

**D.3 MAIN CARRIAGEWAY UNDERBRIDGES OVER RAILWAYS, LOCAL ROADS, CREEKS, DRAINAGE LINES AND FAUNA ACCESSWAYS – ELEVATIONS AND CROSS SECTIONAL ELEVATIONS**

Generally, these bridges are not highly visible. Where there are twin bridges, only the parapets of the bridge on the opposite carriageway will be seen from the new highway. The design of bridge crash barriers is important because they will be seen from the new carriageways. Key design elements are consistent for all the underbridges on the Nambucca Heads to Urunga Upgrade as follows:

**Headstock and Piers**

Due to the low visibility of these bridges, simple and straightforward designs are adopted. Headstocks are rectangular in elevation and section and piers are circular.

**Parapets**

The parapets generally comprise a 650mm concrete barrier with twin metal rails on top. This design allows views to be maximised from the highway to creeks and surrounding countryside and, for twin bridges, minimises the parapet depth when seen from the other bridge. The outer parapet face extends downwards below the soffit of the bridge deck to partially obscure the substructure, provide consistent proportions and cast a strong shadow line to minimise the visual impact of the bridge structure. The parapets taper outwards toward the bottom at 5 degrees to match those of the overbridges. The top of the parapet has an inwards cross fall draining to the bridge deck, to minimise staining on the face of the parapet. The twin rail termination detail adopts a recent Roads and Maritime standard detail.

**Abutments and Scour Protection**

The surfaces of spill through abutments beneath bridges are typically finished with stone boulders in accordance with scour protection and fauna passage requirements. The twin bridges over the North Coast Railway Line utilise abutment walls as detailed below.

**D.3.1 Twin Bridges over North Coast Railway – Station 61km800**

These highway bridges cross over the North Coast Railway Line. They consist of a single span of 25.722m with six 1200mm deep Super-T girders on the southbound bridge and five 1200mm deep Super-T girders on the northbound bridge. The width of the northbound bridge between the face of the barriers is 11.0m. The southbound bridge includes an on ramp and has a width which varies between 13.632m and 14.03m. Spill through abutments offer no particular advantage at this location and a shorter single span and retaining wall abutments are employed as a more efficient and economical solution. Reinforced soil walls are adopted. They have a natural concrete finish with a false horizontal joint to provide strong horizontal banding which minimises the vertical joints of the RSW panels.

The parapets are medium performance level barriers comprising a 650mm high precast concrete barrier/parapet surmounted by twin steel rails, providing an overall height of 1300mm above road surface level. A single conduit is located in each barrier. For each bridge a longitudinal drainage pipe is located between the parapet skirt and outermost Super-T. The skirt extends downwards sufficiently to conceal the drainage pipe when the bridge is viewed in elevation. Safety screens are also provided in accordance with the SWTC.

