

Mitigation Measures

The collective measures proposed to mitigate and manage potential impacts associated with the proposed development are detailed in the table below. These measures have been derived from the environmental outcomes in **Section 6.0** of the EIS and those detailed in appended specialist reports.

MITIGATION MEASURES

Arboriculture

- The Applicant will liaise with Lake Macquarie City Council regarding the removal and replacement of street trees located within James Street;
- The project arborist will review palms proposed for transplanting and advise on suitability and requirements for undertaking the transplanting works. The assessment will also include discussions with the site hygienist to confirm this will not result in exposure to contaminants;
- The project arborist will assist during the design development and documentation phases for structures including pathways and services that occur in the vicinity of those trees designated as "threatened". This is required to determine whether it is possible for threatened trees to be retained by undertaking design modifications or altering construction techniques;
- Once "threatened" and "transplant" trees/palms have been re-assessed, the project arborist will re-issue the updated Tree Assessment Sheets/TPZ-SRZ Diagrams for use on site;
- A Tree Retention and Protection Diagram will be prepared showing tree protection fencing and root protection systems in critical locations as part of the documentation works for all trees to be retained. This drawing will be prepared in consultation with the design team (and head contractor, if one is appointed at this stage of the project);
- No construction activities, including but not limited to: accessing the site; storing equipment or materials; and, the erection and supporting of scaffolding, shall occur within the fenced tree protection zones. The tree protection measures will be reviewed prior to the commencement of earthworks and/or tree removal;
- All trees to be removed will be clearly marked by the project arborist encircling the trunk at 1500mm (approx. eye height) above ground level using fluorescent pink spray paint, or similar, ensuring that only the one (1) colour is used consistently to avoid confusion. This work will be carried out by the project arborist prior to the removal of any tree. Any tree not marked in this manner will be assumed to be retained;
- Tree removal work will be undertaken in a manner that is most appropriate with respect to nearby trees to be retained having regard to: fall zones; interlocking canopies; and, intertwined root plates to ensure that no unintended collateral damage is sustained to the trees to be retained;
- All retained trees will be inspected at the completion of the tree removal work and hazardous or damaged limbs will be trimmed, if required;
- Tree removal work and hazard reduction work will be carried out by or supervised by a qualified tree worker (AQF Level 3 or equivalent) in accordance with the Australian Standard AS 4373-2007: Pruning of amenity trees and the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia, 2016);
- Any trenching required to be undertaken within the TPZ of trees to be retained will be monitored by an AQF5 arborist. Should roots greater than 38mm diameter be encountered, then the arborist will inspect and properly trim roots to minimise the potential for infection; and
- Tree remains will be mulched where possible.

Visual Impact

- Maintain as many of the existing trees along Tiral Street and James Street as possible;
 - Native trees are planted around the perimeter of the site to visually break up the building mass where possible;
 - The use of native trees and shrubs will be implemented to maintain a consistent appearance across the landscape, especially along the perimeter of the site;
 - Materials, textures and colour selection will relate to the palette of the surrounding environment to minimise visibility and potential for visual impact; and
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- Large areas of reflective surfaces and bright, contrasting colours will be avoided on the buildings.

Traffic and Accessibility

- The Construction Traffic Management Plan prepared by Varga Traffic Planning (26 August 2022) will be prepared and implemented and followed by all construction staff for the duration of construction works; and
- The Green Travel Plan prepared by Varga Traffic Planning (August 2023) will be implemented and monitored during the operation of the proposed development.

Stormwater, Drainage and Flooding

- Stormwater management and erosion and sediment controls will be applied to the development generally in accordance with the Stormwater Management and Soil and Water Management Report by MPC (31 August 2022).

Social Impact

Pre-Construction

- Proactive communication and engagement will occur with the community prior to site establishment. Measures to be considered include newsletter and construction updates on the scope of the project, likely high impact activities (noise, vibration, traffic, and pedestrian changes), and contact details for inquiries and complaints;
- Meetings/presentations with neighbouring properties prior to construction will be considered;
- An inquiry and complaint management process will be established and implemented for the duration of construction works; and
- Engagement will occur with the local community to provide project information during and after construction.

Construction Phase

- A Construction Management Plan (CMP) will be prepared that incorporates the findings of the various project technical studies. The CMP will detail proposed management and mitigation measures for the following:
 - Traffic and parking management;
 - Site safety and management;
 - Health impacts – noise, dust, and emissions;
 - Noise monitoring;
 - Buffers for visual impacts;
 - Heritage management including unexpected finds procedure; and
 - Complaints management process.
- Ongoing communications will occur with the community to keep residents updated on construction scheduling. This may include signage, notifications, and other appropriate communication channels; and
- Opportunities to use local contractors, suppliers, and service providers where possible will be considered.

