West Gate Tunnel Project

Assessment Report

Alternative design to lower Wurundjeri Way extension

November 2017

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1 Introduction

1.1 Purpose

This report considers the potential environmental effects of an alternative design to lower the Wurundjeri Way extension section of the West Gate Tunnel Project (WGTP).

The report has been prepared by the Western Distributor Authority (WDA) in response to a request from the Minister for Planning to assist in the Minister's assessment of the environmental effects of the WGTP. Specifically, this report responds to a request from the Minster for Planning for additional information on the following matters:

- Information and review in relation to the potential option of lowering the Wurundjeri Way extension component of the WGTP and modifying the Dynon Road link cross section
- Information or assessment in relation to the potential environmental effects of lowering the Wurundjeri Way extension component of the WGTP and modifying the Dynon Road link cross section.

A copy of the request from the Minister for Planning is contained in Attachment A.

1.2 Background

Wurundjeri Way extension

The Wurundjeri Way extension forms part of the Port, CityLink and city connections component of the WGTP. The city connections includes three interlinked and interdependent structures including:

- Footscray Road connection
- Dynon Road connection
- Wurundjeri Way extension.

The Wurundjeri Way extension as included in the WGTP Environment Effects Statement (EES) extends Wurundjeri Way to Dynon Road via a grade separated connection over Dudley Street and an overpass over the Dynon Road link, effectively operating as a city bypass.

The Wurundjeri Way extension provides the ability to redistribute traffic from Dynon Road that would otherwise travel south via the central city. It also caters for traffic from the West Gate Tunnel which, without the Wurundjeri Way extension, would otherwise have been required to use Footscray Road and Dudley Street to access Wurundjeri Way.

Consideration of alternative configurations of the WGTP's city connections found that the Wurundjeri Way extension was required to avoid traffic from the WGTP causing increased congestion in roads within and around the central city. When combined with the connections to Footscray Road and Dynon Road, the Wurundjeri Way extension ensures that traffic at the eastern end of the WGTP is distributed efficiently into the existing arterial road network.

The Wurundjeri Way extension will enable vehicles to bypass the central city, removing through traffic from streets within the CBD by providing more direct access south of the Yarra River for the large proportion of traffic from Dynon Road and Footscray Road with destinations south of the Yarra River.

The functional design of the Wurundjeri Way extension included in the EES, its strategic importance to the WGTP and its contribution to the network performance is further discussed in section 3.

Environment Effects Statement

The WGTP EES, draft planning scheme amendment and Works Approval application were publically exhibited between 29 May and 10 July 2017. A total of 504 submissions were received.

An Inquiry and Advisory Committee (IAC) was appointed by the Minister for Planning and held a public hearing to consider the EES (and draft approvals) and public submissions between 14 August and 19 September 2017.

In support of the public hearing 40 expert witness reports, 73 project notes and 343 tabled documents were presented to the IAC to aid their assessment of the EES and approval documents.

The alignment and elevation of the Wurundjeri Way extension and Dynon Road link and its potential impacts on the future development of E-Gate were raised by a number of submitters including individual residents from North Melbourne, West Melbourne and Docklands, VicRoads, City of Melbourne, Ashe Morgan, Digital Harbour, Friends of Moonee Ponds Creek, Melbourne Water Inner Melbourne Planning Alliance, Kensington Association, and Docklands Community Association. The impacts of the Wurundjeri Way extension on a future pedestrian connection between North and West Melbourne, E-Gate and the Docklands precinct was also of concern to submitters.

While this report highlights the views of some submitters on issues directly relevant to the matters outlined in the Minister for Planning's request, it does not purport to represent all issues of all submitters.

During the IAC hearing a number of parties presented and/ or elaborated on their written submissions in relation to certain issues in relation to the Wurundjeri Way extension.

Further information on the key issues raised in written submissions and during the IAC hearing related to the Wurundjeri Way extension is presented in section 4.

The WDA was well aware of these issues with the design presented in the EES. This was reiterated in the WDA's closing submission to the IAC, where the WDA stated that on the matter of the city connections:

> *89. Design of these connections has been influenced by:*
>
> *(a) the existing CityLink elevated structures;*
>
> *(b) the need to tie-in with the existing CityLink, Footscray Road, Dynon Road and Wurundjeri Way alignments;*
>
> *(c) the Moonee Ponds Creek;*
>
> *(d) a 66kV high voltage transmission tower next to Moonee Ponds Creek;*
>
> *(e) the existing rail lines and V/Line and MTM stabling yards, and the future urban renewal planned for E-Gate; and*
>
> *(f) the existing Dudley Street rail overpass, signal equipment room and switch room, and the future additional freight rail tracks and redevelopment of the southwestern corner of the Dudley Street/Wurundjeri Way intersection.*

90. WDA recognises the arguments against the elevated structure and was conscious of these issues throughout the formulation of the EES. The IAC will appreciate that the design is a product of complex and competing strategic and physical requirements associated with rail infrastructure. There is not a straightforward alternative. The IAC should find that the Project is acceptable in this context. Nevertheless, WDA is undertaking further investigations to understand potential impediments to the potential to lower the Wurundjeri Way extension. Obviously any further investigations are outside the scope of the EES, as they involve a strategic and physical rail context.

Since the EES hearing, the option to lower the Wurundjeri Way extension has been further informed by a number of key outcomes:

- Development of an option for the permanent relocation of the V/Line train stabling area at the South Dynon rail area located to the west of Moonee Ponds Creek and CityLink, which now has the support of Transport for Victoria
- Analysis of traffic performance of a lowered Wurundjeri Way extension and Dynon Road link intersection (as opposed to an overpass), has indicated minimal traffic impacts. Across all movements there would be at least a Level of Service D or better, including at the Dynon Road/ Dynon Road link intersection further to the east and at the intersection of the lowered Wurundjeri Way extension and Dynon Road link
- Traffic performance for the adjacent arterial road network operates satisfactorily and within relevant performance requirements
- The intersection of the lowered Wurundjeri Way extension and Dynon Road link can be designed to meet relevant design guides, standards and meet functional and safety requirements, while providing for safe and efficient maintenance
- The reduced gradient in the vicinity of the lowered Wurundjeri Way extension and Dynon Road link would have a positive impact on potentially reducing greenhouse gas emissions and increasing road safety, particularly for heavy vehicle movements
- Better facilitation of the opportunity of a pedestrian/ cycle link between North Melbourne railway station, E-Gate and Docklands (Waterfront City) due to reduction in height by up to 10 metres and due to removal of rail stabling lines under the road (making a pedestrian/ cycle link able to pass under the road at grade in locations where sufficient clear is available)
- Reduced visual bulk and scale by the removal of on and off ramps (on structure) on each side of a grade separated Wurundjeri Way extension at the Dynon Road link
- The elevated structure at the intersection has less visual bulk and scale, due to the intersection being more compact and largely confined to two planes (rather than 3)
- Analysis of noise impacts indicates the lowered design (compared to the EES design) will have no discernible difference in noise levels for sensitive receptors on Railway Place
- Qualitative analysis of air quality impacts indicating no appreciable difference in PM_{10} pollutant concentrations at the closest sensitive receptors.

1.3 Overview of benefits

The alternative design to lower the Wurundjeri Way extension and provide an elevated intersection with the Dynon Road link provides the following key benefits:

- Provides for an improved interface between the E-Gate site and existing railway corridor
- Offers flexibility for a high quality urban design response to maximise the future development potential of the E-Gate site and its integration with the surrounding evolving urban environment
- Enhances development potential of E-Gate by lowering the elevated structure adjacent to the northern boundary of E-Gate
- Provides greater opportunity for a combined elevated pedestrian/ cycling bridge and at grade level crossing between the North Melbourne railway station, E-Gate and Docklands (Waterfront City)
- Provides potential for future vehicle access directly to the lowered Wurundjeri Way extension from E-Gate
- Minimises the potential for light spillage and overshadowing to diminish the amenity of future commercial, residential or higher amenity uses of the E-Gate site.

1.4 Document structure

The structure and content of this document is as follows:

- Section 2 provides an outline of stakeholder consultation that WDA has undertaken in preparing this report
- Section 3 provides an overview of the Wurundjeri Way extension as part of the design included in the EES
- Section 4 provides a summary of issues raised in relation to the design of the Wurundjeri Way extension through the EES exhibition and hearing
- Section 5 provides a description of the alternative design to lower the Wurundjeri Way extension and provide an intersection with the Dynon Road link
- Section 6 outlines the planning and urban design considerations with the alternative design
- Section 7 provides an assessment of the potential impacts of the proposed functional design to lower the Wurundjeri Way extension in relation to:
  - Effects on traffic and transport
  - Effects on air quality
  - Effects on noise and vibration (surface)
- Section 8 sets out the conclusion of this assessment including in relation to the EES Scoping Requirements and the *Transport Integration Act 2010* transport system objectives and decision making principles.

2 Stakeholder consultation

2.1 Overview

This section identifies the key stakeholders involved with investigation into the alternative design to lower the Wurundjeri Way extension. It includes the key issues relevant to each stakeholder and feedback received to inform the preparation of the functional design.

2.2 Stakeholders and feedback

Transport for Victoria and other relevant rail entities

The State is currently preparing a draft Victorian Train Stabling and Maintenance Strategy in consultation with Transport for Victoria (TfV), Public Transport Victoria, VicTrack, Metro Trains Melbourne and V/Line. The stabling strategy sets outs the long term plan for the location and development timeframes of train stabling and maintenance facilities. The stabling strategy complements the Victorian Rolling Stock Strategy which responds to the forecast significant increase in the size of the train fleet over the coming decades.

WDA has been in regular discussions with relevant State agencies and rail entities on the impacts of the WGTP on the E-Gate site and any potential implications on future train stabling and maintenance facilitates associated with the State's rolling stock strategy.

V/Line currently operates a train stabling area on the northern boundary of the E-Gate site, beneath the proposed elevated Wurundjeri Way extension. In consultation on the potential to lower the Wurundjeri Way extension, the relevant State agencies and other rail entities have supported an alternative V/Line stabling option to allow the lowering of the Wurundjeri Way extension.

The alternative stabling option provides for a V/Line train stabling area at the South Dynon rail area located to the west of Moonee Ponds Creek and CityLink. The alternative option provides for existing and future Next Generational Rolling Stock stabling requirements (see section 5 for further information). In accordance with the stabling strategy, the Metro Trains Melbourne (MTM) train stabling for the Melbourne Metro Rail Project would be located at Kananook.

TfV supports the integrated delivery of the WGTP and alternative option for the V/Line train stabling area (see correspondence in Attachment B). Consultation on the functional design of the alternative V/Line train stabling option continues with the relevant State agencies and rail entities. TfV also supports the lowering of Wurundjeri Way and the conversion from interchanging to intersecting with the WGTP to Dynon Road link.

VicRoads

VicRoads supports the lowering of the Wurundjeri Way extension at the point that it is adjacent to E-Gate, subject to maintenance of the proposed lane capacity and functionality of the Wurundjeri Way extension (see correspondence in Attachment B).

VicRoads also supports the lowering of the Wurundjeri Way extension as proposed and the conversion of the connection to the WGTP to Dynon Road link from an interchange to an intersection.

The Wurundjeri Way extension component of the project is proposed to be handed to VicRoads to operate once constructed and commissioned.

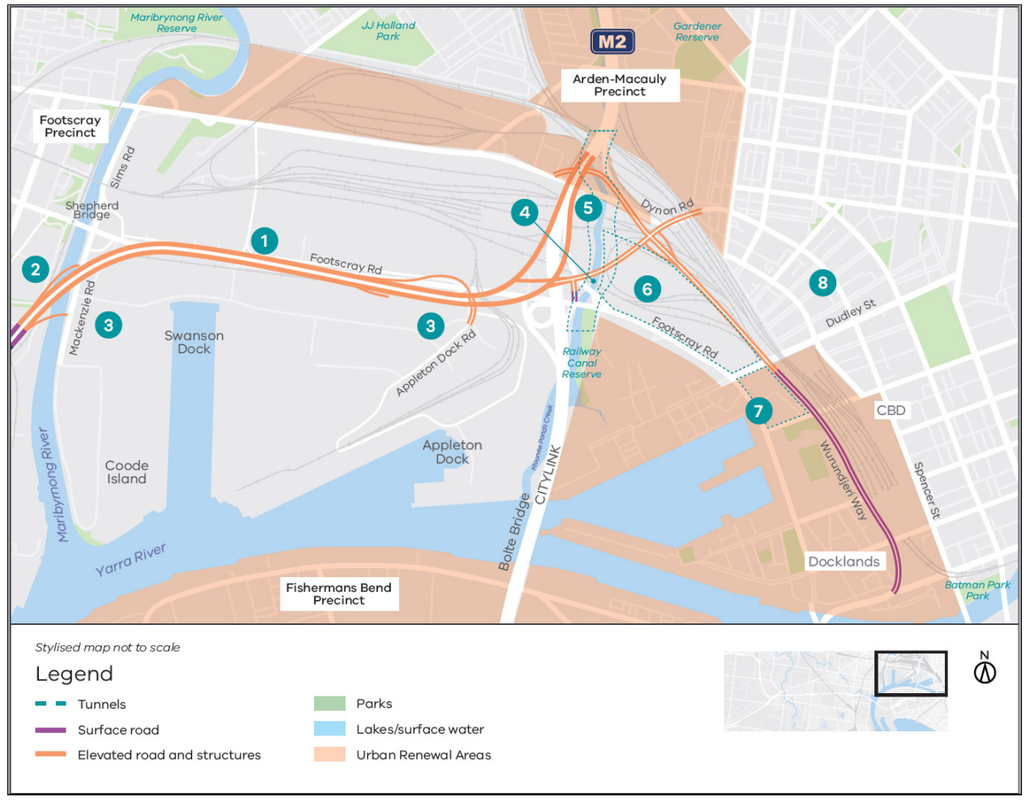
3 Overview of Wurundjeri Way extension EES design

3.1 Overview

This section describes the design of the Wurundjeri Way extension as assessed in the WGTP EES and considered by the IAC during the public hearing process. It sets out the EES design function layout, strategic importance and contribution to the network performance.

The Wurundjeri Way extension forms part of the Port, CityLink and city connections component of the WGTP as shown in Figure 3-1.