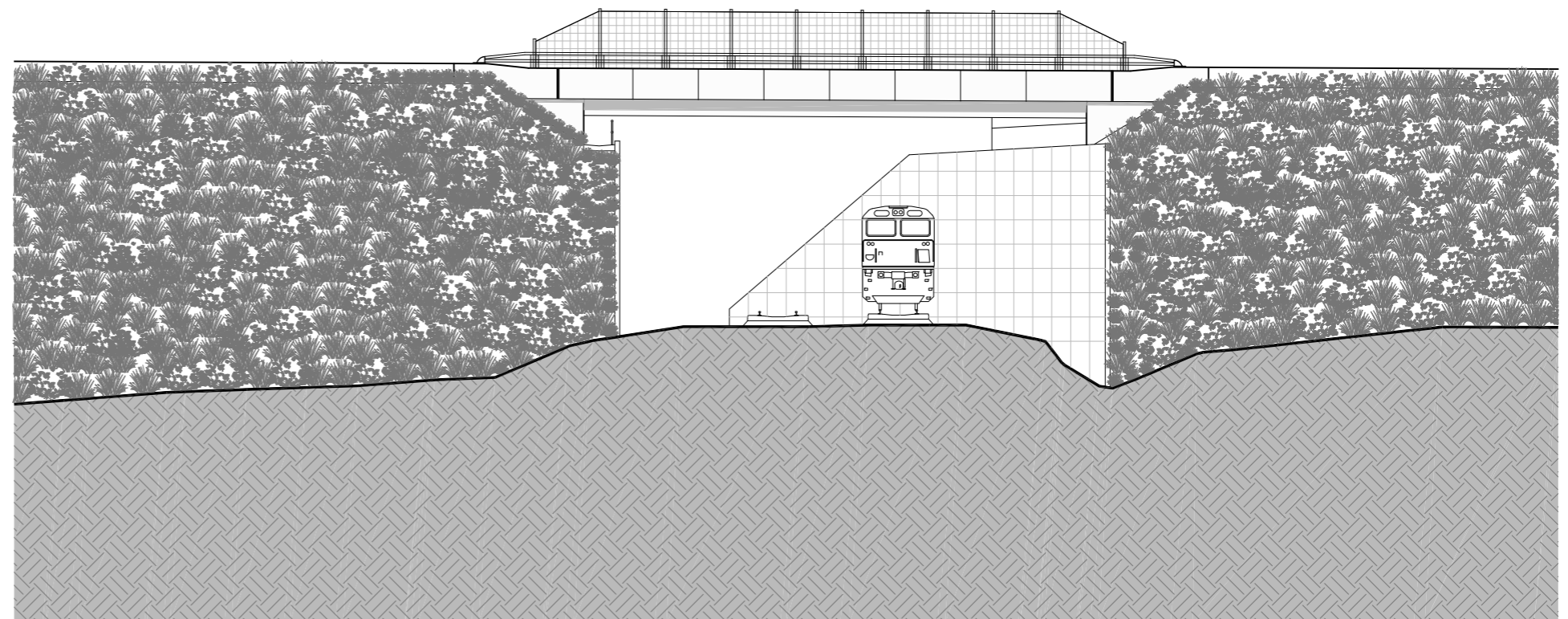
The approaches to the North Coast Railway Line underbridges are located on fill embankments which are approximately 12.0m tall at the abutments.

**Changes since 15% DCD**

- Span reduced from 25.20m to 22.78m then increased to 25.722m to allow for fauna passage.
- Super-T girders reduced in depth from 1200mm to 1000mm.
- Width of southbound bridge reduced slightly.

**Urban Design Comments on 85% PDD to be incorporated in 100% SDD**

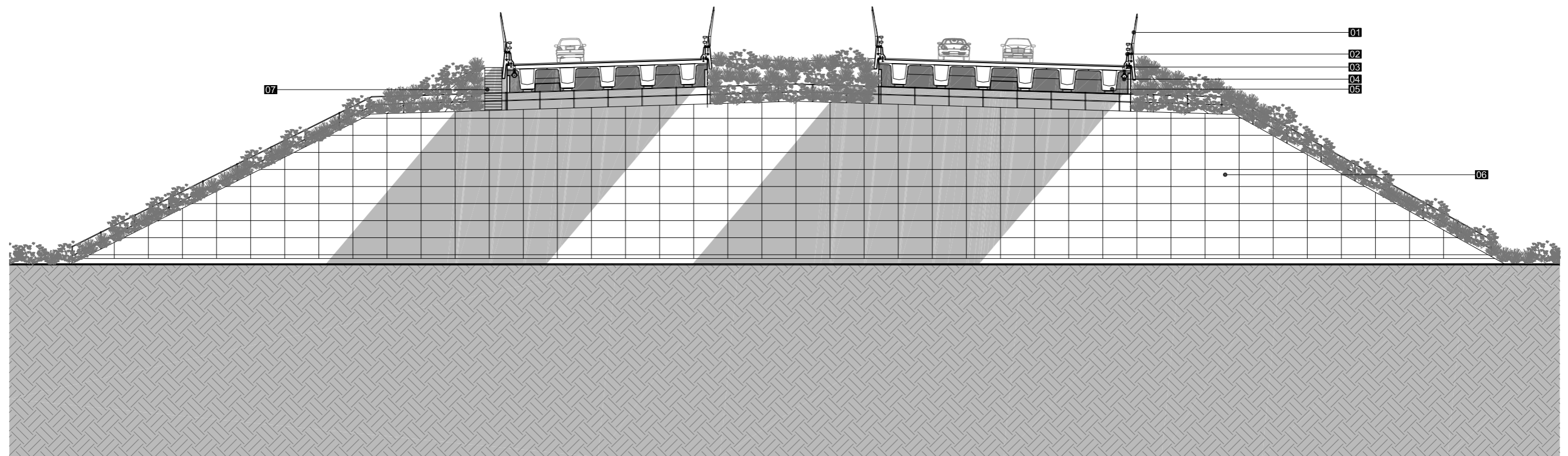
- None.



