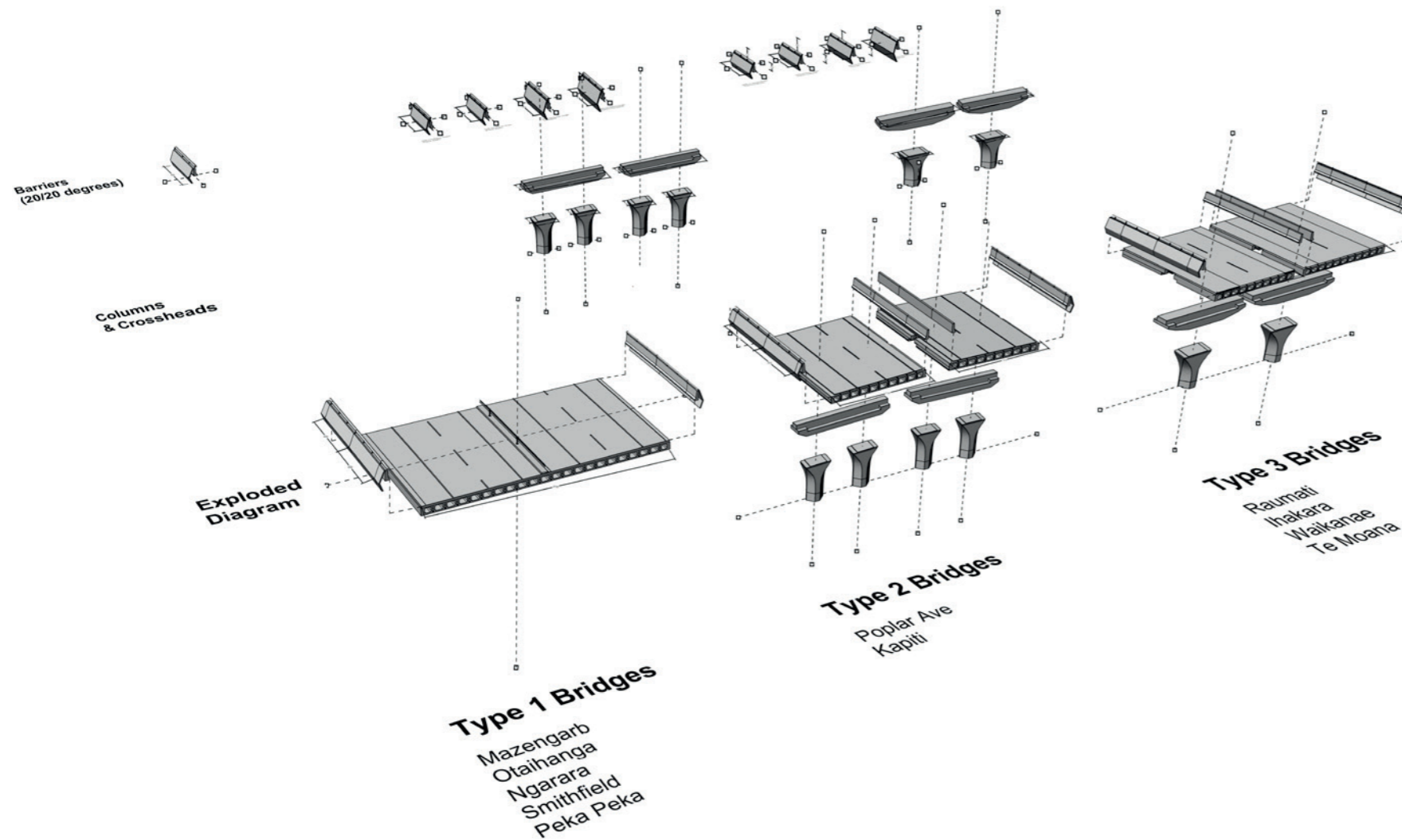


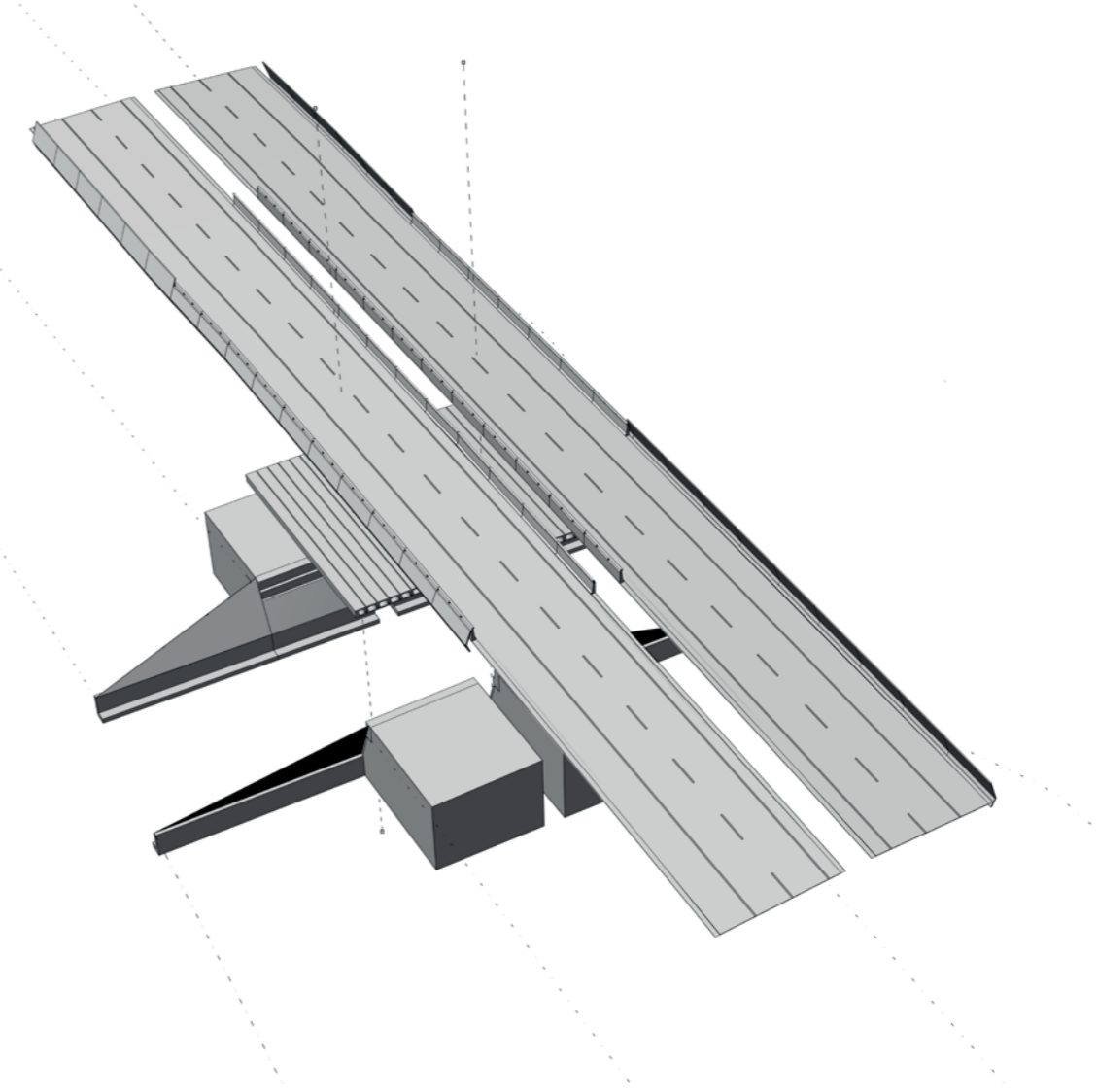
Appendix 3: BRIDGE SUMMARY- MAZENGARB BRIDGE
Site Specific Management Plan 004 - [Sectors 420]
MacKays to Peka Peka Expressway

01 SEPTEMBER 2014 - CERTIFIED ISSUE - REV C

Bridges as a series of components



Proposed Mazengarb exploded isometric



Design Objectives

With reference to the Urban and Landscape Design Framework (Technical Report 5) (ULDF) there are four design objectives for the bridges and their respective contexts. These four objectives are overarching aims for the project and have been extracted from the Design Concept statements in two sections of the ULDF: Local Road Interface Design (section 5.7) and Bridge Design (section 5.8).

