APPENDIX E – EXISTING RECORDS FOR THE EMPRESS ST STRUCTURE – 1990 BID OPPORTUNITY

The included documents are supplied for review and use of the Proponent during the bidding period only. The information remains the property of the City of Winnipeg.

This information is not meant to be exhaustive and is not meant to take the place of the investigations and due diligence required of the Proponent.

Form 22(M): 84 - 2

THE CITY OF WINNIPEG
WORKS AND OPERATIONS DIVISION

TENDER FOR

BIDDING SPECIFICATIONS

EMPRESS STREET OVERPASS STRUCTURE
REHABILITATION, STRENGTHENING
AND RELATED WORKS
IN THE CITY OF WINNIPEG

TENDER No. P.D. 90-26

PROVINCE OF MANITOBA
90.02.26
B. W. GULAY
REGISTERED ENGINEER

PROVINCE OF MANITOBA
C. D. STEWART
90/02/26
REGISTERED ENGINEER

PREPARED FOR: WORKS AND OPERATIONS DIVISION
STREETS AND TRANSPORTATION DEPARTMENT

PREPARED BY: WARDROP ENGINEERING INC.
PROJECT NO. 890007-02-00

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Bidder Supplied Documents
(which must accompany the Tender Submission Forms to constitute a complete Tender Submission):

Bid Security (Form F, or as specified in BI:14.01.)

Written undertaking to provide Performance Security
(Form G, or as specified in BI:14.02.)

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PART A

TENDER SUBMISSION

PLEASE NOTE

ALL FORMS MAKING UP THE TENDER SUBMISSION MUST BE COMPLETED, SIGNED WHERE INDICATED, AND RETURNED WITH ALL REQUIRED BIDDER SUPPLIED DOCUMENTS TO CONSTITUTE A FORMAL BID.

IF THIS PROCEDURE IS NOT FOLLOWED, THE BID MAY BE CONSIDERED INFORMAL.

TENDER SUBMISSION

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Form G: Agreement to Bond	46
Bidder Supplied Documents (which must accompany the Tender Submission Forms to constitute a complete Tender Submission):	
Bid Security (Form F, or as specified in BI:14.01.)	
Written undertaking to provide Performance Security (Form G, or as specified in BI:14.02.)	

THE CITY OF WINNIPEG

FORM OF TENDER

1. Tender Number — P.D. 90-26

2. Project Title — EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

3. Bidder

_____
Name of Bidder

_____
Street

_____
City Province Postal Code

_____
Contact Person Telephone Number

4. Offer — I/We, the Bidder, hereby offer to execute the Work for the above named project in accordance with the Contract Documents at the place and in the manner set out, for the total amount in Canadian funds of:

ALTERNATIVE A - FULL CLOSURE*

$_____
(in figures)

_____
(in words)

_____

ALTERNATIVE B - PARTIAL CLOSURE*

$_____
(in figures)

_____
(in words)

_____

*NOTE: Bids must be received on both Alternatives for the Bid to be considered (See BI:8).

5. Time — This offer shall be open for acceptance, binding and irrevocable for a period of seventy-five (75) Calendar Days following the Time and Date Set for the Final Receipt of Bids in BI:5.

6.	Contract	I/We undertake to execute the Contract Documents in the manner stipulated by the Solicitor and return same within Seven (7) Calendar Days of receipt of the Contract Documents together with written notice signed by the Solicitor in the manner provided in the General Conditions of Contract.
7.	Prices: Unit Price	The Total Bid Price is based on the unit prices listed on Form A: Schedule of Prices (Unit Price) appended thereto, and I/We agree that the sum of the quantities multiplied by the Unit Prices for each item shall take precedence over the total amount stated in Clause 4 hereof.
8.	Qualifications	I/We have in the past executed the works listed on Form B1: Qualification (Contractor), appended hereto, which are similar in scope and value for which this offer is made.
9.	Sub-contractors	I/We propose to sublet portions of the Work as listed on Form C1: Sub-contractors and/or Form C2: Sub-contractors (Materials), appended hereto, and agree that no unidentified portions of the Work will be sublet and no substitution of Sub-contractors will be allowed without the prior written approval of the Contract Administrator.
10.	Equipment	I/We propose to furnish, as a minimum, the equipment listed on Form D1: Equipment (Bridge Works), and Form D2: Equipment (Road Works) appended hereto.
11.	Schedule	I/We agree to execute the Work in accordance with the schedule shown on Form E: Schedule of Work, appended hereto.
12.	Bid Security	In accordance with BI:15.01, I/We enclose herewith a Bid Security in the form of a (1) Irrevocable Letter of Guarantee (2) Certified Cheque (3) Bill of Exchange (Money Order/Bank Draft) (4) Bid Bond in the amount of _____ and agree that it shall be held by the City in accordance with the Contract Documents. Further I/We enclose herewith the Written Undertaking specified in BI:15.02 to provide Performance Security required by BI:16.
13.	Performance Security	I/We undertake to provide the Performance Security specified in the Contract Documents following notification of acceptance of this Offer and prior to the commencement of any Work but in no event later than the time period specified in Clause 6 hereof for the return of the Contract Documents.

14. Insurance — I/We undertake to provide the Insurance Policies specified in the Contract Documents following notification of acceptance of this offer and prior to the commencement of any Work but in no event later than the time period specified in Clause 6 hereof for the return of the Contract Documents.

15. Contract Documents — I/We agree that the Contract Documents as defined in GC.1.01(7) of the General Conditions in their entirety shall be deemed to be incorporated in and to form a part of this offer notwithstanding that they are not necessarily attached to or accompany this Tender Submission.

16. Addenda — I/We certify that the following addenda have been received and agree that they shall be deemed to form a part of the Contract Documents:

No. _____ Dated _____

_____ _____

_____ _____

17. Signatures — In witness whereof I/We have hereunto set my/our hand(s) this _____ day of _____ , A.D. 19____.

Signed and sealed by the Bidder in the presence of:

_____
Signature of Witness

_____
Name of Bidder

_____
Signature of Bidder

_____
Name and Title of Signator

(SEAL)

THE CITY OF WINNIPEG

Sheet 1 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	A. BRIDGE WORKS					
1.	Removal of Asphaltic Concrete Overlay	SP:13	SQUARE METRE	810		
2.	Removal of Bridge Deck Surface Concrete and Existing Top Reinforcing Steel	SP:13	SQUARE METRE	810		
3.	Removal of Handrail Parapet on Stairwells	SP:13	LUMP SUM	100%	LUMP SUM	
4.	Removal of Bridge Deck Median, Sidewalk Concrete, Concrete Curb and Reinforcing Steel	SP:13	LUMP SUM	100%	LUMP SUM	
5.	Removal of Existing Bridge Rail	SP:13	LUMP SUM	100%	LUMP SUM	
6.	Removal of Abutment Backwalls and Reinforcing Steel	SP:13	CUBIC METRE	14		
7.	Removal of Approach Slab Concrete	SP:13	SQUARE METRE	170		
8.	Supply and Installation of Noise and Protection Screen	SP:13	LUMP SUM	100%	LUMP SUM	
9.	Structural Concrete Repairs a) Piers b) Abutments	SP:16	SQUARE METRE SQUARE METRE	334 40		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 2 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
10.	Reinforcing Steel	SP:2				
	a) Supply					
	i) Plain		KILO-GRAM	26002.6		
	ii) Epoxy-Coated		KILO-GRAM	26762.7		
	b) Placement					
	i) Plain		KILO-GRAM	26002.6		
	ii) Epoxy-Coated		KILO-GRAM	26762.7		
11.	Field Epoxy-Coat Existing Reinforcement	SP:2	LUMP SUM	100%	LUMP SUM	
12.	Supply and Placement of Structural Concrete	SP:3				
	a) Abutment Backwall		CUBIC METRE	21.5		
	b) Pier Cap Cantilever		CUBIC METRE	2		
	c) Superstructure Diaphragms		CUBIC METRE	28		
	d) Approach Slabs and Grade Beams		CUBIC METRE	50		
	e) Approach Sidewalk Slab		CUBIC METRE	9		
	f) Slope Paving		CUBIC METRE	75		
	g) Bridge Sidewalk		CUBIC METRE	53		
	h) Median Traffic Barrier		CUBIC METRE	25		
	i) Shoulder Traffic Barrier		CUBIC METRE	49		
	j) Full-Depth Concrete Deck Patch		CUBIC METRE	2		
	k) Handrail Parapet on Stairwells		CUBIC METRE	3.5		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 3 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
13.	Epoxy-coated Dowels and Galvanized Expansion Sleeves	SP:3				
	a) Supply					
	i) Traffic Barriers		EACH	72		
	ii) Approach Slab		EACH	122		
	b) Installation					
	i) Traffic Barriers		EACH	72		
	ii) Approach Slab		EACH	122		
14.	Penetrating Concrete Sealer	SP:3 & SP:9	SQUARE METRE	2400		
15.	Jacking and Supporting Bridge Superstructures	SP:6	LUMP SUM	100%	LUMP SUM	
16.	Bridge Bearings	SP:4				
	a) Supply					
	i) Unidirectional Bearings		EACH	18		
	ii) Multidirectional Bearings		EACH	24		
	iii) Fixed Bearings		EACH	3		
	b) Installation					
	i) Unidirectional Bearings		EACH	18		
	ii) Multidirectional Bearings		EACH	24		
	iii) Fixed Bearings		EACH	3		
17.	Structural Steel	SP:5				
	a) Supply		TONNE	3.4		
	b) Erection		TONNE	3.4		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 4 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
18.	Supply and Installation of Conduits and Splice Pits	SP:7				
	a) Supply					
	i) 100 Diametre PVC		LINEAR METRE	77		
	ii) Splice Pit		EACH	6		
	b) Installation					
	i) 100 Diametre PVC		LINEAR METRE	77		
	ii) Splice Pit		EACH	6		
19.	Expansion Joints	SP:8				
	a) Supply		EACH	2		
	b) Installation		EACH	2		
20.	Supply and Placement of High Density Concrete	SP:9	SQUARE METRE	835		
21.	Aluminum Traffic Barrier Bridge Rail Posts, BRI Type C	SP:10				
	a) Supply		EACH	48		
	b) Installation		EACH	48		
22.	Aluminum Traffic Barrier Rail	SP:11				
	a) Supply		LINEAR METRE	130		
	b) Installation		LINEAR METRE	130		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 5 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
23.	Supply and Installation of Aluminum Pedestrian Handrail	SP:12				
	a) Aluminum Pedestrian Bridge Handrail					
	i) Supply		LINEAR METRE	79		
	ii) Installation		LINEAR METRE	64		
	b) Aluminum Pedestrian Approach Handrail					
	i) Supply		LINEAR METRE	93		
	ii) Installation		LINEAR METRE	93		
24.	Surface Preparation and Painting of Structural Steel	SP:14	LUMP SUM	100%	LUMP SUM	
25.	Supply and Installation of Sub-drain System	SP:15	LINEAR METRE	44		
26.	Portable Concrete Traffic Control Barrier	SP:17				
	a) Type A					
	i) Placement		LINEAR METRE	50		
	ii) Relocation		LINEAR METRE	274		
	iii) Removal		LINEAR METRE	50		
	b) Type B					
	i) Placement		LINEAR METRE	42		
	ii) Removal		LINEAR METRE	42		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
27.	Steel Soil Reinforcement Strips for Reinforced Granular Backfill at Abutments	SP:18				
	a) Supply		LUMP SUM	100%	LUMP SUM	
	b) Installation		LUMP SUM	100%	LUMP SUM	
28.	Supply and Placement of Backfill for Abutment Backwalls and Grade Beam Construction Works	SP:18	LUMP SUM	100%	LUMP SUM	
	SUB-TOTAL PART A					

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	B. ROAD WORKS					
29.	Subgrade, Sub-base and Base Course Construction	CW3110-R4				
	a) Excavation		CUBIC METRE	250		
	b) Subgrade Compaction		SQUARE METRE	750		
	c) Supplying and Placing Crushed Limestone Sub-base Material		TONNE	450		
	d) Supplying and Placing Granular Base Course Material		CUBIC METRE	42		
	e) Grading of Boulevards		SQUARE METRE	600		
30.	Full-depth Patching of Existing Pavement Slabs and Joints	CW3230-R3				
	a) Full-depth Slab Patches					
	i) Pavement Tie-in		SQUARE METRE	48		
	b) Full Slab Replacement 250 mm Reinforced Concrete		SQUARE METRE	555		
	c) Drilled Dowels		EACH	70		
	d) Roadway Expansion/ Contraction Joints	SP:27	LINEAR METRE	32		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
31.	Renewal of Existing Miscellaneous Portland Cement Concrete Slabs	CW3235-R1 CW3310-R4				
	a) Removal					
	i) Concrete Sidewalk		SQUARE METRE	200		
	ii) Median Slab		SQUARE METRE	175		
	b) Installation					
	i) 100 mm Concrete Sidewalk	SP:29	SQUARE METRE	205		
	ii) 150 mm Reinforced Concrete Sidewalk	SP:29	SQUARE METRE	15		
	iii) Safety Median	SP:28	CUBIC METRE	11.6		
	iv) Median Barrier	SP:28	CUBIC METRE	55.5		
	v) Monolithic Concrete Median		SQUARE METRE	28		
32.	Renewal of Existing Curbs	CW3240-R1				
	a) Removal					
	i) Barrier Curb		LINEAR METRE	410		
	b) Installation					
	i) Barrier Curb		LINEAR METRE	110		
	ii) Barrier Curb (Separate)	CW3310-R4	LINEAR METRE	80		
	iii) Paraplegic Curb		LINEAR METRE	14		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
33.	Joint and Crack Maintenance	CW3250-R2				
	a) Joint Cleaning		LINEAR METRE	30		
	b) Crack Cleaning					
	i) Routing Cracks (2 to 10 mm width)		LINEAR METRE	20		
	ii) Crack Cleaning (width > 10 mm)		LINEAR METRE	10		
	c) Joint and Crack Sealing		KILO-GRAM	60		
	d) Longitudinal Joint Filling (Width > 20 mm)		LINEAR METRE	10		
	e) Reflection Crack Cleaning and Sealing During One Year Maintenance Warranty Period		LINEAR METRE	70		
34.	Asphaltic Concrete Pavement Works	CW3410-R4 & SP:25				
	a) Asphaltic Concrete Overlay (Type I - Surface Course)		TONNE	110		
35.	Planing of Pavement	CW3450-R2 & SP:23				
	a) Planing 0-50 mm Depth (Asphaltic Concrete)		SQUARE METRE	580		
36.	Boulevard Sodding	CW3510-R4				
	a) Sodding Using Imported Topsoil		SQUARE METRE	600		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
37.	Installation of Aluminum Balanced Barrier	CW3650-R3				
	a) Supply of Barrier Posts					
	i) 1.6 m Length		EACH	41		
	ii) 0.8 m length		EACH	1		
	b) Installation of Barrier Posts		EACH	42		
	c) Supply of Barrier Rail					
	i) 11.43 m Length		LINEAR METRE	286		
	ii) 7.62 m length		LINEAR METRE	7.6		
	d) Installation of Barrier Rail		LINEAR METRE	293.6		
38.	Salvaging Guide Rail Energy Absorbing Terminal Unit	SP:26	LUMP SUM	100%	LUMP SUM	
39.	Removal and Disposal of Flexbeam Barrier	SP:19	LINEAR METRE	160		
	SUB-TOTAL PART B					

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	C. TRAFFIC DIVERSION WORKS - Temporary Portage Avenue Eastbound Left-Turn at Empress Street					
40.	Subgrade, Sub-base and Base Course Construction	CW3110-R4				
	a) Excavation		CUBIC METRE	360		
	b) Subgrade Compaction		SQUARE METRE	470		
	c) Supplying and Placing Crushed Limestone Sub-base Material		TONNE	350		
	d) Supplying and Placing Granular Base Course Material		CUBIC METRE	72		
	e) Grading of Boulevards		CUBIC METRE	470		
41.	Renewal of Existing Miscellaneous Portland Cement Concrete Slabs	CW3235-R1				
	a) Removal					
	i) Concrete Sidewalk		SQUARE METRE	15		
	b) Installation					
	i) Concrete Sidewalk		SQUARE METRE	20		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 12 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
42.	Renewal of Existing Curbs	CW3240-R1				
	a) Removal					
	i) Barrier Curb		LINEAR METRE	170		
	b) Installation					
	i) Variable Height Barrier Curb (100 to 180 mm)		LINEAR METRE	165		
	ii) Paraplegic Curb		LINEAR METRE	5		
43.	Asphaltic Concrete Pavement Works	CW3410-R4				
	a) Temporary Asphaltic Concrete Pavement - (Type III Base Course)		TONNE	170		
	b) Temporary Asphalt Curb		LINEAR METRE	180		
	c) Remove Temporary Asphalt Concrete Pavement	CW3110-R4	SQUARE METRE	440		
	d) Remove Temporary Asphalt Curb		LINEAR METRE	180		
44.	Boulevard Sodding	CW3510-R4				
	a) Sodding Using Imported Topsoil		SQUARE METRE	470		
45.	Maintenance of Traffic Diversion Roads	SP:20	LUMP SUM	100%	LUMP SUM	

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
46.	Adjustment or Abandonment of Existing Pavement and Boulevard Structures and Appurtenances a) Adjust Existing Catchbasins and Manholes	CW3210-R4	EACH	1		
	SUB-TOTAL PART C					

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	D. TRAFFIC DIVERSION WORKS - Portage Avenue Centre Median Reconstruction					
47.	Subgrade, Sub-base and Base Course Construction	CW3110-R4				
	a) Excavation		CUBIC METRE	360		
	b) Subgrade Compaction		SQUARE METRE	670		
	c) Supplying and Placing Crushed Limestone Sub-base Material		TONNE	250		
	d) Supplying and Placing Granular Base Course Material		CUBIC METRE	50		
	e) Grading of Boulevards		CUBIC METRE	15		
48.	Renewal of Existing Miscellaneous Portland Cement Concrete Slabs	CW3235-R1				
	a) Removal					
	i) Median Slab		SQUARE METRE	130		
	b) Installation					
	i) Monolithic Concrete Median Slab		SQUARE METRE	13		
49.	Renewal of Existing Curbs	CW3240-R1				
	a) Removal					
	i) Barrier Curb		LINEAR METRE	490		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
50.	Asphaltic Concrete Pavement Works	CW3410-R4 & SP:25				
	a) Asphaltic Concrete Pavement Widening (Type I - Surface Course)		TONNE	350		
51.	Installation of Aluminum Balanced Barrier	SP:30 & SP:31				
	a) Removal of Barrier Posts		EACH	26		
	b) Removal of Barrier Rail		LINEAR METRE	183		
	c) Installation of Barrier Posts					
	i) 1.60 m Length		EACH	36		
	ii) 0.80 m Length		EACH	4		
	d) Installation of Barrier Rail					
	i) 11.43 m Length		LINEAR METRE	260		
52.	Removal, Modification and Reinstallation of Guide Rail Energy Absorbing Unit	SP:26	EACH	2		
53.	Portable Concrete Median Barrier	SP:32	LINEAR METRE	200		
54.	Adjustment or Abandonment of Existing Pavement and Boulevard Structures and Appurtenances	CW3210-R4				
	a) Adjust Manholes		EACH	1		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 16 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
55.	Boulevard Sodding a) Sodding Using Imported Topsoil	CW3510-R4	SQUARE METRE	15		
	SUB-TOTAL PART D					

Name of Bidder

THE CITY OF WINNIPEG

Sheet 17 of 17 Sheets

SCHEDULE OF PRICES
ALTERNATIVE A - FULL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	SUMMARY A. BRIDGE WORKS B. ROAD WORKS C. TRAFFIC DIVERSION WORKS D. TRAFFIC DIVERSION WORKS					

Total Bid Price (in figures) $ _____

(in words) _____

_____

_____
Name of Bidder

THE CITY OF WINNIPEG

Sheet 1 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	A. BRIDGE WORKS					
1.	Removal of Asphaltic Concrete Overlay	SP:13	SQUARE METRE	810		
2.	Removal of Bridge Deck Surface Concrete and Existing Top Reinforcing Steel	SP:13	SQUARE METRE	810		
3.	Removal of Handrail Parapet on Stairwells	SP:13	LUMP SUM	100%	LUMP SUM	
4.	Removal of Bridge Deck Median, Sidewalk Concrete, Concrete Curb and Reinforcing Steel	SP:13	LUMP SUM	100%	LUMP SUM	
5.	Removal of Existing Bridge Rail	SP:13	LUMP SUM	100%	LUMP SUM	
6.	Removal of Abutment Backwalls and Reinforcing Steel	SP:13	CUBIC METRE	14		
7.	Removal of Approach Slab Concrete	SP:13	SQUARE METRE	170		
8.	Supply and Installation of Noise and Protection Screen	SP:13	LUMP SUM	100%	LUMP SUM	
9.	Structural Concrete Repairs	SP:16				
	a) Piers		SQUARE METRE	334		
	b) Abutments		SQUARE METRE	40		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
10.	Reinforcing Steel	SP:2				
	a) Supply					
	i) Plain		KILO-GRAM	26014.5		
	ii) Epoxy-Coated		KILO-GRAM	26454.4		
	b) Placement					
	i) Plain		KILO-GRAM	26014.5		
	ii) Epoxy-Coated		KILO-GRAM	26454.4		
11.	Field Epoxy-Coat Existing Reinforcement	SP:2	LUMP SUM	100%	LUMP SUM	
12.	Supply and Placement of Structural Concrete	SP:3				
	a) Abutment Backwall		CUBIC METRE	21.5		
	b) Pier Cap Cantilever		CUBIC METRE	2		
	c) Superstructure Diaphragms		CUBIC METRE	28		
	d) Approach Slabs and Grade Beams		CUBIC METRE	50		
	e) Approach Sidewalk Slab		CUBIC METRE	9		
	f) Slope Paving		CUBIC METRE	75		
	g) Bridge Sidewalk		CUBIC METRE	53		
	h) Median Traffic Barrier		CUBIC METRE	25		
	i) Shoulder Traffic Barrier		CUBIC METRE	49		
	j) Full-Depth Concrete Deck Patch		CUBIC METRE	2		
	k) Handrail Parapet on Stairwells		CUBIC METRE	3.5		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 3 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
13.	Epoxy-coated Dowels and Galvanized Expansion Sleeves	SP:3				
	a) Supply					
	i) Traffic Barriers		EACH	72		
	ii) Approach Slab		EACH	122		
	b) Installation					
	i) Traffic Barriers		EACH	72		
	ii) Approach Slab		EACH	122		
14.	Penetrating Concrete Sealer	SP:3 & SP:9	SQUARE METRE	2400		
15.	Jacking and Supporting Bridge Superstructures	SP:6	LUMP SUM	100%	LUMP SUM	
16.	Bridge Bearings	SP:4				
	a) Supply					
	i) Unidirectional Bearings		EACH	18		
	ii) Multidirectional Bearings		EACH	24		
	iii) Fixed Bearings		EACH	3		
	b) Installation					
	i) Unidirectional Bearings		EACH	18		
	ii) Multidirectional Bearings		EACH	24		
	iii) Fixed Bearings		EACH	3		
17.	Structural Steel	SP:5				
	a) Supply		TONNE	3.4		
	b) Erection		TONNE	3.4		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 4 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
18.	Supply and Installation of Conduits and Splice Pits	SP:7				
	a) Supply					
	i) 100 Diametre PVC		LINEAR METRE	77		
	ii) Splice Pit		EACH	6		
	b) Installation					
	i) 100 Diametre PVC		LINEAR METRE	77		
	ii) Splice Pit		EACH	6		
19.	Expansion Joints	SP:8				
	a) Supply		EACH	2		
	b) Installation		EACH	2		
20.	Supply and Placement of High Density Concrete	SP:9	SQUARE METRE	840		
21.	Aluminum Traffic Barrier Bridge Rail Posts, BRI Type C	SP:10				
	a) Supply		EACH	48		
	b) Installation		EACH	48		
22.	Aluminum Traffic Barrier Rail	SP:11				
	a) Supply		LINEAR METRE	130		
	b) Installation		LINEAR METRE	130		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 5 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
23.	Supply and Installation of Aluminum Pedestrian Handrail	SP:12				
	a) Aluminum Pedestrian Bridge Handrail					
	i) Supply		LINEAR METRE	79		
	ii) Installation		LINEAR METRE	64		
	b) Aluminum Pedestrian Approach Handrail					
	i) Supply		LINEAR METRE	93		
	ii) Installation		LINEAR METRE	93		
24.	Surface Preparation and Painting of Structural Steel	SP:14	LUMP SUM	100%	LUMP SUM	
25.	Supply and Installation of Sub-drain System	SP:15	LINEAR METRE	44		
26.	Portable Concrete Traffic Control Barrier	SP:17				
	a) Type A					
	i) Placement		LINEAR METRE	20		
	ii) Relocation		LINEAR METRE	20		
	iii) Removal		LINEAR METRE	20		
	b) Type B					
	i) Placement		LINEAR METRE	50		
	ii) Relocation		LINEAR METRE	391		
	iii) Removal		LINEAR METRE	50		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 6 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
27.	Steel Soil Reinforcement Strips for Reinforced Granular Backfill at Abutments	SP:18				
	a) Supply		LUMP SUM	100%	LUMP SUM	
	b) Installation		LUMP SUM	100%	LUMP SUM	
28.	Supply and Placement of Backfill for Abutment Backwalls and Grade Beam Construction Works	SP:18	LUMP SUM	100%	LUMP SUM	
	SUB-TOTAL PART A					

Name of Bidder

THE CITY OF WINNIPEG

Sheet 7 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	B. ROAD WORKS					
29.	Subgrade, Sub-base and Base Course Construction	CW3110-R4				
	a) Excavation		CUBIC METRE	250		
	b) Subgrade Compaction		SQUARE METRE	750		
	c) Supplying and Placing Crushed Limestone Sub-base Material		TONNE	450		
	d) Supplying and Placing Granular Base Course Material		CUBIC METRE	42		
	e) Grading of Boulevards		SQUARE METRE	600		
30.	Full-depth Patching of Existing Pavement Slabs and Joints	CW3230-R3				
	a) Full-depth Slab Patches					
	i) Pavement Tie-in		SQUARE METRE	48		
	b) Full Slab Replacement 250 mm Reinforced Concrete		SQUARE METRE	555		
	c) Drilled Dowels		EACH	70		
	d) Roadway Expansion/ Contraction Joints	SP:27	LINEAR METRE	32		

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
31.	Renewal of Existing Miscellaneous Portland Cement Concrete Slabs	CW3235-R1 CW3310-R4				
	a) Removal					
	i) Concrete Sidewalk		SQUARE METRE	190		
	ii) Median Slab		SQUARE METRE	175		
	iii) Median Barrier		LINEAR METRE	48		
	b) Installation					
	i) Concrete Sidewalk	SP:29	SQUARE METRE	190		
	ii) Safety Median	SP:28	CUBIC METRE	11.5		
	iii) Median Barrier	SP:28	LINEAR METRE	55.5		
	iv) 150 mm Reinforced Concrete Sidewalk	SP:29	SQUARE METRE	15		
	v) Monolithic Concrete Median		SQUARE METRE	28		
32.	Renewal of Existing Curbs	CW3240-R1				
	a) Removal					
	i) Barrier Curb		LINEAR METRE	410		
	b) Installation					
	i) Barrier Curb		LINEAR METRE	110		
	ii) Barrier Curb (Separate)		LINEAR METRE	80		
	ii) Paraplegic Curb		LINEAR METRE	14		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 9 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
33.	Joint and Crack Maintenance	CW3250-R2				
	a) Joint Cleaning		LINEAR METRE	30		
	b) Crack Cleaning					
	i) Routing Cracks (2 to 10 mm width)		LINEAR METRE	20		
	ii) Crack Cleaning (width > 10 mm)		LINEAR METRE	10		
	c) Joint and Crack Sealing		KILO-GRAM	60		
	d) Longitudinal Joint Filling (Width > 20 mm)		LINEAR METRE	10		
	e) Reflection Crack Cleaning and Sealing During One Year Maintenance Warranty Period		LINEAR METRE	70		
34.	Asphaltic Concrete Pavement Works	CW3410-R4 & SP:25				
	a) Asphaltic Concrete Overlay (Type I - Surface Course)		TONNE	110		
35.	Planing of Pavement	CW3450-R2 & SP:23				
	a) Planing 0-50 mm Depth (Asphaltic Concrete)		SQUARE METRE	580		
36.	Boulevard Sodding	CW3510-R4				
	a) Sodding Using Imported Topsoil		SQUARE METRE	600		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 10 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
37.	Installation of Aluminum Balanced Barrier	CW3650-R3				
	a) Supply of Barrier Posts					
	i) 1.6 m Length		EACH	41		
	ii) 0.8 m Length		EACH	1		
	b) Installation of Barrier Posts		EACH	42		
	c) Supply of Barrier Rail					
	i) 11.43 m Length		LINEAR METRE	286		
	ii) 7.62 m Length		LINEAR METRE	7.6		
	d) Installation of Barrier Rail		LINEAR METRE	293.6		
38.	Salvaging Guide Rail Energy Absorbing Terminal Unit	SP:26	LUMP SUM	100%	LUMP SUM	
39.	Removal and Disposal of Flexbeam Barrier	SP:19	LINEAR METRE	160		
	SUB-TOTAL PART B					

Name of Bidder

THE CITY OF WINNIPEG

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SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	C. TRAFFIC DIVERSION WORKS					
40.	Construction, Maintenance and Removal of Traffic Diversion Crossovers on Empress Street	SP:21	LUMP SUM	100%		
	SUB-TOTAL PART C					

Name of Bidder

THE CITY OF WINNIPEG

Sheet 12 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	D. TRAFFIC DIVERSION WORKS - Portage Avenue Centre Median Reconstruction					
41.	Subgrade, Sub-base and Base Course Construction	CW3110-R4				
	a) Excavation		CUBIC METRE	360		
	b) Subgrade Compaction		SQUARE METRE	670		
	c) Supplying and Placing Crushed Limestone Sub-base Material		TONNE	250		
	d) Supplying and Placing Granular Base Course Material		CUBIC METRE	50		
	e) Grading of Boulevards		CUBIC METRE	15		
42.	Renewal of Existing Miscellaneous Portland Cement Concrete Slabs	CW3235-R1				
	a) Removal					
	i) Median Slab		SQUARE METRE	130		
	b) Installation					
	i) Monolithic Concrete Median Slab		SQUARE METRE	13		
43.	Renewal of Existing Curbs	CW3240-R1				
	a) Removal					
	i) Barrier Curb		LINEAR METRE	490		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 13 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
44.	Asphaltic Concrete Pavement Works	CW3410-R4 & SP:25				
	a) Asphaltic Concrete Pavement Widening (Type I - Surface Course)		TONNE	350		
45.	Installation of Aluminum Balanced Barrier	SP:30 & SP:31				
	a) Removal of Barrier Posts		EACH	26		
	b) Removal of Barrier Rail		LINEAR METRE	183		
	c) Installation of Barrier Posts					
	i) 1.60 m Length		EACH	36		
	ii) 0.80 m Length		EACH	4		
	d) Installation of Barrier Rail					
	i) 11.43 m Length		LINEAR METRE	260		
46.	Removal, Modification and Reinstallation of Guide Rail Energy Absorbing Unit	SP:26	EACH	2		
47.	Portable Concrete Median Barrier	SP:32	LINEAR METRE	200		
48.	Adjustment or Abandonment of Existing Pavement and Boulevard Structures and Appurtenances	CW3210-R4				
	a) Adjust Manholes		EACH	1		

Name of Bidder

THE CITY OF WINNIPEG

Sheet 14 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
49.	Boulevard Sodding a) Sodding Using Imported Topsoil	CW3510-R4	SQUARE METRE	15		
	SUB-TOTAL PART D					

Name of Bidder

THE CITY OF WINNIPEG

Sheet 15 of 15 Sheets

SCHEDULE OF PRICES
ALTERNATIVE B - PARTIAL CLOSURE

FOR EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

Item No.	Description	Spec. Reference	Unit	Approx. Quantity	Unit Price	Amount
	SUMMARY A. BRIDGE WORKS B. ROAD WORKS C. TRAFFIC DIVERSION WORKS D. TRAFFIC DIVERSION WORKS					

Total Bid Price (in figures) $ _____

(in words) _____

_____

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **CONTRACTOR'S EXPERIENCE** IN SIMILAR WORK

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work was Performed			
7. Owner's Representative and Title/Current Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender (10 sheets provided).

_____
Name of Bidder

THE CITY OF WINNIPEG

SUB-CONTRACTORS

DESCRIPTION OF WORK	SUB-CONTRACTOR	ADDRESS
1. Abutment Excavation		
2. Removal of Deck, Sidewalks & Barriers		
3. Repairs to Piers & Abutments		
4. Reinforcing Steel Placement		
5. Concrete Falsework & Formwork		
6. Structural Concrete Placement		
7. Bearing Installation		
8. Girder Strengthening Works		
9. Construct Concrete Traffic Barriers		
10. Conduit Installation		
11. Splice Pit Installation		
12. Expansion Joint Installation		
13. Place Concrete Approach Slabs		
14. High Density Concrete Works		
15. Aluminum Traffic Barrier Rail Installation		
16. Aluminum Pedestrian Hand Rail Installation		

Name of Bidder

THE CITY OF WINNIPEG

SUB-CONTRACTORS

DESCRIPTION OF WORK	SUB-CONTRACTOR	ADDRESS
17. Backfill Works		
18. Soil Reinforcement Works		
19. Concrete Slope Paving Works		
20. Steel Girder Surface Preparation & Painting		
21. Concrete Pavement Placing		
22. Asphalt Overlay Works		
23. Removal and Salvaging of G.R.E.A.T. Unit		

Name of Bidder

THE CITY OF WINNIPEG

SUB-CONTRACTORS (MATERIALS)

MATERIAL	SUPPLIER, MANUFACTURER OR FABRICATOR	ADDRESS
1. Granular Backfill		
2. Drainage Piping		
3. Asphaltic Concrete		
4. Structural Steel		
5. Reinforcing Steel		
6. Structural Concrete		
7. Bridge Bearings		
8. Conduits		
9. Conduit Support System		
10. Expansion Joints		
11. High Density Concrete		
12. Aluminum Traffic Rail Posts		
13. Aluminum Traffic Rail		
14. Aluminum Pedestrian Handrail		
15. Steel Soil Reinforcement Materials		
16. Soil Reinforcement Materials		
17. Paint for Steel Girders		
18. Penetrating Concrete Sealer		

Name of Bidder

THE CITY OF WINNIPEG

EQUIPMENT SCHEDULE

Demolition Work	Excavation and Backfilling	Structural Steel Work	Hydro Demolition Work			Number of Machines	
						On Site	In Reserve

Name of Bidder

THE CITY OF WINNIPEG

EQUIPMENT SCHEDULE

Structural Concrete Placement	High Density Concrete Place.	Jacking Superstructure	Compaction	Miscellaneous		Number of Machines	
						On Site	In Reserve

Name of Bidder

THE CITY OF WINNIPEG

EQUIPMENT SCHEDULE

Excavation and Backfilling	Compaction and Grading	Paving Equipment	Traffic Control	Miscellaneous		Number of Machines	
						On Site	In Reserve

SHEET 1 OF 1

Name of Bidder

CITY OF WINNIPEG
Form E – SCHEDULE OF WORK
Tender No. P.D. 90–26

EMPRESS STREET OVERPASS –STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS
ALTERNATIVE A – COMPLETE CLOSURE OF EMPRESS STREET OVERPASS
TIME PERIOD – Week ending/1990

DESCRIPTION OF WORK	WEEK ENDING	APR 14	APR 21	APR 28	MAY 5	MAY 12	MAY 19	MAY 26	JUN 2	JUN 9	JUN 16	JUN 23	JUN 30	JUL 7	JUL 14	JUL 21	JUL 28	AUG 4	AUG 11	AUG 18	AUG 25	SEP 1	SEP 8	SEP 15	SEP 22	SEP 29
PORTAGE AVERNUE TRAFFIC DIVERSION TYPE	TDT	VII	I	I	I	II/IV	V	V	V	I	III	V	I	I	I	III	III	III	V	V	V	V	IV/II	I	I	VII
SUBMISSIONS AND MATERIAL SUPPLY																										
Submission and approval of:																										
– protection screens and hoarding		100%																								
– jacking system		100%																								
Supply of:																										
– bridge bearing shopdrawings			100%																							
– bridge bearings									33%	67%	100%															
– expansion joint shopdrawings					100%																					
– expansion joints																	100%									
TRAFFIC DIVERSION WORKS																										
Install temporary left–turn lane	VII	100%																								
Install Portage Ave. median crossovers and median lane widening	VII	100%																								
Install Empress Street traffic closure barricades		0%	*100%																							
BELOW DECK REHABILITATION WORKS																										
Install overhang protection and noise screen, north span	I	0%	100%																							
Install overhang protection and noise screen, north/center span	I	0%	50%			100%																				
Install watertight metal plate protection screen, north/center span	I	0%	50%			100%																				
Install north sidewalk shelter	I	0%	100%																							
Remove north slope paving and haul away	I	0%	100%																							
Reconstruct north slope paving	I	0%			100%																					
Construct north pier cantilevered bracket	I	0%			100%																					
Install north span exterior girder coverplates	I	0%			100%																					
Prepare bridge jacking support system at north pier & abutment	I	0%			100%																					
Prepare bridge jacking support system at center pier	II				0%	100%																				
Install center pier protection hoarding	II				0%	100%																				
Prepare bridge jacking support system at center pier	IV				0%	100%																				
Install center pier protection hoarding	IV				0%	100%																				
Construct center pier cantilevered bracket	IV				0%	100%																				
Install overhang protection and noise screen, south/center span	IV				0%	50%	100%																			
Install watertight metal plate protection screen, south/center span	IV				0%	50%	100%																			
Install overhang protection and noise screen, south span	V					0%	100%																			
Install south sidewalk shelter	V					0%	100%																			
Remove south slope paving and haul away	V					0%	100%																			
Reconstruct south slope paving	V					0%			100%																	
Construct south pier cantilevered bracket	V					0%			100%																	
Install south span exterior girder coverplates	V					0%			100%																	
Prepare bridge jacking support system at south pier & abutment	V					0%			100%																	
Jack up south and south/center bridge spans and support	Vlam								0%	*100%																
Install south/center span exterior coverplate	Vlam								0%	*100%																
Jack up north and north/center bridge spans and support	Vlpm								0%	*100%																
Install north/center span exterior coverplates	Vlpm								0%	*100%																
Install bridge bearings and shoe plates on north pier and abutment	I								0%	100%																
Install bridge bearings and shoe plates on center pier	III									0%	100%															
Install bridge bearings shoe plates on south pier and abutment	V									0%	0%	100%														
Lower down south and south/center bridge spans on new bearings	Vlam											0%	*100%													
Lower down north and north/center bridge spans on new bearings	Vlpm											0%	*100%													
Attach shoe plates to north and north/center girders	I											0%	100%													
Remove overhang protection and noise screen	I											0%	100%													
Remove watertight metal plate protection screen	I											0%	100%													
Remove existing steel diaphragms	I											0%	100%													
Install splicing plates	I											0%	100%													
Install new concrete sidewalk, curb and diaphragm formwork	I											0%		100%												
Remove diaphragm formwork	I											0%			100%											
Rehabilitate pier and abutment	I											0%			100%											
Remove pier protection hoarding	I											0%			100%											
Attach shoe plates to center girders	III														0%	100%										
Remove overhang protection and noise screen	III														0%	100%										
Remove watertight metal plate protection screen	III														0%	100%										
Remove existing steel diaphragms	III														0%	100%										
Install splicing plates	III														0%	100%										
Install new concrete sidewalk, curb and diaphragm formwork	III														0%		100%									
Remove diaphragm formwork	III														0%			100%								
Rehabilitate pier	III														0%			100%								
Remove pier protection hoarding	III														0%			100%								
Attach shoe plates to south and south/center girders	V																	0%	100%							
Remove overhang protection and noise screen	V																	0%	100%							
Remove watertight metal plate protection screen	V																	0%	100%							
Remove existing steel diaphragms	V																	0%	100%							
Install splicing plates	V																	0%	100%							
Install new concrete sidewalk, curb and diaphragm formwork	V																	0%	100%							
Remove diaphragm formwork	V																	0%		100%						
Rehabilitate pier and abutment	V																	0%		100%						
Remove pier protection hoarding	V																	0%		100%						
Remove formwork and install traffic paint protection screen	V																	0%			100%					
Sand blast and paint south and south/center girders	V																	0%			100%					
Rehabilitate south stairs and install handrail	V																	0%			100%					
Remove sidewalk protection	V																	0%			100%					
Clean up area	V																	0%			100%					
Remove formwork and install traffic paint protection screen	IV																				0%	100%				
Sand blast and paint south/center girders	IV																				0%	100%				
Clean up area	IV																				0%	100%				
Remove formwork and install traffic paint protection screen	II																				0%	100%				
Sand blast and paint north/center girders	II																				0%	100%				
Clean up area	II																				0%	100%				
Remove formwork and install traffic paint protection screen	I																				0%	100%				
Sand blast and paint north and north/center girders	I																				0%	100%				
Rehabilitate north stairs and install handrail	I																				0%	100%				
Remove sidewalk protection	I																				0%	100%				
Clean up area	I																				0%	100%				
Remove Empress Street traffic control barricades	VIII																								0%	100%
Restore Portage Avenue and median and Empress island	VII																								0%	*100%
ABOVE DECK REHABILITATION WORKS																									0%	100%
Remove existing waterproofing membrane and asphalt deck surface			0%				100%																			
Remove existing bridge rails			0%					100%																		
Demolition of existing sidewalk, median and curb			0%						100%																	
Hydro–demolition of top surface of deck			0%									100%														
Demolish approach slab and roadway slabs		0%	50%											100%												
Remove existing expansion joints and local deck concrete			0%	0%									100%													
Excavate approach fill to accomodate soil reinforcing		0%	50%											100%												
Demolish existing backwalls			0%	50%											100%											
Reconstruct concrete backwalls and wingwalls			0%			50%										100%										
Install backfill and soil reinforcing			0%							50%								100%								
Construct new roadway and sidewalk approach slabs									0%		50%								100%							
Install new concrete diaphragms													0%	33%		67%				100%						
Install new bridge sidewalk										0%										100%						
Install concrete shoulder and median traffic barriers												0%								100%						
Install expansion joints												0%								100%						
Place high–density concrete overlay												0%									100%					
Install bridge traffic railing																					0%			100%		
Install bridge hand railing																					0%			100%		
Clean–up area																								0%	100%	
ROADWORKS																										
Supply temporary construction facilities		0%	100%																							
Demolish existing roadway		0%		50%											100%											
Remove asphalt topping		0%		50%											100%											
Remove existing median slab		0%		50%											100%											
Remove existing flex–beam railing		0%		50%											100%											
Remove existing great barrier		0%		100%																						
Install new roadway and sidewalk slabs				0%							50%												100%			
Install splice pits		0%										50%												100%		
Install new concrete safety barrier and median												50%													100%	
Install asphalt overlay tie–in											0%	50%													100%	
Boulevard grading and sodding																									0%	100%
Remove temporary construction facilities									0%																	

NOTE:

Bidders shall indicate below each time period the cumulative percentage of work which he anticipates will be completed by that time period. Each item of work must be carried backward untill it shows 0% completion.

This schedule does not list all the work noted on the plans and specifications. The contractor shall carry out all work required in an orderly fashion within the traffic diversion constraints noted above.

"*" indicates work to be carried out on Sunday between the hours of 6:00 am and 6:00 pm.

Proposed commencement date: April 9, 1990
Proposed bridge traffic closure date: April 15, 1990
Superstructure jacking: June 3, 1990
Superstructure lowering: June 24, 1990
Proposed bridge traffic opening date: September 23, 1990
Completion of work: September 29, 1990

Supply and installation of bridge bearings as noted on this schedule is is critical to the completion of this project.
The contractor will be assessed liquidated damages in accordance with the specifications for work not completed by the interim completion dates noted.

I Denotes work being carried out on the North & 2/3 of North Center Span
II Denotes work being carried out on the 2/3 of North–Center Span from Center Pier
III Denotes work being carried out on the 1/3 of North–Center Span and 1/3 of South–Center Span
IV Denotes work being carried out on the 2/3 of South–Center Span from Center Pier
V Denotes work being carried out on the South and 2/3 of South–Center Span
Vlam Denotes work being carried out on the South and South–Center Span
Vlpm Denotes work being carried out on the North and North–Center Span
VII Denotes work being carried out on the Median Lane, 1/3 of North–Center Span and 1/3 of South–Center Span
VIII Denotes no work being carried out under the Bridge normal flow of traffic

Refer to Traffic Diversion Drawing for Details

CITY OF WINNIPEG
Form E1 – DAILY MANPOWER AND WEEKLY EQUIPMENT SCHEDULE

DAILY MANPOWER SCHEDULE
Tender No. P.D. 90–26

DAY / MANPOWER SCHEDULE	WEEK ENDING	APR 14	APR 21	APR 28	MAY 5	MAY 12	MAY 19	MAY 26	JUN 2	JUN 9	JUN 16	JUN 23	JUN 30	JUL 7	JUL 14	JUL 21	JUL 28	AUG 4	AUG 11	AUG 18	AUG 25	SEP 1	SEP 8	SEP 15	SEP 22	SEP 29
SUNDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										
MONDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										
TUESDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										
WEDNESDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										
THURSDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										
FRIDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										
SATURDAY TOTAL NUMBER OF PERSONS/SHIFT TOTAL NUMBER OF SHIFTS/DAY																										

NOTE: The contractor shall fill in the total number of ON–SITE persons per shift and the number of shifts per day for each day, for the duration of the project.

WEEKLY EQUIPMENT SCHEDULE
Tender No. P.D. 90–26

PROPOSED EQUIPMENT ON SITE	WEEK ENDING	APR 14	APR 21	APR 28	MAY 5	MAY 12	MAY 19	MAY 26	JUN 2	JUN 9	JUN 16	JUN 23	JUN 30	JUL 7	JUL 14	JUL 21	JUL 28	AUG 4	AUG 11	AUG 18	AUG 25	SEP 1	SEP 8	SEP 15	SEP 22	SEP 29

NOTE: The contractor shall list all major equipment proposed to complete the works and checkmark each week that each piece of equipment will be on site.

WARDROP ENGINEERING INC.

