



APPENDIX D – MITIGATION MEASURES

Environmental Risk Assessment and Mitigation Measures – 15A and 15B Moseley Street and 25-31 Donald Street, Carlingford

The following section provides recommendation for mitigation measures in response to potential impacts identified in **Section 6** of the EIS. The structure of mitigation measures is based on the DPHI’s hierarchy of approaches for managing impacts identified in the *State Significant Development Guidelines* released by DPHI in March 2024, as:

- **Performance based measure** – identify performance criteria that must be complied with to achieve an appropriate environmental outcome but do not specify how the outcome is to be achieved.
- **Prescriptive measure** – require action to be taken or specify something that must not be done.
- **Management based measure** – identify one or more management objectives that must be achieved through the implementation of a management plan.

Following the implementation of appropriate mitigation measures as recommended, it is determined that the proposal will not result in any significant adverse impacts on the surrounding environment. The following table illustrates how the matters raised within the SEARs will be addressed.

This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 *Risk Management–Principles and Guidelines* (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposed development prior to application of any mitigation or management measures. In accordance with the SEARs, the Environmental Risk Assessment (ERA) addresses the following significant risk issues:

- The adequacy of baseline data;
- The potential cumulative impacts arising from other developments in the vicinity of the site; and
- Measures to avoid, minimise, offset the predicted impacts where necessary involving the preparation of detailed contingency plans for managing any significant risk to the environment.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for ‘likelihood’ and ‘consequence’.

Likelihood		Consequence	
A	Almost certain	1	Widespread and/or irreversible impact
B	Likely	2	Extensive but reversible (within 2 years) impact or irreversible local impact
C	Possible	3	Local, acceptable or reversible impact
D	Unlikely	4	Local, reversible, short term (<3 months) impact
E	Rare	5	Local, reversible, short term (<1 month) impact

The risk levels for likely and potential impacts were derived using the following risk matrix.

		LIKELIHOOD				
		A	B	C	D	E
CONSEQUENCE	1	High	High	Medium	Low	Very low
	2	High	High	Medium	Low	Very low
	3	Medium	Medium	Medium	Low	Very low
	4	Low	Low	Low	Low	Very low
	5	Very low	Very low	Very low	Very low	Very low

The results of the environmental risk assessment for the proposed development are presented in the below table and are based upon the range of technical and specialist consultant reports appended to the EIS. The table has directly related mitigation measures responding to each impact also based upon the range of technical and specialist consultant reports appended to the EIS.

N.B. 'O' – Operational; 'C' – Construction

'Pe' – Performance based mitigation measure; 'Pr' – Prescriptive based mitigation measure 'Ma' – Management based mitigation measure

