GENERAL NOTES FOR EROSION AND SEDIMENT CONTROL

1. USE THE EROSION AND SEDIMENT CONTROL STANDARD DRAWINGS IN CONJUNCTION WITH THE JTD BEST MANAGEMENT PRACTICES MANUAL.

2. THE PLACEMENT OF EROSION CONTROL MEASURES IS SITE SPECIFIC. DRAW THE KNOWLEDGE APPROVAL OF THE EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO INSTALLATION.

3. EROSION AND SEDIMENT CONTROL MEASURES PLACEMENT AND INSTALLATION MAY BE CONTROLLED BY THE INDES, PERMIT OR CONTRACT SPECIFICATIONS.

4. DRAWING NOT TO SCALE.

REVISIONS

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<th>BY</th>
<th>NO</th>
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SHEET 1 OF 1

IDAHOTRANSPORTATION
DEPARTMENT

BOISE, IDAHO

STANDARD DRAWING
EROSION AND
SEDIMENT CONTROL
EXAMPLE APPLICATIONS

STANDARD DRAWING
212-1

ORIGINAL ISSUED BY KEVIN KIBLALI,
DESIGN/TRAFFIC SERVICES ENGINEER

13663
PASSENGER ISOLE.
STATE OF IDAHO
SLOPE DRAIN (LINER) TO BE USED WITH 4:1 SLOPE ON FLATTER

FLOW

TOP OF FILL SLOPE

SECTION A-A

SEAL SPLILLWAY AREA WITH BERMS

LINES WITH ROCK PROTECTED SLOPE

FLOW

SECTION B-B

SLOPE DRAIN (PIPE)

FLOW

TOP OF FILL SLOPE

SECTION C-C

SEAL SPLILLWAY AREA WITH BERMS

LINES WITH ROCK PROTECTED SLOPE

FLOW

SECTION B-B

NOTES

1. SEE THE GENERAL NOTES FOR TEMPORARY EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. PLACE SLOPE DRAINS ON UNDISTURBED SOIL OR WELL COMPACTED FILL AND LOCATE AS SHOWN ON THE PLANS.
3. DETERMINE SLOPE DRAIN SIZE AND NUMBER BY DESIGN STORM EVENT.
4. INSTALL GALVANIZED STEEL APRONS AS SHOWN ON STANDARD DRAWING 608-1.
5. INSTALL GALVANIZED STEEL APRONS AS SHOWN ON STANDARD DRAWING 706-6.
6. TIPS AND BAR AS SHOWN ON STANDARD DRAWING 706-6.
7. CHECK SLOPE DRAINS PERIODICALLY FOR DAMAGE OR DEBRIS. PLACE ANCHORS AS NEEDED TO SECURE THE SLOPE DRAIN.
8. LINERS MAY CONSIST OF PLASTIC SHEETING, EROSION CONTROL GEOTEXTILES, OR APPROVED TURF REINFORCED NAR (TRM).
9. EXTEND LINER AT LEAST 3.5' IN FRONT OF DRAIN INLET.
10. AMENDMENT AT LESS THAN 1 PERCENT SLOPE. ENSURE DISCHARGE IS AT A NON-EROSIVE VELOCITY.
11. NOT TO SCALE.
NOTES

1. SEE THE GENERAL NOTES FOR TEMPORARY EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. DETERMINE SEDIMENT TRAP SIZE ON A 2-YEAR 24-HOUR STORM DESIGN OR 3,600 CCF/ACRE. THE MAXIMUM DRAINAGE AREA PER SEDIMENT TRAP IS 5 ACRES.
3. LOCATE SEDIMENT TRAP OUTSIDE OF THE SLOPE STAKE LIMITS AND CONSTRUCT PRIOR TO THE START OF EXCAVATION OR REMOVAL OF EXISTING VEGETATION.
4. ENSURE THAT RIPRAP MATERIAL IS IN ACCORDANCE WITH 710.04 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
5. PROVIDE TYPE II RIPRAP/EROSION CONTROL GEOTEXTILE IN ACCORDANCE WITH SUBSECTION 718.06 OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
6. ENTIRE TRAP MAY BE ROCK LINED IF NECESSARY.
7. NOT TO SCALE.

SECTION A-A

FLAT BOTTOM - 0%
### Rolling Dip

**Rolling Dip Dimension Table**

<table>
<thead>
<tr>
<th>Road Slope</th>
<th>Dip</th>
<th>Interception Ditch</th>
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</thead>
<tbody>
<tr>
<td>0% to 4%</td>
<td>3:1</td>
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</tr>
<tr>
<td>4% to 6%</td>
<td>2:1</td>
<td></td>
</tr>
<tr>
<td>6% to 8%</td>
<td>1:1</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. See the general notes for temporary erosion control standard drawings 212-1.
2. Construct diversion channels, ditches, swales, dikes, berms, waterbars, and rolling dips to the dimensions shown on the plans. Use a plastic liner when runoff is not intended to infiltrate into the soil.
3. When using a diversion channel, construct a temporary dam to divert water into the channel. A temporary downstream dam is optional and may be used to prevent water from returning to the upstream work area.
4. Use diversion ditches with clear water. Use a diversion channel when the flow exceeds 0.25 cubic feet per second.
5. Install a plastic liner along the length and width of diversion channels and ditches. Overlap the plastic liner edges 2 feet. Secure the plastic liner edges with berms, rocks, or other suitable materials.
6. The recommended maximum drainage area for grassed swales is 1 acre. The recommended maximum drainage area contributing runoff to a dike, swale, or combination thereof should not exceed 5 acres.
7. Use dikes when berms are not sufficient to control runoff. Compact dikes to 90 percent of standard density.
8. Divert collected runoff, intercepted runoff or both from a dike, dike, or combination thereof to a sediment control device or stabilized area.
9. Ensure that the side slopes of a dike or swale within the clear zone are 6:1 or flatter unless otherwise specified.
10. Drawing not to scale.
In-Line with Highway

Perpendicular to Highway

Stabilized Construction Entrance

Vehicle and Equipment Washdown

Slope Protection (Typ)

Seal Upper Pipe End and Dam with Concrete at Both Sides of Trench

Perforated Pipe

Drain Rock

Plastic Liner

Concrete Dams

Section B-B

NOTES

1. See the General Notes for Erosion Control Standard Drawings on 22-1.
2. Drawing not to scale.

Original Issued by Kevin Stablan
Design/Traffic Services Engineer

Boise, Idaho

Temporary Erosion and Sediment Control
Stabilized Construction Entrance
and Vehicle Washdown

Requires Std. Dwg. 212-2
FRAMED WIRE/FABRIC FILTER

FIBER WATTLE FILTER

PRE-MANUFACTURED SEDIMENT FILTER FOR INLET GRATE

NOTES
1. SEE THE GENERAL NOTES FOR EROSION CONTROL STANDARD DRAWINGS ON 212-1.
2. REMOVE TRASH, DEBRIS, DIRT, AND MATERIALS THAT MAY INTERFERE WITH THE INLET OR CATCH BASIN PROTECTION FUNCTION PRIOR TO PLACEMENT AND DAILY THEREAFTER (OR AS NEEDED).
3. ADJUST TO ENSURE EFFECTIVENESS.
4. FRAMED WIRE/FABRIC FILTER AND FIBER WATTLE FILTERS ARE INTENDED TO BE USED ON STRUCTURES NOT PREVIOUSLY SURROUNDED BY PAVEMENT.
5. ENSURE WATER DISCHARGING FROM THE INLET MEETS APPLICABLE WATER QUALITY STANDARDS.
6. USE IN CONJUNCTION WITH OTHER INLET PROTECTION DEVICES, NOT AS THE SOLE IMPER ON SECTION 50-6 IN THE BMP MANUAL.
7. DRAWING NOT TO SCALE.
GABION OUTLET WEIR

1. Use permanent erosion control devices standard drawings in conjunction with the standard specifications for highway construction and the ITD best management practices manual.
2. See plans for site dimensions.
3. The placement of permanent erosion control measures is site specific. Obtain the engineer's approval of the permanent erosion control measures prior to installation.
4. Permanent erosion control devices are intended to last more than 6 months and should be integrated into the final erosion control plan.

GABION OUTLET WEIR

NOTES

1. Obtain appropriate permits before erosion devices are placed in streams and channels, or both.
2. Gabions and revet mattresses may be used for permanent erosion control, temporary erosion control, or both.
3. The discharge through or over revet mattresses, gabions, or both should be directed onto stabilized area such as vegetation, riprap, or both.
4. Gabions and revet mattresses should be embedded a minimum of 4" into the existing ground.
5. All sack gabions should be secured with 6' x 3/4" metal stakes or 6' steel posts.
6. Ensure that the width of the gabion outlet weir is constructed as shown on the plans or as directed by the engineer.
7. Gabions may be used with revet mattresses to form sediment control dams and should be installed so that the channel capacity is not restricted shall the device totally fill-up. Revet mattresses may be used as a channel liner to prevent erosion and to intercept sediment laden runoff.
8. 6' revet mattresses will usually promote vegetation for side slopes that are not continually submerged in water. 9' revet mattresses may be used to line large channels or streams with greater flow rates or in soils that erode easily. 12' revet mattresses may be used to line large streams and rivers.
9. Secure revet mattresses used for slope revetment with metal posts or stakes to prevent sliding or shifting.
10. Not to scale.
NOTES

1. USE THIS DRAWING IN CONJUNCTION WITH THE ITD BEST MANAGEMENT PRACTICES (BMP) MANUAL.

2. ENSURE THAT THE PETROLEUM STORAGE AREAS LAST FOR THE DURATION OF THE PROJECT.

3. PROVIDE A TYPE 1 OR TYPE 2 PETROLEUM STORAGE AREA WITH AN IMPERMABLE PETROLEUM RESISTANT MEMBRANE IF PETROLEUM PRODUCTS ARE STORED ON SITE.

4. ENSURE THAT THE TOTAL VOLUME OF THE BERMED AREA IS 110 PERCENT OF THE TOTAL CAPACITY OF THE STORAGE CONTAINER(S) INSIDE THE BERM.

5. NOTIFY THE ENGINEER AND THE HAZARDOUS MATERIALS COORDINATOR OF SOIL CONTAMINATION RESULTING FROM PETROLEUM SPILLAGE. REMOVAL PROCEDURE REQUIRES ENGINEER AND HAZARDOUS MATERIALS COORDINATOR APPROVAL.

6. ENSURE THAT RUNOFF AT THE EQUIPMENT STAGING AREA ENHANCED IS RETAINED IN THE STAGING AREA.

7. REMOVE UNCONTAMINATED STORM WATER FROM INSIDE THE STORAGE AREA. TREAT CONTAMINATED STORMWATER AS A HAZARDOUS WASTE AND HAVE IT REMOVED BY A CERTIFIED HAZARDOUS WASTE CONTRACTOR.

8. STORE INCOMPATIBLE MATERIALS IN SEPARATE STORAGE AREAS.

9. STORE MATERIALS IN THEIR ORIGINAL PACKAGING AND ON PALLETS, IF PRACTICAL.

10. NOT TO SCALE.

PETROLEUM STORAGE AREA - TYPE 1

PETROLEUM STORAGE AREA - TYPE 2
NOTES

1. USE THIS DRAWING IN CONJUNCTION WITH THE ITD BEST MANAGEMENT PRACTICES (BMP) MANUAL.

2. ACTUAL LAYOUT DETERMINED IN THE FIELD.

3. INSTALL THE CONCRETE WASHOUT SIGN WITHIN 30 FEET OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

4. USE OF PREFABRICATED TEMPORARY WASHOUT MAY ONLY BE USED ON APPROVAL BY THE ENGINEER.

5. NOT TO SCALE.
THE MAXIMUM TIE BAR SPACING IN TRANSVERSE JOINTS SHALL BE 12 INCHES.

THE MAXIMUM TIE BAR SPACING IN OTHER JOINTS SHALL BE 18 INCHES.

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THE MAXIMUM TIE BAR SPACING IN TRANSVERSE JOINTS SHALL BE 12 INCHES.

THE MAXIMUM TIE BAR SPACING IN OTHER JOINTS SHALL BE 18 INCHES.
NOTES:
1. T - THICKNESS OF CONCRETE PAVEMENT (i.e. DEPTH)
2. L - PANEL LENGTH (JOINT SPACING)
3. Ti - T = 1.5" / L
4. FOR RECOMMENDED DOWEL SIZES, SEE JOINT TYPES SHEET.

ELEVATION - IMPACT SLAB, HIGHWAYS/STREETS/ROADS
FOR TRANSVERSE JOINTS ADJOINING ASPHALT PAVEMENT IN RECONSTRUCTION OR NEW CONSTRUCTION PROJECTS WHERE T/T IN.

DISTANCE - ANCHOR FOR END OF CONCRETE
15'-0"
13'-0"
PORAHD CEMENT CONCRETE
2'-0"
RIGHT ANGLES TO TRANSVERSE JOINT AT CONCRETE PAVEMENT END OF NORMAL CONSTRUCTION JOINT
PERMISSIBLE ASPHALT JOINT DETAIL
SEE CONCRETE TO ASPHALT PAVEMENT EXCAVATED FOR ANCHOR CONSTRUCTED, THEN ROADWAY BASE IS TO BE 2'-0" 1.5 IN.
SUBBASE 2 IN.
CONCRETE T1 = (T + 1.5") / 2
AC SURFACE BASE
DOWEL BAR
1.5 FT. MIN.
OPTIONAL
ELEVATION - IMPACT SLAB, HIGHWAYS/STREETS/ROADS
ASPHALT & CONCRETE PAVEMENT JOINT DETAIL
NOT FOR USE UNLESS SPECIFICALLY CALLED OUT IN PLANS.

NOTES:
1. THE PAVEMENT EDGE IS TO BE PLACED APPROXIMATELY VERTICAL.
2. THE DOWEL BAR DIAMETERS SHALL BE DETERMINED BY THE BAR DIAMETER TABLE.
4. THE MAXIMUM TIED TRANSVERSE WIDTH SHALL BE 60 FEET. CONDITIONAL JOINTS THAT ARE UN-TIED IN ACCORDANCE WITH THE FOREGOING SHALL BE APPROVED BY THE ENGINEER IN NO CASE SHALL AN UN-TIED JOINT BE A CONSTRUCTION JOINT.
5. A CONSTRUCTION JOINT SHALL BE AT LEAST 6 FEET FROM A SAWED JOINT.
6. TRANSVERSE AND LONGITUDINAL JOINTS SHALL BE SAWED JOINTS.
7. SEALANTS AND PREFORMED SEALS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
8. THE ANCHOR IS TO BE USED AT RAILROAD GRADE CROSSINGS ADJACENT TO FLEXIBLE PAVEMENTS AND SIMILAR INTERRUPTIONS TO THE CONCRETE PAVEMENT.
9. MAKE A VERTICAL SAW CUT IN THE ASPHALT TO SERVE AS A FORM FOR THE END OF THE CONCRETE PAVEMENT.
10. PREFERRED PRACTICE IS TO PLACE THE CONSTRUCTION JOINT AT THE LOCATION OF A PLANNED CONTRACTION JOINT AND USE DOWEL BARS PER STD. TRANSVERSE JOINT DETAILS.
11. NOT TO SCALE
12. ALL LONGITUDINAL CONCRETE TO ASPHALT JOINTS SHALL BE SAWED AND SEALED.
NOTES:
1. FOR HOT-POURED SEALANT, SHAPE FACTOR D/W = 1 (TYPICAL, ONLY IF BACKER ROD USED)
2. FOR SILICONE SEALANT, D/W = 0.5 (TYPICAL)
3. FOR TWO-COMPONENT COLD-POURED SEALANT, D/W = 0.5 (TYPICAL)
4. FOR PREFORMED COMPRESSION SEAL, W IS SIZED FOR SLAB & CLIMATE
5. SUBSECTION REFERENCES ARE TO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
6. DILATANTS AND PREFORMED SEALS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
7. SAW CUT TO CONTROL SLAB CRACKING SHALL BE T/3 (FIELD-INSTALLED SEALANT) OR T/3 DEPT. EQUALS DESIGN THICKNESS OF CONC. PAVEMENT.

CROSS-SECTIONS:

SUB-NOTES
- DIMENSIONING REFERS TO SEALANT RESERVOIR ONLY.

SEALANT SHAPE FACTOR = SHAPE FACTOR = WIDTH OF SEALANT / DEPTH OF SEALANT
When ramp edge is within 2' of mainline edge, run edge parallel to mainline and carry edge widening 2' wide for 105' (7 panels @ 15').

When ramp edge is within 2' of mainline edge, run edge parallel to mainline and carry edge widening 2' wide for 30' (2 panels @ 15').

TYPICAL ON-RAMP GORE AREA DETAIL

TYPICAL OFF-RAMP GORE AREA DETAIL
EXAMPLE JOINTING PLAN (MULTIPLE LANES)

LEGEND
T = TIED LONGITUDINAL JOINT (NO. 5 REBAR)
D = DOWELED LONGITUDINAL JOINT (SAME DOWEL DIMENSIONS AS TRANSVERSE JOINTS)

NOTES
1. SEE STANDARD DRAWING 409-1 FOR JOINT DETAILS, APPLICABLE NOTES, JOINT LOCATIONS, BAR AND DOWEL DETAILS.
2. SUPPLY SHOP DRAWINGS FOR ENGINEER APPROVAL PRIOR TO THE PLACEMENT OF CONCRETE FOR EACH RAMP CORE AREA.
3. PLACE THE FULL WIDTH OF MAIN LINE ROADWAY CONCRETE PRIOR TO PLACING THE GORE AND RAMP CONCRETE.
4. TERMINATE LONGITUDINAL JOINTS THAT ARE PARALLEL TO THE RAMP CENTERLINE AT A TRANSVERSE JOINT. ENSURE THAT THE DISTANCE ALONG THE TRANSVERSE JOINT BETWEEN THE EDGE OF THE MAIN LINE PAVING AND THE LONGITUDINAL JOINT IS AT LEAST TWO FEET.
5. BEGIN AND END THE EDGE WIDENING AT A JOINT.
6. CONNECT THE NARROW PORTION OF THE RAMP TO THE MAIN ROADWAY WITH THE BARS ALONG THE LONGITUDINAL JOINT TO THE LAST TRANSVERSE JOINT WHICH IS LESS THAN 60 FEET RIDE, THEN USE DOWEL BARS THROUGH THE REMAINDER OF THE JOINT.
7. LONGITUDINAL CONSTRUCTION JOINT BETWEEN EXISTING AND PROPOSED PAVEMENT.
8. MATCH TRANSVERSE JOINTS WITH THE SPACING OF THE TRANSVERSE JOINTS IN THE ADJACENT EXISTING PAVEMENT.
9. TIE CONSTRUCTION JOINTS.
10. LIMIT TIED TRANSVERSE WIDTH TO 60'.
11. DIMENSIONS ARE FOR ILLUSTRATION PURPOSES ONLY.
12. DRAWINGS NOT TO SCALE.
NORMAL TRANSVERSE JOINT SPACING IS 12' UNLESS OTHERWISE NOTED ON PROJECT. MAXIMUM TRANSVERSE JOINT SPACING IS 15'. THE MINIMUM TRANSVERSE JOINT SPACING IS 6'. ALL TRANSVERSE JOINTS MUST CONNECT ACROSS THE PAVEMENT. NORMAL LONGITUDINAL JOINT SPACING IS 2' & THE MAXIMUM IS 12'. THE LONGITUDINAL JOINTS SHALL BE CONNECTED WITH THE LINE LINES. THE MAXIMUM TIED WIDTH IS 2'. ALL CONSTRUCTION JOINTS SHALL BE TIED. PAVEMENT WIDER THAN 60' SHALL HAVE DOCKED LONGITUDINAL JOINT.

NOTES
1. THE TYPICAL PAVEMENT JOINT PATTERN SHOWN IS FOR ILLUSTRATION PURPOSES ONLY AND IS INTENDED TO BE USED AS A GUIDE IN DEVELOPING THE JOINT PATTERN FOR THE PROJECT. THE CONTRACTOR SHALL PREPARE A PAVEMENT JOINT PATTERN FOR THE ENTIRE PROJECT FOR APPROVAL BY THE ENGINEER.

2. WHEN POSSIBLE, MANHOLE SHALL BE CENTERED BETWEEN JOINTS. JOINT SPACING MAY BE ADJUSTED NEAR MANHOLES WITHIN THE STANDARD LIMITS. SEE STANDARD DRAWING 411-2.

3. IF THE CONTRACTOR ELECTS TO BOX OUT AROUND THE MANHOLE OR CATCH BASIN FRAMES AND PLACE THE PAVEMENT AROUND THE FRAME AS A SEPARATE OPERATION, TIED CONSTRUCTION JOINTS SHALL BE PLACED AS SHOWN IN THE BOX OUT DETAIL.

4. JOINTS IN THE CURBS SHALL COINCIDE WITH TRANSVERSE JOINTS IN THE PAVEMENT.

5. SEE STANDARD DRAWING 615-1 FOR ADDITIONAL NOTES ON REQUIREMENTS FOR CURB CONSTRUCTION.

6. THE CONTRACTOR MAY PLACE CURBS AS SHOWN IN OPTIONS 1, 2, OR 3.

7. SAWED JOINTS SHALL BE 2' WIDE AND SHALL BE FILLED WITH HOT POURED ELASTOMERIC JOINT FILLER MEETING REQUIREMENTS OF SUBSECTION 704.02 OR A NEOPRENE COMPRESSION SEAL OF APPROVED CONFIGURATION MEETING THE REQUIREMENTS OF SUBSECTION 704.04 MAY BE USED.
30" X 5" TIE BARS AT 30'-0" TO C.
SEE STD. DWG. 409-1.