Name of Bidder

CITY OF WINNIPEG
Tender No. P.D. 90–26

EMPRESS STREET OVERPASS
STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS

FORMS E AND E1
ATERNATIVE A

CITY OF WINNIPEG
Form E – SCHEDULE OF WORK
Tender No. P.D. 90–26

EMPRESS STREET OVERPASS –STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS
ALTERNATIVE B – PARTIAL CLOSURE OF EMPRESS STREET OVERPASS
TIME PERIODE – Week ending/1990

DESCRIPTION OF WORK	WEEK ENDING	APR 14	APR 21	APR 28	MAY 5	MAY 12	MAY 19	MAY 26	JUN 2	JUN 9	JUN 16	JUN 23	JUN 30	JUL 7	JUL 14	JUL 21	JUL 28	AUG 4	AUG 11	AUG 18	AUG 25	SEP 1	SEP 8	SEP 15	SEP 22	SEP 29
PORTAGE AVENUE TRAFFIC DIVERSION TYPE	TDT	VII/I	I	II/IV	V	V	VI/I	III	V	I	I	III	III	V	V	VIII	VIII	I	III	V	I	I	IV/II	V	V	VIII
SUBMISSIONS AND MATERIAL SUPPLY																										
Submission and approval of:																										
– protection screens and hoarding		100%																								
– jacking system		100%																								
Supply of:																										
– bridge bearing shopdrawings		100%																								
– bridge bearings						33%	67%	100%																		
– expansion joint shopdrawings			100%																							
– expansion joints												50%										100%				
TRAFFIC DIVERSION WORKS																										
Install Portage Ave. median crossovers & median lane widening	VII	100%																								
Install Empress Street traffic diversion barricades	VIII	0%	*100%																							
BELOW DECK REHABILITATION																										
Install overhang protection and noise screen, north span	I	50%									100%															
Install overhang protection and noise screen, north/center span	I	0%	25%	50%							75%		100%													
Install watertight metal plate protection screen, north/center span	I	0%	25%	50%							75%		100%													
Install north sidewalk shelter	I	100%																								
Remove north slope paving and haul away	I	100%																								
Reconstruct north slope paving	I	0%	100%																							
Construct north pier cantilevered bracket	I	0%	100%																							
Install north span exterior girder coverplates	I	0%	100%																							
Prepare bridge jacking support system at north pier & abutment	I	0%	100%																							
Prepare bridge jacking support system at center pier	II		0%	100%																						
Install center pier protection hoarding	II		0%	100%																						
Prepare bridge jacking support system at center pier	IV		0%	100%																						
Install center pier protection hoarding	IV		0%	100%																						
Construct center pier cantilevered bracket	IV		0%	50%				100%																		
Install overhang protection and noise screen, south/center span	IV		0%	25%	50%								75%		100%											
Install watertight metal plate protection screen, south/center span	IV		0%	25%	50%								75%		100%											
Install overhang protection and noise screen, south span	V			0%	50%										100%											
Install south sidewalk shelter	V			0%	100%																					
Remove south slope paving and haul away	V			0%	100%																					
Reconstruct south slope paving	V			0%		100%																				
Construct south pier cantilevered bracket	V			0%		100%																				
Install south span exterior girder coverplates	V			0%		100%																				
Prepare bridge jacking support system at south pier & abutment	V			0%		100%																				
Jack up south and south/center bridge spans and support	Vlam					0%	*100%																			
Install south/center span exterior coverplate	Vlam					0%	*100%																			
Jack up north and north/center bridge spans and support	Vlpm					0%	*100%																			
Install north/center span exterior coverplates	Vlpm					0%	*100%																			
Install bridge bearings & shoe plates on north pier & abutment	I					0%	100%																			
Install bridge bearings and shoe plates on center pier	III						0%	100%																		
Install bridge bearings shoe plates on south pier and abutment	V							0%	100%																	
Lower down south & south/center bridge spans on new bearings	Vlam								0%	*100%																
Lower down north & north/center bridge spans on new bearings	Vlpm								0%	*100%																
Attach shoe plates to north and north/center girders	I								0%	100%																
Remove overhang protection and noise screen	I					0%	50%											100%								
Remove watertight metal plate protection screen	I					0%	50%											100%								
Remove existing steel diaphragms	I								0%	100%																
Install splicing plates	I								0%	100%																
Install new concrete sidewalk, curb and diaphragm formwork	I					0%	50%											100%								
Remove diaphragm formwork	I								0%		50%										100%					
Rehabilitate pier and abutment	I								0%		100%															
Remove pier protection hoarding	I								0%		100%															
Attach shoe plates to center girders	III										0%	100%														
Remove overhang protection and noise screen	III						0%	50%											100%							
Remove watertight metal plate protection screen	III						0%	50%											100%							
Remove existing steel diaphragms	III										0%	100%														
Install splicing plates	III										0%		100%													
Install new concrete sidewalk, curb and diaphragm formwork	III						0%	50%											100%							
Remove diaphragm formwork	III										0%		50%										100%			
Rehabilitate pier	III										0%		100%													
Remove pier protection hoarding	III										0%		100%													
Attach shoe plates to south and south/center girders	V												0%	100%												
Remove overhang protection and noise screen	V							0%	50%											100%						
Remove watertight metal plate protection screen	V							0%	50%											100%						
Remove existing steel diaphragms	V												0%	100%												
Install splicing plates	V												0%		100%											
Install new concrete sidewalk, curb and diaphragm formwork	V							0%	50%											100%						
Remove diaphragm formwork	V												0%		50%								100%			
Rehabilitate pier and abutment	V												0%		100%											
Remove pier protection hoarding	V												0%		100%											
Remove formwork and install traffic paint protection screen	V																						0%	100%		
Sand blast and paint south and south/center girders	V																						0%		100%	
Rehabilitate south stairs and install handrail	V																						0%		100%	
Remove sidewalk protection	V																						0%		100%	
Clean up area	V																									
Remove formwork and install traffic paint protection screen	IV																					0%	100%			
Sand blast and paint south/center girders	IV																					0%	100%			
Clean up area	IV																					0%	100%			
Remove formwork and install traffic paint protection screen	II																					0%	100%			
Sand blast and paint north/center girders	II																					0%	100%			
Clean up area	II																					0%	100%			
Remove formwork and install traffic paint protection screen	I																			0%	100%					
Sand blast and paint north and north/center girders	I																			0%		100%				
Rehabilitate north stairs and install handrail	I																			0%		100%				
Remove sidewalk protection	I																			0%		100%				
Clean up area	I																					100%				
Remove Empress Street traffic diversion barricades	VIII																							0%	*100%	
Restore Portage Avenue and median and Empress Island	VII																							0%	100%	
Switch over Empress Street	VIII													0%	*100%											
ABOVE DECK REHABILITATION WORKS																										
Remove existing waterproofing membrane & asphalt deck surface		0%	50%												100%											
Remove existing bridge rails		0%	50%												100%											
Demolition of existing sidewalk, median and curb		0%			50%											100%										
Hydro–demolition of top surface of deck		0%				50%												100%								
Demolish approach slab and roadway slabs		0%	25%				50%									75%			100%							
Remove existing expansion joints and local deck concrete		0%					50%									75%			100%							
Excavate fill to accomodate soil reinforcing		0%	25%				50%									75%			100%							
Demolish existing backwalls		0%	25%				50%									75%			100%							
Reconstruct concrete backwalls and wingwalls		0%			25%			50%										75%				100%				
Install backfill and soil reinforcing		0%			25%			50%										75%				100%				
Constr. new sidewalk and approach slabs		0%				25%			50%										75%				100%			
Install new concrete diaphragms						0%	17%	34%	50%									67%	84%	100%						
Install new bridge sidewalk and curb									0%				50%										100%			
Install concrete shoulder and median traffic barriers									0%				50%										100%			
Install expansion joints									0%				50%										100%			
Place high–density concrete overlay													0%	50%										100%		
Install bridge traffic railing														0%	50%										100%	
Install bridge hand railing						0%									100%											
Clean–up area														0%	50%											100%
ROADWORKS																										
Supply temporary construction facilities		0%	100%																							
Demolish existing roadway		0%	25%				50%								75%				100%							
Remove asphalt topping		0%	25%				50%								75%				100%							
Remove existing median slab		0%	50%				100%																			
Remove existing flex–beam railing		0%	25%				50%								75%				100%							
Remove existing great barrier		0%	100%																							
Install new roadway and sidewalk slabs		0%				25%				50%									75%				100%			
Install splice pits		0%												100%												
Install new concrete safety barrier and median		0%												50%										100%		
Install asphalt overlay tie–in		0%												50%										100%		
Boulevard grading and sodding																							0%	100%		
Remove temporary construction facilities																								0%	100%	

NOTE:

Bidders shall indicate below each time period the cumulative percentage of work which he anticipates will be conpleted by that time period. Each item of work must be carried backward untill it shows 0% completion.

This schedule does not list all the work noted on the plans and specifications. The contractor shall carry out all work required in an orderly fashion within the traffic diversion constraints noted above.

"*" indicates work to be carried out on Sunday between the hours of 6:00 am and 6:00 pm.

Proposed commencement date: April 9, 1990
Proposed bridge traffic closure date: April 15, 1990
Superstructure jacking: May 13, 1990
Superstructure lowering: June 3, 1990
Empress Street traffic switchover date: July 15, 1990
Proposed bridge traffic opening date: September 23, 1990
Completion of work: September 29, 1990

Supply and installation of bridge bearings as noted on this schedule is is critical to the completion of this project. The contractor will be assessed liquidated damages in accordance with the specifications for work not completed by the interim completion dates noted.

I Denotes work being carried out on the North & 2/3 of North Center Span
II Denotes work being carried out on the 2/3 of North–Center Span from Center Pier
III Denotes work being carried out on the 1/3 of North–Center Span and 1/3 of South–Center Span
IV Denotes work being carried out on the 2/3 of South–Center Span from Center Pier
V Denotes work being carried out on the South and 2/3 of South–Center Span
Vlam Denotes work being carried out on the South and South–Center Span
Vlpm Denotes work being carried out on the North and North–Center Span
VII Denotes work being carried out on the Median Lane, 1/3 of North–Center Span and 1/3 of South–Center Span
VIII Denotes no work being carried out under the Bridge normal flow of traffic

Refer to Traffic Diversion Drawing for Details

CITY OF WINNIPEG
Form E1 – DAILY MANPOWER AND WEEKLY EQUIPMENT SCHEDULE

DAILY MANPOWER SCHEDULE
Tender No. P.D. 90–26

DAY		WEEK ENDING	APR 14	APR 21	APR 28	MAY 5	MAY 12	MAY 19	MAY 26	JUN 2	JUN 9	JUN 16	JUN 23	JUN 30	JUL 7	JUL 14	JUL 21	JUL 28	AUG 4	AUG 11	AUG 18	AUG 25	SEP 1	SEP 8	SEP 15	SEP 22	SEP 29
SUNDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										
MONDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										
TUESDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										
WEDNESDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										
THURSDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										
FRIDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										
SATURDAY	TOTAL NUMBER OF PERSONS/SHIFT																										
	TOTAL NUMBER OF SHIFTS/DAY																										

NOTE: The contractor shall fill in the total number of ON–SITE persons per shift and the number of shifts per day for each day, for the duration of the project.

WEEKLY EQUIPMENT SCHEDULE
Tender No. P.D. 90–26

PROPOSED EQUIPMENT ON SITE	WEEK ENDING	APR 14	APR 21	APR 28	MAY 5	MAY 12	MAY 19	MAY 26	JUN 2	JUN 9	JUN 16	JUN 23	JUN 30	JUL 7	JUL 14	JUL 21	JUL 28	AUG 4	AUG 11	AUG 18	AUG 25	SEP 1	SEP 8	SEP 15	SEP 22	SEP 29

NOTE: The contractor shall list all major equipment proposed to complete the works and checkmark each week that each piece of equipment will be on site.

WARDROP ENGINEERING INC.

Name of Bidder

EMPRESS STREET OVERPASS
STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS

FORMS E AND E1
ATERNATIVE B

THE CITY OF WINNIPEG

BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____

_____

of _____

(hereinafter called the "Surety"), as Surety, is held and firmly bound unto THE CITY OF WINNIPEG (hereinafter called the "Obligee") in the sum of Ten Percent (10%) of the total amount of the Bid Price in the Tender Submission hereinafter described, for the payment whereof said Surety binds itself firmly by these presents.

WHEREAS _____

(hereinafter called the "Principal") has submitted a Bid to the Obligee dated the _____ day of _____ , 19 ___ for:

EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

as more fully set out in the Tender Package.

NOW THEREFORE, the condition of this obligation is such that if the Bid of the Principal is not accepted, or if said Bid is accepted and the Principal, in accordance with the terms of the Bid, enters into a Contract with the said Obligee and furnishes the required Performance Security for guaranteeing the faithful performance of the Contract, this obligation shall be void, but otherwise shall remain in full force and effect.

SIGNED, SEALED AND DELIVERED the _____ day of _____ , 19 ___ .

Signed, sealed and delivered)
in the presence of:) (Name of Surety)
)
)
) By: _____
Attorney-in-Fact

THE CITY OF WINNIPEG

AGREEMENT TO BOND

(to be attached to and form part of the Bid Bond)

We, the undersigned, the Surety on the attached Bid Bond, hereby undertake and agree with THE CITY OF WINNIPEG to become bound as Surety for:

_____
(name of bidder)

of _____
(place)

the Bidder to you on _____ , 19 ___ for the construction of:

EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING

AND RELATED WORKS IN THE CITY OF WINNIPEG
(description of Work)

in an amount equal to ONE HUNDRED ___ percent (100 %) of the Contract Price for the due and proper performance of the Work shown and described in the Tender Package, if our Principal's Bid is accepted by you, such Performance Bond to provide for a Warranty Period of TWO ____ (2) year(s) from the date of the Certificate of Total Performance of the Work. Said Performance Bond is to be in a form satisfactory to the Solicitor for The City of Winnipeg.

It is a condition that this Agreement to Bond shall become null and void if the Performance Bond mentioned above is not required from our Principal within SEVENTY-FIVE(75) Calendar Days following the Time and Date set for Final Receipt of Bids.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

As witness our Corporate Seal, testified by the hand of the proper officer thereunto duly authorized.

Dated this _____ day of _____, 19 ___.

(Name of Surety)

By:_____

Attorney-in-Fact

PART B

BIDDING INSTRUCTIONS

THE CITY OF WINNIPEG

BIDDING INSTRUCTIONS

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BI:1. TENDER NUMBER: P.D. 90-26

BI:2. PROJECT TITLE:

Empress Street Overpass Structure Rehabilitation, Strengthening and Related Works in the City of Winnipeg

BI:3. PROJECT DESCRIPTION/SCOPE:

3.01 The Work to be done under this Contract consists of of the Empress Street Overpass Structure Rehabilitation, Strengthening and Related Works, in the City of Winnipeg in accordance with this Tender Package.

3.02 The major items of Work for this Contract are as follows:

A. Bridge Works:
- a) Removal of existing bearings and installation of new bearings at all abutments and piers.
- b) Demolition of existing approach slabs, modification of abutment back walls and installation of expansion joints.
- c) Strengthen exterior girders and make all girders continuous over piers.
- d) Cast concrete diaphragms over piers and abutments.
- e) Removal of existing deck asphalt and deck down to 25 mm below bottom of top deck reinforcing steel and including all deteriorated concrete to a minimum depth of 80 mm. Epoxy coat existing exposed portion of truss bars.
- f) Removal of existing sidewalk on west side, centre median and curb section on east side.
- g) Construction of new sidewalk and median safety barrier.
- h) Construction of shoulder barriers complete with traffic barrier railings and posts.
- i) Installation of epoxy coated reinforcing steel and minimum 140 mm high density concrete topping over traffic surface of the overpass.
- j) Installation of new aluminum pedestrian handrail.
- k) Concrete repair to piers and abutments.
- l) Surface preparation and painting of structural steel.
- m) Reinforcement of pier cap cantilevers.
- n) Reconstruction of existing slope pavings and surface run-off channel underneath the overpass.
- o) Reconstruction of approach slabs.

B. Roadworks:
- a) Removal and reconstruction of immediate roadway slabs.
- b) Resurface asphalt overlay beyond reconstructed roadway slabs.
- c) Supply and installation of aluminum shoulder barriers.
- d) Repair of existing stairways and approach sidewalk and handrails.

BI:3. PROJECT DESCRIPTION/SCOPE: (Cont'd)

3.02 (Cont'd)

C. Traffic Diversion Works - Alternative A: Temporary Portage Ave. Left-turn Lane at Empress Street

a) Removal of existing grass median
b) Construction of temporary asphalt pavement and curb
c) Restoration of grass median and concrete curb

- OR -

C. Traffic Diversion Works - Alternative B

a) Construction, maintenance and removal of asphalt cross-over on Empress Street

D. Traffic Diversion Works - Alternative A and Alternative B: Widening of Portage Avenue Median Lanes

a) Removal of existing grass median
b) Removal of concrete median
c) Relocation of existing aluminum balance barrier
d) Removal, modification and reinstallation of G.R.E.A.T. units
e) Construction of asphalt pavement in Portage Avenue center median
f) Installation of portable concrete safety shape traffic barrier.

BI:4. DEPOSIT FOR TENDER PACKAGE:

4.01 Bidders desiring to take out a copy of the Tender Package, which consists of one bound "Bidding Specifications" Booklet and one bound "Bidding Drawings" Set must deposit with the City the sum of one hundred ($100.00) dollars.

4.02 This deposit will be refunded upon the return of the Tender Package excluding the Tender Submission, complete and in good condition, no later than Fourteen (14) Calendar Days after the Time and Date Set for the Final Receipt of Bids.

BI:5. TIME AND DATE SET FOR FINAL RECEIPT OF BIDS:

5.01 Time and Date Set for Final Receipt of Bids:

TIME: 12:00 noon Winnipeg Time

DATE: March 16, 1990

at: PURCHASING DEPARTMENT, MAIN FLOOR,
ADMINISTRATION BUILDING, CIVIC CENTRE,
510 MAIN STREET
WINNIPEG, MANITOBA

5.02 Except where extended by Addendum, Bids received later than the time stated above will not be accepted and will be returned unopened.

BI:6. GENERAL ENQUIRIES:

General enquiries may be directed to:

C.D. (Doug) Stewart, P.Eng.
Wardrop Engineering Inc.
Telephone No. (204) 956-0980

BI:7. SITE INVESTIGATION:

7.01 The Contractor, prior to tendering, is to make himself fully acquainted with the extent of work required and the nature of the site in accordance with GC:2.01 of the General Conditions.

7.02 The following information is available for viewing at the office of Wardrop Engineering Inc., 77 Main Street, Winnipeg, Manitoba, between the hours of 8:30 a.m. to 5:00 p.m., Winnipeg time, Monday to Friday. Inquiries to be directed to Mr. C.D. (Doug) Stewart, P.Eng. at (204) 956-0980.

i) Drawings used to construct existing bridge;
ii) Engineering reports on the Empress Street Overpass authored by Wardrop Engineering Inc.
    a) Empress Street Overpass Report on Collision Damage, October 1988
    b) Empress Street Overpass Structural Investigation Load Rating and Preliminary Engineering Study, January 1989
iii) Delamination Survey, June 28, 1978, Federal Technical Surveys Ltd.

7.03 No claim shall be made by the Contractor, after the Tender Submission is made or the Work is done, that there was a misunderstanding as to his responsibility in securing for himself information relative to the nature of amount of work to be done.

BI:8. BIDDING ALTERNATIVES:

Further to BI:10 "Prices - Unit Price" and BI:25 "Award of Contract", Bidders are advised that there are two construction sequencing alternatives for this project, as identified below, which are being tendered simultaneously, and that bids must be received on both alternatives for the bid to be considered.

The two construction sequencing alternatives are:

i) Alternative "A" - Full Closure

Empress Street will be closed to traffic by the City of Winnipeg from the south limit of Eastway to 280 m from the south abutment of Empress Street throughout the entire construction period. Access to Winnipeg Hydro Substation by Hydro personnel will be provided. Portage Avenue will not be closed to traffic. The Contractor shall be required to maintain, as a minimum, two lanes of traffic in each direction on Portage Avenue during reconstruction of the bridge. The Contractor will be required to provide the necessary traffic and pedestrian control in accordance with City of Winnipeg Standard Provision CW 1100 Clause 16, and as directed by the Contract Administrator.

ii) Alternative "B" - Partial Closure

Empress Street shall remain open to two lanes of traffic, one in each direction for the duration of the Contract except for 2-one day periods where Empress Street will be closed from the south limit of Eastway to 70 m from the south abutment of Empress Street. Portage Avenue will not be closed to traffic. The Contractor shall be required to maintain, as a minimum, two lanes of traffic in each direction at Portage Avenue during reconstruction of the bridge. The Contractor will be required to provide the necessary traffic and pedestrian control in accordance with City of Winnipeg Standard Provision CW 1100, clause 16 and as directed by the Contract Administrator.

The Contractor shall be responsible for constructing and maintaining the asphalt concrete roadway crossovers as specified and as shown on the Drawings. Signing for the crossovers will be provided by the City of Winnipeg. The Contractor shall maintain the signing to the satisfaction of the City of Winnipeg Streets and Transportation Department.

The Contractor shall give 14 days notice in writing of his intentions to close Empress Street to allow the City to advertise the closing. The duration of closing shall be no longer than 12 hours at a time and shall occur, at the most, 2 times during the duration of the construction period. Deviation from the program will occur only with written approval of the Contract Administrator.

BI:8. BIDDING ALTERNATIVES: (Cont'd)

The City reserves the right to award a Contract to the lowest or any tender of either Alternative. The City also reserves the right not to award to the lowest tender or Alternative if it is in the City's best interest.

BI:9. TENDER SUBMISSION:

9.01 The Tender Submission shall consist of the following:

Tender Submission Forms:
(1) Form of Tender
(2) Form A: Schedule of Prices (Unit Price)
- Alternative A - Full Closure
- Alternative B - Partial Closure
(3) Form B1: Qualification (Contractor)
(4) Form C1: Sub-contractors
(5) Form C2: Sub-contractors (Materials)
(6) Form D: Equipment Schedule
(7) Form E: Schedule of Work
Alternative A - Full Closure
Alternative B - Partial Closure
(8) Form E1: Daily Manpower and Weekly Equipment Schedule
Alternative A - Full Closure
Alternative B - Partial Closure
(9) Form F: Bid Bond
(10) Form G: Agreement to Bond

Bidder Supplied Documents:
(11) Bid Security (Form F, or as specified in BI:15.01)
(12) Written Undertaking to provide Performance Security (Form G, or as specified in BI:15.02).

9.02 The Tender Submission shall be fully completed and returned by the Bidder with all required entries made clearly and completely, and with the Signatures clause of the Form of Tender signed and the company seal affixed, all in accordance with BI:18 to constitute a formal Bid.

9.03 The Tender Submission shall be submitted, enclosed and sealed in the envelope provided. The envelope must be clearly marked with the Tender Number and the Bidder's name and address.

9.04 Schedules, exhibits, samples or other Bidder Supplied Documents required to be submitted to constitute a complete Tender Submission may be packaged with or separately from the Tender Submission Forms, but in any case each document and package shall be clearly marked with the Tender Number and the Bidders' name and address, and an indication on the package that the contents are part of his Tender Submission.

BI:9. TENDER SUBMISSION: (Cont'd)

9.05 Tender Submissions shall be submitted to the address, and no later than the Time and Date Set for Final Receipt of Bids, as specified in BI:5.

9.06 Except where and extended by Addendum, Tender Submissions received after the Time and Date Set for Final Receipt of Bids in BI:5 will not be accepted and will be returned unopened.

9.07 Within 24 hours after the Time and Date Set for Final Receipt of Bids, the three (3) lowest Bidders shall provide the Contract Administrator with a completed Form B2: Qualifications (Subcontractors) for each subcontractor proposed on Form C1: Sub-contractors and Form C2: Sub-contractors (Materials) and a Schedule of Project Supervisory and Back-up Supervisory Staff of the Contractor and Sub-contractor(s), all which shall form part of the Tender Submission.

BI:10. PRICES - UNIT PRICE:

10.01 The Work shall be measured and paid for on a unit price basis. The units to be measured and paid for shall be as identified on Form A: Schedule of Prices (Unit Price).

10.02 The quantities listed on Form A: Schedule of Prices (Unit Price) are to be considered approximate only. The City will use said quantities for the purpose of comparing bids.

10.03 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor for each Item of Work, to be measured as specified in the Method of Measurement clause of each applicable Specification.

10.04 Prices tendered shall be gross prices including all applicable duty, freight, cartage, Federal and Provincial Taxes and charges governmental or otherwise paid and including profit and all compensation which shall be due to the Contractor for supplying labour, materials, plant and supervision not only for the classifications expressly specified but for those which have been omitted and all details necessarily connected with the completion of the Work and all risks and contingencies connected therewith.

BI:11. QUALIFICATION:

11.01 No Contract shall be awarded to any Bidder who, in the judgement of the Board of Commissioners, is not a responsible Bidder or does not have all the necessary experience, capital, organization, and/or equipment to perform the Work in strict accordance with the terms and provisions of the Contract. Each Bidder shall be prepared to submit, on request of the City, the following information:

1. Proof that he is incorporated or otherwise authorized to do business in Manitoba;
2. Proof that he is financially capable of carrying out the terms of the Contract;
3. Proof that he has successfully carried out work, similar in scope and value, or is fully capable of performing the Work required to be done in accordance with the terms of the Contract;
4. Such other pertinent data as may be required by the Contract Administrator.

11.02 Bidders shall provide, on the request of the Contract Administrator, full access to any of the Bidder's facilities to evaluate the Bidder's ability to perform the Work.

11.03 The Bidder shall complete Form B1: Qualification (Contractor) giving a list of previously completed work, similar in scope and value, in sufficient detail to demonstrate his qualification to undertake this Work.

11.04 Further to Clause BI:9.07, the three (3) lowest Bidders who propose to sublet any portion of the Work shall complete, and submit to the Contract Administrator within 24 hours of the Time and Date Set for Final Receipt of Bids, on behalf of each Sub-contractor listed on Forms C1 and C2 referred to in BI:12, one (1) Form B2: Qualification (Sub-contractor) giving a list of previously completed work by said Sub-contractor, similar in scope and value to the Work he would undertake under this Contract, in sufficient detail to demonstrate his qualification to undertake the Work.

BI:12. SUB-CONTRACTING:

12.01 Bidders who propose to sublet any portion of the Work shall complete Form C1: Sub-contractors and Form C2: Sub-contractors (Materials), giving a complete list of the Sub-contractors who he proposes to engage with a description of the Work to be sublet.

BI:12. SUB-CONTRACTING: (Cont'd)

12.02 No more than one Sub-contractor may be named for a class of Work unless all Sub-contractors named are proposed to do a portion of that class of the Work. If this is the case, the Bidder shall append to Form C1: Sub-contractors and Form C2: Sub-contractors (Materials) a document(s) in accordance with BI:9.04 clearly detailing such apportioning.

12.03 Where no Sub-contractors are identified, it will be interpreted that the Bidder proposes to execute that class of the Work with the Bidder's own forces.

BI:13. EQUIPMENT:

13.01 The Bidder shall complete Form D1: Equipment Schedule (Bridge Works) Form D2: Equipment Schedule (Road Works) giving a list of:

(1) the minimum quantity of each type of equipment in first class working condition that the Bidder proposes to employ for each type of Work; and
(2) additional equipment of each type in first class working condition that the Bidder is prepared to employ on each type of Work if required by the Contract Administrator.

BI:14. SCHEDULE - COMPLETION DATE:

14.01 The Bidder shall complete Form E: Schedule of Work for Alternative "A" and Alternative "B" indicating below each date the "Cumulative Percentage of Work" that he anticipates will be completed by that date, for each Item of Work; and Form E1: Daily Manpower and Weekly Equipment Schedule indicating the number of persons per shift and shifts per day and equipment types per week that he anticipates will be representive of the total daily workforce.

14.02 Bidders shall note that this is an URGENT project and that all work is to be completed by September 29, 1990 for Alternative A and for Alternative B.

14.03 Request for an extension to the tendering period beyond the date and time set out in this tender packages will not be considered due to the restricted award schedule for this project.

14.04 Also refer to SC:8, Liquidated Damages and SP:33 Accelerated Completion.

BI:15. BID SECURITY:

15.01 Each Tender Submission shall be accompanied by Bid Security in the form of:

(1) a Bid Bond of a surety company entitled to conduct business in the Province of Manitoba, in such form as shall be determined by the Solicitor in the amount of at least ten percent (10%) of the Total Bid Price; or

(2) an irrevocable Letter of Guarantee, drawn on a bank, credit union, caisse populaire, or trust company entitled to conduct business in the Province of Manitoba in such form as shall be determined by the Solicitor and drawn on a Winnipeg Branch of such institution in the amount of at least five percent (5%) of the Total Bid Price; or

(3) a certified cheque or bill of exchange drawn on a bank, credit union, caisse populaire, or trust company entitled to conduct business in the Province of Manitoba in such form as shall be determined by the Solicitor and drawn on a Winnipeg Branch of such institution in the amount stipulated for the Performance Security in BI:14.

15.02 Each Bid Security in accordance with BI:13.01 (1) or (2) shall be accompanied by a written undertaking to provide Performance Security in the form of:

(1) an Agreement to Bond - Form G, if the Performance Security is proposed to be a Performance Bond.

(2) a letter from a financial institution entitled to conduct business in the Province of Manitoba indicating its willingness to provide an irrevocable Letter of Guarantee if the Performance Security is proposed to be an irrevocable Letter of Guarantee.

A written undertaking is not required for Bid Security submitted in the form of a certified cheque or bill of exchange in accordance with BI:13.01(3).

15.03 The Bid Security of the successful Bidder and the next two lowest evaluated responsive Bidders will be released by the City when a Contract for the Work has been duly executed by the successful Bidder and the Performance Security furnished as provided herein. The Bid Securities of all other Bidders will be returned when a Contract is awarded.

15.04 The Bid Security of all Bidders will be released by the City as soon as practicable following notification by the Commissioner to the Bidders that no award of Contract will be made pursuant to the Invitation to Tender issued by the City.

15.05 The City will not pay any interest on certified cheques furnished as Bid Securities.

BI:16. PERFORMANCE SECURITY:

16.01 The successful Bidder shall provide Performance Security in the form of:

(1) a Performance Bond in a form attached to these Bidding Instructions (Form H: Performance Bond) in the amount of one hundred percent (100%) of the Contract Price; or

(2) an irrevocable Letter of Guarantee drawn on a bank, credit union, caisse populaire or trust company entitled to conduct business in the Province of Manitoba, in such form as shall be determined by the Solicitor and drawn on a Winnipeg branch of such institution in the amount of one hundred percent (100%) of the Contract Price.

(3) a certified cheque drawn on a bank, credit union, caisse populaire or trust company entitled to conduct business in the Province of Manitoba, in such form as shall be determined by the Solicitor and drawn on a Winnipeg branch of such institution in the amount of one hundred percent (100%) of the Contract Price.

16.02 The successful Bidder shall provide the required Performance Security following notification of the award of the Contract by way of Letter of Intent and prior to the commencement of any Work but in no event later than the date specified in the General Conditions for the return of the executed Contract Documents. Where a certified cheque or bill of exchange has been provided as Bid Security, it will be retained as the Performance Security and no further submission is required.

16.03 The City will not pay any interest on certified cheques furnished as a Performance Security.

BI:17. INSURANCE:

17.01 Further to GC.3.01(3) of the General Conditions, the Contractor shall be required to provide the Category II Insurance coverages specified in SC:3 of the Supplemental Conditions prior to the commencement of any Work, but in any event no later than the date specified in the General Conditions for the return of the executed Contract Documents. The City of Winnipeg will carry the Category I Construction Contract Insurance coverages specified in SC:3 of the Supplemental Conditions.

BI:18. SIGNATURES:

18.01 The Form of Tender of the Tender Submission shall be signed in ink and sealed, where applicable, in accordance with the following requirements:

(1) If the Bid is submitted by a sole proprietor carrying on business in his own name, his name shall be printed immediately above and below his signature; or
(2) if the Bid is submitted by a person carrying on business under a name other than his own, his business name shall be printed immediately above his signature and his own name and title shall be printed below his signature; or
(3) if the Bid is submitted by a partnership, the full name of the firm or business shall be printed immediately above the signature of the partner or partners who have authority to sign for the partnership, and the name and title of the partner(s) shall be printed below the signature(s); or
(4) if the Bid is submitted by a corporation, the full name of the corporation shall be printed immediately above the signature of its duly authorized officer(s), the name and title of the signing of officer(s) shall be printed below the signature(s) and the corporate seal affixed; and
(5) the signature of person(s) bidding must be in their respective handwriting; and
(6) a witness shall be present at the signing and sealing of the Tender Submission and must sign immediately to the left of the signature of the Bidder after the signing and sealing.

18.02 Bids submitted by agents proposing to represent principals must be accompanied by a Resolution of the principals or by an irrevocable Letter of Authority and Direction from the principals in a form satisfactory to the Solicitor showing that the agents are duly authorized to sign and submit the Tender Submission on behalf of the principals and have full power to execute the Contract on behalf of the principals, which Contract, when so executed, will bind the principals and have the same effect as if it were duly signed by the principals.

18.03 In the case of a joint Bid being submitted by two or more persons, the word "Bidder" therein and the pronouns referring to the Bidder shall be understood to have a plural meaning, and the undertakings, covenants and obligations of such joint Bidders in the Tender Submission and in the Contract, when awarded, shall be both joint and several.

BI:19. DISCREPANCIES:

19.01 Bidders who find discrepancies or omissions in the Tender Package or are unsure of the meaning or intent thereof, in whole or in part shall notify the Contract Administrator.

19.02 The Contract Administrator will, if deemed necessary, issue Addenda to all Bidders.

19.03 Addenda will be issued at least seventy-two (72) hours prior to the Time and Date Set for Final Receipt of Bids in BI:5. Bidders are advised to direct all questions or comments to the Contract Administrator at least seven (7) clear working days prior to the Time and Date Set for Final Receipt of Bids in BI:5 to allow time for the preparation and distribution of necessary Addenda.

19.04 Notwithstanding the generality of the foregoing, the Contract Administrator may extend the Time and Date Set for the Final Receipt of Bids at any time for cause.

19.05 Oral interpretations made to any Bidder shall not effect a modification of any provision of the Contract Documents.

BI:20. SUBSTITUTES:

20.01 The Contract is based on the materials, equipment, methods and products specified in the Contract Documents. Substitutes shall not be made without the Contract Administrator's prior written approval.

20.02 Where the phrases "or equal" or "or alternative" occur in the Contract Documents, Bidders must not assume that a substitute will be allowed unless application has been made to and prior written approval has been granted by the Contract Administrator.

20.03 All requests involving a substitute shall include sufficient information and details to enable the Contract Administrator to determine the acceptability of the material, equipment, method, or product as either an equal or alternative. The request shall identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the requested substitute, as well as any anticipated cost or time savings that may be associated with the substitute. Further, the request shall certify that the substitute will adequately perform the functions called for by the general design, be similar and of equal substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the Schedule of Work and Completion Date(s) specified in the Tender Package.

BI:20. SUBSTITUTES: (Cont'd)

20.04 Requests for approval of a substitute must be received in writing by the Contract Administrator not less than seven (7) Calendar Days prior to the Time and Date Set for Final Receipt of Bids in BI:5.

20.05 Approval for a substitute may be granted as an equal or as an alternative and an Addendum will be issued to all Bidders advising of same.

20.06 If a substitute is approved as an equal, Bidders may use the substitute in place of the specified item.

20.07 If a substitute is approved as an alternative, Bidders must base their Total Bid Price upon the specified item but may indicate separately in the Tender Submission, an alternative price based upon the substitute.

20.08 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved and accepted alternative will be considered.

BI:21. OPENING OF TENDER SUBMISSIONS:

21.01 Tender Submissions will be opened publicly, after the Time and Date Set for Final Receipt of Bids in BI:5 has elapsed, in the office of the Purchasing Department, Administration Building, Civic Centre, 510 Main Street, Winnipeg, Manitoba, R3B 1B9, or in such other office as may be designated by the Purchasing Department. Bidders or their representatives may attend.

BI:22. IRREVOCABLE BID:

22.01 Bids submitted by the Bidder shall be irrevocable for the time period specified in Clause 5 of the Form of Tender.

22.02 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly executed and the Performance Security furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Clause 5 of the Form of Tender.

BI:23. WITHDRAWAL OF BIDS:

23.01 Bidders may withdraw their Bid without penalty at any time prior to the Time and Date Set for Final Receipt of Bids in BI:5.

23.02 Bidders who withdraw their Bid after the Time and Date Set for Final Receipt of Bids in BI:5 but before award of the Contract shall forfeit their Bid Securities unless the Board of Commissioners allows otherwise.

BI:24. REJECTION OF BIDS:

24.01 The City may reject a Bid as informal if the Tender Submission is incomplete, obscure or conditional, or contains additions, deletions, alterations or other irregularities.

24.02 The City may reject Bids that are submitted by Bidders who, in the judgement of the Board of Commissioners, are not responsible or are not qualified to conduct and complete the Work.

24.03 The City may reject all or any part of any Bid and/or waive technical requirements if, in the judgement of the Board of Commissioners, the interests of the City so require.

BI:25. AWARD OF CONTRACT:

25.01 The City will award the Contract, or announce that no award will be made, within the time period specified in Clause 5 of the Form of Tender. Bidders will be bound by their Bid for this period.

25.02 The Bid Evaluation Criteria, are specified in the SC:4 of the Supplemental Conditions, will be used to evaluated Bids.

25.03 Where the Contract is proposed in separate sections, or with alternatives, the City reserves the right to award any section separately, or to choose any alternative which is in its best interests.

BI:26. EXECUTION OF CONTRACT:

26.01 The successful Bidder shall execute an indenture with the City in the form and in the manner required by the Solicitor.

26.02 The form and nature of this indenture may be ascertained previous to submitting a Bid on the Work by applying to the Solicitor.

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work was Performed			
7. Owner's Representative and Title/Current Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of			
Contract Works			
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was Performed			
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and Title/Current			
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_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

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1. Year			
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_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of			
Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work			
was Performed			
7. Owner's Representative			
and Title/Current			
Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
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9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work was Performed			
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a) Project Manager			
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_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work was Performed			
7. Owner's Representative and Title/Current Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of			
Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work			
was Performed			
7. Owner's Representative			
and Title/Current			
Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work was Performed			
7. Owner's Representative and Title/Current Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work was Performed			
7. Owner's Representative and Title/Current Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

QUALIFICATION

STATEMENT OF **SUB-CONTRACTOR'S* EXPERIENCE** IN SIMILAR WORK

SUB-CONTRACTOR: _____ (firm name)

	Most Recent Contract	Second Most Recent Contract	Third Most Recent Contract
1. Year			
2. Value of Contract			
3. Description of			
Contract Works			
4. Duration of Contract			
5. Location of Project			
6. Owner for Whom Work			
was Performed			
7. Owner's Representative			
and Title/Current			
Phone Number			
8. Contractor's Staff:			
a) Project Manager			
b) Back-up Manager			
c) Project Superintendent			
d) Back-up Superintendent			
9. Number of Sub-contractors			

*NOTE: One Form B2: Qualification (Sub-contractor) shall be completed by the Bidder (Contractor) for each Sub-contractor involved in this Tender.

_____
Name of Bidder

THE CITY OF WINNIPEG

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS THAT we, _____ _____ , (hereinafter called the "Principal"), and _____, (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), in the sum of:

_____ _____ Dollars ($ _____) of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for which payment well and truly to be made we bind ourselves, our and each of our successors and assigns (or ourselves, our and each of our executors, administrators and assigns) jointly and severally firmly by these presents.

SIGNED, SEALED AND DELIVERED this _____ day of _____ , A.D. 19 ___ .

WHEREAS the Principal, _____, bound by a Contract in writing, under seal, bearing the date the _____ day of _____ A.D. 19 ___, has contracted with the Obligee to:

EMPRESS STREET OVERPASS STRUCTURE REHABILITATION, STRENGTHENING AND RELATED WORKS IN THE CITY OF WINNIPEG

NOW THEREFORE the condition of the above obligation is such that if the Principal, _____ or its successors or assigns (or his executors, administrators or assigns) shall carry out and perform said Contract and every part thereof in the manner and within the times in said Contract set forth and in accordance with the terms and conditions in said Contract specified, and shall perform the Work in a good, proper, workmanlike manner, and make all payments whether to the Obligee or to others as therein provided, and in every other respect comply with the conditions and perform the covenants in the aforesaid Contract

contained, and shall indemnify and save harmless the Obligee against and from all loss, costs, damages, claims and demands of every description as in said Contract set forth and from all penalties, assessments, claims, actions for loss, damages or compensation whether under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the said Contract or any part thereof, and save the Obligee harmless therefrom, up to and including TWO (2) year(s) from the date of the Certificate of Total Performance of the Work, THEN THIS OBLIGATION TO BE VOID, but otherwise to remain in full force and effect. Provided always, however, that the total of the obligation of this Performance Bond shall be limited to the sum of:

_____ Dollars ($ _____).

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the parties have hereunto caused their respective corporate seals to be fixed, attested by the signature of their proper officers in that behalf.

SIGNED, SEALED AND DELIVERED)
)
in the presence of) (Name of Principal)
)
) Per: _____
)
) Per: _____
)
)
)
) (Name of Surety)
)
) By: _____
) Attorney-in-Fact

PART C

SUPPLEMENTAL CONDITIONS

THE CITY OF WINNIPEG

SUPPLEMENTAL CONDITIONS

INDEX TO SUPPLEMENTAL CONDITIONS

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SC:1. GENERAL CONDITIONS AND STANDARD PROVISIONS:

In addition to these Supplemental Conditions, the General Conditions (Form 20:88-03) and Standard Provisions (CW 1100-R3), that are included in the current Standard Construction Specifications of the City of Winnipeg, are applicable to the Work.

SC:2 WORKERS COMPENSATION

The Contractor shall be registered with the Workers Compensation Board of Manitoba and shall purchase and maintain in good standing Workers Compensation coverage.

The Contractor shall, within seven (7) calendar days of a request by the Contract Administrator, provide proof of coverage.

SC:3 CONSTRUCTION CONTRACT INSURANCE

Further to BI:17 of the Bidding Instructions, **The City of Winnipeg will carry such Construction Contract Insurance coverages as are hereinafter set out in Category I** to cover all parties engaged in the Work of this Contract. Provison of the Category I Insurance by the City of Winnipeg is not intended in any way to relieve the Contractor from his obligations under the terms of the Contract, in accordance with the intent of GC.7.03 of the General Conditions. Specifically, any risk of loss which is not covered under the terms of the Category I Insurance, remains with the Contractor in accordance with the intent of GC.7.03 of the General Conditions. Specifically, losses relating to deductibles for insurance specified under these Category I Insurance requirements, as well as losses in excess of limits of coverage, rest with the Contractor. Furthermore, the City of Winnipeg reserves the right to either self-insure on behalf of itself and on behalf of the Contractor and all Sub-Contractors or to purchase said Category I Insurance coverage, which will not in any way alter the Contractor's responsibilities in regard to the Construction Contract Insurance provisions identified herein.

The Contractor and Subcontractors shall, at their own expense, obtain and maintain such Insurance coverages as are hereinafter set out in Category II to cover motor vehicles, aircraft, watercraft and construction equipment, and other Insurance requirements, including General Liability Insurance if re-entry onto the project site is necessary to correct Warranty defects and deficiencies during the Contract Warranty Period.

SC:3 CONSTRUCTION CONTRACT INSURANCE (Cont'd)

A definition of the terms relative to these Construction Contract Insurance coverages and the associated deductibles is as follows:

A. General

Throughout these insurance clauses, the term "City" shall refer to The City of Winnipeg, as defined in GC.1.01(5) of the General Conditions; and the term, "Contractor" shall refer to the General Contractor with whom The City of Winnipeg has a Contract as defined in GC.1.01(10) of the General Conditions. Furthermore, the terms "Contractors" shall refer to any Contractor or Sub-contractor engaged in the Works of this Contract, except those firms whose only function is to deliver materials or supplies to the project site.

B. Category I Insurance - to be Obtained by the Owner

Subject to the City's right to elect to self-insure, as stated above, the City will obtain and maintain during the Contract period up to and including the day fixed for Total Performance of the Work (Project Completion Date), and for the duration of any extension(s) thereto approved in writing by the City, certain policies of insurance in the names of the City of Winnipeg, the Contract Administrator, and of the Contractor and all Sub-Contractors, hereinafter called the "Insured"; all at the City's expense.

Subject to the City's right to elect to self-insure, as stated above, the City will continue to maintain the same policies of insurance in the names of the Insured beyond the day fixed for Total Performance of the Work, and the duration of any extension(s) thereto approved in writing by the City, until the day that Total Performance of the Work is achieved; all at the Contractor's expense.

The City will, on request, provide the General Contractor with a full copy of these Category I Insurance policies.

Meanwhile, during the bidding period, to assist Bidders in formulating their Tender Submissions, the following description of the Category I Insurance is provided. This contains, in general terms only, the main features of the actual policies.

.1 "All Risks" - Course of Construction Insurance

This policy will cover "all risks" of physical loss or damage to all materials, structures, property, and equipment entering into or intended for the Work or alternations thereto, while anywhere in Canada or U.S.A.; and while being transported anywhere in Canada or U.S.A.; and at the site of the Work during or pending construction, erection and installation.

SC:3 CONSTRUCTION CONTRACT INSURANCE (Cont'd)

B. Category I Insurance - to be Obtained by the Owner (Cont'd)

.1 "All Risks" - Course of Construction Insurance (Cont'd)

The sum insured by this policy will be the estimated completed value of all insured property or such lesser amount as the City may determine.

The policy will contain a waiver of the insurer's rights of subrogation against all parties insured.

.2 Comprehensive General Liability Insurance

This policy, to be obtained by the City, will, subject to the terms thereof, pay on behalf of the Insured, all sums which the Insured shall become legally obligated to pay, for damages because of bodily injury (including death) or property damage (including loss of use or occupancy), arising out of or related to the Work in an inclusive amount of $10,000,000.00 for any one occurrence.

The coverage will include those policy extensions commonly referred to as Products, Completed Operations, Blanket Contractual, Contractor's Protective, Personal Injury, Contingent Employers, Occurrence Property Damage, Non-Owned Automobile Liability and Explosion, Collapse, and Underground Damage. The policy will be in effect until the day Total Performance of the Work of this Contract is achieved and for a further twenty-four (24) months thereafter, for Completed Operations Liability.

This Insurance will also provide:

i) That the Insurer will pay all expenses, including legal costs in connection with any claims which may be required to be contested by an Insured;

ii) That liability of any one Insured to another Insured, will be covered as though separate policies were issued to each, subject to an overall limit of $10,000,000.00.

SC:3 CONSTRUCTION CONTRACT INSURANCE (Cont'd)

C. General Provisions for Category I Insurance

.1 Deductible for "All Risks" Course of Construction Insurance

In respect of any deductible provided under the "All Risks" Course of Construction Insurance:

i) In respect of losses for which coverage is provided under such "all risks" policy, the first $10,000.00 of each and every loss shall be for the account of the General Contractor, unless a Certificate of Substantial Performance has been issued for such Work by the Contract Administrator and the Work has been accepted by the City.

ii) In respect to any losses for which coverage is provided under such "all risks" policy, the Contractors hereby waive all rights of recovery which might otherwise exist for his benefit under the Comprehensive General Liability Insurance.

iii) In respect of losses for which coverage is provided under such "all risks" policy, the City hereby relieves the Contractors from responsibility for any amount in excess of $10,000.00, for each and every loss.

.2 Deductibles for Comprehensive General Liability Insurance

In respect of losses for property damage, for which coverage is provided under the Comprehensive General Liability Insurance;

i) The first $10,000.00 of each and every property damage loss shall be for the account of the General Contractor.

.3 City's Right

The City shall have the right to deduct amounts for which the Contractors are responsible under this Section from any monies which are due or may become due to the General Contractor.

