Level 4, 180 George Street, Sydney, NSW, 2000
colliers.com.au

Appendix E
Consolidated Mitigation Measures

SSD-91496958 – 159-167 Darley Street West, Mona Vale In-fill Affordable Housing

The collective measures required to mitigate the impacts associated with the proposed works are detailed below. These measures have been derived from the assessment in **Section 6.0** of the EIS and those detailed in appended consultants' reports.

Ref No.	Mitigation Measure
Trees and Landscaping	
TL-1	An Arborist experienced in tree protection on construction sites will be engaged prior to the commencement of construction work on the site. The Project Arborist will monitor and report regularly to the Principal Certifying Authority (PCA) and the Applicant on the condition and protection of the retained trees during the construction works. The Project Arborist will monitor any demolition, excavation, machine trenching or compacted fill placed within the TPZ of all retained trees.
TL-2	The schedule of works for the development will acknowledge the role of the Project Arborist and the need to protect the retained trees. Sufficient notice must be given to the Project Arborist where his/her attendance is required. Should the proposed design change from that reviewed, additional arboricultural assessment will be required.
TL-3	The Project Arborist will certify tree protection measures at key stages of the construction. Copies of the Certifications should be sent to PCA.
TL-4	Tree protection fencing may need to be temporarily removed to allow for demolition. Demolition machinery to be used will be as small (light weight) as possible minimise soil compaction. Tracked machinery used will stand on existing hardstand wherever possible to minimise soil compaction.
TL-5	If haul roads or heavy construction traffic is proposed within TPZs of retained trees, ground protection will be required to minimise root damage through soil compaction. The Project Arborist will be consulted as to the most appropriate ground protection required.
TL-6	Bulk earthworks are required close to retained trees and are to be shored vertically within TPZs. Rock saw excavation will be used wherever possible rather than benching towards trees.
TL-7	Paving will be at or above existing ground lines to minimise root disturbance in TPZ areas only. Permeable surfaces will be used wherever possible. Where concrete paving is required, the captured rainfall will be allowed to drain to the TPZs beneath.
TL-8	Trenches will be routed outside TPZs wherever possible. Where this routing is not possible, trenching will be horizontally bored or dug with a small (maximum 1.5t) tracked machine. All trenching for services will be certified by the Project Arborist. Roots greater than 50mmø will be retained under or over services conduits, unless approved by the Project Arborist

TL-9	Tree protection fencing as indicated on the Tree Protection Plan provided in the Arboricultural Impact Assessment at **Appendix T** will be installed prior to commencement of works. Fencing may need to be temporarily moved to allow for tree removal and immediately reinstated. Where fencing not feasible, the trunk(s) will be battened as to avoid bark wounding and ground protection provided with placement of mulch or additional matting or boarding.
TL-10	Areas within tree protection fencing will be mulched to a maximum depth of 100mm with a weed-free wood chip mulch to conserve soil moisture and inhibit weed growth.
TL-11	The following activities are prohibited within tree protection fencing areas: • Topsoil stripping • Storage of building material without installation of ground protection • Parking or movement of heavy machinery without installation of ground protection • Depositing of any potentially phytotoxic liquids or substances including concrete tailings • Installation of site sheds without installation of ground protection • Any excavation or compacted fill not indicated on approved construction drawings.
TL-12	If crown pruning is required to any tree, it will comply with Australian Standard AS4373-2007: Pruning of Amenity Trees and be kept to a minimum wherever possible. Crown pruning will be undertaken by Contracting Arborist with minimum AQF Level 3 qualifications. Approval for crown pruning is to be granted under this SSDA or as a separate approval once works have commenced.
TL-13	Other tree protection measures including additional mulching, temporary immigration, scaffolding protection, prevention of soil compaction (machinery movements) and prevention of soil profile inversion (fill) will be implemented as required and as directed by the Project Arborist.
TL-14	The Tree Protection Plan provided in the Arboricultural Impact Assessment at **Appendix T** will be updated and include a Tree Protection Specification (TPS) for CC documentation to reflect any layout or level changes and account for any updates to drawings. Additional services Plans, not assessed for the DA submission will also be reviewed to determine if there are any additional tree impacts. The amended TPP and TPS will be kept in the Site Office during the construction period to guide tree protection procedures. The recommendations contained in the amended TPP and TPS will be incorporated into the Construction Management Plan and Vegetation Management Plan.
TL-15	Trees 18 and 45 (Cabbage Tree Palms, Livistona australis) and are to be transplanted on-site by a tree transplant company or be supervised by a suitably qualified person as indicated on the Landscape Plan at **Appendix I**. A Transplant Method Statement will be prepared by a tree transplant company to detail the feasibility, preparation, handling and aftercare of both trees. The trees will either be taken off-site temporarily and stored at a local nursery or stored on-site in a temporary nursery to be monitored by a suitably qualified person.
TL-16	Tree removal will be undertaken by Contracting Arborists with minimum AQF Level 3 qualifications. Tree removal and pruning works will comply with Safe Work Australia "Guide to Managing Risks of Tree Trimming and Removal Work" July, 2016. Particular care will be taken not to damage the crown or roots of trees being retained.
TL-17	Where the trunk of a tree to be removed is located within the SRZ of a tree being retained (e.g. Tree 50) the stump of the tree being removed will be ground out rather than being grubbed out to minimise root damage.

