

- due to the proximity of the works to buildings (e.g. R8 and R9) and the noise intensive nature of works such as piling, there would be limited scope to further reduce construction noise levels by using engineered noise controls (other than those already proposed);
- the worst-case construction noise impacts during pile installation and intricate lifts (scenarios 1 to 4) would be short-term, taking up to four (4) months to complete;
- for the remaining 11 months of construction, noise levels would be below 75 dBA and during the day-time only, therefore are unlikely to cause adverse amenity impacts;
- the day-time occupancy rate at nearby residences is likely to be low;
- the indoor noise level at all nearby residences is likely to be below 75 dBA during all scenarios because the noise modelling undertaken in the NVIA is conservative and does not take into account noise attenuation provided by:
 - the facades of existing and new residential properties nearby (20 dBA to 25 dBA) such as buildings R8 and R9 at Barangaroo South which have been built to provide a high level of noise attenuation consistent with the CBD context of the area and the future night-time noise levels expected at the Barangaroo precinct;
 - the use of portable localised temporary screens predicted to provide attenuation up to 15dBA; and
 - the use of temporary acoustic barriers predicted to provide attenuation up to 10dBA.
- noisy day-time activities would be undertaken in no more than 4-hour blocks with 2-hour respite periods and outside key periods (e.g. lunchtime to avoid impacts to nearby cafes and restaurants);
- new residents at Barangaroo South are entering into a precinct that is still undergoing development and the predicted noise levels are not beyond community expectations for a major CBD construction site in a major city. In this regard it is noted that the project forms part of the strategic planning undertaken to ensure that the Barangaroo precinct is adequately serviced by public transport and has been earmarked for development since the approval of the original Barangaroo Concept Plan in 2007. As such, information has been publicly available for some time indicating that a ferry hub would be constructed on the waterfront in front of new buildings at Barangaroo South; and
- the Proponent has committed to preparing a comprehensive Construction Noise and Vibration Management Plan (CNVMP) in consultation with the EPA and including a suitable noise monitoring program.

Taking the above into account, the Department concludes that noise from day-time construction of the ferry hub is unlikely to result in unreasonable noise impacts.

Evening and night-time construction hours (scenarios 1 to 4)

The project requires some evening and night-time (early morning) out-of-hours works for piling and intricate lifts (scenarios 1 to 4) when calm water conditions occur to ensure construction accuracy and worker safety. These works would be short-term taking approximately three to four months to complete but are when the worst-case noise impacts of the project would occur, particularly from sleep disturbance.

Initially, both the Department and the EPA considered that further justification should be provided for the out-of-hours works, including exact timeframes for specific targeted works to ensure they are kept to an absolute minimum. It was also recommended that the use of the jack-up barge be investigated to enable piling and intricate lifts to be undertaken independent of sea and weather conditions thus eliminating the need for out-of-hours works altogether. In the event of unavoidable out-of-hours works, the Department requested that a greater emphasis be placed on managing potential noise impacts on individual receivers through community consultation and respite provision process.

The Proponent has advised the Department that the use of the jack-up barge is its preferred method of construction during piling and intricate lifts. However, a commitment to utilise this equipment cannot be made until a construction contractor is appointed (post-determination) and it is confirmed that a jack-up barge is available for use (noting limited availability). The Proponent has therefore requested that flexibility be built into the approval in the unlikely event that a jack-up barge cannot be secured. In

this regard, the Proponent has confirmed that any out-of-hours works would be generally undertaken only in the morning from 5 am to 7 am.

The Department accepts the responses provided by the Proponent in the RTS and is satisfied that it is genuinely committed to obtaining a jack-up barge to allow for piling to be carried out during early day-time hours. The Department acknowledges that complying with standard construction hours may not be possible for this type of project (if a jack-up barge cannot be obtained) and in any event, would unnecessarily extend the duration of the works by 4-6 weeks, meaning sensitive receivers would be impacted by noise for a substantially longer period. After further discussions with the Department, the Proponent has agreed to:

- ensure that a jack-up barge is used where possible during piling and intricate lifts (scenarios 1 to 4);
- only undertake construction works during standard construction hours, except where (for out-of-hours works):
 - it is demonstrated that a jack-up barge is not available for use;
 - it is demonstrated that all reasonable and feasible noise mitigation measures have been implemented to achieve the relevant NMLs;
 - the works are fully justified and limited to an explicit duration (e.g. 5 am to 7 am) in consultation with surrounding residents and businesses;
 - night-time work is not undertaken on more than 4 consecutive nights during any 7-day period and works are not undertaken on a Sunday night/Monday morning;
 - sensitive receivers predicted to be impacted by that work have been notified by letterbox drop between 5 and 14 days prior to the commencement of work;
 - a 24-hour community complaints line and complaints handling protocol is in place to ensure timely and active response; and
 - an independent Environmental Management Representative (EMR) has been appointed for the project, the EMR has taken responsibility for overseeing the works, and is satisfied that the works comply with the above parameters.
- customise the CNVMP for the project to consider the actual construction methodology and equipment to be used by the construction contractor once appointed; and
- implement a comprehensive Community Liaison Plan (CLP) for the project with a focus on community consultation, early notification procedures, and a noise monitoring, complaints and response mechanism for critical stages of the works.

