WestConnex

New M5 Urban Design and Landscape Plan

Western Interchange and Portals: Eastbound retaining walls

M5N-HSL-MNP-100-110-TR-1971_B01

Project:
WestConnex New M5

Urban Design and Landscape Plan for Western Interchange and Portals:
Eastbound retaining walls

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Front cover image: Western Interchange and portals (Artists impression only subject to change during design development) - HASSELL image.

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PREPARED FOR CPB CONTRACTORS | DRAGADOS | SAMSUNG C&T BY HASSELL

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(Artists impression only subject to change during design development)

1 INTRODUCTION

1.1 Purpose

The WestConnex New M5 Project is being designed and constructed by the CPB Dragados Samsung Joint Venture (CDS).

This Urban Design and Landscape Plan has been prepared by HASSELL for CDS to satisfy the Ministers Condition of Approval B61 (SSI6788). This plan provides a comprehensive outline of the Urban Design and Landscape strategies for the Western Interchange and Portals - Retaining Walls 01, 03, 04, 05.

The UDLP process is currently staged to reflect the current program of works across the project. The Staging Report has been broken up into a number of areas and stages for the project. The Western Interchange and Portals: East Bound Retaining Walls UDLP reflects that staging report under condition A10.

1.2 Background

WestConnex is one of the largest transformative urban motorway program of works in Australia – linking Sydney's west and south-west with the city, airport and port in a 33km continuous motorway. It will be the trigger for urban revitalisation providing new opportunities for residential and commercial development along the corridor, making Sydney a more attractive place to live, work and socialise.

The urban and landscape design works contribute to the following specific project objectives:

- Create opportunities for urban renewal, improved liveability and public and active transport improvements along and around the New M5 Main Works corridor
- Enable opportunities for urban renewal by reducing traffic and improving amenity along the New M5 Main Works corridor
- Maintain the connectivity of active transport facilities in the M5 Motorway corridor
- Consistent with the WestConnex scheme, the New M5 Project includes an objective to protect natural and cultural resources and enhance the environment through the following key approaches:
  - Minimise adverse impacts at a local level on air quality / noise
  - Provide for improvement of social and visual amenity
  - Minimise impacts on natural systems including biodiversity
  - Minimise impact on Aboriginal and non-Aboriginal cultural heritage
  - Integrate sustainability considerations throughout the design, construction and operation of the New M5 Project including consideration of the Infrastructure Sustainability Council of Australia (ISCA) IS Rating Tool.

Urban Design Objectives

Urban design objectives particular to this project are covered in section 2.3 of this Urban Design and Landscape Plan.

Ministers Conditions of Approval

An Environmental Impact Statement (EIS) for the Project was submitted on 23 November 2015 for public exhibition and comment. On 4 March 2016, a Submissions Report was prepared in response to submissions received during the EIS exhibition period. The Plan was considered by the Department of Planning and Environment (DP&E) and informed the Minister for Planning, in the projects approval assessment.

On 20 April 2016, planning approval for the WestConnex New M5 project was received from the Minister for Planning. The approval was subject to Conditions of Approval, including B34, B35, B36, B38, B60, B61, B62, B63 and B64 which are specific to Urban and Landscape Design.

These Conditions of Approval are contained in Section 1.8 of this Plan. Compliance with the Conditions is noted, and includes the location in this Plan where each Condition is addressed.

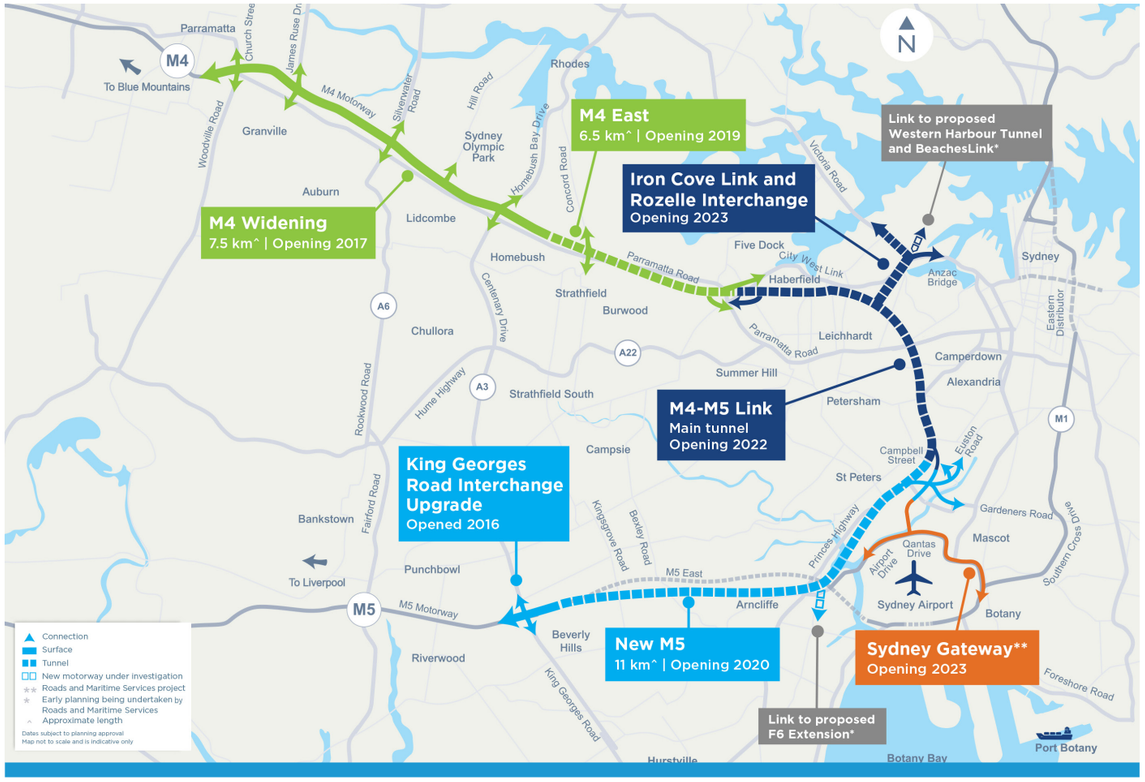

Figure 1-1 - WestConnex regional context map

1.3 Description of the overall Project Works

The overview below sets out the core scope of the New M5 Main Works:

- Western Surface Works from west of the KGRIU and the Western Portals including the Western Connections with the existing M5 East Motorway
- Western Portals, located to the west of Bexley Road
- An Eastbound Carriageway and a Westbound Carriageway between the Western Surface Works and the future Stage 3
- St Peters Caverns to enable:
  - Traffic from the Eastbound Carriageway to connect with the Eastern Portals, and the Stage 3 Stubs
  - Traffic from the Eastern Portals and the Stage 3 Stubs to connect with the Westbound Carriageway
- Eastern Portals at St Peters Interchange
- Northern Ramps between the Eastern Portals and Euston Road at the junction with Campbell Road
- Stubs at the Eastern Portals for the future Eastern Ramps (Gardeners Road and Sydney Gateway)
- Stage 3 Stubs to a point between Canal Road and Campbell Road for the future connection to Stage 3
- Local Road Upgrades to include:
  - Widening of Euston Road between Campbell Road to the intersection with Sydney Park Road and Huntley Street
  - Widening of Campbell Road/Street between Burrows Road to the intersection with Unwins Bridge Road and May Street
  - A new eastward extension of Campbell Road across Alexandra Canal to intersect with Bourke Road and then onto the intersection of Bourke Road and Gardeners Road, and
  - Upgrades of existing intersections described above
- All roadside tolling infrastructure on the New M5 between King Georges Road Interchange and the Northern Ramps
- All roadside tolling infrastructure for the existing M5 East between King Georges Road Interchange and General Holmes Drive
- Local operational control and incident response facilities
- A local maintenance facility, and
- A main operational control Motorway Control Centre (the MCC').

The project has been split into six geographical zones for delivery purposes. The zones are split as follows and shown below:

- Zone 125 – MOC1 Kingsgrove Motorway Operations Complex, MOC2 Bexley Road South Motorway Operations Complex, MOC3 Arncliffe Motorway Operations Complex, MOC4 St Peters Motorway Operations Complex - Ventillation Facilities and Fire Water Tanks and Pump Rooms and MOC5 Burrows Road Motorway Operations Complex.
- Zone 150 – Tunnels
- Zone 200 – Western Interchange and Portals
- Zone 700 – St Peters Local Road Upgrades
- Zone 800 – Feature Lighting
- Zone 900 – St Peters Interchange

Reference Documents

Throughout the design process, the following documents have been utilised:

- Beyond the Pavement - RTA urban design policy, procedures and design principles, RMS, January 2014.
- Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects, RTA, September 2011.
- Bridge Aesthetics - Design Guidelines to Improve the Appearance of Bridges in NSW, RMS, July 2012.
- Designing to Minimise Vandalism - An investigation into planning and design measures to avoid or mitigate vandalism (Final Draft), RTA, November 2008.
- Guideline for Batter Surface Stabilisation using vegetation, RMS, April 2015.
- Landscape guideline - Landscape design and maintenance guidelines to improve the quality, safety and cost effectiveness of road corridor planting and seeding, RTA, April 2008.
- Noise wall design guideline - Design guidelines to improve the appearance of noise walls in NSW, RTA, March 2016.
- Shotcrete Design Guidelines - Design guidelines to avoid, minimise and improve the appearance of Shotcrete, RTA, March 2016.
- Soil Landscapes of Sydney, Soil Conservation Service of NSW, 1989.
- Specification D&C R178, Vegetation, Version for New M5 Main Works, RMS, November 2014.
- Specification D&C R179, Landscape Planting, Version for New M5 Main Works, RMS, November 2014.
- Specification D&C R271, Design and Construction of Noise Walls, Version for New M5 Main Works, RMS, November 2014.
- Tunnel Urban Design Guideline - Design guideline to improve the customer and community experience of road tunnels in built up urban areas, RMS Centre for Urban Design, Draft for discussion, March 2014.
- Westconnex Motorway Urban Design Framework, SMC and RMS Centre for Urban Design, Draft, October 2013.

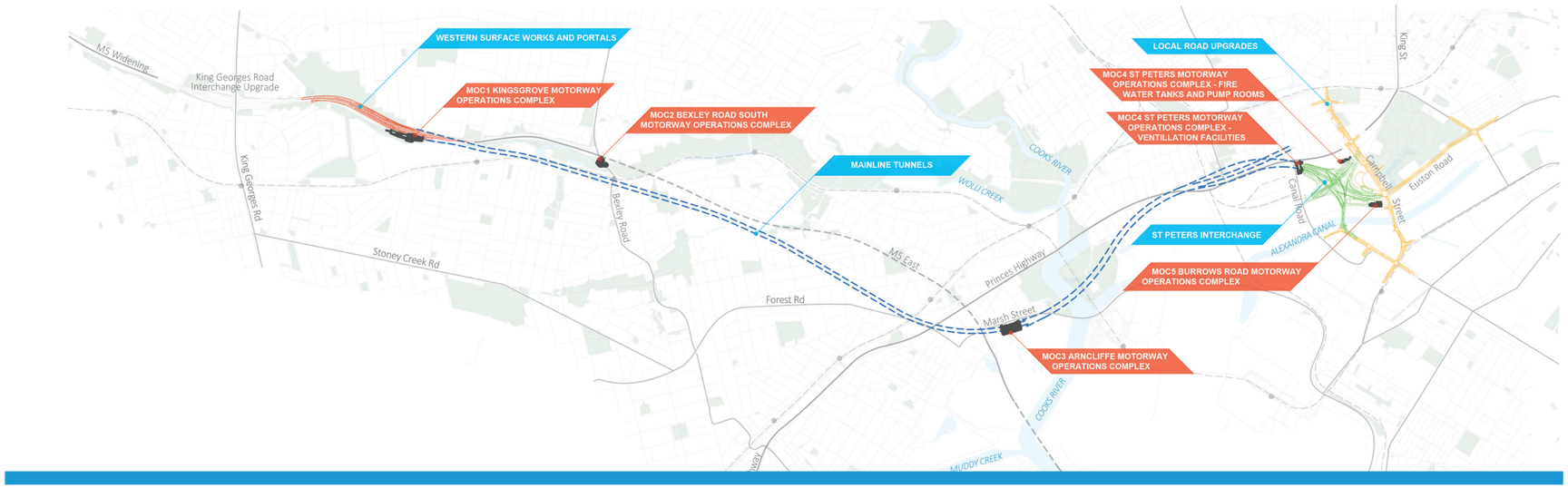

Figure 1-2 - Schematic showing New M5 project zones

1.4 Urban Design policy

Work leading to the presentation of the Urban and Landscape Design has been an iterative process and has included:

- A thorough review of briefing materials and associated working papers including the WestConnex Urban Design Framework
- Inspections of the route and its environs
- Numerous design workshops and meetings involving the CDS project design team members
- A review of Sydney Motorways Corporation (SMC) and Roads and Maritime Services (RMS) design standards and industry construction methods.

The Urban & Landscape Design proposals for the project have been prepared in reference to the objectives and design principles of:

- RMS Beyond the Pavement
- WestConnex Urban Design Framework
- RMS Urban Design Guidelines.

Beyond the Pavement

In Beyond the Pavement, RMS nominates urban design goals and physical design outcomes that are sought on all RMS projects. These include that road projects must fit sensitively with the landform and built, natural and community environments; contribute to the accessibility and connectivity of communities and permeability of movement; and that roads must contribute to the overall quality of the public domain for the community.

The document lists nine urban design principles that should govern the planning and design of road infrastructure:

1. Contributing to urban structure and revitalisation
2. Fitting with built fabric
3. Connecting modes and communities
4. Fitting with the landform
5. Responding to natural patterns
6. Incorporating heritage and cultural contexts
7. Designing roads as an experience in movement
8. Creating self-explaining road environments
9. Achieving integrated and minimal maintenance design.

WestConnex Urban Design Framework

HASSELL was engaged by RMS to produce the WestConnex Urban Design Framework, which provides specific urban design direction for the city shaping project. The framework sets out the overall vision for the Motorway;

'The WestConnex Motorway shall be a sustainable, high quality and transformational project for the people of Sydney and NSW. Exhibiting design excellence as a whole and in all constituent parts, it should be sensitively integrated into the natural and built environment, help build communities and contribute to the future livability of the city - Australia's 'Global City'.

CDS has applied the WestConnex Urban Design Framework to develop the Urban and Landscape Design for the Project.

Refer to Section 2.3 of this Plan for the project urban design objectives.

RMS Urban Design Guidelines

The RMS Urban Design Guidelines have also been used in the development of urban and landscape design proposals for the Project. These guidelines include:

- Tunnel urban design guideline
- Bridge aesthetics
- Landscape guidelines
- Noise wall design guideline
- Shotcrete design guidelines
- Biodiversity guidelines
- Designing to minimise vandalism.

1.5 Minister for Planning Conditions of Approval

On 20 April 2016, planning approval for the WestConnex New M5 project was received from the Minister for Planning. The approval was subject to Conditions of Approval, including clauses B34, B35, B36, B38, B60, B61, B62, B63 and B64 which are specific to Urban and Landscape Design.

The Ministers Conditions of Approval clauses are listed below along with a reference to where each condition is addressed within this Plan.

Minister for Planning Conditions of Approval

Condition of approval	Reference
B60 Urban Design Review Panel Within three months of the date of this approval, unless otherwise agreed by the Secretary, the Proponent must establish an Urban Design Review Panel (UDRP) to provide advice and guidance during detailed design and the preparation of the Urban Design and Landscape Plan. The UDRP is to provide advice in relation to architecture, heritage values, urban and landscape design and artistic aspects of the SSI and must:	**Section 1.7**
(a) be comprised of - (i) representatives from the Proponent, including the Head of Urban Design, (ii) where the works affect places of heritage significance, an independent heritage architect, (iii) two independent architects one of which is a landscape architect, (iv) representatives from the relevant council(s), (v) a maximum of two experts, relevant to the works being considered, as selected by the Proponent, where relevant, and (vi) the NSW Government Architect as Chair;	**(i) Gareth Collins (RMS Head of Urban Design) is a member of the Panel,** **(ii) Bruce Pettman (Independent Heritage Architect) is a member of the Panel,** **(iii) Yvonne von Hartel and Kim Crestani (Independent Architects) and Garth Patterson (Independent Landscape Architect) are members of the Panel,** **(iv) Noted, Canterbury Bankstown Council and Georges River Council representatives are members of the Panel** **(v) Noted and as applicable,** **(vi) Peter Poulet (NSW Government Architect) is a member of the Panel.**
(b) meet at least four times a year, or as otherwise agreed by the UDRP;	**Noted. Meetings held 13/09/17, 22/12/17 and 6/2/17 (subsequent meetings not applicable, these meeting minutes will be included in the Main UDLP).**
(c) review and provide advice on the detailed design of the SSI and final revíew of the Urban Design and Landscape Plan (required by condition 861); and	**Noted. Meetings held 13/09/17, 22/12/17 and 6/2/17 (subsequent meetings not applicable, these meetings minutes will be included in the Main UDLP). UDLP issued to Panel 7/2/17. Refer Appendix A.**
(d) keep a record of meeting minutes and a schedule of action items arising from the meeting. The Proponent may establish a separate UDRP for each precinct.	**Noted. Meetings held 13/09/17, 22/12/17 and 6/2/17 (subsequent meetings not applicable, these meeting minutes will be included in the Main UDLP).**

