



Prepared for
Art Gallery of NSW
Date: 20 June 2019

Response to Submissions – Section 4.55(1A) Modification to SSD 6471

Art Gallery of NSW Expansion Project – Sydney Modern

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This report is considered a draft unless signed by a Director or Principal.



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Revision history

Issue Reference	Issue Date	Issue Status
A	16 August 2019	Draft for client review
B	23 August 2019	Final
File Ref: 190722_mod 1_response to submissions		

Contents

1. Introduction	3
1.1 Purpose of this report	3
1.2 Background	3
1.3 Proposal	4
1.4 Authorship	4
2. Key issues and response	5
2.1 Summary of submissions received	5
2.2 Key themes	5
2.3 Rationale for modification	5
2.4 Clarification of design, architectural merit and visual impact	6
2.5 Health impact	8
2.6 Impact on vegetation and landscaping	10
2.7 ESD and biodiversity impact	12
2.8 Safety and security impacts	13
3. Conclusion	14

Figures & tables

List of figures

Figure 1 Photomontage of SMP proposal showing view south-east down emergency fire egress path from Art Gallery Road	7
Figure 2 Photomontage of SMP proposal showing view west from atop Terrace Apartments open space	8
Figure 3 Cooling Tower Distances	9
Figure 4 Section A – Cooling Tower Sections (Scale 1:100)	11
Figure 5 Section B – Cooling Tower Sections (Scale 1:100)	11

List of tables

Table 1 Example specifications for proposed air inlet/outlet grille	7
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Appendices

Appendix A: Submissions – prepared by various	
Appendix B: Architectural drawings – prepared by SANAA / Architectus	
Appendix C: Photomontages – prepared by SANAA / Architectus	
Appendix D: Landscape response – prepared by McGregor Coxall Landscape Architects	
Appendix E: Landscape drawings – prepared by McGregor Coxall Landscape Architects	
Appendix F: Mechanical response – prepared by Steensen Varming engineers	
Appendix G: Ecological response – prepared by WSP Australia Pty Ltd	

1. Introduction

1.1 Purpose of this report

This Response to Submissions (RTS) report has been prepared in relation to a modification application submitted to the NSW Department of Planning, Industry and Environment (DPIE) on 20 June 2019 under Section 4.55(1A) of the Environmental Planning and Assessment Act 1979 (EP&A Act) for approved State Significant Development (SSD) 6471 for the Art Gallery of New South Wales (AGNSW) Expansion Project, known as Sydney Modern.

The proposed modification generally comprises the deletion of the approved seawater heat exchange system, to be replaced with a series of cooling towers located in an unused void inside the approved excavation footprint. Associated minor landscaping amendments are also proposed. Refer to a description of the proposed modification at Section 1.3 of this report.

A total of four (4) submissions were received in relation to the modification, from the City of Sydney Council, the NSW Environment Protection Authority, the Heritage Council of NSW, and the Environment, Energy and Science (EES) Group.

Refer to the summary of submissions received at Section 2 of this report and responses to key issues raised at Section 3 of this report.

This RTS should be read in conjunction with the exhibited Section 4.55(1A) Modification to SSD 6471 prepared by Architectus, dated 20 June 2019, and supporting documents at **Appendices B to G**.

1.2 Background

An overview of recent and relevant approval history for the site is provided below.

The AGNSW Expansion Project, known as Sydney Modern, was approved by the Minister for Planning on 20 November 2018. As detailed within the Notice of Determination for SSD 6471, consent was granted for:

“Sydney Modern Expansion Project:

- demolition, earthworks and excavation works*
- construction of new art gallery building*
- remediation and conversion of former fuel bunker to gallery use*
- construction of new entry plaza and associated canopy*
- new loading dock with access from Lincoln Crescent*
- installation of seawater heat exchange system*
- public domain and landscaping works, including new footpaths, public lifts and tree planting*
- subdivision.”*

It is noted that construction works associated with the approved development have not yet commenced, however the facilitating subdivision of land has been undertaken, within lots registered in early 2019. As such, affected lots and land title details have changed from those described within the SSDA documentation.

