



WestConnex M4-M5 Link

Rozelle Interchange - Modification: The Crescent overpass and active transport links

Design amendment report

April 2020

Transport for NSW

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Prepared for

Transport for NSW

Prepared by

AECOM Australia

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Appendices

Appendix A	Environmental Management Measures and Conditions of Approval
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Glossary and terms of abbreviations

Term	Meaning
A	
AECOM	AECOM Australia Pty Ltd
AM peak hour	Unless otherwise stated, this refers to vehicle trips arriving at their destination during the average one hour peak in the AM peak period between 7.00 am and 9.00 am on a normal working weekday
At-grade	At ground level, not on an embankment or in a cutting
B	
Bicentennial Park	Park adjacent to Chapman Road and Rozelle Bay as outlined in the Conditions of Approval
C	
C6	The Crescent civil site located on the east side of The Crescent adjacent to Rozelle Bay
CC6a	Construction ancillary facility proposed on the southern side of The Crescent adjacent to Rozelle Bay and to the east of the City West Link / The Crescent intersection
CBD	Central Business District
CEMP	Construction Environmental Management Plan required by Condition C1
CPTED	Crime Prevention Through Environmental Design
CNVG	<i>Construction Noise and Vibration Guideline</i> (Roads and Maritime, 2016)
CNVMP	Construction Noise and Vibration Management Sub-Plan required by Condition C4.
Construction	Includes all physical work required to construct the project
CoRTN	<i>Calculation of Road Traffic Noise</i> algorithms (UK Department of Transport 1988)
CoA	Conditions of Approval
CSSI	Critical State Significant Infrastructure
D	
dB	Decibel - sound level measurement
dba	A-weighted decibels A-weighting is applied to instrument-measured sound levels in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies
DD Act (DDA)	<i>Disability Discrimination Act 1992</i> (Commonwealth)
DECC	Former NSW Department of Environment and Climate Change, now OEH
DPE	Former NSW Department of Planning and Environment, now DPIE
DPIE	NSW Department of Planning, Industry and Environment, formerly DPE
E	
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority

Term	Meaning
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i> (NSW)
EPI	Environmental planning instruments
EPL	Environment Protection Licence under the <i>Protection of the Environment Operations Act 1997</i> (NSW)
F	
G	
H	
hr	Hour
I	
ICNG	<i>Interim Construction Noise Guideline</i> (NSW DECC 2009)
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways
Iron Cove Link	Tunnel connection providing an underground bypass of Victoria Road between Anzac Bridge and Iron Cove Bridge
J	
K	
km/h	Kilometres per hour
L	
L _{Aeq}	The 'energy average noise level'
L _{A90}	The "background noise level" in the absence of construction activities. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. The L _{Aeq} (15minute) construction Noise Management Levels (NMLs) are based on the L _{A90} background noise levels
Landscape character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features
LCZ	Landscape character zone
LEP	Local environmental plan
LGA	Local Government Area
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream or intersection and the perception by motorists and/or passengers
M	
m	Metres
m ²	Square metres
m ³	Cubic metres

Term	Meaning
M4-M5 Link mainline tunnels	M4-M5 Link Stage 1 (the mainline tunnels) is also commonly referred to as Stage 3A of the WestConnex program of works including tunnels connecting with the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters
MP	Member of Parliament
N	
NCA	Noise Catchment Areas
NCG	<i>Noise Criteria Guideline</i> (Roads and Maritime, 2015)
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NMLs	Noise Management Levels
NOx	Nitrogen oxides
NSW	New South Wales
O	
OEH	NSW Office of Environment and Heritage, formerly DECCW and now part of DPIE
ONVR	Operational Noise and Vibration Review required by Condition E92
P	
Pedestrian and cycling green link (green link)	The active transport link bridging over City West Link and connecting the Rozelle Rail Yards open space area to the north and the Rozelle Bay light rail stop to the south
PM	(Airborne) particulate matter
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of less than 10 micrometres (µm)
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of less than 2.5 micrometres (µm)
PM peak hour	Unless otherwise stated, this refers to trips travelling on the network during the average one hour peak period between 3pm to 6pm on a weekday
Project (M4-M5 Link project)	The approved project that is subject to this proposed modification. A component of the WestConnex program of works. Includes a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle Interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle Interchange
Proponent	The person or organisation that proposes to carry out the project or activity. For the purpose of the project, the proponent is Transport for NSW
Q	
R	
RBL	Rating Background Level
RLMP	Residual Land Management Plan required by Condition E112

Term	Meaning
RNP	<i>NSW Road Noise Policy</i> (NSW EPA, 2011)
Roads and Maritime	Former NSW Roads and Maritime Services, now Transport for NSW
Rozelle Interchange	M4-M5 Link Stage 2 (the Rozelle interchange and Iron Cove Link) is also commonly referred to as Stage 3B of the WestConnex program of works. It will comprise a new underground motorway interchange connecting from the M4-M5 Link mainline tunnels to City West Link and the Anzac Bridge with links to the future Western Harbour Tunnel project. It also connects with the proposed Iron Cove Link which is an underground bypass of Victoria Road between Anzac Bridge and Iron Cove Bridge.
Rozelle Rail Yards	Former rail yards now proposed to be developed as open space as part of the M4-M5 Link project. The site is generally bounded by City West Link and The Crescent (east) to the south, Victoria Road to the east, Lilyfield Road to the north and the light rail stabling and maintenance facility to the west.
S	
s	Second
S170	State Agency Section 170 Heritage and Conservation Register. Section 170 of the <i>Heritage Act 1977</i> (NSW) requires NSW Government agencies to keep a register of heritage items/assets owned, occupied or managed by that government agency
SEARs	Secretary's Environmental Assessment Requirements Requirements and specifications for an environmental assessment prepared by the Secretary of the NSW Department of the Planning and Environment under section 115Y of the <i>Environmental Planning and Assessment Act 1979</i> (NSW)
SEPP	State Environmental Planning Policy
SHR	State heritage register
SPIR	Submissions and Preferred Infrastructure Report
SREP	Sydney Regional Environmental Plan
SSD	State Significant Development
SSI	State Significant Infrastructure
Shared user path bridge	A proposed horseshoe shaped shared user path bridge located to the east of the City West Link/The Crescent intersection and connecting between the proposed Rozelle Rail Yards open space area to the north and the east side of The Crescent adjacent to Rozelle Bay to the south
Shared user path ramp	A shared use path ramp connecting the Rozelle Bay light rail stop with the west side of The Crescent to the north of The Crescent/Johnston Street/Chapman Road intersection
T	
TAFE	Technical and Further Education
The contractor	John Holland CPB Contractors
The Crescent overpass	A proposed elevated vehicular overpass at The Crescent that would allow eastbound traffic from Annandale to bypass the signalised intersection at The Crescent/City West Link and continue east on The Crescent toward Victoria Road and Anzac Bridge
TTAMP	Traffic Transport and Access Management Sub-Plan required by Condition C4

Term	Meaning
U	
UDLP	Urban Design and Landscape Plan required by Conditions E133 and E134
V	
Visual amenity	Pleasantness or attractiveness of a place or area
VISSIM	A multi-modal traffic flow simulation software package
VHT	Vehicle hours travelled
VKT	Vehicle kilometres travelled
W	
Western Harbour Tunnel and Beaches Link	The Western Harbour Tunnel and Beaches Link program of works consists of: <ul style="list-style-type: none"> Western Harbour Tunnel which stretches from the Warringah Freeway at Cammeray, across Sydney Harbour, to the WestConnex Rozelle Interchange Beaches Link, which provides an alternative to the Spit Bridge for the Northern Beaches, connecting from Seaforth and Balgowlah under Middle Harbour and through to the Warringah Freeway and Gore Hill Freeway
Western Harbour Tunnel project	Western Harbour Tunnel and Warringah Freeway Upgrade project which stretches from the Warringah Freeway at Cammeray, across Sydney Harbour, to the WestConnex Rozelle Interchange
WestConnex program of works	A program of works that includes the M4 Widening, King Georges Road Interchange Upgrade, M4 East, New M5 and M4-M5 Link projects
X	
Y	
Z	
Others	
µg/m ³	Micrograms per cubic metre

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1 Introduction

1.1 Background

The M4-M5 Link project (the project) is part of the WestConnex program of works that, together with the proposed Sydney Gateway, would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-west Sydney. In addition, it would allow for better connectivity through local communities and between the important economic centres along Sydney's Global Economic Corridor.

The project includes the construction and operation of a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters, an interchange at Lilyfield and Rozelle (the Rozelle Interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link).

Approval for the construction and operation of the project was granted on 17 April 2018 by the NSW Minister for Planning and Public Spaces (application number SSI 7485).

The approval provides for the construction and operation of the project in two stages:

- Stage 1¹ - construction of the Mainline Tunnels between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. These works commenced in 2018 with the Mainline Tunnels scheduled to open to traffic in 2022
- Stage 2² - construction of the Rozelle Interchange and Iron Cove Link. Stage 2 commenced in 2019 and is scheduled to open to traffic in 2023.

The Environmental Impact Statement (EIS) and the Submissions and Preferred Infrastructure Report (SPIR) described and assessed important road network and active transport links at Lilyfield and Rozelle. Specific to the proposed modification those works involved:

- The realignment and widening of key roads and intersections at and around the junction of The Crescent and City West Link
- New and upgraded pedestrian and cyclist infrastructure including new north south connections between the new open space at the Rozelle Rail Yards, Rozelle Bay light rail stop and Bicentennial Park.

1.2 Proposed modification

The proposed modification relates to Stage 2 of the project and would occur within the Inner West and City of Sydney Local Government Areas (LGA). The proposed modification includes the following key components:

- A new elevated vehicular overpass at The Crescent (the overpass) that would allow eastbound traffic heading north on The Crescent from Annandale to bypass the signalised intersection at The

¹ M4-M5 Link Stage 1 (the Mainline Tunnels)

² M4-M5 Link Stage 2 (the Rozelle Interchange and Iron Cove Link)

Crescent/City West Link junction and continue east on The Crescent towards Victoria Road and the Anzac Bridge

- Modifications to the eastbound lanes of the City West Link and The Crescent on either side of the intersection and northbound lanes on The Crescent at Annandale to provide space for the tie-in of the overpass
- Upgrades to the intersection of The Crescent/Johnston Street/Chapman Road (including lane reconfiguration and marking, signal phasing, adjusting positions of traffic signals kerb works etc.)
- Realignment of the Pedestrian and cycling green link (green link) to the west of The Crescent, providing a connection between the Rozelle Rail Yards and the Rozelle Bay light rail stop
- A new horseshoe shaped shared user path bridge (shared user path bridge) spanning The Crescent to the east of The Crescent/City West Link intersection. The shared user path bridge provides a connection between the Rozelle Rail Yards and the at grade surface connection (the 'shared user path') to Bicentennial Park along the east side of The Crescent and adjacent to Rozelle Bay. The shared user path bridge would provide the pedestrian and cyclist connectivity required by Conditions E120 and E121 for the project albeit in a different arrangement to that shown in the EIS
- Minor changes to the layout of the approach roads leading to the Anzac Bridge from Victoria Road, The Crescent and the Rozelle Interchange to improve traffic merging arrangements
- Use of a minor construction ancillary facility, established in accordance with Condition C24, as a construction ancillary facility. The proposed C6a construction ancillary facility site is located on the south side of The Crescent to the west of James Craig Road and adjacent to Rozelle Bay. The proposed modification would allow use of the site for a limited number of additional purposes which are not permitted by Condition C24 including:
 - Light vehicle parking for workers (around 9 spaces) and
 - Material laydown areas and a limited number of associated vehicle movements (small delivery vans and rigid trucks).

These additional purposes would support the various construction activities at the C6 civil site.

The proponent of the M4-M5 Link project and the proposed modification is Transport for NSW.

1.3 Public exhibition of the Modification report

The modification public exhibition period of five weeks commenced on 21 August and ended on 25 September 2019.

A total of 1,278 submissions from 1,211 submitters were received in response to the Modification report. The types and numbers of submissions have been summarised in **Table 1-1**.

Table 1-1: Summary of submissions

Submitter type	Number of submissions
Community	1,245
Organisation	24
Public Authorities	9
Total	1,278

Submissions from key stakeholders and the community raised the following key concerns:

- The justification provided for the proposed overpass was not sufficient
- The impacts associated with the proposed overpass would outweigh any of the claimed benefits
- The quality of the options assessment undertaken for key elements of the modification such as the overpass and key active transport links was inadequate. An underpass or at grade intersection option was preferred rather than an overpass
- The changes proposed to the approved active transport links as a result of the proposed overpass would reduce pedestrian/cycling connectivity, increase travel distances and travel times, and reduce the amenity and safety of pedestrians and cyclists
- The proposed overpass and the shared user path bridge were visually intrusive and obstructed views towards Rozelle Bay, Anzac Bridge and the city skyline
- The proposed overpass and the shared user path bridge were not consistent with the character of the surrounding area
- The proposed urban design and landscaping treatment for the southern portion of the green link adjacent to the Rozelle Bay light rail stop was not satisfactory
- The proposed overpass and pedestrian ramp between Rozelle Bay light rail stop and The Crescent obstructed views of The Crescent mural which has heritage value
- The removal of the existing at grade signalised pedestrian crossing of The Crescent at its intersection with Johnston Street would significantly impact on pedestrian/cycling connectivity between Annandale and the foreshore and pedestrian/cycling safety
- The removal of the right turn movement from Johnston Street to The Crescent (southbound) would detrimentally impact on local connectivity and result in redirected traffic using alternative routes that are less convenient, and in some cases, not safe
- The removal of the right turn movement from The Crescent (eastbound) to James Craig Road would detrimentally impact on connectivity to port related businesses in the Rozelle Bay, Glebe Island and White Bay areas and the proposed station precinct for the Sydney Metro West project. This would result in redirected traffic using alternative routes that are less convenient
- The elevated overpass is not consistent with the WestConnex commitment to minimising visual impacts through placing roads underground.

A response to all of the issues raised by stakeholders and the community is detailed in Part B (Response to public authority submissions) and Part C (Response to community and organisation submissions) of the Response to submissions report.

1.4 Consultation following public exhibition of the Modification report

Consultation with the community and stakeholders has occurred during the preparation of the Modification report and during public exhibition of the modification. Full details of the consultation for the modification are described in Section A.2 of the Response to submissions report.

Following public exhibition of the Modification report and during the preparation of this Design amendment report, Transport for NSW undertook further consultation. The details of the issues raised, and the responses provided during this consultation are provided in **Table 1-2**.

Table 1-2: Consultation following the public exhibition of the modification

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
<p>Bicycle stakeholder groups workshop</p>	<p>21 November 2019</p>	<p>Workshop with the Bicycle User Group, Bikes NSW and Inner West Council</p>	<p>Will the overpass still be constructed if the Western Harbour Tunnel project is not approved?</p>	<p>The overpass will need to be built regardless of the Western Harbour Tunnel project. The overpass business case needs to be able to stand on its own merits, namely the benefits of improving the intersection performance and broader network.</p>
			<p>Will there be a separated cyclist and pedestrian lane on the shared user path bridge?</p>	<p>Due to the width constraints of the shared user path bridge, that will not be possible.</p>
			<p>Is it possible to put markings on the shared user path to make it clearer or encourage where cyclists and pedestrians should go?</p>	<p>The layout and design of the wayfinding signage will be established as part of the Urban Design Landscape Plan (UDLP) process in accordance with Condition 133 and Condition 134.</p>
			<p>Concerns about the noise impacts of the overpass on the pedestrians using the green link. Suggested the cyclist lane is put closer to the overpass and the pedestrian lane further away from the overpass.</p>	<p>Due to the width constraints of the green link, that will not be possible.</p>

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
			<p>Why is a pedestrian underpass crossing The Crescent at the intersection with Johnston Street, where the existing signalised crossing is, not possible?</p>	<p>The width of the road is too narrow to achieve the gradients needed to construct an underpass. Additionally, an underpass would not present an ideal arrangement from a pedestrian safety perspective.</p> <p>As a result of the community feedback, Transport for NSW will be undertaking further traffic modelling to explore options to improve the pedestrian connectivity.</p>
			<p>Indicated that reinstating the existing signalised pedestrian crossing of The Crescent is a priority. Asked if cyclists are also able to use it.</p>	<p>Transport for NSW is investigating the possibility of reinstating the crossing. If this is done, bike lanterns would be included at the signals to accommodate cyclists.</p>

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
			<p>What are the gradients on the proposed widened shared user path ramp going up to the Rozelle Bay light rail stop?</p>	<p>The proposed path from the light rail stop to The Crescent would have a grade of approximately 1 in 20. The ramp would be compliant with relevant Australian Standards including <i>Disability Discrimination Act 1992</i> (Cth) (DDA) requirements. Transport for NSW is investigating the possibility of widening the ramp to 4.5 metres, so it operates as a shared user path.</p>
			<p>Suggest gathering information about Opal card usage in the local area to understand which bus stops residents are using.</p>	<p>Transport for NSW to investigate Opal data.</p>
			<p>Will the shoulder area going south on The Crescent near the Chapman Road intersection stay with the new design?</p>	<p>Transport for NSW will investigate opportunities to retain that narrow shoulder area on The Crescent southbound during development of the detailed design.</p>

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
Jamie Parker (MP for Balmain)	18 February 2020	Briefing of The Crescent overpass and active transport links modification design refinements	Design refinements were positively received. No key issues or concerns raised. Positive feedback on the design refinement and consultation process received.	Comments noted.
Glebe Island and White Bay Community Liaison Group Meeting	10 March 2020	Briefing of The Crescent overpass and active transport links modification design refinements	Community member raised a question to Port Authority of NSW members on whether the removal of the right-hand turn in to James Craig Road would adversely impact on port operations. Port Authority of NSW responded and advised this would be investigated. No comments or issues raised regarding design refinements	Comments noted
Annandale Foreshore Community Group	13 March 2020	Briefing of The Crescent overpass and active transport links Modification design refinements	Improvements to pedestrian and cyclist access noted. Improvements to visual impact outcomes noted. Improvements to pedestrian safety noted. Retention of the right-hand turn from Johnson Street on to The Crescent positively received. Design refinements and consultation process were positively received.	Comments noted

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
WestProtects	13 March 2020	Briefing of The Crescent overpass and active transport links modification design refinements	Improvements to pedestrian and cyclist access noted. Improvements to visual impact outcomes noted. Improvements to pedestrian safety noted. Retention of the right-hand turn from Johnson Street on to The Crescent positively received. Positive feedback on the design refinement and consultation process received. Recommendation to investigate the separation of cyclists and pedestrians along the shared user ramp, even if only by using line marking.	Transport for NSW to investigate opportunities for separation of pedestrians and cyclists using line marking. Other comments noted.
Anthony Albanese (MP for Grayndler)	23 March 2020	Briefing of The Crescent overpass and active transport links modification design refinements	Re-affirmed strong opposition to the broader Project, to the proposed modification and the revised design.	Comments noted

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
Inner West Council	02 April 2020	Briefing of The Crescent overpass and active transport links modification design refinements	The revised design was positively received. Improvements to pedestrian and cyclist access at The Crescent, Johnston Street, and Chapman Road intersection were noted. General comment that the revised design was positive and reflected community concerns. A request for the indented bus bay to have shelter provision received.	Transport for NSW to investigate provision of shelter at the indented bus bay, however noted the constraints of the locality. Other comments noted
Bicycles NSW, and Inner West Bicycle User Groups	02 and 03 April 2020	Briefing of The Crescent overpass and active transport links modification design refinements	<p>The revised design was positively received. General comment that the revised design was positive and reflected community concerns.</p> <p>General commentary received on regional and local cycle connections.</p> <p>Request that the cycle lane on Johnson Street be retained, and that the narrow shoulder along The Crescent southbound be retained.</p> <p>Request for bicycle lanterns to be incorporated into the design for the signalised crossing of Johnson Street.</p>	Transport for NSW to investigate incorporating bicycle lanterns into the signalised crossing of Johnson Street. Other comments noted.