(8) #6 BARS, 1'-6" (TYP.)
DEFORMED BAR EQUALLY SPACED & GROUTED IN PLACE.

18" DOWEL BARS 12'-0" IN CENTER
SEE STD. DWG. 409-1.

4-"#6 BARS, 1'-6" (TYP.)
INNER HOOP BAR @ MID DEPTH
MID PANEL DETAIL

NOTE:
1. TRANSVERSE JOINTS MAY BE MOVED TO ACCOMMODATE ROUNDOUT. THE EDGE OF CIRCULAR JOINT SHALL BE A MINIMUM OF 2'-0" FROM TRANSVERSE JOINT. A RELOCATED JOINT SHALL BE CONTINUOUS FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.


3. ALL METAL REINFORCEMENT BARS SHALL BE EPOXY COATED.

4. THE CIRCULAR FORM SHALL BE REMOVED PRIOR TO DRILLING AND GROUTING OF TIE BARS.

5. DRILLING AND GROUTING IS THE PREFERRED METHOD OF PLACING TIE BARS. HOWEVER, TIE BARS MAY BE PLACED IN PLACE IF A MAXIMUM 2" OF CLEARANCE IS PROVIDED TO OUTER EDGE OF FRAME.


7. METAL REINFORCEMENT FOR HOOP BARS SHALL BE ONE PIECE CONSTRUCTION HAVING A MINIMUM LAP LENGTH OF 2'-0"

8. ALL SITUATIONS NOT SHOWN AND MAY REQUIRE COMBINATION OF DETAILS.

9. WHEN THE CAST-IN-PLACE ROUNDOUT IS USED THE FRAME SHALL BE ANCHORED TO THE STRUCTURE TO PREVENT MOVEMENT DURING THE PAVING OPERATION.

10. STANDARD DRAWING 605-13 SHALL ACCOMPANY THIS DRAWING.

11. DOWEL BAR AND TIE BAR SIZE AND LOCATION SHALL BE AS SHOWN ON STANDARD DRAWING 409-1.

12. NOT TO SCALE.
APPLICATION FOR SQUARE FRAME W/GRADE & MANHOLE

FOR DETAILS INSIDE OF CIRCULAR ISOLATION JOINT SEE STD. DWG. 605-13

MANHOLE FRAME FOR VISUAL REFERENCE ONLY
(SEE STANDARD DRAWING 605-13 FOR REINFORCEMENT DETAILS)

METAL REINFORCEMENT TIEING DETAIL OPTION

CAST IN PLACE DETAIL

CIRCULAR ISOLATION JOINT 4' DIAMETER

METAL REINFORCEMENT TIEING DETAIL OPTION

REINFORCING BARS (NO. 4)

OUTSIDE MANHOLE WALL

8" MIN. TYP.

CIRCULAR ISOLATION JOINT 4" DIAMETER

MANHOLE FRAME FOR VISUAL REFERENCE ONLY

(SEE STANDARD DRAWING 605-13 FOR REINFORCEMENT DETAILS)
TRENCHING

MATERIALS AND COMPACTION TABLE

<table>
<thead>
<tr>
<th>PIPE LOCATION</th>
<th>MATERIAL</th>
<th>COMPACTION REQUIREMENT</th>
<th>MATERIAL</th>
<th>COMPACTION REQUIREMENT</th>
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</thead>
<tbody>
<tr>
<td>INSIDE ROADWAY PRISM</td>
<td>COARSE AGGREGATE &lt; 4 INCHES</td>
<td>ENGINEER ACCEPTANCE</td>
<td>3/4&quot; AGGREGATE</td>
<td>ENGINEER ACCEPTANCE</td>
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<tr>
<td>OUTSIDE ROADWAY PRISM</td>
<td>COARSE AGGREGATE</td>
<td>ENGINEER ACCEPTANCE</td>
<td>3/4&quot; AGGREGATE</td>
<td>ENGINEER ACCEPTANCE</td>
</tr>
</tbody>
</table>

NOTES

1. PLACE MATERIAL IN ACCORDANCE WITH SECTION 210.
2. CONTROLLED DENSITY FILL COPY IN ACCORDANCE WITH SECTION 522 CAN BE USED IF APPROVED BY THE ENGINEER.
3. LOOSE LIFT THICKNESS, DIRECTLY ON TOP OF PIPE MAY BE INCREASED WITH APPROVAL TO PREVENT DAMAGE TO PIPE DURING COMPACTION.
4. WHEN TWO DIFFERENT DIAMETER PIPES ARE INSTALLED, USE THE LARGER D DIAMETER TO DETERMINE THE S DIAMETER.
5. WHEN THE PIPE DIAMETER IS 36 INCHES OR GREATER AND THE PIPE IS INSTALLED DURING ERECTION OR CONSTRUCTION, USE B DIAMETER EQUAL TO THE PIPE DIAMETER.
6. PROVIDE THE FOLLOWING MINIMUM COVER DEPTHS:
   WATER PIPE: 4 FT.
   LPG OR GAS PENTANE: 4 FT.
   ELECTRICAL MAIN LINES: 4 FT.
   COMMUNICATIONS OR ELECTRONICS: 2 FT.
   UTILITY OWNERS AND LOCAL PUBLIC AGENCIES MAY HAVE DIFFERENT MINIMUM COVER DEPTHS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE REQUIRED COVER DEPTHS.
7. PERFORM TRENCHING PER OSHA REQUIREMENTS.
8. DO NOT DISTURB THE INSTALLED PIPE OR CONDUIT, OR LEAVE VIBRATORS WHEN USING TRENCH BOXES OR SHIELDS.
9. DRAWINGS NOT TO SCALE.
Type 1 - Standard Grate Slot Detail

Section C-C

When concrete pavement is used standard grate slot detail

Cross bar spacer

Fillet weld

1/8" Bearing bar

Section B-B

Elevation

Top view

Typical coupling band

Flow

Typical installations

Notes

1. Use minimum pipe thickness of 0.078 inches for slotted drains.
2. The depth of grates on slotted drains will be as shown on the plans.
3. Slotted drain grates do not need to be painted or galvanized.
4. Ensure that gaskets, gasket materials, O-rings, and coupling bands meet the requirements of Standard Drawing 706-6.
5. The finished top of pavement shall be flush with the grate surface.
6. Weld the metal grate in accordance with the requirements of the American Welding Society D1.1.
7. Not to be used in temporary or permanent traffic lanes, use only where traffic is occasional, such as on highway shoulders.
8. Not to scale.
**NOTES**

1. CARE SHALL BE TAKEN TO AVOID PLACING MANHOLES IN WHEEL PATHS.

2. MANHOLE TYPE B MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST MANHOLES SHALL MEET THE REQUIREMENTS OF ASTM C478. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON PRECAST UNITS WITH FLOOR AND/OR PIPE OPENINGS.

3. CAST-IN-PLACE MANHOLE TYPES B SHALL CONFORM TO SECTION 805-131. MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. CAST-IN-PLACE MANHOLES SHALL HAVE 6" WALLS AND MINIMUM 8" FLOORS. THE METAL REINFORCEMENT USED ON THE WALLS AND FLOORS SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" CAST AGAINST EARTH.

4. ALL CONNECTIONS AND BROKEN AREAS SHALL BE GROUTED SMOOTH TO FORM A WATER TIGHT MANHOLE. MASTIC SEALANTS, GASKETS, USED ON PRECAST SECTIONS CONSTRUCTION JOINTS SHALL CONFORM TO AASHTO AND ASTM REQUIREMENTS.


6. THE CONCRETE MANHOLE LIDS SHALL BE DESIGNED FOR AASHTO M-25 LIVE LOADS.

7. MEAN MANHOLE DEPTH IS GREATER THAN 4'0" INSTALL MANHOLE STEPS. THE NORMAL STEP-TO-STEP SPACING IS 12" AND THE STEPS PROTRUDING FROM THE MANHOLE WALL 3/4".

8. USE OF A PLASTIC MANHOLE FRAME SUPPORT, I.E. WHIRLY-GIG OR COMPARABLE DEVICE IS AN ACCEPTABLE CONSTRUCTION OPTION FOR FURTHER INFORMATION REFER TO STANDARD DRAWING 605-13).

9. STANDARD DRAWING 605-13 SHALL ACCOMPANY THIS DRAWING.
MANHOLE TYPES C & D

1. Care shall be taken to avoid placing manholes in wheel paths.
2. Manholes Type C & D may be either precast or cast-in-place. Precast manholes shall meet the requirements of ASTM C478. Prior approval of the shop drawing shall be required on precast units with floor and/or pipe openings.
3. Cast-in-place manholes Type C & D shall conform to Section 609 - Minor Structures of the Current "ITD Standard Specifications for Highway Construction." Cast-in-place manholes shall have 6" walls and minimum 8" floors. The metal reinforcement used on the walls and floors shall be No. 4 bars. All reinforcement shall have minimum concrete cover of 2" and/or 3" if cast against earth.
4. All construction and broken areas shall be grouted smooth to form a watertight manhole. Mastic sealants, gaskets, and chongs used on precast sections/construction joints shall conform to AASHTO and ASTM requirements.
5. Bends in the main storm sewer shall be made by forming curved channels within the manhole. The inside of the top lateral pipes may not be lower than the inside top of main sewer pipes. When the invert of the lateral pipe falls below the top of vertical pipe, the channel shall be formed from the lateral pipe to the main sewer.
6. The concrete manhole lids shall be designed for AASHTO H-25 live loads.
7. When manhole steps are required a eccentric cone section shall be used. Plastic coated manhole steps shall be placed in manholes greater than 4" in depth. Manhole steps shall conform to IDAHO Highway Construction Standards for Public Works Construction. Standard Drawing 50-509 and Section 524.08 Plastic Coated Manhole Steps.
8. Use of a plastic manhole frame support, i.e. Whirly-Gig or comparable device, is an acceptable construction option. (For further information refer to Standard Drawing 605-13.)

**NOTES**

**SECTION A-A**
(Scale 1/8" = 1')

**SECTION C-C**
(Scale 1/8" = 1')

**SECTION D-D**
(Scale 1/8" = 1')

**SECTION E-E**
(Scale 1/8" = 1')

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**STANDARD DRAWING**

MANHOLE TYPES C & D

**BOISE IDAHO**

**ORIGINAL SIGNED BY:**

**STUART HUTCHINSON**

**CHIEF ENGINEER**

**DRAWING DATE:**

**MSM 05-07**

**CADD FILE NAME:**

**605-12**

**DEPARTMENT:**

**TRANSPORTATION**

**HEADQUARTERS:**

**ITD, IDAHO**

**REQUIRES STD. DWG. 605-13**

**SHEET 1 OF 1**
**FRAME PLAN**

- **CONCRETE COLLAR PLAN**
  - 12" MIN. OVERLAP
  - MANHOLE FRAME CAST IN COLLAR

- **FRAME PLAN**
  - NO. 6 REBAR 7/16" MIN. OVERLAP LENGTH EACH
  - 4" MIN. DIAMETER

- **COVER PLAN - BOTTOM HALF VIEW**
  - PLACE COLLAR FLUSH TO 3/4" BELOW FINISH GRADE & AFTER ASPHALT PLACEMENT

- **SECTION A-A**
  - 3" (±) 1/2" MIN. CLEARANCE FOR METAL REINFORCEMENT ON BOTTOM AND 2" (±) 1/2" IF COLLAR IS PLACED ON TOP OF MANHOLE/STRUCTURE

- **SECTION B-B**
  - 2" (±) 1/2" MIN. CLEARANCE FOR METAL REINFORCEMENT ON BOTTOM AND 2" (±) 1/2" IF COLLAR IS PLACED ON TOP OF MANHOLE/STRUCTURE

- **NOTES**
  1. THE MINIMUM WEIGHT OF THE FRAMES SHALL BE 150LBS.
  2. FRAMES AND COVERS SHALL CONFORM TO AASHTO M 306-05 AND SHALL BE MADE OF CLASS 35B GRAY IRON.
  3. THE Layout and dimensions of the webs are typical minimum proprietary manhole covers without webs.
  4. THE SURFACE SHOWN IS FOR ILLUSTRATION ONLY. ANY SURFACE DESIGN OTHER THAN SMOOTH MAY BE USED UPON APPROVAL.
  5. A CAST-IN-PLACE CONCRETE COLLAR SHALL BE PLACED AROUND THE MANHOLE FRAME UNLESS OTHERWISE DIRECTED.
  6. THE CONCRETE COLLAR SHALL MEET THE REQUIREMENTS OF SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

---

**MANHOLE FRAME, COVER, & CONCRETE COLLAR**

**STANDARD MANHOLE FRAME BASIC DIMENSIONS**

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**STANDARD MANHOLE COVER BASIC DIMENSIONS**

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**MANHOLE FRAME SUPPORTED WITH CONC. COLLAR RINGS**

- SEE NOTE NO. 6

**PLASTIC MANHOLE FRAME SUPPORT**

- SEE NOTE NO. 71

---

**ORIGINAL SIGNED BY:**
- **TOM COLE**
- **LOREN THOMAS**

---

**BOISE IDAHO**

**STANDARD DRAWING**

- **605-13**

---

**REVISIONS**

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**IDAH0 TRANSPORTATION DEPARTMENT**

**ASSISTANT CHIEF ENGINEER**

**CHIEF ENGINEER**
1. Patterns used in drawing:

- Inlet Sections
- Catch Basin bottoms

2. Inlets and Catch basins may be either precast or cast-in-place. Precast units shall meet the requirements of AASHTO M306 Class 35B. Approval of shop drawings will be required on modified units.

3. A 1" side draft is allowed for form removal.


5. The grade line of the top inside of any pipe shall enter at a point no lower than the top inside of the outlet pipe.

6. Pipes can enter or leave the box in any direction. All connections and broken areas shall be grooved smooth.

7. Steel angles shall be set so that each bearing bar of prefabricated grate shall have full bearing in both ends. The finished top of concrete shall be even with the angle/grate surface. The structural steel need not be painted but shall meet the requirements of AASHTO A36.

8. All metal reinforcement used shall be No. 4 bars. The metal reinforcement shall be smooth cut to accommodate pipes.

9. Gray iron cast to the dimensions given for the steel grates may be used. The castings shall conform to AASHTO M306 Class 35B gray iron castings.

10. Inlet/catch basin grates may either be resistance welded or arc welded. In either case the grate shall be true and flush.

11. Grade B will be used only when specified.

12. Not to scale.

Notes:

- Inlet Sections
- Catch Basin bottoms

- Pavement:

- Inlets and catch basins may be either precast or cast-in-place. Precast units shall meet the requirements of AASHTO M306 Class 35B. Approval of shop drawings will be required on modified units.

- A 1" side draft is allowed for form removal.

- Cast-in-place inlets and catch basins shall conform to section AS 9-1979 minor structures of the current ITD Standard Specifications for Highway Construction.

- The grade line of the top inside of any pipe shall enter at a point no lower than the top inside of the outlet pipe.

- Pipes can enter or leave the box in any direction. All connections and broken areas shall be grooved smooth.

- Steel angles shall be set so that each bearing bar of prefabricated grate shall have full bearing in both ends. The finished top of concrete shall be even with the angle/grate surface. The structural steel need not be painted but shall meet the requirements of AASHTO A36.

- All metal reinforcement used shall be No. 4 bars. The metal reinforcement shall be smooth cut to accommodate pipes.

- Gray iron cast to the dimensions given for the steel grates may be used. The castings shall conform to AASHTO M306 Class 35B gray iron castings.

- Inlet/catch basin grates may either be resistance welded or arc welded. In either case the grate shall be true and flush.

- Grade B will be used only when specified.

- Not to scale.
NOTES

1. PATTERNS USED IN DRAWING:

   INLET SECTIONS: (TYPICAL)
   CATCH BASIN BOTTOMS: (TYPICAL)
   PAVEMENT: (TYPICAL)

2. INLETS AND CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C 913. PRIOR APPROVAL OF SHOP DRAWINGS WILL BE REQUIRED ON MODIFIED UNITS.

3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.

4. CAST-IN-PLACE INLETS AND CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

5. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.

6. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND SPOKES AREA SHALL BE GROUTED SMOOTH.

7. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATED GRATE SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED BOTTOM OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A 36.

8. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES.

9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.

10. INLET/CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND Flush.

11. GRATE B WILL BE USED ONLY WHEN SPECIFIED.

12. NOT TO SCALE.
2. INLETS AND CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM C 963. ORDER APPROVAL OF SHEET DRAWINGS WILL BE REQUIRED ON MODIFIED UNITS.

3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.

4. CAST-IN-PLACE INLETS AND CATCH BASINS SHALL CONFORM TO SECTION 600 - MINOR STRUCTURES OF THE CURRENT IDT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

5. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.

6. PIPE CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND OPENED AREAS SHALL BE GROUTED SMOOTH.

7. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PREFABRICATION GRATE SHALL HAVE FULL BEARING ON BOTH SIDES. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE ANGLE/GRATE SURFACE. THE STRUCTURAL STEEL NEED NOT BE PAINTED BUT SHALL MEET THE REQUIREMENTS OF ASTM A 36.

8. ALL METAL REINFORCEMENT USED SHALL BE hooks, 4 bars. THE METAL REINFORCEMENT SHALL BE SMOOTH TO ACCOMMODATE PIPES.

9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.

10. INLET/CATCH BASIN GRATES MAY BE EITHER RESISANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.

11. GRATE B (STEEL) SHALL HAVE FULL BEARING ON BOTH ENDS. THE FINISHED EDGE OF THE GRATE SHALL BE TROWEL SMOOTH.

12. NOT TO SCALE.
CATCH BASIN - DETAILS

1. CATCH BASINS MAY EITHER BE PRECAST OR CAST-IN-PLACE PRECAST UNITS. THEY MUST MEET THE REQUIREMENTS OF ASTM C913. PRIOR APPROVAL OF THE SHOP DRAWING WILL BE REQUIRED ON MODIFIED UNITS.

2. CAST-IN-PLACE CATCH BASINS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.

4. THE GRADE LINE OF THE TOP INSIDE OF ANY PIPE SHALL ENTER AT A POINT NO LOWER THAN THE TOP INSIDE OF THE OUTLET PIPE.

5. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BURIED AREAS MUST BE GRATED SMOOTH.


7. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH CUTOFF TO ACCOMMODATE PIPES. VERTICAL BARS NEED TO BE LENGTHENED FOR CATCH BASINS DEEPER THAN 4'-6".

8. GRATE B WILL BE USED ONLY WHEN SPECIFIED.

9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES.

10. CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.

11. NOT TO SCALE.

CATCH BASIN TYPE 6

(WEIGHT: APPROXIMATELY 79 LBS., SEE NOTE 9)

CATCH BASIN - DETAILS

(WEIGHT: APPROXIMATELY 88 LBS., SEE NOTE 9)

NOTES
NOTES

1. CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE.

2. SPECIFIED METAL REINFORCEMENT SHALL MEET THE REQUIREMENTS OF ASTM C615.


5. BARS AND SUPPORTS AS SPECIFIED.

6. GRAY IRON CASTINGS.

7. EQUILATERAL GRATE SHALL BE SMOOTH CUTOFF FOR THE DRAINAGE SURFACE.

8. THE DRAINAGE SURFACE SHALL BE SMOOTH CUTOFF FOR THE DRAINAGE SURFACE.

9. THE DRAINAGE SURFACE SHALL BE SMOOTH CUTOFF FOR THE DRAINAGE SURFACE.

10. NOT TO SCALE.

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107.8 LF AT 0.668 LBS/FT = 106 LBS

CROSS BARS: 3/4" O.D. x 1-1/4" OR RECTANGULAR BAR OF EQUIVALENT AREA

PLAN OF EQUIVALENT AREA

SECTION C-C

GRADE A (STEEL)

(WEIGHT: APPROXIMATELY 88 LBS, SEE NOTE 9)

SECTION C-C

GRADE B (STEEL)

(WEIGHT: APPROXIMATELY 79 LBS, SEE NOTE 8 & 9)

REVISIONS

STANDARD DRAWING

CATCH BASIN TYPE 7

ENGLISH

STANDARD DRAWING NO.

605-24

SHEET 2 OF 2

IDAHO TRANSPORTATION DEPARTMENT

BOISE, IDAHO

ORIGINAL DRAWER BY LINDA TOMLIN

ASSISTANT CHIEF ENGINEER DEVELOPMENT

CHIEF ENGINEER

NOTES

1. CATCH BASINS MAY BE EITHER PRECAST OR CAST-IN-PLACE.

2. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.


4. STEEL ANGLES SHALL BE SET SO THAT EACH BEARING BAR OF PRECAST UNITS SHALL MEET THE REQUIREMENTS OF ASTM A36.

5. ALL METAL REINFORCEMENT SHALL BE NO. 4 BARS. METAL REINFORCEMENT SHALL BE SMOOTH CUTOFF FOR THE DRAINAGE SURFACE.

6. GRAY IRON CASTINGS.

7. EQUILATERAL GRATE SHALL BE SMOOTH CUTOFF FOR THE DRAINAGE SURFACE.

8. GRAY IRON CASTINGS.

9. GRAY IRON CASTINGS.

10. NOT TO SCALE.
NOTES

1. TYPE 8 INLET CAN BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST AND MODIFIED INLETS SHALL MEET THE REQUIREMENTS OF AASHTO M306. PRIOR APPROVAL OF SHOP DRAWINGS IS REQUIRED FOR USE OF PRECAST AND MODIFIED INLETS. USE EQUALS OR BETTER MATERIALS IN CAST-IN-PLACE.

