

Appendix B – Mitigation Measures Table

Impact / Risk	Mitigation Measure	Timing	Responsibility
General			
Heritage			
Impacts upon undiscovered archaeological artefacts or archaeological potential	<p>An unexpected finds protocol (with appropriate induction) will be in place during works to identify and protect any artefacts that may be discovered. The unexpected find protocol shall be documented in the Contractor's Construction Management Plan based on Eco Logical's Statement of Heritage Impact and ACHAR as set out below.</p> <p>A standard unexpected finds process should be adopted during works associated with the proposal as a mitigation measure as follows:</p> <ul style="list-style-type: none"> An 'unexpected heritage find' can be defined as any unanticipated archaeological discovery, that has not been previously assessed or is not covered by an existing approval under the Heritage Act 1977 (Heritage Act) or National Parks and Wildlife Act 1974 (NPW Act). These discoveries are categorised as either: <ul style="list-style-type: none"> Aboriginal objects (archaeological remains i.e.: stone tools), Historic (non-Aboriginal) heritage items (archaeological remains (i.e.: artefacts) or movable objects) Human skeletal remains (reportable deaths, Aboriginal objects or relics) <p><u>Unexpected finds policy.</u></p> <p>Should any unexpected historical archaeology be uncovered during any future excavation works, the following procedure must be adhered to:</p> <ul style="list-style-type: none"> Stop all work in the immediate area of the item and notify the Project Manager. Establish a 'no-go zone' around the item. Use high visibility fencing, where practical. Inform all site personnel about the no-go zone. No work is to be undertaken within this zone until further investigations are completed. Engage a suitably qualified and experienced Archaeologist to assess the finds. 	Construction	Contractor

Impact / Risk	Mitigation Measure	Timing	Responsibility
	<ul style="list-style-type: none"> The Heritage Council must be notified if the finds are of local or state significance. Additional approvals will be required before works can recommence on site. If the item is assessed as not a 'relic', a 'heritage item' or an 'Aboriginal object' by the Archaeologist, work can proceed with advice provided in writing. <p>Should any unexpected human skeletal remains be uncovered during any future excavation works, the following procedure must be adhered to: If any human remains are disturbed in, on or under the land, you must:</p> <ul style="list-style-type: none"> not further disturb or move these remains immediately cease all work at the particular location notify NSW Police notify Heritage NSW Environment Line on 131 555 as soon as practicable and provide available details of the remains and their location not recommence any work at the particular location unless authorised in writing by Heritage NSW. <p>Unexpected Aboriginal objects remain protected by the National Parks and Wildlife Act 1974. If any such objects, or potential objects, are uncovered during works, all work in the vicinity should cease immediately. A qualified archaeologist should be contacted to assess the find and Heritage NSW and Nowra LALC must be notified.</p>		
Interpretation of Aboriginal cultural heritage significance into the Redevelopment	<p>The key aim of heritage interpretation would be to connect to contemporary experience of hospital staff, patients and visitors with the Aboriginal cultural values associated with the Shoalhaven/Nowra area. Heritage interpretation elements at the site may include:</p> <ul style="list-style-type: none"> Engaging Aboriginal artists to develop designs/artworks that could be incorporated into the built form through design features such as: <ul style="list-style-type: none"> Paving Murals Artwork Incorporating local Tharawal words and language into naming conventions within the building (room names, floor names), in consultation with RAPs. Any landscaping or plantings surrounding the hospital buildings could incorporate traditional Tharawal bush medicine that are native to the bioregion such as: <ul style="list-style-type: none"> Pig Face (Tharawal name: 'Kupburril') Coastal tea tree ('Ban-ban') Bracken fern ('Gunggai') Blueberry ash ('Tdjeunen') Ivy-leaved violet ('Warrabira') 	Prior to Operation	Health Infrastructure / LHD

