1.0 GENERAL

1.1 Scope

1.1.1 This Section includes the design, fabrication, supply, and construction of sound barriers composed of precast concrete panels with concrete and steel foundations.

1.1.2 Sound barrier systems shall be Stone Tree Precast Fencing Systems installed to the heights and lengths specified on the construction drawings.

1.2 Related Requirements

1.2.1 Specification 2500 - Supply of Portland Cement

1.3 Reference Standards

1.3.1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
1.3.2 CSA Z107.9-00 – Standard for Certification of Noise Barriers
1.3.3 CSA S16, Design of Steel Structures
1.3.4 CSA A23.1 Concrete Materials and Methods of Concrete Construction
1.3.5 CSA A23.3 Design of Concrete Structures
1.3.6 CSA A23.4 Precast Concrete – Materials and Construction
1.3.7 CSA A179.04 – Mortar and Grout for Unit Masonry.
1.3.8 CSA G30.18, Carbon Steel Bars for Concrete Reinforcement
1.3.9 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
1.3.10 CSA W47.1, Certification of Companies for Fusion Welding of Steel
1.3.11 CSA W59, Welded Steel Construction (Metal Arc Welding)
1.3.12 ASTM E413 Classification for Rating Sound Insulation
1.3.13 CSA-S6 Canadian Highway Bridge Design Code
1.3.14 AASHTO Guide Specification for the Structural Design of Sound Barriers
1.3.15 AASHTO LRFD Bridge Design Specification
1.3.16 National Building Code of Canada, Part 4 – Structural Design

1.4 General

1.4.1 The foundations and sound barrier panels shall be composed of precast concrete panels, designed, fabricated, and supplied by a licensed manufacturer, and installed in accordance with this Specification, the General Requirements, and either:

.1 CAN/CSA-S6 Canadian Highway Bridge Design Code; or

.2 AASHTO Guide Specification for the Structural Design of Sound Barriers; or

.3 AASHTO LRFD Bridge Design Specification

1.4.2 The top of the barrier profile shall be installed level. To accommodate sloping ground, the barrier shall be evenly stepped (max 610 mm) with all panels installed level.

1.5 Submittals

1.5.1 Submittals shall adhere to Specification 2500 – Supply of Portland Cement.

1.6 Quality Control

1.6.1 Concrete testing shall adhere to Specification 2500 - Supply of Portland Cement.

1.6.2 The supplier shall notify the Engineer of casting times. The supplier shall allow the Engineer free access to those portions of their plant where the panels are being produced and stored.

1.6.3 All materials shall be protected from weather and damage while in transit or at the construction site.

1.6.4 Precast concrete members shall not be handled for shipment until 75 percent of design strength is achieved. Proof of strength shall be a compressive strength of a cube (core) on a field cured plank at the Contractor's expense.

1.6.5 Rejection: The Engineer reserves the right to reject any product not meeting the requirements of these Specification including, but not limited to, the occurrence of one or more of the following:

.1 Defects that indicate any imperfect concrete mixing or moulding.

.2 Surface defects indicated by honeycombed or open textures.

.3 Damaged materials including cracked and chipped blocks.

1.6.6 Cleaning, Patching, and Repairs

.1 Cleaning, patching, and repair of precast panels shall be in accordance with CSA A23.4.

.2 Approval by the Engineer shall be required for all cleaning, patching, and repairing methods.

.3 Clean soiled precast concrete surfaces by approved means.

2.0 PRODUCTS

2.1 Materials

2.1.1 Precast Concrete Panels

.1 Concrete materials shall conform to CSA A23.4 unless otherwise noted.

.2 Exterior dimensions shall be uniform and consistent with a maximum deviation of 3 mm not including textured relief face.

.3 Concrete grout shall conform to CSA 179.04.

.4 Reinforcing steel: billet steel conforming to CSA-G30.18, Grade 400R.

(a) Bending, cutting, and placing of reinforcing steel shall conform to CSA A23.1 and CSA A23.3.

.5 Mix Design

(a) Minimum compressive strength at 28 days: 35 MPa

(b) Class C1/S1 (HVSCM-2)

(c) Cement Type: GU
(d) Fly Ash, Type CL: 20%
(e) Maximum aggregate size: 14 mm
(f) Specified slump: 650 mm +/- 150 mm
(g) Air content: 5-8%
(h) Maximum water / cementing materials ratio: 0.40

.6 Colour to be confirmed with Shop Drawings. Coloured concrete must resist weathering and ultraviolet damage.

.7 Texture shall be an Ashlar Pattern

.8 The Sound Transmission Class (STC) of the noise attenuation wall panels shall be in accordance with CSA Z107.9-00 – Standard for Certification of Noise Barriers and shall be determined from the measured sound transmission loss in accordance with ASTM E413.

2.1.2 Concrete Grout

.1 Mix Design

(a) Minimum compressive strength: 25 MPa
(b) Maximum aggregate size: 10 mm
(c) Air content: 4-6%
(d) Maximum slump: 100 mm

2.1.3 Posts

.1 General:

(a) Steel posts shall be used.
(b) Shapes, sizes, details, and method of construction in accordance with reviewed Shop Drawings.

.2 Steel:

(a) Structural steel in accordance with CSA S16.
(b) Grade of steel in accordance with CSA G40.20/G40.21.
(c) Welds in accordance with CSA W47.1 and CSA W59.
(d) Hot-dip galvanized in accordance with ASTM A123/A123M.

3.0 EXECUTION

3.1 Construction

3.1.1 The sound barrier shall be constructed at the location and to the elevations as shown on the Drawings or as established by the Consultant.

3.1.2 Pile locations, size, and depth as shown on the Drawings.

.1 Reinforcing steel shall be accurately and firmly anchored in place with 100 mm clear cover when used.