East West Link Alliance Memorandum

To:	Amelia Linzey	**Date:**	23rd March 2016
From:	Lloyd de Beer	**Our Ref:**	
Copy:	Noel Nancekivell, Lara Jay		
Subject:	**MCA Assessment – Embankment Design Options Presentation**		

1 Purpose

This memo presents eight design alignment options (embankment and bridge) for the Mangere inlet foreshore area (Project Sector 2). The information is presented ahead of MCA (Multi-Criteria Assessment) workshops for analysis by experts prior to the meeting.

The intention of this MCA is to assess the location of the alignment and type of structure (embankment or bridge), only. This MCA will not cover leachate and stormwater treatment options, or construction materials and dredging options/locations. Additional MCA's and supporting information will be supplied and held specific to discuss these aspects of the design.

This memo with its supplementary information and drawings outlines the key constraints and design inputs specific to each option.

2 Location of Embankment

Refer to Figure 1 below for location of Embankment in Project Sector 2. The assessment area extends between the Neilson Street interchange to Anns Creek within the Mangere Inlet. The length of assessment is approximately 3000m, extending upto 130m into the Mangere Inlet from the CMA boundary.

Figure 1 Embankment Location for Assessment

3 Information Provided

The following information is provided to allow a full assessment of the Embankment alignment to be made

- Plans showing alignment options
- Typical cross sections for each alignment
- Longitudinal Sections for on land alignments with underlying geotechnical features
- Indicative coastal edge landscape treatment for the inner and further out bund options to give MCA experts an understanding of what the different options could look like. Further development of this is planned prior to the MCA workshop
- Existing Auckland Council PAUP (Proposed Auckland Unitary Plan) features
- Design commentary of each option specifically relating to stormwater treatment, groundwater, geotechnical, walking and cycling, and Urban Design

3.1 Appendices

- Appendix A Drawings
- Appendix B Auckland Council GIS Data
- Appendix C Indicative Landscape Treatment
- Appendix D Design Commentary on Each Option
- Appendix E Ground conditions and longitudinal section of inland alignment

4 Detailed Business Case Alignment

The embankment alignment presented in the Detailed Business Case (DBC) was chosen as a general route along the Mangere inlet foreshore with the intention that further design development and options assessment would take place post-DBC approval. Options presented in this MCA have investigated further stormwater treatment options, property impacts, embankment location alternatives and the like.

5 Options Presented

Considerations for the below options have been undertaken by each required design discipline and is located in Appendix A.

Notes applicable to all options:

- The road cross section (bridge or embankment) is still to be agreed with the NZ Transport Agency and is shown indicatively only. Any change to the cross section will be applied equally to each option presented
- The coastal edge of the embankment will vary in width and is currently shown parallel to the roadway. The edge is expected to be variable (refer to Appendix C) but will apply equally to each option presented.
- Wetland widths are shown on each option indicatively only. The final widths and final form of treatment will be discussed and agreed at subsequent MCA workshops.

- Embankments to be constructed from imported fill or mudcrete or a variety of both methods. These options will be discussed at subsequent MCA workshops. Roadway constructed on the reserve edge or inland will require significant imported fill.

5.1 Option 1 – Inner Inlet Bridge Alignment

The fundamental elements of Option 1 are:

- Super Tee Concrete Bridge for road users and pedestrians indicated to be constructed within CMA (35m max spans). Note that there is the potential to position this bridge in numerous locations in and around the foreshore.
- No regional stormwater treatment (to capture SW outfalls and leachate) proposed in this option; stormwater runoff from the new roadway will require treatment, possibly proprietary devices would be the only practical solution.
- Existing Waikaraka shared path to remain in its current location (north of roadway alignment)
- Additional shared path proposed on southern side of bridge structure
- Vector high pressure gas main to remain
- No permanent reclamation anticipated

5.2 Option 2 – Bridge with SW Treatment Bund

Agreement reached at Pre-MCA Workshop on 9th March 2016 that this option would not be assessed further through the MCA process.

5.3 Option 3 – Reserve Edge Embankment Alignment

The fundamental elements of Option 3 are:

- Embankment constructed over the existing foreshore (excluding Waikaraka Cemetery), outside the existing property boundary and extending approximately 20m into the CMA
- No regional stormwater treatment (to capture SW outfalls and leachate) proposed in this option; stormwater runoff from the new roadway will require treatment.
- Existing Waikaraka shared path to be removed and reconstructed with the new embankment to the northern side of the roadway alignment
- A new shared path proposed on the southern side of the embankment to allow access to the foreshore
- Relocate Vector high pressure gas main
- Landfill settlement mitigated with steel piles at 3m c/c with 1.5m hardfill and geogrid overlay. Large majority of the roadway will be constructed over top of these landfills.

5.4 Option 4 – Reserve Edge Embankment Alignment, with Additional Outer Bund

The fundamental elements of Option 4 are:

- Embankment constructed over the existing foreshore (excluding Waikaraka Cemetery), outside the existing property boundary with an additional bund constructed to contain the stormwater wetland. The overall encroachment into the CMA will be approximately 80m.
- Regional stormwater treatment (to capture SW outfalls and leachate) is proposed in this option to be treated in a wetland (or similar); stormwater runoff from the new roadway will be treated in the wetland or separate system.
- Existing Waikaraka shared path to be relocated to new embankment on northern side of the roadway alignment
- A new shared path proposed on the outer bund to allow access to the foreshore
- Relocate Vector high pressure gas main
- Landfill settlement mitigated with steel piles at 3m c/c with 1.5m hardfill and geogrid overlay. Large majority of the roadway will be constructed over top of these landfills.

5.5 Option 5 – Inner Inlet Embankment Alignment

The fundamental elements of Option 5 are:

- Embankment proposed to be constructed immediately outside CMA boundary within the Mangere Inlet. The embankment will encroach into the CMA approximately 50m.
- No regional stormwater treatment (to capture SW outfalls and leachate) proposed in this option; stormwater runoff from the new roadway will require treatment.
- Existing Waikaraka shared path to remain in its current location (to the north of the embankment)
- A new shared path proposed on the southern side of the embankment to allow access to the foreshore
- Vector high pressure gas man to remain

5.6 Option 6 –Outer Inlet Embankment Alignment

The fundamental elements of Option 6 are:

- Embankment constructed approximately 50m from the CMA boundary to allow for wetland to be constructed between the existing foreshore and new embankment. The wetland and new embankment will encroach into the CMA by approximately 100m.
- Regional stormwater treatment (to capture SW outfalls and leachate) and roadway runoff is proposed to be treated in a wetland (or similar).
- Existing Waikaraka shared path to remain in its current location (north of roadway alignment)
- A new shared path proposed on the southern side of the embankment to allow access to the foreshore
- Vector high pressure gas main to remain

5.7 Option 7 – Tunnel

Agreement reached at Pre-MCA Workshop on 9th March 2016 that this option would not be assessed further through the MCA process.

5.8 Option 8 – Inland Alignment

The fundamental elements of Option 8 are:

- Embankment construction inland (within private property). This option does not require reclamation.
- Landfill settlement mitigated with steel piles at 3m c/c with 1.5m hardfill and geogrid overlay. Large majority of the roadway will be constructed over top of these landfills.
- No regional stormwater treatment (to capture SW outfalls and leachate) proposed in this option; stormwater runoff from the new roadway will require treatment.
- Existing Waikaraka shared path to remain in its current location within the foreshore reserve.
- Vector high pressure gas to remain
- Large amount of property acquisition necessary in this option

5.9 Option 9 – Inner Inlet Embankment Alignment (with mechanical stormwater treatment)

The fundamental elements of Option 9 are:

- Embankment proposed to be constructed immediately outside CMA boundary within the Mangere Inlet. The embankment will encroach into the CMA approximately 50m.
- Stormwater treatment for roadway and regional catchment proposed within mechanical devices/chambers/filters or similar and positioned within the embankment footprint to limit encroachment further into CMA. Type of treatment to be investigated further
- Existing Waikaraka shared path to remain in its current location (to the north of the embankment)
- A new shared path proposed on the southern side of the embankment to allow access to the foreshore
- Vector high pressure gas man to remain

5.10 Option 10 – Inner Inlet Embankment alignment, with Additional Outer Bund

The fundamental elements of Option 10 are:

- Embankment proposed to be constructed immediately outside CMA boundary within the Mangere Inlet with an additional bund constructed to contain the stormwater wetland. The overall encroachment into the CMA will be approximately 130m.
- Regional stormwater treatment (to capture SW outfalls and leachate) is proposed in this option to be treated in a wetland (or similar); stormwater runoff from the new roadway will be treated in the wetland or separate system.