Traffic, Transport and Accessibility	
TTA-1	A detailed Construction Traffic Management Plan will be prepared by the appointed contractor at the Construction Certificate stage and will cover the following additional information: • description of the existing site and its location • existing road network and traffic conditions • construction programme • heavy vehicle access route • works zone details • public and active transport infrastructure • construction traffic generation estimates and its impacts on the surrounding road network • hoarding • site amenities • sediment control • neighbour notification • contractor parking • site inductions • approved construction work hours • swept path analysis of heavy vehicle access to the site • assessment of on-street parking impacts • emergency vehicle access • traffic control plan(s) • contact details of key project personnel
TTA-2	In preparing any future detailed CTMP, reference will be made to the following policies and guidelines: • TfNSW Traffic Control at Work Sites Technical Manual (Issue 6.1 – 28 February 2022) • Australian Standards AS1742.3: Traffic Control Devices for Works Sites on Road • Notice of Determination for the proposed SSDA and any relevant consent conditions
TTA-3	Traffic control plans (TCP) will be prepared in accordance with the principles of TfNSW's Traffic Control at Work Sites Technical Manual (Issue 6.1 – 28 February 2022).

TTA-4	Construction parking will be provided within the basement once the superstructure is completed, where possible.
TTA-5	Determine designated routes for heavy vehicle movements on arterial road networks. Truck movements are to be avoided during peak hours where possible to minimise impact on pedestrian and cyclists.
TTA-6	Implement A-Class Hoarding and/or secure mesh fencing with breathable mesh cover to protect public space prior to demolition works beginning.
TTA-7	The site is to be secured prior to the commencement of demolition and throughout construction and must comply with WorkCover and Safework NSW requirements.
Biodiversity	
B-1	A Vegetation Management Plan will be prepared for the project and and will need to be approved prior to the issue of a Construction Certificate.
B-2	Any hollow-bearing features of trees removed as part of the development will be salvaged for reuse in rehabilitation areas within nearby retained vegetation on the site.
B-3	Clearing limits will be marked either by high visibility tape on trees or metal/wooden pickets, fencing or an equivalent boundary marker that will be installed prior to clearing.
B-4	Disturbance will be restricted to the delineated area and no stockpiling of equipment, machinery, soil or vegetation will occur beyond this boundary.
B-5	Pre-clearance surveys will be conducted in all areas of vegetation that are required to be cleared.
B-6	Clearing of vegetation is to be undertaken using a two-stage clearing process and the following provisions will be made to protect any native fauna during clearing and demolition activities by the following means: • All staff working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present; • Animals disturbed or dislodged during the clearance but not injured will be assisted to move to adjacent bushland or other specified locations. • If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanised)
B-7	Construction activities will be undertaken in accordance with "The Blue Book" (Landcom 2004). These include implementation of the following measures: • Installation of sediment control fences; • Covering soil stockpiles; and • Avoiding soil disturbance prior to heavy rainfall.
B-8	The following tree protection measures will be implemented to avoid inadvertent impacts to trees that are marked for retention: • Implementation of tree protection fencing; • Suitable tree protection zones; and

