

Annex F

Swing Bridge

Swing Bridge and Longbird Bridge Replacement

Independent check

2023

Reference Documents

Drawings and Specification Lists



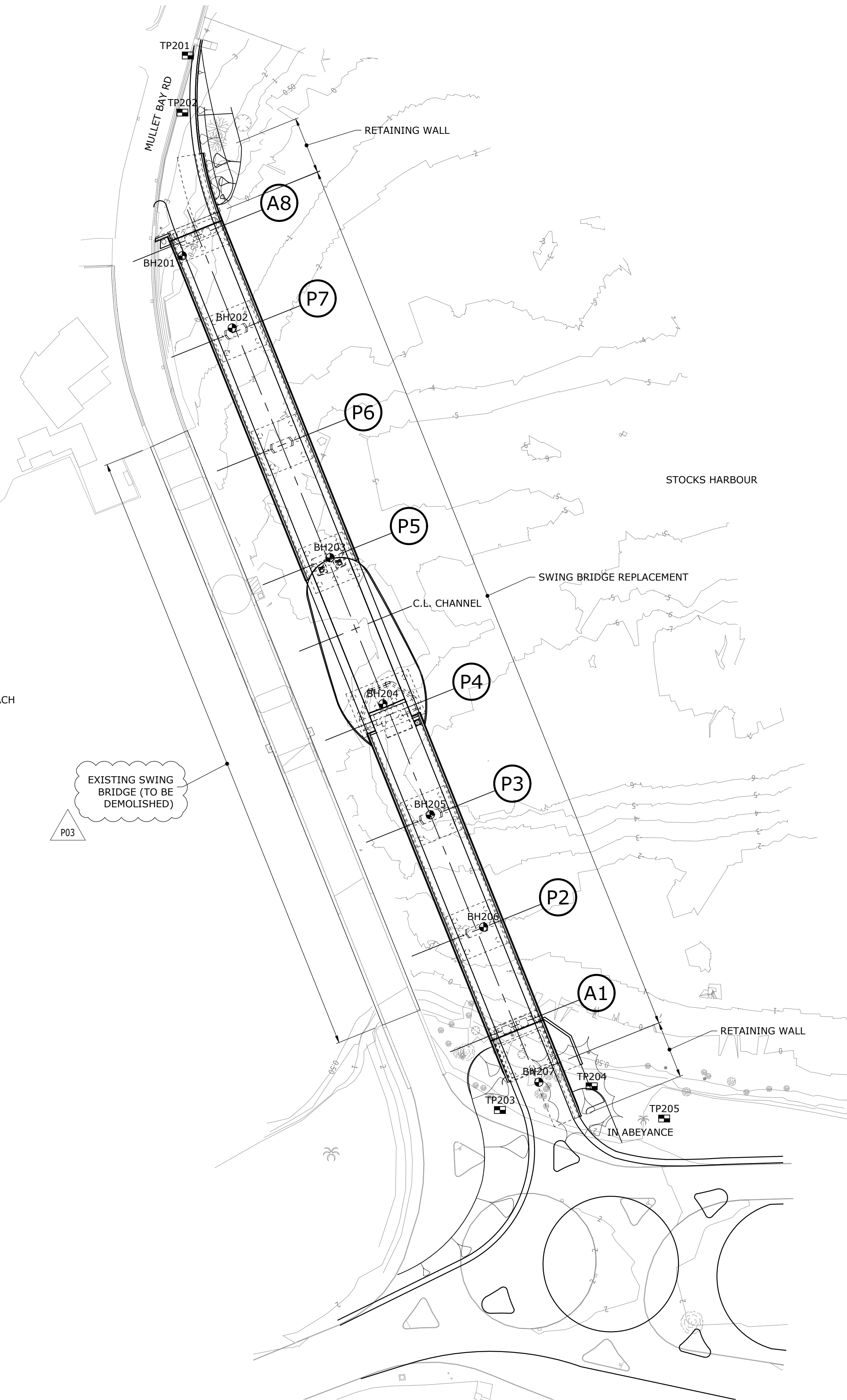
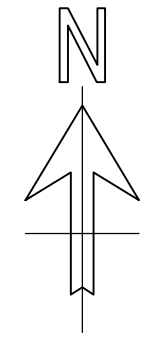
GOVERNMENT OF BERMUDA

Ministry of Public Works

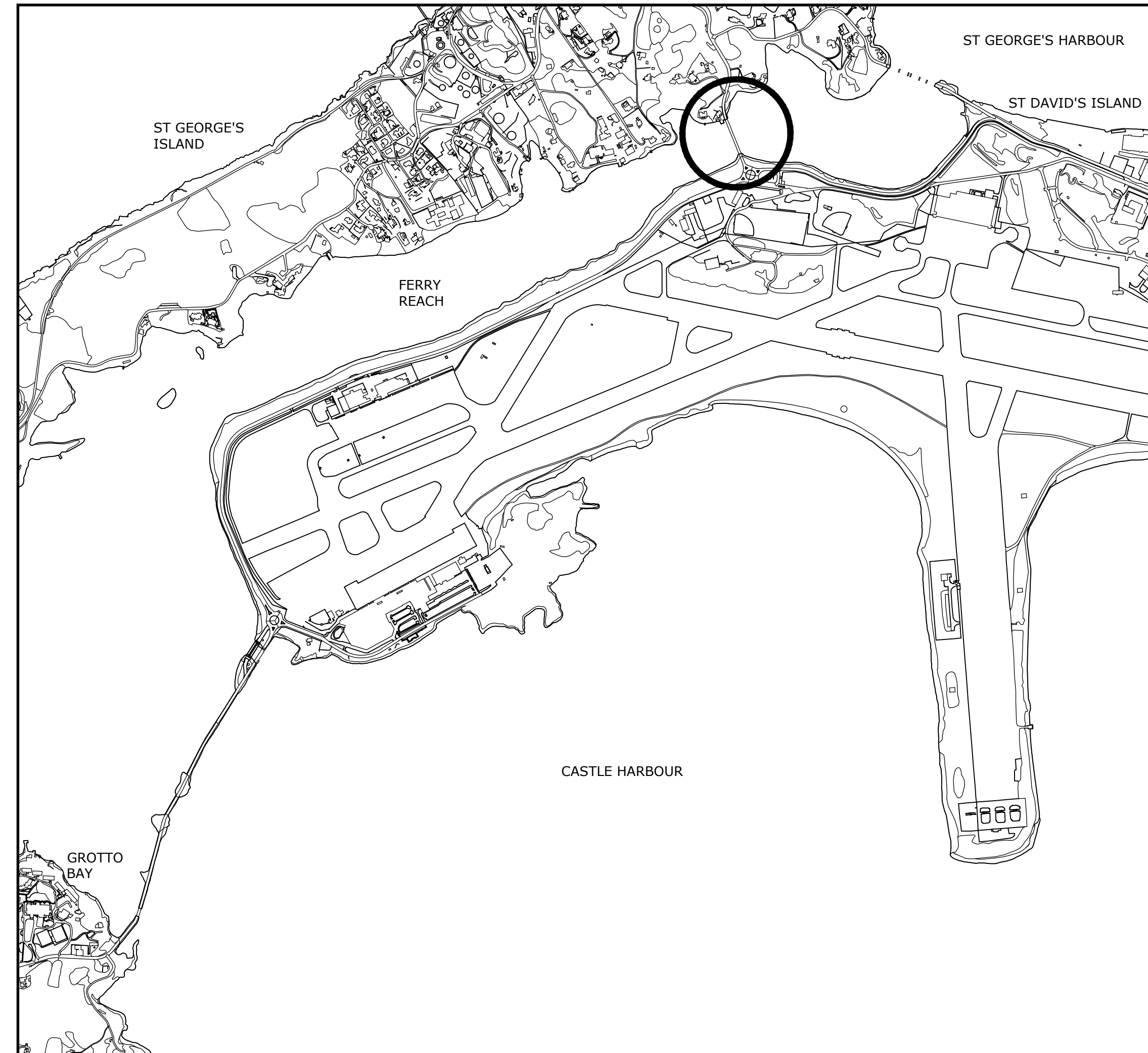
Department of Works and Engineering

SWING BRIDGE REPLACEMENT

Drawings List
General Arrangement
Notes
Construction Sequence
Indicative Mechanical Drawings

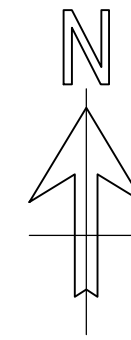


PLAN
1: 500



PLAN
1: 10000
LOCATION PLAN

NOTES
1. FOR NOTES REFER TO DRAWING
3502-RAM-SB-XX-DR-CB-30111.



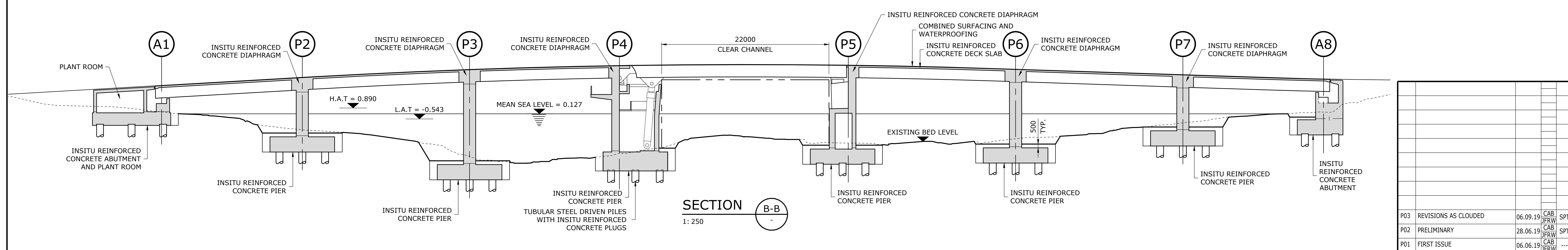
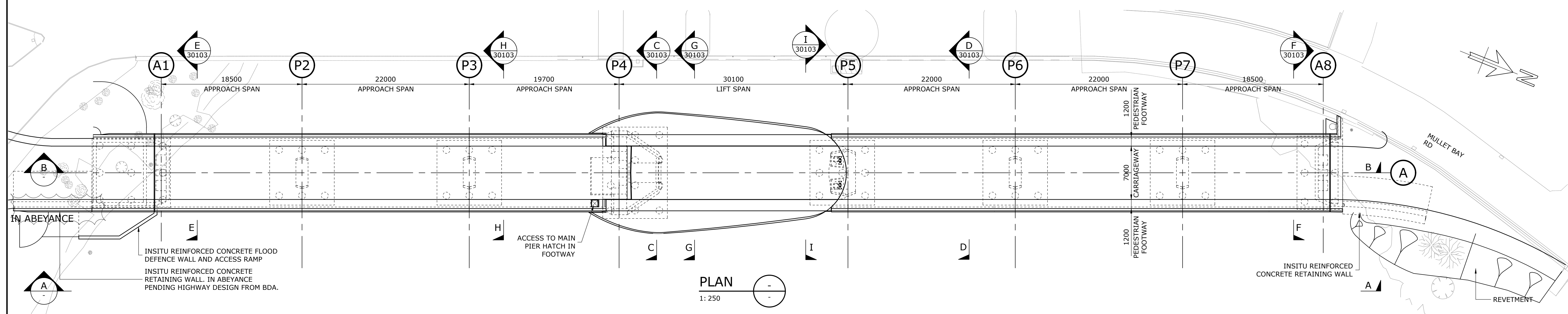
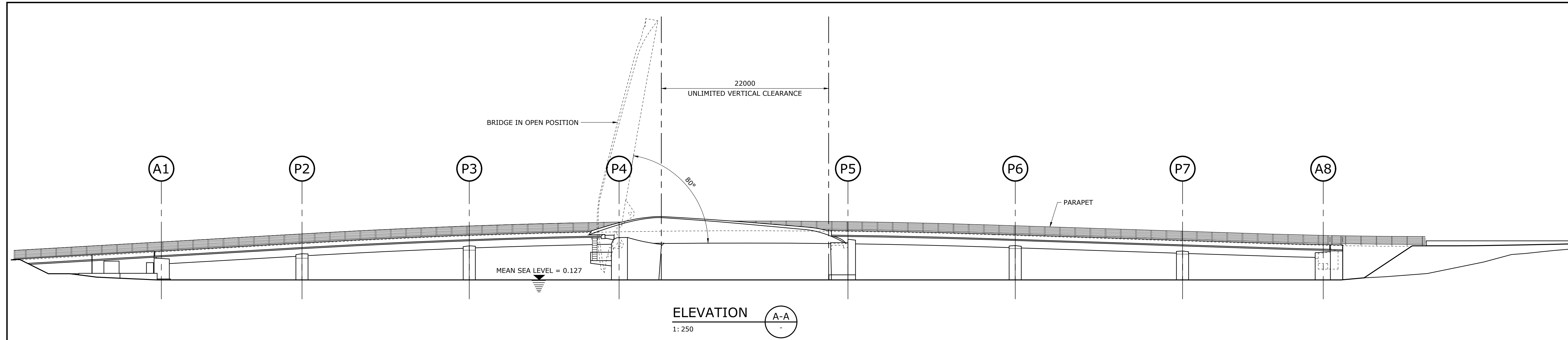
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P03	REVISIONS AS CLOUDED	06.09.19	CAB JFRW	SPT
P02	PRELIMINARY	28.06.19	CAB JFRW	SPT
P01	FIRST ISSUE	06.06.19	CAB JFRW	---



Project Title:
**REPLACEMENT OF SWING BRIDGE
AND LONGBIRD BRIDGE, BERMUDA**

Drawing Title:
**SWING BRIDGE REPLACEMENT
GENERAL ARRANGEMENT
SHEET 1**

Status: PRELIMINARY			
Drawn: M.Cooper	Date: APR.2019	Scale (at A1): AS SHOWN	Rev: P03
Drawing No.: 3502-RAM-SB-XX-DR-CB-30101			Rev: P03



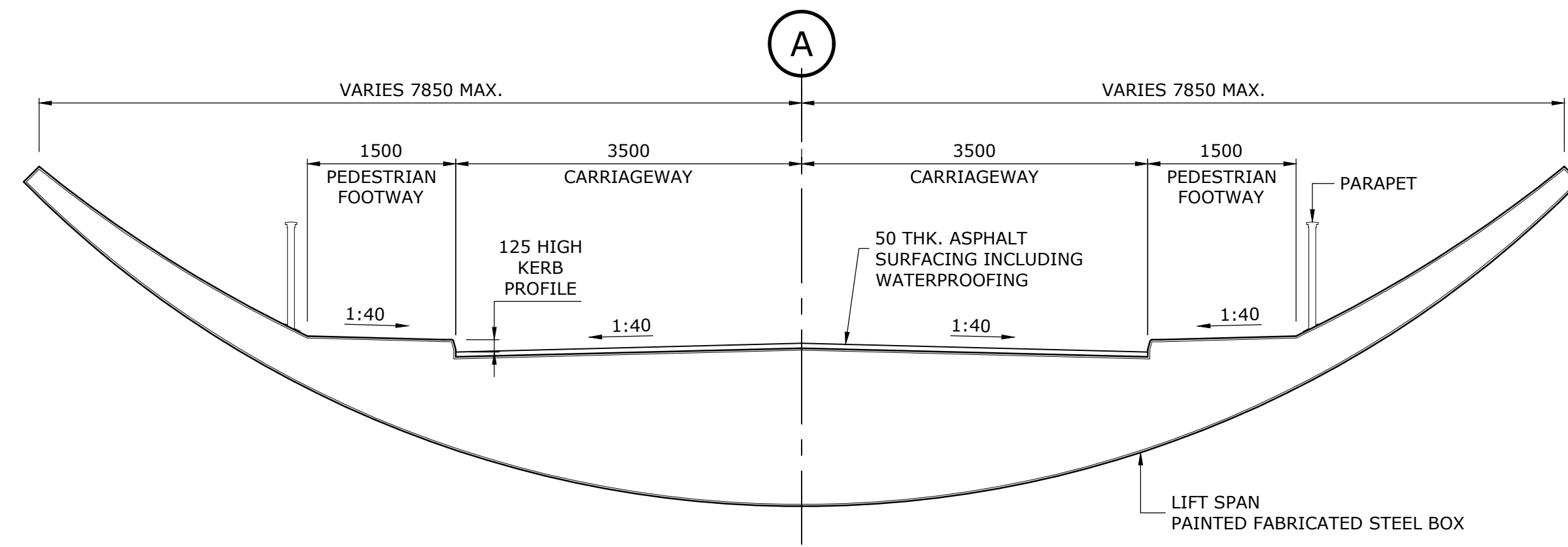
NOTES
1. FOR NOTES REFER TO DRAWING: 3502-RAM-SB-XX-DR-CB-30111.

Rev	Description	Date	By	App
P03	REVISIONS AS CLOUDED	06.09.19	CAB	SPT
P02	PRELIMINARY	28.06.19	CAB	SPT
P01	FIRST ISSUE	06.06.19	CAB	JFRW

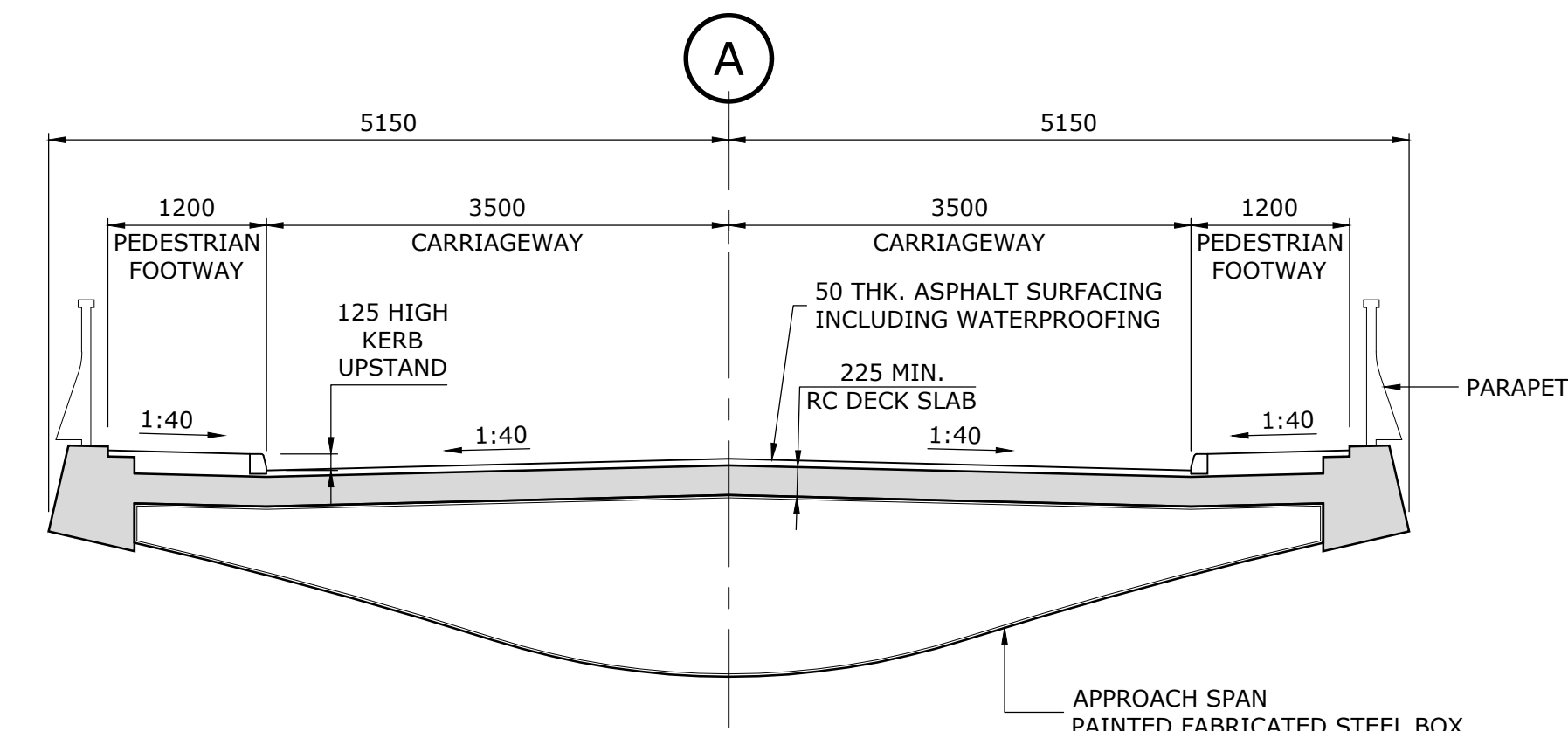


Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA			
Drawing Title: SWING BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 2			
Drawn: M.Cooper	Date: APR.2019	Scale (at A1): AS SHOWN	Rev:
Drawing No.: 3502-RAM-SB-XX-DR-CB-30102			P03

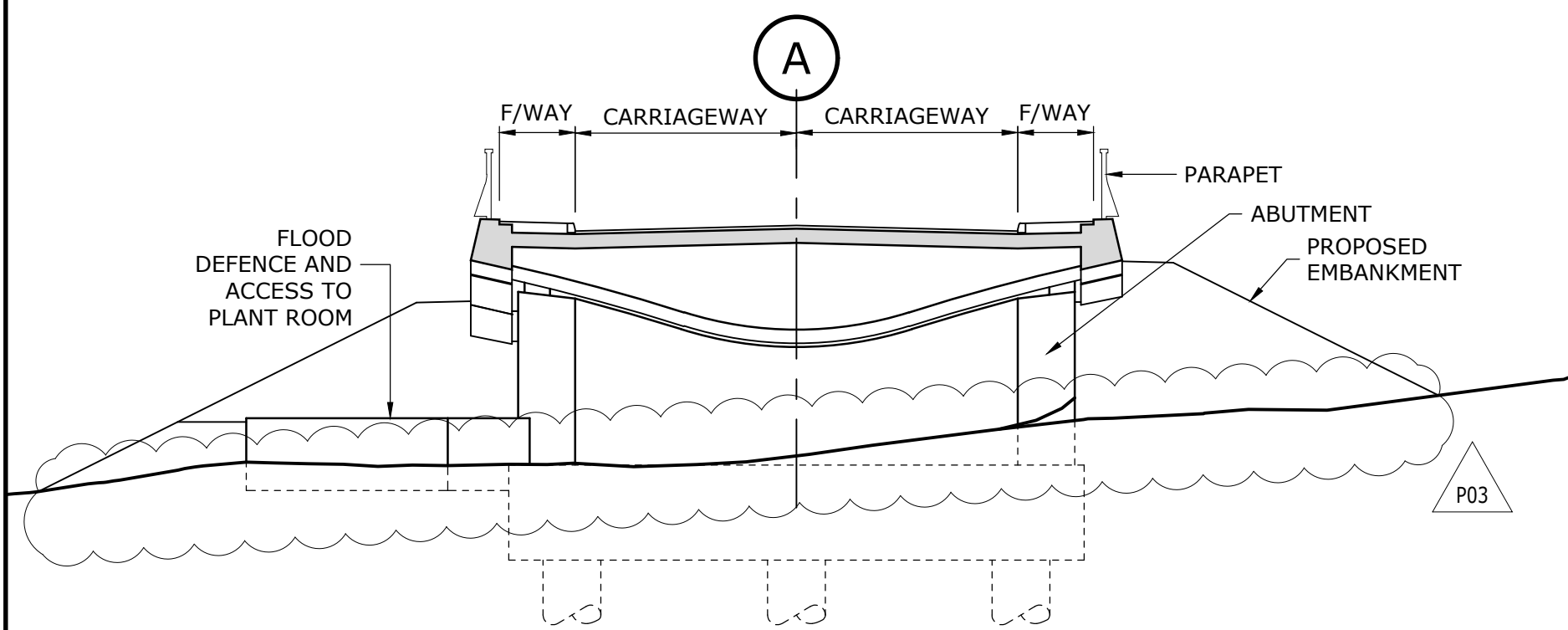
Status: PRELIMINARY			
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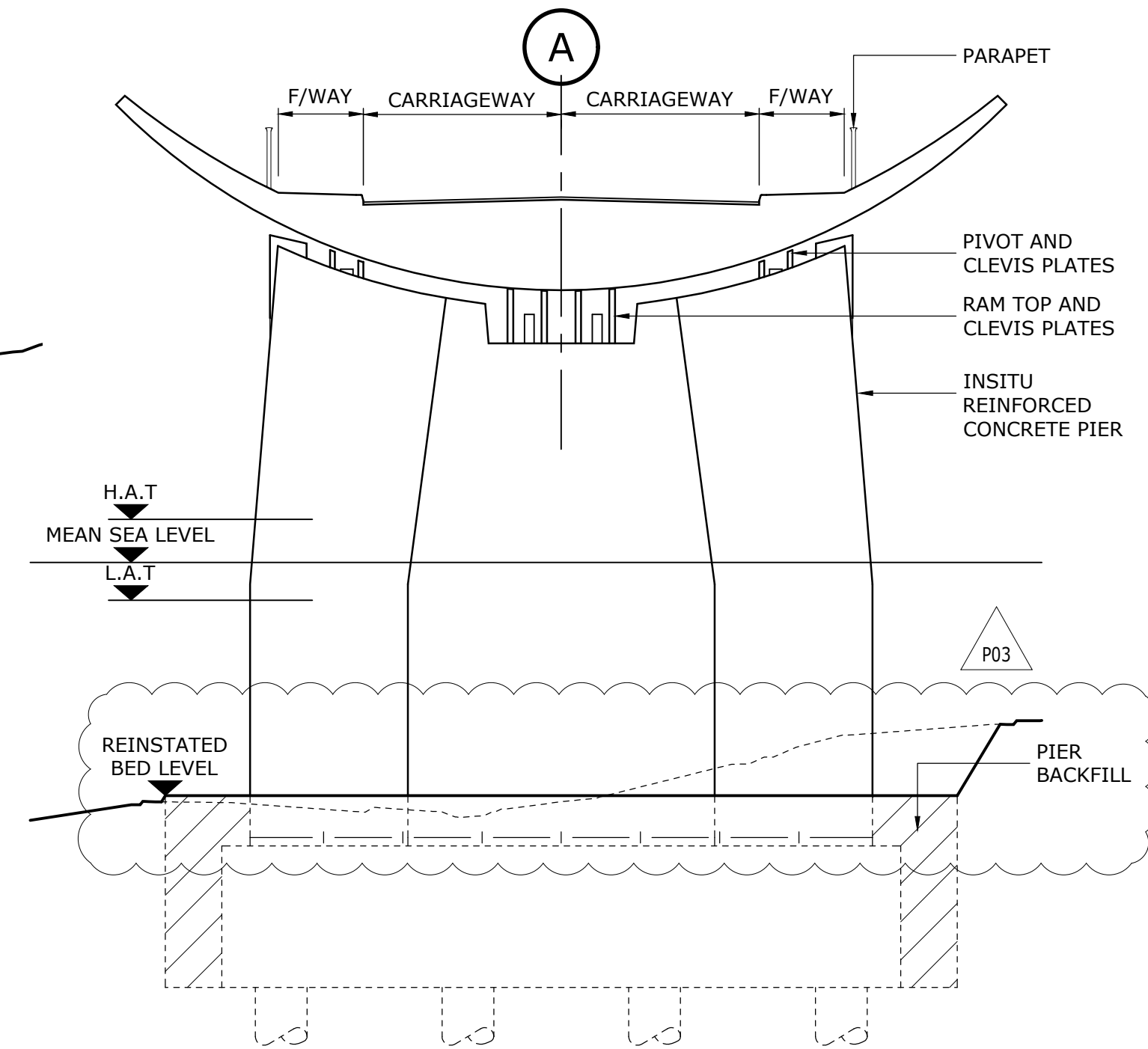
SECTION C-C
1: 50
LIFT SPAN TYPICAL SECTION



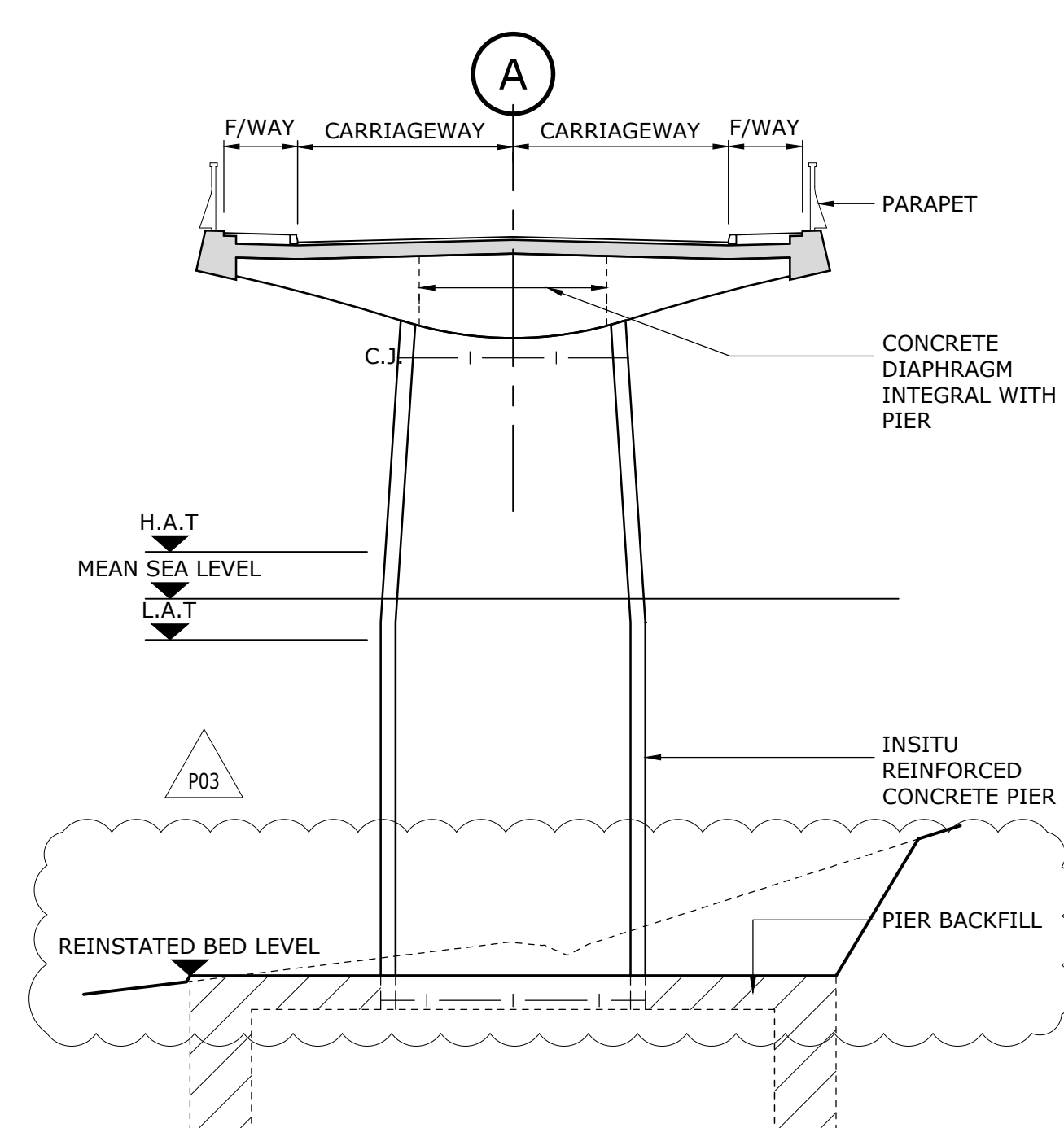
SECTION D-D
1: 50
APPROACH SPAN TYPICAL SECTION



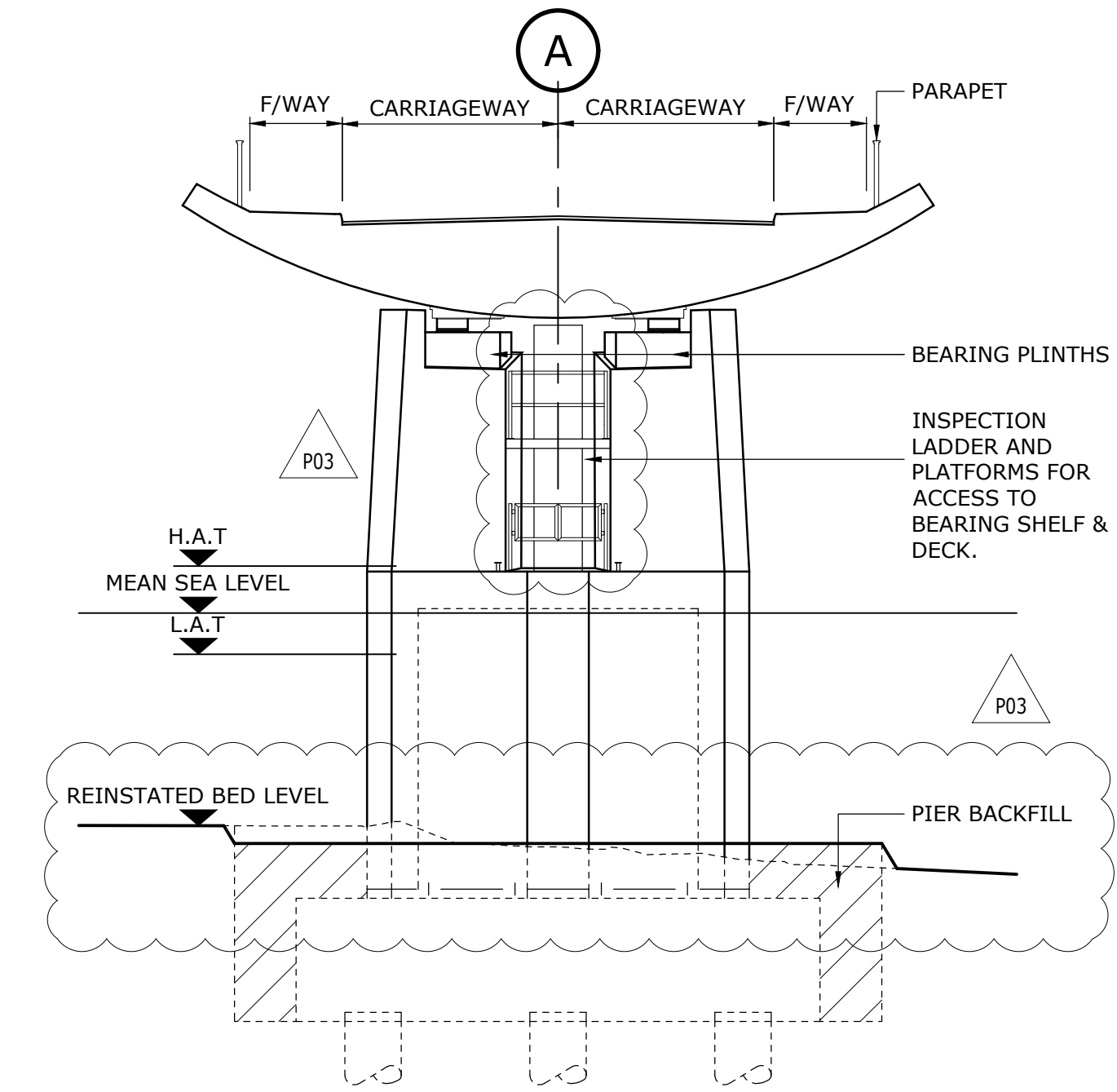
ELEVATION E-E
1: 100
SOUTH ABUTMENT (A1)



