

FORM 620



GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Department of Transportation and works
Highway Design Division

SECTION 620 BIN-TYPE RETAINING WALL

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620.01 SCOPE

This specification covers the requirements for the supply and installation of a bin-type retaining wall comprising bins of the design types and dimensions, and made up components of the dimensions and thickness as shown on the drawings.

620.02 MATERIALS

The materials for constructing the bin-wall shall conform to the types, dimensions and thicknesses as shown on the plans.

All elements including but not limited to the base or grade plate, horizontal stringers and spacers, vertical connectors, stiffeners, corner angles, nuts, bolts and washers shall be galvanized steel. Materials used in the fabrication of bin-type retaining walls shall conform to the applicable requirements of ASTM Designation A526 and Z600, with respect to base metal analysis and the weight of zinc coating.

All required bin-wall elements together with nuts, bolts and washers shall be supplied by the Contractor.

Bedding and backfill material shall consist of well graded, pervious, granular, other material having no more than 10% passing the number of 100 or 0.152 mm sieve and with a maximum particle size not exceeding 75 mm. However, should any part of the bedding or backfill be subjected to frequent inundation or expectation of the same, then the material used in those parts of the structure shall not have particles smaller than 3 mm.

The other material, other material borrow, or excavation for foundation other material used for bedding and backfill shall be measured and paid for according to the appropriate contract price for that item.

620.03 EXCAVATION FOR FOUNDATION

Excavation for Foundation for the bin-wall shall be carried out and paid for in accordance with the provisions of Section 403 "Excavation for Foundations", however, the following additional requirements shall also apply.

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Excavation shall be carried out to the lines and grades as staked by the Engineer.

The use of mechanical excavation equipment will be permitted, except where, in the opinion of the Engineer, their use will cause damage to structures below ground, in which case excavation by hand shall be used.

The Contractor shall proceed with caution in the excavation work so that the exact location of all buried pipes, service cables and underground structures, both known and unknown may be determined and he shall be responsible for the repair of such pipes, services, cables and structures when broken or otherwise damaged.

Where such underground structures and pipes, etc. need to be removed in order for the bin-wall to be placed, then the removal shall be carried out according to the appropriate specification for that work and paid for according to the appropriate contract item on the Unit Price Table. Should there not be a contract item for the removal of the particular type of structure encountered, then such required removal will be paid for in accordance with the provisions of Section 150 "Force Account".

Should blasting be required to carry out the excavation, the Contractor shall ensure that any existing structures and any already assembled bin-walls are adequately protected. Any damage occurring during the carrying out of the works shall be put right by the Contractor at his own expense.

Excavation near the various grades shall be carried out by hand to ensure that no over-excavation occurs and that base plates may be placed at the correct grades and locations on undisturbed ground over their entire length.

However, where rock, or other unyielding foundation, occurs at base elevation the excavation shall be deepened to 200 mm below base elevation to allow room for the addition of bedding.

Should the Contractor excavate deeper than required, then the excavation shall be refilled to the required unyielding foundation excavation grade with approved material and compacted to at least 95% of Standard Proctor Density (ASTM D698-78) all at the Contractor's expense.

The excavation at the sides and back of the bin-wall shall be of such width as to facilitate the use of hand operated compaction equipment when backfilling between the sides of the bin-wall and the sides of the excavation. This width will normally be 1 m wide, or of such width as the Engineer may direct.

Where because of unstable soil conditions the excavation cannot be carried out to a trench steep batter, the Contractor shall not excavate a more gentle slope. In these conditions, the excavation shall be carried out in a series of steps with surfaces vertical and horizontal.

Excavation material conforming to the requirements of bedding material and backfill as stated in 620.02 materials shall be used as either bedding or backfill for the bin-walls. Such material may be placed straight away into partly erected bins or stockpiled for later placing.

Excavation material not suitable for use with bin-walls but nevertheless suitable for fill construction shall be incorporated in full construction in accordance with Section 204 "Grading of Fill".

Excavation material which is unsuitable for fill construction shall be placed and trimmed along fill slopes or elsewhere, as directed by the Engineer.

620.04 SHEATHING AND SHORING

Protection of the works and all work done under this section shall comply with the relevant requirements of "The Occupation Health and Safety Act, including all Amendments", Province of Newfoundland and Labrador.

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Where, due to the nature of the work, the Contractor sheathes, shores, or braces the excavation, then such sheathing, shoring or bracing shall be supplied, installed, maintained and removed before backfill is placed, all at the Contractor's expense.

All works behind the sheathing shall be filled with native backfill or other material, as the Engineer directs, and compacted as the sheathing is placed.

620.05 PROVISIONS FOR TRAFFIC AND PEDESTRIANS

The Contractor shall make provisions for the accommodation and protection of traffic and pedestrians and the owners and occupants of adjacent houses and premises, during the carrying out of the works. Such required temporary stairs, bridgeways, guards and fences shall be provided by the Contractor at his own expense.

The Contractor shall provide, place and maintain until the work is completed such barricades, construction signs, torches, red lanterns and guards as are required to protect persons from injury and to avoid property damage.

Excavated material when stockpiled shall be piled so as to avoid obstructing sidewalks, driveways or the road.