Figure 3-1 Port, CityLink and city connections component



3.2 Functional layout and horizontal alignment

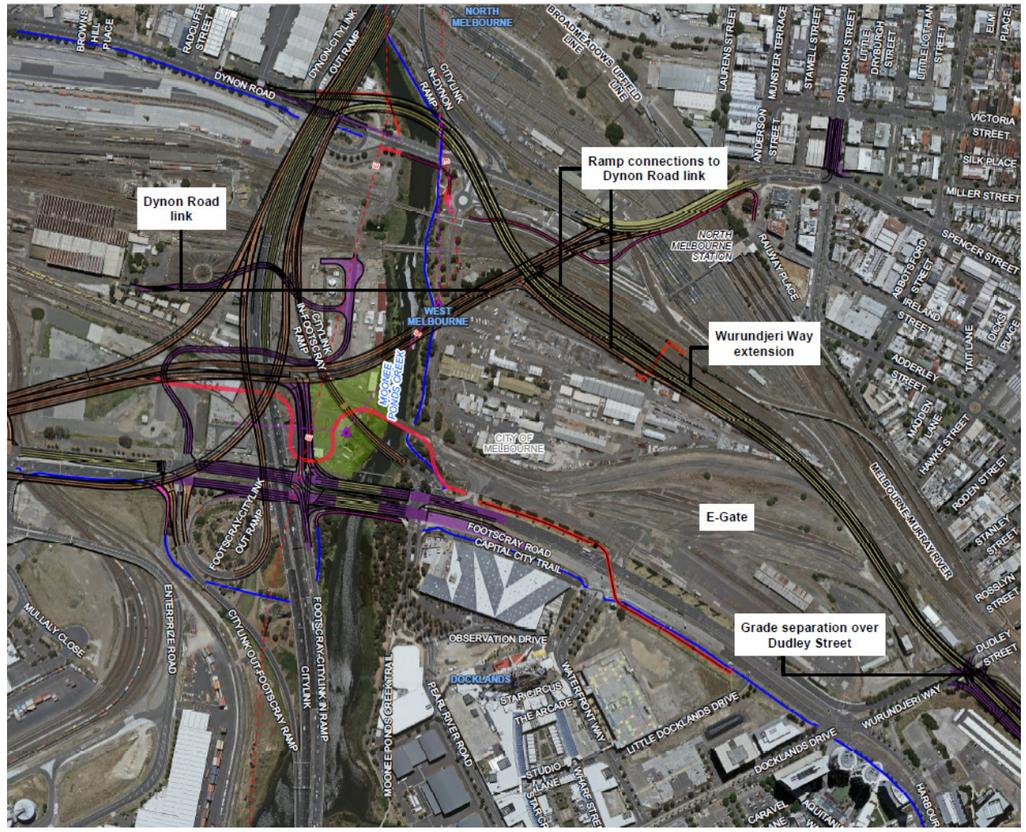
The Wurundjeri Way extension widens and extends Wurundjeri Way to connect Dynon Road at the CityLink interchange to Wurundjeri Way on the south side of Dudley Street via a grade separated connection over Dudley Street, as shown in Figure 3-2.

The EES design of the Wurundjeri Way extension includes the widening of Dynon Road on the north side west of CityLink to provide for the left turn lanes that would connect to the Wurundjeri Way extension. The northern section of the Wurundjeri Way extension would extend east at grade from Dynon Road as a pair of two-lane carriageways before crossing Moonee Ponds Creek at a relatively low level. At Dynon Road, the northbound carriageway would connect to the north side east of CityLink at a signalised intersection. The intersection would provide for westbound right turns only. The left turn back towards the city would not be provided. The Wurundjeri Way extension as presented in the EES extends up and over the proposed Dynon Road link on a single structure at approximately 17.5 metres above natural ground level.

The alignment for the Wurundjeri Way Extension would then extend through the V/Line stabling yards and follow the northern boundary of the E-Gate site to minimise impact on this site while remaining clear of rail assets to the north. The height of the two lanes would decrease from approximately 17.5 to approximately 10 metres above natural ground level before rising to approximately 7.5 metres just before crossing Dudley Street. The undercroft provides for the reinstatement of the V/Line train stabling area beneath the Wurundjeri Way extension at the conclusion of construction.

The two lanes would then merge to one lane before passing over Dudley Street to connect to Wurundjeri Way as one-lane. A clearance exceeding the minimum 5.9 metre clearance would be available over Dudley Street allowing for over-height vehicles to negotiate Over-Dimensional Route 5A (Footscray Road – Dudley Street – Wurundjeri Way route).

Figure 3-2 Wurundjeri Way extension

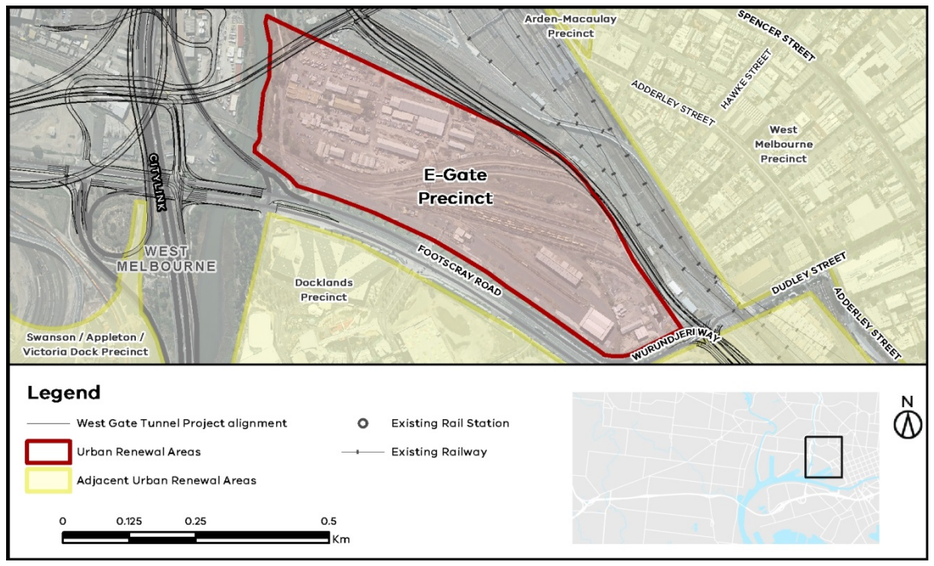


The alignment at Wurundjeri Way and Dudley Street is constrained on the east side by provision for two future freight rail tracks, and on the south western side of Dudley Street/Wurundjeri Way by property which is to be developed.

Wurundjeri Way would be widened to three through lanes in each direction between Dudley Street and Flinders Street. Wurundjeri Way would also be widened further on the west side north of the La Trobe Street overpass to accommodate both the connection with Dudley Street and the new carriageways of the extension.

Some permanent land acquisition would be required near the intersection of Dynon Road and Wurundjeri Way to accommodate the new shared use path bridge, new public open space area, the widened carriageway and upgraded intersection. The Wurundjeri Way extension and Dynon Road link road interface with the north-eastern part of the E-Gate site, decreasing the land available for future development within the site. The interface is shown in Figure 3-3. There area of loss is less than 1.5 hectares of the 20 hectare site.

Figure 3-3 E-Gate site interface



3.3 Strategic importance

In developing the WGTP design, a number of city connection options were investigated. Only the option of three city connections working together (Footscray Road connection, Dynon Road connection and Wurundjeri Way Extension connection between Dynon Road and the project) achieves optimal network performance to provide considerable benefits to traffic network efficiency and optimisation.

Strategic traffic modelling has shown that a large proportion of traffic on Dynon Road west of CityLink is destined for locations south of the Yarra River and this traffic travels through the CBD to access these locations. This through traffic places pressure on central city roads and signalised intersections. An extension of Wurundjeri Way which extends the city bypass function of this road assists in relieving the pressure on Dynon Road.

The Wurundjeri Way extension also provides the ability to redistribute traffic from the West Gate Tunnel which would otherwise have been required to use Footscray Road and Dudley Street to access Wurundjeri Way.

The provision of efficient connections from the West Gate Tunnel to arterial roads is consistent with the project objectives by providing a viable alternative to access the western edges of the central city, and reducing traffic volumes on the West Gate Bridge.

3.4 Contribution to network performance

The overall network performance is improved with the city connections. Traffic volumes on Footscray Road are estimated to decrease by approximately 3 per cent in the AM peak, while traffic on Dynon Road would increase marginally by 5 per cent. This would lead to an improvement in performance on Footscray Road with the WGTP compared to the 2031 base case (V/C ratio improves from 1.1 to 1.0) while the operation of Dynon Road would be approximately the same. However, much of this 'new' traffic on Dynon Road is seeking to access locations to the north of the central city and using this more direct route rather than travelling through the central city as before, thereby relieving some peak period pressure on these critical central city roads. Dudley Street traffic is expected to reduce by 7 per cent compared to the base (no project) case in the section west of Wurundjeri Way.

The Dudley Street section east of Wurundjeri Way is expected to increase by 16 per cent compared to the base case. Similarly to the Footscray and Dynon connection, this increase on Dudley Street is due to traffic redistributing to the route, filling the gap left by traffic now using Dynon Road and the Wurundjeri Way extension. The increase in traffic on this section of Dudley Street is acceptable in terms of network performance as the redistributed traffic from Dynon Road is no longer travelling through the Spencer Street/ Dudley Street intersection, providing the potential to re-phase the signals to accommodate the new flows, and extended queuing can be accommodated on the west site of Wurundjeri Way.

The connection to Wurundjeri Way from the West Gate Tunnel would also result in fewer vehicles turning from Footscray Road into Wurundjeri Way, reducing congestion and delays at this intersection.

4 Issues raised in EES exhibition and IAC hearing

4.1 Overview

This section summarises the key issues raised by submitters to the EES and also during the IAC hearing process in relation to the elevation and alignment of the Wurundjeri Way extension. While this report highlights the views of some submitters on issues directly relevant to the matters outlined in the Minister for Planning's request, it does not purport to represent all issues of all submitters.

Table 4-1 notes the number of written submissions received that commented on different aspects of the Wurundjeri Way extension, and the issues raised in relation to this aspect of the EES design.

Table 4-1 Summary of written submissions to the exhibited EES

Submission theme	Council	Resident Living Near the WGTP	Community Group / Residents Group	Statutory Authority	Industry Group	Business	Other Individual
Visual impacts of elevated structure	2	4	3	0	1	0	0
Urban design of Wurundjeri Way extension	2	1	4	1	0	0	1
Compatibility with urban renewal area	1	6	4	1	2	1	2
Connectivity and access between West Melbourne, Docklands, and E-Gate	1	5	2	0	0	0	2
Noise impacts	1	3	2	0	0	0	0
Other general concerns with Wurundjeri Way extension as a city connection	0	2	0	0	0	0	0

4.2 Visual impact

The City of Melbourne submitted that the Wurundjeri Way extension would restrict the nature and quality of urban renewal options for the E-Gate site. It was submitted that the elevation of the Wurundjeri Way extension would be in the foreground of views to the city from E-Gate, making residential development less appealing. Similarly, it would be visible from West Melbourne, also making residential development less appealing.

Other submitters raised concerns with the visual impact of the Wurundjeri Way extension when viewed from open space areas and multi-level residential buildings in West Melbourne. Some submitters considered the introduction of additional elevated structures along the railway and Moonee Ponds Creek corridors presented unreasonable bulk and massing, especially when viewed against the port and CityLink infrastructure.

4.3 Physical impact on E-Gate

The City of Melbourne submitted that the Dynon Road and Wurundjeri Way extension unreasonably reduces the E-Gate site available for redevelopment by 32%. The Inner Melbourne Planning Alliance Inc. also submitted the potential area for development of E-Gate would be significantly constrained by the WGTP. While the EES confirmed the WGTP would only impact 7.5% of the extent of the E-Gate site (as determined by Development Victoria), both the City of Melbourne and Inner Melbourne Planning Alliance Inc. submitted any impacts were unreasonable for such a strategically important site.

It is the view of the City of Melbourne and the Inner Melbourne Planning Alliance that the alignment and elevation of the Wurundjeri Way extension would likely result in extensive overshadowing by virtue of its height above natural ground level, its width and its predominately solid concrete construction. It was submitted the elevated structure would result in a defensive design response against the northern boundary. The City of Melbourne concluded that the structure would have a severe, adverse impact on the built environment of E-Gate and evolving urban environment.

City of Melbourne also raised concerns with likely noise impacts on future development at E-Gate necessitating attenuation measures within the site. It is the City of Melbourne's view that a landscape and/ or road buffer would be required which would render a 45-55 metre wide corridor undevelopable.

4.4 Integration with E-Gate and surrounding areas

City of Melbourne submitted that the alignment and elevation of the Wurundjeri Way extension creates a barrier between existing and emergent urban renewal areas, limiting the potential for the elevated structure to integrate successfully into the surrounding setting. In the absence of future development plans for E-Gate, City of Melbourne asserts that the WGTP should uphold its own urban design principles and allow sustainability principles to influence the engineering.

Ashe Morgan (representing AM Harbour Town Nominee), City of Melbourne, Inner Melbourne Planning Alliance Inc. and Melbourne Western City Connection all submitted the scale, alignment and elevation of Wurundjeri Way extension would impact negatively on the potential for integration with and connections between the Docklands (Waterfront City), E-Gate, Arden Macaulay and North and West Melbourne.

Ashe Morgan proposed that the Wurundjeri Way extension should enable, not simply preclude, an active transport link between the Docklands (Waterfront City site) and North Melbourne. Options for a pedestrian bridge were presented at the hearing. Ashe Morgan recommended a targeted reduction in the rise of the Wurundjeri Way extension to be no greater than the Regional Rail bridge at North Melbourne Station.

The Melbourne City Western Connection also submitted previous design proposals for the E-Gate site allowed for open space areas near the Moonee Ponds Creek frontage and a pedestrian link extending to the North Melbourne railway station. The Melbourne City Western Connection submitted the height of the Wurundjeri Way extension would significantly constrain realisation of this design option. The Friends of Moonee Ponds Creek also raised concerns over the impact of the Wurundjeri Way extension (and Dynon Road link) on future open space connectivity between Moonee Ponds Creek and E-Gate. In their submission, the Friends of Moonee Ponds Creek supported an at grade solution for the extension, avoiding the Creek area.

These views were also shared by other submitters seeking for the WGTP to facilitate the planning and/ or delivery of a pedestrian/ cycle connection between West Melbourne, E-Gate and Docklands. Some submitters also raised concerns with the elevation of the Wurundjeri Way extension and potential noise impacts on residential buildings.

4.5 Usable space

City of Melbourne raised concerned with the creation of undesirable spaces under the Wurundjeri Way extension, however discussion on a preferred elevation height for a desirable urban design outcome was not provided.

5 Design description – lowering of Wurundjeri Way extension

5.1 Overview

This section provides a description of the key design elements of the alternative design to lower the Wurundjeri Way extension. A plan view showing the horizontal alignment is presented in section 5.2.1 and a long section showing the vertical alignment is presented in section 5.2.2. A drawing showing both the horizontal and vertical alignments together is provided in section 5.2.3 and Attachment C. It should be noted that the design vertical geometry is subject to the detailed design process and is presented as a concept design in this report. Dimensions in the report are also, therefore, approximate.