The Department has formalised the above, where relevant, into recommended conditions of approval. The Department has also included a condition requiring appointment of an Environmental Management Representative to take responsibility for monitoring and overseeing the environmental performance of the project, including any out-of-hours works. To ensure rigour, the CNVMP, CLP and EMR would all need to be approved by the Secretary, prior to the commencement of construction. These conditions have been developed based on the EPA's recommendations for an out-of-hours works protocol in consultation with the Department. The protocol is considered best practice for the management of out-of-hours noise from construction of CBD wharf infrastructure. Conditions would also require the Proponent to implement all reasonable and feasible measures to minimise noise and to manage any residual impacts on individual receivers through a community consultation process. This is consistent with the approval requested by both the City of Sydney and Leichhardt Council.

With these conditions in place, the Department's assessment concludes that the noise impacts associated with the construction of the project can be effectively managed, particularly given that the worst-case impacts and out-of-hours works (if required) would be short-term for up to 4 months of the 15-month construction program, and the remaining 11 months of construction would take place during the less sensitive day-time period with noise levels below 75 dBA.

The Department also considers that the effective implementation of these measures by the Proponent and the EMR would be critical to ensuring the construction noise impacts of the project are effectively managed so that they do not adversely impact on nearby sensitive receivers.

Finally, the Department considers that the project is in the broader public interest because it would result in a number of key public benefits. In this regard, the Department acknowledges the long-term importance of the project as a critical piece of public infrastructure needed to service the Barangaroo site which will be a major employment hub of significant value to the NSW economy. The Department therefore concludes that on balance, the long-term benefits associated with proposal would outweigh any short-term construction noise impacts.

5.1.2 Water

During construction, water quality may be impacted upon by sediments disturbed by construction vessels, piling, interception of groundwater during landside construction, sediment laden run-off from landside construction, and the generation of additional stormwater flows or accidental spills (e.g. fuels) from construction vessels.

However, given water depths in Darling Harbour range from 9.5 m to 11.5 m, construction vessels are unlikely to disturb underlying sediment. Further, excavations during landside construction would be shallow and would not intercept groundwater along the foreshore located 1.5 m to 3 m below ground level.

An Erosion and Sediment Control Plan would be prepared as part of the CEMP for the project in accordance with Landcom's *Blue Book* to prevent contaminated run-off from the temporary landside construction compound further contributing to poor water quality in Darling Harbour. Construction of the project is also not expected to result in additional stormwater flows or velocities.

Silt curtains would be installed in the water between the inner piles and the shore to protect seawall and aquatic habitats (e.g. algae) from potential smothering and turbidity from sediments disturbed during the construction works (e.g. piling). Emergency spill kits would also be kept on barges and all workers would be trained in their use. Detailed measures to manage accidental spills would be formalised in the CEMP.

DPI considered that the CEMP should include a methodology to manage any unexpected groundwater intercepted during construction. The Department has therefore incorporated this requirement into recommended conditions. As a final measure, a suitable water monitoring program for key parameters (visual and sampling) would also be included in the CEMP to allow timely identification and rectification of any unforeseen water quality issues.

Given the above, the Department concludes that potential water quality impacts during construction (and operation) of the project would be minor and will be sufficiently managed.

5.1.3 Ecology

Considering the findings the water assessment (above) and associated mitigation measures, the Aquatic Ecology Assessment (AEA) in the EIS found that the construction (and operation) of the project would result in negligible losses of and impacts to aquatic habitat and organisms.

The AEA also found that the construction of the new piles and pontoons for the ferry hub would result in a net long-term gain in available algae attached to wet surfaces providing shelter and feeding habitat for small reef fish and large pelagic fish.

DPI considered that provided all mitigation measures outlined in the EIS are implemented, the project would not result in any impacts to aquatic ecology. The Department has therefore recommended conditions requiring the Proponent to prepare a CEMP that are consistent with all mitigation measures contained in the AEA.

With these conditions in place, the Department's assessment concludes that the impacts of the project on marine ecology during construction (and operation) would be negligible.