SEARS	Potential Impact	Stage of Project	Likelihood	Consequence	Risk Level	Mitigation Measure
ESD	The proposed development must be consistent with the principles of ecologically sustainable development in accordance with section 193 of the EP&A Regulation 2021.	C&O	D	4	Low	<ul style="list-style-type: none"> ▪ Performance Glazing such as high-performance glazing is recommended for most units ▪ Individual 1-phase non-ducted air-conditioning system of 2.5 star rating for cooling and 2 star rating for heating for all living areas and bedrooms in the dwelling units for heating and cooling requirements. ▪ Non residential spaces air conditioning to be selected as per Section J requirements. ▪ Centralised energy efficient bulk-metered gas instantaneous hot water system is recommended for water heating within the proposed development. ▪ Approximately 10% of "Greenpower" should be made available to residents, providing the opportunity to contribute to a reduction in total greenhouse gas emissions produced by the proposed development. ▪ It is recommended that the following lighting features be incorporated into the development to minimise energy consumption due to lighting: <ul style="list-style-type: none"> – Maximise use of compact fluorescents or LED and minimise or where possible eliminate the use of halogen down lights, as compact fluorescents are much more efficient than halogen lighting. – Light switches to be located at room exits to encourage switching lights off when leaving a room. Separate switches to be installed for special purpose lighting. – Lighting to the carpark, lobbies and common hallways will be controlled by motion sensors and time clocks, to minimise unnecessary use of artificial lighting. ▪ SLR recommends a maximum average lighting power density of 4 W/m2 for the proposed development. ▪ For BASIX compliance, the below measures for energy performance in appliances could include: <ul style="list-style-type: none"> – 3-star energy efficient dishwashers; – 2-star energy efficient clothes dryer; – A gas cooktop and an electric oven to be installed within each residential dwelling. ▪ It is recommended that the below types of alternate water supply be explored for use in landscape irrigation and fire services, reducing the demand for potable water: <ul style="list-style-type: none"> – Reticulation of reclaimed water to the site – Rainwater/stormwater storage and reuse – Grey water storage and reuse. ▪ To achieve greater than the standard level, following water efficient fixtures and fittings are recommended for the proposed site: <ul style="list-style-type: none"> – All residential kitchen and bathroom taps are 4-star; – All shower heads are 4.0 Stars (>4.5 but <=6 L/min); – All residential toilet flushing systems are 4-star; o All dishwashers are 2-star ▪ The Asbestos identification and removal procedures will be included in the site Environmental Management Plan (EMP) where required. ▪ Incorporate a CO2 monitoring system to the basement area where appropriate to satisfy NCC requirements. ▪ The use of paints and floor coverings with low levels of volatile organic compounds (VOC) and low formaldehyde wood products should be used where possible. ▪ Installation of a solar PV system.
Trees and Landscaping	Tree removal and impacts on trees which have been identified for retention.	C	E	4	Low	<ul style="list-style-type: none"> ▪ Protective fencing: Protective 1.8m high fencing should be installed at the location illustrated on the Tree Management Plan before any site works start. ▪ Signage: All signs are to provide clear and readily accessible information to indicate that a TPZ has been established. Signage identifying the TPZ must be attached to outside of fencing and be visible from within the development site. ▪ Root zone protection: Where necessary, access through the TPZ can be achieved by laying aggregate and timber boards (or similar) over the root zone to protect roots. ▪ Trunk protection: Where fencing cannot be installed, the vertical trunk of exposed trees shall be protected by the placement of 3.6m lengths of 50 x 100mm hardwood timbers, spaced vertically, at 150mm centres and secured by 2mm wire at 300mm wide spacing over suitable protective padding material.

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						<ul style="list-style-type: none"> ▪ Arboricultural supervision: Any work within TPZs requires qualified arboricultural supervision to minimise the risk of misunderstanding and misinterpretation. Site personnel must be properly briefed before any work starts. Ongoing work must be inspected regularly and, on completion, the work must be signed off by the Project Arborist to confirm compliance by the contractor. ▪ Tree Damage: In the event of damage to a tree or the TPZ, the Project Arborist shall be engaged to inspect and provide advice on remedial action. ▪ Excavation within TPZ: Excavation within TPZ must be carried out under the instruction and supervision of the Project Arborist. ▪ Fill within TPZ: All fill material to be placed within the TPZ should be approved by Project Arborist and consist of a course, gap-graded material to provide aeration and percolation to the root zone. ▪ Installation of new soft landscaping: All landscaping activity within TPZs has the potential to cause severe damage and any adverse impact must be minimised by following the guidance set out in the AIA. ▪ Installation of new services or upgrading of existing services: where existing services within TPZs require upgrading or new services have to be installed in TPZs, great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible, any excavation must be carried out by hand according to the guidelines set out in the AIA.
Traffic and Transport	Impacts on road network from construction and operational phase. Additional demand on car parking spaces.	C&O	D	4	Low	<ul style="list-style-type: none"> ▪ Installation of double barrier centre (BB) line marking along the centre of the Donald Street pavement on approach, through and departure the curve in the roadway in conjunction with advanced advisory speed signage of 25km/h on approach to the curve ▪ Trim vegetation within the western/southern Donald Street footway adjacent to 26 Donald Street (on the inside of the curve) ▪ Restrict kerbside parking along both Donald Street kerb alignments in the immediate vicinity of the curve in the roadway which include: <ul style="list-style-type: none"> – 18m of 'No Stopping' restrictions which will result in the loss of three on-street parking spaces along the eastern Donald Street kerb alignment to the south of the development driveway – 12m of 'No Stopping' restrictions which will result in the loss of two on-street parking spaces along the western Donald Street kerb alignment adjacent to 24 and 26 Donald Street. ▪ The installation of double barrier (BB line marking within Moseley Street on approach to and departure from Vickery Avenue) or ▪ The installation of painted or raised channelisation islands within Moseley Street on approach to and departure from Vickery Avenue ▪ Tandem parking spaces are to be allocated to single residential dwellings. ▪ A Travel Plan is to be prepared in accordance with the Parramatta DCP prior to issue of an occupation certificate.
Noise and Vibration	Noise and vibration impacts during construction.	C	C	3	Medium	<p><u>Construction – Noise</u> The following noise mitigation measures will be implemented by the construction contractor, where reasonable and feasible, apply best practice noise mitigation measures including:</p> <ul style="list-style-type: none"> ▪ Maximising the offset distance between noisy plant items and nearby noise sensitive receivers. ▪ Avoiding the coincidence of noisy plant working simultaneously close together and adjacent to sensitive receivers. ▪ Minimising consecutive works in the same locality. ▪ Orienting equipment away from noise sensitive areas. ▪ Carrying out loading and unloading away from noise sensitive areas. ▪ Take all reasonable and feasible measures to mitigate noise effects this could include efficient silences and low noise mufflers. <p><u>Construction – Vibration</u> The following vibration mitigation measures will be implemented by the construction contractor:</p> <ul style="list-style-type: none"> ▪ Relocate any vibration generating plant and equipment to areas within the site in order to lower the vibration impacts. ▪ Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment. ▪ Use lower vibration generating items of excavation plant and equipment e.g. smaller capacity rock breaker hammers.

