



**MODIFICATION TO MAJOR PROJECT MP 09_0200
VEHICLE AND PEDESTRIAN SAFETY PROJECT
AT
THE SYDNEY OPERA HOUSE**

ENVIRONMENTAL ASSESSMENT

Prepared on behalf of
The Sydney Opera House Trust
November 2011

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List of Abbreviations

BCA	Building Code of Australia
CMP 2003	Conservation Management Plan 2003 <i>("Sydney Opera House: A Revised Plan for the Conservation of the Sydney Opera House and its Site" (3rd edition 2003) by James Semple Kerr</i>
DGEARs	Director Generals Environmental Assessment Requirements
EA	Environmental Assessment
EPA Act	Environmental Planning and Assessment Act 1979
SEPP	State Environmental Planning Policy
VAPS	Vehicle and Pedestrian Safety

Certification of Environmental Assessment

Proponent, Site and Project Details

Applicant: Sydney Opera House Trust
Sydney Opera House
GPO Box 4274
Sydney NSW 20001

Site: The Sydney Opera House
Bennelong Point
Lot 5 in Deposited Plan 775888
Lot 4 in Deposited Plan 787933
Lot 101 of DP828892

Proposal: Modification to Major Project MP 09_0200
Sydney Opera House Vehicle and Pedestrian Safety Project
As described in this report and including internal modifications to create an additional level within envelope of approved underground loading dock and associated access and egress changes, changes guardhouse and entry ramp.

Authorship

This Summary report has been prepared by

Terence P Byrnes

Principal

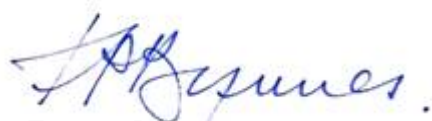
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Declaration

We certify that the contents of the Environmental Assessment to the best of our knowledge, has been prepared in accordance with the requirements of Part 3A of the Environmental Planning and Assessment Act 1979 and that to the best of our knowledge the information contained in this report is neither false nor misleading.



Terence P Byrnes

22/11/2011

1. Introduction

This Environmental Assessment has been prepared on behalf of the Sydney Opera House Trust to accompany an application to the Minister for Planning for a modification under s75W of the Environmental Planning and Assessment Act 1979 to Major Project Approval MP09_0200 relating to The Sydney Opera House Vehicle and Pedestrian Safety (VAPS) Project.

Prior to its revocation, and at the time of the lodgement of this application, Part 3A of the Environmental Planning and Assessment Act (EPA Act) applied to the project, as the site is identified in Schedule 3 of *State Environmental Planning Policy 2005 (Major Development)* as one of a number of State Significant sites where certain types of development would require approval under Part 3A. The transitional provisions therefore allow the current modification application to be determined in accordance with previous s75W of the Act.

On 10 December 2010 the Deputy Director General on behalf of the Minister for Planning approved MP09_0200 for the Vehicle and Pedestrian Safety Project including construction of an underground loading dock; alteration of lifts and stairs and construction of new lift services and corridors; a new opening in the southern forecourt and construction of a vehicle access ramp; removal of recessed vehicle access path, existing guardhouse and construction of a new guardhouse and other forecourt improvement works.

In June 2011, the Sydney Opera House Trust made an application to modify the approval. Modifications are described in detail in Section 2 of this report but relate primarily to the provision of an additional level within the approved envelope of the loading dock, as well as minor changes to access and egress and changes to the guardhouse and entry ramp design.

In November 2011, The Department contacted the proponent and requested some additional details to accompany the application including detailed plans and a brief Environmental Assessment (EA) with respect to the proposed modifications. This report aims to satisfy the second of those requests.

This Environmental Assessment has been prepared in line with parameters of the original EA submitted with the original application. However the assessment relates only to the modifications proposed and as these modifications are minor in nature, the extent of this assessment brief as compared to the original report.

For a full description of the overall proposal, the site and locality, an assessment of the impacts of the proposal and the Statement of Commitments, the original 'Environmental Assessment' report and the 'Response to Submissions' should be referred to.

This report will describe the proposed modifications (**Section 2**); carry out an assessment of any potential environmental impacts and describe measures to minimise or mitigate impacts where necessary (**Section 3**); and provide a conclusion (**Section 4**).

