Sound Power Levels for Mechanical Plant and a helicopter	152
Table 9-14	Recommended acoustic performance of glazing system – Helicopter Noise	153
Table 9-15	Working Distances for Vibration Intensive Plant	155
Table 9-16	Noise and Vibration Mitigation Table	155
Table 10-1	Vegetation Zones	163
Table 10-2	EPBC Protected Matters Search Tool Results	164
Table 10-3	Direct vegetation/Habitat Loss	165
Table 10-4	Ecosystem Credit Requirements	167
Table 10-5	Species Credit Requirements	168
Table 10-6	Biodiversity Mitigation Table	169
Table 11-1	Site visit attendees	171
Table 11-2	Aboriginal Heritage Mitigation Table	176
Table 12-1	Historical Heritage Mitigation Measures	179
Table 13-1	Soil landscape features (Source: Douglas and Partners, 2018)	181
Table 13-2	Soil Erodibility Assessment (Source: Douglas and Partners, 2018)	183
Table 13-3	Results of Soil Combustibility Testing (Source: Douglas and Partners, 2018)	184
Table 13-4	Soils and Geology Mitigation Table	186
Table 14-1	Summary of previous soil contamination investigations, sampling locations are shown in Figure 2 of the GHD report (GHD, 2015, refer Appendix B)	188
Table 14-2	Contamination Mitigation table	191
Table 15-1	Pre-development discharge flows	196
Table 15-2	Surface water quality results	201
Table 15-3	Groundwater levels from 2017 monitoring event	203
Table 15-4	Building Drainage Stormwater Conveyance Flow Chart (Wood & Grieve 2017(2))	212
Table 15-5	Road and Carparking Drainage Stormwater Conveyance Flow Chart (Wood & Grieve 2017(2))	212
Table 15-6	Treatment Train Efficiencies	213
Table 15-7	Hydrology Mitigation Table	214
Table 16-1	Consideration of project specific bushfire risks	217
Table 16-2	Determination of APZ	218
Table 16-3	Bush fire Mitigation Table	220
Table 17-1	Visual impact assessment for viewpoints	228
Table 17-2	Visual Amenity Mitigation Measures	230
Table 18-1	Summary of PM ₁₀ levels from the NSW OEI monitoring sites (µg/m ³)	233
Table 18-2	Air Quality Mitigation Table	235

Table 19-1	Potential Waste Generated On-site during excavation, construction and operation.....	236
Table 19-2	Material reuse, recycling and disposal facilities which can be used to dispose of waste and recyclables during Stage 1 of the SSI application	238
Table 19-3	Waste Mitigation Measures	240
Table 20-1	Health and Safety Mitigation Measures	244
Table 21-1	Socioeconomic, Land Use and Property Mitigation Measures	248
Table 22-1	Monthly climate statistics summary – Paterson (TOCAL AWS).....	249
Table 22-2	Climate Change and Sustainability Mitigation Measures.....	252
Table 23-1	Aviation Mitigation Measures	256
Table 24-1	Proposed developments within proximity of the Proposal.....	256
Table 24-2	Cumulative Impacts Mitigation Measures.....	260
Table 25-1	Summary of Stage 1 management and mitigation measures	260
Table 25-2	Summary of Stage 2 Detailed Design considerations.....	266

Appendices

Appendix A:	SEARS
Appendix B:	Contamination Assessment - Phase 2 Environmental Site Assessment Report - Phase 2 Environmental Site Assessment Addendum Letter - Site Audit Statement
Appendix C:	Bush Fire Assessment Report
Appendix D:	Water Impact Assessment Reports - Storm Water Management Plan - Surface Water and Groundwater Assessment
Appendix E:	Biodiversity Impact Assessment Report - Biodiversity Assessment Report - Biodiversity Review
Appendix F:	Traffic Impact Assessment
Appendix G:	Draft Construction Management Plan (CMP)
Appendix H:	Infrastructure Management Plan
Appendix I:	Stage 1 Site Plan and Survey
Appendix J:	Heritage Assessment Report - Aboriginal Cultural Heritage Assessment - Historic Heritage Assessment
Appendix K:	Design Statement and Plans - Architectural Design Statement - EIS Stage 1 Drawing Set
Appendix L:	Community Consultation
Appendix M:	Noise and Vibration Assessment
Appendix N:	Geotechnical Report
Appendix O:	Air Quality Report
Appendix P:	Preliminary Aviation Report

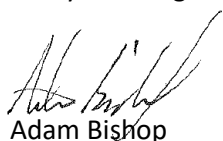
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Date: 15 May 2018

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Date: 15 May 2018

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Date: 15 May 2018

Malinda Facey

Revision History					
Rev No.	Description	Prepared by	Reviewed by	Authorised by	Date
A	Internal Draft	C. Lestrangle	A. Bishop	M. Facey	27/02/2018
B	WORKING DRAFT to client	C. Lestrangle	A. Bishop	M. Facey	15/03/2018
C	WORKING DRAFT to client	C. Lestrangle	A. Bishop	M. Facey	27/04/2018
0	Final Draft	C. Lestrangle	A. Bishop	M. Facey	9/05/2018
1	Final for adequacy review	C. Lestrangle	A. Bishop	M. Facey	15/05/2018
2	Final after adequacy review	C. Lestrangle	A. Bishop	M. Facey	7/06/2018

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Glossary and Abbreviations

AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset Protection Zone
AQMP	Air Quality Management Plan
ASS	Acid Sulphate Soils
BAL	Bushfire Attack Level
CEMP	Construction Environmental Management Plan
CIV	Capital Investment Value
CLM	Contaminated Land Management Act 1997
CNVG	Construction Noise and Vibration Guideline
DECC	Department of Environment and Climate Change
DEC	Department of Environment and Conservation
DoE	Department of Environment
DP	Deposit plan
DPI	Department of Primary Industries
DP&E	Department of Planning and Environment
EEC	Endangered Ecological Community
EIA	Environmental impact assessment
EIS	Environmental impact statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> . Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
EPA	Environment Protection Authority
ERSED	Erosion and Sediment
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Heritage Act	<i>Heritage Act 1977</i>
HI	Health Infrastructure
HNELHD	Hunter New England Local Health District
ICNG	Interim Construction Noise Guideline
INP	Industrial Noise Policy
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local Government Area
LOS	Line of Sight
MNES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
NCG	Noise Criteria Guideline
NLOS	No Line of Sight
NMH	New Maitland Hospital
NNIR	Noticeable Noise Impact Radius

Noxious Weeds Act	<i>Noxious Weeds Act 1993</i>
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NVMP	Noise and Vibration Management Plan
OEH	Office of Environment and Heritage (formerly DECCW)
OEMP	Operational Environmental Management Plan
OOHW	Out of Hours Work
PASS	Potential Acid Sulphate Soils
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RBL	Rating Background Level
REF	Review of Environmental Factors
RFS	Rural Fire Service
Roads and Maritime	NSW Roads and Maritime Services
RNP	Road Noise Policy
RTA	Roads and Traffic Authority
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SHR	State Heritage Register
SSI	State Significant Infrastructure
SSIA	State Significant Infrastructure Application
SWMP	Soil and Water Management Plan
TMP	Traffic Management Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i>
VIA	Visual Impact Assessment
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
WMP	Waste Management Plan

Statement of Authorship

Submission of Environmental Impact Statement (EIS)

EIS prepared by:

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Qualifications: Bachelor of Environmental Science (BEnv Sc, Hons)
Certified Professional in Erosion and Sediment Control (CPESC)

Company: Pitt & Sherry (Operations) Pty Ltd (**pitt&sherry**)

Address: Level 1, 81-85 Hunter Street, Newcastle NSW 2300

Development Application:

Proponent Name: Health Infrastructure

Proponent Address: 14/77 Pacific Hwy, North Sydney NSW 2060

Land to be Developed: Lot 7314 in DP 1162607, Metford
Maitland Local Government Area

Development Description: New Maitland Hospital (NMH) Stage 1 (Concept Design and Early Works)

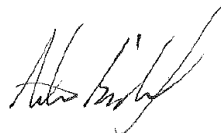
Declaration:

I declare that:

- The statement has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.
- The statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates.
- That the information contained in this statement is neither false or misleading.

Name: Pitt & Sherry (Operations) Pty Ltd

Signature:



Adam Bishop

Date: 7 June 2018

Executive Summary

This Environmental Impact Statement (EIS) has been prepared by **pitt&sherry** on behalf of Health Infrastructure (HI) to identify and assess the environmental issues associated with the New Maitland Hospital Stage 1 (Concept Design and Early Works) works and operation of a concept hospital (the 'Proposal').

The proposed New Maitland Hospital (NMH) is designated as State Significant Infrastructure (SSI) through Schedule 4 of the *State Environmental Planning Policy (State and Regional Development) 2011* (S&RD SEPP). The EIS has been prepared in accordance with Part 5 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) to support a Development Application (DA) for the Proposal.

HI has determined to proceed with a staged infrastructure application for the NMH under Section 5.20 (1) of the EP&A Act as follows:

- Stage 1: Concept plan, site clearance and related preparatory works
- Stage 2: Detailed design, construction and operation of the hospital

This EIS has been prepared pursuant to the reissued Secretary's Environmental Assessment Requirements (SEARs) for the Proposal issued by the Department of Planning and Environment (DP&E) on 21 March 2018. A copy of the SEARs is included in **Appendix A**.

The Proposal will be located on Metford Road on Lot 7314 in DP 1162607 and Part Lot 401 DP 755237 (The 'Site') within the south-western portion of land known locally as the 'Metford Triangle'. Lot 7314 has been acquired by the Health Administration Corporation (HAC) for the purpose of this development. The Site is zoned as Rural Landscape (RU2) under the Maitland Local Environmental Plan (LEP) 2011.

The Metford Triangle was the old brickworks and quarry formally leased and operated by CSR. The surrounding land includes a mixture of residential, commercial uses, light industrial uses and public recreation areas. Additionally, community and rural lands are located north of the site beyond the Great Northern Rail Line and Raymond Terrace Road. Within the Metford Triangle part of Lot 401, DP 755237 and part of Lot 3, DP1091727 (located to the north of the site) and Lot 266, DP755237 (located to the east) consist of cleared and disturbed land due to former use as a brickworks facility.

The NMH concept design includes a building of up to eight storeys and a separate two storey hospital wing to the south. The NMH will include a helipad to cater for emergency patient transport as well as carparking facilities. The development will act as a rural referral hospital for the Hunter New England region and will offer a wide range of health services to accommodate the growing local population.

The key benefit of the Proposal is the provision of a contemporary health care facility that will meet the needs of the regional and local community well into the future. At present the existing Maitland Hospital facility cannot support the growth and change in the type of services needed to provide contemporary health care due to:

- A growing and ageing population in the Hunter Valley
- The existing Maitland Hospital is already operating at 97% capacity, well beyond the state benchmark of 85%
- An increase in the number of residents living with chronic disease
- A number of issues with the existing Maitland Hospital relating to age, asset condition, compliance with current facility guidelines and ability to meet contemporary service delivery and models of care

The Proposal will also provide socio-economic benefits as the NMH is likely to have up to 1,000 full time equivalent employees and generate up to 1,250 jobs over the construction stage. Additionally, it will give the

land from the disused quarry to an essential public purpose and facilitate the growth and support of a skilled, competent and capable health related workforce in the Region.

Importantly, this proposal strongly aligns with Commonwealth, NSW, and NSW Health strategic objectives for the provision of improved health services to the local and regional community. This EIS has considered the relevant urban design principals.

This EIS describes the key environmental risks related to the Proposal and provides a comprehensive assessment of these risks. The key potential environmental impacts have been identified through assessment of the Proposal scope, review of the SEARs issued by DP&E, and consultation with relevant stakeholders and the community.

An environmental risk assessment was undertaken as part of this EIS which identified key environmental risks of the Proposal, these being:

- Traffic
- Biodiversity
- Visual
- Noise
- Bush fire

A number of potential environmental impacts from the Proposal have been avoided or reduced during concept development and options assessment, including avoiding the need for greater excavation, vegetation removal and amenity impacts to residents located south of the site.

Features of the Proposal that mitigate key environmental risks include:

- Suitability of Site
 - The land within the proposal influence area is largely cleared of native vegetation due to previous brickworks activities
 - The land is relatively flat with few elevated viewpoints to view the Proposal.
- Ability to implement buffer/setback distances including
 - The setbacks from the building footprint to the closest residential receivers is approximately 100m, this generous setback distance minimises potential adverse impacts on the visual, acoustic and solar amenity of surrounding properties
 - The setbacks from the building footprint to the Metford Road reserve boundary is approximately 70m, this setback minimises potential adverse impacts on the visual amenity of the area.
- Location of Proposal footprint within the site
 - The NMH is situated in the north-western portion of the site to minimise impacts to the remnant ironbark forest located within the south-western section of the Site. Sitting the NMH as far as possible from the forest minimises vegetation removal required to facilitate the asset protection zone (APZ) and minimises potential adverse impacts on the visual amenity of surrounding receivers.

The projects key environmental risks were identified and are summarised below:

Traffic

A traffic impact assessment (TIA) was conducted to assess parking and traffic impacts and recognised that as part of the construction of Stage 1 works there will be an increased number of heavy and light vehicle movements which will impact the local road network.

Based on the concept design the traffic assessment concluded that the NMH has sufficient planned parking capacity and will have an acceptable impact on the capacity of the surrounding road network. The TIA has recommended several intersection improvements to accommodate forecast growth due to the Green Hills Shopping Centre and planned residential developments at Thornton and Chisholm. However, these improvements will be required without any inclusion of traffic associated with the NMH.

Biodiversity

A biodiversity assessment was undertaken by flora and fauna specialists to assess the impacts of the development on biodiversity. The project footprint has been largely cleared due to its former land use, but it is recognised that there will be some land clearing and tree thinning for the APZ.

The proposal will result in the loss of some native vegetation (Lower Hunter Spotted Gum Ironbark Forest) and fauna habitats. Four threatened fauna species were considered to have the potential to occur within the site. All four species are wide ranging and would be unlikely to be exclusively reliant on the habitat within the site for their life cycle requirements. The proposal would result in a small loss of potential foraging habitat for these four taxa. No threatened ecological communities (TEC) were recorded within the site.

Visual Impact

The proposal would be visible to six potentially affected public viewpoints which includes passing traffic along Metford Road, however the visual impact assessment (VIA) concluded that no viewpoints had a high impact and only two had a moderate impact. Visual impacts of the NMH are mitigated by a lack of elevated viewpoints and visual screening provided by the remnant native forest along the southern boundary.

Noise Impact

Construction activities associated with Stage 1 Early Works would result in a short-term increase in localised noise levels, particularly for residences and other sensitive receivers located close to the site. However, it is anticipated that construction will take place during standard construction hours.

Operational activities would result in a permanent increase in localised noise levels, particularly for residences and other sensitive receivers located close to the site. Increase in traffic and loading dock activities would not have a significant impact on the noise environment of the area however predicted noise levels for operational mechanical plant exceed highly noise affected levels and helicopter activities are also expected to cause noise impacts to nearby receivers. These aspects will need to be considered and mitigated during Stage 2 detailed design.

Bushfire

A Bushfire Impact Assessment (BIA) was undertaken by to investigate the potential construction and operational bushfire hazards of the Proposal and how these risks could be suitably reduced and managed. The land is located on bushfire prone land and contains bushfire hazards such as fuel from the surrounding vegetation and downslopes to the west and east of the southern building which could affect fire behaviour.

The BIA recommended several bushfire protection measures recommended, including a 70m APZ, and concluded that the measures specified would provide an adequate standard of bushfire protection for the NMH.

Lower risk issues including soils, contamination, waste generation, hazards, and cumulative impacts have also been addressed in this EIS.

The EIS identifies appropriate mitigation measures to control the environmental impacts of the proposed development during both Stage 1 early works and Stage 2 detailed design and construction of the NMH. As part of the environmental impact assessment, specialist technical consultants have been engaged and consulted with to identify any risks and suggest suitable mitigation measures to be implemented to minimise environmental impacts of the proposal. These mitigation measures are summarised in Section 25 of this EIS.

The environmental impact assessment that was undertaken concludes that whilst the Proposal would have some impacts on traffic, noise, visual, heritage and biodiversity these impacts are either not significant and can be reduced to an acceptable level with the implementation of the mitigation measures identified in Chapter 25 or can be appropriately managed through design.

Overall the Proposal would provide significant social benefit to the region and on balance the proposal is considered justified.

1. Introduction

This Environmental Impact Statement (EIS) for the New Maitland Hospital (NMH) has been prepared by **pitt&sherry** on behalf of Health Infrastructure (HI) (the “Proponent”) to support a State Significant Infrastructure Application (SSIA) for the proposal under Division 5.2 of the EP&A Act.

HI proposes to deliver a multi-storey Hospital (the “Proposal”) on Lot 7314 in DP 1162607 and Part Lot 401 DP 755237 (the “Site”) located on the eastern side of Metford Road near East Maitland (refer to Figure 2-1). The proposal is located within the Maitland City Council Local Government Area (LGA).

1.1 Proponent identification

HI manages Australia’s largest portfolio of Health capital works projects. HI assists the government to meet New South Wales’ health needs by managing the planning, design and delivery of HI capital works in order to deliver world-class infrastructure and healthcare services to the people of New South Wales.

1.2 Need for the Proposal

The existing Maitland Hospital is the rural referral hospital for the Hunter Valley and district hospital for greater Maitland residents. The Hospital has 184 acute beds and sub-acute beds and provides medical, surgical, obstetric and emergency department services at Level 3/4 Role Delineation (in accordance with *New South Wales Health, Guide to Role Delineation of Health Services, Second Edition, 2016*).

The NSW health system is facing considerable challenges to meet growing demand driven by an increasing population, ageing population, lifestyle diseases and new care technologies. The current Maitland Hospital is already operating at 97% capacity and cannot support the growth and change in the type of services needed to provide contemporary health care to the Hunter Region or to meet the health demands driven by a growing and ageing population. As the population ages, the number of people with chronic conditions and co-morbidities is expected to rise and this will place a strong projected demand on Hunter New England health services.

The Hunter Valley Health Services Planning Project (HVSPP) was established to identify the future needs of the community, and benefits to the State. The HVSPP included broad consultation with clinicians and other stakeholder groups, and analysis of demand trends. The project delivered the Hunter Valley Clinical Services Plan 2013 (HVCSP) and reviewed infrastructure of current health facilities in the Hunter Valley. The major recommendation from the HVCSP was the need for the development of a new rural referral hospital on a greenfield site to replace the current Maitland Hospital (which has reached capacity with little or no scope for expansion).

The following key drivers illustrate why the NMH is in immediate service need:

- The population of the Hunter Valley is projected to increase by 13.8% to 227,280 by 2026. The age group 65 years and over is expected to experience the largest growth, increasing by 61% from 2011 to 2026, and as a proportion of the total population, this is an increase from 17% in 2011 to 18% by 2026
- The existing Maitland Hospital is the busiest facility in the Hunter Valley providing the majority of public health services required by residents. In 2011-12, it accounted for 49% of acute separations, 80% of live births, 51% of theatre attendances, 45% of ED presentations and 46% of subacute separations across the Hunter Valley. Maitland Hospital met 19% of the demand for inpatient services of Hunter Valley residents from 2008 – 2010, and then 20% from 2010 -2012
- The existing Maitland Hospital currently has 200 beds for acute and sub-acute patients. However, demand is increasing and by 2026/27 bed days are projected to be over 78,341 based on the current service configuration (excluding renal dialysis and chemotherapy)

- The current services are at capacity resulting in a high percentage of patients attending or being referred to hospitals in Newcastle or Sydney to meet demand. There are limited ambulatory care services to assist in reducing hospital admissions and length of stay
- The existing Maitland Hospital buildings were assessed in 2013 as unable to provide contemporary models of care and are not easily adapted for re-use. The overall condition of the buildings, while safe and operational, was considered to be of fair or poor condition. In addition, the hospital has limited opportunity for footprint expansion due to constraints including identified heritage items.

Given the above, there is a clear and urgent need to provide Hunter New England Local Health District (HNELHD) with the capability and capacity to better meet the healthcare needs of the Lower Hunter community, to address future demand for services from a growing and ageing population and to better provide services closer to home.

The Proposal will result in the following benefits for the State and the Region:

- Contribute to the fulfilment of the objectives for employment and health services in the State, Regional and Local Plans and Strategies
- Enable the appropriate reuse of a disused quarry and brickworks for an 'essential public purpose'
- Facilitate improved health access and equity outcomes for a NSW regional community
- Assist in closing the gap between Aboriginal and non-Aboriginal Health outcomes. It has been identified by the Hunter New England Local Health District that opportunities to improve the health outcomes and health experience of Aboriginal people are being missed at the Maitland Hospital current site, due to the limited ability to provide culturally appropriate environments and services. The NMH will provide opportunities for co-location of Aboriginal health services and will align with the HNELHD Aboriginal Cultural Audit Tools as the minimum standard for culturally safe and welcoming health services
- Facilitate the growth and support of a skilled, competent and capable health related workforce in the Region
- Contribute to better realignment and integration of health service delivery across the Region through appropriate referral of patient flows and improved networking of services
- Improve patient centred integrated care
- Facilitate the delivery of best practice care models and clinical design to achieve better health outcomes, reduce length of stay and unplanned admissions
- Provide wider economic benefits for Maitland and the surrounding area in terms of attracting new potential business and jobs to the area
- Enable the establishment of stronger service integration across government and nongovernment health providers to increase sustainability and reduce duplication.

1.3 Site Selection and Identification

The site was selected following a comprehensive site selection process and based on the findings of the research carried out during the preparation of the Hunter Valley Clinical Services Plan 2013. The site consists of two separate lots – Lot 7314 in DP 1162607 and Part Lot 401 in DP 755237 (refer Figure 2-3).

The site formed part of the old CSR brickworks and quarry known locally as the Metford Triangle.

Land was sought through the Expression of Interest (EOI) from within a preferred zone which stretched from Ashtonfield to East Branxton and Lorn to Heddon Greta. The initial EOI phase identified more than 35 sites available for a new hospital. Each of the identified sites were assessed against a list of 50 technical and non-technical selection criteria. Key criteria include:

- Accessibility to existing communications, transport links and support services

- Proximity to population centres and areas of population growth and density
- Travel time to other major public and private health facilities
- Access to a skilled and specialist health workforce
- Environmental and geotechnical factors
- Consideration of flood prone areas and the implications for access and operation during flooding
- Land characteristics such as slope, elevation and orientation
- Potential cost to develop, including connection to utilities
- Heritage and cultural aspects.

The assessment concluded that the site best meets the future needs of the rapidly growing Maitland community, and the broader Hunter region and in 2013 it was announced as the preferred Hospital location.

Within the Metford Triangle the preferred site was further refined to Lot 7314 and Part Lot 401. This was due to the need to achieve suitable buffer distances from the rail line (which presents a significant noise source and contributes to local air quality), suitable buffers from residential areas (to reduce noise impacts to residents from hospital operations) and to remain within an area of existing clearance and disturbance minimising the need for further clearing.

1.3.1 Previous assessments

Advitech (2013) Environmental Analysis

In 2013 Advitech was engaged to conduct an analysis of the environmental constraints and opportunities of two potential sites for the development of the Lower Hunter Hospital facility, both in Metford. As a result of this analysis the site was selected.

The site has the following benefits:

- The site is approximately 19.37 hectares and offers plenty of room for future growth and development of the hospital
- The site forms part of a larger area known as the Metford Triangle that could support other health care providers and future education facilities
- It is big enough to accommodate:
 - A helipad
 - A buffer zone for local residences
 - On-site parking facilities for short stay parking, public parking and staff parking
- It is close to existing transport infrastructure (Victoria Street and Metford train stations, New England Highway and other major link roads such as Metford Road and Raymond Terrace Road)
- The site is within 15 minutes of the New Hunter Expressway
- The site is serviced by existing utilities and infrastructure.

KMH Environmental (2014) Preliminary Environmental Appraisal

A Preliminary Environmental Appraisal (PEA) was prepared by KMH Environmental (KMH) in 2014. This report provided an analysis of key environmental aspects associated with the site and was informed by specialist preliminary investigations, the conclusions (at that time) are provided below:

- Air and noise emissions that were observed from the adjacent road and rail operations required building set-backs and design treatments to minimise adverse impacts on hospital operation

- Areas of relatively undisturbed native vegetation appeared to comprise of endangered ecological communities (EEC) that are protected under NSW legislation. The PEA stated that it was desirable to avoid clearing of these areas
- An Aboriginal object was identified onsite (a piece of heat shattered silcrete found within the southwestern part of the Project Area). The PEA stated that the object that will need to be protected and/or salvaged in accordance with obligations under NSW legislation and the requirements of OEH
- Drainage and storm water run-on within the central low-lying parts of the site presented constraints to future building and development, but also provided opportunities for retention and enhancement of these areas as part of the storm water management system
- Geotechnical conditions of the site were not well understood at the time of PEA completion and were subject to change as part of future mine rehabilitation. Opportunity existed to reuse significant areas of stockpiled fill to create engineered building platforms. The PEA stated that significant geotechnical challenges for building could result if the existing voids were subject to uncontrolled fill.

The preliminary environmental appraisal summarised the existing conditions, constraints and opportunities associated with development of a major hospital within the site and evaluated three environmental investigation zones being considered as part of Master Planning to assist in selecting the preferred location.

On the basis of these preliminary investigations and the range of individual environmental aspects considered, the existing cleared areas were assessed as providing the greatest opportunity for placement of the future hospital. As such Lot 7314 DP1162607 was purchased by NSW/HAC as the preferred site of the New Maitland Hospital.

1.4 Approvals strategy

Through the effect of Order No. 673, dated 28 November 2017, made under Section 5.12 (4) [previously 115U(4)] of the *Environmental Planning and Assessment Act 1979* (EP&A Act) an amendment was made to Schedule 4 of the *State Environmental Planning Policy (State and Regional Development) 2011* (S&RD SEPP).

The amendment included the New Maitland Hospital site (as defined on the State Significant Infrastructure Sites Map) and deemed any development on the site that has a capital investment value (CIV) of more than \$100 million for the purposes of a health services facility, to be State Significant Infrastructure (SSI). As the NMH meets these criteria (refer Section 6.5.1), it therefore falls under Part 5.2 of the EP&A Act.

HI is seeking approval for the NMH through a Staged Infrastructure Application in accordance with Section 5.20 of the EP&A Act. Refer to Section 6.7 for further details on the approval pathway.

A two-stage development is proposed and this EIS addresses Stage 1 of the Proposal – Concept Design and Early Works.

The Staged Infrastructure Application is described as follows:

- Stage 1: Seeks approval of a concept design, site clearance and preparatory works
- Stage 2: Seeks approval of the detailed design, construction and operation of the hospital.

A separate planning approval application and EIS will be prepared to assess impacts associated with Stage 2.

1.5 Offsite Works Approved Under Part 5

Separate to the subject Stage 1 SSI Application are a suite of offsite enabling works, are currently being completed along Metford Road.

The works include the construction of a roundabout at the Metford Road/Fieldsend Street intersection and preparation for with an entry into the NMH Site and provision and/or relocation of utilities and associated infrastructure. HI are coordinating these offsite enabling works in consultation with the various utility owners and Maitland City Council. The offsite works packages have been identified as being essential to support the NMH. The likely impacts of the offsite works have been assessed in the form of a Review of Environmental Factors, prepared in accordance with Part 5 of the EP&A Act and the provision of the *State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)*.

The offsite enabling works for the proposed New Maitland Hospital have been separated into two stages as described below.

1.5.1 Stage 1 Offsite Works

The Stage 1 Offsite works are limited to a Water Main upgrade on Fieldsend Street between Turton Street and Metford Road. These works have been assessed and included under an REF prepared by Maitland City Council for their separate works being undertaken on upgrading Fieldsend Street. The combining of these works delivered by Council offers efficiencies and allows coordination of the work required of Council and HI.

1.5.2 Stage 2 Offsite works

The Stage 2 offsite works comprise of external works associated with the provision of utilities and roadworks required to be completed to support the development. These works are being delivered outside of the SSI approval and have been assessed under Part 5 of the EP&A Act and the provisions of *State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)*.

Road Infrastructure Works

An assessment of Review of Environmental Factors (REF) was approved on 12 October 2017. The works include:

- Construction of a roundabout at the Metford Road/Fieldsend Street intersection on Metford Road including demolition of existing road infrastructure, services diversions and relocation of service pits
- Installation of a temporary serviced site compound to facilitate the works
- Installation of temporary services to the site compound from existing service lines
- Replacement and relocation of existing line markings, signage and street lighting
- Upgrade of existing drainage culvert under Metford Road and installation of upstream protection
- Selected removal of trees and vegetation to facilitate proposed works, access points and temporary site compound.

Gas Pipeline Works

An assessment of Review of Environmental Factors (REF) was approved on 5 April 2018. The works included:

- Installation of a new gas pipeline under the road reserve on the western side of Metford Road extending from Fieldsend Street to the immediate south of the Maitland City Council Depot.
- Termination and removal of the existing gas line.

Low Voltage Lighting Works

An assessment of Review of Environmental Factors (REF) was approved on 2 May 2018. The works include:

- Installing LV infrastructure with street lighting within the Metford Road reserve on the eastern side of the road extending from Fieldsend Street to the immediate south of the Maitland City Council Depot.
- Removal of additional roadside trees to facilitate the installation of LV lighting

1.6 Planning Pathway

Under Part 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act), the planning approvals process for State Significant Infrastructure includes the following key steps:

1. Submission of a State Significant Infrastructure Application (SSIA) with an accompanying Preliminary Environmental Appraisal (PEA) to the Secretary of the Department of Planning and Environment (DP&E) under Section 5.15 of the EP&A Act
2. The Secretary is to prepare the Secretary's environmental assessment requirements (SEARs) in respect of the infrastructure under Section 5.16 of the EP&A Act
3. Preparation and submission of an EIS under Section 5.16(2) of the EP&A Act, addressing the matters outlined in the SEARs
4. Preparation of a response to issues raised in submissions and Preferred Infrastructure Report to be submitted to the secretary, if required, under Section 5.17(6)
5. Assessment of the application by the DP&E and preparation of the Secretary's environmental assessment report (Section 5.18)
6. Determination of the proposal by the Minister for Planning or their delegate.

Currently this application is at the third step in the above process, i.e. EIS preparation. The EIS has been prepared in accordance with the reissued SEARs by DPE on 21 March 2018. Section 6.7 describes the approval pathway in greater detail.

1.7 Proposal Objectives

The primary objectives of the NMH include:

- Deliver the best quality health services and clinical outcomes to the community of the Maitland region and the wider Hunter New England Health District and NSW Health
- Develop a community recognised healthcare campus providing integrated health services that meets the community's health needs now and into the future
- Develop a facility that will enhance patient treatment, create a supportive work environment and a stress-free experience for visitors, staff and carers
- Create employment opportunities to grow and support a health-related workforce in the region
- Facilitate improved health access and equity outcomes for a NSW regional community
- Provide health care teaching, training, education and research.
- Provide high quality built environments which people connect with and which harness their pursuit of skills, knowledge, care and innovation.

1.8 Alternatives

1.8.1 Alternative locations

The site was selected after a comprehensive process based on the information provided by the Hunter Valley Clinical Services Plan 2013. Land was sought through the Expression of Interest (EOI) which identified more than 35 sites available for a new hospital. Each of the identified sites were assessed against a list of 50 technical and non-technical selection criteria (refer to Section 1.3).

The site was selected as the location of the proposed new hospital as it best satisfied the evaluation criteria. The development will:

- Provide both the rural referral hospital for the Hunter Valley and the major district hospital for local residents of the Lower Hunter and bordering residents of Newcastle, Lake Macquarie and Port Stephens LGAs
- Facilitate enhanced service provision closer to home
- Enable the co-location of East Maitland community health services and align closely to in-reach and outreach programs to improve the patient journey; enable the development of models of care in conjunction with other partners such as Hunter Medicare Local, Aboriginal health services and other health and non-health providers to improve the health of the community and manage chronic disease in the home and community.

1.8.2 Redevelopment of existing hospital

The existing hospital in Maitland has reached capacity with little or no scope for expansion development. The existing Maitland Hospital buildings were assessed in 2013 as unable to provide contemporary models of care and are not easily adapted for re-use. The overall condition of the buildings, while safe and operational, were considered to be of fair or poor condition. In addition, the hospital has a limited footprint with identified heritage items nearby. The option of redeveloping the existing Maitland Hospital was rejected as unviable.

1.9 EIS Structure

The structure of the EIS is present in Table 1-1.

Table 1-1 Structure of the EIS

Chapter	Chapter Name	Content
Chapter 1	Introduction	Project background, information about the proponent, location, alternatives considered, need for the Proposal, planning pathway and environmental assessment requirements
Chapter 2	Site Analysis	Description of the Proposal site and surrounding area.
Chapter 3	Proposal Description	Detailed description of the Proposal.
Chapter 4	Urban Design and Concept Built Form	Detailed assessment of the design elements of the concept hospital.
Chapter 5	Consultation	Summary of consultation undertaken with Government agencies, stakeholders and the community.
Chapter 6	Planning Context and Regulatory Framework	Consideration of the relevant strategic and statutory provisions and planning pathway.
Chapter 7	Environmental Risk Analysis	Detailed assessment of the potential impacts of the Proposal for a range of key environmental aspects.
Chapter 8	Traffic and Transport	Detailed assessment of the potential impacts of the proposal for a range of key environmental impacts.
Chapter 9	Noise and Vibration	
Chapter 10	Biodiversity	
Chapter 11	Aboriginal Heritage	

Chapter	Chapter Name	Content
Chapter 12	Historic Heritage	
Chapter 13	Soils and Geology	
Chapter 14	Contamination	
Chapter 15	Hydrology (Surface water, groundwater and flooding)	
Chapter 16	Bushfire	
Chapter 17	Visual Amenity	
Chapter 18	Air Quality	
Chapter 19	Waste	
Chapter 20	Health and safety	
Chapter 21	Socioeconomic, Land Use and Property	
Chapter 22	Climate Change and Sustainability	
Chapter 23	Aviation	
Chapter 24	Cumulative Impacts	
Chapter 25	Consolidated Management and Mitigation Measures	Consolidated summary of recommended management and mitigation measures.
Chapter 26	Conclusion	Conclusion to the EIS including key findings.
References	References	References
Appendix A	Secretary's Environmental Assessment Requirements (SEARS)	Supporting documentation including the technical specialist reports.
Appendix B	Contamination Assessment - Phase 2 Environmental Site Assessment Report - Phase 2 Environmental Site Assessment Addendum Letter - Site Audit Statement	
Appendix C	Bush Fire Assessment Report	
Appendix D	Water Impact Assessment Reports - Storm Water Management Plan - Surface Water and Groundwater Assessment)	
Appendix E	Biodiversity Impact Assessment Report - Biodiversity Assessment Report - Biodiversity Review	
Appendix F	Traffic Impact Assessment	
Appendix G	Draft Construction Environmental Management Plan (CEMP)	
Appendix H	Infrastructure Management Plan	

Chapter	Chapter Name	Content
Appendix I	Concept Plan, Stage 1 Site Plan and Site Survey	
Appendix J	Heritage Reports - Aboriginal Cultural Heritage Assessment - Historic Heritage Assessment	
Appendix K	Design Statement and Plans - Architectural Design Statement - EIS Stage 1 Design Set	
Appendix L	Community Consultation	
Appendix M	Noise and Vibration Assessments	
Appendix N	Geotechnical Report	
Appendix O	Air Quality Report	
Appendix P	Preliminary Aviation Report	

1.10 Secretary's Environmental Assessment Requirements

The SEARs for this EIS were reissued on 21 March 2018, and a copy is provided in **Appendix A**. The SEARs reflect the staged development of the Proposal and this EIS has been prepared to address Stage 1, including:

- The concept hospital
- Site clearance and preparatory work (otherwise referred to as Stage 1 early works).

The SEARS identified key issues to be addressed within Stage 1 of the development application and also specifies that the EIS for the Proposal must include all the relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000* and HI must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups, special interest groups including Local Aboriginal Land Councils, and affected landowners.

The SEARs are provided in Table 1-2 which also identifies where the requirements are addressed in this EIS. The matters specified in relation to Stage 2 will be addressed in a separate EIS.

Table 1-2 Summary table of SEARs and where they have been addressed in the EIS

Assessment Requirement	Reference in EIS
General Requirements	
(EIS) must be prepared in accordance with and meet the minimum requirements of clauses 6 and 7 of Schedule 2 the <i>Environmental Planning and Assessment Regulation 2000</i> (the Regulation).	Statement of Authorship (page iii) Executive summary (page iv) EIS Section 1 - Introduction EIS Section 1.7 - Objectives

Assessment Requirement	Reference in EIS
	EIS Section 1.8 - Alternatives EIS Section 3 - Proposal Description EIS Section 6.3 - Summary of Approvals EIS Sections 7 to 24 - Environmental impacts EIS Section 25 - Summary of Mitigation Measures EIS Section 26 - Conclusion EIS Section 26.1 - Project justification EIS Section 26.3 - Ecologically sustainable development
Include an environmental risk assessment to identify the potential environmental impacts associated with the development. Where relevant, the assessment of the key issues below, and any other significant issues identified in the risk assessment, must include: - adequate baseline data - consideration of potential cumulative impacts due to other development in the vicinity (completed, underway or proposed) - measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment.	EIS Section 7 – Environmental Risk Assessment
Accompanied by a report from a qualified quantity surveyor providing: - a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the <i>Environmental Planning and Assessment Regulation 2000</i>) of the proposal, including details of all assumptions and components from which the CIV calculation is derived - an estimate of the jobs that will be created by the future development during the construction and operational phases of the development - certification that the information provided is accurate at the date of preparation.	Provided to DP&E separate to the EIS
Key Issues: Concept Proposal	
Statutory and Strategic Context	
Address the statutory provisions contained in all relevant environmental planning instruments, including: - State Environmental Planning Policy (State & Regional development) 2011; - State Environmental Planning Policy (Infrastructure) 2007; - State Environmental Planning Policy No 44 – Koala Habitat Protection; - State Environmental Planning Policy No. 55 – Remediation of Land;	EIS Section 6.5

Assessment Requirement	Reference in EIS
- State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007; and - Maitland Local Environmental Plan 2011.	
Permissibility: Detail the nature and extent of any prohibitions that apply to the development.	EIS Sections 6.2 to 6.7
Development Standards: Identify compliance with the development standards applying to the site and provide justification for any contravention of the development standards.	EIS Section 6.6
Policies	
Address the relevant planning provisions, goals and strategic planning objectives in the following: - NSW State and Premier Priorities; - Hunter Regional Plan 2036; - Draft Greater Newcastle Metropolitan Plan; - Draft Future Transport Strategy 2056 and supporting documents; - Draft Greater Newcastle Future Transport Plan; - Planning Guidelines for Walking and Cycling; - Healthy Urban Development Checklist, NSW Health; and - Better Placed – An integrated design policy for the built environment of NSW 2017.	EIS Section 6.1
Built Form and Urban Design	
Provide a building envelope study to provide justification for the proposed built form.	EIS Section 4.1 Appendix K
Establish appropriate design guidelines and development parameters within the context of the locality, including but not limited to: - site layout; - gross floor area; - building footprints; - height and massing/building envelopes; - site access; and - landscaping and tree planting.	EIS Section 4.1 and 4.2 Appendix K
Environmental Amenity	
Assess amenity impacts on surrounding locality, including solar access, acoustic impacts, visual privacy and view loss. A high level of environmental amenity for any surrounding residential land uses must be demonstrated.	EIS Sections 4, 9, 17 and 18
Staging	
Details regarding the staging of the proposed development.	EIS Section 4.1 and 3.1
Transport and Accessibility	
Transport and accessibility impact assessment, which details, but not limited to: accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development;	EIS Section 8.3 Appendix F

Assessment Requirement	Reference in EIS
an assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development;	EIS Section 8.3, 8.4.2, Appendix F
details of estimated total daily and peak hour (AM, PM and weekend) trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips;	EIS Section 8.4 Appendix F
the adequacy of public transport, pedestrian and bicycle networks and infrastructure to meet the likely future demand of the proposed development;	EIS Section 8.3, 8.4 Appendix F
the impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site and identify measures to integrate the development with the transport network;	EIS Section 8.4, 8.6 and 8.7 Appendix F
- an assessment of the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development during operational stages, including: - cumulative traffic impact of other proposed developments in the area; - use of the EMME model outputs for the area surrounding the hospital in any traffic modelling; - assessment of mid-block capacity using an approved microsimulation model; - assessment of, but not limited to, the following roads: The New England Highway; Chelmsford Drive; Metford Road; and Raymond Terrace Road.	EIS Section 8.3, 8.4.2, 24.2 Appendix F
- the impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity and for a 10-year horizon, and the need/associated funding for upgrading or road improvement works (if required), including but not limited to: - Raymond Terrace Road and Metford Road; - Metford Road, Fieldsend Street and the site access; - Metford Road and Chelmsford Drive; and - The New England Highway and Chelmsford Drive.	EIS Section 8.4.2 Appendix F
details of travel demand management measures to encourage sustainable travel choices and details of programs for implementation;	EIS Section 8.4.2 Appendix F
the proposed active transport access arrangements and connections to public transport services;	EIS Section 8.4.2 Appendix F
the proposed access arrangements, including car and bus pick-up/ drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones;	EIS Section 8.4.2, 8.5 EIS Figure 8-4 Appendix F
the proposed car and bicycle parking provision, which must take into consideration of the availability of public transport and the requirements of Council's relevant parking codes and Australian Standards;	EIS Section 8.4.2 Appendix F

Assessment Requirement	Reference in EIS
details of emergency vehicle access arrangements	EIS Section 8.4.2 EIS Figure 8-3 Appendix F
service vehicle access arrangements	EIS Section 8.4.2 EIS Figure 8-3
Transport and accessibility impact assessment, which details, but not limited to: → Relevant Policies and Guidelines: <i>Guide to Traffic Generating Developments (Roads and Maritime Services)</i> <i>EIS Guidelines – Road and Related Facilities (DoPI)</i> <i>Cycling Aspects of Austroads Guides</i> <i>NSW Planning Guidelines for Walking and Cycling</i> <i>Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development</i>	Appendix F EIS section 6.1.6 EIS section 8
Ecologically Sustainable Development (ESD)	
Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i>) will be incorporated in the design and ongoing operation phases of the development.	EIS Section 26.3
Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.	EIS Section 22.3 and 22.4
Biodiversity	
Biodiversity impacts related to the proposal are to be assessed and documented in accordance with the Framework for Biodiversity Assessment, unless otherwise agreed by OEH, by a person accredited in accordance with s32 of the <i>Biodiversity Conservation (Savings and Transitional) Regulation 2017</i>.	EIS Section 10 Appendix E
Aboriginal Heritage	
Identify, describe and document the Aboriginal Cultural Heritage values that exist across the site that will be affected by the development, which may include the need for surface survey and test excavation. The identified of Aboriginal Cultural Heritage values should be guided by the <i>Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECC, 2011)</i> and consultation with OEH Regional Officers.	EIS Section 11 Appendix J
Where Aboriginal Cultural Heritage values are identified, consultation with Aboriginal people must be undertaken and documented in accordance with the <i>Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)</i> . The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the EIS.	EIS Section 11 Appendix J
The EIS must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented in the EIS.	EIS Section 11.3 and 11.4 Appendix J
Contamination	
Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.	EIS Section 6.5.5, 13, 14, and 15.

Assessment Requirement	Reference in EIS
→ Relevant Policies and Guidelines: Managing Land Contamination: Planning Guidelines - SEPP 55 Remediation of Land (DUAP)	Appendix B and Appendix D
Utilities	
Prepare an Infrastructure Management Plan detailing the existing capacity and any augmentation requirements of the development for the provision of utilities, including wastewater management. The Plan shall also detail staging of any infrastructure works.	Appendix H
Contributions	
Address Council's Contribution Plan and/or details of any Voluntary Planning Agreement, which may be required to be amended because of the proposed development.	EIS Section 6.6.2
Drainage	
Provide a stormwater concept plan detailing how water quality and quantity impacts on drainage systems would be managed. → <i>Relevant Policies and Guidelines:</i> Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)	EIS Section 15 Appendix D
Flooding	
Assess flood risk on site and surrounding locality (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity.	EIS Section 15 Appendix D
Bushfire	
Prepare a bush fire hazard assessment that addresses the specifications and requirements for Special Fire Protection Purpose Development as detailed in <i>Planning for Bush Fire Protection 2006</i> .	EIS Section 16 Appendix C
Key Issue: Stage 1	
Transport and Accessibility	
Transport impact assessment, which details, but not limited to the following in relation to construction traffic: an assessment of cumulative impacts associated with other construction activities.	EIS Section 24
An assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity.	Appendix F EIS Section 8.4.2 Draft TMP in Appendix F
details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process.	EIS Section 3.2 and 3.8
details of anticipated peak hour and daily construction vehicle movements to and from the site.	EIS Section 8.4.1
details of access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle.	EIS Section 8.4.1
details of temporary cycling and pedestrian access during construction.	EIS Section 8.4.1
details of proposed construction vehicle access arrangements at all stages of construction.	EIS Section 8.4.1
how traffic and transport impacts during construction will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport impacts, including the preparation of a draft Construction Traffic Management Plan	EIS Section 8.5 Draft construction TMP in Appendix F

Assessment Requirement	Reference in EIS
(TMP) to demonstrate the proposed management of the impact (which must include vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures for all demolition/construction activities).	
Noise and Vibration	
Identify and provide a quantitative assessment of the main noise and vibration generating noise sources and activities during construction. Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land. → Relevant Policies and Guidelines: • <i>Interim Construction Noise Guideline (DECC)</i> • <i>Assessing Vibration: A Technical Guideline 2006.</i>	EIS Section 9 Appendix M
Waste	
Identify, quantify and classify the likely waste streams to be generated during construction and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones) for the site.	EIS Section 19
Sediment, Erosion and Dust Control	
Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles. → Relevant Policies and Guidelines: • <i>Managing Urban Stormwater – Soils & Construction Volume 1 2004 (Landcom)</i> • <i>Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA)</i> • <i>Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)</i>	EIS Section 13, 15 and 18 Appendix D and Appendix O
Construction Hours	
Identify proposed construction hours and provide details of the instances where it is expected that works will be required to be carried out outside the standard construction hours.	EIS Section 3.8.8
Plans and Documents	
The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the <i>Environmental Planning and Assessment Regulation 2000</i> . Provide these as part of the EIS rather than as separate documents.	EIS Figure 2-1, Figure 2-3 and Figure 3-1. EIS Section 3.8.7, 10 Appendix F, Appendix I, Appendix K
Building envelope drawings, including dimensions, MGA co-ordinates and RLS (Concept).	Appendix K
Site survey plan, showing existing levels, location and height of existing and adjacent structures/buildings.	Appendix I
Site analysis plan.	Appendix K
View analysis/photomontage (Concept).	EIS Section 17.3 Figure 4-1 Appendix K
Shadow Diagrams.	Appendix K

Assessment Requirement	Reference in EIS
Drawings identifying location of any Departure and Approach Procedures for helipads on the site.	EIS Section 23.2 Figure 23-1 Appendix K
Stormwater Concept Plan.	EIS Section 15 Appendix D
Sediment and Erosion Control Plan (Stage 1).	Appendix D
Landscape Plan, including identifying any trees to be removed and trees to be retained or transplanted (Concept and Stage 1).	Appendix K
Preliminary Construction Management Plan, inclusive of a Construction Traffic Management Plan (Stage 1).	Draft CMP (Appendix G) TMP (Appendix F)
Geotechnical and Structural Report.	Appendix N
Acid Sulphate Soils Management Plan (if required).	Not required
Arborist Report.	Vegetation and trees assessed in biodiversity assessment (Appendix E) would satisfy this requirement as would Appendix K which delineates areas to be retained and cleared.
Consultation	
During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups, special interest groups including local Aboriginal land councils and registered Aboriginal stakeholders and affected landowners. In particular, you must consult with: • Maitland City Council • Roads and Maritime Services • Department of Industry – Crown Lands. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	EIS Section 5 (will be completed for Stage 1 EIS submission as discussed between DPE / HI) Appendix L Aboriginal consultation is covered in EIS Section 11 Appendix J
References	
The assessment of the key issues listed above must consider relevant guidelines, policies, and plans as identified.	EIS Sections 8 to 24

2. Site Analysis

2.1 Regional context

The Hunter New England Local Health District (HNELHD) covers the Local government areas Cessnock, Dungog, Maitland, Muswellbrook, Singleton and Upper Hunter Shire. It encompasses a major metropolitan centre, regional communities and, with a small percentage of people located in remote communities. The NMH has been strategically located to service the Hunter and Maitland regions (refer Figure 2-1).

The majority of land surrounding the site is either residential, industrial, recreational or business development in nature.

Nearby watercourses include Two-mile creek located approximately 800m north of the site which is a tributary of Four-mile creek and the Hunter River. Two-mile creek forms part of a wetland within the East Maitland Common. Native vegetation in the local region is heavily fragmented by clearing for farmlands, roads, residential and industrial purposes.

The site has been selected for its strategic accessibility to existing transport links including major road networks and railway lines which service the region. The New England Highway is a State road running from Newcastle through the Hunter region and also links to the Pacific Motorway and Hunter Expressway. The Great Northern Railway is located to the north of the site. The Hunter line runs along this railway and connects Hamilton to Maitland and then the line divides to travel to either Scone or Dungog.

The ABS 2016 census recorded a statistical population of 77,305 people within the Maitland LGA. Maitland LGA has projected a population growth of 1.9% to 2021 and 0.6% in 2036 (DP&E, 2017). Population growth in the 65 and over category is forecast much higher at 15.8% in 2021 and 20.08% in 2036. The growth in the population as well as the growth in the aging population in the region is a key main driver for health services within the region.

The HNELHD provides a range of public health services to the Hunter, New England and Lower Mid North Coast regions (refer Figure 2-2).

The existing Maitland Hospital is the rural referral hospital for the Hunter Valley and district hospital for greater Maitland residents. The existing Hospital has 200 acute beds and sub-acute beds and provides medical, surgical, obstetric and emergency department services at Level 3/4 Role Delineation (in accordance with *New South Wales Health, Guide to Role Delineation of Health Services, Second Edition*, 2016).



Figure 2-1 Locality Map (Note - the red line shows the NMH boundary)



Figure 2-2 Hunter New England Local Health District

2.2 Site location

The NMH site is comprised of Lot 7314, DP 1162607 and Part Lot 401, DP 755237 and is a total of 19.37 hectares. The site adjoins Metford Road in Metford which is a suburb of Maitland in the lower Hunter Valley and is approximately 2 hours north of Sydney. The NMH is located approximately 5km south-east from the centre of Maitland.

The site forms part of a larger portion of land known locally as the Metford Triangle. The triangle had a total area of 42.27 hectares and includes the following land parcels (refer Figure 2-3):

- Lot 7314, DP 1162607 (approximately 17.34 hectares)
- Lot 401, DP 755237 (approximately 6.92 hectares)
- Lot 266, DP 755237 (approximately 16.60 hectares)
- Part Lot 3, DP 1091727 (approximately 1.41 hectares).

The land within the remainder of the Metford Triangle is Crown Land and is zoned RU2 Rural Landscape in accordance with the Maitland Local Environment Plan (LEP) 2011. The land proposed for the NMH building and ancillary works are on Lot 7314 (owned by the NSW HAC) and Part Lot 401 (Crown Land).

The site is generally comprised of mined, heavily modified or forested areas. The topography undulates and there are some benches and steep ridges from mining activities. Generally, the site slopes towards the east aside from a small section on the south western corner which falls west to Metford Road. The western boundary of the site varies from approximately RL12m at its lowest point to RL20m. The southern boundary varies from RL10.5m to RL25m.

The site is bounded by Metford Road to the west, Lot 401 to the north and the Great Northern rail line beyond Lot 401, Lot 266 to the east and by a high voltage electricity easement and residential subdivision to the south.





Figure 2-4 Site plan and surrounding land uses (Note - the red boundary is the NMH Site boundary)

2.3 Land tenure and zoning

The site is zoned Rural Landscape (RU2) under the Maitland Local Environmental Plan 2011. “Health Services Facilities” including hospitals, are prohibited in this zone. The declaration of the site as a SSI Site permits a development for the purposes of a health services facility that that has a capital investment value of more than \$100 million on land identified as being within the New Maitland Hospital Site (Lot 7314 DP1162607 and Part Lot 401 DP 755237). Section 5.22 (2) of the EP&A Act specifies that Part 3 and environmental planning instruments generally do not apply to SSI.

An extract of the land use zoning map applying to the site and surrounding land is provided at Figure 2-5.

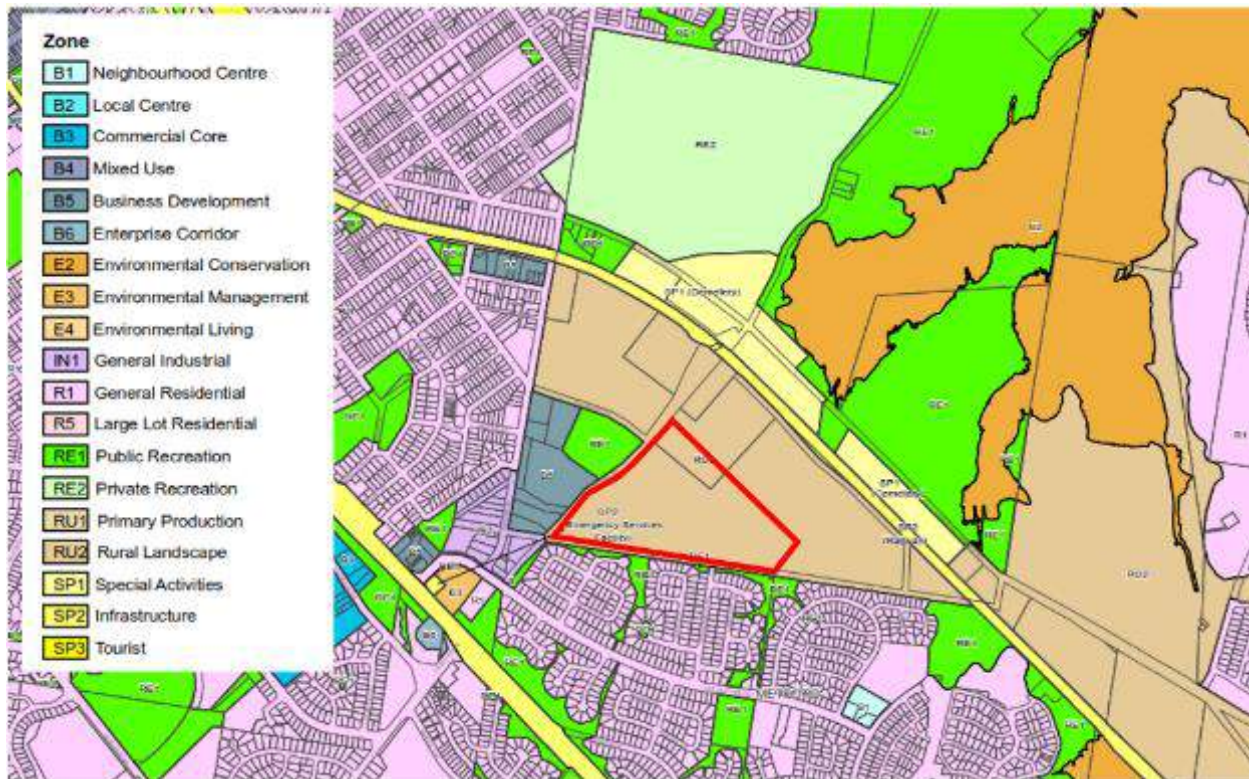


Figure 2-5 Extract of the Land Zoning Map, NMH site outlined in red (Source: Maitland LEP 2011)

2.4 Surrounding land use

The site is bounded by Metford Road to the west, Lot 401 and the Great Northern rail line to the north, Lot 266 to the east and a high voltage electricity easement and residential subdivision to the south.

Surrounding land to the west of the site is a mixture of commercial uses, light industrial uses and public recreation areas, including a sports-field. Beyond these areas, the land is residential. Community and rural lands are located north of the site including the East Maitland Cemetery which is located between the Great Northern Rail Line and Raymond Terrace Road and a model flying club. Surrounding land to the south of the site is primarily residential.

The land within the Metford Triangle (including the site) has been extensively cleared and/or disturbed as a result of former quarrying and brickworks on the land. Surrounding land uses are shown in Figure 2-4.

2.5 Historical land use

The site is located within the former brickworks operated by CSR. CSR currently holds mining leases over the three remaining lots of Crown owned land (Part Lot 401 DP 755237, Lot 266 DP755237, Part Lot 3 DP1091727).

CSR have ceased all clay mining, brick manufacturing and commercial operations on the Metford Triangle and are in the process of rehabilitating the area and relinquishing the above-mentioned mining leases pursuant to a Mine Closure Plan and Development Consent from Maitland Council.

Prior to the closure of CSR's operations, the Metford Triangle featured a quarry, process plant, office, amenities buildings, raw material stockpile areas, clay quarry pits (including Pit 2), sedimentation dams, settling ponds and water storage dams. The main brick processing area was located in the far northern corner (on Lot 401) and comprised brick presses, kilns and storage areas. CSR operations on Lot 7314 and Part Lot 401 included extraction of raw materials (sandstone, siltstone and clay) for brick making, and numerous product stockpiles and shallow open pits.

There are no longer any built structures on the Metford Triangle. Approval to demolish the existing factory buildings on Lot 401 was granted by Maitland City Council in 2012 (Development Consent DA 11-1875) and demolition works are completed. CSR are currently working with the NSW Government and other stakeholders to implement a mine closure plan and remedial action plan that seeks to restore the site to a stable, remediated condition. In this regard, Development Consent DA14-1214 was granted by Maitland City Council in August 2014 for earthworks, demolition and remediation of the site.

2.6 Site suitability

The land for the NMH was previously owned by the Crown however CSR held mining leases on this land. NSW/HAC have acquired Lot 7314 for the development of the NMH through compulsory acquisition. Under CSR's Mine Closure Plan (CMCP) there was a requirement to remediate and rehabilitate Lot 7314 prior to relinquishment of the mining leases on this Lot. This work has now been completed and both parties have established a Surrender Deed that contains certain obligations on CSR including management of any future unexpected contamination finds on Lot 7314.

The following works were completed by CSR to prepare the site for future development:

- Earthworks to achieve a final landform and minimise the amount of exposed clay surfaces, reduce the slopes on some surfaces, and improve drainage conditions on site
- Demolition of the sales office and remaining concrete slabs
- Remediation of land in accordance with the Remediation Action Plan (RAP).

A Site Audit Report and Site Audit Statement dated 29 January 2018 has been issued by JBS&G confirming Lot 7314 can be made suitable for the intend use. Refer to **Appendix B**.

2.6.1 Mine closure planning

Previously mining activities within the site included clay extraction and brick manufacture. These activities have ceased and CSR are in the process of completing their Mine Closure Activities across the Metford triangle to satisfy the Department of Planning & Environment, Division of Resources and Geoscience (DRG) and HI before relinquishing all mining leases.

The CSR Mine closure and domain plans have divided the Metford Triangle into several domains according to the type of environment and the remediation action required. The NMH site (i.e. Lot 7314 and Part Lot

401) contains domains A, C, D and G. Table 2-1 details the remediation actions undertaken on each of the domains.

The scope of CSR's Mine Closure Works includes remediation and rehabilitation of Lot 7314 and Part Lot 401 where the hospital is proposed to be located. CSR works have now been completed on Lot 7314 and the mining leases have been extinguished or are in the process of being extinguished as they apply to Lot 7314.

An Unexpected Finds (Waste) protocol is required to be put in place to deal with contamination "future finds" as required under CSR's Mine Closure Plan.

Table 2-1 Metford Rehabilitation domain area and proposed works

Rehabilitation Domain areas	Environment	Remediation Action
Domain A	Disturbed floor and stockpiles	Fill in low lying areas with stockpile materials, shape to self-drain and apply grasses.
Domain C	Natural steep face with good vegetation.	Risk assess to potentially leave.
Domain D	Vegetated bund wall atop steep natural slope.	Use existing stockpiles, batter face to 3:1, apply grasses.
Domain G	Mixed revegetated land and shallow water bodies.	Build access tracks for potential pedestrian use.

2.6.2 Site Remediation

In 2014 a Remediation Action Plan (RAP) was prepared for the former CSR Brickworks site for the whole of the Metford Triangle to address contamination from historical land uses. The Contaminants of concern on the site were Polycyclic Aromatic Hydrocarbons (PAHs) including Benzo a Pyrene (BaP) and B(a)P TEQ, Total Petroleum Hydrocarbons (TPH) and Asbestos.

On HAC owned Lot 7314 CSR has implemented the RAP to ensure that the site is stable, safe and meet the requirements of the CMOP. The material has been excavated, sorted and remediated according to the following strategy in the RAP, which involved use of a number of techniques in order of preference:

- On-site treatment of the contamination so that it was destroyed, or the associated risk was reduced to an acceptable level
- Off-site treatment of excavated soil, so that the contamination was destroyed, or the associated risk was reduced to an acceptable level, after which soil is returned to the site
- Consolidation and isolation of the soil on site by containment with a properly designed barrier
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material
- Where the assessment indicated, remediation would have no net environmental benefit or would have a net adverse environmental effect, an appropriate management strategy was implemented
- Re-Use onsite and/or disposal, which involved excavation, sorting, re-use (if possible) and off-site disposal to a licensed waste disposal facility.

There was also an option to leave contaminated material in-situ providing there was no immediate danger to the environment or community and the site has appropriate management controls in place.

A Site Audit Report and Site Audit Statement dated 29 January 2018 has been issued by JBS&G confirming Lot 7314 can be made suitable for the intended use. Refer to **Appendix B**. A validation assessment will be undertaken post completion of the Stage 1 bulk earthworks and a certificate issued.

HI have undertaken extensive due diligence on the site prior to and following acquisition from Crown Lands. A Site Audit Statement (SAS) has been provided for the site (refer **Appendix B**). The site audit report determined that site assessment activities undertaken by GHD and proposed remediation and validation works are considered to have met the requirements of the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC, 2006) and that the remediation approach was found to be technically feasible, environmentally justifiable and consistent with relevant laws, policies and guidelines.

Contamination is further discussed in Section 14.

2.6.3 Topography

A full suite of site topography and supporting underground services surveys have been undertaken for the site and surrounding areas (refer Figure 2-6). This information has been used to inform the preliminary design stages of the project.

The site is generally comprised of mined, heavily modified or forested areas. The topography undulates and there are benches and steep ridges from mining activities. Generally, the site slopes towards the east aside from a section on the south western corner which falls west to Metford Road. The western boundary of the site varies from approximately RL12m at its lowest point to RL20m. The southern boundary varies from RL10.5m to RL25m.

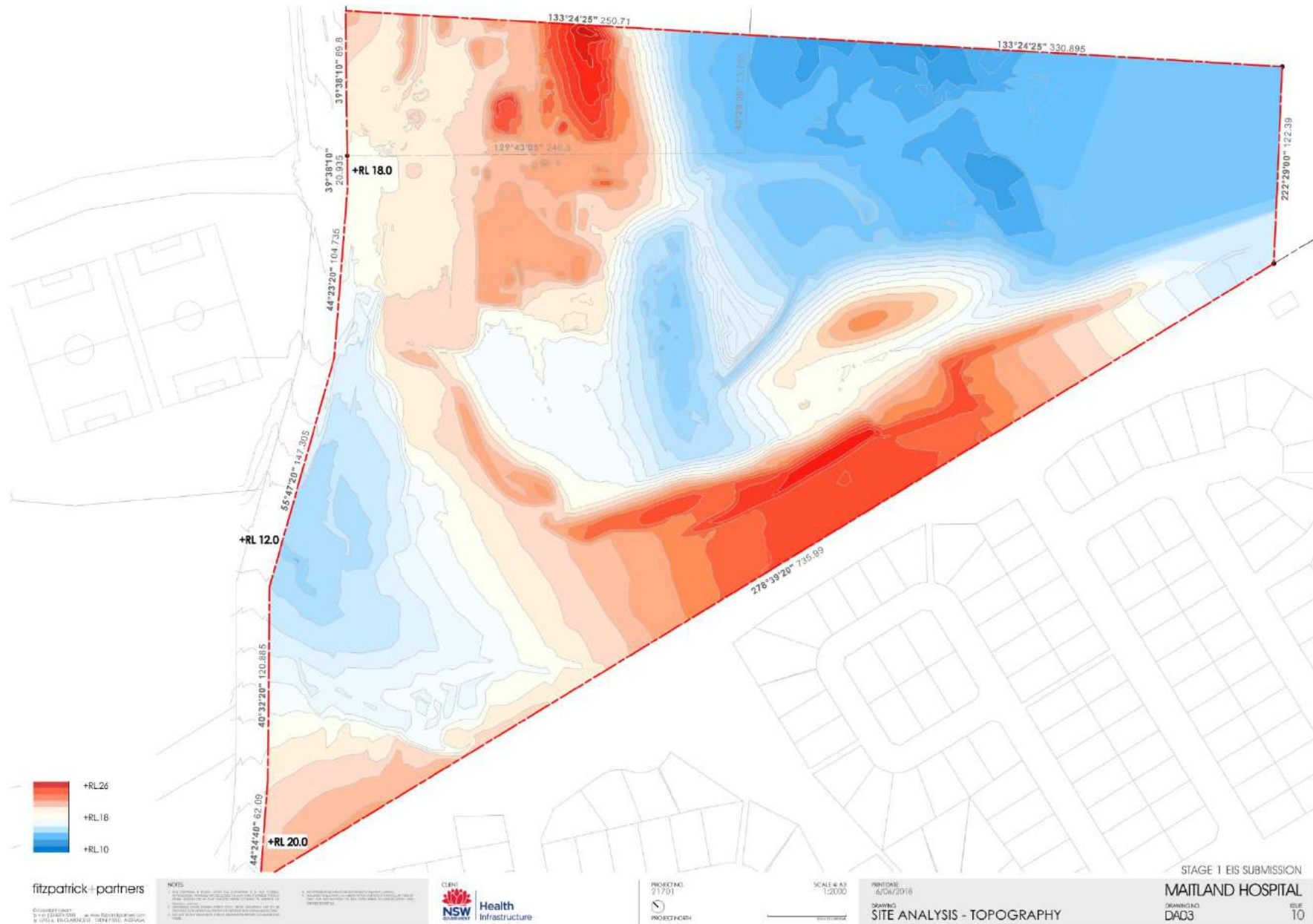


Figure 2-6 Local topography map

2.6.4 Bushfire

The Maitland City Council Bush Fire Prone Land Map identifies that the majority of the site is either bush fire prone land Vegetation Category 1 or is a bushfire vegetation buffer area. Accordingly, any future development must provide the required setbacks in accordance with the *RFS Planning for Bush Fire Protection 2006* (PBP 2006). A Bushfire Assessment Report has been prepared by Eco Logical (refer to **Appendix C**). The recommendations of the bushfire assessment include the provision of Asset Protection Zones, adequate access, water supply for firefighting, the safe installation of utilities, and building construction standards as required by PBP 2006. The results of this assessment are further discussed in Section 16.

2.6.5 Flooding

Many of the surrounding areas are within a flood risk zone. A Flood Impact Assessment has been prepared by Wood & Grieve Engineers (Wood & Grieve) as part of their Storm-water Management Plan (refer to **Appendix D**) which is summarised in Section 15 of this EIS. Flood mapping completed as part of the Hunter River catchment flood study (WMA Water, 2015) shows that the site is not impacted by flooding of the Hunter River as the site is protected by the rail embankment to the North. The flood risk zone does not impact the site (or the Metford Triangle) directly.

2.6.6 Drainage

Two drainage channels traverse the site, mostly draining urban catchments to the south. The major central drainage channel discharges to Lot 266 and then onto the East Maitland common, Tenambit Wetlands and Morpeth Common, located north of Raymond Terrace Road, via a culvert passing under the Main Northern Railway Line. A second smaller drainage channel in the south west of the site discharges to a culvert beneath Metford Road. Internal catchments within the site grade down to these channels.

2.6.7 Vegetation and Biodiversity

The site supports remnants of native forest vegetation in the east portion and south-west corner of the site (refer Figure 2-1). Vegetation remnants on the site are isolated from extensive areas of native vegetation to the north and only tenuously connected by broken corridors to areas of native vegetation to the south. The central drainage channel has areas of riparian vegetation, including permanent ponds created as a result of the altered landscape.

A detailed Biodiversity Assessment has been prepared as part of this EIS (refer Section 10 and **Appendix E**).

2.6.8 Traffic and Access

The site is located close to the Great Northern Railway Line, Raymond Terrace Road, and Metford Road. Raymond Terrace Road bisects Metford Road to the north of the proposed NMH site. It will provide a key linkage in the future to development areas located in Thornton North and Port Stephens. It is a two lane sub-arterial road with a posted speed limit of 60km/h in the vicinity of the proposed site. Metford Road is a local road which connects Morpeth and Metford. It is a two lane sub-arterial road with a posted speed limit of 60km/h to the south and 80km/h to the north of Raymond Terrace Road. It connects with Chelmsford Drive, which in turn connects to the New England Highway.

The main access at a sub-regional level is likely to be predominantly from the New England Highway to the south of the site, linking to the Pacific Motorway and Hunter Expressway.

The proposed NMH site is in proximity to Victoria Street train station on the Hunter Line. Access to Victoria Street train station from the site is via Fieldsend Street approximately a 15-minute walk. Metford Train station on the Hunter line is also located within the region however this represents a longer route to the NMH and has not been considered as being accessible to the NMH.

The area surrounding the site is served by a number of bus routes operated by Hunter Valley Buses. A detailed Traffic and Parking Assessment has been prepared as part of this EIS (refer Section 8 and **Appendix F**).

3. Proposal Description

3.1 Overview – Staged State Significant Infrastructure

HI has committed to undertaking a Staged Infrastructure Application for the following works:

- Stage 1: Concept design, site clearance and preparatory works
- Stage 2: Detailed design, construction and operation of the hospital.

A detailed description of the proposed staging of the development follows.

3.1.1 Stage 1: Concept Proposal and Site Preparation

Stage 1 seeks approval of a Concept Design for the hospital as well as site clearance and preparatory works otherwise referred to as early works within the EIS and consultant's reports. Stage 1 includes:

- Concept design of NMH
- Site clearance and preparatory works generally comprising:
 - Site office and construction compound, including connection of compound to services
 - Connection of temporary and permanent services for the new facility (water, sewer, power, gas)
 - Removal of existing temporary fencing and installation of construction fencing and signage
 - General clearance of site vegetation within the footprint of hospital construction works including tree stumps, but with retention of the majority of native vegetation around the site's perimeter in areas less impacted by historical mining activities. Vegetation clearing for the purposes of an APZ will be assessed in Stage 1 however clearing would not take place until Stage 2
 - Chipping of cleared vegetation (excluding weed species) to use on site for ground stabilisation/erosion control
 - Offsite disposal of surplus cleared vegetation and weeds to green waste recycling facility or another beneficial reuse
 - Bulk earthworks to establish the required site levels and create a stable landform in preparation for hospital construction
 - Associated in-ground infrastructure and works include formation of building foundations, drainage works and excavation of a sub-level structure
 - Site stabilisation (such as establishment of erosion and sediment controls)
 - Site management
 - Construction of internal un-sealed road ways for use during construction
 - Construction of a hard, un-sealed sub-base for temporary construction parking spaces.

3.1.2 Stage 2: Hospital Delivery

Stage 2 includes the detailed design, construction (also referred to as main works within the EIS and consultants reports) and operation of the hospital.

Stage 2 is proposed to include:

- Detailed design of the New Maitland Hospital

- Construction of the New Maitland Hospital
- Utility and services connection / amplifications works
- Internal roadways and car parking for staff, patients and visitors
- Site works such as landscaping, pathways, etc
- Hospital operation.

3.2 Timing

Construction program

Construction durations are expected as follows, subject to refinement of project scope and market feedback on preferred construction methodology:

- Stage 1 Early Works – approximately 12 months
- Stage 2 Main Works – approximately 24 months

Key milestones

The key milestones based on a preliminary program are shown in Table 3-1, subject to receipt of planning approval.

Table 3-1 Construction milestones

Key Milestone	Start	Finish
Stage 1 Early Works	October 2018	September 2019
Stage 2 Main Works	September 2019	September 2021
Operational commissioning	Late 2021	Early 2022

3.3 Health Services Planning Principles

In developing the Concept design for NMH, HI has undertaken a health master planning process for the site with reference to the following health services planning principles:

- Provision of safe, high quality, patient-centred care
- Efficient access and way-finding, providing efficient, clear and unambiguous points of entry and direction
- Capacity to accommodate current and future changes in health care service delivery and technology
- Support for teaching and learning to facilitate the delivery of quality patient care
- Optimisation of operational efficiencies and a whole-of-building approach to the delivery of health and support services
- Provision for a fully integrated Information Management and Technology (IMT) system that supports staff in delivering care across a range of settings and clinical environments
- Incorporation of features that provide for the wellbeing of staff, support shift workers, and include amenities that optimise staff experience
- Fit within the urban context, particularly with regard to creating a sense of place and identity.

From this, a reference design was developed to serve as the basis for the concept design assessment. This reflects opportunities, constraints and other relevant issues with reference to the above planning principles.

