6 Project description

Tables

Figures

6.1 OVERVIEW

This chapter describes the Mordialloc Bypass (Freeway) (the project) in the context of the reference design (also referred to as the 'preliminary design'), including the proposed alignment, relevant design elements and construction methodology. Development of the reference design has considered the project objectives, along with risks and impacts identified through preliminary planning investigations and this Environment Effects Statement (EES) process. This has been an iterative process, with the reference design being refined as information on environmental values and impacts became available.

A project reference design was used to assess the environmental effects of the project. The reference design is the preliminary design of the project within a defined project boundary which provides scope for innovation in the ultimate design to be developed to achieve optimum environmental outcomes.

Once a design and construct (D&C) contractor is engaged, the project's preliminary design will be further developed to detailed design representing the ultimate design for the project to be developed. The terms of the Incorporated Document including the Environment Management Framework (EMF) and the Environmental Performance Requirements (EPRs) will apply to the ongoing design, development and operation of the project.

The key components of the project are summarised in Chapter 1: *Introduction* (Section 1.2) and expanded upon within this chapter below.

TERMS USED IN THIS SECTION

- **Batter slope/angle:** refers to the material or the angle of the material between the ground surface and the surface of the road.
- **Bridge piers:** attached to the pile footing supporting the bridge structure above ground surface.
- **Carriageway:** lanes where traffic will be travelling.
- **Footing/piles:** holes into the ground filled with concrete and/or steel to hold the weight of bridge structures.
- **Grade separation:** where one road passes over or under another road, with no interaction between each road.
- **Gradeline:** defines the angle and height of the road along the entire length.
- **Right-of-way:** the public space between property boundaries reserved or used for public open space and pedestrian, vehicle and public transport movement.
- **Road median:** the area between the two carriageways.
- **Road reserve:** land reserved for road purposes by way of a Public Acquisition Overlay or Road Zone in a planning scheme.
- **Road shoulder (SHLD):** the sealed area beside a road where a car can stop safely.
- **Road verge:** area outside the shoulder, before pedestrian path or batter slope.
- **Wire rope safety barrier (WRSD):** Wire safety barrier commonly used along freeways.

6.2 PROJECT ALIGNMENT

The proposed alignment (shown in Figure 6.1) is about 25km south-east of Melbourne's central business district (CBD) and 5km east of Mordialloc. It passes through the suburbs of Clayton South, Dingley Village, Braeside, Waterways, Aspendale Gardens and Chelsea Heights in the City of Kingston, with small areas of proposed works in Bangholme, the City of Greater Dandenong.

It also passes between the western boundary of Braeside Park and the eastern boundary of the Woodlands Industrial Estate constructed wetlands, traverses constructed wetlands at Waterways, and passes within 1km of the Ramsar-listed Edithvale–Seaford Wetlands. The northern and southern ends of the alignment pass through and along the border of the South East Green Wedge.

The bypass would be located mainly within land reserved to accommodate a six-lane road. Since the late 1990s, most of this reservation has been covered by Public Acquisition Overlay (PAO), some of which is in VicRoads' ownership. This is discussed further in Chapter 9: *Land use and planning*.

The proposed project is about 9.7km long, with two-lane, 7.5km-long carriageways in each direction and a path for walking and cycling. It is expected that each carriageway would have two 3.5m wide lanes, with a 3m-wide outside shoulder and 1m-wide inside shoulder. Another 2.2km of roadworks would be required to connect it to the Mornington Peninsula Freeway. A set of maps outlining the reference design is provided in Attachment III: *Maps and figures*.

6.2.1 Project area

The 158.5 hectare (ha) project area includes a buffer to allow for minor design revisions during the detailed project design. All permanent road works will be confined to the project area shown in Figure 6.1.

The constraints imposed by the project area's topography were considered in the design development. The topography is characterised by higher elevations in the north (30m above sea level (ASL)), and lower elevations in the south. A coastal dune system runs parallel to the coast between Mordialloc and Frankston and has an elevation of around five metres; the elevation drops to below sea level in some areas, including the Edithvale Wetland and other nearby wetlands including Seaford and Carrum Wetlands.

Land use within the project area is mixed. South of Springvale Road, the project will be developed within existing road reservation land along the Mornington Peninsula Freeway and around Thames Promenade. Immediately north of Springvale Road is an area that has been used for cattle grazing. The project spans constructed wetlands adjacent to the Waterways residential area via a 400m bridge. The project then passes between wetlands at Waterways, Braeside Park and Woodlands Industrial Estate. Project land south of Lower Dandenong Road has also been used for cattle grazing.

North of Lower Dandenong Road the project passes between Dingley Village to the east and Redwood Gardens Industrial Estate to the west. This land is not currently used for any purpose, except for land adjoining Centre Dandenong Road, which contains light industrial businesses. North of Centre Dandenong Road contains market gardens, plant nurseries and a mulching business, as well as parcels of vacant land.

Current land use is covered in Chapter 9: *Land use and planning*. Historic land use is covered in Chapter 14: *Aboriginal cultural heritage* and Chapter 15: *Historical cultural heritage*.

6.2.2 Land acquisition

There are 64 parcels wholly or partly within the project area. Land within the project area is predominantly under the control and management of VicRoads, and much of the proposed alignment is subject to an existing PAO.

Four land parcels that would require acquisition are not included under the existing PAO and a planning scheme amendment is required to apply the PAO to these parcels. Of these, three parcels are privately owned and one is in public ownership. Where required, land would be acquired in accordance with the *Land Acquisition and Compensation Act 1986* (Vic) processes. Attachment III: *Maps and figures* contains a map of the existing PAO and the four parcels requiring acquisition.

6.2.3 Proposed road reserve boundary

The proposed road reserve boundary (or right-of-way) is largely confined to the area reserved for the project since the 1990s. The road would be wholly constructed within the road reserve, with the exception of the parcels of land required for the redirection of Woodlands Drive outside of the existing PAO.

6.2.4 Construction footprint

The construction footprint is based on the reference design. The defined construction footprint is contained entirely within the project area. In sensitive vegetation areas, 'no-go zones' have been identified where impacts must be avoided. This includes tree protection zones, important vegetation communities, and areas close to sensitive receptors (wetlands). More information on no-go zones is provided in Chapter 10: *Biodiversity*.

The defined construction area includes:

- future carriageways and medians
- grade-separated intersections
- service and access roads
- noise barriers
- shared use paths
- construction buffers to accommodate the potential need for widened batter slopes, drainage provision and relocating services.

The location of temporary construction compounds will be within the project area, but outside of no-go zones. These compounds will maintain a minimum clearance of 40m to all abutting properties with residences.

The project is a four-lane freeway with full grade separation at Lower Dandenong Road, Governor Road and Springvale Road, and a south-facing grade-separated single point interchange at Centre Dandenong Road. The proposed alignment also allows for a future upgrade from a four-lane to a six-lane freeway within the construction footprint. Future funding may be provided to upgrade the bypass to six lanes.

