
NSW
GOVERNMENT
WestConnex
M4-M5 Link
State Significant
Infrastructure
Modification
Assessment
(SSI 7485 MOD 3)

July 2020

Cover photo

M4-M5 Link Mainline Tunnel at Iron Cove (Source: TfNSW)

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Glossary

Abbreviation	Definition
Approval	Infrastructure Approval
CEMP	Construction Environmental Management Plan
Council	Inner West Council
CSSI	Critical State Significant Infrastructure
Department	Department of Planning, Industry and Environment
DEC	Department of Environment and Conservation
DPIE - Water Group	Department of Planning, Industry and Environment – Water Group
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
Minister	Minister for Planning and Public Spaces
MOC	Motorway Operations Complex
MOC4	Iron Cove Link Motorway Operations Complex
MOD	Modification
OMCS	Operational Motorway Control System
Proponent	Transport for NSW (formerly Roads and Maritime Services)
RtS	Response to Submissions
Secretary	Secretary of the Department of Planning, Industry and Environment
SSI	State Significant Infrastructure
TfNSW	Transport for NSW
The project	WestConnex M4-M5 Link (SSI 7485)
UDLP	Urban Design and Landscape Plan

Executive Summary

On 17 April 2018, the then Minister for Planning approved the M4-M5 Link proposal. The approved project is Critical State Significant Infrastructure (CSSI) and comprises the construction and operation of twin multi-lane tunnels between the M4 East Motorway at Wattle Street, Haberfield and the New M5 St Peters Interchange, as well as an interchange at Rozelle and a twin tunnel connection from the Rozelle Interchange to the Iron Cove Bridge.

Transport for NSW (formerly Roads and Maritime Services) (the Proponent) lodged a modification application to:

- relocate the Iron Cove Motorway Operations Complex (MOC4), including the electrical substation and ventilation facilities into underground caverns;
- construct a switch room, high voltage regulators, an alternative Operational Motorway Control System (OMCS) facility and a stair access well leading down to the ventilation tunnel on the surface between Callan and Toelle Streets at Rozelle;
- construct an underground ventilation tunnel connecting the Iron Cove Link tunnel (at an underground location between Cambridge and Waterloo Streets) with the Iron Cove cut and cover structure near Callan Street;
- use the Iron Cove construction ancillary facility (C8) as a tunnelling and support site for the ventilation tunnel; and
- extend the Iron Cove cut and cover area on the southern side of Victoria Road to facilitate connection to the ventilation tunnel.

It is the third modification application to the M4-M5 Link Infrastructure Approval.

Assessment Process and Community Engagement

The Modification Report was publicly exhibited from 20 November to 18 December 2019 (29 days). A total of 38 submissions were received during the exhibition period. The Department undertook a site inspection of the site of the proposed construction ancillary facility (C8) / alternative OMCS facility to better understand the characteristics of the local environment and appreciate the issues raised in submissions by the community and Inner West Council.

The modification application received 27 public submissions in the nature of objections and therefore does not meet the terms of the Minister's delegation, and the Minister is the approval authority.

Key Assessment Issues

Noise and Vibration

Use of the Iron Cove site for tunnelling is expected to result in some noise exceedances for nearby residents even though tunnelling will be undertaken within an acoustic shed. However, impacts would be relatively short term and mitigation, including at-property treatment, is required to be implemented under the existing Infrastructure Approval.

The proposal also introduces new noise sources (spoil haulage trucks, tunnel support works and fixed facilities) during construction and operation, which are predicted to meet the relevant noise management levels as detailed in the EIS. The Department has recommended a number of conditions, including that tunnelling only commence following the establishment of the temporary acoustic shed, that the Proponent take into account the cumulative noise and vibration levels from concurrent activities associated with construction of the project when implementing mitigation measures, and that noise monitoring be undertaken for operational infrastructure to confirm the predicted noise levels to identify if further noise mitigation is necessary.

A key concern of community members is noise generated by heavy vehicles, particularly for spoil haulage. The Proponent has committed to restricting haulage to standard work hours and this has been reinforced in the Department's recommended conditions. Furthermore, the existing Infrastructure Approval includes conditions for managing construction traffic.

The Department is satisfied that potential noise impacts can be managed through the existing Infrastructure Approval and through the recommended conditions.

Traffic and Transport

The traffic assessment indicates that increased construction traffic volumes would not impact on the operational performance of Victoria Road or the levels of service at nearby intersections. In addition, traffic impacts on City West Link / The Crescent from tunnelling commencing at the Rozelle construction ancillary facility would be in accordance with the approved project.

Urban Design and Visual Amenity

Relocation of the surface operational facilities means a new group of residents would be subjected to visual and amenity impacts. In accordance with the current Infrastructure Approval, the final form and design of these buildings would be subject to the Urban Design and Landscape Plan (UDLP) process under the guidance of a Design Review Panel. The Department considers this a robust and valuable method in attaining high quality results. However, to prevent structures that do not complement the residential character of the neighbourhood, design objectives have been recommended. Additionally, the opportunity to optimise the extent of usable land along Victoria Road through design and siting of built form has been encouraged through the recommended conditions.

The alternative operational motorway control system facility would be smaller in scale compared to the approved Iron Cove Motorways Operation Complex, resulting in a reduction of the number of

properties impacted by overshadowing from six to three. However, the relocation of the surface facilities to between Toelle and Callan Streets at Rozelle means a different set of properties would be overshadowed. The Infrastructure Approval sets out requirements relating to solar access and managing overshadowing.

Residual Land

A benefit of relocating parts of the surface operational facilities of the Iron Cove Motorway Operations Complex (MOC4) underground is an increase in the amount of residual land available following the completion of the project.

The community preference for residual land derived from the modification is public open space. However, there are several factors which contribute to decisions on the use of the land as open space. These include amenity, isolation and accessibility. Inner West Council questioned the suitability of this land as open space in its submission due to its isolation and location adjacent to Victoria Road. As such, the Department remains satisfied with its original position that the most appropriate use/s for the site be determined in consultation with Inner West Council and finalised under the Residual Land Management Plan required by the Infrastructure Approval.

Settlement and Property Impacts

The assessment identified several properties above the ventilation tunnel and caverns that could be affected by settlement. These properties are located above areas where tunnelling is at its shallowest (around eight metres near Victoria Road).

The Infrastructure Approval includes conditions to ensure a conservative approach in managing settlement. These conditions comprise the preparation of a geotechnical model to assess potential settlement, settlement criteria, monitoring requirements, pre- and post-construction dilapidation surveys, requirements for rectifying any damage to property and infrastructure arising from settlement, and establishment of an Independent Property Impact Assessment Panel.

Conclusion and Recommendation

The M4-M5 Link is a critical component of WestConnex, which in turn is key to achieving the Government's transport policies and objectives. The proposed modification would result in a reduction in the scale and footprint of permanent surface works and increase in the availability of residual land.

The Department has reviewed the Modification Report, community, council and government authority submissions and the Response to Submissions, and assessed the key issues arising from the proposed changes to the approved project. These include noise and vibration, traffic and access, urban design and visual amenity, settlement and groundwater.

Overall, the potential environmental impacts associated with the modification would be acceptable with the implementation of mitigation measures. On balance, the proposed modification would provide benefits which outweigh the potential impacts. It is therefore recommended that the modification be approved subject to the recommended conditions.

Contents

1. Introduction

This report provides an assessment of a request by Transport for NSW (TfNSW - the Proponent) to modify the State significant infrastructure (SSI) approval for the WestConnex M4-M5 Link (SSI 7485) (the project). The project is the third stage of the 33 km WestConnex motorway (refer **Figure 1**) that, together with the proposed future Sydney Gateway project, would facilitate improved connections between Western Sydney, Sydney Airport and Port Botany, and south / south-west Sydney.

Figure 1 | WestConnex Overview (Source: WestConnex M4-M5 Link EIS)

The M4-M5 Link connects the M4 East at Haberfield with the New M5 at St Peters and comprises:

- new twin multi-lane tunnels between Wattle Street, Haberfield and the St Peters Interchange;
- an interchange at Rozelle and new tunnel connection to the Iron Cove Bridge (Iron Cove Link);
- upgrades to the surrounding road network;
- active transport facilities and the provision of up to 10 hectares of open space at Rozelle; and
- ancillary facilities including five motorway operation complexes and three tunnel ventilation facilities.

The project is being constructed in two stages:

- Stage 1 – construction of the mainline tunnels between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters - anticipated to be open to traffic in early 2023.
- Stage 2 – construction of the Rozelle Interchange and Iron Cove Link - anticipated to be open in late 2023.

Figure 2 shows the main project components and location.

