



GOVERNMENT OF BERMUDA

MINISTRY OF PUBLIC WORKS

Volume 2 Part 2

Particular Specification

Swing Bridge, Bridge Deck Interim Repairs

St Georges

Department of Works and Engineering

March, 2016

General

1.1 Work Covered By Contract Documents

Project Identification: *Project consists of the localized strengthening of cross beam connections to main girders and bracing.*

Project Location: *Swing Bridge St. Georges Parish, Bermuda.*

Owner: *Ministry of Public Works,
56 Church Street,
Hamilton,
Bermuda HM12.*

Engineer: *The Ministry of Public Works,
56 Church Street,
Hamilton,
Bermuda HM12.*

1.2 Brief Description of the Works

A. The Works consists of:

1. Inspection and preparation of steel connections to receive strengthening repairs.
2. Fabrication of steel strengthening plates.
3. Installation of steel connection strengthening measures.

For the purpose of determining a lump sum price this tender shall be priced on the assumption of the following quantity of works:

- Type 1: Outer Cantilever Connection: 5 number
- Type 2: Main Girder Connection: 10 number
- Type 3: Inner Connection: 5 number

1.3 Form of Contract

A. Project will be constructed under the FIDIC Short Form of Contract First Edition 1999.

1.4 Contract Method of Measurement

A. Construct the Work under a lump sum contract, with fixed prices for each of the three types of repair in 1.2 above.

- B. The lump sum shall be determined based on the number of repairs stated in this document and variations will be appraised on a change in the integer number of repairs.
- C. All work detailed within these documents shall be covered completely within the lump sum price submitted.
- D. Unit rates are all-inclusive and include all labour, equipment and materials and ancillary measures necessary to complete each task. If a specific task is not identified separately the Contractor shall assume that it is included as part of another related listed item or items, and shall base his price on this assumption.

1.5 Work Sequence

- A. Contractor shall schedule the works coordinating all tasks and elements.

1.6 Contractor Use Of Site

- A. Ascertain boundaries of Site within which work must be confined.
- B. Use of Site is to be coordinated through the Ministry of Public Works.

Drawings And Specifications Furnished

1.7 Owner Responsibilities:

Provide 2 paper and 1 electronic copy of drawings and specifications to Contractor.

- C. Drawing List:
 - MMD-353865-C-SK-00-XX-001 – Swing Bridge Cross Beams Interim Repairs
 - MMD-353865-C-SK-00-XX-02 – Swing Bridge Cross Beams Interim Repairs Plate Details

1.8 Contractor Responsibilities:

- A. Pay for additional copies of drawings and specifications if required.
- B. Maintain at Site one complete set of up to date drawings and specifications. Make available to Engineer at any time.

1.9 Supplementary Drawings

- A. Engineer may furnish supplementary drawings to assist proper execution of work. Such drawings will be issued for clarification only and will have same meaning and intent as if included with plans referred to in Contract Documents.

END OF SECTION 01010

- **General**

1.1 Utilities and services

- A. Existing cables and utility services are known to exist within the site.
- B. The contractor is responsible for locating and protecting these and any possible other services within the works area.

1.2 Setting out Stations

- A. Not Applicable.

1.3 Setting out and dimensions

- A. Upon taking possession of the site, the Contractor shall identify all repairs with the Engineer.
- B. The contractor shall verify all dimensions on the contract drawings through site measurement prior to fabrication with the use of site templates if deemed necessary.
- C. The Contractor shall be solely responsible for the accurate measurement of dimensions on site and fabrication of all elements to suit.

END OF SECTION 01050

- **General**

- 1.1 **Use Of Site**

- A. Do not disturb portions of site beyond areas in which the Work is required below the bridge deck.
 - B. Keep bridge deck carriageway clear and unobstructed to single lane traffic flow at all times except with expressed permission in writing from the Engineer.

- 1.2 **Working Hours**

- A. Normal working hours shall be Monday to Saturday 8.00am through to 6.00pm and Sunday working shall be permitted within the hours of 9.00am and 6.00pm.
 - B. Exceptional working hours shall be agreed with the Engineer for final tightening of bolts.