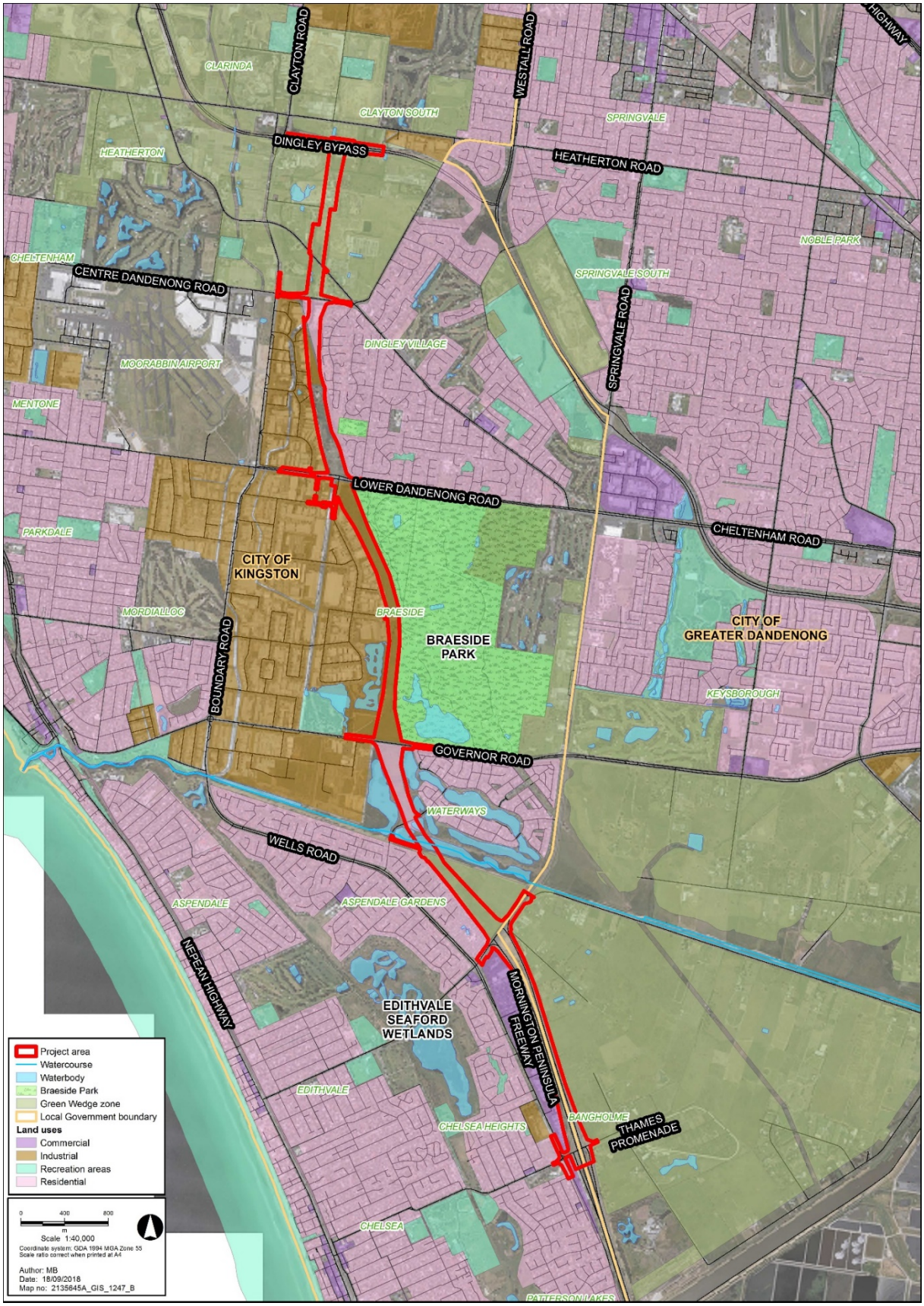

Figure 6.1 Project area

6.3 PROJECT STAGES

Construction staging would be determined by Major Road Projects Authority (MRPA) and the D&C contractor, and would depend on project approvals, seasonal weather conditions, procurement timing, environmental and social considerations and external factors (e.g. nearby events or projects).

Proposed timing for key milestones up to the start of construction are briefly explained in Section 6.13.2.

6.4 SUSTAINABILITY

The Infrastructure Sustainability (IS) Rating Tool, administered by the Infrastructure Sustainability Council of Australia (ISCA), is a comprehensive rating system for evaluating and benchmarking sustainability across design, construction and operation of infrastructure assets. It considers aspects of the design, construction and operation, including the following:

- Management and Governance – management systems, procurement and purchasing, and climate change resilience.
- Using Resources – energy and carbon, water use and management, and construction material impacts.
- Emissions, Pollution and Waste – discharges to land, air and water, environmental and social value of land used, and waste generation and management.
- Ecology – local ecosystem considerations.
- People and Places – community health, well-being and safety, heritage, stakeholder participation, and urban landscape design.
- Innovation.

The rating process involves benchmarking against ISCA standards, and identifying areas where improvements can be made, for example, re-using soil onsite instead of sending material offsite, or using locally sourced recycled aggregate instead of virgin aggregate (meaning material that is being used for the first time).

Before MRPA was established, VicRoads registered the project with ISCA for a 'Design' and 'As-Built' IS rating to drive sustainability across all aspects of the project. MRPA is targeting a 'Design' and 'As-Built' IS rating of 65, which falls within the Excellent rating (between 50–74), out of a possible 110 points.

MRPA has developed a project Sustainability Management Plan which defines the sustainability goals and performance requirements, establishes sustainability governance for the project, defines reporting and verification requirements and defines sustainability targets and priorities beyond the achievement of IS rating outcomes. The final 'As-Built' IS rating of the project would be submitted to ISCA by the contractor for assessment and verification at the completion of the construction.

6.5 ROAD DESIGN

6.5.1 Design guidelines and key design parameters

In July 2010, VicRoads adopted the Austroads Guide to Road Design (AGRD) and provided a series of modifications and clarifications in supplementary documents. VicRoads subsequently developed design notes to further assist road design. The project was developed in accordance with these guidelines and design notes. All structures will be designed to withstand loads in accordance with the requirements of AS 5100 – Bridge Design, and criteria specified in Table 6.1.

Table 6.1 Design criteria for the project

Criteria	Value
Bridges and major culverts	100% of SM1600
Retaining walls and major sign support structures	In accordance with AS5100 - 2017
Design Life	100 years
Pier Collision Loading	In accordance with AS5100 - 2017
Seismic Loading	New bridges as per Austroads Technical Report AP-T200-12
Anti-throw screens	As per VicRoads' "Policy on Reducing Risk of Throwing Objects from Overpass Structures", Document No. N821411
Public Safety Barriers	As per "VicRoads Bridge Public Safety Barriers Policy", Document No. 1390055
Clearance[4]	• Over road 4.6m (Bowen Parkway) • Over road 5.6m (Old Dandenong Road & Centre Dandenong Road) • Over OD Route 5.9m (Lower Dandenong Road, Governor Road & Springvale Road).
Barriers	• Over or adjacent roadways with traffic volumes on any road greater than 40,000 vehicles per day: High containment • Elsewhere: medium containment.
Width between barriers	12.5m

6.5.2 Design for vehicle movements

Project intersections and turning movements are designed considering surrounding land uses to cater for all anticipated vehicle types using the new freeway. The reference design considers all vehicles.