	• Temporary ground and root protection (where relevant).
B-9	The trees proposed from relocation will be appropriately stored during construction and replanted as part of the final landscaping works.
B-10	Appropriate weed control activities will be undertaken prior to vegetation clearing in accordance with the Greater Sydney Local Land Services Area and the *Greater Sydney Regional Strategic Weed Management Plan 2023 – 2027* (LLS: Greater Sydney 2022) under the NSW *Biosecurity Act 2015*.
B-11	The following measures be implemented as part of weed management: • Prevention: Appropriate construction site hygiene measures will be implemented to prevent entry of new weeds to the area such as the cleaning of equipment prior to entering the site. • Eradication: Initial weed treatment will be carried out within the site and include eliminating woody species and targeting large dominant infestations of exotic herbs. This may be achieved via a combination of manual weed removal and herbicide use. The following bush regeneration measures will be undertaken to avoid adverse impacts to retained vegetation: - Not over clearing (remove only targeted species); - Employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance; and - Replacement of disturbed mulch/leaf-litter. • Containment: Follow-up monitoring and maintenance should be undertaken on the site following vegetation clearing activities, to contain any re-emergence of weed species.
B-12	Native species consistent with the local Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion (PWSGF) TEC will be planted throughout revegetation works.
B-13	Implement the Vegetation Management Plan (VMP) in perpetuity.
Noise and Vibration	
NV-1	A report is to be prepared by qualified and experience acoustic consultant and submitted with the construction certificate stage. The report shall review and certify that the documentation includes the measures needed to comply with the noise assessment performance criteria.
NV-2	Design strategies stipulated in the Noise and Vibration Impact Assessment at **Appendix N** must be adhered, where appropriate.
NV-3	If noise levels exceeded the management levels, reasonable and feasible noise management techniques will be reviewed.
NV-4	Vibration caused by construction at any residence or structure outside the subject site must be limited to: • For structural damage vibration, German Standard DIN 4150-3 Structural Vibration: Effects of Vibration on Structures; and • For human exposure to vibration, the evaluation criteria presented in the British Standard BS 6472:1992 Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz) for low probability of adverse comment.

NV-5	A detailed management plan shall provide appropriate ameliorative measurements specific to the site to ensure that the risk of complaints is minimised and if complaints shall arise, are appropriately managed. The engaged contractor will adopt these mitigation methodologies so that construction noise and vibration from the construction of this site can be managed appropriately.
Ground and Water Conditions	
GWC-1	Prior to excavation and construction, detailed dilapidation surveys are to be carried out on all structures and infrastructures surrounding the site that falls within the zone of influence of the excavation to allow assessment of the recommended vibration limits.
GWC-2	For site preparation, following removal of all vegetation and trees (including their root balls), demolition of the existing sheds, slabs and pavements, all grass, topsoil, root affected soils and any deleterious fill or contaminated soil should be stripped.
GWC-3	An engineered shoring wall must be installed prior to excavation commencing to support the full excavation depth.
GWC-4	A groundwater seepage analysis (GSA) comprising rising head tests is to be carried out to assess permeability of the material near BEL.
GWC-5	Monitoring of seepage to be implemented during the excavation works to confirm the capacity of the drainage system.
GWC-6	A sump-and-pump system is to be used both during construction and for permanent groundwater control below the basement floor slab.
GWC-7	The design of footings for the proposed development is to comprise a combination of shallow footings and foundation piles extended to Unit 3 or better material.
GWC-8	During construction stage, geotechnical inspections should be carried out by suitably qualified geotechnical professional to confirm that the required bearing capacities have been achieved, and to determine any variations that may occur between borehole/inspection locations.
GWC-9	Recommended additional work that needs to be carried out as recommended in **Appendix Q** include: • Additional Geotechnical Investigation in the form of at least four cored boreholes across the site to confirm the depth and quality of bedrock across the site; • Preparation of a Geotechnical Monitoring Plan (GMP) for vibration & deflection monitoring of the shoring wall; • Dilapidation surveys of surrounding properties prior to bulk excavation works; • Design of working platforms (if required) for construction plant by an experienced and qualified geotechnical engineer; • Geotechnical inspections of the shoring pile installation by an experienced geotechnical professional prior to placement of any concrete or steel to verify the adequacy socket material; • Classification of all excavated material transported off site; • Witnessing drilling and installation of support measures and proof-testing of any temporary anchors. • Geotechnical inspections of all new shallow footings and foundation piles by an experienced geotechnical professional prior to placement of concrete or steel to verify the bearing capacity of founding material; and