2. The Proposed Modifications

The proposed modifications include the following elements:

1. New Upper Level slabs over the Dock for waste management, plant and utility area

It is proposed to incorporate additional floor slabs, over the Dock and associated plant that provides for:

- A Utility area, offering flexible future use for the Sydney Opera House, in essence the activities included will notionally be “back of house” facilities serving existing functions including but not limited to in-house contractor storage; workshop and amenities; food and beverage dry store, as well as other possible uses including an education centre, rehearsal room, studio and offices.
- Additional waste management and recycling area to satisfy the commitment to sustainability objectives for the future.
- Plant area, offering a location for substations that will ‘future proof’ the Sydney Opera House needs and allow Ausgrid to retire the existing 40 year old substations. The new location will offer significant safety improvement opportunities for the Opera House.

As a result of these areas being all underground, amendments to provisions for egress and services have also been incorporated.

The proposed additional level allows for better use of the underground volume of space. There was no material need to retain a loading dock area with such high ceilings. The revised scheme allows for back-of-house functions that currently crowd the main building to be rationalised and restructured to improve the efficiency of the back-of-house areas in the main building.

2. Entry Ramp off Macquarie Street: Ramp, Portal and Guardhouse.

Amendments to the vehicle entry off Macquarie Street include more precise alignment of the ramp, surface treatments, balustrade details; the guardhouse location and its profile. All due to on-going design refinements necessitated through the co - ordination of detailed considerations, such as:

- Vehicle paths of travel and pedestrian circulation needs across the Forecourt: this has resulted in a minor change to the location of the guardhouse and consequently its profile and interface with the ramp.
- The functional needs of the guardhouse including security and amenity needs have necessitated that the size of the guardhouse be increased from that originally proposed. The modified guardhouse still remains significantly smaller than the existing guardhouse on the site.
- Resolution of the geometry of the portal entry into the tunnel and associated services.
- Integration between Forecourt finishes. In particular the original proposal for the ramp surface included large planks of pink granite. While the pink granite finish will still be retained, smaller

sets are proposed, which will better integrate with the sets on the forecourt surface and assist in the ramp appearing as part of the Forecourt plane.

- Security needs and the Ramp Entry interface incorporating bollards and ram protection.
- A change in the design of the Ramp Balustrade due to safety needs, BCA requirements and crowd loading considerations. In particular, while the original application was approved with a 450mm pre-cast up-stand with steel wire balustrading above (in keeping with the design of the western edge of the Forecourt) this design does not comply with BCA standards due to the fall below the balustrading exceeding 4.0 metres in height. In addition, the likelihood of the Forecourt being used to hold future public events means that the balustrading needs to comply with the NSW variations to the BCA requirements for Entertainment Venues (previously 'Places of Public Entertainment'). This requires a 1.2m high balustrade. Detailed consideration was given to potential designs in collaboration with Jan Utzon and Design 5 Architects. A 1.2 metre high pre-cast up-stand has been chosen as the preferred design solution for 3 reasons: it provides a simple solution architecturally and is less visually apparent than a balustrade incorporating a range of finishes including metal work elements; unlike the western edge of the Forecourt where balustrading is designed to allow a view over the edge, there is no desire to encourage viewing over the edge of the loading dock entrance ramp; and in public event situations where large numbers of patrons may lean against the balustrading, it provides the safest design solution.

