Utah Department of Transportation

2020 Standard Drawings

For Road and Bridge Construction

August 2020

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Introduction

These Standard Drawings are for use in Utah Department of Transportation construction contracts. The book incorporates all Supplemental Drawings approved since the 2017 Standard Drawing Book was released.

All drawings apply on every Department construction project and as such are included by reference. Only design plan sheets can be included in individual projects. Notes labeled "Design-Only" are excluded from the contract. Sheets labeled in the bottom-right of the sheet as "Design-Only" are excluded from the contract.

References

Reference to external publications in any 2020 Standard is to the most recent version, issue, or edition in effect on the date of the *Notice to Bidders*, unless stated otherwise.

Page Numbering

The Standard Drawings of this book are numbered by Series. There is no cumulative page numbering.

August 2020 Drawing Index

Drawing Number	Drawing Name	Blank = No change after 2017 Standards Edition Date = Change Approved Strikethrough = Drawing Deleted
AT 1	Legend Sheet	
AT 2	Ramp Meter Signal Head Details	6/27/2019
AT 3	Ramp Meter Detection Layout and Cabinet Placement	2/28/2019
AT 4	Loop Detector and Wiring Details	10/25/2018
AT 5	Ramp Meter Details Signing and Detection	6/28/2018
AT 6	Conduit Details	
AT 7A	Polymer Concrete Junction Box Details	4/30/2020
AT 7B	Precast Concrete Fiber Optic and Utility Vault Details	
AT 8	ATMS Cabinet	
AT 9	ATMS Cabinet Disconnect and Transformer Frame	6/27/2019
AT 10A	AXIS CCTV Mounting Detail and Wiring Diagram	6/25/2020

AT 10B	CCTV Mounting Detail and Wiring Diagram	6/25/2020
~~AT 10C~~	~~CCTV Mounting Detail and Wiring Diagram~~	~~8/29/2019~~
~~AT 10D~~	~~Camera Cable Splicing Diagrams~~	~~8/29/2019~~
~~AT 10E~~	~~CCTV DIP Switch Settings~~	~~8/29/2019~~
AT 11A	CCTV Pole Mounting Details	8/29/2019
AT 11B	Non-Intrusive Detector Mounting Details	8/29/2019
AT 11C	Pole Mounted Cabinet Bracket	
AT 12	CCTV Foundations for CCTV Poles	2/22/2018
AT 13	Not Used	
AT 14	Solar Traffic Counting Station	6/25/2020
AT 15	RWIS Site and Foundation Details	6/25/2020
AT 16	RWIS Tower Base and Service Pad Layout	6/25/2020
AT 17	RWIS Ground Rod Installation and Tower Grounding	6/25/2020
AT 18	Utility Marker Post Details	

AT 19	Utility Marker Post Locations	
AT 20	Electronic Toll Lanes Control Systems Cabinet Layout	6/28/2018
AT 21	Electronic Toll Lanes Control Systems ETC Gantry	2/28/2019
AT 22	Attachment Details	
AT 23	ETC Equipment Wiring Diagram	
AT 24	ETC-OSI Laser System Wiring Diagram	
BA 1A1	Concrete Barrier General Notes and Standard Details (1 of 3)	10/31/2019
BA 1A2	Concrete Barrier General Notes and Standard Details (2 of 3)	2/27/2020
BA 1A3	Concrete Barrier General Notes and Standard Details 3 of 3	10/31/2019
BA 1B	Concrete Barrier Median Installation	2/27/2020
BA 1C	Concrete Barrier Shoulder Installation	2/27/2020
BA 1D	Concrete Barrier Layout	2/27/2020
BA 1E	Concrete Barrier Column Protection	2/27/2020
BA 1F1	Concrete Barrier F-Shape Installation	2/27/2020

BA 1F2	Free Standing Barrier F-Shape, Cast-in-place Barrier Transition 1 of 3	10/31/2019
BA 1F3	Free Standing Barrier F-Shape, Cast-in-place Barrier Transition 2 of 3	2/27/2020
BA 1F4	Free Standing Barrier F-Shape, Cast-in-place Barrier Transition 3 of 3	10/31/2019
BA 2A	Precast Concrete Barrier – 32 Inch F-Shape	10/31/2019
BA 2B	Precast Concrete Barrier – 32 Inch F-Shape Sloped End Section (For Speeds ≤ 40 MPH)	10/31/2019
~~BA 2C~~	~~Precast Concrete Barrier – 32 Inch New Jersey Shape, Median Small Sign Section~~	~~8/29/2019~~
BA 2C	Precast Concrete Barrier – 32 Inch F-Shape New Jersey Shape Transition	10/31/2019
BA2C1A	F-Shape to Jersey Shape Transition – With Moment Slab	4/30/2020
BA2C1B	F-Shape to Jersey Shape Transition – With Beam Foundation	4/30/2020
BA2C2A	42 Inch Constant Slope Parapet, 32 Inch F-Shape Barrier Transition – With Moment Slab	4/30/2020
BA2C2B	42 Inch Constant Slope Parapet, 32 Inch F-Shape Barrier Transition – With Beam Foundation	4/30/2020
BA2C3A	42 Inch Constant Slope Parapet, Thrie-Beam Transition – With Moment Slab	4/30/2020
BA2C3B	42 Inch Constant Slope Parapet, Thrie-Beam Transition – With Beam Foundation	4/30/2020
BA2C3C	42 Inch Constant Slope Parapet, Thrie-Beam Transition – Reinforcing Steel	4/30/2020

~~BA 2D~~	~~Cast-In-Place Concrete Barrier – 32 Inch F-Shape, 42 Inch Constant Slope Barrier Transition~~	~~6/25/2020~~
BA 2E	Precast Concrete Half Barrier – 32 Inch F-Shape	10/31/2019
~~BA 3A1~~	~~Cast-In-Place Concrete Constant Slope Barrier – 42 Inch 1 of 3~~	~~6/25/2020~~
~~BA 3A2~~	~~Cast-In-Place Concrete Constant Slope Barrier – 42 Inch 2 of 3~~	~~6/25/2020~~
~~BA 3A3~~	~~Cast-In-Place Concrete Constant Slope Barrier – 42 Inch 3 of 3~~	~~6/25/2020~~
~~BA 3A4~~	~~Cast-In-Place Concrete Constant Slope Barrier with Scuppers – 42 Inch~~	~~6/25/2020~~
BA 3A1	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 1 of 8	6/25/2020
BA 3A2	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 2 of 8	6/25/2020
BA 3A3	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 3 of 8	6/25/2020
BA 3A4	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 4 of 8	6/25/2020
BA 3A5	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 5 of 8	6/25/2020
BA 3A6	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 6 of 8	6/25/2020
BA 3A7	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 7 of 8	6/25/2020
BA 3A8	Cast-In-Place Concrete Constant Slope Barrier- 42 Inch 8 of 8	6/25/2020

BA 3B	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Electrical Details	8/29/2019
BA 3C1	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Sign Structure Foundation Transition 1 of 2	8/29/2019
BA 3C2	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Sign Structure Foundation Transition 2 of 2	
~~BA 3D~~	~~Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Median Small Sign Section~~	~~8/29/2019~~
BA 3E1	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, TL-5 1 of 2	8/29/2019
BA 3E2	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, TL-5 2 of 2	
BA 3E3	Cast-In-Place Concrete Constant Slope Barrier with Scuppers – 42 Inch, TL-5	8/29/2019
BA 3F1	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Bridge Parapet Transition 1 of 3	8/29/2019
BA 3F2	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Bridge Parapet Transition 2 of 3	8/29/2019
BA 3F3	Cast-In-Place Concrete Constant Slope Barrier – 42 Inch, Bridge Parapet Transition 3 of 3	
~~BA 3G~~	~~Precast Concrete Constant Slope Barrier – 42 Inch~~	~~6/25/2020~~
~~BA 3H~~	~~Precast Concrete Constant Slope Barrier – 42 Inch, Sloped End Section (For Speeds ≤ 40 MPH)~~	~~6/25/2020~~
~~BA 3I1~~	~~Precast Concrete Constant Slope Barrier – 42 Inch, Median Small Sign Section 1 of 2~~	~~10/31/2019~~
~~BA 3I2~~	~~Precast Concrete Constant Slope Barrier – 42 Inch, Median Small Sign Section 2 of 2~~	~~10/31/2019~~

~~BA 3J~~	~~Precast Concrete Constant Slope Barrier – 42 Inch, 32 Inch F-Shape Transition~~	~~6/25/2020~~
~~BA 3K1~~	~~Cast-In-Place Concrete Constant Slope Half Barrier – 42 Inch~~	~~6/25/2020~~
~~BA 3K2~~	~~Cast-In-Place Concrete Constant Slope Half Barrier with Scuppers – 42 Inch~~	~~6/25/2020~~
~~BA 3K3~~	~~Cast-In-Place Concrete Constant Slope Half Barrier – 42 Inch~~	~~6/25/2020~~
~~BA 3K4~~	~~Cast-In-Place Concrete Constant Slope Half Barrier – 42 Inch~~	~~6/25/2020~~
~~BA 3K5~~	~~Cast-In-Place Concrete Half Barrier – 42 Inch Constant Slope, 32 Inch F-Shape Barrier Transition~~	~~6/25/2020~~
BA 3K1	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 1 of 7	6/25/2020
BA 3K2	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 2 of 7	6/25/2020
BA 3K3	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 3 of 7	6/25/2020
BA 3K4	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 4 of 7	6/25/2020
BA 3K5	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 5 of 7	6/25/2020
BA 3K6	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 6 of 7	6/25/2020
BA 3K7	Cast-In-Place Concrete Constant Slope Half Barrier- 42 Inch 7 of 7	6/25/2020
~~BA 3L~~	~~Precast Concrete Constant Slope Half Barrier – 42 Inch~~	~~6/25/2020~~

~~BA 3M1~~	~~Cast-In-Place Concrete Constant Slope Barrier – 54 Inch 1 of 3~~	~~6/25/2020~~
~~BA 3M2~~	~~Cast-In-Place Concrete Constant Slope Barrier – 54 Inch 2 of 3~~	~~6/25/2020~~
~~BA 3M3~~	~~Cast-In-Place Concrete Constant Slope Barrier – 54 Inch 3 of 3~~	~~6/25/2020~~
~~BA 3M4~~	~~Cast-In-Place Concrete Constant Slope Barrier with Scuppers – 54 Inch~~	~~6/25/2020~~
BA 3M1	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 1 of 10	6/25/2020
BA 3M2	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 2 of 10	6/25/2020
BA 3M3	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 3 of 10	6/25/2020
BA 3M4	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 4 of 10	6/25/2020
BA 3M5	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 5 of 10	6/25/2020
BA 3M6	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 6 of 10	6/25/2020
BA 3M7	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 7 of 10	6/25/2020
BA 3M8	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 8 of 10	6/25/2020
BA 3M9	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 9 of 10	6/25/2020
BA 3M10	Cast-In-Place Concrete Constant Slope Barrier- 54 Inch 10 of 10	6/25/2020

~~BA 3N1~~	~~Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, Median Small Sign Section 1 of 2~~	~~8/29/2019~~
~~BA 3N2~~	~~Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, Median Small Sign Section 2 of 2~~	~~8/29/2019~~
BA 3O1	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, TL-5 1 of 3	8/29/2019
BA 3O2	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, TL-5 2 of 3	8/29/2019
BA 3O3	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, TL-5 3 of 3	
BA 3O4	Cast-In-Place Concrete Constant Slope Barrier with Scuppers – 54 Inch, TL-5	8/29/2019
BA 3P1	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, Bridge Parapet Transition 1 of 3	8/29/2019
BA 3P2	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, Bridge Parapet Transition 2 of 3	8/29/2019
BA 3P3	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, Bridge Parapet Transition 3 of 3	
BA 3Q1	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, 42 Inch Constant Slope Barrier Transition	8/29/2019
BA 3Q2	Cast-In-Place Concrete Constant Slope Barrier – 54 Inch, 32 Inch F-Shape Barrier Transition	10/31/2019
BA 4A	Midwest 31 Inch W-Beam Guardrail Hardware	2/27/2020
~~BA 4B1~~	~~W-Beam Guardrail Transition Hardware~~	~~4/30/2020~~
BA4B1A	Guardrail Transition Hardware 1 of 3	4/30/2020

BA4B1B	Guardrail Transition Hardware 2 of 3	4/30/2020
BA4B1C	Guardrail Transition Hardware 3 of 3	4/30/2020
~~BA 4B2~~	~~W-Beam Guardrail Transition Layouts Approach End and Midwest 31 Inch Guardrail Trailing End~~	~~4/30/2020~~
BA4B2A	Guardrail Transition Layouts 1 of 2	4/30/2020
BA4B2B	Guardrail Transition Layouts 2 of 2	4/30/2020
BA 4B3	W-Beam Guardrail Transition Curb Sections	
BA 4B4	Midwest 31 Inch W-Beam Guardrail Median Barrier and Transition Hardware and Layout	10/26/2017
~~BA 4C1~~	~~31 Inch W-Beam Guardrail Anchor Type 1~~	~~10/26/2017~~
BA 4C1A	Midwest 31 Inch W-Beam Guardrail Anchor Type 1	8/30/2018
BA 4C1B	Midwest 31 Inch W-Beam Guardrail Anchor Type 1	8/30/2018
~~BA 4C2~~	~~W-Beam Guardrail Anchor Type II~~	~~10/26/2017~~
BA 4D1	Midwest 31 Inch W-Beam Guardrail Installations	2/27/2020
BA 4D2	Midwest 31 Inch W-Beam Guardrail Installations	2/27/2020
BA 4D3	W-Beam Guardrail Typical Line Post Embedment Special Conditions	2/22/2018

BA 4D4	Midwest 31 Inch W-Beam Guardrail Transition Layout	
BA 4E	Not Used	
BA 4F1	W-Beam Guardrail 31 Inch Buried In Backslope Terminal	10/26/2017
BA 4F2	31 Inch W-Beam Guardrail Buried In Backslope Terminal with Rub Rail	
BA 4F3	W-Beam Guardrail Buried In Backslope Terminal Anchor	10/26/2017
~~BA 4G~~	~~W-Beam Guardrail Curve Breakaway Details~~	~~10/26/2017~~
BA 4G1	W-Beam Guardrail Curve Breakaway Details	10/26/2017
BA 4G2	Curved Guardrail Anchor	8/30/2018
BA 4H1	Midwest 31 Inch W-Beam Guardrail Long Span	
BA 4H2	31 Inch W-Beam Guardrail with Precast Barrier for Span ≥ 25 FT	
BA 4H3	Midwest 31 Inch W-Beam Guardrail Reduced Deflection Criteria	
BA 4I	Not Used	
BA 4J1	Midwest 31 Inch W-Beam Guardrail Typicals Divided Roadways	8/30/2018
BA 4J2	Midwest 31 Inch W-Beam Guardrail Typical MultiLane Arterial	8/30/2018

BA 4J3	Midwest 31 Inch W-Beam Guardrail Typical 2 Lane 2 Way	8/30/2018
BA 5A	Cable Barrier Typical Hardware and Foundation Requirements	6/25/2020
BA 5B1	Cable Barrier Placement	6/25/2020
BA 5B2	Cable Barrier Placement	6/25/2020
~~BA 5C1~~	~~Cable Barrier W-Beam Anchor Assembly~~	~~6/25/2020~~
~~BA 5C2~~	~~Cable Barrier Parapet Departure Bracket~~	~~6/25/2020~~
BA 5C1	Grading and Installation Details MASH Gating Terminal	6/25/2020
BA 5C2	BRIFEN MASH Gating Terminal Cylindrical End Anchor Foundation Detail	6/25/2020
BA 5C3	BRIFEN MASH Gating Terminal Block End Anchor Foundation Detail	6/25/2020
BA 5D	Median Cable Barrier W-Beam Double Sided and Freeway Crossover Anchor System (Type C; C.A.T.)	6/25/2020
~~BA 5D1~~	~~Median Cable Barrier W-Beam Double Sided and Freeway Crossover Anchor System (Type C; C.A.T.)~~	~~6/25/2020~~
~~BA 5D2~~	~~Median Cable Barrier W-Beam Double Sided and Freeway Crossover Anchor System (Type C; FLEAT-MT)~~	~~6/25/2020~~
~~BA 5E1~~	~~Cable Barrier W-Beam Narrow Median Parapet or Concrete Barrier Anchor~~	~~6/25/2020~~
~~BA 5E2~~	~~Cable Barrier W-Beam Approach Transition~~	~~6/25/2020~~

~~BA 5E3~~	~~Cable Barrier W-Beam Precast Concrete Barrier Trailing Anchor~~	~~6/25/2020~~
BA 5E1	Median Cable Barrier with Concrete Barrier (BRIFEN MASH Gating Terminal Overlap) 1 of 3	6/25/2020
BA 5E2	Median Cable Barrier with Concrete Barrier (BRIFEN MASH Gating Terminal Overlap) 2 of 3	6/25/2020
BA 5E3	Median Cable Barrier with Concrete Barrier (BRIFEN MASH Gating Terminal Overlap) 3 of 3	6/25/2020
~~BA 5F1~~	~~Cable Barrier W-Beam Single Sided Approach Anchor System~~	~~6/25/2020~~
~~BA 5F2~~	~~Cable Barrier W-Beam Single Sided Departure Anchor System~~	~~6/25/2020~~
BA 5F1	Cable Barrier/W-Beam Right Shoulder Approach (BRIFEN MASH Gating Terminal Overlap)	6/25/2020
BA 5F2	Cable Barrier/ W-Beam Right Shoulder Trailing Anchor System (BRIFEN MASH Gating Terminal Overlap)	6/25/2020
BA 5F3	Cable Barrier With W-Beam End Treatment Barrier Gap (BRIFEN MASH Gating Terminal)	6/25/2020
~~BA 5G~~	~~Cable Barrier W-Beam Freeway/Expressway Right Shoulder Anchor System~~	~~6/25/2020~~
BA 5G	Cable Barrier Hazard Protection	6/25/2020
~~BA 5H~~	~~Cable Barrier W-Beam Right Shoulder Application~~	~~6/25/2020~~
~~BA 5I1~~	~~Cable Barrier with Existing W-Beam Approach~~	~~6/25/2020~~
~~BA 5I2~~	~~Cable Barrier with Existing W-Beam Trailing End~~	~~6/25/2020~~

~~BA 5J1~~	~~Cable Barrier Median Hazard Protection~~	~~6/25/2020~~
~~BA 5J2~~	~~Cable Barrier Span ≥ 15 Ft to ≤ 30 Ft~~	~~6/25/2020~~
~~BA 5K~~	~~Cable Barrier with Existing Crash Cushion Median Application~~	~~6/25/2020~~
CB 1	Curb and Gutter Inlet	
CB 2	Open Curb Inlet	
CB 3	Shallow Catch Basin	
CB 4	Open Curb Shallow Catch Basin	
CB 5A	Standard Catch Basin and Cleanout Box	
CB 5B	Standard Catch Basin and Cleanout Box Section	
CB 6A	Drop Inlet Type “A”	
CB 6B	Berm Apron with Drop Inlet Type “A”	
CB 7A	Drop Inlet Type “B”	
CB 7B	Normal Apron with Drop Inlet Type “B”	
CB 8A	Double Catch Basin	

CB 8B	Double Catch Basin	
CB 9A	Standard Catch Basin and Cleanout Box Situation and Layout	
CB 9B	Standard Catch Basin and Cleanout Box Section Details	
CB 9C	Standard Catch Basin and Cleanout Box Schedule of Installation 18 to 42 Inch RCP 12 to 48 Inch CMP	
CB 9D	Standard Catch Basin and Cleanout Box Schedule of Installation 48 to 66 Inch RCP 60 to 78 Inch CMP	
CB 10A	Standard Catch Basin and Cleanout Box Situation and Layout	
CB 10B	Standard Catch Basin and Cleanout Box Section Details	
CB 10C	Standard Catch Basin and Cleanout Box Schedule of Installation 42 to 60 Inch RCP 48 to 72 Inch CMP	
CB 11	Precast Concrete Standard Manhole	
CB 12	Precast Concrete Drainage Box	
CC 1	Crash Cushion and End Treatment Markers	
CC 2	Crash Cushion Drainage Details Guideline A	
CC 3	Crash Cushion and End Treatment Drainage Details Guideline B	
CC 4A	Details for Placement Crash Cushions Type A, B, and D	8/30/2018

CC 4B	Crash Cushion Mounted On Median Island	8/30/2018
CC 4C	Crash Cushion Split Median Island w/RR Crossing	8/30/2018
CC 5A	Grading and Placement Details Crash Cushion Type C C.A.T	8/30/2018
CC 5B	Grading and Placement Details Crash Cushion Type C Fleat-MT	8/30/2018
CC 6	Crash Cushion Type E Sand Barrel Details	
CC 7A	Grading and Installation Details End Treatment Type F Quad Trend 350	8/30/2018
CC 7B	Grading and Installation Details End Treatment Type F Beat-SSCC	8/30/2018
CC 8A	Grading and Installation Details Softstop End Treatment Type G (MASH)	8/30/2018
CC 8B	Grading and Installation Details MSKT-SP-MGS End Treatment Type G (MASH)	8/30/2018
CC 8C	Grading and Installation Details for “3R” Projects End Treatment Type G	10/26/2017
~~CC 9~~	~~Grading and Installation Details SRT M10 End Treatment Type H (MASH)~~	~~10/26/2017~~
CC 9	Grading and Installation Details MFLEAT End Treatment Type H (MASH)	10/31/2019
DB 1A	Standard Diversion Box/Cover Plate/Grating for 18 Inch DIA or 24 Inch DIA Pipe	
DB 1B	Standard Diversion Box Hinged Lid Details for 18 Inch DIA or 24 Inch DIA Pipe	

DB 1C	Standard Diversion Box Bicycle Safe Grating Details for 18 Inch DIA or 24 Inch DIA Pipe	
DB 1D	Standard Diversion Box Three Gate Box Sections for 18 Inch DIA or 24 Inch DIA Pipe	
DB 1E	Standard Diversion Box Three Gate Box Sections for 18 Inch DIA or 24 Inch DIA Pipe	
DB 1F	Standard Diversion Box Three Gate Box Sections for 18 Inch DIA or 24 Inch DIA Pipe	
DB 1G	Solid Cover for Std Dwg DB 1	8/30/2018
DB 2A	Standard Diversion Box w/Interchangeable Walls, Bottom Slab, Walls, and Apron Details	
DB 2B	Standard Diversion Box W/Interchangeable Walls, Quantities Schedule	
DB 2C	Standard Diversion Box w/Interchangeable Walls, Hand Slide Gate Details	
DB 2D	Standard Diversion Box Type G Hand Slide Gate Details	
DB 2E	Standard Diversion Box Hinged Lid (Solid Cover Plate) Type A Details Type I Plan	
DB 2F	Standard Diversion Box Hinged Lid (Solid Cover Plate) Type A Details Type II Plan	
DB 2G	Standard Diversion Box Hinged Lid Solid Cover Type B Details	
DB 2H	Standard Diversion Box Hinged Lid Solid Cover Type B and C Details	
DB 3A	Standard Diversion Box with Manhole Cover Situation and Layout	

DB 3B	Standard Diversion Box with Manhole Cover Up to 42 Inch RCP and Up To 54 Inch CMP	
DB 4	Standard Transtion Concrete Lined Ditch to Pipe or Diversion Box	
DB 5	Standard Screw Grate and Frame	
~~DD 1~~	~~Superelevation, Widening, and Edge Detail~~	~~8/30/2018~~
~~DD 2~~	~~Surface Ditch and Benched Slope Details~~	~~8/30/2018~~
~~DD 3~~	~~Geometric Design for Freeways~~	~~8/30/2018~~
~~DD 4~~	~~Entrance Ramps~~	~~8/30/2018~~
~~DD 5~~	~~Exit Ramps~~	~~8/30/2018~~
~~DD 6~~	~~Intersection Geometrics~~	~~8/30/2018~~
~~DD 7~~	~~Freeway Crossover~~	~~8/30/2018~~
~~DD 8~~	~~Structural Geometric Design Standards for Clearances~~	~~8/30/2018~~
~~DD 9~~	~~Structural Geometric Design Standards~~	~~8/30/2018~~
~~DD 10~~	~~Divided Arterials~~	~~8/30/2018~~
~~DD 11~~	~~Arterial and Collector Roads~~	~~8/30/2018~~

~~DD 12~~	~~Local, Frontage, and Access Roads~~	~~8/30/2018~~
~~DD 13~~	~~Two-Lane Intersection 1 of 2~~	~~8/30/2018~~
~~DD 14~~	~~Two-Lane Intersection 2 of 2~~	~~8/30/2018~~
~~DD 15~~	~~Embankment for Bridge Placement~~	~~8/30/2018~~
~~DD 16~~	~~Utility Location Requirements~~	~~8/30/2018~~
~~DD 17~~	~~Clear Zone and Lateral Offset to Obstruction~~	~~8/30/2018~~
~~DD 18~~	~~Marked Pedestrian Crosswalk Enhancement Flowchart~~	~~8/30/2018~~
DG 1	Maximum Fill Height for Steel Drainage Pipe	
DG 2	Maximum Fill Height for Aluminum Drainage Pipe	
DG 3	Maximum Fill Height for Thermoplastic and Reinforced Concrete Drainage Pipe	
DG 4	Maximum Fill Height and Spacing for Drainage Pipe	8/30/2018
DG 5	Drainage Pipe Installation	
DG 6	Steel Safety End Sections	8/30/2018
DG 7	Steel End Sections	

DG 8	Concrete End Sections	
EN 1	Temporary Erosion Control (Check Dams)	
EN 2	Temporary Erosion Control (Silt Fence)	
EN 3	Temporary Erosion Control (Slope Drain and Temporary Berm)	
EN 4	Temporary Erosion Control (Drop-Inlet Barriers)	
EN 5	Temporary Erosion Control (Pipe-Inlet Barriers)	
EN 6	Temporary Erosion Control (Sediment Trap and Stabilized Construction Entrance)	
EN 7	Temporary Erosion Control (Straw Bale Barrier)	
FG 1A	Right Of Way Fence and Gates (Wood Post)	
FG 1B	Right Of Way Fence and Gates (Wood Post)	
FG 2A	Right Of Way Fence and Gates (Metal Post)	2/28/2019
FG 2B	Right Of Way Fence and Gates (Metal Post)	
FG 3	Swing Gates Type I for Gates Less Than 17 FT	
FG 4A	Standard Wildlife Escape Ramp Details	

FG 4B	Combination Wildlife Escape Ramp Details	
FG 4C	Corner Wildlife Escape Ramp Details	
FG 4D	Right Of Way Pole Fence Detail	
FG 5	Swing Gates Type II for Gates Wider Than 17 FT	
FG 6	Chain Link Fence	6/28/2018
GF 1	Rectangular Grate and Frame	
GF 2	Perpendicular Rectangular Grate and Frame	8/30/2018
GF 3	Rectangular Directional Flow Grate and Frame	
GF 4	Rectangular Solid Cover and Frame	
GF 5	Open Curb Inlet Grate and Frame	
GF 6	2FT x 2FT Grate and Frame	
GF 7	Manhole Cover and Frame	8/30/2018
GF 8A	Standard Trash Racks 90 Degree Crossing Angle	
GF 8B	Standard Trash Racks	

GF 8C	Standard Trash Racks	
GF 9	Manhole Steps	
GW 1A	Raised Island	8/29/2019
GW 1B	Raised Island and Plowable End Section	
GW 1C	Raised Island Details	
GW 1D	Median Reflector Details	
GW 2A	Concrete Curb and Gutter Types	8/31/2017
GW 2B	Concrete Curb and Gutter Details	8/31/2017
GW 3A	Concrete Driveways and Sidewalks	8/31/2017
GW 3B	Concrete Driveways and Sidewalks	
GW 4	Right of Way Marker	
GW 5A	Newspaper and Mailbox Stop Layout	
GW 5B	Newspaper and Mailbox Supports	4/30/2020
GW 5C	Triangular Steel Anchor System	4/30/2020

GW 6A	Delineation Hardware	
GW 6B	Barrier and Flexible Delineation Hardware	2/27/2020
GW 7A	Delineation Application	8/29/2019
GW 7B	Linear Delineation Panel and Installation Details	
GW 8	Surface Ditch, Benched Slope and Embankment for Bridge Placement Details	8/30/2018
~~PA 1~~	~~Pedestrian Access~~	~~2/22/2018~~
PA 1	General Pedestrian Access	2/28/2019
~~PA 2~~	~~Pedestrian Access~~	~~2/22/2018~~
PA 2	Detectable Warning Surface Pedestrian Access	2/28/2019
~~PA 3~~	~~Pedestrian Access~~	~~2/22/2018~~
PA 3	Pedestrian Access Details	2/28/2019
~~PA 4~~	~~Pedestrian Access~~	~~2/22/2018~~
PA 4	Perpendicular and Blended Transition Pedestrian Access	2/28/2019
~~PA 5~~	~~Pedestrian Access~~	~~2/22/2018~~

PA 5	Parallel Pedestrian Access	2/28/2019
PA 6	Roundabout, Transit Shelter, and On Street Parking	8/29/2019
PA 7	Marked Pedestrian Crosswalk Enhancement Flowchart	8/30/2018
PV 1	Joints for Highways with Concrete Traffic Lanes and Shoulders	10/26/2017
~~PV 2~~	~~Pavement/Approach Slab Details~~	~~10/26/2017~~
PV 2	Concrete Pavement Details 1 of 2	10/26/2017
~~PV 3~~	~~Concrete Pavement Details 1 of 2~~	~~10/26/2017~~
PV 3	Concrete Pavement Details 2 of 2	10/26/2017
~~PV 4~~	~~Concrete Pavement Details 2 of 2~~	~~10/26/2017~~
PV 4	Not Used	
PV 5	Urban Concrete Pavement Details	
PV 6A	Rumble Strips Location Details	
PV 6B	Rumble Strips Depth and Location Details	
PV 7A	Typical Rumble Strip Shoulder Sequencing and Applications	

PV 7B	Typical Rumble Strip Center Line Sequencing and Application	
PV 8	Typical Rumble Strip Centerline Application	
PV 9	Dowel Bar Retrofit	
PV 10	Utility Orientation/Adjustment Options in PCCP	
PV 11	Edge Detail	8/30/2018
RR 1	Signs at Railroad Crossings	
RR 2	Pavement Markings at Railroad Crossings	
RR 3A1	Active Pedestrian Controls for Railroad Crossings Sheet 1 of 2	
RR 3A2	Active Pedestrian Controls for Railroad Crossings Sheet 2 of 2	
RR 4A1	Passive Pedestrian Controls for Railroad Crossings Sheet 1 of 2	
RR 4A2	Passive Pedestrian Controls for Railroad Crossings Sheet 2 of 2	
RR 5A1	Pedestrian Controls Semi-Exclusive Railroad Alignments Sheet 1 of 2	
RR 5A2	Pedestrian Controls Semi-Exclusive Railroad Alignments Sheet 2 of 2	
RR 6	Pedestrian Controls Street Running Railroad Alignment Signalized Intersections	8/29/2019

RR 7	Pedestrian Controls Street Running Railroad Alignment Unsignalized Intersections	8/29/2019
RR 8	Raised Island Placement at Railroad Crossings	8/30/2018
RR 9	Signing and Striping at Inactive Railroad Crossings	
SL 1A	Traffic Signal Mast Arm Pole and Luminaire Extension 30 ft through 55 ft	8/31/2017
SL 1B	Traffic Signal Mast Arm Pole and Luminaire Extension 60 ft through 75 ft	8/31/2017
SL 1C	Traffic Signal Mast Arm Pole and Luminaire Extension 80 ft through 85 ft	8/31/2017
SL 1D	Traffic Signal Dual Mast Arm Pole	
SL 1E	Traffic Signal Pole	8/31/2017
SL 2A	Traffic Signal Mast Arm Pole Foundation 25 FT through 75 FT	
SL 2B	Traffic Signal Mast Arm Pole Foundation 80 FT and 85 FT	
SL 3A	Traffic Signal Heads	
SL 3B	Traffic Signal Mounting	
SL 3C	Traffic Signal Mounting	
SL 3D	Mast Arm Sign Mounting	

SL 3E	Traffic Signal Head Wiring	
SL 4A	Traffic Signal Cabinet Base and Pole Mounted Cabinet	
SL 4B	Traffic Signal Cabinet Base Expansion	
SL 4C	Underground Service Pedestals	6/27/2019
SL 4D	Traffic Signal Junction Box and Conduit	
SL 4E	Single Transformer Substation	
SL 5A	Highway Luminaire Arm and Vertical Extension	
SL 5B	Highway Luminaire Ground Mounted Pole	
SL 5C	Highway Luminaire Slip Base Details	
SL 5D	Highway Luminaire Pole Foundation Extension	
SL 6A	Pedestrian Signal Assembly	6/27/2019
SL 6B	Pedestrian Signal Crosswalk	8/30/2018
SL 6C	Pedestrian Hybrid Beacon Crosswalk (HAWK)	8/30/2018
SL 6D	Overhead Flashing Beacon at an Intersection Crosswalk	8/29/2019

SL 6E	Post-Mounted Flashing Beacon at an Intersection Crosswalk	8/29/2019
SL 6F	Overhead Flashing Beacon at a Midblock Crosswalk	8/29/2019
SL 6G	Post-Mounted Flashing Beacon at a Midblock Crosswalk	8/29/2019
SL 7A	Overhead School Speed Limit Assembly	
SL 7B	Post-Mounted School Speed Limit Assembly	
SL 7C	School Speed Limit Signing	
SL 8	Advance Warning Signal (AWS) System	
SN 1	Sign Drawing Series General Notes	
SN 2A	Placement of Ground Mount Signs	
SN 2B	Placement of Ground Mount and Barrier Mount Signs	
SN 2C	Wrong Way Signing, Delineation, and Markings for Off-Ramps and Divided Highways	2/22/2018
SN 3	Speed Reduction Sign Sequence	2/22/2018
SN 4	Typical Installation for Milepost Signs	
SN 5	Freeway Crossover Signing	2/22/2018

SN 6	Object Markers “T” Intersection and Pavement Transition Guidance	2/22/2018
SN 7	Chevron Alignment Signs	
SN 8	Mounting Bar Placement for Small Signs	
SN 9A	Tubular Steel Sign Mounting Requirements	2/22/2018
SN 9B	Tubular Steel Sign Mounting Hardware	
SN 10	Banding Mounting Brackets and Clamps	
SN 11A	Small Sign Tubular Steel Post Base with Concrete (B1) (Socket System)	4/30/2020
~~SN 11B~~	~~Small Sign Tubular Steel Post Base (B2A) (Triangular Steel Anchor System)~~	~~2/27/2020~~
~~SN 11C~~	~~Small Sign Tubular Steel Post Base with Concrete (B2B) (Triangular Steel Anchor System in Concrete)~~	~~2/27/2020~~
SN 12A	Slipbase Sign Base Installation	4/30/2020
SN 12B	Round Post Slipbase Sign Base (B3) Hardware	
~~SN 12C~~	~~Square Post Slipbase Sign Base (B7D) Hardware~~	~~2/27/2020~~
SN 12C	Not Used	
SN 12D	Surface Mounted Tubular Steel Sign Base (B4A)	

SN 13	Side Mounted Tubular Steel Sign Base (B4B)	2/22/2018
SN 14	Median Concrete Barrier Pivot Sign Base	2/28/2019
~~SN 14A~~	~~Barrier Mounted Tubular Steel Sign Bases 20 SQ FT or Less~~	~~2/28/2019~~
~~SN 14B~~	~~Barrier Mounted Tubular Steel Sign Bases (B5A and B5B)~~	~~2/28/2019~~
SN 15A	Ground Mount Sign Frame Fabrication Details	
SN 15B1	Freeway Sign General Requirements	6/25/2020
SN 15B2	Freeway Sign Post and Foundation Requirements	6/25/2020
SN 15C	Freeway Sign Base Post Requirements (B6A, B6B, and B6C)	2/28/2019
SN 15D	Freeway Sign Bracket Details	
SN 15E	Freeway Sign Fuse Plate Requirements	2/28/2019
SN 15F	Freeway Sign Foundation Requirements	6/25/2020
SN 16A	Multi-Directional Breakaway Base for Steel I-Beam Supports, General Requirements	6/25/2020
SN 16B	Multi-Directional Breakaway Base for Steel I-Beam Sign Supports, Two Posts	6/25/2020
SN 16C	Multi-Directional Breakaway Base for Steel I-Beam Sign Supports, Three and Four Posts	

SN 16D	Multi-Directional Breakaway Base for Steel I-Beam Sign Supports, Foundation Details	6/25/2020
SN 16E	Multi-Directional Breakaway Base for Sign Posts, (B7A)	
SN 16F	Multi-Directional Breakaway Base for Sign Posts, (B7B)	
SN 16G	Multi-Directional Breakaway Base for Sign Posts, (B7C)	
SN 17A	Multi-Directional Breakaway Base for Round and Square Post, (B7D)	
SN 17B	Multi-Directional Breakaway Base for Round Pipe Double Post (B7D)	
SN 17C	Multi-Directional Breakaway Coupling System for Square Tube Sign Supports Single Post	
SN 17D	Multi-Directional Breakaway Coupling System for Square Tube Sign Supports Double Post	
~~SN 18~~	~~Ground Mounted Timber Sign Post~~	~~2/27/2020~~
ST 1	Typical Pavement Markings	8/29/2019
~~ST 2~~	~~Passing Lane Detail~~	~~8/29/2019~~
ST 2	School Crossing and School Message	8/29/2019
ST 3	Contrast Pavement Markings for Concrete Pavement	8/29/2019
~~ST 3A~~	~~Freeway Climbing Lane Inside Widening Detail~~	~~8/29/2019~~

~~ST 3B~~	~~Freeway Climbing Lane Outside Widening Detail~~	~~8/29/2019~~
~~ST 4~~	~~Entrance Ramp Pavement Markings~~	~~8/29/2019~~
~~ST 5~~	~~Exit Ramp Pavement Markings~~	~~8/29/2019~~
~~ST 6~~	~~Intersection Pavement Markings~~	~~8/29/2019~~
~~ST 7~~	~~Crosswalks, Parking, and Intersection Approaches~~	~~8/29/2019~~
~~ST 8~~	~~School Crossing and School Message~~	~~8/29/2019~~
~~ST 9~~	~~Contrast Pavement Markings for Concrete Pavement~~	~~8/29/2019~~
~~ST 10~~	~~Bicycle Lane Pavement Markings (Sheet 1 of 2)~~	~~8/29/2019~~
~~ST 11~~	~~Bicycle Lane Pavement Markings (Sheet 2 of 2)~~	~~8/29/2019~~
~~ST 12~~	~~Location of Bicycle Detector Pavement Messages at Intersection~~	~~8/29/2019~~
~~ST 13~~	~~Two-Lane Intersection Pavement Markings (Sheet 1 of 2)~~	~~8/29/2019~~
~~ST 14~~	~~Two-Lane Intersection Pavement Markings (Sheet 2 of 2)~~	~~8/29/2019~~
~~ST 15~~	~~Preferential Lane Signing and Pavement Marking Details~~	~~8/29/2019~~
~~ST 16~~	~~Preferential Lane Access Opening Details~~	~~8/29/2019~~

~~ST 17~~	~~Preferential Lane Median Signing Spacing Greater 1 Mile~~	~~8/29/2019~~
~~ST 18~~	~~Preferential Lane Median Signing Spacing Equal To Or Less Than 1 Mile~~	~~8/29/2019~~
SW 1A	Precast Concrete Cattle Guard - General	10/25/2018
SW 1B	8’-0” Precast Concrete Cattle Guard End Unit	2/27/2020
SW 1C	8’-0” Precast Concrete Cattle Guard Center Unit	2/27/2020
SW 1D	6’-0” Precast Concrete Cattle Guard End Unit	2/27/2020
SW 1E	6’-0” Precast Concrete Cattle Guard Center Unit	2/27/2020
SW 1F	Welded End Guard Unit and Traffic Grill Unit	10/25/2018
SW 1G	Precast Concrete Cattle Guard - Optional CIP Apron	10/25/2018
SW 2	Noise Wall Placement Options	
SW 3A	Precast Concrete Noise Wall 1 of 2	6/28/2018
SW 3B	Precast Concrete Noise Wall 2 of 2	
SW 4A	Precast Concrete Retaining/Noise Wall 1 of 3	6/28/2018
SW 4B	Precast Concrete Retaining/Noise Wall 2 of 3	

SW 4C	Precast Concrete Retaining/Noise Wall 3 of 3	
SW 5	Precast Pilaster Post	6/28/2018
SW 6	Precast Concrete Panel Surface Texture Options	
TC 1	Traffic Control Drawing Series General Notes	10/31/2019
TC 2A	Work Zone Channelization Devices	
TC 2B	Work Zone Signing	2/27/2020
TC 2C	Work Zone Advanced Warning Arrow Boards	
TC 2D	Delineator Mounted Work Zone Sign Bracket	
TC 2E	Ground Mounted Timber Sign Post	2/27/2020
TC 2F	Skid-Mounted Dual Wood Post Temporary Sign Support System	2/27/2020
TC 3A	Hazard Mitigation	
TC 3B	Hazard Mitigation and Positive Protection Devices	
TC 4A	Standard Work Zone Signing General	6/25/2020
TC 4B1	Reduced Speed Work Zone Signing General	6/25/2020

TC 4B2	Temporary Portable Rumble Strips Freeway	6/25/2020
TC 4B3	Reduced Speed Shoulder Work Zone Signing General	6/25/2020
TC 4B4	Shoulder Work Zone Temporary Portable Rumble Strips Freeway/Divided Highway	6/25/2020
TC 4C	Project Limit Signing	
TC 4D1	Work Zone Specialty Signs	
TC 4D2	Work Zone Specialty Signs	6/28/2018
TC 5	Traffic Control Urban Intersection with Roadways Under 50 MPH	
~~TC 6~~	~~Temporary Pedestrian Access Route~~	~~10/31/2019~~
TC 6A	Temporary Pedestrian Access Route (TPAR) – Ramp Details	10/31/2019
TC 6B	Temporary Pedestrian Access Route (TPAR) – Walkway and Device Details	10/31/2019
TC 6C	Temporary Pedestrian Access Route (TPAR) – Diversion	10/31/2019
TC 6D	Temporary Pedestrian Access Route (TPAR) – Detour	10/31/2019
TC 7	Median Crossover and 2-Lane, 2-Way Diversion	6/28/2018
TC 8	Traffic Control Lane Closure	

TC 9	Work Zone Business Access Signing	6/28/2018
TC 10	Traffic Control Expressway and Freeway Crossover/Turn Around	
TC 11	Traffic Control Exit Ramp GORE	
TC 12	Traffic Control Entrance Ramp GORE	
TC 13	Traffic Control Shoulder Haul Road	
TC 14A	Traffic Control Flagging Operation	
TC 14B	Reducing Speed Signing for Pilot Car Operation (Conventional Roads)	
TC 15	Traffic Control 2 Lane/2 Way Seal Coat with Cover Material	4/30/2020
TC 16	Traffic Control for Non-Durable Pavement Marking	
TC 17	Traffic Control Work Zone Guardrail Intermediate End Protection	
TC 18	Blunt End Protection for W-Beam Guardrail and Concrete Barrier	
TC 19	Construction Access Points for Speeds of 55 MPH and Greater	

ATMS LINE STYLE LEGEND

FUTURE OR EXISTING	REQ'D	TYPE	CONDUCTOR TYPES
----#d ----	—— #D ——	4-CONDUIT DUCT BANK (# INDICATES NUMBER OF 4-CONDUIT DUCT BANKS 1, 2, OR 4)	FIBER OPTIC
----hv#----	——HV#——	HIGH VOLTAGE CONDUIT (# INDICATES SIZE IN INCHES - 1 1/2, 2, 3, OR 4)	120, 240, OR 480VAC
----lv# ----	——LV#——	LOW VOLTAGE CONDUIT (# INDICATES SIZE IN INCHES - 1 1/2, 2, 3, OR 4)	COPPER COMM OR POWER LESS THAN 120VAC
--- tal# ---	— TAL# —	TAIL CIRCUIT COMMUNICATIONS CONDUIT (# INDICATES SIZE IN INCHES - 1 1/2, 2, 3, OR 4)	FIBER OPTIC OR COPPER COMM
--- spr# ---	— SPR# —	SPARE CONDUIT (# INDICATES SIZE IN INCHES - 1 1/2, 2, 3, OR 4)	EMPTY
----xc -----		EXISTING CONDUIT	UNKNOWN OR AS SPECIFIED
--- ohp ----	——OHP——	OVERHEAD POWER	N/A
--- ohc ----	——OHC——	OVERHEAD COMMUNICATIONS	N/A
--- ohx ----		EXISTING OVERHEAD CONDUCTORS	UNKNOWN OR AS SPECIFIED
--- md#----	——MD#——	BUNDLED MICRODUCT (# INDICATED NUMBER OF INDIVIDUAL MICRODUCTS CONTAINED WITHIN OVER SHEATH; 2,3,4, OR 7)	MICRODUCT

ABBREVIATIONS

ABBREVIATION	DEFINITION
ATMS	ADVANCED TRAFFIC MANAGEMENT SYSTEM
AWG	AMERICAN WIRE GAUGE
BNC	BAYONET NEIL-CONCELMAN
CAB	CABINET
CAT-#	CATEGORY - (# INDICATES CATEGORY NUMBER) CONDUCTOR
CCTV	CLOSED CIRCUIT TELEVISION
COMM	COMMUNICATIONS
DLC	DETECTOR LOOP LEAD-IN CABLES
DIA	DIAMETER
FRE	FIBERGLASS REINFORCED EPOXY
GND	GROUND CONDUCTOR
GRC	GALVANIZED RIGID CONDUIT
HAR	HIGHWAY ADVISORY RADIO
HDPE	HIGH DENSITY POLYETHYLENE
HFC	HYBRID FIBER CABLE
HMA	HOT MIX ASPHALT
LAN	LOCAL AREA NETWORK
NID	NON-INTRUSIVE DETECTOR
NTS	NOT TO SCALE
OC	OFF CENTER
PC	POLYMER CONCRETE
PCCP	PORTLAND CEMENT CONCRETE PAVEMENT
PTCC	PAN-TILT CONTROL CABLE
PTZ	PAN/TILT/ZOOM
PWR	POWER
RDPE	REMOTE DATA PORT ENCLOSURE
REQ'D	REQUIRED
RMS	RAMP METER STATION
ROW	RIGHT-OF-WAY
RPU	REMOTE PROCESSING UNIT (FOR RWIS)
RWIS	ROADWAY WEATHER INFORMATION SYSTEM
## SMF	SINGLE MODE FIBER (## INDICATES NUMBER OF STRANDS)
TMS	TRAFFIC MONITORING STATION
TOC	TRAFFIC OPERATIONS CENTER
TSC	TRAFFIC SIGNAL CONTROLLER
TYP	TYPICAL
VAC	VOLTS (ALTERNATING CURRENT)
VID	VIDEO
VMS	VARIABLE MESSAGE SIGN
WIM	WEIGHT-IN-MOTION
WP	WORKING POINT

DETAIL CALLOUT LEGEND

CALLOUT	MEANING
"X" / "Y"	SEE DETAIL "X" ON SHEET "Y"

CONDUCTOR LEGEND

CALLOUT	DEFINITION
X-Y(Z)	X=QUANTITY Y=WIRE SIZE (AWG) Z=PURPOSE

EQUIPMENT LEGEND

FUTURE OR EXISTING	REQ'D	EQUIPMENT TYPE
		TYPE I FREEWAY VARIABLE MESSAGE SIGN (VMS) ASSEMBLY
		ROADWAY WEATHER INFORMATION SYSTEM
		OMNI DIRECTIONAL ANTENNA
		YAGI DIRECTIONAL ANTENNA
		CCTV CAMERA/PTZ/POLE AND FOUNDATION
d	D	VIDEO DETECTION
d	D	NON-INTRUSIVE DETECTOR (RADAR)
		WIRELESS IN-PAVEMENT MAGNETOMETER
		WIRELESS DETECTION ACCESS POINT
		WIRELESS DETECTION REPEATER
		DETECTOR LOOP
I-pc	I-PC	TYPE I- POLYMER CONCRETE JUNCTION BOX
II-pc	II-PC	TYPE II- POLYMER CONCRETE JUNCTION BOX
III-pc	III-PC	TYPE III- POLYMER CONCRETE JUNCTION BOX
V	V	COMMUNICATIONS VAULT
		COMMUNICATIONS HUB
		ATMS CABINET
		SIGNAL CABINET
		ADVANCED FLASHING BEACON SIGN ON POLE
		MAST ARM WITH SIGNAL HEADS
		SIGNAL HEAD
		POLE
		POWER POLE
M	M	POLE MOUNTED METER
		POWER SERVICE POINT
ps	PS	UNDERGROUND SERVICE PEDESTAL
		POLE MOUNTED TRANSFORMER
		PAD MOUNTED TRANSFORMER
		PAD MOUNTED TRANSFORMER WITH DISCONNECT

ELECTRICAL SCHEMATIC LEGEND

FUTURE OR EXISTING	SYMBOL	EQUIPMENT
		BREAKER
M	M	METER
N	N	NEUTRAL LUG
EG	EG	EQUIPMENT GROUND LUG
		GROUND ROD
		TRANSFORMER
		BLADE SWITCH
		FUSE

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

LEGEND SHEET

STANDARD DRAWING TITLE

STD. DWG. NO.
AT 1

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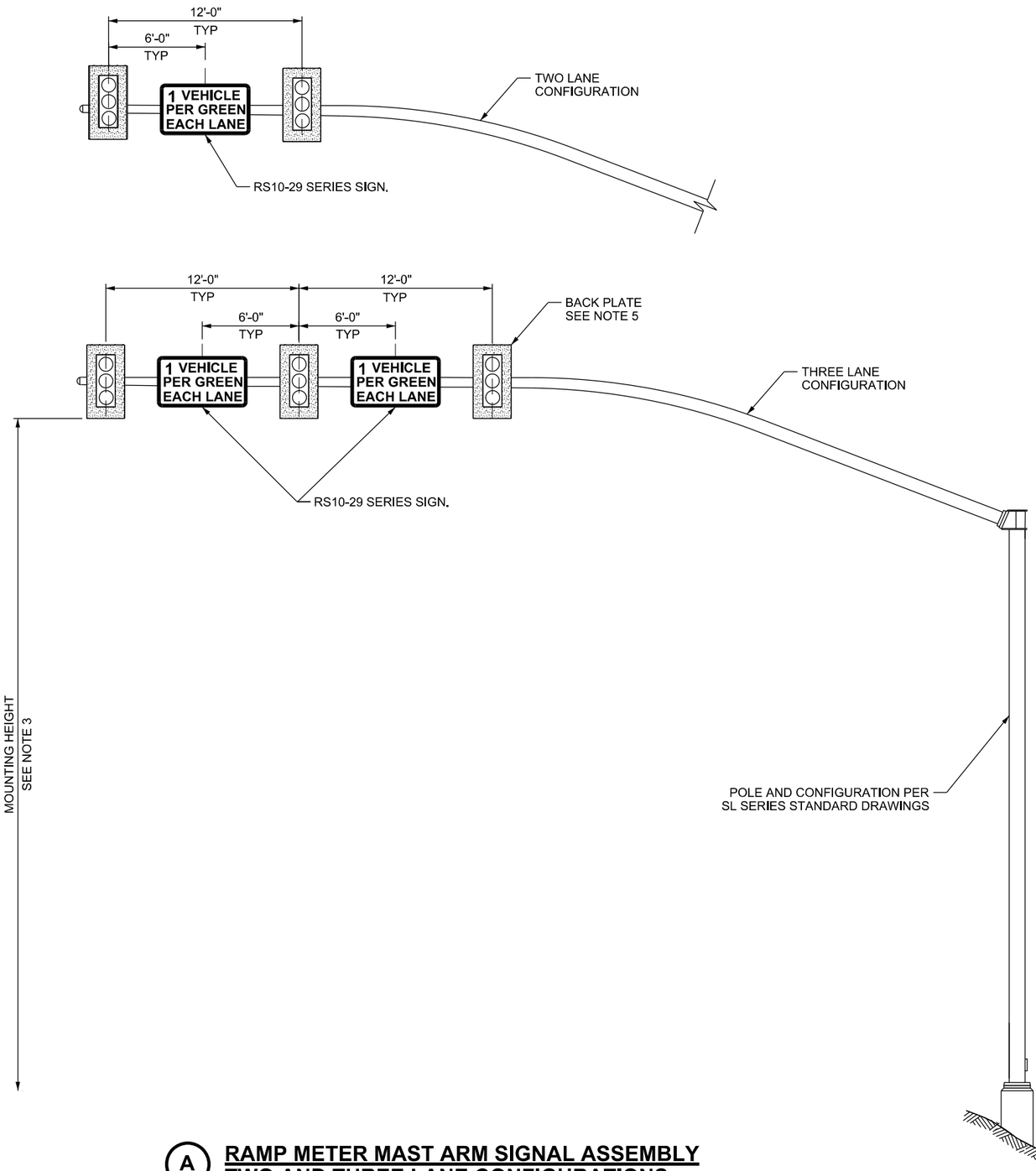
23-JUN-2020



A RAMP METER MAST ARM SIGNAL ASSEMBLY TWO AND THREE LANE CONFIGURATIONS

NOTES:

1. SIGNAL POLE, MAST ARM AND LUMINAIRE EXTENSION ARE STATE FURNISHED ITEMS.
2. ALIGN ALL SIGNAL HEADS WITH CENTER OF LANES.
3. SEE STD DWGS SL 1A AND SL 3B FOR MAST ARM SIGNAL HEAD MOUNTING.
4. USE SEPARATE SEVEN CONDUCTOR CABLE FOR EACH SIGNAL HEAD. SEE STD DWG SL 3E.
5. USE TYPE I SIGNAL HEAD (12 INCH) WITH BACK PLATE ON RAMP METER MAST ARM. SEE STD DWG SL 6. ALL BACK PLATES TO BE SOLID BLACK, RETROREFLECTIVE TAPE WILL NOT BE ALLOWED.
6. VERIFY THE RS 10 - 29 SERIES SIGN WITH TRAFFIC MANAGEMENT DIVISION.

NO.	DATE	APPR.	REMARKS
2	6/27/19	JBY	FIXED DRAWING CROSS REFERENCE ERROR IN NOTE 4; REMOVED NOTE 7
1	2/28/19	CGW	REMOVED 4TH AND 5TH NOTES. DIM. TO EDGE OF TRAVEL WAY. REVISED NOTE 7

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE
RECOMMENDED FOR APPROVAL

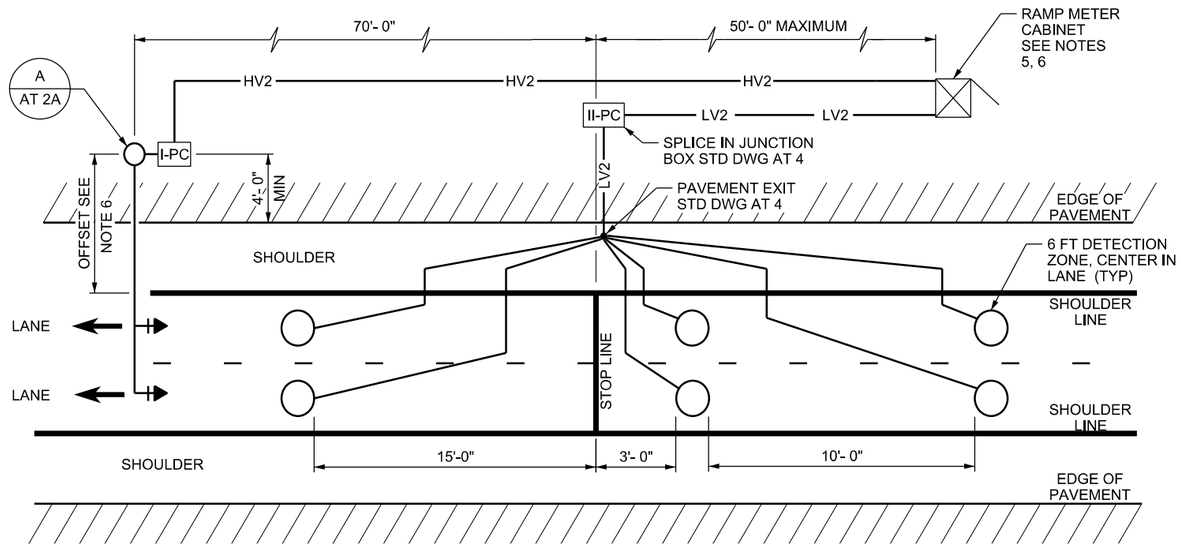
AUGUST 2020
DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

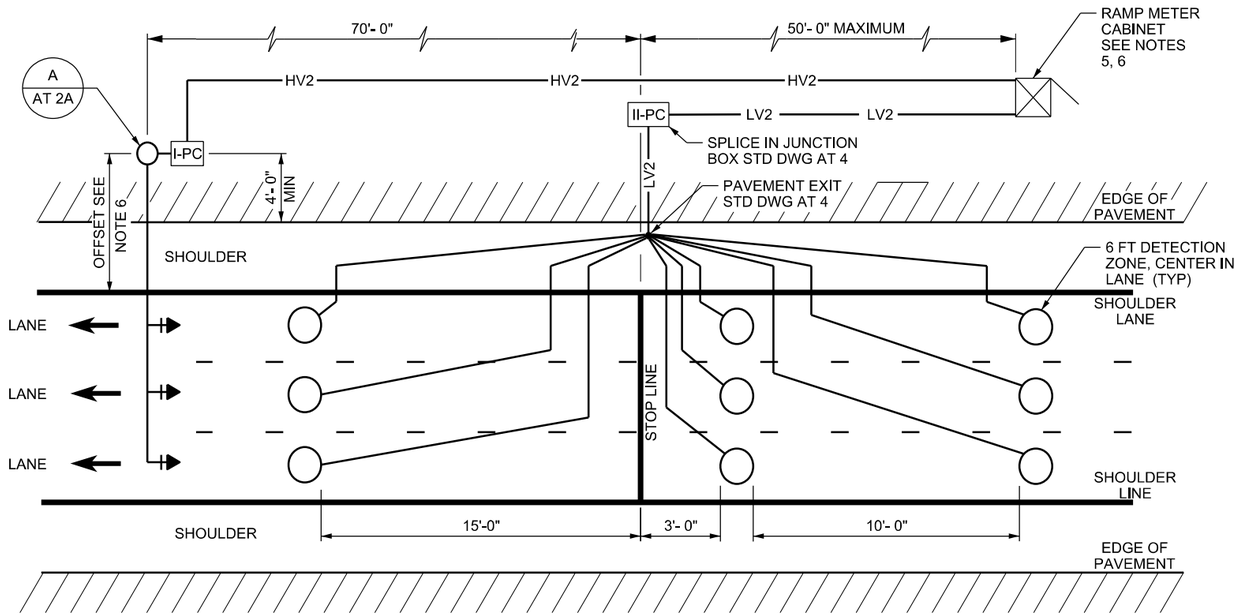
RAMP METER
SIGNAL HEAD DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 2

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1(AT,BA1)\AT02.dgn



A TWO LANE RAMP METER DETECTION ZONE LAYOUT DETAIL
(NOT TO SCALE)



B THREE LANE RAMP METER DETECTION ZONE LAYOUT DETAIL
(NOT TO SCALE)

NOTES:

1. PLACE JUNCTION BOXES ACCORDING TO STD DWG AT 7A. REFER TO STD DWG AT 4 FOR DETECTION.
2. USE PREFORMED LOOPS UNDER NEW PAVEMENT. PREFORMED LOOPS ARE TO BE PLACED PRIOR TO PAVING. SAW CUTTING NEW PAVEMENT WILL NOT BE PERMITTED.
3. TAG EACH LOOP WIRE IN EACH JUNCTION BOX, BEGINNING WITH FIRST LOOP IN LANE CLOSEST TO LEFT SHOULDER.
4. SEE STD DWG AT 5 FOR DETECTOR NUMBERING SCHEME.
5. PLACE CABINET ON RIGHT SIDE OF TRAFFIC UNLESS SPACE IS UNAVAILABLE. CABINET ON LEFT SIDE MUST MEET CLEAR ZONE REQUIREMENTS FOR MAINLINE AND RAMP.
6. ORIENT CABINET SO THAT ELECTRONICS AND SIGNAL HEAD CAN BE VIEWED AT THE SAME TIME.
7. BARRIER BREAK FOR CABINET ACCESS REQUIRED, CONSTRUCT ACCORDING TO PROJECT DOCUMENTS.
8. ENFORCEMENT PULL OUT REQUIRED, CONSTRUCT ACCORDING TO PROJECT DOCUMENTS.
9. SEE PLAN SHEETS FOR DETECTOR LOOP LOCATION. ADJUST THE LOOP PLACEMENT FORWARD OR BACKWARD IN THE SHORTEST DIRECTION FROM THE OPTIMUM POSITION IF A DETECTOR LOOP LOCATION IS IN CONFLICT WITH A MANHOLE, WATER VALVE, OR PAVEMENT EXPANSION JOINT.

NO.	DATE	APPR.	REMARKS
1	2/28/19	CGW	REMOVED 5TH AND 6TH NOTES; REVISED NOTES 7 AND 8

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

RAMP METER
DETECTION LAYOUT AND
CABINET PLACEMENT
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 3

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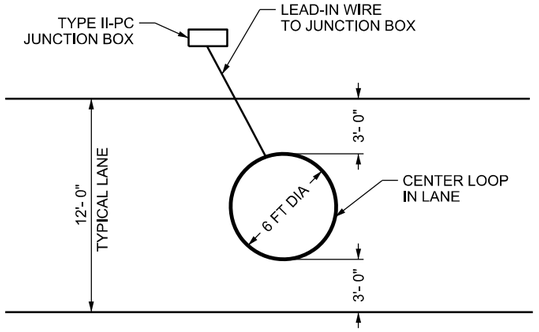
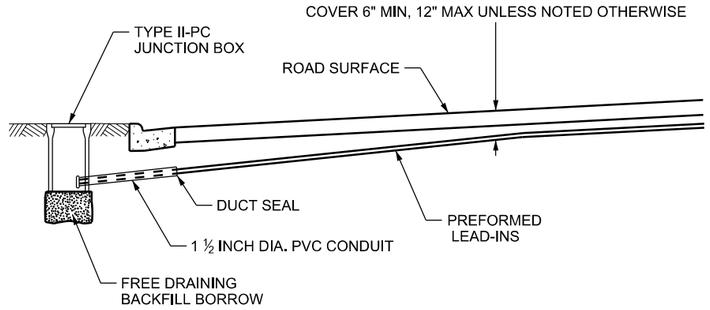
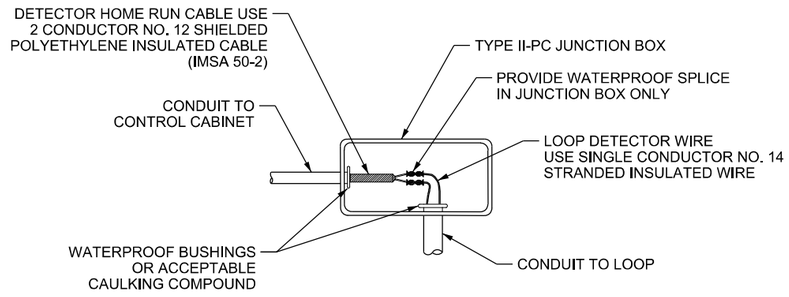
23-JUN-2020



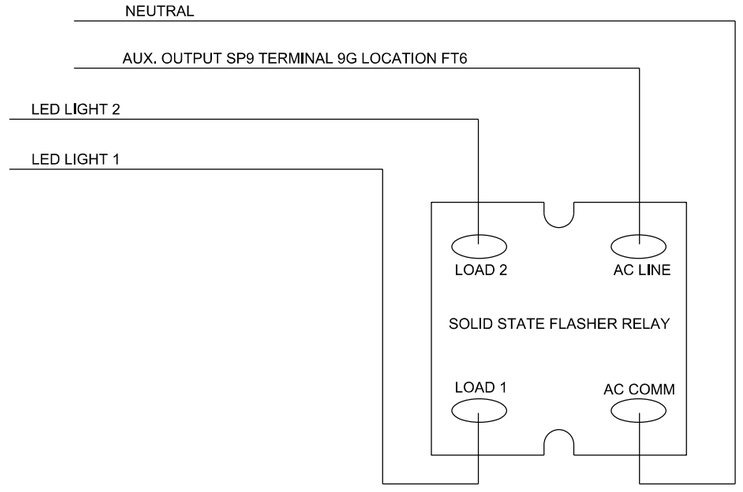
TYPICAL LOOP DETAIL



TYPICAL SECTION



LEAD-IN/HOME RUN SPLICE DETAIL



FLASHER RELAY WIRING DETAIL

NOTES:

1. USE SCHEDULE 40 PVC CONDUIT OR HDPE CONDUIT ONLY. REFER TO STANDARD SPECIFICATION 13553.
2. USE A SEPARATE WIRE FOR EACH LOOP. EACH LOOP WIRE TO BE CONTINUOUS, WITH NO SPLICES, EXCEPT WITH THE HOMERUN WIRE AT THE JUNCTION BOX. USE SEPARATE CONDUCTOR HOMERUN FOR EACH DETECTOR NUMBER ASSIGNMENT. REFER TO STD DWG AT 5.
3. INSPECT AND TEST ALL LOOPS. REFER TO STANDARD SPECIFICATION 13591.

NO.	DATE	APPR.	REMARKS
1	10/25/2018	JBY	SWITCHED WIRES IN LEAD-IN/HOME RUN SPLICE DETAIL.

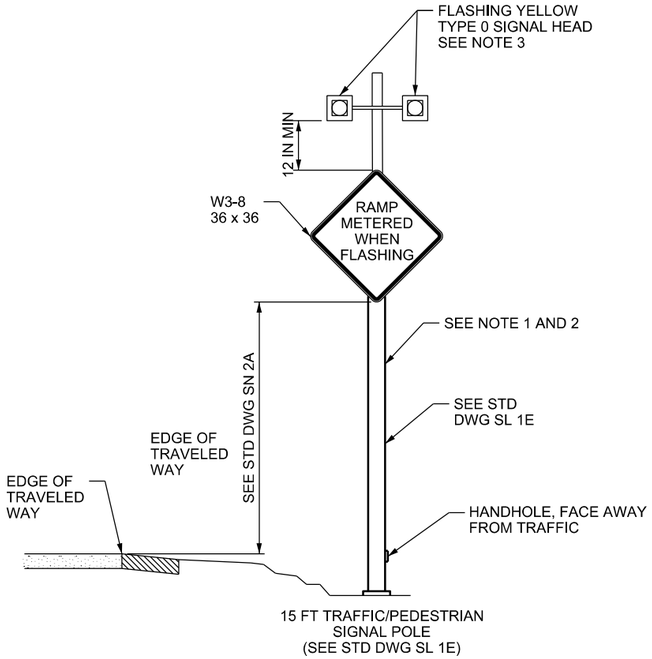
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

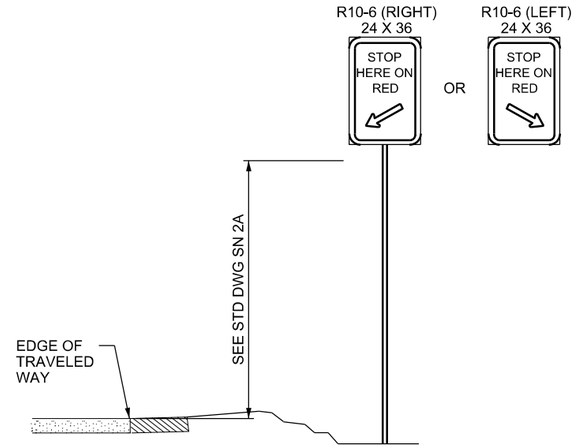
STANDARD DRAWING TITLE
LOOP DETECTOR
AND WIRING DETAILS

STD. DWG. NO.
AT 4

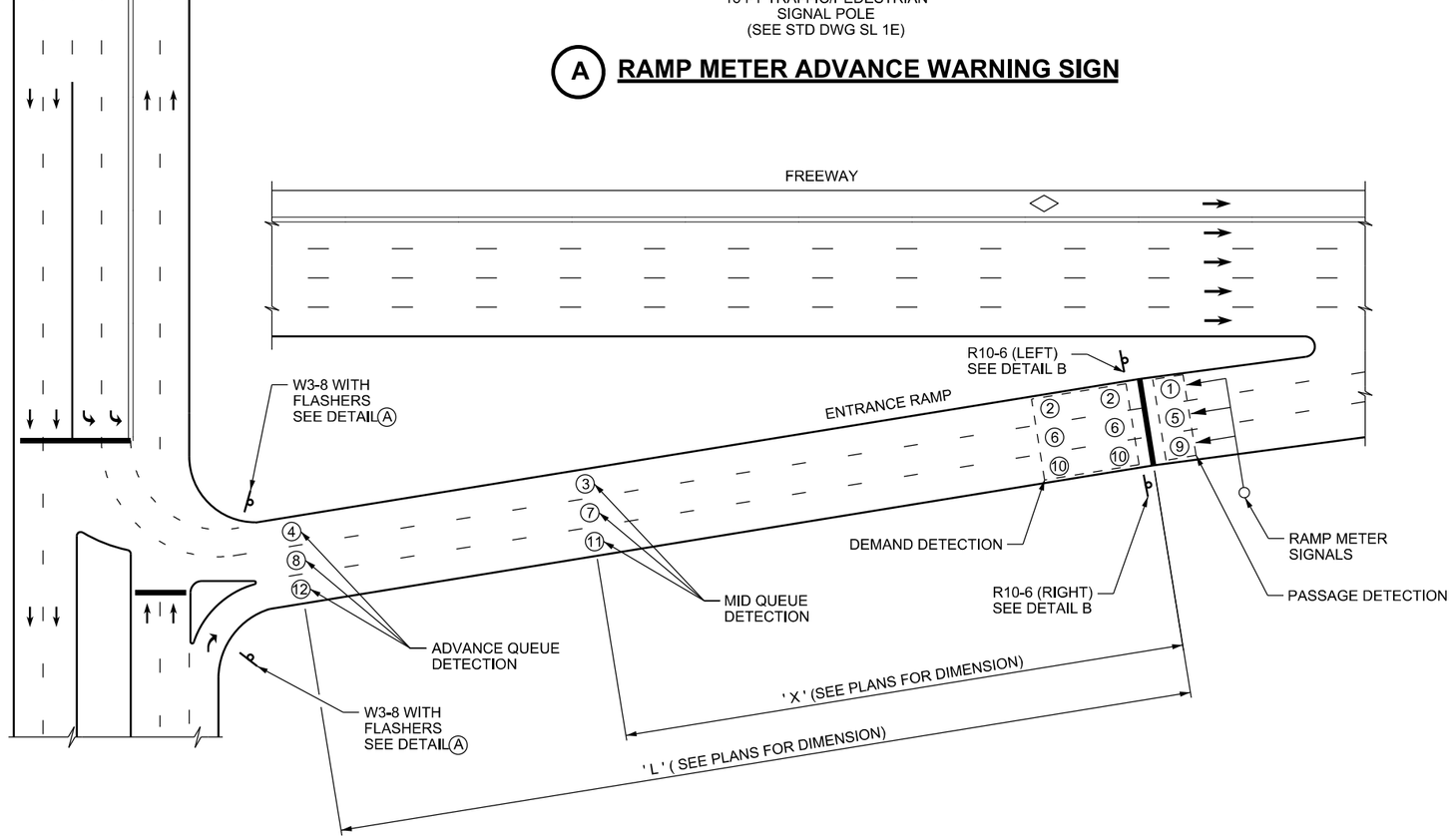
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1 (AT, BA)\AT04.dgn



A RAMP METER ADVANCE WARNING SIGN



B STOP HERE ON RED SIGN



NOTES:

1. PLACE POLE ON BREAKAWAY BASE. LOCATE ACCORDING TO SN 2A SERIES STD DWGS.
2. INSTALL AT LOCATION SHOWN ON PLANS REGARDLESS OF NUMBER OF LANES.
3. 12 INCH YELLOW LED. SEE STD DWG SL 3A AND 3B FOR SIGNAL HEAD DETAIL AND MOUNTING. SEE STD DWG AT 4 FOR FLASHER WIRING DETAILS.
4. USE A SEPARATE CONDUCTOR HOME RUN FOR EACH DETECTOR NUMBER ASSIGNMENT.
5. PROVIDE DETECTION LAYOUT MAP IN RAMP METER CABINET.

LEGEND

(#) CABINET DETECTOR NUMBER ASSIGNMENT.

NO.	DATE	APPR.	REMARKS
1	6/28/18	CGW	UPDATED ALL REFERENCES TO SN AND SL SERIES DRAWINGS.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

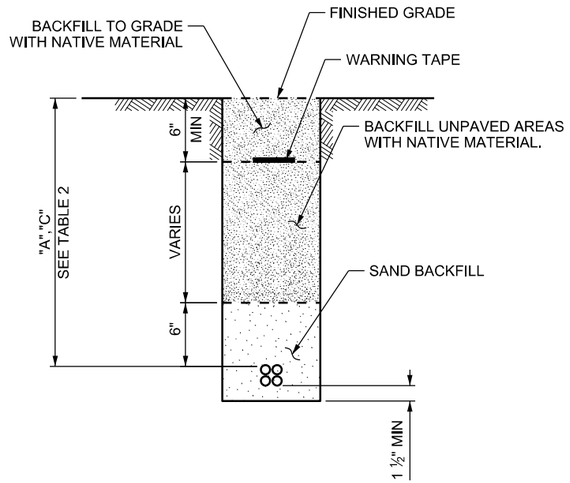
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

RAMP METER DETAILS SIGNING AND DETECTION

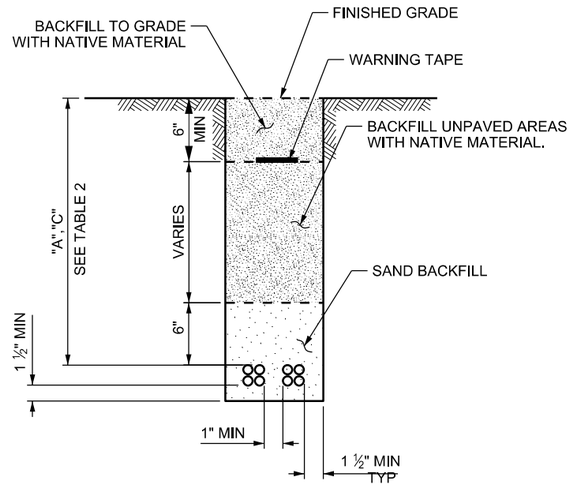
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 5

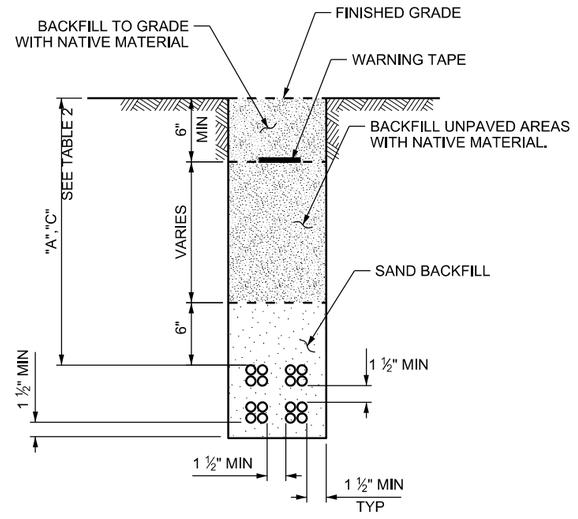
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_BAI\AT05.dgn
23-JUN-2020



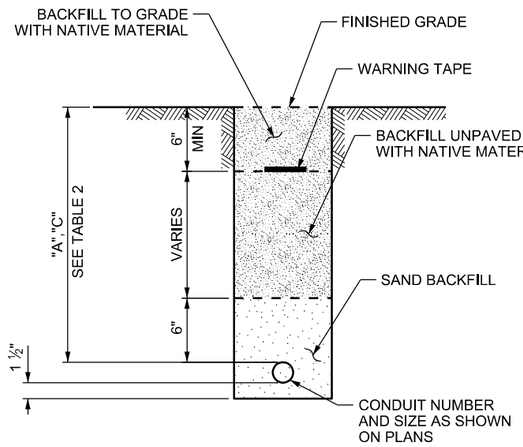
A 1-D MULTIDUCT CONDUIT



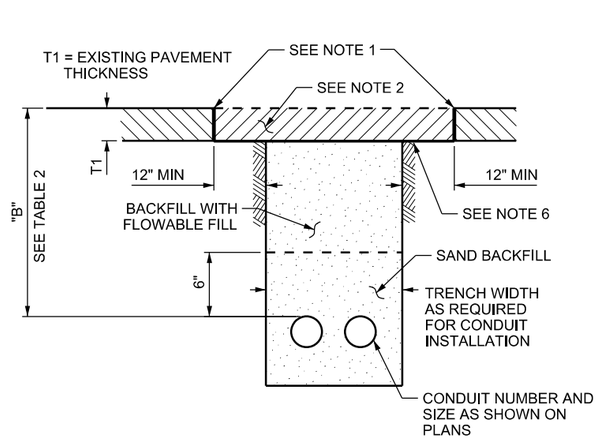
B 2-D MULTIDUCT CONDUIT



C 4-D MULTIDUCT CONDUIT



D NON-MULTIDUCT CONDUIT AND BUNDLED MICRODUCT



E CONDUIT TRENCHED IN ASPHALT PAVEMENT RESTORED WITH T PATCH

TABLE 1. T PATCH RESTORATION

EXISTING ASPHALT PAVEMENT THICKNESS (T1) IN INCHES	RESTORATION T PATCH THICKNESS IN INCHES
0 - 3 ½"	3 ½"
3 ½" - 7"	MATCH EXISTING DEPTH
7" OR GREATER	7"

TABLE 2. MINIMUM CONDUIT DEPTH

	DEPTH IN INCHES	AREA
A	36	OUTSIDE 20 FT OF PAVEMENT EDGE
B	48	HIGHWAY RIGHT-OF-WAY UNDER ASPHALT PAVEMENT SURFACE
C	60	WITHIN 20 FT OF PAVEMENT EDGE

NOTES:

1. SAW CUT PAVEMENT EDGES. APPLY A HOT-POUR RUBBERIZED ASPHALT JOINT SEALANT OR APPROVED EQUAL, APPLIED AFTER PATCH IS INSTALLED.
2. USE HMA MATERIAL FOR T-PATCH. USE OPEN-GRADED SURFACE COURSE FOR THE TOP 1 INCH OF HMA FOR PATCHES GREATER THAN 12 FT WIDE. WHERE OPEN-GRADED SURFACE COURSE EXISTS, MATCH EXISTING PAVEMENT AND CROSS-SECTION.
3. USE SAND BACKFILL AND FLOWABLE FILL WITHIN EXISTING ROADWAY, PROPOSED ROADWAY, AND SIDEWALK PAVEMENT AREAS ONLY.
4. INSTALL DETECTABLE PULL TAPE IN ALL EMPTY CONDUITS.
5. EVENLY APPLY TACK COAT ON FINAL BACKFILL BEFORE INSTALLING T-PATCH.
6. USE ⅜ INCH MINUS WELL-GRADED SAND.

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR

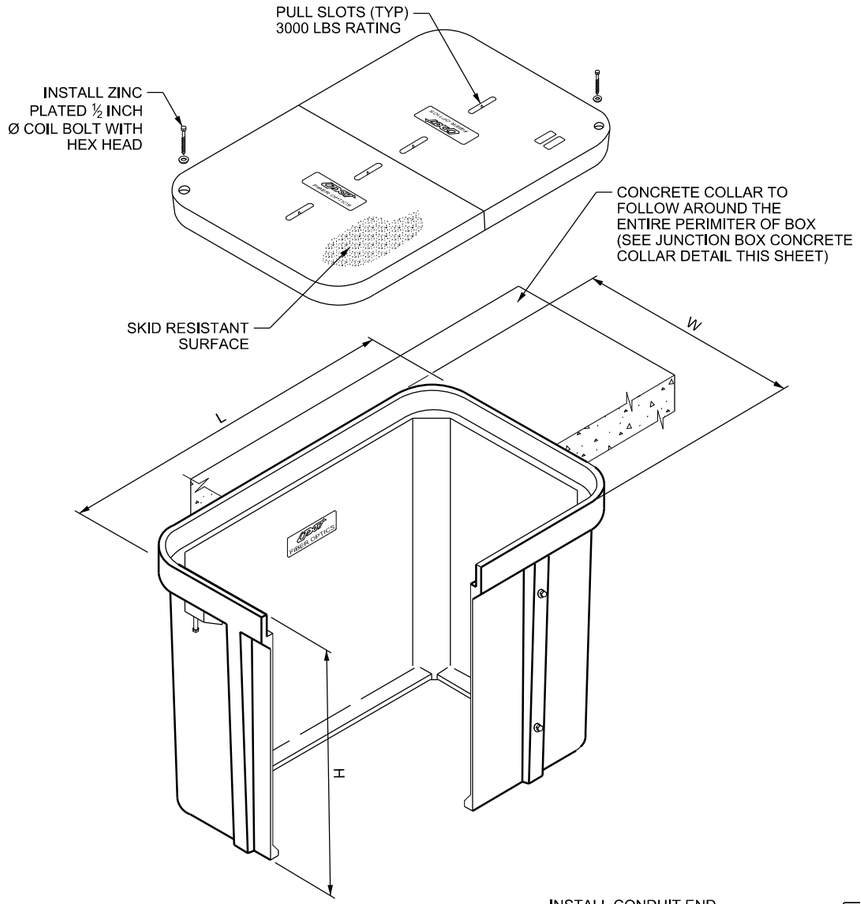
AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — DEPUTY DIRECTOR

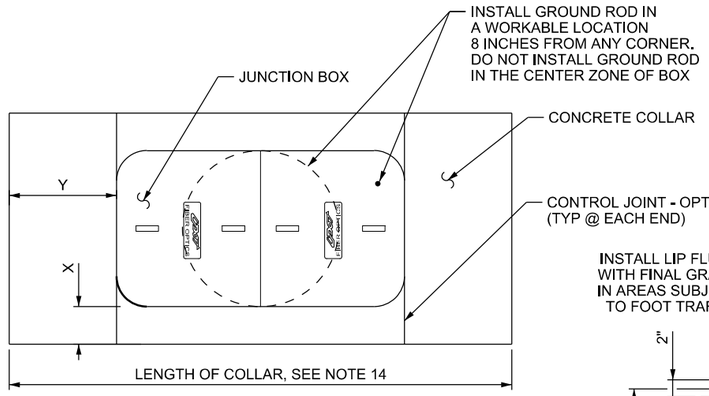
CONDUIT DETAILS

STANDARD DRAWING TITLE

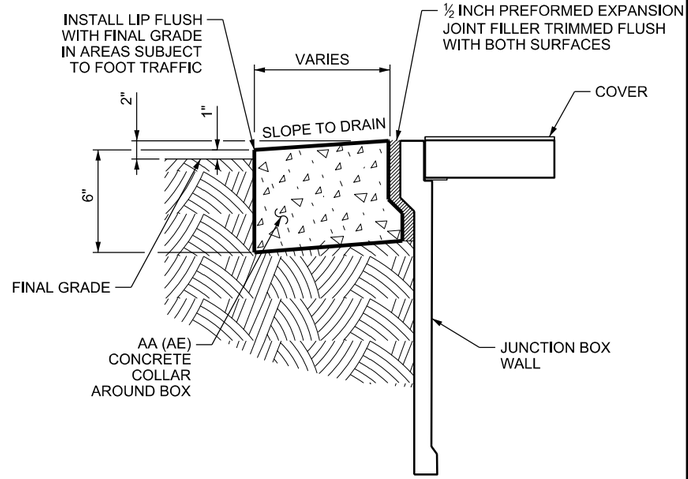
STD. DWG. NO.
AT 6

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1 (AT, BA1)\AT06.dgn





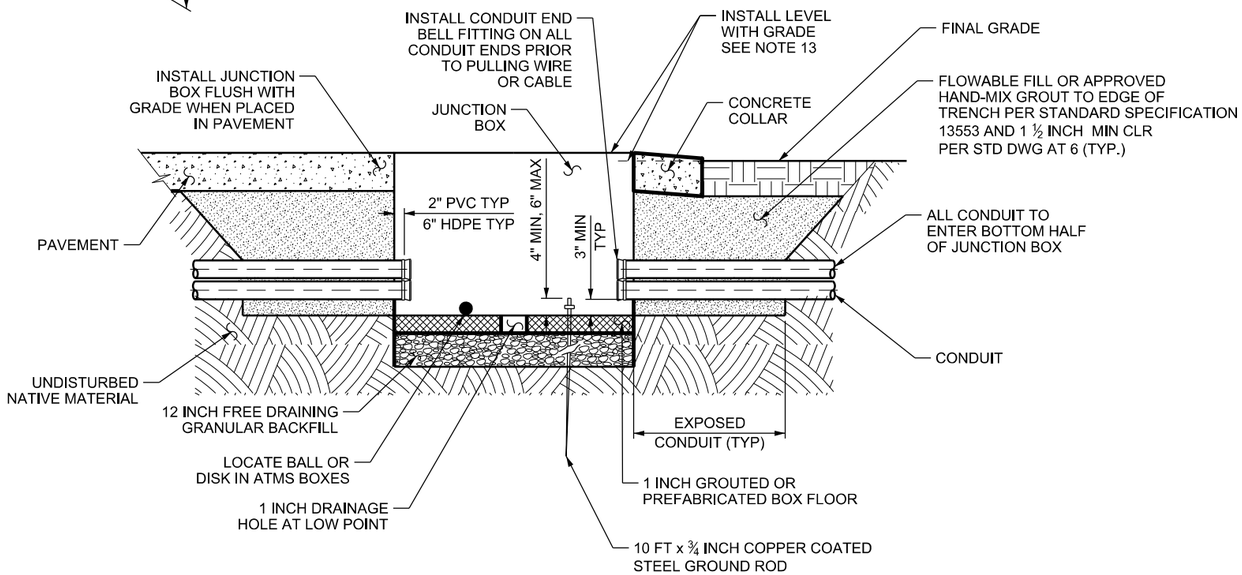
PLAN VIEW - JUNCTION BOX AND CONCRETE COLLAR



JUNCTION BOX CONCRETE COLLAR DETAIL

TABLE OF DIMENSIONS

BOX TYPE	"W" inch	"L" inch	"H" inch	"X" inch	"Y" inch	LOADING
I-PC	13	24	24	10	10	TIER 22
II-PC	24	36	36	10	24	TIER 22
III-PC	30	48	36	10	24	TIER 22



JUNCTION BOX CONDUIT PENETRATION DETAIL

NOTES:

1. BOX LOGO OR NAME PLATE, REFER TO STANDARD SPECIFICATION 13554.
2. DO NOT PLACE JUNCTION BOXES IN THE TRAVELED WAY OR ON FREEWAY SHOULDERS.
3. CONCRETE COLLAR WIDTH VARIES WHEN ADJACENT TO ATMS CABINETS. REFER TO AT AND SL SERIES STD DWGS.
4. PROVIDE CONCRETE COLLARS EXCEPT WITHIN CONCRETE PAVED AREAS.
5. INSTALL CONDUIT PLUG PER STANDARD SPECIFICATION 13554.
6. ALIGN ATMS CONDUIT BY COLOR ON EACH SIDE OF THE JUNCTION BOX.
7. PROVIDE TYPE III-PC JUNCTION BOXES WITH A SPLIT LID.
8. CONFORM TO ANSI/SCTE-77 "SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY" TIER 22 LOADING FOR ALL JUNCTION BOXES. TIER 22 ID PLATE TO BE VISIBLE ON BOX.
9. EXTEND GROUND ROD A MINIMUM OF 4 INCHES AND A MAXIMUM OF 6 INCHES ABOVE BOTTOM OF JUNCTION BOX.
10. USE INTER SYSTEM GROUNDING BRIDGE CLAMP FOR BONDING TO GROUND ROD. ATTACH NOT MORE THAN 4 WIRES PER CLAMP.
11. DO NOT CUT GROUND RODS.
12. PROVIDE CLEAR SPACE OF AT LEAST 36 INCH FOR PERSONNEL TO PULL LID OFF BOX WITHOUT CONFLICT.
13. PLACE JUNCTION BOXES AND CONCRETE COLLARS LEVEL WITH GRADE ON SLOPES 6:1 OR FLATTER. REFER TO PLANS FOR DETAILS OF JUNCTION BOX PLACEMENTS ON SLOPES STEEPER THAN 6:1. SLOPE CONCRETE COLLAR TO DRAIN AS SHOWN.
14. INSTALL ENTIRE PAD UNIFORMLY TO LONGEST LENGTH WHEN SEVERAL JUNCTION BOXES ARE BEING PLACED ADJACENT TO ONE ANOTHER.

NO.	DATE	APPR.	REMARKS
	4/30/20	MAA	ADDED "OPTIONAL" TO CONCRETE COLLAR DETAIL

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

POLYMER CONCRETE JUNCTION BOX DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
AT 7A

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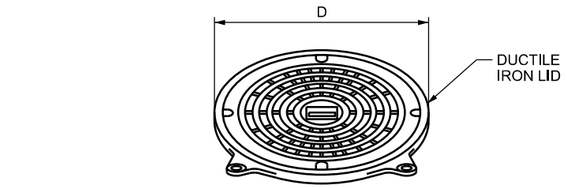
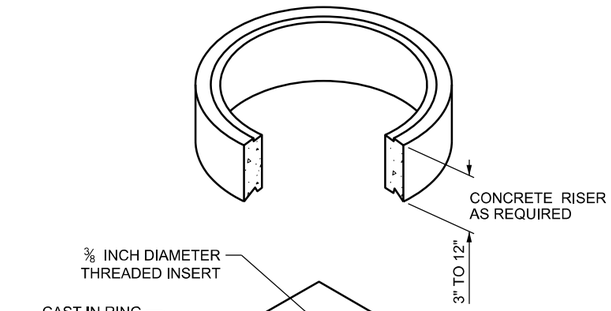
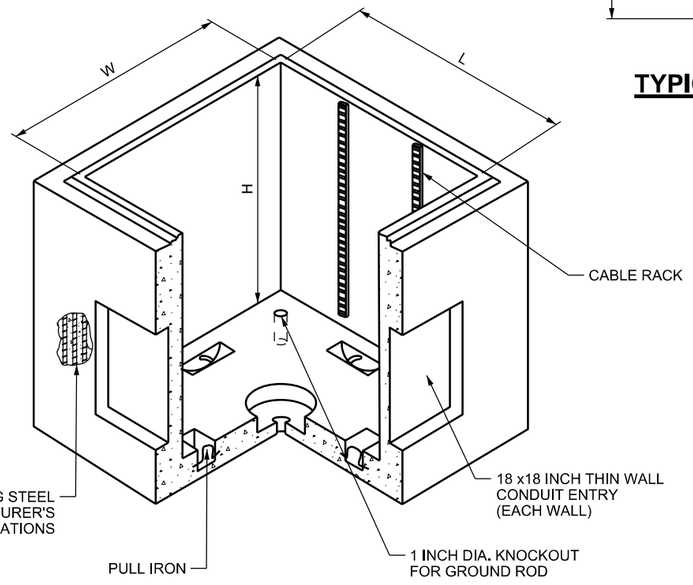
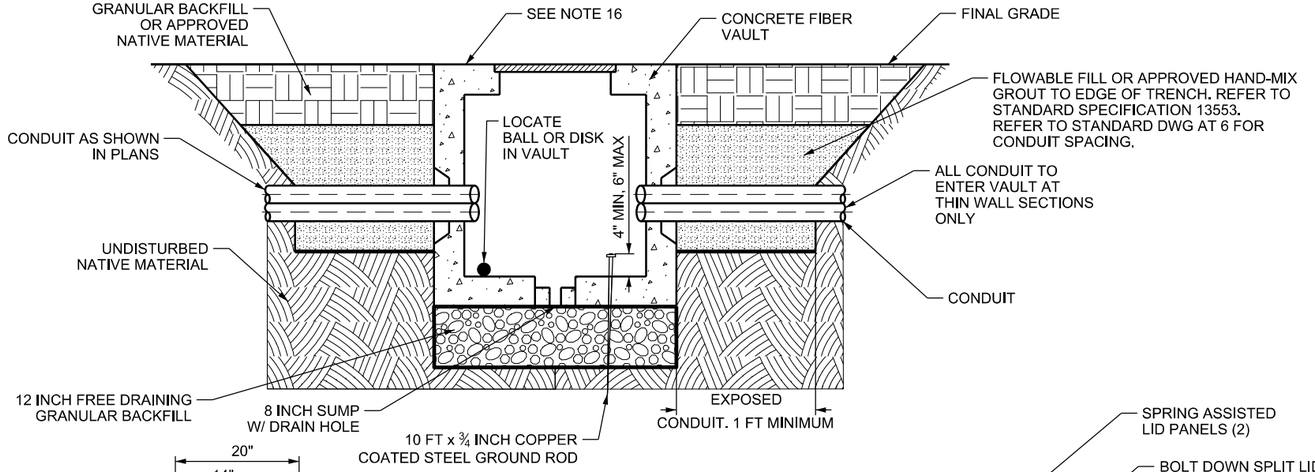
23-JUN-2020



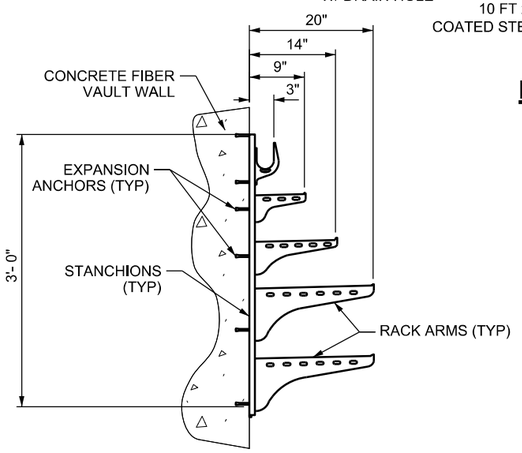




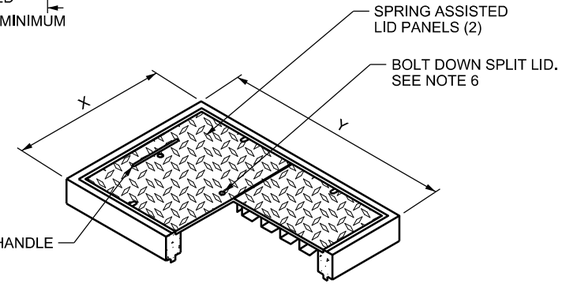
CONCRETE FIBER VAULT WITH MANHOLE LID



FIBER VAULT CONDUIT PENETRATION DETAL



TYPICAL CABLE RACK



METAL LID FOR TYPE IV-CV FIBER VAULT

VAULT DIMENSIONS

VAULT TYPE	"L" INCH	"W" INCH	"H" INCH	"T" INCH	LID	"X" INCH	"Y" INCH	"D" INCH
IV-CV	48	48	48	6 MIN	HINGED OR MANHOLE	24	36	36
V-CV	48	72	72	6 MIN	MANHOLE ONLY	N/A	N/A	36

NOTES:

1. SUPPLY TYPE IV FIBER VAULT WITH A TAMPERPROOF HINGED METAL LID FOR UNPAVED AREAS, OR A TAMPERPROOF HEAVY DUTY MANHOLE-STYLE LID IN PAVED AREAS. SUPPLY FIBER VAULTS, LIDS, AND COVERS RATED FOR AASHTO LRFD HL-93 LOADING.
2. SUPPLY TYPE V-CV FIBER VAULT WITH A MANHOLE-STYLE LID ONLY.
3. SUPPLY MANHOLE LIDS WITH A HOLE OR SLOT FOR REMOVAL WITH A LEVER OR HOOK. SUPPLY HINGED METAL LIDS WITH DROP HANDLES.
4. SUPPLY VAULTS WITH A PERMANENT INTERNAL LADDER.
5. PROVIDE FIBER VAULT LIDS MARKED, "UDOT FIBER OPTIC" USING MIN 3 INCH HIGH LETTERING WITH ⅛ INCH THICKNESS. FORM LETTERS BY ENGRAVING, CASTING, STAMPING, OR WITH A PRECISE WELD BEAD.
6. PROVIDE HINGED METAL LID WITH A MINIMUM OF $\frac{3}{32}$ INCH HIGH DIAMOND PATTERN OR SIMILAR SURFACE.
7. PROVIDE FIBER VAULTS WITH A HEAVY-DUTY NON-METALLIC CABLE STORAGE RACK SYSTEM. PROVIDE RACK ARMS AND STANCHIONS CAPABLE OF SUPPORTING A MINIMUM OF 250 LB FOR TYPE IV-CV FIBER VAULT RACKS, INCLUDE A MINIMUM OF 36 INCH RACK STANCHIONS AND 4 RACK ARMS. FOR TYPE V-CV FIBER VAULTS, INCLUDE A MINIMUM OF 45 INCH RACK STANCHIONS AND 5 RACK ARMS.
8. CONDUITS PENETRATE FIBER VAULT AT THIN WALL SECTIONS ONLY. CORE DRILL HOLE IN THIN WALL SECTION TO CONDUIT SIZE PLUS ¼ INCH. DO NOT "KNOCK OUT" THE THIN WALL SECTION.
9. COMPLY WITH OSHA REQUIREMENTS FOR ENCLOSED WORK SPACES.
10. BOND AND GROUND ALL EXPOSED METALLIC COMPONENTS OF THE FIBER VAULT PER NEC 250 IF ARMORED FIBER OPTIC CABLE IS USED.
11. INSTALL CONDUIT PLUGS ACCORDING TO STANDARD SPECIFICATION 13553.
12. ALIGN ATMS CONDUIT BY COLOR ON EACH SIDE OF FIBER VAULT.
13. EXTEND GROUND ROD A MINIMUM OF 4 INCHES AND A MAXIMUM OF 6 INCHES ABOVE BOTTOM OF FIBER VAULT.
14. USE GROUND ROD BRIDGE CLAMP FOR BONDING TO GROUND ROD. ATTACH NOT MORE THAN 4 WIRES PER CLAMP.
15. DO NOT CUT GROUND RODS.
16. INSTALL VAULT PLUMB AND LEVEL. GRADE BACKFILL FLUSH WITH VAULT.

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

PRECAST CONCRETE FIBER OPTIC AND UTILITY VAULT DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 7B

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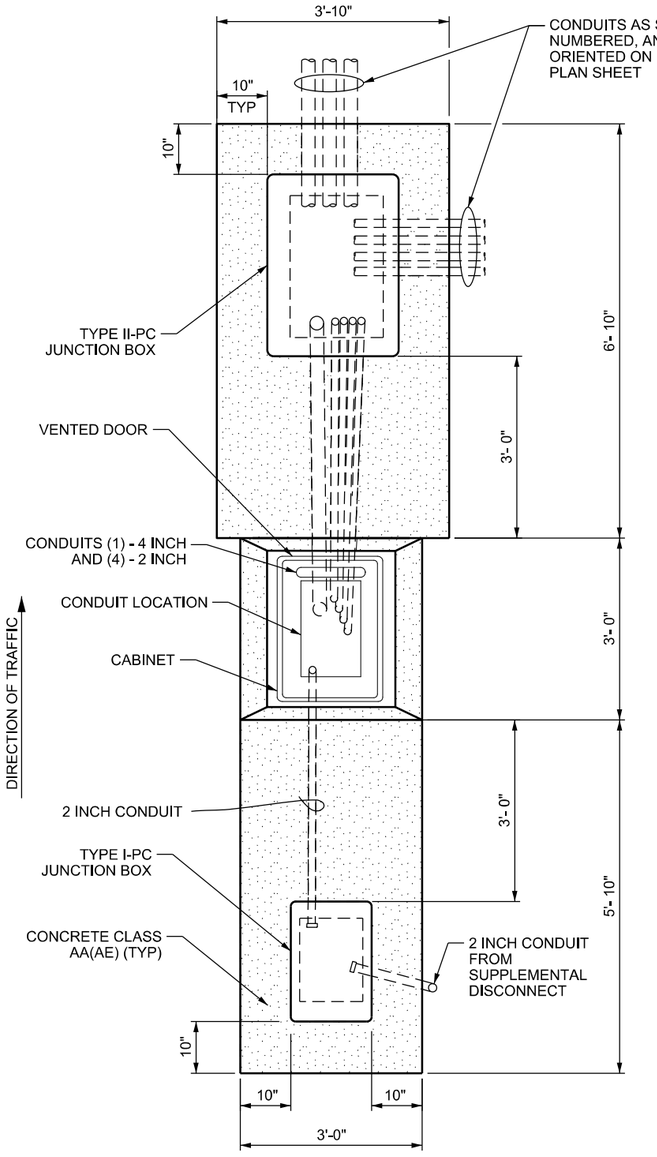
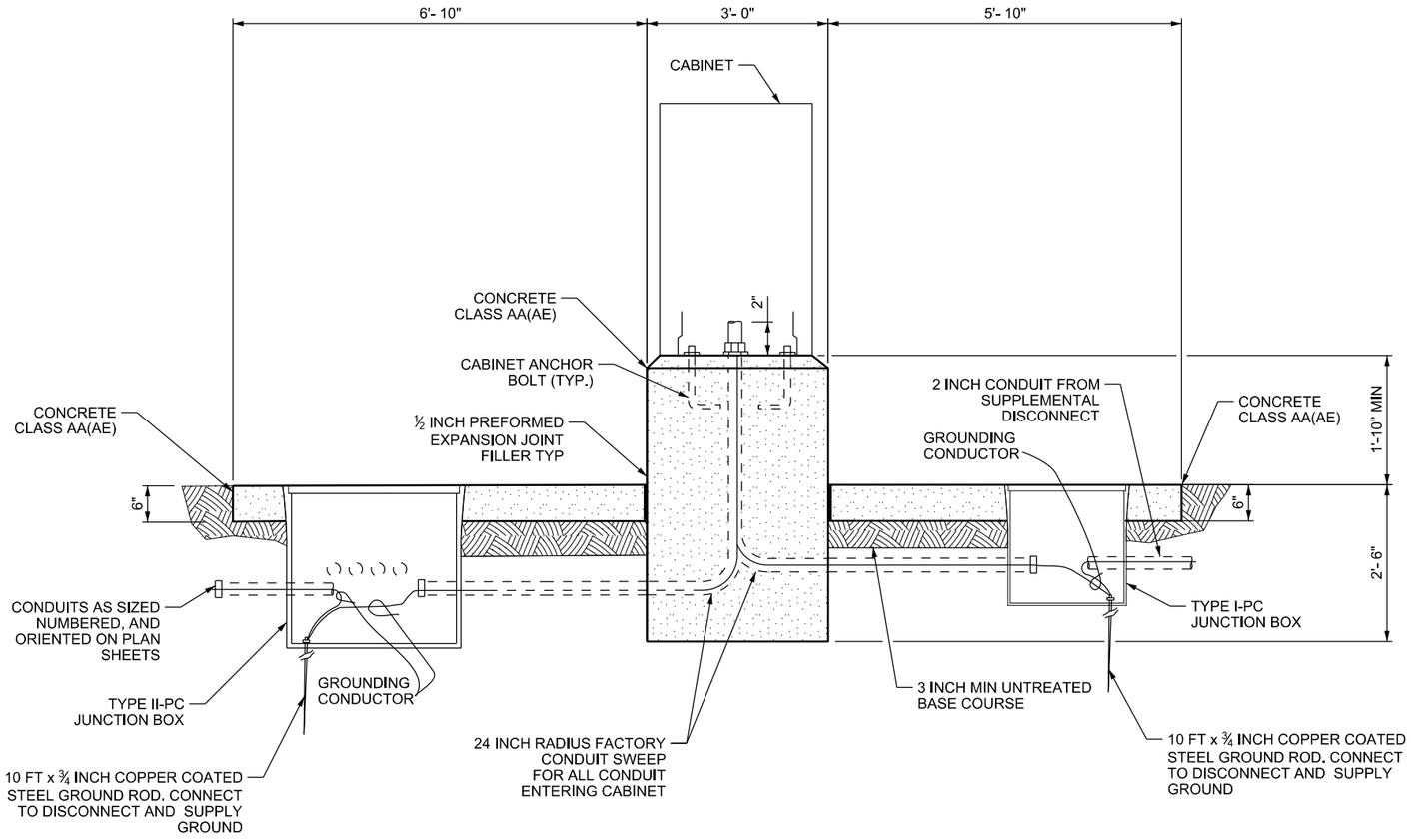
23-JUN-2020



PLAN VIEW



SIDE ELEVATION

(A) ATMS CABINET

NOTES:

1. SEE STD DWG AT 9 FOR CABINET DISCONNECT AND TRANSFORMER DETAIL.
2. FIELD VERIFY CONDUIT LAYOUT IN FOUNDATION TO AVOID CONFLICT WITH CABINET.
3. SEE STD DWG AT 7 FOR TYPICAL ATMS JUNCTION BOX INSTALLATION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

AUGUST 2020
DATE

DEPUTY DIRECTOR

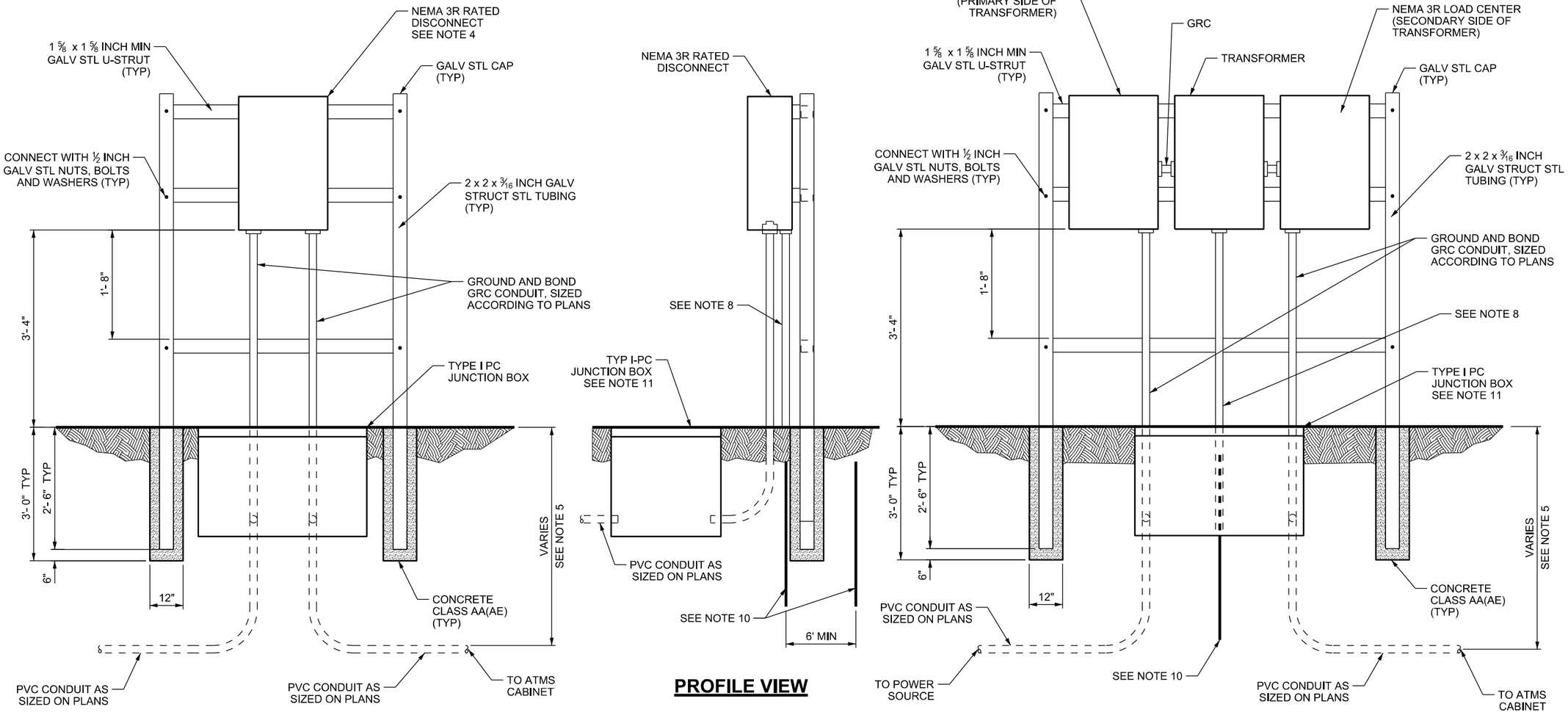
ATMS CABINET

STANDARD DRAWING TITLE

STD. DWG. NO.

AT 8

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1(AT,BA1)\AT08.dgn
23-JUN-2020



PROFILE VIEW

A SUPPLEMENTAL DISCONNECT FRAME

B SUPPLEMENTAL DISCONNECT WITH TRANSFORMER FRAME

NOTES:

1. LOCATE FRAME 10 TO 15 FT FROM CABINET AND ATMS EQUIPMENT.
2. ROUND OFF SHARP EDGES OF STRUCTURAL TUBING. PAINT CUT ENDS OF FRAMING STRUTS WITH ZINC RICH PAINT.
3. APPLY CORROSION PROTECTION TO PORTION OF STRUT BELOW GRADE.
4. ATTACH TRANSFORMER, DISCONNECT AND LOAD CENTER TO FRAMING STRUT WITH WATERTIGHT GASKETS AND GALVANIZED HARDWARE.
5. REFER TO STANDARD SPECIFICATION 13553 FOR CONDUIT DEPTH.
6. USE ONLY FACTORY PRODUCED CONDUIT SWEEPS.
7. SIZE ENCLOSURE TO ACCOMMODATE CONDUIT SIZES PER PLAN.
8. INSTALL 1 INCH SCHEDULE 80 PVC AS PROTECTION FOR GROUNDING ELECTRODE CONDUCTOR.
9. ALL MATERIALS USED MUST BE RATED FOR THE VOLTAGE AND CURRENT AS SHOWN.
10. INSTALL 2 EACH 10 FT X ¾ INCH GROUND RODS DIRECTLY BELOW SUPPORT FRAME, SPACED MINIMUM 6 FT APART AT TRANSFORMER LOCATIONS. INSTALL 6 AWG COPPER GROUNDING ELECTRODE CONDUCTOR BETWEEN GROUND RODS 6 INCHES BELOW GRADE AND BOND TO TRANSFORMER SECONDARY ACCORDING TO NEC ARTICLE 250 REQUIREMENTS.
11. LOCATE TYPE I PC JUNCTION BOX MINIMUM 6 FT AND MAXIMUM 10 FT FROM FRAME.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	6/27/19	MMA	REMOVED SIZE OF GRC IN LEADER
2	10/25/18	JBY	CORRECTED CALL OUT, NOTE 1, ADDED
1	8/31/17	MMA	CORRECTED DIMENSION ERROR, ADDED REFERENCE TO NOTE 11

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

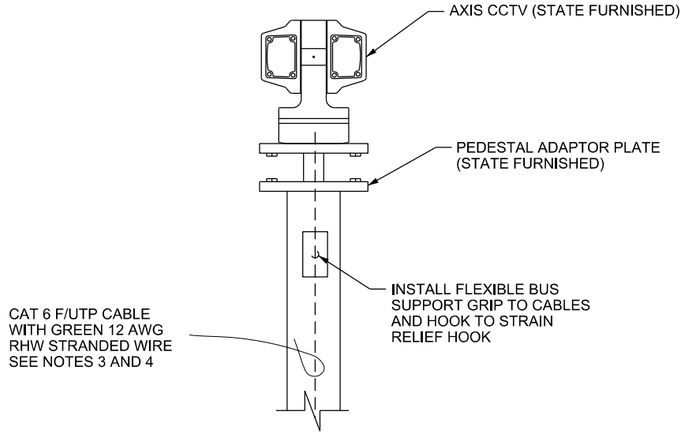
ATMS CABINET AND EQUIPMENT DISCONNECT AND TRANSFORMER FRAME

STANDARD DRAWING TITLE

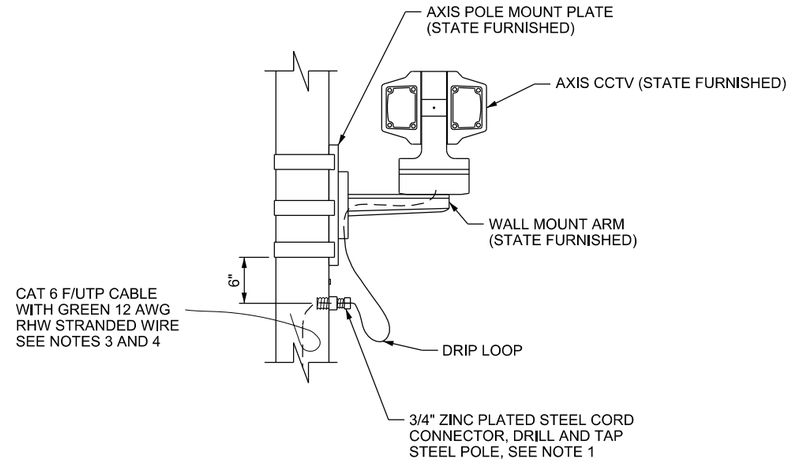
STD. DWG. NO.

AT 9

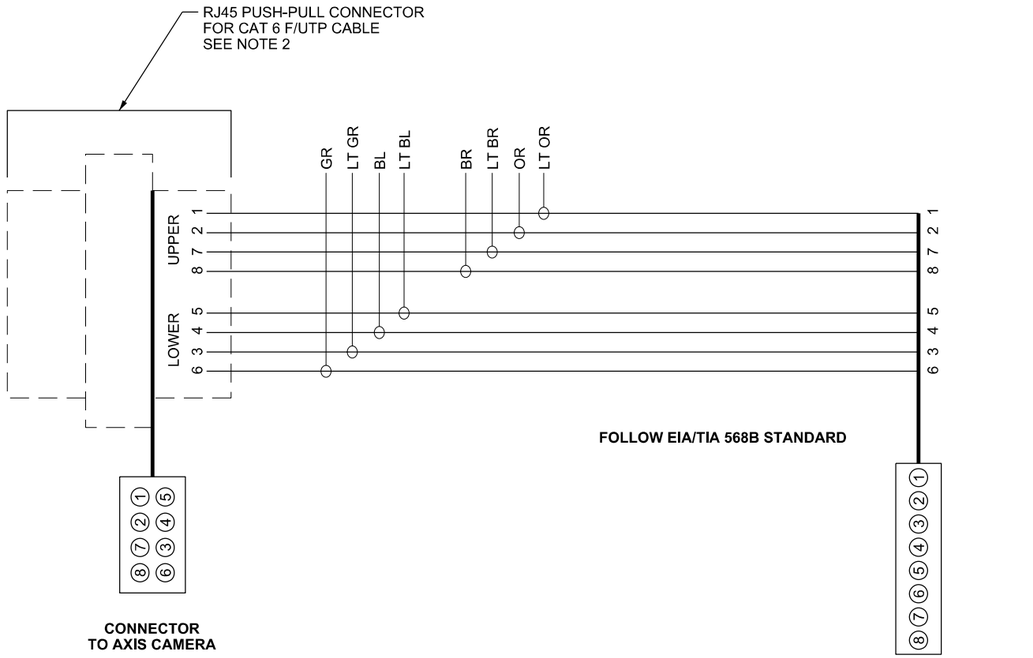
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1(AT, BAI)\AT09.dgn
23-JUN-2020



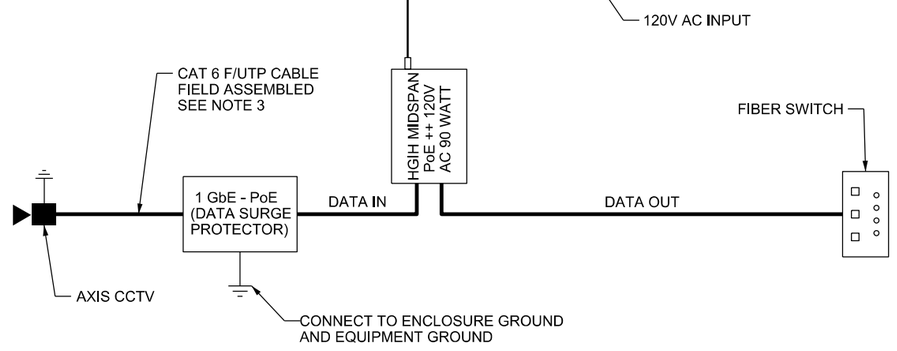
A **MOUNTING DETAIL**
PEDESTAL MOUNTED AXIS CCTV



B **MOUNTING DETAIL**
POLE MOUNTED AXIS CCTV



C **RJ45 PIN CONNECTOR DETAIL**
CAT 6 F/UTP - FIELD ASSEMBLED



D **WIRING DIAGRAM**
AXIS CAMERA

NOTES:

1. SUPPLY AND INSTALL 3/4 INCH ZINC PLATED CORD CONNECTOR. SIZE APPROPRIATELY FOR WIRE DIAMETER.
2. USE STATE FURNISHED RJ45 PUSH-PULL CONNECTOR FOR CAMERA TERMINATION. INCLUDED WITH CAMERA PACKAGE.
3. BOND CAT 6 F/UTP CABLE TO GROUND THROUGH SHIELDED EXTERNAL CONNECTOR.
4. BOND GREEN 12 AWG WIRE TO GROUND AT BASE OF POLE.

NO.	DATE	APPR.	REMARKS
2	6/25/20	MAA	ADDED DETAIL D, REVISED NOTES
1	8/29/19	MAA	REPLACED ENTIRE DRAWING WITH NEW CAMERA TYPE

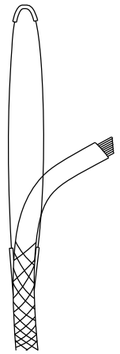
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

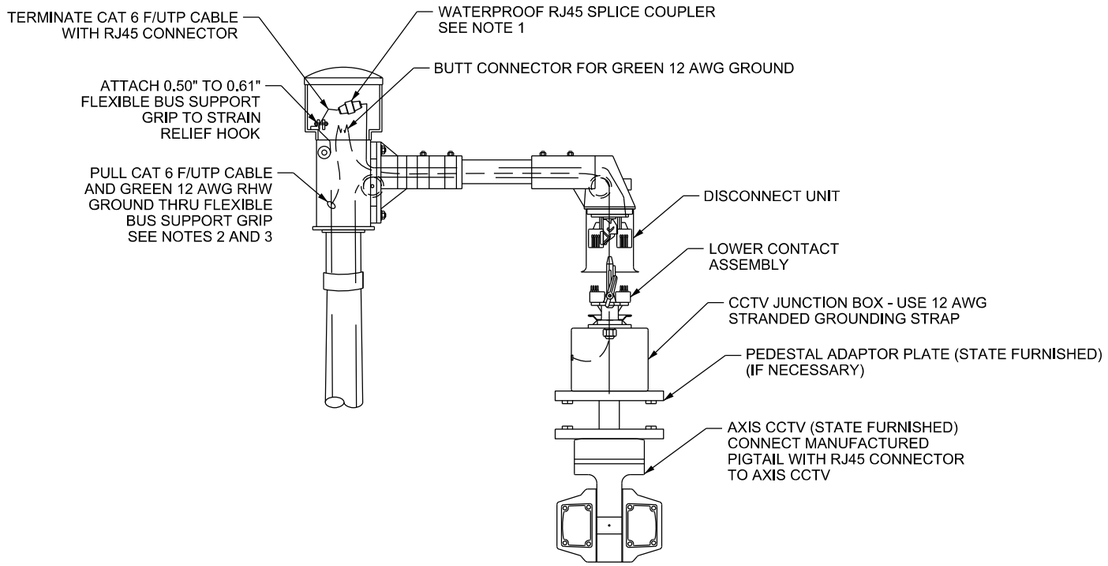
AXIS CCTV
MOUNTING DETAIL
AND WIRING DIAGRAM
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 10A

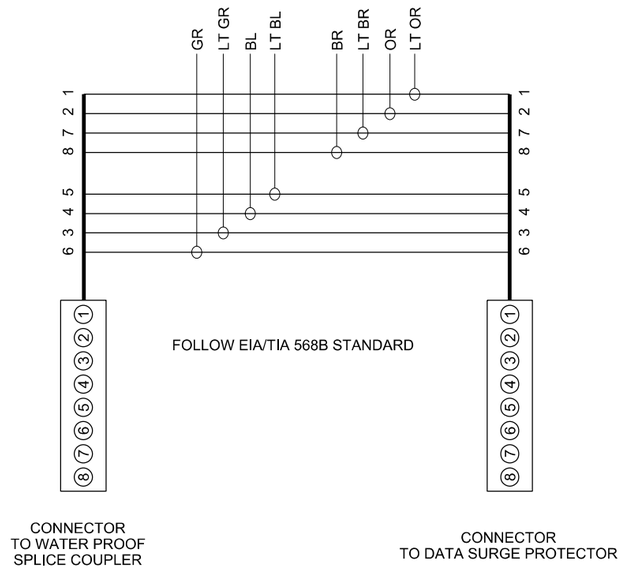
25-JUN-2020 DGN File:G:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\AT10A.dgn



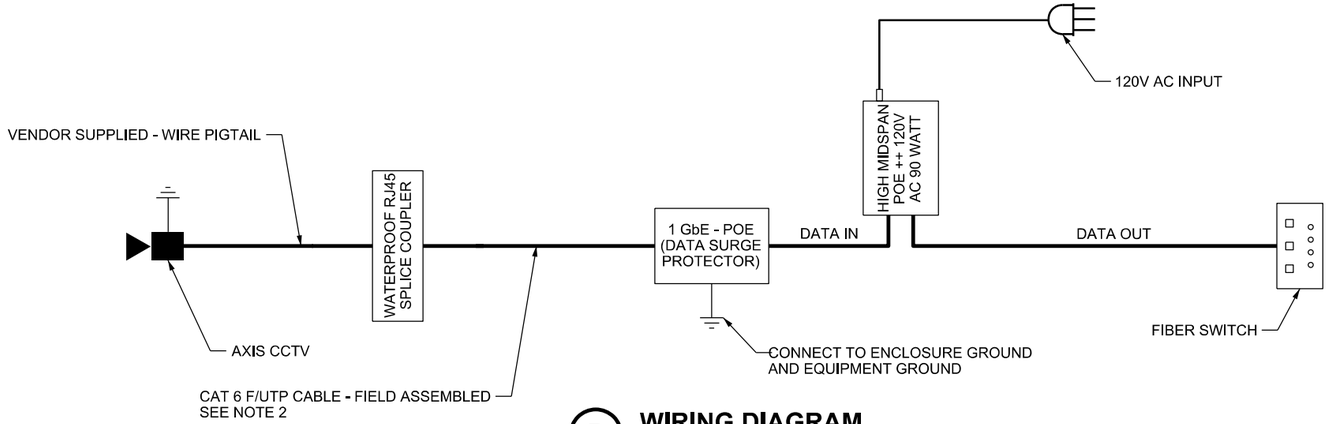
(A) DETAIL
FLEXIBLE BUS SUPPORT GRIP



(B) MOUNTING DETAIL (AXIS)
CAMERA LOWERING SYSTEM



(C) RJ45 PIN CONNECTOR DETAIL
CAT 6 F/UTP - FIELD ASSEMBLED



(D) WIRING DIAGRAM
AXIS CAMERA

NOTES:

1. USE VENDOR SUPPLIED - WATERPROOF RJ45 SPLICE COUPLER.
2. BOND CAT 6 F/UTP CABLE TO GROUND THROUGH SHIELDED EXTERNAL CONNECTOR.
3. BOND GREEN 12 AWG WIRE TO GROUND AT BASE OF POLE.

NO.	DATE	APPR.	REMARKS
2	6/25/20	MAA	REVISED DETAILS C AND D, ADDED OR REVISED NOTES, CHANGED TITLE
1	8/29/19	MAA	REPLACED ENTIRE DRAWING WITH NEW CAMERA TYPE

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DEPUTY DIRECTOR

STANDARD DRAWING TITLE
AXIS CCTV
LOWERING SYSTEM
MOUNTING DETAIL
AND WIRING DIAGRAM

STD. DWG. NO.
AT 10B

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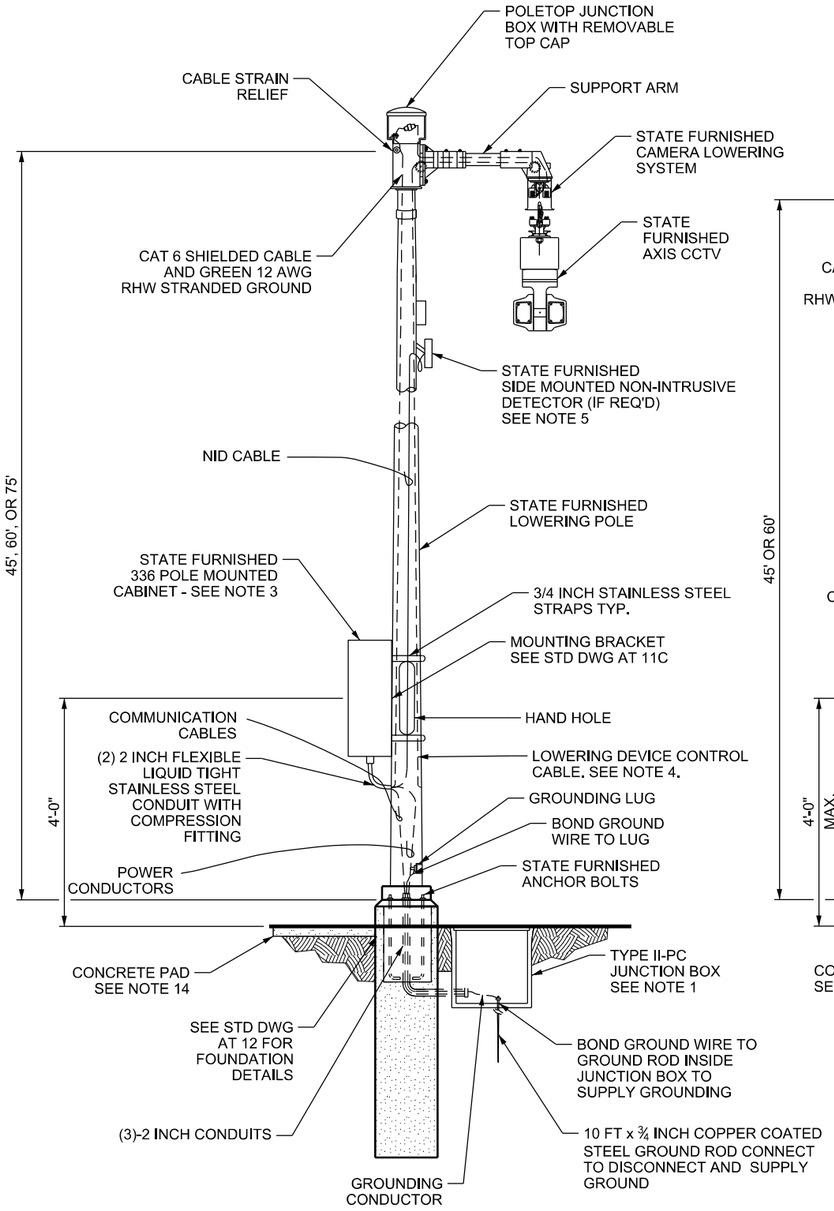
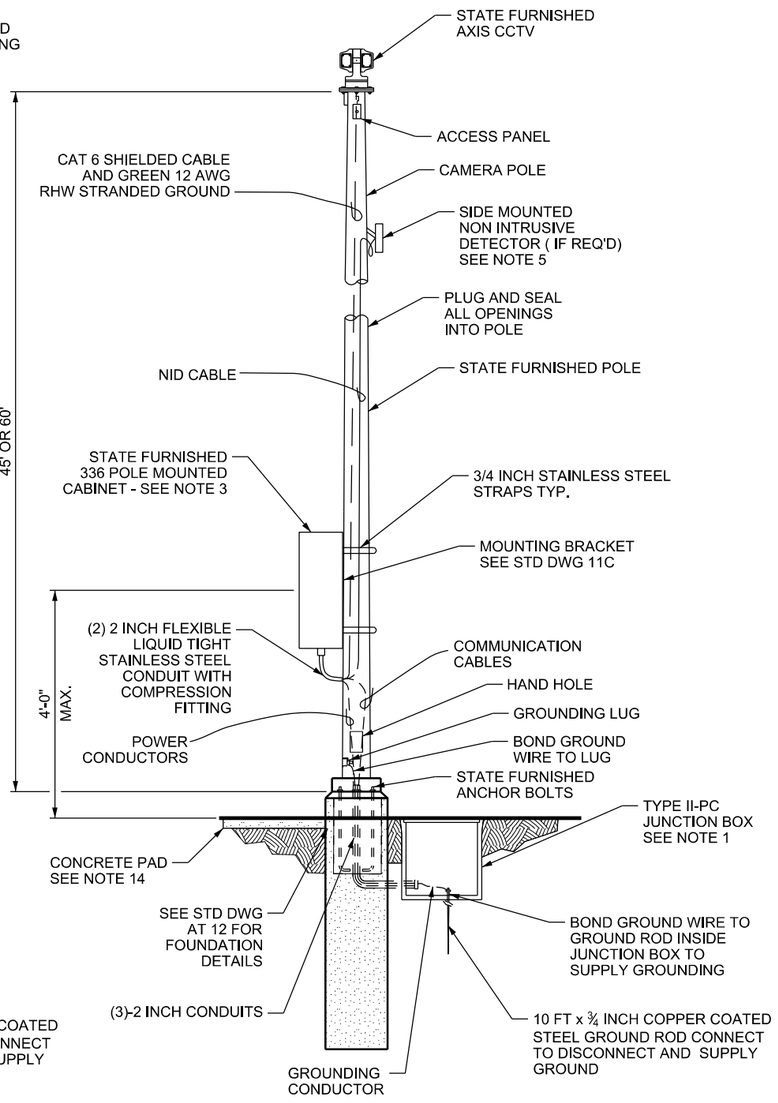
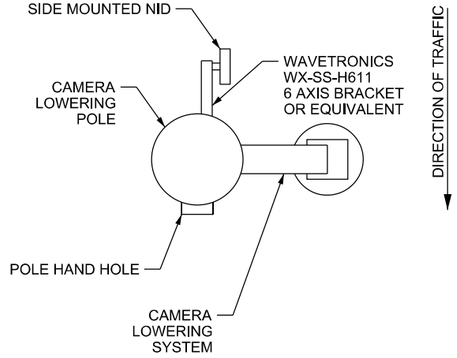
25-JUN-2020



A **CAMERA LOWERING POLE DETAIL**



B **NON-LOWERING CCTV POLE DETAIL**



C **CAMERA LOWERING POLE NID MOUNTING DETAIL TOP VIEW**

NOTES:

1. REFER TO STD DWG AT 7 FOR JUNCTION BOX DETAILS.
2. REFER TO STD DWG AT 10A AND 10B FOR CAMERA MOUNTING DETAILS.
3. USE POLE MOUNTED CABINET UNLESS PAD MOUNTED ATMS CABINET IS CALLED FOR ON PLANS.
4. LOWERING CABLE MUST NOT CONTACT ANY OTHER CABLE.
5. MOUNT NID TO NOT INTERFERE WITH CAMERA LOWERING OPERATION. MOUNT NID 30'-0" ABOVE GROUND SURFACE OR, AS SPECIFIED.
6. LOCATE POLE AT STATION AND OFFSET AS SHOWN.
7. CABINET MUST NOT INTERFERE WITH CAMERA LOWERING OPERATION.
8. ERECT CAMERA LOWERING POLE WITH HAND HOLE ON DOWN STREAM TRAFFIC SIDE OF POLE.
9. DO NOT INSTALL CAMERA LOWERING SYSTEM OR NID ON SAME SIDE OF POLE AS HAND HOLE.
10. ALL CONDUIT ENTRY MUST BE THROUGH BOTTOM OF CABINET.
11. ALL FLEXIBLE STEEL CONDUIT MUST BE INTENDED FOR OUTDOOR APPLICATION.
12. SEE STD DWG AT 11C FOR CABINET POLE MOUNTING DETAILS.
13. REFER TO STANDARD SPECIFICATION 16530 FOR GROUNDING REQUIREMENTS.
14. PROVIDE AN 8 FT LONG X 3 FT WIDE X 4 INCH DEEP CONCRETE PAD, CENTERED UNDER THE MODEL 336 STATE FURNISHED POLE MOUNTED CABINET.

NO.	DATE	APPR.	REMARKS
1	8/29/19	MMA	REPLACED POSITION CAMERA WITH AXIS. ADDED CAT6 CABLE TO DETAILS.

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CCTV POLE MOUNTING DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 11A

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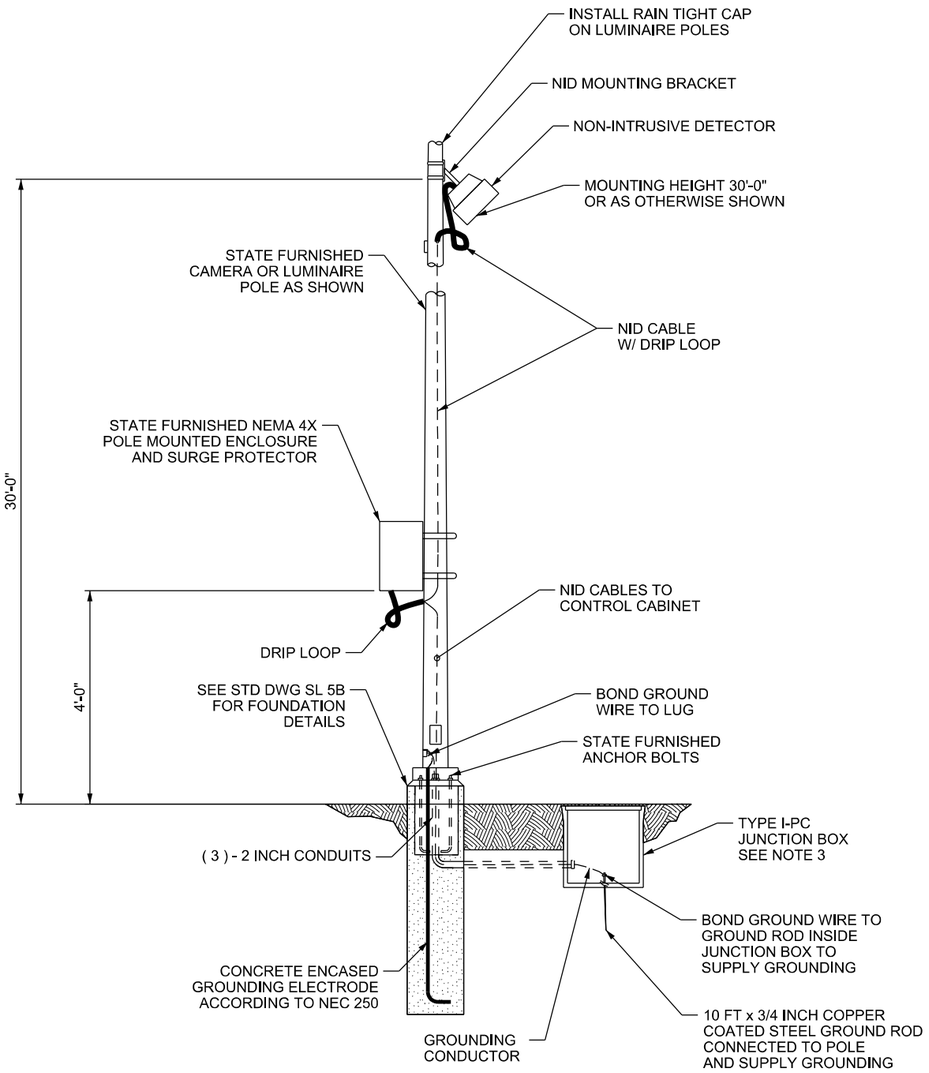
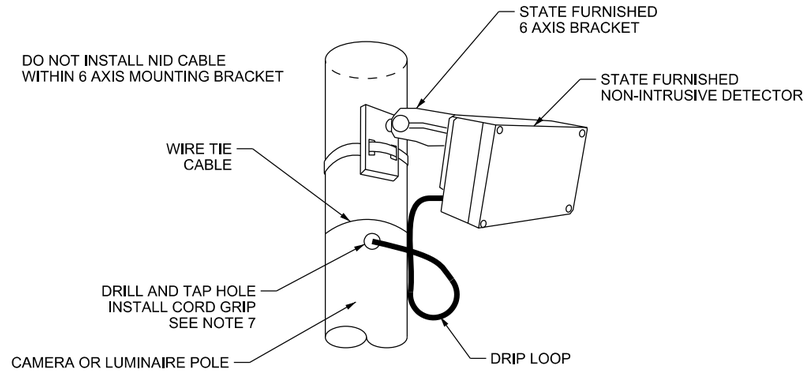
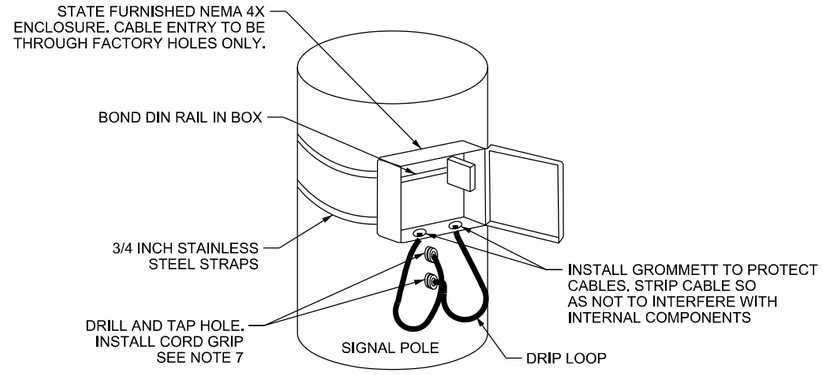
23-JUN-2020



A NID MOUNTING DETAIL NON-LOWERING AND LUMINAIRE POLES



B NID MOUNT ASSEMBLY DETAILS NON-LOWERING AND LUMINAIRE POLES



C POLE MOUNT ENCLOSURE DETAILS CABLE ENTRY THROUGH BOTTOM

NOTES:

1. STATION POLE NO MORE THAN 240 FT PERPENDICULAR DISTANCE TO FARTHEST EDGE OF PAVEMENT.
2. LOCATE POLE AT STATION AND OFFSET AS SHOWN.
3. REFER TO STD DWG AT 7 FOR JUNCTION BOX DETAILS.
4. USE TYPE I PC JUNCTION BOX ON POLES USING NEMA 4X BOX. USE TYPE II PC JUNCTION BOX ON POLES USING NEMA 3S OR 336 POLE MOUNTED CABINETS.
5. REFER TO STD DWG SL 5B, SL 5C, AND SL 5D FOR LUMINAIRE POLE DETAILS.
6. REFER TO STD DWG AT 11A AND AT 12 FOR CCTV POLE DETAILS.
7. SUPPLY AND INSTALL CORD CONNECTOR SIZED APPROPRIATELY FOR WIRE. USE THOMAS AND BETTS, REMKE OR, HUBBELL SHC1023 CORD CONNECTORS.
8. USE SIDE MOUNT NID BRACKET ON CAMERA LOWERING POLE. DO NOT MOUNT NID DIRECTLY ABOVE HAND HOLE OR IN THE CAMERA LOWERING PATH.
9. PLACE CABLES INTO POLE MOUNT NEMA 4X ENCLOSURE THROUGH BOTTOM ONLY. DO NOT DRILL HOLES IN BACK OF ENCLOSURE.
10. REFER TO STANDARD SPECIFICATION 16530 FOR CONCRETE ENCASED ELECTRODE REQUIREMENTS.
11. USE EPOXY SPLICE KIT IF DROP CABLE IS TOO SHORT TO REACH CONTROL CABINET. SPLICE NID CABLE IN JUNCTION BOX, LEAVE 6 FT OF SLACK NEATLY STORED IN JUNCTION BOX.
12. INSTALL NEMA 4X ENCLOSURE AND CLICK 200 SURGE PROTECTOR WHEN CONTROL CABINET IS ACROSS THE ROADWAY FROM NID POLE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MMA	REVISED MOST OF DRAWING TO REFLECT NEW EQUIPMENT

UTAH DEPARTMENT OF TRANSPORTATION
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APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

NON-INTRUSIVE DETECTOR MOUNTING DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 11B

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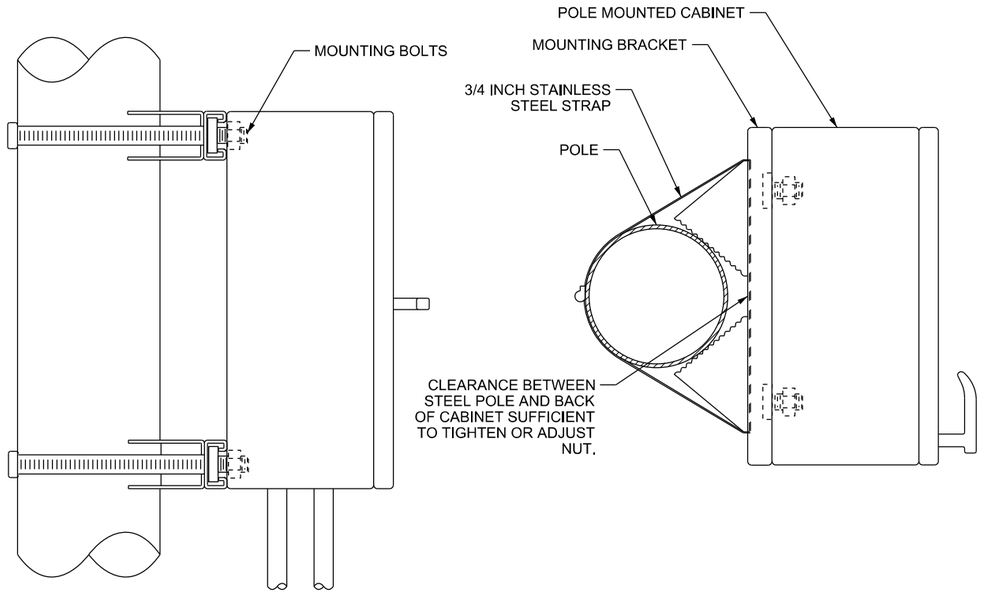
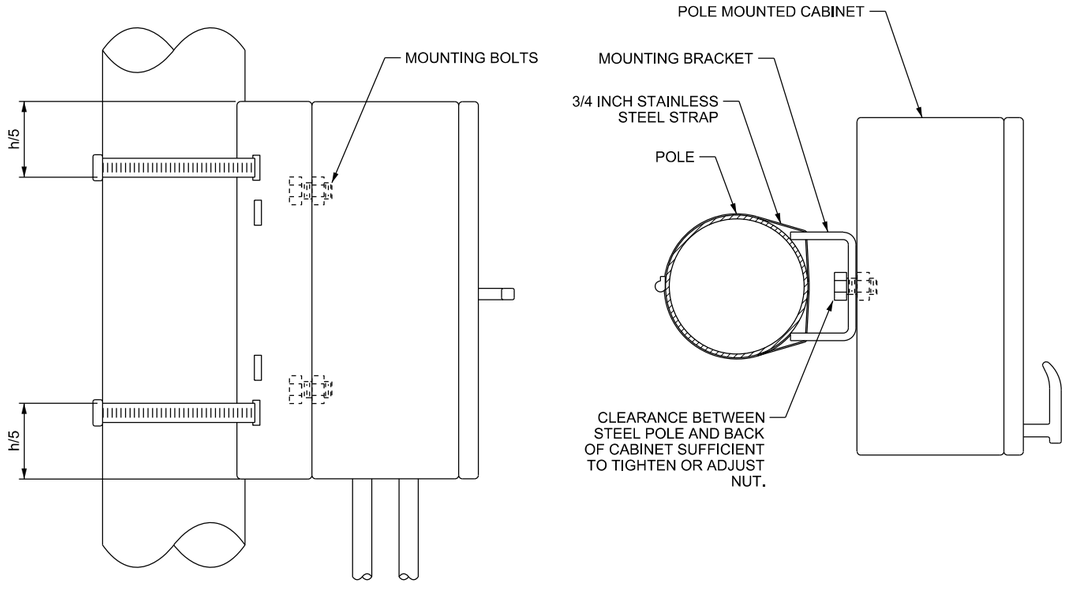
23-JUN-2020



(A) POLE MOUNT CABINET DETAILS TYPE A



(B) POLE MOUNT CABINET DETAILS TYPE B

NOTES:

1. USE MOUNTING HARDWARE INTENDED TO MOUNT CABINETS TO POLES. FOLLOW MANUFACTURER'S INSTRUCTIONS AND LOAD RATINGS.
2. USE TWO BRACKETS PER CABINET OR A FULL HEIGHT BRACKET.
3. USE TYPE A OR TYPE B MOUNTING SYSTEM HARDWARE AND MOUNTING SYSTEM. MUST BE APPROVED BY THE ENGINEER IN ADVANCE.
4. CONDUIT ENTRY TO BE THROUGH BOTTOM OF CABINET ONLY.
5. DO NOT WELD OR RIVIT BRACKET TO CABINET UNLESS FACTORY INSTALLED.

NO.	DATE	APPR.	REMARKS

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POLE MOUNTED CABINET BRACKET
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 11C

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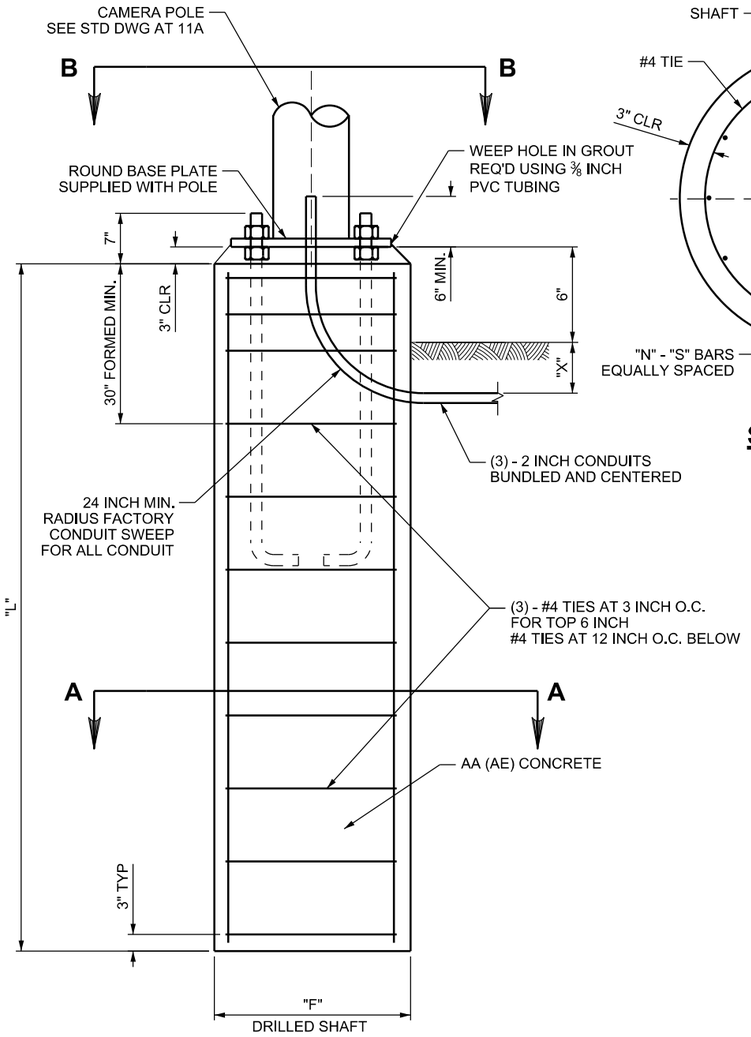
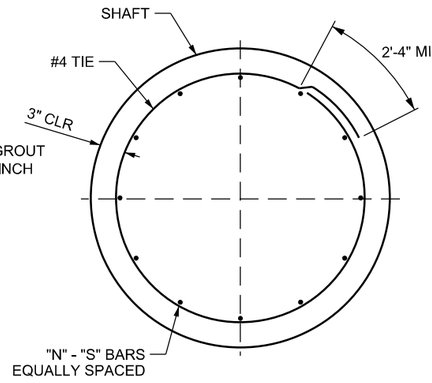
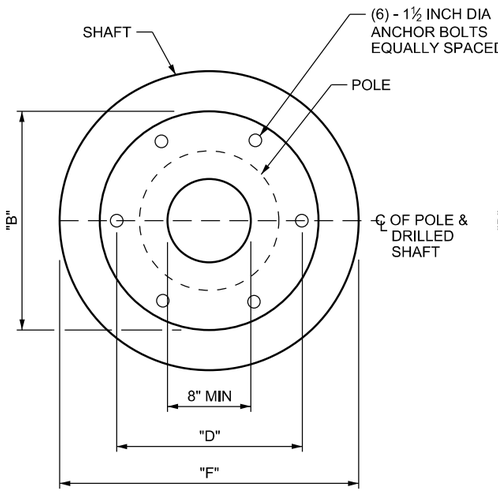
23-JUN-2020

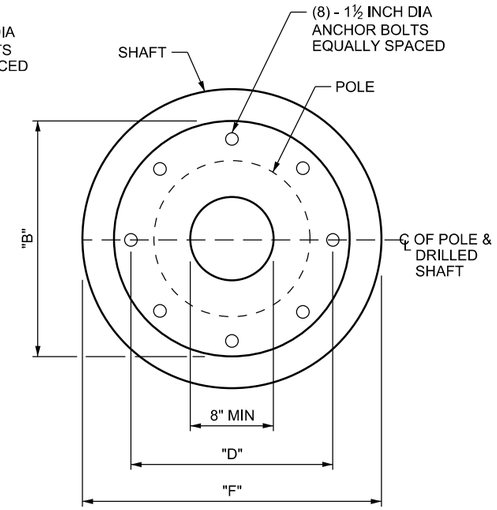




SECTION A-A



SECTION B-B
FOR 45 FT POLES

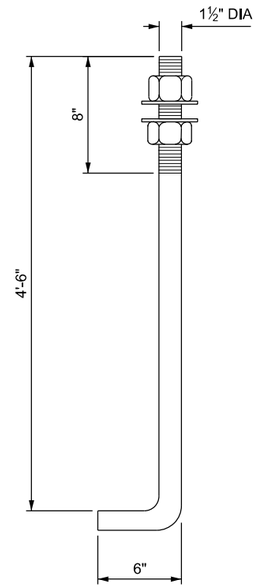


SECTION B-B
FOR 60 FT & 75 FT POLES

TABLE 1 - CONDUIT DEPTH "X"

18 INCH	IF ENTERING ADJACENT JUNCTION BOX
AS REQUIRED BY TABLE 2 OF STD DWG AT 6	IF NO ADJACENT JUNCTION BOX WITHIN 20 FEET OF POLE

A CCTV POLE FOUNDATION



B ANCHOR BOLT DETAIL

TABLE 2 - POLE FOUNDATION DIMENSIONS

DESCRIPTION	"B"	"D"	"F"	"L"	"N"	"S"
45 FT CAMERA POLES	26"	22"	36"	10'-0"	12	#6
60 FT CAMERA LOWERING POLE	28"	24"	42"	11'-6"	16	#6
75 FT CAMERA LOWERING POLE	32"	28"	42"	15'-0"	16	#6

NOTES:

1. USE STEEL ANCHOR BOLT TEMPLATES, TOP AND BOTTOM.
2. REFER TO STANDARD SPECIFICATION 16530 GROUNDING REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	MA	CHANGE NOTE 3 - 2" CONDUITS

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STANDARD DRAWING TITLE
CCTV
FOUNDATIONS
FOR CCTV POLES

STD. DWG. NO.
AT 12

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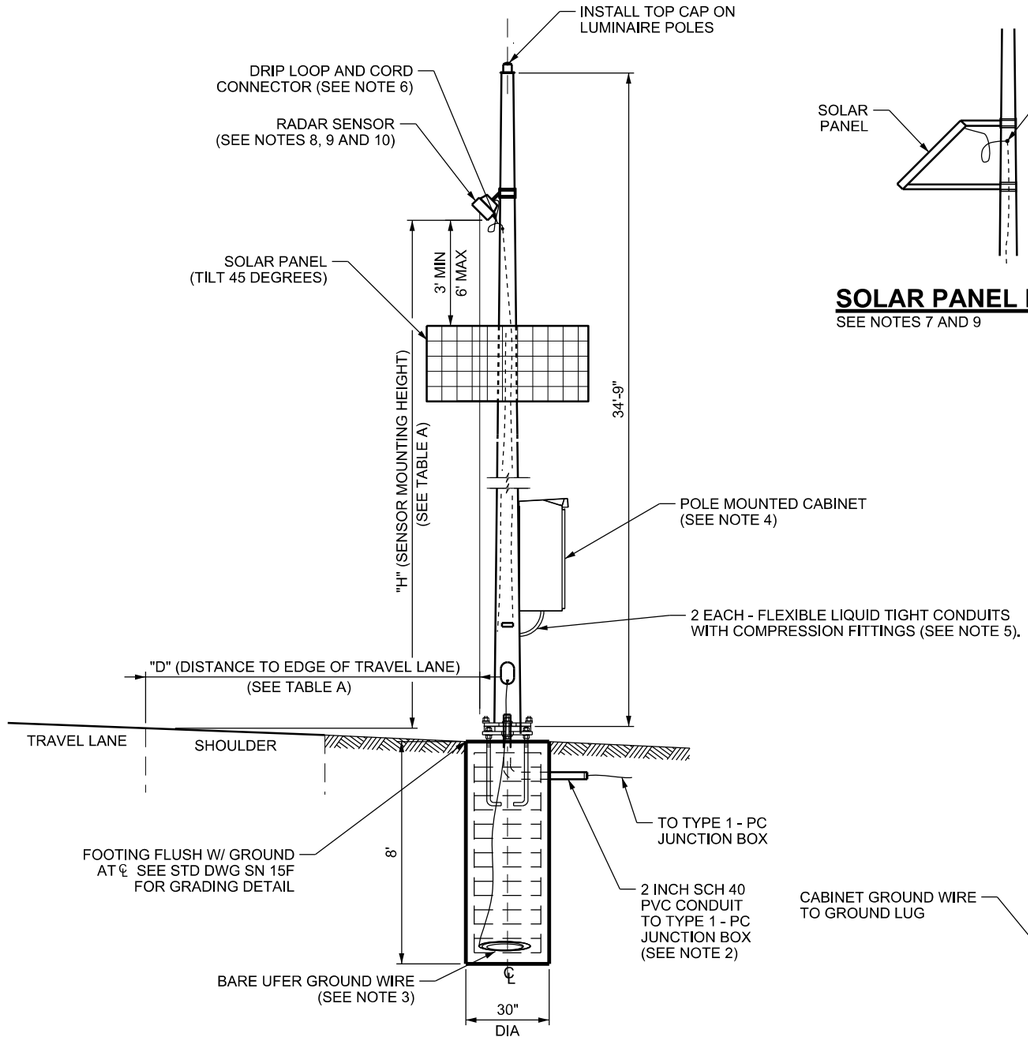
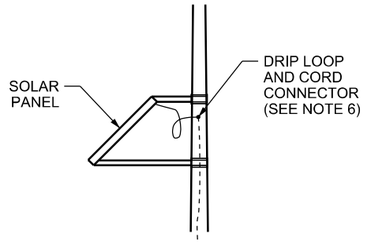


A SOLAR TRAFFIC COUNTING STATION LAYOUT

REFER TO STD DWG SL 5B FOR FOUNDATION DETAILS
REFER TO STD DWG SL 5C FOR SLIP BASE DETAILS



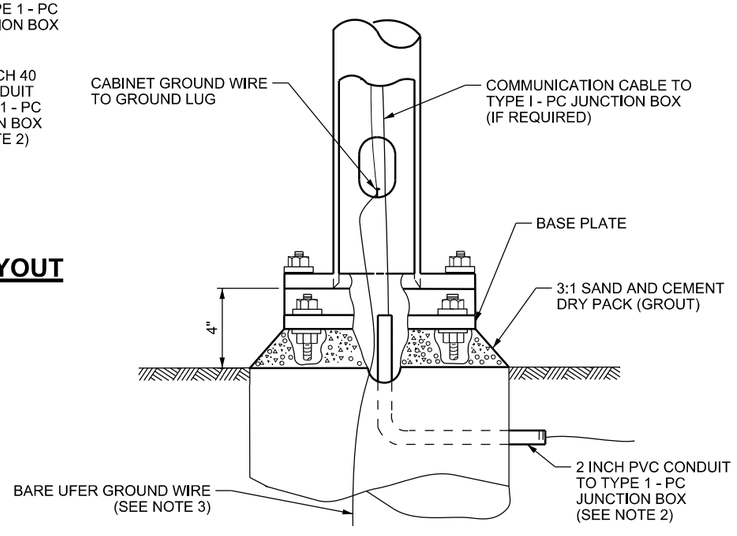
SOLAR PANEL MOUNTING

SEE NOTES 7 AND 9

OPTIMAL POLE & RADAR SENSOR LOCATION (FT)	
POLE "D"	25 TO 35
SENSOR "H"	26 TO 30

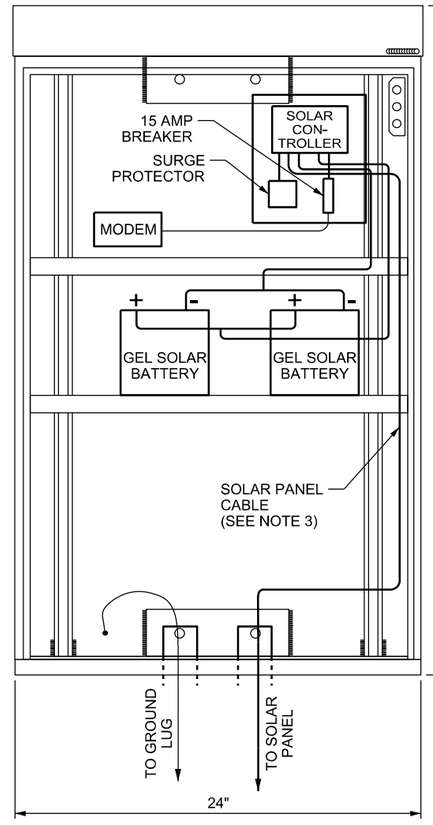
TABLE A

SEE NOTE 7

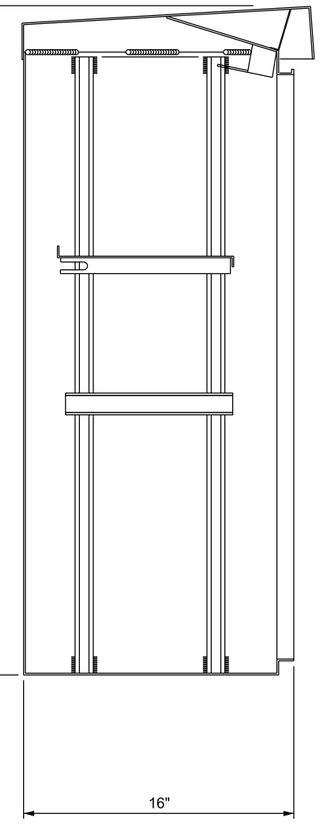


B GROUNDING AND FIBER COMMUNICATION

REFER TO STD DWG SL 5B FOR ANCHOR BOLT DETAILS
REFER TO STD DWG SL 5C FOR SLIP BASE DETAILS



FRONT VIEW



SIDE VIEW

C POLE MOUNTED CABINET DETAIL

REFER TO STD DWG AT-11C FOR MOUNTING DETAILS

NOTES:

1. REFER TO STANDARD SPECIFICATION 13558.
2. INSTALL TYPE 1 PC JUNCTION BOX NEAR POLE BASE. REFER TO STANDARD DRAWING AT11B.
3. INSTALL CONCRETE ENCASED ELECTRODE PER NEC ARTICLE 250 FOR GROUNDING (UFER GROUND).
4. INSTALL CONTROLLER CABINET AND COUNTING SYSTEM EQUIPMENT.
5. INSTALL FLEXIBLE CONDUITS - DRILL AND ATTACH TO POLE WITH WORKABLE SPACE BETWEEN CONDUITS.
6. SUPPLY AND INSTALL CORD CONNECTOR. SIZE APPROPRIATELY FOR WIRE.
7. ORIENT SOLAR PANEL TO FACE DUE SOUTH.
8. REFER TO STD DWG AT 11B, DETAIL B FOR MOUNT ASSEMBLY DETAILS.
9. ADJUST SOLAR PANEL MOUNTING HEIGHT TO AVOID CONFLICT WITH SENSOR DETECTION AREA IF RADAR SENSOR IS FACING SOUTH.
10. VERIFY RADAR SENSOR HEIGHT, AIM RADAR SENSOR DURING FINAL INSPECTION.

