

This specification outlines the requirements for the salvage of an existing guide rail and posts from one location, and the reinstallation of the guide rail at another location using either the salvaged rail sections and posts, or the salvaged rail sections and new posts. Where Department of Transportation and Infrastructure (TI), Highway Design and Construction Division, Highway Specifications Book Standard Drawings are referenced in the Standard Drawings Table of Contents, guide rail shall be installed as per the corresponding Highway Standard Drawing.

## PART 1 REFERENCES

This specification refers to the following standards, specifications, or publications. This specification shall be read in conjunction with applicable standard drawings for guide rail installation as outlined in the Standard Drawings Table of Contents:

ASTM International

A153/A153M	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A307	Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 psi Tensile Strength
D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft <sup>3</sup> (600 kN·m/m <sup>3</sup> ))
F3125/F3125M	<del>Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength</del>

CSA Group

O80	Wood Preservation
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## PART 2 GENERAL

### 2.1 ENVIRONMENTAL REQUIREMENTS

- .1 Guide rail posts located in Protected Water Supply areas but outside the buffer zones indicated on the Section 39 Permit issued by ECC, Water Resources Management Division shall only be chromated copper arsenate (CCA) treated type.

.2 Guide rail posts located in Protected Water Supply areas but inside the buffer zones indicated on the Section 39 Permit issued by ECC, Water Resources Management Division shall be untreated.

PART 3 PRODUCTS

3.1 MATERIALS

.1 Rail Sections, Sloped and Buried Rail Sections, and Rail Terminal Sections

.1 Only salvaged rail sections, sloped and buried rail sections, and rail terminal sections deemed acceptable by the Owner shall be used in the re-assembly.

.2 Fasteners

.1 All bolts, nuts and washers shall be in accordance with ASTM A307, hot dipped galvanized to ASTM A123/A123M-~~or~~ F3125/F3125M, except that rail splice bolts shall be button headed.

.2 Post bolts and splice bolts shall have shoulders of such shape and size that they fit into the bolt slots in the rails and thus prevent the bolt from turning.

.3 Post bolts shall be 16 mm diameter and 200 mm long for use with standard 150 mm x 150 mm, or 16 mm diameter and 250 mm long for use with 200 mm x 200 mm posts.

.4 Post bolt washers for the back of the post shall be 45 mm round and 4 mm thick.

.5 Bolts for anchors shall be 16 mm diameter and 350 mm long for use with standard 150 mm x 150 mm posts and anchors, or 16 mm diameter and 450 mm long for use with 200 mm x 200 mm posts and anchors. Washers shall be 45 mm round and 4 mm thick.

.6 Spikes for anchors shall be 125 mm galvanized spikes.

.7 Bolts, nuts, washers and other fittings shall be hot-dip galvanized in accordance with ASTM A153/A153M.

.8 The Contractor shall supply the bolts, nuts, washers and spikes.

.9 Should any of the salvaged bolts, nuts and washers be suitable for re-use, then the Contractor may use these components.

.3 Signal Reflectors

.1 Silver signal reflectors and yellow signal reflectors shall be of size 75 mm x 100 mm. Reflectors to be supplied by the Contractor.

.2 Nails for securing signal reflectors, shall be supplied by the Contractor and shall consist of 30 mm galvanized flat head nails.

.4 New Posts and Anchors

- .1 Timber for new posts and anchors shall be sound, well-seasoned structural grade lumber.
- .2 Only birch wood will be acceptable for 150 mm x 150 mm guide rail posts. Hemlock or other approved species will be acceptable for 200 mm x 200 mm guide rail posts.
- .3 Posts shall have minimum dimensions of 150 mm x 150 mm x 2400 mm for "Guide Rail Standard Installation Type Guide Rail" and for "Standard Type Guide Rail with Additional Posts".
- .4 Anchors shall consist of either one piece of 150 mm x 150 mm x 450 mm timber, or two pieces of 38 mm x 140 mm x 450 mm lumber.
- .5 After cutting to size, posts and anchors shall be pressure treated with wood preservative in accordance with CSA O80 Wood Preservation. The minimum weight of preservative retained per cubic metre of timber shall be 130 kg with empty cells.
- .6 Where the contract item is given as "Salvage and Reinstallation of Guide Rail On New Posts" then, the Contractor shall supply all the required wood preservative treated new posts and anchors.