3. Changes to Egress configuration to the Dock

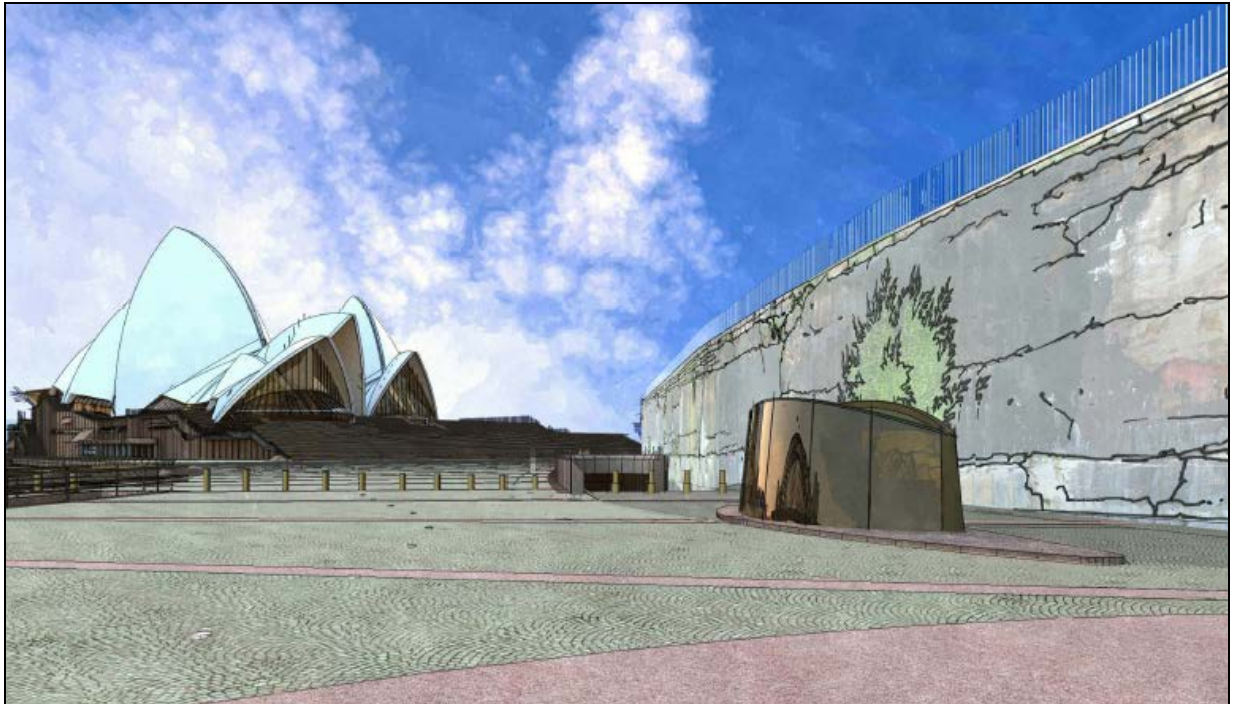
As a result of BCA and Fire Engineering resolution during this design development stage, the egress passage to the eastern side of the vehicle ramp has been removed. An additional connection to the western side egress passage has correspondingly been added to the new upper level, as encompassed under Item 1 above.

4. Additional lift connecting the Dock to the Concert Hall

As part of future proofing, an additional alternative freight-lift has been added, adjacent to the only existing lift to connect the Dock to the Concert Hall, to ensure adequacy in meeting not only the expanded future needs but also the current peak demands placed on the existing lift.

The proposed modifications are depicted and highlighted in colour on the Architectural plans; sections and perspectives 49-FV-SC001-EA-003 ; 100; 110; 120; 310; 320; 325; 330; 338; 340; 900; 902; 903 by Scott Carver Pty Ltd and submitted under separate cover with this application.

The perspectives below provide an overview of the proposed structures as viewed from above ground and below.



Proposed replacement Guardhouse



Architects Perspective Drawing of Interior of Loading Dock.



Section perspective showing relationship between Loading Dock and utility level above.

Other changes from the original approval shown on the plans but not highlighted in colour do not form part of this application. They are minor changes that have been approved as part of the approved fire engineering solutions and will be permitted as part of the Construction Certificate documentation.

3. Environmental Assessment

The following provides a brief Environmental Assessment of the proposed modifications against the same parameters applied to the assessment of the original application.

3.1 Heritage and Archaeology

3.1.1 Current Heritage Listings and Heritage Significance

The Sydney Opera House is listed on the following statutory registers:

- World Heritage List (UNESCO)
- National Heritage List (Australian Government)
- Register of the National Estate (Australian Heritage Council)
- State Heritage Register (NSW Government)
- Sydney Local Environmental Plan 2005 (City of Sydney Council)

The Sydney Opera House is listed on the following non-statutory heritage registers:

- National Trust of Australia (NSW) register
- National Register of Significant 20th Century Buildings (Australian Institute of Architects)

3.1.2 Assessment of Impacts on World Heritage Values, National Heritage Values and State Heritage Values

A detailed discussion of the impact of the proposal on the World Heritage Values, the National Heritage Values and the State Heritage Values of the Sydney Opera House was provided in the original Environmental Assessment and the Heritage Impact Statement submitted with the original application. This discussion is exclusive of considerations relating to Archaeological Heritage and Aboriginal Heritage which are discussed separately below. The set of values for each listing are similar, and therefore the assessment of the impacts on each set of values was also similar.

