

Part 1 General

1.1 NATIONAL MASTER STANDING OFFER

- .1 The National Master Standing Offer (NMSO) for Federal Identity Program (FIP) signage has been awarded to Pattison Signs. As such, they are the only sign company in Canada that carry all the FIP templates for FIP fonts, symbols and the Canada wordmark for the duration of the contract. This is to ensure that all sign products produced for federal departments are standardized, uniform and conform to all visibility standards and material specifications as set in the FIP manual and supporting program documents.
- .2 Contact: Roger Ghantous, Pattison Sign Group (1-613-247-5371).

1.2 REFERENCES

- .1 Aluminum Association, Inc. (AA)
 - .1 Designation System for Aluminum Finishes –DAF 45-03.
- .2 Canadian Standards Association (CSA)
 - .1 CSAW47.2-M1987(R2003), Certification of Companies for Fusion Welding of Aluminum.
 - .2 CSA W59.2-M1991(R2003), Welded Aluminum Construction.
- .3 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - 2007.
- .4 CBSA Signage Guide 2010

1.3 SUBMISSION REQUIREMENTS

- .1 SHOP DRAWINGS
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit drawn-to-scale details for individually fabricated or incised lettering indicating word and letter spacing.
 - .3 Departmental Representative will provide exact text (Names and Room Numbers) for interior room signage.
- .2 SAMPLES
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate representative sample of each type sign, sign image and mounting method.
- .3 MAINTENANCE DATA
 - .1 Provide maintenance data for illuminated signs for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 SYSTEM DESCRIPTION

- .1 Supply and install CBSA Approved LED Traffic Lane Signage (requirements under 2.2 SCOPE OF WORK) on the existing canopies above primary inspection lanes 1, 2, and 3.
- .2 Install SVP Studio software for key pad control and office management for a complete sign lighting control system for each individual sign within the applicable primary inspection booth.
- .3 Provide training to designated CBSA personnel on how to maintain and reprogram the system.

Part 2 Products

2.1 SYSTEM COMPONENTS

- .1 Each sign will be 16 million colors, 16mm 48x144 pixel; cabinet size 2'-11 3/8" x 7'-11 13/16", single- sided. Each sign must have the capability to display graphics and type-able text at the same time. The signs must hold memory for up to 60 days without power. Each sign must be able to operate independently from the other giving the ability to show different text and/or graphics running simultaneously.

2.2 SCOPE OF WORK

- .1 The contractor must remove and dispose of any existing signage as instructed by the Departmental Representative.
- .2 The contractor must relocate some of the existing signage (such as clearance height signs) in each of the three (3) lanes. The electronic stop/proceed signs in each of the three (3) lanes must be removed and disposed of, as instructed by the Departmental Representative.
- .3 Signs must be relocated within each lane as instructed by the Departmental Representative.
- .4 The contractor must supply and mount one (1) new LED sign at each of the three (3) lanes, which must include the following features:
 - a) One-sided, outdoor, 2'-11 3/8" x 7'-11 13/16" full color LED sign.
 - b) Continually display text and/or graphic messages in both English and French language
 - c) Have a pixel pitch of 16mm
 - d) Display varying character fonts of 7, 10, 15, 24, and 32 pixel high characters
 - e) Display up to 4 lines of 7" characters
 - f) Programming software compatible with Microsoft Windows 7
 - g) Connected via wireless Ethernet bridge to computer located, as directed, on site

- h) Utilize 110-120V AC/60Hz power for signs
- i) Entire assembly enclosed in weather-proof cabinetry with welded corners
- .5 Install signage software on all control computers (up to two computers) and provide USB thumb-drives or DVD-ROMs with copies of software.
- .6 Currently, an LED sign is installed above lane 4. The contractor must integrate the control functionality of this LED signs onto the software that will be installed to control the three (3) new LED signs above lanes 1, 2, 3.
- .7 Provide training and telephone support to designated CBSA personnel.

2.3 GENERAL INFORMATION

- .1 The work-site is a restricted area and the contractor must coordinate all work with the Departmental Representative who will arrange access.
- .2 All electrical work including conduit, power supply, and connections to the sign, must be supplied and installed by a certified electrical contractor. The sign contractor must coordinate installation work with a certified electrical contractor. All work is to be performed, but not limited to, as indicated above. Sub-trades are permitted.
- .3 The specifications outlined under 2.2 SCOPE OF WORK must act as a description of the minimum display system desired by CBSA. Contractors must not offer alternatives, except when specifically requested within these specifications.

2.4 DISPLAY CONSTRUCTION

- .1 Service Access: Front
- .2 Cabinet Depth: Maximum 250 mm
- .3 Cabinet: weather-proof cabinetry with welded corners
- .4 Weatherproofing: Sealed cabinet, potted modules and conformal-coated display electronics suitable for high humidity environments. Ingress Protection Rating of 66.
- .5 The LED display will be constructed such that the entire front LED lamp panel can be raised to allow access to components within the LED display. The front LED panel must be constructed with a pneumatic strut system that automatically lifts the cover when the locks are opened.
- .6 An automatic dimming sensor shall be provided for each sign.

2.5 TECHNICAL SPECIFICATIONS

- .1 Single Face Display
- .2 Pixel Dot Pitch: 16mm
- .3 Matrix Size: 48x144 pixels

- .4 Pixel Configuration: 1 red, 1 green, 1 blue
- .5 Color Capability: 16 million colors
- .6 Maximum Brightness: 8000 nits
- .7 Optimal Viewing Angle: 140 degrees horizontal
- .8 Contract Enhancement: Individual louvres for each individual LED diode
- .9 Visual Size: 2'-6" x 7'-6"
- .10 Cabinet Size: 2'-11 13/16" x 7'-11 13/16"
- .11 Weight: 240 lbs.
- .12 Character Height: 7.0" (7 pixels font), 10" (10 pixels font), 15" (15 pixels font), 24" (24 pixels font), 32" (32 pixels font)
- .13 Display Dimming: By photo sensor
- .14 Minimum Viewing Distance: 110 metres (350 feet)
- .15 Estimated LED Life: 100,000 hours (over 10 years)
- .16 Software: SVP Studio LED Editor
- .17 Communication: Wireless Ethernet Bridge
- .18 CSA Certification: CAN/CSA 22.2, UL Standards 48 and 1433
- .19 Warranty Coverage: 5 years parts & labour

Part 3 Execution

3.1 SYSTEM INSTALLATION

- .1 The mounting hardware and brackets must be designed by the manufacturer to support the signs, allow for easy maintenance and provide a professional appearance as determined by the Project Authority.
- .2 All bolts, nuts, and hardware must be stainless steel.
- .3 Material and/or equipment required for the installation of the LED signs are the responsibility of the Contractor.
- .4 The final sign-off of completion for this project will occur when the Departmental Representative is satisfied with the product, installation and training provided.

3.2 TESTING, SET-UP, COMMISSIONING AND TRAINING

- .1 The manufacturer must provide training to designated CBSA personnel on the functionality and features of the new signs to include how to maintain and reprogram the LED display.
- .2 Provide online and over the phone training and support up to 10 years.

3.3 WARRANTY

- .1 There must be a five (5) year on warranty on parts and one year on labor for all signage and control computers (if applicable) from completion of work.
- .2 Contractor must provide a toll-free help desk number that will be manned between 0800-1800 PST; phone support must be included for a period of 5 years from substantial completion of the work.

3.4 ON SITE SURVEY

- .1 The contractor must perform an On Site Survey, as indicated in the call-up against the standing offer.
- .2 The onsite survey will serve to capture site-specific requirements that will enable the contractor to adequately prepare for the removal/relocation of existing signs and the delivery and installations of the required signage. The onsite survey will further ensure that the manufactured product matches the specific site requirements. The survey will analyze such things as current sign location, dimensions and installation techniques of existing signage, building facade, potential site hazards, potential for new signage, photos of the area and its surroundings, and local regulatory requirements.

.3 TASKS

- .1 Deliver On Site Survey to establish and gather all requirements to successfully deliver and install the required Variable Message LED signs.
- .2 Supply and install CBSA Approved LED Traffic Lane Signage on the existing canopies above each of the selected lanes (1, 2, and 3).
- .3 Install SVP Studio LED Editor for a complete sign lighting control system for each individual sign within the applicable Primary Inspection Lane.
- .4 Integrate the control functionality of existing LED sign (above lane 4) onto the software that will be installed to control the three (3) new LED signs above lanes 1, 2, 3.
- .5 Provide training to designated CBSA personnel on how to maintain and reprogram the system.

.4 CONSTRAINTS

- .1 On-site work must be done during regular business hours, Monday to Friday, 1 lane at a time, excluding statutory holidays.
- .2 Vendor must be cognizant that they will be working within an Operational Zone and be willing to follow site instruction from CBSA officers in regards to emergency evacuation.

.5 CLIENT SUPPORT

- .1 CBSA will provide contractors site access and escort at all times while on CBSA property.

.6 SCHEDULE AND COSTS

- .1 All work must be completed and approved by Departmental Representative on or before

.7 DELIVERABLES

- .1 Onsite Survey outlining all requirements to meet the delivery and installation requirements for the variable message LED signs.
.2 Three (3) Variable Message LED Signs.
.3 Mounting of supplied signs.
.4 Removal, relocation, and re-installation of existing signs over lanes.
.5 Installation, training, support of software.
.6 Warranty for signs.

.8 OTHER

- .1 The height of the canopy at Emerson is 5.4 meters (17.8 feet).

