Annex D

Watford Bridge – Waterproofing and Expansion Joint Replacement

General Requirements and Construction Specifications

GENERAL REQUIREMENTS

Part 1 GENERAL

1.1 Work Covered By Contract Documents

.1 Project Identification:

This project consists of the supply and installation of a waterproofing membrane on a prepared concrete bridge deck, supply and installation of expansion joints, sidewalk covers and joint fillers.

.2 Project Location:

Watford Bridge, Bermuda**.**

.3 Project Owner:

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

.4 Project Engineer:

Ministry of Public Works,
Department of Works and Engineering
3rd Floor, 56 Church Street,
Hamilton, Bermuda, HM12**.**

1.2 Form of Contract

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

1.3 Work Sequence

.1 Contractor shall schedule the works coordinating all tasks and elements.

1.4 Contractor Use of Site

.1 Ascertain boundaries of Site within which work must be confined.

.2 Use of Site is to be coordinated through the Ministry of Public Works.

1.5 Drawings and Specifications Furnished

.1 Owner Responsibilities:

.1 One electronic copy of drawings and specifications to Contractor.

.2 Contractor Responsibilities:

.1 Pay for additional copies of drawings and specifications if required.

.2 Maintain at Site one complete set of up to date drawings and specifications. Make available to Engineer at any time.

1.6 Supplementary Drawings

.1 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 GENERAL REQUIREMENTS SECTION

SCOPE OF WORK

Part 1 General

.1 The Works consists of:

.1 Coordination of works with Works and Engineering crews

.2 Removal of existing bridge kerbs; careful removal of the existing bridge deck surfacing and waterproofing membrane. Associated repairs to the concrete bridge deck if necessary,

.3 Removal of a portion of the concrete sidewalk,

.4 Removal of the existing expansion joints and associated repairs to concrete deck and joint bed,

.5 Supply and installation of new bridge deck waterproofing membrane system,

.6 Protection of the waterproofing membrane when the new asphalt pavement is being placed by Works and Engineering crews,

.7 Supply and installation of new polysulphide joint filler,

.8 Supply and installation of new expansion joints,

.9 Reinstatement of portion of the concrete sidewalk,

.10 Supply and installation of the new stainless steel sidewalk cover plates,

.11 Maintenance/reinstatement of public utility ducts within the existing sidewalk and bridge deck locations.

.12 Replacement of precast concrete damaged access hatches. Design or specification to be approved by MPW. Rebar concrete cover should be 2in (or 5cm) minimum.

.2 Removal of the arising shall be in accordance with the latest editions of the Ministry of Public Works Waste Management Plan.

.3 The Contractor shall pay particular attention to the environmental requirements of this Specification.

.4 The Contractor shall phase their works to minimize disruption to traffic through a safe and effective traffic management methodology. One vehicular and pedestrian lane shall be maintained at all times.

.5 The Contractor shall submit method statements and list of equipment to demonstrate how they intend to undertake the removal of the existing waterproofing membrane safely without risk to the existing concrete deck, statutory utilities and public vehicular and pedestrian traffic.

.6 All areas to receive new bridge deck joints and waterproofing shall be inspected by the Engineer and repaired as necessary with an approved high strength concrete repair mortar. Any steel fixings from the existing joint mechanism shall be cut back to give a minimum of 50 mm cover prior to reinstatement of the concrete deck profile.

.7 Changes to the deck joint bed profile to receive the new joint, if required, shall be undertaken with an approved high strength concrete repair mortar.

.8 Waterproofing shall be with an approved proprietary spray applied system that can be used under the asphalt overlay. Installation shall be by contractor trained and approved by the product manufacturer and shall carry a service warrantee. The waterproofing membrane should go beyond the kerbs and extend100mm up, behind them in agreement with “Bridge Joint Details” Drawing.

The spray applied waterproofing system required for this bridge, to be used under the asphalt overlay, usually consists of a Primer, a waterproofing layer or membrane and a tack coat layer. The membrane should satisfy the following characteristics:

- Shore hardness>40
- Elongation>130%
- Tensile Strength> 9MPa
- Needs to pass Crack Bridging Standards such as ASTM C 1305, BD47/99 or equivalent.

The Primer and tack coat (if required) used should be part of the same system, hence the product recommended by the chosen manufacturer to go along with their membrane. Waterproofing thickness shall be as required by product manufacturer.

Some examples of Waterproofing Membranes products existing in the market are:

- Bridge Deck Membrane (by Bridge Preservation)
- Britdex MDP by USL Bridge Care
- Matacryl WPM by Fosroc
- Eliminator by gpc applied technologies

.9 Deck expansion joints shall be asphaltic plug joints, or equal, detailed with joint drainage. The Ministry of Public Works will consider any option that does not require mechanical fixings to the concrete deck and that is capable of accommodating the specified movements.

.10 Deck surfacing shall be preceded by a coloured warning layer, or similar, over the waterproofing membrane. Some waterproofing systems include colouring and in this case the additional warning layer will not be required.

.11 Surfacing of the deck with wearing course shall be performed by the Ministry, mix design shall be approved by the Engineer. Installation of road markings on completion of the scheme shall also be performed by the Ministry.

.12 The contractor should not do any build-up to the concrete deck; only appropriate repairs. The Ministry of Public Works should place asphalt depth to suit required joint thickness. Asphalt depth shall be determined after expansion joint selection and the Contractor should aid in the coordination of asphalting works.

.13 Handrail painting is not included in the scope of works. Handrails should be protected during works and should any damage occur it should be repaired. A condition survey will be performed before construction.

Part 2 Restrictions

.1 Noise: Propose a plan to mitigate noise, including methods of drilling and probing, equipment to be used, and acoustical treatments.

.2 Blockage of channels: All work is to be completed without blocking the channels or disrupting normal marine traffic.

.3 Traffic: All work is to be completed while one lane of traffic is being maintained. Traffic control shall be maintained 24/7. . Peak hour traffic (morning 7:30am to 9:00am; afternoon from 4:30pm thru 6:30pm) should be manned by two men with STOP and GO signs. Non- peak hours will require traffic lights. Contractor should ensure that lights are in working order at all times and batteries are sufficiently charged to comply with this requirement. The traffic management plan needs be approved by W&E prior to commencement of the works

END OF SCOPE OF WORK SECTION

WORK RESTRICTIONS

Part 1 GENERAL

1.1 Utilities and Services

.1 Existing Cables are known to exist within the site.

.2 The Contractor is responsible for locating and protecting these and any possible other services within the works area.

1.2 Setting Out Stations

.1 The Ministry of Public Works will establish sufficient survey stations for the Contractor to undertake the works.

1.3 Setting out and Dimensions

.1 The Contractor shall be solely responsible for the accurate setting out of the works and shall employ a qualified surveyor whenever necessary. Any damages which may be incurred as a result of the incorrect setting out of the works shall be the responsibility of the Contractor.

.2 The Contractor shall be responsible for the maintenance of all bench marks on the site.

.3 The Contractor shall provide accurate locations for all rock anchors installed.

1.4 Use of Site

.1 Limit use of site to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated. Confine construction and operations to within the boundary shown on drawings.

.2 Keep driveways and entrances serving all adjacent premises and public property clear and available to the public, owners, owner's employees, guests, and both service and emergency vehicles at all times. These areas shall not be used for parking or storage of materials.

1.5 Water and Power

.1 Water and power should be supplied by the Contractor.

1.6 Working Hours

.1 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.

END OF WORK RESTRICTIONS SECTION

SUBMITTALS

Part 1 GENERAL

1.1 Required Submittals (Selected Proponent)

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

.1 Schedule of Work

.2 Construction Method Statements

.3 Construction Safety and Health Risk Assessments

.4 Environmental Method Statements

.5 Traffic Management Plan

.6 Concrete hatch design or specifications

.7 Samples. Information Datasheets of products in agreement with the prescribed technical specifications as well as relevant references of where have they been successfully used should be sufficient at Proposal Submission time.

.8 Waterproofing System Method Statement approved by manufacturer.

.9 Insurance Certificates

1.2 Administration

.1 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.

.2 Do not proceed with Work affected by the submittal until review is complete.

.3 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.

.4 Verify that field measurements and affected adjacent Work are coordinated.

.5 Contractor’s responsibility for errors and omission in submission is not relieved by Engineer review of submittals.

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

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

1.3 Schedule of Work

.1 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:

.1 Its title

.2 Its scheduled start and finish dates

.3 Its duration

.4 Any relevant “must” start or finish dates

.2 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.

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

.1 Start of construction

.2 Placement of orders for critical equipment items

.3 Delivery dates (to site) for critical equipment items

.4 Final handover (final completion)

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

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

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

.7 No progress payments will be approved until receipt of schedule updates acceptable to the Engineer. The contractor can submit a payment request at commencement of the works. Justification for payment such as plane ticket invoices for personnel coming from off island; and bill of laden for materials; would be required.

1.4 Method Statements

.1 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.

.2 Method Statements shall identify, among other things:

.1 Sequencing of works

.2 Methods to ensure appropriate environmental protection

.3 Other key tasks as specified in the Contract Documents, and/or as requested by the Engineer.

END OF SUBMITTALS SECTION

ENVIRONMENTAL PROTECTION

Part 1 GENERAL

1.1 Environmental Measures

.1 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.

Part 2 EXECUTION

2.1 Fires

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

2.2 Disposal of Rubbish and Waste Materials

.1 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 Environmental Protection

.2 When, in the 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.

2.4 Pollution Control

.1 Control emissions from equipment and plant to Bermuda authorities' emission requirements.

.2 Prevent extraneous materials from contaminating air, land or water, by vacuum, temporary enclosures, screens, traps or other devices.

.3 Spills of deleterious substances should be immediately contained and cleaned up in accordance with provincial regulatory accordance with provincial regulatory requirements. Spills should be reported forthwith to the Engineer.

2.5 Storage And Handling Of Fuels And Dangerous Fluids

.1 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.

.2 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.

.3 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.

.4 Collect and dispose of used oil filter cartridges and other products of equipment maintenance at industrial waste facility to satisfaction of Engineer.

END OF ENVIRONMENTAL PROTECTION SECTION