END OF SECTION 01140

- **General**

1.1 Required Submittals

A. The Contractor shall submit the following documents to the Engineers Representative:

- Schedule of Work
- Construction Method Statements
- Steel plate fabrication drawings
- Construction Safety and Health Risk Assessments
- Environmental Method Statements
- Samples
- Certificates

1.2 Administration

- A. Provide to the Engineer for review the submittals specified. Submit with reasonable promptness and in an orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- B. Do not proceed with Work affected by the submittal until review is complete.
- C. Review submittals prior to submission to the Engineer. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the Work and Contract Documents. Submittals not stamped, signed, dated and identified as to the specific project will be returned without being examined and will be considered rejected.
- D. Verify that field measurements and affected adjacent Work are coordinated.
- E. Contractor's responsibility for errors and omission in submission is not relieved by Engineer review of submittals.

Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer review.

F. Keep one review copy of each submission on Site.

1.3 Schedule Of Work

A. Prepare schedule in the form of a linked bar chart. All events, activities and constraints shall be numbered and shall be given a title. Details to be given for each event, activity or constraint should include:

- its title
- its scheduled start and finish dates
- its duration
- any relevant "must" start or finish dates

B. Provide a separate bar for each event, activity, operation or constraint, show proposed progress of all activities. Where applicable, indicate labour, construction crews, plant and equipment to be employed.

C. The key milestones in the construction process shall also be identified. Schedule milestones will include but not be limited to the following:

- Start of construction
- Placement of orders for critical equipment items
- Delivery dates (to site) for critical equipment items
- Final handover (final completion)

D. Revise and resubmit schedule every two weeks to reflect actual progress of the Works.

E. With schedule updates, provide written explanations to Engineer as to why previously reviewed schedule is not being met (if applicable).

F. Show changes in operations proposed (if required), to complete construction works within Contract Time.

G. No progress payments will be approved until receipt of schedule updates acceptable to the Engineer.

1.4 Method Statements

- A. Provide Method Statement for each key activity and additionally as requested by Engineer, to show construction methods, equipment and general methodology for carrying out the Work. Relate Method Statement to activities shown on Construction Schedule.
- B. Method Statements shall identify, among other things:
- Sequencing of works
 - Plant and equipment to be utilised for the task
 - Labour resources to be used for the task
 - Methods to ensure appropriate environmental protection
 - Other key tasks as specified in the Contract Documents, and/or as requested by the Engineer.

1.5 Certificates

- A. Within 10 working days after award of Contract, submit certificates of insurances.

END OF SECTION 01300

- **General**

- 1.1 **Environmental Measures**

- A. Meet or exceed the requirements of all Bermuda environmental legislation and regulations, including all amendments up to project date provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.

- **Execution**

- 2.1 **Fires**

- A. Fires and burning of rubbish on site will not be permitted.

- 2.2 **Disposal of Arisings**

- A. Collect all rubbish and waste material and dispose of in accordance with the latest editions of the Ministry of Public Works Waste Management Plan.

- 2.3 **Work In Or Adjacent To Water**

- A. Works performed in and around water will be carried out in accordance with regulations of Bermuda authorities having jurisdiction.
 - B. Install temporary enclosures, screens, traps or other devices to prevent any excess concrete or other construction materials, waste materials or debris falling into the water.
 - C. Remove immediately any solid object inadvertently dropped into the water. On conclusion of construction, dispose of all debris to prevent its entry into the water.
 - D. Re-fuelling of machinery must take place at a safe distance from the water under methods approved by the Engineer.

- 2.4 **Drainage**

- A. Provide temporary drainage and pumping as necessary to keep site free from water. Do not pump water containing suspended materials into waterways, sewer or drainage systems. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Bermuda authority requirements.

2.5 Environmental Protection

- A. When, in opinion of Engineer, negligence of Contractor results in damage or destruction of local flora and or fauna, or other environmental or aesthetic features beyond work areas as shown on contract drawings, the Contractor shall be responsible, at his expense, for complete restoration including replacement to satisfaction of Engineer.