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	Noise impacts from child care operation	O	D	4	Low	<ul style="list-style-type: none"> ▪ Minimise consecutive works in the same locality (if applicable). ▪ Schedule a minimum respite period of at least 0.5 hour before activities commence which are to be undertaken for a continuous 4-hour period. <p><u>Operational – Child care centre</u></p> <p><u>Outdoor Play Areas</u></p> <ul style="list-style-type: none"> ▪ To achieve compliance with the Child care centre noise guideline the maximum number of children within the outdoor play area is as follows: <ul style="list-style-type: none"> – 20 x 0-2 year old within the north-eastern outdoor area – 10 x 2-3 year olds within the northern area of the outdoor play area – 19 x 3-6 year olds – 14 children in the active play area (mid area) and 5 in the passive play area (southern area) ▪ The southern area of the playground is to be designated as passive play area. The passive play area should comprise of passive activities such as painting, garden exploration, reading, block-playing or drawing. Maximum of 14 children can play in the active play area and a maximum of 5 children are permitted in the passive play area at one time. ▪ The building ceiling above the outdoor play area and the carpark should be lined with absorption material/panels with a Noise Reduction Coefficient (NRC) 0.7. ▪ No music is to be played in the outdoor areas. ▪ Children must be supervised at all times. <p><u>Indoor Play Areas</u></p> <ul style="list-style-type: none"> ▪ The windows marked orange in Figure 5-2 of the NVIA must be closed during intensive indoor play time (e.g. children screaming or singing and/or the use of speakers/music). ▪ All glazing at the child care Centre should consist of at least a standard Rw 30 rating window/door. <p><u>Carpark noise control measures</u></p> <p>The following noise control measures and management plan should be implemented for the carpark space:</p> <ul style="list-style-type: none"> ▪ Parents and guardians should be informed of the importance of noise minimisation when entering the site, dropping off or picking up children. This includes avoiding raising your voice within the centre's carpark area or beeping car horn. ▪ The ceiling in the basement driveway area, as shown in Figure 5-1, should be fitted with absorption material/panels with a Noise Reduction Coefficient (NRC) of 0.7 to absorb noise emission from the carpark. <p><u>Acoustic barriers</u></p> <p>The following noise barriers are to be constructed on site:</p> <ul style="list-style-type: none"> ▪ The eastern outdoor play area should have a 3m high solid on the north-eastern boundary and a 2.6m along the south-eastern outdoor play boundary. ▪ The western outdoor play area should have a 2.6m high wall on the western side of the boundary. ▪ A 2.1m along the western boundary of the site, adjacent to the Child Care Centre carpark; and ▪ 2.1m along the southern boundary of the site and south-eastern area of the site on the natural ground level. ▪ Layout of the noise barriers are shown in Figure 5-2 of the NVIA ▪ The construction material of the barriers must have a surface density of 10-15 kg/m² and be free from holes and gaps. Examples of suitable materials are provided in the NVIA.
Water Management	Management of storm water and discharge to Council drainage system during construction	C	D	4	Low	<ul style="list-style-type: none"> ▪ Protection of disturbed ground through devices such as temporary vegetation, diversion banks and sediment fences ▪ Early installation and progressive implementation of erosion controls ▪ Early construction of permanent drainage structures, culverts, sediment basins traps and catch drains ▪ Progressive revegetation of disturbed areas ▪ Use of geotextile to stabilise disturbed surfaces during construction of culverts ▪ Control of runoff from embankments through shaping of fill and construction of temporary windrows and batter drains ▪ Implementation of erosion control measures at associated sites, including access tracks, roads, office/compound site and extraction sites