3.4 Key features

The key features of the Concept design are shown in Figure 3-1 and include the following:

- A building envelope within the north-western part of Lot 7314 mostly on previously disturbed areas
- Building mass of up to eight storeys (including lower ground but excluding plant level)
- Approximate gross floor area of 60,000 square metres
- Primary access from Metford Road at a new roundabout junction opposite Fieldsend Street
- Secondary access for ambulances from Metford Road, south of the Primary access. This allows for accessing the hospital from both points
- An on-grade helipad located to the northeast of the hospital
- Two car parking facilities
- Stormwater drainage to the east of the hospital, to manage stormwater flows through the site from offsite lands as well as from the hospital precinct
- Partial retention of vegetation at the southern, western and eastern end of the site, with some clearing and understorey removal to meet bushfire mitigation requirements (APZ)

3.5 Design outcomes

With reference to the planning principles, the site layout and built form features are summarised as follows:

- A number of massing options have been considered – these have included consideration of building footprints and minimising massing without compromising achievement of required clinical functionality, and limiting capacity for potential future expansion
- Provision for potential future expansion
- Location of noise-generating plant generally towards the northern end of the site away from residential receivers
- Provision of access for ambulances at both the north (primary) and south (secondary) site accesses. The southern access would be for emergency vehicles only and would be separate from the primary access which would be used for all general access by staff, patients and visitors. The primary access off the roundabout would be shared with delivery vehicles
- Restriction of development on the site immediately fronting Metford Road to provide for potential future road widening as part of the supporting road works and to provide for any future needs of the community
- Car parking for staff, visitors and patients
- Retention of an area of vegetation to the west, south and eastern end of the site that would be managed as part of the overall hospital operations and provide passive screening that improves visual outcomes both within the site and for the surrounding community
- Appropriate consideration of bushfire risk with regard to design development and establishment of APZ, and ongoing landscape management
- Internal pedestrian routes that provide appropriate functionality for access within the site and provide connectivity to external access points.



Figure 3-1 NMH Concept Plan

3.6 Clinical Servicing Offering

The NMH will predominantly provide Level 4 health services and will include an expanded bed capacity and essential infrastructure such as operating theatres and delivery suites to an appropriate Role Delineation level for clinically advised Service Related Groups (SRGs). Increased self-sufficiency and capacity to provide additional care locally where it is safe and efficient to do so, will improve the health and wellbeing of Hunter region residents.

HNELHD has well-established District-wide Clinical Networks and Streams who bring together groups of health professionals from primary, secondary and tertiary care settings to improve clinical service delivery across the district. These include:

- Aged Care and Rehabilitation Services
- Children, Young People and Families
- Cancer
- Women's Health and Maternity
- Mental Health and Drug and Alcohol
- Critical Care and Emergency Services
- Chronic Disease
- Non-Aligned Streams (Anaesthesia and Pain, Immunology and Infectious Diseases and HiTH).

The range of services at the proposed new hospital include emergency care, critical care (Intensive Care Unit), surgical care, acute care, maternity services, paediatric care, inpatient medical and surgical beds, rehabilitation, mental health, palliative care, chemotherapy and ambulatory care.

3.7 Access and Parking

Access

Specific details regarding access arrangements for the proposed NMH are the subject of ongoing design development including consultation with Maitland City Council and Roads and Maritime Services (Roads and Maritime) with regard to design of the supporting road works. This notwithstanding, the following design principles have been agreed with Maitland City Council, Roads and Maritime and TfNSW:

- A primary access point comprising a roundabout for access from Metford Road at the Fieldsend Street junction, providing access onto the campus for all staff, visitors and delivery vehicles
- A second access point (un-signalised) off Metford Road, a minimum of 65 metres to the south of the main access that would provide access for ambulances only.

Maitland City Council and Roads and Maritime have given in-principle agreement to allow right-turn egress movements by ambulances in an emergency onto Metford Road from the secondary access. This would be investigated further as part of detailed design development and would include further consultation with Maitland City Council and Roads and Maritime.

Pedestrian access to the site would be available from Metford Road. The access point would connect with an internal pedestrian network.

Access to NMH will also be available via buses. There are existing bus routes along Metford Road. With the development of the NMH it is expected that the bus routes, bus stops and timetables will be reviewed and updated by TfNSW and associated bus operators to provide an effective bus service for the hospital. A bus stop has been allowed for at the entrance of the hospital to provide direct access into the facility.

Parking

The traffic assessment for this EIS has allowed for short term, long -term and staff car park spaces on the hospital site. The eventual number of car park spaces will be dependent on the final design, and the impacts would be assessed in detail in the Stage 2 EIS. As the land surrounding the hospital is a greenfield site there is capacity to add additional parking facilities to the east of the hospital if required.

Options for car parking on the hospital site comprise at-grade (on the surface), and a multi-storey car park. Specific details would be developed as part of Stage 2 detailed design.

3.8 Outline Construction Methodology (Stage 1 Early Works)

3.8.1 Staging

A contractor would be engaged to undertake the Stage 1 early works package. The proposed scope of works and sequencing of these works is anticipated to be as follows:

- Site establishment including utilities installation for site compound
- Installation of environmental controls
- Bulk earthworks and remediation (if required)
- Vegetation clearance (building footprint and buffer only)
- Installation of permanent in-ground services
- Construction preparation for internal roadworks and commencement of car parks
- Installation of inground infrastructure
- Site management through to commencement of Stage 2.

A brief description of these works is provided below, the area of disturbance for stage 1 is shown in Figure 3-2 and the building footprint is shown in Figure 3-3.



Figure 3-2 Project Influence Area for Stage 1 Early Works

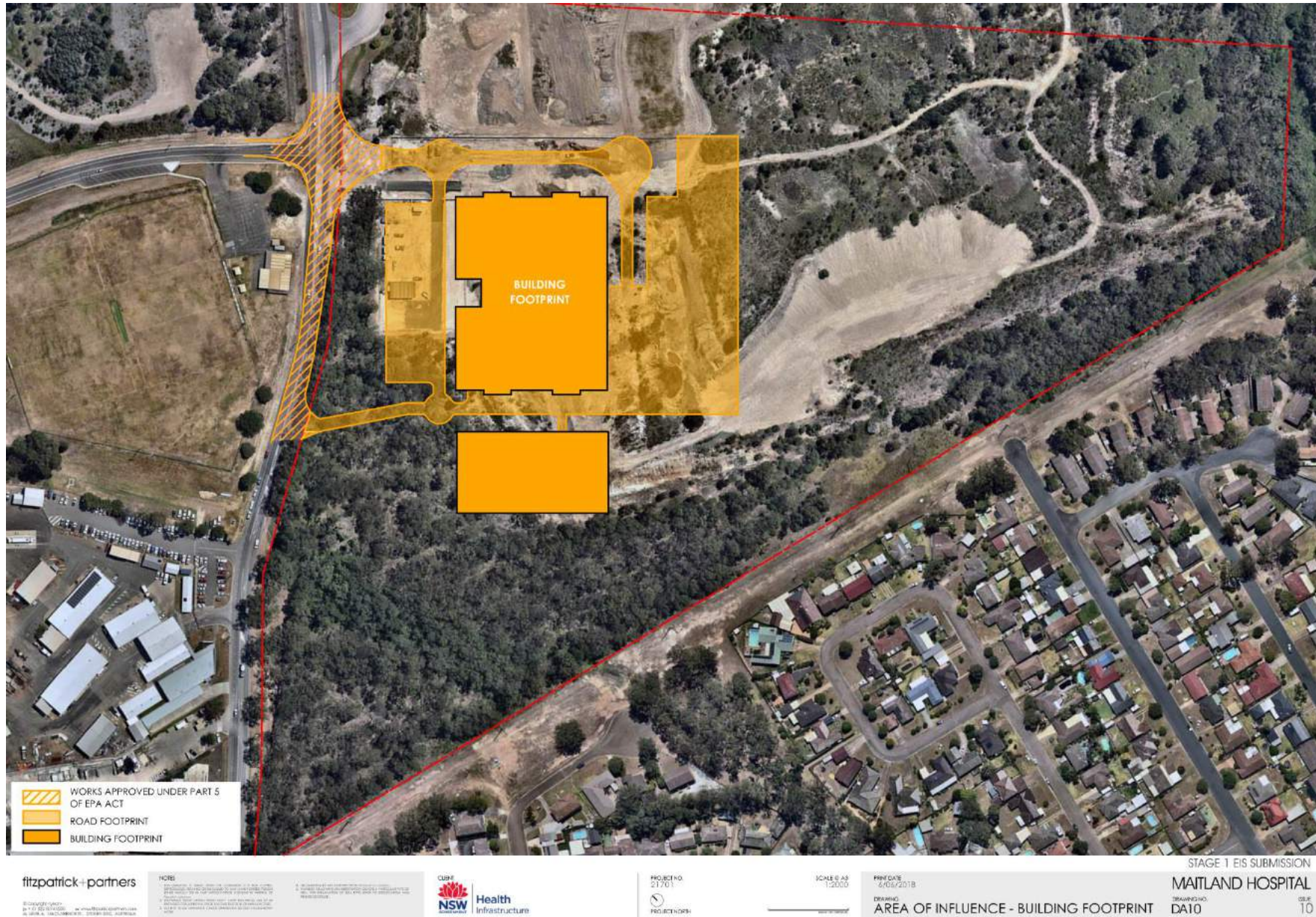


Figure 3-3 Area of influence (building footprint)

3.8.2 Site Establishment

Site establishment activities are anticipated to include:

- Installation of any security measures required to make the site safe including boundary fences and access gates
- Establishment of site compound for the works including site sheds and temporary car parking facilities for workers. This may include site demountables, facilities for use by the early works contractor and toilet/ change room amenities sufficient to meet compliance for the workforce engaged on Stage 1
- Installation of temporary services for the construction works including water supply connection, sewer connection and electrical supply connection
- Installation of erosion and sediment controls around the area of the works to prevent sediment discharge into the surrounding waterways
- Installation of shaker grid and wash down facilities at the exit from the site to minimise the transfer of materials from the site onto the surrounding public roads
- Installation of barrier fencing to define the limit of works and prevent unauthorised clearing
- Installation of temporary culvert under access road to maintain storm water overland flow conveyance from upstream catchment

Plant required to undertake these works may include:

- Delivery vehicles such as flatbed truck and vans
- Fork lift to unload deliveries
- 8t or 14t Excavator for trenching of utilities and installation of culvert

3.8.3 Storm Water Management and Environmental Controls

Broader stormwater and environmental controls would be implemented to prepare and protect the site during the early works earthworks. Wood & Grieves has provided an indicative plan for Stage 1 storm water management and environmental controls which is provided in Figure 3-4. A detailed Construction Environmental Management Plan (CEMP) including a Soil and Water Management Plan (SWMP) would be prepared and implemented by the chosen early works contractor in accordance with contemporary standards.

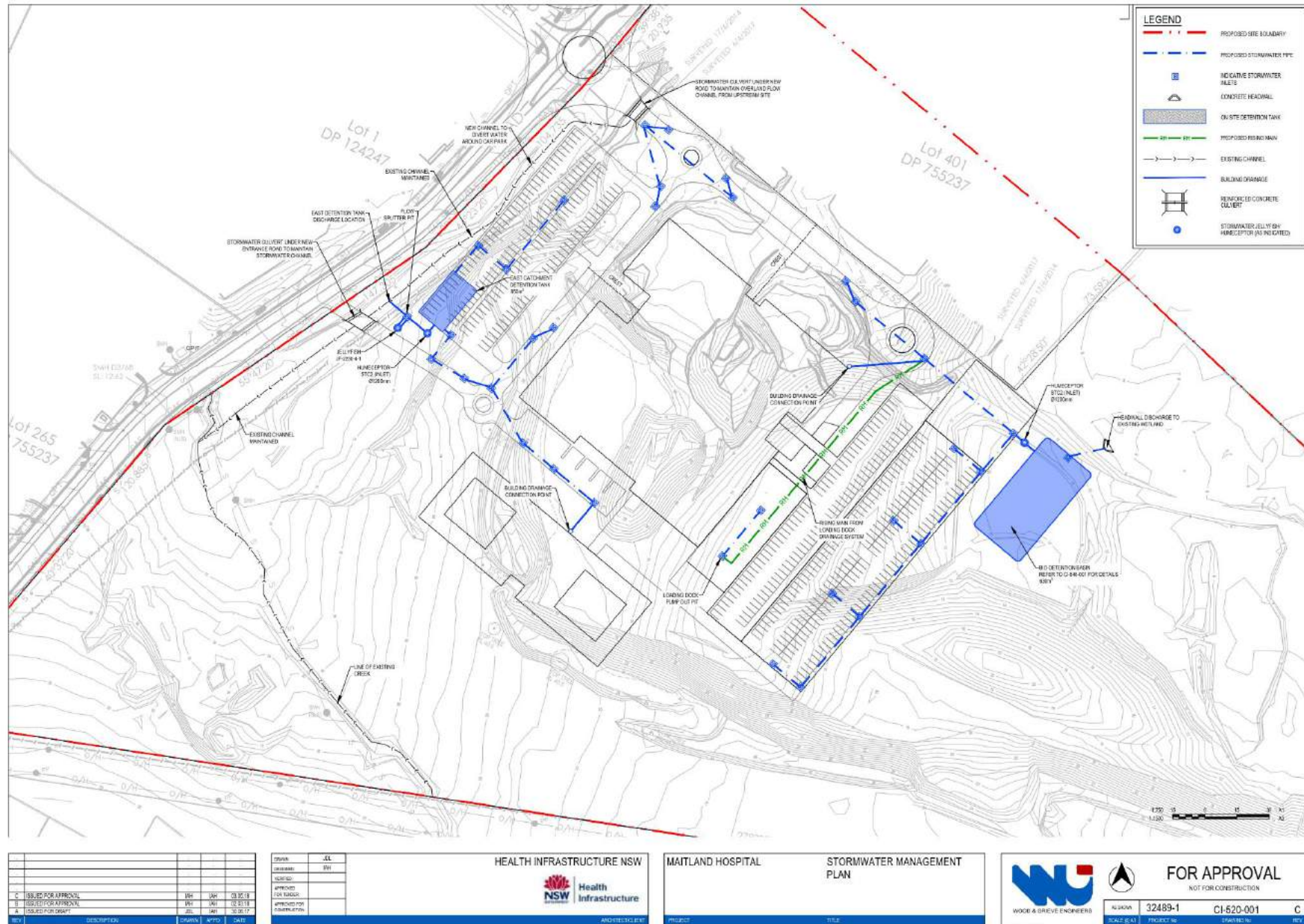


Figure 3-4 Indicative plan for Stage 1 storm water management and Site Environmental Controls

3.8.4 Earthworks and Stabilisation

A detailed plan of management for the bulk earthworks and site stabilisation activities would need to be prepared by the chosen contractor. This is likely to include:

- Establish methodology for staging of the cutting and filling of materials to achieve bulk earthworks levels whilst minimising material to be taken from or imported to Site
- Initiate bulk excavation works in areas of cut, transferring spoil to areas of fill
- In areas of fill, establish required compaction of virgin ground prior to filling above by either rolling virgin material to required compaction or undertaking ground improvement works to achieve the required compaction
- In areas of fill, lay and compact fill in layers of 200mm until earthworks level is achieved, testing compaction as specified
- If imported fill is required obtain engineers approval for source material, track all imported material brought into site in accordance with the specification
- Grade finished earthworks surface to minimise stormwater ponding
- In areas of cut, once bulk earthworks level has been achieved, either rolling virgin material to required compaction or undertaking ground improvement works to achieve the required compaction
- Test final surface compaction as specified
- If material is to be exported from the site, obtain the required testing certification for the material in accordance with the specification
- Identify a licensed waste facility that is authorised to receive any waste material from the site
- Excavate and remove excess material from the site as required and dispose to a licensed waste facility
- Maintain shaker grid and wash down facility to minimise the transfer of materials from the site onto the surrounding public roads
- Stabilise the site progressively following bulk earthworks including provision of topsoil and seeding where appropriate
- If stockpiles are required as part of the works, stabilise stockpiles and employ appropriate erosion and sediment controls to minimise erosion and sedimentation risks
- Wet exposed earth for dust suppression for the duration of the works.

Plant required to undertake these works may include:

- Delivery vehicles such as flatbed truck and vans
- Fork lift to unload deliveries
- 20t – 35t Excavators for excavation of cut materials
- 10m³ Tipping Trucks to move material around site or remove material from site
- Wheeled loader to move material around site
- 20t - 27t Single Drum Rollers to compact fill material and finished earthworks surface
- Articulated Grader to grade fill layers and final earthworks surface
- 1,200L water truck to suppress exposed earth.

3.8.5 Vegetation Removal

Vegetation Clearance works would include:

- Identification of which areas are to be cleared and where protection measures are required to retain vegetation.
- Establishment of tree and vegetation protection measures as required
- Clearance of low laying vegetation and disposal to a licensed green waste disposal facility
- Clearance of larger vegetation such as bushes and trees. Mulching of larger vegetation is likely to be undertaken onsite and either stockpiling for reuse in landscaping, or removal as required in accordance with Environmental requirements for the development
- Spraying of weed killer in exposed areas of works
- Establishment of additional sedimentation and erosion controls as required
- Wet exposed earth for dust suppression for the duration of the works.

Plant required to undertake these works would nominally include:

- Delivery vehicles such as flatbed truck and vans
- Fork lift to unload deliveries
- 8t or 14t Excavator to assist in removal of vegetation
- Mulcher equipment, either stationary or skid steer mounted
- Wheeled loader to build stockpiled mulch
- 10m³ Tipping Truck/s to move mulch to stockpile or remove from site as required
- Weed killer sprayer
- 1,200L water truck to suppress exposed earth.

3.8.6 Traffic, access and parking

As part of its Construction Environmental Management Plan (CEMP), the contractor appointed to undertake the Stage 1 works will be required to submit a Traffic Management Plan (TMP) for approval prior to commencement of works. This would include consultation with Maitland City Council and Roads and Maritime as appropriate. A preliminary CEMP is located in **Appendix G** and a preliminary TMP is included in **Appendix F**.

Construction site access will be at the north-west corner of Lot 7314 via the new roundabout at Fieldsend Street/Metford Road intersection. These works are currently being delivered under the State Environmental Planning Policy (Infrastructure) (ISEPP) and Part 5 of the EP&A Act via a Review of Environmental Factors (REF) (refer Section 1.5).

Staging areas for Stage 1 construction vehicles and parking for worker's vehicles will be provided on site. Parking of construction vehicles on Metford Road and Fieldsend Street will be prohibited.

3.8.7 Utilities

Detailed studies of required utilities upgrades have been undertaken by the consultants engaged to complete the offsite works. Any required services not installed as part of the offsite works package will be included in future works during Stage 2. An Infrastructure Management Plan (Wood & Grieve, 2018) describing the utilities requirements and proposed servicing arrangements is provided in **Appendix H**.

Installation of Permanent In-ground Services will include:

- Establish methodology for staging the installation of utilities to minimise the risk of abortive works
- Confirm programme with utility authorities for connection of new utilities to existing infrastructure
- Import bedding and backfilling material as required by the specification prior to beginning the installation of utility infrastructure
- Undertake trenching works in preparation of utility infrastructure installation
- Lay required bedding material
- Install utility infrastructure in accordance with the contract documents
- Arrange for inspection of utility infrastructure prior to backfilling of trenches
- Back fill trenches in accordance with the contract documents
- Complete connection procedures with utility authorities and make connection to existing utility infrastructure.

Plant required to undertake these works includes:

- Delivery vehicles such as flatbed truck and vans
- Fork lift to unload deliveries
- 8t – 14t Excavators for excavation of trenches
- Backhoe Loader for installation of bedding and backfilling materials
- Wacker Plates for compaction of trench bedding and back filling.

3.8.8 Construction Hours

It is anticipated that construction works for the Stage 1 construction activities would be undertaken during standard construction hours in accordance with the Interim Construction Noise Guideline [ICNG] (DECC, 2009). These standard construction hours are:

- Monday – Friday – 7:00am to 6:00pm
- Saturdays – 8:00am to 1:00pm
- Sundays and Public Holidays – No Work.

Any required out of hours' work would be undertaken in line with an approved out of hours work procedure that will form part of the CMP.

3.8.9 Workforce

There is estimated to be approximately 1,250 full time equivalent jobs over the course of the NMH construction period.

4. Urban Design and Concept Built Form

Fitzpatrick and partners have provided an Architectural Design Statement (refer **Appendix K**) for the NMH. Indicative plans are provided in **Appendix K**. The concept hospital has been designed to meet the specific demands for health services within the region. The proposed Concept Design has been considered in the context of the site's existing and proposed broader context. A new purpose built facility is required due to the limited expansion options for acute, outpatient and inpatient services in their current configuration and location. Assessment of the built form and urban design has been undertaken in accordance with the General Requirements of the SEARs.

The NMH is intended to address multiple functional requirements to ensure optimum care, accessibility and efficiency is maintained into the future. The key design principles for the NMH guiding Fitzpatrick and Partners design for the Concept proposal for the site listed in the Architectural Design Statement include:

- *Developing a state of the art health care facility that meets the needs of catchment population of the Maitland region and the wider Hunter New England Health District and NSW Health*
- *Develop a master planning strategy that supports safe and efficient patient and staff movement through the various patient treatment /care regimes*
- *Develop a configuration of the hospital entry and internal road network to allow clear identification and navigation to key departmental access points*
- *Develop a responsive built outcome that enhances the regional character of the development*
- *Developing a high-quality design outcome that enhances the patient, visitor and staff journey through access to natural light, views and appropriate outdoor spaces where possible throughout the hospital campus.*
- *Positions the built footprint of the new Hospital to address site constraints and support sustainable future expansion of the health service.*

4.1 Built Form

Height, bulk and scale

Gross floor area

The site is not subject to a maximum building height, floor space ration (FSR) or setback requirements under the MLEP 2011. The site for the NMH within Lot 7314 and Part Lot 401 and is 19.37 hectares.

The hospital development is envisaged to provide about approximately 60,000m² of hospital floor space including acute and sub-acute facilities, emergency medicine, imaging and ancillary uses such as retail, open space and carparks.

The size of the development is required in order to accommodate for the population to at least 2031. The gross floor area of the development is also considered in relation to the total site area.

Building footprint

The building footprint has been sited to the northern sector of the site within predominantly cleared land. The building location seeks to maximise the distance from residential development to the south and the existing ironbark forest minimising the need for removal of native vegetation. The concept hospital has also been designed to position the building footprint to allow future flexibility in site utilisation should the need arise in the future.

Height

The overall height of the building is up to eight levels plus basement with the ground floor level being at Reduced level (RL) 19.3 and the top of the building being at RL 56.30. The building height has primarily been

determined by clinical requirements and the efficiencies gained by "vertical stacking" (reducing travel distances, maintaining good clinical adjacencies).

Building Massing/ Building Envelope

The concept proposal provides for a multi-level 'H' shaped tower consisting of a ground floor podium, lower ground floor basement and two linked towers (refer Figure 4-1). A separate rectangular two storey hospital wing is proposed to the south. The height, bulk and scale of the development respond directly to the needs for expanding health services within the locality.

The height, bulk and scale of the proposed Concept Design is acceptable for the following reasons:

- The development is well setback from the Metford Road street frontage and residential properties to the south. The Metford Road setback is on average 70m, and the setback to the southern boundary is 100m. These generous setbacks and the retention of vegetation, particularly to the southern and south-western boundaries of the site, will ensure that the building mass is not exaggerated from any surrounding vantage points.
- The height of the NMH is contextually appropriate having regard to the likely future character of the area, being located within the East Maitland Hospital and Health Precinct.
- The proposed building is appropriately scaled with respect to the total area of the site (19.37ha).
- The proposed building will not over shadow surrounding residential development. The Stage 2 Detailed Design will ensure appropriate solar access to public spaces within the hospital site. Solar access is discussed further in Section 17.3 of this EIS;
- The NMH would represent a significant new built feature in the landscape. At up to 8 storeys in height, it would be the tallest building in the area, and the upper levels would be visible from multiple viewpoints in the surrounding area. Retention of vegetation at the southern and south eastern end of the site would assist in filtering views, particularly from residential properties to the south of the site.

Site layout

The building footprint has been sited to the northern sector of the site maximising the distance from the existing residential development to the south and reducing the impact to the remnant native ironbark forest in the south-west corner. By pushing the hospital to the north-west corner of the site the development area left on the remaining site is maximised or alternatively the adjoining lots may provide scope for expansion in the future. On the western boundary, the NMH has been set back an average of 70 metres from the Metford Road boundary. An existing corridor of mature trees has been maintained to this boundary further reducing the visual impact of the new building, although these may need to be thinned to comply with the APZ requirements. The proposed concept design is shown in Figure 3-1.

All loading dock and service related activity has been located on the eastern end of the lower ground floor of the hospital (RL 14.3) with a 4-5 metre perimeter barrier in the form of a retaining wall to its southern end, minimising both visual and acoustic impact on the existing residential development.

Due to the requirement of a helipad, the concept design has nominated that the helipad would be located north-east of the main building and directly north of the split-level public/ staff carpark. It is proposed that the helipad will be level with the Ground Floor of the hospital (RL 19.3). This location has the greatest separation from the residential development while still maintaining connection to clinical services. A detailed study was compiled to inform the best location taking flight path restrictions, noise implications and site topography into consideration. This siting would also minimise helipad visibility from the hospital wards. Further studies and surveys will be undertaken during Stage 2 detailed design.



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NOTES
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NSW
GOVERNMENT
Health
Infrastructure

PROJECT NO.
21761

SCALE: 1:100

PRINT DATE:
30/04/2018

DRAWING:
INDICATIVE MASSING IMAGE

STAGE 1 EIS SUBMISSION

MAITLAND HOSPITAL
DRAWING NO.
DA17
ISSUE
9

Figure 4-1 Indicative building massing

Site Access

The proposed hospital requires a large footprint with good accessibility. This includes a substantial carparking area which should have the opportunity for level access to the hospital entry. Proposed vehicular access and circulation are shown in Figure 4-2 below.

The NMH has been planned so that the orientation of key entry points, main entry and emergency department are visible from Metford Rd allowing clarity for the public accessing the site and allowing them to make early decisions regarding the services they require prior to entering the hospital site.

Access to the site is on Metford Rd which provides separate public and ambulance access. The main vehicular entry comes off Fieldsend Street for the public, staff and service vehicles. A secondary access point off Metford Rd for emergency vehicles will allow ambulance traffic to access the new hospital without the need to interact with general public traffic and service vehicle traffic accessing the hospital site (refer Figure 4-2).

The internal traffic patterns of the NMH have been developed based on two primary internal roadways. The first runs parallel to Metford Road and encompasses drop-off zones to key entry points to the building and short stay carparking. These entry points include the main entry to the hospital linking directly to ground floor clinical and administrative zones and the main public lifts accessing clinical departments on the upper levels of the Hospital, as well as the Emergency Department.

The second primary onsite roadway runs parallel to the northern frontage of the hospital building and will cater for public accessing the main parking facility on the site in addition to service vehicle connecting to the lower ground loading docks of the hospital. This roadway will also provide access for the proposed bus stop and taxi rank drop-off zone for the hospital.

Carparking facilities are located on either side of the hospital and are divided into a short stay carpark on the western side of the hospital and a public/staff split level carpark on the eastern side of the hospital.

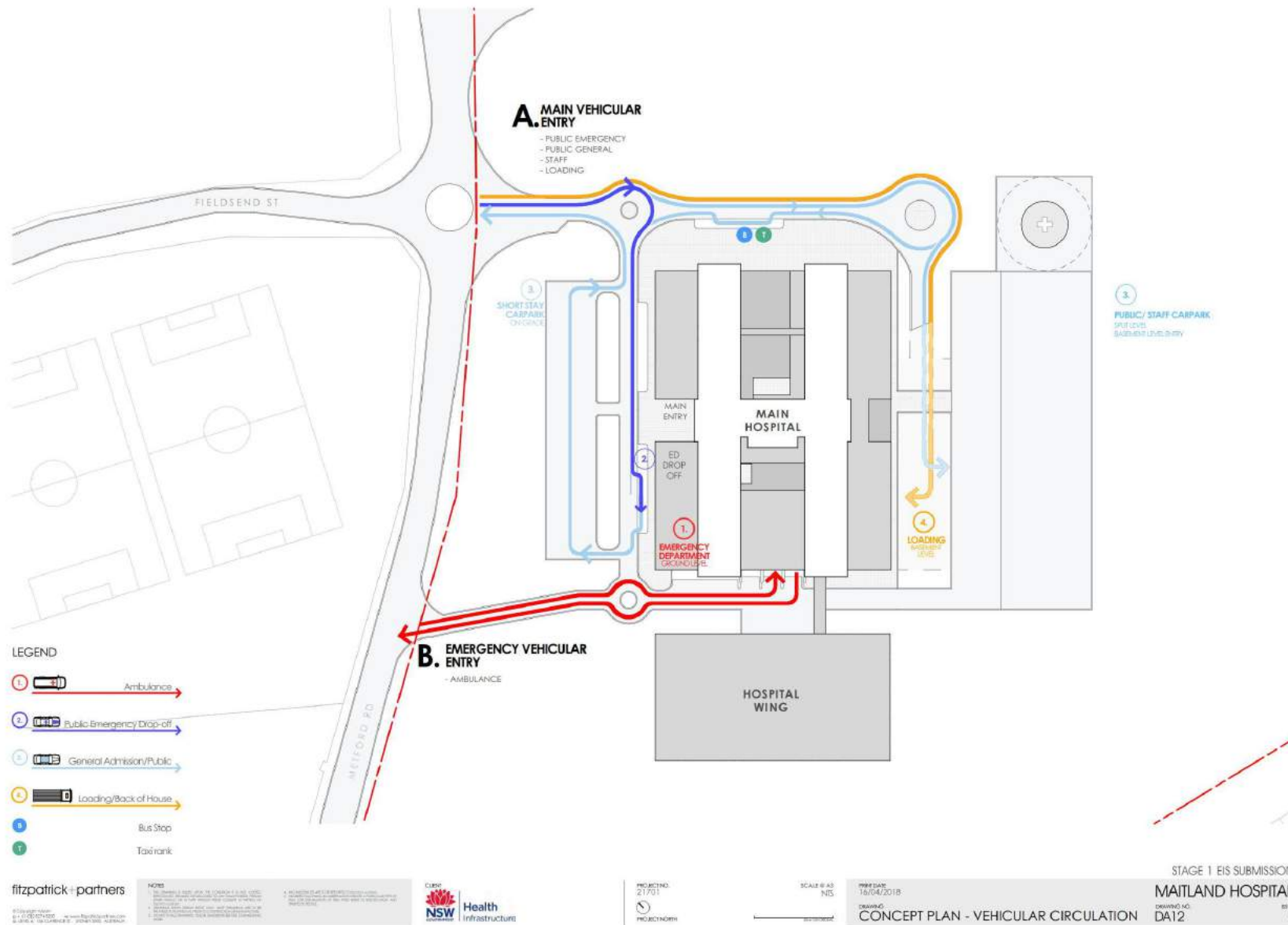


Figure 4-2 Proposed Vehicular Circulation

4.2 Landscaping and tree planting

The concept design maintains the iron bark forest on the south-western, south and eastern perimeters of the site as both a natural feature and also a buffer between the NMH and the existing residential development to the south of the site. Some vegetation clearing will be required to accommodate the APZ (refer Section 16) this will include thinning of the forest and removal of undergrowth within 70m of the hospital façade (refer Figure 4-3).

The areas of the site that have been subjected to mining activity will be rehabilitated as part of this development to establish native vegetation by re-introducing native species endemic to the area. The landscaping treatment immediately adjacent to the NMH will range from a palette of soft landscape areas to open public paved areas leading directly from the main ground floor for use as passive recreation and external seating zones. In addition, a number of enclosed and semi-enclosed courtyards will be established on the ground floor for use as external clinical treatment areas for training and other therapy regimes.



Figure 4-3 Landscape Zonal Plan

4.3 Crime Prevention Through Environmental Design (CPTED)

The proposal has been assessed under the Crime Prevention Through Environmental Design (CPTED) Principles during the concept design process. The four key CPTED principles are:

- Surveillance
- Access Control
- Territorial Reinforcement
- Space Management.

The NMH has adopted the CPTED principles during the development of the concept design to establish a safe and secure environment for staff, patients, contractors and visitors. Stage 2 detailed design will be further refined by the CPTED Principles.

4.3.1 Natural surveillance

This principle involves maximising visibility of people using a public space and creating opportunities for passers-by or residents to observe what happens in an area (the “safety in numbers” concept).

This will be achieved through the placements of buildings and other physical features to encourage passive surveillance into public spaces from buildings, roads and other spaces. Natural surveillance will be encouraged by providing unrestricted sight lines between spaces and avoiding blind spots, providing adequate lighting to increase visibility and ensure the safe use of spaces after hours, and connecting spaces where possible. Additionally, entry points will be situated in areas with a high level of hospital use.

4.3.2 Access control

This principle involves controlling who enters an area so that unauthorised people are excluded. This will be achieved by:

- Securing public entries after hours to control access
- Providing a single point of public entry into the Hospital after hours (through the Emergency Department)
- Providing a 24-hour on-site security station to respond to security issues
- Monitoring public areas using CCTV
- Providing 24-hour access control to sensitive sections of the hospital including engineering service areas.

Natural barriers such as roadways and landscaping as well as electronic and physical barriers will contribute to access control. The key public access points to the building will be clearly defined using appropriate way-finding signage, building form and landscape design. Distinct public routes to the building within the hospital site will be provided.

4.3.3 Territorial reinforcement

This principle is based on the theory that people are more likely to protect territory they feel they own and have a certain respect for the territory of others.

This will be achieved by:

- Clearly segregating and defining spaces into public and clinical/back of house zones through physical barriers, signage or directional means
- Identifying control points to restricted area
- Creating clear circulation patterns for movement about the facility.

- Introducing amenities such as seating in public areas.

Security measures in clinical spaces such as electronic monitoring, and motion activated lighting will reinforce the separation between public and clinical spaces as will the provision of both public and non-public (clinical) lifts allowing staff secure movement without the need to cross non-secure public zones.

4.3.4 Space management

This principle ensures that space is appropriately utilised and cared for. This will be achieved using rough finishes on external areas that require little maintenance, maintaining site cleanliness, rapidly repair damaged items, and restricting access to sensitive areas such as goods lifts. Furthermore, the design will ensure that there are clear observation lines to open areas that would be of high risk to the public such as loading docks and staff parking zones.

In addition to the above the design of the NMH will consider the effective lighting of spaces (both natural and artificial lighting), the provision of clear exit (escape) pathways allowing users of a space the option of more than one route out of the area, and the avoidance of blind spots in spaces.

4.4 Social considerations

The NMH will contribute to enhancing healthy, cohesive and inclusive communities by:

- Increasing the equitable access to a range of public health services
- Enhancing social cohesion due to improved accessibility of health services in regional and rural areas
- Improving access to health facilities for a range of group including aboriginal communities
- Improving the Hunter New England Health Service's self-sustainability and reducing dependency on external Health Districts.

5. Consultation

5.1 Overview

This section outlines the consultation and engagement activities undertaken in respect to the proposed development, and includes a summary of the community, stakeholder and agency consultation that has been undertaken to date. As a result of the engagement several elements of design were reconsidered and incorporated into the final design (refer to Section 5.9). The objectives of consultation were to:

- Identify stakeholders and interested parties
- Develop a process for engaging with the community and stakeholders and interested parties
- Increase community and stakeholder understanding of the Proposal, its objectives and benefits
- Provide information on the proposed development
- Provide an opportunity for feedback and comments on the proposed development
- Ensure that community and stakeholder enquiries are managed and resolved effectively
- Record, review and comment on Proposal feedback
- Identify engagement requirements through the EIS, submission, determination and post approvals stage of the proposed development.

5.2 Identified Stakeholders

The following stakeholders were identified:

- Residents and commercial properties located in close proximity to NMH (shown in Figure 5-1)
- Residents and commercial properties located in close proximity to the existing Maitland Hospital (shown in Figure 5-2)
- Wider community (Maitland LGA)
- Maitland City Council (MCC)
- Community interest groups (various)
- CSR Limited (CSR)
- Aboriginal people who hold cultural knowledge (refer section 5.5)
- Government Agencies including:
 - Air Services Australia (AA)
 - NSW Ambulance
 - Civil Aviation Safety Authority (CASA)
 - Department of Industry (Crown lands) (DoI Crown Lands)
 - Department of Industry (Lands and Water) (DoI Lands and Water)
 - Department of Planning and Environment (DP&E)
 - Department of Resources and Energy (DRE)
 - Hunter Water Corporation
 - NSW Environmental Protection Authority (EPA)
 - NSW Police

- Hunter Development Corporation
- Office of Environment and Heritage (OEH)
- Roads and Maritime Services (Roads and Maritime)
- NSW Rural Fire Service (RFS)
- Transport for NSW (TfNSW)

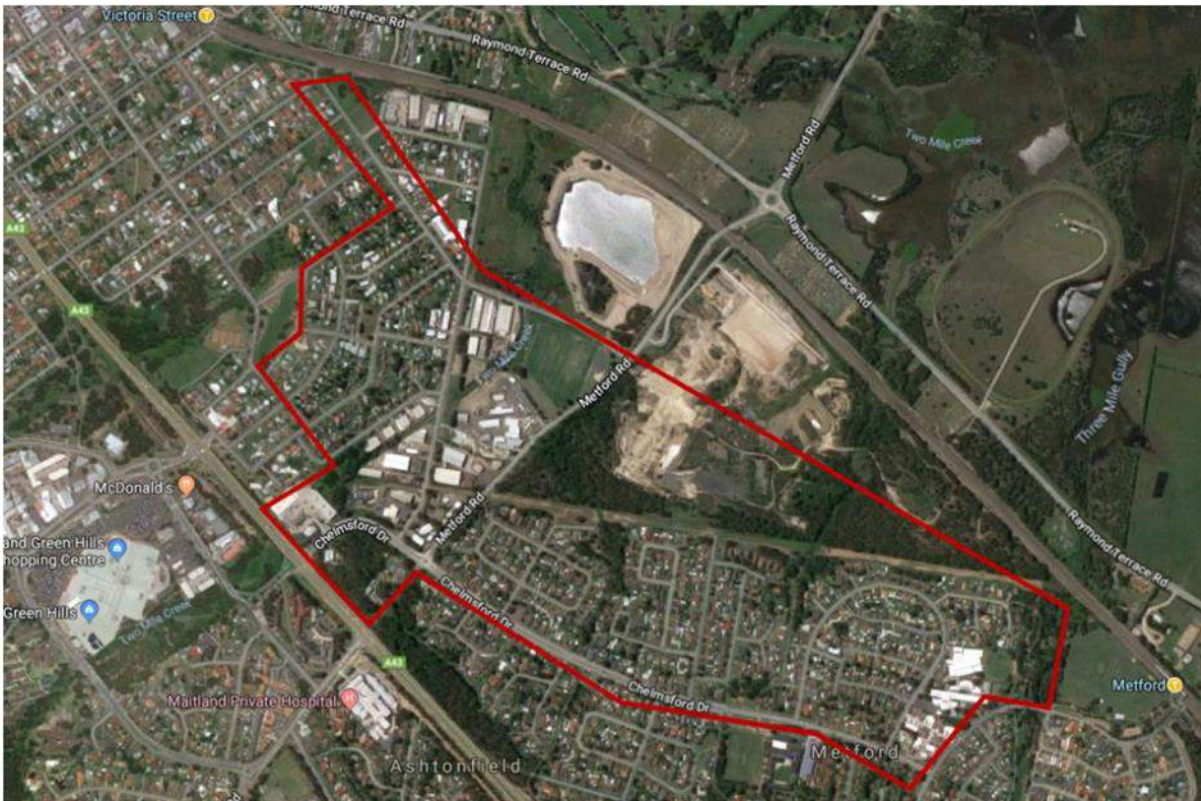


Figure 5-1 Map of residents and business located in close proximity to the NMH. The area within the red received a flyer.

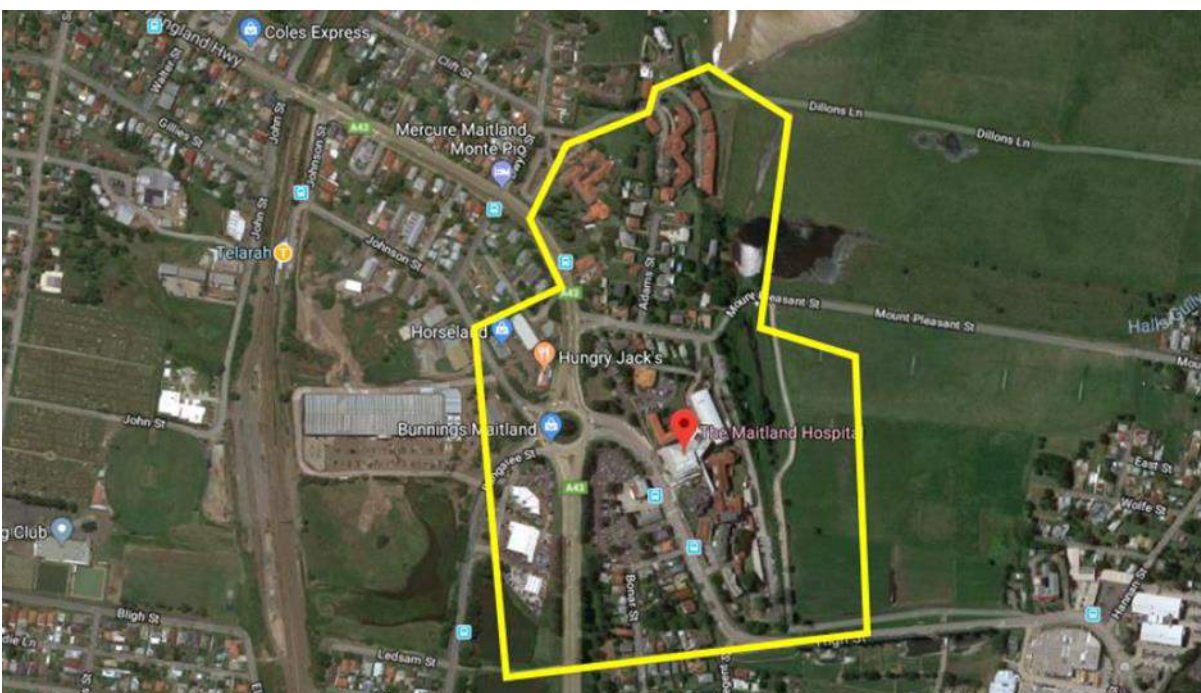


Figure 5-2 Map of residents and businesses located in close proximity to the existing Maitland Hospital. The area within the yellow line received a flyer.

Community Group Presentations

A number of community groups were contacted to offer a presentation / question and answer session in order to obtain feedback on the proposal from specific groups. These include:

- Singleton Council
- Kurri Kurri Business Chamber
- Maitland Business Chamber
- Hunter Business Chamber
- Maitland Country Women's Association
- Rotary Club of East Maitland
- Maitland Sunrise Rotary Club
- Maitland Rotary Club
- East Maitland Lions Clubs
- Maitland Lions Club
- MIndaribba local Aboriginal Land Council
- Schools
 - Maitland Christian School
 - Maitland East Public School
 - Maitland Grossman High School
 - Maitland High School
 - Metford Public School
 - Hunter River Community School
 - Hunter Valley Grammar School

The following community groups expressed interest in the NMH and received a presentation / question and answer session from Health infrastructure:

- Kurri Kurri Business Chamber
- Hunter Business Chamber
- Rotary Club of East Maitland
- Maitland Sunrise Rotary Club
- Maitland Rotary Club
- Metford Public School
- MIndaribba local Aboriginal Land Council

The presentation given to the following stakeholders is contained in **Appendix L**.

5.3 Government Agency Consultation

HI undertook consultation with relevant government agencies. This consultation aimed to seek additional guidance from relevant authorities and clarify items identified in the SEARs. A summary of consultation is provided in Table 5-1.

Table 5-1 Summary of agency consultation through the development phase

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
Air Services Australia (AA)	5/04/2018	Phone conversation	- Clarified the staged approach to the development and what was included in each stage. - HI advised that the project will submit the Development Assessment Submission form at the time of the Stage 2 EIS submission (along with supporting documents, drawings and CAD files) as the project needs to complete detailed design to provide the information necessary for AA assessment noting the construction of the helicopter pad is being approved under Stage 2.	AA service representative appeared to understand the staged process and that detailed design of the helicopter pad would not be required until Stage 2 SSI application submission which will seek approval for the helicopter pad.
NSW Ambulance (ANSW)	4/04/2018	Meeting	- Clarified the staged approach to the development and what was included in each stage - A new Ambulance Station is being constructed at Aberglasslyn. - ANSW are updating their ambulance fleet and the new specifications will need to be considered for the Emergency Department drop off and parking bays. - Access control for emergency vehicles. - ANSW require a small write up room.	- The new station is well located to support the region's population growth zones and service NMH. - Emergency Department (ED) drop off and parking bay specifications will be considered during Stage 2. - Traffic light control not required as there are multiple entry points and a dedicated ambulance entry road. - A write up room will be considered during Stage 2 detailed design. - Ambulance drop off parking bays will be

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			Parking for emergency vehicles.	considered during Stage 2 detailed design, along with opportunities Police vehicles in close proximity to the new ED.
Civil Aviation Safety Authority (CASA)	19/04/2018 and 24/05/2018	Phone conversation and follow up email.	- Clarified the staged approach to the development and what was included in each stage. - Advised that SEARs requirements (e.g. formal survey of Obstacle Limitation Surface) would be completed during Stage 2 EIS submission noting the construction of the helicopter pad is being approved under Stage 2. - Discussed model plane flying club and potential operational conflicts.	- CASA representative appeared to understand the staged process and that CASA input regarding the helicopter pad would not be required until Stage 2 of the EIS. - HI committed to undertaking further investigation during the Stage 2 EIS submission to determine if the model plane flying club would conflict with the planned helicopter operations.
Department of Industry (Crown Lands) DoI (Crown Land)	24/01/2018	Written correspondence	Department of Industry (Crown Land) were notified in writing that a SEARs request had been submitted including part Lot 401 which is Crown Land.	Department of Industry (Crown Land) was notified.
	20/03/2018	Teleconference Discuss proposed NMH and SEARs issued by DP&E.	- Clarified the staged approach to the development and what was included in each stage. - DoI queried whether NSW Health would acquire Part Lot 401. It was advised there are no plans to acquire this land. - Lot boundaries of Lot 401.	- DoI undertook to review the Native Title status of Lot 7314. - HI undertook to provide DoI with any related Lot 7314 acquisition documentation.

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			- Status of extinguishing existing mining leases on Lot 7314. - Native Title status of Lot 7314.	
	3/05/2018	Written correspondence	Dol have reviewed the native title status of Lot 7314 DP1162607, Lot 266 & 401 DP755237, Part Lot 3 DP1091727 and the Crown road through Lot 266 DP755237.	Native title has been extinguished for these areas.
Department of Industry (Lands & Water) DPI (Lands and Water)	6/03/2018	Phone call and written correspondence	HI asked if DPI (Lands and Water) needed further clarification or engagement on the EIS (particularly relating to water requirements).	DPI (Lands and Water) advised that no further discussion of assessment requirements was considered necessary.
Department of Planning and Environment (DP&E)	6/02/2018	Written correspondence	- Informing OEH of the biodiversity work undertaken so far prior to the SEARs request. - Request DP&E to determine that the former planning provisions apply to the NMH under the <i>Biodiversity Conservation (Savings and Transitional) Regulation 2017</i>.	SEARS confirmed that the former planning provisions apply to the NMH under the <i>Biodiversity Conservation (Savings and Transitional) Regulation 2017</i>.
	26/03/2018	Meeting Update on Proposal progress.	- Clarified the staged development, and that the EIS is for a hospital not a health precinct. - Discussion on road impacts and progress with Council and RMS. - Access to site during flooding	- Health will engage with DPE's precinct planning section when the process for the health precinct begins. - HI has agreed to upgrade Chelmsford Drive and Metford Rd (refer to RMS and Council sections in this table)

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			- Details on supporting retail areas. - Providing an update on community engagement progress	- Flood modelling shows that the NMH is still accessible via Chelmsford Drive/ Metford Rd during flooding. - Retail areas will be addressed in stage 2.
Department of Resources and Energy (DRE)	28/02/2017	Meeting	- Discussed HI's intention to develop the site as the NMH. - Advised the process and requirements for the land to be handed from CSR to NSW/HAC.	HI noted these requirements and will engage with DRE to ensure that these are complied with so that the land will be released to NSW/HAC and work on NMH can commence.
	2/06/2017	Meeting (DRE, CSR and HI)	- Compulsory acquisition of Lot 7314 finalised. - Discussion of HI requiring Part Lot 401 to accommodate construction. - Section 240 notice would need to be issued for undertaking the agreed remainder of the CMOP work. - Next steps were discussed.	- HI provided CSR with plans showing the area of Part Lot 401 that was required. - DRE to clarify and advise the processes and instruments for addressing the eventual relinquishment of the leases on Lot 7314.
	21/09/2017	Meeting	- Outlined that HI and CSR have been working to reach an agreement on the Metford Site scope of works and the parties are in the final stages of signing a Deed of Agreement. - Discussion occurred around the options on the pathway to relinquish the mining leases.	- DRG are to inform all parties on the next steps. - DRE suggested that HI and CSR meet with the Mines Safety Regulator. - CSR to issue withdrawal of mining leases application on Lot 7314, when Deed of Agreement is executed.
Environmental Protection	27/02/2018	Email correspondence	Clarified the estimated tonnes of	Based on the estimated tonnages (125,000

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
Authority (EPA)			- soil extracted from the ground. - Clarified the need for an EPL for extractive industries.	tonnes of cut and 125,000 of fill) it was determined that an Environment Protection Licence will be required for Stage 1 works.
	06/03/2018	Phone conversation	- Advised that anything in the standard SEARs that may not apply needs to be justified in the EIS (i.e. flooding requirements) - Recommended that the project engineers and environmental consultants contact the OEH flood team directly.	The project environmental consultants will contact the EPA flood team directly.
	05/04/2018	Phone conversation	- Seeking confirmation about level of flood modelling - EPA interested in the probable maximum flood (PMF) and asked that we address the PMF level in comparison to the hospital.	- Confirmed that we should not need detailed flood modelling based on the position off the floodplain. - Surface water report to include a PMF comparison. - EIS to provide a concluding statement justifying the level of assessment undertaken and why detailed flood modelling for the site was not undertaken or justified.
Hunter Water	24/05/2018	Email correspondence	Clarified the staged approach to the development and what was included in each stage	N/A
NSW Office of Environment and Heritage (OEH)	17/08/2017	Meeting	Inform OEH of biodiversity assessment undertaken to date (GHD, general flora and fauna).	OEH agreed that previous surveys would likely be adequate as they have been undertaken in the last 5 years.

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			- pitt&sherry informed OEH that it is undertaking a biobanking assessment to determine biobanking requirements using the existing Framework of Biodiversity Assessment (FBA 2014) and that a Biodiversity Assessment Report (BAR). - Man-made ponds and their exclusion from the biobank assessment. - Discussion of biobank options.	- Due to the large amount of work already completed ('substantial commencement') transitional arrangements could apply and the BAR using the existing FBA are considered suitable. - OEH suggested P&S include plot data for the man-made ponds and plantings in the BAR for OEH review to confirm the validity of their exclusion in the biobank assessment.
Hunter Development Corporation	02/03/2018	Meeting	Introducing Proposal and staged approach.	N/A
NSW Police Service	06/04/2018	Meeting	- Introducing Proposal and staged approach. - Safe mental health handover process. - NSW Police confirmed they will handover Mental Health patients to the Mental Health unit on site and not at the Emergency Department. - Parking	- NMH proposes to provide the same mental health services as the existing Maitland Hospital. - NSW Police require space for parking two Police vehicles near the new ED Ambulance Parking zone. This will be considered in Stage 2 detailed design.
Rural Fire Service (RFS)	26/04/2018	Phone conversation	- Introducing Proposal and staged approach. - Requirement for a perimeter road - Discussions about using for engineering options such as reinforced turf in lieu of a fire trail.	- HI will need to demonstrate appropriate access is available around the whole perimeter to provide access for fire fighting vehicles. - Access will be addressed in Stage 2 detailed design.

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			Car parks provide access but burning cars can present their own challenges, the car parking areas may require their own APZ's.	If we are required to construct perimeter roads or provide additional APZ from the carpark, this would potentially increase vegetation clearing and require amendment to the biodiversity assessment and offset calculations.
Roads and Maritime Services (Roads and Maritime)	8/07/2017	Meeting No. 1	- Previous traffic report is out of date and a new one needs to be completed. - Seeking letter of approval from Roads and Maritime for SSI Declaration. - Purpose of meeting was the discussion of the planning pathway and approvals process for road upgrades. - Scope – hospital vs Health precinct. - Noted additional traffic in the area due to Bypass and Green Hills Shopping Centre. - Discussed constraints and indicative program	- Seek clarification from DP&E about what advice they require from RMS for SSI Declaration. - RMS to consider its support and provide a response to Dept. Planning within 2 weeks. - At this time only planning for the hospital. Health precinct should not be considered. - Agreed that HI would provide some high-level traffic flow information to assist RMS in understanding the scale of impact created by the new facility
	07/08/2017	Meeting No. 2	- Discussed DP&E concerns. - Discussed scope, size, scale and nature of the project. - Roads and Maritime has been asked to undertake a technical review of the area and to confirm in high level the extent for	- Roads and Maritime need a Preliminary Traffic Assessment that includes: - SIDRA modelling. - Copies of electronic files. - Regional Upgrades required and feasibility. - Traffic report should comment on whether future traffic flows could be

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			additional upgrades and solutions. - Chelmsford roundabout will operate at capacity prior to NMH operation and impact of hospital is expected to contribute to this. - Modelling scope. - Pedestrian and bike pathways. - Road capacity issues may prevent development of the rest of the Metford Triangle.	accommodated through expansion of existing road networks, and that HI need to demonstrate this potential expandability of the network. - GTA to provide RMS with a preliminary Traffic Impact Assessment. - Additional modelling to be undertaken on the Raymond Terrace Road and Chelmsford / New England Highway Intersections. - GTA to look at MCC planning for growth area sub division planning to the North of the site. - Seek Greenhills Traffic report/ Raymond Terrace North and data from MCC Planning Department.
	17/08/2017	Meeting No. 3	- Purpose of the meeting was to have GTA present their preliminary traffic assessment. - Notes changes in traffic growth due to Hunter Expressway, Green Hills Shopping Centre. - Discussion of proposed upgrades - Sensitivity testing	- Metford Road/ Fieldsend Street - roundabout is preferred over signals. - Sensitivity Testing should include the Chisolm housing development. GTA to recast this data based on Chisolm housing development. - RMS confirmed that they agree with the proposed intersection and roundabout upgrades in theory.
	21/09/2017	Meeting No. 4 (DPE, GTA, Roads and Maritime and HI)	- Purpose of the meeting was to: - Address RMS concerns from the previous meeting	- DPE is comfortable in that all issues / concerns have been addressed. - Roads and Maritime are also comfortable with this approach and

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			○ Have GTA present the responses to RMS's letter issued to DPE • Have DPE state that there are no further items that require addressing.	acknowledge that future planning on the site will form part of a different planning pathway. • GTA to add in further details based on Roads and Maritime requests. • Roads and Maritime / GTA to share traffic count survey information. • Look at wider Network and Solutions and associated funding models. • HI and Roads and Maritime to work through additional issues in preparation lodgement.
	12/03/2018	Meeting No. 5	• Introduce government lead model instead of private-public partnership. • Noted that Roads and Maritime growth outputs show Chelmsford Drive/ New England Highway and Chelmsford Drive / Metford Road roundabout at capacity prior to opening of the hospital. • Roads and Maritime do not have analysis on the intersections and primary approach paths to Stockland Green Hills Shopping Centre (GHS). • Funding for upgrades discussed.	• Considering the current road works and ongoing opening of the GHS development stages it would not be worthwhile reviewing until after it is completed later this year (June 2018). • Roads and Maritime will facilitate traffic discussions with Maitland City Council. • It was discussed and agreed that: ○ The base model, principles and inputs are to be reviewed and agreed in Stage 1. ○ to defer detailed analysis of the relevant intersections and mid-block capacity to Stage 2 once GHS is completed. HI to

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			Upgrade design for Metford / Fieldsend Roundabout.	confirm this commitment in Stage 1 submission. - Roads and Maritime to review GTA base model. - Roads and maritime to provide feedback on Metford / Fieldsend Roundabout design.
	21/03/2018	Meeting No. 6	- Advised that Roads and Maritime were satisfied with modelling on Metford Road but would like further modelling along Hunter New England Highway. - A micro simulation model was suggested to determine the percentage increase in traffic generation from multiple sources. - Opportunities for alternate funding include reallocation of contributions from neighbouring residential developments, or a separate Business Case and State Infrastructure Contributions (SIC).	- Further modelling will be undertaken on the Hunter New England Highway during Stage 2. - Microsimulation would only be required as supporting documentation for any application for alternate funding streams. - All agreed the following deliverables for Stage 1 would be acceptable: - Agreed base model - Agreed increase in traffic volumes by 2022 - Agreed parameters/acceptable levels of performance - Identification of pinch points in the traffic network - Stage 1 EIS notes further modelling will be required for Stage 2 EIS. - Council and Roads and Maritime to meet and review growth percentage allowances within Roads and Maritime model.
	30/04/2018	Meeting No. 7	Responding to Roads and Maritime comments on the NMH traffic report.	No agreement on how the Chelmsford/ Metford roundabout upgrade will be financed. HI would like

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
			- Agreed Chelmsford/ Metford roundabout need upgrading. - Pedestrian safety on Metford Road discussed. - SIDRA vs microsimulation models - New England Hwy intersection analysis.	- to take a collaborative approach. - Roads and Maritime confirmed microsimulation was not required. - HI to undertake additional modelling utilising the SIDRA model of New England Hwy intersection as part of stage 2. Roads and Maritime will complete the traffic survey.
	29/5/2018	Meeting No. 8	Discussion on NMH traffic report issued.	- Agreed to next meet in August 2018, when RMS survey data for New England Highway intersection and Chelmsford Road / Metford Road Roundabout, to inform Stage 2. - MCC in principle support for Chelmsford Road Roundabout concept design. - MCC agreed to implement strategies to preserve parking for sports field patrons west of Metford Road and also Fieldsend Street.
Transport for NSW (TfNSW)	15/03/2018	Meeting	- Providing public transport infrastructure within the NMH grounds. - Requirements to ensure that bus services can operate within the internal road network. - Altering some existing routes to include NMH. - Provision of draft guidance documents once finalised.	- Bus capable infrastructure is preferred. - Requirements provided for Stage 2 detailed design. - Recommended that HI have the internal road design approved by TfNSW - A preliminary assessment suggests Hunter Valley Bus Routes 181 and 189 could be diverted into

Stakeholder	Date	Details of Engagement	Key Aspects	Outcome
				the hospital whilst retaining the existing routes.
	10/04/2018	Written correspondence from TfNSW	- Detailed basic requirements to ensure bus services can be provided within the internal road network. - Recommended that HI have the internal road design approved by TfNSW. - Identified potential routes that could incorporate NMH.	- Design requirements will be considered during Stage 2 detailed design. - Will consult further with TfNSW during Stage 2.

5.4 Maitland City Council

HI and LHD have held a number of meetings with Maitland City Council (MCC) to discuss the development. Numerous meetings have been held at the MCC office between March 2017 and May 2018 which have been attended by representatives from MCC and HI. Table 5-2 includes the key concerns raised by MCC during this extensive engagement period.

Table 5-2 Key concerns raised by MCC during engagement

Key Concern	Outcome of Engagement
Water Main Upgrade - Position of pipe and connection point - Council works already occurring in the area	The Water Main Concept Design was to be updated to relocate the pipe in the foot path area. Water Main Concept Design incorporates the water main works with the works Council being undertaken on Fieldsend Street. MCC did want to see the water main works coordinated with their work to upgrade Fieldsend Street and it was agreed that MCC to would undertake the water main upgrade works on HI's behalf.
Traffic and Transport – Accuracy of traffic modelling. Council were concerned that with all the new residential developments as well as the Green Hills Shopping Centre whether the model would be up to date.	Roads and Maritime provided GTA Traffic consultants with outputs for the Maitland area from their Strategic Traffic Forecasting Model (STFM). These outputs included forecasted mid-block traffic volumes for 2021, 2026, and 2031, accounting for the growth in traffic volumes as result of the development of the surrounding areas. Using these volumes, the growth rates for the individual links near the site were calculated and applied to the GTA surveyed 2017 traffic volumes. HI has also committed to further modelling and analysis of the New England Highway utilising a SIDRA model during Stage 2 of the SSI application. The modelling will be completed in Stage 2 to capture the final stage of the Stockland Green Hills Shopping Centre opening.

Key Concern	Outcome of Engagement
Traffic and Transport – Effect of NMH on New England Highway intersection	RMS and HI will work on the modelling of the New England Highway utilising the existing SIDRA model during July / August 2018 for submission as part of the Stage 2 EIS
Traffic and Transport – Identification of road network at capacity and the additional strain the hospital would cause.	Impacts on traffic and transport were covered in a presentation from GTA to council and with the traffic section of the EIS (Section 8).
Traffic and Transport – Concern about parking and the impact of the facility on the Fieldsend Oval.	The exact number of car parking spaces will be determined during Stage 2 however NMH will comply with the recommended range of parking spaces. The impact on parking at Fieldsend Oval and nearby roads will be greatly affected by the fee structure of the hospital parking which will be determined during stage 2. MCC agreed to implement strategies to preserve parking for sports field patrons west of Metford Road and also Fieldsend Street.
Traffic and Transport – Loss of parking on Fieldsend Street to accommodate the new access point for the NMH and maintain pedestrian safety.	Consideration for the Council Depot Carpark to be used by the public on weekends was granted provided that HI provide a pedestrian foot path from the Council Depot car park up to the oval, this work is being undertaken during the Enabling works and does not form part of this EIS.
Traffic and Transport – Chelmsford Drive/Metford Road roundabout upgrade Council raised the need for an upgrade as the intersection is nearing capacity and Roads and Maritime have identified this intersection as the primary ‘pinch-point’.	The Chelmsford Drive/Metford Road roundabout works and Metford Road path will be undertaken by HI separate to the subject Stage 1 SSI Application and will be assessed under Part 5 of the EP&A Act, and the provisions of <i>State Environmental Planning Policy (Infrastructure) 2007</i>. The final design of the Chelmsford Drive/Metford Road roundabout and Metford Road footpath will be developed between MCC and HI.
Traffic and Transport – Chelmsford Drive/Metford Road roundabout upgrade funding Council have not allocated a budget for this.	HI have committed to undertaking these works as part of the project.
Civil Works (Enabling Works) Local bus companies should be consulted about the works as buses use this route Give consideration for the possibility of future road widening.	Local bus companies have been consulted during the planning process regarding the impact of the works on routes and ensuring that the upgrade is suitable for bus movements. The setback from the Hospital footprint to Metford Road is on average 70m. This will allow for potential future road widening works on the southbound side of Metford Road.

Key Concern	Outcome of Engagement
Community engagement Community concern and emotion regarding the closure of the old hospital, and this may need to be considered in community engagement.	NMH will replace the current Maitland Hospital. At this stage the ongoing use of the existing hospital buildings is unknown and will be considered by Government Property NSW.
Community engagement Ensure that meaningful community engagement is carried out	HI noted that stakeholder engagement was underway, and an extensive engagement process was planned (refer section 5.6). MCC recommended using Maitland Business Chamber as a forum. Maitland Business Chamber and other Business Chambers in the area were contacted to offer a presentation / questions and answer session in order to obtain feedback on the proposal from specific groups (refer Section 5.2).
Heritage DA condition relating to the heritage items that were salvaged from the Metford Triangle. Approval was given for the DA to demolish the brickworks on the basis it would at a later date be incorporated into the hospital development.	It was agreed that heritage will be considered within the artwork strategy of the Stage 2 detailed design.
Pedestrian Traffic – MCC noted that the potential pedestrian traffic NMH will generate needs to be better understood.	The roundabout at NMH entrance has been designed with suitable pedestrian accessibility and this had been supported by MCC.
Staged Approval Process	MCC advised they are comfortable that their concerns discussed above will be worked on in Stage 2 and are happy for HI to include conditions/commitments within the Stage 1 EIS that they will continue to undertake regular engagement with MCC and there will be further discussions and analysis relating to MCC concerns.

5.5 Aboriginal Consultation

Umwelt Australia Pty Ltd. (Umwelt) have undertaken Aboriginal community consultation in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW 2010). The purpose of consultation is to assess the cultural significance of Aboriginal objects, places and landscapes. The process occurs in four stages which are documented in **Appendix J** and summarised in Table 5-3 below.

Table 5-3 Summary of Aboriginal Heritage Consultation undertaken

Stage	Date	Method of Engagement	Activity
Stage 1 – Notification and registration of interest	27/05/2017	Advertisement in Newcastle Herald	An advertisement was placed in the newspaper for Aboriginal people who hold cultural knowledge to register an interest in the Proposal.
	29/05/2017	Advertisement in Maitland Mercury	An advertisement was placed in the newspaper for Aboriginal people who hold cultural knowledge to register an interest in the Proposal.
	30/05/2017	Written notification	Letter/emails requesting identification of parties who hold cultural knowledge relevant to site. This was sent to: The National Native Title Tribunal, NTS Corp, Hunter Local Land Services, Office of the Registrar, The Office of Environment and Heritage (OEH) (Newcastle Regional operations), Upper Hunter Shire Council and Wanaruah Local Aboriginal Land Council.
	21/06/2017	Written notification	Letters/emails sent to Aboriginal parties identified by OEH providing notification of assessment and opportunity to register interest for consultation.
From the above investigations, 35 Aboriginal parties were identified and contacted. Registrations of interest were received by 25 of the parties. Following the SSI Declaration (inclusion of Part Lot 401) the modified ACHAR was provided to the registered Aboriginal parties for review and comment (see details below)			
Stage 2 & 3 – Info about the proposal and assessment approach	26/06/2017 to 07/07/2017	Written notification of methodology	Methodology was send to the registered Aboriginal parties for comment. The project received 13 responses. All parties who responded agreed with the methodology.
Stage 3 – Cultural significance of Aboriginal objects and places	07/08/2017	Written notification	Expressions of Interest (EOI) were sent to all registered Aboriginal parties for the opportunity to attend an archaeological and cultural heritage survey on 25/08/2017. The 12 registered parties that provided a complete EOI were invited to attend the survey and onsite meeting.
	25/08/2017	Site visit and survey	Nine representatives from eight organisations attended the site visit. The eight organisations were: Murra Bidgee Mullangari; Cacatua Services; AGA Services; Divine Diggers Aboriginal Cultural Consultants; Gidawaa Walang Cultural Heritage Consultancy; Lower Hunter Aboriginal Incorporated; Lower Hunter Wonnarua Cultural Services;

Stage	Date	Method of Engagement	Activity
			Mindaribba Local Aboriginal Land Council; and Wallagan Cultural Services.
Stage 4 – Review of draft Aboriginal cultural heritage assessment reports	06/10/2017	Written notification	A copy of the draft Aboriginal Cultural Heritage Assessment Report (ACHAR) was provided to all registered Aboriginal parties with an invitation to review and comment on all aspects of the document. Five parties provided comments on the ACHAR. All parties wither supported the information provided or agreed with the recommendations of the report.
	23/02/2017	Written notification	Following the SSI Declaration (inclusion of Part Lot 401) the modified ACHAR was provided to the registered Aboriginal parties for review and comment. No comments were received.

5.6 Community Engagement

Engagement with community stakeholders has been an ongoing process since 2013. Key engagement activities during that time are described in this section.

Engagement relating to health-related stakeholders of the NMH Proposal has been undertaken by Hunter New England (HNE) Health. This included engagement with the HNE Health Board, key clinical staff, the District's peak committees, Directorates and services. Broader staff input on the Proposal was also sought via news articles in the District's Chief Executive News with community and stakeholder forums held during 2013 and 2014.

Specific stakeholder engagement that was undertaken during preparation of the Final Business Case for the new hospital included the following:

- Engagement with local clinical staff and management from February to April 2013 and substantial input from community representatives during this time.
- Engagement to inform the Project Vision and Brand with key clinical staff, community representatives and HNE Health executive in May 2014.
- Engagement with over 280 key clinical staff, stakeholders and executive between June and July 2014.
- A Community and Stakeholder Forum event in March 2014 with a follow up scheduled for November.

Following on from the Final Business Case, specific engagement was undertaken and included the following:

- Engagement with over 280 key clinical staff, stakeholders and executive in September 2016, March 2017, July 2017 and during March – May 2018.
- Community Drop in Session on 19 October 2016.
- Numerous letter box drops and flyers to Community Members since November 2016.
- Presentations to Country Women's Associations, Lions Club, Maitland Mercury, Maitland Local Health Advisory Committee, Local Member, Maitland City Council Mayor and Local Schools during the months of November 2016 and December 2016.

- Ongoing engagement and meetings with key government agencies including RMS, OEH, Department of Primary Industries and Resources and Maitland City Council.

5.6.1 Drop-in Session

Health Infrastructure and the HNELHD held a Community Information drop-in session at Stockland Green Hills Shopping Centre in East Maitland on the 19 May 2018. Residents and businesses located in close proximity to the NMH and the existing Maitland Hospital were invited through a letter box drop which distributed roughly 1,000 flyers (Flyer 1). The general community were invited via advertisements in the local papers (The Maitland Mercury and Hunter Star) prior to the first session.

This Drop-in session was held at a public venue (a busy local shopping centre on a Saturday) and allowed residents the opportunity to seek clarity on aspects of the Proposal but also provided an opportunity for the wider community to weigh in. The drop-in session gave HI a good understanding of the key community concerns.

The drop-in session included display boards of the clinical services offered by the NMH and the concept design, a flyover of the Proposal site displayed on a laptop, laminated displays from the architectural masterplan, a Proposal specific factsheet, a pamphlet on 'How to Build a Hospital' and a Proposal feedback form for community members to fill out. The drop-in session had two representatives from HNE LHD, one representative from Health Infrastructure and one environmental representative from pitt&sherry available to answer community questions. It is estimated that several hundred people were consulted throughout the day although only 30 members of the public submitted formal feedback.

Flyer 1, the project factsheet and the project feedback form are provided in **Appendix L**.

Formal feedback

Key concerns

The feedback form prompted residents to rate their level of concern/interest of several anticipated issues as well as giving the option to specify any other concerns not listed. The seven listed issues were:

1. Traffic, parking and public transport
2. Hospital design
3. Noise impacts during construction
4. Noise impacts during operation
5. Biodiversity (flora and fauna) impacts
6. Clinical service offerings
7. The ongoing use of the existing Maitland Hospital

The results of formal engagement are shown in Figure 5-3. Figure 5-3 shows that 100% of respondents considered traffic, public transport and parking either very important or somewhat important, 77% of respondents were concerned about clinical services provided by NMH and approximately 47% of respondents were concerned about the future of the existing Maitland Hospital and Hospital design.

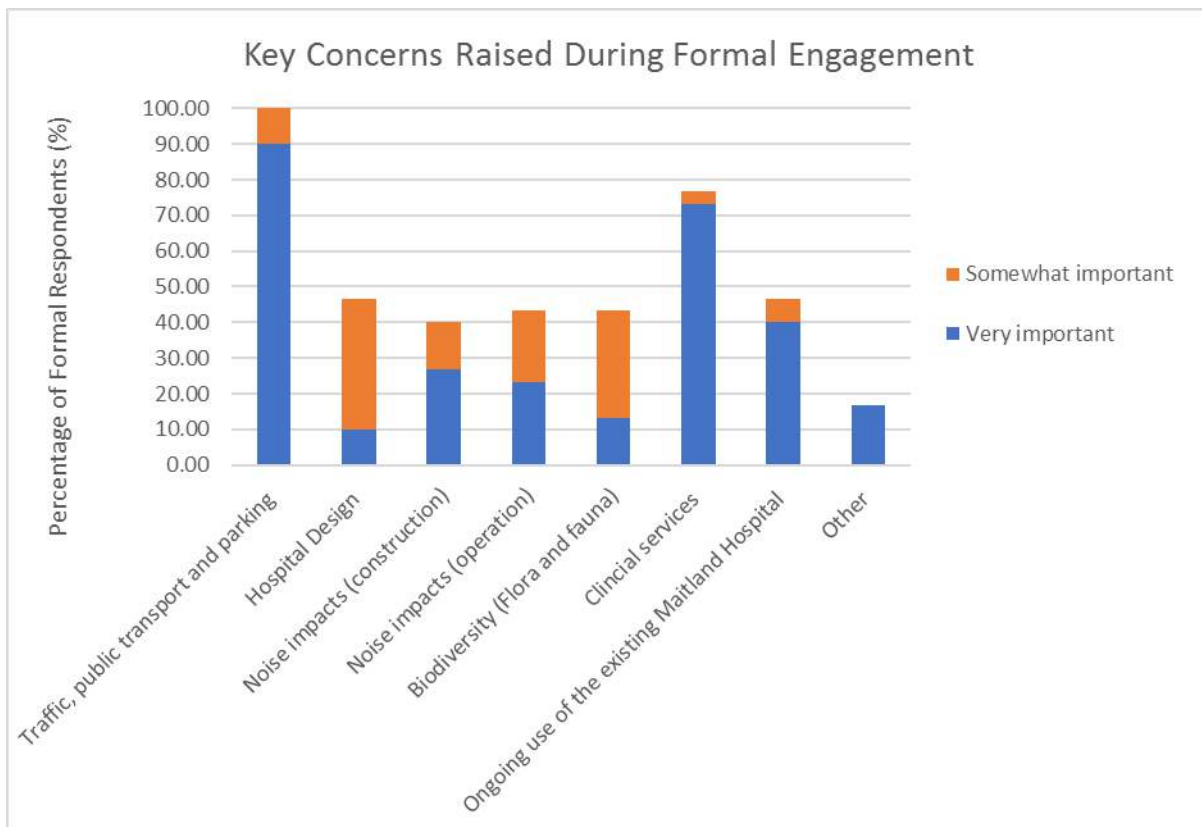


Figure 5-3 Graph of key concerns raised by the community through formal engagement (feedback forms). Other concerns include: helicopter noise, parking fee structure, access, a railway station for NMH and hospital ownership and operation (government owned and operators).

