

Mitigation Measures Table

TOD – 8-24 Nicholson Street, Wollstonecraft (SSD-86462209)

Potential Impact	Particulars	Mitigation Measures	Residual Impact																
Construction Traffic	Minimising construction impact on pedestrians, cyclists and road users	- Preliminary traffic management plan is provided in the Transport Impact Assessment. - A preliminary construction management plan has been prepared by Traders in Purple. A detailed construction management plan will be prepared prior to construction.	Low																
Construction	Construction management	- Construction management plan provided including: - Construction methodology – mobilization - Environmental management - Health and safety management - Emergency response procedure	Low																
Acoustic and Vibration (Operational-intrusion)	- Glazed windows and doors - External walls - External roof / ceiling construction - Ventilation requirements	The complying constructions are listed below: Table 4 – Complying Glazing Constructions <table><tr><th>Facade</th><th>Space</th><th>Facade</th><th>Glazing Construction</th><th>Acoustic Seals</th></tr><tr><td>All</td><td>All</td><td>All Existing Facades</td><td>6.38mm Laminate</td><td>Yes</td></tr></table> Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable. IGU’s can be used in place of the tabled single glazing. Table 5 – Equivalent IGU Systems <table><tr><th>Single Glazing Assembly</th><th>Equivalent IGU</th><th>Minimum R_w/R_w+C_{tr} of Installed Window</th></tr><tr><td>8mm float or toughened and 6.38mm laminated</td><td>8/16AG/8 OR 6/12/6.38</td><td>35/31</td></tr></table>	Facade	Space	Facade	Glazing Construction	Acoustic Seals	All	All	All Existing Facades	6.38mm Laminate	Yes	Single Glazing Assembly	Equivalent IGU	Minimum R _w /R _w +C _{tr} of Installed Window	8mm float or toughened and 6.38mm laminated	8/16AG/8 OR 6/12/6.38	35/31	Low
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		- External walls constructed from concrete/masonry elements will not require any acoustic upgrading to achieve the acoustic requirements. Light-weight materials should be reviewed by an appropriately qualified acoustic consultant. - Masonry roof systems will be acceptable acoustically. In the event any penetrations are required through the external lining of any of the system for other building services, gaps should be filled with acoustic sealant to ensure compliance with acoustic criteria stipulated within this report. - With respect to natural ventilation of a dwelling, NSW Planning requirements allow internal noise levels to be up to 10 dB(A) higher than the specified criterion with windows and doors to a dwelling open to allow for ventilation. Based on the current layouts and noise levels from surrounding roads, assessment of internal noise levels with 'windows open' indicates that all apartments will be able to retain windows or doors open to 5% of the floor area whilst maintaining nominated internal noise levels.	
<i>Acoustic and Vibration (Operational – emission)</i>	Mechanical Plant	- The design and selection of plant has not been undertaken but would generally consist of apartment air conditioning condensing units, residential car park ventilation exhaust/supply ventilation fans and other miscellaneous ventilation fans (which would typically be small fans located internally). - Plant would likely be located internally within the basement and externally on the rooftop. The plant would be selected to meet the noise levels required by the noise limits indicated above, and where required would be treated by enclosing the equipment, treating ducting, acoustic louvres, as required to meet limit noise emissions. A detailed assessment of plant should be conducted by a qualified acoustic engineer following the completion of mechanical plant specifications and plans. - Based on the indicative placement of plant and the distance attenuation between the site and surrounding sensitive receivers, provided the above treatments and the like are incorporated where necessary, the site is expected to be able to comply with the noise emissions criteria summarised above and detailed in Appendix A. - Designers should have regard for the fact that allowances should be made in respect of plant locations to minimise impacts on sensitive receivers and to provide sufficient space to incorporate treatment to plant areas to meet the above.	Low
<i>Acoustic and Vibration (Construction)</i>	Construction noise and vibration	- A detailed noise management plan can be developed by the main contractor that describes in detail the construction phases, programme, processes and equipment used, noise impact assessment and proposed mitigation and management. - Quiet work methods/technologies: - Materials handling/vehicles:	Low