The following key points from the original summary of the heritage impacts of the proposal continue to apply to the proposal and are relevant to the proposed modifications:

- *The proposed Vehicle and Pedestrian Safety Project (VAPS) will have a significant material effect on the Sydney Opera House but apart from the forecourt, these impacts are mainly confined to existing and new underground areas and less significant 'back-of-house' spaces.*
- *On balance, we conclude that these impacts will retain and potentially enhance the World Heritage, National Heritage, and State Heritage values of the Sydney Opera House by removing heavy vehicles and other hazards to pedestrian safety from the forecourt approach to the place, and also by improving the functionality of the Sydney Opera House as a premier performing arts centre of national and international repute. The improvement in pedestrian safety will enhance the visitor and patron experience of approaching the building and permit a safer appreciation of this outstanding architectural icon, "great urban sculpture", from the forecourt.*
- *The project will also remove or replace many of the elements in the forecourt area which have been assessed as intrusive, and thus improve the 'open relationship' of this space with the setting of the Sydney Opera House.*
- *The existing guardhouse, identified as 'intrusive' in the CMP 2003, is reduced in size and re-located in line with the new loading dock entry.*
- *The edge detail around the tunnel entrance is simple and minimal in scale and should not distract from the strength and scale of the Tarpeian Wall, but it will prevent close viewing of this section of the cliff face.*
- *The proposed construction of the underground loading dock will involve excavation around and below the existing tie beams connecting the base of cranked concrete beams supporting the monumental stairs, with the base of the podium on the north side of the vehicle concourse. It is proposed that none of these tie beams be cut or re-located. They will be incorporated into the design and configuration of the proposed concrete beamed ceiling.*
- *The proposed works for the VAPS project will have only minor impacts on backstage areas and will improve functional flexibility and efficiency.*
- *The most significant impact will be during the construction period, when the facilities, activities and excavation required will have a major impact on the topographic setting. These activities and the movement of trucks carrying excavated material or delivering new materials will be a constant source of intrusive noise and annoyance to patrons and visitors as well as the surrounding areas, and will require careful planning and constant management to ensure the impact is acceptable.*

Those original assessments found that while the proposed works will have a significant material effect on the place, most of the works are confined to underground and overall they will not have a negative impact on the listed heritage values of the Sydney Opera House.

Likewise, the proposed modifications which are also predominantly confined to underground works as well as only very minor above-ground variations to the design of the balustrading and surfaces of the entrance ramp and the guardhouse design, do nothing to change the overall conclusion that the proposal has an overall positive impact on the heritage values of the place.

The primary modification, being the additional level within the envelope of the approved loading dock, is considered acceptable in heritage terms as the proposed loading dock as originally approved does not impact on any of the existing parts of the Sydney Opera House, and has no significant visual relationship with Hall designed spaces. Therefore retention of the large ceiling heights and large internal scale of the dock as it was originally approved is not required in order to retain the heritage values of the place.

Rather, the proposed modifications, including the additional service level would retain and potentially enhance those values by improving the functionality of the Sydney Opera House by allowing overcrowded back of house functions within the existing building to be better rationalised.

The proposal continues to remove the existing guardhouse, assessed as and 'intrusive' element in the Forecourt. The proposed modified guardhouse retains a position in closer proximity to the Tarpeian Wall than the existing structure, remains smaller than the existing structure (floor area of around 11m² as compared to 20m² existing), retains simple finishes of bronze and glass and has been designed in a slender elliptical shape that will reduce its apparent size as viewed from the main vehicular approach to the site. The overall heritage impact as compared to the existing structure must therefore be considered as a positive one.

Other external changes to the vehicle entry ramp materials and balustrading are very minor in nature and have also been designed to complement the surrounding Forecourt finishes and minimise visual impacts (refer to discussion in Section 3.2.1 below) and therefore ensure no material adverse heritage impacts.