2. CAST-IN-PLACE INLET TYPE 8 SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT IDT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

3. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.

4. ALL METAL REINFORCEMENT USED SHALL BE NO. 4 BARS. THE METAL REINFORCEMENT SHALL BE SMOOTH DOWEL OR PUNCHED THROUGH 1" DIA BARS TO BE BURIED IN THE CONCRETE APRON. THE APRON MUST BE CAST-IN-PLACE.

5. THE INLET SHALL BE CONSTRUCTED RECTANGULAR USING THE APPROPRIATE WALL DIMENSIONS A & A' DETERMINED BY THE CONNECTING PIPE SIZES. USE THE LARGER WALL DIMENSION IF TWO DIFFERENT PIPE SIZES CONNECT TO DIFFERENT WALLS. USE THE MINIMUM WALL DIMENSION IF NO PIPES CONNECT TO ONE WALL. SELECT THE DEPTH (B MIN.) BY USING THE VALUE OF THE INLET'S LARGEST CONNECTING PIPE. REINFORCEMENT SHALL BE SMOOTH CUT TO ACCOMMODATE PIPES. ALL BARS SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND/OR 3" MINIMUM COVER IF CAST AGAINST EARTH.

6. PIPES CAN ENTER OR LEAVE THE BOX IN ANY DIRECTION. ALL CONNECTIONS AND BRIDGED AREAS SHALL BE GROUTED SMOOTH.

7. THE GRADE LINE OF THE TOP INSIDE OF ANY INLET PIPE SHALL BE AT LEAST 3'-6" FROM THE TOP OF THE OUTLET PIPE. ALL CONSTRUCTION JOINTS MUST BE REINFORCED.

8. THE GRADE LINE OF THE TOP INSIDE OF ANY INLET PIPE SHALL BE AT LEAST 3'-6" FROM THE TOP OF THE OUTLET PIPE.

9. THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF ASTM A36. THE METAL GRATE NEED NOT BE PAINTED OR GALVANIZED.


11. CONSTRUCTION JOINTS MUST BE REINFORCED.

12. NOT TO SCALE.

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* Adjust to fit field conditions.

*BARS 1" DIA. TO BE EXPANDED, SEE TABLE FOR QUANTITIES.

**GRAY IRON CASTINGS. MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B (SEE NOTE NO. 3).**

***METAL GRATE TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES 2" (TYP.)."
INLET MEDIAN DRAIN

INLET MEDIAN DRAIN TYPE 9

REVISIONS

IDaho TRANSPORTATION DEPARTMENT

803 BOISE IDAHO

STANDARD DRAWING

INLET MEDIAN DRAIN

NOTES
1. PRECAST OR CAST-IN-PLACE THE INLET MEDIAN DRAIN. WHEN PRECAST, FABRICATE IN ACCORDANCE WITH ASTM A616 AND PROVIDE SHOP DRAWINGS FOR APPROVAL PRIOR TO INSTALLATION.

2. PROVIDE LONGER VERTICAL REINFORCING STEEL BARS WHEN THE INLET IS DEEPER THAN 48". SMOOTHLY CUT REINFORCING STEEL FOR PIPES.

3. PROVIDE STEEL ANGLES IN ACCORDANCE WITH ASTM A572. ENSURE THE FINISHED TOP OF CONCRETE IS EVEN WITH THE ANGLE AND GRATE SURFACE.

4. SIDE DRAFT UP TO 1" CAN BE PROVIDED TO EASE FORM REMOVAL.

5. FABRICATE OR CAST THE GRATES. WHEN FABRICATED, PROVIDE STEEL IN ACCORDANCE WITH ASTM A616. WHEN CAST, CAST IN ACCORDANCE WITH ASTM A36, WHEN CAST IN ACCORDANCE WITH AASHTO M504/505 GRATE IRON CASTINGS.

6. ORIENT THE SLACK SO THE FLAT BARS AT THE 45° ANGLE ARE POINTED DOWN IN THE DIRECTION OF THE FLOW.

7. ENSURE THE GRATE FULLY CONTACTS THE STEEL ANGLES.

8. PIPES CAN ENTER OR LEAVE THE INLET IN ANY DIRECTION. GROUT PIPE ENTRANCES AND EXITS.

9. ENSURE THE ELEVATION OF INLET PIPE IS HIGHER THAN THE ELEVATION OF THE OUTLET PIPE.

10. DRAWING NOT TO SCALE.
CATCH BASIN TYPE 10

1. CATCH BASIN TYPE 10 IS FOR USE WITH EMBANKMENT PROTECTOR WITH SLOTTED DRAIN. STANDARD DRAWING 607-2.

2. A 1" SIDE DRAFT IS ALLOWED FOR FORM REMOVAL.

3. CATCH BASINS FOR SLOTTED DRAINS CAN BE PRECAST OR CAST-IN-PLACE. ENSURE THAT PRECAST CATCH BASINS MEET THE REQUIREMENTS OF AASHTO M 199, TILTED PRECAST CATCH BASINS OR CONSTRUCT CAST-IN-PLACE CATCH BASINS TO MATCH THE ROADWAY CROWN. OBTAIN THE ENGINEER'S APPROVAL PRIOR TO THE INSTALLATION OF PRECAST CATCH BASINS.

4. CONSTRUCT CAST-IN-PLACE CATCH BASINS IN ACCORDANCE WITH SECTION 609 - MINOR STRUCTURES OF THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

5. PROVIDE A MINIMUM CONCRETE COVER OF 2" OVER REINFORCING STEEL. PROVIDE A MINIMUM CONCRETE COVER OF 3" OVER REINFORCING STEEL IF CAST AGAINST EARTH.

6. ENSURE THAT THE FINISHED TOP OF CONCRETE IS FLUSH WITH THE GRATE SURFACE.

7. ENSURE THAT THE METAL FOR THE GRATE MEETS THE REQUIREMENTS OF ASTM A36. PAINTING OR GALVANIZATION OF THE METAL GRATE IS NOT REQUIRED.

8. WELD THE METAL GRATE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1.

9. SET ANGLES SO THAT EACH BEARING BAR OF THE PREFABRICATED GRATE HAS FULL BEARING ON BOTH ENDS.

10. ENSURE THAT THE DISCHARGE PIPE SIZE IS THE SAME SIZE AS THE SLOTTED DRAIN PIPE, GROUT PIPE CONNECTIONS.

11. NOT TO SCALE.
NOTES

1. SEDIMENT CONTROL BOXES CAN BE EITHER PRECAST OR CAST-IN-PLACE. DETAILED DRAWING OF SEDIMENT CONTROL BOX SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

2. CAST-IN-PLACE BOXES SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES OF THE CURRENT IDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

3. DESIGN LOAD SHALL MEET AASHTO H-25 HIGHWAY LOADING AND CLASS 4000 PSI CONCRETE.

4. ALL REINFORCING STEEL SHALL BE GRADE 60.

5. THE FINISHED TOP OF CONCRETE SHALL BE EVEN WITH THE GRATE SURFACE.

6. THE CATCH BASIN MANHOLE FRAME AND COVER SHALL BE A FLUSH MOUNT TYPE WITH A FRAME NO DEEPER THAN 1/2". THE FLUSH MOUNT MANHOLE IS NOT PERMITTED FOR VEHICULAR TRAFFIC.

7. TANK CAPACITY IS APPROXIMATELY 750 GALLONS OR 100 CU. FT.

8. DESIGN MAY BE REVERSED FOR BEST APPLICATION WITH MANHOLE AND CATCH BASIN OPENINGS IN OPPOSITE DIRECTIONS AND BAFFLE WALLS REVERSED.

9. GRAY IRON CAST TO THE DIMENSIONS GIVEN FOR THE STEEL GRATES MAY BE USED. THE CASTINGS SHALL CONFORM TO AASHTO M306 CLASS 35B GRAY IRON CASTINGS.

10. INLET/CATCH BASIN GRATES MAY EITHER BE RESISTANCE WELDED OR ARC WELDED. IN EITHER CASE THE GRATE SHALL BE TRUE AND FLUSH.

11. NOT TO SCALE.

SEED CONTROL CATCH BASIN

WEIGHT APPROXIMATELY 88 LBS., SEE NOTE 9 & 10.
1. SEDIMENT & OIL TRAPS MAY BE EITHER PRECAST OR CAST-IN-PLACE. PRECAST TRAPS SHALL MEET THE REQUIREMENTS OF ASTM C 437 AND SHALL HAVE A DESIGN LOAD MEETING AMS 4-25 HIGHWAY LOADING.

2. ALL REINFORCING STEEL SHALL BE GRADE 60.

3. CAST-IN-PLACE SEDIMENT & OIL TRAPS SHALL CONFORM TO SECTION 605 - MINOR STRUCTURES OF THE CURRENT IDAHO TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. DETAILED DRAWING OF PRECAST BOX OR CAST-IN-PLACE BOX DESIGN MUST BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

4. FOR DETAILS ON MANHOLE INSTALLATION REFER TO STANDARD DRAWING 605-13 (STANDARD MANHOLE FRAME, COVER, & CONCRETE COLLAR).

5. HEIGHT OF OUTLET BAFFLE WALL AND LENGTH OF INLET BATTLE WALL DETERMINED BY TANK CAPACITY AND FLOW RATE.

6. IF DISTANCE FROM TOP OF BOX TO BOTTOM OF MANHOLE FORM EXCEEDS 12" USE PRECAST MANHOLE RISER PLUS A MAXIMUM OF 12" RISER GRADE RINGS.

7. PROVIDE STEPS WHEN THE DISTANCE FROM TOP OF MANHOLE FRAME TO TOP OF BOX EXCEEDS 24".

8. CONCRETE RISER RINGS (MAX 24"), FOR VAULT DEPTH GREATER THAN 24", USE PRECAST MANHOLE SECTIONS.

9. LOCATION AND FLOW LINE ELAVATION PER DESIGN PLANS.

10. ELV. IN > ELV. OUT OF TOP OF OUTLET BATTLE WALL BY A MINIMUM OF 0.1' UNLESS OTHERWISE APPROVED BY THE ENGINEER.

11. ELV. OUT < ELV. OF TOP OF OUTLET BATTLE WALL BY A MINIMUM OF 0.25', UNLESS OTHERWISE APPROVED BY THE ENGINEER.

12. NOT TO SCALE.
NOTES

1. Locate catch basins to intercept roadway drainage prior to flowing onto a bridge and intercept drainage that has collected on bridge or as shown on the plans.

2. See the design manual for further information on runoff drain or embankment protector.

3. Use concrete barrier with sealed scuppers on the upstream from the grate opening. Use great or plant mix to seal the scuppers along the drain runoff area. Do not use 20' concrete barrier may be used.

4. Do not use in temporary or permanent traffic lanes. Use only where traffic is occasional, such as on highway shoulders.

5. Not to scale.
SEAL GUARDRAIL SCUPPER OPENINGS WITH CRUILOR OR PLAYMIX ON THE
DRAIN SIDE (SEE NOTE NO. 3)

SLOTTED DRAIN

ROADWAY DRAINAGE

ROADWAY DRAINAGE

ISOMETRIC VIEW

(10' BARRIER SHOWN)

[0x0]

2' MIN. COVER FOR POLYETHYLENE PIPE

1' MIN. COVER FOR CORRUGATED METAL PIPE

NATURAL GROUND

GRADED GRAVEL, 6" MAX. SIZE

OUTLET PROTECTION AREA, WELL

CATCH BASIN TYPE 10

EMBANKMENT PROTECTOR
WITH SLOTTED DRAIN

REQUIRES STD. DWG. 605-27

BOISE, IDAHO

3311 West State Headquarters

AT: ITD, ORIGINAL STORED

DECEMBER, 1993

4-9-10 PLR

RDL 12-12

MSM

MSM

MSM

12-01

7-02

3-05

3

2

1

TYPE 10 CATCH BASIN

INNER EDGE OF GRATE

CONCRETE BARRIER &

EDGE OF CURB OR

SEAL GUARDRAIL SCUPPER OPENINGS

WITH CRUILOR OR PLAYMIX ON THE
DRAIN SIDE (SEE NOTE NO. 3)

CROWN/LOW

FLOW

WITH GROUT OR PLANTMIX ON THE
SEAL GUARDRAIL SCUPPER OPENINGS

(GALVANIZED STEEL APRON
(SEE STD. DWG. 608-1)

CORRUGATED DISCHARGE PIPE

OUTLET PROTECTION AREA, WELL
GRADED GRAVEL, 6" MAX. SIZE

SECTION B-B

RDL 12-12

MSM

MSM

MSM

12-01

7-02

3-05

3

2

1

CADD FILE NAME:

BOISE IDAHO 607-2_0113.dgn

ORIGINAL SIGNED BY: TOM COLE

HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: LOREN THOMAS

CHIEF ENGINEER

STANDARD DRAWING

NO.
1
2
3
4
5

DATE
12-01
5-05
5-05
5-05
5-05

BY

SCL

SCL

SCL

SCL

SCL

DATE

SCL

SCL

SCL

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SCL

REVISIONS

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

INDEX ONLY

13663

PROFESSIONAL ENGINEER

STATE OF IDAHO

RYAN P. LANCASTER
ANCHORING DETAIL

APRON DIMENSION FOR 12" TO 54" DIA PIPE

<table>
<thead>
<tr>
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<th>C</th>
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<td>4&quot;-5&quot;</td>
<td>1-3&quot;</td>
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<td>3&quot;</td>
<td>1 TO 5</td>
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<td>16&quot;</td>
<td>5&quot;</td>
<td>2'-5&quot;</td>
<td>3'-0&quot;</td>
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<td>27&quot;</td>
<td>10'-6&quot;</td>
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<td>6'-0&quot;</td>
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<td>54&quot;</td>
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<td>5'-2&quot;</td>
<td>3'-10&quot;</td>
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LONGITUDINAL SECTION
FOR 12" TO 54" DIA PIPE

END VIEW
FOR 12" TO 54" DIA PIPE

CULVERT SECTION
CAST IN PLACE

APRON DIMENSION FOR 60" TO 84" DIA PIPE

<table>
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<td>2 TO 1</td>
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<tr>
<td>84&quot;</td>
<td>2'-1&quot;</td>
<td>1'-0&quot;</td>
<td>4'-1&quot;</td>
<td>6&quot;</td>
<td>2 TO 1</td>
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</tbody>
</table>

NOTES

1. TONGUE AND GROOVE JOINTS ARE SHOWN ON THE DRAWING FOR EXAMPLE ONLY. OTHER JOINTS MAY BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2. NOT TO SCALE.
SIDE VIEW OF CROSS DRAINAGE STRUCTURE

SIDE VIEW OF PARALLEL DRAINAGE STRUCTURE

TYPE 1 CONNECTOR DETAIL
CIRCULAR PIPES 15" THROUGH 24"

TYPE 2 CONNECTOR DETAIL
USE W/ 30" AND LARGER CIRCULAR PIPES AND ALL ARCHED PIPES

SAFETY BAR DETAIL

LONGITUDINAL BAR DETAIL

TAPERED SLEEVE FOR ATTACHING STEEL END
SECTIONS TO CONCRETE OR SMOOTH PIPE
END SECTION WITH OPTIONAL SAFETY BAR SHOWN FOR ILLUSTRATION ONLY

REVISIONS

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

IDAHODEPARTMENT
TRANSPORTATION

STANDARD DRAWING
METAL SAFETY SLOPE APRON

REINFORCED EDGE FULL LENGTH OF END SECTION
SEE SECTION A-A

OPTIONAL PLATE EXTENSION SAME GAUGE AS END SECTION

OPTIONAL TOE PLATE EXTENSION TO BE BOLTED TO END APRON.

TOP OF APRON SIDE LUGS TO BE BOLTED TO END APRON.

EDGE OF SIDEWALL SHEET ROLLED SMOOTHLY AGAINST STEEL ROD

MIN. 3/8" DIA. GALV. STEEL ROD OR NO. 4 GALV. STEEL REINFORCING BAR

1/2" NYLON BOLT TO HOLD THE SURFACES TIGHTLY TOGETHER

SIDE VIEW OF PARALLEL DRAINAGE STRUCTURE

FRONT VIEW - ROUND PIPE

FRONT VIEW - ARCHED PIPE

SIDE VIEW OF CROSS DRAINAGE STRUCTURE

BOISE IDAHO

DESIGN/TRAFFIC SERVICES ENGINEER

ORIGINAL SIGNED BY JESSE BARRUS

RDL 12-12 5

MSM 3-05

DATE: 608-3_0516.dgn

PRINTS ONLY

DATE: 608-3_0516.dgn

DATE: 608-3_0516.dgn
PERSPECTIVE VIEWS - APRONS

NOTES
1. PROVIDE SLOTTED HOLES FOR PARALLEL SAFETY BAR ATTACHMENT.
2. USE AT LEAST ONE PARALLEL SAFETY BAR AT THE STRUCTURE OPENING. ONE PARALLEL SAFETY BARS AT THE SPACING SHOWN WHEN THE PIPE DIAMETER IS GREATER THAN 30". PROVIDE CROSS DRAINAGE BAR TO PARALLEL SAFETY BARS FOR SINGLE PIECE STRUCTURE.
3. USE CROSS DRAINAGE BAR WHEN THE PIPE DIAMETER IS GREATER THAN 30". PROVIDE CROSS DRAINAGE BAR TO PARALLEL SAFETY BARS FOR SINGLE PIECE STRUCTURE.
4. LARGE END SECTIONS MAY BE PROVIDED IN MULTIPLE PANELS. WHEN MULTIPLE PANELS ARE USED, JOIN THE PANELS WITH BOLTS AND NUTS.
5. FOR 10:1 SLOPE END SECTIONS, USE .064" THICK (12 GAUGE) MATERIALS.
6. USE SKEWED .125" GALVANIZED STEEL PIPE FOR SAFETY BARS. FLATTEN END, THEN BEND OUTSIDE 4" TO MATCH STRUCTURE SIDES.
7. FORM 1/2" STEEL CORRUGATIONS TO MAINTAIN INSIDE DIAMETER OF SLEEVE, FINISHED END TO BE THE SAME DIAMETER AS CORRUGATED STEEL PIPE DIAMETER.
8. DRAWINGS NOT TO SCALE.

METAL SAFETY SLOPE APRON

REVISIONS

STANDARD DRAWING

ORIGINAL ISSUED: NOVEMBER, 1990

ORIGINAL SIGNED BY: JESSE BARRUS

DESIGN/TRAFFIC SERVICES ENGINEER

BOISE, IDAHO

IDAHINO TRANSPORTATION DEPARTMENT

DRAWING DATE: 3-05

EQUIV.

DIMENSION (±2") (SEE NOTE NO. 5)

APRONS FOR CIRCULAR PIPES

APRONS FOR ARCHED PIPES

+1 DIA. HEX HEAD BOLTS (TYP.)

+1 DIA. HEX HEAD BOLTS (TYP.)

CROSS DRAINAGE APRON

CROSS DRAINAGE APRON

PARALLEL SAFETY BARS

PARALLEL SAFETY BARS

FIRST PARALLEL SAFETY BAR REG.

FIRST PARALLEL SAFETY BAR REG.

10:1 SLOPE APRON

10:1 SLOPE APRON

PARALLEL DRAINAGE APRON

PARALLEL DRAINAGE APRON

V+2 DIA. HEX HEAD BOLTS (TYP.)

V+2 DIA. HEX HEAD BOLTS (TYP.)

HEAD BOLTS (TYP.)
**INLET STRUCTURE (CULVERT SIZES 18" TO LESS THAN 36" DIA.)**

- Anchor bolts at 1'-6" (±) for CMP over 24" dia.
- No. 4 bars at -8" to C. both ways.

**SECTION A-A**

- Anchor metal reinforcement into headwall when pipe is cut.
- Use alternate grouting scheme for full coverage.

**SECTION B-B (CORRUGATED METAL PIPE)**

- Cutoff wall.
- ANCHOR BOLTS AT 1'-6" (±) FOR CMP
- No. 4 bars at -8" to C. both ways.

**SECTION B-B (CONCRETE PIPE)**

- Cutoff wall.
- Anchor metal reinforcement into headwall when pipe is cut.
- Use alternate grouting scheme for full coverage.

**NOTES**

1. Ensure that anchor bolt and nut material conforms to ASTM A307. Galvanize bolts and nuts after fabrication in accordance with ASTM A 252. Anchor bolts are not required for concrete pipe.

2. The depth of the cutoff wall shown may be reduced if rock is encountered at a higher elevation.

3. To permit the placement and tamping of backfill material, between multiple pipes, provide a clearance space of one-third the diameter of the larger pipe. Ensure that the clear space does not exceed 3 feet.

4. When using pervious bedding and backfill material, prevent seepage and piping by placing impervious material at the inlet cutoff collars may be used instead of impervious material.