3.5 EXTERIOR BUILDING SIGNAGE

- .1 Reference Pattison Signage package prepared for CBSA Emerson site and architectural drawings for exterior signage on the PIL Booths, approach to PIL lanes, canopy and warehouse building. Reference CBSA Signage Guide 2010 for signage types, materials and mounting.

- .2 CBSA Signage Schedule:

| Sign Code | Description | Plan Code | Quantity | Material | Dimension | Mounting Method |
|-----------|----------------------------------|-----------|----------|----------|--------------------|----------------------|
| 3E35a | CCTV | A | 8 | Aluminum | TBD | S/M – S/S |
| 4E01a | Stop Sign | B | 4 | Aluminum | 600x600 or 750x750 | On omega post – S/S |
| 4E01b | Stop Here Until Lane is Clear | C | 4 | Aluminum | 600x600 or 750x750 | On omega post – S/S |
| 3E01a | Firearms | D | 8 | Aluminum | TBD | S/M – S/S |
| 3E25a | Canopy Height (1 for commercial) | E | 4 | Aluminum | TBD | S/M – S/S on canopy |
| 3E33a | PIL Booth Number (7;8;9) | F | 3 | Vinyl | TBD | Vinyl decal on glass |
| 3E34a | Bilingual Services | G | 8 | Vinyl | 100x100 | Vinyl decal on glass |

| | | | | | | |
|-------|------------------------------------|---|---|----------|-------------------------------------|---------------------|
| 4S05a | Barrier Markers (1 solid) | H | 4 | Aluminum | TBD | On bollards S/S |
| 4S05b | Barrier Markers (left or right) | I | 4 | Aluminum | 300x450 or 300x600 or 300x900 | On bollards S/S |
| LED* | Open/Closed | J | 3 | LED | TBD | S/M on canopy |
| 3E32a | Authorized Persons | K | 4 | Aluminum | TBD | S/M – S/S |
| 3E33a | Bays Number (1;2;3;4) | F | 4 | Vinyl | TBD | Vinyl decal |
| 4E01b | Stop Here Until Lane is Clear | C | 1 | Aluminum | Large Size | On omega post – S/S |

*LED is operated inside the building, not in the individual PIL booths.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, (5th Edition).
- .2 ASTM International
 - .1 ASTM A123/A123M-[09], Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A276-[10], Standard Specification for Stainless Steel Bars and Shapes.
 - .3 ASTM B209M-[10], Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric].
 - .4 ASTM B210M-[05], Standard Specification for Aluminum-Alloy Drawn Seamless Tubes [Metric].
 - .5 ASTM B211M-[03], Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire [Metric].
- .3 CSA International
 - .1 CSA G40.20/G40.21-[04(R2009)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA O80 Series-[08], Wood Preservation.
 - .3 CSA O121-[08], Douglas Fir Plywood.
 - .4 CSA W47.2-[11], Certification of Companies for Fusion Welding of Aluminum.
 - .5 CAN/CSA-Z809-[08], Sustainable Forest Management.
- .4 Manual of Uniform Traffic Control Devices of Canada, 2015 (MUTCDC)
- .5 Manitoba Infrastructure, 2015 Traffic Sign Pamphlet

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for traffic signage, including product characteristics, performance criteria, physical size, finish and limitations.

Part 2 Products

2.1 MATERIALS

- .1 Sign supports:

- .1 Steel posts: to CSA G40.21, 4 m long, flanged "U" shaped in cross section, measuring 65 mm wide x 30 mm deep. Metal thickness: 4.5 mm. Hot dipped galvanized: to ASTM A123/A123M.
 - .2 Standard tubular supports for small signs: to ASTM B210M.
 - .3 Timber posts:
 - .1 Sawn timber posts:
 - .1 Type: Pressure Treated.
 - .2 Grade: #2.
 - .3 Dimensions: minimum 100 x 100.
 - .4 Length to suit.
 - .5 CAN/CSA-Z809 or FSC or SFI certified.
 - .2 Fasteners: bolts, nuts, washers and other hardware for roadside signs to be cast aluminum alloy, or galvanized steel
 - .3 Posts to be treated in accordance with CAN/CSA O80 Series.
 - .4 Vertical tubular supports and connecting diagonal members: to ASTM B210M.
 - .5 Truss members: to ASTM B210M.
 - .6 Aluminum tubular members: belt ground satin finish.
 - .7 Base plates for ground mounted signs: to ASTM B209M. Base plates for overhead supports: to ASTM B209M.
 - .8 Tubular support caps for ground mounted signs: to ASTM B210M or fabricated from aluminum plate as specified in ASTM B209M. Castings for overhead signs: to ASTM B211M.
 - .9 Aluminum flanges: to ASTM B211M.
 - .10 Anchor and connecting bolts, 'U' clamps and miscellaneous hardware for overhead sign installations: fabricate from 304 stainless steel as specified in ASTM A276.
 - .11 Fasteners: bolts, nuts, washers and other hardware for roadside signs to be cast aluminum alloy, or galvanized steel.
- .2 Signboards:
- .1 Plywood: to CSA O121, 19 mm thick. Overlaid Douglas Fir, Medium Density CAN/CSA-Z809 or FSC or SFI certified, overlaid one side only with fibre or plastic sheet surfacing material.
 - .2 Aluminum sheet: Sign grade aluminum substrate (5052-H38) to ASTM B209M or CSA HA.4-6061-T6, precut to required dimensions.
 - .1 Thickness for signboards varies by category classification of the sign which is shown in bold on the attached MIT Traffic Sign Pamphlet next to the sign dimension.
 - .2 Thickness of sheet aluminum to be a minimum of 2 mm for signs up to 900 mm wide. Thickness to be 3 mm for signs with one dimension greater than 900 mm.
 - .3 Aluminum extrusions: to ASTM B211M, 150 mm or 300 mm panels suitable for bolting together.
 - .4 T-shape stiffeners for signboards: to ASTM B210M.

- .5 Connecting straps and brackets: to ASTM B209M.
- .6 Aluminum materials: to ASTM B209M.
- .7 Reflective sheeting and tape: to ASTM Type IV (High Intensity Prismatic) except:
 - .1 Stop (RA-1) to ASTM Type XI
 - .2 Chevron (WA-9) to ASTM Type XI fluorescent
- .8 Reflective sheeting and tape: to CGSB 62-GP-11M. Adhesive, class of reflectivity and colour as indicated.
- .9 Signs shall be pre-punched with appropriate holes for installation prior to clear coat application.
- .10 Transparent tape: flexible, smooth-surfaced, moisture resistant tape with pressure sensitive adhesive.
- .11 Clear varnish protective coat: MPI-EXT 6.4H.
- .3 Polyposts
 - .1 Polyposts are to be supplied in accordance with Manitoba Infrastructure and Transportation Work Zone Traffic Control Manual, Policy 900-B-12. Reflectivity of the sheeting on the posts shall be minimum ASTM Type IV.

2.2 FABRICATION

- .1 Supports:
 - .1 Connect aluminum support members by welding in accordance with CSA W47.2. Work to be performed by Canadian Welding Bureau qualified members only. Flame cutting of members not permitted.
 - .2 Welds to be of same strength as adjacent member or casting.
 - .3 Reinforce in area of electrical hand holes to equal strength of full section member.
 - .4 Remove sharp edges and burrs.
- .2 Signboards:
 - .1 Plywood blanks:
 - .1 Cut plywood blanks to required shapes and dimensions. Fill edges with wood filler suitable for outdoor use and sand smooth.
 - .2 Lightly sand surfaces, wipe clean with xylene thinner and allow to dry for 8 hours.
 - .3 Spray signboard back and edges with one prime coat and two finish coats in the same colour as the sign .
 - .2 Aluminum blanks:
 - .1 Degrease, etch and bonderize with chemical conversion coating.
 - .2 Clean surfaces with xylene thinner. Dry.
 - .3 For non-reflective signs, spray face with one coat vinyl pretreatment coating and two finish coats of required colour.

- .4 For aluminum signboards that are to be painted before installation, spray and bake face of signboards with two coats of enamel in accordance with MPI-EXT 5.4A.
- .3 Reflective background sheeting and lettering:
 - .1 Cut and apply in accordance with manufacturer's instructions.
 - .2 Apply adhesive coated material with heat lamp vacuum applicator or by squeeze roll application method. Apply pressure sensitive material with roller or squeegee.
 - .3 Edge wrap sheeting on each extrusion prior to bolting extrusions. Match pieces of sheeting from different rolls for each signboard to ensure uniform appearance and brilliance by day and night.
 - .4 Reflective signboard faces may be prepared using silk screen transparent ink.
- .4 Non-reflective lettering and symbols: cut from vinyl film as specified in CGSB 62-GP-9M, or paint using required colour of finish paint or silk screen transparent ink.
- .5 Clean signboards completely and apply transparent tape over top edge and extending 25 mm minimum down back and front of signboard.
- .6 Protect finished signboard faces with one coat of clear varnish.
- .7 Apply two coats of paint to wooden sign posts. Allow initial coat to dry before applying second coat. Apply paint only when relative humidity is below 85% and ambient temperature is above 5 degrees C.
- .3 Sign identification:
 - .1 Apply sign number and date of installation with 25 mm high [stencil painted] black letters on lower left back face of each signboard.