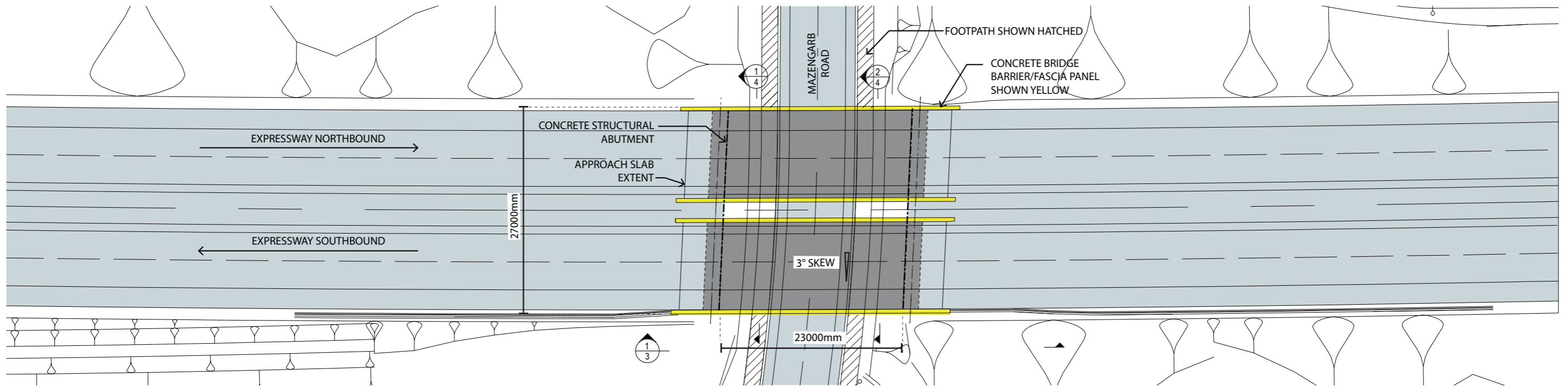
The purpose of extracting these objectives is to enable any changes to bridge structures and their context made through the concept and detailed design process to be considered at the highest level of the design intent. There are design principles in each of the sections as noted above and these too form a basis for considering the development of the designs for the bridges and their context.

As is typical in a design evaluation process, any aspects of design that do not align with the design principles would be elevated to consideration against the design objectives.