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
<p>Annandale North Public-School P&C</p>	<p>03 April 2020</p>	<p>Briefing of The Crescent overpass and active transport links modification design refinements</p>	<p>The revised design was positively received. General comment that the revised design was positive and reflected community concerns.</p> <p>Restated concerns regarding safety risk to school students associated with increased traffic demand on Johnson Street as a result of the modification.</p> <p>Requested clarification of the level of visual obstruction of the mural along The Crescent as a result of the proposed shared user path ramp.</p>	<p>Transport for NSW advised that the concerns regarding increased traffic demands on Johnson Street would be addressed in the Response to submissions report.</p> <p>Transport for NSW advised that the visual impacts on the mural along The Crescent would be consistent with what was proposed in the modification and the approved EIS.</p> <p>Other comments noted.</p>

Meeting/Briefing	Timing	Details	Feedback/Comments	Transport for NSW (response at the time of the meeting)
Rozelle Interchange – Special Community Reference Group Meeting	07 April 2020	Briefing of The Crescent overpass and active transport links modification design refinements	<p>The revised design was positively received.</p> <p>Request for visualisations of the revised design to state what year post-opening they represent.</p> <p>Request for Transport NSW to investigate as far as possible separation of cyclists and pedestrians along the proposed shared user ramp.</p> <p>Single comment regarding the loss of connection between green space provided by the shared user path bridge in the Modification design.</p>	<p>Transport for NSW to investigate opportunities for separation of pedestrians and cyclists using line marking.</p> <p>Transport for NSW to investigate adding post-opening time dates on visual renders showing the revised design.</p> <p>Other comments noted.</p>
Port Authority of NSW	09 April 2020	Briefing of The Crescent overpass and active transport links modification design refinements	<p>The revised design was positively received.</p> <p>Comment and discussion regarding the origin of the traffic modelling and data used to assess the impact of the loss of the right hand turn from The Crescent on to James Craig Road.</p>	<p>Transport for NSW advised the assessment for the right-hand turn traffic movement from The Crescent on to James Craig Road was based on traffic data from the M4-M5 Link EIS.</p> <p>A detailed response is provided in the Response to submissions report.</p>

1.5 Design review process

Following the public exhibition period for the proposed modification Transport for NSW considered the issues raised in the submissions and reviewed a number of elements of the proposed design. The design review process involved meetings with Department of Planning, Industry and Environment (DPIE) and the NSW Government Architect's Office and consultation with local community groups and other stakeholders. The process is summarised below:

- Transport for NSW held a number of meetings with DPIE to discuss issues raised by submissions during the public exhibition for the modification and to further analyse the various design options considered for the intersection of City West Link/The Crescent
- An independent Special Design Review Panel was convened by the NSW Government Architect's Office, comprising members of the State Design Review Panel, to consider the proposed modification and provide recommendations in relation to the proposed design
- Based on issues raised by submissions and the feedback received from the Special Design Review Panel, Transport for NSW proposed a series of design changes
- The proposed design changes were then presented to the Special Design Review Panel who provided further feedback
- The proposed design changes were further refined in response to the feedback provided by the Special Design Review Panel
- A number of meetings were held with the local community and other stakeholders to present the proposed design changes and to obtain further feedback
- The revised design was confirmed, and further environmental assessment was carried out.

The proposed modification provides an indicative concept design of The Crescent overpass, (the overpass) revised active transport links and changes to the intersection of Johnston Street/The Crescent/Chapman Road. Should the modification be approved it would be subject to further detailed design and refinement. This would include further development via the Urban Design and Landscape Plan (UDLP) for the Rozelle Interchange which is currently being prepared in accordance with Conditions E133 and E134. The UDLP is to be prepared in consultation with the relevant local councils, Infrastructure NSW (former UrbanGrowth NSW), the community and affected landowners and businesses.

1.6 The revised design

In response to some of the issues raised in submissions, Transport for NSW is proposing a number of design changes (the revised design) to achieve improved connectivity, visual amenity and urban design outcomes. These design changes include:

- Lowering the height of the proposed overpass by around two metres at its apex so it is a similar height to the green link. This will improve visual amenity and urban design outcomes, resulting in an improved space and outlook toward Rozelle Bay, Anzac Bridge and the city skyline
- Improving the design of the southern section of the green link to improve its amenity and interface with the Rozelle Bay light rail stop
- Increasing the width of the proposed pedestrian ramp from the Rozelle Bay light rail stop to the west side of The Crescent to 4.5 metres to allow for shared use by pedestrian and cyclists
- Retaining, widening and upgrading the existing at-grade signalised pedestrian crossing of The Crescent at its intersection with Johnston Street, including the introduction of paving treatments and bicycle lanterns. As a result of this change, the other multiple crossings of The Crescent and Chapman Road detailed in the Modification report are no longer proposed

- Retaining the right-hand turn movement from Johnston Street to The Crescent (southbound)
- Removing the proposed shared user path bridge between the proposed Rozelle Rail Yards open space and the eastern side of The Crescent.

The revised design is presented in **Figure 1-1** and **Figure 1-2**, with a full description of the revised design and associated environmental assessment is provided **Section 2** and **Section 3**.

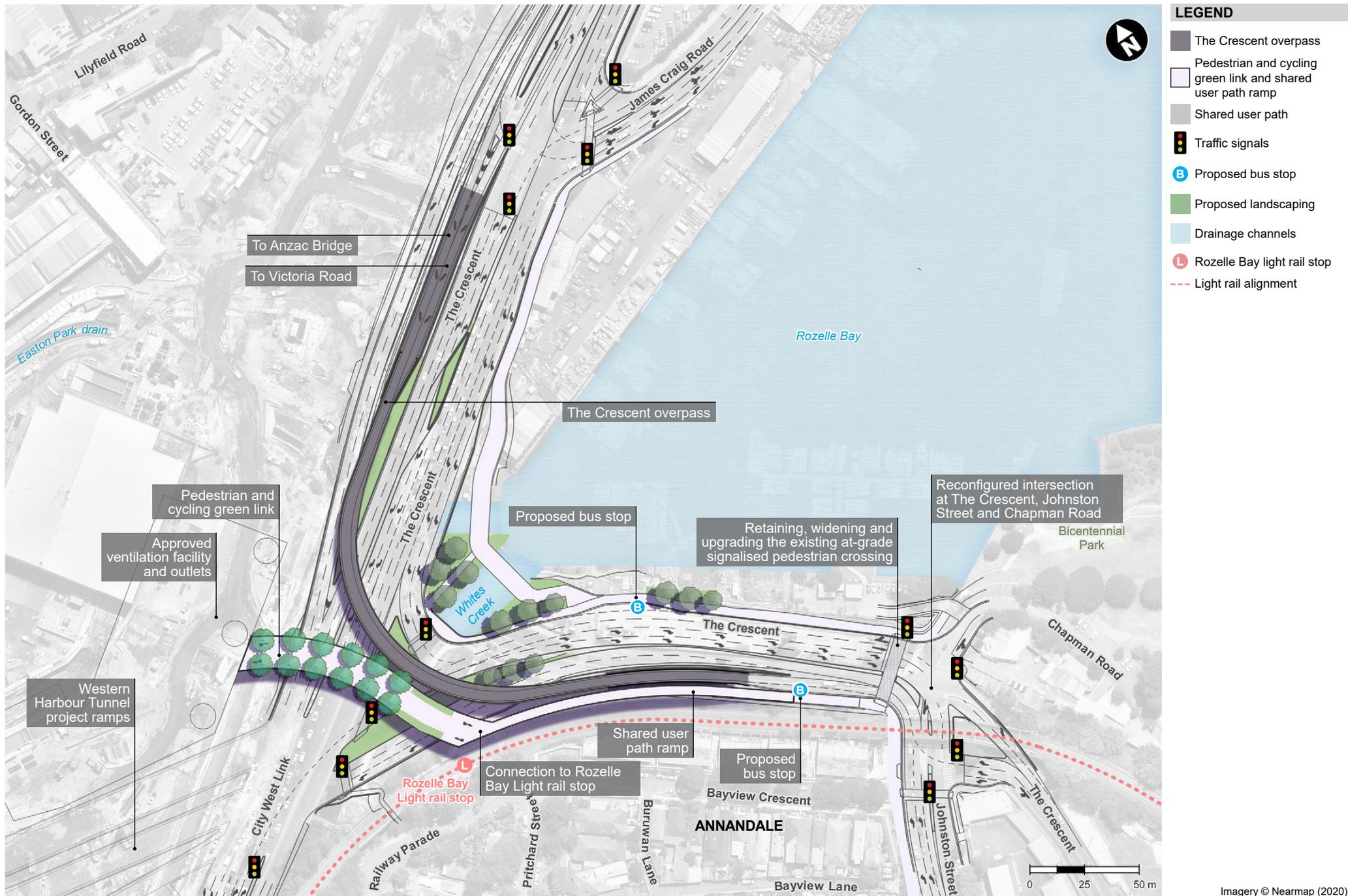


Figure 1-1 The revised design

Indicative view – design elements are subject to the Urban Design and Landscape Plan.



Figure 1-2: Indicative aerial view of the City West Link intersection (10 years following the project opening)

1.7 Purpose of this document

In response to some of the issues raised in submissions and during community and stakeholder workshops, Transport for NSW is proposing a number of design changes to the modification to achieve improved connectivity, environmental, visual amenity and urban design outcomes.

This report describes the revised design and undertakes an environmental assessment of those design changes. The Design amendment report has been provided to DPIE for review and assessment along with the Response to submission report.

As a result of the revised design, some of the Environmental Management Measures (EMM) and Conditions of Approval (CoA) which were proposed in the Modification report are to be updated.

This Design amendment report has the following structure:

- **Section 1** Introduction
- **Section 2** Revised design
- **Section 3** Environmental assessment of the revised design
- **Section 4** Conclusion
- **Appendix A** Revised Environmental Management Measures and Conditions of Approval.

2 Revised design

2.1 Overview of revised design

This section provides a summary of the revised design which is proposed in response to the issues raised and feedback received in submissions and stakeholder workshops. The revised design includes the following design changes:

- Lowering the height of the proposed overpass by around two metres at its apex so it is a similar height to the green link. This will improve visual amenity and urban design outcomes, resulting in an improved amenity and outlook for pedestrians and cyclists toward Rozelle Bay, Anzac Bridge and the city skyline
- Improving the design of the southern section of the green link to improve its amenity and interface with the Rozelle Bay light rail stop
- Increasing the width of the proposed pedestrian ramp from the Rozelle Bay light rail stop to the west side of The Crescent to 4.5 metres to allow for shared use by pedestrian and cyclists
- Retaining, widening and upgrading the existing at-grade signalised pedestrian crossing of The Crescent at its intersection with Johnston Street, including the introduction of paving treatments and bicycle lanterns. As a result of this change, the other multiple crossings of The Crescent and Chapman Road detailed in the Modification report are no longer proposed
- Retaining the right-hand turn movement from Johnston Street to The Crescent (southbound)
- Removing the proposed shared user path bridge between the proposed Rozelle Rail Yards open space and the eastern side of The Crescent.

The revised design is discussed in this section, with the environmental assessment of the revised design provided in **Section 3**.

2.2 Description of proposed design changes

The Crescent overpass

The design of the overpass has been revised to reduce the height of the structure by approximately two metres at its apex. The overpass road surface would be around nine metres above ground (maximum of around 10 metres with barriers), which is a similar to the height of the adjacent green link over City West Link. The overpass will have a minimum clearance of around six metres. The length and grade of the overpass ramps remain unchanged.

The overpass is to have one traffic lane with a shoulder area provided on the inside curve to allow for driver visibility and emergency use (for example, in the event of a breakdown). At its eastern end (exit) near James Craig Road the overpass would diverge to two traffic lanes, one lane to access Anzac Bridge via the 'mousehole' and one lane to access Victoria Road (northbound).

Lowering the height of the overpass would reduce the visual impact of the structure and improve the amenity and outlook for pedestrians and cyclists using the green link in an easterly and north easterly direction toward Rozelle Bay, Anzac Bridge and the city skyline. An elevation view of the overpass is shown in **Figure 2-1**.

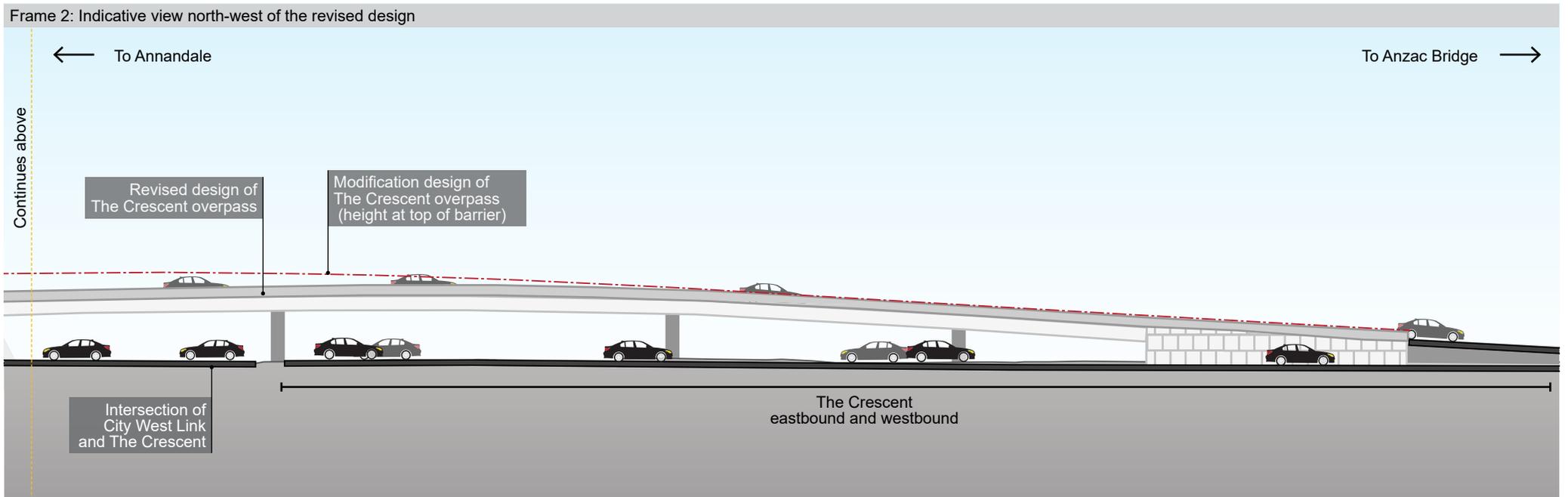
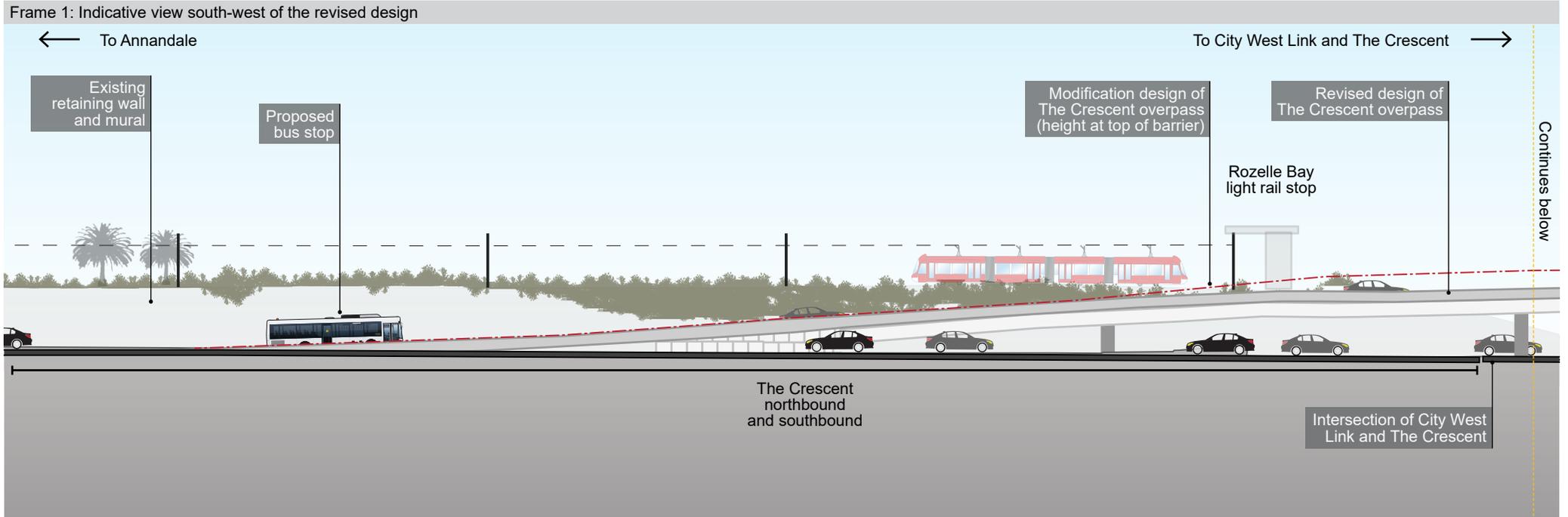


Figure 2-1 The revised design - the overpass (long section)

Not to scale

Southern section of the green link

It is proposed to revise the design of the southern section of the green link to improve its interface with the Rozelle Bay light rail stop.

The design of the green link has been developed having regard to a number of considerations including:

- the level of the proposed ventilation building within Rozelle Rail Yards open space at the northern end of the bridge
- the required vertical clearance of the structure above City West Link and The Crescent
- the width of the bridge and the need for it to support landscape plantings which has structural implications
- the limited areas available for placement of piers within the road reserves and
- the existing level of the Rozelle Bay light rail platform which is lower by comparison to the northern and central sections of the green link.

As a result, the green link ramps down at its southern end to meet the light rail platform and this southern section of the structure is not able to provide the necessary soil depth required to support the continuation of tree planting across the full length of the bridge.

Transport for NSW is considering a number of improvements to the appearance of this section of the green link to ensure it integrates appropriately with the remainder of the green link and the Rozelle Bay light rail stop. Options being considered include landscape plantings in raised planter beds, enhanced paving treatments and sculptural elements.