.5 Re-usable Posts and Anchors

- .1 Only salvaged posts and anchors deemed acceptable by the Owner shall be used in the re-assembly, and then only if the contract item is given as, "Salvage and Reinstallation of Guide Rail On Salvaged Posts". Where the contract item is given as, "Salvage and Reinstallation of Guide Rail On New Posts" then, salvaged posts shall not be used.

.6 Wood Preservative

- .1 Wood preservative for use in treating field cut ends of posts shall be of the same type and chemical composition as that used in the original treatment.
- .2 The Contractor shall supply the wood preservative.
- .3 The minimum required depth of penetration of wood preservative shall be 13 mm. To determine penetration, a borer core shall be taken from 20 pieces in each charge. If 80 % of the borings meet the penetration requirements, the charge shall be accepted.
- .4 Incising will normally be required. However, this requirement will be waived if specifications for both penetration and retention are satisfied.
- .5 If requested by the Owner's Representative, the Contractor shall provide penetration and retention test reports for the guide posts and guide rail posts supplied for the project.

PART 4 EXECUTION

4.1 DISMANTLING OF EXISTING GUIDE RAIL

- .1 The Contractor shall exercise care in dismantling and removing rails and terminal sections so that they are not damaged and remain suitable for re-use. The rails and terminal sections shall be transported to, and stored at, a secure storage site provided by the Contractor at their own expense, pending their re-assembly at a new location.
- .2 Should any material, designated for reinstallation or just salvage, be damaged or lost by the Contractor, then the Contractor shall be charged with the costs of replacement with equivalent new material. Damaged material shall become the property of the Contractor and shall be disposed of.

4.2 REMOVAL AND SALVAGE OF EXISTING POSTS

- .1 The Contractor shall exercise care in excavating posts so that they are not damaged and remain suitable for re-use.
- .2 Where the contract item is given as, "Salvage and Reinstallation of Guide Rail On Salvaged Posts", then the posts shall be transported to, and stored at a location designated by the Owner.
- .3 Where the contract item is given as, "Salvage and Reinstallation of Guide Rail On Salvaged Posts", then the posts shall be transported to and stored at, a secure storage site provided by the Contractor at their own expense pending their re-use at a new location.
- .4 Should any post designated for salvage and reinstallation, be damaged or lost by the Contractor, then the Contractor shall be charged with the cost of replacement. Damaged posts shall become the property of the Contractor and shall be disposed of.

4.3 BACKFILLING POST HOLES

- .1 The Contractor shall backfill to the required grade using the excavated materials if suitable. Should the excavated material be unsuitable, or should there be insufficient suitable backfill material from the excavation, then the Owner will direct that material from a cut or borrow area will be used to complete the backfilling.
- .2 Backfill shall be placed in layers not exceeding 200 mm in thickness loose measurement. Each layer shall then be compacted to the required compaction before a further layer is placed.

- .3 Backfill consisting of ~~common other~~ material or ~~common other~~ material borrow shall be compacted to ~~a minimum of not less than~~ 95 % ~~maximum dry of the Standard Proctor D~~ density in accordance with (ASTM D698).
- .4 In rock backfill material where Standard Proctor test cannot be carried out, compaction shall be continued until a compaction is achieved that is equivalent to that obtained in a fill when there is no visible movement of fill under a vibrating vibratory compactor with vibratory roller of length not less than 1.5 metres.
- .5 The backfilled hole or trench shall be levelled and trimmed to provide slighty contours and adequate drainage.