	• Ongoing monitoring of groundwater inflows into the bulk excavation during excavation works.
Water Management	
W-1	The OSD section will discharge via a 300mm pipe to Council's existing kerb inlet pit in the street. The top volume level of stormwater within the OSD tank will be lower than any inlet pits on the upstream line, preventing backwater surcharging.
Flood Risk	
FR-1	The design will be provided in accordance with the recommendations outlined in the Flood Impact and Risk Assessment at **Appendix Z**.
FR-2	The following preliminary Flood Emergency Response Plan measures will be implemented: 1. In a flood emergency, residents should move inside of their units to avoid potentially being exposed to hazardous floodwaters. 2. If required or advised by the NSW SES residents can evacuate the site during flood events by travelling east via Darley Street to Pittwater Road. 3. Site management and residents should be aware of weather forecasts and warnings by subscribing to NSW SES, BoM, Early Warning Network and other relevant warning systems. 4. Warning signage shall be installed at the site, that states that the flood affected areas in the southern portion of the site are unsafe during a flood and should not be accessed during a rain event. 5. Any affected structures should be designed to withstand flood forces up to and including the PMF. This will ensure damage to the property is minimal and safety to residents is maintained.
FR-3	No solid infill or enclosed storage should be introduced beneath Building C, and the undercroft area should be maintained clear of stored items, debris and other obstructions as part of the ongoing site management.
Contamination and Remediation	
CR-1	The RAP outlines the preferred remediation option as excavation of impacted soil and offsite disposal to licensed waste facilities. The proposal is to adhere to the RAP in the event that contaminated soils are encountered.
CR-2	Prior to commencement of site works, the appointed site remediation contractor must prepare a site-specific work health and safety plan, construction environmental management plan and asbestos management plan for the project, covering human / environmental health and safety issues.
CR-3	Should an unexpected find or area of high level (residual) contamination be encountered during the course of the remediation, then the procedures described in the Remedial Action Plan at **Appendix S** will be implemented, until the remediation goal has been achieved and the site is deemed suitable for the proposed (residential) use.
CR-4	Prior to commencement of works, environmental controls, site access, security, fencing and any required warning signed will be established.
CR-5	A project plan will be developed to outline engineering design for excavation support (if required), dewatering management, water treatment requirements and design (if required), staging of excavation works, stockpiling, waste stabilisation, waste material loading, traffic management and waste tracking.