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		- Trucks and bobcats to use a non-tonal reversing beacon (subject to OH&S requirements) to minimise potential disturbance of neighbours. - Avoid careless dropping of construction materials into empty trucks. - Trucks, trailers and concrete trucks (if feasible) should turn off their engines during idling to reduce noise impacts (unless truck ignition needs to remain on during concrete pumping). - Complaints handling - In the event of complaint, the procedures outlined in Sections 9 of the NVIA. - Construction impacts are expected with any development however will be relatively short term, and is anticipated in the Crows Nest TOD Precinct as it undergoes urban renewal in line with government strategic frameworks and priorities.	
<i>Integrated Water Cycle Management</i>	Sediment and erosion control	- Sediment and erosion control measures: - A temporary site security/safety fence is to be constructed around the site - Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles - Dust control measures including covering stockpiles, installing hessian fences to water exposed areas - Placement of gravel inlet filters around and along proposed and existing stormwater pits - The construction of temporary sediment basin; and - Stabilised site access at the construction vehicle entry/exit	Low
<i>Infrastructure Delivery and Management</i>	Facilitating future connection of the development for power supply, communications, gas, waster and sewer servicing.	- Power Supply - The Accredited Service Provider for Ausgrid has undertaken a desktop analysis of Ausgrid available information to determine the proposed connection to the high-voltage feeder main located outside the site on Oxley Street. The next steps to ensure connection and mitigate risk of connection to Ausgrid's network is to make a formal application for connection. This will occur in the next phase. - Communications - The project has identified existing and new communication infrastructure across multiple communication providers. The access to pit and pipe infrastructure has been documented in this report and mitigation for connection has been viewed through multiple carrier options. To confirm connection, the developer is to select the preferred communication provider and make a formal application for connection. Removal of existing site connections and connection to cabling on Nicholson Street will be completed. - Gas - Gas will not be utilised, therefore a new connection will not be required. The design has mitigated the allowance for gas by undertaking electrical demand analysis for a full electric building.	Low

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		- Water – The availability of water supply for potable water and fire fighting requirements has been assessed. This assessment has utilised Sydney Water requested pressure and flow requirements to mitigate the need for large onsite storage tanks. There are extension works to be carried out on Oxley Street due to insufficient existing water supply along the site frontages. To further mitigate this solution, a formal Sydney Water Section 73 assessment on DA approval is to be undertaken. - Sewer - An existing Sydney Water sewer main clash with the intended building envelope has been identified. This requires a diversion to the sewer. The project team, including a Sydney Water Coordinator has completed a detailed survey of the existing sewer and subsequently integrated a diversion strategy into the design. To confirm this design and allowance for connection, a formal feasibility study is required and building plan approval.	
<i>Ground and Groundwater</i>	- Foundation design - Excavation retention - Excavation vibration considerations - Further input from a geotechnical professional during design and construction to be advised	- Foundation design: – Due to the potential variability of fill material encountered at the site, it is not recommended that any footings founded on Unit 1, Unit 2 or Unit 3 material. The parameters given in Table 4 of the geotechnical investigation report below may be used for the design of pad footings and bored piles. Morrow Geotechnics recommends that a Preliminary Geotechnical Strength Reduction Factor (GSRF) of 0.4 is used for the design of piles in accordance with AS 2159:2009 if no allowance is made for pile testing during construction. Should pile testing be nominated, the GSRF may be reviewed and a value of 0.55 to 0.6 may be expected. – Selection of footing types and founding depth will need to consider the risk of adverse differential ground movements within the foundation footprint and between high level and deeper footings. Unless an allowance for such movement is included in the design of the proposed development, we recommend that all new structures found on natural materials with comparable end bearing capacities and elastic moduli. – Ultimate geotechnical strengths are provided for use in limit state design. Allowable or serviceability bearing pressures adopted in Table 4 are intended to limit settlements to an acceptable level for conventional building structures, typically less than 1% of the minimum footing width. The values given in Table 4 must be confirmed by geotechnical inspection to ensure ground conditions are consistent with material encountered during the investigation. – To adopt these parameters we have assumed that the bases of all pile excavations are cleaned of loose debris and water and inspected by a suitably qualified Geotechnical Engineer prior to pile construction to verify that ground conditions meet design assumptions. Where groundwater ingress is encountered during pile excavation, concrete is to be placed as soon as possible	Low