5.2 Design alignments

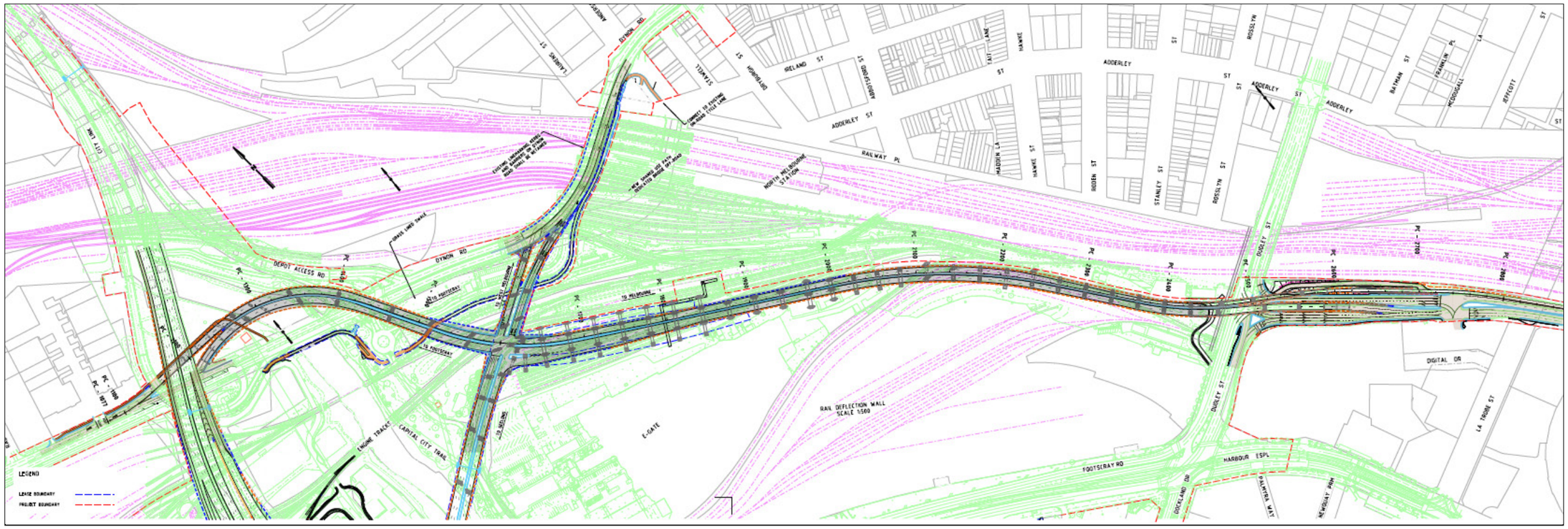
5.2.1 Horizontal alignment

The horizontal alignment to lower the Wurundjeri Way extension would remain unchanged from the design assessed in the EES. The horizontal alignment remains within the project boundary as exhibited in the EES.

The horizontal alignment would extend east from Dynon Road as a pair of two-lane carriageways before crossing Moonee Ponds Creek to the north of the existing Dynon Road bridge and extending to a new intersection (instead of overpass) for the Wurundjeri Way extension and Dynon Road link. The footprint of the alignment would be slightly reduced at this point due to the removal of the two ramp bridges connecting to the Dynon Road link. The horizontal alignment then extends south west before extending through the V/Line stabling yards and following the northern boundary of the E-Gate site. The horizontal alignment then crosses Dudley Street south of the existing railway buildings and bridge to connect into the existing Wurundjeri Way alignment. The horizontal alignment for the lowered Wurundjeri Way extension is shown in Figure 5-1 below.

The horizontal alignment minimises impacts to VicTrack land, various rail entities and railway infrastructure while allowing for crossing of CityLink, CityLink connections, Moonee Ponds Creek, Dynon Road and Dudley Street. The intersection at Dynon Road link results in the removal of both the on-ramp and an off-ramp from the grade separated design. This results in a slight narrowing of the alignment required in the vicinity of the intersection.

Figure 5-1 Plan view showing the horizontal alignment for the lowered Wurundjeri Way extension



5.2.2 Vertical alignment

The vertical alignment of the lowered Wurundjeri Way extension is shown in Figure 5-2 below. The long section shows the proposed EES design in 'green' and the alternative design in 'red'. It also shows the proposed surface gradients, approximate height reductions from the EES design and minimum rail, road and building clearance areas.

The northern section of the alternative design to lower the Wurundjeri Way extension would extend east at grade from Dynon Road as a pair of two-lane carriageways beneath CityLink before crossing Moonee Ponds Creek at a relatively low grade (consistent with the design as presented in the EES).

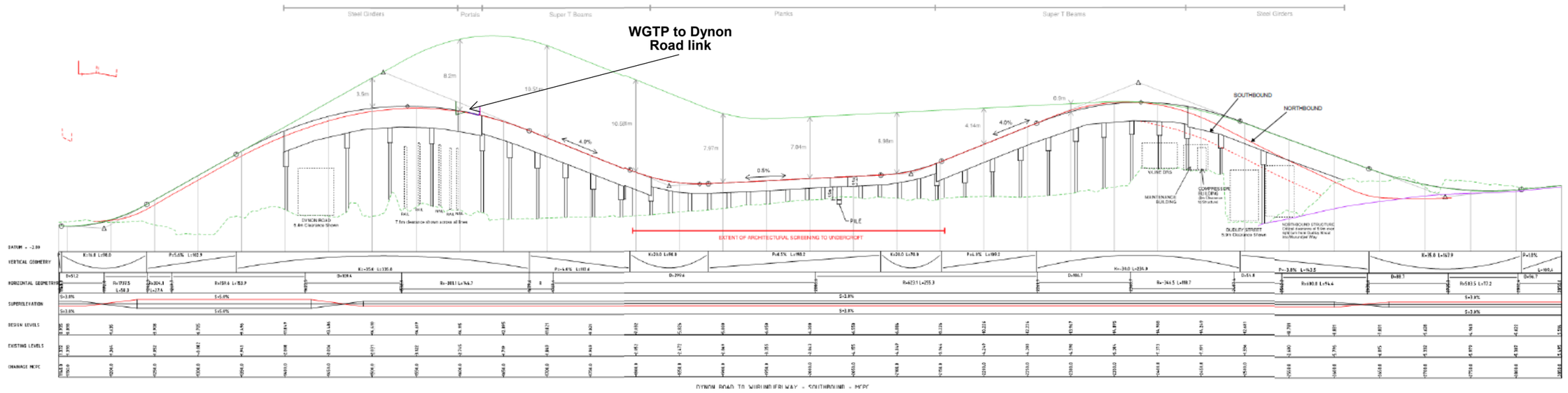
The lowered Wurundjeri Way extension would then extend up to a signalised intersection with the proposed Dynon Road link at a height of approximately 11.5 metres above natural ground level. The intersection would maintain the minimum 7.1 metre railway clearance height, while reducing the road deck height approximately 8.2 metres from the EES design.

The vertical alignment for the lowered Wurundjeri Way extension would then decline for approximately 500 metres to intersect with the northern boundary of E-Gate at a height of approximately 2.6 metres above natural ground level. The reduced height of the intersection provides corresponding reductions in the vertical alignment of the decline structure before its intersection with E-Gate. The alternative design would reduce the height of the decline structure approximately 10.5 metres from the EES design.

The lowered Wurundjeri Way extension would continue south for approximately 350 metres with a deck height of approximately 2.6 metres above natural ground level before crossing Dudley Street and connecting to the existing Wurundjeri Way. The alternative design results in a reduction of the vertical alignment of approximately 6 - 8 metres in height from the EES design across the northern boundary of the E-Gate site.

The lowered Wurundjeri Way extension would rise to provide for vehicle access to existing railway buildings and infrastructure before crossing Dudley Street at approximately 10 metres above road level, ensuring minimum clearance levels are achieved. The southbound/ inbound lane would cross Dudley Street marginally higher than the northbound/ outbound lane to allow for sufficient vehicle clearance to the existing railway buildings to the north of Dudley Street. The vertical alignment then declines from Dudley Street to tie into Wurundjeri Way with alignment to Flinders Street being the same as the EES design.

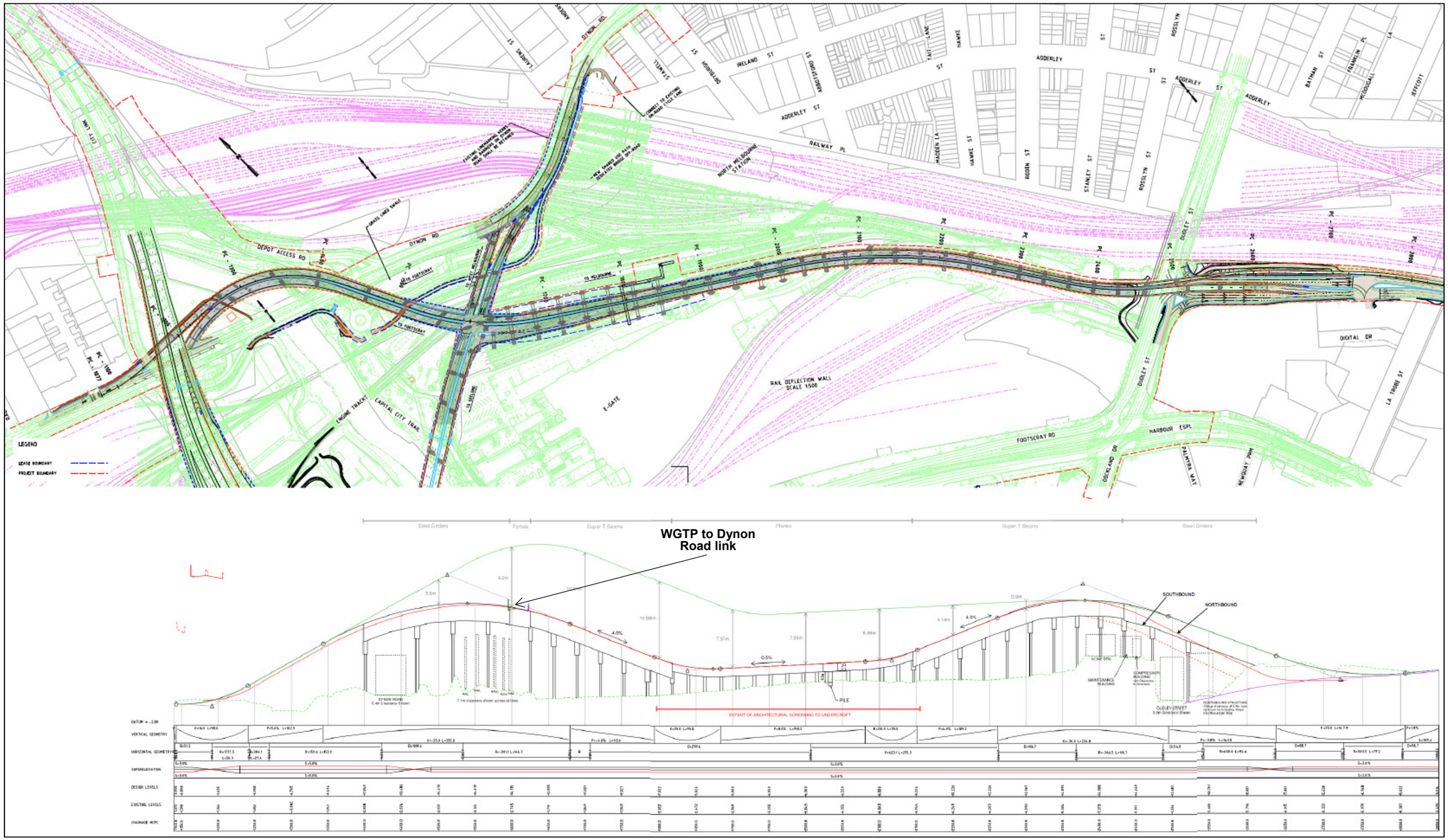
Figure 5-2 Long section showing the vertical alignment of the lowered Wurundjeri Way extension (and EES design)



5.2.3 Horizontal and vertical alignment

Figure 5-3 presents both the horizontal and vertical alignment for the lowered Wurundjeri Way extension against a consistent chainage.

Figure 5-3 Long and cross section showing the lowered Wurundjeri Way extension



5.3 Connection at Dynon Road link

A signalised intersection (instead of an overpass) would be located at the lowered Wurundjeri Way extension/ Dynon Road link. This facilitates removal of the two ramp bridges and provision of the same movements via the intersection. The Wurundjeri Way extension and WGTP to Dynon Road link cross section in this area is required to be changed to facilitate the lowered road and introduction of an intersection. The traffic signal timings and phasings would be optimised with the surrounding network to maximise the attractiveness of the lowered Wurundjeri Way extension 'bypass' function and encourage through traffic to take the more efficient route and reduce unnecessary traffic movements on lower capacity arterial roads.

5.4 Structural design

The alternative design to lower the Wurundjeri Way extension would continue to essentially be one complete bridge structure, and be constructed on a combination of structural forms across its length, generally (from west to east) being steel box sections, super-T beams, concrete planks and further super-T beams at the eastern end at Dudley Street, all supported on concrete piers and crossheads.

Adjacent to the E-Gate northern boundary, the road level of the alternative design to lower the Wurundjeri Way extension would traverse a few metres above natural ground level for a distance of approximately 350 metres. Over this distance an architectural screen ranging in height from approximately 1.3 - 1.8 metres from natural ground level to the underside of the superstructure, would be constructed to prevent access to the undercroft and to improve visual amenity.

A rail deflection wall would be constructed on the northern side of the lowered Wurundjeri Way extension in the vicinity of regional freight rail lines. The rail deflection wall would be a concrete wall founded on piles, with a height to be determined in accordance with bridge design standards, but below the parapet level of the adjacent Wurundjeri Way Extension structure.

Access would be maintained beneath the lowered Wurundjeri Way extension to provide vehicle access to existing rail related buildings located on the northern side of the carriageways such as the Disaster Recovery Centre and Signal Control buildings. The access would extend to the building from the existing Dudley Street frontage as per current arrangements. An existing compressor building may need to be relocated within the site to optimise the lowering of Wurundjeri Way extension.

