**DESIGN NOTES:**

1. DESIGNED IN ACCORDANCE WITH CAN/CSA-S6-06 AND THE REQUIREMENTS OF MINISTRY OF FORESTS AND RANGE/MINISTRY OF TRANSPORTATION CATTLEGUARD STANDARDS AND SPECIFICATIONS, DATED NOVEMBER 27, 2009, WITH THE EXCEPTION OF RUNNING STRIPS.

2. CATTLEGUARDS ARE DESIGNED FOR VEHICLE LOADING(S) SHOWN ON THIS DRAWING. DESIGN LIFE LOADING CYCLES = 100,000 TONNE-CHAINS.

3. ALL WELDING SHALL BE PERFORMED BY A/AN COMPANY CERTIFIED BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1 DIVISION 3 OR BETTER.

4. CATTLEGUARD SHALL BE COATED WITH A SINGLE COAT OF INORGANIC ZINC- rich primer at a dry film thickness (DFT) of 50-75 microns over the profile. The zinc-rich primer shall be chosen from the approved primer list specified by the Ministry of Transportation and Infrastructure for cattle guard applications.

5. FINISHED CATTLEGUARD SHALL BE IDENTIFIED WITH A NAME OR TRADEMARK OF MANUFACTURER, MODEL/TYPE, DESIGN, LOAD AND "MONTH/YEAR" OF MANUFACTURE STAMPED OR WELDED ON EXTERIOR FACE OF EXTENSION ARM AT MOUNTING. ALL LETTERING TO BE A MINIMUM OF .25 IN. HIGH.

**ASSUME NOT TO SCALE**

**ORIGINAL SIGNED AND SEALED**
NOTES:

1. SEE DRAWING No. STD-ECAT-010-01 FOR DESIGN NOTES, STRUCTURAL STICK, NOTES AND SILL OPTIONS.
2. NO SPACERS WILL BE ALLOWED FOR THIS CATTLE GUARD.
3. MODEL TYPE ECAT-010-02.

ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED
ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED

NOTES:
1. SET DRAWING No. STD-ECAT-010-01 FOR DESIGN NOTES.
   STRUCTURAL, STEEL NOTES, SLL OPTIONS AND SPICE DETAILS.
2. NO MORE THAN 4 SPICES ALLOWED IN TOTAL DECK AND NO
   SPICED PIPE SHALL BE ADJACENT TO ANOTHER SPICED PIPE.
3. THIS CATTLE GUARD HAS BEEN DESIGNED WITH THE FOLLOWING
   MULTI-LANE VEHICLE LOAD COMBONATIONS:
   - 90% BCL=625 IN BOTH LANES
   - 100% L-100 & 70% BCL=625
   - 100% 80% OFF-HIGHWAY + 70% BCL=625
4. MODEL TYPE ECAT-010-04.

END VIEW (END PLATE NOT SHOWN FOR CLARITY)
PIPE DECK 7.30 m WIDE CATTLE GUARD
SCALE = 1:20

END PLATE AND SILL DETAIL
SCALE AS SHOWN ARE TECHNICAL FOR EACH ITEM
(CELL DRAWING No. STD-ECAT-010-01 FOR SILL OPTIONS AND MILD DETAIL

FENCE POST BRACE
SCALE = 1:20
(CELL DRAWING ARE TECHNICAL FOR EACH ITEM)
PIPE DECK 4.80 m WIDE CATTLEGUARD

NOTES:
1. SEE DRAWING No. STD-Ecat-010-01 FOR DESIGN NOTES, STRUCTURAL STEEL NOTES, SILL OPTIONS AND SPlice DETAILS.
2. NO MORE THAN 4 SPlices ALLOWED IN TOTAL DECK AND NO SPliced PIPE SHALL BE ADJACENT TO ANOTHER SPliced PIPE.
3. MODEL TYPE (CAT-010-05)

ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED
NOTES:
1. SEE DRAWING NO. STD-ECAT-010-01 FOR DESIGN NOTES, STRUCTURAL STEEL NOTES, SILL OPTIONS AND SPlice DETAILS.
2. NO MORE THAN 4 SPlices ALLOWED IN TOTAL DECK AND NO SPULD PIPE SHALL BE ADJACENT TO ANOTHER SPLED PIPE.
3. THIS CATTLE GUARD HAS BEEN DESIGNED WITH THE FOLLOWING MULTIPLE-VEHICLE (3-D) COMBINATION:
   100% HEAVY-DUTY HIGHWAY + 70% BCL-525
4. MODEL TYPE ECAT-010-06

ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED

Ministry of Forests and Range
Engineering Research, Field Operations Division

CATTLEGUARD 7.3 m x 2.438 m LENGTH FOR HEAVY OFF-HIGHWAY VEHICLE

END VIEW
SILEN SPACE TO SLIDE PIPE
END VIEW
FENCE POST BRACE (SPRINGS SHOWN ARE TYPICAL FOR EACH FRAME)
NOTES:
1. SEE DRAWING NO. STD-ECAT-010-01 FOR DESIGN NOTES, STRUCTURAL STEEL NOTES, SILL OPTIONS AND SPlice DETAILS.
2. NO MORE THAN 4 SPIlCES ALLOWED IN TOTAL DECK AND NO SPIlCED PIPE SHALL BE ADjACENT TO ANOTHER SPIlCED PIPE.
3. THIS CATTLEGUARD HAS BEEN DESIGNED WITH THE FOLLOWING MULTI-LANE VEHicLE LOAD COMBINATION:
   - 90% BCL-625 IN BOTH LANEs
   - 100% L=100 = FULL BCL-625
   - 100% LIGHT OFF-HIGHWAY = 70% BCL-625
4. MODEL TYPE ECAT-010-07.

ASSUME NOT TO SCALE
ORIGIINAL SIGNED AND SEALED
NOTES:

1. SEE DRAWING NO. STD-ECAT-010-01 FOR DESIGN NOTES, STRUCTURAL STEEL NOTES, SILL OPTIONS AND SPLICE DETAILS.

2. NO MORE THAN 4 SPLICED PIPE SHALL BE ADJACENT TO ANOTHER SPICED PIPE.

3. THE CATTLEGARD HAS BEEN DESIGNED WITH THE FOLLOWING MULTI-LANE VEHICLE LOAD COMBINAIONS:
   - 90% BCL-625 IN BOTH LANES
   - 100% L-100 + 70% BCL-625
   - 100% LIGHT OFF-HIGHWAY + 70% BCL-625

4. MODEL TYPE ECAT-D10-D8.

ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED
NOTES:

1. SILL DRAWING No. STD-ECAT-010-01 FOR DESIGN NOTES.

2. NO MORE THAN 4 SPACERS ALLOWED IN TOTAL DECK AND NO SPUCED PIPE SHALL BE ADJACENT TO ANOTHER SPUCED PIPE.

3. THIS CATTLE GUARD HAS BEEN DESIGNED WITH THE FOLLOWING MULTI-LANE VEHICLE LOAD COMBINATION:
   - 100% HEAVY CIVIL-HIGHWAY + 70% BCL-625

4. MODULAR TYPE ECAT-010-10.

PIECE | QTY | DESCRIPTION | LENGTH | WEIGHT
-----|-----|-------------|--------|--------
1    | 10  | P10 x 32 SPACERS | 2.428 | 1,408.6
2    | 1   | DEEP H700 x 114.3 | 1.982 | 4,121.5
3    | 2   | P110 x 320 END PLATE | 1.790 | 905.5
4    | 2   | P20 x 320 END PLATE | 1.790 | 905.5
5    | 2   | 670 x 31 MODEL | 0.750 | 539.5
6    | 2   | P110 x 320 SPACER | 1.790 | 905.5
7    | 6   | PIPE 114.3 D6 x 114.3 MODEL | 0.750 | 100.3
8    | 12  | P110 x 114.3 END PLATE | 0.750 | 94.3
9    | 4   | P110 x 125 END PLATE | 0.750 | 94.3
10   | 4   | PIPE 114.3 D6 x 114.3 END PLATE | 0.750 | 100.3
11   | 8   | PIPE 114.3 D6 x 114.3 END PLATE | 0.750 | 100.3
12   | 2   | PIPE 114.3 D6 x 114.3 END PLATE | 0.750 | 100.3
13   | 2   | PIPE 114.3 D6 x 114.3 END PLATE | 0.750 | 100.3
14   | 2   | PIPE 114.3 D6 x 114.3 END PLATE | 0.750 | 100.3
15   | 2   | PIPE 114.3 D6 x 114.3 END PLATE | 0.750 | 100.3

END VIEW (END PLATE NOT SHOWN FOR CLARITY)

PIECE DECK 8.70 m WIDE CATTLE GUARD

SCALE AS SHOWN

ASSUME NOT TO SCALE

ORIGINAL SIGNED AND SEALED

MINISTRY OF FORESTS AND RANGE
ENGINEERING BRANCH, FIELD OPERATIONS DIVISION

CATTLE GUARD 8.7 m x 2.438 m LONG FOR HEAVY CIVIL-HIGHWAY VEHICLE

MODULAR TYPE ECAT-010-10

REVISIONS
NOTES:

1. See drawing No. S10-ECAT-010-01 for design notes, structural steel notes, sill options and splice details.

2. No more than 4 spikes allowed in total deck and no spiked pipe shall be adjacent to another spiked pipe.

3. Model Type: ECAT-D-1.1

ASSUME NOT TO SCALE
ORIGINAL SIGNED AND SEALED