Impact / Risk	Mitigation Measure	Timing	Responsibility
	<ul style="list-style-type: none"> ○ Kangaroo apple ('Goo-nee-gang') • Providing interpretive information regarding the Aboriginal history of the site within common areas, developed in consultation with RAPs 		
Construction			
Hazardous building materials			
Identification of hazardous materials	Prior to demolition works, JBS&G's Hazardous Building Materials Survey (and addendum) must be provided to the demolition/building contractor.	Prior to commencement of works	Health Infrastructure
	Areas inaccessible during the hazardous material assessment should be inspected by a suitably qualified competent person prior to any works commencing. Suspected ACM should be sampled by a suitably qualified competent person prior to any works commencing.		Contractor Contractor
Management of asbestos containing materials	<p>A Class A or B licensed asbestos removalist shall be engaged to remove all asbestos containing materials as identified in the JBS&G Hazardous Materials Register (Appendix A). Removal and disposal of non-friable asbestos materials shall be undertaken in accordance with the Work Health and Safety Act (2011), Work Health and Safety Regulation (2017) and SWNSW 2019a.</p> <p>While not mandatory during the removal of non-friable ACM, it is considered best practice and recommended that asbestos air monitoring is undertaken during any non-friable asbestos removal works.</p> <p>Following removal works, a clearance inspection shall be completed by a competent person or licensed asbestos assessor to ensure that the asbestos materials identified at the site have been removed to a satisfactory standard. Following the completion of the clearance inspection, a clearance certificate shall be issued by the competent person or LAA to confirm that the ACM has been successfully removed and that the site is suitable for planned demolition works to commence.</p>	<p>Prior to and during demolition</p> <p>Following demolition</p>	Contractor
Management of lead containing dust	A suitably experienced hazardous materials removal contractor should be engaged to remove the lead containing dust in accordance with the AS4361.2-2017 prior to the commencement of any demolition or refurbishment works.	Prior to commencement of works	Contractor
Management of lead paint surfaces	The lead based paints, as identified in JBS&G Hazardous Materials Register (Appendix A), ranged in condition from good to fair and should be managed in accordance with the AS4361.2-2017. Where peeling or deteriorated they should be removed under controlled conditions by an experienced contractor prior to demolition.	<p>Prior to commencement of works</p> <p>Demolition</p>	Contractor

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	Stable lead based paints adhered to building fabric can be disposed as general solid waste in accordance with NSW EPA 2014 provided care is taken to minimise any potential for paint flakes to be dispersed onto ground surfaces and building and demolition waste is not proposed to be recycled.		
Management of Synthetic Mineral Fibres (SMFs)	All SMF containing materials must be removed in accordance with the relevant National Standard and Codes and by an experienced hazardous materials removal contractor. SMF materials can be removed with the building and demolition waste with care taken not to generate fibres. Appropriate PPE is recommended including the use of P2 respirator as minimum and appropriate removal methodology as outlined in [NOHSC: 1004(1990)] and [NOHSC: 2006(1990)].	Demolition	Contractor
Unexpected Finds	Any materials deemed to be consistent with those detailed in the Hazardous Materials Register that have not been previously identified should be assumed to have the same content and be treated accordingly. All demolition works are to be undertaken in accordance with a site Unexpected Find Protocol, whereby, in the event that an unexpected hazardous material is encountered during demolition works, works should cease and an assessment of the material completed by an appropriately qualified and experienced hazardous materials surveyor and/or Licensed Asbestos Assessor. Should any additional suspected hazardous materials be observed during or prior to demolition works, works should cease until a suitably qualified occupational hygienist can assess the suspected hazardous material and provide appropriate recommendations for management and/or removal.	Demolition	Contractor
Contamination			
Unexpected Finds	Future ground disturbance works should be undertaken in accordance with a Construction Environmental Management Plan (CEMP) with an Unexpected Finds Protocol that outlines appropriate actions in the event that potentially contaminated materials are identified. If potentially contaminated materials are identified then a more detailed assessment for will be required as detailed in the ASC NEPM (NEPC, 2013).	Construction	Contractor
	Site workers (including remedial contractors and the nominated environmental consultant) must be vigilant for materials that may impact the soil suitability for the proposed land use, particularly for soils intended to remain following remediation works. Unexpected finds include, but are not limited to, odour, visual contamination, anthropogenic materials (i.e. large quantities of building materials), asbestos containing material, underground storage tanks (UST), or any other suspect materials.	Construction	Contractor

