GENERAL NOTES

1. TOLERANCE FOR TOP OF GUARDRAIL IS ±1 IN.

2. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:

3. WHEN SPECIFIED ON THE PLANS, EXTEND A 2 IN WIDE THICKNESS PAVER SURFACE TO 1 FT BEHIND THE GUARDRAIL POSTS OR TO THE EROSION CONTROL CURB AS SHOWN ON PLANS. GUARDRAIL CUTTING & PATCHING OF OTHER APPROVED METHOD SHALL BE USED TO ADEQUATELY MATCH ALL PAVER SURFACES UNDER GUARDRAIL INSTALLATION. ALL RETURNS TO THE PAVER AREA WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. A MINIMUM 2 IN. THICK CONCRETE PLACEMENT MAY ALSO BE USED FOR PAVERS REARING THE GUARDRAIL INSTALL THE POST IN A 1:1. IN INCREASED PROFILE NEAR GUARDRAIL KNEE DERIVED AS DIRECTED PAYMENT FOR THIS PAVER SURFACE WILL BE MADE UNDER A PAVEMENT OR CONCRETE PAY ITEM WITH QUANTITIES SHOWN ON THE PLANS.

4. THE VARIOUS GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE SHALL BE:
   a. 2 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
   b. 2 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

5. WHEN SPECIFIED ON THE PLANS, GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE:
   a. 0 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
   b. 4 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

6. THE GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE:
   a. 2 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
   b. 4 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

7. THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE:
   a. 2 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
   b. 4 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

8. THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE:
   a. 2 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
   b. 4 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

9. THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE:
   a. 2 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
   b. 4 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

10. THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE:
    a. 2 FT. FOR SHOULDER WIDTHS 8 FT. OR LESS
    b. 4 FT. FOR SHOULDER WIDTHS 6 FT. OR LESS

OPTION A

ROADSIDE INSTALLATION WITH EROSION CONTROL CURB

OPTION B (PREFERRED)

URBAN ROADSIDE INSTALLATION WITH CURB AND GUTTER

EMBANKMENT WITH GUARDRAIL

NOTE: ALL GUARDRAIL POSTS LOCATED IN PAVEMENT SHALL BE PROVIDED WITH LEAVE-OUT AREAS TO ALLOW THE POSTS TO FLOAT IN THEIR EMBANKMENT SLAB THAT VEHICLE IMPACT LOADS ARE DISTRIBUTED THROUGH THE POST INTO THE EMBANKMENT MATERIAL PRIOR TO THE POSTS BREAKING PREMATURELY.

SECTION A-A

LEAVE-OUT AREA FOR GUARDRAIL POSTS LOCATED IN PAVEMENT

NOTE LEAVE-OUT AREA SHALL BE PROVIDED FOR ALL GUARDRAIL POSTS LOCATED IN PAVEMENT TO ALLOW THE POSTS TO FLOAT IN THEIR EMBANKMENT SLAB THAT VEHICLE IMPACT LOADS ARE DISTRIBUTED THROUGH THE POST INTO THE EMBANKMENT MATERIAL PRIOR TO THE POSTS BREAKING PREMATURELY.
GENERAL NOTES

1. REFERENCES SUCH AS "66PDBOl", "66PDEOl", AND "66PWEOI" IN THIS
   TWO 16d GAFFES (TYPICAL) TO 28 INCHES OR ABOVE.

2. STANDARDIZED HIGHWAY BARRIER HARDWARE PREPARED BY THE
   AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.

3. RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED
   INSTEAD OF THE STANDARD 6 FT. POSTS PROVIDED THAT THE SUPPLIED MATERIAIS
   HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS
   USED FOR TESTING AND APPROVAL.

4. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO
   W6 X 9. W6 X 8.5 WIDE FLANGE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
   THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 X 9
   STANDARD PLAN AS DEFINED IN AASHTO M270 (ASTM A709) GRADE 36 STEEL UNLESS CORROSION
   RESISTANT STEEL IS REQUIRED, IN WHICH CASE THE POST SHALL BE
   MANUFACTURED USING AASHTO M133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION
   ASSAY RETENTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THAT THE SPECIES AND GRADE MEET
   THE REQUIREMENTS OF THE CONTRACT.

5. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
   RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
   AFTER THE SECTION IS CUT AND ALL HOLES ARE DRILLED IN THE ANCHOR DEPTH OF 3 INCHES OR DEEPER, THE BOLT HEADS AND WASHERS SHALL BE ZINC-COATED IN AccordANCE WITH THE SPECIFICATION.

6. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO AASHTO M133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION
   ASSAY RETENTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THAT THE SPECIES AND GRADE MEET
   THE REQUIREMENTS OF THE CONTRACT.

7. SEE SHEETS 7 AND 9 FOR CURB TREATMENTS AT GUARDRAIL TERMINALS.

8. IF THE ENGINEER WILL BE LESS THAN 25 INCHES, REJECT GUARDRAIL BEHIND TO 25 INCHES OR ABOVE.

9. ALL W-BEAM SPECIES AND SPLICE OF TERMINAL CONNECTORS TO W-BEAM
   SHALL BE LAPPLED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED
   ON THE PLAN OR BY THE MANUFACTURER.

10. W-BEAM TYPE AND SIZE OF POSTS AND BLOCKS SHALL BE THE SAME
    THROUGHOUT THE PROJECT EXCEPT WHEN SPECIFIED. POSTS AND BLOCKS
    ARE SPECIFIED IN AASHTO M133-95 AND ARE SPECIALIZED FOR W-BEAM INSTALLATIONS.

11. LAPPED PORTION OF THE W-BEAM POSTS IN BLOCKS SHALL BE INSTALLED
    IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED
    ON THE PLAN OR BY THE MANUFACTURER.

12. THE STANDARD 5/8 IN. 1 1/2 IN. HEX NUTS (TYPICAL) TO 28 INCHES OR ABOVE.

13. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

14. AN ADDITIONAL HOLE IN BLOCKS IS REQUIRED FOR MEDIAN GUARDRAIL APPLICATION.

15. REFLECTOR PLATES SHALL BE INSTALLED AT 25 FT. INTERVALS.

16. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

17. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

18. FIELD MODIFICATION TO RAIL ELEMENTS IS ALLOWED PER MANUFACTURER'S
    RECOMMENDATIONS, OR WITH THE APPROVAL OF THE STANDARDS AND
    SPECIFICATIONS THAT POSTS SHALL NOT BE MODIFIED IN ANY WAY.

19. FIELD MODIFICATION TO RAIL ELEMENTS IS ALLOWED PER MANUFACTURER'S
    RECOMMENDATIONS, OR WITH THE APPROVAL OF THE STANDARDS AND
    SPECIFICATIONS THAT POSTS SHALL NOT BE MODIFIED IN ANY WAY.

20. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

21. GLULAM POSTS AND BLOCKS WILL BE ACCEPTED AS ALTERNATIVES PROVIDED
    THAT THE SUPPLIED MATERIALS HAVE RECEIVED FHWA APPROVAL AND ARE
    CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.

22. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO
   SHALLOW BE LAPPED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED
   ON THE PLAN OR BY THE MANUFACTURER.

23. REFLECTOR PLATES SHALL BE INSTALLED AT 25 FT. INTERVALS.

24. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO
   W6 X 9. W6 X 8.5 WIDE FLANGE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
   THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 X 9
   STANDARD PLAN AS DEFINED IN AASHTO M270 (ASTM A709) GRADE 36 STEEL UNLESS CORROSION
   RESISTANT STEEL IS REQUIRED, IN WHICH CASE THE POST SHALL BE MANUFACTURED
   FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

25. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

26. REFLECTOR PLATES SHALL BE INSTALLED AT 25 FT. INTERVALS.

27. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

28. REFLECTOR PLATES SHALL BE INSTALLED AT 25 FT. INTERVALS.

29. W-BEAM AND THREE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED
    USING A 20 GAUGE 316 STAINLESS STEEL UNLESS CORROSION
    RESISTANT STEEL IS REQUIRED IN WHICH CASE THE POST SHALL BE MANUFACTURED
    FROM A 1/2 OR 5/8 MILL PLATE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.
NOTES
1. THE MGS TRANSITION FROM A TYPE 3 GUARDRAIL SHALL
BE COMPLETED OUTSIDE THE MGS END ANCHORAGE LIMITS.
BACKSLOPE • TOP OF GUARDRAIL MAY SLOPE

TOP RAIL HEIGHT PARALLELS SHOULDER EDGE SLOPE

STeeper than shoulder edge slope

STEEPNESS

SEE TYPE 3B RAIL AND PLAN VIEW FOR ALIGNMENT. THE 200 FT. FLARE LENGTH MAY BE SHORTENED IF THE SLOPE IS LESS THAN 8 FT. WIDE.

END ANCHORAGE TYPE 3B

MOUNT A W-BEAM RUB RAIL 1-1/2 IN. BELOW THE TOP RAIL WHEN THE TOP RAIL HEIGHT EXCEEDS 33 IN. ABOVE THE GROUND

PLAN VIEW

END ANCHORAGE TYPE 3B (RUB RAIL)

WITH ROADSIDE DITCH AT GUARDRAIL

END ANCHORAGE TYPE 3D DEPARTURE TERMINAL

GUARDRAIL SYSTEM (MGS)

TYPE 3 W-BEAM 31 INCHES

MIDWEST

STANDARD PLAN NO.

M-606-1

Standard Sheet No. 5 of 19

Issued by the Project Development Branch: July 31, 2019

Computer File Information

Creation Date: 07/31/19

Designer Initials: JBK

Last Modification Date: 07/31/19

CAD Ver.: MicroStation VB

Scale: Not to Scale

Units: English

Colorado Department of Transportation

Project Development Branch

2039 West Howard Place

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Designer Initials: JBK

Last Modification Date: 07/31/19

CAD Ver.: MicroStation VB

Scale: Not to Scale

Units: English

Issued by the Project Development Branch: July 31, 2019

PROJECT SHEET NUMBER:
I. POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF POSTS.

2. THE GUARDRAIL BETWEEN POST 1 THRU 5 IS ON A STRAIGHT LINE FLARE.

FIRST LINE POST OF APPROVED 31" HIGH GUARDRAIL SYSTEM
POST 6 NOT INCLUDED WITH SRT

SLOT GUARD BRACKET (TYP.)

LENGTH OF NEED
4'-0"

SEE OFFSET NOTE 2

NOTE 1. THE END ANCHORAGES (FLARED) SHALL EITHER BE THE SLOTTED RAIL TERMINAL, SRT-31
AS MANUFACTURED BY TRINITY HIGHWAY PRODUCTS LLC (TELEPHONE # 1-888-356-2363), OR
THE FLOAT-350, AS MANUFACTURED BY ROAD SYSTEMS INC. (TELEPHONE # 432-263-2435).
ONE END ANCHORAGE (FLARED) SHALL INCLUDE ALL POST, RAIL, AND ALL HARDWARE ITEMS
REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (FLARED) SHALL BE INSTALLED
CONFORMING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL
PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND
PARTS LIST TO THE ENGINEER PRIOR TO INSTALLATION OF THE DEVICE.

DEFLECTOR ANGLE (HIGH END) OF SLOT GUARD BRACKET

SHALL BE POSITIONED IMMEDIATELY DOWNSTREAM OF SLOTS - TRAFFIC (AND POST 2 IN
SOME CASES) WILL BE SEVERAL INCHES ABOVE TOP OF RAIL (SEE NOTE 2)

3. POSTS SHALL BE DRILLED FOR BREAKAWAY ACCORDING TO THE MANUFACTURER'S
INSTRUCTIONS.

4. SEE SHEETS 1, 3 AND 5 FOR STANDARD GUARDRAIL TYPE 3 AND INSTALLATION DETAILS.

5. RETROREFLECTORS SHALL NOT BE USED ON END ANCHORAGE POSTS.

6. DELINEATION SHALL BE APPLIED TO THE END PIECE, AND SHALL NOT BE PAID
FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

END ANCHORAGE ACCORDING TO STANDARD PLAN S-612-1

MIDWEST
GUARDRAIL SYSTEM (MGS)
TYPE 3 W-BEAM 31 INCHES

Project Development Branch: JBK

Issued by the Project Development Branch: July 31, 2019

PROJECT DEVELOPMENT BRANCH: JBK
2829 West Howard Place
Denver, CO 80204
Phone: 303-757-9021 Fax: 303-757-9888
1. Payment for the added embankment (approximately 45 cu. yds.) for end anchorage (flared) pay limit

   - The flare shall be as follows:
     A. Under pay item 203 when the contract plan includes pay item 203
     B. Included in the cost of the end anchorage (flared) when the contract plan does not include pay item 203
     C. (See note 2)

   - The added embankment shall be constructed in accordance with subsection 203.07, AASHTO T 99.

2. When the widened area is paved, payment for the pavement (approx. 70 sq. yds.) shall be as follows:
   A. Under pay item 403 or 412 when the contract plan includes pay item 403 or 412
   B. Included in the cost of the end anchorage (flared) when the contract plan includes pay item 403 or 412
   C. (See note 2)

   - The pavement shall be paved in accordance with subsection 203.07, AASHTO T 99.

3. Concrete paved areas shall have their tapered ends squared off as directed by the engineer.

4. When overlay paving, the finished surface at each post shall not be above the top breakaway hole or strut assembly. The widened area at the flared end of the guardrail pay length should not be overlayed unless pavement conditions warrant it.

5. See sheets 1, 2, 3, and 5 for standard type 3 guardrail installation details.

6. The cost of the gutter will be paid for as "Gutter Type 2 (2 ft.)" for a length of 134 ft. or "Gutter Type 2 (3 ft.)" for a length of 40 ft.

7. Inlets or rundows may be used instead of the gutter if specified on the plans. No additional curb shall be added in the vicinity of the end anchorage.

8. 4:1 or flatter slopes in the traversable area shall be used behind the end anchorage, and in advance of posts if this is not possible, a minimum 3:1 slope may be used if approved by the engineer.

9. The widened area, except for curb option A, shall have the same grading as the adjacent guardrail, but in advance of post A. If this is not possible, a minimum 3:1 slope may be used if approved by the engineer.

10. Widening for end anchorage shall be paved on interstates and freeways. For other highways, paving shall be as shown on the plans.
GUARDRAIL TYPE 3

- PAY LENGTH

- LENGTH OF MAX-TENSION TERMINAL
  THE GUARDRAIL PANEL AT POST?

- 12'-6"

- GUARDRAIL PANEL
  GROUND LINE
  TRAFFIC

- 3'-4"

- 6'-3" --- 6'-3" --- 6'-3" -- 6'-1"4" -- 6'-3" --- 6'-3" ----- 6'-3"

- 3'-1Y2"

- END OF GUARDRAIL
  PAY LENGTH

NOTES FOR NONFLARED

1. THE END ANCHORAGE (NONFLARED) SHALL EITHER BE THE SOFTSTOP AS MANUFACTURED BY TRINITY INDUSTRIES, INC. (TEL. #: 1-888-356-2363), OR THE MAX-TENSION AS MANUFACTURED BY LINDSAY TRANSPORTATION SOLUTIONS (TEL. #: 402-829-6800). THE END ANCHORAGE (NONFLARED) SHALL INCLUDE ALL POSTS, HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE GUARDRAIL PANEL AT POSTS 2 THROUGH 5 IS 50'-9Y2". THE END ANCHORAGE (NONFLARED) SHALL BE INSTALLED CONFORMING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LIST TO THE ENGINEER PRIOR TO THE INSTALLATION OF THE DEVICE.

2. DO NOT ATTACH THESE END ANCHORAGES DIRECTLY TO A RIGID BARRIER (EX. CONCRETE BARRIER, STEEL BARRIER, CONCRETE STRUCTURE) WITHOUT A PROPER TRANSITION.

3. CONNECTIONS TO W-BEAMS WHERE THE SPLICE IS NOT AT MID-SPAN BUT AT A POST CAN BE MADE USING A 3'-1Y2", 9'-4Y2", OR 15'-7Y2" W-BEAM PANEL DOWNSTREAM OF TRAFFIC.

4. FOR MSKT END ANCHORAGES (NONFLARED), USE THE MANUFACTURER'S SPECIFIED STEEL FOUNDATION TUBES FOR POSTS CD AND 0.

5. RETROREFLECTOR TABS SHALL NOT BE USED ON END ANCHORAGE POSTS.

6. DELINEATION SHALL BE APPLIED TO THE END PIECE AND SHALL NOT BE PAID FOR SEPARATELY BUT BE INCLUDED IN THE COST OF THE WORK. SEE STANDARD PLAN M-606-1.

END ANCHORAGES (NONFLARED)

- MSKT TERMINAL END ANCHORAGE (NONFLARED)

- SOFTSTOP TERMINAL END ANCHORAGE (NONFLARED)
NOTES

1. PAYMENTS FOR THE ADDED EMBANKMENT (APPROXIMATELY 25 CU. YDS.) FOR THE TRAVERSABLE EMBANKMENT SLOPE SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 203 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 203.
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (NONFLARED) WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 203.

2. WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 39 SQ. YDS.) SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412.
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (NONFLARED) WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412.

3. WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE TOP BREAKWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE END ANCHORAGE (NONFLARED) SHALL NOT BE OVERLAYED UNLESS PAVEMENT CONDITIONS WARRANT IT.

4. SEE SHEETS 1, 2, 3, AND 5 FOR GUARDRAIL TYPE 3 INSTALLATION DETAILS.

5. THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 111 FT., OR "GUTTER TYPE 2 (3 FT.)" FOR A LENGTH OF 50 FT.

6. INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END TREATMENT.

7. THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS THE NORMAL SHOULDER, OR SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.

8. WIDENING FOR END ANCHORAGES SHALL BE PAVED ON INTERSTATES AND FREEWAYS. FOR OTHER HIGHWAYS, PAVING SHALL BE AS SHOWN ON THE PLANS.

9. SEE SHEET 1 FOR GUARDRAIL TYPE 3 GUARDRAIL INSTALLATION DETAILS.

10. ENLARGED AREA FOR END ANCHORAGE (NONFLARED) WITH CURB OPTION B

Computer File Information

Date: 07/31/19

Colorado Department of Transportation
2020 West Howard Place
Boulder, CO 80304
Phone: 303-757-9021 FAX: 303-757-9868

MOIST UB SYSTEM (MGS)
TYPE 3 W-BEAM 31 INCHES

Project Development Branch: July 31, 2019
CAD Ver. MicroStation V8i Scale: Not to Scale Units: English

MIDWEST STANDARD PLAN NO.
M-606-1
Standard Sheet No. 9 of 19
1. The median terminal shall be the MAX-TENSION median as manufactured by BARRIER SYSTEM by Lindsay (Lindsey Transportation Solutions) or equivalent unless otherwise stated.

2. One median terminal shall include all posts, rail, and hardware items required for a complete unit. The device shall be installed at, or transitioned to, 31 inches with panels and post spacing configured at mid-span splice. Transitions to other barrier systems shall also be at a height of 31 inches downstream from the first post.

3. The MAX-TENSION shall not be attached directly to rigid barriers such as concrete barriers, steel barriers or concrete structures without proper transition if rock or stiff soil is encountered. The posts and soil anchor may be installed by auguring and backfilling the hole.

4. Either 8-inch or 12-inch composite or timber blockouts shall be used per manufacturer's recommendations.

5. Rail panels shall be lapped per manufacturer's installation manual, regardless of an upstream or downstream end system position.

6. Rail panels shall be offset 7 1/2 inches at opposite traffic side and 12-gauge steel ground cable shall be installed on the approaching traffic side.

7. All steel components shall be galvanized per ASTM A123 or equivalent green stripe standard.

8. The median terminal shall include all posts, rail, and hardware items required for a complete unit to be installed. In compliance with the manufacturer's instructions, the contractor shall provide a copy of the manufacturer's installation instructions and parts lists to the engineer prior to the installation of the device.

9. Unless otherwise specified on the plans, the median terminal shall be installed for right-of-way traffic application.

10. Each installation shall be supervised and certified as correct upon completion by a representative of the device manufacturer or by an employee of the contractor who is a certified installer. The certified installer shall have completed device training and shall be registered with the manufacturer as a certified installer.

11. Delamination, if required, shall be applied to the end piece and will not be paid for separately but shall be included in the cost of the work, see standard plan M-606-1.
NOTES

1. APPLICATION: THE TRANSITION TYPE 3J MAY BE USED TO SHIELD HAZARDS AT THE INTERSECTION OF TWO ROADWAYS. A 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

2. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

3. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

4. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

5. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

6. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

7. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

8. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

9. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

10. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.