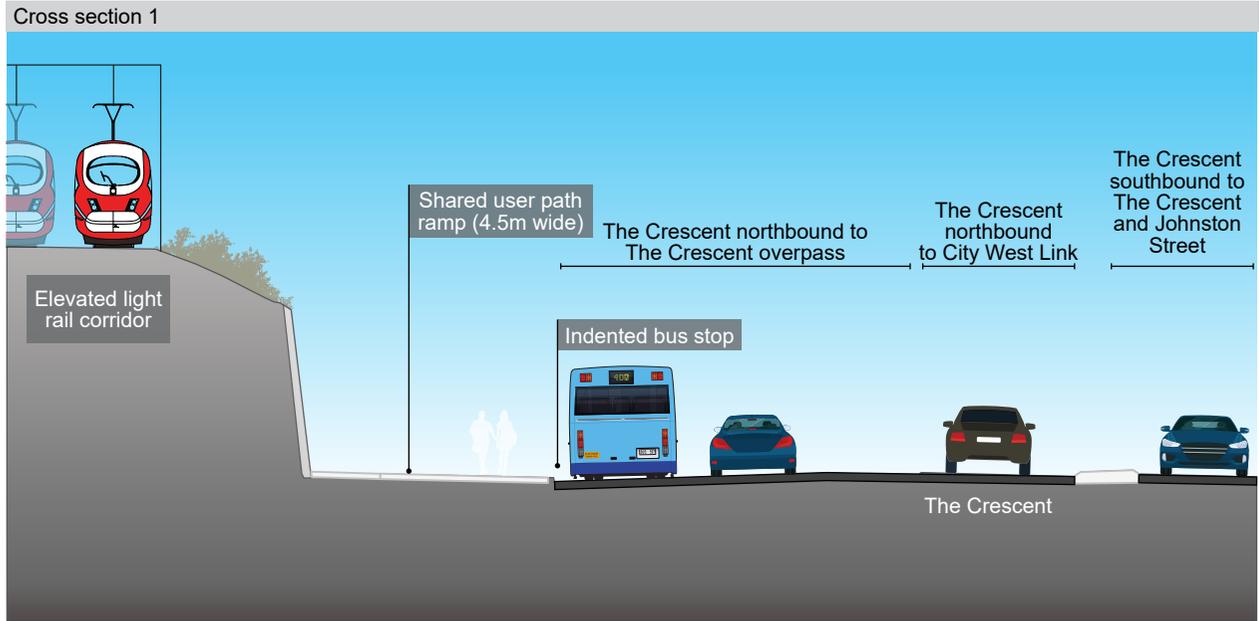
The final design for the green link will be refined during the completion of the UDLP as required by Conditions E133 and E134.

Increased width of pedestrian ramp

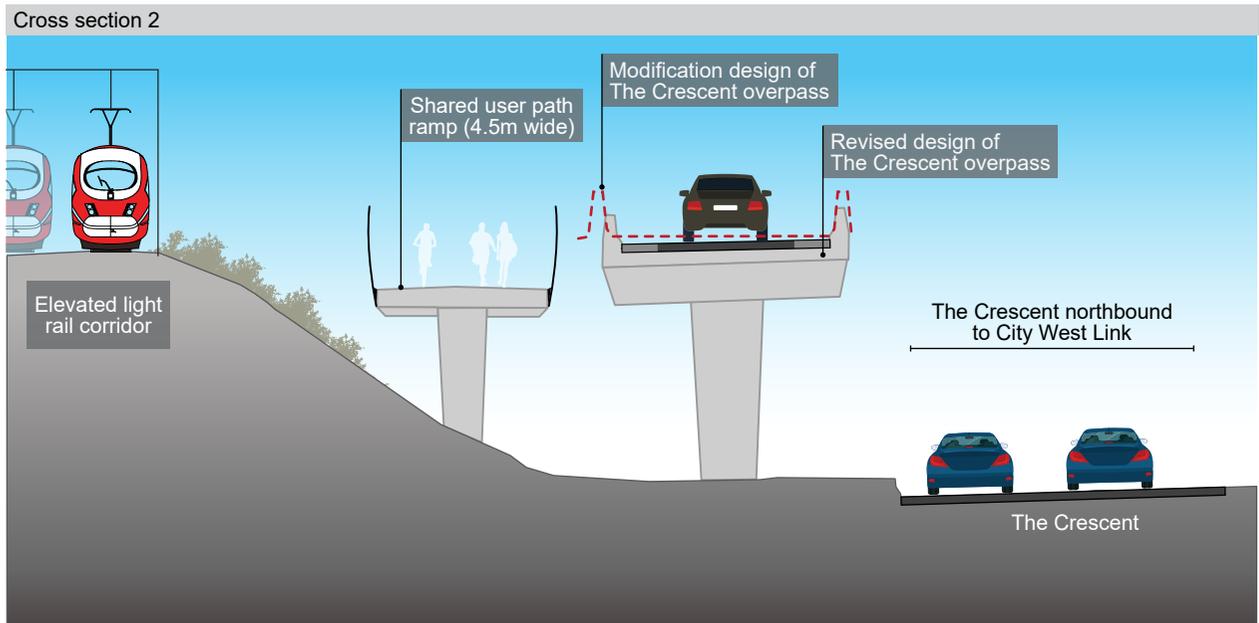
The pedestrian ramp from the Rozelle Bay light rail stop to the at grade path on the western side of The Crescent is to be widened to 4.5 metres. This will allow for shared use by pedestrians and cyclists. The increase in width has been achieved by refining the traffic lane widths within the adjacent road corridor and reducing the setback between the ramp and light rail retaining wall. The widened ramp would be designed to meet relevant Australian Standards and Austroads guidelines for shared user paths.

The shared user path ramp cannot be widened further due to the fixed position of the existing light rail retaining wall along the west side of The Crescent, the position of the bus stop, and the width of the road reserve required for both the overpass and surface traffic lanes along The Crescent.

The shared user path ramp becomes an important part of the active transport connection proposed between the Rozelle Rail Yards open space, Rozelle Bay light rail stop, the west side of The Crescent and Chapman Road and the Rozelle Bay foreshore. It has been widened to accommodate the increased number of pedestrians and cyclists who are likely to use this route. Cross sections of the shared user path ramp and overpass are shown in **Figure 2-2** and **Figure 2-3**.



Not to scale



Not to scale

Imagery © Nearmap (2020)

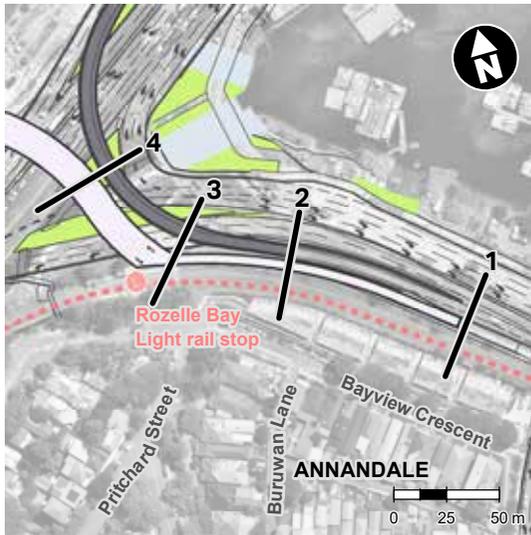
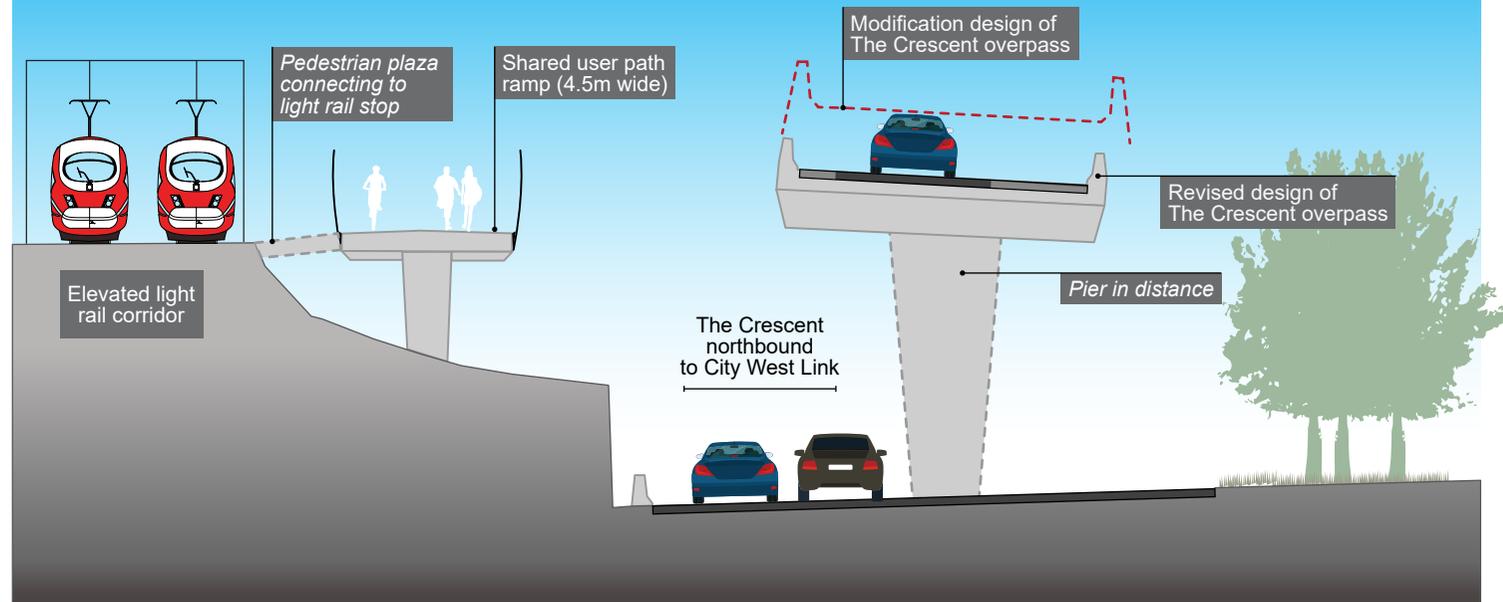


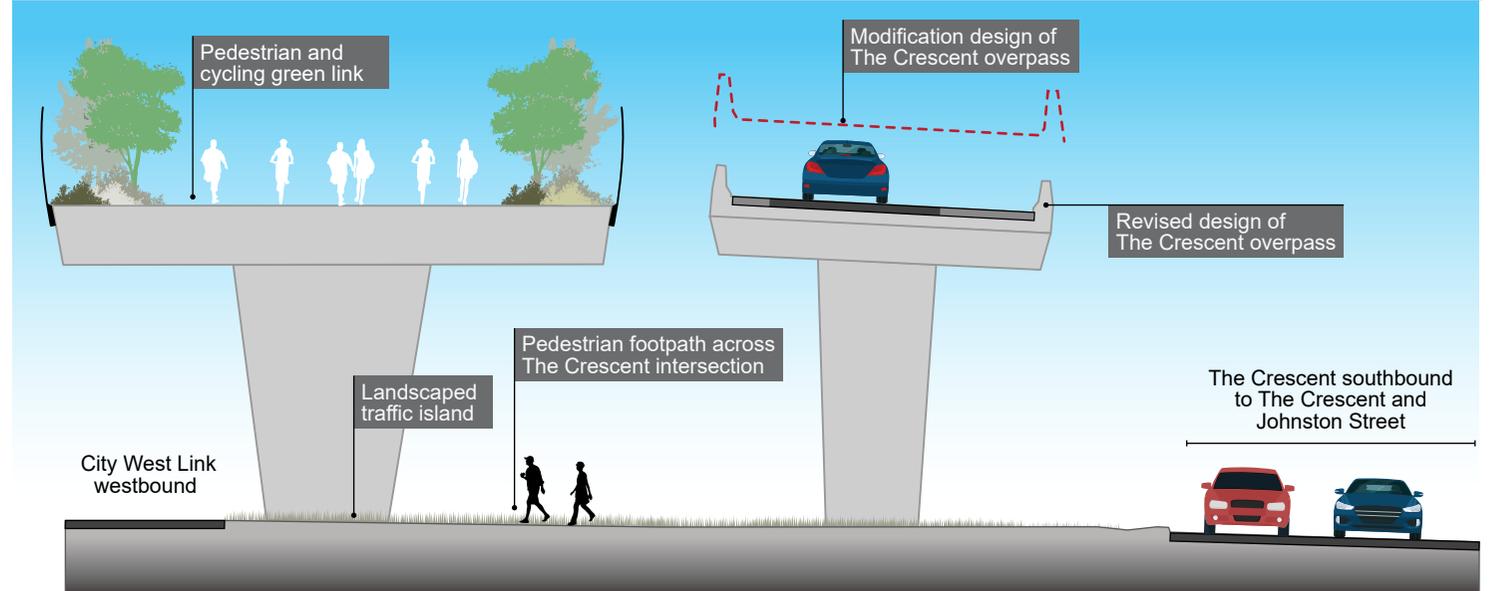
Figure 2-2 The revised design - cross sections 1 & 2

Cross section 3



Not to scale

Cross section 4



Not to scale

Imagery © Nearmap (2020)

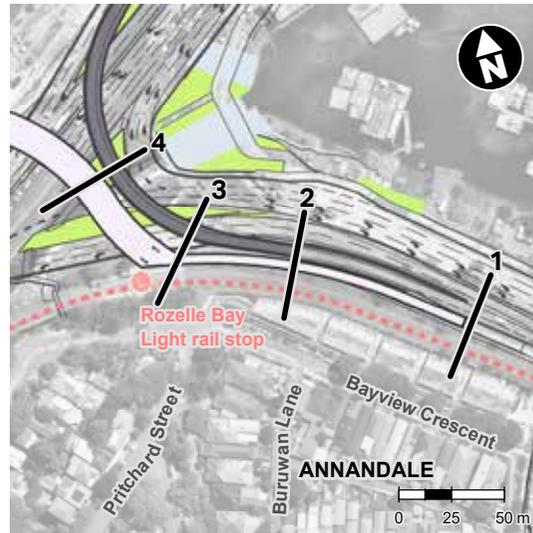


Figure 2-4 The revised design - cross sections 3 & 4

The pedestrian and cycling crossing at The Crescent/Johnston Street/Chapman Road

Transport for NSW is proposing to retain, widen and upgrade the existing at-grade signalised pedestrian crossing of The Crescent at its intersection with Johnston Street. The signalised crossing will be widened to around six metres and upgraded by the introduction of a paved surface to differentiate from the road surface, as well as construction of a central pedestrian refuge and installation of bicycle lanterns.

Retention and upgrading of this crossing will provide the final section of the active transport link between the Rozelle Rail Yards open space, Rozelle Bay light stop, the west side of The Crescent and Chapman Road and the Rozelle Bay foreshore. It will also maintain the important existing connectivity between Annandale and the Rozelle Bay foreshore.

The other multiple crossings of The Crescent and Chapman Road as shown in the Modification report are no longer proposed. The crossing arrangements at this intersection have been rationalised and there are now only two signalised crossings proposed:

- West side of The Crescent to Chapman Road (described above)
- North side of Johnston Street to the south side of Johnston Street.

Retention of the right-hand turn movement from Johnston Street to The Crescent southbound

As part of the proposed design changes, the right-hand turn movement from Johnston Street to The Crescent southbound is to be retained. This right-hand turn movement is currently provided in the existing configuration of the intersection.

This change will ensure that motorists travelling north on Johnston Street will maintain a direct connection to local destinations located along The Crescent including a childcare centre, the Tramsheds and the open space areas along Johnstons Creek and at Bicentennial Park. This change would avoid the need for motorists to use alternate routes which are less direct and will reduce the potential safety risk associated with motorists performing a U-turn movement on Chapman Road to access these areas.

Removal of the shared user path bridge

The shared user path bridge would no longer be provided as part of the proposed design. This bridge was to be a significant structure with an overall length of around 270 metres and a maximum height of around 11 metres.

Removal of the shared user path bridge would remove a grade separated connection between the future Rozelle Rail Yards open space and Chapman Road and consequently reduce the visual impacts associated with the proposed modification. It would also reduce the physical (footprint) impact of the bridge structure and its visual impact when viewed from the proposed open space area within Rozelle Rail Yards and from the foreshore area adjacent to Rozelle Bay.

The at-grade path on the east side of The Crescent between City West Link and Chapman Road would remain and provide a connection to the bus stop on The Crescent southbound.

Within the UDLP area along the east side of The Crescent (refer to **Figure 1-1**) it is proposed to establish landscape plantings which will help to soften the extent of road pavement and provide a demarcation between the road and the active transport links proposed on this side of The Crescent. Landscaping treatments will be detailed in the UDLP which is being prepared in accordance with Condition E134 of the project approval. Outside of this UDLP area the remaining land adjacent to the foreshore is subject to the Residual Land Management Plan (RLMP) required by Condition E112.

3 Environmental assessment of the revised design

This section provides an environmental assessment of the revised design. The environmental aspects listed below are considered to require further assessment as a result of the revised design:

- Traffic and transport
- Urban design
- Visual amenity
- Noise and vibration
- Air quality
- Heritage.

The environmental assessment of the revised design is detailed in the **Sections 3.1 to 3.7**.

Other environmental aspects that were considered in the Modification report are not considered to be affected by the revised design.

3.1 Traffic and transport

The assessment of potential traffic and transport impacts associated with the proposed modification was provided in Section 6.3 and in Appendix B (Traffic and transport assessment) of the Modification report.

A traffic and transport assessment of the revised design has been undertaken focusing on the following:

- Design of the overpass including its capacity and functionality
- Changes to pedestrian and cycling connectivity including revised assessment of pedestrian travel distances and times
- Changes to intersection performance at The Crescent / Johnston Street / Chapman Road intersection using a similar modelling approach to that used for the EIS and Modification report and the same traffic demands
- Swept path analysis and preliminary road safety audit of the intersection arrangements proposed at The Crescent / Johnston Street / Chapman Road intersection.

The outcome of this assessment is presented in the following sections.

The Crescent overpass

Lowering the height of the overpass would cause no changes to predicted traffic volumes or the flow of traffic by comparison to the assessment detailed in the Modification report.

The one traffic lane on the overpass is able to accommodate the forecasted traffic demand in 2023 (year of opening) and 2033 (10 years after opening). Where the overpass diverges to two lanes near its exit adjacent to James Craig Road, the length and number of lanes is forecast to provide sufficient room for queuing on the approach to this leg of the intersection without any impact on the operation of the upstream intersection at The Crescent/Johnston Street/Chapman Road.

At the southern end (entry) of the overpass, line marking and signage would be required to advise northbound motorists on Johnston Street and The Crescent (south) to use the correct lane to access the overpass. At the eastern end (exit) of the overpass, line marking and signage would be required to advise motorists that traffic in the left-hand lane will travel to Anzac Bridge via the 'mousehole', and traffic in the right-hand lane will travel to Victoria Road (northbound).

A shoulder area has been provided on the inside curve of the overpass to allow for driver visibility and emergency use (for example, in the event of a breakdown). The posted speed of The Crescent and the overpass will be 60 km/h.

Vehicles turning left at Johnston Street onto The Crescent northbound may experience buses pulling in and out of the northbound indented bus stop. Sight lines are restricted at this intersection by the light rail bridge structure. However, the risk of a crash is considered low given that vehicles making this left turn are likely to be travelling at a slow speed which reduces stopping distance requirements. This risk only applies to traffic in the kerbside lane wishing to access the overpass. A bus positioned in the northbound indented bus stop will not impede traffic movement in the adjacent traffic lane on this section of the overpass.

The overpass removes the at grade, right turn movement at The City West Link/The Crescent intersection, which should improve safety at this intersection as the right turn movement would be segregated from other conflicting at grade traffic movements.

Pedestrian and cycling connectivity

During the public exhibition period, submissions raised concerns about:

- The revised alignment of the green link and the proposed shared user path bridge
- The removal of the existing signalised pedestrian crossing from the western side of The Crescent to Chapman Road and the multiple and less direct replacement pedestrian crossings proposed
- As a result of the above points, the increased pedestrian travel distances and times involved and the increased difficulty in accessing the Rozelle Bay foreshore from the Rozelle Rail Yards open space and from Annandale
- The width of the pedestrian ramp from the footpath on the western side of The Crescent to the Rozelle Bay light rail stop.

