

# TRANSPORT FOR NSW (TfNSW)

## QA SPECIFICATION M773

### CONCRETE BRIDGE REPAIRS – DESIGN

#### NOTICE

This document is a Transport for NSW QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Transport for NSW or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

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#### REVISION REGISTER

<b>Ed/Rev Number</b>	<b>Clause Number</b>	<b>Description of Revision</b>	<b>Authorised By</b>	<b>Date</b>
Ed 1/Rev 0		First edition	GM, IC	19.11.12
Ed 1/Rev 1	5.1.2 Annex M	Reference to “B204” deleted. Referenced documents updated.	DCS	27.10.17
Ed 1/Rev 2		Specification reference no changed from M769 to M774.	MCQ	18.09.18
Ed 1/Rev 3	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20



# TfNSW QA SPECIFICATION M773

## CONCRETE BRIDGE REPAIRS – DESIGN

### GUIDE NOTES

These guide notes provide guidance to TfNSW personnel on the application of the Specification and the preparation of the project-specific annexures. They do not form part of the Specification or the Contract (or Agreement).

#### USING M773

M773 has been developed specifically for use under TfNSW internal Alliance arrangements or Single Invitation Maintenance Contracts. It should not be used for any other type of contract without a full review of its practicability for that application.

M773 is a QA specification and the use of QA specifications requires the implementation of a quality management system by the Contractor that meets the quality management system requirements specified in TfNSW Q4M.

#### EDITION 1

This is the first issue of the Specification. Suggestions for improvement and amendments on technical issues following use of the Specification should be directed to the Senior Bridge Engineer (Rehabilitation Design), Bridge & Structural Engineering. Any other comments or suggestions should be forwarded to the Contracts Quality Manager, Commercial Services Branch.

#### OUTLINE OF M773

Concrete bridge repairs are covered by three TfNSW Maintenance Specifications and one set of TfNSW guidelines as follows:

M772: Concrete Bridge Repairs – Investigation

M773: Concrete Bridge Repairs – Design

M774: Concrete Bridge Repairs – Construction

TfNSW Concrete Bridge Repairs – Guidelines

The flowchart in Figure A outlines the repair process and the relevant TfNSW Maintenance Specifications. M773 is highlighted by dark borders in the flowchart.

The Principal commences the repair process by organising and carrying out a preliminary assessment of the defective bridge and deciding on the actions to be taken.

Where there is a need for immediate action to allow traffic on the bridge or to ensure the structural integrity of the bridge as part of an emergency response, the Principal should organise this before calling up Work under M773.

#### **Main activities to be executed in M773**

Design Input:

- Establish design provisions;
- Confirm design features.

Design requirements:

- Repair materials;
- Repair methods;
- Temporary works.

Design output:

- BASIC DESIGN output;
- COMPLEX DESIGN output.

## SECTION 1 GENERAL

### Scope

The Work includes the design of repairs for all defective concrete members in the bridge excluding those which are permanently under water, buried in the ground, damaged by fire, or which require electro-chemical repair methods.

### Details of Work

Annexure A must be completed by the Principal after carrying out the detailed investigation of the bridge in accordance with M772. Annexure A.1 specifies the general bridge information, members covered by the repair design, design loads and life, design type and repair methods to be used.

The design may be either a BASIC DESIGN or a COMPLEX DESIGN. The latter must be specified where structural engineering input is required.

The Principal must request Bridge & Structural Engineering to:

1. Assist in finalising the parameters for the COMPLEX DESIGN; and/or
2. Evaluate the design where it requires the use of topical corrosion inhibitors.

The information supplied by the Principal must be entered in Annexure A.2.

## SECTION 2 PLANNING

### Project Quality Planning Requirements

PROJECT QUALITY PLAN (PQP) is critical to this QA Specification. PQP should be prepared before work commences, and be based on TfNSW guidelines, manuals or other relevant documents.

The PQP must be followed by the Contractor at all times during the work, kept up to date and periodically resubmitted to the Principal.

Experienced officers should carry out regular surveillance of the Works for the Principal.

The PQP must specify the requirements for the investigation, including investigation procedures, testing and sampling techniques, and equipment to be used.

### Documents

The Principal should provide the Contractor with all available information on the bridge (Annexure A.2). Principal-supplied information includes drawings and reports. In addition to the Investigation Report produced under M772, reports may include the preliminary investigation report, Bridge Information System (BIS) condition and inspection reports, structural assessment reports, repair records etc. Drawings may include ORIGINAL DRAWINGS and WORK-AS-EXECUTED DRAWINGS, etc.

The Contract Manager must collate all the relevant information for the Contract and supply it to the Contractor. Ensure that irrelevant or out of date documents are not provided to the Contractor.

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Note that ORIGINAL DRAWINGS for most bridges are available electronically from TfNSW Plan Manager.

## SECTION 3 RESOURCES

### Personnel

Experienced and qualified personnel must carry out the design and the design review of the repair.

For COMPLEX DESIGN, refer the names of consultants and structural engineers proposed by the Contractor to Bridge & Structural Engineering for review and acceptance.

## SECTION 4 EXECUTION

### General

Complex Design must conform to AS/NZS ISO 9001 Clause 7.3 and be based on an approved concept design. Certify that each design conforms to this Specification.

### Design Input

Use the repair methods, design loads and material design properties specified in the Investigation Report for the design. Before proceeding with the final repair design, the Contractor must review the design provisions and confirm the features of the design with the Principal.

### Design Requirements

Specify the design service life and the assumed conditions in service to ensure that the desired outcomes for the repair design will be achieved.

All repair materials must be capable of achieving the design service life under the assumed service conditions when used as specified in the repair design.

Damage to pre-tensioned or post-tensioned prestressed concrete members may vary from minor to severe or critical. The repair of such members may need input from experienced bridge designers.

All temporary works must be designed in accordance with the design criteria for the bridge, and be included with the repair design. Changes to the design criteria for temporary works must be approved by the Principal.

### Design Output

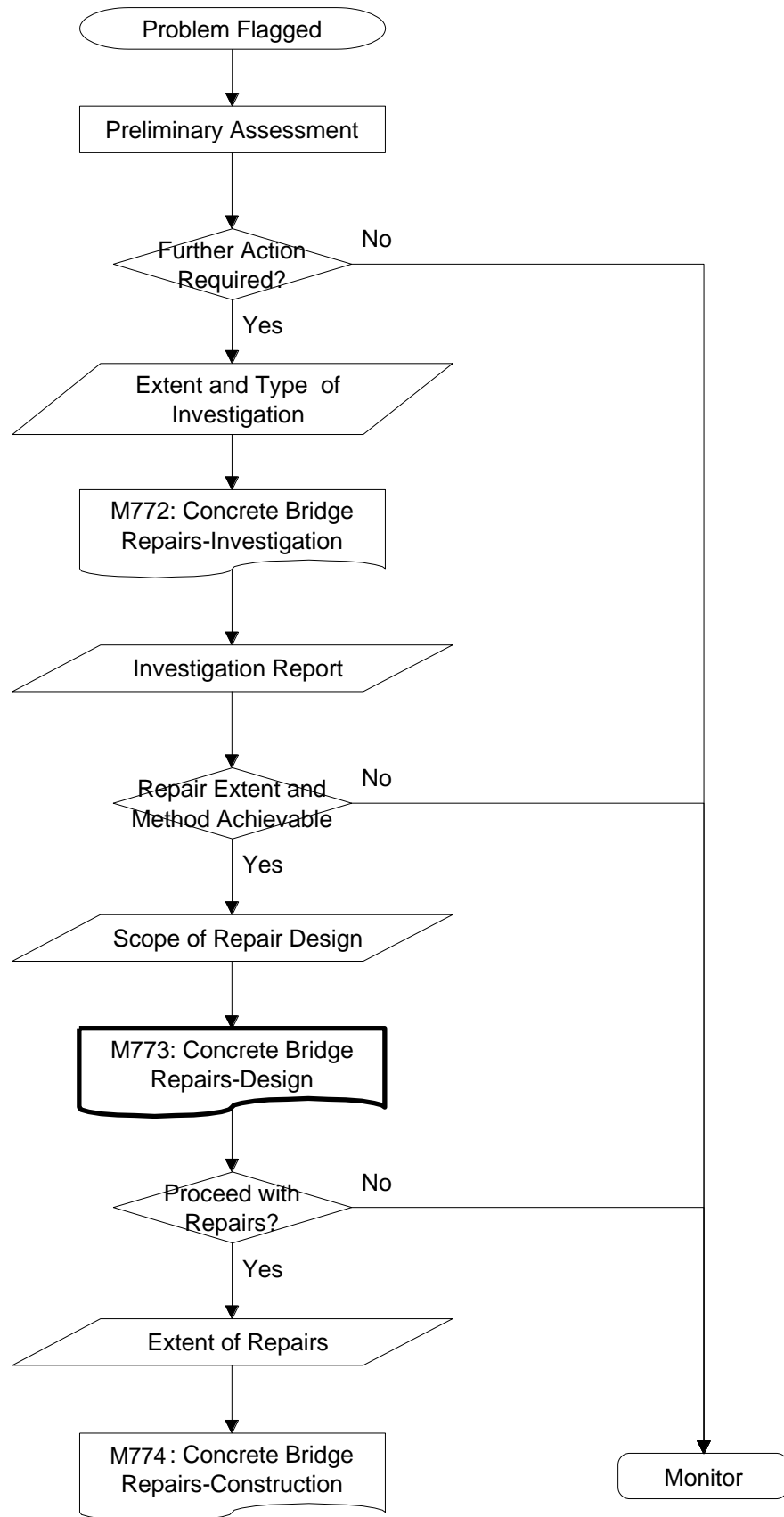
The design output for BASIC DESIGN includes a single or several sketches and a reference to M774, without design calculations. For Complex Designs, the output includes detailed repair design drawings with supporting design report and a project-specific version of M774.

## SECTION 5 CONFORMITY

Where feasible, design should conform to AS 5100 *Bridge Design*, except where aspects of the design are not within its scope, in which case specific clauses from other bridge design codes or articles from technical journals may be relevant and applicable.

Features of the design covered by specific TfNSW QA bridgeworks specifications must be designed in accordance with those specifications.

**Figure A. Concrete Repair Process**





Transport  
for NSW

QA SPECIFICATION M773

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# CONCRETE BRIDGE REPAIRS - DESIGN

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IC-QA-M773

VERSION FOR: DATE:
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## FOREWORD

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### REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW M773 Edition 1 Revision 2.

All revisions (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

### PROJECT SPECIFIC CHANGES

Project specific changes are not permitted in this document.

**TRANSPORT FOR NSW (TfNSW)**  
**QA SPECIFICATION M773**  
**CONCRETE BRIDGE REPAIRS – DESIGN**

**1 GENERAL**

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- |     |   |                                |
|-----|---|--------------------------------|
| 1.1 | The Work to be executed under this Specification involves the preparation of the design for the repair of damaged or deteriorated concrete bridge members.<br><br>This Specification does NOT cover repair designs for:<br><br>.1 Bridge members normally under water, i.e. below normal water level or mean higher low water (MHLW) level;<br>.2 Buried concrete members;<br>.3 Fire-damaged concrete members;<br>.4 Electro-chemical repair techniques, excluding incipient corrosion provisions used with patch repairs. | <b>Scope</b>                   |
| 1.2 | Details of the Work including the type of design and the specific repair method(s) to be used are specified in Annexure A.  | <b>Details of Work</b>         |
| 1.3 | Payment for the activities associated with completing the Work in accordance with this Specification will be made using the pay items listed in Annexure B.   | <b>Measurement and payment</b> |
| 1.4 | Provide the Identified Records (refer Specification TfNSW Q4M Annexure E.2) summarised in Annexure C.2.   | <b>Records</b>                 |
| 1.5 | The standards, specifications and test methods referred to by this Specification are referenced using an abbreviated form (e.g. AS/NZS 1234). The titles are given in Annexure M.   | <b>Referenced documents</b>    |
| 1.6 | Some words and phrases have special meanings in this Specification. In some cases, the defined meaning is different from the meaning that the word or phrase might have in ordinary use. In order to understand the Specification, You need to take these special meanings into account.  | <b>DEFINED TERMS</b>           |

Defined terms have the special meanings set out in Annexure M.

All defined terms are indicated by using small capitals (e.g. DEFINED TERM) unless they are one of the following basic terms, which appear too often for small capitals to be used.

- |                       |                 |
|-----------------------|-----------------|
| - Principal           | - Work          |
| - You                 | - Specification |
| - Structural Engineer | - Business Day  |

- |     |   |                                 |
|-----|---|---------------------------------|
| 1.7 | Nomenclature and acronyms used in this Specification are also defined in Annexure M.  | <b>Definitions and acronyms</b> |
| 1.8 | Unless otherwise specified, the issue of an Australian Standard or TfNSW test method to be used is the issue current one week before closing date for tenders. The TfNSW specification to be used is the issue contained in the contract documents.   | <b>Applicable issue</b>         |
| 1.9 | You are responsible for all activities, actions, works and supply of materials, unless specifically stated otherwise. Accordingly, this Specification does not generally use wording such as "You must ..." or "You shall ..." because this is the underlying requirement. However, such wording is used where actions in a clause involve both You and the Principal and the roles need to be unambiguous. | <b>Interpretation</b>           |

## **2 PLANNING**

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### **2.1 PROJECT QUALITY PLAN**

- |       |   |                                       |
|-------|---|---------------------------------------|
| 2.1.1 | The requirements of the PROJECT QUALITY PLAN are defined in TfNSW Q4M. In addition, the PROJECT QUALITY PLAN must:  |                                       |
| .1    | Address the Hold Points and Witness Points required by this Specification, as summarised in Annexure C.1. The Principal will consider the submitted documents prior to authorising the release of the Hold Point. | <b>HOLD POINTS and WITNESS POINTS</b> |
| .2    | Address each of the requirements in this Specification, as listed in Annexure D.1 in summary form to aid preparation.   | <b>Processes</b>                      |
| .3    | Include the submission of test reports and other documents verifying ongoing conformity of all work and materials.  | <b>Conformity documents</b>           |
| .4    | Be revised as necessary to reflect the assessment findings and to ensure that the repair procedures executed as documented will result in repairs that conform to the repair design.                              | <b>Revise PROJECT QUALITY PLAN</b>    |

2.1.2	<p>Process Held: Commencement of Work.</p> <p style="text-align: right;"><b>HOLD POINT</b></p> <p>Submission Details: At least 10 Business Days prior to the planned date of commencement of Work, submit:</p> <p>.1 PROJECT QUALITY PLAN in conformity to Clause 2.1.1.</p> <p>.2 Proposed audit procedures to ensure conformity to this Specification in the absence of frequent testing and supervision by the Principal.</p> <p>Release of Hold Point: The Principal will consider the submitted documents prior to authorising the release of the Hold Point.</p>	
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## **2.2 DOCUMENTS**

- |       |   |                           |
|-------|---|---------------------------|
| 2.2.1 | The Principal will supply the information listed in Annexure A.2 to provide the background and references for the Work. | <b>Information</b>        |
| 2.2.2 | Do not assume that the information supplied by the Principal is correct representation of the existing bridge.          | <b>Verify information</b> |

You must assess the adequacy of the information supplied by the Principal for accuracy and consistency with observations of current bridge and operating conditions, correct locations of all existing components and features, and possible misalignment or clashes with existing details. However, structural engineering checks of the supplied drawings are not required.

## **3 RESOURCES**

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### **3.1 PERSONNEL**

- |       |  |                                  |
|-------|--|----------------------------------|
| 3.1.1 | All structural design activities must be carried out by a Structural Engineer who is a Member of Engineers Australia, or equivalent, with relevant expertise and experience in bridge design.                                    | <b>Professional Engineers</b>    |
| 3.1.2 | Submit all proposals for alternative qualifications for personnel or changes to personnel to the Principal for consideration.  | <b>Alternatives or changes</b>   |
| 3.1.3 | Document the names of all personnel together with their qualifications, experience and roles in the PROJECT QUALITY PLAN. Include all consultants, designers, surveyors and sampling and testing officers proposed for the Work. | <b>Document personnel in PQP</b> |

## **4 EXECUTION**

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### **4.1 GENERAL**

- |       |   |                               |
|-------|---|-------------------------------|
| 4.1.1 | The repair design will be either BASIC DESIGN or COMPLEX DESIGN. Base the latter on the concept design approved by the Principal, as specified in Clause 4.2.5.   | <b>Concept design</b>         |
| 4.1.2 | Certify that all repair designs and associated temporary works conform to this Specification.   | <b>Design certification</b>   |
| 4.1.3 | Notwithstanding TfNSW Q4M, control COMPLEX DESIGN in accordance with AS/NZS ISO 9001 Clause 7.3.<br><br>Carry out, verify and certify COMPLEX DESIGN using Structural Engineers experienced in bridge design (refer to Clause 3.1.1). | <b>COMPLEX DESIGN control</b> |

## **4.2 DESIGN INPUT**

- |       |  |                                      |
|-------|--|--------------------------------------|
| 4.2.1 | The type of repair design, member(s) to be repaired and repair method(s) must be as specified in Annexure A.1.   | <b>Repair methods specified</b>      |
| 4.2.2 | Use the design loads specified in Annexure A.1. Certify that the specified design loads are appropriate, or propose alternative design loads together with appropriate justification.  | <b>Certification of design loads</b> |
| 4.2.3 | Use the design material properties for the bridge members provided in the INVESTIGATION REPORT. Notify the Principal if this information has not been provided.  | <b>Material design properties</b>    |
| 4.2.4 | Incorporate the following provisions into the design input:<br><br>.1 Bridge raising restrictions, where applicable;<br>.2 Safety and constructability requirements;<br>.3 Justification of design assumptions, especially for unusual older bridges, to address issues such as:<br><br>.i Load distribution/sharing between deck members and supporting members;<br>.ii Joint fixity within bridge trusses and resulting effects;<br>.iii Local effects, e.g. joint closure due to abutment movement, frozen bearings, etc.   | <b>Design provisions</b>             |
| 4.2.5 | Confirm the following design features with the Principal before proceeding with final repair design:<br><br>.1 Cause(s) of deterioration and methods of mitigation;<br>.2 Constraints on repair;<br>.3 Opportunity to improve the bridge, including capacity upgrades;<br>.4 Responsibility for repair/reinstatement of public utilities affected by defects or repairs;<br>.5 Members to be repaired using the design repair methods;<br>.6 Aesthetics of the repaired bridge;<br>.7 Design loads, refer to Annexure A.1;<br>.8 Bridge configuration and articulation;<br>.9 Verification of materials and design properties;<br>.10 Concept repair design and applicable bridge design code if different from AS 5100 (for COMPLEX DESIGN only). | <b>Confirm design features</b>       |

4.2.6	Process Held: Commencement of final repair design.  Submission Details: Submit concept repair design and associated design features to the Principal at least 10 Business Days prior to commencing work on final repair design.  Release of Hold Point: The Principal will consider the submitted documents prior to authorising the release of the Hold Point.	<b>HOLD POINT</b>
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### **4.3 REPAIR DESIGN REQUIREMENTS**

4.3.1	Design all repairs to achieve the specified design life.	<b>Design life</b>
4.3.2	Use repair materials in the design compatible with service conditions and repair methods.  Take into consideration:  .1 Defect type and geometry; .2 Condition of substrate; .3 Ambient temperature and relative humidity; .4 Causes of deck cracking and appropriate repair techniques; .5 WHS and environmental requirements; .6 Downtime requirements.	<b>Crack and patch repair material</b>
4.3.3	Where prestressing is included in the repair design, i.e. for repair of damaged prestressed girders, specify design prestressing forces, jacking forces, sequence of stressing and any preloading needed to achieve the required prestress, e.g. for splicing of internal tendons.	<b>Prestressed members</b>
4.3.4	All designs for patch repairs of defects caused by chloride-induced corrosion must include protection against incipient corrosion, e.g. use of suitable reinforcement coatings or embedded sacrificial anodes.  Specify the type, size and spacing of embedded anodes, when used.  Anodic coatings used on steel reinforcement as sacrificial anodes must have a service life greater than the repair design life.	<b>Incipient corrosion</b>
4.3.5	Design all temporary works, including interim repairs, access, supports and bracing, required for the final repair. Consider the effects of flooding on temporary works, where applicable.	<b>Temporary works design</b>
4.3.6	Temporary works must not cause instability, unsafe forces or displacements.	<b>Forces and displacements</b>
4.3.7	Where temporary supports change the load paths of the bridge, provide design calculations verifying the safety of the bridge.	<b>Load path changes</b>

- 4.3.8 Apply repair design criteria to the design of temporary works. **Design criteria**
- Some design criteria may be relaxed where appropriate due to the short duration of the Works, e.g. thermal movements, fatigue loads or creep.
- Comply with the relevant TfNSW Bridge Technical Directions.
- 4.3.9 Where it is not feasible to provide the design load capacity for the temporary works, submit your proposal to the Principal before continuing with the repair design. Your proposal may include any combination of the following: **Changes to design load**
- .1 Traffic load limits;
  - .2 Traffic speed limits; or
  - .3 Reducing the number of traffic lanes.

4.3.10	Process Held: Changes to design criteria for temporary works.	<b>HOLD POINT</b>
	Submission Details: Submit proposed changes at least 5 Business Days prior to commencing work on final repair design.	
	Release of Hold Point: The Principal will consider the submitted documents prior to authorising the release of the Hold Point.	

#### **4.4 REPAIR DESIGN OUTPUT**

- 4.4.1 Submit design output appropriate to the design type below. **Design type**
- Submit design certification in accordance with Clause 4.1.2.
- 4.4.2 Highlight in the design output any matters that may assist in carrying out the repairs, e.g. constraints on installation of jacks, presence of cable racks, water pipes or other services affected by jacking, etc. **Repair design constraints**
- 4.4.3 BASIC DESIGN output must include at least: **BASIC DESIGN output**
- .1 Repair design drawings or sketches;
  - .2 Reference to TfNSW M774.
- 4.4.4 COMPLEX DESIGN output must include at least: **COMPLEX DESIGN output**
- .1 Repair design report detailing: **Design report**
    - .1 Design assumptions and loads;
    - .2 Analytical results for maximum member forces, displacements and reactions;
    - .3 Design and verification calculations.



- |    |   |  |
|----|---|--|
| .2 | Customised TfNSW M774 Repair specification covering:  | <b>Customised repair specification</b> |
| .1 | Repair procedures;  |  |
| .2 | Repair materials;   |  |
| .3 | Repair application conditions;  |  |
| .4 | Applicable standards and references.  |  |
| .3 | Repair design drawings in accordance with TfNSW Structural Drafting and Detailing Manual showing: | <b>Design drawings</b>                 |
| .1 | Simplified General Arrangement of the bridge, with defects highlighted;                           |  |
| .2 | Public utilities and their locations;   |  |
| .3 | Bridge configuration or articulation, with changes highlighted;                                   |  |
| .4 | Arrangement of repairs and all temporary works;   |  |
| .5 | Traffic management during the Works;  |  |
| .6 | Setting out information, tolerances and clearances;   |  |
| .7 | Sequence or staging of the Works;   |  |
| .8 | Lifting points and jack forces and deflections, loading sequence, etc.                            |  |

## **5 CONFORMITY**

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### **5.1 DESIGN CONFORMITY**

- |       |  |                                |
|-------|--|--------------------------------|
| 5.1.1 | Certify that the concrete repair design conforms to this Specification and AS 5100.  | <b>Design conformity</b>       |
| 5.1.2 | Certify that the concrete repair as designed will conform to the following TfNSW QA Specifications: TfNSW B80, TfNSW B110, TfNSW B113, TfNSW B115 and TfNSW R68, as appropriate. | <b>TfNSW QA Specifications</b> |

## **ANNEXURE A – DETAILS OF WORK**

### **A.1 WORK SUMMARY – MEMBERS COVERED BY REPAIR DESIGN**

<b>BRIDGE NAME AND LOCATION</b>		
<b>TfNSW BRIDGE NO.</b>		
<b>DESIGN TYPE<sup>1</sup></b>	<input type="checkbox"/> <b>BASIC DESIGN</b>	<input type="checkbox"/> <b>COMPLEX DESIGN</b>
<b>DESIGN LOADS</b>		
<b>DESIGN LIFE</b>		
<b>MEMBER TYPE</b>	<b>IDENTIFICATION</b>	<b>REPAIR METHOD<sup>2</sup></b>
<b>ABUTMENTS</b>		
<b>PILES</b>		
<b>PILE CAPS</b>		
<b>PIERS</b>		
<b>HEADSTOCKS</b>		
<b>X-GIRDERS /DIAPHRAGMS</b>		
<b>GIRDERS</b>		
<b>DECK</b>		
<b>APPROACH SLABS</b>		
<b>BARRIERS</b>		
<b>NOTES:</b>	<sup>1</sup>	<b>SELECT ONE OPTION.</b>
	<sup>2</sup>	<b>METHODS SELECTED BY THE PRINCIPAL, BASED ON INVESTIGATION REPORT.</b>

## A.2 INFORMATION SUPPLIED BY THE PRINCIPAL

<b>Documentation</b>	<b>Supplied by Principal *</b>	<b>Paper copy</b>	<b>Electronic copy</b>	<b>Document Reference and Date (dd-mm-yyyy)</b>
1. TfNSW M774	YES / NO			
2. INVESTIGATION REPORT from TfNSW M772	YES / NO			
3. ORIGINAL DRAWINGS of bridge	YES / NO			
4. WORK-AS-EXECUTED DRAWINGS of bridge	YES / NO			
5. Most recent construction drawings	YES / NO			
6. Drawings of past design modifications	YES / NO			
7. TfNSW BIS bridge condition reports	YES / NO			
8. Structural assessments/reports on bridge	YES / NO			
9. Repair design concept	YES / NO			
10. Bridge Survey Control	YES / NO			
11. Records of application or presence of toxic or hazardous chemicals on, or in vicinity of the bridge	YES / NO			
12. Other documentation: Future utilisation of bridge, forward planning etc. _____	YES / NO			
NOTES: (*) Delete one option.				

## **ANNEXURE B – MEASUREMENT AND PAYMENT**

### **B.1 GENERAL**

B.1.1	Pay Items are identified in Annexure B.2.	<b>Pay Items</b>
B.1.2	Price pay items in the schedule of pay items, taking into account all the costs associated with doing the work.  Include the costs of any unpriced pay items in the priced pay items.	<b>Prices</b>
B.1.3	Distribute overheads between priced pay items.	<b>Overheads</b>
B.1.4	Pay item with a specified quantity of work must not be tendered as a lump sum.	<b>No Lump Sum</b>
B.1.5	Pay Item 909 applies for work relating to provision for traffic.	<b>Provision for traffic</b>
B.1.6	You will not be paid for work that does not conform to this Specification.	<b>No payment</b>

### **B.2 SCHEDULE OF PAY ITEMS**

<b>Maintenance Activity Code</b>	<b>Item Name and Description</b>	<b>Units of Measurement</b>
<b>773.01</b>	<b>BASIC DESIGN</b>	<b>Each</b>
	Includes the following tasks: .1 Design drawings or sketches	
<b>773.02</b>	<b>COMPLEX DESIGN</b>	<b>Each</b>
	Includes the following tasks: .1 Concept design .2 Design report .3 Customised TfNSW M774 .4 Design drawings	

## **ANNEXURE C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

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Refer to Clause 2.1.1.

### **C.1 SCHEDULE OF HOLD POINTS**

<b>Clause</b>	<b>Type</b>	<b>Process Held</b>	<b>Submission Details</b>
2.1.2	Hold	Commencement of Work.	Submission of: <ul style="list-style-type: none"><li>▪ PROJECT QUALITY PLAN conforming to requirements in Clause 2.1.1;</li><li>▪ Proposed audit procedures to ensure conformity to this Specification in the absence of frequent testing and supervision by the Principal.</li></ul>
4.2.6	Hold	Commencement of final repair design.	Submission of concept repair design and associated design features to the Principal.
4.3.10	Hold	Changes to design criteria for temporary works.	Submission of proposed changes to design criteria for temporary works.

### **C.2 SCHEDULE OF IDENTIFIED RECORDS**

<b>Clause</b>	<b>Description of Identified Record</b>
2.1.1	PROJECT QUALITY PLAN.
4.1.1	Concept design.
4.2.3	Material design properties.
4.4.3	BASIC DESIGN output.
4.4.4.1	COMPLEX DESIGN report.
4.4.4.2	Customised TfNSW M774.
4.4.4.3	Repair design drawings.

## ANNEXURE D – PLANNING DOCUMENTS

---

### D.1 DESIGN PROCESS

The information to be supplied must include, but not be limited to, the following:

Clause	Process	Description
4.1.3	Design control	Control COMPLEX DESIGN in accordance with AS/NZS ISO 9001 Clause 7.3
4.2.2	Certification of design loads	Certify that the Principal's proposed design loads are appropriate, or propose alternative design loads together with appropriate justification
4.3.3	In-place prestressing	Specify design prestressing forces, jacking forces, sequence of stressing and any preloading needed to achieve the required prestress
4.3.4	Incipient corrosion protection	Specify the type, size and spacing of embedded anodes, when used

## ANNEXURES E TO L – (NOT USED)

## ANNEXURE M – REFERENCED DOCUMENTS AND DEFINITIONS

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### M.1 REFERENCED DOCUMENTS

#### M.1.1 Australian Standards

AS/NZS ISO 9001      Quality Management Systems - Requirements

AS 5100      Bridge Design

#### M.1.2 TfNSW Specifications

TfNSW B80      Concrete Work for Bridges  
TfNSW B110      Pretensioned Precast Concrete Members  
TfNSW B113      Post-Tensioning of Concrete  
TfNSW B115      Precast Concrete Members (Non Pretensioned)  
TfNSW G71      Construction Surveys  
TfNSW Q4M      Quality Management System (Type 4)  
TfNSW R68      Shotcrete Work Without Steel Fibres  
TfNSW M772      Concrete Bridge Repairs - Investigation  
TfNSW M774      Concrete Bridge Repairs - Construction

#### M.1.3 Other TfNSW Documents

TfNSW Structural Drafting and Detailing Manual

TfNSW Bridge Policy Circulars

## M.2 DEFINED TERMS

BASIC DESIGN	A repair design that does not require structural design input
Business Day	Any day other than a Saturday, Sunday or public holiday or 27, 28, 29, 30 or 31 December
COMPLEX DESIGN	A repair design that requires structural design input
HOLD POINT	A point beyond which a work process must not proceed without the Principal's express written authorisation (refer TfNSW Q4M)
INVESTIGATION REPORT	An investigation report produced under TfNSW M772
ORIGINAL DRAWINGS	Original bridge design drawings or original WORKS-AS-EXECUTED DRAWINGS
Principal	Means Transport for NSW
PROJECT QUALITY PLAN	Refer to Clause 2.1
Specification	Means TfNSW M773
Structural Engineer	A professional engineer who is a member of Engineers Australia (IEAust) and/or is listed on the National Engineering Register (NER) as a Structural Engineer
Work	The scope of work covered by the Specification under the Contract (refer Annexure A.1 and TfNSW Q4M)
WORK-AS-EXECUTED DRAWINGS	Drawings recording details of completed Work
You	Means the Contractor, including subcontractors, employees and agents of the Contractor

## M.3 DEFINITIONS

The following definitions apply to this Specification:

<b>Term</b>	<b>Alternative Term</b>	<b>Definitions</b>
Bridge Information System	BIS	General term for the approved TfNSW bridge inspection and condition rating reporting system and its database
Bridge Survey Control		The survey control network for the bridge (refer Specification TfNSW G71)
Member	Component Element	Any member or part of member forming part of a structural assembly
Temporary works		All works which are not part of the permanent repair but are required before or during completion of permanent repairs. These include, but are not limited to, interim repairs, access and scaffolding, temporary bracing and temporary supports (e.g. supplementary bearings, shoring, blocking, and cribbing)