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		upon completion of pile excavation. Pile excavations should be pumped dry of water prior to pouring concrete, or alternatively a tremmie system could be used. - Excavation retention: - For the design of flexible shoring systems, a triangular pressure distribution may be employed using the parameters provided in Table 5 of the geotechnical investigation report. For design of rigid anchored or braced walls, a trapezoidal earth pressure distribution should be used with a maximum pressure over the central 50% of the supported height of $0.65 \cdot K_a \cdot \gamma \cdot H$ (kPa), where 'H' is the effective vertical height of the wall in metres - Appropriate surcharge loading from construction equipment, vehicular traffic and neighbouring structures at finished surface level should be considered in the retention design. Surcharge loads on retention structures may be calculated using a rectangular stress block with an earth pressure coefficient of 0.5 applied to surcharge loads at ground surface level. - Excavation Vibration Considerations - As a guide, safe working distances for typical items of vibration intensive plant are listed in Table 6. The safe working distances are quoted for both "cosmetic" damage (refer British Standard BS 7385:1993) and human comfort (refer NSW Environmental Protection Agency Vibration Guideline). The safe working distances should be complied with at all times, unless otherwise mitigated to the satisfaction of the relevant stakeholders. - The safe working distances provided in Table 6 are given for guidance only. Monitoring of vibration levels may be required to ensure vibrations levels remain below threshold values during the construction period. - Additional Geotechnical Input: - Further input from a geotechnical professional during design and construction is advised in order to ensure a cost-effective design which can be constructed safely and efficiently. Areas for geotechnical input should include: - All excavated material transported off site should be classified in accordance with NSW EPA 2014 - Waste Classification Guideline Part 1; Classifying Waste. - A suitably qualified geotechnical engineer is to assess the condition of exposed material at foundation or subgrade level to assess the ability of the prepared surface to act as a foundation or as a subgrade - Observation of the material within pile excavations should be undertaken at the start of piling works to confirm that material across the site is in accordance with the geotechnical model presented in the geotechnical investigation report.	

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		Regular inspections of battered and unsupported excavations, where proposed, to confirm geotechnical conditions and to assess the suitability of design assumptions and to provide further advice with regards to excavation retention/ support and proposed construction methodologies, if required.	
Contamination	Further recommendations following preliminary site investigation	- Undertake a Supplementary Contamination Assessment beneath the on-site structures and hardstand areas to characterise the existing building footprints following demolition works; - Undertake a hazardous building material survey of the structures present on-site prior to demolition; - Following removal of hazardous building materials (if identified), a clearance inspection must be undertaken by an appropriately qualified occupational hygienist / SafeWork NSW LAA; - A waste classification assessment should be carried out on any soil materials proposed for disposal off-site as per the NSW EPA Waste Classification Guidelines (2014); and - Records of the transport and disposal of any materials off-site should be maintained.	Low
Soil Salinity	- Minimising the impact of development on the site salinity; - Minimising the impact of salinity on the proposed development; - Maintaining as much as practicable the natural water balance; - Maintaining good drainage; - Avoiding disturbance or exposure of sensitive soils; - Retaining or increasing appropriate native vegetation in strategic areas; and - Implementing building controls and engineering responses where appropriate.	Management strategies generally include: - Develop the best use of existing topography to minimise cut and fill operations; - Maintenance and improvement of native vegetation along drainage courses; - Water management of landscaped areas; - Utilise native and deep rooted plants in order to minimise soil erosion; - Minimise exposure of slightly to moderately saline soils in temporary excavation faces; - Minimise exposure of slightly to moderately saline soils in stockpiles during site works; - Minimise potential for ponding or water logging areas on the site; - Provision of lining in temporary ponds with non-saline clays to minimise groundwater recharge through the soils; - Dispose of excavated slightly to moderately saline soils to locations where salts cannot be leached to the environment; - Natural drainage patterns to be maintained where possible; Drainage infrastructure in vulnerable areas to be installed as soon as practical to avoid excessive water infiltration, ponding of water on site and salt leaching; Imported material should be tested for salinity to avoid importing saline soils;	Low