5.1.4 Vessel Movements

During construction, the majority of construction plant, equipment, materials and personnel would access the site via Sydney Harbour, travelling by boat or barge from the construction contractor's off-site facility to the subject site. This would result in a minor increase in additional vessels in Darling Harbour during the construction period

TNSW has advised that the 130 metre wide navigation channel in Darling Harbour would be maintained throughout the construction period wherever possible to minimise navigation and safety impacts on vessels travelling to and from Darling Harbour during construction. Water-borne construction plant may also be docked and operated within the subject site during construction. Some minor vessel detours may be required during this time, however these would be temporary and are considered unlikely to have a significant impact on other users of the waterway. In addition, access to other ferry wharves in Darling Harbour would not be restricted.

Based on the above, the Department is satisfied that the generation of vessel movements during construction would be low and is unlikely to have a significant impact on users of the waterway in Darling Harbour. The Department also considers that the potential navigation and safety impacts associated with additional maritime traffic generated by the construction of the project can also be effectively managed via the implementation of the Proponent's proposed Vessel Traffic Management Plan (VTMP).

5.1.5 Traffic and Car Parking

During construction, some heavy and light vehicles would be required to access the site via Lime Street to transport materials to and from the construction compound located on the foreshore. A small number of light vehicles may also be required to park on Lime Street. However, traffic generation is expected to be minor with a worst-case scenario of up to 10 trucks accessing the construction compound a day (approximately one per hour) during concrete pours. These movements and any parking required would be easily accommodated by the surrounding road network. Up to 15 construction workers would be on the site at any one time but would generally use public transport to access the site consistent with other major CBD construction projects.

Based on the above, the Department is satisfied that traffic generated by the construction of the project would be minor and can be safely accommodated by the surrounding road network. Notwithstanding this, to ensure construction traffic is effectively managed, the Department has recommended a condition that would require the Proponent to prepare a Traffic Management Plan (TMP) as part of the Construction Environmental Management Plan (CEMP) for the project that is consistent with all construction traffic management measures contained in the EIS.

5.1.6 Construction Management

The Department is satisfied that all other residual construction impacts of the project (waste, air etc) would be minor and can be effectively managed in accordance with standard conditions. The Department also notes that these impacts would be temporary in nature for approximately 15 months during construction of the first two (2) wharves. Where relevant, the Department has incorporated the requirements of government agencies, including the EPA (**Section 4**) into the recommended conditions to manage residual construction impacts. The Department has also formalised the requirement for a CEMP into the infrastructure approval. The CEMP would address all issues associated with the construction of the ferry hub, including:

- site management;
- construction methodology and staging;
- identifying the roles and responsibilities of key personnel;
- all environmental management and mitigation measures (e.g. for air, waste, traffic, unexpected heritage finds etc); and

- a protocol for community consultation and complaints handling consistent with the CLP for the project.

The CEMP would also incorporate a suite of other plans, including a CLP, CNVMP, TMP and VTMP. To address separate concerns raised by Council and Leichardt Council (**Section 4**), and to coordinate the ongoing works being undertaken at Barangaroo, the CEMP would be prepared in consultation with Lend Lease and the BDA to ensure the effective coordination. The Proponent has also committed to undertaking a review of potential vibration impacts after all vibration generating equipment is known to determine appropriate offset distances at potentially affected receivers.

For the reasons outlined above, the Department is satisfied that the CEMP and its associated plans would provide a suitable framework for managing the potential environmental impacts associated with the construction of the ferry hub. With recommended conditions in place, the Department concludes that the construction impacts of the project would be effectively managed.

5.2 Urban Design and Visual Impacts

5.2.1 Urban Design

The Department has reviewed the EIS and the accompanying conceptual design drawings of the proposed ferry hub and notes the proposed design exhibits a high standard of urban and architectural design by (**Figure 7**):

- incorporating curved roof profiles and a light-weight structure that maximises transparency and maintains a sense of openness and visual connection to the water;
- maximising the use of glazed screens, balustrades, gates and barriers around each wharf to increase transparency through the structures;
- integrating key elements of the structure to produce a simple and unified low-scale structure that is consistent with the architectural character of TNSW's Sydney Ferry Wharf Upgrade Program;
- minimising the scale of key elements on the wharves (e.g. the kiosk and sewerage pump-out facilities) and the height of the roof to a maximum of 6.5 m above sea level;
- providing a built form (bulk, height and scale) that is appropriate for and responds to the urban context of the site, the status of the project as a new major ferry hub (as opposed to a suburban wharf) and is consistent with other major CBD ferry hubs (e.g. Circular Quay);
- maximising access to natural light by providing a glazed roof-light for each pontoon; and
- using high quality materials and finishes such as glass reinforced concrete, glazed screens, stainless steel, glazed roof-lights and zinc (standing seam) roofing which have been selected to provide weather protection, maximise transparency, improve amenity and sightlines of approaching ferries, and are appropriate to the function and exposed maritime environment of the ferry hub.