Part 3 Execution

3.1 INSTALLATION

- .1 Sign bridge:
 - .1 Erect sign bridge as indicated. Permissible tolerance: 12 mm maximum departure from vertical.
- .2 Sign support:
 - .1 Erect supports as indicated. Permissible tolerance: 50 mm maximum departure from vertical for direct buried supports. Where separate concrete footings have been placed, erect posts with base plates resting on levelling nuts and restrained with nuts and washers. Permissible tolerance: 12 mm maximum departure from vertical.
 - .2 Coat underside of base plate with corrosion protective paint before installation. Connect shoe base to shaft with inside and outside fillet welds.
 - .3 Close open aluminum tubes and posts with aluminum cap. Cut oblong holes in shoe bases to drain condensation. Install aluminum bolt cover on each base plate restraining nut.

- .4 Erect posts plumb and square to details as indicated.
- .5 Single channel steel posts:
 - .1 Drive to required depth without damage to posts.
 - .2 If rock or concrete is encountered, drill hole to required depth and set post in sand.
 - .3 In finished concrete surfaces, backfill with concrete or grout. Protect from adverse conditions until cured.
- .6 Wooden post installation:
 - .1 Excavate post holes to recommended minimum diameter. Compact bottom of hole to provide firm foundation. Set post and backfill in 150 mm layers with excavated material. Compact each layer before placing each subsequent layer.
 - .2 Leave or make depression, approximately 150 mm deep, around posts until paint is dry, then backfill and compact with excavated material to ground elevation.
 - .3 Install signs in accordance with MIT Figure SB-1 and SB-2 attached to this specification.
- .7 Join truss sections with wrought aluminum flanges welded to chords with inside and outside fillet welds. Build in camber to truss and monotube bridge supports to allow for deflection due to dead load of sign support, signboards, appurtenances; and an additional [1:300] camber.
- .3 Signboard:
 - .1 Fasten signboard[s] to supporting posts and brackets as indicated.
 - .2 Fasten lane markers to signboard.
 - .3 Use strapping with crimped or bolted connections where signs fastened to utility poles.
 - .4 Use T-shape aluminum stiffeners to join portions of sign panel on site. Cover face of T-stiffener with material identical to face of sign panel.













































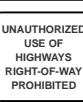





3.2 CORRECTING DEFECTS


























































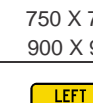



















- .1 Correct defects, identified by Departmental Representative, in sign message, consistency of reflectivity, colour or illumination. Correct angle of signboard and adjust luminaire aiming angle for optimum performance during night conditions to approval of Departmental Representative.







































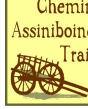













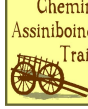








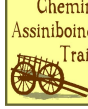



































3.3 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by traffic signage installation and salvage operations.

END OF SECTION































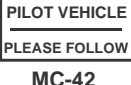















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| <div></div> <div>RB-15</div> <div>600 X 600 900 X 900</div> <div>5.1 5.1</div> | <div></div> <div>RB-16</div> <div></div> <div></div> | <div></div> <div>RB-34</div> <div>600 X 750 900 X 1200 1200 X 1500</div> <div>5.1 7.4 7.4</div> | <div></div> <div>RB-35</div> <div></div> <div></div> | <div></div> <div>RB-41 L</div> <div>600 X 600</div> <div>5.1</div> | <div></div> <div>RB-41 R</div> <div></div> <div></div> | <div></div> <div>MR-102</div> <div>750 X 750</div> <div>5.1</div> | | |
| <div></div> <div>RB-17 R</div> <div>600 X 900</div> <div>5.1</div> | | <div></div> <div>RB-63</div> <div>600 X 600 900 X 900</div> <div>5.3 5.3</div> | | <div></div> <div>RB-41 RT</div> <div>600 X 300</div> <div>5.1</div> | | <div></div> <div>RC-6</div> <div>600 X 600 900 X 900 1200 X 1200</div> <div>5.1 5.1 7.4</div> | | |
| <div></div> <div>RB-17 T</div> <div>600 X 300</div> <div>5.1</div> | | | | | | | | |
| <div><div>Urban Speed Area</div><div>MAXIMUM 50 km / h</div><div>Unless Otherwise Posted</div></div> <div>MR-10 (U)</div> <div>2700 X 1070</div> <div></div> | | <div><div>MORE THAN ONE TRUCK AT ONE TIME PROHIBITED</div></div> <div>MR-23</div> <div>600 X 750</div> <div>5.1</div> | | | | | | |
| <div><div>Rural Speed Area</div><div>MAXIMUM 90 km / h</div><div>Unless Otherwise Posted</div></div> <div>MR-10 (R)</div> <div>2700 X 1070</div> <div>1.2</div> | | <div><div>ON BRIDGE</div></div> <div>MR-23 T</div> <div>600 X 300</div> <div>5.1</div> | | | | | <div><div>STOP FOR SCHOOL BUS</div><div>BOTH DIRECTIONS WHEN SIGNALS FLASHING</div></div> <div>MR-120 U</div> <div>E4 1200 X 1200 E2 1200 X 450 E3 1200 X 600</div> <div>7.4</div> | |

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|--|---|--|--|--|--|---|--|---|---|-----|
|  WA-1L |  WA-1R |  WA-11 |  WA-12 R |  WA-13 L |  WB-1 900 X 900 1200 X 1200 |  WB-4 13.3 7.8 |  MW-82 |  MW-86 |  MW-87 | |
|  WA-2L |  WA-2R |  WA-14 |  WA-16 R | |  WB-9 750 X 750 900 X 900 1200 X 1200 | 16.1 16.1 16.2 |  MW-88 |  MW-90 |  MW-94 | |
|  WA-3L |  WA-3R |  WA-18 L* |  WA-18* |  WA-18 R* |  WB-3 |  WC-5 |  WC-6 |  MW-99 900 X 900 |  MW-107 5.1 | |
|  WA-4L |  WA-4R |  WA-21 750 X 750 900 X 900 |  WA-22 5.1 5.1 |  WA-23 *13.3 *13.3 |  WC-7 |  WC-10 |  WC-12 R | | | |
|  WA-5L |  WA-5R |  WA-24 |  WA-25 |  WA-26* |  WC-13 750 X 750 900 X 900 |  WC-15 5.1 5.1 |  WC-23 |  WA-36 400 X 900 600 X 1350 | 13.3 7.8 | |
|  WA-6L |  WA-6R |  WA-31 |  WA-32 | |  WC-1 750 X 750 | 13.3 | |  WA-36 L 300 X 900 | 13.3 | |
| 600 X 600 750 X 750 900 X 900 | 5.1 5.1 5.1 |  WA-33 L |  WA-33 R |  WA-34 |  WC-16 R 750 X 750 900 X 900 | 13.3 13.3 | |  H-315 T 13.3 | | |
|  WA-7 S | 600 X 600 750 X 750 | 5.3 5.3 |  WA-33 L 750 X 750 900 X 900 | 5.1 5.1 |  WC-2 R 750 X 750 900 X 900 | 13.3 13.3 |  WC-3 750 X 750 900 X 900 |  MW-95 5.1 5.1 |  H-320 100 X 200 | 5.1 |
|  MW-1 | 600 X 750 900 X 1200 | 5.3 7.6 |  WA-33 L 600 X 300 900 X 450 | 5.1 5.1 |  WC-9 900 X 900 | 5.1 |  H-319 S 300 X 200 | 10.6 | | |
|  WA-8 1200 X 1200 |  WA-8 L/R |  WA-8 B 7.4 |  WA-27 900 X 600 | 5.3 |  MW-89 |  MW-132 5.1 |  H-323 DS 450 X 450 | 13.5 | | |
|  WA-9 600 X 750 | 13.3 | | | |  WA-30 S 600 X 300 900 X 450 |  WA-28 S 5.3 5.3 |  H-323 SS 600 X 600 | 13.6 | | |

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|--|--|---|---|--|---|--|---|---|---|---|--|---|--|
|  D-321 90 X 900 |  D-322 90 X 450 | 13.7 |  IB-1 * |  M-2A * |  M-2B |  IS-5 L |  IS-6 R |  IS-7 |  IS-8 |  IS-9 R | | | |
|  ID-21 R 130 X 200 | 5.1 |  M-2G 600 X 750 900 X 1200 |  M-2J 5.1 7.4 |  M-2Q 5.3 7.6 |  MM-4 L |  MM-5 |  MM-18 |  NORTH IS-10 |  EAST IS-11 |  SOUTH IS-12 |  WEST IS-13 |  BY-PASS IS-14 |  ENDS IS-15 |
| Anthony ST IDM-1 ? X 150 | 12.2 |  M-2C * |  M-2H |  M-2K |  MM-17 |  CITY ROUTE MM-19 |  2 km MM-20 |  LEFT LANE MM-23 |  EXIT 2 km MM-24 |  NEXT LEFT MM-25 | | | |
| Darren RD IDM-2 ? X 230 | 12.3 |  M-2N |  M-2P * |  M-2S # |  MM-26 600 X 600 | | | | 600 X 300 900 X 450 | 5.1 5.1 | | | |
| Cantilever BLVD IDM-3 ? X 305 | 2.2 |  M-2F 1200 X 900 | 7.4 |  M-2M 600 X 600 |  M-2MB 600 X 750 | 5.1 |  JUNCTION IB-4 |  MM-8 | 1240 X 300 1840 X 450 | 7.4 7.4 | | | |
|  CITI 92.1 FM CKXL 91.1 FM Winnipeg MI-53 1800 X 1200 | 7.5 |  M-2R 600 X 600 900 X 900 # | 5.1 5.1 |  M-2F 1200 X 900 | 7.4 |  IC-1 |  IC-2 |  IC-3 |  IC-4 |  IC-5 |  IC-6 | | |
|  CFCW 750 AM Portage la Prairie MI-54 1200 X 1200 | 7.5 |  M-2M 600 X 600 | 5.1 |  M-2MB 600 X 750 | 5.1 |  IC-7 |  IC-8 |  IC-9 |  IC-15 |  IC-20 |  IC-21 | | |
|  ADOPT-A-HIGHWAY LITTER CONTROL NEXT 8 km MI-87 1500 X 750 | 7.4 |  M-2M 600 X 600 | 5.1 |  M-2MB 600 X 750 | 5.1 |  IC-10 |  IC-11 |  IC-12 |  IC-13 |  IC-14 |  IC-16 | | |
|  Manitoba Thanks The Clean Team MI-87 T 1500 X 600 | 7.4 |  M-2V 600 X 900 | 5.1 |  M-2L 600 X 900 | 5.1 |  SERVICE ROAD MI-22 |  BUSINESS SECTION MI-50 |  Historic Site MI-49 |  MI-21 |  MI-26 |  MI-27 | | |
|  Site Available MI-87 TB 1500 X 600 | 7.4 |  M-2K T 600 X 300 900 X 450 | 5.1 5.1 |  M-2K TB 600 X 300 900 X 450 | 5.1 5.1 |  MI-29 |  MI-30 |  MI-31 |  MI-33 |  MI-34 |  MI-37 | | |
| | |  M-2J T 600 X 300 900 X 450 | 5.1 5.1 |  M-2Q T 600 X 300 900 X 450 | 5.1 5.1 |  MI-38 |  MI-39 |  MI-41 |  MI-42 |  MI-46 |  MI-47 | | |
| | |  MI-116 600 X 600 900 X 900 | 16.2 16.2 | | |  MI-64 |  MI-90 | | | 600 X 600 900 X 900 | 5.1 5.1 | | |