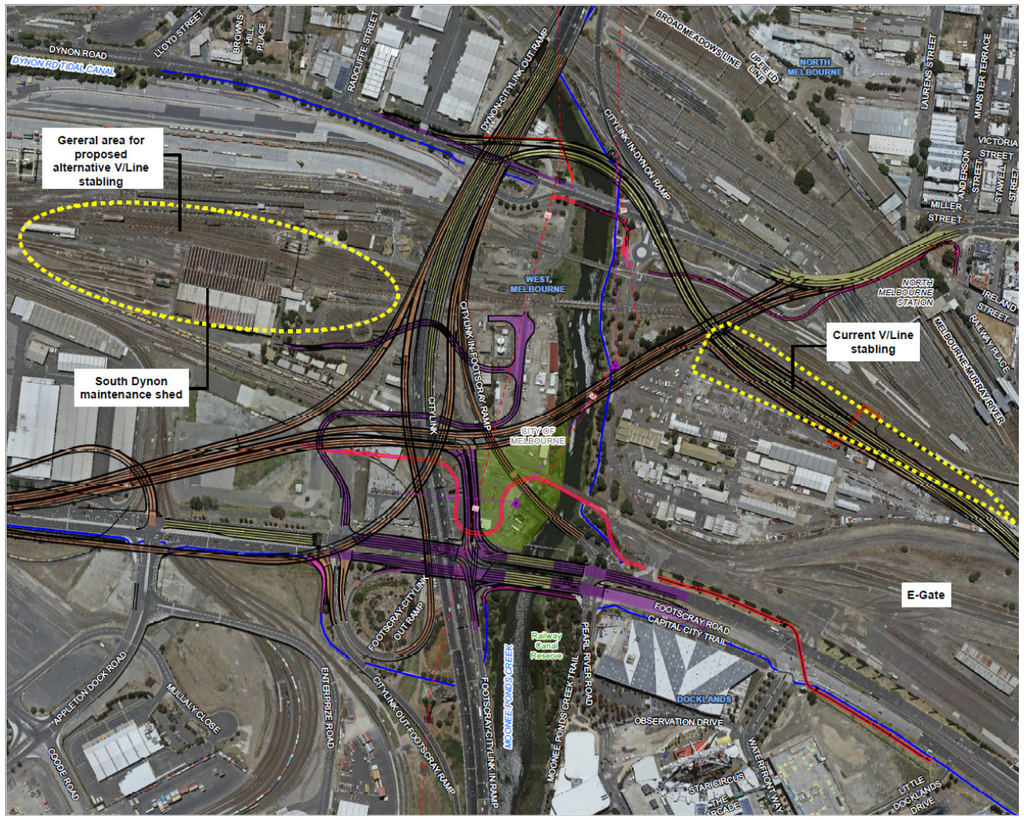
5.5 V/Line stabling relocation

V/Line currently operates a train stabling area on the northern boundary of the E-Gate site, beneath the proposed elevated Wurundjeri Way extension. As mentioned in section 2, the draft Victorian Train Stabling and Maintenance Strategy provides for an alternative V/Line stabling option to support the alternative design to lower the Wurundjeri Way extension. The alternative option involves locating the V/Line stabling area on the north side of the South Dynon maintenance shed west of the Moonee Ponds Creek as shown in Figure 5-4.

This has been the major control on the lowering of the Wurundjeri Way extension and with it now confirmed as being able to be relocated, facilitates the opportunity to lower Wurundjeri Way extension. The removal of the rail stabling lines from underneath the Wurundjeri Way extension also actively facilitates future pedestrian/ cyclist and other movements underneath the road, where sufficient vertical clearance is available.

A preliminary design for the alternative stabling option allows stabling for seven trains each of 160 metres in length. The alternative option also provides area for the future provision of a total of seven (7) trains each of 250 metres in length to accommodate the New Generation Regional Trains stabling requirements.

Figure 5-4 Proposed general area for proposed alternative V/Line stabling area



6 Planning and urban design

6.1 Urban design vision and principles

The urban design vision for the WGTP is to:

> *achieve urban design excellence through genuinely innovative and high quality design, responsive and effective urban integration, positive connections within the neighbourhoods through which it passes and a positive contribution for local communities and for greater Melbourne.*

In realising this vision, the WGTP builds upon and extends the significant legacy and reputation for high quality public infrastructure that has been established in Victoria. The project contributes to a sense of identity and pride for Melbourne's west, serves local and regional road users, and provides a positive net benefit for communities and metropolitan residents.

Eight urban design principles have been developed to assist in achieving a uniformly high standard of urban design quality and integration. These principles (listed in Table 6-1 below) are embedded in the urban design concept for the project and for the alternative design to lower the Wurundjeri Way extension as assessed below. The Environmental Performance Requirements adopted for the WGTP require these principles to be integrated into the project's detailed design.

Table 6-1 Urban design principles

Urban design principle	Description
Urban integration	Integrate the project corridor with the surrounding urban and open space fabric to provide a better integrated environment that serves both the community and road users
Identity	Provide a distinctive set of urban design elements that create identity for the project corridor, while recognising and enhancing the character of neighbourhoods and precincts through which the freeway passes
Connectivity and wayfinding	Provide legible and distinctive experiences for local communities and road users through application of appropriate urban design and landscape treatments
Resilience and sustainability	Assist the WGTP to become sustainable, enduring and resilient by implementing environmentally sustainable design that minimises environmental impacts and providing a design that is enduring and functional for generations to come
Amenity	Provide improved amenity for local communities, places and environs
Vibrancy	Conserve and enhance safe public spaces through well considered and integrated design
Safety	Create safe environments that assist in the development of a series of connected and resilient communities
Accessibility	Support accessible and inclusive environments so that positive activation and contribution to prosperity, well-being and the perception of care within communities is developed

6.2 Urban design assessment

The proposed lowering of the Wurundjeri Way extension between Dynon Road and Dudley Street is consistent with and responds to the urban design principles established in the Urban Design Strategy. It provides a more responsive, high quality urban design outcome and increased benefits to both the E-Gate site and the existing buildings along Railway Place. It seeks to protect and enhance the function, connectivity and character of the evolving urban environment including built form and public realm.

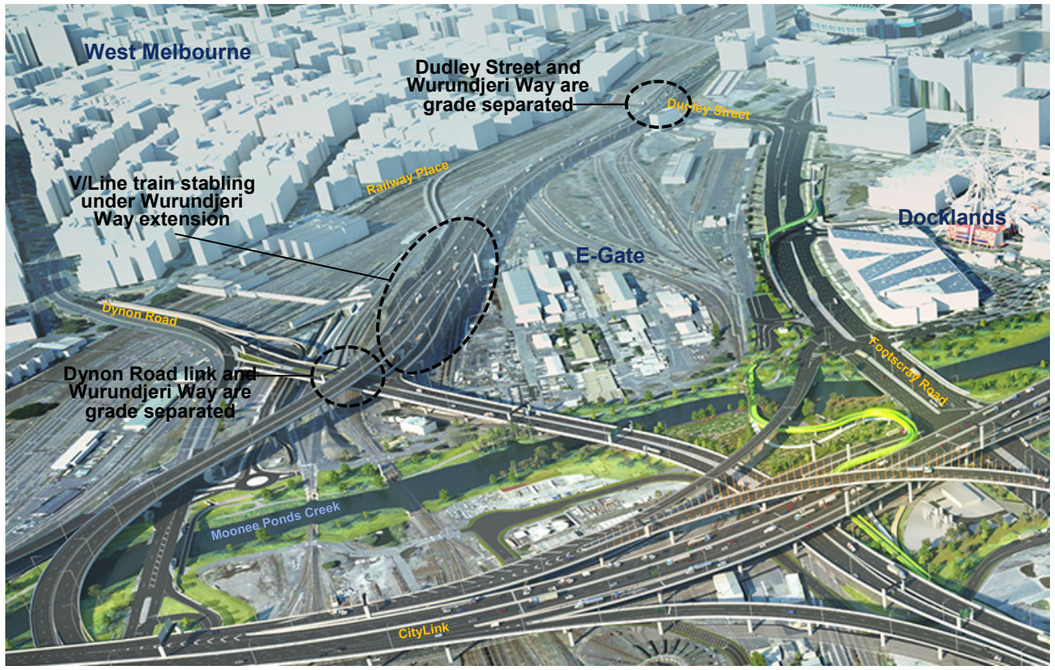
The alternative design includes reducing the height of the elevated structure to approximately 2.6 metres from ground level to road deck and approximately 4.1 metres from ground level to the top of the parapet for the longest possible extent along the northern boundary of the E-Gate site. It also includes an elevated intersection at the junction of lowered Wurundjeri Way extension and Dynon Road link, to further reduce the height of the elevated structure in the precinct whilst maintaining the required clearance above the Regional Rail Link.

The horizontal alignment of the lowered Wurundjeri Way extension remains largely unchanged to minimise physical impacts to the E-Gate site and operating rail corridor. The ramps connections to the Dynon Road link have been eliminated in the alternative design, creating even less impact on E-Gate.

Illustrative plans showing the EES and alternative design to lower the Wurundjeri Way extension are shown in Figure 6-1 and Figure 6-2.

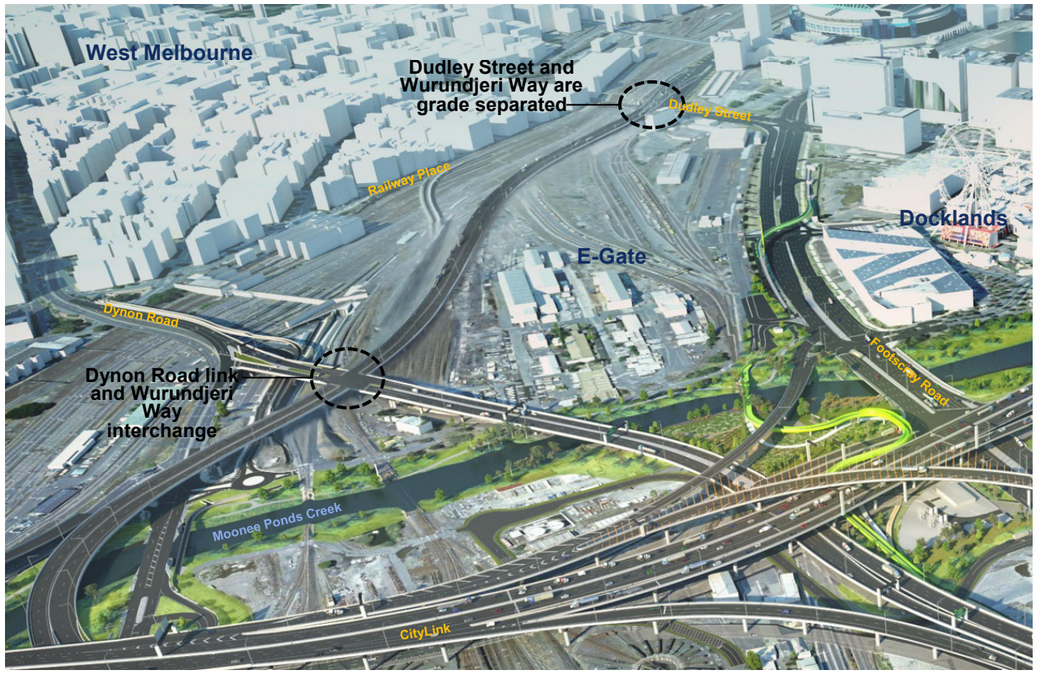
EES design of Wurundjeri Way extension and Dynon Road link

Figure 6-1 EES design of Wurundjeri Way extension and Dynon Road link



Alternative design of Wurundjeri Way extension and Dynon Road link

Figure 6-2 Alternative design of the lowered Wurundjeri Way extension and Dynon Road link



6.2.1 Interface with E-Gate

The lowered elevated structure of the Wurundjeri Way extension presents an improved interface with the E-Gate site.

The lower vertical alignment creates less of a visual impact from both existing properties along Railway Place and any future commercial, residential or higher amenity developments in E-Gate. It also maximises city views from E-Gate and reduces the risk of light spillage and overshadowing into future development on the E-Gate site.

The removal of the on and off ramps to the Dynon Road link would also reduce the visual bulk and massing of the structure as it presents to the north-western corner of the E-Gate site and future development. The reduced size and elevation of the elevated structure would also reduce the risk of light spillage and overshadowing on this area of the E-Gate site.

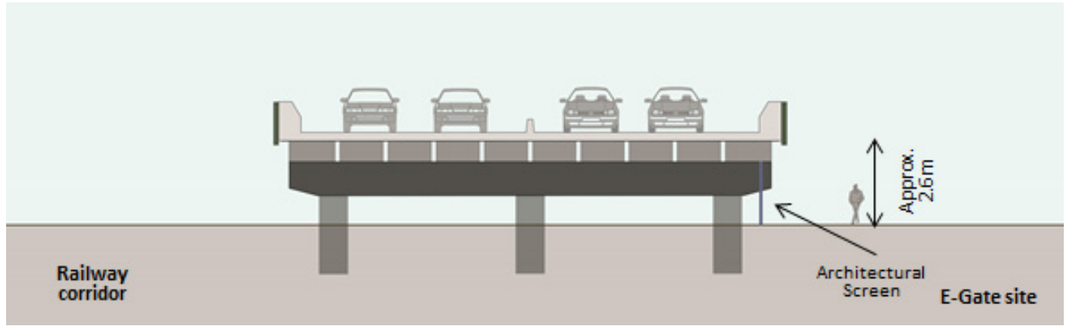
An infill screen wall with architectural cladding would be applied to the undercroft area of the elevated structure (as shown in Figure 6-3 below) along approximately 40% of the northern boundary of the E-Gate site. This would screen the rail corridor from the E-Gate site and address safety and security for the very low space beneath the elevated road deck.

The elevated structure is set back from the northern boundary of the E-Gate site. This provides a potential opportunity for a landscape buffer on the E-Gate site or the VicRoads managed land between the elevated road and E-Gate, which would address both the identity and amenity of the precinct.

The elevated structure is at approximately 2.6 metres from ground to road deck for approximately 40% of the northern E-Gate boundary. The road rises at the southern end of the E-Gate site, to pass over Dudley Street and rises to the north to meet up with the elevated Dynon Road link before clearing the Regional Rail alignment.

In the future, it might be possible to explore land uses under the elevated structure that would be complementary to the development of E-Gate. These could include pedestrian/ cycle paths, car parking, hardscape recreational areas and community and retail buildings below the road deck, improving amenity and vibrancy of the precinct.

Figure 6-3 Indicative typical section through the lowered Wurundjeri Way extension at the lowest point



6.2.2 Vehicle access from the lowered Wurundjeri Way extension to E-Gate

Lowering the elevated road to a lowest level of approximately 2.6 metres above ground level creates the opportunity for future intersection and vehicle access directly from the Wurundjeri Way extension into the E-Gate site. This could include both a signalised intersection and/or left in/left out access ramps from ground level to the elevated structure. This potential access point on the Wurundjeri Way frontage maximises flexibility of master planning for E-Gate and enhances vehicle connectivity.