Drawings are for illustrative purposes only.  
For dimensions and extent of works refer to Engineers Drawings.  
For Landscape types and extents refer to Landscape Drawings.

E 3.1.2

Figure D.3.1.1 Twin Bridges over North Coast Railway: Elevation



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NORTHBOUND

SOUTHBOUND

- 01 GALVANISED SAFETY SCREEN
- 02 TWIN METAL STEEL RAIL BARRIER
- 03 CONCRETE PARAPET
- 04 DRAINAGE PIPE
- 05 SUPER-T GIRDERS
- 06 CONCRETE REINFORCED SOIL WALL
- 07 DARK TINTED CONCRETE MAINTENANCE ACCESS STAIRS

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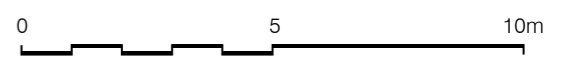


Figure D.3.1.2 Twin Bridges over North Coast Railway: Cross Sectional Elevation

### D.3.2 Twin Bridges over Boggy Creek – Station 62km750

These bridges carry the highway over Boggy Creek. They also accommodate on and off ramps for the Nambucca Heads Interchange. They comprise two equal spans of 27.00m with seven 1200mm deep Super-T girders for the northbound bridge and for the southbound bridge eight 1200mm deep Super -T girders for Span 1 and seven 1200mm deep Super-T girders for Span 2. The inclusion of ramps means the width of the bridge deck for each carriageway varies, with a minimum of 14.95m and a maximum of 18.03m. Spill through abutments are adopted with a slope of 1.5H:1V. The substructure comprises reinforced concrete headstocks supported on 1000mm diameter circular concrete piers.

The parapets are medium performance level barriers comprising a 650mm high precast concrete barrier / parapet surmounted by twin steel rails, providing an overall height of 1300mm above road surface level. A single conduit is located in each barrier.