2.6 Pollution Control

- A. Control emissions from equipment and plant to Bermuda authorities' emission requirements.
- B. Prevent extraneous materials from contaminating air, land or water, by vacuum, temporary enclosures, screens, traps or other devices.
- C. Spills of deleterious substances should be immediately contained and cleaned up in accordance with provincial regulatory requirements. Spills should be reported forthwith to the Engineer.

2.7 Storage And Handling Of Fuels And Dangerous Fluids

- A. Locate fuel storage facility a minimum of 100 m from any water body in an area approved by the Engineer and construct impermeable dykes so that any spillage is contained.
- B. Prevent spillage of gasoline, diesel fuel and other oil products into the water and on land. Clean up spills promptly at own cost in accordance with Bermuda regulatory requirements. Report any fuel spills immediately to Engineer.
- C. Proper use of primers, grouts, bonding adhesives and other hazardous substances will be undertaken to prevent their entry into the water. Substances are to be stored and mixed on protected surfaces away from site to prevent their entry into waterways and contamination of soils.
- D. Collect and dispose of used oil filter cartridges and other products of equipment maintenance at industrial waste facility to satisfaction of Engineer.

2.8 Protection

- A. The Contractor shall provide the protection necessary to prevent damage to existing properties, and shall protect existing trees and vegetation which are to remain.

2.9 Disposal

- A. All materials arising from site clearance which are surplus to or unsuitable for use in the works shall be disposed of by the Contractor to approved tipping areas or as directed by the Engineer's Representative.

END OF SECTION 01561

- **General**

1.1 Preparatory Work

Install adequate safe working platforms or similar as required to undertake the works

Install adequate measures to the working area to contain debris or loose paint from entry to the watercourse and for subsequent removal from site.

1.2 Corrosion Survey

A corrosion survey is to be carried out on the existing cross girders at the connection locations to determine if:

- a) bottom flange trigger level of 3.75mm is exceeded;
- b) web trigger level of 3.75mm at connection Types 1 and 2 is exceeded;
- c) web trigger level of 5.25mm at the inner connection point Type 3 is exceeded;
- d) top flange trigger level of 4.25mm is exceeded.

1.3 Survey methodology:

Undertake preparatory works as noted in para 1.1 above
Systematically clean (down to sound metal) and measure the residual section thicknesses of each cross beam at the node points:

- Interface between cross beam bottom flange/diagonal bracing
- Interface between cross beam bottom flange/main girder top flange
- Cross beam bottom flange at mid span.

Determine if the measurements fall outside trigger levels of assumed values a, b and c above.

Agree strengthening as required with the Engineer.

In the event that the measurements surveyed for the top flange and the web as less than those noted above the Engineer will provide further instruction. This will be considered a variation to the works.

- **Installation**

2.1 Surface Preparation

- A. Pressure wash local area for repair.
- A. Prepare surface using a needle gun or similar to achieve St 2 (Swedish SIS 05 5900 Standard) surface cleanliness. This is the equivalent of the American SSPC Standard SSPC – SP2.

For the purpose of this specification St 2 or SP2 is defined as:

‘Free from visible oil grease and dirt and from poorly adhering mill scale, rust, varnish coating and foreign matter.’

- B. The Contractor shall bring the thickness of the flange to a consistent level across its full width using structural filler. Devcon Epoxy Putty A (steel filled epoxy putty) or similar approved