6.2.3 Connectivity between West Melbourne, E-Gate and Docklands

Lowering the Wurundjeri Way extension provides greater opportunity for an elevated pedestrian/ cycle connection between the North Melbourne railway station, E-Gate and Docklands (Waterfront City). The lower vertical alignment of the road improves accessibility by allowing for potentially shorter ramps for any active transport link and provides flexibility to achieve a *Disability Discrimination Act* compliant design. In addition, the removal of rail stabling lines from underneath the Wurundjeri Way extension , provides the opportunity to have shared use paths cross under the road where sufficient vertical clearance allows. Depending on the crossing point, this avoids the need to have future shared use path connections from E-Gate to West Melbourne to have to cross over the Wurundjeri Way extension on structure.

The North Melbourne railway station provides a probable connection for any future pedestrian/ cycle link from North and West Melbourne. Another possible connection includes an extension of an existing pedestrian link for rail operators accessed from the northern concourse of the North Melbourne railway station to the E-Gate site. These connections and potential alignments (vertical and horizontal) are shown in Figure 6-4 - Figure 6-7 to illustrate the potential benefits of the alternative design to lower the Wurundjeri Way extension.

The Regional Rail Link extends north along Railway Parade from Dudley Street before crossing the metropolitan railway lines at elevation and descending to the north of the E-Gate site. The available information indicates the road deck height of the lowered Wurundjeri Way extension at approximately 2.6 metres above ground level would be lower than the Regional Rail Link rail deck adjacent to North Melbourne railway station, consistent with the requests of Ashe Morgan.

Greater pedestrian/ cycle connectivity improves the amenity and future urban integration of E-Gate with Docklands (Waterfront City) and North and West Melbourne.

6.2.4 Impact on future built form

Lowering the elevated structure also maximises flexibility of built form and public realm on the E-Gate site. With the top of parapet at approximately 4.1 metres above ground level for 40% of the northern boundary, occupants on the second or third floor of any adjacent buildings in E-Gate would be able to see over the structure.

The ground level of any future private open space or public areas in E-Gate could be elevated adjacent to the elevated structure to provide views over the road and existing railway corridor, minimising the visual delineation between the site and the surrounding area.

Figure 6-4 Indicative plan of possible future pedestrian/ cycle connection from North Melbourne railway station to the E-Gate site

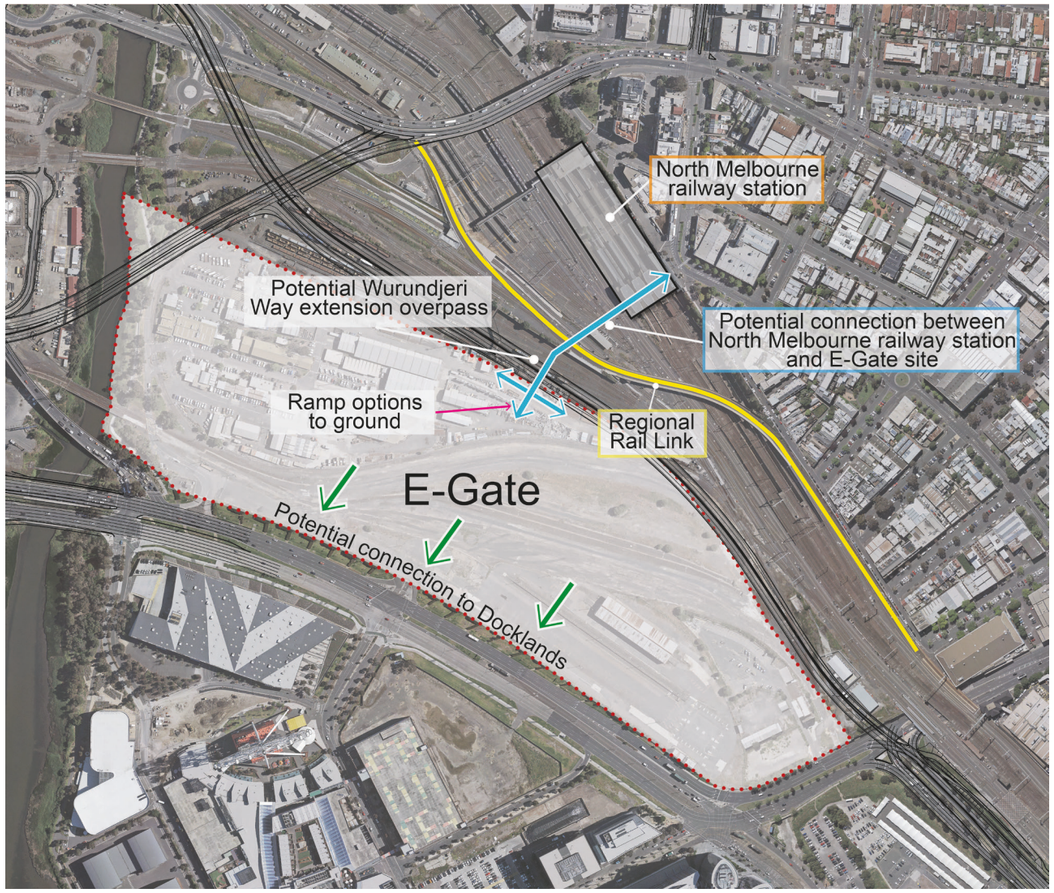


Figure 6-5 Indicative section of possible future pedestrian/ cycle connection from North Melbourne railway station to the E-Gate site

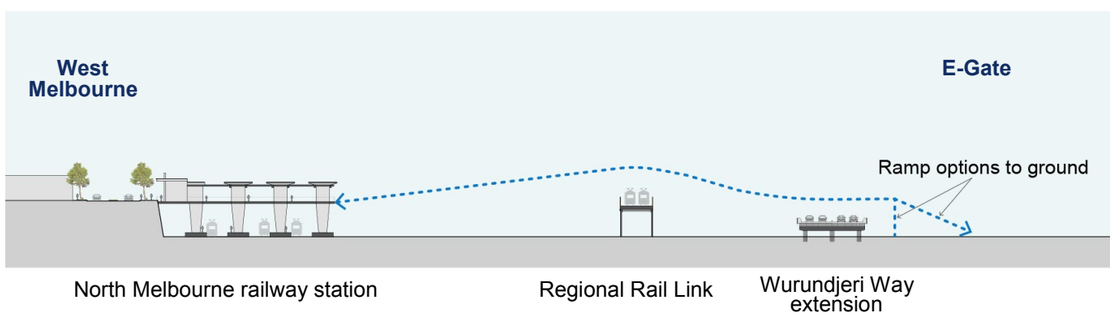


Figure 6-6 Indicative plan of possible future pedestrian/ cycle connection between existing rail operator pedestrian overpass and the E-Gate site

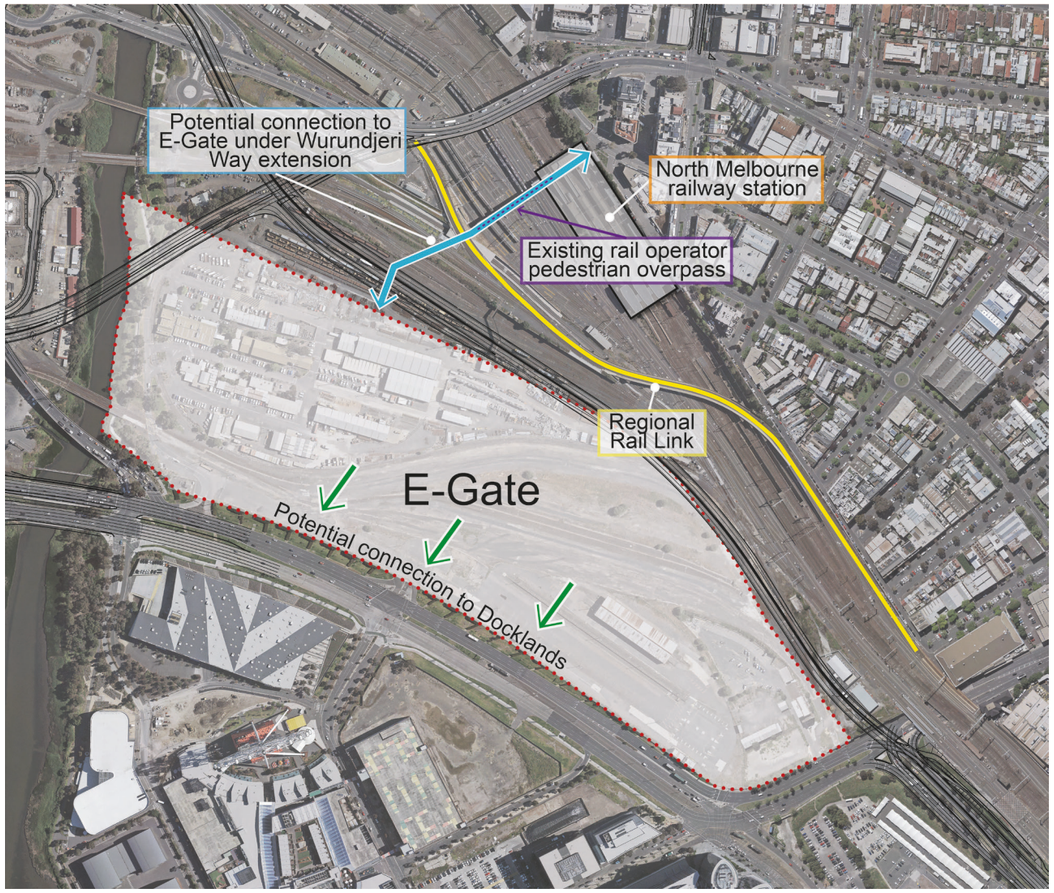
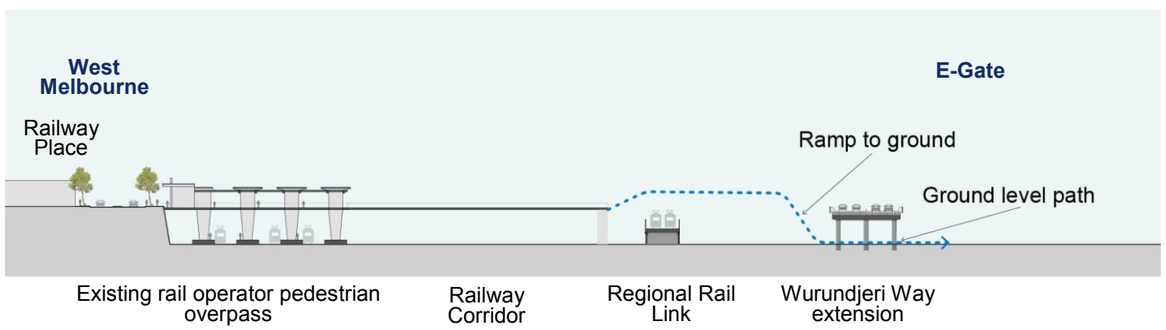


Figure 6-7 Indicative section of possible future pedestrian/ cycle connection between existing rail operator pedestrian overpass and the E-Gate site



7 Impact assessment

7.1 Traffic and transport

7.1.1 Overview

A full traffic and transport impact assessment was prepared for the EES design and provided in Technical Report A *Transport* to the EES. Technical Report A provides an assessment of the existing conditions on the road network in the Port, CityLink and city connections component (and overall for the WGTP). Traffic modelling was undertaken to forecast potential impacts of the conditions in 2031 with and without the project, and the impacts of construction activities was assessed.

The assessment undertaken for this report has focused on the key changes of the alternative design, and any implications of this for the traffic and transport impacts identified and assessed in Technical Report A *Transport.* Overall, the lowering of Wurundjeri Way has negligible implication for the effects on traffic and transport of the WGTP.

7.1.2 Relevant changes to EES design

With the lowering of Wurundjeri Way, the following aspects of the design are relevant in considering the potential traffic and transport impacts of the alternative design:

- Traffic movement and performance related to changes in grade and changes to the intersection of the lowered Wurundjeri Way extension and Dynon Road link
- Potential for direct vehicular access into a developed E-Gate site from the lowered Wurundjeri Way extension
- Design opportunities for active transport connections
- Construction methodology including haulage.

These elements have been considered in the sections below. The alternative design does not result in any changes to the strategic transport modelling of traffic volumes undertaken for the EES.

7.1.3 Method

The assessment undertaken of the alternative design has included the following aspects:

- Review of proposed design geometry and alignment
- Performance analysis of the intersection of the lowered Wurundjeri Way extension and Dynon Road link using VISSIM (see Attachment D)
- Consultation with VicRoads and Transport for Victoria (refer section 4)
- Consideration of opportunities for typical access connections for vehicles and active transport
- Consideration of alternative design structure in relation to typical construction methodologies
- Drawing conclusions of the impacts of the design alternative based on the above quantitative and qualitative assessment
- Consideration of any requirement for additional mitigation or management as a result of these conclusions.

7.1.4 Assessment results

Traffic movement and performance

No change to traffic volumes is forecast as a result of the lowering of the Wurundjeri Way extension. There are no anticipated changes of note for the origin-destination movements due to the reduction in service level being very minor and still making this route a far more attractive option than the alternative of Dynon Road/ Spencer Street.

A performance analysis has been completed for the new intersection of Wurundjeri Way and Dynon Road link. This analysis is provided in Attachment D.

The analysis has found that the intersection would cause a reduction in the 'free flow' along Wurundjeri Way as it approaches its connection to Dynon Road, resulting in a slight performance reduction with some increases in delays on the Wurundjeri Way extension and Dynon Road connection.

During the AM peak, there is a relatively minor impact to the Dynon Road traffic compared to the EES design. There is an increase in delay to Wurundjeri Way extension traffic due to the road no longer being grade separated. There is an increase in delay of 15 to 17 seconds per vehicle to the Dynon Road link traffic in traversing both intersections.

During the PM peak, there is a slight reduction in delay to the Dynon Road traffic as a result of the required changes to the signal offsets. There is an increase in delay to Wurundjeri Way extension traffic due to the road no longer being grade separated. There is an increase in delay of 25 to 26 seconds per vehicle to the Dynon Road link traffic in traversing both intersections.

Both the intersections at Wurundjeri Way extension / Dynon Road link and Dynon Road / Dynon Road link and all approaches to the intersections operate at or better than Level of Service D, meeting the project performance level of a minimum of Level of Service D.

These increases in delays due to the full signalisation of this intersection may result in some vehicles diverting away from the lowered Wurundjeri Way extension back onto Footscray Road if there is a perception of an improved alternative. However, the capacity of the Footscray Road/Dudley Street/Harbour Esplanade/Docklands Drive intersection and the Dudley Street/Wurundjeri Way intersection would limit any diversions.

The predicted delays may also reduce the number of vehicles diverting from Dynon Road onto Wurundjeri Way, which may impact on the operation of Dynon Road link. However again, the capacity of the Dynon Road/ Dryburgh Street intersection would limit any diversions.

Grades for the lowered Wurundjeri Way extension would be reduced providing performance and safety improvements, particularly for trucks.