Transport for NSW is proposing a number of design changes to address the key issues raised in submissions. The proposed design changes that are most relevant to the consideration of pedestrian and cycling connectivity include widening of the pedestrian ramp to 4.5 metres to allow for shared use by pedestrians and cyclists, retention and widening and upgrading of the signalised at grade pedestrian crossing of The Crescent and removal of the shared user path bridge.

An assessment of active transport connectivity has been undertaken based on the revised design.

Assessment

The active transport arrangements proposed in the EIS, the proposed modification and the design changes are summarised below.

- **EIS** – showed a green link connecting Rozelle Rail Yards open space, Chapman Road and the foreshore area. There was also a bridge connection between the green link and the Rozelle Bay light rail stop, a pedestrian ramp down from the light rail stop to the west side of The Crescent and the existing at grade, signalised crossing of The Crescent at Chapman Road was to be retained
- **Proposed modification** - showed a green link connecting Rozelle Rail Yards open space and the Rozelle Bay light rail stop. From the light rail stop, there was a pedestrian ramp down to the west side of The Crescent and crossings of Johnston Street, The Crescent and Chapman Road to access the foreshore area. There was also a separate, shared user path bridge connecting Rozelle Rail Yards open space, Chapman Road and the foreshore area
- **Revised design** – shows a green link connecting Rozelle Rail Yards open space and the Rozelle Bay light rail stop. From the light rail stop, there is a 4.5-metre-wide shared user path ramp down to the west side of The Crescent and a widened and upgraded signalised pedestrian crossing of The Crescent to

connect with Chapman Road and the foreshore area. As a result of these changes, the shared user path bridge is no longer required or proposed.

The changes to active transport connections create more direct routes compared to the proposal in the Modification report and routes that, in most cases, are similar in travel distance and time to the EIS. The revised design at the intersection of The Crescent/Johnston Street/Chapman Road provides for a direct and safer crossing of The Crescent, retains and improves the existing connection to the foreshore and Bicentennial Park for pedestrians and cyclists travelling from the south or west, and removes the need to traverse multiple sets of traffic lights at this intersection.

It is proposed to remove the shared user path bridge from the modification design. The revised design will provide a more direct connection from the Rozelle Rail Yards open space to the Rozelle Bay foreshore via the green link, widened shared user path ramp and the upgraded, at grade, signalised crossing of The Crescent.

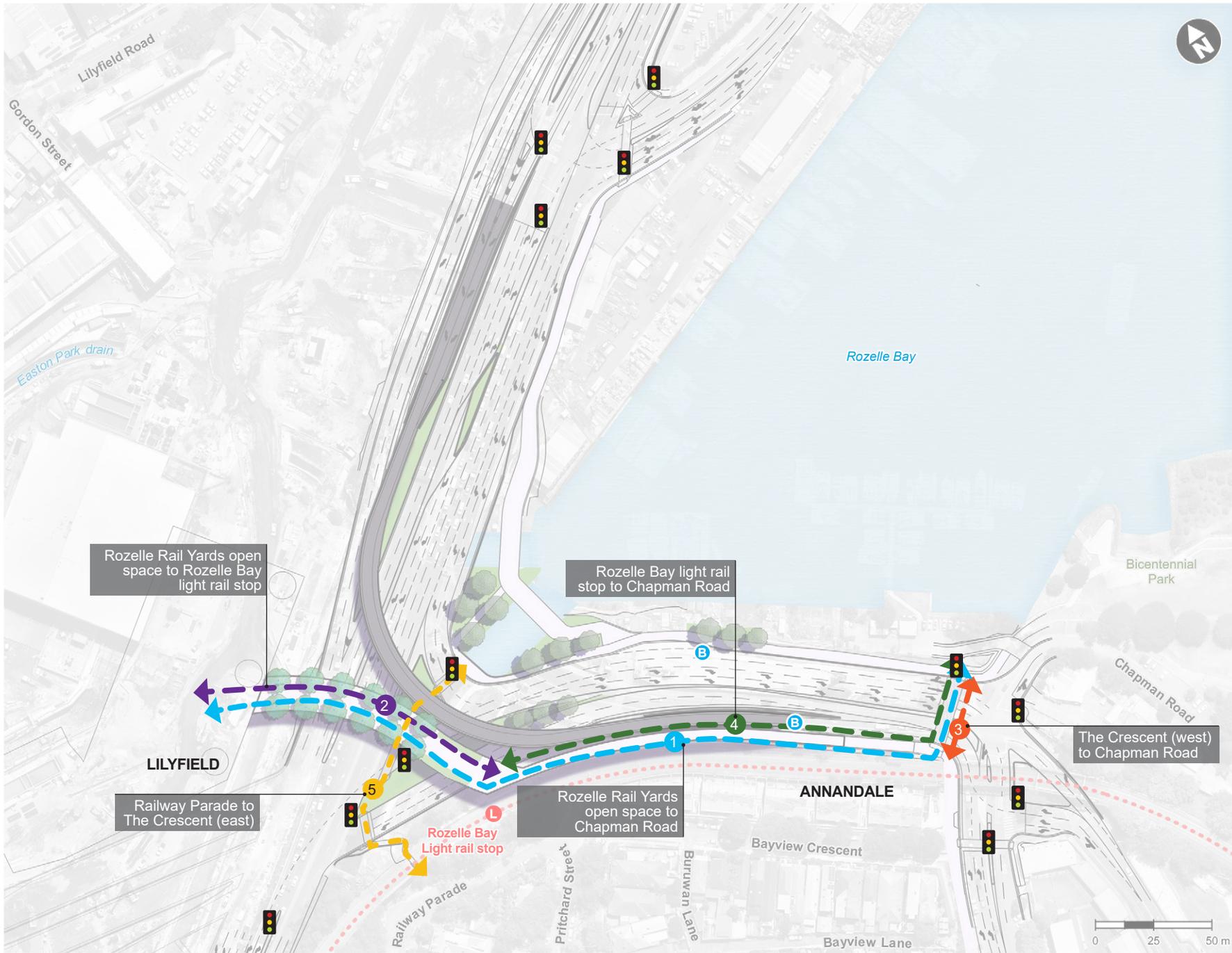
Figure 3-1 shows the different sections of the active transport connections between the Rozelle Rail Yards open space and Chapman Road which include:

- Route 1: Rozelle Rail Yards open space to Chapman Road
- Route 2: Rozelle Rail Yards open space to Rozelle Bay light rail stop
- Route 3: The Crescent (west) to Chapman Road
- Route 4: Rozelle Bay light rail stop to Chapman Road
- Route 5: Railway Parade to The Crescent (east).

Table 3-1 shows the calculated travel distances and times for each section of the active transport connections. The calculated travel distances, to the closest five metres, include waiting times at signalised intersections and are based on an average pedestrian walking speed of 1.3 metres per second.

Table 3-1: Pedestrian travel distances and times

Route	Pedestrian Trip	Distance (metres)			Pedestrian travel time (minutes)		
		EIS	Modification	Revised design	EIS	Modification	Revised design
1	Rozelle Rail Yards open space to Chapman Road	330	515	365	04:14	06:36	05:56
2	Rozelle Rail Yards open space to Rozelle Bay light rail stop	265	155	150	03:24	01:59	01:55
3	The Crescent (west) to Chapman Road	30	155	35	01:23	03:14	01:42
4	Rozelle Bay light rail stop to Chapman Road	205	335	210	03:38	05:33	03:57
5	Railway Parade to The Crescent (east)	120	120	120	02:47	02:47	02:47



LEGEND

- The Crescent overpass
- Pedestrian and cycling green link and shared user path ramp
- Shared user path
- Traffic signals
- Proposed bus stop
- Proposed landscaping
- Drainage channels
- Rozelle Bay light rail stop
- Light rail alignment
- Movements

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Figure 3-1: Revised design - pedestrian and cyclist active transport connections

Imagery © Nearmap (2020)

The “Route 1” connection (Rozelle Rail Yards open space to Chapman Road) as shown in the EIS is no longer proposed as a result of the introduction of the overpass. To identify the travel distance and time taken for the equivalent route for the revised design, “Route 2” and “Route 4” have been combined. On that basis:

- The revised design would take five minutes and 56 seconds over a distance of 365 metres, with pedestrians and cyclists negotiating one at grade signalised crossing of The Crescent
- The EIS design would take four minutes and 14 seconds over a distance of 330 metres with no signalised crossings required.

Although the revised design would result in a longer travel time than the EIS, the revised design is an improvement over the arrangement proposed in the modification, which included the longer route of the shared user path bridge.

For “Route 2” (Rozelle Rail Yards open space to Rozelle Bay light rail stop), the revised design performs the same as the arrangements proposed in the modification and considerably better than the arrangements proposed in the EIS.

For “Route 3” (The Crescent west to Chapman Road), the proposed design changes perform comparably with the arrangement proposed in the EIS and much better than the arrangement proposed in the modification.

For “Route 4” (Rozelle Bay light rail stop to Chapman Road), the arrangement proposed in the EIS performs comparably to the revised design and significantly better than the modification.

For “Route 5” (Railway Parade to The Crescent (east)), the arrangements proposed in the EIS, modification and the revised design are similar.

The revised design would not impact upon the at grade shared user path on the eastern side of The Crescent along the Rozelle Bay foreshore. This active transport route will continue to be available to pedestrians and cyclists consistent with the arrangements proposed in the EIS.

The Crescent/Johnston Street/Chapman Road intersection

During the public exhibition period, submissions raised concerns about the removal of the pedestrian crossing at The Crescent and the removal of the right turn movement from Johnston Street to The Crescent (south). As a result, Transport for NSW is proposing to revise the intersection design proposed in the modification to retain those existing movements.

A traffic and transport assessment has been prepared to assess these proposed changes to the intersection layout.

Traffic demands

The assessment of the revised design adopts the same traffic demands used in both the EIS and Modification report, both of which did not include the Western Harbour Tunnel and Warringah Freeway Upgrade project (Western Harbour Tunnel project) surface connection onto City West Link. Traffic demands using this connection are assessed as part of the Western Harbour Tunnel project EIS.

Pedestrian and cycling movements at the existing intersection crossings were surveyed in September 2019. Pedestrian and cycling movements were updated in the modelling based on these surveys. The busiest pedestrian crossing at The Crescent/Johnston Street/Chapman Road intersection is from the west side of The Crescent to Chapman Road. Pedestrian movements at this crossing are on average:

- Around 700 to 1,000 two-way movements in a 24-hour period
- Around 100 two-way movements per hour in the AM peak and PM peak hours

- Generally, less than 50 two-way movements per hour outside of peak periods.

The other existing pedestrian crossings at this intersection are also used, but with lower pedestrian volumes.

Traffic signal phasing

The traffic signal phasing used at The Crescent/Johnston Street/Chapman Road intersection is shown in **Figure 3-2**. The traffic signal cycle length used is 150 seconds.

The length of phase B is dictated by the length of the pedestrian crossing on the northern approach to the intersection and is fixed at 20 seconds minimum green time.

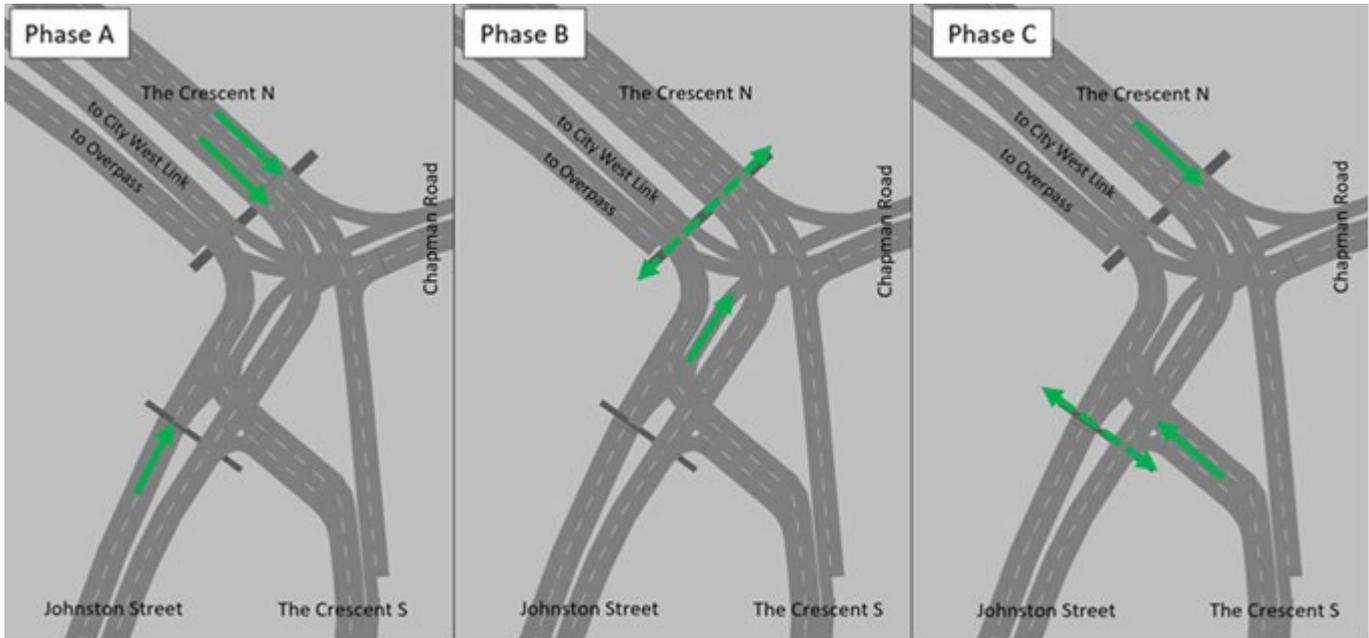


Figure 3-2: Traffic signal phasing on Johnston Street/The Crescent/Chapman Road intersection

Performance measures

Intersection performance measures used in the analysis are:

- Intersection Level of Service (LoS)
- Average queue lengths recorded at the intersection.

The intersection LoS criteria are based on the delay experienced by an average vehicle and are used to determine the performance of the intersection in the analysed network (refer to **Table 3-2**).

Table 3-2: Intersection Level of Service criteria

Delay (seconds)	LoS
<14	A
15-28	B
29-42	C
43-56	D
57-70	E
>70	F

Source: Guide to Traffic Generating Developments, RTA 2002

Modelling approach

Intersection performance was assessed using existing microsimulation (VISSIM) traffic models previously used to assess operational intersection performance for the Rozelle Interchange in the EIS and Modification report. However, to be consistent with the proposed design changes, a pedestrian crossing was added on The Crescent (northern approach to the intersection) and the right-turn from Johnston Street into The Crescent (south) was permitted.

It was assumed that the pedestrian crossing would be called in every signal cycle due to the number of pedestrians and cyclists likely to use it. The length of the pedestrian crossing dictates how long phase B should be to provide safe clearance time for pedestrians i.e. 20 seconds minimum green time. Phase B is 10 seconds longer than the maximum green time in the EIS models due to the wider carriageway and therefore slightly longer pedestrian crossing time. The modification did not include this pedestrian crossing.

Assessment

2023 results

The performance in the 2023 AM and PM peak hours is presented in **Table 3-3**.

Table 3-3: Comparison of Level of Service for EIS, modification and revised design – Project 2023

	EIS			Modification			Revised design		
	Approach	Intersection	Average queue (m)	Approach	Intersection	Average queue (m)	Approach	Intersection	Average queue (m)
2023 - AM peak hour									
The Crescent (S)	F (156s)	C (40s)	329	E (57s)	B (26s)	55	D (54s)	C (32s)	50
Chapman Rd	D (49s)		17	F (76s)		3	E (59s)		2
The Crescent (N)	A (11s)		191	B (15s)		30	B (22s)		45
Johnston St	B (22s)		128	B (25s)		17	C (41s)		25
2023 - PM peak hour									
The Crescent (S)	F (167s)	F (153s)	268	E (61s)	C (33s)	73	F (136s)	E (67s)	206
Chapman Rd	E (58s)		2	F (74s)		3	E (62s)		2
The Crescent (N)	A (14s)		23	A (14s)		24	B (19s)		32
Johnston St	F (474s)		498	D (44s)		61	F (98s)		136

In 2023, the AM peak hour level of service for the intersection dropped from LoS B to LoS C in comparison to the modification, but it is still acceptable. In the PM peak hour, the level of service for the intersection dropped in comparison to the modification from LoS C to LoS E.

Compared to the EIS, the intersection performance in the AM peak hour indicated a small improvement in delay, although the level of service remained at LoS C. There was a significant improvement in delay in the PM peak hour (157 seconds vs 67 seconds), with the level of service improving from LoS F to LoS E.

Queue lengths are forecast to be significantly shorter than in the EIS, with the queue on The Crescent (south) approach forecast to reduce by about 280 metres in the AM peak hour and 60 metres in the PM

peak hour. On Johnston Street, the queue length reduces by about 100 metres in the AM peak hour and by about 360 metres in the PM peak hour.

2033 results

The performance in the 2033 AM and PM peak hours is presented in **Table 3-4**.

Table 3-4: Comparison of Level of Service for EIS, modification and revised design – Project 2033

	EIS			Modification			Revised design		
	Approach	Intersection	Average queue (m)	Approach	Intersection	Average queue (m)	Approach	Intersection	Average queue (m)
2033 - AM peak hour									
The Crescent (S)	F (175s)	C (40s)	330	F(78s)	C (31s)	116	F(99s)	C (42s)	154
Chapman Rd	D (50s)		18	F(74s)		3	E (62s)		2
The Crescent (N)	A (12s)		187	B (16s)		37	B (23s)		55
Johnston St	B (23s)		154	B (28s)		22	D (44s)		32
2033 - PM peak hour									
The Crescent (S)	F (163s)	F (145s)	267	F(89s)	E (63s)	135	F (132s)	F (106s)	200
Chapman Rd	E (58s)		2	E (69s)		3	D (56s)		2
The Crescent (N)	A (15s)		28	B (18s)		36	B (23s)		45
Johnston St	F (483s)		498	F (124s)		195	F (247s)		389

In 2033, the performance in the AM and PM peak hours shows similar trends to the performance recorded in 2023. In the AM peak hour, the introduction of the new intersection arrangement resulted in a slight increase in average delay compared to the EIS and modification, however each scenario (EIS, modification and revised design) is forecast to achieve an LoS C. Queue lengths on Johnston Street and The Crescent (south) are also notably reduced by comparison to the EIS.

In the PM peak hour, the EIS and revised design were both forecast to operate at LoS F. However, there is a reduction in average delay and queue lengths on Johnston Street of around 110 metres and on The Crescent (south) of around 70 metres by comparison to the EIS.

In the PM peak hour, there is a reduction in LoS compared to the modification (LoS E to LoS F) and the queue on Johnston Street in the PM peak hour is forecast to increase by about 190 metres and on The Crescent (south) approach by about 70 metres. However, compared to the EIS, the queue lengths are reduced.

Summary

A summary of the 2023 and 2033 AM peak and PM peak intersection LoS is presented in **Table 3-5**.

Table 3-5: Summary of The Crescent/Johnston Street/Chapman Road intersection performance

Case/Year	Peak Hours	EIS	Modification	Revised design
2023	AM Peak	C	B	C
	PM Peak	F	C	E
2033	AM Peak	C	C	C
	PM Peak	F	E	F

The revised design would result in a reduced level of intersection performance by comparison to the proposed modification particularly in the PM peak hour. However, the revised design would result in a comparable or slight improved level of intersection performance by comparison to the EIS. The reduction in performance by comparison to the modification is as a result of:

- Reinstating the at grade, signalised pedestrian crossing to accommodate direct pedestrian and cyclist connectivity between the Rozelle Rail Yards open space, Chapman Road and the Rozelle Bay foreshore
- Maintaining the right turn movement from Johnston Street to The Crescent (south) to maintain local connectivity on the road network.