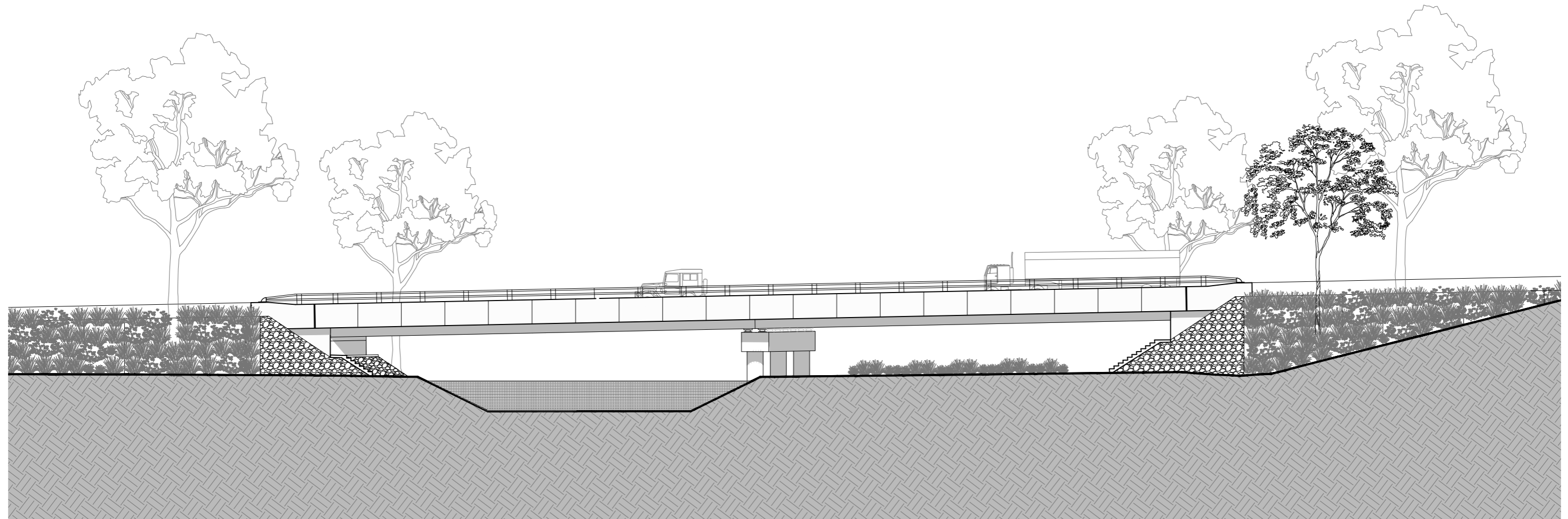
The abutments are potentially subject to scour and they are accordingly treated with stone boulders.

#### Changes since 15% DCD

- Number of spans reduced from 3 to 2.
- Span length increased from 24.0m to 27.0m.
- Except for Span 1 of the southbound bridge (which remains at eight), the number of Super-T girders per span has been reduced from eight to seven.
- Super-T girder depth has increased from 1000mm to 1200mm.
- Deck widths have been reduced, the minimum from 15.55m to 14.95m and the maximum from 21.16m to 18.03m.

#### Urban Design Comments on 85% PDD to be incorporated in 100% SDD

- None.



BOGGY CREEK

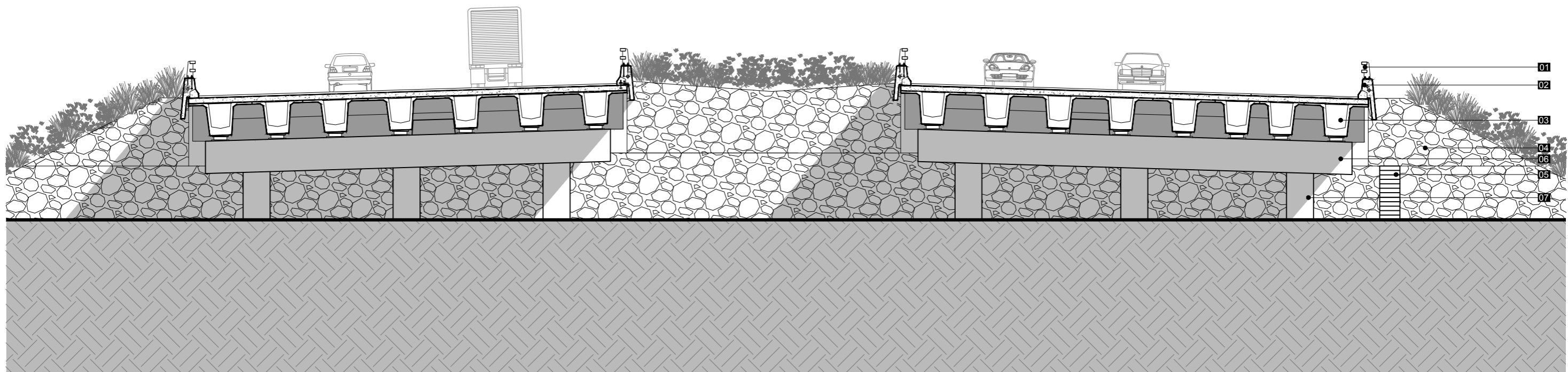
E 3.2.2

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0 10 20m

Figure D.3.2.1 Twin bridges over Boggy Creek: Elevation

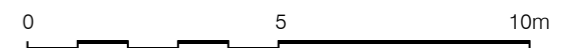




- 01 TWIN METAL RAIL BARRIER
- 02 CONCRETE PARAPET
- 03 SUPER-T GIRDERS
- 04 STONE BOULDER SCOUR PROTECTION
- 05 MAINTENANCE ACCESS STAIRS
- 06 CONCRETE HEADSTOCK
- 07 CIRCULAR CONCRETE PIERS