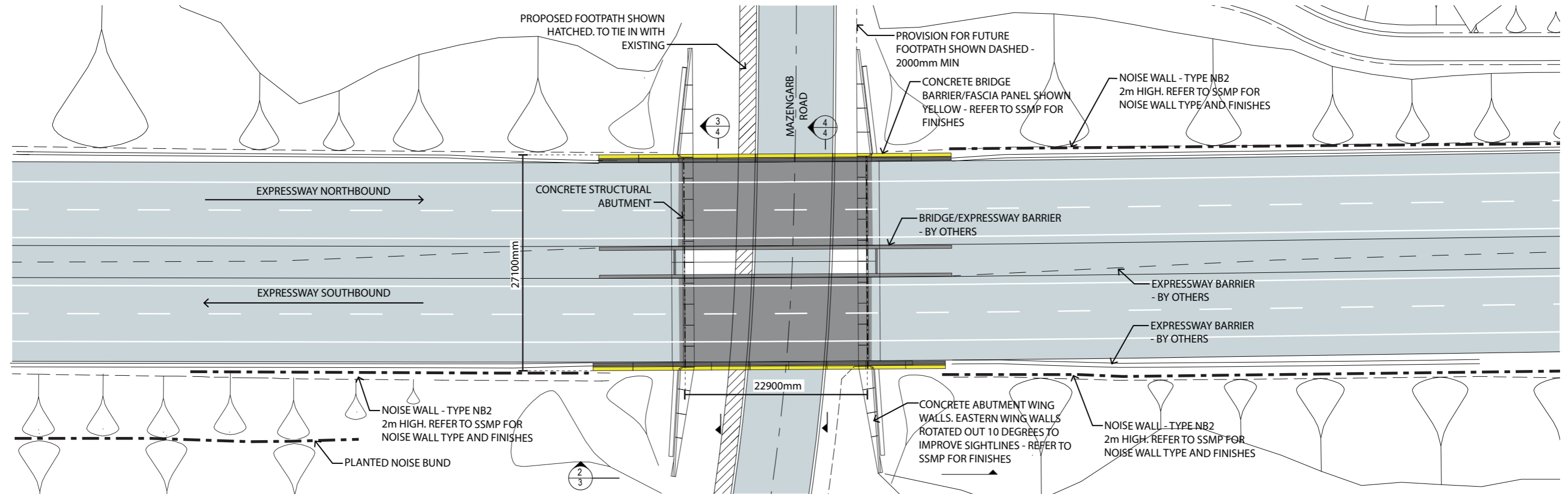
Design Objectives:

1. The public spaces of the roads and streets take primacy over the experience of the Expressway users. Local people will be making slower movements and as a consequence the bridges will be more visually apparent to them than to people travelling along the Expressway
2. As a new element in the landscape, the bridges respect the surrounding landscape and are expressed in terms of their horizontality, fluidity and simplicity because the landscape is relatively low key and low in scale; having several 'feature' bridges would become both visually complex and overwhelming in scale.
3. Bridges are formed as a whole from a single kit of parts, which allows the components to be repeated and a similar approach used at the multiple crossings to register as a 'family' of bridges because people will have multiple interactions day to day with the Expressway and this approach promotes simplicity and visual continuity.
4. Utilise concrete prefabricated parts because this allows fine levels of quality control, cost benefits and significant improvements in construction time at the crossings and reduces disturbance to the area.

AEE Consented to DET Proposed Graphic Comparison



AEE PLAN- MAZENGARB ROAD BRIDGE - 1:500@A3



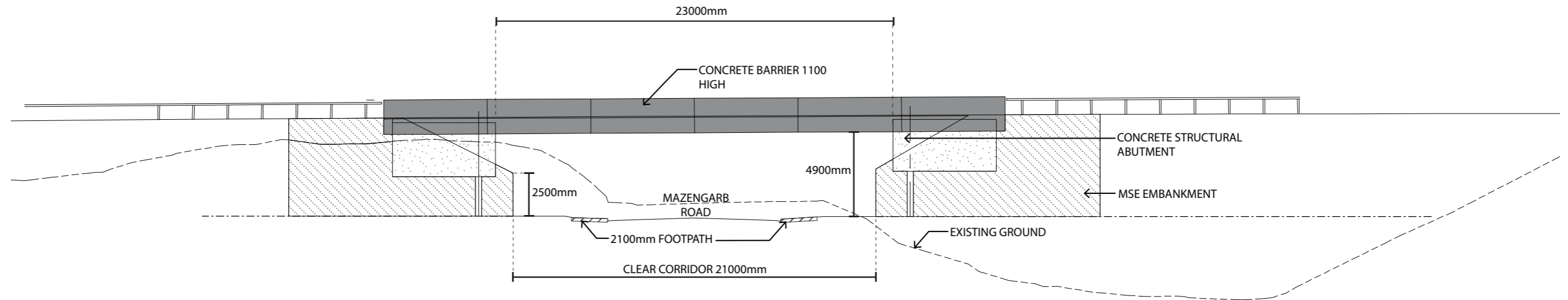
PROPOSED PLAN- MAZENGARB ROAD BRIDGE - 1:500@A3