Residential demographics

Of the 30 respondents who submitted formal feedback 50% of respondents came from Metford or Morpeth, 20% came from Thornton, Beresfield, Woodbury, Tenambit or Chisholm and approximately 14% came from Ashtonfield, Louth Park or East Maitland and approximately 10% came from other locations (refer Figure 5-4).

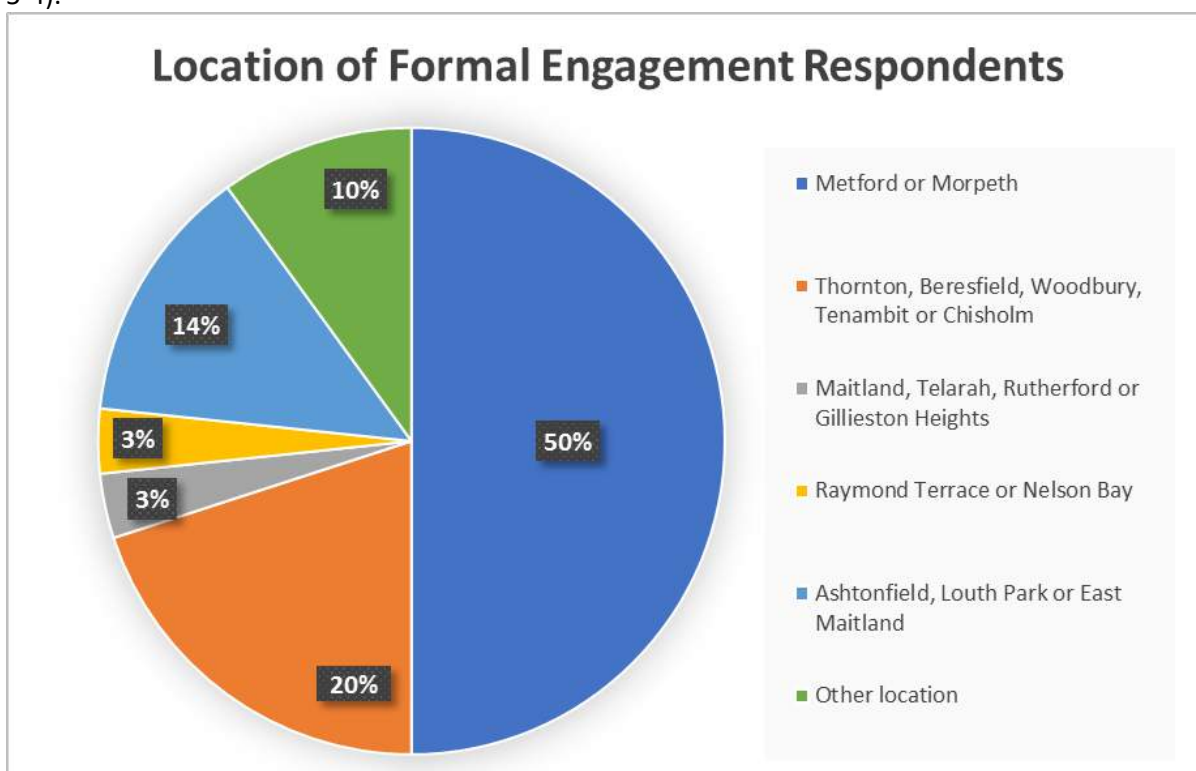


Figure 5-4 Graph of the percentage of formal engagement respondents from each location

100% of respondents from Metford or Morpeth considered noise, traffic, public transport and parking very important, 60% considered clinical services very important, and 47% considered noise during operation as very important.

Approximately 67% of respondents from Thornton, Beresfield, Woodbury, Tenambit or Chisholm considered traffic, public transport and parking very important, approximately 67% considered clinical services very important, and approximately 33% considered hospital design, operational noise and biodiversity somewhat important.

100% of respondents from Ashtonfield, Louth Park, or East Maitland were concerned about traffic, public transport and parking, clinical services and the ongoing use of the existing Maitland Hospital.

Informal feedback

General feedback from the community during the drop-in session was positive and excited about the opening of the NMH and the employment opportunities that the hospital will bring to the area during construction and operation. However, there were several reoccurring concerns: Traffic, public transport, parking, hospital design and operation, ongoing use of the existing Maitland Hospital, types of clinical services offered by the hospital, helicopter noise, accommodation for patients, visitors, carers and family, employment opportunities and the future of the other areas of the Metford Triangle. Table 5-4 summarises the key informal feedback comments and HI responses.

Table 5-4 Key issues raised during informal communication with community members during the drop-in session

Issues raised	Response
Traffic	
Impacts of additional traffic on Metford Road and Chelmsford Drive which already experiences bad congestion during school pick up and drop off times.	HI has committed to funding the following as part of the project: - Creation of the Fieldsend Road/ Metford Road intersection - upgrades to Chelmsford Drive/ Metford Road intersection (which will be designed in consultation with Roads and Maritime and Maitland City Council) - New England Highway Traffic Modelling using a SIDRA model during Stage 2 detailed design.
One access road isn't enough, need a secondary access road for public traffic.	At this stage only one vehicular access point for the general public is proposed as this reflects the traffic modelling that has been undertaken.
Rumour that an access road will be built through Stockland Avenue	There will not be a secondary access road through Stockland Avenue. Access via the southern boundary of the site is restricted due to an existing electricity easement and the endangered ecological community (EEC) located in the south-western corner of the site.
Difficulty getting off the Hunter New England Highway (signals are not long enough) this could cause problems for people using that road to get to the NMH.	Health Infrastructure has committed to conducting further modelling along the Hunter New England Highway during Stage 2 detailed design to determine the impact of the hospital on this road and the intersection with Chelmsford Drive. Roads and Maritime have agreed to undertake the survey work at this location to inform the model.
Any road upgrades need to consider future growth and associated increase in traffic	Traffic impacts have been modelled to 2032 and have included traffic impacts from the planned residential developments at Thornton and Chisholm, as well as the Stockland Green Hills Shopping Centre. Road upgrades have been recommended based on these results.

Issues raised	Response
Parking	
Will there be sufficient parking? Includes parking for patients, staff, carers and visitors	At present the concept hospital will have a multi-storey car park on the eastern elevation for staff and long-term patients and a single level short stay car park on the western elevation for short stays and visitors. The exact number of car spaces will be determined during Stage 2 detailed design however detailed design will ensure that the number of spaces are within the range recommended for the size of the hospital and the type of services being provided.
What is the fee structure of the NMH parking area?	Parking cost structure is yet to be determined however it should be noted that paid parking arrangements could create a demand for street parking in the local area and this should be examined further, if required, during Stage 2 of the SSI application.
Parking fee structure should consider free passes for chemo or long-term stays and seniors discounts.	Parking cost structure is yet to be determined. This should be examined further, if required, during Stage 2 of the SSI application.
Parking on Fieldsend Oval on Saturdays – how will the project ensure that this is not impacted by users of the Hospital?	Parking cost structure is yet to be determined however it should be noted that paid parking arrangements could create an impact on parking at Fieldsend Oval. This should be examined further, if required, during Stage 2 of the SSI application. However, the intent is that parking surrounding the oval is preserved for sports field patrons.
Public Transport	
What public transport services will be available for access to the NMH?	The proposed NMH includes an on-site bus stop for incorporation into Hunter Valley bus routes. HI have consulted with TfNSW who have recognised an opportunity to revise the network structure and alter some route designs to accommodate the NMH if the appropriate infrastructure is provided. A preliminary assessment suggests Hunter Valley Bus Routes 181 and 189 could be diverted into the hospital whilst retaining the existing routes. The NMH will need to consult with the Hunter Valley bus operators to facilitate the inclusion of the NMH proposed bus stop into the bus network.
Many people have expressed their desire for a new train station at NMH considering its role as a rural referral hospital.	At this stage there is no plan to build a new train station or move an existing one. Victoria Street Railway Station is located approximately 1.4km north-west of the Site and Metford Railway Station is located approximately 1.5km from the Metford Road / Fieldsend Street intersection.
Consider walkway access from Victoria Street train station direct to the hospital.	The pedestrian connections within the NMH site will be designed to connect with Council's proposed pedestrian and bicycle shared path along Fieldsend Street that is currently under construction. By providing a connection to Fieldsend Street, the NMH site will be maximising the opportunity for cyclists to connect to the Victoria Street Railway Station.
Clinical Services	
What clinical services will be offered at the NMH?	New Maitland Hospital will offer a wide range of health services closer to home including: Emergency department

Issues raised	Response
	• Chemotherapy • Surgical • Critical care beds including intensive care • Maternity • Paediatrics • Medical services • Mental health • Rehabilitation • Palliative care • Inpatient beds • Outpatient clinics
Specific clinical services the public were interested in were: • Podiatry • Angiograms • Renal dialysis • Mental health services	The services provided were listed on one of the information boards. It was explained that Maitland would perform a District Hospital role within the broader Hunter New England Health network, which also includes John Hunter Hospital.
(IBIS) – Mental health unit on Morisset Campus, rumour that this facility will be closing.	This is not being considered as part of this project.
Hospital operation	
When will the hospital be operational?	The hospital is expected to be open to the public in early 2022, however this is subject to timing of planning approvals.
Confusion about whether the hospital is public or not, whether it will be run by the government	The NMH will be owned and operated by the NSW Government.
Hospital operation feedback: The majority of the community that were spoken to on the day were pleased that the hospital would be fully public however some think an opportunity for a hospital with a higher level of service was missed by rejecting a partnership approach.	
Hospital Design	
Is the hospital big enough? Concerns that the hospital (esp. the emergency department) won't be big enough to accommodate the expanding population.	The size of the development has been designed in order to accommodate for the population to at least 2031. The Metford Triangle location was selected to provide the NMH with the ability to expand in future giving it the capacity to accommodate future change.
Concerns about areas for patient rehabilitation, these areas should be protected from wind tunnels and require solar access.	The design of the building has been developed in consideration of all of the site constraints including solar access and prevailing winds.
Hospital design feedback: The majority of the community that were spoken to on the day liked the hospital design but would like to know more about the facades, bed numbers, landscaping and the materials used for the hospital. This information will be finalised during Stage 2 detailed design.	
Metford Triangle	
Other areas of the Metford Triangle (Lot 266) are being used for walking and recreational activities. Will these areas be maintained?	Lot 266 will not be affected by the NMH.

Issues raised	Response
What will happen to the rest of the Metford Triangle? Concerns it will become a residential development instead of a health precinct.	Lot 7314 DP1162607 was purchased by NSW/HAC. The other lots will be returned to the NSW Department of Industry (Crown Lands) once CSR have completed their mining rehabilitation work and relinquished their mining leases. The Draft Greater Newcastle Metropolitan Plan has designated the Metford Triangle as a health precinct. It is anticipated that the NMH will be the first step in the development of the Metford Triangle. The land within the triangle is not appropriately zoned for residential development.
Employment opportunities	
What local trade involvement is expected for NMH construction?	The NMH will have a positive employment impact during construction. The contract with the successful construction company will include a minimum requirement for local industry participation and training.
How will locals get involved and tender for jobs? • Health • Construction Operation (cafes and franchises)	Health Infrastructure will be managing the tenders for the construction in line with NSW Procurement guidelines and promotes construction companies to participate in industry engagement sessions during early procurement. The contracts for café operations will be managed by HNE LHD.
Will employees be transferred, or will they have to reapply for their jobs	Employees will be transferred from the existing Maitland hospital to the NMH.
<i>Employment opportunities feedback</i> The community were happy about that new job opportunities would be coming to the area in construction and health related services particularly students who have new job opportunities available for them when they graduate. The community reacted positively to the opportunities for developing a skilled health workforce locally.	
Existing Maitland Hospital	
What will happen to the existing Maitland Hospital?	It is expected that the NMH will replace the current Maitland Hospital. At this stage the ongoing use of the existing hospital buildings is unknown and will be considered by Government Property NSW.
The existing Maitland Hospital should remain open.	The existing Maitland Hospital buildings were assessed in 2013 as unable to provide contemporary models of care and are not easily adapted for re-use. The overall condition of the buildings, while safe and operational, were considered to be of fair or poor condition. As such the health services available at the existing Maitland Hospital will move to the NMH once it is operational.
Noise	
Concerns from noise from helicopter activities	Initial estimates are that there may be an anticipated three emergency flights per month or 36 flights per year. Whilst the helicopter operations are expected to be minimal the Concept Design has reduced noise impacts by locating the HLS as far as practicable from nearly noise sensitive receivers and

Issues raised	Response
	establishing flight paths that minimise the impact from low level flight over sensitive receivers. The potential noise impacts of the helicopter operation will be further addressed in the Stage 2 SSI application once the HLS and flight path details are finalised.
Noise from construction	There will be noise impacts upon residents and businesses during construction. However, none of the modelled worst-case scenarios exceed the 'highly noise affected' criteria and construction would be largely carried out within standard construction hours.
Noise from hospital operation	Initial noise modelling has identified that operational activities associated with NMH would result in a permanent increase in localised noise levels, particularly for residences and other sensitive receivers located close to the site. Operational noise will need to be considered and mitigated during Stage 2 detailed design.
Noise from construction, operation and helicopter facilities affecting shift workers who sleep during the day	There will be noise impacts upon residents during construction however the noise impacts do not exceed 'highly noise affected' criteria. A Construction Noise Vibration Management Plan (NVMP) will be prepared by the Contractor as part of the CEMP and this NVMP will include mitigation measures to reduce impacts of construction noise. Operational noise will need to be considered and mitigated during Stage 2 detailed design. Sleep disturbance from helicopter noise is considered to be minimal considering the limited number of movements anticipated (average three per month)
Environment is already noisy from the rail line, model flying club and sirens from the nearby fire station.	The operation of the hospital would result in a permanent increase in localised noise levels. Operational noise will need to be considered and mitigated during Stage 2 detailed design.
Accommodation	
Provision of self-contained, flexible accommodation (not cottages) for families/patients/carers	This is being considered by HNE LHD outside of the project scope.
Availability for accommodation for patients, family, visitors and corporate travellers. The existing Maitland Hospital had a nearby hotel.	This is being considered by HNE LHD outside of the project scope.
Environmental and cultural aspects	
Loss of trees and visual screening. Can we limit the number of trees to be removed	Tree removal is required for the hospital disturbance area but also for the mandatory APZ requirements for bushfire protection. Clearing for the APZ would comprise selective canopy removal to an open woodland/woodland structure similar to a park. The APZ zone would have no overlapping canopies, mid storey removal and partial groundcover removal. The NMH has been situated in the north-west corner of Lot 7314 to minimise vegetation removal and HI have committed to

Issues raised	Response
	supplementary planting along the southern border as well as committing to biodiversity offsetting requirements to compensate for the unavoidable loss of vegetation at the site.
How will the Hospital incorporate sustainability aspects?	The NMH has considered sustainability aspects these are detailed in section 22.3 of the EIS.
Effects on native fauna specifically asked about Black cockatoos and Australian Wood ducks	The habitat of this fauna was outside of the project footprint and zone of influence.

5.7 Media

Following the announcement of the NMH Proposal in 2013, a website and email address were established for the Proposal. The email is still active (HNELHD-NewMH@hnehealth.nsw.gov.au) and the website was active until 2017 but has now been replaced by (www.hnehealth.nsw.gov.au or <http://www.hnehealth.nsw.gov.au/about/Pages/New-Maitland-Hospital.aspx>) and a new website is in planning. The email address and website were publicised, are displayed on the project signboard, and made available to enable stakeholders and community members to provide feedback on the proposal and ask questions.

NSW Health has distributed multiple media releases about the NMH since 2013 to keep the public informed of the progress of the development (example media releases are provided in **Appendix L**).

Various newspaper articles featuring the NMH were published by the Newcastle Herald, the Maitland Mercury, the Daily Telegraph, the Sunday Morning Herald and several other papers during preparation of the EIS.

The community drop-in session was advertised in two local papers during the week prior to the drop-in session, one was advertised in the Maitland Mercury and one in the Hunter Star.

5.8 Summary of Actions

Table 5-5 below outlines the actions taken to date in response to issues or concerns raised by stakeholders and the Maitland LGA community during engagement. HI will continue to engage with stakeholders throughout the remainder of the Stage 1 approvals process and on into Stage 2 detailed design. Many of the identified issues are relevant to the detailed design and will be considered by HI at this time.

Table 5-5 Summary of actions taken to date to address key issues raised during engagement

Issue	Actions	Outcome
Traffic	HI commissioned a detailed traffic impact assessment (TIA) which identified the following upgrades: - Metford Road / Chelmsford Drive intersection upgrade - Increasing the number of circulating lanes on the east and south side of the roundabout to two lanes - Provision of an additional 50-metre lane on the Chelmsford Drive east	See TIA in Appendix F. In response to traffic concerns from the community, in particular Metford Road and Chelmsford Drive, HI have committed to the following road upgrades: - Metford Road / Fieldsend Street upgrade - Metford Road / Chelmsford Drive intersection upgrade

Issue	Actions	Outcome
	approach and Metford Road north approach. - Metford Road/ Raymond Terrace Road roundabout - It is recommended that all the short approach and departure lanes be extended to a minimum of 100 metres, with exception of the Raymond Terrace Road north exit being increased to 200 metres. Engagement with sensitive receivers prompted a review of the Traffic Impact Assessment, to ensure concerns raised have been addressed.	The treatments for Metford Road / Chelmsford Drive intersection upgrade will be determined in consultation with Maitland City Council and Roads and Maritime Services. HI have also committed to undertaking further traffic modelling along New England Highway once the final stage of the Stockland Green Hills Shopping Centre is complete. The analysis will be completed using the SIDRA modelling and will be included in Stage 2 of the staged infrastructure application of the proposed NMH.
Parking	Engagement with sensitive receivers prompted a review of the Traffic Impact Assessment, to ensure concerns raised have been addressed.	See TIA in Appendix F. The concept design for the NMH contains a multi-storey car park to the east of the main hospital building for staff and long-term patients as well as a single level car park to the west of the hospital for short term stays and visitors. The exact number of car spaces and the fee structure of the car parking facility will be determined during stage 2 detailed design. However detailed design will ensure that the number of spaces are within the range recommended for the size of the hospital. Additionally, as the land surrounding the hospital is a greenfield site there is capacity to add additional parking facilities to the east of the hospital if required.
Public Transport	HI have consulted with TfNSW to determine whether there is an opportunity to add NMH to existing routes or to alter the network structure. HI have also consulted TfNSW regarding the infrastructure requirements for a bus service (e.g. Internal road to provide safe and efficient access for buses [built with 3.5m travel lanes and swept path analysis conducted by a 14.5m non-rear steer bus])	In response to the community's desire for a method of public transport for the NMH an onsite bus stop has been incorporated into the NMH design. A preliminary assessment suggests Hunter Valley Bus Routes 181 and 189 could be diverted into the hospital whilst retaining the existing routes. Further actions The NMH will need to consult with the Hunter Valley bus operators to facilitate the inclusion of the NMH proposed bus stop into the bus network.

Issue	Actions	Outcome
Visual impact	HI commissioned view analysis for all six identified viewpoints.	See the view analysis in the Architects design documents (Appendix K) Supplementary planting will be undertaken prior to opening of the hospital within the approximately 0.4 hectare predominantly cleared area along the southern boundary of Lot 7314 to provide extra visual screening for residents.
Construction Noise	Engagement with community members during the drop-in session prompted a review of the Noise Impact Assessment, to ensure concerns raised have been addressed.	The Noise Impact Assessment has addressed concerns through implementation of construction restrictions such as strict operating hours. Refer Appendix M.
Operational Noise	Engagement with community members during the drop-in session prompted a review of the Noise Impact Assessment, to ensure concerns raised have been addressed.	The Noise Impact Assessment has provided an initial assessment of operational noise and identified the key noisy activities that will need to be considered during detailed design. Refer Appendix M. Stage 2 detailed design will consider: • Positioning mechanical plant away from nearby receivers • Screening around mechanical plant • Acoustic insulation within duct work.
Helicopter Operations Noise	Engagement with community members prompted a review of the helipad location, to ensure concerns raised have been addressed.	HI has reduced the noise impact from helicopter noise as much as possible by situating the helipad in the north-east corner of the disturbance area creating a large buffer distance between sensitive receivers and the helicopter landing site (HLS).
Effects of vegetation loss on native fauna	HI commissioned several biodiversity (flora and fauna studies) including an independent peer review to ensure that concerns about native fauna have been addressed. The ecologists have consulted with NSW OEH to be advised on biodiversity offsetting and mitigation measures.	Biodiversity studies are provided in Appendix E. HI has reduced the loss of native vegetation as much as possible by sitting the Hospital in the north-west corner of Lot 7314 to minimise the impacts to the ironbark forest situated in the south-west corner and along the southern boundary.

Issue	Actions	Outcome
		HI has also committed to offset this vegetation loss by one of the following methods: • Purchase of land with suitable plant community types (PCTs) to establish a Biodiversity Stewardship Site. The proposed removal of 2.45 hectares of habitat would likely require approximately 10-14 hectares of forested land. • Purchasing ecosystem and species credits on the biobank public credit register. • Making a payment into the Biodiversity Conservation Fund (BCF).
Public vs private vs not-for-profit	Different delivery models were considered in order to increase the level of service of the hospital.	In response to community concerns, the NMH will be a fully public hospital which is government owned and operated.

5.9 Changes in Design

Through the development of the Proposal several changes were made to optimise preliminary design and minimise impacts on the local community. These changes included:

- Movement of the NMH footprint to the north-west corner of Lot 7314 to create a suitable buffer distance between the residences and the hospital and users of Metford Road and the hospital.
- Movement of the NMH footprint to the north-west corner of Lot 7314 to maximise the use of available space and allow for future expansion.
- Movement of the NMH footprint to the north-west corner of Lot 7314 to reduce the amount of vegetation clearing of Lower Hunter Spotted Gum Ironbark Forest (LHSGIF) whilst still meeting APZ requirements.
- Traffic modelling was undertaken to determine road upgrade requirements (refer to traffic section of the EIS section 8)
- Conducting a view analysis for each viewpoint to allow visualisation of potential outcomes.
- Supplementary planting to increase the level of visual screening and reduce fragmentation of habitat.
- Consideration of setback distances. The setback from the Hospital footprint to Metford Road is on average 70m. This will allow for potential future road widening works on the southbound side of Metford Road

5.10 Ongoing Community Engagement

The NMH is a staged development. The engagement activities described above are only those undertaken for Stage 1 Early works. Further engagement will be undertaken for Stage 2 Detailed design.

6. Planning Context and Regulatory Framework

This chapter outlines the strategic and statutory planning framework that applies to the Proposal. It addresses the matters for consideration set out under SEARs 1 and 2 – Concept Proposal.

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation) provide the framework for assessment and approval of development and activities in NSW and are further outlined in Section 6.3.1.

6.1 Consistency with Strategic Planning Framework

In accordance with SEARs, the following strategic planning policies have been considered in the assessment of the proposal:

- *NSW State and Premier Priorities*
- *Hunter Regional Plan 2036*
- *Draft Greater Newcastle Metropolitan Plan*
- *Draft Future Transport Strategy 2056 and supporting documents*
- *Draft Greater Newcastle Future Transport Plan*
- *Planning Guidelines for Walking and Cycling*
- *Healthy Urban Development Checklist, NSW Health*
- *Better Placed – An integrated design policy for the built environment of NSW 2017*

Consistency with the relevant goals contained to the above strategic policies is discussed below.

6.1.1 NSW State and Premier Priorities

The NSW State and Premier Priorities are a series of reforms designed to grow the economy, deliver infrastructure, and improve health, education and other services across NSW.

The key NSW state priorities are:

- Strong budget and economy
- Building infrastructure
- Protecting the vulnerable
- Better Services
- Safe Communities

The priorities more specifically relating to the NMH include:

- Building infrastructure
- Improving service levels in hospitals
- Cutting waiting time for planned surgeries

The proposed NMH redevelopment will deliver State health infrastructure that will help to reduce waiting times for planned surgery by improving capacity, allowing for greater integration of services, and creating greater efficiencies by incorporating state of the art facilities and equipment.

The proposal will create temporary job opportunities in manufacturing, construction and construction management during the project's construction phase of works, and job opportunities in health and

administration at the project's completion. The proposal will create jobs and apprenticeships for the construction sector through government infrastructure. The proposal is forecast to generate up to 1,250 jobs over the construction phase. In addition, the proposal will facilitate the growth and support of a skilled, competent and capable health related workforce in the Region. The NMH is likely to have up to 1,000 full time equivalent staff upon operation.

The project will contribute to achievement of:

- Jobs closer to home
- Increased business investment in rural and regional NSW
- Increased business investment.

NSW Making it Happen also includes priorities for the Regions, such as building infrastructure in the Hunter Region. The proposed development of NMH is identified as a priority infrastructure project for the Region.

6.1.2 Hunter Regional Plan 2036

The Hunter Regional Plan (DP&E, Oct 2016) (HRP) outlines the NSW Government's vision, goals and actions for the sustainable growth of this Region to 2036. The aims of the HRP is to guide the delivery of homes, jobs, infrastructure and services to support the growing and changing needs of the Hunter. The Plan acknowledges that infrastructure investment is needed to create jobs and housing, and to support the provision of services.

The proposal is consistent with the overarching vision for the Region in the HRP, including:

- Beyond Greater Newcastle are vibrant centres, towns and villages, many of which have benefited from emerging job opportunities in the health, agriculture, tourism, defence, energy and transport sectors.
- Infrastructure investment is the linchpin of economic development across the Hunter. It supports freight, health and education services, and agribusiness and tourism, as well as building resilience to global economic cycles and climate change.

Specifically, the Proposal is consistent with Action 8.5 of the HRP which contemplates a health precinct and hospital at the Metford Triangle site and Action 26.2 which supports the enabling of health facilities in the Region. It is expected that the NMH will be a catalyst for the development of the Metford Triangle Health Precinct into the future.

The HRP includes that the Hunter has the largest share of both regional population and regional employment and is located in the State's fastest growing corridor – from the northern edge of Sydney to Newcastle. The HRP forecasts that the population of Maitland will increase by 26,650 people over the next 20 years and a projected increase of 6,476 jobs. The existing Maitland Hospital facility cannot support the predicted population growth and change in the type of services needed to provide contemporary health care.

The proposed NMH will resolve the constraints of providing modern health to the growing Region and provide opportunities to develop a health campus that will meet the needs of the Region, including in terms of skilled employment, well into the future.

6.1.3 Draft Greater Newcastle Metropolitan Plan

The Draft Greater Newcastle Metropolitan Plan (dGNMP) sets out strategies and actions that will drive sustainable growth across Cessnock City, Lake Macquarie City, Maitland City, Newcastle City and Port Stephens communities.

East Maitland is identified in the dGNMP as the location for an emerging health precinct centring around the Metford Triangle. The site for the Stage 1 and Concept Plan application for the NMH is on Lot 7314 and Part Lot 401. In accordance with the strategic planning framework for the Region, the proposed hospital sits

within the identified health precinct (see Figure 6-1). It is anticipated that the proposed NMH will be a catalyst for the development of the triangle ensuring that the vision for the area is realised in accordance with the higher order strategic planning documents guiding the development of East Maitland. On an ongoing basis, the HNELHD will appropriately work with Maitland City Council, Transport for NSW, RMS and DP&E to develop a Health Master Plan for the East Maitland Hospital and Health Precinct.

Consistent with the desired outcomes for East Maitland identified in the dGNMP, the proposal has been designed to protect the environmental values of the site. The concept design maintains the iron bark forest on the south-western, south and eastern perimeters of the site as both a natural feature and also a buffer between the NMH and the existing residential development to the south of the site. Some vegetation clearing will be required to accommodate the APZ (refer Section 16) this will include thinning of the forest and removal of undergrowth within 70m of the hospital façade (refer Figure 4-3). A detailed Biodiversity Assessment has been prepared as part of this EIS (refer Section 10 and Appendix E).

The areas of the site that have been subjected to mining activity will be rehabilitated as part of this redevelopment to establish native vegetation by re-introducing native species endemic to the area.

Small scale retail and community services that supports the needs of hospital workers and visitors to the precinct will be included in the Stage 2 – detailed design application.

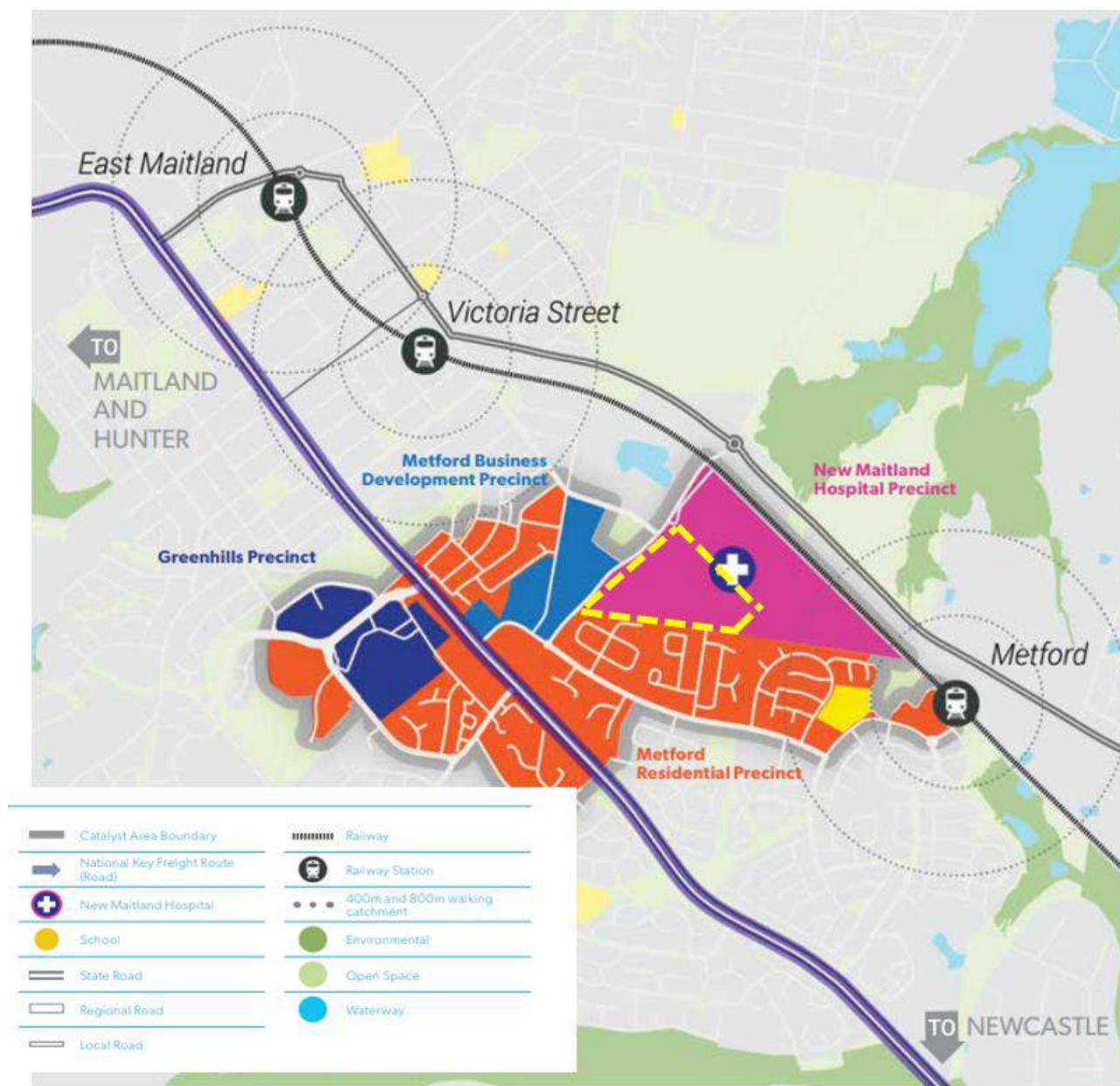


Figure 6-1 Health precinct identified in the draft Greater Newcastle Metropolitan Plan (dGNMP), extract of figure 15 of the dGNMP (NB: the dashed yellow line is the approximate location of the site for the NMH).

6.1.4 Draft Future Transport Strategy 2056 and supporting documents

The Draft Future Transport Strategy (dFTS) 2056 sets the vision, state-wide directions and headline initiatives that will deliver the outcomes framework for transport in NSW and will guide transport investment over the longer term. It will be delivered through a series of supporting plans, such as the draft Greater Newcastle Future Transport Plan (refer to Section 6.1.5). A key outcome for the plan is to “support successful places” by creating a transport network across the State that better connects regional cities and centres and will increase access to regional jobs, services and education. Improved transport will broaden the catchment of the Greater Newcastle area and improve access to services such as the NMH.

The Concept Proposal has been designed to:

- Create movement networks for people and their various forms of transport.
- Ensure the NMH includes a clear and interconnected set of movement networks that accentuate key site access points and fit with the public transport network and pedestrian infrastructure. Health Infrastructure have commenced engagement with TfNSW and bus operating companies (refer Section 8)

in order to include the NMH within existing transport networks. Additionally, several road upgrades have been suggested to create better connectivity to the NMH (refer Section 8.6).

- The Traffic Impact Assessment prepared by GTA Consultants (refer **Appendix F**) provides details on the pedestrian, cycling and public transport options available to provide sustainable transport infrastructure to the Proposal. A work travel plan is also provided in **Appendix F** which also includes ways to promote active travel. These strategies are summarised in EIS Section 8 and are proposed as mitigation measures in Section 25.

6.1.5 Draft Greater Newcastle Future Transport Plan

The Draft Greater Newcastle Future Transport Plan (dGNFTP) provides the overarching strategic transport network and vision that will guide future transport planning for the Greater Newcastle area. It is a 'Supporting Plan' for the Draft Future Transport Strategy 2056 (see Section 6.1.4 above).

A specific initiative of the dGNFTP is to: *Address pinch points in the road network and inform the program of road network optimisation improvements*. To ensure the best value of money is spent on transport services and infrastructure, the level of service provided should meet the demand for those connections. To ensure that an appropriate level of transport services and infrastructure for the role of the NMH is provided, a traffic impact assessment has been commissioned which includes a level of service analysis and recommended transport upgrades.

In consultation with RMS and MCC, HI has committed to undertaking road improvements to the Chelmsford Road and Metford Road roundabout. These upgrades will be designed to accommodate the forecast background traffic growth in the area as well as the NMH development. These intersection works will be undertaken by HI separate to the subject Stage 1 SSI Application and will be assessed under Part 5 of the EP&A Act and the provisions of *State Environmental Planning Policy (Infrastructure)* 2007.

Refer to section on the Draft Greater Newcastle Future Transport Plan in the Transport Impact Assessment (TIA) at **Appendix F**. Other transport-related strategies are discussed in the TIA.

6.1.6 Planning Guidelines for Walking and Cycling

The Planning Guidelines for Walking and Cycling aims to improve consideration of and prioritise walking and cycling to create more opportunities for people to live and work in places with easy walking and cycling access to urban services and public transport. The Plan came into force to reflect the change in culture where individuals were using bicycles as a more frequent mode of transportation.

In accordance with the principles of Planning Guidelines for Walking and Cycling:

- A work travel plan is also provided in **Appendix F**, aims to reduce the environmental impact of travel to and from the development and includes measures to encourage and provide support for walking, cycling, public transport and car sharing, while reducing dependence on private vehicles and parking.
- The pedestrian connections within the NMH site are being designed to connect with Council's proposed pedestrian and bicycle shared path along Fieldsend Street that connects to Victoria Street Station.
- Bicycle parking and change/shower facilities will be provided to encourage staff to cycle or run to the hospital (this will be detailed at Stage 2).
- Shelters along walkways or near bus stops and street lighting will be considered during Stage 2 Detailed Design.

6.1.7 Healthy Urban Development Checklist

The Healthy Urban Development Checklist (HUDC) aims to assist health professionals to provide advice on urban development policies, plans and proposals. Prepared by NSW Health, the HUDC seeks to ensure built

environments are created within New South Wales that are sustainable and promote healthy habits. The proposal satisfies a range of items contained to the checklist, including:

Physical activity – response:

- Opportunities will be provided for encouraging physical activity through the provision of bicycle parking facilities.
- The pedestrian connections within the NMH site are being designed to connect with Council's pedestrian and bicycle shared path along Fieldsend Street that connects to Victoria Street Station.
- Concept planning for the creation of a landscaped forecourt for the use of staff and visitors.

Transport and physical connectivity – response:

- Alternative transport systems have already been identified and consultation is ongoing with TfNSW and bus operators to create availability of public transport to the NMH.
- The Traffic Impact Assessment prepared by GTA Consultants (refer **Appendix F**) provides details on the pedestrian, cycling and public transport options available to provide sustainable transport infrastructure to the Proposal.
- A work travel plan is also provided in Appendix F which also includes ways to promote active travel.
- These strategies are summarised in EIS Section 8 and are proposed as mitigation measures in Section 25.

Community safety and security – response:

- Stage 2 – detailed design - CCTV will be provided in high risk areas including lifts, lift lobby, payment machines, boom gates, car park entrance and exits.
- External lighting will be provided to meet the Australian Standard for lighting for crime prevention.
- Refer to Section 4.3 - Stage 2 detailed design will be further refined by the CPTED Principles.

Public open space – response:

- There will be access to green space for use by staff and visitors through the creation of landscaped public areas such as a forecourt.
- The proposed public spaces will be subject to detail design at Stage 2 and will be safe, accessible, attractive and easy to maintain. Lighting will be provided that require low maintenance.

Social infrastructure – response:

- The proposed development provides access to a range of facilities to attract and support a diverse population, as the development will provide public health care services, and provide educational and training facilities.
- The development will be designed to be accessible.
- The development responds to current and project community needs in terms of health care provision and provides for early delivery of social infrastructure.

Environment and health – response:

- The NMH will be appropriately landscaped and this will be considered during Stage 2 detailed design. The remnant areas of the ironbark forest in the south-western corner of the site will be retained minus the necessary APZ requirements.
- Noise impacts have been addressed in a noise impact assessment (**Appendix M**).
- Air quality impacts have been addressed in the air quality report.

- The Proposal is subject to bushfire. Relevant APZ and other bushfire prevention requirements have been included as mitigation measures in EIS Section 16.4.
- A flooding assessment has been completed however the site is not subject to this potential hazard.
- The sitting of the helipad as indicated in the Concept Design is to the north east of the proposed hospital away from residential properties to the south of the site.

The proposal will enable the development of the NMH. The proposed development will replace the current Maitland Hospital and provide increased service capacity and complexity. The proposal is consistent with the intent of the Healthy Urban Development Checklist by providing a new development that contributes to social infrastructure in the locality and region, promotes equitable access to resources and will facilitate cycling and pedestrian accessibility.

6.1.8 Better Placed – An Integrated Design Policy for the Built Environment of NSW 2017

The Better Placed Policy includes seven key considerations in the design of the built environment. Consideration of these seven considerations and relevance to the Concept design section of the Proposal is undertake in below, detailed consideration of policies will be addressed in Stage 2 Detailed Design.

Table 6-1 Better Placed Guidelines in relation to NMH

Objectives	Objective Description	Comment
1) Better Fit – Contextual, local and of its place	Good design in the built environment is informed by and derived from its location, context and social setting. It is place-based and relevant to and resonant with local character, heritage and communal aspirations. It also contributes to evolving and future character and setting.	The NMH has demonstrated a response to the local landscape setting by locating the building footprint to the northern sector of the site. The NMH has respected the importance and character of the iron bark forest on the south-western sector of the site and has maintained the majority of this zone both as a natural feature and also a buffer between the new Hospital development and the existing residential development to the south of the site. The NMH is consistent with the identified future character of the area as being part of the Metford Triangle Hospital and Health Precinct. It is expected that the NMH will be the catalyst for further, considered precinct planning of the area. The NMH will generate benefits to the existing community by providing public health services to the local and regional community. Stage 2 detailed design will consider the incorporation of a heritage interpretation strategy (to be informed by the former brickworks located within the Metford Triangle).

Objectives	Objective Description	Comment
2) Better Performance – Sustainable, adaptable and durable	Environmental sustainability and responsiveness is essential to meet the highest performance standards for living and working. Sustainability is no longer an optional extra, but a fundamental aspect of functional, whole of life design.	The development will investigate the following climate change design considerations during Stage 2 detailed design to minimise resource use (refer to EIS Section 22.4). This includes use of heat and water recovery system, the use of energy and water efficient equipment and shading and landscaped areas for user comfort during heat. The NMH has also considered sustainable transport refer EIS Section 8. The NMH will be able to provide the appropriate level of care with the ability to expand in the future giving it the capacity to accommodate future change.
3) Better for community – Inclusive connected and diverse	The design of the built environment must seek to address growing economic and social disparity and inequality, by creating inclusive and welcoming and equitable environments. Incorporating diverse uses, housing types and economic frameworks will support engaging places and resilient communities.	The Proposal is a public hospital and is able to provide public health services to all members of the local and regional community.
4) Better for people – Safe, comfortable and liveable	The built environment must be designed for people with a focus on safety, comfort and the basic requirement of using public space. The many aspects of human comfort which affect the usability of a place must be addressed to support good places for people.	The Proposal has considered Crime prevention through environmental design (CPTED) to ensure a safe environment for the public and functionality such as separate access roads for emergency vehicles versus private and heavy vehicles. These are addressed at Section 4.3 of this EIS. The landscaping of the NMH will include open public paved areas for use as passive recreation and external seating zones. Human comfort in public areas can be achieved by introducing amenities such as seating and covers from the rain and sun.
5) Better working – Functional,	Having considered, tailored response to the program or requirements of a building or place, allows for efficiency and usability with the potential to adapt	The size of the development is required in order to accommodate for the population to at least 2031, there is also

Objectives	Objective Description	Comment
efficient and fit for purpose	to change. Buildings and spaces which work well for their proposed use will remain valuable and well-utilised.	room within the site to expand to accommodate future growth.
6) Better Value – Creating and adding value	Good design generates ongoing value for people and communities and minimises costs over time. Creating shared value of place in the built environment raises standards and quality of life for users, as well as adding return on investment for industry.	The NMH has significant social value as it will improve accessibility for patients and carers, increase equitable access to a range of public health services, enhance social cohesion due to the improved accessibility of health services in regional and rural area. Long term the NMH will seek to reduce operating costs by adopting energy efficient systems in heating, cooling, lighting and building management through an integrated building control system.
7) Better look and feel – Engaging, inviting and attractive	The built environment should be welcoming and aesthetically pleasing, encouraging communities to use and enjoy local places. The feel of a place, and how we use and relate to our environments is dependent upon the aesthetic quality of our places, spaces and buildings. The visual environment should contribute to its surroundings and promote positive engagement.	Building design including details such as landscaping, materials and finishes will be further considered during Stage 2 detailed design.

HI will work with the Office of the NSW Government Architect throughout the EIS process in relation to this Concept Plan and the future Stage 2 Detailed Design application, in order to demonstrate how high-quality design will be appropriately achieved, with reference to Better Placed – *An integrated design policy for the built environment of NSW*.

6.2 Consistency with Regulatory Planning Framework

6.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment (DoE) and provides a legal framework to protect and manage nationally important flora, fauna, ecological communities and heritage places defined as ‘*matters of national environmental significance*’ (MNES). Provisions of the EPBC Act also come into effect when the Proposal takes place on or affects Commonwealth land or waters where the development is carried out by Commonwealth agencies.

An action that ‘*has, will have or is likely to have a significant impact on MNES*’ is deemed to be a ‘controlled action’ and may not be undertaken without prior approval from the Commonwealth Minister, as provided under Part 9 of the EPBC Act.

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World heritage properties
- National heritage places
- Wetlands of International importance
- Listed nationally threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions including uranium mining
- Water resources in relation to coal seam gas or large mining development.

The purpose of a referral is to obtain a decision on whether the proposed action will need formal assessment and approval under the EPBC Act. An assessment of whether the proposed Project may have a significant impact on any MNES or on the environment of Commonwealth land has been undertaken.

This EIS has assessed the potential impacts of the Proposal and determined that the proposal is unlikely to impact on any MNES, therefore a referral will not be made to the Commonwealth Minister for the Environment.

An EPBC Protected Matters Search was conducted in 17 October 2017, using a 10km buffer. The search found that the following have the potential to occur within 10km of the site.

Listed Threatened Ecological Communities

Three threatened ecological communities (TECs) listed under the EPBC Act have been recorded within a 10km radius of the site.

- Central Hunter Valley eucalypt forest and woodland
- Lowland Rainforest of Subtropical Australia
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

None of the three TECs have been recorded on the site and thus would not be impacted as a result of the proposal.

Nationally Listed Threatened Species

A total of 62 threatened species listed under the EPBC Act have been recorded or have suitable habitat within a 10km radius of the site. A total of four fauna species have been recorded or are considered as possible occurrences on Lot 7314 and Part Lot 401, these being:

- Spotted-tail Quoll
- Grey headed Flying Fox
- Swift Parrot
- Regent Honeyeater.

All four species are wide ranging and would be unlikely to be exclusively reliant on-site habitats for their life cycle requirements. The proposal would result in a small loss of potential foraging habitat for these four taxa.

A number of listed Threatened flora species are considered as possible occurrences on the site (including *Acacia bynoeana*, *Grevillea parviflora subsp parviflora*, *Rutidosia heterogama*, *Tetratheca juncea*, and *Cryptostylis hunteriana*). These threatened species have been targeted in previous site investigations (GHD, 2012; General Flora and Fauna, 2014) as well as in a recent Biobank assessment (pitt&sherry, 2017) and have not been detected. As such, these taxa are not considered to be present on the site and are thus unlikely to be impacted by the proposal.

Nationally Listed Migratory Species

A total of 48 migratory species listed under the EPBC Act have been recorded or have potential suitable habitat within a 10km radius of the site.

Of the 48 listed Migratory species recorded within a 10km buffer distance from the subject site, a total of 15 migratory wetland species are considered as possible occurrences on Lot 7314 within the small man-made ponds.

Whilst limited potential habitat exists on Lot 7314 and Part Lot 401 for the above listed species, it is noted that much more expansive habitats exist within the Tenambit wetlands to the north in addition to the ephemeral and semi-permanent floodplain wetlands of the lower Hunter valley which would be expected to provide higher quality habitat for these wetland taxa. None of the subject species would be expected to be exclusively reliant on-site habitats and all are considered relatively wide-ranging species, none of which are at their limit of distribution at Metford. The retention of the HBTs recorded in the study area (and those recorded throughout the Metford Triangle from previous ecology surveys) as well as the minimisation of tree clearing associated with the APZ establishment would be expected to maintain movement corridors for the subject species throughout the greater Metford Triangle remnant.

Based on the above-described factors, the Proposal is not likely to result in a significant impact on the relevant subject species and thus a referral to the Commonwealth Department of Environment and Energy (DoEE) is not assessed as being required based on our interpretation of the guidelines.

6.3 New South Wales Legislation

6.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the principal piece of legislation covering assessment and determination of development proposals in NSW. It aims to encourage the proper management, development and conservation of resources, environmental protection and ecologically sustainable development. The development assessment and approval system in NSW is set out in Parts 4 and 5 of the EP&A Act.

The proposed hospital is subject to Part 5.2 of the EP&A Act (State significant infrastructure). HI is the proponent for the proposed NMH and preparation of an EIS is required.

The objects of the EP&A Act are addressed in the table X below:

Table 6-2 Objectives of the EP&A Act in relation to the NMH

Objective	Response
a) Promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources	The NMH promotes the social welfare and economic welfare of the community by providing: - Improved public health services at a suitable capacity and level of service within the HNELHD - Additional employment opportunities throughout construction and operation of the NMH.

Objective	Response
	The socio-economic impacts of the NMH are addressed in section 21. A detailed assessment of potential environmental impacts resulting from the proposed works is provided in section 8 to section 24 of this EIS. Any impacts (or potential impacts) resulting from the proposed works are addressed through mitigation measures detailed at section 25 of this EIS.
b) Facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment	Ecologically sustainable development in relation to the NMH is addressed in section 26.3.
c) Promote the orderly and economic use and development of land	The proposal promotes the orderly and economic use and development of the land by returning the land to public use and by replacing the existing Maitland Hospital with its outdated infrastructure with a modern Hospital that will be able to implement contemporary and improved models of care.
d) To promote the deliver and maintenance of affordable housing	N/A
e) Protect the environment including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats	During the site selection process, the location and design of the NMH were considered, such that it would avoid vegetated areas and create suitable buffer distances between sensitive receivers. Biodiversity impacts are assessed in section 10. Mitigation measures identified in section 10.5 of this EIS mean that the proposed works will have an acceptable biodiversity impact on the site and surrounding locality.
f) Promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)	Aboriginal and cultural heritage impacts are assessed in section 11 and section 12. The sustainable management of built and cultural heritage is promoted through: • The consideration of incorporating heritage items from the former brickworks as a feature of the site into Stage 2 detailed design • Surface collection conducted at site AHIMS# 38-4-1684 to salvage the artefact. These measures and those identified in the detailed assessment of heritage at section 11 and section 12 mean that the proposed works will have an acceptable heritage impact on the site and surrounding locality.

Objective	Response
g) Promote good design and amenity of the built environment	Built form and urban design is addressed in detail in section 4 and section 6.1. Environmental amenity including traffic, noise, visual amenity, and air quality are addressed in sections 8, 9, 17 and 18 respectively. These assessments demonstrate that the appropriateness of the built form has been assessed and environmental amenity has been considered during concept design and potential issues have been avoided during the initial concept design development stages. These aspects will be further considered in Stage 2 detailed design.
h) Promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants	A range of mitigation measures have been proposed at Section 25 of this EIS. Subject to these mitigation measures the proposed works will be capable of promoting the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants. These aspects will be further considered in Stage 2 detailed design.
i) Promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State	N/A
j) Provide increased opportunity for community participation in environmental planning and assessment	Community participation has been carried out prior to the lodgement of this SSI application and further consultation will be carried out during the public exhibition of the SSI. For details with respect to consultation carried out to date, refer to section 5 of this EIS.

Authorisations not required for approved SSI

Section 5.23 of the EP&A Act identifies authorisations that are not required for approved SSI. These are:

- Concurrence under Part 3 of the Coastal Protection Act 1979 of the Minister administering that Part of that Act
- A permit under Sections 201, 205 or 219 of the *Fisheries Management Act 1994*
- An approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977*
- An Aboriginal heritage impact permit (AHIP) under Section 90 of the *National Parks and Wildlife Act 1974*
- An authorisation referred to in Section 12 of the *Native Vegetation Act 2003* to clear native vegetation or State protected land
- A bush fire safety authority under Section 100B of the *Rural Fires Act 1997*
- A water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000*.

Authorisations required for approved SSI

Under Section 5.24 (1) of the EP&A Act, certain approvals that may normally be required for carrying out certain development ‘cannot be refused if it is necessary for carrying out approved State significant infrastructure...’, these being:

- An aquaculture permit under Section 144 of the *Fisheries Management Act 1994*
- An approval under Section 15 of the *Mine Subsidence Compensation Act 1961*
- A mining lease under the *Mining Act 1992*
- A production lease under the *Petroleum (Onshore) Act 1991*
- An environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in Section 43 of that Act)
- A consent under Section 138 of the *Roads Act 1993*
- A licence under the *Pipelines Act 1967*.

Land owner’s consent

Section 193 of Part 10 of the *Environmental Planning and Assessment Regulations 2000* (EP&A Regulations) provides owner’s consent and notification requirements for State Significant Infrastructure projects. The Clause states:

“The consent of the owner of the land on which State significant infrastructure is to be carried out is required for an infrastructure application or modification request unless the application or request relates to any of the following:

- (a) State significant infrastructure proposed to be carried out by a proponent that is a public authority*
- (b) critical State significant infrastructure*
- (c) State significant infrastructure comprising any one or more of the following:*
 - (i) linear transport infrastructure*
 - (ii) utility infrastructure*
 - (iii) infrastructure on land with multiple owners designated by the Secretary for the purposes of this clause by notice in writing to the person making the application or request”*

As the proposal, will be carried out by HI, a public authority, the consent of individual land owners will not be required to make the application. However, under Section 193 (4) of the EP&A Regulations HI will be required to give notice of the application:

- “(a) by written notice to the owner of the land before, or no later than 14 days after, the application or request is made*
- (b) by advertisement published in a newspaper circulating in the area in which the infrastructure is to be carried out:*
 - (i) in the case of an infrastructure application—at least 14 days before the environmental impact statement that relates to the infrastructure is placed on public exhibition*
 - (ii) in the case of a modification request—no later than 14 days after the request is made”.*

HAC have acquired Lot 7314 for the development of the NMH through compulsory acquisition and a notification letter was sent to Crown lands on 22 January 2018 (refer Section 5) to inform them of the inclusion of Part Lot 401 in the EIS.

6.3.2 Protection of the Environmental Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the Environmental Protection Authority (EPA) and includes provisions relating to the protection of the environment. One of the objectives of the Act is to protect, restore and enhance the quality of the environment in NSW, having regard to the need to maintain ecologically sustainable development. There are serious offences under this Act for

causing pollution of air, noise, water or land. The Contractor and NSW Health are obliged to notify OEH when a “pollution incident” occurs that causes or threatens “material harm” to the environment.

Schedule 1 of the POEO Act defines “Scheduled activities” for which an environmental protection licence (EPL) is required. Stage 1 of the NMH meets the definition of a scheduled activity pursuant to the following:

- Schedule 1, Clause 19 of the POEO Act: Extractive activities – Excavate, process or store more than 30,000 tonnes per year of extractive materials. The earthworks quantities are still being finalised but are currently estimated as approximately 80,000 tonnes of cut and fill. Should this occur within a year, the activities would meet the definition of a scheduled activity and an EPL would be required during Stage 1 construction works.

As such an Environmental Protection Licence (EPL) is to be obtained for Stage 1 of the NMH. The EPL application will be undertaken by HI in consultation with NSW EPA and will involve the submission of a Licence Application (Premises) form and licence application fee after Stage 1 works have been approved. HI will also submit any supporting documentation required such as, the likely impact of any pollution caused the scheduled activity and details of any mitigation measures that will be implemented. The proposal would operate under the conditions of an EPL which will provide adequate safeguards to control and prevent any offsite discharges of pollutants.

Activities associated with the NMH operation that may require an EPL will be address in the Stage 2 EIS however this could include:

- Helicopter-related activities (Schedule 1, Clause 20) – Helicopter-related activities with an intended use of more than 30 flights movements per week (take-off and landing are separate movements) within 1km of dwellings not associated with the activity, but not including an activity that is carried out exclusively for the purposes of emergency aeromedical evacuation, retrieval or rescue. The estimated number of helicopter movements per week for the NMH is approximately 3 flights per month and the majority of these would classify as being for emergency aeromedical evacuation, retrieval or rescue. As such, helicopter activities associated with the NMH would not constitute scheduled activities however this will be confirmed during Stage 2 detailed design.

6.3.3 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (NPW Act) provides the basis for the legal protection and management of Aboriginal sites within NSW. Sections 84 and 90 of the NPW Act provide statutory protection for any physical/ material evidence of Aboriginal occupation of NSW and places of cultural significance to the Aboriginal community. The key principles of the Act in relation to Aboriginal heritage are the prevention of unnecessary or unwarranted destruction of Aboriginal objects, and the active protection and conservation of objects which are of high cultural significance. It is an offence to knowingly disturb an Aboriginal object, irrespective of its nature or significance, without the prior consent of the Director-General of the NSW OEH. On the basis that the project is State Significant Infrastructure (SSI), this approval will not be required in accordance with Clauses 5.23 of the EP&A Act.

6.3.4 Threatened Species Act 1995

The *Threatened Species Act 1995* (TSC Act) provides for the protection for threatened plants and animals native to NSW and integrates the conservation of threatened species into development control processes under the EP&A Act. The TSC Act has been repealed however as HI has undertaken substantial environmental assessment for the EIS prior to when the *Biodiversity Conservation Act 2016* commenced transitional arrangements and the Framework for Biodiversity Assessment applies. The Secretary of DP&E determined in writing (letter dated 19 February 2018 and reissued 21 March 2018) that the proposed development constitutes an interim planning application under the Biodiversity Conservation (Savings and Transitional) Regulation 2017 and that the biodiversity assessment should be undertaken in accordance with the requirements of the TSC Act and the associated NSW Biodiversity Offsets Policy for Major Projects and the Framework for Biodiversity Assessment.

The proposed works would involve removal of vegetation; however, the landscape of the subject site has been heavily modified. Comprehensive surveys undertaken by GHD, General Flora and Fauna and pitt&sherry noted that vegetation within the Site was analogous to two “Endangered Ecological Communities’ (EEC’s) identified under Part 3 of Schedule 1 of the TSC Act 1995 – the Lower Hunter Spotted Gum Ironbark Forest and Hunter Lowlands Redgum Forest. The proposed development is unlikely to have an adverse effect on the extent of an ecological community such that its local occurrence is likely to be placed at risk of extinction.

As the proposal is a SSI project and as Planning Agency Head and the Environment Agency Head has not specified that the proposal is unlikely to have any significant impact on biodiversity values a Biodiversity Assessment Report (BAR) report must be prepared as part of the EIS (refer Section 10 and **Appendix E**).

HI must also consider threatened species, populations, ecological communities, habitat, key threatening processes, offsets and recovery plans in fulfilling its statutory responsibilities. The Proponent has a number of options available to meet their offsetting obligations as determined by the biobank assessment these are covered in Section 10 and **Appendix E**.

6.3.5 Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 (BC Act) aims to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act replaces the *Threatened Species Conservation Act 1995* (TSC Act) as the key piece of legislation that identifies and protects threatened species, populations and ecological communities in NSW.

Under clauses 27 and 28 of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* this proposal is to be assessed in accordance with the Framework for Biodiversity Assessment (FBA), given the SEARs have been issued and the field data has been collected under the FBA.

6.3.6 Heritage Act 1977

The Heritage Act 1977 (Heritage Act) provides for the conservation of items of environmental heritage in NSW. The Act defines heritage as items or places that are of state and/ or local heritage significance and include: places, buildings, works, relics, moveable objects and precincts. The Heritage Act establishes a register including an inventory and list of protected heritage items.

Under Section 170 of the Heritage Act government departments are required to establish and keep a register of heritage places under their control entitled the ‘*Heritage and Conservation Register*’.

There are no heritage listed buildings or items on the site. Approval to demolish the existing factory buildings on Lot 401 was granted by Maitland City Council in 2012 (Development Consent DA 11-1875). No other buildings exist on the site. As a consequence, there are no listed heritage items under the *Heritage Act 1977* that exist on the site or might be affected by site works.

A Heritage Assessment has been prepared as part of the EIS (refer Section 12 and **Appendix J**).

6.3.7 Rural Fires Act 1997

The requirement to obtain a Bushfire Safety Authority under s100B of the *Rural Fires Act 1997* is triggered for developments on bushfire prone land for a special fire protection purpose, which includes a hospital. On the basis that the project is SSI, this approval will not be required in accordance with Clause 5.23 of the EP&A Act.

However, it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land.

A Bushfire Assessment has been prepared as part of the EIS and outlines relevant bushfire protection measures (refer Section 16 and **Appendix C**).

6.3.8 Local Land Services Amendment Act 2016

The *Local Land Services Amendment Act 2016* replaces the *Native Vegetation Act 2003* and creates new rules for rural land clearing. Under the *Local Land Services Act 2013* (LLS), the Local Land Services statutory corporation is responsible for the management and delivery of local land services in the social, economic and environmental interests of the State.

The relevant objectives under the LLS Act for this development are to:

- Require decisions taken at a regional level to take account of State priorities for local land services
- Ensure the proper management of natural resources in the social, economic and environmental interests of the State.

The *Local Land Services Amendment Act No 64*, Division 3 prescribes the regulation of clearing of native vegetation in regulated rural areas. In Section 60(O) of the Act clearing of native vegetation in a regulated rural area is authorised if the clearing is authorised by a SSI approval under Part 5.2 of the *EP&A Act*.

6.3.9 Water Management Act 2000

The *objectives of the Water Management Act 2000* (WM Act) are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. The provisions of the WM Act are being progressively implemented in NSW, repealing various other pieces of legislation in the process. Under this Act, licences and approvals are required for certain activities and works, including dewatering excavations and groundwater interference.

Clause 38 of the *Water Management (General) Regulation 2011* specifies that a public authority does not need to obtain a controlled activity approval for any controlled activities that it carries out in, on or under waterfront land. The WM Act defines a public authority as a government department or administrative office which would include HI NSW.

The Proposal is within the area applicable to the *Water Sharing Plan (WSP) for the Hunter Unregulated and Alluvial Water Sources 2009*, prepared in accordance with the provisions of the WM Act. The WSP regulates the interception and extraction of unregulated and alluvial water sources within the defined area. Therefore, any interference and extraction of water within the proposal site generally requires a water access licence (WAL) under the *Water Management Act 2000*.

Section 5.23 of the *EP&A Act* states that approved SSI projects are exempt from various authorisations under the WM Act including a water use approval under Section 89, a water management work approval under Section 90 and an activity approval (other than an aquifer interference approval) under Section 91.

There are no proposed takes of groundwater for water supply and Maitland and Metford are not mapped within the Department of Primary Industries high priority Groundwater Dependent Ecosystem (GDE) map. Should the proposal require dewatering of excavations during construction, the proponent would liaise with Water NSW and obtain any required water licenses as any dewatering activity that is estimated to exceed 3 ML/yr must obtain a licence under Section 61 of the WM Act. This would be required prior to commencing any activity where a Water Sharing Plan is in place (as discussed above). Dewatering calculations would be required prior to any development of foundations by use of pilling. A permit for dewatering will be required

for interception of groundwater required for construction however it is noted that exemptions exist for temporary construction projects that involve a limited take of groundwater.

A hydrology, flooding and surface water assessment has been prepared as part of the EIS (refer Section 15 and **Appendix D**).

6.3.10 Water Act 1912

In those water sources (rivers, lakes and groundwater aquifers) in NSW where water sharing plans have not commenced, the Water Act 1912 still governs the issue of new water licences and the trade of water licences and allocations. Even though a water sharing plan may be in place, some of licencing provisions remain in force where the water source is not covered by a water sharing plan, such as water taken from the deeper rock strata.

As the proposal, does not intend to extract surface water or groundwater from the fractured rock aquifer the proposal does not require licensing or approvals under the *Water Act 1912*.

6.3.11 Public Health Act 2010

The objectives of the *Public Health Act 2010* are to protect and promote public health, control the risk to public health, promote the control of infectious diseases, prevent the spread of infectious diseases, and recognise the role of local governments in protecting public health. The *Public Health Act* requires doctors, hospital chief executive officers, and pathology laboratories to notify patients with certain medical conditions to the Secretary of the Ministry of Health.

During operation, the NMH will be required to comply with the *Public Health Regulations 2012*, especially in relation to disposal of human bodies, notification of diseases and control of swim and spa pools within the facility.

6.3.12 Roads Act 1993

The objectives of the *Roads Act 1993* are to set out the rights of the public to access and use public roads, to establish procedures for opening and closing public roads, to provide for the classification of roads, to confer function of carrying out road work on Roads and Maritime Services (Roads and Maritime) and on other roads authorities and to regulate the carrying out of various activities on public roads.

Section 138 of the *Roads Act* requires consent be obtained prior to disturbing or undertaking work in, on or over a public road. However, under Clause 5(1) in Schedule 2 of the *Roads Act*, public authorities do not require consent for works on unclassified roads and Metford Road is not a classified road.

A Traffic and Transport Assessment has been prepared as part of the EIS (refer Section 8 and **Appendix F**).

6.3.13 Crown Lands Act 1989

The *Crown Lands Act 1989* provides for the administration and management of Crown Land in the eastern and central divisions of NSW. Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the *Crown Land (Continued Tenures) Act 1989*. The Minister may grant a “*relevant interest*” such as a lease, licence of permit, over Crown Land for the purposes of any infrastructure, activity or other purpose that the Minister thinks fit.

Lot 7314 was Crown Land until its acquisition by HI, Part Lot 401 as well as the other surrounding lots that form the Metford Triangle (Lot 226 DP755237, Lot 401 DP755237 and Part Lot 3 DP 1091727) remain Crown Land. The signed Surrender Deed between CSR and HI allows access to Part Lot 401 and removes the obligation for a licence to use Crown Land.

6.3.14 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) includes provisions to list threatened species of fish and marine vegetation, including endangered populations, ecological communities and key threatening processes. If the proposal is likely to significantly impact on the threatened species, populations or ecological communities, then a species impact statement is required.

Under Part 7 of the FM Act, a permit is required for dredging and reclamation, obstruction of fish passage, harm to marine vegetation and use of electrical or explosive devices in a waterway. None of these activities would be undertaken for the proposed works and as such a permit is not required. The assessment of potential impact areas of likely fish habitat has been considered as part of the EIS.

6.4 Summary of external approvals/licenses potentially required

Based on the sections above the following external approvals or licences may be required for the NMH development (refer Table 6-3).

Table 6-3 Summary of approvals or licences that may be required for the NMH

Relevant Legislation	Authority	Stage	Approval Required
<i>Environmental Planning and Assessment Act 1979</i>	Department of Planning and Environment	Stage 1 SSI application	Development approval under Section 5.2 of the EP&A Act
<i>Protection of Environment Operations Act 1997</i>	NSW Environmental Protection Authority (EPA)	Stage 1 SSI application	Environment Protection Licence for Extractive Industries
<i>Protection of Environment Operations Act 1997</i>	NSW Environmental Protection Authority (EPA)	Stage 2 SSI application	Environment Protection Licence for Helicopter-related activities. (To be confirmed during Stage 2 detailed design)

6.5 Planning instruments and policies

6.5.1 State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (S&RD SEPP) is the prevailing environmental planning instrument (EPI) applying to the NMH Project.

Clause 15 states that development specified in Schedule 4 is declared to be SSI for the purposes of development assessment. Through the effect of Order 2017 No. 673, dated 28 November 2017, made under Section 5.12(4) of the EP&A Act, an amendment was made to Schedule 4 to the S&RD SEPP. The purpose of the order was to identify certain '*specified development on specified land*' within Lot 7314 and Part Lot 401 to be SSI. The criteria for development to be declared SSI under Schedule 4, for the Maitland Hospital Proposal and the proposed development's relationship to this schedule are confirmed in Table 6-4.

Table 6-4 Proposed Maitland Hospital development's relationship to Schedule 4, Part 5 of the State and Regional Development SEPP

Schedule 4, Part 2 requirement	Response
Development for the purposes of a health services facility and associated car park ...	The concept proposal is for a health services facility and associated infrastructure such as a car park and helipad.
... that has a capital investment value of more than \$100 million ...	Capital investment value (CIV) is defined in clause 3 of the EP&A Regulation as being: <i>'capital investment value of a development or project includes all costs necessary to establish and operate the project, including the design and construction of buildings, structures, associated infrastructure and fixed or mobile plant and equipment, other than the following costs':</i> • amounts payable, or the cost of land dedicated, or any other benefit provided, under a condition imposed under Division 6 or 6A of Part 4 of the Act or a planning agreement under that Division • costs relating to any part of the development or project that is the subject of a separate development consent or project approval • land costs (including any costs of marketing and selling land) • GST (within the meaning of A New Tax System (Goods and Services Tax) Act 1999 of the Commonwealth). The CIV for the NMH is commercial-in-confidence but has been provided separately to DPE as part of the documentation associated with lodgement of the SSI application.
... on land identified as being within the New Maitland Hospital Site on the State Significant Infrastructure Sites Map (being Lot 7314, DP 1162607 and part of Lot 401, DP 755237, Maitland).	The proposal is wholly on land that is mapped as the New Maitland Hospital Project as per the State Significant Development Sites Map – Maitland Hospital Sheet SSDS_001

6.5.2 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to enable the efficient delivery of infrastructure across NSW, provide a consistent planning regime for infrastructure, providing greater flexibility in the location of infrastructure and service facilities and identifying the environmental assessment category into which different types of infrastructure and services development fall.

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP), Division 10, Clause 57 states that *'development for the purpose of health services facilities may be carried out by any person with consent on land in a prescribed zone'*. A prescribed zone does not include either R2 Zone of the RE1 Zone as outlined in the LEP. While the proposed development is not consistent with the Infrastructure SEPP, the S&RD SEPP is the prevailing planning instrument that permits the proposed hospital with the approval of the Minister for Planning in accordance with Part 5.2 of the *EP&A Act*.

ISEPP, Division 17, Subdivision 2, Section 104 requires that development specified in Column 1 of the Table to Schedule 3 of this planning instrument must be referred by the consent authority to the NSW Roads and Maritime Service (Roads and Maritime) for assessment if the conditions under Column 2 or Column 3 of the Table are met. Roads and Maritime will comment on accessibility of the site, and any potential safety, congestion or parking implications.

As the Proposal is a 'Hospital' with 200 or more beds, to be located on land with access to any road, the development application will need to be referred to Roads and Maritime.

6.5.3 State Environmental Planning Policy (Mining, Petroleum, Production and Extractive Industries) 2007

The site is described as within an '*identified resource*' pursuant to Clause 7.5 of the Maitland LEP, meaning that it is land to which clause 13 of *State Environmental Planning Policy (Mining, Petroleum, Production and Extractive Industries) 2007* applies. Clause 13 requires that the consent authority consider whether or not the development is likely to have a significant impact on current or future extraction or recovery of materials.

The site ceased to operate as a clay mine and brickworks in 2006. The site is being remediated for the proposed health services facility use. There is no intention to recommence extraction related activities, nor are there any extraction related activities on surrounding land which will be affected. In their response to request for SEARs letter dated 31 January, the Division of Resources and Geoscience indicated they have no resource sterilisation concerns with the project.

6.5.4 State Environmental Planning Policy no.44 – Koala Habitat Protection

This Policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. This policy achieves this aim by:

- Requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat, and
- Encouraging the identification of areas of core koala habitat, and
- Encouraging the inclusion of areas of core koala habitat in environment protection zones.

The Maitland LGA has been identified within Schedule 1 of SEPP 44 as land to which the SEPP applies. No Koalas were observed during the site survey; however, two koala feed tree species are found on the site, including Forest Red Gum and Grey Gum. The number of individual trees of these species combined probably exceeds 15% of the number of native trees on the site. Therefore, the site is potential Koala habitat.

Steps are followed in State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) to determine if the site is "potential" or "core" Koala habitat. The site was found not to be a core Koala habitat. There are no current known records of koalas in Maitland therefore koalas have been assessed as having a low likelihood of occurrence. General Flora and Fauna completed targeted koalas survey in 2014 (refer **Appendix E**), no koalas or signs of koalas (scats or claw marks) were recorded.

6.5.5 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) was enacted to provide a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment. In accordance with clause 7(1) of SEPP 55, a consent authority must not consent to the carrying out of any development on land unless:

- a) It has considered whether the land is contaminated

- b) If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or would be suitable, after remediation) for the purpose for which the development is proposed to be carried out
- c) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land would be remediated before the land is used for that purpose.

A Site Audit Report has been issued for the site. The site is not the subject of a declaration, order, agreement, proposal or notice under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.

Contamination is addressed in Section 14 of this EIS.

6.5.6 NSW aquifer interference policy

The NSW Aquifer Interference Policy was finalised in September 2012 and clarifies the water licensing and approval requirements for aquifer interference activities in NSW.

The Policy outlines the water licensing requirements under the WM Act. A water licence is required whether water is taken for consumptive use or whether it is taken incidentally by the aquifer interference activity (such as groundwater filling a void), even where that water is not being used consumptively as part of the activity's operation. Under the WM Act, a water licence gives its holder a share of the total entitlement available for extraction from the groundwater source. The water access licence (WAL) must hold sufficient share component and water allocation to account for the take of water from the relevant water source at all times.

The NSW Aquifer Interference Policy requires that potential impacts on groundwater sources, including their users and GDEs, be assessed against minimal impact considerations, outlined in Table 1 of the Policy. If the predicted impacts are less than the Level 1 minimal impact considerations, then these impacts will be considered as acceptable.

The NMH's impact on groundwater resources have been assessed in Section 15. However, the surface water and groundwater assessment completed by GHD (refer **Appendix D**) concluded that based on current designs the NMH will be located above the existing water table and therefore groundwater is unlikely to be intercepted during construction or operation.

