

2 MAY 2023

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Appendix E: Structural Engineering Plans



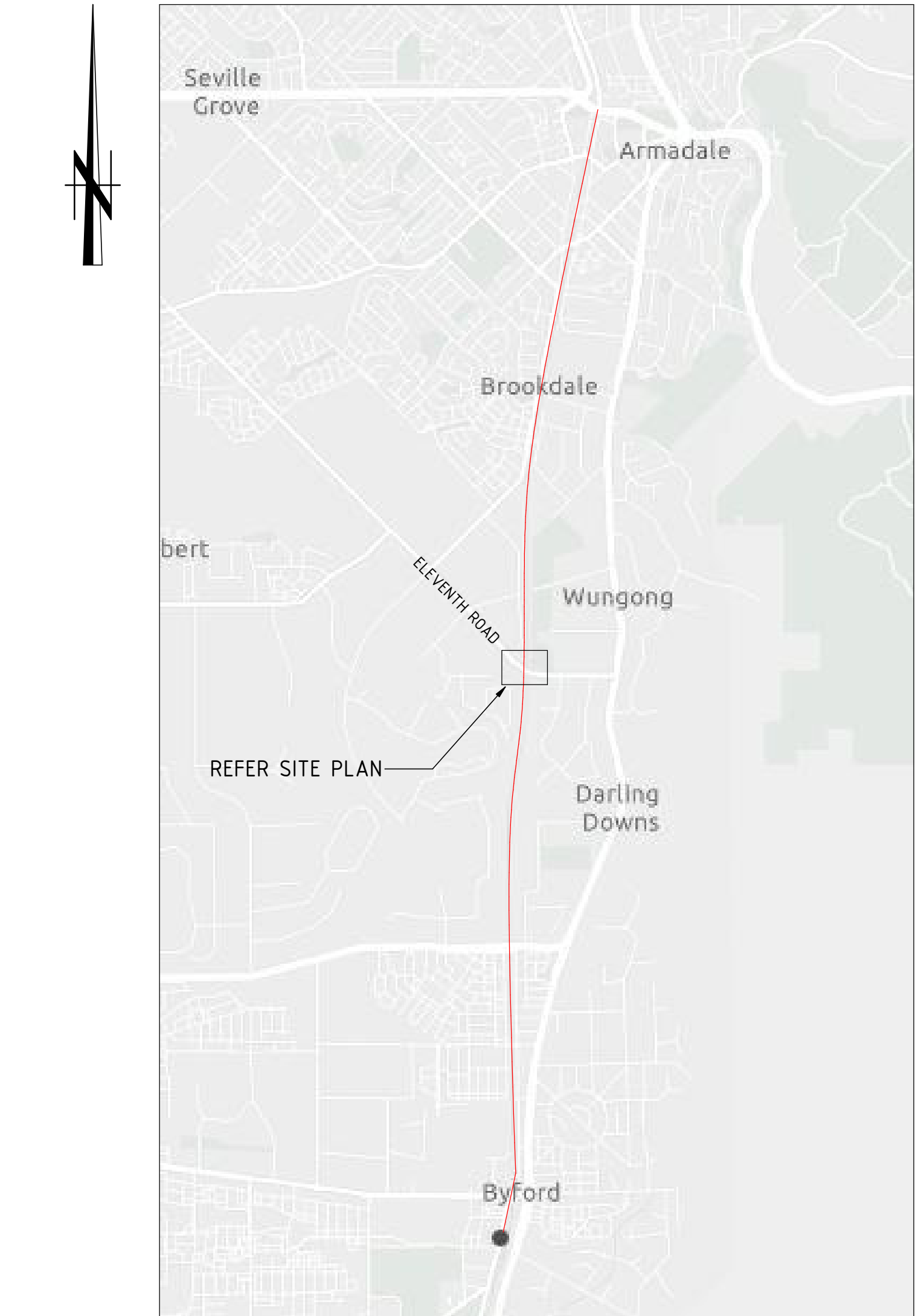
BYFORD RAIL EXTENSION
ELEVENTH ROAD (SLKm:4.39)
OVER RAILWAY
BRIDGE No 1933
CITY OF ARMADALE