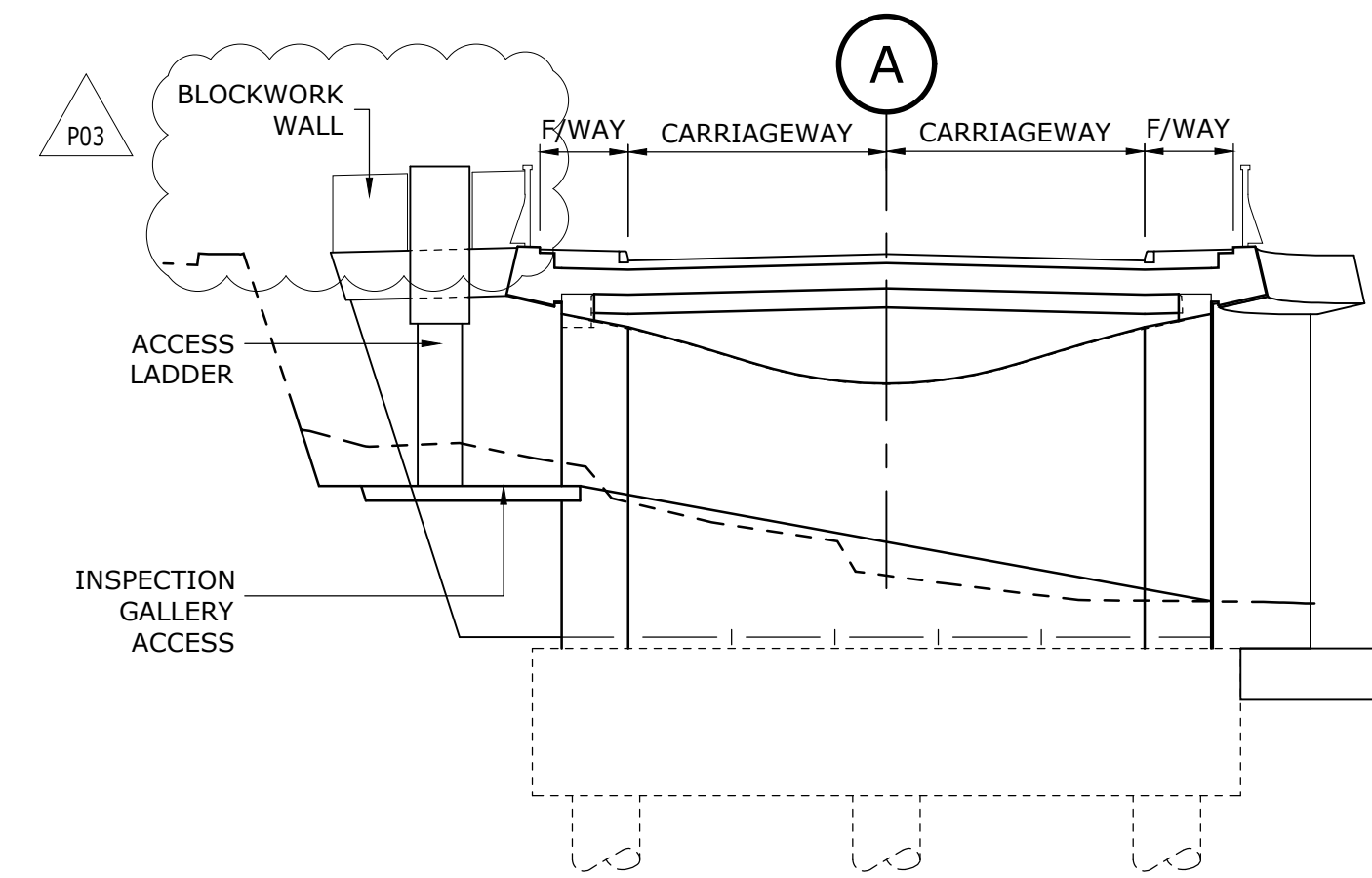
ELEVATION G-G
1: 100
MAIN PIER (P4)



ELEVATION H-H
1: 100
APPROACH PIER (P3)

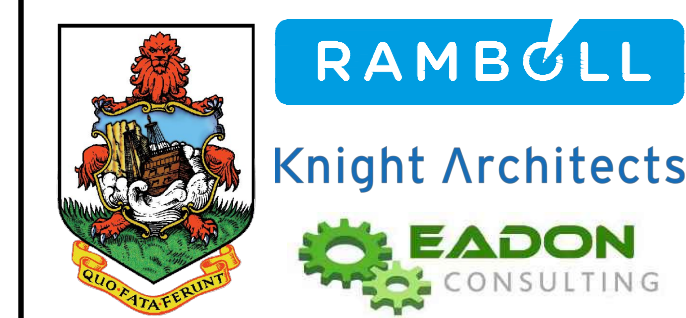


ELEVATION I-I
1: 100
LANDING PIER (P5)



ELEVATION F-F
1: 100
NORTH ABUTMENT (A8)

NOTES
1. FOR NOTES REFER TO DRAWING: 3502-RAM-SB-XX-DR-CB-30111.



Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA
Drawing Title: SWING BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 3

Rev	Description	Date	By	App
P03	REVISIONS AS CLOUDED	06.09.19	CAB	SPT
P02	PRELIMINARY	28.06.19	CAB	SPT
P01	FIRST ISSUE	06.06.19	CAB	---

Status: PRELIMINARY	
Drawn: M.Cooper	Date: APR.2019
Drawing No.: 3502-RAM-SB-XX-DR-CB-30103	Scale (at A1): AS SHOWN
Rev: P03	

GENERAL NOTES.

- THIS DRAWING SHALL ONLY BE USED FOR THE DESIGN ELEMENT STATED IN THE DRAWING TITLE.
- ONLY WRITTEN DIMENSIONS SHALL BE USED.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- ALL LEVELS ARE IN METRES RELATED TO ORDINANCE DATUM.
- ALL CHAINAGES ARE IN METRES UNLESS NOTED OTHERWISE.
- DETAILS OF THIS BRIDGE ARE ALSO SHOWN ON THE LATEST REVISION OF THE DRAWINGS LISTED ON DRAWING NUMBER 3502-RAM-SB-XX-DR-CB-30051.
- THE DESIGNER'S INTENDED CONSTRUCTION SEQUENCE IS SHOWN ON DRAWING NUMBERS 3502-RAM-SB-XX-DR-CB-30201, 30202, 30203 AND 30204. NO VARIATION IS PERMITTED TO THE CONSTRUCTION SEQUENCE WITHOUT THE CONSENT OF THE DESIGNER.
- FOR FURTHER DETAILS OF ROADWORKS ADJACENT TO THE BRIDGE SEE DRAWING SERIES 3502-RAM-###-###-###-###-###.
- FOR FURTHER DETAILS OF FOOTWAY/VERGE CONSTRUCTION ADJACENT TO THE BRIDGE SEE DRAWING SERIES 3502-RAM-###-###-###-###-###.
- DETAILS OF THE CONNECTION TO ROADWORKS DRAINAGE ARE SHOWN ON DRAWING SERIES 3502-RAM-###-###-###-###-###.
- THE TYPE OF SAFETY FENCE AND ITS EXTENT ADJACENT TO THE BRIDGE IS SHOWN ON DRAWINGS SERIES 3502-RAM-###-###-###-###-###.
- THIS BRIDGE HAS BEEN DESIGNED FOR THE FOLLOWING TRAFFIC LOADING: LM1 AND LM2 TO BS EN 1991-2 WHICH COVER TRAFFIC LOADING SPECIFIED IN "EVALUATION CRITERIA FOR HIGHWAY BRIDGES IN BERMUDA".
- FOR THE APPROACH SPAN THE PARAPET ANCHORAGE HAS BEEN DESIGNED FOR COEXISTENT NOMINAL POST LOADS OF:
13.6 kNm BENDING MOMENT AT POST BASE.
22.7 kN SHEAR FORCE AT POST BASE.
FOR THE LIFT SPAN THE PARAPET ANCHORAGE HAS BEEN DESIGNED FOR THE ULTIMATE PLASTIC BENDING MOMENT CAPACITY OF THE POST. AN INTERMEDIATE POST MAXIMUM SPACING OF 2040MM FOR APPROACH SPANS AND 2000MM FOR THE LIFT SPAN HAVE BEEN ASSUMED.
- THE APPROXIMATE POSITION OF EXISTING AND PROPOSED SERVICES AFFECTING THE WORKS AT THIS BRIDGE ARE INDICATED ON DRAWING 3502-RAM-SB-XX-DR-Z-30021. THE CONTRACTOR TO CONFIRM EXACT POSITIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHOULD UNDERTAKE APPROPRIATE INVESTIGATIONS FOR UNKNOWN SERVICES PRIOR TO CONSTRUCTION.
- PARAPET POSTS ARE TO BE FIXED VERTICAL AND STRING COURSE JOINTS ARE TO BE LOCATED MIDWAY BETWEEN POSTS.

FOR PARAPET POST BASE PLATE WELDED TO DECK STEELWORK REFER TO DRAWING SERIES 3502-RAM-SB-XX-DR-A
- BOREHOLE LOCATIONS ARE APPROXIMATE ONLY.
- THE DECK SLAB IS TO BE CAST TO ALLOW FOR IMMEDIATE AND LONG TERM DEFLECTIONS USING THE PRE-CAMBERS GIVEN ON THE DECK OUTLINE/STEELWORK DRAWINGS. THE CARRIAGEWAY LEVELS OVER THE BRIDGE ARE TO FOLLOW FROM THE PRECAMBER, PLUS A CONSTANT SURFACING THICKNESS (WEARING COURSE) OF MINIMUM 50mm.
- DECK WATERPROOFING TO BE SPRAY APPLIED TO BRIDGE DECK AND SHALL EXTEND TO THE ENDS OF THE DECK ONLY.

COMBINED FOOTWAY WATERPROOFING/SURFACING TO BE 5MM THICK PROPRIETARY EPOXY RESIN OVERLAID WITH AGGREGATE. SYSTEM IS TO BE COMPLIANT WITH CL.10 OF BD29/17 DMRB AND PROVIDE MINIMUM SLIP RESISTANCE EQUIVALENT TO A MEAN CORRECTED PENDULUM TEST VALUE OF 45 UNITS USING STANDARD SKID RESISTANCE PENDULUM TEST (BS EN 13036-4) FOR THE LIFE OF WALKWAY SURFACING.

TWO COATS OF BITUMINOUS PAINT IN ACCORDANCE WITH SPECIFICATION CLAUSE 2004 TO BE APPLIED TO ALL BURIED CONCRETE SURFACES UP TO WITHIN 300MM BELOW FINISHED GROUND LEVEL.
- THE APPROACH SPANS STRUCTURE HAS BEEN DESIGNED TO BE MADE 'INTEGRAL' BETWEEN AN EFFECTIVE BRIDGE TEMPERATURE RANGE OF +9 TO +38°C. THIS REPRESENTS A SHADE AIR TEMPERATURE RANGE OF +5 TO +34°C.
- NO BACKFILL IS TO BE PLACED UNTIL SECTION IS COMPLETE AND HAS ACHIEVED 28 DAY STRENGTH. BACKFILL SHALL BE BROUGHT UP SUCH THAT THE HEIGHT DIFFERENCE ACROSS THE ABUTMENTS IS LIMITED TO 600mm.
- SYMBOLIC REPRESENTATION OF BEARINGS IS BASED ON BS EN 1337-1.
- FOR DETAILS OF PROPOSED METHODOLOGY FOR BEARING REPLACEMENT, REFER TO THE STRUCTURES MAINTENANCE MANUAL, REF 3502-RAM-###-###-###-###-###.

23. PROPOSED BRIDGE FOUNDATIONS AND SUBSTRUCTURE ARE TO BE BUILT IN CLOSE PROXIMITY TO THE EXISTING BRIDGE ABUTMENTS AND FOUNDATIONS. WHERE EXISTING STRUCTURES OBSTRUCT CONSTRUCTION OR INSTALLATION OF NEW ELEMENTS THEY SHOULD BE REMOVED PRIOR TO CONSTRUCTION OF REPLACEMENT BRIDGE.

CONCRETE OUTLINE NOTES.

- FOUNDATIONS.
INSITU GROUND AT UNDERSIDE OF FOUNDATION IS TO BE INSPECTED BY SUITABLY QUALIFIED PERSONNEL TO CONFIRM FOUNDATION ASSUMPTIONS PRIOR TO PLACING BLINDING. ALL TOPSOIL AND MADE GROUND IS TO BE REMOVED PRIOR TO PLACING BLINDING. POCKETS/AREAS OF SOFT MATERIAL SHALL BE EXCAVATED AND REPLACED WITH WELL GRADED AND COMPACTED GRANULAR MATERIAL AS APPROPRIATE. REFER TO SPECIFICATION CLAUSE 604.
- CONCRETE TO BE:
BLINDING: ST2.
PILES: GRADE C40/50 MIX REF C40/50/B.
PILECAPS: GRADE C40/50 MIX REF C40/50/B.
ABUTMENT STEM: GRADE C40/50 MIX REF C40/50/A.
PIERS: GRADE C40/50 MIX REF C40/50/A.
DECK: GRADE C40/50 MIX REF C40/50/C.
STRINGCOURSE: GRADE C40/50 MIX REF C40/50/A.
BEARING PLINTHS: GRADE C40/50 MIX REF C40/50/A.
MASS CONCRETE: GRADE C22/30 MIX REF C22/30/D.
- CONCRETE FINISHES TO BE:
F1 TO FORMED BURIED CONCRETE SURFACES
F2 TO ALL OTHER FORMED SURFACES
F3 TO SOFFIT, ENDS OF DECK AND STRINGCOURSE
F4 TO EXPOSED FACES OF WALL + PIERS
F6 ROUGH SAWN BOARD FINISH AT LOCATIONS INDICATED ON THE DRAWINGS
U1 TO BURIED CONCRETE SURFACES
U3 TO ALL OTHER UNFORMED SURFACES
U4 TO TOP OF DECK
- ALL BACKFILLED CONCRETE SURFACES ARE TO BE PAINTED UP TO WITHIN 300mm OF FINISHED GROUND LEVEL WITH A BELOW GROUND WATERPROOFING SYSTEM IN ACCORDANCE WITH SPECIFICATION FOR HIGHWAYS WORKS CLAUSE 2004.
- HORIZONTAL & VERTICAL CONSTRUCTION JOINTS ARE NOT PERMITTED IN EXPOSED FACES UNLESS THEY ARE SHOWN ON THE DRAWINGS.
- ALL EXPOSED CONCRETE ARRISSES TO HAVE A 25X25 CHAMFER UNLESS NOTED OTHERWISE.
- THE PARAPET STRINGCOURSE HAS BEEN DETAILED ON THE BASIS OF SYSTEMS THAT UTILISE POSTS AT 2040mm MAXIMUM CENTRES FOR APPROACH SPANS. THE CONTRACTOR MUST ADVISE THE DESIGNER SHOULD A PARAPET SYSTEM WITH ALTERNATIVE POST CENTRES BE PROPOSED.
- CONCRETE TO REACH 28 DAY STRENGTH BEFORE REMOVAL OF FORMS.

PILING.

- PILES ARE TO BE ASTM A252 GRADE 2 STEEL TUBES.
- SPECIFIED WORKING LOAD, SWL, AT THE TOP OF PILES IS AS TABULATED.
- THE ASSESSMENT OF YIELD STRENGTH AND WALL THICKNESSES OF THE PILES HAVE BEEN DETERMINED FROM INTERPRETATION OF THE GEOLOGICAL INFORMATION PROVIDED WITHIN THE GROUND INVESTIGATION REPORT (3502-RAM-XX-XX-RP-CE-30001) AND THE ACCOMPANYING GEOTECHNICAL FACTUAL REPORT.
- FINAL PILE CUT-OFF LEVEL IS 150 MM ABOVE THE UNDERSIDE OF PILE CAP LEVEL. PILES SHALL BE CUT AND FINISHED IN ACCORDANCE WITH CLAUSE 1606 OF THE SPECIFICATION.

PILES ARE ASSUMED TO BE DRIVEN BY DIESEL IMPACT HAMMER TO REFUSAL WITHIN THE COMPETENT UNWEATHERED BASALT LAYER. THE ESTIMATED TOE LEVEL FOR THE PILES IS AS TABULATED. REFUSAL ON THE BASALT IS TO BE PROVEN BY THE SPECIFIED CRITERIA IN APPENDIX 16/6 AND CHECKED BY DYNAMIC ANALYSIS TO APPENDIX 16/8.
- HARD LIMESTONE ROCK LAYERS MAY BE PRESENT ABOVE THE ESTIMATED PILE TOE LEVEL IN THE COMPETENT UNWEATHERED BASALT LAYER.
- BASED ON THE RESULTS OF DRIVING ASSESSMENTS THE PILES ARE NOT SIZED TO BE DRIVEN THROUGH THE LIMESTONE LAYERS AND IT IS ANTICIPATED THAT THERE WILL BE A NEED TO DRILL AND DRIVE PILES THROUGH LIMESTONE ROCK LAYERS WHERE ENCOUNTERED IN ORDER TO THEN DRIVE THE PILES TO REFUSAL ON THE BASALT.
- THE CONTRACTOR SHALL UNDERTAKE PILE DRIVING ANALYSIS TO CONFIRM THAT THE PILE WALL THICKNESS IS APPROPRIATE FOR THE SELECTED METHOD OF PILE INSTALLATION.
- EXTENSIONS TO PILES, WELDING AND WELD TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH CLAUSE 1606 OF THE SPECIFICATION.
- THE INSIDE SURFACE OF THE STEEL TUBE PILES IN THE LENGTH OF THE PILE FROM CUT-OFF LEVEL TO 4.15M BELOW CUT OFF LEVEL IS TO BE UNPAINTED AND FREE FROM OIL/GREASE AND LOOSE SCALE OR RUST.
- CONCRETE PLUG AND REINFORCEMENT REQUIRED IN THE TOP 4.15M LENGTH OF EACH PILE IS TO BE IN ACCORDANCE WITH CLAUSE 1605 AND SERIES 1700.
- TESTING OF PRELIMINARY PILES SHALL BE IN ACCORDANCE WITH CLAUSE 1608 AND APPENDIX 16/6 AND 16/8 OF THE SPECIFICATION.
- TESTING OF WORKING TEST PILES. TEST PILES SHALL BE WORKING PILES SELECTED FOR TEST LOADING IN ACCORDANCE WITH CLAUSE 1606 AND 1608 AND APPENDIX 16/1 AND 16/8 OF THE SPECIFICATION.
- WHERE A PILE TO BE TESTED IS INSTALLED BEFORE EXISTING GROUND LEVEL IS REDUCED TO CUT OFF LEVEL, THAT LENGTH OF PILE ABOVE CUT OFF LEVEL IS TO BE ISOLATED FROM THE SURROUNDING GROUND BEFORE THE PILE TEST IS STARTED OR THE TEST LOAD IS TO BE ADJUSTED IN ACCORDANCE WITH SPECIFICATION APPENDIX 16/8. THIS TEST LOAD IS TO BE AGREED AND CONFIRMED WITH DESIGNER.
- FOR PILES, CORROSION ALLOWANCE WAS TAKEN INTO ACCOUNT IN THE DESIGN AS SACRIFICIAL THICKNESS OF 2.6MM FOR EACH EXPOSED FACE, ACCORDING TO TABLE NA.1 OF THE NA TO BS EN 1993-5.

STEELWORK NOTES.

- THESE NOTES ARE TO APPLY TO ALL STEELWORK EXCEPT WHEN OVERWRITTEN BY THE INDIVIDUAL DETAIL DRAWING.
- FOR STRUCTURAL STEELWORK SPECIFICATION REFER TO SPECIFICATION APPENDIX 18. THIS APPENDIX IS TO BE READ IN CONJUNCTION WITH MCHW SHW 1800 SERIES. A MINIMUM QUANTIFIED SERVICE CATEGORY OF F56 AND EXECUTION CLASS EXC3 SHALL BE ASSUMED BY THE CONTRACTOR, UNLESS A MORE ONEROUS REQUIREMENT IS NOTED IN THE SPECIFICATION OR ON DRAWINGS. FOR LIFT SPAN STEELWORK THE QUANTIFIED SERVICE CATEGORY SHALL BE F112, IN ACCORDANCE WITH PD 6705-2.
- STEELWORK GRADES:
ALL STEELWORK TO BE GRADE S355 J0 +N TO BS EN 10025-2 UNLESS OTHERWISE NOTED.
ALL STAINLESS STEEL TO BE GRADE 1.4462 TO BS EN 10088.
- ALL SHEAR STUDS TO BE 19mm DIA, 150mm LONG, TYPE SD1 TO BS EN ISO 13918, UNLESS NOTED OTHERWISE.
- ALL BEAMS SHALL BE SHOP-WELDED. ON SITE WELDS SHALL BE AVOIDED, EXCEPT FOR APPROACH SPAN ERECTION.
- FOR INACCESSIBLE AREAS WITHIN THE LIFT SPAN AND/OR APPROACH SPAN CORROSION ALLOWANCE WAS TAKEN IN TO ACCOUNT IN THE DESIGN AND SACRIFICIAL THICKNESS OF 4MM FOR EACH EXPOSED FACE, ACCORDING TO TABLE NA.1 OF THE UK NA TO BS EN 1993-2 (ATMOSPHERIC CORROSION CLASSIFICATION C3 TO BS EN ISO 9223).
- FOR THE APPROACH SPANS, ALL WELDS ARE TO BE FULL PENETRATION / FULL STRENGTH BUTT WELDS UNLESS NOTED OTHERWISE.
FOR THE LIFT SPAN ALL WELDS SHALL BE FULL PENETRATION / FULL STRENGTH BUTT WELDS, UNLESS NOTED OTHERWISE.
EXTERIOR WELDS TO BE GROUND FLUSH.
- ALL WELDS AND WELDED PARTS SHALL MEET THE REQUIREMENTS OF TABLE 8.1 TO 8.10 OF BS EN 1993-1-9 INCLUSIVE AS AMENDED BY THE UK NATIONAL ANNEX NA BS EN 1993-1-9, TO ACHIEVE THE MINIMUM DETAIL CATEGORY COMPATIBLE WITH THE QUANTIFIED SERVICE CATEGORY OF THE PART OF THE STRUCTURE UNLESS NOTED OTHERWISE ON A SPECIFIC DETAIL.
- WELD SYMBOLS USED IN THESE DRAWINGS ARE IN ACCORDANCE WITH BS EN ISO 2553 SYMBOLIC REPRESENTATION. FOR FILLET WELDS Z SYMBOL REPRESENTS THE LEG LENGTH.
- BUTT WELDS ARE FULL PENETRATION OF THE THICKNESS JOINED UNLESS MINIMUM DEPTH OF PENETRATION IS STATED.
- WHERE FILLET WELDS ARE PROPOSED THEY SHOULD BE BOTH SIDES ALL ROUND AND CONTINUOUS, UNLESS DETAILED OTHERWISE. WHERE FILLET WELD LEG LENGTH IS STATED THE REQUIRED THROAT THICKNESS 'A' SHALL BE LEG LENGTH X 0.707.
- THE STEELWORK DIMENSIONS SHOWN ARE SPECIFIED FOR A MEAN TEMPERATURE OF 20 DEG C AS PER STEELWORK SPECIFICATION.
- SNIPES/COPE HOLES MUST BE LOCATED AT THE POSITIONS SHOWN AND WILL BE A MINIMUM OF 40mm RADIUS OR 1.5 TIMES THE PLATE THICKNESS, UNLESS OTHERWISE DETAILED.
- TRIANGULAR SNIPES WILL NOT BE PERMITTED.
- WHERE SNIPES ARE SHOWN (2MM NOMINAL CLEARANCE TO LONGITUDINAL WIELD) A CONTINUOUS FILLET WELD IS TO BE PROVIDED ACROSS THE SNIPES.
- STEEL WEBS MUST BE MAINTAINED IN A STABLE STATE DURING ALL STAGES OF FABRICATION AND CONSTRUCTION. TEMPORARY STABILITY BRACING TO BE PROVIDED IF NECESSARY UNTIL THE SOFFIT PLATE AND TRANSVERSE STIFFENERS SHOWN ON THE DRAWINGS ARE FULLY CONNECTED -- REFER TO DESIGNERS RISK ASSESSMENT 3502-RAM-XX-XX-RP30101.
- BEARING STIFFENERS TO BE MACHINED TO GIVE FULL CONTACT BEARING (FITTED) TO BOTTOM FLANGE AND BOTTOM FLANGE AND BEARING RESPECTIVELY. AS PER CL.1811.1 OF SHW AND IS DENOTED AS S ON DRAWINGS.
- ANY WELDING OR BOLTING OF TEMPORARY ERECTION ATTACHMENTS TO GIRDERS AND THEIR REMOVAL MUST HAVE THE PRIOR AGREEMENT OF THE DESIGNER.
- PROVISION SHALL BE MADE FOR THE SUPPORT OF THE FORMWORK (FOR THE STRING COURSE). FALSEWORK TO BE SUPPORTED FROM THE DECK SLAB. NO FIXINGS SHALL BE PERMITTED ON THE SOFFIT PLATE.
- FINAL STEEL GEOMETRY AND LEVELS ARE TO BE CALCULATED BY THE STEELWORK MANUFACTURER TO SUIT THE PRECAMBER VALUES SHOWN ON THE DRAWING. PRECAMBER SHOWN ALLOWS FOR STEELWORK AND CONCRETE DEAD LOADS, SUPERIMPOSED DEAD LOADS AND CREEP. TOP AND BOTTOM FLANGES TO BE SMOOTH CONTINUOUS CURVES. REFER TO DRAWING NUMBER 3502-RAM-SB-XX-DR-CB-37041.
- FOR LIFT SPAN, BOLTS AT ACCESS COVER PLATES SHALL BE COUNTERSUNK M16 GRADE 8.8 UNLESS NOTED OTHERWISE.
BOLTS AT BEARING PLATES SHALL BE ENGAGED WITHIN THE TAPERED PLATES AT THE TOP. MINIMUM BOLT DIAMETER TO BE M16.
- ALL GAPS IN STEELWORK AND WATER TRAPS TO BE FILLED WITH A SEALANT AS DESCRIBED ON THE DRAWINGS AND SPECIFICATION APPENDIX DOCUMENT.
- ALL WELDING CONSUMABLES TO BE COMPATIBLE WITH THE STRUCTURAL STEEL GRADE USED. REFER TO STEELWORK SPECIFICATION FOR FURTHER REQUIREMENTS.
- PLATES NOTED AS "Z STEEL" SHALL BE Z35 QUALITY TO BS EN 10164. THE FABRICATOR SHALL GENERALLY TAKE SUITABLE MEASURES TO MITIGATE THE RISK OF LAMELLAR TEARING AS DESCRIBED IN PD6695-1-10 CLAUSE 3.2.

MATERIAL NOTES.

- "NEOPRENE" SHALL BE CHLOROPRENE RUBBER CLASS C50 TO BS 2752:2003.

REINFORCEMENT NOTES.

- ALL REINFORCEMENT SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH THE SPECIFICATION AND GRADE B500B RIBBED BARS TO BS4449:2005 OR GRADE 60 RIBBED BARS TO ASTM A615 WITH A MINIMUM YIELD STRENGTH OF 60,000 PSI WHICH IS EQUAL TO 414MPA.
- ACCEPTABLE ALTERNATIVE BAR DIAMETER PER GRADE AS PER THE BELOW TABLE:

BS4449 B500B	ASTM A615 GRADE 60
B12	#4
B16	#5
B20	#7
B25	#8
B32	#10
- REINFORCEMENT CALLED UP AS FOLLOWS:
40 B20 01 125 N1 (00)
WHERE:
40 NO. OF BARS
B20 TYPE AND SIZE
01 BAR MARK
125 SPACING
N1 POSITION
(00) SHAPE CODE
ABBREVIATIONS USED:
N NEAR FACE (N1 NEAREST TO CONC. FACE).
F FAR FACE (F1 NEAREST TO CONC. FACE).
T TOP (T1 NEAREST TO CONC. FACE).
B BOTTOM (B1 NEAREST TO CONC. FACE).
S SIDE FACE (S1 NEAREST TO CONC. FACE).
STAGG ALTERNATELY STAGGERED.
ES EQUALLY SPACED.
ALT ALTERNATELY PLACED.
ABR ALTERNATE BAR REVERSED.
- NOMINAL COVER TO REINFORCEMENT (UNLESS OTHERWISE NOTED):

PILE CAPS	85mm
ABUTMENTS, PIERS	80mm
BRIDGE DECK TOP SURFACE, SOFFIT AND PIER DIAPHRAGMS	50mm
RETAINING WALLS INCLUDING FOOTING	85mm
PARAPET EDGE DETAIL TOP, SIDES AND SOFFIT	80mm

REFER TO CLAUSE 1728 OF THE SPECIFICATION, FIGURE 17/1 (b) FOR TOLERANCES ON REINFORCEMENT POSITION.
INSITU CONCRETE FOR PILE CAPS, RETAINING WALLS INCLUDING THEIR FOOTINGS: Δ c dev =15mm
INSITU CONCRETE FOR THE REST OF CONCRETE ELEMENTS: Δ c dev =10mm.
BAR BENDING SCHEDULES HAVE BEEN PREPARED ON THE BASIS OF THE NOMINAL COVER, EXCEPT WHERE NOTED.
- LAP LENGTHS
UNLESS NOTED OTHERWISE MINIMUM LAP LENGTHS FOR 50% STAGGERED LAPS, BASED UPON THE SMALLER BAR, SHALL BE:
C40/50 CONCRETE:

BAR SIZE	ZONE 1		ZONE 2	
	GOOD BOND	POOR BOND	GOOD BOND	POOR BOND
B10	420	590	430	600
B12	500	710	510	680
B16	670	950	680	950
B20	830	1180	850	1180
B25	1040	1480	1060	1480
B32	1330	1890	1350	1890

ANCHORAGE LENGTHS
ANCHORAGE LENGTHS OF STRAIGHT BARS SHALL BE:
C40/50 CONCRETE:

BAR SIZE	ZONE 1		ZONE 2	
	GOOD BOND	POOR BOND	GOOD BOND	POOR BOND
B10	300	430	310	440
B12	360	510	370	510
B16	480	680	490	680
B20	590	850	600	850
B25	740	1060	750	1060
B32	950	1350	960	1350

AREAS OF POOR BOND ARE DENOTED BY SHADING (ZONE 2) ON THE DRAWINGS.
- BAR BENDING SCHEDULES HAVE BEEN PREPARED ON THE BASIS OF THE LAP +25mm.
- REINFORCEMENT IS DETAILED AND SCHEDULED TO B.S. 8666:2005 - REFER TO SPECIFICATION CLAUSE 1713.
- THE REINFORCEMENT DETAILED REPRESENTS THE MINIMUM DESIGN REQUIREMENT. ADDITIONAL BARS TO AID FIXING OR STABILITY TO BE DETAILED BY THE CONTRACTOR.
- UNLESS NOTED OTHERWISE REINFORCEMENT SPACING IS MEASURED PERPENDICULARLY TO THE BAR DIRECTION.
- DIAGRAMS FOR ANY ADDITIONAL SHAPE CODES ARE INCLUDED WITH THE BENDING SCHEDULES.
- WHERE APPLICABLE, LIFTING ARRANGEMENTS TO BE APPROVED BY THE CONTRACTOR AND SUBMITTED TO THE DESIGNER FOR APPROVAL.