Each carriageway provides two 3.5m wide lanes, with a 3m wide outside shoulder and 1m wide inside shoulder. Figure 6.2 shows a typical project 'mid-block' cross-section which are typically near or slightly above ground level and Figure 6.3 shows the elevated roadway leading up to a bridge structure with associated on and off ramps. Mid-block road sections are those between intersecting arterial roads (e.g. between Lower Dandenong Road and Centre Dandenong Road).

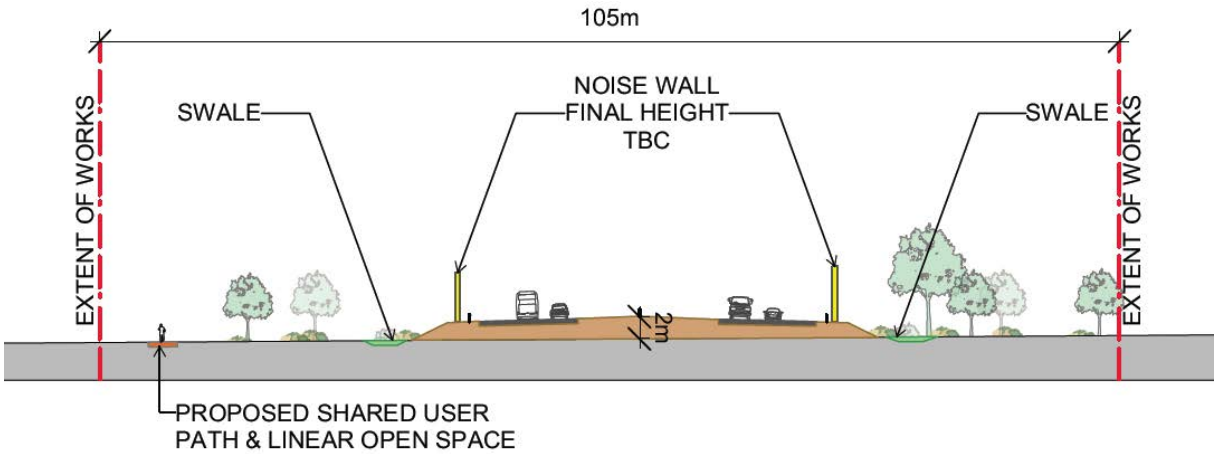

Figure 6.2 Typical mid-block freeway cross-section near ground level

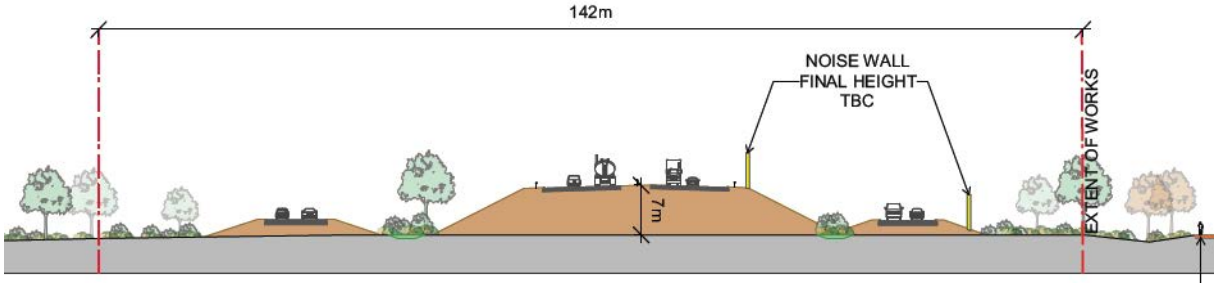

Figure 6.3 Typical mid-block freeway cross-section at approach to bridge structure including on and off ramps

The mid-block median would be 8.7m wide, surfaced with a spray seal and would maintain the carriageway's crossfall or gradient, creating a highpoint instead of the low point typical on similar roads. This achieves two outcomes – no median maintenance or mowing, and no drainage pits and pipes. The 8.7m median allows for a future 3.5m traffic lane and 0.5m inner shoulder in each direction, and for a concrete safety barrier.

6.5.3 Road network access

The project provides access to the local arterial road network through a signalised T-intersection at the Dingley Bypass and several grade-separated interchanges. Figure 6.4 shows proposed access arrangements for traffic movements to and from the project. The map shows where the intersection treatments are located. The map also includes the current primary traffic flow routes along Springvale Road and Boundary Road, and where the project will be constructed.