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Figure D.3.2.2 Twin bridges over Boggie Creek: Cross Sectional Elevation





### D.3.3 Twin Bridges over Cow Creek – Station 63km650

These bridges carry the highway over Cow Creek. They are on a curved horizontal alignment and comprise a single 37.0m span with six 1800mm deep Super-T girders per bridge. The width of the bridge deck for the southbound carriageway is 11.0m and 12.60m for the northbound carriageway. Spill through abutments are adopted with a slope of 1.5H:1V. The abutment structures comprise reinforced concrete beams with wing walls and are supported on piles.

The parapets are medium performance level barriers comprising a 650mm high precast concrete parapet with twin steel rails providing an overall height of 1300mm above road surface level. A single conduit is provided in each barrier. For each bridge a longitudinal drainage pipe is located between the parapet skirt and outermost Super-T. The skirt extends downwards sufficiently to conceal the drainage pipe when the bridge is viewed in elevation.

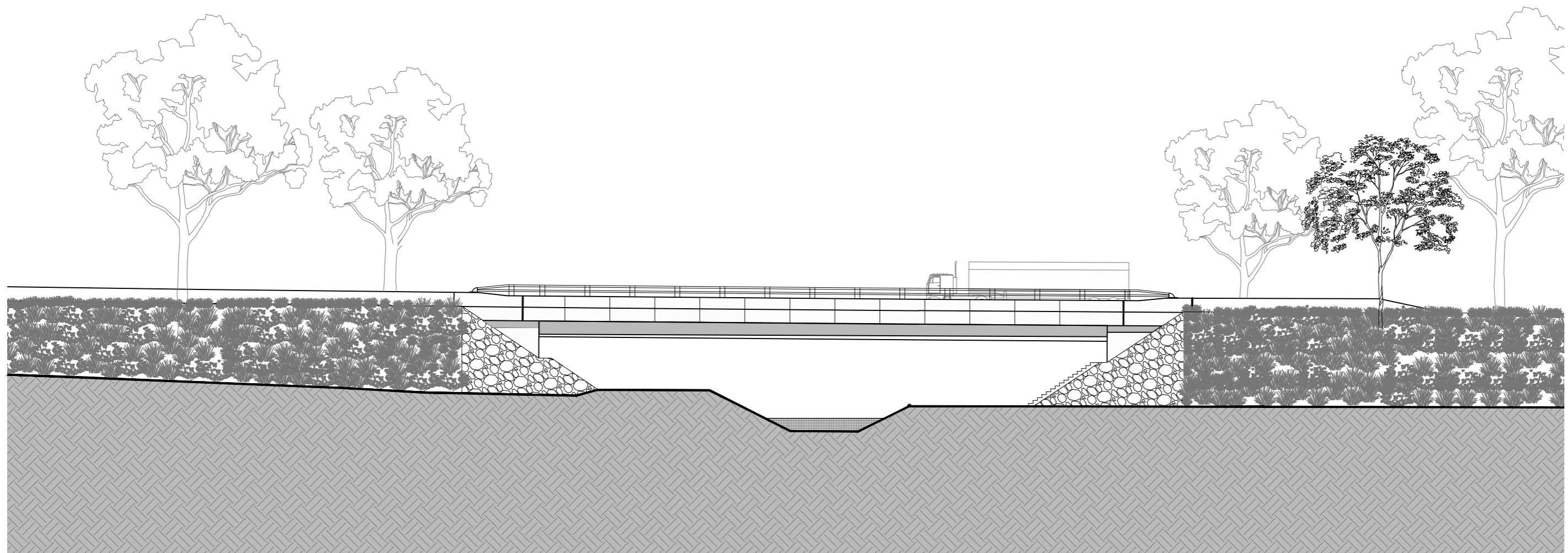
The abutments are potentially subject to scour and they are accordingly treated with stone boulders.