6.6 Local Environment Plans

6.6.1 Maitland Local Environmental Plan 2011

The Proposal is located within the Maitland Local Government Area (LGA) and the relevant local planning instrument is the Maitland Local Environmental Plan (LEP) 2011. As the proposal, will be assessed under Part 5.2 of the EP&A Act the consent and land use provisions of the LEP do not apply. Relevant provisions are discussed in Table 6-5.

Table 6-5 Relevant provisions of the Maitland LEP

Relevant objectives	Relevance to the Proposal
Land use zones.	The LEP designates the site of the proposed works is zoned as Rural Landscape (RU2). The objectives of this zone are: • To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. • To maintain the rural landscape character of the land. • To provide for a range of compatible land uses, including extensive agriculture. • To provide for a range of non-agricultural uses where infrastructure is adequate to support the uses and conflict between different land uses is minimised. “Health Services Facilities”, which includes “Hospitals” are prohibited in the zone under the Maitland LEP 2011 however, the declaration of development on the Metford Triangle site as SSI will overcome the existing land use prohibition and facilitate the orderly development of the land for the NMH. The proposal is immediately adjacent to areas with mixed zoning including Public recreation (RE1), Business Development (B5), General Infrastructure (IN1) and General Residential (R1). Whilst the site has been zoned rural landscape the site and surrounds have been used as a brick pit and have little rural landscape characteristics. The NMH is considered compatible because provides a non-agricultural use which will support surrounding land uses such as the residential and recreational land uses located nearby.
To provide for a range of non-agricultural uses where infrastructure is adequate to support the uses and conflict between different land uses is minimised (RU2 zone).	The future hospital would provide for a range of non-agricultural uses. The new land use will be complementary with residential areas as medical related services will now be within close proximity to residents and there will be minimal amenity issues once operational. Furthermore, the proposed development would serve a regional role in terms of providing health-infrastructure to residents within the Maitland LGA, as well as the Hunter region.
Acid Sulphate Soils.	The Site is within an area mapped as Class 5 Acid Sulphate Soils (ASS). Potential ASS impacts are addressed in Section 13.
Preservation of trees or vegetation.	The Site has both native and exotic vegetation. Weeds are common throughout the site but there is a section of native forest in the south-west corner that retains much of the original structural and floristic diversity that provides habitats for common and threatened flora and fauna species. Additionally, there are areas of riparian vegetation.

Relevant objectives	Relevance to the Proposal
	The Proposal will involve clearing of trees and underground vegetation, there would also be clearing of exotic grasses and shrubs during construction. Potential impacts are addressed in Section 10.
Heritage Conservation.	The area is not expected to have any items of heritage value. There are no listed items of heritage value in close proximity to the site. Refer to Section 12.
Bush fire hazard reduction.	The land of the proposed site is mapped as bush fire vulnerable. A large part of the site is identified as either bushfire buffer area or bush fire prone land Vegetation Category 1 on the Bush Fire Prone Land Map on the Maitland City Council website. Potential impacts are addressed in Section 16.
Earthworks	Major earthworks are not proposed however some earthworks such as levelling would be required. Potential impacts are addressed in Section 13.
Significant Extractive Resources	The land is classified as an “Identified resource” on the Mineral Resource Area Map. The site has previously operated as a clay mine and brickworks. There is no intention to recommence extraction related activities, nor are there any extraction related activities on surrounding land which will be affected. In their response to request for SEARs letter dated 31 January, the Division of Resources and Geoscience indicated they have no resource sterilisation concerns with the project. As such this matter is not considered further.
Flood planning	The site proposed for the New Maitland Hospital is not be located on flood liable land, however adjacent flood plains (Tenambit Wetlands and Morpeth Floodplain) are flood prone. This includes Raymond Terrace Road, which is an access route to the site. Potential flood impacts are addressed in Section 15.
Riparian land and watercourses	There are two drainage lines that run through the Metford Triangle. One of these runs through the south-west corner of Lot 7314 DP1162607. Vegetation removal along the drainage lines is not proposed as part of the works. Other watercourses within Lot 7314 include man-made ponds in the central part of the site which are currently used for stormwater detention and water quality control. The Proposal will impact upon these man-made ponds. Potential impacts to riparian land and watercourses are addressed in Section 10

6.6.2 Development Contributions

Development contributions under clause 7.11 and 7.12 of the EP&A Act may only be imposed on applications for development consent under Part 4 of the EP&A Act. The NMH is a State Significant Infrastructure application in accordance with Part 5 of the EP&A Act and is subject to ministerial approval rather than development consent. Consequently, s.711 and 7.12 do not apply to Part 5 applications for Ministerial Approval.

The proposal provides a clear and distinctive community benefit through improvements to the level of health care and improved accessibility to contemporary health services for the community. In this case, given the significant capital investment in the public hospital, the NMH is considered to result in a material public benefit. The proposal will also provide a positive contribution to the realisation of the NSW Governments strategic vision for the region and the state.

HI will not be entering into a voluntary planning agreement (VPA) as it is not considered to be necessary or appropriate given the material public benefit that will flow to the community through the provision of high quality public health services.

The traffic assessment prepared by GTA (**Appendix F**) concludes that road improvements are required at the intersection of Chelmsford Road and Metford Road to accommodate both the forecast background traffic growth in the area and the NMH development. In consultation with RMS and Maitland City Council, HI will undertake road improvements works at Chelmsford Road / Metford Road (including a footpath along Metford Road). These intersection works will be undertaken separate to the subject Stage 1 SSI Application and will be assessed under Part 5 of the EP&A Act and the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

6.7 Approval pathway

The proposed Maitland Hospital will require assessment under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). Part 5.2 of the EP&A Act provides for land designated for State significant infrastructure at Section 5.12(4):

“Specified development on specified land is State significant infrastructure despite anything to the contrary in this section if it is specifically declared to be State significant infrastructure. Any such declaration may be made by a State environmental planning policy or by an order of the Minister (published on the NSW legislation website) that amends a State environmental planning policy for that purpose”.

Through the effect of Order 2017 No. 673, dated 28 November 2017, made under Section 5.12 (4) of the EP&A Act, an amendment was made to Schedule 4 of *State Environmental Planning Policy (State and Regional Development) 2011* (S&RD SEPP). This designates any development carried out by or on behalf of a public authority within the Metford Triangle Site (as defined by the State Significant Infrastructure Sites Map) and has a capital investment value of more than \$100million, to be State Significant Infrastructure (SSI). As the NMH meets these criteria, it therefore falls under Part 5.2 of the EP&A Act.

Part 5.2 of the EP&A Act provides for a staged infrastructure application at Section 5.20 (1): *“For the purposes of this Part, a staged infrastructure application is an application for approval of State significant infrastructure under this Part that sets out concept proposals for the proposed infrastructure, and for which detailed proposals for separate parts of the infrastructure are to be the subject of subsequent applications for approval. The application may set out detailed proposals for the first stage”.*

HI has determined to proceed with a staged infrastructure application for the NMH under Section 5.20 (1) of the EP&A Act as follows:

- Stage 1: Concept design, site clearance and preparatory works
- Stage 2: Detailed design, construction, and operation of the hospital.

This EIS is intended to support the planning approval application for the concept design, and for the site clearance and related preparatory works (Stage 1). A separate EIS will be prepared to assess impacts associated with Stage 2, which will be the subject of a separate planning approval application.

Division 5.2 of the EP&A Act designates the Minister for Planning and Infrastructure as the approval authority for SSI and that the Department Secretary is to provide the environmental assessment requirements in respect of the proposed infrastructure. In terms of assessment, Section 5.16 (2) states that the environmental assessment requirements must require an EIS to be prepared in accordance with the *Environmental Planning and Assessment Regulation 2000 (EP&A Regulation)*. To comply with Section 5.16 and 5.15 of the Act this EIS has been prepared and approval from the Minister has been sought to carry out this State Significant Infrastructure project.

Under 5.23 the following authorisations are not required for approved SSI projects.

- An approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977*
- An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974*
- An authorisation referred to in Section 12 of the *Native Vegetation Act 2003* (or under any Act repealed by that Act) to clear native vegetation or State protected land
- A bush fire safety authority under Section 100B of the *Rural Fires Act 1997*
- A water use approval under Section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000*.

Additionally, Section 5.23 (2) Division 8 of Part 6 of the *Heritage Act 1977* does not apply to prevent or interfere with the carrying out of approved State significant infrastructure and under Section 5.22 (2) of the EP&A Act environmental planning instruments do not apply to or in respect of State Significant Infrastructure, except where they apply to the declaration of infrastructure as SSI.

7. Environmental Risk Analysis

This chapter introduces and describes the key environmental risks and provides a comprehensive assessment of these risks related to the Proposal. The key potential environmental impacts have been identified through assessment of the Proposal scope, review of the SEARs issued by DP&E, and consultation with relevant government agencies.

This section describes the methodology for assessing the key environmental risks related to the Proposal and the outcomes of the risk analysis. The environmental risk analysis informs the scope of the EIS by ensuring all potential environmental impacts are identified and assessment is focused on the key risk areas.

It responds to the following SEAR: the EIS must *'include an environmental risk assessment to identify the potential environmental impacts associated with the development'*.

7.1 Objective

An environmental risk analysis was undertaken to identify the potential environmental impacts of the Proposal and to assign a risk rating to each potential impact. The environmental risk analysis was further reviewed and revised following several consultation sessions with key stakeholders, evaluation of the SEARs and receipt of specialist reports and other relevant documentation.

The main objectives of the environmental risk analysis are to:

- Determine the key environmental impacts of the Proposal and assist stakeholders to focus on the issues for assessment
- Identify any additional key issues not specified in the SEARs that would require investigation
- Verification of the key environmental risks
- Encourage a level of investigation that is commensurate with the risk of the potential environmental impacts which may result from the Proposal.

7.2 Methodology

The environmental risk analysis was conducted in accordance with the principles of the Australian and New Zealand standard AS NZS ISO 31000:2009 Risk Management – Principles and Guidelines. The level of risk was assessed by considering the potential impacts of the proposed hospital prior to application of any mitigation or management measures.

Risk comprises the likelihood of an event occurring and the consequences of that event. Definitions for the level of consequence and likelihood are outlined in Table 7-1 and Table 7-2 respectively. Table 7-3 defines a risk matrix process giving scores based on likelihood and consequence. Table 7-4 provides an environmental risk assessment for this project.

Table 7-1 Risk Analysis Consequence Definitions

Consequence level	Definition
Catastrophic	Long term (greater than 3 months) and irreversible impacts. Resulting in a major prosecution under relevant environmental legislation.
Major	Medium term (between 1 and 3 months) and potentially irreversible impacts. Resulting in a fine or equivalent penalty under relevant legislation.
Moderate	Moderate and reversible impacts, or medium term (between 1 and 3 months).

Consequence level	Definition
Minor	Minor and reversible impacts, or short-term impacts (less than 1 month).
Insignificant	Minor, negligible impacts.

Table 7-2 Risk Analysis Likelihood Definitions

Likelihood	Definition	Probability
Almost certain	The event is almost certain to occur in the course of normal or abnormal construction or operational circumstances.	>90%
Likely	The event is more likely than not to occur in the course of normal or operational circumstances.	51% to 90%
Possible	The event may occur in the course of normal construction or operational circumstances.	26% to 50%
Unlikely	The event is unlikely to occur in the course of normal construction or operational circumstances.	5% to 25%
Very unlikely	The event may occur in exceptional construction or operational circumstances only.	<5%

Table 7-3 Risk matrix

Consequence	Likelihood					
		Very unlikely	Unlikely	Possible	Likely	Almost certain
	Catastrophic	15	19	22	24	25
	Major	10	14	18	21	23
	Moderate	6	9	13	17	20
	Minor	3	5	8	12	16
	Insignificant	1	2	4	7	11

Table 7-4 Risk assessment – Stage 1 Concept hospital, site clearance and preparatory works

Aspect	Timing	Potential Impact	Likelihood	Consequence	Risk Level
Aboriginal Heritage	Construction	Impacts to identified and unidentified heritage items and places.	Unlikely	Major	14
Air quality	Construction	Dust generated during construction of Proposal, particularly during earthworks and excavations.	Likely	Minor	12
	Construction and operation	Local air quality impacts caused by emissions from vehicles, plant and machinery. Additionally, greenhouse gas emissions from energy use associated with vehicles and plants.	Likely	Minor	12
Biodiversity	Construction	Destruction of potential habitat for threatened fauna species (including removal of hollow-bearing trees).	Possible	Major	18
	Construction	Adverse effect on threatened species and /or endangered ecological communities such that its local occurrence is likely to be placed at risk of extinction.	Unlikely	Major	14
	Construction	Unapproved removal and/or damage of planted trees, urban bushland and/or endangered ecological communities on site.	Possible	Major	18
	Construction/operation	Harm to fauna within or entering the site.	Possible	Minor	8
	Construction/operation	Alterations to drainage arrangements of the Site that feeds into the wetlands north of the site.	Unlikely	Moderate	9
	Construction/operation	Contamination of waterways due to accidental spill or discharge of chemicals, fuels, oils and other contaminants that feed into the wetlands causing downstream effects.	Possible	Major	18
	Operation	Possible increase in weeds following construction works.	Possible	Moderate	13
	Construction/operation	Disturbance to fauna from noise and vibration during construction works and operations.	Likely	Minor	12
Bushfire	Construction/operation	Increased risk of bush fire associated with operating vehicles, plant and equipment powered by fuels over land containing combustible materials.	Unlikely	Moderate	9

Aspect	Timing	Potential Impact	Likelihood	Consequence	Risk Level
	Construction/ operation	Increased ignition risks from construction and operational infrastructure and activities such as fuel storage.	Unlikely	Moderate	9
	Construction/ operation	Risk of bushfire in the adjacent forested and vegetated areas impacting on facility causing facility shutdown, evacuation and/or property damage, injury or loss of life.	Unlikely	Major	14
Contamination	Construction	Construction activities expose contamination present onsite.	Unlikely	Moderate	9
	Construction	Construction activities cause contamination due to accidental spill or discharge of chemicals, fuels, oils and other contaminants.	Possible	Moderate	13
	Operation	Site unsuitable for proposed use as a medical facility due to Site contamination.	Very Unlikely	Moderate	6
Climate Change & Sustainability	Construction	Significant demand on non-renewable restricted resources such as fuels and metals.	Very unlikely	Major	10
	Construction / operation	Significant demand on energy resources in short supply.	Very unlikely	Major	10
Hazards	Operation	Inappropriate storage, handling or disposal of clinical wastes that have the potential to be infectious, toxic or radioactive. This will be considered in Stage 2 of the SSI application.	Unlikely	Moderate	9
	Operation	Incorrect storage, handling or disposal of hazardous medical supplies This will be considered in Stage 2 of the SSI application.	Unlikely	Moderate	9
Historic Heritage	Construction	Impacts to unidentified heritage items and places.	Very Unlikely	Major	10
Hydrology (Surface water, groundwater and flooding)	Construction	Sediment laden runoff during construction entering the nearby waterways such as the wetland.	Possible	Major	18
	Construction	Contamination due to accidental spill or discharge of chemicals, fuels, oils and other contaminants.	Possible	Moderate	13

Aspect	Timing	Potential Impact	Likelihood	Consequence	Risk Level
	Construction	Changes to drainage arrangements.	Unlikely	Moderate	9
	Construction	Interception of groundwater.	Unlikely	Moderate	9
	Operation	Contamination of land/water sources due to chemical spillage/leakage during transportation and storage of chemicals or during operations of the facility.	Possible	Moderate	13
	Operation	Existing drainage network unable to cope with an increased catchment area.	Unlikely	Moderate	9
Noise and vibration	Construction	Noise and vibration impacts during construction of the facility causing disruption to sensitive receivers.	Possible	Moderate	13
	Construction	Vibration impacts to structural integrity of nearby buildings.	Very unlikely	Minor	3
	Operation	Noise impacts to sensitive receivers during the operation of the facility especially from emergency vehicles, hospital plant and helicopter operations.	Likely	Moderate	17
Socio-economic, land use & property	Construction	Impacts to the operations of nearby businesses and commercial areas.	Possible	Moderate	13
	Operation	Impacts to the operations of nearby businesses and commercial areas.	Unlikely	Minor	5
	Operation	Prohibiting extractive industries use and further exploration of identified mineral and resources land.	Almost Certain	Insignificant	11
Soils & geology	Construction	Construction activities cause erosion and sedimentation.	Likely	Moderate	17
	Construction	Construction activities expose Potential Acid Sulfate Soils (PASS) and create Acid Sulfate Soils (ASS).	Unlikely	Moderate	9
	Construction	Construction activities expose the water table and contaminate groundwater sources.	Unlikely	Major	14
	Operation	Construction activities cause contamination due to accidental spill or discharge of chemicals, fuels, oils and other contaminants.	Possible	Moderate	13
Traffic and Transport	Construction	Increased traffic and congestion to primary road network and haulage routes during construction of the facility.	Likely	Moderate	17
	Construction	Disruptions to public transport routes and services.	Possible	Minor	8

Aspect	Timing	Potential Impact	Likelihood	Consequence	Risk Level
	Operation	Contribution to further congestion on local roads and wider road network from hospital traffic.	Likely	Moderate	17
	Operation	Potential for increase in demand for street parking.	Possible	Moderate	13
Utilities	Operation	Hospital operation creates strain on existing utilities.	Unlikely	Moderate	9
Visual	Construction	Temporary impacts to the visual environment and aesthetic quality of the surrounding landscape during construction of the facility.	Possible	Moderate	13
	Construction	Use of lighting towers during any night work would create an increase in light spillage from residential properties at night.	Possible	Moderate	13
	Operation	Visual impact and view loss from construction of hospital buildings and Asset Protection Zone.	Likely	Moderate	17
	Operation	Loss of bushland setting and screening vegetation on hospital site contributing to loss of amenity, aesthetic quality and visual character of the local area.	Possible	Moderate	13
	Operation	Loss of visual privacy.	Very unlikely	Moderate	6
	Operation	Loss of solar access.	Very unlikely	Moderate	6
	Operation	Increased light spillage on residential properties at night.	Possible	Moderate	13
Waste	Construction	Spoil storage on site leading to potential run off.	Possible	Major	18
	Construction / operation	Inappropriate storage and/or disposal of waste.	Possible	Major	18

7.3 Summary of environmental risk analysis outcomes

Discussion of the existing environmental features and potential environmental impacts related to the Proposal was undertaken by the EIS authors as part of the first environmental risk analysis workshop. This discussion resulted in targeting specific environmental issues determined to be most relevant to the Proposal, based on the information gathered for the Preliminary Environmental Assessment (PEA). These issues were assessed in the environmental risk analysis and, using the methodology described above (based on the Australian and New Zealand standard *AS NZS ISO 31000:2009 Risk Management – Principles and Guidelines*) a risk level was allocated to the potential impacts identified for each issue.

The issues that were addressed in the environmental risk analysis were:

- Aboriginal heritage
- Air Quality
- Biodiversity
- Bushfire
- Contamination
- Climate Change & Sustainability
- Hazards
- Historic heritage
- Hydrology (Surface water, groundwater and flooding)
- Noise & vibration
- Socio-economic, land use & property
- Soils & geology
- Traffic & Transport
- Utilities
- Visual
- Waste.

Conclusion

Overall, the environmental risks presented by the NMH are not significant. A number of features of the NMH contribute to this assessment, including:

- The separation distances to the nearest residential and other sensitive receptors
- The significant level of disturbance to the Site that has occurred previously
- The level of rehabilitation undertaken by CSR
- The proximity to major road network (New England Highway)
- APZ requirements
- Biodiversity offsetting requirements.

Where the analysis identifies potential environmental impacts, it concludes that these can be adequately managed through the incorporation of mitigation and management measures into the design or implementation of the Proposal during its construction and operation.

8. Traffic and Transport

8.1 Introduction

GTA Consultants (GTA) were commissioned by HI to undertake a preliminary transport impact assessment of the Metford Road corridor to provide advice on traffic, access and parking impacts and mitigation measures associated with the proposed NMH development (refer **Appendix F**).

A construction (Stage 1) and operation (Stage 2) assessment has been undertaken. The operational assessment is a summary of probable traffic impacts and arrangements based on a concept hospital as aspects are subject to change throughout the design process. A finalised operational traffic assessment will be provided in Stage 2 of the SSI application associated with the Detailed Design.

8.2 Offsite works

The proposed offsite works outlined in section 1.5 involve the construction of access roads and the addition of a roundabout to provide adequate access to the site. The offsite works will include:

- Two access roads:
 - Proposed roundabout to accommodate the primary site access at the Metford Road/Fieldsend Street intersection.
 - Secondary site access around 120 metres south of the Metford Road/Fieldsend Street intersection on Metford Road. This secondary access route will be used for emergency vehicles only.

The above offsite works are being delivered outside this SSI application and have been assessed in a separate review of environmental factors (REF). The REF was approved in October 2017 under Part 5 of the EP&A Act and works are currently underway.

- Addition of a roundabout at the Metford Road/ Fieldsend Street intersection. The upgrade will generally consist of one lane in and out of the roundabout with additional left-righthand turn slip lanes to facilitate movement in and out of the NMH site. These works are subject to finalisation of the design in consultation with Maitland City Council and will be progresses in accordance with a separate review of environmental factors (REF) to be prepared outside if the SSI application.

8.3 Existing Environment

The Site has been selected for its strategic accessibility to existing transport links including major road networks and railway lines which service the region including major highways and the Great Northern Railway line. Figure 8-1 shows the existing local transport network.



Figure 8-1 Context Plan showing existing local road network

Road Network

Metford Road

Metford Road is a two-way, sub-arterial road which currently carries an average of 13,000 vehicles per day. The road runs along the western boundary of the site and is aligned in a north-east, south-west direction. Metford Road has one lane in each direction and configured with a nine-metre-wide carriageway (refer Figure 2-4). Unrestricted kerbside parking is generally permitted south of Fieldsend Street however, no kerbside parking is permitted north of Fieldsend Street. A section of Metford Road between Chelmsford Street and Raymond Terrace Road is an approved 25-metre B-double route.

Fieldsend Street

Fieldsend Street is a two-way, local road which currently carries an average of 2,000 vehicles per day (refer Figure 2-4). Fieldsend Street intersects Metford Road at the northern corner of the site and is aligned in a north-west, south-east direction with one lane in each direction. No kerbside parking is permitted near the site.

Council has identified road, cycleway and pedestrian infrastructure upgrades for Fieldsend Street in their Capital Works Program 2016-2020. This includes the construction of a cycleway between Metford Road and Brunswick Street, as well as pedestrian footpaths between Metford Road and Turnton Road. The cycleway is already complete.

Chelmsford Drive

Chelmsford Drive is a two-way sub-arterial road and is aligned in a north-west, south-east direction. Chelmsford Drive has one lane, one bicycle lane and one parking lane in each direction east of Metford Road and two lanes in each direction west of Metford Road. No kerbside parking is permitted west of Metford Road.

New England Highway

The New England Highway is classified as a State Road and therefore under Road and Maritime Services control. The New England Highway runs from Newcastle through the Hunter region and also links to the Pacific Motorway and Hunter Expressway. Near the site it is aligned in a north-west, south-east direction and is two-way with two traffic lanes in each direction. No kerbside parking is permitted.

Raymond Terrace Road

Raymond Terrace Road is classified as a State road. Near the site it is aligned in a north-west, south-east direction and is two-way with one traffic lane in each direction. No kerbside parking is permitted.

Intersections

The following intersections currently exist near the site:

- Metford Road / Chelmsford Drive (roundabout)
- Metford Road / Raymond Terrace Road (roundabout)
- Metford Road / Fieldsend Street (un-signalised, priority control).

Traffic Volumes

HealthStats NSW have predicted that the Maitland LGA will have an overall growth of around 30,989 people by 2031 from 2011 population numbers. This is similar to projections made by NSW Department of Planning and Environment (DP&E) which predict that the Maitland LGA will grow by approximately 31,650 people by 2031. This increase in population will naturally have an effect on the volumes of traffic in the area.

Journey to work (JTW) data from 2011 census data (TfNSW, 2011) around the Metford area indicates that a total of 6,603 people work within the selected Travel Zones. The data indicates that there is a heavy reliance

on private transport with 93% of workers traveling to the area using private vehicles, as either drivers or passengers, and 6% of workers traveling to work by either walking, taking the train or taking the bus.

GTA undertook traffic surveys and reviewed historical Council data to determine levels of traffic in the local area on Thursday 18 May 2017, Thursday 25 May 2017 and Saturday 27 May 2017 during the following peak periods:

- Thursday 7am to 9am
- Thursday 3pm to 6pm
- Saturday 8:30am to 3pm.

A review of historical data identifies that the Fieldsend Street (between Metford Road and Turton Street) carries about 188 vehicles during peak hour and 2,000 vehicles per day. Based on growth rates the peak hour traffic volume on Fieldsend Street between Metford Road and Turton Street has been assumed to be around 200 vehicles per hour for 2017. The survey also identified that Metford Road carries approximately 13,000 vehicles per day.

Intersection Operation

Intersection performance was measured using vehicle delay as an indicator. SIDRA Intersection, a computer-based modelling package, was used to calculate intersection performance. Table 8-1 shows the criteria the SIDRA Intersection adopts in assessing the level of service.

Table 8-1 SIDRA level of service (LoS) criteria

LoS	Average delay per vehicle (seconds/ vehicle)	Traffic signals, roundabouts	Give way and stop signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 8-2 presents a summary of the existing operation of the intersection. Based on this assessment the intersections of Metford Road/ Chelmsford Drive and Metford Road/ Raymond Terrace Road currently operate satisfactorily in peak conditions. However, the Chelmsford Drive south east approach to the Metford Road roundabout does queue in the AM peak. Results and observations indicate that vehicles are currently getting through the roundabout however under the current lane arrangements it is nearing capacity. Additionally, the Fieldsend Street/ Metford Road intersection experiences delays to the low number of right turn movements out of Fieldsend Street during the peak periods due to the constant through movements on Metford Road.

Table 8-2 Existing operating conditions (May 2017)

Intersection	Peak	Leg	Degree of saturation	Average delay (sec)	95 th percentile queue	Level Service of
Metford Road/ Chelmsford Drive	AM	South East	0.98	53	162	D
		North East	0.90	20	149	B
		North West	0.34	11	18	A
	PM	South East	0.63	17	45	B
		North East	0.82	21	91	B
		North West	0.46	6	29	A
Metford Road/ Fieldsend Street	AM	South East	0.48	12	15	A
		North West	0.64	104	21	F
		South West	0.33	5.7	0	A
	PM	South East	0.36	12	14	A
		North West	0.46	61	14	E
		South West	0.38	0	0	A
Metford Road/ Raymond Terrace Road	AM	South East	0.69	15	52	B
		North East	0.51	13	26	A
		North West	0.47	12	24	B
		South West	0.54	15	33	B
	PM	South East	0.59	13	34	A
		North East	0.35	12	14	A
		North West	0.68	17	45	B
		South West	0.82	21	84	B

Parking

Currently the demand for parking near the NMH site is generated largely by sporting and recreational activities at Fieldsend Oval which is located adjacent to the site. This parking demand is particularly high during Saturday mornings and moderate during lunch and afternoon.

An inventory of available parking was created and identified a total of 80 unrestricted on-street spaces along Metford Road, the majority of which are between Fieldsend Street and the Council Depot, and 213 off-street spaces (such as carparks, grassed verges and grass areas). Table 8-3 provides a breakdown of the 213 off-street spaces and Figure 8-2 illustrate the location of off-street and on-street parking supply.

During peak periods the football club has been recorded at nearing capacity however the Council depot and on-street parking still have vacancies.

Table 8-3 Off-street Parking

Zone	Description	Number of spaces
A	Inside Council Depot	72
B	In front of Council Depot	26
C	Football Club Carpark, next to Fieldsend Oval (marked)	35
D	Parking on grass adjacent to Fieldsend Oval (unmarked)	80
TOTAL		213



Figure 8-2 Off-street parking supply

Public Transport

The existing public transport in the area currently consists of bus and train services. The Hunter Line, which forms part of the Great Northern Railway, is located to the north of the Site and connects Hamilton to Maitland. The Hospital is located between Victoria Street Railway Station and Metford Railway Station and is within 2km from both. Victoria Street Railway Station is located approximately 1.4km north-west of the Site and Metford Railway Station is located approximately 1.5km from the Metford Road / Fieldsend Street intersection. The Metford area is also serviced by several bus routes. The ones closest to the NMH site run along Metford Road, Raymond Terrace Road and Chelmsford Drive. Currently the only bus service using Metford Road is the 189 bus service and school bus services.

Details of public transport located in the vicinity of the Proposal are provided in Table 8-4.

Table 8-4 Public transport routes within the vicinity of the Proposal

Service	Route Number	Route Description	Location of stop	Distance to nearest stop	Frequency on/off-peak
Bus	181	Rutherford to Woodberry	Metford Road at Chelmsford Drive	650m	Hourly
	187	East Maitland and Metford Loop			Hourly peak / every two hours off peak
	189	Stockland Green Hills to Thornton			Hourly peak / every two hours off peak

Service	Route Number	Route Description	Location of stop	Distance to nearest stop	Frequency on/off-peak
Train	N/A	Hunter Line	Victoria Street Railway Station	1.4km	Every 30 minutes
	N/A	Hunter Line	Metford Railway Station	2.7km	Every 30 minutes

Pedestrian and Bicycle

At the time of assessment there were no footpaths located along Metford Road or Fieldsend Street. Current cycleways in the vicinity include (GHD, 2014):

- An on-road cycleway on Metford Road between Chelmsford Drive and the Council Depot
- An on-road cycleway on Chelmsford Drive between Metford Road and Schnanck Drive
- An off-road cycleway on Chelmsford Drive between Metford Road and Molly Morgan Drive.

However, as part of the Maitland City Council's 'Capital Works Program 2016 – 2020' the following will be constructed:

- Footpaths along Fieldsend Street between Metford Road and Turnton Street
- Cycleways along Fieldsend Street between Metford Road and Brunswick Street.

Road Crash History

A review of recent crash history data from Roads and Maritime for roads near the site determined that a total of 11 crashes were recorded between June 2011 to June 2016, two crashes on Fieldsend Street (between Turton Street and Metford Road) and nine crashes on Metford Road (between Chelmsford Drive and Raymond Terrace Road). Details of these crashes is provided below:

- Of the two crashes on Fieldsend Street, one crash resulted in a moderate injury on an overcast day at the intersection of Turton Street and Fieldsend Street
- Of the nine crashes on Metford Road, two crashes resulted in moderate injuries. The first occurred at the intersection of Metford Road and Raymond Terrace Road on a fine day and the second occurred on Metford Road with the vehicle travelling off the road and into a roadside utility pole during a rainy day.

8.4 Impact Assessment

8.4.1 Construction (Stage 1 Early Works)

Road Network

Construction works associated with Stage 1 Early Works is anticipated to result in some delays to facilitate the movement of construction vehicles into and out of the site. Traffic delays that may occur as a result of construction would be managed under a Traffic Management Plan (TMP). A draft TMP has been developed and is attached to the TIA in **Appendix F**. Before the start of construction, the construction contractor would develop a detailed Construction Traffic Management Plan to ensure the safe and efficient movement of traffic.

Traffic Volumes

Traffic generation from the construction of the hospital would comprise:

- Heavy vehicle movements for the delivery and removal of construction equipment and machinery, spoil and waste management

- Small and medium vehicles for material delivery
- Light vehicles for movement of construction personnel, including contractors, site labour force and specialist supervisory personnel.

The expected traffic generation from construction is summarised in Table 8-5. It is estimated to be up to 30 heavy vehicles on-site per day (60 two-way heavy vehicle movements per day) and up to 50 light vehicles per day (100 two-way heavy vehicle movements). It is expected that these vehicles movements will be spread through the day, however, in the worst-case assessment it has been assumed that 20% of heavy vehicles, six vehicles (12 two-way vehicle movements) and 100% of light vehicles, 50 vehicles (100 two-way vehicle movements) would occur during the peak hour and there could be up to a total of 80 vehicles arriving and departing the site per day.

Table 8-5 Daily construction traffic volumes (worst case)

Vehicle type	Total number of vehicles per day (on average)	Total vehicle movements per day (on average)
Heavy vehicles/ trucks	30	60
Light vehicles	50	100
TOTAL	80	160

Intersection Operation

The construction of the worksite preparation works is estimated to generate additional traffic movements (a total of 160 vehicle movements per day) during the peak construction period of Stage 1 (refer to traffic volumes section above). This may cause congestion and minor delays at key intersections along the haulage route.

It is recommended that heavy vehicles movements take place outside the peak periods and it is likely that construction workers would access the site before the weekday AM peak hour. Vehicle movements would be managed under a Traffic Management Plan (TMP) to reduce any negative impacts from construction traffic.

Parking

No parking will be allowed on the surrounding road network. All construction vehicles will be parked within the NMH site. There is no anticipated impact on parking during construction of the NMH.

Public Transport

There would be minimal disruption to existing bus routes during construction of the Proposal, as vehicular access would be maintained along all roads. However, there may be an increase in travel time due to increased vehicles along Metford Road, Raymond Terrace Road and Chelmsford Drive during construction.

Pedestrians and Bicycle

There is no anticipated impact to pedestrian and cyclist movements as construction of the NMH will take place entirely within Lot 7314 DP 1162607 and there are no footpaths or cycleways currently adjacent to the site.

Construction Haulage Route

The main access routes for construction vehicles are from the New England Highway and Raymond Terrace Road. The main access roads are State roads, which carry high traffic volumes. Any additional construction vehicle traffic on these State Roads would have a negligible traffic impact, as this additional construction

vehicle traffic would be within the range of daily variation in traffic on these routes. The main access point will be via the existing gate and access road into the site opposite Fieldsend Street.

The movement of materials should be managed through the scheduling of deliveries and availability of fleet to minimise the number of haulage and delivery vehicles during peak periods and on weekends.

8.4.2 Operation (Stage 1 Concept Hospital)

This section summarises an assessment of operational traffic and transport issues based on the Concept Hospital design. This assessment would be refined for the detailed design as part of the future Stage 2 SSI application.

Road Network

Internal

The Hospital has been planned so that the orientation of key entry points, main entry, emergency department, are visible from Metford Rd allowing clarity for the public accessing the site and allowing them to make early decisions regarding the services they require prior to entering the hospital site. NMH will have two access points from Metford Road which are as follows:

- A proposed roundabout to accommodate the primary site access at the Metford Road/Fieldsend Street intersection
- A secondary site access point around 120 metres south of the Metford Road/Fieldsend Street intersection on Metford Road.

A secondary access point off Metford Rd was proposed to allow emergency ambulance traffic to access the new Hospital without the need to interact with general public traffic and service vehicle traffic also accessing the Hospital site.

The proposed roundabout at the Metford Road/ Fieldsend Street intersection ultimately would be the main hospital access to service all vehicle movements including general traffic, staff, service vehicles and buses. The Internal road network and vehicular circulation movements are shown in Figure 8-3. This primary internal road has been planned to allow a high degree of traffic flow and provide the ability for people to drop-off visitors along the length of the roadway during peak times where direct access to the main entry of Emergency Department is limited due to slower vehicles.

The second primary onsite roadway runs parallel to the northern frontage of the hospital building and will cater for public accessing the main long-term parking facility on the site located on the western precinct of the site in addition to service vehicle connecting to the lower ground loading docks of the Hospital. This roadway will also provide access for the proposed bus drop-off zone for the Hospital.

Traffic Volumes

Traffic generation from the operation of the hospital would comprise:

- Staff trips to and from work either by car, bus, train, bicycle or walking
- Patient and visitor movements including car, drop-off, bus, train, walking and ambulance
- Servicing and maintenance including deliveries, supplies, waste management.

The expected traffic generation from hospital operation was calculated using the number of beds and average staff per day shift (refer **Appendix F**). Estimates of peak hour traffic volumes for the AM and PM peak periods are given in Table 8-6. Based on this it is expected that the site will generate a peak hour total of 408 vehicle movements (285 vehicles exiting and 123 vehicles entering) during the PM peak hour.

Table 8-6 Traffic generation estimates

Peak Period	Traffic Generation (vehicles per hour)		
	In	Out	TOTAL
AM	166	42	208
PM	123	285	408

It should be noted that traffic growth in the area is also expected to increase due to population growth and land release for residential developments.

Intersection Operation

The capacity of urban roads is generally determined by the capacity of the intersections or the 'midblock' capacity (the sections of roads between intersections).

Traffic operation conditions at several key intersections with and without the development, and associated road works, was modelled by GTA consultants using the EMME model. A summary table of these results is provided in Table 8-7.

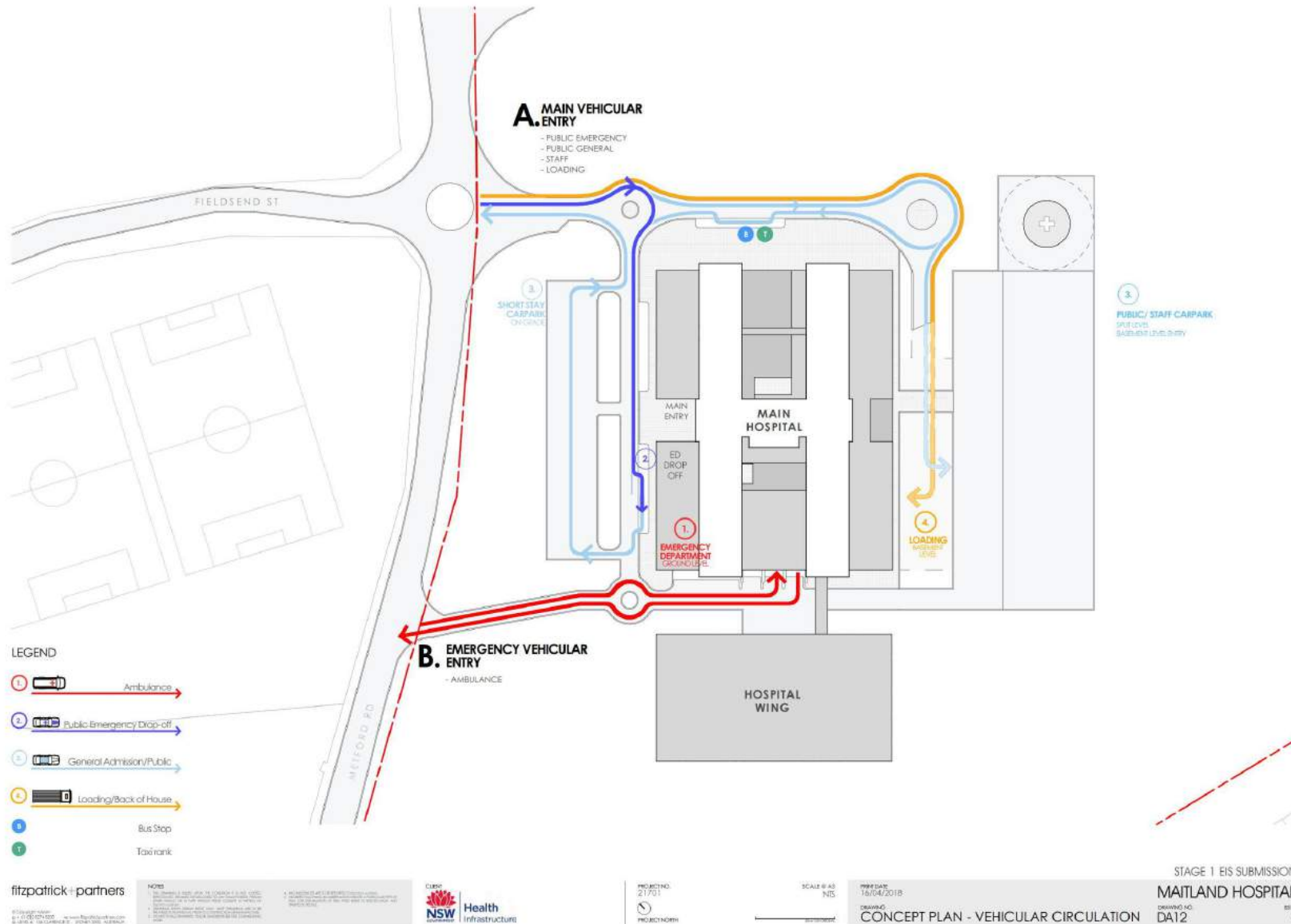


Figure 8-3 Proposed vehicular circulation

Table 8-7 Comparison of 2032 operations with and without the development

Intersection	Peak Period	Leg	2032 Operating Conditions - Without the NMH				2032 Operating Conditions - With the NMH			
			Degree of Saturation*	Average delay (sec)	95 th percentile queue (m)	Level of Service	Degree of Saturation*	Average delay (sec)	95 th %ile queue (m)	Level of Service
Chelmsford Drive / Metford Road	AM	South East	1.52	261	696	F	1.58	286	742	F
		North East	1.20	109	631	F	1.16	92	583	F
		North West	0.31	12	16	A	0.29	12	14	A
	PM	South East	0.93	38	139	C	1.00	54	188	D
		North East	1.06	65	285	E	1.29	150	666	F
		North West	0.50	12	31	A	0.48	12	28	A
Metford Road / Fieldsend Street (priority control)	AM	South East					0.13	18	8	B
		North East	0.67	17	36	B	0.91	13	135	A
		North West	3.13	1,120	273	F	0.20	14	9	A
		South West	0.38	6	0	A	0.65	12	46	A
	PM	South East					0.37	8	22	A
		North East	0.60	21	65	B	0.67	10	45	A
		North West	2.15	662	213	F	0.30	18	16	B
		South West	0.49	6	0	A	0.81	13	75	A
Metford Road / Raymond Terrace Road	AM	South East	0.89	27	124	B	0.95	36	165	C
		North East	0.55	14	30	B	0.61	15	37	B
		North West	0.54	14	33	A	0.55	14	35	B
		South West	0.88	32	109	C	0.89	34	115	C
	PM	South East	0.74	16	64	B	0.74	17	65	B
		North East	0.45	14	22	A	0.46	14	23	B
		North West	0.75	20	58	B	0.75	20	59	B
		South West	1.09	76	292	F	1.15	98	372	F
*Degree of saturation is the demand versus the total capacity of the intersection. If the levels are over 0.85 then the intersection is suffering from traffic congestion.										

The results of Table 8-7 show that with NMH development (including the offsite works to the roundabout at the intersection of Fieldsend Street/ Metford Road/ Hospital Main Access) traffic the intersection of Fieldsend Street/ Metford Road/ Hospital Access would operate well with spare capacity.

The Chelmsford Drive/ Metford Road roundabout operates at capacity in both the AM and PM peaks due to the increased movements on Metford Road providing insufficient opportunities for Chelmsford Drive (northbound) traffic to enter the roundabout. The Chelmsford Drive / Metford Road roundabout will operate at capacity with or without the impact of the proposed NMH; with the south-east and north-east legs of the intersection operating with high degrees of saturation and average delays.

Upgrades to the Chelmsford Drive/ Metford Road roundabout are detailed in section 8.6. Intersection works will be undertaken by Health Infrastructure separate to this Stage 1 State Significant Infrastructure (SSI) Application and will be assessed under Part 5 of the EP&A Act, and the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

Analysis of the New England Highway between Mitchell Road and Chisholm Road (inclusive of the Chelmsford Road intersection), has been conducted as a part of this study. Following consultation with Roads and Maritime (refer section 5) it was concluded that the analysis should be completed after the final stage of the Stockland Green Hills Shopping Centre development opens and updated traffic surveys can be completed in July/ August 2018 outside of the school holiday period. The New England Highway analysis will therefore be included in Stage 2 of the staged infrastructure application for the proposed NMH hospital.

Mid-Block Capacity

Mid-block capacity assessment has been determined to analyse the link capacity on wider road network. The typical mid-block capacities for various types of urban roads are provided in **Appendix F** but the assumed traffic capacity of 1,200 passenger cars per hour per lane has been adopted for key roads near the NMH.

An analysis of mid-block level of service (LoS) was conducted by GTA Consultants (refer **Appendix F**) based on criteria set out by Roads and Maritime and experience with comparable developments. This criteria is replicated in Table 8-8 below.

Table 8-8 Mid-Block Level of Service Criteria (based on Guide to Traffic Generating Developments (RMS, 2002))

LoS	Description	Volume to Capacity Ratio (VCR) Range
A	A condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.	0.00 – 0.34
B	In the zone of stable flow and drivers still have the reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than LoS A.	0.35 – 0.50
C	Also, in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.	0.51 – 0.74
D	Close to the limit of stable flow and approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.	0.75 – 0.89

LoS	Description	Volume to Capacity Ratio (VCR) Range
E	Occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause break-down.	0.90 – 0.99
F	In the zone of forced flow. With LOS F, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdown occurs, and queuing and delays result.	1.0 or greater

Table 8-9 provides an assessment of the mid-block capacity for each direction of the surrounding road network during peak periods for a 2032 growth scenario.

Table 8-9 Summary of Traffic Capacity – 2032 growth scenario

Scenario	Location	Traffic Volumes				VCR Range (and LOS)			
		AM		PM		AM		PM	
		EB/NB		WB/SB		EB/NB	WB/S B	EB/NB	WB/S B
Without Development	Raymond Terrace Road	844	1,251	1,023	1,226	0.71 (C)	1.05 (F)	0.86 (D)	1.03 (F)
	Metford Road	720	1,229	936	918	0.60 (C)	1.03 (F)	0.78 (D)	0.77 (D)
	Chelmsford Drive	774	1,316	1,256	997	0.33 (A)	0.55 (C)	0.53 (C)	0.42 (B)
With Development	Raymond Terrace Road	848	1,263	1,056	1,238	0.71 (C)	1.06 (F)	0.88 (D)	1.04 (F)
	Metford Road	854	1,263	1,036	1,149	0.72 (C)	1.06 (F)	0.87 (D)	0.96 (E)
	Chelmsford Drive	903	1,349	1,352	1,219	0.38 (B)	0.57 (C)	0.57 (C)	0.51 (B)
Note: NB = northbound, EB = eastbound, SB = southbound, WB = west bound									

Table 8-9 indicates that by 2032 Raymond Terrace Road westbound/ Metford Road southbound will be approaching or at capacity during the AM and PM peak, irrespective of the NMH development. However, Raymond Terrace Road eastbound/ Metford Road northbound will be operating with some spare capacity during the AM and PM peak. Chelmsford Drive is expected to operate well, with spare capacity during both peak hours.

Parking

The NMH will provide readily accessible car parking for staff, visitors and patients. Both short and long -term parking will be provided to address access requirements to the Hospital. The exact number of car spaces will be determined during stage 2 detailed design however detailed design will ensure that the number of spaces are within the range recommended for the size of the hospital. Motor bike and disabled parking arrangements will also be considered during stage 2 detailed design but the Building Code of Australia (BCA)

2014) recommends one disabled space for every 50 car parking spaces for a Hospital (outpatient area) and one disabled space for every 100 car parking spaces for a Hospital (non-outpatient area).

At present the concept hospital will have a multi-level car park on the eastern elevation for staff and long-term patients and a single level short stay car park on the western elevation (refer Figure 8-3) for short stays and visitors. The multi-level car park will be accessed via the roundabout in the north-east corner of the Site where vehicles will travel down towards the lower ground level and loading dock before entering the carpark. Vehicle accessing the Emergency Department drop-off zone and the short stay carpark will use the roundabout in the north-west corner of the Site near the primary access.

There is the potential for all parking along Metford Road between Fieldsend Street and the Council Depot to be removed in conjunction with the Metford Road upgrades to maintain pedestrian safety, additionally parking on grass adjacent to the Football Club will be removed to accommodate construction of the Metford Road / Fieldsend Street roundabout creating a loss of 134 car park spaces.

Reduction in available parking will result in a moderate impact to the local community. The loss of parking in these areas will affect public access to these areas particularly the sports field on training and game days and increase travel distances to these facilities. The down-stream effect of loss of parking in these areas includes increased demand for on-street parking on local roads

This impact is mitigated by capacity in the nearby Council depot (estimated to be 72 parking spaces) and addition of parking spaces along Fieldsend Street at the boundary of the sporting facility which are currently under construction and estimated to create an additional 15 spaces. There is also the potential to extend the existing carpark next to the Football Club.

Parking cost structure is yet to be determined however it should be noted that paid parking arrangements could create a demand for street parking in the local area and this should be examined further if required during Stage 2 of the SSI application.

Public Transport

The proposed NMH includes an on-site bus stop for incorporation into Hunter Valley bus routes. Proposed bus routes will access the site via the Metford Road/ Fieldsend Street roundabout and circulate around the eastern-most internal roundabout to access the bus stop located near the Main Hospital entry on the southern edge of the internal access road. Both internal roundabouts have been designed to accommodate bus movements.

Providing the bus stop within the development site would encourage public transport use and remove any safety concerns that could occur to implement a bus stop location within the Metford Road corridor. It is also recommended that bus services provide connection between the NMH and Victoria Street train station.

HI have consulted with TfNSW (refer Section 5) who have recognised an opportunity to revise the network structure and alter some route designs to accommodate the NMH if the appropriate infrastructure is provided. A preliminary assessment suggests Hunter Valley Bus Routes 181 and 189 could be diverted into the hospital whilst retaining the existing routes.

The NMH will need to consult with the Hunter Valley bus operators to facilitate the inclusion of the NMH proposed bus stop into the bus network. Considering the high level of activity expected from the hospital, it is reasonable to assume that the proposed NMH would generate a significant demand for public transport if convenient routes and schedules are proposed.

Pedestrian and Bicycle

The pedestrian connections within the NMH site will be designed to connect with Council's proposed pedestrian and bicycle shared path along Fieldsend Street that is currently under construction. The proposed

roundabout design includes a refuge island on Metford Road to provide a safe connection from the site to Council's shared path. By providing a connection to Fieldsend Street, the NMH site will be maximising the opportunity for cyclists to connect to the Victoria Street Railway Station.

Proposed pedestrian movements within the Site are shown in Figure 8-4.

Service Vehicles and Loading Dock

The current design for NMH includes one loading area on the lower ground level in the south-east corner of the hospital with direct access to the main building. This will be accessed via the main internal access road and the eastern internal roundabout. The loading area is proposed to accommodate vehicles up to and including 12.5-metre vehicles within six loading bays. The final loading bay area has yet to be designed. More detail will be provided during Stage 2 detail design of the SSI application.

Sustainable Travel Arrangements

A work travel plan can be used by hospitals to manage the transport choices of their staff. The plan aims to promote and encourage sustainable travel such as walking, cycling, public transport and car-pooling and reduce reliance on single occupant private vehicles.

The following travel demand strategies detailed below and within **Appendix F** will be considered during Stage 2 of the SSI:

- Provide staff accommodation near the site
- Provide a shuttle bus service between the hospital and key public transport interchanges or key residential areas with low public transport connectivity
- Amend bus routes (in consultation with the bus operators)
- Provide bicycle parking
- Provide change/shower facilities
- Promote car-pooling.

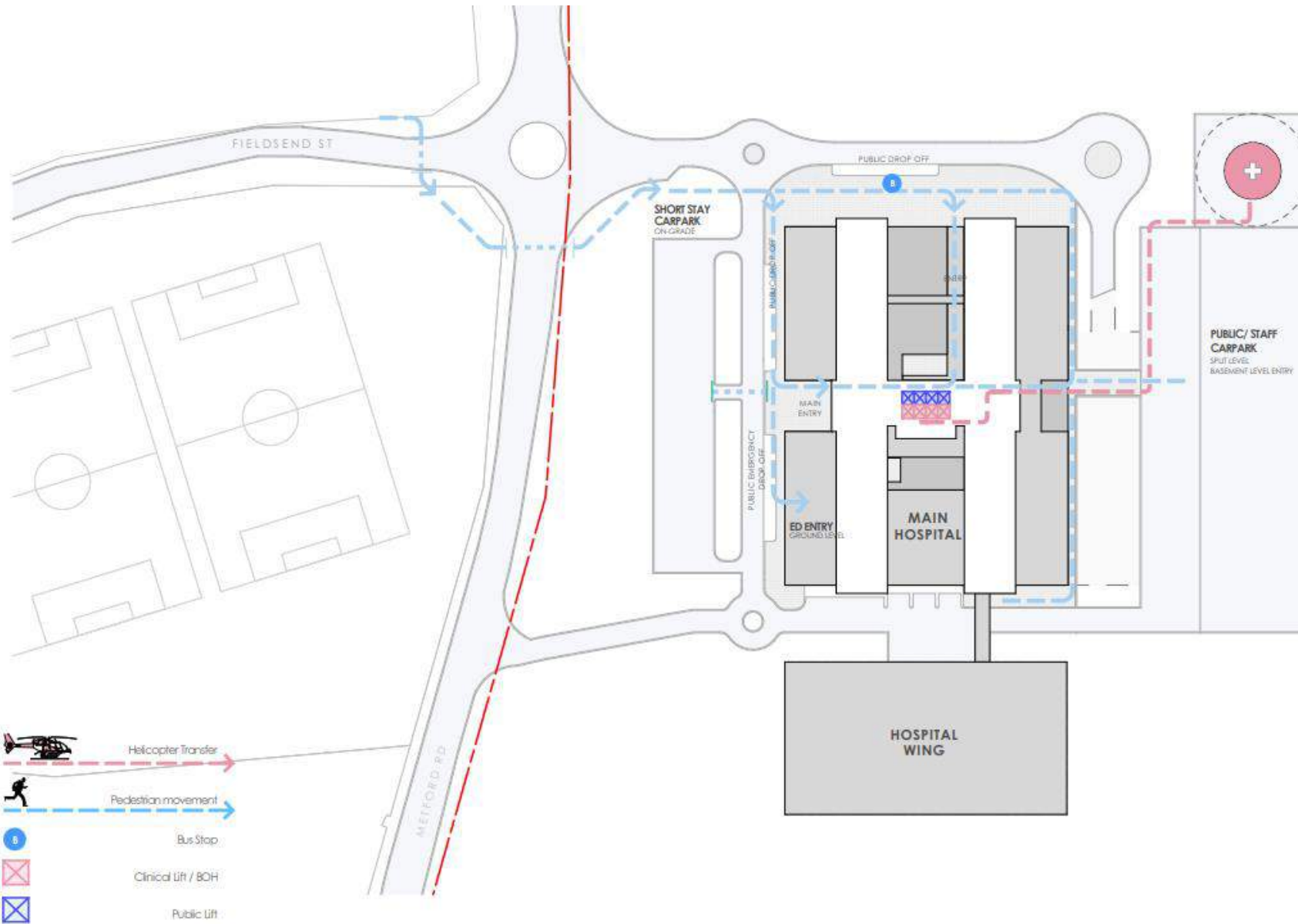


Figure 8-4 Pedestrian circulation

8.5 Mitigation Measures

The following mitigation and management measures in Table 8-10 are recommended to minimise potential traffic impacts.

Table 8-10 Traffic Mitigation Table

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
T1	A Construction Traffic Management Plan (TMP) is to be developed by the Contractor and incorporated into the Construction Environmental Management Plan (CEMP). A Draft TMP has been developed for the Proposal (refer Appendix F)
Stage 2 Detailed Design Considerations and Mitigation Measures	
T2	Monitor demand for parking at Fieldsend Oval once the Enabling Works along Metford Road are complete to determine whether to extend the existing on-site carpark at Fieldsend Oval.
T3	A detailed Work Travel Plan for the NMH should be developed in consultation with relevant stakeholders prior to the opening of the hospital.
T4	Further traffic modelling of the New England Highway will be undertaken during stage 2 detailed design. This modelling will utilise the existing SIDRA model and will include new data from updated RMS surveys which will occur during July / August 2018.

8.6 Recommendations

The following have been recommended by the TIA.

Upgrade Chelmsford Drive/ Metford Road roundabout

The Chelmsford Drive/ Metford Road roundabout operates at capacity with and without the impact of the proposed development; with the south-east and north-east legs of the intersection operating with high degrees of saturation and average delays. To improve capacity the following upgrade works were recommended:

- Increasing the number of circulating lanes on the east and south side of the roundabout to two lanes
- Provision of an additional 50 metre lane on the Chelmsford Drive east approach and Metford Road north approach (refer Figure 8-5).

Modelling has shown that these proposed upgrades would result in satisfactory intersection operation with spare capacity in all peak periods for the 2032 growth scenario.

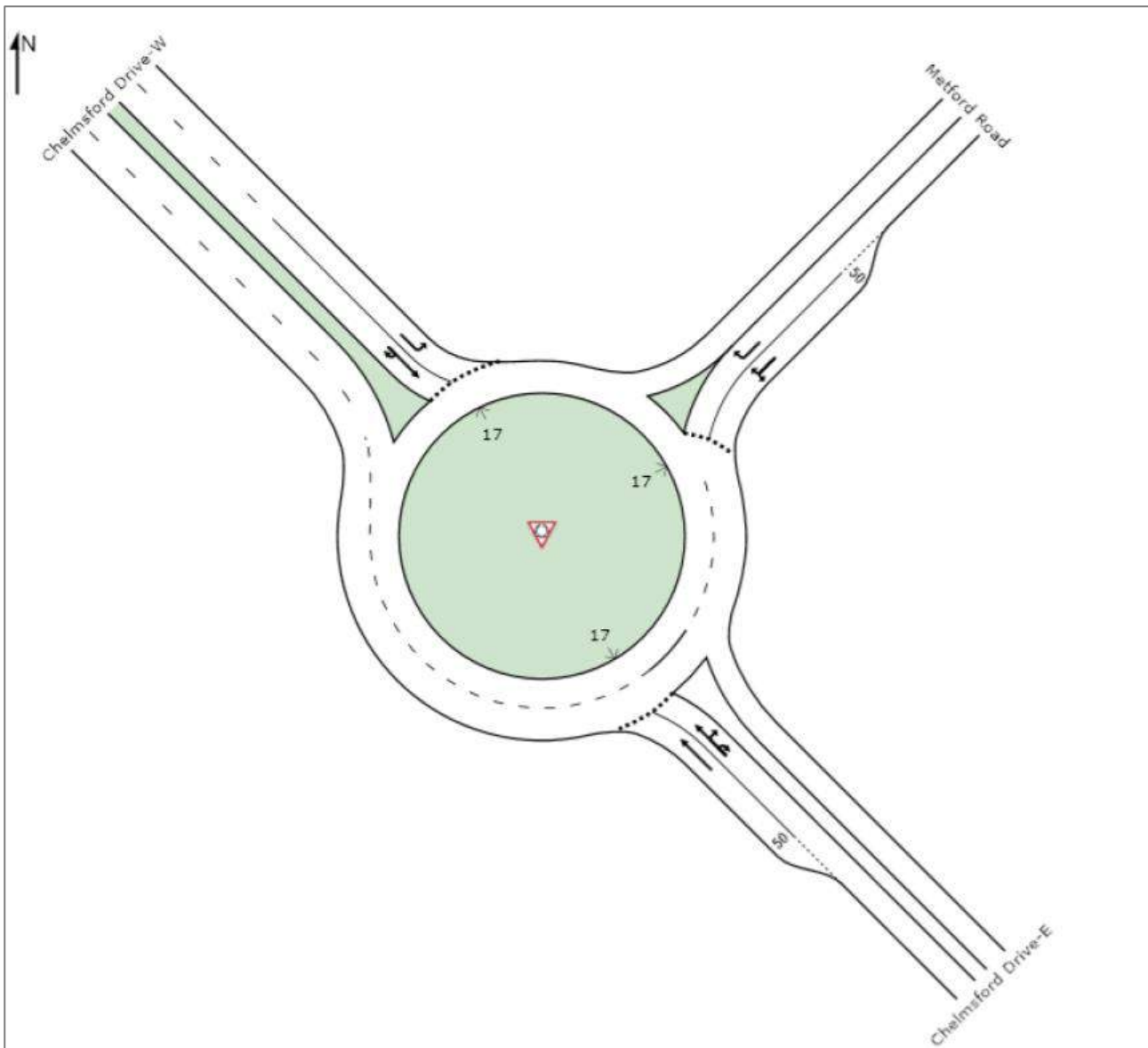


Figure 8-5 Proposed layout of Chelmsford Drive/ Metford Road roundabout

Upgrade Metford Road/ Raymond Terrace Road roundabout

Modelling has shown that some movements at the Metford Road/ Raymond Terrace Road roundabout would operate at capacity with or without the proposed development during both AM and PM peak periods for the 2032 growth scenario. To improve capacity the following upgrade works were recommended:

- All the short approach and departure lanes be extended to a minimum of 100 metres, with exception of the Raymond Terrace Road north exit being increased to 200 metres (refer Figure 8-6).

Modelling has shown that these proposed upgrades would result in satisfactory intersection operation with spare capacity in all peak periods for the 2032 growth scenario.

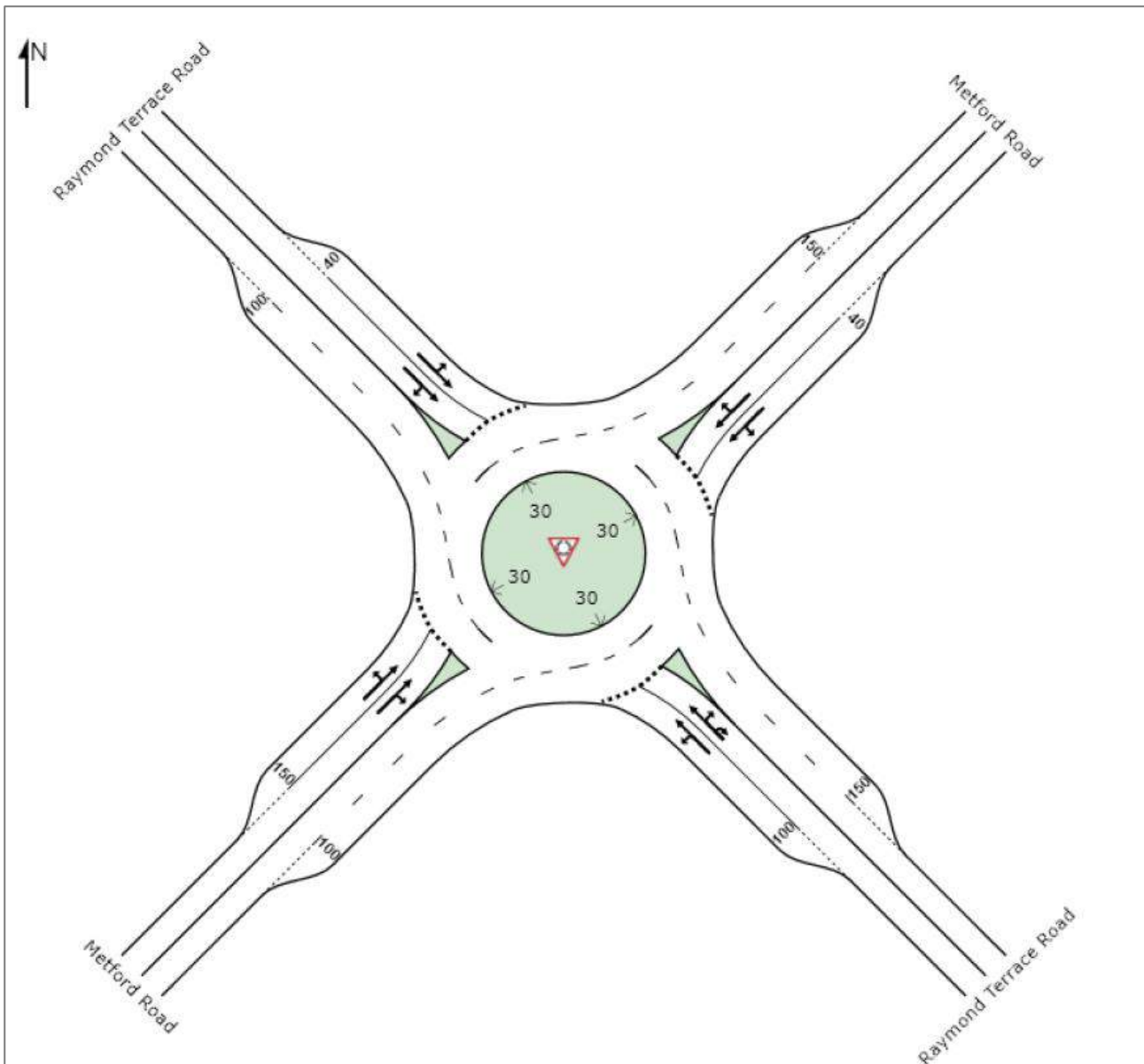


Figure 8-6 Proposed layout of Metford Road/ Raymond Terrace Road roundabout

8.7 Commitments

Metford Road / Chelmsford Drive intersection upgrade

HI have committed to completing the Metford Road / Chelmsford Drive intersection upgrade works as part of the NMH. However, the upgrade will be undertaken by HI separate to the subject Stage 1 SSI Application and will be assessed under Part 5 of the EP&A Act, and the provisions of *State Environmental Planning Policy (Infrastructure) 2007*. The final design will be developed in partnership with Maitland City Council.

New England Highway Traffic Modelling

Analysis of the New England Highway between Mitchell Road and Chisholm Road (inclusive of the New England Highway / Chelmsford Road intersection) will be completed in consultation with Roads and Maritime and Health Infrastructure after the final stage of the Stockland Green Hills Shopping Centre development opens. The New England Highway analysis will be completed using SIDRA modelling and will be included in Stage 2 of the staged infrastructure application for the proposed NMH.

9. Noise and Vibration

9.1 Introduction

A Noise and Vibration Impact Assessment (NVIA) was prepared by Wood & Grieve Engineers to assess the potential construction, operational and road traffic noise and vibration impacts associated with the Stage 1 of the Proposal. The purpose of the report is to assess the construction noise impacts associated with Stage 1 activities and also provide an initial assessment of hospital operational noise impacts to identify any potential issues to be considered during the Stage 2 EIS. The NVIA is provided in **Appendix M**.

The report was prepared in accordance with the following policies and guidelines:

- NSW DECCW *Interim Construction Noise Guideline 2009*
- NSW EPA *Industrial Noise Policy 2000*
- NSW DEC *Assessing Vibration: a technical guideline 2006*
- NSW Health Infrastructure *Engineering Services Guidelines 2016*
- AS/NZS 2107:2016 – *Acoustics – Recommended design sound levels and reverberation times for building interiors*
- NSW EPA *Environmental Noise Control Manual*
- NSW DoP *Development Near Rail Corridors and Busy Roads – Interim guideline 2008*
- NSW EPA Rail Infrastructure *Noise Guideline 2013*
- British Standard BS7385:1993 “*Evaluation and Measurement for Vibration in Buildings*” – Part 2: “*Guide to Damage Levels from Ground-borne Vibration*”
- German Standard DIN4150-Part 3 “*Structural vibration in buildings – Effects on structures*”.

Noise Assessment Methodology

A quantitative construction noise assessment has been undertaken due to the expected duration of the Proposal. A preliminary operational noise assessment has also been undertaken.

To establish the existing background noise environment of the Proposal area noise data was collected by a combination of unattended and attended noise measurements at representative locations around the site over 10 days during June 2017.

Un-attended noise measurements of 15-minute duration were conducted on Thursday 15 June 2017 and Monday 3 July 2017 at two locations, one along the electricity easement and one along Metford Road (refer Figure 9-1 for measurement locations). Unattended noise logging was conducted from Thursday 15 June 2017 to Saturday 24 June 2017 at three locations, one along the electricity easement, one along Metford Road and 51 Turton Street (refer Figure 9-1 for measurements locations).

The NSW Office of Environment and Heritage (OEH) Industrial Noise Policy (INP) defines background and ambient noise for daytime, evening and night time periods as follows:

Day:	is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
Evening:	is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
Night:	is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays & Public Holidays.

Vibration Assessment Methodology

Unattended vibration monitoring was conducted from Thursday 15 June 2017 to Sunday 25 June 2017 at one location, within the Metford Triangle near Metford Road. A vibration monitor was placed at position V1 as shown in Figure 9-1 to measure the background vibration that is representative of the site location.

9.2 Existing Environment

Surrounding area and surrounding receivers

The Proposal is located in Metford NSW and is surrounded by industrial and recreational areas to the west, part of CSR occupied Lot 401 to the north and residential subdivision to the south. Wood & Grieve observed that the local ambient noise environment is dominated by noise from the surrounding nature (characteristic of bushland and the natural environment) through the majority of the day, evening and night periods. Receivers are identified in Figure 9-1.

Background Noise levels

Noise monitoring was carried out at selected locations (refer Figure 9-1) within the study area to measure the existing road traffic noise and the background and ambient noise environment in the vicinity of the Proposal site. Table 9-1 and Table 9-2 give a summary of the background noise levels of the Site. Table 9-1 illustrates the results of attended background noise monitoring, Table 9-2 illustrates the results of the traffic noise survey for the day and night time periods and Table 9-3 illustrates the results of the residential receiver noise survey for the day, evening and night time periods.

Table 9-1 Attended Background Noise Monitoring Summary (Source: Wood & Grieve Engineers NVIA Report 2017)

Measurement Location	Measurement Time	LAeq, 15mins dB(A)	LA90 dB(A)	LA10 dB(A)	Comments
P1	3/07/2017 – 12:15pm	73.1	58.9	77.5	Dominated by traffic movements along Metford Road.
P2	15/06/2017 – 12:41pm	42.3	40.2	43.8	General environmental noise.
P3	15/06/2017 – 1:14pm	59.3	47.3	60.8	General environmental noise as well as intermittent traffic along Turton Street.

Table 9-2 Unattended background noise monitoring – L1 to measure traffic noise from Metford Road (Source: Wood & Grieve Engineers NVIA Report 2017)

Location	Equivalent Continuous Noise Level LAeq,period - dB(A)		Noisiest 1 Hour LAeq, 1 hour - dB(A)	
	Day (15 hr)	Night (9hr)	Day (15hr)	Night (9hr)
L1	58	51	61	55

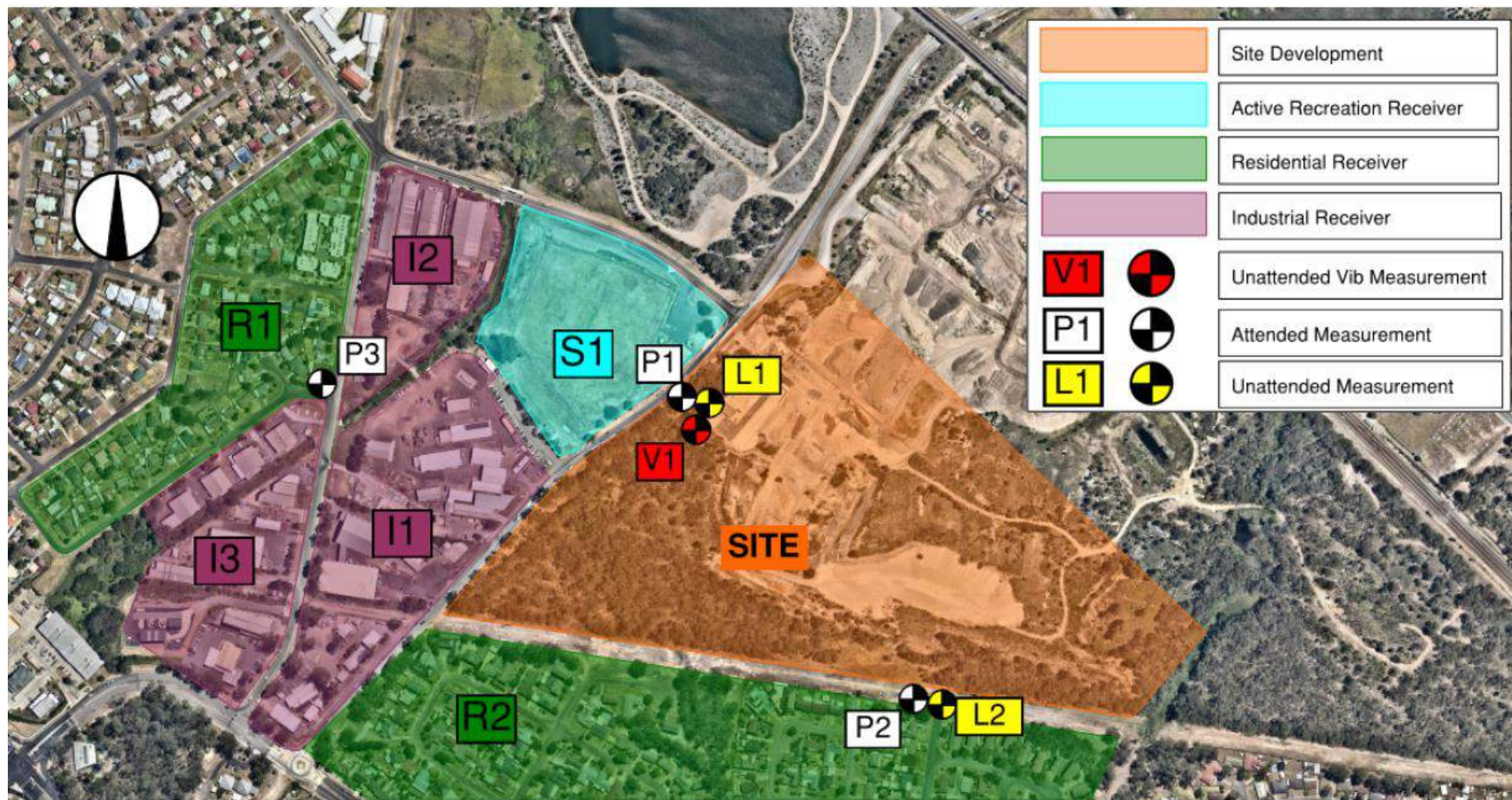


Figure 9-1 Site map and locations of measurements and receivers (Source: Wood & Grieve Engineers NVIA Report 2018)

Table 9-3 Unattended background noise monitoring – L2 to measure background and ambient noise of the nearest sensitive residential receiver (R2) (Source: Wood & Grieve Engineers NVIA Report 2017)

Location	Equivalent Continuous Noise Level LAeq,period - dB(A)			Background Noise Level RBL - dB(A)		
	Day	Evening	Night	Day	Evening	Night
L2	49	48	45	42	42	37
Note: Any rain affected data during the period of logging has been excluded from the calculations.						