SC:3 CONSTRUCTION CONTRACT INSURANCE (Cont'd)

D. Category II Insurance - to be Obtained by the Contractor and Sub-Contractor

.1 Construction Equipment Insurance

The Contractor and each Sub-Contractor shall, at their own expense, obtain and maintain during the Contract period up to and including the day that Total Performance of the Work is achieved, "All Risks" Insurance coverage for all construction equipment to be used in connection with the Work of this Contract, that are owned or rented or for which such Contractor or Sub-Contractor may be responsible. In the event of loss or damage to the said equipment, or any part thereof, such Contractor or Sub-Contractor shall, if so requested by the City in writing, forthwith replace such damaged or destroyed equipment. Each such Insurance Policy shall be endorsed to waive rights of subrogation against the City. Deductible(s) for this Insurance coverage shall be acceptable to the City and are to be borne by the Contractors.

.2 Motor Vehicles, Aircraft, and Watercrafts

The Contractor and each Sub-Contractor shall, at their own expense, obtain and maintain during the Contract period up to and including the day that Total Performance of the Work is achieved, such Insurance coverage as will protect each Contractor or Sub-Contractor against the liability imposed by law for damage, including personal injuries and death, arising from the ownership, use, or operation of any motor vehicle, aircraft, or watercraft used or to be used in connection with the Work to be performed by such Contractor or Sub-Contractor under its Contract and which is not covered by the City's Comprehensive General Liability policy referred to hereinbefore, for not less than $1,000,000.00 all inclusive limits for each loss. Deductible(s) for this Insurance coverage shall be acceptable to the City, and are to be borne by the Contractors.

.3 Other Insurance

a) General

Subject to the provisions of Category I Insurance coverages, the Contractor and each Sub-Contractor shall provide, at their own expense, obtain and maintain during the Contract period up to and including the day that Total Performance of the Work is achieved, any additional Insurance coverage which is required by law or that they consider necessary. Deductible(s) for this Insurance coverage shall be acceptable to the City and are to be borne by the Contractors.

SC:3 CONSTRUCTION CONTRACT INSURANCE (Cont'd)

D. Category II Insurance - to be Obtained by the Contractor and Sub-Contractor (Cont'd)

.3 Other Insurance (Cont'd)

b) Comprehensive General Liability Insurance

If re-entry onto the project site to undertake Warranty defects and deficiencies or to undertake other Contract Provisions, as approved and directed by the Contract Administrator, is necessary during the Contract Warranty Period, the Contractor shall, at his own expense, obtain and maintain a Policy of General Liability Insurance in amount of not less than $1,000,000.00 all inclusive, with the City of Winnipeg, the Contract Administrator being named as additional named insureds, with a cross-liability clause, in a form satisfactory the City Solicitor. The Contractor shall be responsible to ensure that each Sub-Contractor who may be required to return to the project site to correct Warranty defects and deficiencies or to undertake other Contract Provisions during this period shall also have similar General Liability Insurance coverage in place prior to their re-entry onto the site. Deductible(s) for this Insurance coverage shall be acceptable to the City and are to be borne by the Contractors.

E. General Provisions for Category II Insurance

.1 Evidence of Insurance

A Certificate of Insurance and/or a certified true copy of each Category II Insurance Policy obtained by the Contractor and each Sub-Contractor shall be submitted to the City immediately upon award of the Contract or, in any case, prior to commencement of any of the Work of the Contract by said Contractor or Sub-Contractor. All such policies shall be placed with insurers, and in a form, acceptable to the City Solicitor. Each such policy shall state that it cannot be cancelled, without at least fifteen (15) days' prior written notice to the City.

The approval of any such policy by the City shall in no way relieve the Contractor of its obligations to provide and to cause its Sub-Contractor to provide the Insurance coverage(s) herein referred to.

SC:3 CONSTRUCTION CONTRACT INSURANCE (Cont'd)

D. Category II Insurance - to be Obtained by the Contractor and Sub-Contractor (Cont'd)

.2 Sub-Contractors

The Contractor shall ensure that each of the Sub-Contractors engaged under this Contract procure the Insurance coverage(s) required by this Category II; and shall be responsible for obtaining and filing a Certificate of Insurance and/or a certified true copy of all such Insurance policies with the City prior to commencement of Work on the Contract. Otherwise, it shall be understood that the Contractor is directly liable for the actions or inactions of its Sub-contractors while they may be on site without Insurance Policy(s), and for all costs related to the settlement of the claim against an uninsured Sub-contractor; and the City may, at its election, deduct said costs from any monies that are due to the General Contractor.

.3 Failure to Meet Insurance Requirements

If the Contractor or any Sub-Contractor fails to furnish to the City a Certificate of Insurance and/or a certified true copy of each Insurance Policy required to be obtained by this Category II, or if after furnishing such documentation, the Policy lapses, is cancelled, or is materially altered, then in every such case, the City may obtain and maintain such Insurance coverage(s) in the name of such Contractor or Sub-contractor. The costs thereof shall be payable by the Contractor or Sub-contractor to the City on demand and the City may, at its election, deduct the costs thereof from any monies which are due to the General Contractor.

SC:4. BID EVALUATION CRITERIA:

Further to BI:25.02 of the Bidding Instructions, award of this Contract shall be based on the following Bid Evaluation Criteria:

The City will consider the Contractor's past performance on projects of a similar nature, size, and complexity; the Contractor's equipment and staff resources; the Contractor's financial responsibility; the Contractor's identified project supervisory and back-up supervisory staff; the Contractor's identified Sub-contractors and their supervisory and back-up supervisory staff; and the identified detailed daily manpower and equipment Schedules. These factors will be a consideration in determining the award of this Contract and will be incorporated as an integral part of the Contract. Award may be made to other than the low Bidder on the basis of these or any combination of factors.

SC:5. COMMENCEMENT OF WORK:

5.01 Further to GC.3.03 of the General Conditions, the Contractor shall commence the Work of this Contract on April 9, 1990 unless otherwise approved in advance by the Contract Administrator in writing. The required Performance Security and applicable Construction Contract Insurance coverages must be provided, acceptable to the City Solicitor, prior to commencement of any Work.

SC:6. COMPLETION OF WORK:

Further to Clause G.C.8.06 of the General Conditions, the Contractor shall complete, to the satisfaction of the City, the Work of this Contract by September 29, 1990 referred to herein as the day fixed for Total Performance of the Work and/or the Project Completion Date. The work shall be undertaken and completed in accordance with the completed Form E: Schedule of Work.

The successful Contractor shall complete the following Work as identified in Form E: Schedule of Work, considering the critical date for the supply of bridge bearings. To conform with the expected completion of work, the specified dates shall be followed:

1. Supply 33% of bridge bearings - May 12, 1990
2. Supply 66% of bridge bearings - May 19, 1990
3. Supply 100% of bridge bearings - May 26, 1990

Furthermore, the successful Contractor shall complete the Items of Work as identified in Form E: Schedule of Work by the dates specified therein.

Completion of the Work shall mean the Total Performance of the Work including correction of all deficiencies, in accordance with Clause GC.1.01(27) of the General Conditions. The date that the Work is inspected and accepted by the Contract Administrator shall be defined as the day that Total Performance of the Work is achieved. A Certificate of Total Performance of that date will be issued by the Contract Administrator with the Final Progress Estimate, in accordance with GC.9.07 of the General Conditions.

SC:6. COMPLETION OF WORK: (Cont'd)

Should the Contractor fail to complete the Work by the completion date fixed for Total Performance of the Work, the Contractor, subject to GC.8.05 of the General Conditions, shall pay to the City the sum stipulated in SC:8 as liquidated damages for each and every working day following that day fixed for the completion date for Total Performance of the Work in Supplemental Condition, SC:6 and ending on the day immediately preceding the day that the completion date for Total Performance of the Work has been achieved and is so certified by the Contract Administrator.

Further to GC.8.02 of the General Conditions, if at any time during the progress of the Work, the Contractor is falling behind schedule in the Work, the Contract Administrator will direct the Contractor to implement additional manpower and/or equipment if the Contractor does not do so of his own initiative; and the Contractor shall immediately implement same and initiate increased hours of productive work until such time as the Work is back on schedule. The Contractor shall supply the Contract Administrator each day, with a record of the manpower and equipment that worked on each Item of Work of the Contract the previous day.

SC:7. WORKING DAY:

Further to GC.1.01(29) of the General Conditions, and to Standard Provision 2, "Working Day" means any calendar day, including Saturdays and Sundays, Statutory and Civic holidays, unless prohibited by law.

SC:8. LIQUIDATED DAMAGES:

Further to GC.8.06(3) of the General Conditions, the sum fixed for Liquidated Damages for this Contract is **Three Thousand Six Hundred Dollars ($3,600.00) per Working Day**, and the definition of the conditions related to the application of liquidated damages shall be as defined in this Supplemental Condition SC:8.

The following Liquidated Damages clause is restricted to covering the City's actual out-of-pocket expenses occasioned by the Contractor's failure to meet completion dates specified in SC:6 for Total Performance of the Work, September 29, 1990.

In the event that all the Work specified under this Contract is not completed by the Project Completion Date as set forth in SC:6, the Contractor shall pay to the City the lesser of either the sum stipulated herein as Liquidated Damages for each and every working day, as defined in SC:7, that completion of the Work exceeds the Project Completion Date, or for the actual loss experienced by the City for each Working Day aforesaid.

SC:8. LIQUIDATED DAMAGES: (Cont'd)

The City may, but is not obligated, to increase the completion date for the Work as a whole or to extend the completion date for the Work as a whole. In the event that the commencement date for the project, as identified in Form E: Schedule of Work is either postponed by more than one week or is advanced by more than one week at the request of the Contractor; so then shall the completion date specified for the Project Completion Date of this Contract be deemed to be postponed or advanced a similar period of time for purposes of calculation of Liquidated Damages.

Notwithstanding and in addition to the City's right to Liquidated Damages as stated above, the Contractor shall be liable for all losses and/or damages including, but not limited to, any physical and/or consequential loss or damage suffered by the City as a result of the Contractor's failure to comply with the terms of this Contract.

SC:9. NOTICES:

Further to GC.7.06 of the General Conditions, all notices, consents, approvals, statements, authorizations, documents or other communications to the City shall be sent to the following address:

The City of Winnipeg
Works and Operations Division
Streets and Transportation Department
100 Main Street
Winnipeg, Manitoba R3C 1A4

Attention: Director of Streets & Transportation

SC:10. CONTRACT ADMINISTRATOR:

Further to GC.1.01(8) of the General Conditions, the Contract Administrator for this Work is Wardrop Engineering Inc. represented by Mr. C.D. (Doug) Stewart, P.Eng.

At the pre-construction meeting, Mr. Stewart will introduce to the Contractor, additional personnel representing the Contract Administrator and identify their respective roles and responsibilities for the Work.

SC:11. FINAL CONSTRUCTION SCHEDULE:

Further to GC.8.01 of the General Conditions, the successful Bidder shall submit to the Contract Administrator, within three (3) working days after contract award, a C.P.M (Critical Path Method) Schedule for the Work based on the Form E: Schedule of Work Tender Submission which will clearly identify the Start and Completion Date of all tasks, as well as the critical tasks and critical path. Within five (5) working days thereafter, the Contractor shall submit to the Contract Administrator a final detailed daily bar-chart type of construction Schedule similar to the Contract Schedule of Work, a Final Detailed Daily Manpower Schedule and a Final Daily Equipment Schedule, all based on the C.P.M. Schedule accepted by the Contract Administrator, showing the proposed time of commencement and completion of each and every one of the various operations to be performed under each item of work of this Contract, and under each task of the C.P.M. Schedule, together with all other necessary and appropriate information regarding sequence and correlation of work.

SC:12. WARRANTY:

12.01 Commencement of Warranty Period

Further to SC:6, the day that Total Performance of the Work is achieved shall also be defined as the date of commencement of the Contract Warranty Period.

Where, because of adverse weather or other conditions reasonably beyond the control of the Contractor, a minor component of the Work cannot be completed but which will not prevent the full and safe opening of the facility to traffic and the balance of the Work from being put to its intended use, the Commissioner may permit the Warranty Period to commence prior to the Total Performance of the Work in the manner set out herein.

12.02 Maintain the Work

Further to GC.10.01 of the General Conditions, the Contractor shall, at his sole cost and expense, maintain the Work against any and all defects or deficiencies or otherwise which may arise for a period of two (2) years from the date of the Certificate of Total Performance.

12.03 Final Acceptance of the Work and Termination of the Contract

At least two (2) weeks prior to the expiration of the Warranty Period or upon correction of defects and deficiencies, if later, the Contractor shall request of the Contract Administrator a joint inspection of the Work and the Contract Administrator will, on being satisfied that all outstanding defects and deficiencies of the Contract have been corrected, issue a Certificate of Acceptance of the Work, terminating both the Warranty Period and the Contract.

SC:13. OFFICE FACILITIES AND TEMPORARY STRUCTURES:

13.01 Contract Administrator's Field Office

Further to GC.5.03(1) of the General Conditions, the Contractor shall supply for the use of the Contract Administrator, a weatherproof building; to be furnished, heated, ventilated, and cleaned regularly by the Contractor; and to be conveniently located near the site of the work. It shall have a minimum floor are of 20 square metres, a minimum ceiling height of 2.4 metres, and a minimum width of 3.66 metres so as to provide a meeting room large enough of six (6) attendees, with windows and door entrance with a suitable and secure lock.

The field office shall contain; one (1) desk, one (1) tilt office chair on rollers, two (2) drafting tables, one (1) stool, one (1) meeting table, six (6) chairs, one (1) two-drawer legal size filing cabinet, and sufficient shelves and storage racks for plans, etc.

It shall be equipped with fluorescent lights, three (3) electrical wall outlets, and one (1) telephone. The Contractor shall supply proper facilities and fuel to maintain a minimum room temperature of 20°C during the winter and an air conditioning unit to keep the temperature at a maximum of 20°C in the summer. An acceptable toilet facility shall be provided, together with supply of potable water. The cost of providing the field office, maintaining it, removing it, and providing the aforesaid appurtenances, including telephone and hydro charges but excluding long distance telephone calls, shall be borne by the Contractor.

13.02 Contractor's Temporary Structures

The location of all temporary structures of the Contractor and all Sub-contractors shall be subject to the approval of the Contract Administrator. Temporary structures erected by the Contractor and Sub-contractors shall remain their property and shall be removed from the site immediately upon completion of the Work or as directed by the Contract Administrator.

13.03 Temporary Structures Stabilization

All of the Contractor's temporary structures and the Contract Administrator's field office located at the site shall be stabilized by the Contractor in a manner sufficient to prevent such temporary structures from being overturned and wind forces as defined in the National Building Code of Canada (NBC). The stabilization provided shall be designed by a Professional Engineer registered in the Province of Manitoba. Detailed drawings and design notes for the structure stabilization works, bearing the Professional Engineer's seal, shall be submitted to the Contract Administrator.

SC:14. PAYMENT SCHEDULE FOR PRODUCT SUPPLY AND INSTALLATION:

Further to GC.9.04(1) of the General Conditions, payment will be made for the items of supply and installation only upon installation of same, in accordance with the applicable Specification, and acceptance by the Contract Administrator.

SC:15. TAXES AND GOVERNMENTAL CHARGES:

15.01 Further to Article IX of the General Conditions, it is the intention of the City to claim refunds as applicable for all taxes and governmental charges. The City shall be entitled to receive all refunds of any such tax and/or governmental charges paid by the Contractor.

15.02 The Contractor shall maintain accurate documentation and records of all such charges paid and shall provide, and shall require its Sub-contractors to similarly document and provide, promptly upon request, all necessary documentation and signature to the City in order to permit the City to complete its application(s) for the refund.

SC:16. FURNISHING OF TENDER PACKAGE DOCUMENTS:

Upon award of the Contract, the Contractor will be provided with five (5) complete sets of the Tender Package, consisting of a "Bidding Specifications" booklet, and a "Bidding Drawing" Set as well as five (5) copies of any Addenda which may have been issued during the Tendering period. Should the Contractor require additional sets of these Documents, they will be supplied to him at cost.

SC:17. TRAFFIC AND PEDESTRIAN CONTROL:

17.01 The Contractor is advised that the City of Winnipeg will provide and maintain signing for traffic diversions for the duration of the project. However, the Contractor will be responsible for the placement, maintenance, relocation and removal of all portable concrete traffic barriers required for the diversions in accordance with Specification SP:17. The Contractor will also be responsible for providing and maintaining all necessary signing and barricades for traffic and pedestrian control around the perimeter of the construction area during the duration of the project in accordance with the latest issue of the "Manual of Temporary Traffic Control in Work Areas on City Streets".

17.02 Pedestrian access across the bridge will not be allowed for the duration of the project. The Contractor shall provide and maintain barricades and signing, approved by the Contract Administrator, identifying the bridge is closed to pedestrians.

SC:17. TRAFFIC AND PEDESTRIAN CONTROL: (Cont'd)

17.03 As a minimum two lanes of traffic in each direction on Portage Avenue will be maintained for the duration of the project.

17.04 For Alternative "A" Empress Street Overpass will be closed to traffic for the duration of the project.

17.05 For Alternative "B", Empress Street shall remain open to two lanes of traffic, one in each direction for the duration of the project, except for the two specified 12 hour periods when Empress Street Overpass will be closed to traffic to allow for jacking of the superstructure.

17.06 The Contractor shall provide access to the Winnipeg Hydro Substation for Hydro personnel at all times.

17.07 The Contractor shall sequence the construction activities in order of the traffic diversion types allowed on Portage Avenue and allowable traffic diversion stages on Empress Street Overpass as shown on the Drawings and on Form E1 in the Tender Submission to ensure completion of the works included in each traffic diversion phasing and reopening of the bridge to traffic on schedule.

17.08 The Contractor shall satisfactorily vacate the work area of the lane closures on Portage Avenue and Empress Street Overpass prior to the City commencing the guide signing switchover works. The City will complete all guide signing switchover works within 12 hours after the Contractor vacates the work area.

17.09 If all construction works of a traffic diversion type is satisfactorily completed ahead of the dates indicated on E1, the Contractor will be permitted to begin the construction works of the next traffic diversion type early, provided the traffic diversion switchover is completed by the City and provided the Contractor gives the Contract Administrator at least 48 hours notice prior to when he anticipates beginning the construction work within the next traffic diversion type.

SC:18. JOB MEETINGS:

18.01 Regular weekly job meetings will be held at the site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contractor, Contract Administrator or City respectively on any matter discussed at the meeting. The progress of the project will be reviewed at each of these meetings, so the Contractor must be represented by a responsible person capable of discussing the Schedule and having authority to make any necessary revisions to the Contractor's work force and/or scheduling that may be determined at these meetings by the Contract Administrator to be necessary.

SC:18. JOB MEETINGS: (Cont'd)

18.02 The Contract Administrator reserves the right to cancel any meeting if he feels that there are not sufficient matters that warrant discussion, or call additional job meetings whenever he deems it necessary. Twenty-four (24) hours notice shall be given by the Contract Administrator prior to a meeting being held or cancelled.

SC:19. NIGHT WORK AND NOISE LIMITATIONS:

19.01 Night work may have to be undertaken by the Contractor, as required by his Schedule of Work and by his actual work progress, to ensure timely completion of all works of this Contract, all at his own cost.

19.02 Further to GC.7.01 of the General Conditions, the Contractor shall show that he has the approval of all applicable authorities in regards to said night work and to the anticipated/actual construction noise levels. Also, the Contractor, at his own cost, incidental to these works, shall supply sufficient lighting to enable all night work to be done in a safe and efficient manner, satisfactory to the Contract Administrator.

19.03 The Contractor is advised that possible noise level problems may limit his night work activities. It will be the Contractor's responsibility to schedule work activities to minimize potential problems and/or to employ noise reduction measures to lower the noise to an acceptable level. Time extension will not be granted on the basis of the Contractor being ordered to limit his activities at night.

SC:20. DAMAGE TO EXISTING STRUCTURES AND PROPERTY:

20.01 Further to Standard Provision 3, and to GC.5.02(11)(a) of the General Conditions, special care shall be taken to avoid damage to existing adjacent structures or properties during the course of the work.

20.02 Any damage caused by the negligence of the Contractor or his Sub-Contractors to the adjacent structures or properties, shall be promptly repaired by him at his own expense, to the satisfaction of the Contract Administrator.

20.03 The Contractor shall limit his activities to the work area limits indicated on the Drawings.

SC:21. LAYOUT OF THE WORK:

21.01 The Contractor shall be responsible for the true and proper laying out of the works and for the correctness of the position, levels, dimensions, and alignment of all aspects of the works. He shall provide all required instruments and competent personnel for performing all layouts.

21.02 Should any error appear or arise in position, levels, dimensions and/or alignments, during the course of the works, the Contractor shall promptly rectify such errors to the satisfaction of the Contract Administrator, at his own expense.

21.03 The Contract Administrator shall be notified at least one (1) working day prior to any works being commenced in order to check and approve all elevations and layouts.

21.04 The Contractor shall carefully protect and preserve all benchmarks, stakes and other items used in giving the basic data supplied by the Contract Administrator. Any such benchmarks or stakes removed or destroyed by the Contractor, without the consent of the Contract Administrator, shall be replaced by the Contract Administrator at the expense of the the Contractor.

SC:22. CO-OPERATION WITH OTHERS ON SITE:

22.01 Further to GC.5.02(8) of the General Conditions, the Contractor is advised that other Contractors and the personnel of the City and of Utilities may be working on the site during the execution of this Contract.

22.02 Construction of watermain works along the westbound curb lane, on Portage Avenue, will be taking place during the construction of the bridge and road work.

22.03 It will be the Contractor's responsibility to co-operate to the fullest extent with other personnel working in the area and such co-operation is an obligation of the Contractor under the terms of this Contract.

SC:23. SITE ACCESS:

23.01 Further to GC.2.01 of the General Conditions, access to the work site will only be allowed within the limits of the street right-of-way as shown on the Drawings. The Contractor will not be allowed to deviate from the approved access routes, without prior written permission of the Contract Administrator.

SC:23. SITE ACCESS: (Cont'd)

23.02 The Contractor is advised that other Contactors may be utilizing the same access location near the work site during the execution of this Contract. It will be the Contractor's responsibility to cooperate to the fullest extent with personnel of other Contractors and Utilities working in the area, and such cooperate is an obligation of the Contractor under the terms of the Contract.

SP:24. CONSTRUCTION ON/ADJUSTMENT TO THE CPR TRACKS

24.1 General

The Contractor shall be responsible for coordinating his work with the Canadian Pacific Railway Company and shall notify the Superintendent - Winnipeg Division, seven (7) calendar days in advance of when he intends to do any work within the railway right-of-way or within 10 metres of the existing railway track and shall be governed by their requirements. The Contractor shall determine and carry out the work subject to whatever conditions the Railway Company may consider necessary for the protection of its traffic.

The methods of construction and the timing of work within or adjacent to the railway property shall be subject to the approval of the Contract Administrator.

The City shall make arrangements with the Railway Company for the Contractor's employees to enter on the lands of the Railway Company in order to carry out the work.

24.2 Work on the Existing Bridge Structure

The Contractor shall be fully responsible for any loss or damage cause to the CPR property or personnel due to neglect by the Contractor or his employees. Prior to commencement of any work and/or adjacent to the CRP tracks, the Contractor shall obtain the CPR's and Contract Administrator approvals in writing on the methods and procedures. The Contractor shall be obligated to meet all requirements imposed by the CPR and Contract Administrator during these operations. Further, the Contractor shall closely coordinate his work with CPR during construction to create minimum disruption to the CPR operations.

PART D

SPECIFICATIONS

THE CITY OF WINNIPEG

SPECIFICATIONS

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SPECIFICATIONS

SP:1. APPLICABLE STANDARD SPECIFICATIONS

In addition to the Specifications included in this Tender Package, the Contractor is advised that all current Standard Specifications which are included in the Standard Construction Specifications of the City of Winnipeg shall apply to the Work.

Specification		No. of Pages
CW 1000	General Conditions (Form 20:88-03)	16
CW 1100-R3	Standard Provisions	14
CW 3110-R4	Sub-grade, Sub-base and Base Course Construction	16
CW 3210-R4	Adjustment or Abandonment of Existing Pavement and Boulevard Structures and Appurtenances	13
CW 3230-R3	Full Depth Patching of Existing Pavement Slabs and Joints	8
CW 3235-R1	Renewal of Existing Miscellaneous Portland Cement Concrete Slabs	5
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CW 3310-R4	Portland Cement Concrete Pavement Works	22
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CW 3510-R4	Boulevard Sodding	4
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The Contractor is advised that all current Standard Specifications that are included in the Standard Specifications of the City of Winnipeg shall apply to the Work, whether specifically listed herein before or not.

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.1 Description

This Specification shall cover the supply, fabrication, and placement of plain and epoxy-coated reinforcing steel and the field epoxy-coating of existing exposed reinforcing steel.

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

2.2 Materials

2.2.1 General

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

2.2.2 Handling and Storage of Materials

All materials shall be handled in a carefully and workmanship like manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the requirements of CSA Standard CAN3-A23.1-M77, Storage of Materials, except as otherwise specified herein.

2.2.3 Reinforcing Steel

Reinforcing steel shall be deemed to include all reinforcing bars, tie-bars, and dowels.

All reinforcing steel shall conform to the requirements of CSA Standard G30.12-M1977, grade 400 MPa, Billet-Steel Bars for Concrete Reinforcement. If, in the opinion of the Contract Administrator, any reinforcing steel provided for the concrete works exhibit flaws in manufacture or fabrication, such materials shall be immediately removed from the site and replaced with acceptable reinforcing steel.

All reinforcing steel shall be straight and free from paint, oil, millscale, and injurious defects. Rust, surface seams, or surface irregularities will not be cause for rejection, provided that the minimum dimensions, cross sectional area, and tensile properties of a hard-wire-brushed specimen are not less than the requirements of CSA Standard G30.12-M1988.

Welded wire fabric shall be of the sizes shown on the Drawings and shall be hot-dip galvanized to a minimum net retention of 600 g/sq.m.

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.2 Materials (Cont'd)

2.2.4 Epoxy Coating

2.2.4.1 Shop Applied

The epoxy coating shall be strictly in accordance with ASTM Standard Specification A777, except as otherwise specified herein.

The coating material shall be of organic composition, except that when a pigment is used, the pigment may be of inorganic composition. The coating and films shall be free from holes, voids, contaminations, cracks, damaged areas, and holidays (breaks in the coating of pinhole size, not visible to the naked eye.) Any reinforcement exhibiting these defects in the epoxy coating will be rejected by the Contract Administrator or repaired to the satisfaction of the Contract Administrator.

The coating material shall not blister, soften, lose bond, nor develop holidays when immersed in each of the following: Distilled water, an aqueous solution of 3M $CaCl_2$, an aqueous solution of 3M NaOH, and a saturated solution of $Ca(OH)$ at a temperature of 24°C $\pm$ 2°C for a period of forty-five (45) days. The intentionally made holes shall exhibit no undercutting during the forty-five day test period.

There shall be no failure of the film, as indicated by the evolution of hydrogen gas at the cathode, or appearance of corrosion products of iron at the anode, during a period of one hour of applied voltage.

The accumulative concentration of chloride ions permeating through the film shall not exceed 1 $x10^{-4}$ m, when testing at 24°C $\pm$ 2°C for forty-five (45) days.

No cracking of the coating shall be visible to the naked eye on the outside radius of the bent bar.

Hairline cracking without evidence of disbonding at the base of deformations in the area of the bend will be accepted.

The bond strength to the concrete shall be such that yielding of the reinforcement occurs before the loaded end slip exceeds 0.25 mm or the free end slip exceeds 0.05 mm.

The slip ratio of coated bars to uncoated bars shall not exceed 1.3 for free end slip or 1.6 for loaded end slip after a test period of forty-five (45) days.

Loss of mass of each specimen shall not exceed 100 mg per 1000 cycles.

SPECIFICATIONS

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.2 Materials (Cont'd)

2.2.4.1 Shop Applied (Cont'd)

There shall be no shattering, cracking, or bond loss of the coating, except at the impact area, when tested with the impact of 0.9 m kg at a temperature of 24°C ± 3°C.

The hardness of the coating on the steel reinforcing bars shall be not less than a Knopp Hardness number of 16, when using a 10 g mass.

Sheared ends of bars shall be coated with epoxy patching material before rusting occurs and before shipment to the job site.

Furthermore, all cracking and other visible damage or deterioration of the coating as a result of handling or bending operations, or any other causes, shall be field epoxy coated with epoxy patching material as specified hereinafter.

2.2.4.2 Field Applied

Field applied epoxy coating shall be approved touch-up epoxy coating material as specified by the manufacturer for touching up the shop coating.

Approved touch-up epoxy coating materials are as follows:

1. 3M Scotchcoat 302, 309, 312, or 313.
2. Sterling 10686.

2.2.5 Bar Accessories

Bar accessories shall be of a type approved by the Contract Administrator. They shall be made from a nonrusting material or galvanized steel, and they shall not stain, blemish, or spall the concreted surface for the life of the concrete.

Bar accessories shall include bar chairs, spacers, clips, wire ties, wire (18 gauge minimum), or other similar devices that may be approved by the Contract Administrator. The supplying and installation of bar accessories shall be deemed to be incidental to the supplying and placing of reinforcing steel.

Bar couplers if approved by the Contract Administrator shall be Bar-Grip Coupler supplied by Dayton Barsplice Inc., or equal as approved by the Contract Administrator.

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.2 Materials (Cont'd)

2.2.6 Grout

Grout as specified hereinafter shall be used for the grouting of reinforcing steel dowels.

Grout shall consist of a pre-mixed, non-metallic, non-shrink grout. Approved products are In-Pakt by Grace Construction Materials, and M-bed by Sternson. The grout shall be of a consistency suitable for the application intended, as approved by the Contract Administrator.

2.3 Construction Methods

2.3.1 Fabrication of Reinforcing Steel

Reinforcing steel shall be fabricated in accordance with CSA Standard G30.12-M1977 to the lengths and shapes as shown on the Drawings.

2.3.2 Placing of Reinforcing Steel

Reinforcing steel shall be placed accurately in the positions shown on the Drawings and shall be retained in such positions by means of a sufficient number of bar accessories so that the bars shall not be moved out of alignment during or after the depositing of concrete. The Contract Administrator's decision in this matter shall be final.

Reinforcing steel shall be free of all foreign material in order to ensure a positive bond between the concrete and steel. The Contractor shall also, remove any dry concrete, which has been deposited on the steel from previous pouring operations, before additional concrete may be placed. Intersecting bars shall be tied positively at each intersection.

Splices in reinforcing steel shall be made only where indicated on the Drawings. Prior approval of the Contract Administrator shall be obtained where other splices must be made. Welded splices shall conform to CSA Standard W186 M1981, and are subject to prior written approval of the Contract Administrator.

Reinforcing steel shall not be straightened or rebent in a manner that will injure the metal. Bars with bends not shown on the Drawings shall not be used. Heating of reinforcing steel will not be permitted without the prior approval of the Contract Administrator. A minimum of twenty-four (24) hours advance notice shall be given to the Contract Administrator prior to the pouring of any concrete to allow for inspection of the reinforcement.

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.3 Construction Methods (Cont'd)

2.3.3 Welded Wire Fabric

Welded wire fabric shall be supplied and installed where shown on the Drawings, incidental to concrete placement,and no additional payment will be made for this work.

2.3.4 Installing Reinforcing Steel Into Existing Concrete

Dowels which are to be anchored into existing concrete shall be installed in pre-drilled holes as shown on the Drawings and grouted into place to the correct grade and alignment. Holes shall be thoroughly cleaned prior to installation of the bar.

Care shall be taken not to disturb the dowels until the grout has set properly. Any dowels which are found to be loose shall be removed and reinstalled properly to the satisfaction of the Contract Administrator. After the Contract Administrator has approved the installation of the dowels, the reinforcing steel shall be placed to clearances as shown on the Drawings and shall be positively tied at all intersections.

Drilling and grouting operations to install reinforcing steel dowels shall be considered incidental to the placement of the reinforcing steel.

2.3.5 Field-Epoxy Coat Existing Reinforcement

All existing reinforcing steel that is exposed and is required by the Contract Administrator to be reused in the reconstruction shall be sandblasted to bare "white" metal and given one coat of field applied epoxy. The same application standard for quality will apply as for the factory applied epoxy.

The sandblasting of the existing reinforcing steel shall be considered incidental to the field epoxy coating.

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.4 Quality Control

2.4.1 Inspection

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations; from the selection and production of materials, through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

2.4.2 Access

The Contract Administrator shall be afforded full access for the inspection and control testing of reinforcing steel; both at the site of work and at any plant used for the fabrication of the reinforcing steel, to determine whether the reinforcing steel is being supplied in accordance with this Specification.

2.4.3 Quality Testing

Quality control testing will be used to determine the acceptability of the reinforcing steel supplied by the Contractor.

The Contractor shall provide, without charge, the samples of reinforcing steel required for quality control tests and provide such assistance and use of tools and construction equipment, as is required.

2.5 Method of Measurement

2.5.1 Supplying and Placing of Reinforcing Steel

The supplying and placing of reinforcing steel will be measured on a mass basis. The mass to be paid for shall be the total number of kilograms of reinforcing steel installed in accordance with this Specification, acceptable to the Contract Administrator, as computed from the approved reinforcing layout shown on the Drawings, excluding the mass of bar accessories.

2.5.2 Field Epoxy-Coat Existing Reinforcement

The sandblasting and epoxy-coating of existing reinforcing will be paid for on a Lump Sum Basis as acceptable by the Contract Administrator, and no measurement will be made for the work.

SP:2. SUPPLYING AND PLACING REINFORCING STEEL

2.6 Basis of Payment

2.6.1 Supply and Placing Reinforcing Steel

The supplying and placing of reinforcing steel shall be paid for at the Contract Unit Price per kilogram for the "Items of Work" listed herebelow, measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other for items incidental to the work included in this Specification.

Items of Work:

Reinforcing Steel

(a) Supply
    i) Plain
    ii) Epoxy-Coated

(b) Placement
    i) Plain
    ii) Epoxy-Coated

2.6.2 Field Epoxy-Coat Existing Reinforcement

The field epoxy-coating of existing reinforcement will be paid for at the Contract Lump Sum Price for "Field Epoxy-Coat Existing Reinforcement", which price shall be payment in full for supplying all material and performing all operations herein described and all other for items incidental to the work included in this Specification.

SP:3 STRUCTURAL CONCRETE

3.1 Description

This Specification shall cover the preparation of Portland Cement Structural Concrete for, and all concreting operations related to, the construction of Portland Cement Concrete works as specified herein.

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.

3.2 Materials

3.2.1 General

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

3.2.2 Handling and Storage of Materials

All materials shall be handled and stored in a careful and workmanlike manner, to the satisfaction of the Contract Administrator. Storage of materials shall be in accordance with the latest edition of CSA Standard CAN3-A23.1-M.

3.2.3 Testing and Approval

All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

All materials shall conform to the latest edition of CSA Standard CAN3-A23.1-M.

All testing of materials shall conform to the latest edition of CSA Standard CAN3-23.2-M.

All materials shall be approved by the Contract Administrator at least twenty-one (21) days before any construction is undertaken. If, in the opinion of the Contract Administrator, such materials, in whole or in part, do not conform to the Specification detailed herein or are found to be defective in manufacture or have become damaged in transit, storage or handling operations, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at this own expense.

SP:3 STRUCTURAL CONCRETE

3.2 Materials

3.2.4 Aggregates (Cont'd)

of the coating as a result of handling or bending operations, or

Nominal Size of Aggregate	Percent of Total Dry Weight Passing Each Sieve (mm)						
	56	40	28	20	10	5	2.5
40 mm	100	95 to 100	--	30 to 70	10 to 0	0 to 5	--
20 mm	--	00	100	90 to 100	25 to 60	0 to 10	0 to 5

(c) Coarse Aggregate-Crushed Granite

Crushed granite coarse aggregate shall be used for the full-depth concrete deck patch, bridge sidewalk, median and shoulder , traffic barriers, approach slabs, structural approach sidewalk slabs, slope paving and handrail concrete parapet.

The crushed granite aggregate shall be 100 percent crushed granite, cleaned and free from alkali, organic or other deleterious matter, and/or excessive fines, as approved by the Contract Administrator. Crushed granite aggregate shall be well graded throughout and shall conform to the grading requirements in the following table.

GRADING REQUIREMENTS FOR COARSE AGGREGATE (CRUSHED GRANITE)

Nominal Size of Aggregate	Percent of Total Dry Weight Passing Each Sieve (mm)						
	56	40	28	20	10	5	2.5
40 mm	100	95 to 100	--	30 to 70	10 to 0	0 to 5	--
20 mm	--	00	100	90 to 100	25 to 60	0 to 10	0 to 5

3.2.5 Cement

All cement, unless hereinafter specifically stated, shall be Type 10, Normal Portland Cement, conforming to requirements of CSA Standard CAN3-A5-M88.

All cement for the slope paving works and abutment backwall shall be Type 50 sulphate-resistant cement, conforming to the requirements of CSA Standard CAN3-A5-M88.

SP:3 STRUCTURAL CONCRETE

3.2 Materials (Cont'd)

3.2.6 Water

Water used for mixing concrete shall be clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious substances. It shall be equal to potable water in physical and chemical properties.

3.2.7 Admixtures

No admixtures, other than air-entraining agent, shall be used without the written authorization of the Contract Administrator or, unless otherwise specified in these Specifications, and it shall be the Contractor's responsibility to ensure that any admixture is compatible with all other construction materials.

(a) Air-Entraining Agent

The air-entraining agent shall conform to the requirements of CSA Standard CAN3-A266.1-M78 and shall produce a satisfactory air void system and an air content within the required range.

(b) Water-Reducing Agent

If the Contract Administrator authorizes the use of a water-reducing agent, it shall be Type WN and shall conform to the requirements of CSA Standard CAN3-A266.2-M78.

(c) Superplasticizing Agent

If the Contract Administrator authorizes the use of a superplasticizing agent, the superplasticizing agent shall conform to the requirements of CSA Standard CAN3-A266.5-M1981 and CAN3-A266.6-M85. The agent shall be free of chlorides, and shall not effect the air-entraining ability to produce the specified air-void system.

(d) Other Admixtures

No other admixtures will be authorized for use in Portland Cement Concrete, unless authorized in writing by the City Bridge Engineer.

3.2.8 Curing Compounds

3.2.8.1 General

Curing compounds shall be liquid membrane-forming and conform to the requirements of ASTM Standard C 309 and the proposed standard ASTM P 198. Rate of application shall be the rate required to meet the requirements of ASTM P198 for the texture of concrete the curing compound is being applied to.

SP:3 STRUCTURAL CONCRETE

3.2 Materials (Cont'd)

3.2.8.2 For Approach Slabs

Curing compound for approach slabs shall be resin based and white pigmented.

3.2.8.3 For Other Than Approach Slabs

Curing compounds for other than approach slabs shall be either of chlorinated rubber, resin, or acrylic polymer base. As chlorinated rubbers discolour, they shall only be used on areas that will be below grade. The resin or acrylic polymer curing compounds my be either clear or with a fugitive dye.

3.2.9 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 Sikalflex by Sika; or equal as approved by the Contract Administrator.

3.2.10 Latex Bonding Agent

Latex bonding agent shall be SCP Concrete Bonding Agent, as supplied by Specialty Construction Products, or equal as approved by the Contract Administrator.

3.2.11 Fibre Joint Filler

Fibre joint filler shall be rot-proof and of the preformed, non-extruding, resilient-type, made with a bituminous fibre such as "Flexcell" and shall conform to the requirements of ASTM Standard D1751 or equal as approved by the Contract Administrator.

3.2.12 Form Coating

Form coating shall be "Sternson CRA," or as approved by the Contract Administrator.

3.2.13 Expanding Joint Filler

Expanding joint filler shall be precompressed to 20 percent of its original width and shall be grey in colour. Approved products are Will-seal", Type 150G, by Will-Seal Construction Foams Limited and "Emseal", by Emseal Corporation.

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3.2 Materials (Cont'd)

3.2.14 Patching Mortar

The patching mortar shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted, and the mortar shall consist of not more than 1 part cement to 2-1/2 parts and by damp loose volume. White Portland Cement shall be substituted for a part of the grey Portland Cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch. The quantity of mixing water and bonding agent shall be no more than necessary for handling or placing.

3.2.15 Cement Slurry Bonding Grout

Cement slurry bonding grout shall be a mixture of 1 part cement and 1 part sand,mixed with enough water and latex bonding agent (mixed in equal parts) to allow the slurry mixture to be brushed onto existing concrete surfaces.

3.2.16 Formwork

Formwork materials shall conform to CSA Standard CAN3-A23.1-M77 and American Concrete Publication SP-4, "Formwork for Concrete".

Form sheeting plywood shall be exterior Douglas Fir, concrete form grade, conforming to CSA 0121, a minimum of 20 mm thick.

No formwork accessories will normally be allowed to be left in place within 75 mm of the surface following form removal. However, if the Contract Administrator does permit these items to be left in place, they must be made from a nonrusting material or galvanized steel; and they shall not stain, blemish or spall the concrete surface for the life of the concrete.

Boards used for formwork shall be fully seasoned and free from defects that may mar the surface, such as knots, wraps, cracks, etc.

Forms for exposed surfaces may be either new plywood or steel as authorized by the Contract Administrator.

Studding shall be spruce or pine and shall have such dimensions and spacing that they shall withstand without distortion, all the forces to which the forms will be subjected.

Whalers shall be spruce or pine, with minimum dimensions of 100 mm x 150 mm.

Stay-in-place forms require the approval of the Contract Administrator.

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3.2 Materials (Cont'd)

3.2.17 Plain Formliner

Plain formliner shall be a Buffalo Board sheathing material such as "KB" board, as approved by the Contract Administrator. This Formliner shall be used on all exposed superstructure and bridge approach-formed surfaces, except soffit surfaces, surfaces on which an architectural formliner is to be applied, or where a normal form finish is specified. Plain formliner is not intended for use on the substructure.

3.2.18 Epoxy Coated Dowels and Galvanized Expansion Sleeves for Concrete Traffic Barrier

Dowels and expansion sleeves shall be fabricated in accordance with CSA Standard G30.12-M1977.

The dowels shall be plain 25 mm diameter bars, 550 mm in length with CSA Standard G30.12-M1977.

The expansion sleeves shall be 1.6 mm gauge, 32 mm in outer diameter, 300 mm in length, and shall be galvanized in accordance withe CSA Standard G164-M1981, to a retention of 600 g/sq.m.

3.2.19 Polyester Blankets

Covering material for wet cursing shall be 100 percent polyester 3 mm thick blankets and shall be white in colour. An approved product is "Mirafi Goxtextile P150" or equal as approved by the Contract Administrator.

3.2.20 Epoxy Adhesive

Epoxy adhesive shall be ST 431, as manufactured by Sternson Ltd., and distributed by D.W. Court Ltd., or equal as approved by the Contract Administrator.

3.2.21 Benchmark

Benchmark plugs as supplied by the City.

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3.2 Materials (Cont'd)

3.2.22 Penetrating Concrete Sealer

Sealing compounds shall be penetrating type, silane sealers, conforming to NCHRP Report 244, for water absorption.

Further to Report 244, sealers shall provide a minimum of 75 percent reduction in water absorption after surface abrasion. Approved products include:

Product	Rate of Application (m^2/L)
Capper Cap Seal X	3.0
Masterseal SL	4.3
Isoflex 618	4.28
Sil-act ATS 42	2.94

3.2.23 Miscellaneous Materials

Miscellaneous materials shall be of the type specified on the Drawings or approved of by the Contract Administrator.

3.3 Concrete Design Requirements

3.3.1 Mix Design Statement

For each type of concrete to be used, the Contractor shall provide the Contract Administrator with a Mix Design Statement, certifying the constituent materials and mix proportions that will be used in the Portland Cement Concrete. The Contractor shall also supply evidence to the Contract Administrator that the mix proportions selected will produce concrete of the specified strength, workability, air content requirements, and yield prior to construction.

The spacing factor of the air-void system within the paste fraction of the concrete shall not exceed 230 microns.

The Mix Design Statement, prepared and stamped by a Professional Engineer of Manitoba, shall be submitted to the Contract Administrator at least twenty-one (21) days prior to the delivery of any concrete to the job site. Once approved by the Contract Administrator, all concrete shall be supplied in accordance with this Statement, which shall be called the Job Mix Formula.

When previous data on the proposed mix is not available, the Contractor will be required to prepare field trail batches in order that the concrete be tested prior to construction. Such field trial batches shall be carried out in similar conditions and using similar equipment, batching, and mixing procedures as will

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3.3 Concrete Design Requirements

3.3.1 Mix Design Statement (Cont'd)

be used in the actual construction. The number of trail batches required shall be determined by the Contract Administrator and shall depend on the class of concrete materials. All costs related to trial batches and subsequent testing prior to construction shall be at the Contractor's own expense.

No changes in the Job Mix Formula will be permitted without following the above procedure.

3.3.2 Concrete Strength and Workability

(a) Concrete Strength

(i) Minimum Compressive Strength at 28 days = 35 MPa
(ii) Maximum Water/Cement Ratio = 0.40
(iii) Slump - 80 mm ± 30 mm
(iv) Aggregate
- 20 mm Nominal standard aggregate for superstructure diaphragms, abutment backwall and pier cap cantilever construction.
- granite aggregate for approach slabs, bridge sidewalk, handrail parapet on stairwell, median barriers, shoulder barriers, slope paving and approach sidewalk construction.

(v) Air Content - 5.0% to 8.0% for both fresh concrete and the hardened concrete
- Maximum spacing factor of air-void system is past of hardened concrete is 230 microns.

(vi) Cement - Type 10, except for slope paving and abutment backwall which is Type 50.

(b) Working Base Concrete

Proportioning of fine aggregate, coarse aggregate, cement, and air-entraining agent shall be such as to yield concrete having the required strengths and workability, as follows:

20 MPa Concrete
(i) Minimum Compressive Strength at 28 days - 20 MPa
(ii) Minimum Cement Content = 240 kg/cu.m.
(iii) Maximum Water/Cement Ratio = 0.55
(iv) Slump = 80 mm ± 25 mm
(v) Aggregate Size: = 20 mm Nominal
(vi) Air Content = Nil
(vii) Cement: Type 10

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3.4 Concrete Supply

Unless otherwise specified in these Specifications of the Contract, only the use of a ready-mix concrete plant will be permitted. Concrete shall be proportioned, mixed, and delivered in accordance with the requirements of the latest edition CSA Standard CAN3-A23.1-M, "Production of Concrete", or the latest edition except that the transporting of ready-mixed concrete in nonagitating equipment is not permitted without the written permission of the Contract Administrator.

Unless otherwise directed by the Contract Administrator, the discharge of ready-mixed concrete shall be completed within one and a-half (1.5) hours after the introduction of the mixing water to the cement and aggregates.

The Contractor shall maintain all equipment used for handling and transporting the concrete in a clean condition and proper working order.

3.5 Equipment

3.5.1 General

All equipment shall be a type approved by the Contract Administrator. The equipment shall be in good working order, kept free from hardened concrete or foreign materials, and shall be cleaned at frequent intervals.

The Contractor shall at all times have sufficient standby equipment available on short notice.

3.5.2 Mechanical Screed for Structural Approach Slab

The mechanical screed shall be such that it is:

i) constructed to span the full width of the slab being poured

ii) supported on screed rails positioned above the surface being screeded

iii) Sufficiently strong to retain its shape under all working conditions, especially if any working scaffolds are supported on the same screed rails

iv) capable of producing the flatness tolerance as specified herein.