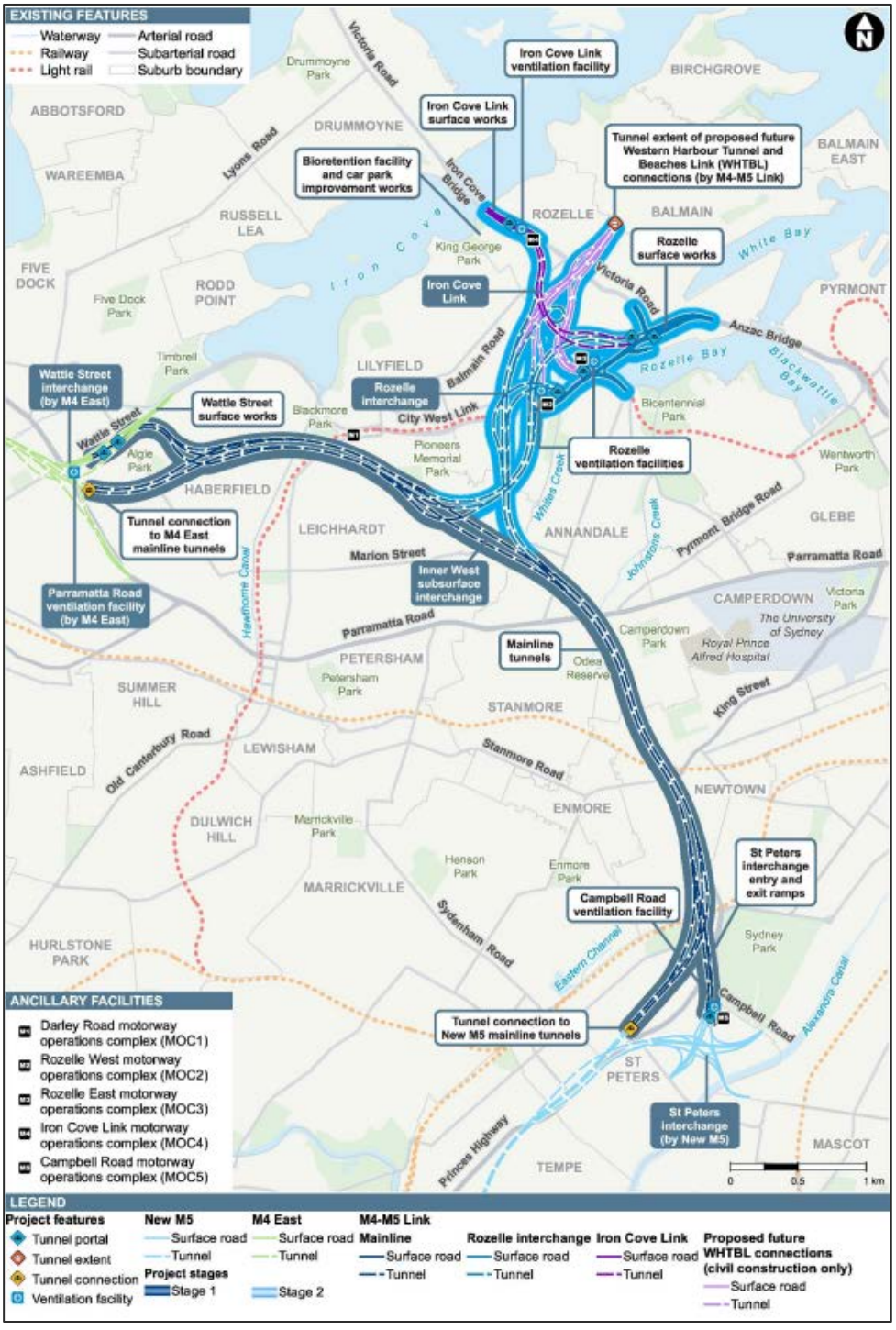

Figure 2 | Project location and design elements
(Source: Iron Cove ventilation underground Modification Report)

The proposed modification relates to Stage 2 of the project. The modification request seeks approval for the construction of a ventilation tunnel and two caverns for housing ventilation equipment, relocation of the Iron Cove motorway operations complex (MOC4) underground (including the electrical substation and ventilation facilities) and use of the Iron Cove construction ancillary facility (C8) as a tunnelling and support site (see **Section 2**).

1.1 Background

The Iron Cove Link site is located along Victoria Road, Rozelle and is in an urban environment surrounded by diverse land uses including low to medium density residential communities, commercial and light-industrial developments, recreational areas and transport activities. The area subject to the modification is in the Inner West Council local government area.

The approved project involves the construction of the MOC4 on the southern side of the realigned Victoria Road between Callan and Springside Streets, as well as an electrical substation on the corner of Victoria Road and Callan Street (**Figure 3**). MOC4 would be approximately 10 metres above ground level and 50 metres in length. The substation would be approximately four metres high.

Figure 3 | Approved Iron Cove Link MOC4 site
(Source: Iron Cove ventilation underground Modification Report)

The approved Iron Cove civil site (C8) is located along the southern side of Victoria Road at Rozelle between Byrnes Street and Springside Street (**Figure 4**). The approved construction uses include offices, amenities, parking, workshop and maintenance facility, laydown and parking to support construction of the Iron Cove Link surface works, including tunnel entry and exit ramps, upgrades and modifications to the eastbound and westbound carriageways of Victoria Road.

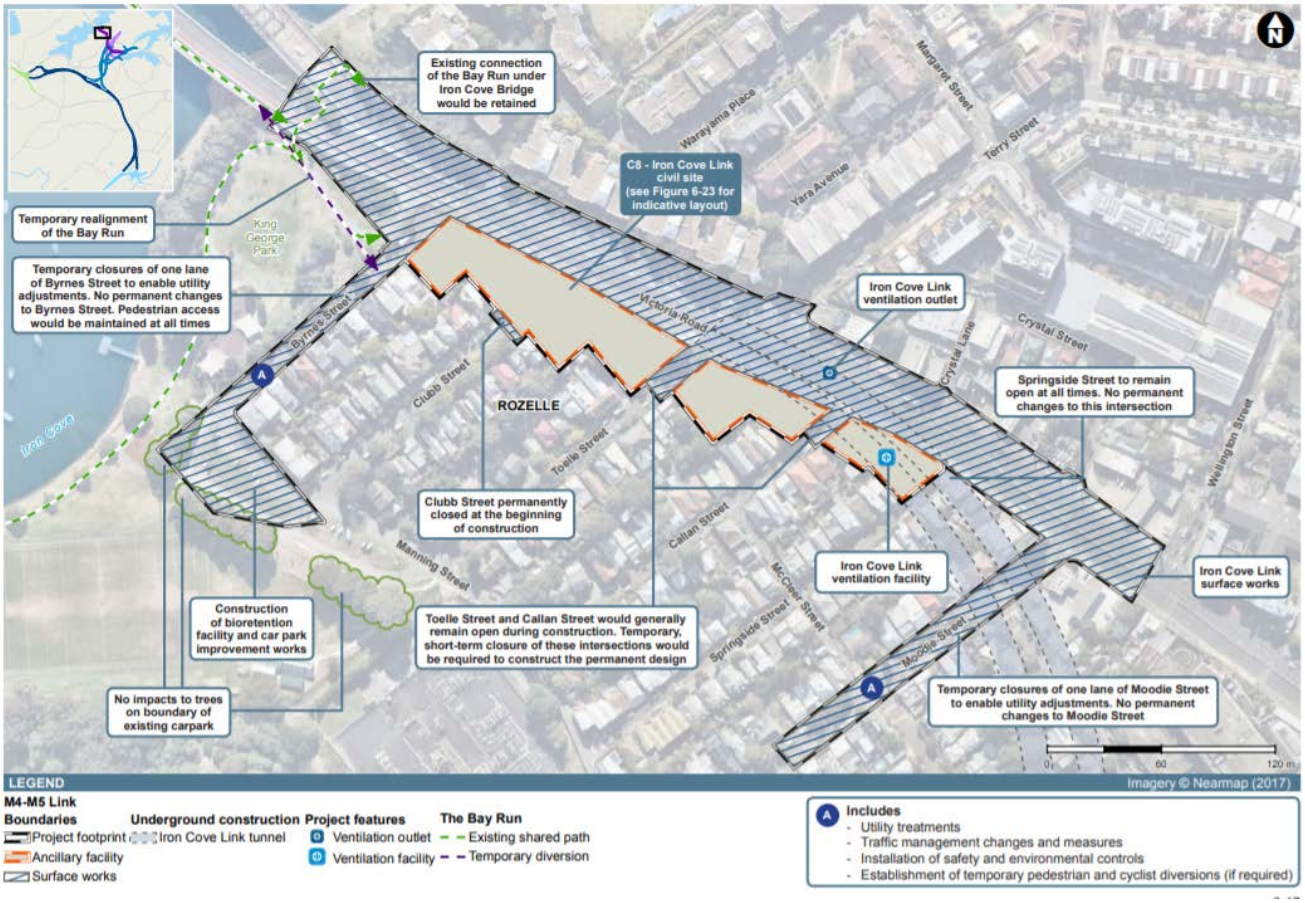

Figure 4 | Location of Iron Cove construction ancillary facility and surface works
(Source: Iron Cove ventilation underground Modification Report)

1.2 Approval History

The M4-M5 Link (SSI 7485) was approved on 17 April 2018 by the then NSW Minister for Planning. A modification relating to Stage 1 was approved on 25 February 2019. The modification involved the inclusion of civil sites at Parramatta Road West and Parramatta Road East (C1b and C3b), a civil and tunnel site at Northcote Street (C3a), removal of the Darley Road civil and tunnel site, and relocation of the operational water treatment plant from Darley Road site to the Campbell Road motorway operations complex at the St Peters Interchange.

A modification application (SSI 7485 Mod 2) has been lodged (15 August 2019) by TfNSW, proposing a vehicular overpass at The Crescent, alterations to the approved active transport links and modifications to the intersection at The Crescent / Johnston Street / Chapman Road at Annandale. The modification is currently under assessment by the Department.

1.3 Relevant conditions and table of definitions

The following is a list of the conditions of approval relevant to this modification request.

Condition A1 – *The CSSI must be carried out in accordance with the terms of this approval and generally in accordance with the description of the CSSI in the WestConnex M4-M5 Link Environmental Impact Statement – Volumes 1A-C and 2A-J (dated August 2017) (the EIS); the WestConnex M4-M5 Link Submissions and Preferred Infrastructure Report (dated January 2018) (the*

SPIR); and the WestConnex M4-M5 Link Mainline Tunnel Modification Report (dated September 2018) (Modification 1 Report) as amended by the WestConnex M4-M5 Link Mainline Tunnel Modification Response to Submissions (dated November 2018) (Modification 1 RtS)..

Condition A12 – *The CSSI may be constructed and operated in stages. Where staged construction or operation is proposed, a **Staging Report** (for either or both construction and operation as the case requires) must be prepared and submitted to the Secretary for information. The **Staging Report** must be submitted to the Secretary no later than one (1) month prior to the commencement of construction of the first of the proposed stages of construction (or if only staged operation is proposed, one (1) month prior to the commencement of operation of the first of the proposed stages of operation).*

Condition A21(i) – *consider any minor amendments to be made to the CEMP, CEMP Sub-plans and monitoring programs that comprise updating or are of an administrative nature, and are consistent with the terms of this approval and the CEMP, CEMP Sub-plans and monitoring programs approved by the Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval.*

Condition C2(a) – *a description of activities to be undertaken during construction (including the scheduling of construction).*

Condition C12 – *The **Groundwater Monitoring Program** must include:*

- *(a) daily measurement of the amount of water discharged from the water treatment plants;*
- *(b) water quality testing of the water discharged from the water treatment plants;*
- *(c) monitoring of groundwater pore pressures in the Hawkesbury Sandstone aquifers adjacent to the tunnel alignment, in consultation with DPI Water;*
- *(d) monitoring of groundwater electrical conductivity in key locations between saline water bodies and the tunnel as identified by the project groundwater model including:*
  - *(i) in the Haberfield / Lilyfield area to the south of Iron Cove,*
  - *(ii) in the Rozelle area to the north of Rozelle Bay,*
  - *(iii) in the Annandale area to the west of Rozelle Bay,*
  - *(iv) in the Rozelle area to the south east of Iron Cove, and*
  - *(v) in the St Peters area to the north west of Alexandra Canal,*

  with a minimum of two (2) groundwater monitoring wells to be provided in each key location in consultation with DPI Water;
- *(e) measures to record or otherwise estimate and report groundwater inflows into the tunnels during their construction;*
- *(f) a method for providing the data collected in (a) and (b) to Sydney Water every three (3) months to demonstrate the project's compliance with the discharge criteria and, if applicable, the Proponent's trade waste licence; and*
- *(g) a method for providing the groundwater monitoring data to DPI Water every three (3) months during construction.*