5. Use entrance loss coefficient k = 0.2 for beveled entrance.

6. When culvert is skewed to embankment, the embankment may be contoured as shown.

7. Cover reinforcing steel with a minimum concrete depth of 2".

8. All edges to have 1/8" chamfer or beveled edges.

9. This inlet is to be used only outside of the clear zone, or behind curvilinear ditches.

10. Not to scale.

**SUMMARY OF QUANTITIES**

<table>
<thead>
<tr>
<th>Dia (Inches)</th>
<th>Concrete (cu. yd.)</th>
<th>Metal Reinforcement</th>
<th>Dia (Inches)</th>
<th>Concrete (cu. yd.)</th>
<th>Metal Reinforcement</th>
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SLOPE ADJUSTMENT DETAIL

- 20% GRADATION DETAIL

**DIMENSION TABLE**

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<th>Dia (Inches)</th>
<th>Concrete (cu. yd.)</th>
<th>Metal Reinforcement</th>
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</table>

**REVISIONS**

- CULVERT INLET HEADWALL
- STANDARD DRAWING
- 609-1
- SHEET 1 OF 1

**IDIAGO TRANSPORTATION DEPARTMENT**

- ORIGINALSEN BY LORREN THOMAS
- TECHNICAL SUPERVISOR / ENGINEER
- ORIGINALSEN BY TIM COLE
- CHIEF ENGINEER
**METAL REINFORCEMENT TABLE**

<table>
<thead>
<tr>
<th>MARK</th>
<th>LOCATION</th>
<th>BAR SIZE</th>
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<tr>
<td>F-1</td>
<td>FLOOR</td>
<td>NO. 4</td>
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<tr>
<td>L-1</td>
<td>TOP &amp; BOTTOM OF INLET LIP</td>
<td>NO. 4</td>
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<tr>
<td>H-1A</td>
<td>HORIZ. IN TOP OF WALL 5 &amp; IN FLOOR BACK WALL</td>
<td>NO. 4</td>
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<tr>
<td>H-1B</td>
<td>HORIZ. IN WING WALL BETWEEN HEADWALL (PAIRS ONLY)</td>
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<td>W-1A</td>
<td>EACH SIDE OF PIPE IN HEADWALL, FLOOR, &amp; INLET LIP</td>
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<td>IN FLOOR, &amp; INLET LIP</td>
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<td>W-1C</td>
<td>IN FLOOR, &amp; INLET LIP</td>
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<td>VERTICAL IN FLOOR, &amp; INLET LIP</td>
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<td>W-2</td>
<td>VERTICAL IN WING WALLS</td>
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**HEADWALL DIMENSION TABLE**

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**METAL REINFORCEMENT TABLE**

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**NOTES**

1. THIS HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAILS INSTALLED OUTSIDE THE CLEAR ZONE.
2. CAST-IN-PLACE HEADWALLS SHALL CONFORM TO SECTION 609 - MINOR STRUCTURES, OF THE CURRENT ITD STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND MINIMUM COVER IF CAST AGAINST EARTH. NO. 4 BARS.
4. ALL EDGES TO HAVE 3/4" CHAMFER OR TOLED EDGES.
5. ALL PIPE CULVERTS WITH A CONCRETE HEADWALL SHALL HAVE THE INLET HEADWALLS REVISED. USE EXISTENCE LOSS COVER IF NECESSARY.
7. USE CONCRETE, METAL OR PLASTIC PIPE WITH HEADWALL CONCRETE HEADWALL SHOWN ON DRAWING.
8. NOT TO SCALE.
ELEVATION

PLAN

BAR LOCATION DETAILS

MEET SPACE IS GREATER THAN 2'-0".

HEADWALL DIMENSION TABLE

METAL REINFORCEMENT TABLE

METAL REINFORCEMENT TABLE

GRATE DIMENSION & MATERIALS TABLE

NOTES

1. THIS HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAIL OR INSTALLED OUTSIDE THE CLEAR ZONE.

2. CAST-IN-PLACE HEADWALLS SHALL CONFIRM TO SECTION 609 - MINOR STRUCTURES, IF THE CURRENT TYE, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" AND 3" MINIMUM COVER IF CAST AGAINST EARTH.

4. ALL EDGES TO HAVE 1/4" CHAMFER OR TOLED EDGES.

5. ALL PIPE CULVERTS WITH A CONCRETE HEADWALL SHALL HAVE THE INLET HEADWALLS DEVELOP USE ENTRANCE LOSS EQUIVALENT TO 0.2 FOR REVERSED ENTRANCES.


7. USE CONCRETE, METAL, OR PLASTIC PIPE WITH HEADWALL CONCRETE PIPE SHOWN ON DRAWING.

8. NOT TO SCALE.

CONCRETE HEADWALL FOR ARCH PIPE CULVERT

REFERENCE

REVISES

IDAHOTRANSPORTATION

 department

 ENGLISH

 STANDARDDRAWING

BOISE,IDAH0

609-4

SHEET 2 OF 2
TYPICAL SIPHON INLET & OUTLET TREATMENT
(PRIVATE IRRIGATION SYSTEMS ONLY)

SECTION A-A - METAL PIPE

- ELEVATION - CONCRETE PIPE
  (GRATE NOT SHOWN)
  - D - INSIDE DIAMETER OF PIPE

SECTION A'-A' - CONCRETE PIPE

- SECTION B-4 DETAIL
- HEADWALL TOP
- PIPE
- D - INSIDE DIAMETER OF PIPE
- D = INSIDE DIAMETER OF PIPE
- D/24 45°

METHOD OF FABRICATING ELBOW

- B-4 DETAIL
- KEY DETAIL

ISOMETRIC VIEW

FULL OR PARTIAL CONTROL OF ACCESS

PARTIAL CONTROL OF ACCESS

FULL CONTROL OF ACCESS

PARTIAL CONTROL OF ACCESS

TYPICAL SIPHON INLET & OUTLET TREATMENT
(PRIVATE IRRIGATION SYSTEMS ONLY)
A SIPHON SYSTEM REQUIRES A GRATE ON BOTH INLET ENTRANCES.

POLYETHYLENE PIPE WITH A SIPHON HEADWALL IS ALLOWED.

THE USE OF CONCRETE, CORRUGATED METAL, OR CORRUGATED GALVANIZED HEADWALLS WILL BE REQUIRED ONLY WHEN SHOWN ON THE METAL FOR THE GRATE SHALL MEET THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY D1.1. GRATES FOR INLET ENTRENCHES.

THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL BAR SPACINGS ARE FROM CENTER TO CENTER. ALL EDGES TO HAVE 1/2" CHAMFER OR TOOLED EDGES.

1. THE SIPHON HEADWALL SHALL BE USED ONLY WHEN PROTECTED BY GUARDRAIL OR INSTALLED OUTSIDE THE CLEAR ZONE.

2. ALL CAST-IN-PLACE HEADWALLS SHALL CONFORM TO SECTION 995 - WING WALLS, STRUCTURES OR THE CURRENT IDAHO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

3. THE METAL REINFORCEMENT SHALL BE NO. 4 BARS. ALL REINFORCEMENT SHALL HAVE A MINIMUM CONCRETE COVER OF 2" OR 3" MINIMUM COVER IF CAST AGAINST EARTH.

4. ALL EDGES TO HAVE 1/2" CHAMFER OR TOOLED EDGES.

5. ALL PIPE INLETS/OUTLETS WITH A CONCRETE SIPHON HEADWALL SHALL HAVE THE INLET HEADWALLS REVEISON FOR ENTRANCE LOSS COEFFICIENT 0.9 FOR REVELED ENTRANCES.


7. THE USE OF CONCRETE, CORRUGATED METAL, OR CORRUGATED POLYETHYLENE PIPE WITH A SIPHON HEADWALL IS ALLOWED PROVIDED PIPE SHOWN ON DRAWING.

8. A SIPHON SYSTEM REQUIRES A GRATE ON THE INLET AND OUTLET HEADWALL.

9. NOT TO SCALE.
NOTES

1. Slide gate and guides shall be 16 gauge galvanized steel.

2. No scale is represented on these drawing illustrations.

MINIMUM DIMENSIONS TABLE

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>MINIMUM DIMENSIONS (INCHES)</th>
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<tbody>
<tr>
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</table>

SIDE ELEVATION

END ELEVATION

SECTION A-A
Right-of-Way Fence Location Details

Barbed or Woven Wire Fence Notes:
1. Designate post material on project plans, indicate whether the fence will be a drop fence and the location where drop fence staples will be used.
2. Designate Option 1, 2, or 3 for Fence Type 9 - Wildlife Fence - on project plans.
3. Attach anchor plates to metal posts unless the post is set in solid rock, drill holes when metal posts are set in solid rock.
4. Staple each wire to each wood post. Staple alternating wires on mesh wire fences, use two staples on braces and in sag sections. Rotate the staples to straddle across the wire grid. Allow enough space for wire to pass through the staple.
5. Attach fence wire or wire mesh to steel posts with wire clamps. Use one wire clamp per wire. On wire mesh, use four wire clamps per post or eight wire clamps per post in sag sections.
6. Ground wire and wire mesh fences that are near power transmission lines or that cross under transmission lines. See the wire and wire mesh fence grounding table and wire and wire mesh fence grounding details. To ground, connect each fence wire to a grounded ground cable with split bolt cable connectors. For wire mesh fence, connect the braided ground cable to a grounded ground cable every 18'.
7. When the fence terminates at a bridge, ensure that the top of the fence does not extend beyond the top of the parapet or railing.
8. In the sag detail, install corner brace in addition to the concrete block when the angle is greater than 20°.

Fence Type 1
- 1A (Wood)
- 1B (Metal)

Fence Type 2
- 2A (Wood)
- 2B (Metal)

Fence Type 3
- 3A (Wood)
- 3B (Metal)

Fence Type 4
- 4A (Wood)
- 4B (Metal)

Fence Type 5
- 5A (Wood)
- 5B (Metal)

Sag Details
- No. 8
- No. 5
- No. 6
- No. 4

Drop Fence Staple Detail
- (Side View)
- (Front View)

Standard Drawing
- IDAHO TRANSPORTATION DEPARTMENT
- NO. 610-1

Original Signed by Ted Mason
Design/Traffic Services Engineer

Headquarters
BOISE IDAHO
NOVEMBER, 2016
3 OF 3 SHEET
EXAMPLE FENCE APPLICATIONS
FOR FENCE TYPES 1, 3, 5, & 9

FENCE TYPE 4 - CHAIN LINK FENCE DETAILS

REVISIONS

SCALES SHOWN ARE FOR 11" X 17" SHEETS ONLY

IDAHO TRANSPORTATION DEPARTMENT

STANDARD DRAWING

ENGLISH

610-1

FENCES
**Fencing Details**

- **Chain Link Fence Notes**
  1. The minimum fence height is 8' when barbed wire and the 3-wire barbarm are used. Do not use razor wire with the 3-wire barbarm.
  2. Space posts equal distances apart, 10' maximum spacing.
  3. Adjust the top bar elevations to provide a smooth visual fence profile. Install corner posts at horizontal breaks in the fence if 10' or more.
  4. Stretch the fence fabric smooth so that it has a uniform appearance.
  5. Selvage the plain wire ends on the top and bottom of the chain link fabric by the twisted or knobbled method. See wire selvage detail.
  6. Chain link fence hardware may vary somewhat from that shown in the chain link fence hardware table. Ensure that hardware and materials used are uniform and compatible.
  7. Chain link fence hardware must fit snugly on post. See Note No. 20.
  8. Eye-top cap galvanized, pressed steel cap must fit snugly on post.
  9. Tension wire/brace band galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  10. Band bolt galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  11. Rail end galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  12. Brace end galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  13. Truss rod tighteners galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  14. Truss rod galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  15. Top rail sleeve galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  16. Tension bar galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  17. Fence fabric galvanized, pressed steel cap or galvanized, medium carbon steel cap.
  18. Tie wires min. 9 gauge aluminum with one hooked end.
  19. Coils tension wire min. 7 gauge.
  21. Chain link fence grounding detail.

**Chain Link Fence Grounding Table**

- Fits 3" O.D. post, 1" top rail.
- Fits 2" O.D. post, 1" top rail.
- Fits 1 1/2" O.D. post, 1" top rail.

**Chain Link Fence Hardware Table**

- Fits 3" O.D. post, 1" top rail.
- Fits 2" O.D. post, 1" top rail.
- Fits 1 1/2" O.D. post, 1" top rail.

---

**Notes:**

- See standard specifications for highway const.
- See standard specifications for highway const.
- See standard specifications for highway const.

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**Revisions:**

- No date.
- No date.

**Drawing Date:**

- November 3, 2016

---

**Drawing No.:**

- 610-1_1216.dgn

**Original Signed By:**

- Ted Mason

**Department:**

- Idaho Transportation Department

**Drawn By:**

- Randy Lancaster

---

**REVISIONS:**

- No date.
- No date.
GATE TYPE 1
FOR FENCE TYPES 1, 5, & 9
LATHE SIDE
HINGE SIDE

GATE WIDTH + 2½"

VERTICAL STAYS (SEE TABLE)
MIN. FOUR
HINGE BRACES
OVERSIZED HINGE POST
(SEE NOTE NOS. 3 & 9)

GATE TYPE 1A
FOR FENCE TYPES 1, 5, & 9
LATHE SIDE
HINGE SIDE

GATE WIDTH + 2½"

VERTICAL STAYS (SEE TABLE)
MIN. FOUR
HINGE BRACES
OVERSIZED HINGE POST
(SEE NOTE NOS. 3 & 9)

GATE TYPE 2
FOR FENCE TYPE 3
LATHE SIDE
HINGE SIDE

3' TO 18'

VERTICAL STAY (SEE TABLE)
TRUSS ROD

GATE TYPE 3
FOR FENCE TYPE 4
LATHE SIDE
HINGE SIDE

24' MAXIMUM OPENING WIDTH

NARROW SINGLE LEAF GATE

WIDE SINGLE LEAF GATE

DOUBLE LEAF GATES

GATE GROUNDING
(SEE NOTE NO. 4)

HORIZ. BRACE
(SEE NOTE N. 5)

WIRE LOOPS
9 GAUGE BARBLESS
(SEE NOTE NOS. 3 & 9)

OVERSIZED HINGE POST
(SEE TABLE)

VERTICAL STAYS (SEE TABLE)

REQUIRES STD. DWGS. 610-1 & 610-3
**Chain Link Fence Gate Hardware Table**

<table>
<thead>
<tr>
<th>Gate Type</th>
<th>Gate Height</th>
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<tr>
<td>TYPE 2</td>
<td>8' to 10'</td>
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**Gate Grounding Details**

- **Flexible Connecting Cable**
  - Connects the gate to the fence or to the fence and a grounding rod.
- **Minimum 8' Vertical Grounding Rod**
  - Ensure that the gate is grounded with a flexible copper cable.
- **Grounding Table**

**Notes**

1. Constructions gates from the materials shown on fences standard drawing unless otherwise shown.
2. Alternate gate designs may be used with engineer approval.
3. Construct matching metal or wood terminal brackets on both sides of the gate opening. Modify the terminal bracket on the hinge side of type 1A gates.
4. Ground gates that are near power transmission lines or that pass under transmission lines. Ground by connecting the hinge side of the gate to the fence or to the fence and a grounding rod. See the gate grounding details table and gate grounding for gates that are near power transmission lines (these gates are not to be grounded).
5. Construct vertical stays and horizontal brackets in accordance with the gate vertical stay table and the gate horizontal brace table.
6. When two type 1A, type 2, or type 3 gates are used in a single opening, provide a drop rod to secure the gate.
7. Ensure that the gate location detail allows 6' of less, less than the end of the approach construction or as otherwise directed by the engineer if installed at the end of the approach, provide a drop right-of-way fence along the edge of the approach.
8. Type 1 gates:
   - Construct gate ends and vertical stays from a section of metal fence post or round wood post 2½" to 3" in diameter. Place larger wooden stays at the gate ends.
   - Attach wire loops made with a double woven 9 gauge hangar wire or a suitable chain. Adjust the loops so that the gate is free to close. When closed, fasten the loops to the adjacent latch/hinge post.
   - Staple the stays and end posts to the connecting wires.
9. Type 1A gates:
   - Use a modified metal or wood post on the hinge side, use a 4" diameter, 7½" metal tube or a 6" diameter 8" wood post. If the metal post is used, set the post in an 8" square or round foundation.
   - Ensure that hinges on gates wider than 10' move leveling threads on a 12½" diameter or larger rod.
   - Ensure that latches are lockable.
10. Type 2 gates:
    - Fabricate gate frames with 1½" D.D. galvanized steel tubing with 0.050" wall thickness or 1½" diameter galvanized pipe.
    - Use 12½ gauge or heavier galvanized wire mesh.
    - Equip gate with an adjustable diagonal truss rod. The truss rod tightener and non-tightening end of the truss rod may be welded to the gate.
    - Use galvanized malleable steel hinges and latches.
    - Paint welds with JTD paint formula No. 2.
    - Clear the ground near the gate so that the gate can swing 90° in each direction.
11. Type 3 gates:
    - Chain link fence hardware may vary somewhat from that shown. Ensure that the hardware and materials used are uniform and compatible.
    - Paint welds with JTD paint formula No. 2.
    - Clear the ground near the gate so that the gate can swing 90° in each direction.
12. Drawing not to scale.
NOTES

1. Use metal braces when metal fence posts are used. Use wood braces when wood fence posts are used.

2. Use double wood corner braces when the exterior fence corner angle exceeds 30°. Install double line and terminal braces in accordance with the fence brace table.

3. See the brace spacing table for the maximum distances between braces.
РЕЖИМЫ ТЕКСАЯ СЛЕД: 927  12-73

План

ЕСЕР 11" Х 17"

Схема A-A

ПЕРЕЧЕНЬ МАТЕРИАЛОВ

КРЕМЕНЬ ГЕОЛ.ОБР. ЦЕМЕНТ

СОДЕРЖАНИЕ СПЕЦИФИКАЦИЙ ДЛЯ НАСТОЯЩЕЙ ПОСТРОЙКИ.

1. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

2. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

3. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

4. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

5. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

6. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

7. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

8. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

9. УСТРАНИТЕ ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

ТРЕВОЖИЩИЙ ИНСТРУКЦИЯ

ПРОЕКТ НА ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

ПРОЕКТ НА ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

ПРОЕКТ НА ПОДОЗРЕНИЯ НА КУПЕ РЯДА КУРСАШЕВ ОДОЖДАЮЩИХ СТРОИТЕЛЬСТВО.

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1. IF THE CATTLE GUARD IS CONSTRUCTED ON A PAVED ROAD WITH PAVEMENT MARKINGS, TERMINATE OR OBLITERATE THE LONGITUDINAL PAVEMENT MARKINGS 25 FEET FROM THE CATTLE GUARD MARKINGS.

2. IF THE CATTLE GUARD IS CONSTRUCTED ON AN UNPAVED ROAD, PAVE THE CATTLE GUARD AREA AND EXTEND PAVEMENT A MINIMUM OF FIVE FEET BEYOND WHERE THE CATTLE GUARD IS TO BE MARKED.

3. MARK THE CATTLE GUARD PRIOR TO ATTACHING THE CATTLE GUARD WINGS. USE WHITE WATERBORNE PAINT OR THERMOPLASTIC PAVEMENT MARKINGS. MARK A MINIMUM OF EIGHT LINES.

4. SECURE THE CATTLE GUARD WINGS TO PAVEMENT WITH ONE OF THE FOLLOWING OPTIONS:

   a. INSERT \( \frac{3}{4} \)"x8" BOLTS INTO PRE-DRILLED HOLES IN THE PAVEMENT. ENSURE THAT THE BOLT HEAD IS FLUSH WITH THE BASE PLATE.

   b. PLACE A \( \frac{3}{4} \) TURNBUCKLE FASTENED WITH NO. 6 WIRE BETWEEN THE WING CENTER MEMBER (B-2) AND THE BRACE POST. TIGHTEN TURNBUCKLE TO PRESS WING FEET TO ROADWAY PAVEMENT.