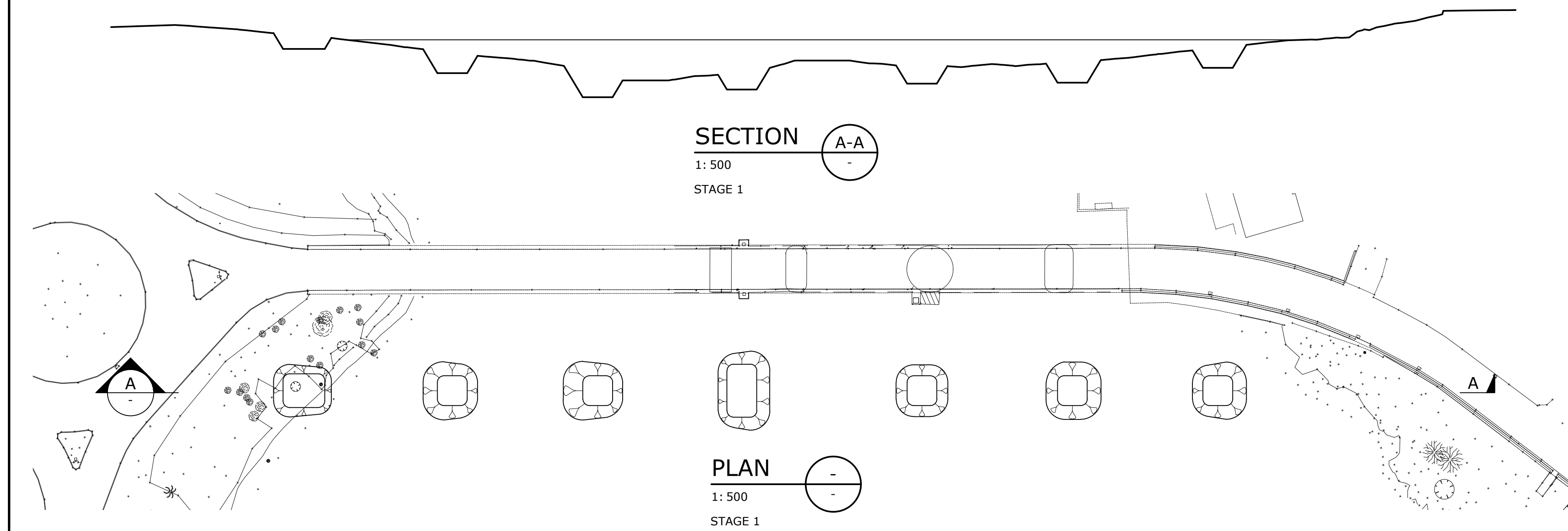


Project Title:
REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA

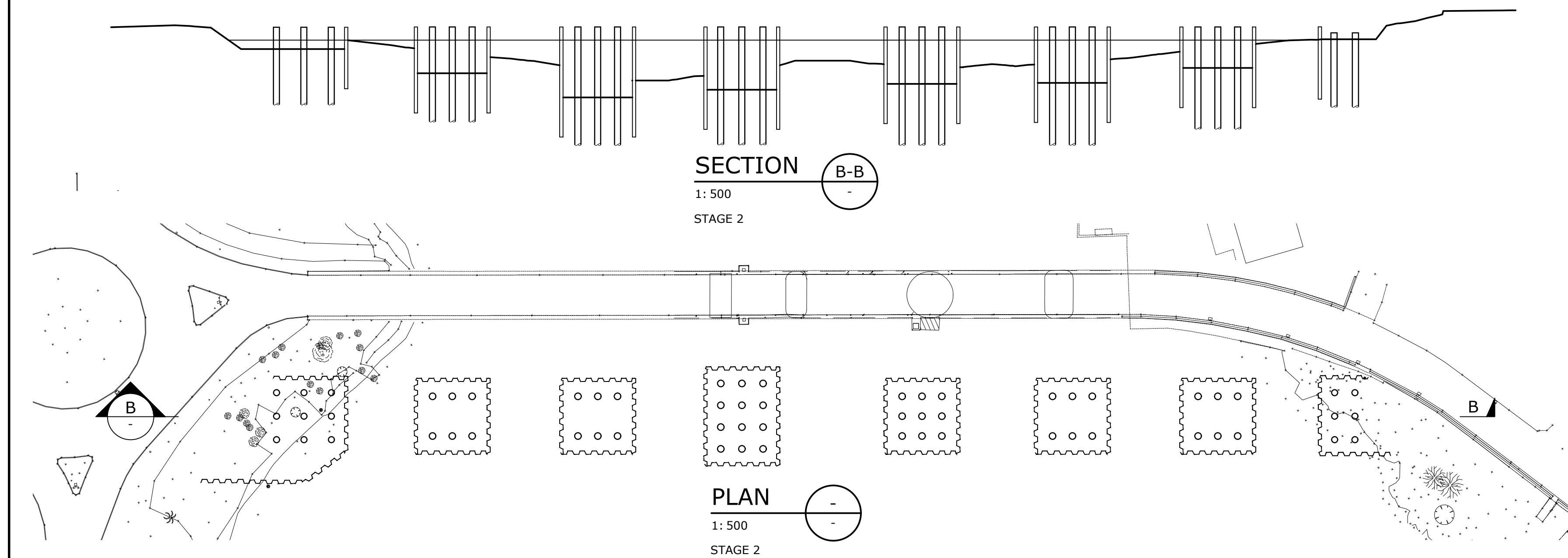
Drawing Title:
SWING BRIDGE REPLACEMENT NOTES

Rev	Description	Date	By	App
P03	REVISIONS AS CLOUDED	06.09.19	CAB	SPT
P02	PRELIMINARY	28.06.19	CAB	SPT
P01	FIRST ISSUE	06.06.19	CAB	---

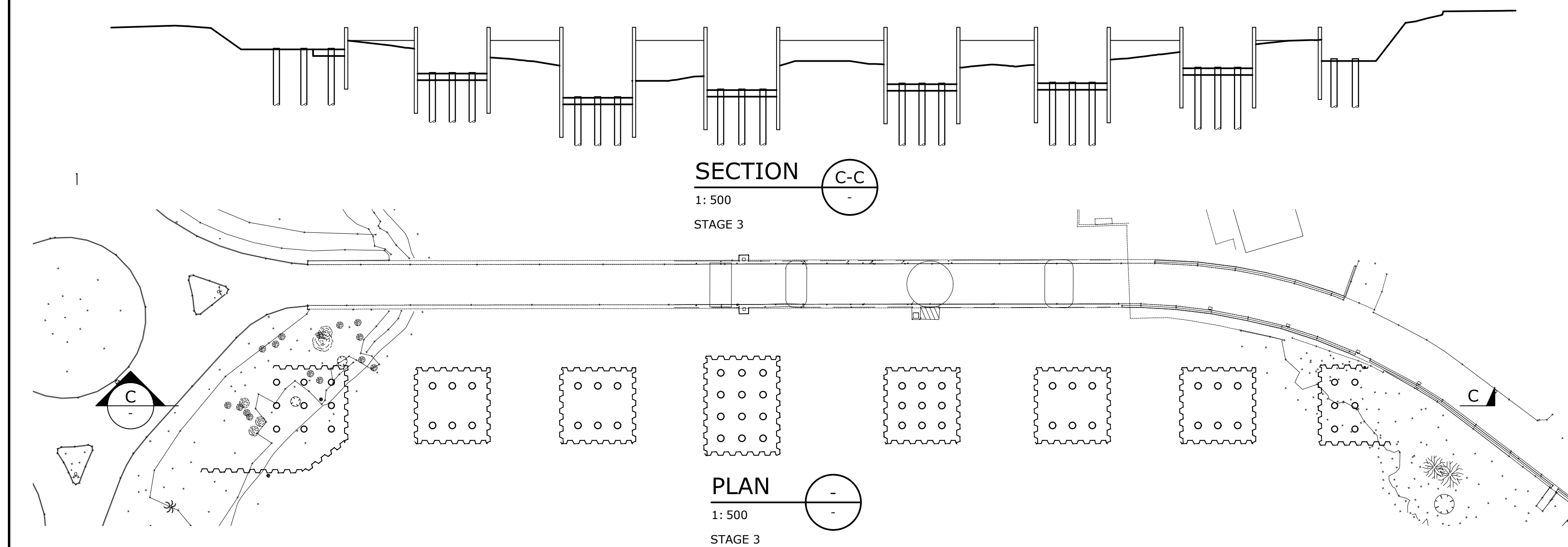
Rev	Description	Date	By	App
Status: PRELIMINARY				
Drawing No.:		Date:		Scale (at A1):
3502-RAM-SB-XX-DR-CB-30111		---		N/A
Rev:				P03



- STAGE 1**
- SET UP SITE COMPOUND.
 - ESTABLISH NEW NAVIGATION CHANNEL.
 - PRE-EXCAVATION FOR PIERS.
 - EXCAVATE TRENCH TO WEST OF EXISTING SWING BRIDGE AND INSTALL POWER & CONTROL CABLES.



- STAGE 2**
- DRIVE PERMANENT WORKS PILES TO REQUIRED DEPTH.
 - CONSTRUCT TEMPORARY COFFERDAMS.



- STAGE 3**
- EXCAVATE COFFERDAMS.
 - PLUG COFFERDAM BASES.
 - DE-WATER COFFERDAM.
 - CUT PILES TO REQUIRED LEVEL.

Rev	Description	Date	By	App
P03	REVISIONS AS CLOUDED	06.09.19	CAB JFRW	SPT
P02	PRELIMINARY	28.06.19	CAB JFRW	SPT
P01	FIRST ISSUE	06.06.19	CAB JFRW	---

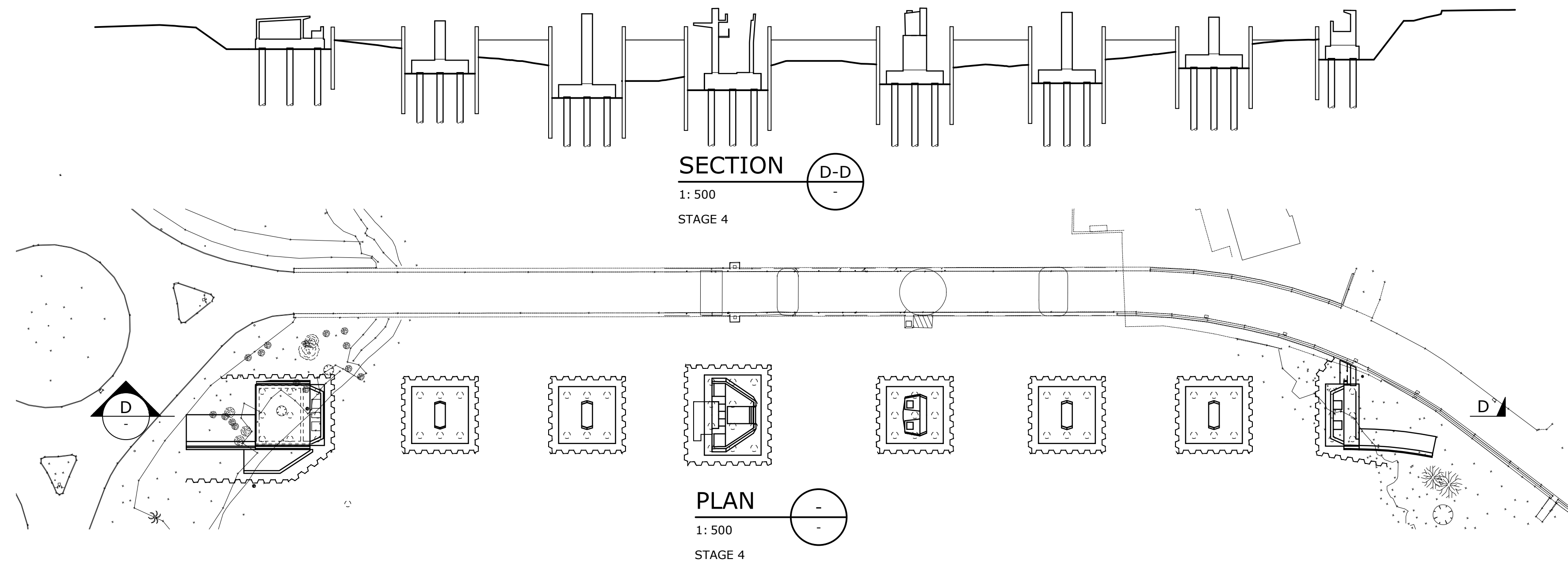
Status: PRELIMINARY			
Drawn: M.Cooper	Date: APR.2019	Scale (at A1): AS SHOWN	Rev: P03



Project Title: **REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA**

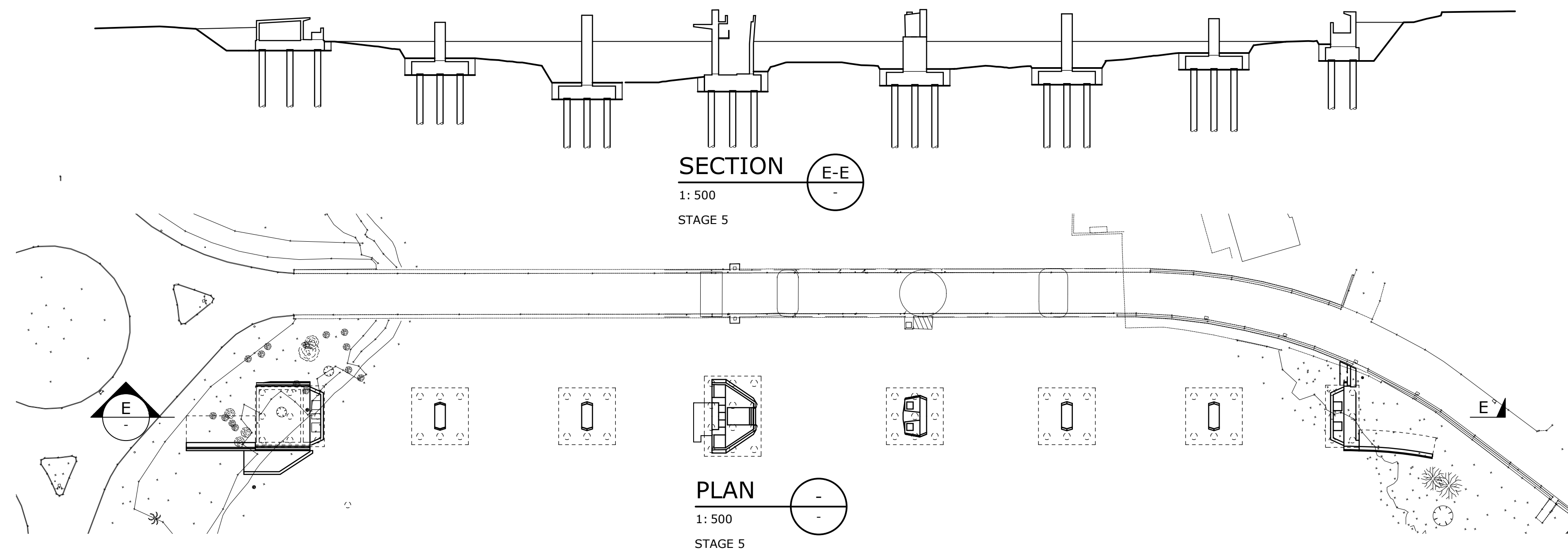
Drawing Title: **SWING BRIDGE REPLACEMENT CONSTRUCTION SEQUENCE SHEET 1**

Drawing No.: 3502-RAM-SB-XX-DR-CB-30201



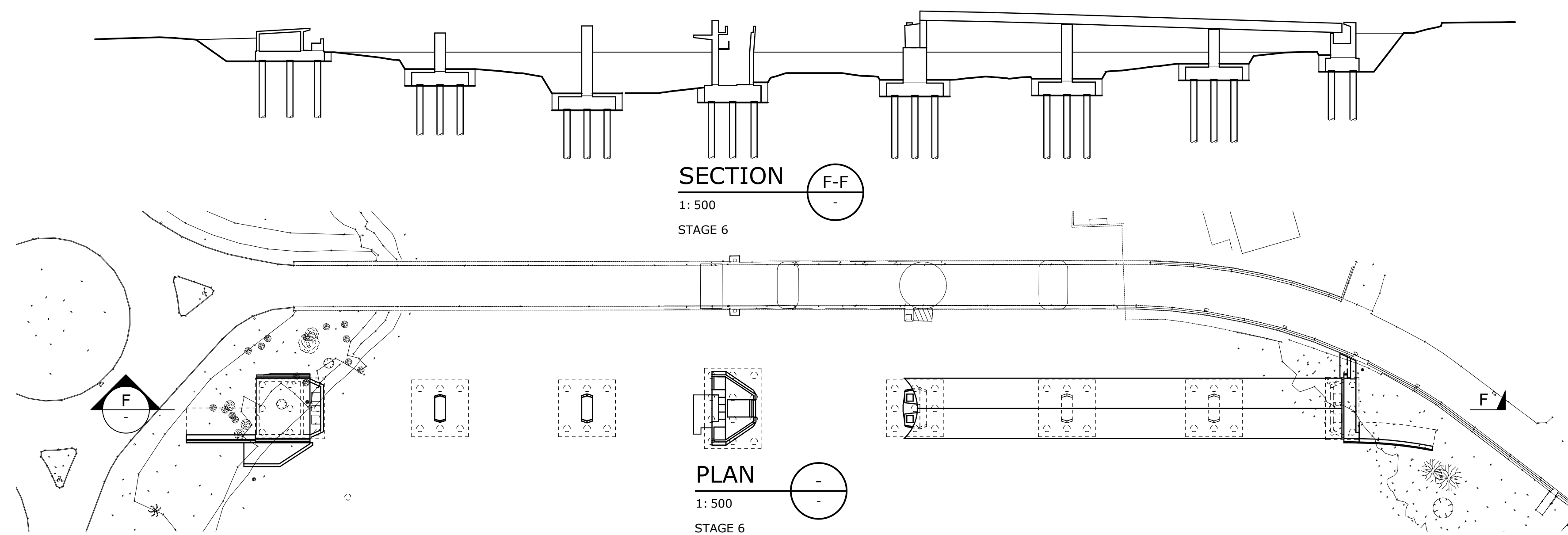
STAGE 4

- CONSTRUCT PILE CAPS.
- CONSTRUCT PIERS, ABUTMENTS & RETAINING WALLS. PIERS SHALL BE CONSTRUCTED TO APPROPRIATE LEVEL SO THAT TEMPORARY JACKS CAN BE INSTALLED.



STAGE 5

- REMOVE TEMPORARY COFFERDAMS.
- REINSTATE SEA BED ABOVE PILE CAPS.
- INSTALL SCOUR PROTECTION (IF REQUIRED).
- INSTALL M&E EQUIPMENT IN SOUTH ABUTMENT.
- BACKFILL ABUTMENTS & NORTH RETAINING WALL.



STAGE 6

- INSTALL BEARINGS AT NORTH ABUTMENT.
- INSTALL TEMPORARY JACKS AT THE TOP OF PIERS P5, P6, AND P7.
- ERECT NORTH APPROACH STEELWORK SPANS & WELD THEM TOGETHER.

NOTES

1. THE ERECTION OF THE APPROACH SPANS AND LIFT SPAN FROM THE BARGE ONTO THEIR FINAL POSITION CAN BE DONE VIA VERTICAL SUPPORTS USING A CRANE OR A BALLASTED BARGE AND TEMPORARY JACKS. FOR THE APPROACH SPANS, THE LOCATION OF THE ERECTION POINTS SHALL NOT EXCEED 1M LONGITUDINALLY FROM THE LOCATION OF THE TEMPORARY SUPPORT POINTS PROVIDED VIA TAPERED STEEL BEARING PLATES (SUPPORT ON THE WEB). FOR THE LIFT SPAN PIVOT BEARING END, THE LOCATION OF THE ERECTION POINTS SHALL NOT EXCEED 1M LONGITUDINALLY FROM THE LOCATION OF THE DESIGNATED BEARING SUPPORT POINT (SUPPORT ON THE WEB). FOR THE LIFT SPAN NOSE END, THE LOCATION OF THE ERECTION POINTS SHALL NOT EXCEED 1M TRANSVERSELY FROM THE LOCATION OF THE DESIGNATED BEARING SUPPORT POINT (SUPPORT ON THE BEARING DIAPHRAGM). ANY TEMPORARY SUPPORT ARRANGEMENT FOR THE APPROACH SPANS OR LIFT SPAN FOR SEA TRANSPORTATION AND/OR FABRICATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND/OR STEEL FABRICATOR.

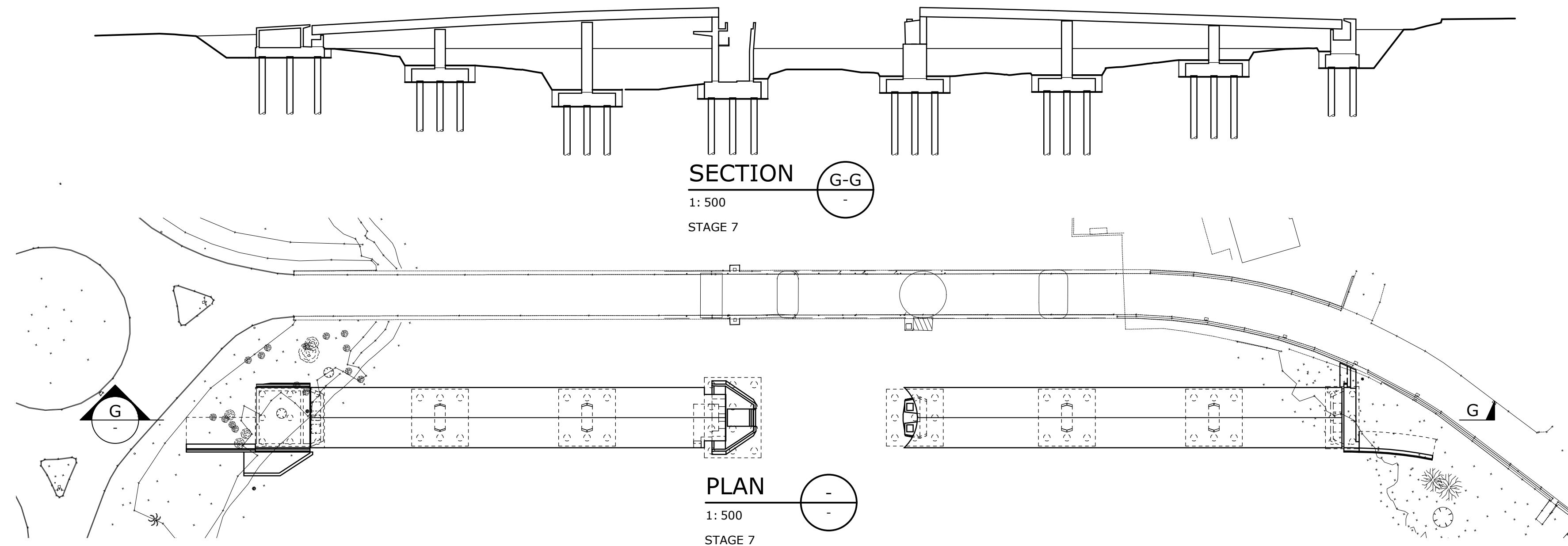
Rev	Description	Date	By	App
P03	REVISIONS AS CLOUDED		CAB JFRW	SPT
P02	PRELIMINARY	28.06.19	CAB JFRW	SPT
P01	FIRST ISSUE	06.06.19	CAB JFRW	---



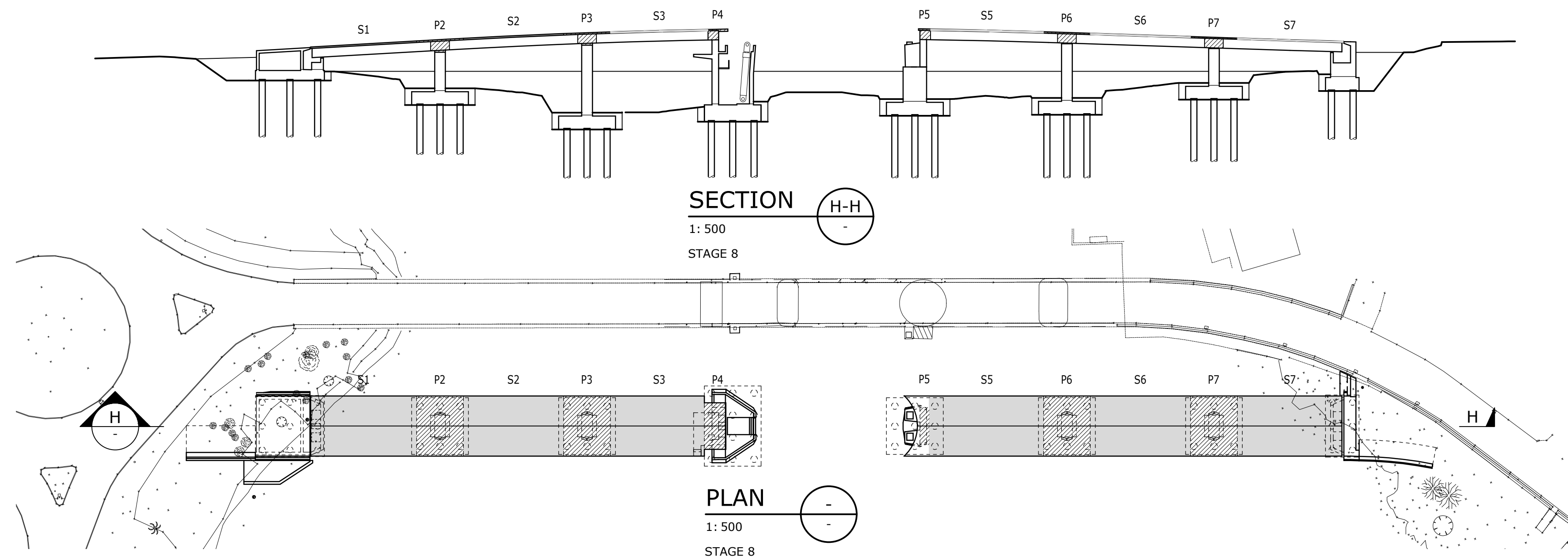
Project Title:
REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA

Drawing Title:
SWING BRIDGE REPLACEMENT CONSTRUCTION SEQUENCE SHEET 2

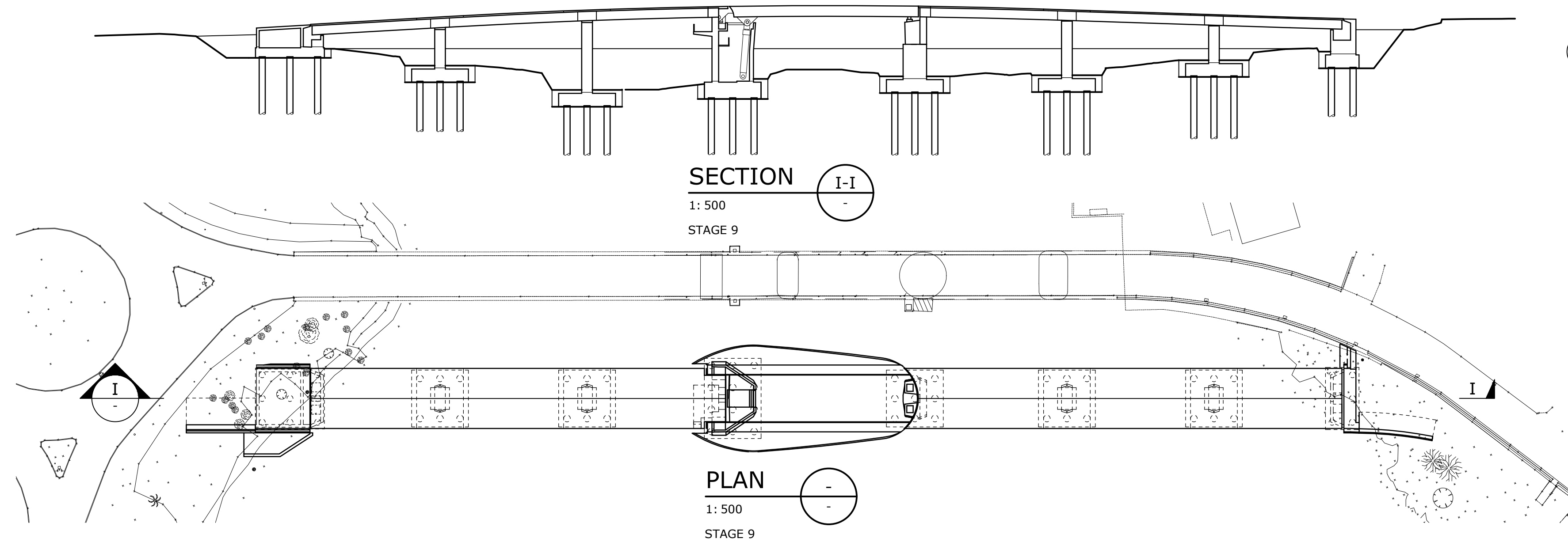
Status: PRELIMINARY				
Drawn: M.Cooper	Date: APR.2019	Scale (at A1): AS SHOWN	Rev:	
Drawing No.: 3502-RAM-SB-XX-DR-CB-30202				P03



- STAGE 7**
- INSTALL BEARINGS AT SOUTH ABUTMENT.
 - INSTALL TEMPORARY JACKS AT PIERS P2, P3 AND P4.
 - ERECT SOUTH APPROACH STEELWORK SPANS & WELD THEM TOGETHER.
 - INSTALL M&E SERVICES IN SOUTH APPROACH VIADUCT.



- STAGE 8**
- CAST DIAPHRAGMS AT P2, P3, P4, P5, P6 & P7 (POUR A).
 - CAST DIAPHRAGMS AT P2, P3, P4, P5, P6 & P7 (POUR B).
 - CAST DECK SLABS AT SPAN 1 & SPAN 7.
 - CAST DECK SLABS AT SPAN 2 & SPAN 6.
 - CAST DECK SLABS AT PIER 2 & PIER 7.
 - CAST DECK SLABS AT SPAN 3, PIER 4, SPAN 5 & PIER 5.
 - CAST DECK SLABS AT PIER 3 & PIER 6.
 - INSTALL BEARINGS FOR LIFT SPAN AT NOSE PIER.
 - INSTALL CYLINDERS AT PIVOT PIER.
 - INSTALL ACCESS PLATFORMS/LADDERS.



- STAGE 9**
- ERECT LIFT SPAN AND PIVOT BEARINGS AT PIVOT PIER.
 - CONNECT SUPERSTRUCTURE TO SUBSTRUCTURE AT PIVOT PIER.
 - POST TENSION PIVOT BEARING ANCHORS.
 - COMPLETE INSTALLATION OF M&E EQUIPMENT, INCLUDING TEMPORARY CONTROL OPERATORS HUT.

NOTES

1. THE ERECTION OF THE APPROACH SPANS AND LIFT SPAN FROM THE BARGE ONTO THEIR FINAL POSITION CAN BE DONE VIA VERTICAL SUPPORTS USING A CRANE OR A BALLASTED BARGE AND TEMPORARY JACKS. FOR THE APPROACH SPANS, THE LOCATION OF THE ERECTION POINTS SHALL NOT EXCEED 1M LONGITUDINALLY FROM THE LOCATION OF THE TEMPORARY SUPPORT POINTS PROVIDED VIA TAPERED STEEL BEARING PLATES (SUPPORT ON THE WEB). FOR THE LIFT SPAN PIVOT BEARING END, THE LOCATION OF THE ERECTION POINTS SHALL NOT EXCEED 1M LONGITUDINALLY FROM THE LOCATION OF THE DESIGNATED BEARING SUPPORT POINT (SUPPORT ON THE WEB). FOR THE LIFT SPAN NOSE END, THE LOCATION OF THE ERECTION POINTS SHALL NOT EXCEED 1M TRANSVERSELY FROM THE LOCATION OF THE DESIGNATED BEARING SUPPORT POINT (SUPPORT ON THE BEARING DIAPHRAGM). ANY TEMPORARY SUPPORT ARRANGEMENT FOR THE APPROACH SPANS OR LIFT SPAN FOR SEA TRANSPORTATION AND/OR FABRICATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND/OR STEEL FABRICATOR.

P03

P03

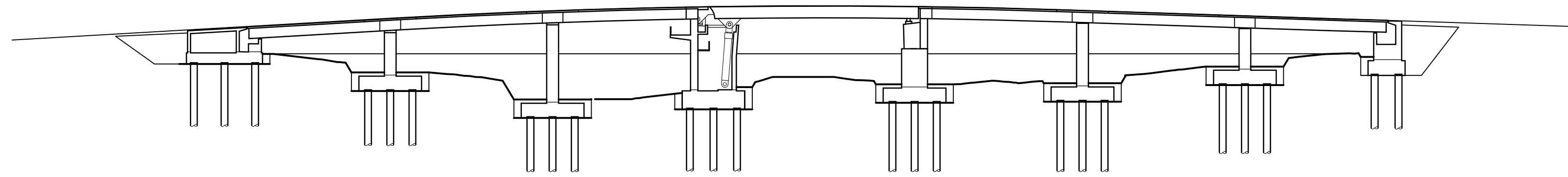


Project Title:
REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA

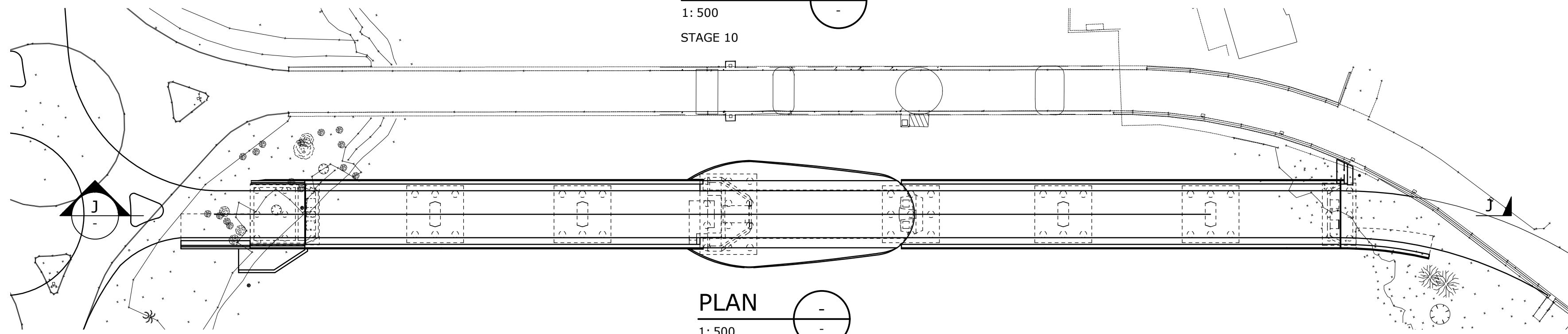
Drawing Title:
SWING BRIDGE REPLACEMENT CONSTRUCTION SEQUENCE SHEET 3

Rev	Description	Date	By	App
P03	REVISIONS AS CLOUDED	06.09.19	CAB JFRW	SPT
P02	PRELIMINARY	28.06.19	CAB JFRW	SPT
P01	FIRST ISSUE	06.06.19	CAB JFRW	---

Status: PRELIMINARY				
Drawn:	Date:	Scale (at A1):		
M.Cooper	APR.2019	AS SHOWN		
Drawing No.:	Rev:			
3502-RAM-SB-XX-DR-CB-30203	P03			



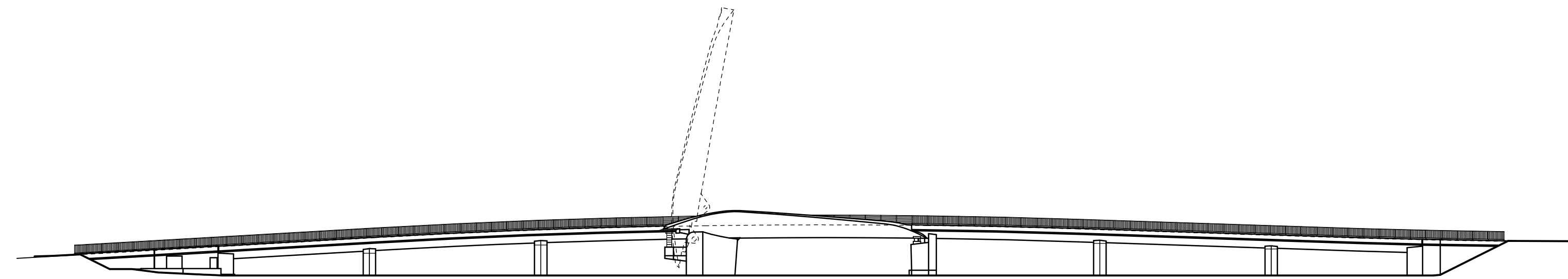
SECTION J-J
1:500
STAGE 10



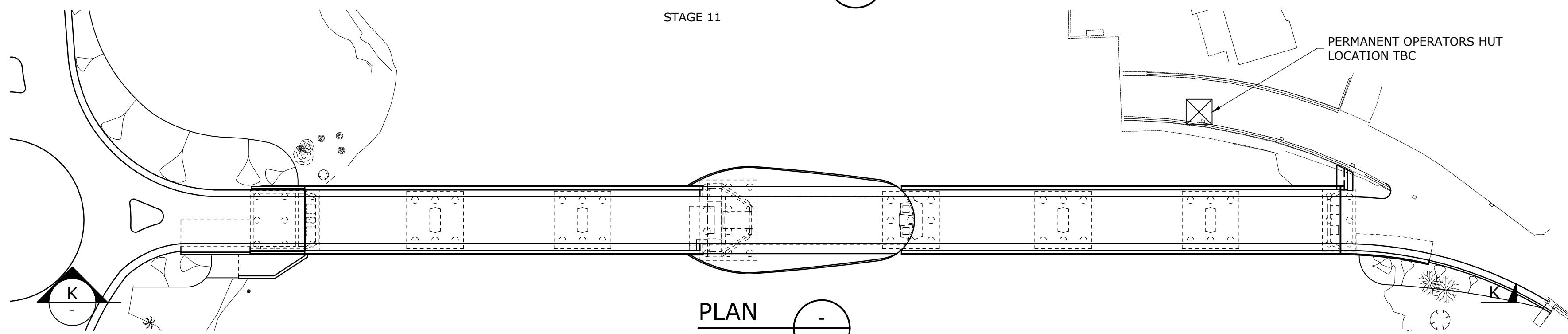
PLAN
1:500
STAGE 10

STAGE 10

- CAST DECK STRING COURSES IN APPROACH SPANS.
- INSTALL KERBS, PARAPETS, SURFACING & ALL OTHER FINISHES.
- COMMISSIONING OF LIFT SPAN. TEMPORARY CONTROL POINTS.
- OPEN BRIDGE TO TRAFFIC.