NO.	DATE	APPR.	REMARKS
4	6/25/20	MAA	REFERENCE TO 13558, REVD NOTES, RECONFIGURED FROM GROUND TO POLE MOUNT
3	6/25/20	MAA	MOVED BARE WIRE UFER GROUND WIRE DETAIL AND CHANGED REFERENCE TO SN15F
2	6/27/19	JBY	UPDATED DRAWING REFERENCES AND NAME OF JUNCTION BOXES IN DETAIL A, B
1	2/28/19	CGW	REPLACED GROUND WITH POLE MOUNTED CABINET, ADDED SENSOR MOUNTING TABLE

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SOLAR TRAFFIC COUNTING STATION
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 14

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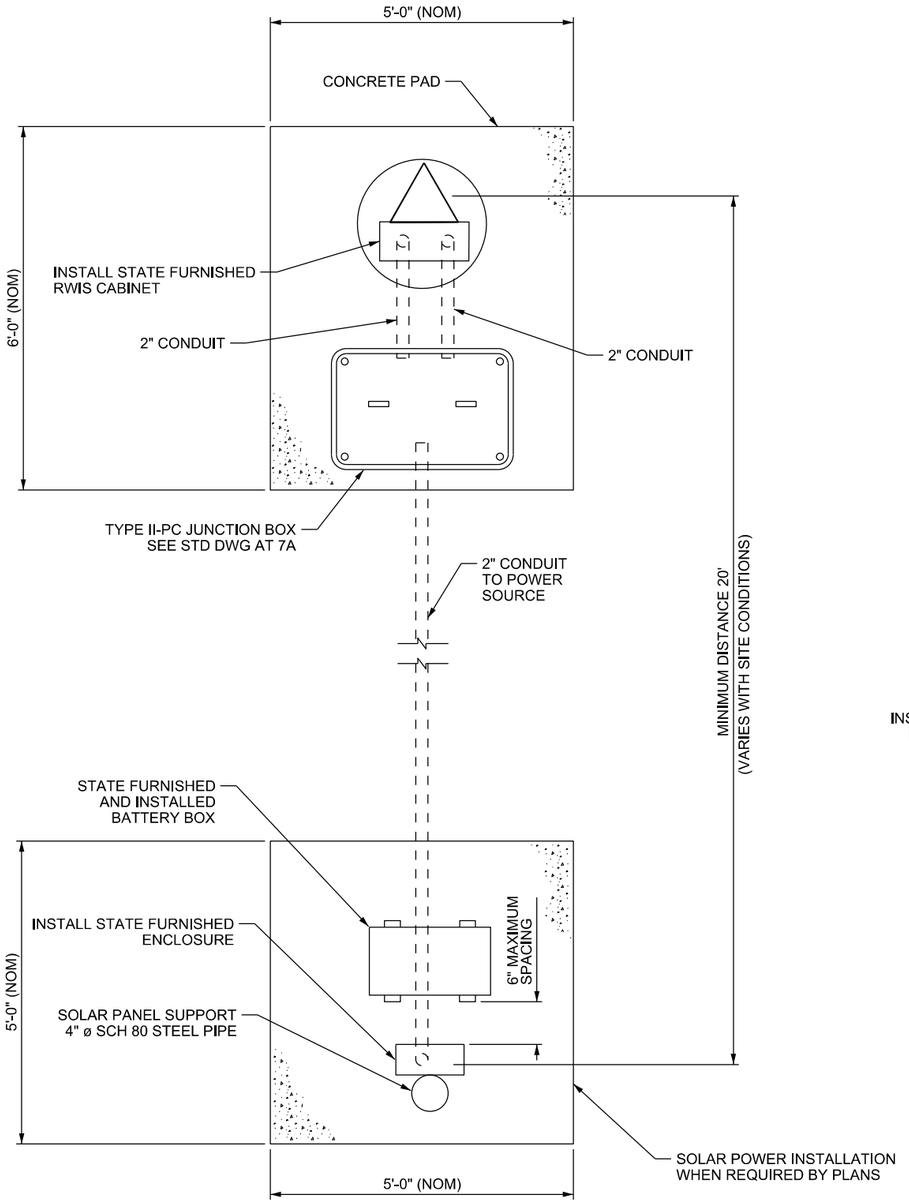
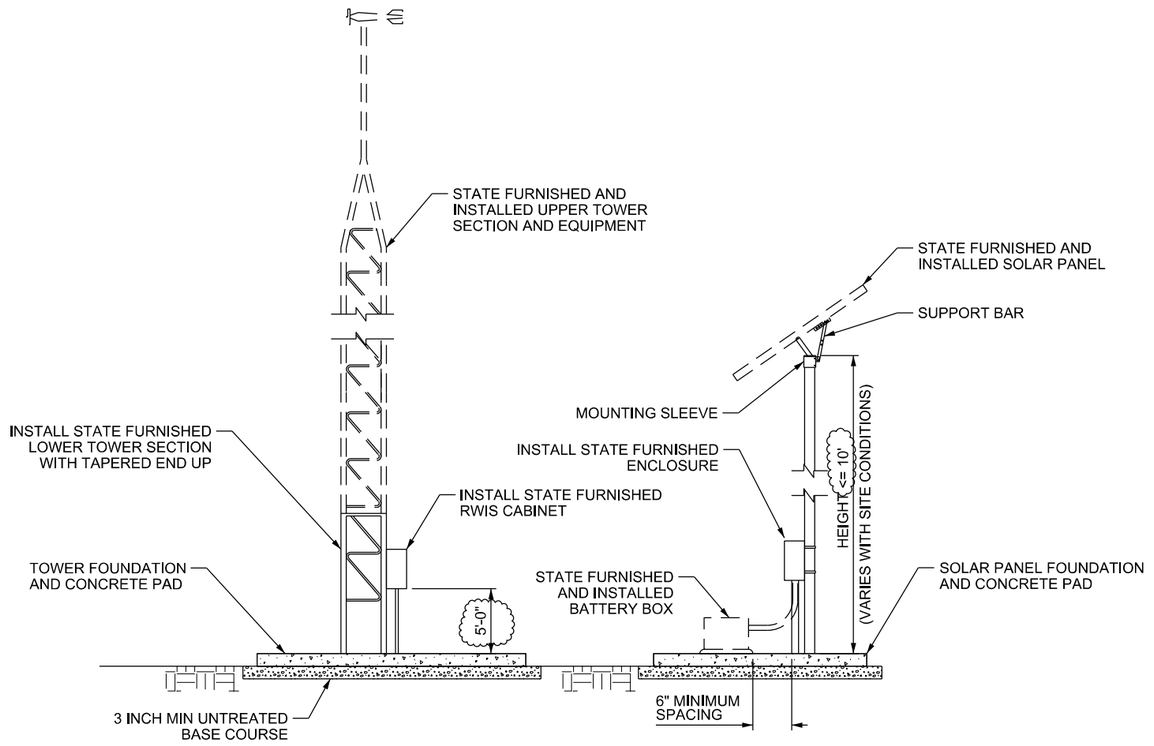


A **RWIS SITE LAYOUT (PLAN VIEW)**



B **RWIS TOWER AND SOLAR PANEL (PROFILE VIEW)**

LEGEND

— — — FUTURE EQUIPMENT BY THE DEPARTMENT

NOTES:

1. PAD DIMENSIONS ARE NOMINAL. SEE PLANS FOR SPECIFIC SITE VARIATIONS.

NO.	DATE	APPR.	REMARKS
2	6/25/20	MAA	REVISED SOLAR POLE LENGTH AND MOUNT
1	2/28/19	CGW	REMOVED 1ST NOTE AND REFERENCES TO STD DWG AT 11C

UTAH DEPARTMENT OF TRANSPORTATION
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DEPUTY DIRECTOR

RWIS SITE AND FOUNDATION DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.

AT 15

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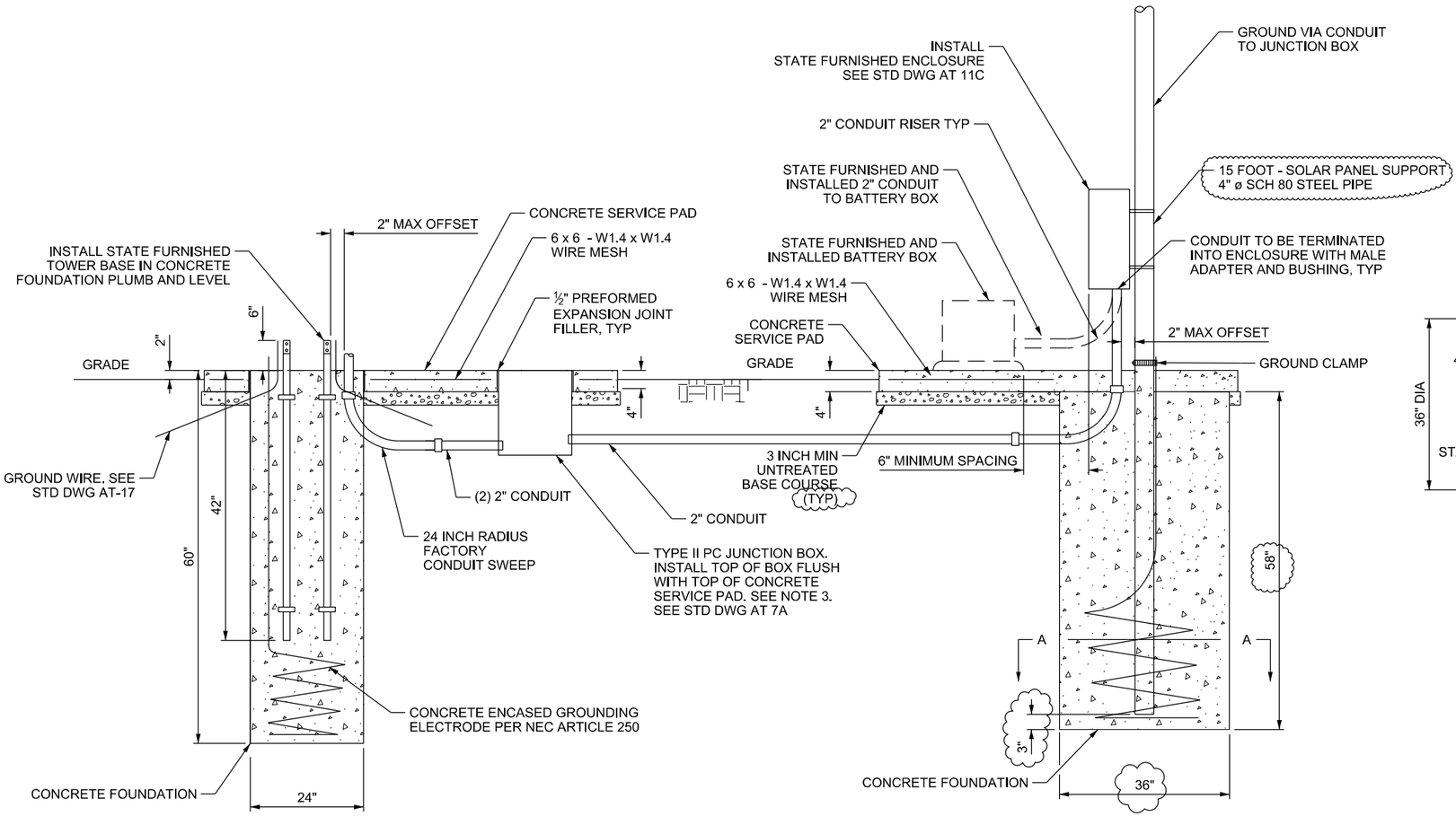
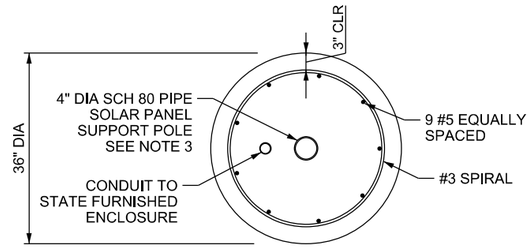




SECTION A-A

(B) RWIS TOWER BASE AND SERVICE PAD INSTALLATION DETAIL

NOTES:

1. INSTALL POLYMER CONCRETE JUNCTION BOXES AS PER STD DWG AT 7A.
2. USE CONCRETE, CLASS AA(AE) FOR FOUNDATIONS AND PADS.
3. USE LEVEL AT TOP OF THE TOWER BASE SECTION TO VERIFY A PLUMB AND LEVEL TOWER INSTALLATION. SET THE TOP OF THE TOWER BASE 6 INCHES ABOVE THE CONCRETE PAD.
4. FINISH CONCRETE TO DRAIN WATER AWAY FROM EQUIPMENT.
5. PROVIDE A CONTROL JOINT FROM THE CORNER OF THE BOX TO THE CORNER OF THE CONCRETE WHEN FINISHING CONCRETE .
6. TOWER BASE DIMENSION MAY VARY DEPENDING ON MANUFACTURER. USE MANUFACTURER'S MANUALS TO VERIFY DIMENSIONS PRIOR TO INSTALLING FOUNDATION.
7. REFER TO STANDARD SPECIFICATION 16530 FOR CONCRETE ENCASED ELECTRODE REQUIREMENTS. PROVIDE 3 INCH MINIMUM CLEAR COVER.
8. DO NOT EXCEED A MAXIMUM 4 PANEL (2X2 CONFIGURATION) SOLAR ARRAY. FOUNDATION AND PV PANEL SUPPORT ARE STRUCTURALLY LIMITED. REFER TO PLANS FOR INSTALLATION OF LARGER ARRAYS.

LEGEND

— — FUTURE EQUIPMENT BY THE DEPARTMENT

NO.	DATE	APPR.	REMARKS
	6/25/2020	MAA	REVISED DIMENSIONS ON SUPPORT POLE AND FDN

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

AUGUST 2020

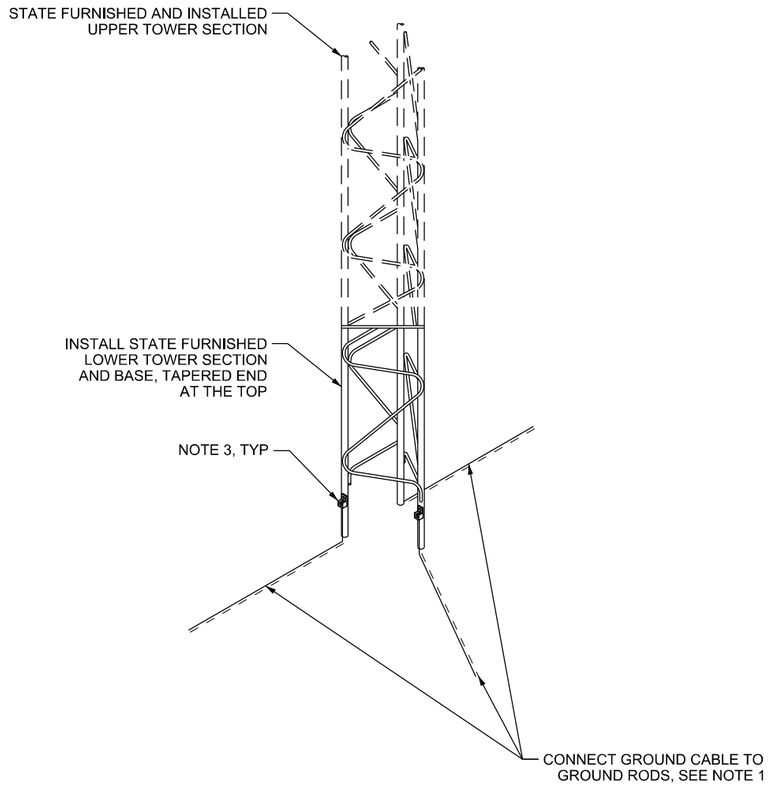
DEPUTY DIRECTOR

RWIS TOWER BASE AND SERVICE PAD LAYOUT

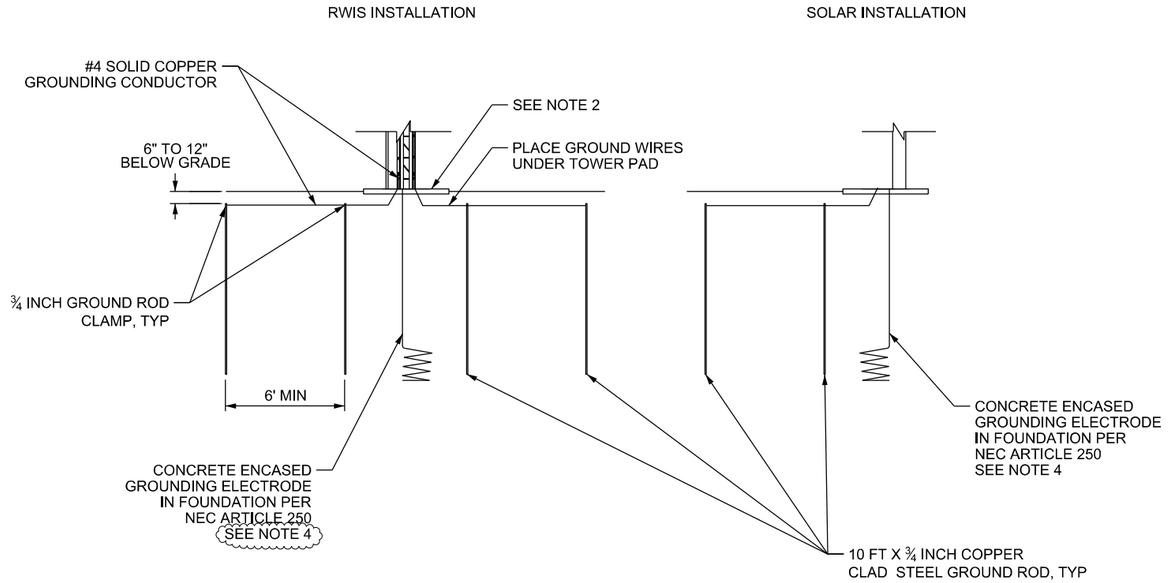
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 16

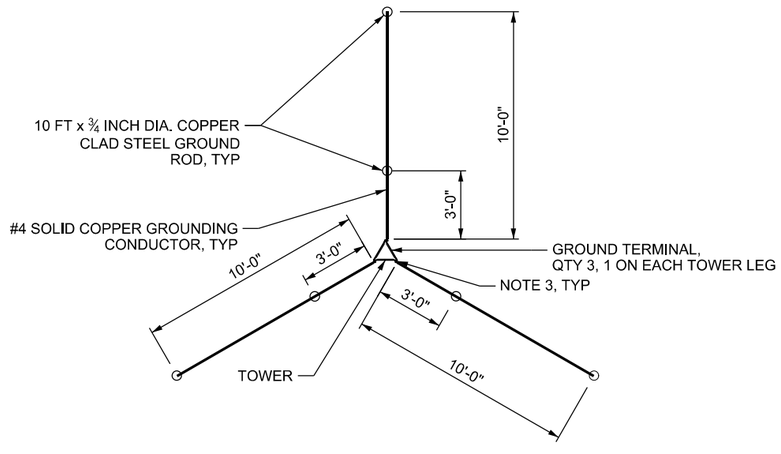
DGN File:G:\Standardsand Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\AT16.dgn
25-JUN-2020



A GROUND CABLE TERMINATION DETAIL



B GROUND CABLE TERMINATION DETAIL
PROFILE VIEW



C GROUND CABLE TERMINATION DETAIL
PLAN VIEW

NOTES:

1. INSTALL GROUND CABLES BEFORE PLACING CONCRETE PAD.
2. ANCHOR GROUND CABLES UNDER CONCRETE PAD WITH SUITABLE CLAMPS OR ANCHORS.
3. INSTALL GROUNDING CONDUCTOR AND RODS ON ALL THREE LEGS OF THE RWIS TOWER AND TO THE SOLAR POLE CONNECTED WITH APPROVED GROUND CLAMPS.
4. INSTALL CONCRETE ENCASED GROUNDING ELECTRODES TO A TOWER LEG AND TO THE SOLAR PANEL SUPPORT POLE WITH APPROVED GROUND CLAMPS.

LEGEND

— — — FUTURE EQUIPMENT BY THE DEPARTMENT

NO.	DATE	APPR.	REMARKS
1	6/25/20	MAA	ADDED NOTE TO PLACE TAPERED END UP

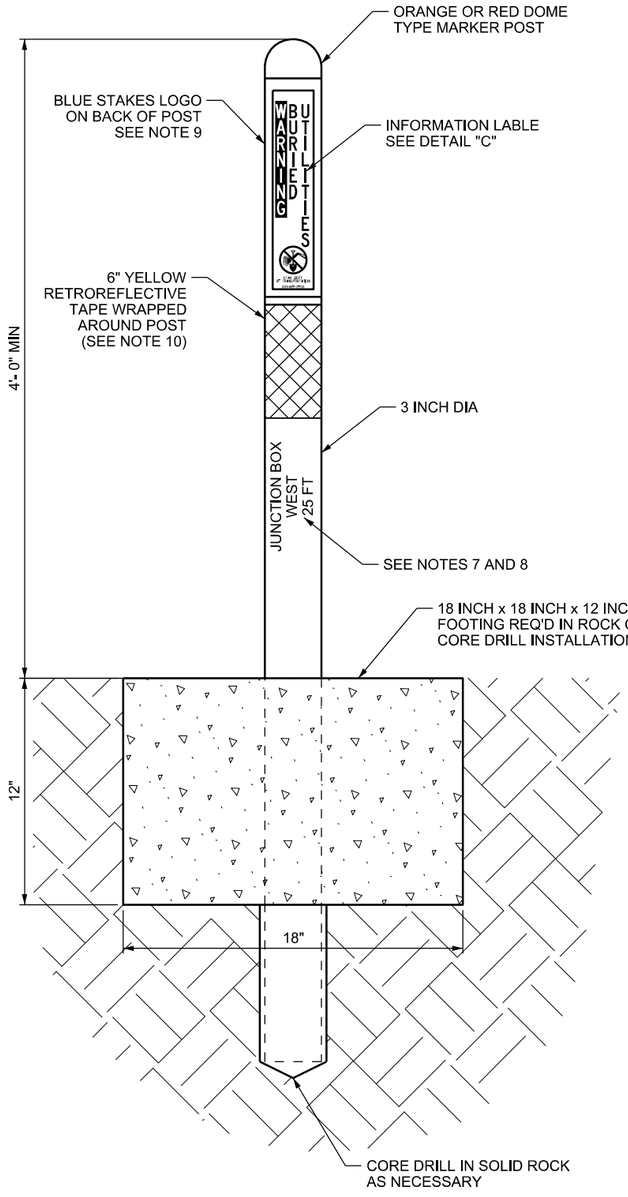
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE AUGUST 2020
DEPUTY DIRECTOR

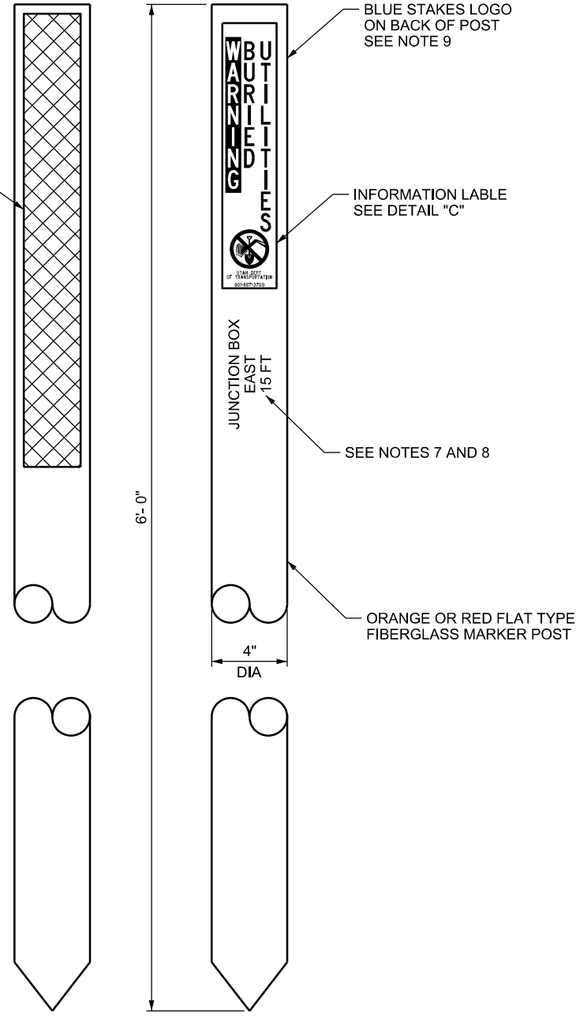
RWIS GROUND ROD INSTALLATION AND TOWER GROUNDING
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 17

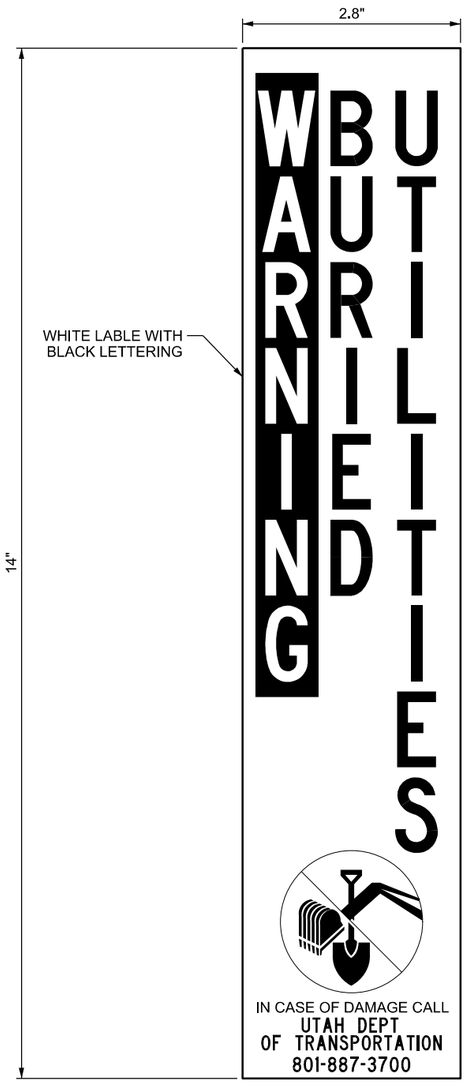
DGN File: D:\Standardsand Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\AT17.dgn
25-JUN-2020



A **UTILITY MARKER POST DOME TYPE**



B **UTILITY MARKER POST FLAT TYPE**



C **LOCATION MARKER INFORMATION LABEL**

NOTES:

1. FURNISH AND INSTALL FIBER GLASS UTILITY MARKER POSTS OR DOME-TYPE MARKER POSTS AS SPECIFIED IN THE PLANS. USE FLAT TYPE MARKER POSTS IN POUNDABLE SOIL. USE DOME TYPE MARKER POSTS IN UNSTABLE SOIL OR SOLID ROCK.
2. PROVIDE FIBERGLASS MARKER POSTS THAT ARE 4 INCH WIDE BY 6 FT TALL, WITH 4 FT EXPOSED AFTER INSTALLATION.
3. PROVIDE DOME-TYPE MARKER POSTS THAT ARE 3 INCH DIAMETER AND 6 FT LG, WITH 4 FT EXPOSED AFTER INSTALLATION.
4. PROVIDE MARKER POSTS THAT ARE ORANGE IN COLOR WHEN THE JUNCTION BOX/VAULT/CONDUIT SYSTEM CONTAINS COMMUNICATION CABLE.
5. PROVIDE MARKER POSTS THAT ARE RED IN COLOR WHEN THE JUNCTION BOX/VAULT/CONDUIT SYSTEM CONTAINS POWER CABLE.
6. DUPLICATE MARKER POSTS ARE NOT REQUIRED ON PARALLEL CONDUIT RUNS.
7. WRITE "JUNCTION BOX" OR "VAULT," OFFSET TO BOX OR VAULT, AND DIRECTION TO BOX ON MARKER POST WITH PAINT PEN OR PERMANENT MARKER PEN FOR POSTS MARKING BOXES OR VAULTS.
8. WRITE "CONDUIT" AND DIRECTION TO CONDUIT RUNNING LINE ON MARKER POST WITH PAINT PEN OR PERMANENT MARKER PEN FOR POSTS MARKING CONDUIT RUNS. DO NOT INCLUDE OFFSET TO CONDUIT.
9. PLACE LOGO STICKERS ON MARKER POST 3 INCHES FROM TOP.
10. FURNISH AND INSTALL YELLOW RETROREFLECTIVE TAPE, ASTM TYPE III MINIMUM, AT JUNCTION BOX LOCATIONS ONLY. VERIFY THAT RETROREFLECTIVE TAPE IS VISIBLE TO ON COMING TRAVEL LANE.

NO.	DATE	APPR.	REMARKS

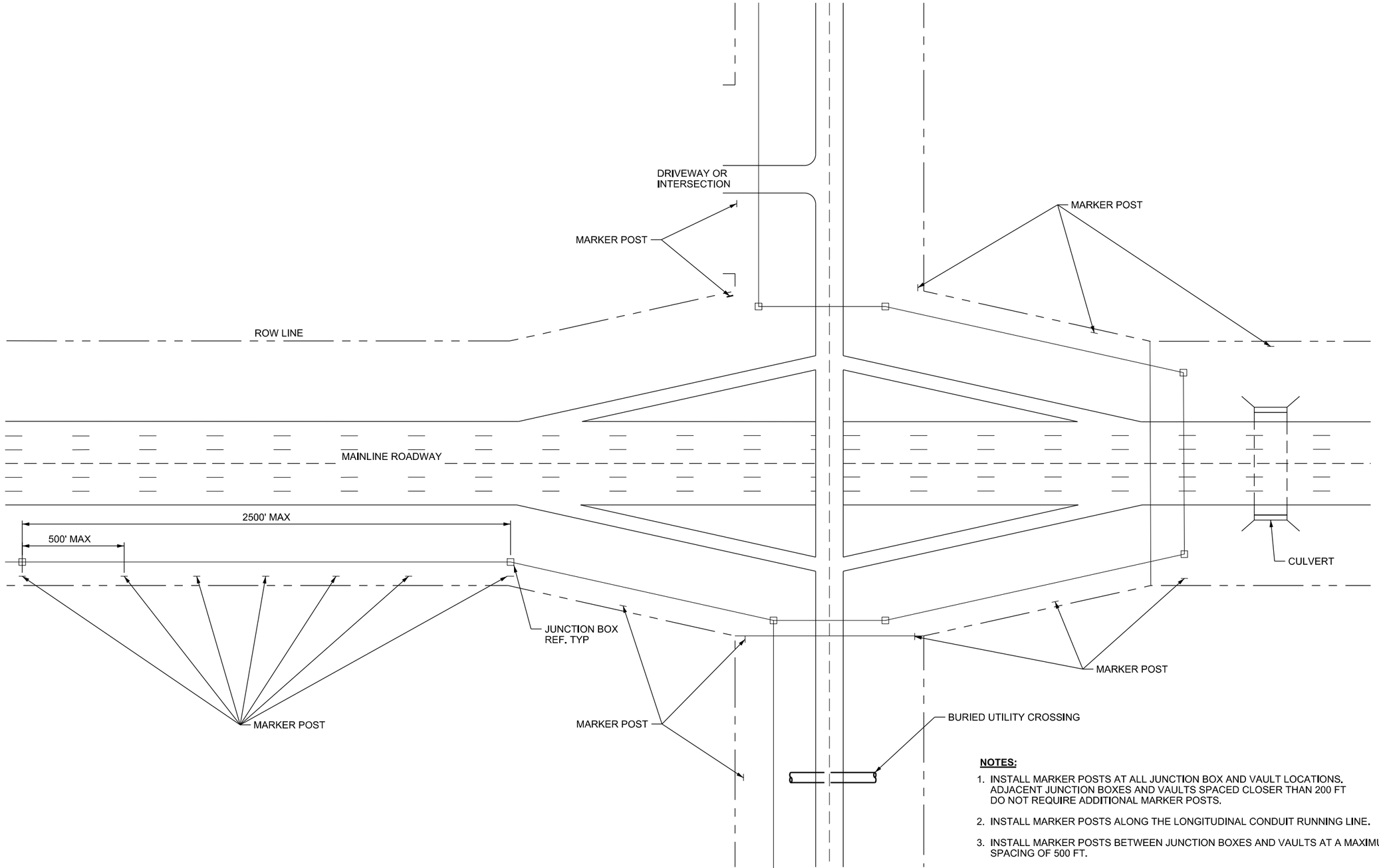
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

UTILITY MARKER POST DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 18

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_Bat\AT18.dgn
23-JUN-2020



NOTES:

1. INSTALL MARKER POSTS AT ALL JUNCTION BOX AND VAULT LOCATIONS. ADJACENT JUNCTION BOXES AND VAULTS SPACED CLOSER THAN 200 FT DO NOT REQUIRE ADDITIONAL MARKER POSTS.
2. INSTALL MARKER POSTS ALONG THE LONGITUDINAL CONDUIT RUNNING LINE.
3. INSTALL MARKER POSTS BETWEEN JUNCTION BOXES AND VAULTS AT A MAXIMUM SPACING OF 500 FT.
4. PLACE MARKER POST NEAR THE ROW FENCE OFFSET FROM THE BOX, VAULT, OR RUNNING LINE.
5. INSTALL A MARKER POST NEAR THE ROW LINE AT ALL ROADWAY OR DRIVEWAY CROSSING LOCATIONS.
6. INSTALL A MARKER POST NEAR THE ROW LINE AT ALL UTILITY, CONDUIT, PIPE, CULVERT AND CANAL CROSSINGS.
7. USE MARKER POSTS ON ALL CONTROLLED ACCESS RIGHT OF WAY, INCLUDING INTERSTATE, STATE AND RURAL TYPE ROADS.

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

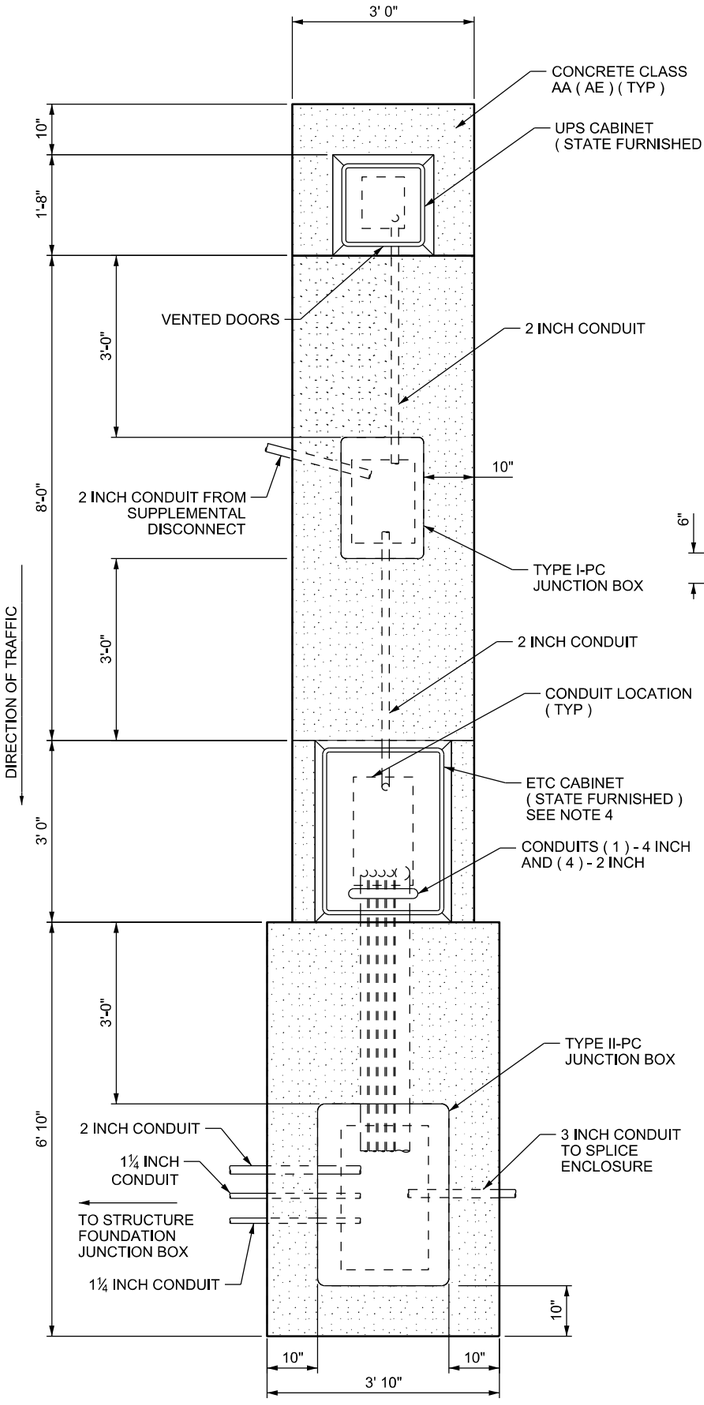
UTILITY MARKER POST LOCATIONS

STANDARD DRAWING TITLE

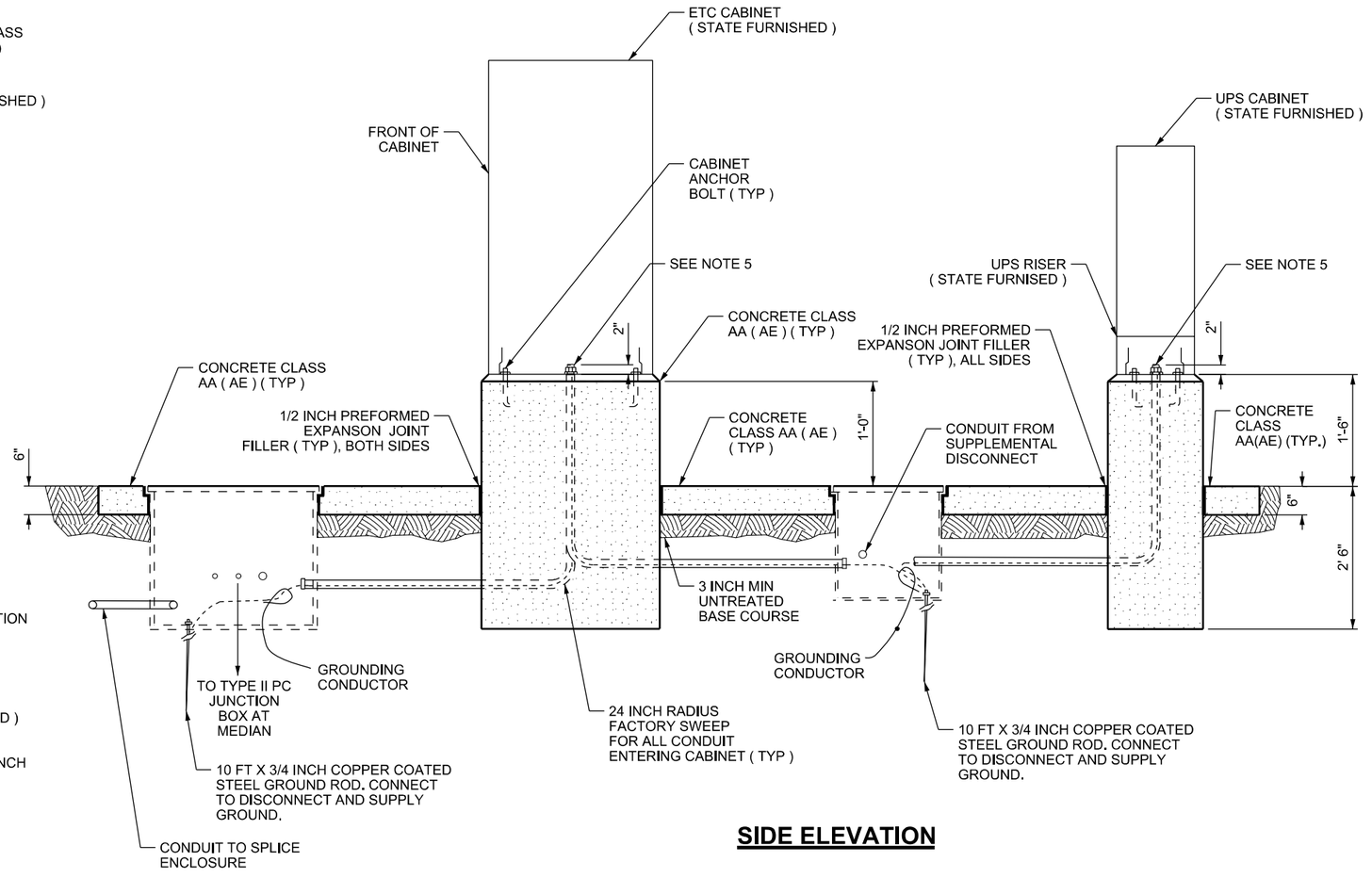
STD. DWG. NO.

AT 19

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1(AT,BA1)\AT19.dgn



PLAN VIEW



SIDE ELEVATION

(A) ETC CABINET

NOTES:

1. REFER TO STD DWG AT 9 FOR CABINET DISCONNECT AND TRANSFORMER DETAIL.
2. FIELD VERIFY CONDUIT LAYOUT IN FOUNDATION TO AVOID CONFLICT WITH CABINETS.
3. REFER TO STANDARD SPECIFICATIONS FOR ANCHOR BOLT INFORMATION.
4. DRAWER IN ETC CABINET TO FACE MOST NORTHERN SIDE.
5. INSTALL COARSE STEEL WOOL IN ALL CONDUIT TERMINATED IN CABINETS (NO DUCT SEAL).

NO.	DATE	APPR.	REMARKS
1	6/28/18	CGW	CORRECTED SPELLING ERROR IN TITLE AND TRAVEL DIRECTION ARROW ON LEFT.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED
DEPUTY DIRECTOR

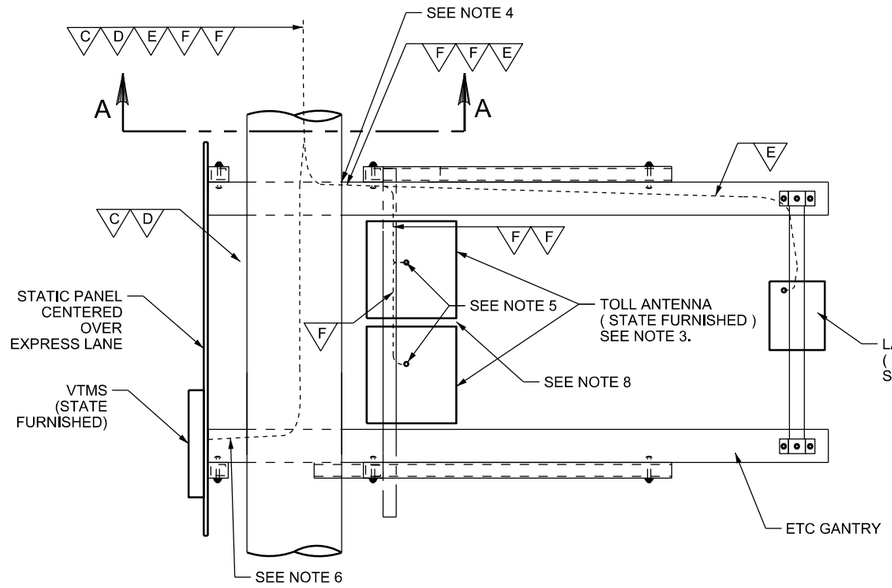
ELECTRONIC TOLL LANES CONTROL SYSTEMS CABINET LAYOUT

STANDARD DRAWING TITLE

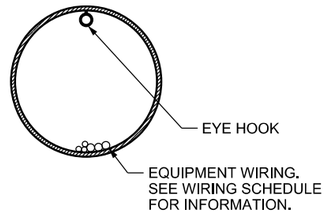
STD. DWG. NO.

AT 20

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1(AT, BAI)\AT20.dgn
23-JUN-2020

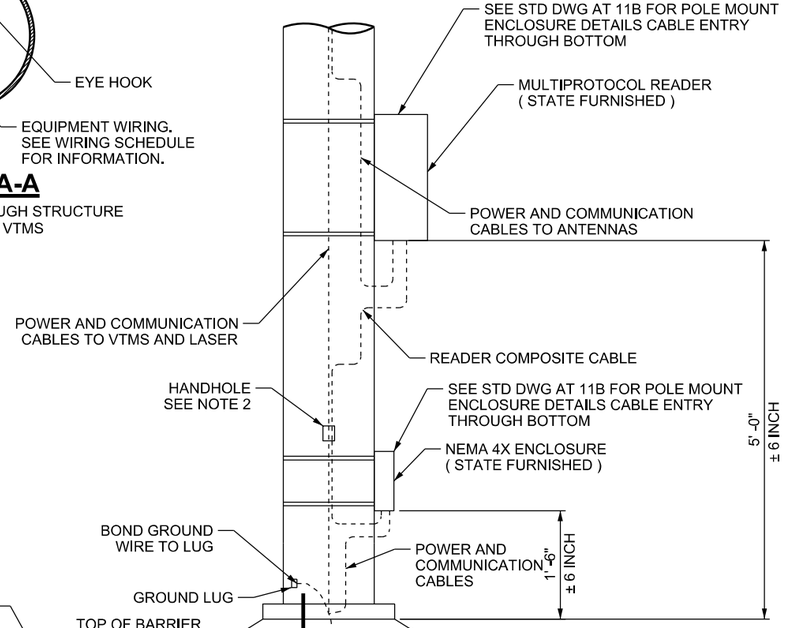


A ETC GANTRY EQUIPMENT LOCATION DETAIL

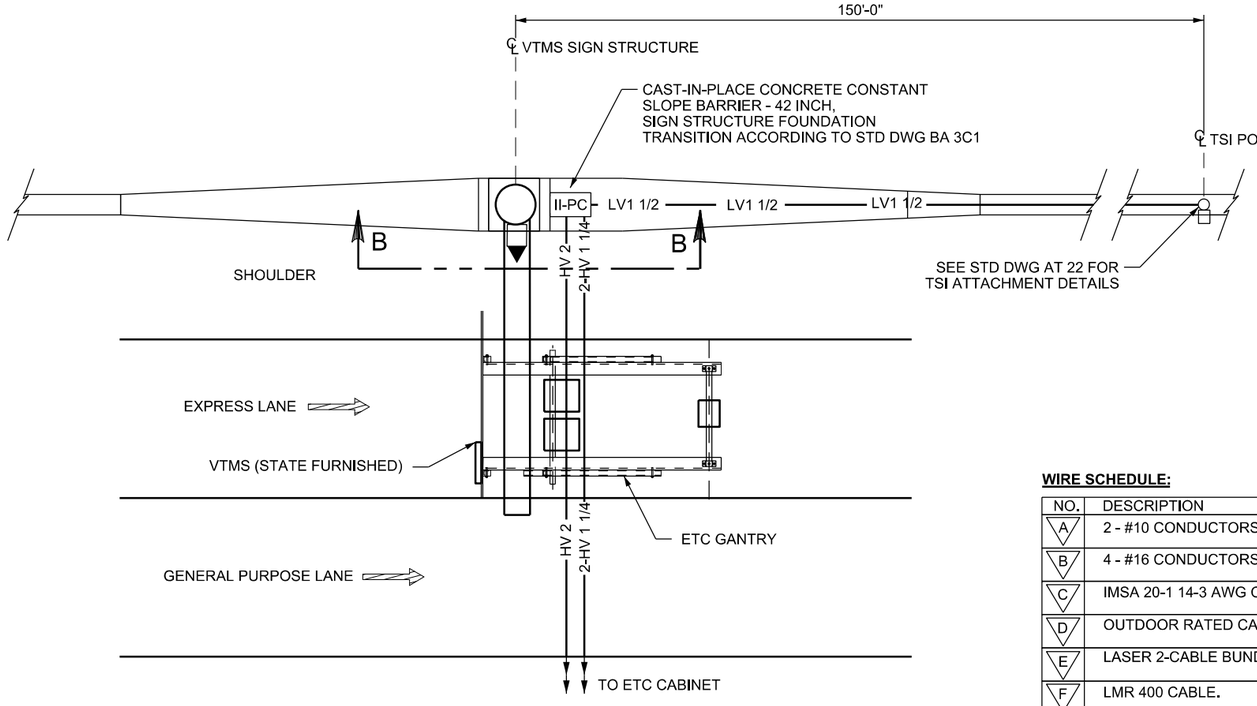


SECTION A-A

WIRE CONFIGURATION THROUGH STRUCTURE TO ETC EQUIPMENT / VTMS



SECTION B-B



C ETC PLAZA DETAIL

WIRE SCHEDULE:

NO.	DESCRIPTION
A	2 - #10 CONDUCTORS, 1 - #10 EQUIPMENT GROUND.
B	4 - #16 CONDUCTORS (TSI 2A-1604).
C	IMSA 20-1 14-3 AWG CABLE.
D	OUTDOOR RATED CAT-5E CABLE.
E	LASER 2-CABLE BUNDLE. (STATE FURNISHED)
F	LMR 400 CABLE.
G	READER COMPOSITE CABLE (STATE FURNISHED)
H	6 SMFO PRETERMINATED DROP CABLE.

NOTES:

1. SEE STRUCTURE DRAWINGS FOR ETC GANTRY DIMENSIONS AND DETAILS.
2. PLACE NEMA 4X ENCLOSURE TO AVOID CONFLICT WITH HANDHOLE.
3. SEE STD DWG AT 22 FOR GANTRY EQUIPMENT ATTACHMENT DETAILS.
4. USE CABLE EXIT STRAIN RELIEF, 1½ INCH WITH SOLID INSERT OR EQUIVALENT. DRILL HOLES IN INSERT TO CABLE SIZE.
5. USE CABLE ENTRY STRAIN RELIEF, 5 INCH HEAT SHRINK TUBING WITH GLUE. APPLY WITH HEAT GUN ONLY.
6. USE ¾ INCH LIQUID TIGHT FLEXIBLE METAL CONDUIT, TYPE LFMC BETWEEN STRUCTURE AND VTMS.
7. REFER TO STANDARD SPECIFICATION 16530 FOR CONCRETE ENCASED GROUNDING ELECTRODE REQUIREMENTS.
8. GAP BETWEEN ANTENNAS IS 6 INCHES.

NO.	DATE	APPR.	REMARKS
2	2/28/19	CGW	ADDED REFERENCE TO STD DWG BA 3B TO SECTION B-B
1	5/15/18	CGW	SPECIFICATION REFERENCE IN NOTE 7 UPDATED.

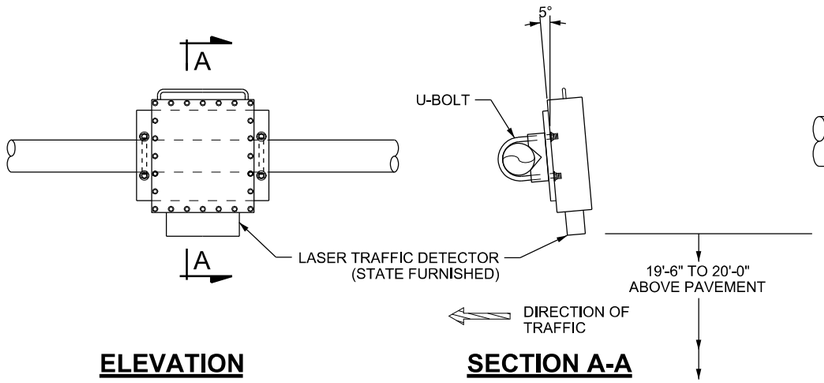
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
AUGUST 2020 DATE
APPROVED
DEPUTY DIRECTOR

ELECTRONIC TOLL LANES
CONTROL SYSTEMS
ETC GANTRY
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 21

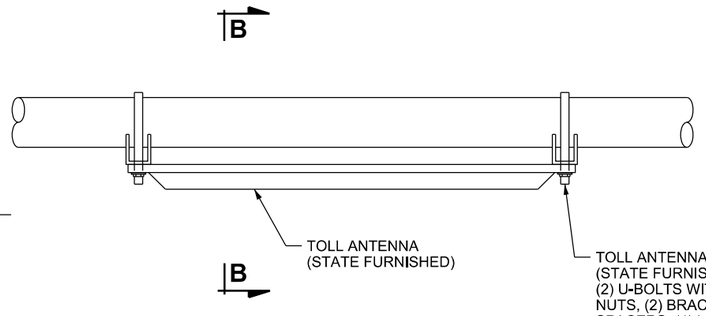
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_BA1\AT21.dgn
23-JUN-2020

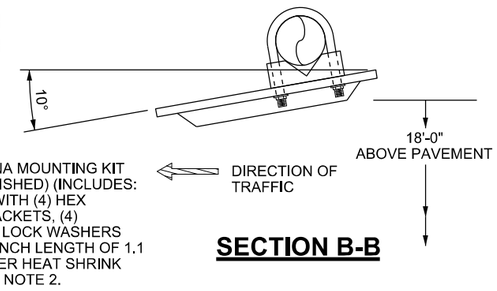


ELEVATION

SECTION A-A

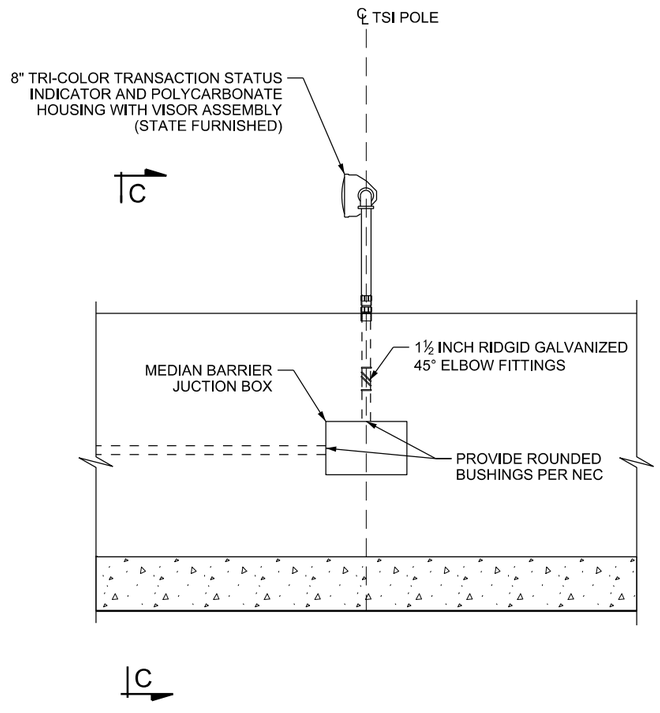
(A) LASER ATTACHMENT DETAIL

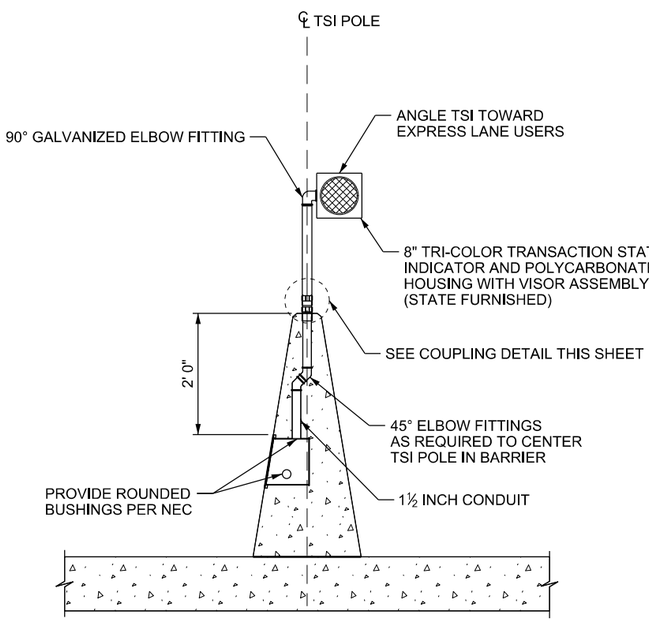




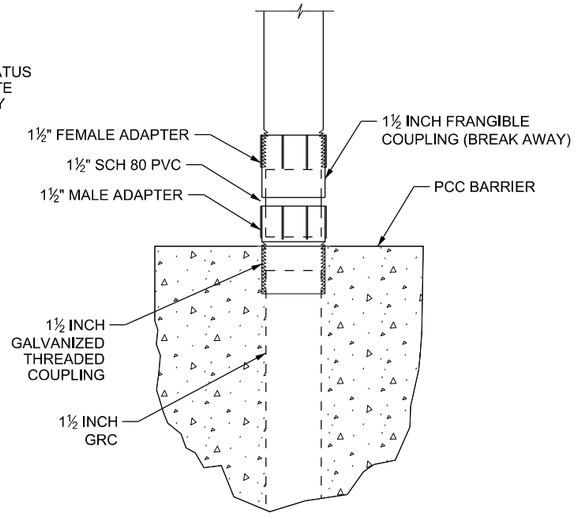
SECTION B-B

(B) TOLL ANTENNA ATTACHMENT DETAIL





SECTION C-C



COUPLING DETAIL

(C) TSI ATTACHMENT DETAIL AND MEDIAN BARRIER JUNCTION BOX

NOTES:

1. USE AN INCLINOMETER OR ANGLE FINDER TO VERIFY THE ANTENNA AND LASER MOUNTING ANGLES.
2. TIGHTEN NUTS WITH A TORQUE WRENCH TO 50 FT-LB.
3. REFER TO STD DWG AT 21 FOR TSI LOCATION.
4. REFER TO STD DWG AT 24 FOR LASER WIRING DIAGRAM.

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 — DATE

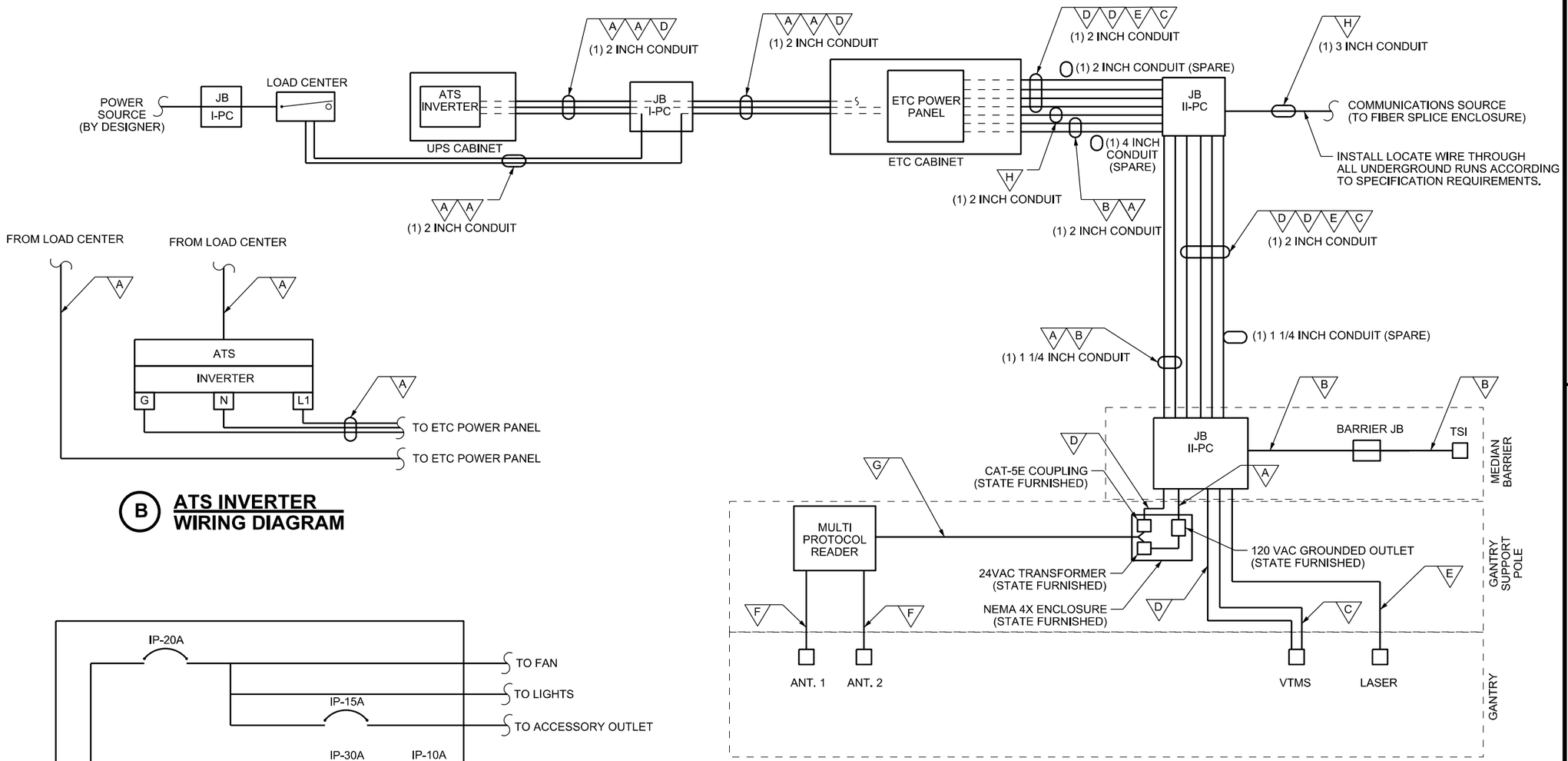
CHAIRMAN STANDARDS COMMITTEE APPROVED — DEPUTY DIRECTOR — AUGUST 2020 — DATE

ATTACHMENT DETAILS

STANDARD DRAWING TITLE

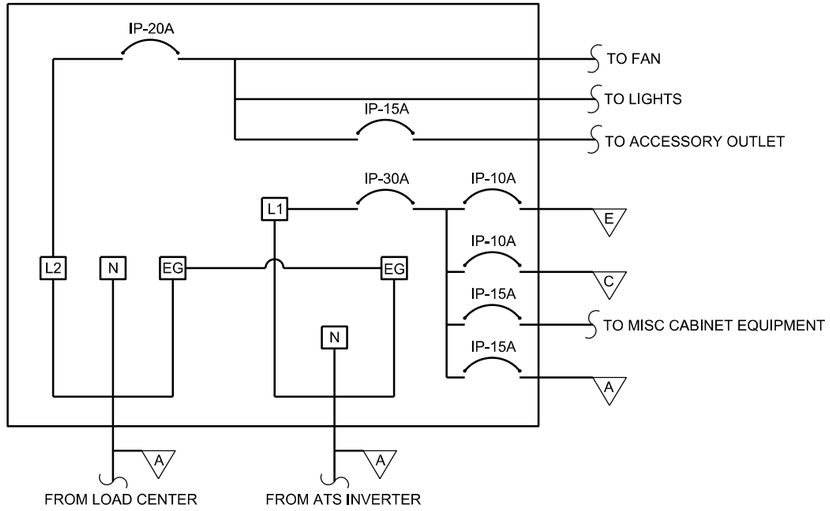
STD. DWG. NO.
AT 22

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_BAI\AT22.dgn
23-JUN-2020



A ETC EQUIPMENT WIRING DIAGRAM

B ATS INVERTER WIRING DIAGRAM



C ETC POWER PANEL WIRING DIAGRAM

WIRE SCHEDULE:

NO.	DESCRIPTION
A	2 - #10 AWG CONDUCTORS, 1 - #10 AWG EQUIPMENT GROUND.
B	4 - #16 CONDUCTORS (TSI 2A-1604).
C	IMSA 20-1 14 - 3 AWG CABLE.
D	OUTDOOR RATED CAT-5E CABLE.
E	LASER 2-CABLE BUNDLE. (STATE FURNISHED)
F	LMR 400 CABLE.
G	READER COMPOSITE CABLE (STATE FURNISHED)
H	6 SMFO PRETERMINATED DROP CABLE.

NO. | DATE | APPR. | REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

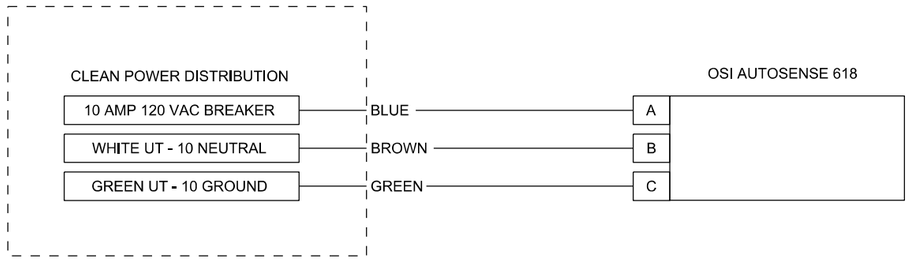
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

ETC EQUIPMENT WIRING DIAGRAM
STANDARD DRAWING TITLE

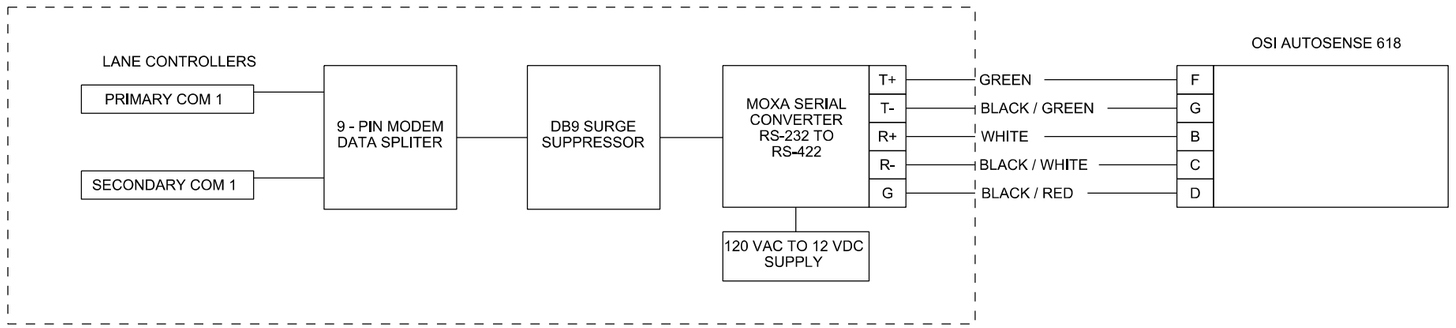
STD. DWG. NO.
AT 23

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_BAI\AT23.dgn
23-JUN-2020

OSI AUTOSENSE 618 POWER WIRING DIAGRAM TO THE ROADSIDE CABINET



OSI AUTOSENSE 618 COMMUNICATION WIRING DIAGRAM TO THE ROADSIDE CABINET



(A) OSI AUTOSENSE 618 WIRING

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

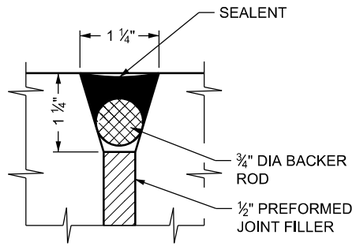
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE — AUGUST 2020 DATE
APPROVED
DEPUTY DIRECTOR

ETC - OSI LASER SYSTEM WIRING DIAGRAM

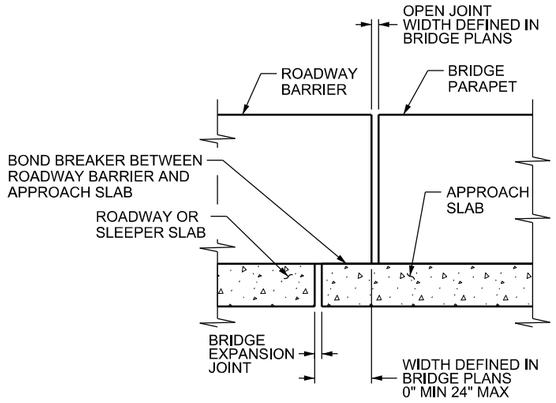
STANDARD DRAWING TITLE

STD. DWG. NO.
AT 24

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_BAT\AT24.dgn

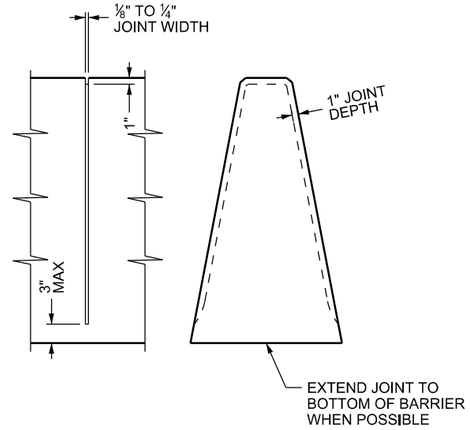


TYPE 1



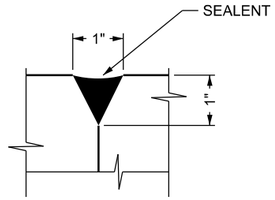
TYPE 2

EXPANSION JOINT DETAILS

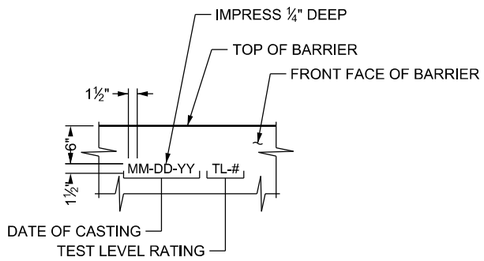


ELEVATION **END VIEW**

SAW CUT CONTRACTION JOINT

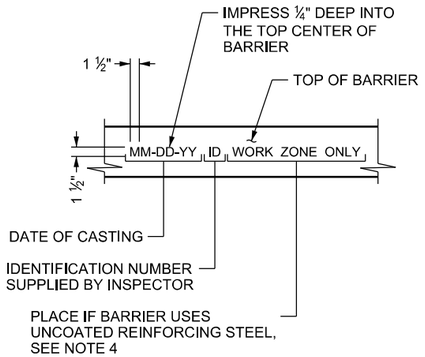


FORMED CONTRACTION JOINT



CAST-IN-PLACE BARRIER MARKING DETAIL

PLACE AT BEGINNING, END, AND AT 1,000-FT INTERVALS



PRECAST BARRIER MARKING DETAIL

LEGEND

A.S. = AS SHOWN
CIP = CAST-IN-PLACE
DIA = DIAMETER
EQ = EQUAL
R = RADIUS
SPA = SPACES

GENERAL NOTES:

1. PAVEMENT OVERLAY LIMITATIONS - EFFECTIVE BARRIER IS MEASURED FROM TOP OF PAVEMENT TO TOP OF BARRIER. DO NOT PLACE PAVEMENT OVERLAY THAT REDUCES EFFECTIVE BARRIER TO LESS THAN THE EFFECTIVE BARRIER LIMIT:
   A. 32 INCH F-SHAPE BARRIER: DO NOT OVERLAY MATERIAL PAST THE FIRST BREAK POINT OF BARRIER. FIRST BREAK POINT IS 3 INCHES ABOVE BOTTOM OF BARRIER. EFFECTIVE BARRIER LIMIT IS 29 INCHES.
   B. 42 INCH CONSTANT SLOPE BARRIER: EFFECTIVE BARRIER LIMIT IS 36 INCHES
   C. 54 INCH CONSTANT SLOPE BARRIER: EFFECTIVE BARRIER LIMIT IS 48 INCHES.
2. USE CLASS AA(AE) CONCRETE.
3. USE COATED DEFORMED CARBON STEEL REINFORCEMENT BARS CONFORMING TO AASHTO M 284 OR M 111 AND AASHTO M 31 GRADE 60, RESPECTIVELY.
4. USE OF NON-COATED REINFORCING STEEL SCHEDULE ALLOWED FOR BARRIER SECTIONS CONSTRUCTED FOR USE IN WORK ZONE APPLICATIONS. MARK AS "WORK ZONE ONLY." SEE "PRECAST BARRIER MARKING DETAIL." DO NOT USE BARRIER MARKED AS "WORK ZONE ONLY" IN PERMANENT APPLICATIONS.
5. CONSTRUCT BARRIER BY FIXED FORM OR SLIP FORM METHOD.
6. PLACE A VERTICAL CONSTRUCTION JOINT AT END OF DAY'S POUR AND WHEN WORK IS HALTED FOR MORE THAN 2 HOURS.
7. PROVIDE END SECTION AT BARRIER ENDS AND AT INTERRUPTIONS IN THE BARRIER INCLUDING EXPANSION JOINTS AND CRASH CUSHIONS.
8. SEE STD DWG GW 6B FOR DELINEATION HARDWARE AND STD DWG GW 7A FOR DELINEATION SPACING.
9. PROVIDE 1.5 INCH MINIMUM COVER TO REINFORCING STEEL UNLESS NOTED OTHERWISE. REINFORCING STEEL DIMENSIONS ARE OUT TO OUT AND INSIDE BEND RADII ARE SHOWN. BEND STIRRUPS OUT OF PLANE IF NECESSARY TO MEET MINIMUM CLEARANCE.
10. LOCATE EXPANSION JOINTS IN CONCRETE BARRIER AT ALL TRANSITIONS AND APPROACH SLABS. USE A TYPE 1 EXPANSION JOINT AT TRANSITIONS. USE A TYPE 2 EXPANSION JOINT AT APPROACH SLABS.
11. INSTALL ELECTRICAL/ATMS CONDUITS, JUNCTION BOXES, AND PULL BOXES AS REQUIRED PER CONTRACT DOCUMENTS.
12. SAW OR CUT CONTRACTION JOINTS 1 INCH DEEP AT PAVEMENT TRANSVERSE JOINTS OR AT 15 FT MAX SPACING WHEN PLACED ON ASPHALT PAVEMENT. SAW OR CUT WITHIN 10 HOURS OF CONCRETE PLACEMENT. USE FORM CONTRACTION JOINT DETAIL IF PLACING BARRIER BY FORM METHOD.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.
2	10/31/19	SDD	MODIFIED NOTE 1A.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CONCRETE BARRIER
GENERAL NOTES AND
STANDARD DETAILS
1 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1A1

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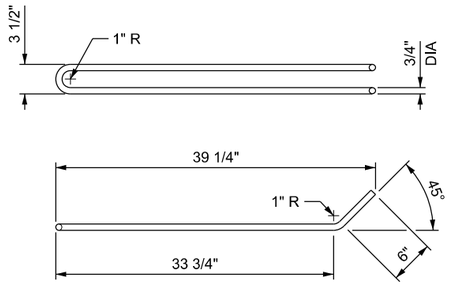
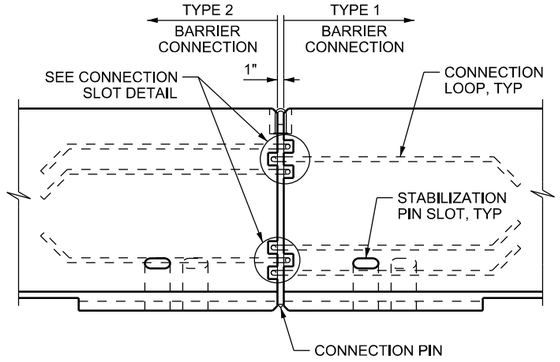
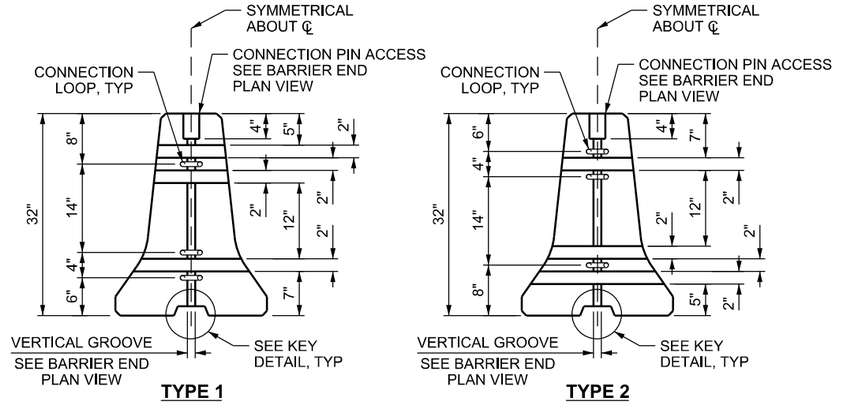
23-JUN-2020



CONNECTION LOOP

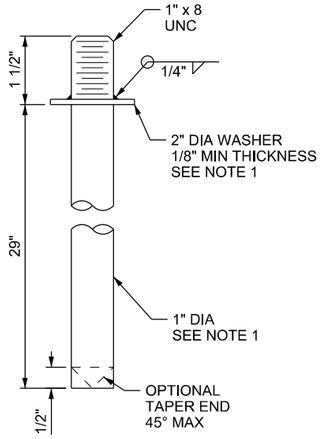


CONNECTION DETAIL



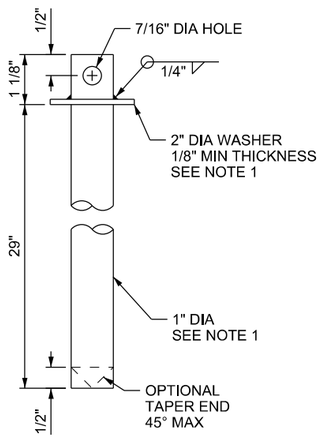
TYPICAL BARRIER CONNECTION

FULL BARRIER SHOWN, HALF BARRIER SIMILAR



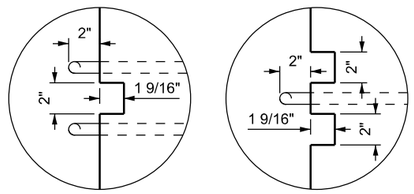
CONNECTION PIN

SEE NOTE 4

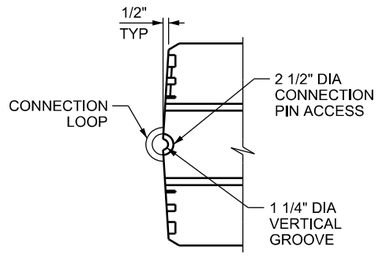


ALTERNATE CONNECTION PIN

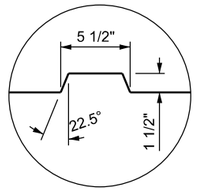
SEE NOTE 4



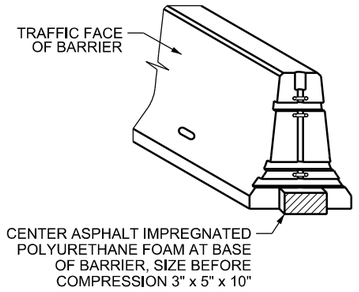
CONNECTION SLOT DETAIL



BARRIER END PLAN VIEW



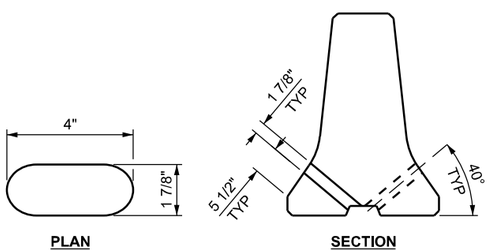
KEY DETAIL



BARRIER SEAL

SEE NOTE 7

F-SHAPE BARRIER CONNECTION DETAILS



STABILIZATION PIN SLOT

SEE NOTE 8

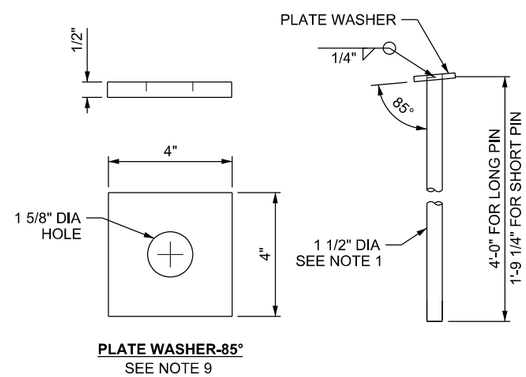


PLATE WASHER-85°

SEE NOTE 9

F-SHAPE STABILIZATION PIN

SEE NOTES 1, 2 & 9

F-SHAPE BARRIER STABILIZATION PIN DETAILS

NOTES:

1. USE STEEL MEETING ASTM A 36 FOR CONNECTION LOOP, STABILIZATION PIN AND ASSOCIATED PLATE WASHER. USE STEEL MEETING ASTM A 449, TYPE 1, FOR THE CONNECTION PIN AND ASTM A 572, GRADE 50, FOR THE ASSOCIATED PLATE WASHER.
2. HOT DIP GALVANIZE CONNECTION LOOP, CONNECTION PINS, AND STABILIZATION PINS AFTER MANUFACTURING ACCORDING TO ASTM A153.
3. DO NOT HEAT TO MAKE BENDS.
4. USE OF A HOT-FORGED HEAD, MEETING PLATE SIZE AND THICKNESS IS ACCEPTABLE IN PLACE OF A WELDED PLATE.
5. PULL BARRIER TIGHT AFTER INSTALLING THE CONNECTION PIN THEN INSTALL STABILIZATION PINS IF REQUIRED. ANGLE BARRIERS A MAXIMUM OF 7 DEGREES AT CONNECTIONS.
6. SEE APPLICABLE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.
7. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT.
8. PRE-DRILL A 1 3/4 INCH DIA HOLE THROUGH PAVEMENT AND ENTIRE DEPTH WHEN SOIL CONDITIONS REQUIRE IT USING STABILIZATION PIN SLOTS AS A GUIDE.
9. ROATATE PIN SO HEAD IS FLUSH ON BARRIER FACE.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	02/27/20	CGW	REVISED BARRIER PIN LENGTH APPLICATION, REVISED NOTE CALLOUTS.
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020

CHAIRMAN STANDARDS COMMITTEE — APPROVED — DATE: AUGUST 2020

DEPUTY DIRECTOR

CONCRETE BARRIER GENERAL NOTES AND STANDARD DETAILS 2 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1A2

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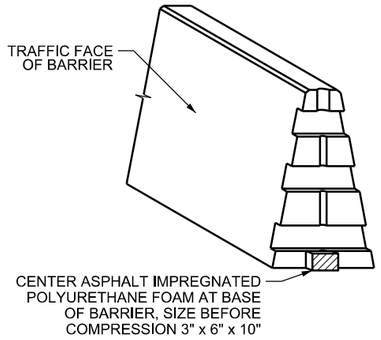
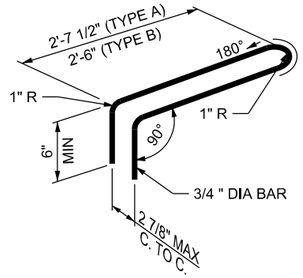
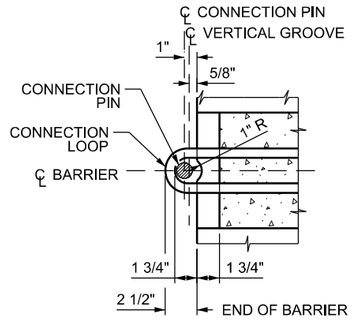
23-JUN-2020



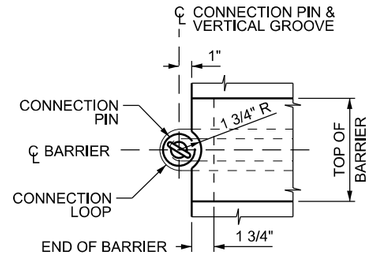
BARRIER SEAL



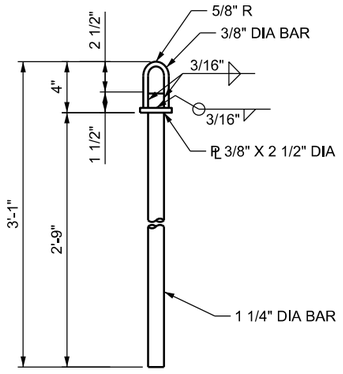
CONNECTION LOOP



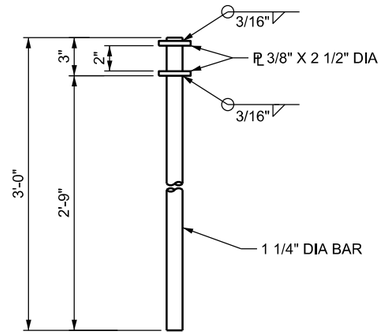
CONNECTION LOOP PLACEMENT



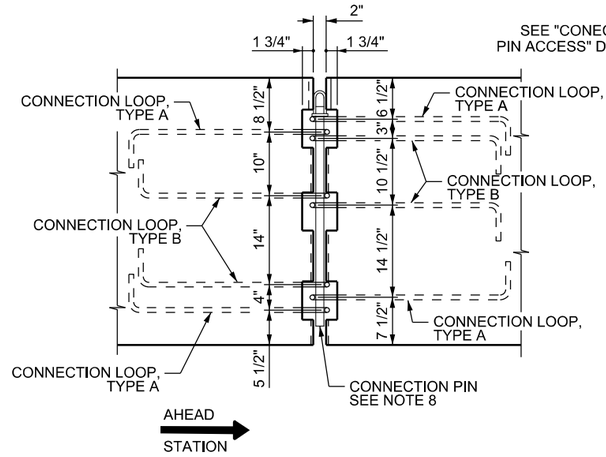
CONNECTION PIN ACCESS



CONNECTION PIN OPTION 1

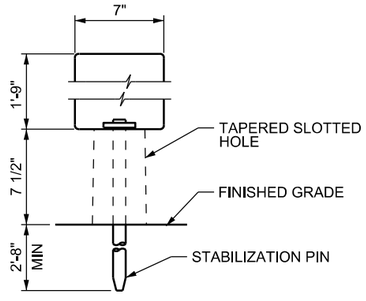


CONNECTION PIN OPTION 2

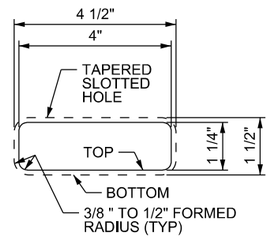


TYPICAL BARRIER CONNECTION

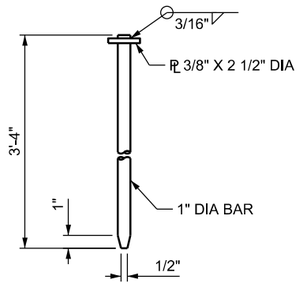
CONSTANT SLOPE BARRIER CONNECTION DETAILS



BLOCK OUT ELEVATION



BLOCK OUT PLAN



CONSTANT SLOPE STABILIZATION PIN

BARRIER BLOCK OUT AND STABILIZATION PIN DETAILS

NOTES:

1. USE STEEL ROD MEETING ASTM A 36 FOR CONNECTION LOOP, STABILIZATION PIN AND ASSOCIATED PLATE WASHER.
2. HOT DIP GALVANIZE CONNECTION LOOP, CONNECTION PINS, AND STABILIZATION PINS AFTER MANUFACTURING ACCORDING TO ATSM A153.
3. DO NOT HEAT TO MAKE BENDS.
4. USE OF A HOT-FORGED HEAD, MEETING PLATE SIZE AND THICKNESS IS ACCEPTABLE IN PLACE OF A WELDED PLATE.
5. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT.
6. CENTER STABILIZATION PIN IN TAPERED SLOTTED HOLE.
7. PRE-DRILL A 1 INCH DIA HOLE THROUGH PAVEMENT AND ENTIRE DEPTH WHEN SOIL CONDITIONS REQUIRE IT BEFORE INSTALLING STABILIZATION PIN.
8. PULL BARRIER TIGHT AFTER INSTALLING THE CONNECTION PIN THEN INSTALL STABILIZATION PINS IF REQUIRED.
9. SEE APPLICABLE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

CONCRETE BARRIER GENERAL NOTES AND STANDARD DETAILS 3 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 1A3

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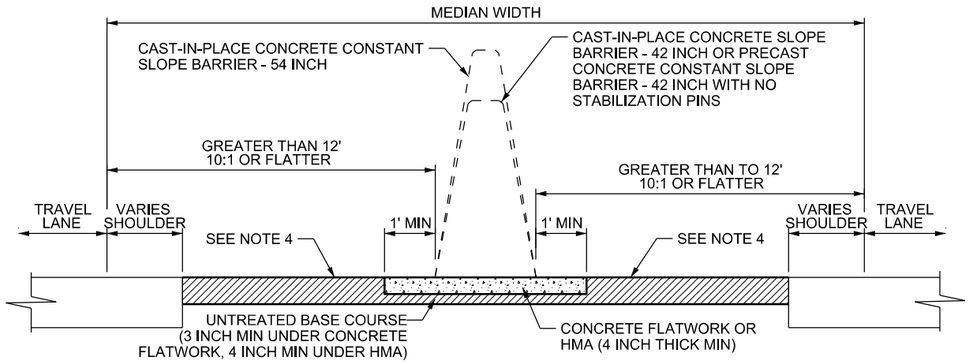
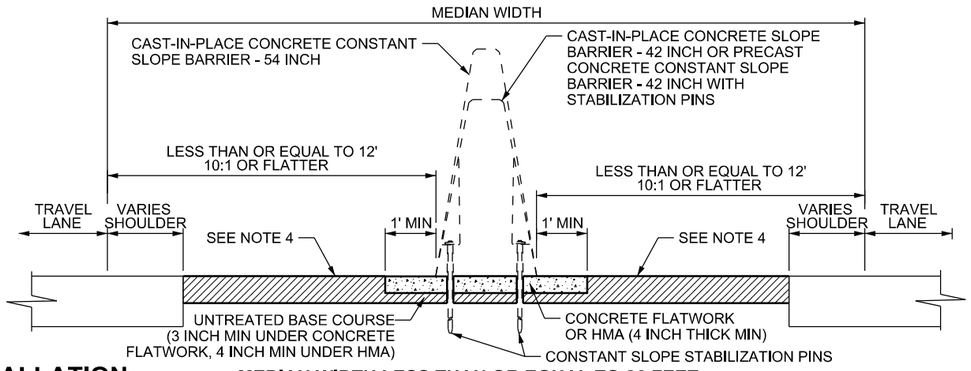
23-JUN-2020

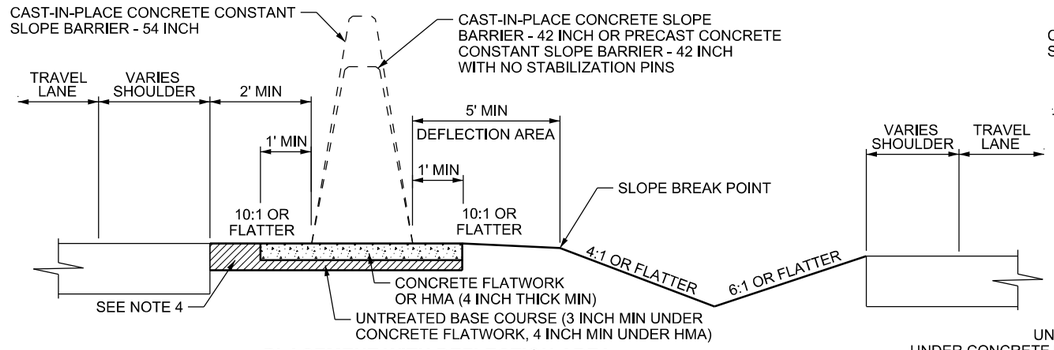


MEDIAN WIDTH GREATER THAN 26 FEET

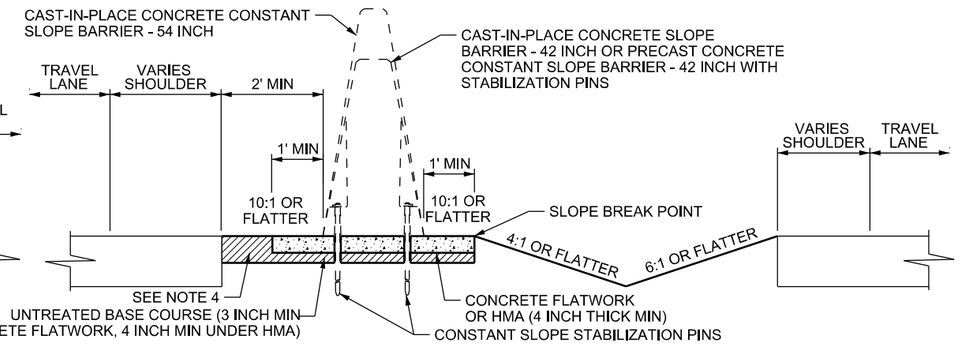


MEDIAN WIDTH LESS THAN OR EQUAL TO 26 FEET

MEDIAN INSTALLATION

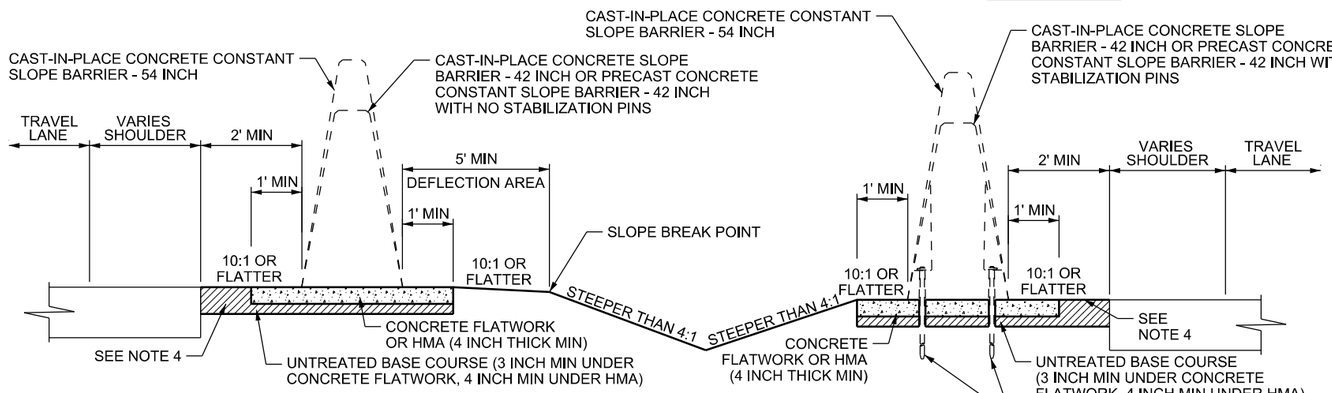


PLACEMENT WITH DEFLECTION AREA

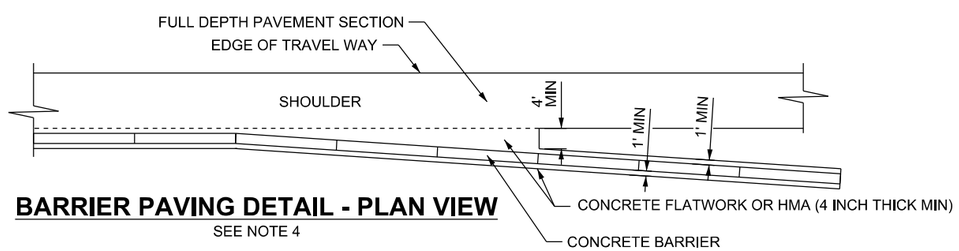


PLACEMENT WITHOUT DEFLECTION AREA

MEDIAN INSTALLATION WITH OFFSET ROADWAY



MEDIAN INSTALLATION WITH SLOPES STEEPER THAN 4:1



BARRIER PAVING DETAIL - PLAN VIEW

SEE NOTE 4

NOTES:

1. PIN ALL PRECAST BARRIER SECTIONS TOGETHER AT CONNECTION LOOPS. PULL BARRIER TIGHT AFTER INSTALLING CONNECTION PIN.
2. P1 BARS IN CAST-IN-PLACE CONCRETE BARRIER ARE REQUIRED IN ALL APPLICATIONS. SEE CAST-IN-PLACE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.
3. TEMPORARY WORK ZONE APPLICATIONS:
   - 3A. STABILIZATION PINS ARE NOT REQUIRED WHEN 1 FT SLOPE OF 10:1 OR MORE IS PROVIDED BEYOND THE BARRIER.
   - 3B. STABILIZATION PINS ARE REQUIRED WHEN SLOPE BEHIND THE 1 FT DISTANCE BEYOND THE BARRIER IS STEEPER THAN 2:1.
   - 3C. DO NOT PLACE STABILIZATION PINS IN NEW ROADWAY SURFACE FOR TEMPORARY BARRIER.
4. PAVE AREAS LESS THAN 4 FT WIDE (BARRIER FACE TO EDGE OF PAVED SHOULDER) WITH 4 INCH MIN THICK FLATWORK OR HMA. COMPACTED SHOULDER MATERIAL IS ALLOWED WHERE THE DISTANCE IS GREATER THAN 4 FT.
5. SEE STD. DWG. BA 1F SERIES FOR CONCRETE BARRIER F-SHAPE INSTALLATION OPTIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	02/27/20	CGW	CLARIFIED MATERIAL UNDER BARRIER
2	10/31/19	SDD	REMOVED JERSEY PRECAST BARRIER OPTION, MODIFIED DEFLECTION AREA FOR PRECAST CONSTANT SLOPE BARRIER.
2	6/27/19	CGW	ADDED NOTE 4 AND PAVING DETAIL FOR MATERIAL BETWEEN SHOULDER AND BARRIER
1	DATE	APPR.	REMARKS

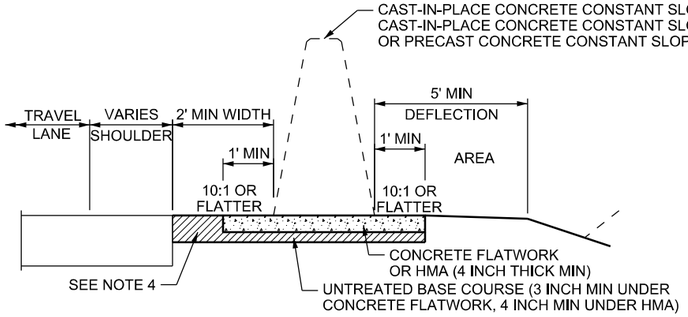
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED	DATE
DEPUTY DIRECTOR	AUGUST 2020
	DATE

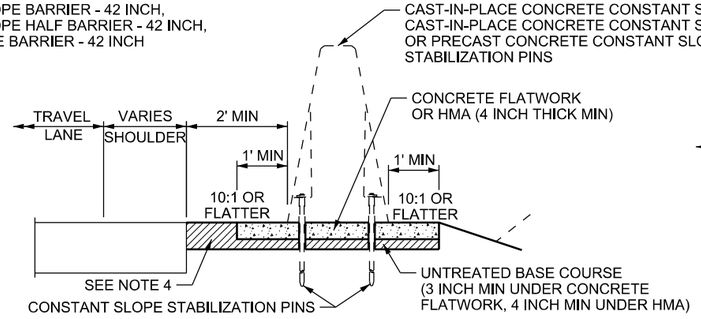
STANDARD DRAWING TITLE
CONCRETE BARRIER
MEDIAN INSTALLATION

STD. DWG. NO.
BA 1B

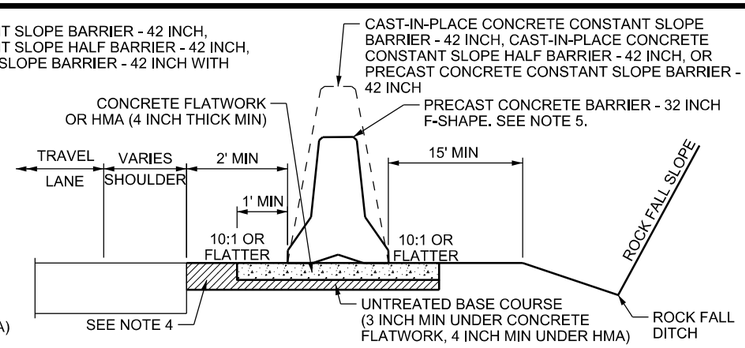
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1 (AT, BA1)\BA01B.dgn
23-JUN-2020



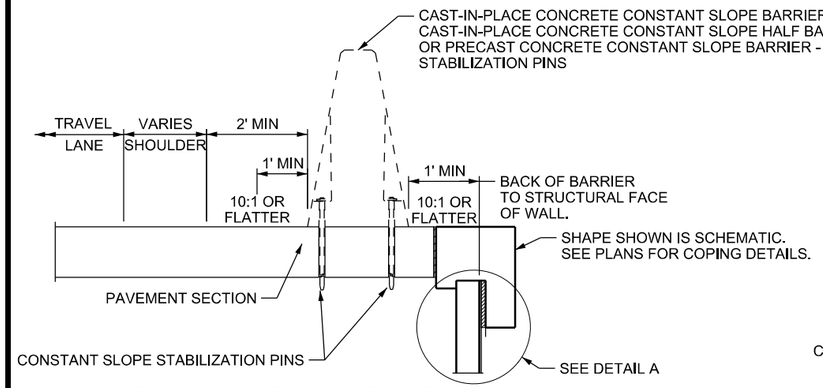
PLACEMENT WITH DEFLECTION AREA



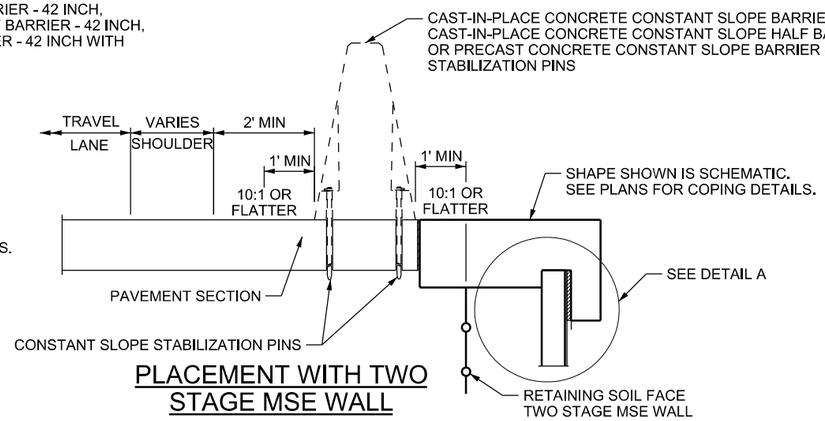
PLACEMENT WITHOUT DEFLECTION AREA



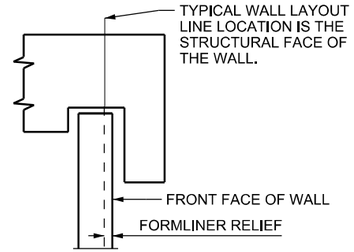
PLACEMENT WITH ROCK FALL CONSIDERATIONS



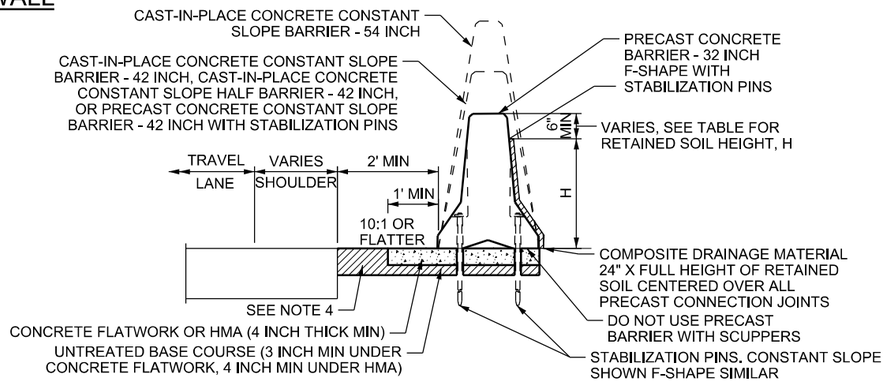
PLACEMENT WITH SINGLE STAGE MSE OR RETAINING WALL



PLACEMENT WITH TWO STAGE MSE WALL



DETAIL A

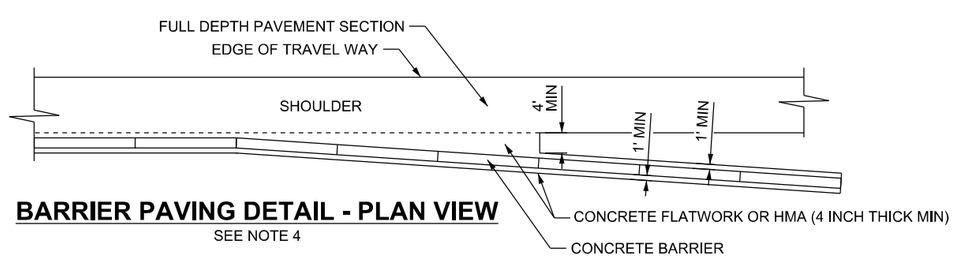


RETAINING BARRIER

ENGINEER'S APPROVAL REQUIRED WITH VERIFICATION BY THE REGION PRECONSTRUCTION ENGINEER

PERMISSIBLE RETAINED SOIL HEIGHT (H)		
BARRIER TYPE	BACKSLOPE	
	2:1 OR FLATTER	LEVEL WITH LL SURCHARGE *
PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE	26"	13"
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH OR PRECAST CONCRETE CONSTANT SLOPE BARRIER - 42 INCH	35"	19"
CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH	29"	15"

*ACCOUNTS FOR 2 FT OF EQUIVALENT SOIL FOR LIVE LOAD SURCHARGE.



BARRIER PAVING DETAIL - PLAN VIEW

SEE NOTE 4

NOTES

1. PIN ALL PRECAST BARRIER SECTIONS TOGETHER AT CONNECTION LOOPS. PULL BARRIER TIGHT AFTER INSTALLING CONNECTION PIN.
2. P1 BARS IN CAST-IN-PLACE CONCRETE BARRIER ARE REQUIRED IN ALL APPLICATIONS. SEE APPLICABLE CAST-IN-PLACE CONCRETE BARRIER DRAWINGS FOR REINFORCING STEEL REQUIREMENTS.
3. TEMPORARY WORK ZONE APPLICATIONS:
   - 3A. STABILIZATION PINS ARE NOT REQUIRED WHEN 1 FT SLOPE OF 10:1 OR MORE IS PROVIDED BEYOND THE BARRIER.
   - 3B. STABILIZATION PINS ARE REQUIRED WHEN SLOPE BEHIND THE 1 FT DISTANCE BEYOND THE BARRIER IS STEEPER THAN 2:1.
   - 3C. DO NOT PLACE STABILIZATION PINS FOR TEMPORARY BARRIER IN NEW ROADWAY SURFACE.
4. PAVE AREAS LESS THAN 4 FT WIDE (BARRIER FACE TO EDGE OF PAVED SHOULDER) WITH 4 INCH MIN THICK FLATWORK OR HMA. COMPACTED SHOULDER MATERIAL IS ALLOWED WHERE THE DISTANCE IS GREATER THAN 4 FT.
5. SEE STD. DWG. BA 1F SERIES FOR CONCRETE BARRIER F-SHAPE INSTALLATION OPTIONS.

REVISIONS			
3	2/27/20	CGW	EXTENDED FULL-DEPTH PAVEMENT UNDER BARRIER AT WALLS. REVISED CALLOUTS
2	10/31/19	SDD	REMOVED JERSEY PRECAST BARRIER OPTION. MODIFIED DEFLECTION AREA FOR PRECAST CONSTANT SLOPE BARRIER. ADDED 54 INCH RETAINING BARRIER OPTION.
2			DELETED PLACEMENT WITH BARRIER OFFSET DETAIL.
1	6/27/19	CGW	ADDED NOTE 4 AND PAVING DETAIL FOR MATERIAL BETWEEN SHOULDER AND BARRIER
NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE — DEPUTY DIRECTOR

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

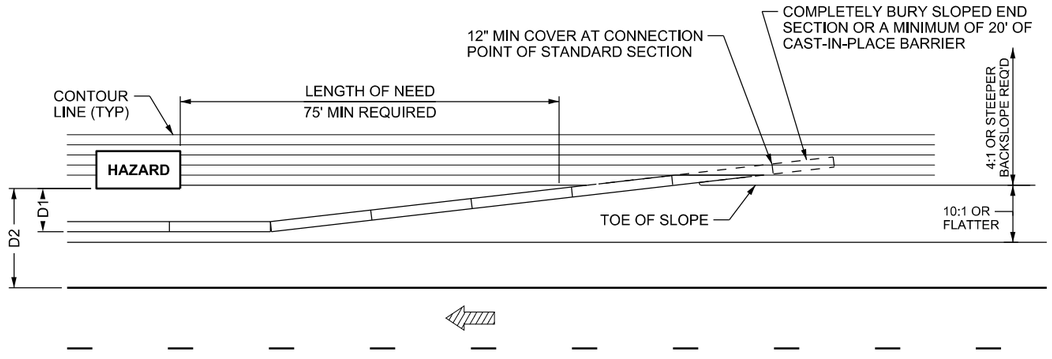
STANDARD DRAWING TITLE

CONCRETE BARRIER SHOULDER INSTALLATION

STD. DWG. NO.

BA 1C

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\BA1\BA01C.dgn
23-JUN-2020

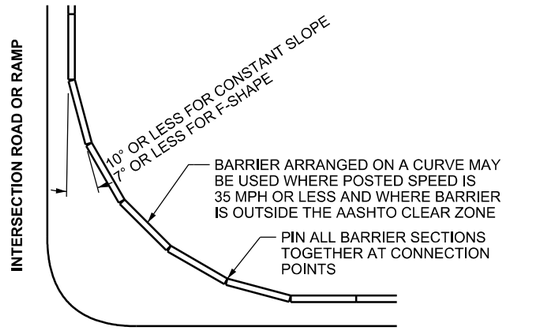


LENGTH OF NEED (LON) FORMULAS FOR BURIED END SECTION

BACKSLOPE STEEPER THAN 3:1
LON = FLR x D1

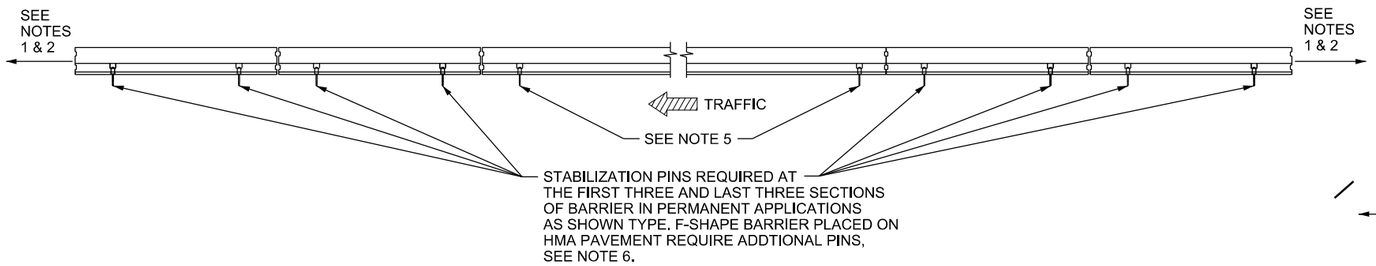
BACKSLOPE 3:1 TO A MINIMUM 4:
≥ 50 MPH "LON"= 450 - (15 x D2)
≤ 45 MPH "LON"= 250 - (15 x D2)

LON: LENGTH OF NEED
FLR: BARRIER FLARE RATE, SEE PROJECT PLANS.
D1: DISTANCE FROM FACE OF BARRIER TO FACE OF HAZARD OR DITCH BOTTOM
D2: DISTANCE FROM EDGE OF TRAVEL LANE TO FACE OF HAZARD OR DITCH BOTTOM



CROSS STREET OR OVERPASS
SEE BA 1E FOR COLUMN PROTECTION REQUIREMENTS

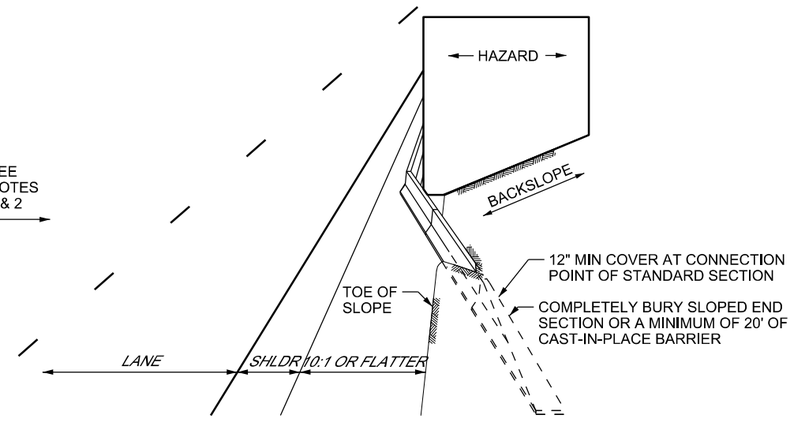
BURIED END SECTION PLAN



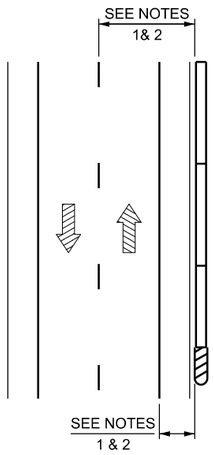
TYPICAL ELEVATION

F-SHAPE BARRIER SHOWN. PRECAST CONSTANT SLOPE SIMILAR.

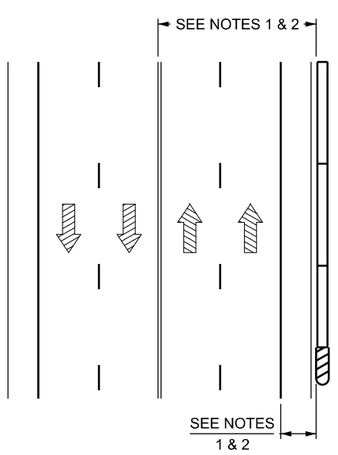
CURVED LAYOUT



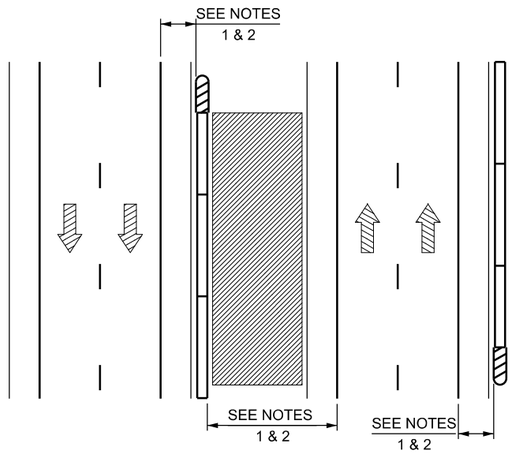
BURIED END SECTION PERSPECTIVE VIEW



TWO LANE / TWO WAY



MULTI-LANE ARTERIAL



MULTI-LANE ARTERIAL WITH TRAVERSABLE MEDIAN

NOTES:

1. INSTALL APPROPRIATE END TREATMENT, CRASH CUSHION, OR END SECTION WHEN BARRIER END IS WITHIN THE MAXIMUM REQUIRED AASHTO CLEAR ZONE. DO NOT EXTEND FLARED BARRIER IN ORDER TO MOVE END OF BARRIER OUTSIDE OF CLEAR ZONE TO AVOID USING END PROTECTION FOR BOTH WORK ZONE AND PERMANENT APPLICATIONS.
   A. SELECT APPROPRIATE END TREATMENT OR CRASH CUSHION FROM THE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS WHEN DESIGN SPEED EXCEEDS 40 MPH. USE AN END TREATMENT WHEN RECOVERY AREA BEHIND SELECTED SYSTEM IS ACHIEVED.
   B. APPROACH END NON-DIVIDED ROADWAYS: INSTALL A SLOPED END SECTION WHEN DESIGN SPEED FOR ROADWAY IS 40 MPH OR LESS. USE APPROPRIATE SECTION FOR BARRIER TYPE.
   C. TRAILING END NON-DIVIDED ROADWAYS: INSTALL A SLOPED END SECTION ON TRAILING ENDS WHEN AN END TREATMENT OR CRASH CUSHION IS NOT REQUIRED.
2. INSTALL APPLICABLE BARRIER TRANSITION PRIOR TO INSTALLING W-BEAM, END TREATMENT, OR CRASH CUSHION WHEN A CONSTANT SLOPE SYSTEM IS USED.
3. PLACEMENT WITH CURBS:
   A. 32 INCH BARRIER: 10-FT SET BACK REQUIRED FROM FACE OF CURB.
   B. 42 INCH AND 54 INCH BARRIER: 10-FT SET BACK RECOMMENDED FROM FACE OF CURB.
4. SLOPED END SECTION DOES NOT NEED TO BE PLACED ON A PAVED SURFACE WHEN USED IN A BURIED END SECTION APPLICATION.
5. INSTALL ONE STABILIZATION PIN IN THE SLOT OF THE LAST FREE-STANDING SEGMENT CLOSEST TO THE FIRST PINNED SEGMENT WHEN TRANSITION FROM FREE-STANDING TO PINNED BARRIER.
6. SEE STD. DWG. BA 1F2 FOR BARRIER LAYOUT REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	02/27/20	SDD	REVISED DEFLECTION ANGLE ON CURVED LAYOUT FOR F-SHAPE BARRIER
2	10/31/19	SDD	MODIFIED TYPICAL ELEVATION, ADDED NOTES 5 & 6.
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

CONCRETE BARRIER LAYOUT
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1D

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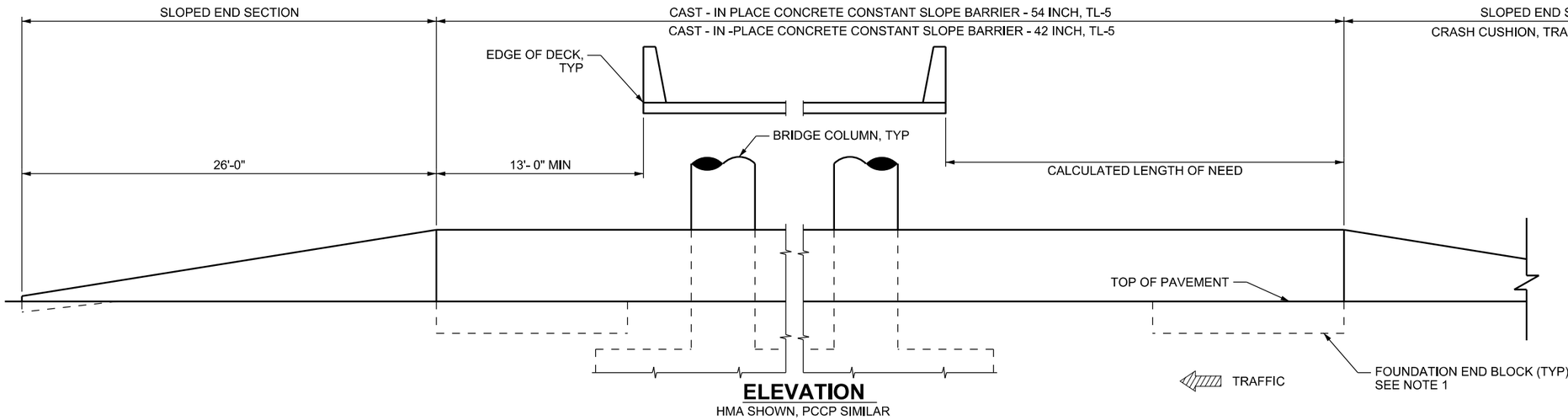
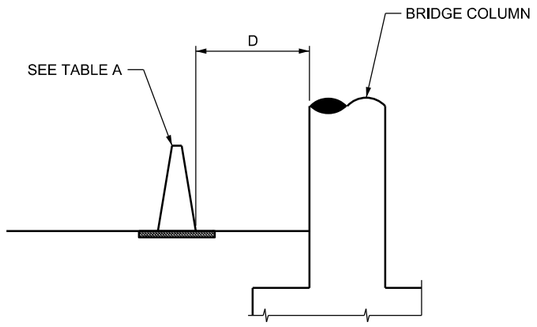
23-JUN-2020



ELEVATION

HMA SHOWN, PCCP SIMILAR



SECTION

D	BARRIER TYPE	NOTES
10'-0" < D < CLEAR ZONE	CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42" TL-5	
4'-0" ≤ D ≤ 10'-0"	CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54" TL-5	
2" ≤ D < 4'-0"	CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54" TL-5	

TABLE A

NOTES:

1. SEE STD DWGS BA 3E1 AND BA 3O1 FOR FOUNDATION END BLOCK DETAILS. FOUNDATION END BLOCKS ARE NOT REQUIRED WHEN BARRIERS ARE PLACED ON PCCP ROADWAY PANEL OF 8 INCH THICKNESS OR GREATER.
2. PLACEMENT OF FILL MATERIAL BETWEEN COLUMN AND BACK OF BARRIER IS NOT ALLOWED ABOVE BARRIER FOUNDATION.
3. DO NOT PLACE BARRIER CLOSER THAN 4'-0" UNLESS REQUIRED IN PROJECT PLANS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	02/27/20	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.
			MOVED DESIGN COLUMN IMPACT LOAD DETAIL TO DM SHEET.
			REPLACED SECTION DETAIL WITH TABLE.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

CONCRETE BARRIER COLUMN PROTECTION

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 1E

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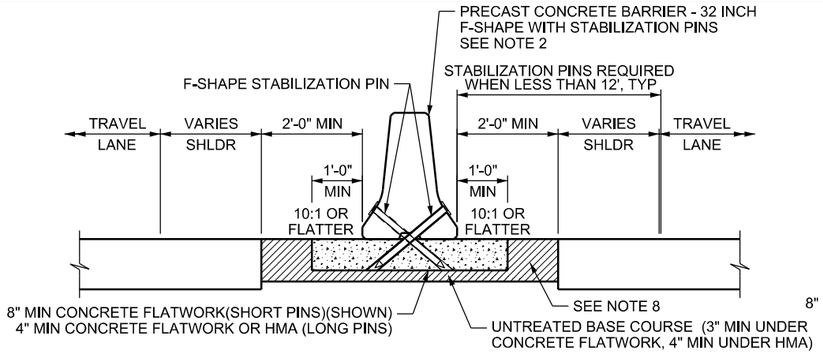
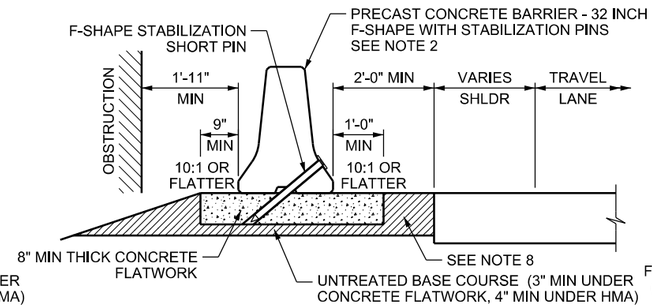


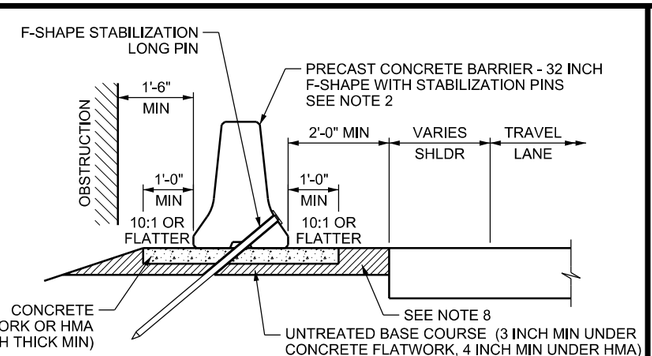
MEDIAN BARRIER PINNED

SEE NOTE 5



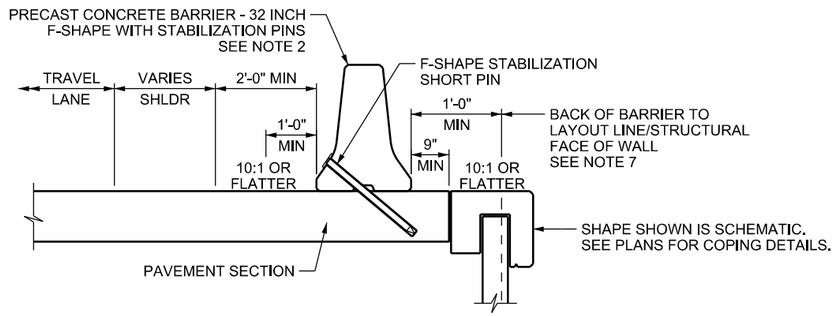
SHORT-PINNED BARRIER INSTALLATION

SEE NOTE 5



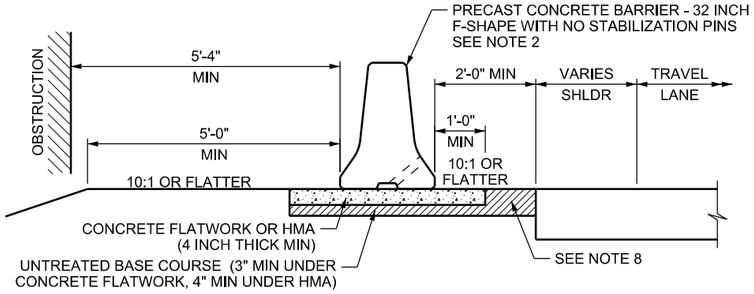
LONG-PINNED BARRIER INSTALLATION

SEE NOTE 5



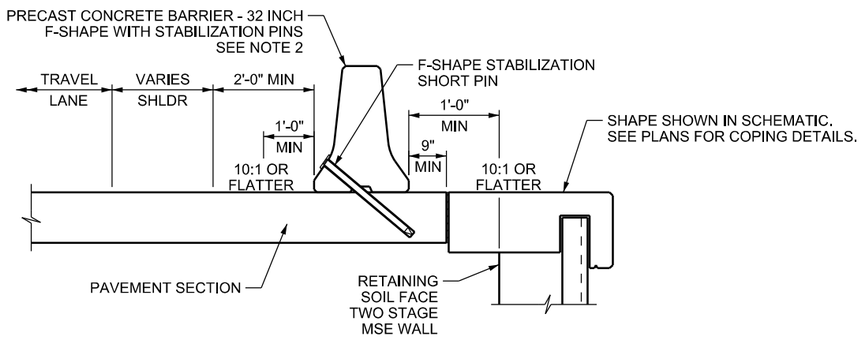
PLACEMENT WITH SINGLE STAGE MSE OR RETAINING WALL WITH CONCRETE PAVEMENT

SEE NOTE 5



FREE-STANDING BARRIER

SEE NOTE 6



PLACEMENT WITH TWO STAGE MSE WALL WITH CONCRETE PAVEMENT

SEE NOTE 5

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE" ON STD DWG BA 2A FOR BARRIER CROSS SECTION DIMENSIONS.
3. TEMPORARY WORK ZONE APPLICATIONS:
   - 3A. STABILIZATION PINS ARE NOT REQUIRED WHEN 1 FT SLOPE OF 10:1 OR MORE IS PROVIDED BEYOND THE BARRIER.
   - 3B. STABILIZATION PINS ARE REQUIRED WHEN SLOPE BEHIND THE 1 FT DISTANCE BEYOND THE BARRIER IS STEEPER THAN 2:1.
   - 3C. DO NOT PLACE STABILIZATION PINS FOR TEMPORARY BARRIER IN NEW ROADWAY SURFACE.
4. PROVIDE BARRIER SEGMENTS FOR AT LEAST THE CALCULATED LENGTH OF NEED UPSTREAM FROM HAZARDS AND PROVIDE AT LEAST THREE PRECAST CONCRETE BARRIER SEGMENTS DOWNSTREAM OF HAZARDS. DO NOT INSTALL FEWER THAN SIX BARRIER SEGMENTS.
5. USE THE FOLLOWING NUMBER OF STABILIZATION PINS IN EACH BARRIER SEGMENT AT PINNED PRECAST F-SHAPE CONCRETE BARRIERS INSTALLED ON TRAFFIC SIDE OF BARRIER:
   - 5A. FOR SHORT-PIN INSTALLATION - 2 PINS (SHOULDER) AND 4 PINS (MEDIAN)
   - 5B. FOR LONG-PIN INSTALLATION - 3 PINS (SHOULDER) AND 6 PINS (MEDIAN)
6. SEE STD DWG BA 1F2 FOR STABILIZATION PIN PLACEMENT WHEN TERMINATING FREE-STANDING PRECAST F-SHAPE CONCRETE BARRIER OR TRANSITIONING FROM FREE-STANDING TO PINNED BARRIER OR RIGID BARRIER.
7. SEE "DETAIL A" ON STD DWG BA 1C FOR DETAILS.
8. SEE "BARRIER PAVING DETAIL - PLAN VIEW" ON STD DWG BA 1C FOR ADDITIONAL PAVING INFORMATION.
9. SEE STD DWG BA 1C FOR PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE PLACEMENT IN ROCK FALL CONSIDERATION OR AS A RETAINED BARRIER.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	02/27/20	CGW	EXTENDED FULL-DEPTH PAVEMENT UNDER BARRIER AT WALLS, REVISED CALLOUTS
1	10/31/19	SDD	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION

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SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

CONCRETE BARRIER F-SHAPE INSTALLATION

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 1F1

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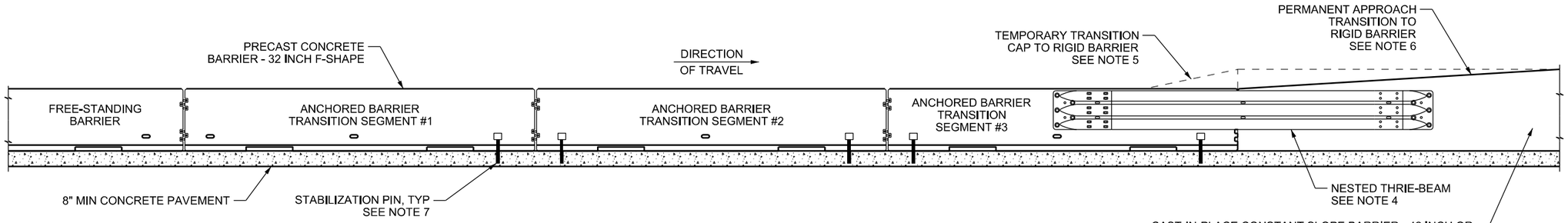
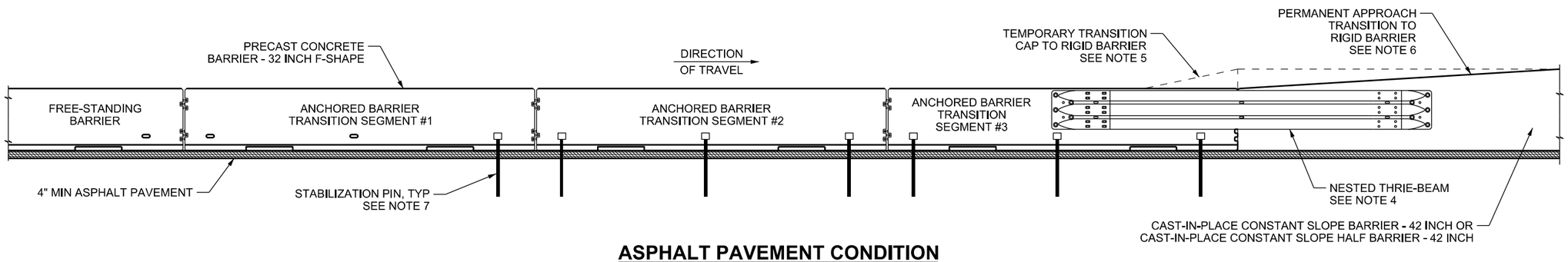
23-JUN-2020



CONCRETE PAVEMENT CONDITION

TRAFFIC SIDE - LEFT SHOULDER INSTALLATION SHOWN, RIGHT SHOULDER SIMILAR



ASPHALT PAVEMENT CONDITION

TRAFFIC SIDE - LEFT SHOULDER INSTALLATION SHOWN, RIGHT SHOULDER SIMILAR

TRANSITION FROM FREE-STANDING TO RIGID BARRIER

SEE NOTES 1 AND 8

NOTES:

1. DO NOT USE THIS TRANSITION TO CONNECT TO BRIDGE PARAPET.
2. INSTALL TRANSITION AFTER SITE PREPARATION IS COMPLETE.
3. INSTALL BARRIER STABILIZATION PINS BEFORE THRIE-BEAM TERMINAL CONNECTORS, THRIE-BEAM ELEMENTS, AND FIELD SIDE STRAP.
4. NEST TWO THRIE-BEAM ELEMENTS PER TRANSITION. SEE STD DWG BA 1F4 FOR THRIE-BEAM DETAILS.
5. USE TRANSITION CAP FOR TEMPORARY APPROACH TRANSITIONS OF PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE TO CAST-IN-PLACE CONCRETE BARRIER - 42 INCH CONSTANT SLOPE. SEE STD DWG BA 1F4 FOR TEMPORARY TRANSITION CAP DETAILS.
6. DO NOT USE TEMPORARY TRANSITION CAP FOR PERMANENT APPROACH TRANSITIONS OF FREE-STANDING PRECAST F-SHAPE BARRIER TO CAST-IN-PLACE CONSTANT SLOPE BARRIER. SEE STD DWGS BA 3A2, 3K3, AND 3M2 FOR CAST-IN-PLACE TRANSITION DETAILS.
7. INSTALL ONE STABILIZATION PIN IN THE SLOT OF THE LAST FREE-STANDING SEGMENT CLOSEST TO THE FIRST PINNED SEGMENT WHEN TRANSITIONING FROM FREE-STANDING TO PINNED BARRIER.
8. TRANSITION FIRST TO PINNED PRECAST BARRIER (MINIMUM THREE SEGMENTS), THEN TO RIGID BARRIER WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO RIGID BARRIER.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/31/19	SDD	NEW DRAWING.	