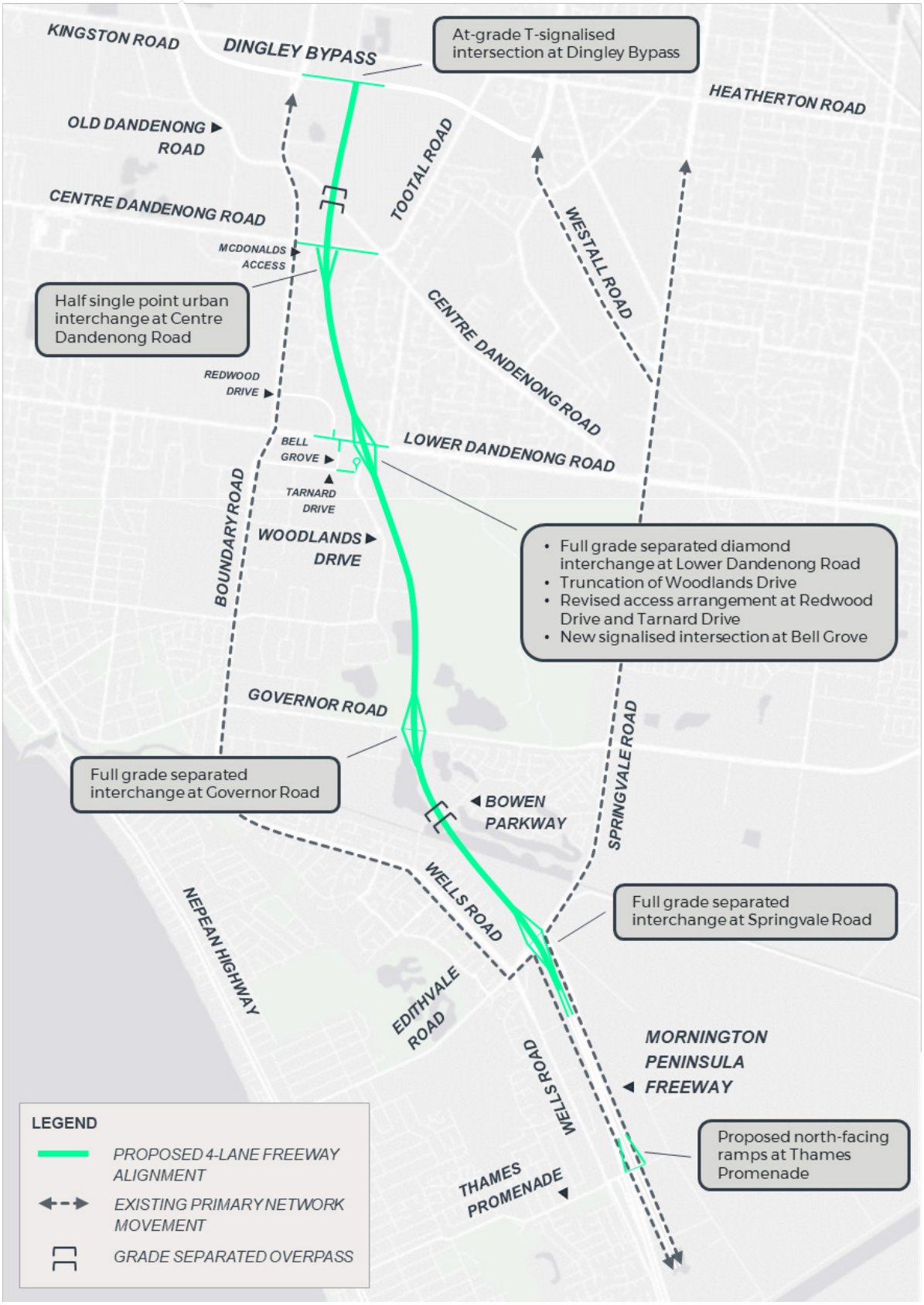

Figure 6.4 **Proposed access arrangements for traffic movements to/from the Mordialloc Bypass (Freeway)**

Full diamond intersections (see Figure 6.5) allow traffic to enter and exit the freeway from every direction, except for the single point interchange at Centre Dandenong Road (see Figure 6.6) that only allows access from the south. There would also be new north-facing ramps constructed at Thames Promenade, establishing a full diamond intersection, like that shown in Figure 6.7.

The project would alter the access arrangements at Woodlands Drive, Redwood Drive and commercial access along Centre Dandenong Road. The project would require the following access arrangement changes:

- Cut off the current traffic flow on Woodlands Drive to and from Lower Dandenong Road and redirect the flow via Tarnard Drive and Bell Grove (with a new signalised intersection at the intersection of Bell Grove and Lower Dandenong Road).
- Allow only left-in and left-out movements at Redwood Drive at Lower Dandenong Road, and divert right turning traffic from Lower Dandenong Road into Redwood Drive to a new U-turn facility east of Boundary Road.

Centre Dandenong Road will be widened to two lanes in each direction from the freeway to Boundary Road to cater for the anticipated traffic volumes on this road segment to support growth including the Moorabbin Airport precinct development. It is proposed to convert the existing McDonalds access along Centre Dandenong Road (east of Boundary Road) to a left-in, left-out only access. Traffic impacts and mitigation measures are further described in Chapter 8: *Traffic and transport.*

Figure 6.5 Schematic of full diamond grade-separated interchange

Figure 6.6 Schematic of grade-separated single point urban interchange

Figure 6.7 Example of full diamond grade-separated interchange

6.5.4 Posted speed limits

The freeway is designed to 110km/h with a sign-posted speed limit of 100km/h. The design and posted speed limits for ramps and connecting roads are outlined in Table 6.2 and are in accordance with the AGRD.

Table 6.2 Speed limits – posted and design

Section	Posted speed limit (km/h)	Design speed limit (km/h)
Freeway (urban)	100	110
Freeway ramps	80	80
Dingley Bypass	80	90
Old Dandenong Road	60	70
Boundary Road	80	90
Centre Dandenong Road	60	70
Lower Dandenong Road	80	90
Governor Road	80	90
Springvale Road	80	90
Tanard Drive Precinct	50	50
Other local roads	60	70

6.5.5 Gradelines

The gradeline provides a measure of the road's vertical slope or grade, expressed as a percentage value of the height change compared to the horizontal distance travelled. For a safe and economic road configuration, the design grade should not be steeper than three percent, in accordance with the AGRD.

The carriageways for the project comply with the sight distance requirements for 110km/h design speed zones, and design grades not exceeding five percent.

6.6 BRIDGE AND STRUCTURE DESIGN

The major structural elements of the project are:

- structure over the former landfill area and Old Dandenong Road Drain
- Old Dandenong Road bridge
- Centre Dandenong Road bridge
- Lower Dandenong Road bridge
- Braeside Park pedestrian underpass
- Governor Road bridge
- Waterways bridge
- Springvale Road bridge.

Structural elements are discussed at Section 6.6.2 and outlined on the map set in Attachment III: *Maps and figures.*

6.6.1 Design guidelines

Unless otherwise specified, all structures would be designed and constructed in accordance with the requirements set out in the following documents:

- Australian Standard (AS) 5100 – 2017 Bridge Design
- VicRoads Standard Specification Sections for Roadworks and Bridgeworks
- AS 1428 Design for Access and Mobility
- Austroads Guide to Bridge Technology – Part 3: Typical Bridge Superstructures, Substructures and Components
- AGRD - Part 6A: Pedestrian and Cyclist Paths and VicRoads Supplement to AGRD Part 6A
- AS/NZS 1170.2 - Part 2: Wind loads
- VicRoads Bridge Technical Notes.

6.6.2 Structural elements

All bridges, except for Waterways bridge, are single structures of 12.5m width between barriers. This provides two 3.5m traffic lanes, a 3.5m outer shoulder and 2m inner shoulder. Construction of a single structure at 12.5m provides space for an additional lane in the future. The additional lane could be added by adjusting line marking, without needing extra structural width, and would provide three 3.5m lanes with 1m inner and outer shoulders.

Figure 6.8 and Figure 6.9 provide a schematic and an example of the standard bridge structure design for each arterial road for the project. It is estimated that piles will be driven to a depth of less than 50m (depending on ground conditions), or where the piles achieve the design level of resistance.