5. PAINT THE CATTLE GUARD WINGS YELLOW WITH NO. 6 PAINT SYSTEM C. INSERT \( \frac{3}{4} \)" BOLT AND NUT.”
31" LONG-SPAN APPLICATION
SEE NOTE NOS. 17 AND 18

SECTION A-A
WIDE-FLANGE OR TIMBER POST

SECTION B-B

SECTION C-C
HEADWALL OR OTHER OBSTRUCTION

IDaho TRANSPORTATION DEPARTMENT

STANDARD DRAWING
31" W-BEAM GUARDRAIL

612-1
TRANSITION TO 31" W-BEAM GUARDRAIL

SEE NOTE NO. 19

27'-29'

LEGEND:
* EXTRA POSTS
BELT BLOCKOUT TO POST, BUT
DO NOT BOLT TO GUARDRAIL

REDUCED POST SPACING

SEE NOTE NO. 7

NORMAL SPACING  6'-3" NORMAL SPACING
25'-8 POSTS AT 3'-1½" (HALF) SPACING
25'-16 POSTS AT 1'-6¾" (QUARTER) SPACING

EXISTING W-BEAM GUARDRAIL
TRANSITION HEIGHT AND POST SPACING OVER 25' (TWO GUARDRAIL PANELS)
31" W-BEAM GUARDRAIL

TRANSITION TO 31" W-BEAM GUARDRAIL

SEE NOTE NO. 19
ROCK SIZE NO. 3 FOR CONCRETE COARSE AGGREGATE BACKFILL WITH

CASE 1
CASE 2

POST WIDE-FLANGE POST TIMBER POST

W-BEAM GUARDRAIL HARDWARE COMPONENTS TABLE

<table>
<thead>
<tr>
<th>COMPONENT DESCRIPTION</th>
<th>WIDE-FLANGE POST</th>
<th>TIMBER POST</th>
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<tbody>
<tr>
<td>4-SPACE W-BEAM GUARDRAIL</td>
<td>RWM04g</td>
<td>RWM04s</td>
</tr>
<tr>
<td>W-BEAM GUARDRAIL POSTS</td>
<td>PWD01, PWD02</td>
<td></td>
</tr>
<tr>
<td>TRIBER GUARDRAIL POST</td>
<td>PWD09</td>
<td></td>
</tr>
<tr>
<td>KIT TIMBER GUARDRAIL POST</td>
<td>PDB01, POLYETHYLENE PDB01g</td>
<td></td>
</tr>
<tr>
<td>5&quot; GUARDRAIL SPLICE BOLT AND RECESSED NUT</td>
<td>FBB01</td>
<td></td>
</tr>
<tr>
<td>15&quot; GUARDRAIL SPLICE BOLT AND RECESSED NUT</td>
<td>FBB03</td>
<td></td>
</tr>
<tr>
<td>3&quot; PLAIN ROUND WASHER</td>
<td>FBB04</td>
<td></td>
</tr>
<tr>
<td>18D GALVANIZED NAIL</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

GUARDRAIL POST IN PAVEMENT
SEE NOTE NO. 9

GUARDRAIL POST IN ROCK FORMATION
SEE NOTE NO. 9

REVISIONS

IDAHOTRANSPORTATION
DEPARTMENT

STANDARD DRAWING

IDAHOTAHPRINTS ONLY
SCALES SHOWN ARE FOR 11" X 17" SCALES SHOWN

31" W-BEAM GUARDRAIL

JUNE, 2017

3'-1"

8"

31" W-BEAM GUARDRAIL HARDWARE COMPONENTS TABLE

<table>
<thead>
<tr>
<th>COMPONENT DESCRIPTION</th>
<th>WIDE-FLANGE POST</th>
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<tr>
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<td>5&quot; GUARDRAIL SPLICE BOLT AND RECESSED NUT</td>
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</tr>
<tr>
<td>15&quot; GUARDRAIL SPLICE BOLT AND RECESSED NUT</td>
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</tr>
<tr>
<td>3&quot; PLAIN ROUND WASHER</td>
<td>FBB04</td>
<td></td>
</tr>
<tr>
<td>18D GALVANIZED NAIL</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
1. The 31" W-beam guardrail system shown is a crash test level 3 barrier system. Provide barrier hardware as shown and as specified in the publication "A Guide to Standardized Highway Barrier Hardware" where the guide and plans conflict. Provide hardware components as shown on the plans.

2. Install guardrail as shown in the normal application unless otherwise indicated on the project plans. The curb applications can be used with any of the curb or gutter or curb types shown in the curb and gutter standard drawing.

3. Provide 31" W-beam guardrail as far as the traveled way as practical. Where practical provide the shyn-line offset distance shown in the shyn-line offset table.

4. Where practical flare the 31" W-beam guardrail away from the traveled way. See the shyn-line offset and flare rate table.

5. Provide adequate deflection distance to obstructions behind the guardrail by preventing the working width shown on the placement detail and in the deflection table.

6. Designate deflection by reducing post spacing. Introduce each reduction in post spacing over 20'. Where necessary, do not bolt the guardrail to the extra posts.

7. Wide-flange or timber posts may be used unless otherwise indicated on the project plans. Use the same post material for the project length (except in the 31" long-span application).

8. Remove pavement and rock around guardrail posts. Use timber or polyethylene blockouts with wide-flange posts. Use timber blockouts with timber posts. Use the same post material for the project length. In the 31" long-span application, the wide-flange post normal application can be constructed without blockouts if indicated on the project plans or if approved by the engineer.

9. Install the blockout and W-beam guardrail using the hole 7" from the top of the post. The higher hole is reserved for future guardrail adjustment.

10. Use timber or polyethylene blockouts to timber posts to restrict block rotation. Nail through the sides of the blockout and post.

11. Use wide-flange posts are used and when practical install the bolt (FBB03) on the upstream side of the post in relation to the adjacent traffic.

12. Splice 31" W-beam guardrail between posts. Overlap splice so that the edges where the 31" is downstream of the adjacent traffic.

13. Begin and end 31" W-beam guardrail with a terminal anchor or transition. Construct terminals or transitions using the same post material as the guardrail. When practical, some anchors and terminals are only available with timber or wide-flange posts.

14. Splice W-beam guardrail with wide-flange posts. Use the same post material for the project length (except in the 31" long-span application).

15. Where practical provide the shyn-line offset distance shown in the shyn-line offset table.

16. Delinate guardrails with type 9 delineators. See the delineator standard drawing for delineator spacing.

17. The long-span application can be used where two posts (18'-9" or 25') are bolted together. The long-span application is used where practical. Provide the shyn-line offset distance shown in the shyn-line offset table.

18. When connecting to existing guardrail, install the guardrail at the proposed connection point. Calculate the height of the connection point.

19. Replacement of the existing W-beam guardrail if the top of guardrail height is less than 27'.

20. Drawing not to scale.
USE WHEN DITCH FORESLOPE IS 10:1 OR FLATTER
### Modified 4-Space W-Beam Guardrail Detail

**Components:**
- **W6x8.5 Structural Shape**

**Requirements:**
- Plate detail
- Post 3 to section A-A
- Wide-flange post details

**Notes:**
1. Use the buried-in-backslope guardrail terminal where a backslope is reasonably close to the point where the barrier is introduced or terminated. The buried-in-backslope terminal eliminates the possibility of an end-on impact with the guardrail and reduces the likelihood of intrusions behind the barrier. The buried-in-backslope terminal designs shown in this sheet are for level 2 terminals and are calculated according to the formula 7.5:1 or flatter backslope. This formula is derived from the RWM04 standard.
2. The hazard may be the slope environment or other roadway hazard. Provide the following terminal lengths between the length of need point and the hazard for the following backslope conditions:
   - **A. 2:1 Backslope - 75' or more to hazard**: Provide length of need calculated by formula. Insert the appropriate formula here.
   - **B. 2:1 Backslope - 75' or more to hazard**: Provide length of need according to formula. Insert the appropriate formula here.
3. Use the buried-in-backslope guardrail terminal where a backslope is reasonably close to the point where the barrier is introduced or terminated. The buried-in-backslope terminal eliminates the possibility of an end-on impact with the guardrail and reduces the likelihood of intrusions behind the barrier. The buried-in-backslope terminal designs shown in this sheet are for level 2 terminals and are calculated according to the formula 7.5:1 or flatter backslope. This formula is derived from the RWM04 standard.

** burial-in-backslope terminal hardware components table**

| Item No. | Component Description | SPC
|---------|-----------------------|---|
| 1       | 4-space W-beam guardrail | TF-13 NAME
| 2       | Modified 4-space W-beam guardrail | RWM04a
| 3       | 6" wide-flange guardrail posts | PRE-
| 4       | 8" wide-flange guardrail posts | PRE-
| 5       | 4" wide-flange guardrail posts | PRE-
| 6       | 4" W-beam blockout | PRE-

**Buried-in-backslope terminal Hardware Components Table**

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</tr>
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<td>5</td>
<td>4&quot; wide-flange guardrail posts</td>
<td>PRE-</td>
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<tr>
<td>6</td>
<td>4&quot; W-beam blockout</td>
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</tbody>
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**Legend:**
- **W6x8.5 Structural Shape**
- **Posts 1 and 2**
- **Post 3 to section A-A**

**NOTES:**
- Drill 3/4" holes in W-beam connection and plate.
- Use the buried-in-backslope guardrail terminal where a backslope is reasonably close to the point where the barrier is introduced or terminated. The buried-in-backslope terminal eliminates the possibility of an end-on impact with the guardrail and reduces the likelihood of intrusions behind the barrier. The buried-in-backslope terminal designs shown in this sheet are for level 2 terminals and are calculated according to the formula 7.5:1 or flatter backslope. This formula is derived from the RWM04 standard.

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- **Posts 1 and 2**
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**NOTES:**
- Drill 3/4" holes in W-beam connection and plate.
- Use the buried-in-backslope guardrail terminal where a backslope is reasonably close to the point where the barrier is introduced or terminated. The buried-in-backslope terminal eliminates the possibility of an end-on impact with the guardrail and reduces the likelihood of intrusions behind the barrier. The buried-in-backslope terminal designs shown in this sheet are for level 2 terminals and are calculated according to the formula 7.5:1 or flatter backslope. This formula is derived from the RWM04 standard.

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</table>

**Legend:**
- **W6x8.5 Structural Shape**
- **Posts 1 and 2**
- **Post 3 to section A-A**

**NOTES:**
- Drill 3/4" holes in W-beam connection and plate.
- Use the buried-in-backslope guardrail terminal where a backslope is reasonably close to the point where the barrier is introduced or terminated. The buried-in-backslope terminal eliminates the possibility of an end-on impact with the guardrail and reduces the likelihood of intrusions behind the barrier. The buried-in-backslope terminal designs shown in this sheet are for level 2 terminals and are calculated according to the formula 7.5:1 or flatter backslope. This formula is derived from the RWM04 standard.
NOTES

1. THE FLARED TERMINAL SHOWN IS AN EXAMPLE ONLY. FLARED TERMINAL DESIGNS VARY BY PRODUCT AND MANUFACTURER.
2. DISTANCES SHOWN FROM THE TERMINAL POSTS TO THE GRADE EXTENTS ARE MEASURED FROM THE BACK OF THE POST.
3. PROVIDE A 4% OR FLATTER SLOPE BEYOND THE GRADE EXTENTS WHERE PRACTICAL.
4. INSTALL THE TERMINAL IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO THE INSTRUCTIONS FOR SYSTEM LENGTH, EFFECT NUMBER OF POSTS, POST SATING, AND WHEN A FLARED TERMINAL IS TO BE INSTALLED ON A HORIZONTAL CURVE.
5. VERIFY THE LENGTH OF NEED POINT WITH MANUFACTURER INSTRUCTIONS FOR A SPECIFIC PRODUCT ELEMENTS. THE GUARDRAIL TERMINAL DOWNSTREAM OF THE LENGTH OF NEED POINT CAN BE INCLUDED AS PART OF THE LENGTH OF NEED.
7. IF THE FLARED TERMINAL DESIGN USES AN ANCHOR CABLE, INSTALL AN EXTRA HERRINGBONE ON EACH END OF THE CABLE.
8. AFFIX A TYPE 3 OBJECT MARKER TO THE TERMINAL END SECTION.
9. DRAWING NOT TO SCALE.
NOTES
1. THE TANGENT TERMINAL SHOWN IS AN EXAMPLE ONLY. TANGENT TERMINAL DESIGNS VARY BY PRODUCT AND MANUFACTURER.
2. USE THE PREFERRED GRADING LAYOUT WHEN PRACTICAL. THE ALTERNATIVE GRADING LAYOUT MAY BE USED WHEN UPGRADEING AN EXISTING TERMINAL WITH SITE LIMITATIONS. DISTANCES SHOWN FROM THE TERMINAL POSTS TO THE GRADING EXTENTS ARE MEASURED FROM THE BACK OF THE POST.
3. PROVIDE A 41° OR FLATTER SLOPE OUTSIDE OF THE GUARDRAIL TERMINAL GRADING EXTENTS WHERE PRACTICAL.
4. INSTALL THE TERMINAL IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO THE INSTRUCTIONS FOR SYSTEM LENGTH, EFFECTIVE NUMBER OF POSTS, POST SPACING AND WHEN A TANGENT TERMINAL IS TO BE INSTALLED ON A HORIZONTAL CURVE.
6. PROVIDE A MINIMUM OF 12" OF 3" W-BEAM GUARDRAIL BETWEEN THE GUARDRAIL TERMINAL AND A GUARDRAIL TRANSITION.
7. IF THE TANGENT TERMINAL DESIGN USES AN ANCHOR CABLE, INSTALL AN EXTRA Hex Nut ON EACH END OF THE CABLE.
8. APPLY A TYPE 3 CONTRACT MARKER TO THE TERMINAL END SECTION.
9. DRAWING NOT TO SCALE.

REVISIONS
<table>
<thead>
<tr>
<th>NO.</th>
<th>DATE</th>
<th>PURPOSE</th>
<th>DRAWN DATE</th>
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<td>FOR 11&quot; X 17&quot; PRINTS ONLY</td>
<td>12/07/2020</td>
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<td>12/07/2020</td>
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IDAHO TRANSPORTATION DEPARTMENT

STANDARD DRAWING
GUARDRAIL TERMINAL TANGENT

BOISE, IDAHO

STANDARD DRAWING NO. 612-8

English

PROFESSIONAL ENGINEER

Randy Lancaster

IDT 368-3

REVISION NO. 1
### COMPONENT DESCRIPTION

- **NO. 72" TIMBER GUARDRAIL POST**
- **RECTANGULAR GUARDRAIL PLATE WASHER**
- **TRANSITION SECTION**
- **THREE-BEAM TERMINAL CONNECTOR PLATE**
- **THREE-BEAM TIMBER POST**
- **THREE-BEAM TERMINAL CONNECTOR PLATE**
- **W-BEAM TIMBER BLOCKOUTS**

### LOW SPEED GUARDRAIL TRANSITION HARDWARE COMPONENTS TABLE

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>COMPONENT DESCRIPTION</th>
<th>QTY.</th>
<th>WIDE-FRANGE POST</th>
<th>TIMBER POST</th>
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<td>ASYMMETRICAL W-BEAM GUARDRAIL TRANSITION SECTION</td>
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<td>RW02b</td>
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<td>-</td>
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<td>THREE-BEAM BLOCKOUT</td>
<td>1</td>
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<td>P002b</td>
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</table>

### NOTES

1. The guardrail transition shown is a Mash Test Level 2 transition. Use the transition on highways where the posted speed limit is 40 MPH or less and where a semi-rigid guardrail, such as 3/8"-W-BEAM GUARDRAIL, joins a rigid barrier, such as a bridge rail, bridge parapet or concrete barrier.
2. Provide barrier hardware as shown and as specified in the publication "A Guide to Standardized Highway Guardrail Hardware," where the guide and plans conflict, provide hardware components as shown on the plans.
3. Wide-flange or timber posts may be used unless otherwise indicated. Use the same post material as in the adjoining 3/8"-W-BEAM GUARDRAIL.
4. Use timber or polyethylene blockouts with wide-flange posts. Use timber blockouts with timber posts.
5. Nail timber blockouts to timber posts to restrict block rotation.
6. When wide-flange posts are used and when practical, install the guard rail (fibers) on the upstream side of the post in relation to the adjacent traffic.
7. Overlap splines so that the exposed W-beam edge is downstream of the adjacent traffic.
8. Provide a minimum of 12-1/2" of 3/8"-W-BEAM GUARDRAIL between the guardrail transition and a guardrail terminal or anchorage.
9. Install rectangular guardrail plate washers under guardrail nuts at the splice between the three-beam guardrail and three-beam terminal connector.
10. A connector plate to keep the three-beam terminal connector in a vertical plane is optional. See the detail on the high-speed guardrail transition standard drawing.
11. Delimitate the transition. See the delineator standard drawing.
12. Drawing not to scale.
CONCRETE BARRIER TO THREE-BEAM TRANSITION CONNECTOR PLATE

**CONNECTOR BOLT DETAIL**

**STIFFENER DIMENSION TABLE**

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**CONNECTION PLATE STIFFENER DETAIL**

SEE NOTE NO. 8
1. Use the transition in highways where the posted speed limit is 45 MPH or higher and where 31” W-beam guardrail joins a bridge rail or parapet. Cast-in-place concrete barrier or Precast concrete barrier. The guardrail transition shown is considered to be a crash test level 3 transition.

2. Provide barrier hardware as shown and as specified in the publication "A guide to standardized highway barrier hardware" where the guide and plans conflict, provide hardware components as shown on the plans.

3. Wide-flange or timber posts may be used unless otherwise indicated. Use the same post material as in the adjoining 31” W-beam guardrail.

4. Use timber or W-beam blockouts with wide-flange posts. Use timber blockouts with timber posts. Use the same blockout material as in the adjoining 31” W-beam guardrail. Use W-beam timber blockouts to timber posts to restrict block rotation.

5. When wide-flange posts are used and when practical, install the bolts (FBB02) on the upstream side of the post in relation to the adjacent traffic.

6. Construct curb type 5 beneath the three-beam section as shown. The curb can be cast-in-place or precast.

7. The following apply to varying barrier connections:

   A. Bridge rail or parapet see bridge plans.

   B. Cast-in-place concrete barrier use the concrete barrier to three-beam transition connector plate.

   C. Precast concrete barrier:

      1. Use the concrete barrier to three-beam transition connector plate.

      2. Chamfer the first 4 1/2’ inches of the barrier that extends beyond the face of the curb beneath the transition.

      3. Use anchor pins to pin down the first three barrier sections.

8. The following apply to the concrete barrier to three-beam terminal connector plate:

   A. Use ASTM A56 steel.

   B. Use 3/4” thick steel for flat plates PL and P2. Use 3/4” thick steel for stiffeners S3 through S10.

   C. Weld components with E60 rod.

   D. Weld stiffeners located on the outside edges of the cover plates with 3/4” continuous back weld on external sides and 1/4” fillet weld by 1” long spaced at 2’ on internal sides.

   E. Weld stiffeners located on the inside of the cover plates with 1/4” fillet weld by 1” long spaced at 2” on internal sides.

   F. Weld rectangular and triangular cover plates together with a 3/4” continuous back weld on both sides.

   G. Galvanize connector plates after punching and assembly.

   H. Galvanize the three-beam terminal connector plate.

9. Provide a minimum of 12-6” of 31” W-beam guardrail between the guardrail transition and a guardrail terminal or anchor.

10. Install rectangular guardrail plate washers under guardrail nuts at the splice between the three-beam guardrail and three-beam terminal connector.

11. Delineate the transition with type 9 delineators. See the delineator standard drawing for delineator spacing.

12. Drawing not to scale.
FREE-STANDING BARRIER

BARRIER ANCHOR PINNED TO CONCRETE PAVEMENT

BARRIER ANCHOR PINNED TO ASPHALT PAVEMENT

MEDIAN BARRIER ANCHOR PINNED

TRANSITION FROM FREE-STANDING TO ANCHOR PINNED AND FROM ANCHOR PINNED TO RIGID BARRIER

(SEE NOTE NO. 5 THROUGH 8)

REVISIONS

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IDAHO TRANSPORTATION DEPARTMENT

BOISE, IDAHO

STANDARD DRAWING

PRECAST CONCRETE BARRIER

STANDARD DRAWING NO. 612-18

SHEET 2 OF 3

ORIGINAL DRAWING

DESIGN TRAFFIC SERVICES ENGINEER

PROFESSIONAL ENGINEER

STATE OF IDAHO

13663

RANE LANCASHIRE
CONCRETE BARRIER SHY-LINE
OFFSET AND FLARE RATE TABLE

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NOTES
1. THE PRECAST CONCRETE BARRIER SHOWN IS A MASS TEST LEVEL 3
   LONGITUDINAL BARRIER SYSTEM. THE BARRIER USES THE F-BAR
   CROSS SECTION.
2. PRECAST USING CLASS C40 CONCRETE, CHAMFERED TOP, BOTTOM AND
   ENDS 3/4" PROVIDE "A" MINIMUM CONCRETE COVER OVER REINFORCING
   STEEL A 2" WHITE PVC SLEEVE MAY BE USED TO FORM THE LIFTING
  ホールS IF NEEDED LEAVE THE PVC SLEEVE IN PLACE.
3. PIN CONNECT BARRIER UNITS; PRECAST CONCRETE BARRIERS MAY BE
   ANGLED APPROXIMATELY 2° AT CONNECTIONS
4. PROVIDE THE CALCULATED LENGTH OF NEED UPSTREAM FROM HAZARDS
   AND DOWNSTREAM AT LEAST THREE PRECAST CONCRETE BARRIER
   HINTS. DOWNSTREAM OF HAZARDS, DO NOT INSTALL SHORTER THAN SIX BARRIER
   SEGMENTS.
5. THE PRECAST CONCRETE BARRIER CAN BE INSTALLED FREE-STANDING
   OR ANCHOR PINS TO PAVEMENT
   A. IF FREE-STANDING, INSTALL THE TWO BARRIER SEGMENTS NEAREST THE
      ENDS OF THE CONCRETE BARRIER TERMINAL WITH ANCHOR PINS AS DESCRIBED
      IN NOTE 6.
   B. IF ANCHORED, INSTALL THE PINS IN EACH BARRIER SEGMENT
      INSTALLED IN CONCRETE PAVEMENT AND USE THREE PINS IN EACH
      BARRIER SEGMENT INSTALLED IN ASPHALT PAVEMENT. IF ANCHOR
      PINS IN A PAVEMENT, INSTALL ANCHOR PINS ON BOTH SIDES OF THE
      BARRIER IN TOTAL 6 CONCRETE PAVEMENT & 6 TOTAL IN ASPHALT
      PAVEMENT. PRE-DRILL ANCHOR PIN HOLES IN CONCRETE PAVEMENT
      USING THE LIST AS A GUIDE.
6. WHEN TRANSITIONING FROM FREE-STANDING TO ANCHOR PINS, INSTALL
   ANCHOR PINS IN THE BARRIER 6" THE ENDS OF THE BARRIER TO BE
   CONNECTED. INSTALL THE LAST BARRIER SEGMENT CLOSEST TO THE FIRST ANCHOR PINS.
7. WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO FIXED BARRIER
   ELEVATION AS CONCRETE-PHASE CONCRETE BARRIER ON BRIDGE PARAPET, TRANSITION FIRST TO
   ANCHOR PINS PRECAST BARRIER MINIMUM THREE SECTIONS. THEN TO THE BARRIER. CUT OFF THE
   END HOLES OF THE LAST SEGMENT OF PRECAST BARRIER IN THE F-SHAPE TO
   SINGLE HOLES TRANSITION.
8. WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO BRIDGE
   GUARDRAIL, INSTALL THE LAST THREE PRECAST CONCRETE BARRIER
   SEGMENTS AND CONNECT TO A GUARDRAIL TRANSITION CHAMFERED THE
   LAST 4\(\frac{1}{2}\)" INCHES OF THE BARRIER AND DRILL 6" DIAMETER
   HOLE AS SHOWN.
9. FLARE THE UPSTREAM END OF THE BARRIER IN ACCORDANCE WITH
   THE CONCRETE BARRIER SHY-LINE OFFSET AND FLARE RATE THEN
   SHY-LINE OFFSET AT OR BEFORE SHY-LINE.
10. TERMINATE THE BARRIER WITH A CASHINISH END TREATMENT OR
    CONNECT TO ANOTHER SYSTEM. ACCEPTABLE END TREATMENTS INCLUDE
    TAPERING THE BARRIER OUTSIDE OF THE CLEAR
    ZONE, TRANSITIONING TO BRIDGE GUARDRAIL, A CRASH MODULE,
    A PRECAST CONCRETE BARRIER TERMINAL, OR TRANSITION TO A BRIDGE
    PARAPET. WHEN CONNECTING THE F-SHAPE PRECAST BARRIER TO A NJ-SHAPE PRECAST CONCRETE
    BARRIER USE THE F-SHAPE TO NJ-SHAPE TRANSITION.
11. DRAWINGS NOT TO SCALE.