CR-6	A remediation workshop will be conducted with the appointed contractors to further develop required remedial measures, excavation plans, waste classifications, and environmental management requirements.
CR-7	A Hazardous Materials Survey will be required prior to demolition of any existing structures, to ensure that hazardous materials that may have been used within the structures are identified and appropriately managed during demolition to prevent potential spreading of contamination and potential health risk to site workers.
CR-8	An inspection of the surface/exposed soil surface will be performed by a qualified and experience environmental consultant following demolition.
CR-9	An AMP will be prepared.
CR-10	Appropriate control measures will be implemented during excavation of soil material at the site and air monitoring for asbestos will be implement during asbestos removal works.
CR-11	If odours are significant enough to cause nuisance at a site boundary, then measures for odour control will be adopted.
CR-12	Material handling and management procedures will be implemented for any excavated material and any material designated for offsite disposal must be classified in accordance with NSW EPA.
CR-13	Validation sampling will be performed and results will be presented in a Site Validation Report, prepped by an environmental consultant.
CR-14	Measures set out in Section 7 of the Remedial Action Plan at **Appendix S** will be implemented where necessary.
Waste Management	
WM-1	Implementation of the Operational Waste Management Plan, which is provided at **Appendix Y**.
WM-2	Ongoing monitoring of waste management plans during construction and operation.
Aboriginal Cultural Heritage	
ACH-1	Record keeping will be undertaken and the due diligence report will be kept as evidence of the due diligence process having been applied to the subject area.
ACH-2	Should any archaeological deposits be uncovered during any site works, the following unexpected archaeological finds procedure will be undertaken: 1. All works within the vicinity of the find must immediately stop. The find location and minimum 2m buffer should be cordoned off with signage identifying the area as a 'no-go zone' to prevent accidental impact. The find must not be moved 'out of the way' without assessment. 2. The site supervisor or another nominated site representative must contact either the project archaeologist (if relevant) or Heritage NSW (Enviroline 131 555) to contact a suitably qualified archaeologist.

	3. The nominated archaeologist must examine the find, provide a preliminary assessment of significance, record the item and decide on appropriate management measures. Heritage NSW should be notified of the find through a Section 146 notification. Such management may require further consultation with the approval authority, preparation of a research design and archaeological investigation/salvage methodology. 4. Depending on the significance of the find, reassessment of the archaeological potential of the subject site may be required and further archaeological investigation undertaken. 5. Reporting may need to be prepared regarding the find and approved management strategies. 6. Works in the vicinity of the find can only recommence upon receipt of approval from Heritage NSW.
ACH-3	In the unlikely event that clearly identifiable human remains are uncovered during the proposed works, the following human remains procedure will be undertaken: 1. All works within the vicinity of the find must immediately stop and the location cordoned off with signage installed to stop any accidental impact to the finds. 2. The site supervisor or other nominated manager must notify the NSW Police and Heritage NSW (Enviroline 131 555). 3. The find must be assessed by the NSW Police, which may include the assistance of a qualified forensic anthropologist. 4. Management recommendations are to be formulated by the NSW Police and Heritage NSW. 5. Works are not to recommence until the find has been appropriately managed.
Environmental Heritage	
EH-1	In the unlikely event that any potential archaeological resources are uncovered during any site works, adherence to the unexpected archaeological finds procedure outlined in **ACH-2** above will be undertaken.
EH-2	In the unlikely event that human remains are uncovered during any site works, adherence to the following human remains procedure outlined in **ACH-3** above will be undertaken.
Construction, Operation and Staging	
COS-1	Building construction and delivery of material hours will be restricted to: • 7:00am to 5:00pm inclusive Monday to Friday • 8:00am to 1:00pm inclusive on Saturday • No work on Sundays and Public Holidays Excavation works will be restricted to: • 8:00am to 5:00pm Monday to Friday only. Any works outside of the approved work hours would be subject to specific prior approval from the appropriate authorities.
Engagement	
E-1	Ongoing engagement will be undertaken with local residents, landowners, businesses and key agencies, ensuring that community input remains at the heart of the development process.

Crime Prevention	
CP-1	Surveillance: • Clearly identifiable building entrances at the frontage with gatehouses marking the primary pedestrian entry points. The main entries are easily visible from the street, promoting legibility and a welcoming address for residents and visitors. • Provision of bright and evenly distributed lighting to ensure supervision at night. • Orientation of building entrances and windows to the street to promote passive surveillance.
CP-2	Access Control: • Access control apartments and basement parking through a keyed system. • Provide clear circulation paths within the basement to ensure safe pedestrian movement.
CP-3	Territorial Reinforcement: • Provide clear ownership cues through the location of communal and private open space on the ground level at the rear of the site.
CP-4	Space/Activity Management: • Ensure landscaping is well maintained. • Prepare an operational management plan. • Use of high-quality materials that are vandal resistant and sturdy.