Council's submission stated support for the project and encouraged the Proponent to keep the space between the ferry concourse and the roofline clear as possible to maintain views through the structures from the waterfront and noted some opportunities to de-clutter roof space under the wharves during detailed design. Council also supported the use of standing seam zinc roofing materials and the need for a non-reflective, textured roof finish.

In the RTS, the Proponent confirmed that enabling views through the ferry hub to the water was a key design principle of the project which has been achieved by limiting the number of structural columns to four per wharf, providing clear glazed screens and balustrades and limiting structures on the pontoons to the minimum required for safe operations. The Proponent also confirmed that the standing seam zinc roofing materials to be used for the ferry hub would be zinc with a dull matte finish which would develop an oxide layer over time, further reducing reflectivity.

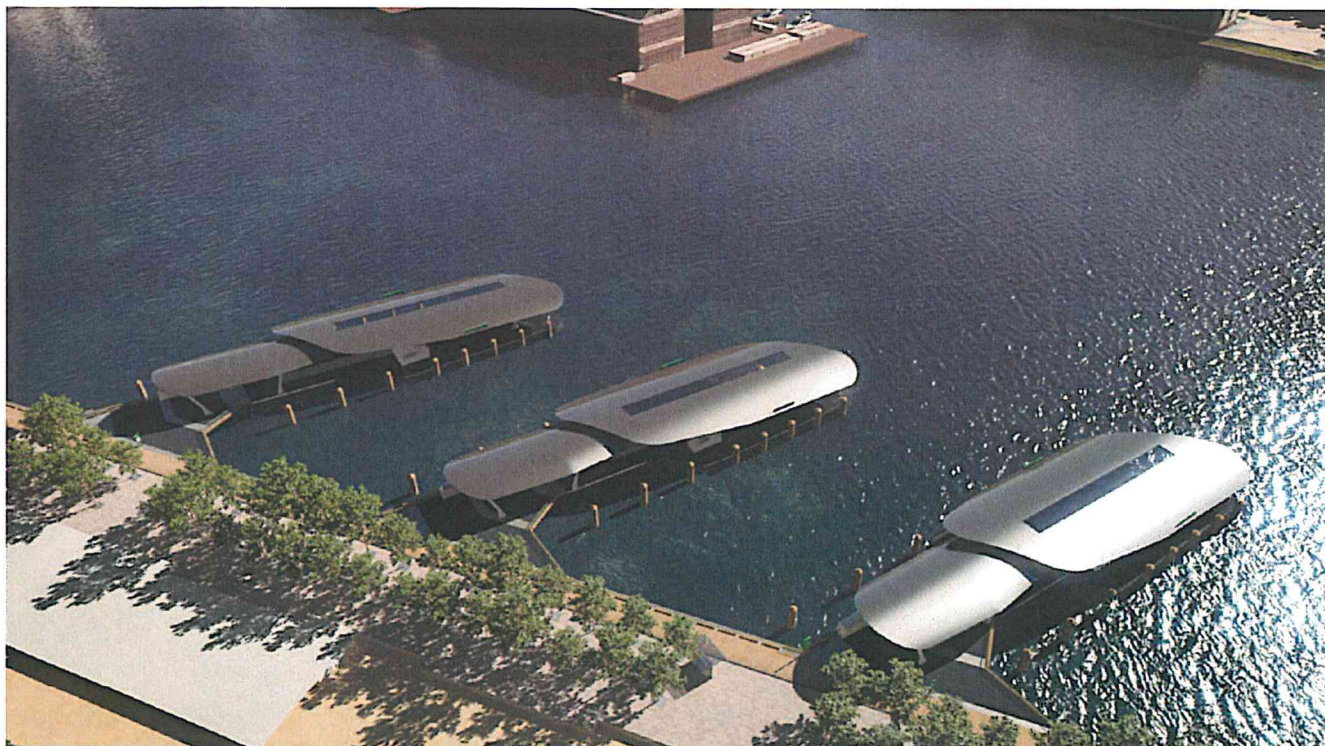


Figure 7: Photomontage of the Ferry Hub

The Proponent has also committed to investigating further opportunities during the detailed design of the project to increase the transparency of the structures to maximise water views and de-clutter the roof space under the wharves by limiting the number of signs on the pontoon ceilings.