11. THE TRANSITION TYPE 3J TERMINAL MAY BE USED ONLY ON INTERSECTIONS WHERE THE INTRUDING ROADWAY IS ON THE APPROACH ROADWAY OR DRIVEWAY.
GUARDRAIL FOR OBSTRUCTION IN MEDIANS WIDER THAN 30 FT.

NOTE FOR OBSTRUCTIONS THAT ARE WIDER THAN 30 FT IN MEDIANS USE SHEET 16.

GUARDRAIL FOR OBSTRUCTION IN MEDIANS WIDER THAN 30 FT.

NOTE FOR OBSTRUCTIONS THAT ARE WIDER THAN 30 FT IN MEDIANS USE SHEET 16.

OBSTRUCTIONS IN MEDIANS

GUARDRAIL SYSTEM (MGS)

MIDWEST

TYPE 3 W-BEAM 31 INCHES

STANDARD PLAN NO.

M-606-1

Standard Sheet No. 13 of 19

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

Computer File Information

Creation Date: 07/12/19

Designer: JBK

CAD Version: AutoCAD 2013

Sheet Revisions

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Project Development Branch: July 31, 2019

Project Sheet Number:

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

Computer File Information

Creation Date: 07/12/19

Designer: JBK

CAD Version: AutoCAD 2013

Sheet Revisions

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Project Development Branch: July 31, 2019

Project Sheet Number:

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:
NOTES

1. MEDIAN BARRIERS TANGENT TO THE ROADWAY MAY BE USED WHERE THE SHOULDER SLOPES IN THE MEDIAN ARE STEEP.

2. BARRIER LENGTHS SHALL BE INCREASED TO ACCOUNT FOR STEEP EMBANKMENTS OR OTHER HAZARDS WITHIN CLOSE PROXIMITY OF BRIDGES.

@ - Do not construct TR and Guardrail on the trailing side of the transitions to not obstruct the use of shoulders.

N - Shown on plans, length to shield all hazards is based on guardrail's length of need for another hazard design, and the median shall be 2 ft. - 8 ft. where no extensions exceed that total length of need will include the length of transition, the length of rail, and any prospective length in the rail end treatment.

M - 25 feet for transition Types 3G and 3H.

A - Edge of 9 ft. or 10 ft. shoulder.

B - Edge of 6 ft. or less shoulder.

⭐ - The anchor can be placed in nonlevels.
**NOTES**

1. GUARDRAIL TRANSITION FROM PARALLEL TO ROADWAY SHOULDER AT 3G SEGMENT TO 15:1 TAPER WITHIN 25 FEET BASED ON POST OFFSET DIMENSIONS SHOWN.

2. SEE SHEET 14 FOR THE RIGHT SHOULDER GUARDRAIL LAYOUT.

**MULTILANE DIVIDED HIGHWAYS - (DEPRESSED MEDIANS, 60 FT. AND OVER WITH OPEN HAZARDS OR OBSTRUCTIONS)**
MULTILINE DIVIDED HIGHWAYS - (DEPRESSED MEDIANS, 21 - 59 FT. WITH OPEN HAZARDS OR OBSTRUCTIONS)

1. GUARDRAIL TRANSITIONS FROM PARALLEL TO ROADWAY SHOULDER AT 3G SEGMENT TO 15:1 TAPER WITHIN 25 FEET BASED ON POST OFFSET DIMENSIONS SHOWN.

2. THE OPTION 1 LAYOUT SHALL BE USED WHEN “Y” IS 16 FEET OR LESS.

3. THE OPTION 3 LAYOUT SHALL BE USED WHEN “Y” EXCEEDS 16 FEET OR WHEN MEDIAN BARRIER IS CONTINUOUS.

4. SEE SHEET 14 FOR RIGHT SHOULDER GUARDRAIL LAYOUT.

NOTE: *

L - MUST MEET THE LENGTH OF NEED AND SHOULD NOT EXCEED 250 FT. UNLESS SITE CONDITIONS WARRANT.

TR - 25 FEET FOR TRANSITION TYPE 3G.

C - CHANGE 100 FT TRANSITION TO NORMAL SLOPE.

M - WIDTH OF MEDIAN.

L - TOTAL LENGTH PAY AS GUARDRAIL TYPE 3.

Y - FINAL OFFSET AT END.

TRANSITION TO TYPICAL 15:1 TAPER

EDGE OF TRAVELED WAY

TRAVEL LANE

EDGE OF SHOULDER

INITIAL OFFSET

EDGE OF TRAVELLED WAY
NOTES
1. A TYPE 2G OR 2H TRANSITION (SEE SHEET 12) SHALL BE USED TO CONNECT THE TYPE 3 W-BEAM TO A TYPE 9 CONCRETE BARREN (SEE M-606-15) OR TO A TYPE 9 OR 10 BRIDGE RAIL.

2. "TR" SHALL BE 12 FEET FOR THE TRANSITION TYPES 2G AND 2H.


- END ANCHORAGE CAN BE FLARED OR NONFLARED.

GUARDRAIL FOR ROADSIDE OBSTRUCTIONS

GUARDRAIL FOR ROADSIDE FILL CONSTRUCTION

GUARDRAIL FOR ROADSIDE CUT-TO-FILL CONDITION

LAYOUT FOR DRIVEWAY APPROACH

2-WAY NORMAL BRIDGE APPLICATION

GUARDRAIL SYSTEM (MGS)
TYPE 3 W-BEAM 31 INCHES

MIDWEST

STANDARD PLAN NO.
M-606-1

Standard Sheet No. 17 of 19

Issued by the Project Development Branch: July 31, 2020

Project Sheet Number:
NOTES
1. POSTS 1, 2, 3, and 4 may be timber or steel.
2. The number of omitted posts is dependent on the length of the gap.
3. One post may be omitted without any modification to the guardrail run.

LONG-SPAN RAILING FOR ONE, TWO, OR THREE OMITTED POSTS AT GAP

TIMBER POST
POSTS 1-2 ARE @, AND 3-4 (SEE NOTE 3)

STEEL POST
POSTS 1-2 ARE @, AND 3-4 (SEE NOTE 3)

BREAKWAY TIMBER POST
POSTS 3-4
GUARDRAIL FOR CULVERTS

NOTES

1. LOCATION AND LENGTH OF MEDIAN GUARDRAIL APPROACHES TO CULVERTS WITH FULL HEADING AND ANCHORAGE SHALL BE AS SHOWN FOR BRIDGES ON SHEET 3. THE GUARDRAIL TYPE 3 SHALL CONTINUE ACROSS THE CULVERT AS SHOWN ON THIS SHEET.

2. HEAD SMACKER BOX GUARDRAIL TREATMENT IS SHOWN ON THIS SHEET FOR CULVERTS 14 FT. OR LESS IN LENGTH.

3. CONSTRUCTION AND PAYMENT FOR FILL HEIGHTS SHALL BE INCLUDED IN THE COST OF THE GUARDRAIL TYPE 3.

4. ANCHORAGE D SIX BOLTS FOR BASE PLATE "B" WITH INSIDE MOUNT THE BOLTS SHALL BE 7/8 IN. DIA X 10 IN. HIGH STRENGTH RODS THREADED FULL LENGTH AND ALL GALVANIZED. THE BOLTS SHALL BE CAST-IN-PLACE FOR FORMWORK STRUCTURES FOR EXISTING STRUCTURES THE RODS SHALL BE INSTALLED IN 1-1/4 IN. HOLES WITH NON-SHRINK GROUT OR EPOXY CONTINUING TO A MINIMUM OF 10 IN. FROM THE TOP OF A CULVERT. THE ROCS MAY REQUIRE BOLTS TO BE LESS THAN 10 IN. FROM THE BOLTS SHALL BE APPROVED BY THE ENGINEER.

5. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM COULD INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY ADDITIONAL LENGTH IN THE RAIL END TREATMENT.

6. ALL POSTS, BASE PLATES, AND ANCHOR BOLTS SHALL BE FABRICATED FROM ASTM A 36 STEEL THE ABOVE MATERIAL, W-BEAM, AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509. CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS SHALL BE IN ACCORDANCE WITH SECTIONS 601, 602, AND 509, RESPECTIVELY.

7. POST ANCHORS ENCASED IN CONCRETE SHALL BE ASTM A 36 STEEL AND NEED NOT BE GALVANIZED.

8. PRIOR TO INSTALLATION OF GUARDRAIL ON CULVERTS, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105 SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.
GENERAL NOTES

1. ALL EDGES SHALL BE ROUNDED WITH A 1 IN. RADIUS

2. THE BARRIER SHALL BE ANCHORED AT THE ENDS AND AT 24 IN. SPACING ACROSS A BARRIER SECTION (e.g. DROP INLET OR CULVERT OVERTOPPING AREAS)

3. BARRIER FOUNDATION SHALL BE PAVEMENT, OR COMPACTED AGGREGATE BASE, OR EMBANKMENT MATERIAL

4. CONSTRUCTION JOINTS SHALL BE USED ON ALL BARRIER TYPES SHOWN, AT THE END OF THE DAY'S POUR OR AFTER ANY INTERRUPTION LONGER THAN 30 MINUTES. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.

5. NO FOOTING IS REQUIRED (TYP.) EXCEPT FOR 10 FT. ANCHORAGE

6. REINFORCING STEEL IN ANCHORAGE SHALL BE GRADE 60 EPOXY COATED DEFORMED BARS WITH MINIMUM DOWELS SPLICE OF 38 IN. WIRE STRAND LONGITUDINAL REINFORCEMENT 100 PERCENT OF THE MINIMUM REQUIRED TENSILE STRENGTH.

7. REINFORCING STEEL IN ANCHORAGE SHALL BE INCLUDED IN THE COST OF GUARDRAIL

8. CONTINUOUS LONGITUDINAL REINFORCEMENT SHALL BE EITHER GRADE 60 EPOXY COATED DEFORMED BARS OR WIRE STRAND WITH ULTIMATE TENSILE STRENGTH OF 38,000 LBS.

9. EACH SEAM IN TRANSVERSE CONTRACT JOINTS SHALL BE ACCOMPLISHED IN ONE 10 FT LONG SEGMENT OF BARRIER

10. CONCRETE SHALL BE CLASS D

11. ADDITIONAL MATERIAL FOR BARRIER EXTENSION GREATER THAN 1 IN. WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK

12. ENTRY CASTER LONGITUDINAL REBAR SHALL HAVE A MINIMUM GAP SPACE OF 1/2 IN. IN WIDE STRAND LONGITUDINAL REINFORCEMENT SHALL BE NOT NEEDED IN MECHANICALLY SPECCED TO MAINTAIN PERCENT OF THE MINIMUM REINFORCEMENT TENSILE STRENGTH

13. ALL INCIDENTAL WORK AND MATERIAL SUCH AS DOWELS, GROUT, ARCHITECTURE, ETC. USED IN INSTALLATION SHALL BE INCLUDED IN THE COST OF GUARDRAIL

14. RETROREFLECTORIZATION IS REQUIRED ON ALL BARRIER TYPES. SEE STANDARD PLAN M-606-14

NOTE 1/4" BREAKPOINT

NOTE 8

NOTE 7

NOTE 6

NOTE 5

NOTE 4

NOTE 3

NOTE 2

NOTE 1
**JOINTS TO MATCH JOINT TYPE AND 7' MIN. SPACING IN CONCRETE BARRIER**

**2'-6"**

---

**CONCRETE GLARE SCREEN**

**GLARE SCREEN AT MEDIAN OBSTRUCTIONS**

**CONCRETE GLARE SCREEN**

**ELEVATION AS REQUIREMENT CONTINUOUS BARS**

**#5 REINFORCEMENT CONTINUOUS BARS**

**4 #5 LONGITUDINAL CONTINUOUS REINFORCEMENT FOR ENTIRE LENGTH OF BARRIER**

**SECTION F-F**

**SECTION G-G**

**SECTION H-H**

**SECTION J-J**

**SECTION K-K**

**SECTION L-L**

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**GUARDRAIL TYPE 7**

**F-SHAPE BARRIER**

**TYPE 7 TO SINGLE TYPE 3G TRANSITION AND ANCHORAGE**

---

**GUARDRAIL TYPE 7 STANDARD PLAN NO. M-606-13**

**STANDARD PLAN NO. M-606-13**

**STANDARD SHEET NO. 2 OF 4**
The design for this application shall be based on the following:

1. The barrier shall be constructed of concrete or other acceptable material.
2. The barrier shall be constructed to the specifications shown on the plans.
3. The barrier shall be installed in such a manner as to provide adequate protection against vehicle impacts.
4. The barrier shall be designed to meet the requirements of the adjacent shoulder or paved area.
5. The barrier shall be designed to provide adequate protection against pedestrians and cyclists.
6. The barrier shall be designed to provide adequate protection against livestock and farm equipment.
7. The barrier shall be designed to provide adequate protection against debris and other obstructions.

For further information, please refer to the Colorado Department of Transportation Standard Plans.

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**Guardsrail Type 7**

**F-Shape Barrier**

**Standard Plan No.** M-606-13

**Standard Sheet No.** 3 of 4

Issued by the Project Development Branch: July 31, 2019

James B. K."
NOTES

1. THE DT IS DESIRABLE FOR THIS DIMENSION WITH A 4 FT. LEFT SHOULDER. THE MINIMUM IS 0 FT. WHICH IS ACCEPTABLE FOR 6 FT. OR WIDER SHOULDERS.

2. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:
   A. FOR GUARDRAIL FACE 2 FT. OR LESS FROM THE NORMAL EDGE OF PAVED SHOULDER, CONTINUE THE RATE OF SLOPE OF THE NORMAL PAVED SHOULDER TO THE BREAKPOINT.
   B. FOR GUARDRAIL FACE MORE THAN 2 FT. FROM THE NORMAL EDGE OF THE PAVED SHOULDER, THE SLOPE SHALL BE 10:1 OR FLATTER.

3. IF THE DISTANCE FROM THE EDGE OF SHOULDER TO THE OBSTRUCTION EXCEEDS 4 FT.-7 IN., TYPE 3-W BEAM GUARDRAIL MAY BE SPECIFIED ON THE PLANS INSTEAD OF TYPE 7 (SEE PLANS, AND DETAIL BELOW).

4. STYLES CA BARRIERS ARE SHOWN. STYLES CD MAY BE USED AS APPROPRIATE. SEE SHEET 2 FOR TYPE 7 TO SINGLE TYPE 3G TRANSITION.

5. THE AREA BETWEEN SHOULDER AND THE TYPE 7 SHALL BE PAIRED. PAYMENT FOR THE PAIRED SURFACE WILL BE MADE UNDER A PAY ITEM FOR NEW ASPHALT OR CONCRETE, WITH QUANTITIES SHOWN ON THE PLANS.

6. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND AS SHOWN ON THE PLANS. MINIMUM SHALL BE 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW.

HAZARDS ON ROADSIDES

1. GUARDRAIL TYPE 7
2. F-SHAPE BARRIER

Project Revisions

COLORADO DEPARTMENT OF TRANSPORTATION
200 W. COLFAX AVE.
DENVER, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-606-13

STANDARD SHEET NO. 4 of 4
**GENERAL NOTES**

1. **ALL STEEL REINFORCEMENT SHALL BE 2 IN. CLEAR OF THE NEAREST SURFACE OF CONCRETE UNLESS OTHERWISE SHOWN.** REINFORCEMENT STEEL SHALL BE GRADE 40 MINIMUM.

2. **CONCRETE SHALL BE CLASS D.**

3. **ALL PERMANENT PRECAST BARRIERS USED TO REPLACE OTHER CONCRETE BARRIERS SHALL BE IN NEW CONDITION, UNDAMAGED, AND WITH NO REPAIRS.**

4. **FOR TEMPORARY INSTALLATIONS, INSTALL WITH A MINIMUM 4 FT. DISTANCE FROM THE CENTERLINE OF THE CONCRETE BARRIER TO ANY OBSTRUCTIONS.** BRIDGE PENETRATIONS SHOWN IN PLAN ARE NOT INTENDED FOR TEMPORARY INSTALLATIONS WITH LESS THAN A 4 FT. BRIDGE PENETRATION. STABILIZATION PINNING SHOWN ON PLAN MAY BE USED ON EACH BARRIERS UNIT ADJACENT TO ONE BETWEEN 4 FT. AND IFT. OF BOTH SIDES OF THE OBSTRUCTION. SEE SHEET 3 FOR STABILIZATION PINNING DETAILS.

5. **THE FLARE RATE FOR TEMPORARY INSTALLATIONS SHALL BE 20° OR FLATTER UNLESS OTHERWISE APPROVED BY THE ENGINEER FOR PERMANENT INSTALLATIONS.** SEE THE FLARE RATES TABLE ON STANDARD M-606-13, SHEET 3.

6. **STABILIZATION PINNING SHALL BE USED TO ANCHOR EACH UNIT IN ALL PERMANENT INSTALLATIONS.** SEE SHEET 3 FOR STABILIZATION PINNING DETAILS.

7. **FOR ALL PERMANENT INSTALLATIONS THAT REQUIRE END ANCHORAGE, SEE STANDARD PLAN M-606-13, SHEET 1, FOR ANCHORAGE DETAILS.**

8. **END ANCHORAGE DETAIL IS REQUIRED ON BARRIERS.** SEE STANDARD PLAN M-606-13, SHEET 1, FOR ANCHORAGE DETAILS.

9. **ALL PERMANENT INSTALLATIONS THAT REQUIRE END ANCHORAGE, SEE STANDARD PLAN M-606-13, SHEET 1, FOR ANCHORAGE DETAILS.**

10. **THE FLARE RATE FOR TEMPORARY INSTALLATIONS SHALL BE 10:1 OR FLATTER UNLESS OTHERWISE APPROVED BY THE ENGINEER FOR PERMANENT INSTALLATIONS.** SEE THE FLARE RATES TABLE ON STANDARD M-606-13, SHEET 3.

**STANDARD PLAN NO. M-606-14**

PRECAST TYPE 7 CONCRETE BARRIER

Issued by the Project Development Branch July 31, 2019

Project Sheet Number: 1 of 3

**COMMENTS**

- **ELEVATION BARRIER (Sheet 3)**
- **SECTION A-A**
- **SECTION B-B**
- **SECTION C-C**
- **STIRRUP **
- **LOOP BAR BENDING DETAIL (ASTM A36)**
- **CONTINUOUS KEYWAY**

**DRAWING INFORMATION**

- **Protected by copyright.**
Notes:

1. Washers shall be forged as an integral part of the pin or shall be welded as shown.
2. Pins shall be hot-dipped galvanized after fabrication.
3. If an alternative pin configuration is used for lifting, the lifting pin shall be provided. Pins shall conform to critical dimensions (pin length, diameter).
4. Pins shall conform to ASTM A449.
5. Approved non-shrink grout shall be used for grouting over all pins and screeding of scuppers.
6. Each end of the barrier shall have a 24° taper in each direction from the center pin recess to the outer edge to facilitate placement on curves.
7. Joints between cast-in-place guardrail type 7 and permanent installed precast type 7 concrete barriers shall include all recesses and loops in the cast-in-place end, along with the pin to complete the typical precast type 7 concrete barrier joint.

Details for Pin and Loop Connection

- Was her shall be forged as an integral part of the pin, or shall be welded as shown.
- Pins shall be hot-dipped galvanized after fabrication.
- If an alternative pin configuration is used, the lifting pin shall be provided. Pins shall conform to critical dimensions (pin length, diameter).
- Pins shall conform to ASTM A449.
- Approved non-shrink grout shall be used for grouting over all pins and screeding of scuppers.
- Each end of the barrier shall have a 24° taper in each direction from the center pin recess to the outer edge to facilitate placement on curves.
- Joints between cast-in-place guardrail type 7 and permanent installed precast type 7 concrete barriers shall include all recesses and loops in the cast-in-place end, along with the pin to complete the typical precast type 7 concrete barrier joint.

The horizontal slots shall be 1/8" in depth at the center of the barrier and may decrease in depth at the edge of the barrier due to the 24° taper.

