

**CW 3650 – INSTALLATION OF ALUMINUM BALANCED BARRIER**

**TABLE OF CONTENTS**

|     |   |          |
|-----|---|----------|
| 1.  | GENERAL CONDITIONS.....                               | 1        |
| 3.  | DESCRIPTION.....                                      | 1        |
| 5.  | MATERIALS.....  | 1        |
|     | 5.1 General .....                                     | 1        |
|     | 5.2 Handling and Storage of Materials.....            | 1        |
|     | 5.3 Testing and Approval .....                        | 1        |
|     | 5.4 Balanced Barrier Components.....                  | 1        |
|     | <b>5.5 Granular Backfill Material.....</b>            | <b>2</b> |
|     | 5.6 Alkali-resistant Bituminous Paint .....           | 2        |
| 9.  | CONSTRUCTION METHODS .....                            | 2        |
|     | 9.1 Replacement of Damaged Materials.....             | 2        |
|     | 9.2 Site Inspection .....                             | 2        |
|     | 9.3 Installation of Barrier Posts.....                | 2        |
|     | <b>9.4 Installation of Barrier Rail.....</b>          | <b>3</b> |
|     | 9.5 Acceptance of Barrier .....                       | 3        |
|     | 9.6 Removal and Salvaging of Existing Guardrail ..... | 3        |
|     | 9.7 Concrete Boulevard Slab Openings .....            | 3        |
|     | 9.8 Cleaning.....                                     | 4        |
| 12. | METHOD OF MEASUREMENT.....                            | 4        |
|     | 12.1 Supply of Barrier Posts .....                    | 4        |
|     | 12.2 Installation of Barrier Posts.....               | 4        |
|     | 12.3 Supply of Barrier Rail.....                      | 4        |
|     | 12.4 Installation of Barrier Rail.....                | 4        |
|     | 12.5 Removal of Concrete .....                        | 4        |
|     | 12.6 Salvaging Existing Barrier.....                  | 5        |
| 13. | BASIS OF PAYMENT .....                                | 5        |
|     | 13.1 Supply of Barrier Posts .....                    | 5        |
|     | 13.2 Installation of Barrier Posts.....               | 5        |
|     | 13.3 Supply of Barrier Rail.....                      | 5        |
|     | 13.4 Installation of Barrier Rail.....                | 5        |
|     | 13.5 Removal of Concrete .....                        | 5        |
|     | 13.6 Salvaging Existing Barrier.....                  | 5        |

**CW 3650 - INSTALLATION OF ALUMINUM BALANCED BARRIER****1. GENERAL CONDITIONS**

The General Conditions and Standard Provisions attached hereto shall apply to and be a part of this Specification.

**3. DESCRIPTION**

This Specification shall cover the installation of Aluminum Balanced 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.

**5. MATERIALS****5.1 General**

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

**5.2 Handling and Storage of Materials**

Barrier rail and 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 other barrier components shall be stored in such a manner as to avoid damage, contamination or deterioration.

All materials shall be handled carefully and transported in such a manner so as to ensure that the material is not damaged.

**5.3 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.

**5.4 Balanced Barrier Components**

Balanced barrier components shall be as follows:

- a) Aluminum barrier rail section, barrier posts, splice bars and rail clamp bars shall conform to ASTM Standard B221, Alloy 6061-T6 or Alloy 6351-T6; end caps shall conform to ASTM cast alloy 535.2.

All barrier rails that are to be installed around radii less than 50 metres shall be pre-bent by mechanical methods prior to delivery to the site.

The top edges and corners of barrier posts shall be rounded smooth as shown on Standard Drawing CW302. Rounded edges damaged during installation shall be repaired by the Contractor to the satisfaction of the Contract Administrator.

End caps shall be permanently welded onto the ends of all barrier rail installations, as shown on Standard Drawing CW302.

- b) Stainless steel washers shall conform to ASTM Standard A296, Type 316.
- c) Cap screws shall conform to ASTM Standard A276, Type 316 Stainless Steel.
- d) All other materials not specifically described but required for a complete and proper installation are to be selected by the Contractor subject to the approval of the Contract Administrator.