There are no other recent applications or approvals relevant to the proposed modification.

1.3 Proposal

The proposed modification has not changed from that described in the exhibited Section 4.55(1A) Modification report. A summary of the exhibited modification is provided below.

The proposed modification comprises the deletion of the approved seawater heat exchange system, to be replaced with a series of cooling towers located in an unused void in the approved excavation line of development above the loading dock. Associated minor landscaping amendments are also proposed. No further excavation is required to facilitate the proposed modification.

The proposed modification is a result of ongoing design development post approval, including a review by AGNSW of opportunities to consolidate and collocate building services to ensure more efficient construction processes and a reduced construction impact, as well as improved operation, maintenance and servicing of the expanded AGNSW over time.

The proposed modification as submitted, proposed:

- Amendment to Condition A2 (Approved Drawings)
- Deletion of Conditions B28, D2 and E22 (Seawater Heat Exchange System)

This RTS report includes more detailed architectural and landscape drawings and possible additional conditions of consent are discussed further below.

1.4 Authorship

This report has been prepared by Jane Fielding, Senior Associate, Planning, and Jane Anderson, Urban Planner.

Michael Harrison, Strategic Advisor at Architectus has provided quality assurance.

2. Key issues and response

2.1 Summary of submissions received

A total of four (4) submissions were received in relation to the modification:

- City of Sydney Council (Council) including initial email correspondence with DPIE;
- Heritage Council of NSW (Heritage NSW);
- NSW Environment Protection Authority (EPA); and
- Environment, Energy and Science (EES) Group.

No submissions were received from members of the public.

It should be noted that following receipt of Council's formal response, a meeting was arranged with Council staff to discuss issues raised in their letter, held on 26th July 2019.

2.2 Key themes

The key themes which emerged from the submissions received, and in meeting with Council, are summarized below:

- Rationale for modification;
- Clarification of design, architectural merit and visual impact;
- Health impact;
- Impact on vegetation and landscaping;
- Acoustic impact;
- ESD and biodiversity impact; and
- Safety and security impacts.

A response to the key issues is provided below.

It should be noted as a result of the submissions no further changes have been made to the proposal. However additional architectural and landscape drawings and photomontages and diagrams have been prepared to provide design details of the cooling tower air inlet/outlet grille, and clarifications only have been provided further below to address issues. Refer to these at **Appendices B - G**.

2.3 Rationale for modification

The rationale for the deletion of the sea water heat exchange system and the move to cooling towers, is in part set out in the response from the mechanical engineers, Steensen Varming at **Appendix F**. A detailed evaluation of the various systems via a full life cycle analysis, provided the following reasons in summary:

- Safety and maintenance – the proposed closed loop cooling towers are easier and safer to maintain than the sea water remote plantroom (note: the merits of closed loop systems are discussed further below);
- Capital cost – design development revealed the capital cost of excavation for sea water exchange system pipework and service diversions are cost prohibitive, while energy consumption cost differences between the two systems are negligible;
- Ongoing maintenance cost - the ongoing maintenance costs for a sea water system are higher than cooling tower alternative, and maintenance regime for existing cooling towers can simply extend to the new towers;

- Reliability of a critical system – the cooling tower system is a “tried and tested” system that is more reliable than the sea water system.

Further to the above are the additional reasons:

- It became apparent during detailed design development that a void created by approved excavation could accommodate cooling towers while obscuring them from view from important areas including the Domain; and
- Lessen impact to the harbour foreshore and Terrace Apartments with removal of the seawater heat exchange system, namely lessen amenity impacts from construction (noise, construction traffic, dust), and eliminate tree, archaeological and marine impacts.

2.4 Clarification of design, architectural merit and visual impact

Issue:

Council and the Heritage Council query the detail of the design and how the air inlet/outlet grille and cooling towers sit within the landscape and interface with the Domain.

