



Appendix E – Mitigation Measures

Table 1. Proposed Mitigation Measures

Item / Impact	Supporting Documentation	Recommended Mitigation Measures
Construction Noise and Vibrations	Appendix 20 – Noise and Vibration Impact Assessment	Construction Noise: - A detailed Construction Noise and Vibration Management Plan (CNVMP) should be prepared at the construction certificate stage. Where reasonable and feasible, these measures should be employed throughout the duration of construction. Construction Vibration: - Preliminary Vibration Survey for each vibration generating piece of plant, if proposed to be operated within the minimum recommended distances of TfNSW's <i>Construction Noise and Vibration Guideline</i> of a sensitive receiver.
Operational Noise and Vibrations		Siren Noise: - Ambulance sirens should be turned off by the time they arrive at the hospital, if practicable. Mechanical Plant: - A detailed acoustic assessment of the selected mechanical plant equipment to be undertaken at the construction certificate stage. - Locate the mechanical equipment as far as practicable from sensitive noise receivers. - Use in-duct treatments, such as internally lined ductwork or attenuators where possible.
Construction Traffic	Appendix 11 – Preliminary Construction Traffic Management Plan	General requirements: All vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, dust or dirt particles depositing onto the roadway during travel to and from the site.



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		- Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances. No construction vehicles are permitted to double park, park on the public road, or use public parking facilities. - No building, demolition, excavation or material of any nature and no hoist, plant and machinery (crane, concrete pump or lift) shall be placed on Council's footpaths, roadways, parks or grass verges without Council approval. - All unloading activities will be conducted within the site boundary or designated work zones (subject to Council approval). - There will be a need for traffic control measures to facilitate the entry and egress of the construction vehicles. This is to be confirmed by the appointed contractor. Traffic Guidance Scheme (TGS): - Articulated Vehicles require a TGS at South Street and Montgomery to enable safe access to the clinical tower site. Lead contractor will coordinate with nearby construction sites to minimise overlapping. - Where general truck access and egress to the site is occurring on a day-to-day basis, gate controllers (in the form of accredited Traffic Controllers (TCs)) shall manage construction traffic. Appropriate signage on public roads is required to advise drivers of the presence of Traffic Controllers. - All works will be managed within the site boundaries or under traffic control measures that do not require full closure of the road. - Appropriate traffic management will be implemented to ensure safe movement of vehicles and pedestrians in the vicinity of the site, with resident access to driveways to be maintained at all times. - Each evening, upon completion of work, the contractor is to ensure signage is either covered or removed as required to advise motorists and nearby residents of any traffic changes.



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		- A minimum 14-day notification is to be provided to adjoining property owners prior to the implementation of any temporary traffic control measures. Pedestrian Management: - The site perimeter is to be maintained in a clean, well-illuminated, and safe manner at all times throughout the duration of the project. - Appropriate detour and signage shall be provided by the lead contractor where pedestrian movement along the footpaths that front the site are impeded. Signage will be prepared in consultation with on-site traffic control, and will ensure that any detour, footpath closure, or otherwise is undertaken in accordance with relevant guidelines. - At all times, pedestrians have right-of-way on the footpath, not construction vehicles. Oversized Vehicles: - The use of oversized vehicles is recommended to be restricted to evening or early morning to minimise impacts to the road network.
Visual Impact	Appendix 9 – Landscape and Visual Impact Assessment	Lighting: - Lighting for the site should be designed in accordance with AS/NZS 4282:2023 'Control of the obtrusive lighting effects of outdoor lighting' to reduce light-spillage related visual impacts. - Implementation of some light-spill control methods should be considered to maintain the assessed visual impact of the proposal, including: - Eliminating upward spill lighting by directing light downward - Shielded fittings - Energy-efficient bulbs - Asymmetric beams