ELEVATION K-K
1:500
STAGE 11



PLAN
1:500
STAGE 11

STAGE 11

- DEMOLISH EXISTING SWING BRIDGE.
- MAKE GOOD EMBANKMENTS.
- CONSTRUCT SCOUR PROTECTION. (IF REQUIRED)
- CONSTRUCT PERMANENT OPERATORS HUT.
- COMMISSION PERMANENT CONTROL DESK.

PERMANENT OPERATORS HUT
LOCATION TBC

P03	REVISIONS AS CLOUDED	06.09.19	CAB	SPT
P02	PRELIMINARY	28.06.19	CAB	SPT
P01	FIRST ISSUE	06.06.19	CAB	---

Rev	Description	Date	By	App

Status: PRELIMINARY			
Drawn:	Date:	Scale (at A1):	
M.Cooper	APR.2019	AS SHOWN	
Drawing No.:			Rev:
3502-RAM-SB-XX-DR-CB-30204			P03



Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA

Drawing Title: SWING BRIDGE REPLACEMENT CONSTRUCTION SEQUENCE SHEET 4

ITEM	PART NUMBER	DESCRIPTION	raised/QTY
1	3502-RAM-SB-XX-DR-ME-31001	EAST PIVOT ASSEMBLY	1
2	3502-RAM-SB-XX-DR-ME-32001	LOWER CYLINDER MOUNT ASSEMBLY	1
3	3502-RAM-SB-XX-DR-ME-33001	UPPER CYLINDER MOUNT ASSEMBLY	1
4	3502-RAM-SB-XX-DR-ME-40001	SHOCK ABSORBER ASSEMBLY	2
5	3502-RAM-SB-XX-DR-ME-41001	NOSE LATERAL RESTRAINT PAD ASSEMBLY	2
6	3502-RAM-SB-XX-DR-ME-43001	NOSE SENSOR ASSEMBLY	2
7	3502-RAM-SB-XX-DR-ME-45001	WEST PIVOT ASSEMBLY	1
8	3502-RAM-SB-XX-DR-ME-48001	CYLINDER LASHING PLATE ASSEMBLY	2

BRIDGE DECK

1

3502-RAM-SB-XX-DR-ME-37501

PIER P4

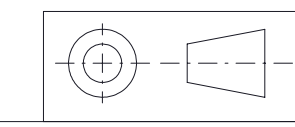
PIER P3

3

7

PIER P5

ISOMETRIC VIEW
NOT TO SCALE



GENERAL TOLERANCE TO ISO 2768 UOS

	0.5 UP TO 3	OVER 3 UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120 UP TO 400	OVER 400 UP TO 1000	OVER 1000 UP TO 2000	OVER 2000 UP TO 4000
MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

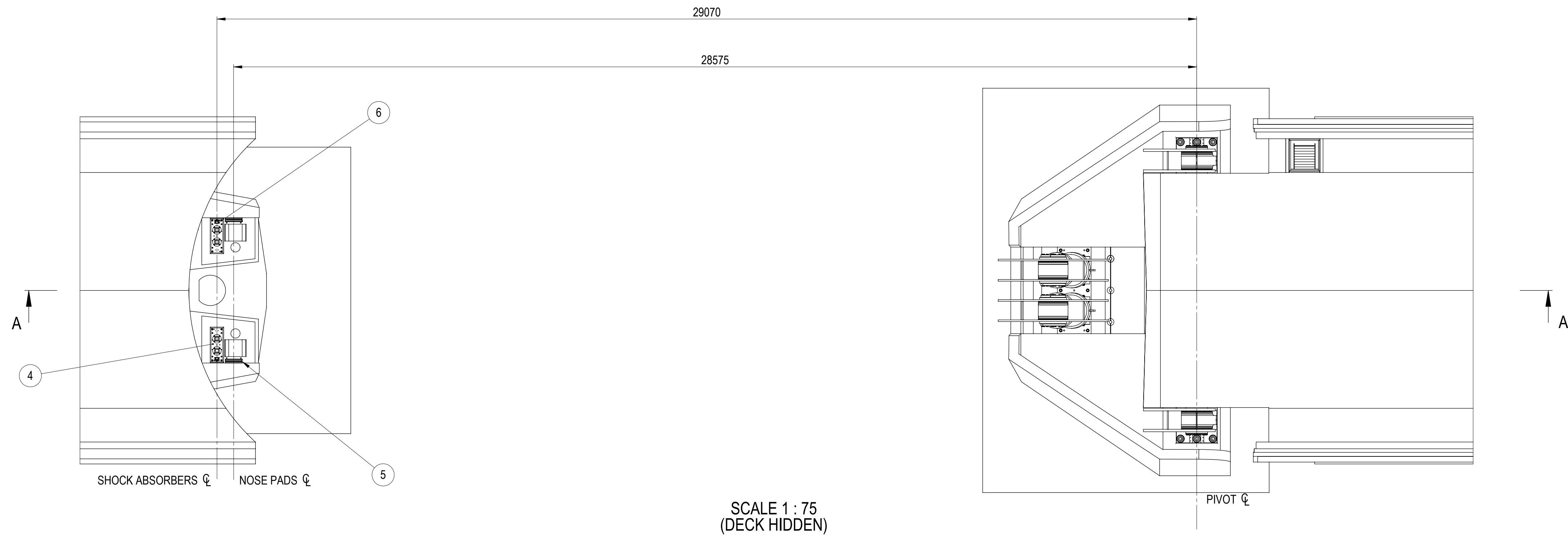
ALL HOLES TO BE H11 UOS

ASSEMBLY No. 3502-RAM-SB-XX-DR-ME-30001

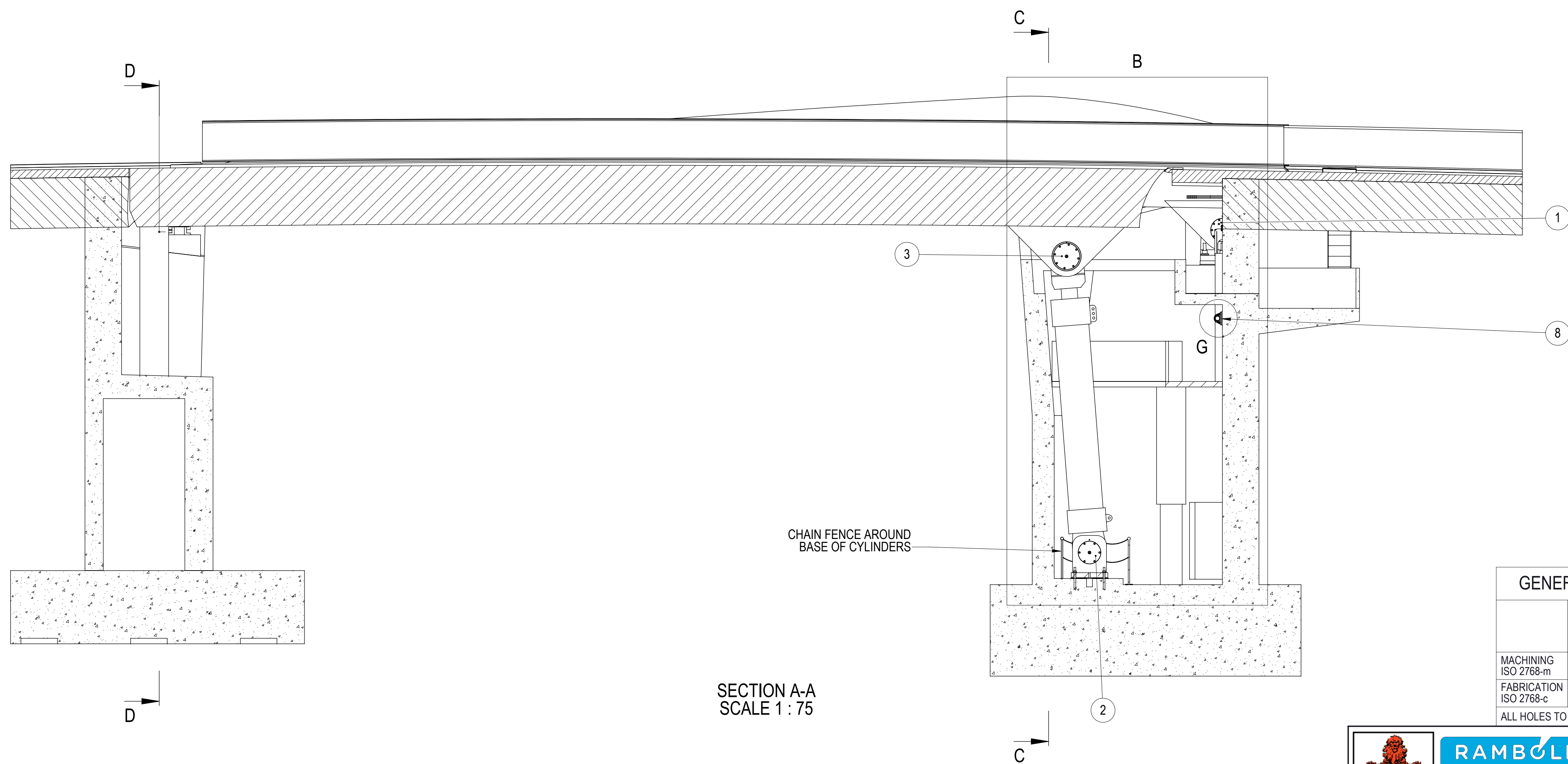


Project Title:		REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA	
Drawing Title:		SWING BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 1	
Drawn:	Date:	Scale (at A1):	Rev:
JJA	05.06.19	AS SHOWN	
Drawing No.:	3502-RAM-SB-XX-DR-ME-30001		Rev:
			P02

Rev	Description	Date	By	App
P02	ADDED NOSE SENSORS	04.09.19	CB LJR	MNT
P01	PRELIMINARY	05.06.19	JJA LJR	MNT
Status: PRELIMINARY				



SCALE 1 : 75
(DECK HIDDEN)



SECTION A-A
SCALE 1 : 75

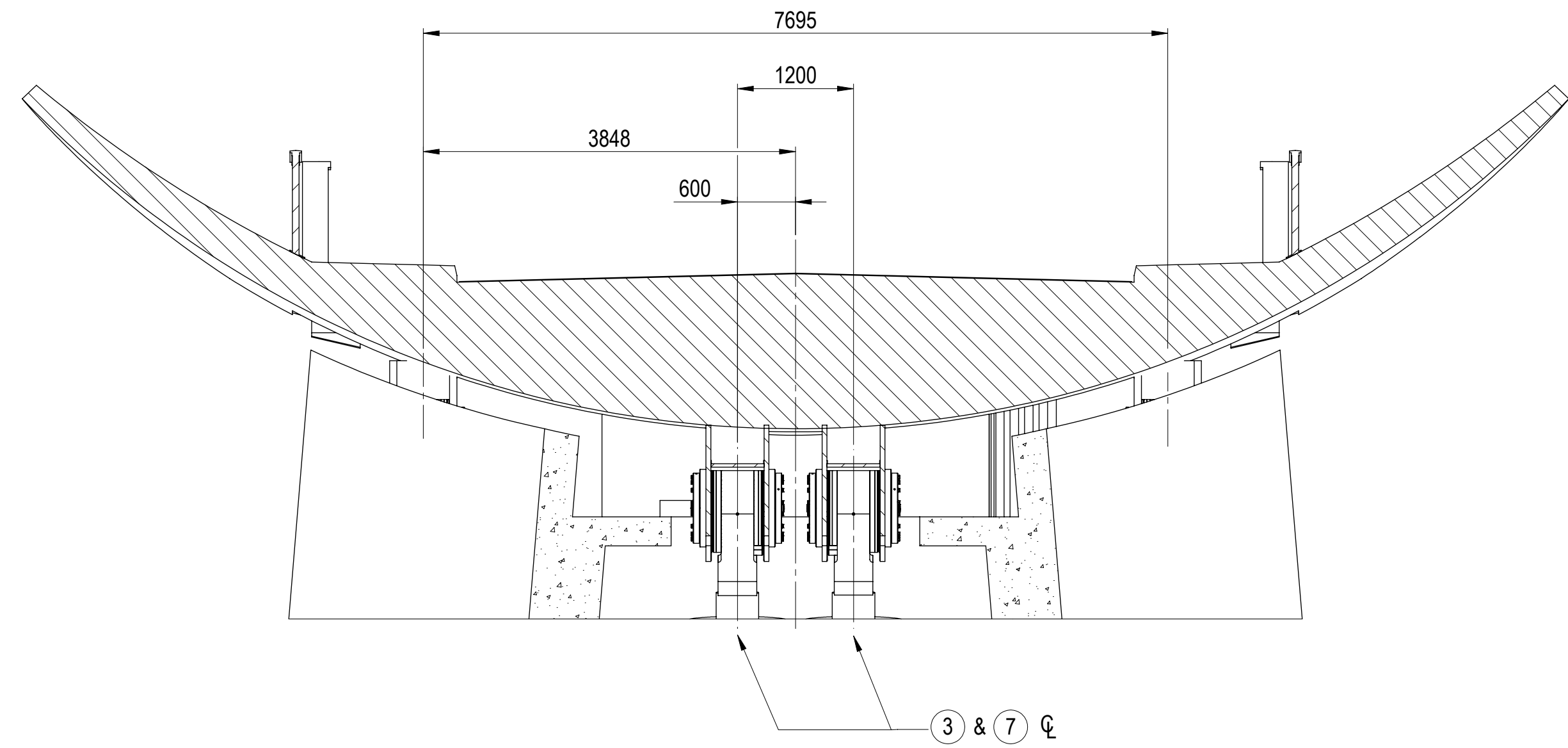
GENERAL TOLERANCE TO ISO 2768 UOS

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MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

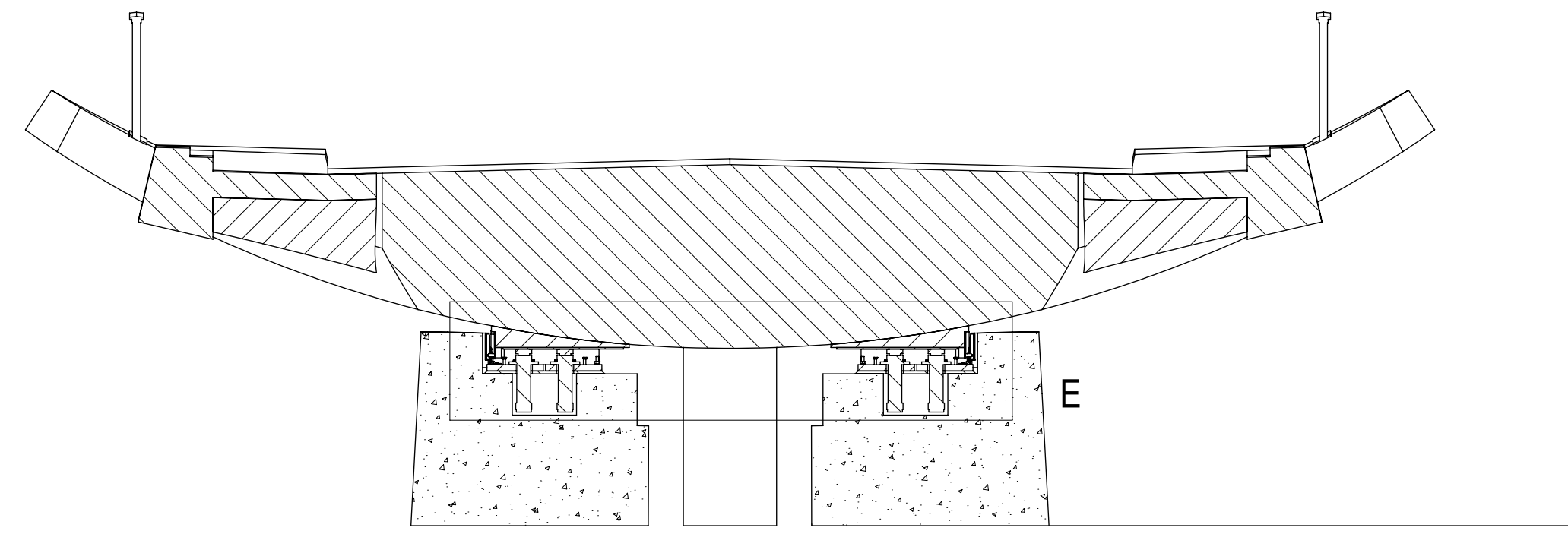
ALL HOLES TO BE H11 UOS



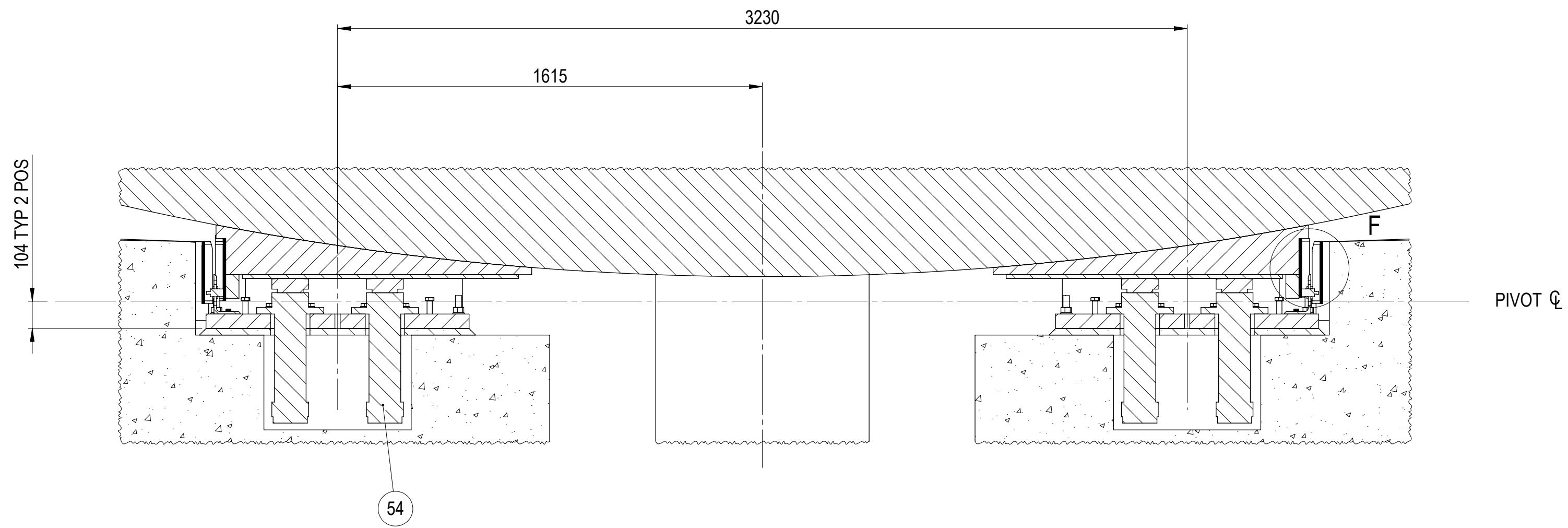
Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA		Rev	Description	Date	By CHK	App
Drawing Title: SWING BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 2		Status:	PRELIMINARY			
Drawn: JJA	Date: 05.06.19	Scale (at A1): AS SHOWN				
Drawing No.: 3502-RAM-SB-XX-DR-ME-30002	Rev: P02					



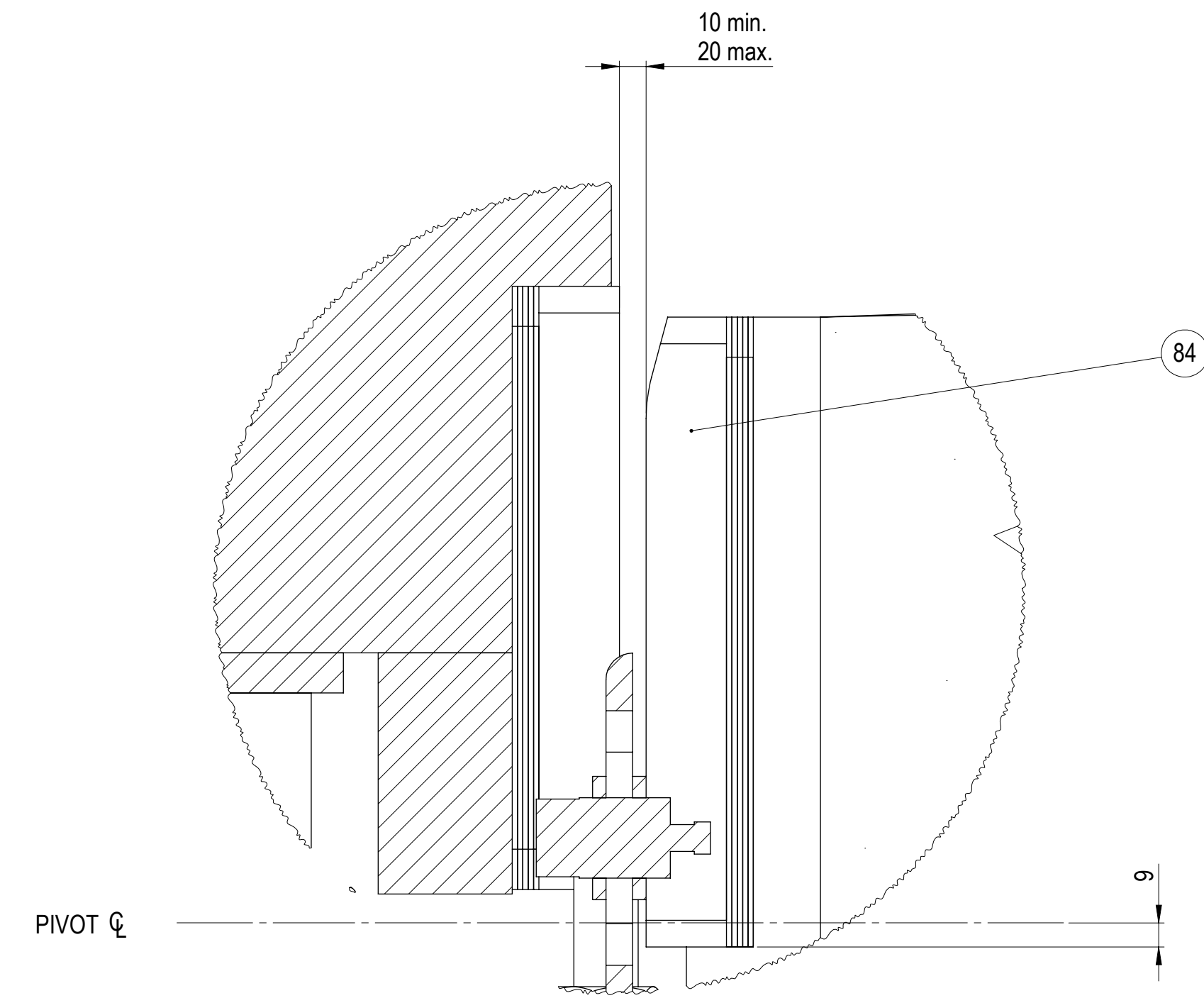
SECTION C-C
SCALE 1 : 50



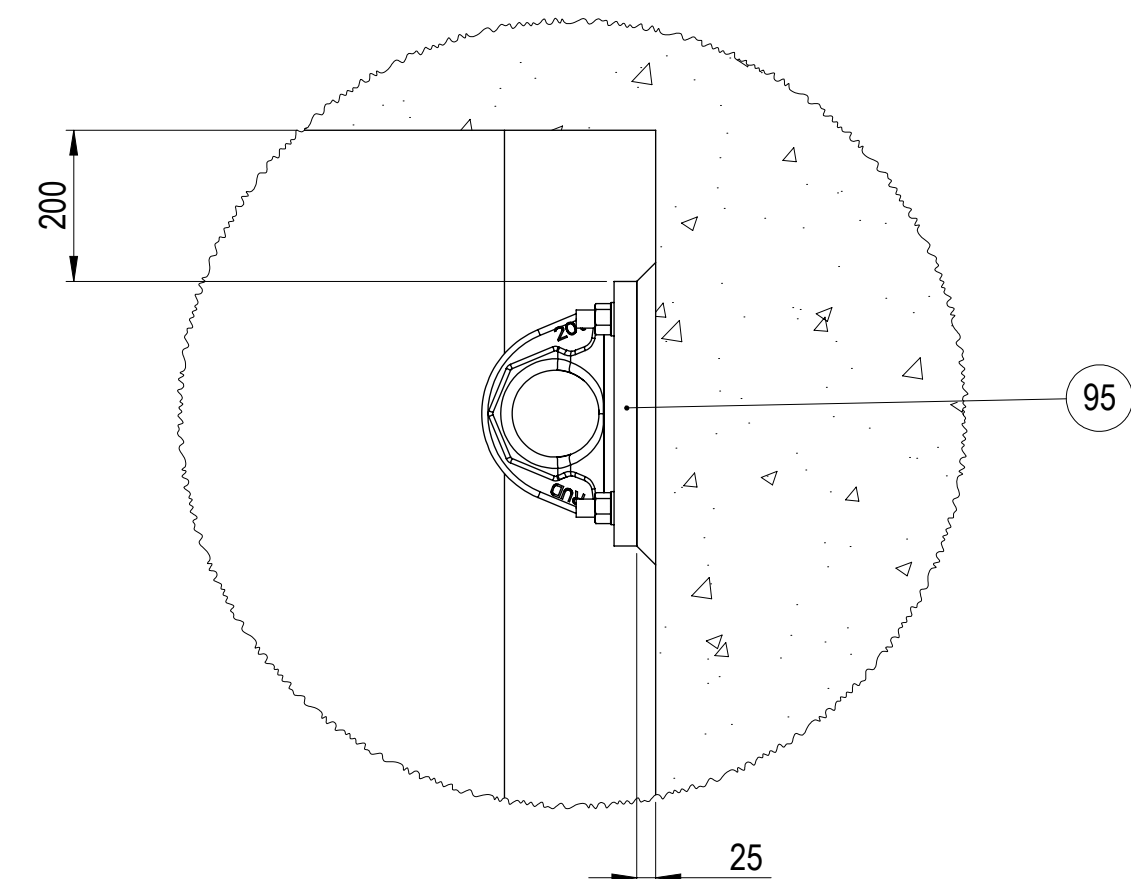
SECTION D-D
SCALE 1 : 50



DETAIL E
SCALE 1 : 15



DETAIL F
TYP 2 POS
SCALE 1 : 2



DETAIL G
TYP 2 POS
SCALE 1 : 10

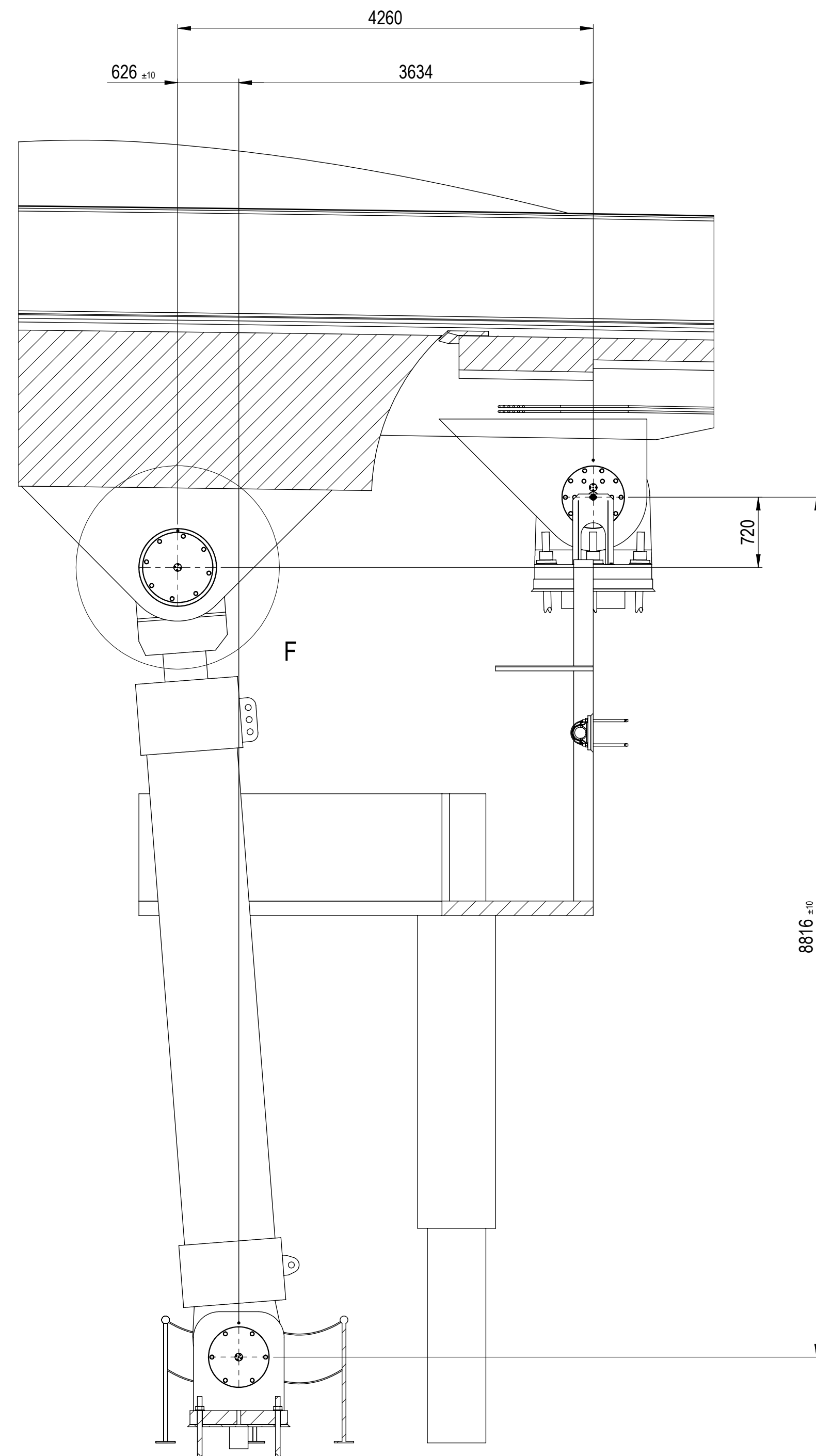
GENERAL TOLERANCE TO ISO 2768 UOS

	0.5 UP TO 3	OVER 3 UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120 UP TO 400	OVER 400 UP TO 1000	OVER 1000 UP TO 2000	OVER 2000 UP TO 4000
MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