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3.5 Equipment (Cont'd)

3.5.3 Movable Work Bridge

The Contractor shall provide a movable work bridge, spanning the approach slabs at a right angle to the centreline of roadway in order to facilitate the brooming; the application of curing compound; the inspection of the freshly-placed concrete; and any remedial work required to be done to the screeded surface, including filling in of holes left by the screed bars. Curing compound will not be allowed on concrete areas that are to receive additional concrete. After the surface has been screeded, all further work that may be required shall be done from the work bridge.

The Contractor shall install a sturdy walkway with safety railing on each side of the work area for the purpose of providing access to the work bridge.

3.5.4 Vibrators

The Contractor shall have sufficient numbers of concrete vibrators on site to properly consolidate all concrete. The type and size of vibrators shall be appropriate for the particular application and shall conform to Standard Construction procedures.

3.5.5 Miscellaneous Equipment

The Contractor shall provide all miscellaneous equipment as required to properly and thoroughly execute and complete all operations related to the supply and placement of structural concrete.

3.6 Construction Methods

3.6.1 General

The works involving Structural Concrete include the construction of:

(a) Abutment Backwall
(b) Pier Cap Cantilever
(c) Superstructure Diaphragms
(d) Approach Slabs and Grade Beams
(e) Median and Shoulder Barriers
(f) Slope Paving
(g) Approach Sidewalk Slab
(h) Bridge Sidewalk
(i) Full Depth Concrete Deck Patch
(j) Handrail Parapet on Stairwells

For construction of High Density Concrete, refer to Specification SP:9.

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3.6 Construction Methods (Cont'd)

3.6.2 Concrete Working Base

Upon completion of all excavation, the bottom of the excavation shall be inspected by the Contract Administrator. The Contractor shall be required to construct a 75 mm thick concrete working base prior to construction of approach slabs. Under no circumstances shall the Contractor place the concrete working base or void form without the prior approval from Contract Administrator. No working base will be required where a void form is specified. The supply and installation of working base or void form will be considered incidental to the work of this Specification, and no separate payment will be made.

3.6.3 Formliners

Plain Formliner shall be used on all exposed superstructure and bridge approach-formed surfaces, except soffit surfaces, surfaces on which an architectural formliner is to be applied, or where a normal form finish is specified.

The supply and use of plain formline finish shall be considered incidental to the works of this Specification, and no additional payment will be made.

3.6.4 Formwork and Shoring

Formwork shall be designed, erected, braced, and maintained to safely support all vertical and lateral loads until such loads can be supported by the concrete.

20 mm plywood: maximum studding spacing - 450 mm centre-to-centre
maximum whaling spacing - 760 mm centre-to-centre

Forms shall be clean before use. Plywood and other wood surfaces shall be sealed against absorption of moisture from the concrete by a field applied form coating or a factory applied liner.

Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be commercially manufactured type. They shall be made from nonrusting material or galvanized steel, and they shall not stain, blemish, or spall the concrete surface for the life of the concrete. The portion remaining within the concrete shall leave no metal within 50 mm of the surface when the concrete is exposed to view. Spreader cones on ties shall not exceed 25 mm in diameter.

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3.6 Construction Methods

3.6.4 Formwork and Shoring (Cont'd)

All exposed edges shall be chamfered 25 mm for the substructure concrete works and 13 mm for the superstructure concrete works unless otherwise noted on the Drawings.

Slots, recesses, chases, sleeves, inserts, bolts, hangers and other items shall be formed or set in coordination and cooperation with the trade concerned. No opening shall be made in structural members that are not shown on the structural Drawings without the prior approval of the Contract Administrator.

Shores shall be provided with positive means of adjustment (jacks or wedges). All settlement shall be taken up before or during concreting as required.

Mud sills of suitable sizes shall be provided beneath shores, bedded in sand or stone, where they would otherwise bear on soil. The soil below shore must be adequately prepared to avoid settlements during or after concreting. Shores must not be placed on frozen ground.

Brace shores horizontally in two directions and diagonally in the same two vertical planes so that they can safely withstand all dead and moving loads to which they will be subjected.

The loads and lateral pressures outlined in Part 3, Section 102, of "Recommended Practice for Concrete Formwork" (ACI 347) and wind loads as specified by the National Building Code, shall be used for design. Additional design considerations concerning factors of safety for formwork elements and allowable settlements outlined in Section 103, of the above reference shall apply.

Formwork shall have sufficient strengths and rigidity so that the resultant finished concrete conforms to the shapes, lines and dimensions of the members shown on the Drawings.

Formwork shall be constructed to permit easy dismantling and stripping and such that removal will not damage the concrete. Provisions shall be made in the formwork for shores to remain undisturbed during stripping, where required.

Forms shall be constructed and maintained so that the completed work is within minus 3 mm or plus 6 mm of the dimensions shown on the Drawings.

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3.6 Construction Methods

3.6.4 Formwork and Shoring (Cont'd)

Forms for the concrete traffic barriers shall be accurately aligned to each other and to the geometry shown on the Drawings so as to provide a smooth, continuous barrier. Any misalignments in the barrier shall be cause for rejection and removal of the same.

Formwork shall be cambered, where necessary, to maintain the specified tolerance to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.

Form panel shall be constructed so that the contact edges are kept flush and aligned.

Where required by the Contract Administrator, the Contractor shall cast test panels, not using less than two panels of representative samples of the forms he proposes for reuse and shall strip them after 48 hours for the Contract Administrator to judge the type of surface produced.

Where prefabricated panels are used, care should be taken to ensure that adjacent panels remain flush. Where metal forms are used, all bolts and rivets shall be countersunk and well-ground to provide a smooth, plane surface.

All form lumber, studding, etc. becomes the property of the Contractor when the work is finished, and it shall be removed from the concrete and the site by the Contractor after the concrete is set, free of extra charge, and the entire site shall be left in a neat and clean condition.

It shall be permissible to use the forms over again, where possible, provided they are thoroughly cleaned and in good condition after being removed from the former portions of the work. The Contract Administrator shall be the sole judge of their condition, and this decision shall be final regarding the use of them again.

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3.6 Construction Methods

3.6.4 Formwork and Shoring (Cont'd)

The Contractor shall submit to the Contract Administrator at least fourteen (14) days prior to any concrete being placed, three (3) prints of the detailed shop Drawings of the proposed falsework and formwork for supporting the bridge superstructure concrete and of the proposed pier cap reinforcing construction. The bridge superstructure falsework and formwork shall be designed to support all loads associated with construction of the structural concrete deck slab and placement of high density concrete, including hoarding and construction live loads and any other loads that may arise. Shop Drawings shall show design loads, type and number of equipment to be used for placing the concrete, method of construction, type and grade of materials, and any further information that may be required by the Contract Administrator.

The formwork and shoring for these works shall be designated by a Professional Engineer registered in the Province of Manitoba. Falsework shall be designed according to the requirements of CSA S269.1-1975, "Falsework for Construction Purposes". The Shop Drawings shall bear the Professional Engineer's seal. The Shop Drawings will not be acceptable if not stamped by Professional Engineer. The submission of such Shop Drawings to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the safety and structural integrity of the formwork and shorings.

3.6.5 Setting Expansion Joints

The Contractor shall adjust all expansion joints to the required elevations and gap and skew, as approved by the Contract Administrator, prior to placement of concrete adjacent thereto. The adjustment shall be done in accordance with the procedures for adjusting of the expansion joints as recommended by the manufacturer or as directed by the Contract Administrator.

3.6.6 Placing Concrete

The Contract Administrator must be notified at least 24 hours prior to concrete placing so that an adequate inspection may be made of formwork, shoring, reinforcement, expansion joints, mechanical screed set-up, movable hoarding, and related works. Placement without required prior notification will not be allowed.

Equipment for mixing or conveying concrete shall be thoroughly flushed with clean water before and after each pour. Water used for this purpose shall be discharged outside the forms.

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3.6 Construction Methods

3.6.6 Placing Concrete (Cont'd)

Concrete shall be conveyed from the mixer to the place of final deposit by methods that will prevent segregation and a marked change in consistency.

Runways for concrete buggies shall be supported directly by the formwork and not on reinforcement.

Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete and any mortar splashed upon the reinforcement or forms shall be removed.

Placing of concrete, once started, shall be continuous. No concrete shall be placed against concrete that has sufficiently hardened to cause the formation of seams of "cold joints" within the section. If placing must be interrupted, construction joints shall be located where shown on the Drawings or as approved.

Concrete shall be placed as nearly as possible in its final position. Rakes or mechanical vibrators shall not be used to transport concrete.

The maximum drop of free concrete into the forms shall not be greater than 1.5 m; otherwise, rubber tubes or pouring ports spaced not more than 1.5 m vertically and 2.5 m horizontally shall be used.

All concrete, during and immediately after deposition, shall be consolidated by mechanical vibrators so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into the corners of forms; eliminating all air or stone pockets that may cause honeycombing, pitting, or planes of weakness. Mechanical vibrators, when immersed, shall have a minimum frequency of 7,000 revolutions per minute.

Vibrators shall be inserted systematically into the concrete at intervals such that the zones of influence of the vibrator overlap (generally 300 to 900 mm). Apply the vibrator at any point until the concrete is sufficiently compacted (5 to 15 seconds) but not long enough for segregation to occur. Spare vibrators in working condition shall be kept on the job site during all placing operations.

Concrete shall not be placed during rain or snow, unless adequate protection is provided for formwork and concrete surfaces.

SPECIFICATIONS

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3.6 Construction Methods

3.6.6 Placing Concrete (Cont'd)

Before any concrete is placed in the approach slabs and bridge deck, the Contractor shall demonstrate to the satisfaction of the Contract Administrator before each pour that all necessary adjustments have been made and to provide the required camber, crown, slab thickness, and concrete cover. This demonstration may be carried out by means of an attachment securely fastened to the finisher's strike-off machine and moving the machine and the strike-off cross the deck over the reinforcing steel with a minimum 3 mm clearance between the steel and attachment.

3.6.7 Finishing of Unformed Surfaces

All unformed concrete surfaces except the structural approach slabs finished as outlined hereinafter.

Screeding of all unformed concrete surfaces shall be performed by the sawing movement of a straightedge along wood or metal strips or form edges that have been accurately set at required elevations.

Screeding shall be done on all concrete as a first step in other finishing operations. Screeding shall be done immediately after the concrete has been vibrated.

After screeding, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared. The surface shall then be consolidated with hand floats. Concrete surfaces after floating shall have a uniform, smooth, granular texture.

The surface of the sidewalk and slope paving shall be given a broom finish.

All surfaces on which the girder bearing grout seat are to be subsequently placed shall be finished to exact elevations and planes shown on the Drawings.

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3.6 Construction Methods (Cont'd)

3.6.8 Finishing of Structural Approach Slabs

The structural concrete approach slabs shall be finished using an approved mechanical screed.

Screed guides shall be placed and fastened in position to ensure finishing the concrete to the required profile. Supporting rails, upon which the finishing machine travels, shall be placed outside the area to be concreted. Provisions for anchorage of supporting rails shall provide for horizontal and vertical stability; positive anchorage may be required by the Contract Administrator. A hold-down device shot into concrete will not be permitted, unless the concrete is to be subsequently resurfaced.

Plans for anchoring support rails shall be submitted to the Contract Administrator for approval. The Contract Administrator's written approval must be received by the Contractor prior to the installation of any anchorage devices.

The mechanical screed, as well at least one work bridge, shall travel on guides or rails supported so that they are completely clear of the finished surface.

Internal vibration of the concrete will be required with mechanical screeding. Care shall be taken not to overwork the concrete surface.

Care shall be taken to ensure that the screed bars are seated uniformly on the screed chairs and that the ends of the screed bars do not overhang the screed chairs by more than 75 mm.

For the approach slabs, the finish flatness tolerance and cutting straightedge required will be the same as for the "High Density Concrete," SP:9.

After floating, the approach slabs shall be given a course, transverse scored texture by drawing a steel broom, as provided by the Contract Administrator, across the surface.

The Contractor shall ensure that sufficient personnel are provided for the finishing of the slab surfaces. In the even that the depositing, vibrating, and screeding operations progress faster than the concrete finishing, the Contractor shall reduce the rate of concrete placement or cease the depositing of concrete until the exposed area of unfinished concrete has been satisfactorily finished. The Contract Administrator's adjustment in this matter will be final and binding on the Contractor. All loads of concrete that exceed the 1.5 hour discharge time limit during the day, while the finishing operations catch up, shall be rejected.

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3.6 Construction Methods (Cont'd)

3.6.9 General Curing

The use of curing compound will not be allowed on concrete areas that are to receive additional concrete.

Freshly-finished concrete shall have either a curing compound applied or be covered and kept moist by means of wet polyester blankets immediately following finishing operations and shall be maintained at above 10°C for at least seven (7) consecutive days thereafter. Construction joints shall only be covered and kept moist by means of wet polyester blankets for the curing period.

Curing compounds shall be applied at the rate required by ASTM P 198 for the approved product. The compound must be applied uniformly and by roller. Spraying of the compound will not be permitted.

Concrete shall be protected from the harmful effects of sunshine, drying winds, surface dripping, or running water, vibration and mechanical shock. Concrete shall be protected from freezing until at least twenty-four hours after the end of the curing period.

Changes in temperature of the concrete shall be uniform and gradual and shall not exceed 3° in one hour and 20° in twenty-four hours.

Formed surfaces shall receive, immediately after stripping and patching, the same application of curing compound as finished surfaces, with the exception of the deck soffit surfaces.

3.6.10 Curing of Structural Approach Slabs

After the finishing is completed, the surface shall be promptly covered with a minimum of a single layer of clean, damp polyester blanket.

Care shall be exercised to ensure that the polyester blanket is well drained and that it is placed as soon as the surface will support it without deformation. The Contractor shall ensure that water from the polyester blankets does not run into areas where concrete placement and finishing operations are underway. If this occurs, concrete placement shall stop until the problem is corrected satisfactory to the Contract Administration.

Water used for wetting the blankets for the first 72 hours shall be a minimum temperature of 40°C when applied to the blankets on the deck.

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3.6 Construction Methods

3.6.10 Curing of Structural Approach Slabs (Cont'd)

Failure to apply wet polyester blankets within 30 minutes after the concrete has been deposited or before the finished surface comes out from under the hoarding, shall be cause for rejecting the work so affected. Concrete in the rejected area shall be removed and replaced at no additional cost to the City.

As soon as the concrete can be walked on without damaging the surface, the polyester blankets shall be covered with a layer of 4 mil polyethylene film and a layer of insulated tarps.

For the approach slabs, the surfaces are to receive a wet polyester

blanket cure for at least 72 hours. Warm water, as specified, shall be applied, as necessary, to keep the polyester blankets wet under the insulated tarps for that period. If the wet cure is removed before seven days, curing compound is to be applied.

Following 72 hours, the insulated tarps may be removed and regular water temperature may be used to continue the curing.

3.6.11 Form Removal

The Contract Administrator must be notified at least 24 hours prior to form removal and given approval prior to beginning work.

The minimum strength of concrete in place for safe removal of soffit forms a horizontal for inclined members as well as vertical forms for pier cap and abutment back wall shall be 20 MPa, with the added provisions that the member shall be of sufficient strength to carry safely its own weight, together with superimposed construction loads, and that the forms shall stay in place a minimum of three days unless otherwise approved by the Contract Administrator.

Field-cured test specimens, representative of the in-place concrete being stripped will be tested, as specified in this Specification, to verify the concrete strength.

3.6.12 Patching of Formed Surfaces

Immediately after forms have been removed but before any repairing or surface finishing is started, the concrete surface shall be inspected by the Contract Administrator. Any repair or surface finishing started before this inspection may be rejected and required to be removed.

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3.6 Construction Methods

3.6.12 Patching of Formed Surfaces (Cont'd)

All formed concrete surfaces shall have bolts, ties, struts and all other timber or metal parts not specifically required for construction purposes cut back seventy-five (75) mm from the surface before patching.

Minor surface defects caused by honeycomb, air pockets greater than 5 mm in diameter and voids left by strutting and tie holes shall be repaired by removing the defective concrete to sound concrete, dampening the area to be patched and then applying patching mortar. A slurry grout consisting of water and cement, shall be well brushed onto the area to be patched. When the slurry grout begins to lose the water sheen, the patching mortar shall be applied. It shall be struck off slightly higher than the surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in this Specification, and the final colour shall match the surrounding concrete.

3.6.13 Finishing and Formed Surfaces

All objectionable fins, projections, offsets, streaks or other surface imperfections shall be removed by approved means to the Contract Administrator's satisfaction. Cement washes of any kind shall not be used.

Concrete surfaces shall have a normal or plain formliner finish. Concrete shall be cast against forms which will produce plane surfaces with no bulges, indentation or protuberances other than those shown on the Drawings. The arrangement of panel joints shall be kept to a minimum. Panels containing worn edges, patches or other defects which will impair the texture of concrete surfaces shall not be used. All fins on the concrete surfaces shall be removed.

3.6.14 Cold Weather Concreting

The requirements of this section shall be applied to all concreting operations during cold weather, i.e., if the mean daily temperature falls below 5°C during placing and curing.

The Contract Administrator will advise the Contractor in writing as to the degree of heating of water and aggregates.

Supplementary equipment as required below shall be at the job site if concrete is likely to be placed in cold weather.

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3.6 Construction Methods

3.6.14 Cold Weather Concreting (Cont'd)

The temperature of concrete placed in cold weather shall be not less than 15°C nor more than 27°C.

Formwork and reinforcing steel shall be heated to at least 5°C before concrete is placed.

Concrete footings shall not be placed on frozen concrete, frozen soil or soil that has frozen and thawed. Other concrete members may be placed on subgrades which have been thawed, with the prior approval of the Contract Administrator.

The substructure girders must be at a minimum temperature of 10°C before placement of any structural or high density concrete thereon.

The temperature of the concrete shall be maintained at not less than 10°C for seven days or 15°C for 5 days or 20°C for three days after placing. The concrete shall be kept above freezing temperature for at least a period of seven days. In no case shall the heating be removed until the concrete has reached a minimum compressive strength, which will be specified by the Contract Administrator for work under construction, and as determined from compressive strength tests on specimens secured under the same conditions as the concrete works in question.

Aggregates shall be heated to a temperature of not less than 20°C and not more than 65°C. Water shall be heated to a temperature between 55°C and 65°C. The temperature of the concrete shall be not less than 15°C and not more than 25°C at the time of placing in the forms.

When the mean daily temperature may fall below 5°C, a complete hoarding of the work, together with supplementary heat, shall be provided.

Combustion type heaters may be used if their exhaust gases are vented outside the enclosures and not allowed to come into contact with concrete surfaces. Fire extinguishers must be readily at hand whenever combustion type heaters are used.

When the ambient temperature is below -15°C, the hoarding shall be constructed so as to allow the concrete to be placed without the hoarding having to be opened. If the mixing is done outside of the hoarding, the concrete shall be placed by means of hoppers installed through the hoarding. The hoppers are to be plugged when not in use.

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3.6 Construction Methods

3.6.14 Cold Weather Concreting (Cont'd)

When the ambient temperature is equal to or above -15°C, the Contractor will be permitted to open small portions of the hoarding for a limited time to facilitate the placing of the concrete.

Before depositing any of the concrete, the Contractor shall show that enough heating equipment is available to keep the air temperature surrounding the forms within the specified range. This shall be accomplished by bringing the temperature inside of the hoarding to the specified 20°C at least 12 hours prior to the start of the concrete placing.

The Contractor shall supply all required heating apparatus and the necessary fuel. When dry heat is used, a means of maintaining atmospheric moisture shall be provided.

Sufficient standby heating equipment must be available to allow for any sudden drop in outside temperatures and any breakdowns which may occur in the equipment.

The Contractor shall keep a curing record of each concrete pour. The curing record shall include: date and location of the pour, mean daily temperature, temperatures above and below the concrete surface at several points, and notes regarding the type of heating, enclosure, unusual weather conditions, etc. This record shall be available for inspection by the Contract Administrator at all times, and shall be turned over to the Contract Administrator at the end of concreting operations.

3.6.15 Hot Weather Concreting

The requirements of this section shall be applied during hot weather, i.e. air temperatures above 25°C during placing.

Concrete shall be placed at as low a temperature as possible, preferably below 15°C but not above 32°C. Aggregate stockpiles may be cooled by water sprays and sun shades.

Ice may be substituted for a portion of the mixing water, providing it has melted by the time mixing is completed.

Form and conveying equipment shall be kept as cool as possible before concreting, by shading them from the sun, painting their surfaces white, and/or the use of water sprays.

Sun shades and wind breakers shall be used, as required, during placing and finishing.

SP:3 STRUCTURAL CONCRETE

3.6 Construction Methods

3.6.15 Hot Weather Concreting (Cont'd)

Work shall be planned so that concrete can be placed as quickly as possible to avoid "cold joints".

The Contract Administrator's approval is necessary before the Contractor may use admixtures, such as retardants, to delay setting, or water-reducing agents to maintain workability and strength, and these must then appear in the Mix Design Statement submitted to the Contract Administrator.

Curing shall follow immediately after the finishing operations.

3.6.16 Construction Joints

Construction joints shall be located where shown on the Drawings or as otherwise approved in writing by the Contract Administrator. Construction joints shall be at right angles to the direction of the main reinforcing steel. All reinforcing steel shall be continuous across the joints. Bevelled shear keys as shown on the Drawings or approved by the Contract Administrator shall be provided at all joints.

In lieu of shear keys, the Contractor may roughen the surface as follows. The surface shall be rough, with a minimum amplitude of 5 mm, which shall be achieved without damaging the epoxy coating on epoxy coated reinforcing steel. Acceptable procedures to obtain this rough surface are as follows:

(a) by removing the mortar from between the larger aggregate particles with a water jet and soft brush when the concrete is in a semi-hardened state;

(b) by first applying a chemical retarder to the surface and then removing the mortar from between the larger aggregate particles with a water jet and brush.

The face of joints shall be cleaned of all laitance and dirt, after which a slurry grout or an approved bonding agent shall be applied. Forms shall be re-tightened and all reinforcing steel shall be thoroughly cleaned at the joint prior to concreting.

SP:3 STRUCTURAL CONCRETE

3.6 Construction Methods (Cont'd)

3.6.17 Installation of Flexible Joint Sealant

Prior to applying the sealant, the joint shall be thoroughly cleaned to make them free of all laitance, loose aggregates, form release agents, and other surface treatments, and primed with material as approved by the sealant manufacturer. No primer or sealant shall be installed until the joint preparation has been approved by the Contract Administrator.

3.6.18 Installation of Expanding Joint Filler

Prior to applying the filler, the joint sides to which the filler is to be bonded shall be thoroughly cleaned of all laitance including form release agents. The recommended primer shall be used, followed by installation of the precompressed seal of the size shown on the Drawings. Manufacturer's instructions for installation are to be followed. If ambient temperatures are too low for the seal to expand on its own, artificial heat shall be applied until the seal is fully expanded and bonded to the sides. No primer or sealant shall be installed until the joint preparation has been approved by the Contract Administrator.

3.6.19 Traffic Rail Post Installation

Installation of the traffic rail post anchor bolts in concrete traffic barriers prior to concrete placement, is incidental to the works of Specification SP:10, "Supply and Installation of Aluminum Traffic Barrier Rail Posts".

3.6.20 Handrail Anchorage Installation

Installation of the handrail post anchor inserts in concrete sidewalk parapet prior to concrete placement is incidental to the works of Specification SP:12, "Supply and Installation of Aluminum Pedestrian Handrail".

3.6.21 Benchmarks and Structures Identification

(a) Benchmarks

The Contractor shall install a benchmark plug(s) supplied by the Contract Administrator at the locations on each structure shown on the Drawings, and at any other locations as may be directed by the Contract Administrator, all incidental to the work of this Specification.

SP:3 STRUCTURAL CONCRETE

3.6 Construction Methods

3.6.21 Benchmarks and Structures Identification (Cont'd)

(b) Structure Identification Date

The Contractor shall indent into the exposed concrete structure identification date at the location on each structure shown on the Drawings or as otherwise directed by the Contract Administrator, all incidental to the work of this Specification.

3.6.22 Application of Penetrating Concrete Sealer

A penetrating type sealer shall be applied to traffic barriers (roadway side and top only), as well as to sidewalk wearing surface and parapet curbs (sidewalk side and top only) and approach slabs.

Concrete shall be cured and dry before application of the sealer. Surfaces must be free of dust, oil, grease, rubber tire residue, curing compounds, paint, or other contaminants prior to application. Any curing compound or other contaminants shall be removed using a method that does not damage the concrete surface finish. The cleaning procedures require the prior approval of the Contract Administrator. Sandblasting will not be allowed. Application of the sealer shall be in accordance with the manufacturer's written Specifications.

3.6.23 Installation of Epoxy Coated Dowels and Galvanized Expansion Sleeves in Concrete Traffic Barrier and Approach Slabs

Epoxy coated dowels and galvanized expansion sleeves shall be installed across contraction joints in concrete traffic barriers on the bridge deck and similarly at the end of the approach slab.

The sleeves and dowels shall be positioned as shown on the Drawings and shall be held in place by positive and satisfactory means so that their correct position will be maintained after the concrete has been placed, vibrated and finished. If sleeves and/or dowels are displaced during concrete placing operations, concrete placement shall cease and shall not resume until displaced dowels and/or sleeves has been reset to true alignment.

3.6.24 Installation of Street Lighting Anchorage

The street lighting anchorage shall be installed at the locations shown on the Drawings and shall be held securely in place so as not to become displaced during concrete placement operations. Any anchorages displaced during concrete placement operations shall be reset to the required position prior to completion of concrete placements.

SP:3 STRUCTURAL CONCRETE

3.6 Construction Methods (Cont'd)

3.6.25 Inserts at Joints

Nut type slotted inserts shall be placed at joints between approach slabs and approach sidewalk. Approved brand are supplied by Preco Industries Ltd.

3.7 Quality Control

3.7.1 Inspection

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations, from the selection and production of the work, through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations, incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works which are not in accordance with the requirements of this Specification.

3.7.2 Access

The Contract Administrator shall be afforded full access for the inspection and control testing of concrete and constituent materials, both at the site of work and at any plant used for the production of concrete, to determine whether the concrete is being supplied in accordance with this Specification.

3.7.3 Materials

All materials supplied under this Specification shall be subject to testing and approval by the Contract Administrator in accordance with Section SP:3.2.3.

3.7.4 Concrete Quality

Quality control tests will be used to determine the acceptability of the concrete supplied by the Contractor.

The Contractor shall provide, without charge, the samples of concrete and the constituent materials required for quality control tests and provide such assistance and use of tools and construction equipment as is required.

The frequency and number of concrete quality control tests shall be in accordance with the requirements of the latest edition of CSA Standard CAN3-A23.1-M.

SP:3 STRUCTURAL CONCRETE

3.7 Quality Control

3.7.4 Concrete Quality (Cont'd)

An outline of the quality tests is as follows:

Slump tests shall be made in accordance with CSA Standard CAN3-A23.2-M77, "Slump of Concrete". If the measured slump falls outside the limits specified in Section 3.3 of this Standard, a second test shall be made. In the event of a second failure, the Contract Administrator reserves the right to refuse the use of the batch of concrete represented.

Air content determinations shall be made in accordance with the latest edition of CSA Standard CAN3-A23.2-M, "Test for Air Content of Plastic Concrete by the Pressure Method". If the measured air content falls outside the limits specified in Section 3.3 of this Specification, a second test shall be made at any time within the specified discharge time limit for the mix. In the event of a second failure, the Contract Administrator reserves the right to reject the batch of concrete represented.

The air-void system shall be proven satisfactory by data from tests performed in accordance with CSA Test Method A23.2-17C. The spacing factor, as determined on concrete cylinders moulded in accordance with CSA Standard A23.2-3C, shall be determined prior to the start of construction on cylinders of concrete made with the same materials, mix proportions, and mixing procedures as intended for the project. If deemed necessary by the Contract Administrator, to further check the air-void system, during construction, testing of cylinders made from as delivered to the job site will be carried out by the Contract Administrator. The concrete will be considered to have a satisfactory air-void system when the average of all tests shows a spacing factor not exceeding 230 microns with no single test greater than 260 microns.

Samples of concrete for test specimens shall be taken in accordance with the latest edition of CSA Standard CAN3-A23.2-M, "Sampling Plastic Concrete".

Test specimens shall be made and cured in accordance with to the latest edition of CSA Standard CAN3-A23.2-M, "Making and Curing Concrete Compression and Flexure Test Specimens".

Compressive strength tests at twenty-eight (28) days shall also be a basis for acceptance of all concrete supplied by the Contractor. For each twenty-eight (28) day strength test, the strength of two companion standard-cured test specimens shall be determined in accordance with the latest edition of CSA Standard CAN3-A23.2-M,

SP:3 STRUCTURAL CONCRETE

3.7 Quality Control

3.7.4 Concrete Quality (Cont'd)

"Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the average of the strengths of the two specimens. A compressive strength test at seven days shall be taken; the strength of which will be used only as a preliminary indication of the concrete strength, a strength test being the strength of a single standard cured specimen.

Compressive strength tests on specimens cured under the same conditions as the concrete works shall be made to check the strength of the in-place concrete so as to determine if the concrete has reached the minimum allowable working compressive strength, as specified in Section SP:3.6.6, and also to check the adequacy of curing and/or cold weather protection. At least two field-cured test specimens will be taken to verify strength of the in-place concrete. For each field-cured strength test, the strength of a single field-cured specimen shall be determined in accordance with the latest edition of CSA Standard CAN3-A23.2-M, "Compressive Strength of Cylindrical Concrete Specimens", and the test result shall be the strength of the specimen.

3.7.5 Corrective Action

If the results of the tests indicate that the concrete is not of the specified quality, the Contract Administrator shall have the right to implement additional testing, as required, to further evaluate the concrete at the Contractor's expense.

The Contractor shall, at his own expense, correct such work or replace such materials found to be defective under this Specification in an approved manner to the satisfaction of the Contract Administrator.

3.8 Method of Measurement

3.8.1 Structural Concrete

The supply and placement of structural concrete shall be measured on a volume basis for each type of structural concrete. The volume to be paid for shall be the total number of cubic metres of structural concrete of each type supplied and placed in accordance with this Specification and accepted by the Contract Administrator, as computed from Drawing dimensions. No deductions will be made for chamfers, reinforcing steel, structural steel, bolts or voids of seventy-five (75) mm in dia. or less. All accessories like inserts are incidental to the supply and placement of structural concrete and no payment shall be made for this work.

SP:3 STRUCTURAL CONCRETE

3.8 Method of Measurement (Cont'd)

3.8.2 Epoxy-coated Dowels and Galvanized Expansion Sleeves

The supply and installation of epoxy coated dowels and galvanized expansion sleeves for structural approach slabs and concrete traffic barriers will be measured on a unit basis. The number of units to be paid for shall be the total number of epoxy coated dowels and galvanized sleeve units supplied and installed in accordance with this Specification and accepted by the Contract Administrator.

3.8.3 Penetrating Concrete Sealer

Penetrating concrete sealer shall be measured on an area basis. The area to be paid for shall be the total number of square metres sealed by the Contractor in accordance with this Specification and accepted by the Contract Administrator, as computed from Drawing dimensions.

3.9 Basis of Payment

3.9.1 Structural Concrete

The supplying and placement of structural concrete will be paid for at the Contract Unit Price per cubic metre for the "Items of Work" listed here below, measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Supply and Placement of Structural Concrete

(a) Abutment Backwall
(b) Pier Cap Cantilever
(c) Superstructure Diaphragms
(d) Approach Slabs and Grade Beams
(e) Approach Sidewalk Slab
(f) Slope Paving
(g) Bridge Sidewalk
(h) Median Traffic Barrier
(i) Shoulder Traffic Barrier
(j) Full Depth Concrete Deck Patch
(k) Handrail Parapet on Stairwells

SP:3 STRUCTURAL CONCRETE

3.9 Basis of Payment (Cont'd)

3.9.2 Epoxy Coated Dowels and Galvanized Expansion Sleeves

The supply and installation of epoxy coated dowels and galvanized expansion sleeves will be paid for at the Contract Unit Price per unit for the "Items of Work" listed herein, which shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

Epoxy-Coated Dowels and Galvanized Expansion Sleeves

a) Supply
   i) Traffic Barriers
   ii) Approach Slab

b) Installation
   i) Traffic Barriers
   ii) Approach Slab

3.9.3 Penetrating Concrete Sealer

The sealing of designated concrete will be paid for at the Contract Unit Price per square metre for "Penetrating Concrete Sealer," measured as specified herein, which shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:4. BRIDGE BEARINGS

4.1 Description

This Specification shall cover the supply and installation of bridge bearings at the locations and in accordance with the details as specified herein and as shown on the Drawings.

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.

4.2 Materials

4.2.1 General

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

All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator.

4.2.2 Bearings

Bearings shall be high-load structural "pot type" bridge bearings, complete, as required, with anchor bolt assemblies, distribution plates, shoe plates, top plates, masonry plates, base plates, and incidental components and fasteners. They shall be supplied and erected by the Contractor as shown on the Drawings.

Bearings shall be designed to conform to the requirements of CAN/CSA-S6-88, "Design of Highway Bridges" and the Drawings and these Specifications. Bearings are to be designed for the loads and movements given on the Drawings.

The overall bearing heights shown on the Drawings may only be adjusted with the approval of the Contract Administrator. The Contractor shall adjust bearing seat elevations, reinforcing steel, and any other works, as required, to suit the actual height of bearings, at the Contractor's own expense.

4.2.3 Structural Steel

All structural steel shall conform to the requirements of CSA Standard CAN/CSA-G40.21-M87, Grade 300 W.

SP:4. BRIDGE BEARINGS

4.2 Materials (Cont'd)

4.2.4 Bearing Fixing Bolts, Fasteners, Washers, and Nuts

Bolts, nuts, and washers required for the bearing installation shall conform to the requirements of ASTM Specification A325M, Type 1.

Bolts, nuts, and washers shall be hot-dip galvanized in accordance with CSA Standard G164-M1981, to a minimum net retention of 600 g/sq.m.

4.2.5 Welding Consumables

Welding Consumables for all processes shall be certified by the manufacturer as complying with the requirements of the following:

a) Manual shielded metal-arc welding (SMAW):
All electrodes for the manual, shielded metal-arc welding process shall conform to CSA W48.1-1980 classification number E7018 for single pass tack welds and CSA W48.3 classification number E8016-B1, C3, E8018, or C3 for final welds.

b) Gas, metal-arc welding (GMAW):
All electrodes used for the gas, metal-arc welding process shall be composite electrodes conforming to CSA W48.5 classification E70-T5.

c) Shielding gas shall be welded grade carbon dioxide with a guarantee dew-point of -46°C.

d) Submerged arc-welding (SAW):
All electrodes and fluxes used for the submerged arc welding process shall conforming to CSA W48.6 classification F72-EM12K.

e) All electrodes, wires and fluxes used shall be of a classification requiring a minimum impact of 27 joules at -18°C as outlined in the various codes mentioned above.

4.2.6 Stainless Steel Sliding Plates

Stainless steel sliding plates shall conform to ASTM A167 Type 304 or 316 with a ASTM A480 No. 8 mirror finish bearing surface (less than 0.127 micrometers arithmetic mean deviation).

SP:4. BRIDGE BEARINGS

4.2 Materials

4.2.6 Stainless Steel Sliding Plates (Cont'd)

Welds shall be located outside the TFE contact surface. The minimum thickness of stainless steel sheet shall be as specified in the following table:

THICKNESS OF STAINLESS STEEL SHEET

Dimensional Difference Between TFE and Stainless Steel	Minimum Thickness of Stainless Steel
up to 300 mm	1.5 mm
300 to 500 mm	2.0 mm
over 500 mm	3.0 mm

4.2.7 Tetrafluoroethylene Polymer (TFE) Bearing Surface

TFE resin for use in sliding surfaces shall be virgin material and shall conform to ASTM Standard D1457.

Except when used as mating surfaces for guides for lateral restraint, the TFE resin shall be used as unfilled sheets and shall contain spherical reservoirs for lubricant pressed into its surface. The diameter of the reservoirs shall not exceed 8 mm, measured at the surface of the TFE, and the depth shall not be less than 2 mm nor more than half the thickness of the TFE. The reservoirs shall be evenly distributed across the surface of the TFE and shall occupy not less than 20% nor more than 30% of the surface.

Material used as mating surface for guides for lateral restraint may be:

a) unfilled TFE
b) TFE fibres with up to 25% by mass of glass fibres
c) lead filled TFE in a bronze matrix

provided the frictional resistance to movement due to the guides is significantly smaller than that of the main bearings.

Etch the TFE on the bonding side. Supply material resistant to all acids, alkalis, and petroleum products, stable at temperatures from -220°C to +260°C, non-flammable and non-absorbing of water. Recess the TFE used for main rotating and sliding surfaces into the steel backing plate to a depth of one-half the TFE thickness, and bond over the entire TFE area to grit blasted steel using an adhesive approved by the manufacturer. The shoulders of the recess shall be sharp and square.

SP:4. BRIDGE BEARINGS

4.2 Material (Cont'd)

4.2.8 Lubricant

Lubricant shall be silicone grease and shall conform to US Military Specification MIL-S-8660C for Silicone Compound.

4.2.9 Anchor Bolts

All anchor bolts, washers, and nuts required in the substructure units for installation of bearings shall be fabricated from CAN/CSA G40-21M87, Grade 300 W steel and shall be hot-dip galvanized in accordance with CSA Standard G164-M1981 to a minimum net retention of 600 g/sq.m.

4.2.10 Non-Shrink Grout

Non-shrink grout shall be M-bed standard grout as manufactured by Sternson Ltd. Approved equals are CPD Non-shrink grout and Set Non-shrink grout by Master Builders.

4.2.11 Shoe Plates for Steel Girders

Shoe plates shall be finished in accordance with Section 4.4.5. They shall be supplied by the bearing manufacturer.

4.2.12 Miscellaneous Materials

Miscellaneous materials shall be of the type specified on the Drawings or approved by the Contract Administrator.

4.3 Equipment

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

4.4 Fabrication

4.4.1 Experience

The works of this Specification shall be undertaken by a firm well experienced in the design, fabrication, and installation of structural bridge bearings. The Contractor shall provide evidence that the bridge bearing designer/supplier/installer has a satisfactory performance record in the design, fabrication and installation of structural bridge bearings similar to those specified herein.

SP:4. BRIDGE BEARINGS

4.4 Fabrication (Cont'd)

4.4.2 Shop Drawings

Submit shop drawings (three (3) prints and one (1) reproducible sepia copy) for review by the Contract Administrator at least 21 days prior to scheduled commencement of fabrication. No fabrication shall commence until approval from the Contract Administrator has been obtained.

Clearly indicate plate sizes, connection attachments, anchorage sizes, and types of fasteners and accessories.

Include bearing layout drawing, erection drawings, elevations and details, where applicable.

Indicate welded connections using CISC standard welding symbols; clearly indicate net weld lengths.

Submit design calculations to the Contract Administrator prior to commencing any fabrication; and for each bearing, clearly indicate how it satisfies the design criteria indicated on the drawings and in the specifications. For guide bars, clearly indicate the adequacy of the fastening of the TFE to the guide bar.

The drawings and design calculations must be stamped by a Professional Engineer, registered in one of the provinces of Canada.

4.4.3 Design Consideration

Design of the bearings shall conform to CAN/CSA-S6-88, "Design of Highway Bridges," plus interims.

The design should be such that bearings will not suffer damage that would affect their correct functioning or incur excessive maintenance costs during their intended life. The strength and stability of bearings should be adequate to withstand the ultimate design loads and movement of the structure.

The bearings should be detailed to exclude crevices and the like, which allow moisture and dirt to be trapped. The materials used in their manufacture and the protective and maintenance measures adopted against corrosion and deterioration due to environmental effects should be such so as to ensure that bearings continue to function correctly throughout their design life.

Where restraints are provided on bearings to resist translational movements, they should be designed to resist either the designated design load effects or 10% of the permanent vertical design load on the bearings; whichever is the greater.

SP:4. BRIDGE BEARINGS

4.4 Fabrication

4.4.3 Design Consideration (Cont'd)

The rotational capacity of bearings about any horizontal axis should be at least 0.035 radians.

Under all serviceability design load effects, the average pressure on glass filled TFE in guides should not exceed 45 MPa and on TFE in a metal matrix 60 MPa. Permissible values for other TFE materials should be established by tests. In the absence of test data, the values for unfilled TFE should be used.

The maximum allowable bearing pressure on the concrete shall be 9.0 MPa. The effective area for distributing a load may be taken as the contact area of the bearing member communicating the load to the plate plus the area within the uninterrupted dispersal lines drawn at a maximum of 45° to the line of application of the bearing reaction from the bearing contact area.

If lead filled, TFE used in guide bars shall be fixed to the substrate by mechanical fasteners in addition to bonding.

Steel substrates to which stainless steel or TFE is bonded shall be grit blasted prior to applying the adhesive. Bond over the entire area of the stainless steel or TFE.

For guided bearings, the top plate shall be restrained through a central pin or by guide bars, which do not use the bottom or baseplate as the restraining device.

The bearing guide system shall be self-aligning to ensure complete contact of the TFE/stainless steel surfaces along the entire length of the guide providing the lateral restraint.

The coefficient of friction between stainless steel sliding surfaces and lubricated virgin unfilled TFE shall not exceed the following values and shall be interpolated linearly for contact pressures within the range given.

Factored Contact Pressure MPa	Coefficient of Friction
10	0.06
25 and above	0.03

SP:4. BRIDGE BEARINGS

4.4 Fabrication

4.4.3 Design Consideration (Cont'd)

The average contact pressures for TFE sliding elements shall not exceed the following values:

Serviceability	Limit States	Type II
	Bonded	Confined
Permanent load effect	20 MPa	30 MPa
All loading combination effect	30 MPa	45 MPa
	Ultimate Limit States	
	Bonded	Confined
Permanent load effect	30 MPa	45 MPa
All loading combination effect	45 MPa	70 MPa

The maximum contact pressure shall not exceed 1.2 times the values indicated above.

Extreme fibre stresses occur as an edge stress under rotation and vertical load conditions.

Metal-to-metal contact surfaces within bearings shall be prepared either by machining or fine grinding. As far as practicable, machining shall be carried out after welding has been finished.

All welding shall conform to the requirements of CSA Standard W59.1-M1989.

The weld attaching the stainless steel to its backing plate shall be continuous so as to prevent ingress of moisture and shall be clean, sound, smooth, uniform, without overlaps and ensure that the stainless steel sheet remains flat throughout its service life.

SP:4. BRIDGE BEARINGS

4.4 Fabrication (Cont'd)

4.4.4 Tolerances

Overall dimension of assembled bearings shall be +/-3 mm in plan and height.

When designed to be parallel, the tolerance of parallelism of the upper surface of a bearing with respect to the lower surface of the bearing, as datum, shall be 0.2% of the diameter for surfaces circular in plan and 0.2% of the longer side for surfaces rectangular in plan.

The deviation from flatness of surfaces in contact with TFE for plane surfaces and from the theoretical surface for spherical surfaces shall not exceed 0.0003 LH mm for rectangular TFE element nor 0.006 RH mm for circular TFE element where L is the greater plan dimension for a rectangular bearing, R is the radius of a circular bearing, and H is the free height of TFE element.

Tolerance of flatness of TFE shall be 0.2 mm when the diameter or diagonal is less than 800 mm and 0.00025 of the diameter or diagonal when this dimension is greater than 800 mm. On TFE surfaces made up of more than one piece of TFE, the above conditions apply to the diameter or diagonal dimension of the inscribing circle or rectangle around the TFE.

Dimensional tolerances on TFE are as follows:

Diameter/ Diagonal	Tolerance on Plan Dimension	Tolerance Recessed	Thickness Bonded
Up to 600	+/-1.0 mm	-0+ 0.54 mm	-0+ 0.12 mm
Over 600-1200 mm	+/-1.5 mm	-0+ 0.60 mm	-0+ 0.18 mm
Above 1200 mm	+/-2.0 mm	-0+ 0.72 mm	-0+ 0.18 mm

The tolerance for the size of recess for confined TFE shall be 0 mm and +1 mm of the corresponding plan dimensions of the TFE sheet for plan dimensions up to 500 mm and 0 and +0.2% of the corresponding plan dimensions above 500 mm.

SP:4. BRIDGE BEARINGS

4.4 Fabrication

4.4.4 Tolerances (Cont'd)

Profile tolerance for the projection of TFE above its confining recess as follows:

Maximum Dimension of TFE (Diameter or Diagonal)	Maximum Thickness	Tolerance on Projection Above Recess	Projection Above Recess
Up to 600 mm	4.5 mm	-0+ 0.5 mm	2.0 mm
Over 600-1200 mm	5.0 mm	-0+ 0.6 mm	2.5 mm
Over 1200-1500 mm	6.0 mm	-0+ 0.8 mm	3.0 mm

Make all measurements on TFE at a temperature of 25°C.

The surface finish between masonry plates and between top plates and the bearing shall conform to ANSI 500.

4.4.5 Coatings

Finish all surfaces of structural steel components of bearings including top plates, shoe plates, base plates, and masonry plates in accordance with the following:

a) Blast-cleaned in accordance with SSPC-SP5, "White Metal Blast Cleaning," to a maximum surface profile of 2.5 mils. All surfaces zinc metallized using a zinc-based alloy containing 15 to 17% aluminum in accordance with CSA Standard G189-1980 to a minimum coating thickness of 7 mils. Immediately after metalizing, apply pretreatment primer and then an aluminum colored acrylic sealer coat of approximately 2 mil thickness over the metallized surfaces.

   An approved primer is Carboline 1037 WP and finish sealer coat is Carboline 1294 (medium gray C703). Touch-up of damaged metallizing and field welds shall be with three coats of zinc-rich paint such as Devcon Z. This is to be followed by the pretreatment primer and the acrylic sealer coat.

4.4 Fabrication

4.4.5 Coatings (Cont'd)

b) Blast-cleaned in accordance with SSPC-SP5, "White Metal Blast Cleaning," to a maximum surface profile of 1.5 mils. All surfaces shall be epoxy coated with a prime coat of 1.50 mils minimum total thickness, intermediate coat (black) of 8.0 mils minimum total thickness, and finish coat (brown) of 8.0 mils minimum total thickness.

The primer epoxy coat shall be Mobil Zinc 4 epoxy zinc rich primer; the intermediate coat shall be Val-chem Hi-Build Epoxy; and the finish coat shall be Val-chem Epoxy Enamel, all applied in accordance with the manufacturer's recommendations.

All field welds and areas of damaged coating shall be touched up. Remove all loose or non-adherent paint. Cleaning shall be performed approximately 20 mm beyond the damaged areas in all directions or until soundly adhered paint is obtained. All rusty areas shall be thoroughly cleaned in order to achieve the original degree of surface preparation. Apply the specified primer, intermediate, and finish coats over the prepared areas.

4.4.6 Adhesives

Adhesives for bonding TFE to metal shall produce a bond with a minimum peel strength of 4 N/mm width when tested in conformance with ASTM Standard D429 Method B. They shall not degrade in the service environment.