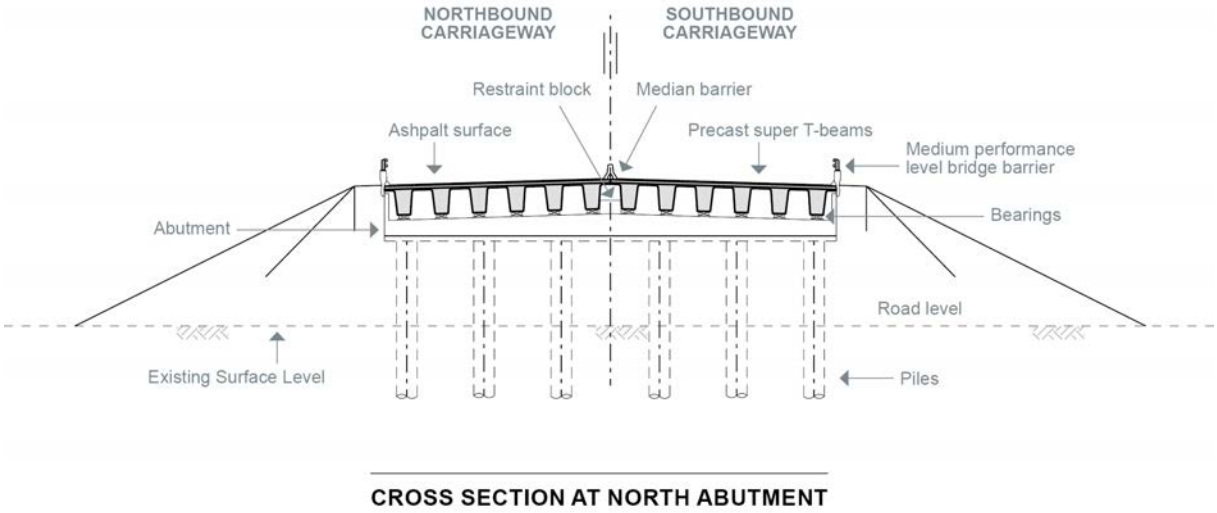

Figure 6.8 Schematic diagram of proposed bridge structure spanning arterial roads

Figure 6.9 Example of proposed bridge structure over arterial roads

The Waterways bridge is proposed to consist of two 12.5m wide, stand-alone structures, with a 12.5m space between the structures to allow light to fill the area beneath the bridge. The bridge would sit on piers spaced approximately every 24 metres, constructed on top of precast driven piles.

The piers would be below the surface of the wetlands and ground surface. A cross-section of the design of the two bridge structures is provided in Figure 6.10.

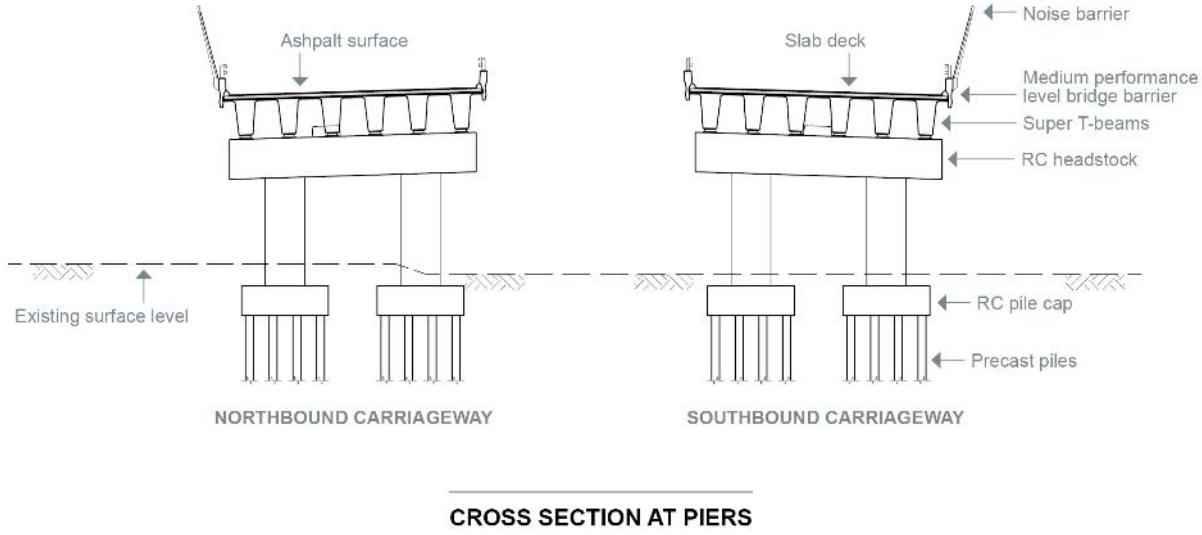

Figure 6.10 Cross-section of current Waterways bridge design

Because the Waterways are sensitive to visual change, every effort has been made to maintain as low a bridge as possible. The height of the bridge is controlled by a 4.8m clearance at Bowen Parkway to the north and a Melbourne Water levee at the south end of the bridge. The detailed design and construction method of this bridge is yet to be finalised and the D&C contractor would minimise (where possible) the visual bulk through innovation and design. Further detail on the visual impact in this area can be found in Chapter 11: *Landscape and visual effects.*

A pedestrian underpass is proposed between Braeside Park and Park Way, and would be constructed as a 3.6m wide and 2.4m high culvert (a square tunnel below the road). Lighting would be provided through the underpass, with open, landscaped entrances. An example of the culvert is shown in Figure 6.11 and the proposed landscape design around the entrances is shown in Figure 6.12. Refer to Attachment III: *Maps and figures* for the full set of landscape concept plans (with symbology descriptions).