DRAWING INDEX

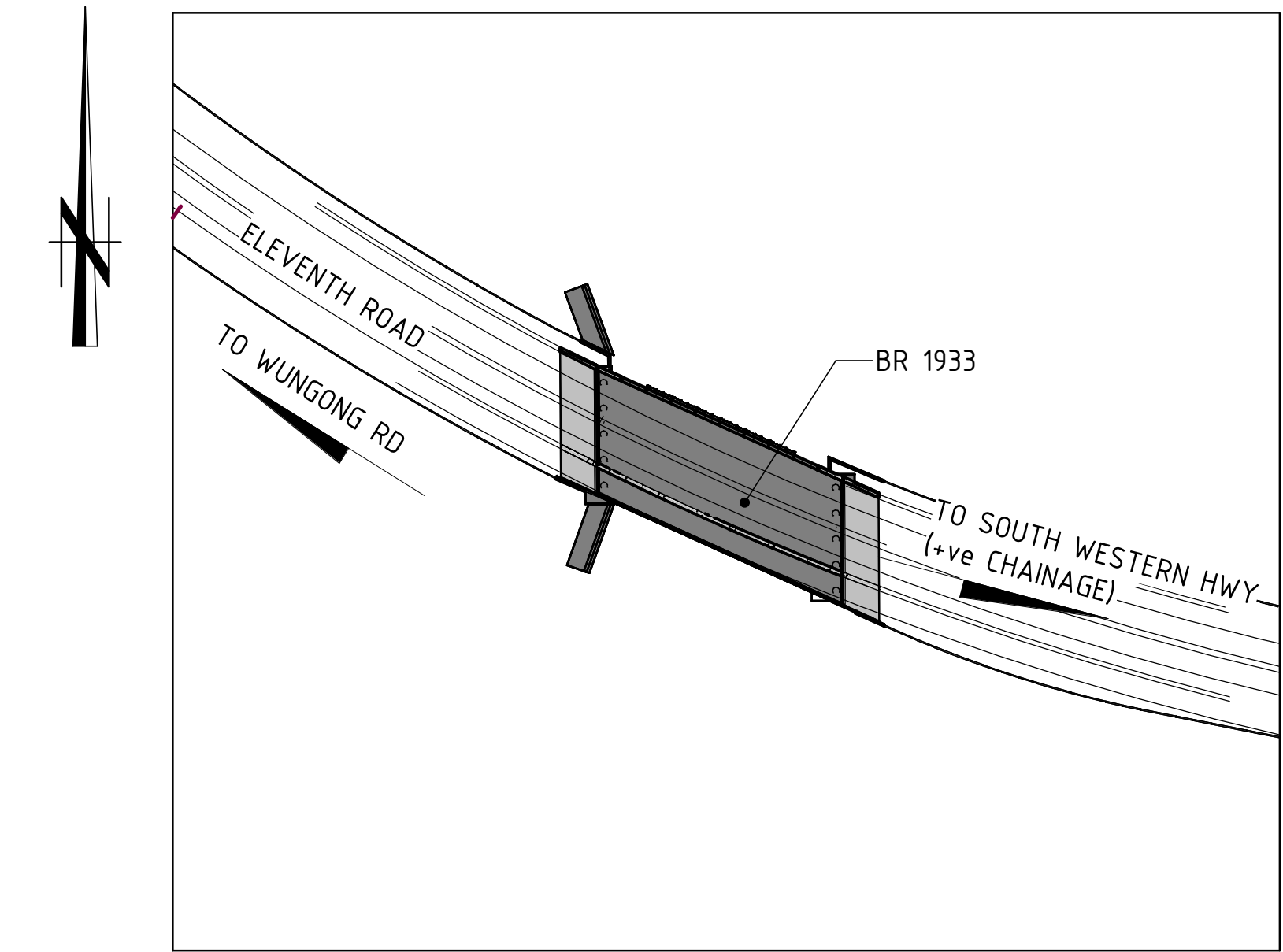
MRWA DRG No	PROJECT DRAWING No	DRAWING TITLE	MRWA DRG No	PROJECT DRAWING No	DRAWING TITLE
-	R30-DEA-DWG-ST-440- 00001	LOCALITY PLAN AND DRAWING INDEX	-	R30-DEA-DWG-ST-440- 00102	PRECAST TEEROFF BEAMS - REINF. DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440- 00005	GENERAL NOTES - SHEET 1	-	R30-DEA-DWG-ST-440- 00111	DECK CONCRETE DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00006	GENERAL NOTES - SHEET 2	-	R30-DEA-DWG-ST-440- 00112	DECK CONCRETE DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440- 00011	GENERAL ARRANGEMENT - SHEET 1	-	R30-DEA-DWG-ST-440- 00113	DECK CONCRETE DETAILS - SHEET 3
-	R30-DEA-DWG-ST-440- 00012	GENERAL ARRANGEMENT - SHEET 2	-	R30-DEA-DWG-ST-440- 00115	DECK REINFORCEMENT DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00013	GENERAL ARRANGEMENT - SHEET 3	-	R30-DEA-DWG-ST-440- 00116	DECK REINFORCEMENT DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440- 00021	GEOMETRIC DATA	-	R30-DEA-DWG-ST-440- 00121	APPROACH SLAB CONCRETE DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00024	CONSTRUCTION SEQUENCE - PRECAST STAGING	-	R30-DEA-DWG-ST-440- 00122	APPROACH SLAB CONCRETE DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440- 00025	CONSTRUCTION SEQUENCE - SUBSTRUCTURE	-	R30-DEA-DWG-ST-440- 00123	APPROACH SLAB REINFORCEMENT DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00026	CONSTRUCTION SEQUENCE - SUPERSTRUCTURE	-	R30-DEA-DWG-ST-440- 00131	EXPANSION JOINT DETAILS
-	R30-DEA-DWG-ST-440- 00031	FOUNDATION LAYOUT	-	R30-DEA-DWG-ST-440- 00135	COVER PLATE DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00032	PILE DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440- 00136	COVER PLATE DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440- 00033	PILE DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440 00141	BARRIER LAYOUT
-	R30-DEA-DWG-ST-440- 00041	ABUTMENT CONCRETE DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440 00142	BARRIER DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00042	ABUTMENT CONCRETE DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440 00143	BARRIER DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440 00051	ABUTMENT - REINFORCEMENT DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440 00144	BARRIER DETAILS - SHEET 3
-	R30-DEA-DWG-ST-440 00052	ABUTMENT - REINFORCEMENT DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440- 00161	ELECTRIFICATION SCREEN DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440 00053	ABUTMENT - REINFORCEMENT DETAILS - SHEET 3	-	R30-DEA-DWG-ST-440- 00162	ELECTRIFICATION SCREEN DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440 00057	COLUMN COLLAR DETAILS	-	R30-DEA-DWG-ST-440- 00171	BALUSTRADE DETAILS - SHEET 1
-	R30-DEA-DWG-ST-440- 00061	ABUTMENT - MSE WALL DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440- 00172	BALUSTRADE DETAILS - SHEET 2
-	R30-DEA-DWG-ST-440- 00062	ABUTMENT - MSE WALL DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440- 00181	LIGHTING AND ELECTRICAL LAYOUT
-	R30-DEA-DWG-ST-440- 00063	ABUTMENT - MSE WALL DETAILS - SHEET 3	-	R30-DEA-DWG-ST-440- 00411	RETAINING WALL - KEY PLAN
-	R30-DEA-DWG-ST-440- 00071	DEFLECTION WALL DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440- 00421	NORTH EAST RETAINING WALL - SHEET 1
-	R30-DEA-DWG-ST-440- 00072	DEFLECTION WALL DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440- 00422	NORTH EAST RETAINING WALL - SHEET 2
-	R30-DEA-DWG-ST-440- 00073	DEFLECTION WALL REINFORCEMENT DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440- 00431	SOUTH EAST RETAINING WALL - SHEET 1
-	R30-DEA-DWG-ST-440- 00074	DEFLECTION WALL REINFORCEMENT DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440- 00432	SOUTH EAST RETAINING WALL - SHEET 2
-	R30-DEA-DWG-ST-440- 00081	BEARING LAYOUT	-	R30-DEA-DWG-ST-440- 00441	NORTH WEST RETAINING WALL - SHEET 1
-	R30-DEA-DWG-ST-440- 00082	BEARING DETAILS	-	R30-DEA-DWG-ST-440- 00442	NORTH WEST RETAINING WALL - SHEET 2
-	R30-DEA-DWG-ST-440- 00091	PRECAST TEEROFF BEAMS LAYOUT PLAN	-	R30-DEA-DWG-ST-440- 00443	NORTH WEST RETAINING WALL - SHEET 3
-	R30-DEA-DWG-ST-440- 00092	PRECAST TEEROFF BEAMS - CONCRETE DETAILS - SHEET 1	-	R30-DEA-DWG-ST-440- 00451	SOUTH WEST RETAINING WALL - SHEET 1
-	R30-DEA-DWG-ST-440- 00093	PRECAST TEEROFF BEAMS - CONCRETE DETAILS - SHEET 2	-	R30-DEA-DWG-ST-440- 00452	SOUTH WEST RETAINING WALL - SHEET 2
-	R30-DEA-DWG-ST-440- 00095	PRECAST TEEROFF BEAMS - PRESTRESSING DETAILS	-	R30-DEA-DWG-ST-440- 00461	TYPICAL WALL CONCRETE DETAILS- SHEET 1
-	R30-DEA-DWG-ST-440- 00097	CONSTRUCTION NOTES	-	R30-DEA-DWG-ST-440- 00465	TYPICAL WALL REINFORCEMENT DETAILS- SHEET 1
-	R30-DEA-DWG-ST-440- 00101	PRECAST TEEROFF BEAMS - REINF. DETAILS - SHEET 1			

MRWA STANDARD DRAWINGS

MRWA DRG No	PROJECT DRAWING No	DRAWING TITLE
0530-1087-1	-	BRIDGE BALUSTRADE FOR PRINCIPAL SHARED PATH - SHEET No. 1
0530-1307-1	-	BRIDGE BALUSTRADE FOR PRINCIPAL SHARED PATH - SHEET No. 2