4.4.7 Replaceability

The entire bearing assembly, except for the top plate used to attach it to the superstructure and the base plate used to anchor it to the substructure but including both contact surfaces of the sliding interface, shall be replaceable without damage to the structure and without removal of any concrete, welds, or anchorages permanently attached to the superstructure and without lifting the superstructure more than 5 mm. Bearings shall not be recessed into plates that are permanently attached to the structure.

SP:4. BRIDGE BEARINGS

4.5 Construction Methods

4.5.1 General

The Contractor shall submit the installation methods he intends to use to install the bearings to the Contract Administrator for approval at least seven (7) days prior to starting any bearing installations.

The essential details and structural dimensions of the existing structure are shown on the Drawings for the information of the Contractor in establishing the methods and limits of removal and installation. The information shown has been obtained from the available as-built drawings. The accuracy of information is not guaranteed and the Contractor must verify all information before commencing work.

The Contractor shall note that the anchor bolts are essential to the structural adequacy of the bearings, and care shall be taken not to damage them during construction.

4.5.2 Installation of Bearing on Substructure Units

Following removal of existing bearings in accordance with Specification SP:13, the new bearings shall be installed as specified herein in accordance with the details shown on the Drawings.

All bearings must be clearly coded by the manufacturer. The coding must prevent mix-up and remain clearly visible on the bearings. They must also be marked with their position on-site and direction of installation, which must correspond with the information contained on the approved drawings for the bearings.

Protect bearings during handling, transport, storage, and installation from damage or distortion, and keep clean and free of all deleterious matter and contaminants including moisture and dust.

Provide suitable handling devices as required. Use temporary clamping devices in the form of mechanical fasteners to maintain correct orientation of the parts during handling, transport, storage, and installation, but do not use for slinging or suspending bearings unless specifically designed for this purpose.

SP:4. BRIDGE BEARINGS

4.5 Construction Methods

4.5.3 Installation of Bearing on Substructure Units (Cont'd)

Verify the condition of bearings supplied to site.

Install bearings in the structures as specified or as reviewed by the Contract Administrator. Installation procedure subject to review of the Contract Administrator and bearing supplier. A representative from the supplier of the bearings will be required to be present when the bearings are installed. Do not dismantle bearings that have been pre-assembled except with the prior approval of the supplier and the Contract Administrator. Agree to the position of any temporary packing between the outer bearing plates and the structure with the Contract Administrator. Provide adequate support of upper plates to ensure no premature rotations.

Locate bearings so that their centerlines are within +/-3 mm of their correct positions. Set bearings to their correct inclination to the horizontal with a tolerance of +/-0.1° in any direction. Concrete surfaces in contact with the bearings shall not vary from a flat plane by m;ore than 3 mm in 500 mm within the plan area of the bearing and local irregularities shall not exceed 1 mm.

The tolerances for the elevations at the top of the bearings to steel plate girders is +/-3.00 mm.

Bed bearings over their entire area. Voids or hard spots after installation are not acceptable. Non-shrink grout pads are to be moist cured for a minimum of seventy-two (72) hours. Following the seventy-two (72) hour moist curing, the grout pads are to be coated with an approved curing compound.

After installation, leave bearings and their surrounding areas clean. Remove temporary transit clamps after the bearing is in its final position, with all permanent connections made and after all grout beds and concrete sections in contact with the bearing have been placed.

Removal of existing bearings and substructure concrete to facilitate installation of new bearings will be paid for under Specification SP:13.

4.5.4 Field Welding

Field welding, where shown on the drawings, shall conform to the requirements of CSA Standard W59.1-M1989. Prior to field welding, all coatings on the steel being welded shall be removed in the area of the weld.

SP:4. BRIDGE BEARINGS

4.6 Quality Control

All workmanship and all materials furnished and supplied under this specification are subject to the close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this specification.

4.7 Guarantee

4.7.1 Fabrication Guarantee

The bearing supplier shall provide a written guarantee stating that they will perform satisfactorily within the design range of movement and under the design loads for a period of five (5) years from the issuance of the Final Certificate, provided that the bearings have been properly installed. The supplier shall state that they have reviewed the installation procedures and find it in accordance with their recommendations. The supplier shall guarantee the replacement of the bearings at no cost to the City in the event that the bearing does not perform satisfactorily within the design range of movement and under the design loads.

4.7.2 Installation Guarantee

The General Contractor shall ensure that the bearings are installed in such a manner that will not void the fabrication guarantee.

The General Contactor shall guarantee in writing, the performance of the bearings for a period of five (5) years from the date of issuance of the Final Certificate. Provide in the guarantee for the replacement of the bearings at no cost to the City in the event that the bearings do not perform satisfactorily in the range of design movement and under the design loads.

4.8 Method of Measurement

The supply and installation of bridge bearings will be measured on a unit basis for each type of bearing. The number of bearings to be paid for shall be the total number of bearings of each type fabricated, transported and installed in accordance with this specification and accepted by the Contract Administrator.

SP:4. BRIDGE BEARINGS

4.9 Basis of Payment

Supply and installation of bridge bearings will be paid for at the Contract Unit Price for the "Items of Work" listed below, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work

Bridge Bearings

a) Supply
   i) Unidirectional Bearings
   ii) Multidirectional Bearings
   iii) Fixed Bearings

b) Installation
   i) Unidirectional Bearings
   ii) Multidirectional Bearings
   iii) Fixed Bearings

SP:5. STRUCTURAL STEEL

5.1 Description

This Specification shall cover the supply, fabrication, transportation, handling, and erection of structural steel and all incidental structural steel elements, components, and fasteners.

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.

5.2 Materials

5.2.1 General

All materials supplied under this Specification shall be of a type approved by the Contract Administrator, and shall be subject to inspection and testing by the Contract Administrator.

The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

5.2.2 Structural Steel

All structural steel (excluding shear connector studs) for the coverplates, fillerplates, bracings, and incidental structural steel elements shall conform to the requirements of CSA Specification CAN/CSA3-G40.21-M87, Grade 300WT.

Charpy V-notch impact test requirements for all flange and web plates shall be 27 joules minimum at -30°C.

The structural steel shall be impact tested at the steel manufacturer's plant in accordance with the requirements of ASTM Standard A370 to meet the requirements of CAN/CSA-G40.21-M87.

Prior to fabrication, the Contractor shall supply to the Contract Administrator the manufacturer's mill certificates giving details of all chemical, physical, and impact properties of the G40.21-M87, Grade 300WT steel to be used in the work.

Edges of all plates shall be subject to visual inspection, and any plates found to include laminations shall not be used on the work.

SP:5. STRUCTURAL STEEL

5.2 Materials (Cont'd)

5.2.3 Welding Consumables

Welding consumables for all processes shall be certified by the manufacturer to be complying with the requirements of CSA Standard W59-M1984 and the following Specifications: For CAN/CSA-G40.21-M87, Grade 300WT steel, they are:

a) Manual shielded metal arc welding (SMAW):

All electrodes shall be basic-type electrodes conforming to CSA W48.1-M1980 or W48.3-M1982, classification E480XX, or imperial equivalent.

b) Gas metal arc welding (GMAW):

All electrodes shall conform to CSA W48.4-M1980, classification ER480S-X, or imperial equivalent.

c) Flux cored arc welding (FCAW):

All electrodes shall conform to CSA W48.5-M1982, classification E480XT-X, or imperial equivalent. Electrodes shall be controlled hydrogen (CH) designation.

d) Submerged arc welding (SAW):

All electrodes shall conform to CSA W48.6-M1980, classification F480X-EXXX, or imperial equivalent.

e) Shielding gas shall be welding grade carbon dioxide with a guaranteed dew point of -46°C.

f) All electrodes, wires, and fluxes used shall be of a classification requiring a minimum impact of 27 joules at -30°C.

The proposed welding procedures and welding consumable certificates shall be submitted to the Contract Administrator for his approval at least twenty-one (21) days prior to the scheduled commencement of any fabrication.

In multiple pass welds, the weld may be deposited such that at least two (2) layers on all surfaces and edges are deposited with one (1) of the filler metals listed above for each particular welding process, provided the underlying layers are deposited with one of the filler metals specified in CSA Standard W59.

SP:5. STRUCTURAL STEEL

5.2 Materials (Cont'd)

5.2.4 High-Strength Bolts, Nuts, and Washers

High-strength bolts, nuts, and washers shall conform to the requirements of ASTM A325, Type 1. Nuts shall conform to the requirements of ASTM Specification A563, Grade C. Washers shall conform to the requirements of ASTM Specification F436, Type 1.

5.2.5 Shear Connector Studs

Shear connector studs shall conform to the requirements of Appendix H, CSA-W59-M1984 and of ASTM A108, Grades 1015, 1018 and 1020 and shall be of a design suitable for end welding using automatic stud welding equipment.

5.3 Equipment

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

5.4 Construction Methods

5.4.1 Fabrication

5.4.1.1 General

Fabrication shall be in accordance with the latest AASHTO Specification edition and all subsequent revisions.

No fabrication or welding of steelwork shall commence until permission to do so has been received from the Contract Administrator.

The repair of any members damaged during fabrication shall be approved by the Contract Administrator.

5.4.1.2 Submissions

At least twenty-one (21) working days prior to the scheduled commencement of any fabrications, the operators' qualifications, the erection diagrams, shop details, welding procedures, mill certificates, and welding consumable certificates shall be submitted to the Contract Administrator for his approval.

5.4.1.3 Erection Diagrams and Shop Details

The erection diagrams and shop details shall consist of three (3) sets of prints and one (1) reproducible sepia set.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods

5.4.1.3 Erection Diagrams and Shop Details (Cont'd)

The diagrams and details shall clearly show shapes, weights, dimensions, details, connections (including proper AWS welding identification), bolt holes, and accessories.

Calculated mass of structural steel shall be submitted following final approval of erection diagrams and shop details.

5.4.1.4 Preparation of Material

a) Straightening Material

Prior to being used in fabrication, all structural steel shall be straight and free from kinks or bends. The flatness tolerance of plate in excess of 1 meter wide shall be in accordance with the tolerance of the finished product as stated in Clause 5.4.1.16. If straightening is necessary, it shall be done by methods that will not injure the metal. The steel shall not be heated unless permission is given by the Contract Administrator. Sharp kinds and bends will be cause for rejection of the steel.

b) Edge Preparation for Welding

The edges of plates or sections that are to be welded together shall be prepared by sawing, shearing, flame cutting, machining, chipping or arc air gouging to the details shown on the shop drawings. Surfaces and edges to be welded shall be smooth, uniform and free from fins, tears, cracks, and other defects that would adversely affect the quality or strength of the weld. Surfaces to be welded shall also be free from loose scale, slag, rust, grease, moisture or other material that will prevent proper welding. Mill scale that withstands vigorous wire brushing, a light film of drying oil or a thin rust shall be removed from the surfaces on which flange-to-web welds are to be made by submerged arc welding or by shielded metal arc welding with low hydrogen electrodes. Surfaces within 50 mm of any weld location shall be free from any paint or other material that would prevent proper welding or produce objectionable fumes while welding.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods

5.4.1.4 Preparation of Material

b) Edge Preparation for Welding (Cont'd)

Edges of material thicker than specified in the following list shall be trimmed if and as required to produce a satisfactory welding edge wherever a weld along the edge is to carry calculated stress:

Sheared edges of material thicker than .....12 mm

Rolled edges of plates (other than Universal Mill Plates) thicker than ..... 9 mm

Toes of angles or rolled shapes (other than wide flange sections) thicker than .....16 mm

Universal Mill Plates or edges of flanges of wide flange section thicker than .....25 mm

Edges may be prepared by oxygen cutting, providing a smooth and regular surface free from cracks and notches is secured and providing that an accurate profile is secured by the use of a mechanical guide. Freehand cutting shall be done only where approved by the Contract Administrator.

All flange plates prepared by flame cutting shall be preheated in accordance with Clause 5.4.1.10.

In all oxygen cutting, the cutting flame shall be so adjusted and manipulated as to avoid cutting beyond (inside) the prescribed lines. Roughness of cut surfaces shall not be greater than than defined by the United States Standards Institute of 1000 (USAI.B46.1, Surface Texture). Roughness exceeding this value shall be removed by machining or grinding. Occasional gouges will be tolerated only at the discretion of the Contract Administrator and shall be repaired in accordance with his instruction.

c) Edge Preparation (Non-welded Edges)

Steel may be cut to size by sawing, shearing, flame cutting or machining. All steel, after cutting, shall be marked by a method agreed to by the Contract Administrator so that its specification may be immediately identified.

Sheared edges of plates shall be planed to a depth of 6 mm.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods

5.4.1.4 Preparation of Material

c) Edge Preparation (Non-welded Edges) (Cont'd)

Any flame cutting of steel shall be in accordance with Clause 5.4.1.4 (b).

Special attention shall be given to the cutting of cover or flange plates. Occasional gouges not in excess of 6 mm deep will be accepted in areas of low stress at the discretion of the Contract Administrator. The repair or removal of such gouges shall be to the Contract Administrator's instructions.

Edges of flame cut flange plates shall be ground to a radius of 2 mm. Re-entrant cuts shall be filleted to a radius of not less than 19 mm.

5.4.1.5 Bolt Holes

All holes for high-tensile bolts shall be either punched, sub-punched, reamed, or drilled and shall be of a nominal diameter not more than 2 mm in excess of the nominal bolt diameter. Holes for splices in webs and flanges of main girders shall be either sub-punched or reamed or drilled full size.

Punched holes shall be clean cut, without torn or ragged edges. The diameter of the die shall not exceed the diameter of the punch by more than 2 mm. If a punched hole must be enlarged to admit a high-tensile bolt, it shall be reamed.

Reamed holes shall be cylindrical and perpendicular to the member. Where practicable, reamers shall be directed by mechanical means. Reaming shall be done with twist drills.

5.4.1.5 Bolt Holes

Drilling shall be done with twist drills. Burrs on the outside surfaces shall be removed.

Poor matching of holes will be cause for rejection.

5.4.1.6 Shear Studs

Welding of shear studs shall conform to the requirements of CSA Standard W59-M1984, Section 3.1.2.2 and 5.5.6.5.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods (Cont'd)

5.4.1.7 Assembly and Welding Sequences

If requested by the Contract Administrator, the fabricator shall supply full details of the proposed assembly and welding sequence of any particular weldment.

5.4.1.8 Marking

Prior to fabrication, all steel shall be marked for identification by heat number and specification by a marking system approved by the Contract Administrator.

5.4.1.9 Assembly

The shop assembly of the various components of the weldments shall be executed in accordance with CSA W59-M1984, Clause 5.4 "Assembly", and Clause 5.6 "Control of Distortion and Shrinkage Stresses".

Tack welding shall be done by qualified operators, using the smallest size weld required to hold the components of the assembly together. Tack welds shall not be less than 50 mm in length and shall be incorporated in the final weld.

Tack welds shall be made with 4 mm maximum size electrodes and shall be subject to the preheat requirements of Clause 5.4.1.10.

5.4.1.10 Preheat and Interpass Temperatures

No welding shall be done when the temperature of the base metal is lower than -20°C.

Preheat shall be applied to all steel to be welded so that the steel within 75 mm of the weld is heated to the temperature shown in Table 1.

Preheat shall be applied in such a manner that moisture from the heating equipment does not penetrate the joint.

For all welding processes, preheat and interpass temperatures shall be maintained during welding, at temperatures not less than stated in Table 1.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods (Cont'd)

5.4.1.10 Preheat and Interpass Temperatures

TABLE 1
MINIMUM PREHEAT AND INTERPASS TEMPERATURES

Thickness of Thickest Part at Point of Welding	CSA Standard CAN/CSA-G40.21-M87 Grade 300 WT
Up to 20 inclusive	None*
Over 20 to 40	10°C
Over 40 to 60	65°C
Over 60	100°C

* When the base metal temperature is below 0°C, the base metal shall be preheated to at least 21°C, and this minimum temperature shall be maintained during welding.

Preheat temperatures above the minimum shown in Table 1 may be required for highly restrained joints, if designated by the Contract Administrator.

Preheat temperature shall in no case exceed 200°C, but there shall be no limit on interpass temperature.

Preheat requirements for tack welds shall be as in the above table except that where single pass tack welds are used and are to be incorporated and consumed in a weld made by the submerged arc and the gas metal arc processes, preheat is unnecessary.

5.4.1.11 Welding

Welding shall be done by the shielded metal arc, gas metal arc, flux cored arc, or submerged arc processes in accordance with CSA Standard 47.1-1983 and CSA Standard W59-M1984.

All welding shall be done under cover and, in the case of gas metal arc welding, shall be done in an area free from wind or draft.

Where the submerged arc or gas metal arc processes are to be used, the Contract Administrator may order that:

A preliminary test run of the approved procedure be made over the length of the joint to prove that the disposition of the equipment, the handling of hoses, and the method and accuracy of travel are satisfactory.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods

5.4.1.11 Welding (Cont'd)

Each operator make a weld specimen not less than 1.2 m in length for fillet welds and 150 mm in length for butt welds. Steel of the same specification and thickness as that to be used in the work shall be used in the specimen welds. No welding shall be done on the work until such a specimen is satisfactory to the Contract Administrator.

Materials to be used for backing strips and run-off tabs shall conform to the same specifications as the base material.

Butt welds shall be extended beyond the edges of the parts to be joined by means of start and run-off tabs providing sufficient thickness to avoid the weld burning through and with a joint preparation similar to that on the main material. For manual shielded metal arc welding, the width of the tabs shall be not less than the thickness of the thicker part being joined or 75 mm, whichever is greater. For submerged arc welding, the width of the tabs shall be not less than 75 mm. Each weld pass shall be carried far enough beyond the edge of the parts being joined to ensure sound welds in the joint. Tabs shall be removed upon completion and cooling of the weld without damage to the parent plate and the end of the weld made smooth and flush with the edges of the abutting parts.

In gas metal arc welding, the equipment shall be capable of sustaining a gas flow rate of 0.85 to 1.27 cu.m. per hour (30 to 45 C.F.H.).

Mechanical scaling tools shall not be used on any weld surface that is a final weld surface. Scaling tools may be used on welded passes, provided their use does not crack or injure the first pass of a multipass weld.

Semi-automatic machines may be used only when they are equipped with a mechanical control of travel speed.

Repairs to welds of base metal shall be made by grinding or arc-air gouging followed by grinding. The use of flame gouging or oxygen will not be permitted.

5.4.1.12 Weld Profiles

Weld profiles shall meet the requirements of CSA Standard W59-1984, Clause 5.9.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods (Cont'd)

5.4.1.13 High Strength Bolts

Installation of high strength bolts shall be in accordance with AASHTO (1989) Division II - Construction Section 10.17.

Sufficient bolts, nuts, and washers shall be furnished to complete the entire structure with an ample surplus to replace all bolts damaged or lost.

5.4.1.14 Bent Plates

When bending plates, the plates shall be so taken from the stock plates such that the bend line will be at right angles to the direction of rolling. The radius of the bend measured inside, shall be not less than the thickness of the plate.

Before bending, the corners of the plate shall be rounded to a radius of 2 mm throughout that portion of the plate where bending is to occur.

5.4.1.15 Shop Assembly

Holes in girder field splices shall be sub-punched and, unless otherwise specified, reamed while assembled in the shop. A shop trial assembly of field splice bolted connections is to be done. The assembly, including camber, alignment, and accuracy of holes shall be approved by the Contract Administrator before reaming is recommended.

5.4.1.16 Dimensional Tolerances

Members and parts of members shall be straight, true to line, and free from twists and bends. In determining acceptability under these general requirements, the tolerances stated hereinafter shall be applied.

Deviation from specified camber at centre of girder: as per CSA Standard W59-M1984, Clause 5.8 (c).

Lateral deviation on H or I members: $\pm$6 mm.

Deviation from flatness of girder webs measured between flanges or between stiffeners: as per CSA Standard W59-M1984.

Combined warpage and tilt of flanges of girders, determined by measuring the offset between the end of the flange plate and the flange plate at the centre of the web plate: as per CSA Standard W59-1984, Clause 5.8 (f).

SP:5. STRUCTURAL STEEL

5.4 Construction Methods

5.4.1.16 Dimensional Tolerances (Cont'd)

This tolerance does not apply to the following cases:

1) Abutting parts of flanges to be butt welded, which shall meet the requirements of CSA Standard W59.1-M1984, Clause 5.4.4.

2) Flange plates at bearings shall meet the requirements of the following clause:

Flanges of members at bearings shall not be out of square with the theoretical vertical axis of the member. The flange plate shall have full contact with the bearing sole plate.

Deviation from specified depth: as per CSA Standard W59-M1984, Clause 5.8 (j).

Curvature of stiffeners normal to the vertical plane:

Intermediate stiffeners: as per CSA Standard W59-M1984, Clause 5.8 (k).

Bearing stiffeners: as per CSA Standard W59.1-M1984, Clause 5.8 (1).

The maximum deviation from the specified length measured on centerline of web: ±6 mm.

5.4.1.17 Facing of Bearing Surfaces

The surface finish of bearing plates, soleplates, and other bearing surfaces that come into contact with each other or with concrete shall be in accordance with the bearing supplier's instructions. Unless specified otherwise by the bearing supplier, the following are the minimum requirements that are based on the American National Standards Institute.

Sliding surfaces Pins and pin holes	ANSI125
Milled ends of compression members, stiffeners, and fillers Contact surfaces of bearing sole plates and girder flanges	ANSI500
Surfaces bearing on concrete	Permissible variation in flatness 3 mm in 1 m or ANSI2000

SP:5. STRUCTURAL STEEL

5.4 Construction Methods (Cont'd)

5.4.1.18 Machined Surface

Machine finished surfaces, as designated on the drawings, shall be coated with an approved protective compound.

5.4.1.19 Shipping

Structural members shall be loaded on trucks or train cars in such a manner that they can be transported and unloaded at their destination without being excessively stressed, deformed, or otherwise damaged.

All necessary haulage permits shall be obtained from the proper authorities, prior to transportation by vehicles of any structural steel members.

5.4.1.20 Delivery

The Contractor shall be responsible for arranging directly with the appropriate authorities, a route and schedule acceptable to them and the Contractor shall keep the authorities and Contract Administrator advised and obtain the authorities' approval on any changes as the project proceeds.

Cars or vehicles containing materials shall be promptly unloaded by the Contractor upon delivery, and in case of failure to do so, the Contractor shall be liable for any demurrage charge.

5.4.1.21 Bearings

To ensure uniform contact with bearings, flanges or girders in that area shall not be out of square with the vertical axis of the girder.

Shoe plates shall have full contact with the flanges of the girders.

In planing the surfaces of bearing members, the cut of the tool shall be in the direction of expansion or rotation.

Members that are built up by welding shall be stress relieved in accordance with the provisions of the American Welding Society.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods (Cont'd)

5.4.2 Erection of Structural Steel

The Contractor shall obtain the Contract Administrator's approvals on erection procedures and scheduling prior to the commencement of erection of structural steel.

5.4.2.1 Falsework

The Contractor shall furnish, construct, and subsequently dismantle and remove off-site, all work bridges and platforms, falsework towers, tools, equipment, erection pins, and any other items required for the erection of the steelwork. Falsework shall be designed by a Professional Engineer registered in the Province of Manitoba and substantially constructed and maintained for the loads that will come upon it. At least twenty-one (21) days prior to falsework erection, the Contractor shall submit for the review by the Contract Administrator, drawings and design details for the falsework he proposes to use. Submission of such drawings and design details shall not relieve the Contractor of any responsibility for the adequacy of the falsework. The drawings shall consist of three (3) sets of prints and one (1) reproducible sepia set.

No separate payment will be made for falsework, but all costs related thereto shall be considered incidental to the works of this specification and shall be included in the Unit Price Bid.

5.4.2.2 Erection Methods and Equipment

The Contractor shall submit to the Contract Administrator drawings (three (3) sets of prints and one (1) reproducible sepia set) showing complete details of the method of erection he proposes to follow and the number and character of the equipment he proposes to use. Where practicable, this submission shall be made prior to submission of shop drawings. Erection will not be allowed to proceed without the Contract Administrator's review of the method proposed. The review shall not relieve the Contractor of any responsibility for the safety of the proposed method of erection or of the equipment or from carrying out the work in full accordance with the drawings and these specifications.

Tack welding for the purpose of falsework attachments or any other temporary attachment will not be permitted.

SP:5. STRUCTURAL STEEL

5.4 Construction Methods (Cont'd)

5.4.2.3 Handling and Storing Materials

The Contractor shall design whatever special handling requirements there may be for transporting and erecting the structural steel. This design must be submitted with the falsework submission and be designed by a Professional Engineer registered in the Province of Manitoba. The Contractor shall ensure the stability of all components and provide temporary structural steel bracing, when required, during: handling, transportation, and erection and until the structural steel is in its final location with all permanent bracing, connections, and supports in place and when the concrete in the deck has reached 75% of its specified strength.

Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Caution shall be exercised when storing structural steel that is exposed to weather or condensation to prevent local corrosion, which may develop in areas where water is trapped. Coating with a water soluble oil after fabrication may be used to avoid this problem. Long members shall be supported on skids placed near enough to prevent injury from deflection. The Contractor shall be responsible for the loss of any material while in his care or for any damage caused to it.

5.4.2.4 Field Assembly

The parts shall be accurately assembled as shown on the drawings and any matchmarks shall be followed. Hammering, which will injure or distort the members, shall not be done. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled.

Field connections shall have one half of the holes filled with bolts and cylindrical erection pins (half bolts and half pins) before final bolting. Fitting-up bolts shall be the same nominal diameter as the high tensile bolts, and cylindrical erection pins shall be 1 mm larger.

5.4.2.5 Straightening Bent Material

The straightening of plates and angles or other shapes shall be done by methods that will not produce fracture or other injury. The metal shall not be heated unless permitted by the Contract Administrator, in which case the heating shall not be to a higher temperature than that producing a "dark cherry red" colour. After heating, the metal shall be cooled as slowly as possible.

Following the straightening of a bend or buckle, the surface of the metal shall be carefully inspected for evidence of fracture and, if necessary, replaced or repaired to the satisfaction of the Contract Administrator.

SP:5. STRUCTURAL STEEL

5.4.2.6 Bolting

All field connections shall be bolted with high strength bolts. Bolting with high strength bolts shall be carried out in accordance with AASHTO (1989) Division II - Construction Section 10.17.

5.4.2.7 Misfits

The correction of minor misfits involving harmless amounts of reaming, cutting, or chipping will be considered a legitimate part of erection. However, any error in shop fabrication that prevents the proper assembling and fitting-up of parts by the moderate use of drift pins or by a moderate amount of reaming and slight chipping or cutting shall be the responsibility of the Contractor.

5.4.2.8 Damage to Substructure

The substructure shall be carefully protected during erection of the structural steel by the Contractor. All concrete surface and corners liable to damage shall be protected with wood blocking, sacking, or other means to prevent damage and chipping of concrete due to wire ropes, swing loads, or other activities. The Contractor shall repair any such damage to the satisfaction of the Contract Administrator.

The erection of structural steel and attachment to substructure piers and abutments shall be done so that, during erection, there shall be no forces applied to cause overstressing of the piers and abutments.

5.5 Quality Control

5.5.1 Inspection

All workmanship and all materials furnished and supplied under this specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection on approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this specification.

SP:5. STRUCTURAL STEEL

5.4 Quality Control (Cont'd)

5.5.2 Access

The Contractor shall allow the Contract Administrator free access to all parts of the work at all times.

5.5.3 Qualifications of Contractor

The Contractor shall produce evidence that his plant has recently been fully approved by the C.W.B. to the requirements of CSA Standard W47.1-1983, Division 1.

The Contractor shall also produce evidence of satisfactory experience in the fabrication of heavy structural steel work. The requirements of five (5) years of C.W.B. approval and/or experience in heavy structural steel work may be waived by the Contract Administrator provided the Contractor's plant has been accepted by the Contract Administrator prior to bidding.

Acceptance of a plant will be at the discretion of the Contract Administrator based upon his assessment of the Contractor's organization, personnel, equipment, and past performance. The Contractor shall employ or retain throughout the fabrication of the work, a Welding Engineer who shall be a Professional Engineer registered in the Province of Manitoba. This Engineer shall be responsible for the design, preparation, and control of welded fabrication, and continuous supervision of all welding procedures and operations in the work.

When a Welding Engineer is retained, the fabricator shall appoint, subject to the Contract Administrator's approval, an employee who shall assist and be responsible to the Welding Engineer.

Prior to the commencement of any fabrication, the Contractor shall submit to the Contract Administrator the names of the Welding Engineer, welding supervisors, and shop inspectors who are to be employed on the work.

5.5.4 Qualifications of Operators

The Contractor shall produce evidence that all welding operators to be employed on the work are currently qualified by the C.W.B. at the time of fabrication and in the processes in which they are to be employed on the work. Such qualification shall have been issued within two years of the commencement of fabrication.

SP:5. STRUCTURAL STEEL

5.5 Quality Control

5.5.4 Qualifications of Operators (Cont'd)

The Contractor shall also produce evidence relative to each operator, showing that he has been executing satisfactory welding in the required processes within the six month period previous to the award of this contract.

5.5.5 Welding Procedures

The Contractor shall submit copies of the welding procedures that he intends to use, for examination and approval by the Contract Administrator.

Such procedures shall be accompanies by documentary proof that they have been previously qualified by the Canadian Welding Bureau at the plant where the work is to be carried out.

The procedures shall include the following information: joint type, welding process, welding position, base metal specification, welding consumable specification and size, preheat requirements, amperage and voltage requirements, speed, polarity, and welding equipment, including a description of travel for automatic welding.

The use of gas welding will be limited to light structural elements.

5.5.6 Quality and Details of Welds

The quality and details of welds shall be in accordance with CSA Standard W59-M1984, Clause 12.5.4.

Welds shall have no cracks, inadequate penetration, or lack of fusion and shall have no other defects exceeding the limits in size and frequency of occurrence as specified in Clause 12.5.4. Fusion type defects, referred to in the Clause, shall be interpreted as slag inclusions and similar generally elongated defects.

Undercut at the toe of the flange-to-web fillet weld will not be allowed, except in regions of low stress at the discretion of the Contract Administrator.

SP:5. STRUCTURAL STEEL

5.5 Quality Control (Cont'd)

5.5.7 Material Storage and Care

5.5.7.1 Steel

Structural material, either plain or fabricated, shall be stored at the bridge site or elsewhere, above the ground upon platforms, skids, or other supports. It shall be kept free from dirt and other foreign matter and shall be protected, as far as practical, from corrosion. Long members shall be supported on skids, placed near enough together to prevent injury from deflection.

Prior to fabrication, all steel shall be marked for identification by heat number and specification by a marking system approved by the Contract Administrator.

5.5.7.2 Welding Consumables

All electrodes having low hydrogen coverings shall be dried for at least two hours between 230°C and 260°C, before they are used. Electrodes shall be stored immediately after drying in storage ovens held at a temperature of at least 120°C. Electrodes that are not used within four hours after removal from a drying or storage oven shall be redried before use. Electrodes that have been wet shall not be used.

5.5.7.2 Welding Consumables

Electrode wire used in submerged arc welding and gas metal arc welding shall be stored in the original container at room temperature and kept free of moisture, oil, direct or other contaminators.

Flux used for submerged arc welding shall be dry and free of contamination from dirt, mill scale, oil, or other foreign material. Fused flux shall not be used on the work.

Gas for gas metal arc welding shall be stored in marked steel bottles and shall not be subjected to temperatures in excess of 50°C nor temperatures of less than 0°C.

SP:5. STRUCTURAL STEEL

5.5 Quality Control (Cont'd)

5.5.8 Testing

In addition to the Contractor's own quality control testing, all materials, welding procedures, shop drawings, and steel work fabrication will be inspected by the Contract Administrator to ascertain compliance with the Specifications and drawings.

A testing agency will work with the Contract Administrator to carry out all shop fabrication inspection and testing until the structural steel is approved ready for shipment. The Contractor shall cooperate fully with the testing firm.

The minimum extent and frequency of weld inspection shall be as follows:

Radiographic Inspection:
. 100% of all flange butt welds
. 25% of all web butt welds, including the 100 mm adjacent to the compression flange
. 100% of 750 mm adjacent to tension flanges of all web butt welds

Magnetic Particle Inspection
. 50% of web-to-flange welds
. 10% of web-to-stiffener welds
. 100% of stiffener-to-tension flange welds

All welds will be visually inspected.

The inspector shall have access to all of the fabricator's normal quality control records for this contract specified herein.

Weld inspection will be carried out in accordance with the requirements of CSA Standard W59-M1984.

Welds that are found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W-59-1984 and then retested. The cost of the repairs and the cost of the retest shall be paid for by the Contractor. All other testing specified herein will be paid for by the Owner.

No repair shall be made until agreed to by the Contract Administrator.

SP:5. STRUCTURAL STEEL

5.5 Quality Control (Cont'd)

5.5.9 Unacceptable Work

Any work found to be unacceptable shall be corrected in accordance with CSA Standard W-59-M1984, Clause 5.10.

No repair shall be made until agreed to by the Contract Administrator.

5.6 Method of Measurement

The supply and erection of structural steel will be measured on a mass basis. The mass to be paid for shall be the total number of tonnes of structural steel supplied and installed in accordance with this Specification, acceptable to the Contractor Administrator, as computed on the basis of the net finished dimensions on the drawings. The mass of rolled shapes will be calculated using the nominal mass listed in recognized handbooks.

No mass deductions or additions will be made for holes under 200 dia., bolts or other factors, galvanizing material or other protective coatings, or deposited shop or field weld metal.

5.7 Basis of Payment

The supply and erection of structural steel will be paid for at the Contract Unit Price per tonne for the "Items of Work", listed herebelow, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Structural Steel

a) Supply
b) Erection

SP:6 JACKING AND SUPPORTING BRIDGE SUPERSTRUCTURE

6.1 Description

This Specification shall cover all bridge superstructure jacking and supporting operations relating to the removal existing (seized) bridge bearings, installation of new bridge bearings and splicing of girders.

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

6.2 Equipment

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

The Contractor shall ensure that he has adequate standby jacking equipment to ensure a continuous and timely bridge superstructure jacking and supporting operations.

The temporary supports shall be designed to carry dead and live loads, accommodate longitudinal bridge temperature movements and provide adequate resistance to the lateral loads.

Jacks for jacking up of the superstructure shall be hydraulically operated jacks with a suitable lifting capacities.

The jacking system employed shall utilize a sufficient number of jacks to lift the maximum total load at each jacking point as specified on the Drawings. All jacks shall be interconnected hydraulically through a control manifold in order to lift the entire bridge superstructure simultaneously and uniformly from the jacking points with one line pressure supplied by a single pump.

The Contractor shall have adequate standby jacking equipment on site to provide at least fifty percent (50%) additional jacking capacity at each jacking point if so ordered by the Contract Administrator and to ensure that each temporary closure of the bridge does not extend beyond the authorized closure period as a result of equipment failure.

The method of jacking and supporting details shall be subject to review by the Contract Administrator and the Contractor shall submit such details and drawings to the Contract Administrator at least seven working days prior to commencing jacking operations. The details shall include the design loads, type and number of jacks to be used for jacking the superstructure as well as the support details.

SP:6 JACKING AND SUPPORTING BRIDGE SUPERSTRUCTURE

6.2 Equipment (Cont'd)

These details shall be designed by a Professional Engineer registered in the Province of Manitoba. The documents showing these details shall bear the Professional Engineer seal. The details will not be accepted if not stamped by a Professional Engineer. At least twenty-one (21) days prior to superstructure jacking, the Contractor shall submit for review by the Contract Administrator, drawings and design details for the jacking and supporting method he proposes to use. The drawings shall consist of three (3) sets of prints and one (1) reproducible sepia set. The submission of such details to the Contract Administrator shall in no way relieve the Contractor of full responsibility for the safety and structural integrity of jacking and supporting operations.

6.3 Construction Methods

6.3.1 General

The jacking and supporting of the bridge superstructure at each jacking location shall include:

1. The jacking up and subsequent supporting of the bridge superstructure to facilitate the girder splicing and bearing rehabilitation works at locations shown on the Drawings.

2. Provision of all necessary gravel beds, mud sills, scaffolding and distribution beams under the end of the girders, as required, to jack up and support the bridge superstructure to facilitate girder splicing the bearing rehabilitation works.

3. Provision of all necessary access and access/work platforms for all jacking operations for the inspection of the works by the Contract Administrator, and for the Contract Administrator to take readings and establish a bridge monitoring system.

4. After the bearing replacement is complete, lowering of the bridge superstructure to its final position.

6.3.2 Jacking Operations

The existing location of steel girders in elevation shall be defined by taking measurements from the bottom of the girder flange to a marked location on top of the pier or abutment for all girders at all locations. The Contractor shall be responsible for taking these measurements and shall ensure that when the girders are reinstalled to reset on new bearings, they sit exactly as shown on the Drawings, or as directed by the Contract Administrator.

SP:6 JACKING AND SUPPORTING BRIDGE SUPERSTRUCTURE

6.3 Construction Methods

6.3.2 Jacking Operations (Cont'd)

All steel girders in any given span are presently connected together transversely and shall be jacked simultaneously at each jacking location. Under no circumstances the bridge superstructure shall be jacked up more than 6 mm at any jacking location.

After the bearing replacement related to each jacking location has been completed, the Contractor shall lower the superstructure and transfer loads to the new bearings. The Contractor shall provide temporary horizontal movement restraints to each section of the superstructure until the concrete in the deck is placed and cured.

Subsequently, all access/work platform and temporary restraints shall be removed and the site returned to its original condition.

6.3.3 Railway Operations

The Contractor is advise that no temporary structure, machinery, equipment or material shall be permitted within the railway clearances as shown on the Drawings. All work shall be carried out in accordance with Specification SP:19.

6.3.4 Temporary Support of the MTS Conduits

Provide temporary supports to the MTS conduits so that the conduits remain in their original position during jacking and supporting of the bridge superstructure until permanent supports can be installed.

6.3.5 Temporary Asphalt Ramps

Incidental to the jacking operations, temporary asphalt ramps shall be provided at the bridge approaches, maintained and modified as required to the satisfaction of the Contract Administrator to facilitate the smooth flow of traffic.

An asphalt ramp shall be provided during the jacking up operation on the both sides of the bridge. The maximum slope shall be one in thirty-two (1:32) and shall be supplied and placed in accordance with Specification CW 3410-R3.

The temporary asphalt ramps shall be modified to the proper elevation during the lowering operations.

The asphalt ramps shall be maintained in good riding condition and to the satisfaction of the Contract Administrator.

SP:6 JACKING AND SUPPORTING BRIDGE SUPERSTRUCTURE

6.4 Method of Measurement

The jacking and supporting of bridge superstructures will be paid for on a Lump Sum Basis, as accepted by the Contract Administrator, and no measurement will be made for this work

6.5 Basis of Payment

The jacking and supporting of the bridge superstructure will be paid for at the Contract Lump Sum price for "Jacking and Supporting Bridge Superstructures", which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:7. SUPPLY AND INSTALLATION OF CONDUITS, CONDUIT SUPPORT SYSTEMS, SPLICE PITS, AND APPURTENANCES

7.1 Description

This Specification shall cover the installation of conduits, conduit support systems, splice pits, and associated appurtenances.

The work 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.

7.2 Materials

7.2.1 General

The Contractor shall be responsible for the supply, safe storage, and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator.

7.2.2 Conduits

All conduits, expansion joints, bends, and appurtenances will be PVC (Polyvinyl Chloride), complete as indicated on the Drawings. All of these components shall be supplied by the Contractor.

7.2.3 Fish Wire

Unless otherwise indicated, fish wire in ducts shall be galvanized steel-line-type and shall not be less than 12 B.W.G. (2.6 mm dia.) grade 130.

SP:7. SUPPLY AND INSTALLATION OF CONDUITS, CONDUIT SUPPORT SYSTEMS, SPLICE PITS, AND APPURTENANCES

7.2 Materials (cont'd)

7.2.4 Concrete

Concrete for encasing the conduits below ground level is to be supplied and installed in accordance with Specification SP:3 "Structural Concrete," incidental to this Specification. The concrete shall be made with Type 50 cement.

7.2.5 Granular Base for Splice Pit

Granular base material shall consist of sound, hard pit run or crushed rock, be free from organic or soft material that would disintegrate through decay or weathering. The granular base materials shall be graded 40 mm down.

7.2.6 Splice Pit

Concrete pipe for the splice pit shall be precast and comply in all respects with ASTM C-76, Class II. Frames and covers shall comply with CW 2131-R2.

7.2.7 Miscellaneous Materials

Miscellaneous materials shall be of a type as indicated on the Drawings and required for a complete installation and as approved by the Contract Administrator.

7.3 Equipment

7.3.1 General

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

SP:7. SUPPLY AND INSTALLATION OF CONDUITS, CONDUIT SUPPORT SYSTEMS, SPLICE PITS, AND APPURTENANCES

7.4 Construction Methods

7.4.1 Placing of Conduit

The conduit to be placed in concrete shall be firmly anchored in place to prevent movement during placing of the concrete. Extreme care shall be exercised when placing concrete to prevent damage to any conduit. The open ends of the conduits shall be suitably capped to protect the conduit from damage.

All conduit connections shall be made in accordance with the manufacturer's instructions.

Where installed below grade, the Contractor shall take care to bed and backfill the conduit so as not to lank or collapse it.

The conduit shall be installed with gradual changes in direction so that fish wire and wiring can easily be threaded through.

Where required, the conduits shall be terminated in splice pits as indicated on the drawings.

7.4.2 Placing of Fish Wire

The fish wire shall be placed in all new conduits and shall be firmly anchored at the open ends of the conduits. Drill a small hole in the conduit cap for passage of the fish wire.

7.4.3 Obstructions

Upon completion of the conduit system, the Contractor shall ascertain that no obstructions are blocking any conduit. If any obstruction is encountered, it shall be removed by the Contractor at his own expense.

SP:7 SUPPLY AND INSTALLATION OF CONDUITS, CONDUIT SUPPORT SYSTEMS, SPLICE PITS, AND APPURTENANCES

7.4 Construction Methods (cont'd)

7.4.4 Installation of Splice Pit

7.4.4.1 Excavation and Backfill for Splice Pit

Excavation and backfilling shall be in accordance with Specification CW 2030-R3 and shall be incidental to the work of this section.

7.4.4.2 Concrete Pipe Installation

The concrete pipe shall be installed in a truly vertical position upon the compacted base to the dimensions shown on the drawings or as otherwise directed by the Contract Administrator. The pipe shall be installed at an elevation such that when the specified frame cover is installed, it shall finish flush with the finished grade.

The pipe shall have a circular hole cut in the wall as indicated on the drawings and be of sufficient size to adequately accept the incoming conduit.

The conduit shall be joined to the pipe wall using an approved jointing compound so as to ensure a watertight joint.

The incoming conduit shall be neatly cut flush with the inside surface of the pipe wall.

7.4.4.3 Frame and Cover Installation

Frames and covers shall be installed in accordance with Specification CW 2131-R2.

7.4.4.4 Miscellaneous Works

All other items necessary for the complete installation of the conduits and splice pits shall be done as directed by the Contract Administrator.

7.5 Quality Control

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations, from the selection and production of materials, through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given.

SP:7 SUPPLY AND INSTALLATION OF CONDUITS, CONDUIT SUPPORT SYSTEMS, SPLICE PITS, AND APPURTENANCES

7.5 Quality Control (cont'd)

The Contract Administrator reserves the right to reject materials or works that are not in accordance with the requirements of this Specification.

7.6 Method of Measurement

7.6.1 Conduits and Splice Pits

Supply and installation of conduits including all appurtenances will be measured on a linear metre basis. The number of linear metres to be paid for shall be the total number of linear metres supplied and installed in accordance with this Specification and the Drawings, and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

Supply and installation of splice pits including all appurtenances shall be measured on a unit basis. The number of splice pits to be paid for shall be the total number of splice pits installed in accordance with this Specification and the drawings, and accepted by the Contract Administrator.

7.7 Basis of Payment

7.7.1 Conduits and Splice Pits

Supply and installation of conduits including all appurtenances will be paid for at the Contract Unit Price per linear metre for the "Items of Work," listed herebelow, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Construction of splice pits shall be paid for at the Contract Unit Price per unit for "Splice Pit," measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:7 SUPPLY AND INSTALLATION OF CONDUITS, CONDUIT SUPPORT SYSTEMS, SPLICE PITS, AND APPURTENANCES

7.7 Basis of Payment

7.7.1 Conduits and Splice Pits (cont'd)

Items of Work

Supply and Installation of Conduits and Splice Pits

a) Supply
   i) 100 Diametre PVC
   ii) Splice Pit

b) Installation
   i) 100 Diametre PVC
   ii) Splice Pit

SP:8. EXPANSION JOINTS

8.1 Description

This Specification shall cover the supply and installation of bridge deck expansion joints.

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

8.2 Materials

8.2.1 All materials supplied under this Specification shall be of a type approved by the Contract Administrator and shall be subject to inspection and testing by the Contract Administrator.

The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials shall be handled in a careful and workmanlike manner, to the satisfaction of the Contract Administrator.

8.2.2 Expansion Joints

Expansion joints shall be neoprene strip seal system. Approved types are:

1. S-300 as supplied by Wastson Bowman Acme
2. GSH 141A as supplied by Wercholoz Inc.
3. RS-300 as supplied by Goodco Ltd.

Expansion joints shall have fabricated cover plates as shown on the Drawings. Sidewalks expansion joints shall be as shown on the Drawings. The seals at each joint shall be supplied in one continuous piece, separate from the steel extrusions or joint. No splicing will be allowed in the seals unless approved by the Contract Administrator.

All steel components of the expansion joints shall be galvanized after shop fabrication of the complete joint in accordance with CSA Standard G164-M1981 to a net minimum retention of 600 g/sq.m.

All fasteners and hardware of the expansion joints shall be grade 316, stainless steel.

Anchor studs shall conform to the requirements of ASTM Specification A108, Grade Designation 1020 and shall be galvanized.

Welding shall be of a low hydrogen classification. Manual electrodes shall be E7016 or E7018. All welding shall be in accordance with CSA Standard W59-M1984.

SP:8. EXPANSION JOINTS

8.2 Materials (Cont'd)

8.2.3 Galvalloy

Galvalloy shall be as supplied by Metalloy Products Co., P.O. Box #3093, Terminal Annex, Los Angeles, California. Locally this is available from Welder Supplies Ltd., 150 McPhillips Street, Winnipeg.

8.2.4 Epoxy Adhesive

Epoxy adhesive shall be ST 431 as manufactured by Sternson Ltd., or approved equal.

8.2.5 Epoxy Grout

Epoxy grout shall be Dural 103 Gel, as distributed by Specialty Construction Products, or approved equal.

8.2.6 Grout

Grout shall be non-metallic, non-shrink grout.

Approved grout are as follows:

1. Masterflow 713 grout
2. Master Builders set non-shrink grout
3. Sika grout 212
4. Sternson M-bed standard grout
5. CPD non-shrink grout
6. Sonogrout

8.2.7 Steel

Steel supplied for the fabrication of the expansion joints shall conform to CSA Standard CAN/CSA-G40.21-M87, grade 300W, or equal as approved by the Contract Administrator.

8.2.8 Steel Extrusions

Steel extrusions shall conform to CSA Standard CAN/CSA-G40.21-M87, minimum grade 230G.

8.2.9 Anchor Bolts

Anchor bolts shall conform to ASTM A307 and shall be galvanized. Each anchor bolt shall come with two galvanized hexagonal head nuts, as shown on the Drawings.