Design development

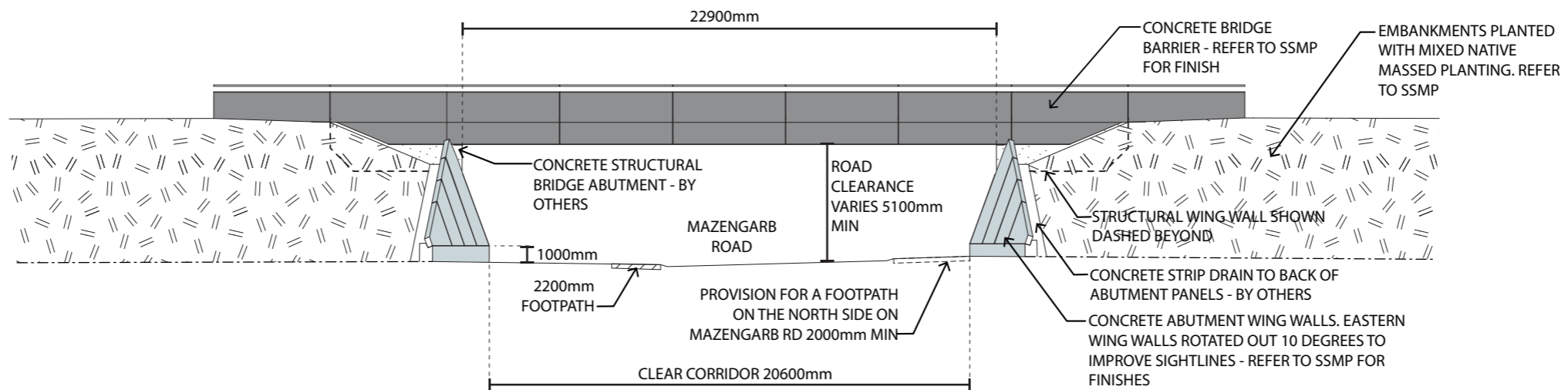
1. Reduced bridge skew. From 3° to 0°
2. More detail provided for abutment treatment
3. Extent of noise walls shown
4. No footpath constructed on the northern side of Mazengarb Road

Rationale

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Improves constructibility 2. Lack of abutment information in AEE phase. The bridge abutments tie in with and retain the proposed embankments. The abutment wing walls are designed as one long continuous element, they lead pedestrians though and under the bridge | <ol style="list-style-type: none"> 3. connecting one side to the other. 3. Provided for reference only. Refer to SSMP for more detail and finishes 4. No existing footpath to tie in to on the northern side. Space provision for future footpath. |
|--|---|