REVISIONS
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IDHO TRANSPORTATION
DEPARTMENT

BOISE, IDAHO

PRECAST CONCRETE BARRIER

STANDARD DRAWING

BOISE, IDAHO

DESIGN/TRAFFIC SERVICES ENGINEER

STANDARD DRAWING NO.

13663

PROFESSIONAL ENGINEER
TERMINAL TYPE A REINFORCING STEEL TABLE

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**TERMINAL TYPE A**

**Connecting Pin Detail**

**Anchor Pin Detail**

**End Loop Bar Detail**

**Barrier Connection** (See Steel Loop Bar Detail and Slot Detail)

**End View**

**Plan**

**Section A-A**

**Elevation**

**Key Detail**

**Slot Detail**
NOTES

1. THE TYPE A TERMINAL MAY BE USED ON THE TRAILING END OF PRECAST CONCRETE BARRIERS IF THE TERMINAL IS OUTSIDE OF THE CLEAR-ZONE OF TRAVEL LANES IN THE OPPOSING DIRECTION.

2. THE TYPE B TERMINAL MAY BE USED WITHIN THE CLEAR-ZONE WHEN TRAFFIC SPEEDS ARE 40 MPH OR LESS AND THE AVAILABLE SPACE IS LIMITED BY RIGHT-OF-WAY CONSTRAINTS OR OTHER ROADSIDE FEATURES THAT PRECLUDE USING A GUARDRAIL TERMINAL OR CRASH CUSHION.

3. PRECAST TYPE A TERMINAL WITH CLASS 30AF OR HIGHER STRENGTH CONCRETE, PRECAST TYPE B TERMINAL WITH Class 50AF concrete, CHAMFER TOP, BOTTOM, AND ENDS. PROVIDE 2" MINIMUM CONCRETE COVER OVER PRECAST TYPE A TERMINAL WITH CLASS 30AF OR HIGHER STRENGTH CONCRETE. CHAMFER TOP, BOTTOM, AND ENDS.

4. PIN CONNECT THE TERMINALS TO CONCRETE BARRIERS.

5. ANCHOR PIN THE TERMINALS AT THE TAPERED END. ENSURE THE ANCHOR PIN DOES NOT PROTRUDE BEYOND THE EXTERIOR OF THE TERMINAL SURFACE.

6. DRAWING NOT TO SCALE.
REINFORCING STEEL TABLE

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1. USE THE F-SHAPE TO NEW JERSEY SHAPE TRANSITION TO CONNECT F-SHAPE PRECAST CONCRETE BARRIER TO NEW JERSEY SHAPE PRECAST CONCRETE BARRIER. A 2" WHITE PVC SLEEVE MAY BE USED TO FORM THE LIFTING HOLE IF USED. LEAVE THE PVC SLEEVE IN PLACE.

2. PRECAST WITH CLASS 50 AF CONCRETE. CHAMFER TOP, BOTTOM, AND ENDS. PROVIDE 2" MINIMUM CONCRETE COVER OVER REINFORCING STEEL.

3. PIN CONNECT THE TRANSITION TO THE ADJACENT PRECAST CONCRETE BARRIERS.

4. DRAWING NOT TO SCALE.

NOTES

CONCRETE BARRIERS.

AND ENDS . PROVIDE 2" MINIMUM CONCRETE COVER OVER PRECAST WITH CLASS 50 AF CONCRETE. CHAMFER TOP, BOTTOM, AND ENDS. PROVIDE 2" MINIMUM CONCRETE COVER OVER REINFORCING STEEL.

F-SHAPE TO NEW JERSEY SHAPE TRANSITION

2" DIA. CIRCULAR ASTM A36 WARMER ¼" MINIMUM THICKNESS

SECTION A-A

SECTION B-B

SECTION C-C

NEW JERSEY SHAPE

SLOT DETAIL

KEY DETAIL

CONNECTING PIN DETAIL

END LOOP BAR DETAIL

DETAIL SEE KEY

DETAIL SEE KEY

DETAIL SEE KEY

IDAHOTRANSPORTATION DEPARTMENT

STANDARD DRAWING

F-SHAPE TO NEW JERSEY SHAPE TRANSITION

DRAWING DATE: MARCH 2019

ORIGINAL SIGNED BY KEVIN SABLAN

DESIGN/TRAFFIC SERVICES ENGINEER

612-24

STATE OF IDAHO

PROFESSIONAL ENGINEER

13663

REIVER LAI FRIEDIAN

STATEBAR EXAM BOARD

602-24-0419

602-24-0419

602-24-0419
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### Diagrams

1. **Elevation (Traffic Side)**
   - F-SHAPE PRECAST CONCRETE BARRIER
   - SINGLE SLOPE PARAPET

2. **Elevation (Field Side)**
   - F-SHAPE PRECAST CONCRETE BARRIER
   - SINGLE SLOPE PARAPET

3. **Plan**
   - F-SHAPE PRECAST CONCRETE BARRIER
   - SINGLE SLOPE PARAPET

4. **Section A-A**
   - ALIGNED F-SHAPE AND SINGLE SLOPE HERE

5. **Details**
   - GUARDRAIL BOLT AND RECESSED NUT
   - STRUCTURAL HEX BOLT AND NUT
   - RECTANGULAR GUARDRAIL PLATE WASHER

### Notes
- **FBB01**, SEE NOTE NO. 7
- **FWR03**, PRINTS ONLY ARE FOR 11" X 17" SCALES SHOWN
- **DRAWING DATE:** MARCH, 2019
- **DESIGN/Traffic Services Engineer:**
- **CADD FILE NAME:** 612-25_0419.dgn
- **STANDARD DRAWING NO:** 612-25
- **ORIGINAL SIGNED BY:** KEVIN SABLAN
- **PROFESSIONAL ENGINEER:**
- **STATE OF IDAHO:**
- **BOISE, IDAHO**
- **Official Scales by KEVIN SABLAN**
- **Design Traffic Services Engineer**
1. Use the transition to connect F-shape precast concrete barrier to 42" single slope bridge parapet. The F-shape to single slope transition shown is a NCHT Test Level 3 System.

2. Anchor pin the last three F-shape precast concrete barrier. The pavement beneath the precast concrete barrier can be asphalt or concrete. See the precast concrete barrier standard drawing.

3. Cut the end loops off of the precast concrete barrier closest to the single slope bridge parapet. Butt the precast concrete barrier up against the single slope bridge parapet and align the barrier faces at the top traffic side corner of the precast concrete barrier.

4. The top and sides of the transition cap may be manufactured from separate plates and welded together at the joint. A single bent plate (end radius ½") max., or a combination of the two.

5. Fabricate the transition cap and field side strap from ASTM A36 steel. Fabricate the transition cap with ⅜" thick steel. Fabricate the field side strap with ½" thick steel galvanized fabricated parts after assembly.

6. Chamfer the top corners of ribs with a ¾" chamfer.

7. Install rectangular guardrail plate washers under guardrail nuts at the splice between the three-beam guardrail and three-beam terminal connector. Install under the bolt head on upstream end and under nut on downstream end.

8. Drawing not to scale.

SEE NOTE NO. 4 THROUGH 6

SEE NOTE NO. 5

SEE NOTE NO. 8
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**NOTES**

1. THE BULLNOSE CRASH CUSHION IS TYPICALLY USED TO SHIELD NARROW MEDIAN HAZARDS SUCH AS BRIDGE PIERS OR OVERHEAD SIGNS, TO SHIELD THE GAP BETWEEN TWIN BRIDGES, AND FOR SOME AREA PROTECTION.

2. SYMMETRICAL OR ASYMMETRICAL DESIGNS MAY BE USED.

3. EITHER THE WOOD OR THE STEEL POST OPTION MAY BE CHOSEN. DO NOT MIX WOOD AND STEEL POSTS.

4. ENSURE THAT GRADING UNDER, AROUND, AND IN FRONT OF THE BULLNOSE CRASH CUSHION IS 10:1 OR FLATTER UP TO AT LEAST POST NO. 9.

5. POST NO. 7 THROUGH 7 ARE SPACED AT 3'-11" INTERVALS.

6. QUANTITIES SHOWN IN THE BULLNOSE CRASH CUSHION HARDWARE COMPONENTS TABLE ARE FOR RAIL SECTION NO. 1 THROUGH 3 AND THE FIRST TWO 2-SPACE THREE-BEAM GUARDRAIL SECTIONS AND POST NO. 1 THROUGH 10.

7. TORSUE THE OUTSIDE NUT ON EACH END OF THE ANCHOR CABLE A MINIMUM OF 100 FT-LBS AGAINST THE INSIDE NUTS.

8. DRAWING NOT TO SCALE.

**DEFINITIONS**

- **RPT POST** - BREAKAWAY CABLE TERMINAL POST - A NON-PROPRIETARY WOOD POST USED IN GUARDRAIL ANCHORS.
- **CRT POST** - CONTROLLED-RELEASE TERMINAL POST - A NON-PROPRIETARY, WRENCHED WOOD POST.
- **UBSP** - UNIVERSAL BREAKAWAY STEEL POST - A NON-PROPRIETARY FRAGMENTING-BOLT STEEL POST.

**TASK FORCE 13** - A JOINT AASHTO, AGC, AND ARTBA SUBCOMMITTEE ON NEW HIGHWAY MATERIALS AND TECHNOLOGIES. THE TASK FORCE ASSIGNED COMPONENT AND SYSTEM NUMBERS AND MAINTAINS A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.

**Drawing Not to Scale**

**Original Signed By:** TED E. MASON

**PREPARED FOR:** DESIGNER

**DESIGNER:** TED E. MASON

**REVISIONS**

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**STANDARD DRAWING**

- **BULLNOSE CRASH CUSHION**
  - **STANDARD DRAWING NO.** 613-1
  - **Original Signed By:** TED E. MASON
  - **Designated as:** DEPS DESIGN ENGINEER
  - **Prepared For:** DESIGNER
  - **Prepared By:** TED E. MASON
  - **Prepared Date:** DEPDESIGN ENGINEER

**Boise, Idaho**

**5-20 02-20 10-03 06-02 12-04 09-10 09-15 13683 13869 13870 13871 13872**

**Language:** English

**Scale:** 1/4" = 1'-0"

**Prints Only**

**Drawings Only For 11" x 17" Scales Shown**

**Drawing Date:** 8-6-01

**CADD FILE NAME:** 613-1_0420.dgn

**Printed: BOISE, IDAHO 3311 West State Headquarters**

**State of Idaho**

**PROFESSIONALLY LICENSED ENGINEER**

**13683**

**Randy Lancaster**

**13869 13870 13871 13872**

**REVISIONS**

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1. Sidewalks may consist of a pedestrian circulation path and a pedestrian access route. The pedestrian circulation path is a prepared surface provided for pedestrian travel in the public right-of-way. The pedestrian access route is a continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path.

2. Provide at least 4" of continuous clear width of pedestrian access route, exclusive of the curb width, where sidewalks are wider than 4". Only a portion of the sidewalk is required to be part of the pedestrian access route.

3. Provide a passing space at 200' or shorter intervals when the clear width of the pedestrian access route is less than 5'.

4. Ensure that the cross slope of the pedestrian access route within the sidewalk does not exceed two percent.

5. Vertical surface discontinuities may occasionally occur at expansion joints, utility covers, vault frames, and gratings within the sidewalk. Ensure that vertical surface discontinuities do not exceed 1/4" or less. Vertical surface discontinuities between 1/2" and 7/8" with a 2:1 slope across the entire vertical surface discontinuity.

6. Ensure that horizontal openings in gratings and joints do not permit passage of a sphere more than 3/4" in diameter.

7. Objects protruding into or overhanging a pedestrian circulation path must not reduce the minimum clear width of the pedestrian access route. Protruding objects include street furniture, street lights, utility poles, equipment cabinets, sign posts and signs, parking meters, trash receptacles, public telephones, mailboxes, newspaper vending machines, benches, transit shelters, bicycle racks, planters, and planted trees, and street sculptures.

8. Provide detectable warning surfaces on pedestrian refuge islands with curb ramps or when cut-through at street level and refuge island widths are greater than six feet in the direction of pedestrian travel. Do not install detectable warning surfaces at pedestrian refuge islands that are cut-through at street level and are less than six feet in width in the direction of pedestrian travel. See standard drawing 614-3 for detectable warning surface details.

9. Use a bond preventative between the sidewalk and curb when constructed separately and placed adjacent to each other.

10. Align curbs and sidewalk joints. Construct joints at 5' intervals that are approximately 1/2" wide and 1/8" in depth. Construct a longitudinal joint when the sidewalk is 8" wide or wider. Install a preformed expansion joint filler every 40'.

11. Drawing not to scale.
SYMBOL LEGEND

1. 1.0% TO 2.0% SLOPE
2. 5.0% TO 8.3% RUNNING SLOPE
3. 2.0% OR FLATTER CROSS SLOPE
4. 10.0% OR FLATTER SLOPE

NOTES

1. EXTENTS OF DRIVEWAY PAY ITEMS ARE SHOWN IN GRAY SHADING.
2. SEE THE SIDEWALKS STANDARD DRAWING FOR NOTES RELATED TO THE PEDESTRIAN ACCESS ROUTE.
3. DO NOT PLACE DETECTABLE WARNING SURFACES ON DRIVEWAYS.
4. USE A BOND PREVENTATIVE BETWEEN THE DRIVEWAY OR SIDEWALK AND CURB WHEN CONSTRUCTED SEPARATELY AND PLACED ADJACENT TO EACH OTHER.
5. ALIGN ALTERNATING CURB AND SIDEWALK JOINTS. CONSTRUCT DRIVEWAY AND SIDEWALK JOINTS AT 5' INTERVALS. USE A BOND PREVENTATIVE BETWEEN THE DRIVEWAY OR SIDEWALK AND CURB WHEN CONSTRUCTED SEPARATELY AND PLACED ADJACENT TO EACH OTHER.
6. DRAWING NOT TO SCALE.

SEE CURB CUT DETAIL

SECTION A-A

SECTION B-B

SECTION D-D

SECTION C-C
PERPENDICULAR CURB RAMP

MINIMUM EXTENT OF TURNING SPACE

DETECTABLE WARNING SURFACE (SEE NOTE No. 66)

CURB RAMP STATION LOCATION

CLEAR SPACE

COUNTERTOP SLOPE (SEE NOTE No. 59)

SEES CURB DETAIL

ISOMETRIC VIEW

EXAMPLE APPLICATIONS

SYMBOL LEGEND

1) 1.0% TO 2.0% SLOPE

5) 5.0% TO 8.3% RUNNING SLOPE, 2.0% OR FLATTER CROSS SLOPE

2) 10.0% OR FLATTER SLOPE

NOTE NO. 4)

(SEE NOTE)

SPACE CLEAR

NOTE NO. 3)

(SEE NOTE)

MINIMUM CURB (OPTIONAL)

SIDE FLARED

RAMP OPTIONS

FLARED-SIDES

CLEAR SPACE

TREAT AS TWO SEPARATE RAMPS

FLARED-SIDES

TREAT AS TWO SEPARATE RAMPS

SPACE CLEAR

NOTE NO. 6)

(SEE NOTE)

SIDE FLARED

LOCATION STATION/CURB RAMP

10.0% OR FLATTER SLOPE

1.0% TO 2.0% SLOPE

2.0% OR FLATTER CROSS SLOPE

NOTE NO. 11)

SURFACE (SEE WARNING DETECTABLE)

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Combination Curb Ramp

Isometric View

Curb Cut Detail

Symbol Legend

1.0% to 2.0% Slope
5.0% to 8.3% Running Slope,
2.0% or Flatter Cross Slope
10.0% or Flatter Slope

Example Applications

IDaho Transportation Department

Standard Drawing No. 614-3

Curb Ramps

Boise, Idaho

Original Signed by Kevin Sabil
Design Traffic Services Engineer

Scales shown are for 11" x 17" prints only.
1. Transition between different types over 10 feet.
2. Provide 4 inches of aggregate base under curb and gutter, curb or gutter unless the curb is placed on pavement.
3. Portland cement concrete curb or traffic separator on asphalt concrete pavement
   Provide a key in the pavement at the centerline of the curb or traffic separator. See the key detail
   Concrete curbs or traffic separators may be pinned to the pavement structure in lieu of the key. Drill the key hole and place pins before the curb or traffic separator is constructed. See the pin detail
   Portland cement concrete curb or traffic separator on Portland cement concrete pavement
   Use an epoxy bonding agent. No key is needed.
   Asphalt concrete curb or traffic separator on asphalt concrete pavement
   No key is needed. Ensure that the curb is bonded to the pavement.
4. Ensure that the gutter slope does not exceed 5 percent at curb ramps.
5. Taper the last 6 feet of curb and gutter types 1, 2, 3, and 4 and curb types 1 and 2 down to a 1 inch height. Taper curb types 3, 4, and 5 and traffic separators types 1 and 2 down to a 1 inch height at a 1:1 slope.
6. Drawing not to scale

NOTE NO. 3

Traffic Separator Type 1
Traffic Separator Type 2
Curb and Gutter Type 1
Curb and Gutter Type 2
Curb and Gutter Type 3
Curb and Gutter Type 4
Curb Type 1
Curb Type 2
Curb Type 3
Curb Type 4
Curb Type 5
Gutter Type 1

Key Detail
Pin Detail
Section A-A
Curb Terminus Detail

Original Signed by: Kevin Sablan
Date: 01/01/2014

Revisions

1. Standard Drawing
2. Idaho Transportation Department
3. Boise, Idaho
4. Rev. 1
5. Sheet 1 of 1
6. 615-1
NOTES:
1. ALL MOUNTING HOLES SHALL BE \( \frac{1}{8} \)" DIAMETER.
EXTRUDED ALUMINUM SIGN PANELS

NOTE:
1. ASSEMBLE EXTRUDED ALUMINUM SIGN PANELS STARTING WITH THE TOP PANEL. CENTER THE PANEL ON THE SIGN POST. ENSURE PANELS ARE HORIZONTAL AND ATTACHED TO THE POSTS WITH POST CLIPS AND POST CLIP BOLTS. STEM THE POST CLIPS AND BOLTS ON BOTH SIDES OF EACH POST AS SHOWN. ENSURE THAT ADJACENT PANELS ARE FLUSH BEFORE TIGHTENING PANEL BOLTS.

2. TORQUE NYLOCK NUTS ON THE POST CLIP BOLTS TO 225 INCH POUNDS WITH DRY CLEAN UNLUBRICATED THREADS.

3. WHEN MODIFYING AN EXISTING SIGN AND ADDITIONAL POST CLIPS ARE TO BE INSTALLED TO THE INSIDE OF THE SIGN POST, THE CONTRACTOR IS PERMITTED TO FIELD DRILL FOR A POST CLIP INSERTION HOLE IN EXISTING EXTRUSIONS.