#### **5.5 Granular Backfill Material**

Granular backfill material shall conform to the requirements of Section 2.2 of Specification CW 3110 for Base Course Material, or as otherwise shown on the Drawings. Crushed limestone base course is not allowed for use.

#### **5.6 Alkali-resistant Bituminous Paint**

Alkali-resistant bituminous paint shall meet the requirements of CGSB Specification 31-GP-3M.

### **9. CONSTRUCTION METHODS**

#### **9.1 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 a damaged component on the barrier.

#### **9.2 Site Inspection**

Prior to commencing installation of the barrier at a location, the Contractor shall verify that the barrier can be installed in strict accordance with the Drawings.

This shall include contacting all Utilities and other owners of underground facilities in order to ensure that the proposed location of the posts is not in conflict with the location of any water pipe, gas line, electrical wire, cable, conduit, sewer, sprinkler system, or other existing facilities or equipment.

Should there be a conflict between a proposed post location and any underground facility, the Contract Administrator must be notified immediately.

#### **9.3 Installation of Barrier Posts**

The surfaces of posts that are in contact with the ground shall be painted with two coats, each one (1) mm in thickness, of alkali-resistant bituminous paint. Painted surfaces shall be dry prior to installation. Painting shall be incidental to the cost of installing barrier posts.

The posts shall be installed in a careful workmanlike manner to the grade and alignment shown on the Drawings.

A 300 mm diameter hole shall be augered into the ground to the specified depth, the post positioned and held accurately in place in the hole, and a granular backfill material placed in the hole and compacted around the post to within 75 mm of boulevard grade. After the granular material has been

satisfactorily compacted, 75 mm of topsoil is to be placed on top.

Where posts require cutting to clear utility lines or other obstructions, to a maximum of 150 mm, such work shall only be permitted with the written permission of the Contract Administrator. The cost of all cutting operations shall be incidental to their installation.

The grade of the posts must be averaged over irregularities in the grade at the site in order to ensure a smooth and uniform grade on the barrier rail.

#### **9.4 Installation of Barrier Rail**

The surfaces of rails that are in contact with the ground shall be painted with two coats, each one mm in thickness, of alkali-resistant bituminous paint. Painted surfaces shall be dry prior to installation. Painting shall be incidental to the cost of installing barrier rail.

The barrier rail shall be carefully installed on the posts. This shall be deemed to include the installation of all accessories as detailed on the drawings. When applicable, it shall also be deemed to include local excavation and backfill, as required, to bury the ends of the barrier rail.

The completed barrier rail shall have a smooth and uniform grade and curvature.

#### **9.5 Acceptance of Barrier**

A barrier with inaccurate alignment and/or poor grade or curvature shall be corrected by the Contractor at his own expense to the satisfaction of the Contract Administrator.

#### **9.6 Removal and Salvaging of Existing Guardrail**

Should there be an existing guardrail at the proposed barrier location, it shall be carefully removed and salvaged. All guardrail components, including hardware, shall be salvaged.

Any materials not required for re-use at the salvage site shall be transported for re-use to another site, as required, or shall be transported to and stockpiled at the location specified in the Specifications for the Work or to such other locations as may be specified by the Contract Administrator.

The post holes remaining following the removal of the guardrail shall be backfilled and compacted to the satisfaction of the Contract Administrator. The cost of backfilling post holes shall be incidental to the salvage of existing barrier posts.

#### **9.7 Concrete Boulevard Slab Openings**

Where a post is located on a concrete slab, the Contractor shall remove a 300 mm square section of the slab centered on the proposed location of the post.

The surface of the slab must be saw-cut to a depth of 50 mm around the perimeter of the 300 mm square opening before the concrete is removed. Care shall be taken to ensure that the saw-cut edge of the opening is not chipped or broken during the removal of the concrete, nor during the installation of the posts. Concrete slab damaged beyond the specified limits shall be replaced at the Contractor's cost to the satisfaction of the Contract Administrator.