1. AEE ELEVATION - MAZENGARB ROAD BRIDGE EAST ELEVATION - 1:250@A3



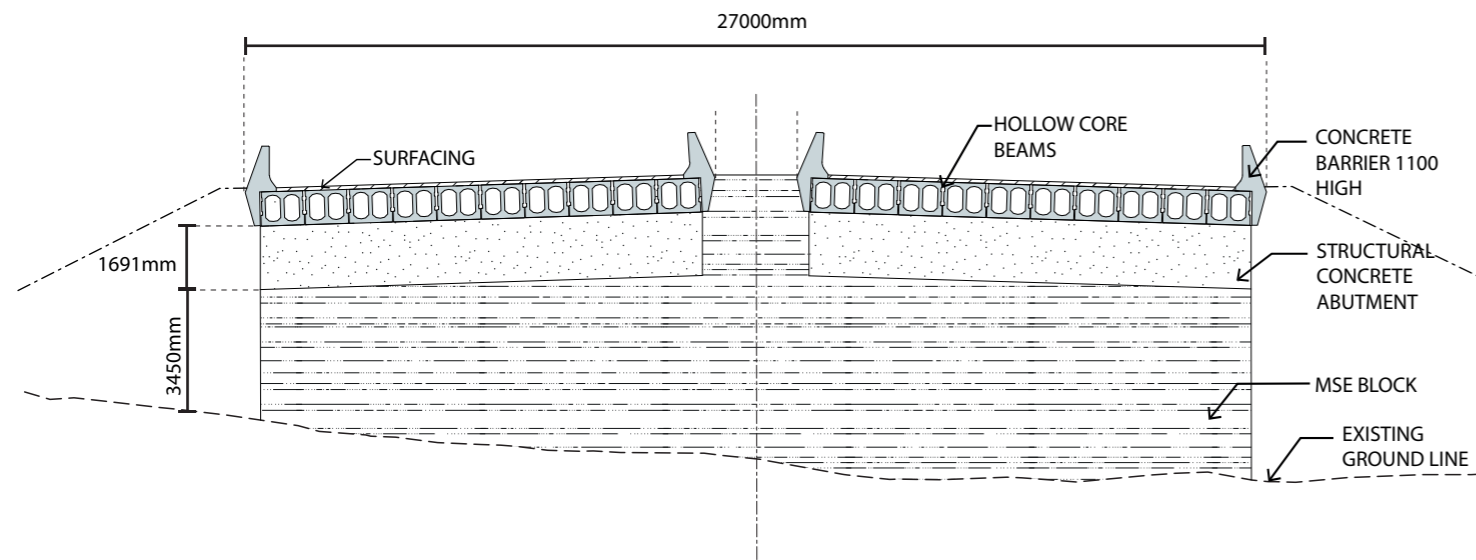
2. PROPOSED ELEVATION - MAZENGARB ROAD BRIDGE EAST ELEVATION - 1:250@A3

Design development

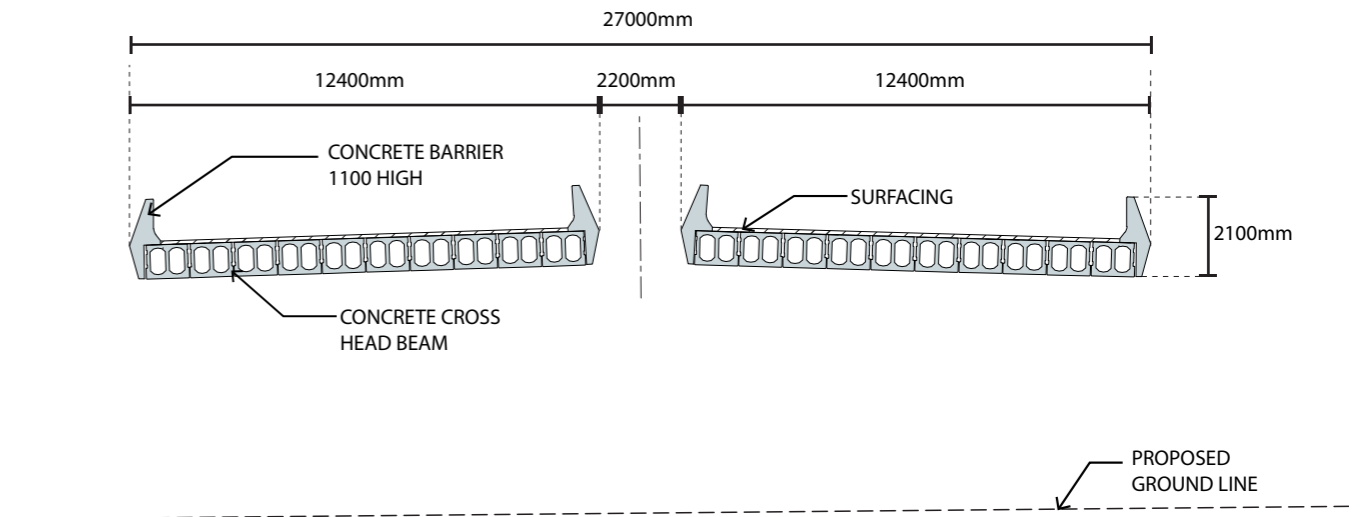
1. More detail provided for abutment treatment
2. No footpath constructed on the northern side of Mazengarb Road

Rationale

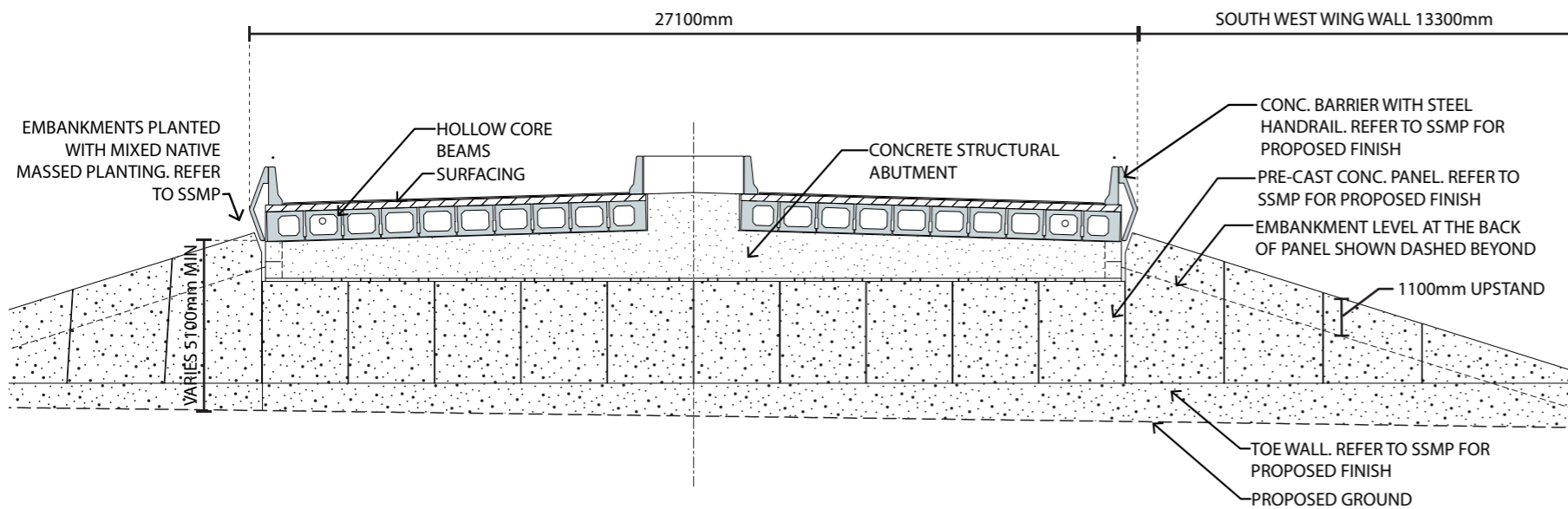
1. Lack of abutment information in AEE phase. The bridge abutments tie in with and retain the proposed embankments. The abutment wing walls are designed as one long continuous element, they lead pedestrians though and under the bridge
2. connecting one side to the other.
No existing footpath to tie in to on the northern side. Space provision for future footpath.