LOCALITY PLAN
NTS



SITE PLAN
NTS

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No.	DESCRIPTION	APPROVED	DATE
B.02	ISSUED FOR DEVELOPMENT APPLICATION	A.M.E	28-02-23
B	ISSUED FOR IDD	A.M.E	02-02-23
A	ISSUED FOR RD	A.M.E	01-08-22
AMENDMENTS			

METADATA

GROUND SURVEY STANDARD:
DATE OF CAPTURE:
MAPPING SURVEY STANDARD:
DATE OF CAPTURE:
MAIN ROADS PROJECT ZONE: PCG2020
HEIGHT DATUM: AHD71



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CONSULTANT DRAWING NUMBER: R30-DEA-DWG-ST-440-00001 Rev8.02

DRAWN	D.D
DESIGNED	B.J
VERIFIED	A.M.E
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CLIENT FILE No:
RECOMMENDED
APPROVED

NOT FOR
CONSTRUCTION

BYFORD RAIL EXTENSION

ELEVENTH ROAD (SLKm:4.39)
OVER RAILWAY
BRIDGE No. 1933
LOCALITY PLAN AND DRAWING INDEX
LOCAL AUTHORITY: CITY OF ARMADALE
MRWA DRAWINGS NUMBER:

Rev:

GENERAL:

- ALL DIMENSIONS ARE IN MILLIMETRES (mm) AND ALL LEVELS ARE IN METRES (m) U.N.O.
- REDUCED LEVELS ARE RELATED TO AUSTRALIAN HEIGHT DATUM (A.H.D.).
- CO-ORDINATES ARE GDA2020 (PCG2020).
- STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION DOCUMENTS.
- DIMENSIONS ON DRAWINGS ARE EXCLUSIVE OF FINISHES.
- DIMENSIONS MUST NOT BE DETERMINED BY SCALING FROM THE DRAWINGS.
- ALL RL'S ARE TO BE FINISHED CONCRETE LEVELS U.N.O.
- ONLY DRAWINGS APPROVED FOR CONSTRUCTION ARE TO BE USED.
- REPORT ANY DISCREPANCIES BETWEEN THE GENERAL NOTES, SPECIFICATION, DRAWINGS AND OBTAIN A DIRECTION FROM THE CONSTRUCTION DIRECTOR OR DELEGATED AUTHORITY.
- ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE FABRICATION SHALL BE CONFIRMED AND VERIFIED PRIOR TO COMMENCING WORKS. REPORT ANY DISCREPANCIES AND OBTAIN A DIRECTION FROM THE CONSTRUCTION DIRECTOR OR DELEGATED AUTHORITY.
- ALL EXISTING SERVICE LOCATIONS SHALL BE VERIFIED ON SITE.
- PROPRIETARY ITEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
- NOMINATION OF PROPRIETARY ITEMS DOES NOT INDICATE EXCLUSIVE PREFERENCE BUT INDICATES THE REQUIRED PROPERTIES OF EACH ITEM. SIMILAR ALTERNATIVES HAVING THE REQUIRED PROPERTIES SHALL BE SUBMITTED FOR APPROVAL. PROPRIETARY ITEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.

FOUNDATION PREPARATION:

- REFER TO GEOTECHNICAL FACTUAL REPORT No. TBC.
- SOIL PREPARATION FOR FOUNDATIONS SHALL COMPLY WITH PROJECT SPECIFICATION '801 - EXCAVATION & BACKFILL FOR STRUCTURES.
- PRIOR TO COMMENCING EXCAVATION FOR FOUNDATIONS, A SURVEY OF THE EXISTING GROUND LEVELS SHALL BE CARRIED OUT AND COMPARED WITH THE LEVELS INDICATED ON THE DRAWINGS. ANY DISCREPANCY SHALL BE REPORTED TO THE BRIDGE DESIGN LEAD FOR ASSESSMENT PRIOR TO PROCEEDING WITH THE WORK.
- REMOVE ANY TOP SOIL CONTAINING GRASS ROOTS OR OTHER ORGANIC MATERIAL, RUBBLE, DEBRIS, OR OTHER UNSUITABLE MATERIAL BELOW THE PROPOSED FOUNDATIONS.
- FOOTINGS HAVE BEEN DESIGNED FOR A SAFE WORKING BEARING PRESSURE AS NOTED IN DESIGN INFORMATION SUMMARY IN UNDISTURBED NATURAL SOIL. CARE SHALL BE TAKEN TO AVOID DISTURBING THE MATERIAL BELOW FOUNDATION LEVEL.
- THE BOTTOM OF THE FOUNDATION EXCAVATES SHALL BE COMPACTED TO 96% BOF MAXIMUM DRY DENSITY. COMPACTION CAN BE TESTED USING A STANDARD PERTH FALLING WEIGHT PENETROMETER IN ACCORDANCE WITH AS 1289.6.3.3. PROVIDING A CORRELATION IS AVAILABLE.
- REMOVE ANY SOFT SOIL AND REPLACE WITH COMPACTED GRANULAR FILL. FILL TO BE PLACED IN LAYERS OF MAXIMUM 300mm THICKNESS AND COMPACTED BY VIBRATING PLATE OR VIBRATING ROLLER TO ACHIEVE THE COMPACTION REQUIRES SPECIFIED IN NOTE 6.
- WHERE EXCAVATION FOR FOUNDATIONS IS AT OR BELOW GROUND WATER LEVEL. THE EXCAVATIONS SHALL BE DEWATERED BY PUMPING OR WELL POINT DEWATERING IN ACCORDANCE WITH SPECIFICATION.
- IMMEDIATELY AFTER THE FOUNDATION BEARING SURFACE HAS BEEN TRIMMED, COMPACTED AND APPROVED, IT SHALL BE COVERED WITH A 50mm LAYER OF BLINDING CONCRETE.
- KEEP EXCAVATIONS FREE OF WATER AND CONSTRUCT FOOTINGS AND BACKFILL AS SOON AS PRACTICABLE AFTER EXCAVATION AND BLINDING.
- ENSURE EXCAVATIONS ARE STABLE AND PROTECT SURROUNDING INFRASTRUCTURE AND SERVICES FROM ADVERSE EFFECTS OF GROUND WORKS. PROVIDE TEMPORARY RETENTION WORKS AS REQUIRED.
- USE SUITABLE CONSTRUCTION TECHNIQUES AND EQUIPMENT FOR BACKFILLING ADJACENT TO STRUCTURES TO PREVENT OVERSTRESSING AND DAMAGE. BACKFILL AGAINST RETAINING WALLS ONLY AFTER THE SPECIFIED CONCRETE STRENGTH HAS BEEN ATTAINED.