Operational Phase

- Ongoing communication and engagement will occur with the community. This may include hosting events and open days.

Residual Impact and Monitoring

- Monitoring and measuring of the Social Impact Assessment outcomes will be undertaken through the lifecycle of the proposal to assist in managing impacts and responding to any unanticipated consequences.

Noise and Vibration

Operational Noise and Vibration Measures

- Mechanical and building services noise emissions:
 - An acoustic assessment of the proposed mechanical and building services equipment will be undertaken at the design stage, providing recommendations for acoustic treatment (where necessary) to ensure noise from mechanical and building services do not exceed the Project Noise Trigger Levels at the nearest affected receivers.

- Loading dock:
 - Install a barrier with a minimum R_w 25 along the boundary of the Building A loading dock and the residences at 28 James Street and 29 Tiral Street to a height of 2.1m with no gaps and openings, including to the bottom. Example material includes fibre cement, plywood, perspex or masonry. The barrier will be installed with acoustic absorption minimum NRC 0.8 to the loading dock side. Example material includes Reapor or Stratocell Whisper;
 - The Building B loading dock will be used in preference over the Building A loading dock, especially for deliveries from medium and large trucks;
 - The loading docks will only be used during the day, preferably between 8am and 5pm. Deliveries outside of these hours will be avoided, but if they are necessary the surrounding neighbours will be notified in advance, and only the Building B or D loading dock shall be used;
 - Signage to be displayed along the route to and within the loading dock to notify drivers to switch off engines during loading/unloading and whenever trucks are stopped;
 - Limit speed to 10km/hr within the delivery route, signage to be displayed enforcing speed limit;
 - Loading and unloading will occur only within the loading dock, with the loading dock door closed;
 - Use small trucks for deliveries where possible. The larger loads will be split and carried by few small trucks where practical;
 - Broadband “quacker” reverse alarms will be used (where practical) over tonal reverse alarms;
 - Trucks will be properly maintained and have proper silencers fitted to control engine noise. Brake noise must not be emitted; and
 - A Noise Management Plan including all of the above measures will be implemented.

- Traffic noise intrusion:
 - Install external glazing that has sufficient airborne insulation performance to attenuate traffic noise such that the interior background design sound levels shown in the Northrop Noise and Vibration Assessment (August 2022) are achieved. Recommended glazing is shown in Table 22 in the Northrop Noise and Vibration Assessment (August 2022).

- Car parks:
 - Install a barrier with a minimum R_w 25 along the boundary of the Building A loading dock and the residences at 28 James Street and 29 Tiral Street to a height of 2.1m with no gaps and openings, including to the bottom. Example material includes fibre cement, plywood, perspex or masonry. The barrier will be installed with acoustic absorption minimum NRC 0.8 to the loading dock side. Example material includes Reapor or Stratocell Whisper.

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- Community and recreational uses:
 - Limit the hours of use in line with the POEO 1997 Offensive Noise Act;
 - Signage will be installed in outdoor areas for noise management requesting to keep the noise to a minimum; and
 - Closing all doors and windows to the Multipurpose Hall and Chapel, Wellness Centre, pool and Club House for uses after hours.
 - Building acoustics:
 - Provide acoustic insulation provisions in accordance with the deemed-to-satisfy requirements of NCC 2019 Part F5. A review of proposed internal walls and floors will be undertaken by an acoustic consultant at detailed design stage.