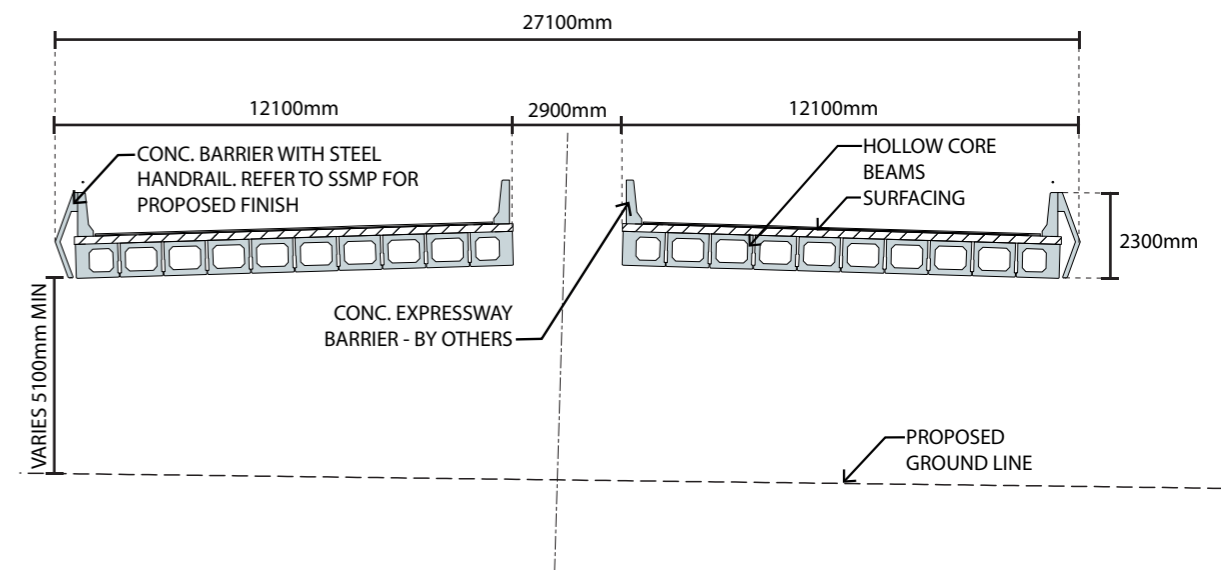
1. AEE SECTIONAL ELEVATION - MAZENGARB ROAD BRIDGE NORTH ABUTMENT - 1:200@A3



2. AEE SECTIONAL ELEVATION - MAZENGARB ROAD BRIDGE (LOOKING NORTH) - 1:200@A3



3. PROPOSED SECTIONAL ELEVATION - MAZENGARB ROAD BRIDGE NORTH ABUTMENT - 1:200@A3



4. PROPOSED SECTIONAL ELEVATION - MAZENGARB ROAD BRIDGE (LOOKING NORTH) - 1:200@A3

Design development

1. More information provided for the bridge abutment
2. Bridge concrete fascia panels removed from the inside of the bridge

Rationale

1. Lack of abutment information in AEE phase. The bridge abutments tie in with and retain the proposed embankments. The abutment wing walls are designed as one long continuous element, they lead pedestrians through and under the bridge

2. connecting one side to the other.
2. Increase width of light shaft.



AEE VISUALISATION - MAZENGARB ROAD BRIDGE (NORTH WEST SIDE OF MAZENGARB LOOKING SOUTH EAST)



PROPOSED VISUALISATION - MAZENGARB ROAD BRIDGE (NORTH WEST SIDE OF MAZENGARB LOOKING SOUTH EAST)