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						<ul style="list-style-type: none"> ▪ Progressive and continual implementation of temporary sediment controls ▪ Diversion of runoff from disturbed areas to sediment control structures ▪ Management of turbid water in basins after rain through flocculation or extraction and use for construction or dust suppression ▪ Construction of temporary sediment traps at strategic locations ▪ Routine maintenance of sediment control devices to ensure that they remain fully functional at all times ▪ Removal of sediment from basins and other structures and placement in secure locations where further movement will not occur ▪ Minimisation of transportation of mud and soil by vehicles onto Gordon Avenue and Hammond Lane, through the use of shakers and wash-bays ▪ Provision for regular inspections of the control measures by a trained personnel to review and update control measures. Inspections should be conducted weekly and immediately after every significant storm event ▪ Dust control through progressive revegetation and application of water ▪ A procedure to ensure that water is not released from basins until achieving the appropriate quality standard ▪ Meeting EPA requirements & the guidelines of the Department of Housing publication "Managing Urban Stormwater: Soils & Construction" (Blue Book).
Social Impacts	Potential social impacts as a result of the development	C&O	C	3	Low	<p><u>Design</u></p> <ul style="list-style-type: none"> ▪ Consider implementing site-specific Crime Prevention Through Environmental Design (CPTED) principles throughout the internal and external layout of the childcare facility and the broader project site. Implementing CPTED principles can enhance safety and security. ▪ Consider ways of integrating Aboriginal culture throughout the development. Aboriginal culture can be represented through urban design, landscaping and artwork. ▪ Consider opportunities to engage with Aboriginal and local stakeholders to inform opportunities for design elements to identify opportunities for the Proposal to celebrate local culture and connection to Country. <p><u>Procurement and opportunities</u></p> <ul style="list-style-type: none"> ▪ Consider initiatives like training, employment and procurement policies or targets during the tender process for the construction works (for example, concerning local workforce, diversity and inclusion, Aboriginal economic participation and opportunities for vulnerable groups) to enhance outcomes beyond the design of the Proposal. <p><u>Construction management</u></p> <ul style="list-style-type: none"> ▪ Consult with Council and Schools Infrastructure NSW (SINSW) throughout the development of the site to understand the current and future needs of the local community, including local childcare and education needs. ▪ Communicate any traffic changes to the local community to ensure they are aware that any traffic or congestion concerns are being managed. ▪ Prepare a detailed Construction Noise and Vibration Management Plan (inclusive of Construction Noise and Vibration Monitoring Strategy) at the Construction Certificate (CC) stage to provide further noise and wellbeing mitigation measures, taking into consideration identified sensitive receivers. ▪ It is recommended that both the construction contractor and the proponent consult with surrounding future developments to understand expected construction timelines and activities, in the development of the Construction Management Plan (CMP) and Construction Traffic Management Plan (CTMP), to ensure all potential disturbances are minimised. ▪ Ensure clear communication with residents during construction to ensure they are fully informed and have access to information as required, including ways to contact construction management if there are issues arising, e.g. disturbance due to increased noise or vibration. ▪ Provide grievance mechanisms and promptly address complaints, including engaging a community liaison officer during construction. ▪ Consider opportunities to utilise alternative construction vehicle access routes, e.g., Jenkins Road, to minimise traffic impacts upon users of Carlingford Court. <p><u>Operational management</u></p> <ul style="list-style-type: none"> ▪ Consider extending the provision of affordable apartments to the 3- and 4-bedroom apartments to better cater to a variety of family sizes. ▪ Consider prioritising teachers and childcare workers in affordable housing provision in the proposed development. ▪ Consider undertaking a community open day once the proposed development becomes operational to invite the community in and facilitate community connections.