CONCRETE:

- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS5100 AND AS DESCRIBED IN PROJECT SPECIFICATION '820 - CONCRETE FOR STRUCTURES', EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
- CONCRETE TESTING SHALL BE UNDERTAKEN IN ACCORDANCE WITH PROJECT SPECIFICATION '201 - QUALITY SYSTEMS'.
- EXPOSURE CLASSIFICATION FOR ALL ELEMENTS IS IN ACCORDANCE WITH AS5100-2017. MINIMUM EXPOSURE CLASSIFICATION TO BE B1 IN ACCORDANCE WITH DURABILITY REPORT R30-BRE-RPT-QA-520-000014.
- CONCRETE GRADE AND MINIMUM COVER TO ALL REINFORCEMENT FOR VARIOUS ELEMENTS SHALL BE AS FOLLOWS U.N.O.:

ELEMENT	EXPOSURE CLASSIFICATION	CONCRETE STRENGTH	NOMINAL COVER TO REINF'T (mm)	ADDITIONAL PROTECTION REQUIREMENTS
		f'c (MPa)		
SUBSTRUCTURE				
PILES	B1	S40	80	CAST AGAINST GROUND
PILE CAP	B1	S40	50	ADDITIONAL COVER MAY BE REQUIRED IF CAST AGAINST BLINDING OR GROUND
COLUMNS	B1	S50	45	
COLUMN COLLARS	B1	S40	50	
SILL BEAM	B1	S40	50	ADDITIONAL COVER MAY BE REQUIRED IF CAST AGAINST DAMP PROOF MEMBRANE OR GROUND
SUPERSTRUCTURE				
PRECAST T-ROFF BEAM				
-INTERNAL SURFACE	B1	S65	35	INTENSE COMPACTION AND RIGID STEEL FORMWORK
-EXTERNAL SURFACE	B1	S65	35	INTENSE COMPACTION AND RIGID STEEL FORMWORK
CAST IN-SITU DECK				
- DECK SURFACE	B1	S50	45	
- DECK UNDERSIDE	N/A	S50	30	
- SKIRT BEAM	B1	S50	45	ADDITIONAL COVER MAY BE REQUIRED IF CAST AGAINST DAMP PROOF MEMBRANE OR GROUND
OTHER STRUCTURES				
APPROACH SLAB	B1	S40	50	ADDITIONAL COVER MAY BE REQUIRED IF CAST AGAINST DAMP PROOF MEMBRANE OR GROUND
TRAFFIC BARRIERS	B1	S40	50	
MSE PRECAST WALL PANELS	B1	S50	45	
IN-SITU RETAINING WALLS (WING WALLS)	B1	S40	50	ADDITIONAL COVER MAY BE REQUIRED IF CAST AGAINST DAMP PROOF MEMBRANE OR GROUND
PRECAST RETAINING WALLS	B1	S40	50	
BLINDING	B1	N20	N/A	
MASS CONCRETE	B1	N20	N/A	
PANEL STEP PACKERS	B1	N20	N/A	

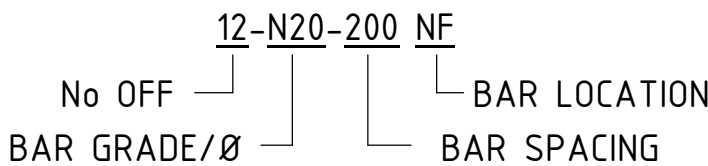
- COVER FOR CONCRETE CAST ON GROUND SHALL BE ASSESSED AS FOLLOWS:
 - FOR CONCRETE CAST ON BLINDING CONCRETE, COVER SHALL BE INCREASED BY 5mm.
 - FOR CONCRETE CAST AGAINST DAMP PROOF MEMBRANE, COVER SHALL BE INCREASED BY 10mm.
 - FOR CONCRETE CAST AGAINST GROUND, COVER SHALL BE INCREASED BY 30mm.
- ADDITIONAL COVER FOR CONCRETE CAST AGAINST GROUND SHALL BE ACHIEVED BY INCREASING THE OVERALL SIZE OF THE ELEMENT AND NOT BY ADJUSTING THE POSITION OF THE REINFORCEMENT WITHIN THE ELEMENT. ADDITIONAL REINFORCEMENET MAY BE REQUIRED IF COVER IS GREATER THAN 100mm. FOR ALL OTHER ELEMENTS SUBMIT TO DESIGN ENGINEER FOR APPROVAL.
- THE SPECIFIED CONCRETE COVERS ARE THE MINIMUM CLEAR COVER TO REINFORCEMENT. TOLERANCE ON STATED MINIMUM COVER +10mm, -0mm U.N.O.
- SERVICES CONDUITS AND PIPES SHALL BE LOCATED IN THE CENTRE OF ELEMENTS WITH 30mm MINIMUM CLEARANCE TO REINFORCEMENT CONDUITS AND PIPES SHALL NOT BE PLACED WITHIN THE CONCRETE COVER ZONE TOLERANCE ON COVER IS +10mm, -0mm UNLESS NOTED OTHERWISE.
- FORMWORK SHALL COMPLY WITH THE PROJECT SPECIFICATIONS.
- FOR FORMWORK STRIPPING TIME, REFER TO PROJECT SPECIFICATION.
- ALL CONCRETE SHALL BE ADEQUATELY VIBRATED USING IMMERSION TYPE VIBRATIONS U.N.O.
- PRECAST ELEMENTS SHALL BE FABRICATED USING RIGID FORMWORK AND INTENSE COMPACTION.
- ALL CAST IN STEEL FITTINGS SHALL BE HOT DIP GALVANISED U.N.O. - ENSURE ISOLATION FROM NON-GALVANISED REINFORCEMENT BY PLASTIC BARRIER OR PVC TAPE THAT IS SUFFICIENT TO PERMANENTLY ISOLATE FITTINGS FROM REINFORCEMENT U.N.O.
- TEMPLATES SHALL BE USED TO ACCURATELY LOCATE AND HOLD IN POSITION ALL CAST-IN ITEMS DURING THE PLACEMENT OF CONCRETE.
- ALL FORMED CONCRETE FINISHES SHALL BE CLASS 2 (U.N.O.) AND ALL UNFORMED CONCRETE FINISHES SHALL BE U2 (U.N.O.) IN ACCORDANCE WITH AS3610 AND THE PROJECT SPECIFICATIONS.
- ABBREVIATIONS USED: ∇ FORMED FINISH ∇ UNFORMED FINISH
- ALL EXPOSED CONCRETE EDGES AND EDGES TO CRACK CONTROL JOINTS TO HAVE 20mm x 20mm CHAMFERS U.N.O.
- CONCRETE CURING OF EXPOSED CONCRETE SURFACES SHALL COMMENCE AS SOON AS SURFACE FINISHING OPERATIONS ARE COMPLETED WHEN THE CONCRETE HAS HARDENED SUFFICIENTLY TO PREVENT DAMAGE.
- METHODS OF CONCRETE CURING SHALL COMPLY THE PROJECT SPECIFICATIONS.
- CONSTRUCTION JOINTS (CJ) SHALL BE PROPERLY FORMED WHERE DETAILED ON THE DRAWINGS. DO NOT CONSTRUCT UNSPECIFIED CONSTRUCTION JOINTS WITHOUT OBTAINING PRIOR APPROVAL FROM SUPERINTENDENT.