Source: Aspect Studios, 2018

Figure 6.11 An example of pedestrian underpass

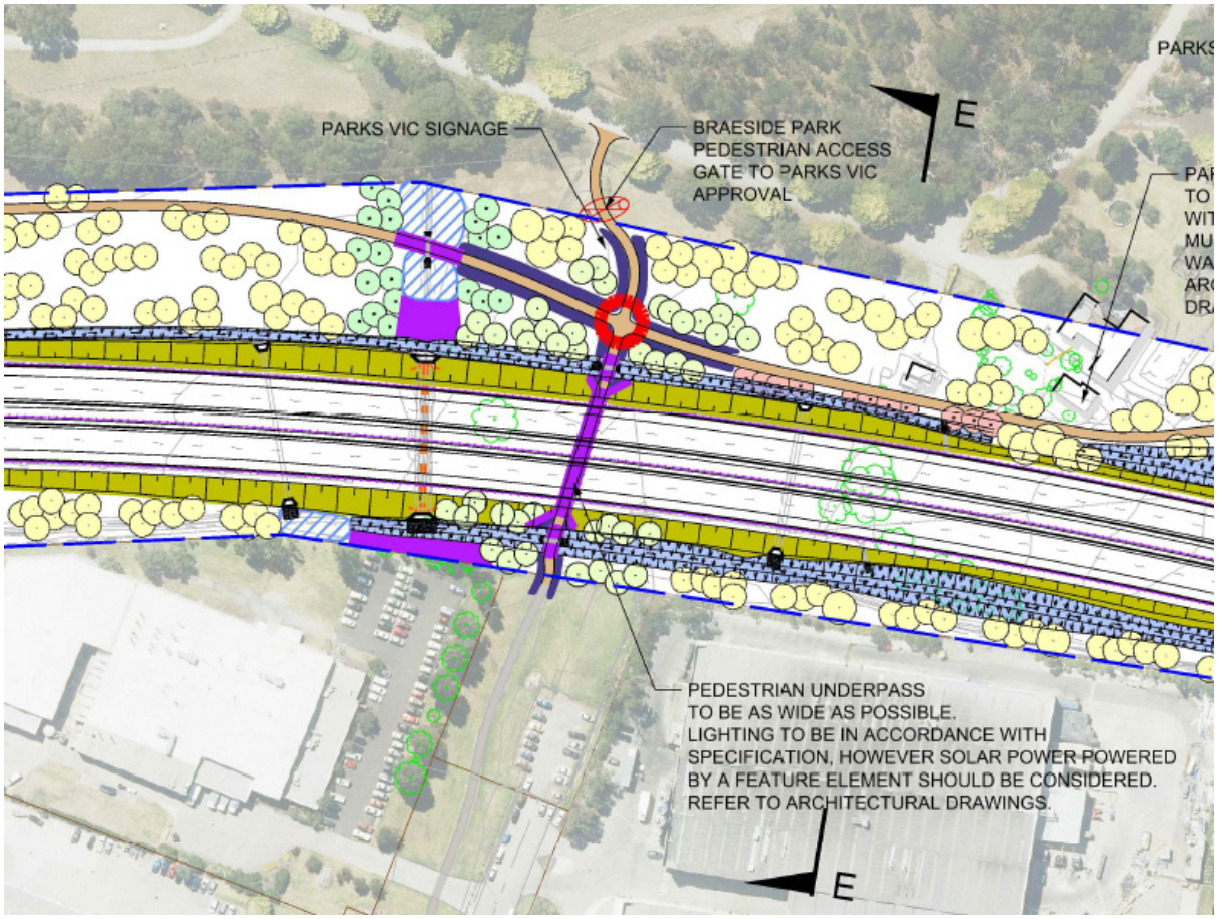

Figure 6.12 Proposed landscape treatment around entrance to pedestrian underpass

6.6.3 Contaminated land management

The final key structural element of the design is the structure over the former landfill in the north of the alignment. Detailed assessment of the site is described in Chapter 18: *Soils and contaminated land*.

Ground conditions on former landfill sites are typically uneven and variable. A basic bridge structure is therefore the most suitable means of crossing this site. This structure would be at (or close to) ground level. Although the construction method is yet to be determined, it is expected that piles would be installed, to approximately 10m, through the waste mass, using a specialised boring technique (displacement bore) that avoids bringing waste or soil to the surface. This method of piling does not create preferential pathways for water to move as it seals around the pile as soon as it is installed.

The piles would provide a base for a concrete slab, forming the carriageway. An additional layer of rock and liners (plastic high density, gas proof lining) would be installed to manage any risks associated with the landfill. Further details are outlined in Section 18.8.1 of Chapter 18: *Soils and contaminated land*.

6.7 DRAINAGE DESIGN

6.7.1 Waterways and drainage

The project crosses several waterways and drainage lines (including the Mordialloc Creek, Dingley Drain and Old Dandenong Drain) as well as the Mordialloc Creek floodplain. Surface water flow and flood impacts have been modelled, and a combination of culverts and pipes are proposed to manage and maintain the current flow regimes. Further details on the project's impacts on surface water are outlined in Chapter 16: *Surface water and hydrology*.

Water sensitive road design

To sustainably manage surface water runoff and protect water quality, the project would be constructed and operated in accordance with the VicRoads Integrated Water Management Guidelines (VicRoads 2011) and Water Sensitive Road Design Guidelines (VicRoads 2007). The project would also be designed to meet the water quality objectives described in CSIRO's Best Practice Environmental Management Guidelines for Urban Stormwater (CSIRO 1999). At a minimum, these are:

- total suspended solids (TSS) – 80 percent retention of the typical urban annual load
- total phosphorus (TP) – 45 percent retention of the typical urban annual load
- total nitrogen (TN) – 45 percent retention of the typical urban annual load
- litter – 70 percent retention of the typical urban annual load
- flows – maintain discharges for the one in 1.5 year flood event at pre-development levels.

Due to the limited available space for water-sensitive road design within the road reserve, it is not possible to treat water from all new impervious areas at source. Therefore, a combination of treatment at source and close-by is proposed. Grassed swales (Figure 6.13) would treat runoff from all new impervious areas for the project, including from shared use paths, road surface and bridge structures.

Source: VicRoads

Figure 6.13 Vegetated roadside swales

An urban stormwater improvement model was used to assess the pollutant source load from all new impervious areas, and to assess the ability of the grassed swales to treat the runoff. The results show that the swales would provide sufficient treatment to achieve best practice pollutant removal targets from the new impervious areas on the project. In addition to the swales, bio retention treatment ponds are proposed at sites of environmental sensitivity, such as near Woodlands Industrial Estate Wetlands and Braeside Park wetlands, to achieve a better outcome than the adopted criteria.

The project water quality treatment efficiency would meet the target levels outlined in the *Urban Stormwater: Best Practice Environmental Management Guidelines (BPEMG)* and the VicRoads *Integrated Water Management Guidelines*.

Spill containment

The proposed road drainage for the project includes allowance for intercepting uncontrolled runoff and emergency containment (critical incident management), by not directly connecting to sensitive waterways prior to treatment. Where there are bridge structures near sensitive sites, the hydrology study investigated ways to manage flows in the event of firefighting foam or other polluted runoff. Flows would be redirected or temporarily contained from the sensitive receiving waterways. Spill containment has been designed to accommodate minimum 20,000 litres spill volume as outlined in AGRD around the sensitive waterways near Governor Road. Details regarding surface water impacts and management can be found in Chapter 16: *Surface water and hydrology*.

6.8 BICYCLE AND PEDESTRIAN USE

A shared use path for pedestrians and cyclists would be constructed along the entire project length to provide alternative transport connections from Dingley Bypass to Springvale Road. This path will form part of VicRoads' Principal Bicycle Network, identified the City of Kingston 2009 – 2013 *Kingston Cycling and Walking Plan*.

The shared use path would provide direct access to Braeside Park, creating a link between the park and the nearby suburbs of Waterways, Dingley Village and Aspendale Gardens. This can be seen on the reference design located in Attachment III: *Maps and figures.*

The shared use path would connect to existing pedestrian networks within the Woodlands Industrial Estate, and to pedestrian links at Aspendale Gardens and Waterways. In addition, signalised intersections at the freeway on- and off-ramps would make crossing existing arterial roads safer and more pedestrian-friendly. Connectivity would be maintained at the grade-separated interchanges with shared use paths provided under the bridge structure.

An existing pathway connection would be restricted at one location, near Elm Tree Grove, where an informal path would be severed. The path currently connects Dingley Village to the industrial precinct. However, pedestrian volumes using this path are very low. The north–south link and new formalised paths along existing intersecting arterial roads will maintain and improve this area's connectivity.

6.9 NOISE ATTENUATION

VicRoads Traffic Noise Reduction Policy 2005 describes situations in which noise attenuation measures are needed. Noise barrier locations and heights have been determined for the reference design based on noise modelling work described in Chapter 12: *Noise and vibration effects.*

In accordance with the above policy, noise attenuation would be required along sections of the proposed carriageway. A combination of low noise pavement and noise barriers between one and six metres high are required to meet the policy. The visual impacts of noise barriers are discussed in Section 11.8.2 of Chapter 11: *Landscape and visual effects.* An indication of where noise barriers are likely to be provided can be seen in Attachment III: *Maps and figures* on the reference design. Actual noise barrier heights and location are to be confirmed following noise modelling during the detailed design phase.