Condition D11 – *The **Operational Groundwater Monitoring Program** must include:*

(a) daily measurement of the amount of water discharged from all water treatment plants;

(b) water quality testing results of the water discharged from all water treatment plants;

(c) monitoring of groundwater pore pressures in the Hawkesbury Sandstone aquifers adjacent to the tunnel alignment, in consultation with DPI Water;

(d) monitoring of groundwater electrical conductivity in key locations between saline water bodies and the tunnel as identified by the project groundwater model including:

(i) in the Haberfield / Lilyfield area to the south of Iron Cove,

(ii) in the Rozelle area to the north of Rozelle Bay,

(iii) in the Annandale area to the west of Rozelle Bay,

(iv) in the Rozelle area to the south east of Iron Cove, and

(v) in the St Peters area to the north west of Alexandra Canal,

with a minimum of two (2) groundwater monitoring wells provided in each key location in consultation with DPI Water;

(e) measures to record or otherwise estimate and report groundwater inflows into the tunnels;

(f) a method for providing the data collected in (a) and (b) to Sydney Water every three (3) months to demonstrate the project's compliance with the discharge criteria and, if applicable, the Proponent's trade waste licence; and

*(g) a process for annually forwarding data on the monthly volume of groundwater discharged from each water treatment plant to DPI Water for a minimum period of five (5) years, consistent with **Condition D12**.*

Condition E7 – *Conditions E3, E4, E5, and E6 do not apply in an emergency, as defined in the OEMP required by Condition D1.*

Condition E27 – *The Proponent must develop and implement a reporting system for in-tunnel and ambient limits. The reporting system must be approved by the Secretary and fully implemented and operational prior to operation. Minimum analytical reporting requirements for air pollution monitoring stations must be as specified in the Approved Methods of Modelling and Assessment of Air Pollutants in NSW (EPA, 2005 or as updated)*.

Condition E38 – *The Proponent must consult with the EPA and **AQCCC** before nominating the proposed auditor to the Secretary. Operation of the CSSI must not commence until the auditor's appointment is approved by the Secretary. The auditor may be the same person(s) appointed under **Condition E27***.

Condition E70 – *Notwithstanding Conditions E68 and E69 the following works are permitted to be undertaken 24 hours a day, seven days a week:*

(a) tunnelling activities excluding cut and cover tunnelling;

(b) haulage of spoil and delivery of material;

(c) works within an acoustic shed; and

(d) tunnel fit out works.

Other surface works associated with tunnelling must only be undertaken in accordance with the requirements of Condition E73.

Condition E73(e) – *construction that causes LAeq(15 minute) noise levels:*

Condition E81 – *Mitigation measures must be implemented with the aim of achieving the following construction noise management levels and vibration criteria:*

(a) *construction 'Noise affected' noise management levels established using the Interim Construction Noise Guideline (DECC, 2009);*
(b) *vibration criteria established using the Assessing vibration: a technical guideline (DEC, 2006) (for human exposure);*
(c) *Australian Standard AS 2187.2 - 2006 "Explosives - Storage and Use - Use of Explosives";*
(d) *BS 7385 Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2" as they are "applicable to Australian conditions"; and*
(e) *the vibration limits set out in the German Standard DIN 4150-3: Structural Vibration- effects of vibration on structures (for structural damage).*

Any works identified as exceeding the noise management levels and/or vibration criteria must be managed in accordance with the ***Construction Noise and Vibration Management Sub-plan.***

Condition E82 – *Mitigation measures must be applied when the following residential ground-borne noise levels are exceeded:*

(a) *evening (6:00 pm to 10:00 pm) — internal LAeq(15 minute): 40 dB(A); and*
(b) *night (10:00 pm to 7:00 am) — internal LAeq(15 minute): 35 dB(A).*

The mitigation measures must be outlined in the Construction Noise and Vibration Management Sub-plan, including in any Out-of-Hours Work Protocol, required by Condition E77.

Administrative changes are proposed to Conditions **A2**, **A3**, **C5**, **C22**, **C24**, **D1**, **D2** and **E92** to include reference not only to the Environmental Impact Statement and Preferred Infrastructure Report but also the documentation relating to the modification applications.

In addition, administrative changes are proposed to the definitions of "Department" and "Secretary" in **Table 1** of the Infrastructure Approval to reflect the current name of the Department and title of the Secretary. Further, the proposed amendments to the conditions will require the summary table (**Table 3**) in the Infrastructure Approval to be updated.

2. Proposed Modification

The proposed modification relates to Stage 2 (Rozelle Interchange) of the project. The Proponent seeks approval to:

- relocate the Iron Cove Motorway Operations Complex (MOC4), including the electrical substation and ventilation facilities, into underground caverns;
- construct a switch room, high voltage regulators, an alternative operational motorway control system (OMCS) facility and a stair access well leading down to the ventilation tunnel on the surface between Callan and Toelle Streets at Rozelle;
- construct an underground ventilation tunnel connecting the Iron Cove Link tunnel (at an underground location between Cambridge and Waterloo Streets) with the Iron Cove cut and cover structure near Callan Street;
- use the Iron Cove construction ancillary facility (C8) as a tunnelling and support site for the ventilation tunnel; and
- extend the Iron Cove cut and cover area on the southern side of Victoria Road to facilitate connection to the ventilation tunnel.

2.1 Ventilation tunnel and caverns

The proposed underground ventilation tunnel would be approximately 340 metres long and on average about seven metres high and 10 metres wide. The ventilation tunnel depth from the surface would vary from about eight metres at its shallowest (near Victoria Road) to around 25 metres (from ground level to tunnel crown) at its deepest.

The underground tunnel would comprise two caverns (to the south of Moodie Street and below Cambridge Street) to house ventilation equipment and an electrical substation, along with access tunnels for maintenance (**Figure 5**). The ventilation cavern would be approximately 25 metres wide, 15 metres high and 70 metres long. The substation cavern would be approximately 20 metres wide, 10 metres high and 65 metres long.

The tunnel and caverns would be drained, consistent with the other ventilation tunnels and caverns constructed as part of the project. Approximately 61,000 cubic metres of additional spoil would be excavated to construct the new ventilation tunnel and caverns compared with the approved M4-M5 Link project which would generate around four million (4,000,000) cubic metres of spoil.

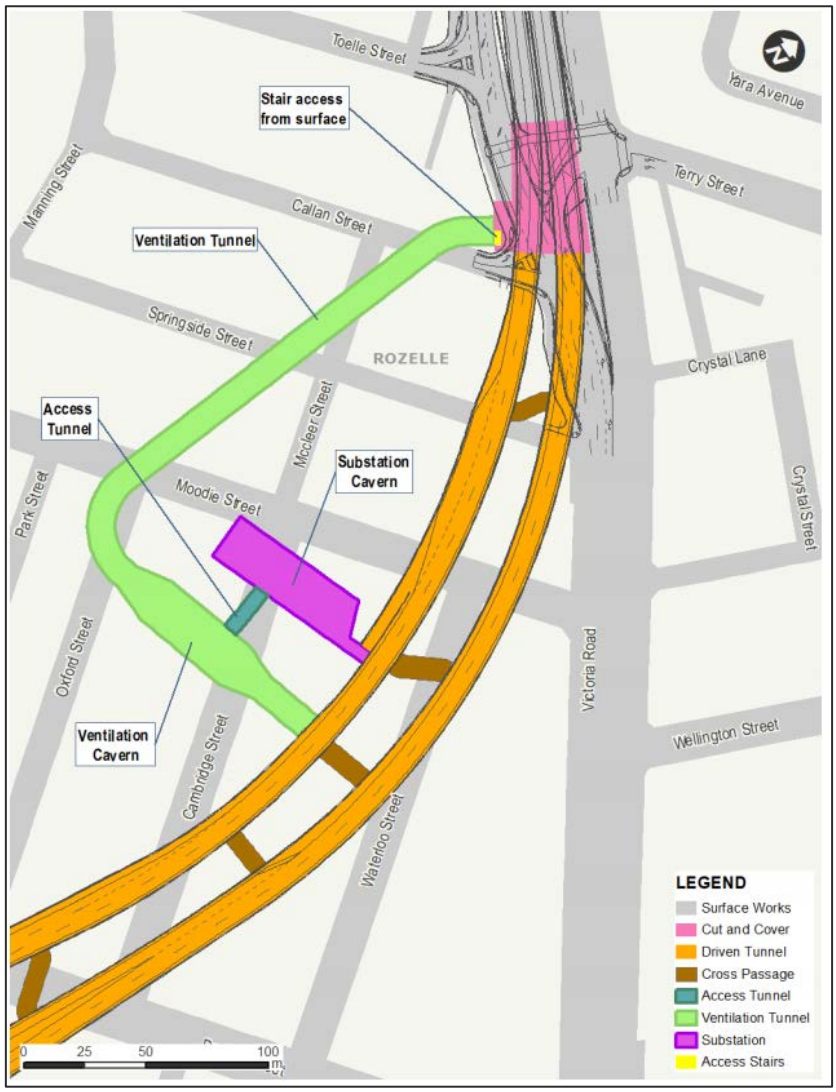

Figure 5 | Alignment of proposed tunnel and caverns at Iron Cove
(Source: Iron Cove ventilation underground Modification Report)

2.2 Relocation of Iron Cove Motorway Operations Complex (MOC4) and residual surface infrastructure

The proposed modification seeks to relocate MOC4 underground within the caverns described in **Section 2.1**. The ventilation cavern would contain the ventilation exhaust facilities, including four ventilation fans laid horizontally, with associated attenuators and dampers. The other cavern would house the relocated electrical substation currently on the corner of Victoria Road and Callan Street.

Residual surface infrastructure would include a switch room and high voltage regulators, a building for an alternative Operational Motorway Control System (OMCS) facility (as a back-up site to the primary facility at the Rozelle Rail Yards) and stair access down to the ventilation tunnel (**Figure 6**). The residual infrastructure is required to support the fans and substation and cannot be located underground for safety reasons and access requirements in an emergency. It would be located on the southern side of Victoria Road between Toelle and Callan Streets, as the closest surface location to the underground ventilation tunnel that can accommodate the combined footprint of these structures.