OTHER SERVICE SYMBOLS ARE AVAILABLE;
CONTACT THE TRAFFIC SIGNING TECHNICIAN.

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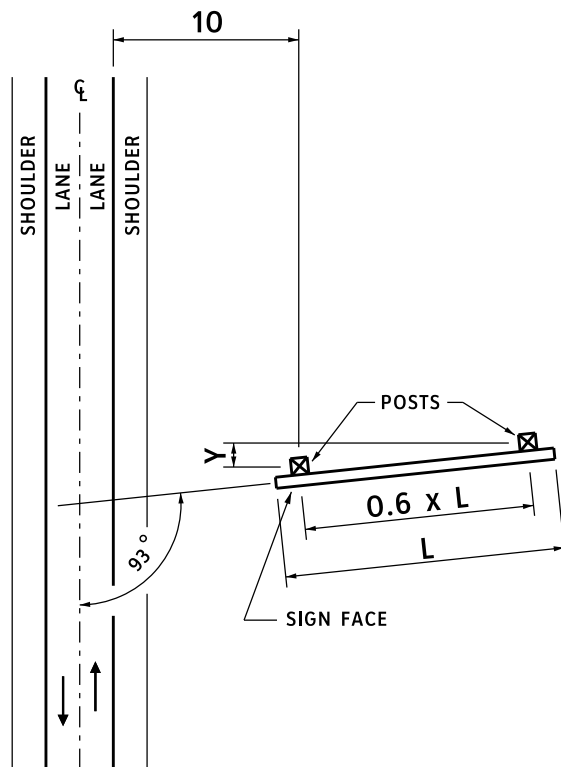
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| <div>  MC-1 1200 X 1200 7.4 </div> <div>  MC-1 D 900 X 900 5.1 </div> <div>  MC-1 DF 1200 X 1200 7.4 </div> <div>  MC-1 DB 1200 X 1200 7.4 </div> <div>  TC-2 </div> <div>  TC-3 </div> <div>  TC-4 </div> <div>  TC-4 DB </div> <div>  TC-5 R </div> <div>  TC-10 </div> <div>  TC-13 R </div> <div>  TC-47 </div> <div>  TC-48 </div> <div>  TC-49 </div> <div>  TC-51 </div> <div>  TC-54 R </div> <div>  MC-4 </div> <div>  MC-6 </div> <div>  MC-31 </div> <div>  MC-32 </div> <div>  MC-33 </div> <div>  MC-36 </div> <div>  MC-37 </div> <div>  MC-51 </div> <div>  MC-53 </div> <div>  MC-55 </div> <div>  MC-64* </div> <div> <p>900 X 900 5.1 *13.3</p> </div> | <div>  MC-9 1200 X 750 7.4 </div> <div>  MC-41 900 X 600 5.1 </div> <div>  MC-42 1200 X 600 15.1 </div> <div>  MC-42 1200 X 600 15.1 </div> <div>  TC-17 750 X 1200 7.4 </div> <div>  MC-179 </div> <div>  H-316 R 1800 X 200 </div> <div>  H-316 L 1800 X 200 </div> <div>  H-317 1800 X 400 4.1 </div> <div>  H-318 R / L 1800 X 200 11.1 </div> <div> <p>GATEWAY ASSEMBLY BOARDS</p> </div> <div>  MR-179 600 X 600 5.1 </div> <div>  MR-179 F 900 X 900 5.1 </div> <div>  WD-A44 600 X 300 5.1 </div> <div>  TC-49 T 900 X 450 5.1 </div> | <div> <p>RESURFACING</p> <p>GRADING</p> <p>TWINNING</p> <p>INTERCHANGE CONSTRUCTION</p> <p>BRIDGE CONSTRUCTION</p> <p>INTERSECTION IMPROVEMENTS</p> </div> <div>  MI-191 2800 X 1500 2800 X 1800 (Bilingual) </div> <div>  MC-44A </div> <div>  </div> <div>  MC-44A B </div> <div>  </div> <div> <p>TRAFFIC CONTROL PADDLES 450 X 450 13.9</p> </div> |
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PLACEMENT AND INSTALLATION OF PANEL SIGNS