Construction Noise and Vibration Management Measures

- Installation of acoustic fencing in the form of construction hoarding is installed to the site boundaries for the duration of the excavation, structural and fit out phases of the project. The acoustic type hoarding will be rigid and is to be minimum R_w 25 such as plywood or fibre cement, minimum 2.1m in height with no gaps and openings, including to the bottom;
- Stationary noisy equipment such as concrete pumps will be fitted with purpose-built semi-enclosure;
- Construction works will only be carried out within the standard construction hours prescribed by the Interim Construction Noise Guideline, shown in Section 5.2.2.1 of the Northrop Noise and Vibration Assessment (August 2022);
- Locate the concrete pump, crane, loading dock, generator and any other stationery noise generating plant as far from residences as practical, e.g. closer to Dudley Road and at the centre of the site;
- Where practical, the use of noisy equipment will be avoided. These will be replaced by quieter equipment/operations for example sawing will be used as an alternative to jack hammering during earth moving or excavation;
- Felled trees shall be transported off site to be mulched so that no mulching will occur on site;
- Managerial measures including Community Liaison and Complaint Handling will be implemented, as detailed in the Northrop Noise and Vibration Assessment (August 2022);
- Respite periods will be provided during noisy activities. Limit noisy activities to when community is less sensitive to noise, e.g. between 9 am and 12 pm or between 2 pm and 5 pm;
- Equipment will be selected or treated to lower their noise emissions, e.g. engines to be installed with proper exhausts or silencers or noise radiating surfaces to be dampened;
- Less annoying alternatives to audible movement alarms (e.g. broadband “quacker” units) that provide a safe system of work or configuring the Site to maximise forward movement of the mobile plant will be utilised;
- Liaison will occur with affected residents, informing them of the scheduled timing for noisy works and what methodologies are being implemented to minimise the noise impact. A special concern is high noise emission levels from the work zone such as the operation of a concrete pump. For such activities, neighbours will be notified beforehand;
- A Construction Noise Management Plan will be prepared by a suitably qualified acoustic consultant and implemented at construction stage;
- A formal system for community liaison and consultation including a complaint handling system will be implemented;
- All truck movements and loading/unloading will take place with minimum amount of noise emissions to the neighbours. The trucks will be selected to have minimum noise and a proper exhaust system. All drivers will be trained to keep noise to a minimum. To eliminate the reversing tones, the route will be planned to minimise reversing distances. Trucks will be switched off as soon as they arrive into position; and
- Observe buffer distances for vibration generating construction equipment.

Accessibility

- The recommendations of the Access Review prepared by Morris Goding Access Consulting (2 September 2022) and Access Statement by Morris Goding Access Consulting (21 August 2023) will be developed in the ongoing design development and will be confirmed prior to the issued of a Construction Certificate.

Contamination

- With regard to hazardous gasses, all mine subsidence investigation bores and any future bores that intersect the Victoria Tunnel Seam/workings will be grouted to the surface in order to prevent gas from the workings / seam migrating to the surface;
- Contamination remediation works will be undertaken across the site in accordance with the Remediation Action Plan prepared by Douglas Partners (August 2022); and
- Following completion of remediation and validation works, a Long-Term Environmental Management Plan will be applied to the ongoing use of the site.

Geotechnical

- The findings of the Douglas Partners Geotechnical Investigation Report (May 2020) will be considered in the detailed design of the proposed development.

Groundwater

- Additional groundwater investigations will be undertaken to facilitate dewatering for construction of the containment cell/s. The additional investigation will include installation of shallow wells within the proposed cell depth both in the northern and southern portion of the cell footprint to assess groundwater levels, groundwater quality and soil permeabilities. This data will be used to model anticipated groundwater inflows for the cell design and allow parameters for licensing requirements for dewatering to be established; and
- A dewatering management plan will be prepared for the development.

Crime Prevention

- The recommendations of the CPTED Report prepared by Harris Crime Prevention (29 August 2022) will be considered during the detailed design of the proposed development.

Biodiversity

- Landscaping within the development will utilise endemic native species suitable for future fauna use;
 - Fauna-protection fencing, including relevant signage, will be installed to create a fauna protection zone;
 - Best practice erosion and sedimentation control methods will be adopted, enforced and maintained throughout vegetation works;
 - Civil Construction staff will be inducted into pre-clearing and clearing protocols, and to identify environmental features for protection;
 - During operation, potential vehicle strike impacts will be mitigated through the introduction of low-speed limits as well as speed limiting devices on the facilities' roads;
 - Conditions of construction operations will be optimised as per an approved Construction Management Plan (CMP) which will include a Noise Mitigation Plan;
 - Dust levels during operations will be managed according to an approved CMP;
 - Daily monitoring of dust generated by construction activities will occur;
 - Dust suppression measures (setting maximum speed limits and application of dust suppressants) will be implemented during construction works to limit dust on site;
 - Optimal construction methods relating to light spill will be applied as per an approved CMP. Such measures will include limiting use of lights where necessary and directing lights in such a way as to limit impact on adjacent vegetated lands;
 - Any soil disturbance during both construction and operations will be managed in accordance with the CMP and a Biodiversity Management Plan;
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- Appropriate handling methods will be applied to mulch created from the removal of exotic vegetation;
 - All construction equipment will be appropriately cleaned to limit the risk of weed seed and fragments to adjacent retained areas;
 - Chemical and manual treatment of weeds will occur where applicable;
 - Appropriate management of weeds will occur within landscaping areas;
 - Activities on the site will be managed in accordance with an approved CMP and designed to limit the amount of rubbish and waste onsite through good housekeeping practices;
 - Landscaping within the development will utilise endemic native species suitable for future Fauna usage and providing supplementary connectivity through residential areas;
 - Light sensitive urban design will be implemented to limit light spill into retained vegetation; and
 - A CMP will be developed and applied during construction.