Overall, the revised design provides a satisfactory intersection performance at this busy section of the arterial road network while taking into consideration the needs of pedestrians and cyclists.

Swept path analysis

A swept path analysis has been undertaken at the intersection of The Crescent/Johnston Street/Chapman Road. A swept path analysis analyses the movement and path of different parts of a vehicle when that vehicle is undertaking a turning manoeuvre. The analysis is conservative as it assumes two heavy vehicles or a heavy vehicle and a bus side by side in the traffic lanes on The Crescent and Johnston Street as they negotiate the different approaches of the intersection.

The swept path analysis determined that the proposed intersection arrangement is feasible and could accommodate the conservative scenario of two heavy vehicles travelling side by side. The lane configuration, including line marking and alignment of kerbing and traffic islands, would be further refined during the detailed design process.

The swept path analysis indicates that a bus positioned in the indented bus stop on The Crescent citybound would not impede traffic movement in the adjacent traffic lane.

Preliminary road safety audit

Transport for NSW has undertaken a preliminary independent road safety audit focusing on the design of The Crescent/Johnston Street/Chapman Road intersection. The preliminary audit has identified some kerbing and line marking adjustments and additional signage to advise motorists of the changed traffic conditions. These recommendations will be considered during the detailed design process and in the preparation of the independent road safety audit required by Condition E56.

3.2 Urban design

Assessment approach

The assessment of potential urban design impacts associated with the proposed modification was provided in Section 6.8 of the Modification report.

An urban design assessment of the revised design has been undertaken. Two key documents provide the framework for the urban design assessment of the revised design:

- Urban Design Report for the M4-M5 Link EIS, August 2017
- Better Placed: Aligning Movement and Place (Government Architect NSW).

An assessment of the revised design using the relevant urban design objectives and principles from each of these documents is discussed in the following section.

Urban Design Report for the M4-M5 Link EIS

The Urban Design Report for the M4-M5 Link EIS was prepared having regard to a number of urban design guideline and policy documents including:

- WestConnex Motorway Urban Design Framework
- Beyond the Pavement, NSW Roads and Maritime
- NSW Sustainable Design Guidelines, Transport for NSW
- Crime Prevention through Environmental Design, Queensland Government.

This report outlined a series of urban design principles which guided proposed development. These included:

- **An integrated and collective approach** - create holistic and integrated design solutions generated by collaboration across disciplines, the community, stakeholders and government bodies.
- **An environmental vision** - create a sustainable and enduring design response which enhances and connects local ecologies, and green spaces.
- **Cross scale connection of spaces** - prioritise both local and regionally significant connections that respond to broader issues aims and initiatives of the local neighbourhoods and at the same time the city.
- **A motorway integrated within its context** - understand the existing landscape and respond in a respectful manner that seeks to enhance and or contribute back to its context.
- **Place sensitive design** - celebrate and work with the character of each place and destination, responding to their unique histories, materiality, architecture, built fabric, cultural context, landform and topography.
- **A multi-dimensional user focus** - consider holistically how a diversity of users' experience space including all ages, abilities and transport modes for a truly inclusive, universally accessible and safe outcome.

- **Revitalisation, opportunity and economics** - establish opportunities for development that supports and connects existing neighbourhoods, complements and stimulates local economies and provides opportunity for growth across existing and future local industries.

In respect to the Rozelle Rail Yards the following urban design strategies were developed:

- Connect and provide for local communities
- Enhance green links
- Integrate water sensitive urban design
- Integrate active transport links
- Integrate the motorway
- Respond to the local character
- Revitalise streets for equality of mobility
- Sensitive economic revitalisation.

Better Placed

Better Placed is a design policy prepared by the NSW Government and released in 2017. The policy outlines seven distinct objectives to define the key considerations in the design of the built environment. Achieving these objectives will ensure our cities and towns, our public realm, our landscapes, our buildings and our open spaces will be healthy, responsive, integrated, equitable and resilient. The seven objectives include:

- **Better fit:** contextual, local and of its place
- **Better performance:** sustainable, adaptable and durable
- **Better for community:** inclusive, connected and diverse
- **Better for people:** safe, comfortable and liveable
- **Better working:** functional, efficient and fit for purpose
- **Better value:** creating and adding value
- **Better look and feel:** engaging, inviting and attractive.

Urban design assessment

The introduction of the proposed overpass has resulted in the need to alter the active transport arrangements that were outlined in the EIS and relevant conditions (E120 and E121) of the project approval. The overpass is required to improve intersection performance on this congested section of the arterial road network and to provide additional capacity at the intersections so they can maintain performance with traffic generation from future projects, including the proposed Western Harbour Tunnel project if that development proceeds. By providing this additional capacity the overpass will encourage traffic to use the key arterial routes (City West Link, The Crescent and Johnston Street) rather than seeking alternative less congested routes through the local area of Annandale.

A number of design options were considered for the intersection of City West Link/The Crescent including an overpass, an at-grade intersection and a tunnel option. Each option was analysed having regard to a range of considerations including traffic performance, design quality, aesthetic outcomes, active transport connectivity, landscape character, visual impact, environmental impacts, constructability, program and cost. The overpass was on balance considered to be the most feasible option having regard to all of the relevant considerations. A summary of the options analysis for the City West Link/The Crescent intersection is presented in Section C4.1 of the Response to submissions report.

Following the public exhibition period for the proposed modification Transport for NSW considered the issues raised in the submissions and reviewed a number of elements of the proposed design. The process also involved meetings with DPIE and the NSW Government Architect's Office and consultation with local community groups and other stakeholders. From an urban design perspective, the key design changes proposed include:

- Lowering the height of the proposed overpass by around two metres at its apex so it is a similar height to the green link
- Improving the design of the southern section of the green link to improve its amenity and interface with the Rozelle Bay light rail stop
- Increasing the width of the proposed pedestrian ramp from the Rozelle Bay light rail stop to the west side of The Crescent to 4.5 metres to allow for shared use by pedestrian and cyclists
- Retaining, widening and upgrading the existing at grade signalised pedestrian crossing of The Crescent at its intersection with Johnston Street, including the introduction of a pedestrian paved surface and bicycle lanterns. As a result of this change, the multiple crossings of The Crescent and Chapman Road detailed in the Modification report are no longer proposed
- Removing the proposed shared user path bridge between Rozelle Rail Yards and the eastern side of The Crescent.

The revised design is assessed against the EIS urban design principles in **Table 3-6** and against the Better Placed design objectives in **Table 3-7**. The key urban design principles from both documents cover similar issues and advocate for similar outcomes. The key issues are summarised below, and discussion is provided on how the revised design meets the intent of the relevant urban design principles and objectives.

Holistic design solution

The revised design has resulted in a design solution which appropriately balances active transport connectivity, safety and amenity, with urban design outcomes and the objective of better accommodating traffic flows at this busy section of the arterial road network.

By increasing the width of the pedestrian ramp from the Rozelle Bay light rail stop to The Crescent, retaining and upgrading the existing at grade signalised pedestrian crossing of The Crescent and removing the multiple crossings proposed at this intersection active transport connectivity and the amenity and safety of pedestrians and cyclists have been improved. Removal of the shared user path bridge and lowering the height of the overpass will result in improved urban design outcomes and reduced visual impacts.

Collaborative approach

The revised design has been proposed in response to feedback received during the public exhibition period and as a result of a collaborative design process which has involved input from DPIE, the NSW Government Architect's office and consultation with local community groups and other stakeholders.

Cross connection of spaces

The pedestrian and cycling active transport connections proposed as part of the revised design are shown on **Figure 3-1**. The revised design prioritises the following significant active transport desire lines:

- Rozelle Rail Yards open space to Chapman Road and the Rozelle Bay foreshore
- Rozelle Rail Yards open space to Rozelle Bay light rail stop
- Johnston Street Annandale to Chapman Road and the Rozelle Bay foreshore.

The green link widened shared user path ramp and upgraded at grade signalised pedestrian crossing of The Crescent will effectively connect the Rozelle Rail Yards open space with the Rozelle Bay foreshore at Chapman Road and Bicentennial Park. As a result, it is considered that the shared user path bridge is no

longer needed as the alternative route is more direct and caters for both north/south and east/west pedestrian and cycling desire lines.

The other key north/south and east/west active transport connections proposed in the EIS, as shown in **Figure 3-3** are not impacted by the proposed modification including:

- Lilyfield Road south through the Rozelle Rail Yards open space and over City West Link to Brenan Street and the Whites Creek corridor and
- Lilyfield Road east through the Rozelle Rail Yards open space and under Victoria Road to link with Anzac Bridge and with the possibility of a future extension to the proposed metro station at White Bay.

Removal of the shared user path bridge means there will not be a grade separated active transport connection between the Rozelle Rail Yards open space and Bicentennial Park as proposed in the EIS. The alternative route is for the most part grade separated except for the at grade signalised pedestrian crossing from the west side of The Crescent to Chapman Road. This existing crossing would be retained, widened and upgraded including a different paved surface to the road lanes, installation of bicycle lanterns and a pedestrian refuge to improve safety.

The alternative route is slightly longer in distance (365 vs 330 metres) and travel time (05:56 vs 4:14 minutes) by comparison to the EIS but reduced in distance (365 vs 515 metres) and travel time (05:56 vs 6:36 minutes) by comparison to the arrangements proposed in the Modification report.

A number of options were considered for the pedestrian and cyclist infrastructure linking the Rozelle Rail Yards open space with the Rozelle Bay light rail stop and Bicentennial Park. These options were discussed in section 4.3.2 of the Modification report.

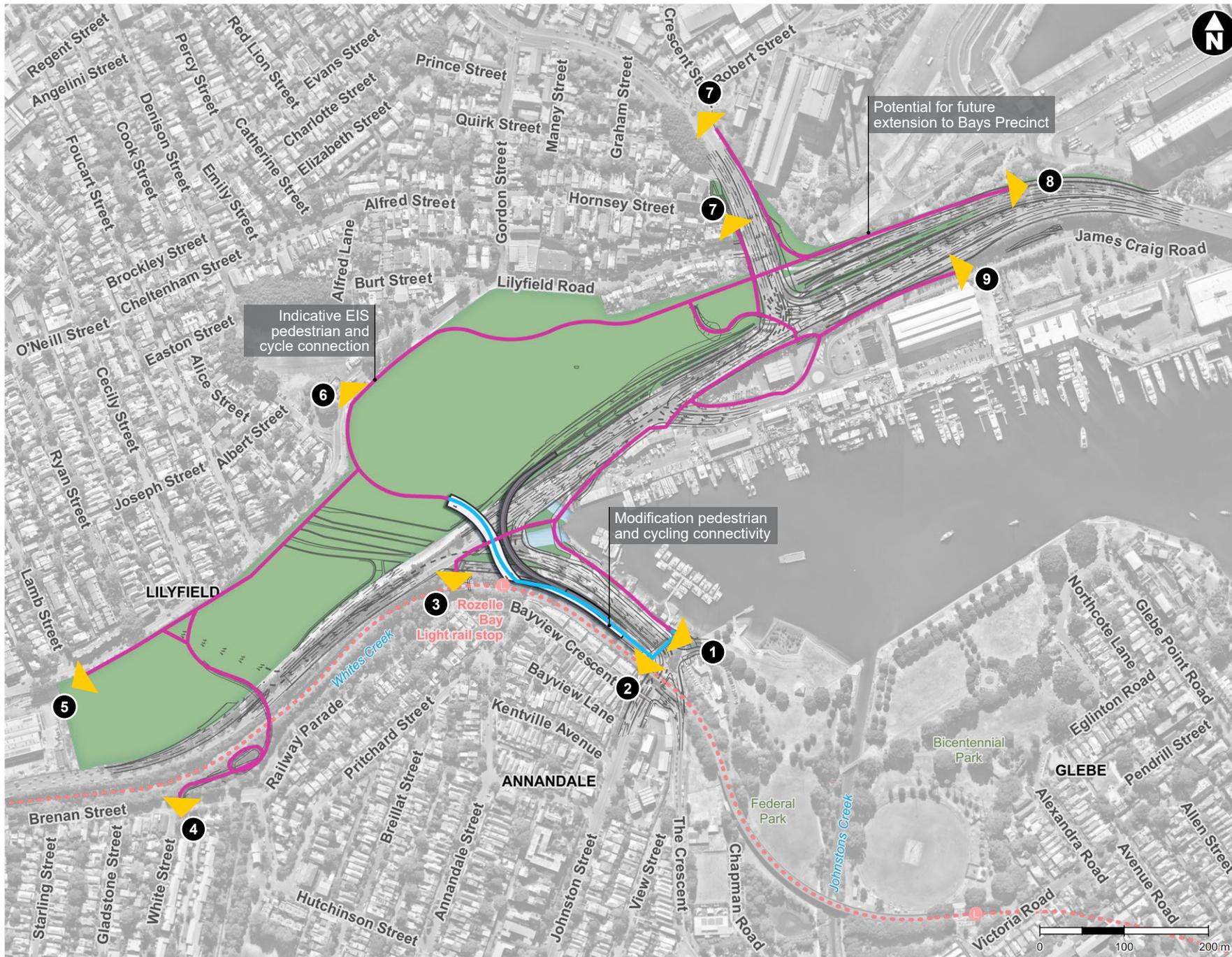
One of the options considered was an elevated shared user path bridge extending south from the Rozelle Bay light rail stop along the west side of The Crescent, turning east to cross The Crescent near Johnston street and ramping down to connect with Bicentennial Park in the vicinity of Chapman Road. This option provides similar connectivity to the EIS with no at grade road crossing required. However, this option was not preferred as it would be:

- extremely challenging to construct given the limited space available between the light rail corridor and the road and the significant constraints which would apply to any construction works within or adjacent to the light rail corridor
- more visually intrusive
- likely to detrimentally impact on the adjacent heritage listed item (the railway bridge over Johnston Street) and potential heritage item (The Crescent mural) either directly or indirectly
- likely to negatively impact on the amenity of the Rozelle Bay foreshore area as a result of the long ramp structure that would be required to return to grade.

Multiple crossings of The Crescent and Chapman Road as shown in the Modification report are no longer proposed. The crossing arrangements at this intersection have been rationalised.

The revised design retains two at grade signalised pedestrian crossings of The Crescent, one at City West Link intersection and one at the Johnston Street intersection, around 200 metres apart. These crossings provide important east/west connectivity between Railway Parade / Johnston Street and the Rozelle Bay foreshore. They also provide connectivity to the bus stops on the west and east sides of The Crescent.

As detailed in the EIS, the existing footpath along the west side of The Crescent between the Rozelle Bay light rail stop and the indented bus stop is to be removed and replaced by the shared user path ramp which provides a more direct and DDA compliant connection.



LEGEND

- Indicative EIS pedestrian and cycle connection
- Modified pedestrian and cycle connection
- ▶ Connection to broader pedestrian and cycle network

- 1** To Bicentennial Park
- 2** To Johnston Street
- 3** To Railway Parade
- 4** To Whites Creek
- 5** To Lilyfield Road
- 6** To Easton Park
- 7** To Victoria Road
- 8** To Anzac Bridge
- 9** To James Craig Road

Figure 3-3 Broader pedestrian and cycling connectivity

Imagery © Nearmap (2020)

Responding to local context

The existing character of the area is dominated by multi-lane arterial roads, several elevated bridge structures, port related maritime uses and an elevated rail corridor. As part of the approved project there are also a number of prominent structures proposed in the Rozelle Rail Yards open space area including a ventilation building, ventilation outlets, tunnel portal and the green link. In the wider area there are a number of visually prominent structures such as the White Bay Power Station, the Glebe Island Grain Silos and the Anzac Bridge.

City West Link and The Crescent are heavily trafficked arterial roads which provide a significant barrier to movement in a north/south and east/west direction. The existing and proposed open space areas within the Rozelle Rail Yards and along the Rozelle Bay foreshore area, existing public transport services (light rail, bus and ferry) and The Crescent mural are also important elements of the local context.

Prior to the commencement of construction works for the project this section of The Crescent between City West Link and Johnston Street included mature tree plantings in the former Buruwan Park, within and adjacent to sections of the light rail corridor and along the east side of The Crescent. As detailed in the EIS, many of these trees have been removed as part of the approved project and as a result the character of this area is now more open and exposed. Replacement tree planting will be proposed as part of the UDLP and in accordance with the requirements detailed in Condition E177.

Residential development in Rozelle and Annandale is largely characterised by older style period housing mostly of one and two storeys in height and located on relatively small lots ensuring a compact urban form. As a result, these residential properties rely on access to public open space areas such as Easton Park, Federal Park and Bicentennial Park.

The overpass and the green link introduce new structural elements into this existing local context but not elements which are totally foreign to the character of the area. These new elements are located within the existing road corridor and are physically separated from the closest residential areas in Annandale by the elevated light rail corridor to the west and in Rozelle by the proposed Rozelle Rail Yards open space area to the north.

Removal of the shared user path bridge reduces the number of elevated structures at the intersection from three to two and importantly removes the longest and highest of the three proposed structures. This would also reduce the physical (footprint) impact on the proposed open space area within Rozelle Rail Yards and the foreshore area adjacent to Rozelle Bay and improve the views from and to these areas. This would also provide an opportunity for the residual land along this foreshore area to be developed in the future as an extension of the open space network which exists to the south of Chapman Road.

Within the UDLP area along the east side of The Crescent opportunities exist to establish landscape plantings which will help to soften the extent of road pavement and provide a demarcation between the road and the active transport links proposed on this side of The Crescent. Landscaping treatments will be detailed in the UDLP which is being prepared in accordance with Condition E134 of the project approval. Outside of this UDLP area other opportunities exist to develop this foreshore area as part of the RLMP required by Condition E112 of the project approval.

Along the west side of The Crescent the shared user path ramp and overpass would impact on views from motorists, pedestrians and cyclists toward the northern section of the existing mural, however, views to the central and southern sections of the mural would not be impacted. In the EIS there was a pedestrian ramp proposed in this same location which would have a similar impact on views to the mural. New views of the mural would be created for pedestrians and cyclists using the shared user path ramp. Photos of the existing mural are shown in **Figure 3-4**.

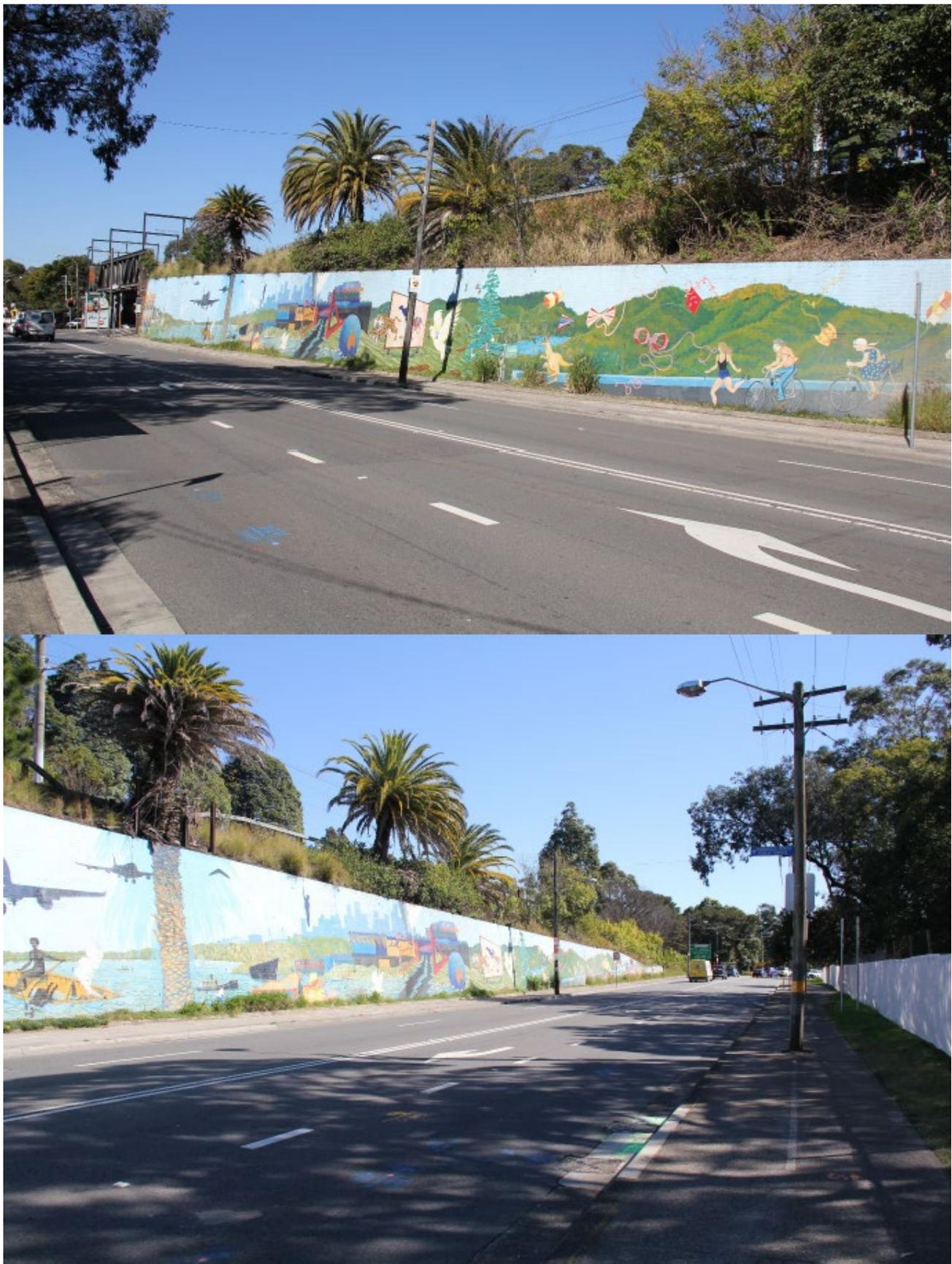


Figure 3-4: The Crescent mural

Integrated design

The overpass and the green link bridge structures have been designed to complement each other in terms of overall height, curvilinear form and structural elements (similar girder and pier types).

The urban design approach is to ensure that all major design elements form an integrated suite of architectural elements that are minimalist, contemporary and recessive in the landscape. The green link and overpass structures are simple, refined and elegant with minimal piers and abutments to maximise permeability and visual transparency. The design objective should be to ensure that non-structural elements such as safety barriers/screens, lighting and signage are integrated into the design of the structures. Further design detail would be presented in the UDLP which is being prepared in accordance with Condition E134 of the project approval.

The green link in the revised design has been designed to connect the elevated platform of the proposed ventilation building within the Rozelle Rail Yards open space with the existing level of the Rozelle Bay light rail platform. This bridge will be around 15 metres wide and at its highest point the bridge deck will be around 8.5 metres above the road level below. The bridge deck will have sufficient depth to accommodate landscape plantings along the majority of its length. The landscaping will soften the structure and provide enhanced amenity for active transport users. The southern section of the green link tapers down to meet the lower level of the light rail platform and as a result the structure is not able to provide the required depth of soil to support landscaping plantings at this end of the green link. Transport for NSW is reviewing the design of the southern section of the green link to improve its amenity and interface with the Rozelle Bay light rail stop.

Landscaping at road surface level is proposed within some of the traffic islands at the intersection of City West Link/The Crescent and in association with the overpass structure. This will help to soften views of the infrastructure and improve the pedestrian and motorists experience at ground level. There are also opportunities to incorporate lighting of the bridge structures to create visual interest.

Details of materials to be used in the proposed bridge and ramp structures, landscape, paving treatments, lighting and wayfinding signage would be confirmed as part of the UDLP for Rozelle Interchange which is being prepared in accordance with Condition E134.

Catering for multiple users and transport modes

The revised design caters for a diverse range of users including pedestrians, cyclists and motorists. The active transport connections cater for both recreational and public transport (light rail, bus and ferry) users and for movements in both north/south and east/west directions. The connections will be used by residents in the suburbs of Rozelle and Annandale as well as by people from a broader catchment including those commuting to and from work in the Sydney CBD and adjacent suburbs.

The active transport links are direct and safe with surveillance available from the Rozelle Rail Yards open space, the Rozelle Bay light rail stop, motorists and pedestrians/cyclists at both ground and elevated levels. The curvature of the green link and the landscaping proposed along the majority of its length will limit surveillance opportunities to some extent but nonetheless this link would provide appropriate safety for users. The active transport links will be well lit and are DDA compliant in terms of ramp grades.

Comfortable and liveable

The revised design supports improved connectivity for residents in the suburbs of Rozelle and Annandale to open spaces areas, public transport services and regional active transport links, including connections to the Sydney CBD via Anzac Bridge, Victoria Road and the foreshore open space areas in Bicentennial Park. This will provide further opportunities for social interaction and physical activity which supports mental wellbeing.

Sustainable design outcomes

The revised design achieves a more holistic design solution which better balances the needs of motorists for improved traffic capacity and efficiency with the needs of active transport users for improved connectivity, safety and amenity. By comparison with the arrangements proposed in the modification, the revised design results in reduced traffic performance at The Crescent/Johnston Street/Chapman Road intersection. This is as a result of retaining the at grade signalised pedestrian crossing of The Crescent and retaining the right turn movement from Johnston Street to The Crescent south. Nonetheless the intersection performance remains similar, or slightly improved by comparison, to the EIS arrangement.

The revised design has achieved more sustainable design outcomes by:

- Removing the shared user path bridge
- Rationalising the multiple at grade pedestrian crossing arrangements at the intersection of The Crescent/Johnston Street/Chapman Road and
- Retaining the right turn movement from Johnston Street to The Crescent south thereby providing for more direct and efficient local traffic movements.

There are a number of CoA which relate directly to the achievement of more sustainable design outcomes including:

- Condition E198 – preparation of a Water Reuse Strategy which sets out options for reuse of collected stormwater and groundwater during construction and operation of the project
- Condition E199 – preparation of a Sustainability Strategy to achieve a minimum Excellent Design and As Built rating under the Infrastructure Sustainability Council of Australia (ISCA) rating tool
- Condition E201 – investigate opportunities to reduce operational greenhouse gas emissions during detailed design.

Creating value

The revised design will create value by supporting improved connectivity for residents in the suburbs of Rozelle and Annandale to open spaces areas, public transport services (including the Rozelle Bay light rail stop, bus stops on The Crescent and the Chapman Road ferry wharf) and regional active transport links (refer **Figure 3-3**) which will connect to Lilyfield Road, Whites Creek, Victoria Road, Anzac Bridge and potentially into the Bays Precinct to access the proposed metro station at White Bay.

The revised design responds to a number of issues raised by the local community during the consultation process and which will result in improvements in the amenity and safety of active transport users.

Table 3-6: Assessment of the revised design using the EIS urban design principles

EIS urban design principles	Assessment of revised design
<p><i>An integrated and collective approach</i> <i>Create holistic and integrated design solutions generated by collaboration across disciplines, the community, stakeholders and government bodies.</i></p>	<p>The revised design has resulted in a design solution which appropriately balances active transport connectivity, safety and amenity, with design outcomes and the objective of better accommodating traffic flows at this busy section of the arterial road network.</p> <p>The revised design has been proposed in response to feedback received during the public exhibition period and a collaborative design process which has involved input from DPIE, the NSW Government Architect’s office and consultation with local community groups and other stakeholders.</p>
<p><i>An environmental vision</i> <i>Create a sustainable and enduring design response which enhances and connects local ecologies, and green spaces.</i></p>	<p>The proposed green link, shared user path ramp and upgraded signalised pedestrian crossing of The Crescent will effectively connect the Rozelle Rail Yards open space with the Rozelle Bay foreshore at Chapman Road and Bicentennial Park.</p> <p>For the most part the proposed connections are grade separated except for the at grade signalised pedestrian crossing from the west side of The Crescent to Chapman Road. The alternative route is for the most part grade separated except for the at grade signalised pedestrian crossing from the west side of The Crescent to Chapman Road. This existing crossing would be retained, widened and upgraded including paving treatments, installation of bicycle lanterns and a pedestrian refuge to improve safety.</p> <p>The alternative route is slightly longer in distance (365 vs 330 metres) and travel time (05:56 vs 4:14 minutes) by comparison to the EIS but reduced in distance (365 vs 515 metres) and travel time (05:56 vs 6:36 minutes) by comparison to the arrangements proposed in the Modification report.</p> <p>Multiple crossings of The Crescent and Chapman Road as shown in the Modification report are no longer proposed. The crossing arrangements at this intersection have been rationalised.</p> <p>Removal of the shared user path bridge would reduce the physical (footprint) impact and visual impact on the proposed open space area within Rozelle Rail Yards and the foreshore area adjacent to Rozelle Bay which enhances these areas.</p> <p>As detailed in the EIS, the existing footpath along the west side of The Crescent between the Rozelle Bay light rail stop and the indented bus stop is to be removed and replaced by the shared user path ramp which provides a more direct and DDA compliant connection.</p>

EIS urban design principles	Assessment of revised design
<p>Cross scale connection of spaces <i>Prioritise both local and regionally significant connections that respond to broader issues aims and initiatives of the local neighbourhoods and at the same time the city.</i></p>	<p>The revised design prioritises the following significant active transport connections:</p> <ul style="list-style-type: none"> • Rozelle Rail Yards open space to Chapman Road and the Rozelle Bay foreshore • Rozelle Rail Yards open space to Rozelle Bay light rail stop • Johnston Street Annandale to Chapman Road and the Rozelle Bay foreshore. <p>The other key active transport connections proposed in the EIS are not impacted by the proposed modification including:</p> <ul style="list-style-type: none"> • Lilyfield Road south through the Rozelle Rail Yards open space and over City West Link to Brenan Street and the Whites Creek corridor and • Lilyfield Road east through the Rozelle Rail Yards open space and under Victoria Road to link with Anzac Bridge and with the possibility of a future extension to the proposed metro station at White Bay.
<p>A motorway integrated within its context <i>Understand the existing landscape and respond in a respectful manner that seeks to enhance and or contribute back to its context.</i></p>	<p>The existing landscape character of the area is dominated by multi-lane arterial roads, several elevated bridge structures, port related maritime uses and an elevated rail corridor. As part of the approved project there are also a number of prominent structures proposed in the Rozelle Rail Yards including a ventilation building, ventilation outlets, tunnel portal and the green link which crosses the City West Link and The Crescent.</p> <p>City West Link and The Crescent are heavily trafficked arterial roads which provide a significant barrier to movement in a north/south and east/west direction. The existing and proposed open space areas within the Rozelle Rail Yards and along the Rozelle Bay foreshore area and existing public transport services (light rail, bus and ferry) are also important elements of the local context. There is an opportunity to provide improved active transport connections which can seamlessly connect these open space areas and improve access to existing public transport services.</p> <p>As detailed in the EIS, most of the mature tree plantings in the former Buruwan Park, within and adjacent to sections of the light rail corridor and along the east side of The Crescent have been removed as part of construction works associated with the approved project. As a result, the character along this section of The Crescent is now more open and exposed. Replacement tree planting will be proposed as part of the UDLP and in accordance with the requirements detailed in Condition E177.</p>

EIS urban design principles	Assessment of revised design
	<p>Residential development in Rozelle and Annandale is largely characterised by older style period housing mostly of one and two storeys in height and located on relatively small lots ensuring a compact urban form. As a result, these residential properties rely on access to public open space areas such as Easton Park, Federal Park and Bicentennial Park.</p> <p>The overpass introduces a new element into this existing context but not one which is totally foreign to this area. These new elements are located within the existing road corridor and are physically separated from the closest residential areas in Annandale by the elevated light rail corridor to the west and in Rozelle by the proposed Rozelle Rail Yards open space area to the north.</p> <p>The overpass and the green link structures have been designed to complement each other in terms of overall height, curvilinear form and structural elements (similar girder and pier types). The structures are simple, refined and elegant with minimal piers and abutments to maximise permeability and visual transparency. The green link has been designed to connect the elevated platform of the proposed ventilation building within the Rozelle Rail Yards with the existing light rail platform. Given its width, height and the depth of its deck structure, the green link will be a prominent structure. This bridge will accommodate landscape plantings along the majority of its length which will soften the structure and provide enhanced amenity for active transport users.</p> <p>The Crescent mural is also an important element of the local context and has potential heritage significance. The widened shared user path ramp between Rozelle Bay light rail stop and the west side of The Crescent will not directly impact on The Crescent mural but will impact on views to the northern section of the mural. Views to the central and southern sections of the mural would not be impacted. As part of the UDLP for the Rozelle Interchange opportunities to deliver public art within the Rozelle Rail Yards will be explored as detailed in Condition E134(n).</p>

EIS urban design principles	Assessment of revised design
<p>Place sensitive design <i>Celebrate and work with the character of each place and destination, responding to their unique histories, materiality, architecture, built fabric, cultural context, landform and topography.</i></p>	<p>The green link has been designed to respond to the topography by connecting the elevated platform of the proposed ventilation building within the Rozelle Rail Yards with the existing light rail platform. Given its width, height and the depth of its deck structure, the green link will be a prominent structure. The bridge will accommodate landscape plantings along the majority of its length which will soften the structure and provide enhanced amenity for active transport users.</p> <p>From the light rail stop the shared user path ramp will connect back to street level on the west side of The Crescent corner and a widened and upgraded at grade signalised crossing of The Crescent will provide the connection to the open space areas along the Rozelle Bay foreshore.</p> <p>Details of materials to be used for the proposed green link, overpass and shared user path ramp structures, landscaping, paving treatments, lighting, signage and public art would be confirmed as part of the UDLP for Rozelle Interchange which is being prepared in accordance with Condition E134.</p> <p>The widened shared user path ramp will not directly impact on The Crescent mural but will impact on views to the northern section of the mural. Views to the central and southern sections of the mural would not be impacted.</p>
<p>A multi-dimensional user focus <i>Consider holistically how a diversity of users experience space including all ages, abilities and transport modes for a truly inclusive, universally accessible and safe outcome.</i></p>	<p>The revised design caters for a diverse range of users including pedestrians, cyclists and motorists. The active transport connections cater for both recreational and public transport (light rail, bus and ferry) users and for movements in both north/south and east/west directions. The connections will be used by residents in the suburbs of Rozelle and Annandale as well as by people from a broader catchment including those commuting to and from work in the Sydney CBD and adjacent suburbs.</p> <p>The active transport links are direct and safe with good surveillance available from the Rozelle Rail Yards open space, the Rozelle Bay light rail stop and motorists and pedestrians/cyclists. The curvature of the green link and the landscaping proposed along the majority of its length will limit surveillance opportunities to some extent but nonetheless this link would provide appropriate safety for users. The active transport links will be well lit and designed to be DDA compliant.</p>

EIS urban design principles	Assessment of revised design
<p><i>Revitalisation, opportunity and economics</i> <i>Establish opportunities for development that supports and connects existing neighbourhoods, complements and stimulates local economies and provides opportunity for growth across existing and future local industries.</i></p>	<p>The revised design provides active transport connectivity in both a north/south and east/west direction to connect existing neighbourhoods and provide improved access to open space areas and public transport. Removal of the shared user path bridge would reduce the impact on the foreshore area adjacent to Rozelle Bay and the City West Link/The Crescent intersection. This would provide an opportunity for this area to be developed in the future as part of the RLMP required by Condition E112.</p>

Table 3-7: Assessment of the revised design using the Better Placed objectives

Better Placed objectives	Assessment of the revised design
<p>Better fit: contextual, local and of its place <i>The process of aligning movement and place necessarily requires an authentic understanding of local context – what constitutes a place, where are they located, how do they perform and what do they need to be successful.</i></p>	<p>The existing character of the area is dominated by multi-lane arterial roads, several elevated bridge structures, port related maritime uses and an elevated rail corridor. As part of the approved project there are also a number of prominent structures proposed in the Rozelle Rail Yards including a ventilation building, ventilation outlets, tunnel portal and the green link which crosses the City West Link and The Crescent.</p> <p>City West Link and The Crescent are heavily trafficked arterial roads which provide a significant barrier to movement in a north/south and east/west direction. The existing and proposed open space areas within the Rozelle Rail Yards and along the Rozelle Bay foreshore area and existing public transport services (light rail, bus and ferry) are also important elements of the local context. There is an opportunity to provide improved active transport connections which can seamlessly connect these open space areas and improve access to existing public transport services.</p> <p>As detailed in the EIS, most of the mature tree plantings in the former Buruwan Park, within and adjacent to sections of the light rail corridor and along the east side of The Crescent have been removed as part of construction works associated with the approved project. As a result, the character along this section of The Crescent is now more open and exposed. Replacement tree planting will be proposed as part of the UDLP and in accordance with the requirements detailed in Condition E177.</p> <p>Residential development in Rozelle and Annandale is largely characterised by older style period housing mostly of one and two storeys in height and located on relatively small lots ensuring a compact urban form. As a result, these residential properties rely on access to public open space areas such as Easton Park, Federal Park and Bicentennial Park.</p> <p>The overpass introduces a new element into this existing context but not one which is totally foreign to this area. These new elements are located within the existing road corridor and are physically separated from the closest residential areas in Annandale by the elevated light rail corridor to the west and in Rozelle by the proposed Rozelle Rail Yards open space area to the north.</p> <p>The overpass and the green link structures have been designed to complement each other in terms of overall height, curvilinear form and structural elements (similar girder and pier types). The structures are simple, refined and elegant with minimal piers and abutments to maximise permeability and visual transparency. The green link has been designed to connect the elevated platform of the proposed ventilation building within the Rozelle Rail Yards with the existing light rail platform. Given its width, height and the depth of its deck structure, the green link will be a prominent structure. This bridge will accommodate landscape plantings along the majority of its length which will soften the structure and provide enhanced amenity for active transport users.</p>

Better Placed objectives	Assessment of the revised design
	<p>The Crescent mural is also an important element of the local context and has potential heritage significance. The widened shared user path ramp between Rozelle Bay light rail stop and the west side of The Crescent will not directly impact on The Crescent mural but will impact on views to the northern section of the mural. Views to the central and southern sections of the mural would not be impacted.</p> <p>As part of the UDLP for the Rozelle Interchange opportunities to deliver public art within the Rozelle Rail Yards will be explored as detailed in Condition E134(n).</p>
<p>Better performance: sustainable, adaptable and durable. <i>Environmental sustainability and responsiveness is essential to meet the highest performance standards for living and working. Sustainability is no longer an optional extra but a fundamental aspect of functional, whole-of life design.</i></p>	<p>The revised design as resulted in a design solution which appropriately balances objectives about active transport connectivity, urban design outcomes and traffic performance at this busy section of the arterial road network.</p> <p>Removal of the shared user path bridge, rationalisation of the at grade pedestrian crossing arrangements at the intersection of The Crescent/Johnston Street/Chapman Road and retention of the right turn movement at this intersection to provide for more direct local traffic movements are examples of how the proposed design has prioritised efficiency of movement and achieved more sustainable design outcomes during both the construction and operational phases.</p> <p>CoA which relate to the achievement of more sustainable design outcomes include:</p> <ul style="list-style-type: none"> • Condition E198 – preparation of a Water Reuse Strategy which sets out options for reuse of collected stormwater and groundwater during construction and operation of the project • Condition E199 – preparation of a Sustainability Strategy to achieve a minimum Excellent Design and As Built rating under the ISCA rating tool • Condition E201 – investigate opportunities to reduce operational greenhouse gas emissions during detailed design.

Better Placed objectives	Assessment of the revised design
<p>Better for community: inclusive, connected and diverse <i>The process of aligning movement and place requires both consideration of the local area, and input from the local community through engagement and inclusive methods of project design and development that involve different stakeholders and experts skilled in place and movement.</i></p>	<p>In relation to consideration of the local area please see response to the Better Fit objective above.</p> <p>The revised design has been proposed in response to feedback received during the public exhibition period for the modification and a collaborative design process which has involved input from DPIE, the NSW Government Architect's Office and consultation with local community groups and other stakeholders including the relevant local councils.</p>
<p>Better for people: safe, comfortable and liveable <i>The built environment is a foundation for community health, providing opportunities for physical activity (active and passive exercise), and social interaction which supports enhanced mental wellbeing.</i></p>	<p>The revised design prioritises the following significant active transport connections:</p> <ul style="list-style-type: none"> • Rozelle Rail Yards open space to Chapman Road and the Rozelle Bay foreshore • Rozelle Rail Yards open space to Rozelle Bay light rail stop • Johnston Street Annandale to Chapman Road and the Rozelle Bay foreshore. <p>These active transport links will support improved connectivity for residents in the suburbs of Rozelle and Annandale to open spaces areas, public transport services and regional active transport links, including connections to the Sydney city via Anzac Bridge. This will provide further opportunities for physical activity which supports mental wellbeing.</p> <p>For the most part the proposed connections are grade separated except for the at grade signalised pedestrian crossing from the west side of The Crescent to Chapman Road. This existing crossing would be retained, widened and upgraded including paving treatments, installation of bicycle lanterns and a pedestrian refuge to improve safety.</p> <p>Multiple crossings of The Crescent and Chapman Road as shown in the Modification report are no longer proposed. The crossing arrangements at this intersection have been rationalised and there are now only two signalised crossings proposed – one crossing of The Crescent and one crossing of Johnston Street.</p>

Better Placed objectives	Assessment of the revised design
<p>Better working: functional, efficient and fit for purpose <i>A well-functioning place and movement network includes options for people to choose different transport modes to suit their needs and daily routines.</i></p>	<p>The revised design has resulted in a design solution which appropriately balances active transport connectivity, safety and amenity, with urban design outcomes and the objective of better accommodating traffic flows at this busy section of the arterial road network.</p> <p>By providing improved connectivity between communities and open space areas and improved access to public transport services, the revised design would support a range of different transport modes including walking, cycling, public transport and private vehicle traffic.</p>
<p>Better value: Creating and adding value <i>Aligning movement and place stands to provide better value – both in terms of direct social, environmental, and economic value as well as in terms of user satisfaction and reflection of community standards.</i></p>	<p>The revised design will create value by supporting improved connectivity for residents in the suburbs of Rozelle and Annandale to open spaces areas, public transport services and regional active transport links.</p> <p>The revised design responds to a number of issues raised by the local community during the consultation process including concerns about the amenity and safety of active transport users.</p>
<p>Better look and feel: engaging, inviting and attractive <i>A balanced approach to movement and better alignment with place needs in project delivery provides the opportunity for a well-designed outcome that considers the integration of movement networks with the local built environment through responding to character, materials, landscape and other key urban design components.</i></p>	<p>The revised design appropriately balances active transport connectivity, safety and amenity, with design outcomes and the objective of better accommodating traffic flows at this busy section of the arterial road network. The revised design effectively integrates the movement network with important elements of the built environment including open space areas, public transport services and broader regional active transport links.</p> <p>Removal of the shared user path bridge would reduce the impact on the foreshore area adjacent to Rozelle Bay and the City West Link/The Crescent intersection. This would provide an opportunity for this area to be developed in the future as an extension of the open space network which exists along the foreshore to the south of Chapman Road.</p> <p>Landscaping at road surface level is proposed within some of the traffic islands at the intersection of City West Link/The Crescent and in association with the overpass structure. This will help to soften views of the infrastructure and improve the pedestrian and motorists experience at ground level.</p> <p>Details of materials to be used for the proposed green link, overpass and shared user path ramp structures, landscaping, paving treatments, lighting and signage would be confirmed as part of the UDLP for Rozelle Interchange which is being prepared in accordance with Condition E134.</p>

3.3 Landscape character and visual impacts

The assessment of potential landscape character and visual impacts associated with the proposed modification was provided in Section 6.7 of the Modification report.

The assessment identified that the landscape character and visual impacts from the proposed modification were generally considered to be consistent with the approved project with the exception of the residents located in the northern part of the apartments at 300 Johnston Street and in Bayview Crescent. As a result of the additional elevated elements such as the overpass and shared user path bridge it was considered that the residents at these locations would experience increased visual impacts by comparison to the infrastructure assessed in the EIS.

The proposed design changes which are most relevant to the consideration landscape character and visual impacts include the lowering of the overpass by around two metres at its apex, widening of the pedestrian ramp to 4.5 metres and removal of the shared user path bridge. These changes would reduce the visual impact associated with the modification when viewed from a number of vantage points within the local area.

Approach to assessment

The landscape character and visual impact assessment presented in this chapter has been undertaken in accordance with *Environmental Impact Assessment Practice Note – Guidelines for Landscape Character and Visual Impact Assessment* (NSW Roads and Maritime Services (Roads and Maritime) 2013a). This method is widely accepted by the NSW Government and is relevant to the project in that it addresses changes to corridor infrastructure within an urban setting.

The method applied for the landscape character and visual assessment for the revised design comprised:

- A sensitivity analysis of existing landscape zones or views subject to change
- An assessment of the magnitude of change on that zone or view.

Sensitivity and magnitude ratings are applied according to the matrix provided in **Table 3-8**.

Potential landscape character and visual impacts would be reduced by the application of the relevant CoA and EMM.

Table 3-8 : Landscape character and visual impact rating matrix

Visual impact		Magnitude of change			
		High	Moderate	Low	Negligible
Sensitivity of receivers	High	High	High–Moderate	Moderate	Negligible
	Moderate	High–Moderate	Moderate	Moderate–Low	Negligible
	Low	Moderate	Moderate–Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Source: Roads and Maritime (2013)

Landscape character assessment

A landscape character assessment has been undertaken of the revised design. This assessment has followed the same approach that was used for the M4-M5 Link EIS including adoption of the same landscape character zones (LCZs) and similar sensitivity and magnitude ratings to determine the overall extent of impacts. The relevant LCZs are shown in **Figure 3-5**. The only change has been to review the sensitivity and magnitude ratings having regard to the specific elements which form part of the revised design and given their proximity to the LCZs identified in the EIS.).

A summary of the outcomes of the landscape character assessment for the revised design is provided in **Table 3-9**. The LCZ most likely to be impacted by the revised design is LCZ 6 – Annandale Street and Young Street precinct which has a rating of high-moderate. This is because of the proximity of the precinct to the elevated overpass and green link structures and the high sensitivity of this residential precinct. The landscape character impacts for all other LCZs were rated moderate or below.

The existing visual character of the area is dominated by heavily trafficked multi-lane arterial roads, several elevated bridge structures, port related maritime uses and an elevated rail corridor. The existing and proposed open space areas within the Rozelle Rail Yards and along the Rozelle Bay foreshore area and The Crescent mural are also important landscape elements.

As detailed in the EIS, most of the mature tree plantings in the former Buruwan Park, within sections of the light rail corridor and along the east side of The Crescent have been removed as part of construction works associated with the approved project. As a result, the character along this section of The Crescent is now more open and exposed. Replacement tree planting will be proposed as part of the UDLP and in accordance with the requirements detailed in Condition E177.

Residential development in Rozelle and Annandale is largely characterised by older style period housing mostly of one and two storeys in height and located on relatively small lots ensuring a compact urban form.

As part of the approved project there are also a number of prominent structures proposed in the Rozelle Rail Yards open space area including a ventilation building, ventilation outlets, tunnel portal and the green link bridge. In the wider area there are a number of visually prominent structures such as the White Bay Power Station, the Glebe Island Grain Silos and the Anzac Bridge.

The overpass and the green link introduce new structural elements into this existing context but not elements which are totally foreign to the character of the area. These new elements are located within the existing road corridor and are physically separated from the closest residential areas by the elevated light rail corridor to the west and the proposed Rozelle Rail Yards open space area to the north. As a result, it is considered that the proposed elevated structures are reasonably consistent with the existing and emerging visual character in the vicinity of this major intersection.

Table 3-9: Revised design - summary of landscape character impacts

Landscape character zone	Sensitivity to change	Magnitude of change	Overall impact rating
LCZ 4 – Glebe Foreshore Parklands	Moderate	Moderate	Moderate
LCZ 5 – Johnston Street Precinct	High	Negligible	Negligible
LCZ 6 – Annandale Street and Young Street precinct	High	Moderate	High-Moderate

Landscape character zone	Sensitivity to change	Magnitude of change	Overall impact rating
LCZ 13 – Easton Park residential precinct	High	Low	Moderate
LCZ 16 – Rozelle Bay wharves precinct	Low	Moderate	Moderate-Low
LCZ 17 – City West Link precinct	Low	High	Moderate
LCZ 18 – Rozelle light rail corridor and Whites Creek canal precinct	Moderate	Moderate	Moderate
LCZ 19 – Rozelle Rail Yards precinct	Low	Moderate	Moderate-Low

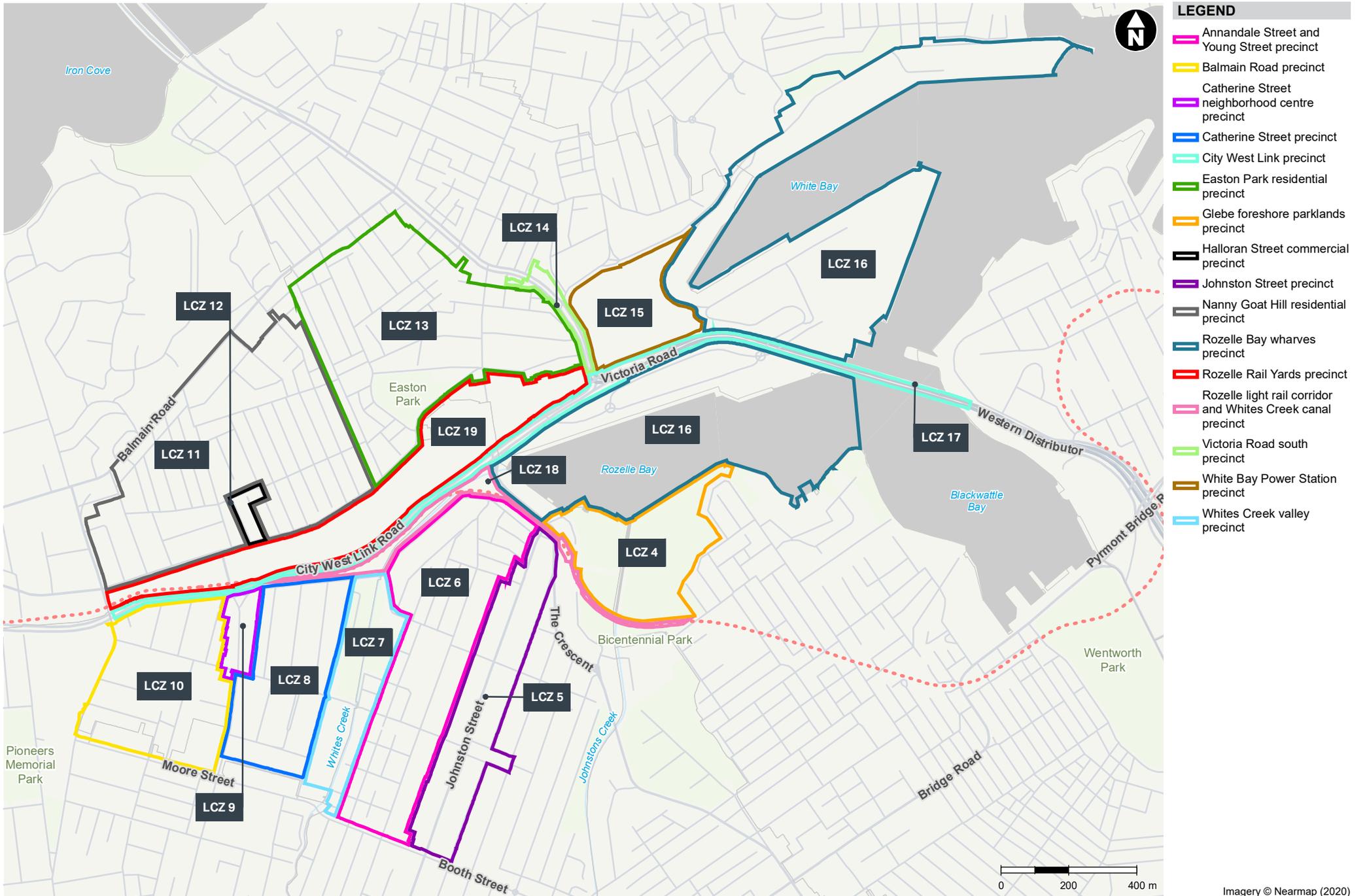


Figure 3-5 Landscape Character Zones

Visual impact assessment

A visual impact assessment has been undertaken of the revised design. This assessment has followed the same approach that was used for the M4-M5 Link EIS including adoption of the same receiver locations and similar sensitivity and magnitude ratings to determine the overall extent of impacts. The only change has been to review the sensitivity and magnitude ratings having regard to the specific elements which form part of the revised design and given their proximity to the receiver locations identified in the EIS. An additional sensitive receiver location has also been included for pedestrian and cyclists near the intersection of City West Link and The Crescent.

The sensitive receiver locations for the visual impact assessment include:

- Residential properties located to the west in Annandale along Bayview Crescent and at 300 Johnston Street
- Residential properties located to the north in Rozelle along Lilyfield Road
- Rozelle Bay light rail stop
- Recreational users in Bicentennial Park
- Pedestrians and cyclists travelling near the intersection of City West Link and The Crescent adjacent to the foreshore areas of Rozelle Bay
- Motorists travelling along City West Link and The Crescent in both directions.

A summary of the outcomes of the visual impact assessment for the revised design is provided **Table 3-10**.

Removal of the shared user path bridge would be a significant and positive change in respect to visual impacts. It would reduce the number of elevated structures at the intersection from three to two. This bridge would be a prominent structure with an overall length of around 270 metres and a maximum height of around 11 metres (including safety screens). Removal of this bridge would also reduce the physical (footprint) impact on the proposed Rozelle Rail Yard open space area and the foreshore area adjacent to Rozelle Bay.

Landscaping at road surface level is also proposed in some of the traffic islands at the intersection of City West Link/The Crescent and in association with the overpass structure. This will help to soften views of the infrastructure and improve the pedestrian and motorists experience at ground level. The final landscape design will be subject to the UDLP process.

Indicative visualisations of the modification are presented in **Figure 3-6** to **Figure 3-10**.



Figure 3-6: Indicative view looking east from City West Link (10 years following project opening)



Figure 3-7: Indicative view looking west from The Crescent (east) (10 years following project opening)



Figure 3-8: Indicative view from the green link towards the Rozelle Bay light rail stop (10 years following project opening)



Figure 3-9: Indicative view from the Rozelle Bay light rail stop along the green link (10 years following project opening)

Indicative view – design elements are subject to the Urban Design and Landscape Plan.



Figure 3-10: Indicative view from the Rozelle Bay light rail stop looking south east (10 years following project opening)

Table 3-10: Revised design - summary of visual impacts

Receptor	Sensitivity to impact	Magnitude of impact	Overall impact rating	Comment
Residential (Annandale - Bayview Crescent)	High	Moderate	High-Moderate	<p>The green link, overpass, traffic using the overpass and the shared user path ramp would be visible for some residences along Bayview Crescent. Some separation is provided by the light rail corridor and changes in topography. Existing trees would also provide some screening of views from these receivers.</p> <p>Existing views from these properties toward Rozelle Bay, Anzac Bridge and the city skyline would not be impacted to any significant degree although the new built form elements would be visible in the foreground.</p> <p>Lighting of the green link, overpass and shared user path ramp would be visible at night albeit in an area that is already well lit. Condition E122 requires the project to minimise light spillage to residential properties and to manage residual night lighting impacts to properties adjacent to the M4-M5 Link project.</p> <p>Reduction in the height of the overpass by two metres at its apex and removal of the shared user path bridge (located in the background of this view) would reduce the visual impact on these receivers to some degree.</p>

Receptor	Sensitivity to impact	Magnitude of impact	Overall impact rating	Comment
Residential (Annandale - 300 Johnston Street)	High	High	High	<p>The green link, overpass, traffic using the overpass and the shared user path ramp would be visible for the residences at the northern end of 300 Johnston Street. Some separation is provided by the change in topography.</p> <p>Existing views from these properties toward Rozelle Bay, Anzac Bridge and the city skyline would not be impacted to any significant degree although the new built form elements would be visible in the foreground.</p> <p>Lighting of the green link, overpass and shared user path ramp would be visible at night albeit in an area that is already well lit. Condition E122 requires the project to minimise light spillage to residential properties and to manage residual night lighting impacts to properties adjacent to the M4-M5 Link project.</p> <p>Reduction in the height of the overpass by two metres at its apex and removal of the shared user path bridge (located in the background of this view) would reduce the visual impact on these receivers to some degree.</p>
Residential (Rozelle – Lilyfield Road)	Moderate	Low	Moderate-Low	<p>Some elements of the green link and overpass will be visible for residents in Rozelle along sections of Lilyfield Road and adjacent streets albeit at some distance away and separated by the proposed open space area at Rozelle Rail Yards. Landscape plantings in this open space area and the proposed ventilation building and outlets in the foreground of this view will reduce the visual impact.</p> <p>Removal of the shared user path bridge and reduction in the height of the overpass by two metres at its apex (both located in the background of this view) would reduce the visual impact on these receivers to some degree.</p>

Receptor	Sensitivity to impact	Magnitude of impact	Overall impact rating	Comment
Motorists on City West Link	Low	Moderate	Moderate-Low	<p>The green link, overpass and shared user path ramp will be visible to motorists on City West Link and The Crescent to varying extents depending on their direction of travel. These elevated structures are located within the road reserve and are considered to be consistent with the existing and emerging visual character in this section of the road network.</p> <p>The overpass will create new elevated views for motorists in an easterly and north easterly direction.</p> <p>Landscape plantings are proposed within some of the traffic islands at the intersection of City West Link/The Crescent and in association with the overpass structure. This will help to soften views of the infrastructure and improve the driver experience at ground level.</p> <p>Removal of the shared user path bridge and reduction in the height of the overpass by two metres at its apex would reduce the visual impact on motorists to some degree.</p>
Recreational (Bicentennial Park)	Moderate	Low	Moderate-Low	<p>Recreational users of Bicentennial Park would have visibility of some parts of the green link and overpass albeit at some distance away and separated by Rozelle Bay and screening vegetation located in the vicinity of Chapman Road.</p> <p>Removal of the shared user path bridge and reduction in the height of the overpass by two metres at its apex located in the background of this view would reduce the visual impact on these recreational users to some degree.</p>

Receptor	Sensitivity to impact	Magnitude of impact	Overall impact rating	Comment
Light rail users	Moderate	High	High-Moderate	<p>From the Rozelle Bay light rail stop light rail users would have clear visibility of the green link, overpass and associated operational traffic from an elevated position. Existing views from the light rail stop toward Rozelle Bay, Anzac Bridge and the city skyline would not be impacted to any significant degree although the new built form elements would be visible in the foreground.</p> <p>Lighting of the green link, overpass and shared user path ramp would also be visible at night albeit in an area that is already well lit.</p> <p>Reduction in the height of the overpass by two metres at its apex and removal of the shared user path bridge would reduce the visual impact on these light rail users to some degree.</p>
Pedestrians and cyclists near the intersection of City West Link and The Crescent adjacent to Rozelle Bay	Low	High	Moderate	<p>Pedestrians and cyclists at this point would have clear visibility of the green link, overpass and associated operational traffic and the shared user path ramp from ground level. These structures would be viewed against the backdrop of the elevated light rail corridor to the west and the ventilation building, outlets, tunnel portal and landscape plantings within the Rozelle Rail Yards open space to the north.</p> <p>Landscape plantings are proposed within some of the traffic islands at the intersection of City West Link/The Crescent and in association with the overpass structure. This will help to soften views of the infrastructure and improve the pedestrian and cyclist experience at ground level.</p> <p>Lighting of the green link, overpass and shared user path ramp would also be visible at night albeit in an area that is already well lit.</p> <p>Removal of the shared user path bridge and reduction in the height of the overpass by two metres at its apex would reduce the visual impact on pedestrians and cyclists to a reasonable degree.</p>

WestConnex M4-M5 Link

A comparison of the visual impacts for the EIS, modification and revised design is presented in **Table 3-11**. The comparison considers the visual impacts associated with the infrastructure approved as part of the EIS in combination with the infrastructure proposed as part of the modification or the revised design. The comparison shows that the combined visual impacts in most cases are similar.