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

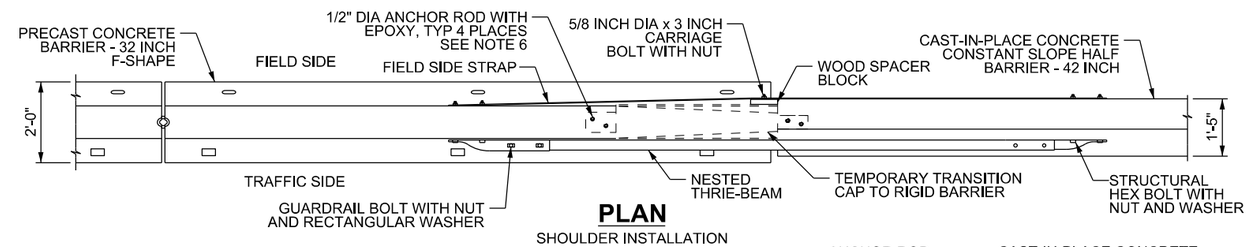
DEPUTY DIRECTOR

FREE STANDING BARRIER
F-SHAPE, CAST-IN-PLACE
BARRIER TRANSITION
1 OF 3

STANDARD DRAWING TITLE

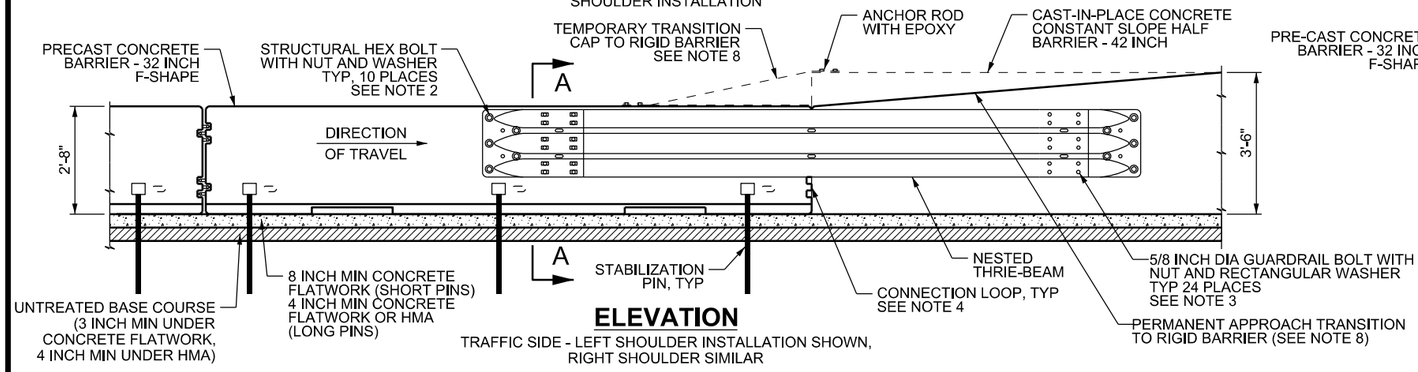
STD. DWG. NO.
BA 1F2

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\BA1\BA01F2.dgn



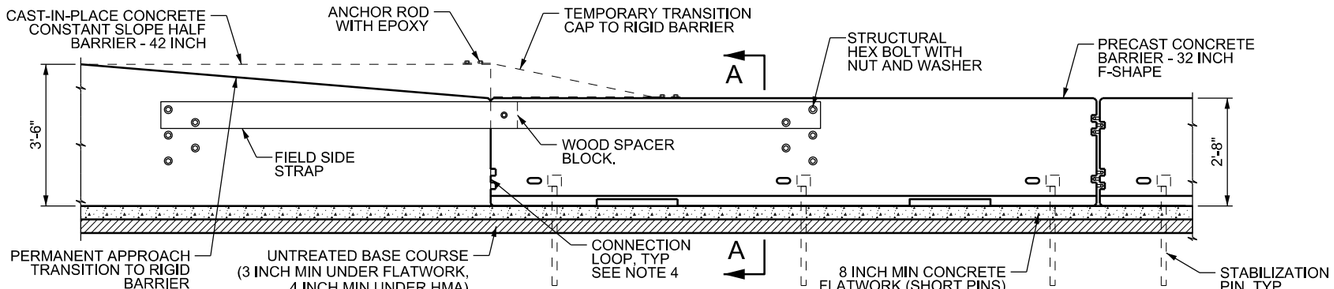
PLAN

SHOULDER INSTALLATION



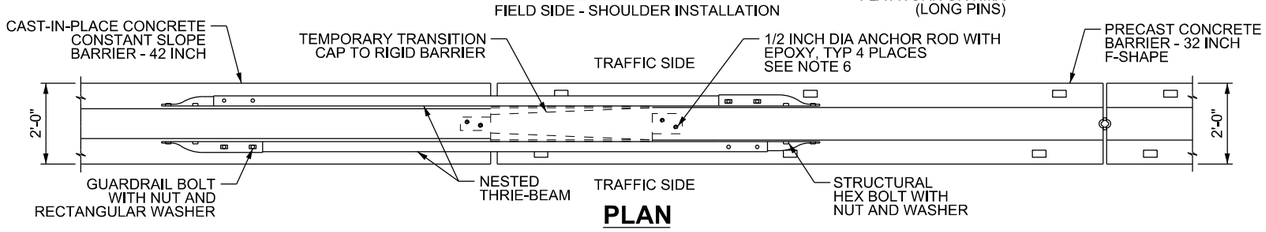
ELEVATION

TRAFFIC SIDE - LEFT SHOULDER INSTALLATION SHOWN, RIGHT SHOULDER SIMILAR



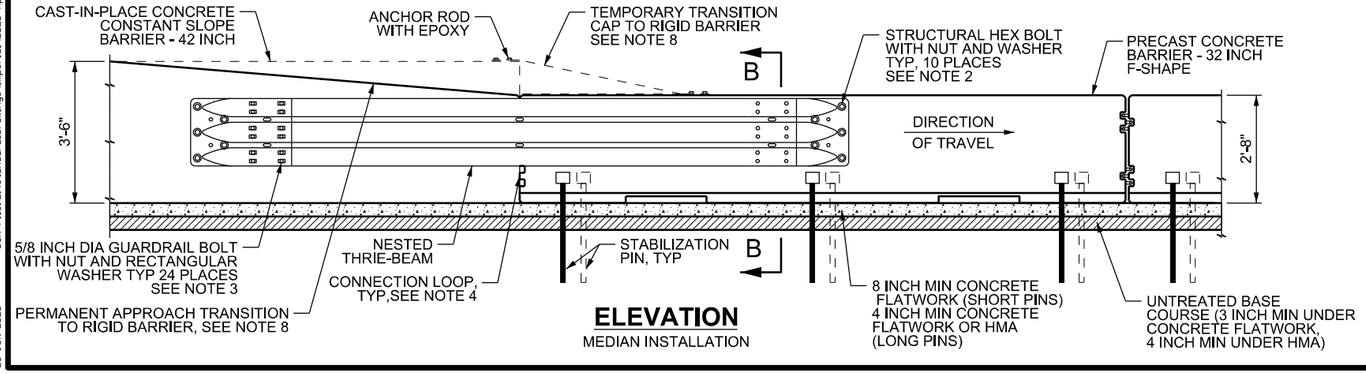
ELEVATION

FIELD SIDE - SHOULDER INSTALLATION



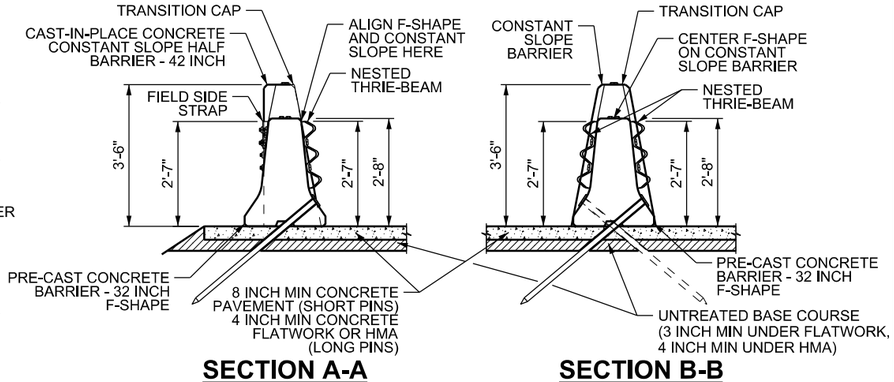
PLAN

MEDIAN INSTALLATION



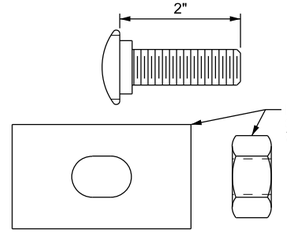
ELEVATION

MEDIAN INSTALLATION



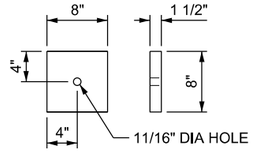
SECTION A-A

SECTION B-B

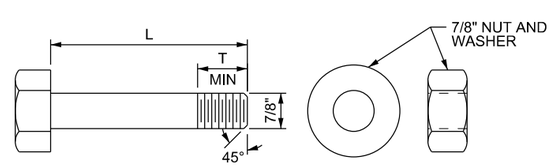


GUARDRAIL BOLT

SEE NOTE 7



WOOD SPACER BLOCK DETAIL



BOLT LOCATION	SHOULDER		MEDIAN	
	L	T	L	T
CONSTANT SLOPE FULL BARRIER	1'-10"	9"	2'-0"	11"
CONSTANT SLOPE HALF BARRIER	1'-4"	7"	1'-6"	9"
F-SHAPE BARRIER				

STRUCTURAL HEX BOLT

SEE NOTE 5

NOTES:

1. INSTALL CONNECTION HARDWARE ACCORDING TO SECTION A-A OR SECTION B-B. USE BOLTS LONG ENOUGH THAT THE NUT WILL HAVE FULL ENGAGEMENT OF THE BOLT AND NO MORE THAN 1/4 INCH TO 1/2 INCH OF THE BOLT IS ABOVE THE NUT. CUT AND FIELD COAT BOLT WITH A ZINC COMPOUND WITH BOLT EXCEEDS 1/2 INCH ABOVE THE NUT.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. INSTALL RECTANGULAR GUARDRAIL WASHER UNDER THE GUARDRAIL BOLT HEAD ON UPSTREAM END. INSTALL RECTANGULAR GUARDRAIL WASHER UNDER NUT ON DOWNSTREAM END. SEE "EXPANDED VIEW THRIE-BEAM TERMINAL CONNECTOR TO GUARDRAIL" ON STD DWG BA 1F4 FOR ADDITIONAL INFORMATION.
4. FIELD CUT CONNECTION LOOPS ON PRECAST BARRIER ADJACENT TO RIGID BARRIER. PLACE PRECAST BARRIER TIGHT AGAINST RIGID BARRIER.
5. USE STRUCTURAL HEX BOLTS CONFORMING TO ASTM F 3125, GRADE A 325. USE HARDENED WASHERS AND HEAVY HEX NUTS ACCORDING TO ASTM F 436 AND A 563, RESPECTIVELY. HOT DIP GALVANIZE ACCORDING TO ASTM A 153.
6. USE GALVANIZED THREADED ANCHOR RODS CONFORMING TO ASTM C 1554, GRADE 55 AND WASHERS AND NUTS ACCORDING TO ASTM F 436 AND A 563 RESPECTIVELY. EMBED ANCHOR RODS AT LEAST 5 INCH AND BOND WITH EPOXY RESIN ACCORDING TO AASHTO M 235 TYPY IV.
7. USE GUARDRAIL BOLTS CONFORMING TO ASTM A 307 AND ACCORDING TO TASK FORCE 13 REPORT, FBB02. USE RECESSED GUARDRAIL NUTS AND RECTANGULAR GUARDRAIL WASHER ACCORDING TO TASK FORCE 13 REPORT, FWR03.
8. SEE STD DWG BA 1F2 FOR PERMANENT AND TEMPORARY APPLICATION GUIDELINES.
9. STABILIZATION PINS SHOWN FOR ASPHALT PAVEMENT CONDITION. SEE STD DWG BA 1F2 FOR STABILIZATION PIN PLACEMENT FOR CONCRETE PAVEMENT CONDITION.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	02/27/20	CGW	CLARIFIED MATERIAL UNDER BARRIER FOR LONG AND SHORT PIN APPLICATIONS
1	10/31/19	SDD	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

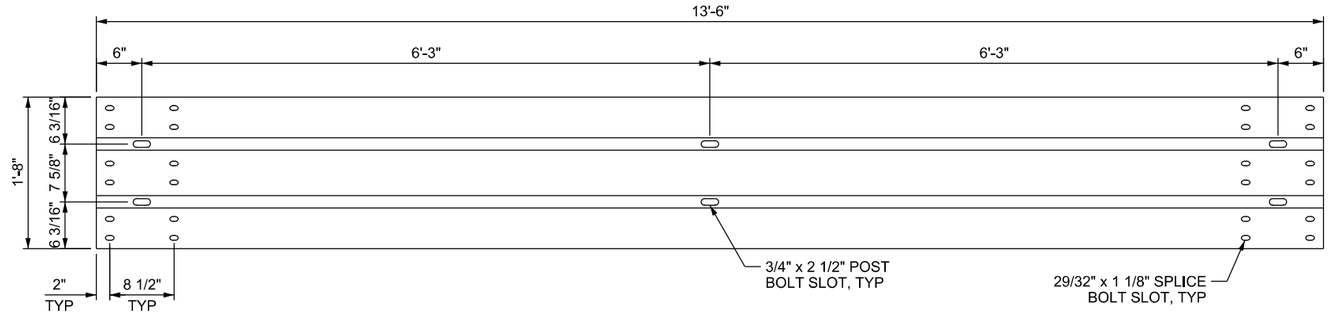
APPROVED
DEPUTY DIRECTOR

FREE STANDING BARRIER
F-SHAPE, CAST-IN-PLACE
BARRIER TRANSITION
2 OF 3

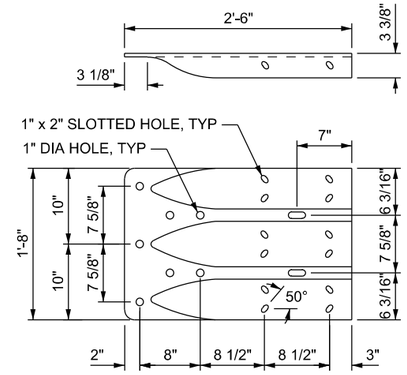
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1F3

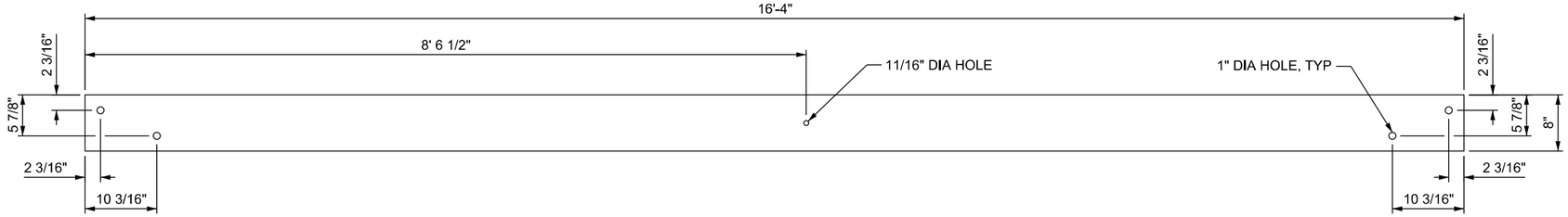
DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\AT_BA1\BA01F3.dgn
23-JUN-2020



2-SPACE THRIE-BEAM GUARDRAIL

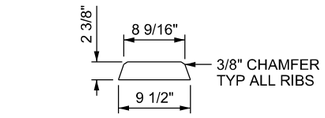


THRIE-BEAM TERMINAL CONNECTOR

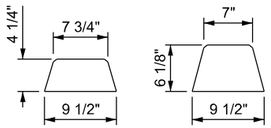


FIELD SIDE STRAP DETAIL

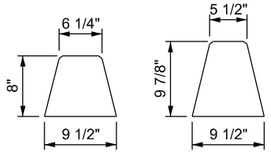
SEE NOTE 1



RIB 1



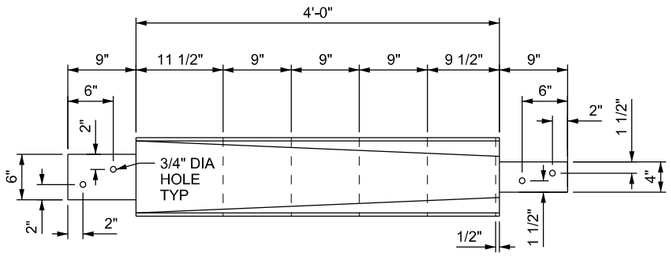
RIB 2 **RIB 3**



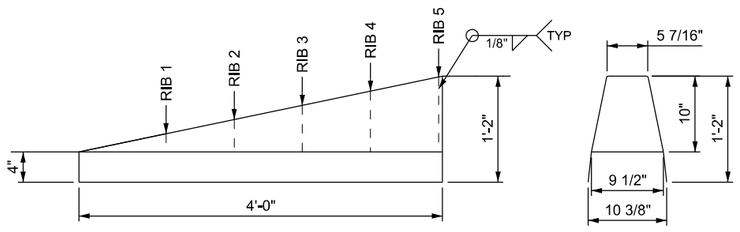
RIB 4 **RIB 5**

RIB DETAILS

SEE NOTE 3



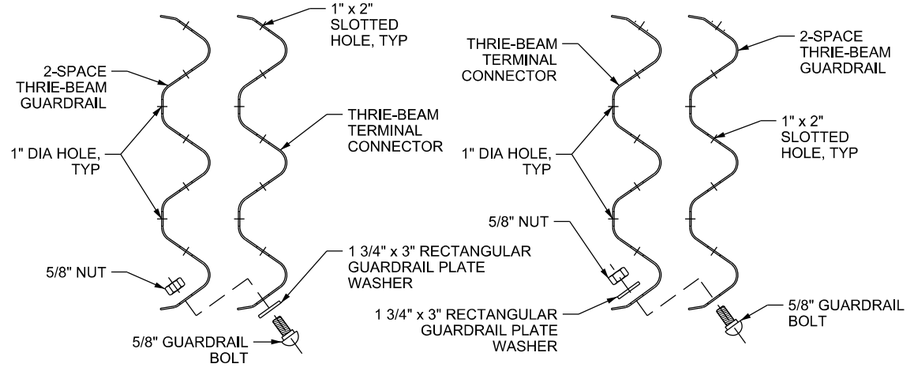
PLAN



ELEVATION **END VIEW**

TRANSITION CAP DETAIL

SEE NOTES 1 AND 2



UPSTREAM END **DOWNSTREAM END**

EXPANDED VIEW THRIE-BEAM TERMINAL CONNECTOR TO GUARDRAIL

NOTES:

1. USE 1/8 INCH THICK ASTM A 36 STEEL PLATE FOR THE TRANSITION CAP. USE 1/4 INCH THICK ASTM A 36 STEEL PLATE FOR FIELD SIDE STRAP. GALVANIZE ACCORDING TO AASHTO M 111 AFTER FABRICATION.
2. THE TOP, SIDES, AND CONNECTION TABS OF THE TRANSITION CAP MAY BE FABRICATED FROM SEPARATE PLATES AND WELDED TOGETHER AT THE JOINTS, A SINGLE BENT PLATE, OR A COMBINATION OF THE TWO. USE A MAXIMUM 1/4 INCH BEND RADIUS FOR TRANSITION CAPS FABRICATED FROM A SINGLE PLATE.
3. RIB PLATE DIMENSIONS ARE BEFORE FABRICATION OF CHAMFERS.
4. USE 10 GAUGE THRIE-BEAM TERMINAL CONNECTION ACCORDING TO TASK FORCE 13 REPORT, RTE01B.
5. USE 12 GAUGE 2-SPACE THRIE-BEAM GUARDRAIL ACCORDING TO TASK FORCE 13 REPORT, RTM02A.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/31/19	SDD	NEW DRAWNG.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

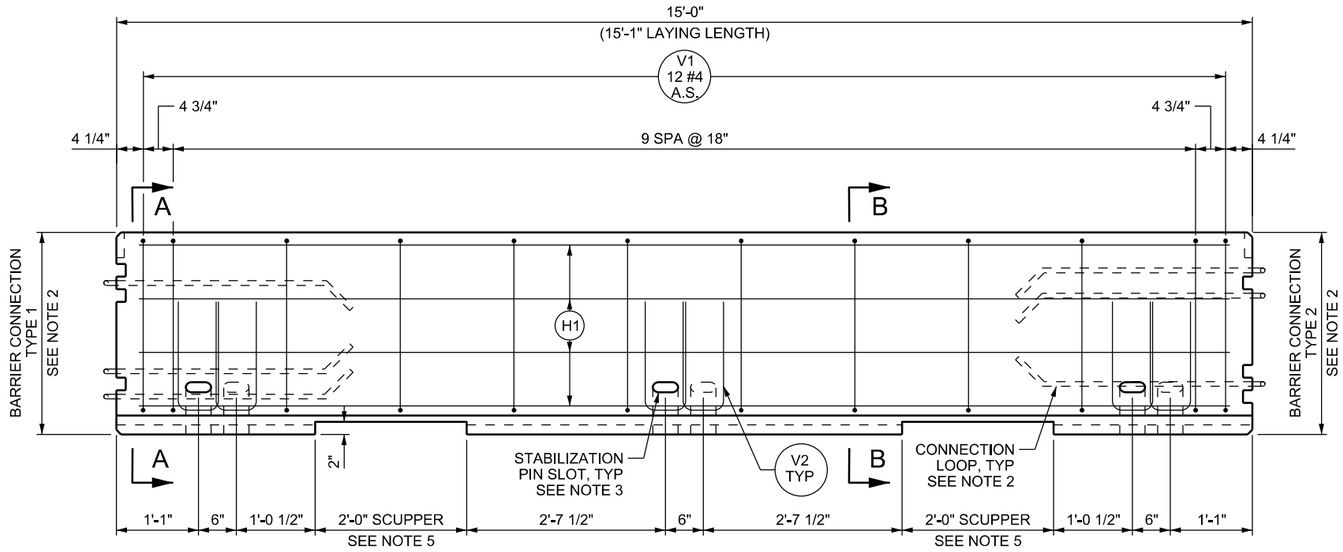
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

FREE STANDING BARRIER
F-SHAPE, CAST-IN-PLACE
BARRIER TRANSITION
3 OF 3

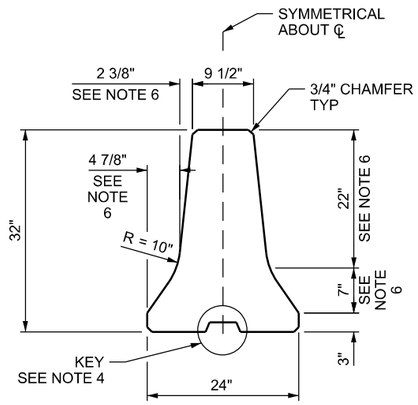
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 1F4

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 1\BA1\BA01F4.dgn
23-JUN-2020

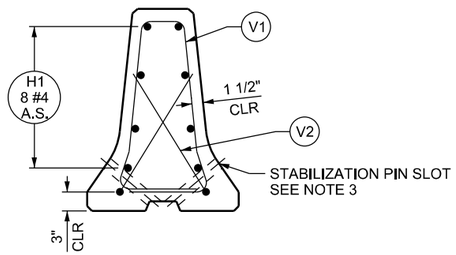


ELEVATION



SECTION A-A

DIMENSIONS



SECTION B-B

REINFORCING

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-6"
V1	#4	12	VERTICAL IN BARRIER TOTAL LENGTH = 6'-10"	6 3/8"; 10 3/4"; 6 1/2"; 1 1/2" R TYP; 10 3/4"; 1'-2 7/8"; 2'-3"
V2	#4	6	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10"; 6 3/8"; 1 1/2" R TYP

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
3. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
4. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
5. PROVIDE SCUPPERS WHEN SHOWN.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.
7. EACH BARRIER UNIT WEIGHTS 3.6 TONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

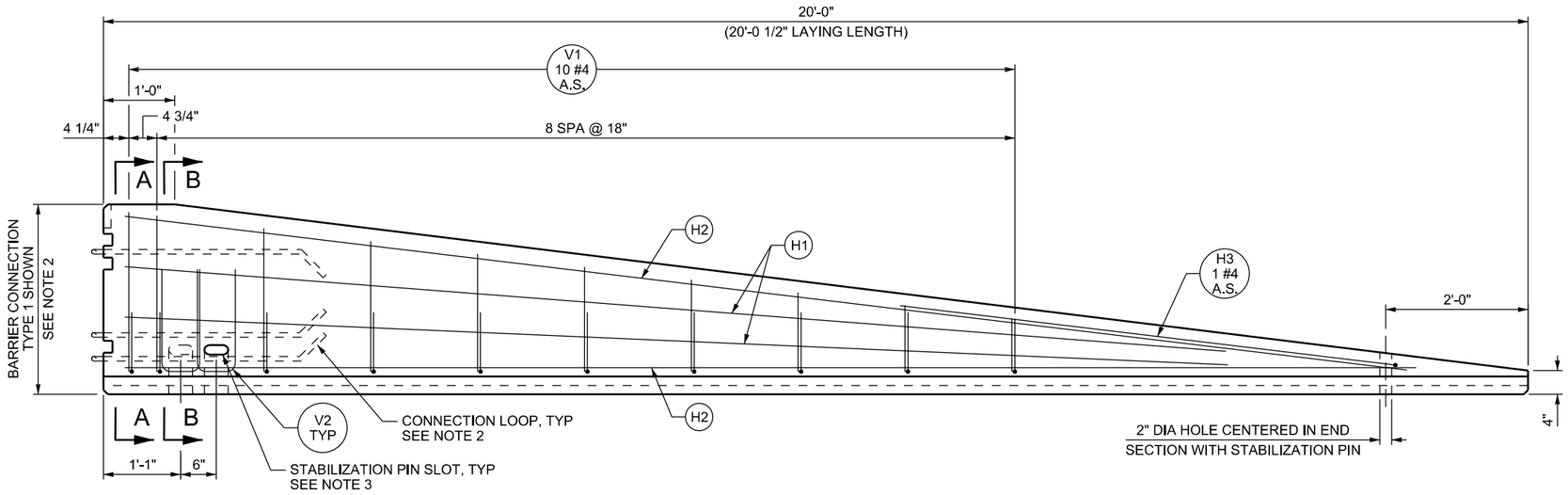
DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE

STANDARD DRAWING TITLE

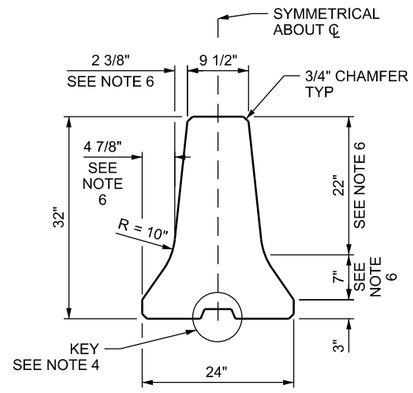
STD. DWG. NO.
BA 2A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA02A.dgn
23-JUN-2020

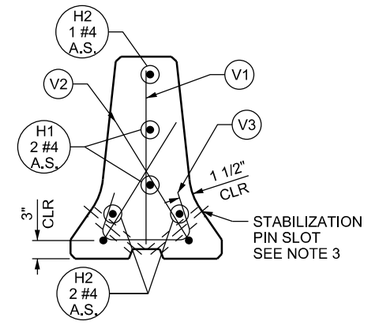


ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	2	HORIZONTAL IN BARRIER	13'-3"
H2	#4	3	HORIZONTAL IN BARRIER	19'-1
H3	#4	1	HORIZONTAL IN BARRIER TOTAL LENGTH = 15'-6"	7'-0", 85°, TYP, 1'-6"
V1	#4	10	VERTICAL IN BARRIER	L / QTY: 27" 2; 25" 1; 23" 1; 21" 1; 19" 1; 17" 1; 15" 1; 13" 1; 11" 1
V2	#4	2	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10", 6 3/8", 1 1/2" R TYP
V3	#4	10	VERTICAL IN BARRIER TOTAL LENGTH = 2'-8"	8 1/2", 10", 1 1/2" R TYP, 1'-2 7/8"



SECTION A-A
DIMENSIONS



SECTION B-B
REINFORCING

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
4. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
5. PROVIDE SCUPPERS WHEN SHOWN.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.
7. USE SLOPED END SECTION AS ALLOWED ON STD DWG BA 1D.
8. USE PERMITTED IN WORK ZONES WHEN SPEED IS 40 MPH OR LESS BEFORE THE START OF THE CONSTRUCTION PROJECT.
9. EACH BARRIER UNIT WEIGHS 3.0 TONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE SLOPED END SECTION (FOR SPEEDS ≤ 40 MPH)

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2B

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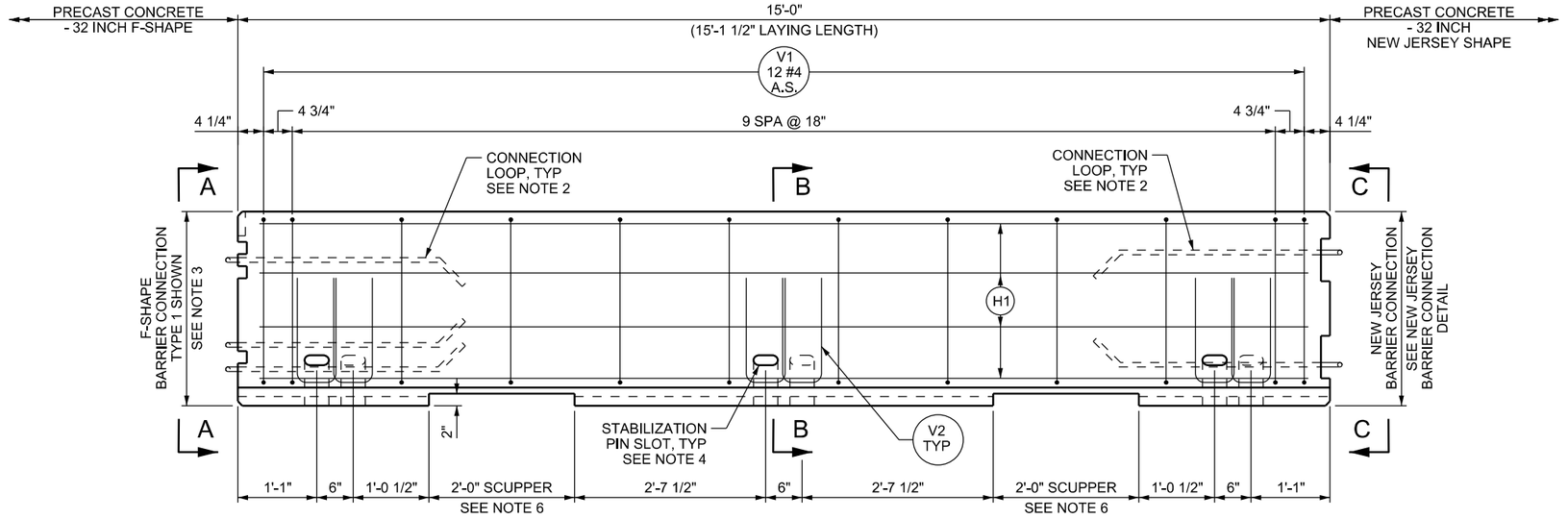
23-JUN-2020



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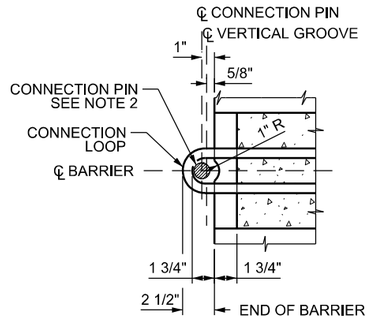
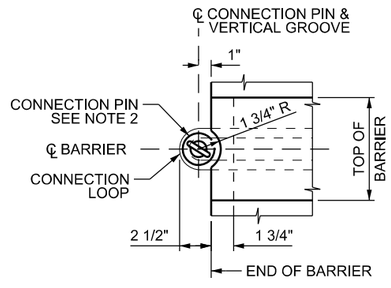


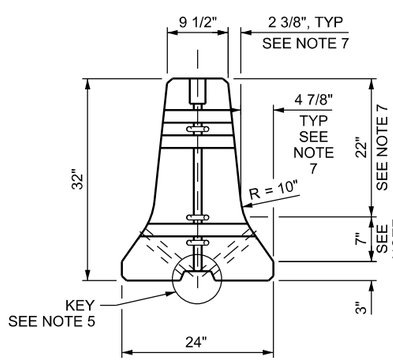
LOOP PLACEMENT



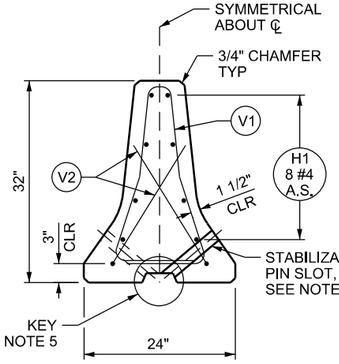
PIN ACCESS

NEW JERSEY BARRIER CONNECTION DETAIL

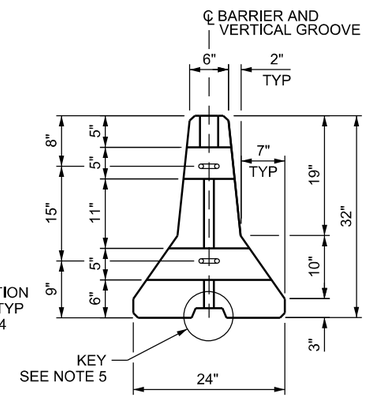
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-6"
V1	#4	12	VERTICAL IN BARRIER TOTAL LENGTH = 6'-8"	9 1/2", 3 3/4", 7", 1 1/2" R TYP, 10 3/4", 1'-2 7/8", 2'-3"
V2	#4	6	VERTICAL BAR AROUND SLOTS TOTAL LENGTH = 4'-0"	1'-10", 6 3/8", 1 1/2" R TYP



VIEW A-A
F-SHAPE BARRIER END



SECTION B-B



VIEW C-C
NEW JERSEY BARRIER END

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP AND CONNECTION PIN DETAILS.
3. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER. SEE STD DWG BA 1A2.
4. SEE "F-SHAPE BARRIER STABILIZATION PIN DETAILS" ON STD DWG BA 1A2 FOR DETAILS.
5. SEE "KEY DETAIL" ON STD DWG BA 1A2 FOR DETAILS.
6. PROVIDE SCUPPERS WHEN SHOWN.
7. MEASURED TO INTERSECTION OF BARRIER SLOPES.
8. USE WITH PRECAST CONCRETE BARRIER AND CAST-IN-PLACE BARRIER.
9. EACH BARRIER UNIT WEIGHS 3.4 TONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

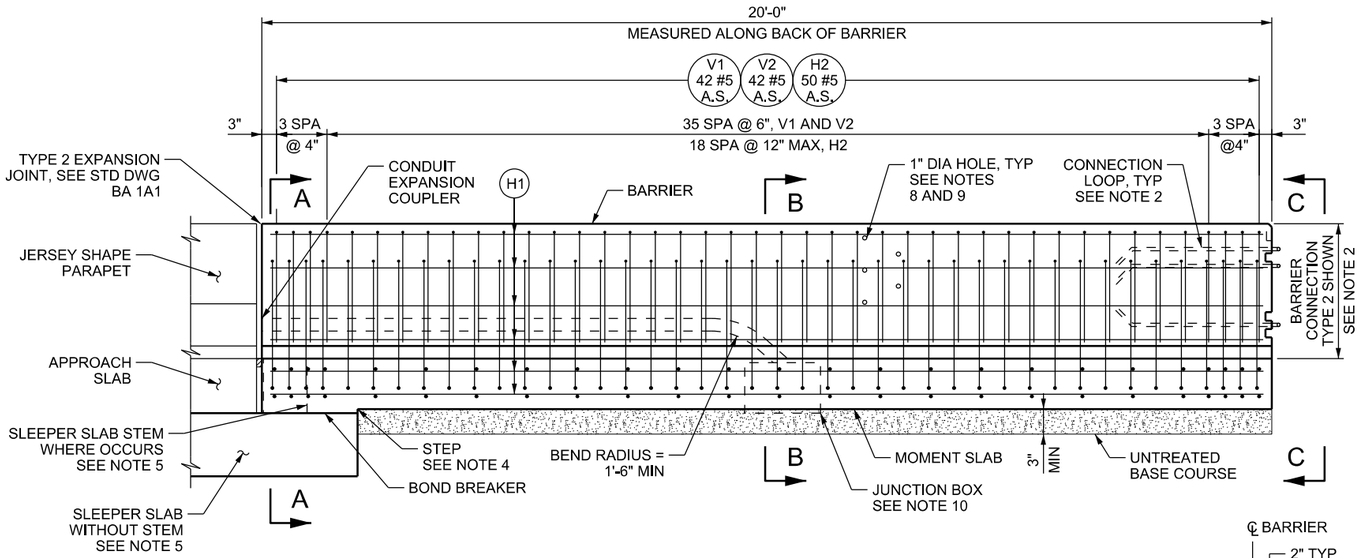
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

PRECAST CONCRETE BARRIER - 32 INCH F-SHAPE, NEW JERSEY SHAPE TRANSITION

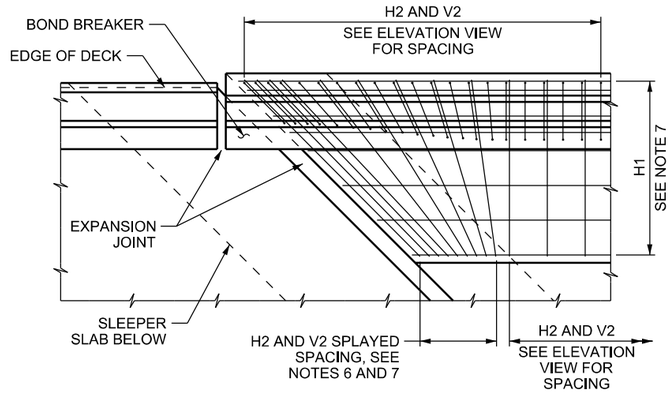
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2C

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA02C.dgn
23-JUN-2020



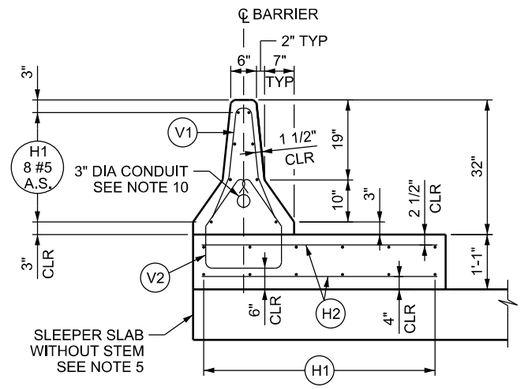
ELEVATION



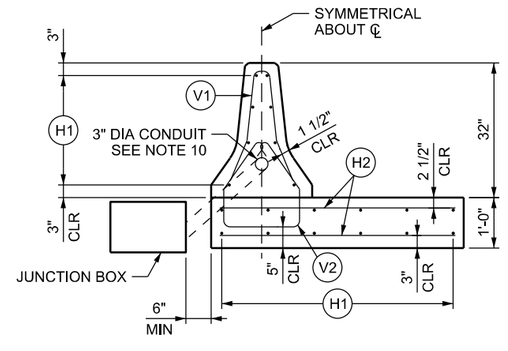
PARTIAL PLAN AT TYPICAL SKEWED APPROACH SLAB

BARRIER REINFORCEMENT NOT SHOWN FOR CLARITY
BRIDGE SKEW OF 45 DEGREES SHOWN, SEE NOTES 6 AND 7
DO NOT SPLAY BARRIER REINFORCEMENT

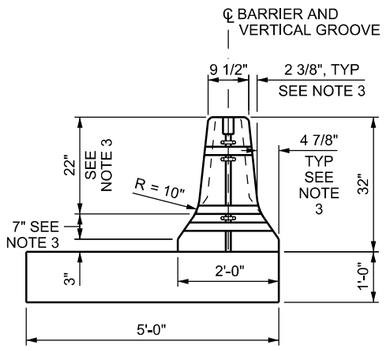
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	20	HORIZONTAL IN BARRIER AND LONGITUDINAL IN MOMENT SLAB	19'-6" SEE NOTE 7
H2	#5	50	TRANSVERSE IN MOMENT SLAB	4'-8" SEE NOTE 7
V1	#5	42	VERTICAL IN BARRIER	W: 3 3/4", *5 3/4" — QTY: 34, 8; 9 1/2", 7", W, 1'-2 7/8", 2'-3"; * PLACE AT F-SHAPED END
V2	#5	42	VERTICAL IN MOMENT SLAB	10", 1'-2", 1'-6", 180° STD HOOK, TYP, 145° TYP; TOTAL LENGTH = 6'-8"



SECTION A-A



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP AND CONNECTION PIN DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. MEASURED TO INTERSECTION OF BARRIER SLOPES.
4. STEP BOTTOM OF MOMENT SLAB AT A 45° ANGLE TO MATCH TOP OF SLEEPER SLAB.
5. OMIT THE CONFLICTING MOMENT SLAB AND BUNDLE DISPLACED H2 AND V2 BARS WITH NEAREST BARS IF SLEEPER SLAB STEM IS PRESENT. USE TWO BARS MAX PER BUNDLE. PLACE BOND BREAKER BETWEEN TOP OF STEM OR DECK AND BARRIER.
6. SPLAY H2 BARS WHEN MOMENT SLAB MEETS SKEWED APPROACH OR SLEEPER SLAB. USE SPACING OF 3 INCH MINIMUM AND 18 INCH MAXIMUM TO ACCOMMODATE VARYING SKEWS.
7. H1 AND H2 BAR LENGTHS PROVIDED ARE BASED UPON A MOMENT SLAB WITH NO SKEW. INCREASE OR DECREASE H1 AND H2 BAR LENGTHS AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT END OF BAR.
8. SEE STD DWG BA 1F2, BA 1F3, AND BA 1F4 FOR THRIE-BEAM CONNECTION LOCATION AND REQUIREMENTS.
9. CORE DRILL 1 INCH DIAMETER HOLE. DO NOT USE A ROTARY PERCUSSION DRILL.
10. FIELD VERIFY CONDUIT IN EXISTING PARAPET AND ADJUST CONDUIT SIZE AND QUANTITY IN TRANSITION AS NEEDED. CONDUIT TO EXIT BARRIER AT APPROXIMATELY MID-POINT OF TRANSITION AND TERMINATE IN JUNCTION BOX AS SHOWN.

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

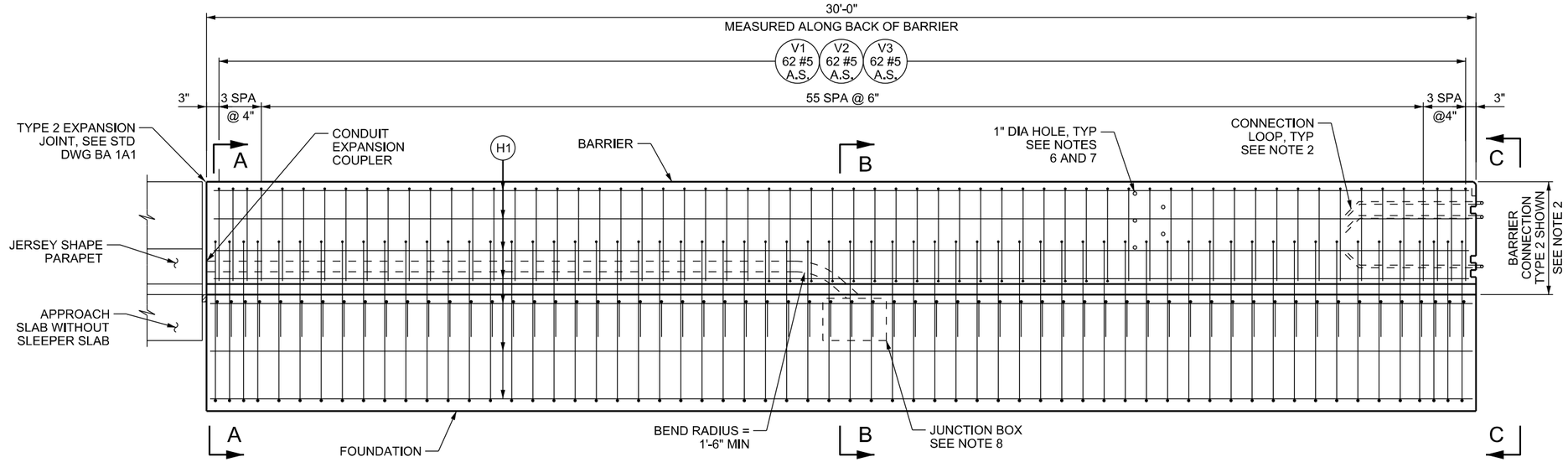
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

JERSEY SHAPE TO F-SHAPE TRANSITION - WITH MOMENT SLAB

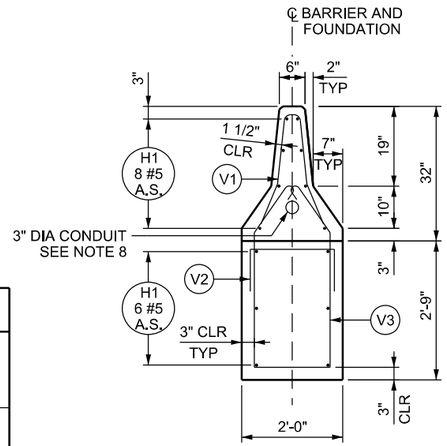
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2C1A

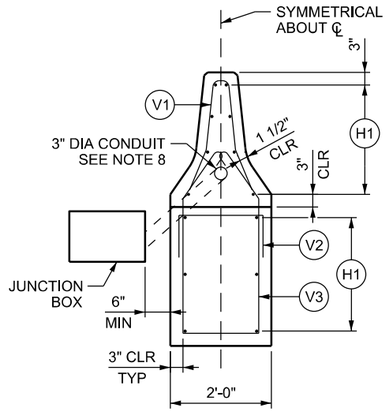
DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA02C1A.dgn
23-JUN-2020



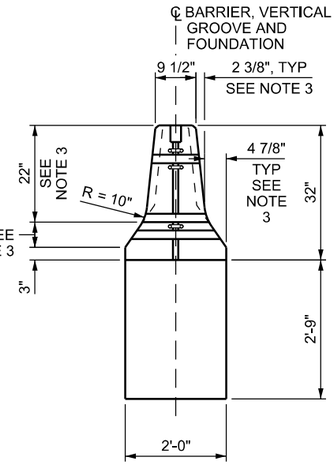
ELEVATION



SECTION A-A

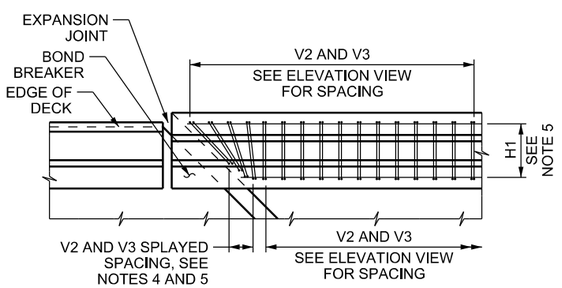


SECTION B-B



VIEW C-C

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	14	HORIZONTAL IN BARRIER AND LONGITUDINAL IN FOUNDATION	29'-6" SEE NOTE 5
V1	#5	62	VERTICAL IN BARRIER	W: 3 3/4" QTY 34; *5 3/4" QTY 8. 9 1/2", 7", W, 1'-2 7/8", 2'-3". * PLACE AT F-SHAPED END
V2	#5	62	VERTICAL IN FOUNDATION TOTAL LENGTH = 3'-2"	1'-6", 10"
V3	#5	62	VERTICAL IN FOUNDATION TOTAL LENGTH = 10'-4"	2'-8", 1'-2", 145° TYP, 180° STD HOOK, TYP, 1'-6"



PARTIAL PLAN AT TYPICAL SKEWED APPROACH SLAB

BARRIER REINFORCEMENT NOT SHOWN FOR CLARITY
BRIDGE SKEW OF 45 DEGREES SHOWN, SEE NOTES 4 AND 5
DO NOT SPLAY BARRIER REINFORCEMENT

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP AND CONNECTION PIN DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. MEASURED TO INTERSECTION OF BARRIER SLOPES.
4. SPLAY V2 AND V3 BARS WHEN FOUNDATION MEETS SKEWED APPROACH SLAB. USE SPACING OF 3 INCH MINIMUM AND 9 INCH MAXIMUM TO ACCOMMODATE VARYING SKEWS.
5. H1 BAR LENGTHS PROVIDED ARE BASED ON A FOUNDATION WITH NO SKEW. INCREASE OR DECREASE H1 BAR LENGTH AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT ENDS OF BAR.
6. SEE STD DWG BA 1F2, BA 1F3, AND BA 1F4 FOR THRIE-BEAM CONNECTION LOCATION AND REQUIREMENTS.
7. CORE DRILL 1 INCH DIAMETER HOLE. DO NOT USE A ROTARY PERCUSSION DRILL.
8. FIELD VERIFY CONDUIT IN EXISTING PARAPET AND ADJUST CONDUIT SIZE AND QUANTITY IN TRANSITION AS NEEDED. CONDUIT TO EXIT BARRIER AT APPROXIMATELY MID-POINT OF TRANSITION AND TERMINATE IN JUNCTION BOX AS SHOWN.

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWING.

REVISIONS

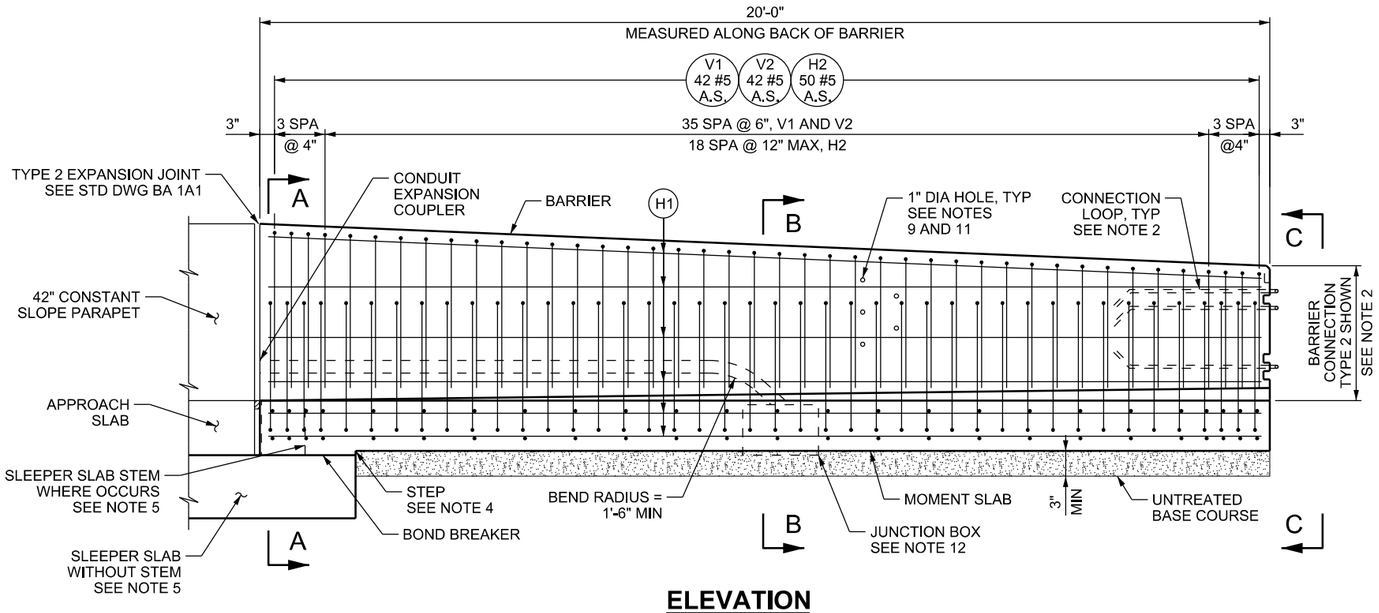
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

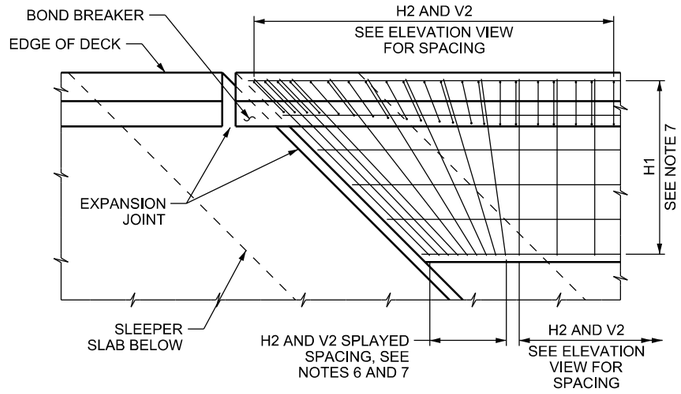
STANDARD DRAWING TITLE
JERSEY SHAPE TO F-SHAPE TRANSITION - WITH BEAM FOUNDATION

STD. DWG. NO.
BA 2C1B

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA02C1B.dgn
23-JUN-2020

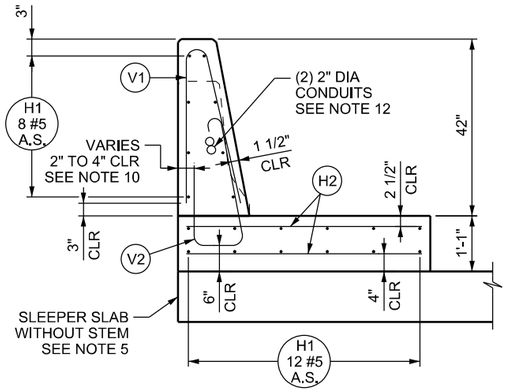


ELEVATION

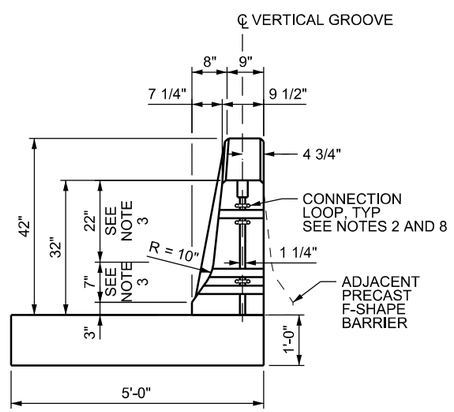


PARTIAL PLAN AT TYPICL SKEWED APPROACH SLAB

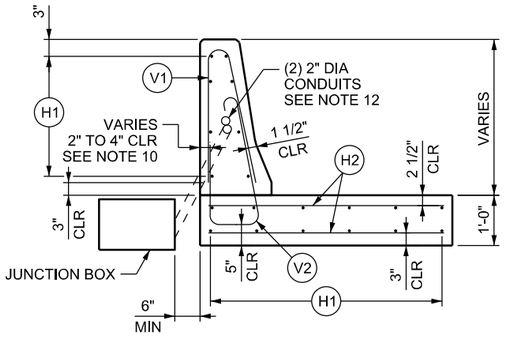
BARRIER REINFORCEMENT NOT SHOWN FOR CLARITY
BRIDGE SKEW OF 45 DEGREES SHOWN, SEE NOTES 6 AND 7
DO NOT SPLAY BARRIER REINFORCEMENT



SECTION A-A



VIEW C-C



SECTION B-B

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	20	HORIZONTAL IN BARRIER AND LONGITUDINAL IN MOMENT SLAB	19'-6" SEE NOTE 7
H2	#5	50	TRANSVERSE IN MOMENT SLAB	4'-8" SEE NOTE 7
V1	#5	42	VERTICAL IN BARRIER	H / W / QTY: 36 1/2" / 13" / 2; 36" / 13" / 2; 35 1/2" / 12 1/2" / 2; 35" / 12 1/2" / 2; 34 1/2" / 12 1/2" / 2; 34" / 12" / 2; 33 1/2" / 12" / 2; 33" / 12" / 2; 32 1/2" / 12" / 2; 32" / 11 1/2" / 2; 31 1/2" / 11 1/2" / 2; 31" / 11 1/2" / 2; 30 1/2" / 11" / 2; 30" / 11" / 2; 29 1/2" / 11" / 2; 29" / 10 1/2" / 2; 28 1/2" / 10 1/2" / 2; 28" / 10 1/2" / 2; 27 1/2" / 10 1/2" / 2; 27" / 10" / 2; 26 1/2" / 10" / 2 — 1 7/8" R, H, 90°, W
V2	#5	42	VERTICAL IN MOMENT SLAB TOTAL LENGTH = 5'-9"	180° STD HOOK, 1'-6", 79°, 1'-0", 2'-8"

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP AND CONNECTION PIN DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. MEASURED TO INTERSECTION OF BARRIER SLOPES.
4. STEP BOTTOM OF MOMENT SLAB AT A 45° ANGLE TO MATCH TOP OF SLEEPER SLAB.
5. OMIT THE CONFLICTING MOMENT SLAB AND BUNDLE DISPLACED H2 AND V2 BARS WITH THE NEAREST BARS IF SLEEPER SLAB STEM IS PRESENT. USE TWO BARS MAX PER BUNDLE. PLACE BOND BREAKER BETWEEN TOP OF STEM OR DECK AND BARRIER.
6. SPLAY H2 BARS WHEN MOMENT SLAB MEETS SKEWED APPROACH OR SLEEPER SLAB. USE SPACING OF 3 INCH MINIMUM AND 18 INCH MAXIMUM TO ACCOMMODATE VARYING SKEWS.
7. H1 AND H2 BAR LENGTHS PROVIDED ARE BASED UPON A MOMENT SLAB WITH NO SKEW. INCREASE OR DECREASE H1 AND H2 BAR LENGTHS AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT END OF BAR.
8. FIELD TRIM OR BEND HOOKS OF V2 BARS THAT ARE IN CONFLICT WITH CONNECTION LOOPS.
9. SEE STD DWG BA 1F2, BA 1F3, AND BA 1F4 FOR THRIE-BEAM CONNECTION LOCATION AND REQUIREMENTS.
10. ALIGN V2 BAR WITH V1 BAR NEAR SLOPED FACE OF BARRIER AS FACE OF BARRIER TRANSITIONS.
11. CORE DRILL 1 INCH DIAMETER HOLE. DO NOT USE A ROTARY PERCUSSION DRILL.
12. FIELD VERIFY CONDUIT IN EXISTING PARAPET AND ADJUST CONDUIT SIZE AND QUANTITY IN TRANSITION AS NEEDED. CONDUIT TO EXIT BARRIER AT APPROXIMATELY MID-POINT OF TRANSITION AND TERMINATE IN JUNCTION BOX AS SHOWN.

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

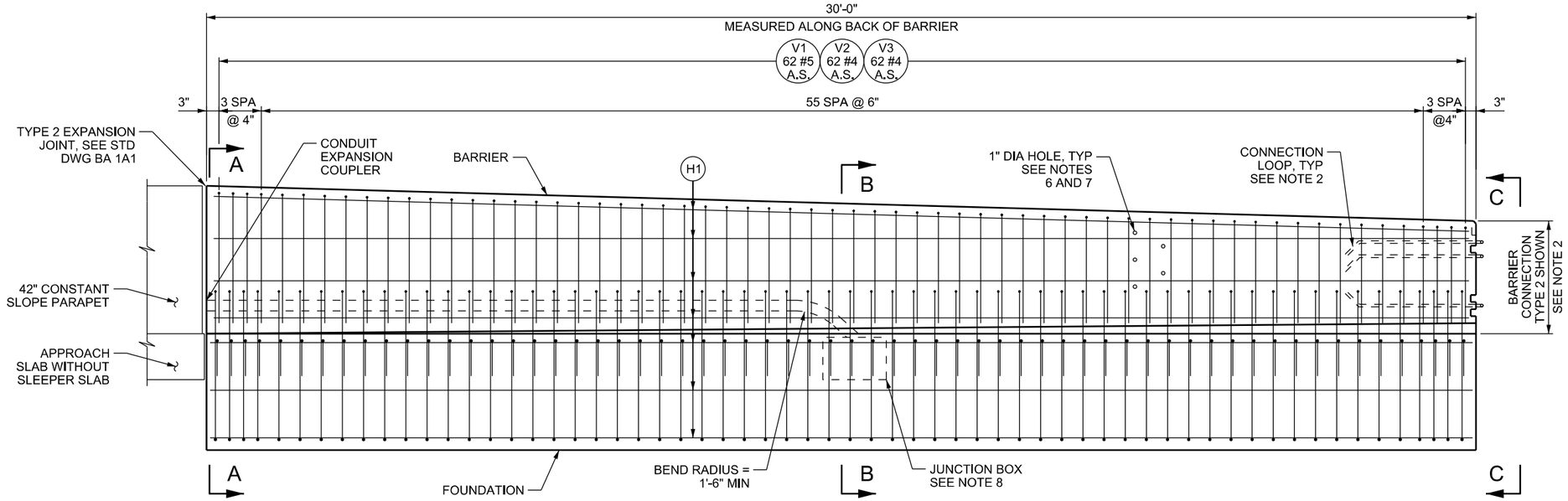
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

42 INCH CONSTANT SLOPE PARAPET, 32 INCH F-SHAPE BARRIER TRANSITION - WITH MOMENT SLAB

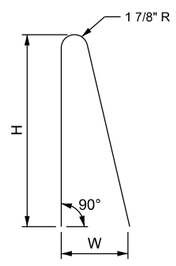
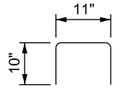
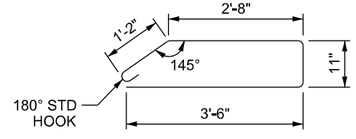
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 2C2A

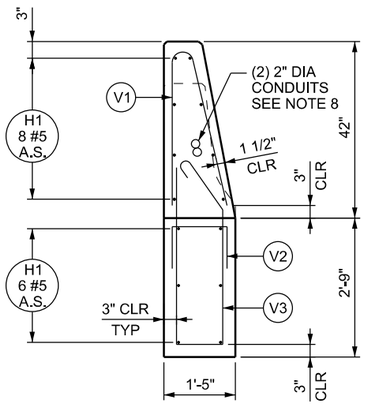
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA2C2A.dgn
23-JUN-2020



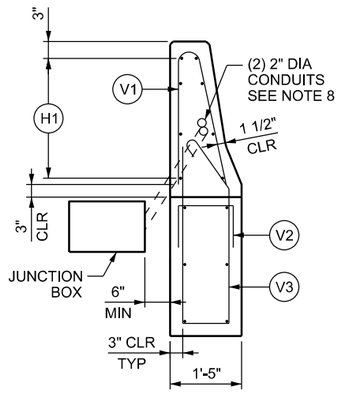
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	14	HORIZONTAL IN BARRIER AND LONGITUDINAL IN FOUNDATION	29'-6" SEE NOTE 5
V1	#5	62	VERTICAL IN BARRIER	
V2	#5	62	VERTICAL IN FOUNDATION TOTAL LENGTH = 2'-7"	
V3	#5	62	VERTICAL IN FOUNDATION TOTAL LENGTH = 8'-10"	

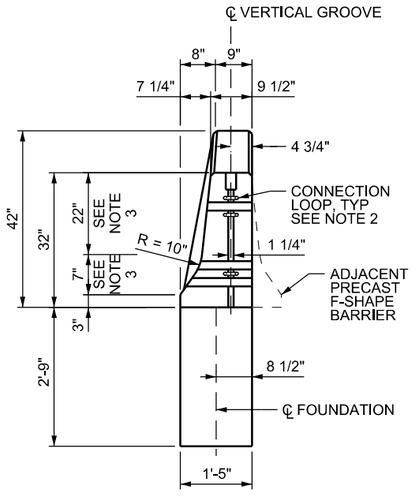
H	W	QTY
36 1/2"	13"	2
36"	13"	4
35 1/2"	12 1/2"	3
35"	12 1/2"	3
34 1/2"	12 1/2"	3
34"	12"	3
33 1/2"	12"	3
33"	12"	3
32 1/2"	12"	3
32"	11 1/2"	3
31 1/2"	11 1/2"	3
31"	11 1/2"	3
30 1/2"	11"	3
30"	11"	3
29 1/2"	11"	3
29"	10 1/2"	3
28 1/2"	10 1/2"	3
28"	10 1/2"	3
27 1/2"	10 1/2"	3
27"	10"	3
26 1/2"	10"	2



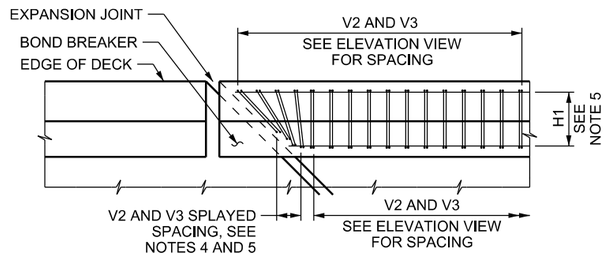
SECTION A-A



SECTION B-B



VIEW C-C



PARTIAL PLAN AT TYPICAL SKEWED APPROACH SLAB

BARRIER REINFORCEMENT NOT SHOWN FOR CLARITY
BRIDGE SKEW OF 45 DEGREES SHOWN, SEE NOTES 4 AND 5
DO NOT SPLAY BARRIER REINFORCEMENT

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR F-SHAPE CONNECTION LOOP AND CONNECTION PIN DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. MEASURED TO INTERSECTION OF BARRIER SLOPES.
4. SPLAY V2 AND V3 BARS WHEN FOUNDATION MEETS SKEWED APPROACH SLAB. USE SPACING OF 3 INCH MINIMUM AND 9 INCH MAXIMUM TO ACCOMMODATE VARYING SKEWS.
5. H1 BAR LENGTHS PROVIDED ARE BASED ON A FOUNDATION WITH NO SKEW. INCREASE OR DECREASE H1 BAR LENGTH AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT ENDS OF BAR.
6. SEE STD DWG BA 1F2, BA 1F3, AND BA 1F4 FOR THRIE-BEAM CONNECTION LOCATION AND REQUIREMENTS.
7. CORE DRILL 1 INCH DIAMETER HOLE. DO NOT USE A ROTARY PERCUSSION DRILL.
8. FIELD VERIFY CONDUIT IN EXISTING PARAPET AND ADJUST CONDUIT SIZE AND QUANTITY IN TRANSITION AS NEEDED. CONDUIT TO EXIT BARRIER AT APPROXIMATELY MID-POINT OF TRANSITION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
42 INCH CONSTANT SLOPE PARAPET, 32 INCH F-SHAPE BARRIER TRANSITION - WITH BEAM FOUNDATION

STD. DWG. NO.
BA 2C2B

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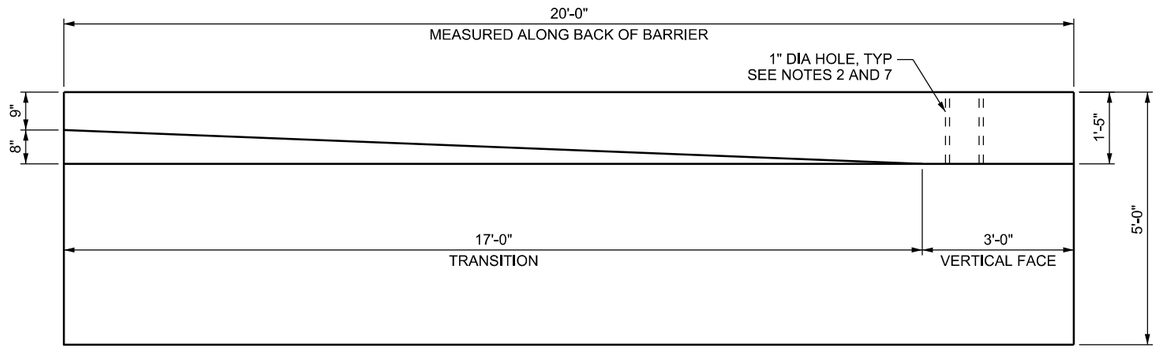
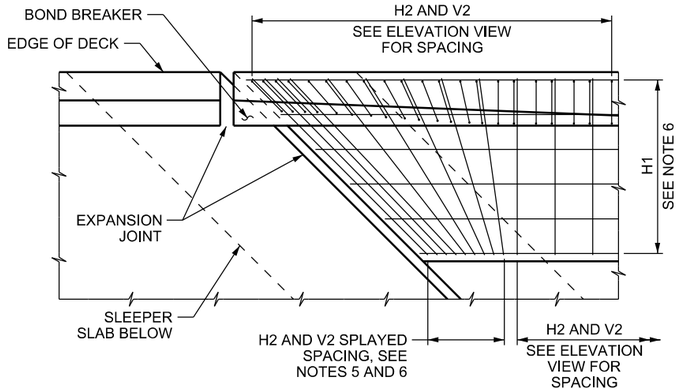
23-JUN-2020



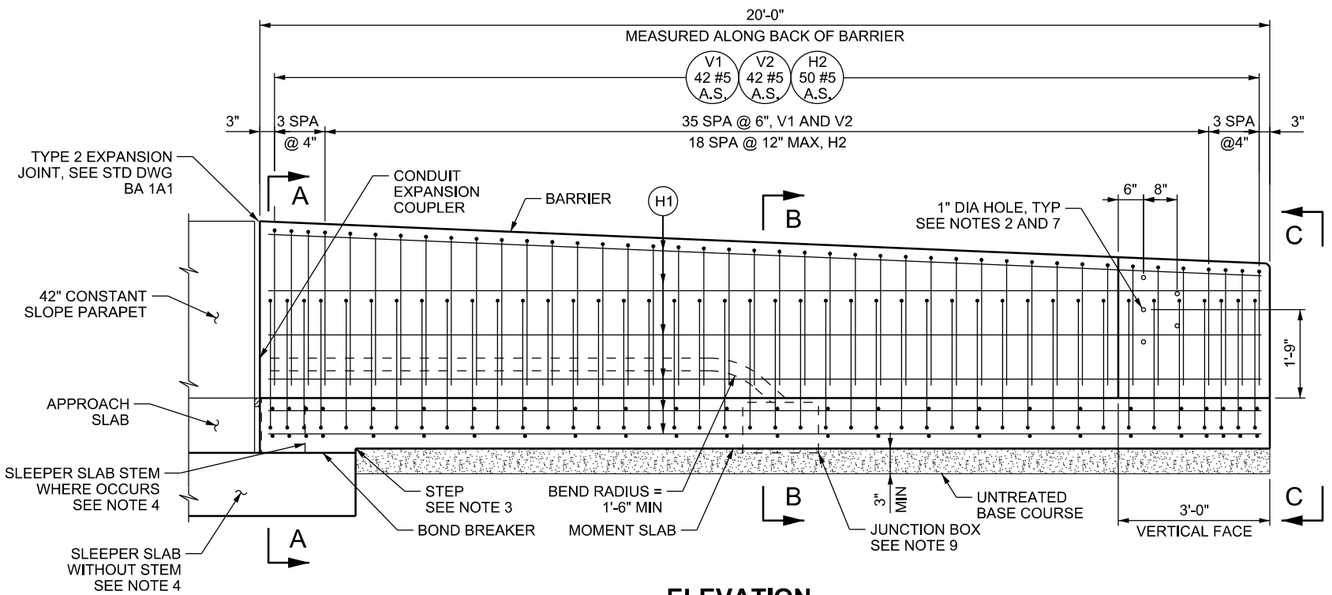
PLAN

REINFORCING STEEL NOT SHOWN FOR CLARITY



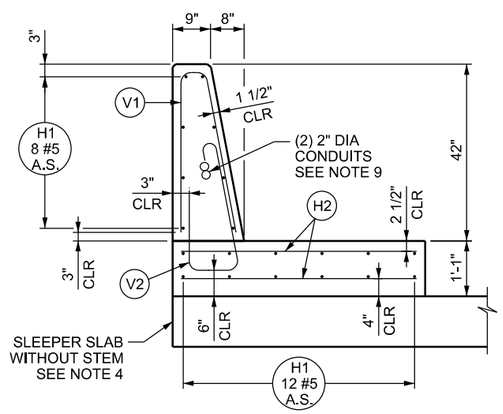
PARTIAL PLAN AT TYPICAL SKEWED APPROACH SLAB

BARRIER REINFORCEMENT NOT SHOWN FOR CLARITY
BRIDGE SKEW OF 45 DEGREES SHOWN, SEE NOTES 5 AND 6
DO NOT SPLAY BARRIER REINFORCEMENT



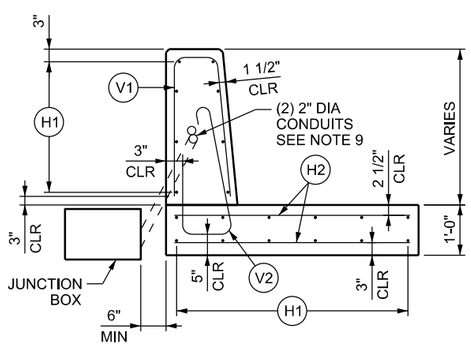
ELEVATION

SEE NOTE 8



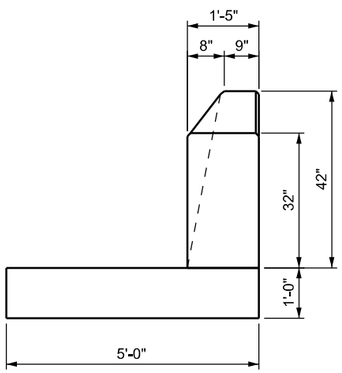
SECTION A-A

SEE NOTE 8



SECTION B-B

SEE NOTE 8



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE. DO NOT USE A ROTARY PERCUSSION DRILL.
3. STEP BOTTOM OF MOMENT SLAB AT A 45° ANGLE TO MATCH TOP OF SLEEPER SLAB.
4. OMIT THE CONFLICTING MOMENT SLAB AND BUNDLE DISPLACED H2 AND V2 BARS WITH THE NEAREST BARS IF SLEEPER SLAB STEM IS PRESENT. USE TWO BARS MAX PER BUNDLE. PLACE BOND BREAKER BETWEEN TOP OF STEM OR DECK AND BARRIER.
5. SPLAY H2 BARS WHEN MOMENT SLAB MEETS SKEWED APPROACH OR SLEEPER SLAB. USE SPACING OF 3 INCH MINIMUM AND 18 INCH MAXIMUM TO ACCOMMODATE VARYING SKEWS.
6. H1 AND H2 BAR LENGTHS PROVIDED ARE BASED UPON A MOMENT SLAB WITH NO SKEW. INCREASE OR DECREASE H1 AND H2 BAR LENGTHS AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT END OF BAR.
7. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
8. SEE STD DWG BA 2C3C FOR REINFORCING STEEL SCHEDULE.
9. FIELD VERIFY CONDUIT IN EXISTING PARAPET AND ADJUST CONDUIT SIZE AND QUANTITY IN TRANSITION AS NEEDED. CONDUIT TO EXIT BARRIER AT APPROXIMATELY MID-POINT OF TRANSITION AND TERMINATE IN JUNCTION BOX AS SHOWN.

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

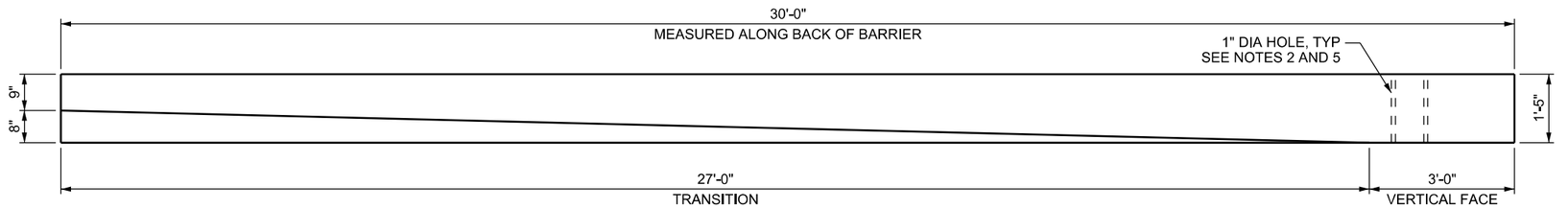
42 INCH CONSTANT SLOPE PARAPET, THRIE-BEAM TRANSITION WITH MOMENT SLAB

STANDARD DRAWING TITLE

STD. DWG. NO.

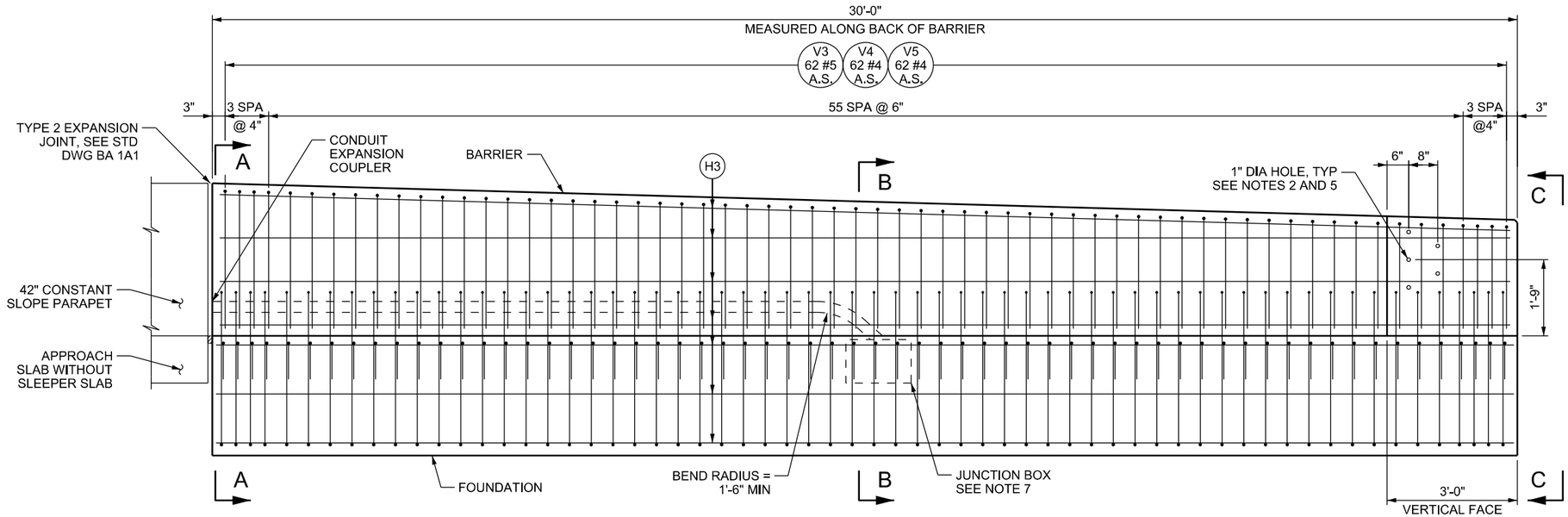
BA 2C3A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA02C3A.dgn
23-JUN-2020



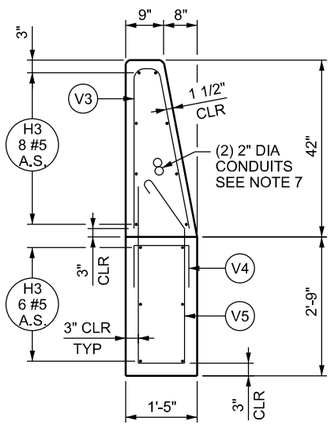
PLAN

REINFORCING STEEL NOT SHOWN FOR CLARITY



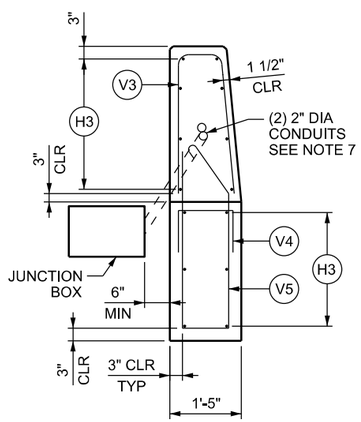
ELEVATION

SEE NOTE 6



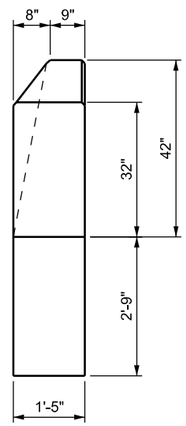
SECTION A-A

SEE NOTE 6

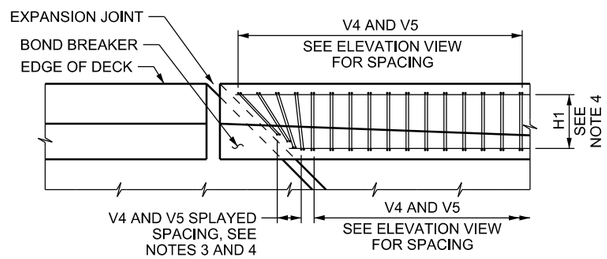


SECTION B-B

SEE NOTE 6



VIEW C-C



PARTIAL PLAN AT TYPICAL SKEWED APPROACH SLAB

BARRIER REINFORCEMENT NOT SHOWN FOR CLARITY
BRIDGE SKEW OF 45 DEGREES SHOWN, SEE NOTES 3 AND 4
DO NOT SPLAY BARRIER REINFORCEMENT

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE. DO NOT USE A ROTARY PERCUSSION DRILL.
3. SPLAY V4 AND V5 BARS WHEN FOUNDATION MEETS SKEWED APPROACH SLAB. USE SPACING OF 3 INCH MINIMUM AND 9 INCH MAXIMUM TO ACCOMMODATE VARYING SKEWS.
4. H3 BAR LENGTHS PROVIDED ARE BASED ON A FOUNDATION WITH NO SKEW. INCREASE OR DECREASE H3 BAR LENGTH AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT ENDS OF BAR.
5. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
6. SEE STD DWG BA 2C3C FOR REINFORCING STEEL SCHEDULE.
7. FIELD VERIFY CONDUIT IN EXISTING PARAPET AND ADJUST CONDUIT SIZE AND QUANTITY IN TRANSITION AS NEEDED. CONDUIT TO EXIT BARRIER AT APPROXIMATELY MID-POINT OF TRANSITION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
42 INCH CONSTANT SLOPE PARAPET, THRIE-BEAM TRANSITION WITH BEAM FOUNDATION

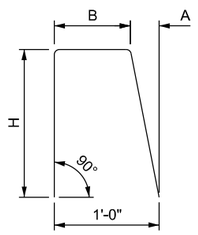
STD. DWG. NO.
BA 2C3B

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA02C3B.dgn
23-JUN-2020

42 INCH CONSTANT SLOPE PARAPET, THRIE-BEAM TRANSITION WITH MOMENT SLAB

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	20	HORIZONTAL IN BARRIER AND LONGITUDINAL IN MOMENT SLAB	19'-6" SEE NOTE 2
H2	#5	50	TRANSVERSE IN MOMENT SLAB	4'-8" SEE NOTE 2
V1	#5	42	VERTICAL IN BARRIER	* VARIES WITH H
V2	#5	42	VERTICAL IN MOMENT SLAB TOTAL LENGTH = 5'-9"	180° STD HOOK, 1'-6", 79°, 1'-0", 2'-8"

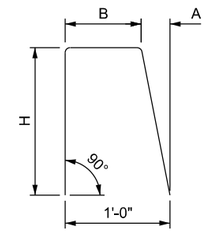
H	A	B	QTY
36"	7"	5"	4
35"	6"	6"	3
34"	6"	6"	4
33"	5"	7"	4
32"	4"	8"	4
31"	3"	9"	4
30"	2"	10"	4
29"	1"	11"	4
28"	1"	11"	3
27"	0"	12"	8



42 INCH CONSTANT SLOPE PARAPET, THRIE-BEAM TRANSITION WITH BEAM FOUNDATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H3	#5	14	HORIZONTAL IN BARRIER AND LONGITUDINAL IN FOUNDATION	29'-6" SEE NOTE 2
V3	#5	62	VERTICAL IN BARRIER	* VARIES WITH H
V4	#5	62	VERTICAL IN FOUNDATION TOTAL LENGTH = 2'-7"	11", 10"
V5	#5	62	VERTICAL IN FOUNDATION TOTAL LENGTH = 8'-10"	3'-6", 180° STD HOOK, TYP, 169°, TYP, 90°, TYP, 11", 1'-2", 2'-8"

H	A	B	QTY
36"	7"	5"	4
35"	7"	5"	6
34"	6"	6"	6
33"	5"	7"	6
32"	4"	8"	6
31"	3"	9"	6
30"	3"	9"	6
29"	2"	10"	6
28"	1"	11"	8
27"	0"	12"	8



NOTES

1. SEE STD DWG BA 2C3A AND BA 2C3B FOR REINFORCING STEEL LOCATION.
2. H1, H2, AND H3 BAR LENGTHS PROVIDED ARE BASED UPON A MOMENT SLAB FOUNDATION WITH NO SKEW. INCREASE OR DECREASE H1, H2, AND H3 BARS LENGTHS AS NEEDED TO PROVIDE 2 INCH CLEAR COVER AT END OF BAR.

REVISIONS

NO.	DATE	SDD	REMARKS
1	04/30/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

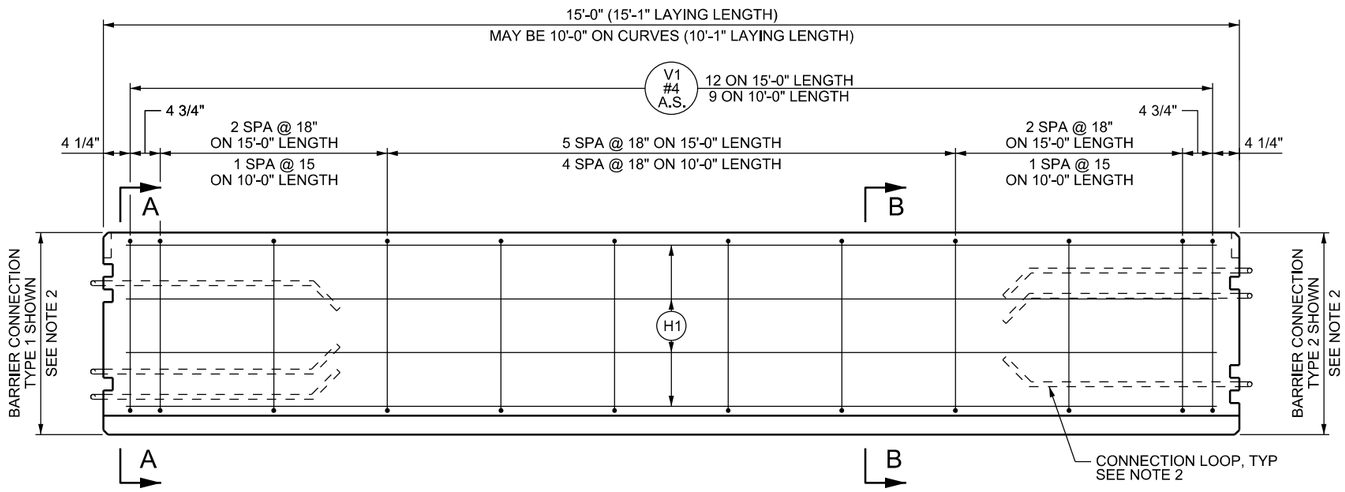
42 INCH CONSTANT SLOPE PARAPET, THRIE-BEAM TRANSITION REINFORCING STEEL

STANDARD DRAWING TITLE

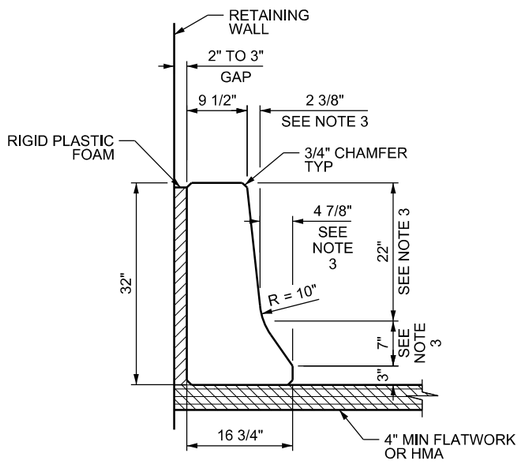
STD. DWG. NO.

BA 2C3C

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA02C3C.dgn

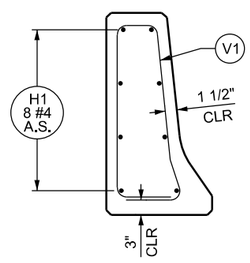


ELEVATION



SECTION A-A

DIMENSIONS



SECTION B-B

REINFORCING

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	8	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	14'-6" (ON 15'-0") 9'-6" (ON 10'-0")
V1	#4	12 (ON 15'-0" LENGTH) 9 (ON 10'-0" LENGTH)	VERTICAL IN BARRIER TOTAL LENGTH = 6' 3 1/2"	6 3/8", 8 5/8", 1 1/2" R, TYP, 10 1/4", 6 1/2", 27", 7 1/2"

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. MEASURED TO INTERSECTION OF BARRIER SLOPES.
4. DO NOT USE AS RETAINING BARRIER. REFER TO STD DWG BA 1C FOR RETAINING BARRIER APPLICATIONS.
5. USE ONLY IN FRONT OF A RETAINING WALL. DO NOT USE IN A WORK ZONE APPLICATION.

4. BARRIER UNIT WEIGHT: 3.0 TONS (15'-0" LENGTH)
   2.0 TONS (10'-0" LENGTH)

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE

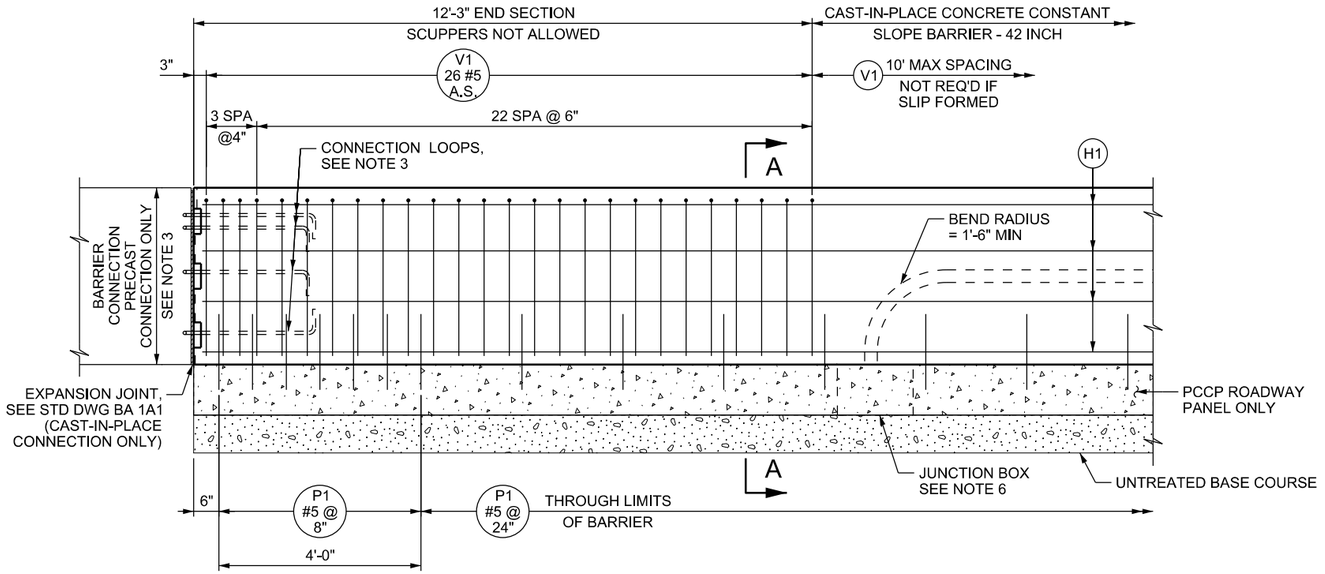
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

PRECAST CONCRETE HALF BARRIER - 32 INCH F-SHAPE

STANDARD DRAWING TITLE

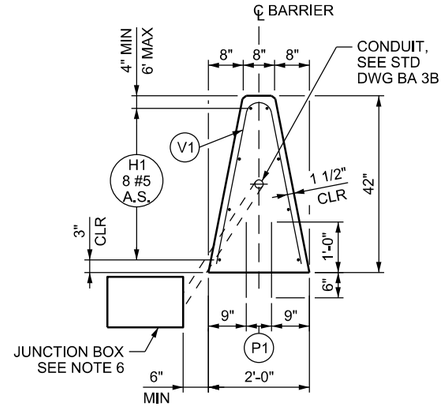
STD. DWG. NO.
BA 2E

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA02E.dgn

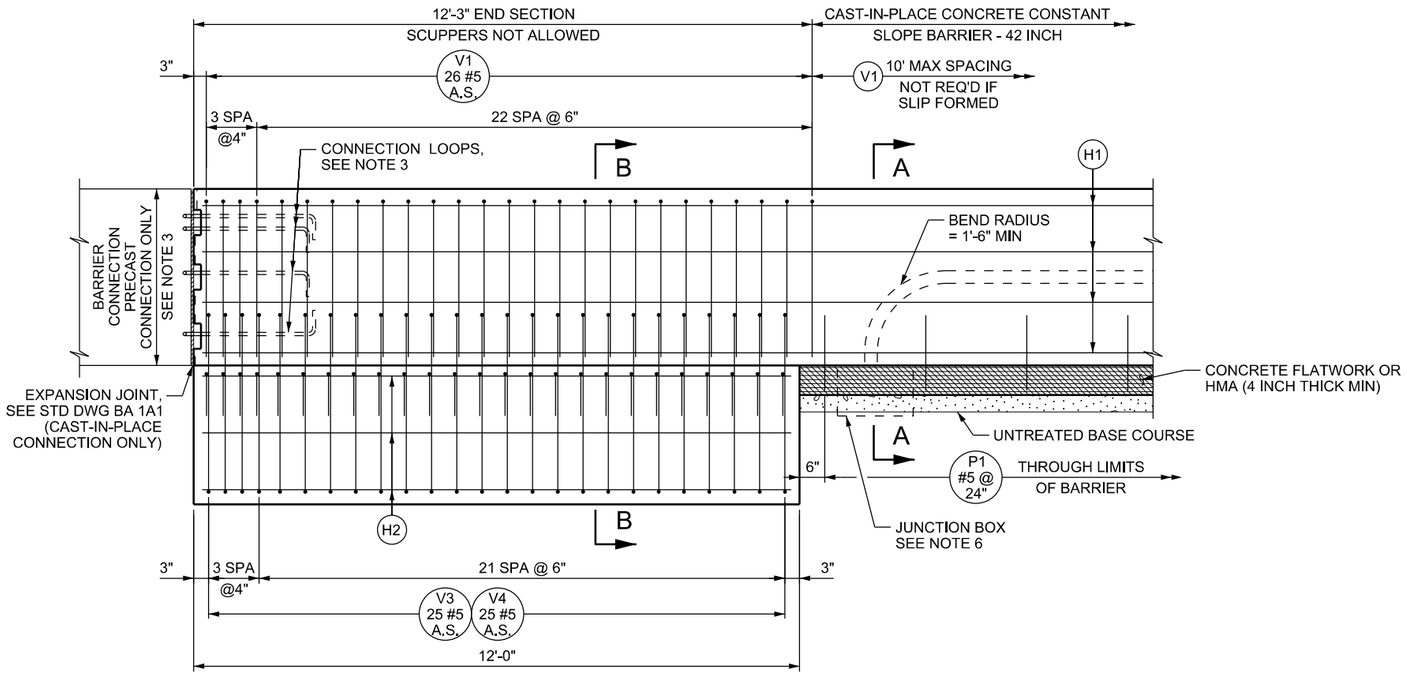


ELEVATION

42 INCH CONSTANT SLOPE BARRIER
END SECTION ON PCCP

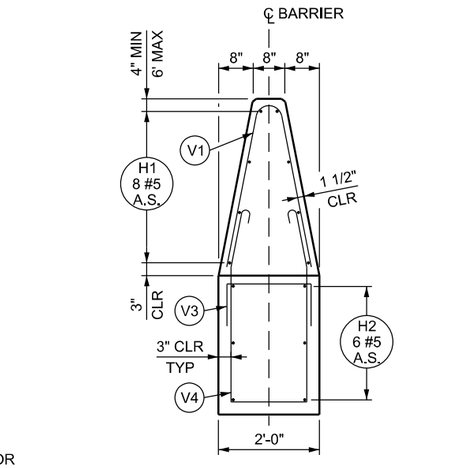


SECTION A-A



ELEVATION

42 INCH CONSTANT SLOPE BARRIER
END SECTION ON HMA



SECTION B-B

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3A2 FOR STEPPED MEDIAN BARRIER DETAILS.
3. SEE "CONSTANT SLOPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A3 FOR DETAILS.
4. SEE STD DWG BA 3A8 FOR REINFORCING SCHEDULE AND NOTES
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
6. FIELD VERIFY CONDUIT IN ADJACENT BARRIER AND ADJUST CONDUIT SIZE AND QUANTITY AS NEEDED. IF NO CONDUIT EXISTS IN ADJACENT BARRIER, CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.
2	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

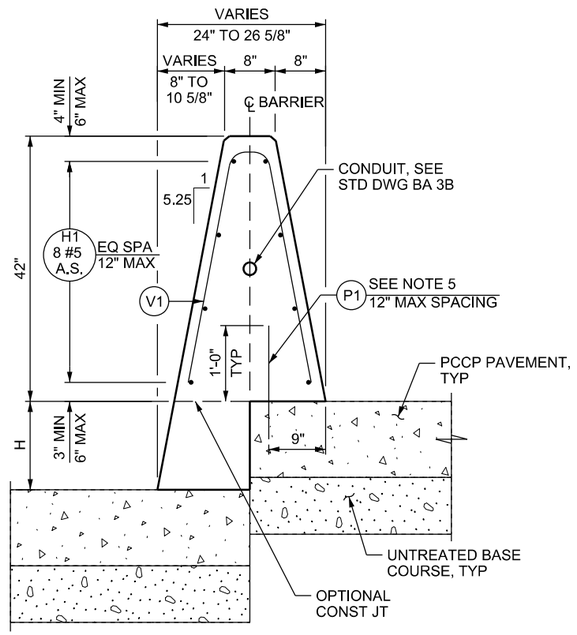
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3
1 OF 8

STANDARD DRAWING TITLE

STD. DWG. NO.

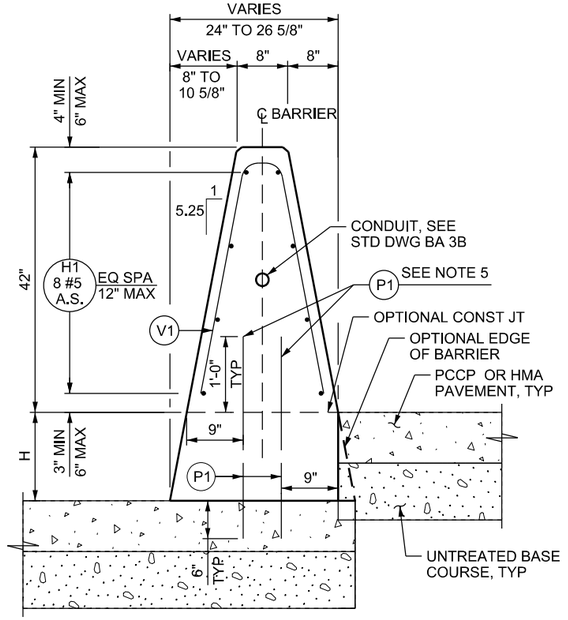
BA 3A1

DGN File:G:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A1.dgn
25-JUN-2020



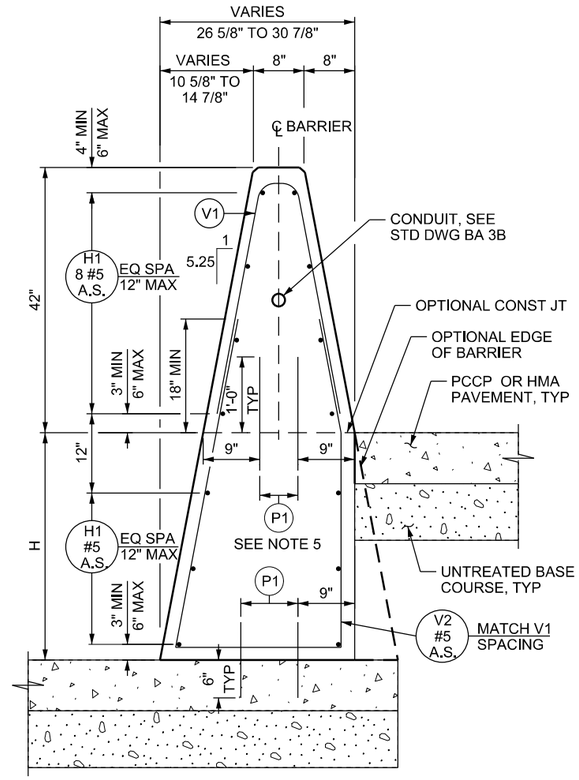
STEPPED MEDIAN BARRIER

H = 0" TO 14" (PCCP ONLY)



STEPPED MEDIAN BARRIER

H = 0" TO 14" (PCCP OR HMA)



STEPPED MEDIAN BARRIER

H = 14" TO 36" (PCCP OR HMA)

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3A1 FOR GENERAL CONSTANT SLOPE BARRIER DETAILS.
3. SEE STD DWG BA 3A8 FOR REINFORCING SCHEDULE AND NOTES.
4. V2 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
5. P1 BARS THROUGH THE OPTIONAL CONSTRUCTION JOINT ARE NOT REQUIRED IF THE CONSTRUCTION JOINT IS NOT USED OR IF THE V2 BARS ARE PRESENT.
6. USE A MAXIMUM OF 12 INCH SPACING FOR P1 BARS. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.

2

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.
2	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

2

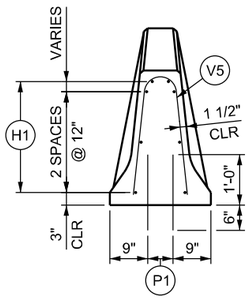
CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE BARRIER -
42 INCH, TL-3
2 OF 8

STANDARD DRAWING TITLE

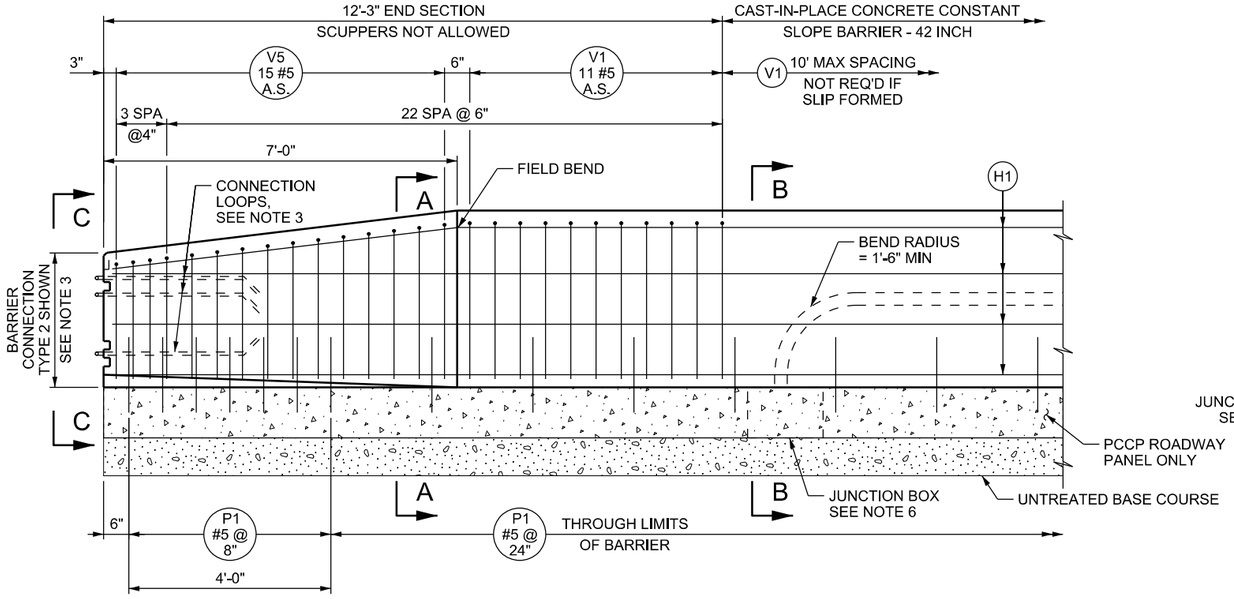
STD. DWG. NO.

BA 3A2

25-JUN-2020 DGN File:G:\Standardsandspecsection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A2.dgn

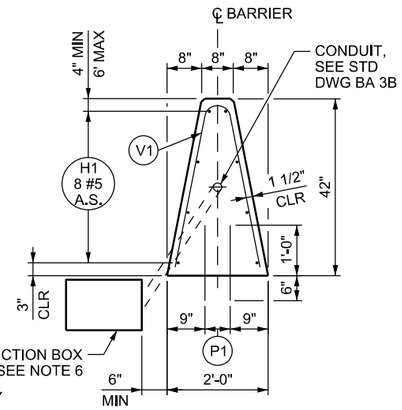


SECTION A-A

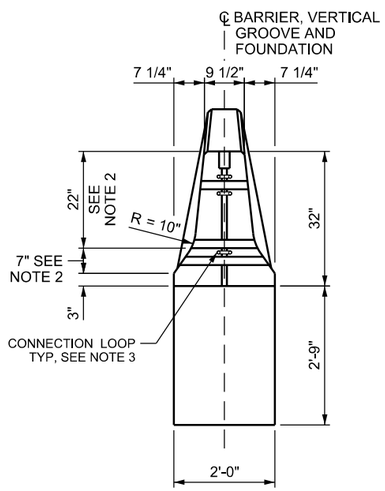


ELEVATION

42 INCH CONSTANT SLOPE BARRIER TO
32 INCH F-SHAPE END SECTION ON PCCP

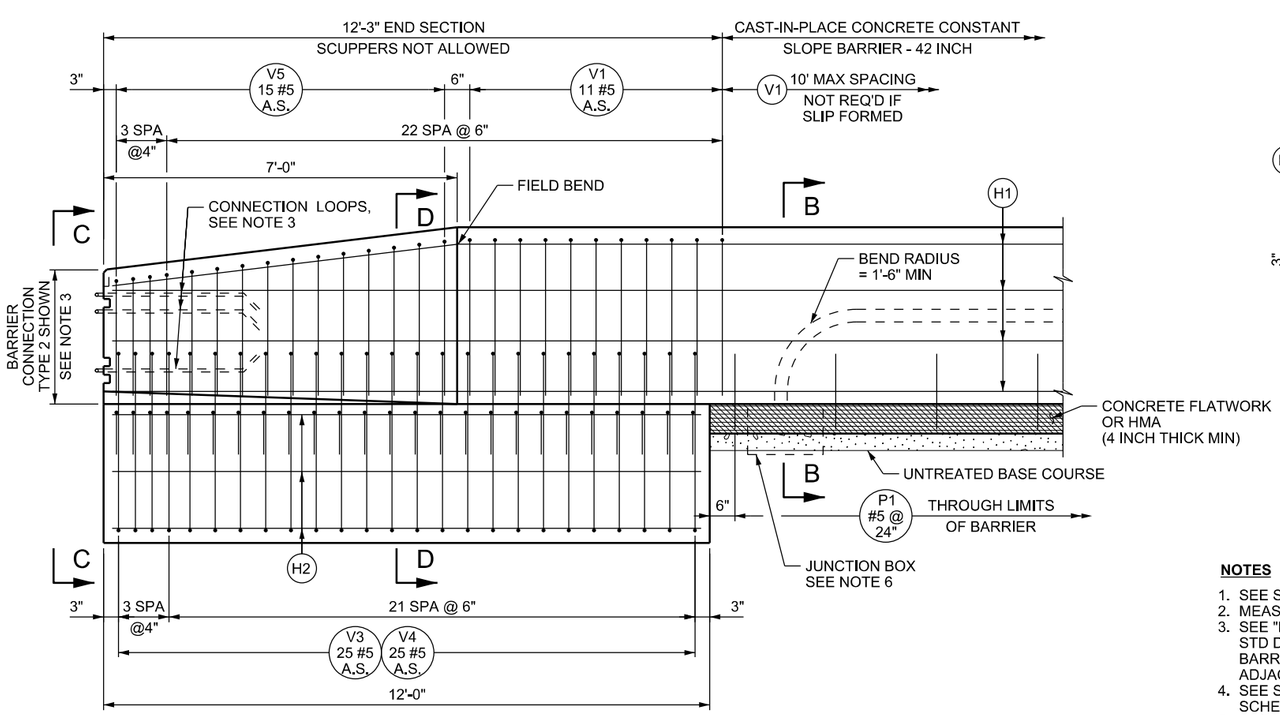


SECTION B-B



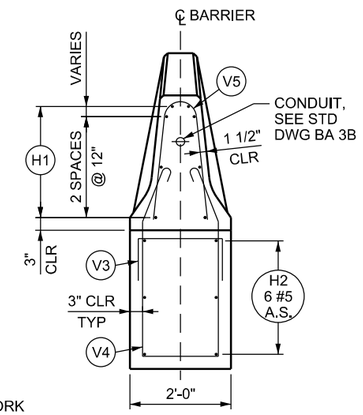
VIEW C-C

END SECTION ON HMA SHOWN,
END SECTION ON PCCP SIMILAR



ELEVATION

42 INCH CONSTANT SLOPE BARRIER TO
32 INCH F-SHAPE END SECTION ON HMA



SECTION D-D

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. MEASURED TO INTERSECTION OF BARRIER SLOPES.
3. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
4. SEE STD DWG BA 3A8 FOR REINFORCING SCHEDULE AND NOTES
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
6. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

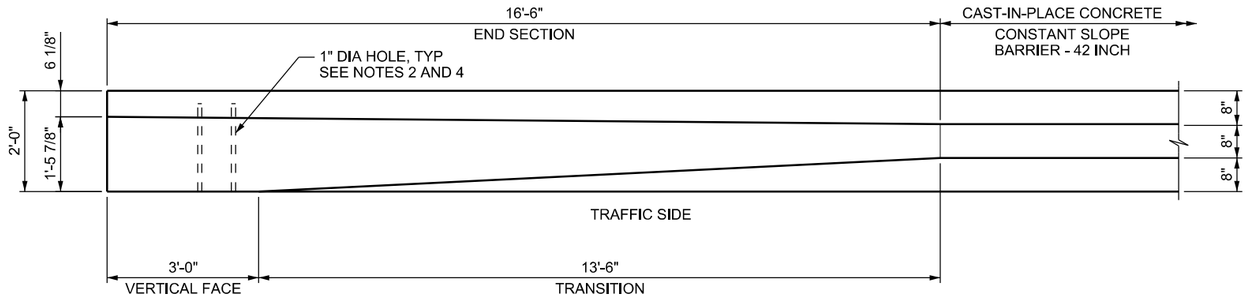
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3
3 OF 8

STANDARD DRAWING TITLE

STD. DWG. NO.

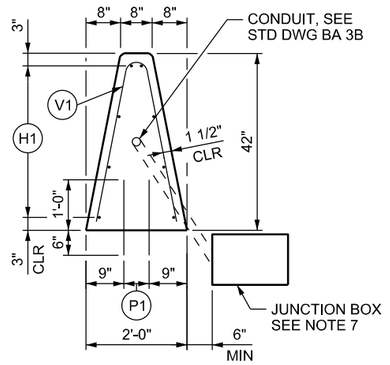
BA 3A3

DGN File:G:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A3.dgn
25-JUN-2020

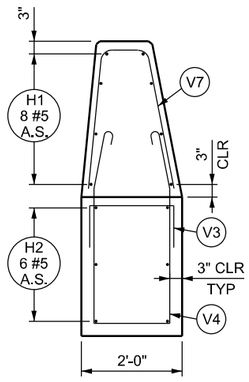


PLAN

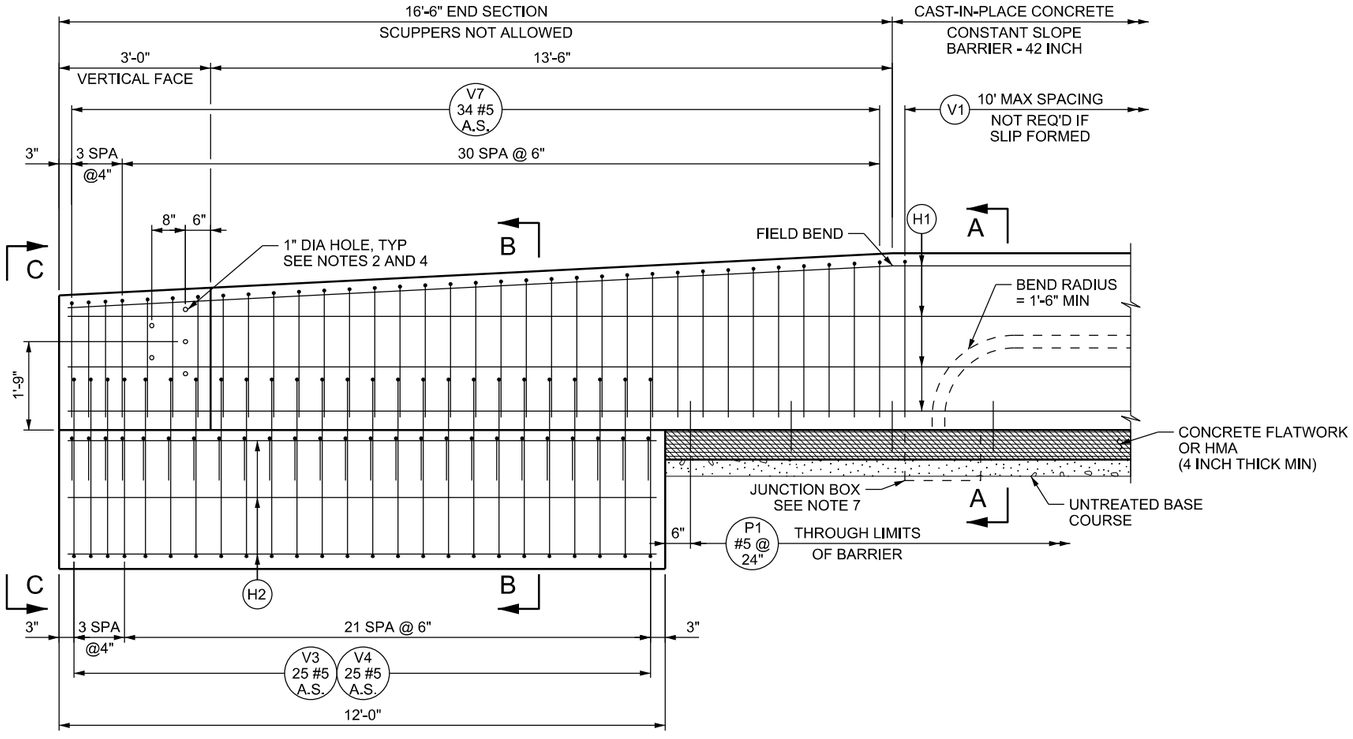
42 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON HMA



SECTION A-A

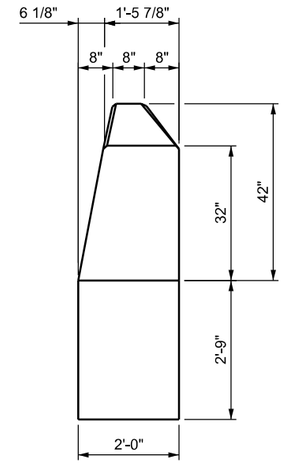


SECTION B-B



ELEVATION

42 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON HMA
SEE NOTE 6



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH THRIE-BEAM STRUCTURAL HEX BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK BARRIER PAD.
4. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
5. SEE STD DWG BA 3A8 FOR REINFORCING STEEL SCHEDULE AND NOTES.
6. USE THIS END SECTION TO TRANSITION TO THRIE-BEAM GUARDRAIL, END TREATMENTS, OR CRASH CUSHIONS.
7. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

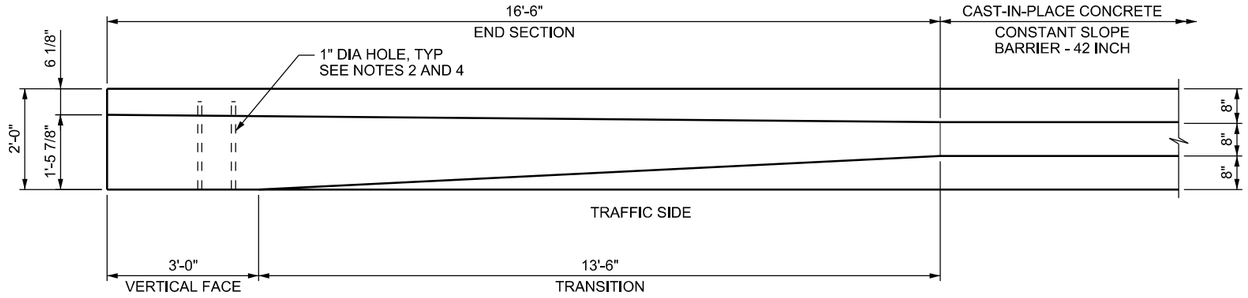
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3 4 OF 8

STANDARD DRAWING TITLE

STD. DWG. NO.

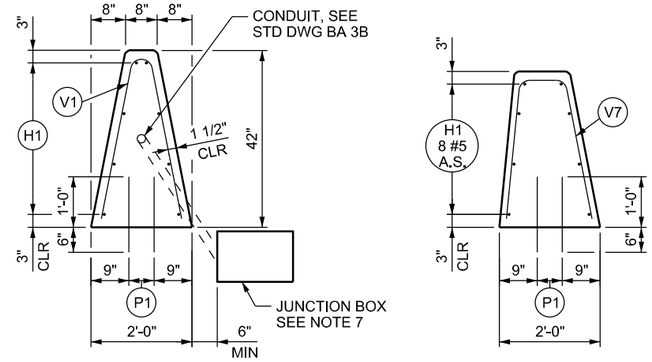
BA 3A4

25-JUN-2020 DGN File:Q:\Standardsandspecsection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A4.dgn



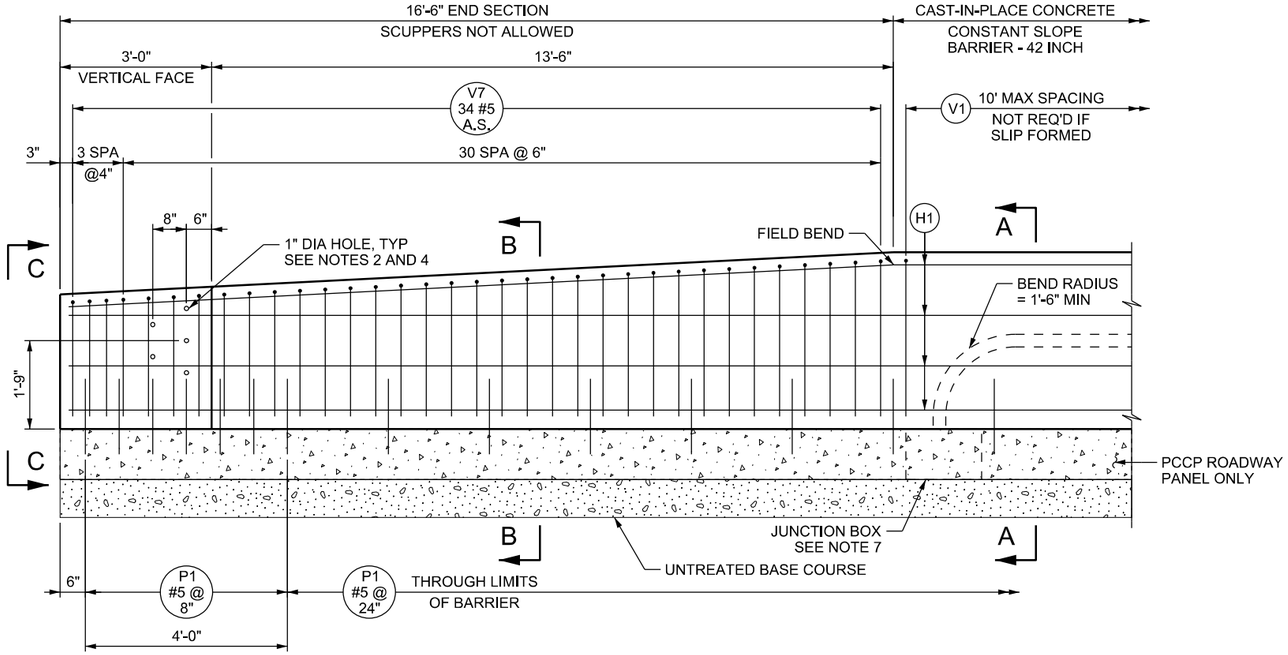
PLAN

42 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON PCCP



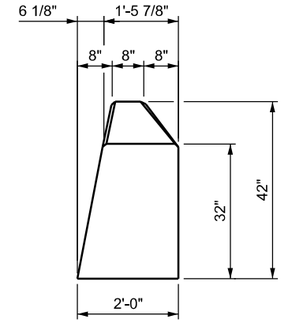
SECTION A-A

SECTION B-B



ELEVATION

42 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON PCCP
SEE NOTE 6



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH THRIE-BEAM STRUCTURAL HEX BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK BARRIER PAD OR PCCP.
4. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
5. SEE STD DWG BA 3A8 FOR REINFORCING STEEL SCHEDULE AND NOTES.
6. USE THIS END SECTION TO TRANSITION TO THRIE-BEAM GUARDRAIL, END TREATMENTS, OR CRASH CUSHIONS.
7. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

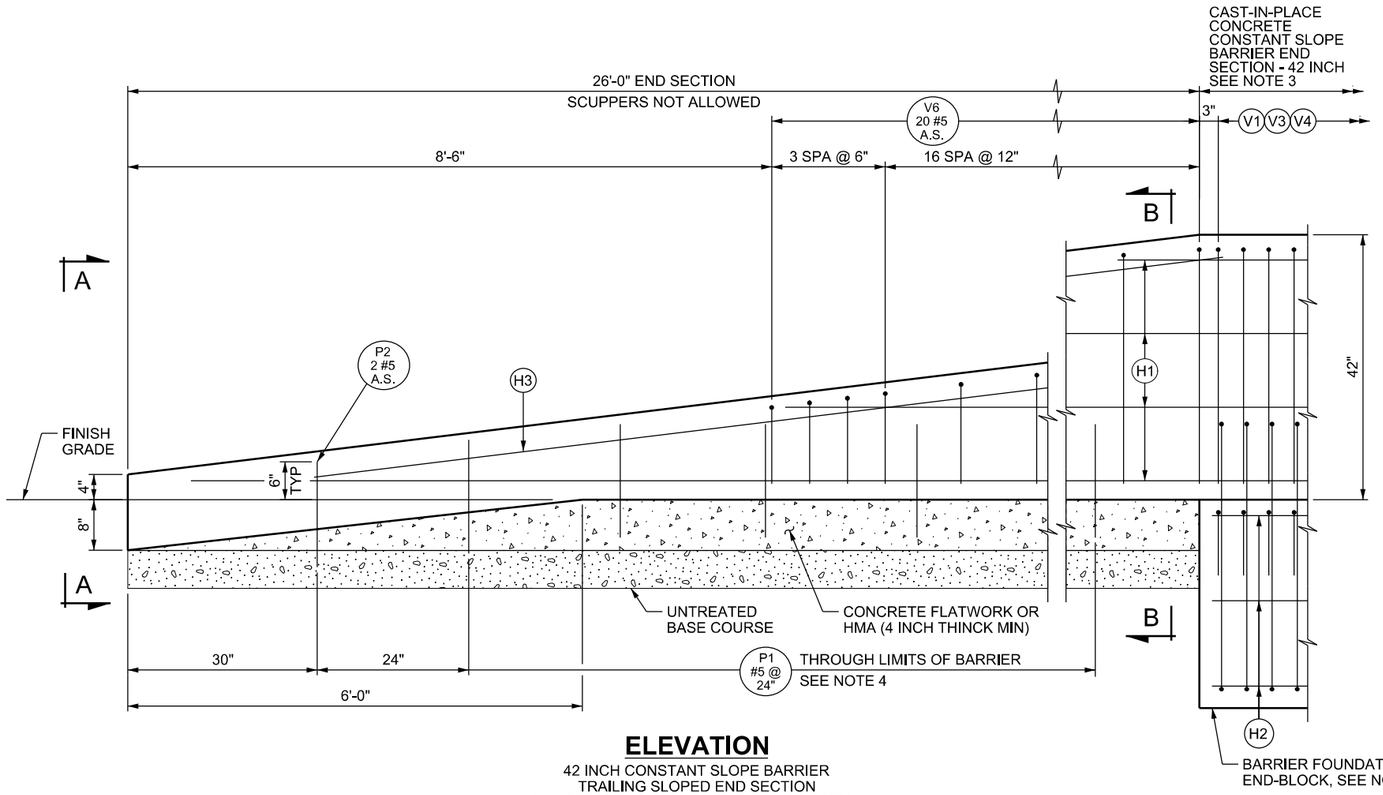
RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3
5 OF 8

STANDARD DRAWING TITLE

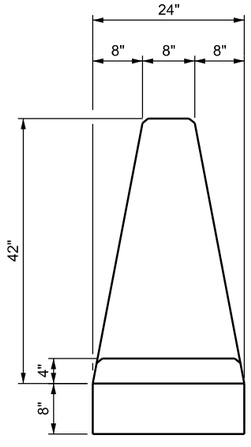
STD. DWG. NO.
BA 3A5

25-JUN-2020 DGN File:D:\StandardsandSpecsSection\Standards Committees\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A5.dgn

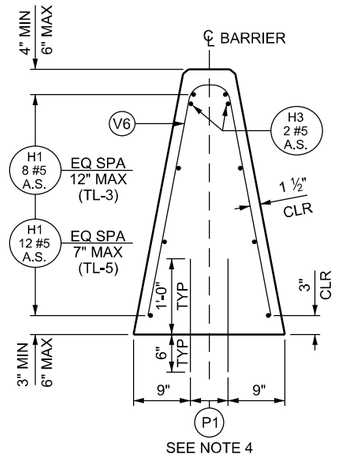


ELEVATION

42 INCH CONSTANT SLOPE BARRIER
TRAILING SLOPED END SECTION
END SECTION ON HMA SHOWN, END SECTION
ON PCCP ROADWAY PANEL SIMILAR



VIEW A-A



SEE NOTE 4

SECTION B-B

TL-3 SHOWN; TL-5 SIMILAR

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3A8 FOR REINFORCING STEEL SCHEDULE AND NOTES.
3. INSTALL CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER END SECTION AS SHOWN ON BA 3A1 OR BA 3E1 FOR TL-3 OR TL-5, RESPECTIVELY. USE THE APPROPRIATE END SECTION FOR PCCP ROADWAY PANEL, CONCRETE FLATWORK, OR HMA PAVEMENT.
4. REDUCE EMBEDMENT AT END OF BARRIER TO PROVIDE A MINIMUM 2 INCH COVER TO TOP OF BARRIER.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.
2	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

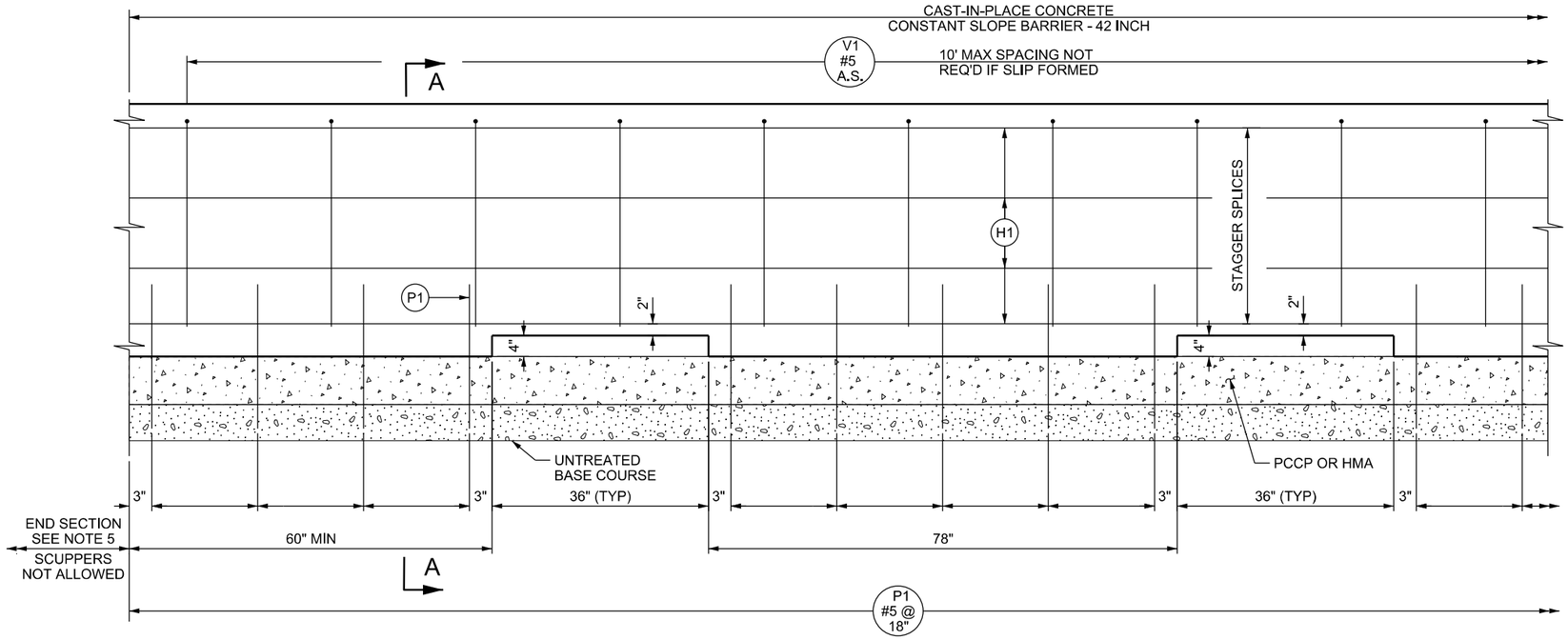
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3 6 OF 8

STANDARD DRAWING TITLE

STD. DWG. NO.

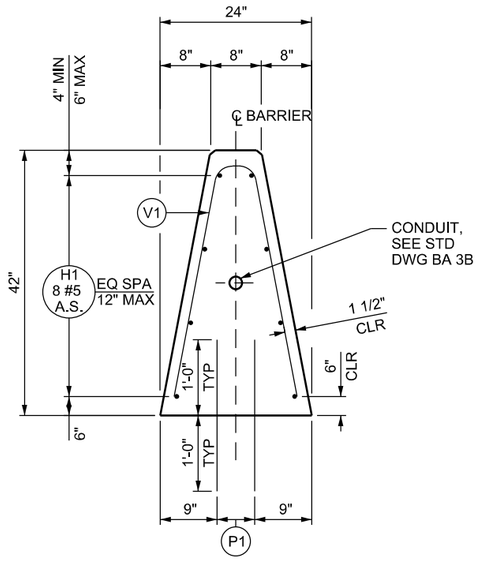
BA 3A6

25-JUN-2020 DGN File:D:\Standardsand5pecsSection\5tandards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A6.dgn



ELEVATION

42 INCH CONSTANT SLOPE BARRIER
WITH SCUPPERS



SECTION A-A

NOTES:

1. SEE STD DWG BA 1A1 FOR FOR GENERAL NOTES.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
3. SEE STD DWG BA 3A8 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3A1, BA 3A2, BA 3A3, BA 3A4, BA 3A5, AND BA 3A6 FOR END SECTION LENGTH AND REINFORCING DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.
2	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

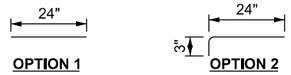
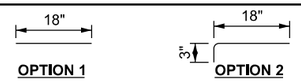
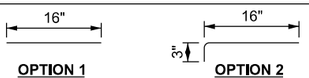
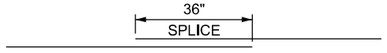
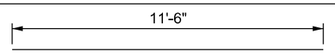
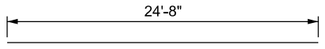
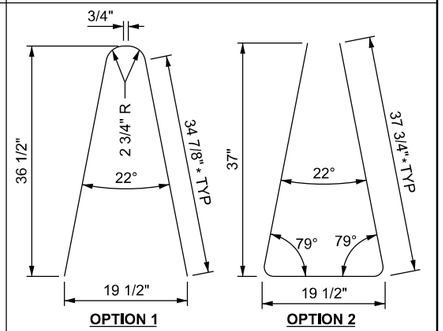
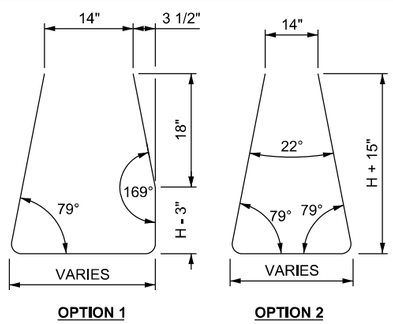
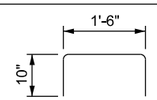
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3
7 OF 8
STANDARD DRAWING TITLE

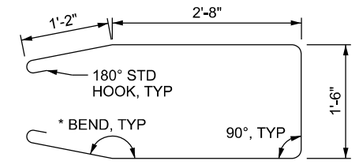
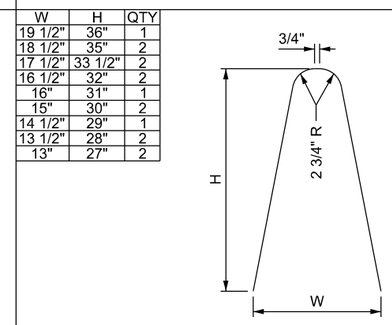
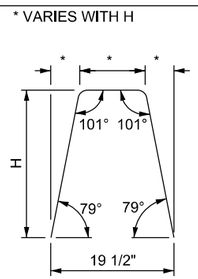
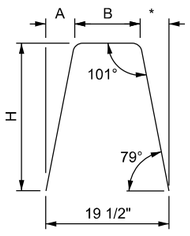
STD. DWG. NO.
BA 3A7

25-JUN-2020 DGN File:Q:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A7.dgn

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH REINFORCING SCHEDULE

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
P1	#5	AS NEEDED	(BARRIER WITH SCUPPERS) PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
P1	#5	AS NEEDED	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
P2	#5	2	PAVEMENT TO BARRIER AT TRAILING SLOPED END SECTION (VERTICAL)	
H1	#5	AS NEEDED	HORIZONTAL IN BARRIER CONTINUOUS THROUGH LENGTH OF BARRIER	
H2	#5	6	HORIZONTAL IN FOUNDATION	
H3	#5	2	HORIZONTAL IN BARRIER ALONG TOP FACE AT TRAILING SLOPED END SECTION	
V1	#5	AS NEEDED	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 6'-10 1/2" OPTION 2 = 7'-11"	
V2	#5	AS NEEDED	VERTICAL IN STEPPED MEDIAN BARRIER	
V3	#5	25	VERTICAL IN FOUNDATION TOTAL LENGTH = 3'-2"	

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH REINFORCING SCHEDULE - CONTINUED

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V4	#5	25	VERTICAL IN FOUNDATION TOTAL LENGTH = 10'-4"	* 169° FOR BA 3A1 AND BA 3A4 145° FOR BA 3A3 
V5	#5	15	VERTICAL IN BARRIER	
V6	#5	20	VERTICAL IN TRAILING SLOPED END SECTION	* VARIES WITH H 
V7	#5	34	VERTICAL IN BARRIER	* VARIES WITH H 

H	QTY
37"	1
35 1/2"	1
34"	1
32 1/2"	1
31 1/2"	1
30"	1
28 1/2"	1
27"	1
25 1/2"	1
24"	1
22 1/2"	1
21 1/2"	1
20"	1
18 1/2"	1
17"	1
15 1/2"	1
14"	1
13 1/2"	1
12 1/2"	1
12"	1

W	H	QTY
19 1/2"	36"	1
18 1/2"	35"	2
17 1/2"	33 1/2"	2
16 1/2"	32"	2
16"	31"	1
15"	30"	2
14 1/2"	29"	1
13 1/2"	28"	2
13"	27"	2

H	A	B	QTY
36"	7"	5"	2
35"	6"	5"	4
34"	6"	6"	3
33"	5"	7"	4
32"	4"	8"	3
31"	3"	9"	3
30"	3"	10"	3
29"	2"	11"	4
28"	1"	12"	3
27"	0"	13"	2
27"	0"	14"	3

NOTES

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT OR 4 INCH THICK CONCRETE BARRIER PAD.
2. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.
3. SEE STD DWG BA 3A1, BA 3A2, BA 3A3, BA 3A4, BA 3A5, BA 3A6, AND BA 3A7 FOR REINFORCING STEEL LOCATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3A DRAWING FOR MASH STANDARDS

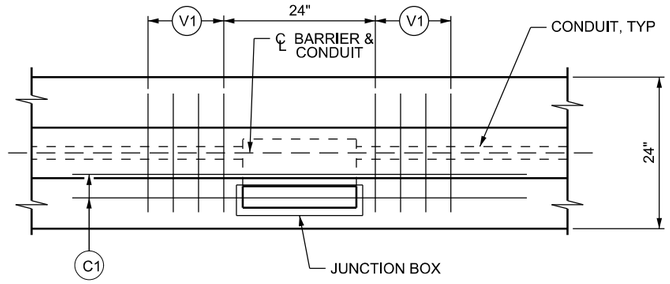
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

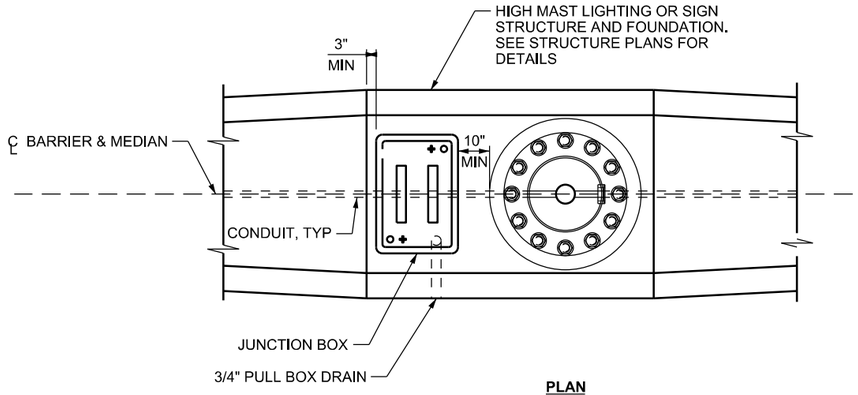
STANDARD DRAWING TITLE
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-3
8 OF 8

STD. DWG. NO.
BA 3A8

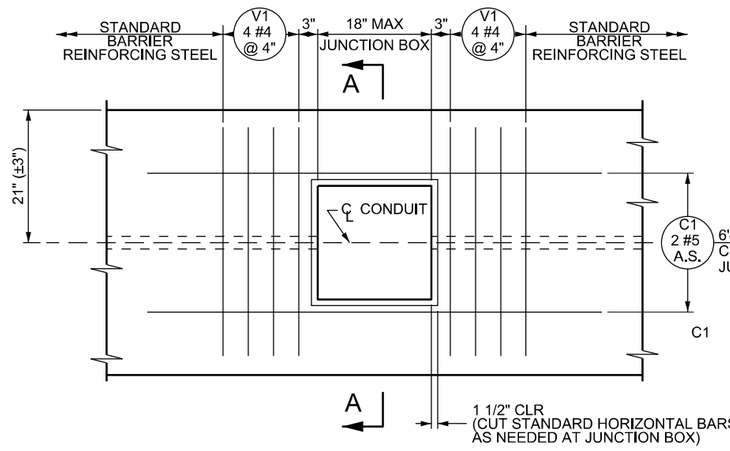
DGN File:G:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03A8.dgn
25-JUN-2020



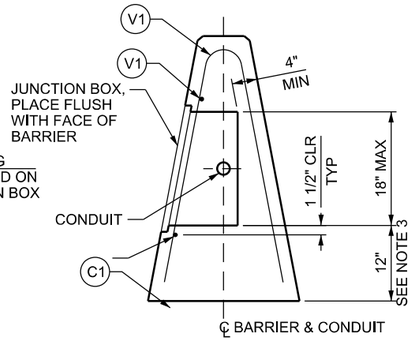
PLAN



PLAN



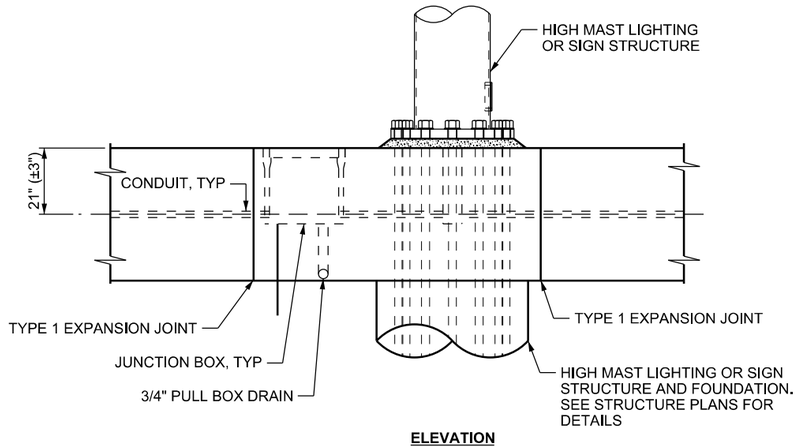
ELEVATION



SECTION A-A

MEDIAN BARRIER CONDUIT

STANDARD REINFORCING STEEL NOT SHOWN



ELEVATION

MEDIAN BARRIER CONDUIT AT SIGN OR LIGHT STRUCTURE

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. INSTALL ELECTRICAL AND ATMS CONDUITS, JUNCTION BOXES, AND PULL BOXES PER CONTRACT DRAWINGS.
3. INCREASE HEIGHT TO ACCOUNT FOR STEPPED MEDIAN. MAINTAIN 12 INCHES TO TOP OF PAVEMENT ON THE HIGHEST SIDE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/28/2019	SDD	ADDED 3/4" PULL BOX DRAIN CALL OUT.
2	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO CONSTRUCTION NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

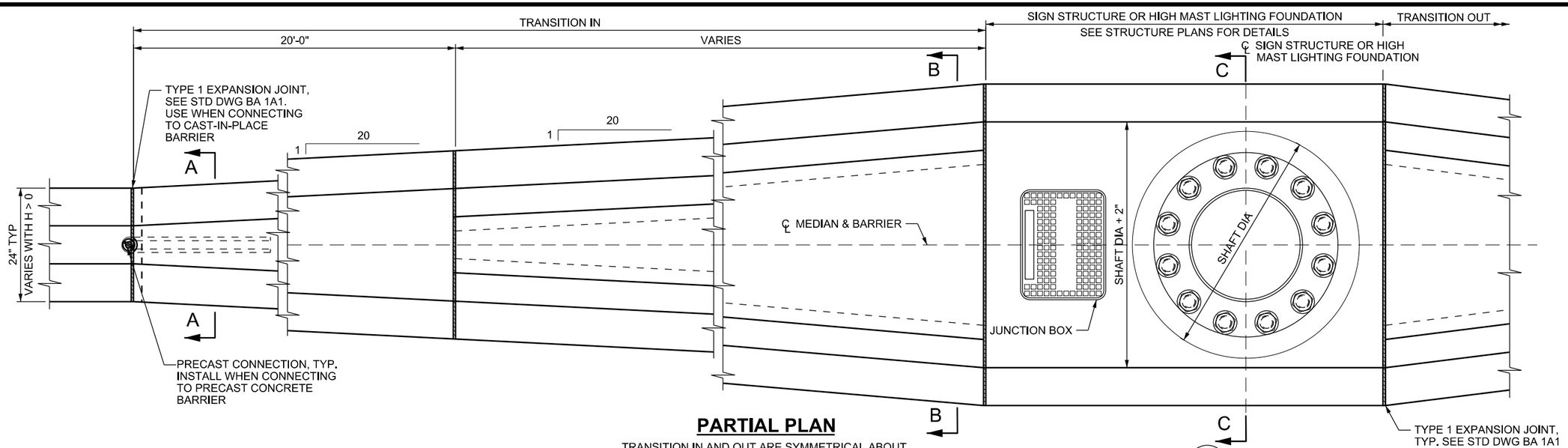
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, ELECTRICAL DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.

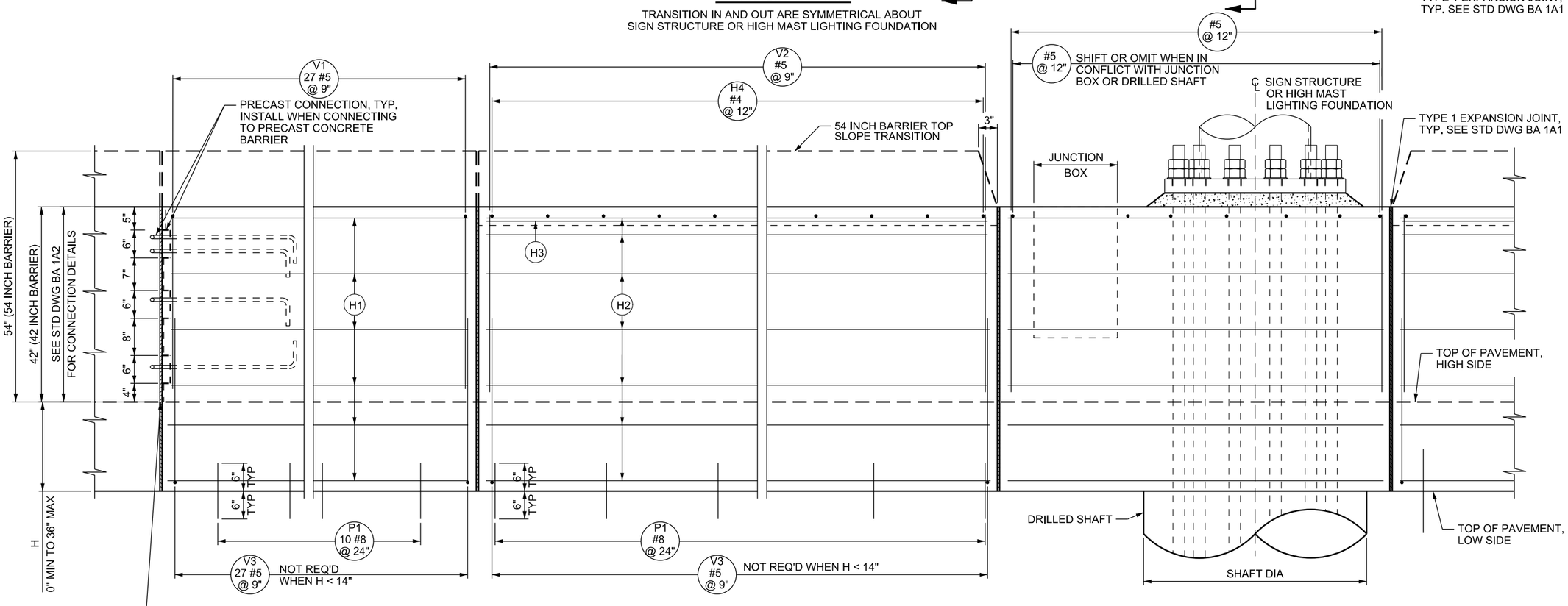
BA 3B

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03B.dgn



PARTIAL PLAN

TRANSITION IN AND OUT ARE SYMMETRICAL ABOUT
SIGN STRUCTURE OR HIGH MAST LIGHTING FOUNDATION



PARTIAL ELEVATION

TRANSITION IN AND OUT ARE SYMMETRICAL ABOUT
SIGN STRUCTURE OR HIGH MAST LIGHTING FOUNDATION;
REINFORCING STEEL FOR 42 INCH BARRIER SHOWN, 54 INCH BARRIER SIMILAR

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3C2 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.
3. INSTALL ELECTRICAL AND ATMS CONDUITS, JUNCTION BOXES AND PULL BOXES ACCORDING TO CONTRACT DRAWINGS.
4. INCREASE LENGTH OF WIDTH TAPER AS NECESSARY TO PROVIDE APPROPRIATE FLARE RATE WHEN DESIGN PLANS SPECIFY ALTERNATIVE FLARE RATE. ADJUST REINFORCING STEEL LENGTHS AS NECESSARY.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, SIGN STRUCTURE FOUNDATION TRANSITION 1 OF 2

STANDARD DRAWING TITLE

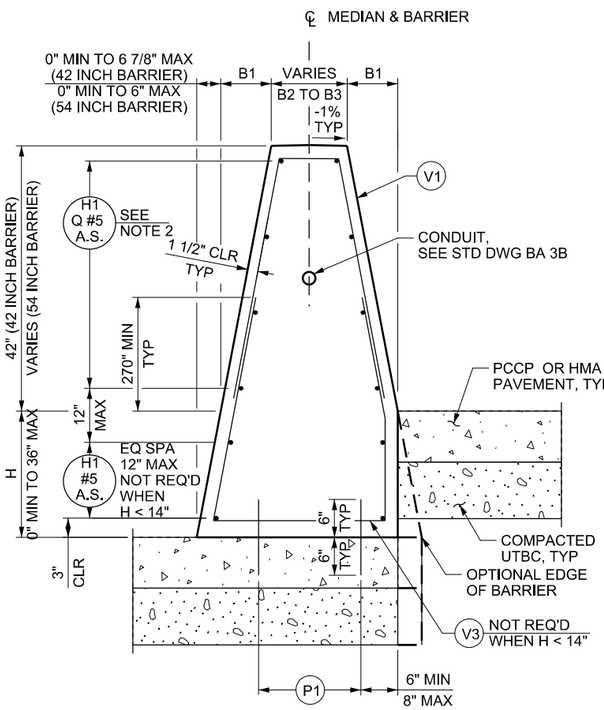
STD. DWG. NO.
BA 3C1

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03C1.dgn

BAR MARK	BAR SIZE	LOCATION	SKETCH
P1	#8	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 3" 12" OPTION 2
H1	#5	HORIZONTAL IN BARRIER	19'-4"
H2	#5	HORIZONTAL IN BARRIER	VARIES
H3	#4	HORIZONTAL IN TOP CLOSURE SLAB	VARIES
H4	#4	HORIZONTAL IN TOP CLOSURE SLAB	VARIES

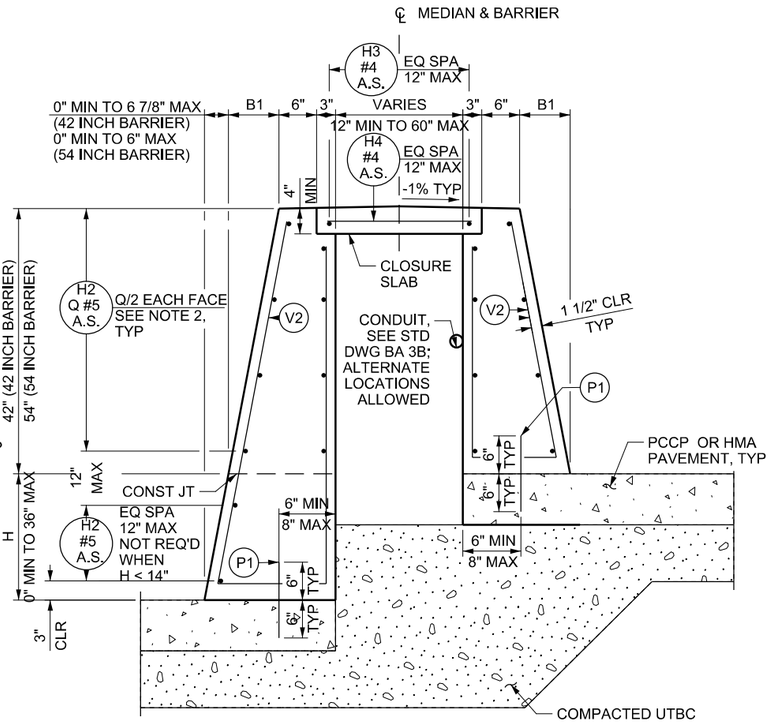
BAR MARK	BAR SIZE	LOCATION	SKETCH
V1	#5	VERTICAL IN BARRIER	7⅛" VARIES 7⅛"; 37 1/2"; 10½° 10½°; 79° 79°; 42 INCH BARRIER
			8¼" VARIES 8¼"; 49 1/2"; 99.5° 99.5°; 80.5° 80.5°; 54 INCH BARRIER

BAR MARK	BAR SIZE	LOCATION	SKETCH
V2	#5	VERTICAL IN BARRIER	4" VARIES VARIES
V3	#5	VERTICAL IN STEPPED MEDIAN BARRIER	14" VARIES 14"; 18"; H - 3"; H + 15"; VARIES VARIES



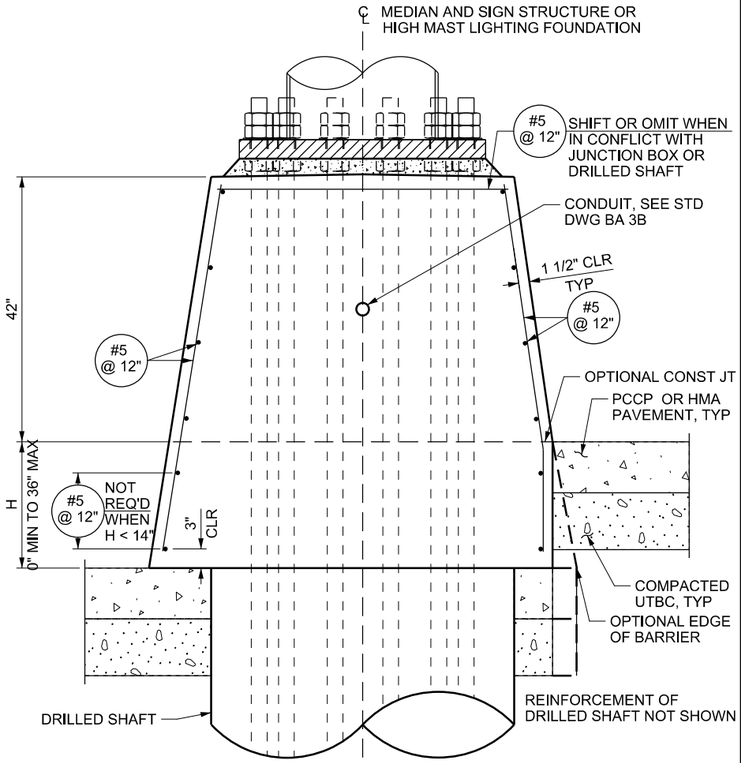
SECTION A-A

SEE NOTE 3 FOR ALTERNATE SECTION WHEN H<14" AND PCCP



SECTION B-B

BARRIER	B1	B2	B3	Q
42 INCH	8"	8"	32"	8
54 INCH	9"	6"	30"	10
42 INCH, TL-5	8"	8"	32"	12
54 INCH, TL-5	9"	6"	30"	14



SECTION C-C

NOTES

1. SEE STD DWG BA 3C1 FOR SECTION LOCATIONS.
2. REINFORCEMENT FOR 42 INCH BARRIER SHOWN, REINFORCEMENT FOR 54 INCH BARRIER SIMILAR.
3. SECTION A-A MAY BE REPLACED WITH TYPICAL SECTIONS FOR H LESS THAN 14 INCHES SHOWN ON STD DWG BA 3A1, BA 3E2, BA 3M1, OR BA 3O2 WITH THE FOLLOWING MODIFICATIONS: VARY THE TOP WIDTH FROM B2 TO B3 AND MODIFY V1 BAR AS REQUIRED TO MAINTAIN MINIMUM COVER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL — CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 DATE — APPROVED — DEPUTY DIRECTOR

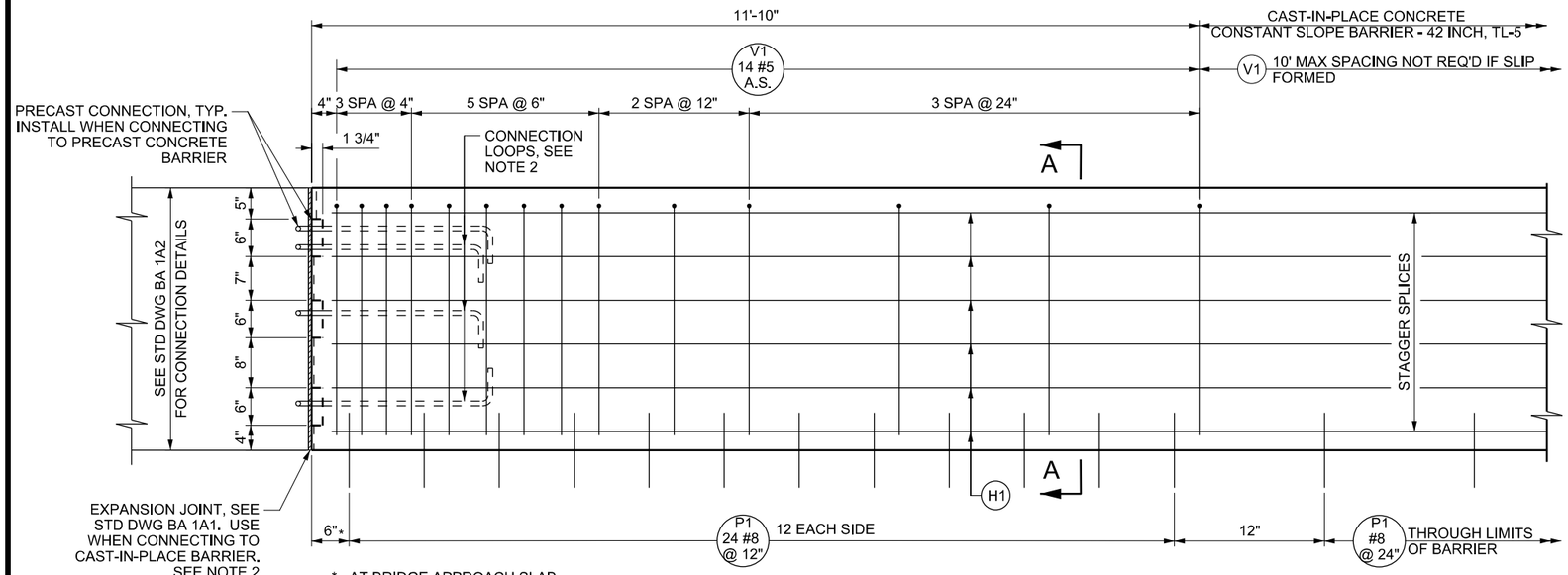
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, SIGN STRUCTURE FOUNDATION TRANSITION 2 OF 2

STANDARD DRAWING TITLE

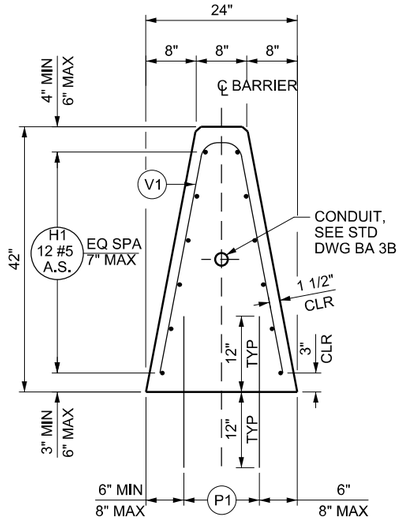
STD. DWG. NO.

BA 3C2

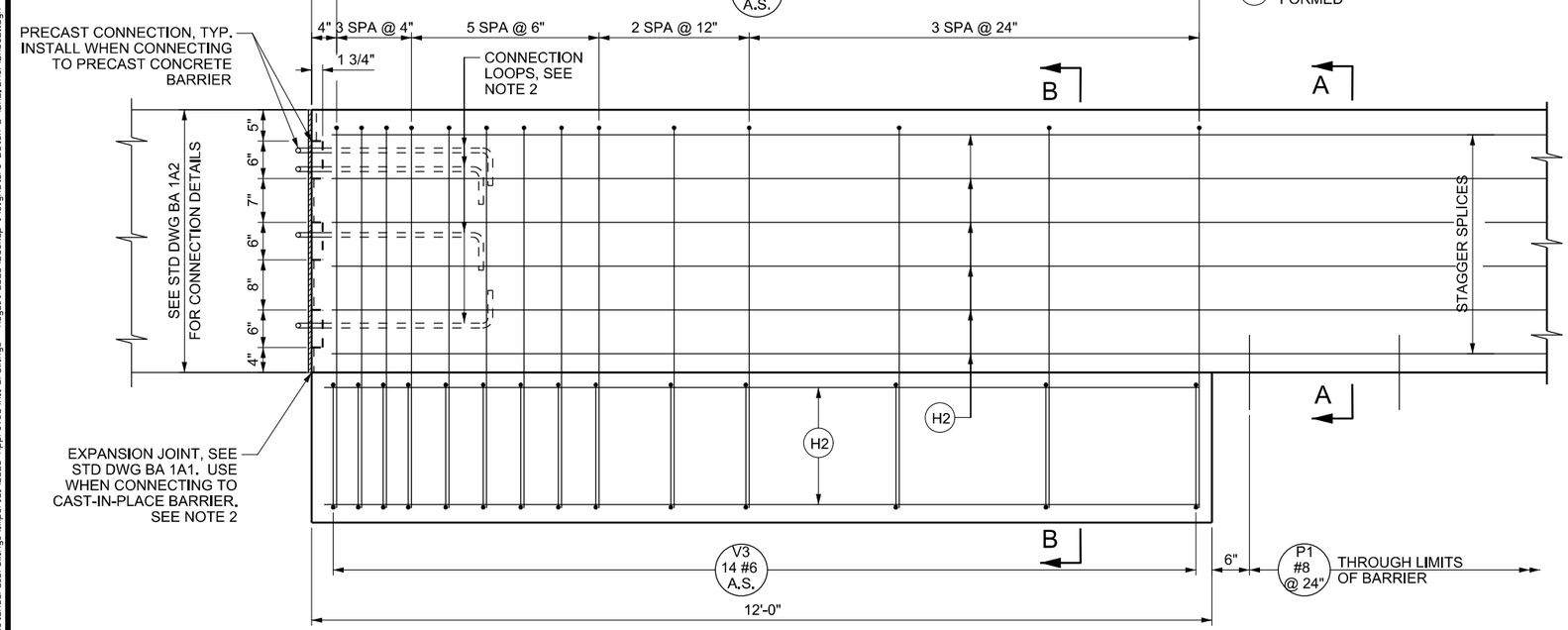
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA03C2.dgn
23-JUN-2020



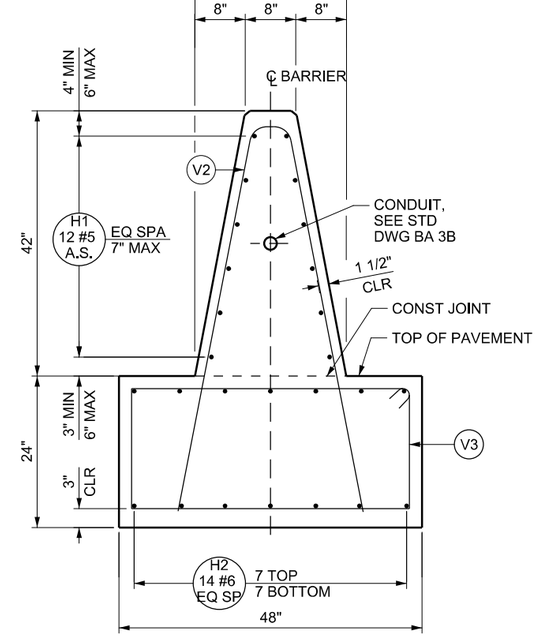
ELEVATION
BARRIER ON PCCP



SECTION A-A



ELEVATION
BARRIER ON HMA



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. SEE STD DWG BA 3E2 FOR STEPPED MEDIAN DETAILS AND REINFORCING STEEL SCHEDULE.
4. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTES TO RDM SHEETS.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

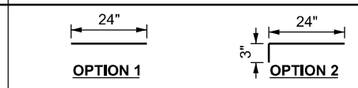
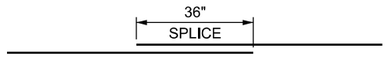
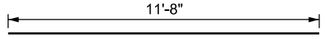
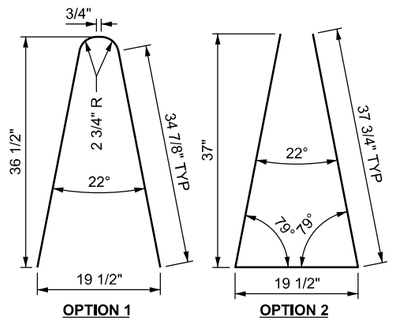
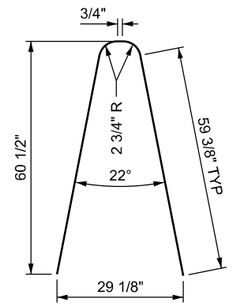
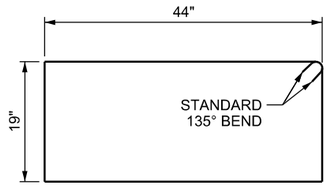
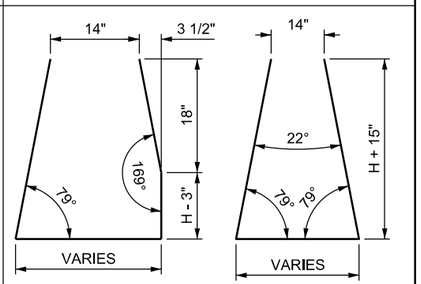
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-5 1 OF 2

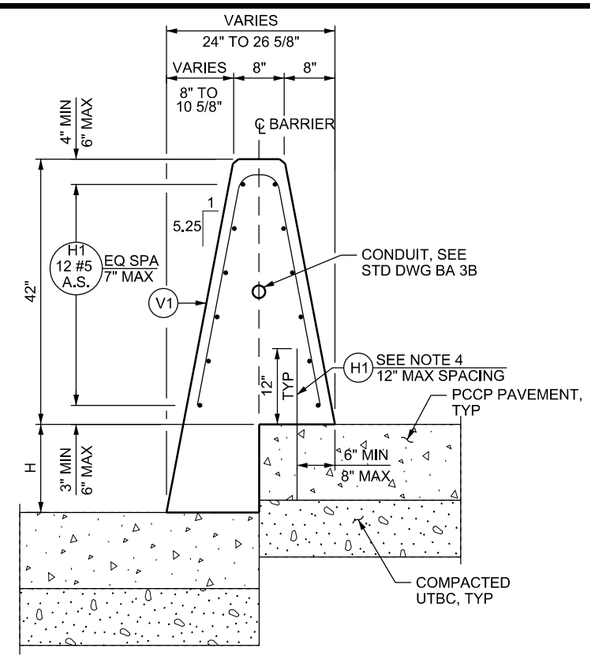
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3E1

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03E1.dgn
23-JUN-2020

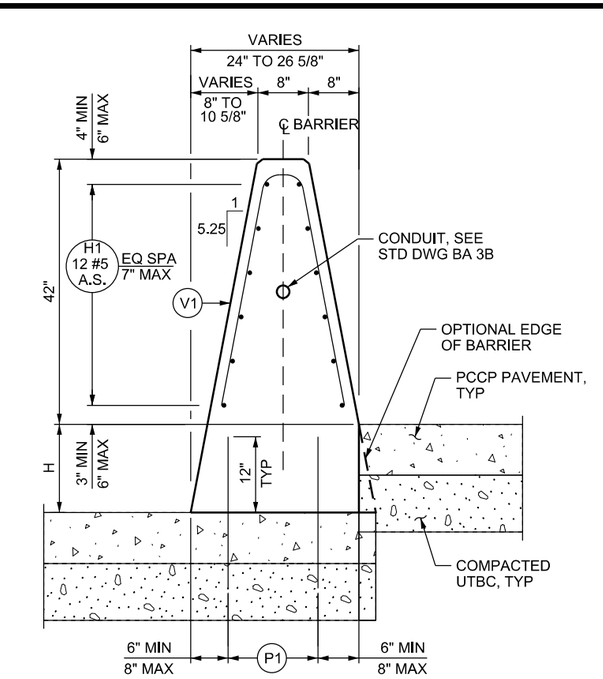
CONSTANT SLOPE BARRIER REINFORCING

BAR MARK	BAR SIZE	LOCATION	SKETCH
P1	#8	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
H1	#5	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS CONTINUOUS THROUGH LENGTH OF BARRIER	
H2	#6	HORIZONTAL IN BARRIER FOOTING	
V1	#5	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 6'-10 1/2" OPTION 2 = 7'-11"	
V2	#5	VERTICAL IN BARRIER TOTAL LENGTH: 10'-11 1/2"	
V3	#6	VERTICAL IN BARRIER FOOTING TOTAL LENGTH: 11'-10"	
V4	#5	VERTICAL IN STEPPED MEDIAN BARRIER	



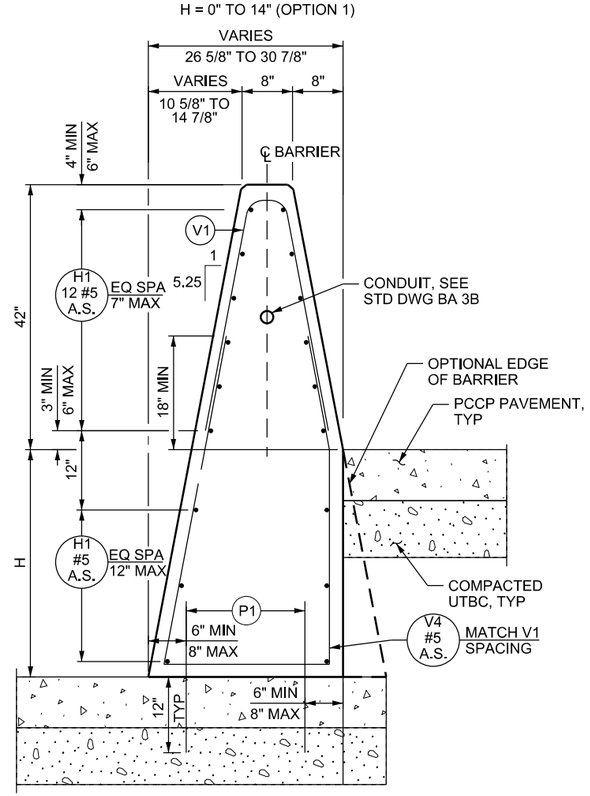
STEPPED MEDIAN BARRIER - PCCP ONLY

H = 0" TO 14" (OPTION 1)



STEPPED MEDIAN BARRIER - PCCP ONLY

H = 0" TO 14" (OPTION 2)



STEPPED MEDIAN BARRIER - PCCP ONLY

H = 14" TO 36"

NOTES

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
2. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.
3. V4 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
4. DECREASE P1 BAR SPACING BY HALF AS SHOWN ON STD DWG BA 3E1. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.
5. DO NOT USE STEPPED MEDIAN BARRIER WITH HMA PAVEMENT.
6. DO NOT USE HOIZONTAL CONSTRUCTION JOINTS IN TL-5 BARRIER.

REVISIONS

NO.	DATE	APPR.	REMARKS

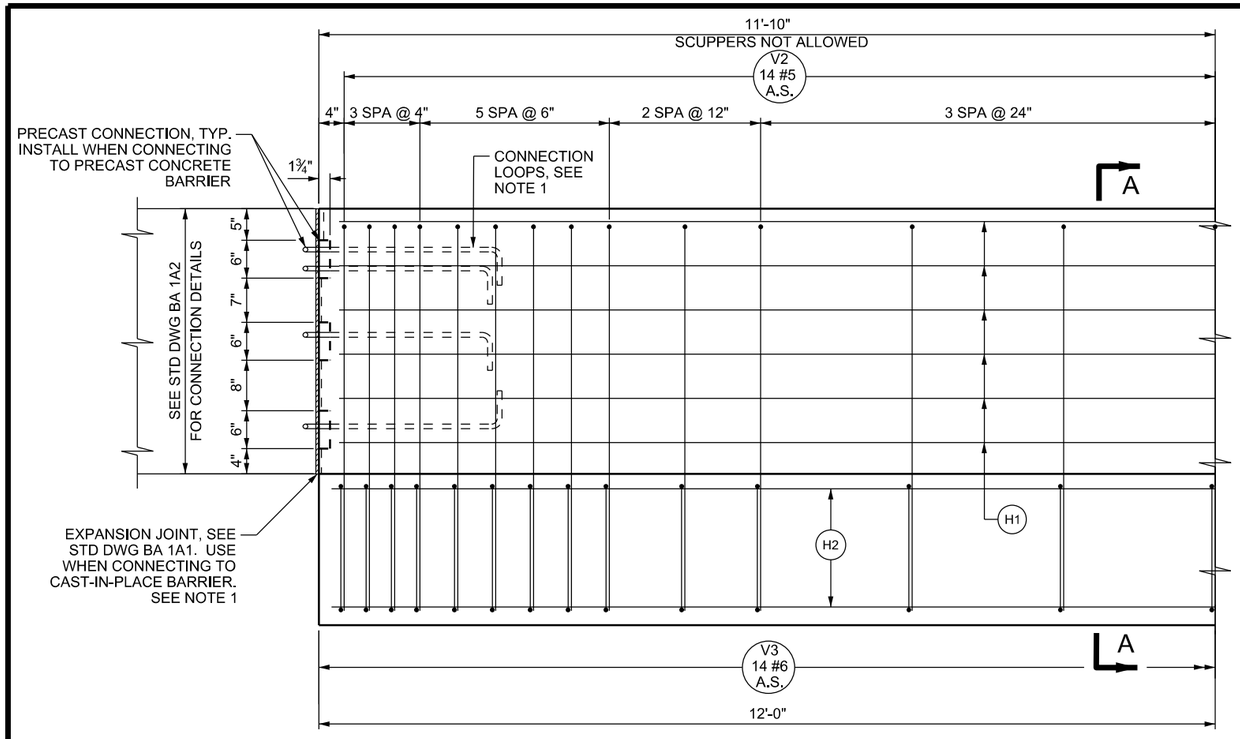
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, TL-5 2 OF 2
STANDARD DRAWING TITLE

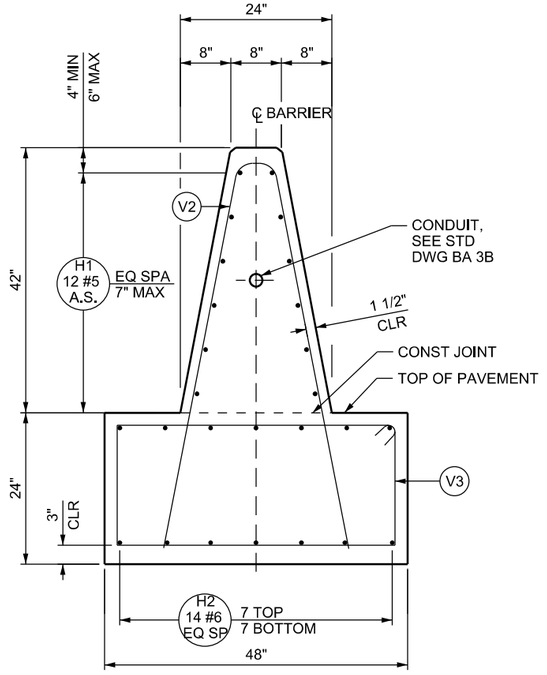
STD. DWG. NO.
BA 3E2

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA03E2.dgn

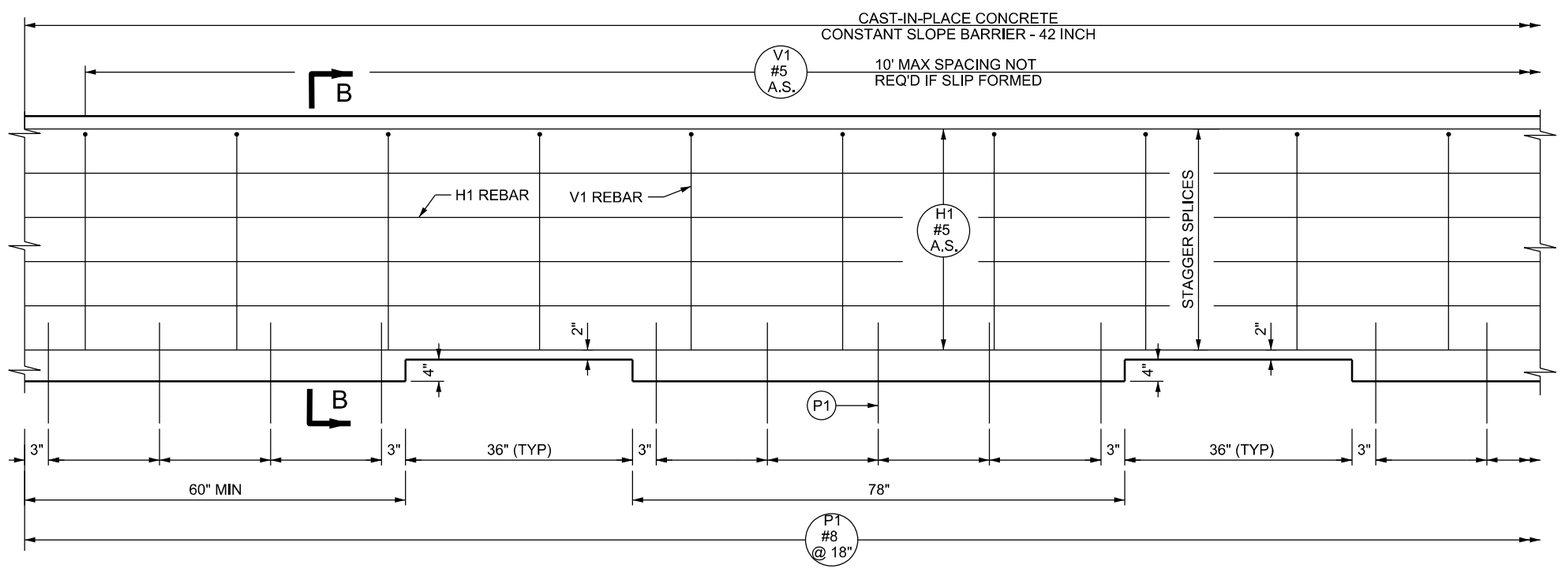


ELEVATION

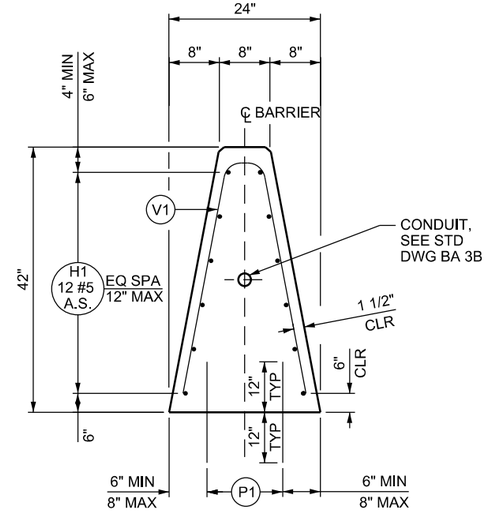
BARRIER ON HMA SHOWN
SEE BA 3E1 FOR BARRIER ON PCCP



SECTION A-A



ELEVATION



SECTION B-B

NOTES:

1. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. SEE STD DWG BA 3E2 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3A2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
6. SEE STD DWG BA 1A1 FOR GENERAL NOTES.