The Heritage Council queried the architectural merit of the proposal, referencing it could present visually as a “back of house” space.

Response:

Typically, cooling towers are located atop buildings because of a lack of available space at ground level and their visual impact. Cooling towers were originally avoided for the new Gallery building because of its setting within the landscaped Domain and the roof forms are visible and/or occupied with landscaping, terraces and photovoltaic panels. As provided above, during design development it became apparent that a void space created by approved excavation could accommodate the cooling towers while mitigating any adverse visual impact from the Domain and surrounding areas.

Since submission of the Modification, detailed architectural and landscape plans and sections have been prepared for the proposal by SANAA/Architectus and McGregor Coxall respectively, to show how the cooling towers will sit within the building and how the air inlet/outlet grille will sit within the landscape. Refer to these at **Appendices B** and **E** respectively.

The following detailed architectural drawings have been prepared:

- DA_1003.5 [B] - General Floor Plan – Lower Level 3 Mezzanine – (note: this is a plan in the Modification set now amended to show location of new sections);
- DA_2051 [A] - Section 1 & Section 2; and
- DA_2052 [A] - Section 3 & Section 4.

The following detailed landscape plans and sections have been prepared:

- LD-DA-00-17 – Cooling Tower Corner; and
- LD-DA-20-01 – Cooling Tower Sections.

The air inlet/outlet grille will be constructed of galvanized steel and thereby grey in colour. It will be approximately 70% open. Given the colour of the air inlet/outlet grille and recessed space below which will always be in shadow, the air inlet/outlet grille will visually recede into the landscape. The current specifications for the air inlet/outlet grille are detailed below. However, note these could vary slightly in further design development.

Table 1 Example specifications for proposed air inlet/outlet grille
Source: SANAA / Architectus

Air inlet/outlet grille component	Nominal specifications of air inlet/outlet grille
Internal framing:	32x5mm Bars (100mm Cross Rod pitch / 40mm Load Bar pitch) = 72% efficient.
Perimeter framing:	4m2 (75mm support around the perimeter)
Discharge Air:	16m2
Intake Air:	32m2
TOTAL Air inlet/outlet grille Area	$32 + 16 + 4 = 52\text{m}^2$

Notwithstanding the visual nature of the air inlet/outlet grille, photomontages have been prepared by Architectus showing views of the proposal from Art Gallery Road and from the east atop Terrace Apartments open space on Lincoln Crescent. These are shown below and provided in full at **Appendix C**. The **Figure 1** photomontage shows the cooling towers will not be visible from Art Gallery Road given topography drops off after the emergency egress path, and due to intervening vegetation. The **Figure 2** photomontage of view from the east shows the air inlet/outlet grille is enough distance away to not have any detrimental visual impact. Given the air inlet/outlet grille's visual nature and intervening vegetation it will visually recede into the landscape.

Figure 3 further below shows distances of the air inlet/outlet grille to surrounding features. It will be located enough distance away to not be visible from the proposed terrace in the new SMP building.



Figure 1 Photomontage of SMP proposal showing view south-east down emergency fire egress path from Art Gallery Road
(Note arrow indicates location of air inlet/outlet grille)

Source: SANAA / Architectus



Figure 2 Photomontage of SMP proposal showing view west from atop Terrace Apartments open space

(Note arrow indicates location of air inlet/outlet grille)

Source: SANAA / Architectus

2.5 Health impact

Issue:

The City of Sydney Council state the cooling towers are to be located away from “occupied areas, pedestrian thoroughfares, air intakes, building areas and trafficable areas”, as referenced under Australian Standard AS/NZS 3666.1:2011 and required by the NSW Public Health Regulation 2012. Their concern relates to possible legionnaires disease risk from pedestrian proximity to these areas.

