

PART 1 GENERAL

1.1 Related Sections

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 References

- .1 American Association of State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO M180- 2000, Corrugated Sheet Steel Beams for Highway Guardrails.
- .2 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A 307-00, Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.28-98, Exterior, Alkyd, House Paint.
 - .2 CAN/CGSB-1.40-M97, Anti-corrosive, Structural Steel Alkyd Primer.
 - .3 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
 - .4 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
 - .5 CGSB 31-GP-107Ma-90, Non-inhibited, Phosphoric Acid Base Metal Conditioner and Rust Remover.

- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-O80 Series-97 (February 2000), Wood Preservation.
- .5 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 Samples

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Engineered stamped shop drawings for crash absorption system.
 - .2 Engineered stamped shop drawings for gate system.
- .2 Inform Parks Canada Representative at least 4 weeks prior to beginning Work, of proposed sources of guide rail and components.

1.4 Waste Management and Disposal

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Divert unused metal materials from landfill to metal recycling facility

as approved by Parks Canada
Representative.

- .5 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Parks Canada Representative.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in any other location where it will pose a health or environmental hazard.
- .8 Do not dispose of preservative treated wood through incineration.
- .9 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .10 Dispose of treated wood, end pieces, wood scraps and sawdust at a sanitary landfill.
- .11 Dispose of unused preservative material at an official hazardous material collections site. Do not dispose of unused preservative material into the sewer system, streams, lakes, on ground or in any other location where they will pose a health or environmental hazard.

PART 2 PRODUCTS

2.1 Materials

- .1 Steel W-beam guide rail as indicated and to following requirements:

- .1 Steel rail and terminal sections: to AASHTO M180, class A Type 11 zinc coated.
- .2 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to CSA G164.
- .2 Organic zinc-rich coating: to CAN/CGSB-1.181.
- .3 Sawn timber posts and offset blocks:
 - .1 Species: Maple, Birch, Beech or Hemlock.
 - .2 Type: pressure treated in accordance with CAN/CSA-080 Series.
 - .3 Dimensions: 200 x 200 x 2500 mm.
 - .4 Posts shall conform to NFLD Dept. of Works and Transportation Specbook (Latest Version).
- .4 Crash Absorption System:
 - .1 Metal work shall be fabricated from either M1020 Merchant Quality or ASTM A-36 steel. After fabrication, metal work shall be galvanized in accordance with ASTM A-123. All welding shall be done by or under the direction of a certified welder.
 - .2 The system shall be assembled with galvanized fasteners. All bolts, nuts and washers shall be Commercial Quality "American National Standard" unless otherwise specified.
 - .3 Include all necessary design, anchors, concrete, excavation,

backfill, erection, and
adjustment.

- .4 For head-on impacts into the nose, a crash absorption system shall be specified which is capable of meeting the occupant risk criteria as recommended in NCHRP 350. For vehicles weighing between 820 and 2000 kg, the theoretical impact velocity of a hypothetical front seat passenger against the vehicle's interior (calculated from vehicle acceleration and 600 mm forward displacement) shall be less than 12 m/s, and vehicle's highest 10 millisecond average acceleration subsequent to the instant of the hypothetical passenger impact shall be less than 20 G's.
- .5 The crash absorption system shall be capable of redirecting 2000 kg vehicles which impact the sides of the system at speeds up to 100 km/h at angles of 20 degrees for both right-way and wrong-way impacts (angles measured from system's longitudinal centerline). The crash absorption system shall be capable of redirecting 820 kg vehicles which impact the sides of the system at speeds up to 100 km/h at angles of 15 degrees.
- .6 The crash absorption system shall be designed and constructed so there is no solid debris from the system which can create a hazard on the roadway

after either head-on or side angle design impacts.

- .7 The crash absorption system shall have been fully tested per the recommended criteria set forth in National Cooperated Highway Research Program (NCHRP) Report 350, 1993, Test Level 3 for redirected, non-gating terminals and crash cushions, and meet the requirements of AS/NZS 3845:1999 Road Safety Barrier Systems.

.5 Gates:

- .1 Sentinel Manual Dual Swing Barrier Gate or approved equal.
- .2 Size and configuration as indicated.
- .3 Include all necessary design, anchors, concrete, excavation, backfill, erection, and adjustment.

PART 3 Execution

3.1 Erection

- .1 Set posts by instrument for alignment, and locations as indicated and as directed by Parks Canada Representative.
- .2 Excavate post holes to depths as indicated and to diameter of 360 mm plus or minus 20 mm. Compact bottom to provide firm foundation. Set post plumb and square in hole.

- .3 Backfill around posts using excavated material and compact in uniform layers not exceeding 150 mm compacted thickness.
- .4 Cut off tops of posts as indicated, with tops parallel to grade of pavement edge.
- .5 Worker protection: workers must wear appropriate protective equipment, including gloves respirators dust masks long sleeved clothing eye protection protective clothing when handling, drilling, sawing, cutting or sanding preservative treated wood and applying preservative materials.
- .6 Treat cut tops with two coats of approved preservative.
- .7 Construct anchorages to details as indicated. Place and compact backfill for anchors as directed by Departmental Representative.
- .8 Erect steel W-beam components to details as indicated. Lap joints in direction of traffic. Tighten nuts to 100 Nm torque. Maximum protrusion of bolt 12 mm beyond nut.

3.2 Painting Touch-up

- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas. Pre-treat damaged surfaces according to manufacturer's instructions for zinc-rich paint.

END