Condition of approval		Reference
B61	**Urban Design and Landscape Plan** Prior to commencement of permanent built surface works and/or landscaping, or as othenrvise agreed by the Secretary, an Urban Design and Landscape Plan (UDLP) must be prepared. The UDLP must be prepared by a suitably qualified and experienced person(s), ín consultation with the relevant council(s) and community, Heritage Council of NSW (or delegate), and the UDRP (condition 860). The UDLP must be approved by the Secretary. The UDLP must present an integrated urban and landscape design for the SSI, and must include, but not be limited to:	**Noted.**
	(a) identification of design objectives, principles and standards based on -	**Section 2.1**
	(¡) local environmental and heritage values, (ii) urban design context, (iii) sustainable design and maintenance, (iv) community safety, amenity and privacy, including 'safer by design' principles where relevant, (v) relevant design standards and guidelines, (vi) prioritising the visual amenity and values of adjoining receivers over the road user experience, (vii) minimising the footprint of the project (including at operational facilities), and (viii) the urban design principles outlined in the documents referred to in conditions A2;	
	(b) landscaping and building design opportunities to mitigate the visual impacts of road infrastructure and operational fixed facilities (including the ventilation facilities, emergency smoke extraction outlet, the Motorway Operations Complex, noise walls etc.);	**Screen planting is provided in front of retaining wall where possible to mitigate the visual impacts. Refer Section 2.6 of this Plan for planting concept plans highlighting proposed planted areas. The scope of this Plan does not include operational fixed facilities, as this will be included in the main UDLP.**
	(c) details on the location of existing vegetation and proposed landscaping (including use of endemic and advanced tree species where practicable). Details of species to be replanted/revegetated must be provided, including their appropriateness to the area and habitat for threatened species. Where feasible and reasonable, top soil and vegetation to be removed must be reused;	**Not applicable for retaining walls. Landscaping intent is shown in Section 2.5.**
	(d) a description of disturbed areas (including compounds) and details of the strategies to progressively rehabilitate, regenerate and/ or revegetate these areas;	**Not applicable for retaining walls.**
	(e) a description of the SSI design features, including the graphics such as sections, perspective views and sketches for key elements of the SSI;	**Section 2.5, 3.**
	(f) information on the reuse of heritage items and materials (condition 834 and 835);	**Not applicable for retaining walls.**
	(g) detail controlled and safe public access to an example of an exposed section(s) of the former St Peters Brickpit Geological Site, unless demonstrated to be impracticable for safety reasons;	**Not applicable for retaining walls.**
	(h) an assessment of the location, design and impacts of operational lighting associated with the SSI and measures proposed to minimise lighting impacts;	**Not applicable for retaining walls.**
	(i) details of where and how recommendations from the UDRP have been incorporated into the plan;	**Not applicable for retaining walls.**
	(j) the Pedestrian and Cycle Implementation Strategy (condition B51);	**Not applicable for retaining walls.**
	(k) the sub-plans identified in conditions 862(a)-(f);	**Not applicable for retaining walls.**
	(l) the timing for implementation of access, landscaping and open space initiatives;	**Not applicable for retaining walls.**
	(m) monitoring and maintenance procedures for the built elements, rehabilitated vegetation and landscaping (including weed control) including performance indicators, responsibilities, timing and duration and contingencies where rehabilitation of vegetation and landscaping measures fail; and	**Not applicable for retaining walls.**
	(n) evidence of consultation with the relevant councils and the community on the proposed urban design and landscape measures, prior to finalisation of the Plan.	**Appendix A.**
	The UDLP must be implemented within one year of operation unless otherwise required by these conditions. Note: The UDLP may be submitted in parts to address the built elements of the SSI and landscaping aspects of the SSI.	**Noted.**

	Condition of approval	Reference
B62	**Urban Design and Landscape Plan must include the following sub-plans** (a) a **Campbell Road Crossing Sub-plan** to assist in the management of access, land use, community amenity and open space impacts associated with the SSI. The Plan must be prepared and approved by the Secretary within twelve months of the date of this approval, unless otherwise agreed by the Secretary. The Plan must be prepared in consultation with the relevant councils and the UDRP, and must address the matters raised during consultation. The Plan must identify and facilitate the construction and establishment of a new land bridge over Campbell Road that is connected to, and contiguous with, the southern end of the existing Sydney Park and the proposed open space area (including active recreation facilities) to the north of the St Peters Interchange. The land bridge is to be designed to satisfy the following objectives -	**Not applicable**
	(i) to enrich and enhance the functionality, integration, recreational value and quality of Sydney Park, (ii) to provide a high quality park that is landscaped and provides a continuous flow of open space over Campbell Road, (iii) to create a new public open space, passive recreation area and garden for the community, (iv) to address the severance created by an expanded Campbell Road and to enhance connectivity between existing and proposed open space that enhances the efficiency and resilience of the southern portion of Sydney Park and the new active recreation areas, and (v) to improve and contribute to the quality and safety of the pedestrian and cyclist environment, including consistency with the Pedestrian and Cycleway Network Review required by condition B50.	**Not applicable**
	The following parameters are to be incorporated and complied with in the design and delivery of the land bridge -	
	(i) be designed to minimise the amenity impacts on adjacent residential development (including visual and acoustic privacy and overshadowing impacts), (ii) be located at least 35 metres to the west of No. 2 Campbell Road, (iii) be of a width that addresses the objectives of this Plan but be no less than 20 metres (at any point), as measured parallel to Campbell Road, (iv) provide high quality access, including the integration of cycling and pedestrian facilities offering continuous paths of travel, over Campbell Road, including consistency with the Pedestrian and Cycleway Network Review (condition 850), (v) considers the provision of pedestrian or cycle access along Campbell Road, (vi) be of a depth to facilitate the planting across the width and depth of the bridge of a diverse range of vegetation (including species design and maturity) consistent with existing and proposed Sydney Park plantings, and (vii) the provision of high quality design and durable park infrastructure, furniture and lighting that meets the relevant council's requirements.	**Not applicable**
B62	The Plan must be consistent with and integrate with the requirements of the UDLP (condition 86l) and the St Peters Interchange Recreational Area Sub-plan (condition 862(b)). This Plan must be fully implemented within four years of the commencement of operations, or as otherwise agreed by the Secretary.	**Not applicable**
	(b) a **St Peters Interchange Recreational Area Sub-plan** to maximise the amount of open space available for the provision of active recreation areas and multifunctional and adaptable active recreation support facilities on the St Peters interchange site (located to the south of Campbell Road). The Plan must be prepared and approved by the Secretary within 12 months of the date of this approval, unless otherwise agreed by the Secretary. The Plan must be prepared by an experienced and qualified person(s) in the design and provision of active recreation facilities and in consultation with the relevant councils (including adjoining councils) and the community. The Plan must detail the construction, timing and responsibility for the delivery of active recreation facilities (including, but not limited to, sporting fields) and take into account the following considerations -	**Not applicable**
	(¡) maximising the availability of active recreational open space, (ii) all relevant policies, guidelines and plans, (iii) the type of facilities to be provided taking into account the current and future local community recreation preferences and needs, (iv) the future use and rationalisation of Albert Street to improve the provision and servicing of open space, including consideration of alternate property access and shared zone treatments, (v) provision of safe and efficient pedestrian and cyclist access connectivity, including integration with the Pedestrian and Cycleway Network Review (condition 850), and (vi) integration with Sydney Park Plan of Management.	**Not applicable**
	The Plan must be consistent with and integrate with the requirements of the UDLP and the Sydney Park Enhancement Sub-plan. Within four years of the commencement of operations, unless otherwise agreed by the Secretary, the Proponent must implement the sub-plan including providing a flat grassed area to be able to be converted into sporting fields and car parking (should a demand be demonstrated).	**Not applicable**

Condition of approval	Reference
(c) A **Campbell Street Green Link Sub-plan** to provide an enhanced and unified landscaped green link between Sydney Park, Simpson Park and Camdenville Park. The objective of the green link is to facilitate a more legible and navigable open space network by providing a high quality open space link to the northern side of Campbell Street between the three parks. The Plan must be prepared by an experienced and qualified person(s) in the design and provision of open space and in consultation with the relevant councils and the community, and is to take into account the following considerations -	**Not applicable**
(i) the provision of a consistent and coherent landscaping theme between Sydney Park, Simpson Park and Camdenville Park, (ii) the establishment of local street conditions, (iii) the provision of enhanced footpath and shared path widths and the separation of walking and cycling paths from the roadway with planted verges or on street car parking, (iv) the provision of crossings along the length of the green link, and (v) reviewing on-street car parking and proposed off-street parking on the southern side of Campbell Road to maximise landscaping, pedestrian and cycling facilities.	**Not applicable**
The Plan must be consistent with and integrate with the requirements of the UDLP and the Sydney Park Enhancement Sub-plan. All facilities must be provided within 12 months of operation.	**Not applicable**
(d) a **M5 Linear Park Enhancement Sub-plan**, for open space bordered by Bexley Road, Bexley, King Georges Road, Beverley Hills, adjoining the M5 Motorway, to connect and enhance the parkland and to offset amenity and open space impacts. The Plan must be prepared and implemented in consultation with relevant Councils, the community and the UDRP and must identify (and consider), but not be limited to -	**Not applicable**
(i) identification of park users and their needs, (ii) amenity of communities adjoining the park, (ii¡) outcomes of consultation and how issues raised have been considered, (iv) measures to enhance active uses and the recreational value of the park (including consideration of active recreational and fitness facilities), and (v) measures to activate and enhance the surveillance of the Kindilan Underpass (including consideration of sight lines, splayed entrances, lighting, public art, and recreational facilities).	**Not applicable**
Notwithstanding the above, the Kindilan underpass must include CCTV surveillance that meets the requirements of NSW Police and the relevant council.	**Not applicable**
(e) an **Alexandra Canal Sub-plan** which details the design and integration of the bridges over the Alexandra Canal, including a Heritage Impact Assessment addressing any heritage impacts to the canal and its setting taking into account future and current accessibility plans for the Canal and the heritage sensitivity of the setting as set out in the Alexandra Canal Heritage Conservation Plan.	**Not applicable**
(f) a **Noise Barrier Location and Design Sub-plan** which includes - (i) identification and confirmation of all permanent noise barrier locations associated with the SSI including new, relocated or modified barriers, (ii) the consultation and decision making process for all new, relocated or modified permanent noise barriers associated with the SSI, (iii) assessment of the potential impacts of the permanent noise barriers including visual amenity, overshadowing, heritage impacts and connectivity and community cohesion, (iv) consideration of safer by design principles, the WestConnex Urban Design Framework, RMS Design Guidelines, (v) adjacent property owner concerns and preferences regarding barrier design and location, and (vi) justification for the final design of new, relocated or modified permanent barriers.	**Details regarding Noise Walls will be included in the main UDLP.**
The permanent barrier design options must be developed in consultation with the UDRP and presented to landowners adjacent to the barriers for consultation prior to the adoption of a final design.	**Details regarding Noise Walls will be included in the main UDLP.**

1.6 Stakeholder and community consultation

MCoA Condition B61 requires that the UDLP be prepared in consultation with the relevant councils and community, NSW Heritage Council and the Urban Design Review Panel (UDRP).

This Plan, the Urban Design and Landscape Plan (UDLP), and a series of illustrative plan drawings has been prepared for the purposes of presentation.

The Plan was made available on the WestConnex website and at the Community Information Centre for public review. Various methods of engagement were undertaken to promote the opportunity to provide feedback including notification, individual briefings, door knocking and email distribution from early February 2017.

The activities undertaken as part of the consultation process are outlined in the following table.

Findings from the consultation are listed in the Document Consultation & Comment Register which can be found in Appendix A of this Plan.

Activity	Stakeholder	Timeframe
Briefings	Canterbury Bankstown Council (through UDRP)	Through UDRP panel and interface meeting held on 24/01/17.
	Kingsgrove North group submissions coordinator	03/02/17 and 14/02/17
	Beverly Hills Progress Association representative	30/01/17 and 14/02/17
Letterbox notifications	Construction update to 3,000 local residents and businesses.	01/02/17 (feedback close date 17/02/17)
Email circulation	Subscribers to the WestConnex NewM5 email updates	10/02/17
	Subsequent reminder to local residents.	
Door knocking	20 residential properties door knocked by members of the project team to provide specific information to those in the vicinity of Glamis Street, Armitree Street, and Rosebank Avenue, Kingsgrove.	16/02/17
Display office	Draft plan made available at community info centre at St Peters and uploaded online during exhibition period from 01/02/17.	01/02/17 – 17/01/17
WestConnex website	Draft plan made available online during exhibition period from 01/02/17.	01/02/17 – 17/01/17

1.7 Urban Design Review Panel

An Urban Design Review Panel (UDRP) has been established by M5AT to provide advice and guidance during detailed design and the preparation of the Urban Design and Landscape Plan and its component sub-plans as required by Planning Approval conditions B60, B61 and B62, respectively.

At the time of release of this UDLP for public display, presentation and review sessions had been undertaken on the following dates:

- 01.10.15 – Urban Design Review Panel (RMS Offices)
- 15.04.16 – Urban Design Review Panel (SMC Offices)
- 13.09.16 – Urban Design Review Panel (RMS Offices)
- 06.02.17 – Urban Design Review Panel (SMC Offices)
- 22.12.16 – Urban Design Review Panel (SMC Offices).

Findings from the consultation, including recommendations from the UDRP, are in included in the Document Consultation & Comment Register which can be found in Appendix A of this Plan.

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AERIAL VIEW OF WESTERN INTERCHANGE PORTALS

(Artists impression only subject to change during design development)

2 GENERAL

2.1 Context

A contextual analysis of the route and environs has been completed. The purpose of this section of the report is to:

- Consider the route for the New M5 and the surrounding local, environmental and landscape context of the project.
- Describe existing site conditions.
- Consider key natural, built and community elements and issues that will be addressed in the detailed design phase of the project.

Refer Section 2.5 for information regarding existing conditions and the design approach related to the proposed works within the Western Interchange and portals & MOC1 Kingsgrove Motorway Operations Complex which is relevant to this Plan.

2.1.1 Regional and local contextual analysis

WestConnex overview

WestConnex will extend from the M4 Motorway at Parramatta to Sydney Airport and the M5 Motorway, re-shaping the way people move through Sydney and generating urban renewal opportunities along the way. It will provide the critical link between the M4 and M5, completing Sydney's motorway network.

While the character varies along the route, the WestConnex will be sensitively integrated into the built and natural environments to reconnect and strengthen local communities and enhance the form, function, character and liveability of Sydney.

Local context

The local context throughout the Project area is characterised by two distinct character zones.

Within the zone extending east from Bexley to the Cooks River, the predominant land use is medium-low density residential, characterised by single dwellings on medium to large blocks, with the suburbs between Wolli Creek and Bexley North older neighbourhoods established on the ridge lines with their valleys currently utilised as open space corridors.

The zone east of the Cooks River to St Peters is located on the low-lying lands between the Cooks River and Alexandra Canal, characterised by Sydney's major transport and freight infrastructure and the commercial and industrial land use adjacent to the Princes Highway. The surrounding parklands, open space, and golf courses are of scenic value.

An analysis of the project corridor was undertaken to understand existing conditions, with the following natural, built and community contexts examined:

- Land use
- Local Government Areas and suburbs
- Landscape character precincts
- Public transport and main roads
- Hydrology
- Open space
- Geology
- Soil landscapes
- Non-Indigenous heritage
- Indigenous heritage.

LEGEND

- Maintenance facility and Bulky Goods/Equipment Storage
- Sediment basin
- Ventilation outlet and Distribution Substation
- Distribution Substation
- Smoke extraction
- Air supply/intake
- Water treatment plant
- 33kV Substation
- Fire water tanks and pump rooms
- Motorway Control Centre
- Western Surface Works
- St Peters Interchange
- St Peters Local Road Upgrades
- Mainline Tunnel

Figure 2-1 - Local Context

2.1.2 Land use

Land use along the corridor is generally a mix of commercial, industrial and residential. The western portion of the alignment is dominated by parkland and residential land uses, whilst the eastern portion of the corridor is largely concerned with industrial, parkland and transport related land uses.

2.1.3 Local Government Areas and suburbs

The New M5 Main Works will pass through six local government areas including City of Canterbury Bankstown, Bayside Council, City of Sydney, Inner West and Georges River Councils.

Each Council is influential with strong communities and potentially different goals, ambitions, procedures and policies which will need to be considered.

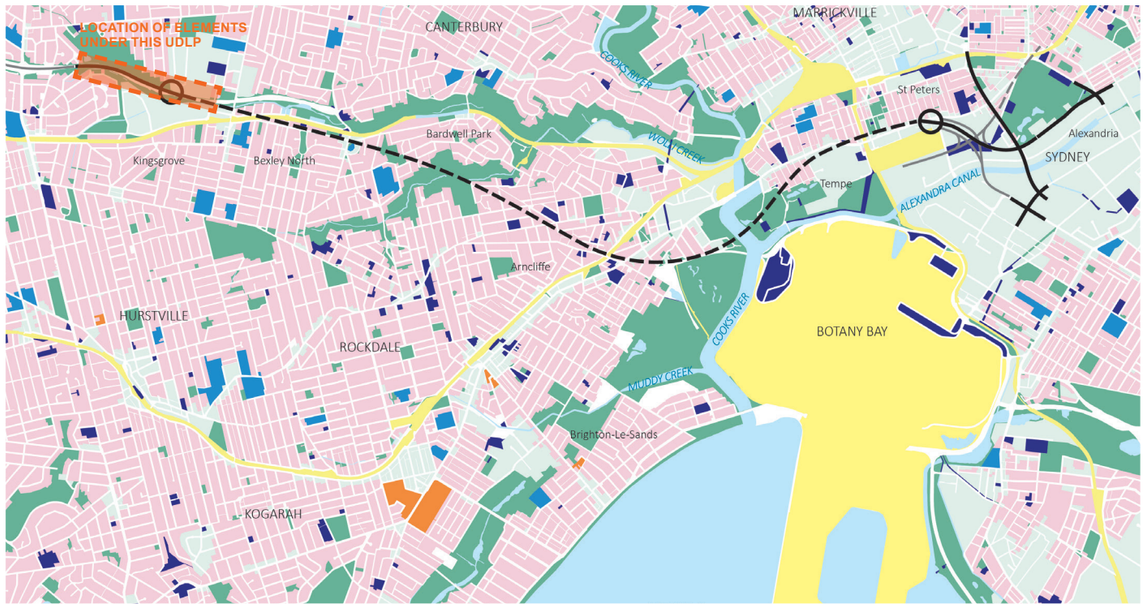


Figure 2-2 - Land Use Map

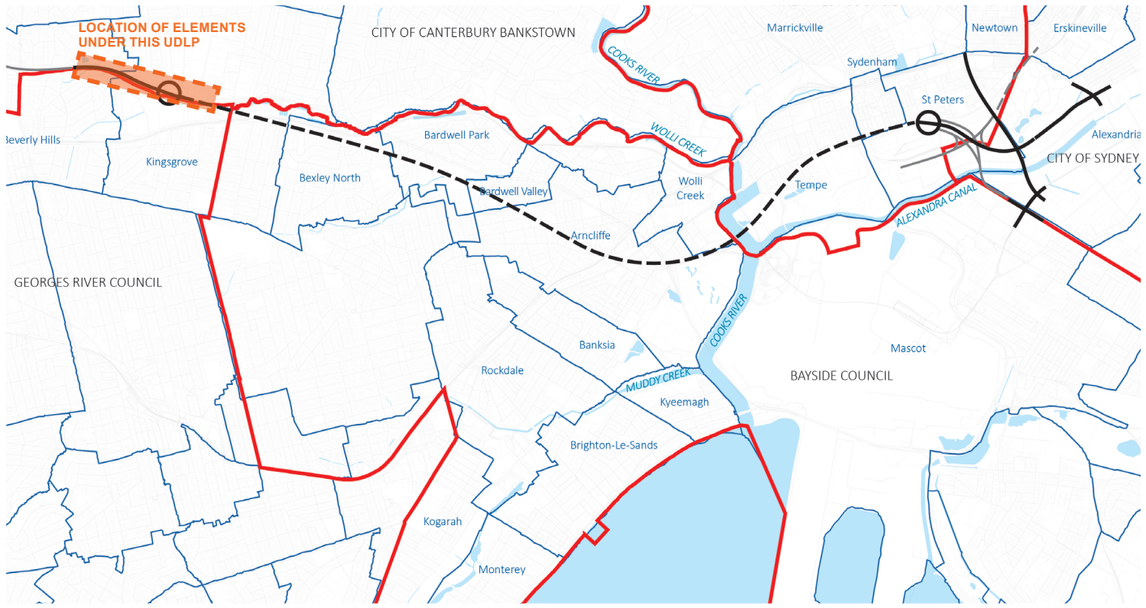


Figure 2-3 - Local Government Map

2.1.4 Public transport and main roads

The current M5 East corridor and the Princes Highway corridor connect a diversity of suburbs, but also forms a north-south divide between suburbs, communities and open spaces.