Response:

Cooling towers are regulated under Division 6 ‘Cooling water system’ of the NSW Public Health Regulation 2012 to prevent adverse microbial growth such as *Legionella*. Cooling towers can take the form of either *open loop* or *closed loop* systems. The proposed cooling towers for SMP are a closed loop system (closed circuit cooling tower), meaning there is no contact between the air and fluid being cooled. This means any exhaust is simply warm air that does not pose a health risk to pedestrians or workers in the vicinity of the air inlet/outlet grille.

AS/NZS 3666.1:2011 sets out a requirement for cooling towers to be located away from “occupied areas, pedestrian thoroughfares, air intakes, (including lift vents), building openings and trafficable areas”. It is the view of Steensen Varming mechanical engineers that none of these areas are in the vicinity of the air inlet/outlet grille, and that an emergency egress path with its minimal use does not qualify. Further to this, that the Australian Standard does not account for the drastic difference in risk of legionella build up in open and closed loop systems. Steensen Varming provide with the selection of cooling towers and associated design, that the risk of legionnaires is negligible. “Closed loop system will typically run dry for much of the year and at a very minimum discards the water within the system every 24hrs, thus there is no standing water for legionella to develop within.”

A closed loop system is also beneficial if there is the potential for debris. A net is proposed under the air inlet/outlet grille to catch debris (leaves and litter). Note this net will be maintained below the air inlet/outlet grille.

Mechanical engineers, Steensen Varming, has provided a technical response to Council’s concern on these issues at **Appendix F**.

Based on the above assessment and attached supporting information, it is considered Council's proposed condition of consent '(1) Microbial Control in Water Systems' is not warranted.

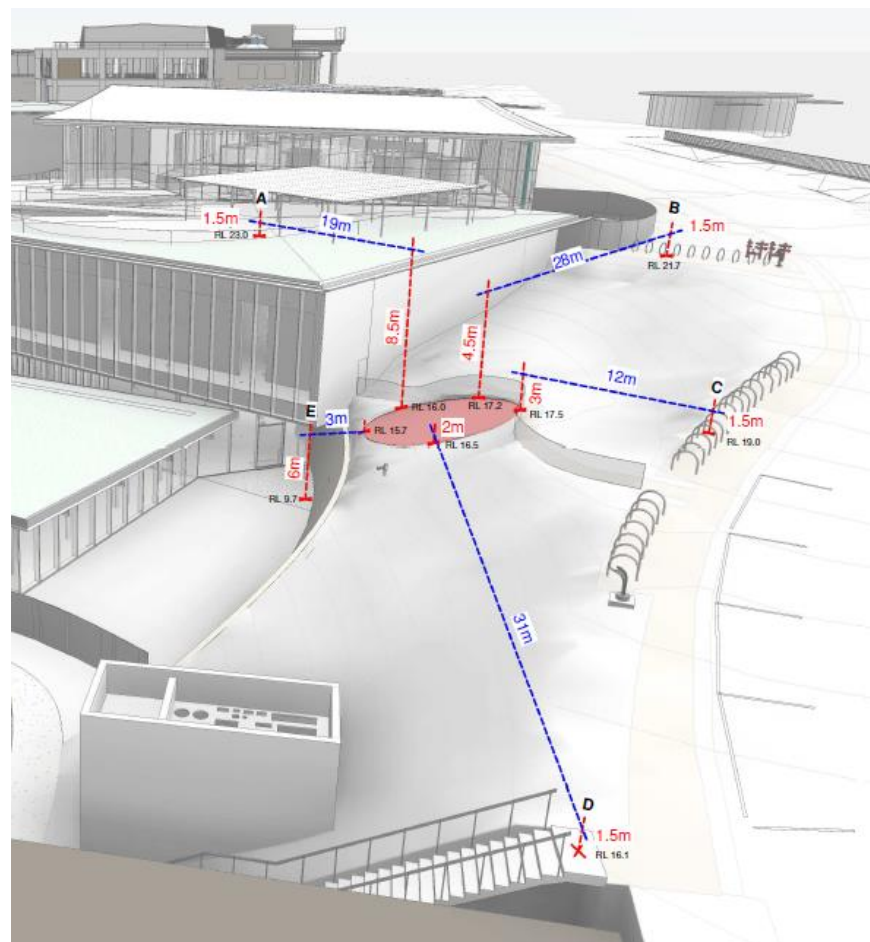
Issue:

Council in their earlier email submission, query the impact of heat exhaust on pedestrian comfort.