Traffic Engineering

ISSUE DATE: APRIL 1993

SB-1

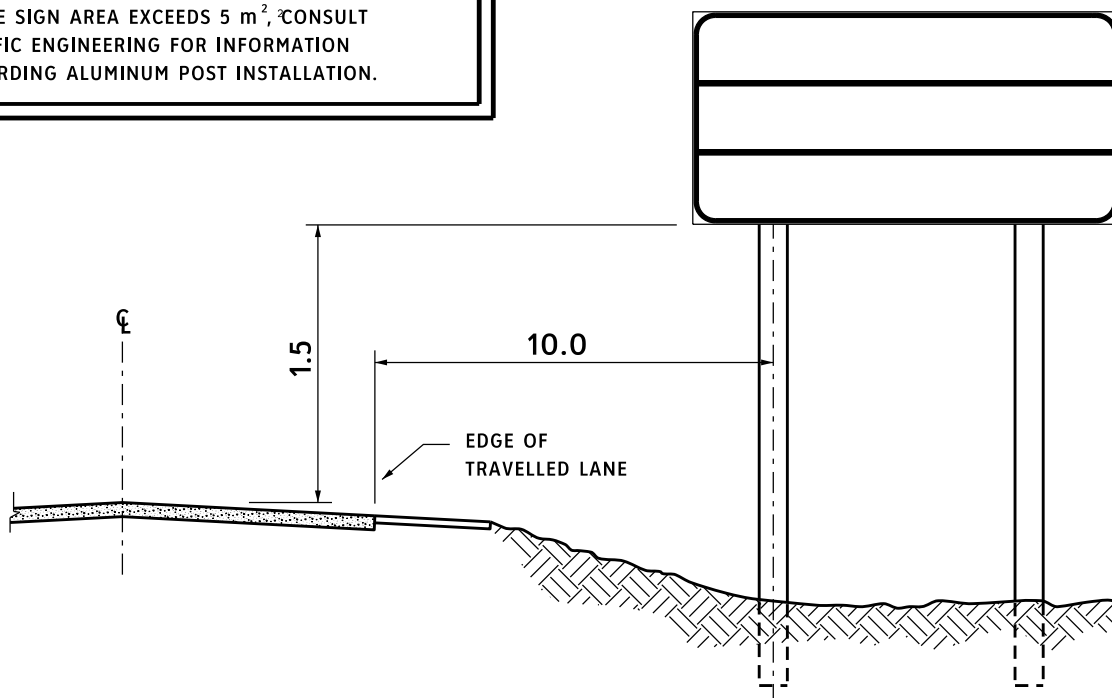


| POST SPACING 0.6 x L (m) | POST OFFSET Y (cm) |
|----------------------------------|----------------------------|
| 1.0 | 5 |
| 1.2 | 6 |
| 1.4 | 7 |
| 1.6 | 8 |
| 1.8 | 9 |
| 2.0 | 10 |
| 2.2 | 12 |
| 2.4 | 13 |
| 2.6 | 14 |
| 2.8 | 15 |
| 3.0 | 16 |
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| 3.4 | 18 |
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| 3.8 | 20 |
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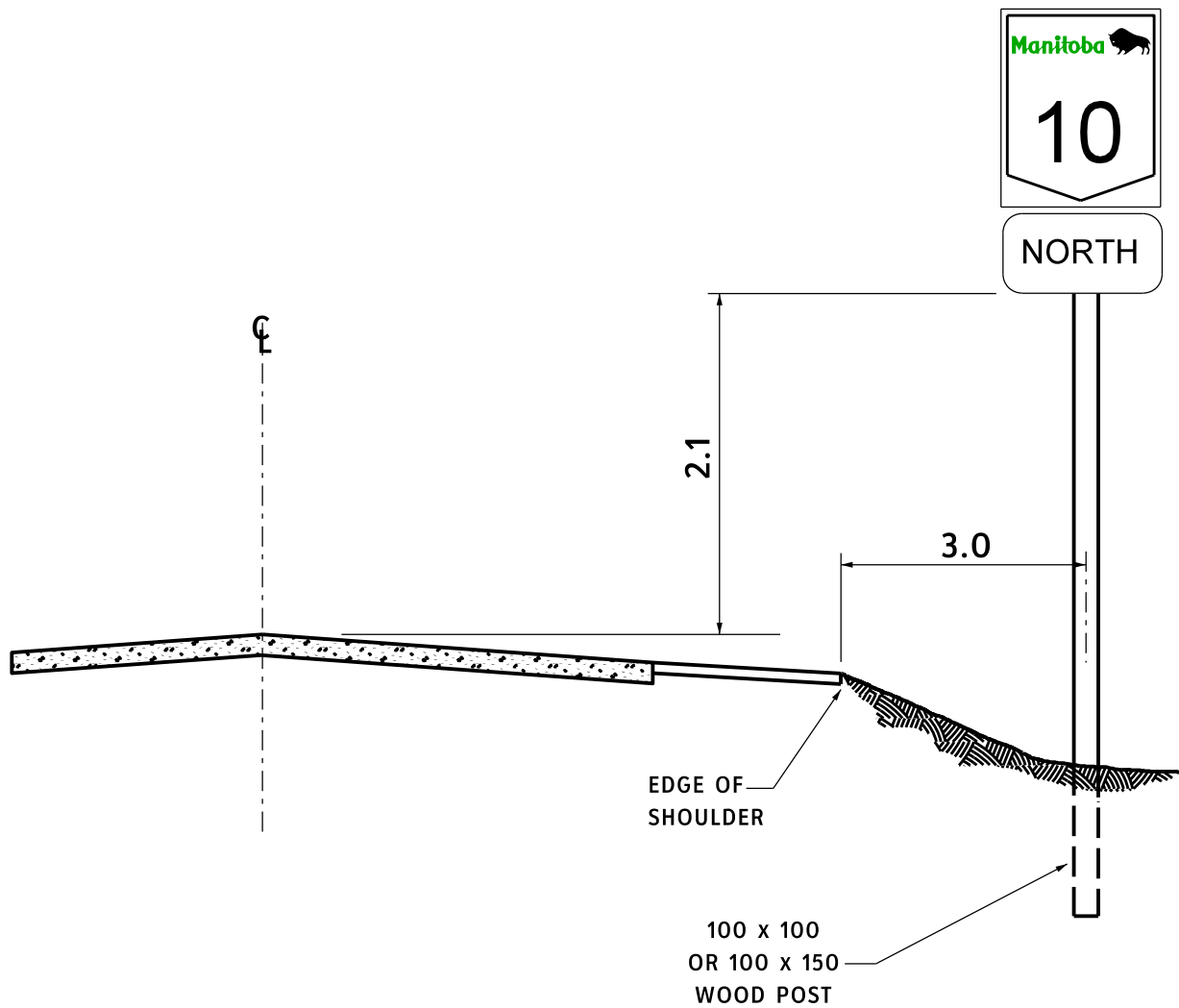
PANEL SIGN PLACEMENT

NOTES:

1. STANDARD SIGN SUPPORTS ARE 100 x 100 mm OR 100 x 150 mm WOOD POSTS.
2. IF THE SIGN AREA EXCEEDS 5 m², CONSULT TRAFFIC ENGINEERING FOR INFORMATION REGARDING ALUMINUM POST INSTALLATION.



PANEL SIGN INSTALLATION



NOTES:

1. THE 3.0 m SHEET SIGN OFFSET OCCASIONALLY EXCEEDS THE REQUIREMENTS OF SECTION A.2 OF THE UTCD MANUAL.

Part 1 General

1.1 REFERENCES

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
- .2 ASTM International
 - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A143, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
 - .3 ASTM A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .4 ASTM F2329, Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners
- .3 CSA International
 - .1 CSA A23.1, Concrete materials and methods of concrete construction / Test methods and standard practices for concrete
 - .2 CSA G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
 - .3 CSA W48, Filler metals and allied materials for metal arc welding
 - .4 CSA W59, Welded Steel Construction (Metal Arc Welding)
- .4 Manitoba Infrastructure and Transportation
 - .1 Manitoba Infrastructure and Transportation Traffic Engineering Branch Specification E-050, Fabrication and Delivery of Structural Supports for Traffic Signals and Luminaires

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 The supplier shall submit to the Departmental Representative, shop drawings sealed by a Professional Engineer, registered or licensed to practice in the Province of Manitoba, in triplicate for approval prior to any fabrication. Shop drawings shall be complete and shall include all information such as material specifications, weld sizes, bills of material, welding procedures, design criteria, etc. within one week from award of contract.
 - .2 Approval of shop drawings by the Traffic Engineering Branch will be for general agreement only and in no case will the supplier be relieved of the responsibility for completeness or adequacy of fabrication materials and procedures.

- .3 No fabrication shall commence until shop drawings have been reviewed and returned to the supplier. All costs resulting from any changes or due to failure to have shop drawings so reviewed shall be borne by the supplier.
- .4 Shop drawings shall indicate the total weight and center of gravity of each component for lifting and rigging purposes..

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions. All materials shall be handled in a careful and workmanship-like manner, to the satisfaction of the Departmental Representative. Storage of materials shall be in accordance with the requirements of CSA Standard A23.1, except as otherwise specified herein.
- .2 During fabrication and surface preparation work, the structures shall be lifted and handled in a careful and workmanlike manner. Significant nicks or scratches caused by improper lifting and handling shall be grounds for repair or rejection at the sole discretion of the Departmental Representative.
- .3 Following galvanizing, protective sleeves shall be used on metallic lifting chains or forklift forks coming in contact with the structures. Nicks or scratches in the galvanizing coating will be grounds for repair or rejection at the sole discretion of the Departmental Representative.
- .4 Structures shall be stored on wood blocking at all times. The structures should be kept free from contact with the debris, mud and standing water at all times.

1.4 QUALITY CONTROL

- .1 General
 - .1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection, 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 approval that may have been previously given. The Departmental Representative reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.
 - .2 The Contractor shall be responsible for making a thorough inspection of materials to be supplied under this Contract. All material shall be free of surface imperfections and other defects.
- .2 Welding Qualifications
 - .1 The Contractor shall produce evidence that the plant has recently been fully approved by the C.W.B. to the requirements of CSA W47.1 Division 2.1 for welding of steel structures.
 - .2 Approved welding procedures shall be submitted to the Departmental Representative prior to fabrication of any steel items.
- .3 Inspection

- .1 The Department will appoint an inspection agency to carry out inspections and testing of work in this Specification. The inspection agency shall report to the Department based on plant inspections of welds, material, fabrication procedures, quality control, mill test certificates, etc. The inspections will include the following:
 - .1 Inspection of all material and proposed fabrication procedures prior to the start of manufacturing.
 - .2 Inspection of all fabricated components prior to surface preparation.
 - .3 Inspection of all fabricated components prior to hot-dip galvanizing
 - .4 A final inspection following hot-dip galvanizing, prior to shipment from the manufacturer's plant
- .2 The inspection agency shall carry out the following welding inspections and testing:
 - .1 Circumferential Welded Splices - 100% of circumferential welds used to join pole sections together shall be inspected. Inspection shall be performed by radiography or ultrasonics, or by destructive tests acceptable to the Departmental Representative. Only one time repair of circumferential welds is allowed without written permission of the Departmental Representative.
 - .2 Longitudinal Seam Welds - 100% of full penetration welds and a random 25% of partial penetration welds of longitudinal seams shall be inspected. Full penetration weld inspections shall be performed by radiography or ultrasonics. In addition, partial penetration welds may be inspected by magnetic particle. Both types of weld may be tested by destructive methods acceptable to the Departmental Representative.
 - .3 Base Connection and Flange Plate Connection Welds - A random 25% of all base connection and flange plate connection welds shall be inspected. Full penetration weld inspection may be performed by radiography or ultrasonics. Fillet welds may be inspected by magnetic particle. Both types of weld may be tested by destructive methods acceptable to the Departmental Representative. Only one time repair of base connection or flange plate connection welds is allowed without written permission of the Departmental Representative.
- .3 Welds that are found by any of the inspection methods to be inadequate and unsatisfactory shall be repaired in accordance with CSA W59 and then re-tested. The cost of the repairs and the cost of the re-test shall be paid for by the Contractor.
- .4 No repair shall be made until agreed to by the Departmental Representative
- .5 The Contractor shall fabricate the components (pieces) in batches such that one inspection can be carried out at each stage (fabrication, surface preparation, galvanizing) for each batch. Batches shall consist of a minimum of 10 components. Where practical, batches should include all the items of a particular stock code. A batch shall not be separated or recombined with other batches such that there are less than 10 items in the resulting batch. The inspection agency reserves the right to refuse inspection of components in the event that the minimum batch requirements are not met.