6.10 LIGHTING AND TRAFFIC SIGNALS

The project would include lighting consistent with Chapter 6 of the *VicRoads Traffic Engineering Manual Volume 1 – Traffic Management.* Street lighting would be provided at all interchange intersections and Park Way underpass. Lighting is not proposed elsewhere along the project alignment.

6.11 LANDSCAPING

Draft landscape concept plan has been developed in response to the outcomes of the landscape and visual impact assessment discussed in Section 11.8.2 of Chapter 11: *Landscape and visual effects*. The draft landscape concept plan is provided in Attachment III: *Maps and figures*, and aims to reduce potential impacts on landscape character. The plan includes:

- using a combination of landform and planting to screen the road from adjacent residences within the right-of-way
- planting to complement and accommodate wildlife links, revegetation and creek systems at culvert locations
- revegetating the wetlands area with appropriate plant species
- locating and designing watercourse crossings to minimise wetland vegetation loss and to accommodate erosion control methods
- planting and mulching unstable batters to reduce the risk of erosion
- encouraging indigenous planting to the right-of-way boundary to extend the landscape character where relevant
- using bio retention swale treatment for the storm water drainage design
- modifying the shared use path alignment, landscape planting and design to maximise pedestrians' and cyclists' line of sight distance to increase passive surveillance and safety in identified safety-risk areas.

Landscape concept plans have been provided for public comment and review as part of the EES and can be found in Attachment III*: Maps and figures.* The landscape plans would be further developed during the detailed design and tender process.

6.12 OTHER TRANSPORT INFRASTRUCTURE AND UTILITIES

The design development process considered existing and future private and public infrastructure and utilities near the project.

Relocating and/or protecting other utilities such as electricity, gas and telecommunication services would be considered at a detailed level closer to construction.

6.13 CONSTRUCTION METHODOLOGY

Proposed construction activities would be consistent with a road construction project within a greenfield corridor, and would include:

- detailed investigations and baseline environmental monitoring, management and/or removal of contaminated land and hazardous material
- vegetation lopping and removal
- clearing and grubbing
- temporary sediment (during construction phase) and erosion control works
- bulk earthworks and haulage
- structures and drainage works
- road pavement construction works
- shared use path construction.

Construction works will be carried out in accordance with Environment Protection Authority (EPA) publication 'Environmental Guidelines for major Construction Sites (February 1996), the project's Construction Environmental Management Plan (CEMP) and other regulations, policies and guidelines described in this EES.

6.13.1 Working hours

Construction work for the project would be undertaken in accordance with EPA Best Practice Environmental Management Guidelines for Major Construction Sites (publication 480). Standard construction work hours are:

- Monday to Friday: between 7.00am and 6.00pm
- Saturday: typically, 7.00am to 1.00pm.

Construction outside the standard hours (e.g. evening and weekend work) may occur at certain stages to allow particular tasks to be undertaken more safely than could otherwise be achieved. Night works could be required in some locations to minimise impacts on traffic or nearby stakeholders. Works proposed to be undertaken outside standard hours would need to be approved in advance by the MRPA superintendent, following consultation with all relevant stakeholders and nearby residents.

6.13.2 Outline construction program

The process of awarding a D&C contract is being conducted alongside the EES process. A request for expressions of interest was released on 14 February 2018. MRPA expects to announce a preferred tenderer in October 2018 and award the final contract in March 2019. Construction is planned to commence in July 2019.

A parallel process ensures the D&C contractor's involvement in the EES process, allowing for a more complete detailed design that considers the EES outcomes. Project construction is expected to take two and a half years, commencing as soon as possible should Ministerial approval for the planning scheme amendment be gained.

6.13.3 Key construction activities

Construction activities would be undertaken in accordance with the D&C contractor's Environmental Management System (EMS) and associated CEMPs, which would incorporate all measures described in Chapter 23: *Environmental management framework* of this EES (including EPRs), and other measures specified in the project's subsequent statutory approval conditions.

6.13.4 Site preparation, pavement and road construction

The following activities would be undertaken to prepare the site and construct the pavement and road:

- Project boundaries would be delineated with suitable fencing and signage.
- Traffic management measures would be installed as required.
- Contractor's site office and compound would be established, along with stockpile sites as required.
- Erosion and sedimentation controls would be progressively installed as needed for relevant activities. Additional environmental management measures would be installed as required, including fencing off and signage to protect sensitive areas.
- Vegetation and tree stumps would be removed and topsoil stripped in the construction area (outside specified and fenced protected areas). Topsoil would be stored on site, for later reuse, protected with silt fencing, and seeded to minimise erosion.
- Utilities would be relocated or protected as and when necessary.
- Stormwater drainage works would be completed, including constructing water sensitive road design measures, which may be consolidated with temporary sediment basins if practical.
- Earthworks and pavement preparation would be carried out by graders and other equipment, including compacting the resultant surface using various rollers and compactor equipment.
- Cut material would be excavated to the necessary level, as and where required.
- Additional fill material would be imported as required.
- Verges would be constructed, batters completed, and roadside elements constructed as required. Required kerbs and channels would be constructed throughout. Granular pavement materials would be imported, placed and compacted.
- Asphalt pavement would be applied by pavers and rollers, or sprayed seal treatments as applicable.
- Lighting, line markings, signs and other road furniture (e.g. safety barriers and guide posts) would be installed where required.
- The construction site would be progressively landscaped and revegetated, including reinstating and topping up topsoil, seeding, planting trees and shrubs, and installing weed mats and mulch.

6.13.5 Structural works

Activities associated with constructing structures such as bridges, culverts and retaining walls, may include the following:

- Installing bored or driven piles for structural elements. Some structures may also incorporate spread or pad footings.
- Completing all footings works for the various structures including casting pile caps for major structures, pad footings for miscellaneous structures, or foundation slabs (for major culvert structures).
- Constructing piers and abutments in situ, up to underside of the deck or other superstructure elements (although precast options may be viable). Structural fill and abutment works would be completed, including constructing approach slabs, while also pre-casting offsite all bridge beams and required crown units.
- Casting bridge headstocks, placing precast beams and constructing the deck. Precast parapets and rails would be installed and kerb infill and deck connection constructed. A thin asphalt wearing course would be placed on completed bridge deck and superstructure, and line marking and associated infrastructure would be installed.
- Placing wall units for retaining walls and building up structural fill in layers to tie all elements together, typically once a strip footing (or similar) is in place. Once at the required level, handrails and other protective mechanisms would be installed.
- Installing any gantries, cantilevers or other major sign supports or crown units (which have previously been manufactured offsite) and connecting these so they are integral with the completed works.
- Constructing any off-structure bridge barriers required, including footing details and precast barrier units. This would need materials brought on site and connected to each other, as well as any other wire rope safety barrier or guard fence to protect end terminals.
- Cleaning up the site and disposing of all waste materials.