NO.	DATE	REMARKS
1	08/29/19	SDD MOVED DESIGN ONLY NOTES TO RDM SHEETS.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

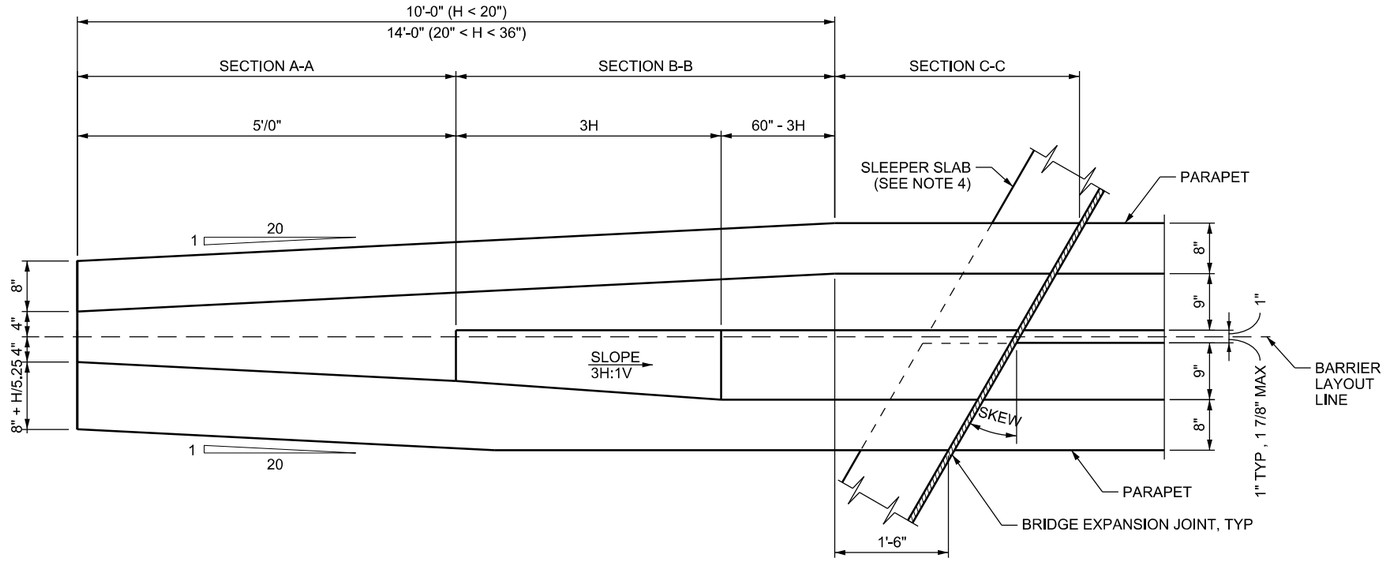
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER WITH SCUPPERS - 42 INCH, TL-5

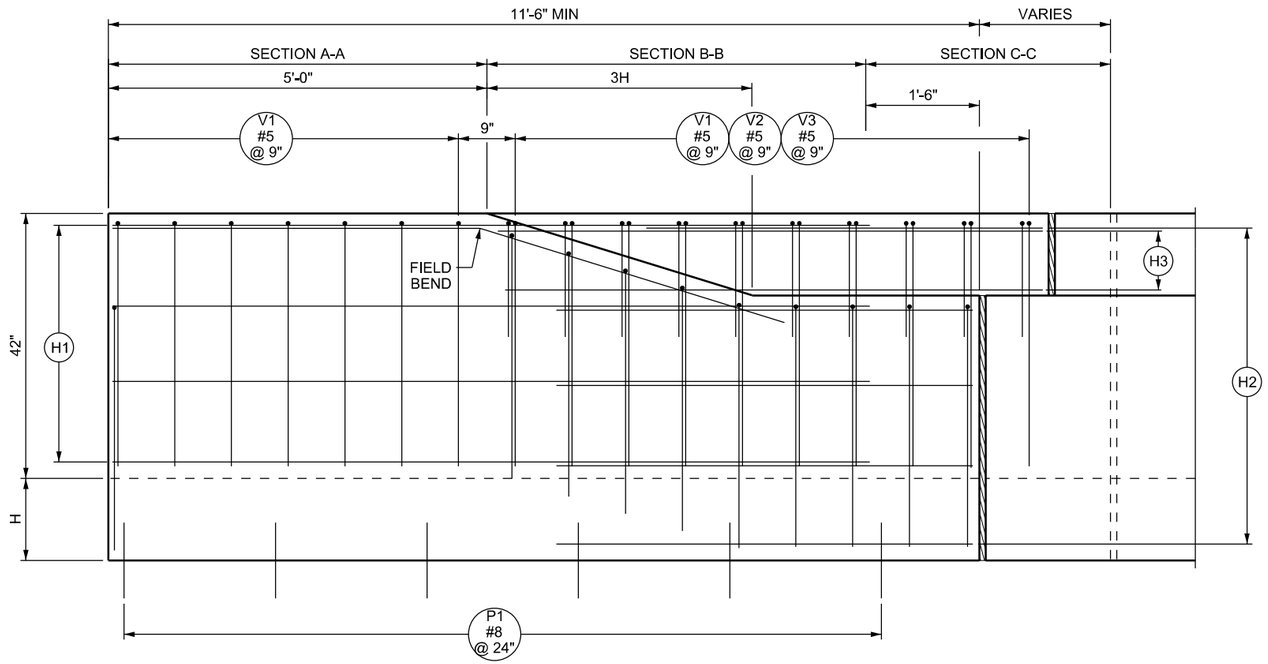
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3E3

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA03E3.dgn
23-JUN-2020



PLAN - SKEW < 30°



ELEVATION - SKEW < 30°

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3F3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.
3. SLEEPER SLAB ENDS AT FACE OF PARAPET FOR H GREATER THAN 14 INCHES.

REVISIONS			
NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTE TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

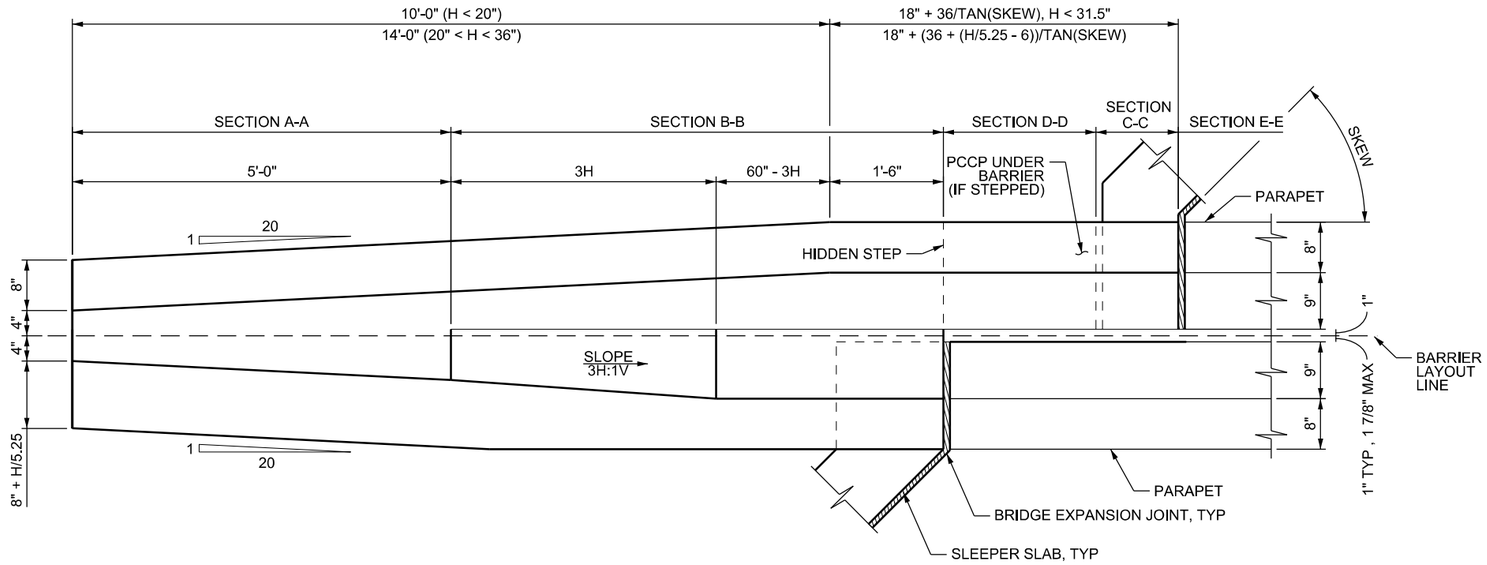
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, BRIDGE PARAPET TRANSITION 1 OF 3

STANDARD DRAWING TITLE

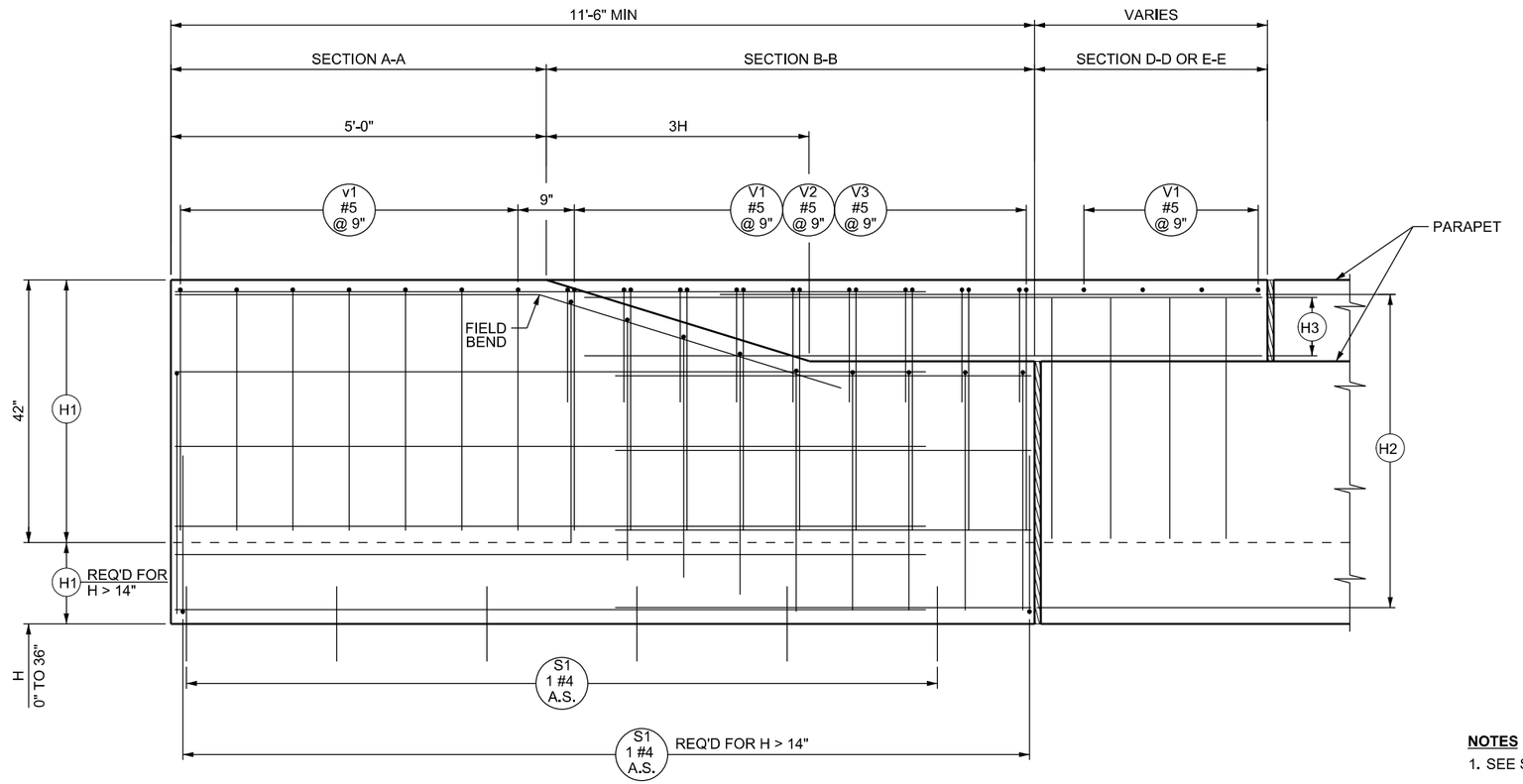
STD. DWG. NO.

BA 3F1

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03F1.dgn
23-JUN-2020



PLAN - H < 36 INCH, 30° < SKEW < 45°



ELEVATION - H < 36 INCH, 30° < SKEW < 45°

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3F3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MOVED DESIGN ONLY NOTE TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

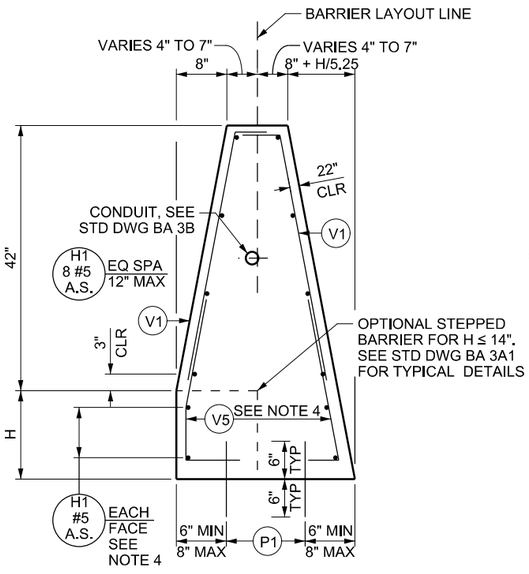
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, BRIDGE PARAPET TRANSITION 2 OF 3

STANDARD DRAWING TITLE

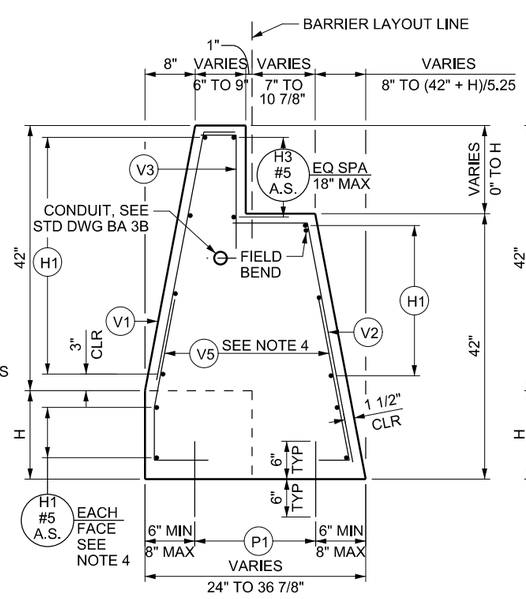
STD. DWG. NO.

BA 3F2

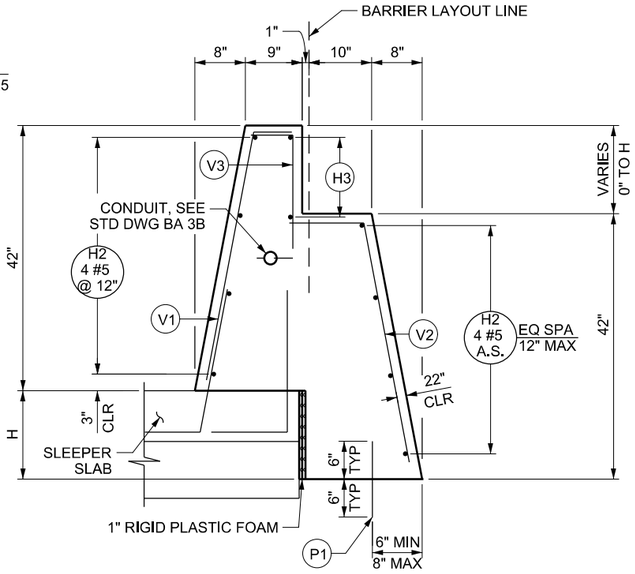
DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2_BA3)\BA03F2.dgn
23-JUN-2020



SECTION A-A

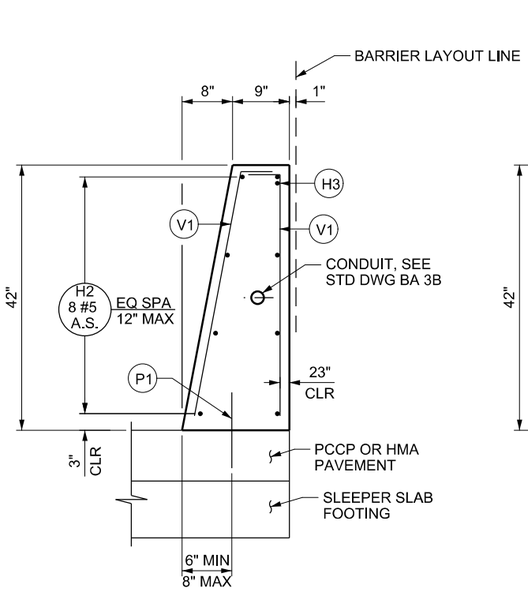


SECTION B-B



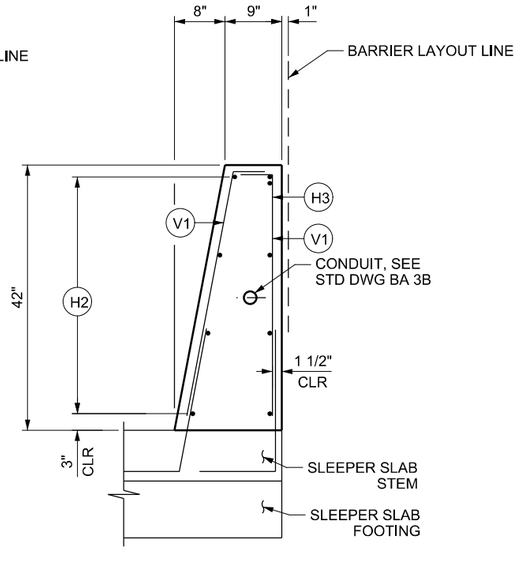
SECTION C-C

(H < 14", SKEW < 30°)



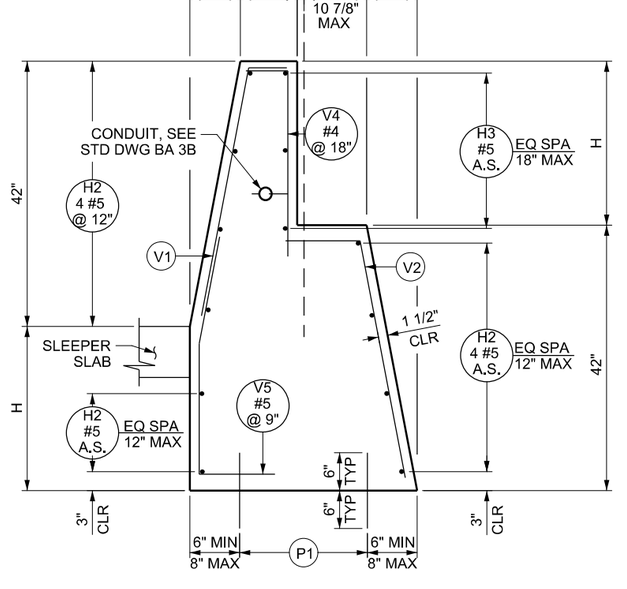
SECTION D-D

(ADJACENT APPROACH SLAB BARRIER NOT SHOWN)



SECTION E-E

(ADJACENT APPROACH SLAB BARRIER NOT SHOWN)



SECTION C-C

(H > 14 INCH, SKEW < 30°)

BAR MARK	BAR SIZE	LOCATION	SKETCH
P1	#8	PAVEMENT TO BARRIER (VERTICAL)	12" / 12" / 3" / OPTION 1 / OPTION 2
H1	#5	HORIZONTAL IN BARRIER	10'-0" FOR H < 20" / 15'-6" FOR H < 36"
H2	#5	HORIZONTAL IN BARRIER	6'-0"
H3	#5	HORIZONTAL IN BARRIER (36" MIN LAP)	VARIES
V1	#5	VERTICAL IN BARRIER	5" / 101° OR 90° / 36" / ROTATED AS NEEDED TO MAINTAIN CLEAR
V2	#5	VERTICAL IN BARRIER	12" / 101° / 36"
V3	#4	VERTICAL IN BARRIER	5" / 18" / ROTATED AS NEEDED TO MAINTAIN CLEAR
V4	#4	VERTICAL IN BARRIER	5" / H / ROTATED AS NEEDED TO MAINTAIN CLEAR
V5	#4	VERTICAL IN BARRIER	18" / H - 3" / 170° OR 180° / 90° OR 79° / 12"

NOTES

1. SEE STD DWG BA 3F1 AND BA 3F2 FOR LOCATION OF SECTIONS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. H1 AND H2 BARS CAN BE OPTIMIZED OR COMBINED.
4. ADDITIONAL H1 BARS AND V5 BARS REQUIRED FOR H GREATER THAN 14 INCHES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

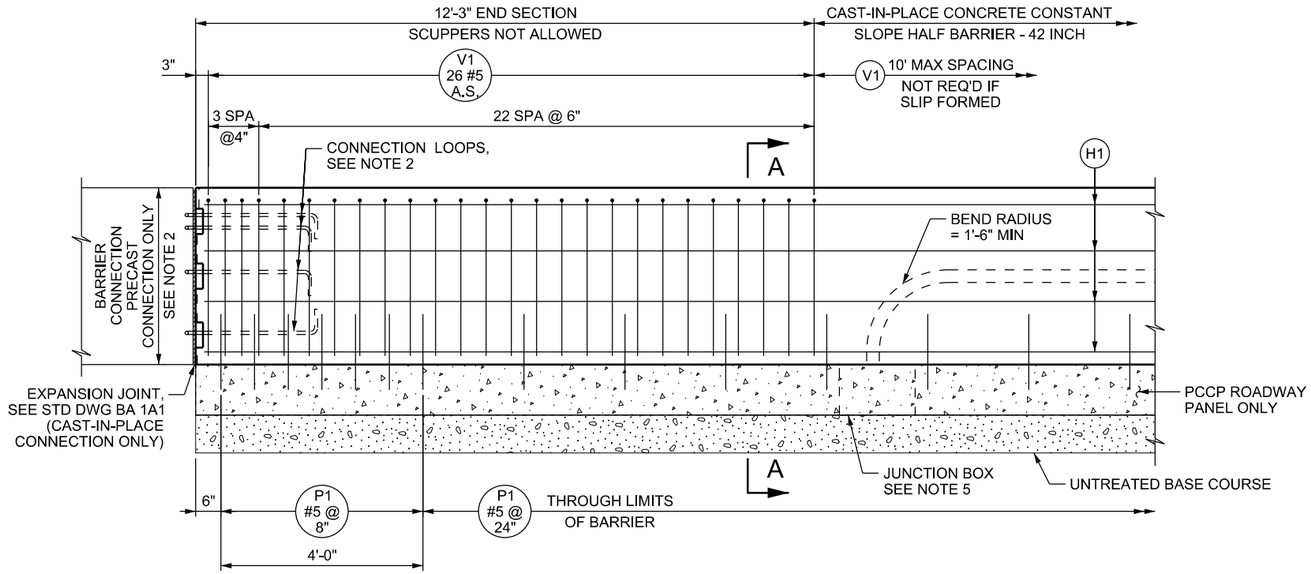
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH, BRIDGE PARAPET TRANSITION 3 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.

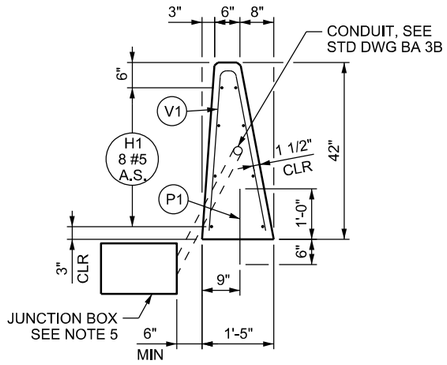
BA 3F3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03F3.dgn
23-JUN-2020

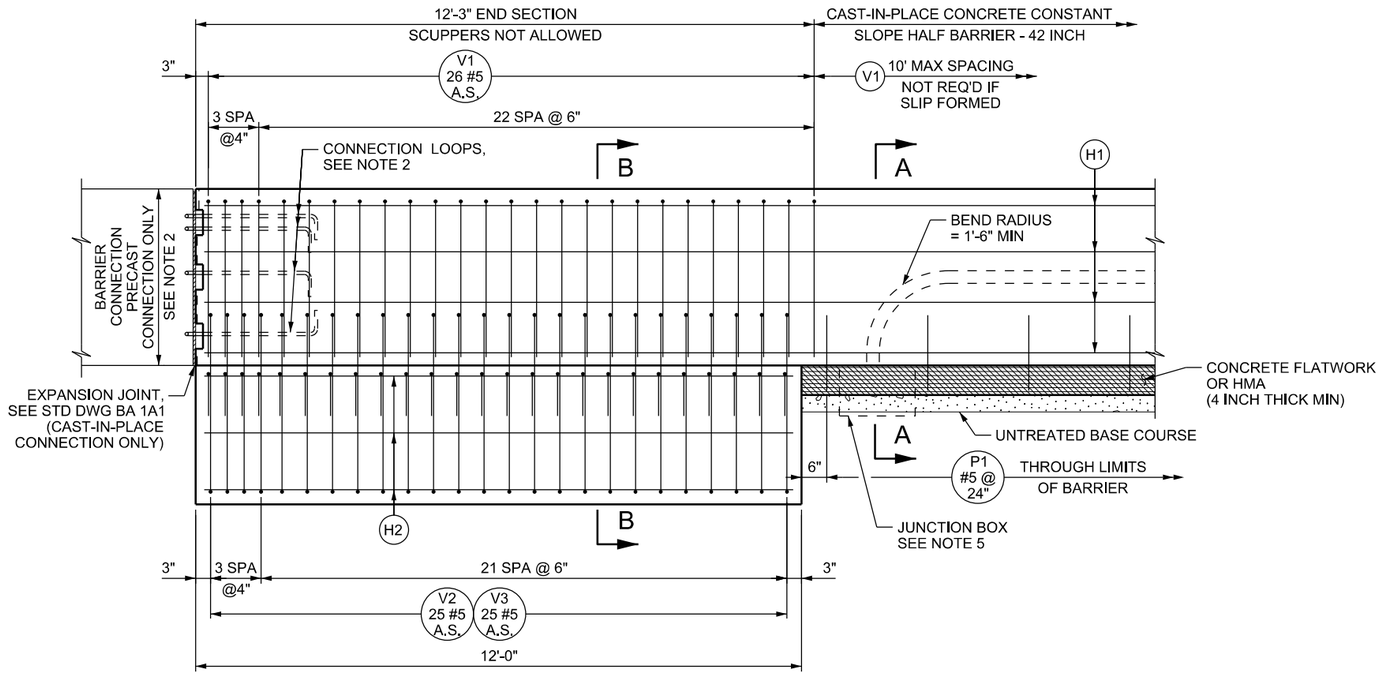


ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER
END SECTION ON PCCP

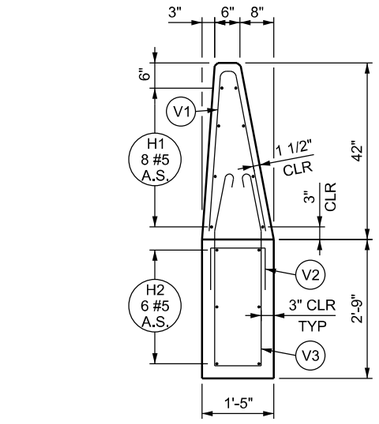


SECTION A-A



ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER
END SECTION ON HMA



SECTION B-B

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "CONSTANT SLOPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A3 FOR DETAILS. CENTER VERTICAL GROOVE OF CONNECTION DETAILS ON TOP OF BARRIER.
3. SEE STD DWG BA 3K7 FOR REINFORCING SCHEDULE AND NOTES
4. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
5. FIELD VERIFY CONDUIT IN ADJACENT BARRIER AND ADJUST CONDUIT SIZE AND QUANTITY AS NEEDED. IF NO CONDUIT EXISTS IN ADJACENT BARRIER, CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.
2	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

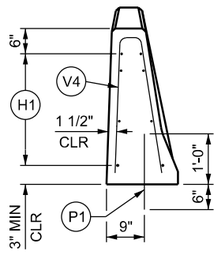
RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH 1 OF 7

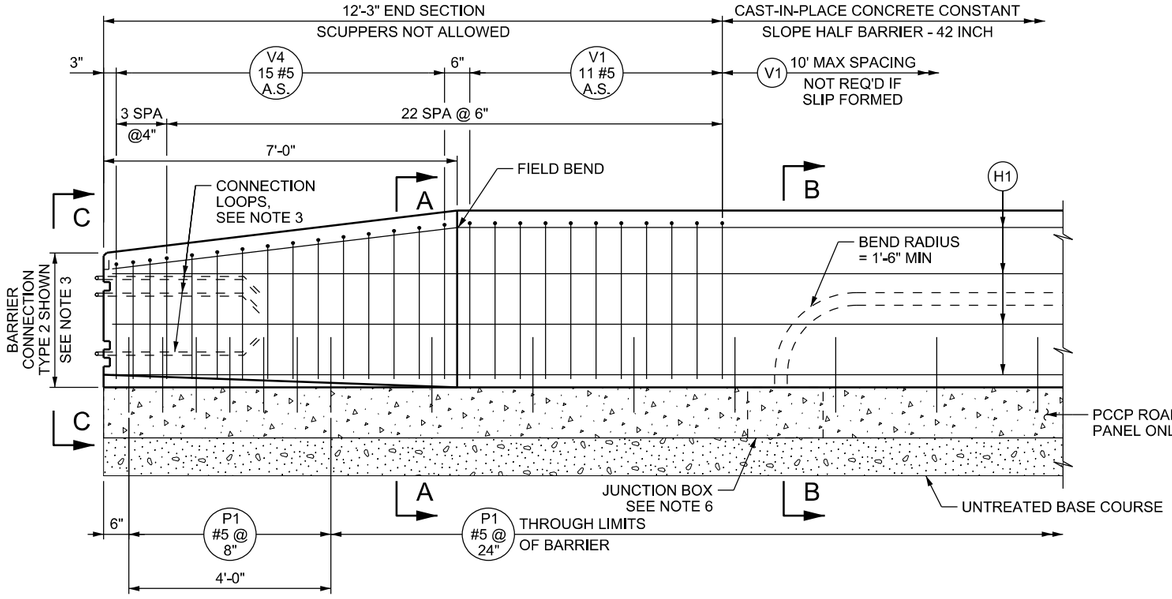
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3K1

DGN File:G:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K1.dgn
25-JUN-2020

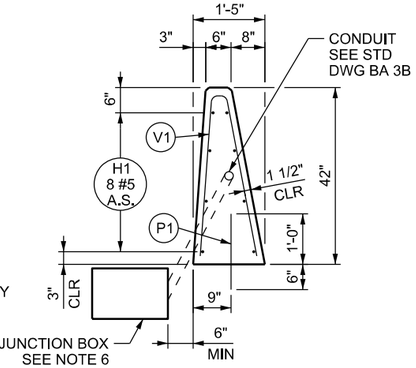


SECTION A-A

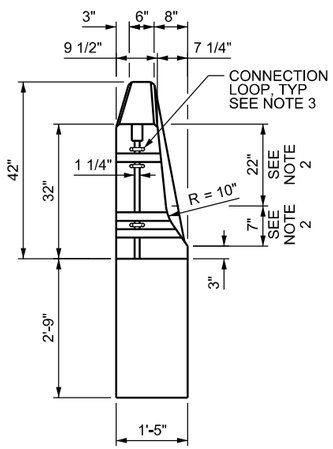


ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER TO
32 INCH F-SHAPE END SECTION ON PCCP

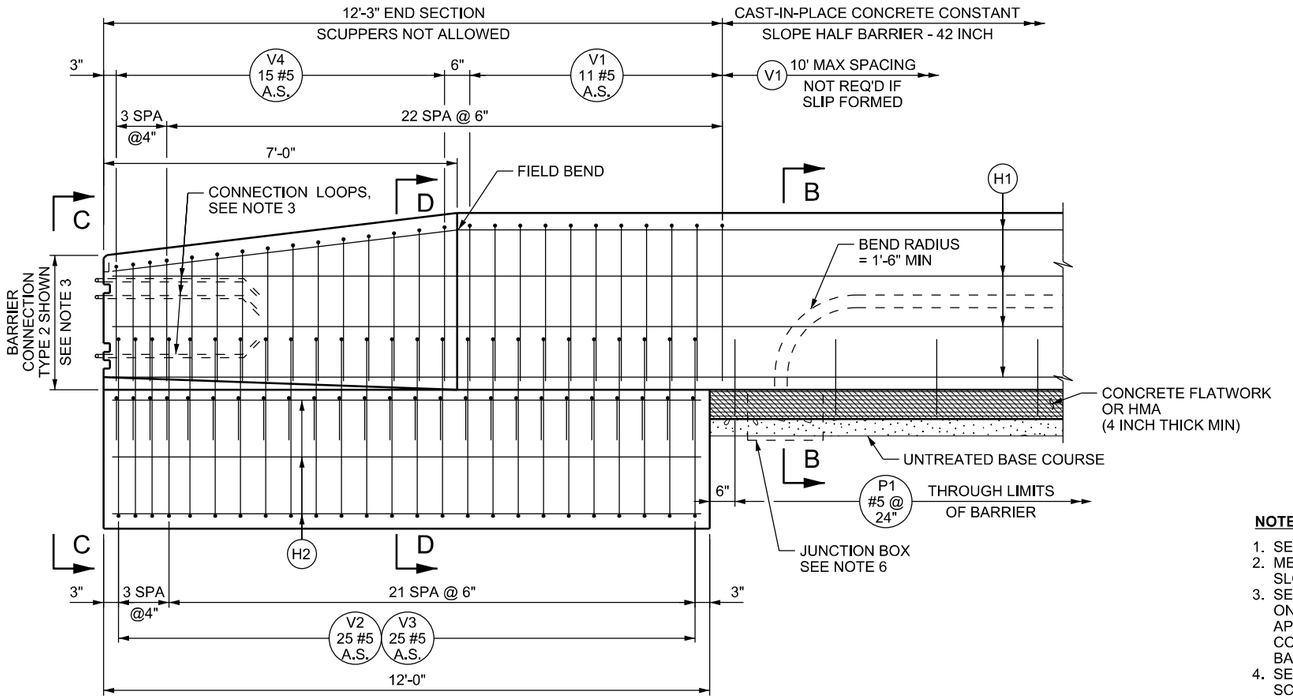


SECTION B-B



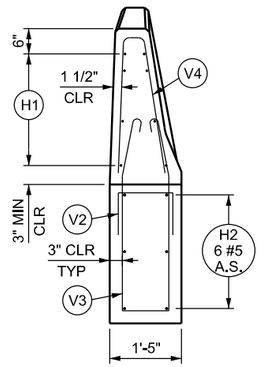
VIEW C-C

END SECTION ON HMA SHOWN,
END SECTION ON PCCP SIMILAR



ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER TO
32 INCH F-SHAPE END SECTION ON HMA



SECTION D-D

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. MEASURED TO INTERSECTION OF BARRIER SLOPES.
3. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
4. SEE STD DWG BA 3K7 FOR REINFORCING SCHEDULE AND NOTES
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
6. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

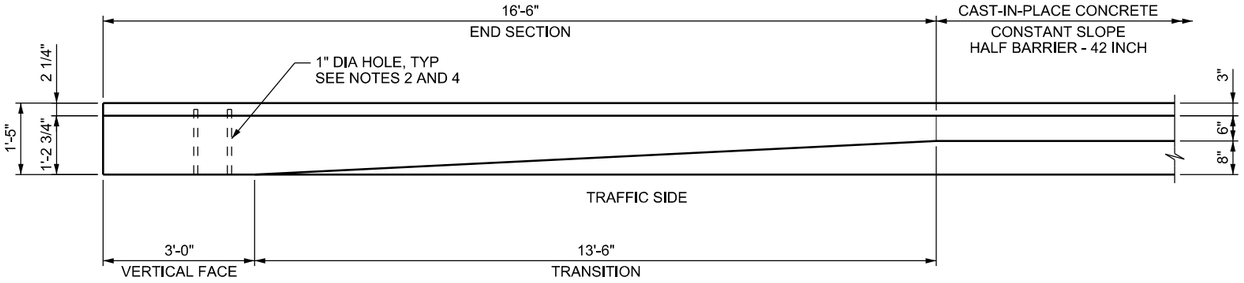
CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE HALF BARRIER -
42 INCH
2 OF 7

STANDARD DRAWING TITLE

STD. DWG. NO.

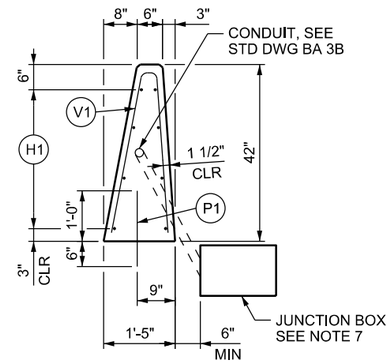
BA 3K2

25-JUN-2020 DGN File:G:\Standardsandspecsection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K2.dgn

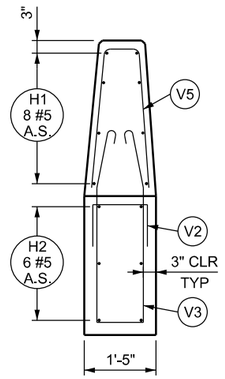


PLAN

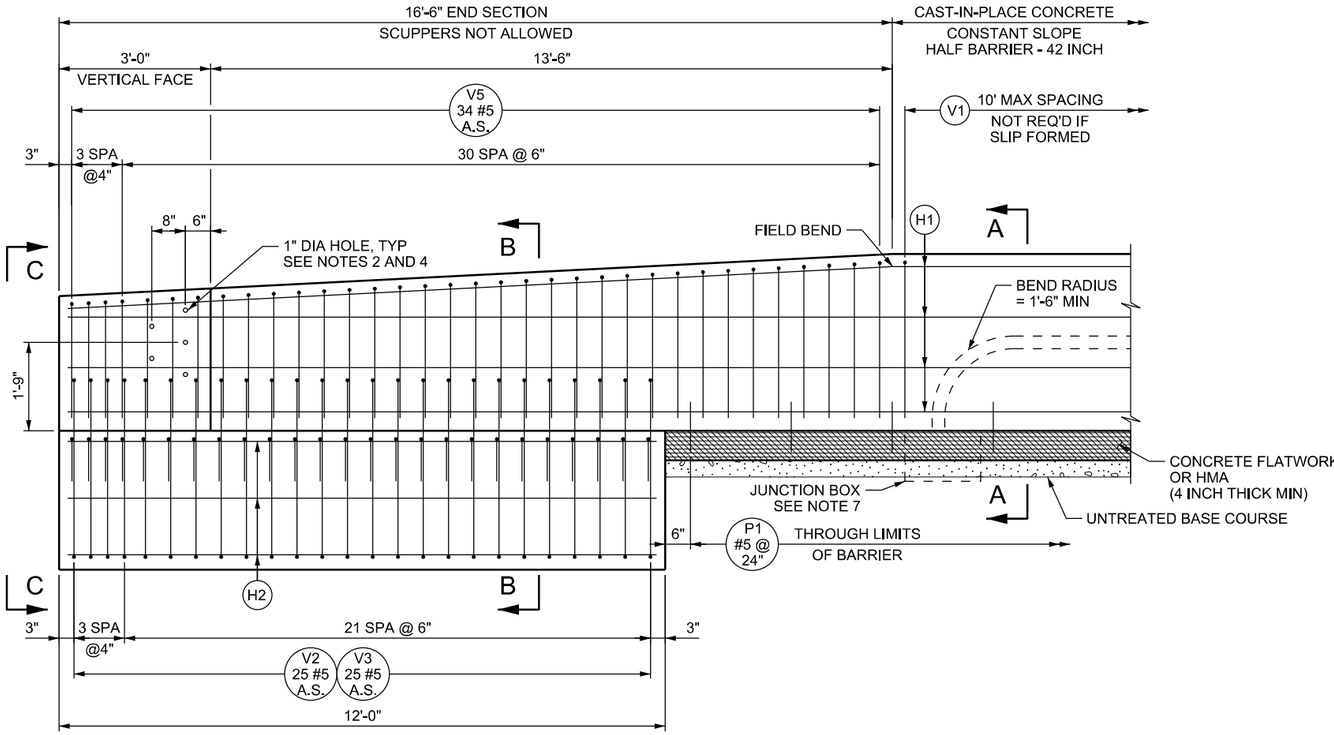
42 INCH CONSTANT SLOPE HALF BARRIER TO
32 INCH VERTICAL FACE END SECTION ON HMA



SECTION A-A

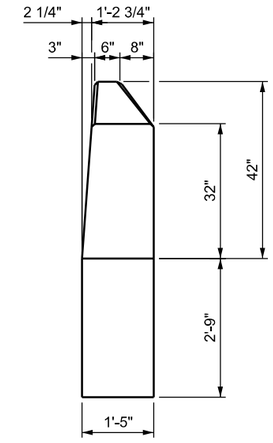


SECTION B-B



ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER TO
32 INCH VERTICAL FACE END SECTION ON HMA
SEE NOTE 6



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH THRIE-BEAM STRUCTURAL HEX BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK BARRIER PAD.
4. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
5. SEE STD DWG BA 3K7 FOR REINFORCING STEEL SCHEDULE AND NOTES.
6. USE THIS END SECTION TO TRANSITION TO THRIE-BEAM GUARDRAIL, END TREATMENTS, OR CRASH CUSHIONS.
7. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

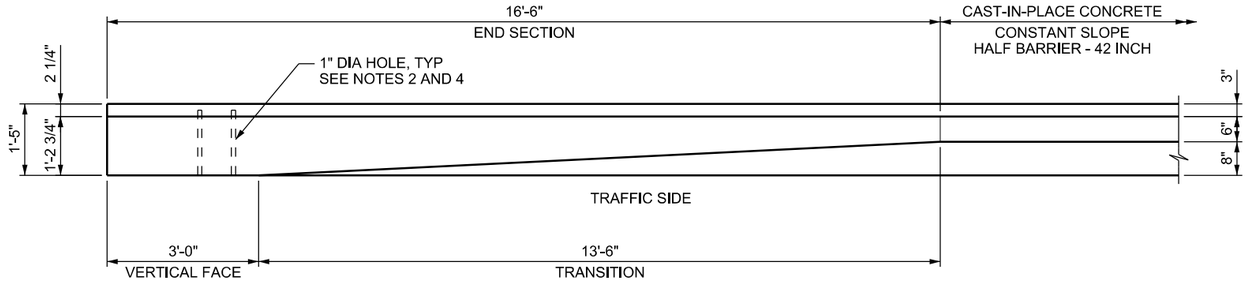
CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH 3 OF 7

STANDARD DRAWING TITLE

STD. DWG. NO.

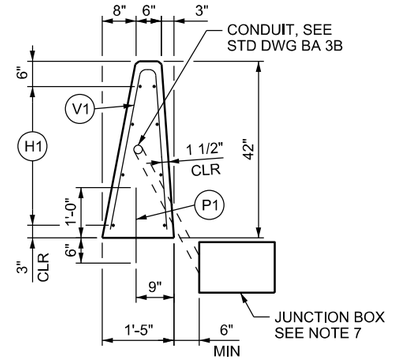
BA 3K3

DGN File:D:\Standardsand$pecsSection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K3.dgn
25-JUN-2020

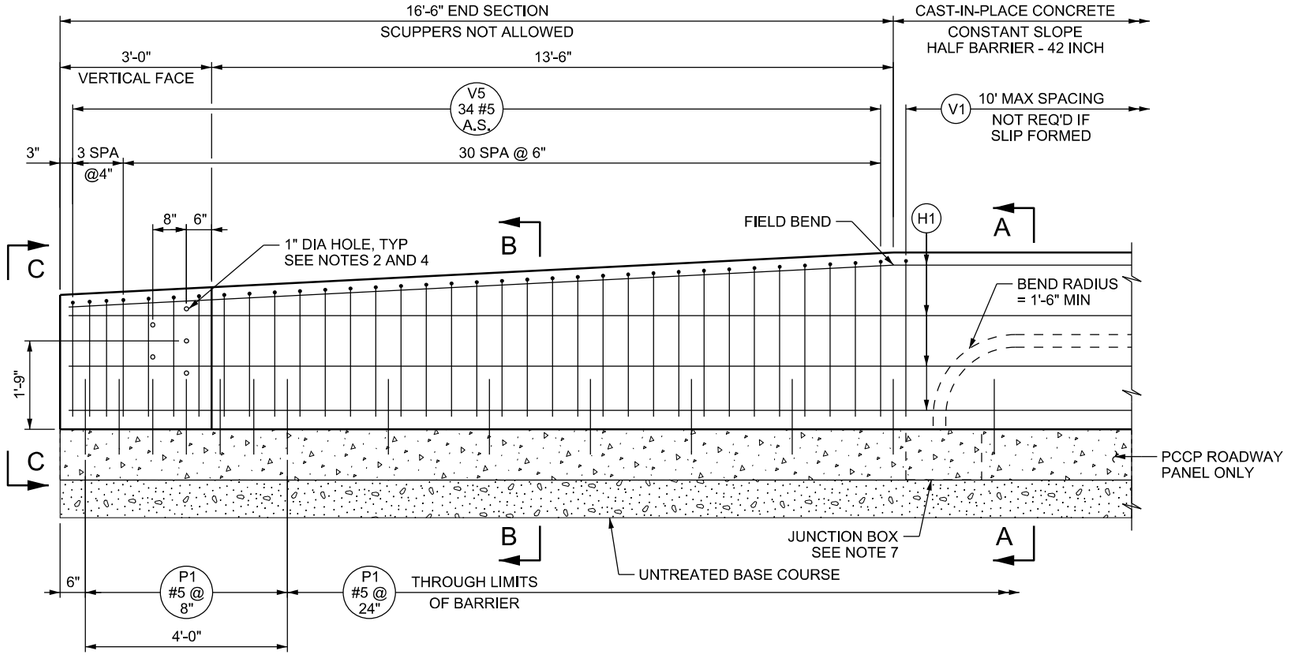


PLAN

42 INCH CONSTANT SLOPE HALF BARRIER TO
32 INCH VERTICAL FACE END SECTION ON PCCP

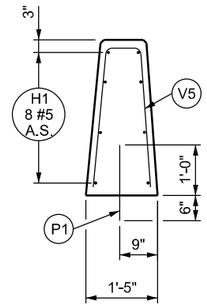


SECTION A-A

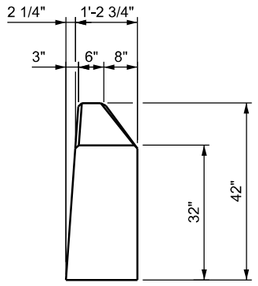


ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER TO
32 INCH VERTICAL FACE END SECTION ON PCCP
SEE NOTE 6



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH THRIE-BEAM STRUCTURAL HEX BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PANEL.
4. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
5. SEE STD DWG BA 3K7 FOR REINFORCING STEEL SCHEDULE AND NOTES.
6. USE THIS END SECTION TO TRANSITION TO THRIE-BEAM GUARDRAIL, END TREATMENTS, OR CRASH CUSHIONS.
7. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL

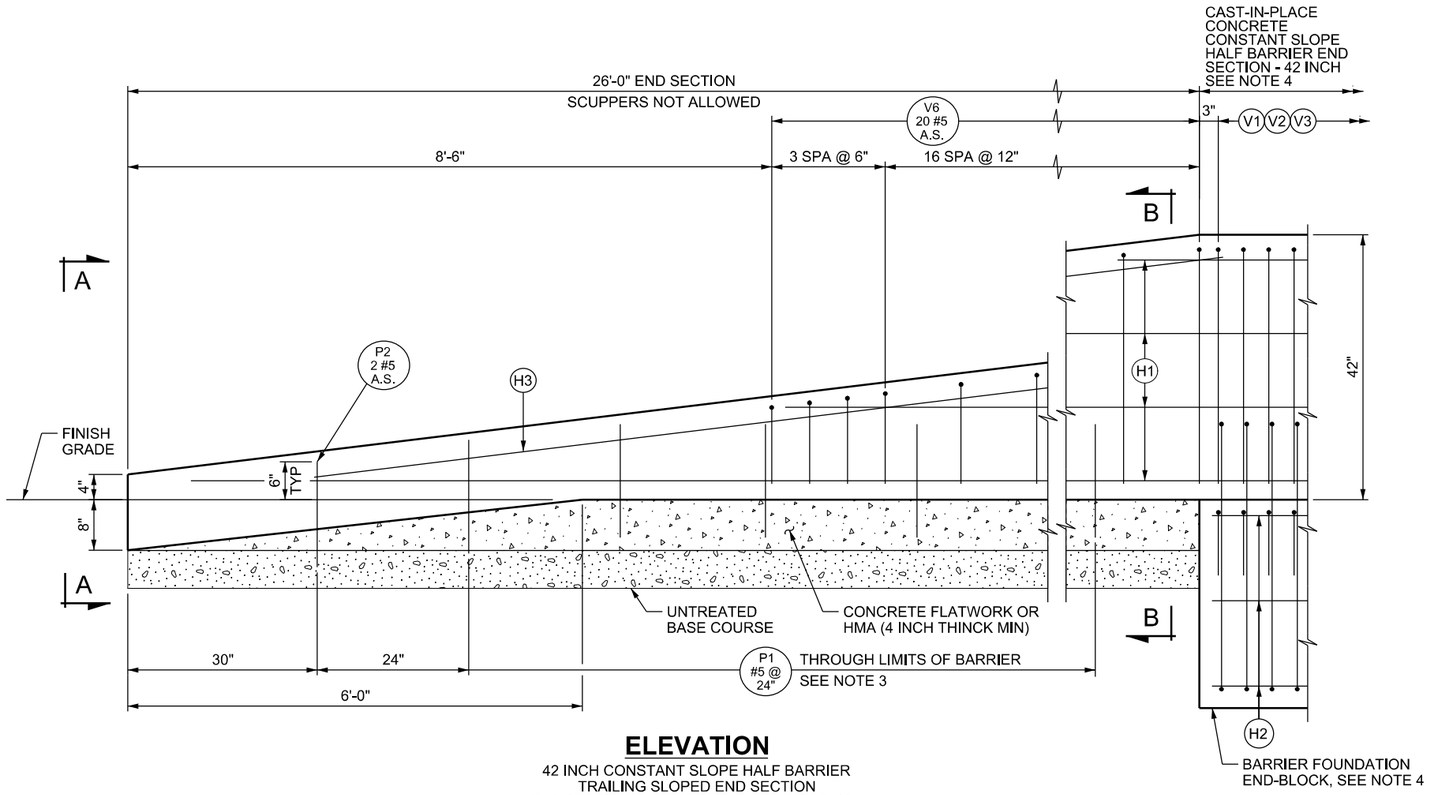
AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE HALF BARRIER -
42 INCH
4 OF 7

STANDARD DRAWING TITLE

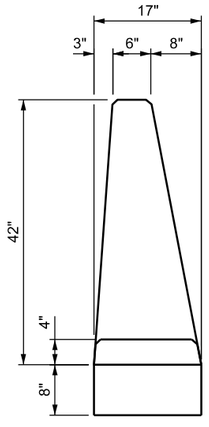
STD. DWG. NO.
BA 3K4

DGN File:D:\Standards\Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K4.dgn
25-JUN-2020

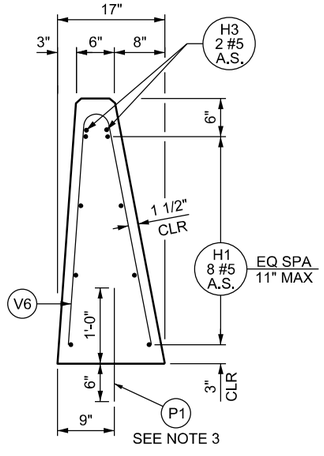


ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER
TRAILING SLOPED END SECTION
END SECTION ON HMA SHOWN, END SECTION
ON PCCP ROADWAY PANEL SIMILAR



VIEW A-A



SECTION B-B

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3K7 FOR REINFORCING STEEL SCHEDULE AND NOTES.
3. REDUCE EMBEDMENT AT END OF BARRIER TO PROVIDE A MINIMUM 2 INCH COVER TO TOP OF BARRIER.
4. INSTALL CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER END SECTION AS SHOWN ON BA 3K1. USE THE APPROPRIATE END SECTION FOR PCCP ROADWAY PANEL, CONCRETE FLATWORK, OR HMA PAVEMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	DELETED DESIGN ONLY NOTES.
2	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

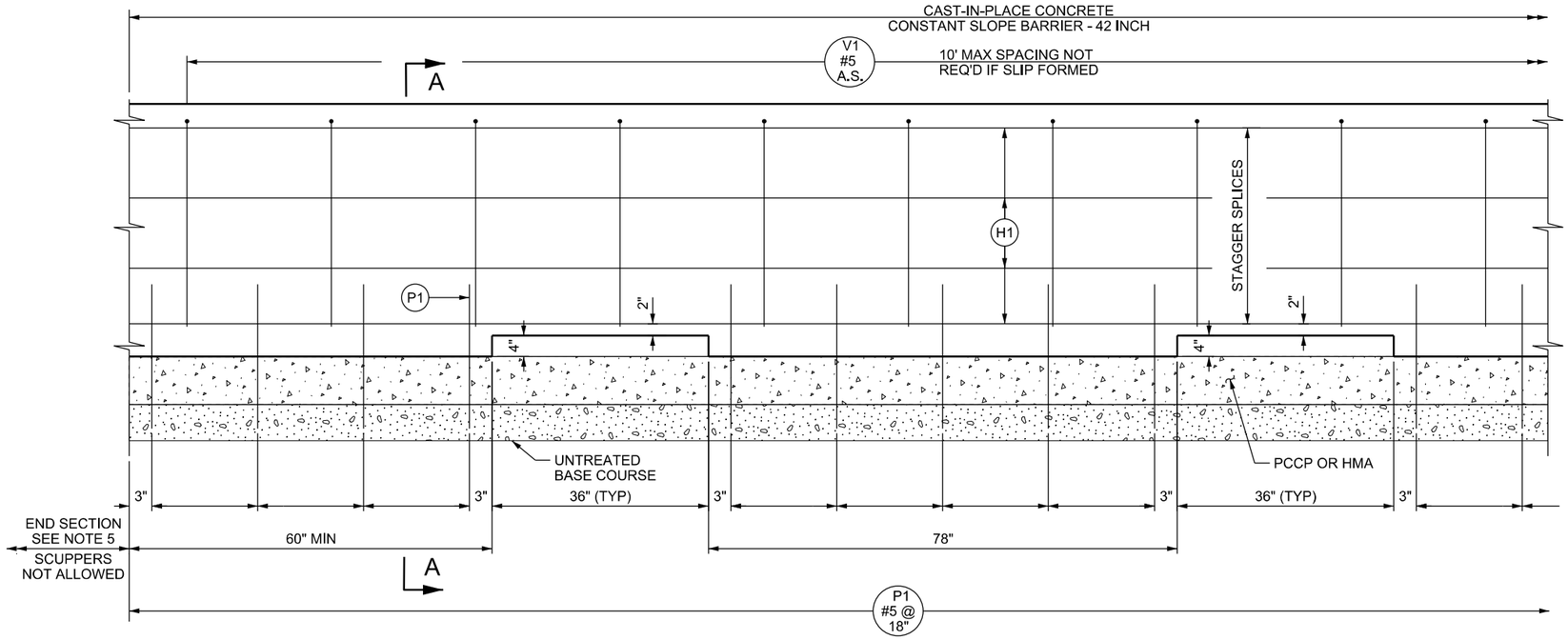
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH 5 OF 7

STANDARD DRAWING TITLE

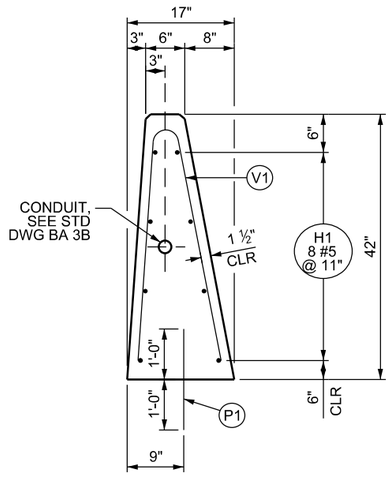
STD. DWG. NO.
BA 3K5

25-JUN-2020 DGN File:D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K5.dgn



ELEVATION

42 INCH CONSTANT SLOPE HALF BARRIER
WITH SCUPPERS



SECTION A-A

NOTES:

1. SEE STD DWG BA 1A1 FOR FOR GENERAL NOTES.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
3. SEE STD DWG BA 3K7 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3K1, BA 3K2, BA 3K3, BA 3K4, AND BA 3K5 FOR END SECTION LENGTH AND REINFORCING DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.
2	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

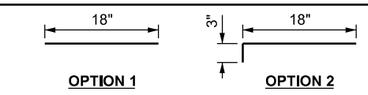
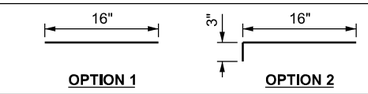
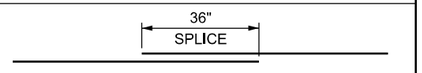
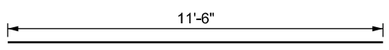
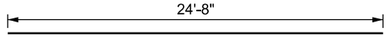
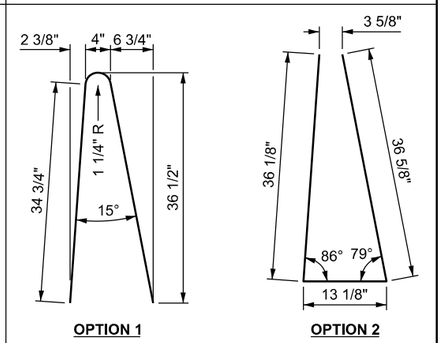
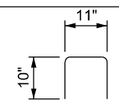
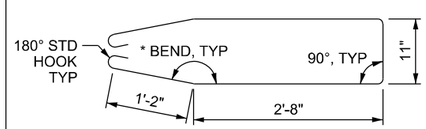
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH
6 OF 7
STANDARD DRAWING TITLE

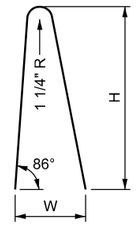
STD. DWG. NO.
BA 3K6

25-JUN-2020 DGN File: G:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K6.dgn

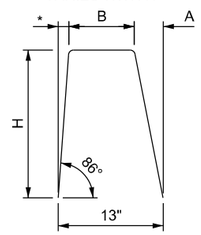
CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH REINFORCING SCHEDULE

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
P1	#5	AS NEEDED	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
P2	#5	2	PAVEMENT TO BARRIER AT TRAILING SLOPED END SECTION (VERTICAL)	
H1	#5	AS NEEDED	HORIZONTAL IN BARRIER CONTINUOUS THROUGH LENGTH OF BARRIER	
H2	#5	6	HORIZONTAL IN FOUNDATION	
H3	#5	2	HORIZONTAL IN BARRIER ALONG TOP FACE AT TRAILING SLOPED END SECTION	
V1	#5	AS NEEDED	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 6'-4" OPTION 2 = 7'-1 7/8"	
V2	#5	25	VERTICAL IN FOUNDATION TOTAL LENGTH = 2'-7"	
V3	#5	25	VERTICAL IN FOUNDATION TOTAL LENGTH = 9'-9"	* 169° FOR BA 3K1 AND BA 3K3 145° FOR BA 3K2 

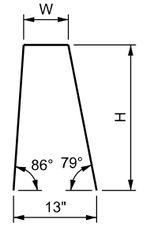
CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH REINFORCING SCHEDULE - CONTINUED

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V4	#5	15	VERTICAL IN BARRIER	

H	W	QTY
36 1/2"	13"	1
36"	13"	1
35"	12 1/2"	1
34 1/2"	12 1/2"	1
33 1/2"	12"	1
33"	12"	1
32"	11 1/2"	1
31 1/2"	11 1/2"	1
30 1/2"	11"	1
30"	11"	1
29"	10 1/2"	1
28 1/2"	10 1/2"	1
28"	10 1/2"	1
27 1/2"	10"	1
27"	10"	1

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V5	#5	34	VERTICAL IN BARRIER	* VARIES WITH H 

H	A	B	QTY
36"	5"	5"	4
35"	4"	5"	2
34"	4"	6"	4
33"	3"	7"	3
32"	3"	7"	3
31"	2"	8"	3
30"	2"	8"	4
29"	1"	9"	3
28"	0"	10"	3
27"	0"	11"	5

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V6	#5	20	VERTICAL IN TRAILING SLOPED END SECTION	

H	W	QTY
37"	3 1/2"	1
35 1/2"	3 1/2"	1
34"	4"	1
32 1/2"	4 1/2"	1
31"	5"	1
29 1/2"	5"	1
28"	5 1/2"	1
27"	6"	1
25 1/2"	6 1/2"	1
24"	6 1/2"	1
22 1/2"	7"	1
21"	7 1/2"	1
19 1/2"	8"	1
18"	8 1/2"	1
16 1/2"	8 1/2"	1
15"	9"	1
13 1/2"	9 1/2"	1
13"	9 1/2"	1
12"	10"	1
11 1/2"	10"	1

NOTES

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT OR 4 INCH THICK CONCRETE BARRIER PAD.
2. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.
3. SEE STD DWG BA 3K1, BA 3K2, BA 3K3, BA 3K4, BA 3K5, AND BA 3K6 FOR REINFORCING STEEL LOCATION.

1

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3K DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

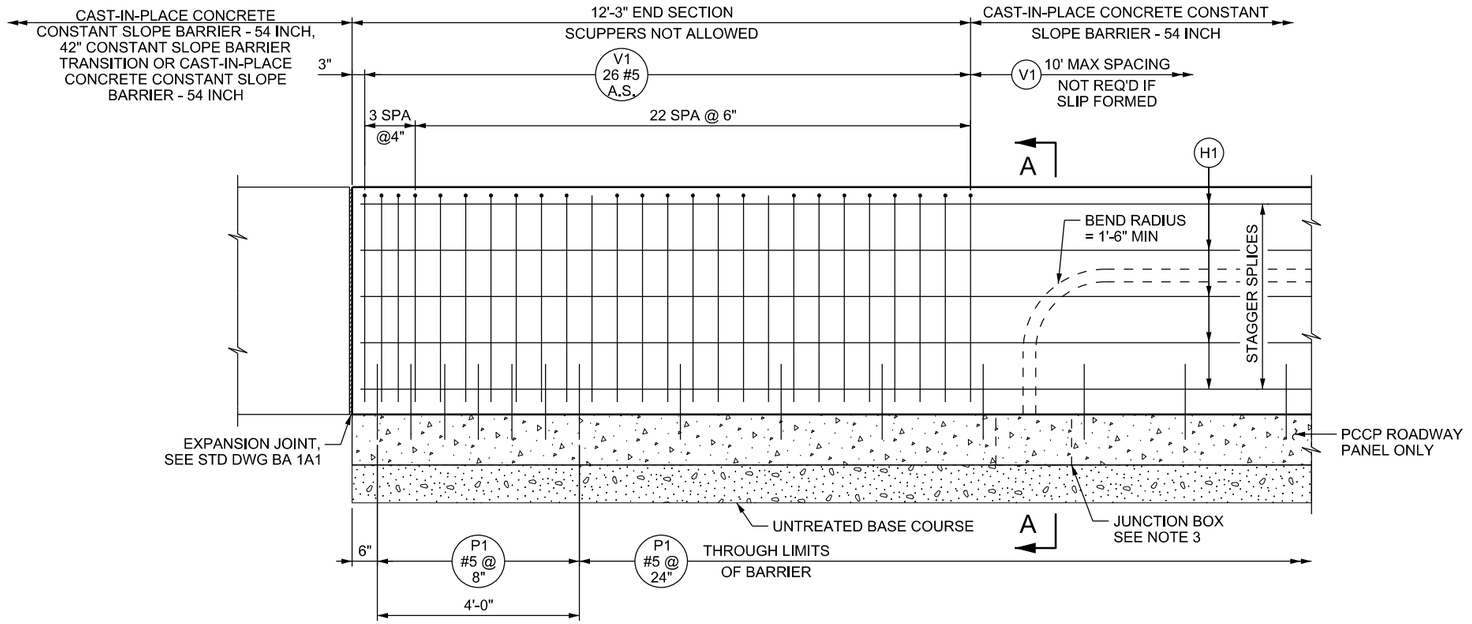
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

1

CAST-IN-PLACE CONCRETE CONSTANT SLOPE HALF BARRIER - 42 INCH
7 OF 7
STANDARD DRAWING TITLE

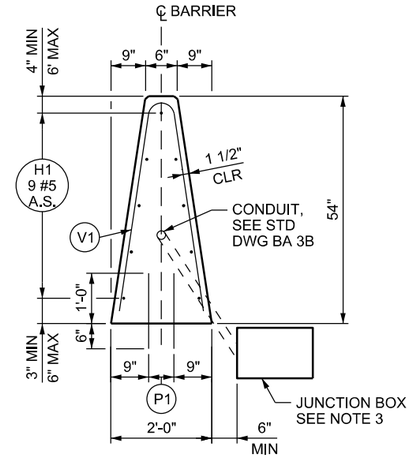
STD. DWG. NO.
BA 3K7

DGN Files:D:\StandardsAndSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03K7.dgn
25-JUN-2020



ELEVATION

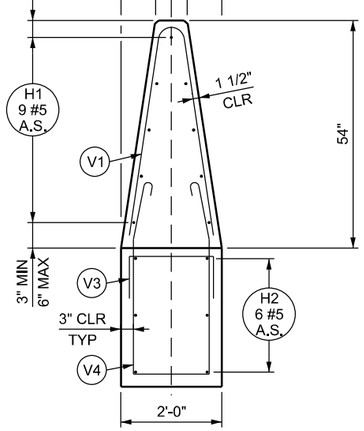
54 INCH CONSTANT SLOPE BARRIER
END SECTION ON PCCP



SECTION A-A

ELEVATION

54 INCH CONSTANT SLOPE BARRIER
END SECTION ON HMA



SECTION B-B

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3M2 FOR STEPPED MEDIAN BARRIER DETAILS.
3. FIELD VERIFY CONDUIT IN EXISTING ADJACENT BARRIER AND ADJUST SIZE AND QUANTITY AS NEEDED. IF NO CONDUIT EXISTS IN ADJACENT BARRIER, CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.
4. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING SCHEDULE AND NOTES
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.
2	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

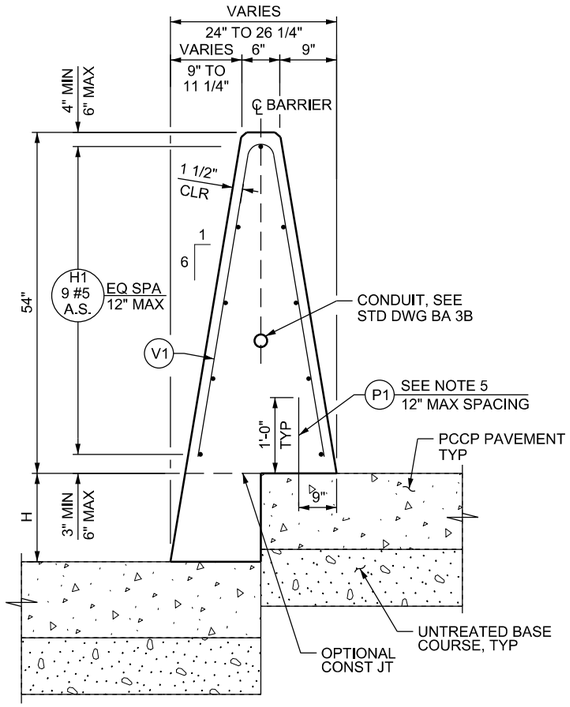
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-3
1 OF 10

STANDARD DRAWING TITLE

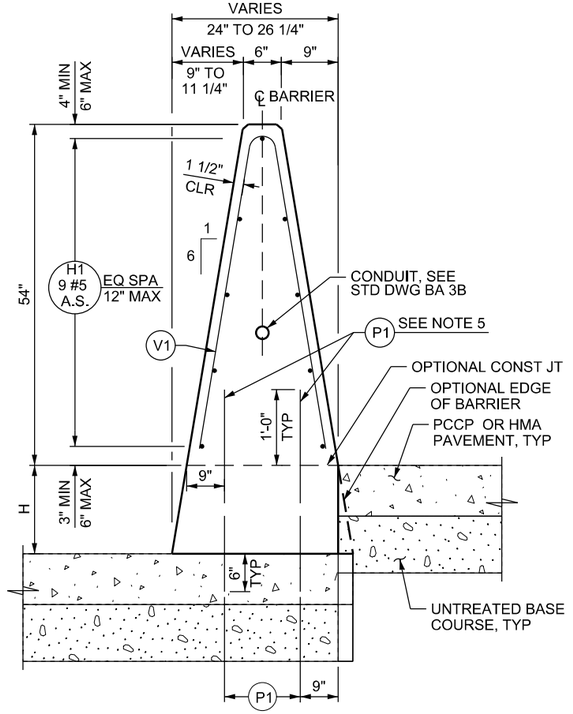
STD. DWG. NO.
BA 3M1

DGN Files:D:\Standardsandspecsection\Standards Committees\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M01-CastinPlaceConcreteConstantSlopeBarrier54inch,TL3-1of10.dgn
25-JUN-2020



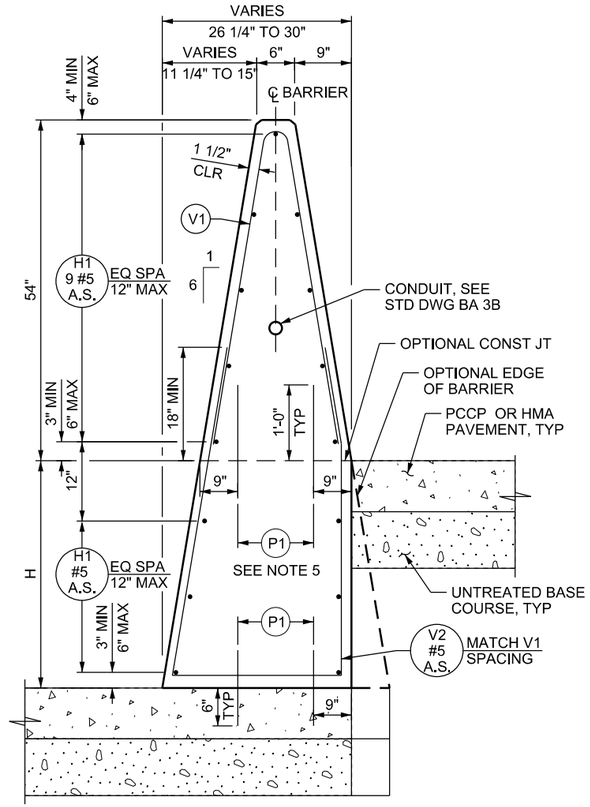
STEPPED MEDIAN BARRIER

H = 0 INCH TO 14 INCH (PCCP ONLY)



STEPPED MEDIAN BARRIER

H = 0 INCH TO 14 INCH (PCCP OR HMA)



STEPPED MEDIAN BARRIER

H = 14 INCH TO 36 INCH

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3M1 FOR CONSTANT SLOPE BARRIER DETAILS.
3. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING SCHEDULE AND NOTES.
4. V2 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
5. P1 BARS THROUGH THE OPTIONAL CONSTRUCTION JOINT ARE NOT REQUIRED IF THE CONSTRUCTION JOINT IS NOT USED OR IF V2 BAR IS PRESENT.
6. USE A MAXIMUM OF 12 INCH SPACING FOR P1 BARS. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.
2	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

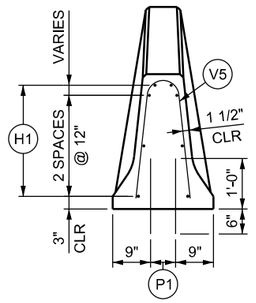
CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE BARRIER -
54 INCH, TL-3
2 OF 10

STANDARD DRAWING TITLE

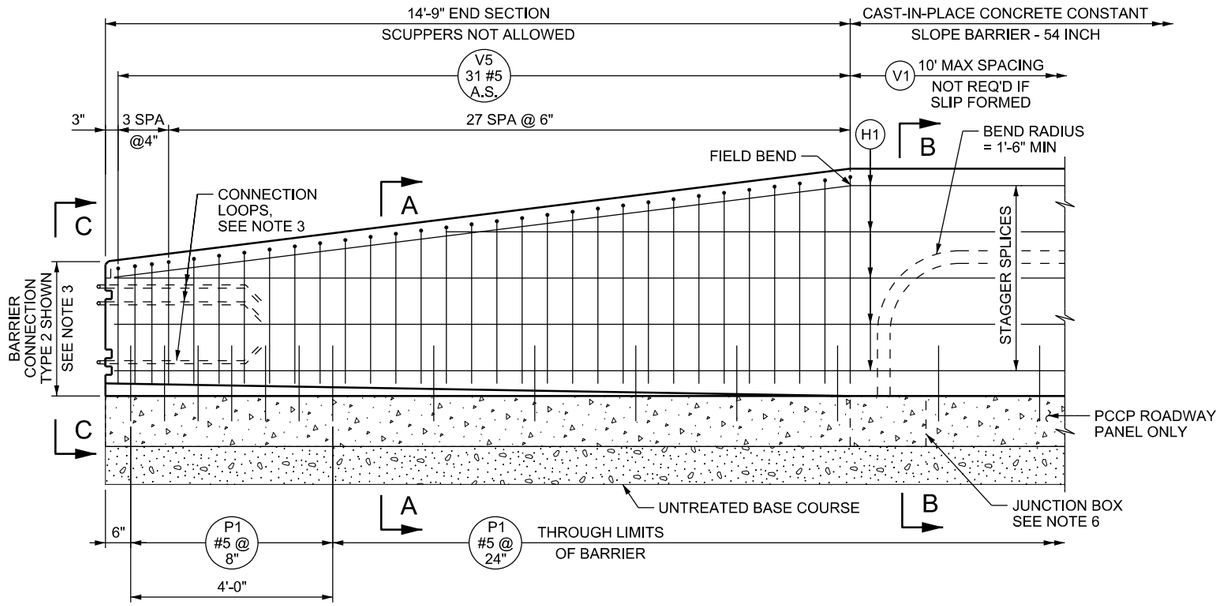
STD. DWG. NO.

BA 3M2

DGN File:G:\Standardsand Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M02-ConstrPlaceConcreteConstantSlopeBarrier-54Inch,TL3-2of10.dgn
25-JUN-2020

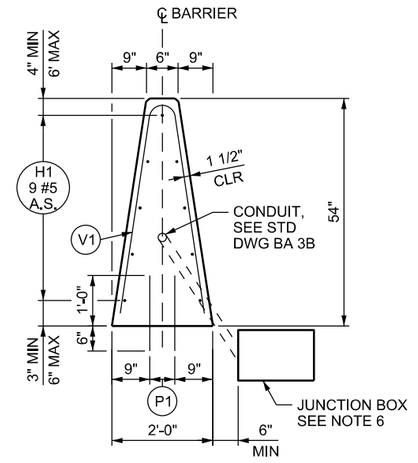


SECTION A-A

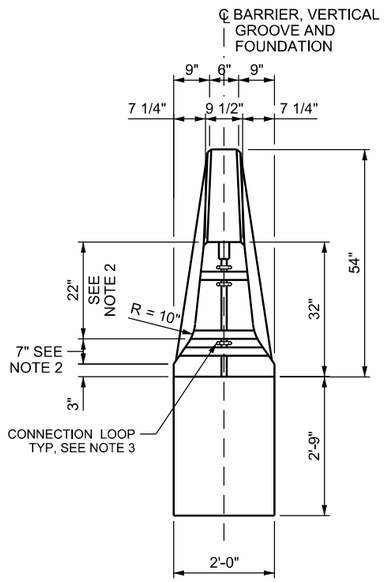


ELEVATION

54 INCH CONSTANT SLOPE BARRIER TO
32 INCH F-SHAPE END SECTION ON PCCP

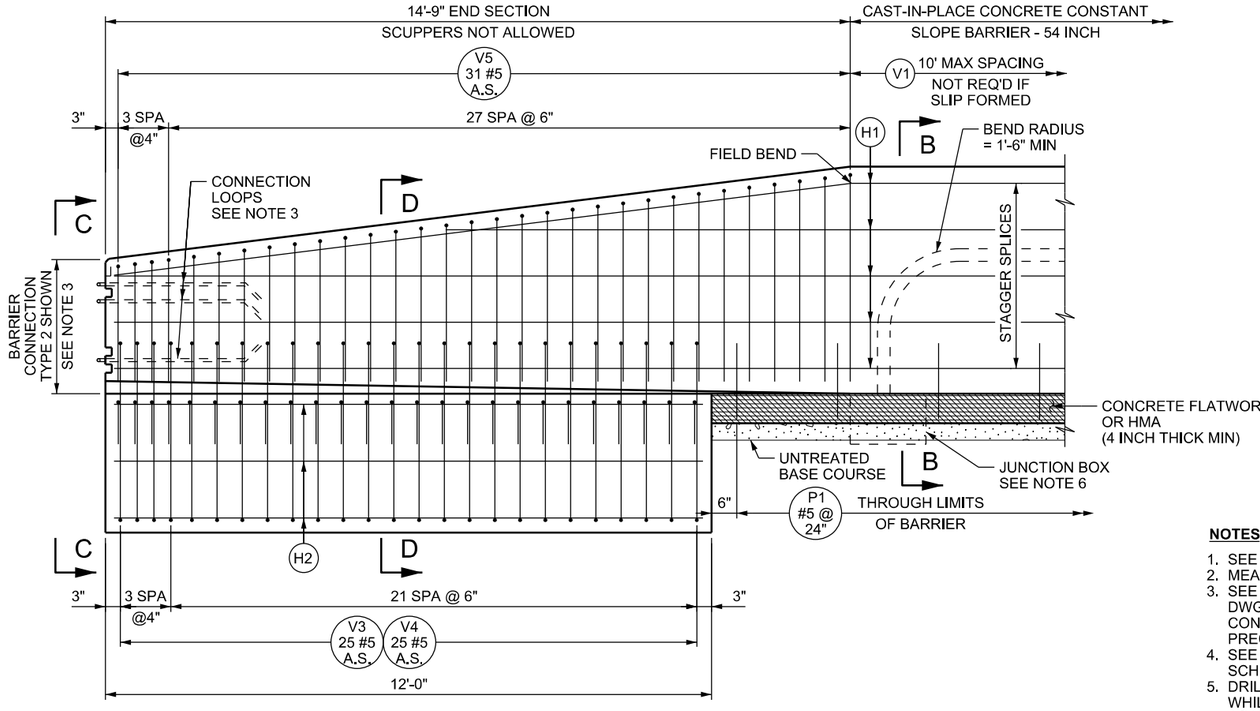


SECTION B-B



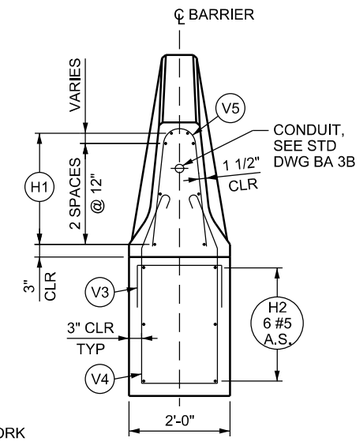
VIEW C-C

END SECTION ON HMA SHOWN,
END SECTION ON PCCP SIMILAR



ELEVATION

54 INCH CONSTANT SLOPE BARRIER TO
32 INCH F-SHAPE END SECTION ON HMA



SECTION D-D

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. MEASURED TO INTERSECTION OF BARRIER SLOPE.
3. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
4. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING SCHEDULE AND NOTES
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
6. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

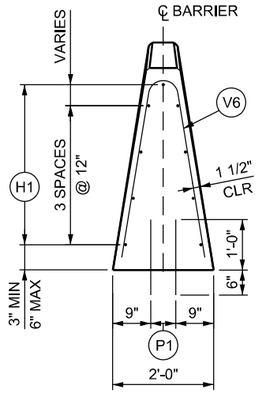
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-3 3 OF 10

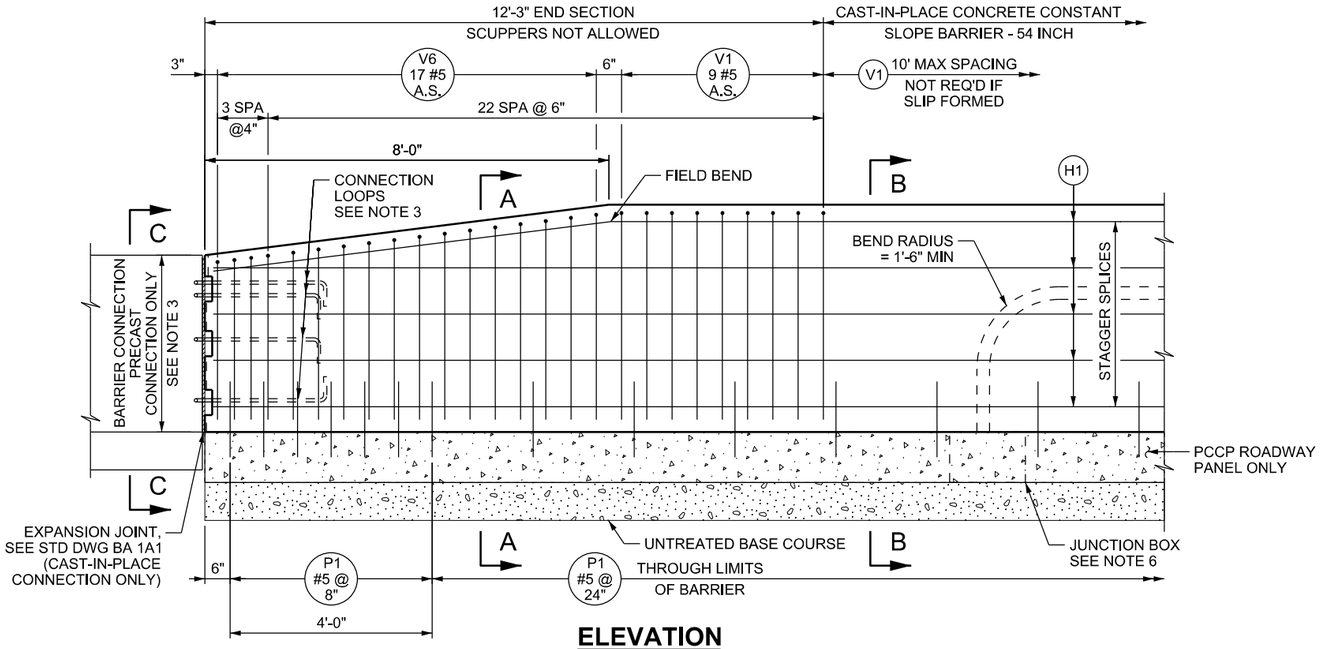
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3M3

DGN Files:D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M03-CastinPlaceConcreteConstantSlopeBarrier54Inch_TL3-3of10.dgn
25-JUN-2020

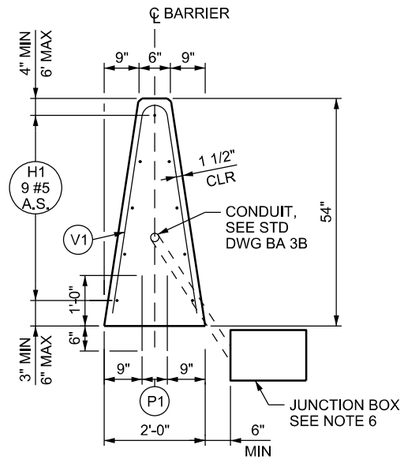


SECTION A-A

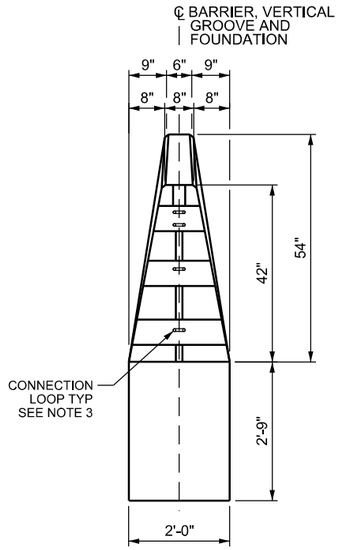


ELEVATION

54 INCH CONSTANT SLOPE BARRIER TO
42 INCH CONSTANT SLOPE END SECTION ON PCCP

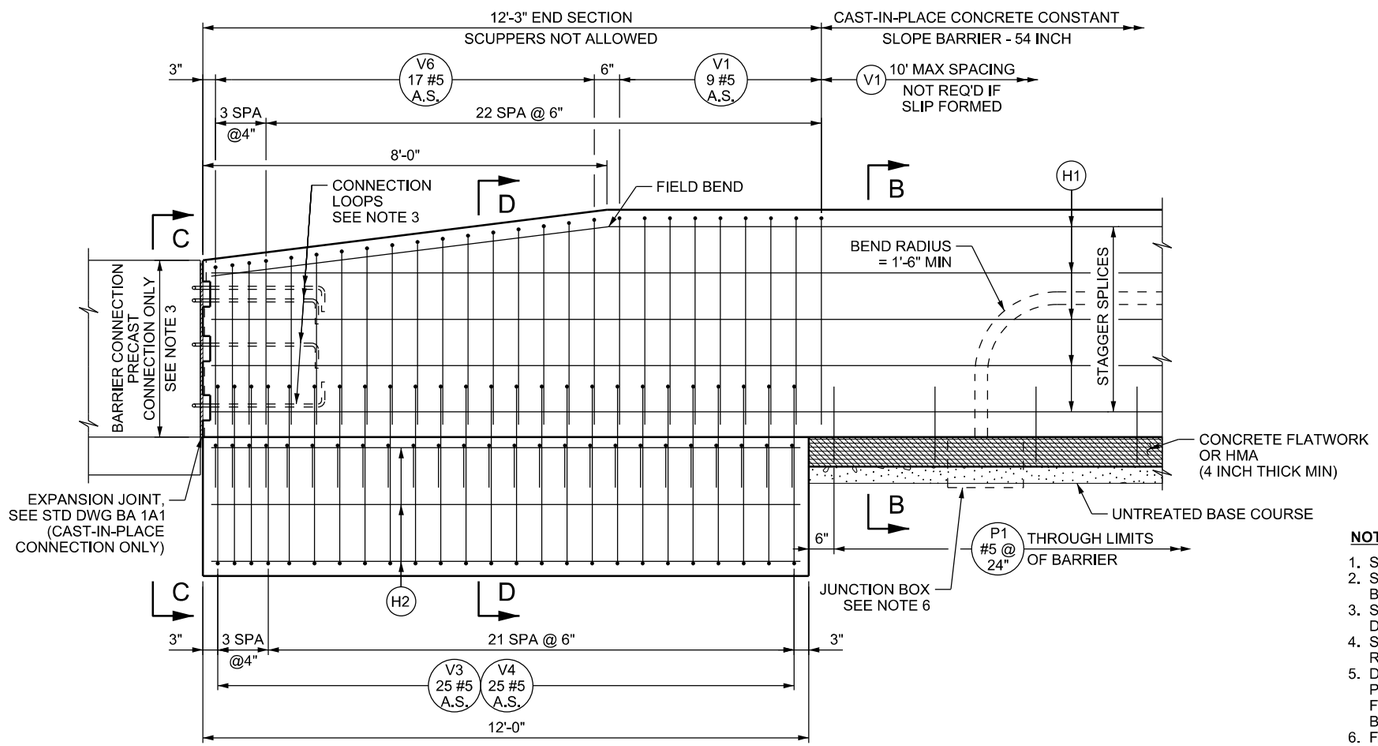


SECTION B-B



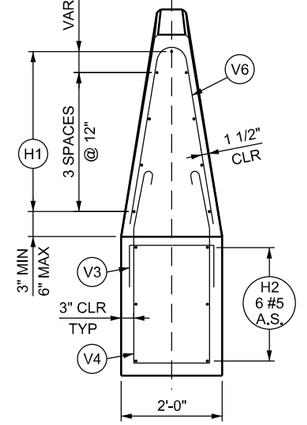
VIEW C-C

END SECTION ON HMA SHOWN,
END SECTION ON PCCP SIMILAR



ELEVATION

54 INCH CONSTANT SLOPE BARRIER TO
42 INCH CONSTANT SLOPE END SECTION ON HMA



SECTION D-D

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3M2 FOR STEPPED MEDIAN BARRIER DETAILS.
3. SEE "CONSTANT SLOPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A3 FOR DETAILS.
4. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING SCHEDULE AND NOTES
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
6. FIELD VERIFY CONDUIT IN EXISTING ADJACENT BARRIER AND ADJUST SIZE AND QUANTITY AS NEEDED. IF NO CONDUIT EXISTS IN ADJACENT BARRIER, CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

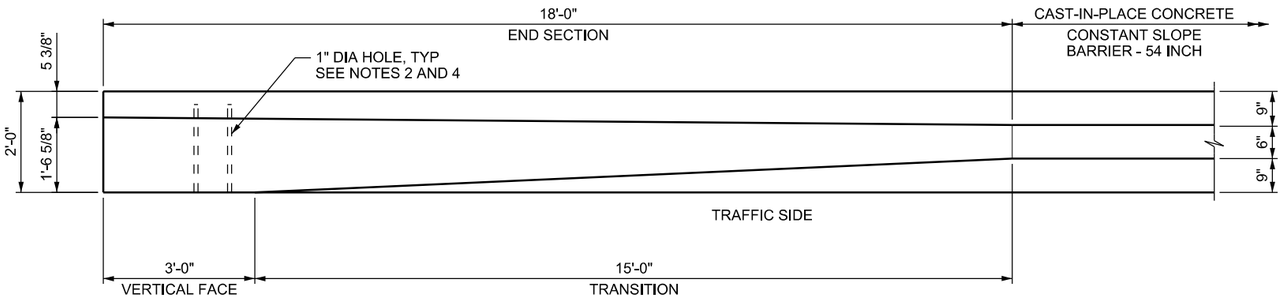
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE BARRIER -
54 INCH, TL-3
4 OF 10

STANDARD DRAWING TITLE

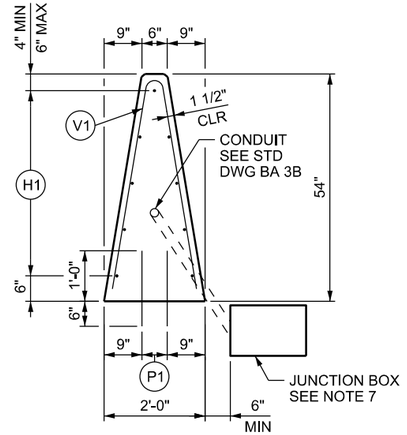
STD. DWG. NO.
BA 3M4

DGN Files:D:\Standardsanddocs\SpecsSection\Standards Committees\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M04-ConstrPlaceConcreteConstantSlopeBarrier54Inch,TL3-4of10.dgn
25-JUN-2020

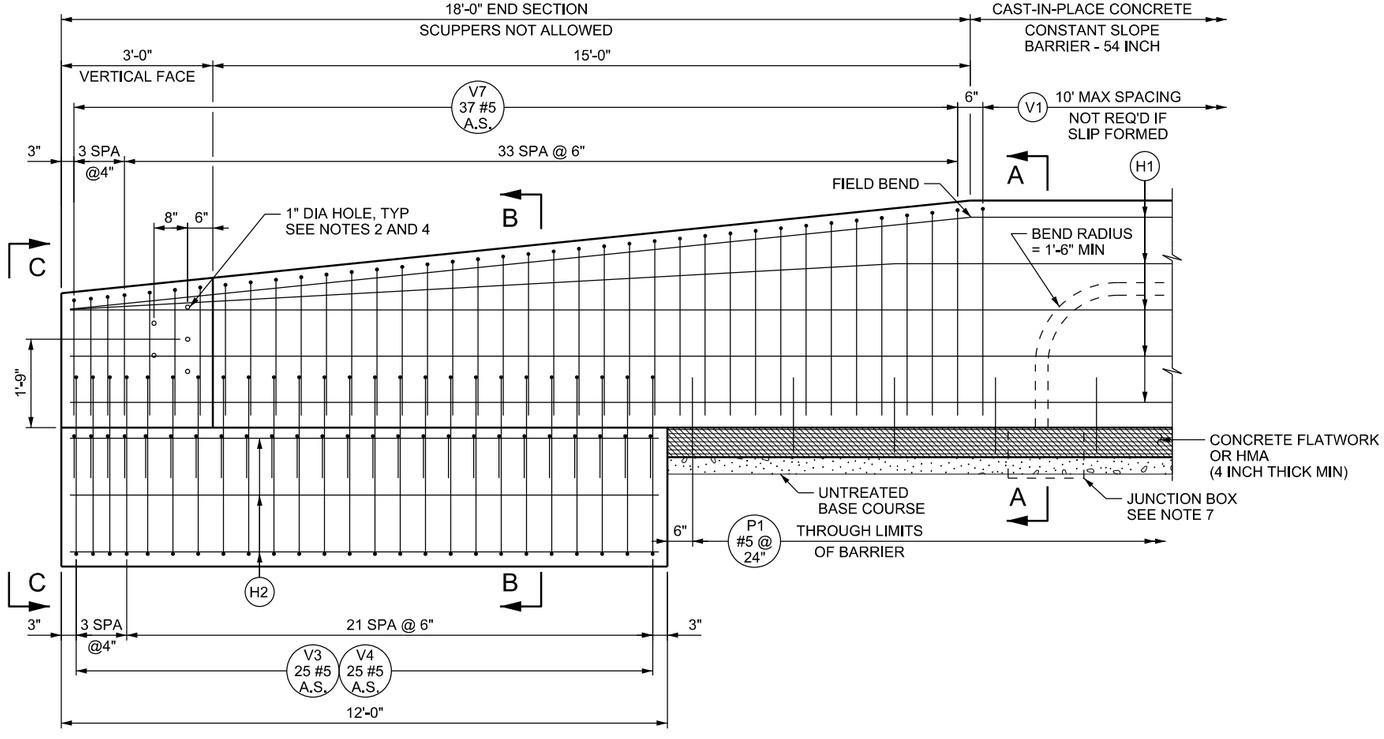


PLAN

54 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON HMA

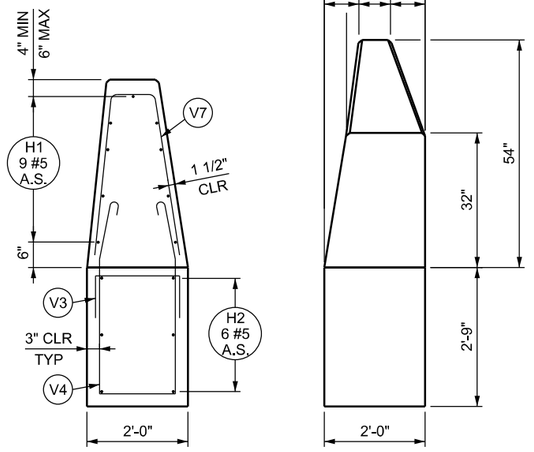


SECTION A-A



ELEVATION

54 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON HMA
SEE NOTE 6



SECTION B-B

VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH THRIE-BEAM STRUCTURAL HEX BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK BARRIER PAD OR PCCP.
4. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
5. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING STEEL SCHEDULE AND NOTES.
6. USE THIS END SECTION TO TRANSITION TO THRIE-BEAM GUARDRAIL, END TREATMENTS, OR CRASH CUSHIONS.
7. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

1

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020

1

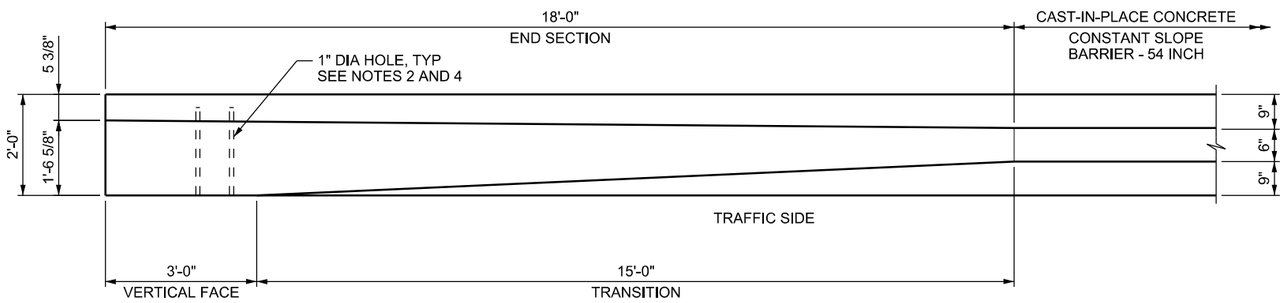
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER- 54 INCH, TL-3 5 OF 10

STANDARD DRAWING TITLE

STD. DWG. NO.

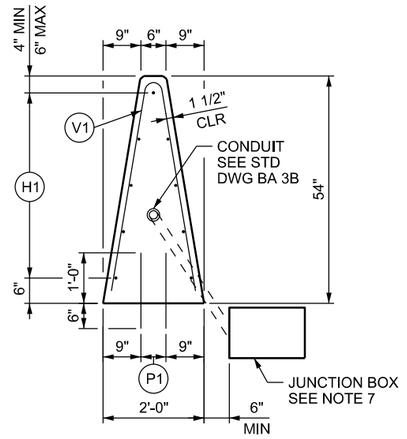
BA 3M5

DGN File: D:\Standards\Specs\Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M05-ConstrPlaceConcreteConstantSlopeBarrier54Inch,TL3-5of10.dgn
25-JUN-2020

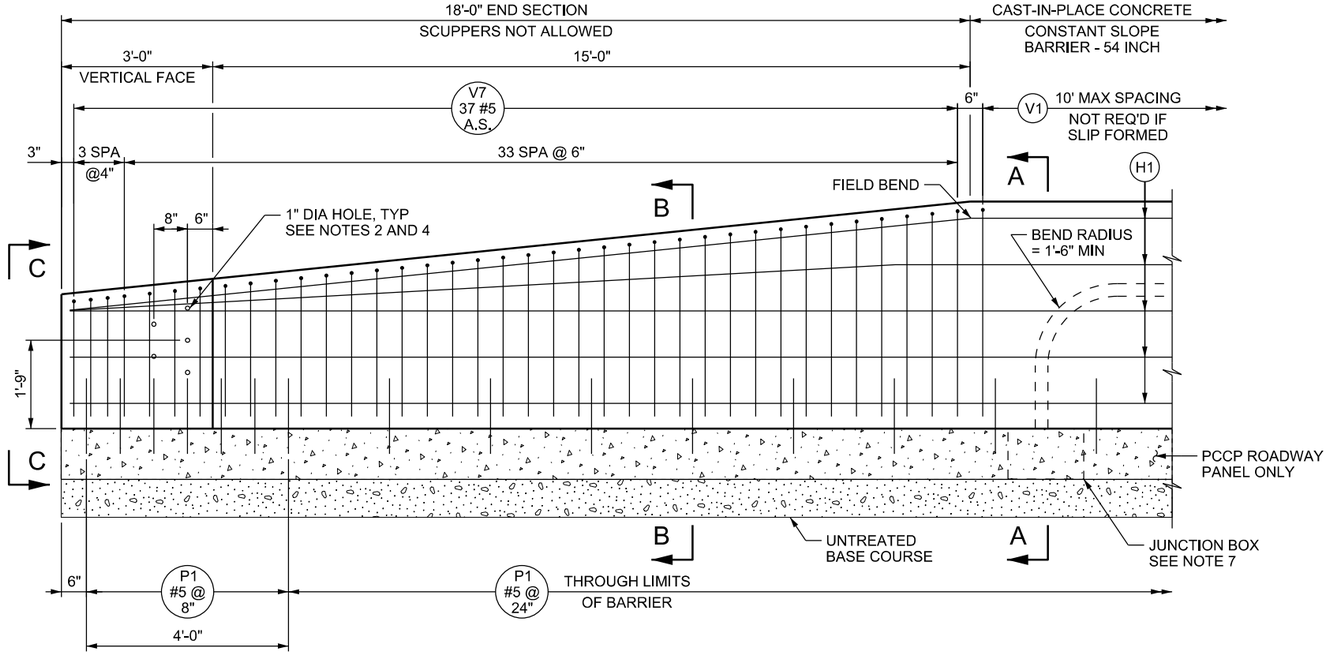


PLAN

54 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON PCCP



SECTION A-A



ELEVATION

54 INCH CONSTANT SLOPE BARRIER TO
32 INCH VERTICAL FACE END SECTION ON PCCP
SEE NOTE 6

SECTION B-B

VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. CORE DRILL 1 INCH DIAMETER HOLE FOR 7/8 INCH THRIE-BEAM STRUCTURAL HEX BOLTS. DO NOT USE A ROTARY PERCUSSION DRILL.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK BARRIER PAD OR PCCP.
4. SEE STD DWG BA 1F3 AND BA 1F4 FOR THRIE-BEAM CONNECTION REQUIREMENTS.
5. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING STEEL SCHEDULE AND NOTES.
6. USE THIS END SECTION TO TRANSITION TO THRIE-BEAM GUARDRAIL, END TREATMENTS, OR CRASH CUSHIONS.
7. CONDUIT TO EXIT BARRIER BEFORE END SECTION AND TERMINATE IN JUNCTION BOX AS SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

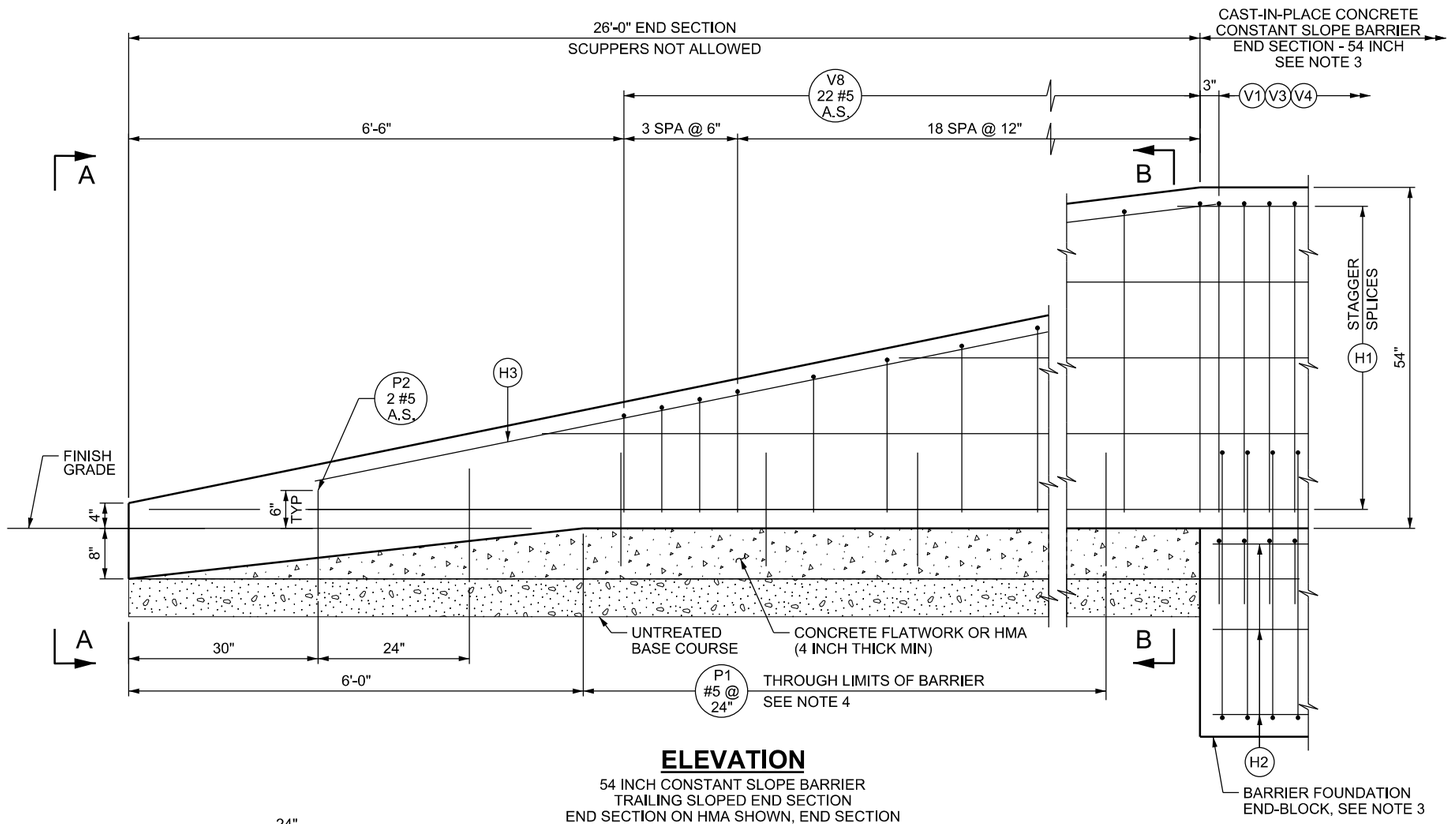
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE BARRIER-
54 INCH, TL-3
6 OF 10

STANDARD DRAWING TITLE

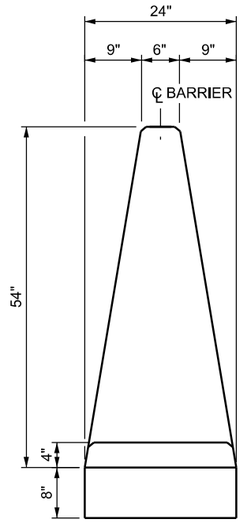
STD. DWG. NO.
BA 3M6

DGN File: G:\Standardsandspecsection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M06-CastinPlaceConcreteConstantSlopeBarrier=54Inch,TL3-6of10.dgn
25-JUN-2020

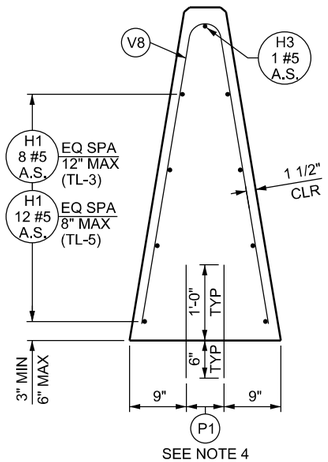


ELEVATION

54 INCH CONSTANT SLOPE BARRIER
TRAILING SLOPED END SECTION
END SECTION ON HMA SHOWN, END SECTION
ON PCCP ROADWAY PANEL SIMILAR



VIEW A-A



SEE NOTE 4

SECTION B-B

TL-3 SHOWN; TL-5 SIMILAR

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING STEEL SCHEDULE AND NOTES.
3. INSTALL CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER END SECTION AS SHOWN ON BA 3M1 OR BA 3O1 FOR TL-3 OR TL-5, RESPECTIVELY. USE THE APPROPRIATE END SECTION FOR PCCP ROADWAY PANEL, CONCRETE FLATWORK, OR HMA PAVEMENT.
4. REDUCE EMBEDMENT AT END OF BARRIER TO PROVIDE A MINIMUM 2 INCH COVER TO TOP OF BARRIER.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	DELETED DESIGN ONLY NOTES.
2	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
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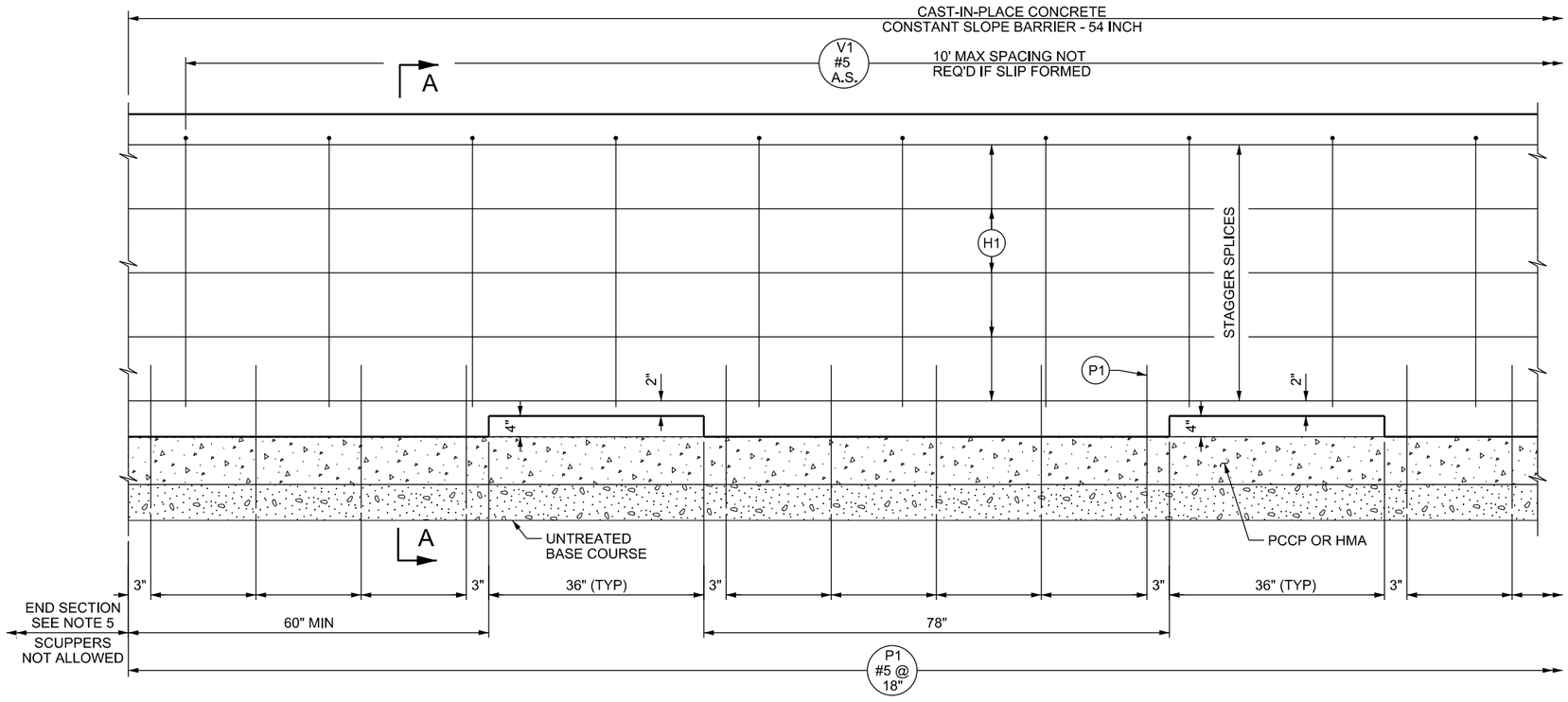
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-3
7 OF 10
STANDARD DRAWING TITLE

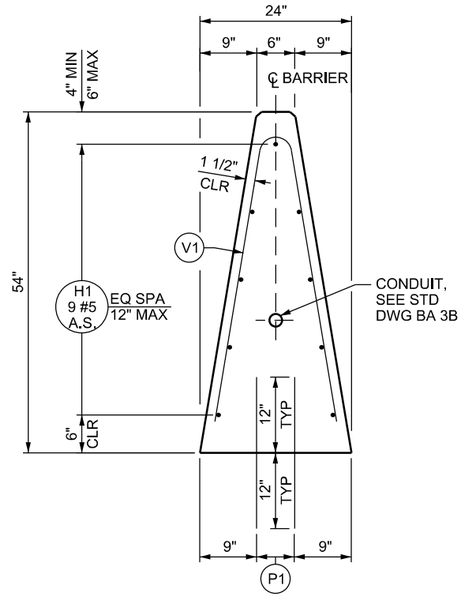
STD. DWG. NO.
BA 3M7

25-JUN-2020 DGN File:G:\Standardsandspecsection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M07-ConstnPlaceConcreteConstantSlopeBarrier54Inch,TL3-7of10.dgn



ELEVATION

54 INCH CONSTANT SLOPE BARRIER
WITH SCUPPERS



SECTION A-A

NOTES:

1. SEE STD DWG BA 1A1 FOR FOR GENERAL NOTES.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING 4 INCH THICK CONCRETE BARRIER PAD OR PCCP.
3. SEE STD DWG BA 3M9 AND BA 3M10 FOR REINFORCING STEEL SCHEDULE AND NOTES.
4. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
5. SEE STD DWG BA 3M1, BA 3M2, BA 3M3, BA 3M4, BA 3M5, AND BA 3M6 FOR END SECTION LENGTH AND REINFORCING DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.
2	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

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DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-3
8 OF 10

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3M8

DGN File: D:\Standardsandspecsection\Standards Committee\MeetingFiles\2020\v4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M08-ConstnPlaceConcreteConstantSlopeBarrier54Inch,TL3-8of10.dgn
25-JUN-2020

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH REINFORCING SCHEDULE

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
P1	#5	AS NEEDED	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	TL-3: 18" / 18", 3", OPTION 1 / OPTION 2; TL-5 OR SCUPPER BARRIER: 24" / 24", 3", OPTION 1 / OPTION 2
P2	#5	2	PAVEMENT TO BARRIER AT TRAILING SLOPED END SECTION	16" / 16", 3", OPTION 1 / OPTION 2
H1	#5	AS NEEDED	HORIZONTAL IN BARRIER CONTINUOUS THROUGH LENGTH OF BARRIER	36" SPLICE
H2	#5	6	HORIZONTAL IN FOUNDATION	11'-6"
H3	#5	1	HORIZONTAL IN BARRIER ALONG TOP FACE AT TRAILING SLOPED END SECTION	25'-9"
V1	#5	AS NEEDED	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 8'-6 3/4" OPTION 2 = 10'-0"	49 1/2", 19°, 48 1/2" TYP, 20", OPTION 1; 49 1/2", 19°, 50 1/8" TYP, 80.5°, 80.5°, 20", OPTION 2
V2	#5	AS NEEDED	VERTICAL IN STEPPED MEDIAN BARRIER	14", 3", 18", 80.5°, 170.5°, H - 3", VARIES, OPTION 1; 14", 19°, H + 15", 80.5°, 80.5°, VARIES, OPTION 2

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH REINFORCING SCHEDULE - CONTINUED

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V3	#5	25	VERTICAL IN FOUNDATION TOTAL LENGTH = 3'-2"	1'-6", 10"
V4	#5	25	VERTICAL IN FOUNDATION TOTAL LENGTH = 10'-4"	* 169° FOR BA 3M1, BA 3M4, AND BA 3M5 145° FOR BA 3M3 1'-2", 2'-8", 180° STD HOOK, TYP, * BEND, TYP, 90°, TYP, 1'-6"
V5	#5	31	VERTICAL IN BARRIER	H / W / QTY: 49" / 19 1/2" / 2 46 1/2" / 18 1/2" / 2 45" / 18 1/2" / 2 43 1/2" / 18" / 2 42" / 17 1/2" / 2 40 1/2" / 17" / 2 39" / 16 1/2" / 2 37 1/2" / 16" / 2 36" / 15 1/2" / 2 34 1/2" / 15 1/2" / 2 33" / 15" / 2 31 1/2" / 14 1/2" / 2 30" / 14" / 2 29" / 13 1/2" / 1 28" / 13 1/2" / 2 27" / 13" / 2 H, * R, W * BEND REDIUS VARIES OVER LENGTH OF BARRIER TRANSITION SECTION

NOTES:

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT OR 4 INCH BARRIER PAD.
2. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.
3. SEE STD DWG BA 3M1, BA 3M2, BA 3M3, BA 3M4, BA 3M5, BA 3M6, BA 3M7, AND BA 3M8 FOR REINFORCING STEEL LOCATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-3
9 OF 10
STANDARD DRAWING TITLE

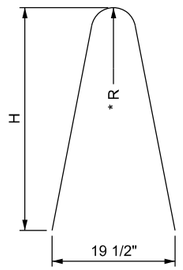
STD. DWG. NO.
BA 3M9

DGN File:G:\Standardsand Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M09-ConstrPlaceConcreteConstantSlopeBarrier-54Inch,TL3-9of10.dgn
25-JUN-2020

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH REINFORCING SCHEDULE - CONTINUED

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V6	#5	17	VERTICAL IN BARRIER	

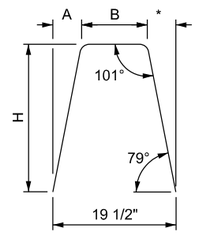
H	QTY
47"	2
46"	2
44"	2
43"	2
41"	2
40"	2
38"	2
37"	2
36 1/2"	1



* BEND RADIUS VARIES OVER LENGTH OF BARRIER TRANSITION SECTION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V7	#5	37	VERTICAL IN BARRIER	* VARIES WITH H

H	A	B	QTY
49"	7 1/2"	4"	1
47"	7"	4 1/2"	2
46"	6 1/2"	5"	2
44"	6"	6"	2
43"	5 1/2"	6 1/2"	2
42"	5"	7"	2
40"	5"	7 1/2"	3
38"	4"	9"	3
37"	3 1/2"	9"	2
35"	3"	9 1/2"	3
33"	2 1/2"	10 1/2"	2
32"	2"	11"	2
31"	2"	11 1/2"	2
30"	1 1/2"	12"	2
28"	1/2"	13 1/2"	4
27"	0"	14"	3



BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
V8	#5	22	VERTICAL IN TRAILING SLOPED END SECTION	* VARIES WITH H

H	QTY
49 1/2"	1
47 1/2"	1
451/2"	1
43 1/2"	1
42"	1
40"	1
38"	1
36"	1
34"	1
32"	1
30 1/2"	1
28 1/2"	1
26 1/2"	1
24 1/2"	1
22 1/2"	1
20 1/2"	1
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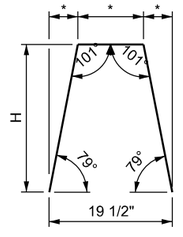
17"	1
15"	1
14"	1
13"	1
12"	1



NOTES:

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT OR 4 INCH BARRIER PAD.
2. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.
3. SEE STD DWG BA 3M1, BA 3M2, BA 3M3, BA 3M4, BA 3M5, BA 3M6, BA 3M7, AND BA 3M8 FOR REINFORCING STEEL LOCATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	05/13/2020	SDD	REVISE BA 3M DRAWING FOR MASH STANDARDS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

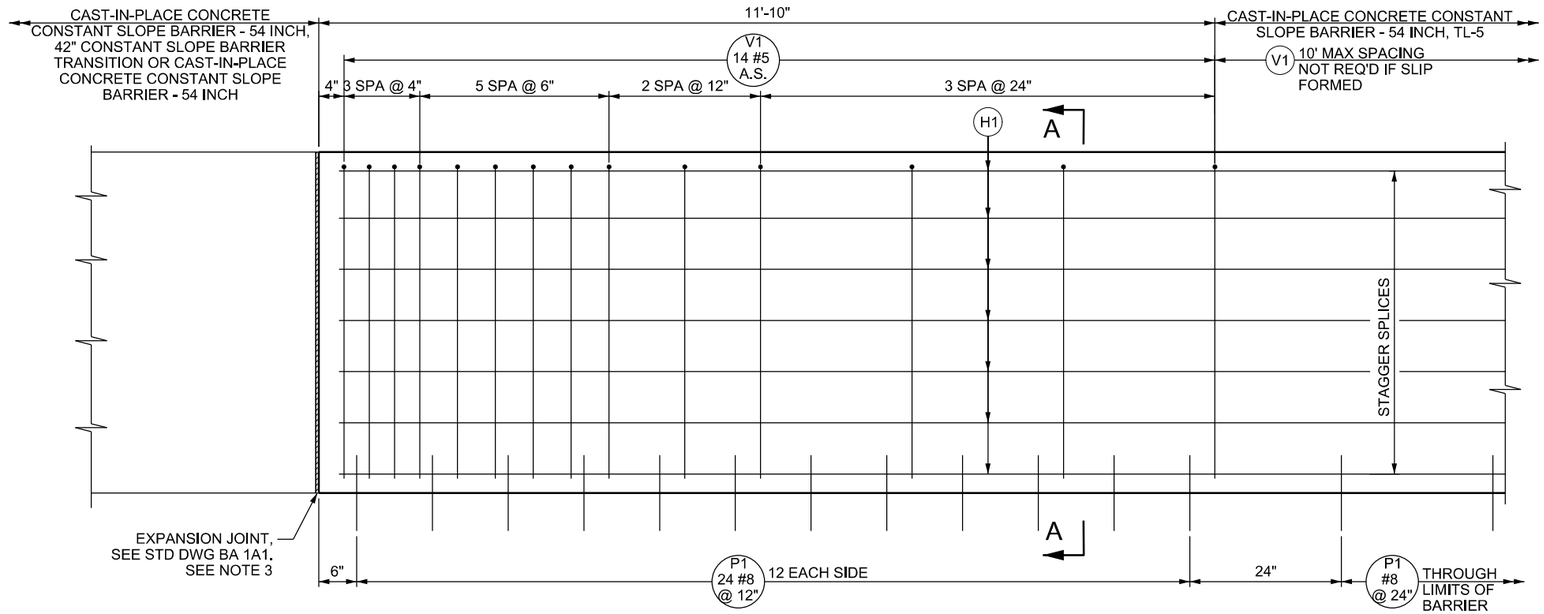
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-3 10 OF 10

STANDARD DRAWING TITLE

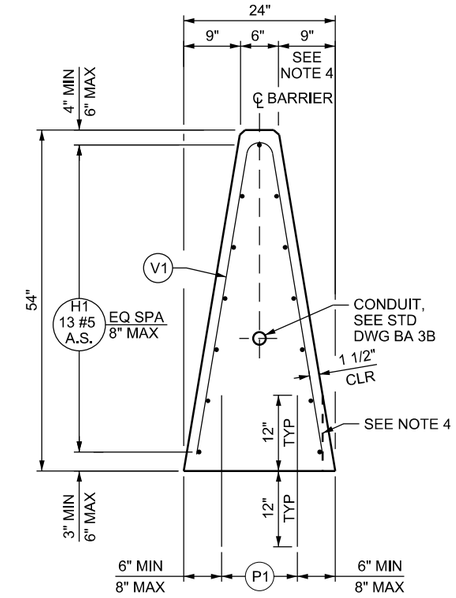
STD. DWG. NO.

BA 3M10

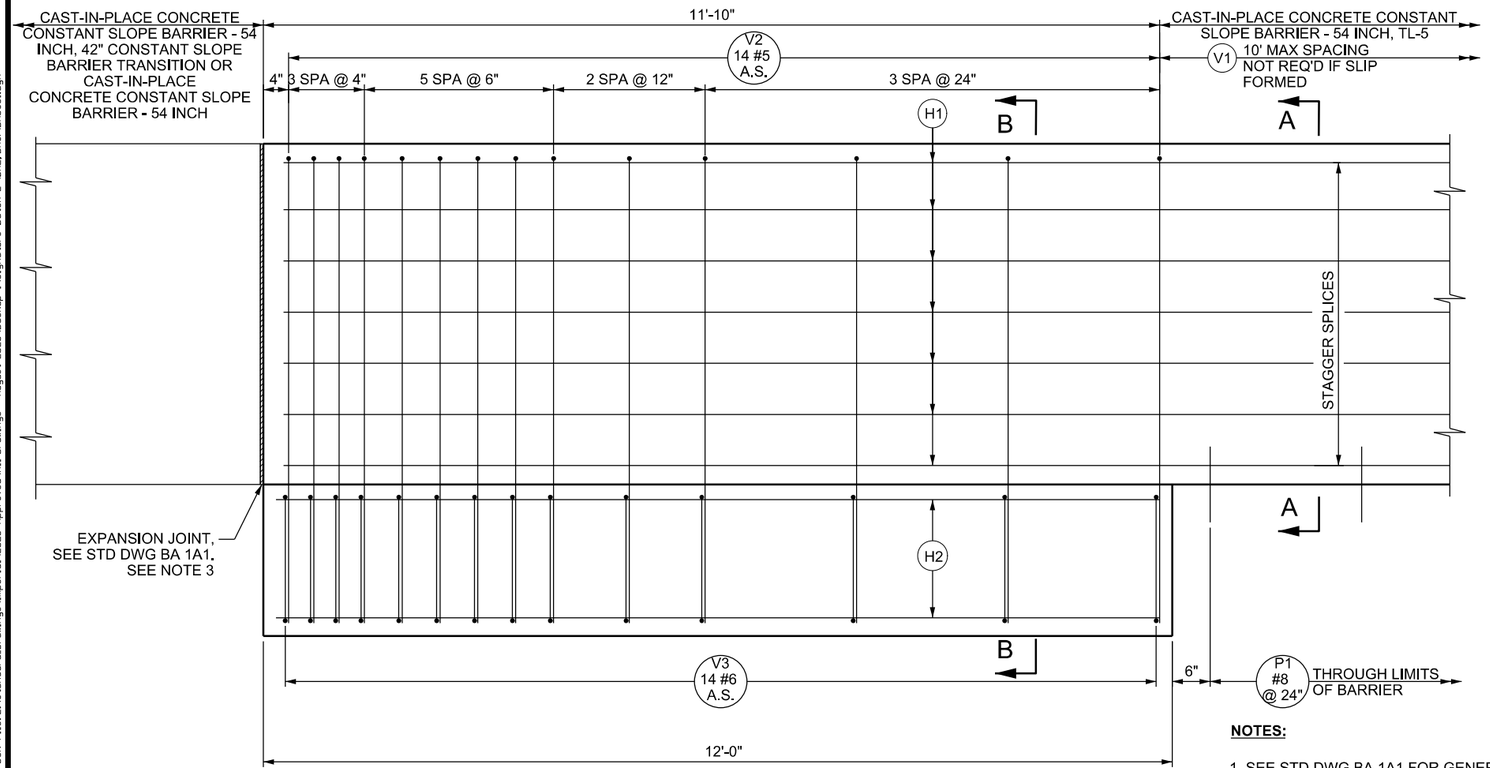
DGN File: D:\Standardsand5pecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA03M10-CastinPlaceConcreteConstantSlopeBarrier54inch,TL3-10of10.dgn
25-JUN-2020



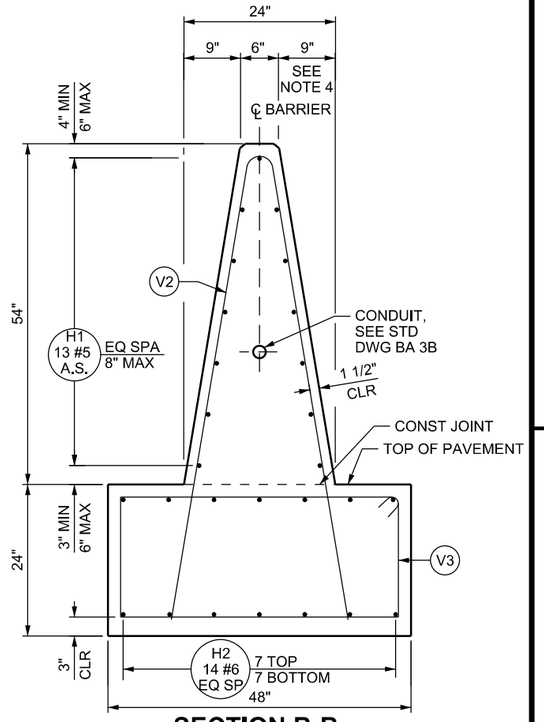
ELEVATION
BARRIER ON PCCP



SECTION A-A



ELEVATION
BARRIER ON HMA



SECTION B-B

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3O2 FOR STEPPED MEDIAN DETAILS AND STD DWG BA 3O3 FOR REINFORCING STEEL SCHEDULE.
3. SEE STD DGW BA 3M2 FOR APPROACH END AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
4. THE 9 INCH DIMENSION MAY BE REDUCED TO 7 INCHES AS SHOWN TO PROVIDE A MINIMUM 2 INCH CLEARANCE TO THE COLUMN IN COLUMN PROTECTION APPLICATIONS. ADJUST REINFORCING STEEL TO PROVIDE MINIMUM COVER.

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

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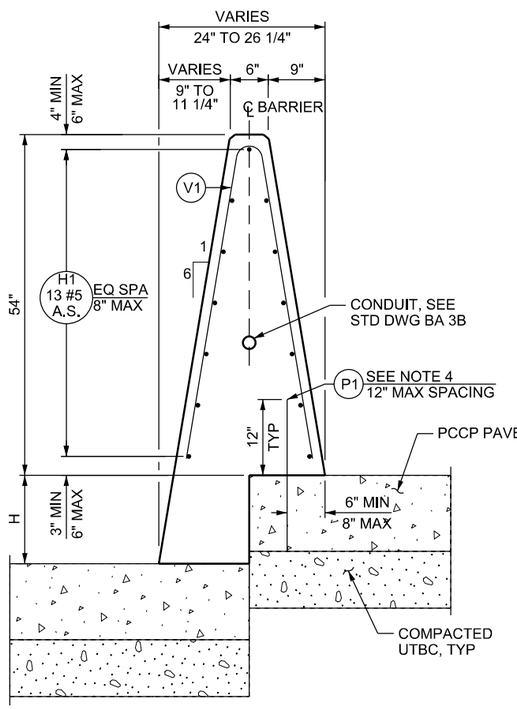
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-5 1 OF 3

STANDARD DRAWING TITLE

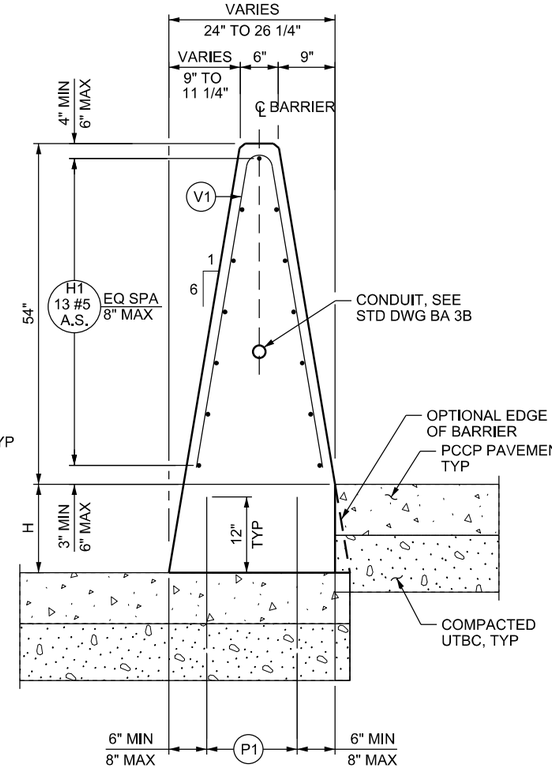
STD. DWG. NO.
BA 3O1

DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA0301.dgn
23-JUN-2020



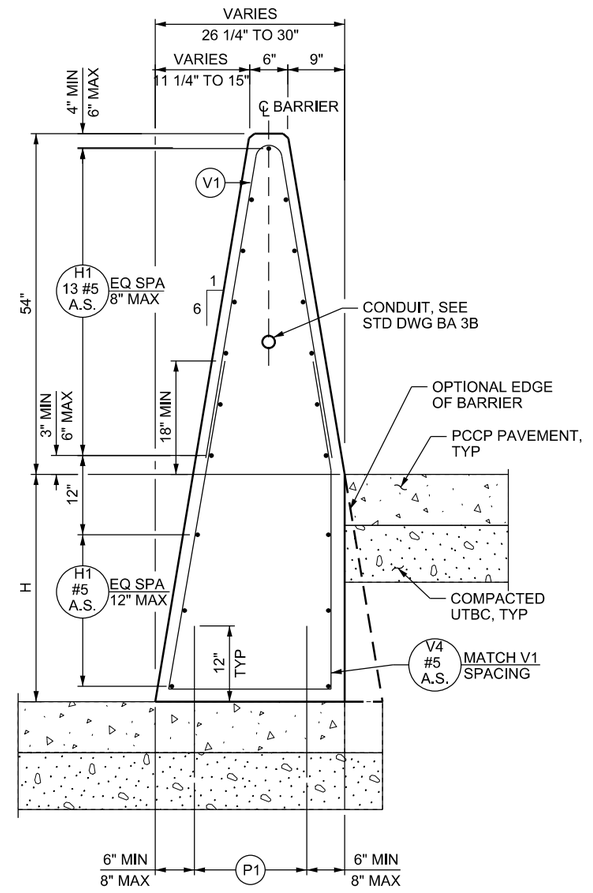
STEPPED MEDIAN BARRIER - PCCP ONLY

H = 0 INCH TO 14 INCH (OPTION 1)



STEPPED MEDIAN BARRIER - PCCP ONLY

H = 0 INCH TO 14 INCH (OPTION 2)



STEPPED MEDIAN BARRIER - PCCP ONLY

H = 14 INCH TO 36 INCH

NOTES:

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
2. V4 BAR SPACING MATCHES V1 SPACING SHOWN IN ELEVATION.
3. DECREASE P1 BAR SPACING BY HALF AS SHOWN ON STD DWG BA 3O1. SEE STEPPED MEDIAN BARRIER DETAILS FOR APPLICABLE LOCATION.
4. DO NOT USE HORIZONTAL CONSTRUCTION JOINTS IN TL-5 BARRIER.
5. DO NOT USE STEPPED MEDIAN BARRIER WITH HMA PAVEMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

CAST-IN-PLACE
CONCRETE CONSTANT
SLOPE BARRIER -
54 INCH, TL-5
2 OF 3

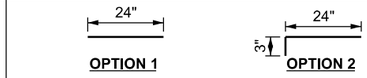
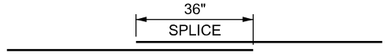
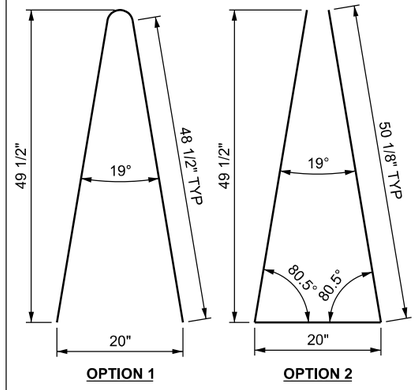
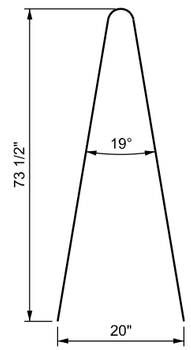
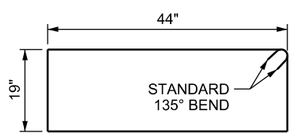
STANDARD DRAWING TITLE

STD. DWG. NO.

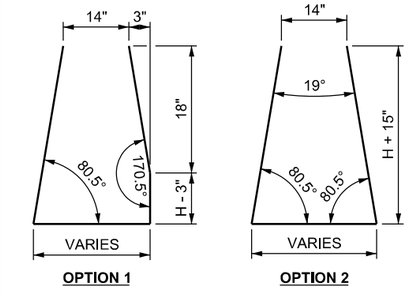
BA 3O2

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03O2.dgn

CONSTANT SLOPE BARRIER REINFORCING

BAR MARK	BAR SIZE	LOCATION	SKETCH
P1	#8	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	
H1	#5	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS CONTINUOUS THROUGH LENGTH OF BARRIER	
H2	#6	HORIZONTAL IN BARRIER FOOTING	
V1	#5	VERTICAL IN BARRIER TOTAL LENGTH: OPTION 1 = 8'-6 3/4" OPTION 2 = 10'-0"	
V2	#5	VERTICAL IN BARRIER TOTAL LENGTH: 13'-4"	
V3	#6	VERTICAL IN BARRIER FOOTING TOTAL LENGTH: 11'-10"	

CONSTANT SLOPE BARRIER REINFORCING

BAR MARK	BAR SIZE	LOCATION	SKETCH
V4	#5	VERTICAL IN STEPPED MEDIAN BARRIER	

NOTES:

1. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
2. THE ENGINEER APPROVES CONTRACTOR DEVISED METHOD OF POSITIONING THE LONGITUDINAL REINFORCING STEEL ±1/2 INCH AS DIMENSIONED.
3. SEE STD DWG BA 3O1 AND BA 3O2 FOR REINFORCING STEEL LOCATION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

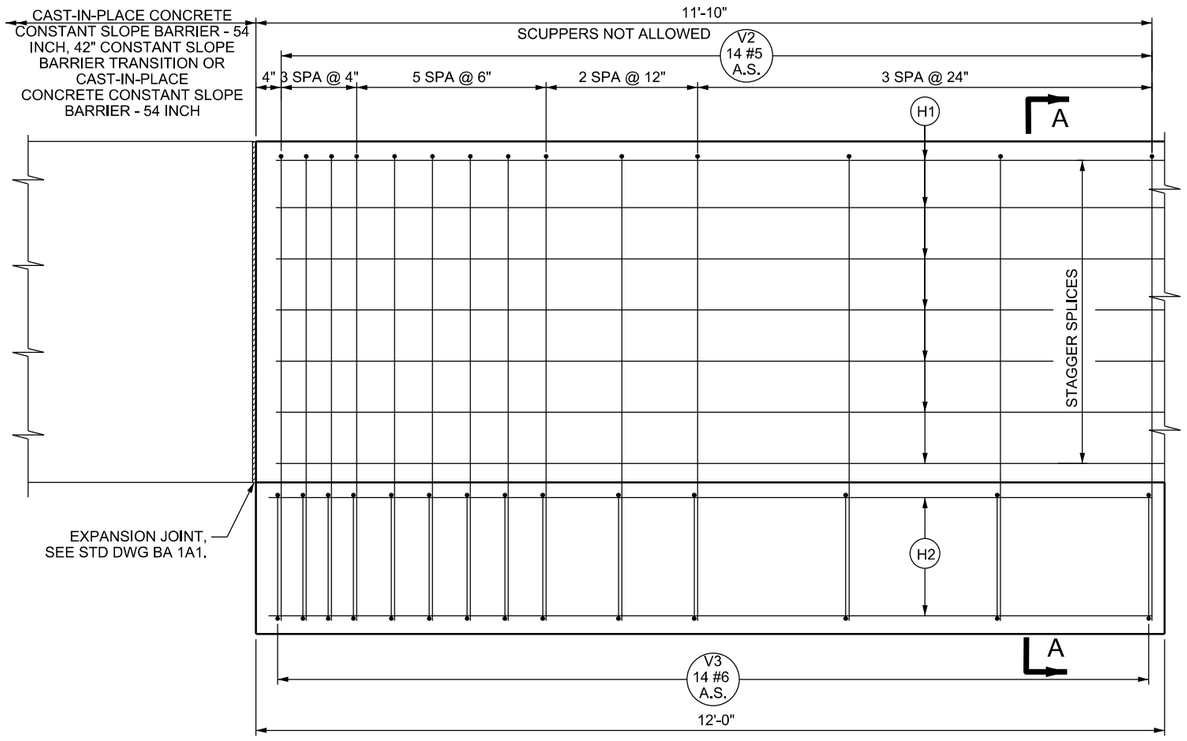
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, TL-5 3 OF 3

STANDARD DRAWING TITLE

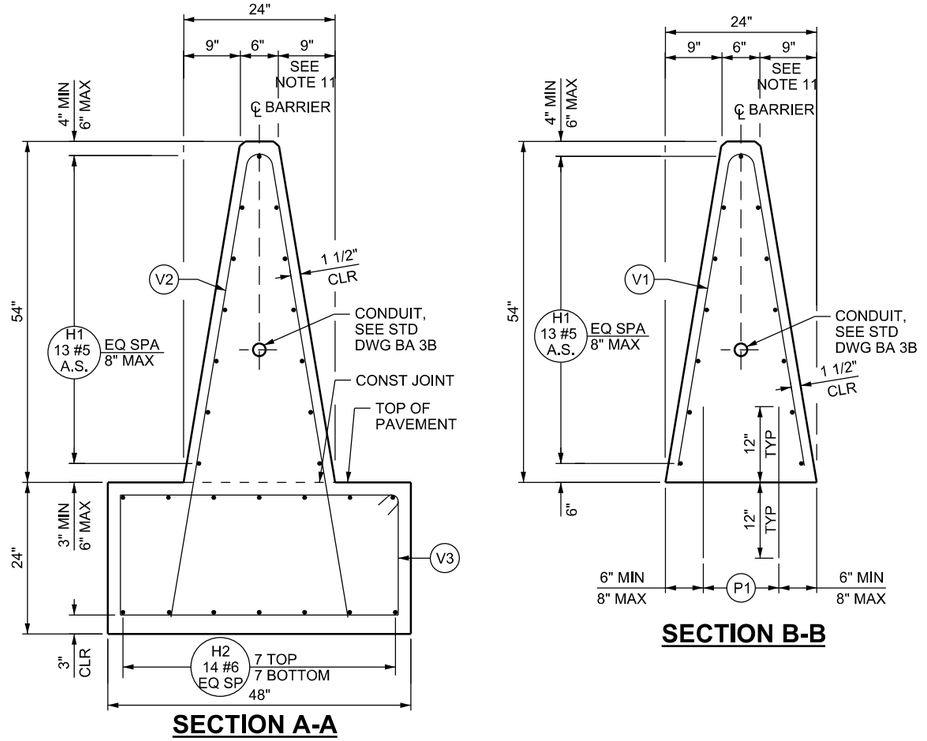
STD. DWG. NO.

BA 3O3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03O3.dgn
23-JUN-2020



ELEVATION

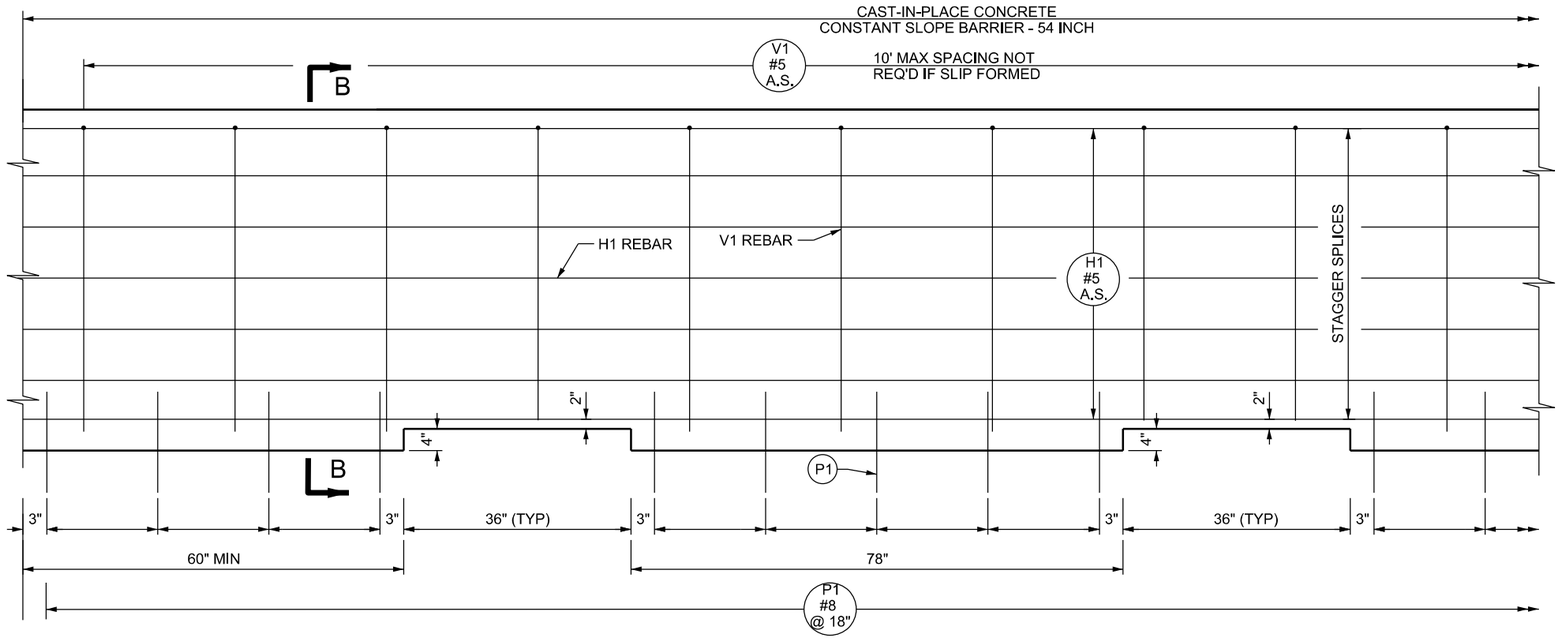


SECTION A-A

SECTION B-B

ELEVATION

BARRIER ON HMA SHOWN
SEE BA 01 FOR BARRIER ON PCCP



ELEVATION

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS.
3. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
4. SEE STD DWG BA 3O3 FOR REINFORCING STEEL SCHEDULE AND NOTES.
5. DO NOT USE BARRIER SEAL WHEN SCUPPERS ARE PRESENT ON BARRIER.
6. SEE STD DWG BA 3M2 FOR APPROACH AND TRAILING END TREATMENTS. NO EXPANSION JOINT REQUIRED.
7. THE 9 INCH DIMENSION MAY BE REDUCED TO 7 INCHES AS SHOWN TO PROVIDE A MINIMUM 2 INCH CLEARANCE TO THE COLUMN IN COLUMN PROTECTION APPLICATIONS. ADJUST REINFORCING STEEL TO PROVIDE MINIMUM COVER.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

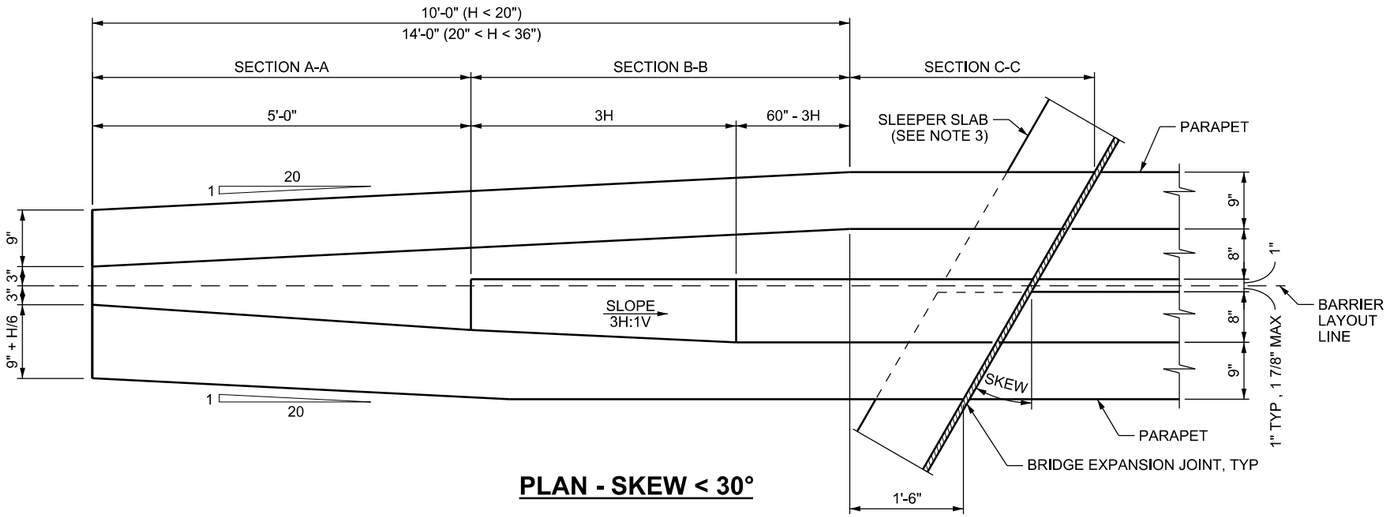
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER WITH SCUPPERS- 54 INCH, TL-5

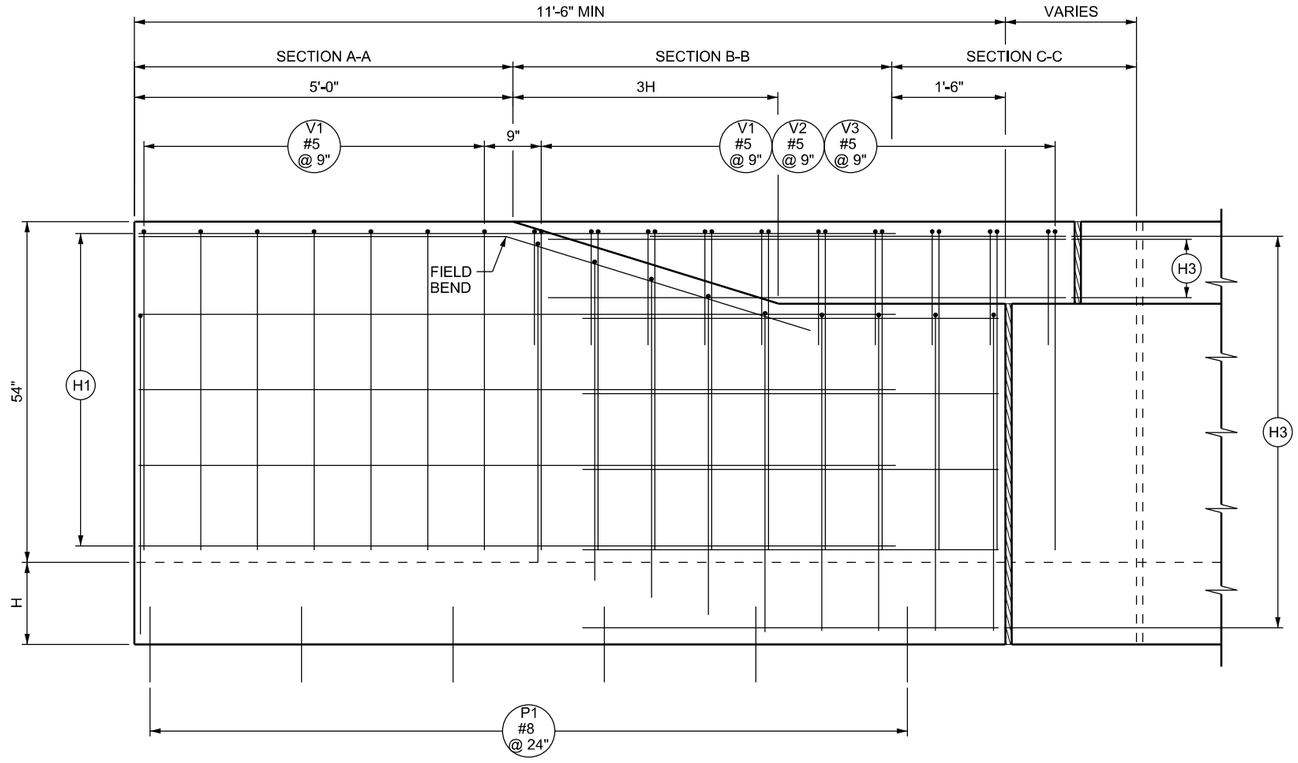
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3O4

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA0304.dgn



PLAN - SKEW < 30°



ELEVATION - SKEW < 30°

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3P3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.
3. SLEEPER SLAB ENDS AT FACE OF PARAPET FOR H GREATER THAN 14 INCHES.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

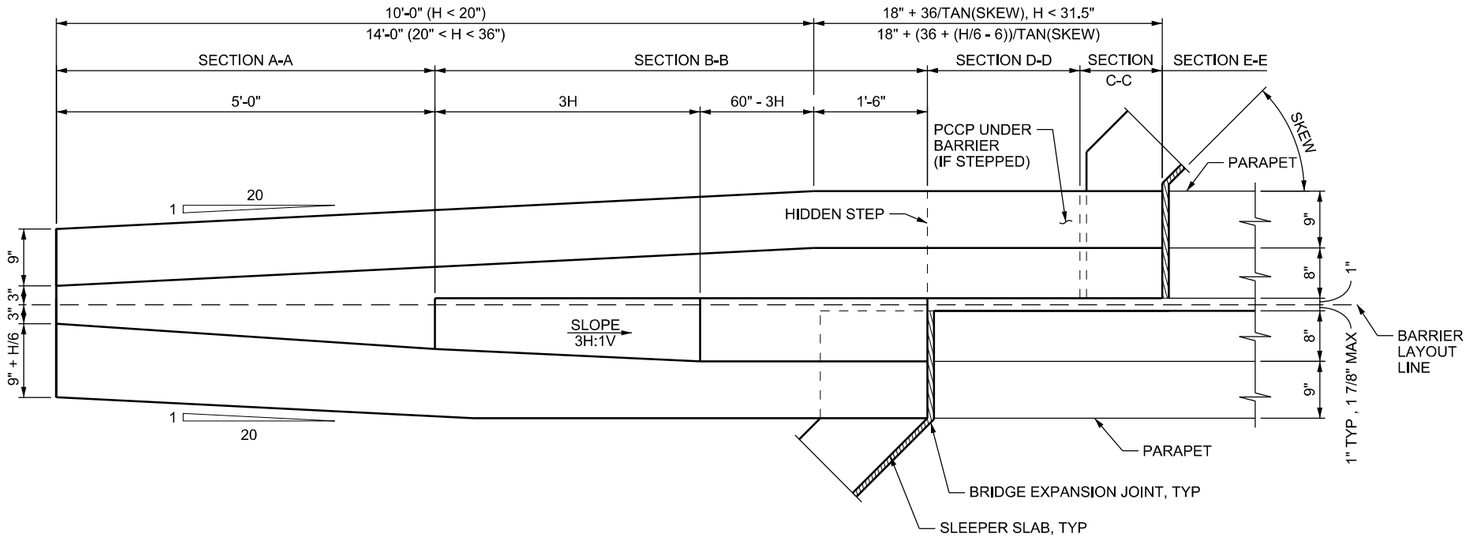
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, BRIDGE PARAPET TRANSITION 1 OF 3

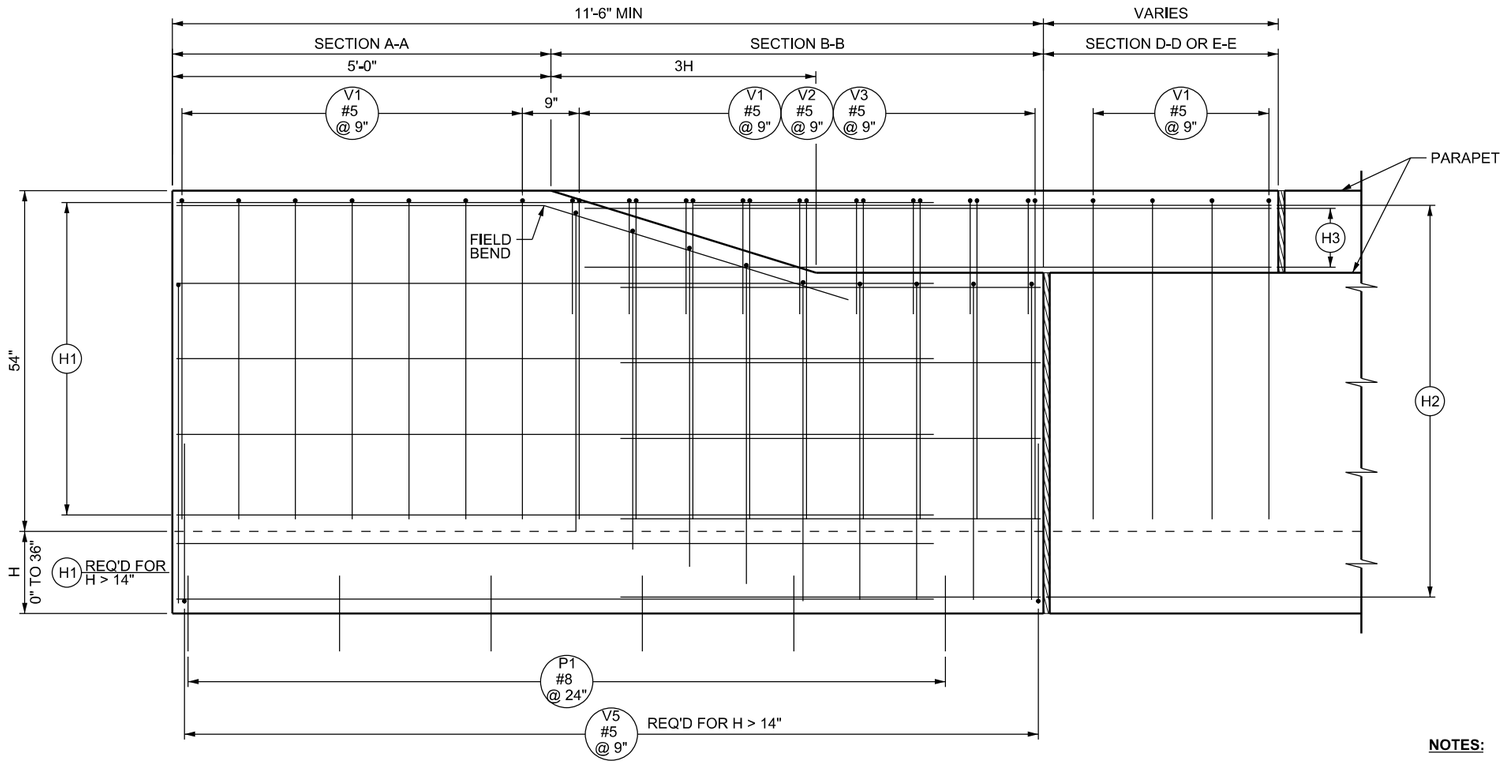
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 3P1

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA03P1.dgn
23-JUN-2020



PLAN - H < 36 INCH, 30° < SKEW < 45°



ELEVATION - H < 36 INCH, 30° < SKEW < 45°

NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE STD DWG BA 3P3 FOR SECTIONS AND REINFORCING STEEL SCHEDULE.