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		- Roads should have well designed sub soil drainage; In fill areas place the soils with highest salinity at the deepest levels; - Application of gypsum to areas of exposed slightly to moderately saline soils if applicable; - Concrete of suitable strength and reinforcement cover is to be used for drainage structures and wherever contact with water and increased soil moisture is expected; - Pipes used for stormwater drainage should be sealed to minimise the risk of leakage; - Soils that are excavated from either roads or service trenches throughout areas or the site found to be slightly to moderately saline should be re-instated at the same horizontal level or lower where possible; and - Conduct a comprehensive post-earthworks salinity assessment to determine the final salinity status of each individual lot.	
<i>Aboriginal Objects</i>	- Potential for Aboriginal objects to be found - Aboriginal heritage interpretation - Aboriginal cultural heritage induction - Unexpected finds procedure (Aboriginal)	- Recommendation 1 – Low-Nil Potential for Aboriginal Objects to be Found. - Based on the findings of this report, it is considered that no further Aboriginal Assessments are required due to the site conditions (including location and land disturbance) which have resulted in a low-nil potential for Aboriginal objects to be disturbed. However, as outlined in the following low-nil potential for Aboriginal objects to be disturbed. However, as outlined in the following recommendations an ‘Unexpected Finds Protocol’ should apply as part of a Heritage Induction process (as outlined in Recommendation 3 and 4). - Recommendation 2 - Aboriginal Heritage Interpretation - It is encouraged that acknowledgement of the Aboriginal history and heritage of the wider area be incorporated into the future project design. Examples of how this could be achieved include murals, sculptures and Aboriginal co-design landscaping and a Connection to Country. - Recommendation 3 – Aboriginal Cultural Heritage Induction - A site induction is recommended to be provided to all employees/contractors engaged for the proposed works for the study area. The induction material should include and overview of the types of sites to be aware of (i.e., artefact scatters), obligations under the NPW Act, and the requirements of an archaeological Unexpected Finds Procedure. - Recommendation 4: Unexpected Finds Procedure (Aboriginal) - Upon discovery of an archaeological feature that is suspected to be an Aboriginal Unexpected Find (excluding human remains- see Recommendation 6 below), the following procedure should be followed:	Low