PRECAST TYPE 7 CONCRETE BARRIER

STANDARD PLAN NO. M-606-14

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number: Standard Sheet No. 2 of 3

Prepared by Project Development Branch: July 31, 2019

Colorado Department of Transportation

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NOTES
1. SEE SHEET 1 FOR REINFORCEMENT AND OTHER DETAILS NOT SHOWN HERE.
2. PINS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
3. FOR TERMINAL ANCHORING OF THE PERMANENT INSTALLATION OF PRECAST TYPE 7 CONCRETE BARRIER, SEE THE END ANCHORAGE DETAIL IN STANDARD PLAN M-606-13, SHEET 1.
4. AN OPTIONAL 3 IN. MAXIMUM TAPERED END PIN MAY BE PROVIDED ON THE STABILIZATION PIN TO FACILITATE DRIVING.

1 3/12" DIA. PLATE 3/8" THICK

VARIES (SEE TABLE)

FILL RECESS WITH GROUT AFTER PLACING PIN.

FORM HOLE FOR PIN WITH SPECIAL PIN PLATED TYPE TO BE LEFT IN PLACE.

STABILIZATION PIN THROUGH SURFACING INTO SUBGRADE. DRILLED HOLES REQUIRED FOR CONCRETE PAVEMENT.

ROAD SURFACE PIN LENGTH

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCRETE</td>
<td>≤ 2 FT ≤ 2 IN</td>
</tr>
<tr>
<td>HMA</td>
<td>≤ 3 FT</td>
</tr>
<tr>
<td>SOIL</td>
<td>≤ 3 FT ≤ 2 IN</td>
</tr>
</tbody>
</table>

ELEVATION VIEW WITH PINS

PLAN VIEW OF S BAR ENDS

STABILIZATION PIN (ASTM A 36 STEEL) 1" DIA. PIN (SEE NOTE 2)

OPTIONAL TAPERED END PIN (SEE NOTE 4)

TABLE OF STABILIZATION PIN LENGTHS

PRECAST TYPE 7 CONCRETE BARRIER

DETAILS FOR STABILIZATION OF PERMANENT OR TEMPORARY PINNED PRECAST TYPE 7 CONCRETE BARRIER

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO. M-606-14
Standard Sheet No. 3 of 3
GENERAL NOTES

1. SEE SHEET 2 FOR DETAILS OF CONCRETE BARRIER STYLE CA FOR ANCHOR CONNECTIONS TO STRUCTURES OR TRANSITION TO GUARDRAIL TYPE 1.
2. SEE SHEET 4 FOR CONCRETE BARRIER STYLE CA TRANSITIONS AT BRIDGE COLUMNS AND SIGN POLES IN MEDIANS.
3. WHERE GLARE SCREENS ARE REQUIRED, USE CONCRETE BARRIER STYLE CG ON SHEET 4.
4. WHERE ROADBED OFFSET IS GREATER THAN 1 INCH, SEE CONCRETE BARRIER WALL OR TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF DISSIMILAR SHAPE.
5. BARRIER MAY BE CAST-IN-PLACE OR SLIP FORMED.
6. BARRIER FOUNDATION SHALL BE PAVEMENT OR COMPACTED AGGREGATE BASE, CONCRETE OR COMPACTED EMBANKMENT MATERIAL.
7. CONSTRUCTION JOINTS SHALL BE USED ON ALL BARRIER TYPES SHOWN, CONCRETE OR GRADE AT THE END OF THE DAY'S POUR OR AFTER ANY INTERRUPTION LONGER THAN 30 MINUTES. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
8. CONSTRUCTION JOINTS SHALL BE USED ON ALL BARRIER TYPES SHOWED, AT THE END OF THE DAY'S POUR OR AFTER ANY INTERRUPTION LONGER THAN 30 MINUTES. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
9. ALL REINFORCING STEEL SHALL BE GRADE 60 EPOXY COATED DEFORMED BARS AND SHALL BE A MINIMUM OF 2 INCHES IN FROM THE NEAREST CONCRETE SURFACE, UNLESS OTHERWISE NOTED.
10. CONTINUOUS LONGITUDINAL REINFORCEMENT SHALL BE EITHER GRADE 60 EPOXY COATED DEFORMED BARS OR WIRE STRAND WITH MINIMUM ULTIMATE TENSILE STRENGTH OF 28,000 LBS. AND CLASS C GALVANIZING ACCORDING TO ASTM A 603.
11. TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF UNIFORM SHAPE SHALL BE ACCOMPLISHED IN ONE 15 FOOT LONG SEGMENT OF BARRIER.
12. EPOXY COATED LONGITUDINAL REBAR SHALL HAVE A MINIMUM LAP SPLICE BUTT WELDED OR MECHANICALLY SPLICED TO MAINTAIN 100 PERCENT OF THE MINIMUM REQUIRED TENSILE STRENGTH.
13. ADDITIONAL MATERIAL FOR BARRIER EMBEDMENT GREATER THAN 1 INCH WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
14. RETROREFLECTORIZATION IS REQUIRED ON ALL BARRIER TYPES. SEE BARRIER RETROREFLECTOR NOTES ON STANDARD PLAN S-612-1.

CONCRETE BARRIER STYLE CA

DETAILS SIMILAR TO STYLE CA EXCEPT AS NOTED. USE CONCRETE BARRIER WALL FOR CUSTOM-PLACE BARRELS.

CONCRETE BARRIER STYLE CC

DETAILS SIMILAR TO STYLE CA EXCEPT AS NOTED. USE CONCRETE BARRIER WALL FOR CUSTOM-PLACE BARRELS.

CONCRETE BARRIER STYLE CD

BARRED AGAINST WALLS.

SECTION A-A

CONSTRUCTION JOINT

FINISHED GRADE

SECTION B-B

TRANSVERSE CONTRACTION JOINTS

FORMERLY KNOWN TRANSVERSE CONSTRUCTION JOINTS ARE REQUIRED AT 20 FT. INTERVALS OR THE INTERVALS SHALL MATCH THE CONCRETE PAVEMENT JOINTS FOR INSTALLATIONS THAT ARE ON TOP OF THE CONCRETE ROADWAY. SEE CONCRETE BARRIER STYLE CA FOR TYPICAL DIMENSIONS.
NOTES

1. SEE SHEET 3 FOR END ANCHORAGE REQUIREMENTS. AT A MINIMUM, THE BARRIER SHALL BE ANCHORED AT THE ENDS AND AT INTERUPTIONS WITH THE 60 FOOT ANCHORAGE THE ANCHORAGE SHALL BE CONCRETE OR CONCRETE WITH 2-#8 X 8"
   BARS.

2. SEE SHEET 4 FOR CONCRETE BARRIER STYLE CA AND STYLE CC.

3. TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF DISSIMILAR SHAPE SHALL BE ACCOMPLISHED IN ONE 15 FOOT LONG SEGMENT OF BARRIER.

4. SEE SHEET 6 FOR CONCRETE BARRIER STYLE CA TRANSITIONS AT BRIDGE COLUMNS AND SIGN PEDESTALS IN MEDIAN.

5. FOR STYLE CA CONNECTIONS TO STRUCTURES, SEE THE BRIDGE PLANS.

END ANCHORAGE

TRANSITION CONCRETE BARRIER TYPE 9 TO CONCRETE BARRIER TYPE 7 OR EXISTING
NOTES

1. See plans for concrete barrier lengths less than 150 feet and/or hinge widths equal to or less than 1 foot behind the concrete barrier.

2. See Sheet 2 for reinforcing bar details.

3. New concrete barriers under 150 feet shall be dowelled into existing concrete bridge barriers or wingwalls to minimize rotations to any of them. See Sheet 1 for dowel placement layout.

4. For end anchorages under 150 feet, construct the anchorage for the entire length of the concrete barrier.

5. For concrete barrier runs greater than 150 feet but less than 500 feet, the run shall be anchored at the ends and at gaps, such as an emergency access.

6. For end anchorages over 500 feet, construct anchorages every 250 feet.

7. Reinforcing steel in anchorage shall be grade 60 epoxy-coated deformed bars.

8. Concrete shall be class D.

9. All incidental work and additional materials shall be included in the cost of the concrete barrier.

1. SEE PLANS FOR CONCRETE BARRIER LENGTHS LESS THAN 150 FEET AND/OR HINGE WIDTHS EQUAL TO OR LESS THAN 1 FOOT BEHIND THE CONCRETE BARRIER.

2. SEE SHEET 2 FOR REINFORCING BAR DETAILS.

3. NEW CONCRETE BARRIERS UNDER 150 FEET SHALL BE DOWELED INTO EXISTING CONCRETE BRIDGE BARRIERS OR WINGWALLS TO MINIMIZE ROTATIONS TO ANY OF THEM. SEE SHEET 1 FOR DOWEL PLACEMENT LAYOUT.

4. FOR END ANCHORAGE UNDER 150 FEET, CONSTRUCT THE ANCHORAGE FOR THE ENTIRE LENGTH OF THE CONCRETE BARRIER.

5. FOR CONCRETE BARRIER RUNS GREATER THAN 150 FEET BUT LESS THAN 500 FEET, THE RUN SHALL BE ANCHORED AT THE ENDS AND AT GAPS, SUCH AS AN EMERGENCY ACCESS.

6. FOR END ANCHORAGES OVER 500 FEET, CONSTRUCT ANCHORAGES EVERY 250 FEET.

7. REINFORCING STEEL IN ANCHORAGE SHALL BE GRADE 60 EPOXY-COATED DEFORMED BARS.

8. CONCRETE SHALL BE CLASS D.

9. ALL INCIDENTAL WORK AND ADDITIONAL MATERIALS SHALL BE INCLUDED IN THE COST OF THE CONCRETE BARRIER.
NOTES
1. SEE SHEET 5 FOR DETAILS OF CONCRETE BARRIER STYLE CGE/CG END ANCHORS CONNECUTIONS TO STRUCTURES AND TRANSITIONS TO GUARDRAIL TYPE 9.
2. WHERE ROADBED OFFSET IS GREATER THAN 6 INCHES SEE CONCRETE BARRIER STYLE CGE.
3. BARRIER FOUNDATION SHALL BE PAVERED, OR COMPACTED AGGREGATE BASE, OR COMPACTED EMBANKMENT MATERIAL.
4. RETROREFLECTORIZATION IS REQUIRED ON ALL BARRIER TYPES SEE THE BARRIER RETROREFLECTOR NOTES ON STANDARD PLAN 5-624.

CONCRETE BARRIER STYLE CGE

DETAILED SIMILAR TO STYLE CG EXCEPT AS NOTED. BARRIER KNOCKED TO CONCRETE SURFACES.

VARIES

TRANVERSE CONTRACTION JOINTS

FORMED OF SAWED TRANSVERSE CONTRACTION JOINTS ARE REQUIRED AT 20 FT. INTERVALS OR THE INTERVALS SHALL MATCH THE CONCRETE PAVEMENT JOINTS FOR INSTALLATIONS THAT ARE ON TOP OF THE CONCRETE ROADWAY PAVEMENT. SEE CONCRETE BARRIER STYLE CG FOR TYPICAL DIMENSIONS.

CONCRETE BARRIER STYLE CGC

DETAILS SIMILAR TO STYLE CGE EXCEPT AS NOTED. USE CONCRETE BARRIER END ANCHOR WHEN NEEDED, SHOWN WITH 3/8 INCH BARBED SURFACES OFFSET. BARRIER FOR OFFSET ROADWAYS.

SECTION A-A

FINISHED GRADE

TRANSVERSE CONTRACTION JOINTS

FORMED OF SAWED TRANSVERSE CONTRACTION JOINTS ARE REQUIRED AT 20 FT. INTERVALS OR THE INTERVALS SHALL MATCH THE CONCRETE PAVEMENT JOINTS FOR INSTALLATIONS THAT ARE ON TOP OF THE CONCRETE ROADWAY PAVEMENT. SEE CONCRETE BARRIER STYLE CG FOR TYPICAL DIMENSIONS.

CONCRETE BARRIER STYLE CGG

DETAILS SIMILAR TO STYLE CGC EXCEPT AS NOTED. USE CONCRETE BARRIER END ANCHOR WHEN NEEDED, SHOWN WITH 3/8 INCH BARBED SURFACES OFFSET. BARRIER FOR OFFSET ROADWAYS.

SECTION A-A

FINISHED GRADE
NOTES

1. SEE SHEET 3 FOR ANCHORAGE REQUIREMENTS AT A CORNER. 
   THE BARRIER SHALL BE ANCHORED AT THE END AND AT INTERRUPTIONS 
   WITH THE 10 FOOT ANCHORAGE. ANCHORAGE SHALL BE VINCULUM OR 
   CONCRETE WITH 2-8 X 8" DOWEL BARS. 

2. SEE SHEET 4 FOR CONCRETE BARRIER STYLE CC AND STYLE CGC. 

3. SEE SHEET 5 FOR TRANSITION TO THICK BEAMS. 

4. TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF SEGMENTAL 
   CONCRETE SHALL BE ACCOMPLISHED IN ONE 15 FOOT LONG SEGMENT OF BARRIER. 

5. SEE SHEET 6 FOR CONCRETE BARRIER STYLE CA TRANSITIONS 
   AT BRIDGE COLUMNS AND SIGN PEDESTALS IN MEDIAN. 

6. FOR STYLE CG CONNECTIONS TO STRUCTURES, SEE THE BRIDGE PLANS. 

---

TRANSITION CONCRETE BARRIER STYLE CG/CG TO CONCRETE BARRIER TYPE 7 OR EXISTING
NOTES
1. THE CONTRACTOR'S OPTIONS FOR FILL BETWEEN CONCRETE BARRIER WALLS:
   A. PLACE 4 INCHES OF POLYSTYRENE AT BASE BETWEEN CONCRETE BARRIER WALLS.
   B. PLACE 1 FOOT OF GRANULAR MATERIAL AT BASE BETWEEN WALLS.
   C. PLACE GRANULAR MATERIAL FROM BASE TO BOTTOM OF 4 INCH CAP.
   D. MONOLITHIC CONCRETE WITH FOAM BLOCKOUTS IS NOT PERMITTED.
2. REINFORCING STEEL SHALL EXTEND CONTINUOUS THROUGH CONSTRUCTION JOINTS.
3. SEE OVERHEAD SIGN PLANS FOR SIGN PEDESTAL ELEVATIONS FOR NEW CONSTRUCTION.
4. ADJUST HEIGHT OF CONCRETE BARRIER WALL ON LOW SIDE OF OFFSET DR.
   SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF CONCRETE BARRIER CAP.
5. FOR OVERHEAD SIGNS, SEE STANDARD PLAN S-614-60. 

CONCRETE BARRIER TRANSITION AT BRIDGE COLUMNS

CONCRETE BARRIER TRANSITION AT SIGN PEDESTAL
1. The Contractor's options for fill between concrete barrier walls:
   a. Place 4 inches of expanded polystyrene at base between concrete barrier walls.
   b. Place granular material at base between walls.
   c. Place granular material from base to bottom of 4-inch cap.
   d. Monolithic concrete with foam blockouts is not permitted.

2. Reinforcing steel shall extend continuous through construction joints.

3. See overhead sign plans for sign pedestal elevations for new construction.

4. Adjust height of concrete barrier wall on low side of offset or super-elevated roadways to provide level grade across top of concrete barrier cap.

5. For overhead signs, see standard plan S-614-60.
SINGLE TYPE 3G TRANSITION AND ANCHORAGE

CONCRETE AND REINFORCEMENT DETAIL

SINGLE TYPE 3G TRANSITION AND ANCHORAGE

CONNECTION DETAIL

SINGLE TYPE 3G ISOMETRIC VIEW

TYPE 9 TO SINGLE TYPE 3G TRANSITION AND ANCHORAGE OPTION

SEE SHEET 1 FOR REINFORCEMENT INFORMATION AND SHEET 3 FOR ANCHORAGE DETAILS.
DETAIL A

BEVELED METAL BOX SPACE

SEE NOTE D

DETAIL B

PLATE A

1/4" PLATE THICKNESS

1/4" HOLES

1/4" PLATE THICKNESS

LEGEND

1. WHERE BEVELED METAL BOX SPACERS ARE INSTALLED, PLACE A 1 1/4 INCH X 3 1/4 INCH AND A 1 INCH HS BOLTS PASSING THROUGH THE INTERIOR OF BOX.

2. ALL METAL BOXES SHALL BE GALVANIZED.

NOTES

1. WHERE BEVELED METAL BOX SPACERS ARE INSTALLED, PLACE A 1 1/4 INCH X 3 1/4 INCH AND A 1 INCH HS BOLTS PASSING THROUGH THE INTERIOR OF BOX.

2. ALL METAL BOXES SHALL BE GALVANIZED.

Section A-A

CONCRETE BARRIER

CONCRETE ANCHORAGE

SEE DETAIL B (BOTH SIDES OF BARRIER)

BEVELED METAL BOX SPACER, SEE DETAIL A

11/4" PIPE SPACER

PLAN

DOUBLE THRIE BEAM BARRIER CONNECTION TO CONCRETE BARRIER

ELEVATION

GUARDRAIL TYPE 3

SINGLE SLOPE BARRIER

PROJECT SHEET NUMBER:

STANDARD PLAN NO.

M-606-15

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

STANDARD PLAN NO.

M-606-15

Issued by the Project Development Branch: July 31, 2019

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M-606-15

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

STANDARD PLAN NO.

M-606-15

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:
ST AND ARD 12 GAUGE

LEGEND

1. USE \%% Button head bolts and hex nuts for connections to posts or anchor on rail face for bolted connections to post.

2. The nested rail elements, end cap and single 10 gauge three rail elements may be selected together from the materials listed to the wood post and concrete barrier or railing.

3. Expanded SAPE 1/2" holes for rail elements through post (and the connection to the concrete barrier or railings) shall be the standard 5/8" x 5/8". The top and the bottom rail elements with washers and nuts are required for rail elements at post (4) and the connection to the concrete barrier or railing.

4. Where the top elevation of posts (4) shall not project more than 1 inch above the top elevation of the rail element.

5. The depth of the metal box spacer varies from the 5/8" to 7/8" and is dependent on the width of the concrete railings or wall. The combined dimensions for the depth of the metal box spacer plus the width of railing or wall is typically 17 1/2" where the space between the edges of the concrete railings or wall and the rear three rail elements is less than 17 1/2". Metal plates similar to plate 1/1 are used as spacers.

6. Where the width of the concrete railings or wall is greater than 7/8" rail elements are not required to fall the space greater than the 7/8". Where the space between the edges of the concrete railings or wall and the rear three rail elements is more than 7/8" a metal plate similar to plate 1/1 is used as a spacer.

NOTES

- Use 1/4" galv. pipe sleeve for new construction, or 1/4" drilled holes for existing structure.

- Transition railing without blockout attachment.

- Use 1/4" galv. pipe sleeve for new construction, or 1/4" drilled holes for existing structure.

- Transition railing with blockout attachment.

- Plate 1/1 is used for front and back of bolted connection.

- Plate 1/1 is used for front and back of bolted connection.

- Plate 1/1 is used for front and back of bolted connection.
Backfill, Class 2, if the Contractor at his expense, accepts the option of using concrete or other material acceptable to the Engineer in lieu of backfill, Class 2.

The width of column or pier treatment between columns or obstructions.

Obstruction wider than 3 ft.

- 1" preformed joint material
- Pier column, rod support post, concrete wall, or similar obstruction.

Obstruction 3 ft. wide or less.

Hazard in narrow medians.

**NOTES**

1. The design in these applications shall be paid on a rate contained in the associated Purchased Item Schedule or item 30 of the Plans.
2. The pay length for barrier on both sides of an obstruction will be determined by one linear measurement along the guardrail centerline.
3. The backfill and cap between columns or obstructions will not be measured or paid for separately but shall be included in the work.

Guardrail between columns or obstructions may be Styles CA or CD as shown on the Plans.

The shy line offset is measured from the edge of the traveled way.

Table of flare rates for permanent concrete barrier.

### Table of Flare Rates for Permanent Concrete Barrier

<table>
<thead>
<tr>
<th>Obstruction Width</th>
<th>Flare Rate</th>
<th>Flare Rate</th>
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</thead>
<tbody>
<tr>
<td>3 ft or less</td>
<td>30:1</td>
<td>30:1</td>
<td>30:1</td>
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<tr>
<td>3 ft to 6 ft</td>
<td>26:1</td>
<td>24:1</td>
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<td>6 ft to 9 ft</td>
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<td>9 ft to 12 ft</td>
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<tr>
<td>12 ft or more</td>
<td>8:1</td>
<td>6:1</td>
<td>4:1</td>
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</tbody>
</table>

The flare rate may be impacted by other acceptable safety end treatment.