Furthermore, the original recommendations made to mitigate against impacts to the World, National, and State Heritage values which were incorporated into the Statement of Commitments and the conditions of the approval would continue to apply to the proposal as modified and thereby continuing to ensure no adverse heritage impacts arise, regardless of any proposed modifications.

3.1.3 Assessment of Archaeological Impacts

It is noted that the National Heritage List and World Heritage List citations for Sydney Opera House do *not* include the site's archaeological potential. Furthermore, The New South Wales State Heritage Register citation also concludes that the contribution of the site's potential relics to the site's overall significance is likely to be low. While the Sydney Opera House is an item of Outstanding Universal Value, the site's potential archaeological remains have no direct association with Sydney Opera House itself or this significant phase of the site's history.

The majority of the proposed modifications are within the envelope of the already approved basement. Additional areas of excavation are very minor and limited to the area of the additional lift shaft and the additional egress corridor from the new B2 level adjacent to the vehicular tunnel.

The Archaeological Management Plan and Archaeological Impact Assessment submitted with the original application provide a comprehensive assessment of the Archaeological potential of the site, its significance, an assessment of the impacts of the proposal.

It is noted that the Archaeological Impacts Assessment found that the excavation of the area of the proposed lifts (where the proposed additional lift would be located) would be unlikely to have any impacts as they would be located within the footprint of the existing basement level.

The Assessment also found that in the proposed cut-and-cover construction of the vehicular tunnel (adjacent to the proposed new egress corridor) is considered to have a relatively minor archaeological impact as this area of the site is identified as having limited archaeological potential or significance and that while excavation for the proposed tunnel would require removal of sections of the Bennelong stormwater channel, the stormwater channel would have been diverted prior to the commencement of the proposed works (as part of a previous development proposal for the site) and removal of sections of the

drain for construction of the tunnel would represent only a minor incremental impact to this heritage item when considered in conjunction with the previous works. On this basis the proposed additional egress corridor in this area is also unlikely to have any significant archaeological impacts.

The Archaeological Management Plan and Archaeological Impact Assessment submitted with the original application also provide comprehensive recommendations to mitigate against the archaeological impacts of the proposal. These recommendations include an Archaeological Investigation and Archaeological monitoring during the proposed works and have been adopted into the Statement of Commitments and the conditions of the approval and would continue to apply under the proposed modification. As such it is considered that no significant adverse archaeological impacts would arise from the proposed modifications.

3.1.4 Assessment of Aboriginal Cultural Heritage Impacts

The Aboriginal Cultural Values Assessment submitted with the original application identifies Aboriginal cultural values associated with the place and an assessment of the impacts of the proposal on those values.

Consultation with Aboriginal stakeholders built upon previously documented values and a range of cultural values are set out in the report. Values relate to the association of the site and surrounding areas a meeting and gathering place for Aboriginal people, the negative associations with the site including the dislike of the Australia Day commemoration in the Botanic Gardens and the slaughtering of Aboriginal people in the early days of settlement. The Tarpeian Wall Project (a planned future mural) is of particular interest to the local Aboriginal communities. The value of the place for performing arts, including Aboriginal performers is also of importance. Surviving middens and physical relics would also have value.

The small areas of additional excavation have a minor potential for impacts to any physical Aboriginal objects that may survive at the site. Otherwise the proposed modifications for internal alterations to the approved works will have no impact.

The report makes a number of recommendations for the mitigation of both physical impacts and for the ongoing management of broader Aboriginal cultural values associated with the Sydney Opera House. These have been adopted into the Statement of Commitments and the conditions of the approval and would continue to apply under the proposed modification. As such it is considered that no significant impact on Aboriginal Cultural Heritage would arise from the proposed modifications.

3.1.5 Compliance with Conservation Management Plan 3rd Edition

Conservation Management Plan—“*Sydney Opera House: A Revised Plan for the Conservation of the Sydney Opera House and its Site*” (3rd edition 2003) (CMP 2003) by James Semple Kerr identifies and defines the significant values of the Sydney Opera House and then formulates policies framed to retain those values. It includes comprehensive policies to guide the long-term conservation of the heritage values of the place and thus is given status through various statutory requirements.

