

M4-M5 Link

Environmental Impact Statement

August 2017

Appendices L to N





WestConnex speaks your language

Learn more by visiting

www.westconnex.com.au/yourlanguage

to watch project videos in your language and read more about WestConnex. If you need an interpreter, call the Translating and Interpreting Service on **131 450**.

Arabic

اعرف المزيد بزيارة الموقع
www.westconnex.com.au/yourlanguage
وذلك لمشاهدة الفيديوهات الخاصة بالمشروع باللغة العربية
وقراءة المزيد عن وست كونكس. إذا كنت في حاجة إلى
مترجم، اتصل بخدمة الترجمة الخطية والشفهية على الرقم
131 450.

Chinese

了解詳情請上網
www.westconnex.com.au/yourlanguage觀看(普通話)
視頻並查閱有關WestConnex的更多訊息。如需要傳譯員請
。撥電話傳譯服務 **131 450**

Hindi

स वेबसाइट र पकड़िधी आँ। एका मा ज
www.westconnex.com.au/yourlanguage व (हिन्दी) स इ
ा ने कज रेो मयब दिखयेप र वेबसाईनेक्स के रेो म व
र औक सामिगरी पेछा दि मदद मापयिआ आ एो जिन्हवाह वच
दुभाषयिआ सेवा रेो **131 450** र फ़ोन करे।

Greek

Μάθετε περισσότερα επισκεπτόμενοι το
www.westconnex.com.au/yourlanguage για να δείτε τα
βίντεο του έργου στα ελληνικά και να διαβάσετε περισσότερα
για το WestConnex. Εάν χρειάζεστε διερμηνέα, καλέστε την
Υπηρεσία Μετάφρασης και Διερμηνείας στο **131 450**.

Italian

Per saperne di più visiti il sito
www.westconnex.com.au/yourlanguage, dove potrà
guardare i video del progetto in lingua italiana e trovare maggiori
informazioni su WestConnex. Se ha bisogno di un interprete,
contatti il Servizio di Traduzione ed Interpretariato (Translating
and Interpreting Service) al numero **131 450**.

Korean

www.westconnex.com.au/yourlanguage 를 방문하여 한국어로
된 프로젝트 비디오를 보고 WestConnex 에 관해 읽고 배우세요.
통역이 필요하시면 번역 및 통역 서비스 **131 450** (TIS) 으로 전화
하십시오.

Vietnamese

Hãy tìm hiểu thêm và viếng trang mạng
www.westconnex.com.au/yourlanguage để xem phim ảnh
bằng Việt ngữ về công trình này và đọc thêm về WestConnex.
Nếu quý vị cần thông ngôn viên, xin vui lòng gọi Dịch Vụ Thông
Ngôn Phiên Dịch số **131 450**.

Volume 2F

Appendices

L	Technical working paper: Urban design
M	Shadow diagrams and overshadowing
N.....	Technical working paper: Active transport strategy



Appendix



Technical working paper: Urban design





M4-M5 LINK

SYDNEY, NSW

URBAN DESIGN REPORT

August 2017

Contents

Executive Summary	01	6.0 Future Opportunities	57
1.0 Introduction	02	6.1 Future opportunities at the Rozelle Rail Yards	57
1.1 Overview of WestConnex and related projects	02	6.2 Future opportunities on Victoria Road	58
1.2 Purpose of this report	03	7.0 Summary	59
1.3 SEARs	04	8.0 References	60
1.4 Relationship to other reports in the EIS	05		
2.0 Urban Design and M4-M5 Link	06	Annexure 1 - Portal Design Review	
2.1 Urban design	06	Annexure 2 - Ventilation Facility Design Review	
2.2 Project location	06		
2.3 Overview of the project	06		
2.4 Consultation	07		
2.5 Urban design review panel	07		
3.0 Principles and Objectives	08		
3.1 Assessment methodology	08		
3.2 Urban design objectives and principles	09		
4.0 Context	10		
4.1 Regional context	10		
4.2 Metropolitan context	10		
4.3 Local context	11		
5.0 Urban Design Analysis and Outcomes	12		
5.1 Rozelle interchange	12		
5.1.1 Existing conditions	13		
5.1.2 Key findings	18		
5.1.3 Rozelle Rail Yards strategies	19		
5.1.4 Built form	23		
5.1.5 Open space and connectivity	24		
5.1.6 Spatial comparison	25		
5.2 Iron Cove Link	33		
5.2.1 Existing conditions	34		
5.2.2 Key findings	39		
5.2.3 Iron Cove strategies	40		
5.2.4 Built form	42		
5.2.5 Streetscape and connectivity	43		
5.2.6 Future uses	44		
5.3 Project interfaces	45		
5.3.1 Wattle Street interchange	45		
5.3.2 St Peters interchange	46		
5.4 Assessment of the M4-M5 Link against the urban design principles	48		
5.5 Guiding principles	50		
5.5.1 Built form design and materials	50		
5.5.2 Portal design	50		
5.5.3 Tunnel interiors	51		
5.5.4 Ventilation facility design	52		
5.5.5 Lighting	53		
5.5.6 Water sensitive urban design	54		
5.5.7 Wayfinding, interpretation and public art	55		
5.5.8 Crime prevention through environmental design	56		

Contents

Figures and Tables

Table 1.1:	WestConnex and related projects	02
Figure 1.1:	Overview of the project	02
Figure 1.2:	Overview of WestConnex and related projects	03
Table 1.2:	How SEARs have been addressed in this report	04
Table 2.1:	Key stakeholder engagement that has shaped the urban design concept	07
Figure 3.1:	Guidelines and policies used	08
Figure 3.2:	Methodology	08
Figure 4.1:	Regional context	10
Figure 4.2:	Local context	11
Figure 5.1:	Access and movement	13
Figure 5.2:	Culture	14
Figure 5.3:	Natural environment	15
Figure 5.4:	Built form and landscape	16
Figure 5.5:	History and heritage	17
Figure 5.6:	Rozelle Rail Yards concept plan	20
Figure 5.7:	Rozelle Rail Yards longitudinal section	21
Figure 5.8:	Rozelle Rail Yards land bridge section	22
Figure 5.9:	Rozelle Rail Yards built form	23
Figure 5.10:	Rozelle Rail Yards open space and connectivity	24
Figure 5.11:	Public open space comparison	25
Figure 5.12:	Artist's impression of waterside walk heading east	26
Figure 5.13:	Artist's impression of bird's eye view of Rozelle Rail Yards	27
Figure 5.14:	Render at 10 years of project operation from Catherine Street at the entry to Lilyfield light rail stop [Inset: existing view]	28
Figure 5.15:	Render at 10 years of project operation of view looking west along City West Link [Inset: existing view]	29
Figure 5.16:	Render at 10 years of project operation of view looking west from City West Link west of The Crescent [Inset: existing view]	30
Figure 5.17:	Render at 10 years of project operation looking south from Easton Park to the Rozelle Rail Yards [Insert: existing view]	31
Figure 5.18:	Render at 10 years of project operation of view looking west from The Crescent east of City West Link [Inset: existing view]	32
Figure 5.19:	Access and movement	34
Figure 5.20:	Culture	35
Figure 5.21:	Natural environment	36
Figure 5.22:	Built form and landscape	37
Figure 5.23:	History and heritage	38
Figure 5.24:	Iron Cove concept plan	41
Figure 5.25:	Iron Cove built form	42
Figure 5.26:	Iron Cove streetscape and connectivity	43
Figure 5.27:	Iron Cove future uses	44
Figure 5.28:	Haberfield concept plan	45
Figure 5.29:	St Peters master plan staging [New M5 UDLP, 2017]	46
Figure 5.30:	St Peters master plan [New M5 UDLP, 2017]	47
Figure 5.31:	Portal design threshold	50
Figure 5.32:	Portal design contextual conditions	50
Figure 5.33:	Portal design: entry and exit experience	51
Figure 5.34:	Tunnel interiors	51
Figure 5.35:	Ventilation facility design	52