Guardrail Type 9

Single Slope Barrier
GENERAL NOTES

I. ALL MATERIAL DIMENSIONS AND WEIGHTS ON THIS STANDARD ARE NOMINAL UNLESS OTHERWISE SPECIFIED.

II. POSTS:

- Type: "STUDED TEE" OR "U"
- Height: 42 IN.
- Weight: 1.33 LBS./LIN. FT. (WITHOUT ANCHOR)

III. AT EACH LOCATION WHERE AN ELECTRIC TRANSMISSION, DISTRIBUTION LENGTH: 6 FT.-0 IN. MINIMUM

- SHALL FURNISH AND INSTALL A GROUND CONFORMING TO ARTICLE 250 EQUIVALENT AND SHALL BE OF ALL WELDED CONSTRUCTION.
- WOVEN WIRE SHALL ENCLOSE THE GATE FRAME AS SHOWN AND SHALL BE OF THE SAME WIRE SIZE AS THE FENCE, OR AS APPROVED BY THE ENGINEER.

IV. ALTERNATIVE DRIVEWAY GATES (SINGLE PANEL):

- LENGTH: END, 6 FT.-6 IN. MINIMUM. PANEL GATE, 7 FT.-0 IN. MINIMUM.
- A METAL LINE POST SHALL BE INSTALLED A MAXIMUM OF EVERY 500 FT. ALONG A WOOD POST FENCE. THE METAL POST SHALL BE WITHIN 1 FT. OF THE NEAREST WOOD POST, AND SHALL BE TIED TO EACH STRAND WITH A WIRE CLAMP.

V. FOOTINGS OR BASES:

- MINIMUM THREE NO. 10 RIVETS WHERE DIAGONAL BRACES CONNECT TO TOP AND BOTTOM PANELS.
- WOOD STAYS MAY BE STAPLED, OR DRILLED AND TIED WITH WIRE.

VI. RIGHT OF WAY FENCES SHALL BE CONSTRUCTED APPROXIMATELY 6 IN. INSIDE THE BOUNDARY OF THE RIGHT OF WAY AS SHOWN ON THE PLANS, OR AS STAKED.

VII. WHERE STEEL POSTS ARE SPECIFIED, EVERY FIFTH POST SHALL BE WOOD, WHEN SPECIFIED ON THE PLANS.

VIII. WIRE FENCES SHALL BE PLACED ON OTHER SIDE OF FENCE ACCORDING TO CONTRACT OR AS SHOWN ON THE PLANS.

IX. HORIZONTAL HOLES SHALL BE PROVIDED IN END, CORNER, AND GATE POSTS AS DETAILED.

X. WIRE STAYS:

- MAY BE USED WHEN SPECIFIED IN THE CONTRACT.
- MAY BE STAPLED, OR DRILLED AND TIED WITH WIRE.

XI. GATES:

- WILL BE ACCEPTABLE SUBJECT TO THE ENGINEER’S APPROVAL.
- ALTERNATIVE EQUIVALENT STANDARD METAL GATES OTHER THAN SHOWN MAY BE ACCEPTABLE SUBJECT TO THE ENGINEER’S APPROVAL.

XII. COMPRESSED BARBED WIRE SHALL COMPLY WITH AASHTO M 280, (ASTM A 121), (COLD ROLLED PIPE 2% ± 0.16 4.64 ± 5% 0.160 ± 5%)
- ACCEPTABLE EQUIVALENTS, AND SHALL BE IN ACCORDANCE WITH AASHTO M 281.

XIII. HORIZONTAL HOLES SHALL BE PROVIDED IN END, CORNER, AND GATE POSTS AS DETAILED.

XIV. WIRE STAYS:

- MAY BE USED WHEN SPECIFIED IN THE CONTRACT.
- MAY BE STAPLED, OR DRILLED AND TIED WITH WIRE.
NORMAL SPACING BETWEEN LINE POSTS

METAL STAYS (GALVANIZED)

NUMBER REQUIRED:

ONE BETWEEN LINE POSTS AND POSTS HAVING BRACES.

TWO EQUALLY SPACED BETWEEN LINE POSTS MAY BE TIED TO THE BOTTOM WIRE.

WOODEN STAYS FOR BARBED WIRE OR COMBINATION WIRE FENCES:

WHEN WOODEN STAYS ARE SPECIFIED ON PLANS, LINE POSTS SHALL BE SPACED ON 16'-0" CENTERS, IN LIEU OF 20'-0" NORMAL SPACING.

WOODEN STAYS SHALL REST ON THE NATURAL GROUND AND MAY BE STAPLED, OR DRILLED AND TIED WITH WIRE.

1. AT ALL STRUCTURES OF 4 FT. x 4 FT. AND LARGER, THE FENCE SHALL END AT THE EYEBOLTS IN THE WINGS OF THE STRUCTURE. WHERE THE TYPE OF STRUCTURE PROHIBITS THE USE OF EYEBOLTS, AN END POST WITH BRACE SHALL BE USED.

2. EYEBOLTS SHALL BE MADE OF 3/8" ROUND BARS WITH A MINIMUM OF 6 IN. OF BODY LENGTH EMBEDDED (HOOKED OR BENT) IN FRESH CONCRETE.

3. FOR EYEBOLTS IN EXISTING CONCRETE, THE 3/8" IN. BARS SHOULD BE DEFORMED AND GRAILTED INTO DRILLED HOLES.

4. EYEBOLTS SHALL HAVE A MINIMUM OF 1 IN. INSIDE EYE DIAMETER.

5. EYEBOLTS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. EYEBOLTS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
1. At each location where an electric transmission, distribution, or secondary line creates a fence, the contractor shall furnish and install a ground conforming to Article 4 of the National Electric Code. A ground shall also be installed at a maximum of every 500 ft along the fence. The ground rod shall be at least 7 1/2 ft into the ground. The rod shall be connected to each wire with a minimum of 8 gauge stranded copper wire. Grounding will not be paid for separately but shall be included in the cost of the fence.

2. Horizontal fabric shall be at least 3 ft above ground level and shall conform to the dimensions and weights for either “Ordinary Pipe” or “Alternative Pipe” as shown on Sheet 2. “Alternative Pipe” shall be high strength steel pipe conforming to Federal Specifications RR-F-476.3.

3. Tension wire shall be continuous between end or corner post and line brace rail is not required for 36 in., 42 in., or 48 in. fabric heights. Brace rail for fence with roll-formed steel components. The contractor shall state at the pre-construction conference, the type of construction and type of line post to be used throughout the project.

4. Grounding shall be paid for separately but shall be included in the cost of the fence.

5. At each location where an electric transmission, distribution, or secondary line crosses a fence, the contractor shall furnish and install a ground conforming to Article 4 of the National Electric Code. A ground shall also be installed at a maximum of every 500 ft along the fence. The ground rod shall be at least 7 1/2 ft into the ground. The rod shall be connected to each wire with a minimum of 8 gauge stranded copper wire. Grounding will not be paid for separately but shall be included in the cost of the fence.

6. The contractor shall be responsible for re-establishing disturbed or destroyed survey monuments to the appropriate accuracy in accordance with subsection 608.6 of the standard specifications.
**Fence Material**

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<tr>
<th>FABRIC HEIGHT</th>
<th>END, CORNER &amp; LINE POSTS</th>
<th>GATE FRAMES &amp; HINGE</th>
<th>TOP &amp; BRACE RAILS</th>
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<tr>
<td>FEET</td>
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<td>9' THRU 12'</td>
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**Pipe Formed Steel**

**Ordinary Pipe**

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**Alternative Pipe**

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<td>4.640</td>
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**Roll-Formed Steel**

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</tr>
<tr>
<td>2.50</td>
<td>0.160</td>
<td>4.640</td>
</tr>
</tbody>
</table>

**Rail Splice**

Use drop rod if gate frames extend down to center rest. Use latch shown for walk or single gate.

**Details**

- **GATE FRAMES & HINGE**
- **TOP & BRACE RAILS**
- **END, CORNER & LINE POSTS**
- **TENSION BANDS & BRACE BANDS**
- **RAIL ENDS & BRACE TRUSS BANDS**
- **BANDS, RAIL ENDS & TIGHTENERS**

**Computer File Information**

- Creation Date: 07/25/20
- User: JBK
- View: MicroStation 8.8
- Scale: Not to Scale
- Units: English

**Sheet Revisions**

- Issued by the Project Development Branch: July 31, 2019
- Project Sheet Number: M-607-2

**Project Development Branch**

- JBK
GENERAL NOTES

1. ALL POSTS AND BRACES SHALL BE OF THE TYPES AND MATERIALS SHOWN ON THIS SHEET OR ACCEPTABLE EQUIVALENTS. ALL ARE CONFORMING WITH AASHTO M-281. ADDITIONAL END POSTS SHALL BE PROVIDED IN END POSTS AS REQUIRED. ADDITIONAL END POSTS SHALL BE SUPPLIED FOR FULL BRACE POSTS WHEN REQUIRED BY THE ENGINEER.

2. LINE BRACE POSTS SHALL BE INSTALLED EVERY 800 FT. OR LESS WHERE THE FENCING IS CONTINUOUS. THE COST SHALL BE INCLUDED IN THE WORK. SEE STANDARD PLAN M-607-3.


4. CONCRETE FOOTINGS SHALL HAVE HOLES AT GROUND LEVEL AND SHALL BE FITTED WITH GALVANIZED (ZINC-COATED) MACHINES BOLTS. THE BOLTS SHALL BE ADDED TO EACH HOLES. THE COST OF THE CONCRETE SHALL BE INCLUDED IN THE WORK.

5. ON CURVES, FENCE WIRE SHALL BE PLACED ON THE SIDE OF THE POST WHICH WILL RESULT IN THE LEAST AMOUNT OF TENSION ON FENCE TIES.

6. AT EACH LOCATION WHERE AN ELECTRIC TRANSMISSION, DISTRIBUTION OR SECONDARY LINE CROSSES A BARRIER FENCE, THE CONTRACTOR SHALL FURNISH AND INSTALL A GROUND CONFORMING TO ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. THE GROUND ROD SHALL BE A MINIMUM DIAMETER OF 3/8 IN. AND 8 FT. IN LENGTH, AND DRIVEN AT LEAST 7 1/2 FT. INTO THE GROUND. THE ROD SHALL BE CONNECTED TO EACH WIRE WITH A MINIMUM AWG NO. 8 STRANDED COPPER WIRE. GROUNDING WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

LOCATION OF BARRIER FENCE AT BOX CULVERTS WITH NO FILL

END POST WITH BRACE

SPECIFICATIONS

END POSTS:
TYPE: 1 1/2" x 1 1/2" STRUCTURAL STEEL ANGLES
WEIGHT: 4.25 LBS. PER LIN. FT. NOMINAL (RAW)
LENGTH: 6'-6" MINIMUM
NO. OF BRACES: ONE
LINE POSTS:
TYPE: 1 1/2" x 1 1/2" STRUCTURAL STEEL ANGLES
WEIGHT: 6.35 LBS. PER LIN. FT. NOMINAL WITHOUT ANCHOR (RAW)
LENGTH: 6'-6" MINIMUM
ANCHOR: SECURELY FASTENED WITH BEARING SURFACE SUFFICIENT TO RESIST MOVEMENT OF POST. WGT.: 0.67 LBS. MINIMUM
BRACE:
TYPE: 1 1/2" x 1 1/2" STRUCTURAL STEEL ANGLES
WEIGHT: 3.19 LBS. PER LIN. FT. NOMINAL (RAW)
LENGTH: 6'-6" MINIMUM
WOVEN WIRE FENCE FABRIC:
STYLE OR DESIGN NUMBER: 726 - 6 - 1/2" TIES:
END POSTS: EACH HORIZONTAL WIRE OF WOVEN WIRE FABRIC TO BE WRAPPED AROUND POST AND FASTENED IN ADDITION TO TWO TIE WIRE.
LINE POSTS: MINIMUM THREE TIES PER POST FOR WOVEN WIRE FABRIC.

BARRIER FENCE

STANDARD PLAN NO.
M-607-3

Issued by the Project Development Branch: July 31, 2019
GENERAL NOTES

2. At each location where an electric transmission/distribution or secondary line crosses a barrier fence, the contractor shall flatten and install a ground conductor in accordance with Article 250 of the National Electrical Code (NEC). The ground conductor shall be a minimum diameter of 3/8" in 40 ft length and driven at least 7½ ft into the ground. The rod shall be connected to each wire with a minimum No. 2 AWG stranded copper wire. Grounding conductors may be paid for separately but shall be included in the work.

3. End posts, corner posts, and line brace posts shall be assembled by the unit and paid for as such. All work and material associated with each assembly shall be included in the unit price for that assembly.

4. All line posts shall be 5 in. min. diameter and 12 ft long. All end, corner, and line brace posts shall be 6 in. min. diameter and 12 ft long. All posts and braces shall be treated in accordance with Subsection 710.07.

5. Fence wire may be placed on either the road side or the field side of posts, depending on local conditions. On curves, the wire should be placed on the side which would result in the least amount of tension on the staples. Also, where wind drift or other conditions would result in unusual pressure against the wire, concrete structures may be placed on the sides of the fence to provide support. The wires may be placed on the sides of the fence where it is not necessary to provide support.

6. Where concrete structures are used as a deer pass, the fence shall end at eyebolts in wings of the structure. Eyebolts in fresh concrete shall be made of 1/2 in. round bars and embedded a minimum of 6 in. with a hooked or bent end. In existing concrete, eyebolts have a minimum of 1 in. inside eye diameter and shall be furnished and installed by the contractor. Cost of eyebolts shall be included in the contract price for fencing.

7. Deer gate and top braces shall be painted with green paint according to Subsection 708.03 and color No. of Federal Standard 5958.

8. All fence wire ties, brace wires, staples, and other wire appurtenances shall be galvanized in accordance with ASTM A 116 type E.

9. The contractor shall re-establish disturbed or destroyed survey monuments to the approximate accuracy in accordance with Subsection 625.08 of the Standard Specifications.

10. Continuous line wire shall be high tensile (70 k.s.w.)*. Continuous stay wire shall be no-tenesile 37 k.s.w. and small, not furnished and installed by the contractor. Cost of stay wire shall be included in the contract price for fencing.

11. Deer gates and top braces shall be painted with green paint according to Subsection 708.03 and color No. of Federal Standard 5958.

12. When weaving fence fabric, staples shall conform to AASHTO M-279 (ASTM A 116) DESIGN NO. 2096-6-12!/2, GRADE 60, COATING TYPE ZA, COATING CLASS 80.

*ALTERNATIVE: CONSTRUCT DEER FENCE WIRE FABRIC AS PER NATIONAL FENCING ASSOCIATION GUIDELINES.

DEER FENCE, GATES, AND GAME RAMPS

STANDARD PLAN NO. M-607-4

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number: 1 of 5
ANIMAL HABITAT

---

LEGEND

- LINE POST
- END POST
- ONE-WAY DEER GATE VARIABLE IN MULTIPLES OF 16' BY ADDING MORE LINE POSTS TO THIS SECTION.
- ONE-WAY LINE POSTS

NOTES

1. SIX IN DOUBLE ACTING SPRING DOOR HINGE WITH FLAT BUTTON TIPS CUT IN TWO SHALL BE USED AS A SINGLE SWING HINGE AND BE PROVIDED WITH A GREASING NIPPLE AND WELDED TO SUPPORT PLATE.

2. TINES SHALL BE MOLDED IN ONE PIECE OF STEEL (AASHTO M169, GRADE 1050), WITH NO WELDS ALLOWED.

---

PLAN VIEW - TYPICAL DEER GATE INSTALLATION

SECTION A-A

FRONT VIEW - DEER GATE

TYPICAL HINGE DETAIL

TYPICAL TINE DETAIL
DEER FENCE WIRE FABRIC TRANSITIONED TO WINGWALL EYEBOLTS AT 3' MAX. SPACING.

I. LOCATIONS OF DEER FENCE IN THE CLEAR ZONE SHALL BE SHOWN IN THE PLANS.
2. POSTS WITHIN THE CLEAR ZONE SHALL BE DRILLED.
3. DRILL HOLES PERPENDICULAR TO THE ROADWAY.
4. KNEE BRACE SHALL BE OMITTED FROM ANY END POST OR CORNER POST WITHIN THE CLEAR ZONE.

FENCE DEER OVER CONCRETE BOX CULVERT

END POST AND CORNER POST

GAP CLOSURE

USE THIS DETAIL TO CLOSE ALL GAPS BETWEEN 6 INCHES AND 3 FEET.
GAP CLOSURES SHALL BE INCLUDED IN THE PRICE OF THE FENCE AND NOT BE PAID FOR SEPARATELY.
NOTES

1. The landing zone shall be flat, stable, and earthed. The area shall be void of objects that may harm or endanger wildlife. The engineer may adjust the game ramp location as needed.

2. There shall be no disturbance beyond the run of temporary/permanent easements.

3. Fill material shall be structured backfill (Class 2) and meet the requirements of Section 206 with a minimum composition of 90%.

4. Four inches of topsoil shall be placed in accordance with Section 207.

5. Fencing shall be completed after the engineer approves grading.

6. See the stormwater management plan for the seeding plan.

7. Game ramp is paid per revision of Section 607, Fences.

8. The landing zone shall be flat, stable, and earthed. The area shall be void of objects that may harm or endanger wildlife. The engineer may adjust the game ramp location as needed.

9. There shall be no disturbance beyond the run of temporary/permanent easements.

10. Fill material shall be structured backfill (Class 2) and meet the requirements of Section 206 with a minimum composition of 90%.

11. Four inches of topsoil shall be placed in accordance with Section 207.

12. Fencing shall be completed after the engineer approves grading.

13. See the stormwater management plan for the seeding plan.

14. Game ramp is paid per revision of Section 607, Fences.

All game ramp posts shall be a minimum 4'-0" below ground, and a minimum 1" in diameter, and encased in concrete.

15. Geotextile Class 2 placed at 1 foot lifts wrap faced installation with a 3 foot lap at front face. See Sheet 5 for approved equal.

DEER FENCE, GATES, AND GAME RAMPS

STANDARD PLAN NO. M-607-4

Issued by the Project Development Branch: July 31, 2019
EXISTING TERRAIN VARIES TO FORM A SMOOTH TRANSITION

TOPSOIL AROUND TO FORM A SMOOTH TRANSITION

GEOTEXTILE REINFORCEMENT

2'-0" MIN.

2'-0" MAX.

TOP LIFT

BOTTOM LIFT

FILL SECTION PERPENDICULAR TO GAME RAMP

CUT SECTION PERPENDICULAR TO GAME RAMP

SECTION A-A

SECTION B-B

NOTES

1. GEOTEXTILE REINFORCEMENT SHALL BE WOVEN FABRIC WITH A MINIMUM AVERAGE ROLL VALUE OF 4800 LB/FT FOR INSTALLATIONS WITH A GAP AND 2400 LB/FT FOR INSTALLATIONS WITHOUT A GAP BASED ON ASTM 04595.

2. GEOTEXTILE REINFORCEMENT SHALL BE PLACED BY ALTERNATING MACHINE DIRECTION (MD) WITH CROSS MACHINE DIRECTION (XD) FROM LAYER TO LAYER.

3. THE GEOTEXTILE REINFORCEMENT WRAP AT BACK FACE OF GAME RAMP SHALL BE PULLED BACK SLACK FREE WITH ITS END ANCHORED TO SOIL UNDERNEATH WITH STAPLES OR NAILS.

4. MINIMUM SPLICE OF ALL GEOTEXTILE SHALL CONSIST OF 1 FOOT OF OVERLAP.

5. GEOTEXTILE REINFORCEMENT WRAP AT BACK FACE OF GAME RAMP WALL SHALL BE TEMPORARILY HUNG WITH A SPACER BOARD AND TACK STRIP. AFTER REACHING A TOTAL OF 2'-0" COMPACTED LIFT, THE TACK STRIP SHALL BE REMOVED AND GEOTEXTILE REINFORCEMENT SHALL BE PULLED BACK SLACK FREE WITH ITS END ANCHORED TO SOIL UNDERNEATH WITH STAPLES OR NAILS BEFORE THE SPACER BOARD IS PULLED.