Response:

Steensen Varming provides that the discharge from the exhaust will be approximately 5-6 degrees Celsius warmer than the air entering, and would mix quickly with the air, thereby it would only be perceived in close vicinity as warm humid air.

There is no point of pedestrian congregation at the location, and the adjacent path is only an emergency fire egress path from the building with glazed balustrade for its length preventing access to the air inlet/outlet grille from the path. The following diagram shows horizontal and vertical distances from the top of the cooling tower air inlet/outlet grille to public/pedestrian congregation areas (bicycle racks, public stairs, and roof terrace). These distances are adequate for dispersal of warm air so as not to pose an issue. Refer to discussion above on AS/NZS 3666.1:2011.



Dimensions show horizontal & vertical distances from cooling tower discharge.

Key:

- A - Public Rooftop Terrace
- B - Public Bicycle Parking
- C - Public Footpath
- D - Public Footpath
- E - Public Terrace

Figure 3 Cooling Tower Distances

Source: SANAA / Architectus

Issue:

The potential for acoustic impact on pedestrian comfort was raised in the meeting by Council.

The EPA submission addresses acoustic impact of the proposal and references they would be satisfied if the project can be designed to not exceed the rating background level +5dBA.

Response:

The Modification documentation already submitted included an acoustic assessment of the proposal prepared by Arup which examined acoustic impacts on sensitive receivers and acoustic impacts local to the development from the proposed cooling towers. This report proposed a series of acoustic measures to achieve acceptable impacts.

Given the proposed cooling towers sit within a void area, only an emergency egress path sits adjacent at a higher level, and no pedestrian congregation points are adjacent, acoustic comfort to pedestrians will not be an issue.

Should DPIE be of the mind to implement a condition of consent to the effect that the project can be designed to not exceed the rating background level +5dBA, then in principle AGNSW would accept this subject to agreement on detailed wording.

2.6 Impact on vegetation and landscaping

Issue:

The City of Sydney Council requested additional information on the impact of the cooling tower exhaust on nearby existing and proposed trees. Council also requested design details of the air inlet/outlet grille in architectural and landscape documentation, and clarification of its impact on visual amenity, and comfort of the public domain.

Response:

Those significant trees in the vicinity of the exhaust air inlet/outlet grille include T1118 that is existing and to remain in situ, and T1228 that is an existing tree to be relocated/transplanted to the vicinity **in accordance with the previous approval**. Note their locations have not changed as per the approved SSD application for the new building.

In relation to the potential for thermal impact on vegetation from air inlet/outlet grille exhaust, McGregor Coxall landscape architects (refer **Appendix D**) provide there will be no impact on the long-term health of surrounding existing and proposed vegetation. This is given:

- There is a distance of 12.7 metres from the existing tree T1118 (edge of trunk) to the edge of the air inlet/outlet grille. The air inlet/outlet grille is located outside of the Tree Protection Zone (TPZ) and canopy of T1118;
- The distance from the relocated/transplanted T1228 (edge of trunk) to the edge of the air inlet/outlet grille is 4.5 metres;
- Air velocity from the air inlet/outlet grille (around 2 metres / second);
- Air temperature difference (around 5-6 degrees Celsius adjacent the air inlet/outlet grille and this warm air will dissipate and lessen as it moves outwards); and
- Trees are Australian natives and generally heat tolerant.

Detailed landscape plans have also been prepared by McGregor Coxall landscape architects with a plan and sections through the air inlet/outlet grille. Refer to the sections at **Figure 4** and **Figure 5** below and the full documentation at **Appendix E**.