These transport corridors form the main vehicular connections between western and southern Sydney to the CBD.

2.1.5 Hydrology

The site lies within the Cooks River Catchment with a number of tributaries that extend from the Cooks River into the Project corridor (west to east):

- Wolli Creek (Natural and formalised canal)
- Bardwell Creek
- Alexandra Canal.

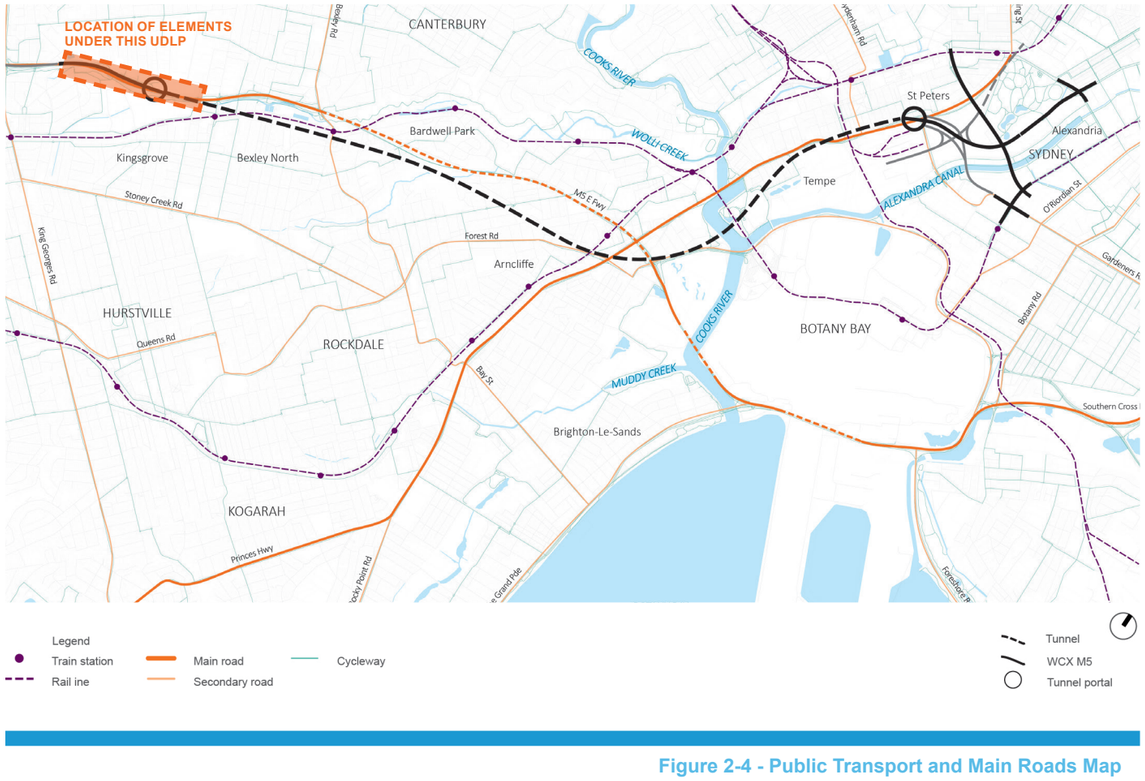


Figure 2-4 - Public Transport and Main Roads Map

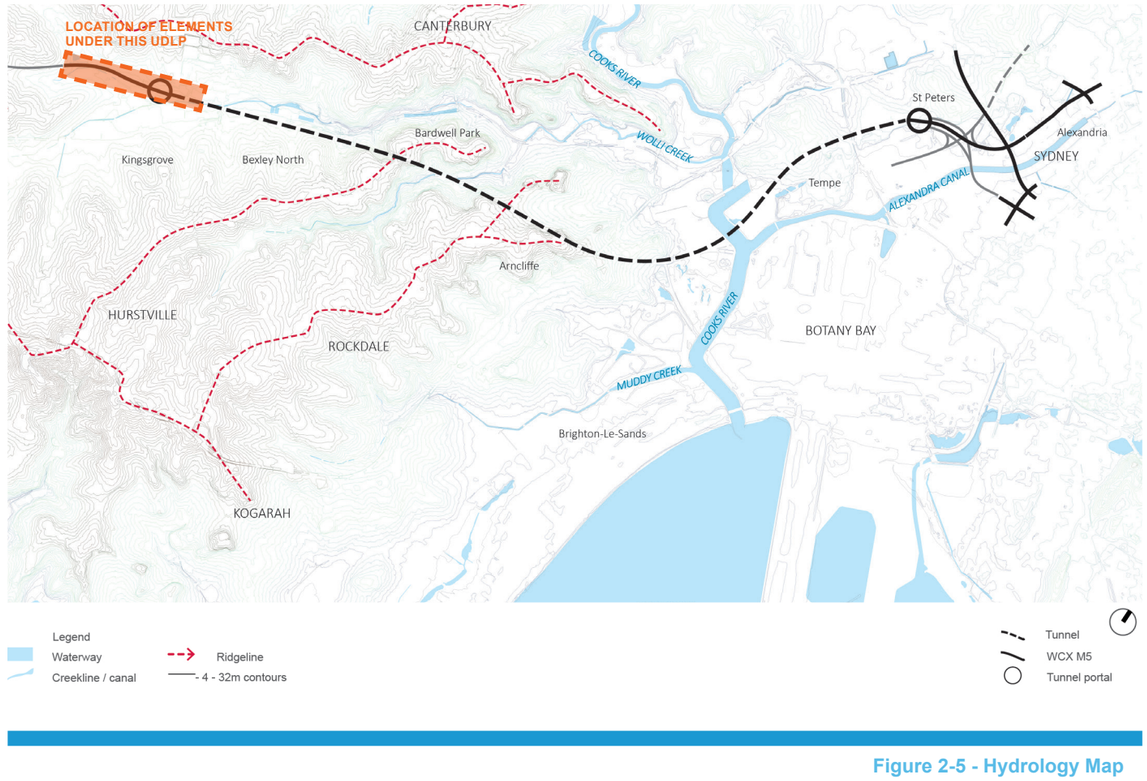


Figure 2-5 - Hydrology Map

2.1.6 Open space

The existing green open space is generally scattered and disjointed, consisting of Municipal Parks, NPWS Reserves and Golf Courses.

The major open space areas within the corridor are around Canterbury Golf Course and Beverly Grove Park to the west, Wolli Creek, parkland associated with the Cooks River and Sydney Park to the east.

The few remaining ecological communities are scattered and for the most part follow existing creek lines.

Figure 2-6 - Open Space Map

2.1.7 Geology

The geology along the project corridor, as described in the Geological Survey of NSW 1:100,000 scale Sydney Map Sheet (sheet 9130, 1983), and confirmed by the project-specific site investigations undertaken between September 2014 and March 2015, is dominated by the Wianamatta Group rocks and the Hawkesbury Sandstone Formation. These units are separated by the Mittagong Formation across the majority of the Sydney Basin area.

- The Wianamatta Group Geological unit comprises Ashfield Shale, which corresponds to the ridgelines around Kingsgrove, and from Sydenham to St Peters.
- Hawkesbury Sandstone is present at depth all the way along the project alignment, at the surface from Bardwell Valley to Wolli Creek, and in areas around Tempe.
- The Mittagong Formation separates the Ashfield Shale from the underlying Hawkesbury Sandstone. The formation represents the transition from the fluvial or terrestrial environment of the Hawkesbury Sandstone deposition to the marine delta deposition of the Ashfield Shale.
- Three dykes were identified during site investigations for the project, around Bexley Road, and on the north and south side of the Cooks River. The dykes in the Sydney region generally consist of linear basaltic rock bodies intruded into the surrounding country rock.

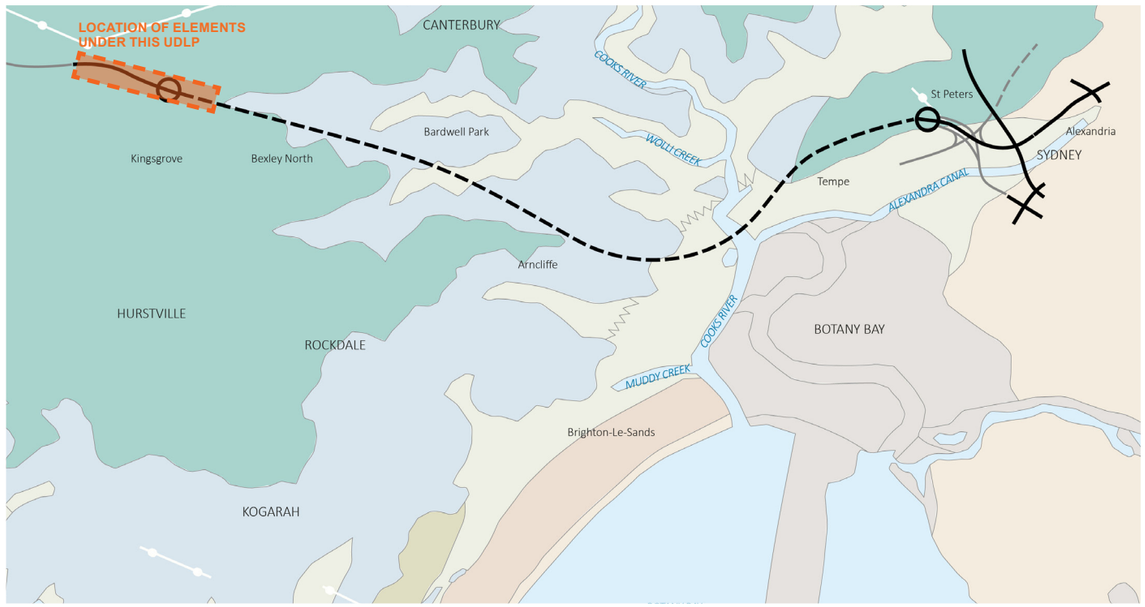


Figure 2-7 - Geology Map

2.1.8 Soil landscapes

The Soil Landscapes of the Sydney 1:100,000 Sheet 9130 (1989) indicates the New M5 works are underlain by the following seven soil landscape groupings:

Blacktown (REbt)

Birrong (ALbg)

Gymea (ERgy)

Hawkesbury (COha)

Oxford Falls (TRof)

Warriewood (SWwa)

Disturbed terrain (DTxx).

2.1.9 Indigenous heritage

The Aboriginal clans of Sydney were a mixture of diverse cultures and languages. Their boundaries were highly blurred and fluid points of exchange and interaction between clans.

The plan below is an indicative representation of the clans in Sydney and their cultural areas.

The Project does not impact any Aboriginal heritage areas.

Aboriginal Heritage in relation to this UDLP and the retaining walls are provided in section 2.5.1 of this UDLP.

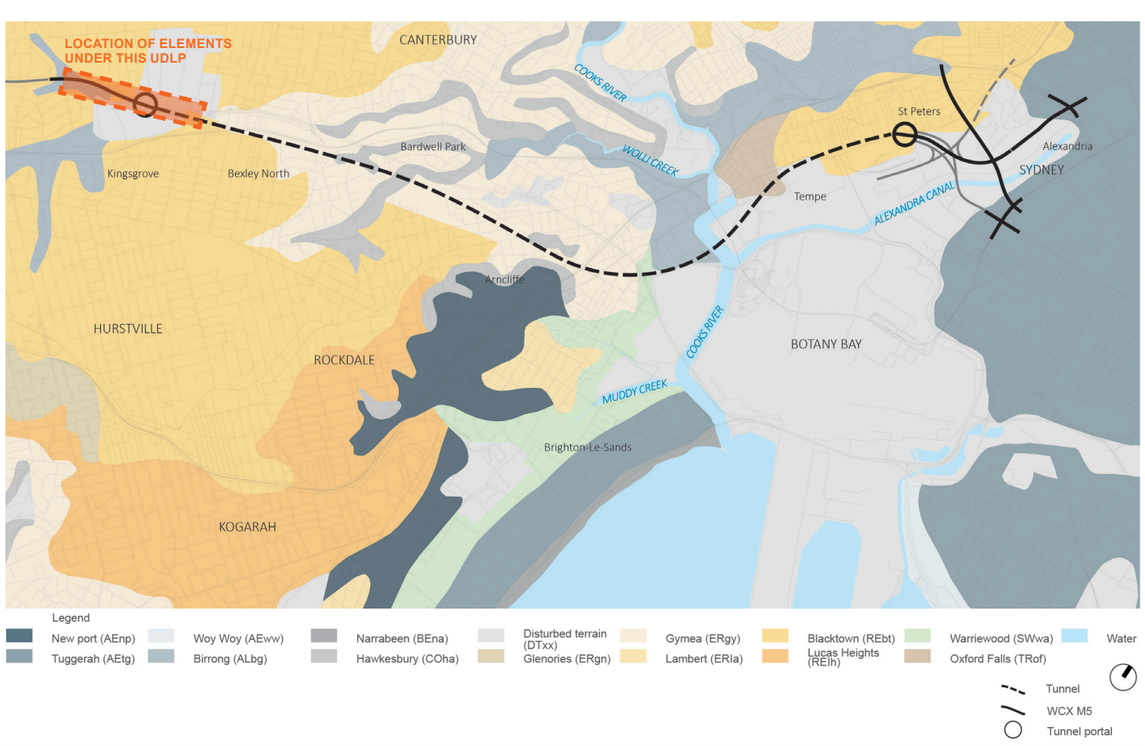


Figure 2-8 - Soil Landscape Map

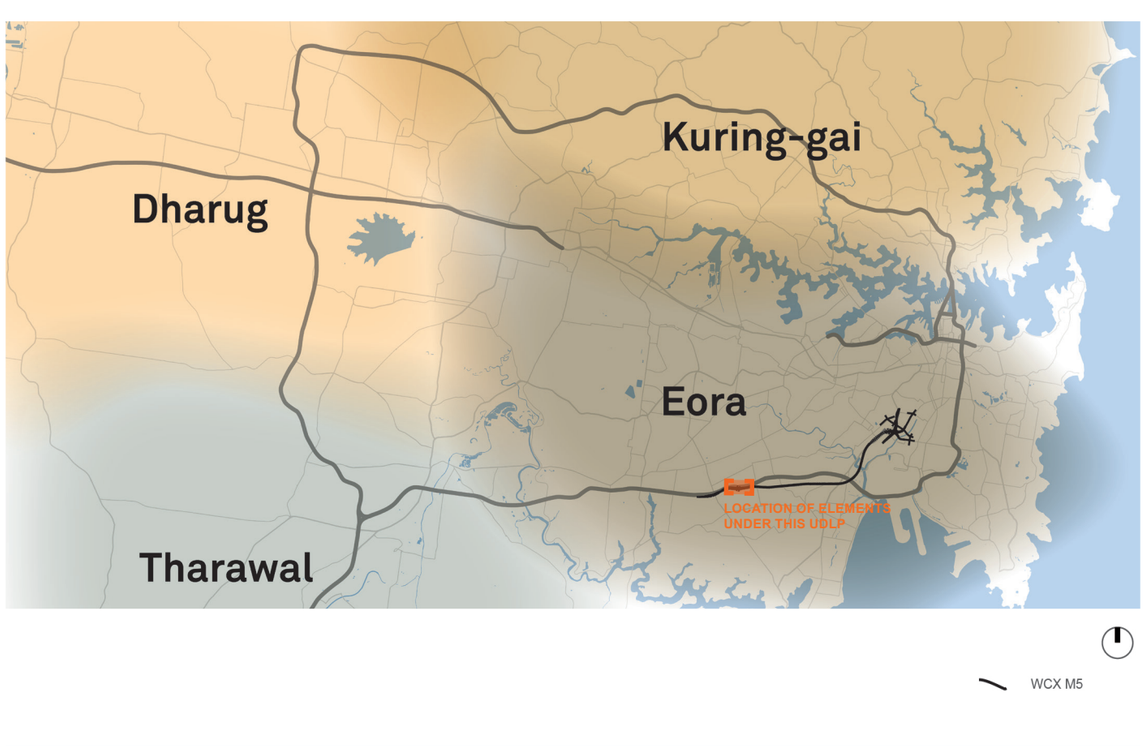


Figure 2-9 - Indigenous Heritage Map

2.1.10 Non-Indigenous heritage

Within the corridor, heritage and conservation areas are generally focused around the Arncliffe and St Peters areas.