An overpass would be more desirable than an intersection from a safety perspective, but this would be managed through standard design and operation measures to reduce safety risks. The improved grades would also result in safer ascents and descents, particularly for trucks.

VicRoads is satisfied that the traffic performance for individual intersections meets the project objective – minimum Level of Service D, and that traffic performance for the adjacent arterial road network operates satisfactorily and within performance requirements (refer section 3).

Active transport

Assessment of the existing walking and cycling network in the EES Technical Report A *Transport* identified a number of missing links and connections with the existing network, including limited connectivity between North Melbourne and Docklands with the Dudley Street route being undesirable to pedestrians.

Removing the rail stabling lines and lowering the Wurundjeri Way extension provides greater opportunity for an elevated pedestrian/ cycling bridge between the North Melbourne railway station, E-Gate and Docklands (Waterfront City) and for crossing under Wurundjeri Way extension where sufficient vertical clearance is available. The lower vertical alignment of the road improves accessibility by allowing for shorter ramps for any active transport link and provides flexibility to achieve a *Disability Discrimination Act 1992* compliant design. Greater pedestrian/ cycle connectivity options provides improved opportunities to address the existing walking and cycling connectivity limitations.

Future connectivity

As outlined in section 6 above, lowering the elevated road to approximately 2.6 metres above ground level creates the opportunity for a future intersection with vehicle access directly from the lowered Wurundjeri Way extension into the E-Gate site. This could include both a signalised intersection and/or left in/left out access ramps from ground level to the elevated structure. A potential access point to the Wurundjeri Way frontage may or may not be appropriate depending on the form of future development on the E-Gate site, however the lowering of the Wurundjeri Way extension would provide enhanced opportunities to consider options as part of future master planning for E-Gate.

Construction

The alternative design may require minor adjustment to the construction methodology. This would be confirmed through detailed design but the lowered structure design may require additional pier supports, a number of which would be lower. The construction activity involved with the alternative design would be generally the same as for the EES design. No change to construction traffic movements associated with construction of the lowered Wurundjeri Way extension is anticipated compared to the EES design.

7.1.5 Mitigation and management

The EES recommended a number of traffic and transport Environmental Performance Requirements (EPRs) for the WGTP, including the development and implementation of Construction Traffic Management Plans, and consideration of a number of matters as part of detailed design.

Based on the assessment undertaken, the EPRs for the EES design remain relevant and no additional mitigation or management measures are necessary for the alternative design.

7.1.6 Conclusion

The EES traffic and transport impact assessment found that the risk of adverse traffic impacts as a result of the construction and operation of the port, CityLink and city connections component of the project would be reduced to low following the implementation of the recommended EPRs.

The lowering of Wurundjeri Way results in similar traffic and transport impacts as the EES design with no substantive change in relation to traffic movement, network performance or construction impacts. Enhanced opportunities are created for future options for both active transport connections and accessibility into the E-Gate site.

7.2 Air quality

7.2.1 Overview

A full air quality impact assessment was prepared for the EES design and provided in Technical Report G *Air quality* to the EES. The purpose of the assessment in this report is to evaluate the alternative design to lower the Wurundjeri Way extension compared to the EES design to provide qualitative assessment in relation to associated air quality impacts.

7.2.2 Method

The qualitative assessment was undertaken on advice that the strategic traffic volumes on the lowered Wurundjeri Way extension and the wider network in the vicinity, including in North Melbourne and West Melbourne are unchanged compared to the EES design.

The method used to undertake this assessment involved:

A preliminary qualitative assessment was conducted using Victorian regulatory model AUSROADS. AUSROADS models road types as either:

- at grade – ground level
- bridge – elevated structure up to 10 metres above ground level
- depressed – cutting up to 10 metres deep
- fill – elevated road up to 10 metres high

Two modelling scenarios were considered as follows:

- Scenario 1 – Elevated road (10 metres above ground level)
- Scenario 2 - At grade road

For the scenarios above, ‘bridge’ and ‘at grade’ were selected for road types.

The key assumptions made in undertaking this assessment are as follows:

- Vehicle volumes and emission factors specified in Technical Report G of the EES for Wurundjeri Way extension were applied.
- Only PM_{10} was considered.
- Tyre and brake wear emissions were not considered.
- Elevated roads were modelled at a height of 10 metres above ground level.

The potential impacts of the design options for the E-Gate site have not been assessed because the locations and nature of the development on this site are unknown.

7.2.3 Sensitive receptors

The closest sensitive receptors that are relevant to this assessment are the residences located on Railway Place in West Melbourne between Festival Hall and the North Melbourne railway station.

These receptors, at their closest point, are approximately 120 metres from the alignment of the lowered Wurundjeri Way extension. The land between the residences on Railway Place and the lowered Wurundjeri Way extension is occupied by Railway Place, metropolitan railway lines and regional railway lines.

This strip of residences is elevated especially at the northern end of Railway Place. Most of the residences are single storey although some double and three storey dwellings are also present.

7.2.4 EES findings

The findings of the EES assessment of air quality are presented in Technical Report G *Air quality* that was exhibited with the EES.

Air quality impacts associated with the lowered Wurundjeri Way extension were not included in Technical Report G that was exhibited with the EES as the predicted change in traffic volumes on Railway Place were insufficient to model the impact of vehicle emissions on residences or other sensitive receptors.

7.2.5 Assessment results for the lowered design

As it has been assumed that strategic traffic volumes are unchanged in North Melbourne and West Melbourne, no additional assessment has been undertaken and the impacts on residences and other sensitive receptors on arterial roads in these areas are assumed to be unchanged compared to the EES design.

A comparative preliminary assessment was conducted to assess any differences between the two scenarios ‘elevated road’ (EES design) and ‘at grade road (lowered design)’.

The preliminary assessment found that:

- PM_{10} concentrations for the ‘at grade road’ scenario were approximately 1.5 times higher than the ‘elevated road’ scenario close to the roadway (10 metres)
- PM_{10} concentrations for the ‘at grade road’ dropped off significantly within the first 25 metres from the roadway
- PM_{10} concentrations for both the ‘at grade road’ and ‘elevated road’ scenario were approximately the same at a distance of 80 metres and beyond from the road.

7.2.6 Conclusion

On the basis of the assessment undertaken it is concluded that a comparison of the two modelling scenarios for the elevated and at grade road shows there is likely to be no appreciable difference in PM_{10} pollutant concentrations at the closest sensitive receptors.

7.3 Noise and vibration (surface)

7.3.1 Overview

A full air quality impact assessment was prepared for the EES design and provided in Technical Report H *Noise and vibration (Surface)* to the EES. The purpose of this assessment is to evaluate the alternative design to lower the Wurundjeri Way extension compared to the EES design.

7.3.2 Method

The noise assessment was undertaken on advice that the strategic traffic volumes on the lowered Wurundjeri Way extension and the wider network in the vicinity, including in North Melbourne and West Melbourne are unchanged compared to the EES design.

The method used to undertake this assessment involved:

- Manual realigning the 3D vertical geometry in accordance with the design drawings provided
- Generation of updated noise modelling scenarios for the design year (ten years after project opening) and incorporates the updated road alignment for the lowered Wurundjeri Way extension
- Noise levels for each sensitive building in the model have been calculated with a receptor point positioned one-metre in front of the most exposed façade of the building at the lowest habitable floor of the building
- Predicted noise levels have been compared to the design that was exhibited as part of the EES.

The key assumptions made in undertaking this assessment are as follows:

- Both existing and project roads were in operation for the 2031 design year
- The number of lanes and concrete safety barriers would remain the same regardless of the relative vertical geometry of the alternative design option.
- The same traffic volumes for the lowered Wurundjeri Way extension at the design year (2031) apply
- Proposed sign posted traffic speeds would remain the same for the alternative design
- The maximum gradient of the lowered Wurundjeri Way extension would be capped at 4% for all options
- The noise barrier installed along Railway Place as part of the Reginal Rail Link would remain after construction.

The potential impacts of the design options for the E-Gate site have not been assessed because the locations and nature of the development on this site are unknown.

7.3.3 Sensitive receptors

The closest sensitive receptors that are relevant to this assessment are the residences located on Railway Place in West Melbourne between Festival Hall and the North Melbourne railway station as discussed in section 7.2.3 above.

7.3.4 EES findings

The findings of the EES assessment of noise are presented in Technical Report H *Noise and vibration (surface)* that was exhibited with the EES.

The technical report characterised existing noise conditions at Railway Place as follows:

- Existing noise levels measured at 84 Railway Place, West Melbourne were approximately 60dB(A) $L_{A10(18hr)}$
- Sources contributing to the noise level in this area include the nearby metropolitan and freight rail corridors, stabling yards, commercial and industrial activity and local traffic.

The assessment of noise impacts at Railway Place was based on predictive modelling. The key findings of the assessment in relation to Railway Place were as follows:

- The highest predicted noise levels at buildings from Railway Place to Anderson Street were up to 63 dB(A) for the design year when considering the contribution from both project and existing roads.
- The road traffic noise levels are predicted to comply with the noise criterion of 63dB(A) $L_{10(18hr)}$ at Category A receptors when considering all major road traffic noise sources within the nearby area in addition to the EPR NVP1 requirements.
- An increase of approximately 3 dB(A) was noted as a result of the project when compared to the 2031 *no project* situation.

7.3.5 Assessment results

As the strategic traffic volumes are unchanged in North Melbourne and West Melbourne, the impacts on residences and other sensitive receptors on arterial roads in these areas are undiscernible compared to the EES design. Accordingly, this assessment is focussed on the receptors located on Railway Place in close proximity to the east of the Wurundjeri Way extension.

The lowered road is predicted to make no noticeable difference to the noise at buildings located on Railway Place.

In addition, the construction methodology is to use Open Graded Asphalt (OGA) for the Wurundjeri Way extension which is typically referenced as a road surface that is 2 to 3 dB quieter than dense graded asphalt.

7.3.6 Conclusion

On the basis of the assessment undertaken it is concluded that there will be no noticeable difference to traffic noise impacts from the lowered Wurundjeri Way extension compared to the EES design for noise sensitive buildings on Railway Place.

8 Conclusion

8.1 Overview

The proposed lowering of the Wurundjeri Way extension between Dynon Road and Dudley Street is consistent with and responds to the urban design principles. It provides a more responsive, high quality urban design outcome and increased benefits to both the E-Gate site and surrounding area. It seeks to protect and enhance the function, connectivity and character of the evolving urban environment consistent with the relevant evaluation objectives and principles of *Transport Integration Act 2010*.

The alternative design to lower the Wurundjeri Way extension and incorporate an intersection with the Dynon Road link instead of an overpass with ramp connections, and with rail stabling lines removed from underneath the road, provides a demonstratively superior outcome while further minimising the environmental effects of the WGTP and facilitates greater transit connectivity options.

8.2 Benefits of alternative design – align with any earlier updates

This section summarises the key benefits to the lowering of the Wurundjeri Way extension which directly respond to the issues raised during the EES exhibition and IAC hearings. The alternative design provides the following key benefits:

- Provides for an improved interface between the E-Gate site and existing railway corridor
- Offers flexibility for a high quality urban design response to maximise the future development potential of the E-Gate site and its integration with the surrounding evolving urban environment
- Provides greater opportunity for a pedestrian/ cycling connection between the North Melbourne railway station, E-Gate and Docklands (Waterfront City)
- Provides future potential for vehicle access directly to the lowered Wurundjeri Way extension from E-Gate
- Minimises the potential for light spillage or overshadowing to diminish the amenity of future commercial, residential or higher amenity uses of the E-Gate site.

The key benefits are discussed under the themes; improved interface and safety, flexibility for future urban design outcomes and improved connectivity opportunities and noise outcomes.

8.2.1 Improved interface and safety

The lowered and narrower elevated structure of the lowered Wurundjeri Way extension presents an improved interface with the E-Gate site. It creates less of a visual impact from both existing properties along Railway Place and any future developments in E-Gate. It also maximises city views from E-Gate and reduces the risk of light spillage and overshadowing into future development on the E-Gate site.

The elevated structure is set back from the northern boundary of the E-Gate site. This provides a potential opportunity for a landscape buffer along the E-Gate site or the VicTrack managed land between the elevated road and E-Gate, which would address both the identity and amenity of the precinct.

In the future, it might be possible to explore land uses under the elevated structure that would be complementary to the development of E-Gate. These could include pedestrian/ cyclist paths, car parking, hardscape recreational areas and community and retail buildings below the viaduct, improving amenity and vibrancy of the precinct.

The architectural screens addresses safety and security for the very low space beneath the elevated Wurundjeri Way extension.

Lowering the elevated structure minimises the potential for light spillage or overshadowing to diminish the amenity of future commercial, residential or higher amenity uses of the E-Gate site.

8.2.2 Flexibility for future urban design outcomes

The alternative design offers flexibility for a high quality urban design response to maximise the future development potential of the E-Gate site and its integration with the surrounding evolving urban environment. With the lowered road occupants on the second or third floor of any future adjacent buildings in E-Gate would be able to see over the structure.

Alternatively, future commercial or residential buildings could employ podium car parking at the lower levels, similar to other developments in Docklands, to provide clear sightlines over the Wurundjeri Way extension towards the central city, North and West Melbourne.

Also, the ground level of any future private open space or public areas in E-Gate could be elevated adjacent to the elevated structure to provide views over the road and existing railway corridor, minimising the visual delineation between the site and the surrounding area.

8.2.3 Improved connectivity opportunities

The lowering of the Wurundjeri Way extension provides greater opportunity for future pedestrian/ cycling connection between the North Melbourne railway station, E-Gate and Docklands (Waterfront City). The lower vertical alignment of the road improves accessibility by allowing for shorter ramps for any active transport link and provides flexibility to achieve a *Disability Discrimination Act* compliant design. The removal of the rail stabling lines from under the extension actively facilitates ground level crossings under the road where sufficient clearance allows.

The alternative design to lower the elevated road to approximately 2.6 metres above ground level creates the opportunity for future intersection and vehicle access directly from the Wurundjeri Way extension into the E-Gate site. This could include both a signalised intersection and/ or left in/ left out access ramps from ground level to the elevated structure

8.3 EES Scoping Requirements

This section provides an assessment of the lowering of the Wurundjeri Way extension against relevant evaluation objectives of the EES Scoping Requirements.

8.3.1 Transport capacity, connectivity and traffic management

Evaluation objective: *To increase transport capacity and improve connectivity to and from the west of Melbourne and, in particular, to increase freight movement via the freeway network instead of local and arterial roads, while adequately managing effects of the works on the existing broader and local transport networks, including road, public transport, cycling and pedestrian transport networks.*

Response: The lowering of the Wurundjeri Way extension provides future vehicle access opportunities from the elevated structure directly into E-Gate without impacting the operation of the existing railway corridor. The alternative design is enabled by the permanent relocation of the V/Line stabling yards to the South Dynon railway area west of Moonee Ponds Creek. Furthermore, a lower structure abutting the northern boundary of the E-Gate site would facilitate future pedestrian/ cycling links between North Melbourne railway station, E-Gate and Docklands (Waterfront City).