In relation to potential impact on Tree Protection Zones, **there is no further excavation proposed** in the Modification or in this Response to Submissions. As aforementioned the cooling towers will be sited within an approved excavated void space. And as there is

no change to location of existing or proposed trees, new arborist advice has not been commissioned nor warranted.

Based on the above assessment and attached supporting information, it is considered Council's proposed conditions of consent (2) and (3) 'Setback to Trees' are not warranted.

Issues of visual amenity and thermal comfort on pedestrians are addressed above.

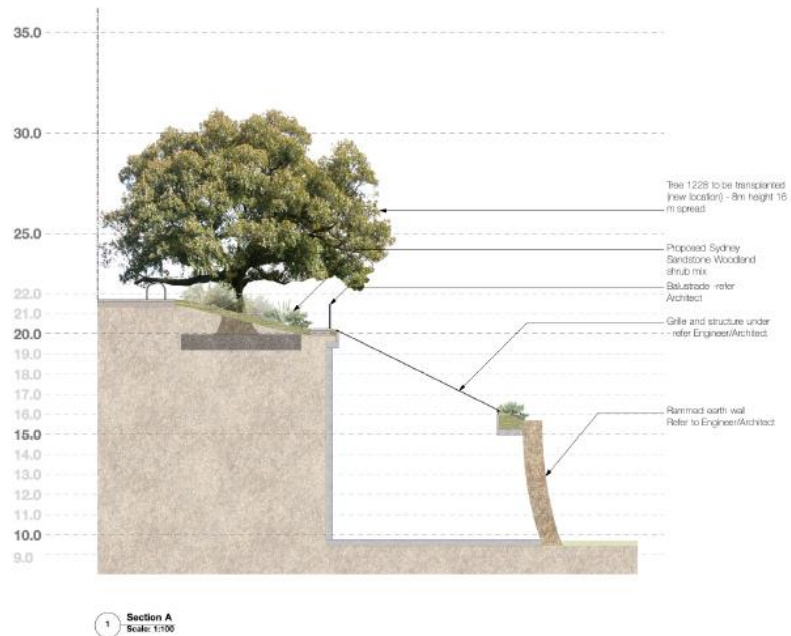


Figure 4 Section A – Cooling Tower Sections (Scale 1:100)
Source: McGregor Coxall

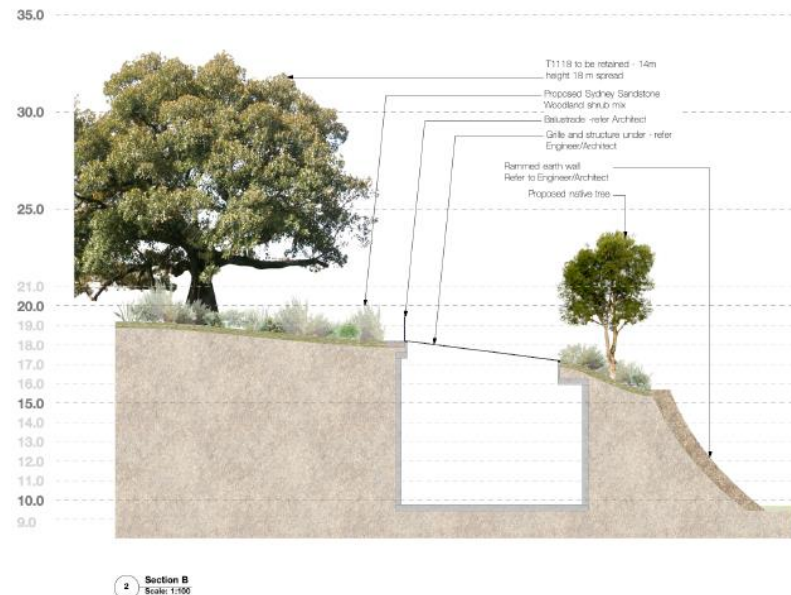


Figure 5 Section B – Cooling Tower Sections (Scale 1:100)
Source: McGregor Coxall

2.7 ESD and biodiversity impact

Issue:

Council notes the Ecologically Sustainable Development (ESD) Addendum prepared by WSP Australia Pty Ltd provided that the change from the heat rejection system to cooling towers reduces the credit 18B Potable water for the Green Star rating from six points to four points, with the discrepancy in water use being made up by rainwater harvesting. However, Council concede that this does not affect the 6 star Green star rating. Council do indicate though that rainwater harvesting details do not accompany the application and should do so, to achieve a higher Green star score and ESD outcome.