6.13.6 Earthworks

The relatively flat ground and estimated flood levels of the project area mean construction would mostly take place above the current ground level. Most earthworks would be filling works to raise the road level and ramping to bridge structures.

Preliminary project estimates forecast the need to import between one and 1.5 million cubic metres of fill material to build up the road in certain areas. Fill material would be sourced from within the work site where possible. Additional sources would include approved and licenced quarries and borrow pits. All imported fill would be in accordance with EPA guidelines.

During construction, cut material that is unsuitable for fill would be used for batter flattening, noise mounding or land forming where possible. Cut material would only be disposed of onsite within the identified construction area, or outside environmentally sensitive 'no-go' areas. Unsuitable cut material may be disposed of offsite (in environmentally non-sensitive areas) as agreed with landowners and subject to necessary statutory approvals.

It has not been feasible to identify sites for sourcing fill material during this EES because:

- the precise quantities of fill needed can only be determined in the detailed design phase
- the precise nature and quantity of materials on nearby sites is not currently known
- the construction contractor(s) would be responsible for sourcing the fill.

The road pavement material – which may include concrete, steel, crushed rock, aggregate, sand and other quarry materials – would be sourced from appropriately licensed facilities that can supply the required quality of material. As far as possible, these would be sourced from local and commercial suppliers. Exact material quantities are currently unknown and would be calculated at the detailed design phase.

Surplus material that cannot be used on site would be disposed of at accredited materials recycling or waste disposal facilities.

At this stage, it is unknown how much water would be needed during construction, since this would depend on the D&C contractor's materials selection and construction methodologies. The majority of the water required is likely to be needed for earthworks construction and dust suppression. Non-potable water would be used for construction wherever possible. Water could be sourced locally from non-potable supplies, or by reusing water captured on site. Recycling wastewater would be considered if it accords with the VicRoads Water Use Policy.

6.13.7 Construction site drainage

During construction, the project would be required to meet the objectives of the Best Practice Environmental Management Guidelines for Urban Stormwater (CSIRO 1999), EPA guidelines Construction Techniques for Sediment Pollution Control (publication 275) and Environmental Guidelines for Major Construction Sites (publication 480). Sediment control devices would be used to capture and treat any site runoff to prevent sediment laden water being discharged into nearby drainage and waterways. Water quality in receiving waterways would be monitored to ensure site runoff caused no detrimental impacts.

6.13.8 Construction traffic

Project construction would require vehicle movements associated with the works, movement of workers, transporting construction machinery and equipment to and from the site, as well as bringing and disposing of materials.

Construction related traffic may affect intersection and network capacity in the short-term as vehicles enter and exit the existing road network. The D&C contractor would designate entry and exit points that consider speed, sight distances for safe access, and existing intersections' capacity.

Construction vehicles would not typically use local roads. It is VicRoads policy to restrict construction vehicles and machinery to arterial roads, as far as possible. Around the project area, the following arterial roads are likely to be impacted by project construction traffic:

- Springvale Road between Edithvale Road and Westall Road
- Dingley Bypass between Boundary Road and Westall Road
- Boundary Road between Springvale Road and Dingley Bypass.

The program and staging of construction sections would determine the construction traffic volumes – increasing the construction pace would generate higher traffic volumes on the network each day, but for a shorter period. How the construction phases are sequenced would depend on the D&C contractor's works program, construction methodology adopted, the time of year and the phase of the project.

Detailed Transport Management Plans (TMPs) would outline the arrangements for managing all potential construction impacts.

6.13.9 Site compounds, utilities and service

Site compounds would be used to stockpile materials, store plant and equipment, and provide site offices, parking and construction workers' amenities. Chemicals and fuels for construction would be kept in appropriate storage areas within the compound site. Site compounds and construction laydown areas are likely to be located close to the section of road under construction, but the exact number, area and localities cannot yet be specified.

MRPA would require the D&C contractor to identify and obtain MRPA's approval to establish and locate temporary construction compounds, preferably within the project area. If the contractor's preferred location is outside the project area, it would not be authorised by the incorporated document and the contractor would need to obtain all necessary statutory approvals.

The D&C contractor's CEMP would contain provisions that prevent locating site compounds and laydown areas from sites that:

- contain Ecological Vegetation Classes or known habitats for endangered species
- are located within 30m of waterways
- are located within 40m of dwellings.

6.13.10 Waste and spoil management

The D&C contractor's CEMP would outline measures to manage all waste streams generated by the project. As described above, the majority of the project would be built on embankments with only a very small amount of waste rock and soil being excavated as spoil.

As part of the CEMP, and as outlined in Chapter 18: *Soils and contaminated land*, a Soil Management Plan (SMP) would be developed to detail the process to manage contaminated soils identified during any excavations. The SMP would align with the waste management hierarchy as defined in the *Environment Protection Act 1970* (Vic). This establishes the hierarchy of waste treatment as follows:

- Avoidance: the design is predominantly built above ground surface, meaning that excavation of spoil would be minimised as much as possible.
- Reuse: opportunities for reuse would be explored prior to the commencement of works.
- Recycling: opportunities for recycling would be explored prior to the commencement of works.
- Recovery of energy: not applicable for soils.
- Treatment: this is required if spoil is contaminated. It may be required prior to reuse or disposal, subject to opportunities available and capacity or requirements of licenced disposal sites.
- Containment: Containment may be feasible within the berms leading up to bridge structures if the material is geotechnically sound.
- Disposal: disposal to landfill facilities licenced to receive soils of the type excavated for the project.

6.14 REHABILITATION

After construction works are completed, the construction would be landscaped and revegetated, including reinstating topsoil, seeding, planting trees and shrubs, installing weed mats and mulch, and installing any design elements, as required. The Landscape Management Strategy, developed as part of rehabilitation and weed management works, would be in accordance with the Landscape Concept Plan (see Attachment III: *Maps and figures*).

6.15 OPERATION AND MAINTENANCE

MRPA is currently responsible for the planning and delivery of the project, but upon completion and opening the operation and maintenance responsibilities will be handed over to VicRoads.

Key operational activities include ongoing road maintenance consistent with applicable practices and standards. Assets to be maintained by VicRoads include landscaping, stormwater drains, bridges, road pavement, signage, barriers and line marking.

6.15.1 Roadside management

VicRoads asset management (including roadsides) is defined in the Roadside Management Strategy 2011, *Roadside Management– A Balanced Approach* (VicRoads 2011).

The strategy sets the primary direction for holistic and integrated roadside management. It uses an asset management approach to balance the key objectives of roadside management and identify the most appropriate treatments to preserve roadside functions.

The strategy provides clear and consistent objectives to managing roadside areas and provides a framework for balanced consideration of the four key objectives of roadside management, to:

- enhance transport safety, efficiency and access
- protect environmental and cultural heritage values
- manage fire risk
- preserve and enhance roadside amenity.

The strategy provides a balanced approach, including ways to manage complex and conflicting situations by consulting with local communities to achieve the best balance between all factors, while ensuring the road network still performs efficiently.