6. DO NOT USE SPACER FOR THE TOP LIFT (FINAL LIFT). TOP LIFT SHALL ABUT THE GAME RAMP WALL.

DEER FENCE, GATES, AND GAME RAMPS

STANDARD PLAN NO. M-607-4

Standard Sheet No. 5 of 5

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

Computer File Information

Creation Date: 07/31/19
Designer Initials: JBK

Last Modification Date: 07/31/19
Detailer Initials: LT A

CAD Ver.: MicroStation V5. Style: Not to Scale. Units: Decimal Degree

Colorado Department of Transportation
2039 West Howard Place
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-9868

Project Development Branch: JBK
GENERAL NOTES

1. Wire-bound picket fence, conforming to ASTM F 537, shall be stretched tight and securely fastened to all posts with 11 gauge galvanized steel wire clamps or 12 Y2 gauge galvanized steel wire ties.

2. All fence posts complete with anchor plate, shall be hot-dipped galvanized conforming to AASHTO M 281. Line posts (without anchor) shall weigh at least 1.33 lbs. per lin ft.

3. In general, snow fence shall be placed 100 to 150 ft. from the centerline of roadway. However, the specific location on each project will be shown on the plans, or as determined by the Engineer.

4. Snow fence may be placed immediately in front of the right of way fence on the highway side when such location is suitable. This will avoid trapping of weeds and debris between the fences. In such installations the snow fence shall not be tied or fastened to the right of way fence.

5. Fence shall be securedly braced at each end panel with a regular line post and diagonal cable consisting of two 12 gauge twisted wire. Each strand to consist of two 12 gauge twisted wires.

6. Line brace posts shall be installed every 400 ft. or less where the fencing is continuous and shall not be paid for separately but be included in the area.

7. Two horizontal wires shall be strung behind the pickets for the full length of the fence. Each horizontal wire shall consist of two 12 gauge twisted galvanized wires. Each horizontal wire shall be fastened securely to each fence post by means of 11 gauge wire clamps or 12 Y2 gauge wire ties.

TYPICAL SECTIONS THROUGH SNOW FENCE POST AND PICKETS

NOTE: Other sections of steel posts having equal weight and equivalent strength may be used in lieu of either of these sections shown.

END ELEVATION
GENERAL NOTES

1. **Steel Light Standards** shall have an 8 in. outside diameter at the base with a 7½ in. minimum wall thickness, and a uniform taper throughout. Light standards shall be rising in a uniform manner, as required, and fabricated in accordance with sections 613 and 715.

2. A certificate of conformance (C.O.C.) shall be submitted to the engineer after fabrication of the light standards. The C.O.C. shall be submitted in accordance with subsection 103.2.

3. The gate arm shall be fabricated from high-strength rectangular fiberglass and coated rectangular aluminum tubing. The maximum arm length shall be 4 ft. The fiberglass/aluminum gate shall be supplied by Safetran, B&B Electronic, or an approved equivalent.

4. The contractor shall survey the cross section of the roadway, determine each gate arm length, and submit the information to the engineer before ordering material. The location of the gate arm pivot shall be verified by the contractor and submitted to the engineer.

5. A breakaway shear pin base is required for the lightweight aluminum/fiberglass arms, and excess force is applied to the gate arm extended with the shear pin base, the pin shall shear. The gate operator, monitoring damage to the vehicle and the gate.

6. The heights of the gate arm guides were determined for a 29 ft. tall tapered light standard with a 12 in. outside diameter and rising height. The height of the gate arm over the roadway shall be 3 ft. - 7 in. to 4 ft. - 7 in. from the bottom of the arm to the roadway.

7. The arm gear which is cable shall be manufactured by Dutton-Lainson, Inc., Model AP, with a 5/32 in. cable, and a full capacity of 2000 lbs.

8. When the gate is fully raised, the nut and washer shall fit snugly against the outside of the rear carriake, and the pin shall be secured with a 5/32 in. pin. The pin shall be 3 in. long and have a 5/32 in. diameter. The nuts and washers shall be secured with a 5/32 in. pin. The nuts and washers shall be secured with a 5/32 in. pin.

9. Electrical connections to the power source shown on the plans shall be paid for by force account. If no power source is available, they shall be fabricated in accordance with the engineer's approval.

10. Gate warning lights shall be red LED (type B) high intensity. The lights at the end of the arm near the centerline of the roadway shall be steady burn. The other two lights shall flash at the rate required by the MUTCD. Spacing of the lights shall vary based on roadway width and gate arm length. The contractor shall determine the spacing and submit the LED layout to the engineer for verification prior to placement.

11. Galvanizing of the steel light standards, mast arms, drop gate pivots, supports, guides, and all associated hardware shall be galvanized in accordance with section 715. All rough edges and burrs shall be ground smooth prior to galvanizing.

12. Bolted connections: All bolts shall conform to ASTM A307, grade A, unless designated as high strength. All bolts shall conform to ASTM A325. After the road closure gate is assembled, all exterior bolt heads shall be painted with two coats of aluminum paint. The aluminum paint shall meet the requirements of subsection 708.04.

13. Field assembly: In some installations, the connection plates for the lubricator arms may require modification to allow the pivot socket to slip over the arm without damage. The connections shall be reamed with two coats of aluminum paint.
DROP GATE ARM GUIDE

STEEL LIGHT STANDARD

GATE ARM

PIVOT ASSEMBLY

PADLOCK IN PLACE WHEN GATE IS RAISED

SECURE CABLE TO PIVOT WITH CLEVIS AND CLIP N'THIMBLE KIT OR SIMILAR METHOD INSURING THAT CABLE IS PROTECTED FROM ABRASION

GATE ARM AND BOLTS NOT SHOWN.

NOTE: PLACE THE BLACK AND WHITE "ROAD CLOSED" SIGN IN THE CENTER OF THE THROUGH LANE. THE SIGN LETTERS WILL BE 6 IN. HIGH.

ROAD CLOSED

ALTERNATING RED AND WHITE RETRO-REFLECTIVE MATERIAL, 6 IN STRIPES AT 45° ANGLE, COVERING ENTIRE GATE ARM.

HOLE IN BAR (CENTERED) -

SECTION A-A

DROP GATE ARM SUPPORT DETAIL

GATE ARM AND BOLTS NOT SHOWN.
ANCHOR BASE
BOLT CIRCLE DIAMETERS
SHALL BE COMPATIBLE
1" TO 1'/4" x 3" TO 4"
CONNECTOR BOLTS WITH
TWO FLAT LOCK WASHERS
IN CONFORMANCE WITH
ASTM A 307 (FOUR REQUIRED)
17" TO 26"
BOLT CIRCLE DIAMETER SHALL FIT
THE LIGHT STANDARD FOUNDATION

NOTES:
1. HARDWARE SHALL CONFORM TO MANUFACTURER'S REQUIREMENTS.
2. A HAND HOLE IS NOT REQUIRED IN POLE IF A BREAK-AWAY TRANSFORMER BASE IS USED.
3. CONCRETE SHALL BE CLASS B.
4. EACH LIGHT STANDARD SHALL BE WIRED WITH A BREAK-AWAY FUSED CONNECTOR AND BE GROUNDED AS STATED IN THE SPECIFICATIONS.
5. LIGHT STANDARD FOUNDATIONS MUST BE PLACE IN DITCHES OR OTHER LOW AREAS.
6. CONCRETE SHALL BE COMPACTED IN CONFORMANCE WITH SECTION 203.
7. THE PHYSICAL SHAPES OF THE POLE CAPS, BRACKETS, AND CONCRETE PULL BOXES SHALL BE CONSIDERED APPROXIMATE AS SHOWN.
8. ALL NUTS, BOLTS, STUDS AND WASHERS SHALL BE GALVANIZED IN CONFORMANCE WITH AASHTO M 232 (ASTM A 153).

BREAK-AWAY SUPPORT COUPLING

2-1/2" MIN.
ELA CONDUIT
(HARDWARE OPTION)
2-1/2" MIN.
ELA CONDUIT
(HARDWARE OPTION)
4 ANCHOR BOLTS, ASTM A307
1" DIA. WITH TOP 8" GALVANIZED. THE ANCHORS CAN BE A DESIGN RECOMMENDED AND SUPPLIED AS A PART OF THE BREAK-AWAY SUPPORT COUPLING.
8 #7 REBARS
(SPACE EVENLY)

TYPICAL FOUNDATION SECTION

TYPICAL CONCRETE FOUNDATION

TYPICAL CONDUIT BURIAL SECTION

TYPICAL BREAK-AWAY TYPE TRANSFORMER BASE DETAIL

NOTES:
1. BOLT CIRCLE DIAMETERS SHALL BE COMPATIBLE
2. MEAN HOLE IS NOT REQUIRED IN POLE IF A BREAK-AWAY TRANSFORMER BASE IS USED
3. BOLT CIRCLE DIAMETER SHALL FIT THE LIGHT STANDARD FOUNDATION
4. SHEET METAL COVER ALUMINUM OR GAS STEEL CORROSION-RESISTANT SPACE AS REQUIRED BY MANUFACTURER
5. HARDWARE SHALL CONFORM TO MANUFACTURER'S REQUIREMENTS
6. 2-1/2" MIN.
ELA CONDUIT
(HARDWARE OPTION)
7. BREAK-AWAY SUPPORT COUPLINGS SHALL MEET THE BREAK-AWAY REQUIREMENTS STATED IN THE LATEST EDITION OF AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS"
8. LIGHT STANDARD FOUNDATIONS MAY BE PRECAST CONCRETE OR CAST-IN PLACE CONCRETE
9. LIGHT STANDARD FOUNDATIONS INCLUDING BREAK-AWAY SUPPORT COUPLINGS
10. CONCRETE SHALL BE COMPACTED IN CONFORMANCE WITH SECTION 203
11. CONCRETE SHALL BE CLASS B
12. EACH LIGHT STANDARD SHALL BE WIRED WITH A BREAK-AWAY FUSED CONNECTOR AND BE GROUNDED AS STATED IN THE SPECIFICATIONS
13. LIGHT STANDARD FOUNDATIONS MUST NOT BE PLACE IN DITCHES OR OTHER LOW AREAS
14. CONCRETE SHALL BE COMPACTED IN CONFORMANCE WITH SECTION 203
15. THE PHYSICAL SHAPES OF THE POLE CAPS, BRACKETS, AND CONCRETE PULL BOXES SHALL BE CONSIDERED APPROXIMATE AS SHOWN
16. ALL NUTS, BOLTS, STUDS AND WASHERS SHALL BE GALVANIZED IN CONFORMANCE WITH AASHTO M 232 (ASTM A 153)
HIGH WIND STOWING PROCEDURE

If arm cannot be brought back to the upright position because of high winds, the following procedure can be used:

1. With arm in down position remove two " x 1/4" bolts from shear pin base. See the shear pin base detail.
2. Swivel arm using the 1/4" x 8 HS bolt as a pivot.
3. Swivel arm clear of roadway and secure to a delineator post.
4. Reset arm to upright position when weather permits.

Note: See details below.

- ONE 1/4" x 8 HS BOLT TO SHEAR PIN BASE
- TWO 1/4" EYE BOLTS (ONE ON EACH SIDE)
- ONE 1/4" x 8 HS BOLT TO SHEAR PIN BASE

ROAD CLOSURE GATE

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO.
M-607-15

Standard Sheet No. 8 of 9

Project Sheet Number:
NOTES
1. POLE BASE PLATE SHALL CONFORM TO ASTM A 572, GRADE 42.
2. BOTTOM PLATE OF SLIP BASE ASSEMBLY SHALL CONFORM TO ASTM A 572, GRADE 50.
3. ALL STRUCTURAL STEEL SHALL BE GALVANIZED AFTER FABRICATION IN CONFORMANCE WITH ASTM A 123. ALL CONTACT AREAS OF THE STRUCTURAL STEEL SHALL BE FREE OF GALVANIZING BEADS AND RUNS.
4. SLIP BASE CONNECTING HARDWARE SHALL CONFORM TO ASTM A 325, AND SHALL BE ELECTROPLATED CADMIUM IN CONFORMANCE WITH ASTM B 766 TYPE NS.
5. KEEPER PLATE SHALL CONFORM TO ASTM A 653, GRADE 33, AND COATING G 90.

SHEET REVISIONS

- Creation Date: 07/31/19
- Date: Comments
- Designer Initials: JBK
- Last Modification Date: 07/31/19
- Detailer Initials: LT A
- CAD Ver.: MicroStation V7
- Scale: Not to Scale
- Units: English
- Project Sheet Number: 9 of 9

ROAD CLOSURE GATE

Issued by the Project Development Branch: July 31, 2019

STANDARD PLAN NO. M-607-15

COMPUTER FILE INFORMATION

- Issued by Colorado Department of Transportation: 2020 West Howard Place
- Designer: JBK
- Consultant: C-K
- Issued by: Project Development Branch: JBK
- Date: 07/31/19
- CAD Ver.: MicroStation V7
- Scale: Not to Scale
- Units: English
- Project Sheet Number: 9 of 9
- Computer File Information:

LIGHT STANDARD BASE PLATE

28 GRADE KEEPER PLATE

SECTION A-A

OPTIONAL BREAK-AWAY TYPE BASE
**CURB RAMP GENERAL NOTES:**

1. In new construction or full-depth reconstruction, provide a separate curb ramp for each marked or unmarked pedestrian street crossing. Curb ramps shall be contained wholly within the width of the pedestrian street crossing or crosswalk they serve, or as shown on the contract plans.

2. Alternations are defined as changes to an existing roadway that affect pedestrian access, circulation, or use. Alternations include, but are not limited to, reconstructing, rehabilitation, reconstruction, curb ramp retrofits, restoration of features, or changes to structural parts or elements of a pedestrian facility.

3. A sidewalk surface located as a paved surface adjacent to a curb ramp or turning space, without raised obstacles, that could be inadvertently traversed by a user who is visually impaired.

4. In alterations, where an existing physical constraint prevents providing a separate curb ramp for each pedestrian street crossing, a single ramping area in the area shall be permitted to serve two pedestrian street crossings. The use of a single ramp shall be approved by the engineer prior to construction.

5. Diagonal ramps are not acceptable in new construction or full-depth reconstruction.

6. Detectable warning surfaces shall contrast visually with the adjacent gutter, highway, or pedestrian access route surface, either light-on-dark or dark-on-light. Federal yellow color is preferred, however, other colors may be used if approved by the engineer.

7. In alterations, where a ramp or turning space must tie into an existing grade that cannot be altered, the ramp or turning space may be warped to transition to the required cross slope. The transition to the required cross slope shall be spread evenly over the length of the ramp or turning space to minimize the degree of warping. The rate of change on a ramp or turning space shall not exceed 3% per linear foot.

8. Design and construct curb ramps, turning spaces, and flare slopes with the flattest slopes possible. The slopes indicated in these details show the maximum slopes allowable, preferred values to be used during design, layout, and construction are:

   - Ramp running slope 7.5%
   - Ramp cross slope 2.5%
   - Turning space running slope 2.5%
   - Turning space cross slope 2.5%
   - Flare slope 0-3°

**CURB RAMP PAY AREAS**

<table>
<thead>
<tr>
<th>Type 1</th>
<th>Type 2 - Two Ramps</th>
<th>Type 2 - One Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
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**PERCENT SLOPE**

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<tr>
<th>0.5%</th>
<th>1.0%</th>
<th>2.0%</th>
<th>5.0%</th>
<th>7.5%</th>
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<td>1:10</td>
<td>50:1</td>
<td>20:1</td>
<td>14:1</td>
<td>12:1</td>
<td>10:1</td>
</tr>
</tbody>
</table>

**SLOPE TABLE**

- TYPE 1 - DIRECTIONAL BLENDED TRANSITION
- TYPE 2 - DEPRESSED CORNER
- TYPE 2 - Blended Transition

**GENERAL NOTES & PAY AREAS**

**STANDARD PLAN NO.**

<table>
<thead>
<tr>
<th>M-608-1</th>
<th>Standard Sheet No. 1 of 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Development Branch</td>
<td>JBK</td>
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</tbody>
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**COMPUTER FILE INFORMATION**

- Creation Date: 07/31/19
- Designer Initials: JBK
- CAD Version: MicroStation V7

**COLORADO DEPARTMENT OF TRANSPORTATION**

<table>
<thead>
<tr>
<th>2023 West Howe Place</th>
<th>CDOT No. 3rd Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denver, CO 80204</td>
<td>Phone: 303-757-9021 FAX: 303-757-9888</td>
</tr>
</tbody>
</table>

**PROJECT DEVELOPMENT BRANCH**

- Issued by the Project Development Branch, 3rd Quarter 2023
**PERPENDICULAR RAMP Notes**

1. **RAMP WIDTH** - Provide 5 ft. or greater where possible. 5 ft. is minimum. Provide 4 ft. at narrow ramps servicing narrower use paths. Shall match the width of the path.

2. **RAMP RUNNERS** - Provide 5 ft. maximum.

3. **TURNING SPACE RUNNING SLOPE** - 2.0% maximum. Turning space running slope is measured in the same direction as the ramp running slope.

4. **Ramp and Turning Space Cross Slope** - 2.0% typical at crossings without yield or stop control. Where a signal where allowed can proceed through the intersection without slowing or stopping, the cross slope of ramps and turning spaces may equal the roadway grade at midblock pedestrian street crossings. The ramp and turning space cross slope may equal the normal grade.

5. **TURNING SPACE DIMENSIONS** - Provide a turning space at the top of perpendicular ramps with a width equal to the width of the curb ramp. Turning space length must be a 4 ft. horizon measured in the direction of the ramp run. When a turning space is constrained at the back of sidewalk, increase length to 5 ft. minimum in the direction of the ramp run.

6. **RAMP ALIGNMENT** - Ramps shall be aligned to be fully contained within the crosswalk or street crossing they serve. Provide one ramp for each street crossing direction. In alterations, where existing physical constraints prevent providing the curb ramp for each crossing direction, a single diagonal curb ramp (on the apex of a corner) shall be permitted to serve both pedestrian street crossings. If a diagonal ramp is used, a clear space of 4 ft. x 4 ft. must be provided at the base of the ramp. The clear space must be within both crosswalks and wholly outside of any adjacent vehicular travel lanes. Diagonal ramps are not acceptable in new construction, or full-depth reconstruction.

7. **RAMP LENGTH - PERPENDICULAR RAMP LENGTH IS DEPENDENT UPON THE RAMP SLOPE, HEIGHT OF CURB, AND ADJACENT SIDEWALK CROSS-SLOPE WHICH MUST BE INTERCEPTED. SEE DETAIL A FOR CALCULATING RAMP LENGTH WHEN CHASING SIDEWALK CROSS-SLOPE. WHERE TERRAIN IS SLOPING MORE THAN 15 FT. REGARDLESS OF THE RESULTING RAMP SLOPE.**

8. **RAMP FLARES** - Where a ramp edge abuts a walkable surface, a flared side shall be provided. Ramp flares shall not exceed 10.0%.

9. **VERTICAL CURB RETURNS** - Vertical curb returns may be used only where a ramp abuts a non-walkable surface, or where a ramp is protected from pedestrian traffic. For example, by a signal cabinet or utility pole which blocks passage.

10. **GUTTER COUNTER SLOPE** - 5.0% maximum.

**PERPENDICULAR RAMP Notes**

**RAMP LENGTH**

- **DETECTABLE WARNING Surface**
- **CURB RAMP**
- **GUTTER**
- **GRADE BREAK**
- **CONCRETE SIDEWALK**
- **TURNING SPACE**
- **RAMP**
- **ELEVATION INCREASE**

**DETAIL A - RAMP LENGTH**

- **SCHOOL**
- **TURNING SPACE**
- **DETECTABLE WARNING Surface**

**TYPE 1 PERPENDICULAR CURB RAMPS**

**PERPENDICULAR RAMP Notes**

- **RAMP WIDTH** - Provide 5 ft. or greater where possible. 5 ft. is minimum. Provide 4 ft. at narrow ramps servicing narrower use paths. Shall match the width of the path.

- **RAMP RUNNERS** - Provide 5 ft. maximum.

- **TURNING SPACE RUNNING SLOPE** - 2.0% maximum. Turning space running slope is measured in the same direction as the ramp running slope.

- **Ramp and Turning Space Cross Slope** - 2.0% typical at crossings without yield or stop control. Where a signal where allowed can proceed through the intersection without slowing or stopping, the cross slope of ramps and turning spaces may equal the roadway grade at midblock pedestrian street crossings. The ramp and turning space cross slope may equal the normal grade.

- **TURNING SPACE DIMENSIONS** - Provide a turning space at the top of perpendicular ramps with a width equal to the width of the curb ramp. Turning space length must be a 4 ft. horizon measured in the direction of the ramp run. When a turning space is constrained at the back of sidewalk, increase length to 5 ft. minimum in the direction of the ramp run.