#### Changes since 15% DCD

- Span increased slightly from 36.0m to 37.0m.
- Width of the northbound carriageway has been increased from 11.0m to 12.6m.

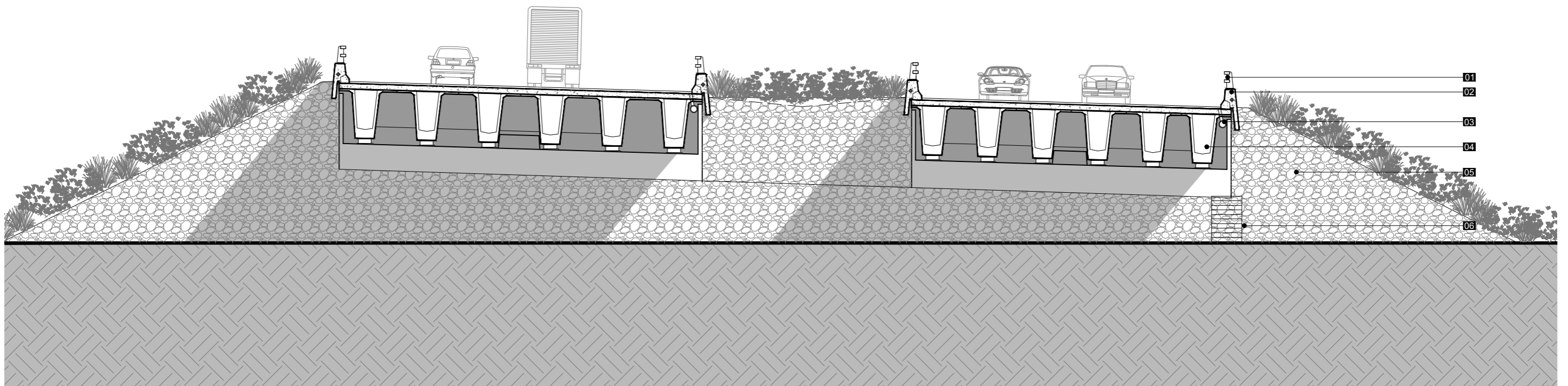
#### Urban Design Comments on 85% PDD to be incorporated in 100% SDD

- None.



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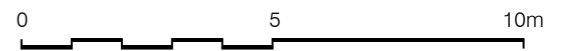
Figure D.3.3.1 Twin bridges over Cow Creek: Elevation



- 01 TWIN METAL RAIL BARRIER
- 02 CONCRETE PARAPET
- 03 DRAINAGE PIPE
- 04 SUPER-T GIRDERS
- 05 STONE BOULDER SCOUR PROTECTION
- 06 MAINTENANCE ACCESS STAIRS

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Figure D.3.3.2 Twin bridges over Cow Creek: Cross Sectional Elevation



#### D.3.4 Twin Bridges over Valla Road – Station 64km150

These bridges carry the highway over Valla Road. They are on a curved horizontal alignment and comprise a single 32.70m span with seven 1500mm deep Super-T girders for the northbound bridge and six 1500mm deep Super-T girders for the southbound bridge. The width of the bridge deck is 13.0m for the northbound carriageway and 11.0m for the southbound. Spill through abutments are adopted with a slope of 1.5H:1V. The abutment structures comprise reinforced concrete beams with wing walls and are supported on piles.

The parapets are medium performance level barriers comprising a 650mm high precast concrete barrier / parapet surmounted by twin steel rails, providing an overall height of 1300mm above road surface level. A single conduit is provided in each barrier. For each bridge a longitudinal drainage pipe is located between the parapet skirt and outermost Super-T. The skirt extends downwards sufficiently to conceal the drainage pipe when the bridge is viewed in elevation.