SP:8. EXPANSION JOINTS

8.2 Materials (Cont'd)

8.2.10 Anchor Studs

Anchor studs shall conform to ASTM Specification A108, Grade Designation 1020 and shall be galvanized.

8.2.11 Sidewalk Coverplates and Traffic Barrier Slider Plates

Sidewalk coverplates and traffic barrier slider plates, and median slider plates shall be fabricated from steel conforming to CSA Standard G40.21-M87, grade 300W, and shall be galvanized in accordance with CSA Standard G164-M1981 to a net minimum retention of 600 g/sq.m.

Cap screws shall be stainless steel, flat head socket cap screws (Countersunk).

8.2.12 Preformed Neoprene Joint Seals

8.2.12.1 General

Preformed joint seal shall be manufactured from a vulcanized elastrometric compound using crystallization resistant polychoroprene (neoprene) as the only polymer.

The preformed neoprene joint seal shall meet the requirements of Ontario Provincial Standard Specification (OPSS) 1210 "Material Specification for Preformed Neoprene Joint Seals," latest edition, and as amended herein; and of Table 1 of this Specification. All tests will be made on specimens prepared from the extruded seals.

8.2.12.2 Markings

All joint seals shall be identified as to the manufacturer by means of a continuous permanent mould mark. The mould marks shall be registered with the Contract Administrator and shall be used on all seals produced by the respective manufacturer. The seal shall also be permanently marked, on the side of the seal, with the date of production and the batch/lot, at intervals of not more than 1.2 m.

The Contractor shall supply to the Contract Administrator a summary of the seals identifying the date of manufacture, the batch/lot, and the proposed installation location.

SP:8. EXPANSION JOINTS

8.2 Materials

8.2.12 Preformed Neoprene Joint Seals (Cont'd)

8.2.12.3 Quality

The Contractor shall supply sample material at no charge to the Owner for quality control testing purposes. The samples will each be 1-1/2 m long. Each sample will represent the two bridge joint seals of the same size, lot, and make and shall be continuous with same until sampled by the Contract Administrator. As soon as the seals to be used in the joint assemblies have been manufactured, they shall be available to the Contract Administrator for sampling.

Testing procedures will be in accordance with the latest versions of the methods indicated in Table 1.

All material failing to meet the Specification requirements will be rejected.

Lots rejected may be culled by the supplier and, upon satisfactory evidence of compliance with the specifications, will be accepted.

TABLE 1

PHYSICAL REQUIREMENTS

Property	Physical Requirements	Test Procedure *
1. Tensile Strength	Min. 13.5 MPA	ASTM D412 OPSS 1210.07.03.01.02
2. Elongation at Break	Min . 250%	ASTM D412 OPSS 1210.07.03.01.02
3. Hardness, Type A Durometer	55 +7 Points -5	ASTM D2240 OPSS 1210.07.03.01.03
4. Oven Aging Test 70 hr. at 100°C		ASTM D573
Reduction in Tensile Strength	Max. 20%	
Reduction in Elongation	Max. 20%	
Increase in Hardness	Max. 10 Points	
5. Permanent Set at Break	Max. 10%	ASTM D412
6. Low Temperature Stiffening Hardness, Type A Durometer		ASTM D2240 OPSS 1210.07.02.01.03
7 d at -10°C Increase in Hardness	Max. 15 Points	

SP:8. EXPANSION JOINTS

8.2 Materials

8.2.12 Preformed Neoprene Joint Seals (Cont'd)

TABLE 1 (Cont'd)

PHYSICAL REQUIREMENTS

7. Oil Swell, ASTM Oil No. 3 70 h at 100°C Weight Change	Max 45%	ADTM D471
8. Ozone Resistance 20% Strain, 300 pphm in air 70 h at 40°C (Wipe with toluene to remove surface contamination)	No Cracks	ASTM D1149
9. Safe Compressibility Test (Z min.)		OPSS 1210.07.03.01.04
Bridge Seal - ≤63.5 mm	Min. 50%	
≤63.5 mm	Min. 55%	
10. Pressure Generation at 15% Deflection	Min 20 kPa	OPSS 1210.07.03.01.04
Property	Physical Requirements	Test Procedure *
11. Recovery		
22 h at -28°C	Min. 80% No Cracking	
70 h at -10°C	Min. 88% Splitting or	OPSS 1210.07.03.01.05
70 h at +100°C	Min. 85% Sticking	

*ASTM - American Society for Testing and Materials
OPSS - Ontario Provincial Standard Specification

8.3 Equipment

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

SP:8. EXPANSION JOINTS

8.4 Fabrication

Shop Drawings (three (3) prints and one (1) reproducible sepia), showing the fabrication details and proposed field splice details of the steel components of the expansion joint shall be provided to the Contract Administrator for approval at least twenty-one (21) days prior to scheduled commencement of fabrication. No fabrication shall commence until approval from the Contract Administrator has been obtained. The complete expansion joint shop fabrication and installation shall be done by or under the direct supervision of a trained factory representative, who shall be responsible for the joint installation procedure.

Care shall be taken to ensure that all members are straight and flat and free from twists, bends, and distortions due to welding. The units shall be shop assembled in pairs and checked for matching of sliding surfaces, correct cross-fall, and skew as well as accurate positioning and alignment of supporting brackets. The Contractor shall exercise care in the handling of all units to prevent twists, bends and warping. The use of a rigid lifting arm with four-point connections to each unit is recommended. Such connections may be made to the slotted holes of the seating brackets, but care shall be taken not to damage or distort these holes.

Matching expansion joint units shall be assembled and bolted together for shipping.

Expansion joint assemblies, splice plates, and splices shall be shop checked for fit and match marked.

All metal surfaces of the expansion joint shall be cleaned thoroughly of rust, rust scale, mill scale, dirt, paint, and other foreign material by commercial sand, grit, or shop-blasting or pickling prior to blasting or pickling prior to galvanizing. Heavy deposits of oil and grease shall be removed with solvents prior to blasting or pickling.

In no case shall weldments be substituted for extrusion shapes.

SP:8. EXPANSION JOINTS

8.5 Construction Methods

8.5.1 Installation

The Contractor shall install expansion joints as shown on the plans and Specifications and shall be responsible for the correct matching and seating of parts. The expansion joints shall be checked for accurate matching of sliding plates with the expansion joints installed on the specified cross-fall and skew. This check shall be made with erection bolts in sliding plates removed and supports firmly in place. Erection bolts shall be reinstalled when erection of the expansion joints has been completed to the satisfaction of the Contract Administrator.

8.5.2 Opening Variations

The plans shall include, in tabular form, the required installation openings throughout the probable installation temperature range as defined under Clause 8.5.3.

8.5.3 Installation Temperature

In the absence of a more accurate procedure, the installation temperature shall be taken to be the mean shade air temperature at the structure for the 48 hours prior to joint installation for concrete structures and for the 24 hours prior to joint installation for structures where the main members are made of structural steel.

8.5.4 Galvanizing Touch-up, Prior to Placement of Concrete

All field welds, and all areas of galvanizing damaged by shop or field welding or otherwise, shall be repaired by coating with Galvalloy material in accordance with the following "Galvalloy Process":

> The surface to be coated shall be heated to approximately 315°C, then rubbed with a bar of Galvalloy, allowing a small amount to flow. The Galvalloy shall then be spread by brushing briskly with a wire brush, and brushed sufficiently to obtain a bright finish. This process shall be repeated three (3) times to ensure a proper thickness is achieved.

SP:8. EXPANSION JOINTS

8.5 Construction Methods (Cont'd)

8.5.5 Placement of Concrete at Joints

Concrete shall be placed on the bridge deck side of the joint first. The assembly shall be set in position such that it will remain true to line and elevation during and after concreting.

Care shall be taken during compaction of the concrete to ensure that there are no voids in the concrete under and around the structural steel components.

Before concreting the abutment or other side of the joint, the top clamping system shall be loosened so that the adjustment bolts are set to give the correct width for the mean concrete temperature of the deck. The width shall be obtained from the installation temperature table given on the approved shop drawings. The clamping channels shall then be tightened, the assembly secured at the correct line and level, and the adjustment bolts removed.

Concrete of the abutment side of the joint shall be carried out as for the deck side. The clamping channels shall be removed shortly after the concrete has set.

The supply and placement of the expansion joint concrete shall be undertaken, completed, and paid for in accordance with the requirements of Specification SP:3, "Structural Concrete".

Immediately prior to placement of concrete at the expansion joint, all metal contact surfaces between the expansion joint and concrete shall be coated with epoxy adhesive.

Epoxy grout shall be used to fill any bolt holes left after the removal of manufacturer's clamping channels.

8.5.6 Installation of Seal

The seal at each expansion joint shall be installed as one continuous piece after completion of all concreting operation, satisfactory to the Contract Administrator; and shall not be installed prior to casting of the expansion joints into the concrete deck and sidewalks.

SP:8. EXPANSION JOINTS

8.5 Construction Methods (Cont'd)

8.5.7 Watertight Verification of Joint Seal

The Contractor shall dyke off the expansion joint and maintain seventy-five (75) mm of water over all areas of the seal for a period of not less than four (4) hours, with no leakage. Any and all leaks shall be corrected, using mechanical adjustment of the expansion joint to the satisfaction of the Contract Administrator. In no case shall caulk or other temporary devices or materials be used to seal leaks in the expansion joint. The Contract Administrator's decision in this regard shall be final. All forming materials shall be removed from the expansion gaps prior to the leak testing. The Contractor shall provide access to the pier tops during the testing.

8.6 Fabrication Guarantee

The expansion joint supplier shall provide a written guarantee stating that they will perform satisfactorily within the design range of movement and under the design loads for a period of five (5) years from the issuance of the Final Certificate, provided that the expansion joints have been properly installed. The supplier shall state that they have reviewed the installation procedures and find them in accordance with their recommendations. The supplier shall guarantee the replacement of the expansion joints at no cost to the City, in the event that the joint does not perform satisfactorily within the design range of movement and under the design loads.

8.7 Installation Guarantee

The General Contractor shall ensure that the expansion joints are installed in such a manner that will not void the fabrication guarantee.

Similar to the expansion joint supplier, and before final acceptance by the Contract Administrator, the General Contractor shall guarantee, in writing, the performance of the expansion joints for a period of five (5) years from the date of issuance of the Final Certificate. Provide in the guarantee for the replacement of the expansion joints at no cost to the City, in the event that the expansion joints do not perform satisfactorily in the range of design movement and under the design loads.

SP:8. EXPANSION JOINTS

8.8 Quality Control

All workmanship and all materials furnished and supplied under this Specification are subject to the close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the Work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

8.9 Method of Measurement

The supply and installation of expansion will be measured on a unit basis. The number of expansion joints to be paid for shall be the total number of expansion joints of each type fabricated, transported, and installed in accordance with this Specification and accepted by the Contract Administrator.

8.10 Basis of Payment

Supply and installation of expansion joints will be paid for at the Contract Unit Price for the "Items of Work", listed below, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Expansion Joints
a) Supply
b) Installation

SP:9. HIGH DENSITY CONCRETE

9.1 Description

This Specification shall cover the supply and preparation of high density Portland Cement concrete for, and all concreting operations relating to, the construction of high density concrete (top 140 mm) on the superstructure and on the abutment back wall.

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

9.2 Materials

9.2.1 General

All materials shall be in accordance with Section 3.2 of Specification SP:3, "Structural Concrete," unless specified otherwise in this Specification.

9.2.2 Aggregates

Coarse Aggregate (13 mm Nominal)

Coarse Aggregate shall be 100 percent crushed granite, clean and free from alkali, organic, or other deleterious matter, shall have two fractured faces, shall have an absorption not exceeding 3 percent, and shall conform to the following gradation requirements:

Canadian Metric Sieve Size	Percent Passing
20,000	100%
13,000	97% - 100%
10,000	40% - 90%
5,000	5% - 30%
80	0% - 1.5%

9.2.3 Bonding Grout

Equal parts of Portland Cement and sand, mixed with sufficient water to form a stiff slurry. The consistency of the slurry shall be such that it can be applied with a stiff brush to the concrete in a thin, even coating that will not run or puddle in low spots. The grout shall be thinned to a paint consistency for sealing vertical joints between adjacent lanes and at curbs.

SP:9. HIGH DENSITY CONCRETE

9.2 Materials (Cont'd)

9.2.4 Epoxy Adhesive

Epoxy adhesive shall be ST 431, as manufactured by Sternson Ltd., and distributed by D.W. Court Ltd., or equal as approved by the Contract Administrator.

9.2.5 Latex Bonding Agent

Latex bonding agent shall be SCP Concrete Bonding Agent, as supplied by Specialty Construction Products, or equal as approved by the Contract Administrator.

9.2.6 Penetrating Concrete Sealer

Penetrating concrete sealer shall be supplied in accordance with SP: 3.2.23.

9.2.7 Polyester Blankets

Covering material for wet curing shall be 100 percent polyester, 3-mm-thick blankets and shall be white in colour. An approved product is "Mirafi Geotextile P150" or equal as approved by the Contract Administrator.

9.3 Equipment

9.3.1 Proportioning and Mixing Equipment

A construction or sanitary mixer of the rotating paddle-type or a continuous mixer used in conjunction with volumetric proportioning will be required. The device for proportioning water shall be accurate within 1 percent.

9.3.2 Placing and Finishing Equipment

Unless otherwise specified, an approved finishing machine complying with the following requirements shall be used.

a) A mechanical strike-off shall be required to provide a uniform

SP:9. HIGH DENSITY CONCRETE

9.3 Equipment

9.3.2 Placing and Finishing Equipment (Cont'd)

b) At least one oscillating screed shall be designed to consolidate the concrete to 98 percent of the unit weight, determined in accordance with ASTM C138-71T, by vibration. A sufficient number of identical vibrators shall be effectively installed, such that at least one vibrator is provided for each 1500 m of screed length. The bottom face of this screed shall be at least 125 mm wide and with a turned up or rounded leading edge to minimize tearing of the surface of the plastic concrete. Each screed shall have an effective weight of at least 325 kg for each square metre of bottom face area. Each screed shall be provided with positive control of the vertical position, the angle of tilt, and the shape of the crown.

c) Design of the finishing machine, together with appurtenant equipment, shall be such that positive machine screeding to the plastic concrete will be obtained within 25 mm of at least 150 mm beyond the line where a sawcut is intended to form the edge of a subsequent placement section and shall overlap the sawn edge of a previously-placed course at least 150 mm.

d) The finishing machine shall be capable of forward and reverse motion under positive control. Provision shall be made for raising the screeds to clear the screed surface for travelling in reverse.

e) Supporting rails upon which the finishing machine travels will be required on all overlay projects. The support for these rails shall be fully adjustable (not shimmed) to obtain the correct profile.

f) When placing concrete in a lane abutting a previously-completed lane, the side of the finishing machine adjacent to the completed lane shall be equipped to travel on the completed lane.

9.3.3 Work Bridges

At least two work bridges will be required (one for finishing and one for curing operations), independent of the finishing machine.

These work bridges shall travel on guides or rails supported clear of the finished deck surface. These rails may be the same as those used for the finishing machine.

SP:9. HIGH DENSITY CONCRETE

9.3 Equipment

9.3.4 Movable Deck Hoarding

Shop Drawings (three [3] prints and one [1] reproducible sepia), showing the fabrication details of the movable hoarding shall be provided to the Contract Administrator for review at least 21 days prior to the scheduled commencement of fabrication. Such Drawings shall show design loads, method of construction, type and grade of materials, and any further information that may be required by the Contract Administrator.

The movable deck hoarding shall be designed by a registered professional Engineer and constructed to the following requirements:

a) Sufficient clearances shall be provided to enable the placing and finishing of concrete deck overlay to proceed unhindered inside of the hoarding.

b) The minimum length of the hoarding shall be 25 m.

c) The hoarding shall have a clear, unsupported span of at least 7 m.

d) The roof and sides of the hoarding shall be covered with waterproof material, with all joints overlapping enough to withstand the force of "driving" rain, and at least two-thirds of the roof and the entire sides shall be opaque in order to prevent the deck concrete from being exposed to direct sunlight.

   The sides of the hoarding at the junction of the hoarding with the deck forms shall be so constructed as to prevent the entrance of rain from the sides.

   Provisions must be made for enclosing the ends of the hoarding on very short notice in the event that closing of the ends proves necessary during the concrete pour.

   The roof of the hoarding is to be checked for holes before each concrete pour and repaired, as required, before such a pour will be allowed to begin.

e) The hoarding is to be constructed on wheels or rollers for ready mobility. Another acceptable method is to have stationary sides, with a roof on wheels or rollers.

f) The rail system for the movable deck hoarding must be independent of the rail system used for the screeding machine and the work bridges.

SP:9. HIGH DENSITY CONCRETE

9.3 Equipment

9.3.4 Movable Deck Hoarding (Cont'd)

g) The hoarding must not be removed from over top of the newly-completed concrete deck topping without first obtaining permission from the Contract Administrator.

Movable deck hoarding shall be considered incidental to the placement of high density concrete, and no separate measurement or payments will be made for this work.

9.3.5 General

The overall combination of labour and equipment for proportioning, mixing, placing, and finishing new concrete shall be of such minimum capability as to meet the following requirements, except when noted otherwise on the Drawings.

Total Overlay Area Per Bridge (Sq. Metre)	Minimum Requirements (Cubic Metres/Hour
0 - 275	1.0
276 - 410	1.5
411 - 550	2.0
Over - 550	2.5

The finishing machine shall be so designed that, when concrete is mixed and placed at the specified minimum rate, under normal operating conditions, the elapsed time between depositing the concrete on the floor and final screeding shall not exceed 10 minutes. Similarly, the placing equipment and operations shall be such that in no case shall the elapsed time between mixing and final screeding exceeding thirty (30) minutes.

9.4 Construction Methods

9.4.1 General

The bridge deck surface shall be constructed using high density concrete in accordance with the requirements of this Specification.

Falsework erected for placement of lower lift of deck concrete shall remain in place during high density concrete placement over that falsework.

The lower lift of deck concrete shall reach a minimum compressive strength of 30 MPa, as determined by field-cured test cylinders, before high density concrete is placed.

SP:9. HIGH DENSITY CONCRETE

9.4 Construction Methods (Cont'd)

9.4.2 Surface Preparation

The concrete surface over which the high density concrete topping is to be applied, shall be thoroughly cleaned to remove all laitance, dirt, or other deleterious material. The cleaning shall be accomplished by either high-pressure waterblasting, heavy sandblasting, sandblasting, and/or other means deemed necessary and approved by the Contract Administrator. The cleaning operations shall be done prior to the placement of reinforcing steel, the application of the bonding grout or latex bonding agent, and the placement of the high density concrete deck overlay.

The time interval between the surface preparation and the placing of the concrete topping shall be kept to a minimum, and utmost care shall be taken to keep the prepared surfaces clean during the interval. All residue produced by the sandblasting shall be removed from the top of the bridge as the sandblasting proceeds.

Immediately before proceeding with each pour, the prepared surface shall be inspected for dirt and other deleterious materials that may have been deposited after the completion of cleaning. All such dirt and deleterious material shall be cleaned off in a manner and by procedures satisfactory to the Contract Administrator.

9.4.3 Setting up and Operation of Movable Deck Hoarding

The Contractor will be require to provide a movable deck hoarding in conjunction with all pours during all weather conditions.

The hoarding shall meet the requirements of Clause 9.3.4 of this Specification. Prior to placing any concrete deck overlay, the Contractor shall erect the hoarding and shall demonstrate to the satisfaction of the Contract Administrator that the hoarding can be moved along the entire length of high density concrete deck topping to be poured.

During concrete deck overlay placement and finishing, the hoarding shall be moved along the bridge deck, keeping pace with the approved finishing machine. The leading edge of the hoarding shall be kept at a distance of at least 10 m in front of the approved finishing machine at all times during the pour, and the back edge shall, at all times, cover and protect from direct sunlight and finished concrete that has not been covered by wet polyester blankets. The hoarding shall be long enough to ensure that no uncovered finished concrete extends beyond the back edge of the hoarding or is exposed to direct sunlight.

SP:9. HIGH DENSITY CONCRETE

9.4 Construction Methods

9.4.3 Setting up and Operation of Movable Deck Hoarding (Cont'd)

Following completion of any deck overlay pour, the hoarding shall remain in place over the freshly-packed concrete deck overlay until such time as the concrete has set up or as directed by the Contract Administrator.

9.4.4 Proportioning and Mixing of High Density Concrete

High density concrete overlay shall be proportioned and mixed at the project site. Ready-mixed concrete will not be approved.

High density concrete overlay shall meet the following requirements:

a) Basic absolute volumes per unit volume of concrete

Coarse aggregate	0.312088
Fine aggregate	0.312088
Air	0.060000
Water	0.160255
Cement	0.155569

b) Approximate quantities of dry materials per cubic metre of high density concrete

Coarse aggregate (13 mm)	826 kg
Fine aggregate	826 kg
Cement	488 kg (minimum)

These quantities are based on the following assumptions:

Specific gravity of cement	3.14
Specific gravity of coarse and fine aggregate	2.65
Weight of water	1.00 g/mL

A water-reducing admixture for improving workability will be required. The admixture must be approved by the Contract Administrator and shall be used in strict accordance with the manufacturer's instructions.

Unless otherwise specified herein, the slump measured in accordance with AASHTO T110 shall be 20 mm with a maximum of 26 mm and no minimum requirements. The slump will be measured, at the point of mixing, 5 minutes after batching.

SP:9. HIGH DENSITY CONCRETE

9.4 Construction Methods

9.4.4 Proportioning and Mixing of High Density Concrete (Cont'd)

The intended air content of the finished high density concrete is 6 percent. Air content of fresh, unvibrated concrete at the time of placement shall be 6.5 percent ± percent.

9.4.5 Placing and Finishing High Density Concrete

The Contractor will be required to conduct a high density concrete trail for this finishing operations using the approved finishing machine. The trail shall be conducted on a sloped surface similar to the existing maximum slopes and crossfalls on the bridge. It shall be constructed 8.0 m wide by 4.0 m long, by minimum 140 mm depth. This trail may be conducted at a suitable location at the bridge, if available, or in the Contractor's own yard. The trail will be considered incidental to this Specification, and no additional payment will be made for this work.

The trail section shall confirm that the Contractor's finishing equipment and operations can produce a surface meeting the finish tolerances as hereinafter specified. The trail sections, once accepted by the Contract Administrator, shall become the minimum standard of acceptance for the flatness of the finish.

The surface of the high density concrete shall be finished to a flatness tolerance as specified herein. The surface flatness of the finished high density overlay will be determined by measuring the elevation difference between equidistant points spaced 305 mm apart, along straight or curved lines running parallel or perpendicular (radial) to the direction of travel on the bridge deck. An acceptable surface flatness, as measured along any such line on the finished surface, will have the absolute difference between any two consecutive readings (a reading being the difference in elevation between two consecutive points) not exceeding 5 mm.

At each location(s) where absolute difference of 5 mm is exceeded, further detailed contour survey(s) will be conducted by and at the discretion of the Contract Administrator to determine the extent of the area requiring corrective action, all at the Contractor's expense. Corrective measures shall involve immediate removal of the surface in the areas not meeting the specified surface flatness tolerance and/or acceptable rideability, in the judgement of the Contract Administrator, and replacement of same to a minium depth of 50 mm, with the the perimeter of the area saw-cut to a depth of 25 mm (the cut face to be sloped to key in the replacement concrete), as directed by the Contract Administrator. If more than 20 percent of the surface is rejected by the Contract Administrator, based on the flatness tolerance and/or any other defect, the Contractor shall immediately remove and replace the entire area of the applicable pour.

SP:9. HIGH DENSITY CONCRETE

9.4 Construction Methods

9.4.5 Placing and Finishing High Density Concrete (Cont'd)

This criteria will not apply across the crown or at the deck drains, which must be constructed to meet design grades as shown on the Drawings or as directed by the Contract Administrator.

The Contract Administrator will take readings and determine the acceptability for the surface flatness within thirty-six (36) hours after completion of each pour. The Contractor shall remove and replace the curing blankets, poly and insulating tarps, as required by the Contract Administrator, to undertake the necessary flatness testing and shall restore same immediately upon completion of the testing in each area to the satisfaction of the Contract Administrator.

During the high density concrete finishing operations, the Contractor shall utilize a 3.05 m (10 ft.) straightedge with a 75 mm (3 inch) semicircular shape, as supplied by Bidwell Inc., and as approved by the Contract Administrator. It shall be used both for flattening the plastic concrete surface and for checking and verifying the surface flatness before applying the transverse score and commencing curing of the surface. The Contract Administrator will do a conformance check of the surface flatness of the set concrete within eighteen (18) hours after each pour, and the Contract Administrator will advise the Contractor within thirty-six (36) hours of any concrete not meeting the surface flatness tolerance, which shall be immediately removed and replaced by the Contract Administrator at his own expense as specified herein, unless otherwise directed by the Contract Administrator.

Screed guides shall be placed and fastened in position to ensure finishing the concrete to the required profile. Supporting rails upon which the finishing machine travels shall be placed outside the area to be concreted. Provisions for anchorage of supporting rails shall provide for horizontal and vertical stability; positive anchorage may be required by the Contract Administrator. A hold-down device shot into concrete will not be permitted unless the concrete is to be subsequently resurfaced. Plans for anchoring support rails shall be submitted to the Contract Administrator for approval. The Contract Administrator's written approval must be received by the Contractor prior to the installation of any anchorage devices.

No longitudinal or transverse joints will be allowed, unless detailed on the Drawings or authorized in writing by the Contract Administrator. Where transverse and longitudinal joints are allowed, the concrete and longitudinal joints are allowed, the concrete overlay previously placed shall be sawn to a straightedge and vertical edge before the adjacent concrete overlay is placed.

SP:9. HIGH DENSITY CONCRETE

9.4 Construction Methods

9.4.5 Placing and Finishing High Density Concrete (Cont'd)

After the surface has been cleaned and immediately before placing high density concrete, either a thin coating of bonding grout shall be scrubbed into the dry prepared surface, or latex bonding agent mixed 1 to 1 with water shall be sprayed onto the dampened surface prepared in accordance with manufacturer's recommendations.

Care shall be exercised to ensure that all parts receive a thorough, even coating and that no excess of grout is permitted to collect in pockets. The rate of progress in applying grout shall be limited so that the grout does not become dry before it is covered with new concrete.

The latex bonding agent mixture will be permitted for use only where the placement of reinforcing steel precludes the application of the scrubbed-in bonding grout. Prior to placing latex bonding agent mixture, the cleaned concrete surface should be watered to produce a damp finish, but with no standing water. The latex bonding agent mixture shall be sprayed onto the dampened existing concrete in an even layer with no ponding. The entire surface is to be covered and no "shadow" shall remain under the reinforcing steel. The Contractor shall have enough sprayers on standby to substitute for those that become plugged. Once applied, the mixture shall be left to become tacky prior to the placement of the concrete overlay. The rate of application shall be monitored to ensure that concrete is only placed on adhesive that is tacky. If there is ponding of the latex bonding agent in pockets, the Contractor shall use an air compressor or other suitable method to spread the bonding again before it hardens and before and before fresh concrete placement occurs.

The high density concrete deck overlay shall have a minimum thickness of 140 mm or as directed by the Contract Administrator in order to provide a total minimum deck slab thickness as shown on the Drawings. No additional payment nor deduction will be made for variation in overlay thickness from the dimensions shown on the Drawings.

Immediately before placing the high density concrete overlay at an expansion joint, all metal contact surface between the expansion joint and the high density concrete shall be coated with epoxy adhesive.

Fresh concrete, 75 mm or more in thickness, shall be vibrated internally in addition to the surface screed vibration.

SP:28 CONCRETE MEDIAN BARRIER AND SAFETY MEDIAN ON PAVEMENT

28.3 Design Requirements (Cont'd)

28.3.2 Concrete Strength and Workability

Proportioning of fine aggregate, coarse aggregate, cement fly ash, water, air-entraining agent and water reducing admixture shall be such as to yield concrete having the required strength and workability as follows:

Minimum Specified Compressive Strength
@ 28 days = 30 MPa
Minimum Cementitous Content = 320 kg/cu.m.
Maximum Water/Cementitous Ratio = 0.49
Maximum Slump = 80 mm ±25mm
Aggregate Size = 20 mm Nominal
Air Content = 5.0% to 7.0%

28.4 Construction Methods

28.4.1 Removal of Existing Concrete Median Barrier

Alternative B will require the removal of the existing cast-in-place concrete median barrier south of the bridge in order to construct a temporary detour.

The removal of the existing barrier shall be done in such a manner that the adjacent pavement is not damaged. The length of barrier removed is as shown on the drawings. The barriers shall be loaded and hauled off the site. Clean up of the concrete debris and other materials resulting from the removal of the barrier will be considered incidental.

28.4.2 Installation of Concrete Median Barrier and Safety Median

The concrete median barrier and the concrete safety median are to be constructed at the location and to the dimensions shown on the drawings.

Concrete placing and curing shall be as per Specification CW 3310-R4, Section 9.

28.4.2.1 Surface Finish

Prior to initial set of the concrete, the edges of the barrier shall be carefully finished with an appropriate edging tool. The entire surface of the barrier shall be given a brushed finish following edging.

SP:9. HIGH DENSITY CONCRETE

9.4 Construction Methods

9.4.6 Curing (Cont'd)

It is intended that the surface receive a wet polyester blanket cure for at least seven days. Warm water, as specified, shall be applied as necessary to keep the concrete and polyester blankets wet under the polyethylene film and insulated tarps for at least 72 hours. After the 72 hours, the insulated tarps may be removed, leaving the polyester blankets and polyethylene film in place. The use of cool water will be permitted after 72 hours. The Contractor must ensure the concrete and polyester blankets are kept wet for the entire seven days.

9.4.7 Limitation of Operations

Night work will not be permitted for the purpose of placement of high density concrete overlay.

No traffic shall be permitted on a finished surface until after the first 48 hours of the curing period. In addition, no preparation work shall be performed in the adjacent lane on areas adjoining new concrete during the specified curing period. At temperatures below 12°C, the Contract Administrator may require a longer waiting time.

No concrete shall be placed unless the air and deck temperatures are above 5°C and rising. If at ambient temperature of 25°C or above, hot-weather concreting, in accordance with SP:3, Structural Concrete, shall apply. No concrete placement shall occur at a temperature above 32°C. The Contractor shall use cold water and/or ice in the mix to keep the temperature of the fresh concrete down, if required.

9.4.8 Penetrating Concrete Sealer

Application of concrete sealer shall be in accordance with Specification SP:3.6.22.

9.5 Quality Control

Quality control shall be in accordance with Section 7 of Specification SP:7, "Structural Concrete".

SP:9. HIGH DENSITY CONCRETE

9.6 Method of Measurement

9.6.1 High Density Concrete

High density concrete will be measured on an area basis. The area to be paid for shall be the total number of square metres of high density concrete placed in accordance with this Specification and accepted by the Contract Administrator, as computed from Drawing dimensions.

9.6.2 Penetrating Concrete Sealer

Penetrating concrete sealer shall be measured on an area basis. The are to be paid for shall be the total number of square metres sealed by the Contractor in accordance with Specification and accepted by the Contract Administrator, as computed from Drawing dimensions.

9.7 Basis of Payment

9.7.1 High Density Concrete

High density concrete will be paid for at the Contract Unit Price per square metre for "Supply and Placement of High Density Concrete", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

9.7.2 Penetrating Concrete Sealer

The sealing of designated concrete will be paid for at the Contract Unit Price per square metre for "Penetrating Concrete Sealer," measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

SP:10. SUPPLY AND INSTALLATION OF ALUMINUM TRAFFIC BARRIER RAIL POSTS

10.1 Description

This Specification shall cover the supply and installation of aluminum traffic barrier rail post on top of the concrete shoulder traffic barrier.

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

10.2 Materials

10.2.1 General

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

All materials supplied under this Specification shall be subject to inspection and approved by the Contract Administrator.

10.2.2 Handling and Storage of Materials

Traffic barrier rail posts shall be stored in neat, regular piles on blocks or built up platforms in order to avoid damage or contamination and for ease of checking, handling, and inspection.

All materials shall be handled carefully and transported in such a manner so as to ensure that the material is not damaged.

10.2.3 Traffic Barrier Rail Posts

Aluminum traffic barrier bridge rail posts shall be supplied conforming to the requirements of the Drawings.

The traffic barrier rail post shall conform to the requirements of ASTM B221-M83 Alloy 6061-T6 or Alloy 6351-T6 for extrusions, sheet, and plate. Aluminum Filler Alloy for welded construction shall be one of the following: ER4043, ER5183, ER5356, ER5554, ER5556, or ER5654. Welded construction shall conform to the requirements of CSA Standard S244-1969 and CSA Standard W47.2-M1987.

All edges and corners of traffic barrier rail posts extrusions and plates shall be rounded smooth as shown on the Drawings. Rounded edges damaged during installation shall be repaired by the Contractor to the satisfaction of the Contract Administrator.

SP:10. SUPPLY AND INSTALLATION OF ALUMINUM TRAFFIC BARRIER RAIL POSTS

10.2 Materials (Cont'd)

10.2.4 Rail Post Anchor Bolts

Rail post anchor bolts shall be 250 mm x 16 mm diameter stainless steel; each complete with one stainless steel hex nut, one stainless steel lock, one stainless steel flat washer,and one 50 dia. galvanized flat washer. The anchor bolts shall be threaded for 65 mm and shall be prebent as shown on the Drawings (where applicable). The stainless steel shall conform to ASTM A276 Type 316.

10.2.5 Rail Post Shims

Rail post shims conform to ASTM Standard B221, Alloy 6061-T6, and shall be supplied as required to facilitate the installation of the posts as shown on the Drawings. Supply of shims will be considered incidental to the supply of bridge rail posts.

10.2.6 Alkali-Resistant Bituminous Paint

Alkali-resistant bituminous paint shall meet the requirements of CGSB Specification 31-GP-3A for corrosion-preventative compound cold application soft film.

10.2.7 Anti-Seize Compound

The anti-seize compound to be applied to all threaded components when being assembled shall be LPS-3, manufactured by Holt-Lloyd (Canada) Ltd., Markham, Ontario, L3R 2Z3.

10.3 Equipment

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

10.4 Construction Methods

10.4.1 Supply and Traffic Barrier Bridge Rail Posts

Traffic barrier bridge rail posts shall be supplied by the Contractor, completely fabricated, as shown on the Drawings.

Welded construction shall conform to the requirements of CSA Standards S244-1969, "Welded Aluminum Design and Workmanship:, and W57.2-M1987, "Aluminum Welded Qualification Code".

SP:10. SUPPLY AND INSTALLATION OF ALUMINUM TRAFFIC BARRIER RAIL POSTS

10.4 Construction Methods (Cont'd)

10.4.2 Installation of Rail Post Anchors

The rail post anchor bolts shall be cast into the top of concrete barrier in a careful, workmanlike manner in the location and to the grade as shown on the Drawings or as directed by the Contract Administrator, in conjunction with the concrete operations. This work will be considered incidental to the installation of traffic barrier rail posts.

10.4.3 Installation of Traffic Barrier Bridge Rail Posts

The rail posts shall be installed in a careful, workmanlike manner onto the anchor bolts to the grade and alignment shown on the Drawings or as directed by the Contract Administrator.

The grade of the rail posts must be averaged over irregularities in the grade of the concrete to ensure a smooth and uniform grade on the barrier rail. The rail posts shall be set on aluminum shims, as required, to achieve the correct elevation and grade. Additional aluminum shims shall be installed as required to achieve the correct elevation and grade. The surface of the bottom shim that is in contact with concrete shall be painted with two coats; each 1 mm in thickness of alkali-resistant bituminous paint, which is to be dry prior to installation. A minimum of 3 mm aluminum shim shall be installed under each post.

10.4.4 Replacement of Damaged Materials

In the event of damage to any materials, the Contractor shall immediately notify the Contract Administrator and make all repairs or replacements necessary, at his own expense, to the satisfaction of the Contract Administrator. In no case shall the Contractor install damaged component on the barrier.

10.5 Quality Control

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspecting and testing by the Contract Administrator including all operations from the selection and production of materials, through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

SP:10. SUPPLY AND INSTALLATION OF ALUMINUM TRAFFIC BARRIER RAIL POSTS

10.6 Method of Measurement

The supply and installation of traffic barrier bridge rail posts will be measured on a unit basis. Then number of traffic barrier bridge rail posts to be paid for shall be the total number of traffic barrier bridge rail posts supplied and installed in accordance with this Specification and accepted by the Contract Administrator.

10.7 Basis of Payment

The supplying and installation of traffic barrier bridge rail posts will be paid for at the Contract Unit Price per unit for the "Items of Work" listed below, measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other for items incidental to the work included in this Specification.

Items of Work:

Aluminum Traffic Barrier Bridge Rail Posts, BR1, Type C

(a) Supply
(b) Installation

SP:11. SUPPLY AND INSTALLATION OF ALUMINUM BALANCED TRAFFIC BARRIER RAIL

11.1 Description

Further to CW 3650-R3, this Specification shall over the supply and installation of aluminum traffic barrier rail on the aluminum traffic barrier rail posts.

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 other things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

11.2 Materials

11.2.1 General

All materials supplied under this Specification shall conform to the requirements of Standard Construction Specification CW 3650-R3 and as specified herein.

11.2.2 Special Aluminum Traffic Barrier Rail Components

In addition to the material identified in CW 3650-R3 the following traffic barrier rail components are to be supplied in accordance with the Drawings and as specified herein.

a) Rail End Sections
b) Rail Clamp Bars (146 mm in length)
c) Expansion Splice Bars (700 mm in length)
d) Anchor Bolts for the Rail End Sections

11.2.3 Cap Screws

Cap screws shall conform to ASTM A276 Type 316.

11.3 Equipment

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

11.4 Construction Methods

11.4.1 General

The installation of aluminum traffic barrier rail shall conform to the requirements of Standard Construction Specification CW 3650-R3 and as shown on the Drawings, to the satisfaction of the Contract Administrator.

SP:11. SUPPLY AND INSTALLATION OF ALUMINUM BALANCED TRAFFIC BARRIER RAIL

11.4 Construction Methods (Cont'd)

11.4.2 Anchor Bolts

Anchor bolts for aluminum traffic barrier rail end sections are to be supplied and installed in accordance with Specification SP:10, incidental to this Specification.

11.5 Method of Measurement

The supply and installation of aluminum traffic barrier rail, including rail end sections, will be measured on a linear metre basis. The number of liner metres to be paid for shall be the total of linear metres of aluminum traffic barrier rail, including rail end sections, supplied and installed in accordance with this Specification and accepted by the Contract Administrator, as computed by suming up the installed horizontal length of the individual rail/rail end section lengths.

11.6 Basis of Payment

The supply and installation of aluminum traffic barrier rail will be paid for at the Contract Unit Price per linear metre for the "Items of Work" listed herebelow, measured as specified herein, which price shall be payment in full for supplying all materials for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Aluminum Traffic Barrier Rail

a) Supply
b) Installation

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.1 Description

This Specification shall cover the supply and installation of aluminum pedestrian bridge handrail and aluminum pedestrian approach handrail.

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.

12.2 Materials

12.2.1 General

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

All materials supplied under this Specification shall be of a type approved by the Contract Administrator.

12.2.2 Handling and Storage of Materials

All materials shall be handled and stored in a careful and workmanshiplike manner, to the satisfaction of the Contract Administrator.

12.2.3 Testing and Approval

All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

12.2.4 Material for Handrails

a) Extruded Shapes of Drawn Tubing for Posts - shall conform to CSA Aluminum Alloy and Temper HA.7 SG 11R-T6 (ASTM B221 M-83 Alloy 6351-T6) of HA.7 GS 11N-T6 (ASTM B221 M-83 Alloy 6061-T6).

b) Extruded Shapes for Rails - shall conform to CSA Aluminum Alloy and Temper HA.5 SG 11R-T6 (ASTM B221 M-83 Alloy 6061-T6).

c) Sheet and Plate - shall conform to CSA Aluminum Alloy and Temper Standard HA.4 SG 11R-T6 (ASTM B209 M-83 Alloy 6351-T6) or HA.4 GS 11N-T6 (ASTM B209 M-83 Alloy 6061-T6).

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.2 Materials

12.2.4 Material for Handrails (Cont'd)

d) Casting for End Caps - shall conform to CSA HA.9 G170-T6.

e) Bolts and Cap Screws, Nuts and Washers - Stainless Steel Type 316.

f) Handrail Anchorage System - shall be stainless steel Acro-Richmond Type anchor insert c/w stainless steel hi-tensile anchor bolts and washers, all conforming to the requirements and dimensions as shown on the drawings. Stainless Steel shall conform to ASTM A276 Type 316.

g) Alkali-Resistant Bituminous Paint - shall meet the requirements of CGSB 31-GP-3M.

h) Life Preserver Enclosure Side Panels - shall be 13 mm lexan glazing.

12.2.5 Standby Materials

In addition to the aluminum pedestrian handrail to be supplied and installed, and incidental to the work of this Specification, the Contractor shall supply to the City, f.o.b., the City Bridge Yard, the standby materials as listed on the Drawings.

12.3 Equipment

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

12.4 Construction Methods

12.4.1 Layout

Before fabrication and/or installation of the aluminum pedestrian handrail, the Contractor shall satisfy himself as to the dimensions of all rail sections required, by field measurements. In no case shall the clear width of any opening in the handrails exceed 100 mm.

12.4.2 Fabrication

12.4.2.1 General

Shop Drawings (three (3) prints and one (1) reproducible sepia copy) showing fabrication details of the handrail shall be provided to the Contract Administrator for approval at least fourteen (14) days prior to scheduled commencement of fabrication.

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.4 Construction Methods

12.4.2 Fabrication

12.4.2.1 General (cont'd)

The fabricator shall fabricate the entire rail, in sections, to permit the installation of the rail sections by fastening to the anchor inserts preset in the concrete parapet.

All fabrication shall be carried out in accordance with this Specification and the drawings.

The punching of identification marks on the members will not be allowed.

Any damage to members during fabrication shall be drawn to the attention of the Contract Administrator in order that the Contract Administrator may approve remedial measures.

Dimensions and fabrication details that control the field matching of parts shall receive very careful attention in order to avoid field adjustment.

Components of railings shall be jointed by means of bolts, cap screws, and welds as called for on the drawings. Special aluminum alloy fasteners may be used provided that they are approved in writing by the Contract Administrator.

12.4.2.2 Sample Panel

The Contractor shall be required to supply one completely fabricated sample panel, including at least one post, to the Contract Administrator and receive approval of the sample panel from the Contract Administrator prior to proceeding with fabrication of the remainder. The approved sample shall become the standard for acceptance of all aluminum pedestrian handrail panels.

12.4.2.3 Finish

All portions of the work shall be neatly finished. Shearing, cutting, clipping, and machining shall be done neatly and accurately. Finished members shall be true to line, free from twists, bends, sharp corners, and edges. Aluminum rail shall be thoroughly cleaned of all dirt and discolouration by approved methods after installation, and all marks and scratches occurring during fabrication shall be removed. The Contractor may, at his

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.4 Construction Methods

12.4.2 Fabrication

12.4.2.3 Finish (Cont'd)

own expense, apply a think coat of clear, non-yellowing lacquer to the cleaned surfaces; but he shall, in any case, ensure that the railings, when erected, have a clean surface of uniform appearance and texture.

12.4.2.4 Cutting

Material 13 mm thick or less may be sheared, sawn, or cut with a router. Materials more than 13 mm thick shall be sawn or routed. Cut edges shall be true and smooth and free from excessive burrs or ragged breaks. Re-entrant cuts shall be avoided wherever possible. If used, they shall be filleted by drilling prior to cutting. Flame cutting of aluminum alloys is not permitted.

14.4.2.5 Bolting

Bolt holes in 10 mm or thinner material may be drilled or punched to finished size. In material thicker than 10 mm, the holes shall be drilled to finished size or sub-punched smaller than the normal diameter of the fastener and reamed to size. The finished diameter of the holes shall be not more than 7 percent greater than the nominal diameter of the fastener, except:

i) Slotted holes for expansion purposes shall be provided as required on the drawings.

ii) Holes for anchor bolts may be up to 50 percent greater than the nominal bolt diameter with a maximum of 13 mm greater than the nominal bolt diameter.

Holes shall not be drilled in such a manner as to distort the metal, but holes only slightly misaligned may be reamed to render a reasonable fit.

In all bolts the finished shank shall be long enough to provide full bearing, and washers shall be used under the nuts to give full grip when the nuts are tightened.

12.4.2.6 Welding

Welded construction shall conform to the requirements of CSA Standards S244-1969 "Welded Aluminum Design and Workmanship," and W47.2-M1987 "Aluminum Welding Qualification Code."

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.4 Construction Methods

12.4.2 Fabrication

12.4.2.6 Welding (Cont'd)

Welding will not normally be permitted except that, where it is called for on the Drawings, it shall be done by qualified welders using the Metal Inert Gas (MIG) process. All areas to be welded should be thoroughly cleaned with a suitable solvent followed by wire brushing if surfaces are heavily oxidized. The size of fillet for equal leg fillet welds is defined as the leg length of the largest isosceles right angle triangle that can be inscribed within the fillet weld section. Welds must penetrate into the root corner. All butt welds should have full penetration to ensure maximum strength. Defective welds should be repaired by chipping out the defective area and rewelding. Particular care must be paid to the elimination of craters and cold starts.

Welders and procedures shall be qualified as agreed between the Contract Administrator and the fabricator. The minimum requirements for mechanical test results of joints butt welded with Alcan 56S filler alloy shall be 250 MPa for Alcan D45S-H11A and 165 MPa for Alcan B51S-T4 alloy. In addition to the mechanical tests, soundness tests should be made as follows:

Guided Bend Test - All bend tests should be fully guided through an angle of 180°. Root, face, and side bend tests in Alcan D45S parent alloy welded with Alcan 56S filler wire require a bend radius of 2T where T is the thickness of the material. For Alcan B51S parent alloy welded with Alcan 56S filler wire, a bend radius of 4T is required. Root bend and face bend specimens on material 10 mm thick and less should be 305 mm long and a minimum of 25 mm in width and cut from a plate having a minimum butt weld length of 450 mm. No test piece should be taken within 25 mm of the ends of the weld. Side bend test should be carried out on material over 10 mm in width. Longitudinal edges should be given a 2 mm radius. There should be no crack greater than 3 mm in length. If a crack starts from an edge, the specimen should be disregarded.

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.4 Construction Methods

12.4.2 Fabrication

12.4.2.6 Welding (Cont'd)

Fracture Test - The butt-welded joint shall have a notch not exceeding 2 mm in depth sawn on the four sides of the weld bend and the weld broken. Inspection of the fracture should reveal no gas pockets or inclusions greater than 2 mm in diameter and the area lost due to scattered gas, porosity, or voids should not exceed 3 percent of the area under inspection.

12.4.3 Handrail Anchorage Installation

The handrail posts and section shall be brought on site and accurately installed as shown on the Drawings or as required by the Contract Administrator. Shims shall be used for the alignment of posts. At least one 3.0 mm shim is to be installed at each post.

12.4.4 Handrail Installation

The material shall be carefully handled so that no parts will be bent, broken, or otherwise damaged. Hammering, which will injure or distort the member, is not permitted. The Contractor shall report to the Contract Administrator any failure of members to come properly together before taking any corrective measures.

