



SOUND BY DESIGN™ NOISE BARRIER SPECIFICATIONS

PART 1: GENERAL

- 1.1 This work includes the design, manufacture, delivery and erection of *Sound By Design™* Sound Reflective Noise Barrier Systems, complete. The manufacturer of *Sound By Design™* is Design Concrete Systems Ltd. P.O. Box 839, 40 Birch Street, Seaforth, Ontario, Canada N0K 1W0.
- 1.2 The *Sound By Design™* noise barrier system is accepted by the Ministry of Transportation Ontario as a Designated Source Material (DSM 5.50.20) and shall be designed in accordance with the requirements of the “Canadian Highway Bridge Design Code”, and CSA Z107.9 Standard for Noise Barriers. The “Reference Wind Pressure” shall be specified in the code for the locality of the noise barrier.
- 1.3 The manufacturer of the noise barrier system shall prepare detailed layout and fabrication drawings including pertinent specifications thereto, together with the complete engineering calculations. The manufacturer shall submit to the Contractor or Owner’s Representative six (6) sets of drawings and specifications, sealed by a Licensed Professional Engineer, for approval prior to commencement of manufacture or construction.
- 1.4 The Contractor or Owner’s Representative shall establish the alignment of the wall, the top of wall elevations and final ground line elevations at the bottom of the wall. The manufacturer shall use these elevations to develop the layout and fabrication drawings including complete elevations of each wall indicating top and bottom of wall elevations. The final ground elevations and wall alignments established in the field shall be protected by the Contractor for the duration of the project and shall not be adjusted without prior approval of the Engineer.
- 1.5 The Contractor or Owner’s Representative shall carry out site investigations to determine soil parameters, water tables, location of underground services and above grade obstructions. The manufacturer shall use these parameters to determine the depths, sizes and locations of footings.

PART 2: MATERIALS

- 2.1 **Panel Construction:** *Sound By Design™* panels shall be of a homogenous, steel reinforced, zero slump concrete mixture. All concrete shall conform to CAN/CSA-A23.3. Concrete strength at 28 days shall not be less than 40 MPa. All reinforcing steel shall be deformed bars conforming to CAN/CSA-G30.18-M92 having minimum yield strength of 400 MPa. The panel design shall be sealed by a Licensed Professional Engineer.
- 2.2 **Acoustical Characteristics:** *Sound By Design™* Panels shall be reflective on both faces. The Sound Transmission Class (STC) of the *Sound By Design™* Panels shall be equal to or greater than 32 as determined in accordance with ASTM E90-75.



- 2.3 Aesthetics:** *Sound By Design™* Panel face colours and textures shall be as specified in the Contract Documents. (Owner to specify colours, percentages of each colour, colour pattern, texture, on one or both sides and percentage of textured panels). The visual appearance of the Noise Barrier Panels, in terms of colour, pattern and texture, shall be uniform when viewed at a distance of 15m from the face of the wall. Any visual blemishes shall be repaired and touched up as per Manufacturer's specifications.
- 2.4 Steel Posts:** Steel posts shall be hot rolled wide flange structural sections in accordance with shapes, sizes, details and method of connection as shown on the drawings. All structural steel work to comply with CSA Standard S 16 and grade of steel shall be G40.21-M 350W. All welds shall conform to CSA Standard W59 and CSA Standard W47.1. All steel components to be hot dip galvanized after fabrication in accordance with CSA Standard G164-M. The post design shall be sealed by a Licensed Professional Engineer.
- 2.5 Post Footings:** Concrete in augured footings shall be minimum 20 MPa and in non-standard, engineered footings, it shall be 25 MPa, all in accordance with OPSS 1 350. Depth and diameter of footing shafts shall be designed in accordance with CAN/CSA S6-06. Clause 5-7.2.