Glossary

Abbreviation	Name
ATN	Active Transport Network
CBD	Central Business District
CPTED	Crime Prevention Through Environmental Design
EIS	Environmental impact statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> [NSW]
LGAs	Local Government Areas
Roads and Maritime	NSW Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SMC	Sydney Motorway Corporation
UDLP	Urban Design and Landscape Plan
WSUD	Water Sensitive Urban Design

Executive Summary

This report provides the principles by which the project would demonstrate design excellence and integrate with surrounding neighbourhoods, particularly at areas of surface intervention.

NSW Roads and Maritime Services [Roads and Maritime] consider that whilst the functionality of the M4-M5 Link project is fundamental, attention to design quality at the outset would ensure long-term success. This report details the urban design principles that have been developed for the project. These principles are based on analysis of site context, particularly in relation to the Rozelle Rail Yards and Iron Cove. These principles would also guide the development of the urban design concepts for the above ground infrastructure located within the Darley Road motorway operations complex [MOC1] at Leichhardt, and the Campbell Road motorway operations complex [MOC5] at St Peters. The remaining areas of surface intervention at Haberfield and St Peters have been planned under the M4 East and New M5 projects respectively.

The principles will guide the development of urban design concepts and master plans for the sites. Based on the Roads and Maritime guideline ‘Beyond the Pavement’ and the ‘WestConnex Urban Design Framework,’ the principles are:

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 the city.

A motorway integrated within its context- Understand the existing landscape and respond in a respectful manner that seeks to enhance and contribute 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 multidimensional 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.

These principles have been applied to concepts for the Rozelle Rail Yards and Iron Cove Link sites as presented in this report. The base scope of the urban design components of the project as committed by Roads and Maritime includes construction of:

- Active transport connections
- Fixed facilities such as ventilation facilities and outlets, water treatment plants, electricity substations and offices and worker parking
- Drainage, including Water Sensitive Urban Design [WSUD]
- Open space and landscaping.

Section 6 contains options as to how the principles and base scope could be embellished to deliver future opportunities for these sites and surrounds. The final design and arrangement of urban design elements would be detailed in a series of Urban Design and Landscape Plans [UDLPs] for the project. These plans would be based on the principles developed and include detailed master plans for the site and would be subject to consultation with the community and stakeholders.

1.0 Introduction

NSW Roads and Maritime Services [Roads and Maritime] is seeking approval to construct and operate the WestConnex M4-M5 Link [the project], which would comprise 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.

Together with the other components of the WestConnex program of works and the proposed future Sydney Gateway, the project would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney’s Global Economic Corridor and local communities.

Approval is being sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* [NSW] [EP&A Act] for the project. A request has been made for the NSW Minister for Planning to specifically declare the project to be State significant infrastructure and also critical State significant infrastructure. An environmental impact statement [EIS] is therefore required.

1.1 OVERVIEW OF WESTCONNEX AND RELATED PROJECTS

The M4-M5 Link is part of the WestConnex program of works. Separate planning applications and assessments have been completed for each of the approved WestConnex projects. Roads and Maritime has commissioned Sydney Motorway Corporation [SMC] to deliver WestConnex, on behalf of the NSW Government. However, Roads and Maritime is the proponent for the project.

In addition to linking to other WestConnex projects, the M4-M5 Link would provide connections to the proposed future Western Harbour Tunnel and Beaches Link, the Sydney Gateway [via the St Peters interchange] and the F6 Extension [via the New M5].

The WestConnex program of works, as well as related projects, are shown in Figure 1.1 and described in Table 1.1.

Project	Description	Status
Westconnex program of works		
M4 Widening	Widening of the existing M4 Motorway from Parramatta to Homebush.	Planning approval under the EP&A Act granted on 21 December 2014. Open to traffic.
M4 East	Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange.	Planning approval under the EP&A Act granted on 11 February 2016. Under construction.
King Georges Road Interchange Upgrade	Upgrade of the King Georges Road interchange between the M5 West and the M5 East at Beverly Hills, in preparation for the New M5 project.	Planning approval under the EP&A Act granted on 3 March 2015. Open to traffic.
New M5	Duplication of the M5 East from King Georges Road in Beverly Hills with tunnels from Kingsgrove to a new interchange at St Peters. The St Peters interchange allows for connections to the proposed future Sydney Gateway project and an underground connection to the M4-M5 Link. The New M5 tunnels also include provision for a future connection to the proposed future F6 Extension.	Planning approval under the EP&A Act granted on 20 April 2016. Commonwealth approval under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> [Commonwealth] granted on 11 July 2016. Under construction.
M4-M5 Link [the project]	Tunnels connecting to the M4 East at Haberfield [via the Wattle Street interchange] and the New M5 at St Peters [via the St Peters interchange], a new interchange at Rozelle and a link to Victoria Road [the Iron Cove Link]. The Rozelle interchange also includes ramps and tunnels for connections to the proposed future Western Harbour Tunnel and Beaches Link project.	The subject of this EIS.
Related projects		
Sydney Gateway	A high-capacity connection between the St Peters interchange [under construction as part of the New M5 project] and the Sydney Airport and Port Botany precinct.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.
Western Harbour Tunnel and Beaches Link	The Western Harbour Tunnel component would connect to the M4-M5 Link at the Rozelle interchange, cross underneath Sydney Harbour between the Birchgrove and Waverton areas, and connect with the Warringah Freeway at North Sydney. The Beaches Link component would comprise a tunnel that would connect to the Warringah Freeway, cross underneath Middle Harbour and connect with the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Seaforth. It would also involve the duplication of the Wakehurst Parkway between Seaforth and Frenchs Forest.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.
F6 Extension	A proposed motorway link between the New M5 at Arncliffe and the existing M1 Princes Highway at Loftus, generally along the alignment known as the F6 corridor.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.