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

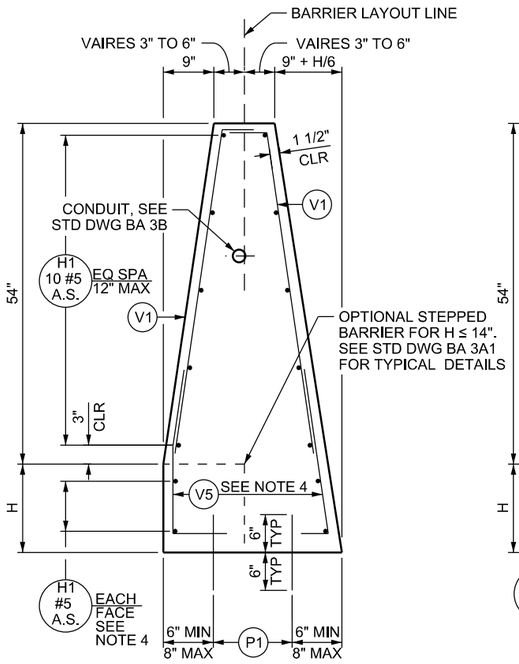
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, BRIDGE PARAPET TRANSITION 2 OF 3

STANDARD DRAWING TITLE

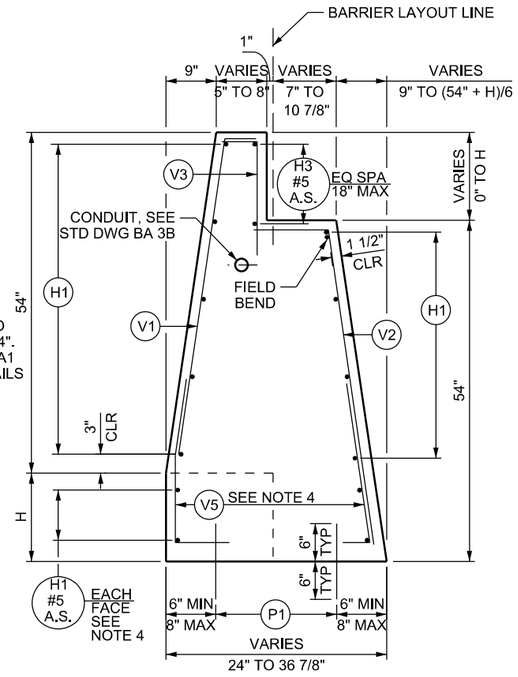
STD. DWG. NO.

BA 3P2

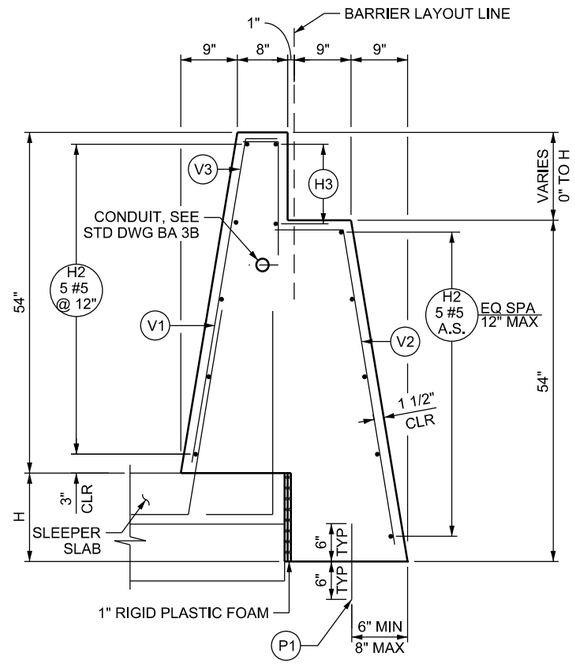
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2,BA3)\BA03P2.dgn
23-JUN-2020



SECTION A-A



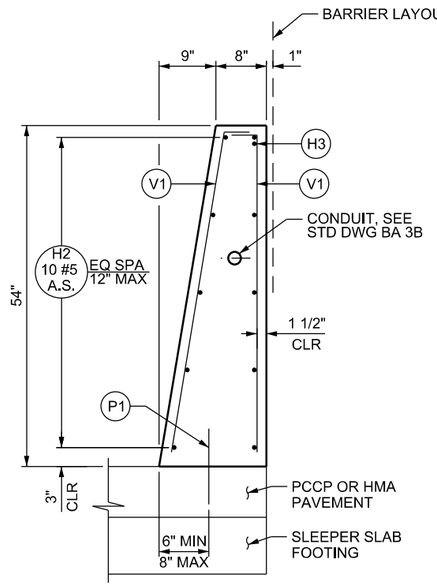
SECTION B-B



SECTION C-C

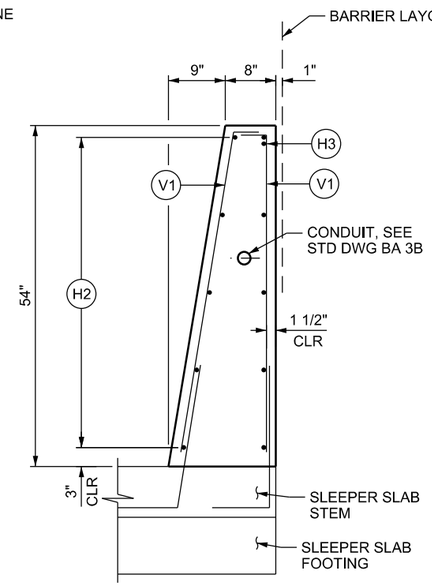
(H < 14", SKEW < 30°)

BAR MARK	BAR SIZE	LOCATION	SKETCH
P1	#8	PAVEMENT TO BARRIER (VERTICAL)	12" OPTION 1 / 12" 3" OPTION 2
H1	#5	HORIZONTAL IN BARRIER	10'-0" FOR H < 20" / 15'-6" FOR H < 36"
H2	#5	HORIZONTAL IN BARRIER	6'-0"
H3	#5	HORIZONTAL IN BARRIER (36" MIN LAP)	VARIES
V1	#5	VERTICAL IN BARRIER	5", 101° OR 90°, ROTATED AS NEEDED TO MAINTAIN CLEAR, 48"
V2	#5	VERTICAL IN BARRIER	12", 101°, 48"
V3	#4	VERTICAL IN BARRIER	5", ROTATED AS NEEDED TO MAINTAIN CLEAR, 18"
V4	#4	VERTICAL IN BARRIER	5", ROTATED AS NEEDED TO MAINTAIN CLEAR, H
V5	#4	VERTICAL IN BARRIER	18", H - 3", 170° OR 180°, 90° OR 79°, 12"



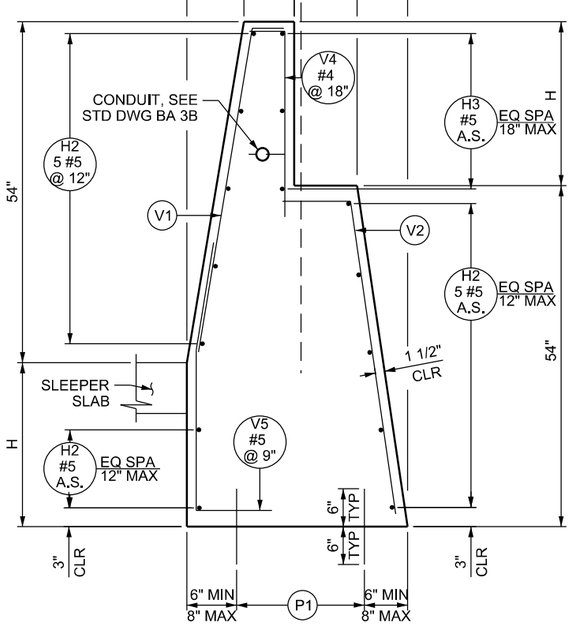
SECTION D-D

(ADJACENT APPROACH SLAB BARRIER NOT SHOWN)



SECTION E-E

(ADJACENT APPROACH SLAB BARRIER NOT SHOWN)



SECTION C-C

(H > 14 INCH, SKEW < 30°)

NOTES:

1. SEE STD DWG BA 3P1 AND BA 3P2 FOR LOCATION OF SECTIONS.
2. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
3. H1 AND H2 BARS CAN BE OPTIMIZED OR COMBINED.
4. ADDITIONAL H1 BARS AND V5 BARS REQUIRED FOR H GREATER THAN 14 INCHES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

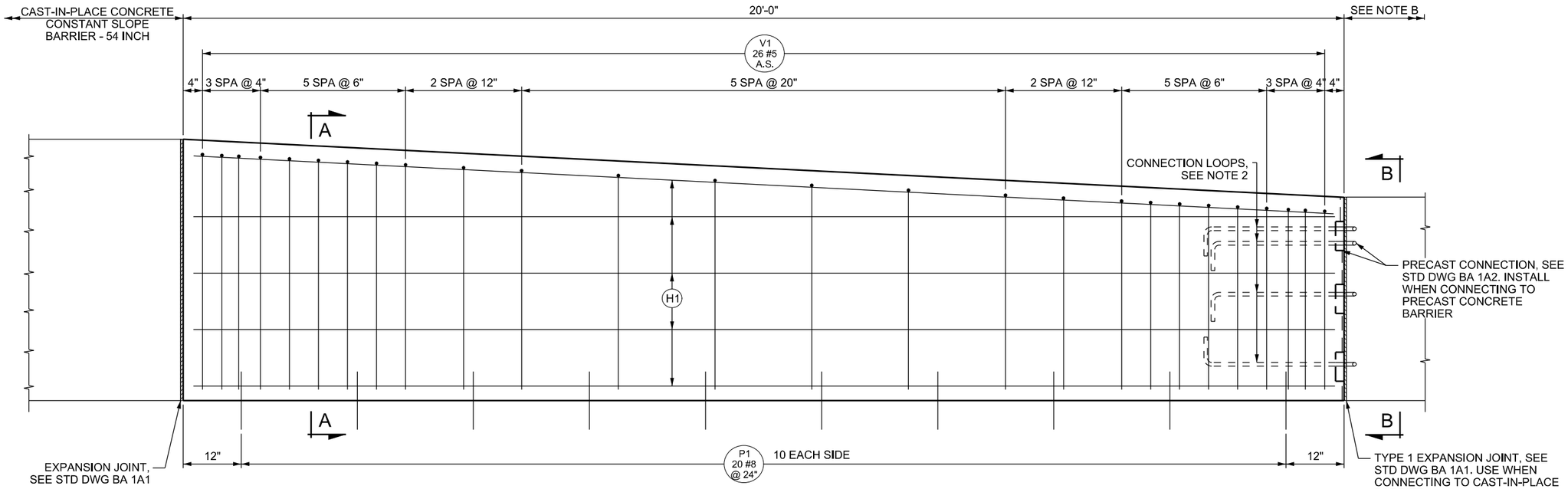
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, BRIDGE PARAPET TRANSITION 3 OF 3

STANDARD DRAWING TITLE

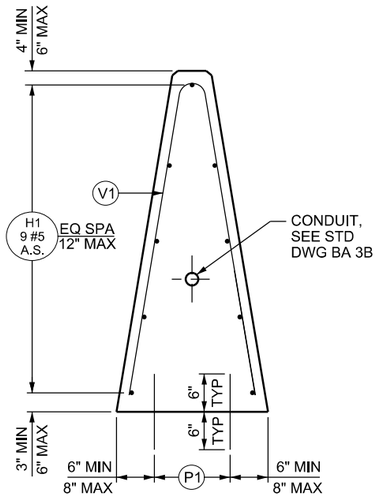
STD. DWG. NO.

BA 3P3

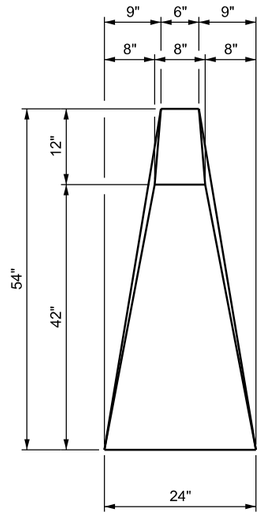
DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2_BA3)\BA03P3.dgn
23-JUN-2020



ELEVATION



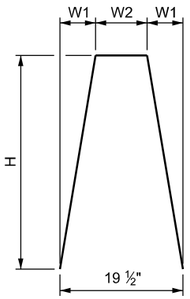
SECTION A-A



VIEW B-B

BAR MARK	BAR SIZE	NO BARS	LOCATION	SKETCH
P1	#8	20	PAVEMENT TO BARRIER (VERTICAL)	12" OPTION 1; 12" / 3" OPTION 2
H1	#5	9	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-8"
V1	#5	26	VERTICAL IN BARRIER	

H	W1	W2	QTY
49 1/2"	8"	3 1/2"	1
49"	8"	3 1/2"	2
48 1/2"	8"	3 1/2"	2
48"	8"	3 1/2"	2
47 1/2"	8"	3 1/2"	1
47"	8"	3 1/2"	1
46 1/2"	8"	3 1/2"	1
46"	8"	3 1/2"	1
45"	7 1/2"	4 1/2"	1
44"	7 1/2"	4 1/2"	1
43"	7 1/2"	4 1/2"	1
42"	7 1/2"	4 1/2"	1
41"	7 1/2"	4 1/2"	1
40 1/2"	7 1/2"	4 1/2"	1
40"	7 1/2"	4 1/2"	1
39 1/2"	7 1/2"	4 1/2"	1
39"	7 1/2"	4 1/2"	1
39"	7 1/2"	5 1/2"	1
38 1/2"	7"	5 1/2"	2
38"	7"	5 1/2"	2
37 1/2"	7"	5 1/2"	1



NOTES:

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR CONNECTION LOOP DETAILS. PLACE THE APPROPRIATE CONNECTION LOOP CONFIGURATION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. DRILL AND EPOXY BOND P1 BARS, OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM WHEN USING PCCP PAVEMENT.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS.

NO.	DATE	APPR.	REMARKS
1	08/29/19	SDD	MODIFIED DESIGN ONLY NOTES TO NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

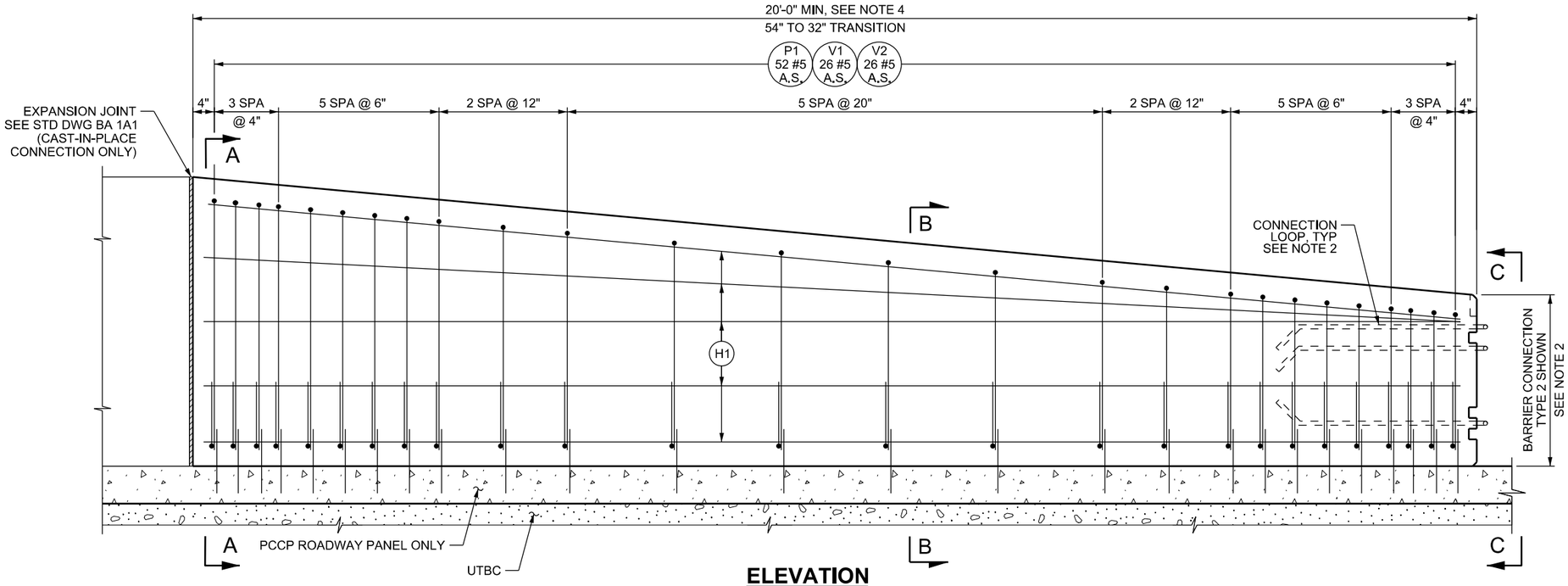
CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, 42 INCH CONSTANT SLOPE BARRIER TRANSITION

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 3Q1

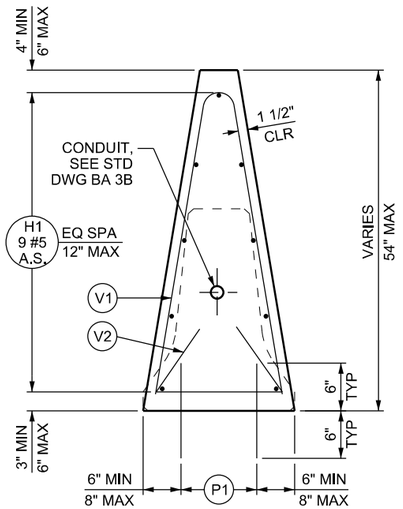
23-JUN-2020 DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA03Q1.dgn



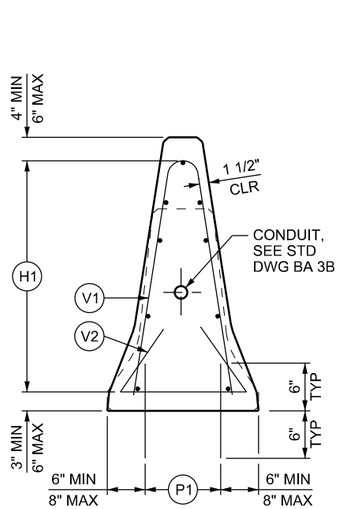
ELEVATION

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	9	HORIZONTAL IN BARRIER TIED INSIDE V1 BARS	19'-6"
P1	#5	52	PAVEMENT TO BARRIER THROUGH LIMITS OF BARRIER (VERTICAL)	12" OPTION 1; 12", 3" OPTION 2
V1	#5	26	VERTICAL IN BARRIER	H / W / QTY table; H, 2" R, W
V2	#5	26	VERTICAL IN BARRIER TIE TO V1 BARS TOTAL LENGTH = 3'-7 1/2"	1'-0", 55°, 55°, 1'-0", 1'-7 1/2"

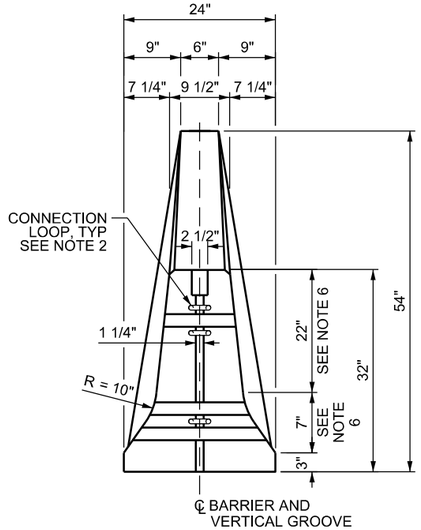
H	W	QTY
47"	20"	1
46 1/2"	19 1/2"	2
46"	19 1/2"	1
45 1/2"	19 1/2"	1
44 1/2"	19 1/2"	1
44"	19"	1
43 1/2"	19"	1
43"	19"	1
42"	18 1/2"	1
41"	18"	1
39"	17 1/2"	1
37"	17"	1
35"	16"	1
33"	15 1/2"	1
31"	15"	1
30"	14 1/2"	1
29"	14"	1
28 1/2"	14"	1
28"	14"	1
27"	13 1/2"	1
26 1/2"	13 1/2"	1
26"	13 1/2"	1
25 1/2"	13"	2
25"	13"	1



SECTION A-A



SECTION B-B



VIEW C-C

NOTES

1. SEE STD DWG BA 1A1 FOR GENERAL NOTES.
2. SEE "F-SHAPE BARRIER CONNECTION DETAILS" ON STD DWG BA 1A2 FOR DETAILS. USE THE APPROPRIATE BARRIER CONNECTION THAT CORRESPONDS WITH ADJACENT PRECAST BARRIER.
3. BARRIER SHAPE VARIES LINEARLY OVER LENGTH OF BARRIER TRANSITION.
4. BARRIER TRANSITIONS MAY BE LENGTHENED, WITH ENGINEER'S APPROVAL, TO ELIMINATE A GAP BETWEEN PRECAST AND CAST-IN-PLACE SECTIONS. REINFORCING SHOWN IS FOR 20 FOOT LENGTH. UPDATE VERTICAL REINFORCING IF LENGTH IS INCREASED. DO NOT EXCEED MAXIMUM SPACING SHOWN.
5. DRILL AND EPOXY BOND P1 BARS OR HAND POSITION WHILE CONCRETE IS IN A WORKABLE FORM.
6. MEASURED TO INTERSECTION OF BARRIER SLOPES.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	ENTIRE DRAWING REVISED.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

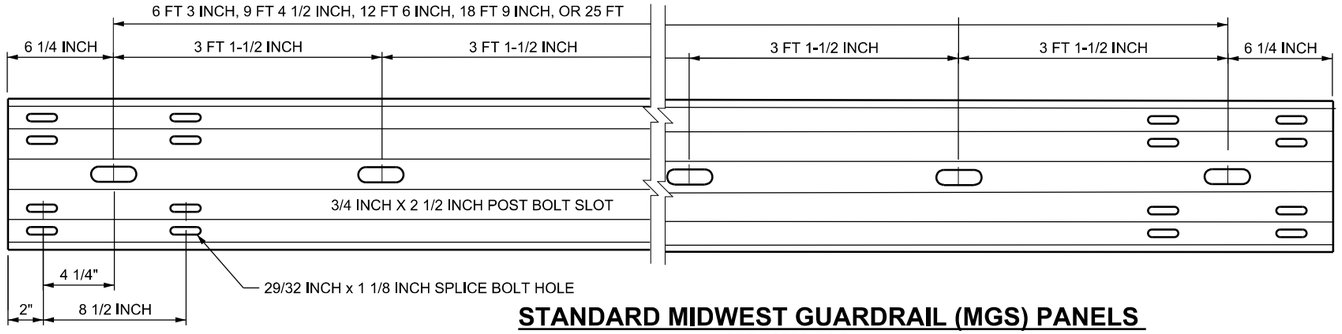
RECOMMENDED FOR APPROVAL — ENGINEER — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 54 INCH, 32 INCH F-SHAPE BARRIER TRANSITION

STANDARD DRAWING TITLE

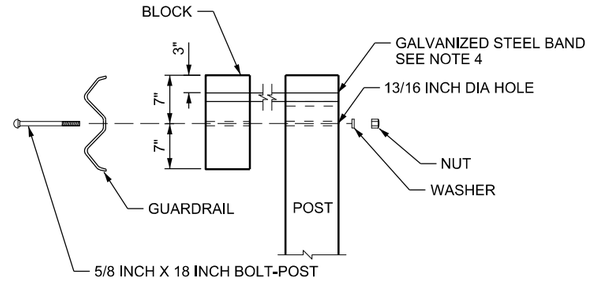
STD. DWG. NO.
BA 3Q2

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 2 (BA2, BA3)\BA03Q2.dgn
23-JUN-2020



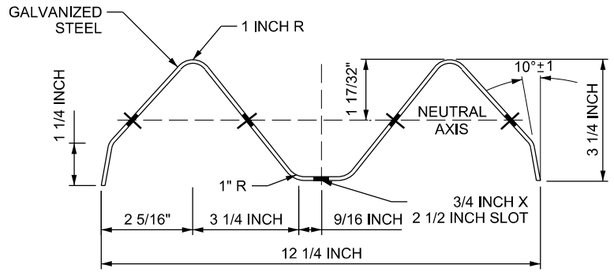
STANDARD MIDWEST GUARDRAIL (MGS) PANELS

SEE NOTES 6 & 7

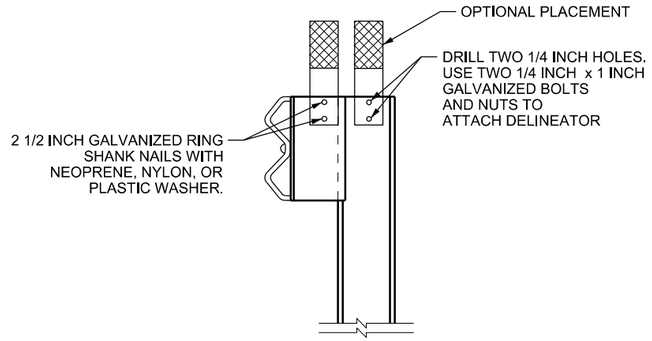


WOOD POST TO GUARDRAIL TYPICAL

USE BOTTOM HOLE FOR INITIAL INSTALLATION
SEE NOTES 1, 3 & 4



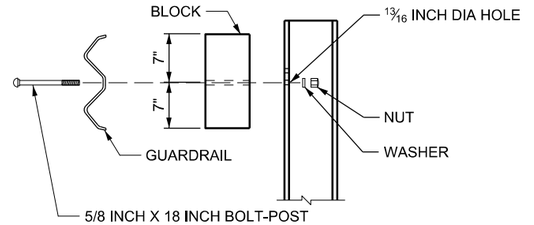
SECTION THRU GUARDRAIL ELEMENT



DELINEATOR DETAIL

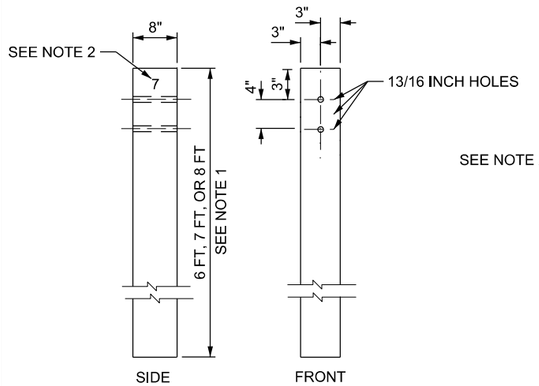
STEEL POST W/WOOD
OR COMPOSITE BLOCK

SEE STD DWG GW 6B FOR HARDWARE
AND GW 7A FOR PLACEMENT

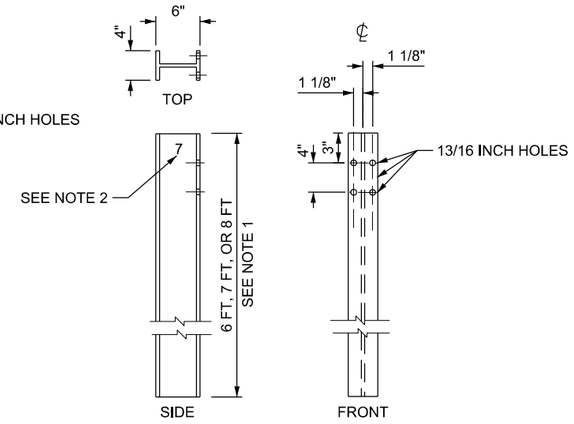


STEEL POST TO GUARDRAIL TYPICAL

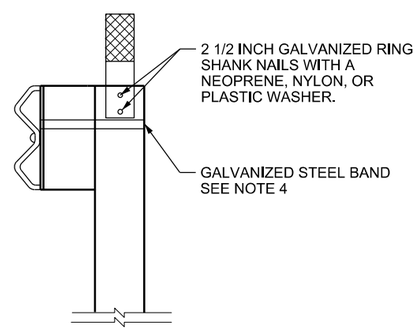
SEE NOTES 1 & 3



6 INCH X 8 INCH WOOD POST



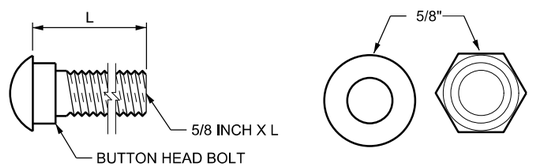
W6 X 8.5 STEEL POST



DELINEATOR DETAIL

WOOD POST W/WOOD BLOCK

SEE STD DWG GW 9 FOR HARDWARE
AND GW 10 FOR PLACEMENT

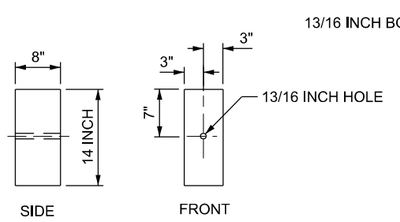


GALVANIZED BOLTS, NUTS, WASHERS

	L
SPLICE BOLTS (WASHER NOT REQ'D.)	1 1/4 INCH
STEEL BOLT W/ WOOD BLOCK	10 INCH
WOOD POST W/ WOOD BLOCK	18 INCH
WOOD POST W/ WOOD BLOCK (MEDIAN)	25 INCH

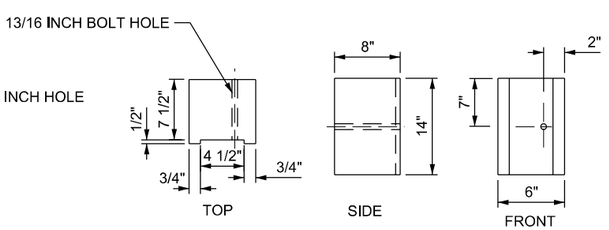
NOTES:

1. SEE INSTALLATION DETAIL STD DWG BA 4D1 OR BA 4D2 FOR POST LENGTH REQUIREMENTS AND HOLE USAGE REQUIREMENT.
2. MARK POST LENGTH ON GUARDRAIL POSTS AS FOLLOWS:
   A. MARKINGS
      1) DO NOT MARK POSTS IF POST LENGTH IS 6 FT.
      2) MARK POSTS WITH "7" IF POST LENGTH IS 7 FT.
      3) MARK POSTS WITH "8" IF POST LENGTH IS 8 FT.
   B. STAMP STEEL POSTS WITH 3/4 INCH MARKING.
   C. BRAND WOOD POSTS WITH 3/4 INCH MARKING.
   D. PLACE STAMP OR BRAND NO MORE THAN 7 INCH FROM TOP OF POST.
   E. BRAND OR STAMP POSTS BEFORE INSTALLATION.
3. DO NOT USE WASHERS ON RAIL FACE OR SPLICE CONNECTION.
4. BAND WOOD BLOCKS TO WOOD POSTS WITH 1/2 INCH STEEL GALVANIZED OR STAINLESS STEEL BAND. BANDING NOT REQUIRED WITH STEEL POSTS AND WOOD OR COMPOSITE BLOCKS.
5. A COMPOSITE OR PLASTIC BLOCK CAN BE SUBSTITUTED FOR THE NOTCHED WOOD BLOCK ON STEEL POST INSTALLATION. MASH COMPLIANCE REQUIRED.
6. MANUFACTURE ACCORDING TO AASHTO GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.



6 INCH X 8 INCH WOOD BLOCK

SEE NOTE 4



6 INCH X 8 INCH NOTCHED WOOD BLOCK

SEE NOTE 5

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	MODIFIED SLOT DIMENSION TO MEET AASHTO M-180.
			MODIFIED MGS PANEL, DELETED NOTE 7.
2	02/27/2020	SDD	MODIFIED POST LENGTH REQUIREMENTS.
			MOVED BLOCK LOCATION TOP OF POST &
			THE ABILITY TO RAISE BLOCK 4" ABOVE POST.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

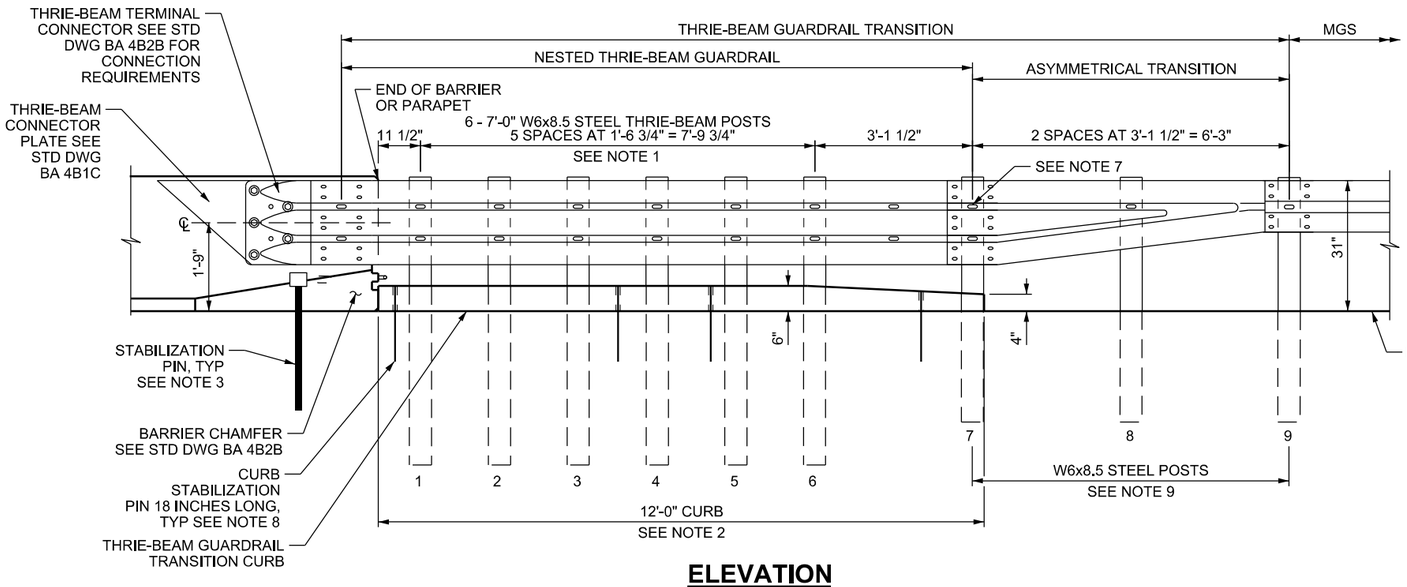
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

MIDWEST 31 INCH
W-BEAM GUARDRAIL
HARDWARE

STANDARD DRAWING TITLE

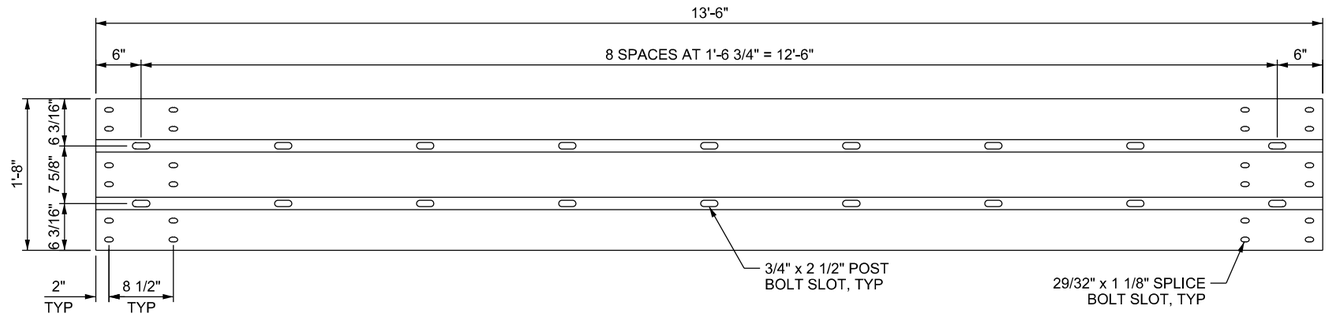
STD. DWG. NO.
BA 4A

DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04A.dgn
23-JUN-2020



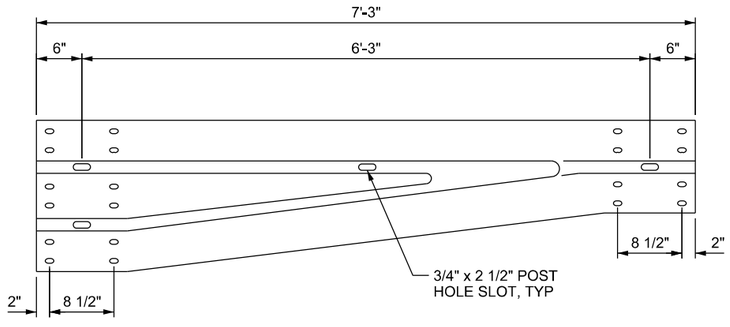
ELEVATION

RIGHT SIDE SHOWN LEFT SIDE SIMILAR



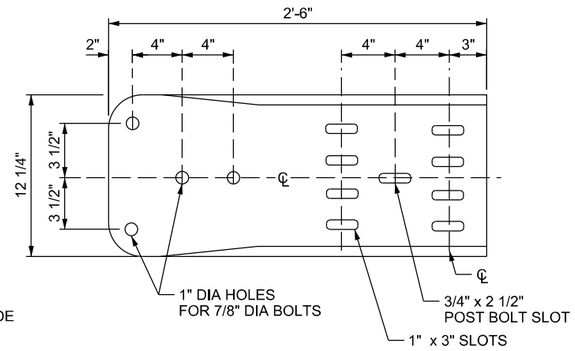
8-SPACE THRIE-BEAM GUARDRAIL

SEE NOTE 4

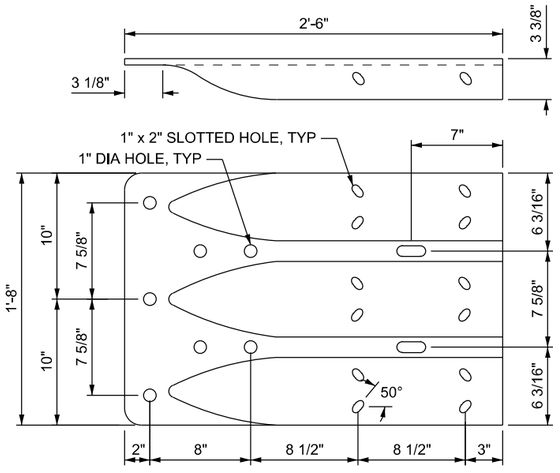


ASYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION

SEE NOTE 6



TERMINAL CONNECTOR PLATE



THRIE-BEAM TERMINAL CONNECTOR

SEE NOTE 5

NOTES:

1. COMPLETE SITE PREPARATION BEFORE INSTALLING TRANSITION.
2. REFER TO BA 4B1B FOR POST 1 THRU 6 DETAIL AND CURB REQUIREMENTS.
3. INSTALL BARRIER STABILIZATION PINS ACCORDING TO STD DWG BA 1A2 AND BA 1F1 BEFORE INSTALLING THRIE-BEAM CONNECTOR PLATE.
4. USE 12 GAUGE 8-SPACE THRIE-BEAM GUARDRAIL ACCORDING TO TASK FORCE 13 REPORT, RTM08A.
5. USE 10 GAUGE THRIE-BEAM TERMINAL CONNECTOR ACCORDING TO TASK FORCE 13 REPORT, RTE01B.
6. USE 10 GAUGE ASYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION ACCORDING TO TASK FORCE 13 REPORT, RWT02A.
7. USE ONE BOLT TO CONNECT THE ASYMMETRICAL W-BEAM TO THRIE-BEAM TRANSITION TO THE STEEL POST 7. USE THE TOP SLOT ONLY.
8. USE CURB STABILIZATION PINS, #5 REINFORCING STEEL ACCORDING TO AASHTO M31 GRADE 60. DRIVE CURB STABILIZATION PINS FLUSH WITH TOP OF CURB.
9. SEE STD DWG BA 4A FOR W6x8.5 STEEL POST DETAILS FOR POST 7 THRU 9.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	04/30/20	SDD	NEW DRAWING.	

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

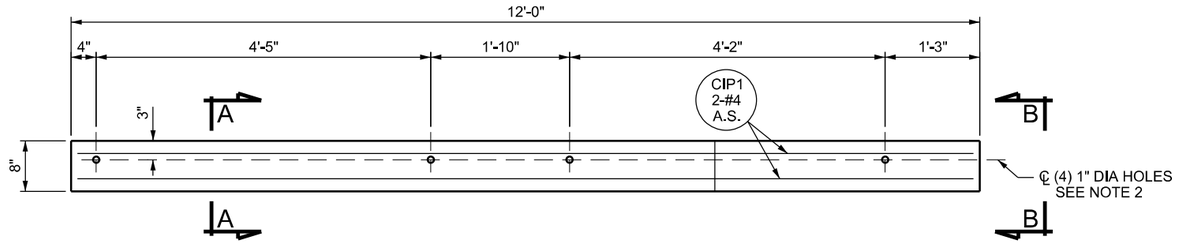
DEPUTY DIRECTOR

GUARDRAIL TRANSITION HARDWARE 1 OF 3

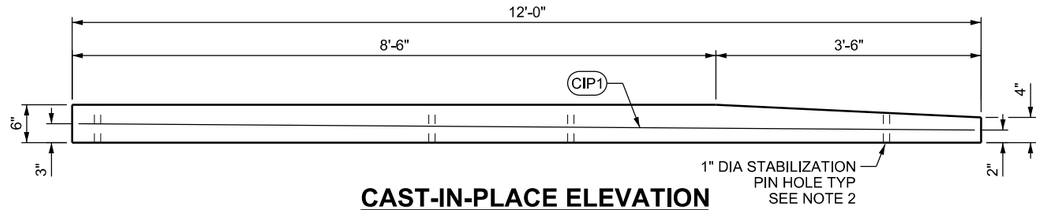
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4B1A

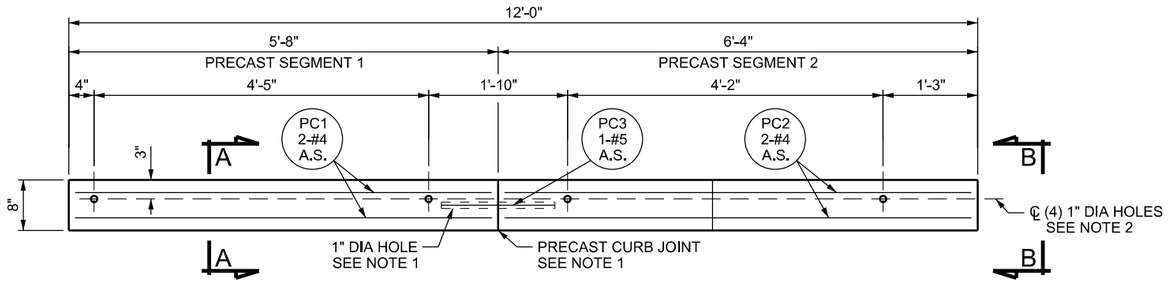
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (B64, CB\BA04B1A.dgn



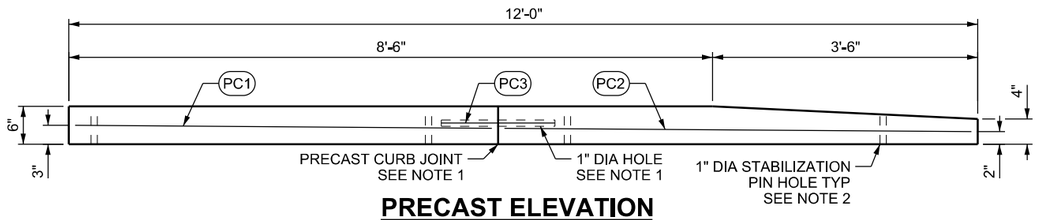
CAST-IN-PLACE PLAN



CAST-IN-PLACE ELEVATION



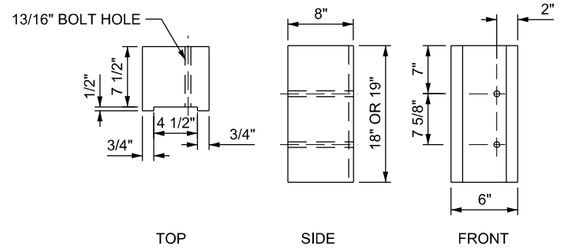
PRECAST PLAN



PRECAST ELEVATION

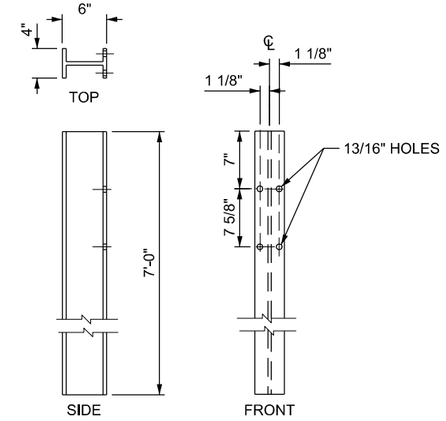
BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
CIP1	#4	2	HORIZONTAL IN CURB	11'-9"
PC1	#4	2	HORIZONTAL IN CURB	5'-5"
PC2	#4	2	HORIZONTAL IN CURB	6'-1"
PC3	#5	1	HORIZONTAL BETWEEN PRECAST CURB SEGMENTS	1'-6"

THRIE-BEAM GUARDRAIL TRANSITION CURB

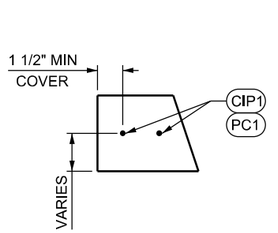


6 INCH X 8 INCH NOTCHED THRIE-BEAM WOOD BLOCK

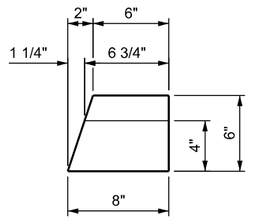
SEE NOTE 3



W6 X 8.5 STEEL THRIE-BEAM POST



SECTION A-A



VIEW B-B

NOTES:

1. USE PRECAST OR CAST-IN-PLACE CONCRETE FOR THE GUARDRAIL TRANSITION CURB. PRECAST CURB OPTION: USE AT MOST TWO PRECAST SEGMENTS AND PROVIDE THE FOLLOWING AT THE JOINT:
   - 1 1/2 INCH MINIMUM CONCRETE COVER FOR B1 REBAR.
   - FORM OR CORE DRILL ONE 1 INCH DIA x 9 INCH HOLE INTO EACH PRECAST SEGMENT.
   - PLACE ONE PC3 BAR WITH EPOXY RESIN ADHESIVE, CENTERED ON THE JOINT DURING CURB INSTALLATION.
2. FORM OR CORE DRILL 1 INCH DIAMETER HOLES FOR CURB STABILIZATION PINS.
3. A COMPOSITE OR PLASTIC BLOCK CAN BE SUBSTITUTED FOR THE NOTCHED WOOD BLOCK ON STEEL POSTS INSTALLATION. MASH COMPLIANCE REQUIRED.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
2	04/30/20	SDD	NEW DRAWINGS.	

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

GUARDRAIL TRANSITION HARDWARE 2 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4B1B

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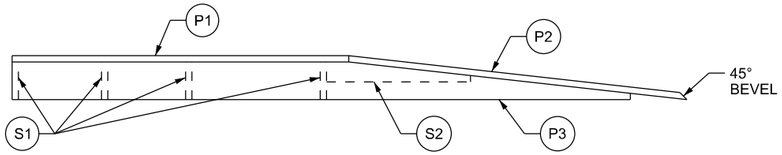
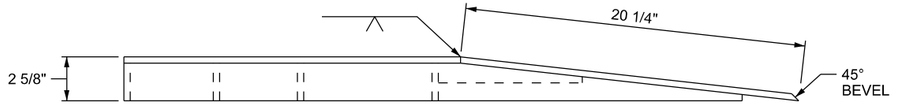
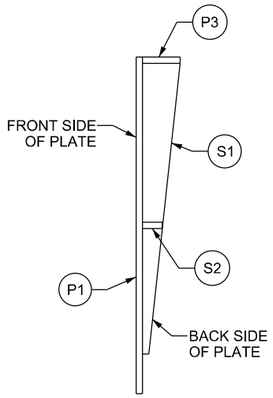
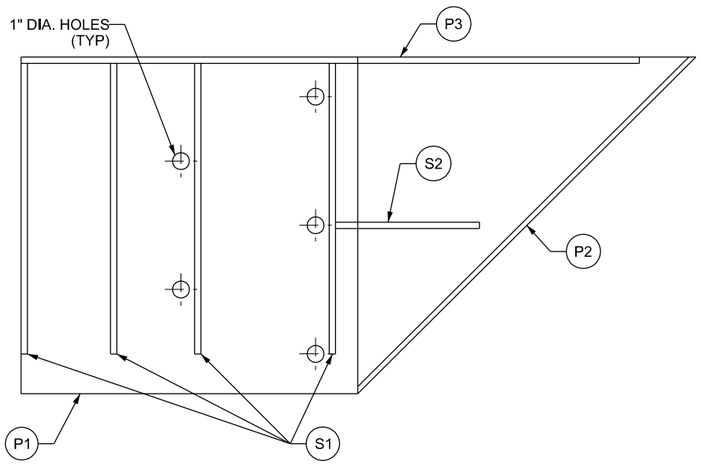
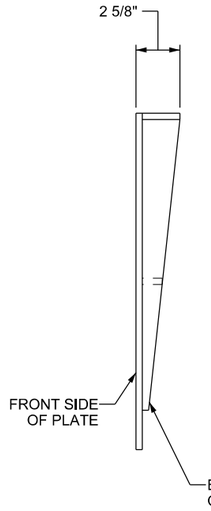
23-JUN-2020











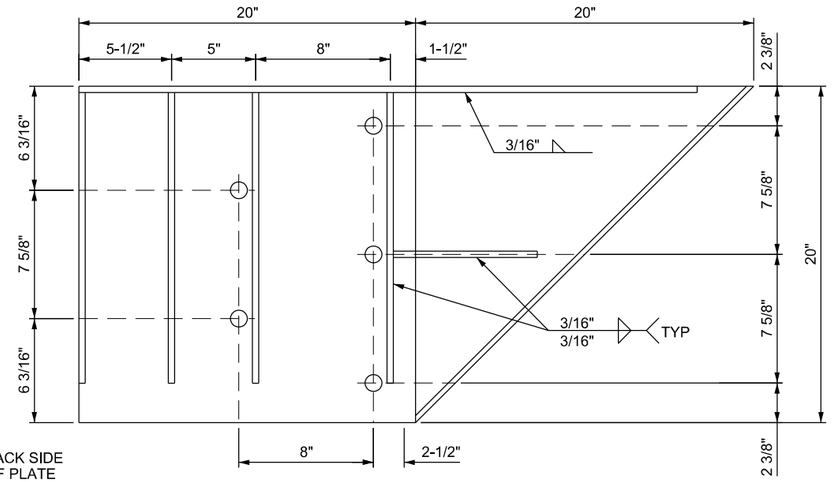


PLATE AND STIFFENER IDENTIFICATION

(BACK SIDE OF PLATE SHOWN)
RIGHT SIDE PLATE SHOWN,
LEFT SIDE PLATE IS MIRRORED

WELDING DETAILS

(BACK SIDE OF PLATE SHOWN)
RIGHT SIDE PLATE SHOWN,
LEFT SIDE PLATE IS MIRRORED

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE No.	QUANTITY	SHAPE	THICKNESS (IN.)	F-SHAPE BARRIER SIZE A x B x C x D x E (IN.)
P1	1		3/8	20 x 20
P2	1		3/8	20 1/4 x 20 x 28 1/2
P3	1		3/8	36 3/4 x 2 1/4 x 20 x 16 7/8 x 3/8
S1	4		3/8	17 1/4 x 2 1/4 x 17 3/8 x 3/8
S2	1		3/8	8 1/2 x 1 1/8 x 1 3/8 x 7 1/4 x 3/8

THRIE-BEAM CONNECTOR PLATE

REVISIONS

NO.	DATE	APPR.	REMARKS
1	04/30/20	SDD	NEW DRAWNG.

UTAH DEPARTMENT OF TRANSPORTATION

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SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

GUARDRAIL TRANSITION HARDWARE 3 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4B1C

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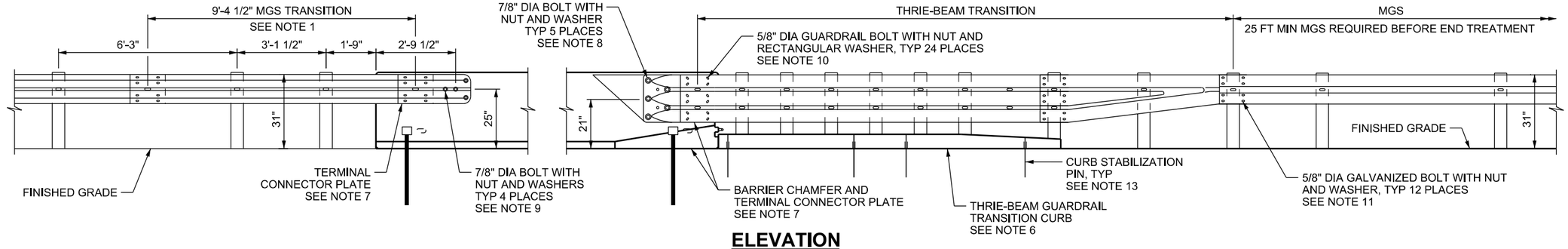
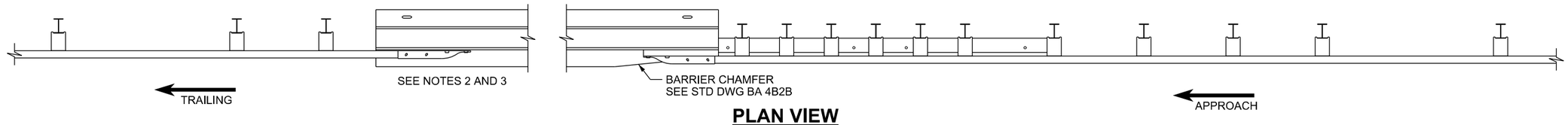


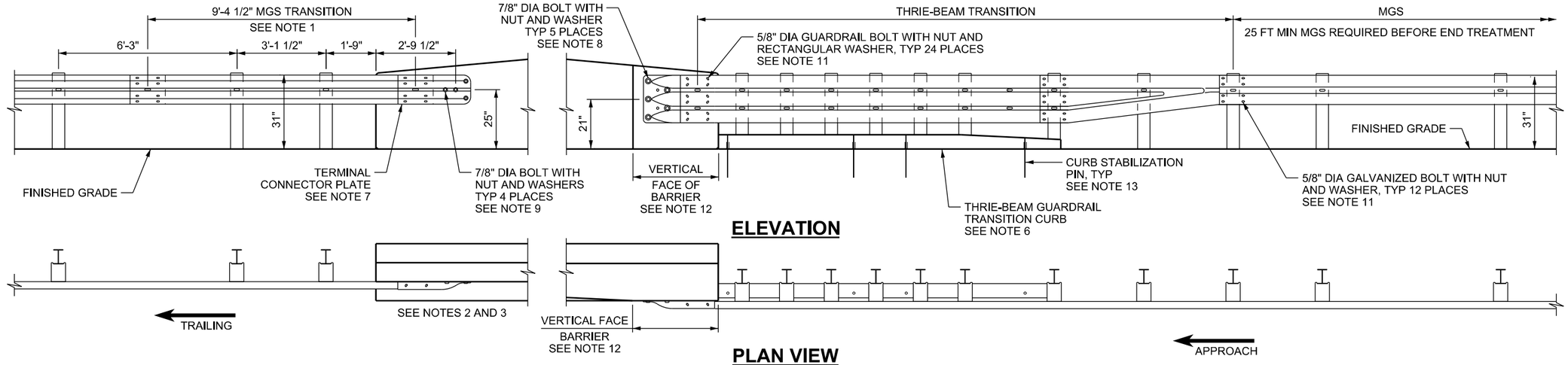
ELEVATION



PLAN VIEW

GUARDRAIL TRANSITION TO PRECAST F-SHAPE BARRIER

RIGHT SIDE SHOWN, LEFT SIDE SIMILAR



ELEVATION

PLAN VIEW

GUARDRAIL TRANSITION TO CONSTANT SLOPE BARRIER

CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER - 42 INCH SHOWN, OTHER CONSTANT SLOPE BARRIERS SIMILAR
RIGHT SIDE SHOWN, LEFT SIDE SIMILAR

NOTES:

1. SEE STD DWG BA 4A AND BA 4B1A FOR TRANSITION COMPONENTS.
2. DO NOT CONNECT AN APPROACH TRANSITION TO CONSTANT SLOPE BRIDGE PARAPET OR FULL HEIGHT CONSTANT SLOPE BARRIER.
3. SEE STD DWG BA 4B2B FOR ADDITIONAL CONNECTION DETAILS. USE BOLTS LONG ENOUGH THAT THE NUT WILL HAVE FULL ENGAGEMENT OF THE BOLT AND NO MORE THAN 1/4 INCH TO 1/2 INCH OF BOLT IS ABOVE THE NUT. CUT AND FIELD COAT BOLT WITH A ZINC COMPOUND WHEN BOLT EXCEEDS 1/2 INCH ABOVE THE NUT.
4. DO NOT USE ALL THREAD ROD.
5. COMPLETE SITE PREPARATIONS BEFORE INSTALLING TRANSITION.
6. SEE STD DWG BA 4B1B FOR THRIE-BEAM GUARDRAIL TRANSITION CURB DETAILS.
7. SEE STD DWG BA 4B2B FOR ADDITIONAL BARRIER END DETAILS AND SECTIONS.
8. USE STRUCTURAL HEX BOLTS CONFORMING TO ASTM F3125, GRADE A325. USE HARDENED WASHERS AND HEAVY HEX NUTS ACCORDING TO ASTM F436 AND A563, RESPECTIVELY. HOT DIP GALVANIZE ACCORDING TO ASTM A153.
9. USE STRUCTURAL HEX BOLTS CONFORMING TO ASTM A325. USE HARDENED WASHERS AND HEX NUTS ACCORDING TO ASTM F436 AND A 563, RESPECTIVELY. PLACE 1 3/4 INCH ROUND FLAT WASHER UNDER BOLT HEAD. PLACE 3 INCH x 3 INCH x 1/4 INCH SQUARE WASHER AND 7/8 INCH LOCK WASHER UNDER HEX NUT. HOT DIP GALVANIZE ACCORDING TO ASTM A153.
10. SEE STD DWG BA 1F3 FOR GUARDRAIL BOLT REQUIREMENTS.
11. SEE STD DWG BA 4A FOR GALVANIZED BOLT REQUIREMENTS.
12. SEE STD DWG BA 1, 2, & 3 SERIES FOR CAST-IN-PLACE CONCRETE CONSTANT SLOPE BARRIER TRANSITION DETAILS.
13. SEE STD DWG BA 4B1A FOR CURB STABILIZATION PIN DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	04/30/2020	SDD	NEW DRAWINGS.

UTAH DEPARTMENT OF TRANSPORTATION

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

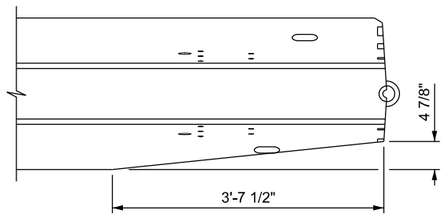
DEPUTY DIRECTOR

GUARDRAIL TRANSITION LAYOUTS 1 OF 2

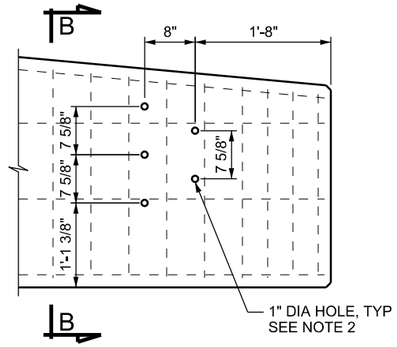
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4B2A

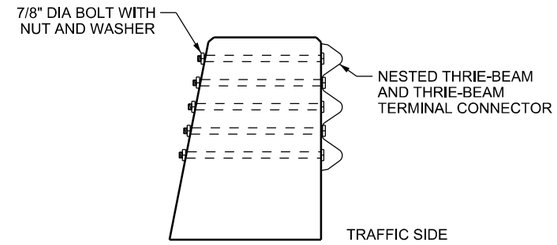
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA4B2A.dgn
23-JUN-2020



PLAN

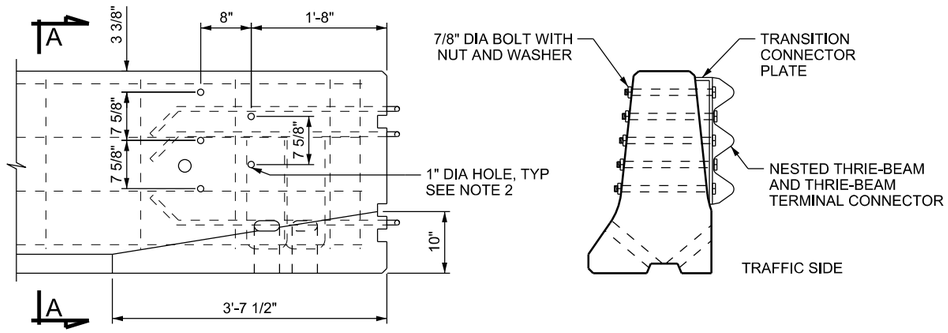


ELEVATION



SECTION B-B

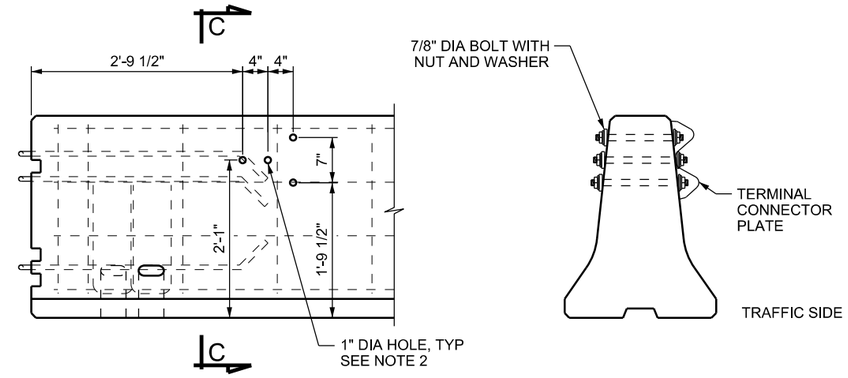
CONSTANT SLOPE BARRIER FOR APPROACH THRIE-BEAM GUARDRAIL TRANSITIONS



ELEVATION **SECTION A-A**

F-SHAPE BARRIER END FOR APPROACH THRIE-BEAM GUARDRAIL TRANSITIONS

SEE NOTES 1 AND 2



ELEVATION **SECTION C-C**

BARRIER END FOR TRAILING W-BEAM GUARDRAIL TRANSITIONS

NOTES:

1. INSTALL STABILIZATION PIN AT THE LAST THREE PRECAST CONCRETE BARRIER SEGMENTS AND CONNECT TO A GUARDRAIL TRANSITION WHEN TRANSITIONING FROM FREE-STANDING BARRIER TO GUARDRAIL.
2. CHAMFER THE END OF THE BARRIER AND CORE DRILL FIVE 1 INCH DIAMETER HOLES AS SHOWN. DO NOT USE ROTARY PERCUSSION DRILL.

NO.	DATE	APPR.	REMARKS
1	04/30/2020	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

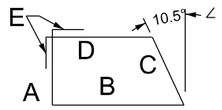
GUARDRAIL TRANSITION LAYOUTS 2 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4B2B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04B2B.dgn
23-JUN-2020

CONSTANT SLOPE REINFORCING STEEL SCHEDULE



TYPE I
(FOR 1 SECTION ONLY)

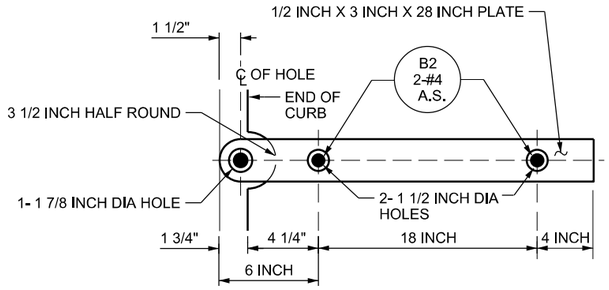
BENT BARS (ALL DIMENSIONS ARE OUT TO OUT)

MARK	SIZE	NO.	TYPE	LENGTH	A	B	C	D	E
C1	#3	1	1	4 FT -2 1/2 INCH	8 1/2 INCH	14 1/2 INCH	8 1/2 INCH	12 INCH	3 1/2 INCH
C2	↑	↑	↑	3 FT -10 INCH	7 1/2 INCH	13 INCH	7 1/2 INCH	11 INCH	↑
C3	↕	↕	↕	3 FT -6 INCH	6 1/2 INCH	12 INCH	6 1/2 INCH	10 INCH	↕
C4	↕	↕	↕	3 FT -1 1/2 INCH	5 1/2 INCH	10 1/2 INCH	5 1/2 INCH	9 INCH	↕
C5	↕	↕	↕	2 FT -9 INCH	4 1/2 INCH	9 INCH	4 1/2 INCH	8 INCH	↕
C6	#3	↓	↓	2 FT -4 1/2 INCH	3 1/2 INCH	8 INCH	3 1/2 INCH	6 1/2 INCH	↓
C7	↓	1	1	2 FT -1 INCH	3 INCH	6 1/2 INCH	3 INCH	5 1/2 INCH	3 1/2 INCH

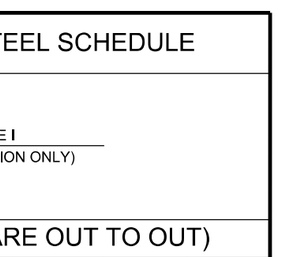
STRAIGHT BARS

MARK	SIZE	NO.	LENGTH	
B1	#4	4	6 FT -8 INCH	
B2	#4	2	8 INCH	

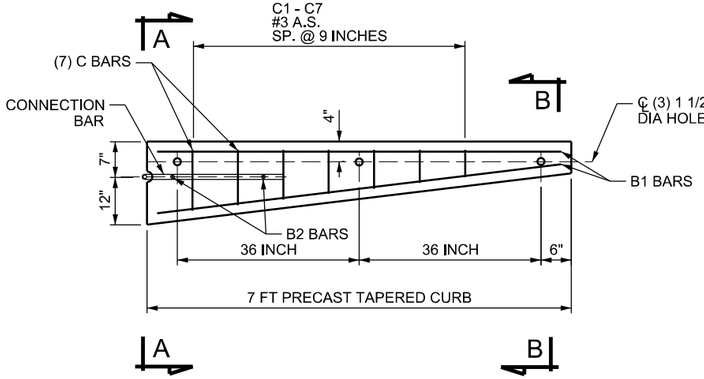
NOTE:
ALL REINFORCING BARS TO HAVE
1 1/2 INCH MINIMUM COVER.



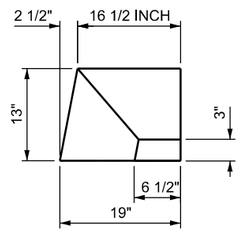
CONNECTION BAR



SECTION A-A

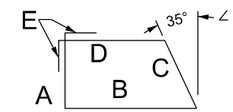


PLAN
CONSTANT SLOPE CURB SECTION



SECTION B-B

NEW JERSEY REINFORCING STEEL SCHEDULE



TYPE I
(FOR 1 SECTION ONLY)

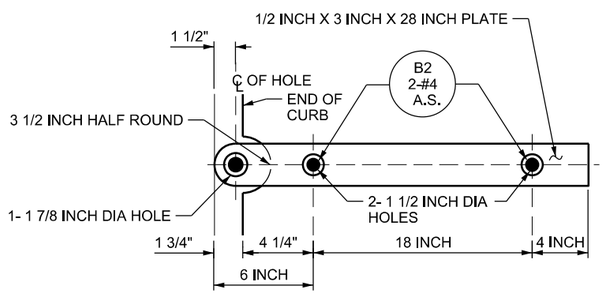
BENT BARS (ALL DIMENSIONS ARE OUT TO OUT)

MARK	SIZE	NO.	TYPE	LENGTH	A	B	C	D	E
C1	#3	1	1	4 FT -2 1/2 INCH	9 INCH	14 1/2 INCH	11 INCH	9 INCH	3 1/2 INCH
C2	↑	↑	↑	3 FT -10 1/2 INCH	8 INCH	13 1/2 INCH	10 INCH	8 INCH	↑
C3	↕	↕	↕	3 FT -6 1/2 INCH	7 INCH	12 1/2 INCH	9 INCH	8 INCH	↕
C4	↕	↕	↕	3 FT -2 INCH	6 INCH	11 INCH	8 INCH	7 INCH	↕
C5	↕	↕	↕	2 FT -10 INCH	5 1/2 INCH	10 INCH	6 1/2 INCH	6 INCH	↕
C6	↓	↓	↓	2 FT -6 INCH	4 1/2 INCH	8 1/2 INCH	5 1/2 INCH	5 INCH	↓
C7	#3	1	1	2 FT -2 1/2 INCH	4 1/2 INCH	8 INCH	5 INCH	5 INCH	3 1/2 INCH

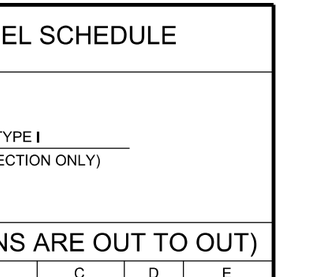
STRAIGHT BARS

MARK	SIZE	NO.	LENGTH	
B1	#4	4	6 FT 9 INCH	
B2	#4	2	8 INCH	

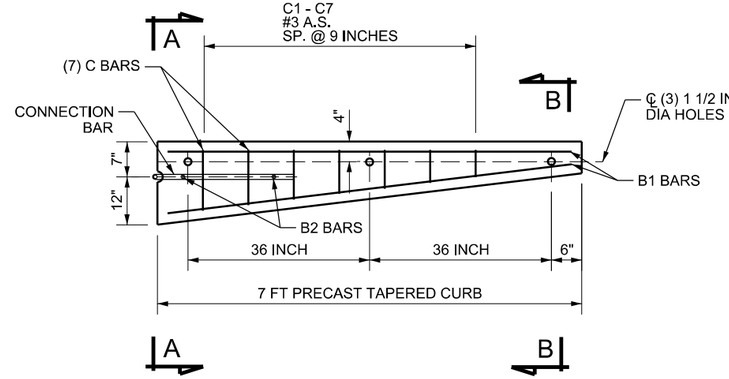
NOTE:
ALL REINFORCING BARS TO HAVE
1 1/2 INCH MINIMUM COVER.



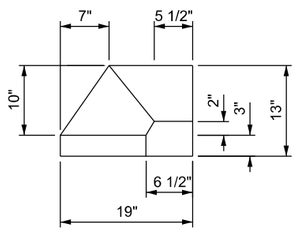
CONNECTION BAR



SECTION A-A



PLAN
NEW JERSEY SHAPED CURB SECTION



SECTION B-B

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

AUGUST 2020
DATE

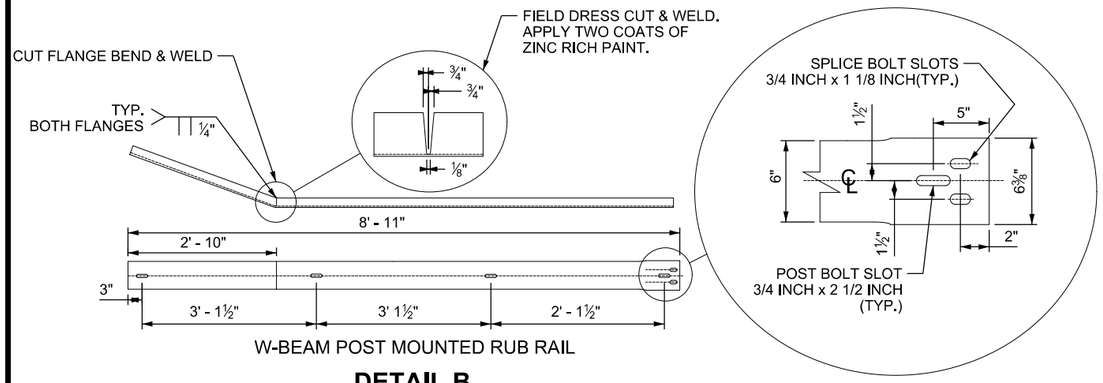
DEPUTY DIRECTOR

W-BEAM GUARDRAIL TRANSITION CURB SECTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4B3

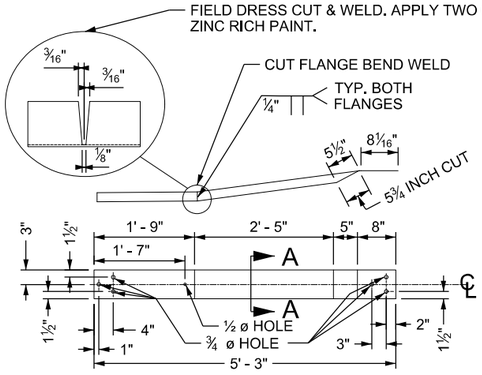
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Bosch 3 (BA4,CB)\BA04B3.dgn
23-JUN-2020



W-BEAM POST MOUNTED RUB RAIL

DETAIL B

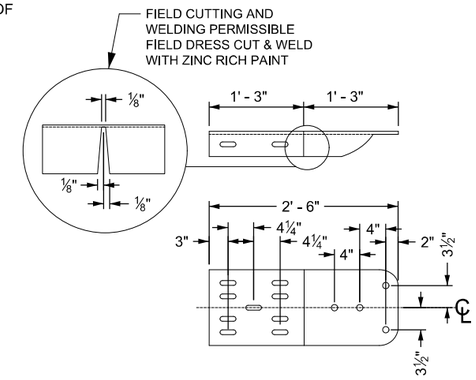
SEE NOTE 2



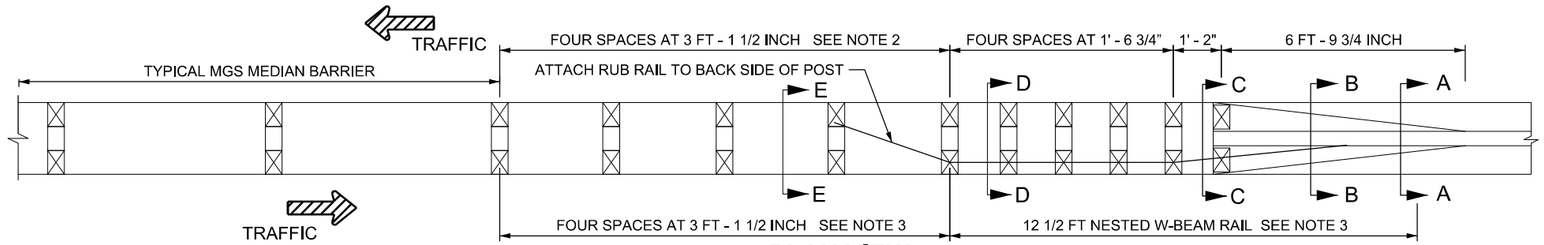
CONCRETE BARRIER MOUNTED RUB RAIL

DETAIL A

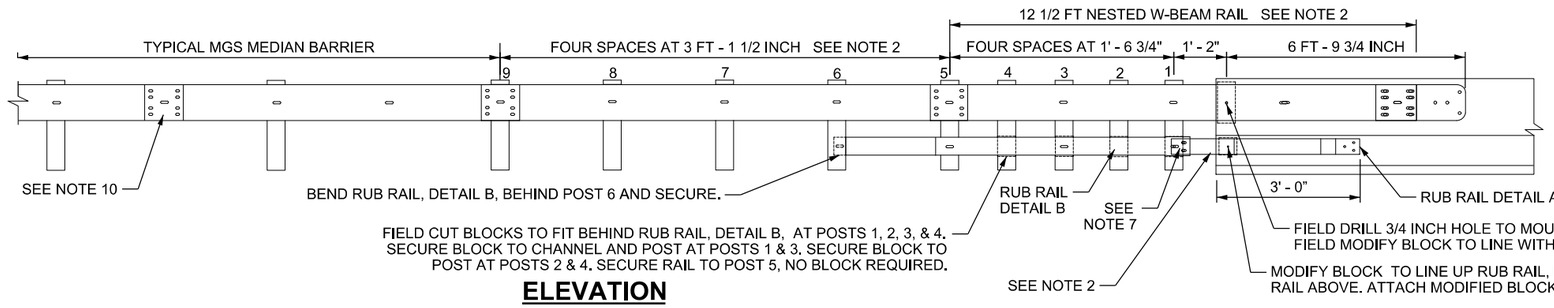
SEE NOTE 2



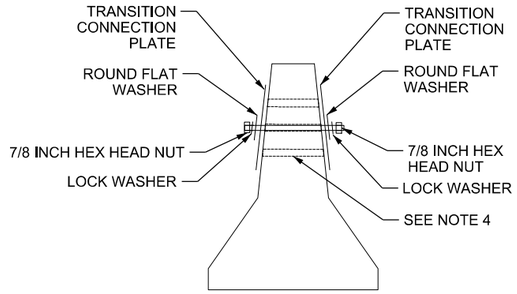
TERMINAL CONNECTION PLATE (RWE02A MODIFIED)



PLAN VIEW

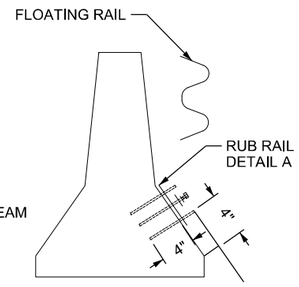


ELEVATION



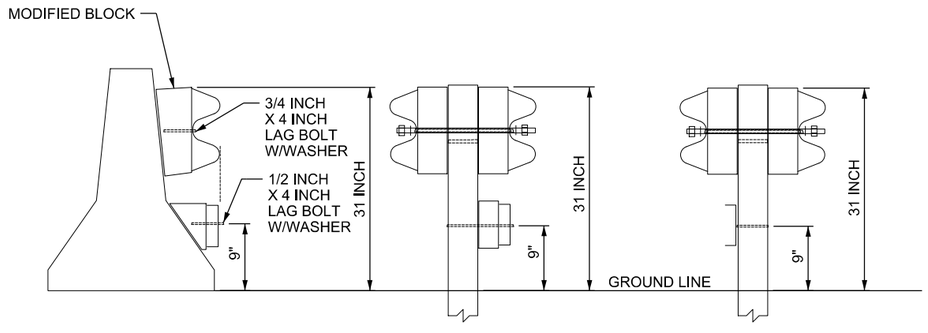
SECTION A-A

SEE NOTES 4 & 9



SECTION B-B

SEE NOTES 1, 2, 5, &, 9



SECTION C-C

SEE NOTES 1 & 2

SECTION D-D

SEE NOTES 6,7, 9, & 11

SECTION E-E

SEE NOTES 7, 8, 9, & 11

NOTES:

1. NEW JERSEY STYLE BARRIER SHOWN. ATTACH TO CONSTANT SLOPE BARRIER IN SIMILAR MANNER. USE CONSTANT SLOPE TRANSITION SECTION, FROM 42 INCHES TO 32 INCHES ACCORDING TO BARRIER TYPE PRIOR TO ATTACHING TRANSITION SECTION.
2. USE C6X 8.2 CHANNEL RUB RAIL FOR THE MANUFACTURING OF DETAIL A AND DETAIL B. TWIST DETAIL A TO A 35 DEGREE RIGHT HAND TWIST. GALVANIZE TO MEET AASHTO M 111 AFTER PUNCHING, CUTTING AND TWISTING ARE COMPLETE.
3. USE TRANSITION GUARDRAIL PANELS ACCORDING TO STD DWG BA 4B1.
4. CORE DRILL BARRIER WITH 1 INCH HOLES, DO NOT USE ROTARY PERCUSSION DRILL. INSTALL TRANSITION CONNECTION PLATE USING 7/8 INCH HIGH STRENGTH TREADED RODS WITH ROUND WASHERS, LOCK WASHERS, AND NUTS ON BOTH SIDES OF THE BARRIER SO THAT NUTS WILL HAVE FULL ENGAGEMENT OF ROD AND WILL NOT BE GREATER THAN 1/2 INCH ABOVE NUT.
5. DRILL BARRIER WITH 3 HOLES, EACH MEASURING 3/4 INCH X 4 INCH. INSTALL THREE 5/8 INCH X 5 1/2 INCH HIGH STRENGTH TREADED RODS USING AASHTO M 235 EPOXY. INSTALL ROUND WASHERS, LOCK WASHERS, AND NUTS SO THAT NUTS WILL HAVE FULL ENGAGEMENT OF ROD AND WILL NOT BE GREATER THAN 1/2 INCH BEYOND NUT.
6. USE 5/8 INCH THREAD ROD WITH WASHERS AND NUTS TO ATTACH W-BEAM GUARDRAIL TO POSTS. USE CENTER HOLE OF POST FOR ATTACHMENT SO THAT NUTS WILL HAVE FULL ENGAGEMENT OF ROD AND WILL NOT BE GREATER THAN 1/2 INCH ABOVE NUT.
7. USE TYPICAL GUARDRAIL SPLICE BOLTS TO CONNECT RUB RAIL DETAIL A AND RUB RAIL DETAIL B TOGETHER. USE TYPICAL GUARDRAIL BUTTON HEAD BOLTS TO ATTACH RUB RAIL TO BLOCKS AND POSTS.
8. ATTACH RUB RAIL TO BACK OF POST # 6.
9. USE GALVANIZED OR ZINC COATED HARDWARE TO MOUNT TRANSITION CONNECTION PLATE, RUB RAIL, DETAIL A, ONTO CONCRETE BARRIER, W-BEAM CONNECTION RODS, AND LAG BOLTS.
10. INSTALL SPLICE BOLTS ONLY WITHIN THE MGS SYSTEM. DO NOT INSTALL CENTER BOLT.
11. USE TOP HOLE OF POST TO SET RAIL HEIGHT THROUGH SECTIONS D AND E.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/26/2017	SDD	CORRECTED TRANSITION HEIGHT REQUIREMENT.	

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN, STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

MIDWEST 31 INCH W-BEAM GUARDRAIL MEDIAN BARRIER AND TRANSITION HARDWARE AND LAYOUT

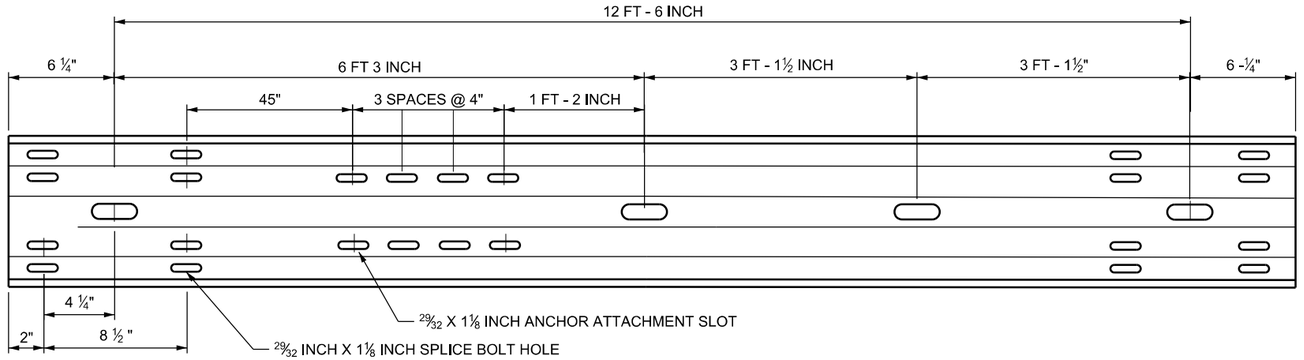
STANDARD DRAWING TITLE

STD. DWG. NO.

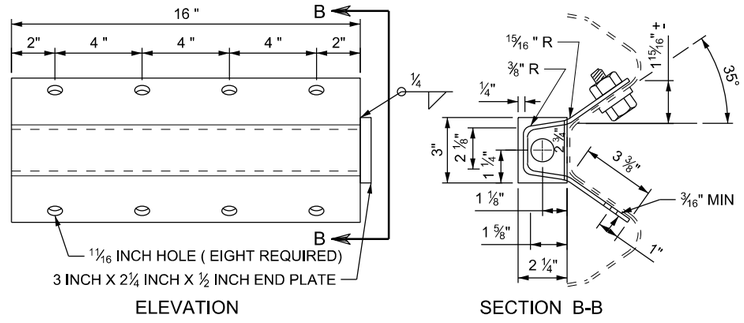
BA 4B4

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB\BA04B4.dgn

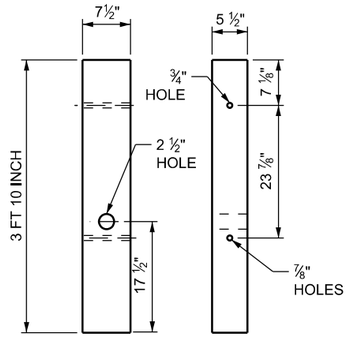
23-JUN-2020



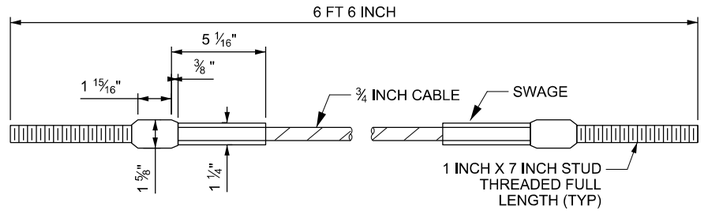
RAIL ELEMENT



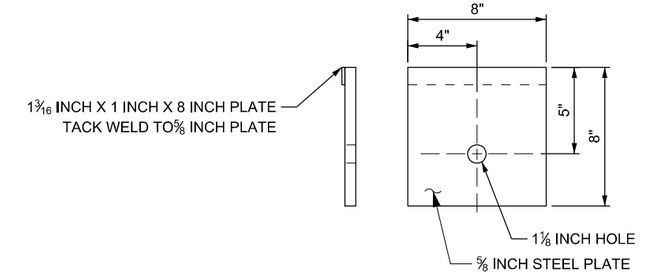
ANCHOR BRACKET (FPA01)



WOOD BREAKAWAY POST (PDF01)

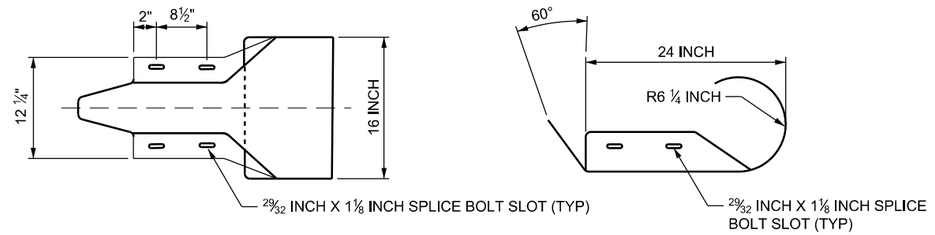


BCT CABLE ANCHOR ASSEMBLY (FCA01)

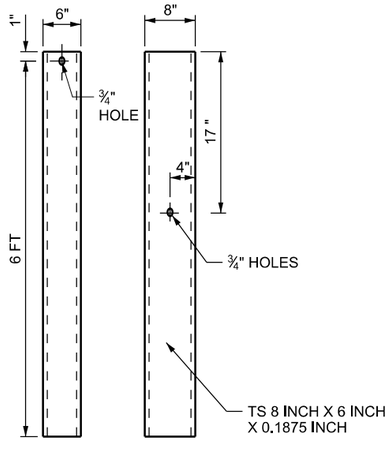


NOTE:
INSTALL BEARING PLATE WITH
5 INCH PORTION UP. SECURE PLATE
TO POST USING TWO NAILS AT
TOP OF PLATE TO PREVENT ROTATION.

BEARING PLATE (FPB01)

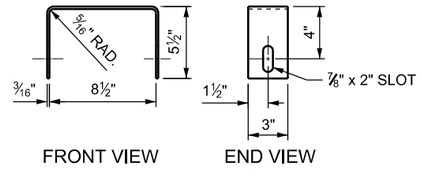


END SECTION (ROUNDED)(RWE03A)

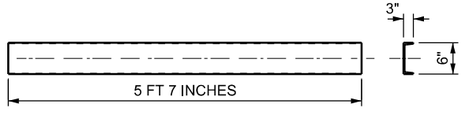


FOUNDATION TUBE (PTE06)

SEE NOTE 1

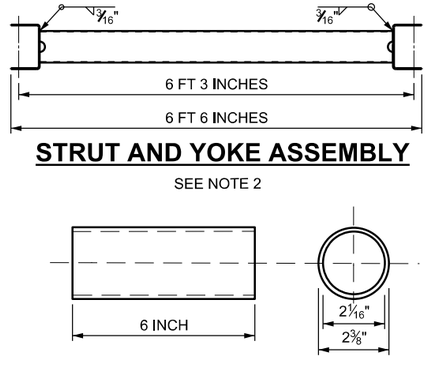


YOKE DETAILS



STRUT DETAILS

6"x3" 10 GAUGE
SEE NOTE 2



STRUT AND YOKE ASSEMBLY

SEE NOTE 2

BREAKAWAY TERMINAL POST SLEEVE (FMM02)

DESIGN-ONLY NOTES

A. DO NOT USE ON APPROACH END.
B. USE ON BARRIER TRAILING END ON DIVIDED ROADWAYS WITH A POSITIVE SEPARATION OR MEDIAN WIDTH GREATER THAN OR EQUAL TO 36 FT MEASURED FROM EDGE OF TRAVEL LANE TO EDGE OF TRAVEL LANE AND BARRIER END IS OUTSIDE THE MAXIMUM REQUIRED CLEAR ZONE AS DEFINED IN THE UDOT ROADWAY DESIGN MANUAL AND THE AASHTO ROADSIDE DESIGN GUIDE.

NOTES:

1. MANUFACTURE ACCORDING TO AASHTO GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE. NUMBER IN PARENTHESIS IS GUIDE REFERENCE NUMBER.
2. MANUFACTURE STRUT AND YOLK ASSEMBLY TO MEET ASTM A36 STEEL GALVANIZED.
3. INSTALL SPLICE BOLTS ONLY WITHIN THE MID-SPAN SPLICE JOINT. DO NOT INSTALL CENTER BOLT.

NO.	DATE	APPR.	REVISIONS
1	10/26/2017	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

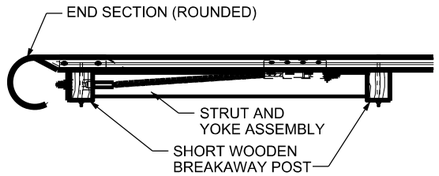
AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

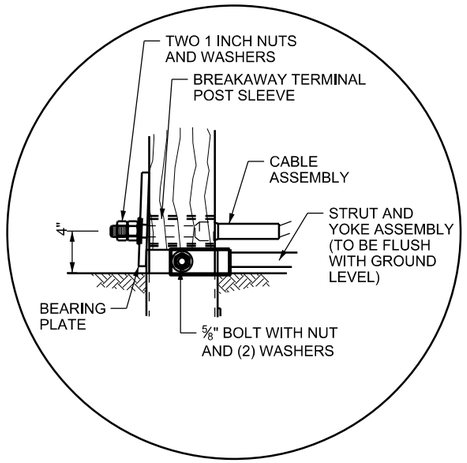
MIDWEST 31 INCH W-BEAM GUARDRAIL ANCHOR TYPE 1
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4C1A

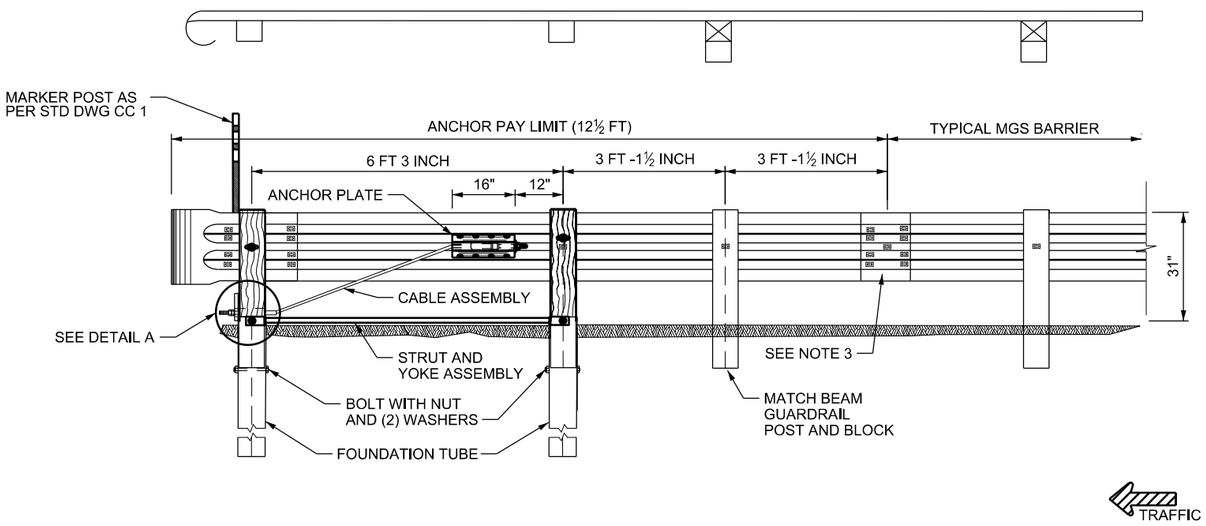
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4_CB)\BA04C1A.dgn
23-JUN-2020



PLAN



DETAIL A



TRAILING END W-BEAM ANCHOR INSTALLATION

DESIGN-ONLY NOTES

A. DO NOT USE ON APPROACH END.
B. USE ON BARRIER TRAILING END ON DIVIDED ROADWAYS WITH A POSITIVE SEPARATION OR MEDIAN WIDTH GREATER THAN OR EQUAL TO 36 FT MEASURED FROM EDGE OF TRAVEL LANE TO EDGE OF TRAVEL LANE AND BARRIER END IS OUTSIDE THE MAXIMUM REQUIRED CLEAR ZONE AS DEFINED IN THE UDOT ROADWAY DESIGN MANUAL AND THE AASHTO ROADSIDE DESIGN GUIDE.

NOTES:

1. MANUFACTURE ACCORDING TO AASHTO GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE. NUMBER IN PARENTHESIS IS GUIDE REFERENCE NUMBER.
2. INSTALL SPLICE BOLTS ONLY WITHIN THE MID-SPAN SPLICE JOINT. DO NOT INSTALL CENTER BOLT.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/26/2017	SDD	NEW DRAWING.	

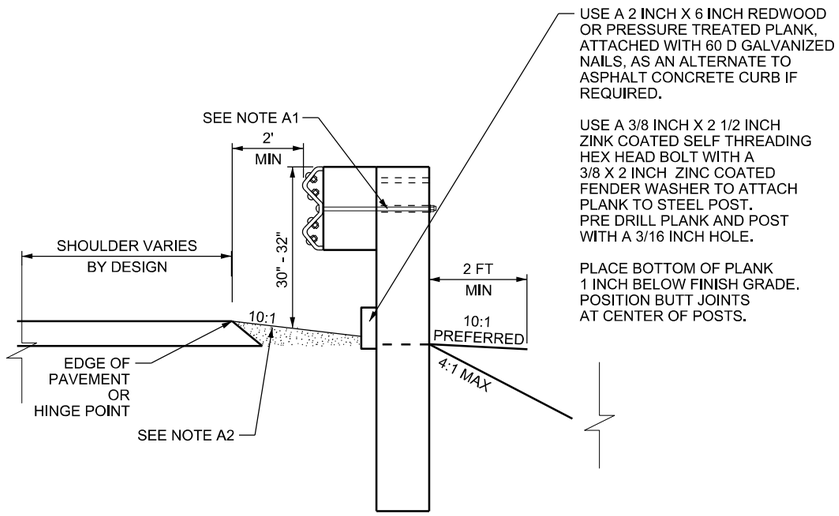
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

MIDWEST 31 INCH W-BEAM GUARDRAIL ANCHOR TYPE 1
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4C1B

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04C1B.dgn



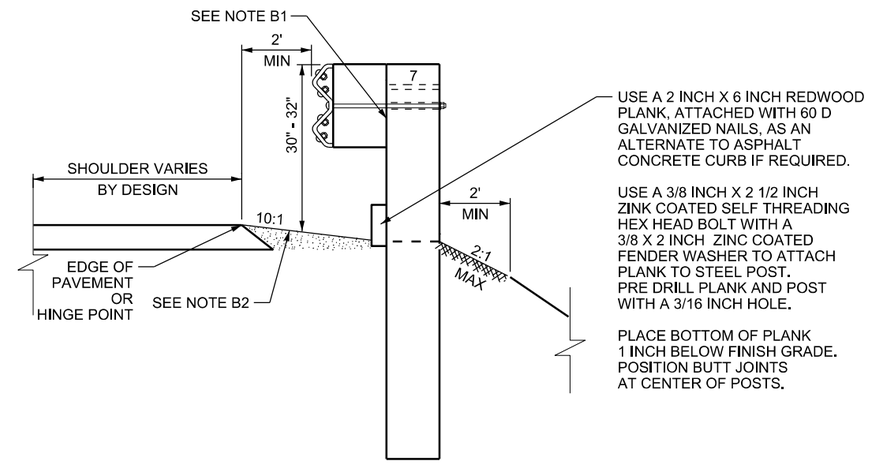
NOTES:

A1. USE BOTTOM HOLE OF POST TO SET INITIAL RAIL HEIGHT.

A2. MATCH ROADWAY CROSS-SLOPE IF SUPERELEVATED MORE THAN 2 PERCENT.

DETAIL A: INITIAL INSTALLATION

USE 6 FT POSTS



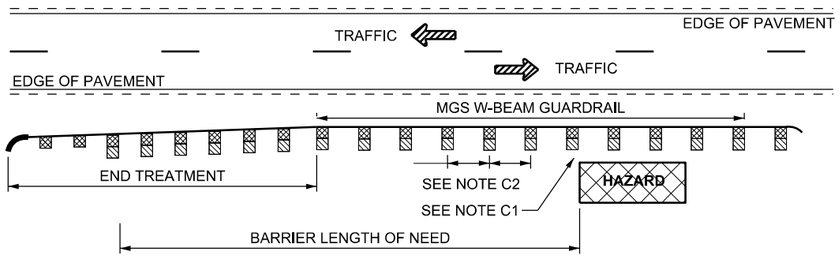
NOTES:

B1. USE BOTTOM HOLE OF POST TO SET INITIAL RAIL HEIGHT.

B2. MATCH ROADWAY CROSS-SLOPE IF SUPERELEVATED MORE THAN 2 PERCENT.

DETAIL B: INITIAL LONG POST INSTALLATION

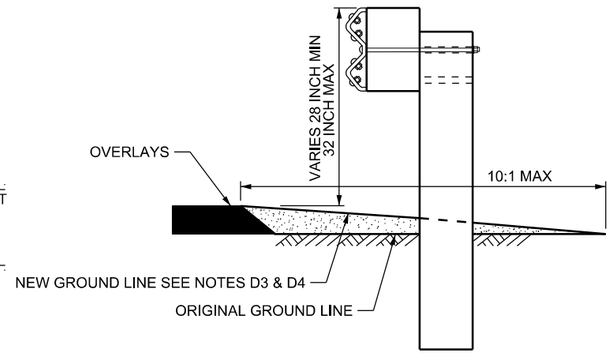
USE 7 FT POSTS



NOTE:

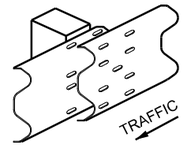
C1. REFER TO STD DWG BA 4H3 IF 38 INCH CLEARANCE IS NOT ACHIEVED FROM BACK OF POST TO FACE OF HAZARD.
C2. USE 6 FT 3 INCH POST SPACING WITH TYPICAL APPLICATIONS.

DETAIL C: TYPICAL INSTALLATION



DETAIL D: EXISTING RAIL ELEMENT RAISED

DO NOT USE FOR INITIAL INSTALLATION



SPLICE LAP DETAIL

NOTES:

D1. SLOPE OF SHOULDER INTO FACE OF RAIL NOT TO EXCEED 8:1.

D2. RAISE REDWOOD PLANKING WHEN REQUIRED.

D3. ADD SHOULDER MATERIAL BEFORE REINSTALLING BLOCK AND RAIL ELEMENTS.

D4. MATCH ROADWAY CROSS-SLOPE IF SUPERELEVATED MORE THAN 2 PERCENT.

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	DETAIL D: CHANGED SLOPE REQUIREMENTS.
2	02/27/2020	SDD	MODIFIED POST LENGTH REQUIREMENTS. NOTES MODIFIED ACCORDINGLY.

UTAH DEPARTMENT OF TRANSPORTATION

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SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

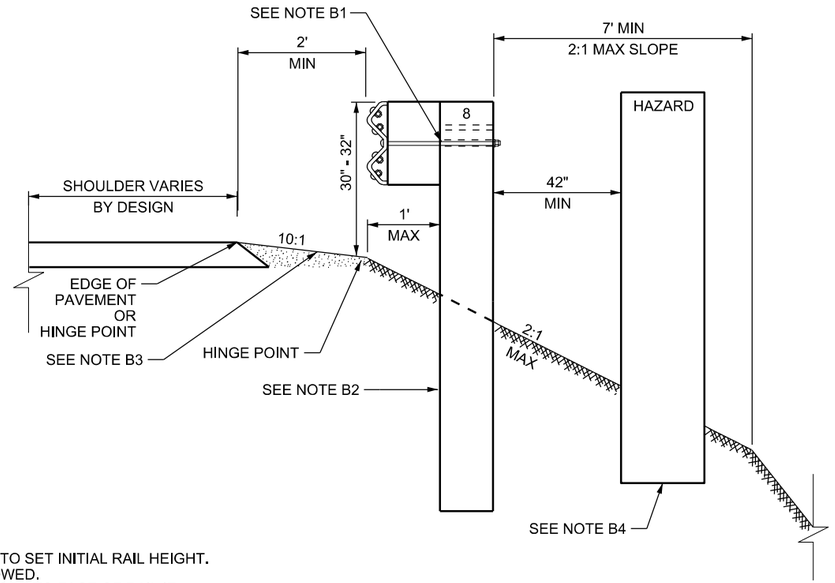
MIDWEST 31 INCH W-BEAM GUARDRAIL INSTALLATIONS

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 4D1

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4_CB)\BA04D1.dgn
23-JUN-2020

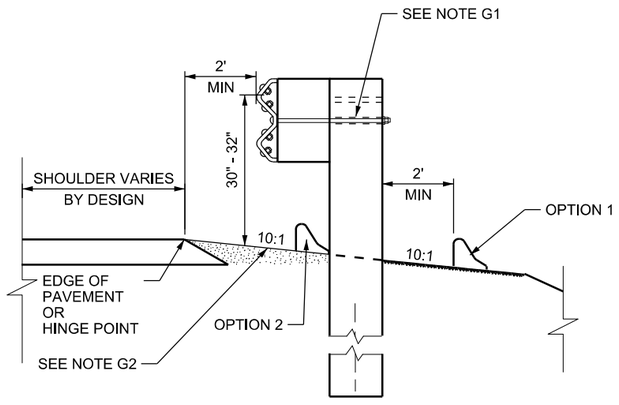


NOTES:

E1. USE BOTTOM HOLE OF POST TO SET INITIAL RAIL HEIGHT.
E2. OMITTED POSTS IS NOT ALLOWED.
E3. MATCH ROADWAY CROSS-SLOPE TO FACE OF RAIL IF SUPERELEVATED MORE THAN 2 PERCENT.
E4. BARRIER DEFLECTION INCREASES TO 42 INCHES WITH THIS INSTALLATION.
E5. PLACE FACE OF RAIL AT OR PRIOR TO HINGE POINT.

DETAIL E: INITIAL LONG POST 2:1 FILL SLOPE INSTALLATION

USE 8 FT STEEL POST ONLY



NOTE:

G1. USE BOTTOM HOLE OF POST TO SET INITIAL RAIL HEIGHT

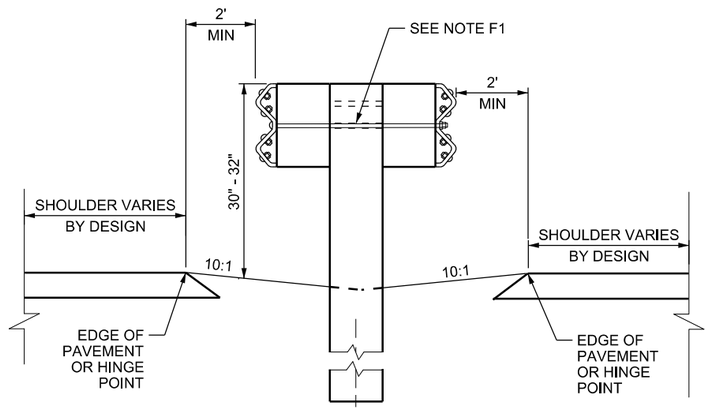
G2. MATCH ROADWAY CROSS-SLOPE TO 2 FT BEHIND POST IF SUPERELEVATED MORE THAN 2 PERCENT.

OPTION 1: PREFERRED INSTALLATION.

OPTION 2: PLACE FACE OF ASPHALT CONCRETE CURB BEHIND FACE OF RAIL. 2 INCH MAXIMUM CURB HEIGHT WHEN USED IN FRONT OF POST.

DETAIL G: INSTALLATION W/ASPHALT CONCRETE CURB

USE 6 FT POSTS



NOTES:

F1. USE BOTTOM HOLE TO MOUNT BLOCK & RAIL.
F2. RAISE BOTH RAIL ELEMENTS AS PER RAIL ELEMENT RAISED DETAIL, WHEN REQUIRED.
F3. ATTACH REQUIRED DELINEATION ON THE POST.
F4. ALL THREAD ROD PERMITTED FOR USE TO ATTACH W-BEAM, POSTS AND BLOCKS. USE OF 2- 10 INCH BOLTS WITH STEEL POSTS. FULL ENGAGEMENT OF NUT REQUIRED ON BOTH SIDES OF RAIL AND NO MORE THAN 1/2 INCH OF EXPOSED ENDS ABOVE NUT.

DETAIL F: MEDIAN BARRIER

USE 6 FT POSTS

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	DETAIL E: CORRECTED 7' DIMENSION. ADDED NOTE B5.
			ADDED HINGE POINT CALL OUT.
2	02/27/2020	SDD	MODIFIED POST LENGTH REQUIREMENTS.
			NOTES MODIFIED ACCORDINGLY.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

MIDWEST 31 INCH W-BEAM GUARDRAIL INSTALLATIONS

STANDARD DRAWING TITLE

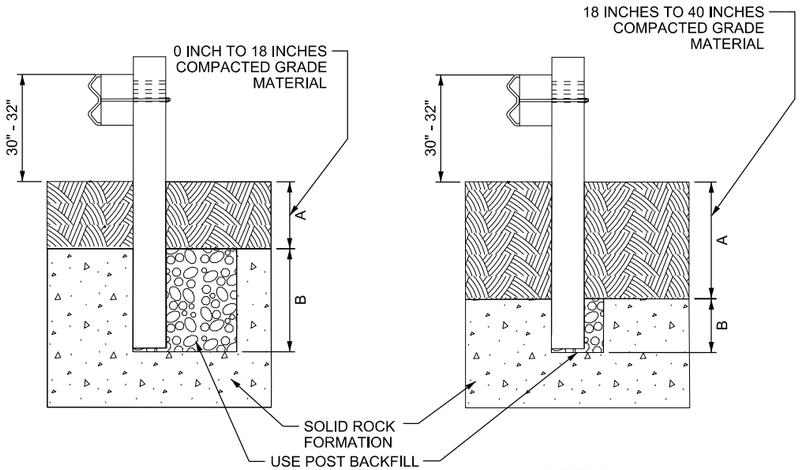
STD. DWG. NO.

BA 4D2

DGN File: L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04D2.dgn
23-JUN-2020

CASE 1 POST LENGTH AND DRILLED ROCK FORMULA
40" - A = B
40" = TYPICAL FULL POST EMBEDMENT A = COMPACTED GRADE MATERIAL (0 INCHES TO 18 INCHES) B = DRILLED ROCK HOLE DEPTH (CUT POST TO MEET DEPTH REQUIREMENT NOT TO EXCEED 24 INCHES. SEE NOTE 3)

CASE 2 DRILLED ROCK FORMULA
40" - A = B
40" = TYPICAL FULL POST EMBEDMENT A = COMPACTED GRADE MATERIAL (18 INCHES TO 40 INCHES) B = DRILLED ROCK HOLE DEPTH

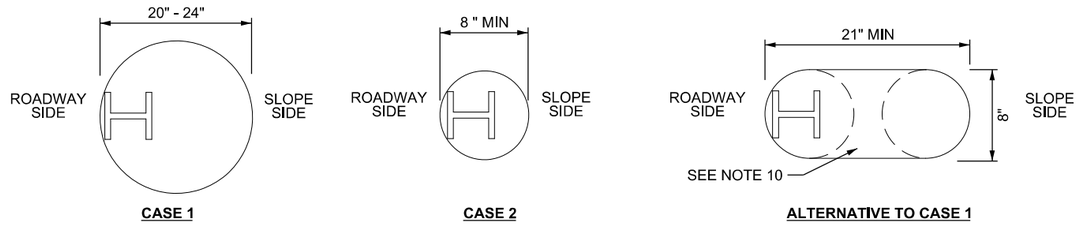


CASE 1

SEE NOTES 3, 4, 6, & 11

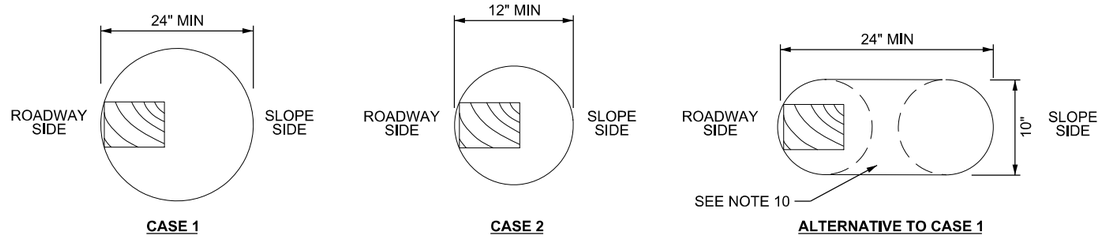
CASE 2

SEE NOTES 4, 6, & 11



CASE 1 **CASE 2** **ALTERNATIVE TO CASE 1**

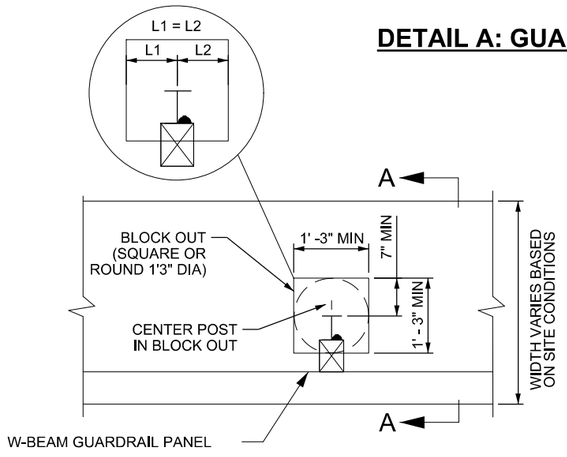
PLAN VIEW STEEL POST



CASE 1 **CASE 2** **ALTERNATIVE TO CASE 1**

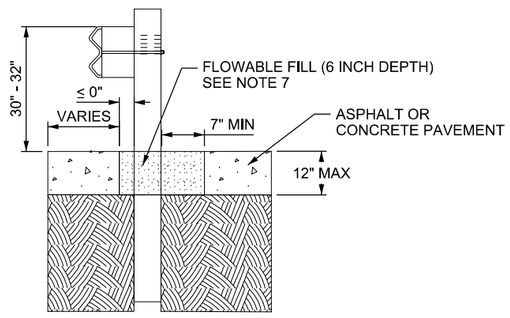
PLAN VIEW WOOD POSTS

DETAIL A: GUARDRAIL POST IN ROCK FORMATION



POSTS DETAIL

STEEL POST SHOWN
WOOD POST SIMILAR



SECTION A-A

SEE NOTES 4, 5, 7, 8 & 9

DETAIL B: GUARDRAIL POST IN HMA / CONCRETE PAVEMENT

NOTES:

1. USE DETAIL "A" WHEN SOLID ROCK CONDITIONS PROHIBIT THE STANDARD GUARDRAIL POST INSTALLATION.
2. USE DETAIL "B" WHEN GUARDRAIL POST, TYPE "G" OR "H" END TREATMENT POST INSTALLATION IS REQUIRED THROUGH HMA OR CONCRETE PAVEMENT.
3. CUT BOTTOM OFF POST AT THE REQUIRED LENGTH SUFFICIENT TO MEET TOP OF RAIL HEIGHT REQUIREMENT WHEN INSTALLING POSTS WITHIN SOLID ROCK FORMATIONS. COAT ALL FIELD-CUT STEEL POSTS WITH A FIELD-APPLIED COLD ZINC MATERIAL.
4. PLACE POST TO ROADWAY SIDE OF HOLE.
5. THESE METHODS ARE APPLICABLE TO TYPICAL W-BEAM GUARDRAIL. ALSO APPLICABLE TO TYPE "F", "G", AND "H" END TREATMENTS WITH FOUNDATION TUBES, STEEL BREAKAWAY POSTS AND CRT POSTS.
6. CONSULT TYPE "F," "G," AND "H" END TREATMENT MANUFACTURER FOR INSTALLATION REQUIREMENTS IN SOLID ROCK FORMATIONS.
7. USE FLOWABLE FILL MEETING STANDARD SPECIFICATION 03575 WITH 28 DAY COMPRESSIVE STRENGTH OF 50 PSI TO 120 PSI. COMPACT EXISTING MATERIAL AROUND GUARDRAIL POST PRIOR TO INSTALLATION OF FLOWABLE FILL.
8. SEE INSTALLATION DETAIL STD DWG BA 4D1 OR BA 4D2 FOR POST LENGTH REQUIREMENTS.
9. CREATE BLOCK OUT BY FORMING, SAW CUTTING OR OTHER SIMILAR METHOD.
10. EXCAVATE AREA BETWEEN DRILLED HOLES. MEET CASE 1 OR CASE 2 BACKFILL REQUIREMENTS.
11. COMPACT BACKFILL ACCORDING TO STANDARD SPECIFICATION 02841.

NO.	DATE	APPR.	REMARKS
1	2/22/2018	SDD	CORRECTED BARRIER HEIGHT REQUIREMENT.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

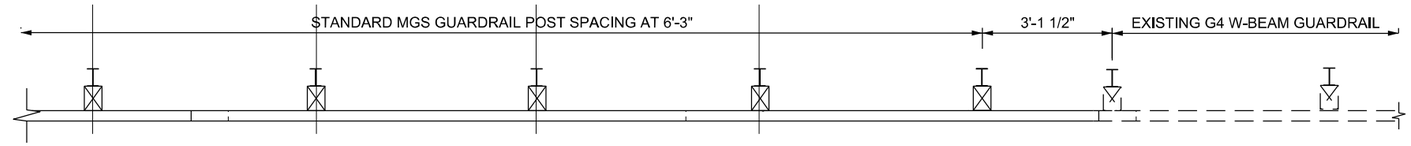
W-BEAM GUARDRAIL TYPICAL LINE POST EMBEDMENT SPECIAL CONDITIONS

STANDARD DRAWING TITLE

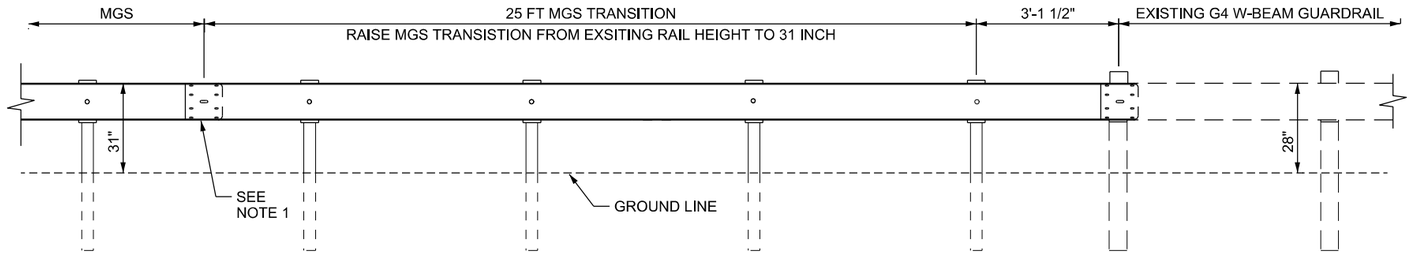
STD. DWG. NO.

BA 4D3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04D3.dgn
23-JUN-2020



PLAN VIEW



ELEVATION VIEW

MIDWEST GUARDRAIL SYSTEM (MGS) W-BEAM TRANSITION TO G4 W-BEAM

DESIGN-ONLY NOTES:

A. USE THIS TRANSITION WHEN CONNECTING TO G4 W-BEAM BARRIER WITH MIDWEST 31 INCH BARRIER.

B. USE THIS TRANSITION WHEN EXISTING BARRIER RUN MEETS THE MINIMUM 28 INCH BARRIER HEIGHT REQUIREMENT.

C. RAISE RAIL ELEMENT THROUGH THE ENTIRE BARRIER RUN TO MEET MINIMUM REQUIRED HEIGHT WHEN THREE HOLE POST SYSTEM IS AVAILABLE. DO NOT EXCEED 32 INCHES. REFER TO BA 4D1 DETAIL D.

D. REMOVE AND REPLACE EXISTING G4 W-BEAM BARRIER WITH MIDWEST 31 INCH W-BEAM BARRIER IF A THREE HOLE POST SYSTEM IS NOT PRESENT.

NOTES:

1. INSTALL SPLICE BOLTS ONLY WITHIN THE MGS TRANSISTION AND MGS SYSTEM. DO NOT INSTALL CENTER BOLT.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

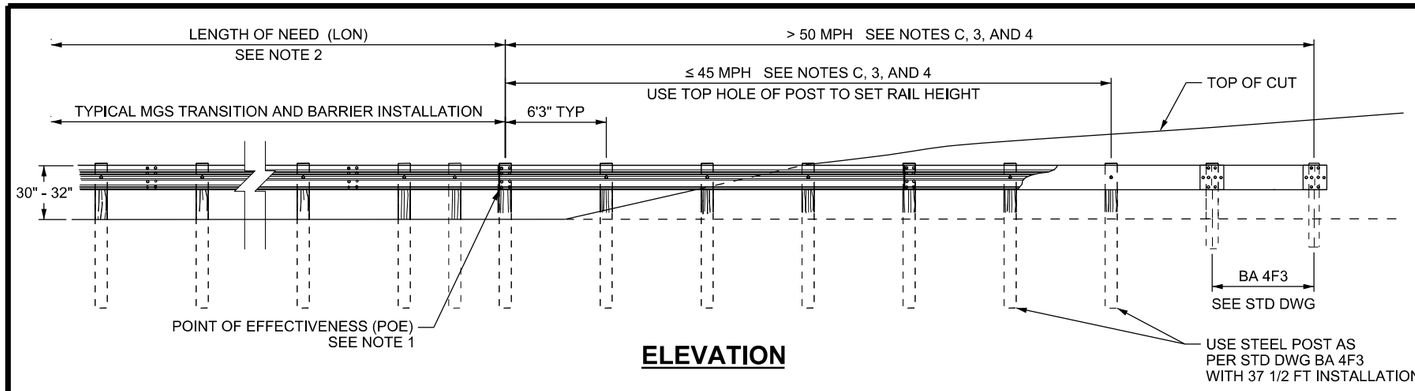
MIDWEST 31 INCH W-BEAM GUARDRAIL TRANSITION LAYOUT

STANDARD DRAWING TITLE

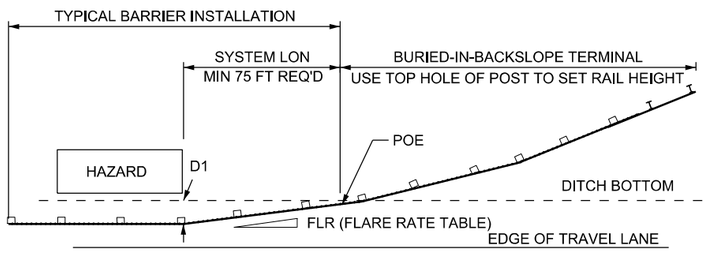
STD. DWG. NO.

BA 4D4

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04D4.dgn

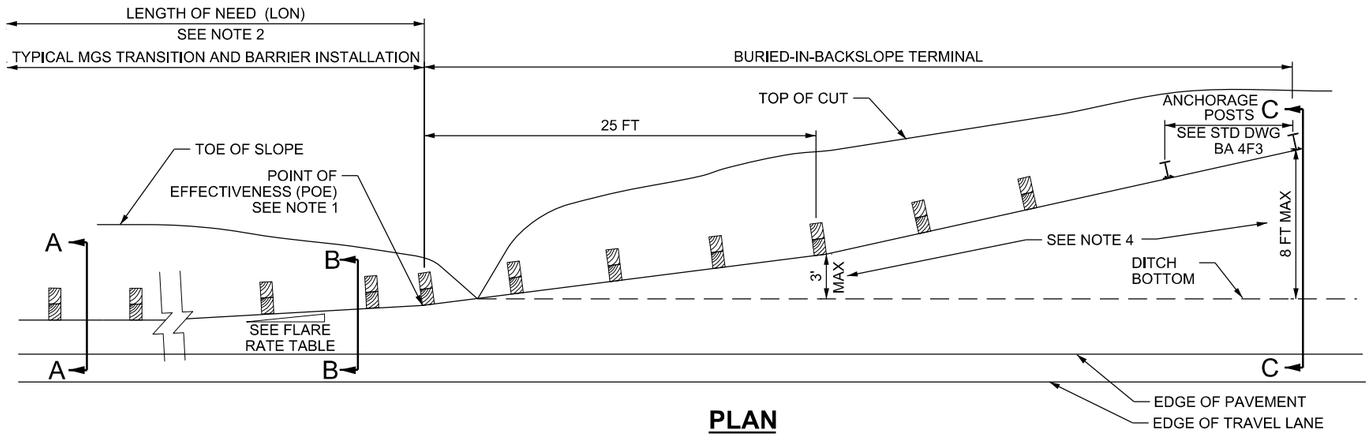


ELEVATION

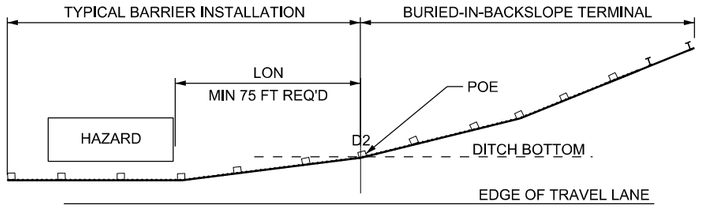


SYSTEM LON = FLR x D1
USE THIS DETAIL IF BACKSLOPE IS STEEPER 3:1.
THIS DETAIL APPLIES AT ALL SPEED LEVELS.

DETAIL A

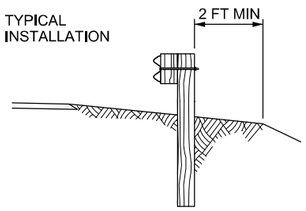


PLAN

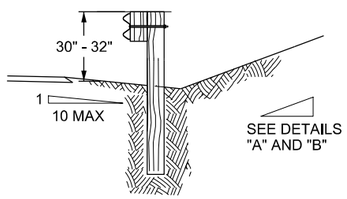


≥ 50 MPH "LON" = 450 - (15 x D2) ≤ 45 MPH "LON" = 250 - (15 x D2)
USE THIS DETAIL IF BACKSLOPE IS 3:1 TO A MINIMUM 4:1
SEE NOTE C

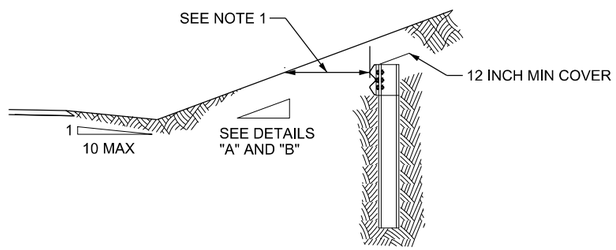
DETAIL B



SECTION A-A



SECTION B-B



SECTION C-C

FLARE RATE TABLE (FLR)	
POSTED SPEED (mph)	RATE
40 OR LESS	9:1
45	10:1
50	11:1
55	12:1
60	14:1
65 OR GREATER	15:1

DESIGN-ONLY NOTES:

A. PRIOR TO USING THIS DESIGN, CONSULT AREA SUPERVISOR TO VERIFY NO NEED EXISTS FOR ACCESS BEHIND THE BARRIER INSTALLATION AND THAT DRAINAGE ISSUES ARE ADDRESSED.

B. DO NOT USE BURIED-IN-BACKSLOPE TERMINAL IN LOCATIONS WHERE THE BACKSLOPE IS FLATTER THAN 3:1, AND THERE IS NO DITCH OR A NARROW SHALLOW DITCH AND THE TOE OF SLOPE IS WITHIN 20 FT OF THE TRAVEL LANE.

C. DESIGN BURIED IN BACKSLOPE TERMINALS AT 37 1/2 FT FOR SPEEDS 45 MPH AND LESS, AND 50 FT FOR SPEED 50 MPH AND GREATER.

NOTES:

1. THE POINT OF EFFECTIVENESS (POE) IS AT THE RAIL FACE OF THE FIRST POST OF THE TERMINAL PRIOR TO CROSSING THE DITCH BOTTOM OR TOE OF SLOPE.
2. SEE DETAILS "A" AND "B" FOR LENGTH OF NEED (LON) REQUIREMENTS AND BACKSLOPE REQUIREMENTS.
3. REFER TO STD DWG BA 4F3 FOR BURIED-IN-BACKSLOPE TERMINAL ANCHORAGE POST DETAILS.
4. STARTING AT THE "POE" SOFTLY BEND RAIL ELEMENT 3 FT MAXIMUM FROM THE TOE OF SLOPE AT THE 25 FT POINT OF TERMINAL. SOFTLY BEND RAIL BACK UNTIL THE 1 FT BURIAL HAS BEEN OBTAINED TO A MAXIMUM OF 8 FT FROM THE TOE OF SLOPE FROM THE 25 FT POINT OF THE TERMINAL TO THE END OF THE TERMINAL. THE BURIED-IN-BACKSLOPE TERMINAL WILL BE SLOPED DOWN WHERE THE END IS 8 FT BEHIND THE TOE OF SLOPE AND 1 FT UNDER THE ORIGINAL GROUND LINE IF THE MAXIMUM 8 FT OFFSET IS REACHED AND THE 1 FT BURIAL HAS NOT BEEN ACHIEVED. THE BACK SLOPE AT THE ANCHORAGE POSTS SHOULD LOOK THE SAME AFTER INSTALLATION AS PRIOR TO INSTALLATION.
5. INSTALL A STABILIZATION MAT OVER DISTURBED AREA TO CONTROL EROSION, UNLESS DIRECTED DIFFERENTLY BY PROJECT SPECIFICATION OR ENGINEER.
6. USE IN ESTABLISHED SLOPES. DO NOT BUILD A MOUND TO USE THIS TERMINAL.

NO.	DATE	APPR.	REVISIONS
1	10/26/2017	SDD	DELETED G4 GUARDRAIL ELEMENT DETAIL.

REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

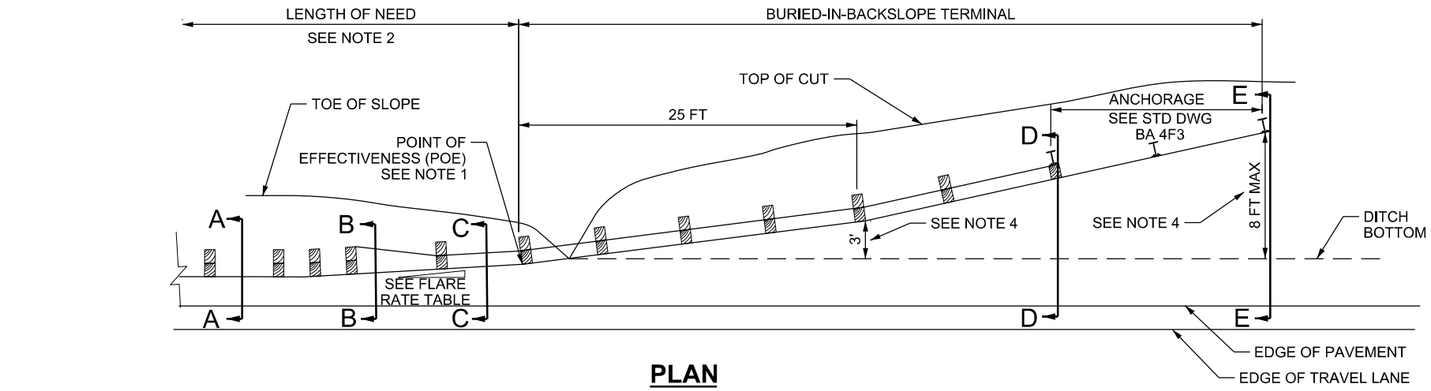
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

W-BEAM GUARDRAIL
31 INCH BURIED IN
BACKSLOPE TERMINAL

STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4F1

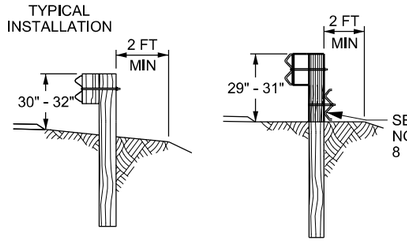
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04F1.dgn
23-JUN-2020



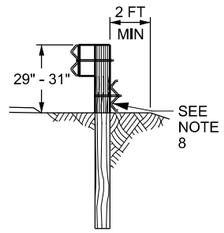
PLAN

FLARE RATE TABLE	
SPEED (MPH)	RATE
40 OR LESS	9:1
45	10:1
50	11:1
*≥ 55	12 1/2:1

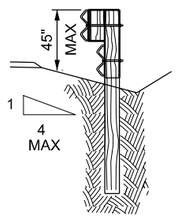
* FLARE RATE TO BE USED ONLY IN CONJUNCTION WITH A BURIED-IN-BACKSLOPE TERMINAL ON HIGHER SPEED ROADWAYS.



SECTION A-A



SECTION B-B



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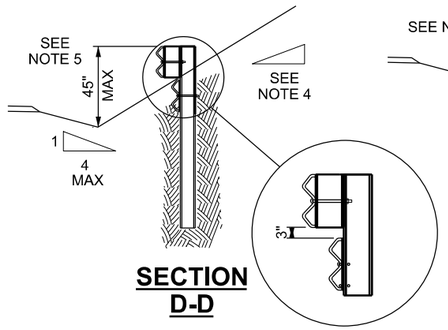

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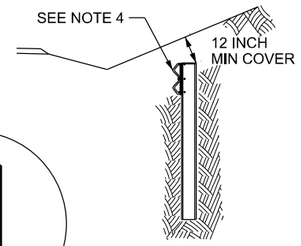

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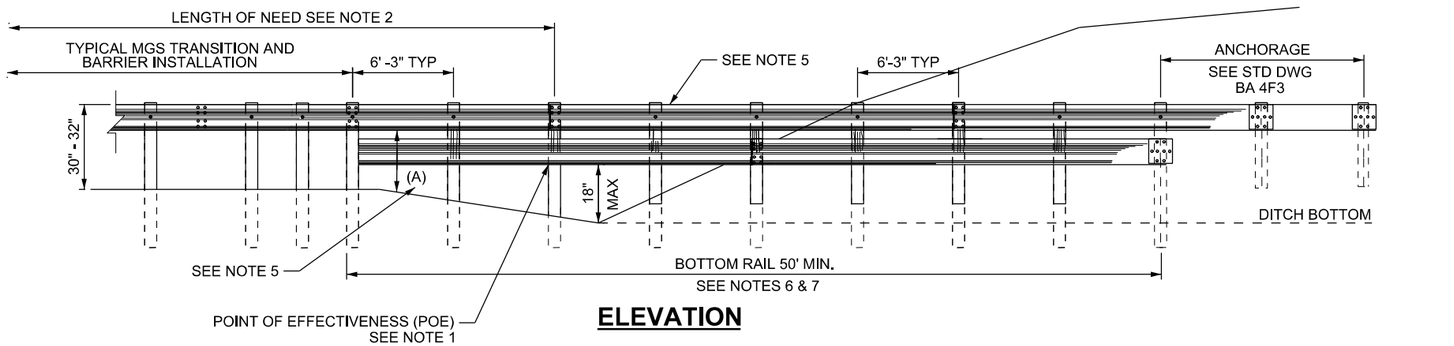
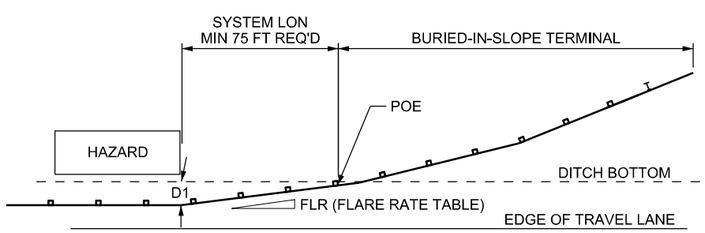
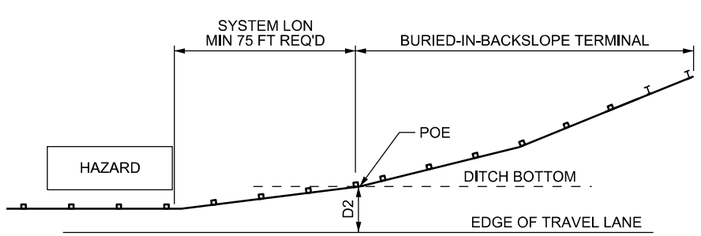


ELEVATION



SYSTEM LON = FLR x D1
USE THIS DETAIL IF BACKSLOPE IS STEEPER THAN 3:1. THIS DETAIL APPLIES AT ALL SPEED LEVELS.

DETAIL A



≥ 50 MPH "LON" = 450 - (15 x D2)
≤ 45 MPH "LON" = 250 - (15 x D2)
USE THIS DETAIL IF BACKSLOPE IS 3:1 TO 4:1.
SEE NOTE B.

DETAIL B

DESIGN-ONLY NOTES:

A. CONSULT AREA SUPERVISOR PRIOR TO USING THIS DESIGN TO VERIFY NO NEED EXISTS FOR ACCESS BEHIND THE BARRIER INSTALLATION AND THAT DRAINAGE ISSUES ARE ADDRESSED.

B. DO NOT USE THE BURIED-IN-BACKSLOPE TERMINAL IN LOCATIONS WHERE THE BACKSLOPE IS FLATTER THAN 3:1, AND THERE IS NO DITCH OR A NARROW SHALLOW DITCH AND THE TOE OF SLOPE IS WITHIN 20 FT OF THE TRAVEL LANE.

NOTES:

1. THE POINT OF EFFECTIVENESS (POE) IS AT THE RAIL FACE OF THE FIRST POST OF THE TERMINAL PRIOR TO CROSSING THE DITCH BOTTOM OR TOE OF SLOPE.
2. SEE DETAILS "A" AND "B" FOR LENGTH OF NEED (LON) REQUIREMENTS AND BACKSLOPE REQUIREMENTS.
3. REFER TO STD DWG BA 4F3 FOR BURIED-IN-BACKSLOPE TERMINAL ANCHORAGE POST DETAILS.
4. INSTALLATION: STARTING AT THE "POE" SOFTLY BEND RAIL ELEMENT 3 FT MAXIMUM FROM THE TOE OF SLOPE AT THE 25 FT POINT OF TERMINAL. SOFTLY BEND RAIL BACK UNTIL THE 1 FT BURIAL HAS BEEN OBTAINED TO A MAXIMUM OF 8 FT FROM THE TOE OF SLOPE FROM THE 25 FT POINT OF THE TERMINAL TO THE END OF THE TERMINAL. THE BURIED-IN-BACKSLOPE TERMINAL WILL BE SLOPED DOWN WHERE THE END IS 8 FT BEHIND THE TOE OF SLOPE AND 1 FT UNDER THE ORIGINAL GROUND LINE IF THE MAXIMUM 8 FT OFFSET IS REACHED AND THE 1 FT BURIAL HAS NOT BEEN ACHIEVED. THE BACK SLOPE AT THE ANCHORAGE POSTS SHOULD LOOK THE SAME AFTER INSTALLATION AS PRIOR TO INSTALLATION.
5. USE TOP HOLE OF POST TO SET RAIL HEIGHT. HOLD THE TOP GUARDRAIL ELEMENT CONSTANT WITH THE TYPICAL BARRIER INSTALLATION. GO UP STREAM 1 POST AND ADD A BOTTOM RAIL ELEMENT UNDER THE STANDARD GUARDRAIL ELEMENT WHEN THE BOTTOM OF THE TOP GUARDRAIL ELEMENT EXCEEDS 18 INCH, AT ANY POINT OF THE SLOPE, POINT (A) ELEVATION VIEW. SLOPE BOTH ELEMENTS DOWN TO MAINTAIN A MAXIMUM HEIGHT OF 45 INCH IN FRONT OF THE TOE OF SLOPE IF THE TOP OF INSTALLATION EXCEEDS 45 INCH FROM THE GROUND, AT ANY POINT IN THE INSTALLATION.
6. BEND THE DOWNSTREAM END OF BOTTOM RAIL TO THE BACKSIDE OF THE POST AND BOLT TO POST.
7. USE 102 INCH LONG POSTS, WOOD OR STEEL,WITH THE SAME WIDTH DIMENSIONS ACCORDING TO STD DWG BA 4A, AT LOCATION REQUIRING BOTTOM RAIL ELEMENT. REFER TO STD DWG BA 4F3 SPECIFIC STEEL POSTS PLACEMENT REQUIREMENTS. MARK ALL 102 INCH POSTS WITH L102 WITH THE SAME METHOD AS DESCRIBED IN NOTE 2 OF STD DWG BA 4A.
8. FIELD DRILLED STEEL POSTS ARE ALLOWED FOR BOTTOM RAIL ELEMENT. USE ZINC RICH PAINT TO COAT FIELD DRILLED HOLES IN POSTS OR RAIL ELEMENTS.
9. INSTALL A STABILIZATION MAT OVER DISTURBED AREA TO CONTROL EROSION.
10. USE IN ESTABLISHED SLOPES. DO NOT BUILD A MOUND TO USE THIS TERMINAL.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

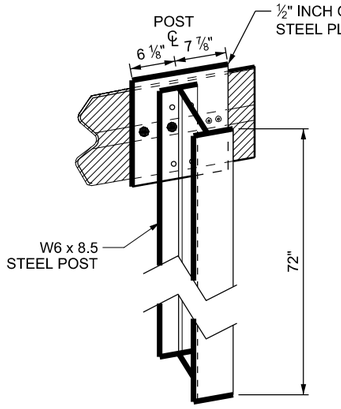
DEPUTY DIRECTOR

31 INCH W-BEAM GUARDRAIL BURIED IN BACKSLOPE TERMINAL WITH RUB RAIL

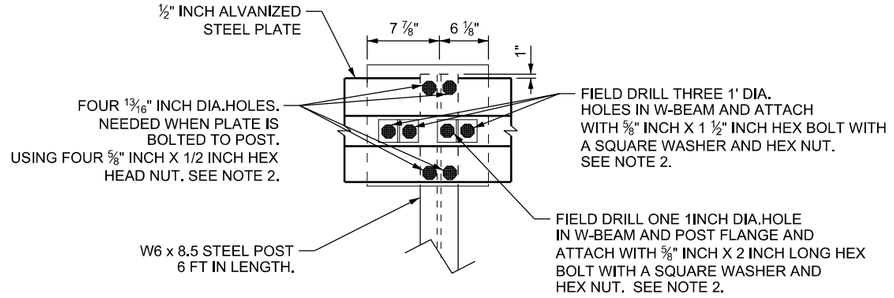
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4F2

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4_CB)\BA04F2.dgn
23-JUN-2020

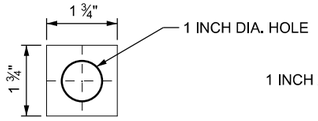


REAR VIEW

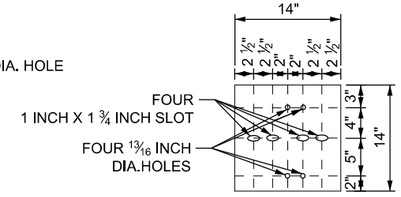


FRONT VIEW

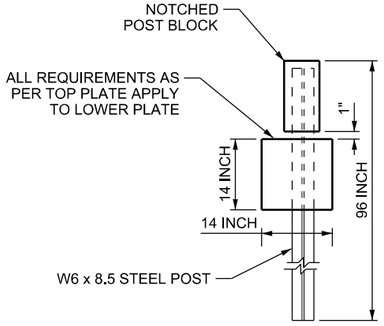
ANCHOR POST/PLATE ATTACHMENT FOR SINGLE RAIL ELEMENT



SQUARE WASHER (3/16 INCH THICK,GALVANIZED)



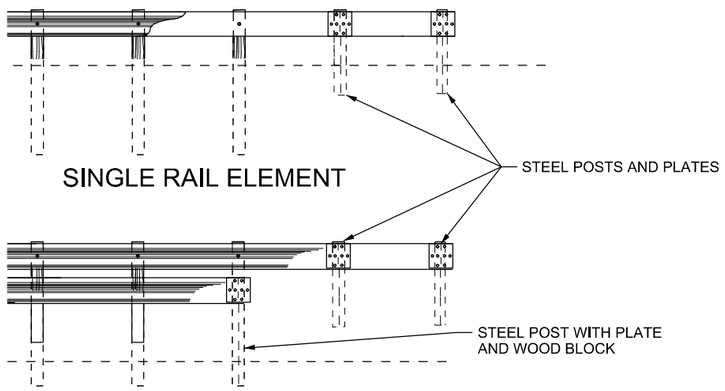
1/2 INCH STEEL PLATE (GALVANIZED)



ANCHOR POST/PLATE ATTACHMENT FOR RUB RAIL ELEMENT

NOTES:

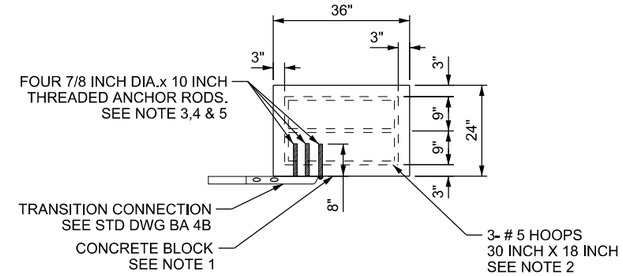
1. USE 1/2 INCH STEEL PLATE MEETING REQUIREMENTS OF ASTM A 36.
2. GALVANIZING REQUIRED FOR PLATE AND HARDWARE.
3. USE ZINC RICH PAINT TO COAT FIELD DRILLED HOLES.

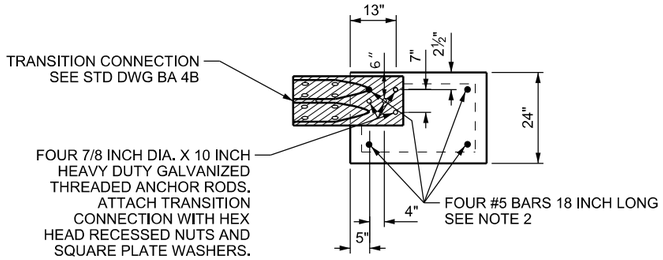


SINGLE RAIL ELEMENT

DOUBLE RAIL ELEMENT

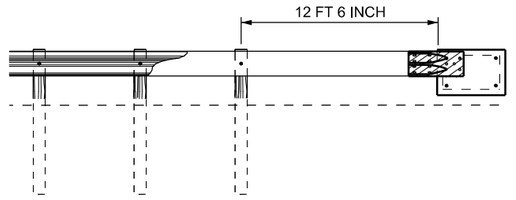
OPTION I STEEL POSTS AND PLATES



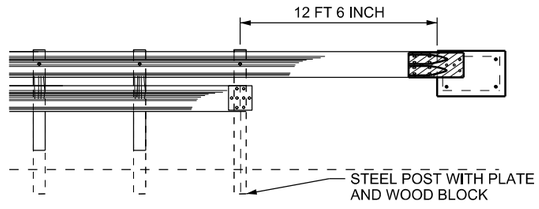


NOTES:

1. USE CONCRETE A(AE).
2. USE COATED REINFORCING STEEL.
3. USE GALVANIZED THREADED ROD.
4. THREADED RODS CAN BE CAST INTO CONCRETE BLOCK OR HOLES CAN BE DRILLED INTO BLOCK AND RODS EPOXIED IN.
5. DRILL HOLES A MINIMUM 9 INCH DEEP. CLEAN DRILLED HOLES PRIOR TO INSERTING TREAD ROD.



SINGLE RAIL ELEMENT



DOUBLE RAIL ELEMENT

OPTION II CONCRETE BLOCK

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	SQUARE WASHER DETAIL: CORRECTED HOLE DIMENSION.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

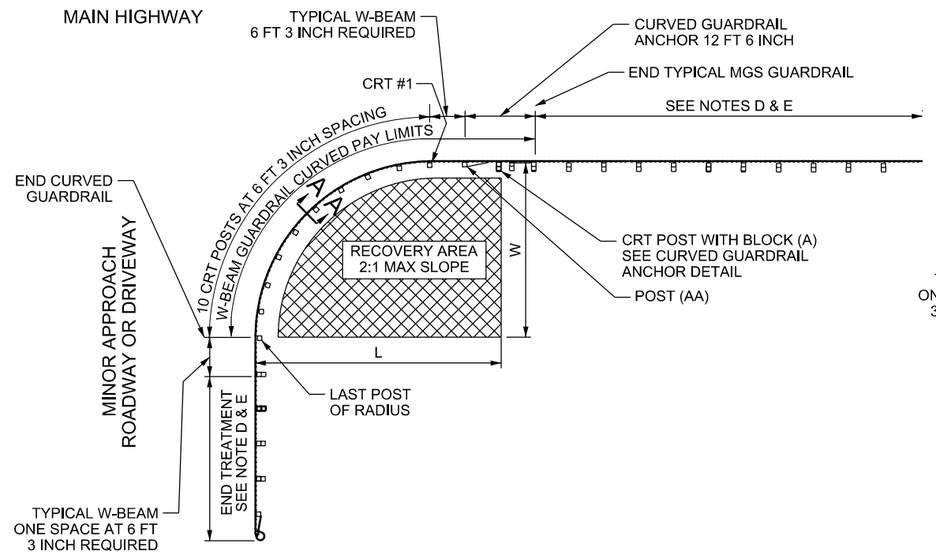
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

W-BEAM GUARDRAIL
BURIED IN BACKSLOPE
TERMINAL ANCHOR

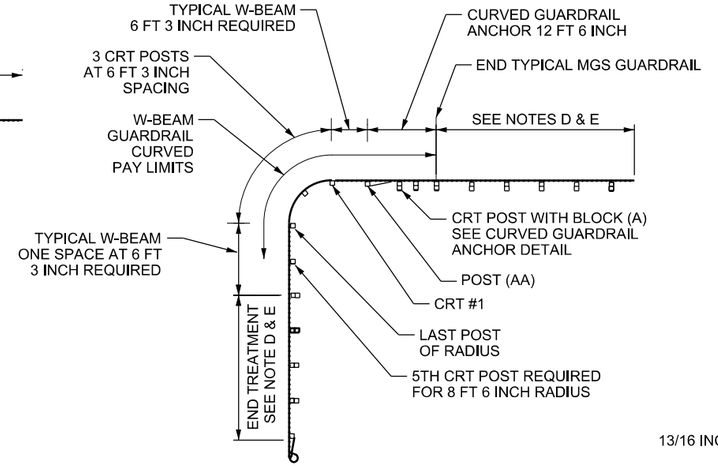
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4F3

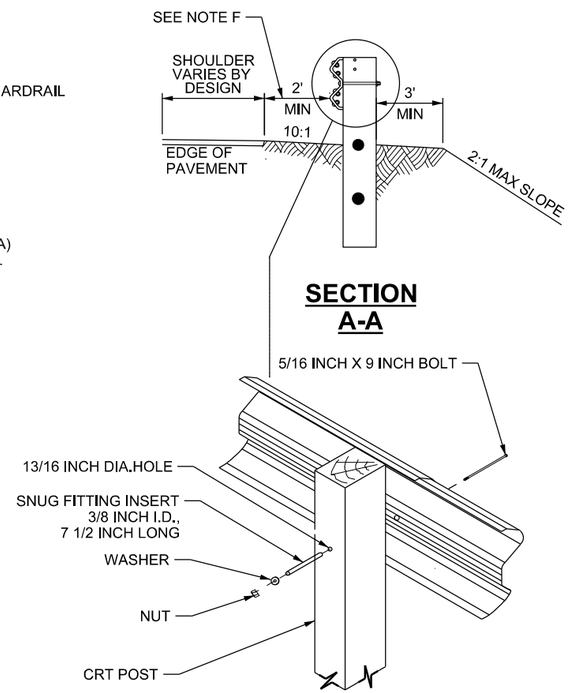
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB\BA04F3.dgn
23-JUN-2020



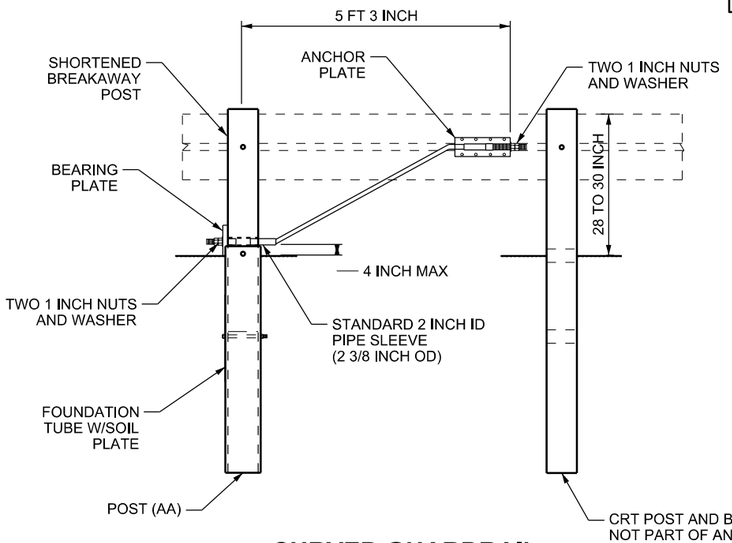
35 FT RADIUS SHOWN
SEE NOTE 5



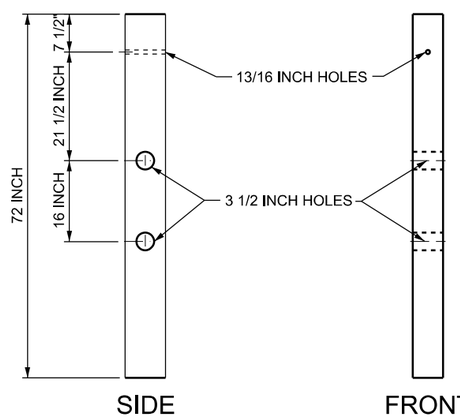
8 FT 6 INCH RADIUS SHOWN
SEE NOTE 5



RADIUS (FT)	TOTAL NO. OF CRT POSTS	REQUIRED AREA FREE OF FIXED OBJECTS		RADIUS & GR ANCHOR
		L (FT)	W (FT)	PAY LIMIT TOTAL (FT)
8 FT 6 INCH	5	25	15	32.25
17 FT	6	30	15	45.25
25 FT 6 INCH	8	40	20	59.25
35 FT	11	50	20	74.25



CURVED GUARDRAIL ANCHOR
SEE NOTE 4



CONTROLLED RELEASE TERMINAL (CRT) POST (PDE09)
SEE NOTE 3

DESIGN-ONLY NOTES:

A. USE THIS INSTALLATION ONLY WHEN RECOVERY AREA CAN BE MAINTAINED. USE A STRONG POST RADIUS INSTALLATION WHEN RECOVERY AREA CANNOT BE MAINTAINED. STRONG POST RADIUS IS CONSTRUCTED WITH MIDWEST 31 INCH W-BEAM GUARDRAIL, SHOP BENT MGS RAIL AND STANDARD MGS GUARDRAIL COMPONENTS AND IS PAID WITH STANDARD MGS GUARDRAIL ITEMS.

B. LIST RADIUS REQUIREMENT FOR EACH LOCATION IN THE PROJECT PLANS AND SUMMARY SHEET.

C. RECOVERY AREA BEHIND THE GUARDRAIL TO BE MAINTAINED FREE OF FIXED OBJECTS AND 2:1 MAXIMUM SLOPE.

D. USE END TREATMENTS, TYPE "G" OR "H" ON INTERSECTING ROADWAYS OPEN TO THE GENERAL PUBLIC AND BARRIER END IS WITHIN THE CLEAR ZONE. USE ANCHOR TYPE II, REFER TO STD DWG BA 4C2 WHEN CONDITIONS OF ANCHORAGE USE ARE MET. USE ANCHOR TYPE I (REFER TO STD DWG BA 4C1, ON BUSINESS/RESIDENTIAL DRIVEWAYS, OR RESTRICTED/LIMITED ENTRY ROADWAYS.