To the west, there are less constraints in terms of heritage and conservation.

Non-indigenous Heritage in relation to this UDLP and the retaining walls are provided in section 2.5.1 of this UDLP.

Figure 2-10 - Non-Indigenous Heritage Map

2.2 Urban design philosophy

The overall Urban Design vision, which includes an Urban Design Philosophy, objectives, principles and strategy plan is based on the SMC Urban Design documents. The Vision as articulated in the Draft WestConnex Urban Design Framework (RMS, 2013) is:

"WestConnex will be a sustainable, high quality and transformational project for the people of Sydney and NSW. Exhibiting design excellence as a whole and through all constituent parts, it shall be sensitively integrated into the built and natural environments, and help build local communities. It will enhance the form, function and character and liveability of Sydney – Australia's 'Global City'.

The quality of urban and landscape design is becoming the accepted measure of a transport facility's success in the urban and regional environment. Good design of our public domain is fundamental to quality of life in our urban areas. Streets, roads, expressways and Motorways constitute a large portion of our public spaces and indeed may be considered as some of our most important public places. After all, it is via the street, car, bus and train that we regularly interact with our living environments and receive many of our experiences.

Infrastructure must deliver urban artefacts that define and give meaning to public space, in a way that is evocative, elegant, efficient and a celebration of our technology.

Our urban design philosophy is based on delivering high quality integrated design outcomes that display relevance, fit, durability and delight.

Aerial view east over existing M5 motorway

2.3 Urban design objectives and principles

The Urban and Landscape Design objectives and principles for the project align to the objectives and principles of the WestConnex Urban Design Framework (WUDF) and the New M5 Environmental Impact Statement to deliver benefits to both road users and the community.

Objective 1: Leading edge environmental responsiveness

Planning, design, construction and long term management shall be based upon a natural systems approach which is responsive to the environment and promotes the highest levels of sustainability.

The Project has prioritised minimising land acquisitions and optimising land use – to reconnect communities and maximise opportunities for urban revitalisation along the alignment.

The Urban and Landscape Design principles:

- Protect and retain as much existing vegetation as possible to minimise the footprint, maximise vegetated screening and reduce community concerns over loss of green space and green links
- Using only containerised planting stock to facilitate rapid establishment of new landscape installations
- Feature plant species that reinforce local Cumberland Plain indigenous plant communities
- Use appropriate vegetation treatments appropriate to reinforce key landscape patterns
- Key elements such as retaining walls and noise walls will have a textured surface with a anti-graffitti paint to discourage vandalism
- Balance the composition of built form and landscape by maximising planting opportunities that visually compete with the scale of the proposed infrastructure elements

Objective 2: Connectivity and legibility

Build connectivity across the city, beyond the boundaries of the motorway corridor and promote increased legibility of places, buildings, streets and landmarks.

The project will create a simple, legible and inviting design solution that will build connectivity across the city, within and beyond the boundaries of the Motorway, enhancing journeys for motorists, pedestrian and cyclists alike.

Urban and Landscape Design principles:

- Provide self-explanatory roads and ease of way-finding through simple and refined treatments of tunnel entry and exits, tunnel portals and facilities to make an enjoyable and legible journey for motorists
- Enhance shared paths to provide safe and seamless journeys for pedestrians and cyclists around tunnel entry and exit points
- Provide visual stimuli within the tunnel that creates a progressive sequence of visual events for the motorist
- Provide architectural articulation to horizontal and vertical surfaces, materials and the lighting of Motorway tunnels to visually and psychologically break up the extent of tunnel lengths.

Objective 3: Place making

Create beautiful places, streets, structures and landscapes that draw their form, character and materiality from local context, the intrinsic natural and cultural qualities of each locale.

The Project will add to local places, streets, structures and landscape and seek to minimise impacts on the local community.

Urban and Landscape Design principles:

- Using high quality and functional materials
- Activating the edges of public spaces through the design and by considering pedestrians and cyclists and adjacent land uses
- Offering opportunities for the redevelopment and renewal of surplus land holdings along the corridor

Objective 4: Urban renewal and liveability

Enable opportunities for urban renewal and provide high levels of urban amenity and livability.

The Project has considered and integrated design with the local movement networks, places and land uses to enable opportunities for urban renewal.

Urban and Landscape Design principles:

- Consolidating and simplifying structures and alignments to enhance surrounding areas
- Improving access to public and active transport
- Restoring local street, pedestrian and bus connectivity (a regular street edge)
- Removing surface traffic which will achieve long term improvement in air quality and noise on surface roads and streets which support pedestrian activity
- Widening footpaths to improve amenity for pedestrians and cyclists
- Providing extensive tree planting of endemic species to achieve tree canopy cover for shade, shelter and habitat
- Featuring coloured built elements to add interest and identity
- Considering the future land use of existing commercial areas that could potentially be rejuvenated - to be developed during Detailed Design
- Maintaining vegetated screening by reducing existing vegetation loss and enhancing existing vegetation screening by utilising similar plant species where possible.

Objective 5: Memorable identity and a safe, enjoyable experience

Provide a memorable project identity and experiences for road users and adjacent stakeholders which are safe, convenient and enjoyable.

Urban and Landscape Design principles:

- Keeping a simple and consistent language of built elements and components to minimise visual clutter
- Creating distinctive portal access points that reinforce the character of the local area, but also being respectful to each individual setting
- Differentiating character zones and breaking up tunnel lengths to vary the driver experience and heighten awareness of geographical location through lighting, signage and art

Objective 6: A new quality benchmark

Provide design and construction quality of world class standard. WestConnex shall establish a new benchmark for integrated sustainability, engineering, art, architecture and urban design.

Urban and Landscape Design principles:

- Integrating the various existing and proposed new built form elements such as the dive structures, portals, noise walls and retaining walls to reinforce an integrated design solution that enhances visual unity and clarity
- Utilising durable and high quality materials to ensure the Motorway maintains its identity for years to come.

2.4 Overview of urban design proposal

Western Interchange and Portals

The western connection of the New M5 Main Works occurs between King Georges Road and Bexley Road within the existing M5 corridor alongside Canterbury Golf Course and Beverley Grove Park. Western surface works and portals incorporate the following:

- The entry and exit portals have been designed to present a memorable approach to the tunnel with wall and portal treatments that respond to functional requirements of the Motorway and still contribute to the motoring experience.
- Existing shared user paths will be relocated to accommodate the widened motorway and the existing Kindilan underpass will be extended to the north under the widened alignment.
- Noise wall detailing will be consistent with the detailing adopted by RMS for the KGRIU. This will minimise clutter and maximise visual consistency for the New M5 East.

Oblique aerial perspective - Western Interchange and Portals
(Artists impression only subject to change during design development)

Retaining walls

This UDLP relates to retaining walls 01, and 03-05 located within the 'Western Interchange and Portals' precinct of the Project. For all other retaining walls, refer to the main UDLP.

Retaining walls 01 and 05 are located on the outer edge of the New M5 Eastbound bypass ramp nearside shoulder and retaining walls 03 and 04 under the bypass ramp at Kindilan Underpass.

Retaining wall 01

Retaining wall 01 (200-RW01) – New M5 Bypass Ramp (M2A0) between CH 30 and CH 590.

- Retaining wall RW-200-01 (control line MWA1) is approximately 570m in length with a retained height up to 6.5m.
- RSW precast concrete panel, approximately 2m x 2m with 30mm vertical rebates at 1m centres.
- Panels are to be painted with a mineral silicate paint, colour matched to the KGRIU standard panels in ‘Colorbond Shale Grey”, such as Dulux Acrathane with a flat finish, that can be cleaned with Dulux Graffiti Eraser or painted over.

Retaining wall 03

Retaining wall 03 (200-RW03) – Kindilan Underpass (new) Western retaining wall.

- Retaining walls RW-200-03 is approximately 50m in length along control line MWW1, with an approximate retained height of up to 4m.
- RSW standard precast concrete panel, approximately 2m x 2m to match the existing Kindilan Underpass panels.

Retaining wall 04

Retaining wall 04 (200-RW04) – Kindilan Underpass (new) Eastern retaining wall.

- Retaining walls RW-200-04 is approximately 50m in length along control line MWW2, with an approximate retained height of up to 4m.
- RSW standard precast concrete panel, approximately 2m x 2m to match the existing Kindilan Underpass panels.

Retaining wall 05

Retaining wall 05 (200-RW05) – New M5 Bypass Ramp (M2A0) between CH 620 and CH 660.

- Retaining wall RW-200-05 (control line MWA3) is approximately 40m in length with a retained height up to 5m.
- RSW precast concrete panel, approximately 2m x 2m with 30mm vertical rebates at 1m centres.
- Panels are to be painted with a mineral silicate paint, colour matched to the KGRIU standard panels in ‘Colorbond Shale Grey”, such as Dulux Acrathane with a flat finish, that can be cleaned with Dulux Graffiti Eraser or painted over.

WESTERN INTERCHANGE PORTALS

(Artists impression only subject to change during design development)

2.5 Urban design concept

For the Western Interchange and Portals, a series of plans illustrating the project are provided. These include the following:

- Urban design plans
- Urban design sections and elevations.

2.5.1 Western Interchange and portals & MOC1 Kingsgrove Motorway Operations Complex

Existing Conditions

The western surface works and MOC1 facility broadly ties in with the existing M5 East Motorway and is surrounded by a mix of residential and light industrial development. The central portion of the site is bounded by Canterbury Golf Course to the north, which is buffered from the M5 East Motorway by a strip of Cooks River/Castlereagh Ironbark Forest (also known as Beverly Grove bushland).

The M5 East Motorway is flanked on both sides by the M5 Linear Park, which provides a shared pedestrian and cycle path linking pockets of recreational open space of varying sizes. Wolli Creek runs roughly parallel to the M5 Linear Park, comprising a fenced concrete channel with occasional pockets of in-channel vegetation (either reed beds or weedy tree species).

Design Approach

In developing the design, the Project has adopted a 'whole of project' thought process to develop simple solutions that will stand the test of time. This allows future sections of the Motorway to adopt similar approaches to materials and detailing to achieve overall project cohesion and integrated 'whole of project outcome'. The entry and exit portals have been designed to present a memorable approach to the tunnel with carefully designed wall and portal treatments that respond to functional requirements of the Motorway and still contribute to the motoring experience.

The MOC1 facility and associated service buildings are also located here. The ventilation shafts and facility buildings are located further to the west on the southern side of the New M5. Access to these facilities is provided via the New M5 westbound ramp.

Existing shared user paths will be relocated to accommodate the widened motorway and the existing Kindilan underpass will be extended to the north under the widened alignment. The alignment design at this location allows large voids between east and westbound movements permitting sunlight into the underpass.

An important consideration that has guided urban design outcomes at this location is the fact that there are a number of variable motorway infrastructure elements constructed as part of the original M5 East, the original M5 and the recent M5 widening works, and the soon to be constructed King Georges Road Intersection Upgrade. All of this combines to create a variable and cluttered driver experience, particularly the large extent of non-transparent noise walls that line the western approach. The most visually significant elements along this section of the motorway are the noise walls. The New M5 Main Works also requires noise walls along both sides of the motorway, so in order to minimise clutter and maximise visual consistency, noise wall detailing will be consistent with the detailing adopted by RMS for the KGRIU.

With the new alignment being elevated alongside Canterbury Golf Course and Beverly Grove Park, a transparent noise wall will be provided along the northern edge of the alignment to allow views over the existing the golf course and parkland providing relief from the 'canyon' effect of the existing non-transparent noise walls along the western approach to the portals.

The landscape approach in this section is essentially to maximise 'green volume' wherever space permits. The corridor is quite constrained at this location by the golf course and parklands to the north and Wolli Creek to the east. Large areas of new tree planting will be incorporated on both sides of the motorway that will, in time, present a continuous green canopy above the edges of the motorway alignment. Within the corridor itself widened median areas will be planted with low maintenance massed plantings of low native shrubs and grasses and the areas above the entry and exist portals will be planted with massed grove plantings of small trees, again to maximise 'green volume' as counterpoint to the scale of the new infrastructure.

Aboriginal and Non-indigenous Heritage

Retaining walls 01, 02, 04 and 05 do not affect / impact any indigenous or non-indigenous heritage items in the Kingsgrove area.

Visual Impacts - Sensitive Receivers

Areas assessed as high visual impact within the EIS include:

- Pedestrian/Cyclist views from Beverly Grove Park South towards the Kingsgrove Motorway Operations Complex.

In relation to the view from Beverly Grove Park South, the possibility of mitigating this impact is through a combination of architectural treatments within the facility compound and high quality landscape screen planting around the perimeter.

Limitation of vegetated batters to 1:3 and 1:4 where possible will maximise the impact of vegetation on these batters and minimise maintenance. High quality fencing suitable for parks and public spaces will also be used to minimise the visual impact of this facility.

2.6 Urban design concept plans

The key urban and landscape design features of the project relevant to this assessment are outlined in the following section and shown in six 1:1,000 scale Urban Design Concept Plans.

The concepts and strategies identified in these diagrams are consistent with the WestConnex Motorway Urban Design Framework.

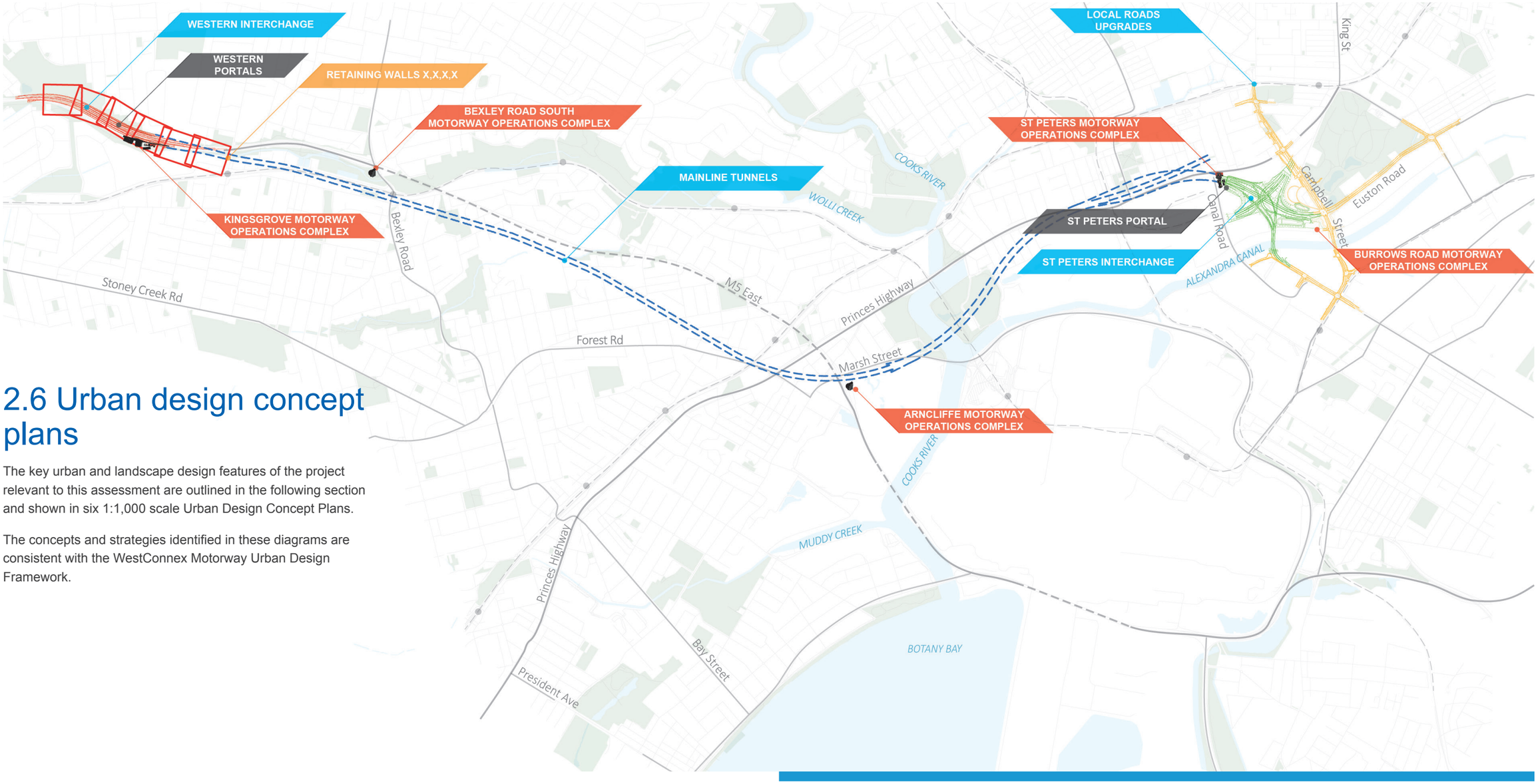
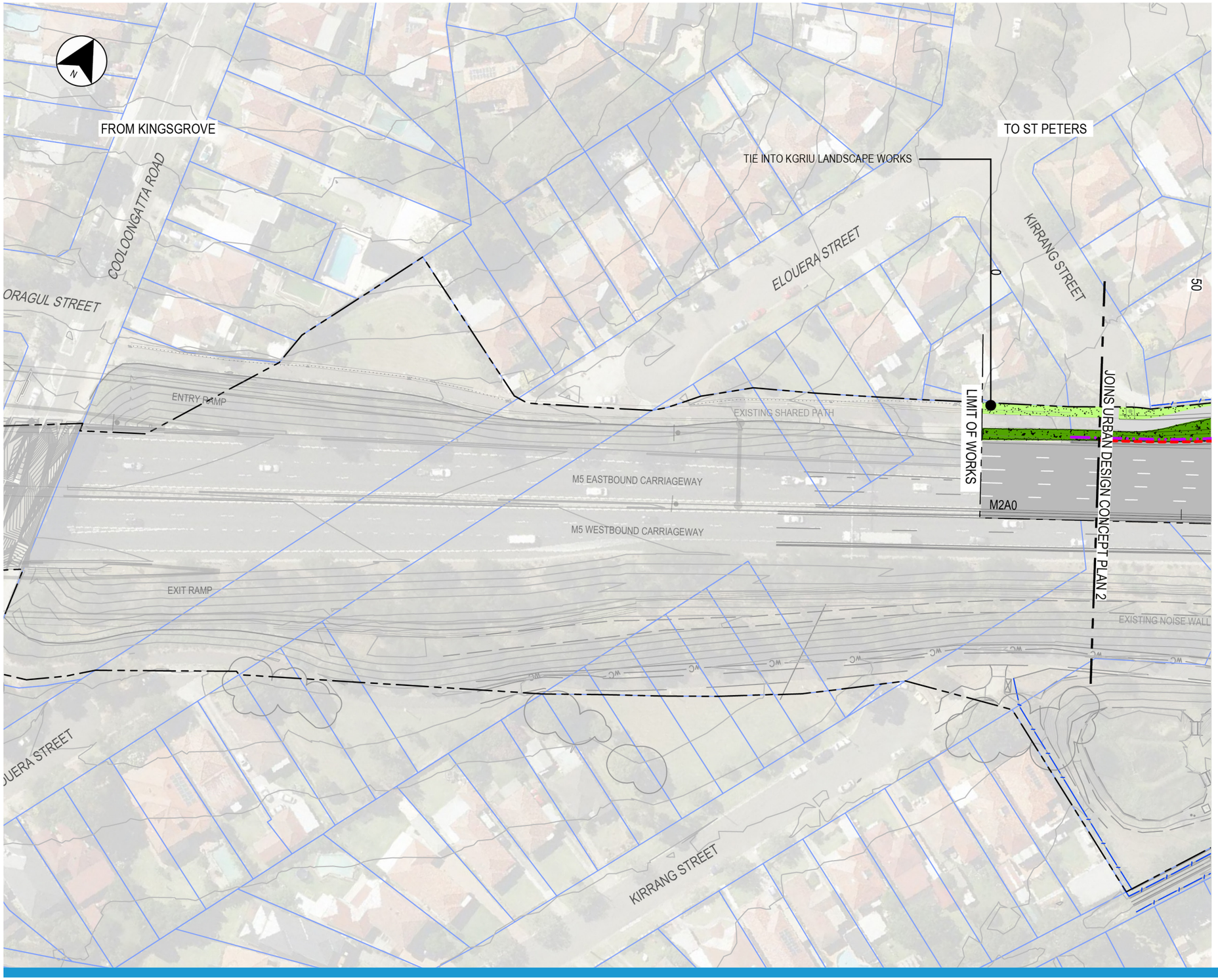