- **RAMP ALIGNMENT** - Ramps shall be aligned to be fully contained within the crosswalk or street crossing they serve. Provide one ramp for each street crossing direction. In alterations, where existing physical constraints prevent providing the curb ramp for each crossing direction, a single diagonal curb ramp (on the apex of a corner) shall be permitted to serve both pedestrian street crossings. If a diagonal ramp is used, a clear space of 4 ft. x 4 ft. must be provided at the base of the ramp. The clear space must be within both crosswalks and wholly outside of any adjacent vehicular travel lanes. Diagonal ramps are not acceptable in new construction, or full-depth reconstruction.

- **RAMP LENGTH - PERPENDICULAR RAMP LENGTH IS DEPENDENT UPON THE RAMP SLOPE, HEIGHT OF CURB, AND ADJACENT SIDEWALK CROSS-SLOPE WHICH MUST BE INTERCEPTED. SEE DETAIL A FOR CALCULATING RAMP LENGTH WHEN CHASING SIDEWALK CROSS-SLOPE. WHERE TERRAIN IS SLOPING MORE THAN 15 FT. REGARDLESS OF THE RESULTING RAMP SLOPE.**

- **RAMP FLARES** - Where a ramp edge abuts a walkable surface, a flared side shall be provided. Ramp flares shall not exceed 10.0%.

- **VERTICAL CURB RETURNS** - Vertical curb returns may be used only where a ramp abuts a non-walkable surface, or where a ramp is protected from pedestrian traffic. For example, by a signal cabinet or utility pole which blocks passage.

- **GUTTER COUNTER SLOPE** - 5.0% maximum.
CURB HEIGHT MAY BE REDUCED TO 3" MIN.

BACK OF SIDEWALK

CROSSWALK BAR (TYPICAL)

CLEAR SPACE (SEE NOTE 6 - SHEET 2)

CURB HEIGHT MAY BE REDUCED TO 3" MIN.

BACK OF SIDEWALK

CROSSWALK BAR (TYPICAL)

CLEAR SPACE (SEE NOTE 6 - SHEET 2)

TURNING SPACES MAY OVERLAP

NOTE

PLACEMENTS SHOWN ARE TYPICAL CONFIGURATIONS ONLY AND ARE NOT NECESSARY OF ALL OPTIONS. OTHER RAMP CONFIGURATIONS MAY BE ACCEPTABLE AS LONG AS THEY CONFORM TO THE CRITERIA IN THIS STANDARD, AND ARE APPROVED BY THE ENGINEER.

TYPE 1 RAMPS FOR WIDE SIDEWALK
(3" REDUCED CURB)

TYPE 1 RAMP
(TYPICAL)

NOT ALLOWABLE IN NEW CONSTRUCTION/FULL DEPTH RECONSTRUCTION
SEE GENERAL NOTE 4

CROSSWALK BAR
(TYPICAL)

LANDING AREA RUNNING SLOPE 2% PREF., 5% MAX. MATCH RAMP CROSS SLOPE

TURNING SPACES MAY OVERLAP

CROSSWALK BAR
(TYPICAL)

LANDING AREA RUNNING SLOPE 2% PREF., 5% MAX. MATCH RAMP CROSS SLOPE

TYPE 1 DIRECTIONAL RAMPS
(3" REDUCED CURB)

LANDING AREA RUNNING SLOPE 2% PREF., 5% MAX. MATCH RAMP CROSS SLOPE

NOTE

PLACEMENTS SHOWN ARE TYPICAL CONFIGURATIONS ONLY AND ARE NOT NECESSARY OF ALL OPTIONS. OTHER RAMP CONFIGURATIONS MAY BE ACCEPTABLE AS LONG AS THEY CONFORM TO THE CRITERIA IN THESE STANDARDS, AND ARE APPROVED BY THE ENGINEER.

TYPE 1 PERPENDICULAR RAMPS

TYPE 1 DIRECTIONAL RAMPS
(LARGE RADIUS)

LANDING AREA RUNNING SLOPE 2% PREF., 5% MAX. MATCH RAMP CROSS SLOPE

CROSSWALK BAR
(TYPICAL)

TURNING SPACES MAY OVERLAP

CROSSWALK BAR
(TYPICAL)

LANDING AREA RUNNING SLOPE 2% PREF., 5% MAX. MATCH RAMP CROSS SLOPE

NOTE

PLACEMENTS SHOWN ARE TYPICAL CONFIGURATIONS ONLY AND ARE NOT NECESSARY OF ALL OPTIONS. OTHER RAMP CONFIGURATIONS MAY BE ACCEPTABLE AS LONG AS THEY CONFORM TO THE CRITERIA IN THESE STANDARDS, AND ARE APPROVED BY THE ENGINEER.

TYPE 1 CURB RAMPS TYPICAL CONFIGURATIONS

TYPE 1 DIRECTIONAL RAMPS
(LARGE RADIUS)

NOTE

PLACEMENTS SHOWN ARE TYPICAL CONFIGURATIONS ONLY AND ARE NOT NECESSARY OF ALL OPTIONS. OTHER RAMP CONFIGURATIONS MAY BE ACCEPTABLE AS LONG AS THEY CONFORM TO THE CRITERIA IN THESE STANDARDS, AND ARE APPROVED BY THE ENGINEER.

STANDARD PLAN NO.
M-608-1

CURB RAMPS

Project Sheet Number: 3 of 10

Issued by the Project Development Branch: July 31, 2019
**Curb Ramps**

**Typical**
- Curb ramp width: 4 ft. typ., 6 ft. max.
- Curb ramp slope: 8.3% max.
- Curb ramp cross slope: 2.0% max.
- Turning space running slope: 2.0% max.
- Turning space cross slope: 2.0% max.
- Turning space dimensions: Provide a turning space at the bottom of parallel ramps with a width equal to the width of the curb ramp, with a 4 ft. minimum measured in the direction of the ramp run. If the turning space is constrained on two sides, provide a 5 ft. minimum measured in the direction of pedestrian street crossing. The turning space may contain the detectable warning surface.

**Notes**
- Ramps shall be aligned so the turning space is fully contained within the original or street crossing they serve. Provide one ramp for each street crossing direction. In addition, where existing physical constraints prevent providing one curb ramp for each crossing direction, a single diagonal curb ramp on the side of a corner shall be permitted to serve both pedestrian street crossings. Diagonal ramps are not acceptable in new construction or full-depth reconstruction.
- Ramps shall be aligned so the turning space is fully contained within the original or street crossing they serve. Provide one ramp for each street crossing direction. In addition, where existing physical constraints prevent providing one curb ramp for each crossing direction, a single diagonal curb ramp on the side of a corner shall be permitted to serve both pedestrian street crossings. Diagonal ramps are not acceptable in new construction or full-depth reconstruction.
- Ramps shall be aligned so the turning space is fully contained within the original or street crossing they serve. Provide one ramp for each street crossing direction. In addition, where existing physical constraints prevent providing one curb ramp for each crossing direction, a single diagonal curb ramp on the side of a corner shall be permitted to serve both pedestrian street crossings. Diagonal ramps are not acceptable in new construction or full-depth reconstruction.

**Detectable Warning Surface Sheets for Placement Details**
- Provide a turning space at the bottom of parallel ramps with a width equal to the width of the curb ramp, with a 4 ft. minimum measured in the direction of the ramp run. If the turning space is constrained on two sides, provide a 5 ft. minimum measured in the direction of pedestrian street crossing. The turning space may contain the detectable warning surface.

**Typical Diagrams**

**Section C-C**
- Curb ramp width: 4 ft. typ., 6 ft. max.
- Curb ramp slope: 8.3% max.
- Curb ramp cross slope: 2.0% max.
- Turning space running slope: 2.0% max.
- Turning space cross slope: 2.0% max.
- Turning space dimensions: Provide a turning space at the bottom of parallel ramps with a width equal to the width of the curb ramp, with a 4 ft. minimum measured in the direction of the ramp run. If the turning space is constrained on two sides, provide a 5 ft. minimum measured in the direction of pedestrian street crossing. The turning space may contain the detectable warning surface.

**Section B-B**
- Curb ramp width: 4 ft. typ., 6 ft. max.
- Curb ramp slope: 8.3% max.
- Curb ramp cross slope: 2.0% max.
- Turning space running slope: 2.0% max.
- Turning space cross slope: 2.0% max.
- Turning space dimensions: Provide a turning space at the bottom of parallel ramps with a width equal to the width of the curb ramp, with a 4 ft. minimum measured in the direction of the ramp run. If the turning space is constrained on two sides, provide a 5 ft. minimum measured in the direction of pedestrian street crossing. The turning space may contain the detectable warning surface.

**Section A-A**
- Curb ramp width: 4 ft. typ., 6 ft. max.
- Curb ramp slope: 8.3% max.
- Curb ramp cross slope: 2.0% max.
- Turning space running slope: 2.0% max.
- Turning space cross slope: 2.0% max.
- Turning space dimensions: Provide a turning space at the bottom of parallel ramps with a width equal to the width of the curb ramp, with a 4 ft. minimum measured in the direction of the ramp run. If the turning space is constrained on two sides, provide a 5 ft. minimum measured in the direction of pedestrian street crossing. The turning space may contain the detectable warning surface.

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**Computer File Information**
- Creation Date: 07/31/19
- Designer Initials: JBK
- Last Modification Date: 07/31/19
- CAD Ver.: MicroStation VB
- Standard Sheet No.: 4 of 10
- Project Development Branch: JBK
- Issued by the Project Development Branch: July 31, 2019

**STANDARD PLAN NO. M-608-1**
- Standard Sheet No.: 4 of 10
COMBINATION CURB RAMP NOTES:

① The curb ramp placements shown are typical configurations only and not indicative of all possible curb ramp configurations that may be acceptable as long as they conform to the criteria in these standards, and are approved by the Engineer.

② Ramp and turning space cross slope - 2.0% typical at crossings without yield or stop control, or where a signal where vehicles can proceed through the intersection without stopping. The cross slope of the ramp and turning space may equal the highway grade at midblock pedestrian street crossings. The ramp and turning space cross slope may equal the highway grade.

③ Where it is acceptable for a ramp or turning space cross slope to exceed 2.0% and match the highway grade, the ramp above the turning space may be warped to tie into the adjoining sidewalk cross slope. The transition to the sidewalk cross slope shall be smooth and over the length of the ramp to minimize warping. The rate of change in cross slope may not exceed 5.0% per linear foot.

COMBINATION CURB RAMPS TYPICAL CONFIGURATIONS
Not to Scale

TOP OF PAVEMENT GUTTER SLOPE 5% MAX.

CONCRETE SIDEWALK 6" FL TO 4' MIN.

DETECTABLE WARNING SURFACE 6"

DEPRESSED CORNER

GUTTER COUNTER SLOPE 5% MAX.

TYPE 5 - DEPRESSED CORNER/BLENDED TRANSITION

BLENDED TRANSITION & DEPRESSED CORNER NOTES

DEPRESSED CORNER/BLENDED TRANSITION

1. Perpendicular and parallel ramp configurations are preferred. BLENDED TRANSITION are DEPRESSED CORNER notes only be used where site conditions make them a more appropriate option, or where perpendicular or parallel ramps cannot be installed due to a physical site constraint.

2. RAMP WIDTH - PROVIDE 5 FT or greater where possible. If site constraints do not permit, provide 4 ft. NORTH ARROW: RAMP DEPRESSED CORNER notes shall match the width of the path.

3. RAMP RUNNING SLOPE - 8.3% MAX.

4. BLENDED TRANSITION RUNNING SLOPE - 5.0% MAX.

5. RAMP AND TURNING SPACE CROSS SLOPE - 2.0% TYPICAL. AT CROSSINGS WITHOUT YIELD OR STOP CONTROL, OR WITH A CONVEY, Where Vehicles CAN PROCEED THROUGH THE INTERSECTION WITHOUT SLOWING OR STOPPING, THE CROSS SLOPE OF RAMPS AND TURNING SPACES MAY EQUAL THE HIGHWAY GRADE.

6. TURNING SPACE DIMENSIONS - PROVIDE A 4 FT. X 4 FT. TURNING SPACE AT THE BOTTOM OF RAMP RUNS. THE TURNING SPACE MAY CONTAIN THE DETECTABLE WARNING SURFACES.

7. RAMP ALIGNMENT - TURNING SPACE SHALL BE ALIGNED TO BE FULLY CONTAINED WITHIN THE CROSSWALK OR STREET CROSSING THEY SERVE.

8. RAMP LENGTH - RAMP LENGTH IS DEPENDENT UPON THE RAMP SLOPE AND THE CHANGE OF ELEVATION FROM THE TURNING SPACE TO THE SIDEWALK. WHERE TERRAIN IS SLOPING A RAMP IS NOT REQUIRED TO CHASE GRADE MORE THAN 15 FT. REGARDLESS OF THE RESULTING RAMP SLOPE.

9. RAMP FLARES - WHERE A RAMP EDGE ABUTS A WALKABLE SURFACE, A FLARED SIDE MUST BE PROVIDED. RAMP FLARE SLOPES SHALL NOT EXCEED 10.0%.

10. VERTICAL CURB RETURNS - VERTICAL CURB RETURNS MAY BE USED ONLY WHERE A RAMP AIDS A NON-WALKABLE SURFACE, OR WHERE A RAMP IS PROTECTED FROM PEDESTRIAN CROSS TRAFFIC (FOR EXAMPLE BY A FENCE, SHRUB OR UTILITY POLE WHICH BLOCKS PASSAGE).

11. GUTTER COUNTER SLOPE - 5.0% MAX.

12. DWS PLACEMENT - DWS SHALL BE PLACED AROUND THE RADIUS AND LOCATED AT THE BACK OF CURB ON BLENDED TRANSITION AND DEPRESSED CORNER RAMPS.
INTERSECTION ISLANDS

MEDIAN ISLANDS

MEDIAN / RAILROADS / ISLANDS

NOTE:
1. DETECTABLE WARNING SURFACES SHALL BE PLACED IN ALIGNMENT WITH THE BACK OF CURB.
2. FLARED SIDES ARE PREFERENTIAL ON RAISED INTERSECTION ISLANDS AND SHOULD BE PROVIDED ON ISLANDS WHICH SERVE SHARED USE PATHS, OR AT LOCATIONS WHERE BICYCLE USE IS EXPECTED.
3. FOR CUT-THROUGH MEDIAN ISLANDS, DETECTABLE WARNING SURFACES SHALL BE PLACED IN ALIGNMENT WITH THE BACK OF CURB AND SEPARATED BY A MINIMUM 2 FOOT SPACE WITHOUT DWS. IF A 2 FOOT SEPARATION BETWEEN DETECTABLE WARNING SURFACES CANNOT BE PROVIDED, NO DETECTABLE WARNING SURFACES SHALL BE INSTALLED.
4. CURB RAMPS AND CUT-THROUGH ISLANDS SHOULD BE THE SAME WIDTH AS ANY SHARED USE PATH WHICH THEY SERVE.

ELIMINATE DWS IF MEDIAN REFUGE IS LESS THAN 6" IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL.

MEDIAN ISLANDS

CROSSWALK BAR (TYPICAL)

MEDIAN ISLAND

CURB RAMPS

STANDARD PLAN NO.
M-608-1

Standard Sheet No. 8 of 10

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

Colorado Department of Transportation
200 West Howard Place
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-8858

Project Development Branch: JBK

Computer File Information

Sheet Revisions

Creation Date: 07/12/19
Designer Initials: JBK

Last Modification Date: 07/31/19
Detailer Initials: LT A

CAD File Information

Scale: Not to Scale Units: English
DETECTABLE WARNING SURFACE NOTES:

1. DETECTABLE WARNING SURFACES (DWS) SHALL BE INSTALLED AT SIDEWALK, SHARED USE PATH, OR STREET TRANSITIONS, AND SHALL CONSIST OF TRUNCATED DOMES OR PLATES WHICH ARE EMBEDED IN THE CONCRETE CURB RAMP WHILE THE CONCRETE IS PLASTIC.

2. THE DETECTABLE WARNING SURFACE SHALL SPAN THE FULL WIDTH OF THE CURB RAMP, SHARED USE PATH, OR OTHER ROADWAY ENTRANCE AS APPLICABLE. A GAP OF 2 INCHES FROM THE EDGE OF THE DETECTABLE WARNING SURFACE TO THE EDGE OF THE CURB RAMP OR SHARED USE PATH IS PERMITTED.

3. WHEN DETECTABLE WARNING SURFACES ARE PLACED ON A SLOPE GREATER THAN 5.0%, TRUNCATED DOMES SHOULD BE ALIGNED IN THE DIRECTION OF THE RAMP RUN; OTHERWISE DOMES ARE NOT REQUIRED TO BE ALIGNED. TRUNCATED DOMES SHALL BE IN A SQUARE GRID OR RADIAL PATTERN. WHEN PLACED RADIALLY, PLACE ADJACENT DWS PLATES EDGE TO EDGE, EDGES OF CUT PLATES SHALL BE STRAIGHT.

4. LOCATION ONE CORNER OF THE DWS LEADING EDGE AT THE BACK OF CURB. NO POINT ON THE LEADING EDGE OF THE DWS MAY BE MORE THAN 5 FT. FROM THE BACK OF CURB. IF THE RADIUS OF A CORNER MAKES THIS IMPOSSIBLE, ORIENT THE CURB RAMP PERPENDICULAR TO THE CURB AND GUTTER.

5. WHERE PERPENDICULAR DIRECTIONAL RAMPS ABUT A WALKABLE SURFACE, THE LEADING EDGE OF THE DWS SHALL NOT BE PLACED FURTHER THAN 2 FEET FROM THE BACK OF CURB. IF THE RADIUS OF A CORNER MAKES THIS IMPOSSIBLE, ORIENT THE CURB RAMP PERPENDICULAR TO THE CURB AND GUTTER.

6. IF THE DETECTABLE WARNING SURFACE IS CUT, GRIND OFF THE REMAINING PORTION OF ANY CUT TRUNCATED DOMES. SEAL ALL CUT PANEL EDGES WITH AN APL SEALANT TO PREVENT WATER DAMAGE.

7. TRUNCATED DOME PLATES SHALL BE EMBEDED IN THE CONCRETE CURB RAMP, WHILE THE CONCRETE IS PLASTIC.

8. DWS SHALL NOT BE PLACED OVER GRADE BREAKS.

DETECTABLE WARNING SURFACE PLACEMENT

TYPE 1 CURB RAMP (PERPENDICULAR ON TARGET)

TYPE 1 CURB RAMP (DIRECTED ON RADIUS)

TYPE 2 CURB RAMP (DIRECTED ON RADIUS)

TYPE 2 - DIRECTIONAL RAMP
DWS SPANS WIDTH OF CURB RAMP (WITHIN 2" OF EACH EDGE)

RETURN CURB OR CURB RAMP

SECTION VIEW OF DETECTABLE WARNING SURFACE PLATE (LOOKING AT PERPENDICULAR RAMP RUN FROM STREET)

SECTION VIEW FOR PARALLEL CURB RAMP TYPES (LOOKING PERPENDICULAR TO RAMP RUN)

SECTION VIEW FOR PERPENDICULAR CURB RAMP TYPES (LOOKING PERPENDICULAR TO RAMP RUN)

DETECTABLE WARNING SURFACE DETAILS

STANDARD PLAN NO. M-608-1

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number: 10 of 10

Project Sheet Number:

Colorado Department of Transportation
2029 West Howard Place
Denver, CO 80204
Phone: 303-757-9021 FAX: 303-757-8858

Detectable Warning Surface Details

Curb Ramps
GENERAL NOTES

1. In roadway curves with a radius of 1,900 ft. or less, curbs and gutters are to be placed in the arc of the curve. Unless otherwise noted on the plans, a maximum chord length of 10 ft. may be used when the curve radius is greater than 1,900 ft.

2. Concrete shall be Class B.

3. Profile grade of curbs and gutters shall be located at the flow line.

4. Curb type A may be used in lieu of curb and gutter type B, unless otherwise specified on the plans.

5. Curb and gutter type B shall be used to facilitate drainage for profile grades as shown on the plans.

6. Profile grade of curb and gutter section shall match concrete pavement thickness shown on the plans. Curb and gutter shall be Class P concrete if placed monolithically with concrete pavement.