#### Changes since 15% DCD

- None.

#### Urban Design Comments on 85% PDD to be incorporated in 100% SDD

- None.

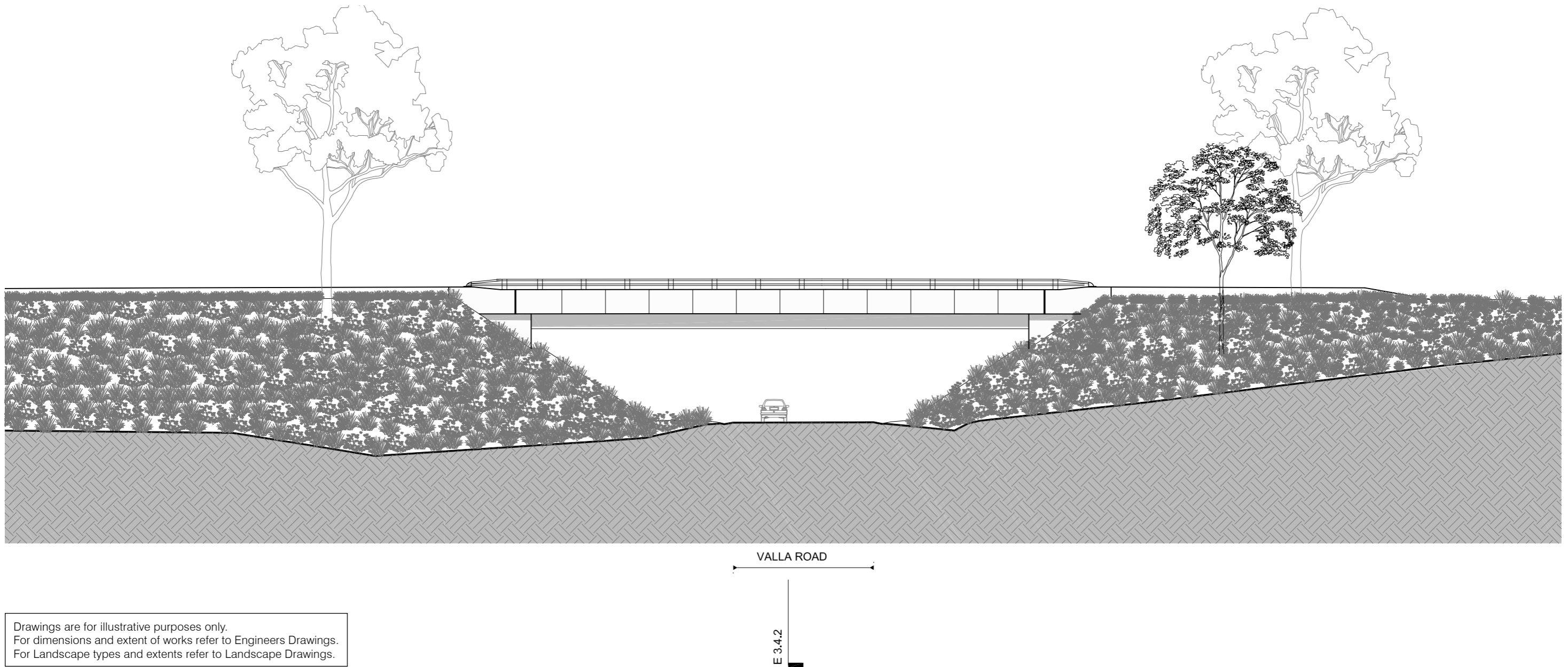
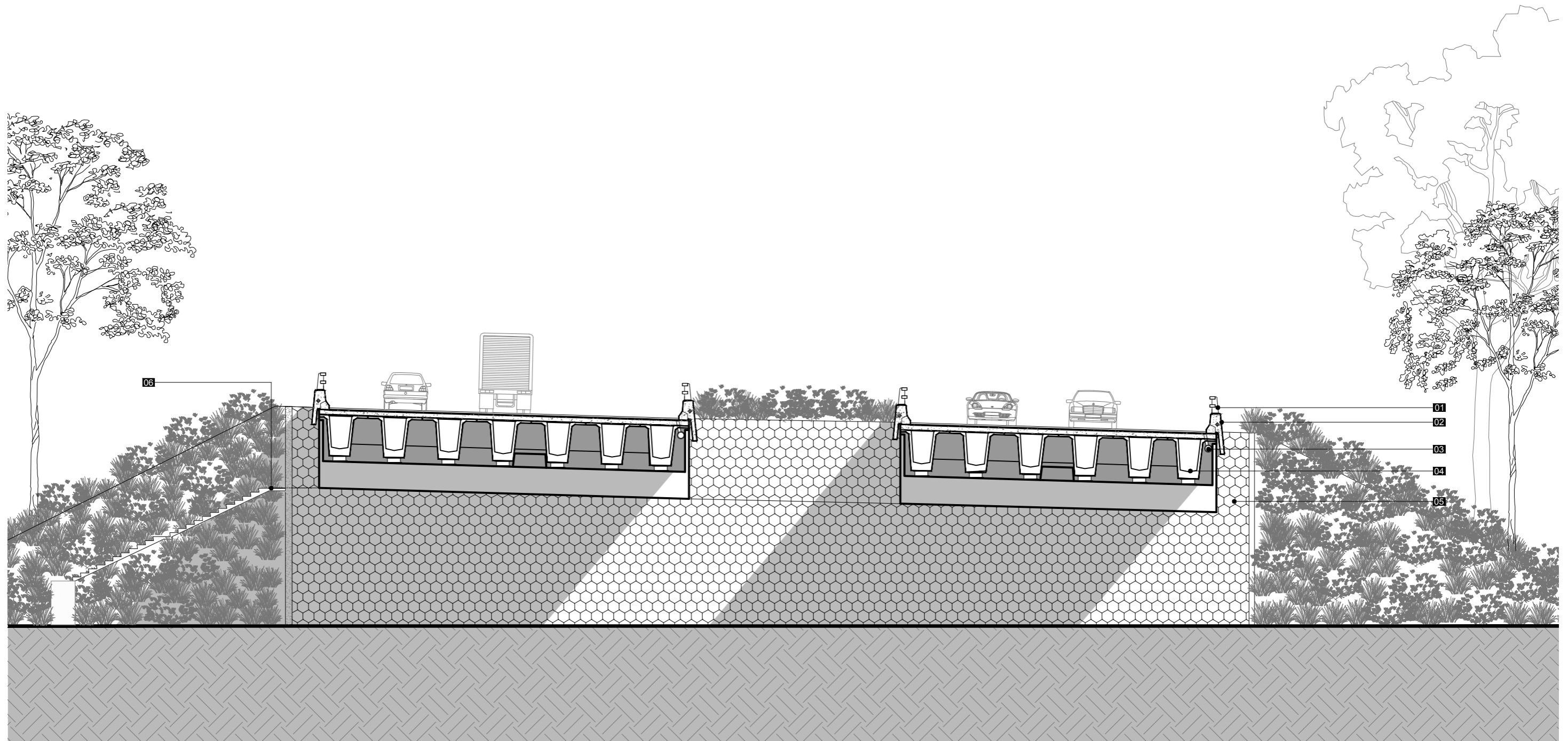


Figure D.3.4.1 Twin bridges over Valla Road: Elevation





- 01 TWIN METAL RAIL BARRIER
- 02 CONCRETE PARAPET
- 03 DRAINAGE PIPE
- 04 SUPER-T GIRDERS
- 05 CONCRETE PAVER ABUTMENT TREATMENT
- 06 MAINTENANCE ACCESS

Drawings are for illustrative purposes only.  
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 For Landscape types and extents refer to Landscape Drawings.

Figure D.3.4.2 Twin bridges over Valla Road: Cross Sectional Elevation

0 5 10m