- .6 The Contractor shall only carry out the next step in the fabrication process (e.g. fabrication, surface preparation, galvanizing) only after the completed previous step has been duly inspected
- .4 Unacceptable Work
 - .1 Any welding work found to be unacceptable shall be corrected in accordance with CSA W59. No repair shall be made until agreed to by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Extension Arms
 - .1 All extension arms shall be one piece without any flanges, except where the arm is attached to the vertical member.
- .2 Tubular Components
 - .1 Each tubular component shall be fabricated in one piece, except where joints are indicated.
- .3 Structural Steel
 - .1 Structural steel shall be in accordance with CSA G40.21. The grade supplied shall be in accordance with the grades shown.
 - .2 For purposes of hot-dip galvanizing, the silicon content in the steel shall be controlled as follows:
 - .1 For monotubular steel shafts, to within 0 to 0.03% or within 0.15 to 0.22%
 - .2 For base, flange and gusset plates and other miscellaneous steel: below 0.30%.
 - .3 The Supplier is advised that copies of mill test certificates showing the chemical and physical properties of all structural steel to be supplied under this Specification must be submitted to the Departmental Representative. The mill test certificates shall be submitted prior to commencement of product fabrication for acceptance by the Departmental Representative.
 - .4 Steel shall not be acceptable unless the mill test certificate states the grade to be in accordance with the grades stated. Lower grade steel shall not be acceptable (despite favourable published mill test yield results), and items fabricated without steel certification shall be rejected.
 - .5 All costs resulting from any changes or due to failure to have submissions reviewed shall be borne by the Supplier.
- .4 Hot-Dip Galvanizing
 - .1 Hot-dip galvanizing shall be in accordance with ASTM A123 - 09 to a net minimum retention of 600 g/m².
- .5 Galvanizing Repair

- .1 Galvanizing repair materials shall meet the requirements of Section 3.1.5.1.2 of this Specification. Zinc paint shall be Zinga or equal as approved by the Departmental Representative.
- .6 Welding Consumables
 - .1 The selection, supply, and storage of electrodes for all processes shall be according to CSA W59 requirements (latest edition) and CSA W48 (latest edition). Only controlled hydrogen designation electrodes and low hydrogen wire consumables shall be used for the SMAW and flux-cored arc welding processes, respectively.
 - .2 Electrodes and fluxes shall be strictly stored and maintained as required by CSA W59, section 5.2.
- .7 Connection Bolts
 - .1 Connection bolts shall be ASTM A325 high strength bolts each with one grade DH nut and one hardened washer, all hot-dip galvanized in accordance with ASTM F2329.
 - .2 The galvanized nuts shall be overlapped to the minimum amount required for fastener assembly. The nuts shall be lubricated with a lubricant containing a visible dye. The lubricant shall be clean and dry to the touch.
- .8 Stainless Steel Hardware
 - .1 Stainless steel hardware shall be in accordance with ASTM A276 Type 316 stainless steel unless otherwise shown.
- .9 Miscellaneous Materials
 - .1 Miscellaneous material incidental to this work shall be as approved by the Departmental Representative.

2.2 IDENTIFICATION

- .1 Each structure will be provided with a “raised stock code” welded to the component, as indicated. Each character of the stock code shall be approximately 25 mm wide by 40 mm tall, with a 10 mm space provided between each character. The weld profile shall be a smooth half round bead approximately 2 mm tall by 3 mm wide.
- .2 For horizontal (arm type) components, the raised stock code shall be provided approximately 500 mm from the flange plate and located on the top-side of the arm.
- .3 For vertical (shaft and stub type) components, the raised stock code shall be provided approximately 500 mm from the base plate and located on the access panel side of the shaft.
- .4 Horizontal (arm type) components shall be marked with a raised “T” welded to the top face of the arm approximately 250 mm away from the flange plate. The raised weld shall conform to the requirements of the “raised stock code” described above.

Part 3 Execution

3.1 INSTALLATION

- .1 General Requirements
 - .1 Holes in the base plates shall be sized as indicated.
 - .2 Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facilities shall be consulted regarding the size and location of these holes. Holes shall be provided by drilling, not burning
 - .3 Prior to fabrication, the dimensional limitations on the size and shape imposed by the galvanizing facilities shall be determined for hot-dip galvanizing all individual components of the traffic signal and pedestrian corridor standards.
- .2 Fabrication
 - .1 All fabrication shall be carried out in accordance with this Specification and the Contract Drawings, as well as AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals – 2009, plus all subsequent revisions.
 - .2 The punching of identification marks on the members will not be allowed.
 - .3 Any damage to members during fabrication shall be brought to the attention of the Departmental Representative in order that the Departmental Representative may approve remedial measures.
 - .4 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.
 - .5 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.
 - .6 All holes shall be free of burrs and rough edges.
- .3 Welding
 - .1 Welding shall be in accordance with CSA W59, “Welded Steel Construction” (latest edition).
 - .2 The proposed welding procedures and welding consumable certificates shall be submitted to the Departmental Representative for approval at least two (2) days prior to the scheduled commencement of any fabrication.
 - .3 All seams shall be continuously welded and free from any slag and splatter. Longitudinal welds shall be a minimum of 70% penetration, except those within 200 mm of baseplates, flanges, end openings, access openings, and circumferential welds, which shall be 100% penetration. All circumferential groove welds shall be 100% penetration, and where circumferential welds are used at a butt joint, an internal backup strip shall be provided.
 - .4 Longitudinal seam welds in davit arms and extensions shall be located at the bottom of the horizontal members. Only one longitudinal seam is permitted in each member.
 - .5 Welds joining monotubular column or arm elements to base or flange plates shall be unequal leg welds, with the long leg of the fillet weld along the column or

arm. The termination of the longer weld leg shall contact the shaft's surface at approximately a 30° angle.

- .6 All welds shall be ground smooth and flush with the adjacent surface prior to hot-dip galvanizing.

.4 Surface Preparation and Cleaning

- .1 Surface preparation and cleaning of materials prior to hot-dip galvanizing shall be in accordance with ASTM A153 and SSPC Specification SP:6 "Commercial Blast Cleaning", unless otherwise specified herein. The Contractor shall ensure that the exterior of all individual components of the standards are blast cleaned prior to pickling to achieve the minimum zinc coating mass of 600 g/m². All welding and provision of holes is to be completed prior to surface preparation and cleaning, except where shown.
- .2 The sandblasting and cleaning of all components shall be done in the shop.
- .3 After sandblasting, the inside and outside of the structure shall be cleaned free of all sand and sandblasting debris by means of blowing with compressed air and/or vacuuming to the satisfaction of the Departmental Representative.
- .4 After the fabricated components have been sandblasted and cleaned, an inspection agency will carry out a visual inspection of the components in the shop before they are shipped to the galvanizing plant.
- .5 Following sandblasting, the structures shall be galvanized as soon as practical. If significant surface rusting should develop on the structures before they are galvanized, they shall be re-sandblasted as directed by the Departmental Representative.

.5 Hot-Dip Galvanizing

.1 General

- .1 The hot-dip galvanizing plant shall be a Regular Member of the American Galvanizers Association, Inc.
- .2 Hot-dip galvanizing shall be in accordance with ASTM A123 - 09 to a net minimum retention of 600 g/m². The contractor shall safeguard against embrittlement of the fabricated steel in accordance with ASTM A143 - 07 "Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement".
- .3 All outside surfaces and interior surfaces of all individual components of the traffic signal and pedestrian corridor standards shall be hot-dip galvanized in accordance with the requirements of this Specification.
- .4 The galvanizing coating on outside surfaces of the structures shall be generally smooth and free of blisters, lumpiness and runs. In particular, the outside surfaces of the bottom 2.5 m of the vertical support members shall have a smooth finish equal to the finish on hot-dipped galvanized handrails.
- .5 The aesthetic appearance of the structure after hot-dip galvanizing will be a criterion in the acceptance or rejection of the galvanized coating. The galvanized coating on the entire structure shall have a uniform "silver" colour and luster. Galvanizing with parts of the structure having

dull grey coating or streaks or mottled appearance will not be acceptable. If the galvanizing is rejected for aesthetic reasons, the Contractor shall rectify the appearance by applying spray-on molten zinc metallizing with 85/15 zinc/aluminum alloy. The metallizing shall be carried out in the shop before the structure is installed.

- .6 To prevent problems with aesthetic appearance of structures after hot-dip galvanizing, the Contractor shall be responsible for ensuring that the silicon content in the steel used for fabricating the structures is controlled as specified herein.
- .7 Defects in the galvanizing coating shall be repaired in accordance with Section 3.1.5.1.2 of this Specification. The Departmental Representative shall be consulted before repairs are made. Other defects and contaminants in the galvanizing coating, such as heavy dross protrusions, flux inclusions and ash inclusions shall be grounds for rejection of the galvanizing coating system.
- .8 The Contractor shall verify the thickness of galvanized coatings as directed by the Departmental Representative and have these readings available for review.
- .9 All threaded attachments and couplings shall be re-threaded after the sign structures have been hot-dip galvanized.
- .10 All external galvanizing vent and drain holes shall be filled with either aluminum or plastic tapered plugs.
- .2 Repair of Damaged Galvanizing
 - .1 In the event that repairs to the galvanizing coating are required, repair materials and practices shall be supplied and performed in accordance with ASTM A780 – 09 “Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings”.

3.2 CORRECTING DEFECTS

- .1 Correct defects, identified by Departmental Representative, in sign message, consistency of reflectivity, colour or illumination. Correct angle of signboard and adjust luminaire aiming angle for optimum performance during night conditions to approval of Departmental Representative.