Background Vibration levels

The results of the unattended vibration monitoring have been collated using the median vibration levels for daytime and night time (in accordance with the *NSW DEC Assessing Vibration: a technical guideline*) and are shown in Table 9-4 below.

Table 9-4 Unattended background vibration monitoring at location V1 (Source: Wood & Grieve Engineers NVIA Report 2017)

Location	Median Background Acceleration (m/s ²)					
	Daytime (7:00am – 10:00pm)			Night time (10:00pm – 7:00am)		
	x-axis	y-axis	z-axis	x-axis	y-axis	z-axis
V1	0.003	0.004	0.003	0.002	0.002	0.001

9.3 Noise Criteria

9.3.1 Construction Noise Criteria

In NSW, noise impacts arising from construction activities are managed in accordance with the *Interim Construction Noise Guideline* (ICNG). Table 9-5 below (reproduced from Table 2 of the ICNG) sets out the noise management levels for residences and how they are to be applied. The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints. The guideline has been developed to assist with the management of noise impacts, rather than to present strict numeric noise criteria for construction activities.

Table 9-5 Noise management levels at residential receivers (Source: Wood & Grieve Engineers NVIA Report 2017)

Time of Day	Management Level LAeq (15 min)*	How to Apply
Recommended standard hours: Monday to Friday 7 am – 6 pm	Noise affected 52 dB(A)	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent

Time of Day	Management Level LAeq (15 min)*	How to Apply
Saturday 8 am – 1 pm No work on Sundays or public holidays		should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is, above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: • Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) • If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected Evening 47 dB(A) Night 42 dB(A)	A strong justification should typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB (A) above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see section 7.2.2 of the ICNG.
* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence. Noise levels may be higher at upper floors of the noise affected residence.		

Residential receivers are considered '*noise affected*' where construction noise levels are greater than the noise management levels identified in Table 9-5 above. The noise affected level represents the point above which there may be some community reaction to noise. Where predicted and/or measured construction noise levels exceed noise management levels, all feasible and reasonable work practices would be applied to meet the management levels.

Construction Noise Management Levels (NMLs) for the Proposal were adopted in accordance with the Interim Construction Noise Guideline (ICNG) as outlined in Table 9-6.

Table 9-6 OEH ICNG Construction Noise Criteria

Land Use	Management Level, LAeq,15min – applies when properties are being used
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Active recreation areas	External noise level 65 dB(A)
Industrial premises	External noise level 75 dB(A)

9.3.2 Operational Noise Criteria

The NSW Office of Environment and Heritage (OEH) Industrial Noise Policy (INP) sets out noise criteria to control the noise emission from industrial noise sources. Mechanical and operational noise from the development shall be addressed following the guideline in the NSW INP.

The calculation is based on the results of the ambient and background noise unattended monitoring, addressing two components:

- Controlling intrusive noise into nearby residences (Intrusiveness Criteria)
- Maintaining noise level amenity for particular land uses (Amenity Criteria).

The intrusiveness criterion can be summarised as $LA_{eq, 15 \text{ minute}} \leq RBL \text{ background noise level} + 5 \text{ dB(A)}$. The amenity criterion defines the acceptable noise levels that will protect against noise impacts such as speech interference, community annoyance and to some extent sleep disturbance. Intrusiveness and amenity criterion are outlined in Table 9-7.

Table 4.1 of the NSW DECCW INP provides procedures for determining whether an adjustment should be applied for greater annoyance aspect this includes things like tonal noise, low frequency noise and intermittent noise. This is applicable for the external noise emissions from the development. These project specific noise levels (PSNL) are in accordance with the requirements of the NSW INP and shall be assessed to the most affected point on or within the residential boundary. PSNL are given in Table 9-7.

Table 9-7 Intrusiveness criteria, amenity criteria for operational noise levels and Project Specific Noise Levels

Receiver location	Period	Background Noise Level RBL dB(A)	Intrusiveness Criteria LAeq (15 minute) dB(A)	Amenity Criteria LAeq (period) dB(A)	PSNL dB(A)
Nearest sensitive residential receivers (R2) to the south	Day (7am to 6pm)	42	47	55	47
	Evening (6pm to 10pm)	42	47	45	45
	Night (10pm to 7am)	37	42	40	40
	Night (internal)	N/A	N/A	N/A	45

Receiver location	Period	Background Noise Level RBL dB(A)	Intrusiveness Criteria LAeq (15 minute) dB(A)	Amenity Criteria LAeq (period) dB(A)	PNSL dB(A)
	(10pm to 7am)				
Light industrial receivers	All – when in use	N/A	N/A	65	70
Active Recreation Area (Sports field)	All – when in use	N/A	N/A	55	55

9.3.3 Traffic Noise Generation Criteria

Road traffic noise impact is assessed in accordance with the NSW Road Noise Policy (RNP) (DECC 2011). The criterion (Table 3 – Road Traffic Noise Assessment Criteria for Residential Land Uses) divides land use developments into different categories and lists the respective criteria for each case. The category that is relevant to the proposed use of the site is shown below in Table 9-8.

Table 9-8 NSW Road Noise Policy – Traffic Noise Assessment Criteria

Road Category	Type of project/ land use	Assessment Criteria	
		Day (7am – 10pm)	Night (10pm – 7am)
Freeway/ arterial/ sub-arterial roads	8. Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors.	LAeq, (15 hour) 55	LAeq, (15 hour) 50
	9. Existing residences affected by noise from redevelopment of existing freeway/arterial/sub-arterial roads.	LAeq, (15 hour) 60	LAeq, (15 hour) 55
	10. Existing residences affected by additional traffic on existing freeways/ arterial/sub-arterial roads generated by land use developments.		
Local Roads	11. Existing residences affected by noise from new local road corridors.	LAeq, (1 hour) 55	LAeq, (1 hour) 50
	12. Existing residences affected by noise from redevelopment of existing local roads.		
	13. Existing residences affected by additional traffic on existing local roads generated by land use developments.		

In the event that the traffic noise at the Site is already in excess of the criteria noted above, the NSW RNP states that the primary objective is to reduce the existing level through feasible and reasonable measures to meet the criteria above.

If this is not achievable, Section 3.4.1 Process for applying the criteria – Step 4 states that for existing residences affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise should be limited to 2 dB above that of the corresponding ‘no build option’.

9.3.4 Construction & Operational Vibration Criteria

Table 9-9 indicates the vibration criteria for the nearest residential and industrial properties to the development.

Table 9-9 Construction vibration criteria summary for continuous and impulsive vibration (m/s²)

Location	Period	Human Comfort Vibration Objectives			Building damage Objectives – velocity (mm/s)
		Continuous m/s2 (RMS)		Intermittent m/s1.75 (VDV)	
		Z – axis	X – and y – axis		
Residential	Daytime (7am to 10pm)	0.010 – 0.020	0.0071 – 0.014	0.20 – 0.40	5
	Night time (10pm to 7am)	0.007 – 0.014	0.005 – 0.010	0.13 – 0.26	5
Industrial	Daytime (7am to 10pm)	N/A	N/A	N/A	20
	Night time (10pm to 7am)	N/A	N/A	N/A	20

9.3.5 Disturbance Criteria

Section 4.3 of the ICNG (DECC, 2009) states that a sleep disturbance assessment is required where construction activities are planned to occur for more than two consecutive nights. Proposed construction anticipated to occur for 18 months in duration. Therefore, an assessment of sleep disturbance has been completed.

The NSW Road Noise Policy (RNP) (EPA, 2011) guidance states:

- Maximum internal noise levels below 60 to 65 dBA are unlikely to wake sleeping occupants
- One or two noise events per night, with maximum internal noise levels of 65-70 dBA, are not likely to affect the health and wellbeing of occupants significantly
- As a rule, for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) L_{Amax} more than 10 or 15 per night.

If noise levels over the screening criteria were identified, then additional analysis would consider factors such as:

- How often the events would occur
- The time the events would occur (between 10pm and 7am)
- Whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).

Due to the great likelihood that noise events within the proposed hospital development will occur more than 15 times per night, an $L_{Amax} \leq 45$ sleep disturbance criterion for noise events within the proposed hospital development will be adopted.

9.4 Impact Assessment

Construction Noise Assessment (Stage 1 Early Works)

Construction activities associated with Stage 1 would result in a short-term increase in localised noise levels, particularly for residences and other sensitive receivers located close to the site.

It is anticipated that construction would be largely carried out within standard construction hours. The expected working hours for construction are as follows:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sundays and Public Holidays: No work.

Construction for Stage 1 Early Works is expected commence in 2018 and take approximately 12 months.

The key noise generating activities that will occur are listed below:

- Site establishment
- Earthworks - stabilisation and vegetation removal
- Earthworks - stabilisation and internal road construction
- Earthworks - stabilisation and in-ground infrastructure
- Earthworks - stabilisation and utilities.

Table 9-10 shows the predicted noise levels of each activity at different sensitive receiver locations. Noise modelling for the works near residential receivers (refer Table 9-10) identified that the NMLs would be exceeded for receivers for the duration of the works. However, noise levels for all activities at all receivers are predicted to remain below the highly noise affected ICNG NML of 75 dBA at all receivers.

Noise modelling for the works near active recreation receivers (refer Table 9-10) identify that the NMLs would be exceeded for receivers for all Stage 1 activities excluding site establishment. However, noise levels for all activities at all receivers are predicted to remain below the highly noise affected ICNG NML of 75 dBA at all receivers.

Noise modelling for the works near industrial receivers (refer Table 9-10) identify that the NMLs would not be exceeded for receivers for any of the Stage 1 activities.

Table 9-10 Predicted noise levels at location – R2 (Residential), S1 (Active Recreation) and I1 (Industrial Premises)

Description	Predicted Noise Level Leq, 15min dB(A)	Noise Management Level (NML) Leq, 15min dB(A)	Exceedance (dB(A)) (External)	Compliance with NML Y/N	Compliance with “highly noise affected criteria “Y/N
Residential Receivers (R2)					
Site Establishment	57 – 63	52	5 – 11	No	Yes

Description	Predicted Noise Level Leq, 15min dB(A)	Noise Management Level (NML) Leq,15min dB(A)	Exceedance (dB(A)) (External)	Compliance with NML Y/N	Compliance with “highly noise affected criteria “Y/N
Earthworks, Stabilisation and Vegetation Removal	63 – 71	52	11 – 19	No	Yes
Earthworks, Stabilisation and Internal Road Construction	63 – 71	52	11 – 19	No	Yes
Earthworks, Stabilisation and inground infrastructure	63 – 71	52	11 – 19	No	Yes
Earthworks, Stabilisation and Utilities	63 – 71	52	11 – 19	No	Yes
Active Recreation (S1)					
Site Establishment	58 – 62	65	0	Yes	Yes
Earthworks, Stabilisation and Vegetation Removal	67 – 74	65	2 – 9	No	Yes
Earthworks, Stabilisation and Internal Road Construction	68 – 71	65	3 – 6	No	Yes
Earthworks, Stabilisation and Piling	68 – 74	65	3 – 9	No	Yes
Earthworks, Stabilisation and Utilities	67 – 74	65	2 – 9	No	Yes
Industrial Receivers (I1)					
Site Establishment	53 – 54	75	0	Yes	Yes
Earthworks, Stabilisation and Vegetation Removal	63 – 64	75	0	Yes	Yes
Earthworks, Stabilisation and Internal Road Construction	62 – 63	75	0	Yes	Yes
Earthworks, Stabilisation and Piling	63 – 64	75	0	Yes	Yes
Earthworks, Stabilisation and Utilities	63 – 64	75	0	Yes	Yes
Assumptions: - Many of the noise sources will be generating noise during separate periods of time. In these instances, the loudest source relative to the receiver is assumed to be operating to consider the worst-case scenario - Plant and vehicles expected to be operating 60% of the time.					

The LAeq (15-min) noise contour map for the worst-case scenario for construction noise (Earthworks, Stabilisation and Piling) is presented in Figure 14 1 and are representative of received noise levels for all assessment periods.

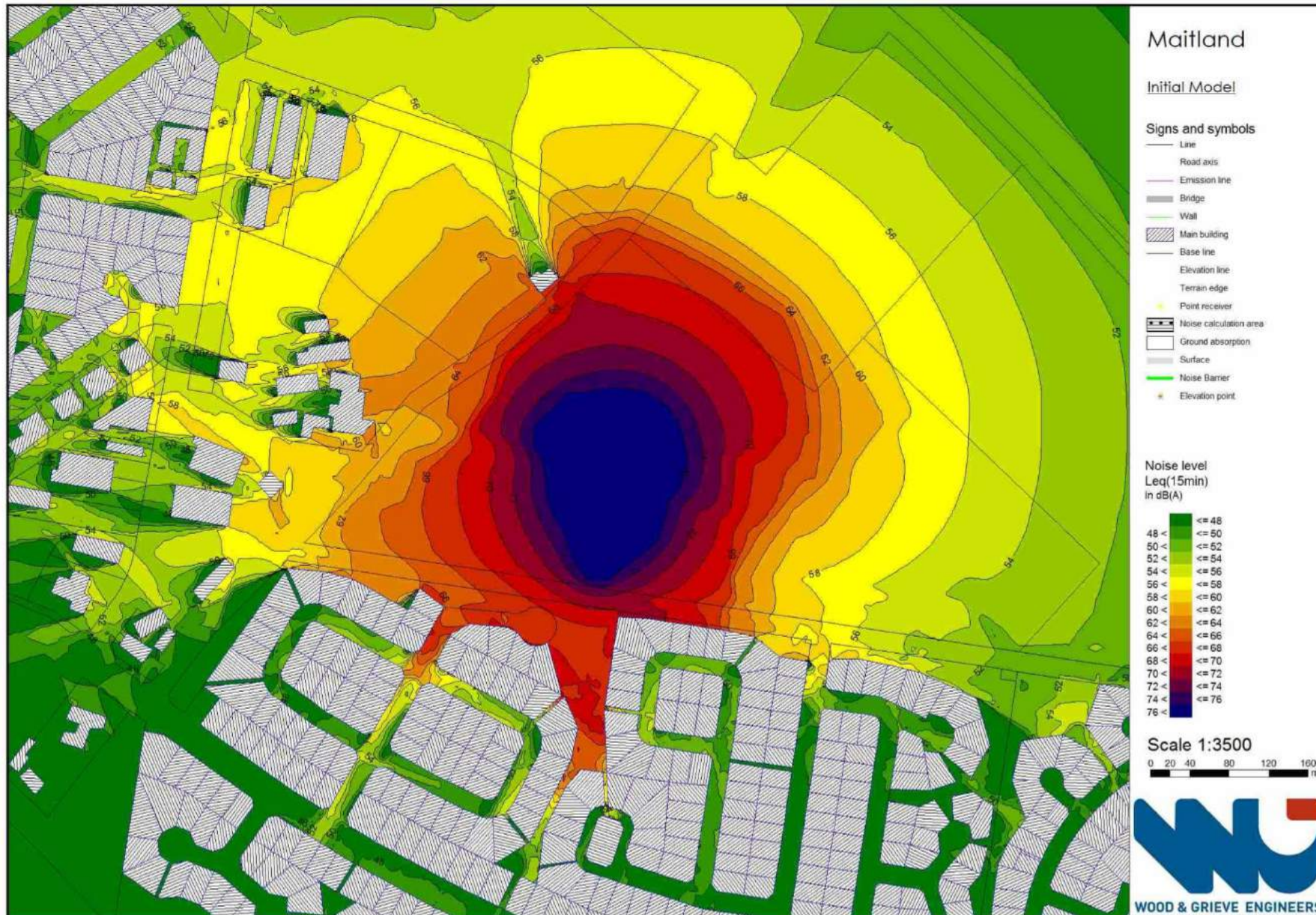


Figure 9-2 Worst case construction noise emission contour map for earthworks, stabilisation and inground infrastructure works

Sleep disturbance

A sleep disturbance assessment due to the noise generated by construction works was not conducted as all construction works are assumed to occur during the standard hours of operation outlined in Table 9-5.

Operation Noise Assessment (Stage 1 Concept Hospital)

This section summarises an assessment of operational noise impacts based on the Concept Hospital design. This assessment would be refined for the detailed design as part of the Stage 2 SSI application.

Operational activities would result in a permanent increase in localised noise levels, particularly for residences and other sensitive receivers located close to the site. Increases in operational noise levels would be caused by:

- Addition of an external car park
- Hospital loading dock and waste collection operations
- Road traffic generation
- Plant and machinery noise from hospital operations
- Helicopter noise
- Emergency vehicle noise (ambulance sirens).

Table 9-11 gives the predicted noise levels from some operational activities and gives the predicted increase in traffic noise levels. Noise generated by carparking, loading dock and waste collection are not expected to exceed the evening time noise criterion. Table 9-12 shows that traffic noise at the site is already in excess of the criteria noted in Table 9-7 above. Traffic noise cannot be reduced to meet the criteria however the increase in the total traffic noise will be below 2 dB above the existing peak period noise levels (refer Table 9-12).

Table 9-11 Predicted noise levels from operational activities

Operational Activity	Receiver Location	Predicted Noise Level dB(A)	Evening Time Criterion dB(A)	Exceedance	Compliance (Yes/ No)
External carpark	Residential Receiver R2	45	45	0	Yes
Loading dock and waste collection	Residential Receiver R2	44	45	0	Yes
Assumptions: • 600 car-parking bays, car park area as indicated in DA architectural drawings provided • The carpark will have a smooth concrete surface • Calculations use peak hour period for vehicle movements.					

Table 9-12 Predicted Increase in Traffic Noise Levels (AM/PM Peak hours)

Period	Existing Noise Levels Day LAeq (1hr)	Predicted Noise Levels Day LAeq(1hr)	Predicted Increase in Traffic Noise, dB(A)
AM Peak	73.1	73.2	0.1
PM Peak	73.1	73.4	0.3
Assumptions: - AM peak hour 2022 daily traffic volume is predicted to be 1,697 without the Proposal and 1,743 with the Proposal. - PM peak hour 2022 daily traffic volume is predicted to be 1,663 without the Proposal and 1,772 with the Proposal.			

Noise emissions from the operational noise sources were calculated for the nearest and potentially most affected residential receiver locations. The noise emissions from the development were determined by modelling the noise sources, receiver locations, and topographical features of the proposed site. Noise sources from general operations at the site typically include mechanical services noise from air-conditioning equipment and exhaust fans etc. servicing the hospital. Refer to Table 9-13 for the proposed sound power levels for the mechanical plant associated with the proposed development.

The predicted noise levels for operational mechanical plant exceed highly noise affected ICNG NML of 75 dB(A). This will need to be considered and mitigated during Stage 2 detailed design.

Table 9-13 Sound Power Levels for Mechanical Plant and a helicopter

Item	SWL re 10-12 W dB								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Overall dB(A)
Level 2 Mechanical Plant Room Louvres	93	99	93	85	84	82	80	75	90
Total Roof Level Discharges	88	94	88	80	79	77	75	70	85
Aw139 Helicopter	139	136	135	132	131	125	118	113	-

Helicopter Noise to Sensitive Receivers

On this basis, there are no mandatory noise emission criteria resulting from helicopter noise operations, previous assessments in the Land and Environmental Court NSW have applied noise criteria obtained from Air Services Australia.

Air Services Australia Principles and Procedures for minimising the impact of aircraft noise fly Neighbourly Guide are as follows:

1. No overflight of residential areas, if this can't be achieved then
2. No overflight of residential area below 1,500 ft AGL, if this can't be achieved then
3. Minimisation of incidence of helicopters flying below 1,500 ft AGL, if this can't be achieved then
4. Minimisation of noise impact on residential areas by helicopters below 1,500 ft AGL
5. Minimisation of noise impacts on residential areas by hovering/circling helicopters
6. Implement Fly Neighbourly procedures.

Based on the advice provided by AviPro, the overflight of the helicopter is expected to be <1,500 ft AGL when under neutral weather conditions.

Further to the above, the proposed helipad has been located as far as practicable from the nearby noise sensitive receivers.

Helicopter Noise impact on Proposed Hospital

There are a number of noise and vibration concerns associated with the operation of emergency medical transport helicopters such as the specific frequency dependent / vibration criteria of specialist facilities such as operating theatres and sleep disturbance of patients.

Control of helicopter noise and vibration is currently a key driver in the design of facade systems and external building elements. The NMH building façade is proposed to be designed in order to meet the internal design noise levels in the presence of helicopter operations.

The LAeq(15-min) noise contour map for the worst-case scenario for operational noise (helicopter operation) is presented in Figure 9-3 and are representative of received noise levels for all assessment periods.

In order to achieve the internal noise levels specified in the Engineering Services Guidelines for the hospital, the minimum recommended glazing selection for the façades of the proposed development is provided in Table 9-14. The values in Table 9-14 should be considered as the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading, thermal requirements etc.

Table 9-14 Recommended acoustic performance of glazing system – Helicopter Noise

External Façade Noise Level, dB(A)	Required Acoustic Rating of Glazing Assembly, Rw2	Fixed Single Glazed System
<96	31	6mm glass
96 – 98	32	6.38mm laminated glass
98 – 100	34	8.38mm laminated glass
100 – 102	35	10.38 laminated glass
102 – 104	37	12.38mm laminated glass
Note: The required acoustic rating of glazing assembly, refers to the acoustic performance of the glazing once installed on site (including the frame).		

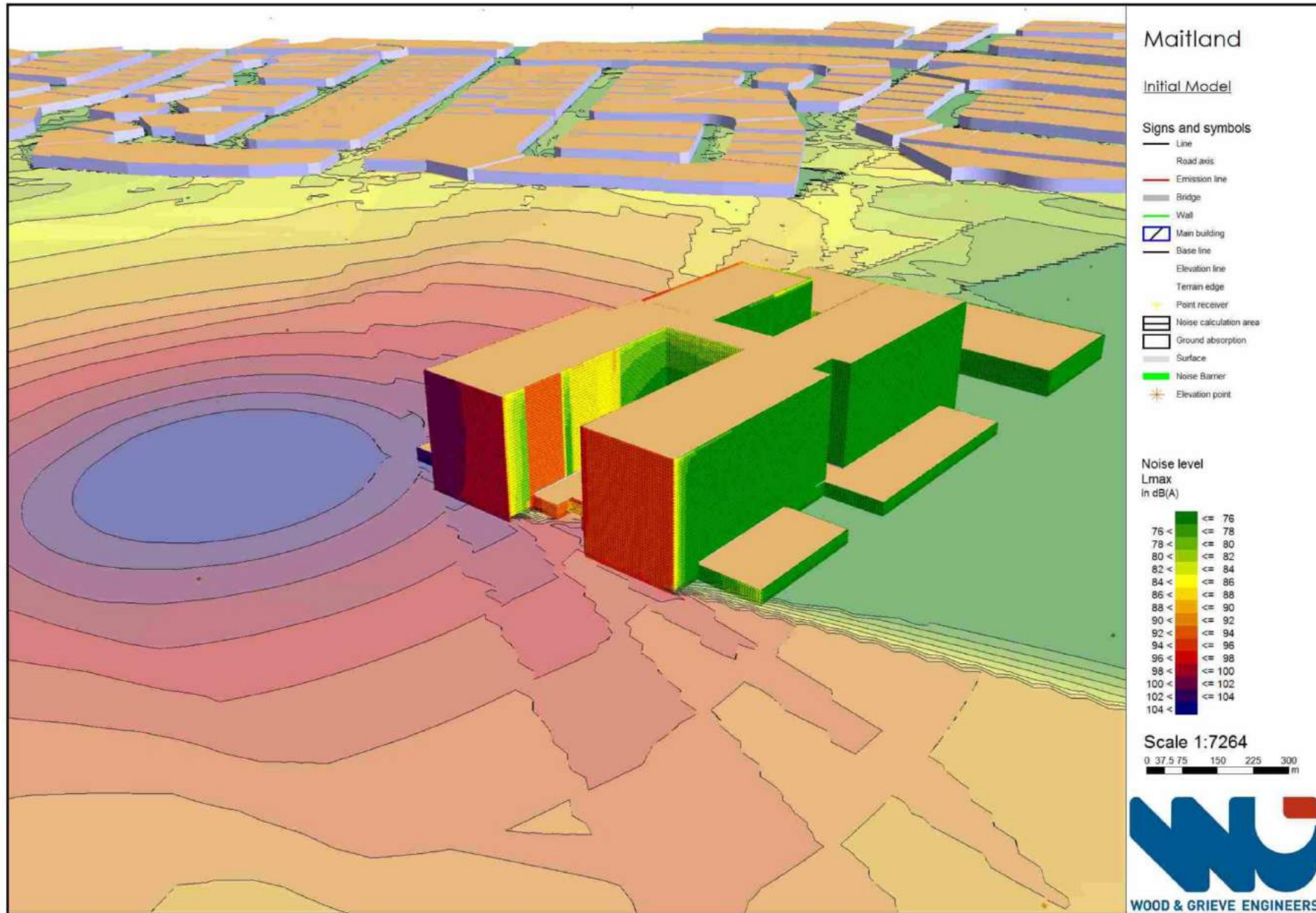


Figure 9-3 Worst case operational noise emission contour map for External facade noise levels due to helicopter movements - North

Vibration

Potential sources of construction vibration come from the use of construction equipment include vibrating rollers. Table 9-15 provides the recommended minimum working distances for the use of various vibration intensive sources to nearby receivers.

At the nearest receiver is over 100m away from the proposed works cosmetic damage and human response vibration levels are not expected to be exceeded throughout construction. Nevertheless, vibration measures have been provided in Table 9-15 as preventative measures.

Table 9-15 Working Distances for Vibration Intensive Plant

Plant Item	Rating/ Description	Safe Working Distances	
		Cosmetic Damage (BS 7385)	Human Response (OH&E Vibration Guideline)
Vibratory Roller	<50 kN (Typically 1-2 tonnes)	5m	15m to 20m
	<100 kN (Typically 2-4 tonnes)	6m	20m
	<200 kN (Typically 4-6 tonnes)	12m	40m
	<300 kN (Typically 7-13 tonnes)	15m	100m
	>300 kN (Typically 13-18 tonnes)	20m	100m
	>300 kN (> 18 tonnes)	25m	100m
Small Hydraulic Hammer	(300kg – 5 to 12t excavator)	2m	7m
Medium Hydraulic Hammer	(900kg – 12 to 18t excavator)	7m	23m
Large Hydraulic Hammer	(1,600kg – 18 to 34t excavator)	22m	73m
Vibratory Pile Driver	Sheet Piles	2m to 20m	20m
Pile Boring	≤800mm	2m	N/A
Jackhammer	Hand held	1m	Avoid contact with structure
Compactor	852G	10	20
Dozer	D810 with ripper	2 (nominal)	10
Excavator	≤30 Tonne	10	15
Grader	≤20 Tonne	2 (nominal)	10
Truck Movements	-	-	10m

9.5 Mitigation Measures

The following mitigation and management measures in Table 9-16 are recommended to minimise potential noise impacts.

Table 9-16 Noise and Vibration Mitigation Table

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
N1	A Construction Noise Vibration Management Plan (NVMP) will be prepared by the Contractor as part of the CEMP. The construction NVMP will include consideration of: • Monitoring strategy • Mitigation measures • Notification requirements.
Stage 2 Detailed Design Considerations and Mitigation Measures	
N2	Ensure that the Stage 2 detailed design includes opportunities for noise mitigation including: • Required separation or buffer distances. • Consideration of building materials to reduce internal noise such as double glazing. • Consideration of the placement of noisy activities in relation to sensitive receivers (such as loading dock, helipad and hospital services). • Inclusion of physical barriers minimising both visual and acoustic impact.
N3	The building façade is proposed to be designed in order to meet the internal design noise levels in the presence of helicopter operations as per NSW HI Engineering Services Guidelines.
N4	During Stage 2 detailed design consider: • Position mechanical plant away from nearby receivers • Screening around mechanical plant • Complete acoustic insulation within duct work.

10. Biodiversity

10.1 Introduction

A Biodiversity Assessment Report (BAR) was undertaken by the pitt&sherry to investigate the potential impacts on biodiversity of the Proposal (refer **Appendix E**). Previous ecological investigations on the former CSR brickworks site (Metford triangle) have been undertaken by GHD (2013) and General Flora and Fauna (2014) and have been relied upon to prepare this BAR (these reports are included in **Appendix E**). Additional biodiversity offsetting work (8 Biobank plots/transects) was undertaken in July 2017 across the NMH study area by pitt&sherry to assist with the completion of the Biobank assessment and to validate previous vegetation mapping.

In 2018 a peer review of this BAR was undertaken by Michael Murray of Forest Fauna Surveys. A copy of the review is provided in **Appendix E**.

The reports were prepared in accordance with the following policies and guidelines:

- Framework for Biodiversity Assessment (FBA, 2014)
- Biobanking Assessment Methodology (BBAM, 2014)
- *Guidelines for Threatened Species Assessment* (DEC and DPI, 2005).

Assessment Methodology

An initial Desktop Assessment of relevant spatial ecological datasets was conducted to identify vegetation communities mapped for the Subject Land as well as locations of threatened flora species that have been previously recorded in the Gunnedah locality. This included a search of:

- OEH Atlas of NSW Wildlife database
- Commonwealth Department of the Environment (DotE) EPBC Protected Matters database
- Various regional vegetation mapping datasets within the Greater Hunter and Lower Hunter region.

The Desktop Assessments were followed by a Site Assessment in July 2017 which completed 10 Biobank biometric plots/transects within Lot 7314, six of which were within Lower Hunter Spotted Gum Ironbark Forest (LHSGIF) habitats, two within the man-made ponds and two within the rehabilitation plantings/regrowth habitat.

A site based, major project development scenario was run through the current version of the Biobank Credit Calculator on 11 August 2017 by accredited assessor, Isaac Mamott (accreditation number 0081). Based on the results of this a biodiversity offset strategy assessing three offset options was created.

Review of Previous Ecological Investigations

Previous surveys of the Site were undertaken by GHD (2013) and General Flora and Fauna (2014a; 2104b). These are reproduced in full and provided in **Appendix E**.

GHD (August 2013)

GHD conducted terrestrial flora and fauna surveys across the Metford Triangle and adjoining lands to the west of Metford Road. The assessment methodology included: five full floristic botanical plots; fauna habitat assessment; anabat microbat detection; call playbacks and camera trapping.

The GHD report did not identify any threatened flora species but noted that two vegetation types on site were analogous to the LHSGIF and Hunter Lowlands Redgum Woodland (HLRW) EECs listed under the NSW Threatened Species Conservation Act 1995 (TSC Act). The report also recorded two threatened species listed under the TSC Act used for foraging activities:

- Little Bentwing Bat
- Grey headed Flying Fox.

General Flora and Fauna (September 2014a)

General Flora and Fauna conducted baseline and targeted terrestrial flora and fauna surveys across the Metford Triangle. The assessment methodology included: nine full floristic botanical plots; eight straight line transects; small mammal trapping; anabat microbat detection; diurnal bird surveys; call playbacks; and active searching for reptiles.

The General Flora and Fauna report did not identify any threatened flora species but noted that two vegetation types on site were analogous to the LHSGIF and HLRW EECs listed under the TSC Act. The report also recorded seven threatened species listed within the Metford Triangle:

- Little Lorikeet
- Squirrel Glider
- Little Bentwing Bat
- Large Bentwing Bat
- Greater Broad-nosed Bat
- Large footed Myotis
- Grey headed Flying Fox.

A total of two of these seven species (Little Lorikeet and Squirrel Glider) were recorded by General Flora and Fauna within the NMH Site. A total of 12 hollow bearing trees were recorded within the LHSGIF situated in the far south-eastern corner of the Metford Triangle. These hollow bearing trees recorded on the site may provide potential nesting and denning habitat.

General Flora and Fauna (October, November and December 2014b)

General Flora and Fauna conducted targeted surveys for Green and Golden Bell Frogs as well as a suite of threatened flora species in October, November and December 2014. The assessment methodology included: call playbacks; and parallel line transects. No threatened species were recorded during these surveys despite dedicated searches for them.

Forest Fauna Surveys, Review (2018)

A review of this Biodiversity Assessment Report was undertaken by Forest Fauna Surveys (2018). A copy is provided in **Appendix E**.

The basis of the review was to consider the adequacy of previous assessments specific to threatened fauna, and whether the proposed action will impact upon threatened fauna. This report also provides recommendations to assist with fauna management and impact minimisation which have been incorporated within the BAR. The review included a site inspection and foot traverse of the area of influence to inspect habitat values of the remnant forest for threatened fauna.

The review determined that the totality of previous investigations result in collation of a comprehensive dataset regarding site fauna and their habitats. No further fauna surveys are considered necessary in order to adequately assess the impact of the proposed development on threatened fauna. This review supports the BAR findings that there would not be a significant impact on any threatened species.

10.2 Existing Environment

The site is contained within a portion of the former CSR Brickwork site which lies within the Sydney Basin Bioregion within the North Coast botanical subdivision and within the Maitland LGA.

Surface hydrology, landform and soils have been highly disturbed having undergone considerable modification by earthworks and extraction for the brickworks that previously operated on the site as well as the rehabilitation work completed for mine closure.

The western portion of the study area drains to the west to Two-mile creek whilst the central and eastern portion drains to the east to an unnamed tributary of Three Mile Gully, which, in turn, all flow northward to the Morpeth and Tenambit wetlands on the northern side of the main northern railway line, ultimately discharging into the Hunter River.

The site supports remnants of native vegetation in the south-west corner of the site. This native vegetation has had a history of disturbance including partial clearing and weeds are common across the site. Vegetation in the region has been cleared for farmland, roads, housing development, industrial precincts and electricity easements. Vegetation remnants on the site are isolated from extensive areas of native vegetation to the north and only tenuously connected by broken corridors to areas of native vegetation to the south (refer Figure 10-1).

The study area is mapped as being underlain with the Beresfield soil landscape group, comprising Permian-aged siltstone, mudstone and sandstone-derived silts, clays and sands. This regional mapping is generally consistent with site observations of topsoils and rock outcropping.

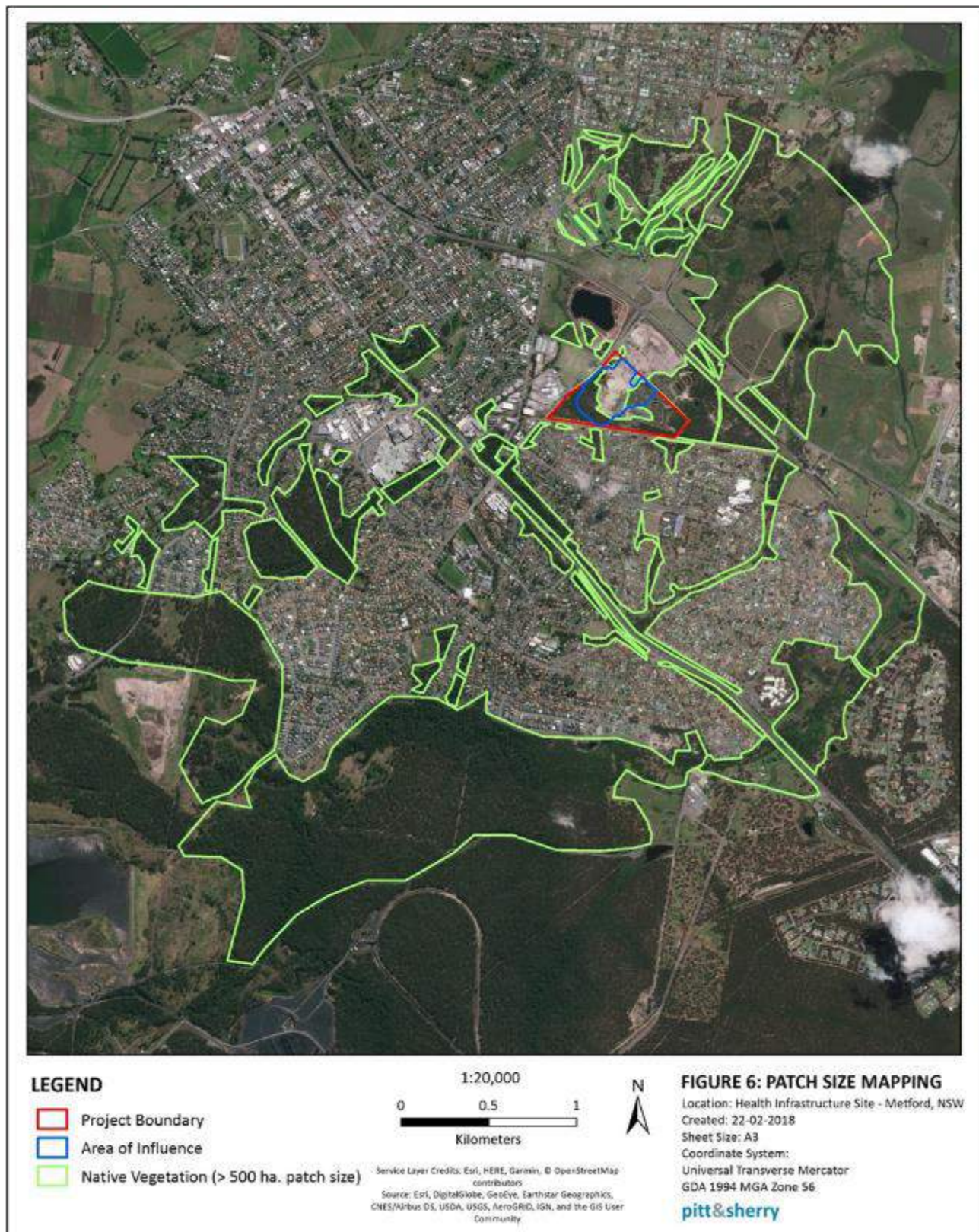


Figure 10-1 Existing environment and Patch Size mapping (Figure 6 of the BAR, pitt&sherry 2018)

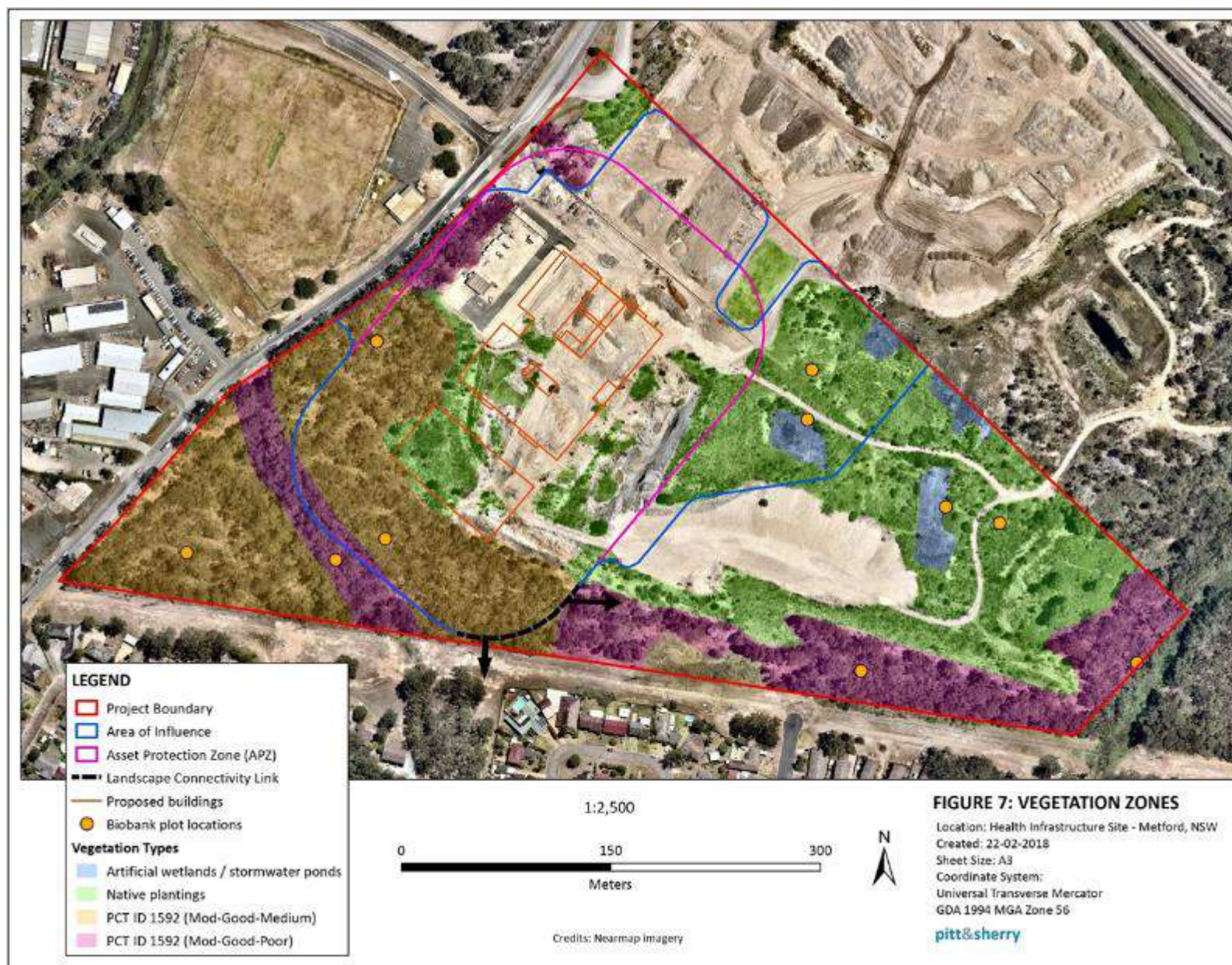


Figure 10-2 Vegetation zones (Figure 7 of the BAR, pitt&sherry 2018)

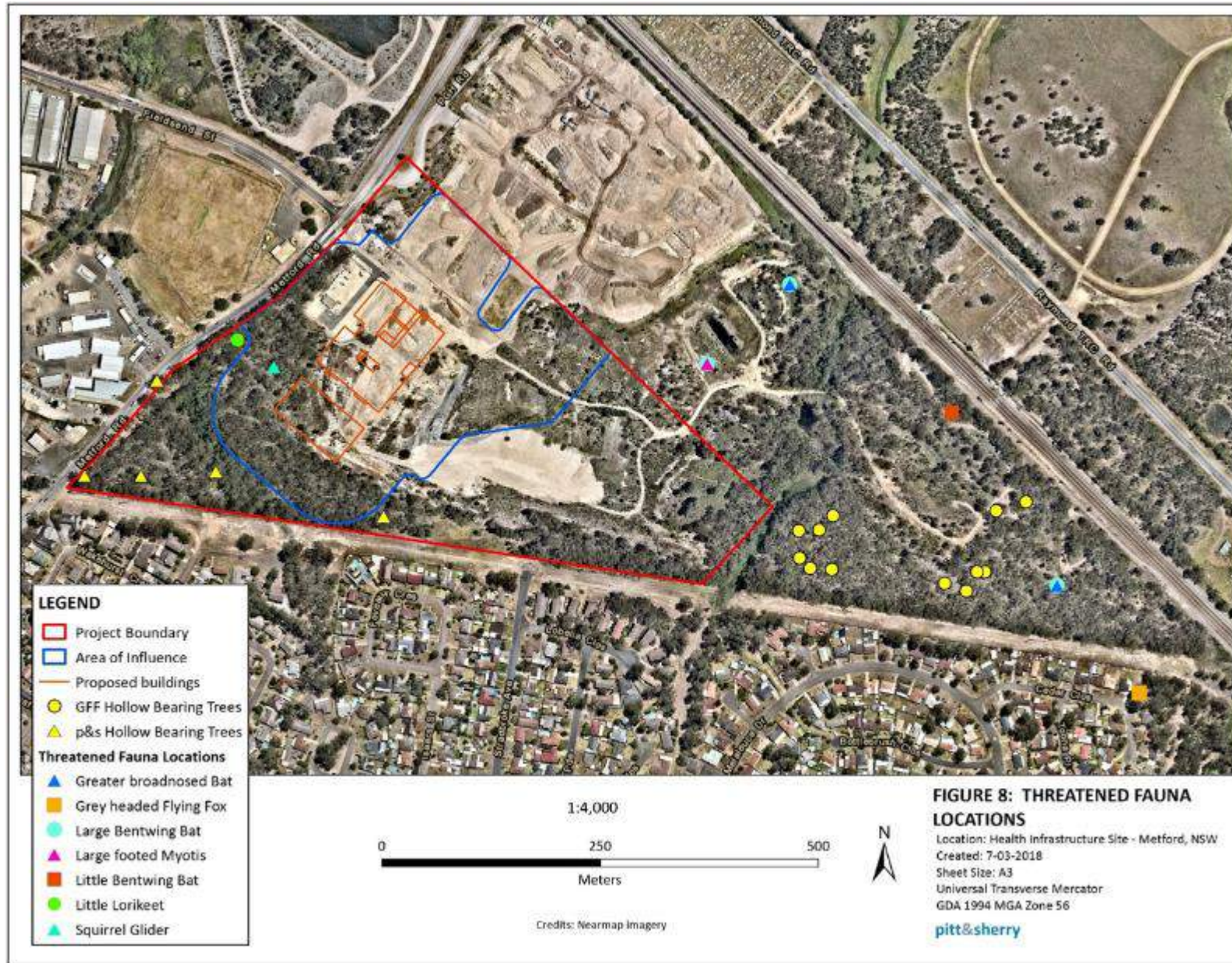


Figure 10-3 Threatened fauna locations (Figure 8 of the BAR, pitt&sherry 2018)

Flora and Fauna species

One EEC community and 27 threatened fauna species have either been recorded or have been predicted to occur on Lot 7314 (Refer **Appendix E** for a full list of species). Targeted flora surveys as well as opportunistic traverses failed to record any Threatened flora species on Lot 7314 and Part Lot 401. As such, it is considered that no Threatened flora species would be impacted by the current proposal and thus none have been included as subject species for the purposes of this impact assessment.

The following plant community Types (PCTs) were identified on the Site (refer Figure 10-2):

- Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest (Moderate/Good – Medium)
- Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest (Moderate/Good – Poor)
- Artificial wetlands/Man-made ponds
- Native tree plantings (Acacia and eucalypt).

The Spotted Gum-Red Ironbark-Grey Gum shrub-grass PCT was divided into two vegetation zones based on a large difference in native mid-storey and ground-cover species richness and also based on weed infestation (Refer Table 10-1). Vegetation zone 2 also corresponded to a moist variant of Vegetation Zone 1, occurring along an ephemeral drainage line in the far south-western bushland remnant of the study area which drains west to two-mile creek. Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest is considered analogous to LHSGIF EEC.

Table 10-1 Vegetation Zones

No.	Plant Community Type (PCT)	Areal extent within Construction and Development Footprint Area (ha) (Project Influence Area)	Condition Class	EEC
1	Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest of the Lower Hunter (HU806; PCT ID 1592)	2.05	Moderate/Good – Medium	Lower Spotted Ironbark Forest (LHSGIF)
2	Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest of the Lower Hunter (HU806; PCT ID 1592)	0.4	Moderate/Good – Poor	Lower Spotted Ironbark Forest (LHSGIF)

Previous surveys have identified two threatened fauna species on the proposed development Site (Lot 7314), these being the Squirrel Glider and Little Lorikeet. An additional five Threatened fauna species were recorded by General Flora and Fauna (2014) outside Lot 7314 but within the greater Metford triangle, these being the Grey headed Flying Fox, Greater Broad-nosed Bat, Little Bent-wing Bat, Eastern (Large) Bent-wing Bat and Southern Myotis. Whilst recorded outside of Lot 7314, these five bat species would be expected to forage and potentially roost within the forest habitats on Lot 7314.

Commonwealth Matters of National Environmental Significance (MNES)

An EPBC protected matters report was undertaken on the 17 October 2017 (20km buffer of the development site) to identify Matters of National Environmental Significance (MNES) that have the potential to occur within the development site. The assessment has been undertaken in accordance with the Commonwealth Significant Impact Assessment Guidelines (DoE 2013) which lists a suite of significant impact criteria to assist

in determining whether there is likely to be a significant impact on Matters of National Environmental Significance (MNES) and thus whether a referral to the Commonwealth DoEE is required.

Results of the protected matters search are provided in Table 10-2 below.

Table 10-2 EPBC Protected Matters Search Tool Results

MNES	Number of MNES identified within a 20km buffer from the Site
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance	1
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	3
Listed Threatened species	62 Threatened species 15 flora species 47 fauna species
Listed Migratory Species	48

Based on the search results, the proposal would not impact upon any world heritage properties, national heritage places, Commonwealth marine areas nor the Great Barrier Reef Marine Park given their absence in the vicinity of the site. The potential impact on the remaining MNES are discussed in the impact section below.

10.3 Impact Assessment

Demonstration of Avoidance and Minimisation of Biodiversity Impacts

The development building footprint of the NMH has been sited within the predominantly cleared areas of Lot 7314 to avoid and minimise impacts to the LHSGIF remnant situated in the south-western sector of the subject lot. The retained bushland remnant would also serve as a visual buffer between the NMH and the existing residential suburb of Metford to the south of Lot 7314.

Limited clearing of the central portion of the LHSGIF south-western remnant would be required to accommodate an asset protection zone (APZ) for the NMH. Clearing for the APZ would comprise selective canopy removal to an open woodland/woodland structure (10-30% PFC) with no overlapping canopies, mid storey removal and partial groundcover removal. During APZ establishment advice would be sought from a fauna ecologist to identify key habitat trees (hollow-bearing trees) for retention, to minimise impacts on hollow-dependant fauna.

Stage 1 Early Works and Concept Hospital Footprint

Direct biodiversity impacts that must be managed during construction include:

- Clearing of native vegetation, and removal of dead wood and dead trees causing direct habitat loss which in turn may cause:
 - Fragmentation/ Loss of habitat connectivity
 - Increase edge effects
 - Loss of tree food sources and reduced foraging habitat
 - Loss of nest sites.

- Introduction and/ or spread of noxious weeds and pathogens
- Disturbance of fauna during construction due to light, noise and air quality impacts generated by vehicles, equipment and construction activities
- Fauna mortality or injury
- Erosion of disturbed areas leading to sedimentation and dust affecting any downgradient habitat or habitat within drainage channels (refer Section 13).

Clearing of Native Vegetation

The proposal will result in the direct loss of native vegetation and fauna habitats listed in Table 10-3. Habitats proposed for direct removal or thinning have been calculated from an overlay of the proposed development onto vegetation mapping. The proposal will result in a direct total habitat loss of 2.45 hectares of LHSGIF in the south-western remnant of Lot 7314. The majority of vegetation removal is needed in order to comply with the APZ requirements.

Table 10-3 Direct vegetation/Habitat Loss

PCT name and ID	Area proposed to be completely removed (hectares)	Area proposed to be thinned and under-scrubbed for APZ establishment (hectares)
Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest of the Lower Hunter (HU806; PCT ID 1592) – Moderate/Good-medium condition	0.09	1.96
Spotted Gum-Red Ironbark-Grey Gum shrub-grass Open Forest of the Lower Hunter (HU806; PCT ID 1592) – Moderate/Good-Poor condition	Nil	0.4

Habitat fragmentation

Fragmentation can reduce species richness by reducing patch size causing a loss of any species that are area sensitive. Fragmentation can also alter interactions between species, such as pollination, seed dispersal and herbivory.

The site is not part of a vegetation corridor linking remnants or extensive areas of natural native vegetation. The New England Highway and main northern railway line form a local movement barrier for less mobile species identified onsite such as the Squirrel Glider causing isolation from both from smaller woodland stands surrounding the Tenambit and Morpeth wetlands to the north and from the larger tracts of forested lands to the south of the New England Highway. The limited vegetation clearing associated with the enabling works compound and thinning associated with APZ establishment would not be expected to contribute to further habitat isolation nor movement barrier impacts for less mobile subject species such as the Squirrel Glider.

Edge Effects

Disturbances surrounding the site have cleared most of the natural vegetation so that the remnant areas have already been fragmented and are experiencing edge effects such as the invasion of weeds and changes in abiotic features. The proposed clearing associated with the NMH will contribute to further fragmentation of the greater Metford triangle LHSGIF EEC remnant and may increase vulnerability to edge effects and potentially cause a reduction in genetic diversity. However, the Proposal is not likely to place the LHSGIF EEC remnant at risk of extinction.

Foraging Habitat

Forested habitat is present in the wider region that can contribute to the foraging ranges of mobile species such as owls, microbats and the grey headed flying fox. The direct loss of 2.45 ha of dry sclerophyll forested

habitat is not expected to result in a significant fauna impact as these mobile species are not anticipated to be solely reliant on the site.

Nesting

A total of seven hollow bearing trees were recorded within the LHSGIF south-western remnant on Lot 7314 (refer Figure 10-3). Three of these hollow bearing trees are located within the area of disturbance associated with the proposed APZ and assuming they can be retained, will continue to provide potential shelter, denning, roosting and nesting habitat for a variety of fauna species.

Fauna mortality or injury

The vegetation clearing, and thinning works have the potential to impact upon fauna that may be utilising the habitats within proposed clearing areas at the time of the clearing. Mitigation measures outlined in Section 10.5 will reduce the potential for injury to fauna during clearing activities.

Weeds and pathogens

The site contains sparse to moderate weed cover and two weeds of national significance (WoNS) has been recorded within the Subject Land (*Lantana camara* and *Senecio madagascariensis*) and this has the potential to migrate off site as a result of vehicular access and site disturbance. Mitigation measures outlined in Section 10.5 will reduce the potential weed and pathogen spread.

Light, noise and vibration

Potential indirect impacts on retained fauna (dry sclerophyll) habitats on Lot 7314 during construction activity include noise and vibration and night time light spill. Noise, vibration and light spill can have an impact on a suite of protected and Threatened fauna such as roosting microbats and owls and denning arboreals such as the Squirrel Glider (recorded on Lot 7314). Construction works for Stage 1 are expected to occur within standard construction hours minimising any need for artificial lighting but the operation of the NMH will introduce a new permanent night light source.

The site lies within an urban area of the lower Hunter valley and it is considered that the assemblage of resident and transient fauna utilising site habitats would be habitualized to typical urban daytime ambient noise and vibration levels from Metford Road, the industrial area on the western side of Metford Rd (south of Fieldsend oval) and the long-term mining activity and more recent remediation activity that has been undertaken on the site.

Commonwealth Matters of National Environmental Significance (MNES)

Wetlands of International Importance

The Hunter Estuary Wetlands (Hunter Wetlands National Park), a RAMSAR wetland, is located approximately 10km south-east (downstream) from the site. With appropriate stormwater management, the proposal is unlikely to have a significant impact on the RAMSAR wetland based on the criteria noted above.

Threatened Ecological Communities (TECs)

The Protected Matters report lists the following three TECs recorded within 10km from the site:

1. Central Hunter Valley eucalypt forest and woodland (critically endangered)
2. Lowland rainforest of Subtropical Australia
3. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

None of the three TECs have been recorded on Lot 7314 and thus would not be impacted as a result of the proposal as the site supports LHSGIF.

Listed Threatened Species

Of the 62 listed Threatened species recorded within a 10km buffer distance from the site (excluding migratory wetland species), a total of four species have been recorded or are considered as possible occurrences on Lot 7314, these being:

1. Spotted-tail Quoll
2. Grey headed Flying Fox
3. Swift Parrot
4. Regent Honeyeater

All four species are wide ranging and would be unlikely to be exclusively reliant on-site habitats for their life cycle requirements. The proposal would result in a small loss of potential foraging habitat for these four taxa.

Green and golden bell frogs as well as several threatened flora species also have the potential to occur on site, however as these have not been recorded despite targeted survey efforts these taxa are not considered to be present on the Site and thus are unlikely to be impacted by the Proposal.

Listed Migratory Species

Of the 48 listed Migratory species recorded within a 10km buffer distance from the site, a total of 15 migratory wetland species are considered as possible occurrences on Lot 7314. Whilst habitat does exist on Lot 7314 it has limited potential. Furthermore, it is expected that the Tenambit wetlands to the north as well as the ephemeral and semi-permanent floodplain wetlands of the lower Hunter valley would provide higher quality habitat for these wetland taxa.

The Proposal will require removal of approximately 2.45 hectares of native vegetation but will not remove identified hollow bearing trees and is not expected to affect the long-term viability of the remnant vegetation onsite. None of the subject species would be expected to be exclusively reliant on-site habitats and all are considered relatively wide-ranging species.

Based on the above discussion, the Proposal is not likely to result in a significant impact on the relevant subject species and thus a referral to the Commonwealth Department of Environment and Energy (DoEE) is not assessed as being required based on our interpretation of the guidelines.

10.4 Biodiversity Offsets

Credit Calculator

The BBAM (2014) Credit Calculator was run and generated a Credit Profile for the development proposal for Ecosystem Credits as shown below in Table 10-4. This table reveals a total Ecosystem Credits requirement prescribed in the 'credits' tab in the BBAM calculator of 83 to offset the loss/modification of 2.45 hectares of LHSIGF habitats on the proposed development site

Table 10-4 Ecosystem Credit Requirements

Vegetation Zone	Management Zone	Management Zone Area (ha)	Final Ecosystem Credit requirement for Management Zone
1. Spotted Gum - Red Ironbark - Grey Gum shrub - grass open forest of the Lower Hunter (mod/good-medium)	MZ1a (full clearing)	0.09	3.0
	MZ1b (APZ)	1.96	65

Vegetation Zone	Management Zone	Management Zone Area (ha)	Final Ecosystem Credit requirement for Management Zone
2. Spotted Gum - Red Ironbark - Grey Gum shrub - grass open forest of the Lower Hunter (mod/good-poor)	MZ2b (APZ)	0.4	14
Total		2.45	83 (rounded up)

The filtered list of species credit species deemed relevant for the current proposal and the associated credits are listed in Table 10-5. The development impacts require 56 species credits combined for the Squirrel Glider and Southern Myotis.

Table 10-5 Species Credit Requirements

Scientific name	Common name	Area of Habitat Loss	Credit Type (TSPD)	Number of Species Credit Required for Offsetting
<i>Petaurus norfolcensis</i>	Squirrel Glider	0.09	Species	28
<i>Myotis macropus</i>	Southern Myotis	0.09	Species	28
TOTAL				56

Biodiversity Offset Strategy (BOS)

HI is committed to meeting its offset obligations through one or more of the following options:

- Payment into the Biodiversity Conservation Fund (BCF) of an amount determined in accordance with the BAM biodiversity offset payment calculator
- Purchase and retirement of open market available ecosystem and species credits in accordance with the Biodiversity Conservation Regulation 2016 offset and offset variation rules. Ecosystem and species credits can be identified on the biobank public credit registers
- Purchase of land with suitable plant community types (PCTs) to establish a Biodiversity Stewardship Site. The proposed removal of 2.45 hectares of LHSGIF habitat would likely require approximately 10-14 hectares of forested land, based on a typical biobank/stewardship site generating somewhere between 6-8 credits per hectare.

The offset strategy will be confirmed in the Stage 2 EIS submission as part of detailed design.

10.5 Mitigation Measures

The following mitigation and management measures in Table 10-6 are recommended to minimise potential biodiversity impacts.

Table 10-6 Biodiversity Mitigation Table

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
B1	A Biodiversity Management (BMP) is to be prepared by the Contractor as part of the CEMP and will detail a range of impact management and mitigation measures including (but not limited to) a clearing protocol, pre-clearing surveys, retention of key habitat and supplementary plantings as recommended in the Biodiversity Assessment Report.
B2	A clearing protocol will be implemented that includes the following controls: - The Contractor will identify a staged clearing plan in consultation with a suitably qualified Arborist. This will include preparation of a Stage 1 Tree Removal Plan that outlines essential clearing areas required for Stage 1. As far as practicable, clearing of the APZ is to be delayed until Stage 2 (hospital construction). - Prior to clearing the Contractor will mark and delineate all trees for clearing. - Clearing limits are to be clearly defined by a registered surveyor and suitably demarcated (eg metal stake and high vis plastic mesh fencing) prior to vegetation clearing activity. - A clearing protocol will be developed for the APZ in consultation with a bushfire consultant and fauna ecologist, to identify trees proposed for retention and clearing. The protocol would aim to achieve the APZ requirements while maximising retention of key fauna habitat trees (ie hollow bearing trees). - Each tree proposed for clearing associated with APZ establishment must be appropriately tagged for clearing (eg through the use of surveyors flagging tape and spray paint). Trees not marked must not be removed. - Clearing techniques for clearing within the APZ would be developed in consultation with an arborist. Clearing shall be undertaken to minimise impact on retained trees by observing tree protection zones that seek to protect trees against direct damage, soil compaction and disturbance to the rootzone. - Trees would be felled away from the retained forested remnants back into the proposed development footprint to minimise impacts within protected areas.
B3	Where practicable restrict vegetation clearing activity to within the period late February to end of May, this being outside the main breeding periods for threatened hollow dependant fauna known to utilise the site. If clearing outside this period, ecological pre-clearing surveys must be undertaken by a suitably qualified fauna ecologist prior to clearing. These surveys will be aimed at targeting Threatened species known or potentially occurring in the area and attempt to identify critical sites for these species. If critical habitat sites are located, appropriate impact mitigation measures will be undertaken per the type of site/feature and species concerned.
B4	Ecological pre-clearing surveys where required shall be undertaken by a fauna ecologist prior to the commencement of each stage of clearing. These pre-clearing surveys will include: - Detection of any resident fauna and relocating these beyond the project influence area. - Identification and inspection of any identified hollow-bearing trees targeted for removal. Cavities to be checked for inhabiting fauna upon felling. Any injured fauna should be captured where possible and taken to the local wildlife carer. Once rehabilitation has been achieved (if possible), the individual will be released into retained habitats adjoining the capture site, and if required, into shelter sites appropriate for that species (<i>i.e.</i> nest boxes).

Reference	Mitigation Measures
B5	A site induction must be undertaken by all personnel undertaking clearing operations to explain the relevance of any marked items (e.g. Hollow bearing trees requiring ecological supervision, clearing boundaries) and identify their responsibilities. An site induction notice will need to signed by all relevant personnel involved with the clearing operations indicating they understand ecological requirements.
B6	Should pre-clearing surveys identify any hollow bearing trees targeted for removal, and the hollow is occupied or there is evidence of recent occupation, they shall be replaced through a compensatory nest box program in retained bushland habitats on Lot 7314.
Stage 2 Detailed Design Considerations and Mitigation Measures	
B7	Supplementary planting is to be undertaken prior to opening of the hospital within the approximately 0.4 hectare predominantly cleared area along the southern boundary of Lot 7314 to facilitate greater movement for the Squirrel Glider between stands of bushland on Lot 7314, in accordance with recommendations provided in the Biodiversity Assessment Report.
B8	All new fencing, including security fencing associated with the New Maitland Hospital, that will intersect remnant forest on the site, should avoid use of barbed wire to avoid injury / mortality to all flying / gliding fauna.
B9	It is recommended that night lighting be installed as far from the retained bushland habitats on Lot 7314 as possible and that such lighting be directed away from such habitats to minimise nocturnal light spill.

11. Aboriginal Heritage

11.1 Introduction

Umwelt (Australia) Pty Ltd (Umwelt) was commissioned by HI to provide an Aboriginal Cultural Heritage Assessment Report (ACHAR) and archaeological technical report (ATR) to determine the archaeological significance of the site. This assessment is provided in **Appendix J** and summarised below.

The assessment employed a regional approach, taking into consideration resource availability within the area (water and stone raw materials), the landscape of the study area (landforms, water resources, soils, geology etc.) and the regional archaeological patterning identified by past studies.

The report has been prepared in accordance with:

- *The Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (DECC, 2010a)*
- *The Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (The Code of Practice) (DECCW, 2010b)*
- *The Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW, 2010c).*

The assessment was completed in consultation with the local Aboriginal community and following the four-stage process required under the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010).

The following tasks were undertaken as part of the assessment:

- A review of statutory registers and inventories for indigenous cultural heritage including the OEH
- A Desktop Assessment of the Aboriginal Heritage Information Management System (AHIMS) for known archaeological sites:
 - A search of OEH's Aboriginal Heritage Information Management System (AHIMS) was undertaken by Umwelt on the 19 May 2017.
- A review of local environmental information (topographic, geological, soil, geomorphological and vegetation descriptions) to determine the likelihood of archaeological sites and specific site types, prior and existing land uses and site disturbance that may affect site integrity
- A review of previous cultural heritage investigations to determine the extent of archaeological investigations in the area and any archaeological patterns
- The development of a predictive archaeological statement based on the data searches and literature review
- Identification of human and natural impacts in relation to the known and any new archaeological sites and/or archaeological potential of the study area
- Consultation with the Aboriginal stakeholders as per the Aboriginal Cultural Heritage Consultation Requirements for Proponents
- A site inspection with the participation of the registered Aboriginal stakeholders
- The development of mitigation and conservation measures in consultation with the registered Aboriginal stakeholders.

Archaeological Survey

As per the Aboriginal Cultural Heritage Consultation Requirements for Proponents (*DECCW 2010*), Umwelt followed the four stages of consultation which included the notification of project proposal and registration of interest, presentation of information about the Project, gathering information about cultural significance and a survey. All registered Aboriginal Parties, were invited to participate in the cultural significance assessment however only seven groups attended the site visit, these groups are listed in Table 11-1.

Table 11-1 Site visit attendees

Organisation	Name of attendee
Umwelt	Nicola Roche
Umwelt	Joshua Madden
A.G.A Services	Ashley Sampson
Cacatua	George Sampson
Cacatua	Greg Sampson
Divine Diggers	Ron Perkins
Lower Hunter Aboriginal Incorporated	Dave Allen
Lower Hunter Wonnaruah Tribunal Consultancy	Tom Miller
Murra Bidgee Mullangari Aboriginal Corporation	Joshua White
Mindaribba Local Aboriginal Land Council	Steve Campbell
Wallagan Cultural Services	Donna Sampson

11.2 Existing Environment

The assessment found that whilst the regional environment provided resources, including water, flora and fauna and raw stone materials, the project area itself appears to have limited water resources and it is likely that areas bordering nearby swamps would have been more attractive to Aboriginal people. Previous studies identified three possible sources of silcrete which was commonly used by Aboriginal people in the manufacture of flaked stone artefacts.

The project area has been subject to significant modifications and land disturbance as a result of past land use as a clay quarry and brick making site which has significantly reduced the potential for Aboriginal objects to remain present and intact in this area.

Aboriginal heritage items are often associated with particular landscape features as Aboriginal people used these features in their day-to-day lives or cultural ceremonies. These landscape features include sand dunes systems, headlands or ridge tops, caves, cliff faces and waters. There are several waterways located in the area surrounding the Site including the Hunter River, Tenambit Wetlands and Morpeth Floodplain however, the Proposal is located over 200m from these landscape features and the site of the proposed works is within a highly-disturbed environment.

Predictive model

A predictive model was used to provide an indication of the potential archaeological resource based on the local archaeological context and environmental context. Given the high disturbance levels and the limited access to wetland resources, the predictive model suggests that within the investigation area, it was possible that isolated finds and/or very small density artefacts scatters may be located that reflect transitional use of the landscape rather than targeted occupation.

The following predictive statements were made:

- Due to the high level of disturbance within the remainder of the project it is likely that any Aboriginal objects that may remain are unlikely to be in their original depositional context and that subsurface deposits will lack integrity
- If present, Aboriginal cultural heritage archaeological sites are likely to be open camp sites and expressed as either isolated stone artefacts and/or small stone artefact scatters
- Due to land use disturbances, scarred trees are unlikely to occur within the project area.

Aboriginal Heritage Information Management System

A search of OEH's Aboriginal Heritage Information Management System (AHIMS) was undertaken by Umwelt on the 19 May 2017. The search identified four previously recorded Aboriginal sites within 1km of the boundary. Figure 11-1 indicates the location of the AHIMS sites in relation to the project area.

Tenambit 1 (AHIMS no. 38-4-0362)

Tenambit 1 is an isolated broken flake, located approximately 800m north of the current project area. The broken flake was identified on the boundary of a rising main within a highly-disturbed context adjacent to a creek line and swamp. Although still identified as a valid site the site card indicates that test excavations were recommended for the site and associated potential archaeological deposit (PAD).

Tenambit 3 (AHIMS no. 38-4-0364)

Tenambit 3 is an isolated mudstone flake, located approximately 1km north of the current project area. The isolated find was found within close proximity to a creek line and a swamp within a disturbed context. Like Tenambit1, Tenambit 3 is showing as a valid site on the AHIMS database despite test excavations recommended for the site and associated PAD.

Metford Road PAD (AHIMS no. 38-4-0688)

The Metford Road PAD was recorded at the intersection of Metford Road and Raymond Terrace Road, approximately 500m north of the project area. The PAD was subject to archaeological excavations in 2006 which recovered nine unretouched silcrete flakes, two silcrete retouched flakes and two silcrete cores. The site is identified as valid on the AHIMS database however, based on the report and site card, this site has been destroyed.

NMH1 (AHIMS no. 38-4-1684)

NMH1 is an archaeological site located within the site. The site was identified at MGA coordinates E369170 N6374453 in an exposure measuring one metre by three metres. NMH1 consists of a single fragment of heat shattered silcrete present in conjunction with small ironstone gravel but no silcrete gravels, indicating that it is not a natural occurrence.



Figure 11-1 AHIMS search results showing 4 Aboriginal Heritage Sites within 1km of the NMH Site (Figure 4.1 of the ATR , Umwelt 2018)

Previous Investigations

The review of available contextual information has found that the sites are not common across the area and those that are located in close proximity to the project area are generally isolated finds and small artefact scatters. Previous archaeological assessments indicate that the local region was likely utilised by past Aboriginal peoples however, more intense utilisation of the region is archaeologically evident closer to freshwater resources and the nearby wetlands and swamps.

Archaeological Survey

The land was divided up into three survey areas (refer Figure 11-2) based on archaeological potential. The results of which are detailed below.

Survey Unit 1

Survey Unit 1 (SU1) included the disturbed quarry landscape that had been completely stripped of all topsoil. SU1 was characterised by numerous gravel and/or clay soil dumps, truck access ways and quarry cuttings. The archaeological survey did not identify any Aboriginal heritage material and found that there is no archaeological potential within SU1 due to the removal of topsoil and any archaeological deposits that may be present.

Survey Unit 2

Survey Unit 2 (SU2) included the disturbed and vegetated quarry bund. The archaeological survey did not identify any Aboriginal cultural heritage material and found that there is low to no archaeological potential within SU2.

Survey Unit 3

Survey Unit 3 (SU3) included a gentle slope landform that has been subject to disturbance from top soil removal and dumping of fill including soil, gravels and brick with some minor soil excavations. SU3 was characterised by dense vegetation which was dominated by lantana and Eucalypts.

The archaeological survey did not identify any Aboriginal cultural heritage material, and found that there is only low archaeological potential within SU3. The previously recorded isolated artefact (NMH1, AHIMS number 38-4-1684) was not re-identified during the archaeological survey. The artefact was originally found along an eroded soil profile. The current survey observed that the area had undergone high levels of erosion. As such it is likely that NMH1 was not reidentified due to the high level of erosion and was moved due to natural post depositional processes.

The survey found that there is nil to low archaeological potential across SU1 and SU2 due to the lack of topsoil and levels of disturbance. SU3 also has low archaeological potential. The archaeological survey did not identify the previously recorded Aboriginal archaeological site and did not identify and further sites and/or areas of archaeological potential.

Assessment of Archaeological (Scientific) Significance

Overall the project has been assessed as having low archaeological significance based on:

- The nil to low archaeological potential of the site
- The level of disturbance and lack of soil landscape integrity
- The low level of archaeological significance of the isolated find.



Image Source: Nearmap (Dec 2017)
Data Source: Department of Finance, Services & Innovation (2017)

0 50 100 200m
1:4 000

Legend

- Project Area
- Proposed Hospital Area of Influence
- Survey Unit 1 (102 579 Sq. m)
- Survey Unit 2 (5 525 Sq. m)
- Survey Unit 3 (76 638 Sq. m)

FIGURE 5.1

Survey Units

Figure 11-2 Aboriginal Heritage Survey Units (Figure 5.1 of the ATR, Umwelt 2018)

11.3 Impact Assessment (Stage 1 Early Works and Concept Hospital)

This assessment considers the potential impacts on Aboriginal heritage based on the predicted area of influence and disturbance footprint for the Stage 1 Early Works and Concept Hospital. This assessment would be refined if required to evaluate any footprint changes during Stage 2 Detailed Design.

The OEH Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (2010:21) describes impacts to be rated as follows:

1. Type of harm: is either direct, indirect or none
2. Degree of harm is defined as either total, partial or none
3. Consequence of harm is defined as either total loss, partial loss, or no loss of value.