- Existing Waikaraka shared path to remain in its current location within the foreshore reserve.
- A new shared path proposed on the outer bund to allow access to the foreshore
- Relocate Vector high pressure gas main

6 Other considerations

- The coastal edge of embankment will vary in width. There is a possibility for input to mitigate/improve local ecology and landscape treatment.
- The roadway cross section is yet to be agree and drawings are indicative only
- The wetland width will be defined more accurately further on once more information is known.

Appendix A

Drawings

JOINS TO NEILSON STREET INTERCHANGE OPTIONS

JOINS LINE BELOW

JOINS LINE ABOVE

JOINS TO ANNS CREEK OPTIONS

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- LANDFILL
- E(OH) — OVERHEAD TRANSPOWER LINE
- G — MAJOR HIGH PRESSURE GAS MAIN (VECTOR)

PROPOSED FEATURES

- <---- CUT SLOPES
- <------ INDICATIVE ROAD ALIGNMENT
- <----- FILL SLOPES
- BRIDGE STRUCTURE

0 20 40 60 80 100m
SCALE 1:4,000 @ A3 SIZE

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FOR DISCUSSION
24/03/2016

PRELIMINARY

No.	Issued Status	Drawn	Check'd	App'd	Date
A	DRAFT ISSUE FOR WORKSHOP DISCUSSION	AR			

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East West Link

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Designed: R BAILEY	Design Check		
Scale: Original Scale (A1)	Reduced Scale (A3): AS SHOWN	Contract No: PA4041	

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Drawing Number: Z2A-R-01-101
Rev No.: A

Plot Date: 24 March 2016 - 3:48 p.m. Plotted by: Ajeshni Ram Cad File No: W:\CAD\AutoCAD\DWG\Z2A-R-01-101.dwg

JOINS TO NEILSON STREET INTERCHANGE OPTIONS

JOINS LINE BELOW

JOINS LINE ABOVE

JOINS TO ANNS CREEK OPTIONS

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- LANDFILL
- E(OH) OVERHEAD TRANSPOWER LINE
- G MAJOR HIGH PRESSURE GAS MAIN (VECTOR)

PROPOSED FEATURES

- <---- CUT SLOPES
- <----- INDICATIVE ROAD ALIGNMENT
- <----- FILL SLOPES
- BRIDGE STRUCTURE

0 20 40 60 80 100m
SCALE 1:4,000 @ A3 SIZE

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Discipline: RD ALIGNMENT - MULTI- CRITERIA ASSESSMENT
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Drawing Number: Z2A-R-02-101
Rev No.: A

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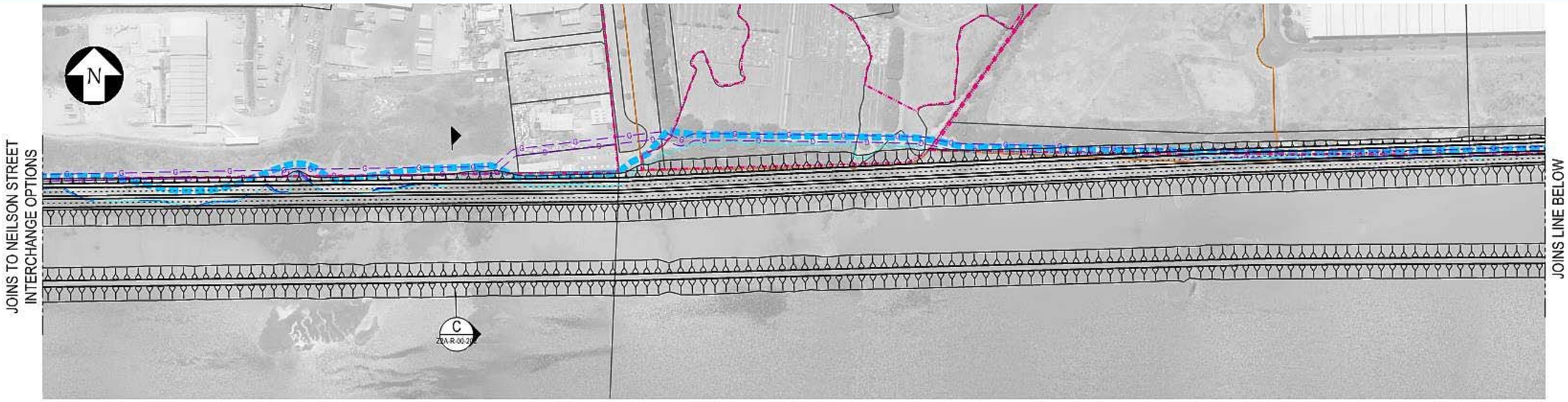

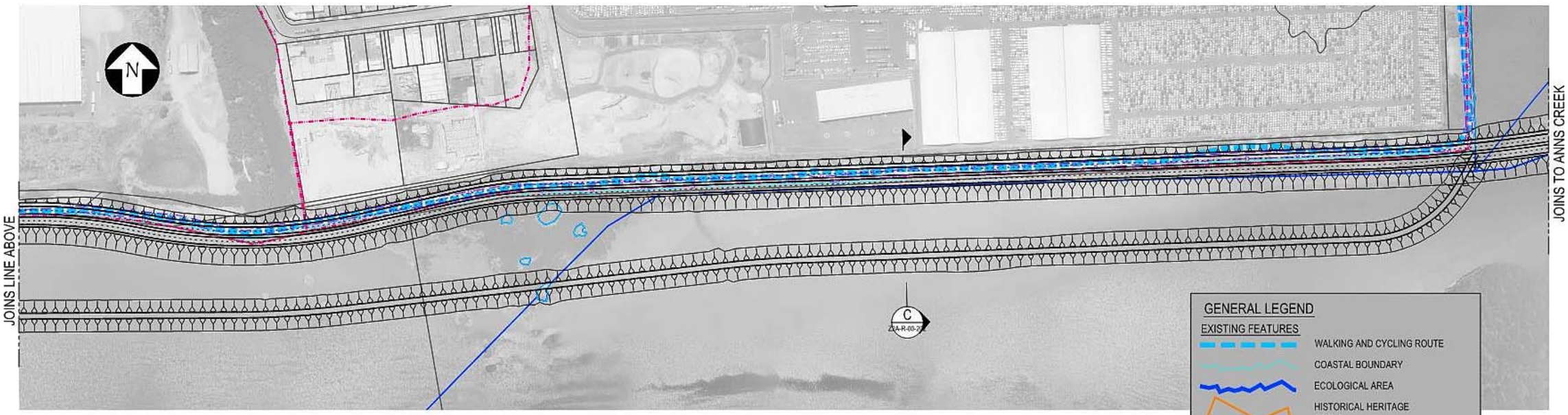

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- LANDFILL
- E(OH) OVERHEAD TRANSPOWER LINE
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PROPOSED FEATURES

- <---- CUT SLOPES
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- BRIDGE STRUCTURE

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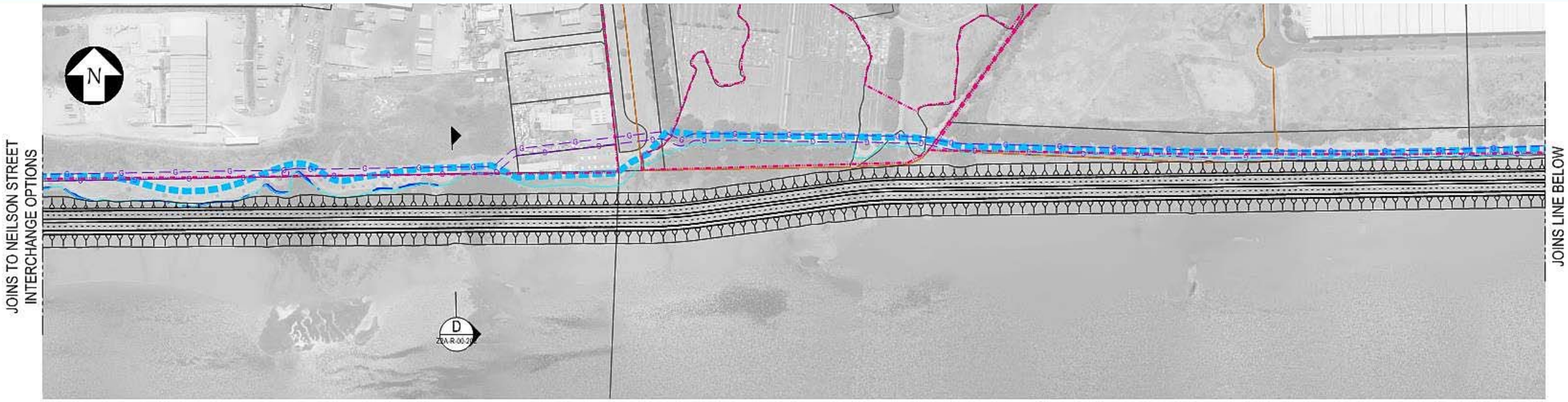

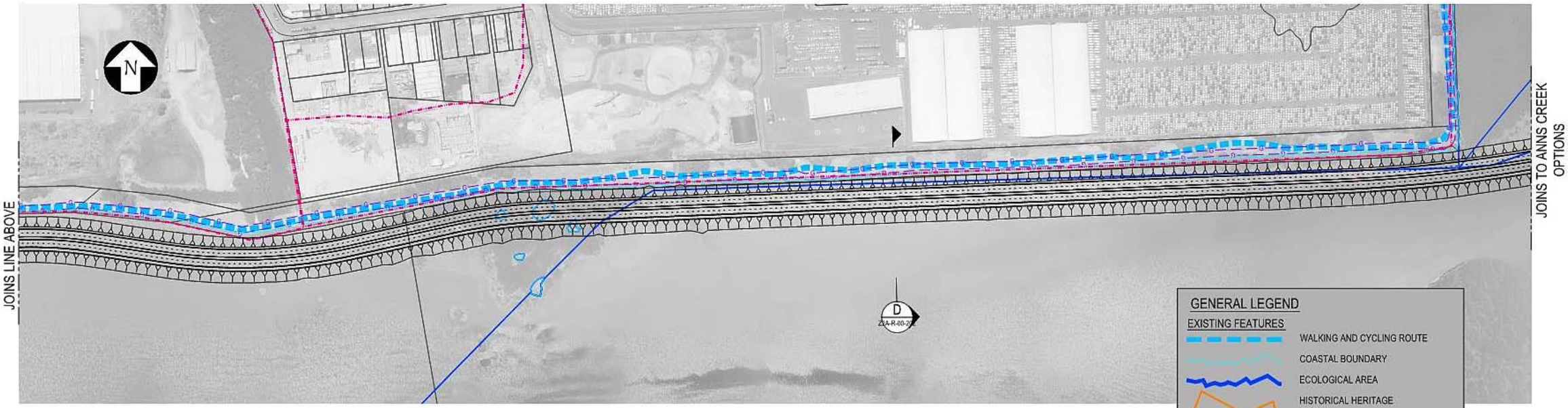

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
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SCALE 1:4,000 @ A3 SIZE

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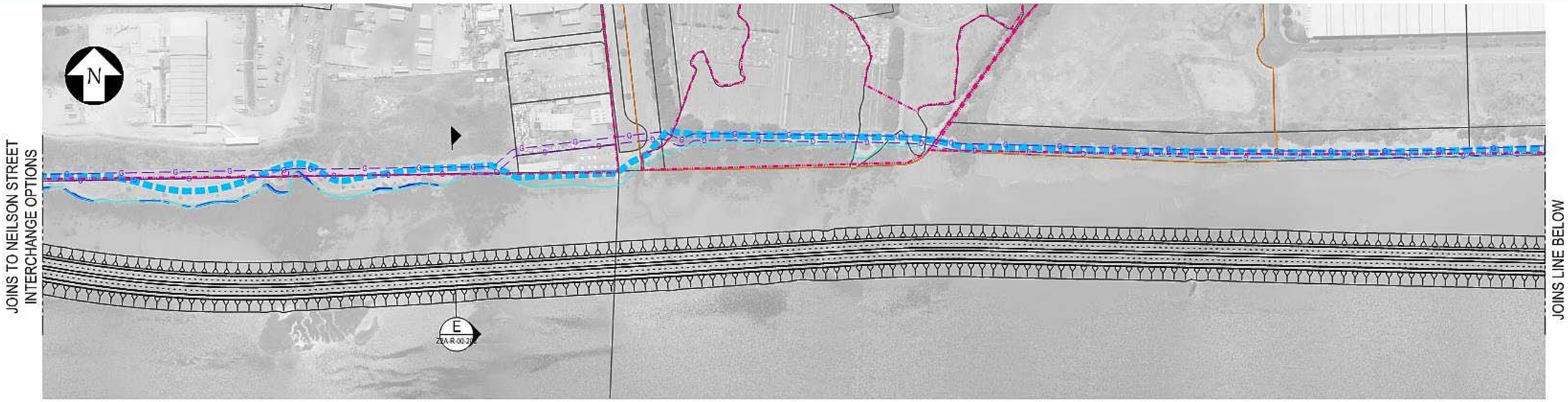

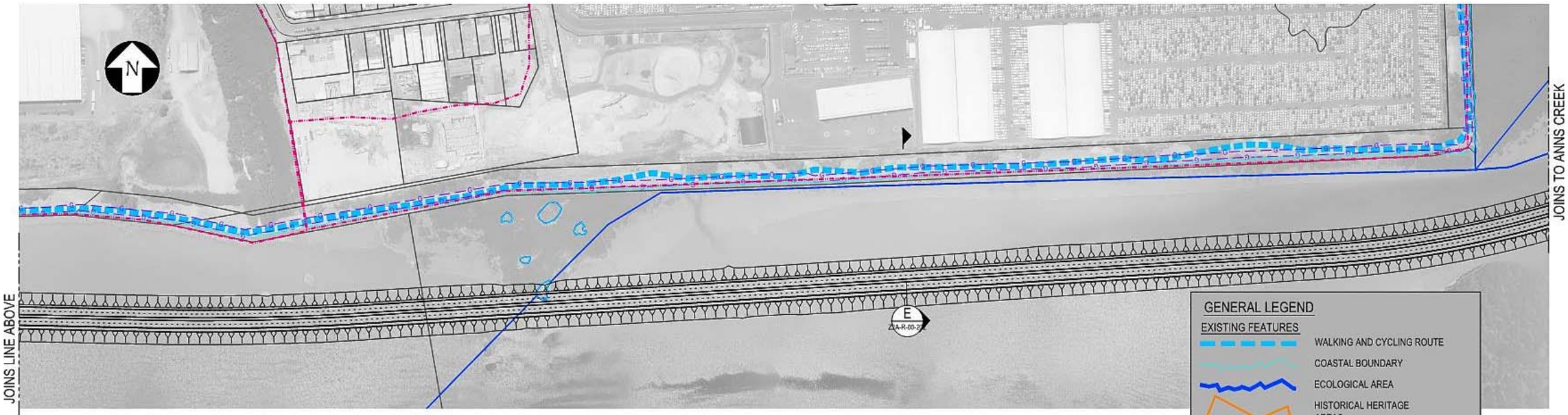

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
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- NATURAL FEATURES
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PROPOSED FEATURES

- <---- CUT SLOPES
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- <----- FILL SLOPES
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Rev No.	A

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JOINS TO NEILSON STREET INTERCHANGE OPTIONS

JOINS LINE BELOW

JOINS LINE ABOVE

JOINS TO ANNS CREEK OPTIONS

F
Z2A-R-00-210

F
Z2A-R-00-210

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
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Drawing Title: EMBANKMENT - OPTION 8 LAYOUT
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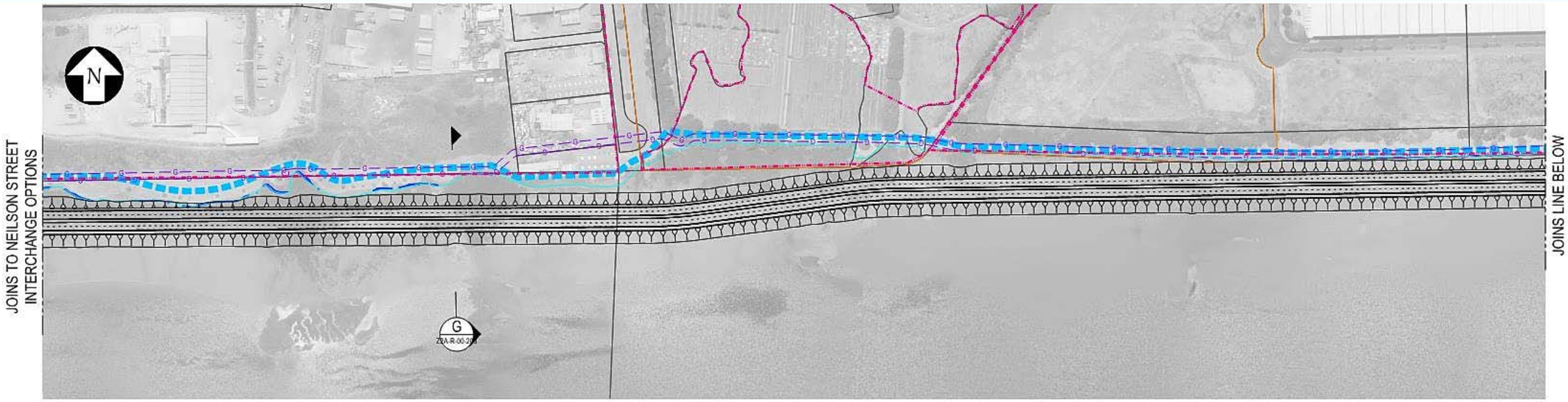

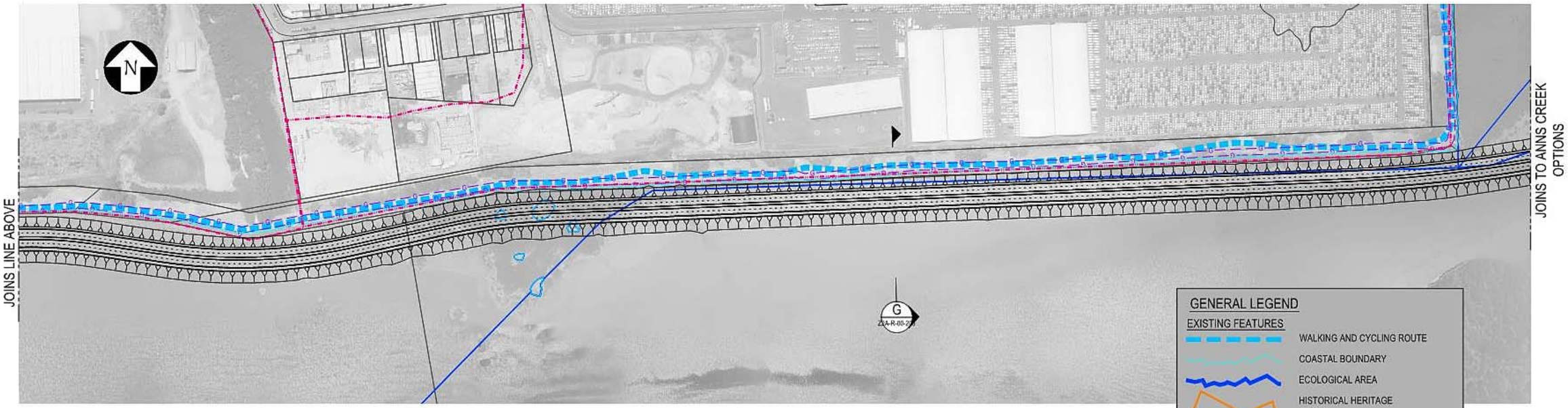

GENERAL LEGEND

EXISTING FEATURES

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- COASTAL BOUNDARY
- ECOLOGICAL AREA
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- NATURAL FEATURES
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Discipline	RD ALIGNMENT - MULTI- CRITERIA ASSESSMENT
Drawing Title	EMBANKMENT - OPTION 9 LAYOUT
Drawing Number	Z2A-R-07-101
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JOINS TO NEILSON STREET INTERCHANGE OPTIONS

JOINS LINE BELOW

JOINS LINE ABOVE

JOINS TO ANNS CREEK OPTIONS

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- LANDFILL
- E(OH) OVERHEAD TRANSPOWER LINE
- G MAJOR HIGH PRESSURE GAS MAIN (VECTOR)

PROPOSED FEATURES

- <---- CUT SLOPES
- <----- INDICATIVE ROAD ALIGNMENT
- <----- FILL SLOPES
- BRIDGE STRUCTURE

0 20 40 60 80 100m
SCALE 1:4,000 @ A3 SIZE

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Designed: R BAILEY	Design Check		
Scale: Original Scale (A1)	Reduced Scale (A3): AS SHOWN	Contract No: PA4041	

Discipline	RD ALIGNMENT - MULTI- CRITERIA ASSESSMENT
Drawing Title	EMBANKMENT - OPTION 10 LAYOUT
Drawing Number	Z2A-R-08-101
Rev No.	A

Plot Date: 24 March 2016 - 4:36 p.m. Plotted by: Ajeshni Ram Cad File No: W:\CAD\AutoCAD\DWG\z2\Z2A-R-08-101.dwg

East West Link Alliance Memorandum

To:	Amelia Linzey	**Date:**	29th March 2016
From:	Lloyd de Beer	**Our Ref:**	
Copy:	Noel Nancekivell, Lara Jay		
Subject:	**EWL MCA Assessment – Otahuhu Creek Design Options Presentation**		

1 Purpose

This memo presents four design options necessary for the widening of SH 1 northbound and southbound motorway over the Otahuhu Creek (Project Sector 5). An existing culvert is positioned under the motorway at Otahuhu Creek of which there are a number of options to extend, widen or replace. The information is presented ahead of MCA (Multi-Criteria Assessment) workshops for analysis by experts prior to the meeting.

This memo with its supplementary information and drawings outlines the key constraints and design inputs specific to each option.

Additional design options have also been included for review by the MCA experts to determine if they have benefit to the project to be included in the design process or further assessed.

2 Location of Otahuhu Creek

Refer to Figure 1 below for location of Otahuhu Creek in Project Sector 5. The assessment area is in the immediate vicinity of Otahuhu Creek to the north of the Princes Street interchange.

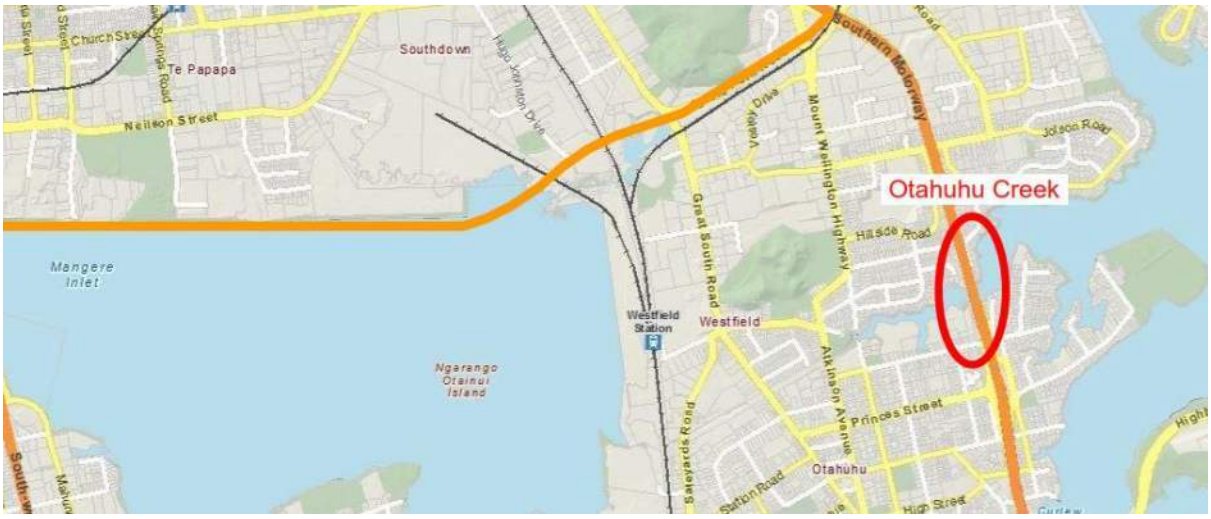


Figure 1 – Otahuhu Creek Location for Assessment

3 Information Provided

The following information is provided to allow a full assessment of the options presented at the Otahuhu Creek to allow for the widening of the motorway to be made by technical experts:

Appendix A – Option 1 Design Plans, Cross Sections

Appendix B – Option 2 Design Plans, Cross Sections

Appendix C – Option 3 Design Plans, Cross Sections

Appendix D – Option 4 Design Plans, Cross Sections

Appendix E – Auckland Council Proposed Unitary Plan (PAUP) GIS Feature Information

Appendix F – Geological Features (underlying ground conditions)

Appendix G – Existing As Builts of Culvert

Appendix H – Alternative Options for Culvert Extension

4 Background

The widening of the SH1 northbound and southbound alignments is required to provide a fourth lane in both directions between the Mt Wellington and Princes Street Interchanges.

This requires the widening of the existing culvert over the Otahuhu Creek (Refer to Appendix G for as builts of the existing culvert). The existing culvert has been built in three segments.

Three options (Option 1, 2 and 3) have been identified that allow the widening only of the SH1 motorway maintaining the existing culvert clearances for existing tidal and SW flows.

A fourth option was identified by local iwi to remove the existing culvert and reconstruct a full width bridge with increased clearance to the creek below. This was to allow the re-establishment of the creek to its original form and possibly to allow navigation further up of the creek by canoe

The existing culvert is unlikely to meet the level and flow requirements to address climate change and sea level rise. Further design assessment remains to be undertaken to assess the existing structure

5 Options Presented

5.1 Design aspects similar to all options

The following aspects of design one similar to all options

- The Transpower pylons and powerlines are not affected by the SH1 widening works
- A cycle lane/share path is proposed to be included on the eastern side of the motorway (adjacent to the SH 1 southbound carriageway). A separate bridge could be constructed to carry the path similar to the path over the estuary to the south.

5.2 Option 1 Single Span Bridge Extension (Refer to Appendix A)

The fundamental elements of Option 1 single span bridge extension are:

- New single span bridge widening, spanning over the existing culvert
- Existing culvert to remain and potential climate change impacts on the structure and motorway will not be addressed by this option
- Abutment on either side of culvert with retaining wall to support widened motorway(up to CMA boundary)
- Embankment into causeway where CMA is not impacted

- The works can be constructed adjacent to the operating motorway with all 3 existing lanes maintained on both the northbound and southbound directions during construction

5.3 Option 2 Four Span Bridge Extension (Refer to Appendix B)

The fundamental elements of Option 2 four span bridge extension are:

- New four span bridge widening to SH 1without the need for retaining walls in the CMA zone
- Abutment on either side of culvert with piers either side of the creek within the CMA zone
- Widened embankment where the CMA is not impacted
- Existing culvert to remain and potential climate change impacts on the structure and motorway will not be addressed by this option
- The works can be constructed adjacent to the operating motorway as per Option 1

5.4 Option 3 Culvert Extension (Refer to Appendix C)

The fundamental elements of Option 3 culvert extension are:

- Embankment into causeway for extra lane
- Existing culvert to remain with an extension of equal dimensions to the existing to be constructed and potential climate change impacts on the structure and motorway will not be addressed by this option
- Retaining walls to be constructed either side of culvert within the CMA to limit earthworks
- Widened embankment where the CMA is not impacted
- The works can be constructed adjacent to the operating motorway as per Option 1.

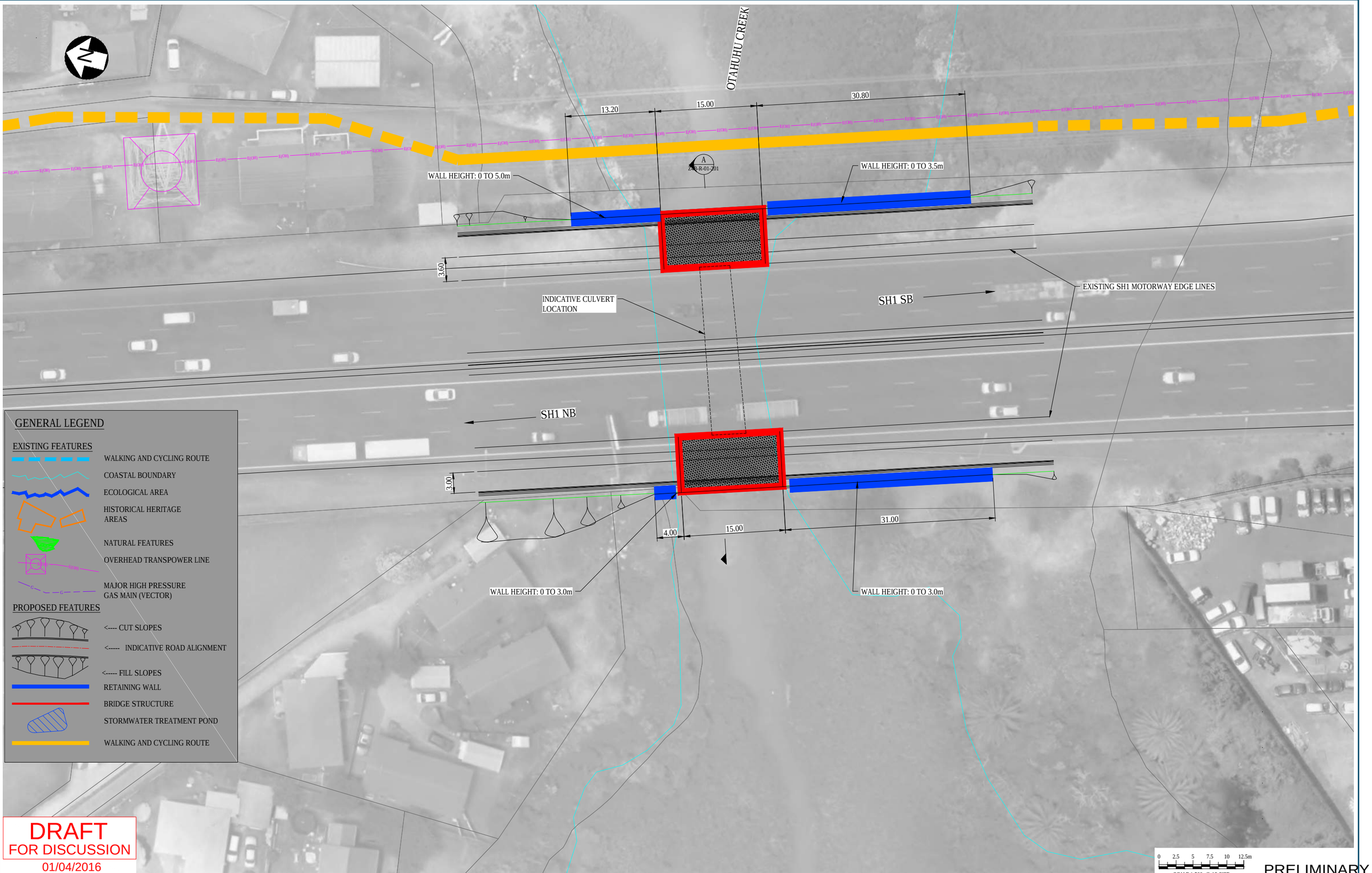
5.5 Option 4 New Bridge (Refer to Appendix D)

The fundamental elements of Option 4 new bridge are:

- New SH 1 bridge to replace existing culvert and embankment
- Existing culvert and embankment apparatus removed
- The new bridge can be constructed (albeit with difficulty) with approximately 4 traffic shifts, maintain 3 lanes in both directions. Temporary bridging and road works would be required plus additional property to construct the temporary road

6 Alternative Options for Consideration

All options presented have a footprint that remains outside the Coastal Marine Area (CMA). Alternate solutions include embankments that cross into the CMA whichis presented in Appendix H.



No.	Issued Status	Drawn	Check'd	App'd	Date
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Designed: RTAN	Design Check		
Scale: Original Scale (A1); Reduced Scale (A3)		Contract No: PA4041	

Discipline	RD ALIGNMENT - MULTI- CRITERIA ASSESSMENT
Drawing Title	SH1 WIDENING AT OTAHUHU CREEK - OPTION 1 LAYOUT
Drawing Number	Z4B-R-01-101
Rev No.	A

Plot Date: 1 April 2016 - 1:02 PM Plotted by: Raymond Tan Cad File No: W:\CAD\AutoCAD\DWGs\Z4B-R-01-101.dwg

N

OTAHUHU CREEK

INDICATIVE CYCLEWAY LOCATION

BRIDGE 15.00 SPAN 1

BRIDGE 15.00 SPAN 2

BRIDGE 15.00 SPAN 3

BRIDGE 15.00 SPAN 4

1

FOUR SPAN BRIDGE OVER CULVERT

TRANSPOWER PYLON AND OVERHEAD LINES NOT IMPACTED BY THE CULVERT WORKS OR MOTORWAY WIDENING

3.50

SH1 SB

EXISTING SH1 EDGELINE

INDICATIVE CULVERT LOCATION

CULVERT TO REMAIN

SH1 NB

FOUR SPAN BRIDGE OVER CULVERT

3.00

POTENTIAL NEED FOR ADDITIONAL RETAINING IN AND AROUND PRIVATE PROPERTY

10.00 SPAN 1 BRIDGE

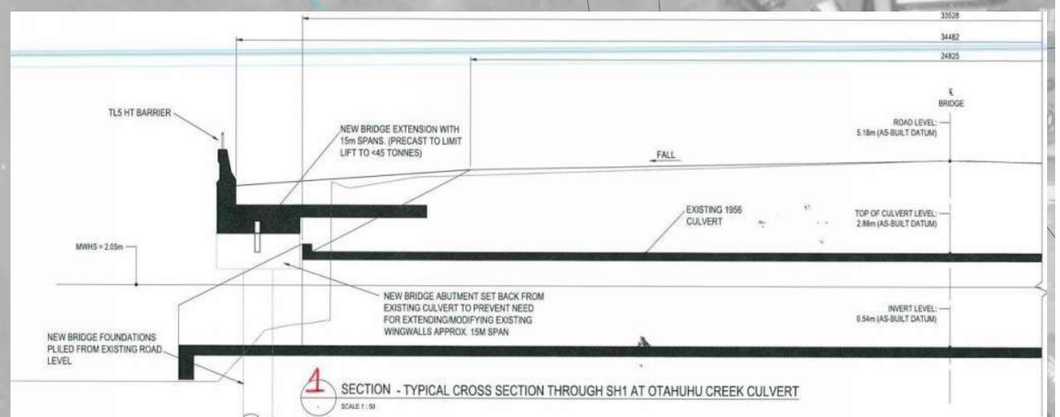
15.00 SPAN 2 BRIDGE

15.00 SPAN 3 BRIDGE

15.00 SPAN 4 BRIDGE

OTAHUHU CREEK

CMA BOUNDARY



GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- OVERHEAD TRANSPOWER LINE
- MAJOR HIGH PRESSURE GAS MAIN (VECTOR)

PROPOSED FEATURES

- <---- CUT SLOPES
- <----- INDICATIVE ROAD ALIGNMENT
- <----- FILL SLOPES
- RETAINING WALL
- BRIDGE STRUCTURE
- STORMWATER TREATMENT POND
- WALKING AND CYCLING ROUTE

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01/04/2016

0 2.5 5 7.5 10 12.5m
SCALE 1:500 @ A3 SIZE

PRELIMINARY

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East West Link

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Designed	Design Check		

Scale: Original Scale (A1) Reduced Scale (A3) AS SHOWN

Contract No PA4041

Discipline
Drawing Title: RD ALIGNMENT - MULT-CRITERIA ASSESSMENT SH1 WIDENING AT OTAHUHU CREEK - OPTION 2 LAYOUT

Drawing Number: Z4B-R-02-101

Rev No. A

Plot Date: 1 April 2016 - 1:22 PM Plotted by: Raymond Tan Cad File No: W:\CAD\AutoCAD\DWGs\Z4B-R-02-101.dwg

N

TAHUHU CREEK

INDICATIVE CYCLEWAY LOCATION

RETAINING 13.00 | CULVERT 7.20 | RETAINING 33.50

2

EXTEND EXISTING CULVERT

TRANSPOWER PYLON AND OVERHEAD LINES NOT IMPACTED BY THE CULVERT WORKS OR MOTORWAY WIDENING

3.50

SH1 SB

EXISTING SH1 EDGELINE

INDICATIVE CULVERT LOCATION

CULVERT TO REMAIN UNDER MOTORWAY

SH1 NB

EXTEND EXISTING CULVERT

3.00

WIDENED BERM AND BATTER

10.00 RETAINING | 7.20 CULVERT | 24.60 RETAINING

RETAINING WALS NEEDED AROUND PRIVATE PROPERTY TO REDUCE PROPERTY IMPACTS

OTAHUHU CREEK

CMA BOUNDARY

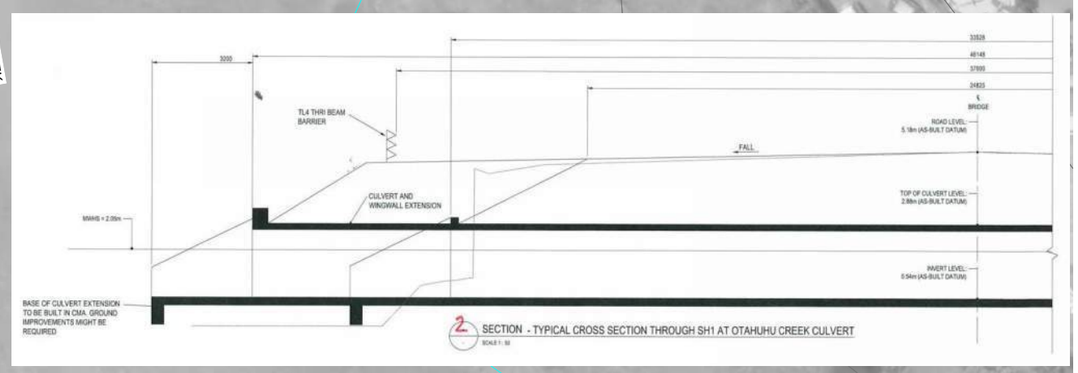
GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- OVERHEAD TRANSPOWER LINE
- MAJOR HIGH PRESSURE GAS MAIN (VECTOR)

PROPOSED FEATURES

- <---- CUT SLOPES
- <----- INDICATIVE ROAD ALIGNMENT
- <----- FILL SLOPES
- RETAINING WALL
- BRIDGE STRUCTURE
- STORMWATER TREATMENT POND
- WALKING AND CYCLING ROUTE



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SCALE 1:500 @ A3 SIZE

PRELIMINARY

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Designed	Design Check		

Scale: Original Scale (A1) | Reduced Scale (A3): AS SHOWN

Contract No: PA4041

Discipline: RD ALIGNMENT - MULT-CRITERIA ASSESSMENT

Drawing Title: SH1 WIDENING AT OTAHUHU CREEK - OPTION 3 LAYOUT

Drawing Number: Z4B-R-03-101

Rev No.: A

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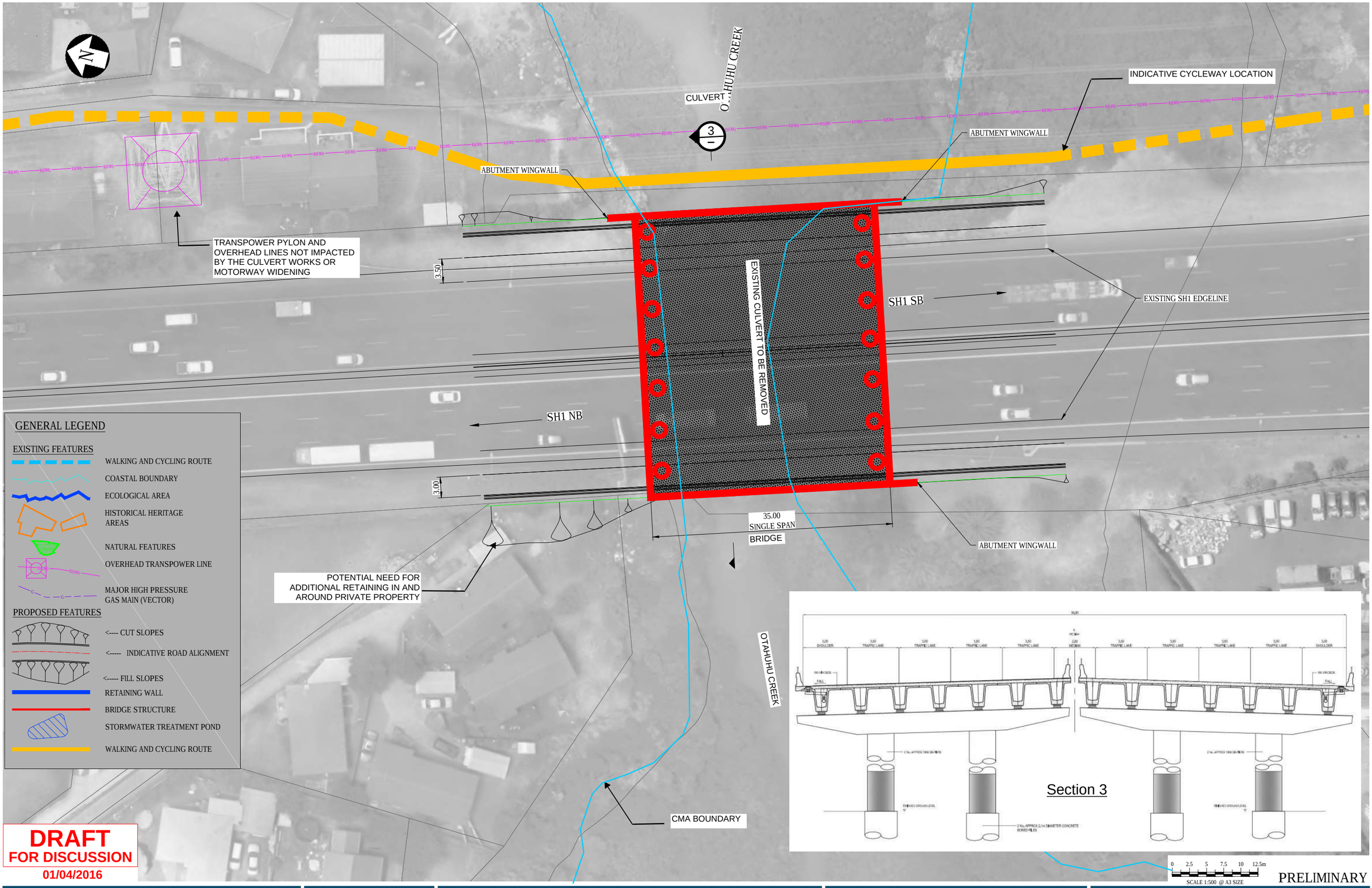

GENERAL LEGEND

EXISTING FEATURES

- WALKING AND CYCLING ROUTE
- COASTAL BOUNDARY
- ECOLOGICAL AREA
- HISTORICAL HERITAGE AREAS
- NATURAL FEATURES
- OVERHEAD TRANSPOWER LINE
- MAJOR HIGH PRESSURE GAS MAIN (VECTOR)

PROPOSED FEATURES

- <---- CUT SLOPES
- <----- INDICATIVE ROAD ALIGNMENT
- <----- FILL SLOPES
- RETAINING WALL
- BRIDGE STRUCTURE
- STORMWATER TREATMENT POND
- WALKING AND CYCLING ROUTE

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01/04/2016

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Designed RTAN	Design Check		
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Discipline	RD ALIGNMENT - MULTI- CRITERIA ASSESSMENT
Drawing Title	SH1 WIDENING AT OTAHUHU CREEK - OPTION 4 LAYOUT
Drawing Number	Z4B-R-04-101
Rev No.	A

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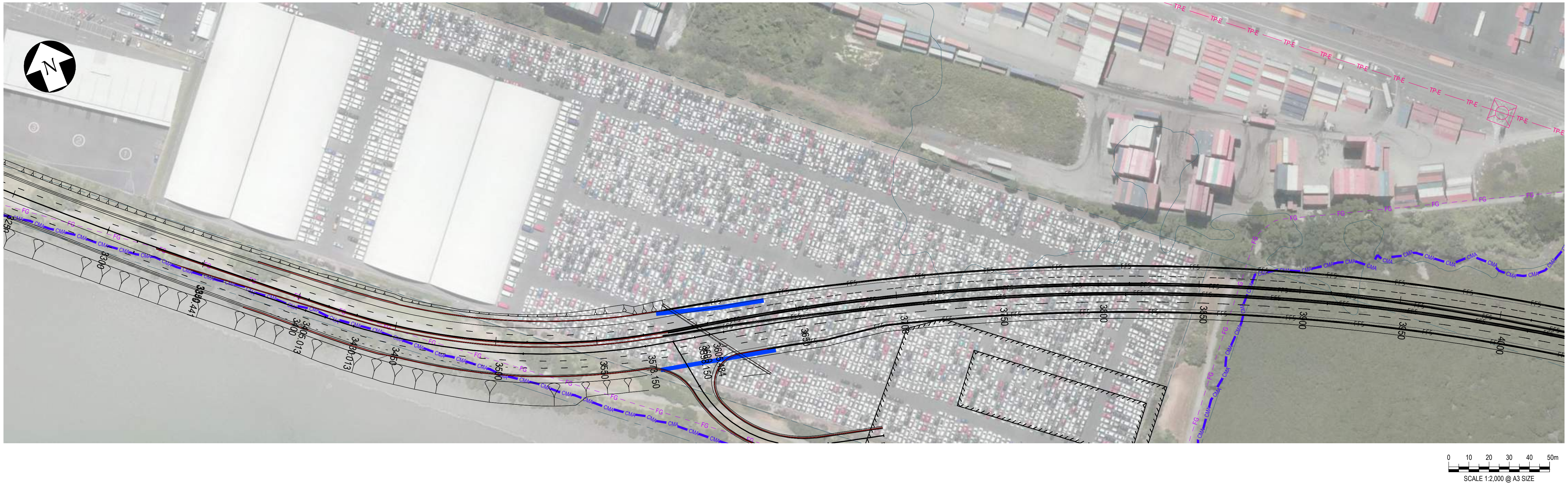

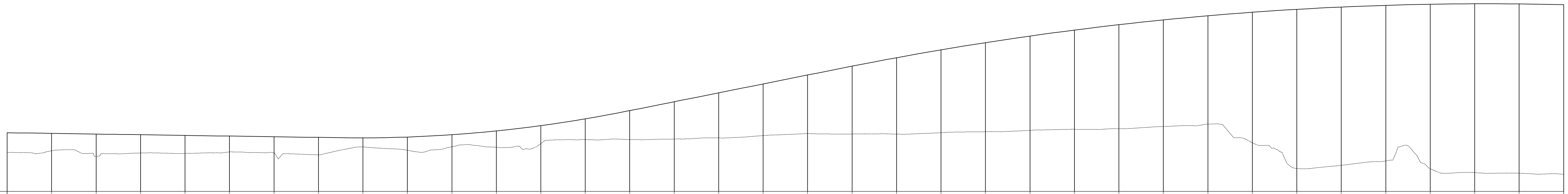

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23/06/2016

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WAKA KOTAHI

East West Link

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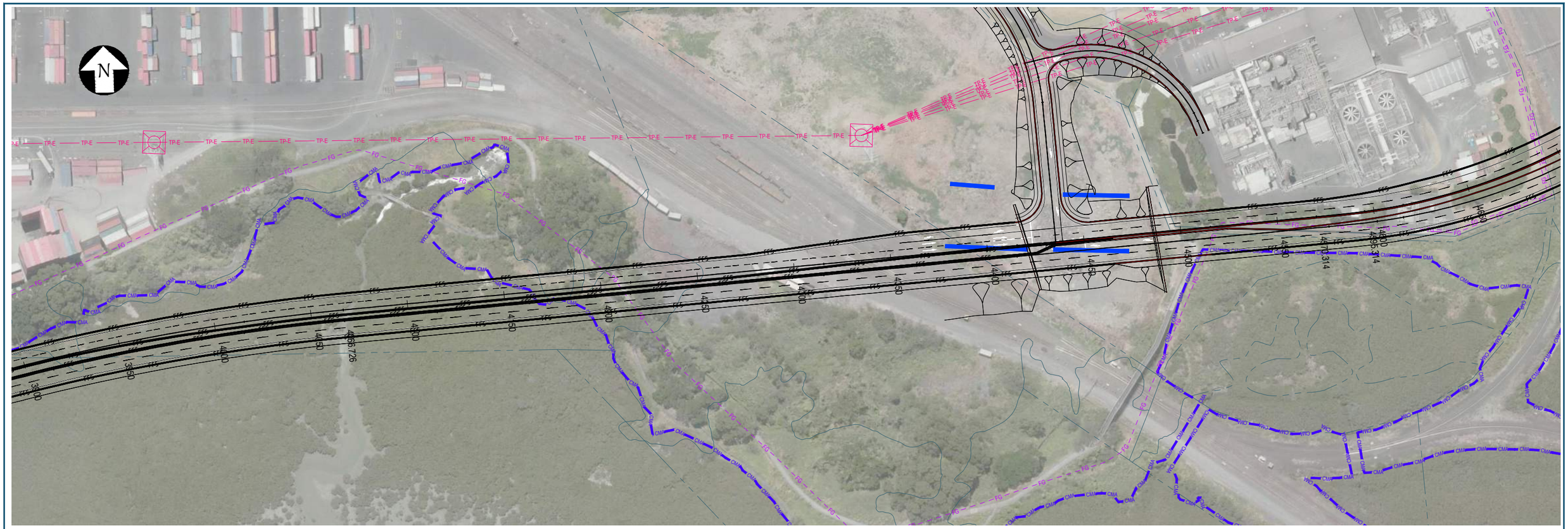
A RAM
Drafting Check
Reviewed
Design Manager
Approved
Alliance Manager
Designed
Design Check
Scale: Original Scale (A1) Reduced Scale (A3) AS SHOWN
Contract No
PA4041

Drawing Title
ROAD ALIGNMENT
DESIGN HOLD - ALTERNATIVE OPTION - MC00
PLAN AND LONG SECTION - SHEET 6
Drawing Number
Z-01-C-206
Rev No.
A

Plot Date: 23 June 2016 - 9:32 AM Plotted by: Raymond Tan Cad File No: W:\CAD\AutoCAD\DWGs\001 Alternative option\Z-01-C-201-205.dwg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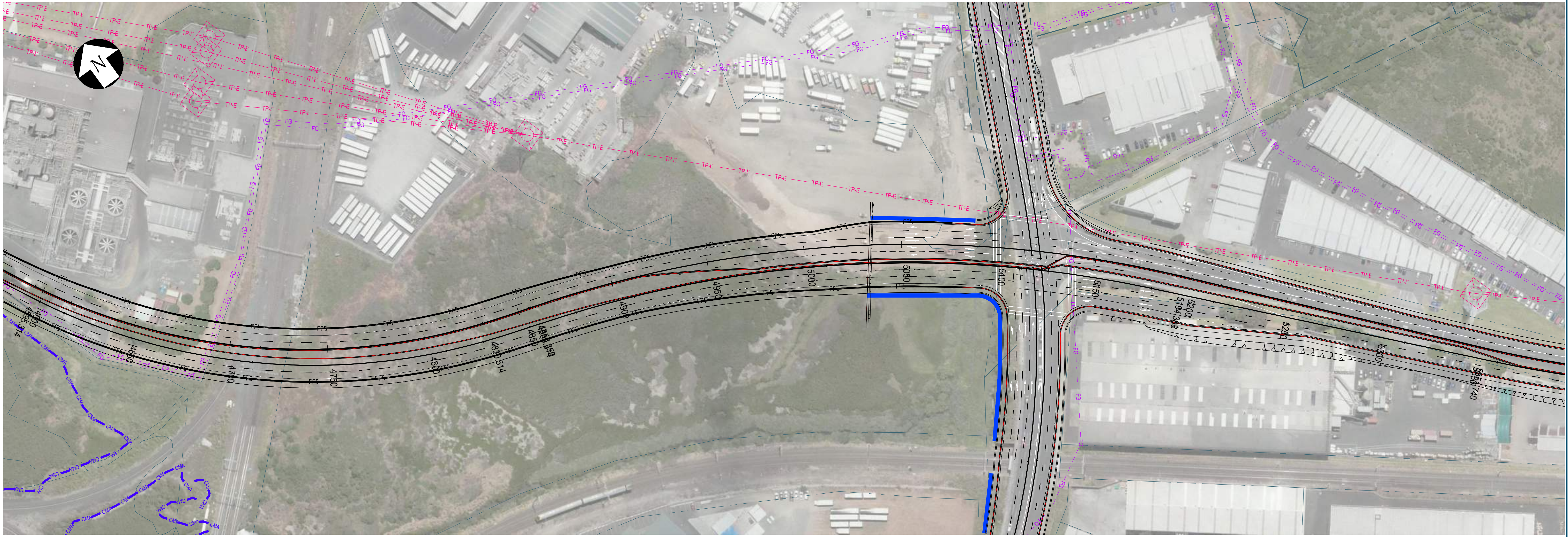

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DESIGN LEVEL	13.268	13.168	13.068	12.968	12.868	12.768	12.668	12.568	12.468	12.368	12.268	12.168	12.068	11.959	11.785	11.534	11.205	10.800
GROUND LEVEL	5.80	5.06	5.38	5.06	1.80	4.33	3.27	1.72	1.72	3.18	3.07	1.93	1.82	1.84	1.84	3.30	4.85	4.96

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DESIGN LEVEL	10.318	9.759	9.123	8.411	7.621	6.754	5.813	4.989	4.405	4.063	3.963	4.104	4.487	5.067	5.667	6.267	6.867	7.467
GROUND LEVEL	4.81	4.45	4.21	8.39	7.95	6.88	5.81	4.75	4.26	4.10	4.13	4.42	4.65	5.04	5.68	6.26	6.88	7.54

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VERTICAL GEOM

CROSSFALL

ARTERIAL ROAD 70KM/H

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23/06/2016

VERTICAL 1:400 @ A3 SIZE 0 2 4 6 8 10m
HORIZONTAL 1:2000 @ A3 SIZE 0 10 20 30 40 50m

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WAKA KOTAHI

East West Link

Drawn A RAM
Drafting Check
Reviewed Design Manager
Approved Alliance Manager
Designed
Design Check
Scale: Original Scale (A1) Reduced Scale (A3) AS SHOWN
Contract No PA4041

Drawing Title
ROAD ALIGNMENT
DESIGN HOLD - ALTERNATIVE OPTION - MC00
PLAN AND LONG SECTION - SHEET 8

Drawing Number Z-01-C-208
Rev No. A

Plot Date: 23 June 2016 - 9:34 AM Plotted by: Raymond Tan Cad File No: W:\CAD\AutoCAD\DWGs\001 Alternative option\Z-01-C-201-205.dwg