2.2 Strengthening Installation

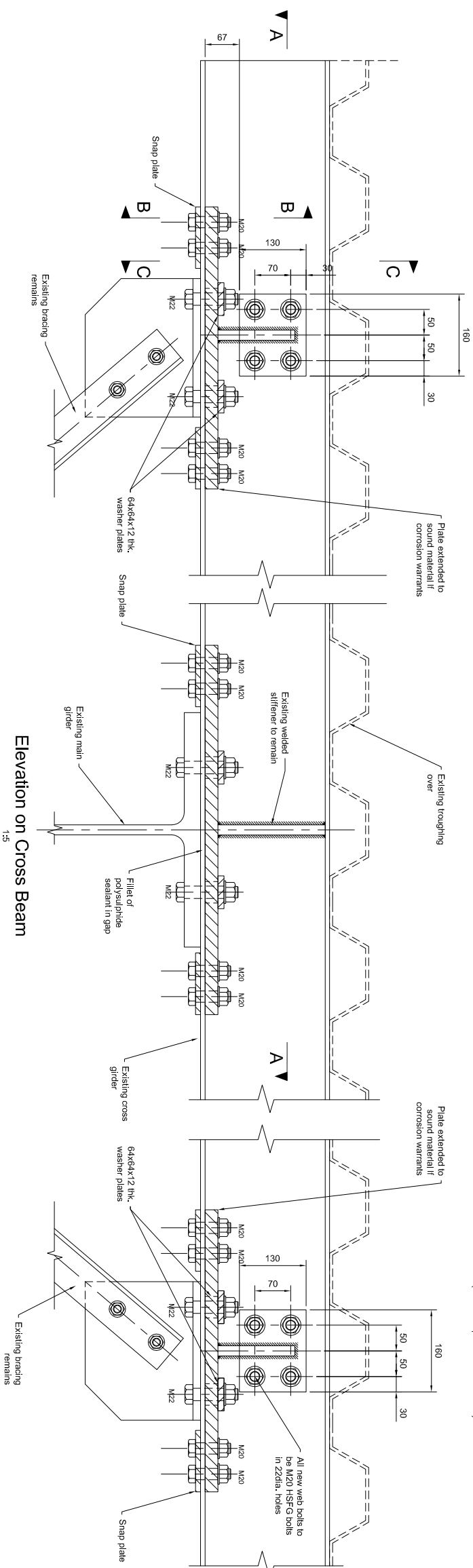
- A. In each location identified and agreed with the Engineer install strengthening:
 - Type 1: Outer Cantilever Connection
 - Type 2: Main Girder Connection
 - Type 3: Inner Connection

as appropriate.

- B. The Contractor shall undertake site measurements and precut all elements to ensure quick and easy installation