PART 3: CONSTRUCTION

- 3.1 Site Grading and Preparation:** Grading, (cut and fill) and berm construction which is associated with the barrier installation shall be completed to within 25mm below the bottom of the barrier wall prior to construction of the barrier footings. All grading shall be in accordance with OPSS 206. Berms shall have a profile with a minimum 3.0m flat top and maximum side slope of 3:1. After completion of wall panel installation, final grading shall be to bottom of wall and there shall be no visible gaps between bottom of wall and top of final grade. Tree pruning and removal shall be kept to a minimum. Materials excavated from footing holes, if acceptable, may be deposited on the adjacent terrain and spread in uniform layers. Surplus excavated material shall be disposed of at the contractor's expense. Alignment and bottom elevations of wall shall be clearly marked and staked prior to commencing with construction of wall footings. Grade stakes shall be placed at approximately 25m on center and at all grade changes, wall steps, starts and ends of wall and alignment changes. Grade stakes shall show the following information: station number, bottom of wall elevation, cut or fill dimension and offset to centerline of wall. Below grade service lines (hydro, telephone, gas, water, drainage, etc.) located within 1.0m of the noise barrier wall or footings, shall be clearly marked by stakes.
- 3.2 Footings:** The depth, type and size of the footings shall be shown on the drawings and shall be designed and approved by a Licensed Professional Engineer with reference to the soil strength parameters and site conditions supplied by the Owner's Representative for the project. The concrete in the footings shall be cured for a minimum of 5 days before work which places stress on the posts may be carried out. The tops of all footings are to be shaped and leveled to provide full horizontal seating of the bottom panels and the remaining surface of the top footing shall be domed to allow the shedding of water.



3.2.1 Cylindrical Footings: Concrete for footings in augured holes shall be cast entirely against undisturbed soil.

3.2.2 Non-Standard Engineered Footings: Where site conditions dictate special footings in large hole excavations (e.g. other than augured holes), the non standard footing shall be designed and sealed by a Licensed Professional Engineer. The excavation shall be backfilled with granular material and compacted, all in accordance with OPSS 501.

3.2.3 Stepped Footings: Where grade changes require the bottom of the wall to be stepped, the top of the footing shall be constructed as shown on the drawings and as per Manufacturer's recommendations.

3.3 Posts: The posts shall be installed plumb to within +/- 10mm of vertical in 5.0m. They shall be located to the lines and grades specified on the drawings to within a tolerance of +/- 10mm. Any accidental coating of concrete on the above grade surfaces of the posts shall be washed off on the same day of installation.

3.3.1 Steel Posts: A concrete leveling pad shall be poured into the bottom of the augured hole 4 hours prior to inserting the concrete post. This pad shall serve to support the concrete post at its proper elevation and alignment during pouring and vibrating of the footing concrete around the inserted post. Galvanized surfaces which are abraded shall be cleaned and the abraded surfaces touched up using soldering or thermal spraying in accordance with OPSS 911.

3.4 Panels: The *Sound By Design™* Panels shall be installed according to type, colour, texture and length as shown on the drawings and in accordance with Manufacturer's recommended practices. Each panel is identified as to its type and orientation in the Noise Barrier Wall. The contractor shall take care and provide adequate protection when handling, moving, and storing the panels to prevent staining, marking, chipping or spalling. To lift and place the *Sound By Design™* Panels, only the lifting device provided by the manufacturer or an approved equivalent shall be used. Touch up and repair is at the contractor's expense and shall be carried out in accordance with the Manufacturer's recommendations or at the Engineer's direction. The bottom panel shall be fully seated on the footing. Top of footing shall be free of foreign material, ice, snow or water. Horizontal joints of adjacent panels shall be lined up to a vertical tolerance of +/- 4mm. Where vertical adjustments are required for alignment, a mortar base shall be used. Intermediate panels shall fit tight to the panel below. The tongue and groove detail shall mesh fully, be free of foreign material, ice or snow and there shall be no visible gaps.

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