The proposed works will impact upon one previously recorded site NMH1 (AHIMS no. 38-4-1684) which is located within the site. The aboriginal heritage site is located within an area designated for thinning and vegetation removal for the APZ. As such, this assessment has found that the proposed works would directly and totally destroy the existing site causing a total loss of value. Under Section 5.23 of the EP&A Act an Aboriginal heritage impact permit (AHIP) is not required for approved SSI. To avoid this impact, it is recommended that surface collection should be conducted at AHIMS site (NMH1) prior to commencing Stage 1 works to see if the artefact can be found (refer Section 11.4).

The archaeological survey did not identify any further archaeological sites and/ or objects or areas of archaeological potential and identified that the majority of the Stage 1 works footprint has no archaeological potential, with low archaeological potential in the remaining portion. On this basis, there is a low likelihood of impacts to Aboriginal archaeology. However unexpected or unidentified Aboriginal heritage items may be uncovered during the construction of the Proposal. In the event of an unexpected find of an Aboriginal heritage item (or suspected item), the safeguards specified below would be implemented to avoid or minimise any potential impact on Aboriginal heritage items uncovered during the proposed works.

11.4 Mitigation Measures

The following mitigation measures in Table 11-2 will be implemented to address potential Aboriginal heritage impacts.

Table 11-2 Aboriginal Heritage Mitigation Table

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
AB1	An Unexpected Finds Protocol which addresses unexpected aboriginal heritage finds will be included in the Construction Environmental Management Plan to be completed by the construction contractor.
AB2	If suspected Aboriginal objects, such as stone artefacts are identified during works, works must cease within 10m of the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, the OEH must be notified under section 89A of the NPW Act. Appropriate management or avoidance should be sought if Aboriginal objects are to be moved or harmed.
AB3	Develop an Aboriginal Cultural Heritage Management Plan for the project that includes provision for the long-term management of Aboriginal objects that may be salvaged from the project area.
AB4	Prior to commencing Stage 1 works surface collection (i.e walking the site) should be conducted at AHIMS site (NMH1) to see if the artefact can be found. If it is identified a GPS

Reference	Mitigation Measures
	would be used to record its location and a photographic record taken. The artefact would be collected and recorded as per OEH requirements and an Aboriginal Site Impact Recording Form (ASIR Form) completed in accordance with the OEH requirements.
AB5	In the extremely unlikely event that human remains are found, works should immediately cease and the NSW Police are to be contacted. If the remains are suspected to be Aboriginal, the OEH may also be contacted at this time to assist in determining appropriate management.

12. Historic Heritage

12.1 Introduction

Umwelt (Australia) Pty Ltd (Umwelt) was commissioned by HI to provide a Historical Heritage Assessment Report (HHAR) to determine the heritage significance of the site. This assessment is provided in **Appendix J** and summarised in this section.

This report has been prepared in accordance with The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (Burra Charter) (2013) and the best practice standards as set out by the NSW Heritage Division. Other appropriate guidelines have been utilised in the preparation of this assessment and they include Assessing Significance (Heritage Office (former), 2001) and Assessing Significance for Archaeological Sites and Relics (Heritage Council, 2009).

NSW has an extensive legislative framework that relates to the protection and management of historical heritage. There is a range of statutory provisions in NSW legislation that address the management and conservation of historical items, relics, archaeological sites and places. These include:

- *The Heritage Act 1977* - The NSW *Heritage Act 1977* provides statutory protection for heritage items that are deemed to be significant and are part of the heritage record for NSW. Heritage items can be defined as a place, building work, relic, moveable object or precinct
- *Environmental Planning and Assessment Act 1979* - The NSW EP&A Act 1979 requires that impacts on heritage items be considered as part of the NSW land use and planning process. Local Environmental Plans are implemented under this legislation and Maitland Council have the Maitland LEP 2011. Part 5 Clause 5.10 of the Maitland LEP 2011 provides a statutory framework for heritage conservation in the Maitland Council LGA
- The Burra Charter 2013 - This is a set of best practice principles and procedures for heritage conservation and investigation in NSW and Australia.

In addition, there are a number of heritage databases which were reviewed as part of this assessment. These included the:

- Maitland LEP 2011
- State Heritage Inventory (s70 registers)
- NSW State Heritage Register (SHR)
- The Australian Heritage Database (including Commonwealth and National Heritage lists and the Register of the National Estate.

12.2 Existing Environment

12.2.1 Historical land use

The project area originally formed a part of a larger parcel of land in East Maitland for public use including common and recreation uses and burial of the dead. A brickworks facility was established to the west of the project area sometime prior to the 1870's and these went on to become known as the Turton Brickworks. The current area was known to form part of the overall brickworks site, however, there is no evidence in historical records to indicate that any buildings were ever constructed on this area.

12.2.2 Previous Assessments

In 2003 a Heritage assessment of the Metford Triangle was undertaken in relation to plans for redevelopment. This study identified the following structures:

- The brick press building
- Chimney
- Drying building
- Shed
- Down draft kilns and flues.

The 2003 study concluded that the archaeological potential for the brickworks was very limited and although there was potential for items such as foundations and other subsurface elements, these would most probably be in poor condition and would not provide any valuable information on what took place on the site in previous years.

In 2004 another assessment was undertaken to carry out an archival recording, archaeological monitoring and investigation of a historic brick chimney that was proposed to be demolished as part of a realignment of the Metford Road. Following the study, consent was granted for the chimney to be removed subject to conditions which included retaining the base of the stack and completing the archaeological investigation.

In 2005 another study was undertaken but on the eastern precinct of the brickworks which is outside the current project area. Several areas of archaeological significance were identified during this study. The report recommended that where possible works be redesigned to avoid impacts on areas with high archaeological potential. It should be noted that as part of this assessment, archaeological potential was identified to the north and outside the current proposal area with no areas of potential within the current project area.

In 2011 Eureka Heritage produced a report to assess the demolition of all standing buildings associated with the former brickworks site. The study concluded that with the exception of the Brick Press Building the demolition would not significantly affect the heritage environment or the heritage significance of the site. It was deemed that demolition of the Brick Press building could have a negative impact so conditions were placed on its demolition. These included a full archival recording, monitored demolition and the salvage of any heritage relics. It is understood these activities were undertaken but a record of them has not been seen.

12.3 Impact Assessment

This assessment considers the potential impacts on historic heritage based on the predicted area of influence and disturbance footprint for the Stage 1 Early Works and Concept Hospital. This assessment would be refined during Stage 2 Detailed Design to address opportunities for incorporation into the design of previously collected heritage items associated with the previous quarrying and brick making activities for the site.

A site inspection was completed by two senior archaeologists from Umwelt in August 2017 to determine the condition and integrity of the site and to gain an understanding of the site setting.

The site inspection revealed that the site:

“had been subject to high levels of historic and modern disturbances. Much of the project area had been completely stripped of topsoil as part of the former quarry works with soil grading and dumps evident across the remaining portion of the project area. The site visit confirmed that all former structures and elements have been removed from the site in their entirety” (Appendix J, Umwelt Historical Heritage Assessment 2017 pg 26).

As all the previously identified items have been removed from the site, the closest listed heritage item is the “East Maitland Railway Station group” which is listed under the Maitland LEP 2011 (Item ID I19) and on the State Heritage Register (SHR) (SHR #01135). This site is located approximately 2.1km to the northwest of the current project area however, the LEP curtilage for this item extends to cover the East Maitland Railway Station and the Main Northern Railway line which is located approximately 240m to the north of the project area. There is no physical link with this site and the project area and accordingly it will not be affected by the proposal. Other listed built heritage items in the Maitland LEP (2011) are all located over one kilometre from the project area and will not be impacted by activities on the project area.

The site inspection also identified that the project area is located to the south of the area that contained the brick works complex. The project area although part of the brick works complex overall was primarily used for quarrying or retained as vacant land.

Umwelt conclude that,

‘In addition to the level of disturbance evidenced in the historical record, the visual inspection of the project area confirmed that it has been severely disturbed. No evidence of a potential archaeological resource or prior use of the project area that may have resulted in any archaeological remains being present was identified during the visual inspection’.

Overall, the project area is not assessed to have any identified historical archaeological potential” (Umwelt, 2017).

12.4 Mitigation measures

The following mitigation measures in Table 12-1 will be implemented to minimise historic heritage impacts.

Table 12-1 Historical Heritage Mitigation Measures

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
HH1	An Unexpected Finds Protocol (Heritage) which addresses unexpected historic heritage finds will be included in the Construction Environmental Management Plan to be completed by the construction contractor.
HH2	Should any unexpected historical heritage archaeological items be discovered during construction, work will cease in the vicinity of the find and a qualified heritage consultant will have to be consulted. Work will be able to recommence in the area of the find on the advice of the qualified heritage consultant.

13. Soils and Geology

13.1 Introduction

A Geotechnical Investigation was prepared by Douglas Partners to assess the geotechnical conditions of Lot 7314 and the potential construction and operational impacts to soils and geology associated with Stage 1 of the Proposal. The report does not contain Part Lot 401 however as there will be no earthworks occurring on Part Lot 401 a geotechnical investigation was not deemed necessary for this part of the site. Further investigations will be completed during Stage 2 detailed design. The report is based on the review of previous geotechnical reports and findings of field works which include supplementary subsurface investigation completed in August 2017. The geotechnical report is provided in **Appendix N**.

13.2 Existing Environment

13.2.1 Soil Landscapes

The Newcastle Coalfields 1:100,000 Geology map indicates that the site is underlain by the Tomago Coal and there is a residual landscape, containing soils formed from in-situ weathering of Permian sedimentary rocks (geology code Pt), including laminated sandstone, claystone, siltstone, tuff and coal.

The Newcastle 1:100,000 Soil landscape Sheet indicated that much of the surrounding land comprises the Beresfield Soil Landscape and the Site includes two soil landscape types Beresfield (geology code Be) and disturbed terrain (*Matthei, 1995*). Beresfield soils generally consist of moderately well drained to imperfectly drained duplex soils, including Yellow Podzolic Soils, Red Podzolic Soils and Soloths, varying with landscape position. Soil profiles commonly comprise loam and sandy loam topsoils overlying medium to heavy clay subsoils. Beresfield Soil Landscape constraints include high foundation hazard, water erosion hazard, Mine Subsidence District, seasonal waterlogging and highly acid soils of low fertility. Soil materials in the western part of site are extensively disturbed and would comprise a heterogeneous mix of soil materials, potentially including materials imported from offsite for use in brick making.

The features of these soil landscapes are summarised in Figure 13-1 and Table 13-1. Additionally, small areas of the Cockle Creek Soil Landscape, an alluvial landscape, occur in the lowest lying central northern and far eastern parts of Metford Triangle outside of the site.

The site has been significantly disturbed for the purposes of mining works and now contains a heterogeneous mix of soils. Mining of raw materials for brick making has lowered the natural surface level and created several sediment ponds to control runoff.



Figure 13-1 Soil landscapes of the site, (Note - the red line shows the site boundary, the solid line shows Lot 7314 and the dotted line showing the area of Part Lot 401, the dark green shading is the Beresfield soil landscape and the grey is the disturbed terrain landscape (Source: Douglas and Partners, 2018)).

Table 13-1 Soil landscape features (Source: Douglas and Partners, 2018)

Feature	Beresfield (Be)	Disturbed Terrain
Soil Landscape Name	Beresfield	Disturbed Terrain
Colour (in Figure 13-1)	Dark Green	Grey
Soil Landscape Code	Be	N/A
Soil Process Group	Residual	Disturbed Terrain
Landscape Description	Undulating low hills and rises on Permian sediments in the East Maitland Hills Region. Slope gradients 3-15%, local relief to 50m, elevation is 20-50m. Partially cleared tall open-forest.	Level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Local relief variable. Land fill includes soil, rock, building and waste materials. Original vegetation completely cleared.
Soils Description (summary only)	<u>Crests:</u> moderately deep (<120cm), Yellow Podzolic Soils, Brown Podzolic Soils and brown Soloths. <u>Upper Slopes:</u> moderately deep (<120cm) Red Podzolic Soils and red Soloths. <u>Side Slopes:</u> brown Soloths and yellow Soloths.	Highly variable.

Feature	Beresfield (Be)	Disturbed Terrain
	<u>Lower Slopes:</u> deep (>200cm), imperfectly to poorly drained Yellow Podzolic Soils, Yellow Soloths and Gleyed Podzolic Soils.	
Limitations	High foundation hazard, water erosion hazard, seasonal waterlogging and high run-on localised lower slopes, highly acid soils of low fertility.	Dependent on the nature of site. Limitations may include mass movements hazard, steep slopes, foundation hazard, unconsolidated low, wet bearing strength material, potential acid sulphate soils, impermeable soils, poor drainage or erosion hazard.

13.2.2 Geotechnical Conditions

The geotechnical investigations included:

- A general walkover of Lot 7314 and observation of the Site conditions
- An initial investigation conducted between 12 October 2015 and 5 November 2015 which involved the excavation of seven boreholes, 20 test pits and two groundwater wells within Lot 7314
- A supplementary investigation conducted from 11 August 2017 and 12 August 2017 which involved drilling three additional boreholes within Lot 7314 and installation of an additional groundwater well.

The boreholes were excavated to depths ranging from 0.65m to 21.9m and the test pits excavated to depths ranging from 0.6m to 2.8m. The results of the excavations identified that the subsurface profile of the site consists of moderately reactive clay soils overlying extremely low strength to medium strength sandstone bedrock. The soil types encountered during the site assessment included:

- Clay, with medium to high plasticity, depths of 1m in the proposed location of NMH and up to 1.8m elsewhere
- Silty Clay, medium to high plasticity, very hard to stiff, depths of 0.3m to 1.1m
- Sandy Clay, depths of 0.0m to 1.8m
- Weathered rock, extremely low strength to medium strength sandstone bedrock
- Filling material – within the eastern, low lying area, filling was encountered to depths of up to 0.8m and generally comprised sandy clay with some coal fines, occasional bricks and gravel
- Coal, very low strength, black coal, depth of 0.3 to 0.6m found in the low-lying areas of the east of the site
- Stockpiled material – sandstone and siltstone with some clay.

The principal geotechnical conditions of the site comprise sequences of four main elements: fills above general ground level (stockpiles), filled depressions/ voids, residual clays and bedrock.

No free groundwater was observed in the test pits with the exception of Pit 318 which encountered groundwater at 0.3m and Pit 319 which encountered groundwater at the surface. Sandpipe monitoring located groundwater at Bore 605 at a depth of 7.2m (RL 17.1 m AHD). The groundwater investigation by GHD recorded groundwater levels ranging from 6.5m AHD to 8m AHD in the north-western and eastern areas of Lot 7314 and RL 16 to 17m AHD in the western corner of the site. However, groundwater levels are affected by climatic conditions and soil permeability and will vary with time.

Existing clay and silty clay soils are of medium to high plasticity and laboratory testing has indicated that the clay has a moderate propensity to change in volume with changes in moisture content and moderate potential to soften on exposure to moisture.

13.2.3 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are soils containing highly acidic horizons or layers resulting from the aeration and oxidation of soil materials that are rich in iron sulphides. The oxidation produces hydrogen ions in excess of the capability of the soil to neutralise the acidity, resulting in acidic discharges to the environment. These discharges can have a detrimental impact on vegetation, receiving waterways, groundwater and aquatic ecosystems.

Potential Acid Sulfate Soils (PASS) are soil materials containing iron sulfides or sulfidic material that has not yet been exposed to air and oxidised, usually because they are below the water table. They pose a considerable environmental risk when disturbed, as they have the potential to become very acidic when exposed to air and oxidised. PASS and ASS are most commonly found in low lying coastal environments, where soils have formed under the influence of seawater. They occur extensively throughout the Hunter River floodplain in areas containing soils of estuarine origin.

The NSW Acid Sulphate Soils Risk map indicates no risk of actual or potential acid sulfate soils. The Maitland LEP Acid Sulfate Soils mapping indicates that the Site is located on land shown as Class 5 Acid sulfate soils (ASS). The planning requirements relevant to Class 5 land focus not on preventing PASS impacts within the Class 5 land (given that PASS do not occur on Class 5 land) but rather on ensuring development works do not cause inadvertent offsite impacts on lands potentially containing PASS (i.e. Class 1, 2, 3 and 4 lands).

The proposal area has historically been highly disturbed and excavated for mining and quarry works additionally the lowest ground elevations are approximately 7 m AHD, which is much higher than the levels at which PASS typically occur locally, which is below 2 m AHD. It is therefore unlikely that any undisturbed PASS exists on the site. Furthermore, some soils on the Site returned high pH values, up to 9, which is inconsistent with ASS.

13.2.4 Salinity

Salinity is the accumulation of salt in land and water to a level that damages the natural and built environment. The geotechnical report by Douglas and Partners measured electrical conductivity (EC) to determine the salt content of the soil. EC measurements ranged from 200 to 9,200 $\mu\text{S}/\text{cm}$. However, the majority of measurements were between 200 to 430 $\mu\text{S}/\text{cm}$ indicating low saline soils. Additionally, the Maitland LEP indicates that the area around the site is not affected by Salinity, therefore this factor was not considered further in the assessment.

13.2.5 Soil Erodibility

Soils were tested to determine the soil erodibility or k-factor by considering particle size analysis, mechanical dispersion and organic compound (refer Table 13-2). In previous assessments, the soil erodibility of the site was assessed and indicated that the soil had a moderate erosion potential and there was evidence of turbid water.

Table 13-2 Soil Erodibility Assessment (Source: Douglas and Partners, 2018)

Soil Type	K value (metric)	Erodibility Category
Clay	0.009	Very Low
Silty Clay	0.010	Low
Sandy Clay	0.021	Moderate

13.2.6 Soil Combustibility

Potentially combustible material was encountered at the following locations (refer Table 13-3). All samples tested indicated the presence of combustible material with three exceeding the criteria of 40% combustible material.

Table 13-3 Results of Soil Combustibility Testing (Source: Douglas and Partners, 2018)

Location	Nature of combustible material	Combustibles %
Pits 303	Black coal filling to depths of up to 0.25m in the north-western area of the site.	65.9
Pit 305	Black coal filling to depths of up to 0.25m in the north-western area of the site.	23.2
Pit 310	Clayey gravelly filling with some coal and carbonaceous siltsone to 1.2m depth, within the “fingers” of filling reached into the south-western area of the site.	30.2
Pit 314	Coal and carbonaceous gravel filling to 0.7m depth over bedrock in the southern strip, adjacent to the former quarry face.	34.3
Pit 316	Exposed coal, as encountered in Pit 316 and also within the floor of the former quarry to the east of the pond, together with the lower sections of the former quarry face.	88.2
Stockpile 1	Silty sand (coal reject)	20.3
Stockpile 2	Silty sand (coal reject)	51.4
Note: Bold results exceed Wollongong City Council DCP Guidelines Chapter E19 earthworks (Land Reshaping Works) for Absolute Maximum Combustibles – 40%.		

13.3 Impact Assessment

Construction (Stage 1 Early Works)

As described in Section 3.8, early works activities will include a number of soil disturbance activities including:

- Site establishment including utilities installation for site compound
- Cut and fill activities
 - Bulk cut and fill works would be required to level the site. It is expected that excavations of up to 6m and 8m of filling may be required
 - Re-compaction of existing fill materials and the placement and compaction of relocated or imported fill materials.
- Vegetation clearance (building footprint and buffer only)
- Excavation and trenching for inground infrastructure and utility works
- Construction of internal roadworks and car parks and use of temporary access roads
- Stockpiling
- Movement of plant and vehicles over unsealed surfaces.

Additionally, construction activities have the potential to: impact soils through compaction and dispersion of soils off-site by construction vehicles; generate dust; and cause accidental spills or leaks that could lead to contamination of soil.

Soil Erodibility

During construction, these activities have the potential to increase the erosion of soil on site and generate sediment laden runoff. This has the potential to impact the surrounding environment including the drainage line within the site and the wetlands to the north and the aquatic communities within these waterways.

The overall site erosion hazard is low to moderate as the disturbance area is relatively large, slopes within the site are gentle overall but steep in localised areas and the erodibility is also very low to moderate due to presence of clay. Temporary batters would be required to facilitate construction. Batters will have a maximum of 2.5H:1V. A standard suite of erosion and sediment controls will be adopted to manage these risks during construction (refer Section 17.4).

Geotechnical Conditions

The existing clay and silty clay soils are of medium to high plasticity and likely to become difficult to work, particularly when wet. Site trafficability will be reduced when these soils become wet. If the soils become wet they should be tined and allowed to dry.

In the event that unfavourable weather conditions occur prior to and during construction, trafficability for non-tracked plant is expected to be very poor in the lower parts of the site and therefore the use of a layer of granular crushed rock, crushed recycled concrete, or similar may be required over the natural clays to provide a working platform for temporary access roads.

Acid Sulfate Soils

Construction activities can cause the oxidation of PASS material through excavation and exposure of PASS material, which in turn can result in environmental impacts including:

- Release of nutrients and heavy metals (particularly arsenic) stored within the soil matrix
- Death or stunted growth of vegetation
- Loss of habitat
- Damage to infrastructure, e.g. corrosion of concrete.

The NSW Acid Sulphate Soils Risk map indicates no risk of actual or potential acid sulfate soils and the Maitland LEP Acid Sulfate Soils mapping indicates that the Site is located on land shown as Class 5 Acid sulfate soils (ASS).

Works on the subject site are not expected to cause impacts to PASS on adjacent Class 2 lands by dewatering and lowering the groundwater table, or otherwise. Project works may cause minor changes to surface water drainage patterns due to land reshaping, installation of formalised drainage and an increase in impervious areas. However, such changes would not impact the regional groundwater aquifer. The proposed development works would not impact the water table on the adjacent Class 2 lands to the point where the water table is lowered below 1m AHD. As such there is no requirement to prepare an Acid Sulfate Soils Management Plan for the works.

Coal and other materials with high carbon content can also contain sulphide ores which may lead to acid generation upon oxidation. Generally, this is not an issue when the carbonaceous materials are thoroughly blended with other soils as is the case for this Site.

Soil combustibility

CSR has undertaken remediation and rehabilitation activities prior to relinquishment of the mining leases on the NMH Site. This includes remediation to minimise and mitigate future combustibility risks. CSR have

addressed this risk by segregating this material, and capping and containing the material somewhere where the material will not be subject to exposure under normal foreseeable use of the site (e.g. burial at depths greater than 2 m below design structure levels or beneath permanent infrastructure as part of the redevelopment). As the risk, has already been addressed, no further assessment is required.

Operation (Stage 1 Concept Hospital)

The operation of the NMH would be unlikely to impact soils. The risk of soil erosion during operation would be minimal as all areas impacted during construction would be sealed or rehabilitated and disturbed land surface would be landscaped and turfed as part of progressive stabilisation to prevent soil erosion from occurring.

Potential impacts on soils and geology would be further considered as part of the Stage 2 SSI application that would address detailed design and construction of the NMH.

13.4 Mitigation Measures

The following mitigation and management measures in Table 13-4 are recommended to minimise soil and geology impacts.

Table 13-4 Soils and Geology Mitigation Table

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
S1	A soil and water management plan (SWMP) will be prepared as part of the CEMP in accordance with Managing Urban Stormwater Guidelines Volume 1, 4th Edition “the Blue Book” (Landcom, 2004) and Volume 2 (DECC, 2008).
S2	The SWMP will also include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.
S3	Erosion and sediment control measures (in accordance with Managing Urban Stormwater Guidelines Volume 1, 4th Edition the “Blue Book” (Landcom, 2004) will be prepared and implemented as part of the CEMP and will include control measures such as: • Sedimentation basins • Sedimentation fences • Stormwater drainage inlet protection • Overland flow diversion swales • Shaker grids and wash downs for vehicles leaving the construction site • Divert clean water around the site • Dust control measures. Erosion and sediment control measures will be implemented before any construction starts are not to be removed until the works are complete and areas are stabilised.
S4	Prepare and implement a CMP which includes appropriate dust control measures.
S5	Manage vehicle access to, from and within the site to limit the amount of material that could be picked up by vehicles and moved onto local roads.

Other safeguards and management measures that would address soil impacts are identified in sections covering water (Section 15), contamination (Section 14), waste (Section 19), and air quality (Section 18).

14. Contamination

14.1 Introduction

The site is located within the former CSR Metford clay mine and brickworks site which was previously used for quarrying, stockpiling, brickmaking and other associated activities. Appropriate measures have been undertaken by HI in order to confirm that the land is suitable for use.

Numerous environmental investigations have been undertaken onsite to determine the level of contamination and the suitability of the site for health-based land use including:

- Site Audit Report, Lot 7314 in DP 1162607 New Maitland Hospital Stage 1 Development Area Metford Road, Metford NSW, JBS&G Australia Pty Ltd, October 2017, (updated January 2018)
- Remedial Action Plan / Contamination Management Plan, New Maitland Hospital Stage 1 Development Area, Metford NSW, GHD Pty Ltd, July 2016
- Additional Environmental Investigation Former CSR Facility, Metford Road, Metford New South Wales 2323, December 2015, DLA Environmental Consultants Pty Ltd
- Phase 2 Environmental Site Assessment, New Maitland Hospital Stage 1 Development Area, Metford Road, Metford NSW 2015, GHD Pty Ltd, December 2015
- Closure Mine Operations Plan for Metford Clay Mine ML 1523, 5848, 4865 and 5090, VGT Pty Ltd, March 2015
- Screening Health and Environmental Risk Assessment, Former CSR Facility, Metford NSW, Golder Associates, December 2015
- Report on Geotechnical investigation, Proposed New Maitland Hospital, Metford Road, Metford, Douglas Partners Pty Ltd, August 2017, (updated May 2018)
- Phase 2 Detailed Environmental Site Assessment CSR/PGH Maitland Metford Road, Metford NSW 2323, DLA Environmental Pty Ltd, January 2014
- Remediation Action Plan, CSR/PGH Metford, Metford Road, Metford NSW 2323, DLA Environmental Consultants Pty Ltd, May 2014
- Stage 2 Soil Investigation, CSR/PGH Maitland NSW, LeVert, September 2011.

This chapter summarises the previous investigations, reviews the existing contamination risk of the site and its surrounds and provides an assessment of the potential contamination impacts associated with the Proposal.

14.2 Existing Environment

A search of the NSW EPA Contaminated Land Record was completed on 1 September 2017 which identified no records of contaminated land within the suburb of Metford. However, the site has a long history of industrial uses associated with mining and brick making and is known to contain some areas of soil contamination. The contaminants of concern on the site were Polycyclic Aromatic Hydrocarbons (PAHs) including Benzo a Pyrene (BaP) and B(a)P TEQ, Total Petroleum Hydrocarbons (TPH) and Asbestos.

Previous investigations

Numerous previous investigations have been prepared for the site. It is noted that some of these investigations were for the entire Metford Triangle not just the proposal site. A summary of relevant

information with respect to Lot 7314 DP 1162607 and Part Lot 401 DP 755237 is included in Table 14-1.

Table 14-1 Summary of previous soil contamination investigations, sampling locations are shown in Figure 2 of the GHD report (GHD, 2015, refer Appendix B)

Area description	Historical land use	Previous investigations	Key findings
South-west portion of Lot 7314 containing the forested area.	Historical aerial photos indicate that no use of the site in this area apart from some early tree clearing (from 1954) and the presence of a small dirt road to the very southwestern end (along the boundary) in 1975.	DLA (2011 – 2013) completed 5 testpits in the area. Testpits were excavated to 0.4 m and terminated in “loamy soil in remnant bush”. DLA (2014) included one surface water sample in this area (“Entry Dam”). GHD (2015) investigated one nested pair of groundwater wells, 23 test pits, seven hand auger pits and one surface water sample.	No contamination issues have been identified aside from one exceedance of TRH (F2) at location TP417 located at the boundary of the south-west portion of the Site and the central portion of the site. GHD expects the area to be primarily undisturbed natural soils.
North-west portion of Lot 7314. This will be where the Hospital will be built	Historical aerial photos indicate that most of the area was cleared in 1954 with exposed soils increasing from this time onwards. A stockpile on the western edge may have been present in 1987. Pit 2 was reported at approx. 5 m deep and backfilled with bricks and clay (and rubbish in the north eastern portion).	LeVert (2011) completed 2 test pits (TP71 & TP72) and collected 1 surface sample (S3) in this area. DLA (2011 – 2013) completed 12 test pits in the area and located one stockpile (SP4) in the northern most area. DLA (2014) included one groundwater sampling location in this area (MW6). GHD (2015) investigated one nested pair of groundwater wells, five boreholes, 35 test pits, three sediment samples and one surface water sample.	DLA locations TP245 and stockpile 4 (SP4) exceeded the Health Screening Level (HSL) for vapour intrusion for low and high density residential use and for total recoverable hydrocarbons (TRH). SP4 also exceeded the DLA site assessment criteria (SAC) (commercial/industrial). It is not known if the stockpile is still located along the northern boundary or has been moved. The DLA report identified multiple locations with benzo(a)pyrene (BaP), exceeding Health Investigation Levels for low density residential (HIL A) and recreational open space (HIL C). The GHD report found exceedances of TRH (F2) at

Area description	Historical land use	Previous investigations	Key findings
			several locations (BH601, TP306, TP402, TP478) and exceedances of BaP at TP401.
Part Lot 401	Historical records show this as a calcium fluoride disposal area with possible foreign materials located on the western edge of this pit. Pit 2 was reported at approx. 5 m deep and backfilled with bricks and clay (and rubbish in the north eastern portion of the pit).	LeVert (2011) completed 1 test pits in this area (TP41). DLA (2014) completed 7 test pits in the area.	DLA noted presence of foreign materials (such as processed timber, plastic, metal fragments, a large steel beam, material bags and old drums). B(a)P concentrations in the western wall of Pit 2. Asbestos-impacted soils in the north-east of Pit 2.
Central portion of Lot 7314	Historical aerial photos indicate that most of the area was cleared in 1954 with areas of exposed soil by 1975. In 1987 a large open pit/quarry was established with a couple of possible coal/shale stockpiles present in 1993 onwards.	LeVert (2011) completed 3 test pits in this area (TP42, TP70 and TP69). DLA (2011 – 2013) completed 16 test pits in the area. GHD (2015) investigated one nested pair of groundwater wells, 38 test pits, one sediment sample and one surface water sample.	DLA locations TP134 and TP135 recorded hydrocarbon concentrations within a large carbonaceous shale stockpile situated on the southern portion of the Site, exceeding HSL for TRH F2. DLA location TP210 to the north of the stockpile also exceeded HSL for TRH F2. GHD locations TP450 and TP452 exceed the HSLs a/b for TRH.
Eastern portion of Lot 7314	Historical aerial photos indicate that most of the area was cleared in 1954 with areas of exposed soil by 1975. In 1987 a large open pit/quarry was established with a couple of possible coal/shale stockpiles present in 1993 onwards.	LeVert (2011) completed 2 test pits in this area (TP67 and TP68). DLA (2011 – 2013) completed 9 test pits in the area. GHD (2015) investigated two groundwater wells, 12 test pits and six auger pits.	No issues identified or stockpiled material/fill. Previous investigations do not indicate the presence of filled voids in this area.

The reports did not find levels of the identified contaminants of potential concern in groundwater which are considered not to require remediation or management under the proposed uses. There was no evidence of potential or actual migration of contaminants from the site which may result in unacceptable risks to surrounding human or ecological receptors.

The Site investigation activities also reported the presence of potentially combustible materials however these materials are considered suitable for re-use on site. Placement of any combustible material on-site will be recorded on the Long-Term Site Management Plan (LTSMP) to be prepared for the site.

Remediation and Validation Requirements

The Remediation Action Plan (RAP) prepared for CSR by DLA Environmental in May 2014 was created considering that the Site would be redeveloped as a hospital comprising: long term care (hospitals, child care, aged facilities and hospices); commercial/ industrial land use (training facilities, administration and ancillary buildings); and open spaces (gardens, play areas).

The RAP has been followed to ensure the successful remediation of the Site so that the site is suitable for use as a hospital. CSR have implemented the RAP on Lot 7314 to ensure that the site will be stable, safe and meets the requirements of the CMOP.

Before the site was handed over a Long-Term Site Management Plan (LTSMP) was prepared. The purpose of the LTSMP is to document the location of any remaining contaminated and combustible material. The LTSMP includes the following:

- Nature and location of contamination remaining on-site
- The objectives of the plan
- Method of management of contaminants
- Individual responsibilities for the plan's implementation
- Time frames that actions specified in the plan will take place
- Procedures to be used in the event that any remaining contaminated and combustible material should be disturbed.

Site Suitability

A Site Audit Report was undertaken by JBS&G (an accredited NSW EPA site auditor) to review investigation, remediation and validation work conducted by contaminated land consultants and to check that these are consistent with current EPA regulations and guidelines and to determine if the land can be made suitable for the proposed land use as a hospital. Expert review of a consultant's work also helps to determine the reliance that can be placed on their assessment and/or remediation.

The audit report determined that site assessment activities undertaken by GHD and proposed remediation and validation works are considered to have met the requirements of the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC 2006).

The audit report determined that the RAP addressed the identified contamination issues as they relate to the proposed uses of the site. The remediation approach documented in the RAP was checked by the auditor and was found to be technically feasible to make the site suitable for the final land as a hospital, environmentally justifiable and consistent with relevant laws, policies and guidelines.

14.3 Impact Assessment

The key contamination risks from the proposal are:

- Disturbance of previously unidentified historical land contamination
- Storage and handling of dangerous goods, vehicle and plant refuelling (spill or leak) and future contamination through fuel and hydrocarbon storage.

Based on the historical use of the site, there could be residual sources of contamination. During excavation, there is a possibility for the unexpected discovery of contaminated materials. If disturbed, contaminants may pose a risk to human health and the environment. The risk of encountering unknown contaminants during excavation is considered low given the extensive remediation work conducted by CSR however if unknown contaminants are encountered during excavation they will be managed in accordance with the mitigation measures provided below.

Chemical and storage areas are a potential source of contamination. Chemical leaks from storage areas could potentially result in the addition of chemicals to surface water or groundwater and may result in contamination of offsite and onsite water and soils. If not used, handled or stored correctly, chemicals can not only pose a risk to the environment but also present a risk to workers' safety and pose future contamination risks. Chemicals and hazardous will be stored as per legislative requirements and the risk of contamination from these sources will be minimised through a range of control measures outlined below.

14.4 Mitigation Measures

The following mitigation and management measures in Table 14-2 are recommended to minimise potential contamination impacts.

Table 14-2 Contamination Mitigation table

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
C1	An Unexpected Finds (Waste) Protocol would be established and implemented as part of the CEMP in case potentially contaminated, hazardous or unsuitable material are encountered during the site works.
C2	The CEMP prepared by the contractor will include: - Fuel and chemical storage - Safety Data Sheet (SDS) requirements - Refuelling protocols - Spill management and response procedures
C3	Machinery, plant, equipment and chemical storage containers will be checked weekly for leaks and defects. Equipment will not be used if there are signs of leaks and defects.
Stage 2 Detailed Design Considerations and Mitigation Measures	
C4	Safety Data Sheets (SDS) will be located on-site and in compounds where chemicals are stored or used and will be up to date (less than five years old).
C5	A Hazardous Substances Chemical Register will be available on-site and in compounds where chemicals are stored or used and will be kept up to date.
C6	Fuels and chemicals will be stored appropriately.

15. Hydrology (Surface water, groundwater and flooding)

15.1 Introduction

This chapter provides a hydrological assessment of the Stage 1 Early Works and Concept Hospital design and assesses potential impacts relating to surface water, groundwater and flooding. These aspects were assessed in detail in the following specialist studies:

- Stormwater Management Plan, Maitland Hospital, Metford NSW (Wood & Grieves, 2018) (**Appendix D**)
- Surface Water and Groundwater Assessment, New Maitland Hospital (GHD, 2018) (**Appendix D**)

In accordance with the SEARs, the specialist surface water and groundwater assessments address the construction and operation impacts related to Stage 1, in particular drainage, flooding, erosion and sediment controls, and groundwater. A conceptual stormwater management plan and conceptual erosion and sediment control plan are outlined in **Appendix D**.

The surface water and groundwater assessments were undertaken in accordance with the following policies and guidelines:

- Maitland City Council Development Control Plan including Standards and Guidelines for stormwater
- Australian Rainfall and Runoff (ARR) Guidelines
- NSW Floodplain Development Manual 2005
- NSW Government Water Quality and River Flow Objectives
- Managing Urban Stormwater: Soils and Construction (Landcom, 2004)
- Relevant Australian Standards and legislation
- Water Sensitive Urban Design (WSUD) principles
- NSW Aquifer Interference Policy
- Engineering best practice.

15.2 Existing Environment

The site generally displays a rolling topography with gradients to the east, west and north. There is an overall gradient to the north of the site towards the Tenambit Wetlands (located to the north of the rail corridor). The site is elevated in the southern portions with elevations of approximately 20 m Australian Height Datum (mAHD), sloping towards the northeast down to approximately 10m AHD. The landform of the site is characterised by an open extraction pit, which has diversions in place directing catchments from the south towards urban drainage paths in the west, towards Two Mile Creek. The diversions are formed to protect a steep highwall up to 10 m high, which extends along the southern portions of the site with mounded fill located at the top adjoining natural ground levels to the south, and the areas to the north generally at the base of the quarry or with material stockpiled above the base. A small portion of the site falls to the east, towards Three Mile Gully. The area surrounding the open extraction pit has been disturbed by mining operations, with highly variable landform including mounds, channels and pits leading either to the pit or sediment basins in the north.

The low point of the site is centrally located at the north-east boundary, with an RL of approximately RL4m, and within a broad drainage area comprising the former quarry floor and sediment basins to the north.

15.2.1 Surface Water Drainage

The Site is in the Hunter River catchment. There are no mapped natural watercourses within the SSI development site or the broader Metford Triangle. The closest watercourses are Two Mile Creek, approximately 200 m to the west of the site, and Three Mile Gully, approximately 600 m east of the site. North-east of the site is predominantly a wetland environment (Tenambit Wetlands) surrounding by open bushland.

There is an existing drainage line that runs through the south-western corner of the site in the western catchment. This drainage line conveys flows from the southern upstream catchment and the western internal catchment and discharges under Metford Road to the wetlands north of the site. This drainage line would be classed as a minor stream in accordance with the Department of Primary Industries – Water guidelines.

In the eastern part of the Site is a broad, low lying drainage depression. This contains several shallow waterbodies but no defined watercourse within the SSI site. This eastern drainage catchment drains towards sediment basins located further to the north on CSR occupied land. Otherwise the Site contains numerous informal drains and bunds which direct stormwater through the disturbed former quarry site.

Water quality in the ephemeral watercourses is likely to be typical of residential and natural land uses, with potentially slightly elevated suspended solids due to the historical extractive activities of the site

The inferred site drainage features are described in Figure 15-1.

15.2.2 External Drainage Catchments

The site has two external stormwater catchments, a northern and southern (refer to Figure 15-2). Sections of Lot 401 in the north discharge stormwater from the north along the western boundary into an open swale and thence into the existing drainage line located in the south-western corner of the Site. This then discharges beneath Metford Road. The Northern catchment contains undeveloped, disturbed land and has an estimated catchment area of 2.3 hectares.

The southern catchment comprises urban residential land to the south which discharges into the Site at two locations from two main drainage channels, east and west. The Western section of the southern catchment discharges directly into the existing drainage line in the southwestern corner; this Catchment has been calculated as approximately 16.7 hectares. The Eastern section of the southern upstream catchment discharges to the East of the site towards the wetlands to the North. This catchment has been calculated to have an overall catchment area of approximately 36.9 hectares of which approximately 12.7 hectares contributes stormwater through the SSI Site.



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Paper Size A4
0 25 50 100 150 200
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



LEGEND

- Project site boundary
- Site boundary
- Cadastral
- Site outlets

- Inferred existing flow path
- Railway
- Waterbody

Watercourse (as per topographic mapping for area)



NSW Health Infrastructure
New Maitland Hospital
Surface Water and Groundwater Assessment

Job Number 22-18003
Revision 0
Date 06 Mar 2018

Hydrologic features

Figure 3-8

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Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 T 61 2 4979 9999 F 61 2 4979 9988 E nmail@ghd.com W www.ghd.com.au

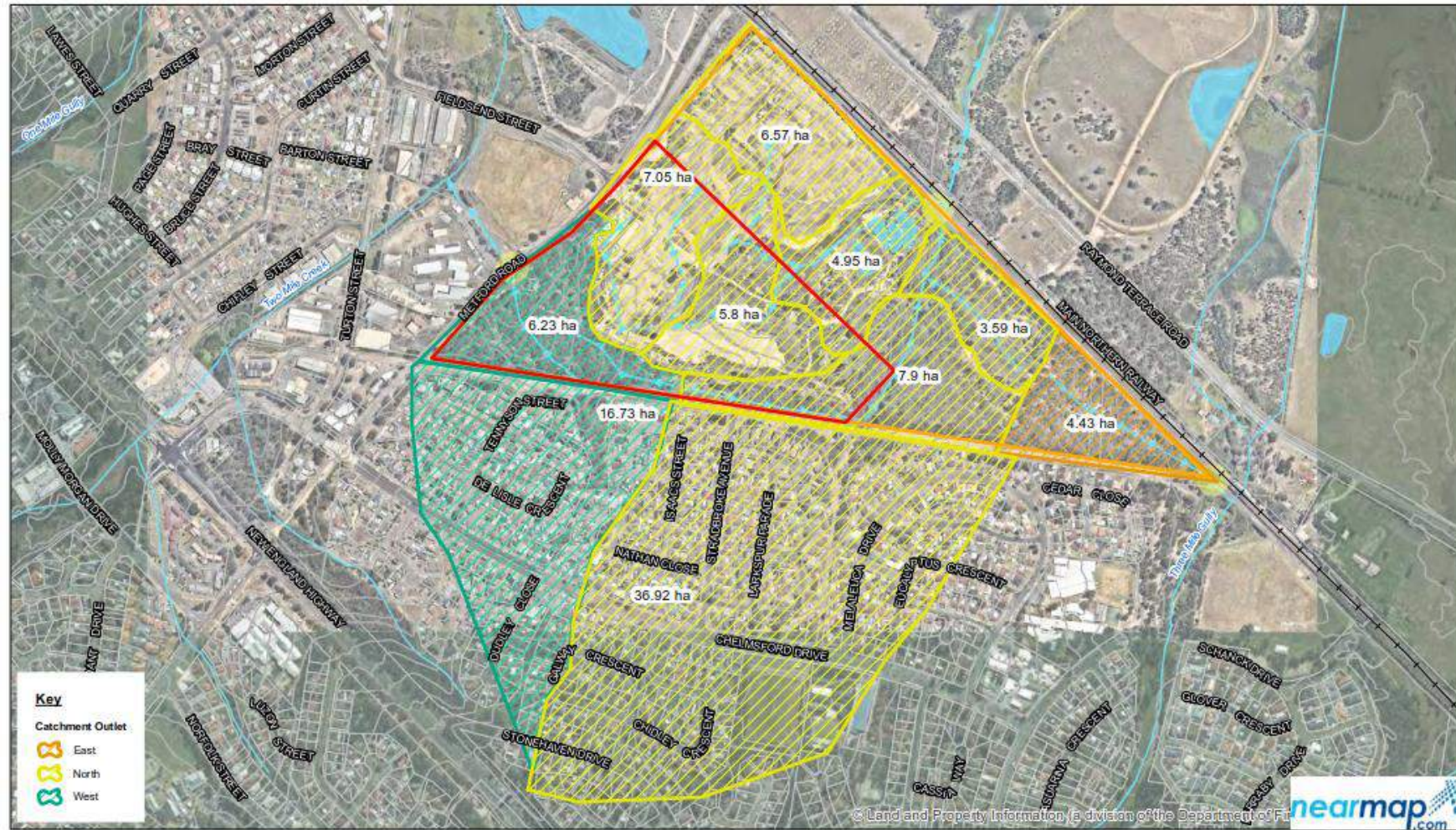


Figure 15-2 Drainage catchments (GHD, 2018)

15.2.3 Internal Drainage Catchments

The site also has two internal stormwater catchments, an eastern and western catchment (refer Figure 15-3). The central drainage depression located in the eastern portion of the Site discharges to the wetlands north of the site beyond the rail corridor. This internal catchment has been calculated as approximately 11.1 ha. The western drainage catchment has been calculated as approximately 6.2 ha and discharges into the southwestern drainage line.

Current drainage patterns and catchments are defined by the existing disturbed terrain. There is no in-ground stormwater drainage infrastructure on the site. Stormwater runoff discharges as overland flow and via the numerous informal bunds and drainage channels, to both the eastern and western catchments.

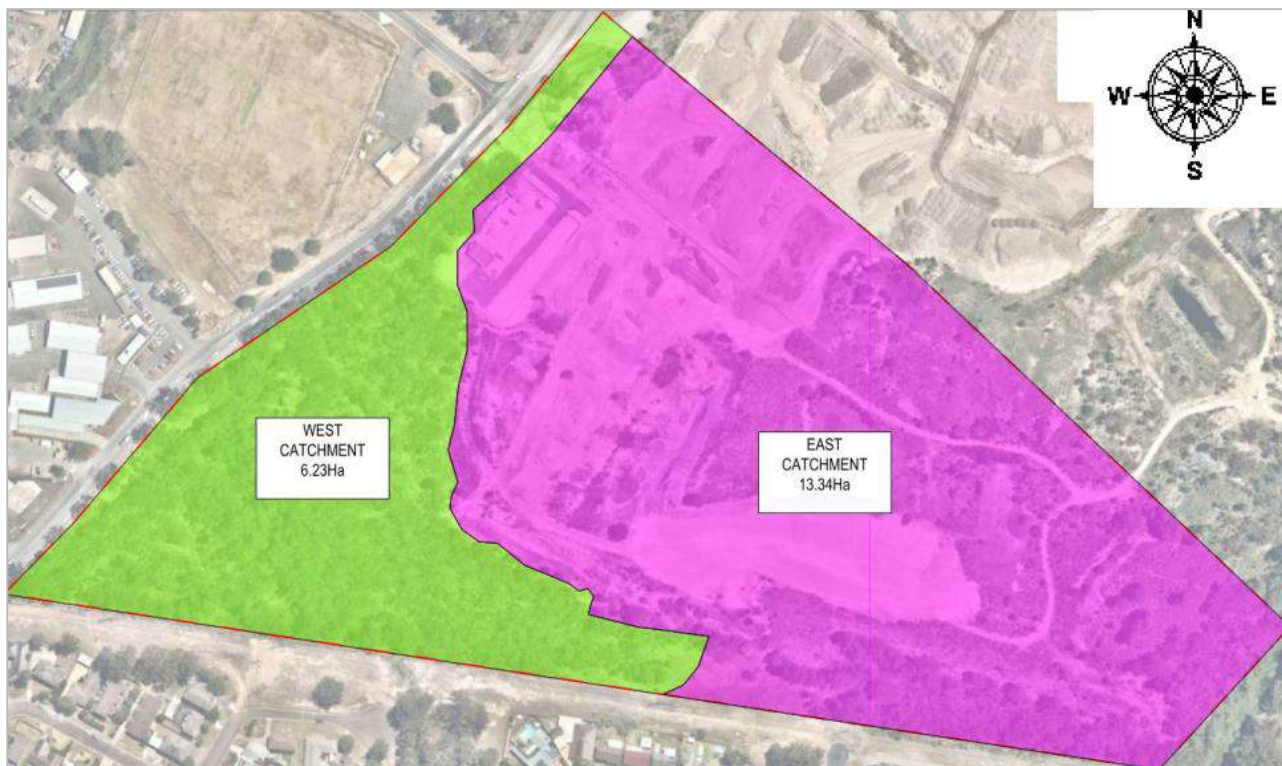


Figure 15-3 Internal catchment map (Wood & Grieve, 2018)

Catchment discharges for the eastern and western catchments, for various average recurrence interval (ARI) events, are summarised in Table 15-1.

Table 15-1 Pre-development discharge flows

Catchment	Catchment Area (m ²)	Discharge flows (m ³ /s)		
		1 Year ARI	10 Year ARI	100 Year ARI
Eastern catchment	111,220	0.118	1.03	2.29
Western catchment	62,300	0.206	1.76	3.84

15.2.4 Flooding

To understand local flood behaviour reference was made to the most recent local flood study (the Hunter River Floodplain Risk Management Study and Plan) undertaken for Maitland City Council by WMA in 2015. This study includes the development site and broadly assesses Hunter River flooding within the region.

The flood mapping indicates the Site is not impacted by flooding of the Hunter River (refer Figure 15-4) as it is protected by the rail embankment to the north. The Hunter River Floodplain Risk Management Study and Plan indicates that the development site is not subject to any flood planning restrictions.

15.2.5 Harvestable Rights

The Harvestable Right provisions of the *Water Management Act 2000* give landholders the right to capture and use for any purpose 10 % of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC).

The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

It is noted that dams constructed for the purpose of water quality control are not included in the harvestable rights allowance, providing water is not pumped or taken from those dams for use.

The MHRDC for Lot 7314 with an area of approximately 17.3 ha, is 1.47 megalitres.

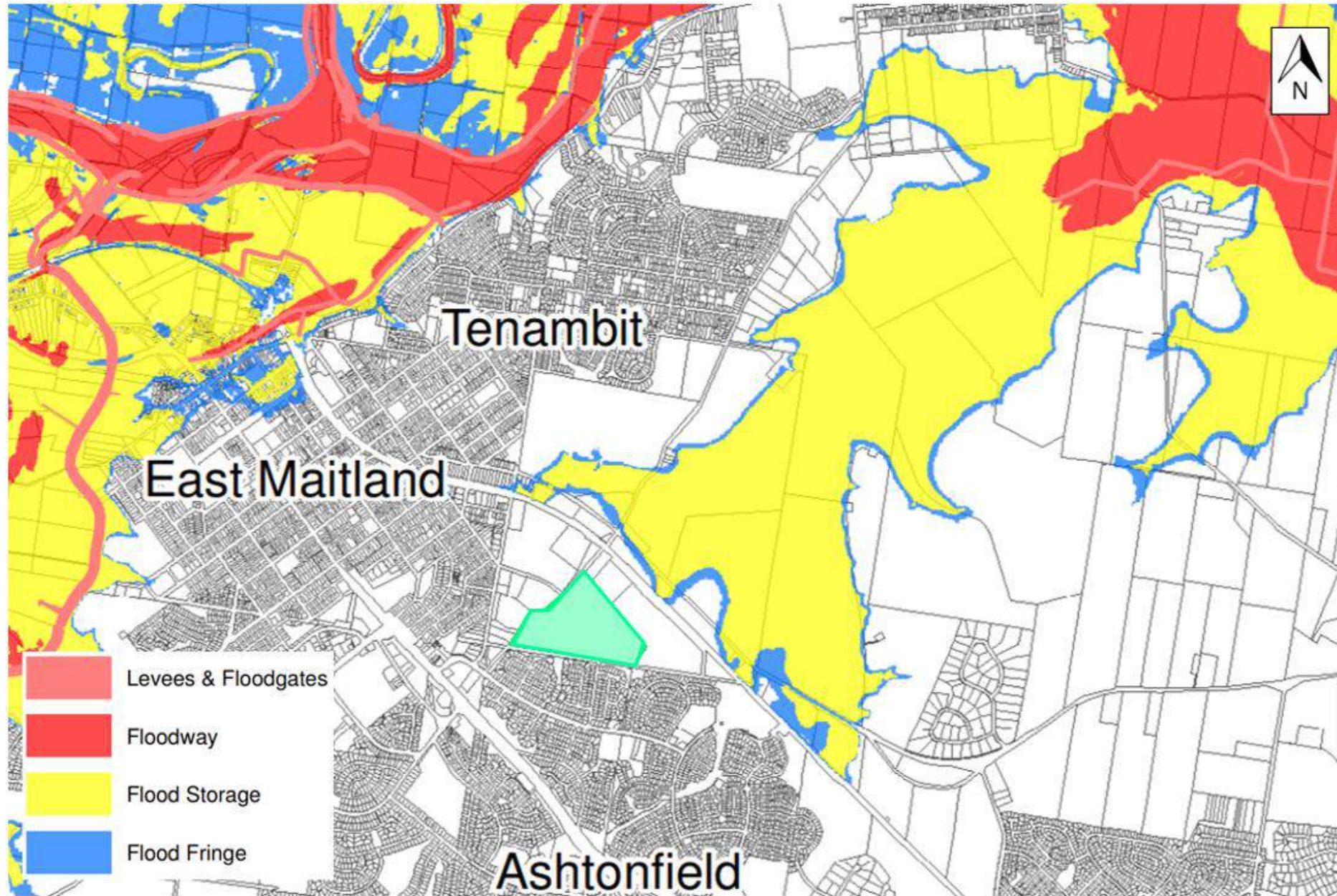


Figure 15-4 Hydraulic Categorisation for a PMF flood event, the green area represents the NMH site (Source: Hunter River Floodplain Risk Management Study and Plan, 2015)

15.2.6 Surface Water Quality

A comprehensive water quality assessment is provided in the GHD (2018) Surface Water and Groundwater Assessment, provided in **Appendix D**. The assessment establishes a baseline for the receiving surface water environment in accordance with the assessment framework and methodologies outlined in ANZECC (2000) and uses threshold guideline values consistent with the water quality values for the receiving waters.

Environmental values associated with the waterways and water sources within the area surrounding the Project include primarily commercial and industry developments, aquatic ecosystems, irrigation and stock watering. As part of this assessment, the guideline values from the ANZECC (2000) for the protection of 95% of aquatic species have been used, as they are considered to be the most sensitive and, regardless of the current water quality present within the receiving environment, and they foster an improved water quality standard into the future.

Additionally, the NSW Water Quality Objectives (NSW WQO) for the Hunter River were consulted. The water quality objectives for waterways affected by urban development are as follows:

- Maintain or improve the ecological condition of waterbodies and their riparian zones over the long term.
- Protect visual amenity and aesthetic qualities of waters.
- Maintain or improve water quality for activities such as boating and wading, where there is a low probability of water being swallowed.
- Maintain or improve water quality for activities such as swimming in which there is a high probability of water being swallowed.

To provide a set of baseline water quality data, surface water samples were collected by GHD between 4 to 7 July 2017 at 3 locations within the site (SW401, SW402 and SW403) (refer **Appendix D**). The samples were analysed for a variety of physical and chemical parameters including nutrients, dissolved metals, pH and electrical conductivity and the results are summarised in Table 15-2.

Several dissolved metals in the dam water exceeded the relevant criteria in ANZECC (2000) Australian and New Zealand Guidelines for Fresh Water Quality, for 95% level of protection. The surface water samples within the site had exceedances of cobalt, manganese, nickel and zinc. The pH of the water indicates slightly acidic conditions and the EC indicates fresh water for sampling locations SW401 and SW403 which have values below 800µS/cm and moderately saline for sample SW402.

Across the surface water monitoring sites, elevated quality parameters indicate an influence from the Project site's previous land use as an area of materials extraction. Typically, zinc, nickel and manganese are associated with geochemical processes associated primarily with coal seams. Samples at SW401 have elevated zinc concentrations indicating that sources of zinc may be within the background catchment chemistry. Whilst nickel did not exceed the guideline value at SW401, it was elevated compared to other monitoring locations.



Figure 15-5 Water monitoring locations

15.2.7 Groundwater Environment

Groundwater exists within coal measures (deep aquifer), a colluvium/weathered bedrock zone and localised alluvial deposits (shallow aquifers). From investigations undertaken from the surrounding areas groundwater is described as:

- Groundwater areas within weathered bedrock is discontinuous and unconfined with areas hydraulically connected to the surface water and/or alluvium.
- There is likely to be limited hydraulic conductivity between the groundwater in the shallow aquifer and the coal measures of the Tomago geological formation (Aquaterra 2008).

Vertical hydraulic conductivities, based on Aquaterra (2008), are typically much less than horizontal conductivities indicating horizontal flow can be 10 to 100 times that of vertical hydraulic conductivities.

Groundwater flow directions for the deep aquifers are likely to be influenced by geological dip, and recharge-discharge processes. Aquaterra (2008) indicate that deep aquifers flow to the west, south and east as they coincide with the crest formed by the Four Mile Creek Anticline. Generally, flow directions are independent of the topography.

Conversely, the shallow aquifers, have flow directions driven by topography. The shallow aquifers within this area have been defined as being influenced by local rainfall recharge with downward percolation to a water table where connectivity to surface water can occur based on topographic influence. Connectivity between surface water and groundwater environments has been previously assessed by Aquaterra (2008). They confirmed that connectivity does exist between wetlands and swamps based on the measurement of water levels in both environments. They indicate that on average, flow from shallow aquifers contribute to the surface water environment, however, in larger rainfall periods or periods of flooding, it is possible for the shallow aquifer to undergo recharge. Aquaterra (2008) conclude that whilst it identified surface water and groundwater connectivity, it is unlikely that groundwater systems present within the area are extensive or significant.

Table 15-2 Surface water quality results

Analyte	Units	LOR	ANZECC Criteria	SW401	SW402	SW403
Field Data						
Sample description	-	-	-	Green, low turbidity, no odour or sheen	Green, low turbidity, no odour or sheen	Turbid, slightly grey, ponded water/da, 5-10m wide >0.5m deep
Temperature	°C	-	-	11.3	9.5	21.1
pH	pH units	-	-	5.37	5.20	7.17
Electrical Conductivity (EC)	µS/cm	-	-	276.5	3,543	346
Dissolved oxygen (DO)	mg/L	-	-	4.02	0.05	6.44
Redox	mV	-	-	252.5	77.3	130
Laboratory Data						
Calcium (filtered)	mg/L	1	-	3	80	-
Magnesium (filtered)	mg/L	1	-	6	356	-

Analyte	Units	LOR	ANZECC Criteria	SW401	SW402	SW403
Potassium (filtered)	mg/L	1	-	4	6	-
Sodium (filtered)	mg/L	1	-	49	905	-
Arsenic	mg/L	0.001	0.013	<0.001	<0.001	-
Barium	mg/L	0.002		0.090	0.050	-
Cadmium	mg/L	0.0001	0.0002	<0.0001	<0.0001	-
Chromium (III + VI)	mg/L	0.001		<0.001	<0.001	-
Cobalt	mg/L	0.001	0.0014	0.005	0.268	-
Copper	mg/L	0.001	0.0014	0.001	<0.001	-
Lead	mg/L	0.001	0.0034	<0.001	<0.001	-
Manganese	mg/L	0.001	1.7	0.149	5.22	-
Mercury	mg/L	0.0001	0.00006	<0.0001	<0.0001	-
Nickel	mg/L	0.001	0.011	0.008	0.099	-
Zinc	mg/L	0.005	0.008	0.051	0.250	-
C6-C10	µg/L	20	-	<20	<20	-
C10-C16	µg/L	100	-	<100	<100	-
C16-C34	µg/L	100	-	<100	<100	-
Benzene	µg/L	1	950	<1	<1	-
Toluene	µg/L	2	180	<2	<2	-
Xylene (o)	µg/L	2	350	<2	<2	-
BTEX (sum of total)	µg/L	1	-	<1	<1	-
PAH - Anthracene	µg/L	0.1	0.01	<1.0	<1.0	-
PAH – Benzo(a)pyrene	µg/L	0.05	0.1	<0.5	<0.5	-
PAH - Naphthalene	µg/L	0.1	16	<1.0	<1.0	-
PAH (sum of total)	µg/L	0.05	-	<0.5	<0.5	-

15.2.8 Groundwater levels

The groundwater assessment considered groundwater level and water quality data from 16 groundwater monitoring locations, some based on recently installed monitoring bores and others that have been developed over time in association with CSR's operations. Monitoring locations are discussed in detail in the *Surface Water and Groundwater Assessment* (GHD, 2018; **Appendix D**).

Groundwater level monitoring has been occurring across the Metford Triangle since 2013. Groundwater level was again measured by GHD as part of their 2017 monitoring event. The standing groundwater levels observed at each bore during the 2017 monitoring event are listed in Table 15-3. A plan showing inferred groundwater contours is provided in Figure 15-6. Groundwater flow direction is generally to the north-east.

Table 15-3 Groundwater levels from 2017 monitoring event

Bore	Top of Bore Casing Elevation (m AHD)	Ground Level (m AHD)	Total Bore Depth (m bgl)	Date Measured	Ground-water Depth (m btoc)	Ground-water Depth (m bgl)	Ground-water Elevation (m AHD)
GHD Monitoring							
MW6	-	19.577	16.24	5/7/2017	12.89	12.29	7.287
MW63	-	-	14.91	5/7/2017	7.89	7.29	10.747
MW64	-	-	11.43	5/7/2017	3.25	2.55	11.165
MW201	-	-	10.88	4/7/2017	3.38	2.78	9.603
MW204	-	-	6.81	4/7/2017	2.93	2.25	6.820
MW205	-	-	10.75	5/7/2017	1.24	0.64	7.051
MW400D	-	18.55	18.54	5/7/2017	12.19	11.62	6.98
MW400S	-	18.26	6.23	5/07/2017	Dry	-	-
MW401	9.00	8.31	12.06	4/7/2017	1.92	1.27	7.08
MW402	10.42	9.81	10.83	5/7/2017	2.69	2.09	7.73
MW403D	21.72	21.11	22.22	4/7/2017	6.17	5.49	15.55
MW403S	21.55	21.06	8.62	4/7/2017	2.68	1.98	18.88
MW404D	8.65	8.13	9.60	6/7/2017	0.55	0.05	8.10
MW404S	8.83	8.10	1.58	6/7/2017	0.97	0.47	7.86
Notes: M btoc: metres below top of casing M bgl: metres below ground level							

GHD (2018) (**Appendix D**) provides a review of groundwater levels against local rainfall patterns and concluded that there is little observed response in levels to rainfall, however this is likely due to the limited frequency of monitoring compared to rainfall events.

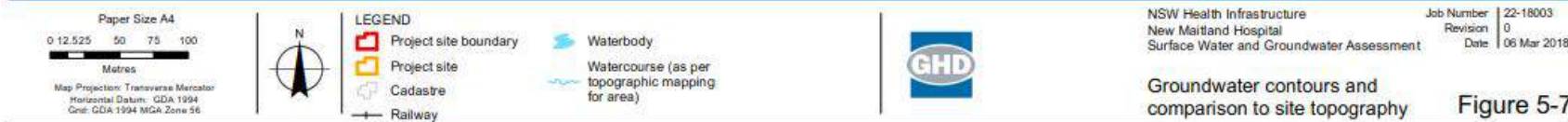
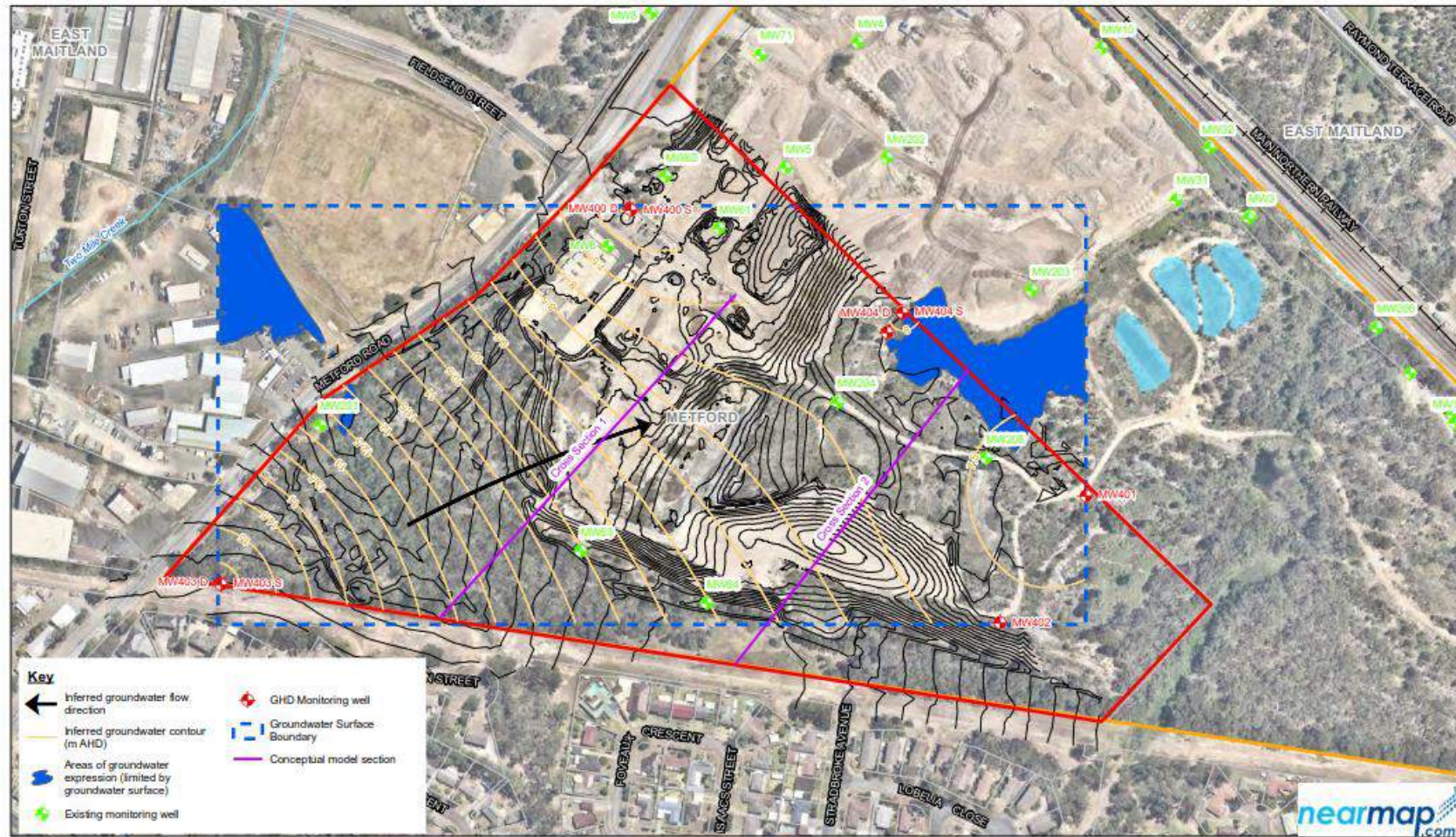


Figure 15-6 Groundwater Contours

15.2.9 Groundwater Quality

Groundwater is typically assessed for chemical parameters against the point of use. Due to the connectivity of the shallow groundwater environment to downstream surface waters systems, groundwater quality has been assessed against the protection of fresh water ecosystems. Groundwater quality has also been assessed against concentrations for stock and domestic purposes. The more stringent value between livestock and irrigation guideline values was used to develop appropriate guideline values for comparison, as detailed in **Appendix D**.

The baseline groundwater environment was evaluated by review of groundwater quality results gathered since 2015 and from the July 2017 monitoring event. The complete groundwater quality results are reported in **Appendix D**. In summary, groundwater sampling results from the 2017 event show the following physical qualities:

- pH ranged between 3.71 and 7.05 indicating slightly to moderate acidic conditions.
- Electrical Conductivity (EC) ranged between 636 $\mu\text{S}/\text{cm}$ and 12,596 $\mu\text{S}/\text{cm}$ indicating fresh to moderately saline water conditions.
- Reduction-oxidation (redox) potential ranged between -7.5 mV and 418.2 mV indicating relatively oxidising conditions.
- Dissolved oxygen (DO) measurements ranged between 0.09 mg/L and 4.97 mg/L.
- Temperature measurements ranged between 16.5°C and 21.1°C.

Groundwater was assessed for major cations, major anions, dissolved metals, total petroleum hydrocarbons (TPH), Benzene, toluene, ethylbenzene and xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs). Sampling results of TRH, BTEX and PAH were below the laboratory limit of reporting (LOR) and the majority of the groundwater samples analysed appear to be sodium-chloride dominant with a tendency to be sulfate dominant in shallow groundwater.

Concentrations of dissolved metals were generally below the NEPM groundwater investigation levels (GILs) (NEPC 2011) which were used as assessment criteria with the following exceptions:

- Cadmium (MW403D, MW403S, MW404S).
- Cobalt (all samples except MW62, MW205, MW400D, MW401 and MW404D).
- Copper (MW61, MW201, MW401, MW403D, MW403S and MW404D).
- Lead (MW403S).
- Manganese (MW6, MW63, MW402, MW404S).
- Nickel (all locations except MW400D and MW402).
- Zinc (all locations except MW6 and MW400D).

Monitoring of filtered metals across the Project site indicate constant elevated concentrations of nickel, zinc and manganese against the DGVs and some stock and domestic guideline values (for example nickel). Filtered copper and cadmium were at times elevated over the sampling period also.

From historical groundwater monitoring, EC has been greater than 10,000 $\mu\text{S}/\text{cm}$ across many of the monitoring wells and would limit any beneficial use of the water regardless of other chemical properties.

There is a clear relationship between groundwater and surface water quality datasets. Elevated nickel and zinc concentrations in surface water are typically as a result of groundwater interactions. Copper and cadmium concentrations are also prevalent in both surface and groundwater sources which also may be due to geochemical influences, but to a lesser extent, or potentially previous land use activities.

15.2.10 Groundwater Connectivity to Surface Water

From the development of a groundwater surface (refer Figure 15-6), the comparison can be made between the existing surface elevation and groundwater surface. It is clear that groundwater is likely to be located at or near the surface in the low-lying areas at the boundaries of the Project site in the north and west.

To further assess the connectivity between the surface water and groundwater, major cations and anions were compared from surface water and groundwater monitoring data using a piper plot. This found that the majority of groundwater and surface water samples analysed appear to be sodium-chloride dominant, with a tendency to sulfate dominance in both surface and shallow groundwater further supporting the understanding of surface water and groundwater connectivity.

15.3 Impact Assessment

15.3.1 Construction (Stage 1 Early Works)

The earthworks associated with Stage 1 Early Works are expected to include excavation and re-compaction of existing fill materials and the placement and compaction or relocation of imported fill materials. As bulk levels are achieved for the development, areas of cut are likely in the north-western and southern portions of the development (up to 6 m). The placement of up to 8 m of fill may be required within the former quarry floor, dependent upon the final development layout (Douglas Partners 2018).

It is expected that final design will aim to balance cut and fill volumes on the site and that importation of significant volumes of fill material will not be required, except for construction materials for which specific characteristics are required (for example, road base, structural fill, drainage gravels and landscaping materials).

The potential hydrological impacts of these construction activities are addressed in the following sections.

Drainage

Construction activities have the potential to result in minor changes to overland flow regimes due to excavation work, temporary structures, stockpiles and introduction of drainage infrastructure. Consideration should be given to the drainage of earthworks to maintain surface water flows that approximate the current broad drainage patterns and natural hydrological attributes (such as volumes, flow rates, management methods and re-use options). Based on the proposed earthworks program there is unlikely to be any significant redirection of overland flow paths.

To minimise the potential for localised inundation of works areas and erosion during construction, it would be necessary to carefully plan, implement and maintain measures aimed at intercepting any concentrated flow and diverting it around disturbed work areas toward the existing stormwater drainage system. Such diversion of relatively “clean” stormwater should be readily achievable based on the existing drainage patterns and should not require any substantial new diversion structures.

Flooding

Flooding during construction may result in erosion and subsequent water quality impacts, as well as damage to earthworks or completed structures. The Proposal is not on flood prone land and is outside the extent for a one in 100-year flooding event. Construction activities are not expected to impact on flooding behaviour in the area. The location of the works is unlikely to result in increased flood risks or decreases in existing storage capacity due to the nature of the works.

Water demand

Non-potable water will be required for the early works, mainly for dust suppression, moisture conditioning of soils during earthworks and compaction, and for washing of equipment. This will be supplied either from stormwater captured in temporary construction sediment basins on site or could be sourced from sediment

basins on the adjoining CSR lands subject to an appropriate agreement being reached. Any shortfall in availability of stormwater can be supplemented by external sources (eg town water from the water mains or purchased through a water cartage service).

Potable water for the site office and amenities will be supplied directly from the mains connection. Temporary rainwater tanks may be used to capture rainwater from portable construction buildings and used for dust suppression. It is likely that rainwater will not provide sufficient water quantities to supply the site's non-potable water needs and shortfall would be provided by the water mains.

Water Quality

The Stage 1 Early Works includes bulk earthworks, excavation, stockpiling, construction of access roads, removal of vegetation and trenching for utilities. These activities will expose soil to disturbance and erosion by wind, rain and stormwater. The consequence of these disturbance activities and the associated erosion hazard is a risk of suspended solids and other construction pollutants being transported offsite, which can impact water quality in receiving waters.

The key potential surface-water contaminant during Stage 1 is sediment or 'total suspended solids' (TSS) generated by soil erosion. Movement of sediment offsite in stormwater could potentially impact the water quality of downstream water resources such as Two-mile creek and the wetlands north of the site. These risks would be managed through implementation of a Soil and Water Management Plan in accordance with relevant best practice guidelines, including *Managing Urban Stormwater: Soils and Construction* (Landcom 2004; the "Blue Book").

The site does not possess any unusual or high risk factors and with appropriate diligence to the selection, design, maintenance and regular review of an appropriate set of erosion and sediment controls, the construction phase water quality risks are readily manageable. A conceptual erosion and sediment control plan is provided in the Wood & Grieve (2018) Stormwater Management Plan (**Appendix D**).