Figure 2-11 - Urban Design concept plan - Key plan



LEGEND

BOUNDARIES
- PERMANENT WORKS BOUNDARY
- EXISTING CADASTRAL

EXISTING FEATURES
- CONTOURS (1m INTERVAL)
- EXISTING TREES TO BE RETAINED
- EXISTING VEGETATION TO BE RETAINED

GROUND TREATMENT
- EDGING
- GRAVEL PAVING

PLANTING AREAS
- MASSED PLANTING
- MASSED PLANTING ON STRUCTURE
- UNDERPLANTING AND WEED ERADICATION
- TURF
- TURF ON STRUCTURE
- MULCH ONLY AREA (NO PLANTING)
- WATER QUALITY BASIN / SWALE PLANTING

TREE PLANTING
- TREE PLANTING
- SMALL TREE GROVE PLANTING

ROAD GEOMETRY
- TUNNEL
- FILL EMBANKMENT / CUT EMBANKMENT
- SHARED / FOOT PATH
- DRIVEWAY / PARKING BAY

ROAD FURNITURE
- RIGID SAFETY BARRIER
- EXISTING FENCE TO BE RETAINED
- BOUNDARY FENCE
- BALUSTRADE
- RETAINING WALL
- NOISE WALL
- EXISTING NOISE WALL
- GATE
- ROAD LIGHT
- GANTRY STRUCTURE

DRAINAGE
- DETENTION BASIN
- STORMWATER PIT
- CONCRETE DRAINAGE CHANNEL
- GRASS DRAINAGE CHANNEL

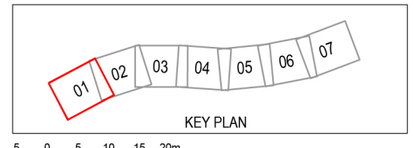


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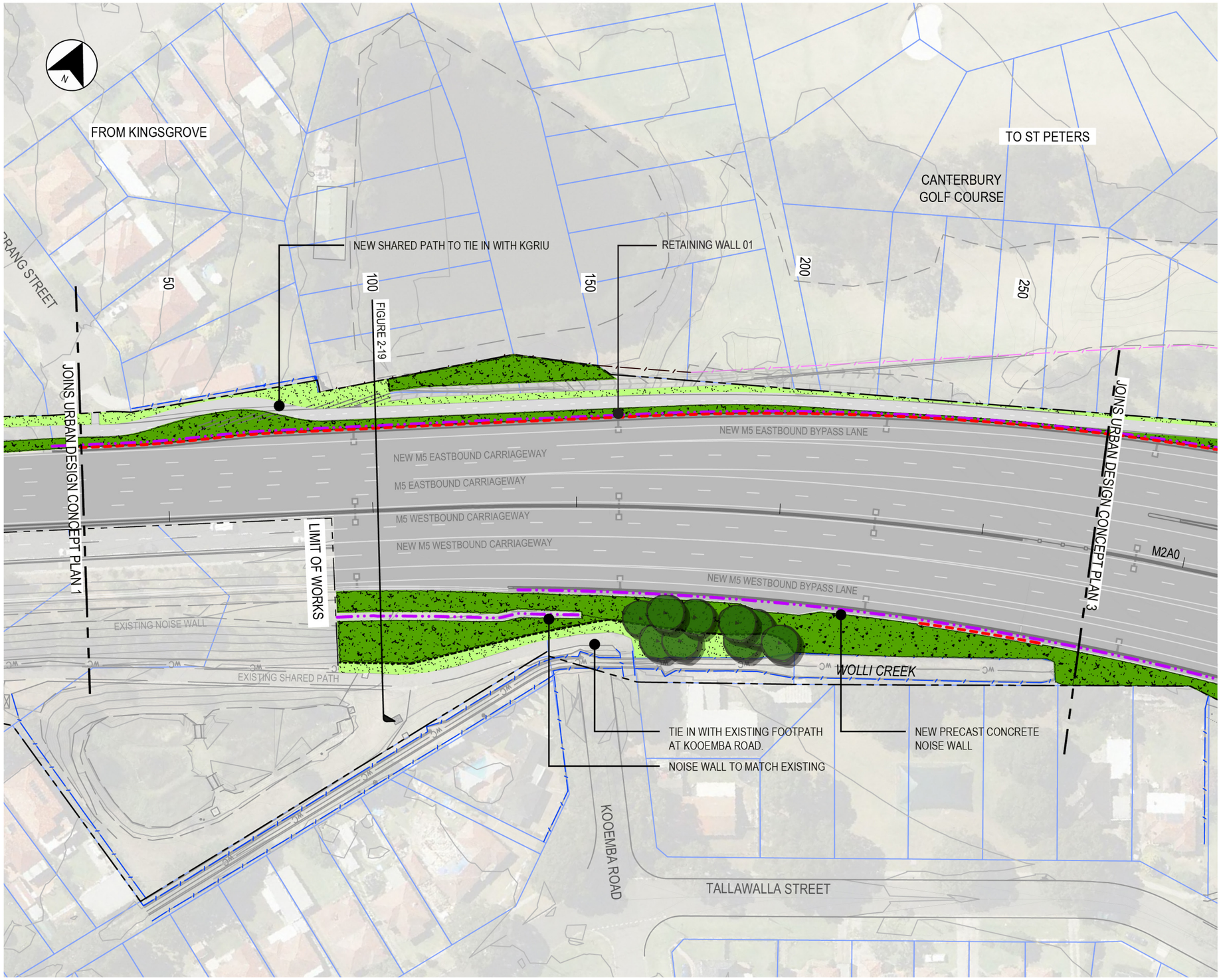
Figure 2-12 - Urban Design Concept Plan - Sheet 1 of 7 - 1:1000



LEGEND

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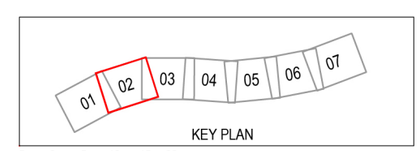

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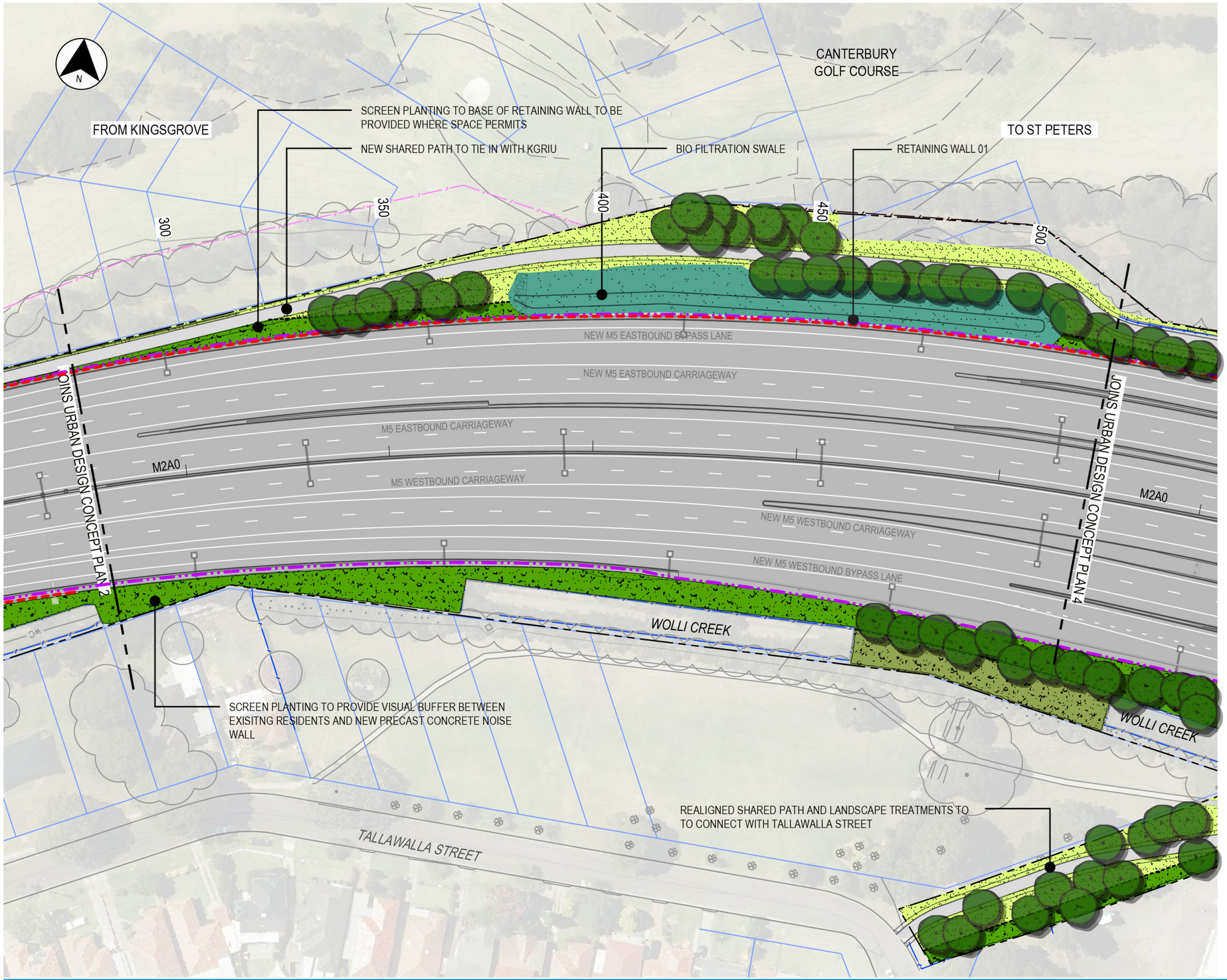
Figure 2-13 - Urban Design Concept Plan - Sheet 2 of 7 - 1:1000



LEGEND

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- CONCRETE DRAINAGE CHANNEL
- GRASS DRAINAGE CHANNEL

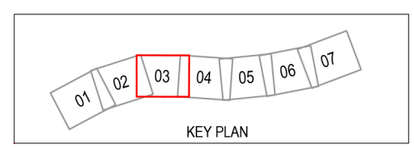

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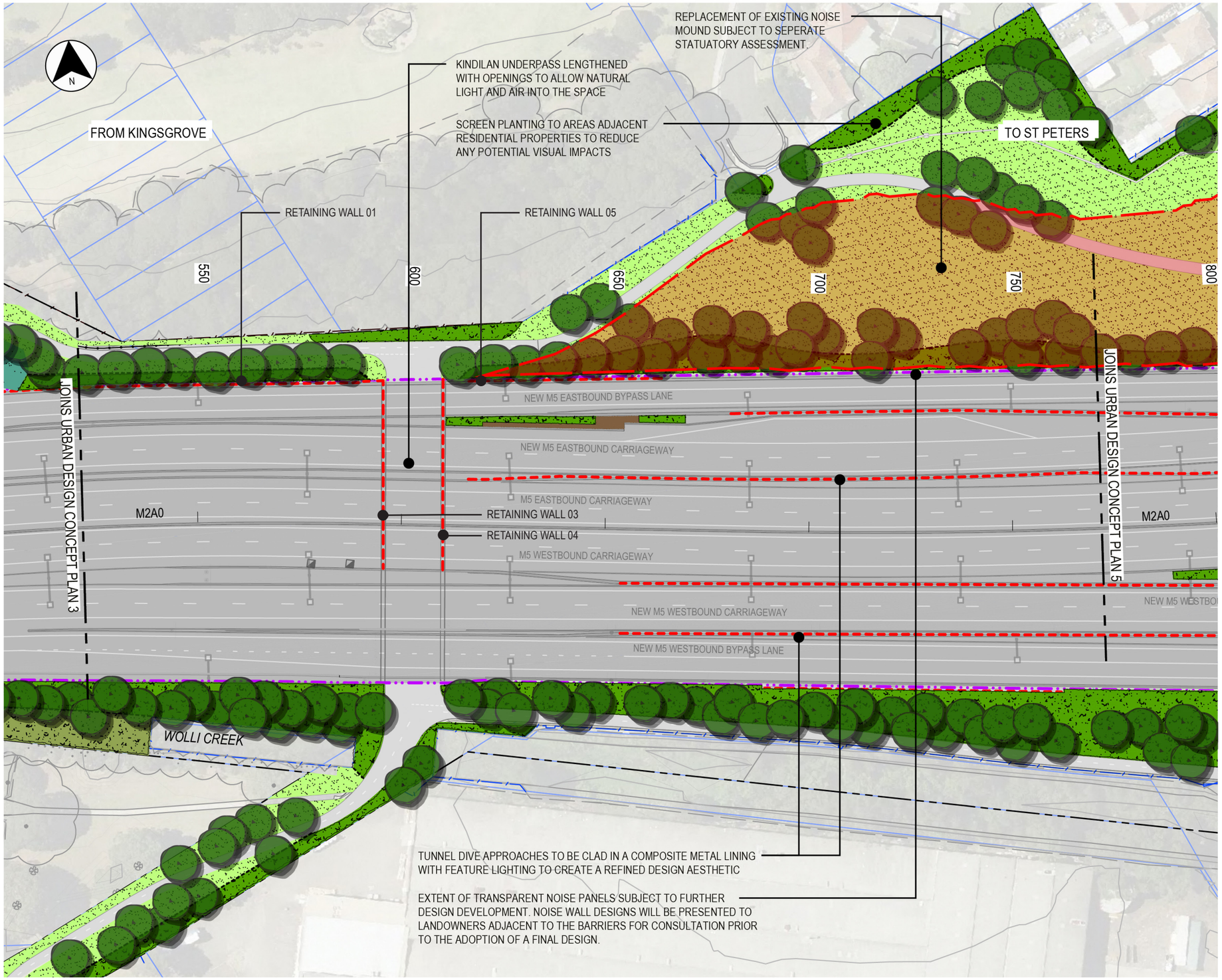
Figure 2-14 - Urban Design Concept Plan - Sheet 3 of 7 - 1:1000



LEGEND

BOUNDARIES
- PERMANENT WORKS BOUNDARY
- EXISTING CADASTRAL

EXISTING FEATURES
- CONTOURS (1m INTERVAL)
- EXISTING TREES TO BE RETAINED
- EXISTING VEGETATION TO BE RETAINED

GROUND TREATMENT
- EDGING
- GRAVEL PAVING

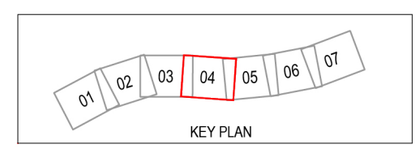
PLANTING AREAS
- MASSED PLANTING
- MASSED PLANTING ON STRUCTURE
- UNDERPLANTING AND WEED ERADICATION
- TURF
- TURF ON STRUCTURE
- MULCH ONLY AREA (NO PLANTING)
- WATER QUALITY BASIN / SWALE PLANTING

TREE PLANTING
- TREE PLANTING
- SMALL TREE GROVE PLANTING

ROAD GEOMETRY
- TUNNEL
- FILL EMBANKMENT / CUT EMBANKMENT
- SHARED / FOOT PATH
- DRIVEWAY / PARKING BAY

ROAD FURNITURE
- RIGID SAFETY BARRIER
- EXISTING FENCE TO BE RETAINED
- BOUNDARY FENCE
- BALUSTRADE
- RETAINING WALL
- NOISE WALL
- EXISTING NOISE WALL
- GATE
- ROAD LIGHT
- GANTRY STRUCTURE