E. DO NOT ATTACH DIRECTLY TO W-BEAM GUARDRAIL TRANSITION, STD DWG BA 4B1 AND 4B2, INSTALL 18 FT 9 INCH OF TYPICAL W-BEAM GUARDRAIL AT END OF TRANSITION PRIOR TO INSTALLING CURVED GUARDRAIL ANCHOR.

F. THE 2 FT MIN BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.

NOTES:

1. SHOP BEND RADIUS ELEMENTS. FIELD BENDING IS NOT PERMITTED.
2. MAINTAIN 10:1 SLOPE IN FRONT OF CURVED SECTION.
3. MEET REQUIREMENTS OF AASHTO GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE FOR CRT TIMBER POST (PDE09).
4. REFER TO STD DWG BA 4C1 FOR ANCHORAGE COMPONENTS.
5. USE STANDARD G4 GUARDRAIL PANELS WITHIN THE W-BEAM GUARDRAIL CURVED SECTION EXCLUDING THE CURVED GUARDRAIL ANCHOR. SEE STD DWG BA 4F1 FOR STANDARD G4 GUARDRAIL PANELS DETAIL.

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	CHANGED RADIUS TO END TREATMENT W-BEAM ELEMENT REQUIREMENT. CHANGED DRAWING NUMBER.

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

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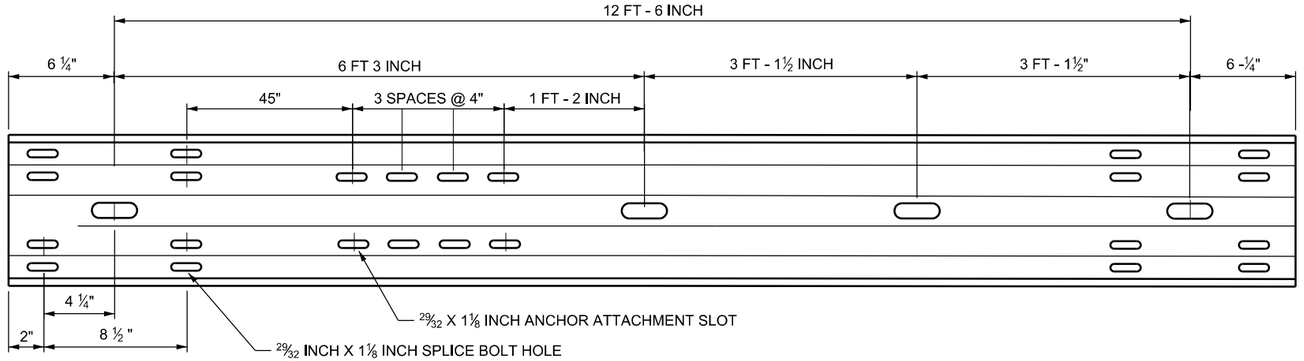
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

W-BEAM GUARDRAIL CURVE BREAKAWAY DETAILS
STANDARD DRAWING TITLE

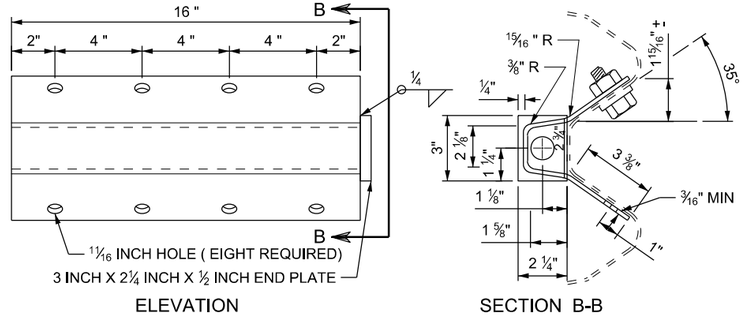
STD. DWG. NO.
BA 4G1

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04G1.dgn
23-JUN-2020

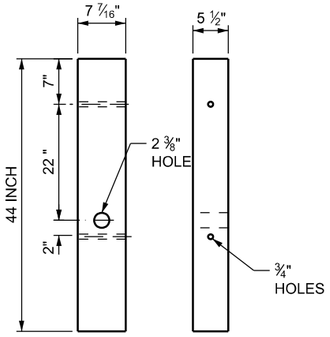


RAIL ELEMENT

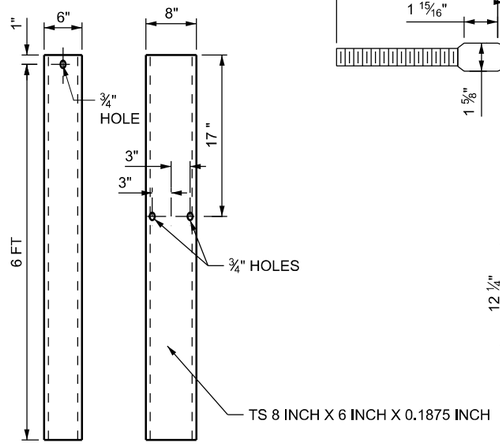
SEE NOTE 1



ANCHOR BRACKET

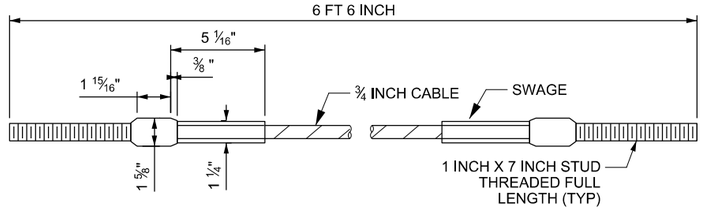


WOOD BREAKAWAY POST

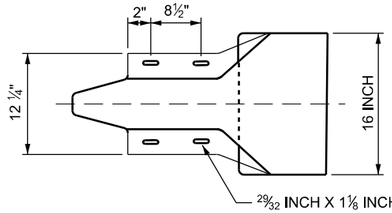


FOUNDATION TUBE

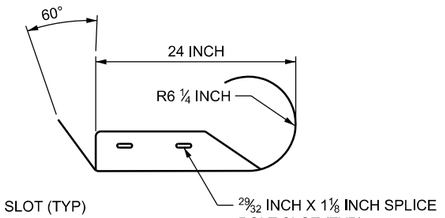
SEE NOTE 1

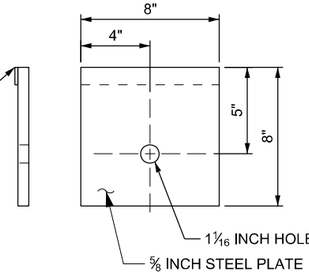


CABLE ANCHOR ASSEMBLY



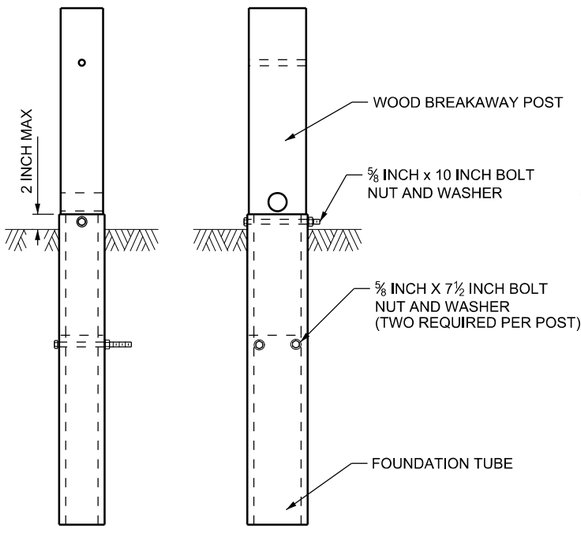
END SECTION (ROUNDED)



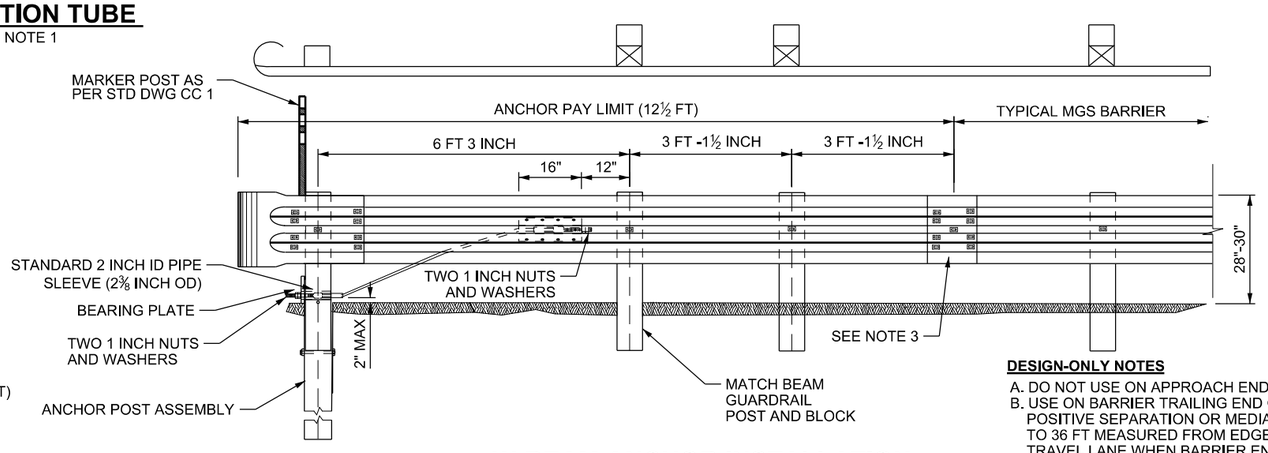


NOTE:
INSTALL BEARING PLATE WITH 5 INCH PORTION UP. SECURE PLATE TO POST USING TWO NAILS AT TOP OF PLATE.

BEARING PLATE



ANCHOR POST ASSEMBLY



W-BEAM ANCHOR INSTALLATION

DESIGN-ONLY NOTES

A. DO NOT USE ON APPROACH END.
B. USE ON BARRIER TRAILING END ON DIVIDED ROADWAYS WITH A POSITIVE SEPARATION OR MEDIAN WIDTH GREATER THAN OR EQUAL TO 36 FT MEASURED FROM EDGE OF TRAVEL LANE TO EDGE OF TRAVEL LANE WHEN BARRIER END IS OUTSIDE THE MAXIMUM REQUIRED CLEAR ZONE AS DEFINED IN THE UDOT ROADWAY DESIGN MANUAL AND THE AASHTO ROADSIDE DESIGN GUIDE.

NOTES:

1. MANUFACTURE ACCORDING TO AASHTO GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE.
2. INSTALL SPLICE BOLTS ONLY WITHIN THE MID-SPAN SPLICE JOINT. DO NOT INSTALL CENTER BOLT.
3. USE WITH W-BEAM GUARDRAIL CURVED BREAKAWAY ONLY.

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	CORRECTED SLOT CALL OUTS TO MEET AASHTO M180.
			CORRECTED END SECTION ANGLE OF CENTER CORRUGATION.
			DELETED NOTE 2 & RENUMBERED NOTES. ADDED NOTE 3.
			CHANGED TITLE & DWG. NO.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CURVED GUARDRAIL ANCHOR

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 4G2

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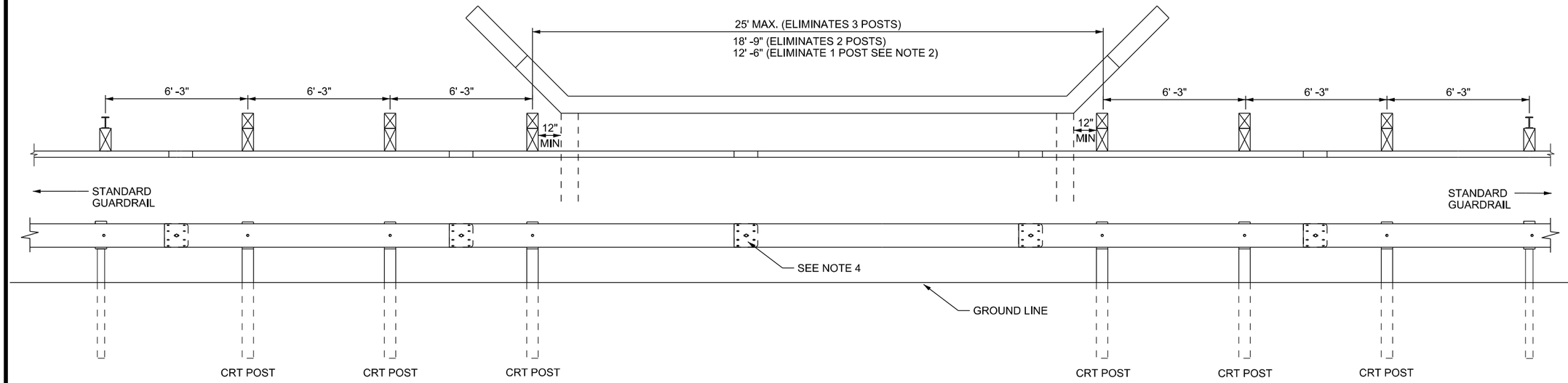
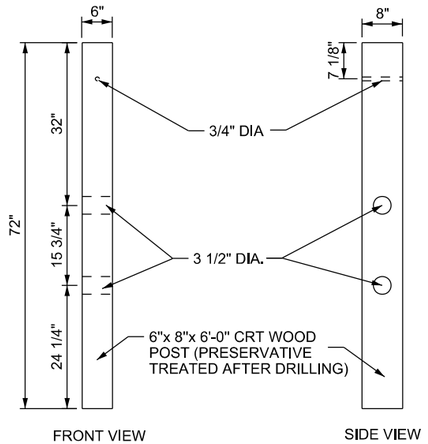
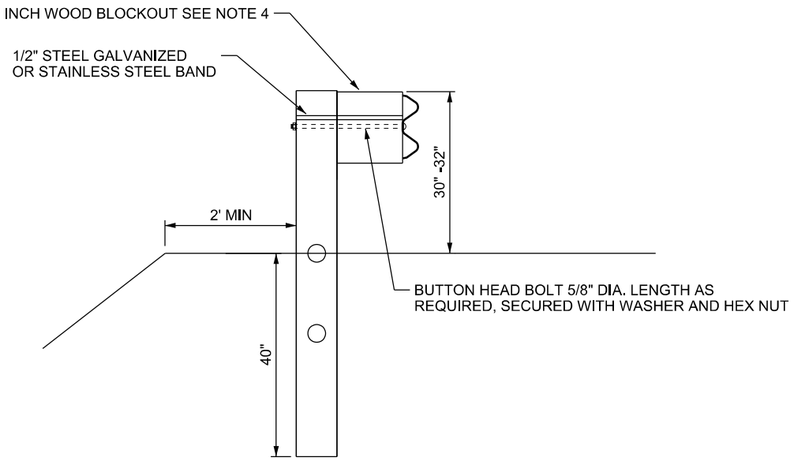
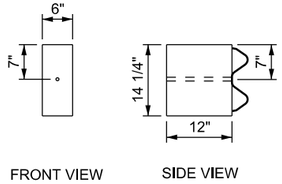
23-JUN-2020





CONTROL RELEASE TERMINAL POST (CRT)





12" BLOCKOUT

NOTES:

1. DO NOT OMIT POSTS WITHIN TERMINALS, TRANSITIONS, POSTS PLACED ON SLOPES, BEHIND CURBS, WITHIN 44 FT FROM THE OUTER CRT POST OF A LONG SPAN, OR WITHIN 62.5 FT FROM THE BEGINNING OR ENDING OF A W-BEAM GUARDRAIL BARRIER RUN.
2. NO SYSTEM CHANGES REQUIRED FOR SINGLE OMITTED POST. LIMITED TO ONE INSTANCE PER 50 FT OF GUARDRAIL LENGTH. MAINTAIN 66 INCHES OFFSET MEASURED FROM BACK OF POST TO FACE OF HAZARD.
3. MAINTAIN 84 INCHES OFFEST MEASURED FROM FACE OF RAIL TO FACE OF HAZARD FOR 2 AND 3 OMITTED POSTS.
4. INSTALL SPLICE BOLTS ONLY WITHIN THE MGS SYSTEM SPLICE JOINT. DO NOT INSTALL CENTER BOLT.
5. USE 12 INCH WOOD BLOCKOUTS ONLY ON CONTROL RELEASE TERMINAL POSTS. COMPOSITE BLOCKS ARE NOT ALLOWED.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

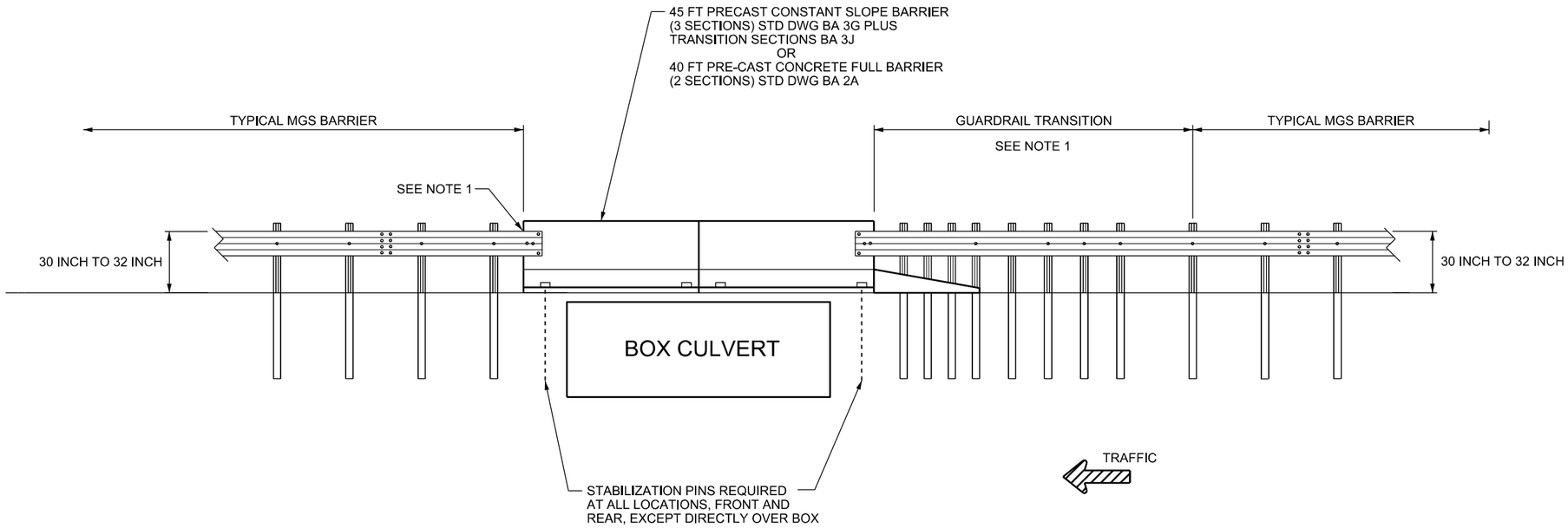
AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL

AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

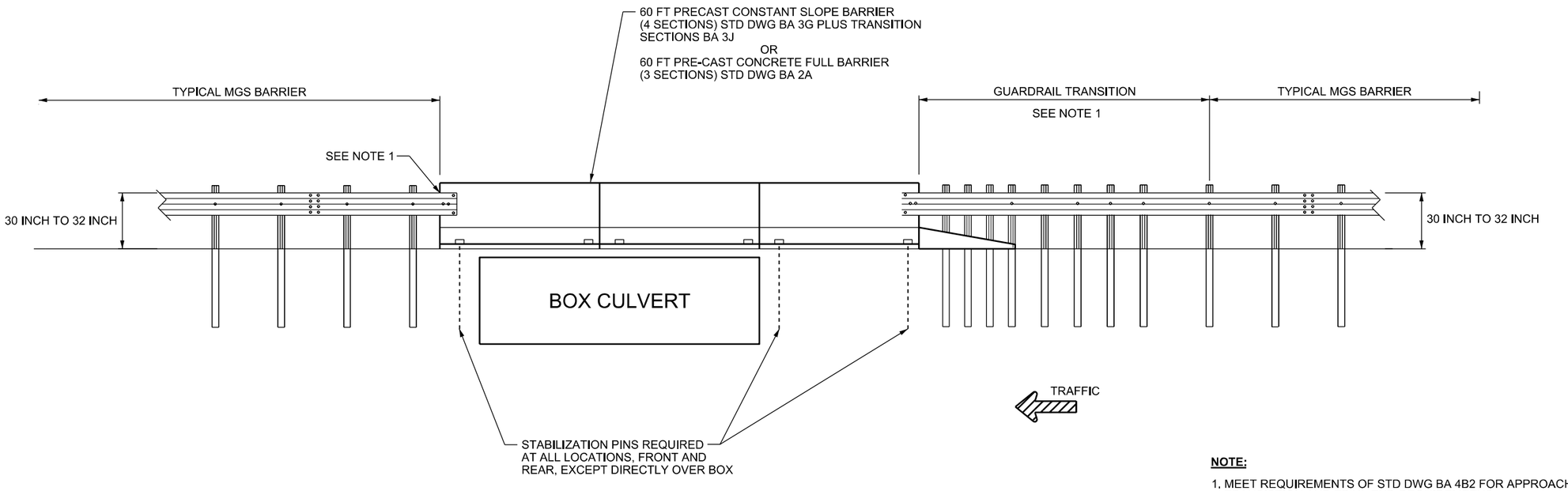
MIDWEST 31 INCH
W-BEAM GUARDRAIL
LONG SPAN
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4H1

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04H1.dgn
23-JUN-2020



DETAIL A
BOX CULVERT ≥ 25 FT & ≤ 30 FT



DETAIL B
BOX CULVERT > 30 FT

NOTE:

1. MEET REQUIREMENTS OF STD DWG BA 4B2 FOR APPROACH TRANSISTION AND TRAIL END REQUIREMETNS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

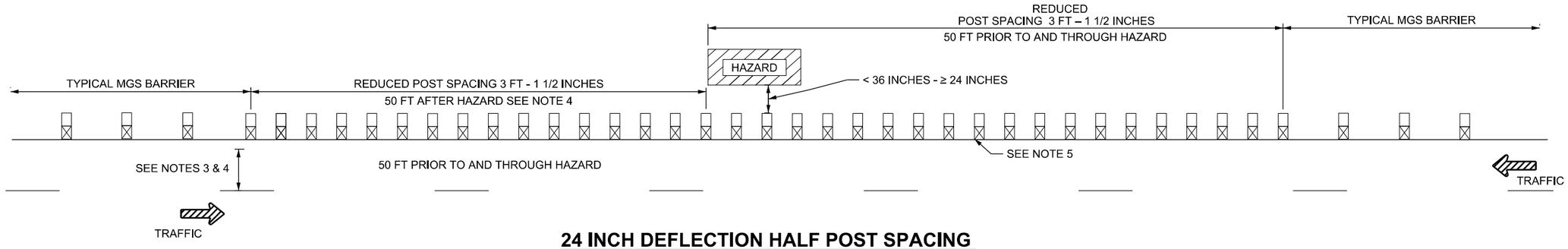
31 INCH W-BEAM
GUARDRAIL
WITH PRECAST BARRIER
FOR SPAN ≥ 25 FT

STANDARD DRAWING TITLE

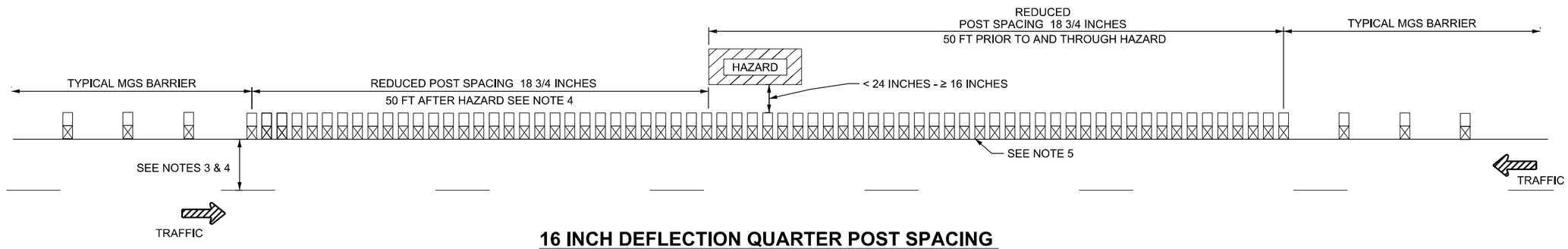
STD. DWG. NO.

BA 4H2

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04H2.dgn



24 INCH DEFLECTION HALF POST SPACING



16 INCH DEFLECTION QUARTER POST SPACING

DESIGN-ONLY NOTES:

A. ALTERNATE BARRIER SYSTEM REQUIRED IF DEFLECTION DISTANCE IS LESS THAN 16 INCHES.

B. DO NOT USE WITH INITIAL LONG POST 2:1 FILL SLOPE INSTALLATIONS.

C. INDICATE LOCATIONS ON PLAN SET THAT REQUIRE REDUCED DEFLECTION CRITERIA. SPECIFY DEFLECTION DISTANCE FROM BACK OF POST TO FACE OF HAZARD.

NOTES:

1. USE TYPICAL 8 INCH WOOD OR COMPOSITE BLOCKS.
2. MEASURE DEFLECTION DISTANCE FROM BACK OF POST TO FACE OF HAZARD.
3. STIFFEN AS REQUIRED WHEN USED ON ROADWAYS WITH OPPOSING TRAFFIC AND THE NEAREST APPROACH LANE OF OPPOSING TRAFFIC IS LESS THAN THE MAXIMUM REQUIRED CLEAR ZONE.
4. STIFFENING REQUIRED FOR 25 FT AFTER HAZARD WHEN USED ON ONE-WAY ROADWAYS.
5. BOLTS NOT REQUIRED THROUGH RAIL ELEMENTS FOR THOSE INSTALLATIONS REQUIRING ADDITIONAL POSTS.
6. STIFFENING NOT REQUIRED IF DEFLECTION DISTANCE IS GREATER THAN OR EQUAL TO 38 INCHES FROM BACK OF POST TO FACE OF HAZARD.
7 NOT TO BE USED ON INITIAL LONG POST 2:1 FILL SLOPE INSTALLATION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

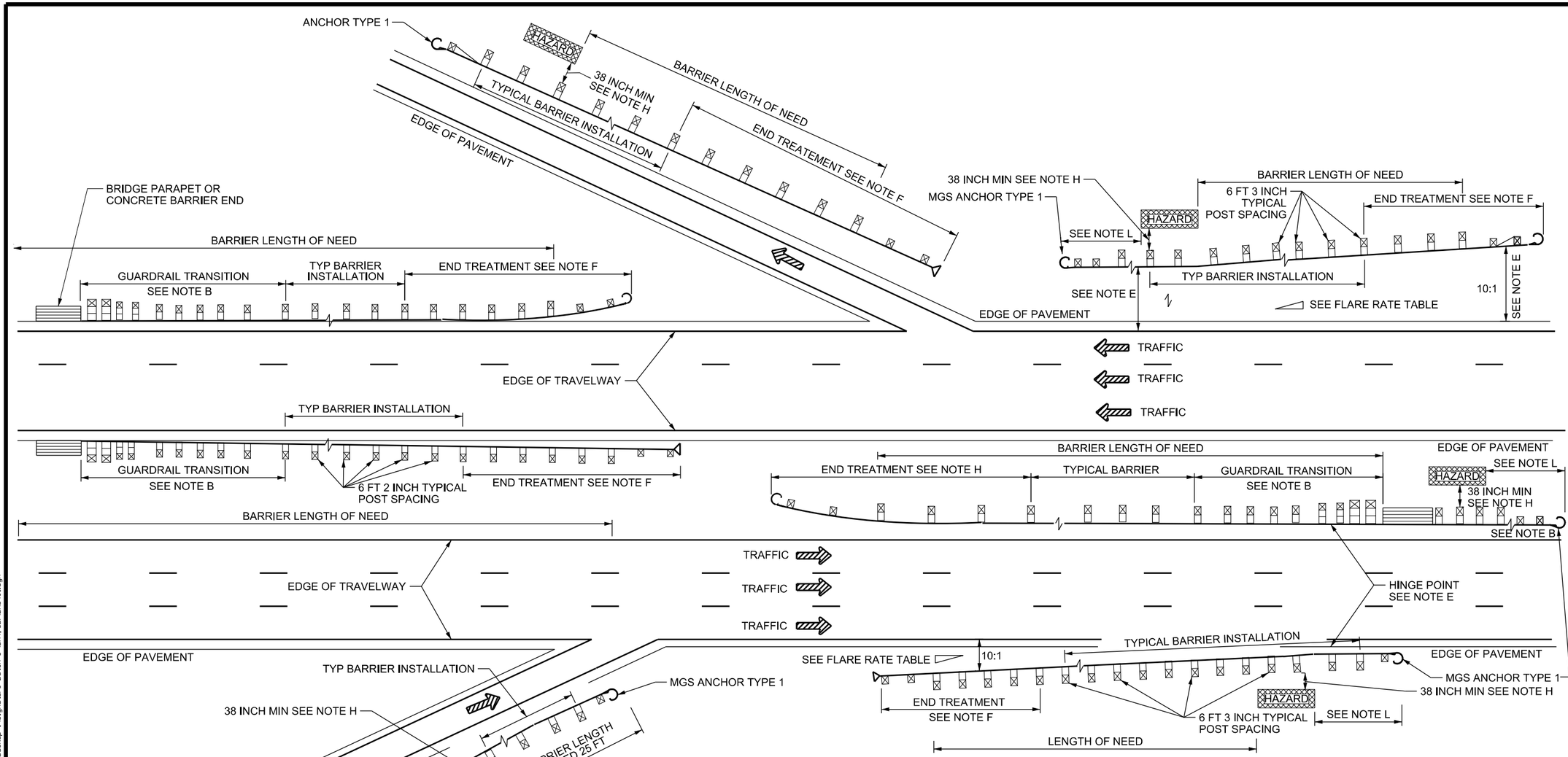
AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

MIDWEST 31 INCH W-BEAM GUARDRAIL
REDUCED DEFLECTION CRITERIA
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4H3

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4_CB)\BA04H3.dgn



FLARE RATE TABLE		
SPEED (MPH)	RATE OUTSIDE SHY LINE	* RATE INSIDE SHY LINE
≤ 35	7:1	13:1
40	8:1	16:1
45	10:1	18:1
50	11:1	21:1
55	12:1	24:1
60	14:1	26:1
65	15:1	30:1
≤ 70	15:1	30:1

* DESIGN EXCEPTION REQUIRED

DESIGN-ONLY NOTES:

A. END TREATMENT REQUIRED WHEN BARRIER END IS WITHIN THE MAXIMUM REQUIRED AASHTO ROADSIDE DESIGN GUIDE CLEAR ZONE REQUIREMENTS.
B. REFER TO STD DWG BA 4B2 WHEN ATTACHING W-BEAM GUARDRAIL TO THE APPROACH END OR TRAILING END OF CONCRETE BARRIERS OR BRIDGE PARAPETS.
C. CONSIDER USING BURIED TERMINAL END, BA 4F SERIES STD DWG WHEN CONDITIONS PERMIT.
D. USE FLARED GUARDRAIL INSTALLATIONS WHEN POSSIBLE.
E. USES OF MGS W-BEAM GUARDRAIL INSTALLATION PERMITTED ON A SLOPE NO STEEPER THAN 10:1. MATCH ROADWAY CROSS-SLOPE IF SUPER ELEVATED MORE THAN 2 PERCENT. REFER TO BA 4D SERIES STD DWG.
F. END TREATMENTS SHOWN ARE FOR ILLUSTRATION. TYPES G AND H CAN BE USED ON TANGENT OR FLARED GUARDRAIL INSTALLATIONS.
G. CONSULT GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS CC SERIES STD DWGS FOR PROPER END TREATMENT SELECTION AND INSTALLATION REQUIREMENTS.
H. REFER TO STD DWG BA 4H3 FOR REDUCED DEFLECTION REQUIREMENTS WHEN 38 INCHES CANNOT BE MAINTAINED BEHIND W-BEAM GUARDRAIL POST TO FACE OF HAZARD. USE 42 INCHES DEFLECTION FOR INITIAL LONG POST 2:1 FILL SLOPE INSTALLATION WITH STANDARD POST SPACING
I. RECOVERY AREA IS THAT AREA EXTENDING LATERALLY FROM THE APPROACH END OF THE GUARDRAIL TERMINAL TO THE BEGINNING OF THE LENGTH OF NEED AND OUT TO THE DESIGNED CLEAR ZONE. SLOPES IN THE RECOVERY AREA TO BE DETAILED AT THE SAME SLOPE RATE AS REQUIRED BY THE UDOT ROADWAY DESIGN MANUAL FOR THE ROADWAY TYPE.
J. PLACE NO NON-YIELDING DEVICES INSIDE RECOVERY AREA.
K. PLACE YIELDING DEVICES , SUCH AS SIGN POST, A MINIMUM OF 75 FT BACK FROM HEAD OF END TREATMENT AND OFFSET MINIMUM OF 10 FT FROM BACK OF TYPICAL W-BEAM BARRIER. REFER TO CC SERIES STD DWG FOR PLACEMENT IN FRONT OF END TREATMENT OR CRASH CUSHION.
L. USE 25 FT BARRIER LENGTH OF NEED MEASURED FROM THE END OF ANCHOR BACK TO HAZARD FOR THE MIDWEST 31 INCH GUARDRAIL (MGS) ANCHOR TYPE 1.

DESIGN-ONLY DRAWING

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/26/2017	SDD	ADDED MGS ANCHOR TYPE I REQUIREMENTS. ADDED NOTE L.	

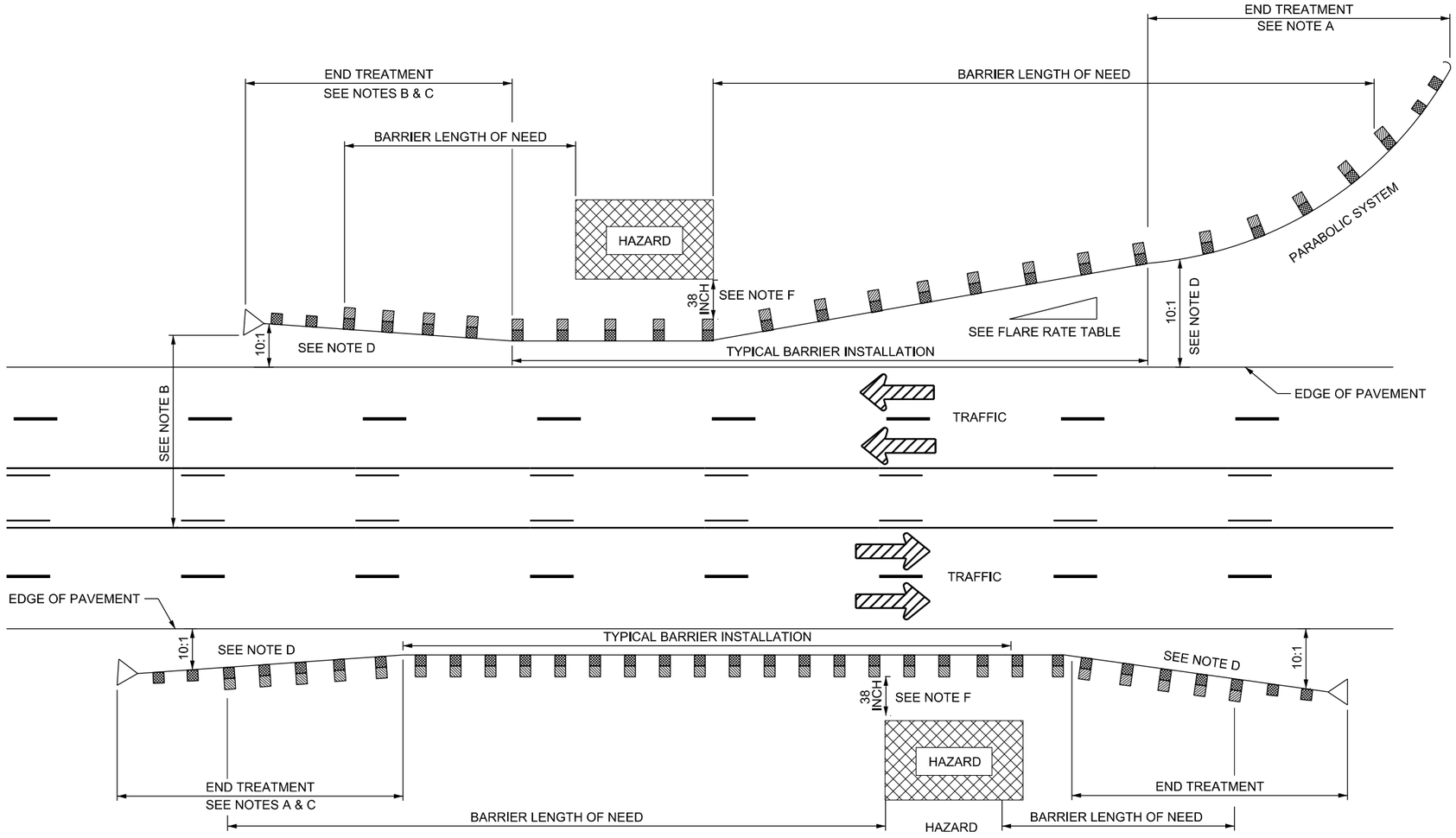
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

MIDWEST 31 INCH W-BEAM GUARDRAIL TYPICALS DIVIDED ROADWAYS
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4J1

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04J1.dgn
23-JUN-2020



FLARE RATE TABLE		
SPEED (MPH)	RATE OUTSIDE SHY LINE	* RATE INSIDE SHY LINE
≤ 35	7:1	13:1
40	8:1	16:1
45	10:1	18:1
50	11:1	21:1
55	12:1	24:1
60	14:1	26:1
65	15:1	30:1
≤ 70	15:1	30:1

* DESIGN EXCEPTION REQUIRED

DESIGN-ONLY NOTES

A. APPROACH END:
USE AN APPROVED END TREATMENT, AS APPROVED IN THE GUIDELINES FOR CRASH CUSHION AND BARRIER END TREATMENTS OR A BURIED IN BACK SLOPE TERMINAL (BA 4F SERIES STD DWGS).

B. TRAILING END:
USE AN APPROVED END TREATMENT, AS APPROVED IN THE GUIDELINES FOR CRASH CUSHION AND BARRIER END TREATMENTS OR A BURIED IN BACK SLOPE TERMINAL (BA 4F SERIES STD DWGS ON DIVIDED ROADWAY WITHOUT POSITIVE SEPARATON.

C. END TREATMENT SHOWN ARE FOR ILLUSTRATION. USE TYPE G ON TANGENT GUARDRAIL INSTALLATIONS.

D. USES OF MGS W-BEAM GUARDRAIL AND END TREATMENT INSTALLATION PERMITTED ON A SLOPE NO STEEPER THAN 10:1. MATCH ROADWAY CROSS-SLOPE IF SUPERELEVATED MORE THAN 2 PERCENT. REFER TO BA 4D SERIES STD DWG.

E. CONSULT GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS, CC SERIES STD DWGS FOR PROPER END TREATMENT SELECTION AND INSTALLATION REQUIREMENTS.

F. REFER TO STD DWG BA 4H3 FOR REDUCED DEFLECTION REQUIREMENTS WHEN 38 INCHES CANNOT BE MAINTAINED BEHIND W-BEAM GUARDRAIL POST TO FACE OF HAZARD. USE 42 INCHES DEFLECTION FOR INITIAL LONG POST 2:1 FILL SLOPE INSTALLATION WITH STANDARD POST SPACING.

DESIGN-ONLY DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/26/2017	SDD	REPLACED ANCHOR TYPE II WITH AN END TREATMENT. CHANGED NOTE B, C, & D.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

MIDWEST 31 INCH W-BEAM GUARDRAIL TYPICAL MULTILANE ARTERIAL

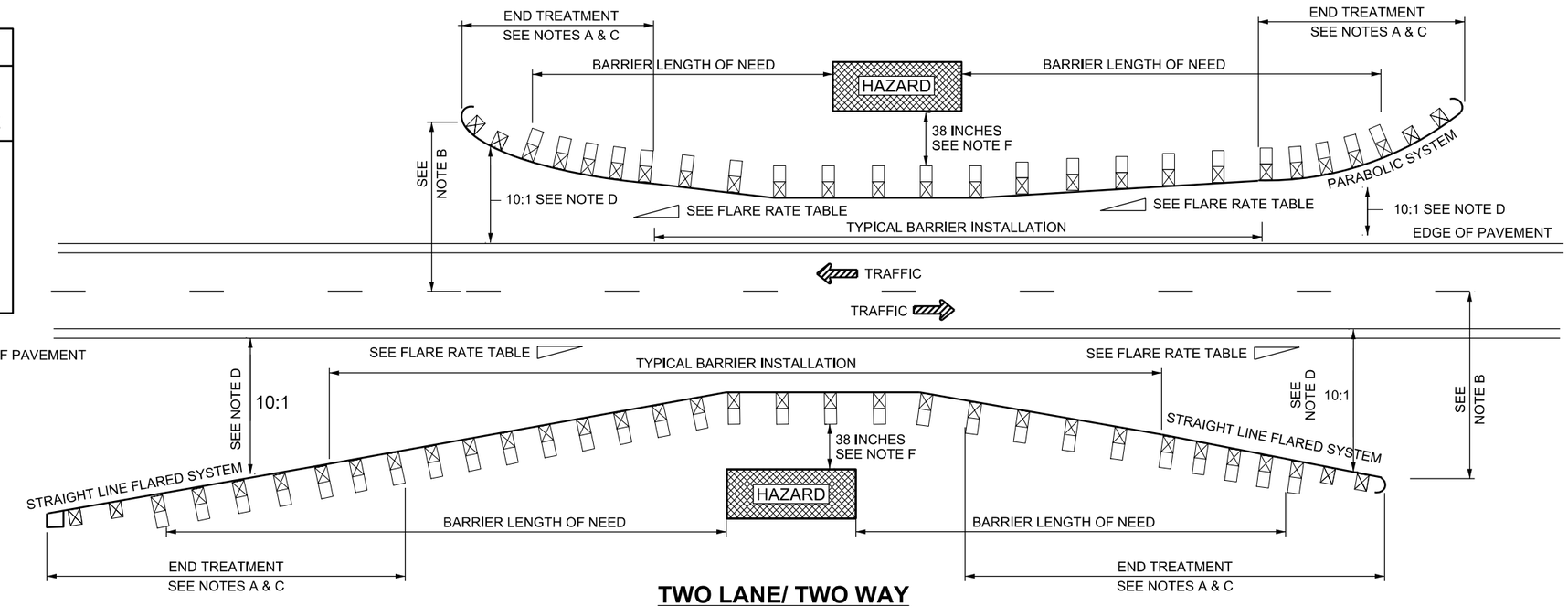
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4J2

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04J2.dgn
23-JUN-2020

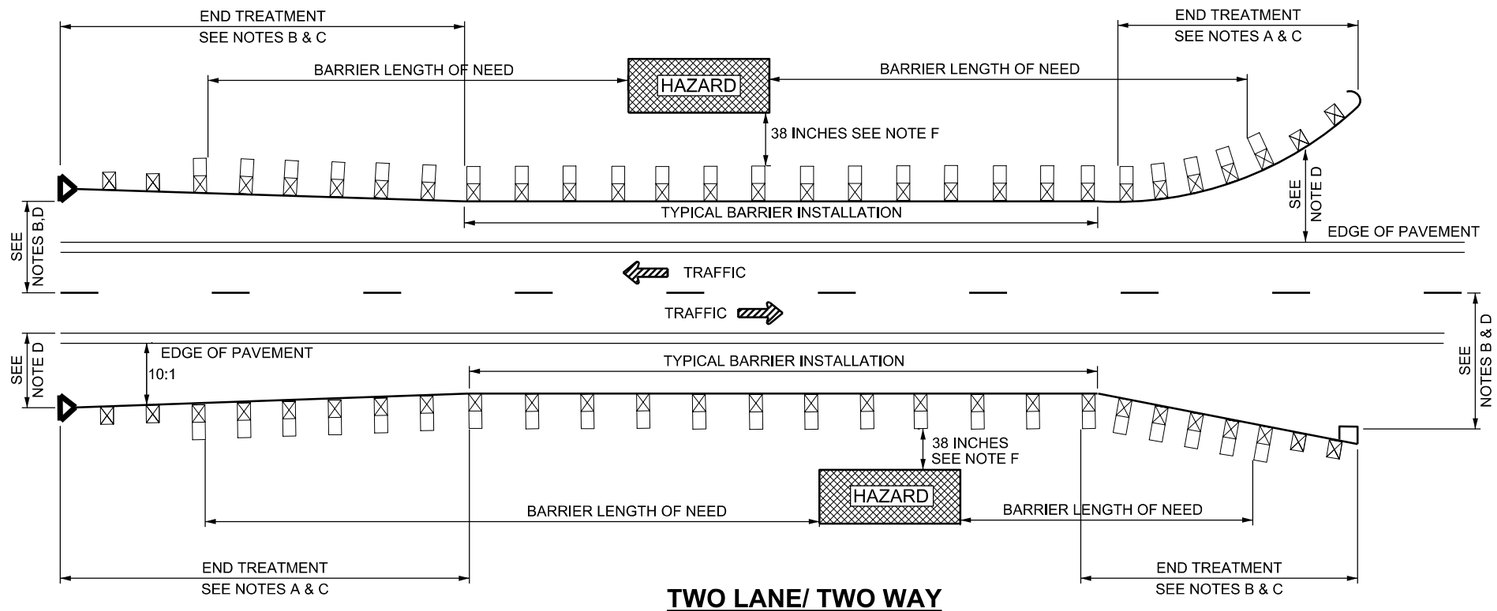
FLARE RATE TABLE		
SPEED (MPH)	RATE OUTSIDE SHY LINE	* RATE INSIDE SHY LINE
≤ 35	7:1	13:1
40	8:1	16:1
45	10:1	18:1
50	11:1	21:1
55	12:1	24:1
60	14:1	26:1
65	15:1	30:1
≤ 70	15:1	30:1

* DESIGN EXCEPTION REQUIRED



TWO LANE/ TWO WAY
FLARED GUARDRAIL INSTALLATION

(DETAIL BA 4J3-2)



TWO LANE/ TWO WAY
TANGENT GUARDRAIL INSTALLATION

(DETAIL BA 4J3-1)

DESIGN-ONLY NOTES

A. APPROACH END:
USE AN APPROVED END TREATMENT, AS APPROVED IN THE GUIDELINES FOR CRASH CUSHION AND BARRIER END TREATMENTS OR A BURIED IN BACK SLOPE TERMINAL (BA 4F SERIES STD DWGS). AN ANCHOR TYPE II PERMITTED WHEN DESIGN SPEED IS 40 MPH OR LESS.

B. TRAILING END:
1. USE AN END TREATMENT AS APPROVED IN GUIDELINES FOR CRASH CUSHION AND BARRIER END TREATMENTS CURRENT EDITION, OR A BURIED IN BACK SLOPE TERMINAL WITHIN CLEAR ZONE AS DEFINED IN THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE.
2. USE AN ANCHOR TYPE II, STD DWG BA 4C2.AT OR BEYOND MINIMUM CLEAR ZONE AS DEFINED IN THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE

C. END TREATMENTS SHOWN ARE FOR ILLUSTRATION. TYPES "G" AND "H" CAN BE USED ON TANGENT OR FLARED GUARDRAIL INSTALLATIONS.

D. USES OF MGS W-BEAM GUARDRAIL INSTALLATION PERMITTED ON A SLOPE NO STEEPER THAN 10:1. MATCH ROADWAY CROSS-SLOPE IF SUPERELEVATED MORE THAN 2 PERCENT. REFER TO STD DWG BA 4D SERIES.

E. CONSULT GUIDELINES FOR CRASH CUSHIONS AND END TREATMENTS CC SERIES STANDARD DRAWINGS, FOR PROPER END TREATMENT SELECTION AND INSTALLATION REQUIREMENTS.

F. REFER TO STD DWG 4H3 FOR REDUCED DEFLECTION REQUIREMENTS WHEN 38 INCHES CANNOT BE MAINTAINED BEHIND W-BEAM GUARDRAIL POST TO FACE OF HAZARD. USE 42 INCHES DEFLECTION FOR INITIAL LONG POST 2:1 FILL SLOPE INSTALLATION WITH STANDARD POST SPACING.

DESIGN-ONLY DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

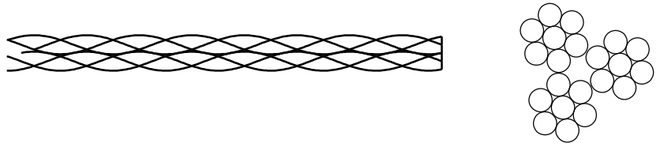
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

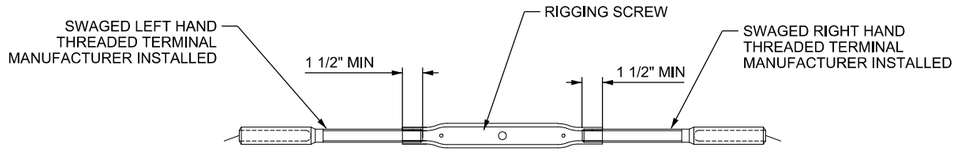
MIDWEST 31 INCH W-BEAM GUARDRAIL TYPICAL 2 LANE 2 WAY
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 4J3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\BA04J3.dgn
23-JUN-2020



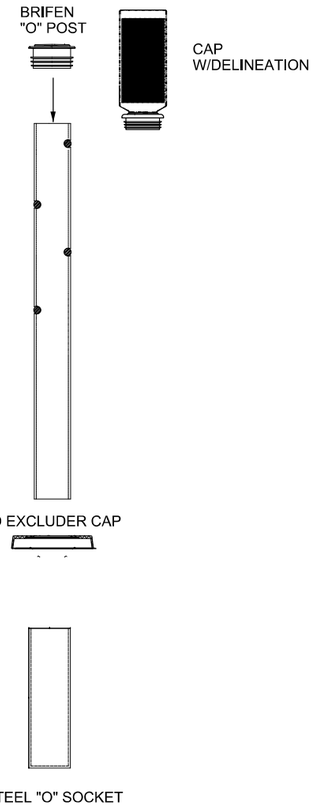
GALVANIZED WIRE ROPE 3/4 INCH 3 X 7 CONSTRUCTION



BRIFEN CONNECTION SHOWN, OTHER SYSTEMS SIMILAR.

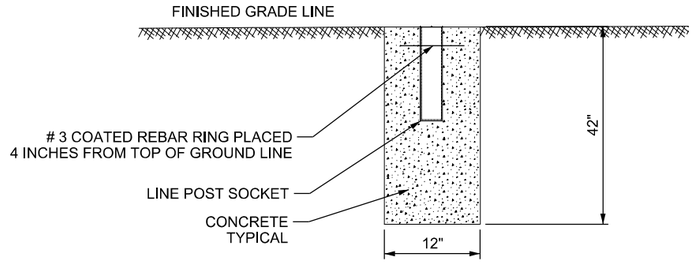
WIRE ROPE CONNECTION DETAIL

SEE NOTE 2

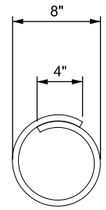


LINE POST, SOCKET AND HARDWARE

SEE NOTE 1



LINE POST SOCKETED CONCRETE FOUNDATION ON SLOPES 10:1 OR FLATTER



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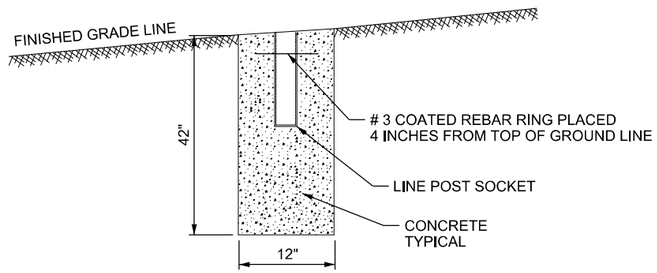


LINE POST SOCKETED CONCRETE FOUNDATION ON SLOPES BETWEEN 6:1 AND 10:1

NOTES

1. BRIFEN WIRE ROPE SAFETY FENCE 4 ROPE O- POST SYSTEM IS PROPRIETARY. MEET DEPARTMENT AND MANUFACTURER'S REQUIREMENTS.
2. WIRE ROPE CONNECTION:
   A. USED TO SPLICE TWO CABLE ENDS TOGETHER
3. MEET DELINEATION REQUIREMENTS ACCORDING TO STANDARD SPECIFICATION 02845.
4. CONSTRUCT MOW STRIP WITH BITUMINOUS OR CONCRETE MATERIAL.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	REMOVED DESIGN ONLY NOTES, MODIFIED NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

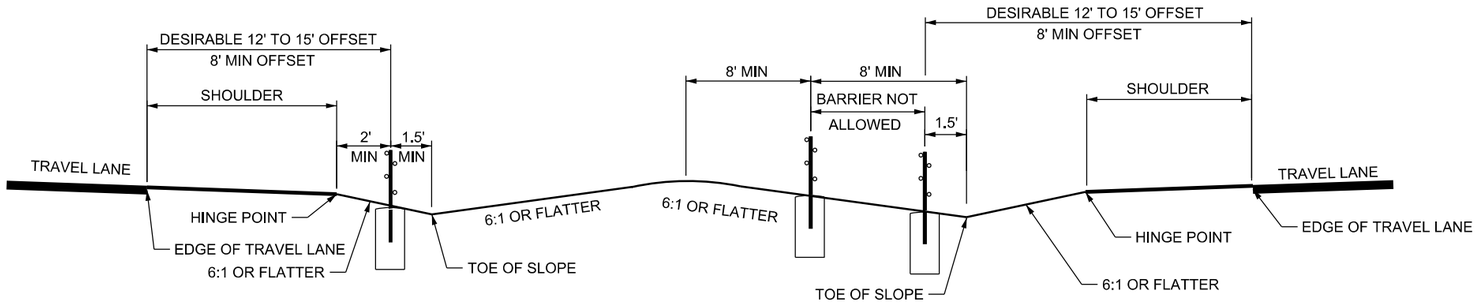
MASH CABLE BARRIER TYPICAL HARDWARE AND FOUNDATION REQUIREMENTS

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 5A

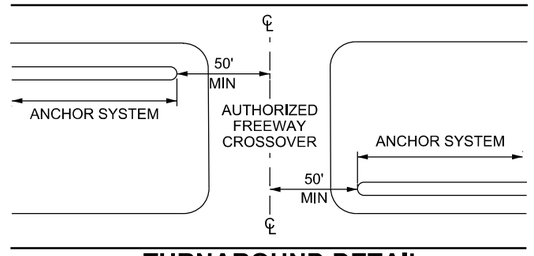
25-JUN-2020 DGN File:D:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05A.dgn



PLACEMENT PRIOR TO TOE OF SLOPE

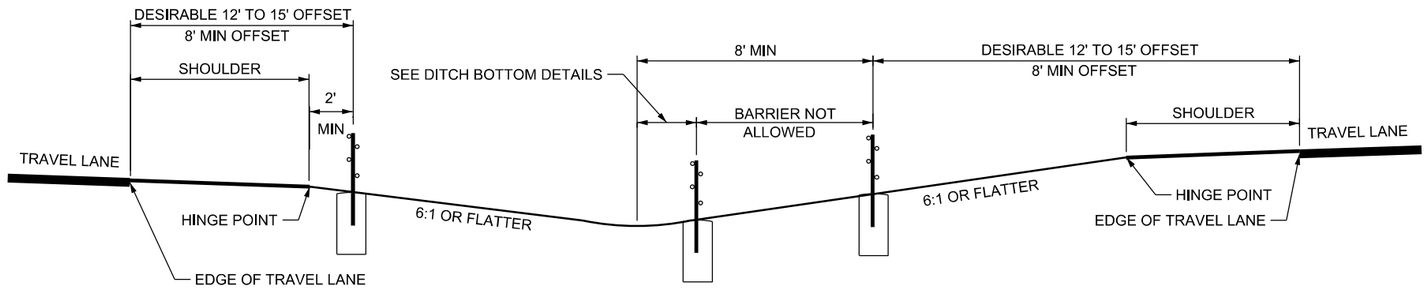
PLACEMENT BEYOND TOE OF SLOPE

MEDIAN PLACEMENT WITH BACKSLOPES 6:1 OR FLATTER



TURNAROUND DETAIL

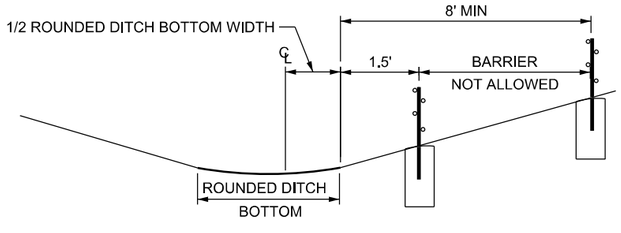
SEE NOTE 5



PLACEMENT IN RELATION TO SHOULDER HINGE POINT

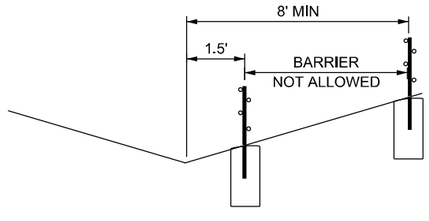
PLACEMENT IN RELATION TO DITCH BOTTOM

MEDIAN PLACEMENT WITH FORESLOPE 6:1 OR FLATTER



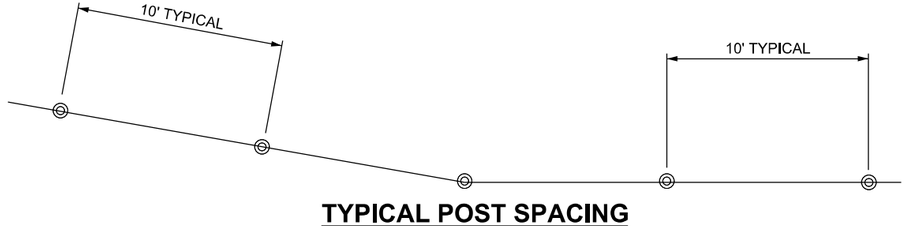
MEDIAN WITH ROUNDED DITCH BOTTOM

SEE NOTE 6



MEDIAN WITH V-DITCH BOTTOM

SEE NOTE 6



TYPICAL POST SPACING

SEE NOTES 1 & 2

NOTES:

1. FLARE RATE: FLATTER OR EQUAL TO 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE.
2. REDUCE POST SPACING TO 5 FT ON CENTER WHEN MEDIAN WIDTH IS 20 FT OR WHEN PLACED ON THE INSIDE OF A CURVE AND THE OFFSET IS SUCH THAT THE CABLE HAS A POTENTIAL OF ENCROACHMENT INTO TRAVEL LANE AND MEDIAN WIDTH IS NOT LESS THAN 16 FT.
3. REMOVE DELINEATOR POST WHEN WITHIN 4 FT OF FACE OF CABLE BARRIER. FACE IS DEFINED AS THE CABLE TO THE NEAREST TRAVEL LANE.
4. DELINEATOR POSTS NOT REQUIRED WHEN CABLE BARRIER IS PLACED WITHIN THE OFFSET REQUIREMENTS OF STD DWG GW 7A.
   A. PLACE 2 FT BEHIND CABLE BARRIER WHEN DELINEATOR POSTS ARE DESIRABLE.
5. PLACE 50 FT FROM CROSSOVER CENTERLINE REQUIRED WHEN ANCHOR SYSTEMS ARE PLACED IN A OFFSET OR IN LINE APPLICATION.
6. PLACE BARRIER WITH A 1.5 FT OFFSET FROM DITCH BOTTOM OR PLACED AT 8 FT FROM DITCH BOTTOM.

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	REMOVED DESIGN ONLY NOTES, MODIFIED NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

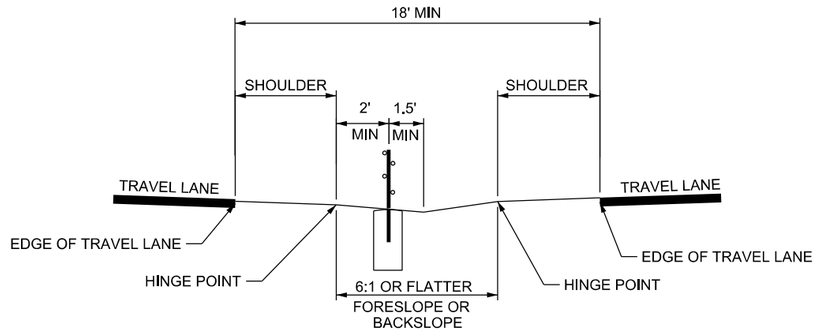
STANDARD DRAWING TITLE

CABLE BARRIER PLACEMENT

STD. DWG. NO.

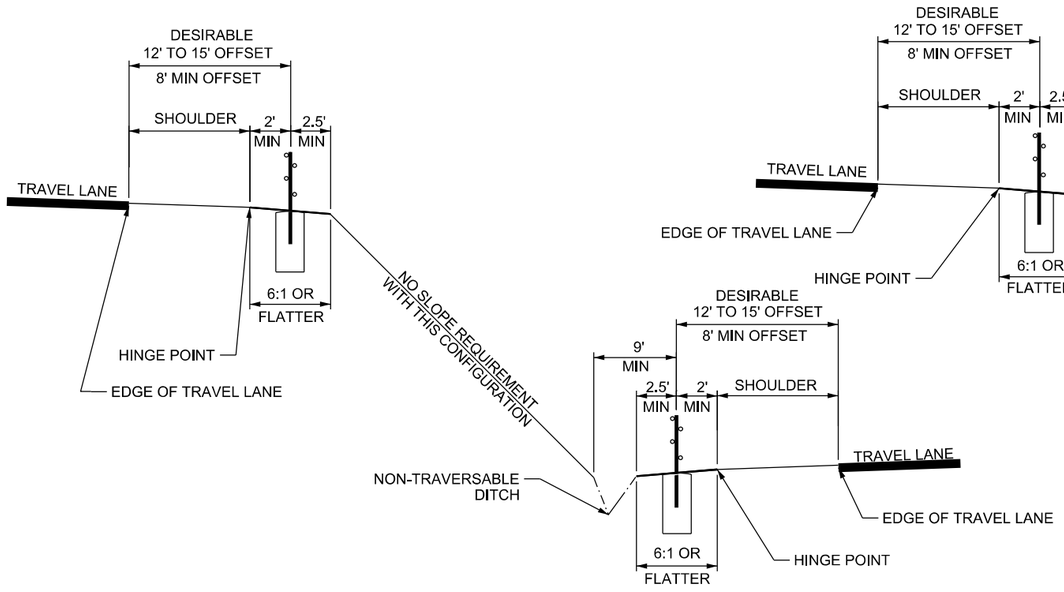
BA 5B1

DGN File: D:\Standardsand5pecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05B1.dgn
25-JUN-2020

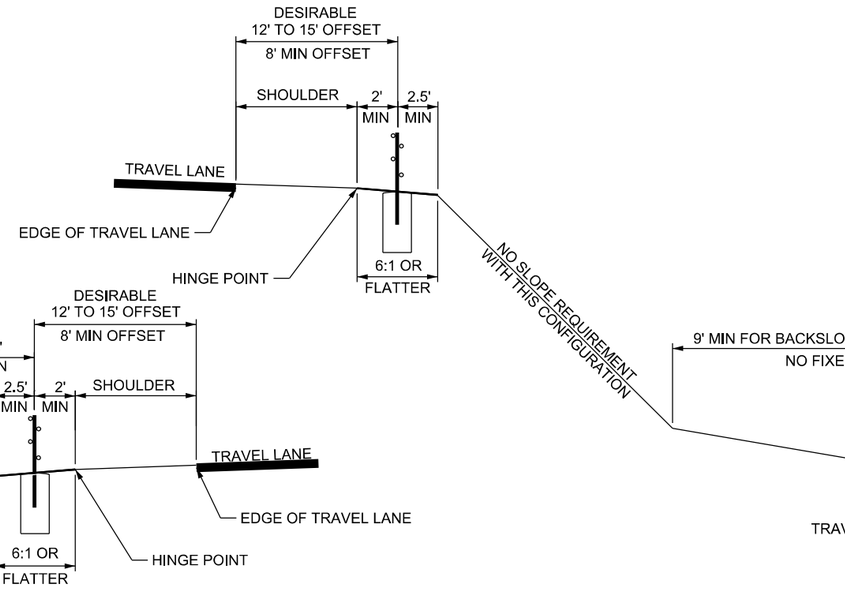


NARROW MEDIAN PLACEMENT

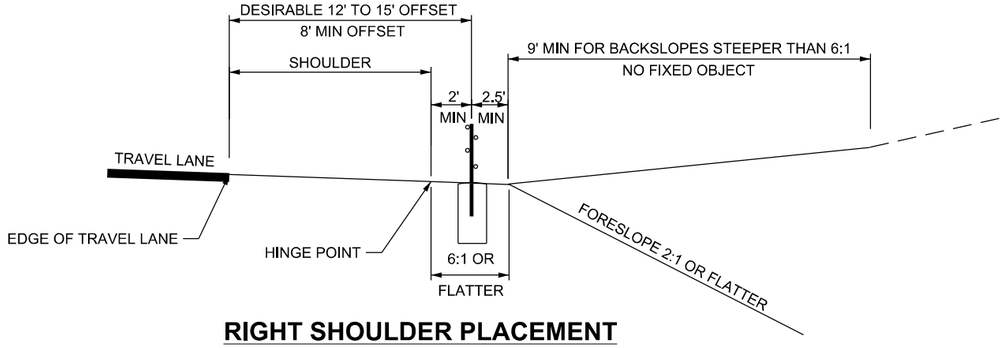
SEE NOTE 3



MEDIAN PLACEMENT WITH VERTICALLY OFFSET LANES WITH DITCH



MEDIAN PLACEMENT WITH VERTICALLY OFFSET LANES WITH NO DITCH



RIGHT SHOULDER PLACEMENT

NOTES:

1. FLARE RATE: FLATTER OR EQUAL TO 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE.
2. SEE STD DWG BA 5B1 FOR TYPICAL POST SPACING REQUIREMENTS.
3. USE 5 FT POST SPACING WHEN:
   A. MEDIAN WIDTH IS GREATER THAN 18 FT BUT LESS THAN 20 FT.
   B. CABLE IS OFFSET LESS THAN 8 FT FROM ANY TRAVEL LANE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	REMOVED DESIGN ONLY NOTES. MODIFIED NOTES 1 & 3A. UPDATED CALL OUTS FOR DEFLECTION CRITERIA.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

CABLE BARRIER PLACEMENT

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 5B2

DGN File:D:\Standardsand$pecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF ALL PASSES, THESE ARE READY FOR BOOK\BA05B2.dgn
25-JUN-2020

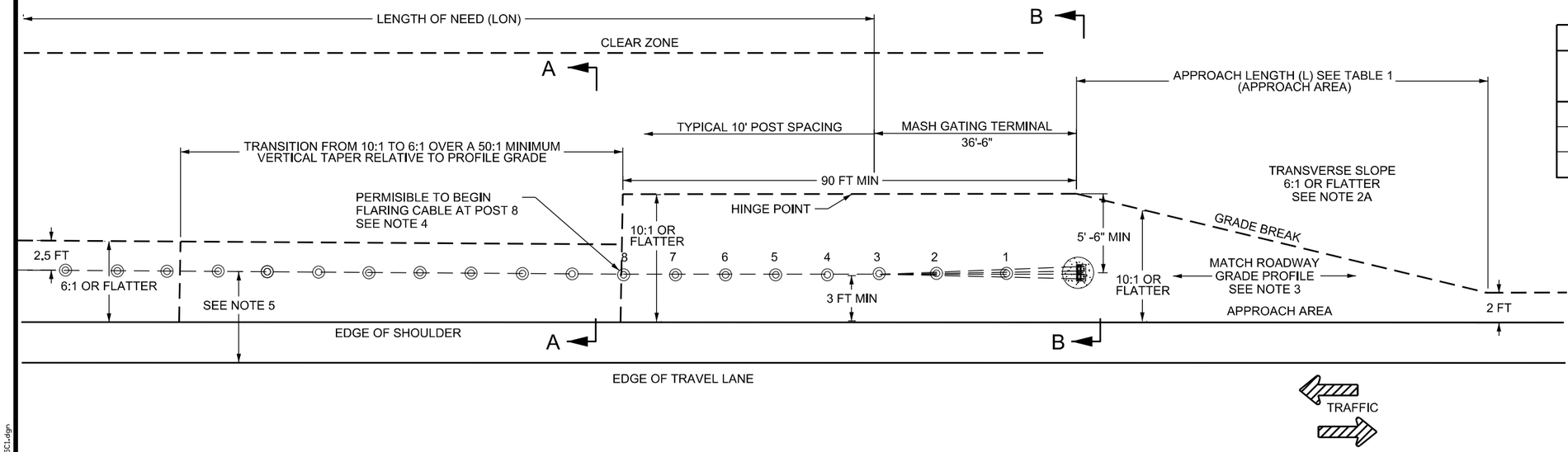
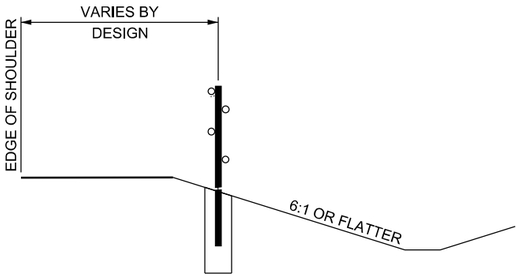
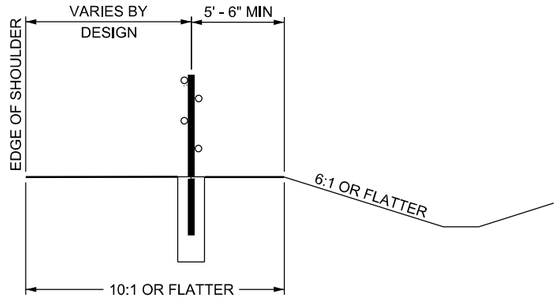


TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT

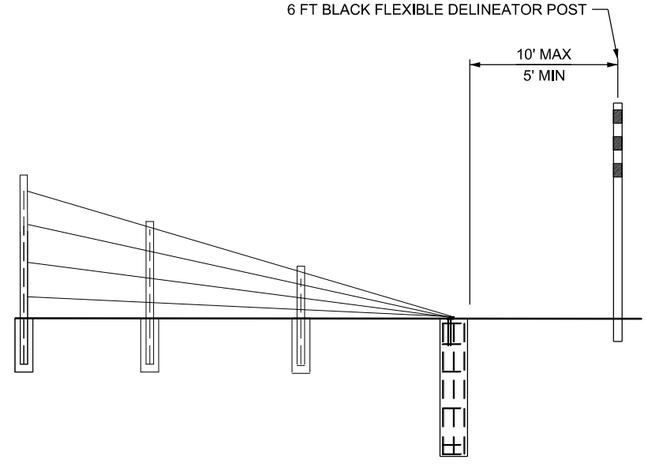
HIGH TENSION CABLE BARRIER MASH GATING TERMINAL



TYPICAL SECTION A-A



TYPICAL SECTION B-B



SYSTEM DELINEATION

SEE NOTES 1

NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR MASH GATING TERMINAL AND LINE POST REQUIREMENTS. SEE STD. DWG. BA 5C2 OR BA 5C3 FOR MASH GATING TERMINAL CONCRETE FOUNDATION REQUIREMENTS. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
2. CONSTRUCT PLATFORM AS REQUIRED EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
   B) CONSTRUCT 50:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM TRAILING END OF APPROACH PAD. GRADUALLY TRANS ION 10:1 SLOPE TO 6:1 SLOPE SUCH THAT CABLES ALIGN WITH POST AT MANUFACTURER'S SPECIFIED ELEVATION.
3. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 65 FT FROM THE ANCHOR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE. FLARE BARRIER OFF THE 10:1 PAD AND VERIFY CABLES ARE LOCATED ON THE POST ACCORDING TO MANUFACTURER'S REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/25/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

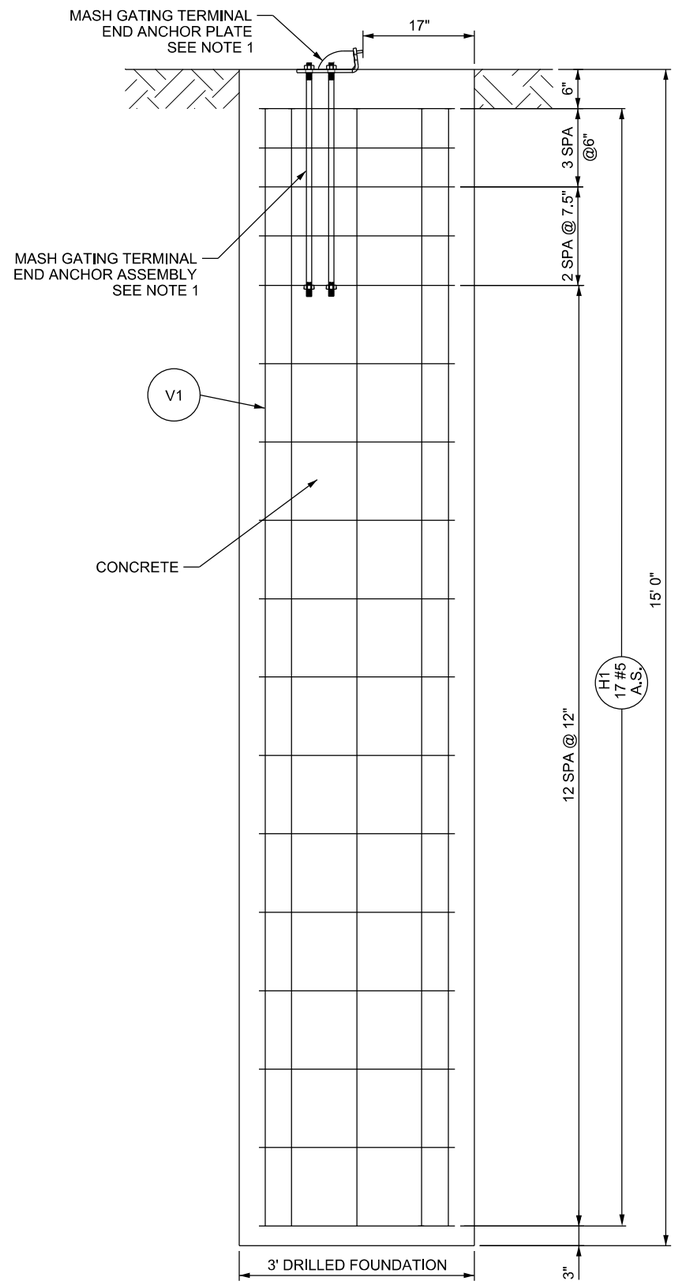
GRADING AND INSTALLATION DETAILS MASH GATING TERMINAL

STANDARD DRAWING TITLE

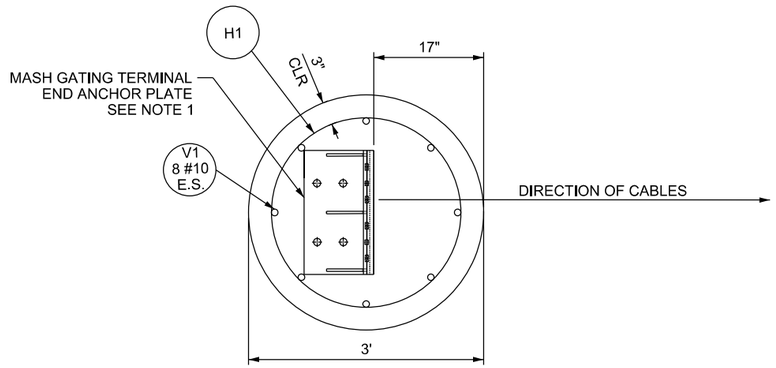
STD. DWG. NO.

BA 5C1

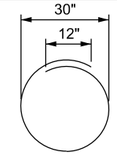
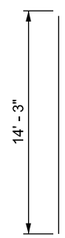
25-JUN-2020 DGN File:G:\Standardsandspecs\Sector\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05C1.dgn



ELEVATION VIEW



PLAN VIEW

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#5	17	HORIZONTAL	
V1	#10	8	VERTICAL	

NOTES:

1. MASH GATING TERMINAL END ANCHOR PLATE AND ASSEMBLY IS A PROPRIETARY SYSTEM. MEET MANUFACTURER'S REQUIREMENTS FOR INSTALLATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

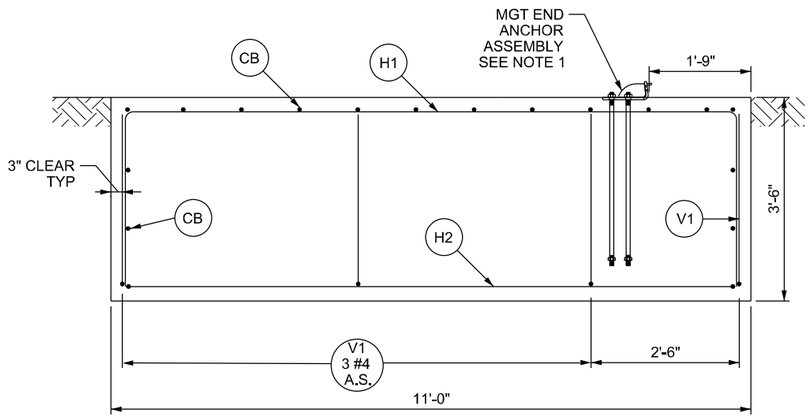
DEPUTY DIRECTOR

BRIFEN MASH GATING TERMINAL CYLINDRICAL END ANCHOR FOUNDATION DETAIL

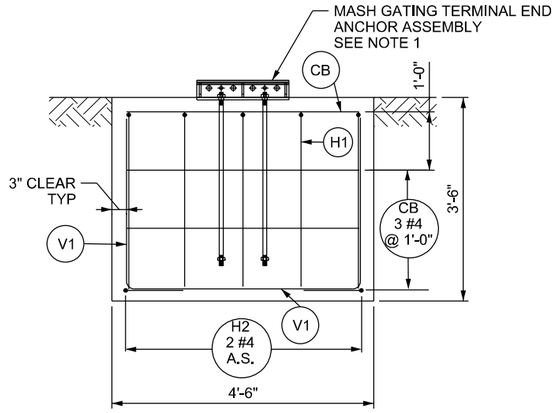
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 5C2

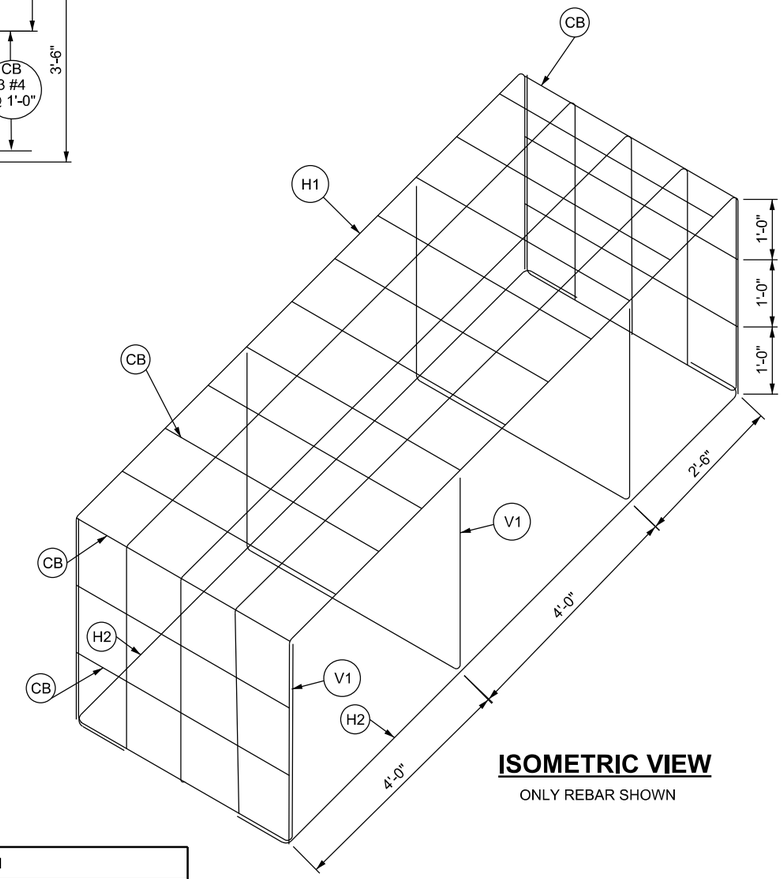
25-JUN-2020 DGN File: D:\Standardsand\SpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05C2.dgn



SECTION B-B

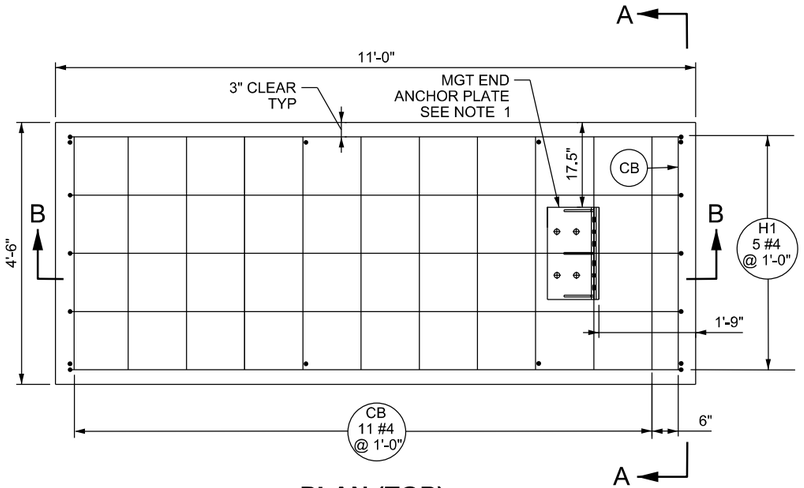


SECTION A-A



ISOMETRIC VIEW

ONLY REBAR SHOWN



PLAN (TOP)

BAR MARK	BAR SIZE	NO. BARS	LOCATION	SKETCH
H1	#4	5	HORIZONTAL LENGTH WISE ACROSS TOP AND VERTICAL TO THE BOTTOM	10'-6" × 3'-0"
CB	#4	16	CROSS BARS TIED TO H1 BARS	4'-0"
H2	#4	2	HORIZONTAL LENGTH WISE ON BOTTOM TIED TO V1 BARS	1'-0" × 10'-6"
V1	#4	4	VERTICAL WITH HORIZONTAL BAR ALONG BOTTOM	3'-0" × 4'-0"

NOTES:

1. MASH GATING TERMINAL ANCHOR PLATE AND ASSEMBLY IS A PROPRIETARY SYSTEM. MEET MANUFACTURER'S REQUIREMENTS FOR INSTALLATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

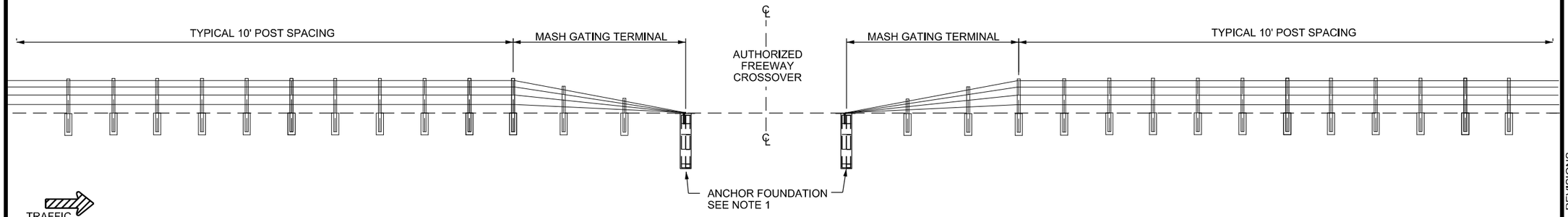
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

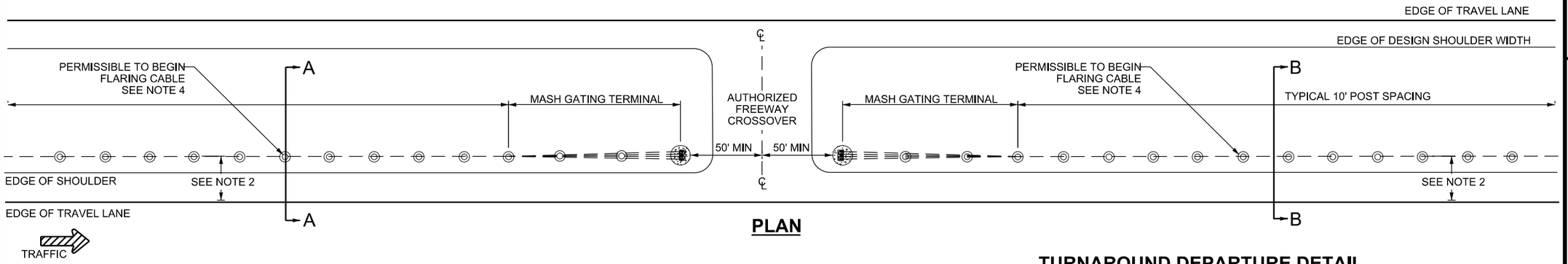
STANDARD DRAWING TITLE
BRIFEN MASH GATING TERMINAL BLOCK END ANCHOR FOUNDATION DETAIL

STD. DWG. NO.
BA 5C3

25-JUN-2020 DGN File: G:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05C3.dgn

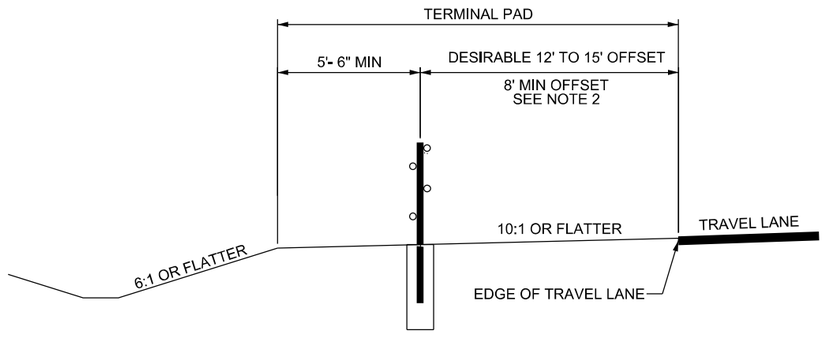


MEDIAN CABLE FREEWAY CROSSOVER ANCHOR SYSTEM ELEVATION



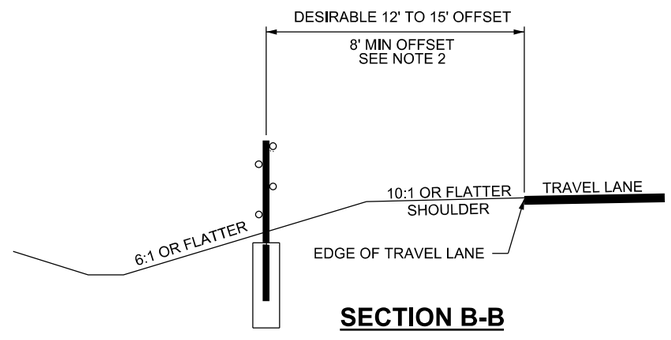
PLAN

TURNAROUND APPROACH DETAIL



SECTION A-A

TURNAROUND DEPARTURE DETAIL



SECTION B-B

NOTES:

1. MEET MANUFACTURER'S REQUIREMENTS FOR MASH GATING TERMINAL HARDWARE AND INSTALLATION REQUIREMENTS. SEE STD. DWG. BA5 C2 OR BA5 C3 FOR FOUNDATION REQUIRMENTS.
2. SEE PLAN SET FOR PROJECT OFFSET REQUIREMENTS.
3. MEET MANUFACTURER'S REQUIREMENTS FOR CABLE HEIGHT AND SEPARATION.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE.
5. MEET MASH GATING TERMINAL GRADING REQUIREMENTS. SEE STD. DWG. BA 5C1

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/25/20	SDD	REVISED DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 DATE

APPROVED
DEPUTY DIRECTOR

MEDIAN CABLE BARRIER
FREEWAY CROSSOVER
ANCHOR SYSTEM
(BRIFEN MASH
GATING TERMINAL)

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 5D

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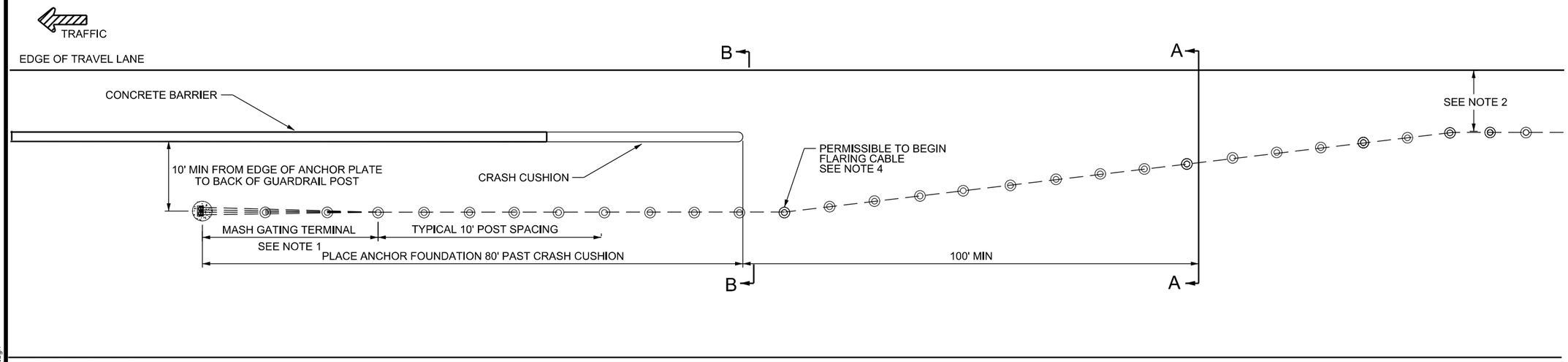
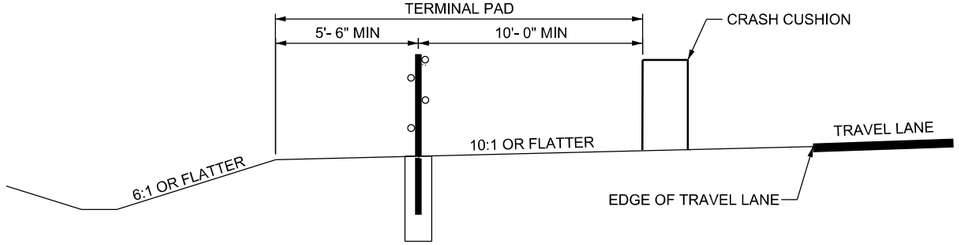


EDGE OF TRAVEL LANE

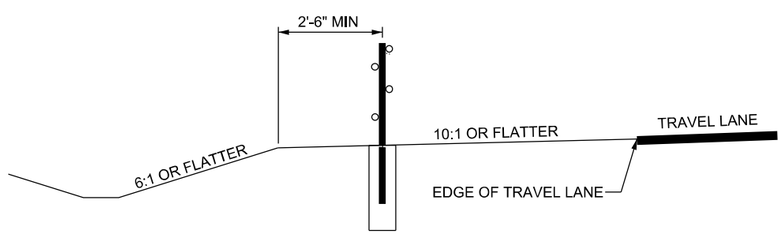
TRAFFIC

FREEWAY/EXPRESSWAY HIGH TENSION CABLE BARRIER OVERLAP
MEDIAN WIDTH GREATER THAN OR EQUAL TO 50 FT

CONCRETE BARRIER APPLICATION SHOWN, W-BEAM BARRIER SIMILAR



SECTION B-B



SECTION A-A

NOTES:

1. SEE STD. DWG. BA5 C2 OR BA5 C3 FOR MASH GATING TERMINAL FOUNDATION REQUIREMENTS.
2. SEE PLAN SET FOR BARRIER OFFSET REQUIREMENTS.
3. INSTALL 12 INCH DIA X 42 INCH DEEP FOUNDATION. MEET ALL OTHER MANUFACTURER'S REQUIREMENTS FOR CAST-IN-PLACE CABLE POST FOUNDATIONS.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE.
5. SEE STD. DWG. BA F SERIES FOR END TREATMENT CABLE BARRIER OFFSET REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

MEDIAN CABLE BARRIER
WITH CONCRETE BARRIER
(BRIFEN MASH GATING
TERMINAL OVERLAP) 1 OF 3

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 5E1

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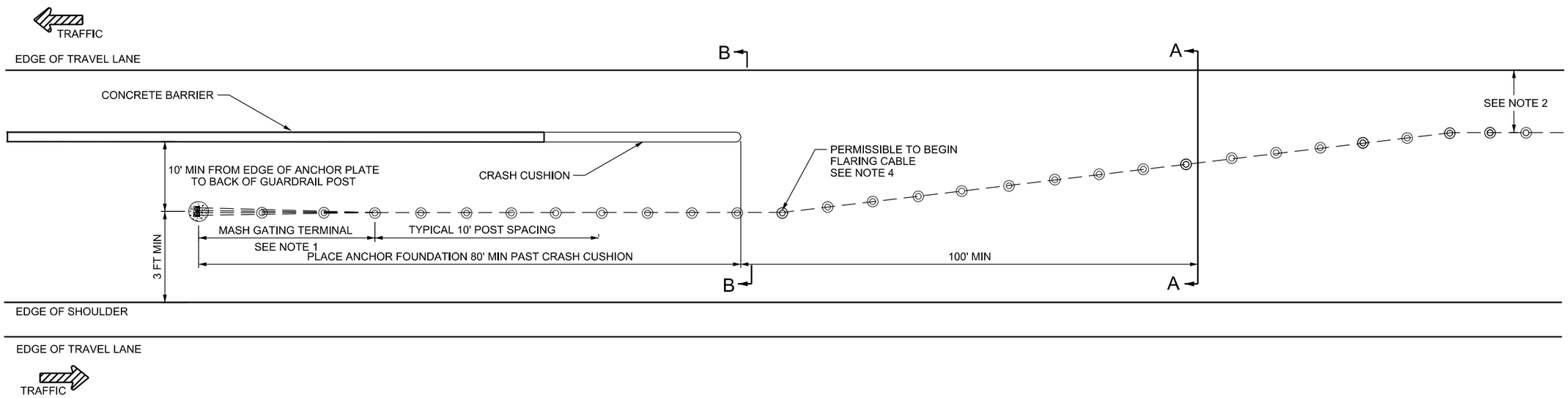
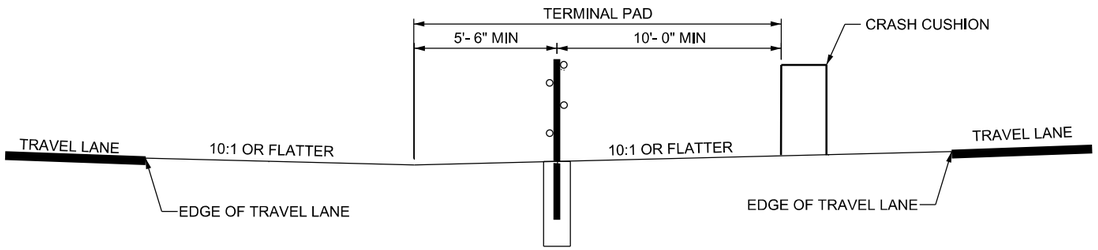
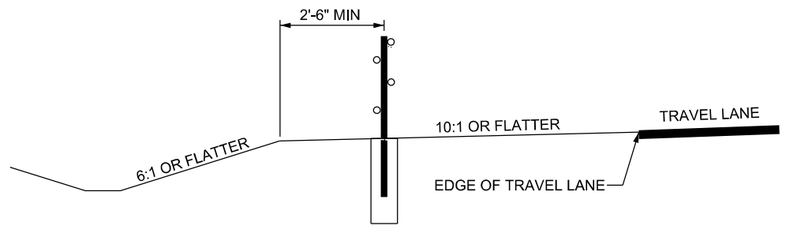


FREEWAY/EXPRESSWAY HIGH TENSION CABLE BARRIER OVERLAP
MEDIAN WIDTH GREATER THAN 25 FT TO LESS THAN 50 FT

CONCRETE BARRIER APPLICATION SHOWN, W-BEAM BARRIER SIMILAR



SECTION B-B



SECTION A-A

NOTES:

1. SEE STD. DWG. BA 5C2 OR BA 5C3 FOR MASH GATING TERMINAL FOUNDATION REQUIREMENTS.
2. SEE PLAN SET FOR BARRIER OFFSET REQUIREMENTS.
3. INSTALL 12 INCH DIA X 42 INCH DEEP FOUNDATION. MEET ALL OTHER MANUFACTURER'S REQUIREMENTS FOR CAST-IN-PLACE CABLE POST FOUNDATIONS.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE.
5. SEE STD. DWG. BA F SERIES FOR END TREATMENT CABLE BARRIER OFFSET REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/25/20	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

MEDIAN CABLE BARRIER
WITH CONCRETE BARRIER
(BRIFEN MASH GATING
TERMINAL OVERLAP) 2 OF 3
STANDARD DRAWING TITLE

STD. DWG. NO.
BA 5E2

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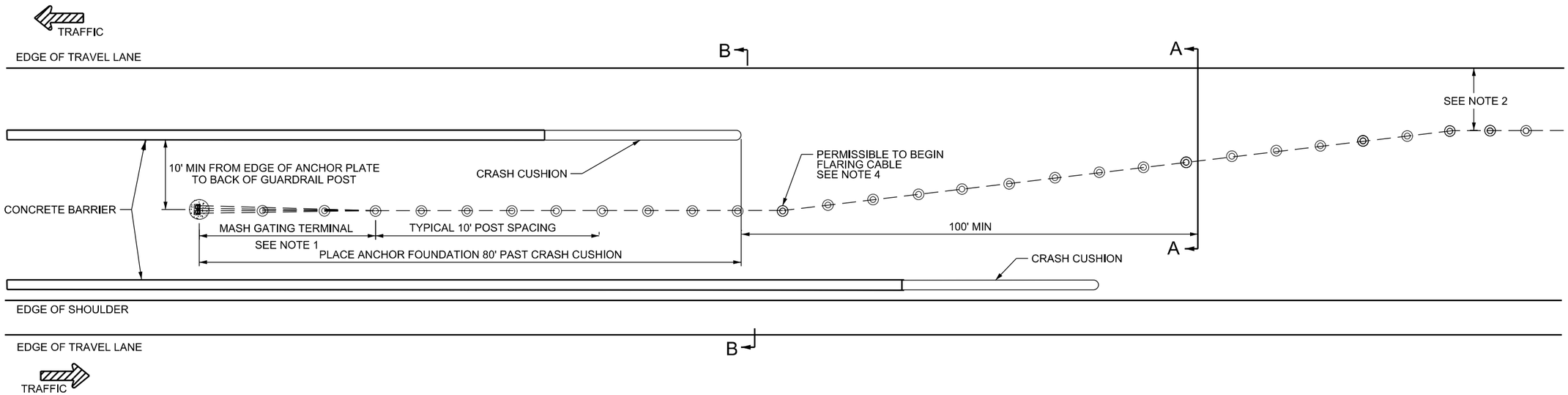
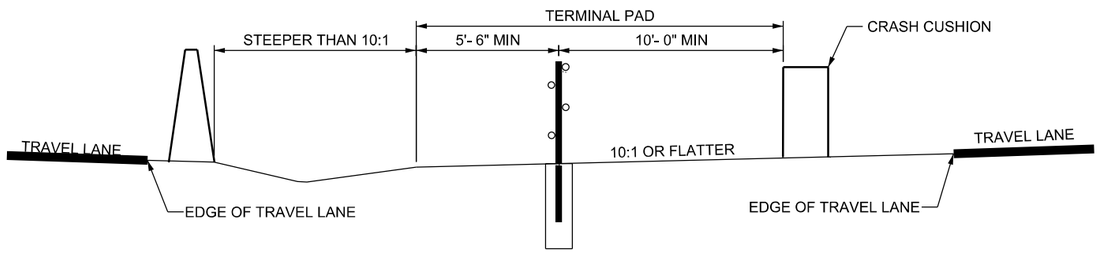
25-JUN-2020

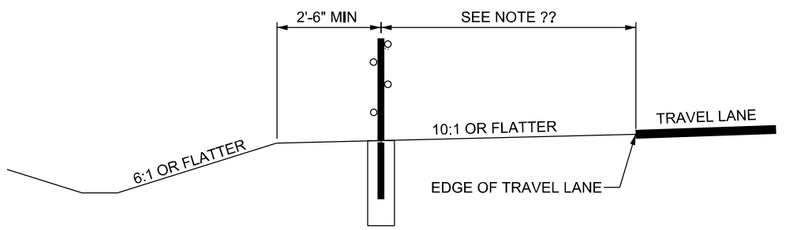


FREEWAY/EXPRESSWAY HIGH TENSION CABLE BARRIER OVERLAP
MEDIAN WIDTH GREATER THAN 25 TO LESS THAN 50 FT

CONCRETE BARRIER APPLICATION SHOWN, W-BEAM BARRIER SIMILAR



SECTION B-B



SECTION A-A

NOTES:

1. SEE STD. DWG. BA 5C2 OR BA 5C3 FOR MASH GATING TERMINAL FOUNDATION REQUIREMENTS.
2. SEE PLAN SET FOR BARRIER OFFSET REQUIREMENTS.
3. INSTALL 12 INCH DIA X 42 INCH DEEP FOUNDATION. MEET ALL OTHER MANUFACTURER'S REQUIREMENTS FOR CAST-IN-PLACE CABLE POST FOUNDATIONS.
5. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE.
6. SEE STD. DWG. BA F SERIES FOR END TREATMENT CABLE BARRIER OFFSET REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	08/25/20	SDD	NEW DRAWING.

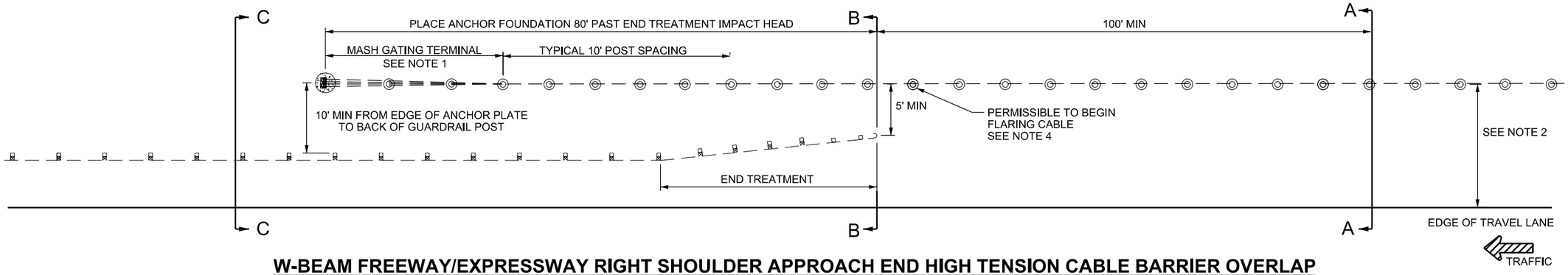
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
MEDIAN CABLE BARRIER
WITH CONCRETE BARRIER
(BRIFEN MASH GATING
TERMINAL OVERLAP) 3 OF 3

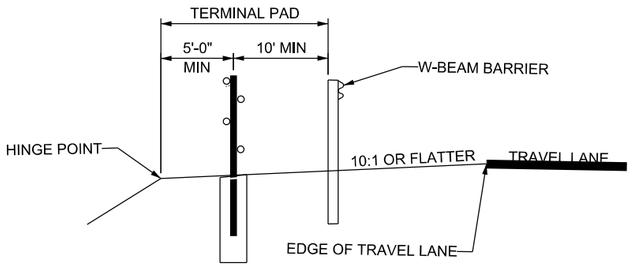
STD. DWG. NO.
BA 5E3

DGN File:D:\Standardsand Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05E3.dgn
25-JUN-2020

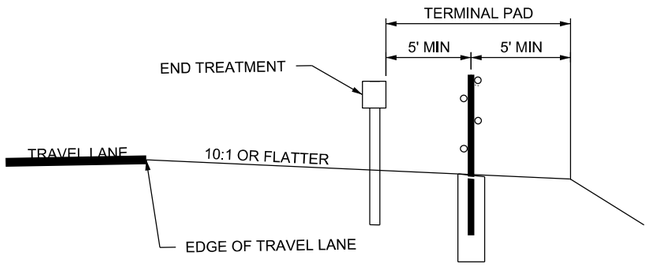


W-BEAM FREEWAY/EXPRESSWAY RIGHT SHOULDER APPROACH END HIGH TENSION CABLE BARRIER OVERLAP

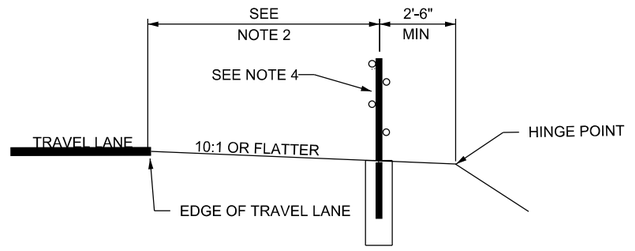
W-BEAM APPLICATION SHOWN CONCRETE BARRIER SIMULAR



SECTION C-C



SECTION B-B



SECTION A-A

NOTES:

1. SEE STD. DWG. BA5 C2 OR BA5 C3 FOR MASH GATING TERMINAL FOUNDATION REQUIREMENTS.
2. SEE PLAN SET FOR BARRIER OFFSET REQUIREMENTS.
3. INSTALL 12 INCH DIA X 42 INCH DEEP FOUNDATION. MEET ALL OTHER MANUFACTURER'S REQUIREMENTS FOR CAST-IN-PLACE CABLE POST FOUNDATIONS.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE. USE 50:1 FLARE RATE WHEN FLARING SYSTEM TOWARDS TRAFFIC.

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE

APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

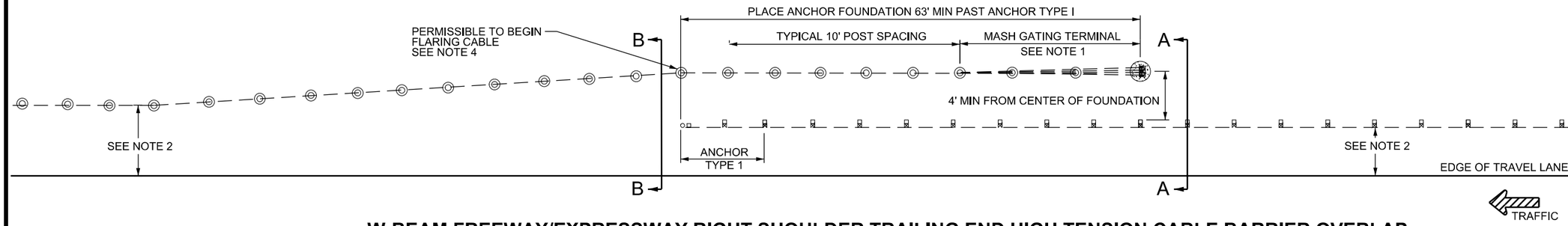
CABLE BARRIER / W-BEAM
RIGHT SHOULDER
APPROACH
(BRIFEN MASH GATING
TERMINAL OVERLAP)

STANDARD DRAWING TITLE

STD. DWG. NO.

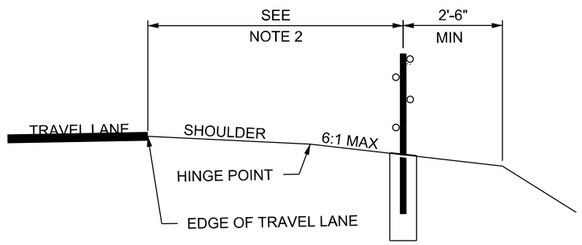
BA 5F1

25-JUN-2020 DGN File: D:\Standardsand$pecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05F1.dgn

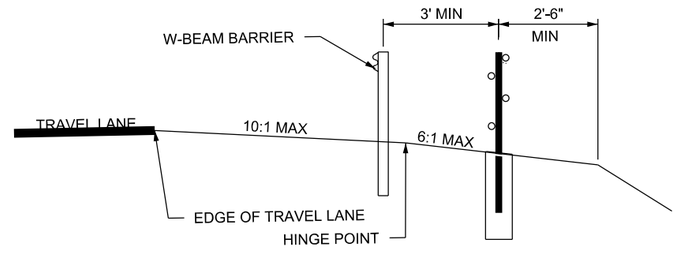


W-BEAM FREEWAY/EXPRESSWAY RIGHT SHOULDER TRAILING END HIGH TENSION CABLE BARRIER OVERLAP

W-BEAM APPLICATION SHOWN CONCRETE BARRIER SIMULAR



SECTION B-B



SECTION A-A

NOTES:

1. SEE STD. DWG. BA5 C2 OR BA5 C3 FOR MASH GATING TERMINAL FOUNDATION REQUIREMENTS.
2. SEE PLAN SET FOR BARRIER OFFSET REQUIREMENTS.
3. INSTALL 12 INCH DIA X 42 INCH DEEP FOUNDATION. MEET ALL OTHER MANUFACTURER'S REQUIREMENTS FOR CAST-IN-PLACE CABLE POST FOUNDATIONS.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE. USE 50:1 FLARE RATE WHEN FLARING SYSTEM TOWARDS TRAFFIC.

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

CABLE BARRIER/ W-BEAM RIGHT SHOULDER TRAILING ANCHOR SYSTEM (BRIFEN MASH GATING TERMINAL OVERLAP)

STANDARD DRAWING TITLE

STD. DWG. NO.

BA 5F2

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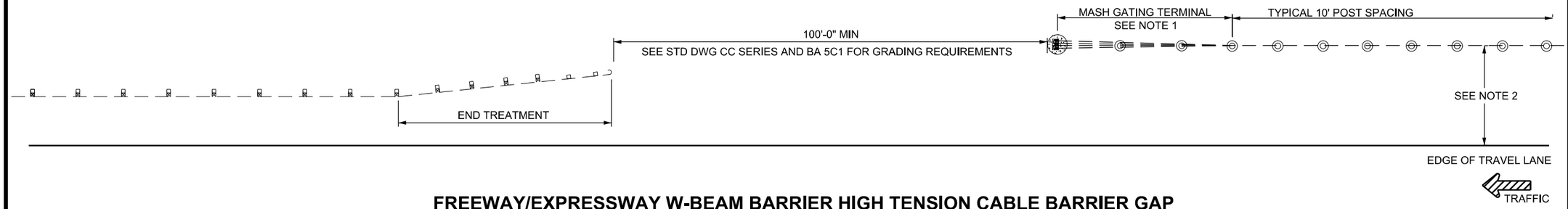
25-JUN-2020



FREEWAY/EXPRESSWAY W-BEAM BARRIER HIGH TENSION CABLE BARRIER GAP

W-BEAM APPLICATION SHOWN CONCRETE BARRIER SIMULAR

NOTES:

1. SEE STD. DWG. BA5 C2 OR BA5 C3 FOR MASH GATING TERMINAL FOUNDATION REQUIREMENTS.
2. SEE PLAN SET FOR BARRIER OFFSET REQUIREMENTS.
3. INSTALL 12 INCH DIA X 42 INCH DEEP FOUNDATION. MEET ALL OTHER MANUFACTURER'S REQUIREMENTS FOR CAST-IN-PLACE CABLE POST FOUNDATIONS.
4. FLARE RATE: EQUAL TO OR FLATTER THAN 50:1 DESIRABLE; 25:1 MAXIMUM ACCEPTABLE. USE 50:1 FLARE RATE WHEN FLARING SYSTEM TOWARDS TRAFFIC.

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	NEW DRAWING.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE

APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

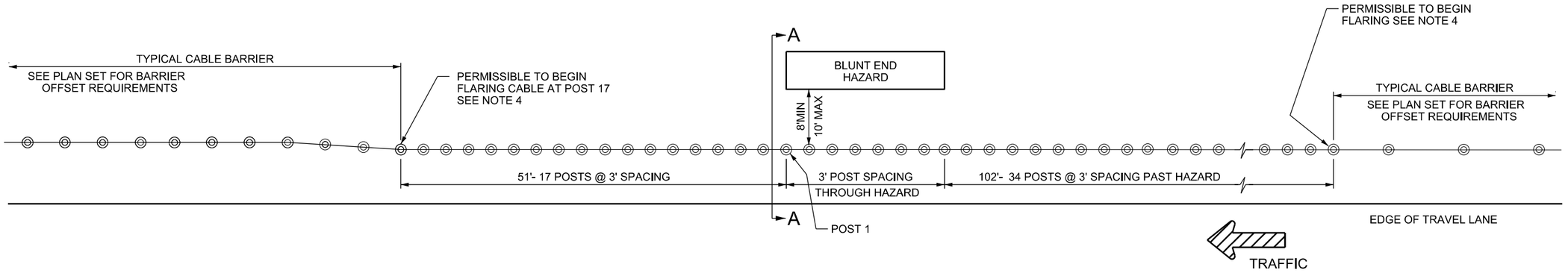
CABLE BARRIER WITH
W-BEAM END TREATMENT
BARRIER GAP (BRIFEN
MASH GATING TERMINAL)

STANDARD DRAWING TITLE

STD. DWG. NO.

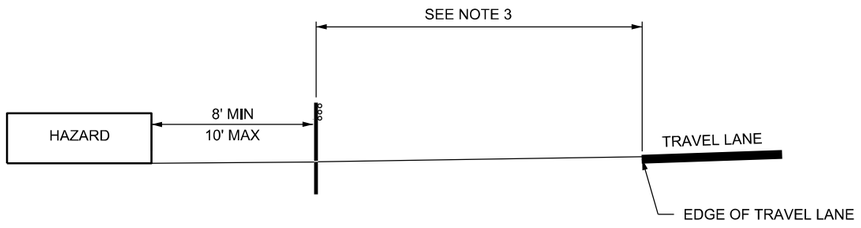
BA 5F3

25-JUN-2020 DGN File: D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05F3.dgn



HAZARD PROTECTION WITH CABLE BARRIER

SEE NOTE 2



SECTION A-A

NOTES:

1. MINIMUM 8 FT DISTANCE FROM FACE OF HAZARD TO CABLE BARRIER REQUIRED.
2. USE 10 FT POST SPACING WHEN CABLE IS GREATER THAN 10 FT FROM HAZARD.
3. SEE PLAN SET FOR PROJECT OFFSET REQUIREMENTS.
4. FLARE RATE: FLATTER OR EQUAL TO 50:1 DESIRABLE, 25:1 MINIMUM ACCEPTABLE.
5. NOT PERMITTED TO PROTECT BRIDGE COLUMNS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/25/20	SDD	REVISED DRAWING AND CHANGE DRAWING NUMBER.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE AUGUST 2020
DEPUTY DIRECTOR

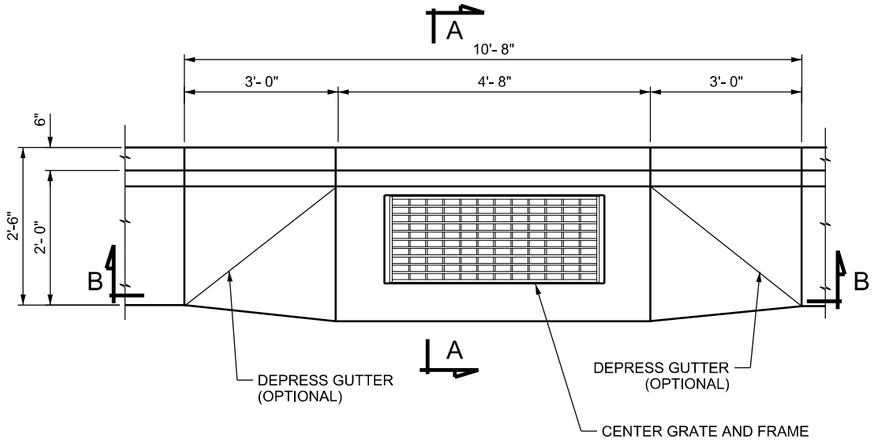
CABLE BARRIER HAZARD PROTECTION

STANDARD DRAWING TITLE

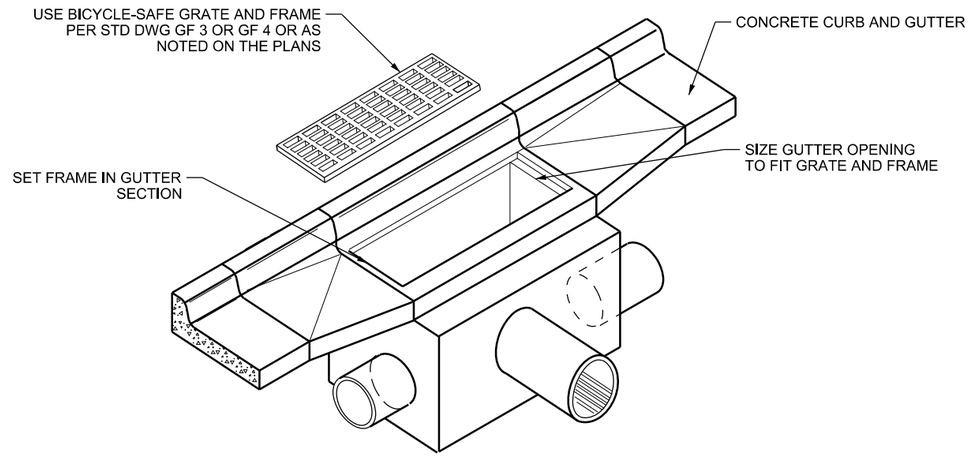
STD. DWG. NO.

BA 5G

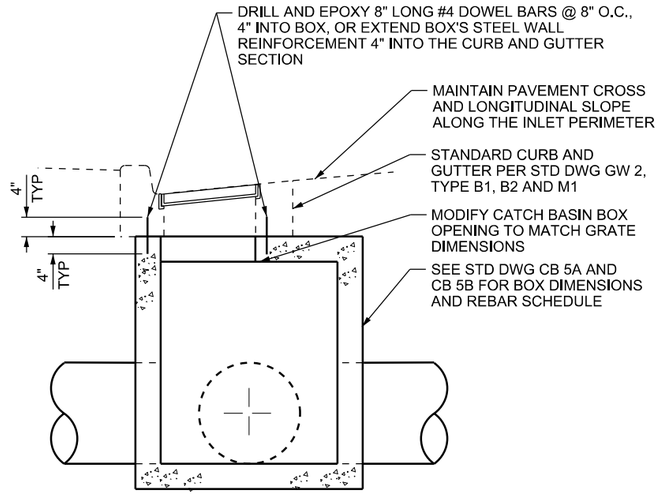
DGN File:G:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\BA05G.dgn
25-JUN-2020



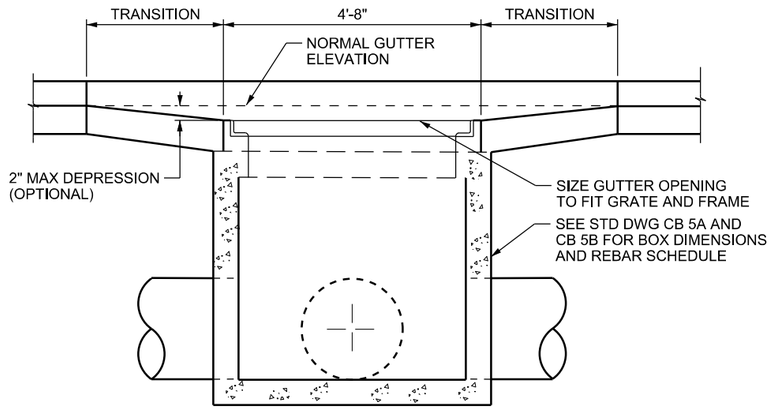
PLAN



ISOMETRIC VIEW



SECTION A-A



SECTION B-B

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
7. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
8. SEE STD DWG GF 3 OR GF 4 FOR GRATE AND FRAME.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR — DATE

CURB AND GUTTER INLET

STANDARD DRAWING TITLE

STD. DWG. NO.

CB 1

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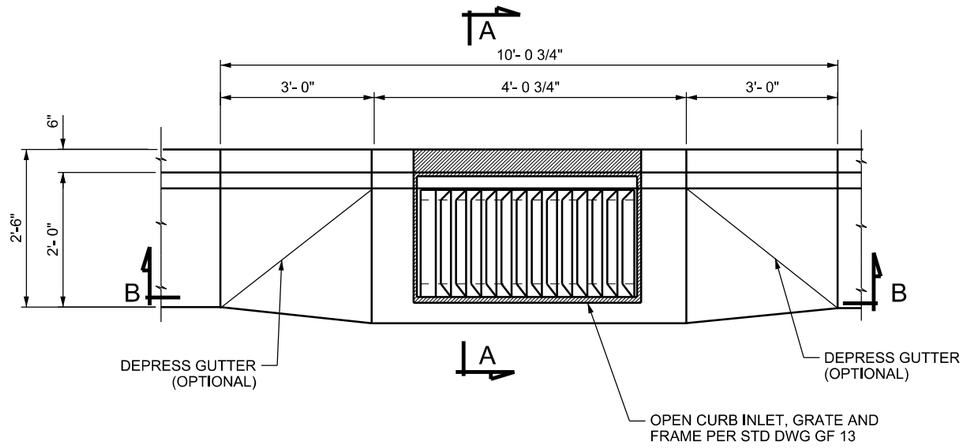
23-JUN-2020



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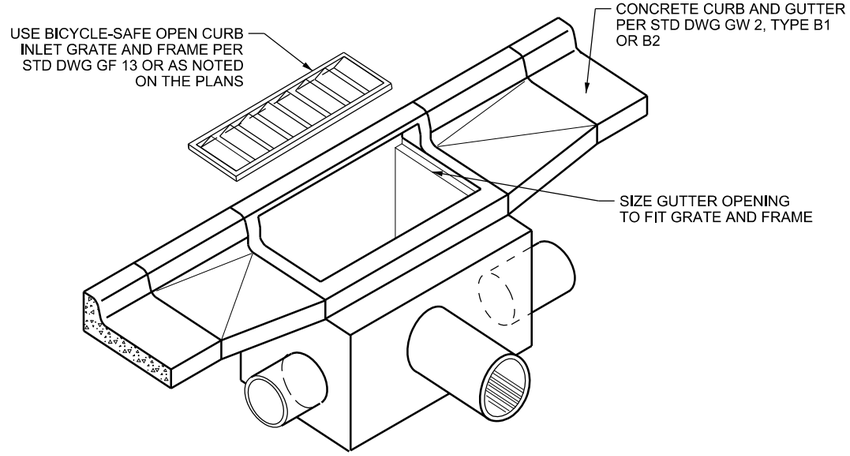
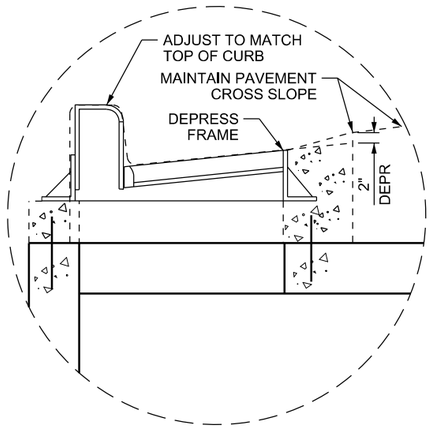
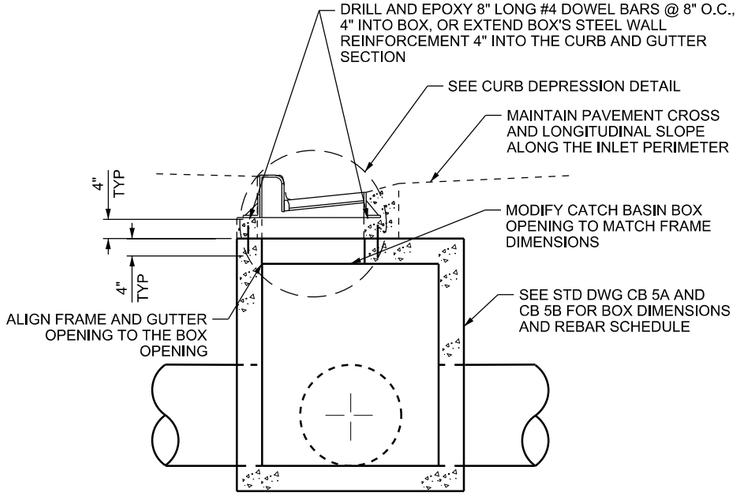


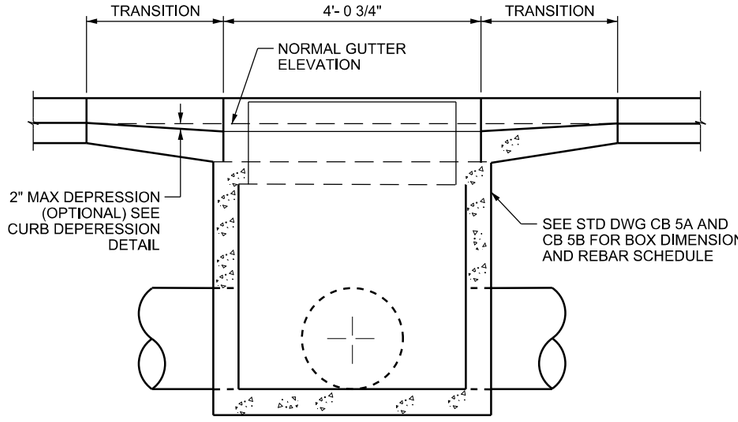
ISOMETRIC VIEW



CURB DEPRESSION DETAIL



SECTION A-A



SECTION B-B

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
7. SEE PLANS FOR DEPRESSION DIMENSIONS.
8. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
9. SEE STD DWG GF 13 FOR GRATE AND FRAME.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

OPEN CURB INLET

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 2

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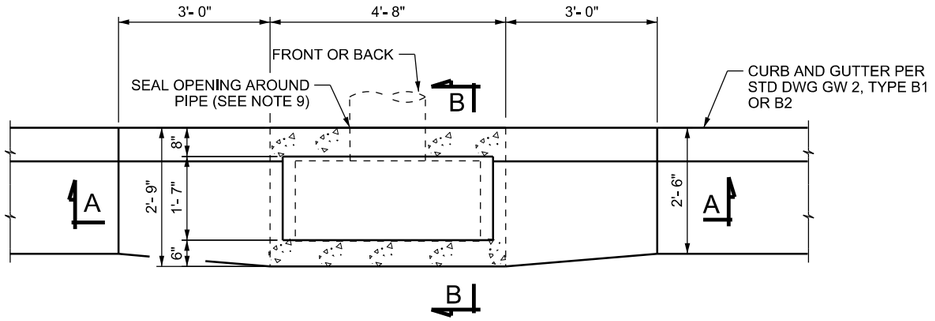
23-JUN-2020



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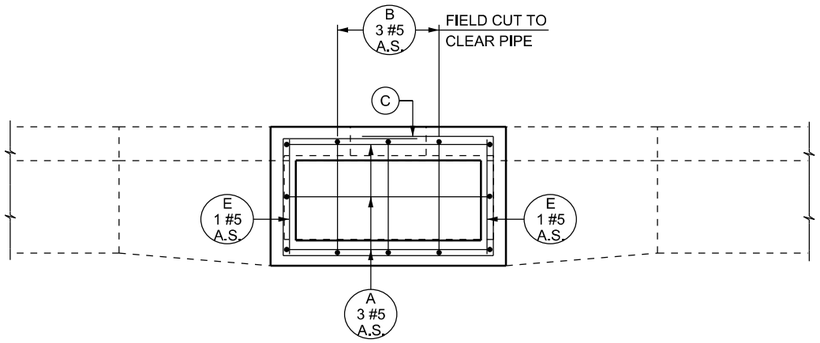

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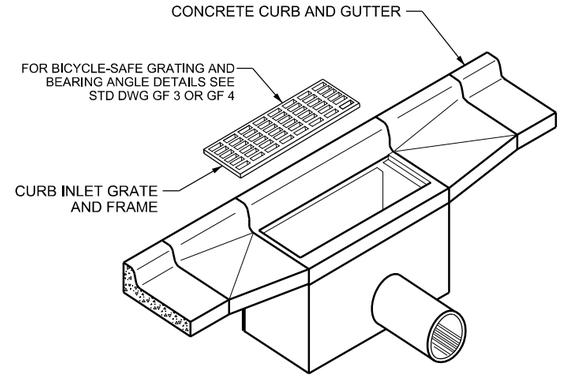
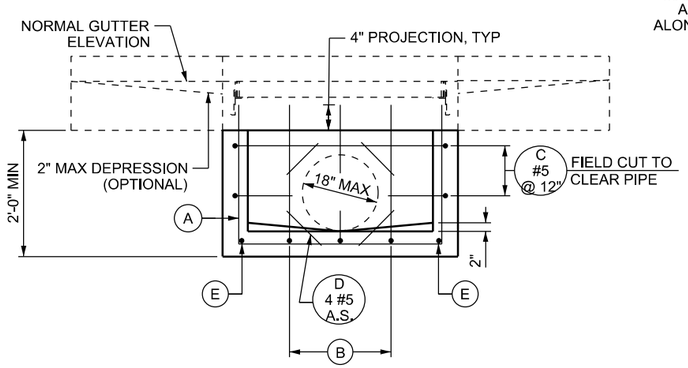
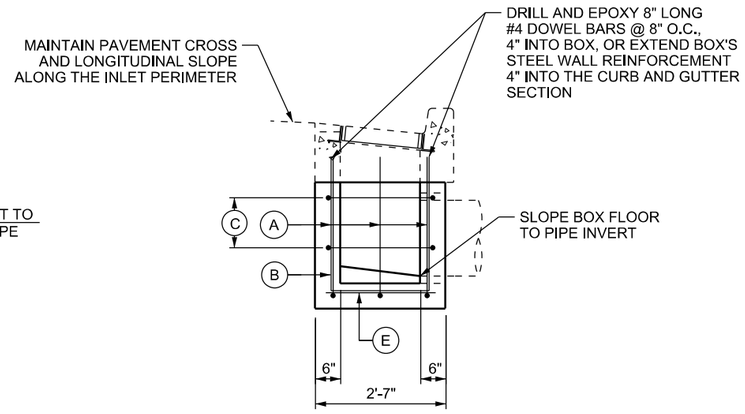


ISOMETRIC VIEW

REINFORCING STEEL LAYOUT				
BAR A	BAR B	BAR C	BAR D	BAR E
		8"		



SECTION A-A



SECTION B-B

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
7. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
8. SEE STD DWG GF 3 OR GF 4 FOR GRATE AND FRAME.
9. CENTER PIPE IN BOX OPENING. USE APPROVED NON-SHRINK GROUT TO SEAL OPENING AROUND PIPE OR USE APPROVED PIPE MANUFACTURER'S PIPE BOOT.
10. SIZE BOX HEIGHT TO MEET MINIMUM COVER FOR PIPE USED. SEE STD DWG DG 4.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

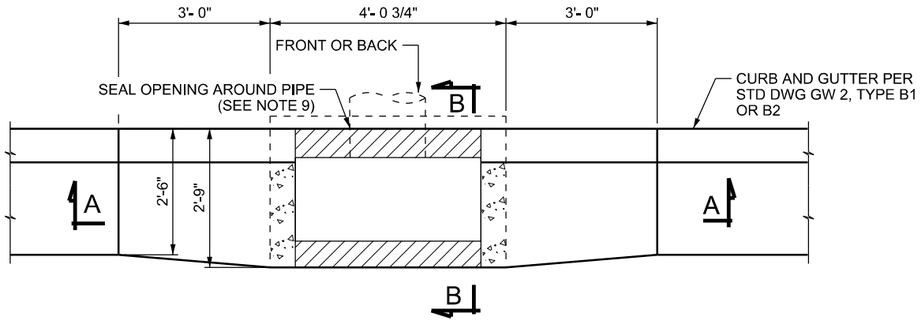
SHALLOW CATCH BASIN

STANDARD DRAWING TITLE

STD. DWG. NO.

CB 3

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB03.dgn



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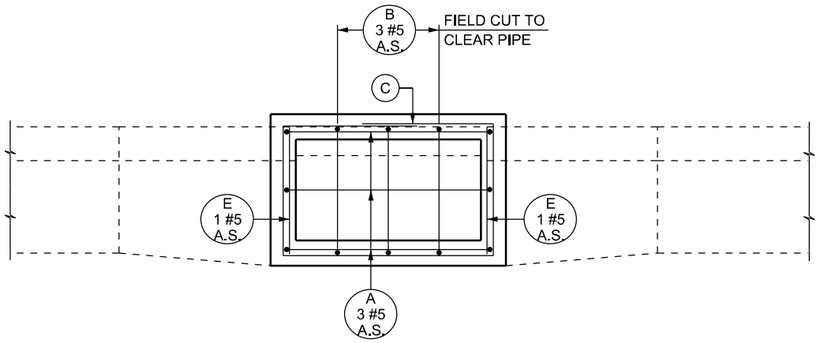

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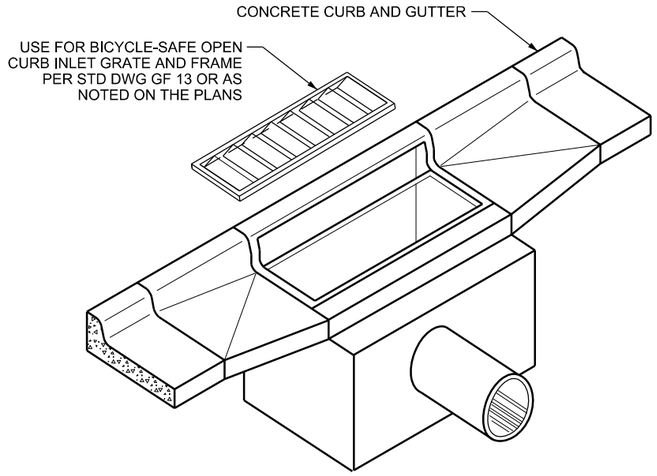
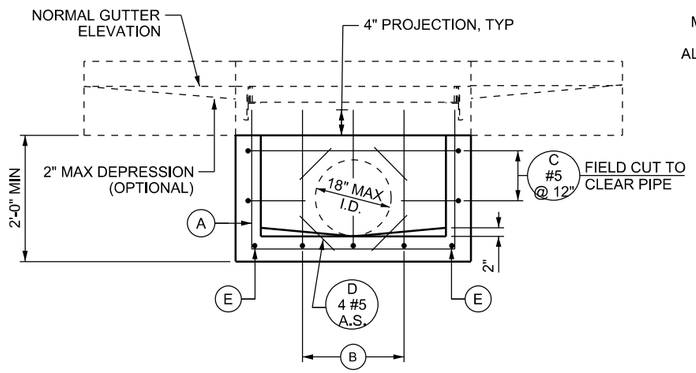
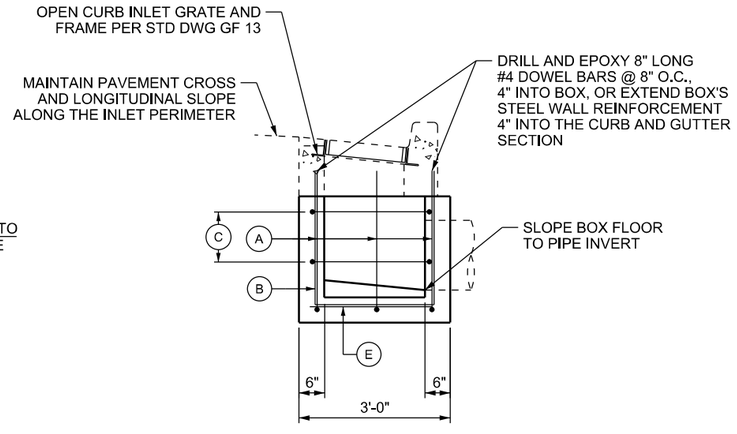


ISOMETRIC VIEW



SECTION A-A



SECTION B-B

REINFORCING STEEL LAYOUT				
BAR A	BAR B	BAR C	BAR D	BAR E
		8"		

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPES.
7. PROVIDE 3/4 INCH CHAMPFER ON ALL EXPOSED CONCRETE CORNERS.
8. SEE STD DWG GF 3 OR GF 4 FOR GRATE AND FRAME.
9. CENTER PIPE IN BOX OPENING. USE APPROVED NON-SHRINK GROUT TO SEAL OPENING AROUND PIPE OR USE APPROVED PIPE MANUFACTURER'S PIPE BOOT.
10. SIZE BOX HEIGHT TO MEET MINIMUM COVER FOR PIPE USED. SEE STD DWG DG 4.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
DEPUTY DIRECTOR

AUGUST 2020
DATE

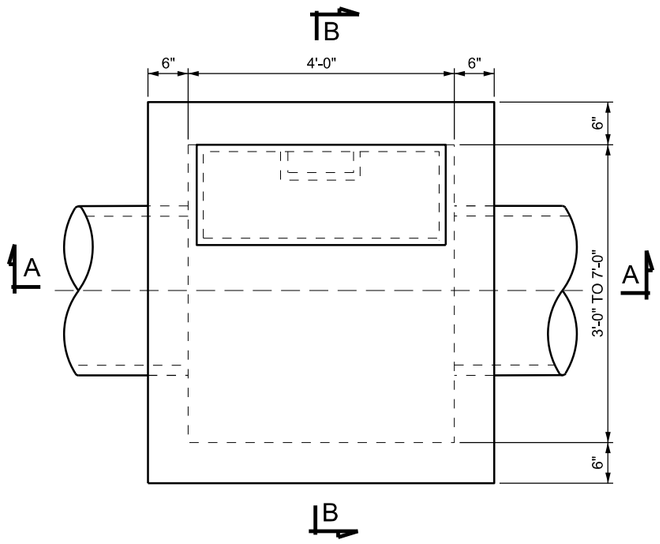
CHAIRMAN STANDARDS COMMITTEE
APPROVED

OPEN CURB SHALLOW CATCH BASIN

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 4

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (B&C,CB)\CB04.dgn



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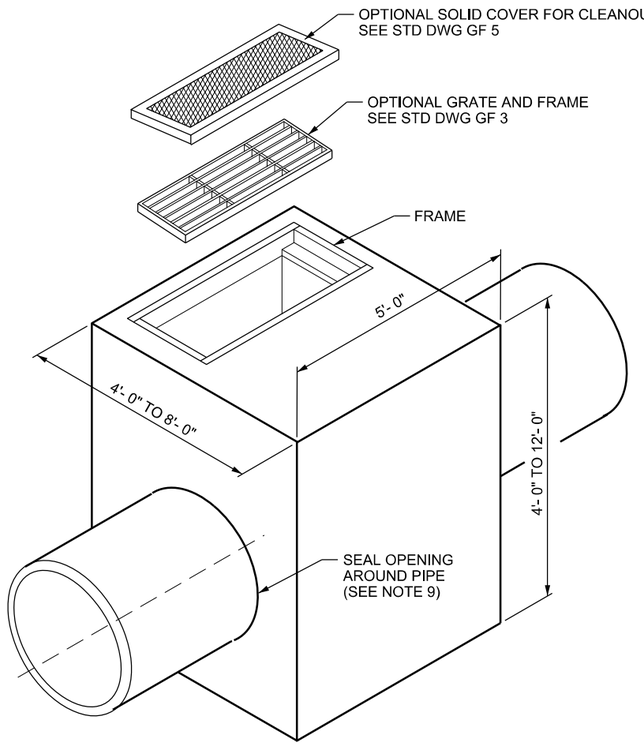

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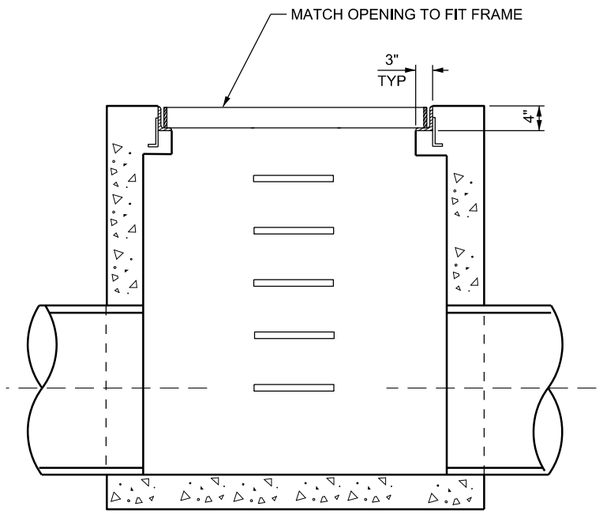
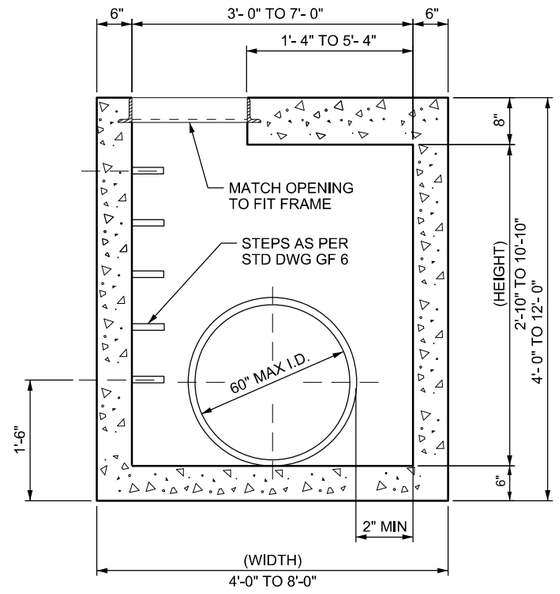


SECTION A-A



SECTION B-B

CATCH BASIN / CLEANOUT BOX

GRATE AND FRAME APPLICATION

QUANTITIES

(FOR DESIGN INFORMATION ONLY)

USE THE FOLLOWING EQUATIONS FOR CALCULATING VOLUME OF CONCRETE AND WEIGHT OF STEEL: (ENTER ALL DIMENSIONS IN FEET)

CONCRETE VOLUME

BOX WIDTHS OF 4 FT TO 8 FT AND DEPTHS OF 4 FT TO 12 FT

CONCRETE VOLUME (CU YDS) = (0.037*WIDTH+0.1853) *DEPTH+ (0.2161*WIDTH - 0.2811)

TO CALCULATE VOLUME OF CONCRETE OF PIPE HOLES VOLUME OF HOLES
(CU YDS) = 0.0083 * (PIPE DIAMETER) - 0.0929

WEIGHT OF REINFORCING STEEL

BOX WIDTHS OF 4 FT UP TO 8 FT AND DEPTHS OF 4 FT TO 12 FT

REBAR WEIGHT (LBS) = (4.101*WIDTH + 19.869) * DEPTH + (19.742 * WIDTH + 15.267)

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
7. PROVIDE 3#4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
8. SEE STD DWG GF 3 OR GF 5 FOR GRATE AND FRAME.
9. CENTER PIPE IN BOX OPENING. USE APPROVED NON-SHRINK GROUT TO SEAL OPENING AROUND PIPE OR USE APPROVED PIPE MANUFACTURER'S PIPE BOOT.
10. SEE STD DWG CB 1 AND CB 2 FOR BOX ELEVATIONS FOR CURB AND GUTTER APPLICATION. INCLUDE CONCRETE QUANTITIES FOR CURB AND GUTTER IN ROADWAY QUANTITIES.
11. PLACE STEPS BEGINNING 2 FT BELOW FINISH GRADE AND PLACE ADDITIONAL STEPS ACCORDING TO STD DWG GF 6.
12. USE 8 INCH LONG, #4 BARS @ 8 INCH O.C. MAX. OR EXTEND BOX REBARS 4 INCHES INTO THE CURB AND GUTTER, TO ATTACH CURB AND GUTTER TO BOX.
13. SET EDGES OF THE BOX TO MATCH PAVEMENT FINISH GRADE AROUND THE BOX PERIMETER WHEN USING THE BOX AS AN INLET. SET TOP OF SURFACE TO MATCH PAVEMENT CROSS AND LONGITUDINAL SLOPE. RESET ANY BOXES WHERE BOX SURFACE OR GRATE AND FRAME IS NOT FLUSH WITH PAVEMENT. DO NOT EXCEED 1/4 INCH GRATE DEPRESSION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
DEPUTY DIRECTOR

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

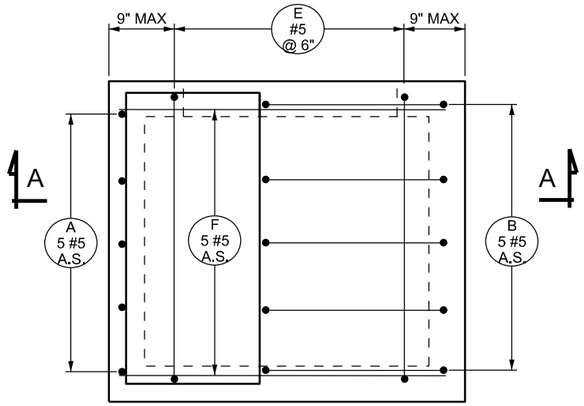
STANDARD CATCH BASIN AND CLEANOUT BOX

STANDARD DRAWING TITLE

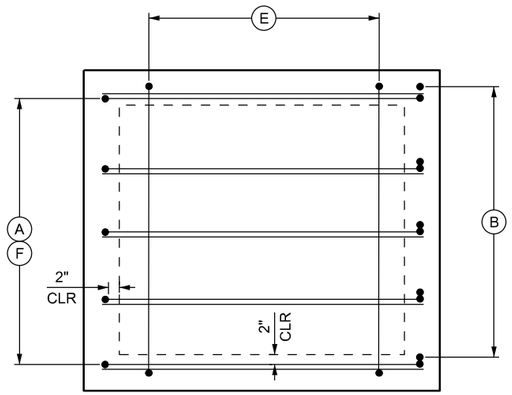
STD. DWG. NO.

CB 5A

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (B&W, CB)\CB05A.dgn



PLAN - TOP SLAB



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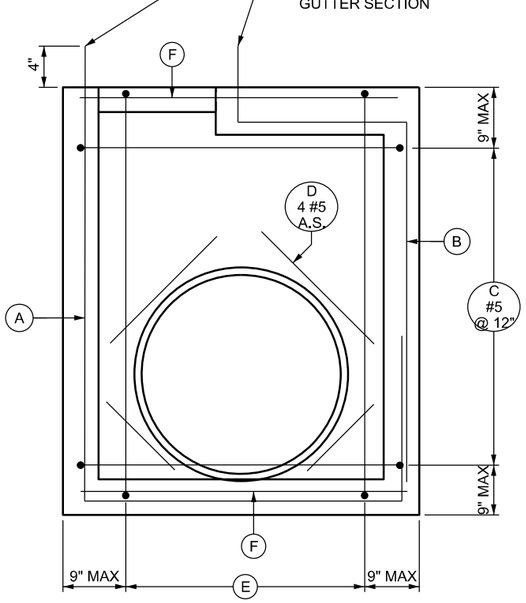
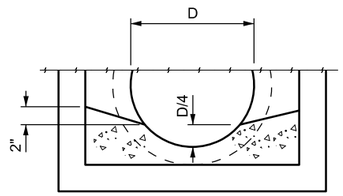


SECTION A-A



FORMED INVERT

REINFORCING STEEL LAYOUT

BAR A	BAR B	BAR C	BAR D	BAR E	BAR F
		8"		8"	

NOTES

1. PROVIDE FORMED INVERT AS SHOWN IN THE DETAIL ON THIS SHEET.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND GRATE OPENINGS, AND MAINTAIN 2 INCH COVER.
3. SEE STD DWG CB 5A FOR ALLOWABLE DIMENSIONS.
4. MAXIMUM PIPE DIMENSIONS ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX, DETERMINE CLEARANCES FOR SKEWED PIPES.
5. SEE STD DWG GF 6 FOR MANHOLE STEP DETAILS.
6. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
7. ALL REINFORCING BARS TO BE #5 BARS AT 12 INCHES UNLESS OTHERWISE SHOWN.
8. EXTEND BARS A AND B INTO CURB AND GUTTER WHEN CASTING FOR CATCH BASIN ON STD DWG CB 1 AND CB 2.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

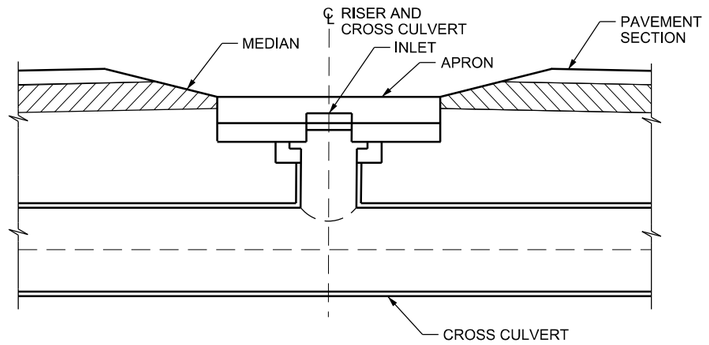
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

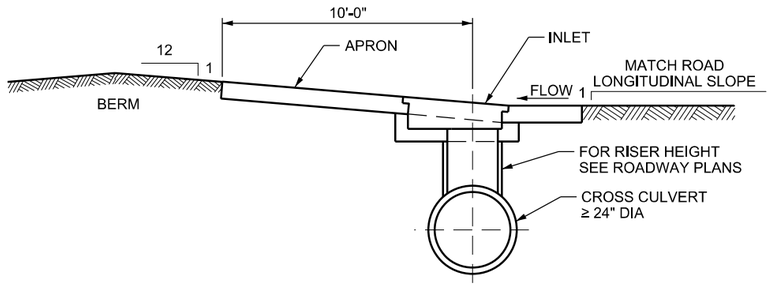
STANDARD CATCH BASIN AND CLEANOUT BOX SECTION

STANDARD DRAWING TITLE

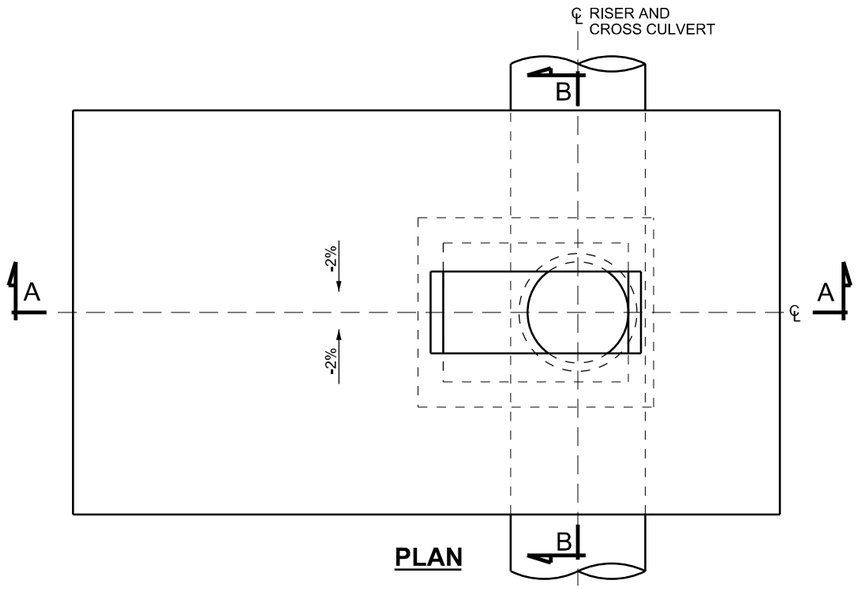
STD. DWG. NO.
CB 5B

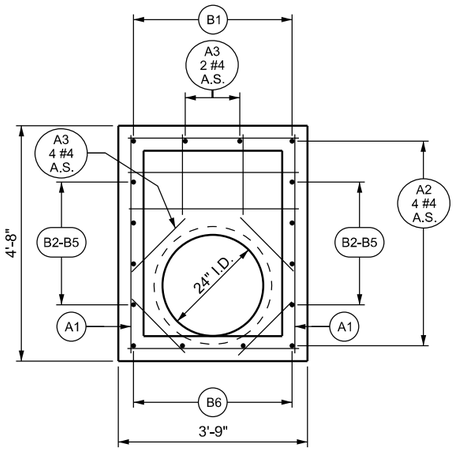
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB05B.dgn



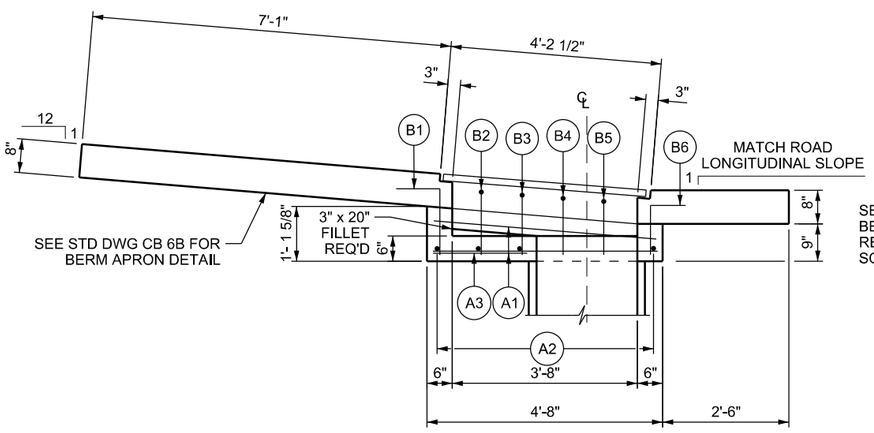


MEDIAN DROP INLET AND APRON SITUATION LAYOUT

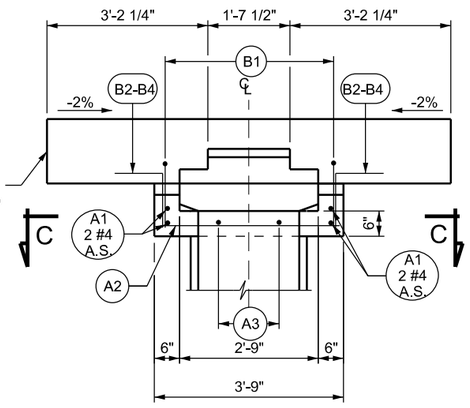




SECTION C-C



SECTION A-A



SECTION B-B

APRON DETAIL
SEE STD DWG CB 6B

QUANTITIES
SEE TABLES IN STD DWG CB 6B

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE STD DWG GF 3 FOR GRATE AND FRAME.
7. USE STRAIGHT #5 REINFORCING BARS AT 18 INCH OC, EXCEPT AS NOTED OTHERWISE.
8. USE 24 INCH DIA PIPE RISER UNLESS OTHERWISE SHOWN ON THE PLANS.
9. CONSTRUCT BERM AS PART OF DROP INLET.