Impact / Risk	Mitigation Measure	Timing	Responsibility
	<p>Any unexpected finds will be reported to the Site Manager immediately. Additionally, the site owner/occupier should be informed as soon as practical following an unexpected find.</p> <p>If an unexpected find is discovered during excavations the Contractor shall:</p> <ul style="list-style-type: none"> • Cease all work in that vicinity • Remove workers from the vicinity and limit access to the area (i.e. fencing, bunting or signage) • An experienced environmental consultant should be contacted to assess the potential risks associated with the Unexpected Finds and provide appropriate management options • Investigate the nature of the risk of the materials, determine the appropriate response and document the actions in accordance with contractual obligations. <p>In the event of a serious unexpected find, which could cause immediate harm to human health and/or the environment, Shoalhaven City Council, Health Infrastructure NSW, and the NSW EPA may need to be informed.</p> <p>In the event potential heritage items are encountered during excavations, works will cease and the Site Manager notified.</p>		
Biodiversity loss			
Manage risks to flora and fauna during construction activities	<p>To avoid critical life cycle events such as breeding or nursing a pre-clearance survey should be carried out to ensure fauna are not present (breeding) prior to clearing.</p> <p>To ensure clearing works minimise the likelihood of injuring resident fauna, the pre-clearance survey of trees to be removed and the identification/location of active nests shall be undertaken by a suitably qualified ecologist.</p> <p>To prevent risk of injury or death of any nesting fauna within the development footprint, the pre-clearance survey shall be undertaken by a suitably qualified ecologist in order to identify any active nests in non-native vegetation.</p> <p>To protect trees to be retained on the development site from any accidental impacts, trees are to be protected with temporary fencing to delineate tree protection zones before and during works.</p>	Prior to commencement of construction	Contractor

Impact / Risk	Mitigation Measure	Timing	Responsibility
Tree removal / protection			
Tree Protection during works	Trees to be retained will require tree protection fencing and signage along with trunk protection for the street trees.	Detailed finalisation and prior to commencement of construction	Contractor
	Trees to be protected: Trees to be retained will be required to be fenced for protection. All fencing shall be installed as specified in Section 5.2 (Tree Protection –Implementation of Tree Protection Zone). Indicative locations of the fencing are shown in the Tree Protection Plan (Plan 3, Appendix 1 of the Moore Trees report).		
	Implementation of Tree Protection Zone: All tree protection works should be carried out before the start of demolition or building work. It is recommended that chain mesh fencing with a minimum height of 1.8 metres be erected as shown in the Tree Protection Plan (Appendix 1). Specifications for this fencing are shown in Tree Protection Fencing Specifications (Appendix 5) and are based on The Australian Standard Protection of trees on development sites, AS 4970, 2009	Prior to commencement of and during construction	
	Individual trunk protection: Street trees numbered as 57-60, 62, 74-77 and 101 will require trunk protection to be installed prior to any demolition works occurring. This is achieved by attaching lengths of timber (75mm x 50mm x 2000mm) fastened around the trunk. Geotextile fabric or carpet underlay shall be wrapped around the trunk prior to the timbers being attached. These timbers are to be fastened with hoop iron strapping and not attached directly into the bark of the tree. These timbers are only to be removed when all construction is complete. See Plate 12 for an example of trunk protection. This trunk protection is based on The Australian Standard Protection of trees on development sites, AS 4970, 2009.	Prior to commencement of and during construction	
	Building material storage: Areas on the site shall have to be set aside for the exclusive use of: <ul style="list-style-type: none"> • Construction access points • Position of site sheds and latrines and temporary services • Storage of materials These points are to be outside of any TPZ area. Any area set aside for the stockpiling of soil and waste shall have the appropriate erosion control measures around this area as specified by an engineer. These erosion control measures shall be monitored and maintained regularly throughout the construction period of the site. These measures are to restrict any waste material entering the TPZ areas of the trees to be retained.	Prior to commencement of and during construction	
	The location of services may potentially impact on the site trees and their root systems. Strip trenching through TPZ areas can sever roots, thus destabilising trees. All disciplines that have to plan service locations that require trenching have been supplied the TPZ distances in this report previously, so that major incursions of greater than 10% can be avoided. These disciplines may include, but not be limited to; stormwater design, gas, water and electricity locations.		