620.06 PROVISION OF UNDERDRAIN

Where the Engineer requires that perforated pipe be placed to provide an underdrain for the bin-wall, then such work shall be carried out and paid for under separate contract items.

Should additional excavation be required to position the underdrain, after excavation for foundation operations for the bin-wall have been completed, then such excavation shall be carried out and paid for in accordance with Section 404 "Trenching and Excavation for Catch Basins".

The perforated pipe shall be installed and paid for in accordance with Section 420 "Installation of Corrugated Steel Pipe for Storm Sewers and Perforated Steel Pipe for Sub-Drainage".

Select bedding for the perforated pipe shall be supplied, placed and paid for in accordance with Section 410 "Select Bedding for Storm Sewers, Sub-Drains and Catch Basins".

620.07 PREPARATION OF BED

Where rock or unyielding soils have been excavated to a compacted grade of not more than 200 mm below the proposed base elevations then bedding material, comprising material conforming to the requirements of 620.02 materials, shall be used to provide a bed for the base plates.

The Contractor shall place and lightly compact the bedding so as to provide the required grades for the base plates, as staked by the Engineer.

The Contractor shall exercise care in the preparation of the bed to ensure a smooth trim bed, only lightly compacted, so that the entire wall may adjust to small differential settlements and avoid the concentration of loads on any individual members of the wall.

620.08 ASSEMBLY OF BIN-WALL

The manufacturer or supplier shall provide shop drawings to both the contractor and Department (minimum two sets each) which outline all steps necessary for the proper assembly of the bin-wall.

The bin-wall shall be installed to the lines, grades and batter as staked by the Engineer.

The assembly of the bin-wall shall comply with the manufacturer's specifications for bin-wall assembly.

Drilling, punching or drifting to correct defects in manufacture, settlement or improper backfill and bedding shall not be permitted. Any parts having holes improperly punched shall be promptly replaced by the manufacturer.

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The Contractor shall ensure that components of the various dimensions and gauge thicknesses are installed at the appropriate locations in the structure, as shown on the plans.

Bin-wall members shall be handled carefully and any which are damaged shall be removed and new members substituted at the Contractor's expense.

All the required nuts and bolts shall be firmly secured in place before acceptance.

The bin-wall shall be so assembled so that when installation is complete the structure presents a neat and uniform appearance.

The Contractor shall co-ordinate the installation of the bin-wall with any work of relocating or installing any other structures which may occur at the same location as the bin-wall.

620.09 BACKFILLING AND COMPACTION

Other material consisting of suitable Excavation for Foundation other material, other material, or other material borrow conforming to the requirements of 620.02 materials shall be used to provide backfill for both inside and around the outside edges of the bins.

Backfill shall be placed in layers of loose thickness not greater than 200 mm and then compacted.

Each layer of backfill shall be compacted to at least 95% of Standard Proctor Density (ASTM D698-78) before a further layer is placed on top.

Compaction in areas more than 300 mm away from stringers and spacers shall be provided by means of a hand held mechanical type compactor.

The corrugations of the stringers and spacers including vertical connectors and corner angles, shall be filled with backfill material conforming to Section 620.02. The maximum thickness of each lift shall be 100 mm. Mechanical tampers shall not operate closer than 300 mm from the stringers and spacers. Compaction within this area shall be achieved by means of hand operated timber rams.

The Contractor shall exercise care in placing backfill to avoid segregation.

Filling the bins shall follow closely the assembly of the structure to avoid storm damage or displacement of the bins by earth movement.

Backfilling should proceed keeping the level of fill in the bins above the level of fill behind the retaining wall. But if restricted working conditions render this impractical, then the fill may be placed behind the wall concurrently with backfilling the bin wall. However, the backfill shall not be placed behind the wall before the backfill is placed in the bin.

Backfilling operations shall proceed to an elevation 300 mm above the top of the bin wall, or to such lower grade as may be staked by the Engineer. Should fill be required above this limit for backfilling, then such fill shall be in accordance with Section 204 "Grading of Fill".

The Contractor shall be liable for any damage arising from default or neglect in backfilling operations.

620.10 MEASUREMENT FOR PAYMENT

Measurement for payment for bin-type retaining wall of a particular design type, shall be the sum given by the addition of the individual bin front nominal areas for all the bins placed of that particular design type. This measurement shall be computed in square metres rounded to two decimal places.

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Bin front nominal area being defined as the product given by a nominal width of bin of 3.05 m times the slope height of the bin measured from the bottom of the bottom stringer to the top of the top stringer.

620.11 BASIS OF PAYMENT

Payment at the contract price for bin type retaining wall, of a particular design type and thickness, shall be full compensation for all materials, labour and equipment-use to supply and install the bin-wall of that design type to the requirements as stated in this specification, including the provisions of shop drawings.

Excavation for foundation for the bin-wall shall be carried out and paid for in accordance with Section 403 "Excavation for Foundation". However, the additional hand work and care required to carry out the excavation in accordance with this specification shall be considered compensated for in the contract price for the bin-type retaining wall.

The preparation of a bed, backfilling and compaction shall be paid for in accordance with Section 403 "Excavation for Foundation", Section 206 "Grading of Cuts" or Section 207 "Borrow", as the case may be, but the additional requirements for placing and compaction in accordance with this specification shall be considered compensated for in the contract price for bin-type retaining wall.