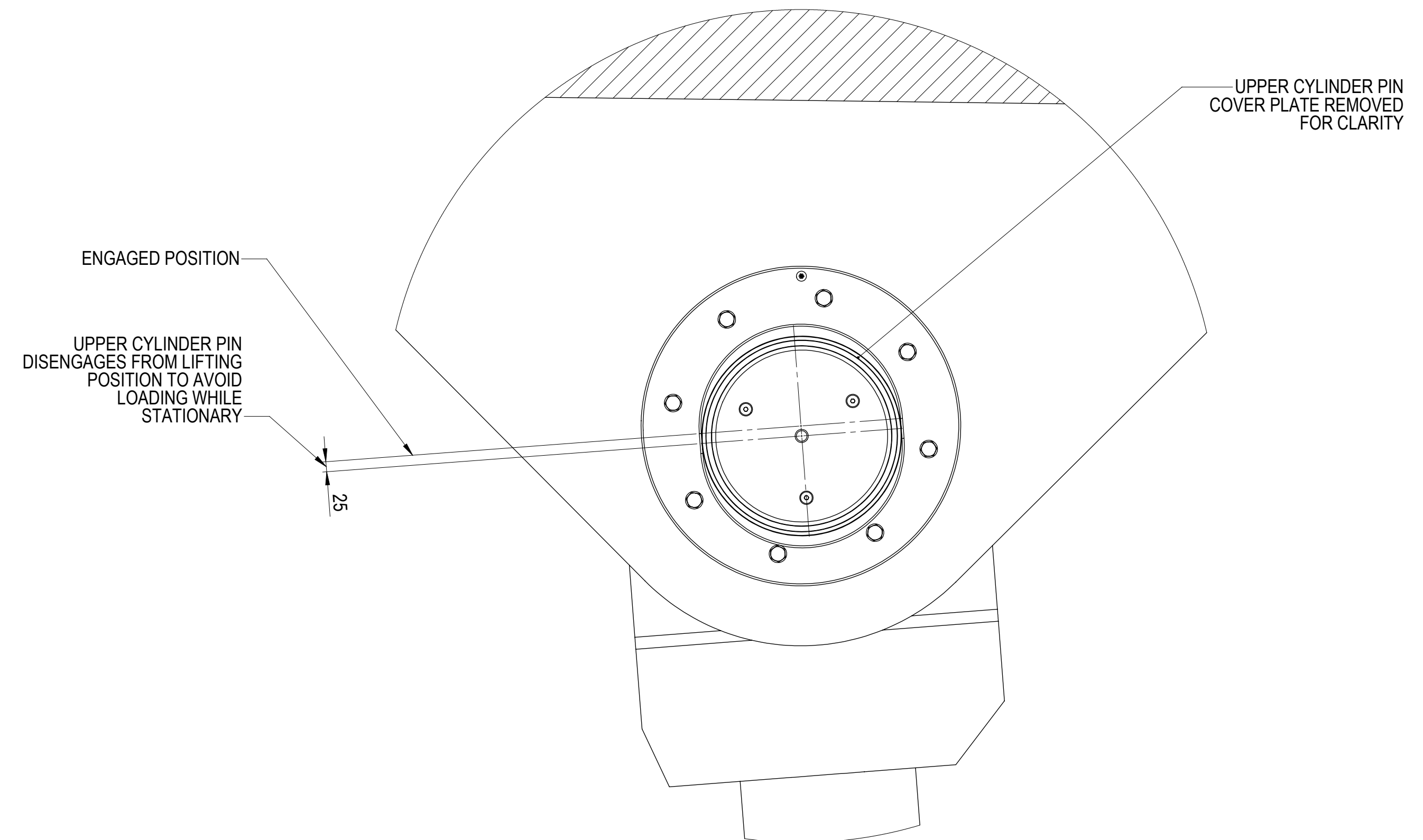
ALL HOLES TO BE H11 UOS



Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA		Rev	Description	Date	By	App
Drawing Title: SWING BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 3		Status:	PRELIMINARY			
Drawn: JJA	Date: 05.06.19	Scale (at A1): AS SHOWN				
Drawing No.: 3502-RAM-SB-XX-DR-ME-30003	Rev: P02					



DETAIL B
(PIER 4 HIDDEN)
SCALE 1 : 40

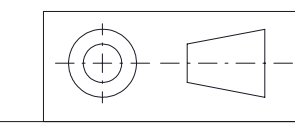


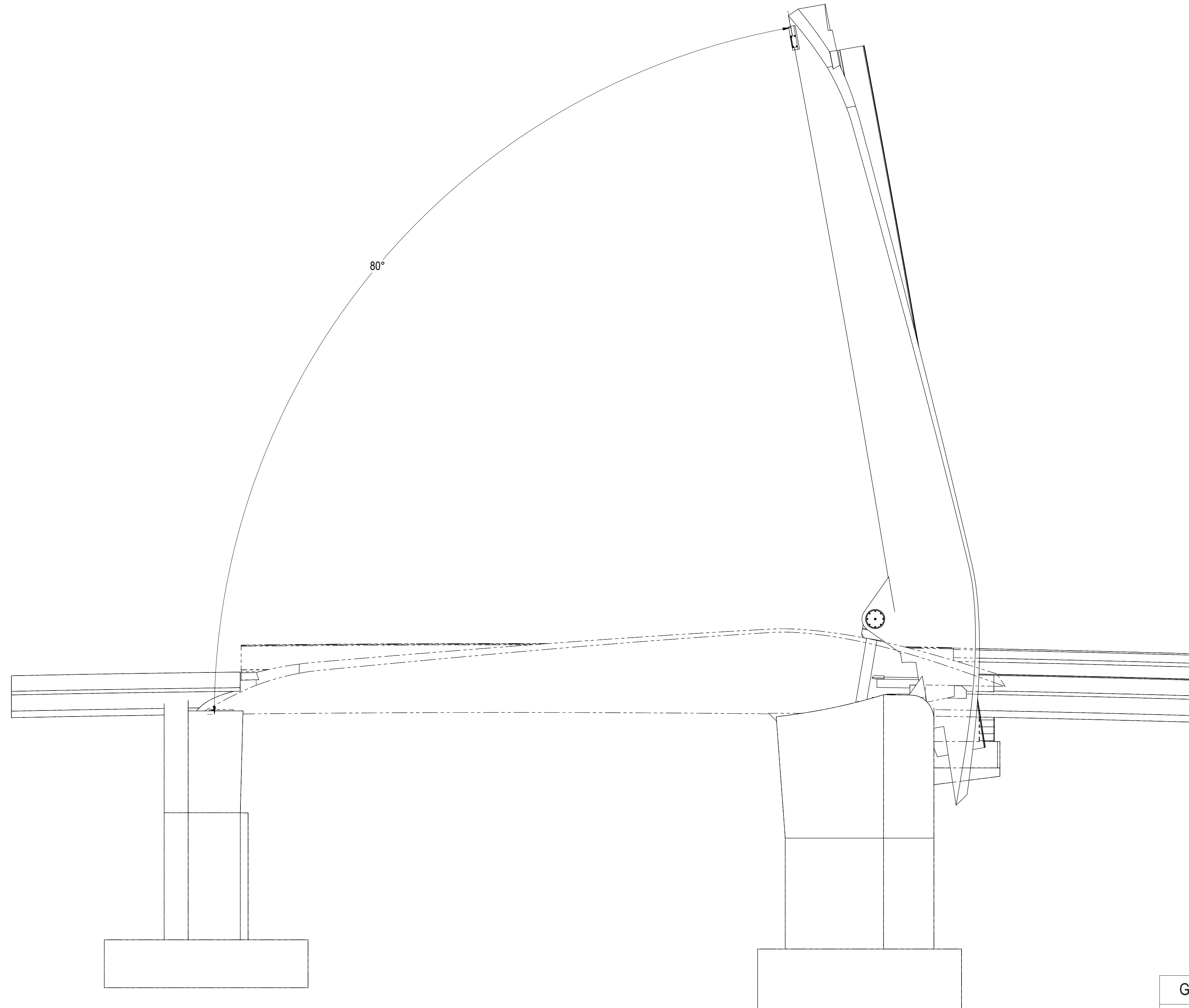
DETAIL F
(DISENGAGED)
SCALE 1 : 10

GENERAL TOLERANCE TO ISO 2768 UOS

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MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

ALL HOLES TO BE H11 UOS





SCALE 1 : 100

ASSEMBLY No. 3502-RAM-SB-XX-DR-ME-30005

GENERAL TOLERANCE TO ISO 2768 UOS

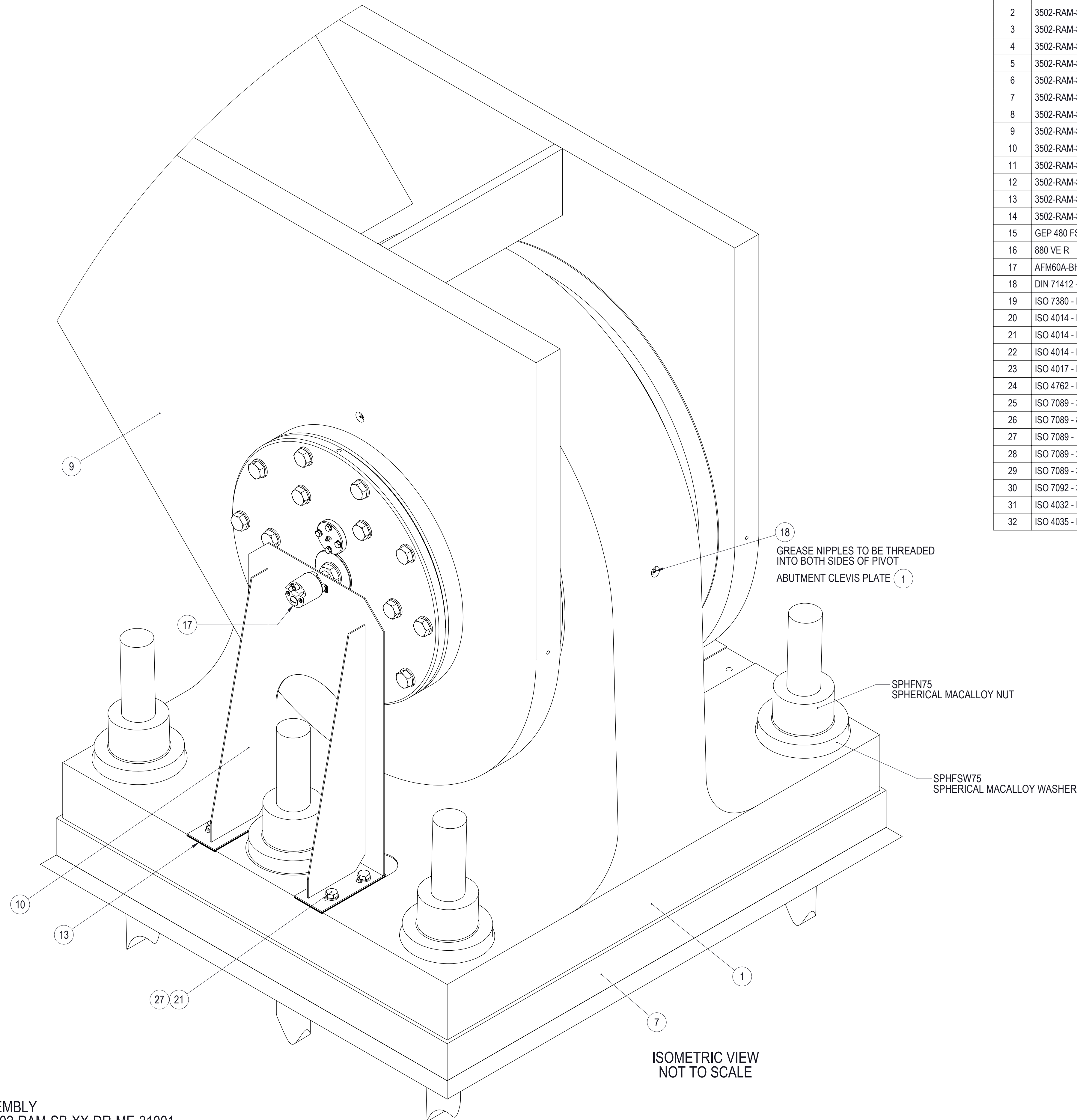
	0.5 UP TO 3	OVER 3 UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120 UP TO 400	OVER 400 UP TO 1000	OVER 1000 UP TO 2000	OVER 2000 UP TO 4000
MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

ALL HOLES TO BE H11 UOS



Project Title:		REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA	
Drawing Title:		SWING BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 5	
Drawn:	Date:	Scale (at A1):	Rev:
JJA	05.06.19	AS SHOWN	
Drawing No.:	3502-RAM-SB-XX-DR-ME-30005		Rev:
			P02

Rev	Description	Date	By	App
P02	ADDED NOSE SENSORS	04.09.19	CB LJR	MNT
P01	PRELIMINARY	05.06.19	JJA LJR	MNT
Status: PRELIMINARY				



ITEM	PART NUMBER	DESCRIPTION	QTY	MASS (kg)
1	3502-RAM-SB-XX-DR-ME-31501	PIVOT ABUTMENT CLEVIS PLATE	1	4041
2	3502-RAM-SB-XX-DR-ME-31502	DECK PIVOT PIN	1	1122
3	3502-RAM-SB-XX-DR-ME-31503	PIVOT BUSH - LARGE DIAMETER	1	30
4	3502-RAM-SB-XX-DR-ME-31504	PIVOT BUSH - SMALL DIAMETER	1	49
5	3502-RAM-SB-XX-DR-ME-31505	PIVOT BEARING RETAINING RING	2	174
6	3502-RAM-SB-XX-DR-ME-31506	PIVOT END PLATE	2	73
7	3502-RAM-SB-XX-DR-ME-31507	PIVOT BASE PLATE	1	1765
8	3502-RAM-SB-XX-DR-ME-31508	DECK PIVOT END PLATE CAP	2	1
9	3502-RAM-SB-XX-DR-ME-31509	PIVOT DECK CLEVIS	1	2172
10	3502-RAM-SB-XX-DR-ME-31510	ENCODER BRACKET	1	9
11	3502-RAM-SB-XX-DR-ME-31511	ENCODER BAR	1	1
12	3502-RAM-SB-XX-DR-ME-31512	ENCODER END PLATE CAP	2	0.42
13	3502-RAM-SB-XX-DR-ME-31513	ENCODER BRACKET SHIMPACK	2	
14	3502-RAM-SB-XX-DR-ME-31514	PIVOT GASKET	1	1
15	GEP 480 FS	SKF - PLAIN SPHERICAL BEARING	1	
16	880 VE R	SKF - V RING SEAL	2	
17	AFM60A-BHIB018x12	SICK ABSOLUTE ENCODER	1	
18	DIN 71412 - M10 x 1.5	M10 GREASE NIPPLE	6	
19	ISO 7380 - M3 x 10 - 10N, GRD 8.8, GALV.	HEXAGON SOCKET BUTTON HEAD SCREW	4	
20	ISO 4014 - M8 x 40 x 40-N, GRD 8.8, GALV.	HEX HEAD BOLT	8	
21	ISO 4014 - M16 x 65 x 65-N, GRD 8.8, GALV.	HEX HEAD BOLT	4	
22	ISO 4014 - M24 x 90 x 90-N, GRD 8.8, GALV.	HEX HEAD BOLT	32	
23	ISO 4017 - M30 x 100-N, GRD 8.8, GALV.	HEX HEAD SCREW	1	
24	ISO 4762 - M36 x 120 - 120N, GRD 8.8, GALV.	HEXAGON SOCKET CAP HEAD SCREW	48	
25	ISO 7089 - 3, GALV., HV 200	PLAIN WASHER	8	
26	ISO 7089 - 8, GALV., HV 200	PLAIN WASHER	8	
27	ISO 7089 - 16, GALV., HV 200	PLAIN WASHER	4	
28	ISO 7089 - 24, GALV., HV 200	PLAIN WASHER	32	
29	ISO 7089 - 30, GALV., HV 200	PLAIN WASHER	2	
30	ISO 7092 - 36, GALV., HV 200	PLAIN SMALL WASHER	48	
31	ISO 4032 - M3 - D, CLASS 8, GALV.	HEX NUT	4	
32	ISO 4035 - M30, CLASS 8, GALV.	HEX THIN NUT	2	

- NOTES
- EXECUTION TO CONFORM TO BS EN 1090-2 EXECUTION CLASS EXC 3.
 - PRELOADED BOLTS SHOULD BE TENSIONED TO EN1090-2 DEFAULT IS 0.7XUT.
 - ALL EXPOSED SURFACES MUST BE PROTECTED AFTER ASSEMBLY.
 - LOCTITE 242 TO BE APPLIED TO FIXINGS ON ASSEMBLY. PROPRIETARY ITEMS MUST BE INSTALLED AS PER MANUFACTURERS INSTRUCTIONS.
 - ITEMS MUST BE LIFTED USING THEIR DESIGNATED LIFTING POINTS.
 - NO CIVIL OR STRUCTURAL DETAILS SHALL BE READ FROM THIS DRAWING.
 - INSTALLATION RISK ASSESSMENT AND METHOD STATEMENT TO BE DEVELOPED BY CONTRACTOR.
 - ANCHOR BOLTS TO BE PRELOADED TO A MINIMUM OF 1509kN AND A MAXIMUM OF 1724kN.

EAST PIVOT ASSEMBLY
ASSEMBLY No. 3502-RAM-SB-XX-DR-ME-31001

GENERAL TOLERANCE TO ISO 2768 UOS

	0.5 UP TO 3	OVER 3 UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120 UP TO 400	OVER 400 UP TO 1000	OVER 1000 UP TO 2000	OVER 2000 UP TO 4000
MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

ALL HOLES TO BE H11 UOS



Project Title:
REPLACEMENT OF SWING BRIDGE
AND LONGBIRD BRIDGE, BERMUDA

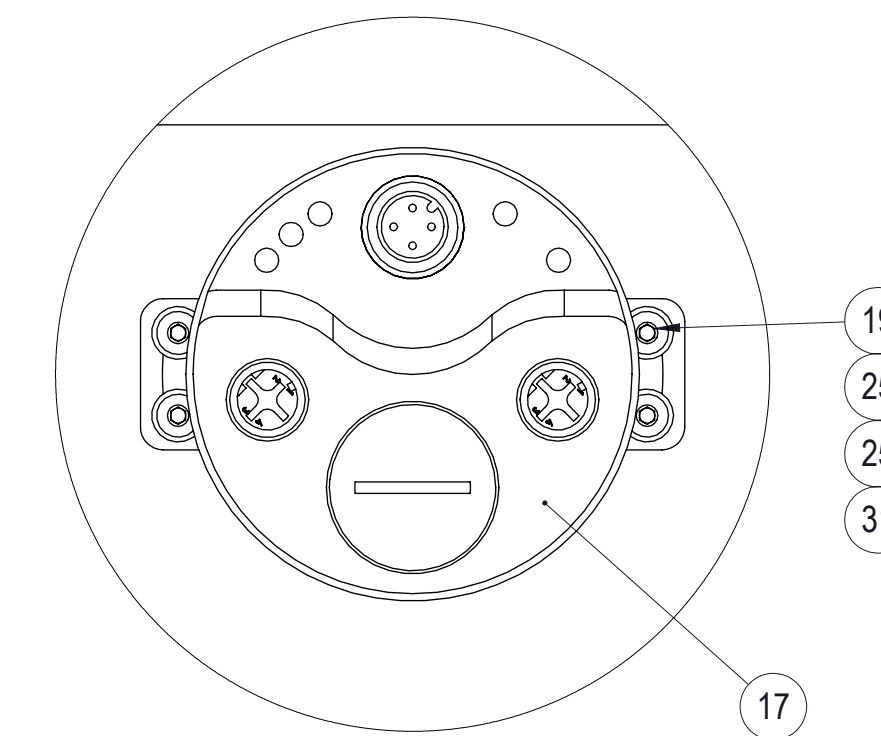
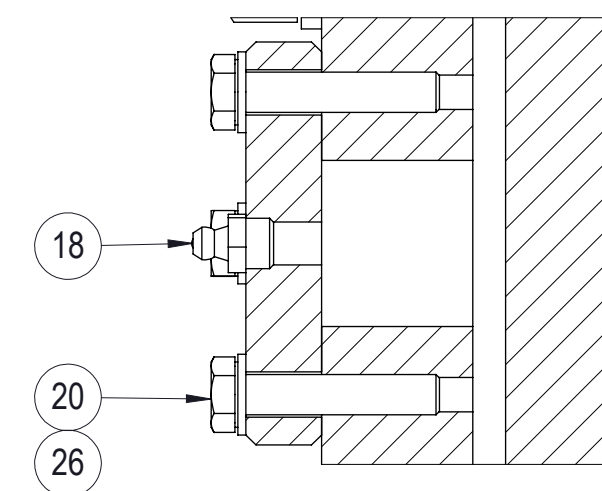
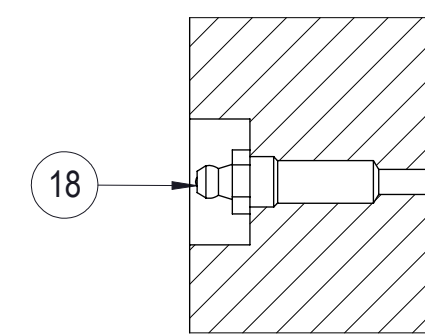
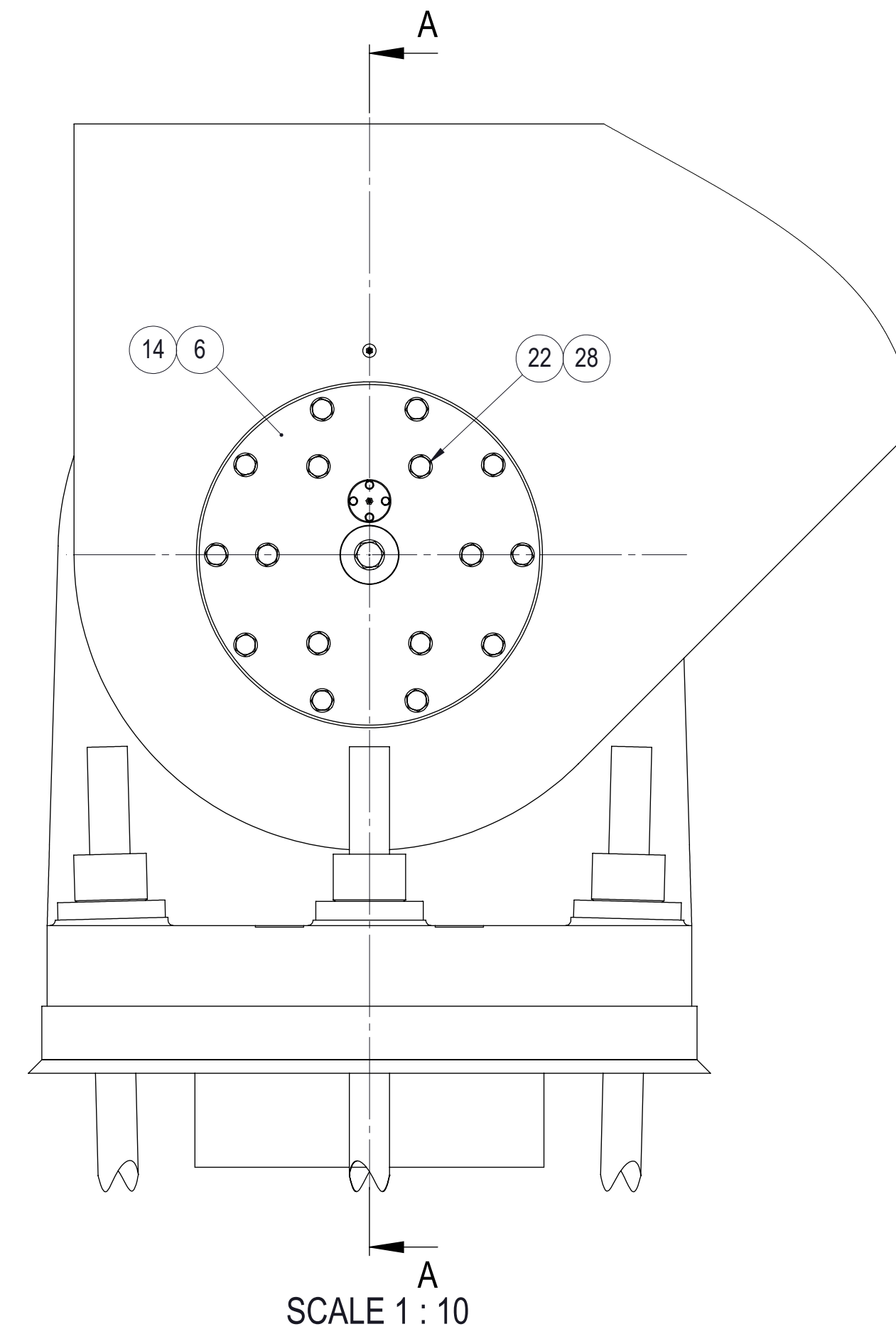
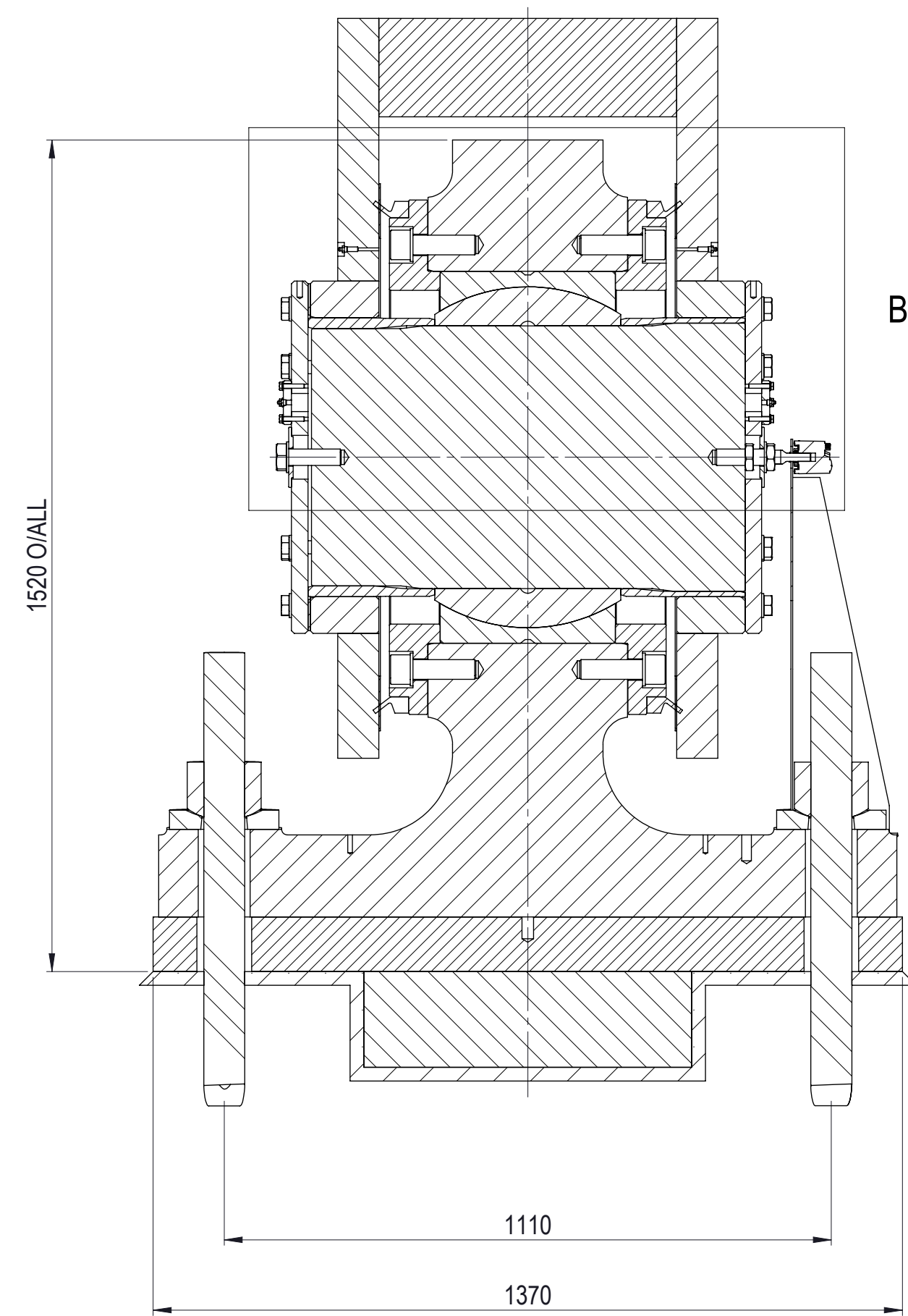
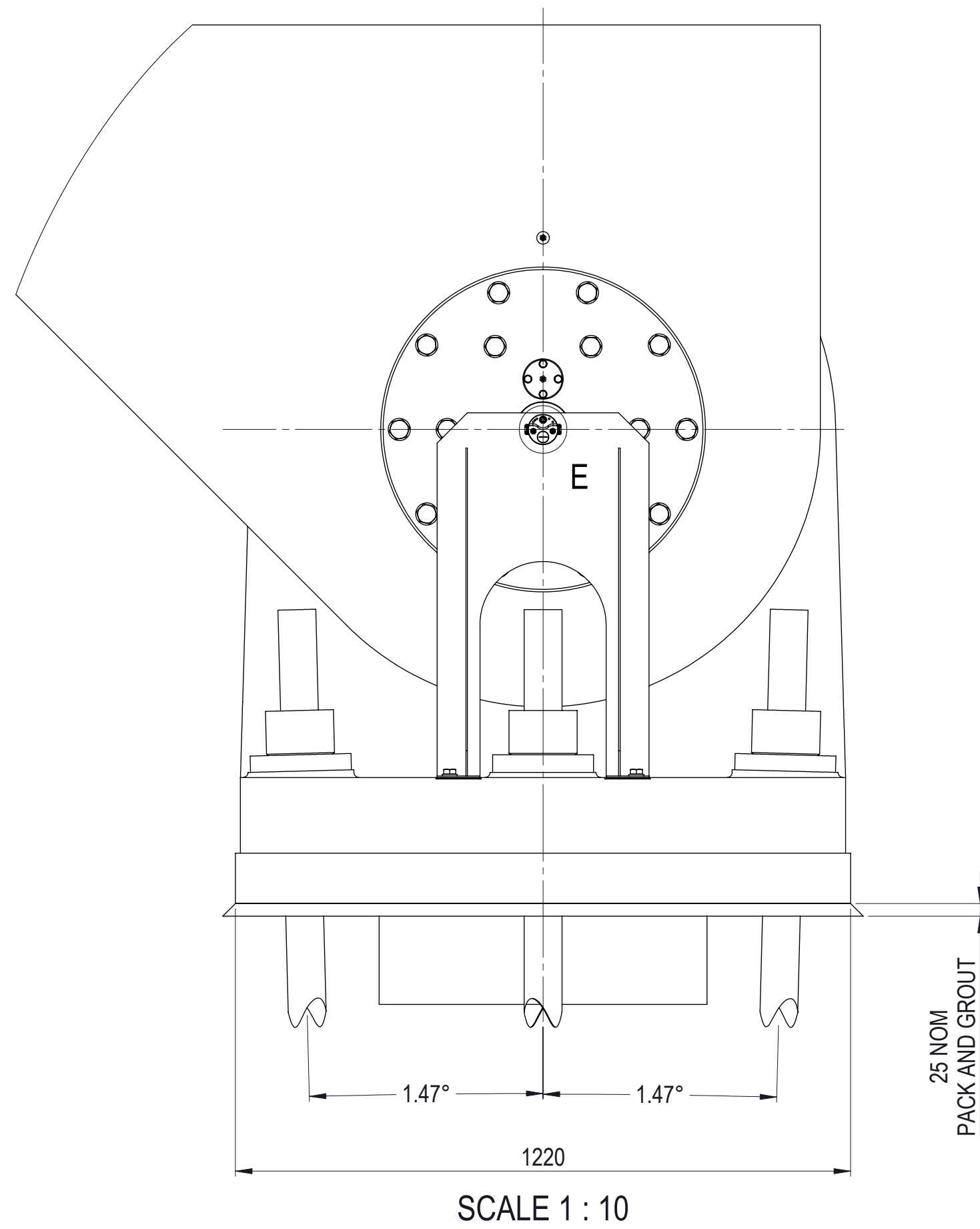
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SWING BRIDGE REPLACEMENT
EAST PIVOT
ASSEMBLY
SHEET 1

Rev	Description	Date	By	App
P04	PRELIMINARY	21.08.19	ADB	MNT
P03	PRELIMINARY	24.06.19	GU	MNT
P02	PRELIMINARY	31.05.19	CB	MNT
P02.1	PRELIMINARY FOR INFORMATION	10.05.19	CB	-
P01	PRELIMINARY	09.04.19	CB	-