Table 1.1: WestConnex and related projects

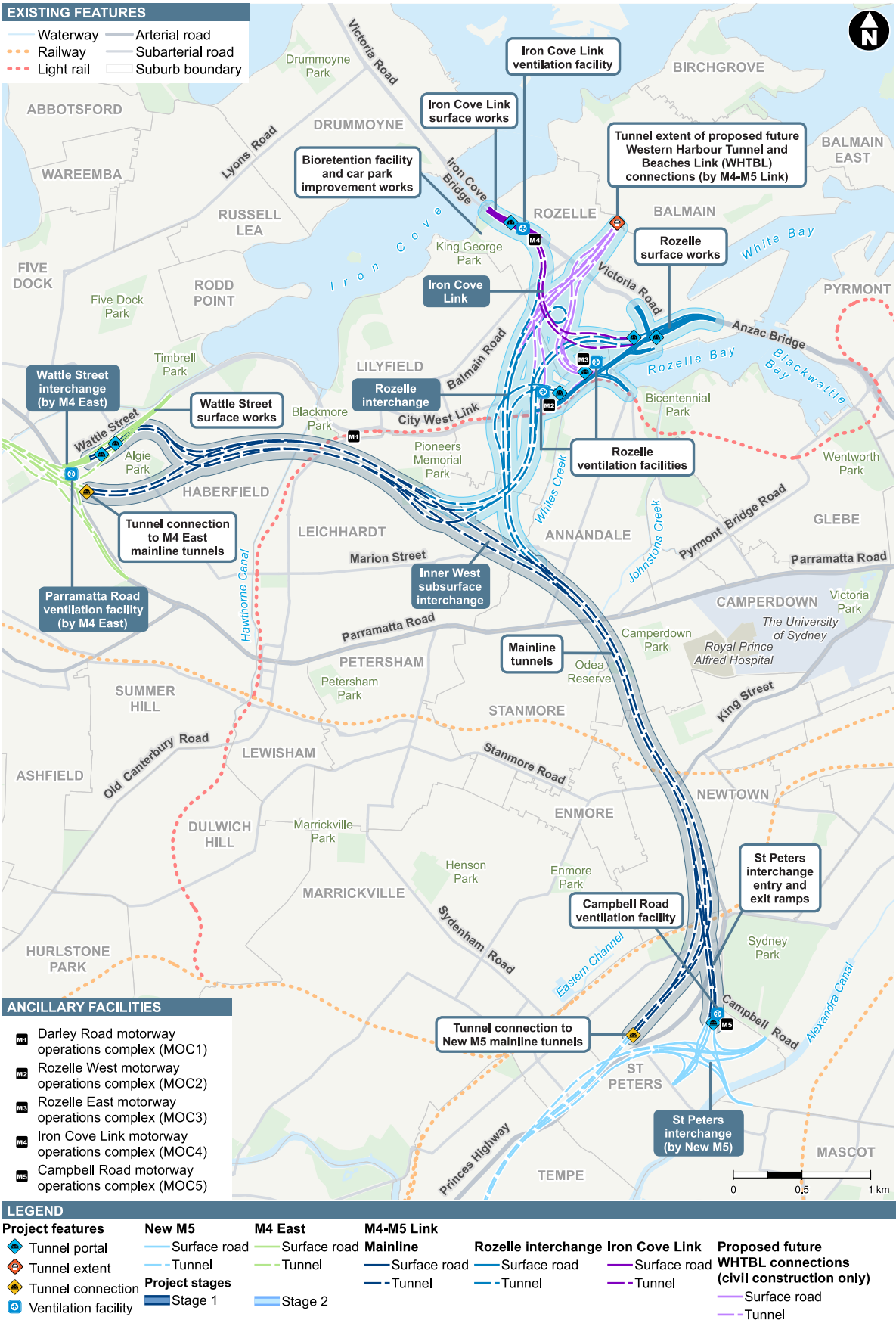


Figure 1.1: Overview of the project

1.2 PURPOSE OF THIS REPORT

This report provides the principles by which the project would demonstrate design excellence during detailed design and integrate with surrounding neighbourhoods, particularly at areas of surface intervention. The report provides concepts for future site uses at Rozelle Rail Yards and Iron Cove Link based on the principles.

Permanent ancillary facilities would also be constructed by the project at Darley Road at Leichhardt and at the Campbell Road Ventilation facility at St Peters. These facilities include:

- Darley Road motorway operations complex [MOC1], comprising a water treatment facility, substation and associated infrastructure
- Campbell Road motorway operations complex [MOC5], comprising a ventilation facility, emergency smoke extraction facility including outlets, substation and associated infrastructure.

This above ground infrastructure would be designed in accordance with the M4-M5 Link UDLP and the principles detailed in this report.

The urban design concepts for Haberfield and the remaining areas of surface intervention at St Peters are detailed in the M4 East and New M5 EISs as updated by the UDLPs developed for both these projects.

Final designs for both the Rozelle Rail Yards and Iron Cove Link sites would be created using the principles that have been developed. A context specific response would be developed that may vary from the concepts outlined in this report based on:

- Feedback from the community
- Feedback from councils
- Development of adjacent developments such as The Bays Precinct
- Designs submitted by the successful contractor to construct the works.

The concepts provided illustrate one way in which the principles could apply to the design of the site. The principles and concepts set a benchmark in terms of the outcome being sought for the sites and outline the commitment to achieving a ‘more than the motorway’ response.

The project would deliver open space development including active transport [pedestrian and cyclist] connections, landscaping, Water Sensitive Urban Design [WSUD] elements including drainage and heritage interpretation within the Rozelle Rail Yards. The final arrangement and design of these elements would be included in the UDLPs.

Detailed UDLPs would be developed to outline the final

designs for the sites accounting for the feedback received. The UDLPs would be based on the principles outlined in this report and further develop the concepts to arrive at a final design for the sites. Section 7 outlines the considerations that would be included in the UDLPs.