The Department supports the proposed conceptual design of the ferry hub as a simple, low-scale, light-weight structure that has been designed using high quality materials to maximise water views and minimise reflectivity. Further, with recommended conditions in place, the Department is satisfied that the Proponent would explore opportunities to further improve the urban and architectural design of the ferry hub during the detailed design phase.

5.2.2 Visual and Scenic Impacts

The visual impact of the ferry hub on nearby residents and on the scenic qualities of the foreshore was an issue of concern raised in public submissions. The EIS includes a Landscape and Visual Impact Assessment (LVIA) which assessed the impact of the ferry hub on 10 key viewpoints and six key landscape character areas in the vicinity of the site (**Figure 8**). The visual impacts of the proposal were considered in the context of the emerging character of the Barangaroo site.

The LVIA found that the worst-case visual impacts would be moderate occurring at viewpoints in close proximity to the ferry hub at Barangaroo South and King Street Wharf (**Figure 9**). Negligible visual impacts would be experienced west of the site at Balmain East, Ballarat Park, Pyrmont (including views from the Pyrmont Bridge which is a State heritage item) (**Figure 10**). The LVIA also found that the operation of the ferry hub would result in no perceived reduction or improvement to visual amenity at night because it would generally be viewed against the brightly lit western edge of the Sydney CBD.

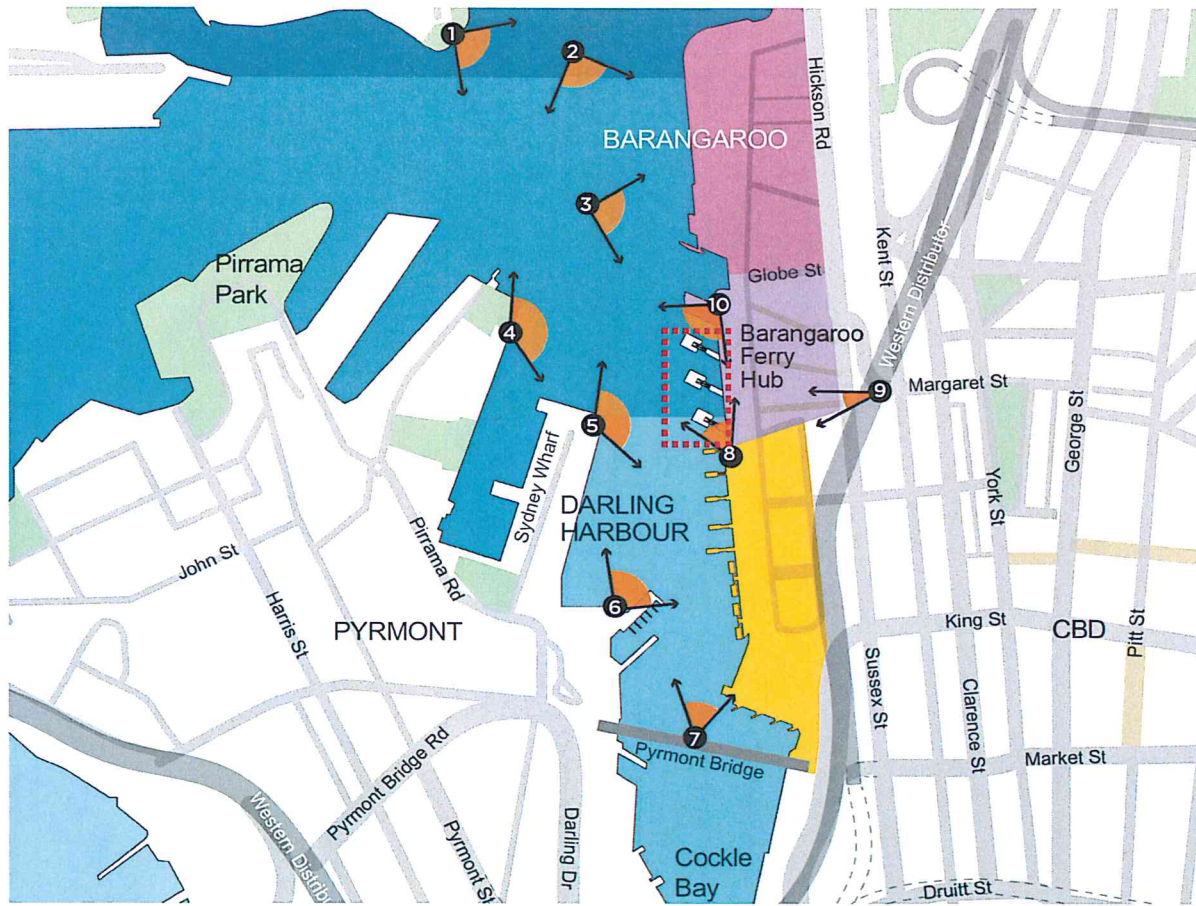


Figure 8: Key viewpoints and landscape character areas

The Department has assessed the view impacts of project in accordance with all relevant matters for consideration outlined in the *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* and the Sydney Harbour DCP (**Appendix F**) and on balance, considers that the visual impact of the project would be acceptable because:

- the project has been designed as a simple, low-scale and light-weight structure using high quality materials to maximise water views and minimise reflectivity;
- the project would not result in any high adverse visual impacts on views to and from the public domain and would result in negligible impacts to nearby landmarks or heritage items including the Pyrmont Bridge;
- the proposal would not detrimentally impact on the unique scenic quality of Sydney Harbour;
- the built form (bulk, height and scale) of the ferry hub is appropriate for and responds to the urban context of the site, the status of the project as a new major ferry hub (as opposed to a suburban wharf) and is consistent with other major CBD ferry hubs (e.g. Circular Quay);
- the visual nature of the ferry hub would be consistent with that of the east Darling Harbour precinct as it essentially represents an extension of existing maritime structures (e.g. wharves) located along the waterfront at King Street Wharf to the north;
- the project would result in negligible viewpoints impacts on existing residents at Balmain East, Ballarat Park and Pyrmont;
- the project would result in negligible impacts to a limited number of future residents in new buildings R8 and R9 at Barangaroo South because:
 - views of the proposed ferry hub from the ground floor retail areas of these buildings would be largely obstructed by landscaping treatments associated with the approved Stage 1A Public Domain Works (SSD 6303); and
 - the proposed ferry hub has a maximum roof height of approximately 6.5 m above sea level compared to a finished floor level of 9.2 m at Level 1 in buildings R8 and R9. As such, views of the ferry hub from residential apartments in these buildings would be limited to elevated

foreground views to the west towards Darling Harbour out over the top of proposed ferry hub from Level 1 and above.

- the Proponent has committed to the implementation of visual mitigation measures during construction and exploring further opportunities during detailed design of the project to minimise visual clutter, maximise openness and transparency to maximise views of the water;
- the project is the realisation of significant strategic planning undertaken to ensure that the Barangaroo precinct is adequately serviced by public transport and has been earmarked for development since the approval of the original Barangaroo Concept Plan in 2007; and
- the project is considered to be in the broader public interest and is consistent with key objectives of the W1 Maritime Waters zone by ensuring that Sydney Harbour is appropriately utilised as a public resource for the public good by providing public water transport without compromising its natural assets.



Figure 9: Photomontage of the ferry hub from the waterfront promenade at Barangaroo South