7. Increase sidewalk thickness to 6 in. at locations shown on the plans.

8. Minimum sidewalk width is 4 ft.

9. Expansion joints shall be installed when abutting existing concrete or fixed structure. Expansion joint material shall be 1/8 in. thick and extend the full depth of contact surface.

10. Gutter cross slopes shall be 2% in. ft. when draining away from curb and 1% in. ft. when draining toward curb (with exception to immediately adjacent to curb ramps - see standard plan M-608-1 for slope requirements).

11. If tie bars are required, the gutter thickness shall be increased to the pavement thickness. Tie bars shall be epoxy-coated #4 conforming to AASHTO M-284 and spaced at 3 ft. intervals. They shall be inserted 1/2 and 1#2 length into the gutter.

CONSTRUCTION OF CONCRETE GUTTERS AT INTERSECTION

1. Expansion joints shall be placed 2' to 3' on center.

2. Expansion joints may be sealed when specified on the plans.

LEGEND

- 2% MAXIMUM SLOPE
- 4 IN. MOUNTABLE - 1 FT. GUTTER
- 6 IN. MOUNTABLE - 1 FT. GUTTER
- 6 IN. MOUNTABLE - 2 FT. GUTTER
- 4 IN. MOUNTABLE WITH SIDEWALK
- STANDARD PLAN NO. M-609-1
- Colorado Department of Transportation
- Issued by the Project Development Branch: July 31, 2019
- Sheet Revisions
- Standard Sheet No. 1 of 4
- Project Sheet Number: 3
CURB TYPE 2
(SECTION B)
6 IN. BARRIER

CURB TYPE 2
(SECTION M)
6 IN. MOUNTABLE

CURB TYPE 4
(SECTION B)
6 IN. BARRIER

CURB TYPE 4
(SECTION M)
6 IN. MOUNTABLE

CURB TYPE 6
(SECTION M)
4 IN. MOUNTABLE

NOTE: BITUMINOUS DR CONCRETE UNLESS OTHERWISE SPECIFIED ON THE PLANS.

Curvature Legend
A = 1/4''
B = 1"
C = W2"
D = W2"

NOTE: RECOMMENDED JOINT SPACING IS EVERY 8 FOOT ALONG THE WIDTH AND LENGTH OF DRIVEWAY. FOR DRIVEWAYS WIDER THAN 12 FEET, JOINTS ARE REQUIRED.

4 FT MIN. DRIVEWAY TRANSITION (SEE PLANS)

CURB CUT FOR DRIVEWAYS (WITHOUT ATTACHED SIDEWALK)

Concrete Pavement (Driveways)

TRANSVERSE CONTRACTION JOINT FOR CONCRETE PAVEMENT (DRIVEWAYS)

SECTION A-A

CONCRETE PAVEMENT (DRIVEWAYS)

CURB, GUTTERS, AND SIDEWALKS

STANDARD PLAN NO.
M-609-1

Issued by the Project Development Branch: July 31, 2019

Project Development Branch: JBK

Computer File Information

Sheet Revisions

Colorado Department of Transportation

2020 West Meadow Place

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Phone: 303-757-9021 Fax: 303-757-9868

Issued by the Project Development Branch: July 31, 2019

Project Sheet Number:

M-609-1

Standard Sheet No. 2 of 4
DRIVEWAY WIDTH SHOWN ON PLANS

SIDEWALK WIDTH SHOWN ON PLANS

CONCRETE CURB & GUTTER

CONCRETE DRIVEWAY ENTRANCE TYPE 1

CONCRETE DRIVEWAY ENTRANCE TYPE 2

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

NOTES

1. DRAINAGE STRUCTURES, TRAFFIC SIGNAL EQUIPMENT, JUNCTION BOXES, AND OTHER OBSTRUCTIONS SHOULD NOT BE PLACED IN FRONT OF THE DRIVEWAY RAMP ACCESS AREAS.

2. FOR THE CURB AND GUTTER SHOWN, SEE PLANS FOR CURB TYPE.

3. RAMP SLOPES SHALL BE FLATTER.

4. CONSTRUCTION OF THE CONCRETE PEDESTRIAN CURB SHALL BE INCLUDED IN THE BID PRICE OF THE CONCRETE PAVEMENT.
NOTES

1. DRAINAGE STRUCTURES, TRAFFIC SIGNAL EQUIPMENT, Senderon Boxes and OTHER OBSTRUCTIONS SHOULD NOT BE PLACED IN FRONT OF THE DRIVEWAY RAMP ACCESS AREAS.

2. FOR THE CURB AND GUTTER SHOWN, SEE PLANS FOR CURB TYPE.

3. RAMPS SLOPES SHALL BE 12:1 OR FLATTER.
GENERAL NOTES
1. CONCRETE SHALL BE CLASS II, THICKNESS MAY BE CAST-IN-PLACE OR PRECAST.
2. REINFORCING BARS SHALL BE #4, GRADE 60.
3. ALL TIMBER SHALL BE TREATED IN CONFORMANCE WITH ASSHTO M 133 AND AWPA C14.
4. WING POSTS MAY BE MADE FROM 8 IN. ROUND NATIVE TIMBER.
5. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND PAINTED WITH ALUMINUM PAINT IN
   ACCORDANCE WITH SECTION 509. ALL HARDWARE SHALL BE GALVANIZED IN CONFORMANCE
   WITH AASHTO M 270 (ASTM A 325) AND MILL SPECIFICATIONS.
6. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M 270 (ASTM A 36).
7. WELDING SHALL CONFORM TO THE AWS STRUCTURAL WELDING CODE AND AASHTO
   STANDARD SPECIFICATIONS FOR WELDING OF STRUCTURAL STEEL HIGHWAY BRIDGES.
8. WHEN A CATTLE GUARD IS TO BE INSTALLED IN IMPERVIOUS MATERIAL, ADEQUATE
   DRAINAGE SHALL BE PROVIDED TO INSURE AGAINST POSSIBLE SUBGRADE DAMAGE. DRAINAGE
   DETAILS SHALL BE AS SHOWN ON THE PLANS. AN OUTLET PIPE MAY BE CONSIDERED.
9. TYPE OF WING (TIMBER OR STEEL) SHALL BE STEEL UNLESS OTHERWISE SHOWN ON THE PLANS.
10. STRUCTURE EXCAVATION AND STRUCTURE BACKFILL WILL NOT BE MEASURED AND PAID FOR
    SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
11. ALTERNATIVE CATTLE GUARDS MAY BE CONSTRUCTED UPON APPROVAL BY THE PROJECT ENGINEER.

1/16" DIA. FOR Y2" DIA. X 8" BOLT (2 REQ'D.)
7/16" DIA. FOR Y2" DIA. X 12" BOLT (2 REQ'D. PER GRILL UNIT)
1/4" DIA. FOR 13/16" DIA. X 1" BOLT, WITH NUT AND THREE WASHERS
6'-4" POST (CAST-IN-PLACE, PRECAST, OR PORTABLE) FOR TIMBER WING (TYP.)
2'-0" TOP OF GROUND (CAST-IN-PLACE, PRECAST, OR PORTABLE) FOR STEEL WING,
AND 2'/4" FOR TIMBER WING (TYP.)

CAST-IN-PLACE FOUNDATION FOR 10 FT. THRU 42 FT. ROADWAYS

PRECAST PORTABLE FOUNDATION FOR 10 FT., 12 FT., 14 FT., AND 16 FT. ROADWAYS

CATTLE GUARD M-611-1
Project Development Branch: July 31, 2019

REINFORCING BARS SHALL BE #4, GRADE 60.

WELDED GRILL CROSS SECTIONS

MULTIPLE GRILL UNIT CONNECTION

ELEVATION VIEW
GENERAL NOTES
1. CONCRETE SHALL BE CLASS B. FOUNDATION MAY BE CAST-IN-PLACE OR PRECAST.
2. REINFORCING BARS SHALL BE #4, GRADE 60.
3. ALL TIMBER SHALL BE TREATED IN CONFORMANCE WITH AAHC M 133 AND AWPA C14.
4. WING POSTS MAY BE MADE FROM 6 IN CHAMFERED AND TREATED IN ACCORDANCE WITH TYP.
5. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND PAINTED WITH ALUMINUM PAINT IN ACCORDANCE WITH SECTION 509. ALL HARDWARE SHALL BE GALVANIZED IN CONFORMANCE WITH AASHTO M111 OR PAINTED WITH ZINC-RICH PAINT MEETING MILITARY SPECIFICATION DDD-P-21035.
6. ALL STRUCTURAL STEEL SHALL CONFORM TO AASHTO M 270 (ASTM A 709) GRADE 36.
7. WELDING SHALL CONFORM TO THE AWS STRUCTURAL WELDING CODE.
8. OUTLET PIPES WILL BE REQUIRED AND PAID FOR AS SHOWN IN THE PLANS. A 6 INCH SLEEVE MAY BE USED THROUGH THE CENTRAL SUPPORT TO DRAIN FROM ONE CELL TO THE OTHER TO MINIMIZE THE NUMBER OF OUTLET PIPES.
9. TYPE OF WING (TIMBER OR STEEL) SHALL BE STEEL UNLESS OTHERWISE SHOWN ON THE PLANS.
10. TIMBER EXCAVATION, STRUCTURE BACKFILL, AND SURVEY WORK WILL NOT BE MEASURED AND PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
11. A 4 IN CONCRETE FLOOR SHALL BE PLACED IN THE DEER GUARD AND SHALL BE GRADED TO DRAIN. THIS QUANTITY WILL NOT BE FUNDED SEPARATELY, BUT SHALL BE INCLUDED IN THE WORK.
12. TOOL OR SAWCUT JOINTS WILL BE REQUIRED IN THE 4 IN CONCRETE FLOOR AS DIRECTED. THIS WORK WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THIS WORK.
13. HIGHWAY LOADING DESIGN DATA: HL-93 (DESIGN TRUCK OR TANDEM, AND DESIGN LANE LOAD).
14. ALTERNATIVE DEER GUARDS MAY BE CONSTRUCTED UPON APPROVAL BY THE PROJECT ENGINEER.
**GENERAL NOTES**

1. Rumble strips shall be omitted at turn and auxiliary lanes, road approaches, residencies, 50 ft. before road intersections, and other interruptions as directed by the Engineer.

2. Rumble strips may be installed by grinding, rolling, or forming on concrete pavements, and by grinding only on HMA pavement. Rumble strip width shall be 12 in. for grind-in and 18 in. for formed or rolled.

3. Minimize the distance between rumble strip and edge line on concrete pavements with 14 ft. wide slabs.

4. Begin rumble strips on the outside edge of the travel lane edge line.

5. Do not install rumble strips on shoulders less than 6 ft. wide when guardrail is placed along the edge of the shoulder.

6. Apply the 60 ft. gap pattern when rumble strips (grind-in) are installed in concrete pavement.

**INTERMITTENT RUMBLE STRIP**

Two-Lane Roadway (HMA)

Two-Lane Roadway (Concrete)

**CONTINUOUS RUMBLE STRIP**

Four-Lane Divided Roadway (HMA)

Four-Lane Divided Roadway (Concrete)
NOTES

1. Rumble strip width shall be 12 in. for grind-in, formed, or rolled.

2. Centerline rumble strips may be continuous through passing zones as determined by the engineer and shown on the plans.

TYPICAL SECTIONS A-A AND B-B

FOR GRIND-IN RUMBLE STRIP ON EXISTING ASPHALT OR CONCRETE PAVEMENT

TYPICAL SECTION B-B

FOR FORMED OR ROLLED ON CONCRETE PAVEMENTS ONLY

DETAILS FOR CENTER LINE RUMBLE STRIPS
1. Grooved rumble strip skew or cluster spacing shall be modified to avoid locating a groove on a concrete pavement transverse joint.

2. Permanent travel lane rumble strips shall be the groove design and may be cut in existing, new, or concrete pavement. The grooves may be cut by chiseling, grinding, or other method as approved.

3. Temporary travel lane rumble strips should normally be the raised design, they may be grooved if located in a pavement that will be removed or covered with a pavement course before completion of the project. Typical uses of temporary rumble strips are for lane closures or alignment changes in construction zones.

4. The raised rumble strips shall be placed on a clean, tack coated treated pavement in % in. above the top of the strips. The strips shall be removed and the pavement compacted by rolling along the strips. Edges may be rounded, with a roller and the top edges rounded. Thermoplastic strips shall be applied by the extrusion process, prefabricated plastic shall be installed in accordance with the instructions of the manufacturer.

NOTES

SECTION A-A (GROOVED)

SECTION B-B (RAISED)

SECTION C-C (RAISED)

SECTION D-D (RAISED)

SECTION E-E (RAISED)

SECTION F-F (RAISED)

SECTION G-G (RAISED)

SECTION H-H (RAISED)

SECTION I-I (RAISED)

SECTION J-J (RAISED)

SECTION K-K (RAISED)

SECTION L-L (RAISED)

SECTION M-M (RAISED)

SECTION N-N (RAISED)

SECTION O-O (RAISED)

SECTION P-P (RAISED)

SECTION Q-Q (RAISED)

SECTION R-R (RAISED)

SECTION S-S (RAISED)

SECTION T-T (RAISED)

SECTION U-U (RAISED)

SECTION V-V (RAISED)

SECTION W-W (RAISED)

SECTION X-X (RAISED)

SECTION Y-Y (RAISED)

SECTION Z-Z (RAISED)
GENERAL NOTES
1. Sand shall be mixed with 5% salt by weight.
2. When arrays are placed on structures where the vibrations from moving traffic may cause the modules to shift, steel or formed-in-place HMA half-rings may be placed on the downhill side of the modules to prevent movement. HMA half-rings may be placed through the bottom of the outer container into the roadway to prevent vehicle movement.
3. Offset the array to avoid impact to the rear module from wrong-way vehicles.
4. Arrays shall not be placed on slopes with lateral or horizontal grades of 5% or greater.
5. Curbs and raised islands shall be no more than 4 in. high.
6. Foundation pads shall be flat and made of 6 in. thick concrete or HMA.
7. Intermixing of different brands of modules are acceptable if the modules are FHWA approved, and the array meets the design criteria.
8. Array configuration may vary in layout and sand weight (lbs) provided they conform to manufacturers' details.

WIDE ARRAYS ARE ACTUALLY SEVERAL NARROW ARRAYS PLACED SIDE BY SIDE TO PROVIDE THE REQUIRED WIDTH.
NOTES
1. SAND WEIGHT (LBS) IN MODULES IS DENOTED BY THE NUMBERS IN THE ARRAY DETAILS.
2. ARRAY CONFIGURATION MAY VARY IN LAYOUT AND SAND WEIGHT (LBS) PROVIDED THEY CONFORM TO MANUFACTURER’S DETAILS.
GENERAL NOTES

1. IF THE EMBANKMENT PROTECTOR IS LOCATED IN THE BOTTOM OF A VERTICAL CURVE, FLARE THE CURB ON EACH SIDE OF THE INLET TO ALLOW FOR FLOW FROM BOTH DIRECTIONS.

2. DETAILS OF GUARD RAIL INSTALLATION ARE SHOWN IN STANDARD PLAN M-606-1.

3. THE END SECTION-PIPE END JOINT FOR CORRUGATED METAL PIPE SHALL BE IN ACCORDANCE WITH THE TYPE 2 TYPICAL CONNECTION DETAIL IN STANDARD PLAN M-603-10. THE TYPE 1 OR TYPE 3 TYPICAL CONNECTION ARE NOT ACCEPTABLE. AS AN OPTION, THE END SECTION MAY BE CONNECTED DIRECTLY TO A SECTION OF PIPE. JOINTS BETWEEN THE STUB AND PIPE, OR SECTIONS OF PIPE, SHALL BE IN ACCORDANCE WITH SECTION 603. JOINTS FOR PLASTIC PIPE SHALL PROVIDE A DIRECT CONNECTION SIMILAR TO THE TYPE 3 PLASTIC END SECTIONS ARE NOT ALLOWED. ALL PLASTIC PIPE JOINTS SHALL BE AS RECOMMENDED BY THE PIPE MANUFACTURER AND APPROVED BY THE ENGINEER.

4. PLASTIC PIPE SHALL CONFORM TO AASHTO M-294 TYPE C.

5. DETAILS OF BITUMINOUS CURBING ARE SHOWN IN STANDARD PLAN M-609-1.

6. STRUCTURE BACKFILL MATERIAL SHALL NOT BE USED WITH THE EMBANKMENT PROTECTOR TYPE 3. EMBANKMENT MATERIAL SHALL BE USED WITH CONSTRUCTION REQUIREMENTS IN ACCORDANCE WITH SECTION 203. PAYMENT FOR THIS EMBANKMENT MATERIAL SHALL BE INCLUDED IN THE PAY ITEM FOR EMBANKMENT PROTECTOR TYPE 3.

PAYMENT FOR THE QUANTITIES SHOWN ON THE PLANS FOR THE WORK SHALL BE AS STATED:

- END SECTION-PIPE END JOINT: SEE STANDARD PLAN M-603-10, SHEET 2 OF 2 FOR DIMENSIONS

- TRASH GUARD (WHEN SPECIFIED ON THE PLANS), PIPE CONNECTION, STRUCTURE EXCAVATION, EMBANKMENT MATERIAL AND ANY EXTRA WORK REQUIRED TO MODIFY OTHER PAY ITEMS.

- EMBANKMENT MATERIAL: 506 OR 507 - PAY ITEMS AS SPECIFIED ON THE PLANS.

- CURB, TYPE 4 OR TYPE 6 (SECTION M): LINEAR FT.

- EMBANKMENT PROTECTOR (TYPE 3): EACH

NOTE: PAYMENT INCLUDES THE END SECTION, THE TRASH GUARD (WHEN SPECIFIED ON THE PLANS), PIPE CONNECTION, STRUCTURE EXCAVATION, EMBANKMENT MATERIAL AND ANY EXTRA WORK REQUIRED TO MODIFY OTHER PAY ITEMS.
GENERAL NOTES

1. IF THE EMBANKMENT PROTECTOR IS LOCATED IN THE BOTTOM OF A SAG VERTICAL CURVE, FLARE THE CURB ON EACH SIDE OF THE INLET TO ALLOW FOR FLOW FROM BOTH DIRECTIONS.

2. DETAILS OF CURBING ARE SHOWN IN STANDARD PLAN M-609-1.

3. STRUCTURE BACKFILL MATERIAL SHALL NOT BE USED IN THIS WORK. EMBANKMENT MATERIAL SHALL BE USED WITH CONSTRUCTION REQUIREMENTS IN ACCORDANCE WITH SECTION 203. EMBANKMENT MATERIAL WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE PAY ITEM FOR EMBANKMENT PROTECTOR (TYPE 5).

4. PAYMENT FOR THE QUANTITIES SHOWN ON THE PLANS FOR THIS WORK SHALL BE AS FOLLOWS:

   - 507 - BITUMINOUS SLOPE AND DITCH PAVING (ASPHALT) — — TON
   - 507 - CONCRETE SLOPE AND DITCH PAVING — — — CU. YD.
   - 609 - CURB, TYPE 4 OR TYPE 6 (SECTION M) — — — LINEAR FT.
   - 615 - EMBANKMENT PROTECTOR (TYPE 5) — — — EACH

   NDTE: THIS PAYMENT INCLUDES THE STRUCTURE EXCAVATION, ANY OTHER EARTHWORk, AND ANY EXTRA WORK REQUIRED TO MODIFY OTHER PAY ITEMS.
**Inverted Siphon**

**GENERAL NOTES**
1. Siphon, drain, valve, and valve box, and trash guards are to be provided only when called for on the plans.
2. Concrete shall be up to Class B.
3. All exposed concrete corners shall be chamfered 4% in.
4. The location, size, pipe material and governing dimensions of siphons will be shown on the plans.
5. To determine wall thickness or class for siphon pipe, see appropriate tables in standard plan M-603.
6. Costs of joint sealers, gaskets, fittings and connections shall be included in the bid price for siphon pipe.
7. Trash guards and appurtenances shall be galvanized in conformance with AASHTO M-111.