Except where shown on the Drawings, field welding will not be permitted unless approved by the Contract Administrator.

The bottom surface of the shim that is in contact with concrete shall be painted with two coats, each 1 mm in thickness, of alkali-resistant bituminous paint, which is to be dry prior to installation.

12.4.5 Definition of Handrail Types

Aluminum pedestrian approach handrail shall include all those rail sections that have a specified height of 920 mm which includes all stairway handrail sections.

Aluminum pedestrian bridge handrail shall include all those rail sections that are grater than 920 mm height or that transition between 1070 mm and 920 mm in height.

SP:12 SUPPLY AND INSTALLATION OF ALUMINUM PEDESTRIAN HANDRAIL

12.5 Quality Control

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

12.6 Method of Measurement

Supply and Installation of Aluminum Pedestrian Handrail

The supply and installation of aluminum pedestrian handrail will be measured on a linear metre basis. The number of linear metres to be paid for shall be the total number of linear metres of aluminum pedestrian handrail measured along the top of the top rail, that is supplied and installed in accordance with this Specification and accepted by the Contract Administrator.

12.7 Basis of Payment

Supply and Installation of Aluminum Pedestrian Handrail

The supply and installation of aluminum pedestrian handrail will be paid for at the Contract Unit Price per linear metre for the "Items of Work" listed below, measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Supply and Installation of Aluminum Pedestrian Handrail

a) Aluminum Pedestrian Bridge Handrail
   i) Supply
   ii) Installation

b) Aluminum Pedestrian Approach Handrail
   i) Supply
   ii) Installation

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.1 Description

This Specification shall cover superstructure and substructure concrete and other removals, including all necessary demolition, salvaging, dismantlement, removal and disposal of applicable materials.

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.

13.2 Equipment

13.2.1 General

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

The size, weight and destructive capabilities of the equipment shall be matched to the type of removal to be done.

13.2.2 Hydrodemolition Equipment

The hydrodemoliton equipment shall consist of powerpac units with a remote robot capable of removing concrete using high pressure water.

The equipment must operate at a noise level of less than 90 decibels, as measured at a distance of 15 metres from either the powerpac or the remote robot.

The minimum actual daily production rate of the hydrodemolition equipment for this project shall be a minimum of 150 sq.m. per working day. The Contractor shall be required to demonstrate that the equipment used is capable of meeting the specified production rate and if not, he shall immediately provide additional equipment to ensure that the minimum daily production rate is met to the satisfaction of the Contract Administrator. Work shall be stopped immediately if blow-throughs of the deck occur at night. Also, no work shall be undertaken within 1 m of the bridge deck edge at night.

The equipment must be capable of working 24 hours per day with at least 80% on the job production availability.

The hydrodemolition equipment must be operated by qualified personnel certified by the manufacturer. The Contractor must have at least one year experience in the operation of hydrodemolishing equipment and have a certified amount of back-up parts and service capable of maintaining the operation of the equipment.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.2 Equipment (Cont'd)

13.2.3 Noise Barriers

Under no circumstances will hydrodemolition operations be permitted between the night time of 9:00 p.m. and 7:30 a.m., without a noise attenuation barrier properly erected in place in accordance with this Specification.

The Contractor shall erect plywood noise attenuation barriers to completely encircle the hydrodemolition concrete stripper during night time hydrodemolition operations. The maximum area to be enclosed shall not exceed 24 metres by 11 metres unless approved otherwise by the Contract Administrator.

The Contractor shall only dismantle and relocate the noise attentuation barriers between the hours of 7:30 a.m. and 9:00 p.m. No dismantling or removal of the sound barriers shall be permitted at any other time.

The noise attenuation barriers shall be constructed of plywood, 16 millimetres minimum thickness, or other approved material with a minimum height of 2.4 metres. The barrier shall be erected so that the vertical face of the barrier leans outward from the noise source at an angle of 10°+2°from the vertical. The barriers shall be constructed in sections or panels to permit easy dismantling and relocations as the project proceeds. All cracks, joints between panels, or other openings in the barriers shall be sealed to prevent direct transmission of sound. The base of the barrier shall also be sealed against the bridge deck with sandbags or other approved materials. Doors shall be provided on each side of the barrier to permit access to each end of the bridge. The barriers shall be properly designed to withstand wind forces.

13.3 Construction Methods

13.3.1 Fees and Permits

The Contractor shall obtain and pay for all licences and permits necessary for the demolition work.

The Contractor shall comply with all Municipal, Provincial and Federal Government regulations relating to the demolition of structures.

13.3.2 Explosives

The use of explosives is prohibited.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.2 Equipment (Cont'd)

13.3.3 Details of Existing Structure

The essential details and structure dimensions of the existing structure are shown on the Drawings for the information of the Contractor in establishing the methods and limits of removal and determining the cost of the work from his examination of the site.

The information shown has been obtained from existing Drawings, measurements and observations at the site. The accuracy of this information is not guaranteed and the Contractor must verify all information before commencing work.

13.3.4 Protection of Street Under the Bridge

The Contractor shall take special precautions during demolition and removal to prevent bridge materials from falling onto the street under the bridge. The Contractor shall be fully responsible for any loss or damage caused to the street under the bridge, property or personnel due to neglect by the Contractor or his employees.

The methods of demolition and removal shall also be approved by the Contract Administrator in accordance with Specification SP.13.3.7 prior to commencement of any demolition operations.

13.3.5 Safety Precautions

The Contractor shall provide flagmen, guards, barricades, railings, overhung protection and noise screen, protection hoarding the necessary warning lights and whenever necessary warning signs and lights at the excavation holes, temporary sheltered sidewalks and/or other construction necessary to secure the safety of workmen, the public and the CPR tracks and personnel alike and shall comply with all Provincial Statues applicable to work of this nature. The Contractor shall provide all other protective measures as may be required by any law in force in Manitoba.

13.3.6 Closure to Traffic

Under no circumstances shall the Contractor close any roadways to traffic or begin any construction operations without prior written approval of the Contract Administrator. In no case shall the Contractor commence any construction until such time as all the signs, barricades and flashers have been erected and traffic has been properly rerouted or detoured in accordance with these Specifications.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.3 Construction Methods (cont'd)

13.3.7 Scope of Work

The work under this Specification shall include the following and as shown on the Drawings or otherwise directed by the Contract Administrator:

i) Removal and disposal of the existing asphaltic concrete overlay from the bridge deck.
ii) Removal and disposal of the existing bridge deck top surface concrete and top mat of reinforcing steel.
iii) Removal and disposal of the existing bridge deck expansion joints.
iv) Removal and disposal of the existing bridge deck median and sidewalk concrete and concrete curb c/w rail and anchorages as shown on the Drawings.
v) Removal and disposal of the existing bridge rail.
vi) Removal and disposal of the existing approach slabs concrete, reinforcing steel and asphalt overlay.
vii) Removal and disposal of abutment backwalls and reinforcing steel.
vii) Removal and disposal of existing bridge bearings.
ix) Removal and disposal of existing concrete stairway curb.
x) Removal and disposal of existing slope paving, and associated fill and grading.
xi) Removal and salvaging of existing G.R.E.A.T. barrier and delivery to the City Bridge yard.
xii) Removal and disposal of all steel diaphragm on piers and abutments.
xiii) All other removals necessary to facilitate the construction of all works as intended in this project by these Specifications and Drawings.

All material demolished and removed shall become the property of the Contractor except as otherwise indicated herein.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.3 Construction Methods

13.3.7 Scope of Work (Cont'd)

The Contractor shall note that the existing lamp standards and luminaires are to be relocated by others. The Contractor shall notify the Contract Administrator ten (10) days in advance of the proposed commencement of demolition works in order that arrangements for the removal of the lamps can be made.

The Contractor shall promptly remove all concrete, structural steel, reinforcing steel and other materials demolished off and away from the site. No storage of any materials on site will be allowed.

It shall be the Contractor's responsibility to find suitable disposal areas away from the site.

The Contractor shall take all necessary precautions to ensure that bridge materials do not fall below during demolition and removal operations. The Contractor shall erect and maintain platforms protective nets and as required to catch falling debris and prevent it from dropping below the street.

Any debris fallen below shall be removed by the Contractor at his own expense.

13.3.8 Demolition Methods and Schedule

At least ten (10) working days prior to the scheduled commencement of any demolition and removal work, the Contractor shall submit to the Contract Administrator details of the proposed equipment, schedule, sequence, and methods of removal for each type of demolition for review and approval. No demolition and removal works shall commence without prior written approval of the Contract Administrator.

All bridge deck surface and structural abutment top surface concrete removal shall be accomplished solely by using the method of hydrodemolition.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.3 Construction Methods

13.3.9 Hydrodemoliton of Top Concrete Surface Areas

Superstructure Bridge Deck Section (South Abutment to North Abutment Expansion Joints).

This work involves removal of the top surface of the concrete bridge deck to a minimum depth of 25 mm below the bottom of the top mat of reinforcing steel to enable the removal of that reinforcing steel. Based on the information available from the existing structure drawings, the depth of this minimum removal will average 80 mm.

The Contractor shall demonstrate to the satisfaction of the Contract Administrator that the proposed hydrodemoliton equipment, personnel and methods of operation are capable of producing the required production rates and finished result as specified in Clause SP.13.2.2., and as required to meet the Work Schedule specified in the Tender Document Form E, "Schedule of Work".

A trial section consisting of an area of at least 150 sq.m. of the concrete bridge deck surface shall be used for this demonstration. The equipment shall be programmed to remove 80 mm of concrete, or as required to remove the concrete down to the bottom of the top layer of reinforcing steel. In the test area, the required concrete shall be removed such that the top layers of reinforcing steel are completely free from the remaining underlying sound concrete; and such that all exposed reinforcing steel which will remain is completely cleaned of rust, scale and corrosion products by the hydrodemolition process.

After completion of the above demonstration, the Contract Administrator will calculate the production rate and evaluate the equipment's performance based on the results of the trial test. Based on these results, the Contract Administrator will direct the Contractor to implement additional manpower and/or equipment if in his estimation the required production rate will not be met.

It is intended that hydrodemolition remove the minimum depths of concrete shown on the Drawings. In addition, it is to remove, in the same process, any areas of unsound concrete below these minimum limited or any additional concrete required to install new deck reinforcing steel with the specified cover and deck clearance. The Contractor shall take all necessary measures to protect and do not damage other concrete below the level defined above, or reinforcing steel which is to remain. Any damage caused do the

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.3 Construction Methods

13.3.9 Hydrodemoliton of Top Concrete Surface Areas (Cont'd)

existing remaining concrete, reinforcing steel or any part of the structure by the Contractor during any demolition or construction operations, or as a result of excessive concrete removal and/or reinforcing steel exposure, will be immediately repaired by the Contract at his own expense to the satisfaction of the Contract Administrator.

In areas where depths of removal occur that are greater than the depth of the bottom of existing reinforcing steel, the concrete below the reinforcing is similarly to be removed to the same level. No concrete "shadows" below reinforcing steel will be permitted to be left in place.

If removal of these shadows or other similar surface area removals, cannot be accomplished by hydrodemolition methods, then it shall only be accomplished by light chipping hammer operations or other methods to the satisfaction of the Contract Administrator, such that the sound underlying concrete to remain is not in any way damaged or fractured.

The run-off from hydrodemolition shall be controlled. No water containing solids shall be allowed to enter the City's land drainage sewer system. Suitable dyking, settling ponds and/or pumping shall be maintained to prevent run-off from flowing indiscriminently off the sides of the bridge, through open deck joints, through breakthroughs. Detailed methods and procedures for water control and disposal are to be submitted to the Contract Administrator for review at least ten (10) working days prior to the schedule commencement of hydrodemolition trial demonstration, and these proposed run-off disposal methods must be approved by the Contract Administrator prior to the start of hydrodemolition.

The Contractor shall erect/maintain suitable protection barricades around the hydrodemolition machine to protect workers and vehicles from being hit by flying debris.

The bridge deck expansion joint removal will require removal of the concrete around the expansion joints as shown on the Drawings and as otherwise necessary to free up and facilitate removal of the existing expansion joint assemblies, as well as to facilitate installation of the new deck joints in accordance with the details shown on the Drawings.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.3 Construction Methods

13.3.10 Structural Concrete and Other Removal

Structural concrete and other removals shall be deemed to include the following, and to the limits as shown on the Drawings or otherwise directed by the Contract Administrator:

i) Bridge sidewalk including concrete, reinforcing steel and bridge sidewalk rail.
ii) Top portions of abutment backwalls and adjacent bridge deck including concrete, reinforcing steel and expansion joint assembly.
iii) Bridge parapet traffic barrier concrete, reinforcing steel, anchorages, steel rail, and fasteners.
iv) Bridge structural approach slabs including concrete, reinforcing steel, and asphalt overlay.
v) Bridge deck full depth removal of concrete and designated reinforcing steel.
vi) Handrail parapet concrete and reinforcing steel on stairwells.
vi) All other removals necessary to facilitate the construction of all works as intended in this project by these Specifications and Drawings.

The proposed method for each type of removal shall be submitted to the Contract Administrator for review at least ten (10) working days prior to the scheduled commencement of the applicable removal operations, and shall be approved by the Contract Administrator prior to the start of demolition. In no case will the Contractor be permitted to use hoe ram type of demolition equipment, or other equipment or method which will cause damage to the remaining sound concrete. The perimeter of each area to receive full depth removal shall be saw cut to a minimum depth of 25 mm, with the saw blade angled into the remaining concrete at approximately 20°C to vertical.

Existing reinforcing steel shall be left in place as shown on the Drawings, or as directed by the Contract Administrator, and shall be sandblasted clean to bare metal prior to application of field applied epoxy coating.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.3 Construction Methods (Cont'd)

13.3.11 Substructure Demolition and Removal:

The Contractor shall completely remove the existing abutment back walls and reinforcing steel up to bearing elevation at abutments.

The Contractor shall remove the cracked and spalled concrete down to the sound concrete at the abutment, incidental to the works under this Specification.

Any damage caused to the existing reinforcing steel dowels and other remaining concrete and reinforcing steel by the Contractor during any demolition or construction operations will be repaired by the Contractor at his own expense to the satisfaction of the Contract Administrator.

13.4 Method of Measurement

13.4.1 Removal of Asphaltic Concrete Overlay:

Removal of the asphaltic concrete overlay will be measured on a surface area basis. The surface area to be paid for shall be the total number of square metres of the asphaltic concrete overlay removed and disposed of in accordance with this Specification and accepted by the Contractor Administrator, as computed from measurements made by the Contract Administrator. Removal of membrane are incidental to this work and no separate payment shall be made with removal.

13.4.2 Removal of Bridge Deck Surface Concrete and Existing Top Mat Reinforcing Steel:

Removal of bridge deck surface concrete and existing top mat reinforcing steel will be measured on a surface area basis. The surface area to be paid for shall be the total number of square metres of the bridge deck surface concrete removed and disposed of in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator. Removal of bridge deck expansion joint are incidental to this work and no separate payment shall be made with this removal.

13.4.3 Removal of Handrail Parapet on Stairwell

Removal of handrail parapet on stairwell will be paid for on a lump sum basis, as accepted by the Contract Administrator, and no measurement will be made for this work.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.4 Method of Measurement (cont'd)

13.4.4 Removal of Bridge Deck Median and Sidewalk Concrete, Concrete Curb and Reinforcing Steel

Removal of bridge deck median and sidewalk concrete, concrete curb and reinforcing steel will be measured on a lump sum basis. The bridge deck median, sidewalk concrete and concrete curb shall be removed and disposed of in accordance with this Specification and accepted by the Contract Administrator, and no measurements made for this work.

13.4.5 Removal of Existing Bridge Rail

Removal of existing bridge rail including salvage to the City of Winnipeg (see 13.3.7) will be paid for on a lump sum basis, as accepted by the Contract Administrator, and no measurement will be made for this work.

13.4.6 Removal of Abutment Backwalls and Reinforcing Steel

Removal of abutment backwalls and reinforcing steel will be measured on a volume basis. The volume to be paid for shall be the total number of cubic metres of abutment backwalls removed and disposed of in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

13.4.7 Removal of Existing Approach Slab Concrete and Asphalt Overlay

Removal of existing approach slab concrete and asphalt overlay will be measured on a surface area basis. The surface area to be paid for shall be the total number of square metres of approach slab and asphalt overlay removed and disposed of in accordance with this Specification and accepted by the Contract Administrator.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.5 Basis of Payment

13.5.1 Removal of Asphaltic Concrete Overlay

Removal of asphaltic concrete overlay will be paid for at the Contract Unit Price per square metre for the "Removal of Asphaltic Concrete Overlay," measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5.2 Removal of Bridge Deck Surface Concrete and Existing Top Reinforcing Steel

Removal of bridge deck surface concrete and existing top reinforcing steel will be paid for at the Contract Unit Price per square metre for the "Removal of Bridge Deck Surface Concrete and Existing Top Reinforcing Steel," measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5.3 Removal of Handrail Parapet on Stairwell

Removal of handrail parapet on stairwell will be paid at the Contract Lump Sum Price for "Removal of Handrail Parapet on Stairwells" which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5.4 Removal of Bridge Deck Median, Sidewalk Concrete, Concrete Curb and Reinforcing Steel:

Removal of bridge deck median, sidewalk concrete, concrete curb and reinforcing steel will be paid for at the Contract Lump Sum Price for the "Removal of Bridge Deck Median, Sidewalk Concrete, Concrete Curb and Reinforcing Steel," measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:13 SUPERSTRUCTURE AND SUBSTRUCTURE CONCRETE AND OTHER REMOVALS

13.5 Basis of Payment

13.5.6 Removal of Existing Bridge Rail:

Removal of existing bridge rail will be paid for at the Contract Lump Sum Price for "Removal of Existing Bridge Rail," which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5.7 Removal of Abutment Backwalls and Reinforcing Steel:

Removal of abutment backwalls and reinforcing steel will be paid for at the Contract Unit Price per cubic metre for the "Removal of Abutment Backwalls and Reinforcing Steel," measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5.8 Removal of Existing Approach Slab Concrete and Asphalt Overlay:

Removal of existing approach slab concrete will be paid for at the Contract Unit Price for "Removal of Approach Slab Concrete," measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

13.5.9 Supply and Installation of Noise and Protection Screen

The supply and installation of noise and overhung protection screen, watertight metal protection, sheltered sidewalk, protection hoarding will be paid for at the Contract Lump Sum Price for "Supply and Installation of Noise and Protection Screen" which price shall be payment in full upon proof of satisfactory results after hydrodemolition and performing all operation herein described and all other items incidental to the work included in this Specification.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.1 Description

This Specification shall cover surface preparation and painting of superstructure structural steel.

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.

14.2 Reference Standards

The following Standard Specifications, as referred to herein, form part of this Specification.

1. SSPC - Steel Structures Painting Council Specifications, latest edition, c/o 4400 5th Avenue, Pittsburgh, PA, 15213

2. CGSB - Canadian Government Specifications Board Specifications, latest edition, c/o Department of Supply and Services Canada, Ottawa, Ontario, K1A 1G6

14.3 Materials

14.3.1 General

The Contractor shall be responsible for the supply, safe storage, testing, and handling of all materials set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator.

14.3.2 Paint

The paint system to be supplied shall consist of the following:

a) Prime Coat - conforming to CGSB Specification 1-GP-183M, "Coating, Zinc Rich Epoxy." Approved prime coat products are:

   1. Mobil Zinc 4, as supplied by Mobil Chemical Company.

   2. Interzinc EPA 072/EPA 073, as supplied by International Paints (Canada) Limited.

   3. Amercoat 68A as supplied by Ameron Canada Inc.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.3 Materials

14.3.2 Paint (Cont'd)

b) Finish Coats - conforming to CGSB Specification 1-GP-199M, "Coating, High Build Vinyl." Approved finish coat products are:

1. Val-Chem Hi-Build Vinyl, 83 Series, as supplied by Mobil Chemical Company.

2. Intervinux VM, as supplied by International Paints (Canada) Limited.

3. Polyclad 936, as supplied by Corrosion Service Company Limited.

4. Amercoat 99R as supplied by Ameron Canada Inc.

or equal as approved by the Contract Administrator.

The colour of the finish coats shall be as follows:

The colour of the final coat is expected to be concrete grey, and close to that specified by CGSB 1-GP-12C, colour 501-212 (semi-gloss). The Contractor shall supply a paint sample or samples applied to a 1200 x 1200 smooth surface. The sample(s) are to be matched to the grey concrete on site.

The Contract Administrator will select the final colour from these samples.

The colour of the intermediate coat(s) shall be a different shade from the colour of the final coat, as approved by the Contract Administrator.

All paint shall be delivered to the site (field applications) or to the shop (shop applications) in the original unopened containers with labels intact. Any material that has livered, jelled, or otherwise deteriorated shall not be used. All paints must be used before its shelf life has expired. The Contractor shall provide the Contract Administrator with a listing, updated weekly, of the size and number of containers of each batch and type of paint (as identified on the label) received from the paint manufacturer on this project.

All material shall be stored under cover in a secured place as approved by the Contract Administrator and shall be kept within storage temperature limitations recommended by the manufacturer.

Laboratory testing of paint samples will be carried out in accordance with Clause 14.2 of this Specification.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.3 Materials (Cont'd)

14.3.3 Abrasive for Blast Cleaning

The blast cleaning abrasive shall be free of corrosion-producing contaminants. Sand abrasive shall be oil free. Slag abrasives shall contain no more than 0.1 percent oil by weight. The blast cleaning abrasive and grit size employed shall be capable of achieving an average profile peak-to-valley height not exceeding 2.0 mils.

14.3.4 Incidental and Miscellaneous Materials

Incidental and miscellaneous materials utilized in undertaking the surface preparation and painting works shall be supplied strictly in accordance with applicable requirements of the Reference Standards, the manufacturer's guidelines, and these Specifications.

This will include paint additives, such as thinners and mineral spirits, solvent mixtures associated with solvent cleaning operations, and any other incidental materials used in conjunction with the works of this Specification.

The use of all such materials shall be reviewed with the Contract Administrator to ensure conformance with the Reference Standards and this Specification, prior to the use of same in the works. The Contract Administrator's decision in these matters shall be final.

14.4 Equipment

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

14.5 Construction Methods

14.5.1 General

The works involve surface preparation and painting of all superstructure steel.

All structural steel additions, modifications, and/or strengthening works, associated with this Contract shall be completed satisfactory to the Contract Administrator, prior to commencement of any surface preparation or painting operations at those locations. All deck formwork must also be removed prior to commencing surface preparation or painting operations in any particular area.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.5 Construction Methods (Cont'd)

14.5.2 Paint Requirements

All exposed surfaces of the superstructure structural steel, including miscellaneous metal fasteners, connections, and hardware, as directed by the Contract Administrator, shall receive surface preparation and painting in accordance with the requirements of this Specification.

Galvanized metal surfaces shall not be painted.

14.5.3 Painting Methods and Schedule

At least ten (10) days prior to the scheduled commencement of any surface preparation and painting operations, the Contractor shall submit to the Contract Administrator the proposed schedule, methods and sequence of operations for review and approval.

Drawings sealed by a Professional Engineer registered in the Province of Manitoba shall be submitted detailing the Contractor's proposed scaffolding, platforms and swingstages to be employed. All scaffolding, platforms and swingstages shall be constructed, erected and operated in accordance with Workplace Safety and Health Division requirements. No works shall commence without prior written approval of the Contract Administrator.

14.5.4 Precautions Against Overspray and Splatter

The Contractor shall take all necessary precautions to prevent blast cleaning overspray and overspray/splatter of the paint. All splatter, overspray and paint spills shall be promptly removed by the Contractor at this own expense to the satisfaction of the Contract Administrator.

The Contractor must provide adequate protection against sandblast or paint damage to the substructure, bearings, vehicles, private property, and the public in the vicinity of the bridge. The Contractor will be held solely liable for any damages resulting from the blast cleaning and painting operations.

14.5.5 Surface Preparation

14.5.5.1 General

Prior to undertaking any blasting operations, the Contractor shall provide all necessary protection over roadways, railways and sidewalks to prevent any spent abrasive from falling or blowing into same. This protection shall be subject to the approval of the Contract Administrator in accordance with Clause 14.5 of this Specification.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.5 Construction Methods

14.5.5 Surface Preparation

14.5.5.1 General (Cont'd)

Also, prior to actual work commencement, a representative trial area shall be blast cleaned to white metal in accordance with SSPC Specification SP5. The degree of cleaning and surface profile achieved, once accepted by the Contract Administrator, will become the standard for all subsequent blasting. Furthermore, the Contractor shall prepare and maintain blasted reference panels for the purpose of calibrating magnetic dry film thickness gauges as specified in SSPC Specification PA2.

14.5.5.2 Blast Cleaning Operations

Prior to blast cleaning, oil and grease deposits shall be removed in accordance with SSPC Specification SP1, "Solvent Cleaning".

The Contractor shall prepare the structural steel, immediately prior to painting, by blast cleaning to white metal in accordance with SSPC Specification SP5. The blast profile shall have an average peak-to-valley height of not greater than 2.0 mils.

All weldments shall be smooth and free of splatter, slag, undercutting, and craters. The weldments will be abrasive blast cleaned to white metal in accordance with SSPC Specification SP5.

All steel and slag flakes that curl up during blasting shall be removed by grinding or other suitable means prior to primer application. This work is incidental to the work of this Specification.

Prior to the completion of blast cleaning, the Contractor shall notify the Contract Administrator so that an inspection can be made prior to the application of any paint.

The areas to be painted shall have the specified surface preparation at the time of primer application. If fresh rusting occurs or the surface becomes contaminated prior to the primer application, then reblasting shall be done to achieve the original degree of surface preparation.

14.5.5.3 Cleanup Operations

Following all sandblasting operations, and prior to the Contract Administrator's inspection, all surfaces involved shall be blown off with compressed air, or cleaned by vacuum for the purpose of removing any traces of blast products from the surface and for the removal of abrasive from pockets and corners.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.5 Construction Methods (Cont'd)

14.5.5.3 Cleanup Operations

The Contractor shall immediately clean up all blasting, abrasive, chipped rust scale, etc., off pier tops, abutments and City and private property to the satisfaction of the Contract Administrator.

Where shop-applied coating has been damaged, remove loose or non-adherent paint. Cleaning shall be performed approximately 20 mm beyond the damaged areas in all directions or until soundly-adhered paint is obtained.

Following surface preparation cleanup operations, the Contractor shall immediately notify the Contract Administrator so that an inspection can be made prior to the application of any paint.

The primer shall be applied as soon as possible after the surface preparation cleanup operation.

14.5.6 Paint Application

14.5.6.1 General

The areas to be painted shall undergo additional blast cleaning operations, as required, to remove any new rust to ensure a white metal blast exists at the time that application of the prime coat commences.

Under no circumstances shall the undercoats or the final coat be applied until the surface preparation or previous coat has been inspected and approved by the Contract Administrator immediately prior to commencement of paint application operations.

Painting shall only be carried out when the surfaces are dry and free of dirt, oil, grease, and other surface contaminants.

Painting shall not be carried out:

a) When the temperature of the air or steel is below 5°C.

b) Unless the temperature of the steel is at least 2.5°C above the dew point.

c) If the temperature is expected to drop below 0°C before the paint is dry.

d) If the relative humidity exceeds the paint manufacturer's written recommendations.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.5 Construction Methods

14.5.6 Paint Application

14.5.6.1 General (Cont'd)

Any paint damaged by cold, heat, or other environmental conditions shall be replaced by the Contractor to the satisfaction of the Contract Administrator.

14.5.6.2 Coat Thickness

The coating system shall consist of the following:

Prime Coat:	2.00 mils minimum thickness
Intermediate Coat:	2.00 mils minimum thickness
Final Coat:	5.00 mils minimum thickness

The paint thicknesses specified herein shall be the thickness over the peaks of the blast profile. To ensure this thickness is being measured, dry film thickness measurements and gauge calibration methods shall be as described in SSPC Specification PA2. Allowable deviation from the specified dry film thickness shall be as follows:

	Dry Film Thickness		
Paint Coat	Specified Thickness (mils)	Minimum Spot Thickness (mils)	Maximum Spot Thickness (mils)
Primer	2.00	1.60	4.00
Intermediate	2.00	1.60	3.00
Final	5.00	4.00	9.00

When the dry film thickness of any coat for an area, measured as specified herein, averages less than the thickness specified for that coat, or has any spot thickness less than the minimum spot thickness specified herein, then additional layer(s) of the same paint materials shall be applied until the minimum required thickness for that coat is attained. Only then may the Contractor continue with operations related to the application of the next coat.

When the dry film thickness of any coat for an area, measured as specified herein, averages greater than the maximum spot thickness, then the entire area shall be blasted to white metal in accordance with Clause 14.5 and painting operations commenced again in that area with the prime coat.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.5 Construction Methods (Cont'd)

14.5.6.2 Coat Thickness

General paint application shall follow the requirements of SSPC Specification PA1, "Shop, Field and Maintenance Painting".

Proprietary paints shall be applied in strict accordance with the manufacturer's written instructions, a copy of which is to be submitted to the Contract Administrator prior to application of any paint.

The paint shall be applied by one or more of the following methods: brushing, rolling, air spray, airless spray, or air-assisted airless spray.

Proprietary paints may be thinned only with the manufacturer's recommended thinner and by no more than the stated amount.

The paints shall be smooth and free of runs, sags, dry spray, blisters, and visible pinholes. The finish shall be of uniform colour and gloss and free of coarse particles and dirt.

Each coat of paint shall be in the proper state of cure before the application of a new coat. Paint shall be considered sufficiently cured for recoating when the additional cost can be applied without the development of film irregularities or loss of serviceability.

Minimum drying times between coats, for the range of temperature encountered, will be in compliance with the paint manufacturer's written instructions. The Contract Administrator reserves the right to require longer curing times, as he sees fit.

14.5.6.3 Cleanup Operations

All areas of overspray, spillage, leakage, etc., shall be immediately cleaned up to the satisfaction of the Contract Administrator.

14.5.6.4 Painting of Inaccessible Areas

Any areas that will be inaccessible after construction shall be blast cleaned and painted before they become inaccessible.

14.5.6.5 Painting of Fasteners

Where limited access precludes the use of spraying equipment, the heads of all structural steel, bolts, nuts, and rivets shall be coated by brush.

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.6 Quality Control

14.6.1 General

The Contractor shall arrange for regular site visits by a representative of the paint manufacturer who shall ensure that the paint is being applied in accordance with the manufacturer's recommendations. The Contract Administrator shall be notified of each such visit and may request additional visits. The Contract Administrator shall be immediately advised of any deviation from this Specification or the manufacturer's requirements.

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations, from the selection and production of materials, through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given.

14.6.2 Paint Testing

Laboratory testing of the paint will be performed by the Contractor at his own expense, incidental to the works of this Specification, under the direction of the Contract Administrator and as specified herein.

The Contractor shall supply full, new unopened containers of primer,

intermediate and final paints, as well as any thinner, catalyst, or other constituent required or used to properly mix the paint. The paint samples shall be obtained from the same batch as that being applied to the structure. The Contractor shall deliver the paint samples to a testing laboratory accredited by the Canadian Government Specifications Board (CGSB) for paint testing, acceptable to the Contract Administrator. Additional samples will be provided to the testing laboratory to replace any that are damaged during shipping. The approved testing laboratory shall perform the following tests in accordance with the requirements of CGSB Specification 1-GP-183M and CGSB Specification 1-GP-199M.

a) Primer: CGSB Specification 1-GP-183M, "Coating, Zinc Rich Epoxy"

   i) Metallic Content of Zinc
   ii) Adhesion
   iii) Impact Resistance
   iv) Salt Spray Resistance
   v) Behavior Towards Topcoats
   vi) Applicability and Appearance
   vii) Cathodic Protection

SP:14. SURFACE PREPARATION AND PAINTING OF STRUCTURAL STEEL

14.6 Quality Control

14.6.2 Paint Testing (Cont'd)

b) Intermediate and Final Paint: CGSB Specification 1-GP-199M, "Coating, High Build Vinyl"

i) Flexibility
ii) Salt Spray Resistance
iii) Adhesion
iv) Accelerated Weathering Resistance
v) Applicability and Appearance

Two (2) sets of tests will be required; one (1) immediately following the award of the Contract, and one part-way through the painting operations, as directed by the Contract Administrator. The results of each set of tests shall be submitted directly to the Contract Administrator by the testing laboratory, in the form of a written report. All costs associated with the supply, delivery and testing of paint samples, as well as the preparation of the written reports, shall be at the expense of the Contractor, incidental to the works of this Specification. No separate measurement or payment will be made for this work.

14.7 Method of Measurement

Surface preparation and painting of structural steel will be paid for on a Lump Sum Basis, as accepted by the Contract Administrator, and no measurement will be made for this work.

14.8 Basis of Payment

Surface preparation and painting will be paid for at the Contract Lump Sum Price for the "Surface Preparation and Painting of Structural Steel", which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:15. SUPPLY AND INSTALLATION OF SUB-DRAIN SYSTEM

15.1 Description

This Specification shall cover the supply and installation of the sub-drain system at the abutments.

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 other things necessary for and incidental to the satisfactory performance and completion of all work as hereinafter specified.

15.2 Materials

15.2.1 General

The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator.

15.2.2 Drain Pipes, Fittings, and Accessories

All drain pipes, fittings, and other accessories or appurtenances shall conform to the requirements of Standard Construction Specification CW 3160-R2 and the requirements of the latest revision of CSPI Specification 501, for Corrugated Metal Pipe (CMP). Corrugated metal pipe shall be 150 mm diameter by 1.6 mm gauge, asphalt-coated. The pipe shall be performed where shown on the Drawings.

15.2.3 Drain pipe Filter Material

Drain pipe filter material shall consist of sound, hard crushed stone, free from organic material meeting the following gradation requirements.

Canadian Metric Sieve Size	Percent of Total Dry Weight Passing
25,000	100%
10,000	10 - 30%
5,000	0 - 5%

15.2.4 Filter Fabric

Filter fabric shall be Mirafi P40, by Geotextile, or Nilex C4 or equal as approved by the Contract Administrator.

SP:15. SUPPLY AND INSTALLATION OF SUB-DRAIN SYSTEM

15.3 Equipment

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

15.4 Construction Methods

The drain pipe shall be excavated for, where required, and laid to the line and grade shown shown on the Drawings, with the separate sections securely jointed together by means of tightly-drawn coupling bands. Drain pipe of the round or elongated type shall have the outside laps of circumferencial joints in each pipe section on the upstream ends and longitudinal lap seams at the sides of each pipe.

Where shown, granular filter material shall be placed and hand-compacted in depths not to exceed 300 mm in accordance with dimensions and locations as directed on the Drawings.

The filter fabric shall be placed neatly around the granular filter material, with lap widths as shown on the Drawings.

Where shown, granular backfill material and the clay seal shall be placed in maximum 300 mm lifts and compacted at its optimum moisture content to 90 percent of modified proctor density.

15.5 Quality Control

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations, from the selection and production of materials, through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection of approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

15.6 Method of Measurement

The supply and installation of the drain pipe, including excavation, drain pipe filter material, filter fabric, granular backfill, and clay seal shall be measured on a linear metre basis. The number of linear metres to be paid for shall be the total number of linear metres of drain pipe that are supplied and installed in accordance with this Specification and the Drawings, and accepted by the Contract Administrator; measured horizontally, at-grade, above the centre line of the drain, as computed from measurements made by the Contract Administrator.

SP:15. SUPPLY AND INSTALLATION OF SUB-DRAIN SYSTEM

15.7 Basis of Payment

The supply and installation of the drain pipe will be paid for at the Contract Unit Price per metre for "Supply and Installation of Sub-drain System", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:16. REPAIRS TO EXISTING ABUTMENT AND PIER CONCRETE

16.1 Description

This Specification shall cover the structural concrete repairs to the deteriorated and cracked areas of the existing abutments and piers.

The work 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.

16.2 Materials

16.2.1 General

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

16.2.2 Bonding Grout

The bonding grout shall consist of 1 part Daraweld - C bonding agent, as manufactured by W.R. Grace and Co., 5 parts Portland Cement, 2.5 parts fine sand and sufficient water to produce a stiff slurry. Alternate bonding grout may be used if approved by the Contract Administrator. The mixing and application of the bonding grout shall be in accordance with the latest printed instructions available from the manufacturer.

16.2.3 Patching Mortar

The patching mortar shall be in accordance with the requirements of Section SP.3.2.14.

16.3 Equipment

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

16.4 Construction Methods

16.4.1 General

The work under this Specification will consist of structural concrete repairs at the following locations:

i) Piers
ii) Abutments

SP:16. REPAIRS TO EXISTING ABUTMENT AND PIER CONCRETE

16.4 Construction Methods (Cont'd)

16.4.2 Removal

The concrete cracks in the abutments and piers at locations identified and marked for repair by the Contract Administrator shall be chipped out and concrete removed in V-shape to a minimum depth of 40 mm or to sound concrete.

At areas where the concrete is deteriorating and spalling, as identified and marked for repair by the Contract Administrator, the Contractor shall make 25 mm deep sawcuts along the periphery of the repair area and remove all loose, deteriorated, loose and unsound concrete down to sound concrete.

The concrete shall be removed using light chip hammer or other approved mechanical chipping devices.

During breakout and removal operations, extreme care shall be exercised so as not to damage surrounding concrete or steel reinforcement.

16.4.3 Sandblasting

The repair surface which deteriorated concrete has been removed and exposed reinforcing steel and concrete surface shall be sandblast cleaned.

The sandblasting operations shall conform to the best modern day sandblasting practice and shall be carried out using approved sandblasting generators with 100 pound pressure at the nozzle.

Abrasives for sandblasting shall consist of siliceons grain free of clay and other deleterious material, subangular to round in shape and containing no particles larger than those that will pass through a No. 1250 Canadian metric sieve size or approved equivalent. Only new abrasives shall be used and reuse will not be permitted.

The Contractor will be required to take all necessary precautions to completely shield other parts of the structure from damage and shall remove all droppings falling below the structure at his own expense and to the satisfaction of the Contract Administrator.

16.4.6 Repair

The repair surface shall be patched with patching mortar. No area shall be repaired unit it has been thoroughly and completely cleaned and prepared. The time interval between the sandblasting and patching shall be kept to a minimum and all residue produced by the sandblasting shall be removed.

SP:16. REPAIRS TO EXISTING ABUTMENT AND PIER CONCRETE

16.4 Construction Methods

16.4.6 Repair (Cont'd)

Immediately prior to patching, a coating of bonding grout shall be applied to the exposed surface. The bonding grout shall be brushed into the concrete in a thin, even coating.

The patching mortar repair of any area, once started, shall be continuous and it shall be struck off slightly higher than the surface and left for one hour before final finishing to permit initial shrinkage of the patching mortar and then it shall be touched up until it is satisfactory to the Contract Administrator. The patch shall be cured as specified in Section SP. 3.6.13.

The Contractor shall ensure that the repaired area colour matches the surrounding concrete to the satisfaction of the Contract Administrator.

16.5 Quality Control

All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator including all operations from the selection and production of materials through to final acceptance of the work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have been previously given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

16.6 Method of Measurement

Structural concrete repairs to the deteriorated and cracked areas of the existing abutment and piers will be measured on a surface area basis. The surface area to be paid for shall be the total number of square metres of patching mortar applied for the structural concrete repairs in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

SP:16. REPAIRS TO EXISTING ABUTMENT AND PIER CONCRETE

16.7 Basis of Payment

Structural concrete repairs to the deteriorated and cracked areas of the existing abutment and piers will be paid for at the Contract Unit Price per square metre for the "Items of Work" listed below, measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Structural Concrete Repairs

a) Piers
b) Abutments

SP:17. PORTABLE CONCRETE TRAFFIC CONTROL BARRIER

17.1 Description

This Specification shall cover the placement, maintenance, relocation and removal of all portable concrete traffic barriers.

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 other things necessary for and incidental to the satisfactory performance and completion of all work as specified hereinafter.

17.2 Barrier Types

Precast Concrete Barriers

Type A - Portable concrete Safety Shape Traffic Barrier

Type B - Portable Concrete Curb Barrier

17.3 Construction Methods

17.3.1 Installation of Portable Concrete Traffic Barrier

The Contractor shall be responsible for the loading, hauling and installation of the portable concrete traffic barrier after the detour crossover has been constructed. The location of the portable concrete traffic barrier shall remain from time of construction of the detour until the road is ready to be opened to traffic.

All portable concrete traffic barrier will be supplied by the City of Winnipeg, Streets and Transportation Department. The Contractor shall notify the Contract Administrator at least two (2) working das in advance of the date the material are scheduled for installation.

The Contractor shall be responsible for all operations related to the pick up and installation of the barriers. The concrete traffic barriers shall be picked up at the City of Winnipeg Bridge Yard, the Provincial Highways Yard on Wilkes Avenue west of the Perimeter Highway, and/or other locations in or adjacent to the City of Winnipeg as directed by the Contract Administrator.

17.3.2 Relocation of Portable Concrete Traffic Barrier

The Contractor shall be responsible for the location of the portable concrete traffic barrier. The relocation shall include the relocation on site of the portable concrete traffic barriers to suit the phases of construction and the associated traffic detouring and as directed by the Contract Administrator. The relocation of portable traffic barriers to suit the phases of construction will not be permitted between 7:00 a.m. to 9:00 a.m. and 3:30 p.m. to 5:30 p.m. on weekdays.

SP:17. PORTABLE CONCRETE TRAFFIC CONTROL BARRIER

17.3 Construction Methods (Cont'd)

17.3.3. Removal of Portable Concrete Traffic Barrier

The Contractor shall be responsible for the removal of the portable concrete traffic barrier. All materials shall be returned to the City of Winnipeg Bridge Yard, at Wilkes Avenue west of Perimeter Highway, and/or other locations in or adjacent to the City of Winnipeg as directed by the Contract Administrator from which the barriers were obtained.

17.4 Method of Measurement

17.4.1 Placement, Relocation and Removal of Portable Concrete Traffic Concrete Control Barrier

The placement, relocation and removal of portable concrete traffic barriers will be measured on a linear metre basis. The number of metres to be paid for shall be the total number of metres placed, relocated and removed in accordance with this Specification as measured by the Contract Administrator.

17.5 Basis of Payment

17.5.1 Placement, Relocation and Removal of Portable Concrete Traffic Barrier

The placement, relocation and removal of portable concrete traffic barriers will be paid for at the Contract Unit Price per linear metre for the "Items of Work", listed below, which price shall be payment in full for supplying all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Portable Concrete Traffic Control Barrier

a) Type A
   i) Placement
   ii) Relocation
   iii) Removal

b) Type B
   i) Placement
   ii) Relocation
   iii) Removal

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.1 Description

This Specification shall cover backfill for abutment foundation, and grade beam construction works, including reinforced granular backfill material.

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

18.2 Materials

18.2.1 General

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

18.2.2 Handling and Storage of Materials

All materials shall be handled and stored in a careful and workmanshiplike manner, to the satisfaction of the Contract Administrator.

18.2.3 Testing and Approval

All materials supplied under this Specification shall be subject to inspection and testing by the Contract Administrator or by the testing laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes.

All materials shall be approved by the Contract Administrator before construction is undertaken. If, in the opinion of the Contract Administrator, such materials, in whole or in part, do not conform to the Specification detailed herein or are found to be defective because of storage or handling operations, then such material shall be rejected by the Contract Administrator and replaced by the Contractor at his own expense.

18.2.4 Clay Backfill

Clay backfill for structures shall be of a type approved by the Contract Administrator and may be suitable site material.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.2 Materials (Cont'd)

18.2.5 Granular Backfill Material

Granular backfill material shall be sound, free from organic material, and meet the following gradation requirements:

Canadian Metric Sieve Size	Percent of Total Dry Weight Passing
50 000	100%
20 000	75% - 100%
5 000	45 - 85%
2 500	35 - 55%
315	15 - 35%
160	5 - 20%
80	0 - 7%

18.2.6 Reinforced Granular Backfill Components

18.2.6.1 Steel Soil Reinforcement Strips

Steel soil reinforcement strips for the reinforced granular backfill shall consist of hot-rolled, shop-fabricated ribbed structural steel, 5 mm thick and 50 mm wide, conforming to the requirements of CSA Standard CAN/CSA-G40.21-M87 grade 300W, with modified ultimate strength of 450 MPa. The steel soil reinforcement strips shall be Balanced Capacity Ribbed Strips (BCR Strips), as supplied by the Reinforced Earth Company Ltd., or equal as approved by the Contract Administrator. The steel soil reinforcing strips shall be cut to length and tolerances as shown on the Drawings. The steel soil reinforcement strip shall be hot-dip galvanized in accordance with CSA Standard G164-M1981, to a net minimum retention of 610 g/sq.m/

18.2.6.2 Steel Tie Strips

The steel tie strips for the reinforced granular backfill shall consist of shop-fabricated structural steel, conforming to ASTM A36 and shall be hot-dip galvanized in accordance with CSA Standard G164-M1981, to a net minimum retention of 610 g/sq.m. The steel tie strips shall be the shape, thickness, and length as supplied by the Reinforced Earth Company Ltd., or equal as approved by the Contract Administrator.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.2 Materials (Cont'd)

18.2.6.3 Fasteners

Fasteners for the reinforcing strips and tie strips shall be ASTM A325 bolts c/w nuts and washers conforming to the size as indicated on the Drawings and be hot-dip galvanized in accordance with CSA Standard G164-M1981, to a net minimum retention of 460 g/sq.m.

18.2.6.4 Walers

Walers shall be 20 M epoxy-coated reinforcing steel bars conforming to the requirements of Specification SP:2. 20 M hot-dipped galvanizing reinforcing detail are also permitted for use as walers. Hot-dip galvanizing shall be in accordance with CSA G164-M81.

18.2.6.5 Filter Fabric

Filter fabric shall be non-woven polyester Mirafi P450, Terrafix 540R, or equal as approved by the Contract Administrator.

18.2.6.6 Galvanized Welded Wire Mesh

Galvanized welded wire mesh shall be MW47.6 x MW47.6 x 7.79 mm or equal as approved by the Contract Administrator. Mesh shall be hot dip galvanized in accordance with CSA G164-M1981, to a net minimum retention of 610 g/sq.m.

18.2.6.7 Styrofoam

Styrofoam shall be extruded expanded HI-40 or equal as approved by the Contract Administrator.

18.3 Equipment

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

18.4 Construction Methods

18.4.1 General

The works shall comprise of the supply, placement, and compaction of clay or granular backfill materials for footings, abutments,and grade beams, including the supply and installation of reinforcing strips, tie strips and associated fasteners for the reinforced granular backfill at the abutments.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.4 Construction Methods (Cont'd)

18.4.2 Backfill Operations

The Contract Administrator shall be notified at least one (1) working day in advance of any backfilling operation. No backfill shall be placed against any concrete until approved by the Contract Administrator and in no case before test cylinders show the concrete strength to be 75 percent of that specified.

The abutment foundation, and grade beam units shall be backfilled with clay or granular backfill materials to the grade line as shown on the Drawings. Backfill materials shall be free of frozen lumps and shall be placed and compacted in an unfrozed state. Backfill shall not be placed on frozen subsoil.

The clay and granular backfill material shall be placed and compacted in lifts of 150 mm (maximum) to 100 percent of Standard Proctor Dry Density.