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	<p>The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ): The TPZ is implemented to ensure the protection of the trunk and branches of the subject tree. The TPZ is based on the Diameter at Breast Height (DBH) of the tree. The SRZ is also a radial measurement from the trunk used to protect and restrict damage to the roots of the tree.</p> <p>The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) have been measured from the centre of the trunk. TPZ and SRZ distances are all listed in the Tree Schedule (Appendix 2). The following activities shall be avoided within the TPZ and SRZ of the site trees to be retained;</p> <ul style="list-style-type: none"> • Erecting site sheds or portable toilets. • Trenching, ripping or cultivation of soil (with the exception of approved foundations and underground services). • Soil level changes or fill material (pier and beam or suspended slab construction are acceptable). • Storage of building materials. • Disposal of waste materials, solid or liquid. 		
	<p>Tree Damage: If the retained trees are damaged, a qualified Arborist should be contacted as soon as possible. The Arborist will recommend remedial action so as to reduce any long term adverse effect on the tree's health.</p>		
	<p>Signage: It is recommended that signage is attached to the tree protection fencing. A sample sign has been attached in Appendix 6. This sign may be copied and laminated then attached to any TPZ fencing area and at least on every fifth fencing panel.</p>		
	<p>Root Pruning: If excavations are required within a TPZ this excavation shall be done by hand to expose any roots. Any roots under fifty (50) millimetres in diameter may be pruned cleanly with a sharp saw. Tree root systems are essential for the health and stability of the tree. Severed roots shall be treated with Steriprune®, available at most large Hardware Stores.</p>		
	<p>Arborist Certification: It is recommended that the contractor supply the Principal Certifying Authority with certification from the Project Arborist three (3) times during the construction phase of the development in order to verify that retained trees have been correctly retained and protected as per the tender conditions of consent and Arborist's recommendations. The certification is to be conducted by a Qualified Consulting Arborist with AQF level 5 qualifications that has current membership with either Arboriculture Australia (AA) or Institute of Australian Consulting Arboriculturists (IACA). Arborist certification is recommended:</p>		

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	(1) Before the commencement of demolition or construction to confirm the trunk protection and fencing has been installed; (2) At mid point of the construction phase; (3) At completion of the construction phase		
Stormwater management - sediment and erosion control			
Managing water quality	Sediment and erosion control measures shall be employed throughout the works.	Construction	Contractor
Traffic and parking			
Construction traffic management	A Construction Traffic Management Plan (CTMP) shall be prepared to establish that the project can be constructed while maintaining safe access and use of the road network. The CTMP shall be continually reviewed and amended if required, due to changes in design, or additional requirements of DPE, Shoalhaven City Council, TfNSW or any other authority requirements.	Prior to the commencement of works Construction	Contractor
Amenity - air quality (dust / odours)			
Air quality	A Construction Management Plan and Environmental Management Plan shall be prepared to minimise and mitigate the impacts of construction with respect to dust, odour and any other air quality related matters. Air monitors are to be provided and monitored during any demolition, bulk earthworks and other construction activities that may likely generate potential air quality issues / disturbance.	Prior to and during construction	Contractor
Amenity – noise and vibration			
Managing construction noise and vibration	All works should be carried out in accordance with the EPA Interim Construction Noise Guideline and AS 2436. A construction noise management plan should be developed prior to construction commencing that includes: <ul style="list-style-type: none"> • Identification of sensitive receivers potentially impacted and nominates noise and vibration management objectives for each. • Identification of the proposed significant construction activities, plant and processes and times of site operation. • Predictions and assessments of noise and vibration impacts and recommends appropriate controls. • Nominated complaint handling procedures and responses, community liaison principles and site management practices to be adopted. Noise management measures as identified by Acoustic Logic in its Noise Impact Assessment shall be considered, adopted and employed as relevant to the circumstances of the case.	Construction	Contractor

Impact / Risk	Mitigation Measure	Timing	Responsibility
Waste generation			
Management of construction waste	To manage waste streams, quantities, and recycling and reuse during the demolition and construction stages of the works, a Waste Management Plan (WMP) shall be prepared and retained on-site during the demolition, excavation and construction phases of the development.	Construction	Contractor
Operation			
Stormwater management – water quantity			
Managing water quantity	The stormwater management system proposed for the works, including on-site detention, rainwater tank, WSUD measures, and pits and pipes connecting to Council's stormwater system shall be provided.	Construction and operation	Contractor
Stormwater management – water quality			
Managing water quality	The water quality strategy proposed for the works, including water quality treatment measures such as rainwater tank, OceanGuard (or equivalent) pit baskets and stormfilter cartridges, stormfilter cartridge chambers, shall be provided.	Construction and operation	Contractor
Bushfire			
Compliance with Planning for Bushfire Protection 2019	The identified existing APZ shall be maintained in perpetuity to the specifications as set out in Appendix A of the Eco Logical Bushfire Assessment.	Operation	LHD
	Any future landscaping shall meet the requirements of Planning for Bushfire Protection 2019 as listed in Appendix A.		
	Gas services shall be installed and maintained in accordance with AS/NZS 1596:2014		
	A Bushfire Emergency Management and Evacuation Plan shall be developed or updated prior to the occupation of the building.	Prior to Operation	LHD
Amenity - lighting			
Lighting impacts outside of the hospital	All external lighting local to the Stage 2 Redevelopment will be designed in accordance with both AS/NZS 1158.3.1 Lighting for roads and public spaces series and AS 4282 Control of Obtrusive Lighting.	Design Development	Health Infrastructure
	Careful consideration will be given to not only neighbouring sites, but also existing buildings and infrastructure internal to the hospital campus.	Design Finalisation and Construction	Contractor
Amenity – noise			
Management of operational noise impacts	An assessment of noise emissions from mechanical plant is to be carried out prior to the granting of a CC and certification provided that the proposed plant and acoustic treatment will achieve compliance with the assessment criteria established in this assessment.	Design Development	Health Infrastructure
	Sliding screen enclosing loading dock area to be imperforate and indicatively constructed of material with surface density >4.5kg/m2 (i.e. sheet metal). The specific make-up and construction is to be determined during design phases.	Design Finalisation and Construction	Contractor