#### 4.4 INSTALLATION

- .1 The guide rail sections, sloped and buried rail sections, terminal rail sections and posts shall be transported to the location where they are required.
- .2 Guide rail shall be placed to the lengths, lines and grades set by the Owner. The guide rail shall be installed in accordance with the applicable standard drawings as outlined in the Standard Drawings Table of Contents, except where directed otherwise by the Owner.
- .3 A sloped and buried rail section shall be placed at each end of a run of guide rail unless directed otherwise by the ~~Owner~~Department.
- .4 On divided highways, a buried end section shall be placed at the approach end of a run of guide rail and a terminal section shall be placed at the other end unless directed otherwise by the Department.
- .4.5 The end post at a sloped and buried rail section shall have an anchor secured to the bottom of the post.
- .5.6 Where a 150 mm x 150 mm x 450 mm timber anchor is used it shall be secured to the post by means of a galvanized nut and 16 mm diameter bolt 350 mm long together with two 45 mm round 4 mm thick galvanized washers.
- .6.7 Where a double 38 mm x 140 mm x 450 mm lumber anchor is used it shall be secured to the post by means of four 125 mm galvanized spikes.
- .7.8 Field boring and cutting to length of anchors will be permitted, provided that the hole is treated with two coats of wood preservative before driving the bolts and provided that the cut end is treated with two coats of wood preservative before burying.
- .8.9 Where the contract item is given as, "Salvage and Reinstallation of Guide Rail On Salvaged Posts" then, posts with the original anchors may be used provided that the anchor is sound. Should the anchor have been

damaged during salvage then the Contractor shall replace the anchor on the post using new materials at their own expense.

- .9.10 The Contractor shall excavate holes for the posts such that when placed in the holes the bottom of the posts are at least 1500 mm below the ground surface.
- .10.11 Posts shall be set plumb and to the established lines and grades and shall be placed at 3810 mm intervals, unless directed otherwise by the Owner.
- .11.12 The posts shall be firmly backfilled with selected material, free of large rock, placed in layers of thickness not greater than 100 mm. Each layer shall be thoroughly compacted before the next layer is placed. Should the backfill be dry then each layer shall be moistened before tamping.
- .12.13 All backfill shall be compacted to a minimum of 95 % maximum dry of Standard Proctor Density in accordance with (ASTM D698).
- .13.14 All surplus excavated material shall be disposed of along the sides of fill, or in other locations as directed by the Owner.
- .14.15 The rails shall be secured to even lines such that the centre of the rail is 635 mm above the edge of pavement or road surface.
- .15.16 The Contractor shall bore holes in the posts for the post bolts and treat the holes with two coats of wood preservative before driving the bolts.
- .16.17 Rail elements and terminal sections shall be lapped so that the exposed ends will not face approaching traffic.
- .17.18 The bolted connections of the rail, element to the post shall be capable of withstanding a 22.5 kN pull at right angles to the lines of the railing.
- .18.19 When the attachment of the rail elements to the posts has been completed, the tops of the posts shall be cut to a point 75 mm above the top of the rail in accordance with the applicable standard drawings as outlined in the Standard Drawings Table of Contents. The tops of the posts shall be treated with two coats of wood preservative after cutting.
- .19.20 Signal reflectors shall be attached to posts at terminal sections, posts at the sloped and buried welded angled sections, and to every fourth post in a length of guide rail. Silver reflectors shall be placed facing oncoming traffic and yellow reflectors shall be placed on the opposite side except for divided highway.
- .20.21 On divided highways, silver reflectors will be placed facing oncoming traffic on the outside shoulder and yellow reflectors will be placed facing traffic on the median shoulder.
- .21.22 The Contractor shall drill nail holes in the reflectors, bend the reflectors to the required shape and secure the reflectors with 30 mm galvanized flat

head nails in accordance with the applicable standard drawings as outlined in the Standard Drawings Table of Contents.

**.22.23** When reinstalling salvaged posts, the original reflectors shall be removed and new reflectors shall be attached.

## PART 5 PAYMENT

### 5.1 MEASUREMENT FOR PAYMENT

.1 Measurement for payment for the Salvage and Reinstallation of Guide Rail, whether installed on New or Salvaged Posts, shall be the length of the reinstalled guide rail placed within the limits designated by the Owner, measured in metres, rounded to one decimal place, measured end to end along the face of the railing and terminal sections.