It is noted that policies 1.5 and 1.6 set out in the CMP 2003 anticipated a project to resolve the heavy vehicle access and loading dock. Policies 6.1; 6.2; 11.1; 13.1 and 13.2 are relevant in that they relate to the materials and form of external elements. The modifications include amendments to the surface

finishes and the size of the balustrading above the tunnel entrance. The proposed finishes however still include precast pink granite panels and sets and are consistent with the existing surface materials and finishes on the Forecourt.

Policy 25.1 relates to the character and treatment of new internal spaces. The policy envisages new underground spaces and provides that where they have a visual relationship with the Hall designed spaces they should correspond with the design regime. However as the proposed underground loading dock and the additional internal level proposed under the modifications have no significant visual relationship with Hall designed spaces, the policy is not relevant to the proposed modifications.

Policies 39.1 and 39.2 relate to treatment of intrusive items. The present security gatehouse is identified as an intrusive item and is approved for removal. The replacement guardhouse is modified under the proposal but will retain a simple oblique shape of reduced volume and dimensions, as compared to the existing structure and will be constructed in bronze or similar material and matching glass to complement balustrading and other finishes within the Forecourt.

Policy 53.1 relates to excavation on the site. Archaeological and excavation issues as they relate to the modifications have been addressed above in Section 3.1.3.

The proposed modifications are therefore considered to be compliant with the applicable policies of the CMP.

3.1.6 Compliance with Sydney Opera House Management Plan 2005

The three reports (Heritage, Archaeology, Aboriginal Values) that informed the Environmental Assessment of the original application were prepared to address the heritage impacts of the proposed works in relation to the requirements of the Sydney Opera House Management Plan and to provide supporting documentation for the required statutory approvals. The Heritage Assessments conclude that the proposed works do not include any activities that would have a significant adverse impact on the National and World Heritage values of Sydney Opera House. Those reports also recommend measures to mitigate and protect the National and World Heritage values of Sydney Opera House which were included in the Statement of Commitments and the conditions of approval and will continue to apply to the proposal as modified. The now proposed minor external modifications and internal modifications do nothing to change these findings or to result in a significant heritage impact to the site.

3.2 Urban Design and Visual Impacts

3.2.1 Urban Design and Impacts of Above-ground Elements

Guardhouse

The existing guardhouse is identified in the CMP 2003 as 'intrusive', impacting on important views of the Sydney Opera House as approaching from the city. The approved replacement guardhouse was to be located much closer to the Tarpeian Wall and constructed in bronze and matching glass as a simple cylindrical shape of reduced volume and dimensions. The overall result being a valuable reduction in the visual impact of this necessary functional structure due to its size, colour, location and simplicity of design.

The modified guardhouse retains a position in closer proximity to the Tarpeian Wall than the existing structure. It but has been slightly increased in size for functional reasons and to meet security and amenity needs. Nevertheless, the modified structure remains smaller than the existing structure (floor area of around 11m² as compared to 20m² existing), retains simple finishes of bronze and glass and has been designed in a slender elliptical shape that will reduce its apparent size and visual impact as viewed from the main vehicular approach to the site.

Overall the proposal as modified therefore still results in a positive urban design outcome for the site.

Vehicle Entry Ramp

Visual impacts of the proposed ramp entry are minimised by ensuring that new works are integrated into the forecourt through geometry, material, module and detail. Important aspects of the *original* design included

- Sympathetic alignment of the ramp with the curve of the Tarpeian Wall the opposing line of the western Forecourt edge; and larger outline of the Boardwalk and Forecourt;
- Ramp grade maximised to shorten the opening;
- Sloping wall up-stand constructed of precast granite to match exiting podium cladding and western parapet edge of the Forecourt; as with angled parapet and bronze handrail and balustrade detail
- Ramp paving constructed of granite finish to complement existing Boardwalk and Podium paving
- A single row of granite slabs laid below the upstand and ramp parapet will mirror the existing double row against the western edge of the Forecourt.

The proposed modifications are generally consistent with the original design, but include smaller precast granite sets to the surface of the ramp, which will better match the surface of the Forecourt and will assist in the assist in the ramp appearing as part of the Forecourt plane.