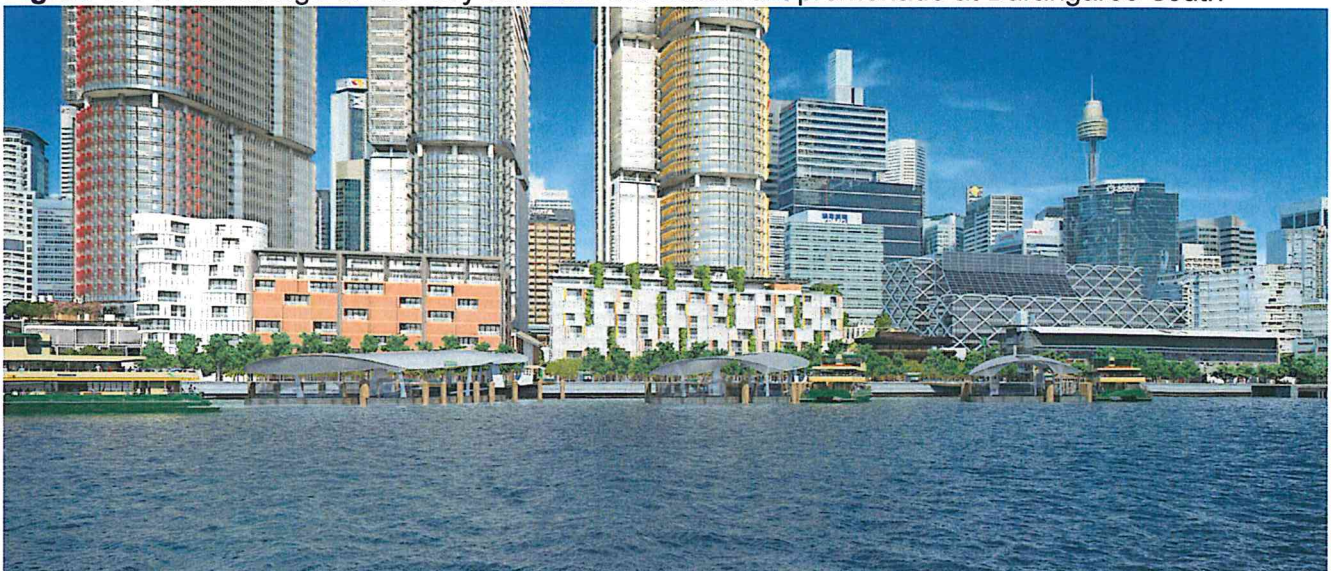


Figure 10: Photomontage of the ferry hub when viewed from the west from Pyrmont

On the basis of the above, the Department concludes that the view impacts of the project are acceptable and has recommended key conditions requiring the Proponent to:

- ensure that ferry hub is designed, constructed and operated in accordance with all mitigation measures outlined in the LVIA;
- explore further opportunities to maximise views through the ferry hub to the water during the detailed design of the project; and
- ensure that the visible light reflectivity from building materials used on the facades and roof of the ferry hub does not exceed 20 per cent and is designed to minimise glare.

5.2.3 Public Domain

The project adjoins the waterfront promenade at Barangaroo South and area of the approved Stage 1A Public Domain Works (SSD 6303). As such, the landside elements of the project need to be designed to effectively integrate with this area. These elements include:

- the final location and design of ticketing and wayfinding stations, customer information totems, wayfinding signage and temporary queuing facilities during special events;
- the final design of all elements of the waterfront promenade (e.g. finishes and handrails);
- the final location and design of bicycle parking;
- the final location of the temporary construction compound on the waterfront promenade to prevent pedestrian conflicts; and
- services access arrangements.

This was an issue raised by the BDA and Lend Lease in the submissions on the project. Council also requested that the ticketing and wayfinding stations be relocated to prevent potential conflicts with pedestrians on the waterfront promenade.

In the RTS, the Proponent confirmed that it would continue to consult with the BDA and Lend Lease during the detailed design of the project to determine the final location of all landside elements of the project. To address Council's concerns, the Proponent also relocated the ticketing and wayfinding stations to be in line with trees on the waterfront promenade outside the main path of pedestrians.

Notwithstanding this, the Department has recommended a condition of approval requiring the Proponent to consult with Lend Lease and the BDA (via the Landside Working Group) to determine the final detail for the design and location of all landside aspects of the project relative to the adjacent public domain, prior to the commencement of construction. The final design is to ensure that the location of all landside elements does not impede pedestrian access in the adjacent public domain.

With this condition in place, the Department concludes that landside elements of the project would be designed to effectively integrate with the adjoining public domain.

5.3 Operational Impacts

5.3.1 Noise

Operational noise levels have been predicted at the nearest residential receivers to the proposed ferry hub. The key sources of noise have been identified as being caused by general ferry noise (engine, propeller, horns and pontoon impacts), public announcements and passenger noise, and maintenance noise arising from sewerage pump-out and night-time cleaning activities.

The proposed hours of operation of the ferry hub would be from 5 am to 12 am midnight (Monday to Friday) and from 7 am to 12 am midnight (Saturdays, Sundays and Public Holidays). The ferry hub would also be required to operate outside of standard hours during special events such as New Year's Eve, Vivid and Australia Day.

Operational noise impacts were modelled based on three (3) key scenarios as outlined including:

- **Scenario 1** (peak – 7am to 9 am and 5 pm to 7pm weekdays) – 21 vessels per hour total, passengers talking across three (3) wharves and 3 PA systems;
- **Scenario 2** (off-peak) – 10 vessels per hour total, passengers talking across three (3) wharves and three (3) PA systems; and
- **Scenario 3** (night-time cleaning) – high pressure water cleaning and sewerage pump-out across two (2) wharves with no ferry movement.

The Noise and Vibration Impact Assessment (NVIA) found that the general operation of the ferry hub during Scenario 1 and Scenario 2 would comply with the relevant day-time criteria but would exceed the night-time criteria at Barangaroo South and Pyrmont by 3dB(A) (53dB(A)) and would result in sleep disturbance (+11 dB(A)). For Scenario 3 it found that maintenance/cleaning would exceed the relevant day-time and night-time criteria by up to 9dB(A) (70dB(A)) (**Table 4**).