Other potential impacts to water quality could arise mainly due to:

- Accidental spill or discharge of chemicals or hydrocarbons, such as fuels and oils in vehicles, barges and/or equipment.
- Stormwater contamination from vehicle and equipment wash-down areas.
- Risk of alkaline runoff from concrete works and washout areas.
- Dewatering sediment laden water from excavations.

Spill risks can be minimised by storing any fuels, oils or other potentially hazardous liquids required to be used for the Proposal in bunded containers within the compound area. With the implementation of the proposed safeguards and management measures, the risks to water quality would be minimal.

The risk of construction site water migrating off-site and impacting water quality in the surrounding environment would be mitigated through implementation of the Safeguards outlined below and in section 13.4 (soils).

Groundwater

Potential impacts to groundwater during Stage 1 construction could occur due to:

- Spills of fuel, oil and other chemicals, causing leaching of pollutants to groundwater
- Interception of groundwater causing impacts to groundwater tables or flow regimes or exposing groundwater to pollution from surface activities.

Appropriate chemical storage and spill clean-up procedures would be implemented and would minimise the risk of groundwater pollution due to hazardous chemicals.

The potential for groundwater interception through excavation earthworks and installation of bore driven piles was assessed. From the review of the concept building layout (Fitzpatrick+partners 2017) and position in the landform of the Project site, the risk of the building envelope intercepting groundwater is unlikely. The buildings' lower ground floor level is expected to be built at approximately 14.3 mAHD, approximately 3.3 m above observed groundwater level (where groundwater levels are observed to be 11 mAHD to 7 mAHD towards the northeast).

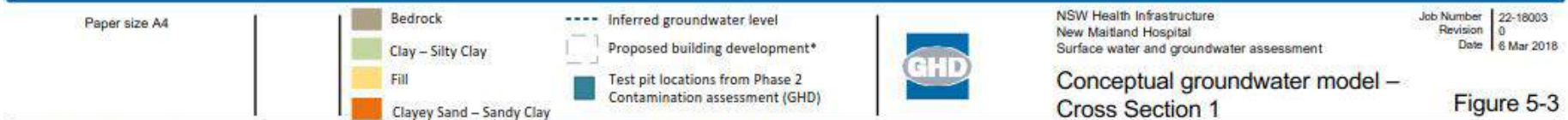
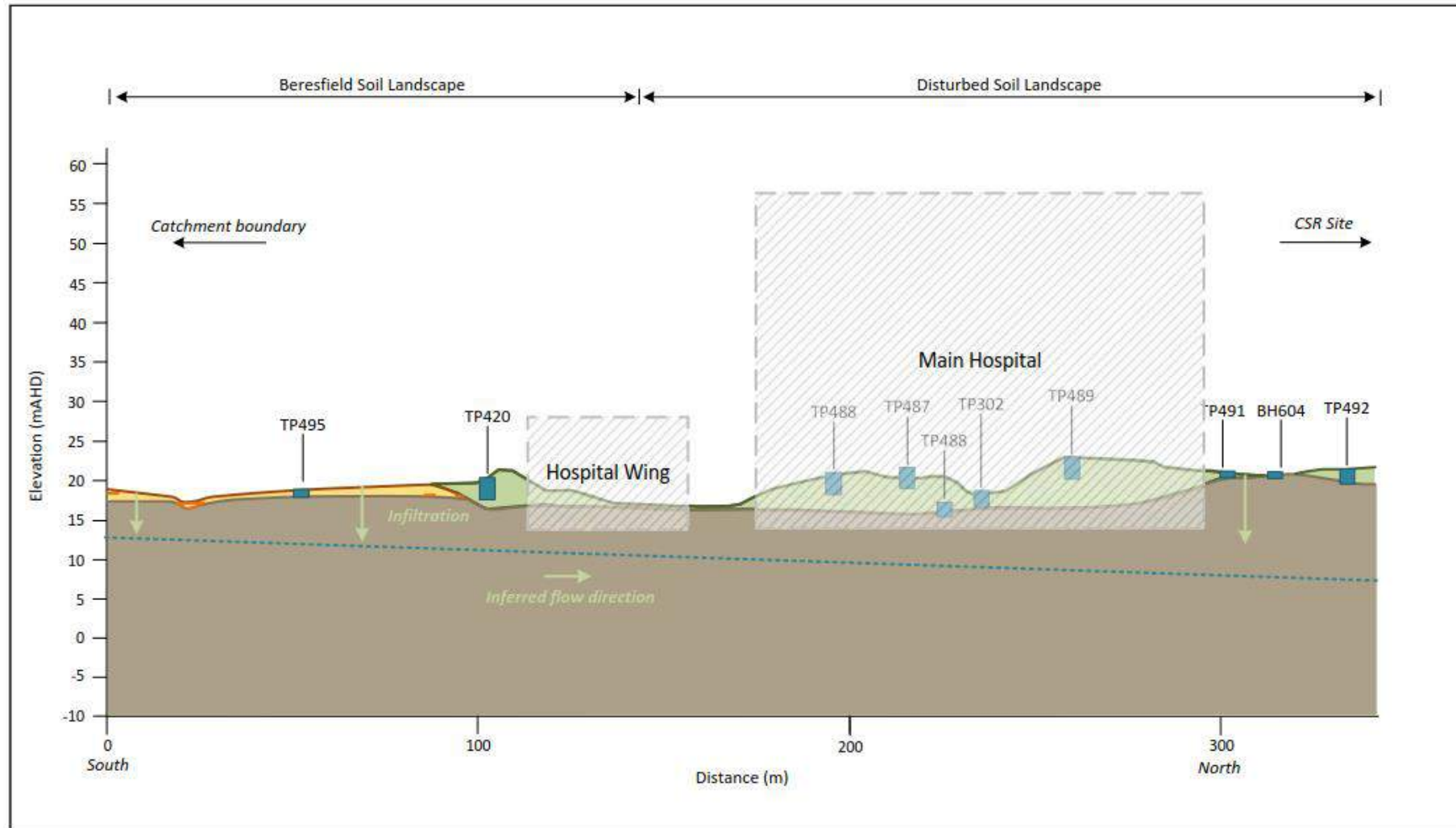
The GHD (2018) *Surface Water and Groundwater Assessment (Appendix D)* provides an analysis of the groundwater environment and specifically addresses the potential for groundwater interception during construction and operation. Based on the information gathered from groundwater monitoring, geology/geotechnical investigations and previous assessments within the region, GHD (2018) developed a conceptual groundwater model describing the conceptual groundwater environment. Cross sections were developed that show the conceptual groundwater levels imposed on cross-sections through the proposed development. Two cross-sections are provided in Figure 15-7 and Figure 15-8. The cross-section positions are indicated in Figure 15-6. The building form including one subsurface level will be located above the existing groundwater table. The building development will therefore not require the significant interception of groundwater volumes. The groundwater assessment concludes that groundwater is unlikely to be intercepted during construction or operation.

Wood & Grieve has advised that the construction requirements for the structural components of the building including any foundation piles are unlikely to require active dewatering or extraction of groundwater volumes. Without the need for these interception activities, the potential impacts on the groundwater environment as a result of construction, are likely to be minimal based on the expected groundwater table.

Where possible the development will seek to balance earthworks cut and fill volumes and will not require any significant excavation depths. In the event that earthworks do intercept the groundwater table, the groundwater level in the vicinity of the excavations would likely reduce to the level of the floor of the earthworks undertaken. This reduction in groundwater level would extend to the north to the point at which it connects to the surface water environment. Any reduction in groundwater level is likely to be localised, temporary and minor. Following the completion of the earthworks, this groundwater level would recover to pre-construction levels.

With any interception of groundwater, licensing of groundwater volumes would be required through consultation with Department of Industry – Water. With the need to manage groundwater volumes, the potential for further impact from poorer quality groundwater needs to be considered. The impact of this poorer quality groundwater is already occurring as it has intercepted the surface to the north of the Project site, however any increase in the contribution of groundwater to the surface (as a result of dewatering activities, discharging directly to the surface) would reduce current dilution effects from uninfluenced surface water catchments.

A review of vegetation across the site has indicated that there are no communities that are either endemic to the site or solely dependent on groundwater resources. The proposal would not impact on groundwater dependent ecosystems.



Conceptual groundwater model – Cross Section 1

Figure 5-3

Figure 15-7 Conceptual Groundwater model – Cross Section 1

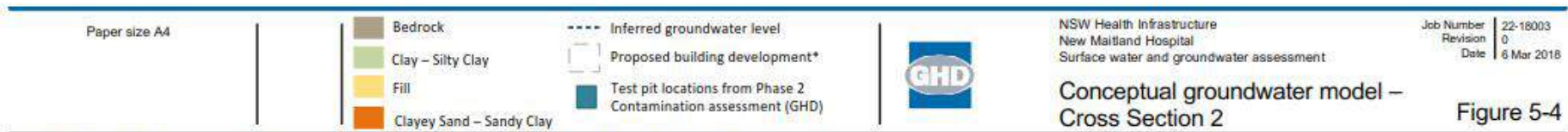
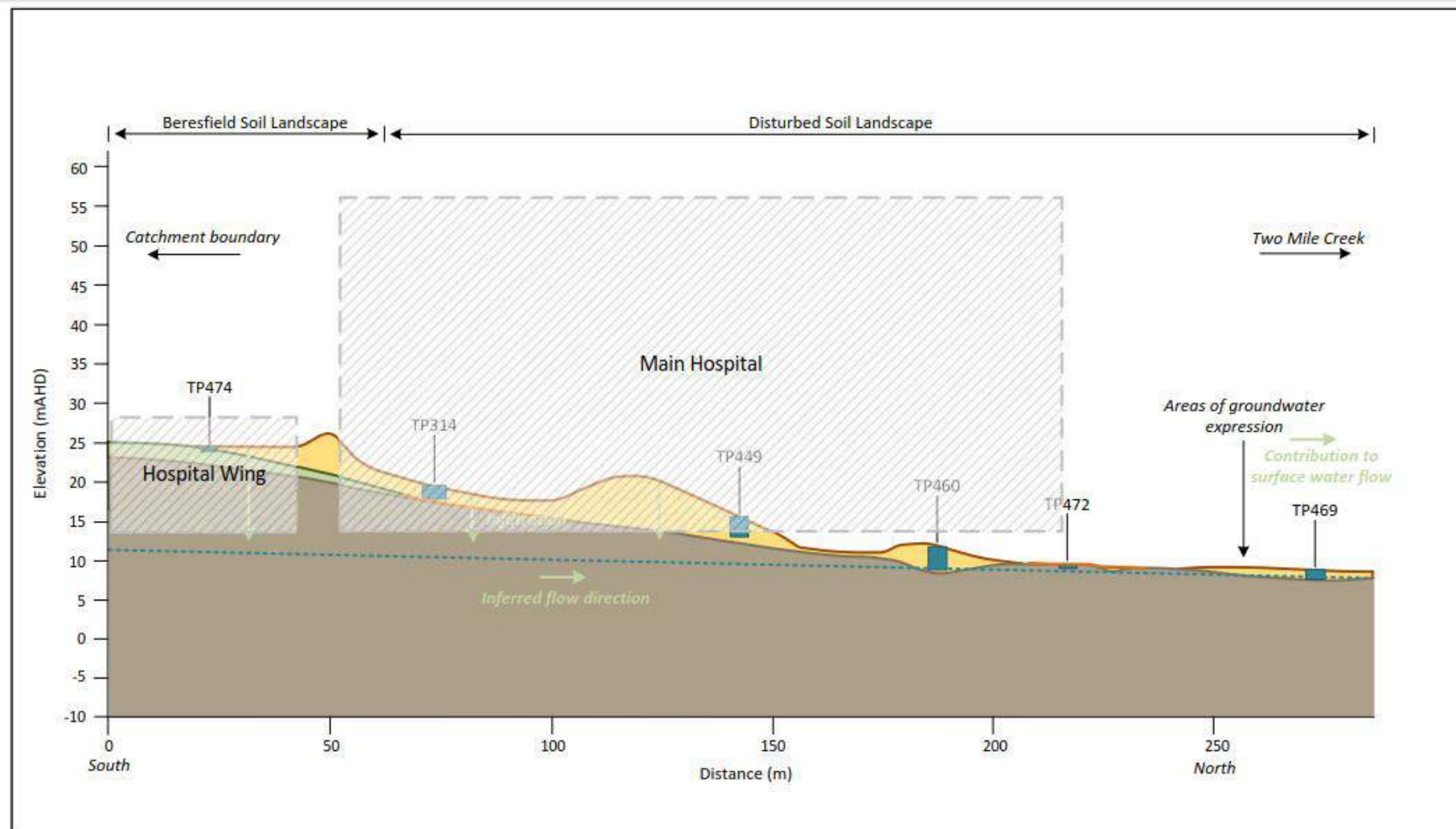


Figure 5-4

Figure 15-8 Conceptual Groundwater model – Cross Section 2

15.3.2 Operation (Concept Hospital)

An assessment of potential hydrological impacts during operation was undertaken based on the Concept Hospital design and is outlined in the Wood & Grieve (2018) and GHD (2018) assessments (refer **Appendix D**). These assessments would be revisited and updated as part of Stage 2 Detailed Design.

Drainage

Internal catchment modification

The Proposal would involve installation of new road drainage, stormwater management elements and an additional impervious catchment area of approximately 61,000m² of hospital floor space plus two carparks, a helipad and new internal roads. These impervious hard stand surfaces have the potential to increase the storm water runoff from the site during storm events due to reduced infiltration. This has potential to reduce ground water recharge, increase surface flooding and increase velocity of flows within drainage systems. The availability of other open areas will reduce the effect of new impervious areas. Additionally, the new drainage systems will be designed to have the capacity to receive the flows from the Proposal and additional measures such as headwalls and other erosion protection methods will be utilised to address discharge of additional catchment flows.

The NMH will aim to ensure that the pre-development and post-development stormwater discharges are equivalent. The potential impacts of development and “urbanisation” of the onsite catchment can be mitigated through adoption of water sensitive design elements and suitable onsite stormwater detention (OSD) structures such as underground tanks and bioretention basins. Design of these structures would form part of detailed design.

Upstream catchment runoff

The proposal will require the construction of the main access road and western car parking area over the existing open swale that moves stormwater from the northern catchment to the existing drainage line. To maintain this movement of water across the Site and to its current receiving environment a series of reinforced concrete culverts will be constructed under the access road and car park areas. These drainage structures will be sized to convey the runoff from a 100-year storm event, ensuring that the stormwater discharge flows from the Northern Catchment are controlled (refer to **Appendix D** for civil drawings which show the locations of these concrete culverts).

The southern residential drainage catchments will continue to drain unimpeded through the site via the existing central and western drainage lines.

Building, road and carpark Drainage

The Proposal would involve installation of new stormwater management elements including road drainage and hospital roof stormwater management. Stormwater run-off from new road pavement, carparking areas and other hard stand areas associated with the NMH would be managed by new drainage infrastructure. The proposal will be designed to prevent uncontrolled discharge of potentially contaminated water including stormwater, from the Site. Stormwater will be conveyed via the following methods outlined in Table 15-4 to Table 15-5.

Once in the in-ground pipe network the runoff will be conveyed via gravity to water quality treatment devices, then to the stormwater detention infrastructure before discharging to the legal point of discharge.



Table 15-4 Building Drainage Stormwater Conveyance Flow Chart (Wood & Grieve 2017(2)).



Table 15-5 Road and Carparking Drainage Stormwater Conveyance Flow Chart (Wood & Grieve 2017(2)).

Points of Discharge

There will be two points of discharge, the eastern and the western catchment discharge points. The eastern catchment will discharge to the existing wetlands and the western catchment will discharge to the existing drainage line.

Attenuation for the western catchment will be achieved by holding the water in an underground detention tank or tanks. By detaining stormwater runoff in detention tanks, the discharge flows and velocities will be restricted however concentrating the discharge from the site to two points will increase the risk of erosion at these discharge locations. To mitigate this risk erosion control measures will be put in place to reduce the flow velocities of stormwater discharge and stabilised erodible surfaces at the discharge point. A headwall will be provided for the discharge points as well as erosion protection measures to stabilise areas directly downstream.

Attenuation for the eastern catchment will be provided by constructing a bio-detention basin west of the eastern car park area. This will also be used as a water treatment device. Modelling indicates that a basin of 1200m³ will be required to provide sufficient stormwater runoff storage to attenuate the post development flows back to that of the pre-development. Accommodation of a suitable stormwater detention device has been factored in to the concept design and is readily achievable. Detailed design of the stormwater management systems would be undertaken in Stage 2.

Flooding

The Wood & Grieve (2018) Stormwater management Plan (**Appendix D**) provides an assessment of potential flood impacts. Reference is made to the Hunter River Floodplain Risk Management Study and Plan (WMA, 2015). The NMH site is within the Hunter River catchment covered by this study.

With reference to Figure 15-4 it can be seen that the proposed development extent will not be impacted by either Regional or Local flooding. The site is protected by the rail embankment to the north.

Although site is not impacted by regional flooding, the proximity of the site to the flood zone has implications for the ability of runoff from the site to discharge downstream. In 2015, Robert Bird Group undertook modelling to assess the local flood impacts on the site. This assessment confirmed a 100-year ARI flood level at the site of RL7.8m AHD. The minimum level of the proposed development will be approximately RL14.0m AHD meaning the development will be considerably higher than the 100-year ARI flood levels. While the probable maximum flood (PMF) levels at the site have not been calculated, based on the modelled 100-yr ARI flood it can be confidently predicted that the PMF level would be well below the proposed building height of RL14.0m.

As a result, it can be confirmed that the development will not impact on any existing floodplain nor will flooding impact on the development. Therefore, there will be no flood planning requirements imposed on

the development. On this basis there has been no further development specific flood modelling undertaken at this time nor is this considered necessary.

In the event of a flood access to the site can be achieved from the New England Highway to the south without travelling through flood waters. However, access from the North via Metford Road may be impacted by Hunter River flood waters in very large floods.

Water quality

The addition of the hospital has the potential to increase gross pollutants, sediments, traffic emissions and vehicle wear, pesticides and fertilisers, hydrocarbons and nutrient concentrations in storm water run-off.

To limit impact on the downstream water quality, Stormwater Quality Improvement Devices (SQID's) will be implemented to reduce a wide range of pollutants prior to discharging to the existing drainage system. The suggested SQIDs are detailed in the IWMP provided in **Appendix D**.

According to the surface water sampling results provided in Table 15-2 surface water quality already exceeds ANZECC guidelines for cobalt, manganese, nickel, and zinc.

In order to achieve pollutant reduction targets set by Council and to meet the NSW WQOs, a series of treatment devices are proposed which together form a treatment train. The treatment train varies for each discharge point (refer Figure 15-9).

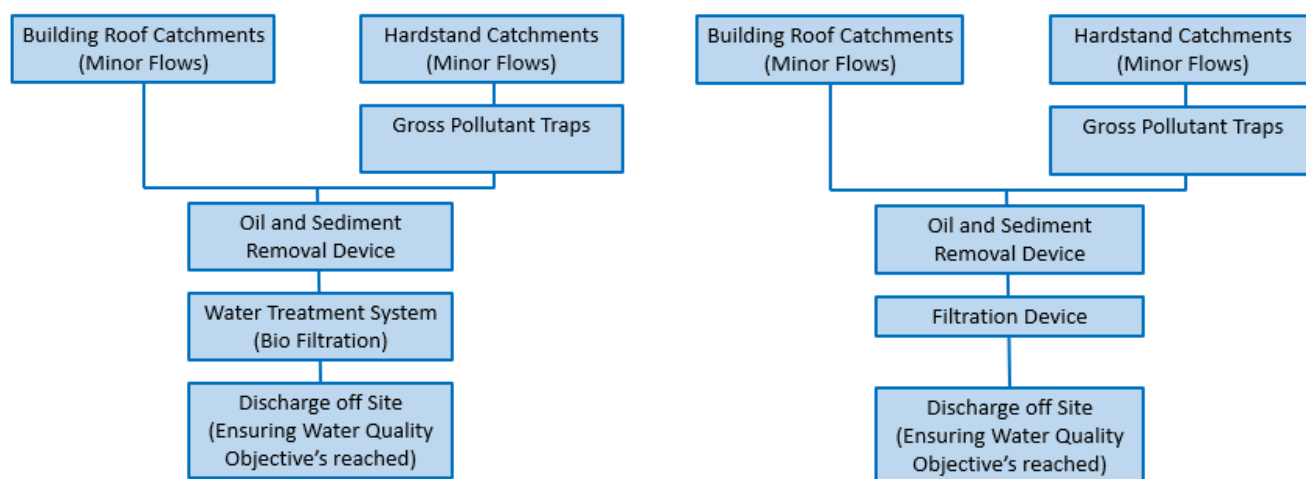


Figure 15-9 Proposed water Quality Treatment Train – Catchment A and Catchment B

To demonstrate that the proposed treatment train meets the required reduction targets, pollutant reduction modelling was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Software program Version 6.1 by eWater CRC. The overall treatment train efficiency results from MUSIC modelling are shown in Table 15-6.

Table 15-6 Treatment Train Efficiencies

Indicator	Total Site Reduction	Site Targets	Target Achieved
Catchment A			
Gross Pollutants	100%	70%	Yes
Total Suspended Solids (TSS)	91.8%	80%	Yes
Total Phosphorus (TP)	66.3%	45%	Yes
Total Nitrogen (TN)	47.0%	45%	Yes
Catchment B			

Indicator	Total Site Reduction	Site Targets	Target Achieved
Gross Pollutants	98.2%	70%	Yes
Total Suspended Solids (TSS)	92.2%	80%	Yes
Total Phosphorus (TP)	61.8%	45%	Yes
Total Nitrogen (TN)	45.3%	45%	Yes

Water demand

Operation of the Hospital would create a demand for the potable water. Wood and Grieve prepared a services infrastructure management plan to assess the requirements of NMH for water, sewer and gas supply (refer **Appendix H**). The report calculated that the average daily water demand would be 271 (L/bed/day). The exact bed number is yet to be determined however on the assumption that the NMH will have approximately 400 beds then the hospital would be expected to consume an estimated 108.40 kL of potable water per day.

Whilst the design is not finalised HI plan to implement sustainable water management, re-use systems and water efficient fixtures to minimise water use.

Water Sharing Plan

The Project is located within the Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009. The plan includes rules for protecting the environment, water extractions, managing licence holders' water accounts, and water trading in the plan area.

The plan applies to all surface waters in the water source, as well as the alluvial groundwater that is highly connected to the surface waters. Alluvial groundwater that are not highly connected to surface waters are excluded from this plan and are covered under the *Water Act 1912*.

There are no proposed takes of groundwater and harvesting of surface water on-site will be limited to capture of site generated stormwater in sediment basins, water quality control ponds and rainwater tanks in accordance with WSUD principles. Captured stormwater may be reused on site for irrigation and grey water purposes.

15.4 Mitigation Measures

The following mitigation and management measures in Table 15-7 are recommended to minimise hydrology impacts.

Table 15-7 Hydrology Mitigation Table

Reference	Mitigation Measures
Stage 1 Construction Mitigation Measures	
SW1	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP.
SW2	A dewatering and discharge procedure would be prepared as part of the SWMP.
SW3	All fuels, chemicals, and liquids will be stored at least 50 metres away from any drainage line as far as is practicable and will be stored in an impervious bunded and covered area within the compound site.
SW4	Visual monitoring of local water quality (i.e. turbidity, sheen, oil and grease) will be undertaken regularly to identify any potential water quality issues.
SW5	Upstream overland water flows would be diverted around the worksite in accordance with the Blue Book.

Reference	Mitigation Measures
SW6	A water monitoring program will be developed as part of the CEMP to ensure that mitigation measures are operating effectively. The monitoring program will include surface water and groundwater.
Stage 2 Considerations	
SW7	An Integrated water management plan will be developed and implemented and will include: • Consideration of stormwater capture, harvesting and reuse. • Management of water quantity and quality. • Procedures for spill response.
SW8	Building drainage systems, road and carparking drainage shall comply with AS3500.3 – 2003.

16. Bushfire

16.1 Introduction

A bushfire protection assessment (BPA) was prepared by Eco Logical to assess the potential design, construction and operational bushfire hazards associated with the Proposal. The purpose of the report was to assess the hazards associated with the development and also provide an initial assessment to identify any potential issues to be mitigated during the Stage 2 Detailed Design and EIS. The BPA is provided in **Appendix C** with a summary of its findings and recommendations provided in the sections below.

The BPA has considered the requirements of the *Planning for Bushfire Protection (PBP) 2006* guidance document (NSW Rural Fire Service 2006) especially section 4.2 which addresses bushfire protection requirements for hospital developments.

Under section 100(B) of the Rural Fires Act 1997 development of bushfire prone land for a special fire protection purpose (such as a hospital) may require a bush fire safety authority. However, as previously noted, Section 5.23 (f) of the EP&A Act provides that a bush fire safety authority is not required for approved SSI developments such as NMH.

It is noted that the BPA references vegetation community details sourced from the 2014 vegetation survey and biodiversity assessment by General Flora and Fauna (GFF, 2014), which addressed the whole of the Metford triangle. The BPA was prepared prior to the more recent Biodiversity Assessment Report (BAR) (pitt&sherry, 2018) being available. The pertinent details on vegetation community type and structure have not changed in the intervening period and remain relevant.

16.2 Existing Environment

Vegetation

The Site is currently heavily disturbed due to mining activities however it supports remnants of native forest vegetation. The vegetation identified in the BAR (refer Section 10) is mainly Spotted Gum Ironbark Forest and Red Gum Forest which are categorised by PBP as 'Forest'. This vegetation occurs in the southwest, south sections of the site. Vegetation remnants on the site are isolated from extensive areas of native vegetation to the north and only tenuously connected by broken corridors to areas of native vegetation to the south. Additionally, the site has areas of riparian vegetation and man-made ponds which contain reeds and are shallow with varying depths.

Topography

The Site displays a gentle rolling topography. There is no significant slope that would determine fire behaviour within the site. There are several slopes within the site that could influence bushfire.

The drainage line on the southern boundary flows from south to west and as a result, there is upsloping ground to the south beyond the riparian drainage line, however >0-50 downslopes to the west and east from the southern part of the building envelope would provide the dominant slopes influencing bushfire.

Fire History

A search of the NSW Rural Fire Service (RFS) bush fire prone land mapping tool on the 21 August 2017 identified that the Proposal will be located on Bushfire Prone land. The Maitland City Council Bush Fire Prone Land Map (*Maitland City Council 2011*) identifies that the majority of the site is either as bush fire prone land Vegetation Category 1 or is a bushfire vegetation buffer area (refer to Figure 16-1). Accordingly, any future development must provide the required setbacks in accordance with the current RFS Planning for Bush Fire Protection 2006 or its future versions.

The urban environment is considered a factor limiting the potential intensity of a bush fire event. The Hunter district has on average 207 bush fires per year, of which five on average can be considered to be major fires (*Hunter Bush Fire Management Committee, 2009*).

The main sources of ignition in the Hunter district are:

- Escapes from legal burnings
- Arson
- Arcing of high voltage power lines.

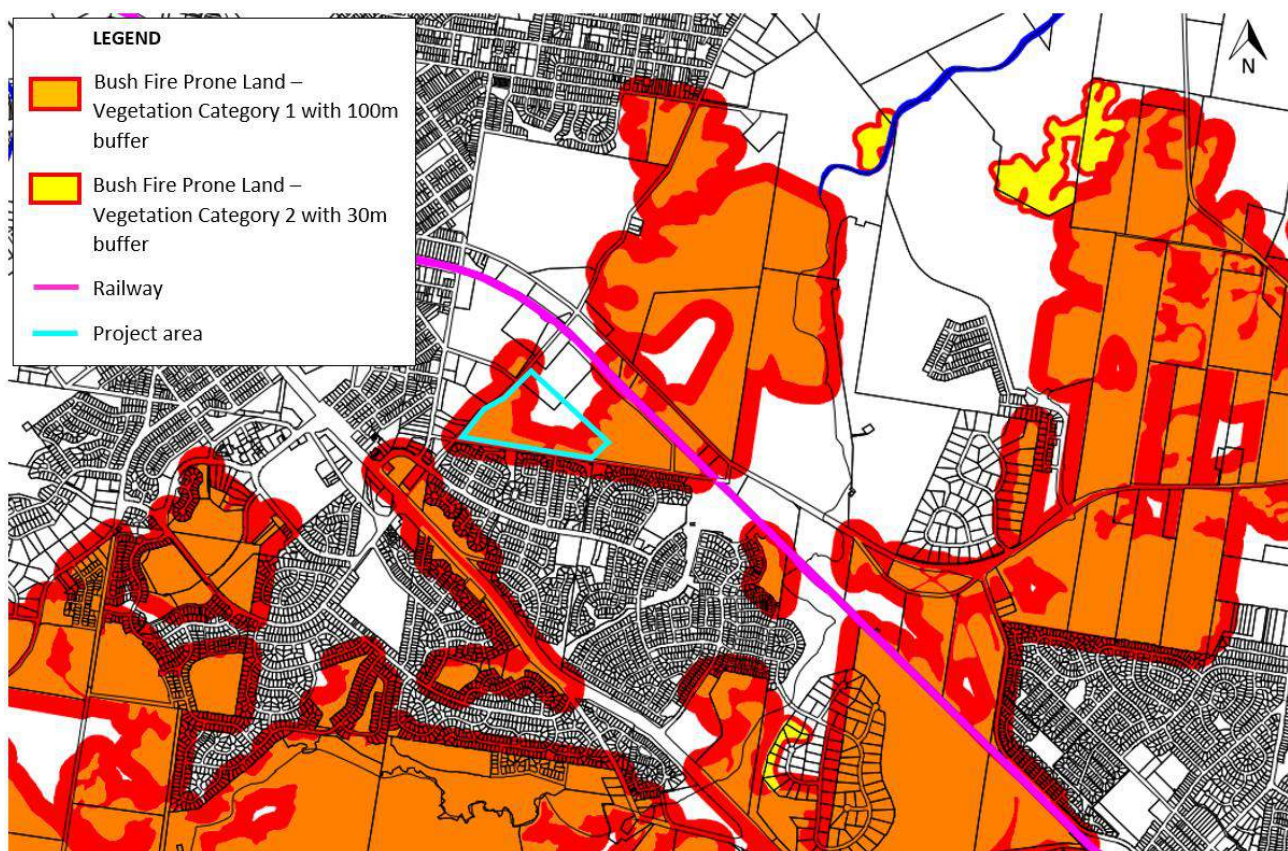


Figure 16-1 Bushfire prone land map

16.3 Impact Assessment

Construction (Stage 1 Early Works)

Activities associated with Stage 1 Early Works that may cause or increase the risk of bush fire include:

- Site preparation activities involving the use of other petrol-powered tools
- Operating a petrol, LPG or diesel-powered motor vehicle over land containing combustible material
- Operating plant fitted with power hydraulics on land containing combustible material
- Storage of fuels and chemicals
- Existing ignition sources such as escapes from legal burnings, arson, and arcing of high voltage power lines.

The activities listed above were also undertaken as part of the previous land use. The existing sources of ignition will continue to present a risk that is comparable to the previous and ongoing land uses.

Operation (Stage 1 Concept Hospital)

An assessment of bushfire risk was undertaken for the Stage 1 Concept Hospital which resulted in a range of recommendations being developed for adoption during Stage 2 Detailed Design and operation of the hospital. Activities associated with operation of the hospital that may cause or increase the risk of bush fire include:

- Use of electrical equipment
- Arcing of high voltage power lines
- Storage of fuels, chemicals and gases
- Use of electrosurgical or laser equipment
- Hospitals require ease of access for emergency patients arriving by ambulance or car with larger doorways that are difficult to ember proof.

Whilst part of the land is within bushfire prone land the fire danger is limited as:

- The ironbark forest is not connected to a larger vegetated area as there are residential and industrial areas to the west and south and a rail corridor and wetlands to the north
- The majority of the site is cleared and the area of the ironbark forest is approximately 6.5ha so there is a limited amount of fuel for the fire
- The site does not contain a significant slope
- The East Maitland Fire Station is located within 1km of the site.

Site specific bushfire risks are described in Table 16-1.

Table 16-1 Consideration of project specific bushfire risks

Site specific issues	Response
There is a section of iron-bark forest located to the south-west of the site which should be managed to the standard of an asset protection zone (APZ).	Currently, it is planned to retain the area of vegetation in the south-western corner of the site but to establish an appropriate APZ. Within the proposed APZ (maximum 70m) selected clearing would occur to substantially reduce the understorey and remove trees so that the canopy is not connected.

Site specific issues	Response
	This would materially contribute to reducing bush fire risk for the site.
Buildings located on site should be set back from the bush fire hazard in accordance with <i>Planning for Bush Fire Protection 2006</i> .	The hospital is appropriately set back from vegetation to the west and south. However bush fire risk will be considered as part of detailed design development in Stage 2.
Further advice is required on the use of the remainder of the Metford Triangle. The removal or suitable management of the vegetation may result in the development site not being considered bush fire prone land.	The land referred to is outside of the hospital development site and is not managed/owned by HI. Noted. However, given the current presence of this vegetation, a precautionary position has been taken with regard to assessing and managing bush fire risk.

The assessment of bushfire constraints undertaken for the hospital site by EcoLogical has identified APZs and bushfire attack level (BAL) applying to the site with respect to the minimum design standard for hospital buildings (refer Table 16-2 and Figure 16-2). Development of the detailed design (Stage 2) will consider these constraints.

The bushfire risk assessment would be revisited as part of the environmental assessment for the Stage 2 EIS once specific details on the proposed hospital buildings and their location on the site are confirmed.

Table 16-2 Determination of APZ

Direction ¹	Slope ²	Vegetation ³	PBP required APZ ⁴	Proposed APZ ⁵	Construction standard ⁶	Comment
West	>0-5° Downslope	Forest	70m	70m	BAL-12.5	Provided onsite
North	>0-5° Downslope	Regrowth Vegetation	70m	70m	BAL-12.5	Provided onsite
East	>0-5° Downslope	Forest	70m	70m	BAL-12.5	Provided onsite
South	Flat/ Upslope	Forest	60m	70m	BAL-12.5	70m due to eastern and western slope influence
All other directions	Managed lands					

¹ Direction of assessment from proposed development.

² Effective slopes assessed over 100m from proposed development where the bushfire hazard occurs.

³ Predominant vegetation classifications over 140m from proposed development.

⁴ Minimum APZ required by PBP acceptable solution for SFPP development.

⁵ APZ proposed to be established and/or provided by existing management arrangements.

⁶ Construction standard based on Table A2.6 of PBP.

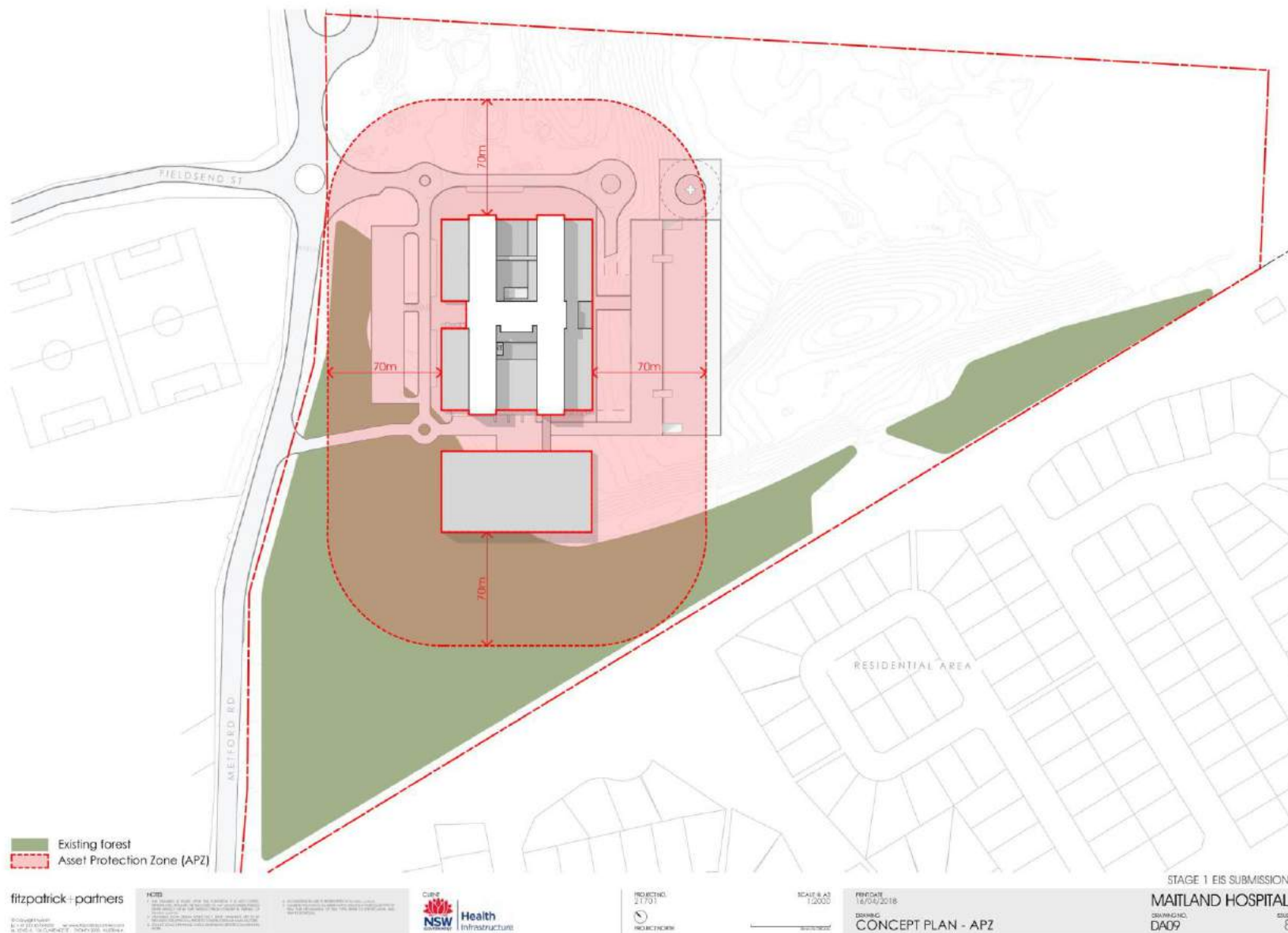


Figure 16-2 Asset Protection Zone (APZ) map

16.4 Mitigation Measures

The following mitigation and management measures in Table 16-3 are recommended to minimise potential noise impacts.

Table 16-3 Bush fire Mitigation Table

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
BF1	An Emergency Response Plan will be prepared by the Contractor as part of the CEMP and will include: • Management of the site in the event of a bush fire • Limiting practices that could cause bush fire • Assembly points and emergency evacuation procedures.
Stage 2 Detailed Design Considerations Mitigation Measures	
BF2	Ensure that there is adequate access to water supply for firefighting purposes.
BF3	Implement a 70m asset protection zone around the perimeter of the hospital building footprint and ensure that the APZ is maintained.
BF4	Ensure that necessary utilities are safely installed and comply with relevant Australian standards including: • Electrical equipment such as electrical cabling, is to be installed in accordance with AS 3000:2007 Electrical installations • Fire Hydrant spacing, sizing and pressures of mains shall comply with A.S. 2419.1 – 2005. • Reticulated or bottled gas on the lot is to be installed and maintained in accordance with Australian Standard AS/NZS 1596 'The storage and handling of LP Gas' (Standards Australia 2014).
BF5	Ensure the proposed access complies with the internal road access provisions of PBP. This includes provision of adequate internal access for emergency service vehicles including Fire and Rescue NSW and NSW Rural Fire Service Appliances, such that acceptable access is provided to the full perimeter of the development.
BF6	The multi-level carpark on the eastern elevation will be constructed from non-combustible materials and will provide shielding to the hospital buildings.

17. Visual Amenity

17.1 Introduction

This chapter reviews the existing visual character of the Site and its surrounds and provides an assessment of the potential visual amenity impacts associated with the Proposal on the existing visual character, nearby residences and public vantage points.

More specifically, the visual assessment considers the following:

- The visual character of the surrounding landscape
- Existing views to the Site
- The sensitivity of the landscape to alteration by the Proposal
- The visual character and extent of the Proposal
- Viewer sensitivity to alteration of the environment by the Proposal.

The operational impact assessment section of this chapter is a summary of probable visual impacts based on a concept hospital design as the detailed design for NMH has not been finalised. A more detailed operational visual assessment will be provided in Stage 2 of the SSI application.

17.2 Existing Environment

The visual character surrounding the Proposal site predominantly consists of an urban environment with industrial environments and pockets of open vegetated landscape in the form of public recreation areas.

The Site is bounded by residential properties along the southern boundary and residential properties are also located to the west of the Site behind a light industrial area. The residences are a mixture of single storey and two storey houses constructed of brick and weatherboard, with private gardens contributing to the overall qualities of the open space. Small to medium tree plantings in turfed verges of local roads create an open visual structure.

A commercial and light industrial area to the west of the Site is characterised by single storey and two storey buildings and warehouses constructed of steel or brick with hard stand or unsealed car parking areas. The areas are usually enclosed with chain mail fence. The western boundary also contains public recreation areas, including a sports-field and there are also public recreation areas located to the north of the site beyond the rail line.

The Site is close to major transport links both road and railway lines which service the region (refer Section 8). Public vantage points of the area include a number of local roads, such as Metford Road, Raymond Terrace Road, Fieldsend Street and Stradbroke Avenue.

The Site of the Proposal has a relatively confined visibility as local topography in the area is relatively flat with no high points that may overlook the proposed development. Nearby watercourses include Two-mile creek located approximately 800m north of the Site which is a tributary of Four-mile creek and the Hunter River. Native vegetation in the local region is heavily fragmented by clearing for farmlands, roads, residential and industrial purposes.

Key characteristics of the Site include:

- Divergent topography varying from RL 26 to RL 10 over the Site with the prominent level being RL 18-19 with the primary slope running south to east

- Remnant native bushland to the south-western sector of the Site
- Areas of riparian vegetation along a drainage line within the south-western corner of the Site
- Considerable sections of the Site still exhibiting symptoms of the previous quarrying activity
- Notable views to the east over natural bushland and to the Hunter Valley environs beyond
- An established residential development to the south of the site and open recreational fields to the north and east.

Five public viewpoints have been identified as potentially sensitive. The viewpoint locations are shown in Figure 17-1 and their viewpoints are provided in Figure 17-2 to Figure 17-7.

- Viewpoint 1 – Views from Metford Road located north of the site, facing south-east (refer Figure 17-2)
- Viewpoint 2 – Views from Fieldsend Oval located to the west of the site, facing west (refer Figure 17-3)
- Viewpoint 3 – Views from Metford Road located west of the site, facing west (refer Figure 17-4)
- Viewpoint 4 – Views from Metford Road, located on the south corner of the site, facing north (refer Figure 17-5)
- Viewpoint 5 – Views from Tennyson Street, located on the southern border of the site, facing north (refer Figure 17-6)
- Viewpoint 6 – Views from Stadbroke Avenue, located south of the site, facing north-west (refer Figure 17-7).

Figure 17-3 to Figure 17-7 have not provided an artist impression of the concept hospital as it is still in design phase and is subject to change. Instead these figures show that the building massing will be visible. A more detailed operational visual assessment will be provided in Stage 2 of the SSI application.



Figure 17-1 Proposed NMH – Assessed potential viewpoints (Fitzpatrick and Partners, 2017)



Figure 17-2
(2018)

Viewpoint 1 – Views from Metford Road located north of the Site, facing south-east (Fitzpatrick and Partners,



Figure 17-3
(2018)

Viewpoint 2 – Views from Fieldsend Oval located to the west of the Site, facing west (Fitzpatrick and Partners,



Figure 17-4 Viewpoint 3 – Views from Metford Road looking at ambulance entry, facing north-east (Fitzpatrick and Partners, 2018)



Figure 17-5 Viewpoint 4 – Views from Metford Road, located on the south corner of the Site, facing north (Fitzpatrick and Partners, 2018)



Figure 17-6 Viewpoint 5 – Views from Tennyson Street, located on the southern border of the site, facing north (Fitzpatrick and Partners 2018)



Figure 17-7 Viewpoint 6 – Views from Stradbroke Avenue, located south of the site, facing north-west (Fitzpatrick and Partners, 2018)

17.3 Impact Assessment

Construction (Stage 1 Early Works)

The majority of visual impacts to viewpoints and existing roads during construction would include:

- Vegetation removal (although the majority of this would not take place until approval of Stage 2 EIS submission)
- Civil works
- Plant and equipment
- Construction facilities, including portable structures, temporary fencing, temporary signage and laydown areas
- Excavations and earthworks.

The elements for the construction period mentioned above would be temporary; however these early works would involve permanent works such as earthworks for site levelling and removal of vegetation within the footprint of the Concept Hospital. Some of this vegetation contributes to the amenity and character of the local area, and screens views of the Proposal from surrounding properties and the road.

Overall it is considered that the visual impact of the Stage 1 works would be relatively minor and are, on balance, acceptable within the context of the development of the hospital site.

Operation (Stage 1 Concept Hospital)

The main component of the Concept hospital is a multi-storey hospital building with a wing to the south and car parking facilities either side of the main hospital. It is acknowledged that due to the height of the proposed new building it would be visually prominent when viewed as part of the existing landscape.

Some of the key visual aspects considered for assessment of the Concept hospital are: solar access; light spillage; privacy; and view loss. These matters are discussed below and would be assessed in greater detail as part of the Stage 2 Detailed Design and EIS.

Solar access

Shadow diagrams have been prepared which reflect the overshadowing impact of the New Maitland Hospital buildings at hourly intervals from 9am to 3pm during the winter solstice (June 21). These are provided on architectural drawing (refer **Appendix K**).

The shadow study demonstrates that shadows cast by the proposed hospital envelope during these times easily fall within the site boundaries. There will be no overshadowing impact on any neighbouring properties including the existing residential development to the south of the proposed Hospital or the recreational fields to the east of Metford Road.

Light Spillage

Operation of the hospital will require lighting to ensure safe use and effective surveillance of the space after hours. Lighting would be designed to ensure any impact to surrounding houses and roads would be minimised. The effects of light spillage on residential land will also be minimised by distance from hospital light sources, vegetation screening and the nature of urban areas (existing presence of street lighting).

Privacy

There will be negligible impact on visual and acoustic privacy on neighbouring properties.

The existing Iron Bark forest on the south-western corner of the site will be largely maintained both as a natural feature and also a buffer between the new Hospital development and the residential area to the south. This established forest combined with a distance of over 100m from the hospital to the nearest

residential property boundaries precludes any overlooking of the hospital onto neighbouring residences and conceals the bulk of the hospital.

In-patient wards have been orientated towards the eastern and western precincts of the site maximising the views for occupants and further reducing over-viewing of the existing residential development to the south.

Views and Vistas

Views from the Site to the north and east of the Site take in predominantly open recreation areas including the east Maitland Common and the Morpeth floodplains. Views for the south and west of the Site take in predominantly residential and industrial areas.

The streetscape will be affected as part of the vegetation bordering both the Metford Road to the west of the NMH and the electricity easement to the south of the NMH will need to be thinned to accommodate the APZ and the building massing is likely to be seen from Fieldsend Street, Metford Road and Stradbroke Avenue.

Six viewpoints have been identified as potentially impacted based on their proximity to the site and the likely extent of views that would be possible. A detailed table of the visual impact assessments for viewpoints is provided Table 17-1. The Proposal has a number of elements that serve to mitigate potential landscape character and visual impacts to key viewpoints:

- There are no elevated views in the surrounding area from where the Proposal would be seen as a whole
- The number of potential residential viewers is low due to the visual screening provided by the remnant native bushland along the southern boundary.

Table 17-1 Visual impact assessment for viewpoints

Viewpoint	Visual Sensitivity	Magnitude	Visual impact
Viewpoint 1 – Views from Metford Road located north of the Site, facing south-east	Due to the public nature of viewpoints from Metford Road and the volume of potential viewers it has a <u>moderate</u> sensitivity.	There will be a <u>high</u> level of change due to the height of the new building, removal of some vegetation. New signage will be required as a result of the Proposal and the main entrance will be seen by this viewpoint. This impact is considered necessary for user wayfinding	Moderate – high visual impact
Viewpoint 2 – Views from Fieldsend Oval located to the west of the Site, facing east	Due to the public nature of viewpoints from Metford Road and the volume of potential viewers it has a <u>moderate</u> sensitivity.	There would be a <u>moderate</u> level of change due to the construction of a new access road, vegetation removal and the new Hospital buildings. The entire length of the new hospital buildings will be visible from this viewpoint. However, the New Hospital has been set back an average of 70m to the Metford Road boundary and will maintain the existing corridor of mature trees providing some vegetation screening between the Hospital and the viewpoint.	Moderate visual impact

Viewpoint	Visual Sensitivity	Magnitude	Visual impact
		However this corridor will need to be thinned as part of the APZ. This impact is considered necessary for user wayfinding	
Viewpoint 3 – Views from Metford Road located west of the Site, facing east	Due to the public nature of viewpoints from Metford Road and the volume of potential viewers it has a <u>moderate</u> sensitivity	There would be a low level of change due to vegetation clearing for the new emergency access road. The removal of this vegetation would have the potential to reduce some screening between receivers and the Proposal, however the majority of vegetation will remain to provide screening. The new road may also result in a change to road alignment and may require additional signage. It is likely that the tree removal and access road would be noticed at the time by some regular users of the Metford Road, yet once removed the new, less-treed landscape would become more familiar over time. Changes to road alignment represent a relatively low level of visual change.	Low-Moderate visual impact
Viewpoint 4 – Views from Metford Road, located on the south corner of the Site	The sensitivity of these residential receivers is <u>low</u> due to screening vegetation.	There would be a <u>low</u> level of visual change. Loss of vegetation would be contained further into the site but the boundary vegetation should remain untouched by the proposal.	Low visual impact
Viewpoint 5 – Views from Tennyson Street, located on the southern border of the site, facing north	The sensitivity of these residential receivers is <u>low</u> due to screening vegetation.	There would be a <u>low</u> level of visual change. Loss of vegetation would be contained further into the site but the boundary vegetation should remain untouched by the proposal.	Low visual impact
Viewpoint 6 – Views from Stradbroke Avenue, located south of the site, facing north-west	The sensitivity of these residential receivers is <u>low</u> due to partial vegetation screening, distance from the proposal and the limited number of receivers at this viewpoint.	There would be a <u>moderate</u> level of visual change. There is some vegetation screening at this viewpoint although there is limited vegetation at this point in the corridor and the existing vegetation would be thinned to accommodate the APZ.	Low - Moderate visual impact

Viewpoint	Visual Sensitivity	Magnitude	Visual impact
		The building massing would be visible due to the size of the Hospital, but the impact would be reduced due to distance.	

17.4 Mitigation Measures

The following mitigation measures in Table 17-2 will be implemented to minimise visual impacts.

Table 17-2 Visual Amenity Mitigation Measures

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
V1	Where practicable, the trees outside of the immediate Stage 1 early works footprint and associated scope of works that require removal as part of the Asset Protection Zone (APZ) will be retained until Stage 2 construction works, to reduce the visual impact of Stage 1 works.
Stage 2 Detailed Design Considerations and Mitigation Measures	
V2	A landscape plan will be completed as part of Stage 2 design documentation.
V3	Lighting shall be designed in consideration of AS 4282 - Control of the obtrusive effects of outdoor lighting.
V4	Where possible, minimise clearing of the iron bark forest on the south-western sector of the site with vegetation to be retained as both a natural feature and also a buffer between the new Hospital development and the existing residential development to the south of the site.

18. Air Quality

18.1 Introduction

An Air Quality Impact Assessment (AQIA) was prepared by Todoroski Air Sciences (2016) to assess the potential air quality and odour impacts associated with the Stage 1 Early Works and Concept Hospital. The AQIA is provided in **Appendix O**.

The AQIA was prepared in accordance with the following regulatory framework and air quality standards:

- *Protection of the Environmental Operations Act 1997*
- *Protection of the Environmental Operations (Clean Air) Regulation 2010*
- *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2016)*
- *National Environment Protection Council "National Environment Protection (Ambient Air Quality) Measure (NEPC, 2016).*

A summary of the AQIA is provided below.

18.2 Existing Environment

The land use surrounding the Proposal area includes a mixture of commercial uses, light industrial uses, public recreation areas and residential. The topography of the site undulates and there are some benches and steep

ridges from mining activities. The site is significantly higher than the downstream wetlands to the north. The low point of the site is centrally located at the north-east boundary.

18.2.1 Local Climate

Long-term climatic data from the Bureau of Meteorology weather station at Paterson (TOCAL AWS) (Site No. 061250) are used to characterise the local climate in the proximity of the Project. The Paterson (TOCAL AWS) station is located approximately 14km north of the Project.

In summary, the climate data indicates that January is the hottest month with a mean maximum temperature of 29.8 degrees Celsius (°C) and July is the coldest month with a mean minimum temperature of 6.2°C. Humidity levels exhibit variability and seasonal flux across the year. Mean 9am humidity levels range from 80 % (%) in March and May to 64% in September and October. Mean 3pm humidity levels vary from 59% in June to 46% in August and September.

Rainfall peaks during the summer months and declines during winter. The data indicate that February is the wettest month with an average rainfall of 116.7 millimetres (mm) over 8.7 days. August is the driest month with 37.9mm over 5.1 days. Wind speeds during the warmer months have a greater spread between the 9am and 3pm conditions compared to the colder months. Mean 9am wind speeds range from 5.5 kilometres per hour (km/h) in February to 13.3km/h in August. Mean 3pm wind speeds range from 11.3km/h in April to 17.9km/h in August. The most common winds are from the west-northwest and northwest sectors.

18.2.2 Local Air Quality

The main sources of local air emission sources would include emissions from local anthropogenic activities such as motor vehicle exhaust, locomotive emissions, domestic wood heaters, general urban activity, and various commercial and industrial activities. Locomotive emissions include those from the railway line and motor vehicle emissions from nearby roads including the New England Highway.

Ambient air quality monitoring data collected from a number of NSW Office of Environment and Heritage (OEH) monitoring sites (refer Figure 18-1) have been reviewed to characterise the local air quality in the vicinity of the Project site and compared against other regional sites. The monitoring site closest to the Proposal is the Beresfield monitor which is located approximately 6.5km south-east of the Site.

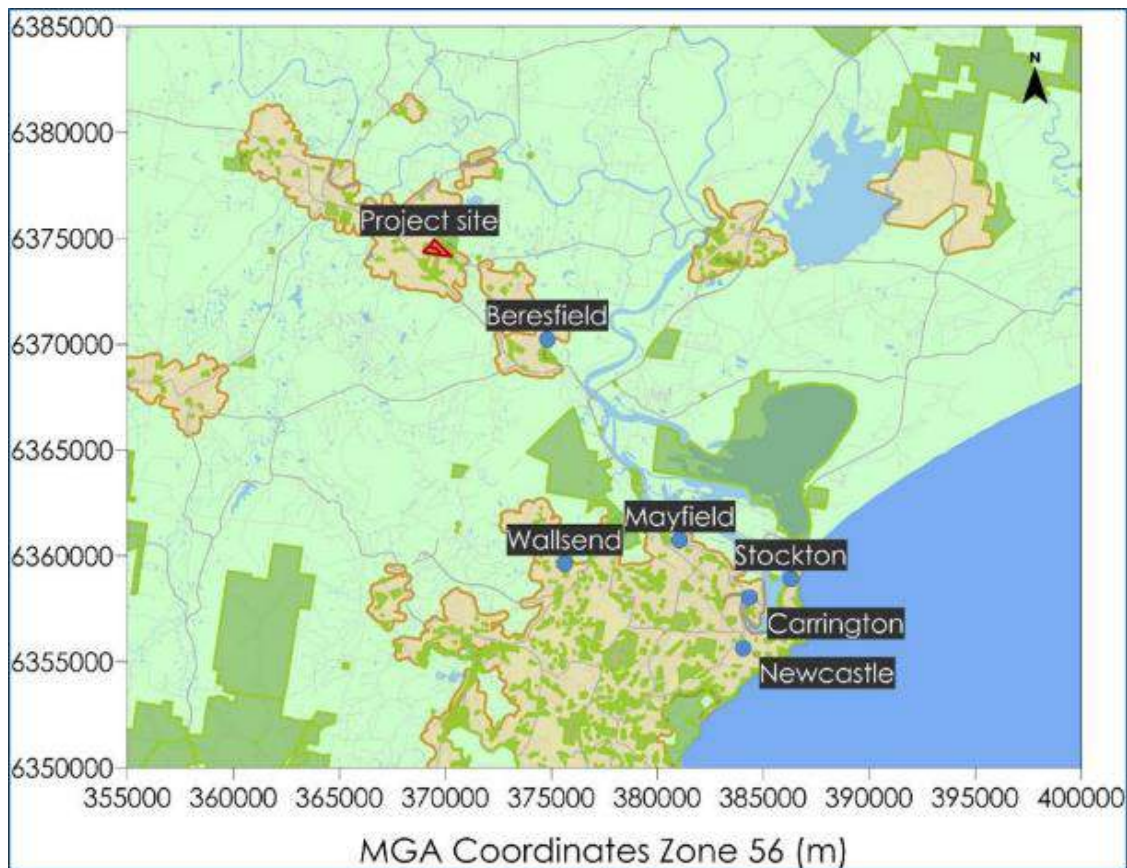


Figure 18-1 Ambient air quality monitoring locations (Todoroski Air Sciences, 2017)

The OEH monitors the following air quality indicators:

- Particulate Matter less than 10 microns (PM10)
- Particulate Matter less than 2.5 microns (PM2.5)
- Nitrogen Dioxide (NO₂).

Particulate matter consists of dust particles of varying size and composition. The upper size range for Total Suspended Particulate matter (TSP) is nominally taken to be 30 micrometres (µm) as particles larger than 30µm will settle out of the atmosphere too quickly to be regarded as air pollutants.

Two sub-classes of TSP are also included in the air quality criteria, namely PM10, particulate matter with equivalent aerodynamic diameters of 10µm or less which can pass through the throat and nose and enter the lungs, and PM2.5, particulate matter with equivalent aerodynamic diameters of 2.5µm or less which can enter the lungs and pass into the bloodstream. Exposure to PM10 and PM2.5 can adversely affect lung and heart health. Nitrogen dioxide (NO₂) is also an air quality indicator as it can inflame and irritate the lungs, aggravate respiratory diseases and lower resistance to respiratory infections.

Table 18-1 presents a summary of the PM10 concentrations from the monitoring stations from 2012 to 2016. The Beresfield data indicates that for PM10, annual average levels were below the relevant EPA criterion (NSW DEC, 2005) of 30µg/m³ (end 2016) and 25µg/m³ (from 2017) and measured levels on a 24-hour average basis are on occasion above the 24-hour average criterion of 50µg/m³.

Figure 18-2 presents measured 24-hour average PM10 concentrations at the surrounding NSW OEH monitoring stations over the period reviewed.

The concentrations are nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating windblown dust, pollen levels and the occurrence of bushfires and hazard reduction burns. Figure 18-2 shows that the monitors generally follow the same trend.

Table 18-1 Summary of PM10 levels from the NSW OEH monitoring sites ($\mu\text{g}/\text{m}^3$)

	Mayfield ^a	Stockton ^b	Carrington ^c	Newcastle	Wallsend	Beresfield
Annual average PM10, $\mu\text{g}/\text{m}^3$ (Criteria 30$\mu\text{g}/\text{m}^3$ till end 2016, 25$\mu\text{g}/\text{m}^3$ from 2017)						
2012	-	-	-	20.6	14.9	21.3
2013	-	-	-	22.7	17.4	21.4
2014	-	-	-	21.4	16.9	19.4
2015	21.7	35.8	22.8	21.4	16.7	18.8
2016	22.6	35.1	23.6	21.6	16.6	19.1
Maximum 24-hour average PM10, $\mu\text{g}/\text{m}^3$ (criteria 50$\mu\text{g}/\text{m}^3$)						
2012	-	-	-	48.7	38.1	50.8
2013	-	-	-	69.0	52.5	55.3
2014	57.4	104.3	66.6	53.7	43.4	45.4
2015	84.7	101.4	80.6	70.4	77.5	64.9
2016	84.1	108.1	95.4	89.1	65.5	48
Maximum 24-hour average PM10 - Number of days greater than 50$\mu\text{g}/\text{m}^3$						
2012	-	-	-	0	0	1
2013	-	-	-	4	2	5
2014	3	18	3	2	0	0
2015	4	67	4	3	1	2
2016	1	59	2	1	1	0
^a Data from July 2014 ^b Data from October 2014 ^c Data from August 2014 $\mu\text{g}/\text{m}^3$ = micrograms per cubic metre						

The monitoring stations also provided data for PM2.5 and NO₂ (refer **Appendix O**). The Beresfield data indicates that for PM2.5, annual average levels were around or occasionally above the relevant EPA criterion (NSW DEC, 2005) of 8 $\mu\text{g}/\text{m}^3$ and measured levels on a 24-hour average basis were also above the 24-hour average criterion of 25 $\mu\text{g}/\text{m}^3$ on a few days. The data indicate that the annual average NO₂ concentrations for each of the monitoring stations were below the relevant criterion of 62 $\mu\text{g}/\text{m}^3$. The maximum 1-hour average NO₂ concentrations recorded at these stations were below the relevant criterion of 246 $\mu\text{g}/\text{m}^3$. These results follow a similar trend to the other monitoring stations within the region.

Occasionally 24-hour particulate emissions exceed NEPM guidelines. However, this situation occurs across NSW, usually corresponds to an event such as a bushfire, and is not unique or unusual. The Beresfield Monitoring location which is representative of the site has similar air quality measurements to other monitoring stations within the region indicating no significant difference in air quality at this site to that of other regional population centres.

Normal anthropogenic activities that occur near the hospital may include smoke in winter, traffic and locomotive emissions and industrial activities. Locomotive emissions and potential emissions from coal wagons and diesel fuel use would occur from the rail corridor that is near to the proposed site.

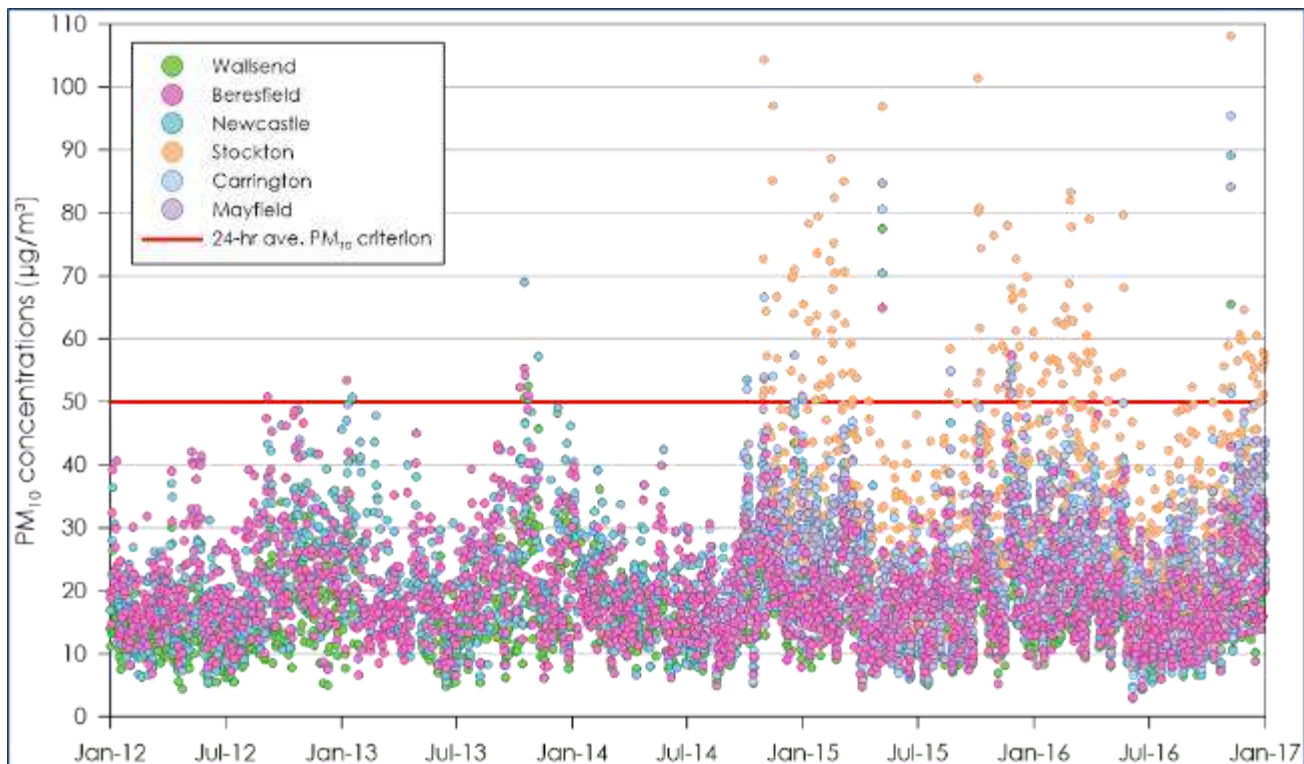


Figure 18-2 24-hour average PM10 concentrations

18.3 Impact Assessment

18.3.1 Construction (Stage 1 Early Works)

During Stage 1 Early Works construction the primary emissions will be dust generated from material handling, vehicle movements, site clearance and earthworks as well as windblown dust generated from exposed areas. These sources of dust are temporary in nature and will only occur during the construction period. Particulate emissions would also be generated from the exhaust of construction vehicles and plant.

The total amount of dust generated from the construction process is unlikely to be significant given the nature of the activities proposed (that is activities would occur for a limited period), and therefore no significant or prolonged effect at any off-site receiver is predicted. Air quality impacts can be readily managed through implementation of conventional earthworks management and dust mitigation activities.

18.3.2 Operation (Stage 1 Concept Hospital)

Concept Hospital

Air emissions from the Concept Hospital and impacts on the hospital from local air quality conditions were considered as part of this Stage 1 assessment and would be addressed in greater detail as part of the Stage 2 Detailed Design and EIS.

Typical sources of air emissions with a hospital may include:

- Ethylene oxide emissions from sterilisation processes
- Bio-hazardous emissions from clinical waste.

The rail corridor is a known source of significant quantities of diesel exhaust and coal dust, thus action to minimise exposure is warranted. To minimise the risks to patient health it is advisable to establish a suitable buffer distance between the proposed hospital and the rail corridor as emissions from transport corridors drop rapidly with distance away from the corridor. The AQIA recommended a minimum 150m buffer

between the rail line and sensitive uses such as hospital wards. At present the proposed hospital would be approximately 350m from the rail line which is well in excess of the recommended buffer.

18.4 Mitigation Measures

The following mitigation and management measures in Table 18-2 are recommended to minimise potential air quality impacts.

Table 18-2 Air Quality Mitigation Table

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
A1	An Air Quality Management Plan (AQMP) will be prepared and implemented by the Contractor as part of the CEMP. The AQMP will include: - Measures to minimise fugitive dust, including through disturbance minimisation and water suppression of exposed areas and roads. - Appropriate stockpile management procedures including covering in line with Blue Book requirements - Monitoring of weather forecasts for adverse weather conditions and measures to secure the site to avoid major dust risks.
A2	Vehicles and plant to be fitted with suitable pollution reduction devices wherever possible and maintained according to manufacturer's specifications.
A3	Covering vehicle loads when transporting material off-site.
Stage 2 Detailed Design Considerations and Mitigation Measures	
A4	Stage 2 detailed design should consider factors such as: - Ventilation design – moving air from “clean areas” to “dirty areas”. - Position of plant and facilities. - Emissions stacks should be insulated and above the highest point of the hospital roof to promote dispersion. - Position north facing windows close to ceiling height to increase the level of sunlight entering the building which can act as a natural disinfectant. - Avoiding capture and recirculation of air pollution downwind of the building. - Building shape to prevent wind speed increases.

19. Waste

19.1 Policy Setting

The waste regulatory framework is administered under the principal legislation of the *Protection of the Environment Operations Act 1997* (POEO Act) and the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act). The purpose of these Acts is to prevent degradation of the environment, eliminate harmful wastes, reduce the amount of waste generated and establish priorities for waste reuse, recovery and recycling. The WARR Act establishes a waste hierarchy, which comprises the following principles:

- Avoidance of waste – minimising the amount of waste generated during construction by avoiding unnecessary resource consumption (i.e. avoiding the use of inefficient plant and construction equipment and avoiding materials with excess embodied energy, waste and excessive packaging)

- Resource recovery – reusing, reprocessing and recycling waste products generated during construction to minimise the amount of waste requiring disposal
- Disposal – where resources cannot be recovered, they would be appropriately disposed of to minimise the potential adverse environmental impacts likely to be associated with their disposal.

Waste generated from the Proposal will be managed in accordance with the principles of the hierarchy and classified in accordance with the EPA's *Waste Classification Guidelines* to ensure that any waste leaving the site is transported and disposed of lawfully and tracked when necessary.

19.2 Impact Assessment

Activities proposed during the Stage 1 Early Works have the potential to generate waste.

Construction (Stage 1 Early Works)

Potential waste streams generated during the construction stage include:

- Green waste (from vegetation removal)
- Liquid waste from equipment use and dewatering
- Biological waste (sewage)
- General domestic waste from on-site staff (lunch packaging, office waste etc.)
- Excess spoil from earthworks not suitable for reuse as backfill
- Construction waste
- Contaminated waste.

The classification and description of each of the general waste types to be potentially generated by the proposal is summarised in Table 19-1.

Table 19-1 Potential Waste Generated On-site during excavation, construction and operation

Waste material and description	Waste classification	Estimated quantities	Management Details
Green Waste Trees, shrubs, groundcover and weeds	General Solid Waste (non-putrescible)	3 tonnes The majority will be reused on site as mulch.	The preferred management strategy for green waste is to reuse suitable material for mulch if it is suitably weed free and complies with the EPA mulch exemption. Other management options for green waste include beneficial offsite reuse or disposal to a green waste facility or landfill. Reuse as mulch is preferred as it will assist with minimising dust emissions, reduce the number of vehicle movements from the Site. This material would also represent a potential resource for future landscaping works.
Liquid waste Oil, fuels and contaminated water from	Liquid waste.	<2,000 L	A limited amount of liquid waste is expected to be generated by the Proposal. Onsite testing may be carried out on the waste water generated onsite to see if it is within discharge limits.

Waste material and description	Waste classification	Estimated quantities	Management Details
equipment washing.			If the waste water is not within discharge limits the wastewater collected in the tanks would be pumped out and taken to an offsite licenced facility on a regular basis.
Biological waste (Sewage) On-site staff use of toilet.	Liquid Waste and General Solid Waste (putrescible).	4 portable toilets.	There are no existing toilets for use during the Construction phase – the construction contractors will use temporary portable amenities. These amenities will be serviced by the provider.
General waste Paper, cardboard, aluminium cans, steel, plastics, glass, food waste, plastic wrap, etc. generated by onsite staff.	General Solid Waste (non-putrescible and putrescible).	120L per week (60L general waste, 60L recycling).	General waste would require removal from site. This should be separated into recyclable and non-recyclable waste. This should be regularly collected from the site and transported to the nearest licenced waste disposal facility by an appropriately licenced contractor.
Excavated soil Topsoil, subsoil, rock, gravel and silt.	General Solid Waste (non-putrescible).	60,000 m3 will be excavated as cut and 60,000m3 will be used as fill however the majority of the soil will be reused onsite unless it is contaminated.	If the spoil is considered suitable then it would be reused as backfill as much as possible however other management options for spoil include beneficial offsite reuse or disposal to landfill. Soil not considered suitable due to Potential Acid Sulphate Soils (PASS) would be treated using lime and then reused. If following treatment (or for other reasons) these soils are still not considered suitable then soil should be transported to the nearest licenced waste disposal facility.
Construction Waste Concrete, metal, steel, timber, fittings, strapping, plastic wrapping, packaging, electrical and plumbing components.	General Solid Waste (non-putrescible).	5 tonnes.	Construction waste will be limited during Stage 1 to in-ground infrastructure and temporary structures. As such, the construction of the Proposal is not expected to generate a significant amount of construction waste. All attempts would be made to separate and reuse or recycle building materials.
Contaminated waste	If any is found this	Nil	No contaminated waste is expected to be generated by the Proposal.

Waste material and description	Waste classification	Estimated quantities	Management Details
Potential for concrete, bricks and asbestos.	will need to be determined.		If any is found the waste would require classification and disposal to an appropriately licenced facility. Previous land use has uncovered asbestos waste in the site. Whilst the presence of asbestos is unlikely given the rehabilitation work undertaken by CSR (refer Appendix B) it will still require special handling, storage and disposal. In the event of an unexpected find all work is to cease immediately. The only waste management option available will be secure collection by a NSW licensed Asbestos Removalist and disposal at a suitable licensed landfill facility. The material will need to be wrapped and sealed in heavy- duty plastic before being removed from site.

It is proposed that all waste generated during the construction of the Stage 1 Early Works will be segregated in accordance with a construction waste management plan (WMP). The waste management plan will include management options for stockpiles.

Table 19-2 below provides details for potential recycling facilities and disposal points that will be used to remove waste and recyclables during Stage 1 activities. Biological waste from portaloos will be serviced by the provider on a regular basis. In the event that any of these facilities are unavailable, the others shall be used or an alternate facility selected.