DRAINAGE
- DETENTION BASIN
- STORMWATER PIT
- CONCRETE DRAINAGE CHANNEL
- GRASS DRAINAGE CHANNEL



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1 : 1000 FULL SIZE A3

Figure 2-15 - Urban Design Concept Plan - Sheet 4 of 7 - 1:1000

LEGEND

BOUNDARIES
- PERMANENT WORKS BOUNDARY
- EXISTING CADASTRAL

EXISTING FEATURES
- CONTOURS (1m INTERVAL)
- EXISTING TREES TO BE RETAINED
- EXISTING VEGETATION TO BE RETAINED

GROUND TREATMENT
- EDGING
- GRAVEL PAVING

PLANTING AREAS
- MASSED PLANTING
- MASSED PLANTING ON STRUCTURE
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- TURF ON STRUCTURE
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- WATER QUALITY BASIN / SWALE PLANTING

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- TREE PLANTING
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- FILL EMBANKMENT / CUT EMBANKMENT
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ROAD FURNITURE
- RIGID SAFETY BARRIER
- EXISTING FENCE TO BE RETAINED
- BOUNDARY FENCE
- BALUSTRADE
- RETAINING WALL
- NOISE WALL
- EXISTING NOISE WALL
- GATE
- ROAD LIGHT
- GANTRY STRUCTURE

DRAINAGE
- DETENTION BASIN
- STORMWATER PIT
- CONCRETE DRAINAGE CHANNEL
- GRASS DRAINAGE CHANNEL

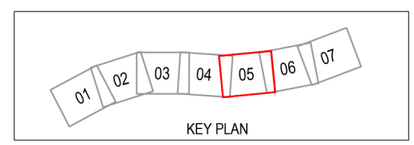

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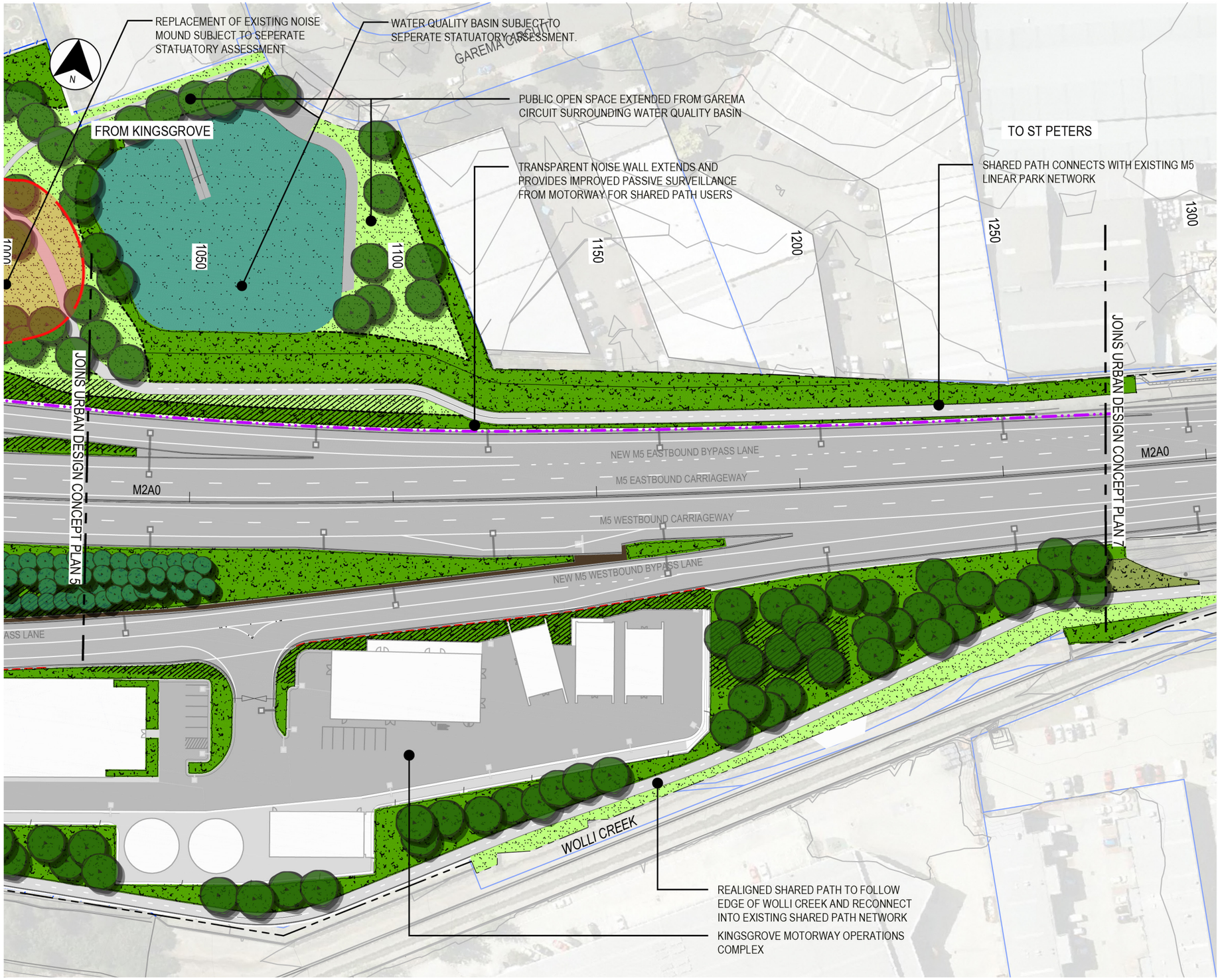
Figure 2-16 - Urban Design Concept Plan - Sheet 5 of 7 - 1:1000



LEGEND

BOUNDARIES
- PERMANENT WORKS BOUNDARY
- EXISTING CADASTRAL

EXISTING FEATURES
- CONTOURS (1m INTERVAL)
- EXISTING TREES TO BE RETAINED
- EXISTING VEGETATION TO BE RETAINED

GROUND TREATMENT
- EDGING
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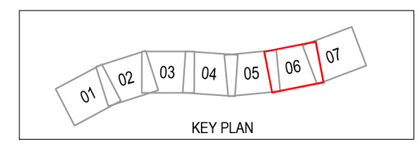
- GANTRY STRUCTURE

DRAINAGE
- DETENTION BASIN
- STORMWATER PIT
- CONCRETE DRAINAGE CHANNEL
- GRASS DRAINAGE CHANNEL



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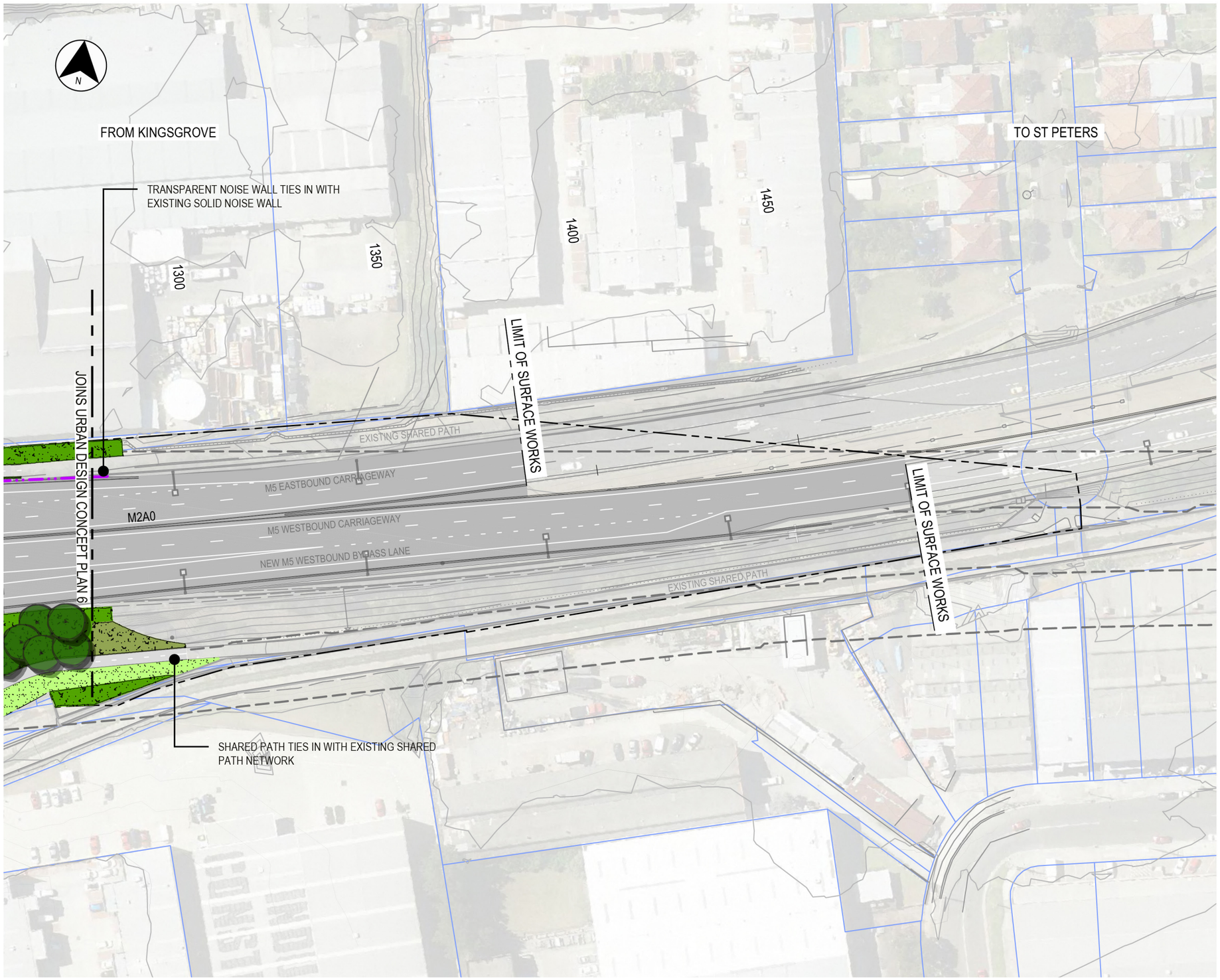
1 : 1000 FULL SIZE A3

Figure 2-17 - Urban Design Concept Plan - Sheet 6 of 7 - 1:1000



LEGEND

BOUNDARIES
- PERMANENT WORKS BOUNDARY
- EXISTING CADASTRAL

EXISTING FEATURES
- CONTOURS (1m INTERVAL)
- EXISTING TREES TO BE RETAINED
- EXISTING VEGETATION TO BE RETAINED

GROUND TREATMENT
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- GRAVEL PAVING

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- EXISTING NOISE WALL
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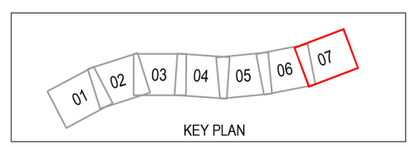
- GANTRY STRUCTURE

DRAINAGE
- DETENTION BASIN
- STORMWATER PIT
- CONCRETE DRAINAGE CHANNEL
- GRASS DRAINAGE CHANNEL



5 0 5 10 15 20m
1 : 1000 FULL SIZE A3

Figure 2-18 - Urban Design Concept Plan - Sheet 7 of 7 - 1:1000

2.6.1 Cross sections

The following cross sections are included within this section to illustrate and describe the Urban Design and Landscaping intent and extent across the Project:

- Western Interchange and Portals CH100 (M2A0)
- Western Interchange and Portals CH875 (M2A0).

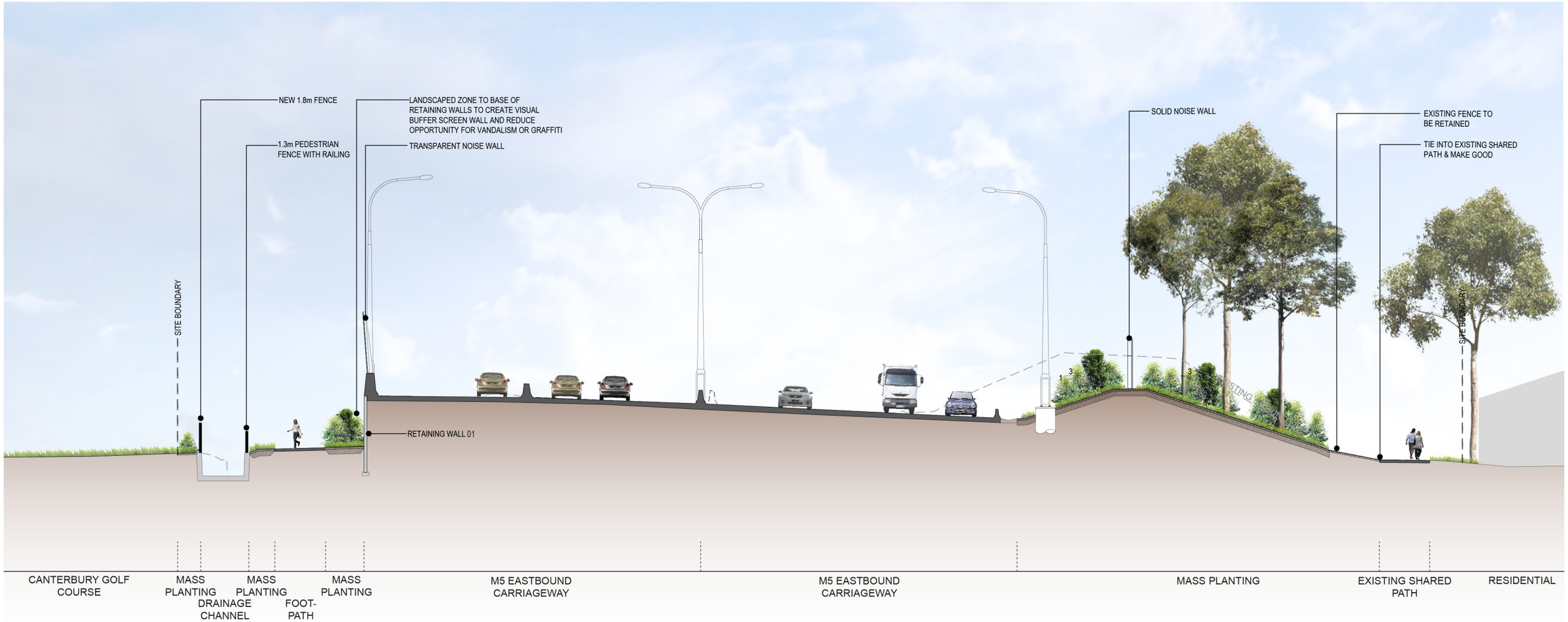


Figure 2-19 - Typical Cross Section - CH100 (M2A0)

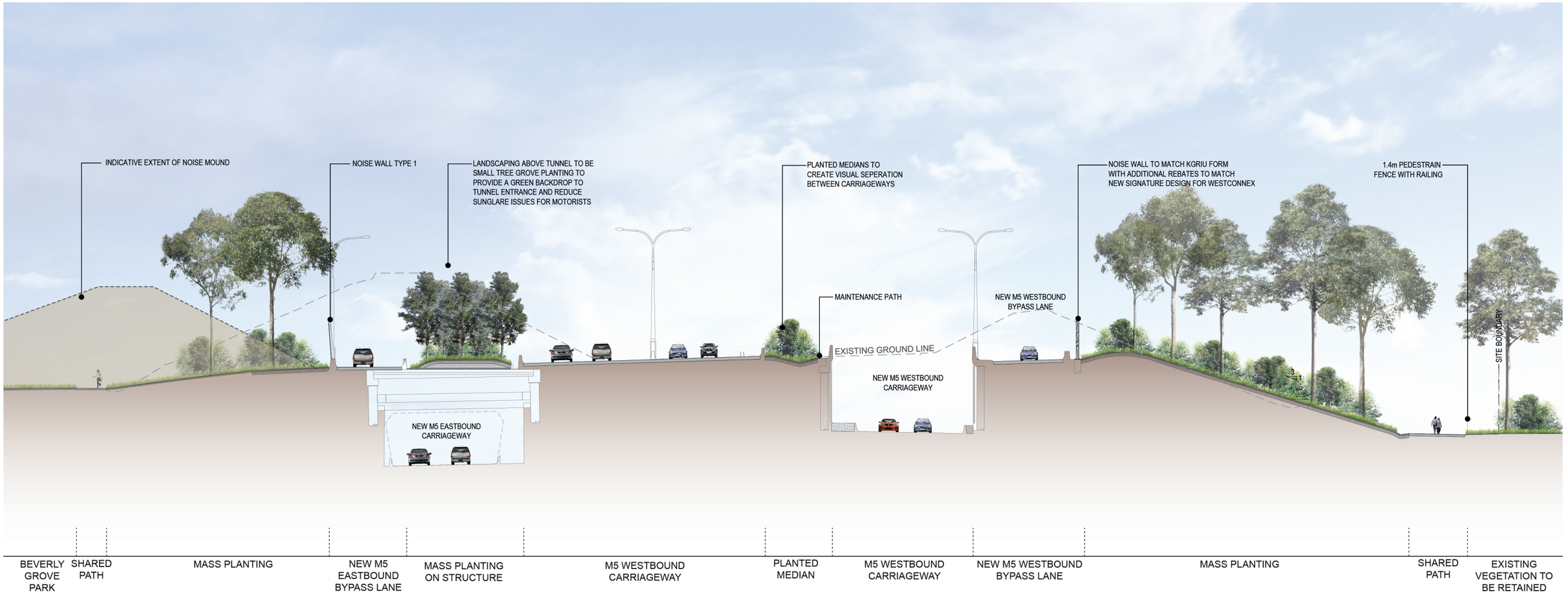


Figure 2-20 - Typical Cross Section - CH875 (M2A0)

WESTERN INTERCHANGE PORTALS

(Artists impression only subject to change during design development)

3 RETAINING WALLS

3.1 Design philosophy

The key design principles for the design of the retaining walls along the Project are as follows:

- All retaining walls must be designed to be a suite of elements
- Retaining walls must be designed as a simple, robust and integrated
- Neutral in colour with non-reflective finishes
- Wall tops are to form continuous smooth flowing lines with no stepping
- Wall plan layouts are simple, with straight or large radius curved alignments, without sharp changes of direction.
- All cut and fill batters and retaining structures at tunnel entrances must be fully integrated into the adjacent landform
- The appearance of concrete retaining structures associated with noise walls is to have a strong vertical emphasis; and
- Fixings for retaining structures must be concealed, or expressed as part of the structure's design if concealment cannot be achieved.