3.3 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by traffic signage installation and salvage operations.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
- .2 National Building Code / CSA International
 - .1 NBC CSA S-136, Design of Light Gauge Steel Structural Members
 - .2 NBC CSA S-6 Steel Structures for Buildings
 - .3 NBC Commentary No. 1 Wind Loads
- .3 Manitoba Infrastructure and Transportation
 - .1 Manitoba Infrastructure and Transportation Traffic Engineering Branch Specification E-050, Specification for Pedestrian Corridor and Traffic Signal Davit Standards

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 The supplier shall submit to the Departmental Representative, shop drawings sealed by a Professional Engineer, registered or licensed to practice in the Province of Manitoba, in triplicate for approval prior to any fabrication. Shop drawings shall be complete and shall include all information such as material specifications, weld sizes, bills of material, welding procedures, design criteria, etc. within one week from award of contract.
 - .2 Approval of shop drawings by the Departmental Representative will be for general agreement only and in no case will the supplier be relieved of the responsibility for completeness or adequacy of fabrication materials and procedures.
 - .3 No fabrication shall commence until shop drawings have been approved and returned to the supplier. All costs resulting from any changes or due to failure to have shop drawings so approved shall be borne by the supplier.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions. All materials shall be handled in a careful and workmanship-like manner, to the satisfaction of the Departmental Representative. Storage of materials shall be in accordance with the requirements of CSA Standard A23.1, except as otherwise specified herein.
- .2 During fabrication and surface preparation work, the structures shall be lifted and handled in a careful and workmanlike manner. Significant nicks or scratches caused by improper lifting and handling shall be grounds for repair or rejection at the sole discretion of the Departmental Representative.

- .3 Following galvanizing, protective sleeves shall be used on metallic lifting chains or forklift forks coming in contact with the structures. Nicks or scratches in the galvanizing coating will be grounds for repair or rejection at the sole discretion of the Departmental Representative.
- .4 Structures shall be stored on wood blocking at all times. The structures should be kept free from contact with the debris, mud and standing water at all times.

1.4 QUALITY CONTROL

- .1 General
 - .1 All workmanship and all materials furnished and supplied under this Specification are subject to close and systematic inspection, 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 approval that may have been previously given. The Departmental Representative reserves the right to reject any materials or works that are not in accordance with the requirements of this Specification.
 - .2 The Contractor shall be responsible for making a thorough inspection of materials to be supplied under this Contract. All material shall be free of surface imperfections and other defects.
- .2 Welding Qualifications
 - .1 The Contractor shall produce evidence that the plant has recently been fully approved by the C.W.B. to the requirements of CSA W47.1 Division 2.1 for welding of steel structures.
 - .2 Approved welding procedures shall be submitted to the Departmental Representative prior to fabrication of any steel items.
- .3 Inspection
 - .1 All material and proposed fabrication procedures shall be inspected prior to the start of manufacturing, by an inspection agency appointed by the Departmental Representative.
 - .2 All standards shall be inspected prior to finishing, by an inspection agency appointed by the Departmental Representative.
 - .3 The inspection agency shall report directly to the Departmental Representative base don plan inspections of welds, material, fabrication procedures, quality control, mill test certificates, etc.
 - .4 A final inspection shall be made by the inspection agency following applications of finish, prior to shipment from the manufacturer's plant.
 - .5 All inspection costs shal be borne by the supplier, on a charge-back basis.
- .4 Unacceptable Work
 - .1 Any welding work found to be unacceptable shall be corrected in accordance with CSA W59. No repair shall be made until agreed to by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Traffic Signal / Pedestrian Corridor Mounting
 - .1 Traffic signals shall mount vertically on Heavy Series and Light Series standards, according to the following:
 - .1 The outboard traffic signal head shall mount on an adjustable hanger.
 - .2 A 50 mm diameter (60mm O.D.) 200 mm long tenon shall be provided with a 15mm wide, 25mm long slotted hole drilled 25mm from the end of the tenon.
 - .3 The inboard traffic signal head, where used on the Heavy Series standards, shall mount on a vertical, rigidly affixed 38mm diameter, 76 mm long full threaded NPS nipple, 3.7 m from the outboard end of the traffic signal arm.
 - .2 A 50 mm diameter (60mm O.D.), 920 mm long tenon shall be provided, with two 15mm wide, 25mm long slotted holes drilled at 300 mm and 610 mm from the end of the tenon.
- .2 Anchor Bolt / Flange Bolt Pattern
 - .1 Base Plate Anchor Bolt pattern for Straight and Light Series Davit Standards shall be four 35mm diameter slotted holes, on a 280mm to 290mm B.C.D. (approximately 206mm square pattern).
 - .2 Anchor Bolts used for Post-Top type and Light Series Davit Standards shall be 28.5mm 7-T.P.I., not included in this specification.
 - .3 Base Plate Anchor Bolt pattern for Heavy Series Davit Arm type standards shall be four 38mm diameter holes, on a 380mm B.C.D. (approximately 270mm square pattern).
 - .4 Anchor bolts used for Heavy Series Davit Arm type standards shall be 32mm 7-T.P.I.
 - .5 Flange plates shall be fabricated in accordance with NMS Specification 10 14 54
 - .6 Four galvanized flange bolts shall be supplied with each extension arm.
 - .7 Flange bolts for Light Series Standards shall be 63.5mm long (2 ½”) long Type A.325 threaded 5/8” – 9 UNC/2B and shall be complete with one A.325 galvanized hex nut and one A.325 galvanized flat washer per bolt.
 - .8 Flange bolts for Heavy Series Standards shall be 76.2mm (3.0”) long Type A.325 threaded 7/8” – 9 UNC/2B and shall be complete with one A.325 galvanized hex nut and one A.325 galvanized flat washer per bolt.
- .3 Access Panel
 - .1 An access panel, approximately 370 mm x 115 mm shall be mounted on the downstream side of the Straight and Light Series Standards at a height of 1000 mm to panel centre line, and at a height of 1370 mm for Heavy Series Standards from panel centre line above the base plate.
- .4 Handhole

- .1 A standard 130 mm x 180 mm handhole shall be provided, mounted at a height of 305mm above the base plate, on the downstream side of Heavy Series Davit Arm standards only. No handhole shall be provided on the Straight or Light Series standard.
- .5 Surface Finish
 - .1 The surface finish of all individual components of the traffic signal and pedestrian corridor standards, i.e.
 - .1 • Straight Standard
 - .2 • Access Panel Cover
 - .3 • Handhole Cover
 - .4 • Light Series Davit Stub
 - .5 • Light Series Extension Arm
 - .6 • Heavy Series Davit Stub
 - .7 • Heavy Series Extension Arms
 - .8 • all Flange bolts, nuts and washers
 - .2 shall be “hot dip galvanized” in accordance with CSA Specification No. G-164.

2.2 IDENTIFICATION

- .1 Each mating flange of Davit Arm Type Standards, and each base-plate flange of straight standards shall be identified with the appropriate identification stock code number (as indicated on the specification sheet) and the date of manufacture. This shall be stamped on the bottom side of each flange, or on the handhole side of the base plate in the case of the straight standard.

Part 3 Execution

3.1 INSTALLATION

- .1 General Requirements
 - .1 Holes in the base plates shall be sized as indicated.
 - .2 Adequate venting and drainage holes shall be provided in enclosed sections for hot-dip galvanizing. The galvanizing facilities shall be consulted regarding the size and location of these holes. Holes shall be provided by drilling, not burning
 - .3 Prior to fabrication, the dimensional limitations on the size and shape imposed by the galvanizing facilities shall be determined for hot-dip galvanizing all individual components of the traffic signal and pedestrian corridor standards.
- .2 Fabrication
 - .1 All fabrication shall be carried out in accordance with this Specification and the Contract Drawings, as well as AASHTO Standard Specifications for Structural

Supports for Highway Signs, Luminaires and Traffic Signals – 2009, plus all subsequent revisions.

- .2 The punching of identification marks on the members will not be allowed.
- .3 Any damage to members during fabrication shall be brought to the attention of the Departmental Representative in order that the Departmental Representative may approve remedial measures.
- .4 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.
- .5 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.
- .6 All holes shall be free of burrs and rough edges.

.3 Welding

- .1 Welding shall be in accordance with CSA W59, “Welded Steel Construction” (latest edition).
- .2 The proposed welding procedures and welding consumable certificates shall be submitted to the Departmental Representative for approval at least two (2) days prior to the scheduled commencement of any fabrication.
- .3 All seams shall be continuously welded and free from any slag and splatter. Longitudinal welds shall be a minimum of 70% penetration, except those within 200 mm of baseplates, flanges, end openings, access openings, and circumferential welds, which shall be 100% penetration. All circumferential groove welds shall be 100% penetration, and where circumferential welds are used at a butt joint, an internal backup strip shall be provided.
- .4 Longitudinal seam welds in davit arms and extensions shall be located at the bottom of the horizontal members. Only one longitudinal seam is permitted in each member.
- .5 Welds joining monotubular column or arm elements to base or flange plates shall be unequal leg welds, with the long leg of the fillet weld along the column or arm. The termination of the longer weld leg shall contact the shaft’s surface at approximately a 30° angle.
- .6 All welds shall be ground smooth and flush with the adjacent surface prior to hot-dip galvanizing.

.4 Surface Preparation and Cleaning

- .1 Surface preparation and cleaning of materials prior to hot-dip galvanizing shall be in accordance with ASTM A153 and SSPC Specification SP:6 “Commercial Blast Cleaning”, unless otherwise specified herein. The Contractor shall ensure that the exterior of all individual components of the standards are blast cleaned prior to pickling to achieve the minimum zinc coating mass of 600 g/m². All welding and provision of holes is to be completed prior to surface preparation and cleaning, except where shown.
- .2 The sandblasting and cleaning of all components shall be done in the shop.