European Heritage

- Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and approvals may be required prior to the recommencement of works. Any historical objects must be reported to Heritage NSW.

Aboriginal Cultural Heritage

- The proposed development works must be contained within the boundaries of the project, as considered in the ACHA prepared by Apex Archaeology (June 2022). If there is any alteration to the boundaries of the proposed development to include areas not assessed as part of the ACHA, further investigation of those areas may be necessary to assist in appropriately managing Aboriginal objects and places which may be present;
- Should unanticipated archaeological material be encountered during site works, all work must cease in the vicinity of the find and an archaeologist contacted to make an assessment of the find and to advise on the course of action to be taken. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

In the unlikely event that suspected human remains are identified during construction works, all activity in the vicinity of the find must cease immediately and the find protected from harm or damage. The NSW Police and the Coroner's Office must be notified immediately. If the finds are confirmed to be human and of Aboriginal origin, further assessment by an archaeologist experienced in the assessment of human remains and consultation with both Heritage NSW and the RAPs for the project would be required; and

- One digital copy of the ACHA will be forwarded to Heritage NSW for inclusion on the Aboriginal Heritage Information Management System (AHIMS). One copy of the ACHA should be forwarded to each of the registered Aboriginal stakeholders for the project.

Ecologically Sustainable Development

- The sustainability initiatives outlined within Section 3 the ESD Report by JHA (24 August 2022) will be implemented by the proposed development; and
- The ESD opportunities outlined on Pages 12 and 13 of the ESD report prepared by JHA (24 August 2022) will be considered in the detailed design and ongoing operation of the proposed development.

Pedestrian Wind Environment

The following measures will be considered during the detailed design of the development.

- Ground level trafficable areas:
 - Retention of the proposed dense landscaping with evergreen tree and shrub planting.
- Level 1 Communal Open Spaces:

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- Retention of the proposed dense landscaping with evergreen tree and shrub planting at the Level 1 podium areas of buildings B, C and D;
 - Installation of 1.5-2m high screens along the north and south perimeters of the western communal open space between buildings C and D;
 - Installation of standard height impermeable balustrades around the Level 1 Dementia Garden; and
 - Installation of densely foliating evergreen tree planting or impermeable awning along eastern façade of the Level 1 Dementia Garden.
 - Private balconies and terraces:
 - Installation of standard height impermeable balustrades at the balconies of Building A;
 - Retention of proposed full-height louvres at the exposed corner balconies of buildings B, C and D. The orientation of these louvres should be aligned against the expected corner accelerated winds. This will be considered at the detailed design stage of development;
 - Retention of proposed of 1.5-1.8m high impermeable end screens at the western edge of the southern balconies at levels 4, and 7–11; and
 - Retention of the proposed 1.5-1.8m high impermeable intertenancy screens.

Wind tunnel testing will be undertaken at the detailed design phase to quantitatively assess the wind conditions and to optimise the size and extent of the treatments required.

Waste Management

The Waste Management Plan by SLR (V5.0, August 2023) will be implemented during the construction and operational phases of the proposed development.

Hazardous Building Materials

- All asbestos containing material (ACM) identified on site in the Hazardous Material Survey by SLR (V2.0, August 2022) will be removed prior to demolition in accordance with the current Regulation and Australian Standard;
- As required by the Work Health and Safety Regulations 2018, the building owner is obliged to comply with the requirements outlined in the Regulation. This includes:
 - All ACM at the workplace is identified and maintained in a register of asbestos containing materials;
 - All in situ ACM is clearly indicated and labelled;
 - Implementation of an Asbestos Management Plan; and
 - Ongoing review of the Asbestos Containing Materials Register and Asbestos Management Plan.
- All asbestos removal work will be undertaken by a suitably licensed asbestos-removal contractor in accordance with the Work Health and Safety Regulations 2018;
- Monitoring of airborne-fibre concentrations will be included as part of the scope of any ACM removal works undertaken. This will be conducted by competent persons who are engaged independently from the removal contractor to avoid potential conflicts of interest; and
- All hazardous materials identified in the survey will be removed prior to demolition in accordance with the current Regulation and Australian Standard.

Infrastructure and Servicing

The detailed site servicing design for the proposed development will give consideration to the Site Servicing Strategy prepared by Northrop (Rev 2, 5 August 2022).