Elements

AEE Design

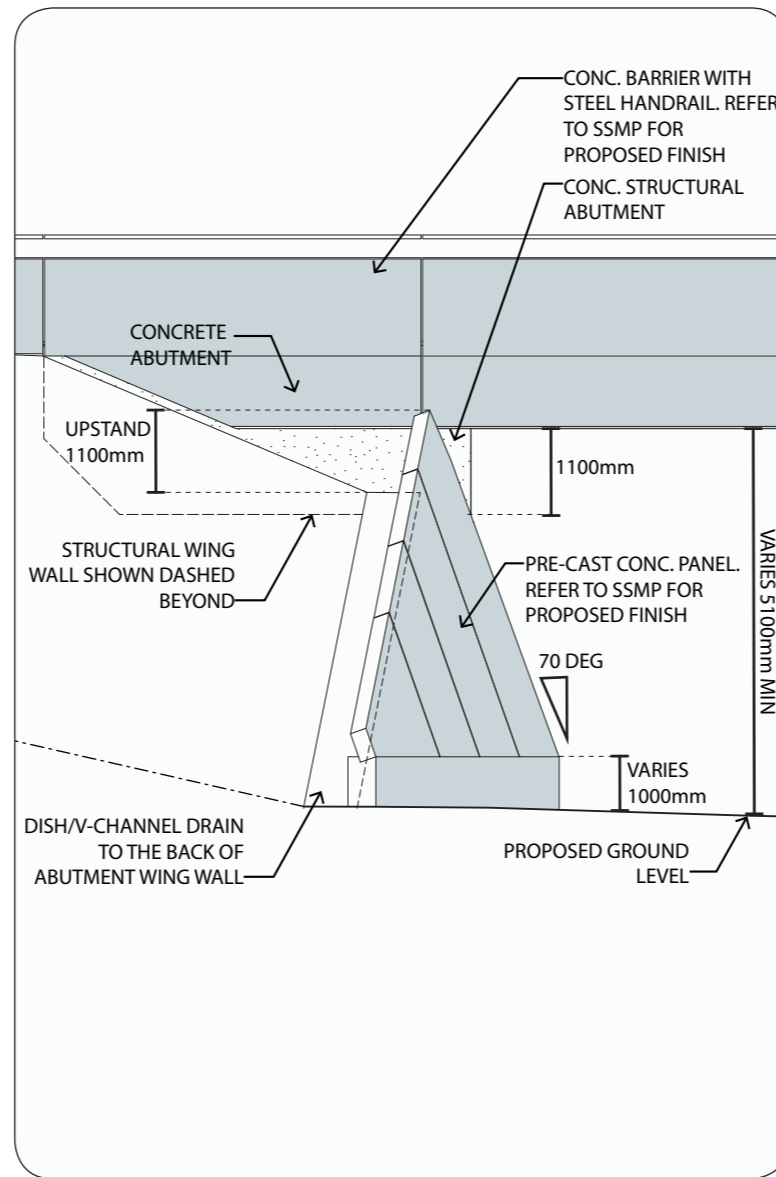
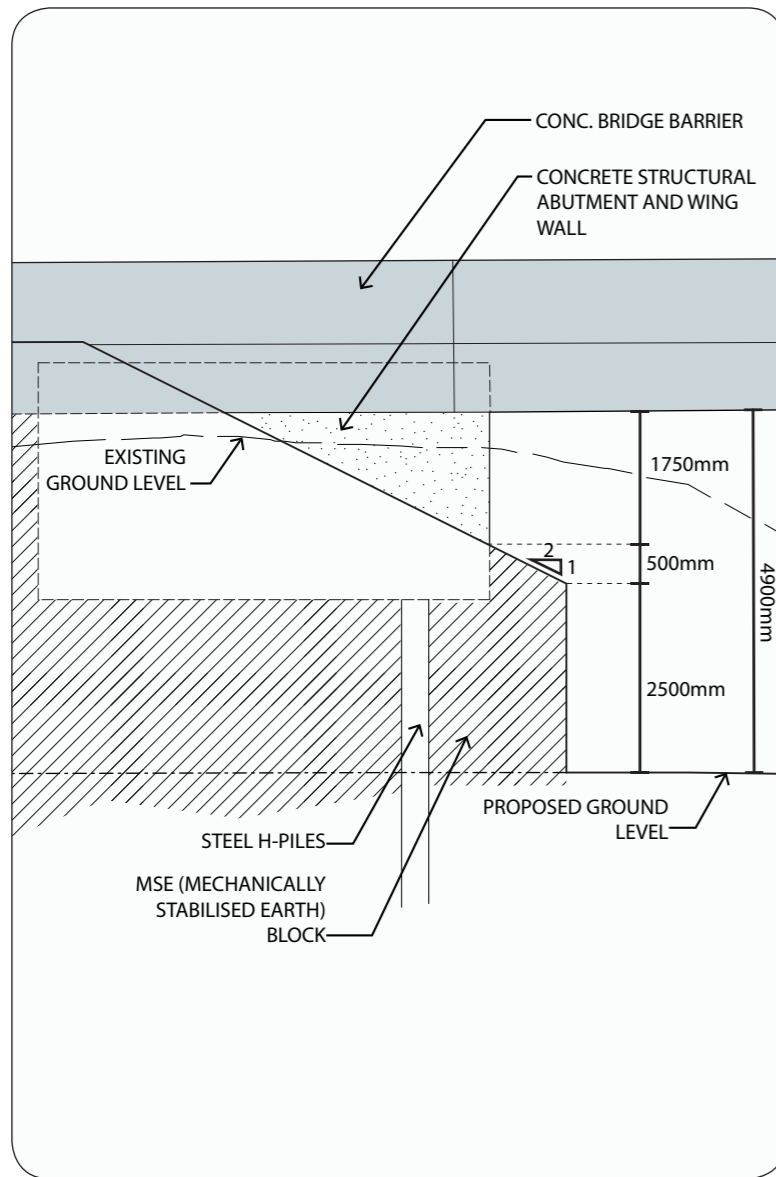
Current Design

Developments

Why?

ULDF Principles

Abutment Elevation 1:100@A3

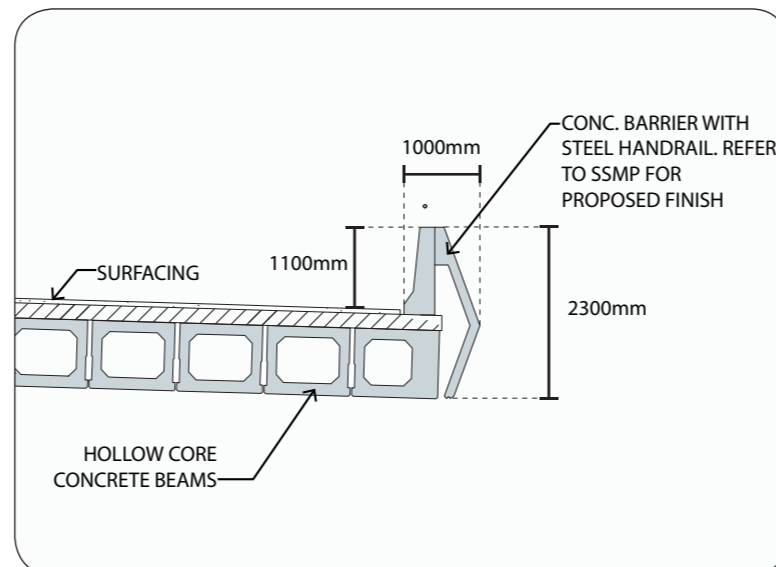
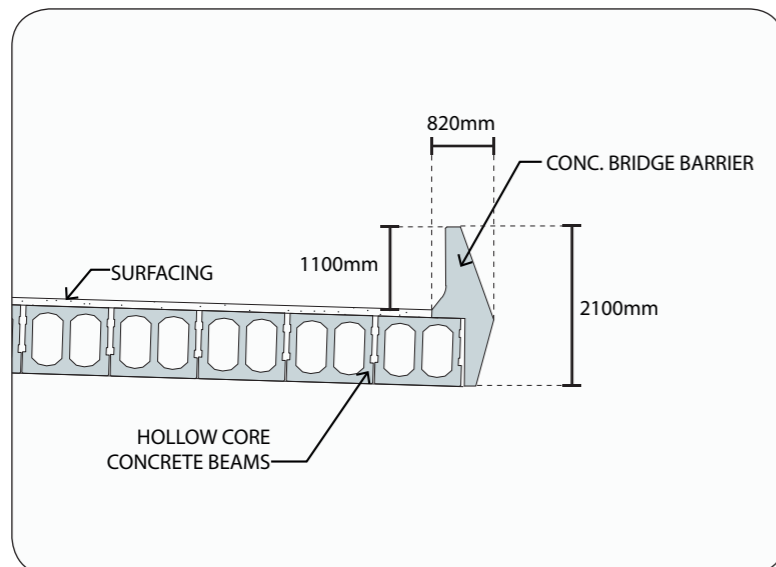