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		○ Cease works in the immediate vicinity of the find. ○ Contact the Project archaeologist to verify the nature of the find. ○ If Unexpected Find is confirmed as Aboriginal archaeology, the project archaeologist will notify Metropolitan Local Aboriginal Land Council and Heritage NSW of the find. If Unexpected Find is confirmed as not Aboriginal in origin, the project archaeologist will provide advice for works to recommence. ○ Project Archaeologist/Metropolitan LALC will undertake a preliminary assessment and recording of the find. ○ Formulate archaeological or heritage management plan- specific to nature of the find. ○ Implement archaeological/heritage management plan. ● Works may commence once archaeological/heritage management plan has been successfully implemented and the project archaeologist provides sign off to contractor for works to resume in vicinity of find.	
<i>Solar Light Reflectivity</i>	● Treatments to mitigate adverse glare conditions	● East, 53° aspect: Limit the maximum normal specular reflectance of visible light of the glazing used on the northern portion of the eastern building façade and balustrades to a value of 13%. Treatments are to be applied to Levels 4 to 11. ● All other glazing on the external façade and balustrades to have a maximum normal specular reflectance of visible light of 20%. ● Abovementioned suggested treatments are indicated in the marked-up plan in the Solar Light Reflectivity Study report.	Low
<i>Wind</i>	● Impact to outdoor trafficable areas ● Treatment strategies	● Lower Ground Level and Ground Level: – Retention of the proposed set-back of the proposed building envelope from the site boundary. – Retention of existing trees (except those that are marked for removal) and the proposed trees along the footpath areas of Nicholson Street and Oxley Street, as well as those located to the south-east and south-west of the site, ensuring that the trees are of an evergreen and densely foliating species capable of growing to a height of at least 3-6m, with 3-6m wide canopies. – Retention of the proposed porous fencing around the corner private open spaces, ensuring at least 1.2m height, and maximum 30-40 porosity. – Retention of the proposed slab cover above the south-west facing entrance to the building at the Lower Ground Level	Low-Moderate

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		– Retention of the proposed impermeable awning structure above the north-east facing entrance to the building at the Ground Level – Inclusion of 1.2-1.5m high evergreen hedges/shrubs within the proposed planter areas around the floor plan at the Ground Level (i.e. in front of and adjacent to the PoS areas). • Level 1-10 Balconies: – Retention of the proposed impermeable balustrades along the exposed perimeter of the various corner balconies, ensuring a height of at least 1.2m. • Level 11 Private Open Space Areas: – Increasing the height of the proposed balustrades along the exposed perimeters of the various private open spaces to at least 1.5m. • Roof Communal Open Space: – Retention of the proposed 2m high impermeable wind barrier (i.e. concrete parapet with the glazed screening) around the entire exposed perimeter of the communal open space. – Retention of the proposed trees within the various planter areas, ensuring that the trees are of an evergreen species capable of growing to a height of at least 2-3m.	
<i>Natural Ventilation</i>	• Natural cross ventilation – apartment aspects • Natural cross ventilated flow paths • Habitable room opening size	• Natural cross ventilation has been achieved through openings on orthogonal aspects (i.e. corner apartments), or opposite aspects (cross-through/cross-over apartments) with direct exposure to prevailing winds or windows located in significantly different pressure regions as defined within Section 4B of the ADG. • It is important that the naturally cross-ventilated flow path does not flow through a bathroom in order to avoid issues with odours. • Each habitable room should have an unobstructed opening size of at least of 5% of the floor area served by the opening, in accordance with Objective 4B-1 of the ADG and have a minimum free area of 0.4m² in order to provide effective natural ventilation.	Low
<i>Operational Waste</i>	• Implementation phase • Occupation/Operational phase • Review and amendment refuse management	The tables provided in the Operation Waste Management Plan (OWMP) relate to a cycle of ongoing implementation, operation, review, and amendment of the refuse strategy. These tables are intended to serve as a live document to be completed and updated during the operational phase of the development. Tasks included for each cycle are listed and are further detailed in the OWMP. • Implementation phase – Certify the as-built form of all refuse related areas. – Appoint personnel to oversee or undertake refuse management tasks. – Conduct internal safety review. – Development of policy and procedures.	Low

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		– Engage refuse collection contractors. – Install signage in all refuse disposal and storage points. – Leasing / Body Corporate Agreement. – Consider fit out and move-in refuse. – Baseline Refuse Auditing. • Occupation/ Operational Phase – Manage rotations of bins to ensure convenient access. – Manage bin transfers to temporary holding or agreed servicing point. – General cleaning. – Perform spot checks on bin contents and refuse streams. – Ongoing education and communication. • Review and amendment refuse management – Coordination of specialised cleaning contractors as required. – Maintenance and servicing of refuse management equipment as per schedule. – Coordination of specialised equipment contractors as required. – Internal safety review. – Audit operational refuse volumes and composition. – Review bin quantities and refuse management equipment.	