**.2** ~~No separate payment shall be made to the Contractor for the cost to:~~

.1 ~~Dismantle and salvage the rail sections.~~

.2 ~~Transport the rail sections and terminal sections to a secure storage site provided by the Contractor at their own expense.~~

.3 ~~Excavate and salvage the guide rail posts.~~

.4 ~~Transport the guide rail posts to a secure storage site provided by the Contractor at their own expense if required to be re-used or to a site designated by the Owner if new posts are to be provided.~~

.5 ~~Store the rail sections and guide rail posts as required.~~

.6 ~~Backfill and compact the excavation.~~

.7 ~~Excavate holes for posts at the required new location.~~

.8 ~~Supply new preserved wood posts and anchors.~~

.9 ~~Transport the stored rail sections and rail terminal sections from the storage site to the place of installation.~~

.10 ~~Supply the bolts, nuts, washers and spikes.~~

.11 ~~Assemble and secure the anchors to the posts as required.~~

.12 ~~Assemble the guide rail to the required lines and grade.~~

.13 ~~Backfill post holes, compact backfill, dispose of excavated waste material, trim posts, supply and apply wood preservative to cut ends and drill holes, and install reflectors.~~

### 5.2 BASIS OF PAYMENT

.1 All costs associated with the work outlined in this specification shall be deemed to be included in the appropriate unit and lump sum prices quoted as outlined in the Measurement for Payment subsection of this section and as included in the MERX Schedule of Quantities and Prices.

.2 Payment at the contract price for Salvage and Reinstallation of Guide Rail on New Posts, shall be compensation in full for all labour, materials and use of equipment to:

- .1 dismantle the rail sections,
- .2 transport the rail sections and terminal sections to a secure storage site provided by the Contractor at their own expense, store the rail sections,
- .3 excavate and salvage the guide rail posts and transport them to the nearest Department Depot,
- .4 backfill and compact the excavation,
- .5 excavate holes for posts at the required new location,
- .6 supply new preserved wood posts and anchors,
- .7 transport the stored rail sections and rail terminal sections from the storage site to the place of installation,
- .8 supply the bolts, nuts, washers and spikes,
- .9 supply, assemble and secure new the anchors to the posts,
- .10 assemble the guide rail to the required lines and grade,
- .11 bend rail sections where required to a uniform radius,
- .12 backfill post holes, compact backfill,
- .13 dispose of surplus excavation material,
- .14 trim posts, supply and apply wood preservative to cut ends and drill holes, and
- .2.15 install reflectors.

.3 Payment at the contract price for Salvage and Reinstallation of Guide Rail with Salvaged Posts, shall be compensation in full for all labour, materials and use of equipment to:

- .1 dismantle the rail sections,
- .2 transport the rail parts and posts to a secure storage site provided by the Contractor at their own expense, store the rail parts and posts,
- .3 excavate and salvage the guide rail posts,
- .4 backfill and compact the excavation,
- .5 excavate holes for posts at the required new location,
- .6 transport the stored rail parts and posts from the storage site to the place of installation,
- .7 supply the bolts, nuts, washers and spikes,
- .8 supply, assemble, and secure new anchors where the original anchors are damaged,
- .9 assemble the guide rail to the required lines and grade,
- .10 bend rail sections where required to a uniform radius,
- .11 backfill post holes, compact backfill,
- .12 dispose of surplus excavation material,

- .13 trim posts, supply and apply wood preservative to cut ends and drill holes, and
- .3.14 remove original reflectors, and install new reflectors.
- .4 Payment at the contract price for Salvage of Guide Rail, shall be compensation in full for all labour, materials and use of equipment to:
  - .1 dismantle the rail sections,
  - .2 salvage all suitable hardware, and
  - .4.3 excavate and salvage the guiderail posts and transport the rail sections, hardware and posts to the nearest Department Depot and stockpile the salvaged materials as directed.

Not For Construction

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