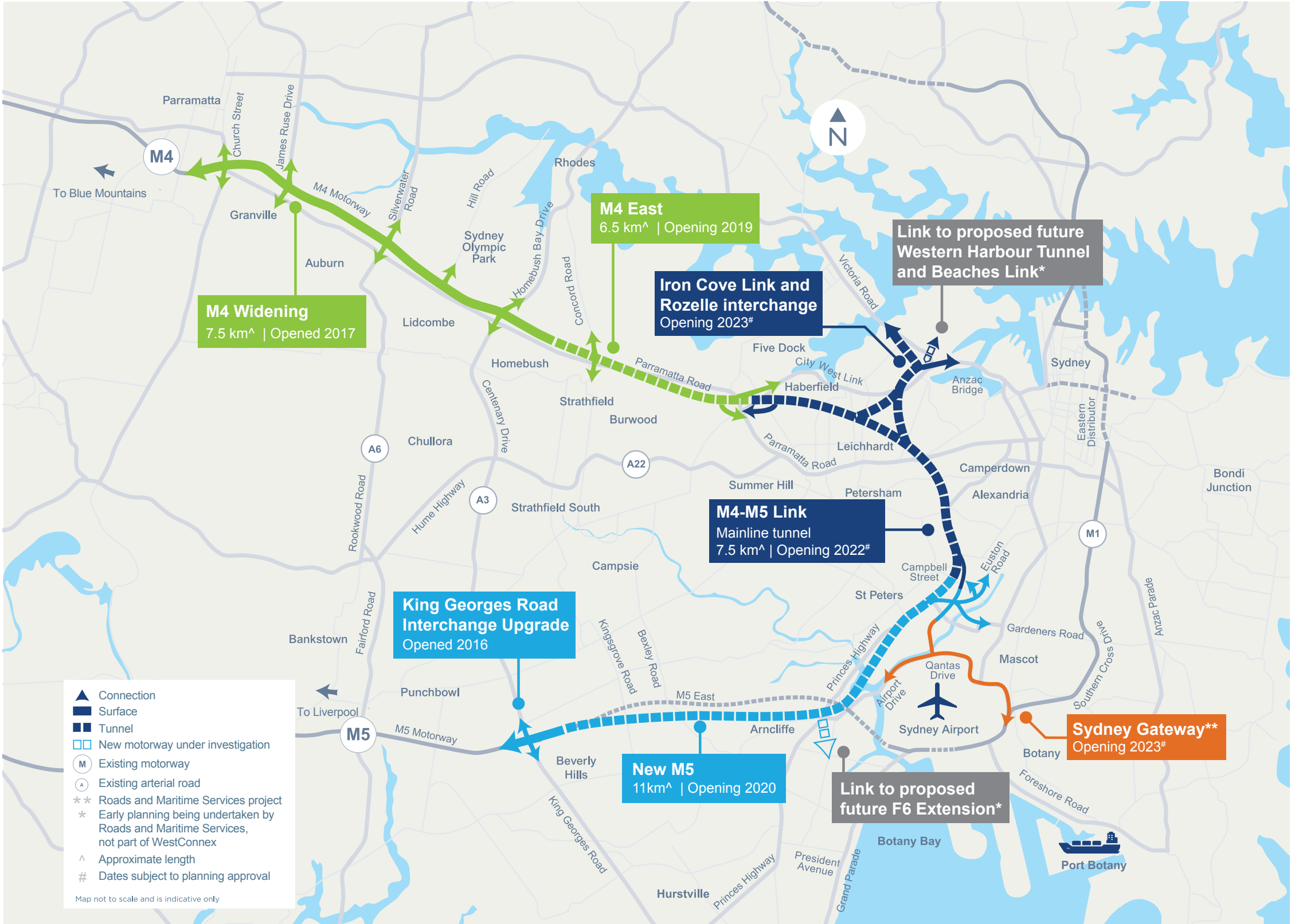


Figure 1.2: Overview of WestConnex and related projects

1.3 SEARS

In preparing this Urban Design Report, the Secretary’s Environmental Assessment Requirements [SEARs] issued for the M4-M5 Link have been addressed. The key matters raised by the Secretary for consideration in the Urban Design Report, and where this report addresses the SEARs are outlined in Table 1.2.

	Requirement	Section where addressed in report
Urban Design	The project design complements the visual amenity, character and quality of the surrounding environment. The project contributes to the accessibility and connectivity of communities.	
	1. The Proponent must: [a] identify the urban design and landscaping aspects of the project and its components to enhance the appearance of ventilation outlets, interchanges, potential connections to The Bays Precinct and transport linkages, tunnel portals, bridges, noise walls, ancillary buildings, and any additional surface infrastructure, ‘cut and cover’ arrangements;	Sections 5, 6, 7.
	[b] identify measures aimed at improving ‘north-south’ connectivity between Balmain/Rozelle and Sydney Harbour;	Sections 5 and 6.
	[c] identify measures aimed at preserving the ‘east-west’ connectivity between White Bay and the Rozelle Rail Yards;	Sections 6. See also EIS Appendix N [Technical working paper: Active transport strategy].
	[d] consider resulting residual land treatments, and demonstrate how the proposed hard and soft urban design elements of the proposal would be consistent with the existing and desired future character of the area traversed or affected by the proposal;	Sections 5, 6, 7. See also EIS Chapter 12 [Land use and property].
	[e] identify opportunities to utilise surplus or residual land, particularly for the provision of community space [passive and recreational] and utilise key structures [such as ventilation outlets] for multiple uses i.e. integration with other structures;	Sections 5, 6, 7. See also EIS Chapter 12 [Land use and property].
	[f] evaluate the visual impacts and urban design aspects of the proposal and its components [such as the ventilation outlets and interchanges] on surrounding areas, taking into consideration the urban and landscape design of the M4 East and New M5 Motorways and WestConnex Urban Design Corridor Framework;	See EIS Appendix O [Technical working paper: Landscape and visual impact].
	[g] explore the use of Crime Prevention Through Environmental Design [CPTED] principles during the design development process, including natural surveillance, lighting, walkways, signage and landscape;	Section 7.
	[h] identify urban design strategies and opportunities to enhance healthy, cohesive and inclusive communities; and	Sections 5, 6, 7.
	[i] describe urban design and landscape mitigation measures, having regard to the urban design and landscape objectives for the proposal	Sections 5, 6, 7.
Visual Amenity	The project minimises adverse impacts on the visual amenity of the built and natural environment [including public open space] and capitalises on opportunities to improve visual amenity.	
	1. The Proponent must provide artist impressions and perspective drawings of the project from a variety of locations along and adjacent to the route to illustrate how the project has responded to the visual impact through urban design and landscaping.	See EIS Appendix O [Technical working paper: Landscape and visual impact].

	Requirement	Section where addressed in report
Socio-economic, Land Use and Property	The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities. The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.	
	1. The Proponent must assess impacts from construction and operation on potentially affected properties, businesses, recreational users and land and water users, including property acquisitions/adjustments, access amenity, relevant statutory rights, and community severance and barrier impacts resulting from the project.	See EIS Appendix P [Technical working paper: Social and economic].
	2. The Proponent must identify opportunities for local centre street revitalisation improvements, pedestrian and cyclist access and connectivity and provision of community and social facilities.	Sections 5, 6, 7. See also EIS Appendix N [Technical working paper: Active transport strategy] and EIS Appendix P [Technical working paper: Social and economic].
	3. The design and siting of project elements should be located in such a way that functional, contiguous areas of residual land are maximised. The design and siting must consider appropriate land use interfaces [i.e. White Bay] and the social and economic impacts of proposed land uses against alternate land uses.	Sections 5, 6, 7. See also EIS Appendix P [Technical working paper: Social and economic].
	4. Where air quality allows, residual land must be designed to positively contribute to additional community uses, public recreation uses and/or affordable or social housing. Passively landscaped areas should not be the default use for residual land.	Sections 5, 6, 7. See also EIS Chapter 12 [Land use and property].
Traffic and Transport	Network connectivity, safety and efficiency of the transport system in the vicinity of the project are managed to minimise impacts. The safety of transport system customers is maintained. Impacts on network capacity and the level of service are effectively managed. Works are compatible with existing infrastructure and future transport corridors.	
	[d] wider transport interactions [local and regional roads, cycling, public and freight transport], taking into account the Sydney City Centre Access Strategy and planned future urban release areas such as The Bays Precinct;	See EIS Appendix N [Technical working paper: Active transport strategy]. and EIS Appendix H [Technical working paper: Traffic and transport]
	[f] impacts on cyclists and pedestrian access and safety, including on known routes and future proposals such as along Lilyfield Road;	See EIS Appendix N [Technical working paper: Active transport strategy]. and EIS Appendix H [Technical working paper: Traffic and transport]
	[g] opportunities to integrate cycling and pedestrian elements with surrounding networks and within the project;	See EIS Appendix N [Technical working paper: Active transport strategy]. and EIS Appendix H [Technical working paper: Traffic and transport]

Table 1.2: How SEARs have been addressed in this report

1.4 RELATIONSHIP TO OTHER REPORTS IN THE EIS

The Urban Design Report should be read in conjunction with the following EIS chapters and appendices:

- EIS Chapter 5, Project description: this chapter describes the project, including the project tunnels, interchanges and associated infrastructure, and ancillary facilities. It also describes the design standards required to deliver the project
- EIS Chapter 6, Construction work: this chapter describes the proposed approach to the construction of the project
- EIS Chapter 7, Consultation: this chapter outlines the consultation that has occurred and assisted in developing the urban design concept for the project
- EIS Chapter 12, Land Use and Property: this chapter details the process for identifying potential future uses for land not required for the ongoing use of the project
- EIS Chapter 13, Urban design and visual amenity: this chapter provides an overview of the urban design principles and findings in this report, and the landscape character and visual impacts of the project
- EIS Appendix N, Active transport strategy: this report details the future active transport network [pedestrian and cycle access] to be provided by the project, as well as future links that could be created by others to complete the network
- EIS Appendix O, Landscape and visual impact: this report analyses the landscape character and visual impacts of the project
- EIS Appendix P, Social and economic: this report details the social impacts of the project and how management measures [including urban design principles] will manage these impacts on surrounding communities.