Throughout the Project, retaining walls will be a key visual element for both road users, adjacent residential properties, and pedestrians and cyclists. The design of retaining structures has been undertaken in consideration of all other elements such as bridges, noise walls and landscape works and provide a cohesive and unified design outcome.

Within the Western Interchange and Portals precinct, retaining walls have been designed with consideration of all other elements to provide a cohesive and unified design outcome. Retaining wall panels have been designed with jointing aligned with the precast traffic barrier and transparent noise wall panels above. The main panel joint of the RSW panel is aligned with the transparent noise wall post above, with the spacings of the noise wall panels designed to accomodate a full sized transparent panel without the need for joints. Together, these three elements present as a neat, integrated design. Further details are included within Section 3.2 of this Plan.

Retaining wall finishes

Finish Type 2A - Rebated reinforced soil wall

Retaining walls 01 and 05 located on the outer edge of the New M5 Eastbound bypass ramp nearside shoulder will be 2m x 2m RSW retaining wall panels with a Class 2 concrete finish, incorporating a simple vertical banding pattern to accentuate the vertical joints, generally with 60mm x 15mm (nom.) shadow rebates at nominal 1000mm centres.

Finish Type 2B - Typical reinforced soil wall

Retaining walls 03 and 04 under the bypass ramp at Kindilan Underpass will be standard 2m x 2m RSW retaining wall panels with a Class 2 concrete finish, so as to match the existing Kindilan Underpass RSW wall panels.

All retaining walls except major walls at SPI will have a consistent finish as per the shadow rebate concept mentioned above. An alternative finish will be adopted for major retaining walls, to compliment the landscape/urban design intent and integration with the portal facade treatment.

Retaining wall details

Detailed elevations and cross sections are illustrated in a series of general arrangement drawings included within this section.

The main retaining wall construction types represented in this section is reinforced soil wall.

Paint application details

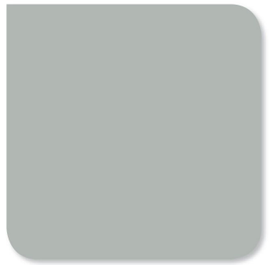
The painting strategy being adopted will consist of a sealer undercoat on the raw concrete. This will be followed by the application of a pigmented anti-graffiti paint.

The majority of the surfaces will be spray painted via a specialist contractor. Where painting may be close to residential properties, paint will be applied by a roller.

Work method statements will be provided to ensure we achieve the desired finish.

The colour choices has been designed to match with the King Georges Road Interchange Upgrade Project to achieve an integrated and overall legible urban character for the precinct.

Sample panels were prepared and painted with the above finish details for review by the Project Urban Designer and the Urban Design Review Panel.



Colorbond 'Shale Grey'

Sample finish

Below is a sample finish for retaining wall panels painted in undercoat.

Finish Type 2A - Rebated reinforced soil wall

Finish Type 2A - Rebated reinforced soil wall

3.2 Reinforced soil walls

Typical details are included within this section.

- Type 2A - Rebated reinforced soil wall.
- Type 2B - Typical reinforced soil wall.

LEGEND

01 REINFORCED SOIL WALL PANELS. 2000mm WIDE, INTEGRALLY COLOURED CONCRETE (CCS 'STALLION' 6% OXIDE) DUMMY JOINT SHADOW REBATES (REFER DETAIL 03) AT 1000mm CENTRES.

02 TRANSPARENT NOISE WALL FIXED TO TOP OF ROAD BARRIER. REFER DETAIL 01/UD-2585 ALIGN POSTS WITH RSW PANEL JOINTS

03 1300mm HIGH ROAD BARRIER. JOINTS AT 2500mm CENTRES

04 ROAD LEVEL

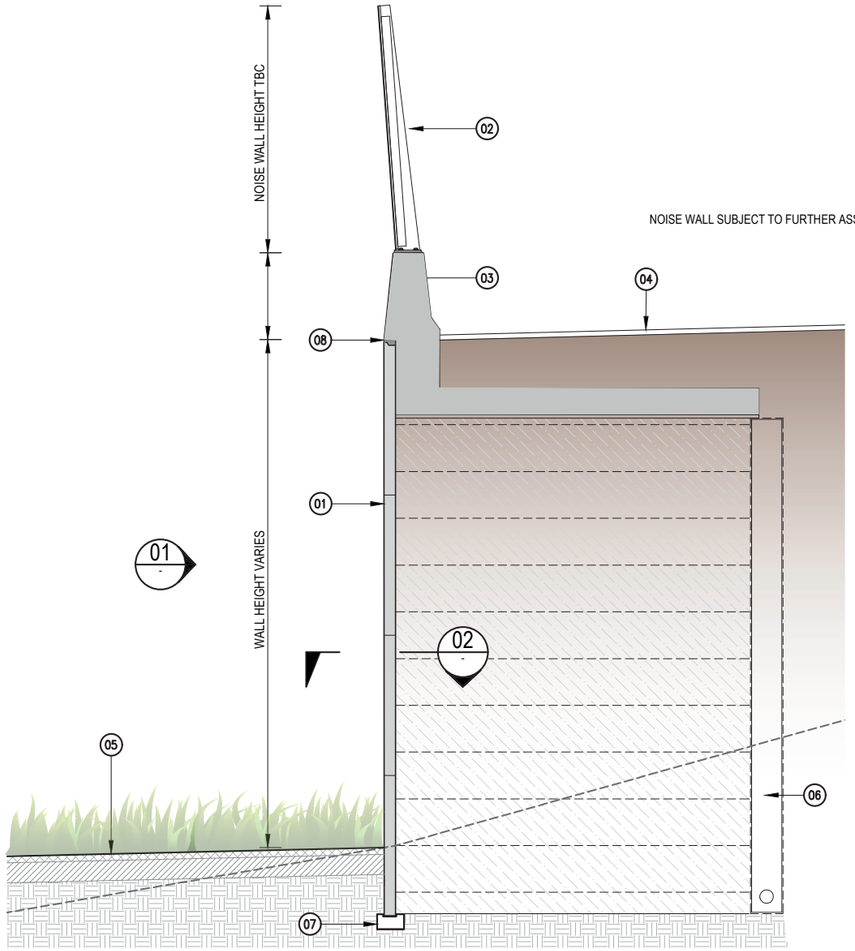
05 GROUND LEVEL

06 SUBSOIL DRAINAGE

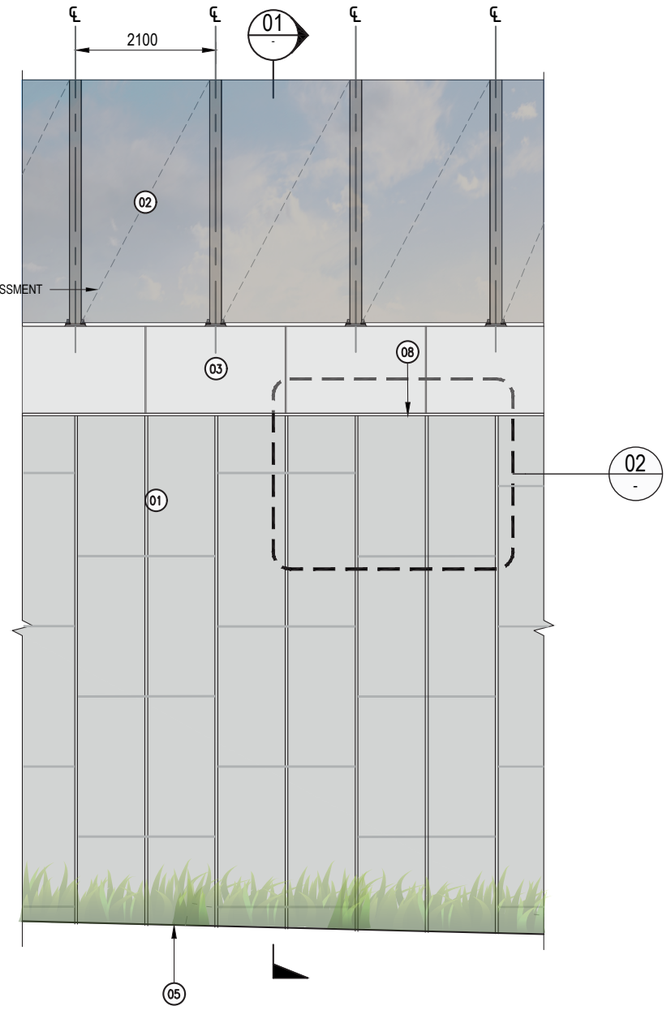
07 CONCRETE FOOTING FOR RSW PANELS

08 50mm REBATE UNDERNEATH BARRIER

09 20mm HORIZONTAL JOINTING

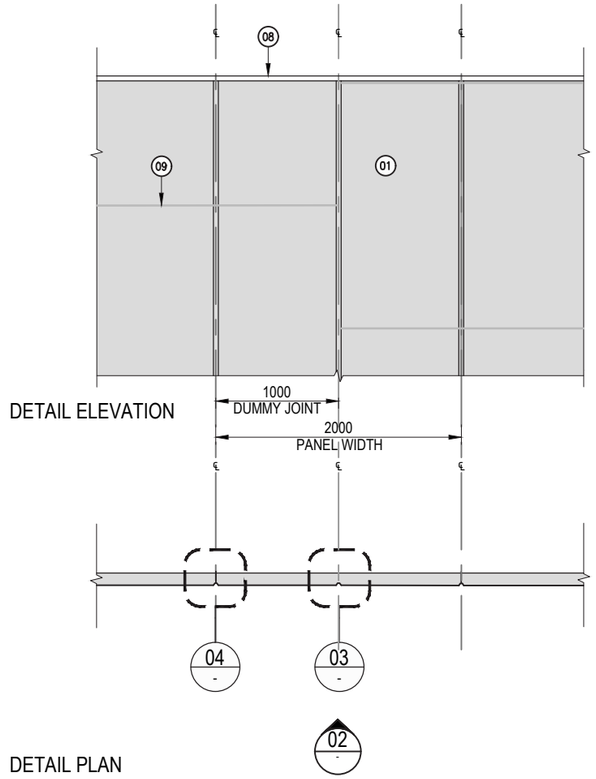


TYPICAL SECTION



TYPICAL ELEVATION

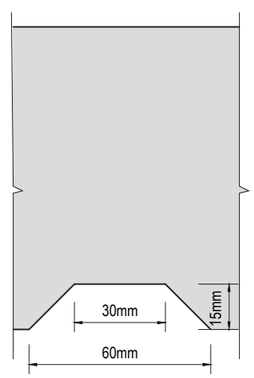
01 RETAINING WALL TYPE 2: REINFORCED SOIL WALL WITH BRIDGE BARRIER (APPLIES TO RW-200-01 / RW-200-05)
1:100



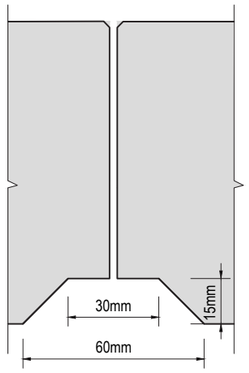
DETAIL ELEVATION

DETAIL PLAN

02 TYPICAL PANEL DETAIL
1:50

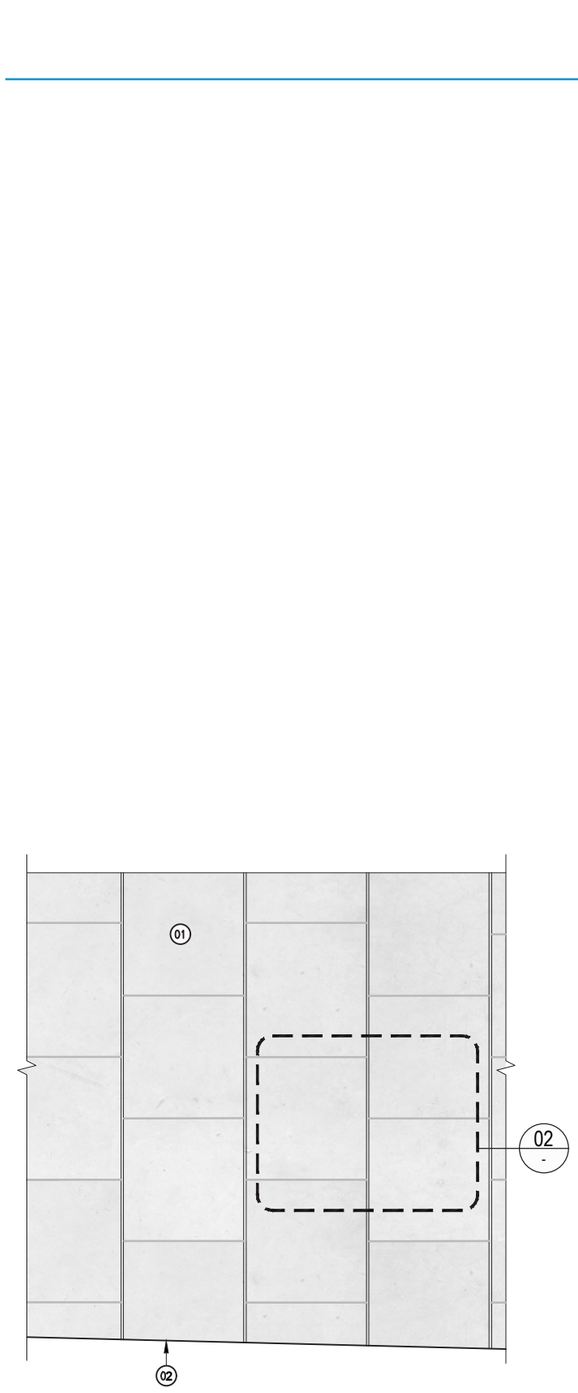


03 VERTICAL DUMMY JOINT DETAIL
1:2

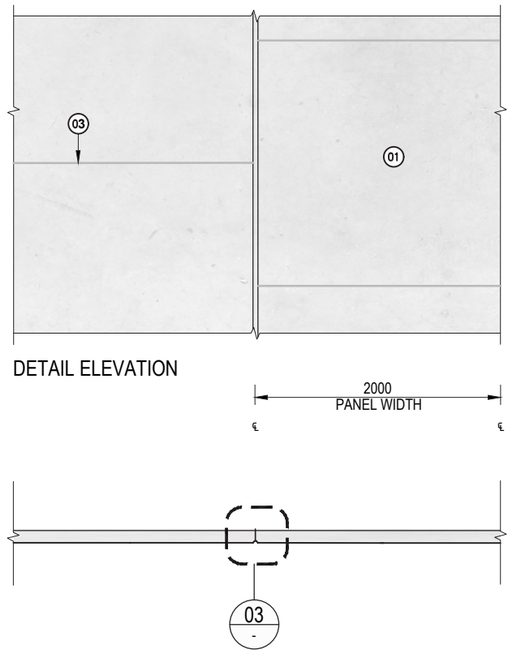


04 VERTICAL PANEL JOINT DETAIL
1:2

Figure 3-1 - Retaining wall typical details - Type 2A



01 TYPICAL PANEL
1:100



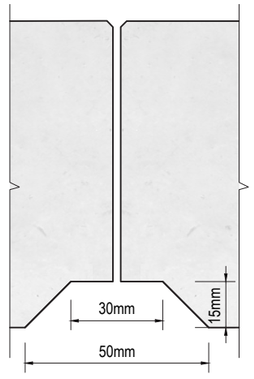
02 TYPICAL PANEL DETAIL
1:50

LEGEND

01 REINFORCED SOIL WALL PANELS. 2000mm WIDE. CLASS 2 CONCRETE. OFF FORM.

02 GROUND LEVEL

03 20mm HORIZONTAL JOINTING



03 VERTICAL PANEL JOINT DETAIL
1:2

Figure 3-2 - Retaining wall typical details - Type 2B

3.2.1 Elevations and sections

The reference number, locations, type and key features of each wall are summarised below.