The balustrade upstand will continue to be of precast granite but will be increased in height and will no longer incorporate metal handrails to match the western edge of the Forecourt. The change in design arises predominantly from BCA and safety requirements. Nevertheless, the proposed balustrading will retain a simple appearance and incorporate materials to complement surrounding finishes. Furthermore, within the context of the overall scale of the Forecourt, the change in balustrade detailing has no apparent impact in terms of scale. As the modifications have been carefully designed to integrate with the design of the proposed ramp and other surrounding existing structures, no adverse visual impacts arise from the proposed modifications.

3.2.2 Design and Impacts on Existing Internal Elements

There are no impacts to any of the main internal spaces of the Sydney Opera House. The only modification proposed to the existing internal areas relates to backstage or lift and service areas: in this case a proposed new Concert hall lift. All lift finishes and openings will be designed to match those of the existing adjacent lift and no material design issues arise.

3.2.3 New Loading Dock and Service Level Design

Under the existing approval, the new loading dock would include very high ceilings and was championed by the architects as being a big and beautiful space:

The dock area will be one of the largest spaces in the building and will be integrated with the architecture of the Opera House through the dominant quality of refined and expressed concrete structure

However as this part of the proposal is underground and does not impact on any of the existing parts of the Sydney Opera House, and as the proposed underground loading dock and associated spaces have no significant visual relationship with Hall designed spaces, the retention of the large internal scale of the dock cannot be warranted on visual impact grounds.

This is especially the case when existing backstage areas within the main building are overcrowded and therefore not operating as effectively as they could be.

The proposed amended design, with a lower ceiling to the loading dock and provision of additional level of plant and utility space results in no material impacts to the important urban design aspects of the site.

Natural materials and finishes such as exposed concrete will be retained within the loading dock and utility level and the design is considered appropriate to the existing hierarchical regime for the place particularly for service areas.

3.2.5 Utzon Design Principles

The 2002 Utzon Design Principles are a record of Jørn Utzon's vision for the building and his comments on the future as his legacy, they are intended as a reference for the management of proposals for change. Together with the Conservation Management Plan, they have been formally endorsed by the then Heritage Office and the Management Plan for the Sydney Opera House as the guiding policy documents for the on-going conservation of the Sydney Opera House.

Of most relevance to the proposed modifications is the following comment regarding the future:

Accommodate new approach and back of house for events under Forecourt

"It might still be possible to locate functions underground under the eastern part of the forecourt."

"If needed some functions could be sunk below the forecourt level, in such a way as to be accessible from the forecourt, but without disturbing the visual impact of the original layout."

"...an approach from the underground parking in the Botanical Garden could emerge via an opening in or near the Tarpian wall. Facilities like dressing rooms or rooms for temporary catering for activities in the forecourt could be placed under the forecourt surface"

Access from carpark through a hole in the forecourt. Space could accommodate back of house and storage for outdoor events.

The proposed modifications are consistent with these principles in they will allow for not only the provision of a loading dock, but will also provide utility areas for back of house functions, storage, waste management and plant rooms consistent with Utzon's vision for the site.

3.3 Traffic and Vehicular Access

Operational traffic and vehicular access is unchanged by the proposed modifications. There will be no change to vehicles numbers, vehicle movements or pedestrian safety during the operational phase. Vehicle manoeuvring areas for the loading dock are also unchanged.

The creation of an additional level within the basement level results in a very small increase in the scope of construction works and therefore a very small increase in construction vehicle movements overall. Condition B5 of the approval which requires submission and approval of a Construction Traffic Management Plan will ensure construction traffic is adequately managed and mitigated on site and as such no adverse traffic and vehicular access impacts arise from the modifications.

3.4 Noise and Vibration

As above, operational noise impacts would be unchanged by the proposed modifications which do not result in any material change to the day to day operation of the site.

Any impacts to construction noise as a result of the very small increase in the scope of construction work would be marginal and as with all construction noise on the site, would be managed through The Construction Environmental Management Plan required under Condition C1 and appropriate conditions D1 and D6 relating to hours of operation and noise emissions from the site.

3.5 Geotechnical and Structural Stability Impacts

As the proposed modifications are almost entirely within the envelope of the approved works, other than two very minor changes for an egress tunnel and additional lift well, no additional geotechnical impacts could be expected to arise. Nevertheless, the detailed geotechnical investigation required to be carried out in accordance with condition G7, will take into account the additional areas of excavation proposed under these modifications, and any resulting recommendations from that report will be implemented during the course of the works.