Table 19-2 Material reuse, recycling and disposal facilities which can be used to dispose of waste and recyclables during Stage 1 of the SSI application

Name of the facility	Address	Opening Hours	Materials and Services	Distance from the Site
Summerhill Waste Management Centre	141 Minmi Road Wallsend NSW 2287	Monday-Friday: 7.30am to 5pm Weekends and public holidays: 9am to 3pm	- Concrete - Solid fill – Soil - Untreated timber - Metals - Glass - Paper and cardboard - Plastics - Garden waste	14.3 km
Benedict Recycling - Newcastle	1a McIntosh Drive Mayfield West NSW 2304	Monday-Friday: 6.00am to 5:30pm Saturday: 6:00am to 4:00pm Sunday:	- Concrete - Solid fill – soil - Untreated timber - Metals - Paper and cardboard	17.3 km

Name of the facility	Address	Opening Hours	Materials and Services	Distance from the Site
		7:00am to 3:00pm	- Plastics - Garden waste	
Mt Vincent Waste Disposal centre	109 Mount Vincent Road East Maitland NSW 2320	Monday-Friday: 8.15am to 4:00pm Weekends: 8:15am to 4:00pm	- Oil – Motor & grease - Asbestos - Concrete - Metals - Glass - Paper and cardboard - Plastics	5.2km
Awaba Waste Management Facility	367 Wilton Road Awaba NSW 2283	Monday-Friday: 8.00am to 4:00pm Weekends: 8:00am to 4:00pm	- Asbestos - Concrete - Solid fill – soil - Untreated timber - Metals - Paper and cardboard - Plastics - Garden waste	29.4 km

General contingency procedures and remedial actions for the management of potentially contaminated material discovered will be illustrated in an Unexpected Finds Protocol (Waste). The protocol will be developed by the contractor prior to the commencement of construction works and implemented in the case of unanticipated discovery of contaminated material during construction of the proposal.

Operation (Concept Hospital)

It is not possible to precisely define waste streams associated with the operation of the hospital as the hospital is only at concept development stage. More detail on the estimated quantities and management practices associated with these wastes would be addressed during the Stage 2 Detailed Design and EIS.

Nonetheless, listed below are potential waste streams that would likely be generated during the hospital operation:

- General domestic waste:
 - Non-recyclable waste
 - Food waste
 - Mixed recycling (plastics, glass and metals)
 - Paper and cardboard.
- Waste water
- Biological waste (sewage)
- Clinical waste
- Disposable medical equipment (syringes, smocks)
- Expired medicines
- Chemicals (cleaning and laboratory)

- Plant maintenance: used oils, hydraulic and other plant fluids
- Textiles (linen waste)
- E-waste from equipment.

19.3 Mitigation Measures

The following mitigation and management measures in Table 19-3 are recommended to minimise potential waste impacts.

Table 19-3 Waste Mitigation Measures

Reference	Mitigation Measures
Stage 1 Mitigation Measures	
WM1	A Waste Management Plan (WMP) will be prepared and implemented by the Contractor as part of the CEMP to manage any construction waste. The WMP will include but not be limited to: • Measures to avoid and minimise waste associated with the project • The procedure for assessing, classifying and storing waste in accordance with the EPA's Waste Classification Guidelines (EPA, 2014) and management options • Procedures for transport and disposal of waste • Monitoring, record keeping and reporting requirements.

20. Health and Safety

20.1 Introduction

This section assesses the Project in relation to the regulatory framework for the assessment of hazard and risk and provides an assessment of the potential impacts of the project in relation to hazard and risk according to the relevant guidelines, as well as in accordance with the SEARs for the project.

Relevant guidelines include:

- *Environmental health Risk Assessment, Guidelines for assessing human health risks from environmental hazards, Commonwealth of Australia (enHealth, 2012)*
- *Methodology for Valuing the Health Impacts of Changes in particle Emissions (EPA, 2013)*
- *Health Impact Assessment: A practical guide (NSW Health, 2007)*
- *Health Impact Assessment Guidelines, Commonwealth Department of Health and Aged Care (enHealth, 2001)*
- *SEPP No. 33 – Hazardous and Offensive Development*

20.2 Existing Environment

20.2.1 Current Health Status of the Population

The HNELHD estimated resident population is 873,741 people (HNELHD, 2016). Overall, the population is experiencing rapid growth and ageing, although several local areas are experiencing depopulation. Aboriginal and Torres Strait Islander people make up 4% of the population (*HealthStats NSW, 2016*). HNELHD has significant groups of disadvantaged people, who experience poorer health than the rest of the population.

There are also trends in lifestyle behaviours and risk factors such as increasing obesity, low levels of physical activity and significant numbers of people who consume alcohol excessively and continue to smoke. The health status of a population is measured by a number of indicators which are detailed below.

Life Expectancy

Life expectancy at birth for residents in the HNELHD is approximately 83 for women and 79 for men (*HealthStats NSW, 2016*). As of 2015 the death rate for HNELHD was 730 deaths per 100,000 population for men and 525 deaths per 100,000 population for women. Both results are above the NSW average. The general trend is a decreasing death rate for men whilst the death rate for women remains fairly constant.

Causes of Death and Hospitalisations

The most common causes of death in both males and females for non-aboriginals are cancers, circulatory diseases, respiratory diseases, mental and behavioural disorders and injury and poisoning. The overall decrease in death rates is mainly due to reductions in deaths from circulatory diseases. The most common causes of death in both males and females for aboriginals are circulatory diseases, cancers, injury and poisoning, respiratory diseases and endocrine diseases (*HealthStats NSW, 2016*).

The most common causes of hospitalisation in non-aboriginal communities are: dialysis; digestive system diseases; nervous and sense disorders; and injury and poisoning. The most common causes of hospitalisation in Aboriginal communities are: dialysis; maternal, neonatal and congenital; injury and poisoning; and digestive system diseases (*HealthStats NSW, 2016*).

Mental Health

Women within the HNELHD experienced higher rates of mental disorders; with a rate of 259 per 100,000 intentional self-harm hospitalisations compared to men at 136 per 100,000. The levels significantly increase in the 15-24-year age group with the rates rising to 663 per 100,000 for women and 278 per 100,000 for men.

Factors Affecting Health Outcomes

There are a range of issues which can influence health outcomes, including socioeconomic status, environmental factors, genetics and specific lifestyle behaviours such as smoking, exercise and dietary habits. The trend in HNELHD is an increase in smoke-free households (increasing from 80% in 2002 to 93% in 2016), an increase in smoke-free cars (increasing from 85% in 2002 and 94% in 2016) and a decrease in smoking in adults and consequently a decrease in smoking attributable hospitalisations.

Data for HealthStats NSW suggests that obesity is rising in the Hunter New England health district will an estimated 60% of the Hunter New England population now either overweight or obese.

Fruit and vegetable consumption remained similar between socio-economic classes, however females were found to eat a greater percentage of recommended daily consumption of fruits and vegetables than males and non-aboriginals ate a greater percentage than aboriginals.

Physical Activity and Access to Social Infrastructure

The percentage of adults (16 years and over) in the HNELHD with adequate physical activity was 39% in 2016 and only 31% in children (5 – 15 years). Adults from higher socio-economic classes had a higher percentage of adequate physical activity than adults from lower economic classes. However, children from the lower socio-economic classes had a higher percentage of adequate physical activity than children from higher economic classes.

Social infrastructure includes a wide range of services and facilities that meet community needs for education, health, social support, recreation, cultural expression, social interaction and community development. Social infrastructure (including schools, community centres, libraries, community health centres and recreation facilities) contribute to overall community well-being.

The following social infrastructure facilities are available within the vicinity of NMH:

- Sport and recreational facilities such as, Fieldsend Oval, Fairhall Park Training Track, Maitland Golf Course, East Maitland and Morpeth Common
- Religious and cultural facilities including, Metford Community Baptist Church and the East Maitland Cemetery
- Education facilities including, Metford Public School, Maitland Christian School and Chelmsford Drive Early Learning Centre
- Health and medical facilities including, Maitland Private Hospital
- Emergency Services including, East Maitland Fire Station and Hunter SES
- Various businesses in the industrial area to the west of the Site.

20.3 Impact Assessment

20.3.1 Environmental hazards and risks

Environmental hazards and risks have been considered for the Stage 1 Early Works and Concept Hospital and include:

- Construction dust and particles (refer section 18)
- Handling, storage and use of fuels and chemicals (refer section 14)
- Excessive noise levels (refer section 9)
- Exposure to contaminated material - (refer to section 14)
- Exposure to hazardous substances and waste
- Pedestrian safety
- Bushfire (refer section 16).

Exposure to hazardous substances and waste

Construction would require the use of hazardous substances and fuels and the operation of the hospital would require the use of potentially hazardous substances and dangerous goods including hazardous medical supplies, laboratory chemicals, disinfectants and cleaning chemicals, and radiation from medical imaging. Spill risks can be minimised by storing any fuels, oils, or other potentially hazardous liquids required to be used for the Proposal, in bunded containers on a covered hard surface. It is also expected that approved separate storage facilities for hazardous materials would be provided for each relevant hospital department such as pathology, nuclear medicine and building maintenance. With the implementation of the proposed safeguards and management measures, the risks associated with chemicals and hazardous goods would be minimal.

Design and operational management of the hospital would facilitate prevention of incidents associated with the use of hazardous substances and dangerous goods and would provide for effective and timely response to incidents should they occur.

Operation will also generate clinical wastes that have the potential to be infectious, toxic or radioactive. This will be considered in Stage 2 of the SSI application however; hazardous waste streams would need to be contained separately to general waste streams and waste segregation would be done at the point of source through a suitable receptacle system with holding spaces in areas such as laboratories, disposal rooms and loading docks.

Waste management would include the collection, holding and dispatch of the main waste streams, these being clinical, chemical, radioactive, cytotoxic, recyclable, organic, liquid, general and sharps wastes. Clinical

(including infectious waste), cytotoxic, pharmaceutical, chemical and radioactive wastes would be classified as hazardous wastes. Clinical waste would be managed in accordance with NSW Health policy and guidelines.

Pedestrian and cyclist safety

Construction of the hospital will result in increased vehicle movements to and from site which may pose a risk to pedestrian and cyclist safety. At present, minimal pedestrian footpaths are located along Metford Road however footpath and cycleway upgrades have been completed on Fieldsend Street. There is no expected impact pedestrians during construction as there are no footpaths currently adjacent to the site and appropriate traffic management would be implemented.

Operation of the hospital would result in increased pedestrian and vehicle movements to and from the site. Safety risks to pedestrians can be reduced by the provision of pedestrian facilities in roadway designs and urban planning and ensuring that pedestrians are adequately visible to road users.

To address pedestrian safety concerns the NMH will include the following pedestrian facilities:

- Designated pedestrian pathways within the site that will encompass the Crime Prevention Through Environmental Design (CPTED) principles (refer section 8)
- A refuge island on Metford Road to assist safe pedestrian movements from NMH to the Council's shared path via the new roundabout

Mine Subsidence

Correspondence with the mine subsidence board on 22 April 2014 ascertained that the property was not within the East Maitland Mine Subsidence District and is not subject to any building restrictions imposed by the Mine Subsidence Board, as such this impact, has not been assessed further.

20.3.2 Distribution of health risks and benefits

The potential adverse health impacts of the Project would largely be to general amenity aspects such as visual, noise, air quality and traffic. However, the long-term effect of the Proposal would have a positive impact on district health and would contribute to meeting current and projected future demand for health services associated with the future growth of the HNELHD including a growing ageing population. The construction and operation of the NMH would also increase employment within the Maitland LGA and facilitate the growth and support of a skilled, competent and capable health related workforce in the Region.

20.3.3 Physical activity and social infrastructure

Physical Activity

Physical activity is an important factor in maintaining good health at any age. The built environment can be designed to provide increased opportunities for physical activity through:

- Active transport infrastructure to promote walking, cycling and public transport
- Street connectivity, density, mixed use development
- Public open space/green space.

The pedestrian connections within the NMH site will be designed to connect to Council's pedestrian and bicycle shared path along Fieldsend Street. By providing this connection the NMH will be maximising the opportunity for pedestrians and cyclists to connect to Victoria Street Railway Station thereby promote walking, cycling and public transport.

Additionally, the NMH intends to provide an internal bus stop within the development site to encourage the use of public transport and remove safety concerns associated with the addition of a bus stop along the Metford Road corridor.

Social Infrastructure

There are strong links between good health, a sense of community and social interaction. The built environment can foster a sense of community through enabling day to day interaction with people and nature in safe and accessible environments:

- People are less likely to interact within or feel part of a community that they perceive to be unsafe
- Green and open spaces facilitate contact with nature as well as community.

The NMH has considered the principles of CPTED (refer section 4.3) in its urban design and will implement measures such as restricted access, open areas with natural surveillance, a strong CCTV and security presence to ensure the safety of the community.

The NMH will also provide landscaped areas with amenity features such as seating to facilitate patient, staff and visitor contact with nature.

20.3.4 Opportunities for Health improvement

The NMH will deliver predominately Level 4 health services which will enhance access for the community of the Hunter New England LHD (HNELHD) in a single facility offering greatly improved services to patients.

The expanded bed capacity will ensure communities have access to the services they need, either locally or within a reasonable travelling distance. Access to local care and will improve the health and wellbeing of Hunter region residents. The NMH campus will also include a number of centres of excellence for the Lower Hunter including maternity and surgical services.

The site is almost six times larger than the current Maitland Hospital site and has the potential to offer space for other healthcare providers and future education facilities.

20.4 Mitigation Measures

The following mitigation and management measures in Table 20-1 are recommended to minimise potential waste impacts.

Table 20-1 Health and Safety Mitigation Measures

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
H&S1	The CEMP for Stage 1 works shall include relevant management and mitigation measures to protect health and safety of workers and the general public.
Stage 2 Detailed Design Considerations and Mitigation Measures	
H&S2	Review and adapt safety precautions into the design of the facility.
H&S3	Addition of pedestrian facilities into the design of the facility.
H&S4	Stage 2 detailed design should consider appropriate pedestrian and cyclist facilities including bicycle parking and end of trip facilities.

21. Socioeconomic, Land Use and Property

21.1 Introduction

The proposal will create health and economic benefits for the region by:

- Providing better health care facilities for the local and regional community

- Providing for future growth and aging populations
- Creating employment opportunities during construction and operation.

This Chapter assesses the social and economic environment within which the proposed NMH is located and the potential interactions with this environment.

21.2 Existing Environment

21.2.1 Population and growth

At the 2016 Census, Maitland LGA had a population of 67,478 people and Metford had a population of 4,767 people, comprising 7.1 % of the Maitland LGA (ABS, 2016). The population of the Maitland LGA is projected to grow at a lower rate than the projected rate of growth for the Sydney Metropolitan area but a higher rate than the state of NSW over the 20 years to 2036. The population of the Maitland LGA is projected to grow to 104,850 people, an average of 1.4 % annually. This is compared to 1.24 % in NSW and 1.6 % in the Sydney Metropolitan area (Department of Planning and Environment 2016).

In 2011, of the 19,745 people in the Maitland LGA reported as being in the work force, approximately 60 % were employed full-time and about 29 % were employed part-time. The most common occupations in the Maitland LGA included Technicians and Trades Workers 18.1 %, Professionals 16.6 %, Clerical and Administrative Workers 14.1 %, Labourers 10.4 %, and machinery operators and Drivers 10.4 % (ABS 2011).

The median age of people in 2016 in Maitland was 36 years, children aged 0 – 14 years made up 21.9 % of the population and people aged 65 years and over made up 14.3 % of the population. The Department of Environment and Planning expects that by 2036, children aged 0 – 14 years will make up 20.6 % of the population and people aged 65 years and over will make up 20.1 % of the population. Based on these results Maitland LGA will have a similar proportion of older people than the state average of 20.88 %.

The existing Maitland Hospital facility cannot support the growth and change in the type of services needed to provide contemporary health care to the local community let alone the broader health district which requires a new referral hospital.

21.2.2 Land uses

HAC compulsorily acquired the parcel of land known as Lot 7314 from Crown Lands and have access to Part Lot 401 under agreement with CSR for the purpose of constructing the NMH.

The site is not within a mine subsidence district. The closest mine subsidence district is “East Maitland” located approximately 800m to the south-west of the site. However, the entire Metford Triangle is mapped as an identified mineral resource area in the Maitland LEP 2011 and the land was used for clay mining and brick production until 2006 by CSR. CSR are the current leaseholder for the remainder of the Metford Triangle and are in the process of completing their Mine Closure Activities to satisfy DRG and HI before relinquishing these leases.

Surrounding land to the west of the site is a mixture of commercial uses, light industrial uses and public recreation areas, including a sports-field. Beyond these areas, the land is residential. The remainder of Part Lot 401, community and rural lands are located north of the site including the East Maitland Cemetery which is located between the Great Northern Rail Line and Raymond Terrace Road and a model flying club. Surrounding land to the south of the site is primarily residential.

Community and rural lands are located north of the site including the East Maitland Cemetery which is located between the Great Northern Rail Line and Raymond Terrace Road and a model flying club. Surrounding land to the south of the site is primarily residential.

21.2.3 Social infrastructure and facilities

Community services and facilities are present within the vicinity of the Proposal. Catering for the needs of both local communities, the following facilities are available:

- Sport and recreational facilities including, Fieldsend Oval, Fair Hall Park Training Track, Don Macindoe Flying Field, Maitland Golf Course, East Maitland and Morpeth Common including Tenambit wetlands Tenambit Wetlands
- Religious and cultural facilities including, Metford Community Baptist Church and the East Maitland Cemetery
- Education facilities including, Metford Public School, Hunter River Community School, Maitland Christian School, Chelmsford Drive Early Learning Centre and Meadowbank Education Trust School (Maitland Campus)
- Health and medical facilities including, Maitland Private Hospital
- Emergency Services including, East Maitland Fire Station and Hunter SES
- Various businesses in the industrial area to the west of the Site.

21.2.4 Local businesses and industry

Commercial properties exist to the west of the Proposal. Businesses cater for both local and regional customers. Some of the industrial and commercial businesses located near the proposal include:

- | | | |
|--------------------------------------|---------------------------------|--|
| • Maitland Council depot | • K9 Country Grooming Salon | • Storage King Maitland |
| • Telstra | • Style 2 U | • Dee Glass |
| • Metford Confectionary Pty Ltd | • Maitland Mazda Service Centre | • Ultra-Tune East Maitland |
| • Hunter Valley Paint Place Maitland | • Matthews Metal management | • Mindaribba Local Aboriginal Land Council |
| • Trade-link | | |

21.3 Impact Assessment

The existing Maitland Hospital facility cannot support the growth and change in the type of services needed to provide contemporary health care. The NMH will be able to provide the appropriate level of care with the ability to expand in the future additionally it will improve health care facilities for the region and reduce the need to redirect excess demand from local catchment population to referral hospitals.

Local economy

The operation of the NMH is considered unlikely to adversely impact the operation of existing local businesses; conversely, it is likely to stimulate economic activity and increase passing trade for nearby businesses.

Other perceived positive economic impacts include:

- Direct and indirect employment opportunities locally and regionally during construction and operation. The NMH is expected to create:
 - Approximately 1,250 full time equivalent construction jobs during the construction period
 - Approximately 1,000 full-time equivalent operational staff
- Wider economic benefits for regional Maitland areas in terms of attracting new potential business to the Health Precinct
- Potential travel time savings for users of health services

- Impact on the health system as measured by cost efficiency as a result of better patient flows, service configuration and capacity utilisation (producer surplus benefits), including:
 - Reduction of potentially preventable hospitalisation in the catchment area due to improved access to ambulatory care and non-admitted patient services
 - Avoided operating costs associated with PPH
 - Higher incremental retail space revenues (i.e. rent for café, florist or shop concessions at the hospital)
- Productivity gains from patients who receive early treatment and return to the workforce sooner.

Social benefits

The operation of the NMH would have positive social impacts including:

- Regeneration of a site previously used for mining into a public precinct delivering positive outcomes directly to the community
- Improved accessibility for patients and carers
- An increase in the equitable access to a range of public health services
- Improved access for Aboriginal communities
- Reduced distress and disability associated with illness and having to travel long distances to other hospitals
- Enhanced social cohesion due to the improved accessibility of health services in regional and rural areas.

Local amenity

The potential adverse social impacts associated with the Proposal relate to amenity aspects including, traffic, visual and air quality. These potential impacts are assessed in detail in Sections 8, 17 and 18 including relevant mitigation measures to reduce and manage these impacts.

Social impacts will be further mitigated through design of the proposal. Additionally, the site is situated with buffer distances exceeding 100m to neighbouring residences which will significantly reduce the risk of impacts from operation of the facility.

Property and land use

HAC compulsorily acquired Lot 7314 for construction of the NMH.

The site has previously undergone extensive clay mining. However, there is no intention to recommence extraction related activities, nor are there any ongoing extraction related activities on surrounding land which will be affected as land within the Metford triangle is undergoing Mine Closure Activities.

Social infrastructure

The majority of impacts will be restricted to within Lot 7314 DP 1162607 so areas of social infrastructure will not be directly impacted by the works. Stage 2 detailed hospital design shall consider the development of small-scale retail that supports the needs of hospital workers and visitors to the NMH.

Existing Hospital

It is expected that the NMH will replace the current Maitland Hospital which will close. At this stage the fate of the existing hospital is unknown and there are no commitments for redevelopment. Moving the health facilities from the existing Maitland Hospital to the NMH will result in short term negative impacts to hospital staff and users whilst they get used to travelling to a different facility. This could result in increased travel times for staff and users. There may also be a loss of trade to surrounding businesses as there will no longer be a travel generating development to bring people to the area, this may particularly affect the retirement

community and hotel located to the north of the existing hospital. However, these negative impacts will be offset by the long-term benefits of an improved healthcare facility and rural referral hospital which will deliver positive social outcomes to the Maitland LGA and Hunter New England region.

21.4 Mitigation Measures

The following mitigation and management measures in Table 21-1 are recommended to minimise potential socio-economic impacts.

Table 21-1 Socioeconomic, Land Use and Property Mitigation Measures

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
SE1	Prior to commencement of Stage 1 works, the Council and the occupier of any land within 40 metres of the site boundary, must be notified in writing providing a project description and the expected dates for commencement and completion of construction works and details of the construction program.
SE2	A site notice board must be located at the main entrance to the site in a prominent position and must include the following: • 24-hour contact person for the site; • Telephone and facsimile numbers and email addresses; and Site activities and time frames.
SE3	A complaint handling procedure and register will be implemented to assist in recording and managing potential conflict with the local community during operations.

22. Climate Change and Sustainability

This chapter provides an assessment of the Proposals risk and vulnerability to climate change. The chapter was completed using the following guidelines:

- Climate Change Impacts and Risk management – A guide for Business and Government (Department of Environment and Heritage, 2006)
- Australian Green Infrastructure Council Guideline for Climate Change Adaptation (AGIC, 2011).

22.1 Existing Environment

Long-term climatic data from the Bureau of Meteorology weather station at Paterson (BoM 2017) (Site No. 061250) are used to characterise the local climate in the proximity of the Project. The Paterson (TOCAL AWS) station is located approximately 14km north of the Project. Table 22-1 present a summary of the data from the Paterson station collected over an approximate 34 to 40-year period for the various meteorological parameters.

In summary, the data indicate that January is the hottest month with a mean maximum temperature of 29.8 degrees Celsius (°C) and July is the coldest month with a mean minimum temperature of 6.2°C. Rainfall peaks during the summer months and declines during winter. The data indicate that February is the wettest month with an average rainfall of 116.7 millimetres (mm) over 8.7 days. August is the driest month with 37.9mm over 5.1 days. Wind speeds during the warmer months have a greater spread between the 9am and 3pm conditions compared to the colder months. Mean 9am wind speeds range from 5.5 kilometres per hour (km/h) in February to 13.3km/h in August. Mean 3pm wind speeds range from 11.3km/h in April to 17.9km/h in August. The most common winds are from the west-northwest and northwest sectors.

Table 22-1 Monthly climate statistics summary – Paterson (TOCAL AWS)

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature												
Mean max. temperature (°C)	29.8	28.9	27.1	24.2	20.8	17.8	17.4	19.4	22.4	25.1	26.9	29.1
Mean min. temperature (°C)	17.7	17.6	15.7	12.5	9.6	7.6	6.2	6.6	9.0	11.4	14.0	16.2
Rainfall												
Rainfall (mm)	110.0	116.7	115.6	88.6	72.1	76.5	40.3	37.9	48.8	64.2	84.7	82.0
Mean No. of rain days (≥1mm)	8.6	8.7	9.2	7.6	7.3	7.7	6.1	5.1	5.8	7.3	8.8	7.6
9am conditions												
Mean temperature (°C)	22.7	22.0	20.6	18.0	14.6	11.9	11.0	12.6	16.2	19.1	20.1	22.2
Mean relative humidity (%)	74	79	80	77	80	78	76	69	64	64	69	69
Mean wind speed (km/h)	7.0	5.5	5.8	7.0	8.4	11.0	11.5	13.3	13.1	11.1	9.5	8.5
3pm conditions												
Mean temperature (°C)	28.3	27.4	25.7	23.0	19.7	16.8	16.4	18.3	20.9	23.3	25.1	27.5
Mean relative humidity (%)	52	56	58	56	58	59	55	46	46	48	49	49
Mean wind speed (km/h)	14.6	12.3	11.6	11.3	11.4	13.8	15.0	17.9	17.8	16.5	16.5	16.1
Source: Bureau of Meteorology, 2017												

22.2 Climate Change Predictions

Climate Change

The Australian Government's Climate Change Impacts and Risk management – A Guide for Businesses and Government (Department of Environment and Heritage 2006) predicts that the Australian climate will become warmer, with different patterns of rainfall, less available moisture retained in the soil and more severe storms.

The Australian Green Infrastructure Council states that climate change has significant potential to disrupt or damage existing and future infrastructure as increased intensity of storm, wind and flood events could cause damage to buildings and regional transport networks.

Additionally, the NSW Government climate change projections for the Hunter region (Department of Environment and Heritage 2016) has projected climate change variables such as temperature and rainfall for the Hunter region for the near future (2020 – 2039) and far future (2060 – 2079). These projections agree that the Metford region will become warmer, will have increase number of high temperature days, will have different rainfall patterns and increased fire risk. A summary of the NSW Governments climate projections is provided below.

- Based on long-term (1910 – 2011) observations, temperatures in the Hunter Region have been increasing since about 1960, with higher temperatures experienced in recent decades. The Metford region is projected to continue to warm during the near future and far future, compared to recent years (1990 – 2009). The warming is projected to be on average about 0.7°C in the near future, increasing to about 2°C in the far future
- The number of high temperature days (days with a maximum temperature over 35°C) is projected to increase by an extra one – five days in the near future and 10 – 20 days in the far future, with fewer low temperature nights (nights below 2°C) also anticipated
- The Hunter Valley currently experiences considerable rainfall variability across the region, seasons and from year-to year and this variability is also reflected in the projections. However, most models agree that autumn rainfall will increase and the climate change projections for the Metford area agree with this. The Metford region is projected to have an 10-20% increase in precipitation during the near future however long-term precipitation is only predicted to increase by 5-10%, compared to recent years (1990–2009)
- The number of days with a Forest Fire Danger Index Greater than 50 is projected to increase by an extra 0 – 0.5 days in the near future and 0.5 – 1 day in the far future. Average fire weather is projected to increase in summer, spring and winter and severe fire weather is projected to increase in summer and spring.

22.3 Impact Assessment

Climate Change

Risks arising from climate change include:

- Increased stress on emergency services and hospitals due to increased intensity and frequency of weather events such as heatwaves, bushfires and storms. These weather events may cause increased incidence of death and serious illness, particularly in older age groups
- Increased use of electricity for air-conditioning and refrigeration requirements due to an increase in the number of days over 35°C, over 40°C, and below 2°C. Causing effects such as:
 - Decrease in system reliability due to inability to meet peak demand
 - Increase in energy costs
- Higher temperatures may also contribute to the spread of vector-borne, water-borne and food-borne diseases and the southward spread of pests and diseases previously limited to tropical areas. This will also increase stress on hospitals and healthcare facilities
- Water resources are likely to be further stressed due to higher evaporative demand, projected growth and climate driven changes in supply for irrigation, cities, industry and environmental flows causing effects including:
 - Water restrictions
 - Increase in water costs
- Changes in rainfall patterns could contribute to increased bush fire risk which will affect properties on bush fire prone land such as the NMH
- Increase in extreme weather events such as storms are likely to lead to increased flash flooding and place strains on current sewage and drainage systems and create challenges for emergency services. Extreme weather events may also cause damage to buildings and transport networks.

Climate change has the potential to significantly impact on the built environment. The majority of infrastructure assets are located within 50km of the coast where over 85% of Australia's population lives. The NMH is approximately 25km from the coast and located about 3.5km from the Hunter River. Potential

climate change impacts include inundation of coastal land by rising sea levels and flash flooding. Extreme storm events, winds and tidal surges will increase exposure of infrastructure to damage and water table elevation can threaten the integrity of building foundations.

Some of these risks can be mitigated through hospital design, engineering solutions and changed practice such as design of robust storm-water systems that take into account climate change predictions, building more resilient structures, install more efficient irrigation systems, bushfire protection measures (refer section 16) and strategies to improve water, energy, and transport efficiency.

Construction Sustainability

The materials required during the proposed construction works are not currently restricted resources; however, materials such as metals and fuels are considered non-renewable and should be used conservatively. Fuel can be conserved by selecting fuel efficient plant and equipment, maintaining plant and equipment to efficient levels, and minimising the periods of idling plant. All new materials to be used would be sourced locally, where possible, to reduced transport costs, including fuel usage.

Given the relatively small scale and duration of the Stage 1 Early Works, it is anticipated that there would be limited practicable options to implement energy conservation measures or water conservation measures. Construction waste practices are detailed in section 19.

Cleared vegetation would be chipped and used on-site for landscaping purposes thereby reducing the number of truck movements that might otherwise have occurred with offsite disposal.

Operation sustainability

Operational sustainability measures will be assessed during Stage 2 Detailed Design. However, the Stage 1 assessment has identified potential opportunities for ecologically sustainable development (ESD).

The design of the New Maitland Hospital will need to consider a whole of life methodology that also considers that hospitals have specialist needs. The development of an ESD framework for the New Maitland Hospital is based on the following key principles:

- Adopting cost effective energy efficient systems in heating, cooling, lighting and building management through an integrated building control system
- Introducing on-site access to community public transport reducing the reliance on private transport
- Introduction of sustainable water management and re-use systems for use in landscape irrigation
- Incorporation of heat recovery systems minimising the energy use of the building
- Cost effective energy efficient building façade system minimising heat load and heat loss of the building
- Water efficient fixtures minimising water usage
- Provisions for effective recycling of operational waste
- Incorporation of native plants and drought tolerant species in development landscaping
- Retention of mature trees where possible.

Overall the development should have a long-term positive impact as it will create an energy efficient facility that considers the potential impacts whilst fulfilling the needs of the community.

22.4 Mitigation Measures

The following mitigation and management measures in Table 22-2 are recommended to minimise potential climate change and sustainability impacts.

Table 22-2 Climate Change and Sustainability Mitigation Measures

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
CCS1	Reduce construction fuel usage by: • Use of fuel efficient construction plant and equipment • Maintaining plant and equipment to efficient levels • Source materials locally, where possible, to reduced transport costs, including fuel usage.
CCS2	Chip cleared vegetation for use onsite.
Stage 2 Detailed Design Considerations and Mitigation Measures	
CCS3	The following climate change design considerations to be investigated during stage 2 SSI application: • Resilient to climate change – ensuring that design accounts for extra risks associated with increased extreme heat days, heavy rainfall events and greater risk of bushfire • Materials selection • Use of heat and water recovery systems • Shading and landscaped areas for user comfort during extreme heat • Use of energy and water efficient equipment including efficient irrigation systems.

23. Aviation

23.1 Introduction

The Stage 1 Concept Hospital reflects the need for a Helicopter Landing Site (HLS) incorporated within the hospital complex to cater for emergency patient transport. A review of the HLS was undertaken by aviation consultants AviPro (2018) to advise on the suitability of an on-grade location for the HLS. The Aviation Report is provided in **Appendix P**.

The assessment was prepared using the following guidelines:

- *Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 V1 (2016)*
- *NSW Health Policy GL2018_010 Guidelines for Hospital Helicopter Landing Sites in NSW (2018)*

It is expected that the location of the helipad and flight paths would be further considered as part of Stage 2 detailed design. Nonetheless, an assessment is provided of the Concept Hospital and selected HLS location.

23.2 Helicopter Frequency at NMH

Current helicopter movements at the existing Maitland Hospital is approximately two movements per month. The anticipated number of helicopter movements at NMH is anticipated to be approximately three per month. This increase is due to the availability of increased clinical capacity at NMH compared to the existing hospital and also the provision of a HLS. Helicopter movements at NMH would be for emergency helicopter transfers and will fall under the Medical Transport category.

23.3 Regulatory Framework

Whilst CASA has provided advisory materials, guidelines and best practice standards currently within Australia, there are no set rules or regulations applicable to the design, construction or placement of HLS's.

As a consequence of the current regulatory situation, NSW Health Infrastructure, Ambulance and the Ministry of Health have developed a set of Guidelines for HLS for the purpose of helicopter emergency medical services (HEMS) which are now Policy (NSW Health Policy *GL2018_010 Guidelines for Hospital Helicopter Landing Sites in NSW* (2018)). This policy will be considered during development of Stage 2 detailed design.

23.4 Flight Path Selection

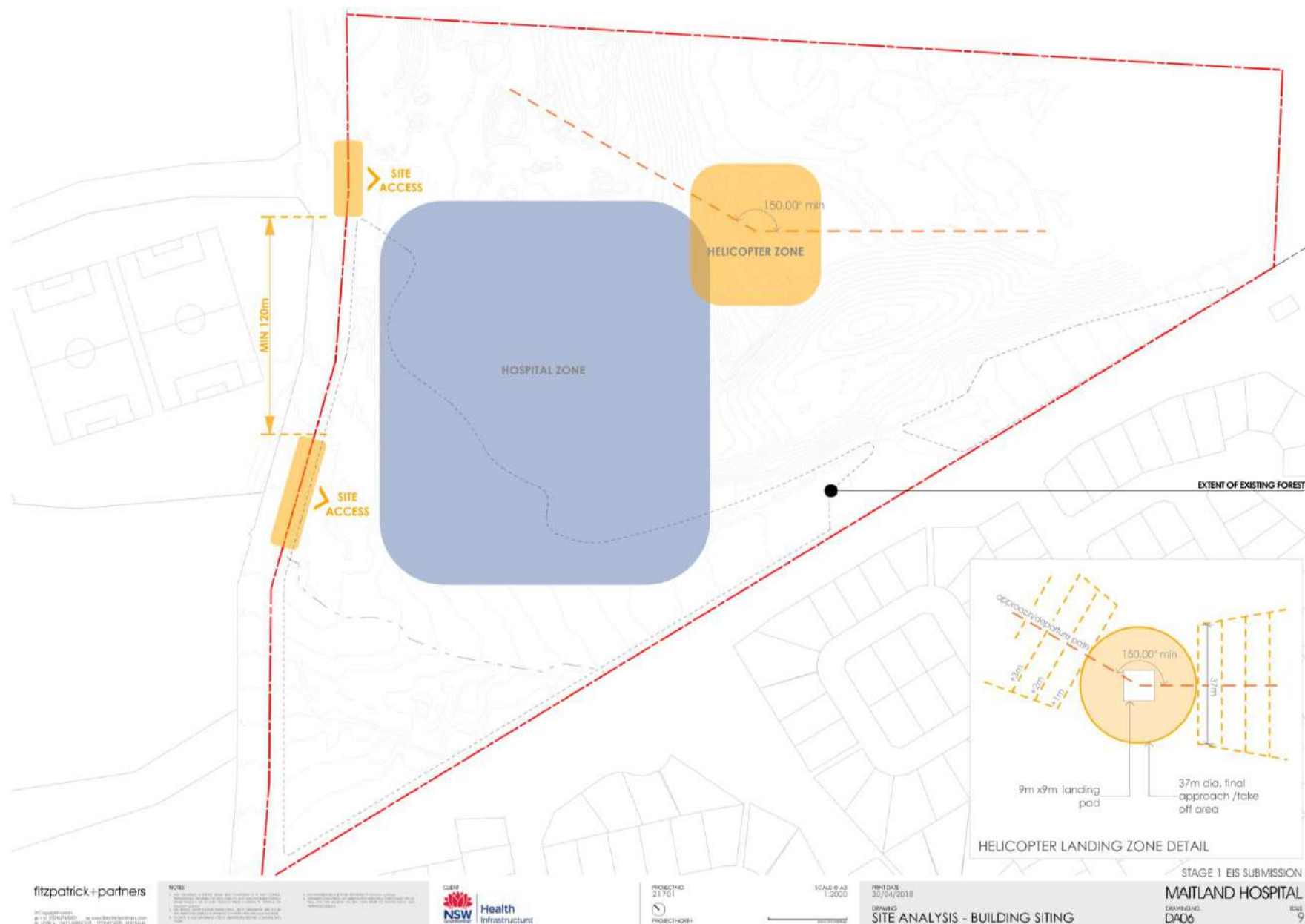
The proposed HLS for the NMH will require safe and efficient operations for aircraft which includes a safe landing and take-off flight path. Flight path selection is usually determined by weather, terrain, obstructions/physical impediments and location of the HLS.

A south approach and departure path has been discounted due to the proximity of residential areas as well as the flight path hazard created by remnant ironbark forest located in the south-west corner, and the wire hazard in the electricity easement along the southern boundary. A west/east approach and departure path is recommended for a ground level HLS as it would avoid these issues, additionally wind conditions in this area support a west/east flight path.

Based on the Concept Hospital layout, the Hospital itself will create an obstruction to the flight path heading west. As such the location at the north-eastern edge of the hospital/ car park precinct has been considered as the preferred HLS (refer Figure 23-1).

HLS options were confined to being located to the north-east of the hospital as here the HLS will:

- Take advantage of the general east/west flight path routes
- Eliminate the obstruction caused by the hospital infrastructure.



23.5 Impacts

The operation of a helipad and associated helicopter services may have the following operational impacts:

- Reduced public amenity from noise impacts
- Reduced public amenity from air quality impacts
- Visual impact
- Increased risk to aviation safety
- Hazards (fuel spills, fires).

Initial estimates are that there may be an anticipated 36 emergency flights per year.

A preliminary assessment of helicopter noise is covered in Section 9. This acknowledged that that short term, infrequent noise impacts will occur from emergency helicopter operations. The Concept Design seeks to reduce these impacts by locating the HLS as far as practicable from nearly noise sensitive receivers and establishing flight paths that minimise the impact from low level flight over sensitive receivers. There are no specific noise emission criteria for emergency helicopter operations.

The potential noise impacts of the helicopter operation will be further addressed in the Stage 2 SSI application once the HLS and flight path details are finalised.

A preliminary assessment of the visual impacts of the concept hospital which includes the HLS is covered in Section 17. The HLS itself is located well into Lot 7314 and being low to the ground and shielded substantially by the hospital building, will not be visible from any public or private viewpoint outside of the Site. Furthermore, the visual impact of the HLS is minimal compared to the visual impacts of the NMH.

Reduced privacy of residents from helicopters flying over neighbouring properties is a potential impact but is expected to be minimal as the predicted number of flights is low and the flight path does not fly over the nearest residential areas to the south.

Helicopter trips proposed would nominally increase the consumption of helicopter fuel and related generation of fuel combustion by-products. This impact is expected to be minimal given the limited number of flights. The HLS may require associated storage of fuel or other hazardous materials and if so, would be considered during stage 2 detailed design.

The new HLS and flight paths would be established and operated in accordance with the appraisal against the Civil Aviation Safety Authority's Guidelines for the establishment and operation of onshore Helicopter Landing Sites.

The addition of helicopter facilities at NMH provides many positive outcomes and is a vital component of the NMH in providing improved health care and critical response services. Helicopter transport permits rapid patient transport over long distances and rapid delivery of advanced medical treatment to critically ill and injured patients. A fundamental premise of the emergency care system is that the time from injury to advanced treatment is a crucial factor in determining clinical outcomes. Helicopter emergency medical services (HEMS) have been shown to be effective in decreasing mortality and improving outcomes.

23.6 Mitigation Measures

The following mitigation and management measures in Table 23-1 are recommended to minimise potential impacts caused by aviation.

Table 23-1 Aviation Mitigation Measures

Reference	Mitigation Measure
Stage 2 Detailed Design Considerations and Mitigation Measures	
Av1	Complete a formal survey of the Obstacle Limitation Surface (OLS) for the Helicopter Landing Site.
Av2	The following guidelines will be considered during stage 2 detailed design: - Civil Aviation Advisory Publication (CAAP) 92-2 - <i>Guidelines for the establishment and operation of onshore Helicopter Landing Sites</i> (2014). - Draft Guideline – <i>Protecting Strategically Important Helicopter Landing Sites</i> (Department of Infrastructure). - NSW health - <i>GL2018_010 Guidelines for Hospital Helicopter Landing Sites in NSW</i> (2018).
Av3	Consider lighting in the vicinity of the helipad in design.
Av 4	Consider future obstructions or proposed developments

24. Cumulative Impacts

24.1 Introduction

Clause 228 of the *EP&A Regulation 2000* requires the consideration of cumulative environmental impacts in the context of existing and proposed developments that will occur within a similar location and timeframe to the Proposal to ensure that potential impacts are not considered in isolation. Identifying potential cumulative impact assists in developing appropriate environmental management measures and provides a basis for coordinated planning and environmental monitoring. This section focuses on identifying cumulative impacts where these impacts could potentially be significant.

24.2 Impacts Assessment

A review of the Department of Planning and Environments Major Projects Register, Maitland City Councils' application tracker and Maitland City Councils Capital Works Program 2016-2020 was undertaken on 22 September 2017 and updated on 2 May 2018. Projects that are expected to be undertaken in proximity to the Proposal are listed and potential cumulative impacts evaluated in Table 24-1.

The assessment focused on proposed developments that are in proximity to the NMH proposal, are of a large scale and of the type that may have cumulative impacts when considered in combination with the NMH proposal.

Table 24-1 Proposed developments within proximity of the Proposal

Project	Potential Cumulative Impact
Thornton North Residential Development Defence Housing Australia (DHA) will be developing a site for residential housing located in Thornton.	Construction: The Thornton North Residential Development is over 3.5km away from the proposed Maitland hospital. Due to this separation there are unlikely to be cumulative amenity impacts during construction from noise or air quality (dust generation). The main cumulative impact would be traffic disruptions. A

Project	Potential Cumulative Impact
The new community will feature more than 450 land lots, with an estimated 830 houses. Of these houses 50 % will be for Defence members and their families and the remaining land lots will be sold to the public. At the time of this EIS around 30 % of the Thornton North residential area has been developed.	detailed traffic impact assessment has been undertaken for the NMH and included consideration of construction traffic (see Appendix F – Traffic Impact Assessment). It is expected that there will be increased construction traffic during and outside of standard construction hours which causes delays and congestion as well as increased air and noise pollution along the main haulage routes (Raymond Terrace Road and Government Road). The potential for such impacts would need to be managed by the Construction Contractors. These roads take high volumes of vehicles daily and are unlikely to experience significant delays due to construction traffic. Due to the separation distance between the NMH and the other proposed development, potential reductions in local amenity are not anticipated to be significant from concurrent construction of the projects. Operation: Increased traffic from additional commuters who now live in the Thornton North residential development has been addressed within the growth scenarios and as part of the overall traffic assessment for the NMH. Provision of suitable access to the residential development will need to be assessed and managed by the proponent of that development. There will also be increased noise due to increased levels of traffic from additional commuters. Once work is complete at the North Thornton residential development and the proposed Maitland Hospital, there would be a positive cumulative impact in relation to the provision of health services to cater for the new residents relocating to these areas of Maitland.
Chisholm Residential Development New Cert Pty Ltd will be developing Thompson Street East Maitland (Lot 1 DP 1218029) for medium density, multi-dwelling housing. At the time of the EIS the development had been recently approved (September 2017).	Construction: The Chisholm Residential Development is over 1.7km away from the NMH and similar to the Thornton North development, the main cumulative impact would be potential traffic disruptions. A detailed traffic impact assessment has been undertaken and took these traffic impacts into consideration (see Appendix F – Traffic Impact Assessment). This development is much smaller than the Thornton North Residential Development with haulage routes potentially including Raymond Terrace Road, Morpeth Road, New England Highway or Metford Road. Despite the smaller size, it is still expected that there will be increased construction traffic, and amenity issues along the haulage routes. The potential for such impacts would need to be managed by the Construction Contractors. These impacts should be manageable as they are high volume roads and the relative increase in traffic due to construction vehicles would be small.

Project	Potential Cumulative Impact
	Operation: Increased traffic from residents in the Chisholm development would need to be assessed and managed by the proponent of that development as part of their development application processes. There will also be increased noise due to increased levels of traffic from additional commuters. Residents moving into the Chisholm development will have access to new health services which creates a positive cumulative impact.
Victoria Station Upgrades – Transport Access Program (TAP) Transport for NSW (TfNSW) has proposed the upgrade of Victoria Street Station. The Proposal would provide a number of improved features to provide an accessible station and improved interchange facilities, including: three new lifts; upgrades to the station entrances; new kerb ramps; and ancillary works such as changes to power supply, lighting and fencing.	Construction: Victoria Street Station is within 2km of NMH. Traffic generated by construction vehicles, including staff vehicles, is likely to be minimal given the nature of the works proposed and would fluctuate dependant on the construction stage. Construction vehicles movements are expected to include approximately one to 12 vehicles per day Monday to Saturday and between five to 20 vehicles per day during weekend possessions. Vehicles are expected to journey to the station via New England Highway and Brunswick Street avoiding Metford Road and Chelmsford Drive. Due to the separation distance between the NMH and the station upgrade and the location of residential areas, potential reductions in local amenity are not anticipated to be significant from concurrent construction of both projects. Construction is expected to commence mid-2017 and take around 18 months to complete. Operation: Daily patronage of Victoria Street Station is expected to increase from both the station upgrades and the existence of the hospital. It is anticipated that the additional rail patronage would mainly generate walking trips. However, with improved accessibility to Victoria Street Station and interchange facilities as well as the provision of formal “kiss and ride” area vehicle movements could increase. No additional commuter parking is proposed as part of The Proposal, so the increase in future road traffic is expected to be minimal and it is considered that the Proposal would have negligible cumulative impacts on traffic in the local road network when considered alongside the NMH.
Road Works – Major Reconstructions The Maitland Council ‘Capital Works Program 2016 – 2020’ has identified the following upgrades to roads in 2017/18 and 2018/19:	Construction: There may be minor cumulative impacts associated with the overlap of the two construction programs but only during the NMH Stage 1 works. Key cumulative impacts would include traffic disruptions, noise, dust, visual and amenity impacts.

Project	Potential Cumulative Impact
- Brunswick Street – Fieldsend to Lawes - Fieldsend Street - Lawes Street – Brunswick to Alliance.	Cumulative travel delays could be readily managed through the provision of a traffic management plan and timing of deliveries of equipment and materials. The potential for such impacts would need to be managed by the Construction Contractor. These works are expected to be completed by the time the Stage 1 construction is due to commence. Operation: In the long-term the cumulative impacts of both the Hospital and road upgrades would be positive. Connectivity between the NMH and other areas in Maitland would be improved resulting in improved driver experience.

24.3 Mitigation Measures

The potential cumulative impacts associated with the NMH proposal and other major developments would be further considered as the Stage 2 detailed design and construction planning are developed. The project team would coordinate activities with the proponents of these other major proposals to minimise any potential cumulative impact.

In the event that these (or other) developments do occur concurrently with the Proposal, the potential for any such cumulative impacts would need to be considered and managed by the Construction Contractor once the timing of other developments becomes known. The CEMP would need to include a process to review and update mitigation measures as new work begins or if complaints are received.

GTA Consultants and Roads and Maritime have been investigating potential design solutions for the supporting road works that would address both the hospital requirements, and the existing capacity and efficiency issues in the local road network. These operational mitigation measures are noted in section 8.

The following mitigation and management measures in Table 24-2 are recommended to minimise potential cumulative impacts.

Table 24-2 Cumulative Impacts Mitigation Measures

Reference	Mitigation Measure
Stage 1 Mitigation Measures	
CU1	The CEMP would incorporate measures to manage cumulative construction impacts. The CEMP and relevant sub-plans would be reviewed and updated as required (such as when new work begins or if complaints are received) to incorporate potential cumulative impacts from surrounding development activities as they become known.

25. Consolidated Management and Mitigation Measures

This EIS has identified a number of management and mitigation measures that are designed to minimise adverse environmental, social and economic impacts that could potentially arise from the Proposal. Through the assessment of Stage 1 (Early Works and Concept Design), mitigation measures have been identified to manage the Stage 1 Early Works construction impacts. These are provided in Table 25-1.

The measures provided are proven and understood to manage construction risks associated with Stage 1 Early Works of this SSI application. Successful implementation would reduce the risks of construction and operational impact. The identified management and mitigation measures will be incorporated into contractual arrangements with future contractors.

In addition, numerous recommendations have been compiled that cannot be addressed during Stage 1 but warrant consideration and should be addressed in the EIS for Stage 2 Detailed Design and Operation of the NMH. These are listed separately in Table 25-2.

25.1 Stage 1 Management and Mitigation Measures

Table 25-1 Summary of Stage 1 management and mitigation measures

Reference	Mitigation Measure
General	
G1	A project specific Construction Environmental Management Plan (CEMP) will be prepared by the Contractor prior to commencing Stage 1 construction and will include as a minimum the following sub-plans: • Biodiversity Management Plan (BMP) • Construction Traffic Management Plan (TMP) • Emergency Response Plan (ERP) • Construction Noise and Vibration Management Plan (NVMP) • Air Quality Management Plan (AQMP) • Waste Management Plan (WMP)
G2	Obtain all required approvals for Stage 1 works prior to commencing Stage 1 construction (refer section 6.4 of the EIS). This is expected to include: • Development approval under Section 5.2 of the EP&A Act An Environment Protection License (EPL) for Extractive Activities
G3	All employees, contractors and subcontractors are to receive a project induction.

Reference	Mitigation Measure
	The environmental component may be covered in toolbox talks and should include: • Environmental mitigation measures • Vegetation clearing operations and controls to prevent unauthorised clearing • The Unexpected Finds Protocols (historic heritage, Aboriginal heritage, contamination and waste) • Aboriginal heritage (Types of aboriginal heritage objects, details of the NMH heritage object, legislative requirements and penalties associated with the harm or desecration of Aboriginal heritage objects). • Waste management strategies and mitigation measures
G4	Implement community consultation measures to keep the community informed of the construction program and potential impacts.
G5	A complaint handling procedure and register will be implemented to assist in recording and managing complaints during construction.
G6	Mud and other debris shall be removed from the wheels and bodies of construction vehicles and equipment prior to leaving the project site and before entering the sealed public road network. Any tracked soil, earth, mud and other similar materials must be removed from the roadway preferably by dry methods (sweeping, shovelling).
Traffic and Transport	
T1	A Construction Traffic Management Plan (TMP) is to be developed by the Contractor and incorporated into the Construction Environmental Management Plan (CEMP). A Draft TMP has been developed for the Proposal (refer Appendix F).
Noise and Vibration	
N1	A Construction Noise and Vibration Management Plan (NVMP) will be prepared by the Contractor as part of the CEMP. The construction NVMP will include consideration of: • Monitoring strategy • Mitigation measures • Notification requirements
Biodiversity	
B1	A Biodiversity Management (BMP) is to be prepared by the Contractor as part of the CEMP and will detail a range of impact management and mitigation measures including (but not limited to) a clearing protocol, pre-clearing surveys, retention of key habitat and supplementary plantings as recommended in the Biodiversity Assessment Report.
B2	A clearing protocol will be implemented that includes the following controls: • The Contractor will identify a staged clearing plan in consultation with a suitably qualified Arborist. This will include preparation of a Stage 1 tree Removal Plan that outlines essential clearing areas required for Stage 1. As far as practicable, clearing of the APZ is to be delayed until Stage 2 (hospital construction). • Prior to clearing the Contractor will mark and delineate all trees for clearing. • Clearing limits are to be clearly defined by a registered surveyor and suitably demarcated (e.g. metal stake and high vis plastic mesh fencing) prior to vegetation clearing activity. • A clearing protocol will be developed for the APZ in consultation with a bushfire consultant and fauna ecologist, to identify trees proposed for retention and clearing. The protocol would aim to achieve the APZ requirements while maximising retention of key fauna habitat trees (i.e. hollow bearing trees).

Reference	Mitigation Measure
	- Each tree proposed for clearing associated with APZ establishment must be appropriately tagged for clearing (e.g. through the use of surveyors flagging tape and spray paint). Trees not marked must not be removed. - Clearing techniques for clearing within the APZ would be developed in consultation with an arborist. Clearing shall be undertaken to minimise impact on retained trees by observing tree protection zones that seek to protect trees against direct damage, soil compaction and disturbance to the rootzone. - Trees would be felled away from the retained forested remnants back into the proposed development footprint to minimise impacts within protected areas.
B3	Where practicable restrict vegetation clearing activity to within the period late February to end of May, this being outside the main breeding periods for threatened hollow dependant fauna known to utilise the site. If clearing outside this period, ecological pre-clearing surveys must be undertaken by a suitably qualified fauna ecologist prior to clearing. These surveys will be aimed at targeting Threatened species known or potentially occurring in the area and attempt to identify critical sites for these species. If critical habitat sites are located, appropriate impact mitigation measures will be undertaken per the type of site/feature and species concerned.
B4	Ecological pre-clearing surveys where required shall be undertaken by a fauna ecologist prior to the commencement of each stage of clearing. These pre-clearing surveys will include: - Detection of any resident fauna and relocating these beyond the project influence area. - Identification and inspection of any identified hollow-bearing trees targeted for removal. Cavities to be checked for inhabiting fauna upon felling. Any injured fauna should be captured where possible and taken to the local wildlife carer. Once rehabilitation has been achieved (if possible), the individual will be released into retained habitats adjoining the capture site, and if required, into shelter sites appropriate for that species (<i>i.e.</i> nest boxes).
B5	A site induction must be undertaken by all personnel undertaking clearing operations to explain the relevance of any marked items (e.g. hollow bearing trees requiring ecological supervision, clearing boundaries) and identify their responsibilities. An ecological site induction notice will need to be prepared and signed by all relevant personnel involved with the clearing operations.
B6	Should pre-clearing surveys identify any hollow bearing trees targeted for removal, and the hollow is occupied or there is evidence of recent occupation, they shall be replaced through a compensatory nest box program in retained bushland habitats on Lot 7314.
Aboriginal Heritage	
AB1	An Unexpected Finds Protocol (Heritage) which addresses unexpected aboriginal heritage finds will be included in the Construction Environmental Management Plan and shall be included as part of the site induction.
AB2	If suspected Aboriginal objects, such as stone artefacts are identified during works, works must cease within 10m of the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, the OEH must be notified under section 89A of the NPW Act. Appropriate management or avoidance should be sought if Aboriginal objects are to be moved or harmed.

Reference	Mitigation Measure
AB3	Develop an Aboriginal Cultural Heritage Management Plan for the project that includes provision for the long-term management of Aboriginal objects that may be salvaged from the project area.
AB4	Prior to commencing Stage 1 works surface collection should be conducted at AHIMS site (NMH1) to see if the artefact can be found. If it is identified a GPS will be used to record its location and a photographic record taken. The artefact will be collected and recorded as per OEH requirements and an Aboriginal Site Impact Recording Form (ASIR Form) completed in accordance with the OEH requirements.
AB5	In the extremely unlikely event that human remains are found, works should immediately cease and the NSW Police are to be contacted. If the remains are suspected to be Aboriginal, the OEH may also be contacted at this time to assist in determining appropriate management.
Historic heritage	
HH1	An Unexpected Finds Protocol (Heritage) which addresses unexpected historic heritage finds will be included in the CMP to be completed by the construction contractor.
HH2	Should any unexpected historical heritage archaeological items be discovered during construction, work will cease in the vicinity of the find and a qualified heritage consultant consulted. Work will be able to recommence in the area of the find on the advice of the qualified heritage consultant.
Soils and Geology	
S1	A soil and water management plan (SWMP) will be prepared as part of the CMP in accordance with Managing Urban Stormwater Guidelines Volume 1, 4th Edition "the Blue Book" (Landcom, 2004) and Volume 2 (DECC, 2008).
S2	The SWMP will also include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.
S3	Erosion and sediment control measures (in accordance with Managing Urban Stormwater Guidelines Volume 1, 4th Edition the "Blue Book" (Landcom, 2004) will be prepared and implemented as part of the CMP and will include control measures such as: • Sedimentation basins • Sedimentation fences • Stormwater drainage inlet protection • Overland flow diversion swales • Shaker grids and wash downs for vehicles leaving the construction site • Divert clean water around the site • Dust control measures. Erosion and sediment control measures will be implemented before any construction starts and are not to be removed until the works are complete and areas are stabilised.
S4	Prepare and implement a CMP which includes appropriate dust control measures.
S5	Manage vehicle access to, from and within the site to limit the amount of material that could be picked up by vehicles and moved onto local roads.
Contamination	
C1	An Unexpected Finds (Waste) Protocol would be established and implemented as part of the CMP and would address the management of potentially contaminated, hazardous or unsuitable material encountered during the site works.
C2	The CMP prepared by the contractor will include:

Reference	Mitigation Measure
	- Fuel and chemical storage requirements - Safety Data Sheet (SDS) register and requirements - Refuelling protocols - Spill management and response procedures
C3	Machinery, plant, equipment and chemical storage containers will be checked weekly for leaks and defects. Equipment will not be used if there are signs of leaks and defects.
Hydrology (Surface water and flooding)	
SW1	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP.
SW2	A dewatering and discharge procedure would be prepared as part of the SWMP.
SW3	All fuels, chemicals, and liquids will be stored at least 50 metres away from any drainage line as far as is practicable and will be stored in an impervious bunded and covered area within the compound site.
SW4	Visual monitoring of local water quality (i.e. turbidity, sheen, oil and grease) will be undertaken regularly to identify any potential water quality issues.
SW5	Upstream overland water flows would be diverted around the worksite in accordance with the Blue Book.
SW6	A water monitoring program will be developed as part of the CMP to ensure that mitigation measures are operating effectively. The monitoring program will include surface water and groundwater.
Bush Fire	
BF1	An Emergency Response Plan will be prepared by the Contractor as part of the CMP and will include: - Management of the site in the event of a bush fire - Limiting practices that could cause bush fire - Assembly points and emergency evacuation procedures.
Visual	
V1	Where practicable, the trees outside of the immediate Stage 1 early works footprint and associated scope of works that require removal as part of the Asset Protection Zone (APZ) will be retained until Stage 2 construction works, to reduce the visual impact of Stage 1 works.
Air Quality	
A1	An Air Quality Management Plan (AQMP) will be prepared and implemented by the Contractor as part of the CMP. The AQMP will include: - Measures to minimise fugitive dust, including through disturbance minimisation and water suppression of exposed areas and roads. - Appropriate stockpile management procedures including covering in line with Blue Book requirements - Monitoring of weather forecasts for adverse weather conditions and measures to secure the site to avoid major dust risks.
A2	Vehicles and plant are to be fitted with suitable pollution reduction devices wherever possible and maintained according to manufacturer's specifications.

Reference	Mitigation Measure
A3	Cover vehicle loads when transporting material off- site.
Waste	
WM1	A Waste Management Plan (WMP) will be prepared and implemented by the Contractor as part of the CMP to manage any construction waste. The WMP will include but not be limited to: • Measures to avoid and minimise waste associated with the project. • The procedure for assessing, classifying and storing waste in accordance with the EPA's Waste Classification Guidelines (<i>EPA, 2014</i>) and management options. • Procedures for transport and disposal of waste. • Monitoring, record keeping and reporting requirements.
Health and safety	
H&S1	The CMP for Stage 1 works shall include relevant management and mitigation measures to protect health and safety of workers and the general public.
Socio-economy, land use and property	
SE1	Prior to commencement of Stage 1 works, the Council and the occupier of any land within 40 metres of the site boundary, must be notified in writing providing a project description and the expected dates for commencement and completion of construction works and details of the construction program.
SE2	A site notice board must be located at the main entrance to the site in a prominent position and must include the following: • 24-hour contact person for the site; • Telephone and facsimile numbers and email addresses; and • Site activities and time frames.
SE3	A complaint handling procedure and register will be implemented to assist in recording and managing potential conflict with the local community during operations.
Climate Change and Sustainability	
CCS1	Reduce construction fuel usage by: • Use of fuel efficient construction plant and equipment. • Maintaining plant and equipment to efficient levels • Minimising the periods of idling plant. • Source materials locally, where possible, to reduced transport costs, including fuel usage.
CCS2	Chip cleared vegetation for use onsite.
Cumulative Impacts	
CU1	The CEMP would incorporate measures to manage cumulative construction impacts. The CEMP and relevant sub-plans would be reviewed and updated as required (such as when new work begins or if complaints are received) to incorporate potential cumulative impacts from surrounding development activities as they become known.

25.2 Stage 2 Management Measures for Consideration

Table 25-2 Summary of Stage 2 Detailed Design considerations

Reference	Mitigation Measure
General	
G7	A project specific Operational Environmental Management Plan (OEMP) will be prepared by the Hospital Operator, prior to operating the facility. This will consider and incorporate: - An operational WMP - An Emergency Response plan
G8	A complaint handling procedure and register will be implemented to assist in recording and managing potential conflict with the local community during operations.
Traffic and transport	
T2	Monitor demand for parking at Fieldsend Oval once the Enabling Works along Metford Road are complete to determine whether to extend the existing on-site carpark at Fieldsend Oval.
T3	A detailed Work Travel Plan for the NMH should be developed in consultation with relevant stakeholders prior to the opening of the hospital.
T4	Further traffic modelling of the New England Highway will be undertaken during stage 2 detailed design. This modelling will utilise the existing SIDRA model and will include new data from updated RMS surveys which will occur during July / August 2018.
Noise and Vibration	
N2	Ensure that the Stage 2 detailed design includes opportunities for noise mitigation including: - Required separation or buffer distances. - Consideration of building materials to reduce internal noise. - Consideration of the placement of noisy activities in relation to sensitive receivers (such as loading dock, helipad and hospital services). - Inclusion of physical barriers minimising both visual and acoustic impact.
N3	The building façade is to be designed in order to meet the internal design noise levels in the presence of helicopter operations as per NSW HI Engineering Services Guidelines.
N4	During Stage 2 detailed design consider the following design factors to minimise operational noise impacts: - Position mechanical plant away from nearby receivers. - Screening around mechanical plant. - Complete acoustic insulation within duct work.
Biodiversity	
B7	Supplementary planting is to be undertaken prior to opening of the hospital within the approximately 0.4 hectare predominantly cleared area along the southern boundary of Lot 7314 to facilitate greater movement for the Squirrel Glider between stands of bushland on Lot 7314, in accordance with recommendations provided in the Biodiversity Assessment Report.
B8	All new fencing, including security fencing associated with the New Maitland Hospital, that will intersect remnant forest on the site, avoid use of barbed wire to avoid injury / mortality to all flying / gliding fauna.

Reference	Mitigation Measure
B9	It is recommended that night lighting be installed as far from the retained bushland habitats on Lot 7314 as possible and that such lighting be directed away from such habitats to minimise nocturnal light spill.
Contamination	
C4	Safety Data Sheets (SDS) will be located on-site and in compounds where chemicals are stored or used, and will be up to date (less than five years old).
C5	A Hazardous Substances Chemical Register will be available on-site and in compounds where chemicals are stored or used, and will be kept up to date.
C6	Fuels and chemicals will be stored appropriately.
Hydrology (Surface water and flooding)	
SW7	An Integrated water management plan will be developed and implemented and will include: • Consideration of stormwater capture, harvesting and reuse. • Management of water quantity and quality. • Procedures for spill response.
SW8	Building drainage systems, road and carparking drainage shall comply with AS3500.3 – 2003.
Bush Fire	
BF2	Ensure that there is adequate access to water supply for firefighting purposes.
BF3	Implement a 70m asset protection zone around the perimeter of the hospital building footprint and ensure that the APZ is maintained.
B4	Ensure that necessary utilities are safely installed and comply with relevant Australian standards including: • Electrical equipment such as electrical cabling, is to be installed in accordance with AS 3000:2007 Electrical installations. • Fire Hydrant spacing, sizing and pressures of mains shall comply with A.S. 2419.1 – 2005. • Reticulated or bottled gas on the lot is to be installed and maintained in accordance with Australian Standard AS/NZS 1596 'The storage and handling of LP Gas' (Standards Australia 2014).
BF5	Ensure the proposed access complies with the internal road access provisions of Planning for Bushfire Protection 2006 Guidelines. This includes provision of adequate internal access for emergency service vehicles including Fire and Rescue NSW and NSW Rural Fire Service Appliances, such that acceptable access is provided to the full perimeter of the development.
BF6	The multi-level carpark on the eastern elevation will be constructed from non-combustible materials.
Visual	
V2	A landscape plan will be completed as part of Stage 2 design documentation.
V3	Lighting shall be designed in consideration of AS 4282 - Control of the obtrusive effects of outdoor lighting.
V4	Where possible, minimise clearing of the iron bark forest on the south-western sector of the site with vegetation to be retained as both a natural feature and also a buffer between the new Hospital development and the existing residential development to the south of the site.
Air Quality	
A4	Stage 2 detailed design should consider factors such as: • Ventilation design – moving air from “clean areas” to “dirty areas”.

Reference	Mitigation Measure
	- Position of plant and facilities. - Emissions stacks should be insulated and above the highest point of the hospital roof to promote dispersion. - Position north facing windows close to ceiling height to increase the level of sunlight entering the building which can act as a natural disinfectant. - Avoiding capture and recirculation of air pollution downwind of the building. - Building shape to prevent wind speed increases.
Health and Safety	
H&S2	Review and adapt safety precautions into the design of the facility.
H&S3	Addition of pedestrian facilities into the design of the facility.
H&S4	Stage 2 detailed design should consider appropriate pedestrian and cyclist facilities including bicycle parking and end of trip facilities.
Climate Change and Sustainability	
CCS3	The following climate change design considerations to be investigated during stage 2 SSI application: - Resilience to climate change – ensuring that design accounts for extra risks associated with increased extreme heat days, heavy rainfall events and greater risk of bushfire. - Materials selection – use of materials for sustainable sources where available. - Use of heat and water recovery systems. - Shading and landscaped areas for user comfort during extreme heat. - Use of energy and water efficient equipment including efficient irrigation systems
Aviation	
Av1	Complete a formal survey of the Obstacle Limitation Surface (OLS) for the Helicopter Landing Site.
Av2	The following guidelines will be considered during stage 2 detailed design: - Civil Aviation Advisory Publication (CAAP) 92-2 - <i>Guidelines for the establishment and operation of onshore Helicopter Landing Sites</i> (2014). - Draft Guideline – Protecting Strategically Important Helicopter Landing Sites (Department of Infrastructure). - NSW health - GL2018_010 Guidelines for Hospital Helicopter Landing Sites in NSW (2018).
Av3	Consider lighting in the vicinity of the aerodrome in design.
Av4	Consider future obstructions or proposed developments

25.3 Health Infrastructure Project Commitments

Upgrade to Chelmsford Drive/ Metford Road

To improve access to the site, the Chelmsford Drive/ Metford Road intersection will be upgraded as part of the NMH works.

The Chelmsford Drive/Metford Road roundabout works and Metford Road path will be undertaken by HI separate to the subject Stage 1 SSI Application and will be assessed under Part 5 of the EP&A Act, and the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

The final design of the roundabout and associated footpath connection on Metford Road will be developed between Council and Health Infrastructure.

New England Highway Traffic Modelling

Analysis of the New England Highway between Mitchell Road and Chisholm Road (inclusive of the New England Highway / Chelmsford Road intersection) will be completed in consultation with Roads and Maritime and Health Infrastructure after the final stage of the Stockland Green Hills Shopping Centre development opens (July / August 2018 outside of school holiday periods). The New England Highway analysis will be completed using the SIDRA modelling and will be included in Stage 2 of the staged infrastructure application for the proposed NMH.

26. Conclusion

This chapter provides the justification for the Proposal taking into account its biophysical, social and economic impacts, the suitability of the Site and whether or not the Proposal is in the public interest. The Proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development (ESD) as defined in Schedule 2 of the EP&A Regulation.

26.1 Justification for the development

The proposal, identified as SSI, has been subject to an environmental impact assessment under Part 5 of the EP&A Act 1979. This EIS has examined and taken into account all matters affecting or likely to affect the environment by reason of the proposed activity.

The environmental impact assessment that was undertaken concludes that whilst the Proposal would have some impacts on traffic, biodiversity, heritage and public amenity, these impacts are not significant and can be reduced to an acceptable level with the implementation of the appropriate mitigation and management measures identified in Chapter 25 or managed through detailed design.

26.2 Benefits of the proposal

The proposed development represents a significant redevelopment of the existing Maitland and Hunter region Health Services and will deliver substantial improvements to the level of health care in the Hunter New England Local Health District (LHD). The region is experiencing health demands from a growing and ageing population and the existing Maitland Hospital cannot support the growth and change in the type of services needed to meet health care demands as it is already operating at 97 % capacity.

The Project would provide a substantial public benefit through the provision of required health services. This resource would contribute to meeting current and projected future demand for such health services associated with the future growth of the Hunter New England LHD. The construction and operation of the NMH would also increase employment within the Maitland LGA, and facilitate the growth and support of a skilled, competent and capable health related workforce in the Region.

The Proposal will have a net positive outcome of the health and wellbeing of the community and these social and economic benefits are considered to outweigh the residual environmental impacts identified in this EIS.

26.3 Ecologically sustainable development

Clause 7(1)(f) of the EP&A Regulation requires an EIS to provide justification for a development with specific reference to the principles of ecologically sustainable development (ESD) as set out in the Regulation. This is provided below.

26.3.1 The precautionary principle

This principle states *‘if there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation’*.

This EIS has been prepared utilising the precautionary principle. An analysis of alternative options specifically around site selection was undertaken to weigh the impacts of each option and reduce the risk of serious and irreversible impacts on the environment.

A range of specialist studies were also undertaken as part of the EIS to assess key issues in detail, provide impartial specialist input to assist in the development process, and identify appropriate mitigation and management strategies.

26.3.2 Inter-generational equity

This principle states, *‘the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations’*.

The Proposal would result in amenity impacts however would not result in any impacts that are likely to adversely impact on the health, diversity or productivity of the environment for future generations. The Proposal would benefit future generations by improving access to health facilities for future generations.

Should the Proposal not proceed, the principle of intergenerational equity may be compromised, as demand for healthcare facilities will increase over time and the existing Maitland Hospital is already at capacity. The proposal has been developed to directly benefit current and future generation in that it contributes to the health services of the community without causing significant environmental impact.

26.3.3 Conservation of biological diversity and ecological integrity

This principle states the *‘diversity of genes, species, populations and communities, as well as the ecosystems and habitats to which they belong, must be maintained and improved to ensure their survival’*.

The environment in which the proposal would be located is predominantly cleared due to past mining operations. However, an area of 2.45 ha would be impacted as understorey clearing and removal of trees would be required to meet the APZ requirements.

An assessment of the existing local environment was carried out to identify and manage any potential impacts of the proposal on local biodiversity. Specific design efforts have been taken to minimise impacts upon vegetation.

The Proposal would not have a significant impact on biological diversity and ecological integrity. A biodiversity assessment and appropriate site-specific safeguards are provided in Section 10 and **Appendix E**.

26.3.4 Improved valuation, pricing and incentive mechanisms

This principle requires *‘costs to the environment should be factored into the economic costs of a project’*.

The environmental consequences of the Proposal have been assessed in this EIS and mitigation measures identified for factors with potential for adverse impact. Implementing the mitigation measures would impose an economic cost on HI, the Contractor employed to complete the works, and the operator increasing both the capital and operating costs of the Proposal. This signifies that environmental resources have been given appropriate valuation.

The Proposal has been designed with an objective of minimising potential impacts on the surrounding environment. This indicates that the concept design for the Proposal has been developed with an environmental objective in mind.

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Appendix A

Secretary's Environmental Assessment Requirements (SEARs)

Appendix B

Contamination Assessment (Phase 2 Environmental Site Assessment Report, Phase 2 Environmental Site Assessment Addendum Letter and Site Audit Statement)

Appendix C

Bush Fire Assessment Report

Appendix D

Water Impact Assessment Reports (Storm Water Management Plan and Surface Water and Groundwater Assessment)

Appendix E

Biodiversity Impact Assessment Reports (Biodiversity Assessment Report and Biodiversity peer review)

Appendix F

Traffic Impact Assessment

Appendix G

Draft Construction Environment Management Plan (CEMP)

Appendix H

Infrastructure Management Plan

Appendix I

Stage 1 Site Plan and Survey

Appendix J

Heritage Assessment Reports (Aboriginal Cultural Heritage Assessment and Historic Heritage Assessment)

Appendix K

Design Reports and Plans (Architectural Design Statement and Master Planning Set)

Appendix L

Community Consultation

Appendix M

Noise and Vibration Assessment

Appendix N

Geotechnical Report

Appendix O

Air Quality Report

Appendix P

Preliminary Aviation Report

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New Maitland Hospital Environmental Impact Statement

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