REINFORCEMENT:

- ALL REINFORCEMENT SHALL CONFORM TO D500N IN ACCORDANCE WITH AS/NZS 4671.
- LAPS ARE GENERALLY SHOWN DIAGRAMMATICALLY THUS  IN GENERAL LAPPING BARS SHOULD NOT BE CRANKED UNLESS IT IS NECESSARY TO FIT STEEL INTO PLACE, ACHIEVE GOOD CONCRETE COMPACTION AND MAINTAIN THE CORRECT BAR POSITION AND COVER. OBTAIN APPROVAL BEFORE CRANKING BARS.
- UNLESS NOTED OTHERWISE ON THE DRAWINGS, LAP LENGTHS SHALL BE AS SHOWN IN TABLE BELOW:

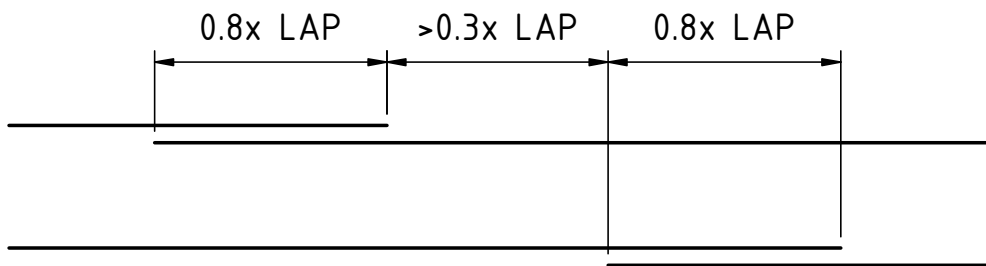
BAR DIAMETER (db)	LAP LENGTH (HORIZONTAL BARS WITH > 300mm OF CONCRETE CAST BELOW THE BARS)	LAP LENGTH (ALL OTHER BARS)
10mm - 24mm	60db	45db
28mm - 32mm	65db	50db
36mm - 40mm	70db	55db

- WHERE MORE THAN HALF OF THE BARS ARE LAPPED AT ANY ONE LOCATION, THE MINIMUM LAP LENGTHS SHALL BE INCREASED BY 25% IN ACCORDANCE WITH AS5100.5 CLAUSE 13.2.2.
- LAP LENGTHS OF UNEQUAL BARS MAY BE BASED ON THE REQUIREMENTS FOR THE SMALLER BAR DIAMETER.
- ALL STANDARD HOOKS AND COGS NOTED ON THE DRAWINGS SHALL BE TO THE REQUIREMENTS OF AS5100.5 U.N.O.
- REINFORCEMENT SHALL NOT BE BENT, CUT, WELDED OR HEAT TREATED ON SITE UNLESS INDICATED ON THE DRAWINGS AND THEN ONLY IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
- SUPPORT ALL REINFORCEMENT ADEQUATELY AND ACCURATELY TO ENSURE CORRECT BAR POSITIONING DURING CONSTRUCTION AND POURING OF CONCRETE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND NOTES ON THE DRAWINGS.
- CLEAN REINFORCEMENT PRIOR TO PLACING CONCRETE.
- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION.
- REINFORCEMENT INDICATED ON DRAWINGS AS FOLLOWS:



- BAR LOCATION ABBREVIATION:

EF	EACH FACE
NF	NEAR FACE
FF	FAR FACE
EW	EACH WAY
ES	EQUALLY SPACED
LV	LENGTH VARIES
T	TOP
B	BOTTOM
UNO	UNLESS NOTED OTHERWISE
ABR	ALTERNATE BAR REVERSED
-----	DENOTES NEAR FACE AND TOP REINFORCEMENT
-----	DENOTES FAR FACE AND BOTTOM REINFORCEMENT
- REINFORCEMENT SHALL BE LOCALLY DISPLACED WHERE NECESSARY TO CLEAR STEEL DOWELS, ANCHOR BOLTS, DRAINAGE PIPES, FORMED HOLES AND RECESSES (WITHOUT DISPLACING IN TO THE COVER ZONE).
- WHERE HELICAL REINFORCEMENT IS SHOWN, THE HELIX SHALL BE ANCHORED AT ITS ENDS BY TWO COMPLETE TURNS OF THE HELIX AT 50mm PITCH. WHERE LAPS ARE REQUIRED, THEY SHALL BE 2 TURNS OF THE HELIX.
- WHERE REINFORCEMENT LAPS ARE REQUIRED BUT NOT SHOWN, STOCK LENGTHS AND STAGGERED LAPS SHALL BE PROVIDED.



NOT FOR
CONSTRUCTION

BYFORD RAIL EXTENSION

ELEVENTH ROAD (SLKm:4.39)
OVER RAILWAY
BRIDGE No. 1933
GENERAL NOTES - SHEET 1
LOCAL AUTHORITY: CITY OF ARMADALE
MRWA DRAWINGS NUMBER:

Rev: dfg

ISSUED FOR DA

PRINT IN COLOUR

METADATA

GROUND SURVEY STANDARD:
DATE OF CAPTURE:
MAPPING SURVEY STANDARD:
DATE OF CAPTURE:
MAIN ROADS PROJECT ZONE: PCG2020
HEIGHT DATUM: AHD71



MetCONNX

CONSULTANT DRAWING NUMBER: R30-DEA-DWG-ST-440-00005 RevB.02

DRAWN D.D
DESIGNED B.J
VERIFIED A.M.E
DIRECTOR



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CLIENT FILE No:
RECOMMENDED
APPROVED

PRETENSIONED PRECAST CONCRETE DECK UNITS:

- PRECAST DECK UNITS SHALL BE CONSTRUCTED AND ERECTED IN ACCORDANCE WITH PROJECT SPECIFICATION "828 - PRECAST CONCRETE MEMBERS".
- THE PRECAST CONTRACTOR SHALL SUBMIT DETAILS OF THE PROPOSED CONCRETE MIX DESIGN FOR APPROVAL BY THE ALLIANCE PRIOR TO CASTING OF UNITS.
- CONCRETE TESTING SHALL BE UNDERTAKEN IN ACCORDANCE WITH SPECIFICATION 201.
- PRESTRESSING STRANDS SHALL BE STRESS RELIEVED SUPER GRADE LOW RELAXATION 7-WIRE STRAND COMPLYING WITH AS/NZS 4672.1. MINIMUM ULTIMATE STRENGTH OF STRANDS TO BE:
 - 15.2 DIA. STRANDS - 1830 MPa
- PRESTRESSING STRANDS AT THE ENDS OF UNITS SHALL BE DEBONDED WHERE SHOWN ON THE DRAWINGS USING FLEXIBLE POLYMER PLASTIC TUBING OR SIMILAR APPROVED METHODS. THE MAXIMUM OUTER DIAMETER OF THE SHEETING SHALL NOT EXCEED 20mm, AND SHALL BE SEALED AT ENDS.
- REFER "REINFORCEMENT" NOTES FOR TYPICAL REINFORCEMENT REQUIREMENTS.
- WHERE DETAILED ON THE DRAWINGS, PROVIDE THREADED REINFORCEMENT BARS WITH PROPRIETARY COUPLERS CAST INTO THE ENDS OF THE DECK UNITS. THE PRECAST CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR SUPPLYING THE CORRESPONDING PROJECTING LOOSE THREADED BARS FOR SUBSEQUENT "ON-SITE" INSTALLATION BY OTHERS.
- THE FORMWORK USED FOR THE UNITS SHALL BE RIGID FORMWORK TO ACHIEVE A CLASS 2 SURFACE FINISH. CONCRETE SHALL BE SUBJECTED TO INTENSE COMPACTION AT THE TIME OF CASTING.
- STEAM CURING, IF PROPOSED, SHALL BE LOW PRESSURE WET STEAMING AND SHALL COMPLY WITH PROJECT SPECIFICATION "820 - CONCRETE FOR STRUCTURES".
- THE UNFORMED TOP SURFACE OF UNITS SHALL BE DELIBERATELY ROUGHENED TO ACHIEVE A "U4" FINISH. REMOVAL OF LAITANCE AND LOOSE MATERIAL FROM THE TOP SURFACE SHALL BE CARRIED OUT BY WATER JETTING OR OTHER APPROVED METHODS TO EXPOSE THE AGGREGATE TO A DEPTH OF 3mm.
- THE TRANSFER OF PRESTRESSING FORCE FROM THE CASTING BED TO THE PRECAST UNITS SHALL NOT OCCUR UNTIL THE CONCRETE HAS REACHED THE MINIMUM CONCRETE TRANSFER STRENGTH SPECIFIED ON THE DRAWINGS.
- TRANSFER OF THE PRESTRESSING FORCE TO THE PRECAST UNITS SHALL BE CARRIED OUT GRADUALLY ON A STRAND BY STRAND BASIS IN ACCORDANCE WITH THE SPECIFICATION.
- STRANDS SHALL BE CUT CONSECUTIVELY AT BOTH ENDS. THE NUMBER OF STRANDS CUT AT EACH END OF A UNIT SHALL NOT DIFFER BY MORE THAN 6 STRANDS AT ANY TIME.
- WHERE DETAILED ON THE DRAWINGS, STRAND ENDS SHALL BE UNRAVELLED LOCALLY TO FORM 76mm DIAMETER UNION ANCHOR. ALL OTHER STRANDS SHALL BE TRIMMED AND SEALED IN ACCORDANCE WITH THE SPECIFICATION.
- ADJACENT PRECAST UNITS FOR EACH SPAN SHALL BE CAST SEQUENTIALLY TO ENSURE SIMILAR AGE OF CONCRETE AT TIME OF INSTALLATION.
- EACH UNIT SHALL BE MARKED IN AN AGREED LOCATION, WITH THE FOLLOWING INFORMATION LEGIBLY MARKED ON THE CONCRETE:
 - BEAM IDENTIFICATION NUMBER
 - DATE AND TIME OF CASTING
 - ORIENTATION FOR INSTALLATION OF UNIT
 - BRIDGE NUMBER
- DURING STORAGE, TRANSPORTATION AND HANDLING, PRECAST UNITS SHALL BE KEPT IN A HORIZONTAL UPRIGHT POSITION AT ALL TIMES AND SUPPORTED AT THE CENTRELINE OF THE LIFTING LOOPS.
- DECK UNITS SHALL BE CAST HORIZONTALLY.
- IMMEDIATELY AFTER PLACEMENT DECK UNITS SHALL BE SECURED TO ENSURE STABILITY.

ANTI GRAFFITI COATING:

- ANTI GRAFFITI COATING TO BE APPLIED IN ACCORDANCE WITH MRWA SPECIFICATION '908 - ANTI GRAFFITI.
- THE FOLLOWING SURFACES SHALL BE TREATED WITH A NON SACRIFICIAL ANTI GRAFFITI COATING:
 - ABUTMENTS AND WING WALLS - FULL EXPOSED HEIGHT, EXTEND 300mm BELOW FINISHED GROUND LEVEL.
 - SUPERSTRUCTURE - ANY PART WHICH IS WITHIN 3000mm OF THE FINISHED GROUND LEVEL.
 - CONCRETE ROAD SAFETY BARRIERS - ALL SIDES FULL LENGTH OF BRIDGE.
- ANTI GRAFFITI COATINGS ON SMOOTH CONCRETE FINISHES SHALL BE NON-SACRIFICIAL COATINGS AND SHALL BE COLOURED AS PER THE PROJECT SPECIFICATIONS. WHERE ADDITIONAL PAINT SYSTEM IS TO BE APPLIED, IT SHALL BE COMPATIBLE WITH THE ANTI GRAFFITI COATING
- 'AS CONSTRUCTED' DRAWINGS SHALL SHOW THE EXTENT OF ANTI GRAFFITI COATING.

STRUCTURAL STEELWORK:

- ALL STEELWORK, FABRICATION AND ERECTION, SHALL COMPLY WITH AS 5100.6, AS/NZS 5131, AS 4100, AS/NZS 1554 AND PROJECT SPECIFICATION "830 - STRUCTURAL STEELWORK".
- STEEL SHALL BE THE FOLLOWING GRADE UNLESS INDICATED OTHERWISE:
 - WELDED BEAMS - GRADE 300 TO AS/NZS 3679.2
 - HOT ROLLED SECTIONS - GRADE 300 TO AS/NZS 3679.1
 - HOT ROLLED PLATE - GRADE 300 TO AS/NZS 3678
 - HOLLOW SECTIONS - GRADE 350 TO AS/NZS 1163
 - STEEL FLAT (MERCHANT BAR) - GRADE 300 TO AS/NZS 3679.1
- STEEL MEMBERS SHALL BE MADE FROM WHOLE LENGTHS, BUTT WELDS SHALL NOT BE USED.
- ALL WELDS SHALL BE CATEGORY SP (SPECIAL PURPOSE) AS DEFINED IN AS/NZS 1554.1.
- ALL WELDING PROCEDURES AND END PREPARATIONS SHALL BE IN ACCORDANCE WITH AS/NZS 1554.1 AND ANY ADDITIONAL REQUIREMENTS NOTED IN THE SPECIFICATION.
- NOMINAL STRENGTH OF WELD METAL SHALL BE 490MPa IN ACCORDANCE WITH AS/NZS 1554.1.
- WELDS TO BE 6mm CONTINUOUS FILLET WELDS UNLESS NOTED OTHERWISE. BUTT WELDS ARE TO BE COMPLETE PENETRATION BUTT WELDS AS DEFINED IN AS/NZS 1554.
- FREE ALL MEMBERS FROM TWISTS AND DISTORTIONS BEFORE AND AFTER WELDING.
- ALL BOLTS SHALL BE M20 (GRADE 8.8/S) UNLESS NOTED OTHERWISE.
- ALL BOLTS SHALL BE SUPPLIED WITH NUTS AND WASHERS. HIGH STRENGTH GRADE 8.8/S BOLTS, NUTS AND WASHERS SHALL COMPLY WITH AS/NZS 1252. COMMERCIAL GRADE 4.6/S BOLTS, NUTS AND WASHERS SHALL COMPLY WITH AS 1110 & AS 1111.
- UNLESS NOTED OTHERWISE ON THE DRAWINGS ALL BOLTS, NUTS AND WASHERS SHALL BE HOT DIP GALVANISED. TAP NUTS OVERSIZE TO SUIT GALVANISED THREAD AND OIL FOR PROTECTION. INSTALL WASHERS UNDER BOLTS HEAD AND NUT.
- DRILL HOLES FULL SIZE OR REAM TO FULL SIZE AFTER SUB-DRILLING OR SUB-PUNCHING. SUB-DRILLED OR SUB-PUNCHED HOLES TO BE A MINIMUM OF 3mm UNDERSIZE. FLAME CUTTING OF HOLES IS NOT PERMITTED.
- SLOTTED HOLES TO BE 2.5 x BOLT DIAMETER LONG UNO. BOLTS TO BE SET CENTRAL IN SLOT. USE OVERSIZED WASHERS AT SLOTTED HOLES.
- AFTER FABRICATION ALL STEELWORK (EXCEPT STAINLESS STEEL) SHALL BE HOT DIPPED GALVANISED UNO IN ACCORDANCE WITH THE SPECIFICATION AND THE FOLLOWING NOTES:
 - BOLTS, NUTS AND WASHERS IN ACCORDANCE WITH AS 1214, DRILLED AND TAPPED TO SUIT GALVANISING. AFTER GALVANISING ALL THREAD COMPONENTS SHALL BE ABLE TO BE ASSEMBLED BY HAND. MINIMUM GALVANISING THICKNESS SHALL BE 40µm
 - ALL OTHER STEELWORK IN ACCORDANCE WITH AS/NZ 4680.
- AIR RELEASE HOLES REQUIRED FOR GALVANISING SHALL BE CONCEALED AND SEALED AGAINST THE INGRESS OF WATER WITH SILICON RUBBER JOINT SEALER - "PARCHEM 66" OR SIMILAR APPROVED.
- DAMAGED GALVANISING SHALL BE REPAIRED IN ACCORDANCE WITH MRWA SPECIFICATION 835.
- PREPARE SHOP DRAWINGS AND SUBMIT TO PROJECTS DESIGN MANAGER FOR GENERAL COMPLIANCE WITH DESIGN.