- .3 After sandblasting, the inside and outside of the structure shall be cleaned free of all sand and sandblasting debris by means of blowing with compressed air and/or vacuuming to the satisfaction of the Departmental Representative.
 - .4 After the fabricated components have been sandblasted and cleaned, an inspection agency will carry out a visual inspection of the components in the shop before they are shipped to the galvanizing plant.
 - .5 Following sandblasting, the structures shall be galvanized as soon as practical. If significant surface rusting should develop on the structures before they are galvanized, they shall be re-sandblasted as directed by the Departmental Representative.
- .5 Hot-Dip Galvanizing
- .1 General
 - .1 The hot-dip galvanizing plant shall be a Regular Member of the American Galvanizers Association, Inc.
 - .2 Hot-dip galvanizing shall be in accordance with ASTM A123 - 09 to a net minimum retention of 600 g/m². The contractor shall safeguard against embrittlement of the fabricated steel in accordance with ASTM A143 - 07 "Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement".
 - .3 All outside surfaces and interior surfaces of all individual components of the traffic signal and pedestrian corridor standards shall be hot-dip galvanized in accordance with the requirements of this Specification.
 - .4 The galvanizing coating on outside surfaces of the structures shall be generally smooth and free of blisters, lumpiness and runs. In particular, the outside surfaces of the bottom 2.5 m of the vertical support members shall have a smooth finish equal to the finish on hot-dipped galvanized handrails.
 - .5 The aesthetic appearance of the structure after hot-dip galvanizing will be a criterion in the acceptance or rejection of the galvanized coating. The galvanized coating on the entire structure shall have a uniform "silver" colour and luster. Galvanizing with parts of the structure having dull grey coating or streaks or mottled appearance will not be acceptable. If the galvanizing is rejected for aesthetic reasons, the Contractor shall rectify the appearance by applying spray-on molten zinc metallizing with 85/15 zinc/aluminum alloy. The metallizing shall be carried out in the shop before the structure is installed.
 - .6 To prevent problems with aesthetic appearance of structures after hot-dip galvanizing, the Contractor shall be responsible for ensuring that the silicon content in the steel used for fabricating the structures is controlled as specified herein.
 - .7 Defects in the galvanizing coating shall be repaired. The Departmental Representative shall be consulted before repairs are made. Other defects and contaminants in the galvanizing coating, such as heavy dross protrusions, flux inclusions and ash inclusions shall be grounds for rejection of the galvanizing coating system.

- .8 The Contractor shall verify the thickness of galvanized coatings as directed by the Departmental Representative and have these readings available for review.
- .9 All threaded attachments and couplings shall be re-threaded after the sign structures have been hot-dip galvanized.
- .10 All external galvanizing vent and drain holes shall be filled with either aluminum or plastic tapered plugs.
- .2 Repair of Damaged Galvanizing
 - .1 In the event that repairs to the galvanizing coating are required, repair materials and practices shall be supplied and performed in accordance with ASTM A780 – 09 “Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings”.

3.2 CORRECTING DEFECTS

- .1 Correct defects, identified by Departmental Representative, in sign message, consistency of reflectivity, colour or illumination. Correct angle of signboard and adjust luminaire aiming angle for optimum performance during night conditions to approval of Departmental Representative.

3.3 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by traffic signage installation and salvage operations.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Aluminum Association (AA).
- .1 DAF 45-03, Designation System for Aluminum Finishes.

1.2 SUBMITTALS

- .1 Product Data.
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
 - .1 For caulking materials during application and curing.
 - .2 For adhesives.
- .2 Shop Drawings.
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate, by large scale details, materials, finishes, dimensions, anchorage and assembly.
- .3 Samples.
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 300 mm long samples of profiles for corner and wall guards.
- .4 Manufacturer's Instructions.
 - .1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Metal corner guards: 2.49 mm thick, 125 x 125 mm size, 1220 mm long, with 5 mm corner radius type 302 satin finished stainless steel, with removable protective paper cover, to profiles indicated, surface, mechanically mounted.

2.2 ACCESSORIES

- .1 Fasteners: self-tapping stainless steel, flush mounting.
- .2 Adhesive: water resistant type as recommended by manufacturer for substrate.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install units on solid backing and erect with materials and components straight, tight and in alignment.
- .2 Mechanically fasten corner guards to substrate at 300 mm on centre. Provide additional anchorage at corner guards with expansion screws at top and bottom of guards.

3.3 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Perform work in accordance with the recommendations and requirements of:
 - .1 National Fire Protection Association, NFPA 10 – Standard for Portable Fire Extinguishers.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data for fire extinguishers and extinguisher cabinets.

1.3 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into the Mechanical Operation and Maintenance Manuals.

Part 2 Products

2.1 SURFACE MOUNTED FIRE EXTINGUISHERS (FE-1) – NON-PUBLIC AREAS

- .1 267mm wide x 607mm high x 160 deep 18 gauge surface mounted steel cabinet.
- .2 Cylinder lock with key. Provide same keying throughout facility and turn keys over to the Departmental Representative.
- .3 Plexi glass panel and break glass hammer.
- .4 White baked enamel finish.
- .5 4.5 kg and 10 kg 2-A, 10 -BC dry chemical multipurpose fire extinguisher.
- .6 CO₂ type extinguishers to be provided in Generator and Mechanical/Electrical Rooms.
- .7 Acceptable Manufacturers: National Fire Equipment, Wilson & Cousins, Herbert Williams

2.2 SEMI-RECESSED FIRE EXTINGUISHERS (FE-2) – OFFICE/PUBLIC AREAS

- .1 368mm wide x 762mm high x 102mm deep cabinet.
- .2 Recessed 18 gauge steel cabinet and 14 gauge steel door and trim with 25mm return.
- .3 Full length semi-concealed piano hinges for 180 degree swing.
- .4 Flush stainless steel door latch with no exposed fasteners.
- .5 Entire cabinet finished in white baked enamel finish.

- .6 Viewing area shall be provided with a plastic bubble canopy.
- .7 4.5 kg 2-A, 5-BC dry chemical multipurpose fire extinguisher.
- .8 Acceptable Manufacturers: National Fire Equipment, Wilson & Cousins, Herbert Williams

2.3 EXTINGUISHER BRACKETS

- .1 Type recommended by extinguisher manufacturer.

2.4 IDENTIFICATION

- .1 Identify extinguishers in accordance with recommendations of ANSI/NFPA 10 and CAN/ULC-S508.
- .2 Attach bilingual tag or label to extinguishers, indicating month and year of installation. Provide space for service dates.

Part 3 Execution

3.1 INSTALLATION

- .1 Install fire extinguishers in cabinets at locations as indicated on the drawings.
- .2 Coordinate locations of fire extinguisher cabinets with the framing trades in order to facilitate recessed installations.
- .3 Mount fire extinguishers and cabinets such that the top of the extinguisher is at 1220 mm above the floor.
- .4 Install fire extinguisher cabinet doors, glazing panels and fire extinguishers in the cabinets prior to the project substantial completion review by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CAN/CGSB-44.40-92, Steel Clothing Locker.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate type and class of locker, thicknesses of metal, fabricating and assembly methods, assembled banks of lockers, tops, rods, hooks, shelves, bases, trim, numbering, filler panels, end/back panels, doors, and handles, locking method, ventilation method and finishes.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
- .3 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 MANUFACTURED UNITS

- .1 Lockers: to CAN/CGSB-44.40, Type 1-Single full-height locker, Class 1 - Thirty complete lockers, floor mounted.
 - .1 Size: 305 mm wide x 460 mm deep x 1800 mm high, steel thickness No.16 MSG.
 - .2 Assembly: welded construction.
 - .3 Top: sloped.
 - .4 Doors: one-piece double-wall envelope construction, steel thickness No.14 MSG, door swing out, left handed.
 - .5 Door handle: recessed handle steel with bright chromium, lift type.
 - .6 Latch and Lock: 3 point cremorne latch engaging at top, bottom and jamb.
 - .7 Hinges: 5 knuckle, fast pin type, heavy duty hinges, welded or attached with tamper proof fasteners, to both locker frames and doors. Provide 2 hinges per door on right side.

2.2 ACCESSORIES

- .1 Locking system: padlocks.
- .2 Options: to CAN/CGSB-44.40,
 - .1 Hanger rods, steel with chromium finish fastened securely to locker body.
 - .2 Jamb trim and fillers, 16 ga steel.
 - .3 Number plates: aluminum with black numerals not less than 12 mm high.
 - .4 Coat hooks: steel, metal chromium finish, able to support 23 kg. Fasten to locker locker bodies with 2 bolts or rivets each.
 - .5 Metal shelf: full width, 16 ga steel fastened to locker body.

2.3 FINISH

- .1 Factory applied baked enamel finish in colour selected by Departmental Representative from manufacturer's standard range.

2.4 MANUFACTURED LOCKER ROOM BENCHES

- .1 Fixed pedestals – Pedestal to be fabricated from stainless steel tubing.
- .2 Seat – Shall be solid phenolic slats screw fastened to pedestal.
- .3 Size: Typical bench unit dimension to be 900 and 1200 mm long x 400 mm wide. See plans for location and size.

Part 3 Execution

3.1 INSTALLATION

- .1 Assemble and install lockers in accordance with manufacturer's written instructions.
- .2 Securely fasten lockers to grounds and nailing strips. Lockers to be set on 150 mm high wood base with vinyl cove base cover.
- .3 Install filler panels (false fronts) where indicated and where obstructions occur.
- .4 Install locker numbers.
- .5 Install locker room benches to floor.

END OF SECTION