Status: PRELIMINARY

Date: 09.04.19
Scale (at A1): AS SHOWN

Drawing No.: 3502-RAM-SB-XX-DR-ME-31001
Rev: P04

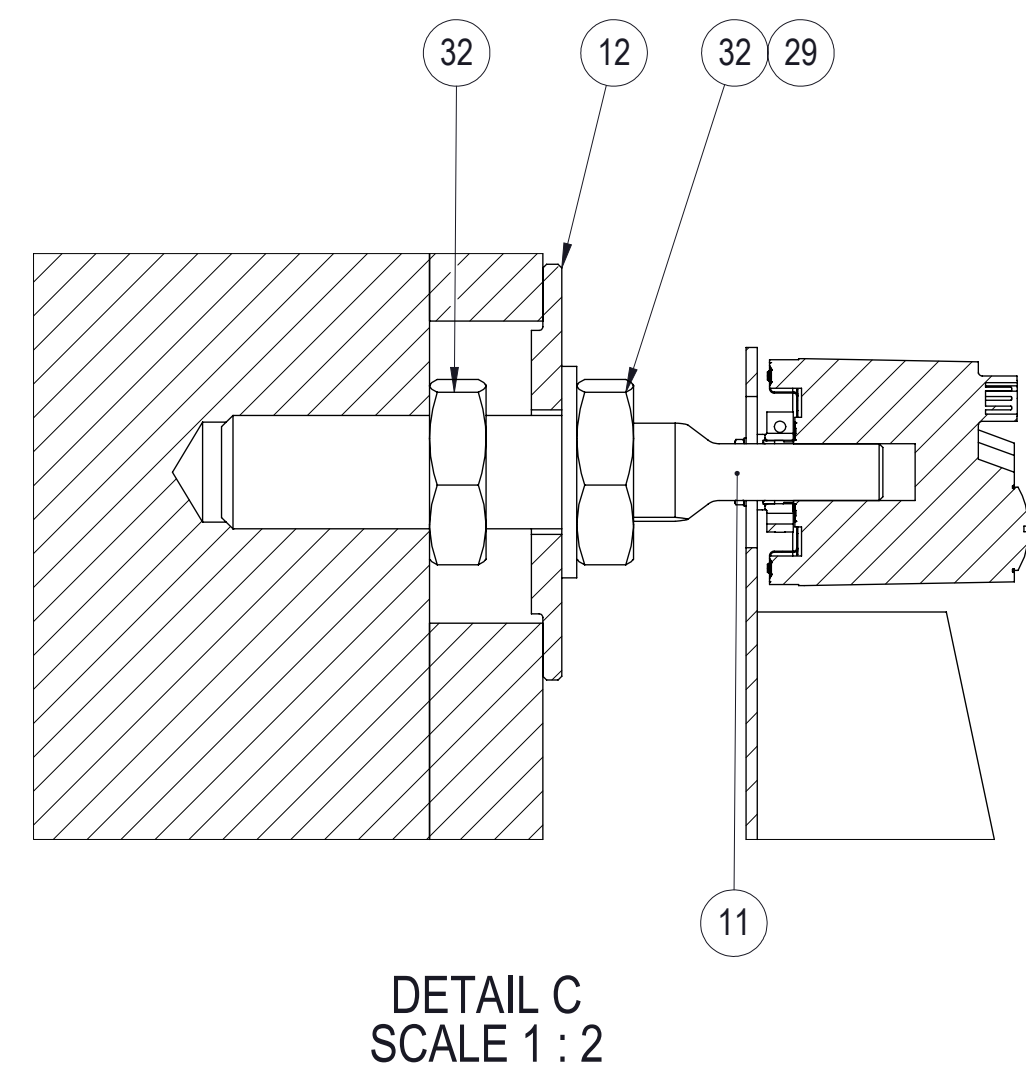
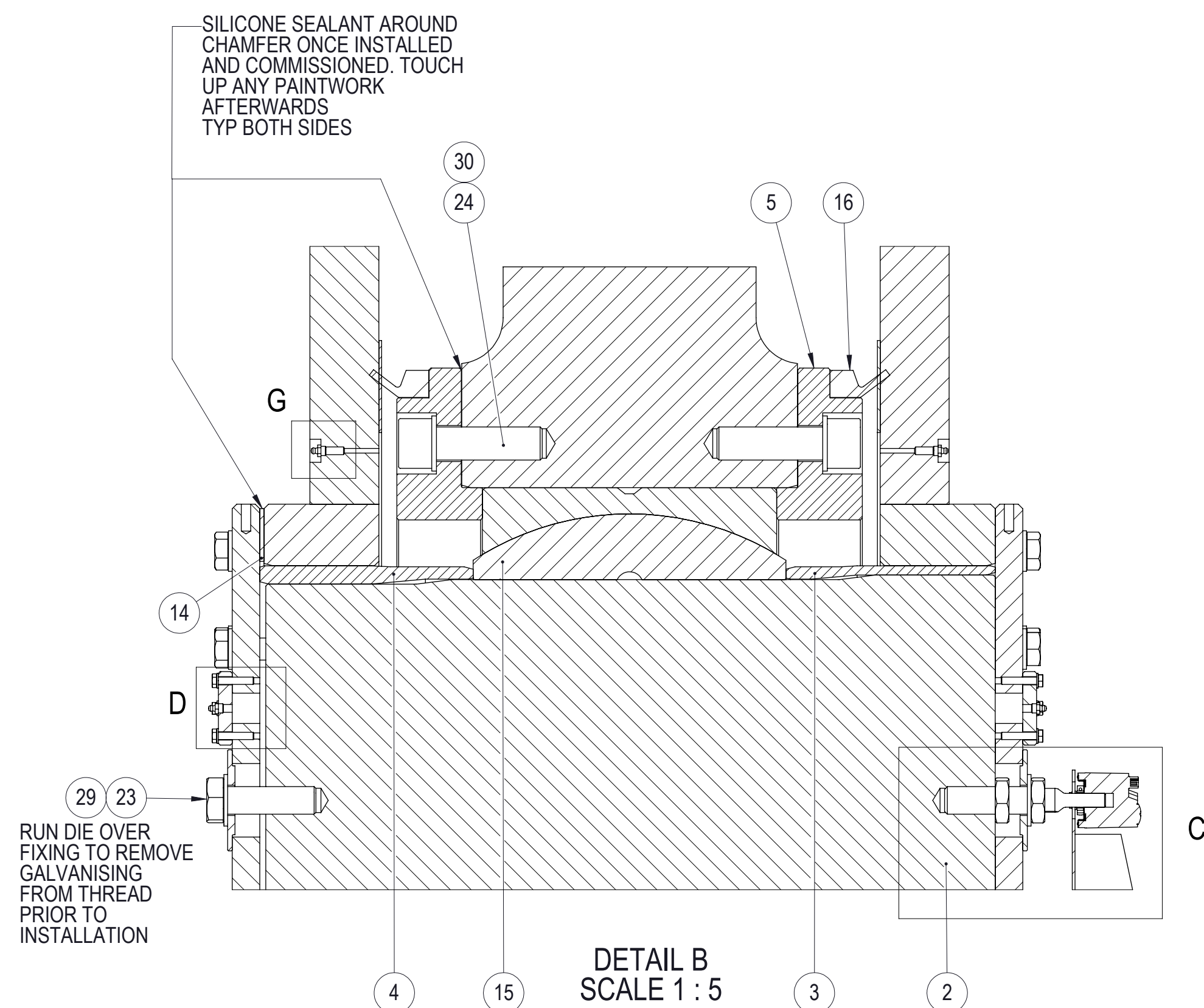


DETAIL E
SCALE 1 : 1

GENERAL TOLERANCE TO ISO 2768 UOS

	0.5 UP TO 3	OVER 3 UP TO 6	OVER 6 UP TO 30	OVER 30 UP TO 120	OVER 120 UP TO 400	OVER 400 UP TO 1000	OVER 1000 UP TO 2000	OVER 2000 UP TO 4000
MACHINING ISO 2768-m	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
FABRICATION ISO 2768-c	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	±4

ALL HOLES TO BE H11 UOS



Project Title:
REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA

Drawing Title:
SWING BRIDGE REPLACEMENT EAST PIVOT ASSEMBLY SHEET 2

Rev	Description	Date	By	App
P04	PRELIMINARY	21.08.19	ADB	MNT
P03	PRELIMINARY	24.06.19	LR	MNT
P02	PRELIMINARY	31.05.19	CB	MNT
P02.1	PRELIMINARY FOR INFORMATION	10.05.19	CB	-
P01	PRELIMINARY	09.04.19	CB	-

Project Title:	REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA
Drawing Title:	SWING BRIDGE REPLACEMENT EAST PIVOT ASSEMBLY SHEET 2
Drawn:	CB
Date:	09.04.19
Scale (at A1):	AS SHOWN
Drawing No.:	3502-RAM-SB-XX-DR-ME-31002
Rev:	P04



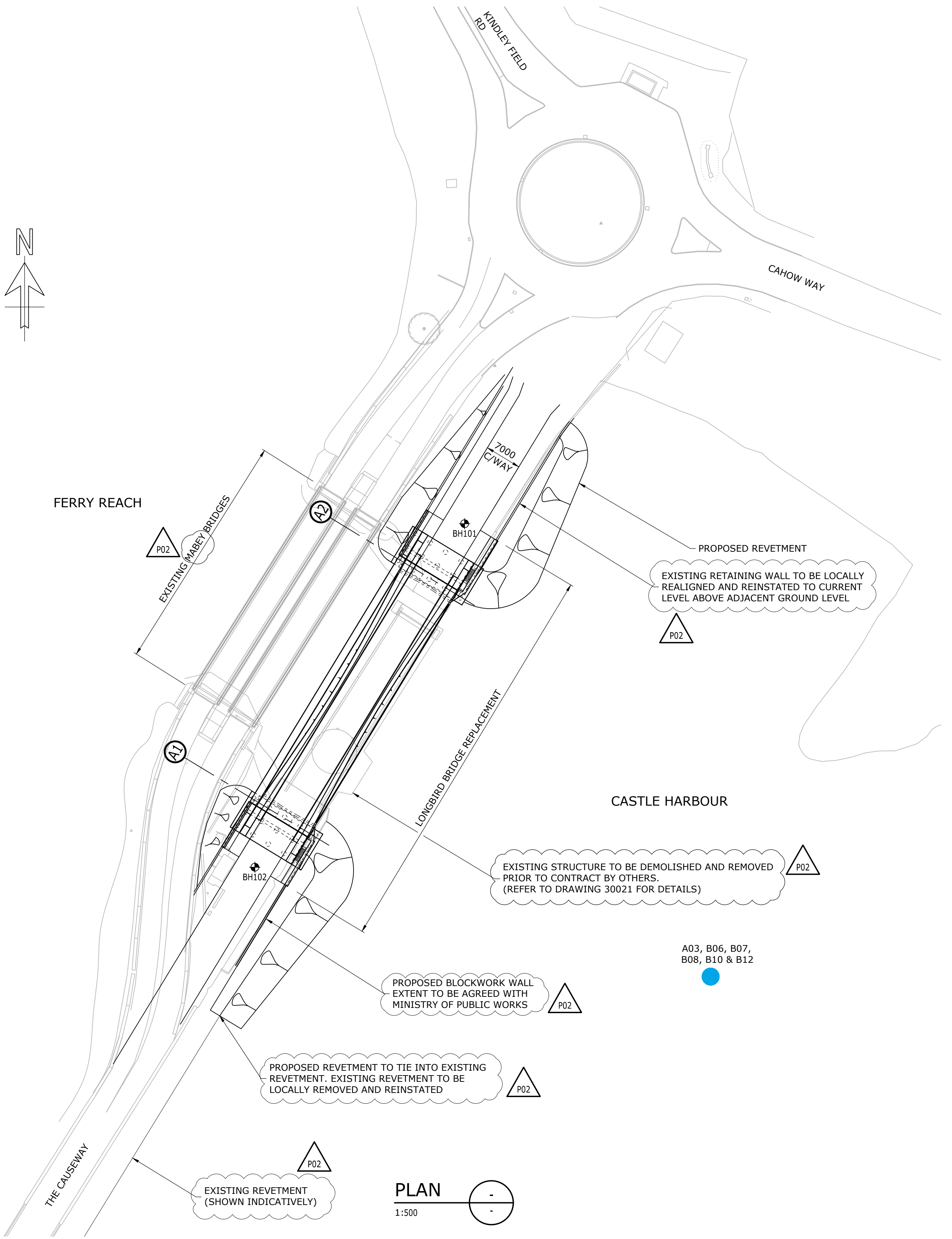
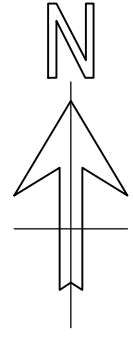
GOVERNMENT OF BERMUDA

Ministry of Public Works

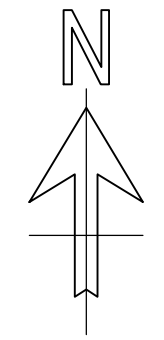
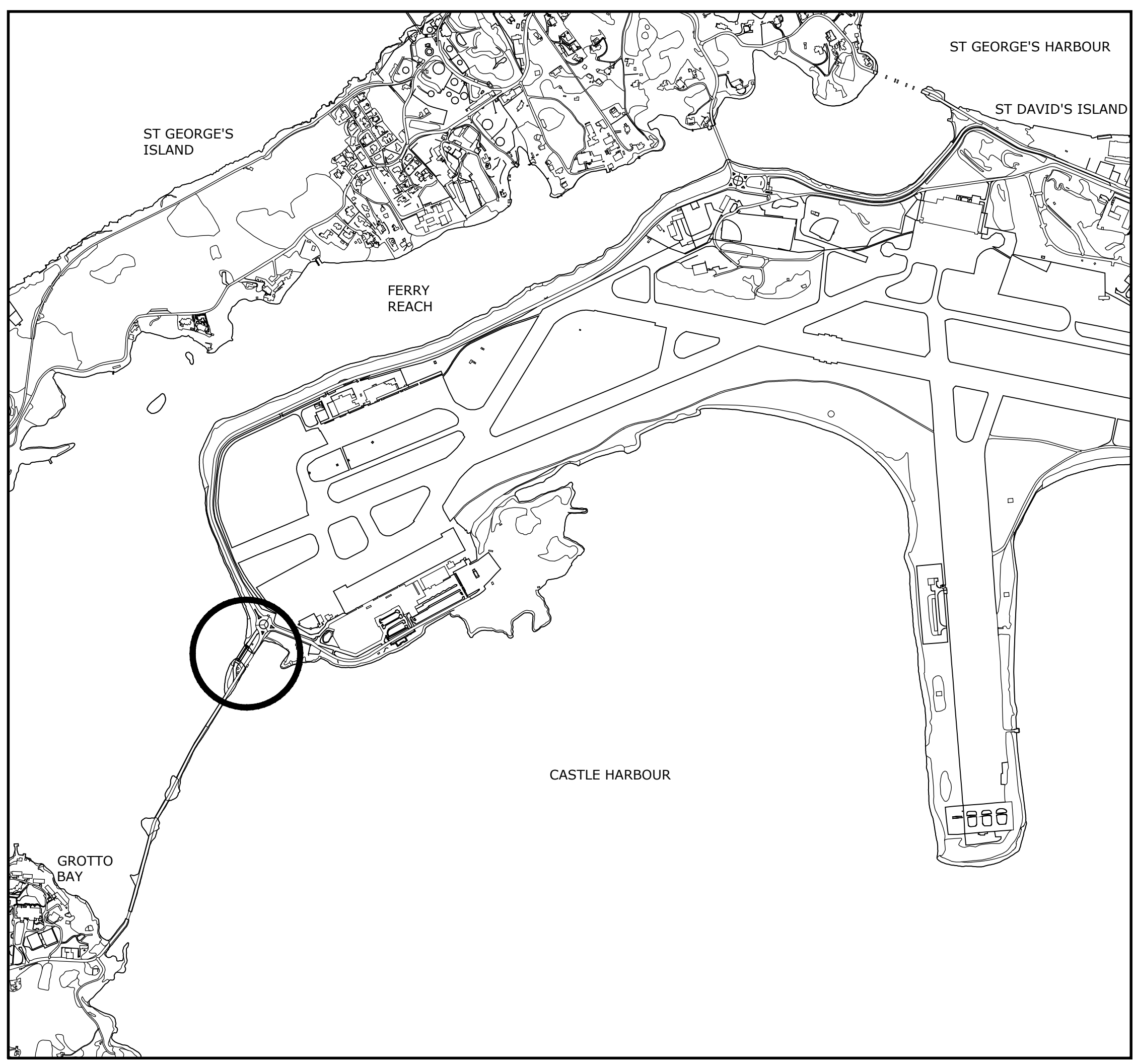
Department of Works and Engineering

Longbird Bridge Replacement

Drawings List
General Arrangement
Notes
Construction Sequence



PLAN
1:500



PLAN
1:10000
LOCATION PLAN

HEALTH AND SAFETY SYMBOLS LEGEND

- Indicates a residual risk requiring a compulsory action
- Conveys information about a residual risk
- Indicates a residual risk requiring a specific action to be avoided
- Warns of a residual risk or information that is unusual and cannot be designed out
- Indicates an environmental hazard

Site Related & Construction Risks

A03 - The approximate positions of services are indicated on drawing 30021. Prior to construction and demolition activities the contractor is to confirm the exact position of the known services and undertake investigation for unknown services.

B06 - During construction, in the event of a predicted surge the tie down bars are to be engaged to prevent uplift and potential instability of structure.

B07 - Drainage holes to be kept free from debris and blockages at all times to ensure box structure is free to drain.

Operational & Maintenance Risks

B08 - During bearing replacement jacks need to be placed at indicated point (along centreline of bearing and underneath diaphragm).

B10 - For replacement of hangers the structure has been design for one hanger to be replaced at any one time.

B12 - Prior to accessing the bridge deck from the abutment end and for maintenance works (e.g. painting) the access at the North and South abutments must be opened and vented with forced ventilation.

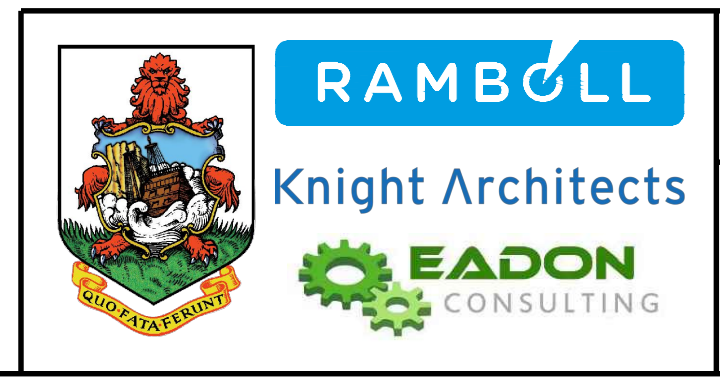
Demolition & Environmental Risks

The table above is provided to assist the Principal Contractor to fulfill their obligations under the Construction Design & Management Regulations, 2015. It does not include residual risks that a competent Contractor will be aware of nor does it absolve the Principal Contractor of his legal responsibilities. For further hazard and risk information, refer to Designer's Risk Assessment 3502-RAM-XX-XX-RP30101

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES
1. FOR NOTES REFER TO DRAWING 3502-RAM-LB-XX-DR-CB-30111.

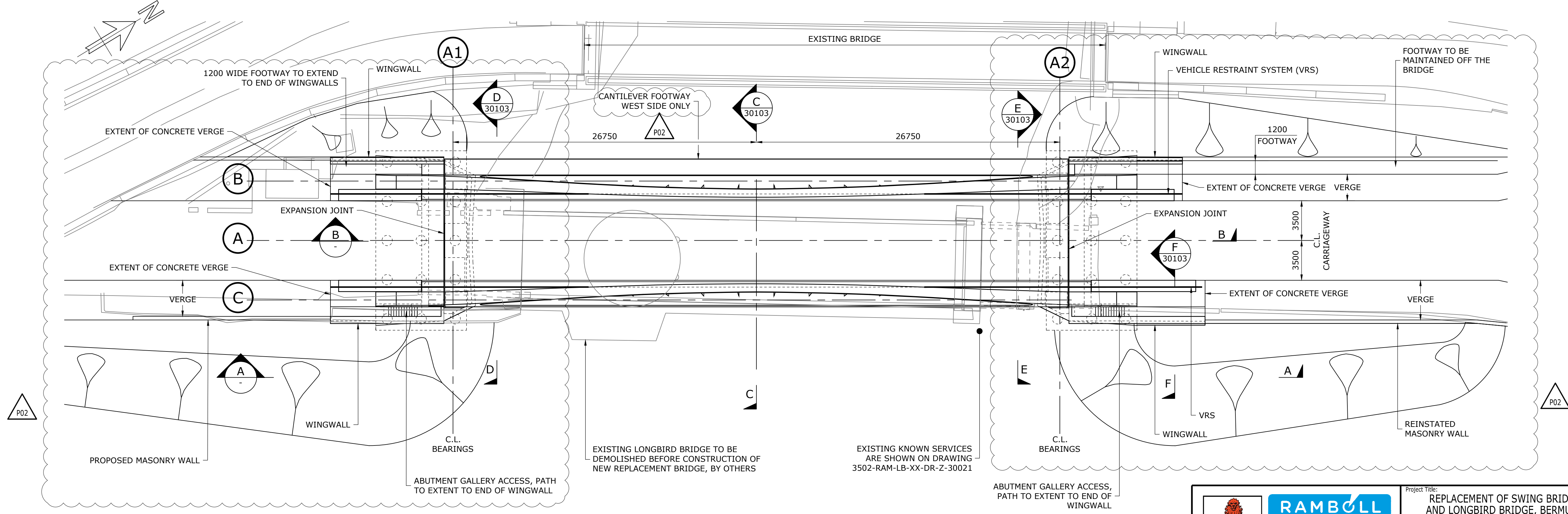
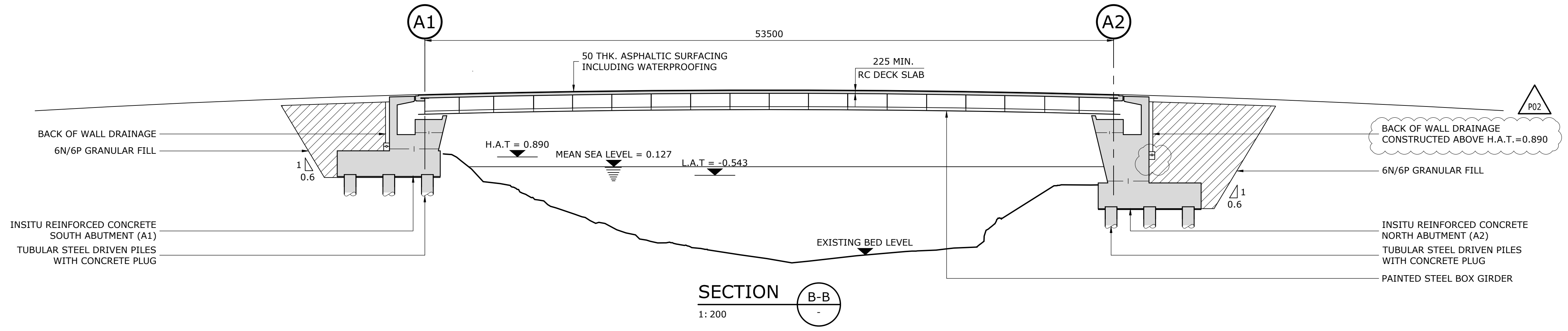
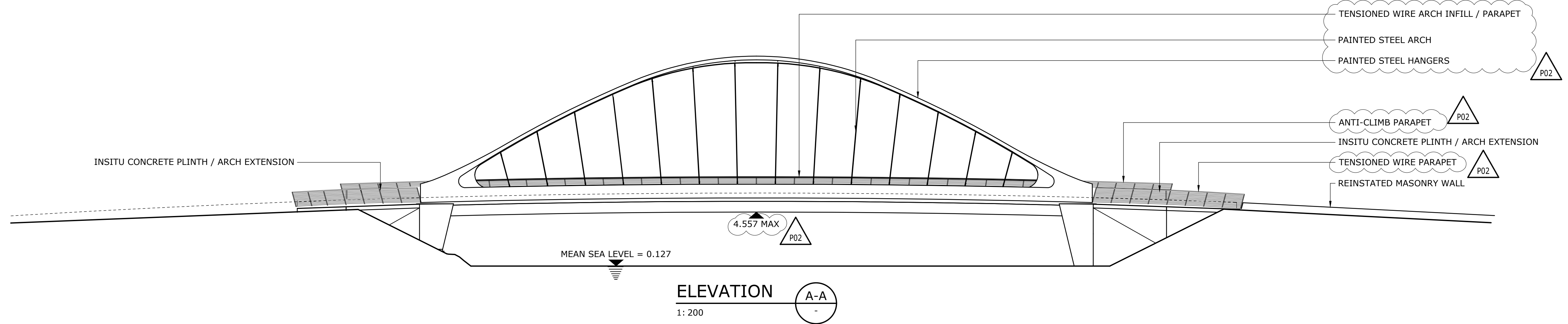
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P01	PRELIMINARY	28.06.19	MJC JFRW	SPT



Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA			
Drawing Title: LONGBIRD BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 1			
Drawn: M.Cooper	Date: APR.2019	Scale (at A1): AS SHOWN	
Drawing No.: 3502-RAM-LB-XX-DR-CB-30101			Rev: P02

Status: PRELIMINARY				
Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA				
Drawing Title: LONGBIRD BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 1				
Drawn: M.Cooper	Date: APR.2019	Scale (at A1): AS SHOWN		
Drawing No.: 3502-RAM-LB-XX-DR-CB-30101			Rev: P02	

NOTES
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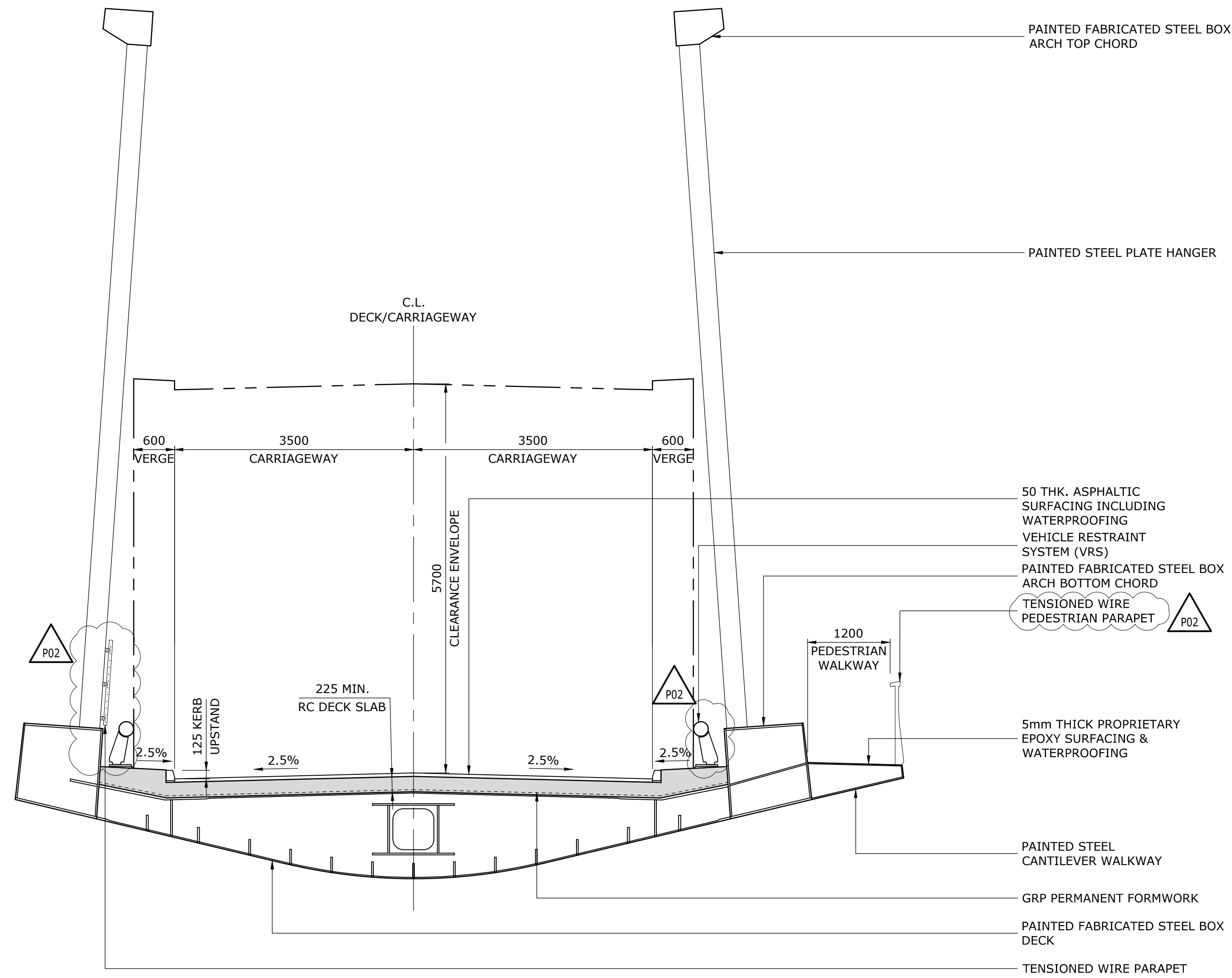


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 Drawing Title: **LONGBIRD BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 2**

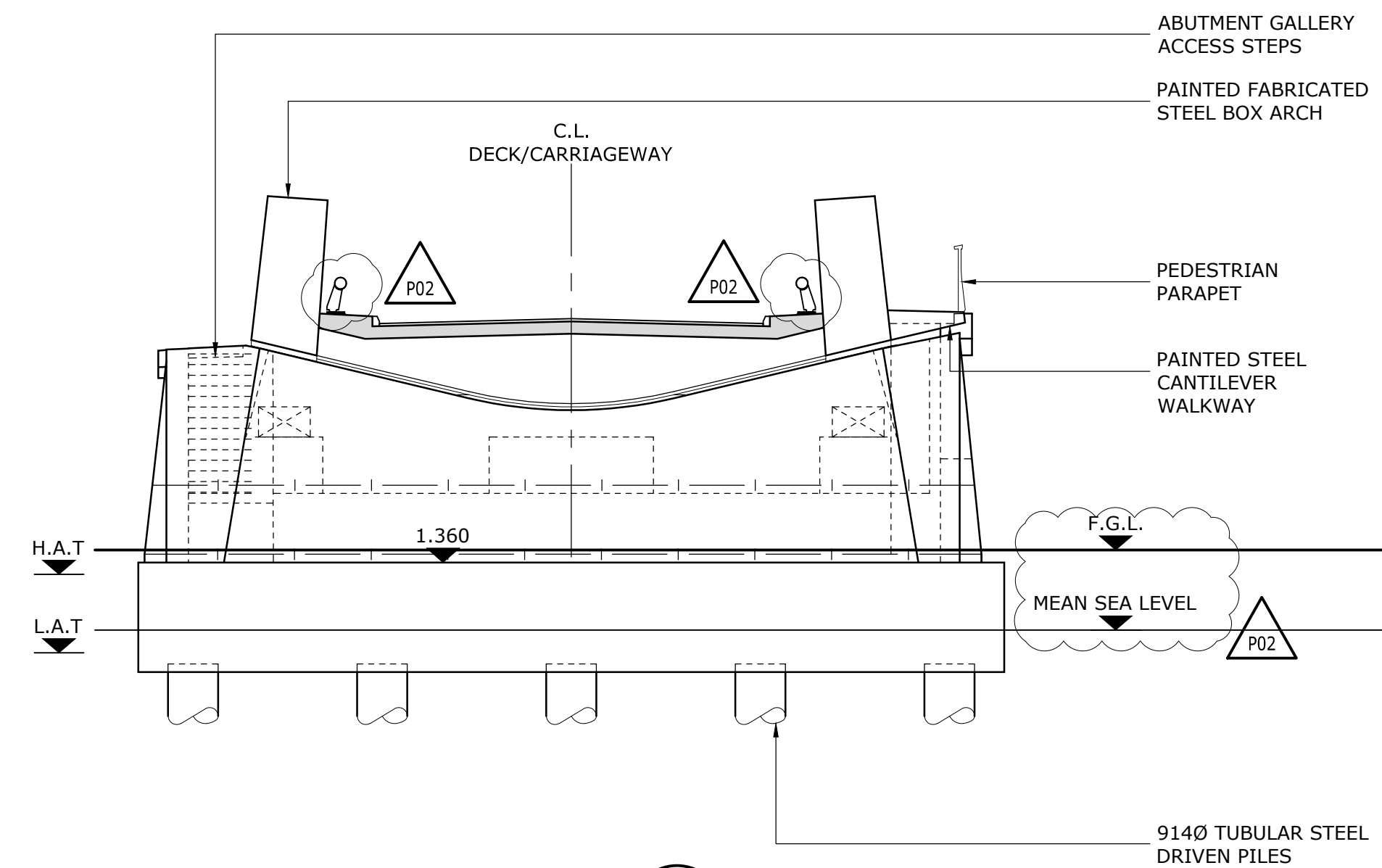
Rev	Description	Date	By	App
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P01	PRELIMINARY	28.06.19	MJC	SPT

Status: **PRELIMINARY**

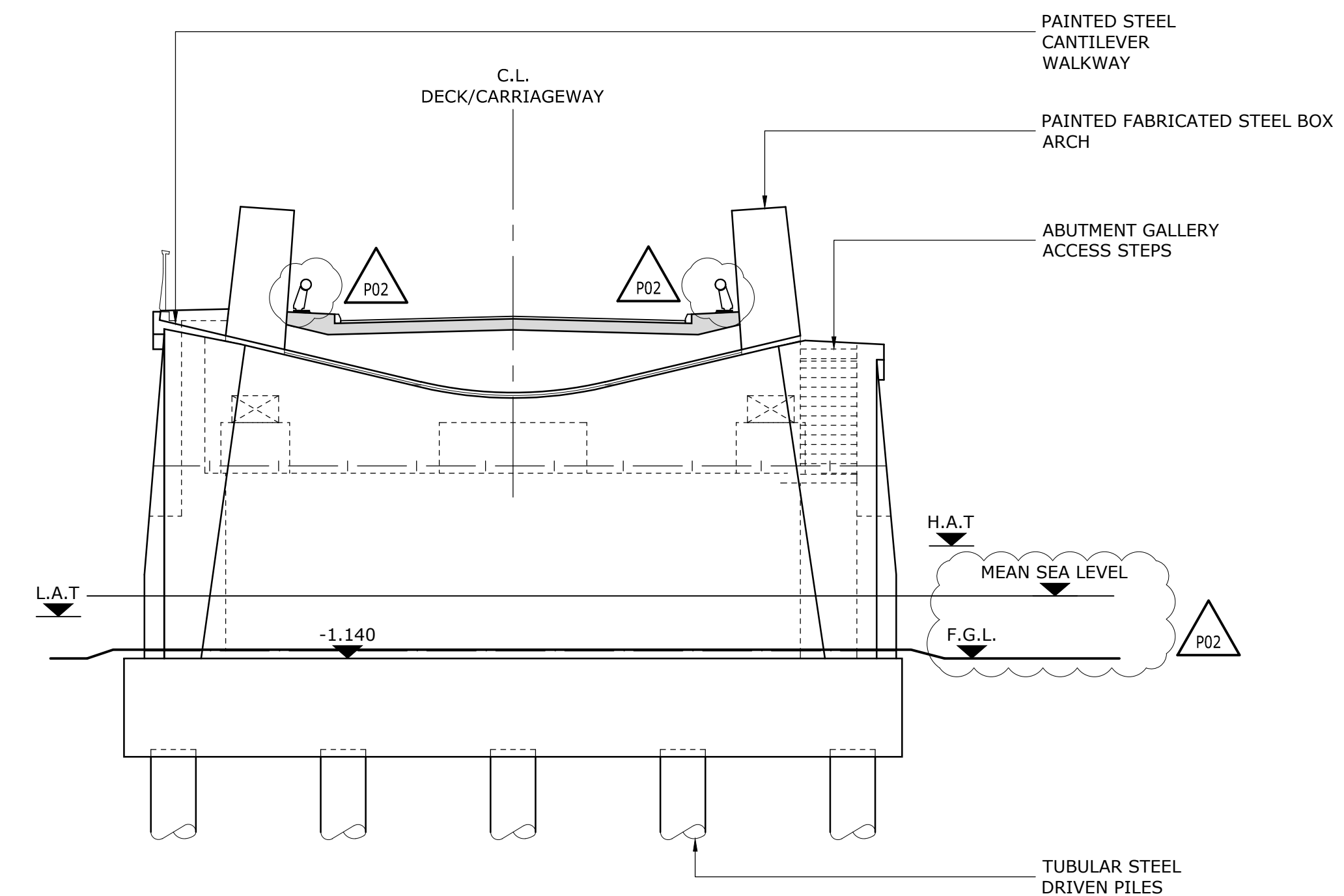
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Drawing No.: 3502-RAM-LB-XX-DR-CB-30102	Rev: P02	