8.3.2 Built environment

Evaluation objective: *To protect and enhance the function and character of the evolving urban environment including built form and public realm within the immediate and broader context of the project works.*

Response: The alternative design provides flexibility for the future development of the E-Gate site to achieve a high quality urban design outcome which integrates with the surrounding evolving urban environment. As indicated as a key benefit of the alternative design, the lowered grade-line supports a range of design responses for the E-Gate site to facilitate improved visual, pedestrian/ cycling, and vehicle connections to surrounding areas including West Melbourne and Docklands (Waterfront City).

8.3.3 Health, amenity and environmental quality

Evaluation objective: *To minimise adverse air quality, noise and vibration effects on the health and amenity of nearby residents, local communities and road users during both construction and operation of the project.*

Response: The lowering of the Wurundjeri Way extension at its intersection with the E-Gate site and adjacent to Railway Place, would increase the separation to existing or any future noise sensitive developments and improve overall amenity and environmental quality. It is not anticipated that the alternative design would provide any measurable changes in air quality.

8.3.4 Social, business, land use, public safety and infrastructure

Evaluation objective: *To minimise adverse effects on the social fabric of the community, including with regard to community cohesion, access to community services and facilities, business functionality, changes to land use, public safety and access to infrastructure.*

Response: The alternative design provides greater opportunity for pedestrian/ cycling connection between the North Melbourne railway station, E-Gate and Docklands (Waterfront City) and would support future initiatives for improved community cohesion and access to social, business, land use, public safety and associated infrastructure.

8.3.5 Landscape, visual and recreational values

Evaluation objective: *To minimise adverse effects on landscape, visual amenity and recreational and open space values and to maximise the enhancement of these values where opportunities exist.*

Response: The lowering of the Wurundjeri Way extension would minimise the visual impact from multi-storey residential buildings in West Melbourne and lower habitable levels of any future residential developments in the E-Gate site. It also maximises city views from E-Gate and reduces the risk of light spillage and overshadowing into future development on the E-Gate site.

The elevated structure is set back from the northern boundary of the E-Gate site. This provides a potential opportunity for a landscape buffer on the E-Gate site or the VicRoads managed land between the elevated road and E-Gate, which would address both the identity and amenity of the precinct.

8.4 Transport Integration Act

The *Transport Integration Act 2010* (the TIA) aims to support the development of an integrated and sustainable transport system in Victoria that contributes to an inclusive, prosperous and environmentally responsible State. The Minister for Planning must consider the transport system objectives and decision making principles set out in the Act in making his assessment of the WGTP EES and draft planning scheme amendment.

The six objectives for the transport system defined in the TIA relate to the following aspects, with the first four objectives closely interrelated:

- Social and economic inclusion
- Economic prosperity
- Environmental sustainability
- Efficiency, coordination and reliability
- Integration of transport and land use
- Safety and health and wellbeing

The EES includes an assessment of the WGTP against the principles and objectives of the TIA in Chapter 9.4 of Volume 1 of the Main Report. The lowering of Wurundjeri Way does not alter the overall assessment of the features of the project that provide consistency with the principles and objectives.

The following sections provide comment on the lowering of the Wurundjeri Way extension providing the opportunity to enhance how the project addresses the objectives of the TIA.

8.4.1 Social and economic inclusion, economic prosperity, environmental sustainability, efficiency and reliability

As for the WGTP overall, the alternative design would continue to be designed and constructed in the context of the project's sustainability principles, including climate resilience, energy efficiency, sustainable waste management, and reducing greenhouse gas emissions.

The lowering provides opportunities to improve the amenity for local places in the vicinity of the lowered Wurundjeri Way alignment and to enhance opportunities for walking and cycling connections between areas north and south of the lowered Wurundjeri Way extension including North Melbourne, E-Gate and Docklands.

8.4.2 Integration of transport and land use

The WGTP has been developed giving consideration to the need to integrate transport and land use planning. The alternative design to lower the Wurundjeri Way extension provides the opportunity to further enhance connectivity and accessibility in this particular location, including with the E-Gate site.

8.4.3 Safety and health and wellbeing

The alternative design to lower the Wurundjeri Way extension has been developed giving consideration to safety. The EES has considered risks to human health associated with the project and the findings of the human health assessment in the EES remain unchanged.

Attachment A – Minister for Planning letter

Hon Richard Wynne MP

Minister for Planning

8 Nicholson Street
East Melbourne, Victoria 3002
Telephone: 03 8683 0964
DX210098

Mr Peter Sammut
Chief Executive Officer
Western Distributor Authority
GPO Box 4509
MELBOURNE VIC 3001

Ref: MBR034974

Dear Mr Sammut

WEST GATE TUNNEL PROJECT ENVIRONMENT EFFECTS STATEMENT

I refer to the matter above.

I confirm that I am currently in the process of considering and preparing my assessment of the environmental effects of the West Gate Tunnel Project (**Project**) pursuant to section 4(1) of the *Environment Effects Act 1978* (**Assessment**).

I request that the Western Distributor Authority provide additional information regarding particular matters which may assist me to make my Assessment. These matters are as follows:

- Information and review in relation to the potential option of lowering the Wurundjeri Way extension component of the Project and modifying the Dynon Road link cross section.
- Information or assessment in relation to the potential environmental effects of lowering the Wurundjeri Way extension component of the Project and modifying the Dynon Road link cross section.

I request that this information be provided as soon as possible.

Please do not hesitate to contact Dr Bruce Abernethy, Director Impact Assessment, by telephone (03 8392 5471) or email bruce.abernethy@delwp.vic.gov.au) should you have any queries in relation to this request.

Yours sincerely

HON RICHARD WYNNE MP
Minister for Planning

8 / 11 / 17

VICTORIA
State Government

Attachment B – Transport for Victoria and VicRoads letters

TRANSPORT FOR VICTORIA | Economic Development, Jobs, Transport and Resources

GPO Box 4509
Melbourne VIC 3001 Australia
Telephone: 03 9651 9999
transport.vic.gov.au
DX 210074

Ref:

Mr Peter Sammut
Chief Executive Officer
Western Distributer Authority
Level 26
80 Collins Street
MELBOURNE VIC 3000

Dear Mr ~~Sammut~~ Peter,

WEST GATE TUNNEL PROJECT
ALTERNATIVE STABLING AND WURUNDJERI WAY EXTENSION

Thank for your letter dated 14 November 2017, regarding the alternative stabling as a result of the West Gate Tunnel Project, and the Change Alert dated 13 November 2017, regarding the project scope that TfV has previously approved.

TfV has been involved in ongoing discussion with the Western Distributer Authority (WDA), V/Line, VicTrack and other stakeholders regarding the West Gate Tunnel Project and the impacts on rail operation on the E-Gate and Dynon areas.

As a result of these discussions, and based on the advice of my team, I, as Head Transport for Victoria, approve the Change Alert.

Resulting from this Change Alert, I am happy that the replacement of the train stabling at E-Gate will be accommodated at the South Dynon precinct, largely consistent with the functional layout shown the Change Alert document. This will allow the construction of future scope consistent with the stabling and maintenance strategy.

I also understand that these works will be undertaken by a State agency other than WDA. The funding contribution from WDA, will be on the basis of the scope outlined in the Change Alert.

Please note that this advice supersedes earlier directions that were provided in the TfV letter dated 11 January 2017. If you have any further questions, please contact David Silvester, Deputy Secretary, Network Planning on 8392 7973.

Yours sincerely

Gillian Miles
Head, Transport for Victoria
16 / 11 / 17

VICTORIA State Government

vicroads

Mr Peter Sammut
Chief Executive Officer
Western Distributor Authority
Level 26, 80 Collins Street
Melbourne VIC 3000

Deputy Chief Executive
60 Denmark Street
Kew Victoria 3101

Ref: 11509426

15 November 2017

Dear Peter

RE: WEST GATE TUNNEL PROJECT - WURUNDJERI WAY LOWERING

Thank you for your letter dated 14 November 2017 relating to the proposed lowering of Wurundjeri Way Extension (WWE), including the conversion of the proposed grade-separated WWE/Dynon Road link interchange to an at-grade signalised intersection, as part of the West Gate Tunnel EES.

As part of VicRoads submission to the Inquiry and Advisory Committee (IAC), VicRoads had previously expressed support for the lowering of the Wurundjeri Way Extension adjacent to E-Gate subject to the resolution of the issue of rail stabling and maintaining the proposed lane capacity and functionality of WWE.

Following careful consideration of your revised proposal, and balancing the needs of the community in conjunction with the important network role of a future Wurundjeri Way Extension as a limited access arterial, VicRoads has no objection to the the lowering of Wurundjeri Way Extension (WWE), including the conversion of the proposed grade-separated WWE/Dynon Road link interchange to an at-grade signalised intersection as outlined in your letter.

VicRoads would be pleased to continue to work collaboratively with the Western Distributor Authority on this matter. Should you have any further queries, Agnelo Duarte, VicRoads Director Project Integration (Tel: 0413283927) would be pleased to continue to assist.

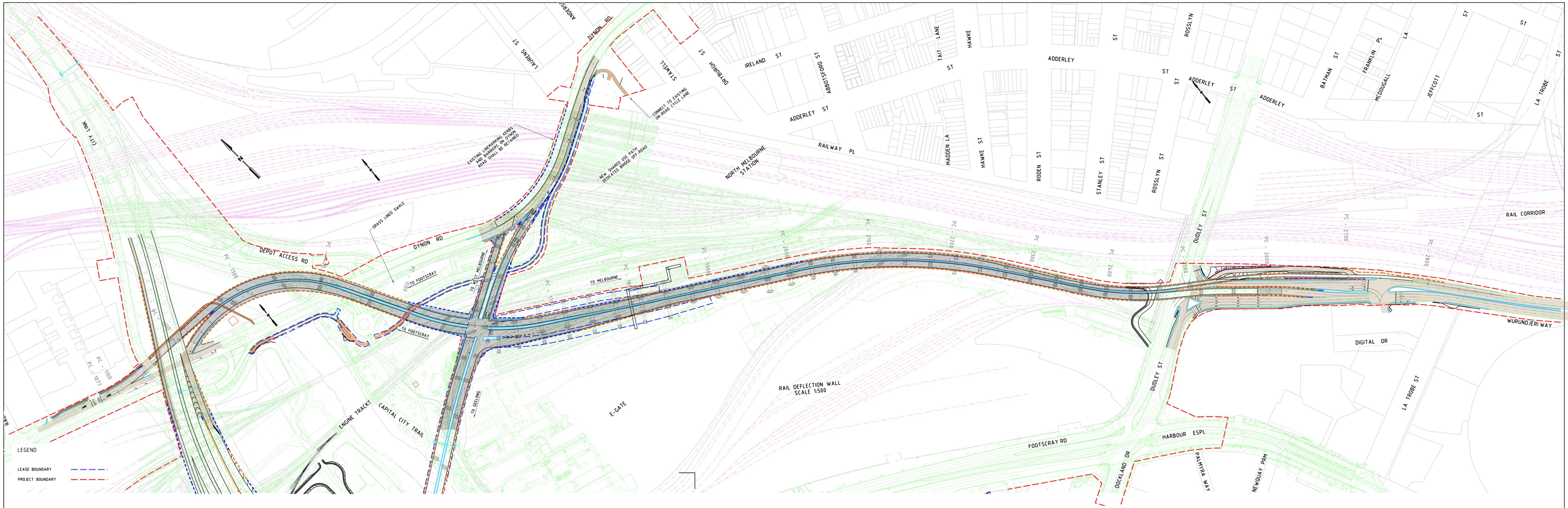
Yours sincerely

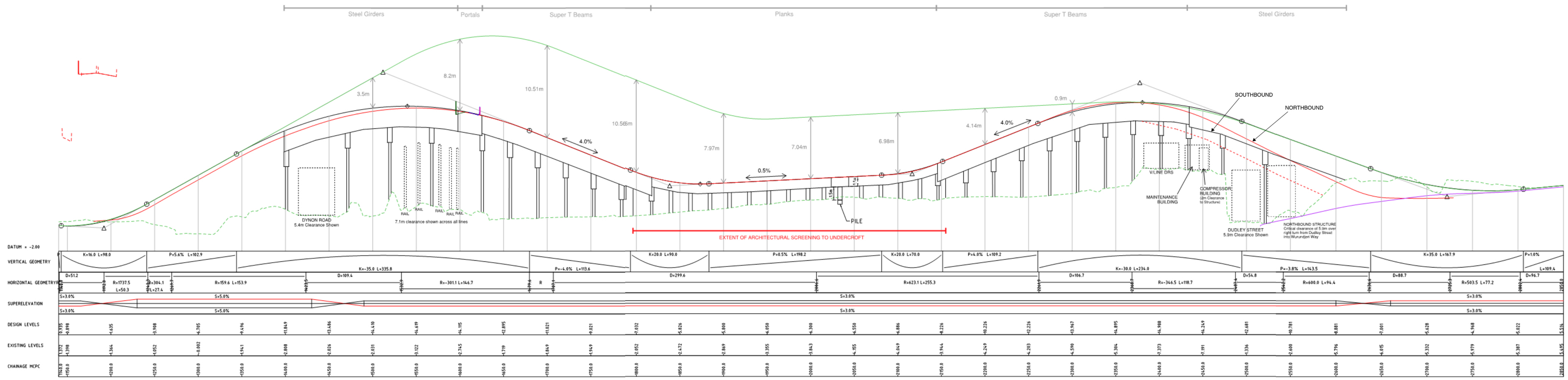
PETER TODD
DEPUTY CHIEF EXECUTIVE

vicroads.vic.gov.au

VICTORIA State Government

Attachment C – Design drawing





DYNON ROAD TO WURUNDJERI WAY - SOUTHBOUND - MCPC

NOTES:
1. SECTION LINE IS DRAWING ALONG THE DESIGN STRING LINE WHICH IS NOT THE LOWEST POINT ON THE STRUCTURE. CLEARANCE EVELOPES INDICATED MAY NOT SHOW CLOSEST POINT OF CLEARANCE TO STRUCTURE
2. INDICATIVE STRUCTURE LINES ARE DRAWN FOR THE SOUTHBOUND ALIGNMENT

STRUCTURES INDICATIVE ONLY - DO NOT SCALE

PRELIMINARY

PROJECT: WEST GATE TUNNEL PROJECT
SECTION: M80 INTERCHANGE TO CITYLINK
DRAWN | DRAFTING CHECK | PEER REVIEW | DESIGN MANAGER
DESIGNED | TEAM LEADER

TITLE: WURUNDJERI WAY EXTENSION
AT GRADE ALIGNMENT
SHEET 01 OF 01

SCALE 1:2000 | DRAWING No WGT-800-018-SKT-AJV-1009-002 | REV E

A1

MICROSTATION

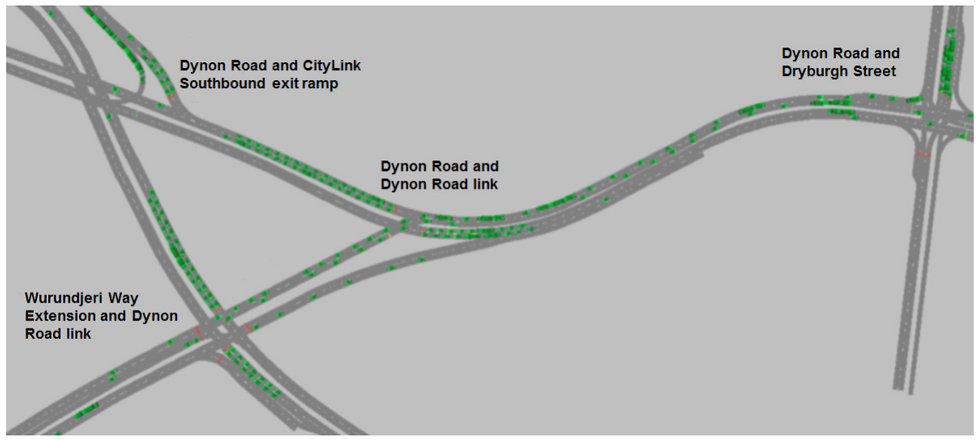
Attachment D – Traffic performance analysis

Introduction

A traffic performance assessment of an elevated option for the intersection of Wurundjeri Way extension and the Dynon Road link has been undertaken. The purpose of this assessment is to understand the impact of signalising all movements at this intersection compared to the EES design which has the Wurundjeri Way Extension grade separated over the Dynon Road link. The VISSIM microsimulation model developed for the EES has been used for the assessment.