MECHANICALLY STABILISED EARTH WALLS:

- MECHANICALLY STABILISED EARTH (MSE) WALLS SHALL BE DESIGNED, MANUFACTURED AND CONSTRUCTED TO COMPLY WITH PROJECT SPECIFICATION '802 - MECHANICALLY STABILISED EARTH WALLS'. CONCRETE, REINFORCEMENT AND STEELWORK SHALL BE IN ACCORDANCE WITH THE GENERAL AND PROJECT SPECIFICATIONS.
- THE MSE SYSTEM SHALL BE DESIGNED BY A SPECIALIST SUBCONTRACTOR WITH DEMONSTRATED EXPERIENCE IN THE DESIGN OF EQUIVALENT WALLS. TENDERS SHALL SUBMIT SUFFICIENT DETAILS OF THEIR PROPOSED SYSTEM TO ENABLE A FULL TECHNICAL AND AESTHETIC ASSESSMENT TO BE MADE OF IT'S SUITABILITY.
- THE SPECIALIST SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND PREPARATION OF ALL DETAILED SPECIFICATIONS AND DRAWINGS FOR THE MANUFACTURE AND CONSTRUCTION OF THE MSE STRUCTURES.
- POST DRILLED FIXINGS IN THE PERMANENT WORKS REQUIRED FOR THE INSTALLATION OF MSE PANELS SHALL BE REMOVED FOLLOWING CONSTRUCTION AND THE CONCRETE FILLED WITH REPAIR MORTAR, OR FIXINGS SHALL BE HOT DIP GALVANISED AND CHEMICALLY ANCHORED.
- FOR ABUTMENT MSE WALL PANELS, THE PRECAST CONTRACTOR SHALL INCORPORATE THE URBAN AESTHETICS REQUIREMENTS (REFER DESIGN LOT 3000). FEATURE GROOVES AND RELIEF ON EXPOSED FACES SHALL BE DOCUMENTED IN THE MANUFACTURE (SHOP) DRAWINGS.
- MAXIMUM DEPTH OF FEATURE GROOVES OR RELIEF IS 10mm. COVER TO REINFORCEMENT SHALL NOT BE REDUCED BY GROOVES OR RELIEF.

DESIGN INFORMATION SUMMARY:

THE BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE FOLLOWING:


- DESIGN STANDARD: AS 5100-2017
 - DEAD LOADS: AS PER CODE
 - TRAFFIC LOADS:
 - LOAD = SM1600, HLP400, GROUP 2 VEHICLE 4, GROUP 2 VEHICLE 5 (SUPERVISED)
 - SM1600 DESIGN LANES = 4
 - FATIGUE LOADING:
 - ROUTE FACTOR = 0.7
 - A160 = 63,350,000 CYCLES
 - M1600 = 4,930,000 CYCLES
 - PEDESTRIAN LOADS: AS PER AS 5100.2-2017
 - WIND LOADING:
 - SERVICEABILITY WIND SPEED V₂₀ = 37m/s
 - ULTIMATE WIND SPEED V₂₀₀₀ = 48m/s
 - EARTHQUAKE LOADS:
 - ACCELERATION COEFFICIENT, a = 0.09
 - SITE SUB-SOIL CLASS = Ce SHALLOW SOIL
 - PROBABILITY FACTOR, kp = 1.3
 - DESIGN CATEGORY = BEDC-3
 - THERMAL:
 - CONSTRUCTION TEMPERATURE = 20°C
 - TEMPERATURE RISE = 29°C
 - TEMPERATURE FALL = -17°C
 - DIFFERENTIAL TEMPERATURE = BRIDGE TYPE 2 FIGURE 17.3 AS 5100.2
 - RAIL IMPACT LOADING: AS PER AS 5100.2-2017
 - DIFFERENTIAL SETTLEMENT ALLOWANCE = 20mm BETWEEN ADJACENT SUBSTRUCTURES
 - FOOTING APPLIED BEARING PRESSURES (BASED ON MEYERHOF DISTRIBUTION):
 - ABUTMENT 1 SLS =
 - ULS =
 - ABUTMENT 2 SLS =
 - ULS =
- AN EXPERIENCED GEOTECHNICAL ENGINEER SHALL INSPECT AND VERIFY BEARING CAPACITY OF FOUNDATIONS PRIOR TO FOOTING CONSTRUCTION.
- BARRIER PERFORMANCE LEVEL = MEDIUM

ISSUED FOR DA

PRINT IN COLOUR

B.02	ISSUED FOR DEVELOPMENT APPLICATION	A.M.E	28-02-23
B	ISSUED FOR IDD	A.M.E	02-02-23
A	ISSUED FOR RD	A.M.E	01-08-22
No.	DESCRIPTION	APPROVED	DATE
AMENDMENTS			

METADATA	
GROUND SURVEY STANDARD:	
DATE OF CAPTURE:	
MAPPING SURVEY STANDARD:	
DATE OF CAPTURE:	
MAIN ROADS PROJECT ZONE:	PCG2020
HEIGHT DATUM:	AHD71

 CONSULTANT DRAWING NUMBER: R30-DEA-DWG-ST-440-00006 RevB.02	DRAWN	D.D
	DESIGNED	B.J
	VERIFIED	A.M.E
	DIRECTOR	

 INFRASTRUCTURE DELIVERY DIRECTORATE MAJOR PROJECTS WATERLOO CRESCENT Telephone (08) 9323 4111	 EAST PERTH 6892 Fax (08) 9323 4430	CLIENT FILE No:
		RECOMMENDED
		APPROVED

NOT FOR CONSTRUCTION

BYFORD RAIL EXTENSION

ELEVENTH ROAD (SLKm:4.39)
OVER RAILWAY
BRIDGE No. 1933
GENERAL NOTES - SHEET 2
LOCAL AUTHORITY: CITY OF ARMADALE
MRWA DRAWINGS NUMBER:

Rev:

1. FOR GENERAL NOTES REFER DRG No. 00005 TO 00006.
2. EXISTING SERVICES LOCATED IN THE VICINITY OF THE STRUCTURAL WORKS. REFER TO PACKAGE UT-040 FOR EXISTING SERVICE LOCATIONS AND PROPOSED WORKS.