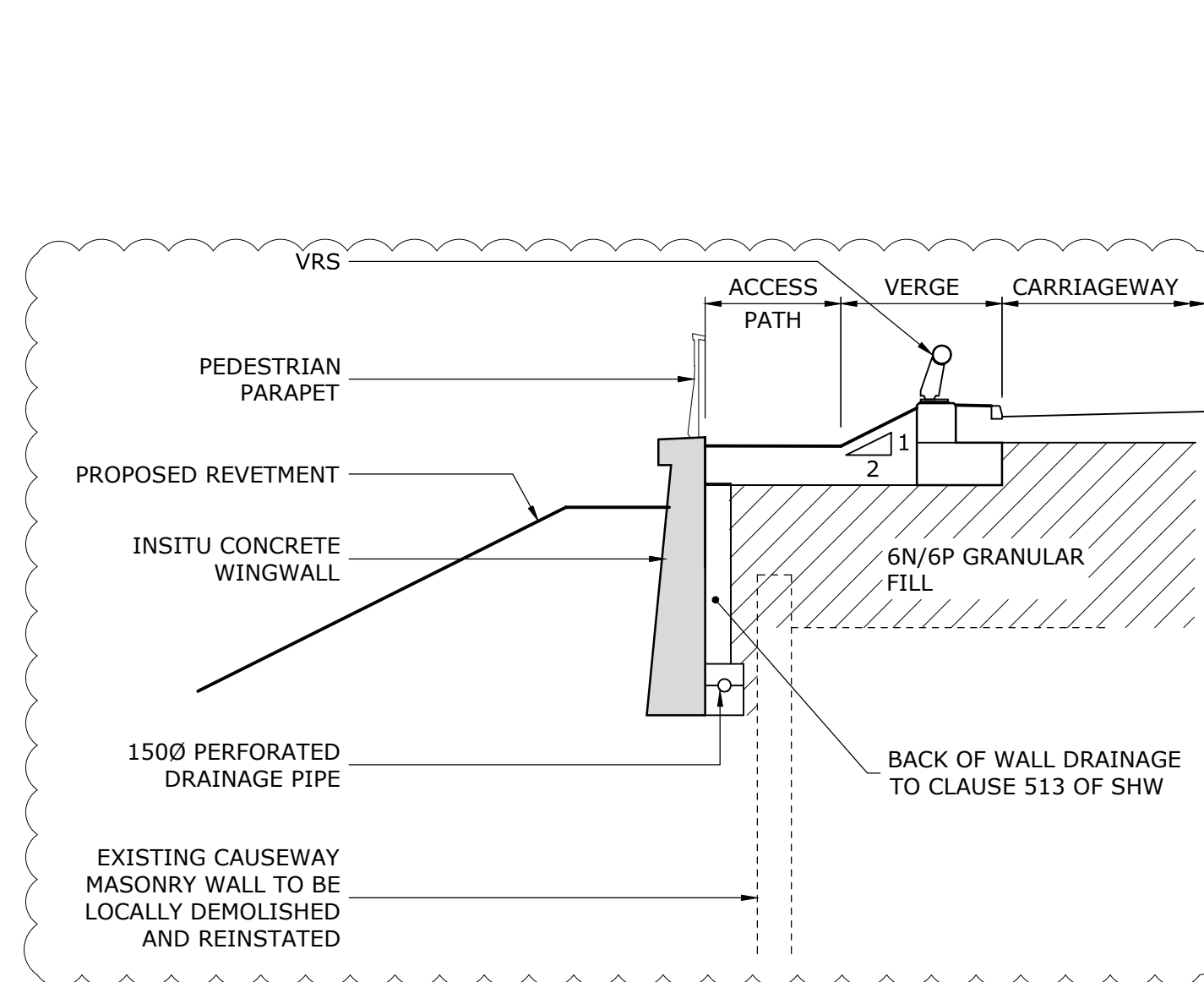
SECTION C-C
1:50



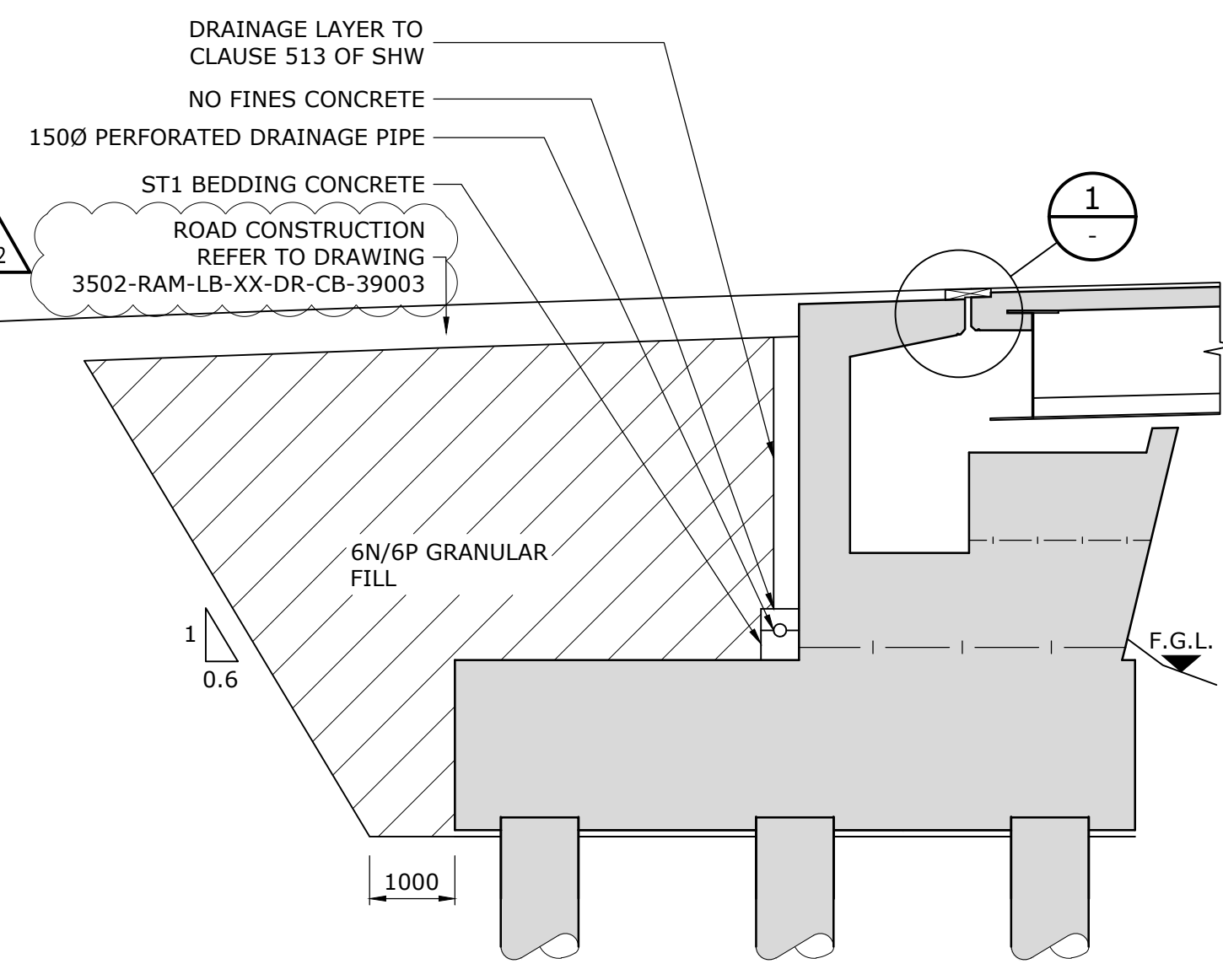
SECTION D-D
1:100
ABUTMENT A1 ELEVATION (SOUTH)



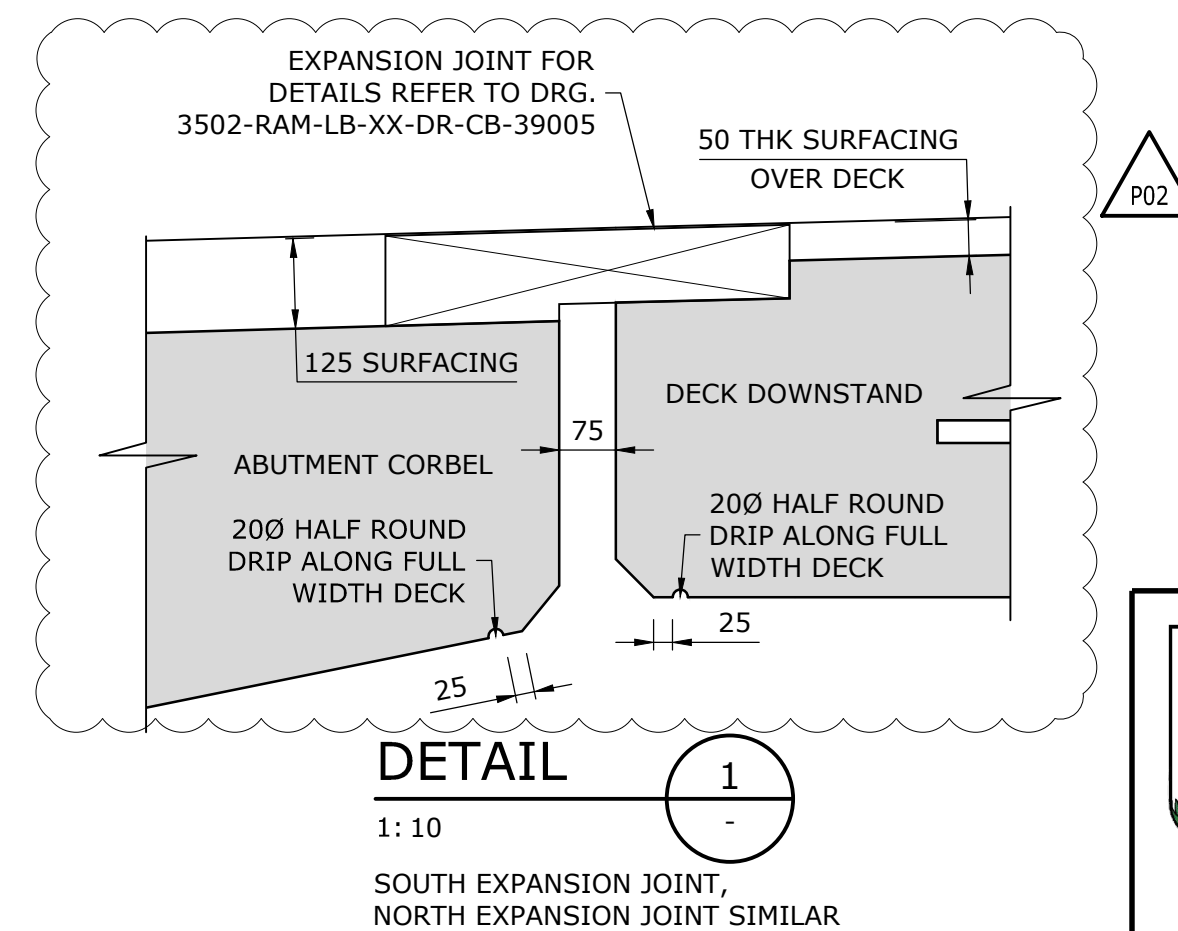
SECTION E-E
1:100
ABUTMENT A2 ELEVATION (NORTH)



SECTION F-F
1:75



SECTION THROUGH ABUTMENT A1 (SOUTH)
1:75

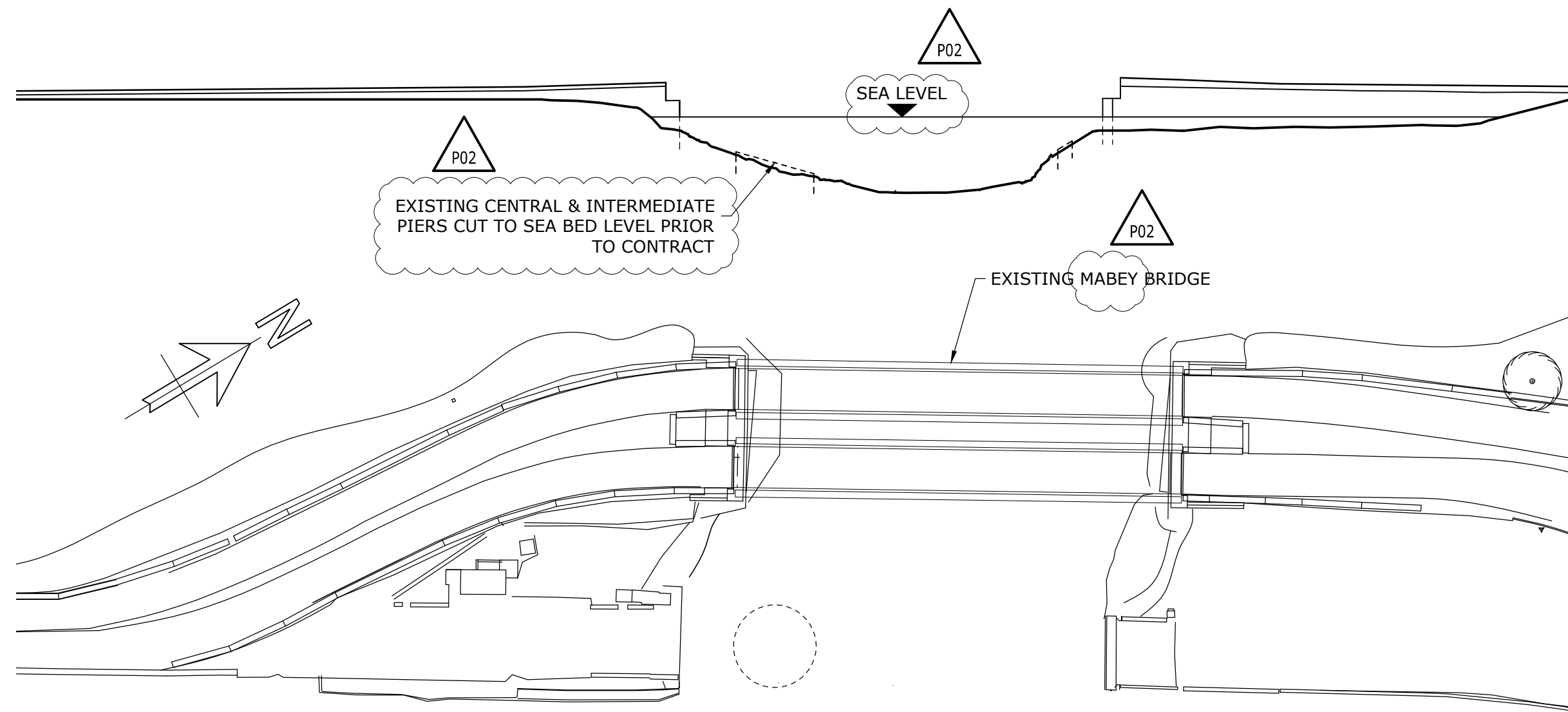


DETAIL 1
1:10
SOUTH EXPANSION JOINT, NORTH EXPANSION JOINT SIMILAR

NOTES
1. FOR NOTES REFER TO DRAWING 3502-RAM-LB-XX-DR-CB-30111.

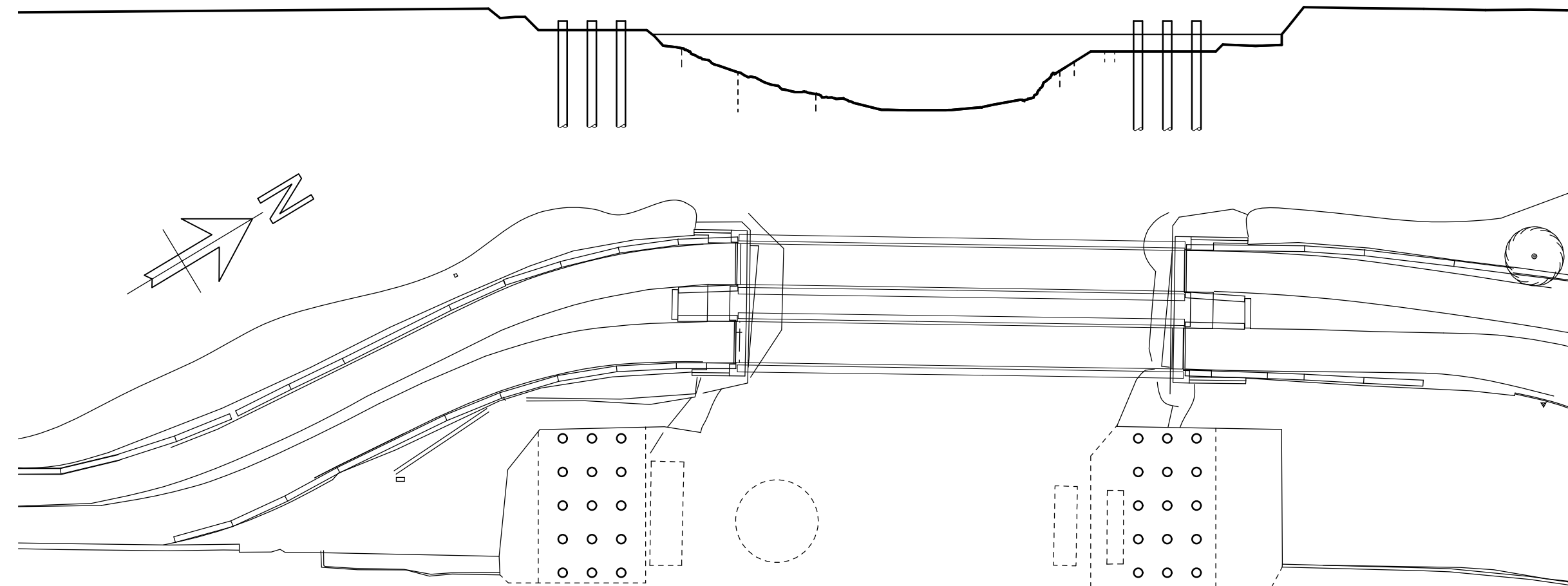
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P02	REVISIONS AS CLOUDED	06.09.19	MJC	SPT
P01	PRELIMINARY	28.06.19	MJC	SPT
Status: PRELIMINARY				
Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA				
Drawing Title: LONGBIRD BRIDGE REPLACEMENT GENERAL ARRANGEMENT SHEET 3				
Drawn:	M.Cooper	Date:	APR.2019	Scale (at A1): AS SHOWN
Drawing No.:	3502-RAM-LB-XX-DR-CB-30103			Rev: P02





STAGE 1

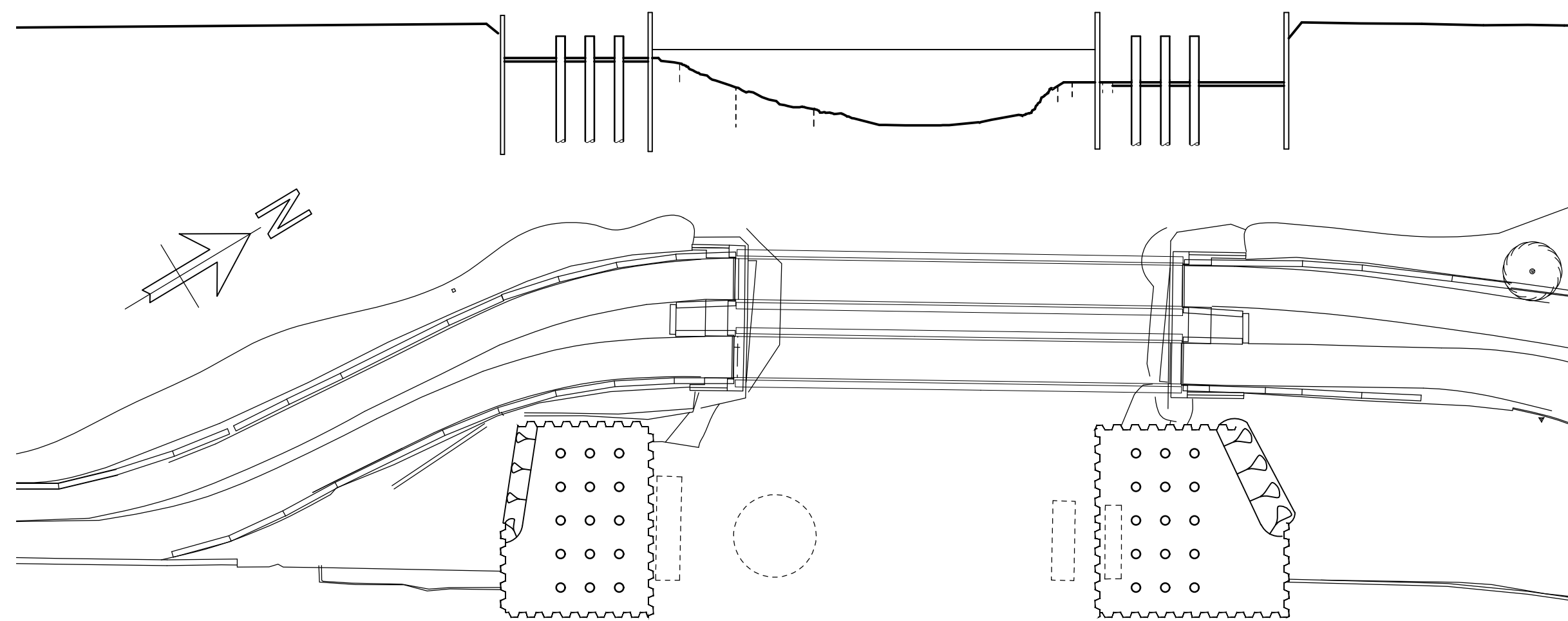
- SET UP SITE COMPOUND.
- ESTABLISH NAVIGATION CHANNEL.



STAGE 2

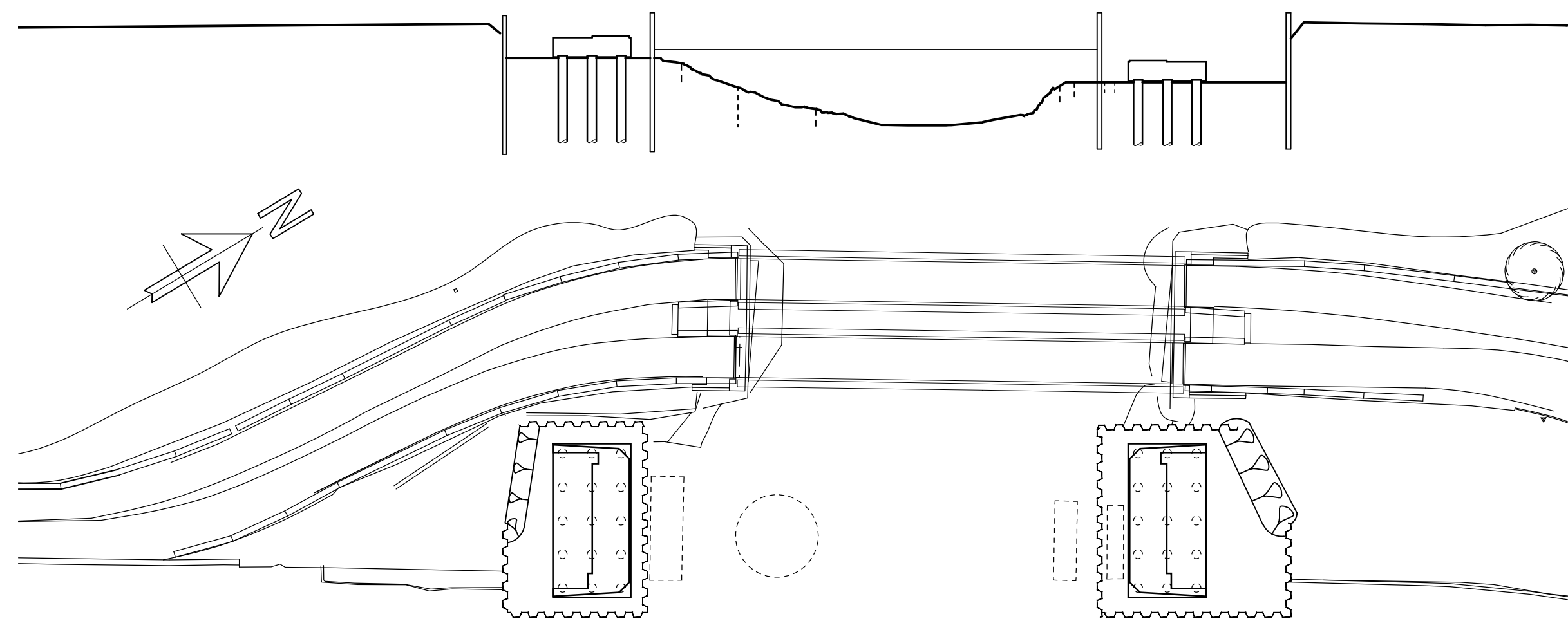
- INSTALL TEMPORARY SILT SCREENS.
- DEMOLISH EXISTING LONGBIRD BRIDGE SUBSTRUCTURE TO BED LEVEL. WHERE EXISTING STRUCTURES OBSTRUCT CONSTRUCTION OR INSTALLATION OF NEW ELEMENTS THEY SHOULD BE REMOVED PRIOR TO CONSTRUCTION OF REPLACEMENT BRIDGE.
- PRE-EXCAVATE FOR FOUNDATIONS.
- DRIVE TUBULAR PILES TO REQUIRED DEPTH.

B06 & B07



STAGE 3

- INSTALL TEMPORARY COFFERDAM.
- EXCAVATE COFFERDAM AND POUR TREMIE CONCRETE PLUG.
- DEWATER COFFERDAM.



STAGE 4

- CUT-OFF TUBULAR PILES.
- CONSTRUCT PILE PLUGS.
- CONSTRUCT NORTH & SOUTH ABUTMENT FOUNDATIONS.

HEALTH AND SAFETY SYMBOLS LEGEND

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- Conveys information about a residual risk
- Indicates a residual risk requiring a specific action to be avoided
- Warns of a residual risk or information that is unusual and cannot be designed out
- Indicates an environmental hazard

Site Related & Construction Risks
 B06 - During construction, in the event of a predicted surge the tie down bars are to be engaged to prevent uplift and potential instability of structure.
 B07 - Drainage holes to be kept free from debris and blockages at all times to ensure box structure is free to drain.

Operational & Maintenance Risks

Demolition & Environmental Risks

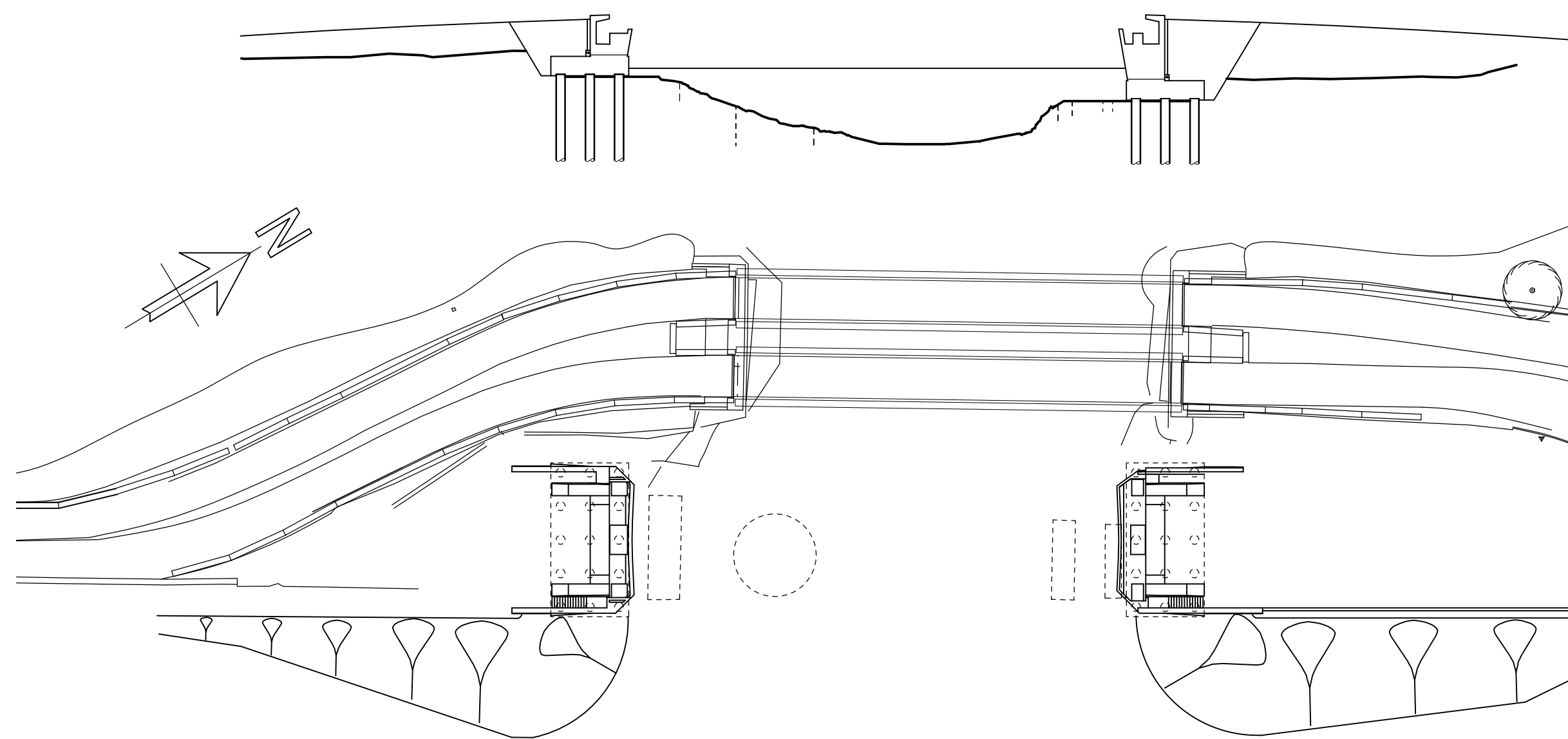
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 For further hazard and risk information, refer to Designer's Risk Assessment 3502-RAM-XX-XX-RP30101
SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

Rev	Description	Date	By	App
P02	REVISIONS AS CLOUDED	06.09.19	MJC/JFRW	SPT
P01	PRELIMINARY	28.06.19	MJC/JFRW	SPT
<p>Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA</p> <p>Drawing Title: LONGBIRD BRIDGE REPLACEMENT CONSTRUCTION SEQUENCE SHEET 1</p> <p>Status: PRELIMINARY</p> <p>Drawn: M.Cooper Date: JUNE 2019 Scale (at A1): AS SHOWN</p> <p>Drawing No.: 3502-RAM-LB-XX-DR-CB-30201 Rev: P02</p>				

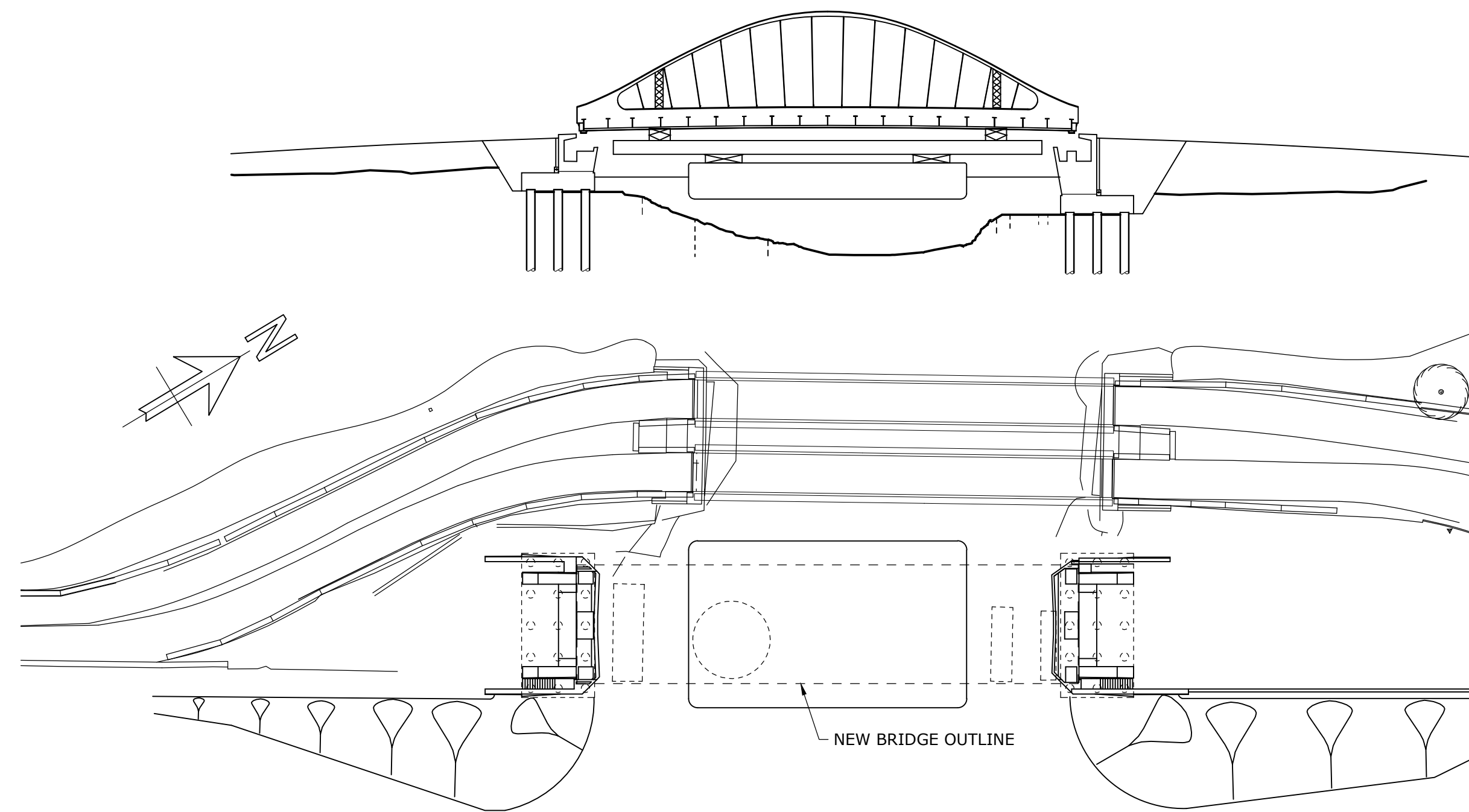


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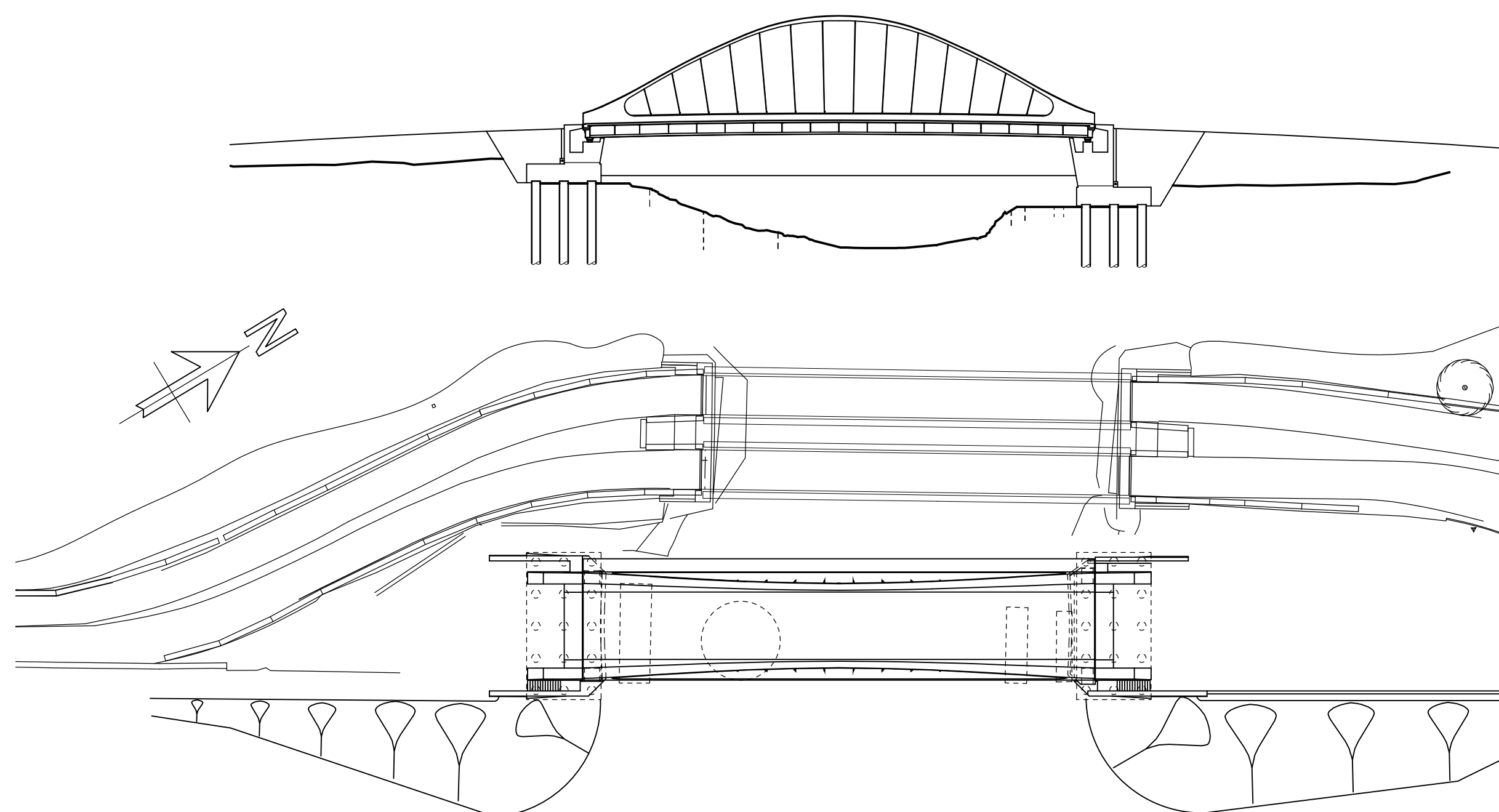


- STAGE 5**
- CONSTRUCT NORTH & SOUTH ABUTMENTS, WINGWALLS & DRAINAGE LAYERS.
 - CONSTRUCT ROCK EMBANKMENTS AND REINSTATE MASONRY WALL BEHIND ABUTMENT A2 (NORTH).
 - BACKFILL ABUTMENTS.
 - REMOVE TEMPORARY COFFERDAM & SILT SCREENS.