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		○ Direction of light from reflective surfaces ○ Warm-white colours, where afforded ○ Curfew switch off for decorative lighting ○ Motion detector control lighting Façade Materiality: • The use of non-reflective surfaces should be utilised to minimise visual impact.
Safety and Security	Appendix 5 – Crime Prevention Report (CPTED), within Design Report	• Activated frontages for both sites have been incorporated into the design, including strategically located seating areas to next to large, glazed windows and placement of the clinical tower cafe, offering clear sightlines of the forecourt (main hospital site) and to within the clinical tower building. • Thoughtful internal layout arrangements, including centralized reception desks allow staff to have clear sightlines to all public entrances and throughout the lobbies. • After hours, the emergency department can only be accessed through the new airlock, which remains locked until reception staff visually confirm a visitor at the glazed door and grant permission to enter. • Landscape design minimises dense planting, to reduce visual concealment opportunities. • Access points have been strategically planned, separating pedestrian and vehicle entries, with separate ambulance, loading dock and public access points. This provides natural access control and minimises people's presence in unsuitable areas. • Mechanically controlled access to staff-only areas, including the basement radiation oncology unit. • Security-controlled pedestrian links between staff and public areas to ensure safety and operational efficiency.



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		CCTV monitoring of high-use areas (including ambulance bays, and internal waiting zones) to support active management and deter inappropriate behaviour.
Infrastructure Requirements	Appendix 36 – Infrastructure Requirements and Utilities Plan	Electrical Infrastructure: - Main switchboards (including main diesel generator switchboard) are to be housed in a 2-hour fire rated dedicated room/s to satisfy BCA and AS:3000 requirements. - The diesel generator is to be housed in a dedicated 2-hour fire rated room/s or in an acoustic enclosure. - An additional central uninterruptured power supply (UPS) is proposed to service the needs of the clinical tower site. - All major power supplies are to be metered/monitored to minimum NCC Section J requirements. - Electrical risers should be in a straight vertical line up the building where possible, to minimise offsets and bends to the rising cable system. - Electrical risers to back onto a 2-hour fire rated structure. Hydraulic Services: - A Section 73 Application is to be submitted to Sydney Water upon development approval. - A water-based fire protection system is proposed throughout the clinical tower building, including: - Automatic fire sprinkler suppression system - Fire hydrant protection system - Fire hose reel protection system Water Minimisation:



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		• Efficient hot water plant with a flow and return system and suitable insulation to meet NCC requirements. • Sub-metering will be provided to monitor and record the hot-water consumption, as well as irrigation systems, water fixtures and water use for the mechanical systems. This will enable ongoing tracking for identification of targeted strategies to minimise operational water consumption. • Potable water consumption to be monitored through electronic system capable of capturing and processing data produced by the sub-meters to meet ESD requirements. • An automatic monitoring system for hydraulic plant and equipment will be capable of alerting any faults or failures of machinery.
Ecologically Sustainable Development	Appendix 15 – Ecologically Sustainable Development Report Appendix 16 – Net Zero Statement	Design: The clinical tower has been designed to ensure the following: • Upfront carbon emissions are at least 10% less than those of a reference building. • The building's energy use is at least 20% less than a reference building. • A 30% reduction in life cycle impacts when compared to standard practice. • Ramsay Health Care (hospital operators) have announced a 42% reduction in greenhouse gas emissions by 2030 and net zero by 2040. The clinical tower has been designed to align with these ambitions. • A U-Value of U2.5 A Life Cycle Assessment is to be completed during the detailed design/construction certificate stage, to limit the environmental impact of the proposal (including selection of third party certified internal finishes, flooring, paints, doors, internal windows, joinery etc).



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		An Implementation Plan has been developed based on best practice principles, which aligns with recognised targets including Green Star. This is provided within the ESD Report to guide the detail design/construction certificate plans, to ensure that the project adheres to the precautionary principle and adopts best practice environmental measures. Electrification: • Heating for the clinical tower will be via 4-pipe chiller/heat pumps which will be more efficient than traditional electric heaters, especially when cooling and heating is required simultaneously. ◦ The 4-pipe system allows the heating to be produced as an output of cooling without rejection to the atmosphere. • Variable speed drives will be provided on the pumps so pump energy can be reduced according to actual building load. • All plantroom mounted air handling systems will utilise outside air economy cycles. • Lighting will be controlled in the building corridors and entrances with light level PE control. • The domestic hot water make up water will be preheated by the 4-pipe chillers. These chillers can produce cooling and heating without additional energy input whilst chilling. • All the power to the medical equipment will be separated metered from remaining distribution boards. • LED lighting is to be used. Net Zero: • The proposal will be self-assessed against the Green Star Buildings to achieve equivalent to a 4-star outcome.



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		- Implementation of a zero-carbon action plan is proposed, as part of Ramsay's (hospital operator) commitment to transitioning to zero emissions by 2040. - The clinical tower will utilise all electric heating and cooling through the use of 4-pipe chiller/heat pumps. - The clinical tower will continue to utilise diesel powered back-up generators as this is a requirement of an alternative energy source in the BCA. Ramsay Health Care (hospital operators) will implement carbon offsets for the diesel utilised. On-site Solar PV: 80 kW of PV will be provided as part of the development, at roof level of the clinical tower building. Waste Minimisation: - A Construction Environment Management Plan (CEMP) is to be prepared to ensure pollution and waste generation is minimised. - Maximising quantities of materials diverted from landfill by reusing, recycling, and reprocessing off-site. - Efficient fittings and fixtures designed to minimise water use within the building are to be implemented.
Aboriginal Cultural Heritage	Appendix 33 – Aboriginal Cultural Heritage Assessment Report Appendix 5 – Appendix D Connecting with Country, within Design Report	- In the event that unrecorded Aboriginal archaeological objects and/sites are identified, all works are to cease immediately in the area to prevent any further impacts. A qualified heritage consultant would be engaged to determine the nature, extent and scientific significance of the object. An AHIMS site card to be completed as necessary. - Similar to above, in the event that potential human skeletal remains are identified, the standard procedure of ceasing works and appropriate investigation by NSW Police and/or Heritage NSW is to be conducted.



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		- Local Aboriginal Knowledge and truth telling has been incorporated as design elements throughout the clinical tower, including wording inscribed along the Princes Highway façade, an artwork mural on a northern-facing Bank Lane façade, and internal artworks sourced from local aboriginal artists. - The aesthetics and materiality of the clinical tower as a whole draws from landscape features typical of Bidjigal Country and is reflective of materiality that found on Country without being extractive. The intention of such is that the clinical tower can be read as Country and have the effect of being familiar with Bidjigal people. - Cultural safety has been prioritised, by designing a welcoming entry that is enhanced by providing views to Country and Dreaming stories through the strategic collation of corridors and frames views of Country associated with patient lounges. - Endemic medicinal plants are well documented across Bidjigal Country. The planting strategy has been informed by these plants, to create not only a familiar planting scheme but also a pharmacy of traditional medicine. - The landscaped areas offer healing spaces whilst also supporting non-human kin.
Non-Aboriginal Heritage	Appendix 34 – Statement of Heritage Impact and Archaeological Assessment	Archaeological investigation is recommended for the clinical tower site prior to ground disturbance works, as this could reveal insights into the key period of Kogarah's commercial and residential development.
Construction Management	Waste Appendix 31 – Demolition and Construction Waste Management Report	Recommended construction waste minimisation measures include: - Ensuring the right quantities of materials are ordered, minimally packaged and where practical pre-fabricated, and any oversupplied materials are returned to the supplier; - Source separation of off-cuts to facilitate reuse, resale or recycling where possible;



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		• Coordination of subcontractors to maximise on site reuse of materials; and • Ensure the site has clear signs directing staff to the correct location for recycling and stockpiling, and that each bin/skip/stockpile is clearly signposted.
Operational Management Waste	Appendix 32 – Operational Waste Management Report	• A refuse room is provided at ground floor level, adjacent to the BOH and loading dock area, measuring 50sqm in area, which is larger than the calculated refuse room requirement (41sqm). • A designated bulky goods storage is proposed in addition the general refuse store. • Operational waste management will continue as existing at the main hospital site.
BCA Compliance and Accessibility	Appendix 7 – BCA Report Appendix 8 – Accessibility Report Appendix 37 – Fire Safety Statement.	Proposed variations from the BCA deemed-to-satisfy (DtS) provisions and the relevant performance solutions are to be addressed during the detailed design phase prior to the issue of a construction certificate.
Contamination	Appendix 26 – Detailed Site Investigation Appendix 27 – Remedial Action Plan Appendix 29 – Site Auditor Review	The following aspects require further consideration / management: • An assessment of human health risks to identify any potential risks during the construction and post-construction phases from formaldehyde and potentially chloroform and carbon disulfide. • Additional groundwater sampling rounds from the existing groundwater monitoring and additional wells and analysis to inform the assessment of human health risks. • Given the past uses of the site, removal of the sewer line and other existing underground infrastructure should be appropriately managed during removal to ensure cross contamination does not occur during removal.