2.0 Urban Design and M4-M5 Link

2.1 URBAN DESIGN

Whilst the functionality of the M4-M5 Link project is paramount, attention to design quality at the outset would ensure long-term success. Through implementation of an overarching urban design vision and careful analysis of context, the project would seamlessly integrate with, and provide peripheral benefits for local and regional communities.

2.2 PROJECT LOCATION

The project would be generally located within the City of Sydney and Inner West local government areas [LGAs]. The project is located about two to seven kilometres south, southwest and west of the Sydney central business district [CBD and would cross the suburbs of Ashfield, Haberfield, Leichhardt, Lilyfield, Rozelle, Annandale, Stanmore, Camperdown, Newtown and St Peters]. The local context of the project is shown in Figure 1.1.

2.3 OVERVIEW OF THE PROJECT

Key components of the project are shown in Figure 1.1 and would include:

- Twin mainline motorway tunnels between the M4 East at Haberfield and the New M5 at St Peters. Each tunnel would be around 7.5 kilometres long and would generally accommodate up to four lanes of traffic in each direction
- Connections of the mainline tunnels to the M4 East project, comprising:
 - A tunnel-to-tunnel connection to the M4 East mainline stub tunnels
 - Entry and exit ramp connections between the mainline tunnels and the Wattle Street interchange at Haberfield [which is currently being constructed as part of the M4 East project]
 - Minor physical integration works with the surface road network at the Wattle Street interchange including road pavement and line marking
- Connections of the mainline tunnels to the New M5 project, comprising:
 - A tunnel-to-tunnel connection to the New M5 mainline stub tunnels north of the Princes Highway, near the intersection of Mary Street and Bakers Lane
 - Entry and exit ramp connections between the mainline tunnels and the St Peters interchange at St Peters [which is currently being constructed as part of the New M5 project]

- Minor physical integration works with the surface road network at the St Peters interchange including road pavement and line marking
- An underground interchange at Leichhardt and Annandale [the Inner West subsurface interchange] that would link the mainline tunnels with the Rozelle interchange and the Iron Cove Link [see below]
- A new interchange at Lilyfield and Rozelle [the Rozelle interchange] that would connect the M4-M5 Link mainline tunnels with:
 - City West Link
 - Anzac Bridge
 - The Iron Cove Link [see below]
 - The proposed future Western Harbour Tunnel and Beaches Link
- Construction of connections to the proposed future Western Harbour Tunnel and Beaches Link project as part of the Rozelle interchange, including:
 - Tunnels that would allow for underground mainline connections between the M4 East and New M5 motorways and the proposed future Western Harbour Tunnel and Beaches Link [via the M4-M5 Link mainline tunnels]
 - A dive structure and tunnel portals within the Rozelle Rail Yards, north of the City West Link / The Crescent intersection
 - Entry and exit ramps that would extend north underground from the tunnel portals in the Rozelle Rail Yards to join the mainline connections to the proposed future Western Harbour Tunnel and Beaches Link
 - A ventilation outlet and ancillary facilities as part of the Rozelle ventilation facility [see below]
- Twin tunnels that would connect Victoria Road near the eastern abutment of Iron Cove Bridge and Anzac Bridge [the Iron Cove Link]. Underground entry and exit ramps would also provide a tunnel connection between the Iron Cove Link and the New M5 / St Peters interchange [via the M4-M5 Link mainline tunnels]
- The Rozelle surface works, including:
 - Realigning The Crescent at Annandale, including a new bridge over Whites Creek and modifications to the intersection with City West Link
 - A new intersection on City West Link around 300 metres west of the realigned position of The Crescent, which would provide a connection to

- and from the New M5/St Peters interchange [via the M4-M5 Link mainline tunnels]
- Widening and improvement works to the channel and bank of Whites Creek between the light rail bridge and Rozelle Bay at Annandale, to manage flooding and drainage for the surface road network
- Reconstructing the intersection of The Crescent and Victoria Road at Rozelle, including construction of a new bridge at Victoria Road
- New and upgraded pedestrian and cyclist infrastructure
- Landscaping, including the provision of new open space within the Rozelle Rail Yards
- The Iron Cove Link surface works, including:
 - Dive structures and tunnel portals between the westbound and eastbound Victoria Road carriageways, to connect Victoria Road east of Iron Cove Bridge with the Iron Cove Link
 - Realignment of the westbound [southern] carriageway of Victoria Road between Springside Street and the eastern abutment of Iron Cove Bridge
 - Modifications to the existing intersections between Victoria Road and Terry, Clubb, Toelle and Callan streets
 - Landscaping and the establishment of pedestrian and cycle infrastructure
- Five motorway operations complexes; one at Leichhardt [MOC1], three at Rozelle [Rozelle West [MOC2], Rozelle East [MOC3] and Iron Cove Link [MOC4]], and one at St Peters [MOC5]. The types of facilities that would be contained within the motorway operations complexes would include substations, water treatment plants, ventilation facilities and outlets, offices, on-site storage and parking for employees
- Tunnel ventilation systems, including ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels
- Three new ventilation facilities, including:
 - The Rozelle ventilation facility at Rozelle
 - The Iron Cove Link ventilation facility at Rozelle
 - The Campbell Road ventilation facility at St Peters
- Fitout [mechanical and electrical] of part of the Parramatta Road ventilation facility at Haberfield [which is currently being constructed as part of M4 East project] for use by the M4-M5 Link project

- Drainage infrastructure to collect surface and groundwater for treatment at dedicated facilities. Water treatment would occur at
 - Two operational water treatment facilities [at Leichhardt and Rozelle]
 - The constructed wetland within the Rozelle Rail Yards
 - A bioretention facility for stormwater runoff within the informal car park at King George Park at Rozelle [adjacent to Manning Street]. A section of the existing informal car park would also be upgraded, including sealing the car park surface and landscaping
- Treated water would flow back to existing watercourses via new, upgraded and existing infrastructure
- Ancillary infrastructure and operational facilities for electronic tolling and traffic control and signage [including electronic signage]
- Emergency access and evacuation facilities, including pedestrian and vehicular cross and long passages and fire and life safety systems
- Utility treatments, including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities. A Utilities Management Strategy has been prepared for the project that identifies management options for utilities, including relocation or adjustment. Refer to Appendix F [Utilities Management Strategy] of this EIS.

The project does not include:

- Site management works at the Rozelle Rail Yards. These works were separately assessed and determined by Roads and Maritime through a Review of Environmental Factors under Part 5 of the EP&A Act [refer to Chapter 2] Assessment process [of the EIS]
- Ongoing motorway maintenance activities during operation
- Operation of the components of the Rozelle interchange which are the tunnels, ramps and associated infrastructure being constructed to provide connections to the future Western Harbour Tunnel and Beaches Link project.

Temporary construction ancillary facilities and temporary works to facilitate the construction of the project would also be required.