Two intersections have been assessed due to their close proximity, these being the Dynon Road/ Dynon Road link and the Wurundjeri Way extension/ Dynon Road link. The study area is shown in Figure C-1.

Figure C-1: Study area



Analysis

The AM and PM peak periods were assessed against the EES results to determine the impact of the full signalisation of the Wurundjeri Way extension/Dynon Road link intersection. The results for each peak period is summarised below.

AM peak

The following points summarise the AM peak results comparing the EES design and the alternative design:

Dynon Road/ Dynon Road link intersection

- There is an increase in average delay for the Dynon Road city bound traffic of 8 to 9 sec/veh (compared to the EES design).
- There is a decrease in average delay for the Dynon Road outbound traffic of 2 sec/veh (compared to the EES design).
- There is a decrease in average delay for the Dynon Road link city bound traffic of 12 to 14 sec/veh (compared to the EES design).
- Overall delay at the intersection is similar for both options.

Wurundjeri Way extension/ Dynon Road link intersection

- There is an increase in average delay for the Wurundjeri Way extension city bound traffic of 25 to 28 sec/veh (compared to no delay for the EES design).
- There is an increase in average delay for the Wurundjeri Way extension out bound traffic of 30 sec/veh (compared to no delay for the EES design).
- There is an increase in average delay for the Dynon Road link city bound traffic of 27 to 31 sec/veh (compared to the EES design).
- There is an increase in average delay for the Dynon Road link outbound traffic of 20 to 23 sec/veh (compared to the EES design).
- There is an increase in the overall average delay of the intersection of 23 to 24 sec/veh.

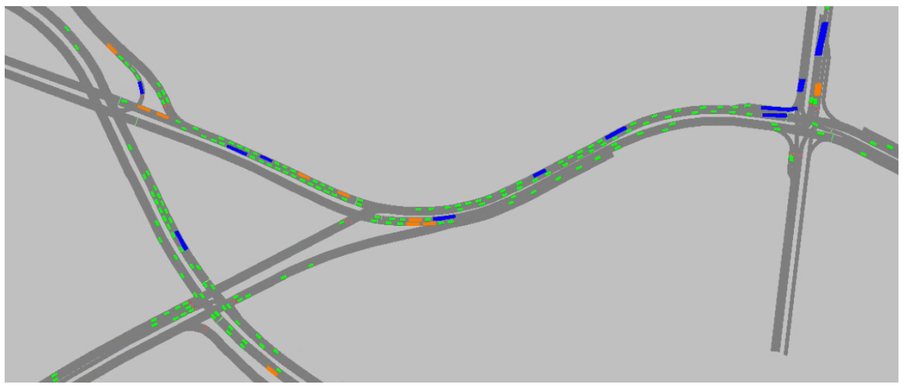
AM peak performance

Overall during the AM peak period comparing the EES design to the alternative design:

- There is a relatively minor impact to the Dynon Road traffic.
- There is an increase in delay to Wurundjeri Way extension traffic due to no longer being grade separated.
- There is an overall increase of 15 to 17 sec/veh in delay to the Dynon Road link traffic in traversing both intersections. This is predominantly due to the required changes to the signal offsets between the two intersections to give priority to Wurundjeri Way extension which results in the Dynon Road link receiving less signal priority.
- At the Dynon Road/ Dynon Road link intersection, the 95th percentile queue length on the Dynon Road link city bound approach reduces compared to the EES results, as the queue is moved back to the intersection with the Wurundjeri Way extension.
- Both intersections and all approaches operate at or better than Level of Service D for both options.

A screen shot of the network performance during the AM peak is shown in Figure C-2. The results of the AM peak are shown in tables C – 1 to C – 4 below.

Figure C – 2 : Screen shot at AM peak



AM peak results – EES grade separated design

Table C – 1: Dynon Road/ Dynon Road link Intersection results

	7 am to 8 am				8 am to 9 am			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road west	17	B	1,000	101	20	B	1,130	109
Dynon Road link citybound	26	C	800	119	24	C	970	122
Dynon Road east	12	B	1,090	76	12	B	1,200	88
All movements	**17**	**B**	**2,890**		**18**	**B**	**3,300**	

Table C – 2: Wurundjeri Way extension/ Dynon Road link Intersection results

	7 am to 8 am				8 am to 9 am			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road link citybound	5	A	1,120	82	5	A	1,340	74
Wurundjeri Way Extension exit ramp	8	A	10	5	9	A	20	6
Dynon Road link outbound	24	C	420	54	22	C	460	76
All movements	**10**	**B**	**1,550**		**9**	**A**	**1,820**	

AM peak results – Alternative design

Table C – 3 - Dynon Road/ Dynon Road link Intersection results

	7 am to 8 am				8 am to 9 am			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road west	26	C	990	125	28	C	1,150	149
Dynon Road link citybound	12	B	790	88	12	B	970	72
Dynon Road east	10	B	1,080	94	10	A	1,220	76
All movements	**16**	**B**	**2,860**		**17**	**B**	**3,340**	

Table C – 4 - Wurundjeri Way extension/ Dynon Road link Intersection results

	7 am to 8 am				8 am to 9 am			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road link citybound	36	D	1,120	150	32	C	1,330	151
Wurundjeri Way Extension outbound	30	C	500	70	30	C	580	77
Dynon Road link outbound	47	D	410	77	42	D	470	74
Wurundjeri Way Extension citybound	25	C	690	81	28	C	780	90
All movements	**34**	**C**	**2,720**		**32**	**C**	**3,160**	

PM peak

The following points summarise the PM peak results comparing the EES and alternative designs:

Dynon Road/ Dynon Road link intersection

- There is a decrease in average delay for the Dynon Road city bound traffic of 0 to 2 sec/veh (compared to the EES design).
- There is a decrease in average delay for the Dynon Road out bound traffic of 3 to 7 sec/veh (compared to the EES design).
- There is an increase in average delay for the Dynon Road link city bound traffic of 11 to 13 sec/veh (compared to the EES design).
- There is an increase in the overall average delay of the intersection of 1 to 2 sec/veh.

Wurundjeri Way extension/ Dynon Road link intersection

- There is an increase in average delay for the Wurundjeri Way extension city bound traffic of 30 to 34 sec/veh (compared to no delay for the EES design).
- There is an increase in average delay for the Wurundjeri Way extension out bound traffic of 40 to 45 sec/veh (compared to no delay for the EES design).
- There is an increase in average delay for the Dynon Road link city bound traffic of 13 to 14 sec/veh (compared to the EES design).
- There is a decrease in average delay for the Dynon Road link out bound traffic of 1 to 6 sec/veh (compared to the EES design).
- There is an increase in the overall average delay of the intersection of 15 to 16 sec/veh.

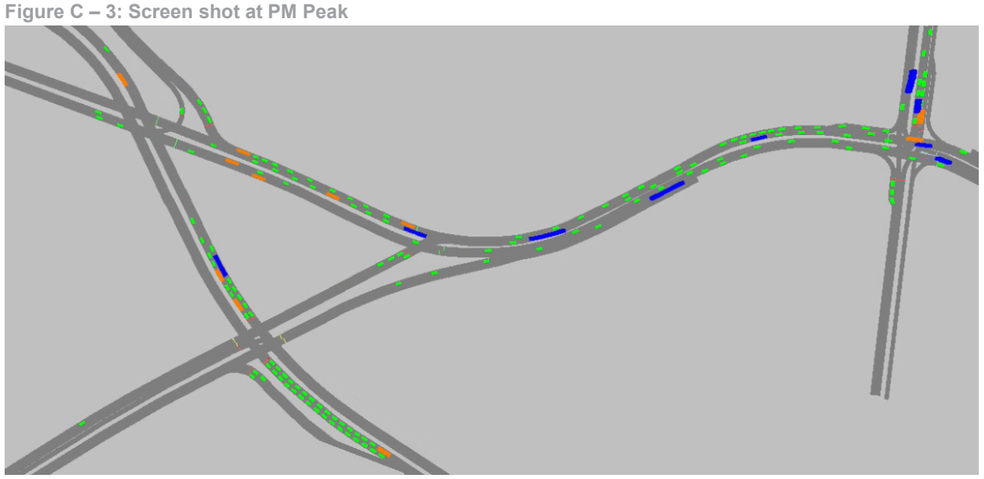
PM peak performance

Overall during the PM peak period comparing the EES and alternative design:

- There is a slight reduction in delay to the Dynon Road traffic as a result of the required changes to the signal offsets.
- There is an increase in delay to Wurundjeri Way extension traffic due to no longer being grade separated.
- There is an overall increase of 25 to 26 sec/veh in delay to the Dynon Road link traffic in traversing both intersections. This is predominantly due to the required changes to the signal offsets between the two intersections to give priority to Wurundjeri Way extension which results in the Dynon Road link receiving less signal priority.
- At the Dynon Road/ Dynon Road link intersection, the 95th percentile queue length on the Dynon Road link city bound approach reduces compared to the EES results, as the queue is moved back to the intersection with the Wurundjeri Way extension.
- At the Wurundjeri Way extension/ Dynon Road link intersection, the 95th percentile queue on the Dynon Road link outbound approach is similar to the EES results.
- Both intersections and all approaches operate at or better than Level of Service for both options.

A screen shot of the network performance during the PM Peak is shown in Figure C – 3. The results of the PM peak are shown in tables 5 to 8 below.

Figure C – 3: Screen shot at PM Peak



PM peak results – EES grade separated design

Table C – 5 - Dynon Road/ Dynon Road link Intersection results

	4 pm to 5 pm				5 pm to 6 pm			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road west	15	B	920	74	17	B	1,130	116
Dynon Road link citybound	15	B	450	78	17	B	550	57
Dynon Road east	7	A	1,710	54	12	B	2,080	123
All movements	**11**	**B**	**3,080**		**14**	**B**	**3,760**	

Table C – 6 - Wurundjeri Way/ Dynon Road link Intersection results

	4 pm to 5 pm				5 pm to 6 pm			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road link citybound	1	A	450	3	1	A	550	0
Wurundjeri Way Extension exit ramp	14	B	240	31	10	B	280	28
Dynon Road link outbound	16	B	790	70	19	B	980	82
All movements	**11**	**B**	**1,480**		**12**	**B**	**1,810**	

PM peak results – Alternative design

Table C – 7 - Dynon Road/ Dynon Road link Intersection results

	4 pm to 5 pm				5 pm to 6 pm			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road west	13	B	920	106	17	B	1,140	132
Dynon Road link citybound	28	C	440	44	28	C	550	75
Dynon Road east	4	A	1,720	45	5	A	2,100	72
All movements	**10**	**B**	**3,080**		**12**	**B**	**3,790**	

Table C – 8 - Wurundjeri Way/ Dynon Road link Intersection results

	4 pm to 5 pm				5 pm to 6 pm			
	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)	Avg Delay (secs)	Level of Service	Arrived volume	95% queue length (m)
Dynon Road link citybound	14	B	450	63	15	B	550	69
Wurundjeri Way Extension outbound	40	D	940	86	45	D	1,020	114
Dynon Road link outbound	15	B	800	70	13	B	970	77
Wurundjeri Way Extension citybound	30	C	440	57	34	C	550	75
All movements	**26**	**C**	**2,630**		**28**	**C**	**3,090**	

Conclusion

The Wurundjeri Way extension and Dynon Road link intersection performance meets the specified performance levels for the project.

The increase in delay on the Wurundjeri Way extension / Dynon Road link due to the full signalisation of this intersection may result in:

- Diversion of vehicles away from the Wurundjeri Way extension back onto Footscray Road if there is the perception that they could get a better run that way. However the capacity of the Footscray Road/ Dudley Street/ Harbour Esplanade/Docklands Drive intersection and the Dudley Street/ Wurundjeri Way intersection would limit any diversions.
- Reducing the number of vehicles diverting from Dynon Road onto Wurundjeri Way, which may impact on the operation of Dynon Road. However the capacity of the Dynon Road/ Dryburgh Street intersection would limit any diversions.

Preferred Respondent (CPBJH) assessment

The table below summarises the preliminary results from the traffic modelling CPB John Holland Joint Venture (CPBJH) have undertaken. CPBJH have used the modelling software AIMSUM which is a micro-simulation modelling package used widely in New South Wales. The State's assessment using the VISSIM model has been included for comparative purposes in Table C – 9.

Table C – 9 - Preferred Respondent results

Wurundjeri Way extension/ Dynon Road link Intersection					
Period	**Option**	**CPBJH Results**		**WDA Results**	
		Intersection Delay	**Level of Service**	**Intersection Delay**	**Level of Service**
AM	Grade Separated	24	C	10	B
	Elevated Intersection	25	C	34	C
PM	Grade Separated	21	C	12	B
	Elevated Intersection	30	C	28	C