Table 4: Residential Operational Noise Management Levels and Predicted NML Exceedances

Location		Worst-Case Predicted Noise Levels (dBA) Scenarios 1, 2 and 3		
		Day-time	Night-time	Sleep Disturbance
Ferry operations				
Barangaroo South		NML 60 (0*)	NML 50 (+3*)	NML 61 (+11*)
Pyrmont		NML 60 (0*)	NML 50 (+3*)	NML 56 (+8-10*)
Maintenance/Cleaning				
NCA-01	Barangaroo South	NML 60 (+4-6*)	NML 50 (+14-16*)	NML 61(+8-9*)
NCA-03	Pyrmont	NML 60 (0*)	NML 50 (+2*)	NML 56 (0*)

* Note: Exceedance in dBA above NML

Although the noise modelling indicates that the project would not comply with the relevant night-time and sleep disturbance NMLs at Barangaroo South and Pyrmont during peak operation (Scenario 1) and night-time cleaning (Scenario 3), the Department recognises that:

- predicted exceedances of the relevant night-time NML during peak operation (Scenario 1) would be minor at 3 dBA and are considered unlikely to occur in practice as Barangaroo becomes further developed and background noise levels begin to increase when retail premises (e.g. bars and restaurants) located along the waterfront promenade commence trading;
- predicted exceedances of the relevant sleep disturbance NMLs during peak operation (Scenario 1) are due to the use of warning horns on ferries which are a safety requirement under the Australian *Uniform Shipping Laws Code 1993*;
- the use of the warning horns on ferries would be consistent with existing maritime noise in Darling Harbour and would not be beyond community expectations for a major ferry hub in the Sydney CBD;
- night-time cleaning and maintenance activities (Scenario 3) would only be undertaken intermittently (three times a week for wharves and once a month for stairs and ladders); and
- the indoor noise level at all nearby residents is likely to comply with the relevant night-time and sleep disturbance NMLs during all scenarios because the noise modelling is conservative and does not take into account that existing and new residential properties nearby (e.g. buildings R8 and R9) have been built to provide a high level of noise attenuation (~20 dBA to 25 dBA) consistent with the CBD context of the area and the future night-time noise levels expected at the Barangaroo precinct.

Taking the above into account, the Department is satisfied that noise from the on-going operation of the ferry hub would not result in indoor exceedances of the relevant NMLs. However, to ensure

operational noise is minimised as far as reasonably practicable, the Department recommends key conditions requiring the Proponent to:

- ensure that the PA systems and speakers are designed, directed and operated in a manner that minimises noise impacts on nearby sensitive receivers; and
- undertake noise monitoring within 18 months of the commencement of the operation of the proposed ferry hub and preparation of an Operational Noise Compliance Report which shall include:
 - noise monitoring to assess compliance with the operational noise levels predicted in the EIS;
 - methodology, location and frequency of noise monitoring undertaken;
 - details of complaints and enquiries received in relation to operational noise;
 - any required recalibrations of the noise model taking into consideration factors such as noise monitoring and actual vessel movements and proportions;
 - an assessment of the performance and effectiveness of applied noise mitigation measures together with a review and if necessary, reassessment of reasonable and feasible mitigation measures; and
 - where required, identification of additional feasible and reasonable measures to those outlined in the EIS.

With the recommended conditions in place, the Department concludes that the operational noise impacts of the ferry hub would be effectively managed thus avoiding potential amenity impacts.

5.3.2. Navigation and Safety

At the year of opening (2016), the proposed ferry hub is expected to have peak service throughput of up to 11 vessels per hour on weekdays and 14 vessels per hour on weekends. By 2026, this would increase up to 15 vessels per hour on weekdays and 14 vessels per hour on weekends.

The vessel throughput would be accommodated by the construction of the two northern-most ferry wharves planned to be constructed initially. The two northern-most wharves would be constructed first because this option:

- moves ferry operations to the north away from:
 - the 'pinch point' which is the narrowest section of the channel in Darling Harbour between Barangaroo and Pyrmont; and
 - existing maritime traffic and congestion at the King Street wharves.
- concentrates ferry operations in a wider waterway reducing impacts from ferry wash; and
- is more efficient in terms of program timing and costs.

To manage potential navigation and safety issues, the Proponent has committed to preparing a comprehensive VTMP for the construction and operation of the ferry hub (similar to that implemented at Circular Quay). The Department has formalised the requirement for a VTMP into the recommended conditions. The VTMP would (as a minimum):

- be prepared in consultation with RMS and the Port Authority of NSW;
- be supported by a risk assessment of the project and its interface with marine traffic in Darling Harbour;
- outline the direction of berthing and the specifics of navigational procedures associated with the project;
- identify all likely impacts on navigational safety resulting from the project;
- identify all mitigation measures to be implemented to minimise and manage navigation and safety impacts on marine traffic in Darling Harbour (including during special events); and
- include a protocol to periodically review the plan to ensure it is up to date and reflects the latest vessel timetabling information.

With these conditions in place, the Department concludes that the potential maritime impacts associated with vessels would be effectively managed.