REVISIONS				
NO.	DATE	APPR.		REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
DROP INLET TYPE "A"

STD. DWG. NO.
CB 6A

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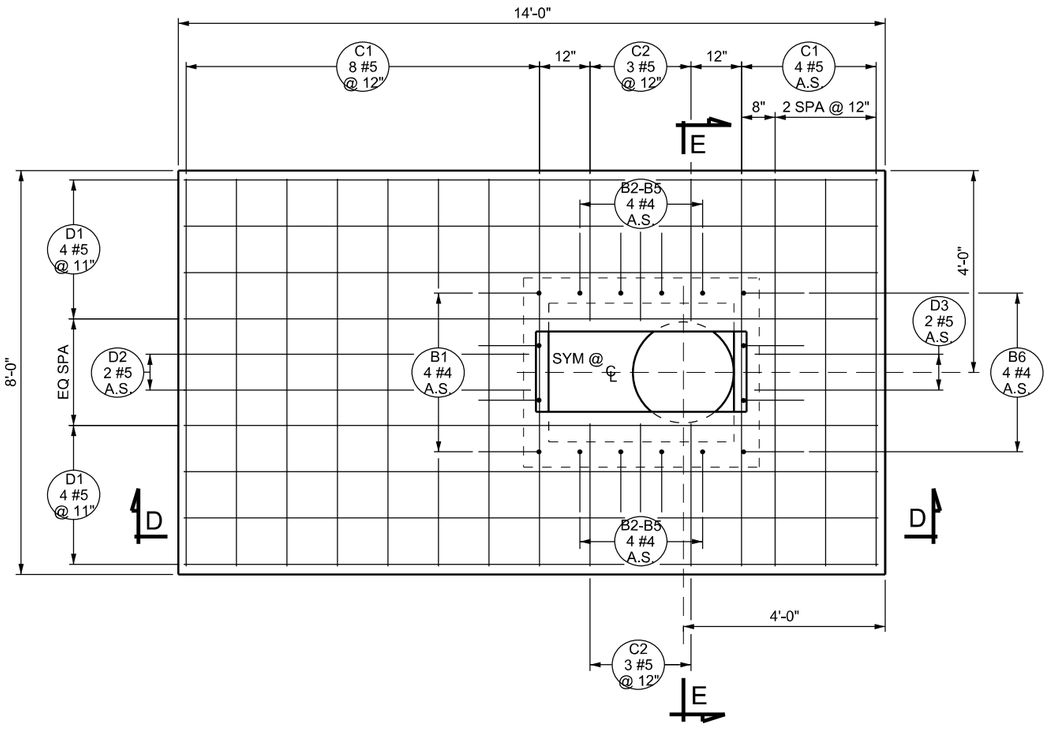
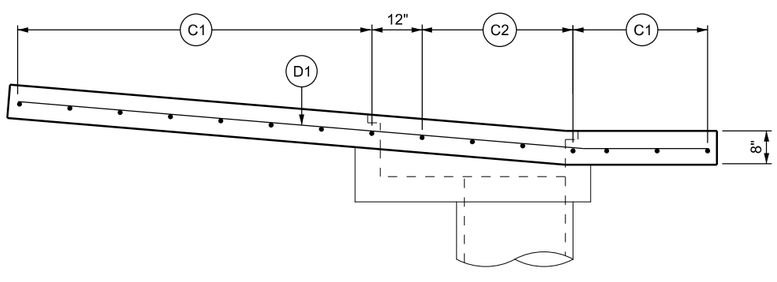
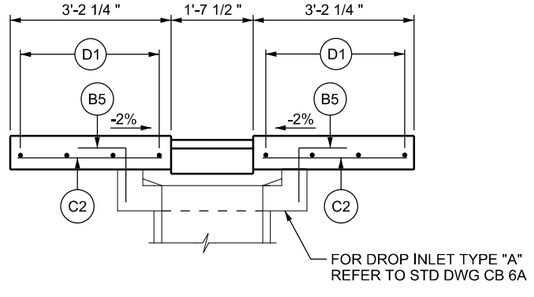
23-JUN-2020



PLAN



SECTION D-D



SECTION E-E

REINFORCING STEEL SCHEDULE																				
A1			A2			A3			B1			B2			B3			B4		
SIZE	NO	LENGTH	SIZE	NO	LENGTH	SIZE	NO	LENGTH	SIZE	NO	a	SIZE	NO	a	SIZE	NO	a	SIZE	NO	a
4	4	4'-4"	4	4	3'-5"	4	6	1'-6"	4	4	1'-6"	4	2	1'-5"	4	2	1'-4"	4	2	1'-3"
B5			B6			C1			C2			D1			D2			D3		
SIZE	NO	a	SIZE	NO	a	SIZE	NO	LENGTH	SIZE	NO	LENGTH	SIZE	NO	LENGTH	SIZE	NO	LENGTH	SIZE	NO	LENGTH
4	2	1'-2"	4	4	1'-0"	4	12	7'-8"	5	6	2'-10"	5	8	13'-8"	5	2	6'-11"	5	2	2'-8"

QUANTITIES (FOR INFORMATION ONLY)	
REINFORCING STEEL (LBS)	CONCRETE (CUBIC YDS)
300	2.7

NOTES

1. CENTER APRON ON CHANNEL FLOWLINE.
2. PLACE 6 INCHES OF UNTREATED BASE COURSE AND COMPACT ACCORDING TO DEPARTMEMT STANDARD SPECIFICATIONS UNDER EACH APRON PRIOR TO FORMING.
3. FIELD BEND D1 BARS AS REQUIRED TO CONFORM TO SLOPE.
4. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
5. USE BERM APRON WITH DROP INLET TYPE "A."
6. REPAIR ANY DAMAGE OR CUTS TO REINFORCING STEEL COATING.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE — DEPUTY DIRECTOR

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

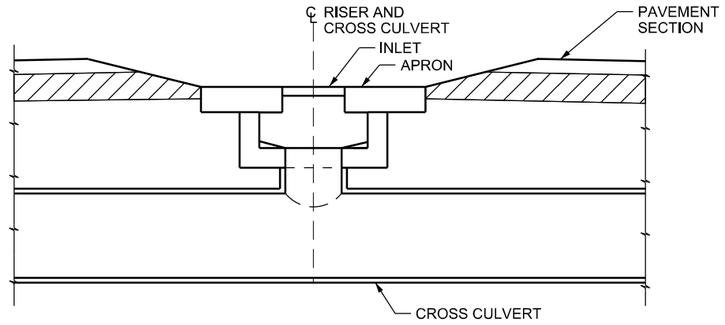
BERM APRON WITH DROP INLET TYPE "A"

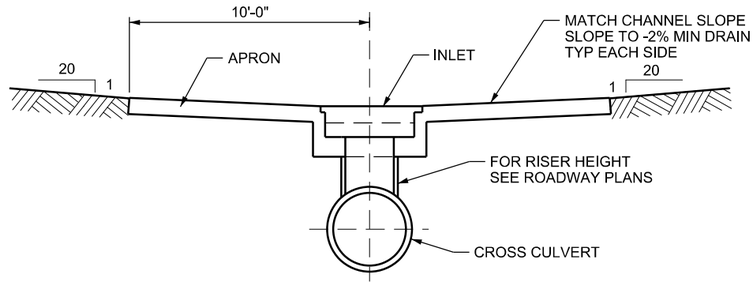
STANDARD DRAWING TITLE

STD. DWG. NO.

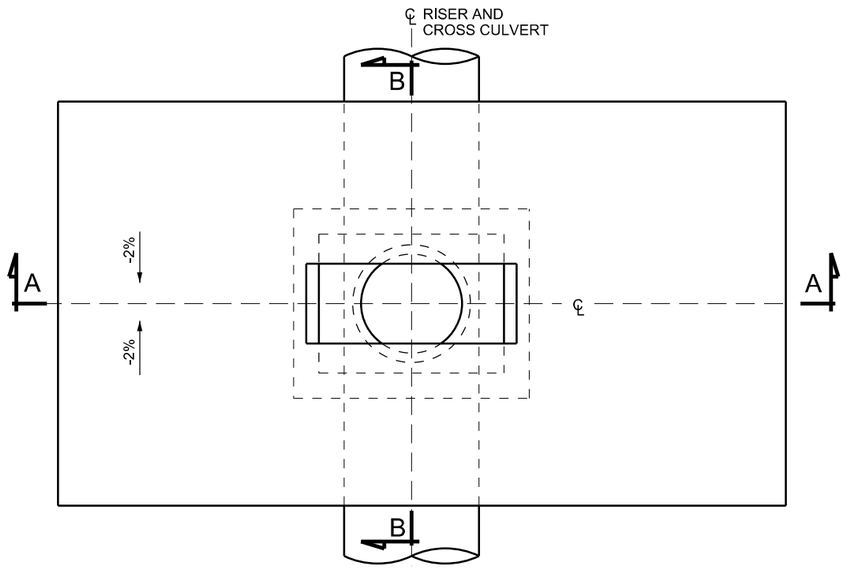
CB 6B

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB06B.dgn

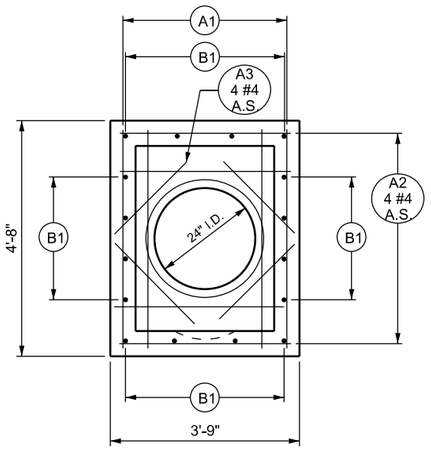




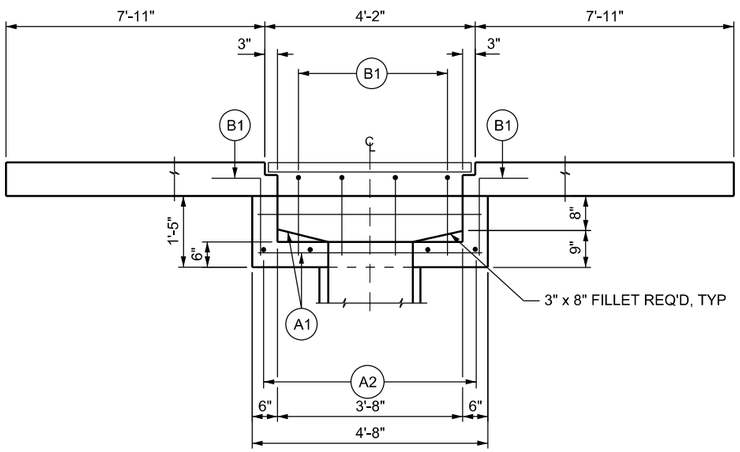
MEDIAN DROP INLET SITUATION LAYOUT



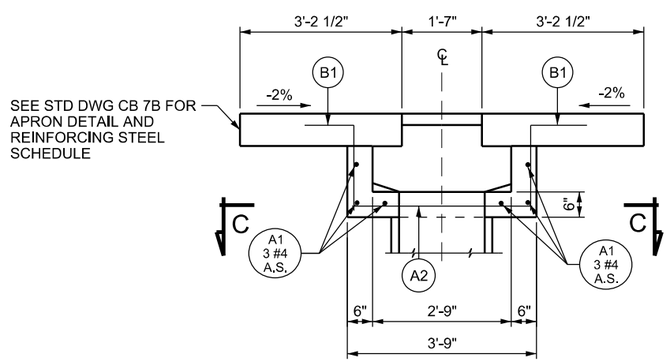
PLAN



SECTION C-C



SECTION A-A



SECTION B-B

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. USE STRAIGHT #5 REINFORCING BARS AT 18 INCH O.C., EXCEPT AS NOTED OTHERWISE.
7. SEE STD DWG GF 3 FOR GRATE AND FRAME.
8. USE 18 INCH DIA PIPE RISER UNLESS OTHERWISE SHOWN ON THE PLANS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

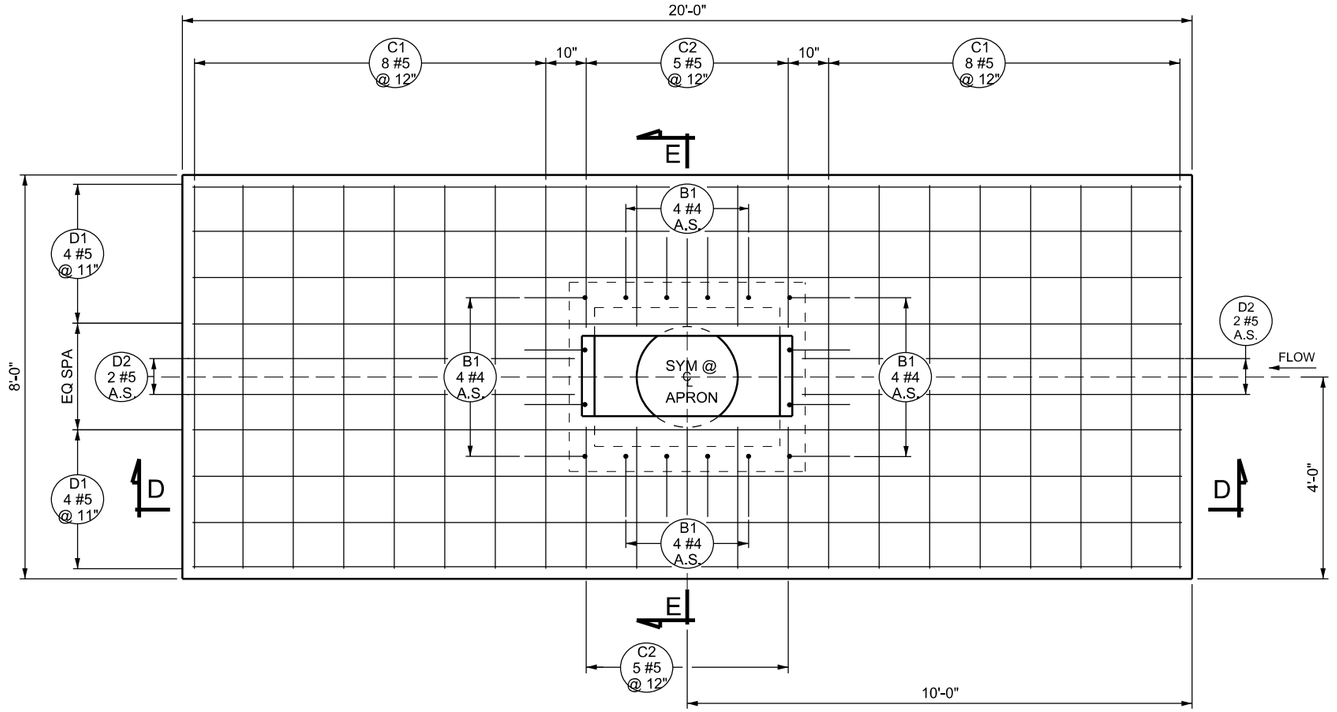
DROP INLET TYPE "B"

STANDARD DRAWING TITLE

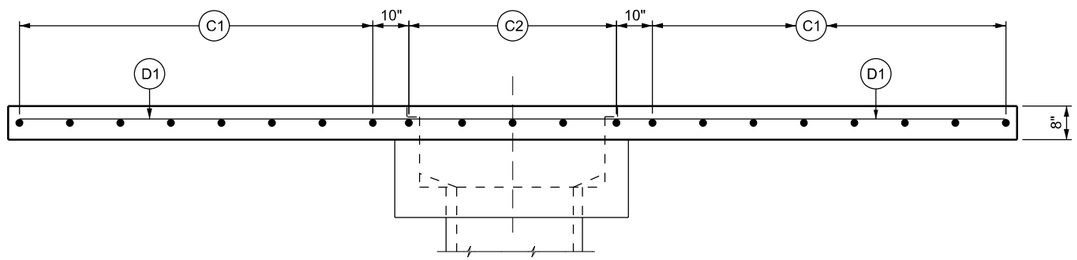
STD. DWG. NO.

CB 7A

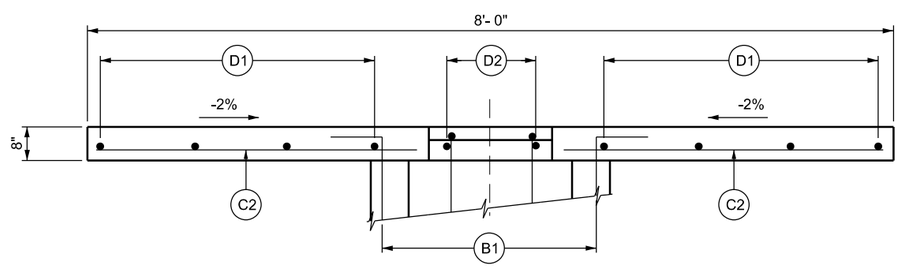
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB07A.dgn
23-JUN-2020



PLAN



SECTION D-D



SECTION E-E

QUANTITIES (FOR INFORMATION ONLY)	
REINFORCING STEEL (LBS)	CONCRETE (CUBIC YDS)
603	3.9

REINFORCING STEEL SCHEDULE

A1			A2			A3		
SIZE	NO	LENGTH	SIZE	NO	LENGTH	SIZE	NO	LENGTH
4	6	4'-4"	4	4	3'-5"	4	4	2'-0"

B1		
SIZE	a (1'-2")	
	NO	a
4	12	VARIES

C1			C2		
SIZE	NO	LENGTH	SIZE	NO	LENGTH
5	16	19'-6"	5	10	2'-10"

D1			D2		
SIZE	NO	LENGTH	SIZE	NO	LENGTH
5	8	19'-8"	5	4	5'-5"

NOTES

1. CENTER APRON ON CHANNEL FLOWLINE.
2. PLACE 6 INCHES OF UNTREATED BASE COURSE AND COMPACT ACCORDING TO DEPARTMENT STANDARD SPECIFICATIONS UNDER EACH APRON PRIOR TO FORMING.
3. FIELD BEND D1 BARS AS REQUIRED TO CONFORM TO SLOPE.
4. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
5. USE NORMAL APRON WITH DROP INLET TYPE "B."
6. REPAIR ANY DAMAGE OR CUTS TO COATING ON REINFORCING BARS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

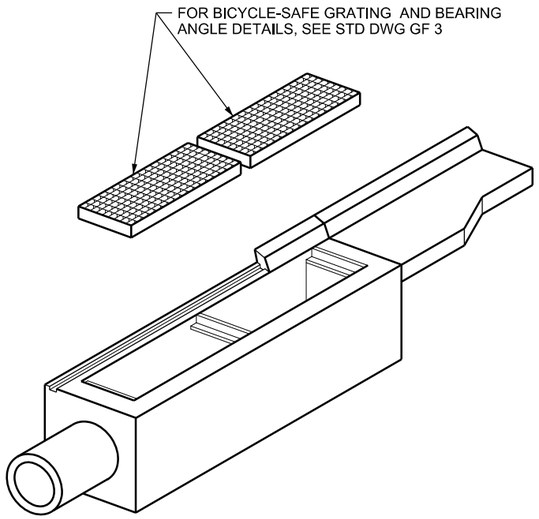
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

NORMAL APRON
WITH DROP INLET
TYPE "B"

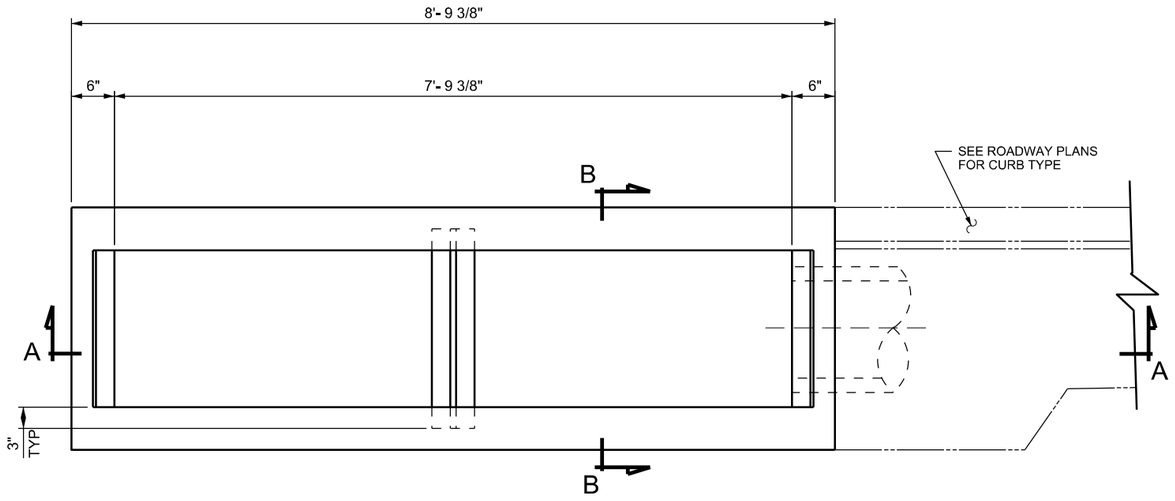
STANDARD DRAWING TITLE

STD. DWG. NO.
CB 7B

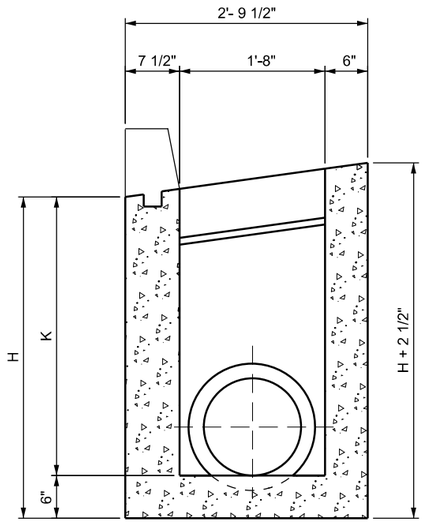
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB07B.dgn
23-JUN-2020



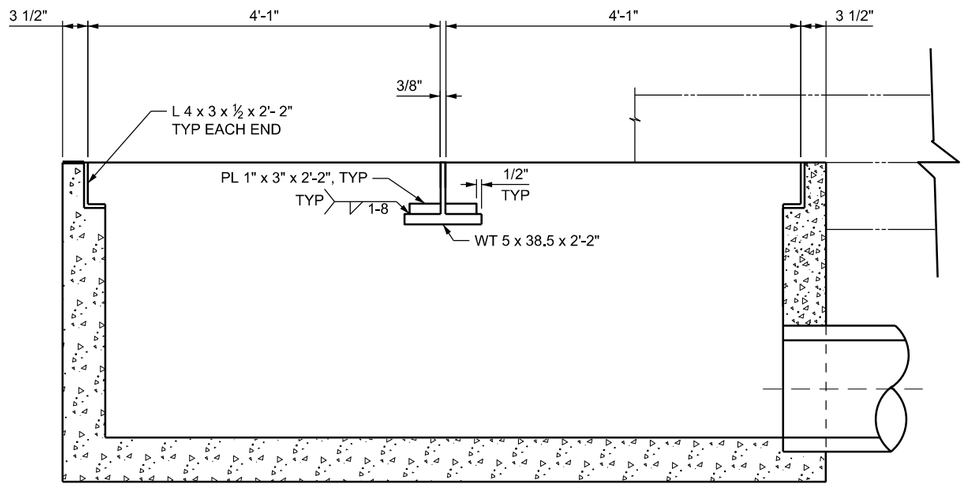
ISOMETRIC VIEW



PLAN



SECTION B-B



SECTION A-A

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi
Fy = 50,000 psi (WT)

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
7. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
8. SEE STD DWG GF 3 FOR GRATE AND FRAME.
9. HOT-DIP GALVANIZE GRATING AND BEARING ANGLES AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111 (ASTM A 123).

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

DOUBLE CATCH BASIN

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 8A

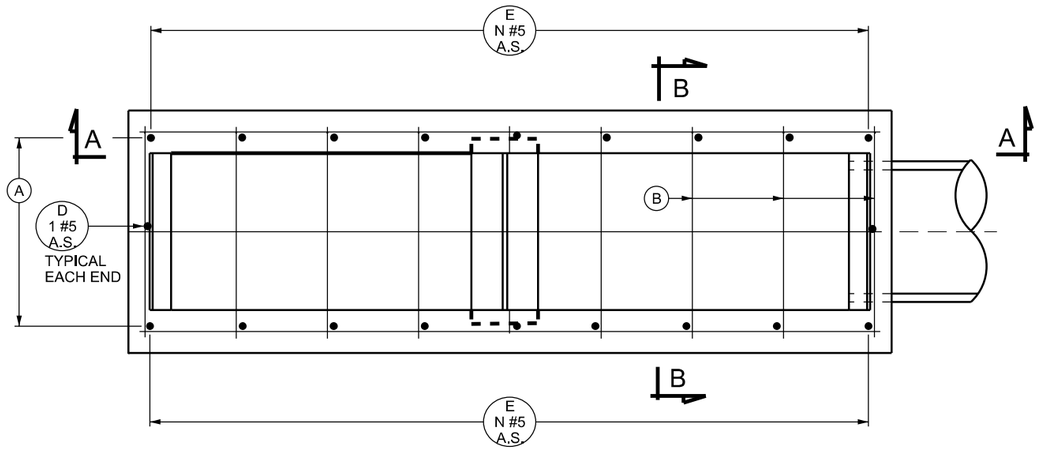
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB08A.dgn

SCHEDULE OF INSTALLATION

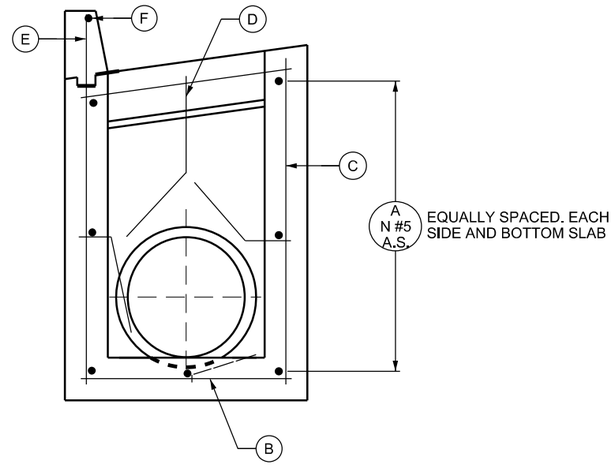
LINE NO	DIMENSIONS		MAXIMUM PIPE DIA		REINFORCING STEEL												QUANTITIES		
					A		B		C		D		E		F		REINFORCING STEEL	CONCRETE	STRUCTURAL STEEL
	H	K	RCP	CMP	N	LENGTH	N	LENGTH	N	LENGTH	N	LENGTH	N	LENGTH	N	LENGTH	LBS	CU YDS	LBS
1	2'-0	1'-6	----	15"	7	8'-6"	13	2'-5"	9	1'-9"	2	1'-8"	9	2'-0"	1	11'-0"	145.0	1.14	770
2	2'-6	2'-0	12"	18"	9	8'-6"	15	2'-5"	9	2'-3"	2	2'-2"	9	2'-6"	1	11'-0"	178.2	1.33	770
3	3'-0	2'-6	15"	18"	11	8'-6"	17	2'-5"	9	2'-9"	2	2'-8"	9	3'-0"	1	11'-0"	211.4	1.52	770
4	3'-6	3'-0	18"	18"	11	8'-6	17	2'-5"	9	3'-3"	2	3'-2"	9	3'-6"	1	11'-0"	221.8	1.71	770
5	4'-0	3'-6	18"	18"	13	8'-6"	19	2'-5"	9	3'-9"	2	3'-8"	9	4'-0"	1	11'-0"	255.0	1.90	770

TABLE "A"

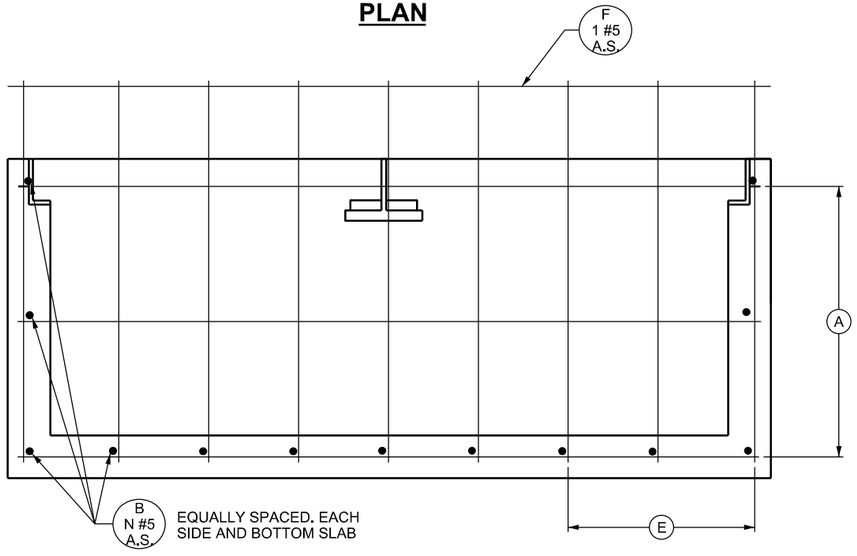
ALL OTHER		CMP	
DIA	CU YDS	DIA	CU YDS
12"	0.023	12"	0.015
15"	0.031	15"	0.023
18"	0.041	18"	0.033



PLAN



SECTION B-B



SECTION A-A

NOTES

1. INCLUDE CONCRETE QUANTITIES FOR CURB AND GUTTER IN ROADWAY QUANTITIES.
2. DEDUCT CONCRETE DISPLACED BY PIPES, TABLE "A," FROM CONCRETE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION.
3. CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH CLEARANCE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

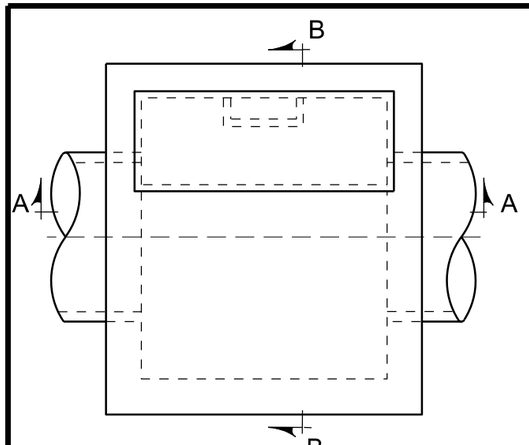
AUGUST 2020
DATE

DOUBLE CATCH BASIN

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 8B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB8B.dgn
23-JUN-2020



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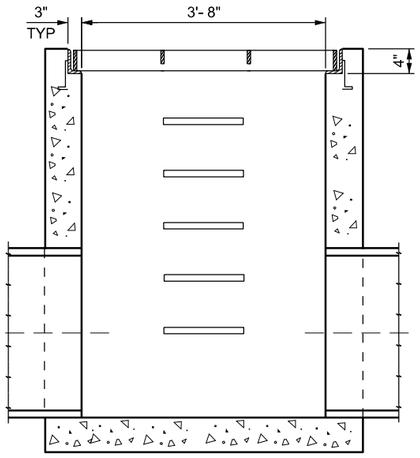
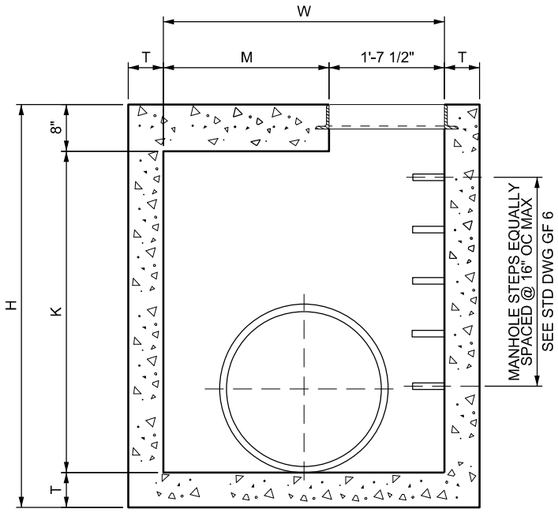


SECTION A-A



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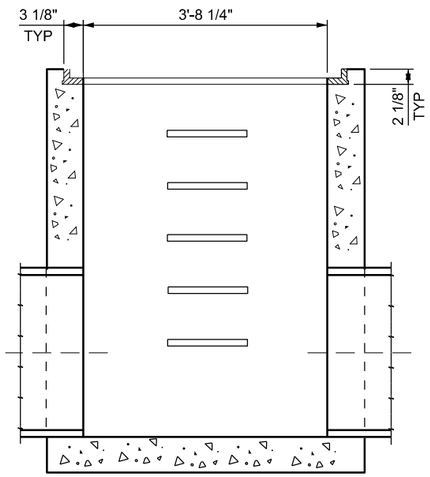
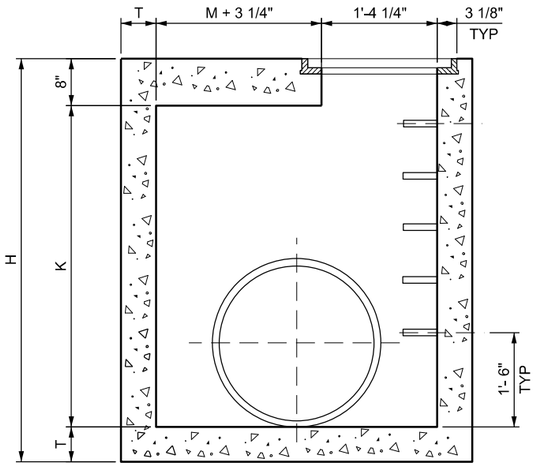
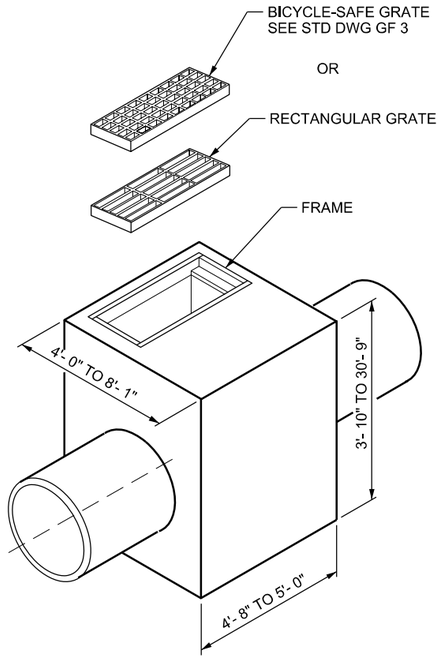


SECTION A-A

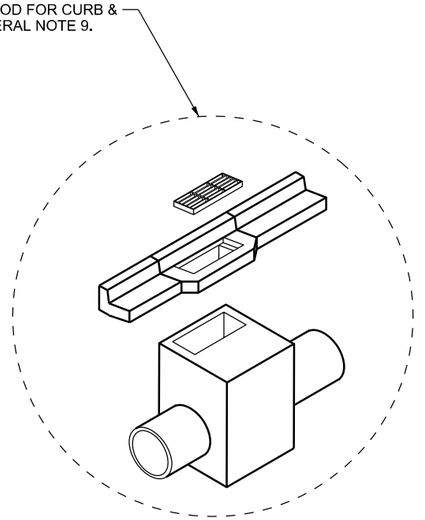


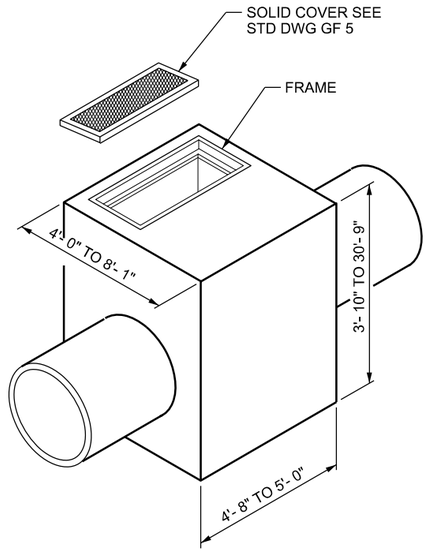
SECTION B-B



CATCH BASIN

GRATE AND FRAME APPLICATION





CLEANOUT BOX

SOLID COVER APPLICATION

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

INDEX OF SHEETS

(CB 9A) A- SITUATION & LAYOUT

(CB 9B) B- SECTION DETAILS

(CB 9C) C- SCHEDULE OF INSTALLATION FOR 18-42 INCH RCP. 12-48 INCH CMP

(CB 9D) D-SCHEDULE OF INSTALLATION FOR 48-66 INCH RCP. 60-78 INCH CMP

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
7. SEE STD DWG GF 3 OR GF 5 FOR GRATE AND FRAME.
8. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
9. SEE STD DWG CB 1 AND CB 2 FOR CURB AND GUTTER APPLICATION FOR BOX ELEVATIONS. INCLUDE CONCRETE QUANTITIES FOR CURB AND GUTTER IN ROADWAY QUANTITIES.

NO.	DATE	APPR.	REVISIONS REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

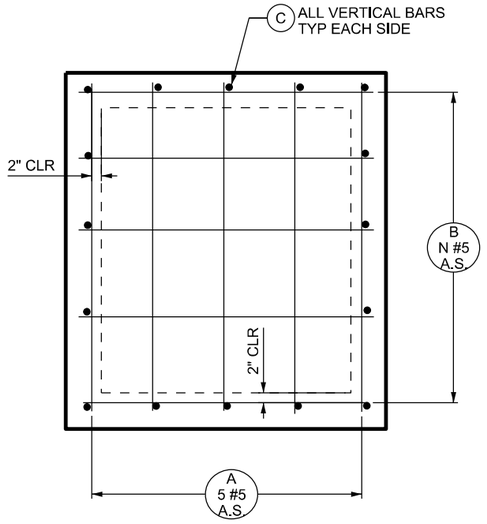
STANDARD CATCH BASIN AND CLEANOUT BOX SITUATION AND LAYOUT

STANDARD DRAWING TITLE

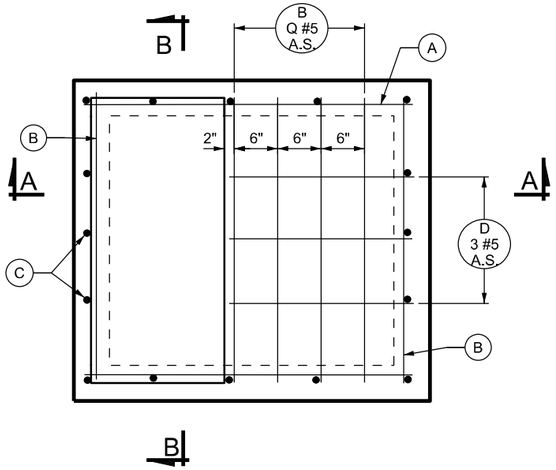
STD. DWG. NO.

CB 9A

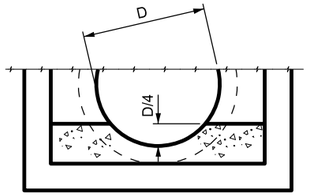
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB09A.dgn



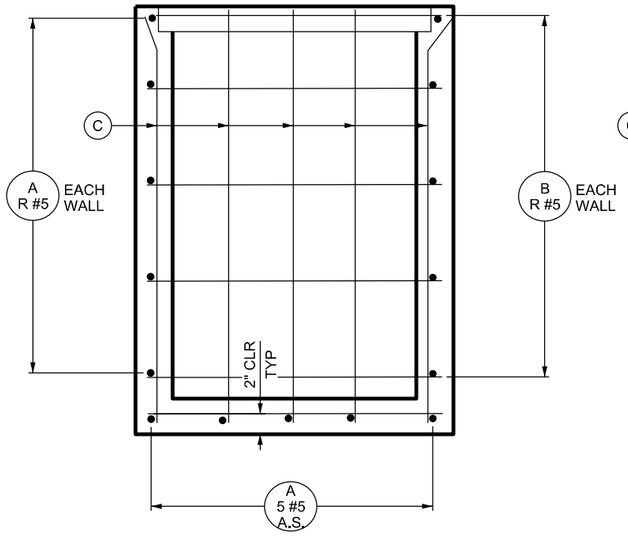
PLAN - BOTTOM SLAB



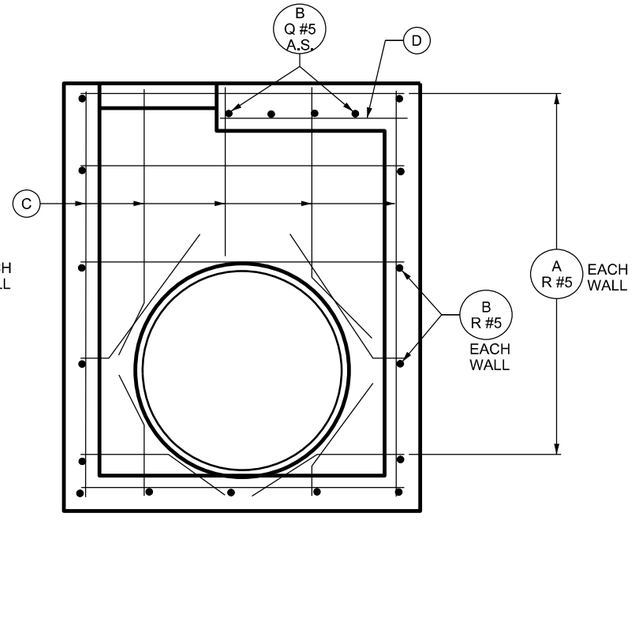
PLAN - TOP SLAB



FORMED INVERT



SECTION B-B



SECTION A-A

NOTES

1. FORM THE BOTTOM SLAB OF THE BOX TO FIT THE INVERT OF THE PIPES WHEN REQUIRED ACCORDING TO THE DETAIL SHOWN ON THIS SHEET. SEE TABLE 3 ON STD DWG CB 9C AND CB 9D FOR ADDITIONAL CONCRETE QUANTITIES.
2. DEDUCT CONCRETE DISPLACED BY PIPES FROM THOSE CONCRETE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION TABLE 1 ON STD DWG CB 9C AND CB 9D.
3. SEE TABLE 3 ON STD DWG CB 9C FOR ADDITIONAL CONCRETE QUANTITIES WHEN FORMED INVERT IS REQUIRED.
4. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCHES MINIMUM CLEARANCE.
5. ALL DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE SHOWN.
6. WEIGHT QUANTITIES FOR GRATE AND FRAME AND SOLID COVER AND ARE SHOWN FOR INFORMATION ONLY.
7. SEE STD DWG CB 9A FOR DIMENSIONS.
8. PIPE DIAMETERS SHOWN IN TABLES AND SCHEDULE ARE INSIDE DIAMETERS.
9. MAXIMUM PIPE DIMENSIONS SHOWN IN SCHEDULE IN INSTALLATION ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX, DETERMINE CLEARANCES FOR SKEWED PIPES.
10. SEE STD DWG GF 6 FOR MANHOLE STEP DETAILS.
11. ALL REINFORCING BARS TO BE #5 BARS @ 12 INCHES, UNLESS OTHERWISE SHOWN.
12. ADD 0.023 CU YDS CONCRETE TO THOSE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION AND 3 INCH TO EACH D-BAR, AND 1.0 LB TO REINFORCING STEEL QUANTITIES WHEN SOLID COVER IS REQUIRED .
13. PROVIDE FORMED INVERT AS SHOWN ON THIS STD DWG.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020

CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020

DEPUTY DIRECTOR

STANDARD CATCH BASIN AND CLEANOUT BOX SECTION DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.

CB 9B

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB09B.dgn

LINE	NO. of MANHOLE STEPS	R	COLUMN "A"											COLUMN "B"											LINE
			DIMENSIONS			REINFORCING STEEL						QUANTITIES		DIMENSIONS			REINFORCING STEEL						QUANTITIES		
			H	K	T	A LENGTH	A NO	B LENGTH	B NO	C #16 LENGTH	D #3 LENGTH	CONCRETE CUBIC YARD	REINFORCE STEEL LBS	H	K	T	A LENGTH	A NO	B LENGTH	B NO	C #16 LENGTH	D #3 LENGTH	CONCRETE CUBIC YARD	REINFORCE STEEL LBS	
1	--	4	3'-10	2'-8	6"	3'-8	13	4'-4	16	3'-5	1'-6	1.41	184	----	----	---	----	--	----	--	----	---	----	----	1
2	2	4	4'-4	3'-2			13		16	3'-11		1.55	192	4'-5	3'-3	6"	4'-2	13	4'-4	17	4'-0	2'-0	1.73	206	2
3	2	5	4'-10	3'-8			15		18	4'-5		1.69	217	4'-11	3'-9			15		19	4'-6		1.88	232	3
4	3	5	5'-4	4'-2			15		18	4'-11		1.83	225	5'-5	4'-3			15		19	5'-0		2.03	241	4
5	3	6	5'-10	4'-8			17		20	5'-5		1.98	250	5'-11	4'-9			17		21	5'-6		2.19	266	5
6	4	6	6'-4	5'-2			17		20	5'-11		2.12	259	6'-5	5'-3			17		21	6'-0		2.34	275	6
7	4	7	6'-10	5'-8			19		22	6'-5		2.26	284	6'-11	5'-9			19		23	6'-6		2.49	303	7
8	5	7	7'-4	6'-2			19		22	6'-11		2.40	292	7'-5	6'-3			19		23	7'-0		2.64	310	8
9	5	8	7'-10	6'-8			21		24	7'-5		2.54	317	7'-11	6'-9			21		25	7'-6		2.79	336	9
10	6	8	8'-4	7'-2			21		24	7'-11		2.69	326	8'-5	7'-3			21		25	8'-0		2.94	344	10
11	6	9	8'-10	7'-8			23		26	8'-5		2.83	351	8'-11	7'-9			23		27	8'-6		3.09	370	11
12	7	9	9'-4	8'-2			23		26	8'-11		2.97	359	9'-5	8'-3			23		27	9'-0		3.24	378	12
13	7	10	9'-10	8'-8			25		28	9'-5		3.11	384	9'-11	8'-9			25		29	9'-6		3.39	405	13
14	8	10	10'-4	9'-2			25		28	9'-11		3.25	392	10'-5	9'-3			25		29	10'-0		3.54	413	14
15	8	11	10'-10	9'-8			27		30	10'-5		3.40	417	10'-11	9'-9			27		31	10'-6		3.70	439	15
16	9	11	11'-4	10'-2			27		30	10'-11		3.54	426	11'-5	10'-3			27		31	11'-0		3.85	447	16
17	9	12	11'-10	10'-8			29		32	11'-5		3.68	451	11'-11	10'-9			29		33	11'-6		4.00	473	17
18	10	12	12'-4	11'-2	6"	3'-8	29	4'-4	32	11'-11	1'-6	3.82	459	12'-6	11'-3	6"	4'-2	29	4'-4	33	12'-0	2'-0	4.15	481	18
19	10	13	12'-11	11'-8	7"	3'-10	31	4'-6	34	12'-6	1'-7	4.72	497	13'-0	11'-9	7"	4'-4	31	4'-6	35	12'-7	2'-1	5.12	521	19
20	11	13	13'-5	12'-2			31		34	13'-0		4.89	505	13'-6	12'-3			31		35	13'-1		5.30	529	20
21	11	14	13'-11	12'-8			33		36	13'-6		5.06	531	14'-0	12'-9			33		37	13'-7		5.48	556	21
22	12	14	14'-5	13'-2			33		36	14'-0		5.23	539	14'-6	13'-3			33		37	14'-1		5.66	564	22
23	12	15	14'-11	13'-8			35		38	14'-6		5.40	565	15'-0	13'-9			35		39	14'-7		5.84	591	23
24	13	15	15'-5	14'-2			35		38	15'-0		5.57	574	15'-6	14'-3			35		39	15'-1		6.02	599	24
25	13	16	15'-11	14'-8			37		40	15'-6		5.74	599	16'-0	14'-9			37		41	15'-7		6.20	626	25
26	14	16	16'-5	15'-2			37		40	16'-0		5.91	608	16'-6	15'-3			37		41	16'-1		6.38	634	26
27	14	17	16'-11	15'-8			39		42	16'-6		6.08	633	17'-0	15'-9			39		43	16'-7		6.56	661	27
28	15	17	17'-5	16'-2			39		42	17'-0		6.25	642	17'-6	16'-3			39		43	17'-1		6.74	669	28
29	15	18	17'-11	16'-8			41		44	17'-6		6.42	667	18'-0	16'-9			41		45	17'-7		6.92	696	29
30	16	18	18'-5	17'-2			41		44	18'-0		6.59	676	18'-6	17'-3			41		45	18'-1		7.10	704	30
31	16	19	18'-11	17'-8			43		46	18'-6		6.76	702	19'-0	17'-9			43		47	18'-7		7.28	731	31
32	17	19	19'-5	18'-2			43		46	19'-0		6.92	710	19'-6	18'-3			43		47	19'-1		7.46	740	32
33	17	20	19'-11	18'-8			45		48	19'-6		7.09	736	20'-0	18'-9			45		49	19'-7		7.64	766	33
34	18	20	20'-5	19'-2			45		48	20'-0		7.26	744	20'-6	19'-3			45		49	20'-1		7.82	775	34
35	18	21	20'-11	19'-8			47		50	20'-6		7.43	770	21'-0	19'-9			47		51	20'-7		8.10	801	35
36	19	21	21'-5	20'-2			47		50	21'-0		7.60	778	21'-6	20'-3			47		51	21'-1		8.18	810	36
37	19	22	21'-11	20'-8			49		52	21'-6		7.77	804	22'-0	20'-9			49		53	21'-7		8.36	837	37
38	20	22	22'-5	21'-2	7"	3'-10	49	4'-6	52	22'-0	1'-7	7.94	812	22'-6	21'-3	7"	4'-4	49	4'-6	53	22'-1	2'-1	8.54	345	38
39	20	23	23'-0	21'-8	8"	4'-0	51	4'-8	54	22'-7	1'-8	9.47	858	23'-1	21'-9	8"	4'-6	51	4'-8	55	22'-8	2'-2	10.17	892	39
40	21	23	23'-6	22'-2			51		54	23'-1		9.67	866	23'-7	22'-3			51		55	23'-2		10.38	900	40
41	21	24	24'-0	22'-8			53		56	23'-7		9.87	892	24'-1	22'-9			53		57	23'-8		10.59	928	41
42	22	24	24'-6	23'-2			53		56	24'-1		10.07	901	24'-7	23'-3			53		57	24'-2		10.80	936	42
43	22	25	25'-0	23'-8			55		58	24'-7		10.26	927	25'-1	23'-9			55		59	24'-8		11.01	963	43
44	23	25	25'-6	24'-2			55		58	25'-1		10.46	936	25'-7	24'-3			55		59	25'-2		11.22	972	44
45	23	26	26'-0	24'-8			57		60	25'-7		10.66	962	26'-1	24'-9			57		61	25'-8		11.43	1000	45
46	24	26	26'-6	25'-2			57		60	26'-1		10.86	970	26'-7	25'-3			57		61	26'-2		11.64	1008	46
47	24	27	27'-0	25'-8			59		62	26'-7		11.05	997	27'-1	25'-9			59		63	26'-8		11.85	1035	47
48	25	27	27'-6	26'-2			59		62	27'-1		11.25	1005	27'-7	26'-3			59		63	27'-2		12.06	1043	48
49	25	28	28'-0	26'-8			61		64	27'-7		11.45	1031	28'-1	26'-9			61		65	27'-8		12.27	1071	49
50	26	28	28'-6	27'-2			61		64	28'-1		11.65	1040	28'-7	27'-3			61		65	28'-2		12.48	1079	50
51	26	29	29'-0	27'-8			63		66	28'-7		11.84	1066	29'-1	27'-9			63		67	28'-8		12.69	1107	51
52	27	29	29'-6	28'-2			63		66	29'-1		12.04	1075	29'-7	28'-3			63		67	29'-2		12.90	1115	52
53	27	30	30'-0	28'-8			65		68	29'-7		12.24	1101	30'-1	28'-9			65		69	29'-8		13.11	1142	53
54	28	30	30'-6	29'-2	8"	4'-0	65	4'-8	68	30'-1	1'-8	12.44	1109	30'-7	29'-3	8"	4'-6	65	4'-8	69	30'-2	2'-2	13.32	1151	54
			W=3'-0, M=1'-4 ½"										N=5, Q=3	W=3'-6, M=1'-10 ½"										N=5, Q=4	

LINE	NO. of MANHOLE STEPS	R	COLUMN "C"											COLUMN "D"											LINE
			DIMENSIONS			REINFORCING STEEL						QUANTITIES		DIMENSIONS			REINFORCING STEEL						QUANTITIES		
			H	K	T	A LENGTH	A NO	B LENGTH	B NO	C #18 LENGTH	D #3 LENGTH	CONCRETE CUBIC YARD	REINFORCE STEEL LBS	H	K	T	A LENGTH	A NO	B LENGTH	B NO	C #18 LENGTH	D #3 LENGTH	CONCRETE CUBIC YARD	REINFORCE STEEL LBS	
1	--	4	----	----	---	----	--	----	--	----	---	----	----	----	----	---	----	--	----	--	----	---	----	----	1
2	2	4	----	----	---	----	--	----	--	----	---	----	----	----	----	---	----	--	----	--	----	---	----	----	2
3	2	5	5'-0	3'-10	6"	4'-8	15	4'-4	21	4'-7	2'-6	2.08	262	----	----	---	----	--	----	--	----	---	----	----	3
4	3	5	5'-6	4'-4			15		21	5'-1		2.24	271	5'-7	4'-5	6"	5'-2	15	4'-4	22	5'-2	3'-0	2.45	287	4
5	3	6	6'-0	4'-10			17		23	5'-7		2.40	299	6'-1	4'-11			17		24	5'-8		2.62	316	5
6	4	6	6'-6	5'-4			17		23	6'-1		2.57	309	6'-7	5'-5			17		24	6'-2		2.79	325	6
7	4	7	7'-0	5'-10			19		25	6'-7		2.73	337	7'-1	5'-11			19		26	6'-8		2.96	354	7
8	5	7	7'-6	6'-4			19		25	7'-1		2.89	346	7'-7	6'-5			19		26	7'-2		3.13	364	8
9	5	8	8'-0	6'-10			21		27	7'-7		3.05	374	8'-1	6'-11			21		28	7'-8		3.30	393	9
10	6	8	8'-6	7'-4			21		27	8'-1		3.21	383	8'-7	7'-5			21		28	8'-2		3.47	402	10
11	6	9	9'-0	7'-10			23		29	8'-7		3.37	412	9'-1	7'-11			23		30	8'-8		3.64	432	11
12	7	9	9'-6	8'-4			23		29	9'-1		3.53	421	9'-7	8'-5			23		30	9'-2		3.81	441	12
13	7	10	10'-0	8'-10			25		31	9'-7		3.69	449	10'-1	8'-11			25		32	9'-8		3.98	470	13
14	8	10	10'-6	9'-4			25		31	10'-1		3.85	459	10'-7	9'-5			25		32	10'-2		4.15	480	14
15	8	11	11'-0	9'-10			27		33	10'-7		4.01	487	11'-1	9'-11			27		34	10'-8		4.32	509	15
16	9	11	11'-6	10'-4			27		33	11'-1		4.18	496	11'-7	10'-5			27		34	11'-2		4.49	518	16
17	9	12	12'-0	10'-10			29		35	11'-7		4.34	524	12'-1	10'-11			29		36	11'-8		4.66	547	17
18	10	12	12'-6	11'-4	6"	4'-8	29	4'-4	35	12'-1	2'-6	4.50	534	12'-7	11'-5	6"	5'-2	29	4'-4	36	12'-2	3'-0	4.83	557	18
19	10	13	13'-1	11'-10	7"	4'-10	31	4'-6	37	12'-8	2'-7	5.52	576	13'-2	11'-11	7"	5'-4	31	4'-6	38	12'-9	3'-1	5.92	600	19
20	11	13	13'-7	12'-4			31		37	13'-2		5.71	585	13'-8	12'-5			31		38	13'-3		6.12	609	20
21	11	14	14'-1	12'-10			33		39	13'-8		5.90	613	14'-2	12'-11			33		40	13'-9		6.32	639	21
22	12	14	14'-7	13'-4			33		39	14'-2		6.09	622	14'-8	13'-5			33		40	14'-3		6.52	648	22
23	12	15	15'-1	13'-10			35		41	14'-8		6.28	651	15'-2	13'-11			35		42	14'-9		6.72	678	23
24	13	15	15'-7	14'-4			35		41	15'-2		6.47	662	15'-8	14'-5			35		42	15'-3		6.93	688	24
25	13	16	16'-1	14'-10			37		43	15'-8		6.66	691	16'-2	14'-11			37		44	15'-9		7.13	718	25
26	14	16	16'-7	15'-4			37		43	16'-2		6.85	700	16'-8	15'-5			37		44	16'-3		7.33	727	26
27	14	17	17'-1	15'-10			39		45	16'-8		7.04	729	17'-2	15'-11			39		46	16'-9		7.53	757	27
28	15	17	17'-7	16'-4			39		45	17'-2		7.24	738	17'-8	16'-5			39		46	17'-3		7.74	766	28
29	15	18	18'-1	16'-10			41		47	17'-8		7.43	767	18'-2	16'-11			41		48	17'-9		7.94	796	29
30	16	18	18'-7	17'-4			41		47	18'-2		7.62	776	18'-8	17'-5			41		48	18'-3		8.14	806	30
31	16	19	19'-1	17'-10			43		49	18'-8		7.81	805	19'-2	17'-11			43		50	18'-9		8.34	836	31
32	17	19	19'-7	18'-4			43		49	19'-2		8.00	815	19'-8	18'-5			43		50	19'-3		8.53	845	32
33	17	20	20'-1	18'-10			45		51	19'-8		8.19	844	20'-2	18'-11			45		52	19'-9		8.75	875	33
34	18	20	20'-7	19'-4			45		51	20'-2		8.38	853	20'-8	19'-5			45		52	20'-3		8.95	884	34
35	18	21	21'-1	19'-10			47		53	20'-8		8.57	882	21'-2	19'-11			47		54	20'-9		9.15	914	35
36	19	21	21'-7	20'-4			47		53	21'-2		8.76	891	21'-8	20'-5			47		54	21'-3		9.35	923	36
37	19	22	22'-1	20'-10			49		55	21'-8		8.95	920	22'-2	20'-11			49		56	21'-9		9.55	953	37
38	20	22	22'-7	21'-4	7"	4'-10	49	4'-6	55	22'-2	2'-7	9.15	929	22'-8	21'-5	7"	5'-4	49	4'-6	56	22'-3	3'-1	9.76	962	38
39	20	23	23'-2	21'-10	8"	5'-0	51	4'-8	57	22'-9	2'-8	10.86	979	23'-3	21'-11	8"	5'-6	51	4'-8	58	22'-10	3'-2	11.57	1013	39
40	21	23	23'-7	22'-4			51		57	23'-3		11.09	988	23'-9	22'-5			51		58	23'-4		11.80	1023	40
41	21	24	24'-1	22'-10			53		59	23'-9		11.31	1018	24'-3	22'-11			53		60	23'-10		12.04	1053	41
42	22	24	24'-8	23'-4			53		59	24'-3		11.53	1027	24'-9	23'-5			53		60	24'-4		12.27	1063	42
43	22	25	25'-2	23'-10			55		61	24'-9		11.75	1057	25'-3	23'-11			55		62	24'-10		12.51	1093	43
44	23	25	25'-8	24'-4			55		61	25'-3		11.97	1066	25'-9	24'-5			55		62	25'-4		12.74	1103	44
45	23	26	26'-2	24'-10			57		63	25'-9		12.20	1096	26'-3	24'-11			57		64	25'-10		12.98	1133	45
46	24	26	26'-8	25'-4			57		63	26'-3		12.42	1105	26'-9	25'-5			57		64	26'-4		13.21	1143	46
47	24	27	27'-2	25'-10			59		65	26'-9		12.64	1135	27'-3	25'-11			59		66	26'-10		13.45	1173	47
48	25	27	27'-8	26'-4			59		65	27'-3		12.86	1144	27'-9	26'-5			59		66	27'-4		13.68	1183	48
49	25	28	28'-2	26'-10			61		67	27'-9		13.08	1174	28'-3	26'-11			61		68	27'-10		13.92	1213	49
50	26	28	28'-8	27'-4			61		67	28'-3		13.31	1183	28'-9	27'-5			61		68	28'-4		14.15	1223	50
51	26	29	29'-2	27'-10			63		69	28'-9		13.53	1212	29'-3	27'-11			63		70	28'-10		14.39	1253	51
52	27	29	29'-8	28'-4			63		69	29'-3		13.75	1222	29'-9	28'-5			63		70	29'-4		14.62	1263	52
53	27	30	29'-8	28'-10			65		71	29'-9		13.97	1251	30'-3	28'-11			65		72	29'-10		14.86	1293	53
54	28	30	30'-2	28'-10	8"	5'-0	65	4'-8	71	30'-3	2'-8	14.19	1261	30'-9	29'-5	8"	5'-6	65	4'-8	72	30'-4	3'-2	15.09	1303	54
			W=4'-0, M=2'-4 ½"										N=6, Q=5	W=4'-6, M=2'-10 ½"										N=6, Q=6	

TABLE 1 : CONCRETE DISPLACED BY PIPES

PIPE SIZES		T= 6"	T= 7"	T= 8"
RCP	CMP	yd^3	yd^3	yd^3
	12"	0.015	0.017	0.019
	18"	0.033	0.038	0.044
18"	24"	0.058	0.068	0.078
24"	30"	0.091	0.106	0.121
30"	36"	0.131	0.153	0.174
36"	42"	0.178	0.208	0.237
42"	48"	0.233	0.271	0.310

TABLE 2 : MAXIMUM PIPE SIZE TO BE USED

	RCP	CMP
COL. A	18"	12", 18", 24"
COL. B	30"	30", 36"
COL. C	36"	42"
COL. D	42"	48"

TABLE 3 : CONCRETE NEEDED FOR FORMED INVERT. (SEE SHEET 2)

PIPE SIZES	12"	18"	24"	30"	36"	42"	48"
RCP (yd^3)	-----	0.191	0.222	0.286	0.378	0.483	-----
CMP (yd^3)	0.081	0.106	0.120	0.124	0.169	0.220	0.277

STRUCTURAL STEEL :

RECTANGULAR GRATE & FRAME = 340 lbs
BICYCLE-SAFE GRATE & FRAME = 365 lbs
SOLID COVER & FRAME = 474 lbs

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD CATCH BASIN AND CLEANOUT BOX SCHEDULE OF INSTALLATION
18 TO 42 INCH RCP
12 TO 48 INCH CMP
STANDARD DRAWING TITLE

STD. DWG. NO.
CB 9C

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (B&E, CB)\CB09C.dgn
23-JUN-2020

LINE	NO. of MANHOLE STEPS	R	COLUMN "E" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #22 LENGTH	D #3 LENGTH	QUANTITIES CONCRETE CUBIC YDS	REINFORCE STEEL LBS	COLUMN "F" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #22 LENGTH	D #3 LENGTH	QUANTITIES CONCRETE CUBIC YDS	REINFORCE STEEL LBS	COLUMN "G" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #28 LENGTH	D #3 LENGTH	QUANTITIES CONCRETE CUBIC YDS	REINFORCE STEEL LBS	COLUMN "H" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #28 LENGTH	D #3 LENGTH	QUANTITIES CONCRETE CUBIC YDS	REINFORCE STEEL LBS	LINE
1	4	6	* 6'-4	5'-2	6"	5'-11	17	4'-4	26	5'-11	3'-9	3.00	370	----	----	---	----	--	----	--	----	---	----	---	----	----	---	----	----	--	----	--	----	---	----	---	----	----	---	----	----	--	----	--	----	---	----	---	1
2	4	7	6'-10	5'-8			19		28	6'-5		3.18	403	6'-10	5'-8	6"	6'-5	19	4'-4	29	6'-5	4'-3	3.39	419	----	----	---	----	--	----	--	----	---	----	---	----	----	---	----	--	----	--	----	---	----	---	2
3	5	7	7'-4	6'-2			19		28	6'-11		3.37	414	7'-4	6'-2			19		29	6'-11		3.59	430	* 7'-4	6'-2	6"	6'-11	19	4'-4	31	6'-11	4'-9	3.80	494	----	----	---	----	--	----	--	----	---	----	---	3
4	5	8	7'-10	6'-8			21		30	7'-5		3.55	447	7'-10	6'-8			21		31	7'-5		3.78	464	7'-10	6'-8			21		33	7'-5		4.00	532	* 8'-1	6'-11	6"	7'-5	21	4'-4	34	7'-8	5'-3	4.33	556	4
5	6	8	8'-4	7'-2			21		30	7'-11		3.74	459	8'-4	7'-2			21		31	7'-11		3.97	476	8'-4	7'-2			21		33	7'-11		4.20	547	8'-7	7'-5			21		34	8'-2		4.54	571	5
6	6	9	8'-10	7'-8			23		32	8'-5		3.92	491	8'-10	7'-8			23		33	8'-5		4.16	510	8'-10	7'-8			23		35	8'-5		4.40	585	9'-1	7'-11			23		36	8'-8		4.75	610	6
7	7	9	9'-4	8'-2			23		32	8'-11		4.10	503	9'-4	8'-2			23		33	8'-11		4.36	521	9'-4	8'-2			23		35	8'-11		4.61	599	9'-7	8'-5			23		36	9'-2		4.96	625	7
8	7	10	9'-10	8'-8			25		34	9'-5		4.29	536	9'-10	8'-8			25		35	9'-5		4.55	555	9'-10	8'-8			25		37	9'-5		4.81	637	10'-1	8'-11			25		38	9'-8		5.18	664	8
9	8	10	10'-4	9'-2			25		34	9'-11		4.47	547	10'-4	9'-2			25		35	9'-11		4.74	566	10'-4	9'-2			25		37	9'-11		5.01	652	10'-7	9'-5			25		38	10'-2		5.39	678	9
10	8	11	10'-10	9'-8			27		36	10'-5		4.65	580	10'-10	9'-8			27		37	10'-5		4.93	600	10'-10	9'-8			27		39	10'-5		5.21	690	11'-1	9'-11			27		40	10'-8		5.60	718	10
11	9	11	11'-4	10'-2			27		36	10'-11		4.84	592	11'-4	10'-2			27		37	10'-11		5.13	612	11'-4	10'-2			27		39	10'-11		5.42	705	11'-7	10'-5			27		40	11'-2		5.81	732	11
12	9	12	11'-10	10'-8			29		38	11'-5		5.02	624	11'-10	10'-8			29		39	11'-5		5.32	646	11'-11	10'-8			29		41	11'-5		5.62	745	12'-1	10'-11			29		42	11'-8		6.02	771	12
13	10	12	12'-4	11'-2	6"	5'-11	29	4'-4	38	11'-11	3'-9	5.20	636	12'-4	11'-2	6"	6'-5	29	4'-4	39	11'-11	4'-3	5.51	657	12'-5	11'-2	6"	6'-11	29	4'-4	41	11'-11	4'-9	5.82	760	12'-7	11'-5	6"	7'-5	29	4'-4	42	12'-2	5'-3	6.23	786	13
14	10	13	12'-11	11'-8	7"	6'-1	31	4'-6	40	12'-6	3'-10	6.36	683	12'-11	11'-8	7"	6'-7	31	4'-6	41	12'-6	4'-4	6.73	706	12'-11	11'-8	7"	7'-1	31	4'-6	43	12'-6	4'-10	7.09	811	13'-2	11'-11	7"	7'-7	31	4'-6	44	12'-9	5'-4	7.58	841	14
15	11	13	13'-5	12'-2			31		40	13'-0		6.58	695	13'-5	12'-2			31		41	13'-0		6.96	717	13'-5	12'-2			31		43	13'-0		7.33	826	13'-8	12'-5			31		44	13'-3		7.83	855	15
16	11	14	13'-11	12'-8			33		42	13'-6		6.80	728	13'-11	12'-8			33		43	13'-6		7.18	752	13'-11	12'-8			33		45	13'-6		7.57	864	14'-2	12'-11			33		46	13'-9		8.08	895	16
17	12	14	14'-5	13'-2			33		42	14'-0		7.02	740	14'-5	13'-2			33		43	14'-0		7.41	763	14'-5	13'-2			33		45	14'-0		7.81	879	14'-8	13'-5			33		46	14'-3		8.33	910	17
18	12	15	14'-11	13'-8			35		44	14'-6		7.23	773	14'-11	13'-8			35		45	14'-6		7.64	798	14'-11	13'-8			35		47	14'-6		8.05	918	15'-2	13'-11			35		48	14'-9		8.58	950	18
19	13	15	15'-5	14'-2			35		44	15'-0		7.45	785	15'-5	14'-2			35		45	15'-0		7.87	809	15'-5	14'-2			35		47	15'-0		8.29	932	15'-8	14'-5			35		48	15'-3		8.83	964	19
20	13	16	15'-11	14'-8			37		46	15'-6		7.67	818	15'-11	14'-8			37		47	15'-6		8.10	844	15'-11	14'-8			37		49	15'-6		8.53	971	16'-2	14'-11			37		50	15'-9		9.08	1004	20
21	14	16	16'-5	15'-2			37		46	16'-0		7.89	830	16'-5	15'-2			37		47	16'-0		8.33	855	16'-5	15'-2			37		49	16'-0		8.77	986	16'-8	15'-5			37		50	16'-3		9.33	1019	21
22	14	17	16'-11	15'-8			39		48	16'-6		8.11	863	16'-11	15'-8			39		49	16'-6		8.56	890	16'-11	15'-8			39		51	16'-6		9.01	1024	17'-2	15'-11			39		52	16'-9		9.58	1058	22
23	15	17	17'-5	16'-2			39		48	17'-0		8.32	875	17'-5	16'-2			39		49	17'-0		8.78	901	17'-5	16'-2			39		51	17'-0		9.24	1039	17'-8	16'-5			39		52	17'-3		9.83	1073	23
24	15	18	17'-11	16'-8			41		50	17'-6		8.54	908	17'-11	16'-8			41		51	17'-6		9.01	936	17'-11	16'-8			41		53	17'-6		9.48	1078	18'-2	16'-11			41		54	17'-9		10.08	1113	24
25	16	18	18'-5	17'-2			41		50	18'-0		8.76	920	18'-5	17'-2			41		51	18'-0		9.24	947	18'-5	17'-2			41		53	18'-0		9.72	1092	18'-8	17'-5			41		54	18'-3		10.33	1127	25
26	16	19	18'-11	17'-8			43		52	18'-6		8.98	953	18'-11	17'-8			43		53	18'-6		9.47	982	18'-11	17'-8			43		55	18'-6		9.96	1131	19'-2	17'-11			43		56	18'-9		10.58	1167	26
27	17	19	19'-5	18'-2			43		52	19'-0		9.19	965	19'-5	18'-2			43		53	19'-0		9.69	994	19'-5	18'-2			43		55	19'-0		10.20	1146	19'-8	18'-5			43		56	19'-3		10.83	1182	27
28	17	21	19'-11	18'-8			47		56	19'-6		9.41	1020	19'-11	18'-8			47		57	19'-6		9.93	1051	19'-11	18'-8			47		59	19'-6		10.44	1209	20'-2	18'-11			47		60	19'-9		11.08	1247	28
29	18	21	20'-5	19'-2			47		56	20'-0		9.63	1032	20'-5	19'-2			47		57	20'-0		10.16	1063	20'-5	19'-2			47		59	20'-0		10.68	1223	20'-8	19'-5			47		60	20'-3		11.33	1261	29
30	18	22	20'-11	19'-8			49		58	20'-6		9.85	1066	20'-11	19'-8			49		59	20'-6		10.39	1097	20'-11	19'-8			49		61	20'-6		10.92	1262	21'-2	19'-11			49		62	20'-9		11.58	1301	30
31	19	22	21'-5	20'-2			49		58	21'-0		10.07	1077	21'-5	20'-2			49		59	21'-0		10.61	1109	21'-5	20'-2			49		61	21'-0		11.16	1277	21'-8	20'-5			49		62	21'-3		11.83	1316	31
32	19	25	21'-11	20'-8			55		64	21'-6		10.28	1155	21'-11	20'-8			55		65	21'-6		10.84	1190	21'-11	20'-8			55		67	21'-6		11.40	1364	22'-2	20'-11			55		68	21'-9		12.08	1406	32
33	20	25	22'-5	21'-2	7"	6'-1	55	4'-6	64	22'-0	3'-10	10.50	1166	22'-5	21'-2	7"	6'-7	55	4'-6	65	22'-0	4'-4	11.07	1201	22'-5	21'-2	7"	7'-1	55	4'-6	67	22'-0	4'-10	11.64	1378	22'-8	21'-5	7"	7'-7	55	4'-6	68	22'-3	5'-4	12.33	1421	33
34	20	23	23'-0	21'-8	8"	6'-3	51	4'-8	60	22'-7	3'-11	12.44	1155	23'-0	21'-8	8"	6'-9	51	4'-8	61	22'-7	4'-5	13.09	1188	23'-0	21'-8	8"	7'-3	51	4'-8	63	22'-7	4'-11	13.75	1367	23'-3	21'-11	8"	7'-9	51	4'-8	64	22'-10	5'-5	14.56	1408	34
35	21	23	23'-6	22'-2			51		60	23'-1		12.69	1166	23'-6	22'-2			51		61	23'-1		13.36	1199	23'-6	22'-2			51		63	23'-1		14.03	1382	23'-9	22'-5			51		64	23'-4		14.85	1422	35
36	21	24	24'-0	22'-8			53		62	23'-7		12.94	1201	24'-0	22'-8			53		63	23'-7		13.63	1235	24'-0	22'-8			53		65	23'-7		14.31	1421	24'-3	22'-11			53		66	23'-10		15.14	1463	36
37	22	24	24'-6	23'-2			53		62	24'-1		13.19	1212	24'-6	23'-2			53		63	24'-1		13.89	1246	24'-6	23'-2			53		65	24'-1		14.58	1436	24'-9	23'-5			53		66	24'-4		15.43	1477	37
38	22	26	25'-0	23'-8			57		66	24'-7		13.45	1269	25'-0	23'-8			57		67	24'-7		14.16	1305	25'-0	23'-8			57		69	24'-7		14.86	1500	25'-3	23'-11			57		70	24'-10		15.72	1544	38
39	23	26	25'-6	24'-2			57		66	25'-1		13.70	1281	25'-6	24'-2			57		67	25'-1		14.42	1317	25'-6	24'-2			57		69	25'-1		15.14	1515	25'-9	24'-5			57		70	25'-4		16.01	1558	39
40	23	29	26'-0	24'-8			63		72	25'-7		13.95	1360	26'-0	24'-8			63		73	25'-7		14.69	1400	26'-0	24'-8			63		75	25'-7		15.42	1604	26'-3	24'-11			63		76	25'-10		16.30	1651	40
41	24	29	26'-6	25'-2			63		72	26'-1		14.21	1372	26'-6	25'-2			63		73	26'-1		14.95	1411	26'-6	25'-2			63		75	26'-1		15.70	1619	26'-9	25'-5			63		76	26'-4		16.59	1665	41
42	24	31	27'-0	25'-8			67		76	26'-7		14.46	1429	27'-0	25'-8			67		77	26'-7		15.22	1470	27'-0	25'-8			67		79	26'-7		15.97	1683	27'-3	25'-11			67		80	26'-10		16.88	1732	42
43	25	31	27'-6	26'-2			67		76	27'-1		14.71	1440	27'-6	26'-2			67		77	27'-1		15.48	1482	27'-6	26'-2			67		79	27'-1		16.25	1697	27'-9	26'-5			67		80	27'-4		17.17	1746	43
44	25	34	28'-0	26'-8			73		82	27'-7		14.97	1520	28'-0	26'-8			73		83	27'-7		15.75	1565	28'-0	26'-8			73		85	27'-7		16.53	1787	28'-3	26'-11			73		86	27'-10		17.46	1838	44
45	26	34	28'-6	27'-2			73		82	28'-1		15.22	1532	28'-6	27'-2			73		83	28'-1		16.01	1576	28'-6	27'-2			73		85	28'-1		16.81	1801	28'-9	27'-5			73		86	28'-4		17.75	1853	45
46	26	37	29'-0	27'-8			79		88	28'-7		15.47	1611	29'-0	27'-8			79		89	28'-7		16.28	1659	29'-0	27'-8			79		91	28'-7		17.08	1890	29'-3	27'-11			79		92	28'-10		18.04	1945	46
47	27	37	29'-6	28'-2			79		88	29'-1		15.73	1623	29'-6	28'-2			79		89	29'-1		16.55	1671	29'-6	28'-2			79		91	29'-1		17.36	1905	29'-9	28'-5			79		92	29'-4		18.33	1960	47
48	27	40	30'-0	28'-8			85		94	29'-7		15.98	1703	30'-0	28'-8			85		95	29'-7		16.81	1753	30'-0	28'-8			85		97	29'-7		17.64	1994	30'-3	28'-11			85		98	29'-10		18.62	2052	48
49	28	40	30'-6	29'-2	8"	6'-3	85	4'-8	94	30'-1	3'-11	16.23	1714	30'-6	29'-2	8"	6'-9	85	4'-8	95	30'-1	4'-5	17.08	1765	30'-6	29'-2	8"	7'-3	85	4'-8	97	30'-1	4'-11	17.92	2009	30'-9	29'-5	8"	7'-9	85	4'-8	98	30'-4	5'-5	18.91	2067	49
			W=5'-3, M=3'-7 ½"									N=7, Q=7		W=5'-9, M=4'-1 ½"									N=7, Q=8		W=6'-3, M=4'-7 ½"									N=8, Q=9		W=6'-9, M=5'-1 ½"									N=8, Q=10		

TABLE 1 : CONCRETE DISPLACED BY PIPES

PIPE SIZES RCP	PIPE SIZES CMP	T= 6" yd^3	T= 7" yd^3	T= 8" yd^3
48"	60"	0.340	0.396	0.453
54"	66"	0.427	0.498	0.569
60"	72"	0.524	0.611	0.698
66"	78"	0.630	0.735	0.840

TABLE 2 : MAXIMUM PIPE SIZE TO BE USED

	RCP	CMP
COL. E	48"	60"
COL. F	54"	66"
COL. G	60"	72"
COL. H	66"	78"

TABLE 3 : CONCRETE NEEDED FOR FORMED INVERT. (SEE SHEET 2)

PIPE SIZES	48"	54"	60"	66"	72"	78"	
RCP (yd^3)	0.676	0.814	0.964	1.126	----	----	
CMP (yd^3)	----	----	0.370	0.443	0.522	0.609	

STRUCTURAL STEEL :
RECTANGULAR GRATE & FRAME = 340 lbs
BICYCLE-SAFE GRATE & FRAME = 365 lbs
SOLID COVER & FRAME = 474 lbs

NOTES
1. LINES MARKED WITH * REFER TO METAL PIPE ONLY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD CATCH BASIN AND CLEANOUT BOX SCHEDULE OF INSTALLATION 48 TO 66 INCH RCP 60 TO 78 INCH CMP

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 9D

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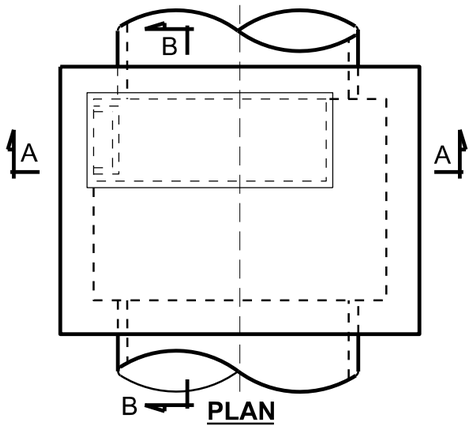
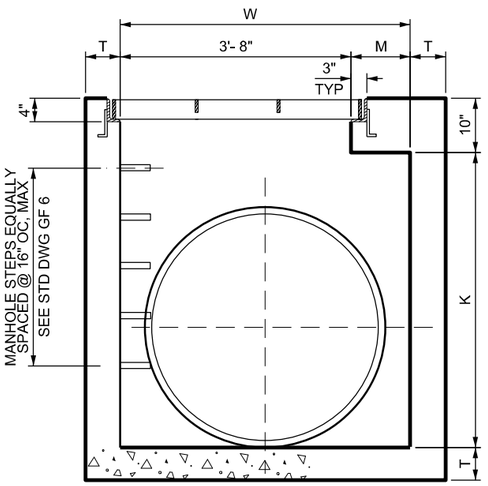
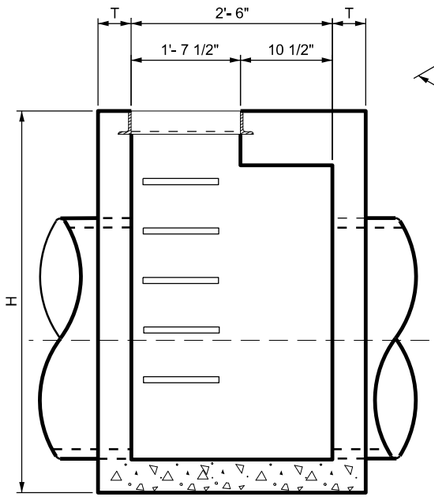
23-JUN-2020

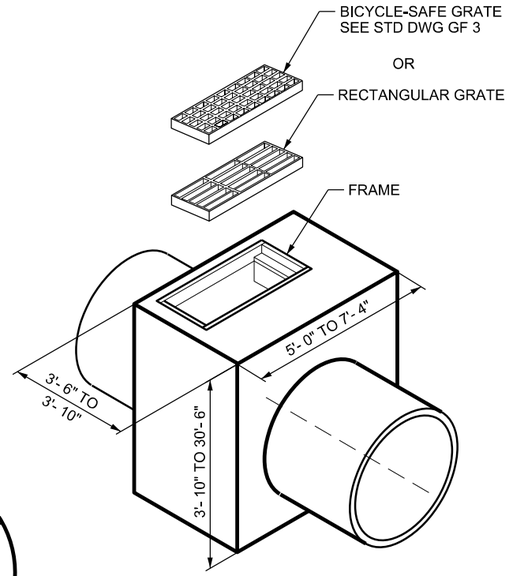




SECTION A-A

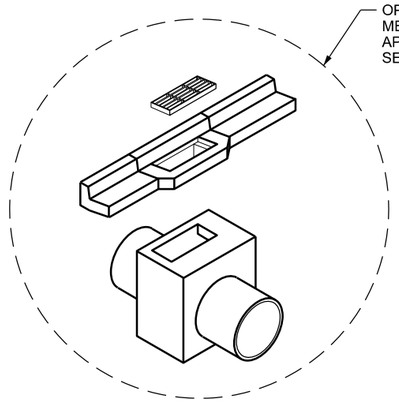


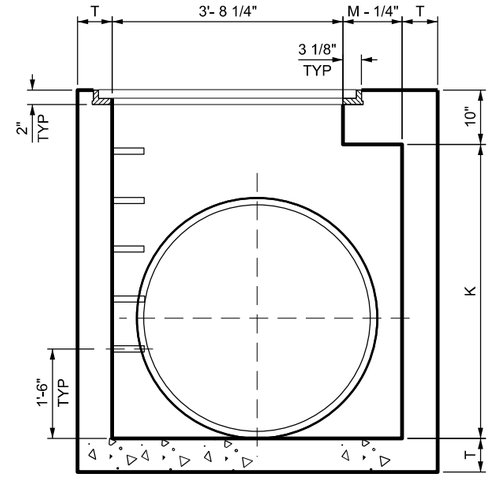
SECTION B-B



CATCH BASIN

GRATE AND FRAME APPLICATION





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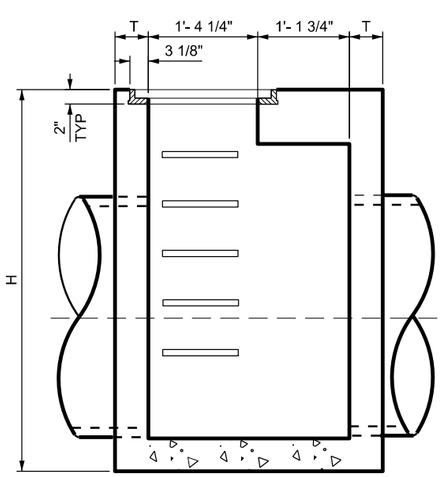
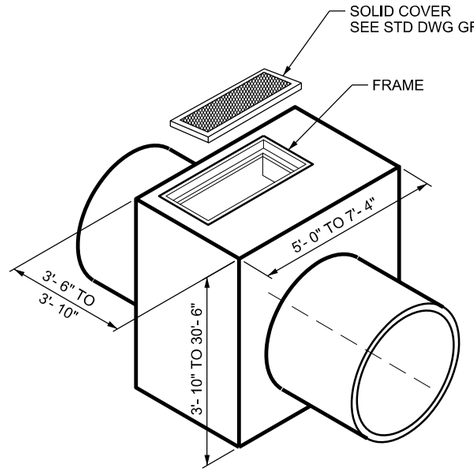


SECTION B-B



CLEANOUT BOX

SOLID COVER APPLICATION

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

QUANTITIES

STRUCTURAL CONCRETE
REINFORCING STEEL
— SEE SCHEDULE OF INSTALLATION

INDEX OF SHEETS

(CB 10A) 1- SITUATION & LAYOUT

(CB 10B) 2- SECTION DETAILS

(CB 10C) 3- SCHEDULE OF INSTALLATION 42-60 INCH RCP 48-72 INCH CMP

NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
7. CENTER PIPE IN BOX OPENING. USE APPROVED NON-SHRINK GROUT TO SEAL OPENING AROUND PIPE OR USE APPROVED PIPE MANUFACTURER'S PIPE BOOT.
8. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
9. SEE STD DWG GF 3 AND GF 5 FOR GRATE AND FRAME.
10. ADJUST FINISHED GRADE ELEVATION OF BOX AS REQUIRED FOR CURB AND GUTTER APPLICATION . INCLUDE CONCRETE QUANTITIES FOR CURB AND GUTTER IN ROADWAY QUANTITIES.
11. USE 8 INCH LONG, #4 BARS @ 8 INCH O.C. MAX DRILL AND EPOXY 4 INCHES INTO BOX OR EXTEND BOX REBARS 4 INCHES INTO THE CURB AND GUTTER, TO ATTACH CURB AND GUTTER TO BOX.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
AUGUST 2020 — DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD CATCH BASIN AND CLEANOUT BOX SITUATION AND LAYOUT

STANDARD DRAWING TITLE

STD. DWG. NO.

CB 10A

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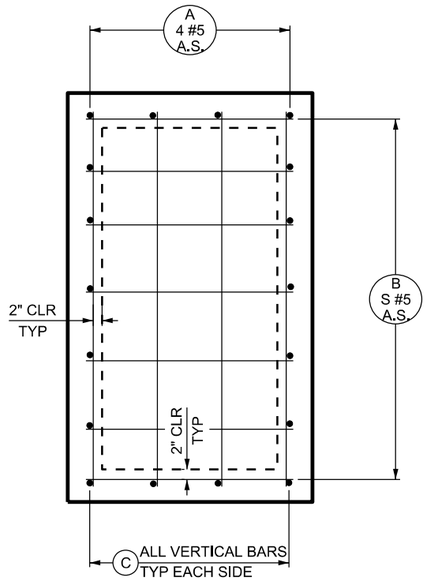
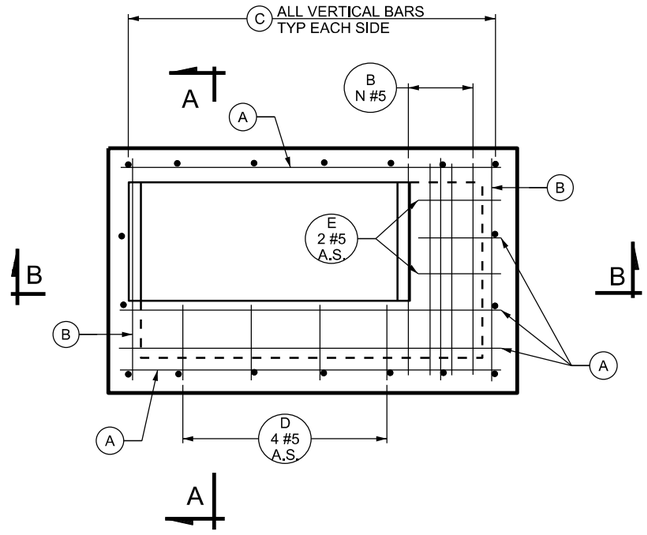
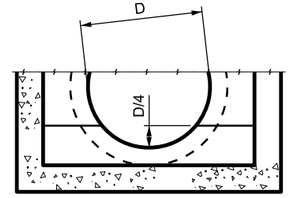


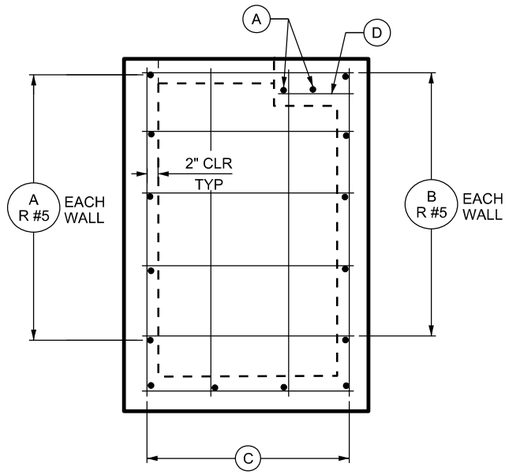
PLAN - BOTTOM SLAB



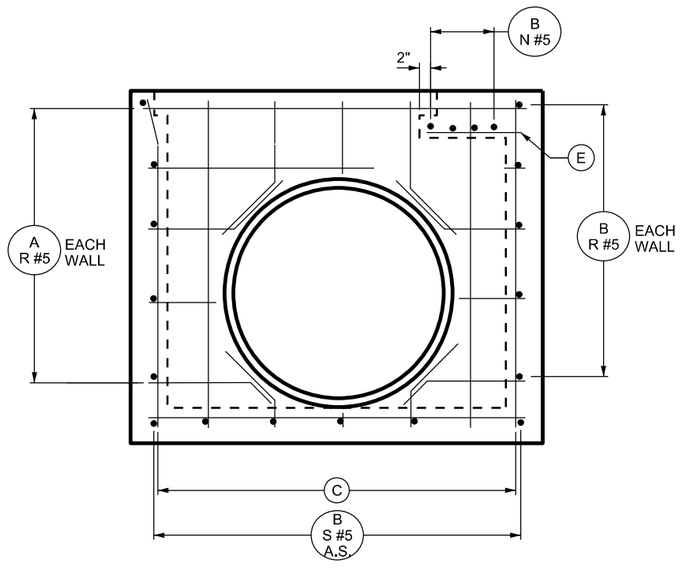
PLAN - TOP SLAB



FORMED INVERT



SECTION A-A



SECTION B-B

NOTES

1. QUANTITIES SHOWN IN THE SCHEDULE OF INSTALLATION ARE FOR ONE UNIT ONLY.
2. FORM THE BOTTOM SLAB OF THE BOX TO FIT THE INVERT OF THE PIPE WHEN REQUIRED ACCORDING TO THE DETAIL SHOWN ON THIS SHEET. SEE TABLE 3 ON STD DWG CB 10C FOR ADDITIONAL CONCRETE QUANTITIES.
3. DEDUCT CONCRETE DISPLACED BY PIPE FROM THOSE CONCRETE QUANTITIES GIVEN IN SCHEDULE OF TABLE 1 ON STD DWG CB 10C.
4. SEE TABLE 3 ON STD DWG CB 10C FOR ADDITIONAL CONCRETE QUANTITIES WHEN FORMED INVERT IS REQUIRED.
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
6. ALL DIMENSIONS ARE OUT TO OUT OF BARS UNLESS OTHERWISE SHOWN.
7. WEIGHT QUANTITIES FOR GRATE AND FRAME, AND SOLID COVER AND FRAME ARE SHOWN FOR INFORMATION ONLY.
8. SEE STD DWG CB 10A FOR DIMENSIONS.
9. PIPE DIAMETERS SHOWN IN TABLES AND SCHEDULE ARE INSIDE DIAMETERS.
10. MAXIMUM PIPE DIMENSIONS SHOWN IN SCHEDULE OF INSTALLATION ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX. DETERMINE CLEARANCES FOR SKEWED PIPES.
11. SEE STD DWG GF 6 FOR MANHOLE STEP DETAILS.
12. USE #5 BARS FOR ALL REINFORCING @ 12 INCHES UNLESS OTHERWISE SHOWN.
13. ADD 0.023 CU YDS OF CONCRETE TO THOSE QUANTITIES GIVEN IN SCHEDULE OF INSTALLATION AND ADD 3 INCH TO EACH D-BAR, AND 1.0 LB TO REINFORCING STEEL QUANTITIES WHEN SOLID COVER IS REQUIRED.
14. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284, OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
15. CHAMFER ALL EXPOSED CONCRETE CORNERS ¾ INCH EXCEPT WHERE NOTED OTHERWISE.
16. USE CLASS AA(AE) CONCRETE EXCEPT WHERE SPECIFIED OTHERWISE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD CATCH BASIN AND CLEANOUT BOX SECTION DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 10B

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BA4, CB)\CB10B.dgn

LINE	NO of MANHOLE STEPS	R	COLUMN "A" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #16 LENGTH	D #4 LENGTH	QUANTITIES CONCRETE CUBIC YARD	REINFORCING STEEL LBS	COLUMN "B" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #18 LENGTH	D #4 LENGTH	E #2 LENGTH	QUANTITIES CONCRETE CUBIC YARD	REINFORCING STEEL LBS	COLUMN "C" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #22 LENGTH	D #4 LENGTH	E #2 LENGTH	QUANTITIES CONCRETE CUBIC YARD	REINFORCING STEEL LBS	COLUMN "D" DIMENSIONS H	K	T	REINFORCING STEEL A LENGTH	A NO	B LENGTH	B NO	C #22 LENGTH	D #4 LENGTH	E #2 LENGTH	QUANTITIES CONCRETE CUBIC YARD	REINFORCING STEEL LBS	LINE
1	–	4	3'-10	2'-6	6"	4'-8	14	3'-2	15	3'-5	1'-0	1.365	179	---	---	---	----	--	---	--	----	---	---	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	1
2	2	4	4'-4	3'-0			14		15	3'-11		1.504	187	---	---	---	----	--	---	--	----	---	---	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	2
3	2	5	4'-10	3'-6			16		17	4'-5		1.642	212	---	---	---	----	--	---	--	----	---	---	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	3
4	3	5	5'-4	4'-0			16		17	4'-11		1.781	220	---	---	---	----	--	---	--	----	---	---	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	4
5	3	6	5'-10	4'-6			18		19	5'-5		1.920	245	---	---	---	----	--	---	--	----	---	---	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	5
6	4	6	6'-4	5'-0			18		19	5'-11		2.059	253	6'-4	5'-0	6"	5'-8	18	3'-2	23	5'-11	1'-0	1'-6	2.417	301	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	6
7	4	7	6'-10	5'-6			20		21	6'-5		2.198	278	6'-10	5'-6			20		25	6'-5			2.575	321	6'-10	5'-6	6"	6'-2	20	3'-2	26	6'-5	1'-0	2'-0	2.763	370	----	----	---	----	--	----	--	----	----	----	-----	----	----	----	---	----	--	----	--	----	----	----	-----	----	7
8	5	7	7'-4	6'-0			20		21	6'-11		2.337	286	7'-4	6'-0			20		25	6'-11			2.732	338	7'-4	6'-0			20		26	6'-11			2.930	382	7'-4	6'-0	6"	6'-8	20	3'-2	28	6'-11	1'-0	2'-6	3.127	400	8
9	5	8	7'-10	6'-6			22		23	7'-5		2.476	311	7'-10	6'-6			22		27	7'-5			2.889	366	7'-10	6'-6			22		28	7'-5			3.096	413	7'-10	6'-6			22		30	7'-5			3.303	432	9
10	6	8	8'-4	7'-0			22		23	7'-11		2.615	319	8'-4	7'-0			22		27	7'-11			3.047	375	8'-4	7'-0			22		28	7'-11			3.263	424	8'-4	7'-0			22		30	7'-11			3.479	443	10
11	6	9	8'-10	7'-6			24		25	8'-5		2.754	344	8'-10	7'-6			24		29	8'-5			3.204	403	8'-10	7'-6			24		30	8'-5			3.430	455	8'-10	7'-6			24		32	8'-5			3.655	475	11
12	7	9	9'-4	8'-0			24		25	8'-11		2.892	352	9'-4	8'-0			24		29	8'-11			3.362	412	9'-4	8'-0			24		30	8'-11			3.596	466	9'-4	8'-0			24		32	8'-11			3.831	487	12
13	7	10	9'-10	8'-6			26		27	9'-5		3.031	377	9'-10	8'-6			26		31	9'-5			3.519	440	9'-10	8'-6			26		32	9'-5			3.763	497	9'-10	8'-6			26		34	9'-5			4.007	519	13
14	8	10	10'-4	9'-0			26		27	9'-11		3.170	385	10'-4	9'-0			26		31	9'-11			3.675	450	10'-4	9'-0			26		32	9'-11			3.930	509	10'-4	9'-0			26		34	9'-11			4.182	530	14
15	8	11	10'-10	9'-6			28		29	10'-5		3.309	410	10'-10	9'-6			28		33	10'-5			3.834	477	10'-10	9'-6			28		34	10'-5			4.096	540	10'-10	9'-6			28		36	10'-5			4.358	562	15
16	9	11	11'-4	10'-0			28		29	10'-11		3.448	418	11'-4	10'-0			28		33	10'-11			3.991	486	11'-4	10'-0			28		34	10'-11			4.263	551	11'-4	10'-0			28		36	10'-11			4.534	573	16
17	9	12	11'-10	10'-6			30		31	11'-5		3.587	443	11'-10	10'-6			30		35	11'-5			4.149	515	11'-10	10'-6			30		36	11'-5			4.430	582	11'-10	10'-6			30		38	11'-5			4.710	605	17
18	10	12	12'-4	11'-0	6"	4'- 8	30	3'-2	31	11'-11	1'-0	3.726	451	12'-4	11'-0	6"	5'-8	30	3'-2	35	11'-11	1'-0	1'-6	4.305	524	12'-4	11'-0	6"	6'-2	30	3'-2	36	11'-11	1'-0	2'-0	4.596	594	12'-4	11'-0	6"	6'-8	30	3'-2	38	11'-11	1'-0	2'-6	4.886	617	18
19	10	13	12'-11	11'-6	7"	4'-10	32	3'-4	33	12'-6	1'-1	4.610	489	12'-11	11'-6	7"	5'-10	32	3'-4	37	12'-6	1'-1	1'-7	5.299	566	12'-11	11'-6	7"	6'-4	32	3'-4	38	12'-6	1'-1	2'-1	5.644	639	12'-11	11'-6	7"	6'-10	32	3'-4	40	12'-6	1'-1	2'-7	5.988	664	19
20	11	13	13'-5	12'-0			32		33	13'-0		4.775	498	13'-5	12'-0			32		37	13'-0			5.486	575	13'-5	12'-0			32		38	13'-0			5.842	651	13'-5	12'-0			32		40	13'-0			6.197	675	20
21	11	14	13'-11	12'-6			34		35	13'-6		4.941	523	13'-11	12'-6			34		39	13'-6			5.673	604	13'-11	12'-6			34		40	13'-6			6.040	682	13'-11	12'-6			34		42	13'-6			6.406	708	21
22	12	14	14'-5	13'-0			34		35	14'-0		5.107	531	14'-5	13'-0			34		39	14'-0			5.861	613	14'-5	13'-0			34		40	14'-0			6.238	694	14'-5	13'-0			34		42	14'-0			6.615	719	22
23	12	15	14'-11	13'-6			36		37	14'-6		5.272	552	14'-11	13'-6			36		41	14'-6			6.048	642	14'-11	13'-6			36		42	14'-6			6.436	725	14'-11	13'-6			36		44	14'-6			6.824	752	23
24	13	15	15'-5	14'-0			36		37	15'-0		5.438	565	15'-5	14'-0			36		41	15'-0			6.235	651	15'-5	14'-0			36		42	15'-0			6.634	737	15'-5	14'-0			36		44	15'-0			7.032	764	24
25	13	16	15'-11	14'-6			38		39	15'-6		5.604	590	15'-11	14'-6			38		43	15'-6			6.422	680	15'-11	14'-6			38		44	15'-6			6.832	769	15'-11	14'-6			38		46	15'-6			7.241	796	25
26	14	16	16'-5	15'-0			38		39	16'-0		5.769	599	16'-5	15'-0			38		43	16'-0			6.609	689	16'-5	15'-0			38		44	16'-0			7.030	780	16'-5	15'-0			38		46	16-0			7.450	808	26
27	14	17	16'-11	15'-6			40		41	16'-6		5.935	624	16'-11	15'-6			40		45	16'-6			6.797	637	16'-11	15'-6			40		46	16'-6			7.228	812	16'-11	15'-6			40		48	16'-6			7.659	840	27
28	15	17	17'-5	16'-0			40		41	17'-0		6.100	632	17'-5	16'-0			40		45	17'-0			6.984	727	17'-5	16'-0			40		46	17'-0			7.426	823	17'-5	16'-0			40		48	17'-0			7.868	852	28
29	15	18	17'-11	16'-6			42		43	17'-6		6.266	658	17'-11	16'-6			42		47	17'-6			7.171	755	17'-11	16'-6			42		48	17'-6			7.624	855	17'-11	16'-6			42		50	17'-6			8.076	885	29
30	16	18	18'-5	17'-0			42		43	18'-0		6.432	666	18'-5	17'-0			42		47	18'-0			7.358	765	18'-5	17'-0			42		48	18'-0			7.822	866	18'-5	17'-0			42		50	18'-0			8.285	896	30
31	16	19	18'-11	17'-6			44		45	18'-6		6.597	692	18'-11	17'-6			44		49	18'-6			7.545	793	18'-11	17'-0			44		50	18'-6			8.020	898	18'-11	17'-6			44		52	18'-6			8.494	929	31
32	17	19	19'-5	18'-0			44		45	19'-0		6.763	700	19'-5	18'-0			44		49	19'-0			7.733	803	19'-5	18'-0			44		50	19'-0			8.215	909	19'-5	18'-0			44		52	19'-0			8.703	940	32
33	17	20	19'-11	18'-6			46		47	19'-6		6.929	725	19'-11	18'-6			46		51	19'-6			7.920	831	19'-11	18'-6			46		52	19'-6			8.416	941	19'-11	18'-6			46		54	19'-6			8.912	973	33
34	18	20	20'-5	19'-0			46		47	20'-0		7.094	734	20'-5	19'-0			46		51	20'-0			8.107	841	20'-5	19'-0			46		52	20'-0			8.615	952	20'-5	19'-0			46		54	20'-0			9.120	984	34
35	18	21	20'-11	19'-6			48		49	20'-6		7.260	759	20'-11	19'-6			48		53	20'-6			8.294	869	20'-11	19'-6			48		54	20'-6			8.812	984	20'-11	19'-6			48		56	20'-6			9.329	1017	35
36	19	21	21'-5	20'-0			48		49	21'-0		7.426	767	21'-5	20'-0			48		53	21'-0			8.481	878	21'-5	20'-0			48		54	21'-0			9.011	996	21'-5	20'-0			48		56	21'-0			9.538	1029	36
37	19	22	21'-11	20'-6			50		51	21'-6		7.591	793	21'-11	20'-6			50		55	21'-6			8.669	907	21'-11	20'-6			50		56	21'-6			9.209	1027	21'-11	20'-6			50		58	21'-6			9.747	1061	37
38	20	22	22'-5	21'-0	7"	4'-10	50	3'-4	51	22'-0		7.757	801	22'-5	21'-0	7"	5'-10	50	3'-4	55	22'-0	1'-1	1'-7	8.856	916	22'-5	21'-0	7"	6'-4	50	3'-4	56	22'-0	1'-1	2'-1	9.407	1039	22'-5	21'-0	7"	6'-10	50	3'-4	58	22'-0	1'-1	2'-7	9.965	1073	38
39	20	23	23'-0	21'-6	8"	5'-0	52	3'-6	53	22'-7	1'-2	9.259	846	23'-0	21'-6	8"	6'-0	52	3'-6	57	22'-7	1'-2	1'-8	10.533	966	23'-0	21'-6	8"	6'-6"	52	3'-6	58	22'-7	1'-2	2'-2	11.171	1092	23'-0	21'-6	8"	7'-0	52	3'-6	60	22'-7	1'-2	2'-8	11.808	1127	39
40	21	23	23'-6	22'-0			52		53	23'-1		9.452	855	23'-6	22'-0			52		57	23'-1			10.752	975	23'-6	22'-0			52		58	23'-1			11.401	1103	23'-6	22'-0			52		60	23'-1			12.051	1139	40
41	21	24	24'-0	22'-6			54		55	23'-7		9.646	881	24'-0	22'-6			54		59	23'-7			10.970	1004	24'-0	22'-6			54		60	23'-7			11.632	1136	24'-0	22'-6			54		62	23'-7			12.294	1172	41
42	22	24	24'-6	23'-0			54		55	24'-1		9.839	889	24'-6	23'-0			54		59	24'-1			11.188	1014	24'-6	23'-0			54		60	24'-1			11.862	1147	24'-6	23'-0			54		62	24'-1			12.536	1184	42
43	22	25	25'-0	23'-6			56		57	24'-7		10.032	915	25'-0	23'-6			56		61	24'-7			11.406	1043	25'-0	23'-6			56		62	24'-7			12.093	1179	25'-0	23'-6			56		64	24'-7			12.779	1217	43
44	23	25	25'-6	24'-0			56		57	25'-1		10.226	924	25'-6	24'-0			56		61	25'-1			11.629	1052	25'-6	24'-0			56		62	25'-1			12.323	1191	25'-6	24'-0			56		64	25'-1			13.022	1228	44
45	23	26	26'-0	24'-6			58		59	25'-7		10.419	950	26'-0	24'-6			58		63	25'-7			11.842	1082	26'-0	24'-6			58		64	25'-7			12.554	1223	26'-0	24'-6			58		66	25'-7			13.265	1262	45
46	24	26	26'-6	25'-0			58		59	26'-1		10.613	958	26'-6	25'-0			58		63	26'-1			12.060	1091	26'-6	25'-0			58		64	26'-1			12.784	1235	26'-6	25'-0			58		66	26'-1			13.508	1273	46
47	24	27	27'-0	25'-6			60		61	26'-7		10.806	984	27'-0	25'-6			60		65	26'-7			12.278	1120	27'-0	25'-6			60		66	26'-7			13.015	1267	27'-0	25'-6			60		68	26'-7			13.750	1307	47
48	25	27	27'-6	26'-0			60		61	27'-1		11.000	992	27'-6	26'-0			60		65	27'-1			12.496	1130	27'-6	26'-0			60		66	27'-1			13.245	1279	27'-6	26'-0			60		68	27'-1			13.993	1318	48
49	25	28	28'-0	26'-6			62		63	27'-7		11.193	1018	28'-0	26'-6			62		67	27'-7			12.714	1159	28'-0	26'-6			62		68	27'-7			13.476	1311	28'-0	26'-6			62		70	27'-7			14.236	1352	49
50	26	28	28'-6	27'-0			62		63	28'-1		11.386	1027	28'-6	27'-0			62		67	28'-1			12.933	1168	28'-6	27'-0			62		68	28'-1			13.706	1322	28'-6	27'-0			62		70	28'-1			14.479	1363	50
51	26	30	29'-0	27'-6			66		67	28'-7		11.580	1071	29'-0	27'-6			66		71	28'-7			13.151	1217	29'-0	27'-6			66		72	28'-7			13.937	1376	29'-0	27'-6			66		74	28'-7			14.722	1418	51
52	27	30	29'-6	28'-0			66		67	29'-1		11.773	1079	29'-6	28'-0			66		71	29'-1			13.369	1227	29'-6	28'-0			66		72	29'-1			14.167	1387	29'-6	28'-0			66		74	29'-1			14.964	1430	52
53	27	32	30'-0	28'-6			70		71	29'-7		11.967	1123	30'-0	28'-6			70		75	29'-7			13.587	1276	30'-0	28'-6			70		76	29'-7			14.398	1440	30'-0	28'-6			70		78	29'-7			15.207	1485	53
54	28	34	30'-6	29'-0	8"	5'-0	74	3'-6	75	30'-1	1'-2	12.160	1167	30'-6	29'-0	8"	6'-0	74	3'-6	79	30'-1	1'-2	1'-8	13.805	1325	30'-6	29'-0	8"	6'-6"	74	3'-6	80	30'-1	1'-2	2'-2	14.628	1493	30'-6	29'-0	8"	7'-0	74	3'-6	82	30'-1	1'-2	2'-8	15.450	1540	54
			N=1	S=6	W=4'-0	M=0'-4								N=4	S=7	W=5'-0	M=1'-4									N=5	S=7	W=5'-6	M=1'-10									N=6	S=8	W=6'-0	M=2'-4								

TABLE 1 : CONCRETE DISPLACED BY PIPES:

PIPE SIZES RCP	CMP	6" CU YD	7" CU YD	8" YD
42"	48"	0.233	0.271	0.310
48"	60"	0.340	0.396	0.453
54"	66"	0.427	0.498	0.569
60"	72"	0.524	0.611	0.698
	54"	0.295	0.344	0.393

TABLE 2 : MAXIMUM PIPE SIZE TO BE USED:

	RCP	CMP
COLUMN A	42"	48"
COLUMN B	48"	60"
COLUMN C	54"	66"
COLUMN D	60"	72"

TABLE 3 : CONCRETE NEEDED FOR FORMED INVERT:

PIPES SIZES	RCP CU YD	CMP CU YD
42"	0.273	----
48"	0.428	0.143
54"	---	----
60"	0.617	0.223
66"	---	0.270
72"	---	0.322

STRUCTURAL STEEL :
RECTANGULAR GRATE & FRAME = 340 LBS
BICYCLE- SAFE GRATE & FRAME = 365 LBS
SOLID COVER & FRAME = 474 LBS

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

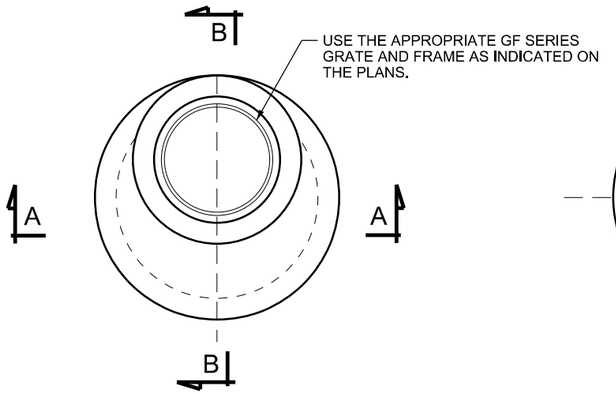
AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

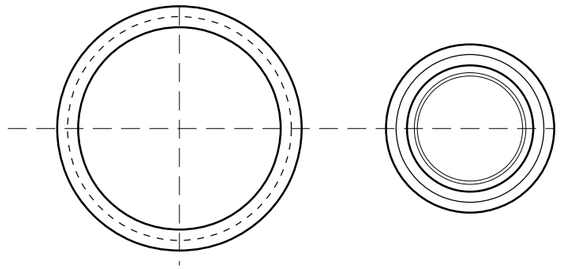
STANDARD CATCH BASIN AND CLEANOUT BOX SCHEDULE OF INSTALLATION
42 TO 60 INCH RCP
48 TO 72 INCH CMP
STANDARD DRAWING TITLE

STD. DWG. NO.
CB 10C

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (B&C)\CB\CB44, CB\CB10C.dgn

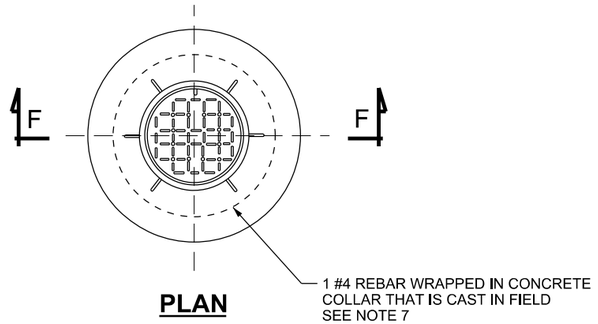


PLAN



SECTION C-C

SECTION D-D



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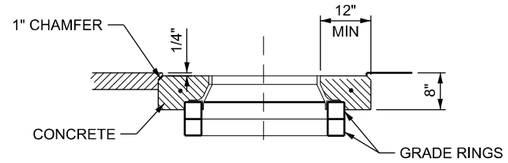
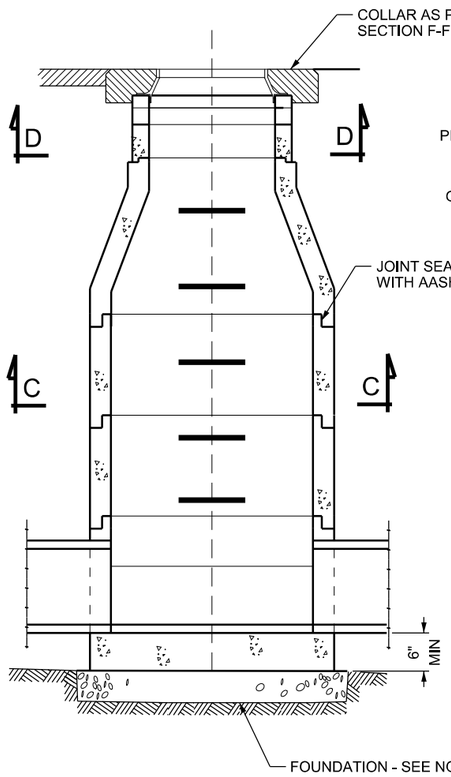
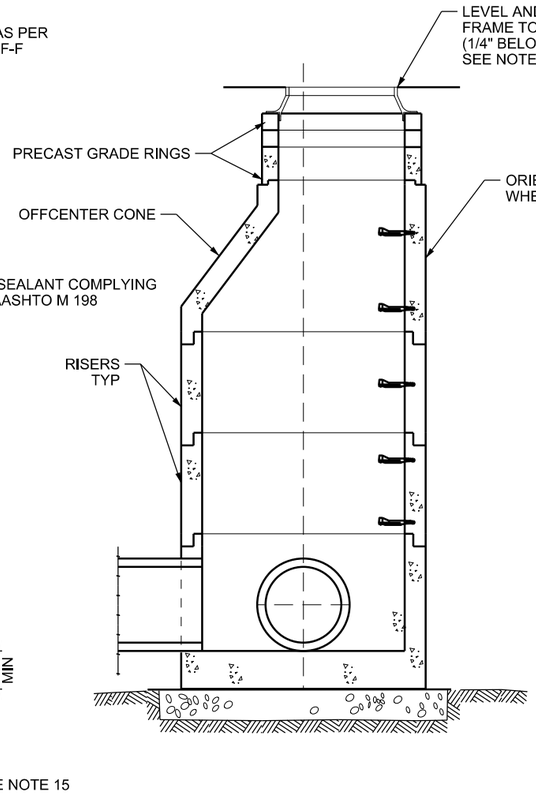


SECTION F-F



SECTION A-A



SECTION B-B

MAX PIPE O.D.		
DIA	45 DEG ANGLE	90 DEG ANGLE
4'- 0"	27"	18"
5'- 0"	36"	24"

PRECAST SECTIONS	MAX HEIGHT
GRADE RINGS	8"
COMBINED GRADE RINGS AND LID	18"
CONES	36"
RISERS	48"

DESIGN DATA

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

NOTES

1. PROVIDE PRECAST CONCRETE STANDARD MANHOLE SECTIONS THAT CONFORM TO AASHTO M 199 (ASTM C 478) EXCEPT THAT THE MINIMUM WALL THICKNESS WILL BE 3 INCHES.
2. USE DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO M 31, GRADE 60 OR WELDED WIRE REINFORCING CONFORMING TO AASHTO M 55 OR AASHTO M 221.
3. COATED STEEL IS NOT REQUIRED FOR PRECAST MANHOLES.
4. USE CLASS AA (AE) CONCRETE.
5. USE TYPE II CEMENT (LOW ALKALI).
6. PROVIDE 1 INCH OF CONCRETE COVER TO REINFORCING STEEL IN MANHOLE WALLS AND CONE.
7. PROVIDE 2 INCHES OF CONCRETE COVER TO REINFORCING STEEL IN MANHOLE BASE AND COLLAR.
8. PLACE STEPS BEGINNING NOT LESS THAN 12 INCHES BELOW FINISH GRADE AND PLACE ADDITIONAL STEPS ACCORDING TO STD DWG GF 6. MANUFACTURER WILL ADJUST GRADE RINGS AND RISER HEIGHTS TO ACCOMMODATE UNIFORM SPACING OF STEPS ACCORDING TO STD DWG GF 6.
9. USE 3, 4, 6, OR 8 INCH GRADE RINGS FOR RISERS.
10. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
11. REMOVE THE CONE AND GRADE RINGS AND ADJUST THE MANHOLE ELEVATION WITH THE APPROPRIATE MANHOLE SECTION IF THE REQUIRED MANHOLE ADJUSTMENT IS MORE THAN 1 FT. MATCH FINISH GRADE FOR THE CONE SECTION AND GRADE RINGS, FRAME AND LID.
12. REMOVE DEBRIS FROM MANHOLE AND PIPE INVERTS.
13. REPAIR OR REPLACE MANHOLE SECTIONS, CONES, AND GRADE RINGS DAMAGED BY CONSTRUCTION TO THE SATISFACTION OF THE ENGINEER.
14. USE STD DWG GF 2 FOR RING AND LID UNLESS OTHER GF SERIES AS SHOWN.
15. PROVIDE HYDRAULIC CEMENT MORTAR ACCORDING TO ASTM C 1329.
16. DO NOT OVER EXCAVATE. PLACE 6 INCH MIN UTBC BEDDING ACCORDING TO STANDARD SPECIFICATION 02721 ON FIRM SUBGRADE. DO NOT USE CRUSHED ROCK IN ACTIVE WATER TABLE WITHOUT APPROVAL OF THE ENGINEER.
17. CAST FORMED INVERT TO BE POURED IN PLANT, WHEN SPECIFIED.
18. MANUFACTURE MANHOLE RISERS, BASES, CONES, AND GRADE RINGS INCLUDING STEEL REINFORCING WHERE REQUIRED ACCORDING TO ASTM C 478.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

AUGUST 2020 — DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE — DATE AUGUST 2020

APPROVED

DEPUTY DIRECTOR — DATE

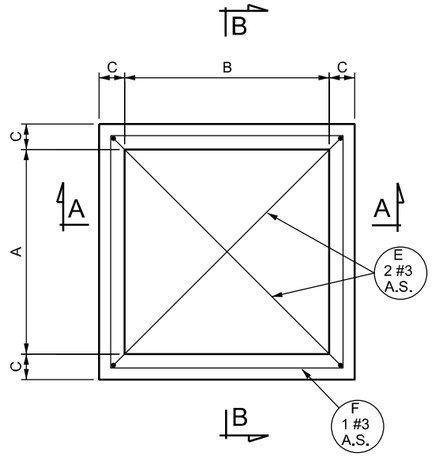
PRECAST CONCRETE STANDARD MANHOLE

STANDARD DRAWING TITLE

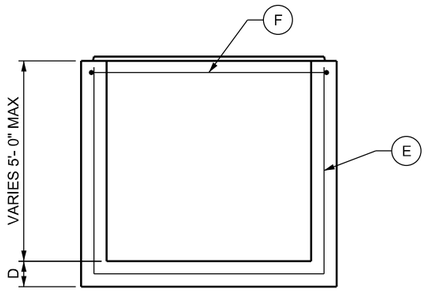
STD. DWG. NO.

CB 11

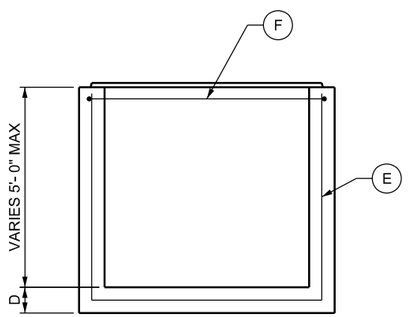
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (B&W_CB)\CB11.dgn
23-JUN-2020



PLAN



SECTION A-A



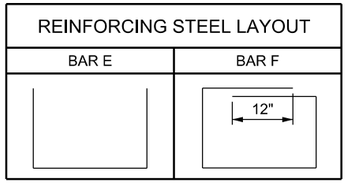
SECTION B-B

PRECAST DRAINAGE BOXES
SMALL STANDARD SIZES

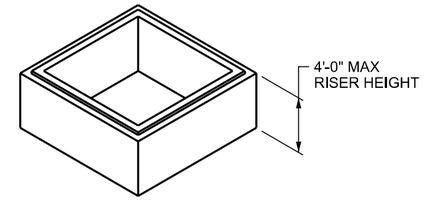
BOX SIZE	A	B	C	D
1'- 6" x 4'- 0"	18"	48"	6"	6"
2'-0" x 2'-0"	24"	24"	6"	6"
2'-0' x 3'-0"	24"	36"	6"	6"
2'-6" x 4'-0"	30"	48"	6"	6"
3'-0" x 3'-0"	36"	36"	6"	6"
3'-0" x 3'-6"	36"	42"	6"	6"
4'-0" x 4'-0"	48"	48"	6"	6"

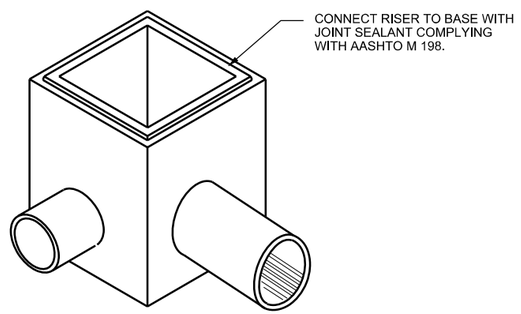
OTHER SIZE BOXES WITH DIFFERENT A AND B DIMENSIONS (LESS THAN 48") ARE ACCEPTABLE

REINFORCING STEEL LAYOUT



RISERS
AN UNREINFORCED PRECAST CONCRETE RISER MATCHING DRAINAGE BOX SIZES MAY BE USED FOR BOXES DEEPER THAN 4'-0".





ISOMETRIC VIEW

DESIGN DATA

STRUCTURAL CONCRETE:	f 'c = 4,000 psi; fy = 60,000; n = 8
SOIL DENSITY:	130 PCF
EQUIVALENT SOIL FLUID PRESSURE:	55 PCF
DEPTH TO WATER TABLE:	5 FEET
DEPTH TO BOTTOM OF BASE:	8 FEET

NOTES

1. THIS DRAWING IS A PRECAST ALTERNATE TO THE CAST-IN-PLACE SIZING AND STRUCTURAL DETAILS IN CB SERIES STD DWG. USE DEFORMED REINFORCING STEEL BARS TO CONFORMING TO AASHTO M 31 GRADE 60 OR WELDED WIRE FABRIC CONFORMING TO AASHTO M 55. COATED STEEL IS NOT REQUIRED FOR SMALL DRAINAGE STRUCTURES ON THIS DRAWING.
2. USE CLASS AA (AE) CONCRETE.
3. USE TYPE II CEMENT (LOW ALKALI).
4. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
5. SEE ROADWAY PLANS FOR NUMBER LOCATION, AND SIZE OF PIPE.
6. USE THE APPROPRIATE GF SERIES GRATE AND FRAME AS INDICATED ON THE PLANS.
7. PROVIDE SUFFICIENT LIFTING POINTS FOR A SAFE INSTALLATION. LOCATE LIFTING DEVICES TO AVOID INTERFERENCE WITH THE REINFORCING STEEL. SUPPLY A MINIMUM OF AT LEAST TWO ENGINEERED LIFTING POINTS PER SECTION. DESIGN LIFTING DEVICES TO PCI DESIGN HANDBOOK. PROPERLY ATTACH TO ALL PROVIDED LIFTING POINTS. LIFT ONLY FROM ENGINEERED LIFTING POINTS.
8. DO NOT USE DRAINAGE BOXES AND RISER COMBINATIONS THAT EXCEED EIGHT FT FROM FINISHED GRADE TO THE BOTTOM OF THE BOX.
9. PROVIDE CORE HOLES THAT ARE A MINIMUM OF PIPE OUTER DIAMETER PLUS 4 INCHES.
10. CUT CORE HOLES AT THE MANUFACTURING PLANT UNLESS FIELD CORE HOLES ARE AUTHORIZED BY THE ENGINEER. CENTER CORE HOLES TO LEAVE 2 INCHES OF CONCRETE MEASURED FROM INSIDE WALL OF THE BOX TO CORE HOLE LOCATE CORE HOLE VERTICALLY TO LEAVE A MINIMUM OF 5 INCHES OF CONCRETE DIRECTLY ABOVE THE CORE HOLE TO THE TOP OF THE BOX. CUT CORE HOLE SO THAT THE BOTTOM OF THE HOLE IS AT OR ABOVE THE FLOOR ELEVATION OF THE BOX.
11. DEVIATIONS FROM CORE HOLE TOLERANCES IN NOTES 9 AND 10 REQUIRE SHOP DRAWINGS. SHOP DRAWINGS WILL IDENTIFY LIFTING POINT NUMBER AND LOCATION.
12. DESIGN PRECAST LIDS FOR HL-93 LIVE LOADS IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS. SUBMIT STAMPED DESIGN DRAWINGS, SEALED BY PROFESSIONAL ENGINEER OR PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF UTAH, TO THE ENGINEER.
13. DO NOT USE THIS DRAWING WHEN THE WATER TABLE IS WITHIN 5 FT OF FINISHED GRADE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

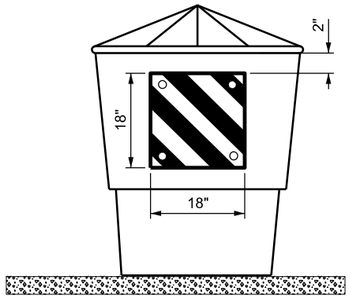
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

PRECAST CONCRETE DRAINAGE BOX

STANDARD DRAWING TITLE

STD. DWG. NO.
CB 12

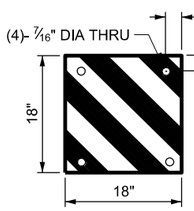
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 3 (BB4, CB)\CB12.dgn
23-JUN-2020



PLACE THE APPROPRIATE OBJECT MARKER PANEL OR SHEETING 2 INCHES FROM THE TOP OF THE LEAD BARREL OF THE ARRAY.

MARKER POST NOT REQUIRED.

CRASH CUSHION TYPE E

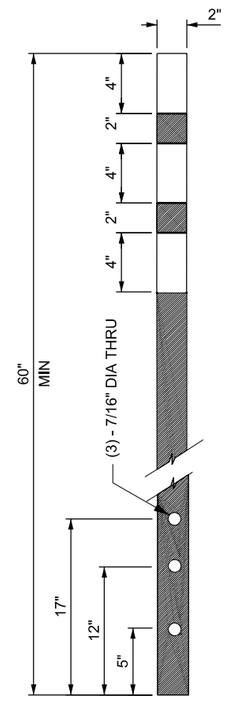


USE A 0.032 GAUGE ALUMINUM MARKER PLATE WITH APPROPRIATE MARKER SHEETING

USE FOUR 3/8 INCH x 1 INCH ZINC PLATED BOLTS WITH WASHERS AND NUTS TO MOUNT PLATE.

SELF ADHESIVE SHEETING WITH APPROPRIATE OBJECT MARKER DESIGNATION CAN BE USED AS A SUBSTITUTE.

MARKER PLATE



MARKER POST

USE YELLOW BANDS OF REFLECTIVE SHEETING AS SPECIFIED BY STANDARD SPECIFICATION 02890, PART 2. PLACE BANDS AT THE TOP OF THE POST WITH A 2 INCH SPACE BETWEEN THE 1ST AND 2ND BAND AND THE 2ND AND 3RD BAND. DRILL THREE MOUNTING HOLES, 7/16 INCH IN DIAMETER, MEASURED FROM THE BOTTOM UP 5 INCHES, 12 INCHES, AND 17 INCHES.

MARKER POST MOUNTING

MOUNT MARKER POST 48 INCHES FROM THE BOTTOM OF THE THIRD YELLOW BAND TO GROUND LEVEL. DO NOT COLLAPSE MARKER POST WHEN SECURING TO SYSTEM.

WOOD POST: PLACE MARKER POST ON THE FRONT OF THE FIRST POST OF SYSTEM AND SECURE WITH THREE 3/8 x 4 INCH ZINC PLATED LAG BOLTS AND WASHERS.

METAL POST: PLACE MARKER POST ON THE FRONT OF THE FIRST POST OF SYSTEM AND SECURE WITH THREE 3/8 x 3 INCH ZINC PLATED BOLTS WITH NUTS AND WASHERS.

PLASTIC NOSE PIECES: PLACE MARKER POST 12 INCHES FORWARD FROM THE BACK EDGE OF THE NOSE PIECE AND SECURE WITH THREE 3/8 x 3 INCH ZINC PLATED BOLTS WITH WASHERS.

DESIGN-ONLY NOTE:

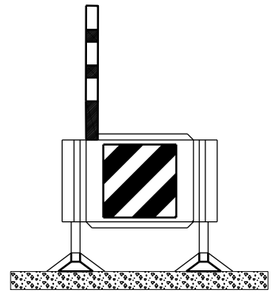
A. MARKER POST IS OPTIONAL WHEN SNOW ACCUMULATION IS NOT A CONCERN.

NOTES:

1. USE MARKER POST UNLESS OTHERWISE SPECIFIED.

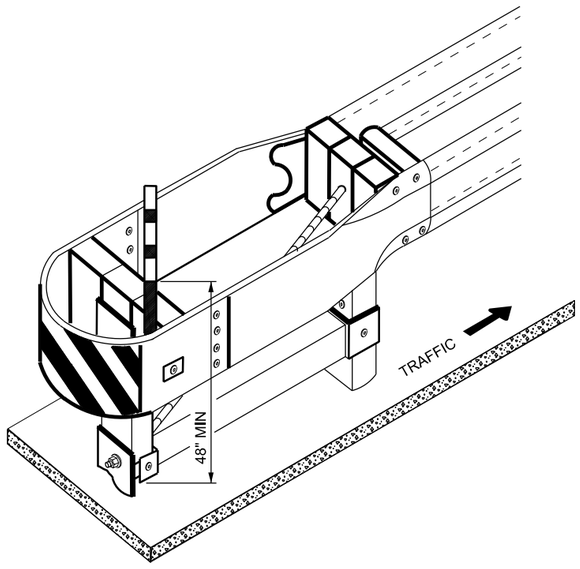
2. COMPLY WITH STANDARD SPECIFICATION 02890 FOR FLEXIBLE SHEETING.

MARKER POST



OBJECT MARKER PLATE OR SHEETING: ATTACH TO THE TOP FRONT AND SIDE OF UNIT NEAREST THE APPROACH LANE OF TRAFFIC. IN A GORE AREA CENTER OBJECT MARKER.

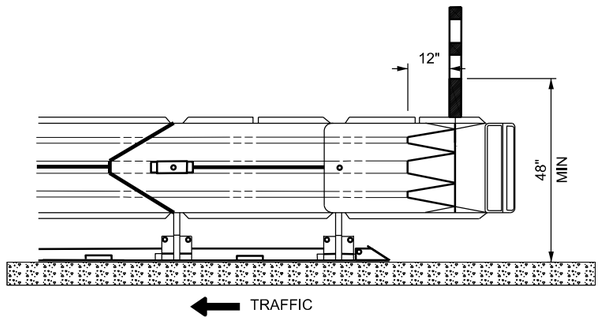
CRASH CUSHIONS TYPE A,B, & D



C.A.T. OBJECT MARKER PLATE OR SHEETING:
ATTACH TO THE FRONT OF SYSTEM TOP AND OFFSET 6 INCHES FROM CENTER TOWARD THE APPROACH LANE OF TRAFFIC.

FLEAT-MT:
INSTALL AN OBJECT MARKER PANEL ONTO EACH OF THE IMPACT HEADS.
INSTALL MARKER POST ON POST 1 OF THE SYSTEM.

CRASH CUSHION TYPE C



CRASH CUSHIONS TYPE A,B, & D

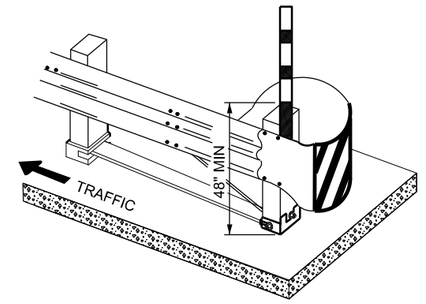
MARKER POST:

MOUNT ON THE SIDE OF THE APPROACH TRAFFIC, 12 INCHES FROM THE BACK EDGE OF PLASTIC NOSE PIECE. IN GORE AREAS MOUNT ON BOTH SIDES.

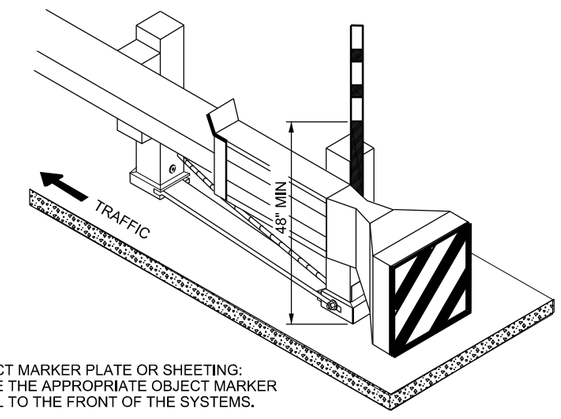
END TREATMENT TYPE F

QUADTREND 350 SYSTEM HAS A BELTED OR PLASTIC NOSE PIECE AND STEEL POSTS,OBJECT MARKER MOUNTING SIMILAR TO TYPE H AND MARKER POST IS MOUNTED ON THE NOSE PIECE SIMILAR TO TYPE B.

BEAT-SSCC:
INSTALL OBJECT MARKER PANEL ONTO IMPACT HEAD.
INSTALL MARKER POST ON POST 1 OF THE SYSTEM.



END TREATMENT TYPE H



OBJECT MARKER PLATE OR SHEETING:
PLACE THE APPROPRIATE OBJECT MARKER PANEL TO THE FRONT OF THE SYSTEMS.

END TREATMENT TYPE G

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

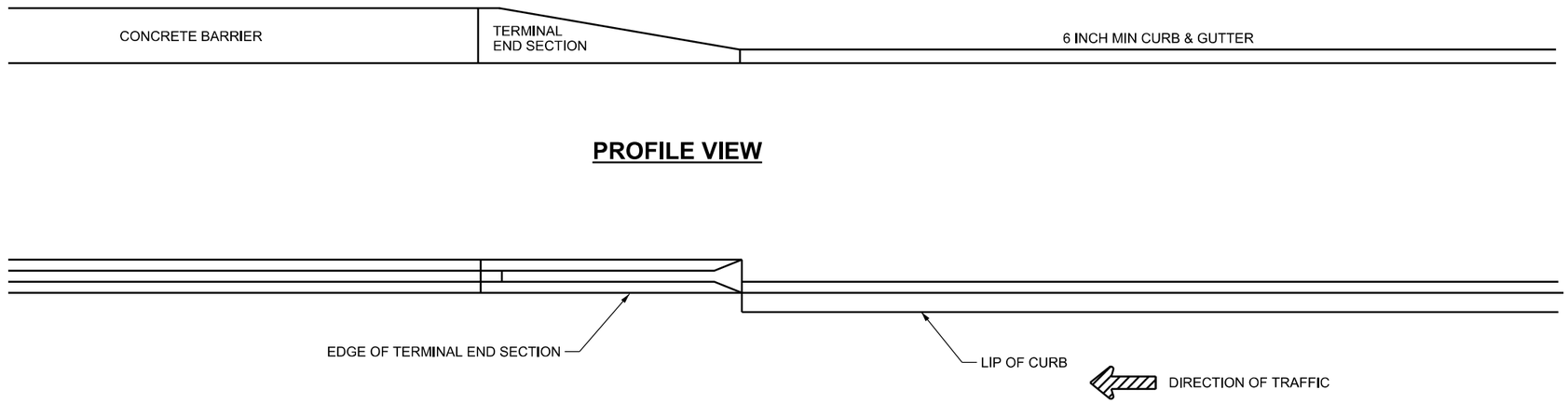
DEPUTY DIRECTOR

CRASH CUSHION AND END TREATMENT MARKERS

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 1

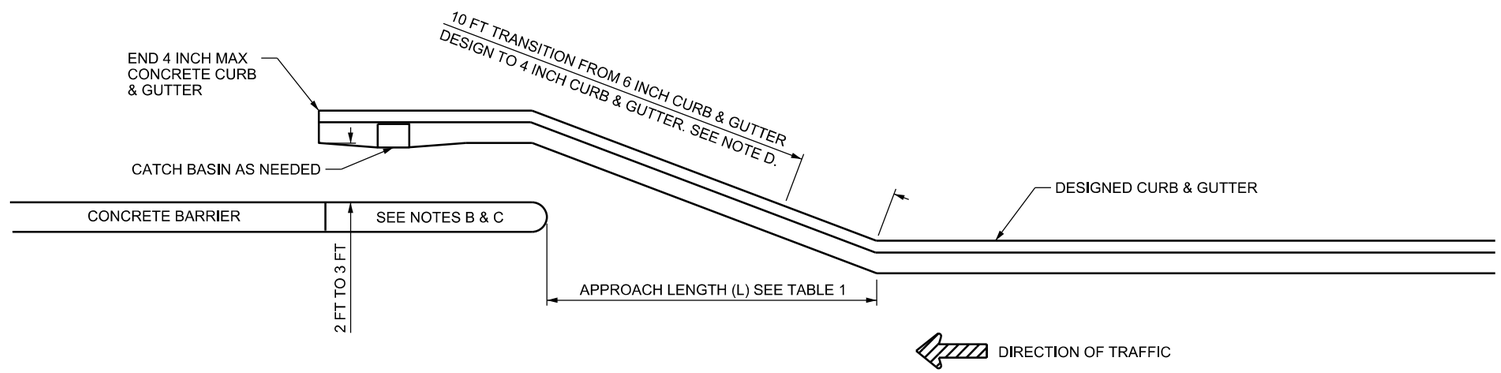
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\CC01.dgn
23-JUN-2020



PROFILE VIEW

PLAN A1: DESIGN SPEED 40 MPH OR LESS

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



PLAN A2: DESIGN SPEED GREATER THAN 40 MPH

DESIGN-ONLY NOTES PLAN A2:

A. REFER TO GUIDELINES FOR CRASH CUSHION AND BARRIER END TREATMENTS FOR APPROVED SYSTEM AND FOR SPECIFIC APPLICATION.

B. PROTECT CONCRETE BARRIER END WITH A TYPE F END TREATMENT OR CRASH CUSHION TYPES A,B, OR D.

C. REFER TO BA 3 SERIES STD DWGS BEFORE ATTACHING CRASH CUSHION OR END TREATMENT TO CONSTANT SLOPE BARRIER. CONCRETE TRANSITION SECTION REQUIRED.

D. CREATE 10 FT CURB & GUTTER TRANSITION DETAIL FOR CHOSEN CURB & GUTTER TYPE.

DESIGN ONLY DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

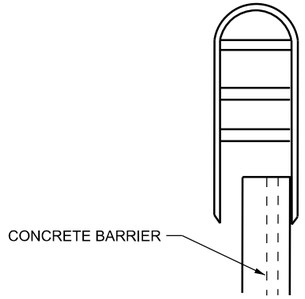
DEPUTY DIRECTOR

CRASH CUSHION
DRAINAGE DETAILS
GUIDELINE A

STANDARD DRAWING TITLE

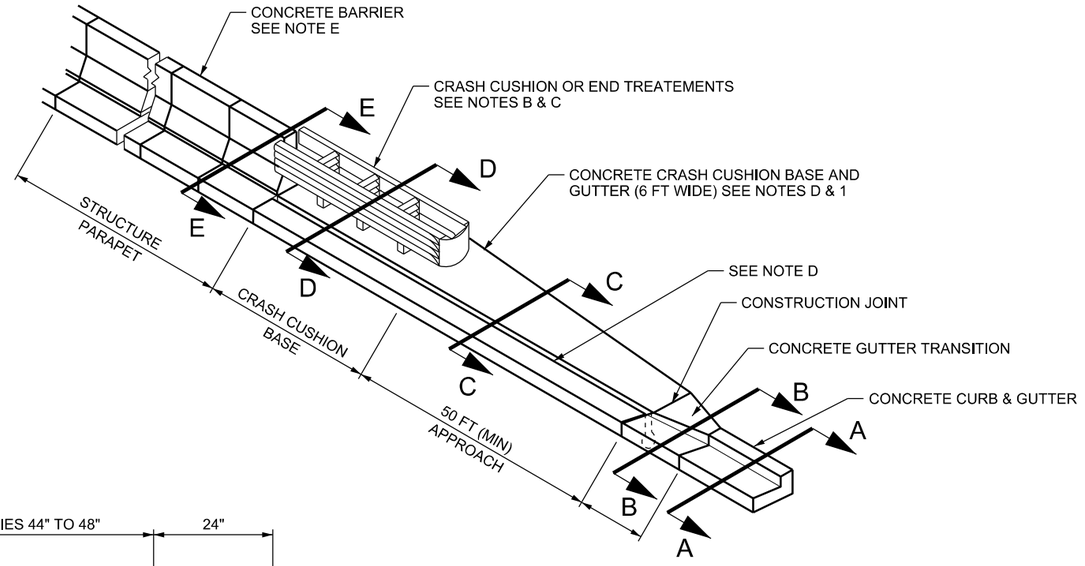
STD. DWG. NO.
CC 2

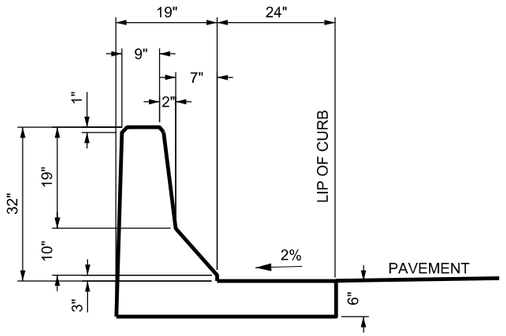
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\CC02.dgn
23-JUN-2020



CRASH CUSHION CONNECTION

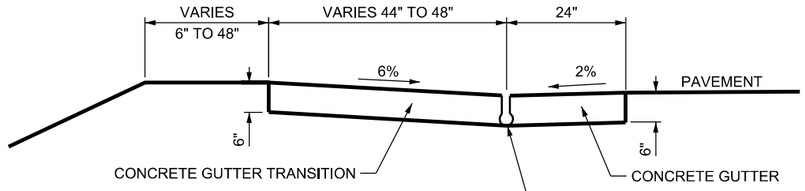
SEE NOTE C



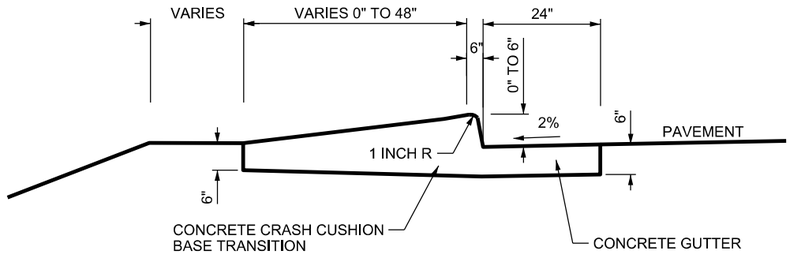


SECTION E-E

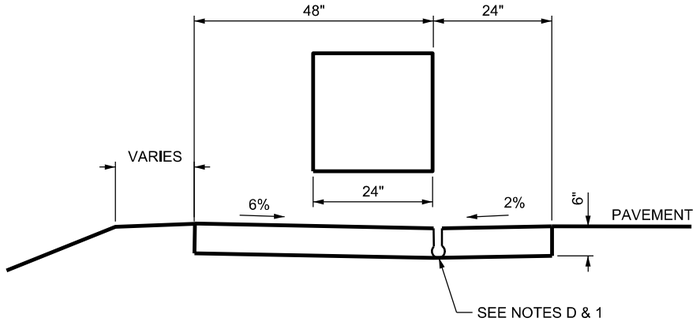
SEE NOTE E



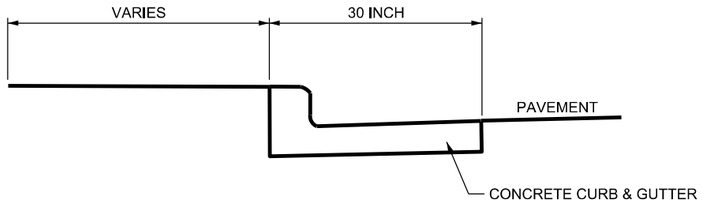
SECTION C-C



SECTION B-B



SECTION D-D



SECTION A-A

DESIGN-0NLY NOTES:

A. ALTERNATIVE INSTALLATION TO STD DWG CC 2 PLAN A2, FOR CRASH CUSHIONS OR END TREATMENTS.

B. REFER TO GUIDELINES FOR CRASH CUSHION AND BARRIER END TREATMENTS FOR APPROVED SYSTEMS AND FOR SPECIFIC APPLICATION.

C. PROTECT CONCRETE BARRIER END WITH A W-BEAM GUARDRAIL TRANSITION WITH A TYPE G OR TYPE H W-BEAM END TREATMENT OR A TYPE F END TREATMENT. PROTECT CONCRETE BARRIER END USING A CRASH CUSHION TYPE A, B, OR D WHEN THE INSTALLATION REQUIREMENTS OF A W-BEAM GUARDRAIL TRANSITION WITH A W-BEAM END TREATMENT OR TYPE F END TREATMENT CANNOT BE MET.

D. DESIGN A DRAINAGE SYSTEM THAT DOES NOT CREATE A RAISED CURB IN FRONT OF OR TO THE SIDES OF THE END TREATMENTS OR CRASH CUSHION SYSTEM WHEN PARALLEL ROAD SYSTEM IS 1 PERCENT OR GREATER. A SLOTTED DRAINAGE SYSTEM IS AN OPTION.

E. NEW JERSEY STYLE BARRIER SHOWN, ATTACH TO CONSTANT SLOPE BARRIER IN SIMILAR MANNER. USE CONSTANT SLOPE TRANSITION SECTION SEE BA 3 SERIES STD DWGS, BEFORE ATTACHING CRASH CUSHION OR END TREATMENT.

NOTES:

1. CAST, IN A MONOLITHIC POUR, CRASH CUSHION BASE AND GUTTER FROM REAR OF SYSTEM TO THE APPROACH TRANSITION WITH CURB AND GUTTER. CONSTRUCT PAD TO MEET CROSS SLOPE LISTED WITHIN THE PLAN SET. CONSTRUCT PAD NOT TO EXCEED SYSTEM MANUFACTURER'S CROSS SLOPE REQUIREMENTS IF CROSS SLOPE IS STEEPER THAN 10:1.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

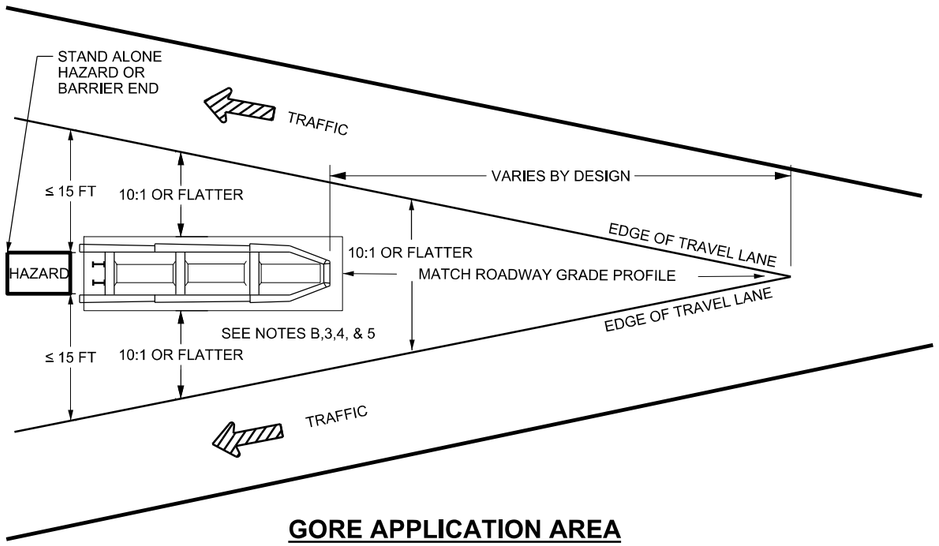
DEPUTY DIRECTOR

CRASH CUSHION AND END TREATMENTS DRAINAGE DETAILS GUIDELINE B

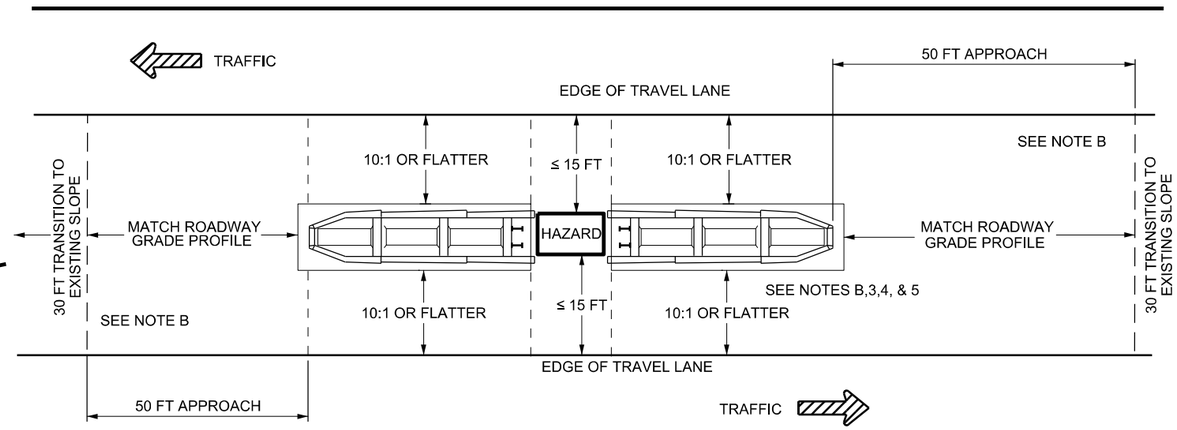
STANDARD DRAWING TITLE

STD. DWG. NO.
CC 3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB\CC03.dgn
23-JUN-2020

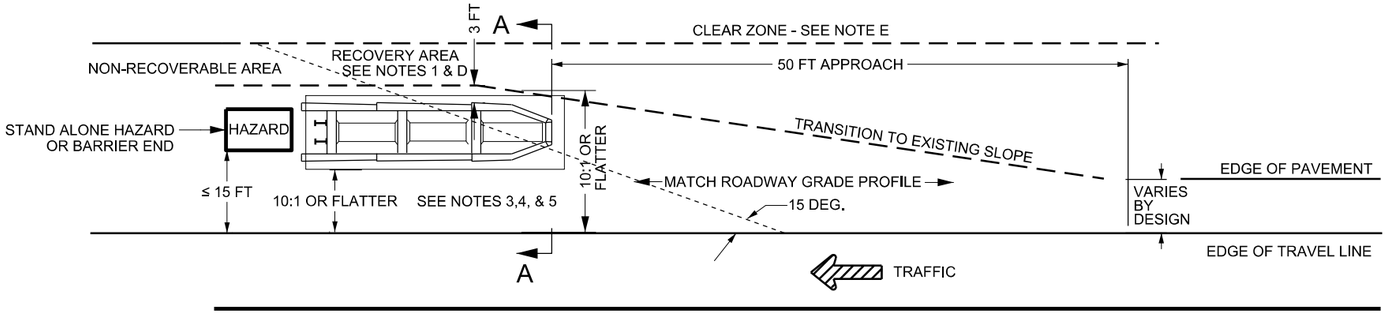


GORE APPLICATION AREA



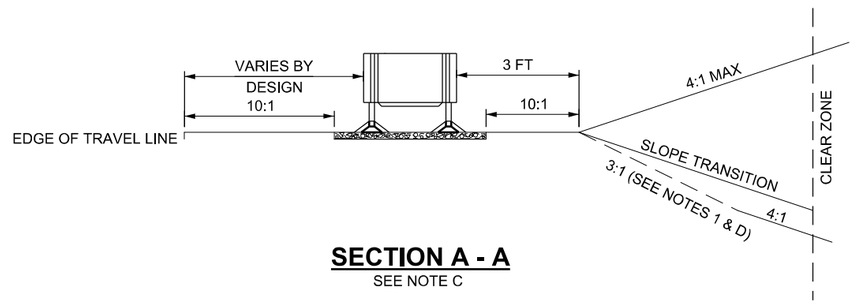
MEDIAN APPLICATION

SEE NOTE C



SHOULDER APPLICATION

SEE NOTE C



SECTION A - A

SEE NOTE C

DESIGN-ONLY NOTES:

A. REFER TO GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR APPROVED SYSTEMS AND FOR SPECIFIC APPLICATION DETAILS.
B. ALL APPLICATIONS REQUIRE THE USE OF A 10:1 SLOPE OR FLATTER TO THE FRONT AND SIDE APPROACHES. USE A 10:1 OR FLATTER SLOPE AT THE REAR OF THE SYSTEM WHEN TRAFFIC ALSO APPROACHES FROM THE REAR OF THE SYSTEM.
C. PROTECT BARRIER ENDS WITH A W-BEAM GUARDRAIL TRANSITION AND TYPE G OR TYPE H W-BEAM END TREATMENT OR TYPE F END TREATMENT AS FIRST OPTION. PROTECT CONCRETE BARRIER END USING A CRASH CUSHION TYPES A, B, OR D WHEN THE INSTALLATION REQUIREMENTS OF A W-BEAM GUARDRAIL TRANSITION AND W-BEAM END TREATMENT OR TYPE F END TREATMENT CANNOT BE MET.
D. MEET SLOPE REQUIREMENTS AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DRAWINGS IN RECOVERY AREA. THE ADDITIONAL INFORMATION BELOW ARE THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS IN RECOVERY AREA.
   1. RECOVERY AREA IS THE AREA BEHIND THE CRASH CUSHION AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF CRASH CUSHION TO THE END OF THE CALCULATED LENGTH OF NEED.
   2. USE A 4:1 OR FLATTER FILL SLOPE IN RECOVERY AREA. USE A MAXIMUM 3:1 FORESLOPE AND ESTABLISH RECOVERY AREA AT BOTTOM OF 3:1 SLOPE IF IMPRACTICAL. A 4:1 OR FLATTER IN RECOVERY AREA REQUIRED WHEN USED WITH A BACKSLOPE .
E. MAINTAIN AASHTO CLEAR ZONE REQUIREMENTS.

NOTES:

1. COMPLETE SLOPE PREPARATIONS PRIOR TO INSTALLING SYSTEM.
2. USE A TRANSITION ELEMENT, ACCORDING TO MANUFACTURER'S SPECIFICATIONS, WHEN TRAFFIC APPROACHES THE REAR OF SYSTEM.
3. USE MANUFACTURER'S SPECIFICATIONS FOR PAD AND BACKUP REQUIREMENTS. A CONCRETE PAD IS REQUIRED FOR PERMANENT INSTALLATION OF TYPE A, B & D CRASH CUSHIONS.
4. CONSTRUCT PAD TO MEET CROSS SLOPE LISTED WITHIN THE PLAN SET. CONSTRUCT PAD NOT TO EXCEED SYSTEM MANUFACTURER'S CROSS SLOPE REQUIREMENTS IF CROSS SLOPE IS STEEPER THAN 10:1. GRADING WILL BE COMPLETED FLUSH TO THE TOP OF THE PAD.
5. INSTALL PROPER MARKINGS ACCORDING TO STD DWG CC 1.
6. INSTALL A CONSTANT SLOPE TRANSITION SECTION BEFORE INSTALLING CRASH CUSHION OR END TREATMENT WHEN CONSTANT SLOPE TYPE BARRIER IS INSTALLED. REFER TO BA 3 SERIES STD DWGS .