Likewise, the minor nature of the proposed modifications are unlikely to result in any structural stability issues beyond those already considered in the original assessment of the application. Conditions B1, B8 and E1 of the approval which require structural drawings, a structural peer review and a structural inspection certificate will apply to the works as modified to safeguard against any structural stability impacts.

3.6 Excavation and Construction Impacts

The proposed construction methodology remains unaltered from that originally proposed.

Construction traffic impacts and noise and vibration impacts were considered in the preceding discussions. Other matters associated with outcomes generated by the excavation process were considered in the original assessment and included acid sulfate soils; contamination; waste management; erosion and sediment control; air quality; safety and heritage protection.

The original assessment found that that any potential impacts could be appropriately managed and mitigated on site. There is nothing particular about the proposed modifications that would result in any changes to those findings.

In addition, appropriate conditions on the approval will ensure no unacceptable impacts arise during the excavation or construction stage and would continue to apply to the modifications proposed.

3.7 Infrastructure Impacts

Impacts on infrastructure relate primarily to diversion of existing in-ground services. These services diversions include High Voltage Cables underneath the forecourt and vehicle concourse, water mains and gas mains cross the forecourt, Telstra Cables across the forecourt, and stormwater lines across the forecourt and vehicle concourse. Those works will not be materially affected by the proposed modifications and will continue to be carried out in accordance with the approval conditions applied to an approval, and the requirements of the responsible authorities.

Likewise the modifications result in no impact on infrastructure off-site in the immediate locality. Once construction is completed, no impacts arise to the local road networks or public transport infrastructure requirements and the current provisions will be unaltered.

3.8 Remaining Matters for Consideration

In addition to the matters already assessed above, the Director General's Environmental Assessment Requirements for the original application required that the following matters be given consideration:

- Odour and Air Impacts;
- Water Quality;
- Climate Change and Sea Level Rise

The proposed internal and minor external modifications result in no additional odour or air impacts; no changes to water quality or stormwater management on the site and no change to sea level rise impacts and as such no further assessment with regard to these issues is considered necessary.

4. Conclusion

The modifications proposed as part of this application relate primarily to the creation of an additional utility level within the approved underground loading dock area. The additional utility level will free up some of the overcrowded back of house areas within the existing building, thereby improving the operational functions of the Sydney Opera House. Other associated underground / internal works include changes to access and egress and an additional lift connecting the Dock and new utility level to the Concert Hall.

Further works above ground relate to minor refinements of a detailed nature and are related to the entrance ramp, surface treatments and guardhouse.

When assessed against the parameters used to assess the original application, the proposed modifications are shown to be minor in nature and result in no material impacts in terms of traffic and vehicular access, noise, geotechnical or structural stability impacts, excavation and construction impacts, infrastructure or other environmental considerations.

The only remaining matters of relevance to the assessment of the modifications are heritage impacts and urban design considerations.

In terms of heritage and urban design, the proposed large scale loading dock as approved does not impact on any of the existing parts of the Sydney Opera House, and has no significant visual relationship with Hall designed spaces, and therefore retention of the large internal scale of the dock is not required to be retained either on heritage or visual impact grounds.

Other internal and underground modifications are so minor they are found to have no impact in heritage or urban design terms, especially given that existing conditions of consent will continue to ensure that heritage values, archaeological values, and Aboriginal values on the site will be protected.

Above ground modifications to the guardhouse and vehicle entrance ramp are also relatively minor in nature. The proposal still removes the intrusive Guardhouse element and replaces it with a smaller structure, simple in design and less visually apparent than the existing structure. Changes to the surface of the entrance ramp allow it to better integrate with the surface of the Forecourt and therefore result in a positive impact in both heritage and urban design terms. The proposed changes to the balustrade height are unavoidable due to safety and BCA requirements, but the retention of the pink granite finish to match surrounding elements and the simple design of the upstand will ensure that no unacceptable impacts arise in terms of either heritage or visual impacts.

The proposed modifications therefore result in no unacceptable environmental impacts and result in a development that will continue to serve the coincident needs of safety, servicing and aesthetics and a practical solution to the servicing needs of the Opera House functions.