No.	Location	Description
RW 200-01	Eastbound carriageway between Chainage M2A0 25 and 550	Retaining Wall Type 2A - Reinforced Soil Wall with Traffic Barrier and Noise Wall
RW-200-02	Westbound carriageway between Chainage (M2A0 - 200 and 300)	Retaining Wall Type 1 - Reinforced Soil Wall with Traffic Barrier and Noise Wall
RW 200-03	Adjoins RW 200-01 and extends to Kindilan Underpass	Retaining Wall Type 2B - Reinforced Soil Wall
RW 200-04	Adjoins RW 200-05 and extends to Kindilan Underpass	Retaining Wall Type 2B - Reinforced Soil Wall
RW 200-05	Adjoins RW 200-04 and extends to Chainage M2A0 - 660	Retaining Wall Type 2A - Reinforced Soil Wall with Traffic Barrier and Noise Wall
RW-200-06	Westbound carriageway between Chainage	Retaining Wall Type 1 - Insitu Retaining Wall and Noise Wall
RW-200-07	Westbound carriageway between Chainage	Retaining Wall Type 1 - Insitu Retaining Wall and Noise Wall

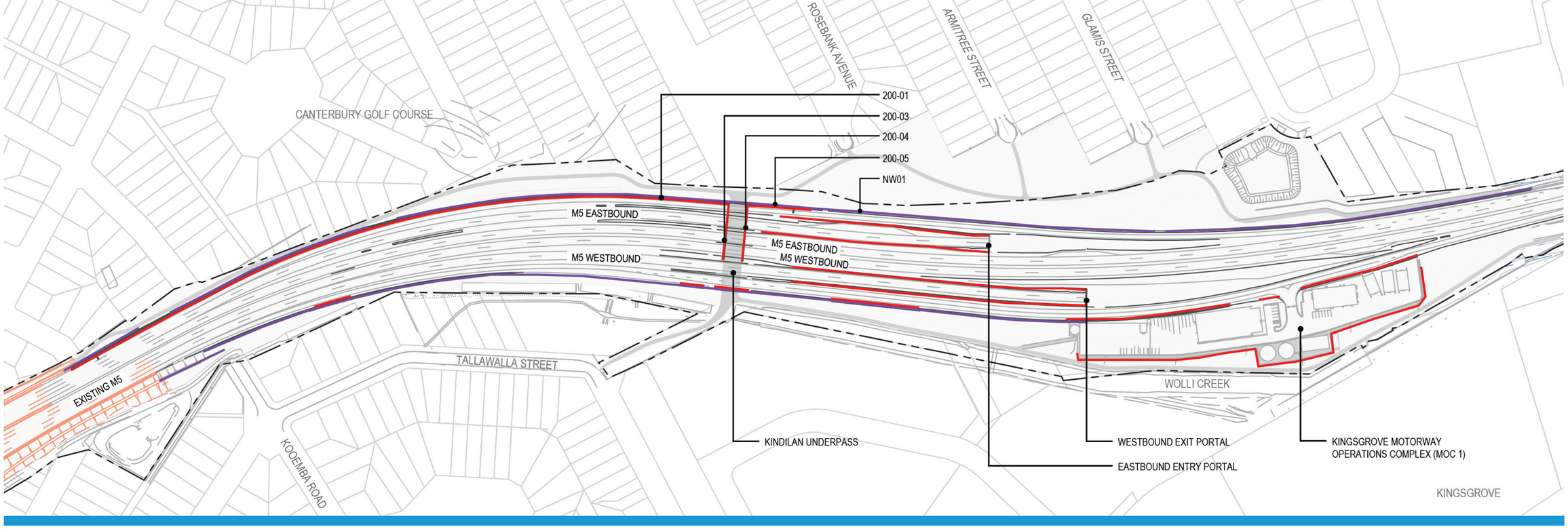
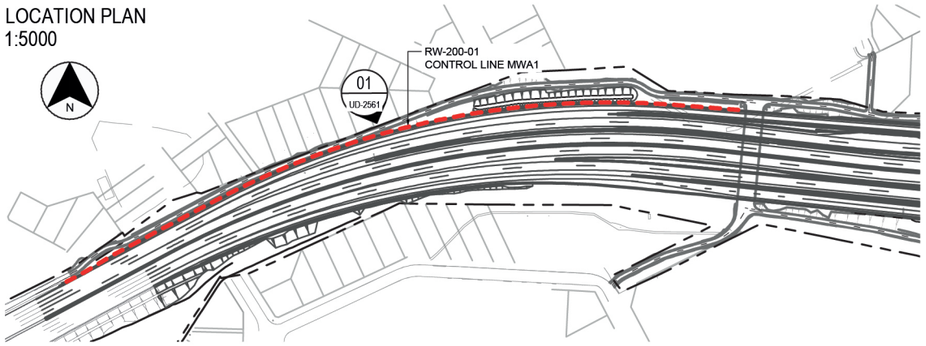
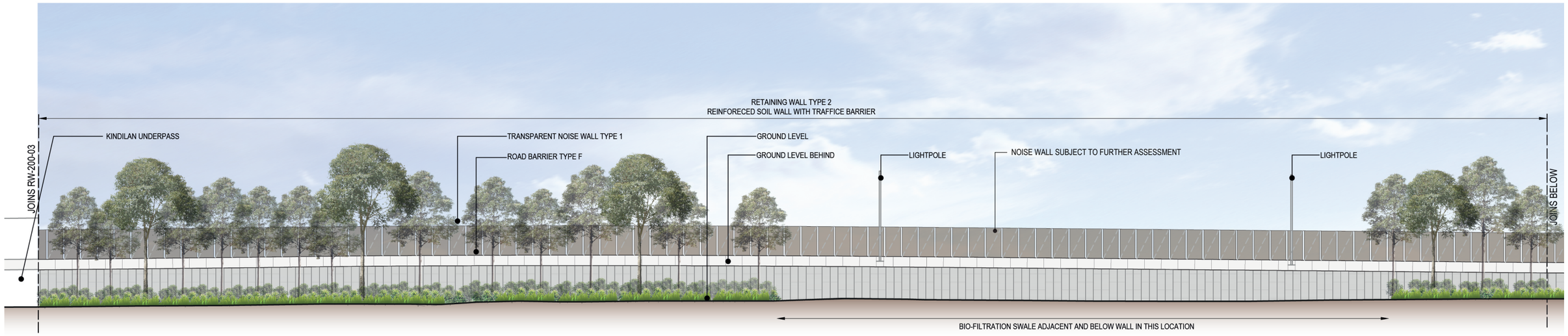


Figure 3-3 - Western Interchange - Retaining Walls - Key plan

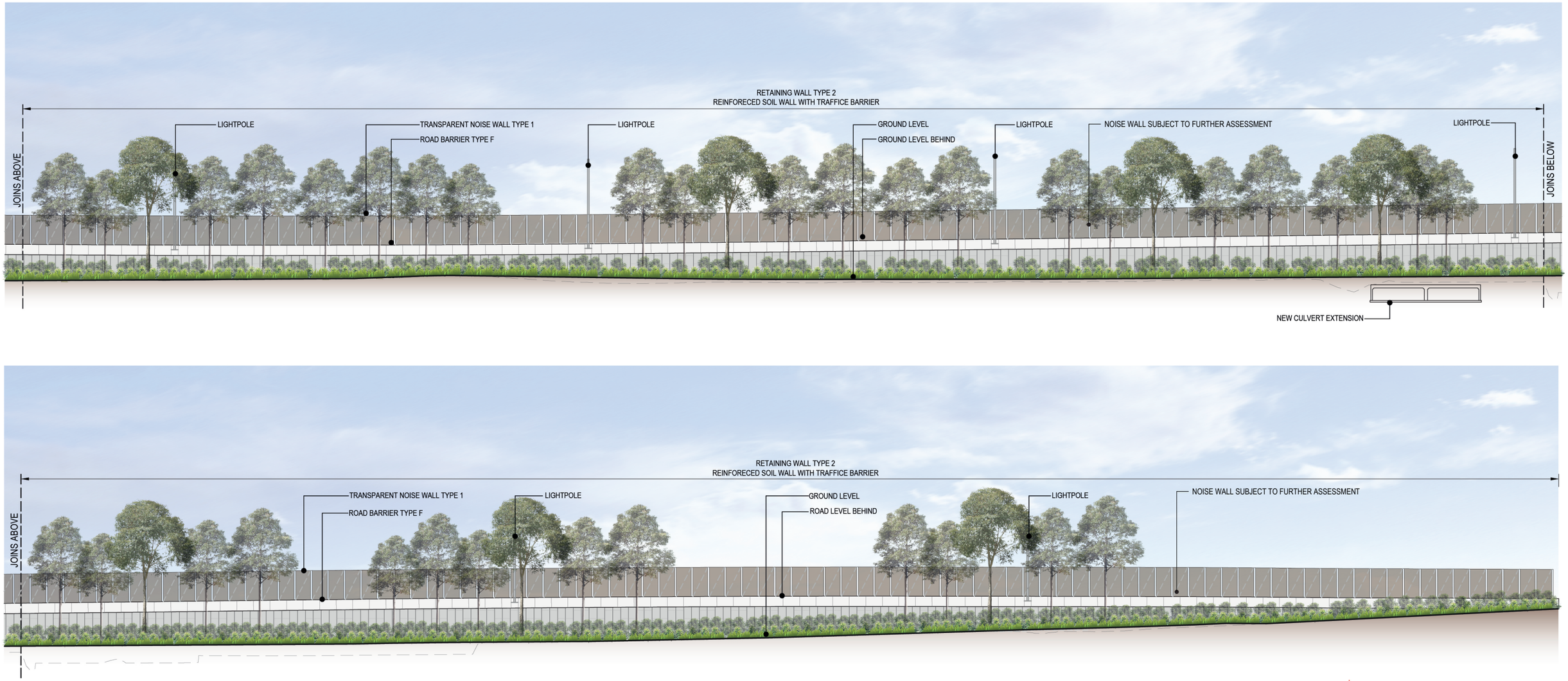
LOCATION PLAN
1:5000





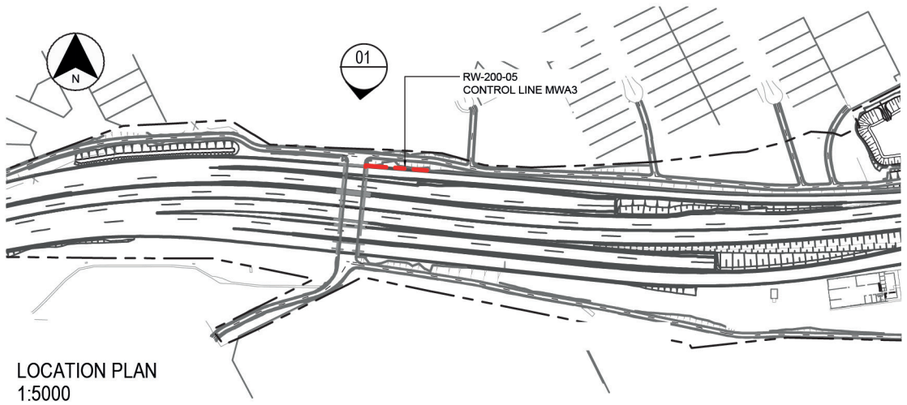
01 ELEVATION - RW-200-01
1:500

Figure 3-4 - Retaining Walls - RW-200-01- Elevation - Sheet 01 of 02

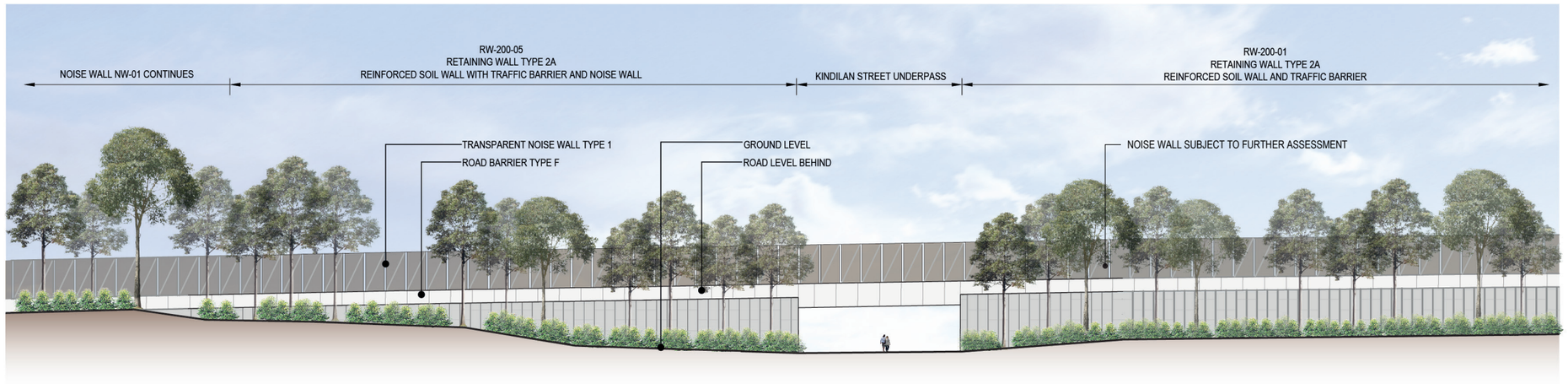


01 ELEVATION (CONT.) - RW-200-01
1:500

Figure 3-5 - Retaining Walls - RW-200-01- Elevation - Sheet 02 of 02

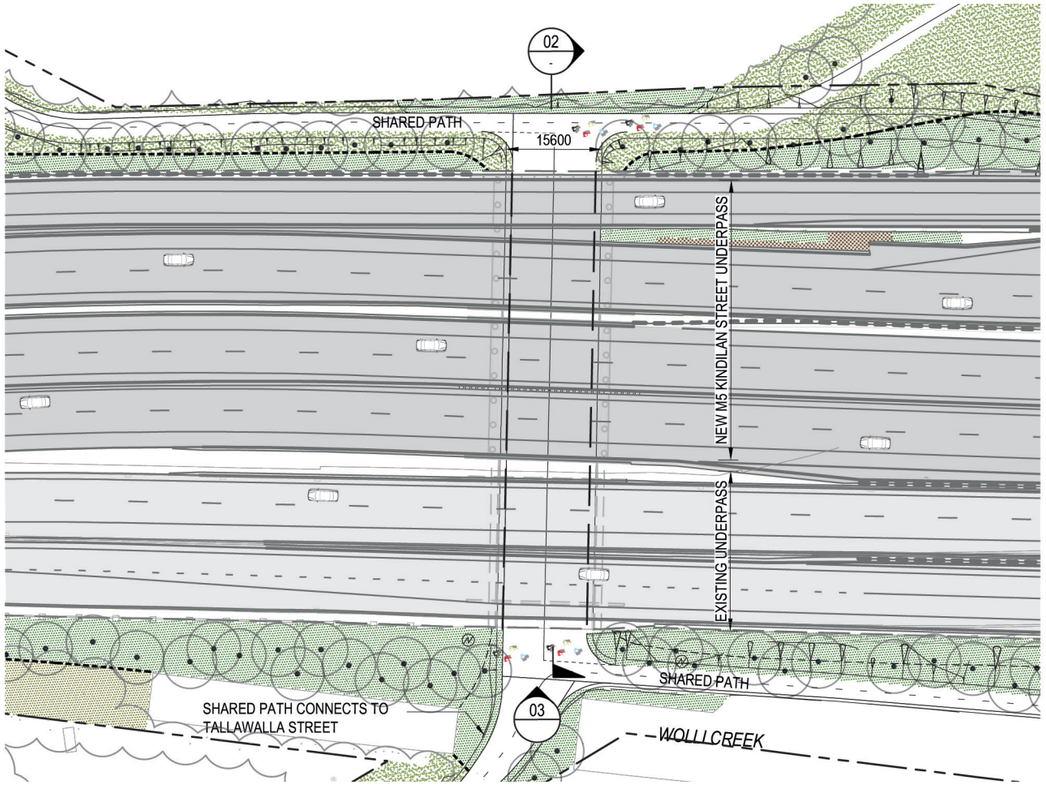


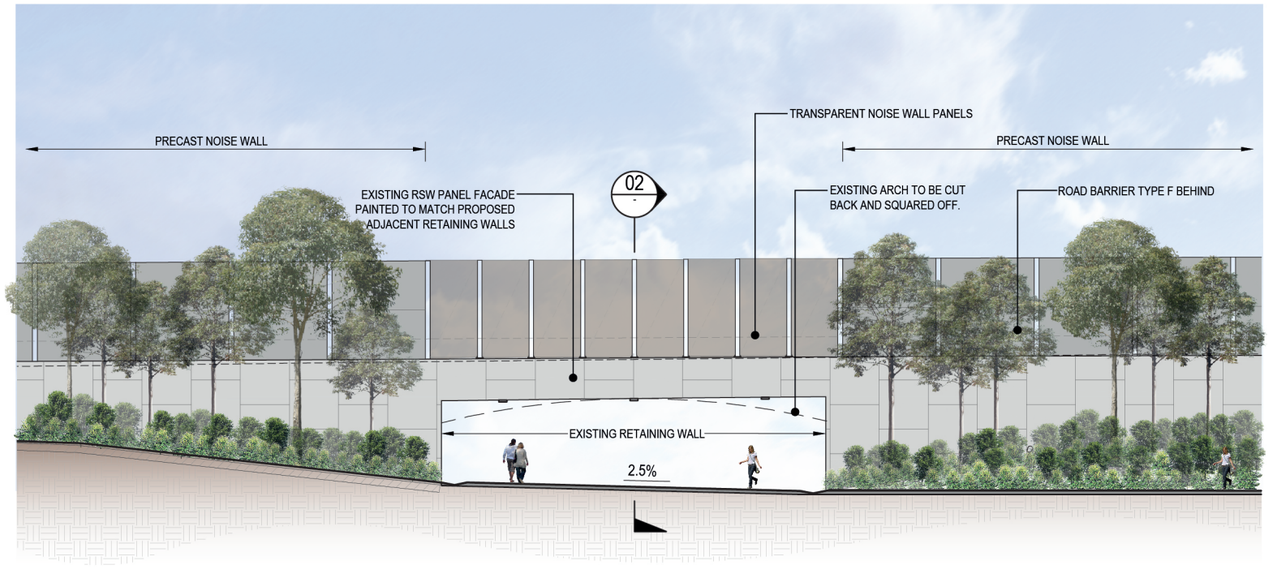
LOCATION PLAN
1:5000



01 ELEVATION - RETAINING WALL RW-200-03 / 05
1:500

Figure 3-6 - Retaining Walls - RW-200-05- Elevation





03 ELEVATION - KINDILAN UNDERPASS
1:250

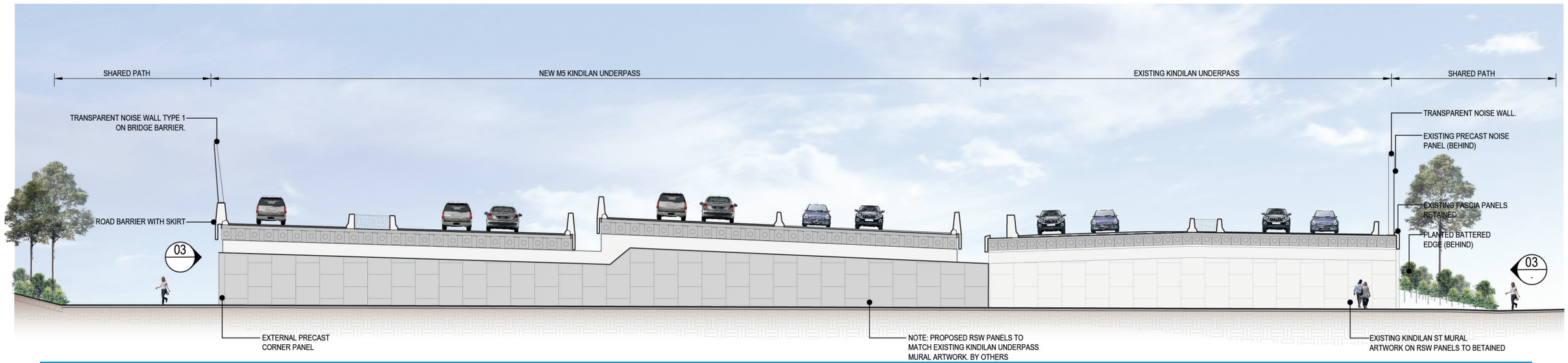


Figure 3-7 - Western Interchange - Kindilan Underpass - Sheet 01 of 02

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