1. More information provided for the bridge abutment
2. Spill through abutment angel reduced.
3. Handrail shown on top of barrier

1. Lack of abutment information in AEE phase. The bridge abutments tie in with and retain the proposed embankments. The abutment wing walls are designed as one long continuous element, they lead pedestrians though and under the bridge connecting one side to the other.
2. To be consistent with the proposed Otaihang Road bridge, improve sightlines.
3. Missing from AEE. Safety requirement for cyclists using the expressway

1. Please refer to ULDF principles summary on sheet; 7 of this document. With particular reference to principle number; 1, 2, 3, 5, 8, 11 and 13

Cross Head & barrier junction 1:100@A3



1. Handrail shown on top of barrier
2. Bridge fascia panel height increased

1. Missing from AEE. Safety requirement for cyclists using the expressway.
2. Increase to the bridge deck depth.

1. Please refer to ULDF principles summary on sheet; 7 of this document. With particular reference to principle number 1, 2, 3, 4, 8 and 13

ULDF PRINCIPLES SUMMARY

ULDF principle	Assessment of ULDF principles
1. Make the bridges generally consistent in their form so they register as a 'family' and provide some visual continuity within the local environment	Proposed bridge form remains consistent with and has become even more so as there is less variation in bridge types from that shown in AEE. Accordingly there is enhanced consistency in the local environment.
2. Express the bridges as simple forms that sit across the changes in landscape and are not seen as strong statement in their own right	Proposed bridge form remains as in AEE. Mazengarb bridge is a visually simple structure that sits across the landscape as an horizontal element.
3. Unite the bridge elements of pier, cross head, deck and barrier as one sculptural form and ensure services are concealed from view	Proposed bridge form remains as in the AEE – has no piers and the form is generally consistent with other bridge forms – will appear as part of same family given the barrier/fascia panel form. There are no services elements or other extraneous protrusions below the bottom of the bridge fascia panels
4. Ensure the form of the bridges from the underside is visually appealing to recognise the primacy of the local roads user's experience in design consideration	Proposed bridge remains as in AEE. The abutment design leads the local road users (Pedestrian and vehicular) up to, beneath and then beyond the bridge space.
5. Design the intersection of the piers with the ground in concert with the local road interface design of abutment forms and materials (refer to local road interface design principles)	Proposed bridge remains as in AEE with no piers. The abutment form has been developed to better tie in with the proposed earthworks surrounding the bridge. The abutments provide for required sight lines for local road crossings by cyclists and walkers.
6. Light the spaces beneath local road over bridges to enhance the quality of the space including the use of natural light penetration where the local road has a higher frequency of pedestrian cycling and other non-vehicular users	There is lighting to be provided under the bridge to recognise the relatively high level of usage by cyclists, walkers and others. This lighting can be used to enhance the architectural forms. The split in the bridge deck, sloping abutment and no piers means there is some natural light penetration to the space beneath the bridge.
7. Use architectural lighting to emphasise the sculptural forms of the bridges and light units that are readily serviceable from the ground	Proposed bridge will be lit from beneath and objective will be to light the underside of the bridge deck
8. Utilise the opportunity provided by multiple bridges to make a system of parts that can be repeated at each location and improve efficiency of construction	Proposed bridge, as in the AEE, remains of the same systematised approach to allow repetition at other locations and improves the efficiency of construction.
9. Use textured finishes within the bridge elements surfaces' to provide a crafted finish – avoid printed forms	The proposed finish on the Mazengarb Road Bridge fascia panels will be fair faced concrete with a white wash, applied concrete coating to ensure colour and tonal uniformity between panels. The bridge abutment will be constructed with precast concrete panels with an inlaid Otaki pebble finish. The underside of the deck will be fair faced concrete without the applied white wash coating to help make these elements visually recessive relative to the barrier. Matt graffiti protection to be applied to all bridge elements surfaces. Refer to the SSMP for further detail on the proposed finishes.
10. Repeat the bridge design concepts within the design of pedestrians bridges recognising that these may be able to utilise lighter weight materials	Not relevant
11. Develop each bridge crossing design considering the piers types best suited to the location	Not relevant
12. Locate bridge piers associated with bridge watercourse crossings away from riparian edges to prevent need to armour stream edges	Not relevant
13. Ensure that the integrity and significance of the bridge forms as important to the amenity of the community is not accorded any less priority than the other design requirements of the project	Proposed bridge form at Mazengarb Road has seen the consideration of all the contributing factors of visual amenity, safe CWB crossing, structural design in high seismic zone, and constructibility.