4. THE CLIP ASSEMBLY IS TO BE ALL ALUMINUM OR ALL STAINLESS STEEL.
**LEGEND**

- C: Distance from edge of shoulder to center of first post
- D: Distance between posts
- F1, F2: Vertical distance from top of the foundation to the pavement elevation at the edge of the shoulder
- PL, P2: Total post length
- R1, R2: Post length up to the hinge
- T: Overall height of sign
- W: Overall width of sign

**NOTES**

1. Use Type A - Wide Flange Posts with extended aluminum signs where the #1 post is insufficient. Use Type A - Wide Flange Posts in pairs.
2. See project sign summary for sign assembly dimensions.
3. Cast foundation in native soils in an augered hole. If an augered hole is impractical, use the foundation in a corrugated metal pipe and backfilled in accordance with Section 8.6 if approved by the Engineer.
4. If solid bedrock is encountered, place vertical reinforcing steel for the depth shown in pole foundation. Minimum depth to hardpan, minimum diameter shall be 4.5. The depth shall be greater than 12" but less than 36". The radius of the foundation may be required.
5. Ensure the foundation and non-breakaway parts of the base do not protrude more than 12 inches above the ground surface.
6. Install breakaway support system in accordance with manufacturer's instructions. Use anchor template to hold anchors solid and level.
7. Drawing not to scale.
TYPICAL INSTALLATION OF SIGNS WITH BRACE ANGLES

TYPICAL INSTALLATION OF MULTIPLE SIGNS WITH BRACE ANGLES

LEGEND

C = Distance from edge of shoulder to center line of first post.
E = Height above the edge of finished shoulder to the bottom of lower sign.
F = Vertical distance from top of foundation to the elevation of the edge of the shoulder.
G = The distance from the top of the foundation to the bottom of the lower sign.
H = Overall height of signs.
P = Total post length.

TYPICAL SIGN ORIENTATION

9. Refer to Standard Drawings 616-15, 616-16, 616-17 for clip and brace angle details.
11. Refer to Standard Drawing 616-4 for hole spacing.
12. Drawing not to scale.

TYPICAL INSTALLATION EXTRUDED ALUMINUM SIGNS
2" x 2" SIGN POST INSTALLATION DETAILS

1. Ensure that the bottom of anchor is kept open to drain.
2. Install sign post and anchor in foundation or embed into solid rock. Ensure that the 2" x 2" post installations are embedded 18" into solid rock and 2" x 2" post installations are embedded 24" into solid rock.
3. Refer to ITD qualified products list for breakaway devices.
4. Do not use brace angles.
5. Drawing not to scale.
SIGN POST DETAILS TABLE

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<td>0-1</td>
<td>4&quot;x4&quot;</td>
<td>3'-6&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>4&quot;x6&quot;</td>
<td>4'-0&quot;</td>
<td>1½&quot;</td>
<td>½&quot; DIA.</td>
</tr>
<tr>
<td>0-3</td>
<td>6&quot;x6&quot;</td>
<td>5'-0&quot;</td>
<td>2&quot;</td>
<td>2&quot; DIA.</td>
</tr>
<tr>
<td>0-4</td>
<td>8&quot;x6&quot;</td>
<td>6'-0&quot;</td>
<td>3&quot;</td>
<td>3&quot; DIA.</td>
</tr>
<tr>
<td>0-5</td>
<td>8&quot;x8&quot;</td>
<td>6'-0&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIGN POST DETAILS TABLE NOTES:

1. 3'-6" CLEAR DISTANCE BETWEEN 4'-8" POSTS OR LARGER.
   FULL WIDTH SIGN CUT NOTICES ARE REQUIRED ON ALL TWO POST INSTALLATIONS.
   OMIT NOTCH FOR SINGLE POST INSTALLATIONS.

2. BREAKAWAY POST FOR 3'-6" x 8" POST IS ONLY APPROVED FOR USE OUTSIDE THE CLEAR ZONE OR WITHIN CLEAR ZONE WHEN PROTECTED BY GUARD RAIL OR OTHER NON-BREAKAWAY DEVICES.

3. BREAKAWAY HOLES SHALL BE FIELD DRILLED POSTS 4"x4" AND LARGER.

4. IF THE LOWER SIGN IS AN OBJECT MARKER, THE BREAKAWAY HOLES SHALL BE DRILLED PARAEL TO THE SIGN FACE.

5. POSTS SHALL BE PRESSURE TREATED ACCORDING TO SECTION 710.09.

6. SEE SIGNING ERECTION SPECIFICATIONS SHEET IN PLANS FOR "C" DIMENSION.
BRACKETS BR-1 THRU BR-4 MOUNT ON TYPE A POSTS.

2. BRACKETS BR-5 THRU BR-7 MOUNT ON TYPE B POSTS.

3. BRACKET MATERIALS:

- ½" x 2" BAR AT 1.70 LBS/FT. FOR ALL VERTICAL SUPPORTS AND FOR HORIZONTAL MEMBERS, BR-1 THRU BR-4.
- 1½" x 1 ½" x ½" ANGLE AT 2.77 LBS/FT. FOR HORIZONTAL MEMBERS, BR-5 THRU BR-7.

4. ALL SIGN MOUNTING HOLES SHALL BE ¾" DIA.

5. BRACKETS SHALL BE ATTACHED TO THE POST BY ¾" DIA. HEX HEAD BOLTS & NUTS WITH TWO FLAT WASHERS AND ONE LOCK WASHER.

6. L BRACKET LENGTH FOR BR-1 THRU BR-3 = POST SPACING PLUS ONE POST WIDTH.

NOTE: FOR BRACKETS THAT REQUIRE THE ABOVE MODIFICATION
ADD AN "A" TO THE BRACKET NUMBER: EXAMPLE BR-3A
1. Weights of brace angles do not include galvanizing.
2. All brace angles shall be 1"x1"x1/8" at 2.77 lbs./ft.
3. Drawing is not to scale.

NOTE:
- These brace angle assemblies may be modified to accommodate additional cardinal route markers above each route shield as shown on the plans.
- Confirming route markers do not require the vertical brace angles.

Top View
- Vertical brace angle
- Lower brace angle

Details:
- X x X
- A
- B

Sec. AA
- Vertical brace angle
- Lower brace angle

Sec. X-X
- Vertical brace angle
- Lower brace angle

Details A
- 1/8" hole
- 3/8" x 3/8" flat washer
- 3/8" lock washer
- 1/4" x 2" flat washer
- 3/16" x 3/8" non-metallic flat washer
- 3/16" x 3/8" machine bolt

Typical sign attachment detail
- Vertical brace angle
- Sign
- Bolt
- Machine screw
- Medium spring
- Lock washer
- Flat washer
- Washer

Notes:
- Assemblies
- Weight of brace angles
- Horizontal brace angle

Steady State, Inc.
36" Route and Auxiliary Sign Brace Angle Assemblies
Requires Std. DWG. 616-6

Boise, Idaho

Drawn by: [Name]
Checked by: [Name]
1. MATCH THE DELINEATOR COLOR TO THE ADJACENT PAVEMENT MARKINGS. USE RED DELINEATORS ON TRUCK ESCAPE RAMPS OR ON THE REVERSE SIDE OF A DELINEATOR TO INDICATE TRAVEL IN THE WRONG DIRECTION ON HOVER OF ONE-WAY MARKING OF DELINEATION.

2. SPACE DELINEATORS @ 20 FEET (6.1 M) APRON ON MAINLINE TANGENT SECTIONS. SPACE DELINEATORS ON CURVES IN ACCORDANCE WITH THE HORIZONTAL CURVE SPACING TABLE. SPACE DELINEATORS 200 FEET (60 M) Apart ON RAMP TANGENT SECTIONS. SPACE RED DELINEATORS ON TRUCK ESCAPE RAMPS AT 50 FOOT INTERVALS.

3. DELINEATE ACCELERATION AND DECELERATION LANES WITH DOUBLE DELINEATORS SPACED AT 500 FOOT INTERVALS.

4. DELINEATE GUARDRAIL AND CONCRETE BARRIERS. SPACING MAY BE REDUCED ON GUARDRAIL AND CONCRETE BARRIER TO FORM A CONTINUOUS OR NEARLY CONTINUOUS "RING" OF DELINEATION.

5. WHEN UNIFORM SPACING IS INTERRUPTED BY DRIVEWAYS, INTERSECTIONS, OR OTHER FEATURES, REDUCE THE DELINEATOR IN EITHER DIRECTION FOR A DISTANCE NOT EXCEEDING ONE QUARTER OF THE UNIFORM SPACING. DELINEATORS STILL FALLING WITHIN SUCH FEATURES MAY BE ELIMINATED.

6. MEASURE DELINEATOR HEIGHT VERTICALLY FROM THE BOTTOM OF THE LOWEST REFLECTIVE DEVICE TO THE ELEVATION OF THE EDGE OF NORMAL SHOULDER. DELINEATORS ATTACHED TO GUARDRAIL, GUARDRAIL POSTS, OR CONCRETE BARRIER MAY BE INSTALLED LOWER THAN 48".

7. RED OR FLEXIBLE POSTS MAY BE USED FOR TYPES 1, 2, 3, AND 4. PROJECT PLANS MAY INDICATE WHICH POST TYPE TO USE.

8. ON GUARDRAIL AND CONCRETE BARRIERS, USE TYPE 9 DELINEATORS OR TYPE 1, 2, 3, OR 4 DELINEATORS BEHIND THE BARRIER.

9. TYPE 9 DELINEATORS VARY IN SHAPE AND MAY BE ATTACHED TO THE TOP OR SIDE OF W-BEAM GUARDRAIL, GUARDRAIL POSTS, OR CONCRETE BARRIER. "B-STYLE" GUARDRAIL DELINEATORS ARE USED, ENSURE THAT THE DELINEATORS ARE PLASTIC.

10. DRAWINGS NOT TO SCALE.

HORIZONTAL CURVE SPACING TABLE

<table>
<thead>
<tr>
<th>Radius of Curve (Feet)</th>
<th>Approximate Spacing in Curve (Feet)</th>
<th>1st Space from Curve (Feet)</th>
<th>2nd Space from Curve (Feet)</th>
<th>3rd Space from Curve (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>200</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>300</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>400</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
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<tr>
<td>500</td>
<td>25</td>
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<td>600</td>
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<td>700</td>
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<td>800</td>
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<td>80</td>
<td>120</td>
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<tr>
<td>900</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
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<tr>
<td>1,000</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>1,100</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>1,200</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>1,300</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td>1,400</td>
<td>25</td>
<td>50</td>
<td>80</td>
<td>120</td>
</tr>
</tbody>
</table>

NOTES:

- DRAWINGS NOT TO SCALE.
- DELINEATORS VARY IN SHAPE AND MAY BE ATTACHED TO THE TOP OR SIDE OF W-BEAM GUARDRAIL, GUARDRAIL POSTS, OR CONCRETE BARRIER. "B-STYLE" GUARDRAIL DELINEATORS ARE USED, ENSURE THAT THE DELINEATORS ARE PLASTIC.

- DRAWINGS NOT TO SCALE.
MILEPOST SIGNS

3/4" Holes Typical

2" x 2" Perforated Square Tubing Sign Post 12 Gauge 2.42 lb./ft. Weight

2 1/2" x 2 1/2" Galvanized Square Tubing Anchor Post 7 Gauge No Perforations 5.09 lb./ft. Weight

CLASS 30 CONCRETE

GROUND LINE

SECTION A-A

SIGN POST INSTALLATION DETAILS

6" Corner Bolt with Locknut & Two Flat Washers or a 3/4" Flange Bolt with Nut See Corner Bolt Detail

2" x 2" Min. Behind Curb

4'-0" Min., 30'-0" Max.

EXPRESSWAY OR FREEWAY

TYPE 1

1/4" x 2 1/2" Bolt with Flat Washer & Locknut

TYPE 1

1/4" Non-Metallic Washer & Flat Washer

TYPE 2

1/4" x 2 1/2" Bolt with Flat Washer & Locknut

TYPE 2

1/4" Non-Metallic Washer & Flat Washer

TYPE 3

1/4" Non-Metallic Washer & Flat Washer

TWO LANE HIGHWAYS

UNDIVIDED MULTI-LANE HIGHWAY

NOTES

1. ON EXPRESSWAYS, FREEWAYS OR MULTI-LANE HIGHWAYS, PLACE A MILEPOST ASSEMBLY IN EACH DIRECTION OF TRAVEL. ON TWO LANE HIGHWAYS, BACK TO BACK MILEPOST ASSEMBLIES MAY BE INSTALLED ON THE SIDE OF THE ROADWAY IN THE DIRECTION OF ASCENDING MILE POSTS.

2. INSTALL SIGN POST AND ANCHOR OR CEMENT INTO SOLID ROCK IF INSTALLED IN ROCK. ENSURE THE ANCHOR POST IS EMBEDDED 18" INTO SOLID ROCK.

3. DO NOT ATTACH MILEPOST SIGNS UNTIL THE CONCRETE HAS EMBEDDED 18" INTO SOLID ROCK.

4. ENSURE THAT THE BOTTOM OF ANCHOR IS LEFT OPEN TO DRAIN. PLACE WHEN FOUNDATIONS ARE CAST IN PLACE.

5. DRAWING NOT TO SCALE.
NOTES

1. SURVEY MONUMENTS CAN BE Precast OR CAST-IN-PLACE. SET THE BRASS CAP IN THE TOP CENTER OF THE MONUMENT.
2. USE ROUND TOP MARKERS FOR VERTICAL CONTROL, HORIZONTAL CONTROL OR BOTH. USE FLAT TOP MARKERS FOR HORIZONTAL CONTROL.
3. ENSURE THAT HORIZONTAL CONTROL MARKERS ARE PLACED WITHIN 1/8" OF THE POINT ESTABLISHED. THE VERTICAL CONTROL POINT IS THE HIGHEST POINT OF THE ROUND TOP CAP.
4. REINFORCE EARTH INSTALLATION MONUMENT MARKER WITH FOUR NO. 2 BARS 3 1/2" LONG, AND PLACED IN AN EQUAL DISTANCE APART. TIE WITH NO. 18 WIRE AT 10 IN.
5. USE CASING WHEN THE MONUMENT IS PLACED IN PAVEMENT. THE MONUMENT MAY BE PLACED CLOSER TO THE GROUND OR IN CASING IN AREAS THAT ARE MOWED. OTHER CASING DESIGNS MAY BE USED WITH APPROVAL FROM THE ENGINEER.
6. MACHINE COVER AND CASING CONTACT SURFACES TO A TRUE BEARING ALL AROUND.
7. THE MONUMENT MARKER MAY BE USED AS A RIGHT-OF-WAY MARKER, PROJECT MARKER, REFERENCE MARKER, CONTROL POINT, OR PROPERTY CORNER.
8. PLACE THE MONUMENT CAP ACCORDING TO ITS PURPOSE "PRINT" FOR RIGHT-OF-WAY MARKER; "REF" FOR PROJECT MARKER; "REP" FOR REFERENCE MARKER; "CTL" FOR CONTROL POINT, OR "COR" FOR PROPERTY CORNER.
9. PLACE THE WITNESS POST AS CLOSE TO THE MARKERS AS PRACTICAL WHEN SOLID ROCK IS ENCOUNTERED. PLACED CLOSER TO THE GROUND OR IN CASING IN AREAS THAT ARE MOWED.
10. DRAWINGS NOT TO SCALE.
SECTION A-A

TYPICAL POLE FOUNDATION IN DRILLED HOLE ANCHOR BASE

THE LOWER 3/5 OF THE FOUNDATION TO BE PLACED AGAINST UNDISTURBED SOIL UNLESS OTHERWISE APPROVED BY THE ENGINEER. THE UPPER 2/5 OF THE FOUNDATION MAY BE FORMED AS NEEDED.

GENERAL NOTES:

1. THE FOUNDATIONS SHALL BE LOCATED AS INDICATED ON THE PROJECT SHEET.

2. FOUNDATION REINFORCING STEEL CAGES MAY BE REQUIRED IF THE REINFORCING STEEL CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).

3. REINFORCING STEEL IN POLE FOUNDATIONS SHALL BE 80 ksi steel.

4. STEEL TEMPLATE REQUIRED FOR ANCHOR BASE ASSEMBLIES SHALL BE INSTALLED ON MANUFACTURER'S LOCATION PER FEMALE ANCHOR SIZE AND ANCHOR BOLT SIZES AND LOCATIONS PER MANUFACTURERS' SPECIFICATIONS.

5. ANCHOR BELTS REQUIRE ONE LEVELING NOTCH, TWO ANCHOR NUTS AND WASHERS.

6. FOUNDATION CONCRETE SHALL ACHIEVE 100% STRENGTH AND CURE FOR A MINIMUM OF 7 DAYS BEFORE ANY LOADING IS APPLIED.

7. FILLER JOINT MATERIAL WILL BE PLACED AROUND POLE FOUNDATION WHEN POLE FOUNDATION IS IN CONTACT WITH SIDEWALK.

8. ELEVATION OF TOP OF POLE FOUNDATION SHALL BE AT A MINIMUM OF 5 INCHES.

9. BREAKAWAY SUPPORTS ARE FOR 11" X 17" LIGHT POLE.

10. DRAWING NOT TO SCALE.

POLE FOUNDATION SCHEDULE

<table>
<thead>
<tr>
<th>POLE TYPE</th>
<th>MOUNTING HEIGHT</th>
<th>MASTARM LENGTH</th>
<th>FOUNDATION TYPE</th>
<th>X</th>
<th>Y</th>
<th>REINFORCING STEEL HOOPS</th>
<th>VERTICAL REINFORCING STEEL</th>
<th>CUBIC YARDS CONCRETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIGHT</td>
<td>30°</td>
<td>ALL</td>
<td>A</td>
<td>2'-10&quot;</td>
<td>6'-0&quot;</td>
<td>4 x 6</td>
<td>20°-35°</td>
<td>6</td>
</tr>
<tr>
<td>LIGHT</td>
<td>35°</td>
<td>ALL</td>
<td>B</td>
<td>2'-6&quot;</td>
<td>7'-0&quot;</td>
<td>4 x 4</td>
<td>25°-30&quot;</td>
<td>6</td>
</tr>
<tr>
<td>LIGHT</td>
<td>40°-50°</td>
<td>ALL</td>
<td>C</td>
<td>3'-2&quot;</td>
<td>9'-0&quot;</td>
<td>5 x 4</td>
<td>45°-35&quot;</td>
<td>8</td>
</tr>
</tbody>
</table>

SECTION B-B

TYPICAL POLE FOUNDATION IN DRILLED HOLE BREAKAWAY BASE

THE LOWER 2/5 OF THE FOUNDATION TO BE PLACED AGAINST UNDISTURBED SOIL UNLESS OTHERWISE APPROVED BY THE ENGINEER. THE UPPER 3/5 OF THE FOUNDATION MAY BE FORMED AS NEEDED.
EXCAVATION NOTES:
1. IF CORRUGATED METAL PIPE IS USED UP TO SIDEWALK OR GRADE LINE, CUT OUT HOLE FOR THE CONDUIT WILL BE EQUAL TO THE DIAMETER OF CONDUIT OR CONDUIT PLUS ONE INCH.
2. WHEN NATIVE SOIL IS USED FOR BACKFILL, IT SHALL BE COMPACTED IN ACCORDANCE WITH SUBSECTION 210.05 OF THE IDAHO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
3. SOCKET ALL VERTICAL REINFORCING STEEL FULL LENGTH AS SHOWN IN POLE FOUNDATION SCHEDULE ON SHEET 1 IN BEDROCK.
4. DRAWING NOT TO SCALE.

SOLID BEDROCK NOTES:
1. IF DEPTH TO BEDROCK IS LESS THAN 4', NOTIFY THE ENGINEER AND REDESIGN OF THE FOUNDATION MAY BE REQUIRED.
2. THREE REINFORCING STEEL HOOPS TO BE EVENLY SPACED ARE REQUIRED.
3. SOCKET ALL VERTICAL REINFORCING STEEL FULL LENGTH AS SHOWN IN POLE FOUNDATION SCHEDULE ON SHEET 1 IN BEDROCK. DIAMETERS OF DRILLED HOLES FOR VERTICAL REINFORCING STEEL SHALL BE AT LEAST 2 INCHES FULL DRILLED HOLES WITH DIA.1.750.02, TYPE B, CLASS 1.
4. DRAWING NOTES APPLY TO THIS APPLICATION.
5. DRAWING NOT TO SCALE.
SNOW POLE INSTALLATION

NOTES
1. ATTACH FLEXIBLE SNOW POLES TO DELINEATOR POLES OR INSTALL RIGID POLE DELINEATORS AND SNOWPOLES AT THE SPACING SHOWN ON THE DELINEATOR STANDARD DRAWING.
2. THE REFLECTOR CAN BE MADE OF THE SAME MATERIAL AND HAVE THE SAME DIMENSIONS AS SINGLE DELINEATORS, OR THEY CAN BE RETROREFLECTIVE SHEETING ATTACHED DIRECTLY TO THE FLEXIBLE SNOW POLE.
3. USE WHITE RETROREFLECTIVE MATERIAL FOR THE REFLECTOR.
4. DO NOT CONNECT MULTIPLE SECTIONS OF RIGID DELINEATOR POLES TO ACHIEVE THE SNOW POLE HEIGHT.
5. DRAWINGS NOT TO SCALE.
EXAMPLE TAPERED ENTRANCE RAMP

EXAMPLE PARALLEL ENTRANCE RAMP

PAVEMENT MARKINGS
ON TWO-WAY HIGHWAYS

DIMENSIONS TO CENTER OF PAVEMENT MARKINGS.
SEE NOTE NO. 11 AND PAINT TRUCK SETUP DETAIL.
DIVIDED HIGHWAY

TWO-LANE HIGHWAY

GAP DETAIL

SEE NOTE NO. 5
**NOTES**

1. Construct rumble strips as shown on the project plans and in the rumble strip dimension table.

2. Provide continuous rumble strips on the left shoulder (adjacent to or under the yellow edge line of divided highways). Provide periodic gaps on right shoulders adjacent to or under white edge line to accommodate bicycle crossing of the rumble strip pattern.