2.4 CONSULTATION

Table 2.1 outlines the consultation to date with key agency stakeholders that has informed and shaped the urban design concept for the project. Feedback from other agencies and the local community has also been considered in developing this concept. Further details regarding consultation are contained in Chapter 7 [Consultation] of the EIS.

2.5 URBAN DESIGN REVIEW PANEL

SMC has established an Urban Design Review Panel to oversee development of urban and landscape design for the project. The role of the Panel is to provide advice regarding the urban design concept and its development. The panel makes recommendations in relation to architecture, urban and landscape design and artistic aspects of the project. These recommendations are used during detailed design and preparation of the UDLPs in the course of design review. Members of the Panel include:

- Peter Poulet [Chair] - NSW Government Architect
- Yvonne von Hartel - Peck von Hartel Architects
- Kim Crestani - Order Architects
- Gareth Collins - Principal Manager, Centre for Urban Design, Roads and Maritime

Stakeholder	Feedback	Impact on M4-M5 Link
UrbanGrowth NSW	<p>As developer for The Bays Precinct project, UrbanGrowth has provided key input on the concept for the Rozelle Rail Yards, including:</p> <ul style="list-style-type: none">• Active transport connections to allow seamless connections between the Rozelle Rail Yards and White Bay• A desire to reduce the amount of land used for surface roads within the Rozelle Rail Yards and the future Bays Precinct• A desire for contiguous land parcels that maximise usable remaining project land• A desire for development sites within the Rozelle Rail Yards in line with The Bays Precinct Transformation Strategy• A desire for reduced land take adjacent to the White Bay Power Station.	<ul style="list-style-type: none">• Active transport network designed to provide level access to White Bay• Placement of the majority of motorway infrastructure below ground to maximise the amount of open space• Use of landform above motorway infrastructure for recreation.• Efficient motorway design east of Victoria Road to reduce land take surrounding White Bay Power Station.
NSW Heritage Council	<p>The NSW Heritage Council were consulted during design development of the project. Feedback to date has included:</p> <ul style="list-style-type: none">• Desire for an urban design led solution• Desire for integration and interpretation of elements that explain former uses of the Rozelle Rail Yards• Desire to minimise impacts on surrounding communities and heritage items.	<ul style="list-style-type: none">• Retention of rail gantries, lighting tower and rail tracks from the Rozelle Rail Yards for incorporation in ultimate open space design• Development of an urban design solution for the project that has led to the majority of road infrastructure occurring underground.
City of Sydney and Inner West	<p>A number of workshops have been held with both City of Sydney and Inner West councils regarding the development of the project. Key areas of feedback include:</p> <ul style="list-style-type: none">• Desire for an integrated active transport concept• Desire for contiguous remaining project land parcels with active end-uses• Minimisation of impacts on local roads- desire to not increase surface traffic• Integration with surrounding streetscapes and public domain palettes.	<ul style="list-style-type: none">• Developed the active transport strategy [Appendix N of the EIS]• Developed concepts for Rozelle Rail Yards and Iron Cove.

Table 2.1: Key stakeholder engagement that has shaped the urban design concept

3.0 Principles and Objectives

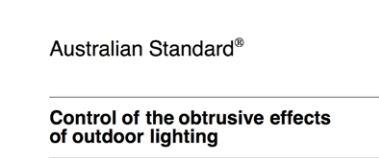
3.1 ASSESSMENT METHODOLOGY

The methodology used to develop the urban design concept for the project is outlined in Figure 3.2. The guidelines and policies [Figure 3.1] as well as the contextual site analysis [section 4] were distilled into a set of principles for the urban design component of the project. These principles formed

Urban Design Guidelines and Policies



- WestConnex Motorway Urban Design Framework



- AS4282-1997 Control of the obtrusive effects of outdoor lighting



- Beyond the Pavement: Roads and Maritime urban design policy, procedures and design principles [Roads and Maritime, 2014]



- Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW [Roads and Maritime, 2012]



- NSW Sustainable Design Guidelines Version 3.0 [Transport for NSW, 2013]



- Roads and Maritime Landbridge discussion paper

Figure 3.1: Guidelines and policies used

the lens through which strategies and concepts could be developed for the sites. Examples of such concepts are contained in section 5.

The following guidelines and policies were considered in the development of the urban design of M4-M5 Link.


Crime prevention and the assessment of development applications

Guidelines under section 79C of the *Environmental Planning and Assessment Act 1979*

- Crime prevention and the assessment of development applications [DUAC, 2001]



- Crime Prevention through Environmental Design [CPTED] [Queensland Government, 2007]

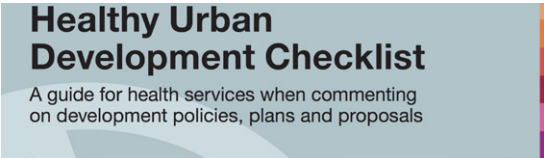


Disability (Access to Premises — Buildings) Standards 2010

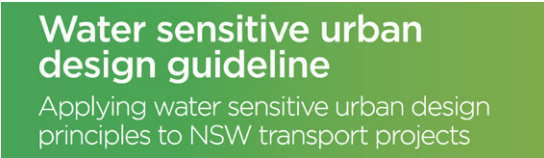
- Disability [Access to Premises – Buildings] Standards 2010



- Technical guideline for Urban Green Cover in NSW



- Healthy Urban Development Checklist [NSW Health, 2009]



- Roads and Maritime/Transport for NSW Water Sensitive Urban Design Guideline

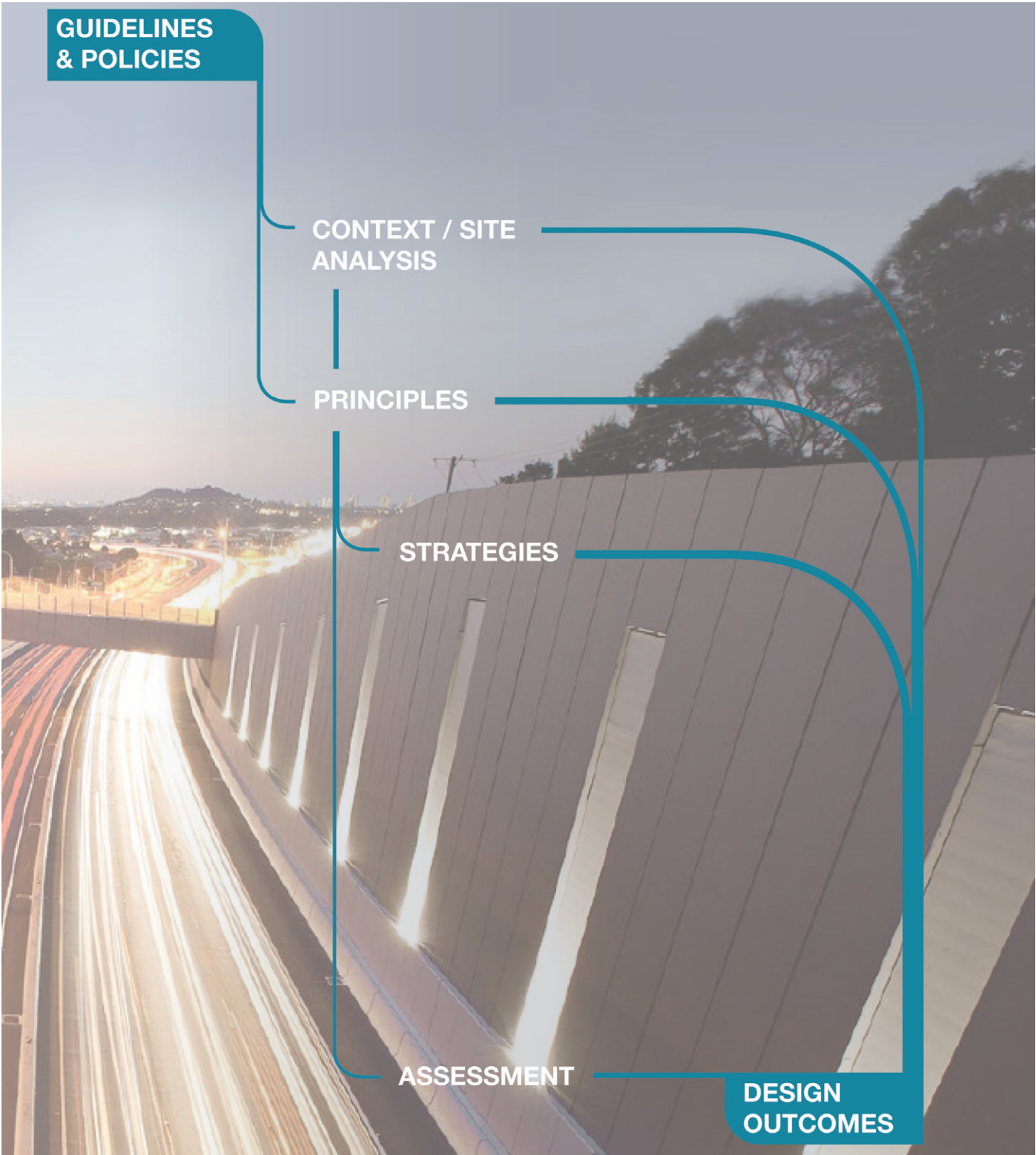
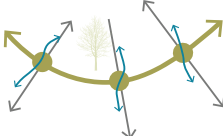
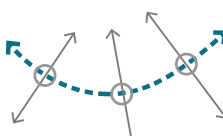