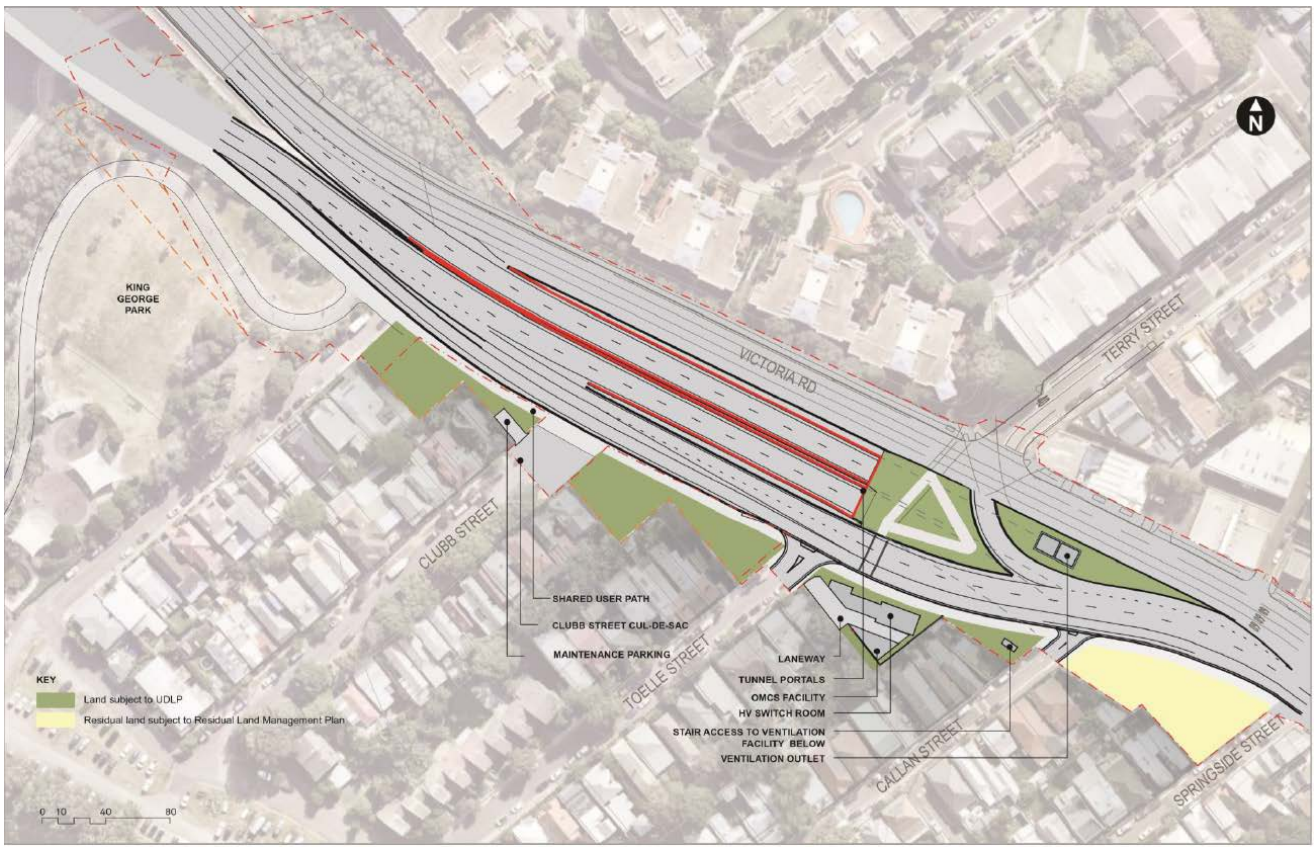

Figure 6 | Indicative location of proposed surface infrastructure at Iron Cove
(Source: Iron Cove ventilation underground Modification Response to Submissions Report)

The combined switch room and high voltage regulator facility would be approximately six metres wide, 30 metres long and up to five metres high. The OMCS facility is a subset of the approved Motorway Control Complex (MOC4) from which key functions of the tunnel would be operated in an emergency. The footprint is approximately nine metres wide by nine metres long and five metres high.

A staircase is proposed on the western corner of Victoria Road and Callan Street to provide an alternative safe maintenance and emergency access to and from the ventilation tunnel from the surface. The structure would be approximately two metres wide, six metres long and three metres high and include an access door and a stairway.

Dedicated parking is also proposed for operational and maintenance personnel at the switch room/OMCS site, with access off Toelle Street. Parking is also proposed off Clubb Street to support all operational infrastructure near the Iron Cove Link western portal.

2.3 Iron Cove construction ancillary facility (C8) tunnelling support site

The modification proposes to use the Iron Cove construction ancillary facility (C8) as a tunnelling and support site to construct the ventilation tunnel and caverns. This would involve the extension of the Iron Cove cut and cover area on the southern side of Victoria Road to facilitate connection between the ventilation tunnel and ventilation outlet.

The resulting chamber is proposed to be temporarily converted into an acoustic shed to assist with noise (and dust) mitigation from tunnelling. Plant, equipment and materials required to construct the proposed new ventilation tunnel and caverns would be supported from the Iron Cove civil site (C8). An indicative site layout is provided in **Figure 7** with a three-dimensional underground representation provided in **Figure 8**.

Tunnel spoil generated at night-time would be stockpiled within the enclosed cut and cover chamber structure and disposed of off-site during daytime hours, whilst daytime generated tunnel spoil would be stockpiled in the dive structure area prior to being loaded into trucks for off-site disposal. The proposed stockpile locations are shown in **Figure 7**.

Light vehicles and delivery vehicles would access the site regularly to support tunnelling operations. Concrete deliveries would also be required regularly during tunnelling for tunnel ground support and concrete lining works.

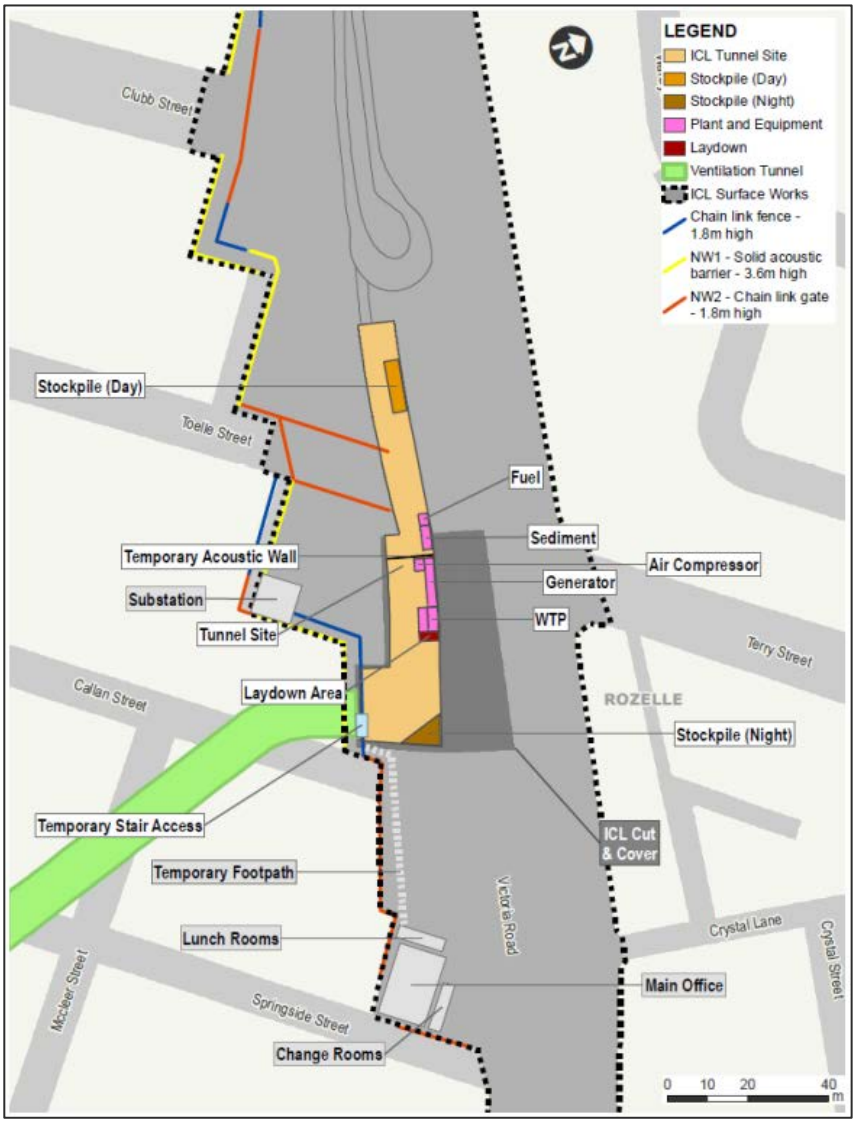

Figure 7 | Indicative layout of the Iron Cove cut and cover tunnel support site
(Source: Iron Cove ventilation underground Modification Report)

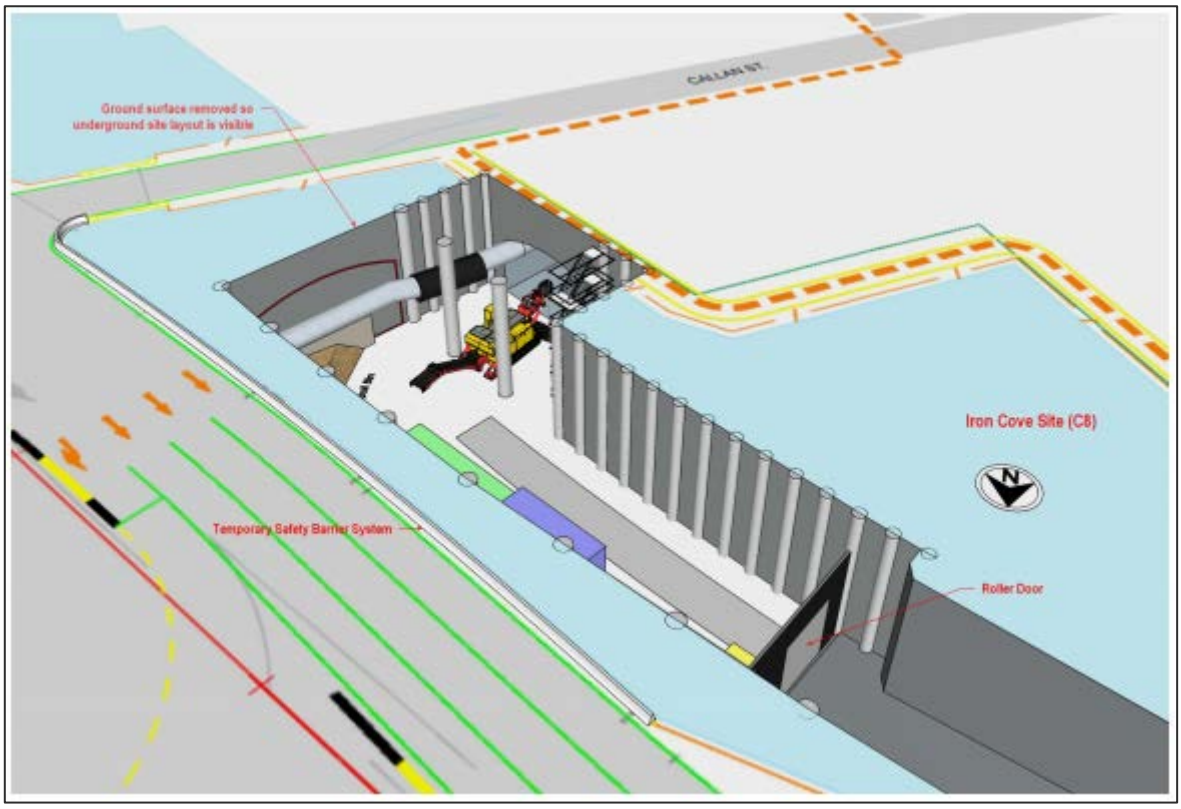

Figure 8 | Three-dimensional representation of the Iron Cove cut and cover tunnel support site (ground surface removed from the image to provide visibility underground)
(Source: Iron Cove ventilation underground Modification Report)

The modification report identifies the potential for tunnelling to be supported from the Rozelle civil and tunnel site (C5) later in the construction program. Tunnelling of the proposed ventilation tunnel and caverns supported from the Rozelle civil and tunnelling site (C5) would be commenced from within the southern end of the Iron Cove Link Tunnel and would not require the installation of any additional surface support infrastructure at C5.

2.4 Construction

Construction program

Tunnelling works at the Iron Cove cut and cover would commence once the southern half of the cut and cover structure has been constructed in quarter three (Q3) 2020. Tunnelling supported from the Rozelle tunnel and civil site (C5) would commence later in the construction program in approximately quarter two (Q2) 2021. The indicative construction program for the proposed modification is outlined in **Table 1**.

Table 1 | Indicative construction program for the proposed modification
(Source: Iron Cove ventilation underground Modification Report)

Construction Activity	2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Construction of cut and cover and tunnel portals (EIS Table 6- 16)																
Excavation of proposed new ventilation tunnel and caverns from C8																
Mechanical and electrical fitout																
Construction switch room, HV regulators, OMCS and access stair structure																
Testing and commissioning																

Construction hours

Construction hours would be in accordance with the Conditions E70 and E73 of the Infrastructure Approval, which allow tunnelling activities (excluding cut and cover tunnelling) and tunnel fit out works to occur 24 hours a day, seven days a week. Spoil haulage would be undertaken during standard construction hours only.

2.5 Operation and maintenance

The proposed ventilation tunnel would operate as per the ventilation facilities described by the project. Air would be extracted from near the Iron Cove Link tunnel exit portal, and conveyed to the ventilation cavern, where the ventilation fans would push the air towards the ventilation outlet facility (located amid the eastbound and westbound carriageways of Victoria Road between Callan Street and Terry Street). The ventilation facilities would be in operation 24 hours a day, seven days a week, as approved.

Heavy maintenance vehicles would access the underground ventilation facilities and substation via an approved breakdown bay adjacent to the westbound lanes within the Iron Cove Link tunnel. Access for maintenance personnel to the ventilation tunnels would also be possible from the access stairway structure located near Callan Street.

Access would also be required to the switch room for scheduled meter readings, monitoring of the equipment and in the event of an incident. The alternative OMCS room is expected to be infrequently used and would only be operated as a backup measure. The High Voltage regulators would be replaced about every 25 years.

Personnel attending the site for scheduled maintenance and monitoring would park in the designated parking with access off Clubb Street, and within the switch room/OMCS facility site with access off Toelle Street.

3. Strategic Context

3.1 The Project

WestConnex is identified in the *Future Transport Strategy 2056* and the supporting plan *Greater Sydney Services and Infrastructure Plan* and is expected to deliver economic benefits to NSW in the order of $24.3 billion over its lifespan through improved access and reliability of the motorway network.

The *State Infrastructure Strategy 2018-2038* stresses the importance of WestConnex in improving intercity and intracity general and freight transport connections and providing improved travel time and increased network capacity. WestConnex is also listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia, 2017).

WestConnex is considered in the *Central City District Plan* and *Eastern City District Plan* (Greater Sydney Commission, 2018) and is consistent with the district priorities for a productive city by improving access to employment and increasing efficiency of freight movements.

3.2 The Modification - alternatives and option selection

The EIS assessed a reference design where a motorways operational complex, including ventilation facilities, would be located above ground adjacent to Victoria Road at Rozelle. Since the project was approved, the Proponent engaged a construction contractor which has looked at several design refinements. In the case of MOC4, the following alternative design options were explored:

- horizontal and vertical arrangements for the fans above ground;
- an underground arrangement within a ventilation building at a depth of about 40 metres; and
- the relocation of the ventilation facility to above the cut and cover structure on Victoria Road.

A number of disadvantages were recognised with the above ground construction options, including traffic impacts on Victoria Road, long duration of excavation and associated impacts (high levels of construction noise and dust), bulk and scale of the ventilation building, potential solar access and overshadowing impacts from aboveground structures, and operational noise. The Proponent identified that undergrounding the ventilation and substation infrastructure would address these challenges, and submitted this modified proposal.

The proposed modification is consistent with the NSW strategic planning policy framework, and the policies and plans which apply to the overall project (**Section 3.1**) apply to the proposed modification.

4. Statutory Context

4.1 Scope of Modifications

In accordance with section 5.25 of the Environmental Planning and Assessment Act 1979 (EP&A Act), a proponent may request the Minister to modify an approval for State significant infrastructure. The Minister's approval for a modification is not required if the infrastructure as modified will be consistent with the existing approval. The proposed changes to the M4-M5 Link project are not consistent with the existing approval. Consequently, modification of the Minister's approval under section 5.25 of the EP&A Act is required.

4.2 Minister's approval and delegations

Under the Instrument of Delegation dated 11 October 2017, the functions and powers of the Minister for Planning under section 5.25 of the EP&A Act to determine a modification of the Minister's approval may be delegated whereby:

- the relevant local council has not made an objection;
- a political disclosure statement has not been made; and
- there are less than 25 public submissions in the nature of objections.

Inner West Council did not object to the modification request. However, twenty-seven submissions in the nature of objections were received from the public. As such, the Minister's delegations cannot be used and the Minister is the approval authority.

5. Engagement

5.1 Department's Engagement

Under section 5.28(1)(g) of the EP&A Act, the Planning Secretary is required to make requests for modifications of approvals determined by the Minister publicly available. The Department considered the modification application had the potential to impact residents in Rozelle previously unaffected by the construction and operation of the M4-M5 Link and introduce new impacts (construction and operational noise and vibration and settlement). Consequently, the Department determined to publicly exhibit the modification request for a period of 29 days from 20 November 2019 to 18 December 2019.

The Modification Report was made publicly available on the Department's website and electronically at NSW Service Centres. The Modification Report was made available at the following locations:

- Transport for NSW (Roads and Maritime Services) – 20-44 Ennis Road, Milsons Point;
- Inner West Council Leichhardt Customer Service Centre – 7-15 Wetherill Street, Leichhardt;
- Balmain Library – 370 Darling Street, Balmain; and
- Leichhardt Library – Piazza Level, Italian Forum, 23 Norton Street, Leichhardt.

The Department advertised the exhibition in the Sydney Morning Herald, Daily Telegraph and Inner West Courier.

The modification request was referred to the following Government agencies for comment:

- Inner West Council (Council);
- Environment Protection Authority (EPA);
- Department of Planning, Industry and Environment – Water Group (DPIE – Water Group);
- Department of Planning, Industry and Environment – Crown Lands (Crown Lands);
- NSW Health; and
- Sydney Water.

The Department also notified the State Member for Balmain in writing.

The Department undertook a site inspection of the site of the proposed construction ancillary facility (C8) / alternative Operational Motorway Control System facility on 28 November 2019 to better understand the characteristics of the local environment and the issues raised in submissions by the community and Council.

5.2 Summary of submissions

During the exhibition period, a total of 38 submissions were received, including six from public authorities and 32 from the public including the Member for Balmain. None of the Government authorities objected to the proposed modification. Of the public submissions received, 27 objected to the proposal. Only two of the public submitters do not live or work within Rozelle or nearby (**Table 2**).

Table 2 | Summary of community submissions

Community Submitters	Number	Position
< 5 km	25	Object
	1	Support
	4	Comment
> 10 km	2	Object
	0	Support
	0	Comment
TOTAL	**32**	

5.3 Key Issues – Government agencies

Sydney Water, Crown Lands and NSW Health advised they had no comments on the proposed modification.

EPA queried the potential for overlapping of the cut and cover and tunnelling works and the need to assess cumulative construction noise and vibration impacts should the two activities coincide. EPA also raised the importance of the Proponent providing the community with details on construction, including when, where and how long, and potential periods of respite.

DPIE – Water Group advised the additional groundwater impacts associated with the tunnelling were not adequately assessed, and recommended that the new construction activities be included in the existing groundwater numerical modelling and additional groundwater monitoring be undertaken.

5.4 Key Issues – Council and the community

5.4.1 Council

Council indicated that it did not want to maintain or own land that is not useful to the community and considers that any residual land adjacent to Victoria Road would not be of benefit as it would have poor amenity due to its location adjacent to large volumes of fast-moving traffic. Council also raised concern over the potential property impacts arising from tunnelling under residential dwellings and creeping operational noise levels from the M4-M5 Link due to amendments to the project.

5.4.2 Community

Key issues are summarised below. Further details of the issues raised are provided in the assessment of key issues in **Section 6.** Some submissions raised other issues unrelated to the proposed modification, in particular the request for provision of filtration for the Rozelle and Iron Cove ventilation outlets.

Noise and Vibration

- Concern over noise and vibration from tunnelling under homes, including potential sleep disturbance from tunnelling undertaken 24 hours a day, seven days a week.
- Operational noise and vibration from underground ventilation facilities and lack of assessment of worst-case operational scenario.
- Inadequate noise and vibration modelling, monitoring and mitigation measures.
- Noise from construction heavy vehicles.
- Provision of noise walls on residual land to reduce operational traffic noise impacts.

Residual Land

- Request for residual land along Victoria Road to be used for community-based amenities such as parks and playgrounds.
- Concern that there is no guarantee that the residual land will be returned as community land rather than developed for commercial or residential purposes.

Tunnelling and Property Impacts

- Information on settlement levels, as measured, be provided to impacted residents.
- Concern that sub-stratum acquisition may negatively affect property values.
- Potential property damage arising from construction vibration and settlement due to the shallow depth of the ventilation tunnel and caverns.
- Request for the ventilation tunnel and caverns to be made significantly deeper to minimise settlement and noise and vibration impacts during construction and operation.

Traffic, Parking and Access

- Concern over the impact of increased heavy vehicle volumes on pedestrian safety.
- Concern regarding spoil haulage through residential streets.
- Proposal gives preference to construction truck movements over pedestrian access and local traffic movements.
- Increased number of lanes on Victoria Road when compared to approved project.
- Proposed decrease in shared path width along Victoria Road.
- Need for more information on access during maintenance.
- Increased number of construction workers and parking on residential streets.

Other issues raised included options analysis and design alternatives, potential overshadowing on adjacent residential premises, timing of the exhibition period, potential electromagnetic radiation impacts, nuisance dust and groundwater impacts.

5.5 Response to Submissions

Following the public exhibition period, the Department directed the Proponent to prepare a response to the submissions received. The Proponent's Response to Submissions (RtS) Report was made publicly available on the Department's website on 20 April 2020. There are no changes to the modification design resulting from the issues raised in submissions.

The RtS was forwarded to the EPA, the DPIE – Water Group and Council. A response was received from the EPA, which recommended mitigation measures for cumulative ground-borne noise and vibration during construction where tunnelling works for the proposed modification coincide with project works under the existing approval.

6. Assessment

The Department in its assessment of the project, including the consideration of submissions received, identified the key issues as: noise and vibration; urban design, visual amenity and placemaking; and traffic and access (Sections 6.1 to 6.3). Other issues are discussed in Section 6.4.

6.1 Noise and Vibration

Issue

The Proponent undertook a noise and vibration assessment in accordance with noise guidelines to assess the impacts associated with the proposed changes to the ventilation facility at Iron Cove during construction and operation. The noise and vibration assessment addressed the impact of tunnelling, the establishment of the cut and cover structure, surface construction activities, construction traffic (including spoil haulage), and operational elements.

Construction Ground-Borne Noise (Tunnelling)

The noise modelling predicts that 78 residences along the ventilation tunnel alignment are expected to experience night-time (10:00 pm to 7:00 am) ground-borne noise impacts above the ground-borne noise management level of 35 dB(A) from tunnelling and excavation of the ventilation tunnel and caverns.

More than two thirds of these (78 per cent) are predicted to be exposed to maximum levels between 35 and 40 dB(A), with a small portion (18 per cent) expected to experience levels between 40 and 45 dB(A), and three with predicted exposure above 45 dB(A). The assessment predicted a maximum ground-borne noise level of up to 47 dB(A). Potential cumulative impacts may also result at six properties which were identified in the EIS to experience ground-borne noise from the mainline tunnel excavation predicted between 35-40 dB(A).

Duration of exposure to ground-borne noise impacts from tunnelling will be approximately two to three weeks per road header pass. Typically, two to three passes will be required with a gap of three to five weeks between each pass.

Construction Airborne Noise

Increases to airborne noise impacts primarily relate to the tunnel support works from the Iron Cove cut and cover, as other works impacts would be consistent or less than those outlined in the EIS.

Plant and equipment required to support tunnelling from the Iron Cove cut and cover site (C8) would access the tunnel from the cut and cover structure, which would be temporarily converted into an acoustic spoil shed. The modelling results for worst-case scenario indicate that noise levels at residences from the proposed tunnel support activities are predicted to be 66 dB(A) during the day and 57 dB(A) during the evening and night. Without any additional mitigation, these values are

predicted to be below the day and evening noise management levels, whereas exceedances up to 6 dB(A) are predicted during the night.

Screening was also undertaken for sleep disturbance at night in the worst-case scenario with the acoustic shed roller door open. No properties are predicted to be above the sleep disturbance criteria.

Construction Vibration

There are no residents identified as being located within the minimum working distances established for cosmetic damage or human annoyance during vibration generating activities. As such, vibration impacts are expected to be negligible.

Operational Noise and Sleep Disturbance

Relocation of the ventilation fans and substation underground would reduce operational noise at this location. The noise assessment for the modified proposal included the potential for noise emission from the above ground ventilation outlet. To mitigate this noise source and achieve the NSW Industrial Noise Policy night-time amenity criteria of 45 dB(A) at residences, an acoustic attenuator would need be installed on the outlet side of the fans.

The high voltage regulators (electrical transformers) and on-load tap changers, which are mechanisms attached to the high voltage regulators that facilitate voltage supply, will emit noise. Operational noise levels from these components are predicted up to 48 dB(A) at ground level and up to 53 dB(A) at first floor residences.

Operational vibration impacts are predicted to be negligible.

Submissions

The community raised concerns regarding the use of the Iron Cove civil site (C8) as a tunnelling support site and the potential construction noise and vibration impacts, as well as general disruption associated with tunnelling occurring 24 hours a day, seven days per week.

Members of the community also raised concerns and requested clarification on the predicted operational noise impacts, and the implementation of mitigation measures (including noise walls) planned because of the proposed relocation of the surface infrastructure. Clarification was also sought on the potential for ground-borne noise and vibration impacts to arise from the subsurface ventilation fans and equipment.

Sleep disturbance during the construction and operation phases of the project was also raised as an issue among some of the submissions received.

The EPA identified the potential for cumulative impacts where mainline tunnelling overlaps with tunnelling associated with the modification and for this to be assessed. The EPA recommended that any approval ensure that the mitigation measures proposed by the Proponent regarding cumulative ground-borne noise and vibration are implemented. Specifically, that predicted ground-borne noise and vibration levels be compared against the noise and vibration criteria and used to select specific

management measures. It also reinforced the importance of keeping the community informed about construction activities and engaged on preferences for mitigation.

Council identified additional residences would be impacted by construction noise, as well as potential operational noise impacts (including sleep disturbance) generated by the high voltage regulators. Council recommended that appropriate mitigation measures be applied to ensure the modified proposal does not diminish existing living standards for noise-affected properties.

Consideration

Construction Ground-Borne Noise (Tunnelling)

Ground-borne noise from the proposed tunnelling would affect an additional 78 residences. The degree of impact is considered commensurate to that associated with tunnelling and excavation works as part of the broader project, with any one residence only being impacted by ground-borne noise for a relatively short duration. Ground-borne noise is currently managed through an existing condition which requires the Proponent to apply mitigation measures when noise levels are exceeded during the evening and night-time periods. In addition, the approval includes requirements for periods of respite, community consultation and the engagement of an Acoustics Advisor whose responsibilities include monitoring the implementation of noise management measures and recommending improvements to measures to reduce noise impacts. These requirements ensure that effective mitigation is implemented.

In response to the EPA's concerns over overlapping tunnelling, the Proponent advised that it would use a construction noise and vibration modelling tool to predict cumulative impacts. The EPA was satisfied with this response. To ensure that the tool is applied during construction, the Department has recommended a condition to this effect along with the requirement to implement specific mitigation measures when criteria is predicted to be exceeded.

Construction Airborne Noise (Tunnel Support Works from Iron Cove Cut and Cover)

Construction of the proposed ventilation tunnel and caverns would predominantly be supported from the Iron Cove civil site (C8) from within the cut and cover. Following removal of rock beneath the cut and cover structure, the resulting chamber would be temporarily converted into an acoustic spoil shed by installing a shed wall and roller door. This would assist in minimising noise impacts from tunnel support activities. To achieve the greatest benefit, the installation would need to occur prior to the commencement of tunnelling and excavation works to construct the ventilation tunnel and caverns. The Department has subsequently recommended a condition to this effect.

The worst-case noise levels at residences from the proposed tunnel support activities are predicted to be 66 dB(A) during the day and 57 dB(A) during the evening and night. These noise levels would be experienced when the roller door of the acoustic shed is open, and the loudest noise-generating activities are simultaneously being undertaken inside and outside of the shed. These values are greater than 10 dB(A) below the noise level predictions for the Iron Cove civil site (C8) detailed in the EIS under the approval. As such, additional noise generated by the modification would unlikely contribute to an increase in the cumulative noise environment. The Department notes that with noise

mitigation in place, the predicted noise levels from tunnel support works at the Iron Cove cut and cover site would be below the noise management levels at all residences during the day or night.

Tunnelling and excavation work proposed as part of the modification would be accompanied by the use of heavy vehicles for spoil haulage. The modification report states that spoil haulage would take place during standard construction hours. To protect the acoustic amenity of adjacent residents, the Department has reinforced this commitment by recommending changes to the Infrastructure Approval.

Operational Noise, Vibration and Sleep Disturbance

Noise modelling predicts that operational noise levels would be reduced by relocating the ventilation fans and substation underground. Further, reductions in noise emission exceedances from the above ground ventilation outlet (as detailed in the EIS) would be achieved by reviewing the fan selection and applying appropriate noise attenuators to this equipment. With appropriate mitigation measures (such as procurement and engineering solutions) the operational noise generated from the residual surface infrastructure, specifically the high voltage regulators and on load tap changers, is predicted to meet the relevant noise criteria, including sleep disturbance. The Proponent predicts ground-borne noise and vibration from the operation of the ventilation fans would be negligible.

To provide certainty of the noise levels at nearby residents, the Department has recommended a condition requiring the Proponent to undertake noise monitoring of the high voltage regulators (including the onload tap changers) within three months of the operation of the high voltage facility, with any exceedances detected requiring noise mitigation. The Proponent has advised that if noise from the high voltage facility is an issue, a partial roof could be installed to reduce noise levels.

6.2 Urban design, visual amenity and place making

Issue

The approved Iron Cove Motorway Operations Complex (MOC4) is proposed to be accommodated in underground caverns. Residual surface infrastructure will include a switch room, high voltage regulators, an alternative OMCS facility and a stair access well leading to the ventilation tunnel.

This arrangement would decrease the surface footprint of the permanent works compared to the approved project and increase the amount of residual land available following completion of construction. The approved MOC4 was approximately 10 metres high, 50 metres long and 15 metres wide. The modified control centre would be approximately nine metres wide, nine metres long and five metres high. The switch room and regulators would be around 30 metres long, six metres wide and five metres high. The modified built form would introduce a different visual landscape with a reduced degree of visual impact and reduced overshadowing for adjoining properties. However, by siting these buildings close to adjoining residential property boundaries, where there was previously dwelling houses, the walls of the infrastructure will impact on the visual amenity of adjacent residents.

Visual impact and amenity during construction would be consistent with the approved project.

Submissions

Community submissions raised concerns over the uncertainty of the final use and design of the residual land along Victoria Road, particularly in relation to residential and commercial development. Most submissions recommended the residual land be dedicated as community space (parks and playgrounds) and appropriately landscaped. The submission from the State Member for Balmain also advocated for open space. Other concerns raised in submissions included:

- proportions, aesthetics and character of the proposed above ground facilities;
- need for community input into the final design;
- consequential impacts from relocation of the facilities, such as visual impact, overshadowing and noise;
- visual impact of noise and site boundary walls and the potential for these to be made “green walls”; and
- request for mature vegetation and dense plantings adjacent to Victoria Road.

Council indicated that it does not want to own and/or maintain residual land that is not useful to the community. At this stage, Council cannot determine the value of the residual land to the community.

Consideration

Overshadowing

A reduction in the scale of built form on the surface would decrease the extent of overshadowing compared with the approved project. A maximum of six properties would be partially or totally overshadowed under the approved project compared with a maximum of three properties partially or totally overshadowed under the proposed modification. However, the modification proposes to construct surface infrastructure in a location different to that approved, resulting in an overall reduced (but different) set of properties being overshadowed. Under the approved project, residences between Callan and Springside Streets would have been affected by overshadowing. Under the proposed modification, residences to the south-west and south-east of the proposed OMCS facility between Toelle and Callan Streets will be impacted at times from overshadowing.

The Infrastructure Approval requires any infrastructure related to the project to be designed and positioned in such a way as to provide solar access to habitable rooms and at least 50 per cent of the principal private open space of any residential property impacted by the project for at least three hours between 9:00 am and 3:00 pm during mid-winter. Properties impacted by overshadowing must be the subject of a Solar Access and Overshadowing Report which addresses compliance with these requirements. In the event this cannot be achieved, the Solar Access and Overshadowing Report must include a consultation plan detailing how potential impacts and mitigation measures would be discussed and negotiated with potentially affected landowners. Alternative mitigation must be provided to the land owner (which could include land acquisition) unless other arrangements can be agreed with the land owner. The Department is of the opinion that these requirements will ensure sunlight access is appropriately considered and managed during detailed design or otherwise offset through negotiated land owner agreements.

Urban design and visual amenity

The relocation of the surface operational facilities means that a new group of residents, particularly those adjacent to the site boundary, will be subjected to views of the operational infrastructure. The Infrastructure Approval requires the Proponent to prepare and implement an Urban Design and Landscape Plan(s) (UDLP), to be reviewed by a Design Review Panel. To complement this process the Department has recommended design requirements aimed at improving the aesthetics, streetscape and urban design of the built form, as well as optimising the extent of useable surplus land through design and construction. The Department is satisfied that the combination of these measures would ensure high quality design of operational infrastructure. The UDLP would also address and guide the landscaping of any residual land adjacent to Victoria Road designated as open space.

Residual Land

A benefit of relocating parts of the surface operational facilities of the Iron Cove Motorway Operations Complex (MOC4) underground is an increase in the amount of residual land available following the completion of the project.

The community preference for the residual land was that it be designated as and created into public space. However, several factors contribute to its suitability as open space. In its assessment of the project, the Department noted that open space in this location is likely to have poor amenity, be isolated with poor accessibility and not necessarily attractive to users. In its submission, Inner West Council questioned the suitability of this land as functional open space. As such, the Department remains satisfied with its original position that the most appropriate use/s for the site should be determined in consultation with Council and finalised under the Residual Land Management Plan required by the Infrastructure Approval.

If it is identified that the residual land is to be returned as open space, it would be subject to the UDLP requirements in the Infrastructure Approval, which requires consultation with Council and the community about the form and layout.

6.3 Traffic and Access

Issue

The Proponent undertook a traffic assessment to assess the impact of increased construction vehicle movements from the Iron Cove construction ancillary facility (C8) on Victoria Road and the surrounding intersections with Evans, Darling and Wellington Streets, and on the road network at the Rozelle tunnel and civil site (C5).

The EIS estimated indicative daily (one-way) construction traffic volumes of 42 heavy vehicles and 140 light vehicles at the Iron Cove construction ancillary facility. Based on the detailed design and proposed modification, the revised estimated peak construction traffic volumes are 144 heavy vehicles (mainly spoil haulage vehicles) and 90 light vehicles.

It is proposed that spoil haulage from the Iron Cove site (C8) would be via Victoria Road, Church Street, Concord Road and Homebush Bay Drive towards the M4 Motorway. Any tunnelling supported

from the Rozelle construction ancillary facility (C5) is expected to occur following peak construction activities at that site. The additional spoil haulage movements generated by the construction of the ventilation tunnel and caverns combined with the estimated other heavy vehicle movements from the site would be less than the peak daily heavy vehicle movements for the approved project. Spoil haulage routes from the Rozelle construction ancillary facility would be in accordance with the approved project.

The modified design would result in negligible additional operational traffic impacts when compared to the approved project.

Submissions

Submissions from the community raised concerns in relation to traffic and access impacts. These predominantly focused on general residential amenity and included:

- associated impacts (noise, dust, safety, disruption) with an increase in heavy vehicle movements for spoil haulage;
- spoil haulage through residential streets;
- traffic congestion and increased journey times in the surrounding locality;
- reduction in the availability of on-street parking resulting from additional workers;
- disturbance from private vehicles of construction personnel arriving and departing the site throughout the night;
- nuisance impacts from the operational aspects and maintenance of the project; and
- adequacy of dedicated parking allocation provided for maintenance vehicles.

Council and Government agencies did not raise any concerns in relation to traffic and transport.

Consideration

The traffic assessment indicates that the increased construction traffic volumes would not impact on the operational performance of Victoria Road or the levels of service at the intersections of Victoria Road with either Evans, Darling or Wellington Streets. In addition, traffic impacts on City West Link / The Crescent from tunnelling commencing at the Rozelle construction ancillary facility would be in accordance with the approved project.

The Department considers that the proposed number of heavy vehicle movements (102 one-way daily movements) is small compared to the daily traffic volumes on Victoria Road and can be accommodated on the existing road network.

The modification does not propose for spoil haulage vehicles to use local residential streets. However, the potential for this to occur was raised as an issue in community submissions. The Infrastructure Approval includes conditions for managing construction traffic, including spoil haulage vehicles and haulage routes, and places limitations on the use of local roads by heavy vehicles. In addition, tracking of spoil vehicles is a mandatory requirement. The Department considers that the conditions of approval provide for the appropriate management of spoil haulage vehicles and that no further conditions are required.

Regarding concerns over on-street parking by construction workers, the proposed modification will result in an additional 6-10 workers being employed at Iron Cove. The Infrastructure Approval requires the Proponent to prepare a Construction Parking and Access Strategy to identify and manage impacts to on- and off-street parking changes during construction. The Department approved an interim Construction Parking and Access Strategy for Stage 2 – Rozelle Interchange which includes the Iron Cove site. The final strategy is being prepared and would take into consideration additional construction workers employed at Iron Cove.

The Department considers that the existing conditions relating to operational traffic and parking are sufficient, as operation of the modified design will not generate significant volumes of surface operational traffic (up to two vehicles per day for routine works) with maintenance vehicles accessing the underground ventilation fans and substation from within the tunnel. Further, adequate parking will be provided for operational and maintenance activities on site.

6.4 Other Issues

The Proponent assessed the potential impacts of the proposed modification in relation to air quality, groundwater drawdown and surface settlement, socio-economic, land use and property, surface water management, resource use and waste minimisation, as well as hazards and risk. The Department considers the Proponent has undertaken an adequate assessment of the issues and that any impacts can be managed through the Proponent's commitments, the conditions in the Infrastructure Approval and the Department's recommendations. **Table 3** provides a summary of these issues and the recommended or amended conditions of approval.

Table 3 | Summary of issues raised

Issue	Details	Consideration and recommended conditions
Settlement and property impacts	• There is the potential for settlement due to tunnel excavation and groundwater drawdown above the ventilation tunnels. • The proposed modification identified properties above the ventilation tunnel and caverns that could be affected by settlement. These properties are located above areas where tunnelling is at its shallowest (around eight metres near Victoria Road). • Initial settlement analysis predicts ground settlement ranges from zero to twenty millimetres.	• The Infrastructure Approval includes conditions to ensure a conservative approach in managing settlement. These conditions include the preparation of a geotechnical model to assess potential settlement, settlement criteria, monitoring requirements, pre- and post-construction dilapidation surveys, requirements for rectifying damage to property, and establishment of an Independent Property Impact Assessment Panel. • Settlement-related conditions include both groundwater and tunnelling induced settlement. The Department considers these conditions are adequate for managing potential settlement impacts from the proposed tunnelling.

Groundwater	• Groundwater inflow for the proposed modification in steady state is projected at 0.4 litre per second per kilometre length which is consistent with the existing condition of approval which requires the Proponent to limit operational groundwater inflows into each tunnel to no greater than one litre per second across any given kilometre. • DPIE - Water Group advised that additional groundwater monitoring bores are required to the west of the proposed construction. • There are no registered bores within two kilometres of the proposed modification and no impacts to existing groundwater users are expected.	• Based on advice received from the DPIE - Water Group, the Department has recommended the conditions relating to construction and operational groundwater monitoring (C12 and D11, respectively) include the installation of additional groundwater monitoring bores to the west of the proposed ventilation tunnels and caverns. • As there are no predicted impacts on registered groundwater users, the Department is satisfied that no further conditions are necessary beyond the existing condition which requires the implementation of 'make good' provisions for impacts to groundwater users in the event of a decline in water supply levels, quality and quantity from registered existing bores.
Health, hazard and risk	• Exposure to electromagnetic radiation and impact on public health from operation of the substation was raised in a submission.	• The *Draft Radiation Protection Standard for Exposure to Electric and Magnetic fields* document by the Australian Radiation Protection and Nuclear Safety Agency in 2006 is the applicable framework. • The Proponent has committed to ensure that exposure limits outlined by the standard would not be exceeded at the boundary of the substation site. • The Department notes the TfNSW contract of works requires the entity engaged to design and construct the substation and high voltage installation in accordance with the *Australian Standard AS 2067:2016 Substations and high voltage installations exceeding 1 kV a.c.*
Air quality	• At the time of approval of the M4-M5 Link, changes were announced to the regulation of road ventilation	• To provide consistency with approvals for M4 East and New M5, and provide additional certainty to the community and

outlets, including that future outlets would be regulated by the EPA. These changes involved requirements relating to emission concentrations, monitoring and reporting being included in an environment protection licence (EPL).

- Whilst the matter was considered in the EIS, conditions relating to the ventilation outlets were not specifically included in the instrument of approval.

guidance to the issuing of the EPL, the Department has included conditions relating to the operation of the ventilation outlets including cross-referencing amendments.

- This approach is supported by the EPA.

7. Evaluation

The Department has reviewed the Modification Report, community and Government authority submissions, and Response to Submissions and has assessed the key issues arising from the proposed changes to the approved project. Overall, the merits of the modification have been evaluated and it is concluded that the benefits of the modification outweigh potential negative impacts. The Department considers the modification should be approved, subject to conditions.

Key issues associated with the proposed modification include noise (construction ground-borne and airborne noise, as well as operational noise), traffic, and urban design and visual amenity. Other issues include settlement, groundwater and air quality. The Proponent indicated that existing environmental management measures and conditions of the Infrastructure Approval are sufficient to manage the impacts of the proposal, with the inclusion of one additional commitment. Based on its assessment, the Department has recommended further conditions of approval and amendments to existing conditions to address a variety of community and council concerns on noise, urban design and visual amenity, and groundwater.

The Department is satisfied that construction traffic volumes, including spoil haulage vehicles, can be managed under the existing Infrastructure Approval. However, amended and additional conditions are recommended to manage operational noise (including additional monitoring to corroborate modelling and assessment predictions) and construction noise (including noise generated by spoil haulage activities).

The relocation of the surface operational facilities means that a different group of residents would be subjected to potential visual impacts and overshadowing. In accordance with the Infrastructure Approval, the final form and design of these buildings would be subject to the Urban Design and Landscape Plan process under the guidance of a Design Review Panel. The Department considers this a robust and valuable method in attaining high quality results. However, to facilitate a design that is reflective of the residential character of the neighbourhood, design objectives aimed at enhancing the visual amenity of the surface-built form have been recommended. In addition, the opportunity to optimise the extent of usable land along Victoria Road has been encouraged through a recommended condition.

The proposed modification would provide several benefits, including increasing the availability of residual land through decreasing the surface footprint of permanent works, reducing overshadowing impacts through a reduction in scale of the operational infrastructure, and ameliorating operational noise impacts by placing the ventilation facilities and substation underground.

8. Recommendation

It is recommended that the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report; and
- **determines** that the application WestConnex M4-M5 Link Modification 3 – Iron Cove ventilation underground (SSI 7485 MOD 3) falls within the scope of section 5.25 of the *Environmental Planning and Assessment Act 1979*;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to approve the modification;
- **agrees** with the key reasons for approval listed in the draft notice of decision;
- **modify** the approval SSI 7485;
- **signs** the attached Notice of Modification **(Attachment G)**.

Recommended by:

Luke Kennington
Planning Officer
Transport Assessments

Recommended by:

Glenn Snow
Director
Transport Assessments

9. Determination

The recommendation is **Adopted** / ~~**Not adopted**~~ by:

The Hon. Rob Stokes MP

Minister for Planning and Public Spaces

28th July, 2020.

Appendices

Appendix A – List of Documents

Environment Protection Authority, 2000. *NSW Industrial Noise Policy*.

Australian Radiation Protection and Nuclear Safety Agency, 2006. *Draft Radiation Protection Standard for Exposure to Electric and Magnetic fields*.

Standards Australia, 2016. *Australian Standard AS 2067:2016 Substations and high voltage installations exceeding 1 kV a.c.*

Roads and Maritime Services, 2017. *M4-M5 Link Environmental Impact Statement*.

Roads and Maritime Services, 2018. *M4-M5 Link Submissions and Preferred Infrastructure Report*.

Roads and Maritime Services, 2019. *WestConnex M4-M5 Link Rozelle Interchange Iron Cove Ventilation Underground Modification Report*.

Transport for NSW, 2020. *WestConnex M4-M5 Link Rozelle Interchange Iron Cove Ventilation Underground Modification Response to Submissions Report*.

Appendix B – Modification Report

https://www.planningportal.nsw.gov.au/major-projects/project/25861

Appendix C – Submissions

https://www.planningportal.nsw.gov.au/major-projects/project/25861

Appendix D – Submissions Report

https://www.planningportal.nsw.gov.au/major-projects/project/25861

Appendix E – Community views

Issue	*Consideration*
Noise and Vibration • Concern over noise and vibration from tunnelling under homes, including potential sleep disturbance from tunnelling being undertaken 24 hours a day, seven days a week. • Operational noise and vibration from underground ventilation facilities and lack of assessment of worst-case operational scenario. • Inadequate noise and vibration modelling, monitoring and mitigation measures. • Noise from construction heavy vehicles and construction workers, especially of a night time. • Provision of noise walls on residual land to reduce operational traffic noise impacts. • Operational noise and sleep disturbance from surface infrastructure.	*Assessment* • Use of the Iron Cove site for tunnelling is expected to result in some noise exceedances for nearby residents even though tunnelling will be undertaken within a converted acoustic shed. However, impacts would be relatively short term and mitigation, including at-property treatment, is required to be implemented under the existing Infrastructure Approval. • The proposal also introduces new noise sources (spoil haulage vehicles and tunnelling support works) during construction and operation to receivers, which are predicted to meet the relevant noise criteria. • The Department is satisfied that potential noise impacts associated with the proposed modified works can be managed through the existing Infrastructure Approval and recommended conditions (refer below) to ensure that the acoustic amenity of residents is not significantly impacted. *Conditions* • The existing Infrastructure Approval requires the implementation of a construction Noise Insulation Program (which includes residents adjacent to the Iron Cove construction ancillary facility), periods of respite, and construction and operational noise and vibration goals to ensure effective management of noise and vibration impacts. However, the Department considers that additional measures could be implemented to enhance noise management and has therefore recommended that noise monitoring be undertaken at the beginning of operation to confirm the predicted noise levels, as this would identify if further noise mitigation is necessary. • To reduce construction noise impacts, the Department has also recommended that tunnelling and excavation works from the Iron Cove civil site (C8) must not commence until the chamber beneath the roof of the cut and cover structure has been converted into a temporary acoustic shed and fitted with a roller door. • Further, spoil haulage from the Iron Cove civil site has been limited to standard construction hours as set out in the Infrastructure Approval.
Overshadowing, Urban Design and Visual Amenity • Concerns regarding the proportions, aesthetics and character of the proposed above ground facilities. • The need for community input into the final design. • Consequential impacts on new receivers from relocation of the facilities, such as visual impact and	*Assessment* • A reduction in the scale of built form on the surface would provide a decrease in the extent of overshadowing compared with the approved project (only three homes would be overshadowed compared to six under the approved EIS design). However, the modification proposes to construct surface infrastructure between Toelle and Callan Streets at Rozelle where as the approved design involved construction of the MOC between Springside Street and Callan Street at Rozelle. Consequently, a different set of properties will be overshadowed. • The relocation of the surface operational facilities would also

overshadowing. • Visual impact of noise walls and site boundary walls, and the potential for these to be made “green walls”. • Request for mature vegetation and dense plantings adjacent to Victoria Road.	result in a reduction of the visual amenity of a different group of residents. • Under the Infrastructure Approval, the final form and design of these buildings would be subject to the Urban Design and Landscape Plan (UDLP) process under the guidance of a Design Review Panel. However, to deter bulky, blank structures that do not complement the residential character of the neighbourhood it is considered that additional design objectives are required. *Conditions* • To improve visual amenity, the Department has recommended articulation of the façade of the high voltage switch room facing Victoria Road and the provision of landscaping along this frontage as a minimum, unless a better outcome is achieved through the UDLP process. • To reduce potential visual impacts, the Department has also recommended that all façades of operational buildings and walls adjacent to or adjoining residential properties must be designed and have finishes sympathetic with surrounding residential neighbourhood. • In terms of improved place making, the Department has recommended that the stair access to the underground ventilation facility be designed and sited to optimise the extent of useable surplus land along Victoria Road. • The Infrastructure Approval sets out requirements relating to overshadowing including the preparation of a Solar Access and Overshadowing Report which sets out measures that would be implemented where overshadowing exceeds the specified minimum hours of direct sunlight. It is considered that the conditions adequately provide for the management of overshadowing.
Residual Land • Request for residual land along Victoria Road to be used for community-based amenities such as parks and playgrounds. • Concern that there is no guarantee that the residual land will be returned as community land rather than developed for commercial or residential purposes.	*Assessment* • Open space in this location is likely to have poor amenity, be isolated with relatively poor accessibility and not necessarily attractive to users. • Inner West Council has indicated that it does not want to own and/or maintain land that is not useful to the community, even though the community has expressed a preference for the residual land to become open space. • The most appropriate use/s for the site should be determined in consultation with Inner West Council and finalised under the Residual Land Management Plan required by the Infrastructure Approval. • If it is identified that the residual land is to be returned as open space, it would be subject to the UDLP requirements in the Infrastructure Approval. This process includes consultation with Inner West Council and the community. *Conditions* • The Infrastructure Approval requires the preparation of a Residual Land Management Plan for all land considered surplus to the needs of the operation of the CSSI. It also includes requirements relating to the state of residual lands if they are to be invested with a public authority and the time of such investments if they are to be used for open space. Therefore, no additional conditions are recommended for determining the use of residual land.

Traffic, Parking and Access • Associated impacts (noise, dust, safety, disruption) with an increase in heavy vehicle movements for spoil haulage. • Spoil haulage through residential streets. • Traffic congestion and increased journey times in the surrounding locality. • Reduction in the availability of on-street parking resulting from additional workers. • Traffic impacts from the operational aspects and maintenance of the project. • Adequacy of dedicated parking allocation provided for maintenance vehicles.	*Assessment* • The traffic assessment indicates that the increased construction traffic volumes would not impact on the operational performance of Victoria Road or the levels of service at surrounding/nearby intersections. • Spoil haulage will not be through residential streets and the existing Approval places restrictions on the use of local roads. • An estimated additional 6-10 construction workers would work from the site. An interim Construction Parking and Access Strategy has been prepared for the Rozelle Interchange to address impacts to on-street parking, including worker parking. The final strategy will take into account the management of any additional parking requirements associated with the modified proposal. • The modification would not result in any significant operational traffic impacts with operational traffic in the order of up to two vehicle movements per day for routine works. Maintenance traffic would primarily access the underground ventilation fans and substation from within the tunnel. Furthermore, adequate parking is considered to be provided for operational and maintenance activities at the surface. *Conditions* • The existing Infrastructure Approval includes conditions for managing construction traffic, including spoil haulage movements and construction parking and access. Therefore, no further conditions are proposed.
Settlement and subsidence • Information on settlement levels, as measured, is provided to impacted residents. • Concern that sub-stratum acquisition may negatively affect property values. • Potential property damage arising from construction vibration and settlement due to the shallow depth of the ventilation tunnels and cavern. • Request for the ventilation tunnels and caverns to be made significantly deeper to minimise settlement and noise and vibration impacts during construction and operation.	*Assessment* • There is the potential for settlement due to tunnel excavation and groundwater drawdown above the ventilation tunnels. The proposed modification has identified a number of properties above the ventilation tunnel and caverns that could be affected by settlement (up to 20 millimetres). These properties are located above areas where tunnelling is at its shallowest (around eight metres near Victoria Road). *Conditions* • The Infrastructure Approval includes a suite of conditions to ensure a conservative approach in managing settlement. These conditions include the preparation of a geotechnical model to assess potential settlement, settlement criteria, monitoring requirements, pre- and post-construction dilapidation surveys, requirements for rectifying any damage to property and infrastructure arising from settlement, and establishment of an Independent Property Impact Assessment Panel. The Department considers these conditions are adequate for managing potential settlement impacts from the proposed tunnelling.

Appendix F – Consolidated Approval

https://www.planningportal.nsw.gov.au/major-projects/project/25861

Appendix G – Notice of Modification