**PIPE DIAMETER CONCRETE REINFORCED STEEL**

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Concrete</th>
<th>Reinforced Steel</th>
</tr>
</thead>
<tbody>
<tr>
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**HEADWALL DIMENSIONS**

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**HEADWALL QUANTITIES**

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**INVERTED SIPHON**

**STANDARD PLAN NO.**

M-616-1

**Standard Sheet No. 1 of 1**

**Computer File Information**

- **Creation Date:** 07/30/19
- **Designer Initials:** JBK
- **Last Modification Date:** 07/31/19
- **CAD Ver.:** MicroStation V8i
- **Scale:** Not to Scale

**Issued by the Project Development Branch: July 31, 2019**
**GENERAL NOTES**

1. **TELEPHONES:**
   - Two telephones. Two private lines (PABX) with touch tone service (if available) from the local carrier. One line shall be shared with floor plan and equipment layout similar to the drawing on this sheet.
   - It shall meet or exceed the following requirements.

2. **DIMENSIONS:**
   - 26 ft. long x 8 ft. wide outside, 7 ft. - 6 in. height inside.

3. **ENOTES:**
   - Include four boxes equipped with RJ-11 jacks (two wire pairs per box).

4. **A MINIMUM OF 4, WITH PROVISION FOR CROSS VENTILATION AND LOCKING.**

5. **SIEVE SHAKER:**
   - One motor driven Stardard portable shaker including:
     - Two-speed switch. Mounted in the roof or at top of wall near the storage cabinet under the work bench.
     - Adequate fluorescent lighting directly over all workbench and desk areas. There shall be one 110 volt exterior porch light fixture within 2 ft. of each exterior door.
     - Ventilator: one general ventilation with 50 cfm capacity and two-speed switch mounted in the roof. At top of wall near the range. The fan is a 2-speed fan that will be placed near the range.
     - SIEVE SS-12R FROM GILSON OR APPROVED EQUAL. The shaker shall be securely bolted to a rigid and sturdy surface.

6. **FLOOR: STANDARDS**
   - 30 in. kitchen range, electric or gas, having four surface burners and a 3.5 cu. ft. oven with reinforced oven racks.
   - One, single tub, stainless steel, 25 in. x 22 in. x 7 in. in elevation.
   - Labrador equipment with ROLLERS. Two stools for work area with height compatible with workbenches. All chairs shall be ergonomically built.

7. **SINK: STANDARDS**
   - Shall have adjustable leveling feet and a level vial attached.
   - Shall have drainboard with standard hose thread spigots. Drains shall have no trap.

8. **TESTING WATER SUPPLY:**
   - Drinking water shall be provided by the contractor. Use potable water only.

9. **AIR CONDITIONING:**
   - One, 8,300 BTU minimum.

10. **HEATING:**
    - Two, one built-in under the work bench with a revolving floor or rotating power source. Base shall have adjustable leveling feet and a level vial attached.
    - The balance shall be equipped with an ambient reading device and one copy of the owner's manual.

11. **FLOOR LABORATORY CLASS 1**
    - Standard Plan No. M-520-1
    - Sheet No. 1 of 1

12. **TELEPHONE:**
    - Telephone(s). The private lines (PABX) with touch tone service (if available) from the local carrier. One line shall be shared with floor plan and equipment layout similar to the drawing on this sheet.

13. **FLOOR PLAN**
    - The dimensions shall be 26 ft. long x 8 ft. wide outside, 7 ft. - 6 in. height inside.

14. **FLOOR PLAN**
    - Include four boxes equipped with RJ-11 jacks (two wire pairs per box).

15. **A MINIMUM OF 4, WITH PROVISION FOR CROSS VENTILATION AND LOCKING.**

16. **SIEVE SHAKER:**
    - One motor driven Stardard portable shaker including:
      - Two-speed switch. Mounted in the roof or at top of wall near the storage cabinet under the work bench.
      - Adequate fluorescent lighting directly over all workbench and desk areas. There shall be one 110 volt exterior porch light fixture within 2 ft. of each exterior door.
      - Ventilator: one general ventilation with 50 cfm capacity and two-speed switch mounted in the roof. At top of wall near the range. The fan is a 2-speed fan that will be placed near the range.
      - SIEVE SS-12R FROM GILSON OR APPROVED EQUAL. The shaker shall be securely bolted to a rigid and sturdy surface.

17. **FLOOR: STANDARDS**
    - 30 in. kitchen range, electric or gas, having four surface burners and a 3.5 cu. ft. oven with reinforced oven racks.
    - One, single tub, stainless steel, 25 in. x 22 in. x 7 in. in elevation.
    - Labrador equipment with ROLLERS. Two stools for work area with height compatible with workbenches. All chairs shall be ergonomically built.

18. **SINK: STANDARDS**
    - Shall have adjustable leveling feet and a level vial attached.
    - Shall have drainboard with standard hose thread spigots. Drains shall have no trap.

19. **TESTING WATER SUPPLY:**
    - Drinking water shall be provided by the contractor. Use potable water only.

20. **AIR CONDITIONING:**
    - One, 8,300 BTU minimum.

21. **HEATING:**
    - Two, one built-in under the work bench with a revolving floor or rotating power source. Base shall have adjustable leveling feet and a level vial attached.
    - The balance shall be equipped with an ambient reading device and one copy of the owner's manual.

22. **FLOOR PLAN**
    - The dimensions shall be 26 ft. long x 8 ft. wide outside, 7 ft. - 6 in. height inside.

23. **FLOOR PLAN**
    - Include four boxes equipped with RJ-11 jacks (two wire pairs per box).

24. **A MINIMUM OF 4, WITH PROVISION FOR CROSS VENTILATION AND LOCKING.**

25. **SIEVE SHAKER:**
    - One motor driven Stardard portable shaker including:
      - Two-speed switch. Mounted in the roof or at top of wall near the storage cabinet under the work bench.
      - Adequate fluorescent lighting directly over all workbench and desk areas. There shall be one 110 volt exterior porch light fixture within 2 ft. of each exterior door.
      - Ventilator: one general ventilation with 50 cfm capacity and two-speed switch mounted in the roof. At top of wall near the range. The fan is a 2-speed fan that will be placed near the range.
      - SIEVE SS-12R FROM GILSON OR APPROVED EQUAL. The shaker shall be securely bolted to a rigid and sturdy surface.

26. **FLOOR: STANDARDS**
    - 30 in. kitchen range, electric or gas, having four surface burners and a 3.5 cu. ft. oven with reinforced oven racks.
    - One, single tub, stainless steel, 25 in. x 22 in. x 7 in. in elevation.
    - Labrador equipment with ROLLERS. Two stools for work area with height compatible with workbenches. All chairs shall be ergonomically built.

27. **SINK: STANDARDS**
    - Shall have adjustable leveling feet and a level vial attached.
    - Shall have drainboard with standard hose thread spigots. Drains shall have no trap.

28. **TESTING WATER SUPPLY:**
    - Drinking water shall be provided by the contractor. Use potable water only.
GENERAL NOTES

I. EQUIPMENT LAYOUT SIMILAR TO THE DRAWING ON THIS SHEET. IT SHALL MEET OR EXCEED THE

COLD WATER FAUCET

THE SHAKER SHALL BE CAPABLE OF SHAKING A FULL SET OF 8 IN. SIEVES AS

II. DIMENSIONS:

DOORS:

CL:

TWO, EQUIPPED WITH DEADBOLT LOCKS, 36 IN. x 80 IN., INSULATED STEEL WITH SMALL CLEAR

HANDLE MOUNTED ABOVE PUSH BAR. EACH DOOR SHALL HAVE A SET OF STEPS WITH DECK, AND

TO A RIGID, STURDY SURFACE.

WORK

D:

SIDE OR FROM THE FRONT. THE DECK, RAINDS, AND STEPS SHALL MEET OSHA REQUIREMENTS.

III. WORKING SURFACE DIMENSION:

MINIMUM OF 9 IN. WIDE BY 12 IN. DEEP.

IV. ELECTRICAL BALANCE:

TWO, 8,300 BTU MINIMUM.

V. ELECTRICAL OR MECHANICAL TYPE.

VI. HEATING:

FURNACE, 55,000 BTU, FORCED AIR TYPE.

VII. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

VIII. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

IX. HEATING:

FURNACE, 55,000 BTU, FORCED AIR TYPE.

X. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XI. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

XII. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XIII. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

XIV. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XV. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

XVI. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XVII. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

XVIII. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XIX. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

XX. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XXI. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.

XXII. WEIGHING SURFACE:

MINIMUM 3 FT. LONG POWER CORD.

XXIII. RECORDING THERMOMETER FOR CURING TANKS SHALL BE EITHER

ELECTRONIC OR MECHANICAL TYPE.
GENERAL NOTES (CONTINUED FROM SHEET 1)

27. FORCED AIR CONVECTION OVEN REQUIRED ON PROJECTS WITH 5,000 OR MORE TONS OF HMA OR WHEN SPECIFIED IN THE PLANS.
   THE FORCED AIR OVEN REPLACES THE RANGE. THE OVEN SHALL BE RATED TO AT LEAST 2000 WATTS INCLUDING:
   1. AT LEAST ONE BLOWER TO CIRCULATE AIR INSIDE WITHOUT DISTURBING FINE GRAINED SOILS PLACED IN THE OVEN .
   2. A MINIMUM ENTER CAPACITY OF 4.8 CUBIC FEET .
   3. AN ELECTRIC CIRCUIT ADAPTER TO CONNECT TO A 2 INCH PIPE WHICH SHALL BE VENTED TO THE OUTSIDE.
   4. AT LEAST TWO ADJUSTABLE SHELVES.
   5. AN OVER-TEMPERATURE PROTECTION DEVICE.
   6. AN ELECTRONIC CONTROL SYSTEM WITH DIGITAL TEMPERATURE READ-OUT AND DIGITAL TEMPERATURE SET POINTS.
   THE OVEN SHALL HAVE A TEMPERATURE RANGE FROM 104 °F TO 464 °F WITH A UNIFORM TEMPERATURE OF ± 3 °F AT 230 °F.
   THE OVEN SHALL BE CAPABLE OF MAINTAINING ± 5 °F THROUGHOUT ITS TEMPERATURE RANGE.
   THE OVEN HEATING ELEMENTS SHALL NOT BE ALLOWED TO OPERATE WITHOUT THE BLOWER.
   IN ADDITION TO THE ABOVE FORCED AIR CONVECTION OVEN, A HOT PLATE CONFORMING TO THE FOLLOWING SHALL BE PROVIDED:
   1. TWO BURNER PORTABLE ELECTRICAL "CAL-ROD" OR "RANGETTE" TYPE.
   2. AT LEAST ONE BURNER RATED A MINIMUM OF 800 WATTS.
   3. EACH HOT PLATE SHALL BE EQUIPPED WITH AN ON-OFF INDICATOR LIGHT.

28. CURING TANK: MINIMUM 95 GALLON CAPACITY WITH A CIRCULATING PUMP WITH A 120 GPM RATING. TANK CAPACITY WILL INCREASE FOR LARGE CONCRETE PROJECTS WHEN SPECIFIED IN THE PLANS.
**GENERAL NOTES**

1. CLASS 1 FIELD OFFICES SHALL CONSIST OF A WEATHERPROOF, INSULATED, TEMPERARY OFFICE TYPE TRAILER, CONSTRUCTED TO THE UNIFORM BUILDING CODE SERIES, WITH FLOOR PLAN AND EQUIPMENT LAYOUT SHOWN ON THIS SHEET.

2. DIMENSIONS: 26 FT. LONG x 8 FT. WIDE OUTSIDE, 7 FT. 6 IN. HEIGHT INSIDE.

3. WINDOWS: A MINIMUM OF 4, WITH PROVISION FOR CROSS VENTILATION AND LOCKING.

4. OUTSIDE DOORS: TWO, REINFORCED WITH DEADBOLT LOCKS, TO BE ABLE TO ACCESSED EITHER FROM THE SIDE OR FROM THE FRONT. HINGE HANDRAILS AT EACH DOOR. THE STEPS, DECKS AND HANDRAILS SHALL MEET OSHA REQUIREMENTS.

5. HEATING: A THERMOSTAT CONTROLLED FORCED AIR UNIT WITH A MINIMUM INPUT CAPACITY OF 200 BTU PER SQUARE FT. OF FLOOR AREA.

6. AIR CONDITIONING: ONE, 8,300 BTU MINIMUM.

7. ELECTRICAL: WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE FOR 110/220 VOLTS, 60 Hz, APPLICATIONS AND PROVIDE RELIABLE OUTLET POWER TO PROPERLY OPERATE ALL FIELD OFFICE EQUIPMENT.

8. LIGHTING: ADEQUATE FLUORESCENT LIGHTING OVER ALL DRAFTING TABLES AND DESK AREAS. THERE SHALL BE ONE 110 VOLT EXTERIOR PORCH LIGHT FIXTURE BETWEEN 2 FT. EACH EXTERIOR DOOR.

9. DECK AND STEPS WITH MINIMUM TREADS 8" MIN. TREADS.

10. DRAFTING TABLES: ONE 26 IN. x 72 IN. HINGED BOARD WITH DOUBLE STORAGE BELOW "EASE BOARD" FROM 30 IN. HEIGHT AT FRONT EDGE.

11. FURNITURE: FOUR CHAIRS WITH ROLLERS AND TWO DRAFTING STOOLS. EACH OF APPROPRIATE HEIGHT. ALL CHAIRS SHALL BE ERGONOMICALLY BUILT.

12. PLAN STORAGE: A PLAN RACK OR FILE FOR FULL SIZE PLANS.

13. CLOSETS: A LOCKED STORAGE AREA OF 15 SQ. FT.

14. DRINKING WATER SUPPLY (COOLING WATER) SHALL BE DISTRIBUTED FROM AN ACCEPTABLE WATER COOLING DEVICE.

15. TELEPHONES: TWO TELEPHONES, TWO PRIVATE LINES, TWO PUBLIC LINES. ONE OF EACH OF THE TELEPHONES, SERVICE OF WHICH IS TO BE AVAILABLE FROM THE LOCAL OFFICE.

16. FIRE EXTINGUISHER: ONE, 10 LBS., CLASS ABC, UNDERWRITERS LABORATORIES, INC. APPROVED.

17. SECURITY: THIS SYMBOL -++- ON THE FLOOR PLAN DENOTES AREAS ON THE TRAILER WHERE ADEQUATE PROTECTION AGAINST ILLEGAL ENTRY, VANDALISM AND THEFT SHALL BE PROVIDED.
GENERAL NOTES

1. CLIMBED FIELD OFFICE: SMALL CONDOMINUM OF A TYPICAL IN-TRANSPORTU.
   TRAFFIC COMPLEX. THE TRAILER IS LOCATED AT THE END OF THE BUILDING AND IS
   DESIGNATED FOR ALL DRAFTING TABLES AND OFFICE AREAS. THERE SHALL BE ONE
   EXTERIOR FIXTURE WITHIN 2 FT. OF EACH EXTERIOR DOOR.

2. DIMENSIONS: 50 FT. LONG X 12 FT. WIDE OUTSIDE, 7 FT.-6 IN. HEIGHT INSIDE.

3. WINDOWS: A MINIMUM OF 6, WITH PROVISION FOR CROSS VENTILATION AND LOCKING.

4. DOORS: TWO INSIDE DOORS MAY BE LOCATED EITHER TO ONE SIDE OR AT CENTER
   OF PARTITION. ONE CLOSET DOOR. TWO DOORS SHALL BE REINFORCED AND HAVE DEADBOLT LOCKS.

5. HEATING & AIR CONDITIONING: THREE TON CAPACITY AIR CONDITIONING AND 80,000 BTU
   CAPACITY HEATING, CONNECTED TO EXISTING & THERMOSTAT CONTROLLED.

6. ELECTRICAL: WORK SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE FOR
   2002. ALL APPLICATIONS ARE TO BE PROVIDED IN ALL FIELD OFFICE EQUIPMENT.

7. LIGHTING: THE FLUORESCENT LIGHTING OVERALL DRAFTING TABLES AND
   DESKS SHALL MEET OR EXCEED THE FOLLOWING REQUIREMENTS.

8. DRINKING WATER: THIS SYMBOLOF THE FLOOR PLAN DENOTES AREAS ON THE
   TRAILER WHERE ADEQUATE PROTECTION AGAINST ILLEGAL ENTRY, VANDALISM AND
   THEFT SHALL BE PROVIDED.

9. TELEPHONES: THREE, 2-LINE TELEPHONES. FOUR PRIVATE LINES (I/FB) WITH
   ROLL-OVER CAPABILITY FOR THE THREE TELEPHONES. ONE LINE SHALL BE
   FOR A TWO-LINE TELEPHONE, A COMPUTER LINE, AND A FACSIMILE
   MACHINE, AND ONE LINE SHALL BE FOR THE FACSIMILE
   MACHINE. THREE TELEPHONES, ONE LINE SHALL BE
   FOR THE FACSIMILE

10. SECURITY: TWO, 2-LINE TELEPHONES. FOUR PRIVATE LINES (I/FB) WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    ONE LINE FOR A TWO-LINE TELEPHONE, A COMPUTER LINE, AND A FACSIMILE
    MACHINE. ONE LINE SHALL BE

11. WORK TABLE: ONE 72 IN. X 36 IN. DESK WITH SIX DRAWERS AND ONE CENTER
    PEN DRAWER. THE TOP OF THE DESK SHALL BE FREE OF ALL SCRATCHES,
    CHIPS, AND DENTS.

12. OFFICE DESK: ONE 72 IN. X 36 IN. TABLE. THE TOP OF THE TABLE SHALL BE
    FREE OF ALL SCRATCHES, CHIPS, AND DENTS.

13. PLAN STORAGE: A PLAN RACK OR FILE FOR FULL SIZE PLANS.

14. CLOSET: A LOCKED STORAGE AREA OF 35 SQ FT.

15. DRINKING WATER SUPPLY: DRINKING WATER OBTAINED FROM AN ACCEPTABLE
    WATER COOLING DEVICE.

16. TELEPHONE: THREE, 2-LINE TELEPHONES. FOUR PRIVATE LINES (I/FB) WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    ROLL-OVER CAPABILITY FOR THE THREE TELEPHONES. ONE LINE SHALL BE
    FOR A TWO-LINE TELEPHONE, A COMPUTER LINE, AND A FACSIMILE
    MACHINE. THREE TELEPHONES, ONE LINE SHALL BE

17. FIRE ExTINGUISHER: TWO, 2-LINE TELEPHONES. FOUR PRIVATE LINES (I/FB) WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    ROLL-OVER CAPABILITY FOR THE THREE TELEPHONES. ONE LINE SHALL BE
    FOR A TWO-LINE TELEPHONE, A COMPUTER LINE, AND A FACSIMILE
    MACHINE. THREE TELEPHONES, ONE LINE SHALL BE

18. SECURITY: TWO, 2-LINE TELEPHONES. FOUR PRIVATE LINES (I/FB) WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    TOUCH TONE SERVICE. TWO LINES ARE FOR TELEPHONE SERVICES, WITH
    ROLL-OVER CAPABILITY FOR THE THREE TELEPHONES. ONE LINE SHALL BE
    FOR A TWO-LINE TELEPHONE, A COMPUTER LINE, AND A FACSIMILE
    MACHINE. THREE TELEPHONES, ONE LINE SHALL BE

FIELD OFFICE
CLASS 2
STANDARD PLAN NO.
M-620-12
STANDARD PLAN NO.
M-620-12
STANDARD PLAN NO.
M-620-12
ALL MONUMENTATION MATERIALS WILL BE FURNISHED BY CDOT

MONUMENT SHELL INSTALLATION:

- This monument shall be used for row or reference monuments or may be used for an aliquot corner monument. When used as an aliquot corner monument, installation and record filling requirements shall be as stated for Type 1 and Type 1A monuments. Monuments shall be installed by attaching the proper size tip to one end of a section of finned rod, and a 3 in. long x 0.5 in. stainless steel shank shall be used. The rod shall be embedded in the rock or in concrete at least 6 in. and grouted in place. The rod may be shortened to accommodate the conditions.

- Vertical and horizontal binding is required.

- When unstable soil conditions are encountered, additional sections of rod shall be added to achieve stability.

- Note: A blank cap may be substituted if the appropriate cap shown above is not available.

- Type 1A monument includes a monument box. A locking cast iron access cover shall be installed when the monument is located in the roadway pavement.

- Type 2A monument includes a monument box. A locking cast iron access cover shall be installed when the monument is located in the roadway pavement.

- Type 4A monument shall be used for permanent easements, project bench marks, project points, and references. An aluminum cap with a minimum diameter of 1.8 in. shall be used with Type 4A. The cap shall be marked with the year of installation and the surveyor's registration number. Type 4A monuments are used with aluminum rod and shall be installed in a concrete or rock setting. The cap shall be marked with the year of installation and the surveyor's registration number.