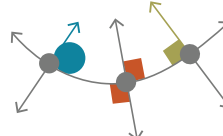


Figure 3.2: Methodology

3.2 URBAN DESIGN OBJECTIVES AND PRINCIPLES

The principles, goals, objectives and opportunities from the key guidelines and policies are reflected in the following principles. The principles provide a platform from which the design concepts have been produced.

Principle	Considerations
<div>1</div> <div></div> <div>An integrated and collective approach Create holistic and integrated design solutions generated by collaboration across disciplines, the community, stakeholders and government bodies.</div> <div></div> <div><ul style="list-style-type: none">- Working across disciplines- Holding regular stakeholder workshops to contribute to design options- Prioritising community input [see Chapter 7 [Consultation] of the EIS]- Working with all future plans and government bodies- Considering relevant regulatory frameworks on the site and in surrounding areas</div>	
<div>2</div> <div></div> <div>An environmental vision Create a sustainable and enduring design response which enhances and connects local ecologies, and green spaces.</div> <div></div> <div><ul style="list-style-type: none">- Enhancing waterways and creeks- Using WSUD where possible- Connecting green spaces- Enhancing local ecologies and vegetation- Using durable, sustainable and long lasting materials and timeless design</div>	
<div>3</div> <div></div> <div>Cross scale connection of spaces Prioritise local and regional significant connections that respond to broader issues, and support aims and initiatives of the local neighbourhoods and the city.</div> <div></div> <div><ul style="list-style-type: none">- Enhancing connectivity between streets, facilities, neighbourhoods, green spaces, cycle and pedestrian connections across the site and the city- Integrating and connecting transport modes- Connecting local and regional road, cycle, public transport and pedestrian links</div>	
<div>4</div> <div></div> <div>A motorway integrated within its context Understand the existing landscape and respond in a respectful manner that seeks to enhance and contribute to its context.</div> <div></div> <div><ul style="list-style-type: none">- Responding to the natural patterns- Respecting and working with the local landform- Enhancing the interface between existing open spaces and the motorway- Avoiding sterilisation of land by providing connections across motorway infrastructure- Simple unadorned structures</div>	
<div>5</div> <div></div> <div>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.</div> <div></div> <div><ul style="list-style-type: none">- Incorporating heritage [see section 7 in regards to requirements for a heritage interpretation strategy]- Respecting and responding to cultural contexts- Complementing the existing built fabric- Consulting with local communities [see Chapter 7 [Consultation] of the EIS]- Increasing the legibility of places, buildings, streets and landmarks</div>	
<div>6</div> <div></div> <div>A multidimensional 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.</div> <div></div> <div><ul style="list-style-type: none">- Ensuring Crime Prevention Through Environmental Design [CPTED] driven designs- Safe, legible connections with way finding for all users- Ensuring universal design outcomes- Considering the user experience for all modes including drivers, pedestrians, cyclists and public transport.</div>	
<div>7</div> <div></div> <div>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.</div> <div></div> <div><ul style="list-style-type: none">- Contributing to urban structure and revitalisation- Capitalising on traffic reduction to enhance local streets and increase neighbourhood liveability- Creating opportunities for urban renewal</div>	

4.0 Context

Pressure on Sydney's infrastructure is increasing rapidly. Sydney's population is expected to rise from 4.7 million in 2012 to eight million in 2061 [Australian Bureau of Statistics, 2013].

This type of large-scale population growth puts increased pressure on Sydney's infrastructure. A range of transport solutions is required to meet this growth, and the M4-M5 Link is one component of this solution.

4.1 REGIONAL CONTEXT

Due to years of urban sprawl, the fabric of Australian cities like Sydney cover an extensive area with low density development by international measures. At the same time as this growth is occurring, we are witnessing another phenomena, where the population has become focused on the inner city. Dubbed "the great inversion," housing demand has shifted from the periphery to the centre, where infrastructure is easily accessible, commute times are reduced and knowledge jobs are close at hand.

4.2 METROPOLITAN CONTEXT

In many cities the centre lies in the middle of a ring road transport network. In Sydney however, some of our major transport routes, such as the M1 Motorway and Parramatta Road, run adjacent to, or through the centre. This places Sydney on the edge of the ring, increasing pressure on the city's heart. With the expected population growth this pressure is anticipated to increase dramatically. WestConnex will relieve some of the pressure on the inner city providing a new ring road link that reduces the need for traffic to travel through the centre. The M4 Widening, M4 East, King Georges Road Interchange Upgrade, New M5 and M4-M5 Link together complete this ring road as shown in Figure 4.1.