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						<ul style="list-style-type: none"> ▪ Prepare an Operational Management Plan (OMP) to ensure ongoing maintenance and upkeep of the communal open spaces. ▪ Consider ongoing activation of the communal open spaces in the development to encourage social interaction and community connections over time. ▪ Ensure communal spaces provide meeting spaces appropriate for children and teenagers across a range of age groups. ▪ Ensure onsite amenity spaces are bookable for community gatherings to reduce pressure on facilities and spaces in the surrounding community. ▪ Ensure the finalisation and implementation of the TP, with key elements of the TP proactively communicated to residents and workers to enhance its impact. The TP should recommend a range of initiatives to encourage residents to use public and active transport, including information on public transport services and active transport facilities. <p><u>Communication</u></p> <ul style="list-style-type: none"> ▪ Continue engagement, local presence, and consultation in the community during the planning and construction stages to increase the perception of influence. ▪ Consider implementing a coordinated community engagement and communication strategy throughout both the construction phase and the operational phase to address diverse stakeholder concerns and increase awareness of the development's positive contribution to Carlingford's evolving character. ▪ Consider undertaking further stakeholder engagement to highlight the Proposal's related opportunities to accommodate the needs of different vulnerable groups seeking affordable housing, particularly families and multigenerational households. ▪ Communicate with neighbours about the impact of the development and the design considerations which reduce the shadow impact and/ or reduce prolonged shadow-cast and are designed to enhance the visual amenity of the development overall, within its surrounding context. Inform neighbouring residents about the visual impact and shadow assessment findings to ensure transparency about any potential impacts and proposed mitigations. ▪ Provide the community with opportunities to provide feedback and share their concerns on perceived impacts.
Waste Management	Impact of the proposed development on waste from construction and demolition and operational waste	C&O	D	5	Very low	<p><u>Construction</u></p> <ul style="list-style-type: none"> ▪ Re-use of excavated material on site as topsoil and behind retaining. Remaining excavated material is to be disposed off site. <p><u>Operation</u></p> <ul style="list-style-type: none"> ▪ 61.8sqm of waste storage area shall be provided to accommodate residential and childcare waste streams. ▪ Residential and childcare waste bins shall be collected twice per week, with the exception of garden organics which will be collected fortnightly.
Geotechnical	Adequate soil and groundwater conditions to support the proposed development	C	E	5	Very low	<ul style="list-style-type: none"> ▪ Any excavation work greater than 500 mm in depth must be inspected by a geotechnical engineer during excavations. ▪ Temporary batters are to be no steeper than 1H:1V. Permanent batters steeper than 2.5H:1V must be designed and supervised by an experienced geotechnical engineer. ▪ Surface water drainage is to be diverted away from any proposed excavation batter faces. ▪ Stormwater is to be discharged to the street and not allowed to infiltrate the existing slope or pond on site. ▪ Safe working distances for typical items of vibration intensive plant are to be complied with.
Contamination	Remedial works to make the site suitable for development	C	E	5	Very low	<ul style="list-style-type: none"> ▪ A Hazardous Materials Survey (HMS) must be conducted before any demolition or renovation by a qualified consultant. If asbestos (ACM) is found, the following are required: <ul style="list-style-type: none"> – Asbestos Removal Management Plan (ARMP) – Class B licensed removal contractor – Compliance with EPA waste transport and management regulations – Post-demolition Asbestos Clearance Certificate by a Licensed Asbestos Assessor ▪ Demolition and excavation must follow all relevant Australian Standards and SafeWork NSW codes of practice. ▪ Any soils requiring excavation, onsite reuse and/or removal must be classified: ▪ Topsoil/FILL to be assessed per NSW Waste Classification Guidelines ▪ Underlying Virgin Excavated Natural Materials to be characterised in accordance with NSW EPA Resource Recovery Orders

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Aboriginal Cultural Heritage	Protect of Aboriginal objects	C	E	5	Very low	<ul style="list-style-type: none"> ▪ An Unexpected Finds Protocol must be prepared and accessible on site in case of unforeseen contamination, including asbestos. ▪ If Aboriginal objects are discovered during the proposed works, works must stop immediately, and an assessment must be undertaken in accordance with Part 6 of the National Parks and Wildlife Act 1974. It is recommended that a stop-work procedure be developed to allow proper assessment and management of any unexpected Aboriginal objects. A sufficiently experienced and qualified archaeologist should be engaged immediately to address the unexpected find and advise further actions.
Utilities	Existing and surrounding ground infrastructure to service the development	C	E	5	Very low	<ul style="list-style-type: none"> ▪ Further utility investigations and provisions will be made in accordance with the recommendations of the Utility, Infrastructure and Services Report by Erbas. ▪ Lodge a Section 73 application with Sydney Water to obtain the Notice of Requirements for Section 73 Certificate compliance. ▪ If the proposal connects to gas, submit a gas application with Jemena via online portal. ▪ Submit an Ausgrid connection application to determine connection points and substation infrastructure viability. ▪ Consult NBN Co's New Developments team to confirm design approvals and avoid any delays in service activation at completion.