The Contractor shall be required to provide necessary water during compaction of backfill materials to achieve the required densities.

18.4.3 Reinforced Granular Backfill Construction at Abutments

18.4.3.1 Construction of Steel Reinforced Granular Backfill

In general, the construction of the steel reinforced granular backfill, including placement of the wire mesh wall and placement of the tie strips and steel soil reinforcement strips, shall conform to the details shown on the Drawings and to procedures and requirements of the Reinforced Earth Company Ltd., except as modified herein.

The locations of the soil reinforcement strips shall be adjusted as required so as not to interfere with the utility ducts located behind the abutments. The adjusted locations shall be subject to approval by the Contract Administrator.

At each soil reinforcement strip level, backfill shall be levelled without voids or ruts and compacted before placing and bolting the steel soil reinforcement strips to the tie strips. Reinforcement strips shall be placed parallel to the roadway centreline. Fastener bolts connecting the reinforcement strips to the tie strips shall be inserted with the thread pointing up. Fastener nuts shall be snugly tightened using manual or power tools.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.4 Construction Methods

18.4.3.1 Construction of Steel Reinforced Granular Backfill (Cont'd)

The wire mesh facing shall be erected in stages, prior to the backfilling operation, using a temporary falsework system.

Soldier timbers shall be erected vertically and be effectively braced into position for a minimum height of 3 m. Above 3 m, a climbing wooden frame shall be used that attaches to the walers of the constructed section below the level under construction. The spacing between soldiers shall be increased or decreased so that effective support is given to the wire facing.

The steel mesh, walers, and filter cloth shall be fixed in place using an approved method ensuring that:

a) The mesh at the top and bottom is folded back into the fill 1200 mm

b) The overlaps and splices for the wire mesh, walers, and filter fabric is as shown on the Drawings.

The filter fabric shall be slit at reinforcing strip locations to allow tie strip penetration for connection to the reinforcing strips. The filter fabric shall not be over cut and must be tight to the tie strip.

At completion of construction operations, the hooks shall be removed from the walers, and the timber support structure shall be dismantled.

At any point, the wall shall have a maximum tolerance of $\pm$ 50 mm from its designated plane.

Placement and compaction of granular backfill material shall conform to the requirements of Section SP:18.4.2 of this Specification. Backfill compaction shall be accomplished without disturbance or distortion of the reinforcement strips or tie strips.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.5 Quality Control

18.5.1 Inspection

All workmanship and materials furnished and supplied under this Specification are subject to close and systematic inspection and testing by the Contract Administrator, including all operations, from the selection and production of materials, through to final acceptance of the specified work. The Contractor shall be wholly responsible for the control of all operations incidental thereto notwithstanding any inspection or approval that may have previously been given. The Contract Administrator reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.

18.5.2 Access

The Contract Administrator shall be afforded full access for the inspection and control testing of constituent materials both at the site of the work and at any plant used for production of the materials to determine whether the material is being supplied and placed in accordance with this Specification.

18.5.3 Materials

All materials supplied and placed under this Specification shall be subject to testing and approval by the Contract Administrator in accordance with Clauses 2.2 and 2.4 of this Specification.

18.5.4 Quality of Backfill Material

The Modified Proctor Density and/or Standard Proctor Density for the granular or clay backfill material shall be determined at the optimum moisture content in accordance with the standard laboratory Proctor Compaction Test Procedure. The field density of each backfill layer shall be a percentage of the applicable Proctor Density, as specified in Section SP:18.4.2.

Quality control tests will be used to determine the acceptability of each backfill layer, as placed and compacted by the Contractor, before any succeeding layer may be applied.

The field density of the compacted layers shall be verified by Field Density Tests, in accordance with ASTM Standard D15556-64, Test for Density of Soil in Place by the Sand-Cone Method, or approved equivalent.

The frequency and number of tests to be made shall be as determined by the Contract Administrator.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.5 Quality Control

18.5.4 Quality of Backfill Material (Cont'd)

Holes made by removal of samples from the layers shall be promptly filled by the Contractor with appropriate material and thoroughly compacted so as to conform in every way with the adjoining compacted material.

18.5.5 Corrective Action

Any material that does not meet the gradation and/or compaction requirements of this Specification shall be removed and replaced by the Contractor at his own expense, to the satisfaction of the Contract Administrator.

18.6 Method of Measurement

18.6.1 Steel Soil Reinforcement Strips for Reinforced Granular Backfill at Abutments

The supply and installation of steel soil reinforcement strips, including the supply and installation of all components (reinforcement strips, tie strips, fasteners, walers, filter fabric, galvanized wire mesh, styrofoam, and all incidental components) for the reinforced granular backfill at the abutments, will be paid for on a Lump Sup basis as accepted by the Contract Administrator, and no measurement will be made for this work.

18.6.2 Backfill for Abutment Foundation, and Grade Beam Construction Works

The supply, placement, and compaction of clay and granular backfill will be paid for on a a Lump Sum basis as accepted by the Contract Administrator, and no measurement will be made for this work.

SP:18. BACKFILL FOR ABUTMENT FOUNDATION AND GRADE BEAM CONSTRUCTION WORKS

18.7 Basis of Payment

18.7.1 Steel Soil Reinforcement Strips for Reinforced Granular Backfill at Abutments.

The supply and installation of steel soil reinforcement strips, including all components for the reinforced granular backfill at the abutments, will be paid for at the Lump Sum Price for the "Items of Work", listed herebelow, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Steel Soil Reinforcement Strips for Reinforced Granular Backfill at Abutments.

a) Supply
b) Installation

18.7.2 Backfill for Abutment Foundation, and Grade Beam Construction Works.

The supply, placement, and compaction of clay and granular backfill material will be paid for at the Contract Lump Sum price for the "Items of Work", listed herebelow, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Supply and Placement of Backfill for Abutment Backwalls, and Grade Beam Construction Works.

SP:19 REMOVAL AND DISPOSAL OF EXISTING FLEXBEAM BARRIER

19.1 Description

This Specification shall cover all operations related to the removal and disposal of the existing flexbeam barrier.

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

19.2 Equipment

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

19.3 Construction Methods

Removal and disposal of existing flexbeam barrier shall include the removal and disposal of all posts and flexbeam railing at the locations shown on the drawings. All barrier materials shall become the property of the Contractor and shall be removed from the site.

The Contractor shall dismantle the existing flexbeam barrier at the site with such care as to leave undamaged any adjacent structures.

All post holes shall be backfilled with sand to within 100 mm of the surrounding ground level following the removal of the barrier posts and compacted to the satisfaction of the Contract Administrator. The top 100 mm shall then be backfilled with topsoil. After the post holes have been backfilled, the area shall be seeded in accordance with the requirements of Specification CW 3520-R2.

The cost of backfilling and seeding the post holes shall be incidental to the removal and disposal of the existing flexbeam barrier.

19.4 Method of Measurement

The removal and disposal of the existing flexbeam barrier will be measured on a linear measure basis. The length to be paid for shall be the total number of metres of flexbeam barrier removed and disposed in accordance with this specification, as computed from measurements made by the Contract Administrator.

SP:19 REMOVAL AND DISPOSAL OF EXISTING FLEXBEAM BARRIER

19.5 Basis for Payment

The removal and disposal of the existing flexbeam barrier will be paid for at the Contract Unit Price for "Removal and Disposal of Flexbeam Barrier", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:20. CONSTRUCTION, MAINTENANCE AND RESTORATION OF TRAFFIC DIVERSION ROADS

20.1 Description

This Specification shall cover the maintenance and restoration of the detour road system for the Alternative A project, and shall supplement Standard Construction Specifications CW 3310-R4, CW 3235-R1, CW 3240-R1, and CW 3410-R4.

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 an incidental to the satisfactory performance and completion of all work as hereinafter specified.

The limits of the construction and maintenance operations for the detour road system are shown on the Drawings.

20.1 Description

This Specification shall cover the maintenance and restoration of the detour road system for the Alternative A project, and shall supplement Standard Construction Specifications CW 3310-R4, CW 3235-R1, CW 3240-R1, and CW 3410-R4.

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 an incidental to the satisfactory performance and completion of all work as hereinafter specified.

The limits of the construction and maintenance operations for the detour road system are shown on the Drawings.

20.2 Detour Signing

The Contractor is advised that the City of Winnipeg will set up and maintain signing and barricades required for the traffic detours for the duration of the project. The Contractor shall be responsible for all construction signing within the limits of the work.

20.3 Maintenance

Maintain the temporary roadways throughout the duration of the project. Maintenance shall consist of maintaining a clean smooth surface in good driving condition on the temporary asphalt detour, all in accordance with this Specification and as directed by the Contract Administrator.

Provide all required signing during maintenance work.

SP:20. CONSTRUCTION, MAINTENANCE AND RESTORATION OF TRAFFIC DIVERSION ROADS

20.4 Method of Measurement

20.4.1 Subgrade, Sub-base and Base Course Construction

As per CW 3110-R4.

20.4.2 Removal of Existing Miscellaneous Portland Cement Concrete Slabs

As per CW 3225-R1

20.4.3 Removal of Existing Curbs

As per CW 3240-R1.

20.4.4 Asphaltic Concrete Pavement Work

As per CW 3410-R4.

20.4.5 Maintenance

Maintenance will be paid for on a lump sum basis as accepted by the Contract Administrator and no measurement will be made for this work.

20.5 Basis of Payment

20.5.1 Subgrade, Sub-base and Base Course Construction

As per CW 3110-R4.

20.5.2 Removal of Existing Miscellaneous Portland Cement Concrete Slabs

As per CW 3235-R1.

20.5.3 Removal of Existing Curbs

As per CW 3240-R1.

20.5.4 Asphaltic Concrete Pavement Work

As per CW 3410-R4.

20.5.5 Boulevard Sodding

As per CW 3510-R4.

SP:20. CONSTRUCTION, MAINTENANCE AND RESTORATION OF TRAFFIC DIVERSION ROADS

20.5 Basis of Payment (Cont'd)

20.5.6 Maintenance

Maintenance will be paid for at the Contract Lump Sum Price for "Maintenance of Traffic Diversion ," which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification. Payment will be made on a prorated basis based on the percent of construction period but shall not be greater than percent of overall work completed.

SP:21. CONSTRUCTION, MAINTENANCE AND REMOVAL OF TRAFFIC DIVERSION CROSSOVER

21.1 Description

This Specification shall cover the construction and maintenance of the Alternative B roadway crossovers on the approaches to the Empress Street overpass and shall supplement Standard Construction Specification CW 3410-R3.

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

The limits of the work are as shown on the Drawings.

21.2 Materials

The Contractor shall be responsible for the supply, safe storage and handling of all materials as set forth in this Specification. All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator.

21.2.1 Testing and Approval

All materials supplied under this Specification shall be subject to inspection and approval by the Contract Administrator or by the Testing Laboratory designated by the Contract Administrator. There shall be no charge to the City for any materials taken by the Contract Administrator for testing purposes. All material shall be approved by the Contract Administrator before any construction is undertaken.

If, in the opinion of the Contract Administrator, such material, in whole or in part, does not conform to the Specification detailed herein or is found to be defective in manufacture or has become damaged in transit, storage or handling operations, then such material shall be rejected by the Contract Administrator, and replaced by the Contractor at his own expense.

21.2.2 Asphaltic Concrete

Asphaltic concrete material shall be supplied in accordance with CW 3410-R3.

21.3 Equipment

All equipment, implements, tools and facilities shall be of a type approved by the Contract Administrator. The Contractor shall have sufficient standby equipment available at all times.

SP:21. CONSTRUCTION, MAINTENANCE AND REMOVAL OF TRAFFIC DIVERSION CROSSOVER

21.4 Construction Methods

21.4.1 General

The construction of the detour crossovers shall be undertaken prior to the commencement of all other construction phases of this project. It shall be the responsibility of the Contractor to provide signing throughout this phase in accordance with the latest issue of "Manual of Temporary Traffic Control with Work Areas on City Streets".

The traffic diversion crossover shall be maintained as specified.

21.4.2 Asphalt Placement

The surface of the detour crossovers shall be paved with asphaltic concrete pavement constructed in accordance with Specification CW 3410-R3.

21.4.3 Maintenance of Detour Crossovers

The Contractor shall be responsible for maintaining the detour crossovers in good riding condition throughout the project.

Maintenance shall be understood to include the regular inspection of the crossover and all operations necessary to maintain a clean, smooth surface on the detour crossovers to the satisfaction of the Contract Administrator. All necessary maintenance work shall be undertaken immediately.

21.4.4 Removal of Traffic Diversion

The Contractor shall remove the traffic diversion crossovers as directed by the Contract Administrator after works have been completed and approved by the City.

21.5 Method of Measurement

21.5.1 Construction, Maintenance and Removal of Detour Crossovers

Construction, maintenance and removal of detour crossovers shall be paid for on a lump sum basis as accepted by the Contract Administrator and no measurement will be made for this work.

SP:21. CONSTRUCTION, MAINTENANCE AND REMOVAL OF TRAFFIC DIVERSION CROSSOVER

21.6 Basis of Payment

21.6.1 Construction, Maintenance and Removal of Detour Crossovers

Construction, maintenance and removal of detour crossovers will be paid for at the Contract Lump Sum Price for the "Items of Work" listed herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

Items of Work:

Construction, Maintenance and Removal of Traffic Diversion Crossover.

The payment for Crossover Maintenance will be prorated over the duration of the Contract.

SP:22 ASPHALTIC CONCRETE OVERLAY

22.1 Description

This Specification shall amend and supplement Specification CW 3410-R4 and cover the supply and placement of asphaltic concrete overlay as shown on the Drawings.

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

22.2 Materials

As per SP:25.

22.3 Equipment

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

22.4 Construction Method

Further to CW 3410-R4, the final surface course of asphaltic concrete shall be 50 mm to 75 mm in thickness. Where the existing pavement is less than 50 mm below the final elevation, the existing pavement shall be planed down to a level equal to 50 mm below the proposed final elevation. Where the existing pavement is more than 75 mm below the proposed final elevation, a levelling course of asphaltic concrete shall be placed to bring the level to 50 mm below the final elevation.

22.5 Method of Measurement

Construction of asphaltic concrete overlay will be measured on a weigh basis. The weight to be paid for shall be the number of tonnes placed and compacted in accordance with this Specification and accepted by the Contract Administrator, as measured on a certified weigh scale.

22.6 Basis of Payment

Construction of asphaltic concrete overlay will be paid for at the Contract Unit Price per tonne for "Asphaltic Concrete Overlay(Type 1 - Surface Course)", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

SP:23 ASPHALT PLANING

23.1 Description

This Specification shall cover the planing of the existing asphaltic concrete overlay and disposal of the asphalt cuttings obtained from the planing operation.

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

23.2 Equipment

As per Specification CW 3450-R2, Section 8.

23.3 Construction Method

The asphalt cuttings obtained from the planing of the existing asphalt surface shall be hauled to the City of Winnipeg bridge yard at Ravelston Avenue or as directed by the Contract Administrator. The cost of disposal of the asphalt cuttings shall be considered incidental to the planing operation.

Further to CW 3450-R2, all required surface preparation and cleaning prior to placing the asphaltic concrete overlay shall be considered incidental to the planing operation.

No planing of sound concrete will be permitted unless specifically requested by the Contract Administrator.

23.4 Method of Measurement

Planing will be measured on an area basis for specified thickness of cut. The area to be paid for shall be the total number of square metres of existing pavement removed for the thickness of cut specified in accordance with this Specification acceptable to the Contract Administrator, as computed from measurements made by the Contract Administrator.

23.5 Basis of Payment

Planing will be paid for at the Contract Unit Price per square metre for "Planing 0 - 50 mm Depth(Asphaltic Concrete)" measured as specified herein, for which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:24 REFLECTION CRACK CLEANING AND SEALING

24.1 Description

This Specification shall supplement Specification CW 3250-R2 and shall cover cleaning of the new asphaltic concrete overlay surface following the joint and crack sealing during the one year maintenance warranty period.

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

24.2 Materials

See Specification CW 3250-R2, Section 5.

24.3 Equipment

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

24.4 Construction Methods

Further to CW 3250-R2, Section 9, following the sealing of all reflection cracks and after sealant has cooled to atmospheric temperature, the Contractor shall sweep the pavement surface of all loose materials.

24.5 Method of Measurement

Reflection crack cleaning and sealing of new asphaltic concrete surfaces will be measured on a linear metre basis. The length to be paid for shall be the total number of metres of reflection crack routed, cleaned and sealed in accordance with this specification, as computed from measurements made by the Contract Administrator.

24.6 Basis for Payment

Reflection crack cleaning and sealing of new asphaltic concrete surfaces will be paid for at the Contract Unit Price per metre for "Crack Cleaning and Sealing During One Year Maintenance Warranty Period", measured as specified herein, which price shall be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:25. AMENDMENTS TO SPECIFICATION CW 3410-R4, ASPHALTIC CONCRETE PAVEMENT WORKS

25.1 Description

These amendments to Specification CW 3410-R4 shall be incorporated into the Specification and, should there be a variance between these amendments and Specification CW 3420-R4, these amendment shall take precedence.

The purpose of these amendments is to revise the following clauses of specification CW 3420-R4:

5.4.1 (b) (ii), 5.4.1 (b) (iv), 6.1, 6.2, 6.3.1, 6.4 and 10.5.

25.2 Materials

25.2.1 Amend Clause 5.4.1 (b) (ii), Abrasion, of CW 3410-R4, as follows:

The Los Angeles Abrasion Loss shall not exceed 35% by weight, of any hand picked portion of a sample containing a minimum of 1.5% by weight of the original sample.

25.2.2 Amend Clause 5.4.1 (iv), Crushed Aggregate, of CW 3410-R4 as follows:

Crushed Aggregate - Aggregate retained on a No. 5000 sieve shall contain not less than sixty (60%) percent crushed aggregate as determined by actual particle count. Crushed aggregate shall be considered as the aggregate having at least two fractured faces.

25.2.3 Further to Clause 6.1, Mix Design Statement, of CW 3410-R4.

Prior to the start of paving the Contractor shall provide the Contract Administrator with the results of three (3) separate sets of Marshall tests to show that he has met the requirements of the mix design statement. Where a correction of the mix design statement is necessary to reflect actual production, the Contractor will submit to the Contract Administrator a minimum of five (5) separate sets of Marshall test results for approval of the corrected mix design statement. This mix design statement, or revised mix design statement, as necessary, will be called the Job Mix-Formula.

Should a change occur in the Job Mix Formula during the course of the work, the Contractor shall re-submit to the Contract Administrator a minimum five (5) separate sets of Marshall test results to support approval of the revision.

SP:25. AMENDMENTS TO SPECIFICATION CW 3410-R4, ASPHALTIC CONCRETE PAVEMENT WORKS

25.2 Materials

25.2.3 Further to Clause 6.1, Mix Design Statement, of CW 3410-R4. (Cont'd)

Should a lengthy break occur in the paving operation, the Contract Administrator may request that the Contractor submit the results of three (3) recent, separate sets of Marshall tests results as evidence that the Job Mix Formula is being achieved.

25.2.4 Amend Clause 6.3.1, Allowable Deviations from Job Mix Formula, of CW 3410-R4, as follows:

The aggregate gradation of the asphaltic concrete supplied by the Contractor shall not deviate from that of the Job Mix Formula by more than the Allowable Deviation shown hereafter and shall fall within the gradation limits shown in Clause 2.04, Table CW 3410.1.

MAXIMUM ALLOWABLE DEVIATION FROM JOB MIX FORMULA

Cnd. Metric Sieve Size	Percent of Total Dry Weight Passing Each Sieve
10 000	± 5%
5 000	± 5%
2 500	± 4%
1 250	± 4%
630	± 4%
315	± 4%
160	± 2%
80	± 2%

SP:25. AMENDMENTS TO SPECIFICATION CW 3410-R4, ASPHALTIC CONCRETE PAVEMENT WORKS

25.2 Materials (Cont'd)

25.2.5 Further to Clause 6.2, Aggregate Gradation Requirements, of CW 3410-R4, amend Table CW 3410.1, Combined Aggregate Gradation Limits, of CW 3410-R4 as follows:

TABLE CW 3410.1

COMBINED AGGREGATE GRADATION LIMITS

Percent of Total Dry Weight Passing Each Sieve

Cnd. Metric Sieve Size	Type I (Surface Course)	Type II (Surface Course)	Type III (Base Course)
40 000			100%
25 000			80% to 100%
16 000	100%		60% to 90%
10 000	70% to 85%	100%	50% to 80%
5 000	55% to 70%	90% to 95%	40% to 60%
2 500	40% to 60%	74% to 80%	30% to 50%
1 250	25% to 50%	55% to 64%	20% to 40%
630	15% to 40%	35% to 46%	15% to 30%
315	5% to 20%	22% to 30%	10% to 20%
160	4% to 11%	-	-
80	3% to 7%	3% to 6%	3% to 6%

25.2.6 Further to Clause 6.4, Physical Requirements, of CW 3410-R4, amend Table CW 3410.2, Physical Requirements as follows:

TABLE CW 3410.2

PHYSICAL REQUIREMENTS

	Type I (Surface Course)	Type II (Surface Course)	Type III (Base Course)
Asphalt Cement, % total sample weight	5.0% to 6.0%	5.0% to 7.0%	4.0% to 5.5%
Voids in Mineral Aggregate, VMA	14.0% min	16.0% min	12.0% min
Air Voids	3.0% to 5.0%	2.5% to 5.0%	2.5% to 5.0%
Marshall Stability, kN at 60°C	7 min	4 min	5 min
Flow Index, Units of 250 um	6 to 16	6 to 16	6 to 16

SP:25. AMENDMENTS TO SPECIFICATION CW 3410-R4, ASPHALTIC CONCRETE PAVEMENT WORKS

25.3 Construction Methods

Further to Clause 9.7, Requirements After Final Rolling, of CW 34 10-R4.

After final rolling, the measured in-place density of the completed course shall be an average of 97% of the 75 blow Marshall density of the paving mixture, with on individual test being less than 95%.

25.4 Quality Control

Further to Clause 10.4, Quality of Asphaltic Concrete Paving Mixture of CW 3410-R4.

A minimum of one sample of asphaltic concrete paving mixture is required per 300 tonnes of asphalt placed.

If less than 300 tonnes of asphalt is placed in one day then the minimum number of samples required is one per day.

25.5 Method of Measurement

As per Specification CW 3410-R4

26.6 Basis of Payment

As per Specification CW 3410-R4

SP:26 GUIDE RAIL ENERGY ABSORBING TERMINAL UNITS

26.1 Description

This Specification covers all work relating to the removal, salvage, modification and reinstallation of the G.R.E.A.T. units.

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

26.2 Materials

Materials required to modify the existing Portage Avenue G.R.E.A.T. units will be supplied by the City of Winnipeg.

26.3 Equipment

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

26.4 Construction Methods

The existing G.R.E.A.T. unit at STA 4+63 on Empress Street shall be carefully dismantled in such a manner and with such equipment as not to disturb adjacent pavement or other works to be left in place and with such care as to leave undamaged, materials designated to be salvaged. The Contractor shall load and haul all salvaged materials to the City of Winnipeg bridge yard at Ravelston Avenue and Plessis Road. At the yard the materials shall be unloaded and stockpiled as directed.

The G.R.E.A.T. units on Portage Avenue shall be dismantled and hauled to the City of Winnipeg bridge yard at Ravelston Avenue where they shall be modified and then reinstalled in the Portage Avenue center median, at both ends of the new portable concrete median barrier. The demolition and disposal of the existing concrete pads and anchor posts shall be considered incidental to the removal of the G.R.E.A.T. units.

26.5 Method of Measurement

26.5.1 The removal and off site disposal of the Empress Street G.R.E.A.T. unit will be measured on a unit basis.

26.5.2 The removal, modification and reinstallation of the Portage Avenue G.R.E.A.T. units will be measured on a unit basis.

SP:26 GUIDE RAIL ENERGY ABSORBING TERMINAL UNITS

26.6 Basis for Payment

26.6.1 The removal and salvage of the existing Empress Street G.R.E.A.T. unit will be paid for at the Contract Lump Sum Price for "Salvaging Guide Rail Energy Absorbing Terminal Unit", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

26.5.2 The removal, modification and reinstallation of the existing Portage Avenue G.R.E.A.T. units will be paid for at the Contract Lump Sum Price for "Removal, Modification and Reinstallation of Guide Rail Energy Absorbing Terminal Unit", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:26 GUIDE RAIL ENERGY ABSORBING TERMINAL UNITS

26.6 Basis for Payment

26.6.1 The removal and salvage of the existing Empress Street G.R.E.A.T. unit will be paid for at the Contract Lump Sum Price for "Salvaging Guide Rail Energy Absorbing Terminal Unit", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

26.5.2 The removal, modification and reinstallation of the existing Portage Avenue G.R.E.A.T. units will be paid for at the Contract Lump Sum Price for "Removal, Modification and Reinstallation of Guide Rail Energy Absorbing Terminal Unit", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:27 ROADWAY EXPANSION/CONTRACTION JOINT

27.1 Description

This Specification shall amend and supplement Specification CW 3310-R4 and shall cover the construction of the transverse roadway expansion/contraction joint in the reinforced concrete pavement slab.

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

27.2 Materials

27.2.1 Incidental Materials

27.2.1.1 Neoprene Compression Seal

Neoprene compression seal shall be WB-1250 as supplied by Watson Bowman Acme or equal.

27.2.1.2 Galvanized Pipe Sleeve

As per SP:3

27.2.1.3 Styrofoam

27.2.1.4 Galvanized Metal Support Clips

27.2.1.5 Dowels

As per Specification CW 3310-R4, Section 5.5.3.

27.2.4.6 Epoxy-Coating

As per Specification CW 3310-R4, Section 5.5.4.

27.3 Construction Methods

The roadway expansion/contraction joint shall be constructed at the first transverse joint beyond the limit of the bridge approach slabs.

SP:27 ROADWAY EXPANSION/CONTRACTION JOINT

27.3 Construction Methods (Cont'd)

27.3.1 Dowel Installation

The dowels shall be aligned parallel to the centreline and surface of the slab with a maximum allowable tolerance of 6 mm in both directions over the length of the dowel. The dowels shall be located at mid slab depth with a maximum allowable tolerance from mid slab depth of 12 mm. If dowels are displaced during concrete placing operations, concrete placement shall cease and shall not resume until the displaced dowels have been reset to the true design position.

27.3.2 Styrofoam Joint Filler

Styrofoam joint filler shall be furnished in lengths equal to the width of one lane. The joint filler shall be cut neatly to the specified sizes. Thickness of the joint filler shall be 20mm with a tolerance of -0 to +1.5mm.

Holes for dowel bars in the joint filler shall be neatly punched in the exact position specified.

The joint filler shall be installed in a vertical position and held at the proper grade and alignment during the placing and finishing of the concrete. The joint filler shall extend from the base of the slab to 57 mm below the concrete surface. The joint shall not deviate in horizontal alignment more than 6 mm from a straight line. No concrete shall be permitted anywhere within the expansion space.

27.4 Method of Measurement

Construction of the roadway expansion/contraction joint will be measured on a linear metre basis. The length to be paid for shall be the total number of metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

27.5 Basis of Payment

Construction of roadway expansion/contraction joint will be paid for at the Contract Unit Price per metre for the "Roadway Expansion/Contraction Joint", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

SP:28 CONCRETE MEDIAN BARRIER AND SAFETY MEDIAN ON PAVEMENT

28.1 Description

This Specification shall cover the removal of the existing concrete median barrier and the construction of the concrete median barrier and concrete safety median.

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

28.2 Materials

28.2.1 General

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

28.2.2 Handling and Storage

As per Specification CW 3235-R1, Section 5.2.

28.2.3 Testing and Approval

As per Specification CW 3235-R1, Section 5.3.

28.2.4 Bonding Agent

As per Specification CW 3235-R1, Section 5.4.

28.2.5 Concrete Materials

As per Specification CW 3310-R4, Section 5.4.

28.2.6 Incidental Materials

As per Specification CW 3310-R4, Section 5.5.

28.3 Design Requirements

28.3.1 As per Specification CW 3310-R4, Section 6.

SP:28 CONCRETE MEDIAN BARRIER AND SAFETY MEDIAN ON PAVEMENT

28.3 Design Requirements (Cont'd)

28.3.2 Concrete Strength and Workability

Proportioning of fine aggregate, coarse aggregate, cement fly ash, water, air-entraining agent and water reducing admixture shall be such as to yield concrete having the required strength and workability as follows:

Minimum Specified Compressive Strength
@ 28 days = 30 MPa
Minimum Cementitous Content = 320 kg/cu.m.
Maximum Water/Cementitous Ratio = 0.49
Maximum Slump = 80 mm ±25mm
Aggregate Size = 20 mm Nominal
Air Content = 5.0% to 7.0%

28.4 Construction Methods

28.4.1 Removal of Existing Concrete Median Barrier

Alternative B will require the removal of the existing cast-in-place concrete median barrier south of the bridge in order to construct a temporary detour.

The removal of the existing barrier shall be done in such a manner that the adjacent pavement is not damaged. The length of barrier removed is as shown on the drawings. The barriers shall be loaded and hauled off the site. Clean up of the concrete debris and other materials resulting from the removal of the barrier will be considered incidental.

28.4.2 Installation of Concrete Median Barrier and Safety Median

The concrete median barrier and the concrete safety median are to be constructed at the location and to the dimensions shown on the drawings.

Concrete placing and curing shall be as per Specification CW 3310-R4, Section 9.

28.4.2.1 Surface Finish

Prior to initial set of the concrete, the edges of the barrier shall be carefully finished with an appropriate edging tool. The entire surface of the barrier shall be given a brushed finish following edging.

SP:28 CONCRETE MEDIAN BARRIER AND SAFETY MEDIAN ON PAVEMENT

28.4 Construction Methods (Cont'd)

28.4.2.2 Tolerances

The dimensions of the completed barrier shall not deviate by more than 10 mm from the dimensions specified. The horizontal alignment shall not deviate more than 10 mm from the Empress Street centerline.

When a 3 m long straight edge is placed on the top and faces of the cast-in-place concrete barrier surface, the surface of the concrete shall not vary more than 6 mm from the edge of the straight edge.

28.4.2.3 Joints

Joints for the concrete median barrier shall be constructed as detailed on the drawings. Joints for the concrete safety median shall be sawcut to a depth of 50 mm and the width shall be 5 mm. Joint spacing for the concrete median barrier and the concrete safety barrier shall match the existing concrete pavement transverse joint spacing.

28.5 Method of Measurement

28.5.1 Construction of concrete median barrier will be measured on an area basis computed from the dimensions at the base of the barrier. The area to be paid for shall be the total number of square metres constructed in accordance with this Specification and accepted by the Contract Administrator.

28.5.2 Construction of concrete safety median will be measured on an area basis computed from the dimensions at the base of the barrier. The area to be paid for shall be the total number of square metres constructed in accordance with this Specification and accepted by the Contract Administrator.

28.6 Basis of Payment

28.6.1 Construction of concrete median barrier, including the 5.0 m transition from full-height to safety shape, will be paid for at the Contract Unit Price per square metre for item "Median Barrier", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

28.6.2 Construction of concrete safety median will be paid for at the Contract Unit Price per square metre for item "Safety Median" measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

SP:29 CONCRETE SIDEWALK

29.1 Description

This Specification shall supplement Specification CW 3325-R1 and shall cover the construction of the 100 mm concrete sidewalk and of the 150 mm reinforced concrete sidewalk.

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

29.2 Materials

29.2.1 General

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

29.2.2 Handling and Storage

As per Specification CW 3325-R1, Section 5.2.

29.2.3 Testing and Approval

As per Specification CW 3325-R1, Section 5.3.

29.2.4 Portland Cement Constituent Materials

As per Specification CW 3325-R1, Section 5.4.

29.2.5 Incidental Materials

As per Specification 3310-R4, Section 5.5.

29.3 Supply of Materials

As per Specification CW 3325-R1, Section 7.

29.4 Design Requirements

29.4.1 As per Specification CW 3310-R4, Section 6.

SP:29 CONCRETE SIDEWALK

29.4 Design Requirements (Cont'd)

29.4.2 Concrete Strength and Workability

Proportioning of fine aggregate, coarse aggregate, cement fly ash, water, air-entraining agent and water reducing admixture shall be such as to yield concrete having the required strength and workability as follows:

29.4.2.1 100 mm Concrete Sidewalk

Minimum Specified Compressive Strength
@ 28 days = 25 MPa
Minimum Cementitious Content = 320 kg/cu.m.
Maximum Water/Cementitious Ratio = 0.49
Maximum Slump = 100 mm
Aggregate Size = 20 mm Nominal
Air Content = 5.0% to 8.0%

29.4.2.2 150 mm Reinforced Concrete Sidewalk

Minimum Specified Compressive Strength
@ 28 days = 30 MPa
Minimum Cementitious Content = 320 kg/cu.m.
Maximum Water/Cementitious Ratio = 0.49
Maximum Slump = 100 mm
Aggregate Size = 20 mm Nominal
Air Content = 5.0% to 8.0%

29.5 Construction Methods

As per Specification CW 3325-R1, Section 9.

29.6 Method of Measurement

Construction of concrete sidewalks will be measured on a surface area basis. The surface area to be paid for shall be the number of square metres constructed in accordance with this Specification and accepted by the Contract Administrator, as computed by measurements made by the Contract Administrator.

29.7 Basis of Payment

Construction of concrete sidewalks will be paid for at the Contract Unit Prices per square metre for "100 mm Concrete Sidewalk" and "150 mm Reinforced Concrete Sidewalk" measured as specified herein, which prices will be payment in full for supplying all materials and for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:30. SUPPLY AND INSTALLATION OF ALUMINUM BALANCED BARRIER

30.1 Description

This Specification shall supplement Standard Construction Specification CW 3650-R3 and shall cover supply and installation of aluminum balanced barrier.

30.2 Materials

30.2.1 Granular Backfill Material

Backfill material for installation of barrier posts shall be 25 mm granular base course and shall conform to the requirements of CW 3110-R4, Section 5.5. No limestone materials or other substitutes will be allowed.

30.2.2 Alkali-Resistant Bituminous Paint

Alkali-resistant bituminous paint meeting the requirements of CGSB Specification 31-GP-3M.

30.3 Construction Methods

30.3.1 Installation of Salvaged Aluminum Balanced Barrier and Posts

The Contractor shall straighten and clean salvaged rail and posts to the satisfaction of the Contract Administrator prior to commencement of an installation works. The cleaning and straightening of existing barrier material will be considered as incidental to installation.

30.3.2 Installation of Aluminum Balanced Barrier and Posts

Further to Specification CW 3650, the surfaces of the posts and rails that are to be in contact with the ground shall be painted with two coats, each 1 mm in thickness, of alkali-resistant bituminous paint which is to be dry prior to installation.

There will be no separate payment for painting with alkali-resistant bituminous paint and these works shall be considered as incidental to the installation.

The top edges and corners of barrier posts shall be rounded smooth and accepted by the Contract Administrator prior to installation of the post.

30.4 Method of Payment

As per CW 3650-R3.

SP:30. SUPPLY AND INSTALLATION OF ALUMINUM BALANCED BARRIER

30.5 Basis of Payment

As per CW 3650-R3.

SP:31 RELOCATION OF ALUMINUM BALANCED BARRIER

31.1 Description

This Specification shall cover the relocation of the existing aluminum balance barrier in the Portage Avenue median. The existing aluminum balance barrier shall be removed and reinstalled as shown on the drawings.

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

31.2 Materials

31.2.1 Salvaging of Existing Materials

All existing barrier components which are deemed by the Contract Administrator to be in good condition shall be reused to reassemble the barrier at its new location.

31.2.2 Handling and Storage of Materials

As per Specification CW 3650-R3, Section 5.2.

31.2.3 Balance Barrier Components

Should any existing components be deemed unsuitable for reuse by the Contract Administrator, these defective components shall be replaced with new components conforming to the requirements of Specification CW 3650-R3, Section 5.4.

31.3 Construction Methods

Further to Specification CW 3650-R3 the Contractor shall give the Contract Administrator 48 hours notice prior to the removal of the existing aluminum barrier. The Contractor shall not commence the removal of the existing barrier until the Contract Administrator has inspected the existing barrier for damage.

The existing aluminum barrier shall be carefully dismantled in such a manner and with such equipment as not to disturb adjacent structures to be left in place and with such care as to leave undamaged, materials designated to be reused or salvaged.

All damaged components shall become the property of the Contractor and shall disposed off the site.

SP:31 RELOCATION OF ALUMINUM BALANCED BARRIER

31.3 Construction Methods (Cont'd)

All post holes shall be backfilled with sand immediately following the removal of the barrier posts and prior to the construction of the pavement widening.

Installation of the aluminum balance barrier at its new location shall be done in accordance with Specification CW 3650-R3.

31.4 Method of Measurement

31.4.1 Removal of Barrier Rail

The removal of barrier rail will be measured on a linear metre basis. the length to be paid for shall be the total number of metres of barrier rail removed in accordance with this specification and accepted by the Contract Administrator, as computed by summing up the individual rail section lengths.

31.4.2 Removal of Barrier Posts

The removal of the barrier posts will be measured on a unit basis. The number of posts to be paid for shall be the total number of posts removed in accordance with this Specification and accepted by the Contract Administrator.

31.4.3 Installation of Barrier Rail

As per Specification CW 3650-R3, Section 12.4.

31.4.4 Installation of Barrier Posts

As per Specification CW 3650-R3, Section 12.2.

31.5 Basis of Payment

31.5.1 Removal of Barrier Rail

The removal of barrier rail will be paid for at the Contract Unit Price per metre for "Removal of Barrier Rail", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

31.5.2 Removal of Barrier Posts

The removal of barrier rail will be paid for at the Contract Unit Price for "Removal of Barrier Rail", measured as specified herein, which price shall be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification.

SP:31 RELOCATION OF ALUMINUM BALANCED BARRIER

31.5 Basis of Payment (Cont'd)

31.5.3 Installation of Barrier Rail

As per Specification CW 3650-R3, Section 13.4.

31.5.4 Installation of Barrier Posts

As per Specification CW 3650-R3, Section 13.2.

31.5.5 Replacement of Damaged Components

There will be no payment made for replacement components damaged by the Contractor during the relocation of the barrier.

Components to replace existing damaged components will be supplied by the City of Winnipeg.

SP:32 PORTABLE CONCRETE MEDIAN BARRIER

32.1 Description

This specification shall cover all operations related to the supply and installation of portable concrete median barriers in the Portage Avenue center median.

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

32.2 Materials

32.2.1 General

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

32.2.2 Handling and Storage

As per Specification CW 3235-R1, Section 5.2.

32.2.3 Testing and Approval

As per Specification CW 3235-R1, Section 5.3.

32.2.5 Concrete Materials

As per Specification CW 3310-R4, Section 5.4.

32.2.6 Incidental Materials

As per Specification CW 3310-R4, Section 5.5.

32.3 Design Requirements

32.3.1 As per Specification CW 3310-R4, Section 6.

SP:32 PORTABLE CONCRETE MEDIAN BARRIER

32.3 Design Requirements (Cont'd)

32.3.2 Concrete Strength and Workability

Proportioning of fine aggregate, coarse aggregate, cement fly ash, water, air-entraining agent and water reducing admixture shall be such as to yield concrete having the required strength and workability as follows:

Minimum Specified Compressive Strength
@ 28 days = 30 MPa
Minimum Cementitous Content = 320 kg/cu.m.
Maximum Water/Cementitous Ratio = 0.49
Maximum Slump = 80 mm ±25 mm
Aggregate Size = 20 mm Nominal
Air Content = 5.0% to 7.0%

32.4 Construction Methods

Portable concrete median barriers shall be installed along the center line of the Portage Avenue median following the completion of all bridge works and removal of all traffic diversions and detours.

The portable concrete barrier sections shall be installed with interlocking devices properly engaged.

The surface onto which the portable concrete median barrier sections are to be installed shall be such that the horizontal and vertical alignment at the junction of each barrier section shall be within 15 mm.

Following the placement of all the portable concrete median barriers asphalt shall be placed and compacted to the satisfaction of the Contract Administrator, on both sides against the base of the barrier to a depth such that the reveal at the base of the barrier is 75 mm. The asphalt shall be feathered to the edge of the median lane.

32.5 Method of Measurement

Installation of portable concrete median barrier sections will be measured on a linear measure basis. The length to be paid for shall be the total number of metres installed in accordance with this Specification and accepted by the Contract Administrator, as computed from measurements made by the Contract Administrator.

SP:32 PORTABLE CONCRETE MEDIAN BARRIER

32.6 Basis of Payment

Installation of portable concrete median barrier sections will be paid for at the Contract Unit Price per metre for "Portable Concrete Median Barrier", measured as specified herein, which price shall be payment in full for supplying all materials and performing all operations herein described and all other items incidental to the work included in this Specification.

SP:33. ACCELERATED COMPLETION

33.01 Description

This Specification shall cover the accelerated completion of the works of this Contract.

33.02 Acceleration of Work

At no risk to the City, the Contractor at his own initiative, means and expense, may undertake to complete the works of this Contract to facilitate the safe re-opening of the entire bridge facility to traffic in advance of the Completion Date of September 29, 1990.

In recognition of the fact that an early completion of the works is of benefit to the City, the City will compensate the Contractor for said early completion on a per diem unit price basis, as hereinafter set out, provided that:

a) Authorization of payment for early completion under this Specification is confirmed in writing by the City within 15 days of award of Contract, and

b) The City will not be liable to pay for any period of acceleration that is less than seven (7) days or that is in excess of twenty-eight (28) days.

It is noted that certain delays on bridge rehabilitation work are normal, due to necessary layout and dimensional changes. The Contract Administrator will attempt to resolve the situation as soon as possible. The Contractor is advised that no extension to time will be given for events of this sort which cause construction delay and are resolved within twenty-four (24) hours of the requirement of change becoming known to both the Contractor and the Contract Administrator. In the event that the commencement date for the project, as identified on Tender Document Form E, "Schedule of Work", is either postponed by more than one week by the City, or advanced by more than one week at the request of the Contractor; so then shall the Completion Date be deemed to be postponed or advanced a similar period of time for purposes of calculation of the "Accelerated Completion" payment.

33.03 Method of Measurement

Subject to Clause 33.02 hereof, accelerated completion will be measured on a unit basis per diem. The number of days to be paid for will be the total number of calendar days which the entire facility is safely re-opened to vehicular and pedestrian traffic in advance of the Completion Date specified herein, with all specified works completed acceptable to the Contract Administrator.

SP:33. ACCELERATED COMPLETION

33.04 Basis of Payment

Subject to Clause 33.02 hereof, accelerated completion will be paid for at the Unit Price per diem specified hereinafter for "Accelerated Completion" which price shall be payment in full for performing all operations undertaken and all other items incidental to the work included in these Bidding Specifications.

Unit Price per diem = $1,200.00

Payment for this item is not identified on the Schedule of Prices, and shall not be included thereon. If accelerated completion does occur as specified herein, then payment will be made for this item upon completion and final acceptance by the City of all works of this Contract, as an addition to the Contract.

PART E

DRAWINGS

T H E C I T Y O F W I N N I P E G

DRAWINGS

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DRAWINGS

DR:1 APPLICABLE STANDARD DETAILS

In addition to the Drawing included with this Tender Package, the Contractor is advised that all current Standard Details which are included in the Standard Construction Specifications of the City of Winnipeg, shall apply to the Work, whether specifically listed herein before or not.

SD-000	Symbols Legend
SD-203	Barrier Curb (Separate)
SD-206	Barrier Curb Replacement
SD-209	Keyway for Portland Cement Concrete Pavement
SD-210A	Longitudinal Joint for Concrete Pavement
SD-211A	Construction Joint and Contraction Joint for Reinforced Concrete Pavement
SD-211B	Construction Joint and Contraction Joint for Plain Concrete and Plain-Dowelled Pavements
SD-212	Sawn Joint, Keyed Joint and Butt Joint for Reinforced, Plain Concrete and Plain-Dowelled Concrete Pavement
SD-216	Reinforced Concrete Pavements 5000 mm Joint Spacing
SD-217	Layout for Type "A" and "B" Bar Mats for Lane-at-a-time Paving 5000 mm Joint Spacing
SD-218B	Typical Joint Details for Portland Cement Concrete Pavements
SD-226A	Location of Longitudinal Joints in Concrete Pavements
SD-226B	Monolithic Concrete Median Slab
SD-227	Safety Median
SD-228	100 mm Concrete Median Slab
SD-229A	Portland Cement Concrete Sidewalk
SD-229B	Paraplegic Sidewalk Ramp
SD-229C	Paraplegic Sidewalk Ramp
SD-229D	Paraplegic Sidewalk Ramp
	Paraplegic Sidewalk Ramp

DR:2 APPLICABLE DRAWINGS

The following Drawings separately bound, constitute the complete Tender Package for this Work in accordance with BI:4 of the Bidding Instructions.

Drawing No.	Title
ALTERNATIVE 'A'	
GENERAL	
B100-90-01A	Cover Sheet, Design Data, and Drawing List
B100-90-02A	General Arrangement and Scope of Work
B100-90-03A	Roadway Reconstruction Detour - Alternative 'A' Completion Closure
B100-90-04	Portage Avenue Traffic Diversion Types
B100-90-05	Temporary Noise and Protection Screen Requirements
BRIDGE DRAWINGS	
B100-90-06A	General Elevation and Cross Sections
B100-90-07	Plan Showing Limits of Demolition
B100-90-08	Plan Showing Limits of New Works
B100-90-09	Bearing Details
B100-90-10A	Diaphragm Details & Pier Cap Reinforcing
B100-90-11	Expansion Joint Details
B100-90-12A	Concrete and Reinforcing Details - Approach Slab and Sidewalks
B100-90-13A	Concrete and Reinforcing Details - Deck Slab
B100-90-14A	Concrete and Reinforcing Details - Median and Shoulder Traffic Barriers
B100-90-15A	Abutment Modifications and Backwall Reinforcing Details
B100-90-16	Aluminum Pedestrian Handrail Details 1
B100-90-17	Aluminum Pedestrian Handrail Details 2
B100-90-18	Aluminum Traffic Barrier Rail Standard Details
B100-90-19	Aluminum Pedestrian Handrails Rails North and South Stairs
B100-90-20	Reconstruction of Concrete Slop Paving and Approach Soil Stabilization
B100-90-21A	Reinforcing Steel Schedule - Alternative "A"
B100-90-22A	Reinforcing Steel Schedule - Alternative "B"
ROADWAY DRAWINGS	
B100-90-23	Roadway Reconstruction Plan and Profile
B100-90-24	Roadway Reconstruction Details
B100-90-25	Layout of Balance Aluminum Shoulder Barrier and Details
B100-90-26	Balanced Shoulder Barrier Standard Details
B100-90-27	Portage Avenue Median Reconstruction
B100-90-28	Miscellaneous Details

DRAWINGS

DR:2 APPLICABLE DRAWINGS (Cont'd)

Drawing No.	Title
ALTERNATIVE 'B'	
GENERAL	
B100-90-01B	Cover Sheet, Design Data, and Drawing List
B100-90-02B	General Arrangement and Scope of Work
B100-90-03B	Roadway Reconstruction Detour - Alternative 'B' Closure of Two Lanes
B100-90-04	Portage Avenue Traffic Diversion Types
B100-90-05	Temporary Noise and Protection Screen Requirements
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