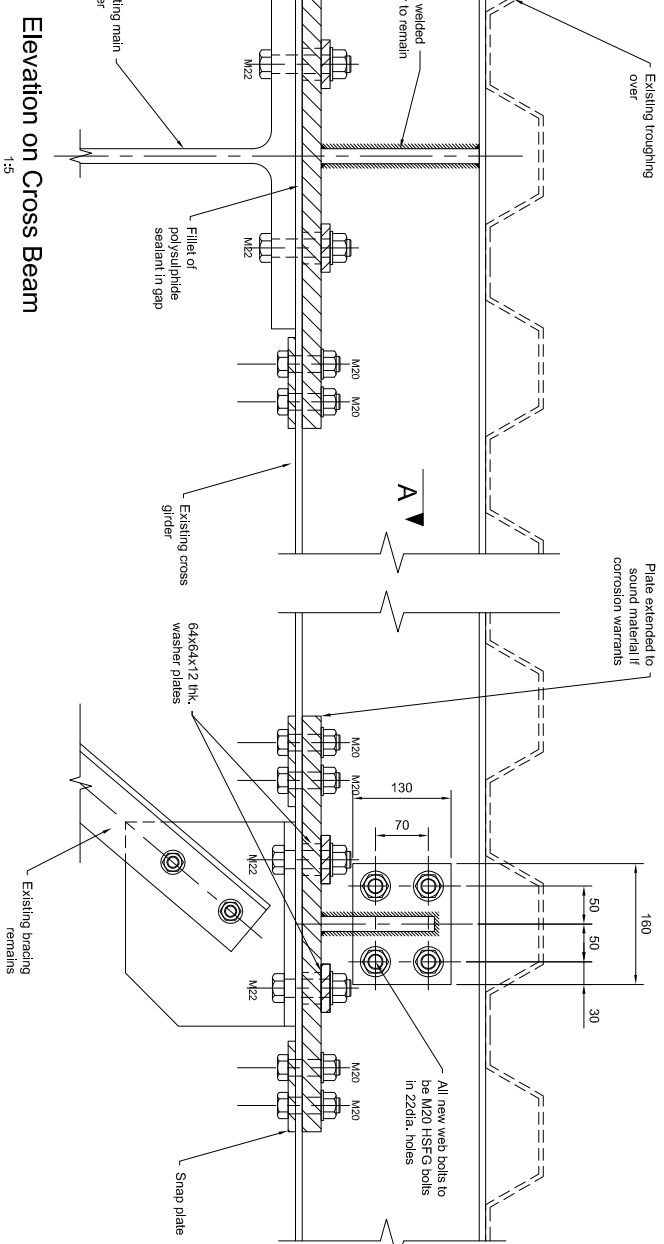
END OF SECTION 05500

Outer Cantilever Connection



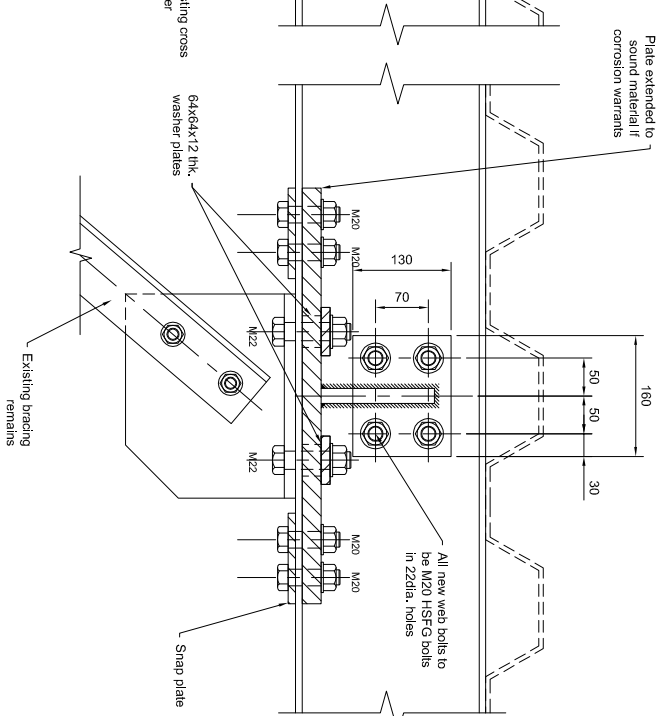
Main Girder Connection

See Note 7



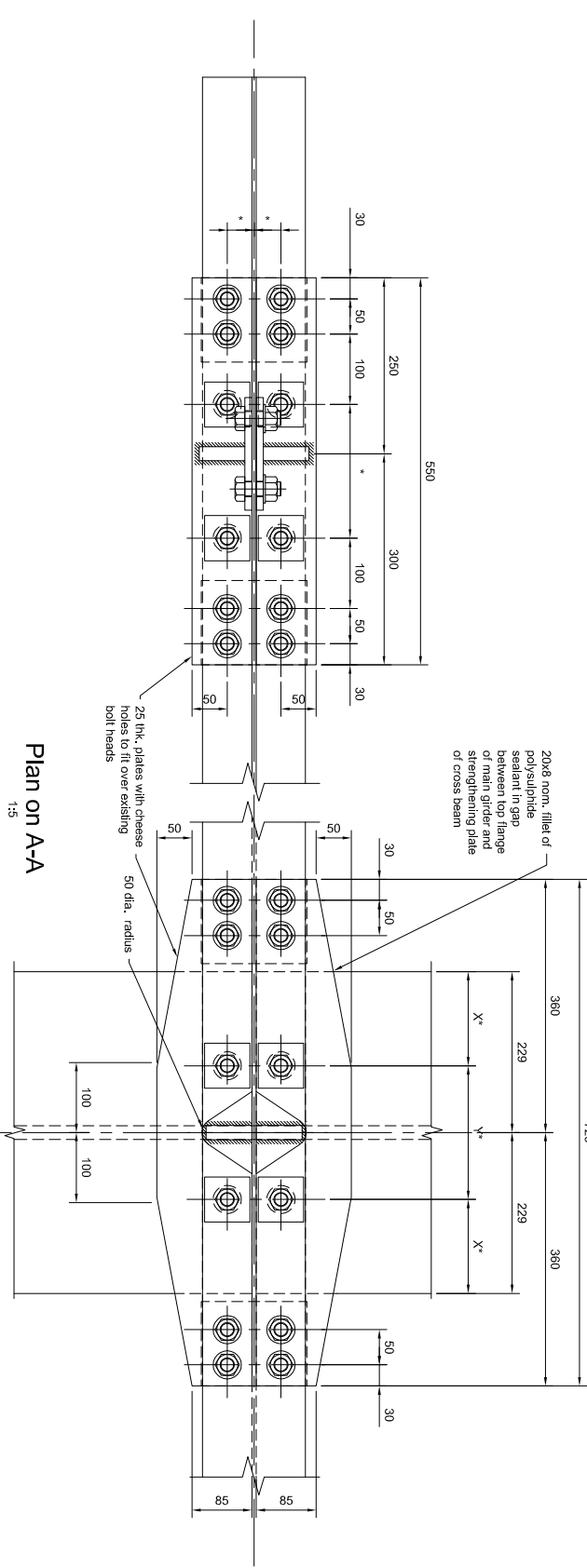
Inner Connection

(Details as per Outer Connection)



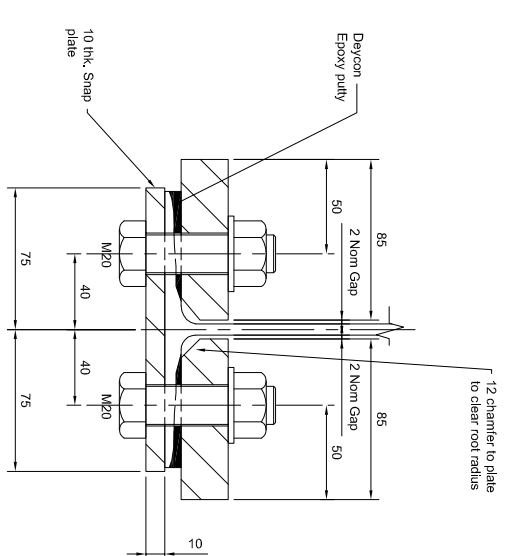
Elevation on Cross Beam

1:5



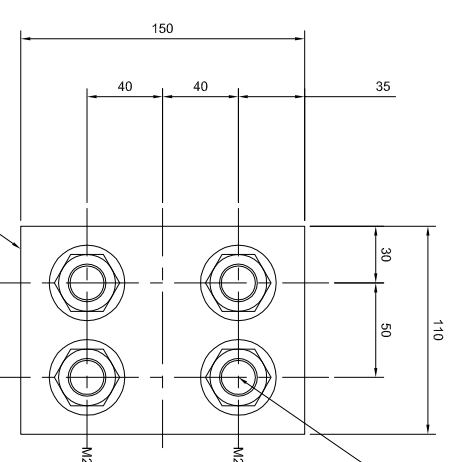
Plan on A-A

1:5



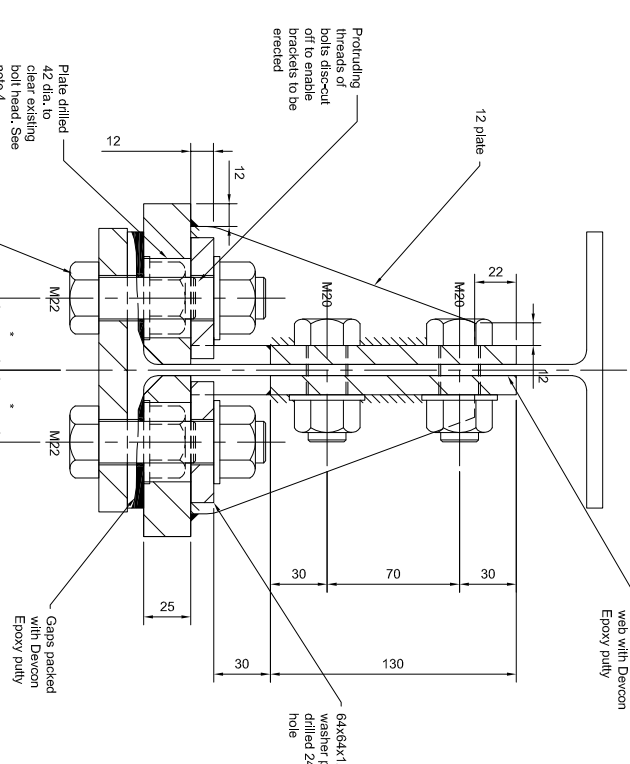
Section B-B

1:2



Plan on Snap Plate

1:2



Section C-C

1:2

Notes

- All New steelwork to be min. 355N/mm² yield stress.
- All new bolts to be HSPG M22 dia. (existing holes) and M20 (new holes).
- All HSPG and nuts to be general grade filled with load indicating washers. Hole dia for 20 dia. bolts to be 22 dia.
- Cheese holes in 25th plate assume no washers to existing bolts. Hole dia. to be increased from 42 dia. to suit existing situation as necessary (50 max).
- All dimensions marked * to be checked on site.
- All welds to be 6FW continuous.
- Existing connection between cross girder and main girder not known in detail. Bolt centres X and Y to be measured prior to fabrication.
- Existing cross girder is a 10" x 6 1/2" x 21lb/ft beam with the following dimensions:
 - 251.46mm deep
 - 146.0mm wide
 - 8.64mm HK flanges
 - 8.10mm HK web

Procedure:

- Drill 22dia. holes in cross girder flange and web to receive M20 bolts.
- Apply Devcon putty to beam as required to provide level bearing surfaces for new steelwork.
- Fit 25th plates over existing bolt heads and bolt to flange and webs.
- Remove and replace existing 6" (22) dia. bolts one at a time commencing where flange is thinnest.
- Repeat for remaining 3 No. 6" bolts at each connection

Reference drawings

Rev	Date	Drawn	Description	CHK'd	App'd
P1	-	KEK	Preliminary	AB	TA
Rev	Date	Drawn	Description	CHK'd	App'd



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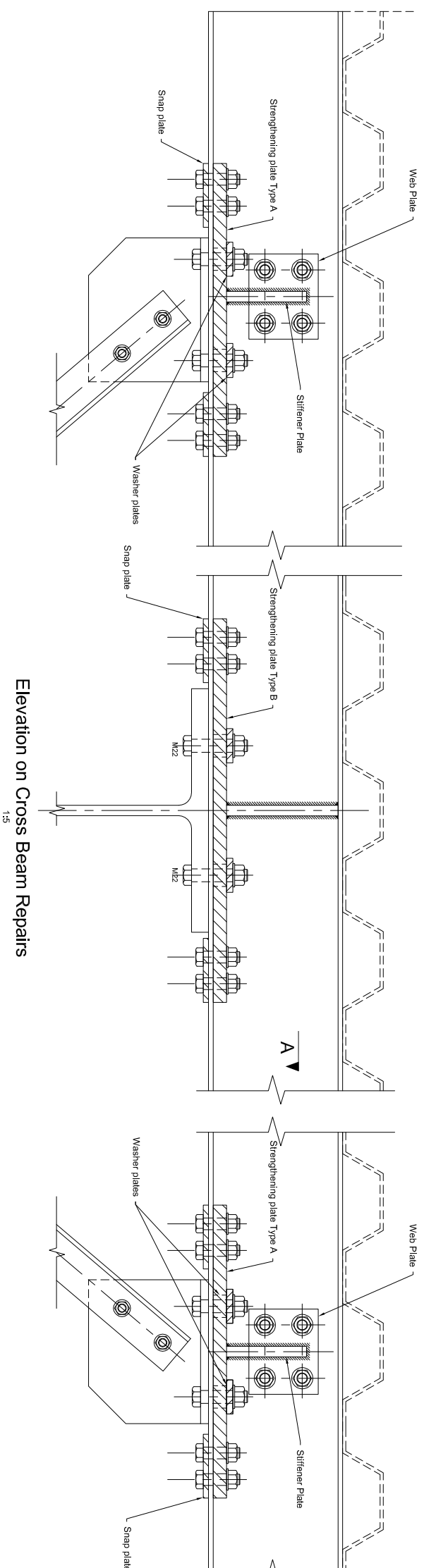
Title
Swing Bridge, St. George's
Bermuda
Swing Bridge Cross Beams
Interim Repairs

As Shown	PRE	Rev	P1	Security
Designed	R. Hickman	Eng check	A. Bance	
Drawn	K. Kidd	Coordination	S. Robinson	
Dwg check	S. Robinson	Approved	T. Abbott	
Scale at A1		Status		
As Shown	PRE	Rev	P1	STD
Drawing Number	MMD-353865-C-SK-00-XX-001			

Repair Type 1 - Outer Connection

Repair Type 2 - Main Girder Connection

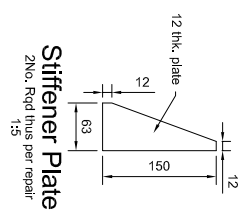
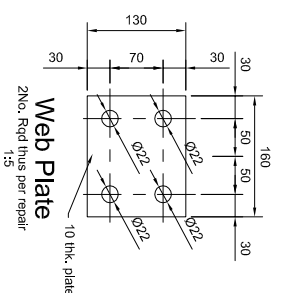
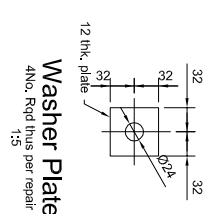
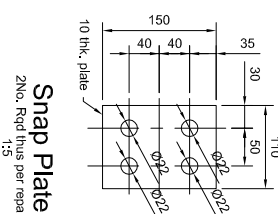
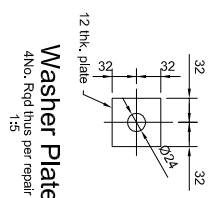
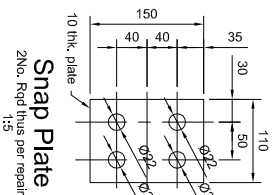
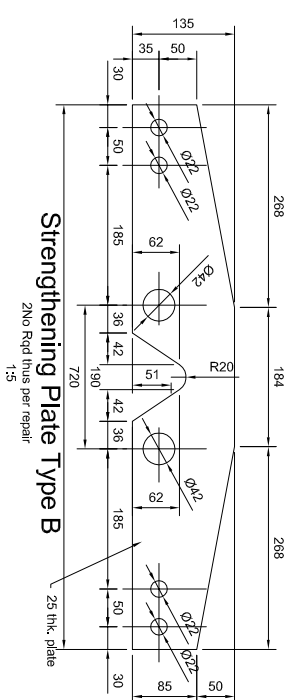
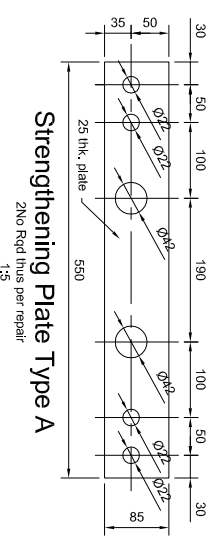
Repair Type 1 - Inner Connection
(Details as per Outer Connection)



Elevation on Cross Beam Repairs
1:5

REPAIR TYPE 1
(OUTER & INNER CONNECTION)

REPAIR TYPE 2
(MAIN GIRDER CONNECTION)



- Notes
1. This drawing to read in conjunction with MMD-353865-C-SK-00-XX-001
 2. Steel fabricator is to confirm and dimensions by a site survey prior to fabrication of plates
 3. Contractor is to confirm the number of each repair required

Reference drawings

Rev	Date	Drawn	Description	CHK'd	App'd
P1	-	SR	Preliminary	AB	TA



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Title
Swing Bridge, St. George's
Bermuda
Swing Bridge Cross Beams
Interim Repairs
Plate Details

Designed	R. Hickman	Eng check	A. Bance
Drawn	K. Kidd	Coordination	S. Robinson
Dwg check	S. Robinson	Approved	T. Abbott
Scale at A1	Status	Rev	Security
As Shown	PRE	P1	STD
Drawing Number	MMD-353865-C-SK-00-XX-002		