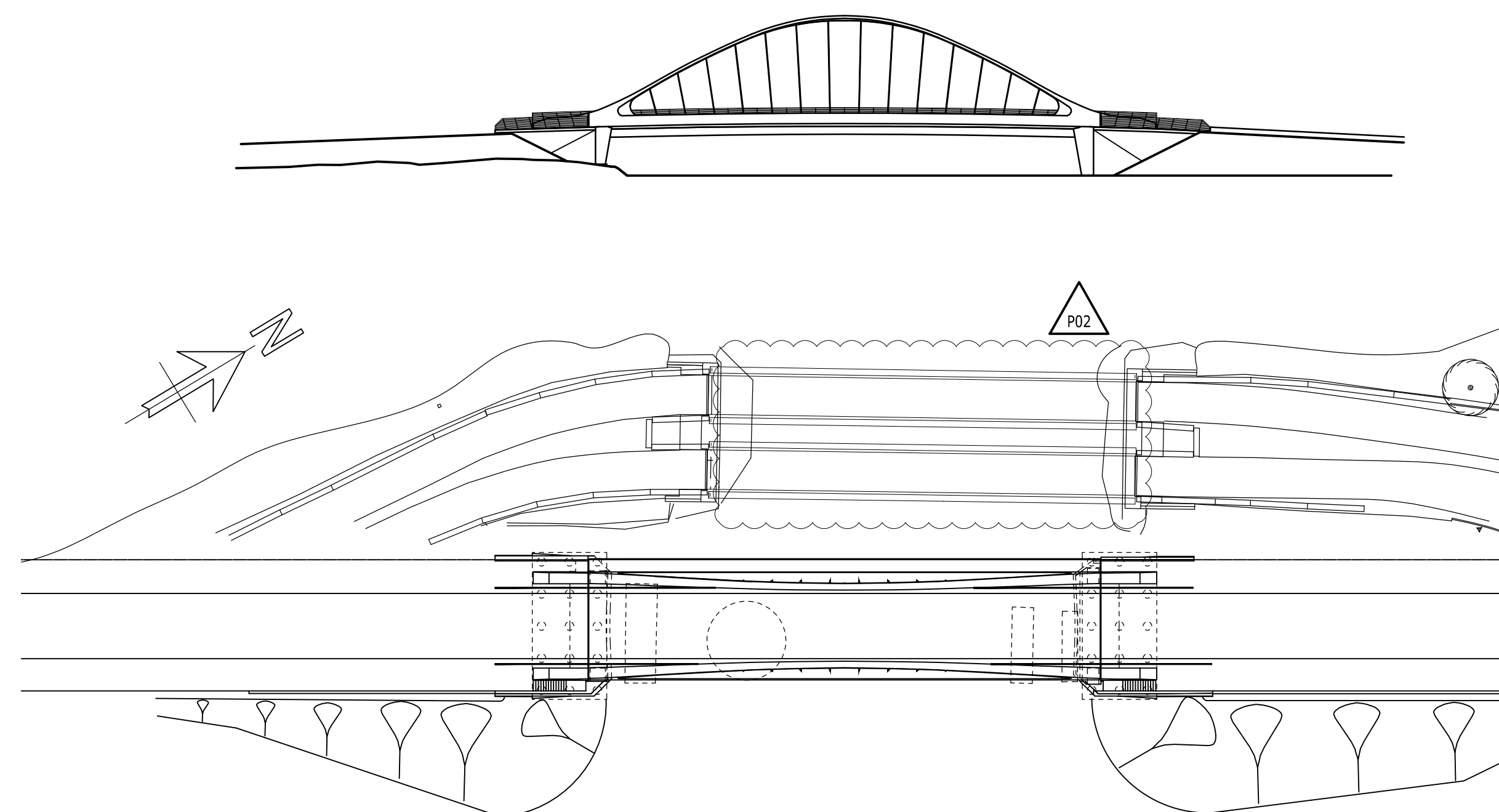
- STAGE 5A**
- STEEL SUPERSTRUCTURE FABRICATED OFF SITE.



- STAGE 6**
- STEEL SUPERSTRUCTURE TRANSPORTED TO SITE ON BARGE.
 - SUPERSTRUCTURE INSTALLED ONTO TEMPORARY BEARING/JACKING LOCATED @ JACKING POINTS.

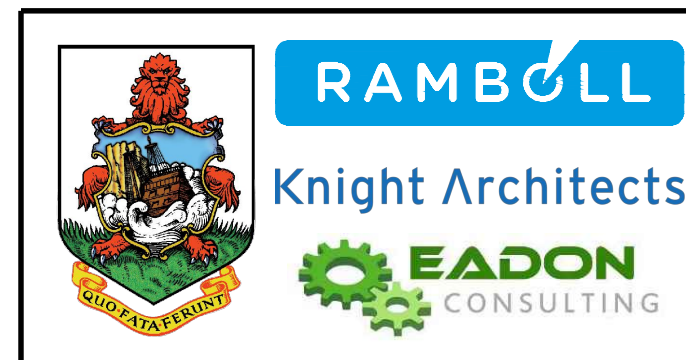


- STAGE 7**
- GROUT / COMPLETE BEARING INSTALLATION & TIE DOWN CONNECTIONS.
 - COMPLETE STEELWORK, IE REMOVE TEMP RESTRAINTS / SEA FASTENINGS.
 - INSTALL PERMANENT FORMWORK, REINFORCEMENT & DECK CONCRETE.



- STAGE 8**
- FINISH WATERPROOFING, EXPANSION JOINTS, SURFACING, DRAINAGE & PARAPETS.
 - OPEN BRIDGE TO TRAFFIC.

Rev	Description	Date	By	App
P02	REVISIONS AS CLOUDED	06.09.19	MJC	SPT
P01	PRELIMINARY	28.06.19	MJC	SPT



Project Title: REPLACEMENT OF SWING BRIDGE AND LONGBIRD BRIDGE, BERMUDA
 Drawing Title: LONGBIRD BRIDGE REPLACEMENT CONSTRUCTION SEQUENCE SHEET 2
 Drawn: M.Cooper
 Date: JUNE 2019
 Scale (at A1): AS SHOWN
 Drawing No.: 3502-RAM-LB-XX-DR-CB-30202

Rev	Description	Date	By	App
PRELIMINARY				
Status:				
Scale (at A1): AS SHOWN				
3502-RAM-LB-XX-DR-CB-30202				P02

Reference Documents
Specifications Table of Contents

Intended for
Government of Bermuda

Document type
Specification

Date
June, 2019

Document No.
3502-RAM-XX-XX-SP-CB-30111

Revision
P01

BERMUDA REPLACEMENT BRIDGES SPECIFICATION – CIVIL AND STRUCTURAL



Knight Architects



BERMUDA REPLACEMENT BRIDGES SPECIFICATION – CIVIL AND STRUCTURAL

Project name **Replacement of Swing Bridge and Longbird Bridge, Bermuda**
Project no. **1620003502**
Recipient **Government of Bermuda**
Document type **Specification- Civil and Structural**
Version **[N/A]**
Date **28/06/2019**
Prepared by **J Wharton**
Checked by **S Thompson**
Approved by **S Thompson**
Description **Preliminary**
Document No **3502-RAM-XX-XX-SP-CB-30111**
Revision **P01**

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Revision	Date	Prepared by	Checked by	Approved by	Description
P01	28/06/2019	JFRW	SPT	SPT	Preliminary

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CONTENTS

Preamble to the Specification	4
Specification for Highway Works Schedule of Pages and Relevant Publication Dates	6
Appendix 0/1: Contract-Specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in the Contract	8
Appendix 0/2: Contract-Specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract	12
Appendix 0/3: List of Contract Specific Numbered Appendices Referred to in the Specification and Included in the Contract	14
Appendix 0/4: List of Drawings Included in the Contract	22
Appendix 1/1: Temporary Accommodation and Equipment for the Overseeing Organisation	35
Appendix 1/4: Working and Fabrication Drawings	39
Appendix 1/5: Testing Carried out by the Contractor	42
Appendix 1/6: Supply and Delivery of Samples to the Overseeing Organisation	65
Appendix 1/7: Site Extent and Limitations on Use	66
Appendix 1/8: Operatives for the Overseeing Organisation	68
Appendix 1/9: Control of Noise and Vibration	69
Appendix 1/10: Permanent Works to be Designed by the Contactor	70
Appendix 1/12: Setting Out and Existing Ground Levels	71
Appendix 1/13: Programme of Works	72
Appendix 1/14: Payment Applications	75
Appendix 1/16: Privately and Publicly Owned Services and Supplies	76
Appendix 1/17: Traffic Safety and Management	77
Appendix 1/19: Routeing of Vehicles	78
Appendix 1/21: Information Boards	79
Appendix 1/22: Progress Photographs	80
Appendix 1/23: Risks to Health and Safety	81
Appendix 1/24: Quality Management System	82
Appendix 2/1: List of Buildings, etc. to be Demolished or Partially Demolished	85
Appendix 2/2: Filling of Trenches and Pipes	91
Appendix 2/3: Retention of Material Arising from Site Clearance	92
Appendix 2/5: Hazardous Materials	93
Appendix 3/1: Fencing Gates and Stiles	94
Appendix 4/1: Road Restraint Systems	95
Appendix 5/1: Drainage Requirements	98
Appendix 5/2: Service Duct Requirements	100

Appendix 6/1: Requirements for the Acceptability and Testing etc. of Earthworks Material	101
Appendix 6/2: Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials	106
Appendix 6/3: Requirements for Excavation, Deposition, Compaction (Other than Dynamic Compaction) etc.	107
Appendix 6/6: Fill to Structures	108
Appendix 6/7: Sub-formation and Capping and Preparation and Surface Treatment of Formation	109
Appendix 6/8: Topsoiling	111
Appendix 6/14: Limiting Values for Pollution of Controlled Waters	112
Appendix 6/15: Limiting Values for Harm to Human Health and the Environment	113
Appendix 6/71: Requirements for Revetments	114
Appendix 7/1: Permitted Pavement Options	124
Appendix 7/2: Excavation, Trimming and Reinstatement of Existing Surfaces	128
Appendix 7/4: Bond Coats, Tack Coats and Other Bituminous Sprays	132
Appendix 7/6: Breaking Up or Perforation of Existing Pavement	133
Appendix 11/1: Kerbs, Footways and Paved Areas	134
Appendix 12/1: Traffic Signs: General	136
Appendix 12/3: Traffic Signs: Road Markings and Studs	137
Appendix 12/5: Traffic Signs: Traffic Signals	138
Appendix 13/1: Information to be Provided When Specifying Lighting Columns	139
Appendix 14/1: Site Records	140
Appendix 14/2: Location of Lighting Units and Feeder Pillars	141
Appendix 14/3: Temporary Lighting	142
Appendix 14/4: Electrical Equipment for Road Lighting	143
Appendix 14/5: Electrical Equipment for Traffic Signs	144
Appendix 16/1: General Requirements for Piling and Embedded Retaining Walls	145
Appendix 16/6: Steel Bearing Piles	146
Appendix 16/8: Non-Destructive Methods for Testing Piles	148
Appendix 17/1: Schedule for the Specification of Designed Concrete	150
Appendix 17/3: Concrete – Surface Finishes	152
Appendix 17/4 : Concrete - General	153
Appendix 17/5: Buried Concrete	155
Appendix 18/1: Requirements for Structural Steelwork	156
Appendix 19/1: (Specification for Highway Works) Sheet No.	167
Appendix 19/3:	168
Appendix 19/4:	169
Appendix 19/5: General Requirements	171
Appendix 20/1: Waterproofing for Concrete Structures	172
Appendix 20/71: Waterproofing for Steel Structures	173
Appendix 20/72: Combined Waterproofing and Surfacing System	175
Appendix 21/1: Bridge Bearing Schedule	177
Appendix 23/1: Bridge Deck Expansion Joint Schedule	179
Appendix 23/2: Sealing of Gaps Schedule	180
Appendix 24/1: Brickwork, Blockwork and Stonework	181
Appendix 26/1: Ancillary Concrete	182

Appendix 26/2: Bedding Mortar	183
Appendix 30/1: Landscape and Ecology - General	184

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BERMUDA REPLACEMENT BRIDGES SPECIFICATION – ARCHITECTURAL



Knight Architects



BERMUDA REPLACEMENT BRIDGES SPECIFICATION – ARCHITECTURAL

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Table of Contents

A - General Requirements

E20 - Finishes To In Situ Concrete - Architectural Requirements

F10 - Block Walling

F30 - Accessories / Sundry Items For Brick / Block Walling

L13 - Louvres

L20 - Doors/ Shutters/ Hatches

L31 - Ladders

M20 - Plastered/ Rendered Coatings

M60 - Painting/ Clear Finishing

Q23 - Pavement Surfacing

Q41 - Barriers/ Guardrails

Z11 - Metalwork

Z20 - Fixings/ Adhesives

Z22 - Sealants

Z30 - Metalwork Finishes

Z31 - Powder Coatings

Z36 - Gaskets

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SWING BRIDGE REPLACEMENT, BERMUDA PARTICULAR SPECIFICATION

SWING BRIDGE REPLACEMENT, BERMUDA PARTICULAR SPECIFICATION

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CONTENTS

1.	DESCRIPTION OF PROJECT	4
1.1	Introduction	4
1.2	Definitions	4
1.3	Deviation from specification	4
1.4	Overriding Authority	4
1.5	Structure and Deck Construction	4
1.6	Mode of Operation	5
1.7	Ship Impact Restraint	5
1.8	Bridge Control Position	5
1.8.1	Machinery and Location of Operating Control and Mechanisms	5
2.	Contractor's scope of work	6
2.1	Design Status	7
2.1.1	Design Standards	8
2.1.2	Checking	9
2.1.3	Integration of Equipment	9
2.1.4	Special Tools	9
2.1.5	Reliability	9
2.1.6	Fault Conditions	10
3.	Performance Requirements	11
3.1	Design Life	11
3.2	Environmental Conditions	12
3.3	Operation	13
3.4	Control Philosophy	13
3.4.1	Automatic (Normal Operation)	13
3.4.2	Automatic (interlock override)	14
3.4.3	Manual/Maintenance	15
3.4.4	Emergency Recovery	15
3.4.5	Fault Log	15
3.5	Pendant	15
3.6	Behaviour under Fault conditions	16
3.7	Emergency stop System	16
3.7.1	Location of Emergency stop buttons	16
3.8	Sensing Requirements	16
3.9	Interlock Requirements	17
3.9.1	Interlock Override	17
3.10	Operator Authority	17
3.11	Additional Equipment	17
3.11.1	Plant Room Gland plate	17
3.11.2	Power Supply and Location	18
3.11.3	UPS/ Battery Backup	18
3.11.4	Lighting	18
3.11.5	Bridge Operation Warning System	18
3.11.6	Marine Navigation Signals	18
3.11.7	Navigation Obstruction Marker Lights	18
3.11.8	Clear Working Zones	18
3.11.9	Portable Tool Supply	18
3.11.10	Sump Pump Power Supply	18
3.11.11	Lightning Protection	18
3.11.12	Hydraulic Spill Kit	19

3.11.13	Signage	19
3.11.14	Fire Detection and Intruder Alarm System	19
4.	Plant Room	19
5.	Mechanical Equipment	20
5.1	Key Elements	20
5.2	General Principles	20
5.3	Pivot Assembly	20
5.4	Casting Process	21
5.4.1	Material Testing	21
5.4.2	Acceptance Levels For Magnetic Particle Inspection	21
5.4.3	Acceptance Levels For Ultrasonic Inspection	21
5.4.4	Repair of Defects Outside Acceptance Levels	22
5.4.5	Justification of Defects Outside Acceptance Levels	22
5.4.6	Surface Finish	22
5.4.7	Machined Features	23
5.5	Upper Cylinder Mount Assembly	23
5.6	Lower Cylinder Mount Assembly	23
5.7	Hydraulic Cylinder Installation	24
5.8	Nose Shock Absorber Assembly	24
5.9	Nose Lateral Bearing Pad Assembly	24
5.10	Corrosion protection specification	24
6.	Description of Electrical System	25
6.1	System Operation	25
6.2	Power Supply and Location	25
6.3	Bridge and Equipment Position Sensing	25
6.4	Uninterruptible Power Supply (UPS)	25
6.5	Operator Control Desk	25
6.6	Ancillary Electrical Equipment	26
6.6.1	Traffic Control Systems	26
6.6.2	Anemometer	26
7.	Hydraulic System	27
8.	Manufacture and construction phases	28
8.1	Works and Factory Acceptance Testing and Inspection	28
8.1.1	Mechanical	28
8.1.2	Electrical	28
8.1.3	Hydraulic	28
8.2	Commissioning	29
8.2.1	Pre-Commissioning	29
8.2.2	Initial Start Up	29
8.2.3	Control position considerations	29
8.3	Acceptance Testing	30
8.3.1	Post-Commissioning	30
8.4	Training	30
9.	Maintenance	31
9.1	Maintenance Period	31
10.	Documentation	31
11.	Manuals	32

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SWING BRIDGE REPLACEMENT, BERMUDA MECHANICAL SPECIFICATION

SWING BRIDGE REPLACEMENT, BERMUDA MECHANICAL SPECIFICATION

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CONTENTS

1.	Mechanical Specification	3
1.1	Introduction	3
1.2	Definitions	3
1.3	Deviation from specification	3
1.4	Documentation	3
1.5	Execution Class	4
1.6	Materials	4
1.7	Preparation	4
1.8	Fabrication Fit-up	5
1.9	Welding Requirements	5
1.9.1	General	5
1.9.2	Welding Quality Plan	5
1.9.3	Welder testing	5
1.9.4	Weld procedures	5
1.9.5	Weld Symbols	5
1.9.6	Weld Identification	5
1.9.7	Welding Processes	6
1.9.8	Welding consumables	6
1.9.9	Production Welding	6
1.9.10	Tack Welds	6
1.9.11	Temporary Attachments	6
1.9.12	Flame cutting and shearing	7
1.9.13	Straightening of Structural Members	7
1.10	Bolts, Nuts and Washers	7
1.11	Inspection and Non-destructive Testing (NDT)	7
1.11.1	General	7
1.12	Machining	8
1.13	Lubrication	8
1.14	Non-Compliance and Rejection	8
1.15	Corrosion Protection System	9
1.16	Handling	9
2.	Construction to Handover Stage	9

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CONTENTS

1.	Hydraulic specification	5
1.1	Introduction	5
1.2	Definitions	5
1.3	Design Life	5
1.4	Scope of the supply	5
1.5	Detailed Design of System	6
1.6	Hydraulic Fluid	7
2.	APPLICABLE STANDARDS AND DOCUMENTS	7
2.1	Documents	7
2.2	Design Codes	7
3.	KEY DATA	8
4.	SCOPE OF SUPPLY	8
5.	DESIGN	8
5.1	Hydraulic Circuit Design	8
5.2	Alternative Component Selection	9
5.3	Hydraulic Fluid	9
5.4	Noise Levels	9
5.5	Location of the Equipment	9
5.6	Hydraulic Equipment Design	9
5.6.1	Reservoir Assembly	9
5.6.2	Main Hydraulic Motor Pump Sets	11
5.6.3	Pilot Pumps	11
5.6.4	Control Valve Manifolds	11
5.6.5	Accumulators	12
5.6.6	Portable Hand Pump	12
5.6.7	Electrical Equipment	12
6.	HYDRAULIC PIPES, FITTINGS AND FLEXIBLE HOSES	12
6.1	Fixed Pipework	12
6.2	Flexible Hoses	13
6.3	Non Destructive Testing (NDT) of welded pipework	14
6.4	Pressure testing of pipework	14
6.5	Flushing of Pipework	14
6.6	Pipework sizes and lengths	14
6.6.1	Fixed Pipework	14
6.7	Hoses	16
6.8	Isolation Valves	16
7.	PROTECTIVE FINISH	17
7.1	General	17
7.2	Final Coat Colour	17
8.	DOCUMENTATION	17
8.1	Information to be issued as part of tender return	17
8.1.1	Nominated Sub-Contractors	17
8.1.2	Tender Information	17
8.2	Information to be issued directly after contract award	17
8.3	Manufacturing Documents	18
8.4	Handover Documentation	18
8.4.1	Operating and Maintenance manual (O&M)	18
8.4.2	Technical File	18
9.	TRAINING	19
9.1	Operator Training	19

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SWING BRIDGE REPLACEMENT, BERMUDA ELECTRICAL SPECIFICATION

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CONTENTS

1.	Electrical Specifications	4
1.1	Introduction	4
1.2	Definitions	4
1.3	Deviations from Specifications	4
1.4	Overriding Authority	4
1.5	Electrical design	4
1.6	Installation Documentation	5
1.7	Labour	5
1.8	Selection of Equipment	5
1.9	Power Supply and Location	6
1.9.1	Standby and Battery Backup Facilities	6
1.10	Cables	6
1.10.1	Cable Types	6
1.10.2	Cable Installation	6
1.10.3	Cable Identification	7
1.10.4	Size of Cores	7
1.10.5	Cable Segregation	7
1.11	Cable Containment	7
1.11.1	Cable Tray	8
1.11.2	Conduit	8
1.11.3	Cable Chain	8
1.11.4	Trunking	8
1.11.5	Cable Tray and Ladder Racking	9
1.11.6	Cable Runs within ducts	9
1.11.7	Cable Runs within Concrete Trenches	9
1.11.8	Excavation Reinstatement and Laying of Cables	9
1.12	Equipment	9
1.12.1	Junction Boxes	9
1.12.2	Distribution Boards	10
1.12.3	Motor Isolators	10
1.12.4	Socket Outlets	10
1.13	Earthing	10
1.14	Inspection and Testing	11
1.15	Control Panels	11
1.15.1	Standards	11
1.15.2	Technical Documentation	11
1.15.3	Construction	11
1.15.4	Protection	12
1.15.5	Equipotential Bonding	12
1.15.6	Interlocking Circuits	13
1.15.7	Control Equipment and Circuits	13
1.15.8	Identification of the Protective Conductors	14
1.15.9	Door Mounted Equipment	14
1.15.10	Electrical Components	17
1.15.11	Equipment Positions	17
1.15.12	Labels and Labelling	17
1.15.13	Verification	17
1.16	Pendants	17
1.17	Programme Logic Controllers (PLC)	18
1.18	Sensors	18

1.19	Portable Tool Supply	19
1.20	Emergency Lighting	19
1.21	Lighting Protection	19
2.	Construction to handover stage	19

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SWING BRIDGE REPLACEMENT, BERMUDA HYDRAULIC CYLINDER PURCHASE SPECIFICATION

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CONTENTS

1.	INTRODUCTION	2
2.	APPLICABLE STANDARDS AND DOCUMENTS	3
2.1	Drawings	3
2.2	Design Codes	3
3.	KEY DATA	4
4.	GENERAL	5
4.1	Hydraulic Fluid	5
4.2	Operation	5
4.3	Scope	5
5.	Design	5
5.1	General	5
5.2	Mode of Operation	6
5.3	Mounting Design	6
5.4	Bearing Life	6
5.5	Assembly Connections	6
5.6	Piston Seal Replacement	6
5.7	Rod Seal Leakage	6
5.8	Lifting Points	6
5.9	Earthing Point	7
6.	MATERIALS	7
6.1	General	7
6.2	Cylinder Rods	7
6.3	Cylinder Barrels	7
7.	MANIFOLD ASSEMBLIES	7
7.1	Manifold Blocks	7
7.2	Valves	7
7.3	Pipework	8
8.	EXTERNAL PROTECTION	8
9.	TESTING	8
9.1	Non Destructive Testing (NDT)	8
9.2	Hydrostatic Testing	8
10.	Documentation	9
10.1	Design Documents	9
10.2	Manufacturing Documents	9
10.3	Certified Documentation	9
11.	Packing	9

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SWING BRIDGE REPLACEMENT, BERMUDA CABLE SCHEDULE

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SWING BRIDGE REPLACEMENT, BERMUDA ELECTRICAL INPUT AND OUTPUT LIST

SWING BRIDGE REPLACEMENT, BERMUDA ELECTRICAL INPUT AND OUTPUT LIST

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SWING BRIDGE REPLACEMENT, BERMUDA PLC & HMI SOFTWARE



Knight Architects



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CONTENTS

1.	Introduction	6
1.1	Document Status	6
1.2	Project Overview	7
1.3	Process Overview	7
1.3.1	Standard Operation	7
1.3.2	Process Flowchart	9
1.3.3	Sensor Override Operation	9
1.3.4	Maintenance Operation	9
1.4	Control System Overview	10
1.4.1	Safety System	10
1.4.2	Fixed Speed Drives	10
1.4.3	Encoder	10
1.4.4	PLC	10
1.4.5	Control Desk	12
1.4.6	Uninterruptible Power Supplies	13
1.4.7	Ethernet/IP	14
2.	Safety System	16
2.1	Overview	16
2.2	Emergency Stop Pushbuttons	16
2.3	Pilz Safety Relay	16
2.4	Stopping and Immobilisation	17
3.	Functional Model	18
3.1	Standard Functionality	18
3.1.1	Digital Devices	18
3.1.2	Analogue Inputs	19
3.1.3	DOL Motors	20
3.1.4	SMC Flex Soft Start Drives	21
3.1.5	Traffic Barriers	22
3.1.6	Sump Pumps	24
3.1.7	Push Button Confirmation	24
3.2	Alarm configuration	25
3.2.1	Alarm Types	25
3.2.2	Alarm List	25
4.	Hydraulic Control	28
4.1	Overview	28
4.2	Proportional Flow Control	28
4.3	Pilot Pumps Control	29
4.3.1	Pilot Pump Interlocks	30
4.4	Main Pumps Control	31
4.4.1	Main Pump Interlocks	33

4.5	Cylinder Monitoring and Control	33
4.6	Raise Bridge Hydraulic Control	34
4.7	Lower Bridge Hydraulic Control	36
4.8	Solenoid Operation Charts	37
5.	Process Functionality	39
5.1	Interlocks	39
5.1.1	General Movement Enable	39
5.1.2	Bridge Lowered Interlock	39
5.1.3	Wind Speed Interlock	39
5.1.4	Maintenance Control Interlock	39
5.1.5	PLC System Healthy Interlock	40
5.2	Traffic Light Operation	40
5.3	Warning Klaxon	41
5.4	Traffic Barriers	43
5.5	Bridge Movements	45
5.5.1	Hydraulic System Control	45
5.5.2	Bridge Position Status	46
5.5.3	Bridge Movement Commands	47
5.5.4	Raise Bridge	48
5.5.5	Lower Bridge	49
5.6	Sensor Override	50
5.6.1	Override Sensors	50
5.6.2	Alarms	50
5.7	Maintenance Operation	51
5.7.1	Overview	51
5.7.2	Interlocks	51
5.7.3	Control	51
5.7.4	Alarms	52
6.	HMI Requirements	53
6.1	Introduction	53
6.2	HMI Overview	53
6.2.1	Hardware	53
6.2.2	System Start-up and Shutdown	53
6.2.3	User Accounts	53
6.2.4	Screen Layout	53
6.2.5	HMI Colour Schemes	54
6.3	HMI Screens	54
7.	THE ABOVE IS SUBMITTED FOR ACCEPTANCE	56
8.	THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW	57

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SWING BRIDGE REPLACEMENT, BERMUDA INSPECTION AND MAINTENANCE SCHEDULE

SWING BRIDGE REPLACEMENT, BERMUDA INSPECTION AND MAINTENANCE SCHEDULE

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CONTENTS

1.	DESCRIPTION OF PROJECT	4
1.1	Introduction	4
2.	COMPLIANCE WITH INSTRUCTIONS IN THIS MANUAL	4
3.	GENERAL SAFETY INSTRUCTIONS	5
3.1	Authority	5
3.2	Isolating	5
3.3	Lifting	5
3.4	Lighting	5
3.5	Important Notice	5
4.	GENERAL SAFETY ADVICE	5
4.1	Guidance notes for users on the safety of personnel	5
4.2	Installation, operation and maintenance	6
5.	GENERAL HAZARDS	6
6.	GUIDANCE NOTES FOR USERS ON THE SAFETY OF PERSONNEL USING ELECTRICAL APPARATUS	8
7.	DESIGN AND CLASSIFICATION OF THE EQUIPMENT	8
7.1	Location of works	8
7.2	Preface	8
7.3	General	8
7.4	Bridge performance	9
7.5	Design Life	9
7.6	Mechanical design	10
7.7	Environmental Conditions	11
8.	DESCRIPTION OF THE MECHANICAL EQUIPMENT	11
8.1	Key Elements	11
8.2	Pivot Assembly	11
8.3	Upper Cylinder Mount Assembly	12
8.4	Lower Cylinder Mount Assembly	13
8.5	Nose Shock Absorber Assembly	14
8.6	Nose Lateral Bearing Pad Assembly	14
8.7	Traffic Signals and Barrier Assembly	15
8.8	Cylinder Cast-in Restrain Brackets	16
9.	OPERATING PROCEDURES	16
10.	MECHANICAL ROUTINE MAINTENANCE AND LUBRIFICATION	16
10.1	Mechanical lubrication schedule	16
10.2	M & E support steelwork paintwork repair	16
10.3	Mechanical Maintenance Schedule	17
11.	RECOMMENDED SPARE	19
12.	TEST CERTIFICATES	20
13.	DESIGN AND CHECK CERTIFICATES	21
14.	MANUFACTURES' LITERATURE	22
15.	OPERATORS' MANUAL	23

LIST OF ABBREVIATIONS

BS	British Standard
CDM	Construction Design and Management
COSHH	Control of substances hazardous to health
EMC	Electromagnetic Compatibility
FMEA	Failure mode and effects analysis
HMI	Human machine interface
NDT	Non-destructive testing
O&M	Operation and Maintenance
PCN	Personnel certification in non-destructive testing
PED	Pressure Equipment Directive
PLC	Programmable logic controller
UPS	Uninterruptible power supply

TABLE OF FIGURES

Figure 1 : Pivot bearing assembly	12
Figure 2: Upper cylinder mount assembly	12
Figure 3: Lower cylinder mount assembly	13
Figure 4: Shock absorber assembly	14
Figure 5: Nose lateral bearing pad assembly	14
Figure 6: Traffic signals and barrier assembly	15
Figure 7: Cylinder cat-in restrain brackets	16

TABLES

Table 1: Bridge Performance Requirements	9
Table 2: Design Life Expectation	10
Table 3: Classification of the bridge mechanism to BS 2573-2	10
Table 4: Environmental Parameters	11
Figure 1 : Pivot bearing assembly	12
Figure 2: Upper cylinder mount assembly	12
Figure 3: Lower cylinder mount assembly	13
Figure 4: Shock absorber assembly	14
Figure 5: Nose lateral bearing pad assembly	14
Figure 6: Traffic signals and barrier assembly	15
Figure 7: Cylinder cat-in restrain brackets	16
Table 5: Mechanical lubrication schedule.	16
Table 6: Maintenance Schedule	18

APPENDICES

Appendix 1

Hydraulic O&M Manual

Appendix 2

Electrical O&M Manual