Table 3-11: Comparison of visual impacts – EIS, modification and revised design

Receptors	EIS impact rating	Combined EIS and modification impact rating	Combined EIS and revised design impact rating
Residential (Annandale - Bayview Crescent)	High-Moderate	High	High
Residential (Annandale - 300 Johnston Street)	High-Moderate	High	High
Residential (Rozelle – Lilyfield Road)	High	High	High
Motorists on City West Link	Moderate-Low	Moderate-Low	Moderate-Low
Recreational (Bicentennial Park) – passive users	High-Moderate	High-Moderate	Moderate
Light rail users	High-Moderate	High-Moderate	High- Moderate
Pedestrians and cyclists on City West Link	Moderate-Low	N/A	Moderate

3.4 Noise and vibration

The assessment of potential noise and vibration impacts associated with the proposed modification was provided in Section 6.4 and in Appendix C (Noise and vibration assessment) of the Modification report.

A comparative analysis of operational traffic noise impacts between the modification and the revised design was undertaken and revealed there would be no change to the daily traffic volumes using the overpass. The outcome of this assessment is detailed below.

The revised design would result in no change to the overall operational noise levels experienced at nearby receivers. This is because the operational traffic noise experienced by the residents located near to the overpass on Bayview Crescent and Railway Parade is being controlled by the much larger traffic volumes on City West Link and The Crescent.

The proposed design changes would have a similar construction methodology to that assessed in the Modification report, with the exception of the shared user path bridge which is no longer proposed. Therefore, it would be expected that construction noise levels would be similar to or slightly less by comparison to the assessment carried out in the Modification report, as this bridge structure is no longer to be built.

As detailed in section 6.4.3 of the Modification report, it is proposed to modify the figure in Appendix D of the CoA that relates to Condition E87 for out-of-hours works mitigation. The noise treatment zone would be extended on that figure to include the additional receivers within Noise Catchment Area (NCA) 21 that are predicted to be impacted by proposed out-of-hours construction works. Construction noise impacts would also be managed in accordance with the Construction Noise and Vibration Management Plan (CNVMP) required by Condition C4.

In summary, the proposed changes to the design of the of the overpass is not expected to result in a change in the predicted operational or construction noise and vibration impacts by comparison to the assessment presented in the Modification report. As a result, the mitigation required would be consistent with that described in the Modification report.

3.5 Air quality

The assessment of potential air quality impacts associated with the proposed modification was provided in Section 6.5 and in Appendix D (Air quality assessment) of the Modification report.

A comparative analysis of the construction and operational air quality impacts between the modification and the revised design was undertaken. The outcome of this assessment is detailed below.

The removal of the shared user path bridge reduces the extent of construction works required to complete the modification. As a result, there may be a minor reduction in air quality impacts during the construction phase of the project.

In the revised design the main change relevant to operational air quality is the lowering of the overpass by around two metres at its apex. The reduction in height reduces the gradient of this section of the overpass and may therefore have a minor benefit in terms of vehicle emissions, in particular emissions from heavy vehicles and buses using the overpass.

There would be no changes to predicted traffic volumes using the overpass or the adjacent intersections by comparison to the volumes assessed in the Modification report. Accordingly, in terms of overall operational

air quality changes, there are unlikely to be any measurable differences to air quality as a result of the revised design.

3.6 Heritage

The assessment of potential non-Aboriginal heritage impacts associated with the proposed modification was provided in Section 6.8 of the Modification report.

The assessment identified that the proposed modification would not result in any direct impacts to listed heritage items or potential heritage items. However, the assessment did identify potential indirect impacts (vibration and visual setting impacts) to:

- Two listed heritage items, the Annandale (Railway Parade) railway bridge and the Annandale (Johnston Street) underbridge. These impacts were not considered significant
- The Crescent mural (a potential heritage item) which would be partly obscured by the overpass and pedestrian ramp structures. This impact was considered significant but noting that the EIS proposed a pedestrian ramp in this same location.

A heritage assessment was undertaken focusing on the elements of the revised design which are most relevant to the consideration of heritage impacts including:

- The lowering of the overpass by around two metres at its apex
- Widening of the pedestrian ramp to 4.5 metres
- Retaining, widening and upgrading the at grade signalised pedestrian crossing at the intersection of Johnston Street/The Crescent
- Removing the shared user path bridge.

The outcome of this assessment is detailed below.

The revised design would result in similar indirect impacts on these heritage items by comparison to the impacts assessed in the Modification report.

The indirect impact of the overpass and the wider shared user path ramp on the visual setting of The Crescent mural would be consistent with the assessment undertaken in the Modification report. The structures would impact on views toward the northern section of the existing mural by obscuring or partly obscuring these views. However, views to the central and southern sections of the mural would not be impacted. The shared user path ramp would itself provide another location for viewing the mural although from a different (elevated) vantage point.

It is proposed that there would be a separation distance of about one metre between the mural and the shared user path ramp. This will ensure that the mural structure (light rail retaining wall) would not be directly affected by the construction of the ramp and would also provide sufficient room for on-going inspection and maintenance of the existing retaining wall and the mural.

Widening and upgrading of the at grade signalised pedestrian crossing of The Crescent would have a minor impact on the visual setting of the Annandale (Johnston Street) underbridge but would not impact on the significance of this heritage item.

Existing CoA and EMM are considered to be appropriate to manage the potential impacts of the proposed modification.

4 Conclusion

4.1 Overview

Following the public exhibition period for the proposed modification Transport for NSW has considered the issues raised in the submissions and reviewed a number of elements of the proposed design. The design review process involved meetings with DPIE and the NSW Government Architect's Office and consultation with local community groups and other stakeholders.

Transport for NSW has revised the design to address the feedback received in submissions and stakeholder workshops. The revised design includes improved connectivity, visual amenity and urban design outcomes. The revised design is described in detail in **Section 2** and an environmental assessment of the revised design is provided in **Section 3**.

4.2 Next steps

The Design amendment report will be placed on exhibition from the 29 April 2020 through to the 13 May 2020. During this 14-day public exhibition period, stakeholders and the community will have to opportunity to provide feedback on the revised design presented in the report. The submissions will be forwarded to Transport for NSW who will prepare a response to the submissions. The submissions and Transport for NSW response will be made publicly available on the DPIE major projects website.

DPIE will, on behalf of the NSW Minister for Planning and Public Spaces, review the Modification report, the Response to submissions report, this Design amendment report, submissions received on the Design amendment report and Transport for NSW response to these submissions.

DPIE will prepare an environmental assessment report and prepare recommended CoA should it recommend that the project be approved. The environmental assessment report and recommendation will be provided to the NSW Minister for Planning and Public Spaces, who will then either approve the modification (with the addition, amendment or removal of any CoA considered appropriate) or refuse to give approval to the modification.

Following determination, the NSW Minister for Planning and Public Spaces determination and the Secretary's Environmental Assessment Report will be published on the DPIE major projects website.

4.3 References

- AECOM Australia Pty Ltd, WestConnex M4-M5 Link: Environmental Impact Statement, prepared for NSW Roads and Maritime Services, August 2017
- AECOM Australia Pty Ltd, WestConnex M4-M5 Link: Submissions and preferred infrastructure report, prepared for NSW Roads and Maritime Services, January 2018
- AECOM Australia Pty Ltd, WestConnex M4-M5 Link: Mainline tunnel – Modification report, prepared for Roads and Maritime Services, September 2018
- Australian and New Zealand Standard 1158: Lighting for roads and public places
- Australian Standard 4282-1997: Control of the obtrusive effects of outdoor lighting
- Department of Environment and Climate Change, *Interim Construction Noise Guideline*, 2009
- Department of Environment and Climate Change, *Road Noise Policy*, 2011
- Environmental Impact Assessment Practice Note – Guidelines for Character and Visual Impact Assessment (EIAG) , prepared for NSW Roads and Maritime Services, 2013
- Institute of Air Quality Management (IAQM) London UK, Guidance on the assessment of dust from demolition and construction, 2014
- NSW Government Architect, Better Placed, 2017
- NSW Government Architect, Better Placed; Aligning Movement and Place, 2019
- NSW Roads and Maritime Services, Beyond the Pavement, 2014
- NSW Roads and Maritime Services, *Construction Noise and Vibration Guideline*, 2016
- NSW Roads and Maritime Services, *Noise Criteria Guideline*, 2015
- NSW Roads and Maritime Services, *Noise Mitigation Guideline*, 2015
- NSW Sustainable Design Guidelines, Transport for NSW, 2013
- Railcorp Section 170 Heritage and Conservation Register (under the NSW Heritage Act 1997)
- Sydney Regional Environment Plan – City West REP No.26
- The State of Queensland, Crime Prevention through Environmental Design, Guidelines for Queensland, 2007
- WDA and RMS Centre for Urban Design, WestConnex Motorway Urban Design Framework, 2013.

Appendix A

Environmental Management Measures and Conditions of Approval

Environmental Management Measures and Conditions of Approval

Transport for NSW has revised the design to address the feedback received in submissions and stakeholder workshops. The revised design includes changes to the modification to achieve improved connectivity, environmental, visual amenity and urban design outcomes.

As a result of the revised design, some of the Environmental Management Measures (EMM) and Conditions of Approval (CoA) which were proposed in the Modification report are to be updated.

The proposed updates are detailed below.

A1 Proposed changes to Environmental Management Measures

Chapter 29 of the Environmental Impact Statement (EIS) for the project summarised the identified EMM that would be adopted to avoid or reduce potential environmental impacts. These measures were revised in Part E of the Submissions and Preferred Infrastructure Report (SPIR) after consideration of the issues raised during the EIS public exhibition period.

Chapter 8 of the Modification report lists the EMM to be amended as part of the modification. No further amendments or changes are proposed to the M4-M5 Link project EMM other than those outlined in the Modification report, besides a minor grammatical update. The updated proposed EMM are presented in **Table A1-1**.

Proposed amendments are shown in **bold** text and deletions shown as strikethrough text.

Table A1-1: EMM to be amended as part of the modification

Impact	REF #	Environmental Management Measure	Timing	Comment
Non-Aboriginal Heritage				
General heritage impacts	NAH03	Photographic archival recording will be undertaken of: <ul style="list-style-type: none"> Infrastructure associated with the White Bay Power Station site that could be affected by the project Whites Creek Stormwater Channel (in the area to be impacted) Stormwater Canal off Lilyfield Road 'Cadden Le Messurier' at 84 Lilyfield Road Former Hotel at 78 Lilyfield Road Victoria Road overbridge Each house at 260-266 Victoria Road Each house at 248-250 Victoria Road Former Bank of NSW (164 Parramatta Road) The Crescent mural. 	Construction	Update to include archival recording of The Crescent mural <u>Additional minor update to correct casing of The Crescent mural.</u>

Impact	REF #	Environmental Management Measure	Timing	Comment
		<p>It will be undertaken in accordance with the NSW Heritage Office guidelines <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (2006).</p> <p>The photographic archival recording will occur prior to any works that have the potential to impact upon the items and will include the identification of appropriate stakeholders, to receive copies of the documentation.</p>		

A2 Proposed changes to the Conditions of Approval

The CoA are presented in Schedule 2 (Conditions of Approval) of the Infrastructure approval. Chapter 7 of the Modification report presents a number of proposed changes to the CoA for the M4-M5 Link project.

As a result of submissions received, additional consultation and the revised design, further amendments to the CoA for the M4-M5 Link project are now proposed. The proposed amendments to the CoA are provided in **Table A2-1** would ensure that the CoA are consistent with the revised design.

Proposed amendments are shown in **bold** text and deletions shown as strikethrough text.

Table A2-1: CoA to be amended as part of the modification

No.	Description of CSSI or CoA	Action and reason
A1	<p>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 <i>WestConnex M4-M5 Link Environmental Impact Statement – Volumes 1A-C and 2A-J</i> (dated August 2017) (the EIS); the <i>WestConnex M4-M5 Link Submissions and Preferred Infrastructure Report</i> (dated January 2018) (the SPIR); and the <i>WestConnex M4-M5 Link Mainline Tunnel Modification Report</i> (dated September 2018) (Modification 1 Report) as amended by the <i>WestConnex M4-M5 Link Mainline Tunnel Modification Response to Submissions</i> (dated November 2018) (Modification 1 RtS); and the <i>WestConnex M4-M5 Link Rozelle Interchange The Crescent overpass and active transport links Modification report</i> (dated August 2019) as amended by the <i>WestConnex M5-M5 Link Rozelle Interchange Modification The Crescent overpass and active transport links Design amendment report</i> (dated April 2020) and associated <i>WestConnex M5-M5 Link Rozelle Interchange Modification The Crescent overpass and active transport links Response to submissions report</i> (dated April 2020).</p>	<p>Update to include the Modification report associated Design amendment report and this Response to submissions report.</p>
A2	<p>The CSSI must be carried out in accordance with all procedures, commitments, preventative actions, performance criteria and mitigation measures set out in <u>Condition A1, the EIS, SPIR, Modification 1 report, and Modification 1 RtS Response to submissions report</u>, unless otherwise specified in, or required under, this approval.</p>	<p>Update to refer to Condition A1 for approved project documents.</p>

No.	Description of CSSI or CoA	Action and reason
E120	<p>A pedestrian and cycling green link, as described in the EIS Modification 2 Design amendment report and Response to submissions report, to be provided from the Rozelle Rail Yards and spanning City West Link to the park adjacent Chapman Road, to the Rozelle Bay light rail stop, must have adequate soil depth to facilitate planting across along the majority of the bridge for of a diverse range of vegetation consistent with the cross section provided at Figure 5.8 of Appendix L, Volume 2F of the EIS. The bridge must be a minimum width of 15 metres, where the pedestrian and cycling green link spans from Rozelle Rail Yards across the City West Link including the slip lane onto The Crescent, unless otherwise agreed by the Secretary.</p>	<p>Update to reflect new alignment of the pedestrian and cycling green link (green link) as per the Modification report, the Design amendment report and this Response to submissions report.</p>
E121	<p>The connection between the pedestrian and cycling green link, shared user path ramp and at-grade signalised crossing of The Crescent, adjacent to Johnston Street, as described in the Modification 2 Design amendment report and Response to submissions report, and the park adjacent to Chapman Road must be designed to integrate with the adjacent open space, and active transport infrastructure within the park and Rozelle Bay light rail stop in a manner that maximises the safe movement of pedestrians and cyclists and provides a contiguous path between the Rozelle Rail Yards open space and the park adjoining Chapman Road.</p>	<p>Update to reflect pedestrian and cycling connectivity from Rozelle Rail Yards to Bicentennial Park as per the Modification report, the Design amendment report and this Response to submissions report.</p>

No.	Description of CSSI or CoA	Action and reason
E134	<p>The Urban Design and Landscape Plan(s) must be prepared by a suitably qualified and experienced person(s) in consultation with the relevant council(s), Infrastructure Urban Growth NSW, the community and affected landowners and businesses. The UDLP(s) must include, but not necessarily be limited to:</p> <p><u>Design</u></p> <ul style="list-style-type: none"> (j) the design of the project landform and earthworks; (k) the design of the CSSI elements including their form, materials and broad detail (including the City West Link pedestrian and cycling green link identified in Condition E120 and shared user path ramp and at grade signalised crossing of The Crescent identified in Condition E121); (l) a description of the CSSI design features, including graphics such as sections, perspective views and sketches of key elements of the CSSI; (m) visual screening requirements; (n) development and delivery of public art opportunities throughout the Rozelle Rail Yards using local artists; (o) demonstrated integration of Crime Prevention Through Environmental Design principles into the detailed design process; 	<p>Update design sub-section to</p> <ul style="list-style-type: none"> • Focus the Urban Design and Landscape Plan (UDLP) on guiding the relevant parts of the design by identifying design objectives rather than being specific regarding the detailed design of the project • Reflect requirements for the green link, shared user path ramp and at grade signalised crossing of The Crescent.

No.	Description of CSSI or CoA	Action and reason
E163	<p>The Proponent must prepare a Heritage Archival Recording and Salvage Report, including photographic recording of heritage items which have been identified for demolition in the documents referred to in Condition A1 and outline how any salvage or recovery of material will be undertaken from these items.</p> <p>Archival recording must also be undertaken of The Crescent mural at Annandale.</p> <p>Archival recording must be undertaken by a suitably qualified heritage specialist and prepared in accordance with NSW Heritage Office's <i>How to Prepare Archival Records of Heritage Items</i> (1998) and <i>Photographic Recording of Heritage Items Using Film or Digital Capture</i> (2006).</p> <p>Within 12 months of completing the archival recording, the Proponent must submit the Heritage Archival Recording and Salvage Report to the Secretary, relevant council(s), relevant local libraries and local historical societies in the respective local government area(s).</p>	<p>The Crescent mural would not be demolished, however The Crescent overpass (the overpass) would visually impact on the northern section of this potential heritage item. Archival recording in line with Condition E163 is required due to the extent of the potential heritage item that would be visually impacted.</p>
Appendix D	<p>This appendix includes a figure relating to CoA E87 for out-of-hours mitigation.</p>	<p>The Condition E87 'treatment zone' shown in Appendix D of the CoA is extended to include the receivers adjacent to the proposed modification. The extended area is shown in Figure 5-14 of Appendix C (Noise and vibration assessment) of the Modification report.</p>

WestConnex M4-M5 Link
Rozelle Interchange - Modification:
The Crescent overpass and active transport links
Design amendment report



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