Response:

Steensen Varming has provided a response to these issues at **Appendix F** with input from Arup, reproduced below:

Based on a water balance model carried out by Arup, approximately 6,400m3 of rainwater will be collected at the B4 tank over the catchment area, this does not include evaporation and overflow losses. Once treated, this will amount to approximately 5,400m3/year of cooling tower make up water, the rest will be used for irrigation.

Please note however, this is not the green star building requirement which I understand is simply to have 200m3 rainwater tank volume installed for the project.

Additionally, the CoS planning requirement is to reduce site building rainwater discharge by 77%, this is outlined in the hydraulic and fire services specification.

The rainwater harvesting system will serve the new cooling towers with water in addition to the existing cooling towers on the existing building, there will however, be a non rainwater harvesting connection for additional top up.

Based on the above assessment and attached supporting information, it is considered Council's proposed condition of consent (4) 'Rainwater Harvesting' is not warranted.

Issue:

The Environment, Energy and Science (EES) Group provided that the applicant did not address the Biodiversity Conservation Act (BC Act) in their response and stated that an assessment of biodiversity values and the impact of the proposal on biodiversity values is required.

Response:

WSP Australia Pty Ltd provides the following response at **Appendix G**:

The proposed modification will require only minor landscaping adjustments, limited to realignment of the fire egress pathway and the redistribution of shrubbery planting located adjacent to the proposed grate outlet (to ensure sufficient clearance).

No additional trees are required to be removed to support the proposed modification and the proposal will not affect any approved tree planting (including relocation) at the site.

The development will maintain the same number of trees approved for the site under SSD 6471, being the planting of a minimum of 273 trees (as required by Condition E19).

Given the proposed modification will not result in any additional or increased impact on the current approved footprint in terms of biodiversity, it is deemed reasonable that the application is subject to section 7.17(2)(c) of the Biodiversity Conservation Act 2016 and as such no further biodiversity impact assessment is required.

2.8 Safety and security impacts

Issue:

The City of Sydney Council requested additional information on safety and security associated with the air inlet/outlet grille.

Response:

Safety and security concerns will be addressed by a combination of:

- The Gallery's security team providing surveillance of the area, which was detailed in the Environmental Impact Statement for the proposed building.
- The proposed glazed balustrade to the downward edge of the emergency egress path from the building which will prevent people from accessing the air inlet/outlet grille;
- Topography which will inhibit access to the air inlet/outlet grille;
- Sydney Sandstone Woodland shrub vegetation will be planted surrounding the air inlet/outlet grille.

3. Conclusion

This Response to Submissions report has been prepared by Architectus on behalf of the Art Gallery of New South Wales Trust to modify SSD 6471 for the approved AGNSW Expansion Project, known as Sydney Modern, pursuant to Section 4.55(1A) of the EP&A Act.

The proposed modification comprises the deletion of the approved seawater heat exchange system, to be replaced with a series of cooling towers located within an unused void inside the approved excavation line above the loading dock to facilitate building environmental systems. The proposed system is entirely within the approved building form. Associated minor landscaping amendments are also proposed.

This Response to Submissions does not change the proposed modification, it only sets out further detail and clarifications in response to submissions.

The proposed modification is not considered to alter the design intent of the approved development and is considered to be substantially the same development as the development for which consent was originally granted. Further, the proposed modification is considered to result in minimal or reduced environmental impact, with improved operational efficiencies when compared to the approved seawater heat exchange system.

Having regard to the matters discussed within this report, it is recommended that the Minister for Planning or delegate grant consent to the proposed modification.