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		An Unexpected Finds Protocol should be developed to manage potential contamination conditions inconsistent with those encountered during the proposed excavation works.
Groundwater	Appendix 22 – Groundwater Impact Assessment	Monitoring of groundwater discharge volumes, water quality, and levels is to be conducted during construction, to ensure the basement levels remain appropriately drained.
Geotechnical	Appendix 21 – Geotechnical Impact Assessment	Detailed design to implement recommendations of Geotechnical Impact Assessment.
Integrated Management	Water Appendix 23 – Water Management Plan and Civil Design Report	Stormwater Drainage and OSD - A stormwater drainage network is proposed with connection to existing Council infrastructure on the corner of Princes Highway and South Street on the site boundary. - An on-site detention (OSD) tank with an internal water chamber is also proposed, to address water quantity and quantity requirements. The OSD tank has a volume of approximately 88 cubic metres with a Ø96mm orifice (invert 17.66mm) to restrict the stormwater discharge rate. The proposed water quality control devices for the clinical tower site are: 3 x 690 NPSORB Stormfilter Cartridges within a minimum 2sqm chamber within the OSD Tank; and 2 OceanGuard 200um pit inserts. The MUSIC model analysis confirmed the above devices are capable of reducing pollutants discharged from the site to below the stormwater treatment objectives prescribed within the Georges River Stormwater Management Policy. Water Sensitive Urban Design:



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		• Water-efficient landscaping: native species have been selected for the landscaped areas, which are suitable for the climate with low irrigation demands. Drip or subsurface irrigation is also recommended where potable water is used, to avoid over watering. • Water efficient fittings and appliances: Supply water efficient products with a higher water rating based on AS/NZS 6400 Water efficient products – Rating and Labelling, products including tap fittings, shower heads and toilets.
Social Impacts	Appendix 35 – Social Impact Assessment	A framework to guide social impact management for the project is recommended, to be developed prior to construction commencing. The framework should incorporate the following key measures: • A Construction and Traffic Management Plan; • A Community and Stakeholder Engagement Plan; • An Interface Plan between the St George Public and Private Hospitals; and • A Local Employment and Procurement Plan.
Flooding	Appendix 24 – Flood Impact Risk Assessment	Notwithstanding the draft status of the <i>Blakehurst and Kogarah Bay Wards Overland Flow Flood Study</i>, the following management measures have been recommended for the main hospital campus: • The Emergency Management Plan of the St George Private Hospital should be reviewed and updated to include warning/alert systems, responses and actions for flash flooding. • It is also noted that alternate egress routes are available from the ground floor to external areas in the event of overland flow, outside of the potentially flood affected area. Vertical evacuation is also available to higher floor levels. Notwithstanding the draft status of the <i>Blakehurst and Kogarah Bay Wards Overland Flow Flood Study</i>, the following mitigation measures have been recommended for the clinical tower site:



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		• Installation of a basement ramp crest, even though Bank Lane is not subject to overland flow in the 1% AEP event. The ramp crest is recommended as it will not impact vehicular movement though it does offer protection against potential uncertainty at the site for an event beyond the 1% AEP. • The clinical tower ground floor level (non-habitable) is above the PMF level.
Aviation	Appendix 38 – Aviation Impact Assessment	• Relevant approvals will be required for the building and construction crane(s) to intrude into the Sydney (Kingsford-Smith) Aerodrome OLS as they are planned to be above RL51. • The building and construction crane(s) will require CASA standard aviation obstacle lighting. • If cranes exceed RL84, coordination will be required with NSW Ambulance and Toll Helicopters, as they would infringe upon one of the Performance Class 1 approach and departure paths for the nearby St George Public Hospital Helicopter Landing Site.