3. In areas where bicycle or pedestrians are expected to cross the rumble strip, provide a 6 foot to 12 foot gap.

4. Omit rumble strips on longitudinal and lateral concrete pavement joints. Omit rumble strips on bridges and bridge approach slabs. Rumble strips are not normally united at private approaches.

5. Restart the rumble strip and gap pattern if the pattern is interrupted.

6. Clean the rumble strips and apply CSS-1 emulsified asphalt at the rate of 0.08 gal/sq yd to the rumble strips.

7. Drawing not to scale.

---

**RUMBLE STRIP DIMENSION TABLE**

<table>
<thead>
<tr>
<th>Type</th>
<th>Width</th>
<th>Depth</th>
<th>Chord</th>
<th>Width</th>
<th>Depth</th>
<th>Chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder Rumble Strips</td>
<td>2&quot; to 6&quot;</td>
<td>6&quot;</td>
<td>1/2&quot; typ.</td>
<td>12&quot;</td>
<td>6&quot;</td>
<td>1/2&quot; max.</td>
</tr>
<tr>
<td>Shoulder Rumble Strips</td>
<td>4&quot; to 8&quot;</td>
<td>12&quot;</td>
<td>1/2&quot; typ.</td>
<td>12&quot;</td>
<td>1/2&quot; max.</td>
<td>10&quot;</td>
</tr>
<tr>
<td>Shoulder Rumble Strips</td>
<td>6&quot; to 16&quot;</td>
<td>12&quot;</td>
<td>1/2&quot; typ.</td>
<td>12&quot;</td>
<td>1/2&quot; max.</td>
<td>10&quot;</td>
</tr>
<tr>
<td>Shoulder Rumble Strips</td>
<td>&gt;8'</td>
<td>12&quot;</td>
<td>1/2&quot; typ.</td>
<td>12&quot;</td>
<td>1/2&quot; max.</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Shoulder Rumble Strips</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

**CONCRETE PAVEMENT JOINT DETAIL**

(SEE NOTE NO. 4)
**Mailbox Dimensions**

<table>
<thead>
<tr>
<th>Mailbox Size</th>
<th>L</th>
<th>W</th>
<th>H</th>
<th>Lp</th>
<th>Wp</th>
<th>Hp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>6&quot;</td>
<td>5&quot;</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>6&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>2</td>
<td>8&quot;</td>
<td>5</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

**Socket and Wedge Mailbox Support System Detail**

- Steel tubing formed into wedge shape
- 12-gauge rolled sheet steel
- Wedge

**Notes**

1. Construct mailbox assemblies in accordance with Section 634 - Mailbox of the Standard Specifications for Highway Construction.


3. Install the mailboxes and assemblies with the fasteners shown in the assembly fastener tables. Some platform slots and holes may remain unused.

4. Center the mailbox on the platform and ensure that the mailbox door opens. Spacing of mailbox mounting holes may vary between manufacturers and additional holes may be drilled in the mailbox, platform, or both to attach the mailbox to the platform.

5. Commercially available mailboxes and mailbox assemblies may be substituted for those shown if they meet the requirements of the U.S. Postmaster General and have successfully passed the testing requirements in WSHP 350. Adjustable platform alternatives and the socket and wedge mailbox support system are examples of commercially available proprietary systems that may be acceptable alternatives. Obtain the engineer's approval before installing alternative mailboxes or assemblies and install in accordance with the manufacturer's instructions.

6. Use an anti-twist plate, shown on the anti-twist plate detail. A socket and wedge mailbox support system may also be used in lieu of an anti-twist plate if the socket and wedge system is used. Follow the manufacturer's installation instructions.

7. The Type D assembly should be used in heavy snow areas or areas where snow flow damage to mailboxes has been observed or is anticipated.

8. When used in heavy snow areas, only one mailbox is recommended for Type A assemblies. The Type C assembly with wood posts is recommended for use in heavy snow areas. A snow shield may be installed as shown on Standard Drawing 634-2.

9. Mailbox sizes 1A and 2, shown in the mailbox, platform, and shelf tables may be installed in the Type A double mailbox assembly in any combination of sizes. When more than one size is to be installed, use the shelf size for the largest mailbox.

10. The Type B assembly is a proprietary system that may be used for non-highway installations. Install a maximum of five size 1 mailboxes, five size 2A mailboxes, or three size 2A mailboxes. When more than one size is to be installed, limit the number of mailboxes to the maximum number for the largest size used.

11. Do not install the mailbox assembly in a concrete foundation. An exception may be made for mailboxes approved by the Postmaster General and have successfully passed the testing requirements of MASH or NCHRP 350. Adjustable platform alternatives and the socket and wedge mailbox support system may be used in lieu of the assembly. Obtain the engineer's approval before installing alternative mailboxes or assemblies and install in accordance with the manufacturer's installation instructions.

12. Ensure that platform, shelf, and brackets are galvanized in accordance with MASH 1332.

13. If used, attach the newspaper box to the support, directly under the mailbox. Ensure that newspaper boxes do not extend beyond the front of the mailbox when the mailbox door is closed. In heavy snow areas, locate the newspaper box on the trailing side of the mailbox.

14. Round or grind the corners of platforms, shelves, brackets, or other hardware that has sharp protruding edges.

15. Not to scale.
NOTES

1. SEE THE MAILBOX STANDARD DRAWING FOR MAILBOX INSTALLATION DETAILS.
2. ROUND OR GRIND THE SHARP CORNERS OF THE PLATFORM, SNOW SHIELD SHELF, AND BRACE.
3. WHEN A NEWSPAPER BOX IS INSTALLED, ENSURE THAT BOX IS ON THE TRAILING SIDE OF THE POST.
4. DRAWING NOT TO SCALE.
HEB 07-10
5
AUGUST, 1994
1 SHEET
REQUIRES STD. DWG. 656-15

DESIGN/TRAFFIC SERVICES ENGINEER

ORIGINAL SIGNED BY: CARL D. MAIN

E: Boise, Idaho

TRAFFIC SIGNAL POLES

SINGLE MAST ARM POLE

NOTE:
1. THIS DRAWING SHOWS TYPICAL INSTALLATION DETAILS
   ONLY. SEE PLAN SHEETS FOR QUANTITY
   OF SIGNAL AND LIGHTING COMPONENTS TO BE INSTALLED.
2. ORIENTATION OF SIGNAL COMPONENTS SHALL BE AS
   SHOWN UNLESS OTHERWISE SPECIFIED ON THE PLAN
   SHEETS.
3. SEE STANDARD DRAWING 656-3 FOR FOUNDATION
   DETAILS.
4. ALL SIGNAL COMPONENTS SHALL BE LEVELLED AFTER THE
   POLE HAS BEEN PLUMBING.
5. SPECIFIC LOCATION OF EACH POLE INSTALLATION SHALL BE
   AS INDICATED ON THE PROJECT PLAN SHEETS.

HEIGHT ABOVE HIGHWAY AT GROUND LINE
17'-0'' TO 22'-6''-E

SIDE WALK OR PAVING TO THE
TOP OF THE FOUNDATION FOR
PEDESTRIAN ACCESS TO
PUSHBUTTONS

PEDESTRIAN PUSHBUTTON MOUNTING

1. PEDESTRIAN PUSHBUTTON ASSEMBLIES ARE TO
   BE MOUNTED AS PER MANUFACTURER'S
   INSTRUCTIONS.

DRILL MAST ARM AND INSTALL 5/8" PLASTIC BUSHING FOR SIGNAL CABLE

COMBINATION TRAFFIC SIGNAL
AND LIGHT POLE (SEE PLANS FOR LUMINAIRE
MOUNTING HEIGHT)

CLAMP ON TYPE MAST ARM
MOUNTING BRACKET AS SPECIFIED
IN THE PLAN SHEET

POSITION ALL MAST ARM MOUNTED SIGNAL
HEADS AT THE SAME ELEVATION

PEDESTRIAN SIGNAL
PEDESTRIAN PUSHBUTTON ASSEMBLY
5" BACK PLATE
VEHICLE HEAD

VIEW A-A

PEDESTRIAN SIGNAL
PEDESTRIAN PUSHBUTTON ASSEMBLY
5" BACK PLATE
VEHICLE HEAD

POLE MOUNTED HEADS FOR
DUAL VEHICLE SIGNAL HEAD
INSTALLATION

PEDESTRIAN PUSHBUTTON MOUNTING

1. PEDESTRIAN PUSHBUTTON ASSEMBLIES ARE TO
   BE MOUNTED AS PER MANUFACTURER'S
   INSTRUCTIONS.

DRILL AND TAP POLE FOR 5/8" CAP SCREWS
TO FIT TERMINAL COMPARTMENT MOUNTING
BRACKET. (TYPICAL POLE MOUNTING)

PEDESTRIAN SIGNAL
PEDESTRIAN PUSHBUTTON ASSEMBLY
5" BACK PLATE
VEHICLE HEAD

WIRE ENTRANCE, DRILL POLE
TO ACCEPT CASTING

PEDESTRIAN SIGNAL
PEDESTRIAN PUSHBUTTON ASSEMBLY
5" BACK PLATE
VEHICLE HEAD

NOTE:
1. THIS DRAWING SHOWS TYPICAL INSTALLATION DETAILS
   ONLY. SEE PLAN SHEETS FOR QUANTITY
   OF SIGNAL AND LIGHTING COMPONENTS TO BE INSTALLED.
2. ORIENTATION OF SIGNAL COMPONENTS SHALL BE AS
   SHOWN UNLESS OTHERWISE SPECIFIED ON THE PLAN
   SHEETS.
3. SEE STANDARD DRAWING 656-3 FOR FOUNDATION
   DETAILS.
4. ALL SIGNAL COMPONENTS SHALL BE LEVELLED AFTER THE
   POLE HAS BEEN PLUMBING.
5. SPECIFIC LOCATION OF EACH POLE INSTALLATION SHALL BE
   AS INDICATED ON THE PROJECT PLAN SHEETS.
Typical Pole Foundation in Solid Bedrock

Solid Bedrock Notes:

1. If depth to bedrock is less than 5', notify the engineer and redesign of the foundation may be required.
2. Four reinforcing steel hoops to be evenly spaced are required.
3. Socket all vertical reinforcing steel full length as shown in pole foundation schedule on Sheet 1. In steel anchor base plate holes for vertical reinforcing steel shall be at least 2 inches in diameter.
4. Excavation notes on Sheet 1 apply to this application.
5. Drawing not to scale.

See Standard Drawing 656-3 Sheet 1 for details.
CABINET FOUNDATION SCHEDULE

<table>
<thead>
<tr>
<th>CABINET</th>
<th>FOUNDATION</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>HOOPS</th>
<th>VERTICAL BARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNAL</td>
<td></td>
<td>2'-0''</td>
<td>2'-0''</td>
<td>2'-0''</td>
<td>2'-0''</td>
<td>2'-0''</td>
<td>6''</td>
<td>6''</td>
</tr>
</tbody>
</table>

REVISIONS

- IDAHO TRANSPORTATION DEPARTMENT
- ORIGINAL DRAWING NO: 656-6
- DRAWING DATE: MAY, 2014

NOTES:
1. THE FOUNDATION SHALL BE LOCATED AS INDICATED ON THE PROJECT PLAN SHEETS.
2. FOUNDATION REBAR CAGES MAY BE WELDED IF THE REBAR CONFORMS TO ASTM A416 AND ALL WELDING CONFORMS TO ANSI/AWS D1.4 (STRUCTURAL WELDING CODE - REINFORCING STEEL).
3. ALL CONDUITS, ELBOWS, AND COUPLINGS WITHIN AND PROTRUDING FROM THE FOUNDATION SHALL BE RIGID STEEL. THE REMAINING CONDUITS SHALL BE AS SHOWN ON THE PLANS.
4. STUBOUTS SHALL BE TERMINATED WITH A STEEL BONDING BUSHING.
5. EARRING PLUG REQUIRED AT BOTH ENDS OF SPARE CONDUITS.
7. CONDUIT SHALL BE INSTALLED IN SUCH A MANNER AS TO NOT CAUSE MODIFICATION OF THE CABINETS.
8. GRADE AREA TO PROVIDE DRAINAGE AWAY FROM CABINET FOUNDATION.
9. "C" WIRE ELECTRICAL MAST INSTALL 1'-0" ABOVE CONDUIT TYPICAL OF ALL CONDUITS PLACED IN GROUND. 10. NOT TO SCALE.
1. Loop numbering in each travel lane 1-4 in ascending order, i.e., the loop nearest the stop bar.

Loop numbering procedure


2. Determination of loop conductors and connection to the lead-in allows only all loops require two turns of four conductor cable.

3. Loop conductors in sealant for total encapsulation.

4. Test loop conductors in slot with a blunt instrument.

5. Lead-in cable, black, red, green, and seal end with an approved sealant kit.

6. Use only when placement behind the curb is not possible.

7. Conductors for loop 1, lane 1 require 1 band of black tape.

8. Conductors for loops 2, lane 2 require 2 bands of black tape.

9. Conductors for loops 3, lane 3 require 3 bands of black tape.

10. Conductor required at the junction box.

11. Color coded loop identification system.
1. FOUR TYPICAL CONFIGURATIONS ARE SHOWN FOR OTHER CONFIGURATIONS, THE MAXIMUM AND MINIMUM DIMENSIONS SHOWN REMAIN APPLICABLE. WHERE CURB AND CURB RAMPS ARE NOT PRESENT, MEASURE FROM THE EDGE OF TRAVELED WAY.

2. PROVIDE A PUSH BUTTON CLEAR SPACE, WITH 30" BY 48" MINIMUM DIMENSIONS. REDUCE THE CLEAR SPACE TO PEDESTRIAN PUSHBUTTON ASSEMBLIES. ENSURE THAT THE CLEAR SPACE SURFACE IS DURABLE, SLIP RESISTANT. POSITION THE CLEAR SPACE TO THE PUSHBUTTON MAY DOUBLE AS THE CLEAR SPACE.

3. PLACE PUSHBUTTON BETWEEN THE EDGE OF THE CROSSWALK LINE EXTENDED FROM THE CENTER OF THE INTERSECTION AND THE SIDE OF A CURB RAMP OF PRECEDENCE; BUT NOT MORE THAN 10' FROM THE SAID CROSSWALK LINE.

4. PLACE PUSHBUTTONS SUCH THAT THE FACE OF CURB OR EDGE OF TRAVELED WAY A MINIMUM DISTANCE OF 0.5" AND A MAXIMUM DISTANCE OF 10' TO THE EDGE OF CURB OR CURB RAMP TO BE USED.

5. ENSURE THAT THE FACE OF THE PUSHBUTTON IS PARALLEL TO THE CROSSWALK TO BE USED.

6. INSTALL ACCESSIBLE PEDESTRIAN SIGNALS WHEN RECOMMENDED BY AN ENGINEERING STUDY.

7. PROVIDE ALL PEDESTRIAN PUSHBUTTONS, WHERE THERE ARE PHYSICAL CONSTRAINTS ON A PARTICULAR CORNER THAT MAKE INSTALLATION IMPractical TO PROVIDE THE 10' SEPARATION BETWEEN THE TWO PEDESTRIAN PUSHBUTTONS. WHERE CURB AND CURB RAMPS ARE NOT PRESENT, MEASURE FROM THE EDGE OF TRAVELED WAY.

8. PUSHBUTTONS MAY BE INSTALLED ON A SIGNAL POLE OR PEDESTRIAN PUSHBUTTON POLE. INSTALL ACCESSIBLE PEDESTRIAN SIGNALS WHEN RECOMMENDED BY AN ENGINEERING STUDY.

9. USE MODULAR OR CAST PEDESTRIAN PUSHBUTTON ASSEMBLIES. DO NOT USE HL FRAME PUSHBUTTON ASSEMBLIES.
STANDARD CORRUGATED STEEL PIPE GASKET TYPES

- D-RING GASKET
- SLEEVE GASKET
- STRIP GASKET
- MASTIC SEALANT GASKET
- REFORMED HELICAL CMP

NOTES

1. THE REFORMED ENDS OF HELICAL CORRUGATED METAL PIPE MADE TO ACCEPT ANNULAR COUPLING BANDS SHALL BE UNIFORM AND SMOOTH IN APPEARANCE. PIPE WITH INHOMOGENEOUS REFORMED ENDS ARE NOT ACCEPTABLE.

2. SLEEVE AND STRIP GASKETS FOR COUPLING BAND TYPES 1-A AND 2-A SHALL EXCEED THE WIDTH OF THE BAND BY A MINIMUM OF 1/8" ON BOTH EDGES. THE GASKETS SHALL FIT SNUGGLY AROUND THE PIPES PRIOR TO INSTALLATION OF THE BAND.

3. ALL WELDS AND/OR EXPOSED FERROUS METAL ON COUPLING BANDS AND BAND CONNECTING HARDWARE SHALL BE REPAIRED IN ACCORDANCE WITH ASME M-38.

4. STEEL BAND THICKNESS SHALL BE AT LEAST 1/8 THE THICKNESS OF GAUGE OF THE PIPE. ALUMINUM BANDS SHALL BE THE SAME THICKNESS AS THE PIPE.

5. THE JOINTS FOR SPIRALS AND SEWERS SHALL BE WATERTIGHT AND PRESSURE TESTED PRIOR TO ACCEPTANCE, AS REQUIRED IN THE STANDARD SPECIFICATIONS.

6. TO PREVENT GALVANIC ACTION WHEN BANDS AND PIPES ARE OF AN UNLIKE METAL, THE BANDS SHALL BE ASPHALT COATED.

7. GASKET MATERIALS ARE NOT TO BE ALTERED, SEWN, OR PATCHED. THE USE OF SEALANTS AND/OR LUBRICANTS WITH BAND GASKETS MUST BE AS THE MANUFACTURER SPECIFIES. THE QUALITY AND CHEMICAL COMPOSITION OF SEALANTS AND LUBRICANTS WILL BE AS THE MANUFACTURER SPECIFIES. CONTACT THE MANUFACTURER FOR DETAILS.

8. WATERTIGHT COUPLING BANDS

9. ALL RECOMMENDATIONS IN THE PIPE COUPLING BAND TABLE ARE TO BE CONSIDERED MINIMAL.

10. NOT TO SCALE.
<table>
<thead>
<tr>
<th>COUPLING TYPE</th>
<th>CORRUGATIONS</th>
<th>PIPE SIZE</th>
<th>COUPLING BAND WIDTH</th>
<th>COUPLING BELTS (IN.)</th>
<th>GASKET TYPE</th>
<th>ANNULAR PIPE</th>
<th>REFORMED HELICAL</th>
<th>HELICAL PIPE</th>
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<tbody>
<tr>
<td><strong>TYPES 1-A</strong></td>
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</tr>
<tr>
<td>HELICAL COUPLING BAND</td>
<td>1½&quot; x ½&quot; &amp; 2½&quot; x ½&quot;</td>
<td>8-½&quot;</td>
<td>7&quot; (4 PIECE)</td>
<td>(3) ¾&quot;</td>
<td>SLEEVE</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td></td>
<td>2½&quot; x ½&quot; &amp; 3&quot; x 1&quot;</td>
<td>12-1¾</td>
<td>7&quot; (4 PIECE)</td>
<td>(3) ¾&quot;</td>
<td>SLEEVE</td>
<td>X</td>
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<tr>
<td></td>
<td>2½&quot; x ½&quot; &amp; 3&quot; x 1&quot;</td>
<td>18-24</td>
<td>12&quot; (4 PIECE)</td>
<td>(3) ¾&quot;</td>
<td>SLEEVE</td>
<td>X</td>
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<td></td>
<td>2½&quot; x ½&quot; &amp; 3&quot; x 1&quot;</td>
<td>30-42</td>
<td>24&quot; (4 PIECE)</td>
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<td>SLEEVE</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td><strong>TYPES 1-B</strong></td>
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<td>8-½&quot;</td>
<td>7&quot; (4 PIECE)</td>
<td>(3) ¾&quot;</td>
<td>SLEEVE OR STRAP</td>
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<td>X</td>
<td>X</td>
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<tr>
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<td>(5) ¾&quot;</td>
<td>SLEEVE OR STRAP</td>
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<td>X</td>
<td>X</td>
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<td><strong>TYPES 2-A</strong></td>
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<td>8-½&quot;</td>
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<td>(4) ¾&quot;</td>
<td>SLEEVE OR MASTIC</td>
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<td>24&quot; (4 PIECE)</td>
<td>(8) ¾&quot;</td>
<td>SLEEVE OR MASTIC</td>
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<td>X</td>
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<tr>
<td><strong>TYPES 2-B</strong></td>
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<td>(4) ¾&quot;</td>
<td>SLEEVE OR MASTIC</td>
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<td>(4) ¾&quot;</td>
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<td>(6) ¾&quot;</td>
<td>SLEEVE OR MASTIC</td>
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<td>X</td>
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<td>24&quot; (4 PIECE)</td>
<td>(8) ¾&quot;</td>
<td>SLEEVE OR MASTIC</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>TYPES 3</strong></td>
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<td>2½&quot; (GALV.)</td>
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<td>10½&quot; (2 STRAP)</td>
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</tbody>
</table>

* WATERTIGHT BANDS ARE NOT REQUIRED ON CULVERT INSTALLATIONS UNLESS SPECIFIED BY THE PLANS OR SPECIAL PROVISIONS.