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	Alternative proposals can be considered acceptable provided noise emission goals are satisfied.		
	Garbage collections should occur between the hours of 7am and 10pm.	Operation	LHD
	Loading dock not to be in use prior to 6am.		
	Loading/unloading activities in the dock area to be undertaken by behind a closed sliding screen (loading dock entry).		
Amenity - wind			
Wind impacts upon the external environment of the development	To mitigate or manage the wind environment at the development a management plan may be required for use of these terraces during helicopter operations. Any furniture on these terraces should be fixed and the use of outward opening swing doors should be reviewed.	Operation	LHD
Traffic and parking			
Green Travel Plan	<p>A Green Travel Plan (GTP) shall be prepared by a suitably qualified traffic consultant in consultation with Transport for NSW and shall promote the use of active and sustainable transport modes.</p> <p>The plan shall include:</p> <ul style="list-style-type: none"> Objectives and modes share targets Measures to encourage staff to park in dedicated staff car parks Facilities and measures to promote public transport usage, car share schemes and employee incentives Measures to promote and support the implementation of the plan, including financial and human resource requirements, roles and responsibilities for relevant employees involved in the implementation of the GTP Monitoring regime 	Prior to commencement of operation and ongoing	HI / LHD
Parking supply and demand	Future traffic and parking studies shall be undertaken at 18 and 36 months after opening of the building to determine any further actions required to address traffic and parking impacts into the future.	Following commencement of operation	Health Infrastructure
ESD measures			
Providing for and improving the building's efficiency and ESD credentials	The development shall apply the HI NSW Design Guide Note (DGN) No. 058 Ecological Sustainable Design guide (DGN 058) and achieve the equivalent of a 5-star Green Star Design & As Built v1.3 rating and an improvement in performance of at least 10% over NCC 2019 Section J DTS requirements.	<p>Design Development</p> <p>Design Finalisation and Construction</p> <p>Operation</p>	<p>Health Infrastructure</p> <p>Contractor</p> <p>LHD</p>

Impact / Risk	Mitigation Measure	Timing	Responsibility
Hazardous goods (SEPP 33)			
Hazardous / Dangerous Goods handling	<p>The ensure there is no risk to off-site populations:</p> <ul style="list-style-type: none"> To achieve the required 4 m separation distance to the site boundary, either the bulk oxygen tanks need to be moved further away or a protective enclosure must be built in accordance with Section 5.4 of the Arup PHA. <p>To ensure there is no risk to on-site populations, Arup makes the following recommendations:</p> <ul style="list-style-type: none"> Avoid any combustible materials, this includes combustible vegetation (includes, but not limited dry grass, brush, weeds, green waste, dead or dying trees, litter or other flammable vegetation that creates a fire hazard), within 12 m. This separation can be achieved using the protective enclosure as outlined in Figure 4 of the Arup PHA. Ensure there are no public assembly points within 12 m of the oxygen tanks, this includes emergency evacuation assembly points. This separation can be achieved using the protective enclosure as outlined in Figure 4 of the Arup PHA. 	<p>Design Finalisation and Construction</p> <p>Operation</p>	Contractor
Waste Generation			
Waste Management	To management waste generation consistent with the objectives and outcomes of the WSP Operational Waste Management Plan, the education, waste management performance monitoring, implementation strategies, and ongoing monitoring and review shall be undertaken.	Operation	LHD