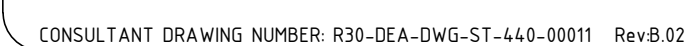
SCALE: (AT A1)


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GROUND SURVEY STANDARD:	
DATE OF CAPTURE:	
MAPPING SURVEY STANDARD:	
DATE OF CAPTURE:	
MAIN ROADS PROJECT ZONE:	PCG2020
HEIGHT DATUM:	AHD71





mainroads
 WESTERN AUSTRALIA
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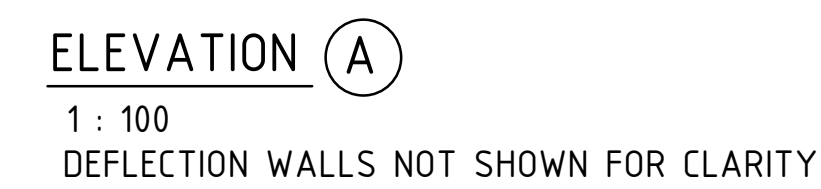
APPROVED

ELEVENTH ROAD (SLK _m :4.39) OVER RAILWAY BRIDGE No. 1933 GENERAL ARRANGEMENT - SHEET 1 LOCAL AUTHORITY: CITY OF ARMADALE MRWA DRAWINGS NUMBER:
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Rev:

CAD DRAWING PATHNAME Autodesk Docs://BRE BYFORD RAIL EXTENSION/R30-MET-MDL-ST-440-00001.rvt

1. FOR GENERAL NOTES REFER DRG No. 00005 TO 00006.



SCALE: (AT 100) 1:100

A

ISSUED FOR DA

PRINT IN COLOUR

B.02	ISSUED FOR DEVELOPMENT APPLICATION	A.M.E	28-02-23
B	ISSUED FOR IDD	A.M.E	02-02-23
A	ISSUED FOR RD	A.M.E	01-08-22
No.	DESCRIPTION	APPROVED	DATE
AMENDMENTS			

METADATA

GROUND SURVEY STANDARD:	
DATE OF CAPTURE:	
MAPPING SURVEY STANDARD:	
DATE OF CAPTURE:	
MAIN ROADS PROJECT ZONE:	PCG2020
HEIGHT DATUM:	AHD71



CONSULTANT DRAWING NUMBER: R30-DEA-DWG-ST-440-00012 RevB.02

DRAWN	D.D
DESIGNED	B. J
VERIFIED	A.M.E
DIRECTOR	



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CLIENT FILE No:

RECOMMENDED

APPROVED

BYFORD RAIL EXTENSION

	ELEVENTH ROAD (SLKm:4.39)
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OVER RAILWAY

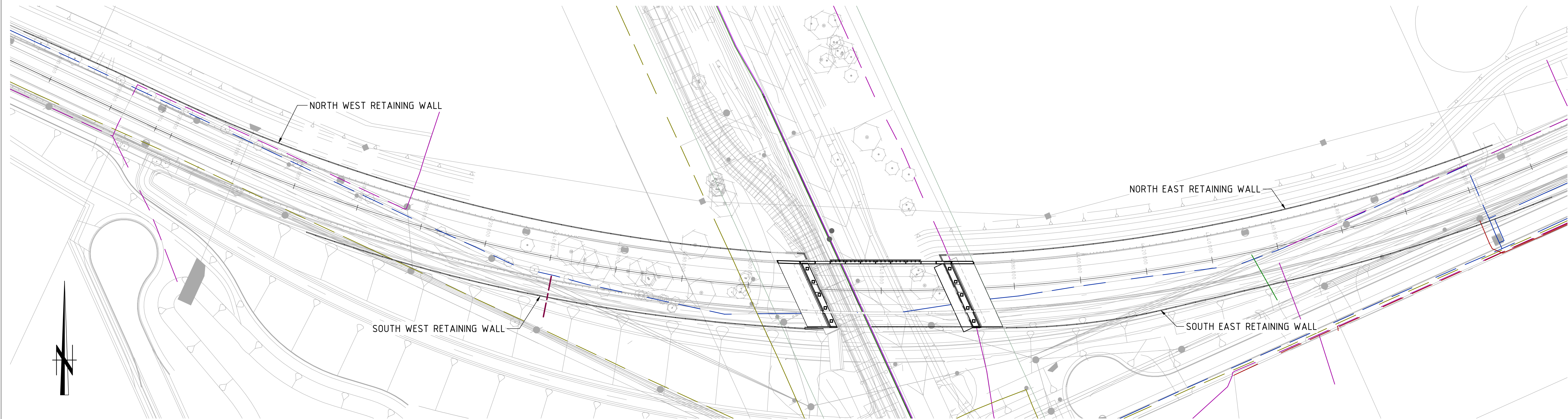
BRIDGE No. 1933

BRIDGE NO. 1935
GENERAL ARRANGEMENT - SHEET 2

LOCAL AUTHORITY: CITY OF ARMADALE

MRWA DRAWINGS NUMBER:

Rev:



KEY PLAN
1 : 600

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B.01	ISSUED FOR DEVELOPMENT APPLICATION	A.M.E	28-02-23
A	ISSUED FOR IDD	A.M.E	02-02-23
No.	DESCRIPTION	APPROVED	DATE
AMENDMENTS			

METADATA	
GROUND SURVEY STANDARD:	
DATE OF CAPTURE:	
MAPPING SURVEY STANDARD:	
DATE OF CAPTURE:	
MAIN ROADS PROJECT ZONE: PCG2020	
HEIGHT DATUM: AHD71	



CONSULTANT DRAWING NUMBER: R30-DEA-DWG-ST-440-004.11 Rev:B.01

DRAWN	D.C
DESIGNED	B.J
VERIFIED	A.M.E
DIRECTOR	



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CLIENT FILE No:
RECOMMENDED
APPROVED

NOT FOR
CONSTRUCTION

BYFORD RAIL EXTENSION
ELEVENTH ROAD (SLKm:4.39)
RETAINING WALLS
BRIDGE No. 1933
RETAINING WALL - KEY PLAN
LOCAL AUTHORITY: CITY OF ARMADALE
MRWA DRAWINGS NUMBER:

Rev: