

**PART E**  
**SPECIFICATIONS**

## PART E - SPECIFICATIONS

### GENERAL

#### E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.

E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available in Adobe Acrobat (.pdf) format on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.

E1.1.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.

E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E1.2 The following Drawings are applicable to the Work:

<u>Drawing Nos.</u>	<u>Drawing</u>
B104-04-01 & 02	2004 Bridge Maintenance – Main Street Bridge Approach Pavements Slab Jacking
B103-04-01 & 02	2004 Bridge Maintenance – Norwood Bridge Approach Pavements Slab Jacking

#### E2. TRAFFIC CONTROL

E2.1 Description

The Work covered under this item shall include all items relating to traffic control at the Site(s).

The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

E2.2 Notification

The Contractor shall notify the City of Winnipeg Customer Services at 986-7472 forty-eight hours in advance of Work taking place at each of the Sites. The Contractor shall also keep Customer Services informed of which lanes are closed. This call is necessary so that the public can be notified of impending lane closures.

E2.3 Construction Method

E2.3.1 General

The Contractor will be responsible for pedestrian and traffic control at the Site(s) acceptable to the Contract Administrator.

For traffic control in the immediate Work area, the Contractor shall erect and maintain all applicable traffic control devices in accordance with the provision contained in the latest edition of the "Manual of Temporary Traffic Control in Work Areas on City Streets," issued by the City of Winnipeg.

The Contractor shall provide and maintain flagmen in accordance with the above-mentioned manual.

If any pedestrian traffic is disrupted or rerouted at the Site, the Contractor shall be responsible for supplying and installing all necessary signs and protection to the satisfaction of the Contract Administrator.

The Contractor shall take all other safety measures necessary to cope with any peculiar or unusual circumstances that have not been set out in the above-mentioned manual and shall, at all times, ensure that maximum protection is afforded to the road-user and that his operations in no way interfere with the safe operation of traffic.

Improper signing will be sufficient reason for the Contract Administrator or Inspector to immediately shut down the entire job.

Barricades supplied and installed by the Contractor in the performance of the Work must clearly show the name of the Contractor and the telephone number(s) at which he can be reached twenty-four (24) hours per day, seven (7) days per week.

During the hours when the Contractor is not working, equipment and stockpiled materials shall be left in such a location so as not to interfere with or present a hazard to motorists or pedestrians.

#### E2.3.2 Specific

As the two Sites are in high volume areas and the traffic movements are complex, the Contractor shall meet with City "Traffic Services" personnel prior to any closures to come to an agreement on the details of the traffic signing. This will be arranged through the Contract Administrator.

For the purposes of this project, no lane closures will be permitted on weekdays between 06:30 and 18:30 hours. At other hours, a maximum of two lanes will be permitted closed at one time.

There should be no need to close sidewalks. However, the areas of the sidewalk being worked on may be cordoned off provided there is still access for pedestrians around the closed area and their passage is safe.

#### E2.4 Measurement and Payment

No separate measurement or payment will be made for the provision of traffic control.

### **E3. SLAB JACKING**

#### E3.1 Description

This Specification shall cover the jacking of the pavement slabs through the injection of a slurry grout or a high-density polyurethane on designated approach pavements to the Main Street and Norwood Bridges Northbound.

The Work to be done by the Contractor under this Specification shall include the furnishing of all superintendence, overhead, labour, materials, equipment, tools, supplies, and all things necessary for and incidental to the satisfactory performance and completion of all Work as hereinafter specified.

## E3.2 Materials

### E3.2.1 General

The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification.

### E3.2.2 Slurry Grout

#### 3.2.2.1 General

Slurry grout shall be a mixture of water, portland cement, sand and additives and have a minimum seven (7) day compressive strength of 3 MPa. The mixture shall be a homogeneous paste with sufficient slump to ensure that all voids are filled to prevent undue stress on the structure.

#### 3.2.2.2 Mineral Aggregate

Aggregates used for slabjacking may consist of natural sand, manufactured sand, or a combination of natural and manufactured sand and limestone dust. Maximum particle size shall be 5 mm.

#### 3.2.2.3 Cement

Type 10 normal portland cement.

#### 3.2.2.4 Water

Water shall be clean and free from injurious amounts of oil, acid, salt, alkali, and organic or other deleterious matter. The Contractor is responsible for the supply of water. The City will supply water from hydrants. The Contractor shall supply the fittings and arrange for a permit to use the hydrant. Water from hydrants may be accepted for use without being tested. If water is of questionable quality, it shall be tested at the expense of the Contractor.

#### 3.2.2.5 Additives

Bentonite or other additives approved by the Contract Administrator, as required to promote lubrication to ensure complete void filling and to compensate for shrinkage during curing

### E3.2.3 High-Density Polyurethane

The material to be used in the injection process shall be a water blown formulation of high-density polyurethane. The material shall not release gases that will contaminate the air. It shall have the following properties:

Density	113 kg/m <sup>3</sup> (7.0 lbs/ft <sup>3</sup> )	ASTM D1622
Compressive Strength	1.24 MPa (180 psi)	ASTM D1621
% Volume Change of Original After Ten Years	2.1%	ASTM D2126

### E3.2.4 Slurry Grout Hole Filling Grout

Grout to be used for the filling of grout holes shall be a pre-bagged cementitious material suitable for pavement undergoing freeze thaw cycles and de-icing chemical applications. It

shall have a minimum compressive strength of 20 MPa @ 4 hours and 40 MPa @ 1 day. Approved products are Thoroc 1060 or 1061 Rapid Mortar.

#### E3.2.5 Flexible Joint Sealant

Flexible joint sealant for all horizontal, vertical, and sloping joints shall be guaranteed non-staining grey polyurethane, approved by the Contract Administrator and applied in strict accordance with the manufacturer's instructions, including appropriate primers. Approved products are Vulkem 116 by Mameco; Sonolastic NP1 by Sonneborne; RC-1 by Permapol; and Sikaflex by Sika; or equivalent as approved by the Contract Administrator.

### E3.3 Equipment

#### E3.3.1 General

All equipment shall be of a type approved by the Contract Administrator and shall be kept in good working order.

#### E3.3.2 Slurry Grout Plant

The grout plant shall consist of a positive displacement grout injection pump capable of applying variable pressures up to 500 psi, and capable of delivering the grout in a uniform and consistent manner. The mixer shall be a high speed colloidal mixing machine, or equivalent, capable of producing a consistent and homogeneous mixture.

### E3.4 Construction Method

#### E3.4.1 General

The Contractor shall provide 48 hours notice to the Contract Administrator before the start of injection operations. Because of the high volume of traffic, the Contractor will not be permitted to close any lanes of traffic at these Sites between the hours of 06:30 and 18:30 hours.

#### E3.4.2 Work Sequencing and Method

The Contractor will be required to submit a work sequence plan to the Contract Administrator for review prior to slab jacking to show how he will sequence the work to limit the amount of slab that is unsupported at any one time and, as a result, subject to slab cracking under traffic loads. In general, the Contractor will be expected to limit the vertical rise of any one area of slab before the adjacent areas are supported by injection product. The slab jacking should be done incrementally so as to limit this possibility.

#### E3.4.3 Pavement Injection Holes

For the foam injection method, the Contractor may drill 16 mm diameter holes in a grid pattern a maximum of 1800 mm apart in the area that is to be jacked. Alternatively, the holes may be cored.

For the slurry grout injection method, the Contractor shall core at least the upper 50 mm of the holes in the pavement at a spacing suitable for the intended purpose. The lower portion of the hole may be drilled.

For either of the injection types, any drilling shall be done in such a manner as to limit the amount of breakout from the underside of the slab.

#### E3.4.4 Preliminary Inspection

Prior to any injection taking place, the Site shall be inspected by the Contractor and the Contract Administrator. The existing condition of the concrete structure or slab shall be noted and agreed upon.

#### E3.4.5 Injection

The Contractor shall inject the slurry grout or foam under the slab to fill any voids and to jack the slabs eliminating settlement depressions. The final jacked elevation shall be within 5 mm of the design elevation. It is recognized that there may be some slab cracking as a result of the live traffic loads. The Contractor shall repair any areas damaged by the lifting process only if he has not followed the Contract Administrator reviewed injection plan submitted by the Contractor prior to starting the injection work.

#### E3.4.6 Restoration and Cleanup

Immediately following the completion of the injection operations, the injection holes shall be filled with grout. In addition, all of the joints previously sealed with flexible joint sealant between the raised slabs and the fixed edge barriers, shall be restored. New sealant shall be on a foam back-up rod and 13 mm thick.

The Contractor will be required to clean up the Site consistent with the surrounding area. Site clean up shall immediately follow the jacking operation. Excessive amounts of slurry grout product are to be hauled from the Site and may not be flushed into the City's storm sewer system.

#### E3.5 Measurement and Payment

##### E3.5.1 Pavement Jacking

Pavement jacking will not be measured and will be paid for at the Contract Lump Price for "Main Street and Norwood Bridges – Approach Pavements Slab Jacking" in accordance with this Specification, accepted by the Contract Administrator.