After the post is installed, it shall be backfilled in accordance with Section 9.3 up to 75 mm below the slab surface. The perimeter of the opening shall be prime-coated and the top 75 mm shall then be filled with hot mix asphaltic concrete and thoroughly compacted to the satisfaction of the Contract Administrator. For drainage purposes, an extra 15 mm thickness of asphaltic concrete shall be added at the posts, tapering down to the level of the slab surface at the saw-cut. The supply and installation of the asphaltic concrete shall be incidental to the cost of installing the posts.

For the buried ends of the barrier rail, a 150 mm wide strip of concrete slab, centered on the rail, shall be removed after saw-cutting the perimeter of the strip to a depth of 50 mm. The strip shall only be long enough to facilitate the installation of the barrier rail end, as detailed. This opening shall then be backfilled as specified hereinabove.

### **9.8 Cleaning**

After the installation of the barrier rail has been completed, the entire barrier shall be thoroughly cleaned by the Contractor to the satisfaction of the Contract Administrator.

## **12. METHOD OF MEASUREMENT**

### **12.1 Supply of Barrier Posts**

The supply of barrier posts will be measured on a unit basis. The number of barrier posts to be paid for shall be the total number of posts supplied in accordance with this Specification and accepted by the Contract Administrator.

### **12.2 Installation of Barrier Posts**

The installation of barrier posts will be measured on a unit basis. The number of barrier posts to be paid for shall be the total number of posts installed in accordance with this Specification and accepted by the Contract Administrator.

### **12.3 Supply of Barrier Rail**

The supply of barrier rail will be measured on a linear measure basis. The length to be paid for shall be the total number of metres of barrier rail supplied in accordance with this Specification and accepted by the Contract Administrator, as computed by summing up the individual rail section lengths.

The supply of barrier rail shall be deemed to include the fabrication and supply of all hardware required for a complete installation.

### **12.4 Installation of Barrier Rail**

The installation of barrier rail will be measured on a linear measure basis. The length to be paid for shall be the total number of metres of barrier rail installed in accordance with this Specification and accepted by the Contract Administrator, as computed by summing up the individual rail section lengths.

### **12.5 Removal of Concrete**

Openings in the concrete boulevard slab will be measured on an area basis. The area to be paid for shall be the total number of square metres removed in accordance with this Specification and acceptable to the Contract Administrator, as computed from the surface area of the approved concrete openings.

**12.6 Salvaging Existing Barrier**

- a) Salvaging existing barrier rail will be measured on a linear measure basis. The length to be paid for shall be the total number of metres of rail salvaged in a condition acceptable to the Contract Administrator.

For Balanced barrier rail, the total length shall be as computed by summing up the individual rail section lengths.

For Flexbeam barrier rail, the total length shall be as computed by summing up the nominal lengths (c. to c. of posts) of the acceptable rail sections.

- b) Salvaging existing barrier posts will be measured on a unit basis. The number of posts to be paid for shall be the total number of barrier posts salvaged.

**13. BASIS OF PAYMENT****13.1 Supply of Barrier Posts**

Supply of barrier posts will be paid for at the Contract Unit Price for "Supply of Barrier Posts", 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.

**13.2 Installation of Barrier Posts**

Installation of barrier posts will be paid for at the Contract Unit Price for "Installation of Barrier Posts", 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.

**13.3 Supply of Barrier Rail**

Supply of barrier rail will be paid for at the Contract Unit Price per metre for "Supply 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.

**13.4 Installation of Barrier Rail**

Installation of barrier rail will be paid for at the Contract Unit Price per metre for "Installation 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.

**13.5 Removal of Concrete**

Removal of concrete will be paid for at the Contract Unit Price per square metre for "Removal of 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.

**13.6 Salvaging Existing Barrier**

- a) Salvaging existing barrier rail will be paid for at the Contract Unit Price per metre for "Salvaging Existing 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.

- b) Salvaging existing barrier posts will be paid for at the Contract Unit Price for "Salvaging Existing Barrier Posts", 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.