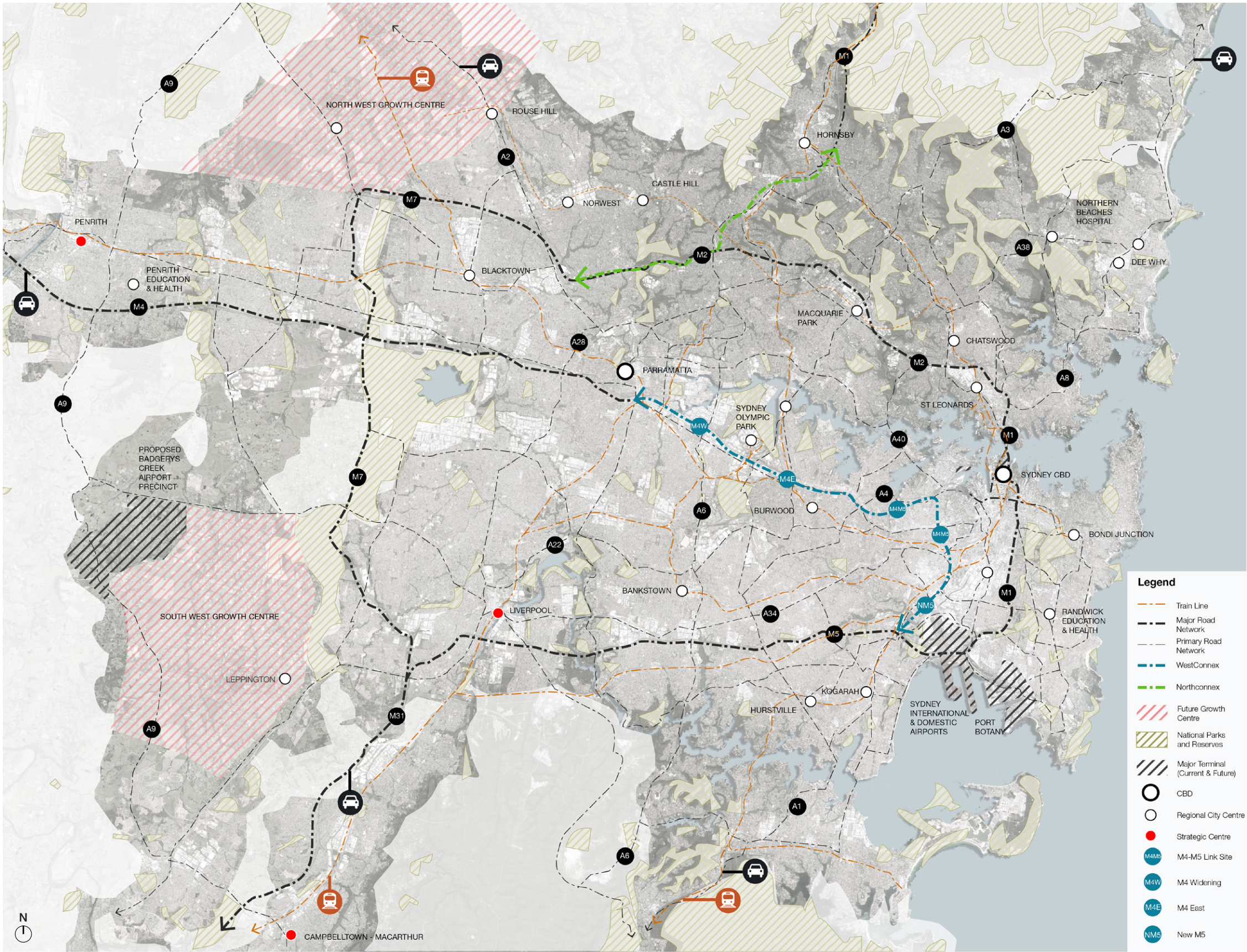


Figure 4.1: Regional context

4.3 LOCAL CONTEXT

The M4-M5 Link would be an underground motorway with entry and exit points that connect to the wider transport network at Haberfield, Rozelle and St Peters. The Rozelle Rail Yards and Iron Cove Link sites are located at and adjacent to disconnected urban environments. These conditions are the result of the historically typical approach to building large individual road systems, which disconnect suburbs and greatly reduce the connectivity and amenity of sustainable modes of transport such as cycling and walking, as shown in Figure 4.2. Rather than increasing or adding to the existing disconnection, the project would provide increased connectivity at these sites.

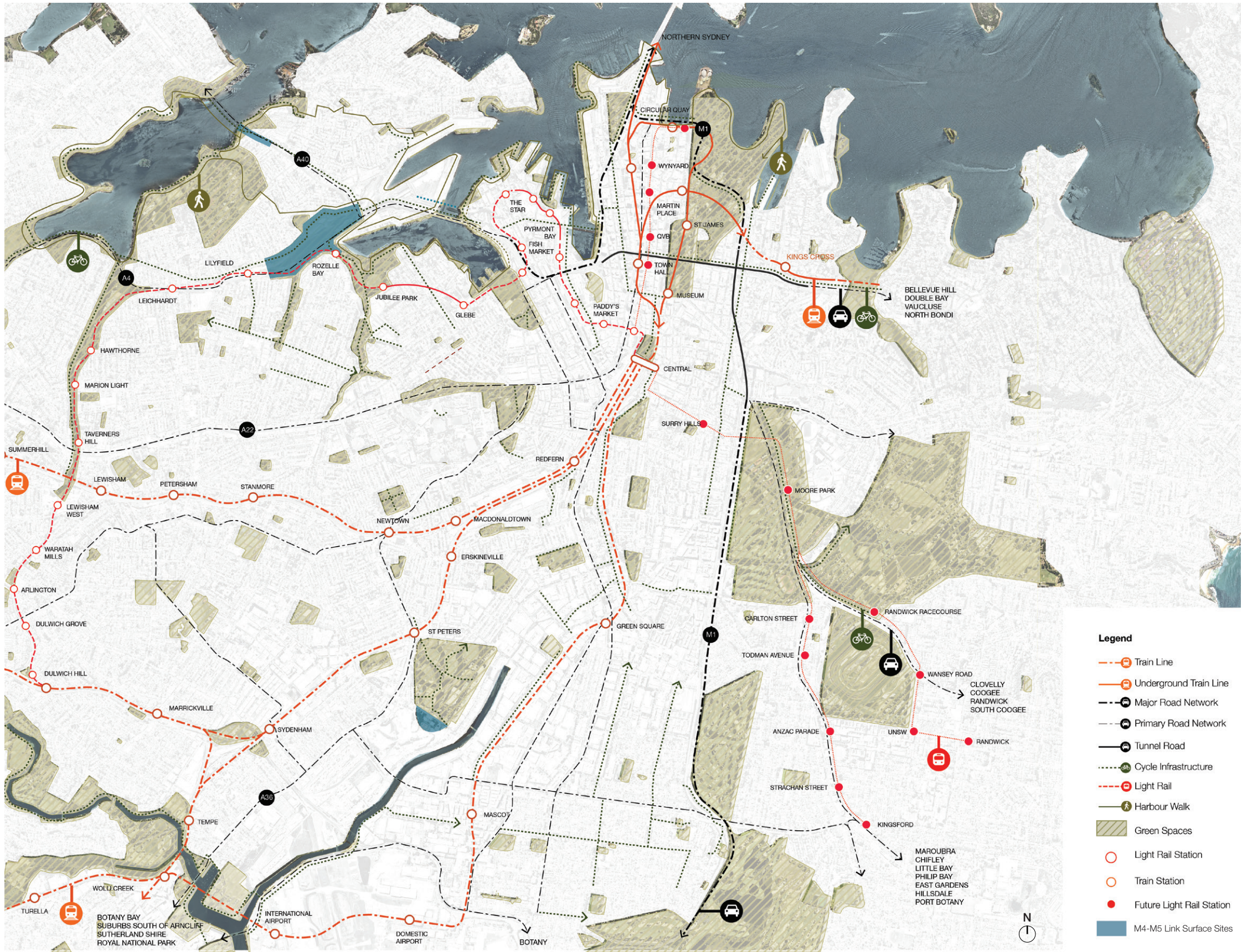


Figure 4.2: Local context