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

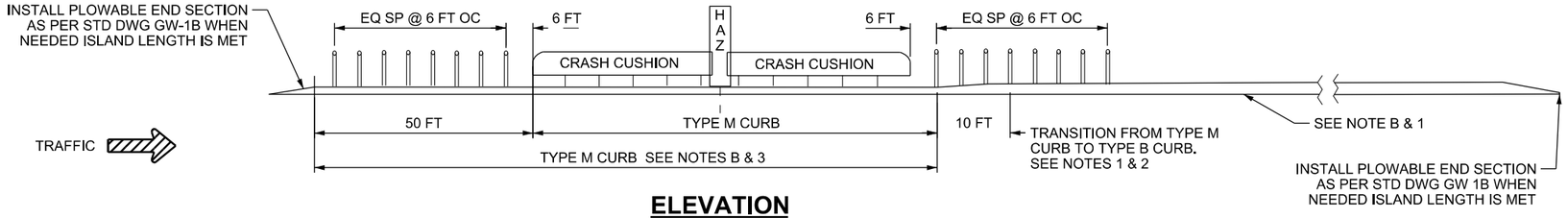
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

DETAILS FOR PLACEMENT CRASH CUSHIONS TYPE A, B, AND D

STANDARD DRAWING TITLE

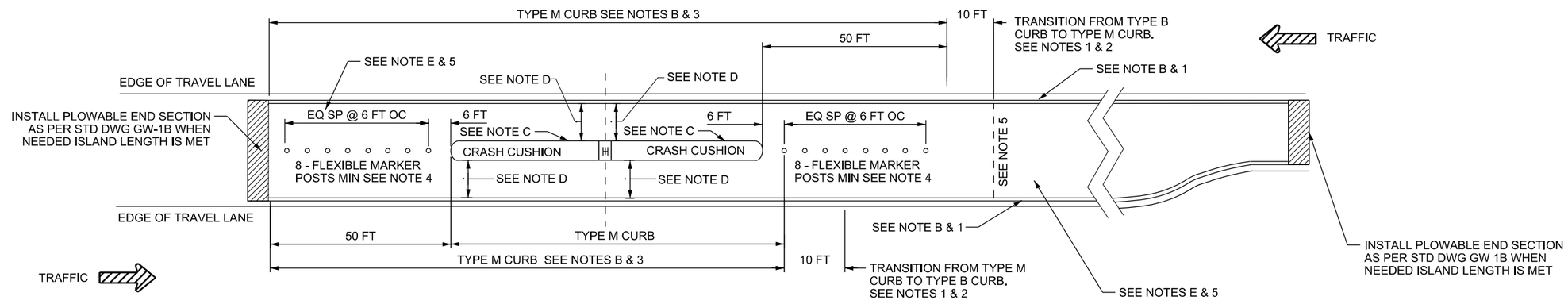
STD. DWG. NO.
CC 4A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\CC04A.dgn
23-JUN-2020



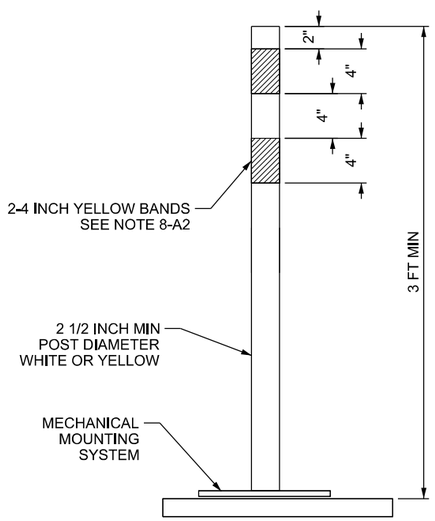
ELEVATION

ONE APPROACH SHOWN
REVERSE APPROACH SIMILAR



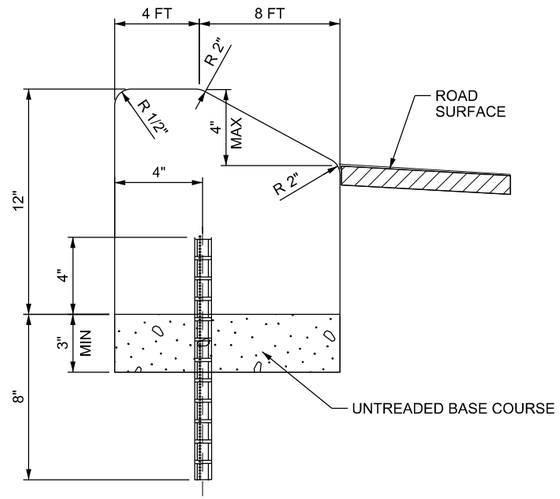
PLAN VIEW

SEE NOTE A



FLEXIBLE MARKER POST SURFACE MOUNTED

SEE NOTE 4



MODIFIED TYPE M1-A CURB

USE # 6 X 12 INCH LONG COATED DEFORMED BARS ON 5 FT MAX CENTERS REFER TO NOTE B

DESIGN-ONLY NOTES:

A. THIS DRAWING DEPICTS TWO DETAILS THAT ARE ACCEPTABLE FOR THE USE OF A CRASH CUSHION ON AN ISLAND APPLICATION. CONSULT PLAN SET TO DETERMINE WHICH APPLICATION TO USE.
   1. EITHER PLAN VIEW ENDS CAN BE USED FOR BOTH APPROACH DIRECTIONS.
   2. PLAN CAN BE COMBINED, AS DEPICTED, FOR APPROACH TRAFFIC.
B. CRASH CUSHION MANUFACTURERS RECOMMEND NO MORE THAN A 4 INCH CURB TO THE APPROACH OR SIDES OF A CRASH CUSHION. USE TYPE M1-A, MODIFIED M1-A, OR M2 CURB WHERE TYPE M CURB IS CALLED OUT. USE OF TYPE M CURB IS ALLOWED FOR ALL ISLAND CURBING.
C. RECOMMEND USING TYPES A, B, OR D CRASH CUSHION SYSTEMS. REFER TO THE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR APPROVED SYSTEMS. INSTALL CRASH CUSHIONS ON CONCRETE PAD ACCORDING TO MANUFACTURER'S REQUIREMENTS.
D. MEET OFFSET REQUIREMENTS ACCORDING TO THE UDOT ROADWAY DESIGN MANUAL. REFER TO LATERAL OFFSET TO OBSTRUCTION REQUIREMENTS, NOTE B.
E. EVALUATE DRAINAGE OF ISLAND SURFACE.

NOTES:

1. CONSULT PLAN SET TO DETERMINE WHICH TYPE M CURB AND TYPE B CURB TO USE. REFER TO STD DWG GW 2 OR MODIFIED TYPE M1-A DETAIL, THIS SHEET.
2. TRANSITION FROM TYPE M CURB TO TYPE B CURB WHERE SPECIFIED.
3. ISLAND LENGTH AND TYPE M CURB REQUIREMENTS CAN VARY BASED ON HAZARD LENGTH AND LENGTH OF CHOSEN CRASH CUSHION SYSTEM. MINIMUM ISLAND LENGTH IS EQUAL TO THE SUM OF HAZARD LENGTH, CRASH CUSHION LENGTH, AND THE MINIMUM 50 FT IN FRONT OF CRASH CUSHION.
4. MARKER POSTS ARE USED TO DISCOURAGE TRAFFIC FROM TRAVERSING ISLAND. USE A SURFACE MOUNTED FLEXIBLE MARKER POST AS APPROVED BY THE ENGINEER.
   A. FLEXIBLE MARKER POST:
      1. MANUFACTURED USING POLYETHYLENE OR POLYPROPYLENE WITH A YELLOW OR WHITE BODY, MINIMUM 0.110 INCH TUBE WALL THICKNESS, 36 INCH TALL.
      2. INSTALL TWO 4 INCH BANDS OF YELLOW SHEETING CONFORMING TO STANDARD SPECIFICATION 02890, ACCORDING TO FLEXIBLE MARKER POST DETAIL.
   B. USE A MECHANICAL SURFACE MOUNTING SYSTEM AND MOUNT ACCORDING TO MANUFACTURER'S REQUIREMENTS.
   C. USE A MOUNTING SYSTEM WHICH THE MARKER POST CAN BE REMOVED AND REPLACED WITHOUT DISTURBING THE MOUNTING BASE.
   D. ADDITIONAL MARKER POSTS INSTALLED AT ENGINEERS DISCRETION.
5. FILL ISLAND BETWEEN THE CURBS AND FROM THE CURB TRANSITION TO THE BACK OF THE CRASH CUSHION USING A DURABLE ALL WEATHER SURFACE (EXAMPLE: ASPHALT, CONCRETE). DO NOT PLACE LANDSCAPE MATERIAL IN FRONT OF OR TO THE SIDES OF CRASH CUSHION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

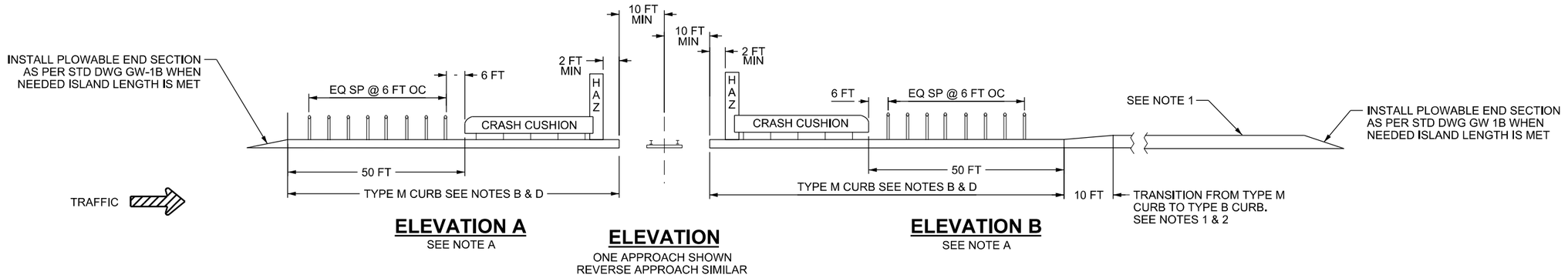
RECOMMENDED FOR APPROVAL		AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED		AUGUST 2020 DATE
DEPUTY DIRECTOR		

CRASH CUSHION MOUNTED ON MEDIAN ISLAND

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 4B

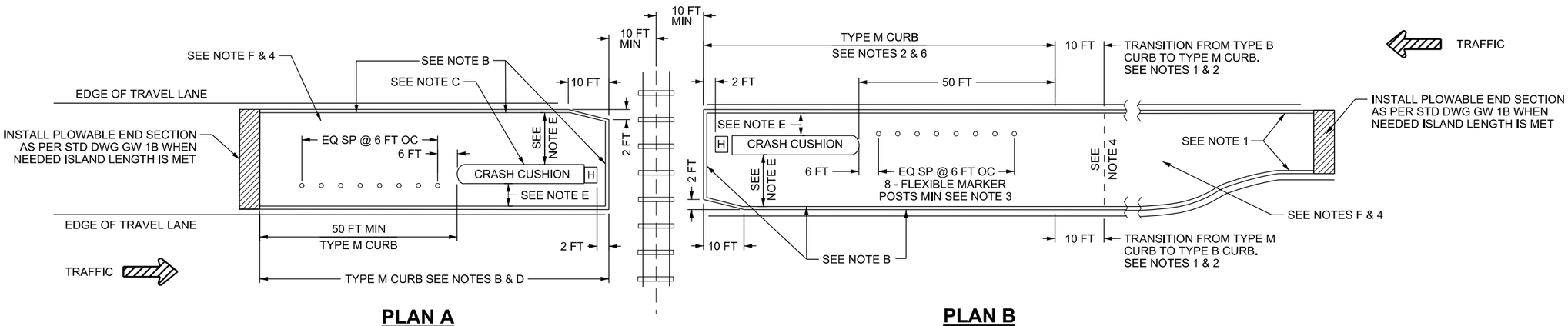
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\CC04B.dgn
23-JUN-2020



ELEVATION A
SEE NOTE A

ELEVATION
ONE APPROACH SHOWN
REVERSE APPROACH SIMILAR

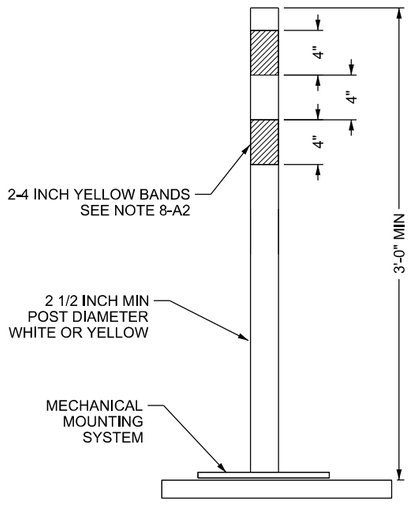
ELEVATION B
SEE NOTE A



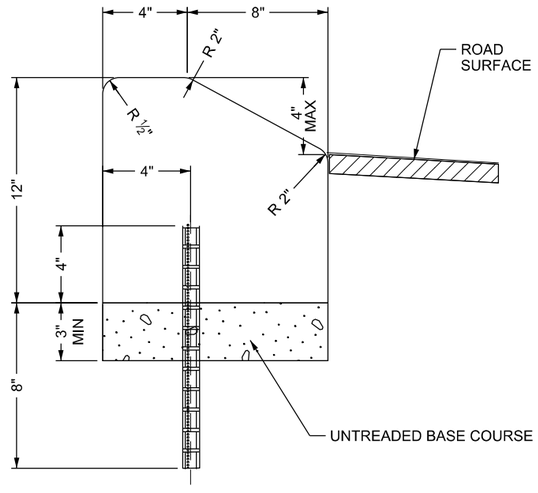
PLAN A

PLAN B

PLAN VIEW
SEE NOTE A



FLEXIBLE MARKER POST SURFACE MOUNTED
SEE NOTE 3



MODIFIED TYPE M1-A CURB
USE # 6 X 12 INCH COATED DEFORMED BARS
ON 5 FT MAX CENTERS REFER TO NOTE B

DESIGN-ONLY NOTES:

A. THIS DRAWING DEPICTS TWO DETAILS THAT ARE ACCEPTABLE FOR THE USE OF A CRASH CUSHION ON AN ISLAND APPLICATION. CONSULT PLAN SET TO DETERMINE WHICH APPLICATION TO USE.
   A. PLAN A CAN BE USED FOR BOTH APPROACH DIRECTIONS.
   B. PLAN B CAN BE USED FOR BOTH APPROACH DIRECTIONS.
   C. PLAN A AND B CAN BE COMBINED, AS DEPICTED, FOR APPROACH TRAFFIC.
B. CRASH CUSHION MANUFACTURERS RECOMMEND NO MORE THAN A 4 INCH CURB TO THE APPROACH OR SIDES OF A CRASH CUSHION. USE TYPE M1, MODIFIED M1, OR M2 CURB WHERE TYPE M CURB IS CALLED OUT. CONSULT PLAN SET TO DETERMINE WHICH M TYPE CURB TO USE. REFER TO STD DWG GW 2.
C. RECOMMEND USING TYPES A, B, OR D CRASH CUSHION SYSTEMS. REFER TO THE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR APPROVED SYSTEMS. INSTALL CRASH CUSHIONS ON CONCRETE PAD ACCORDING TO MANUFACTURER'S REQUIREMENTS.
D. ISLAND LENGTH AND TYPE M CURB REQUIREMENTS CAN VARY BASED ON HAZARD LENGTH AND LENGTH OF CHOSEN CRASH CUSHION SYSTEM. MINIMUM ISLAND LENGTH IS EQUAL TO THE SUM OF REAR OFFSET, HAZARD LENGTH, CRASH CUSHION LENGTH, AND THE MINIMUM 50 FT IN FRONT OF CRASH CUSHION.
E. MEET OFFSET REQUIREMENTS ACCORDING TO THE UDOT ROADWAY DESIGN MANUAL. REFER TO LATERAL OFFSET TO OBSTRUCTION REQUIREMENTS, NOTE B.
F. EVALUATE DRAINAGE OF ISLAND SURFACE.

NOTES:

1. CONSULT PLAN SET TO DETERMINE WHICH TYPE B CURB TO USE. REFER TO STD DWG GW 2.
2. TRANSITION FROM TYPE M CURB TO TYPE B CURB WHERE SPECIFIED.
3. MARKER POSTS ARE USED TO DISCOURAGE TRAFFIC FROM TRAVERSING ISLAND. USE A SURFACE MOUNTED FLEXIBLE MARKER POST AS APPROVED BY THE ENGINEER.
   A. FLEXIBLE MARKER POST:
      1. CONSTRUCTED USING POLYETHYLENE OR POLYPROPYLENE WITH A YELLOW OR WHITE BODY, MINIMUM 0.110 INCH TUBE WALL THICKNESS, 36 INCH TALL.
      2. INSTALL TWO 4 INCH BANDS OF YELLOW SHEETING CONFORMING TO STANDARD SPECIFICATION 02890, ACCORDING TO FLEXIBLE MARKER POST DETAIL.
   B. USE A MECHANICAL SURFACE MOUNTING SYSTEM AND MOUNT ACCORDING TO MANUFACTURER'S REQUIREMENTS.
   C. USE A MOUNTING SYSTEM WHICH THE MARKER POST CAN BE REMOVED AND REPLACED WITHOUT DISTURBING THE MOUNTING BASE.
   D. ADDITIONAL MARKER POSTS INSTALLED AT ENGINEERS DISCRETION.
4. FILL ISLAND BETWEEN THE CURBS AND FROM THE CURB TRANSITION TO THE BACK OF THE CUSHION USING A DURABLE ALL WEATHER SURFACE (EXAMPLE: ASPHALT, CONCRETE). DO NOT PLACE LANDSCAPE MATERIAL IN FRONT OF OR TO THE SIDES OF CRASH CUSHION.

REVISIONS

NO.	DATE	APPR.	REMARKS

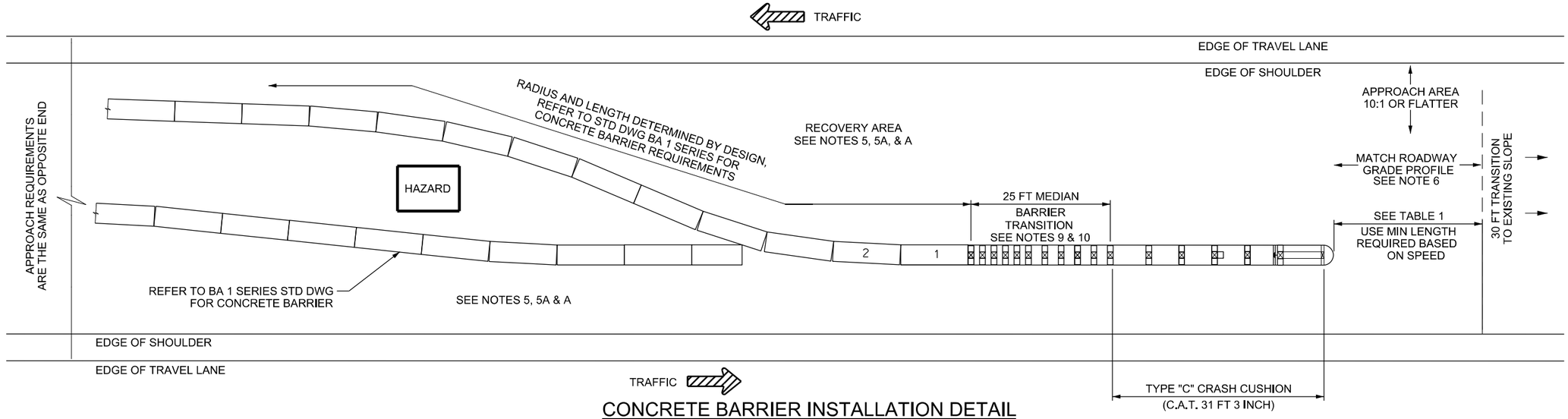
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

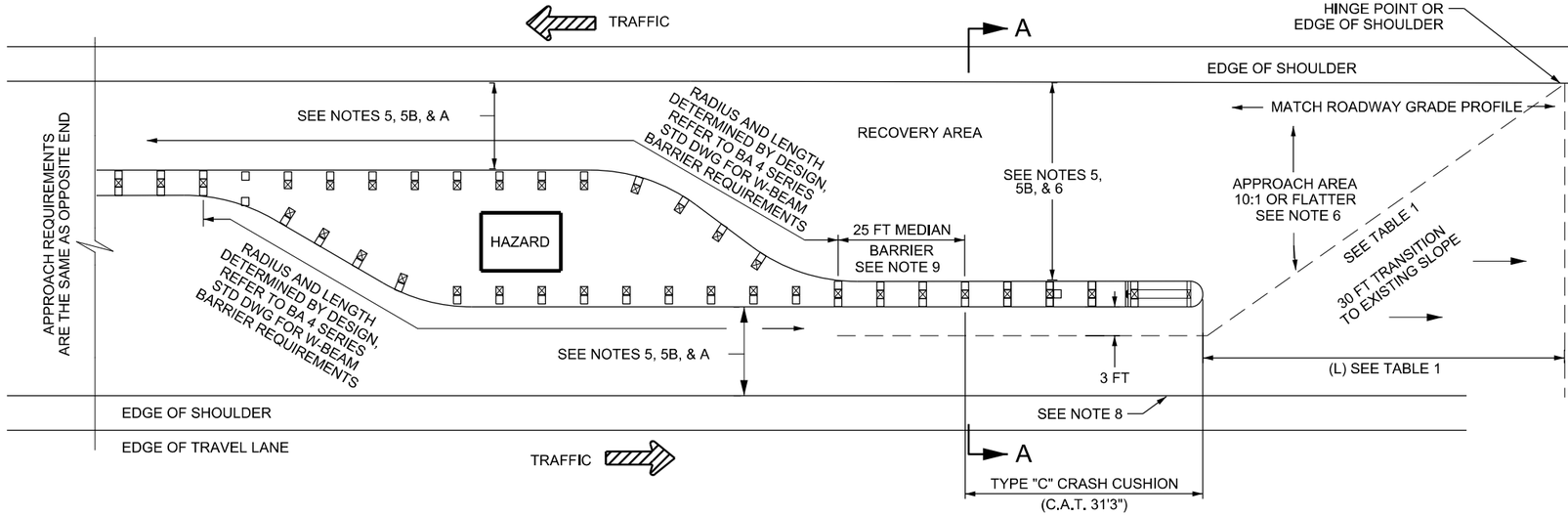
CRASH CUSHION
SPLIT MEDIAN ISLAND
W/RR CROSSING
STANDARD DRAWING TITLE

STD. DWG. NO.
CC 4C

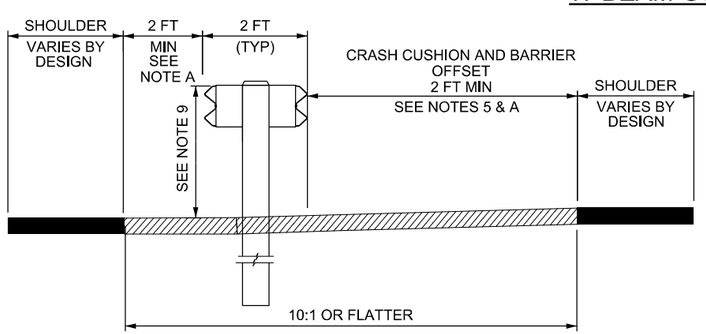
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\CC04C.dgn



CONCRETE BARRIER INSTALLATION DETAIL



W-BEAM GUARDRAIL BARRIER INSTALLATION DETAIL



SECTION A-A

MEDIAN APPLICATION
USE WHEN SLOPES ARE 10:1 OR
FLATTER ACROSS MEDIAN WIDTH

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT

DESIGN-ONLY NOTES:

A. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.

NOTES

1. THE C.A.T., MANUFACTURED BY TRINITY INDUSTRIES. SEE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
2. INSTALL SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
3. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
4. USE GRADED AND COMPACTED SURFACE FOR C.A.T. SYSTEMS.
5. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DRAWINGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS APPROACH AND RECOVERY AREAS OF THIS CRASH CUSHION SYSTEM.
   A. USE A 10:1 OR FLATTER FORESLOPE IN THE APPROACH AND RECOVER AREAS WHEN SYSTEM IS BEING USED IN CONJUNCTION WITH CONCRETE BARRIER.
   B. USE A 10:1 OR FLATTER FORESLOPE IN THE APPROACH AND RECOVER AREA WHEN SYSTEM IS BEING USED IN CONJUNCTION WITH W-BEAM GUARDRAIL.
6. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS. DO NOT PLACE SIGNS OR POLES IN APPROACH AREA. SIGNS OR POLES PLACED IN THE RECOVERY AREA WILL BE BREAKAWAY AND BE A MINIMUM 10 FT FROM SYSTEM RAIL ELEMENTS.
7. INSTALL REQUIRED MARKINGS AS PER STD DWG CC 1.
8. REFER TO BA 4 SERIES STD DWGS FOR MEDIAN BARRIER TRANSITION.
9. ADJUST W-BEAM MEDIAN BARRIER OR W-BEAM MEDIAN BARRIER TRANSITION HEIGHT FROM 31 INCHES TO 28 INCHES OVER LENGTH OF 25 FT FOR ATTACHMENT TO THE C.A.T. SYSTEM.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

GRADING AND PLACEMENT DETAILS CRASH CUSHION TYPE C C.A.T.

STANDARD DRAWING TITLE

STD. DWG. NO.

CC 5A

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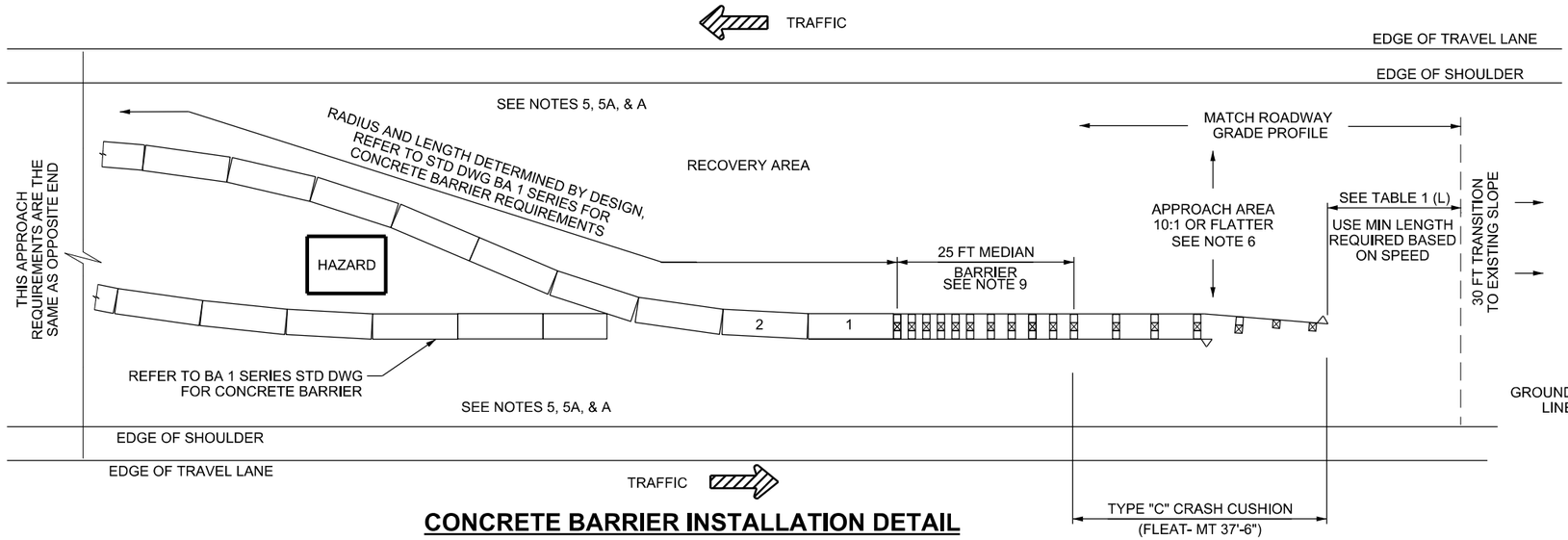
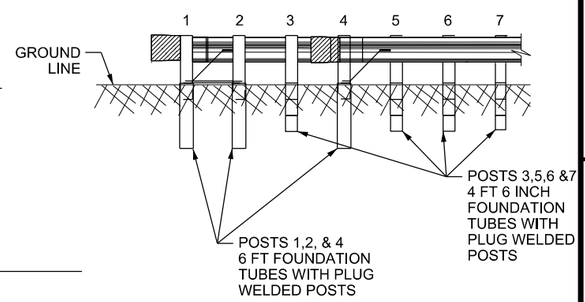
23-JUN-2020

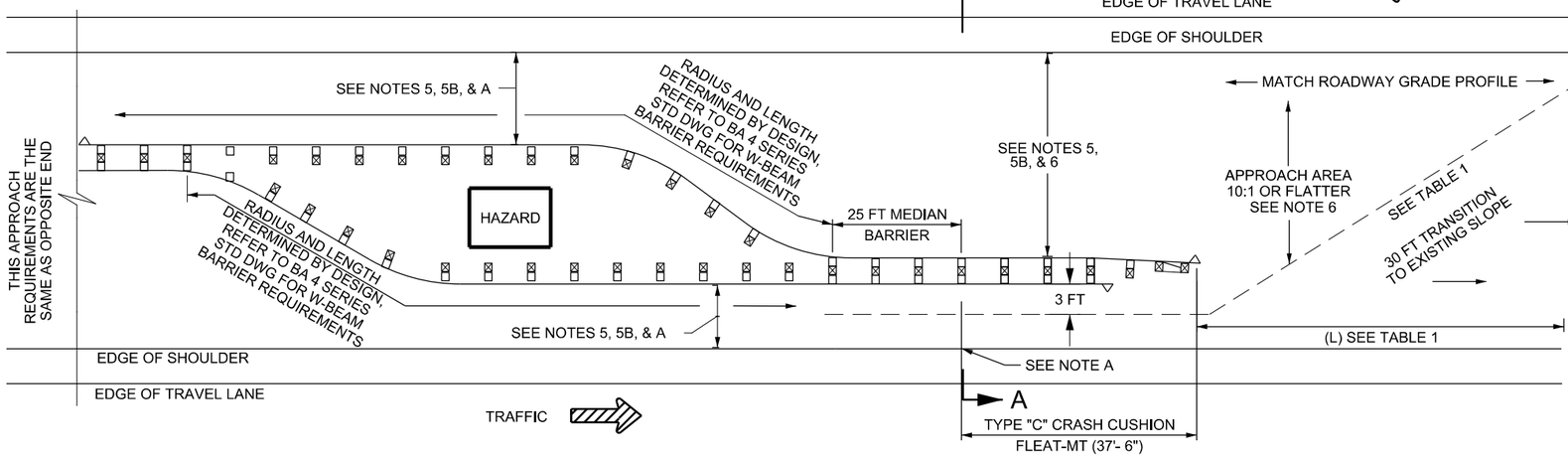


CONCRETE BARRIER INSTALLATION DETAIL

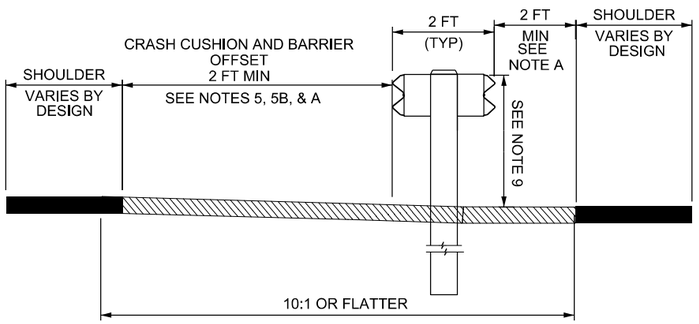
TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



ELEVATION



W-BEAM GUARDRAIL BARRIER INSTALLATION DETAIL



SECTION A-A

MEDIAN APPLICATION
USE WHEN SLOPES ARE 10:1 OR FLATTER ACROSS MEDIAN WIDTH

DESIGN-ONLY NOTES:

A. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.

NOTES:

1. THE FLEAT-MT, MANUFACTURED BY ROAD SYSTEMS INC., SEE GUIDELINES FOR CRASH CUCHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
2. INSTALL SYSTEMS ACCORDING TO DEPARTMENTS'S AND MANUFACTURER'S SPECIFICATIONS.
3. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
4. USE GRADED AND COMPACTED SURFACE FOR FLEAT-MT SYSTEMS.
5. COMPLETE SLOPE PREPARATIONS PRIOR TO INSTALLING SYSTEM. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DRAWINGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS FOR APPROACH AND RECOVERY AREAS OF THIS CRASH CUSHION SYSTEM.
   A. USE A 10:1 OR FLATTER FORESLOPE IN THE APPROACH AND RECOVERY AREAS WHEN SYSTEM IS BEING USED IN CONJUNCTION WITH CONCRETE BARRIER.
   B. USE A 10:1 OR FLATTER FORESLOPE IN THE APPROACH AND RECOVERY AREA WHEN SYSTEM IS BEING USED IN CONJUNCTION WITH W-BEAM.
6. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS. DO NOT PLACE SIGNS OR POSTS IN APPROACH AREA. SIGNS OR POSTS PLACED IN THE RECOVERY AREA WILL BE BREAKAWAY AND AND BE A MINIMUM 10 FT FROM SYSTEM RAIL ELEMENTS.
7. INSTALL REQUIRED MARKINGS ACCORDING TO STD DWG CC 1 AND THIS DRAWING.
8. REFER TO BA 4 SERIES STD DWGS FOR MEDIAN BARRIER TRANSITION.
9. ADJUST W-BEAM BARRIER OR W-BEAM MEDIAN BARRIER TRANSITION HEIGHT FROM 30 INCHES TO 28 INCHES OVER A LENGTH OF 25 FT FOR ATTACHMENT TO THE FLEAT MT SYSTEM.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

GRADING AND PLACEMENT DETAILS CRASH CUSHION TYPE C FLEAT-MT

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 5B

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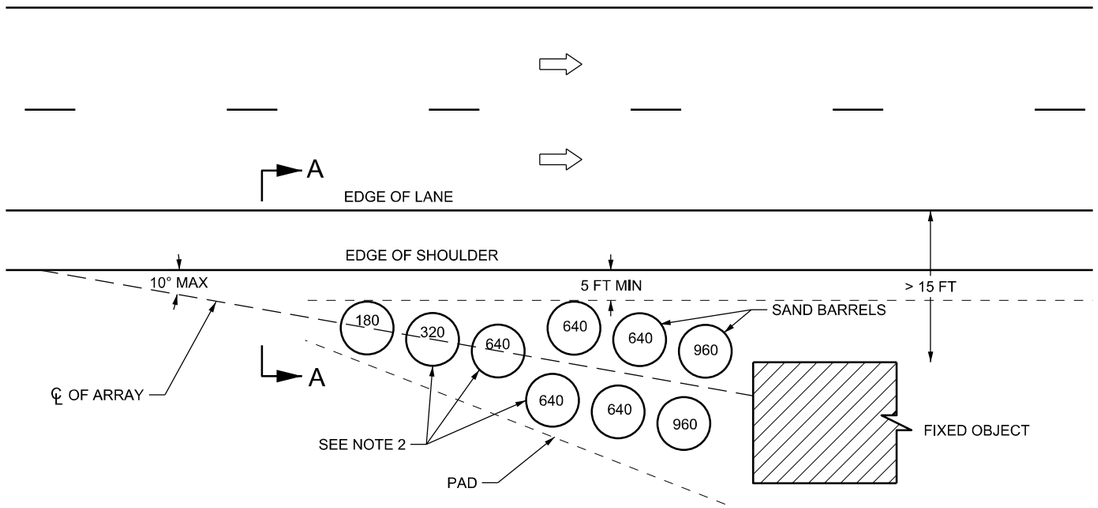
23-JUN-2020



ACTUAL DESIGNS WILL BE SITE SPECIFIC

FOR ILLUSTRATION ONLY

SEE NOTE A

VIEW A-A

DESIGN-ONLY NOTES:

A. USE ENERGITE III SYSTEMS MANUAL TO GET REQUIRED DESIGN CRITERIA. MANUAL AVAILABLE FROM THE DIVISION OF TRAFFIC AND SAFETY.

NOTES:

1. CONSTRUCT PAD WITH HOT MIX ASPHALT OR PORTLAND CEMENT CONCRETE.
2. MARK BARREL POSITION AND THE REQUIRED SAND WEIGHT FOR EACH BARREL POSITION ON THE PAVED SURFACE. USE CONTRASTING COLOR FOR THIS MARKING.
3. INSTALL REQUIRED MARKING ACCORDING TO STD DWG CC 1.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE

APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

CRASH CUSHION TYPE E SAND BARREL DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.

CC 6

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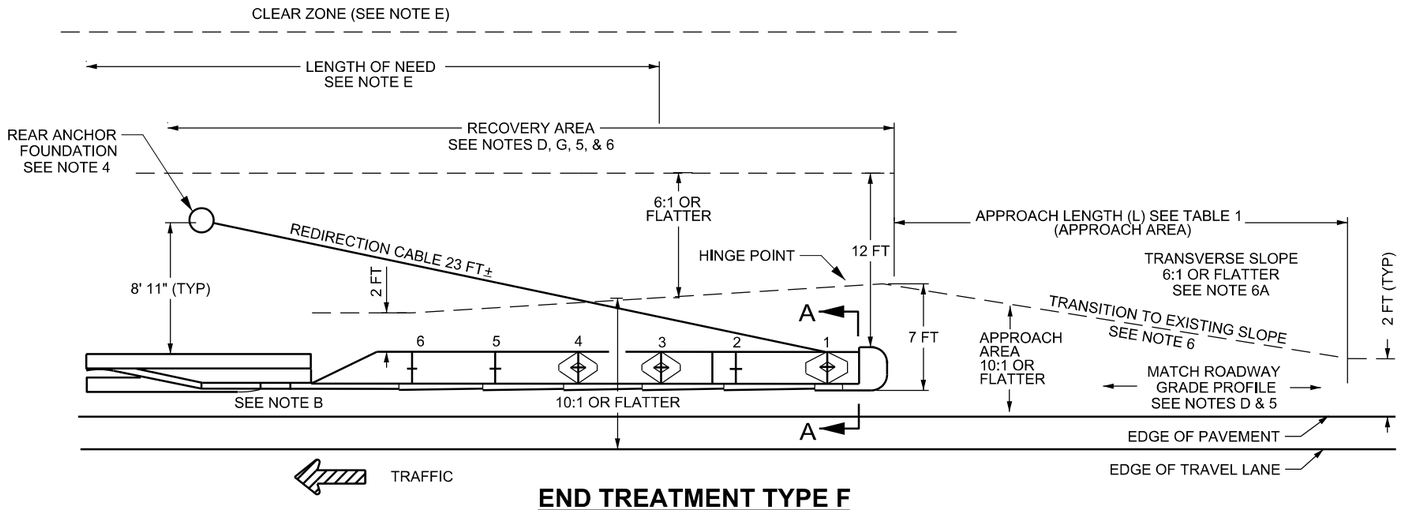
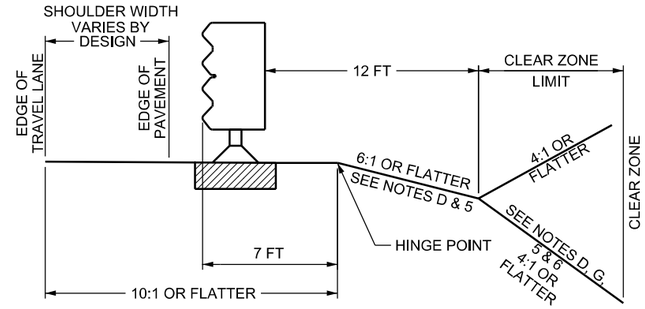
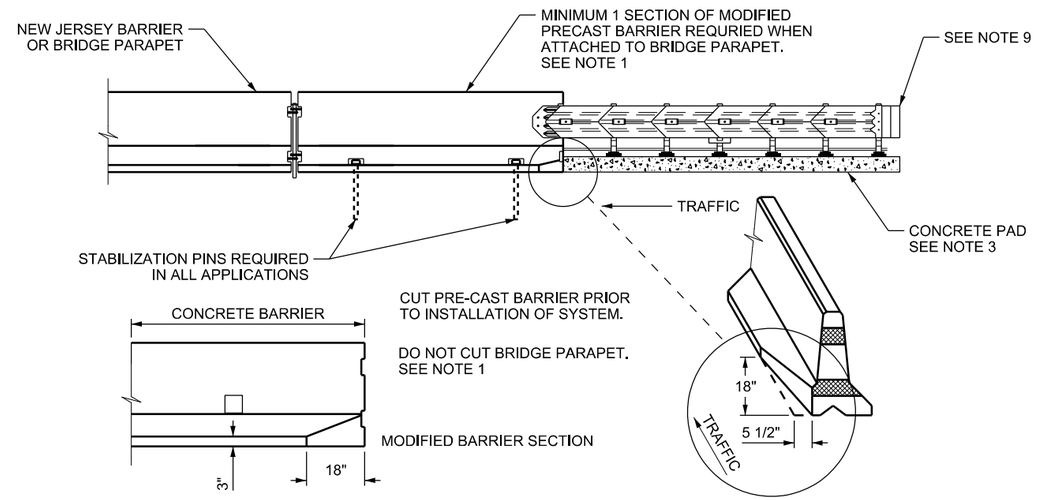


END TREATMENT TYPE F

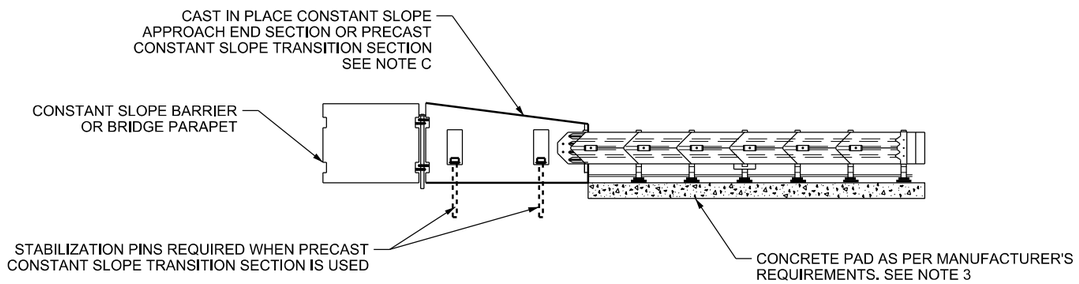


TYPICAL SECTION A-A

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



USE THIS DETAIL WHEN SYSTEM IS INSTALLED WITH NEW JERSEY SHAPED BARRIER



USE THIS DETAIL WHEN SYSTEM IS INSTALLED WITH CONSTANT SLOPE BARRIER

DESIGN-ONLY NOTES:

A. THE QUADTREND-350 IS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, SEE GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
B. USE SYSTEM WHEN DIRECT ATTACHMENT TO BARRIER IS REQUIRED AND THE LONGITUDINAL SPACE IN FRONT OF THE HAZARD IS EQUAL TO THE REQUIRED MINIMUM APPROACH LENGTH AS STATED IN TABLE 1. INSTALL SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
C. REFER TO BA 3 SERIES STD DWGS BEFORE ATTACHING CRASH CUSHION OR END TREATMENT TO CONSTANT SLOPE BARRIER. CONCRETE TRANSITION SECTION REQUIRED.
D. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DRAWINGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS FOR THE APPROACH AREA OF THE END TREATMENT AND THE RECOVERY AREA.
   1. APPROACH AREA: THE AREA PRIOR TO IMPACTING A SYSTEM.
      A) USE 10:1 OR FLATTER FORESLOPES IN APPROACH AREAS.
   2. A FORESLOPE AREA OF 12 FT x 25 FT AT 6:1 OR FLATTER REQUIRED FOR REAR ANCHOR FOUNDATION INSTALLATION
   3. RECOVERY AREA: THE AREA BEHIND THE END TREATMENT AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF THE END TREATMENT TO THE END OF THE CALCULATED LENGTH OF NEED.
      A) USE A 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN RECOVERY AREA.
      B) USE A 3:1 FORESLOPE IN RECOVERY AREA IF IT IS IMPRACTICAL TO USE A 4:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 6:1 OR FLATTER TO CLEAR ZONE LIMITS. REFER TO THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE FOR ADDITIONAL INFORMATION.
      C) USE A 4:1 OR FLATTER BACKSLOPE IN RECOVERY AREA TO THE CLEAR ZONE LIMIT, IF A 4:1 OR FLATTER BACKSLOPE CANNOT BE PROVIDED A 3:1 IS ACCEPTABLE.
   3. MATCH ROADWAY GRADE PROFILE TO THE HEAD OF THE SYSTEM INSIDE THE APPROACH AREAS.
E. REFER TO THE AASHTO ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE AND LENGTH OF NEED (LON) REQUIREMENTS. LENGTH OF NEED BEGIN AT POST 3.
F. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.
G. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 25 FT FROM THE REAR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.

NOTES:

1. CUT PRE-CAST NEW JERSEY BARRIER ACCORDING TO DETAIL, PRIOR TO INSTALLATION OF SYSTEM. SEAL CUT WITH THE SAME TYPE OF SEALER USED ON BARRIER. DO NOT CUT BRIDGE PARAPET, INSTALL 1 SECTION OF MODIFIED NEW JERSEY PRECAST BARRIER, CUT ACCORDING TO DETAIL. INSTALL STABILIZATION PINS IN BARRIER SECTION. MODIFICATION TO CONSTANT SLOPE BARRIER TRANSITION NOT REQUIRED, SEE BA 3 SERIES STD DWGS. THE REQUIRED BARRIER SECTIONS AND TRANSITION SECTION ARE A SEPARATE PAY ITEM FROM THE END TREATMENT.
2. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
3. INSTALL CONCRETE PAD ACCORDING TO MANUFACTURER'S REQUIREMENTS.
4. PLACE CABLE ANCHOR FOUNDATION IN SUCH A MANNER THAT THE REDIRECTING CABLE LAYS 6:1 OR FLATTER ON TOP OF THE GROUND, AND THE FOUNDATION WITH THE CABLE ANCHOR BRACKET ATTACHED DOES NOT EXCEED 4 INCHES ABOVE GROUND LEVEL. DO NOT BURY REDIRECTION CABLE.
5. COMPLETE SLOPE PREPARATION BEFORE INSTALLING SYSTEM.
6. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
7. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
8. ATTACH SAND CONTAINERS AT POSTS 1, 3 AND 4.
9. INSTALL REQUIRED MARKING ACCORDING TO STD DWG CC 1.

REVISIONS

NO.	DATE	APPR.	REMARKS

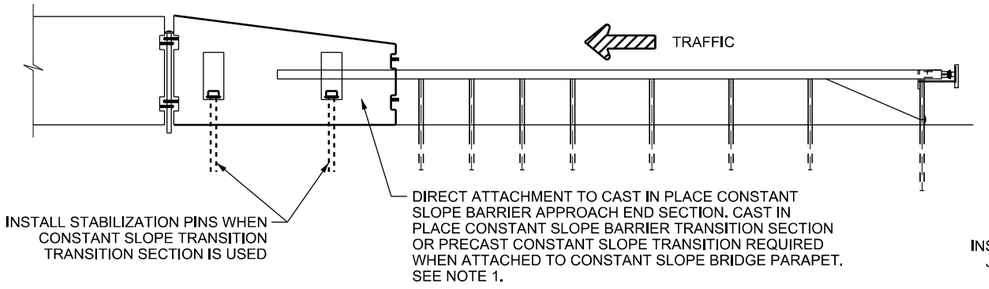
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

GRADING AND INSTALLATION DETAILS
END TREATMENT TYPE F
QUAD TREND 350
STANDARD DRAWING TITLE

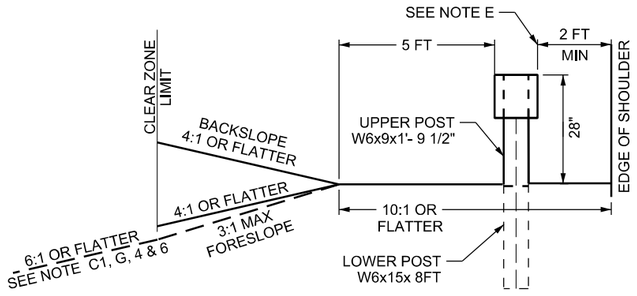
STD. DWG. NO.
CC 7A

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\CC07A.dgn



DETAIL WHEN SYSTEM IS INSTALLED WITH CONSTANT SLOPE BARRIER

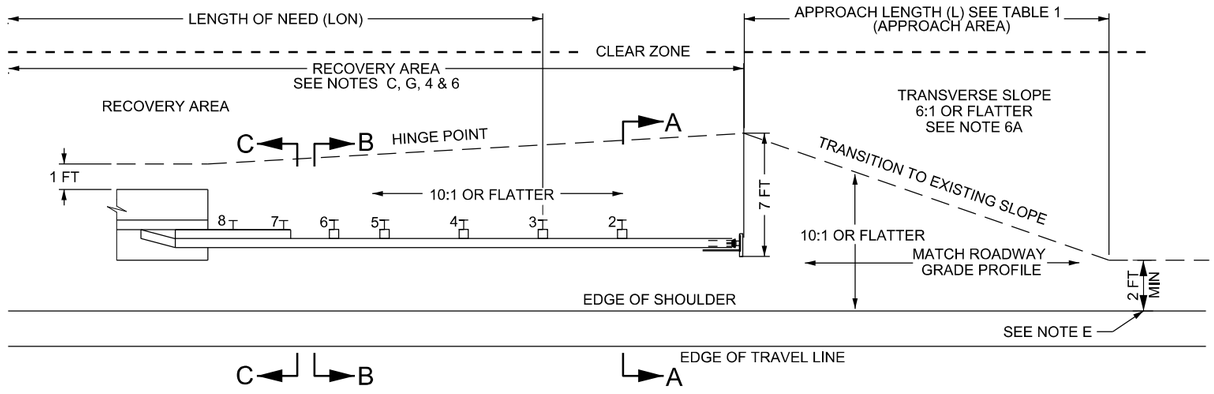
(GROUND MOUNTED POST SHOWN, SURFACE MOUNTED STEEL BREAKAWAY POST ACCEPTABLE, SEE NOTE 3)



SECTION A-A

POST 1

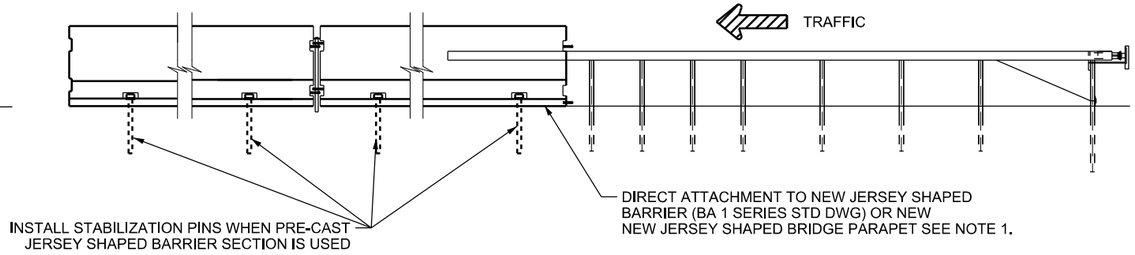
TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT

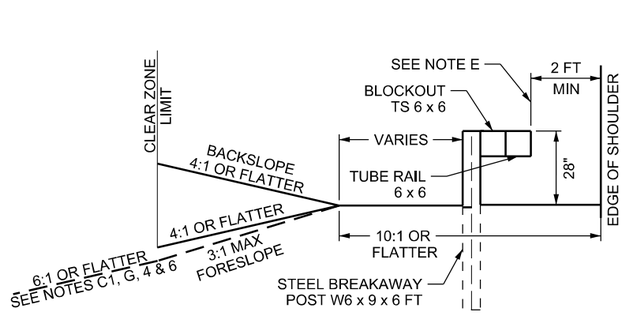


TYPE F END TREATMENT PLAN

DETAIL WHEN SYSTEM IS INSTALLED WITH NEW JERSEY SHAPED BARRIER

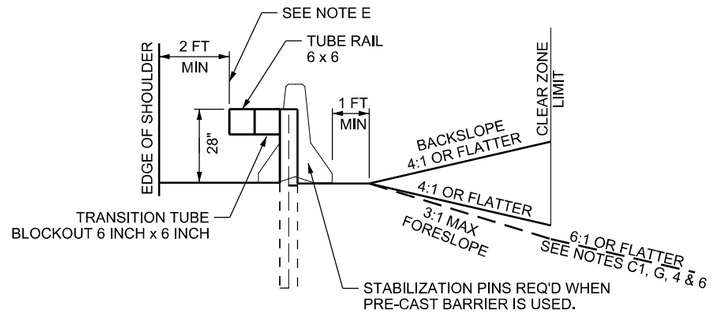
(GROUND MOUNTED POST SHOWN, SURFACE MOUNTED STEEL BREAKAWAY POST ACCEPTABLE, SEE NOTE 3)





SECTION B-B

POSTS 2 TO POST 6



SECTION C-C

POSTS 7-8

DESIGN-ONLY NOTES:

A. THE BEAT-SSCC, MANUFACTURED BY ROAD SYSTEMS INC. SEE GUIDELINES FOR CRASH CUSHIONS & BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
B. USE SYSTEM WHEN DIRECT ATTACHMENT TO BARRIER IS REQUIRED AND THERE IS MORE THAN 125 FT OF LONGITUDINAL SPACE IN FRONT OF THE HAZARD. INSTALL SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
C. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DRAWINGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS FOR THE APPROACH AREA OF THE END TREATMENT AND THE RECOVERY AREA.
   1. APPROACH AREA: THE AREA PRIOR TO IMPACTING A SYSTEM.
      A) USE 10:1 OR FLATTER FORESLOPES IN APPROACH AREAS.
   2. RECOVERY AREA: THE AREA BEHIND THE END TREATMENT AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF THE END TREATMENT TO THE END OF THE CALCULATED LENGTH OF NEED.
      A) USE A 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN RECOVERY AREA.
      B) USE A 3:1 FORESLOPE IN RECOVERY AREA IF IT IS IMPRACTICAL TO USE A 4:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 6:1 OR FLATTER TO CLEAR ZONE LIMITS. REFER TO THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE FOR ADDITIONAL INFORMATION.
      C) USE A 4:1 OR FLATTER BACKSLOPE IN RECOVERY AREA TO THE CLEAR ZONE LIMIT, IF A 4:1 OR FLATTER BACKSLOPE CANNOT BE PROVIDED A 3:1 IS ACCEPTABLE.
   3. MATCH ROADWAY GRADE PROFILE TO THE HEAD OF THE SYSTEM INSIDE THE APPROACH AREAS.
D. REFER TO THE AASHTO ROADSIDE DESIGN GUIDE TO DETERMINE LENGTH OF NEED (LON) AND CLEAR ZONE REQUIREMENTS.
E. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.
F. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 25 FT FROM THE REAR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.

NOTES:

1. ATTACH SYSTEM TRANSITION TO BARRIER OR BRIDGE PARAPET ACCORDING TO MANUFACTURER'S REQUIREMENTS. MODIFICATION NOT REQUIRED FOR NEW JERSEY STYLE BARRIERS OR PARAPETS. REFER TO BA 3 SERIES STD DWGS BEFORE ATTACHING CRASH CUSHION OR END TREATMENT TO CONSTANT SLOPE BARRIER. CONCRETE TRANSITION SECTION REQUIRED.
2. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
3. THE BEAT-SSCC REQUIRES A GRADED AND COMPACTED SURFACE WHEN GROUND MOUNTED POSTS ARE USED. SURFACE MOUNTED POST OPTIONAL, USE MANUFACTURER'S SPECIFICATIONS FOR CONCRETE PAD, POSTS AND MOUNTING HARDWARE.
4. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
5. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
6. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
7. INSTALL REQUIRED MARKERS ACCORDING TO STD DWG CC 1, TYPE F.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

GRADING AND INSTALLATION DETAILS END TREATMENT TYPE F BEAT-SSCC

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 7B

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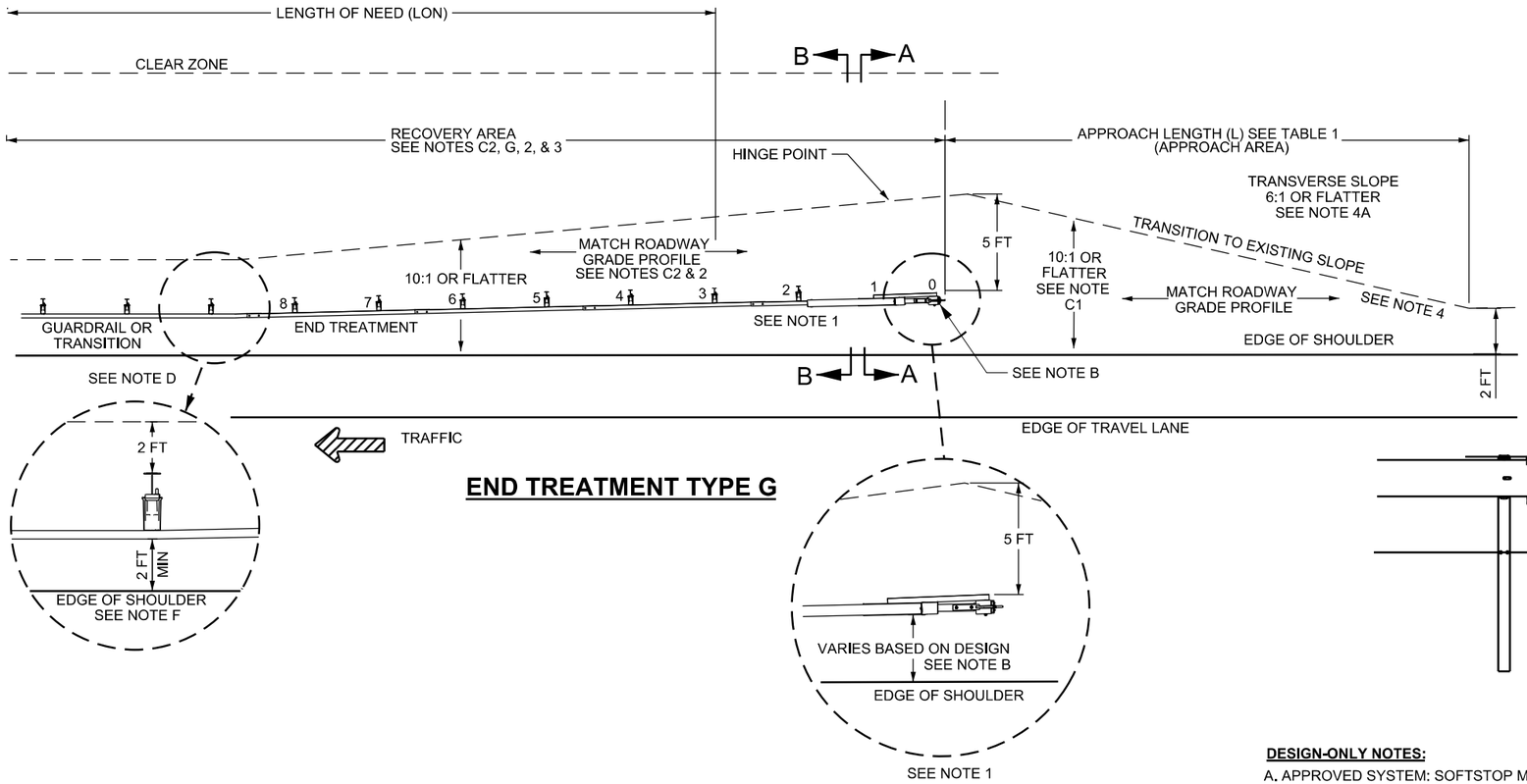
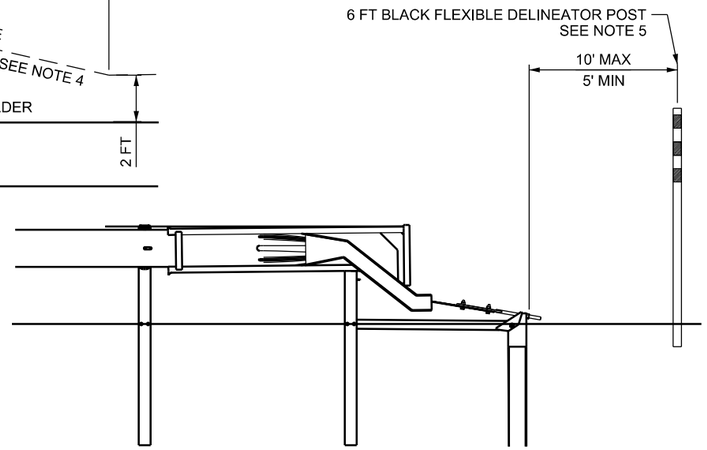


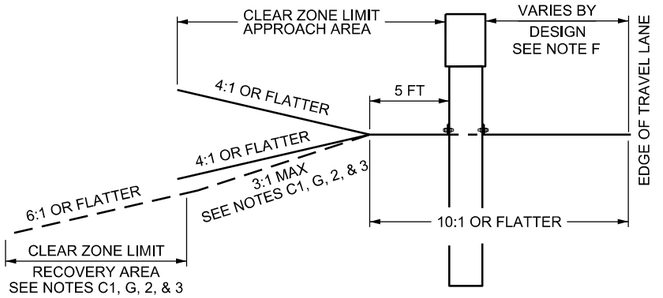
END TREATMENT TYPE G

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT

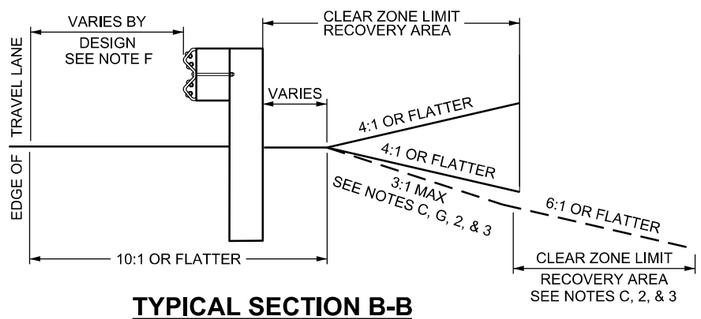


SYSTEM DELINEATION

SEE NOTE 5



TYPICAL SECTION A-A



TYPICAL SECTION B-B

DESIGN-ONLY NOTES:

A. APPROVED SYSTEM: SOFTSTOP MANUFACTURED BY TRINITY HIGHWAY PRODUCTS, LLC . REFER TO UDOT GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
B. SYSTEM OFFSET:
   1. INSTALL SYSTEM WITH 2 FT OFFSET (25:1 FLARE RATE). SYSTEM TO BE INSTALLED WITH TANGENT BARRIER.
   2. SEE MANUFACTURER'S INSTALLATION MANUAL WHEN DESIGNING FOR A CONVEX OR CONCAVE CURVE.
C. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUAL DWGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS FOR THE APPROACH AREA OF THE END TREATMENT AND THE RECOVERY AREA.
   1. APPROACH AREA: THE AREA PRIOR TO IMPACTING A SYSTEM.
      A) USE 10:1 OR FLATTER FORESLOPES IN APPROACH AREAS.
   2. RECOVERY AREA: THE AREA BEHIND THE END TREATMENT AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF THE END TREATMENT TO THE END OF THE CALCULATED LENGTH OF NEED.
      A) USE A 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN RECOVERY AREA.
      B) USE A 3:1 FORESLOPE IN RECOVERY AREA IF IT IS IMPRACTICAL TO USE A 4:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 6:1 OR FLATTER TO CLEAR ZONE LIMITS. REFER TO THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE FOR ADDITIONAL INFORMATION.
      C) USE A 4:1 OR FLATTER BACKSLOPE IN RECOVERY AREA TO THE CLEAR ZONE LIMIT, IF A 4:1 OR FLATTER BACKSLOPE CANNOT BE PROVIDED A 3:1 IS ACCEPTABLE.
   3. MATCH ROADWAY GRADE PROFILE TO THE HEAD OF THE SYSTEM INSIDE THE APPROACH AREAS.
D. USE GUARDRAIL TRANSITION, BA 4 SERIES STD DWGS, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
E. USE THE AASHTO ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENTS AND LENGTH OF NEED (LON) REQUIREMENTS.
F. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.
G. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 25 FT FROM THE REAR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.

NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR POST, RAIL ELEMENT, AND POST TO RAIL CONNECTION REQUIREMENTS. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION
2. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
3. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
4. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS. SEE STD DWG CC 8C FOR EXCEPTIONS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
5. DO NOT MOUNT OBJECT MARKER ON THE SOFTSTOP SYSTEM.
   A) INSTALL A 6 FT BLACK FLEXIBLE MARKER POST ACCORDING TO SYSTEM DELINEATION DETAIL. PLACE YELLOW BANDS OF REFLECTIVE SHEETING AS SPECIFIED BY STANDARD SPECIFICATION, PART 2 AT THE TOP OF THE POST WITH A 2 INCH SPACE BETWEEN THE 1ST AND 2ND BAND AND THE 2ND AND 3RD BAND.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

GRADING AND INSTALLATION DETAILS
SOFTSTOP
END TREATMENT
TYPE G (MASH)

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 8A

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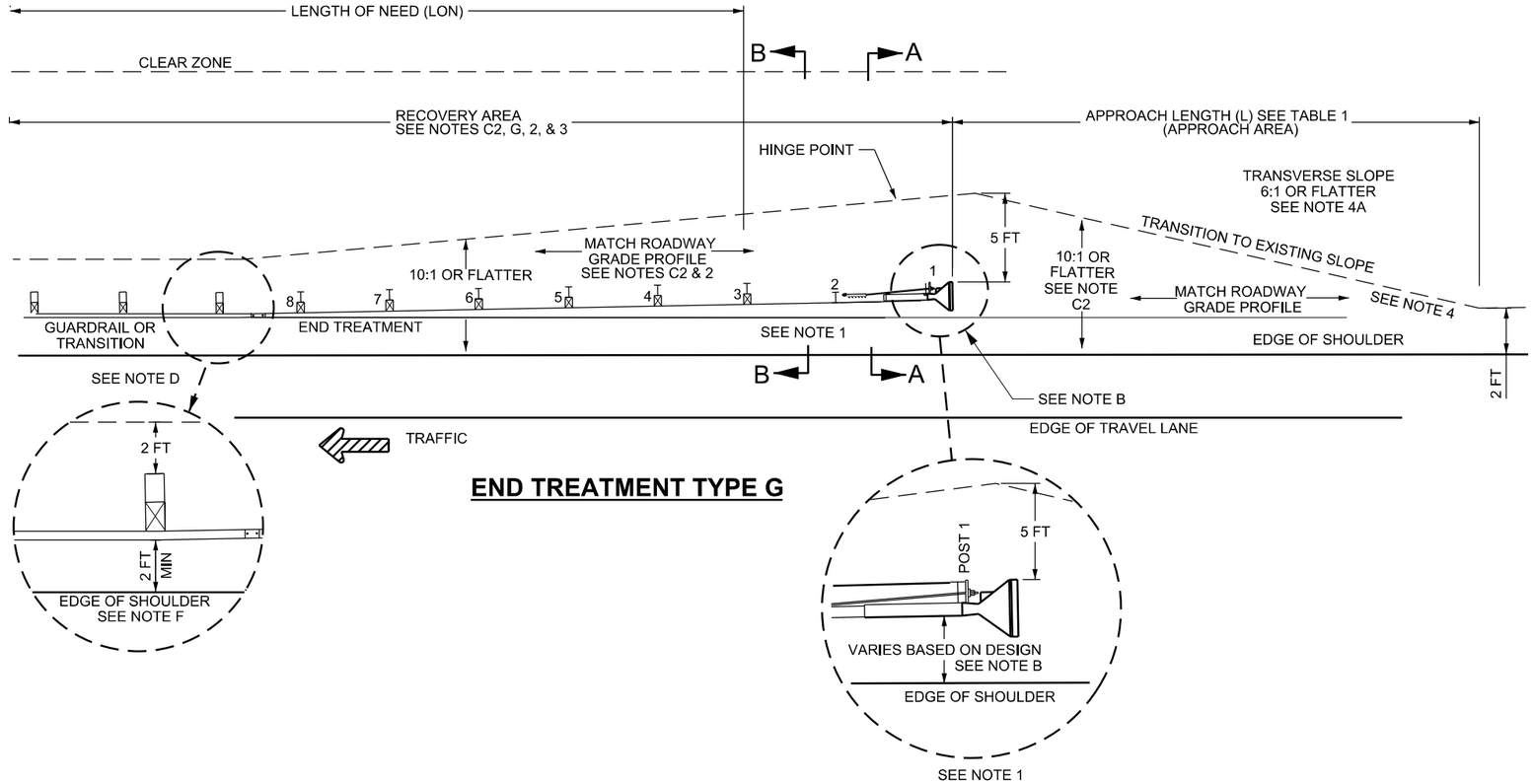
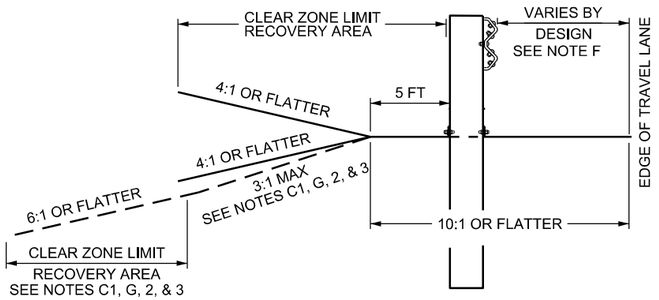
23-JUN-2020

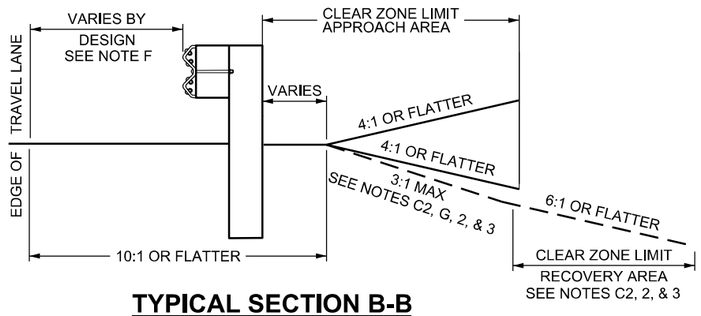


END TREATMENT TYPE G

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



TYPICAL SECTION A-A



TYPICAL SECTION B-B

DESIGN-ONLY NOTES:

A. APPROVED SYSTEM: MSKT-SP-MGS MANUFACTURED BY ROAD SYSTEMS, INC. REFER TO UDOT GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
B. INSTALL SYSTEM WITH 2 FT OFFSET (25:1 FLARE RATE). SYSTEM TO BE INSTALLED WITH TANGENT BARRIER.
C. MEET SLOPE REQUIREMENTS IN RECOVERY AREA AS DETAILED IN APPLICABLE UDOT ROADWAY DESIGN MANUALS DWGS. THE ADDITIONAL INFORMATION LISTED BELOW IS THE MINIMUM ACCEPTABLE SLOPE REQUIREMENTS FOR THE APPROACH AREA OF THE END TREATMENT AND THE RECOVERY AREA.
   1. APPROACH AREA: THE AREA PRIOR TO IMPACTING A SYSTEM.
      A) USE 10:1 OR FLATTER FORESLOPES IN APPROACH AREAS.
   2. RECOVERY AREA: THE AREA BEHIND THE END TREATMENT AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF THE END TREATMENT TO THE END OF THE CALCULATED LENGTH OF NEED.
      A) USE A 4:1 OR FLATTER FORESLOPE OR BACKSLOPE IN RECOVERY AREA.
      B) USE A 3:1 FORESLOPE IN RECOVERY AREA IF IT IS IMPRACTICAL TO USE A 4:1 FORESLOPE. ESTABLISH A RECOVERY AREA AT THE TOE OF THE 3:1 FORESLOPE OF 6:1 OR FLATTER TO CLEAR ZONE LIMITS. REFER TO THE UDOT ROADWAY DESIGN MANUAL AND AASHTO ROADSIDE DESIGN GUIDE FOR ADDITIONAL INFORMATION.
      C) USE A 4:1 OR FLATTER BACKSLOPE IN RECOVERY AREA TO THE CLEAR ZONE LIMIT, IF A 4:1 OR FLATTER BACKSLOPE CANNOT BE PROVIDED A 3:1 IS ACCEPTABLE.
   3. MATCH ROADWAY GRADE PROFILE TO THE HEAD OF THE SYSTEM INSIDE THE APPROACH AREAS.
D. USE GUARDRAIL TRANSITION, BA 4 SERIES STD DWGS, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
E. USE THE AASHTO ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENTS AND LENGTH OF NEED (LON) REQUIREMENTS.
F. 2 FT MINIMUM BARRIER OFFSET IS OPTIONAL WHEN ROADWAY DESIGN REQUIRES A 12 FT OR WIDER EFFECTIVE SHOULDER.
G. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 25 FT FROM THE REAR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.

NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR POST, RAIL ELEMENT, AND POST TO RAIL CONNECTION REQUIREMENTS. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION
2. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
3. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
4. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS. SEE STD DWG CC 8C FOR EXCEPTIONS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
5. MOUNT OBJECT MARKER POST PER STD DWG CC 1 END TREATMENT TYPE G.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

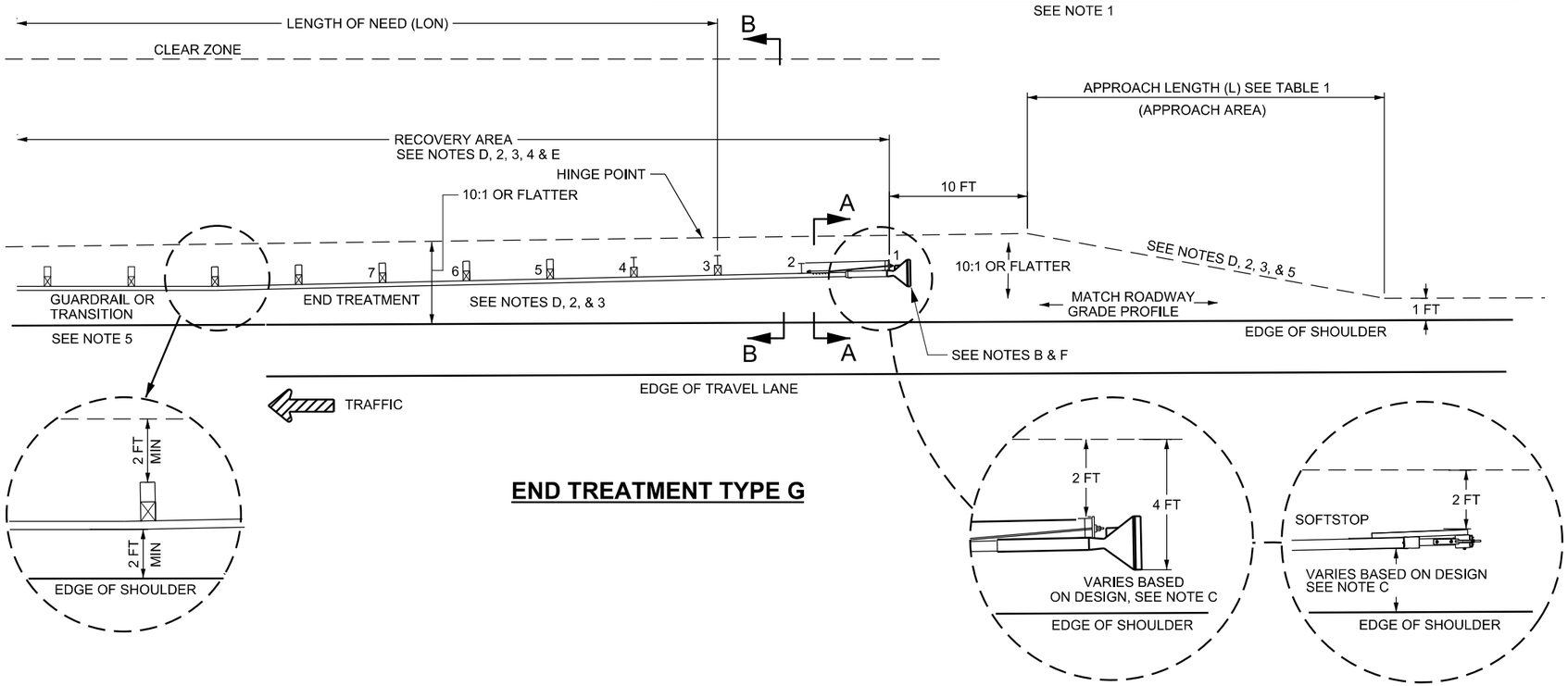
GRADING AND INSTALLATION DETAILS MSKT-SP-MGS END TREATMENT TYPE G (MASH)

STANDARD DRAWING TITLE

STD. DWG. NO.
CC 8B

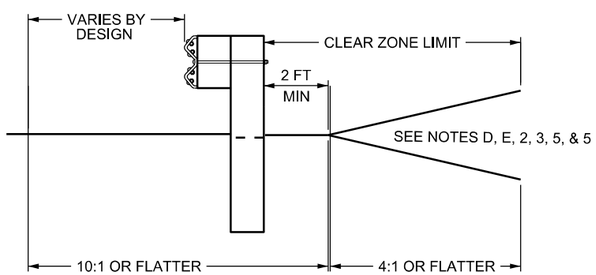
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DBI\CC08B.dgn

USE THIS DETAIL FOR "3R" PROJECTS ONLY

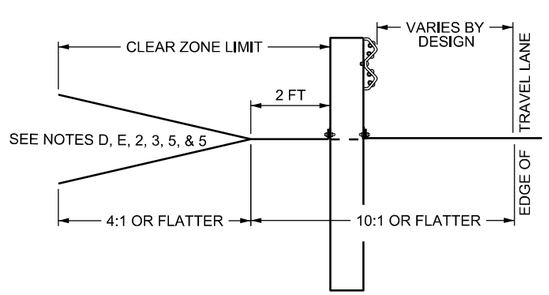


END TREATMENT TYPE G

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



TYPICAL SECTION B-B



TYPICAL SECTION A-A

DESIGN-ONLY NOTES:

A. USE THIS DRAWING ONLY WHEN THERE IS INSUFFICIENT ROOM TO INSTALL MATERIALS AS REQUIRED IN STD DWG CC 8A AND CC 8B WITHOUT THE PURCHASE OF ADDITIONAL RIGHT OF WAY.
B. APPROVED SYSTEMS: SOFTSTOP MANUFACTURED BY TRINITY HIGHWAY PRODUCTS, LLC. THE MSKT-SP-MGS, MANUFACTURED BY ROAD SYSTEMS INC. REFER TO UDOT GUIDELINES FOR CRASH CUSHIONS AND BARRIER END TREATMENTS FOR SPECIFIC SYSTEM DETAILS.
C. SYSTEM OFFSET:
   1. MSKT-SP-MGS: INSTALL SYSTEM WITH 2 FT OFFSET (25:1 FLARE RATE). SYSTEM TO BE INSTALLED WITH TANGENT BARRIER
   2. SOFTSTOP: INSTALL SYSTEM WITH 2 FT OFFSET (25:1 FLARE RATE). SYSTEM TO BE INSTALLED WITH TANGENT BARRIER. SEE MANUFACTURER'S INSTALLATION MANUAL WHEN DESIGNING FOR A CONVEX OR CONCAVE CURVE.
D. USE 10:1 OR FLATTER SLOPES IN APPROACH AREA. DESIGN RECOVERY AREA SLOPES ACCORDING TO STD DWG CC 8A OR CC 8B WHEN CONDITIONS PERMIT.
   1. RECOVERY AREA IS THE AREA BEHIND THE END TREATMENT AND BARRIER SYSTEM EXTENDING FROM THE APPROACH END OF THE END TREATMENT TO THE END OF THE CALCULATED LENGTH OF NEED.
E. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDES AND REAR OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN RECOVERY AREA.
F. USE GUARDRAIL TRANSITION, BA 4 SERIES STD DWGS, WHEN ATTACHING SYSTEM TO CONCRETE BARRIER OR BRIDGE PARAPET.
G. USE THE ROADSIDE DESIGN GUIDE TO ESTABLISH CLEAR ZONE REQUIREMENTS AND LENGTH OF NEED (LON) REQUIREMENTS.

NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR POST, RAIL ELEMENT, AND POST TO RAIL CONNECTION REQIRMENTS.
2. COMPLETE SLOPE PREPARATION PRIOR TO INSTALLING SYSTEM.
3. CONSULT ENGINEER FOR ALLOWABLE SLOPES WHEN REQUIREMENTS OF STD DWG CC 8A OR CC 8B CANNOT BE MET.
4. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
5. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS.
6. INSTALL REQUIRED MARKINGS ACCORDING TO STD DWG CC 1. SEE STD DWG CC 8A FOR SOFTSTOP MARKING REQUIREMENTS.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/26/2017	SDM	MODIFIED NOTE B & C.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

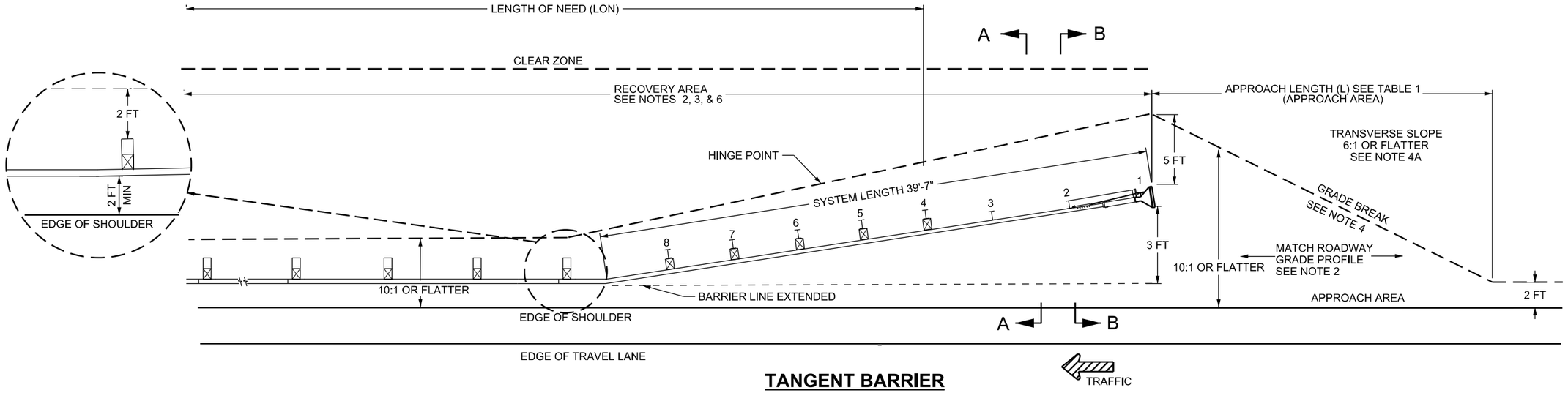
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

GRADING AND INSTALLATION DETAILS FOR "3R" PROJECTS END TREATMENT TYPE G

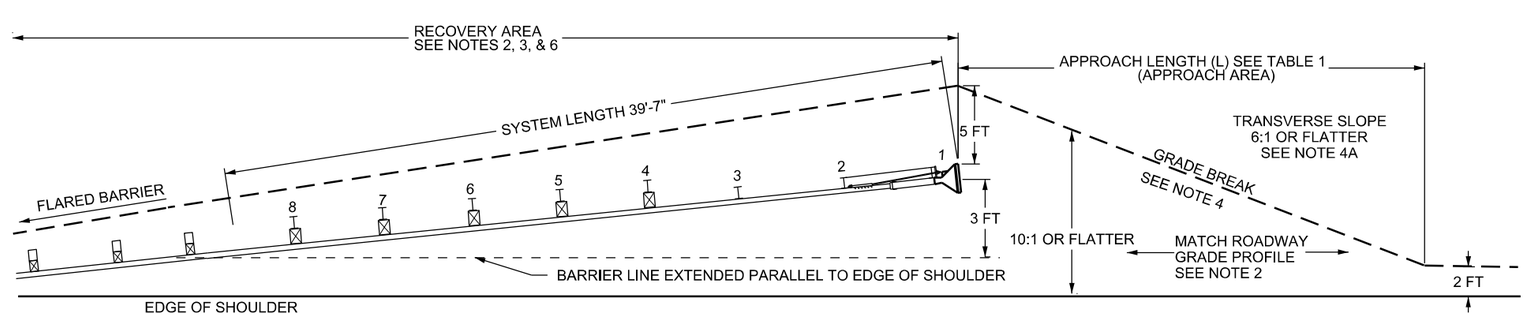
STANDARD DRAWING TITLE

STD. DWG. NO.
CC 8C

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\CC08C.dgn
23-JUN-2020



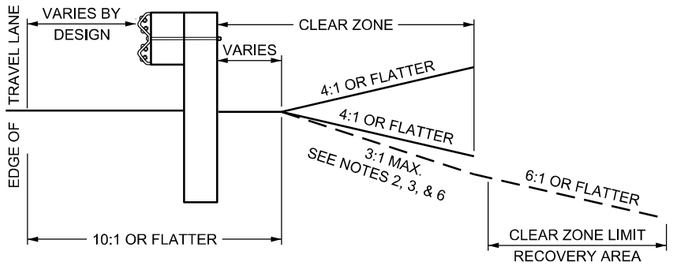
TANGENT BARRIER



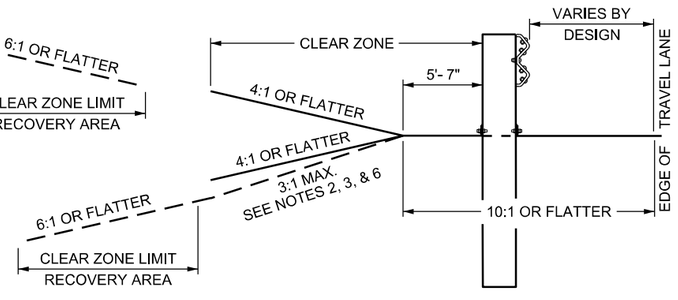
FLARED BARRIER

SEE NOTE 5

TABLE 1	
SPEED MPH	MIN LENGTH (L)
LESS THAN 40	50 FT
40 TO 55	70 FT
60 TO 80	100 FT



TYPICAL SECTION A-A



TYPICAL SECTION B-B

NOTES:

1. REFER TO MANUFACTURER'S SPECIFICATIONS FOR POST, RAIL ELEMENT, AND POST TO RAIL CONNECTION REQUIREMENTS. HAVE SHOP DRAWING AVAILABLE ON SITE FOR REFERENCE DURING INSTALLATION.
2. INSTALL SYSTEM AFTER SITE SLOPE PREPARATION IS COMPLETE.
3. CLEAR RECOVERY AND APPROACH AREAS OF ANY FIXED OBJECTS OR HAZARDS.
4. CONSTRUCT PLATFORM AS REQUIRED WHEN THE SPACE IS AVAILABLE EVEN IF THE PLATFORM EXTENDS BEYOND THE CLEAR ZONE REQUIREMENTS. SEE STD DWG CC 8C FOR EXCEPTIONS.
   A) CONSTRUCT 6:1 OR FLATTER SLOPE FOR TRANSVERSE SLOPE FROM APPROACH PAD.
5. SYSTEM OFFSET:
   A. INSTALL SYSTEM WITH A 3 FT OFFSET WHEN USED WITH A TANGENT BARRIER SYSTEM.
   B. INSTALL SYSTEM WITH A 3 FT OFFSET, FROM BARRIER LINE EXTENDED PARALLEL TO EDGE OF SHOULDER WHEN USED WITH A FLARED BARRIER SYSTEM FROM ZERO TO 14:1 FLARE RATE.
   C. INSTALL SYSTEM DIRECTLY IN LINE WITH BARRIER WHEN BARRIER IS FLARED AT 13:1.
6. DO NOT PLACE SIGNS, POSTS, OR OTHER HAZARDS IN APPROACH AREA. USE BREAKAWAY SIGNS OR POSTS WHEN PLACED IN RECOVERY AREA, AND MAINTAIN A MINIMUM 10 FT CLEARANCE TO THE SIDE AND 65 FT FROM THE IMPACT HEAD OF THE SYSTEM. MITIGATE POTENTIAL HAZARDS IN THE RECOVERY AREA.
7. MOUNT OBJECT MARKER POST PER STD DWG CC 1 END TREATMENT TYPE H.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/31/19	SDD	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

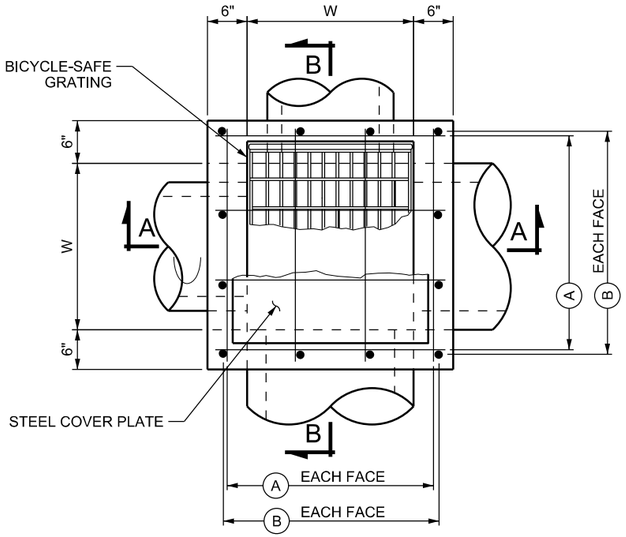
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

GRADING AND
INSTALLATION DETAILS
MFLEAT
END TREATMENT TYPE H
(MASH)

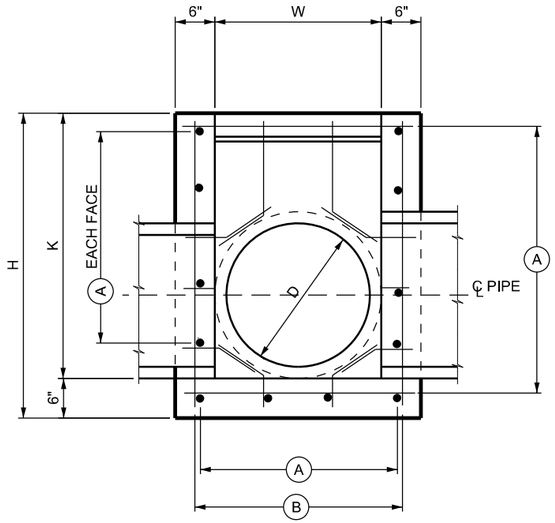
STANDARD DRAWING TITLE

STD. DWG. NO.
CC 9

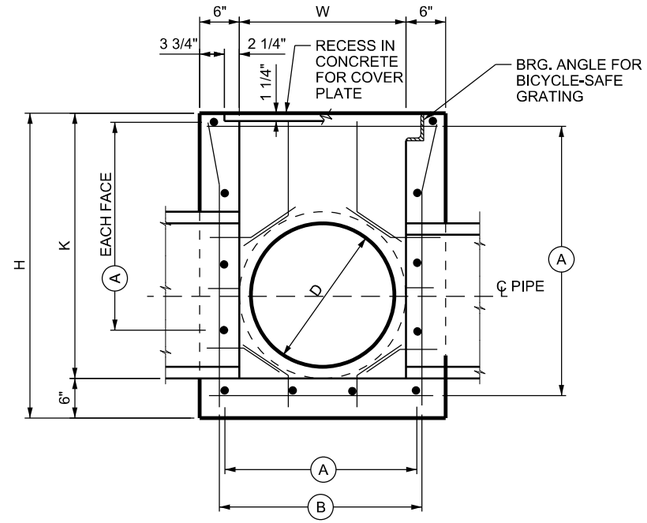
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB\CC09.dgn
23-JUN-2020



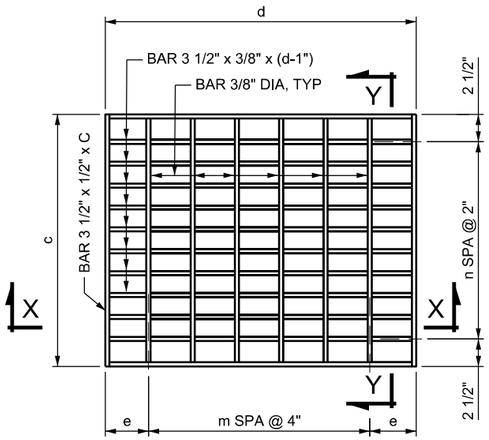
DIVERSION BOX PLAN



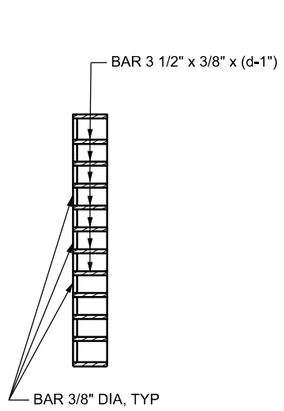
SECTION A-A



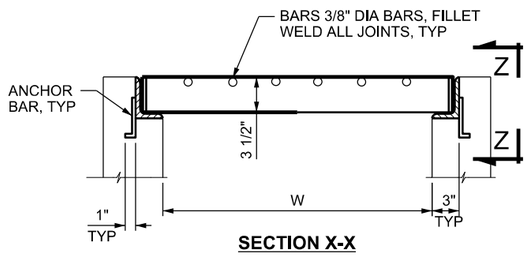
SECTION B-B



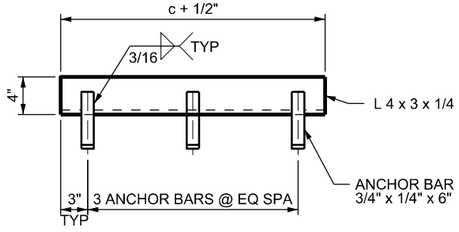
PLAN



SECTION Y-Y

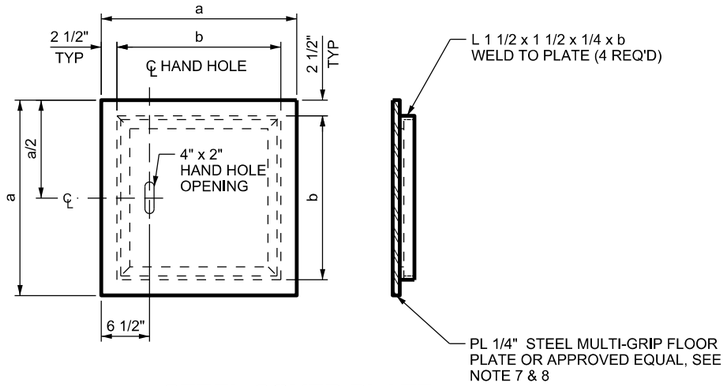


SECTION X-X



VIEW Z-Z

BICYCLE-SAFE GRATING



STEEL COVER PLATE

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

REINFORCING STEEL: fy = 60,000 psi
STRUCTURAL STEEL: Fy = 36,000 psi
STRUCTURAL CONCRETE: f 'c = 4,000 psi; n = 8

GENERAL NOTES:

1. REFERENCE DB SERIES STD DWGS.
2. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
3. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS. ALL BARS TO BE #5 AT 12 INCH PLUS OR MINUS.
4. USE CLASS AA (AE) CONCRETE.
5. USE TYPE II CEMENT (LOW ALKALI).
6. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
7. USE COVER PLATE ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.
8. HOT-DIP GALVANIZE GRATING AND BEARING ANGLES AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111 (ASTM A 123).

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
AUGUST 2020 — DATE

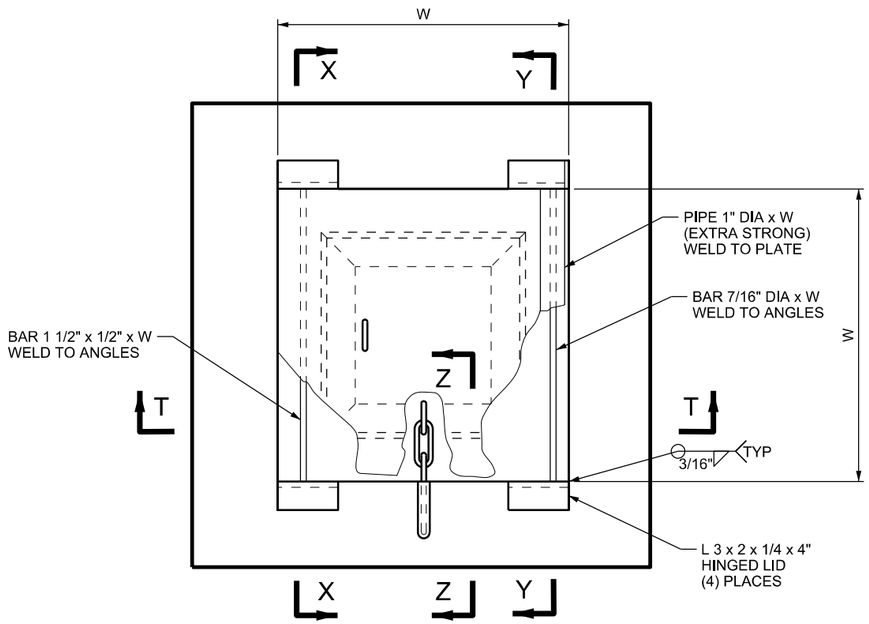
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX/COVER PLATE/ GRATING FOR 18 INCH DIA. OR 24 INCH DIA.PIPE

STANDARD DRAWING TITLE

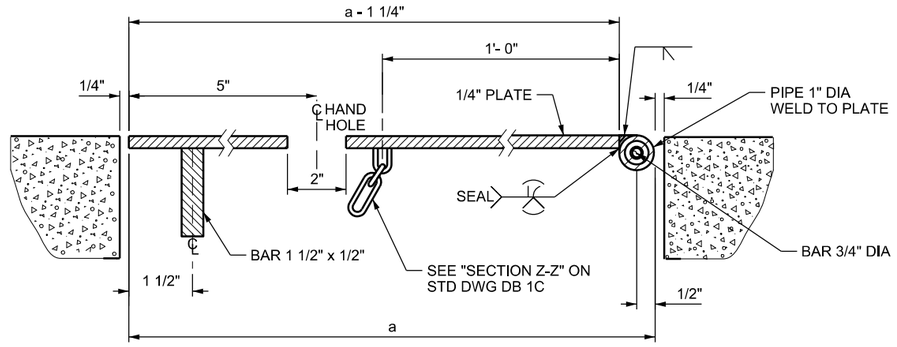
STD. DWG. NO.
DB 1A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB\DB01A.dgn
23-JUN-2020

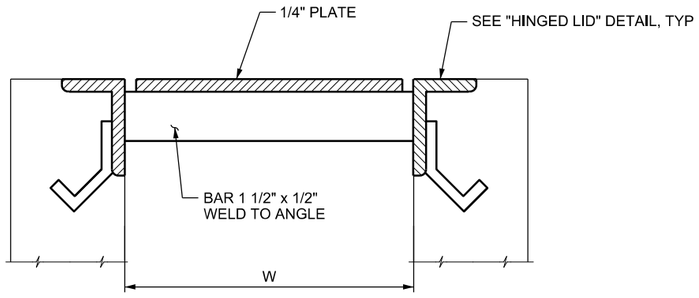


PLAN

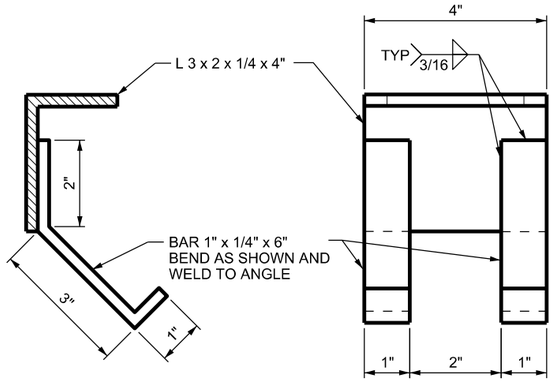
SEE STD DWG DB 1C FOR "SECTION Z-Z"



SECTION T-T



SECTION X-X



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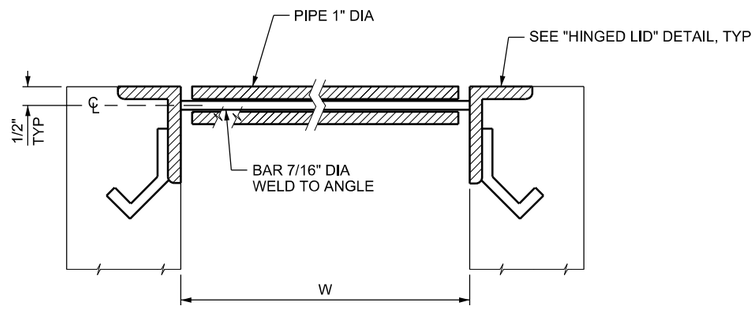


SECTION Y-Y

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. SEE SCHEDULE ON STD DWG DB 1D FOR DIMENSIONS AND QUANTITIES.
3. USE LIDS ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

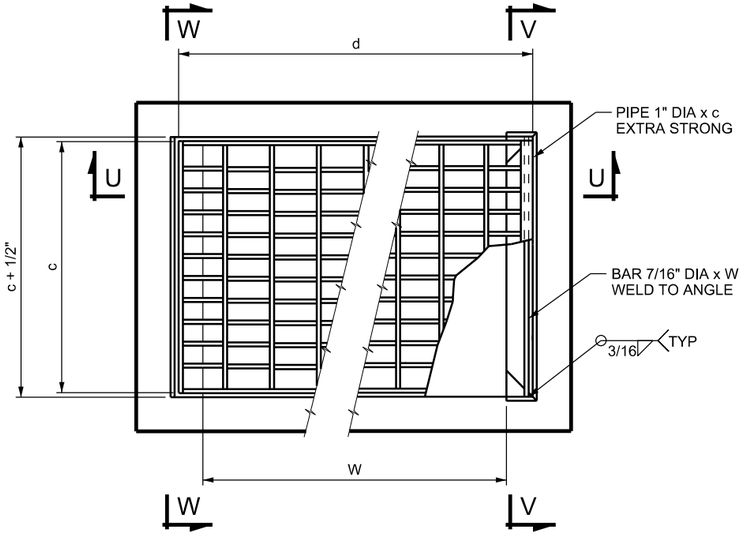
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DIVERSION
BOX HINGED LID
DETAILS FOR
18 INCH DIA OR
24 INCH DIA PIPE

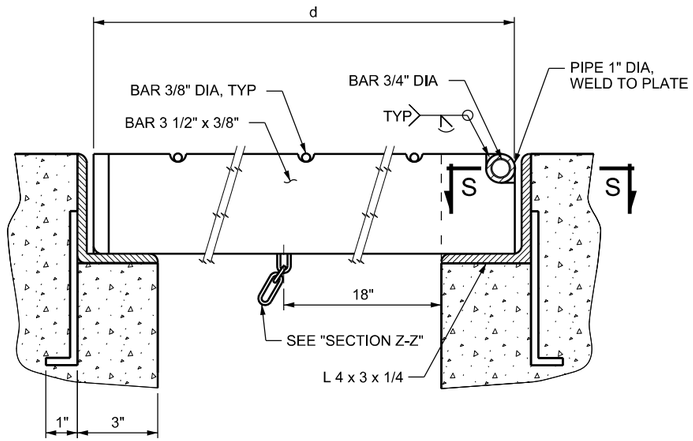
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 1B

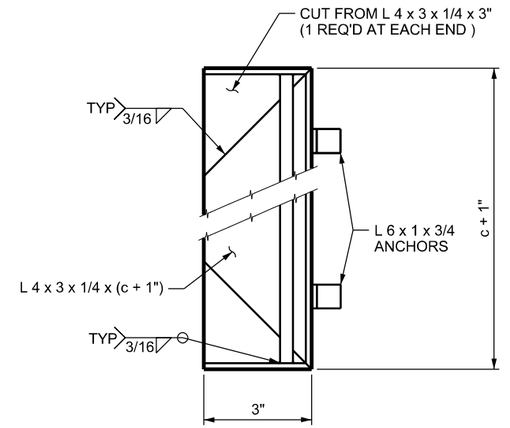
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\DB01B.dgn



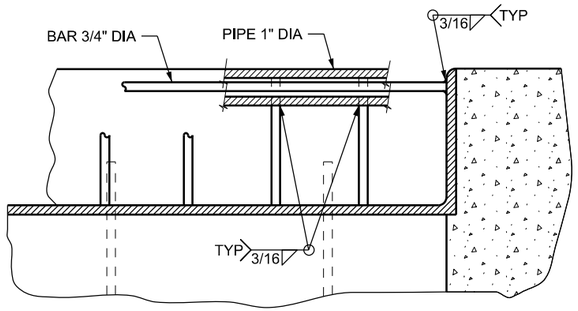
BICYCLE-SAFE GRATING PLAN



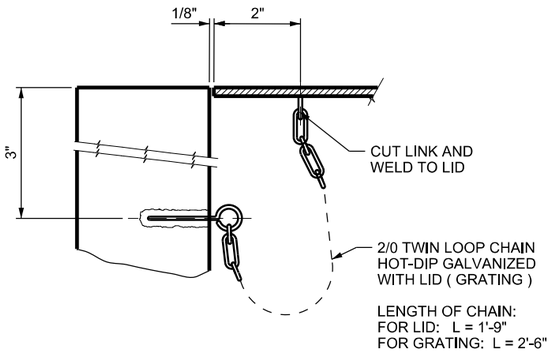
SECTION U-U



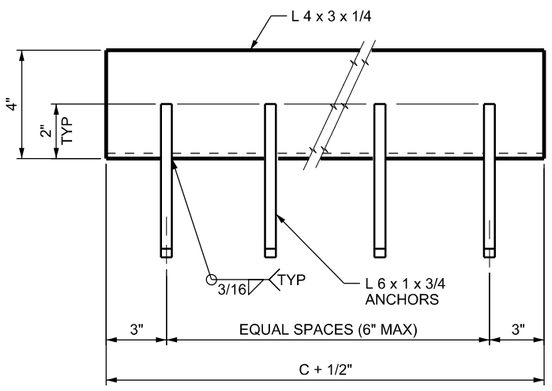
SECTION S-S



SECTION V-V



SECTION Z-Z



SECTION W-W

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. SEE SCHEDULE ON STD DWG DB 1D FOR DIMENSIONS AND QUANTITIES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

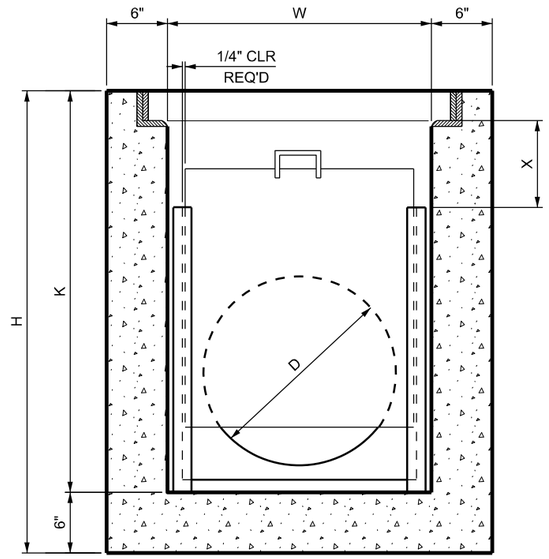
STANDARD DIVERSION BOX BICYCLE-SAFE GRATING DETAILS FOR 18 INCH DIA OR 24 INCH DIA PIPE

STANDARD DRAWING TITLE

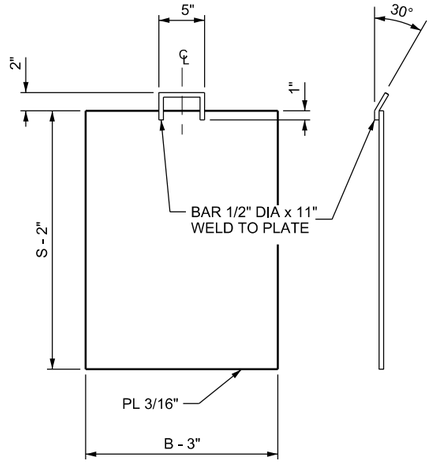
STD. DWG. NO.

DB 1C

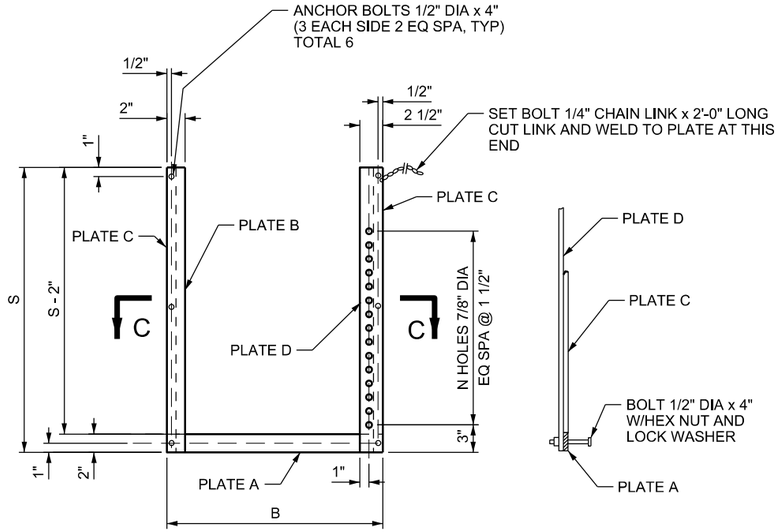
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB)\DB01C.dgn



FRAME AND GATE INSTALLATION



GATE



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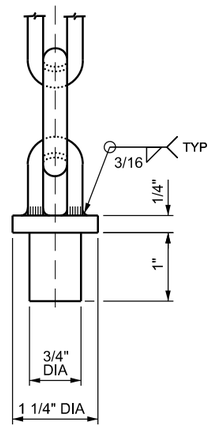
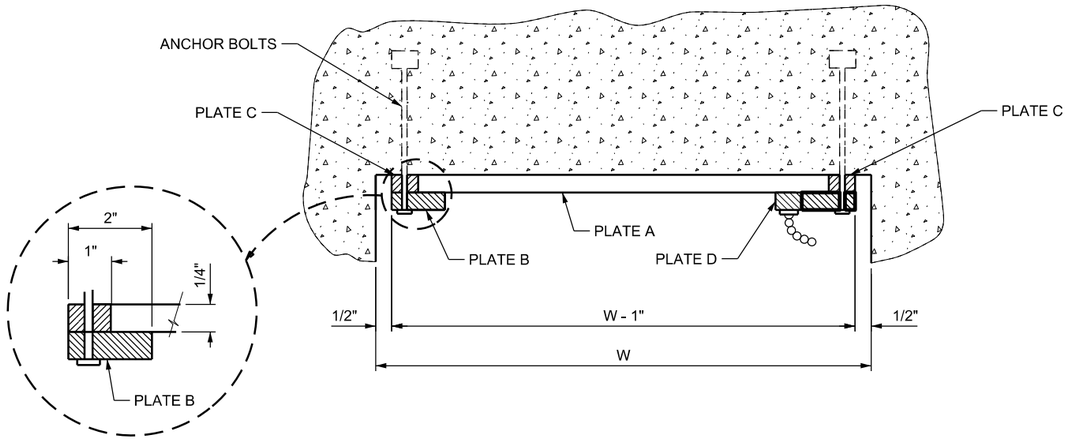


SET BOLT



SECTION C-C

SCHEDULE NO. 1

LINE	DIMENSIONS H	K	W	X	REINFORCING STEEL A-BARS LENGTH	A-BARS NO	B-BARS LENGTH	B-BARS NO	QUANTITIES REINF STL LBS	CONC CU YD	STRUCTURAL STEEL GRATING LBS	COVER PLATE LBS	FRAME LBS	GATE LBS
2'- 1" 1	2'- 6"	2'- 0"	2'- 0"	0	2'- 8"	16	2'- 1"	12	71	.525	177	80	18	26
2'- 7" 2	3'- 0"	2'- 6"	↑	6"	↑	16	2'- 7"	↑	77	.617	↑	↑	↑	↑
3'- 1" 3	3'- 6"	3'- 0"		1'- 0"		16	3'- 1"		83	.710				
3'- 7" 4	4'- 0"	3'- 6"		1'- 6"		20	3'- 7"		100	.802				
4'- 1" 5	4'-0"	4'- 0"		2'- 0"		20	4'-1"		107	.895				
4'- 7" 6	5'-0"	4'- 6"		2'- 6"		24	4'- 7"		124	.988				
5'- 1" 7	5'- 6"	5'- 0"		3'- 0"		24	5'- 1"		130	1.080				
5'- 7" 8	6'- 0"	5'- 6"		3'- 6"		28	5'- 7"		148	1.173				
6'- 1" 9	6'- 6"	6'- 0"	↓	4'- 0"	↓	28	6'- 1"	↓	154	1.265	↓	↓	↓	↓
6'- 7" 10	7'- 0"	6'- 6"	2'- 0"	4'- 6"	2'- 8"	32	6'- 7"	12	171	1.358	177	80	18	26
2'- 7" 11	3'- 0"	2'- 6"	2'- 6"	0	3'- 2"	16	2'- 7"	12	85	.770	254	114	21	41
3'- 1" 12	3'-6"	3'- 0"	↑	6"	↑	16	3'- 1"	↑	91	.878	↑	↑	↑	↑
3'- 7" 13	4'- 0"	3'- 6"		1'- 0"		20	3'- 7"		111	.989				
4'- 1" 14	4'- 6"	4'- 0"		1'- 6"		20	4'- 1"		117	1.100				
4'- 7" 15	5'- 0"	4'- 6"		2'- 0"		24	4'- 7"		137	1.211				
5'- 1" 16	5'- 6"	5'- 0"		2'- 6"		24	5'-1"		143	1.323				
5'- 7" 17	6'- 0"	5'- 6"		3'- 0"		28	5'- 7"		162	1.434				
6'- 1" 18	6'- 6"	6'- 0"		3'- 6"		28	6'- 1"		169	1.545				
6'- 7" 19	7'- 0"	6'- 6"	↓	4'- 0"	↓	32	6'-7"	↓	188	1.656	↓	↓	↓	↓
7'- 1" 20	7'- 6"	7'- 0"	2'- 6"	4'- 6"	3'- 2"	32	7'- 1"	12	194	1.767	254	114	21	41

SCHEDULE NO. 2

PIPE SIZE	DIMENSIONS AND QUANTITIES															
	COVER PLATE		BICYCLE-SAFE GRATING					FRAME AND GATE							
SEE NOTE 4 → D	a	b	c	d	e	m	n	B	S	N	1-PLATE A	1-PLATE B	2-PLATE C	1-PLATE D	GATE
18"	2'- 4"	1'-11"	1'-11"	2'- 4 ½"	4 ¼"	5	9	1'-11"	2'- 0"	12	¼" x 2" x 1'- 11"	¼" x 2" x 2'- 0"	¼" x 1" x 1'-10"	¼" x 2 ½" x 2'- 0"	3/16" x 20 ½" x 1'-10"
24"	2'- 10"	2'- 5"	2'- 5"	2'- 10½"	5 ¼"	6	12	2'- 5"	2'- 6"	15	¼" x 2" x 2'- 5"	¼" x 2" x 2'- 6"	¼" x 1" x 2'- 4"	¼" x 2 ½" x 2'- 6"	3/16" x 26 ½" x 2'- 4"

SEE NOTE 5 → D	a
18"	1'-11½"
24"	2'- 5½"

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. CALCULATIONS OF CONCRETE QUANTITIES ARE FOR BOXES WITH BICYCLE-SAFE GRATING AND NO OPENINGS FOR PIPES.
3. ADD 0.011 CUBIC YARDS OF CONCRETE IN LINES 1 THRU 10 INCLUSIVE AND 0.014 CUBIC YARDS OF CONCRETE IN LINES 11 THRU 20 INCLUSIVE AND DEDUCT 0.053 CUBIC YARDS OF CONCRETE FOR EACH 18 INCH DIA PIPE IN LINES 1 THRU 10 INCLUSIVE AND 0.091 CUBIC YARDS OF CONCRETE FOR EACH 24 INCH DIA PIPE IN LINES 11 THRU 20 INCLUSIVE FOR SOLID COVER.
4. THE GATES CAN ONLY BE PARTIALLY OPENED TO ALLOW THE GRATING OR COVER PLATE TO BE REPLACED IF DIMENSION X IS LESS THAN INSIDE PIPE DIAMETER D.
5. SEE STD DWG DB 1A FOR "STEEL COVER PLATE" DETAIL.
6. SEE STD DWG DB 1B FOR "HINGED LID" DETAIL.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

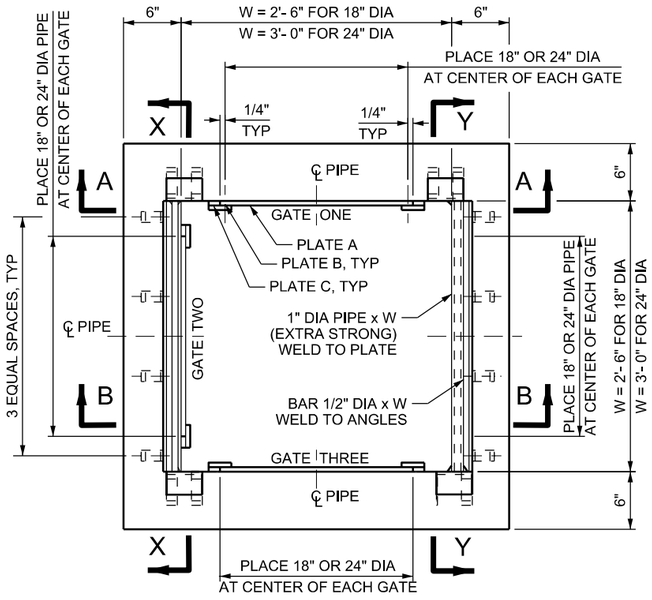
AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX THREE GATE BOX SECTIONS FOR 18 INCH DIA OR 24 INCH DIA PIPE

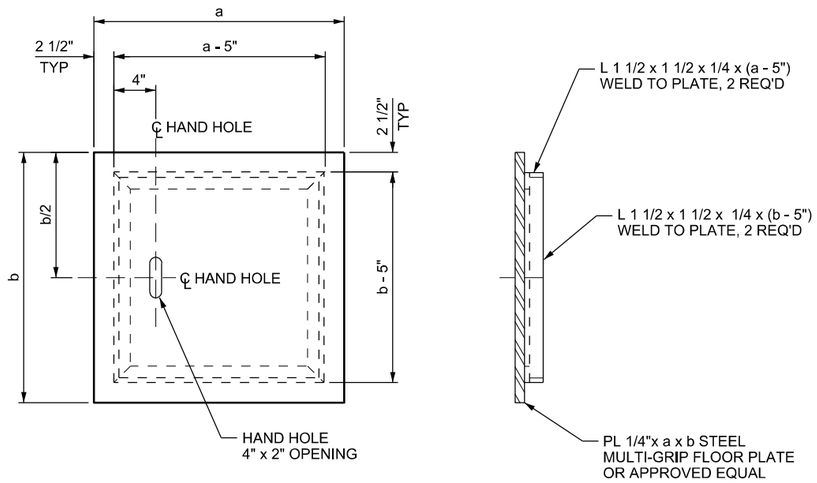
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 1D

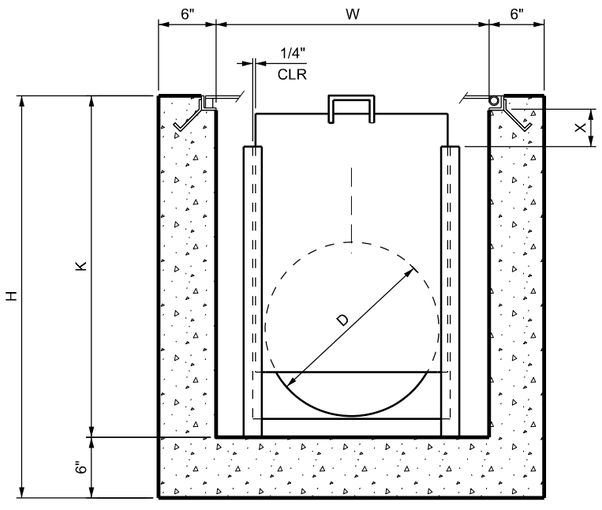
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB\DB01D.dgn
23-JUN-2020



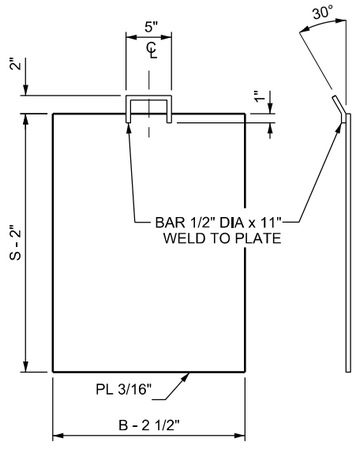
3 GATE PLAN



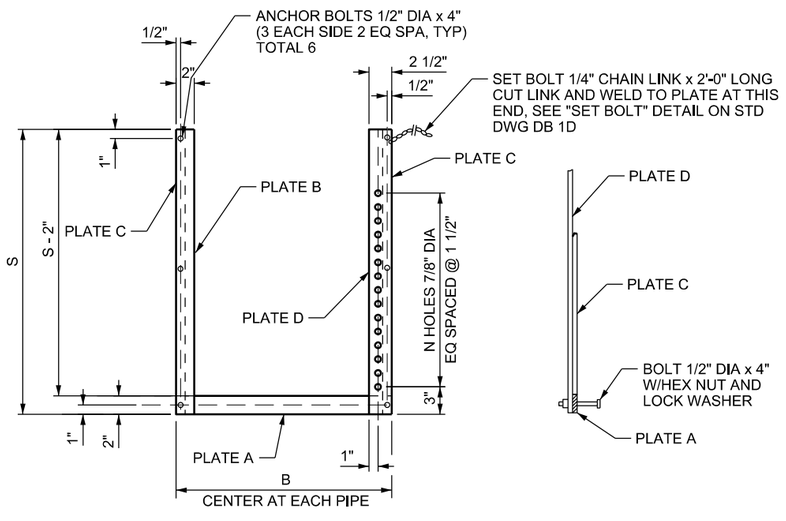
STEEL COVER PLATE



SECTION A-A



GATE



FRAME

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. SEE SCHEDULES ON STD DWG DB 1F FOR DIMENSIONS AND QUANTITIES.
3. SEE STD DWG DB 1F FOR SECTION B-B, X-X AND Y-Y.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

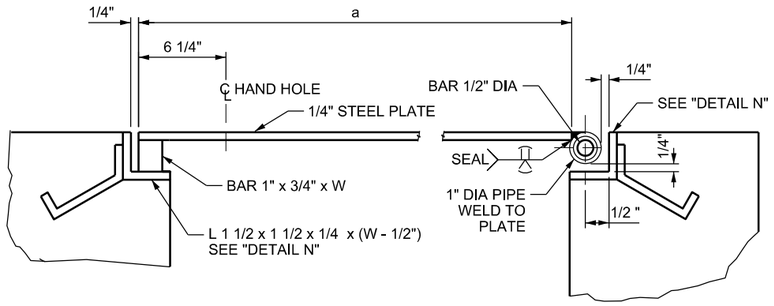
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DIVERSION
BOX THREE GATE
BOX SECTIONS FOR
18 INCH DIA OR
24 INCH DIA PIPE

STANDARD DRAWING TITLE

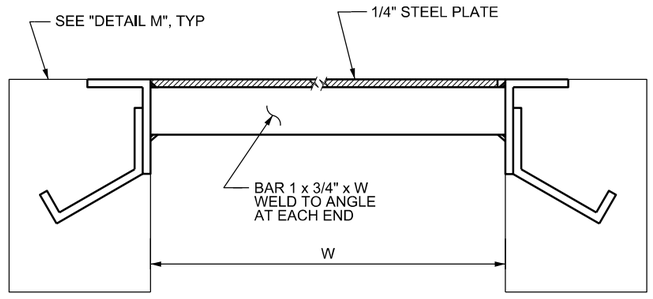
STD. DWG. NO.
DB 1E

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\DB01E.dgn



SECTION B-B

(SECTION IS TAKEN FROM STD DWG DB 1E)



SECTION X-X

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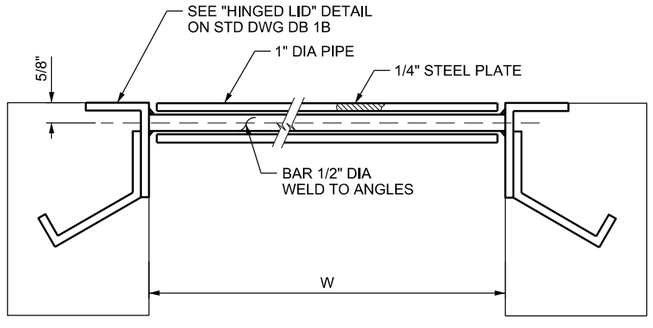


SECTION Y-Y

(SECTION IS TAKEN FROM STD DWG DB 1E)

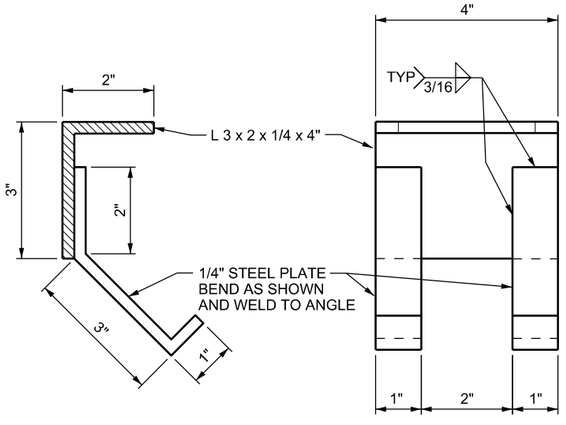
SCHEDULE NO. 1

LINE	DIMENSIONS H	K	W	X	REINFORCING STEEL A-BARS LENGTH	A-BARS NO	B-BARS LENGTH	B-BARS NO	STRUCTURAL STEEL REINF STEEL LB.	CONC CU YD	QUANTITIES PIPES, BARS & ANGLES lbs	COVER PL lbs	FRAME* lbs	GATE lbs EA.
1	2'- 6"	2'- 0"	2'- 6"	0"	3'-2"	16	2'- 1"	12	79	0.672	31	85	14	25
2	3'- 0"	2'- 6"	↑	6"	↑	16	2'- 7"	↑	85	0.783	↑	↑	↑	↑
3	3'- 6"	3'- 0"	↑	1'- 0"	↑	16	3'- 1"	↑	91	0.894	↑	↑	↑	↑
4	4'- 0"	3'- 6"	↑	1'- 6"	↑	20	3'- 7"	↑	111	1.005	↑	↑	↑	↑
5	4'- 6"	4'- 0"	↑	2'- 0"	↑	20	4'- 1"	↑	117	1.116	↑	↑	↑	↑
6	5'- 0"	4'- 6"	↑	2'- 6"	↑	24	4'- 7"	↑	137	1.227	↑	↑	↑	↑
7	5'- 6"	5'- 0"	↑	3'- 0"	↑	24	5'- 1"	↑	143	1.338	↑	↑	↑	↑
8	6'- 0"	5'- 6"	↑	3'- 6"	↑	28	5'- 7"	↑	163	1.450	↑	↑	↑	↑
9	6'- 6"	6'- 0"	↓	4'- 0"	↓	28	6'- 1"	↓	169	1.561	↓	↓	↓	↓
10	7'- 0"	6'- 6"	2'- 6"	4'- 6"	3'- 2"	32	6'- 7"	12	188	1.672	31	85	14	25
11	3'- 0"	2'- 6"	3'- 0"	0"	3'- 8"	16	2'- 7"	16	104	0.944	35	118	18	41
12	3'- 6"	3'- 0"	↑	6"	↑	16	3'- 1"	↑	113	1.074	↑	↑	↑	↑
13	4'- 0"	3'- 6"	↑	1'- 0"	↑	20	3'- 7"	↑	136	1.203	↑	↑	↑	↑
14	4'- 6"	4'- 0"	↑	1'- 6"	↑	20	4'- 1"	↑	145	1.333	↑	↑	↑	↑
15	5'- 0"	4'- 6"	↑	2'- 0"	↑	24	4'- 7"	↑	168	1.463	↑	↑	↑	↑
16	5'- 6"	5'- 0"	↑	2'- 6"	↑	24	5'- 1"	↑	177	1.592	↑	↑	↑	↑
17	6'- 0"	5'- 6"	↑	3'- 0"	↑	28	5'- 7"	↑	200	1.722	↑	↑	↑	↑
18	6'- 6"	6'- 0"	↑	3'- 6"	↑	28	6'- 1"	↑	209	1.852	↑	↑	↑	↑
19	7'- 0"	6'- 6"	↓	4'- 0"	↓	32	6'- 7"	↓	232	1.981	↓	↓	↓	↓
20	7'- 6"	7'- 0"	3'- 0"	4'- 6"	3'- 8"	32	7'- 1"	35	241	2.111	16	118	18	41

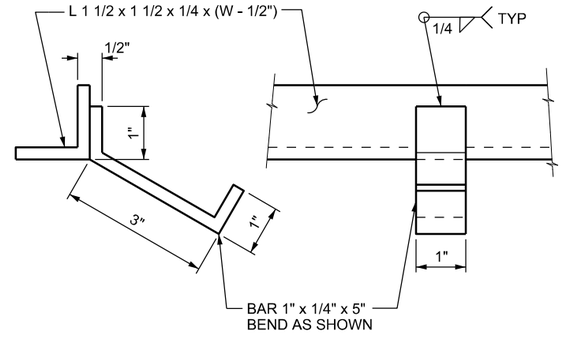
* PLATES A TO D PER GATE

SCHEDULE NO. 2

PIPE SIZE	COVER PLATE D	a	b	FRAME AND GATE B	S	N	1-PLATE A	1-PLATE B	2-PLATE C	GATE SIZE	1-PLATE D
18"	2'- 7	2'-5 1/2	1'- 11	2'- 0	12	1/4" x 2" x 1'-11	1/4" x 2" x 2'- 0	1/4" x 1" x 1'- 10	3/16" x 20 1/2" x 1'- 10	1/4" x 2 1/2" x 2'- 0
24"	3'- 1	2'- 11 1/2	2'- 5	2'- 6	15	1/4" x 2" x 2'-5	1/4" x 2" x 2'- 6	1/4" x 1" x 2'- 4	3/16" x 26 1/2" x 2'- 4	1/4" x 2 1/2" x 2'- 6



DETAIL M



DETAIL N

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. USE LIDS ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

STANDARD DIVERSION BOX THREE GATE BOX SECTIONS FOR 18 INCH DIA OR 24 INCH DIA PIPE

STANDARD DRAWING TITLE

STD. DWG. NO.
DB 1F

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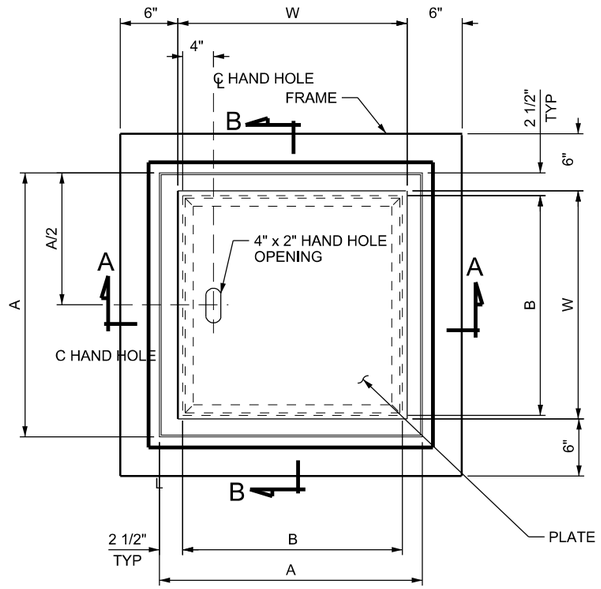
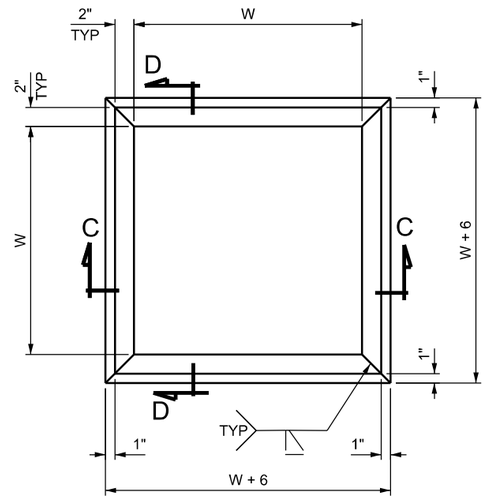
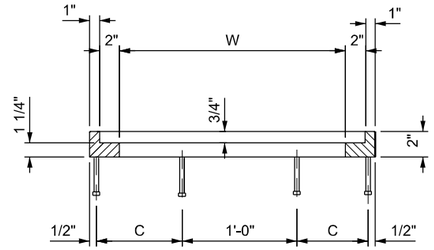
23-JUN-2020



COVER PLAN

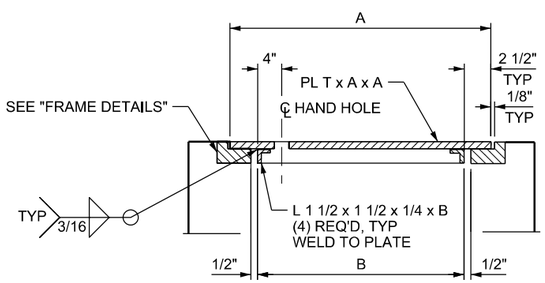


PLAN

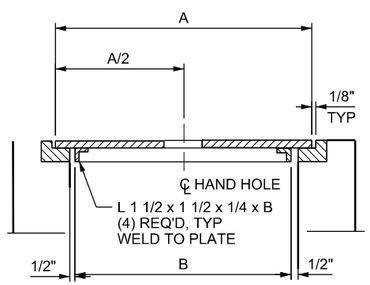


SECTION C-C or D-D

FRAME DETAILS



SECTION A-A



SECTION B-B

DIMENSIONS					QUANTITIES (LB)		
W	A	B	C	T	COVER	FRAME	TOTAL
2'- 0"	2'- 3 3/4"	1'- 10 3/4"	8 1/2"	1/2"	131	163	294
2'- 6"	2'- 9 3/4"	2'- 4 3/4"	11 1/2"	5/8"	189	195	384

DESIGN DATA

STRUCTURAL STEEL: Fy = 36,000 psi

NOTES:

1. ALL STRUCTURAL STEEL: STRUCTURAL CARBON STEEL CONFORMING TO AASHTO M 270, GRADE 36, AND HOT DIP GALVANIZE AFTER FABRICATION IN ACCORDANCE WITH ASTM A 123.
2. USE SOLID COVER ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/30/2018	JGE	REMOVED DESIGN INFORMATION FROM THE DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020

CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020

DEPUTY DIRECTOR

SOLID COVER FOR STD DWG DB 1

STANDARD DRAWING TITLE

STD. DWG. NO.

DB 1G

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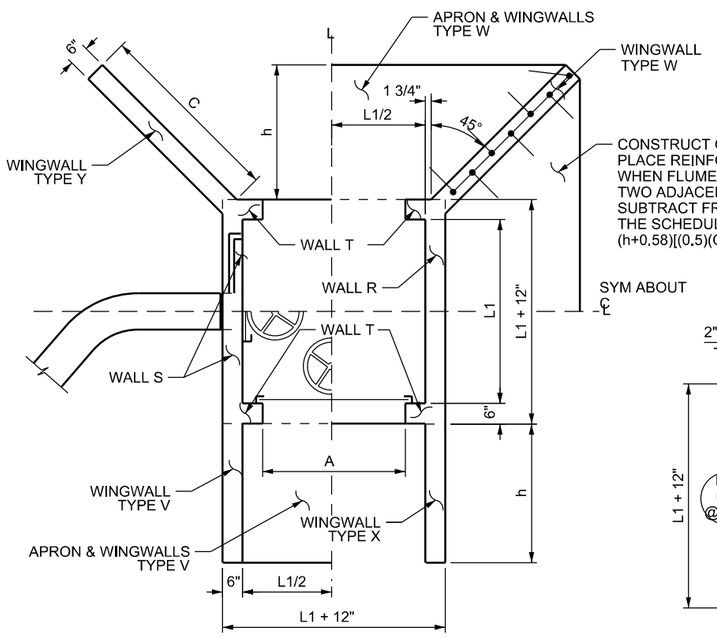
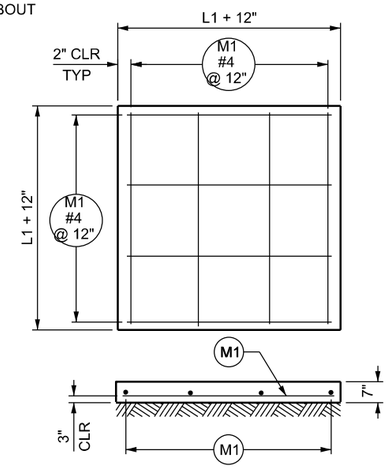
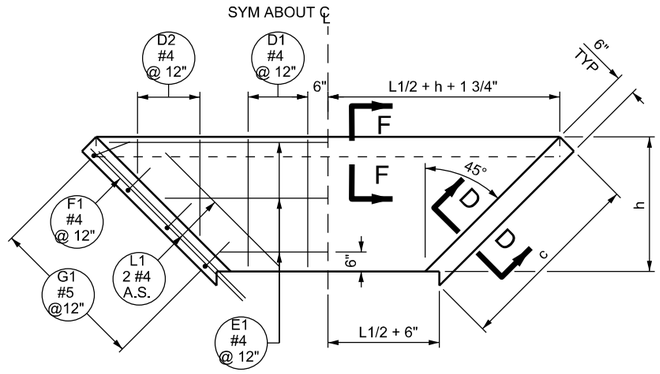
23-JUN-2020



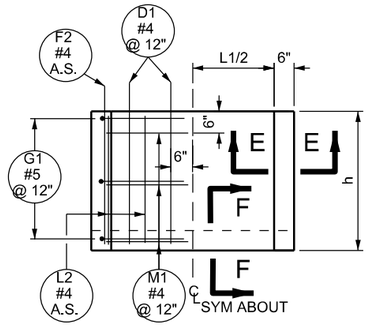
PLAN
DIVERSION BOX
W / INTERCHANGEABLE WALLS



BOTTOM SLAB

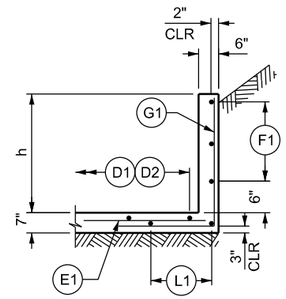


PLAN
APRON & WINGWALL TYPE W

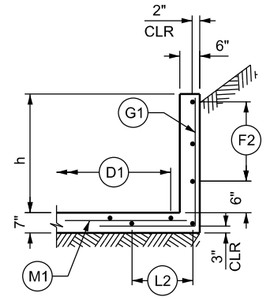


PLAN
APRON & WINGWALL TYPE V

PROVIDE CUT-OFF WALL ONLY WHEN CALLED FOR IN NOTE. PROVIDE WHEN SO SPECIFIED, FOR ALL APRONS SHOWN IN NOTE. SEE ROADWAY PLANS.



SECTION D-D



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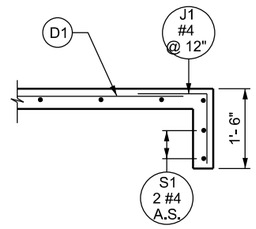
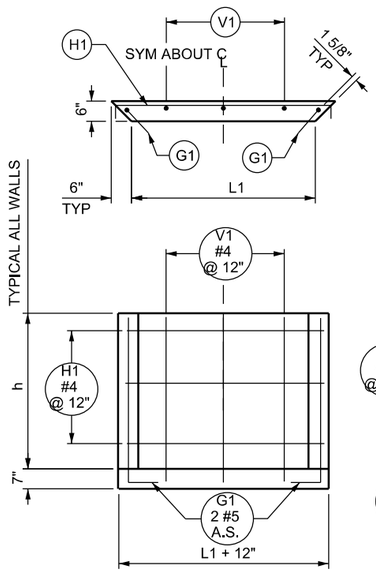
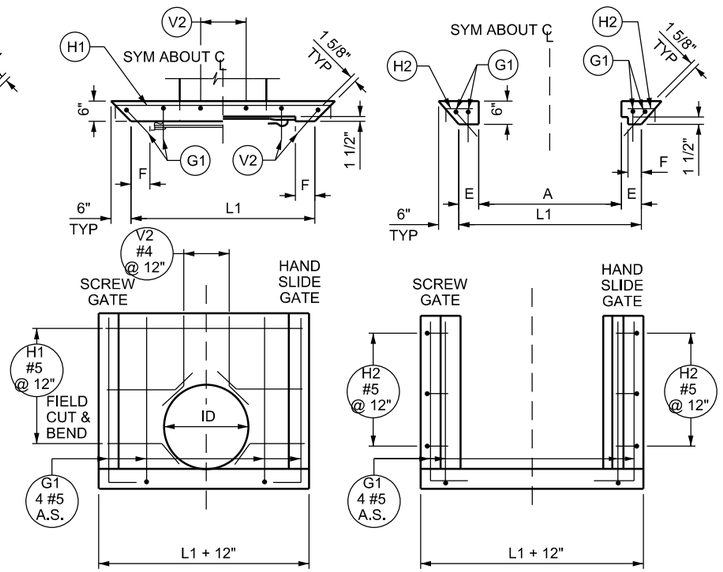


SECTION F-F

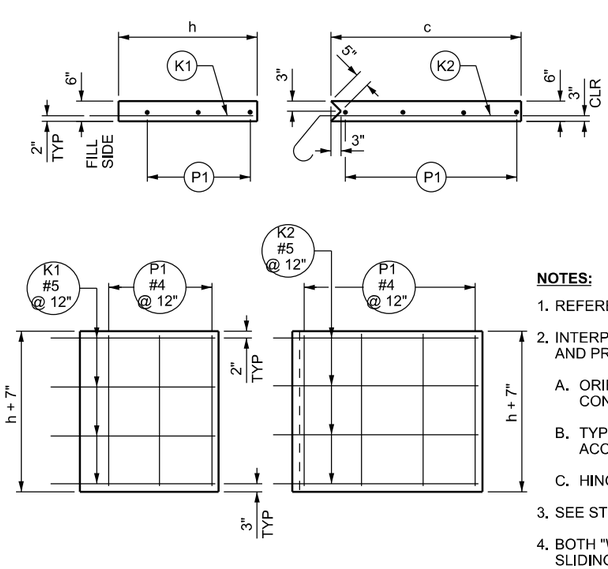


WALL R



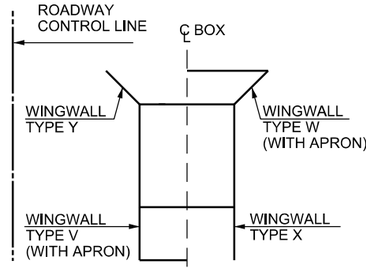
WALL S
SEE NOTE 4, PIPE ARCH SIMILAR

WALL T
SEE NOTE 4



WINGWALL X

WINGWALL Y



SCHEMATIC SKETCH
SEE ROADWAY PLAN AND PROFILE SHEET

NOTES:

1. REFERENCE DB SERIES STD DWGS.
2. INTERPRETATION OF SCHEMATIC SKETCH ON ROADWAY PLAN AND PROFILE SHEET TO INCLUDE:
   A. ORIENTATION OF DIVERSION BOX RELATIVE TO ROADWAY CONTROL LINE.
   B. TYPE OF WALL SPECIFIED FOR EACH BOX WITH ACCOMPANYING GATE AND CUT-OFF WALL REQUIREMENTS.
   C. HINGED LID REQUIREMENTS.
3. SEE STD DWG DB 2B FOR GENERAL NOTES.
4. BOTH "WALL S" AND "WALL T" HAVE THE OPTION OF HAND SLIDING GATE. MODIFY THE CONCRETE LISTED IN THE TABLES WHEN SELECTING THIS OPTION BY SUBTRACTING FROM THEM THE BLOCK-OUT AS DETERMINED BY THESE FORMULAS: "WALL T": 0.25h(E-F)/27; "WALL S": h(L1-2F)(0.125)/2T
5. USE LIDS ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX W / INTERCHANGEABLE WALLS, BOTTOM SLAB, WALLS, AND APRON DETAILS

STANDARD DRAWING TITLE

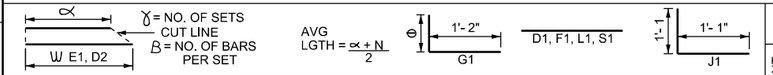
STD. DWG. NO.
DB 2A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB)\DB02A.dgn
23-JUN-2020

DIVERSION BOX SIZES ARE BASED ON BOTH THE SCREW GATE FRAME SIZES AND THE DIAMETERS OF ROUND PIPE. THEY MAY BE USED WITH EITHER FLUMES, ARCH PIPES, OR ROUND PIPES.

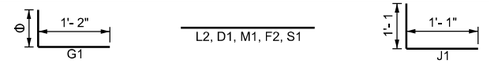
WINGWALLS WITH ATTACHED APRON

TYPE W



PIPE	LINE NUMBER	DIMENSIONS IN INCHES	FLUME SIZE A x B SCREW GATE	FLUME SIZE A x B HAND SLIDE GATE	DIMENSIONS C	E	F	h	L 1	E1 ∝	E1 W	E1 Y	E1 B	E1 AVG LGTH	D2 ∝	D2 W	D2 Y	D2 B	D2 AVG LGTH	D1 LGTH	D1 NO	G1 ⊖	G1 LGTH	G1 NO	F1 LGTH	F1 NO	L1 LGTH	L1 NO	J1 LGTH	J1 NO	S1 LGTH	S1 NO	REINFORCING STEEL LB WITHOUT CUT-OFF WALL	REINFORCING STEEL LB WITH CUT-OFF WALL	CONCRETE CU/YD WITHOUT CUT-OFF WALL	CONCRETE CU/YD WITH CUT-OFF WALL	LINE NUMBER
INSIDE DIAMETER	1	12		12 x 12	2'- 6	6"	3"	1'- 9	2'- 0	3'- 3	5'- 5	1	2	4'- 4	1'- 1	0	2	1	1'- 1	2'- 7	2	1'- 11	3'- 1	6	2'- 8	4	2'- 0	4	2'-2	6	5'- 5	2	42.5	58.4	0.362	0.462	1
	2	18	18 x 18	18 x 18	3'- 2	6"	3"	2'- 3	2'- 6	3'-9	6'- 11	↑	3	5'- 4	1'- 7	7"	↑	2	1'- 1	3'- 1	3	2'- 5	3'- 7	8	3'- 4	6	2'- 9	↑	↑	9	5'- 11	↑	70.4	92.7	0.577	0.690	2
	3	24	24 x 24	24 x 24	3'- 10	6"	3"	2'- 9	3'- 0	4'-3	8'- 5		3	6'- 4	2'- 1	1"- 1		2	1'- 7	3'- 7	3	2'- 11	4'- 1	10	4'- 0	6	3'- 5			9	8'- 5		91.9	116.2	0.832	0.979	3
	4	30	30 x 30		4'- 7	8"	5"	3'- 3	3'- 10	5'-2	10'- 4		4	7'- 9	2'- 7	7"		3	1'- 7	4'- 1	4	3'- 5	4'- 7	10	4'- 9	8	4'- 2			12	10'- 4		122.3	153.5	1.169	1.347	4
	5	36	36 x 36		5'- 4	8"	5"	3'- 9	4'- 4	5'-7	11'- 9		4	8'- 8	3'- 1	1'- 1		3	2'- 1	4'- 7	4	3'- 11	5'- 1	12	5'- 6	8	4'- 10			12	11'- 9		149.7	182.8	1.536	1.739	5
	6	42	42 x 42		6'- 0	8"	4"	4'- 3	4'- 10	6'-2	13'- 4		5	9'- 9	3'- 7	7"		4	2'- 1	5'- 1	5	4'- 5	5'- 7	14	6'- 2	10	5'- 6			15	13'- 4		198.1	255.4	1.934	2.166	6
	7	48	48 x 48		6'- 9	9"	5"	4'- 9	5'- 6	6'-9	14'- 11		5	10'- 10	4'- 1	1'- 1		4	2'- 7	5'- 7	6	4'- 11	6'- 1	16	6'- 11	10	6'- 3			16	14'- 11		236.8	279.9	2.414	2.674	7
	8	36 x 22	36 x 24	36 x 24	3'- 8	8"	5"	2'- 7	4'- 4	5'-7	9'- 5		3	7'- 6	1'- 11	11"		2	1'- 5	3'- 5	4	2'- 9	3'- 11	10	3'- 10	6	3'- 2			10	9'- 5		92.6	120.0	0.832	0.996	8
SPAN x RISE	9	43 x 27	48 x 30		4'- 3	8"	4"	3'- 0	5'- 4	6'-7	11'- 3		3	8'- 11	2'- 4	1'- 4		2	1'- 10	3'- 10	5	3'- 2	4'- 4	10	4'- 5	6	3'- 9			11	11'- 3		108.5	139.5	1.123	1.318	9
	10	50 x 31	60 x 36		4'- 9	9"	5"	3'- 4	6'- 6	7'-9	13'- 1		4	10'- 5	2'- 8	8"		3	1'- 8	4'- 2	7	3'- 6	4'- 8	12	4'- 11	8	4'- 3			15	13'- 1		150.0	189.2	1.417	1.645	10
	11	58 x 36	60 x 36		5'- 4	9"	5"	3'- 9	6'- 6	7'-9	13'- 11		4	10'- 10	3'- 1	1'- 1		3	2'- 1	4'- 7	7	3'- 11	5'- 1	12	5'- 6	8	4'- 10			15	13'- 11		164.7	205.0	1.709	1.952	11
	12	65 x 40	72 x 42		5'- 9	9"	5"	4'- 1	7'- 6	8'-9	15'- 7	↓	5	12'- 2	3'- 5	5"	↓	4	1'- 11	4'- 11	8	4'- 3	5'- 5	14	5'- 11	10	5'- 4	↓	↓	18	15'- 7	↓	210.0	256.9	2.040	2.311	12
	13	72 x 44	72 x 48		6'- 3	9"	5"	4'- 5	7'- 6	8'-9	16'- 3	1	5	12'- 6	3'- 5	9"	2	4	2'- 3	5'- 3	8	4'- 7	5'- 9	14	6'- 5	10	5'- 9	4	2'-2	18	16'- 3	2	224.0	271.8	2.321	2.603	13

TYPE V



LINE NUMBER	G1 ⊖	G1 LGTH	G1 NO	L2 LGTH	L2 NO	D1 LGTH	D1 NO	M1 LGTH	M1 NO	F2 LGTH	F2 NO	J1 LGTH	J1 NO	S1 LGTH	S1 NO	REINFORCING STEEL LB WITHOUT CUT-OFF WALL	REINFORCING STEEL LB WITH CUT-OFF WALL	CONCRETE CU/YD WITHOUT CUT-OFF WALL	CONCRETE CU/YD WITH CUT-OFF WALL	LINE NUMBER
1	1'- 11	3'- 1	6	1'- 5	4	2'- 7	2	2'- 8	3	2'- 7	4	2'-2	4	2'- 8	2	38.8	48.2	0.227	0.278	1
2	2'- 5	3'- 7	6	1'- 11	↑	3'- 1	3	3'- 2	3	3'- 1	6		5	3'- 2		52.4	63.9	0.358	0.417	2
3	2'- 11	4'- 1	8	2'- 5		3'- 7	3	3'- 8	4	3'- 7	6		5	3'- 8		71.9	84.0	0.518	0.586	3
4	3'- 5	4'- 7	8	2'- 11		4'- 1	4	4'- 6	4	4'- 1	8		6	4'- 6		90.8	105.5	0.731	0.813	4
5	3'- 11	5'- 1	10	3'- 5		4'- 7	4	5'- 0	5	4'- 7	8		6	5'- 0		115.6	131.0	0.953	1.044	5
6	4'- 5	5'- 7	10	3'- 11		5'- 1	5	5'- 6	5	5'- 1	10		7	5'- 6		138.0	155.5	1.205	1.304	6
7	4'- 11	6'- 1	12	4'- 5		5'- 7	6	6'- 2	6	5'- 7	12		8	6'- 2		179.8	199.6	1.503	1.613	7
8	2'- 9	3'- 11	6	2'- 3		3'- 5	4	5'- 0	3	3'- 5	6		6	5'- 0		63.4	78.7	0.545	0.636	8
9	3'- 2	4'- 4	8	2'- 8		3'- 10	5	6'- 0	4	3'- 10	8		7	6'- 0		92.6	440.8	0.744	0.854	9
10	3'- 6	4'- 8	8	3'- 0		4'- 2	7	7'- 2	4	4'- 2	8		9	7'- 2		107.9	130.5	0.952	1.079	10
11	3'- 11	5'- 1	10	3'- 5		4'- 7	7	7'- 2	5	4'- 7	8		9	7'- 2		132.0	154.6	1.128	1.255	11
12	4'- 3	5'- 5	10	3'- 9	↓	4'- 11	8	8'- 2	5	4'- 11	10	↓	10	8'- 2	↓	152.9	178.3	1.367	1.511	12
13	4'- 7	5'- 9	10	4'- 1	4	5'- 3	8	8'- 2	5	5'- 3	10	2'-2	10	8'- 2	2	161.3	186.7	1.534	1.678	13

DIVERSION BOX SIZES ARE BASED ON BOTH THE SCREW GATE FRAME SIZES AND THE DIAMETERS OF ROUND PIPE. THEY MAY BE USED WITH EITHER FLUMES, ARCH PIPES, OR ROUND PIPES.

WINGWALLS WITHOUT ATTACHED APRON

WINGWALL X

WINGWALL Y

PIPE	LINE NUMBER	DIMENSIONS IN INCHES	FLUME SIZE A x B SCREW GATE	FLUME SIZE A x B HAND SLIDE GATE	DIMENSIONS C	E	F	h	L 1	WINGWALL X K1 LGTH	WINGWALL X K1 NO	WINGWALL X P1 LGTH	WINGWALL X P1 NO	REINFORCING STEEL LBS	CONCRETE CUBIC YARDS	WINGWALL Y K2 T	WINGWALL Y K2 LGTH	WINGWALL Y K2 NO	WINGWALL Y P1 LGTH	WINGWALL Y P1 NO	REINFORCING STEEL LBS	CONCRETE CUBIC YARDS	LINE NUMBER
INSIDE DIAMETER	1	12		12 x 12	2'- 6	6"	3"	1'- 9	2'- 0	2'- 7	3	1'- 11	3	11.9	0.076	2'- 9	3'- 10	3	1'- 11	3	15.8	0.103	1
	2	18	18 x 18	18 x 18	3'- 2	6"	3"	2'- 3	2'- 6	3'- 1	3	2'- 5	3	14.5	0.118	3'- 5	4'- 6	3	2'- 5	4	20.5	0.160	2
	3	24	24 x 24	24 x 24	3'- 10	6"	3"	2'- 9	3'- 0	3'- 7	4	2'- 11	4	22.7	0.170	4'- 1	5'- 2	4	2'- 11	4	29.3	0.229	3
	4	30	30 x 30		4'- 7	8"	5"	3'- 3	3'- 10	4'- 1	4	3'- 5	4	26.2	0.231	4'- 10	5'- 11	4	3'- 5	5	36.1	0.317	4
	5	36	36 x 36		5'- 4	8"	5"	3'- 9	4'- 4	4'- 7	5	3'- 11	5	37.0	0.301	5'- 7	6'- 8	5	3'- 11	6	50.5	0.418	5
	6	42	42 x 42		6'- 0	8"	4"	4'- 3	4'- 10	5'- 1	5	4'- 5	5	41.3	0.380	6'- 3	7'- 4	5	4'- 5	6	55.9	0.526	6
	7	48	48 x 48		6'- 9	9"	5"	4'- 9	5'- 6	5'- 7	6	4'- 11	6	54.6	0.469	7'- 0	8'- 1	6	4'- 11	7	13.6	0.654	7
SPAN x RISE	8	36 x 22	36 x 24	36 x 24	3'- 8	8"	5"	2'- 7	4'- 4	3'- 5	3	2'- 9	3	16.2	0.152	3'- 11	5'- 0	3	2'- 9	4	23.0	0.208	8
	9	43 x 27	48 x 30		4'- 3	8"	4"	3'- 0	5'- 4	3'- 10	4	3'- 2	4	24.5	0.199	4'- 6	5'- 7	4	3'- 2	5	33.9	0.274	9
	10	50 x 31	60 x 36		4'- 9	9"	5"	3'- 4	6'- 6	4'- 2	4	3'- 6	4	26.7	0.242	5'- 0	6'- 1	4	3'- 6	5	36.8	0.336	10
	11	58 x 36	60 x 36		5'- 4	9"	5"	3'- 9	6'- 6	4'- 7	5	3'- 11	5	37.0	0.301	5'- 7	6'- 8	5	3'- 11	6	50.5	0.418	11
	12	65 x 40	72 x 42		5'- 9	9"	5"	4'- 1	7'- 6	4'- 11	5	4'- 3	5	39.8	0.353	6'- 0	7'- 1	5	4'- 3	6	54.0	0.486	12
	13	72 x 44	72 x 48		6'- 3	9"	5"	4'- 5	7'- 6	5'- 3	5	4'- 7	5	42.7	0.409	6'- 6	7'- 7	5	4'- 7	7	60.5	0.56	13

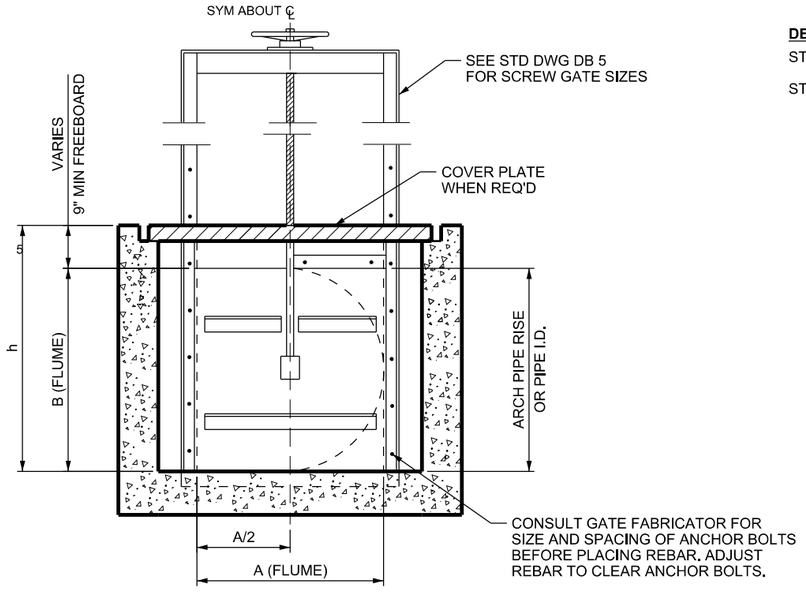
WALL TYPES

WALL R

WALL S

WALL T

PIPE	LINE NUMBER	DIMENSIONS IN INCHES	FLUME SIZE A x B SCREW GATE	FLUME SIZE A x B HAND SLIDE GATE	WALL R G1 ⊖	WALL R G1 LGTH	WALL R G1 NO	WALL R H1 I	WALL R H1 LGTH	WALL R H1 NO	WALL R V1 LGTH	WALL R V1 NO	WALL R REINFORCING STEEL LBS	WALL R CONCRETE CUBIC YARDS	WALL S G1 ⊖	WALL S G1 LGTH	WALL S G1 NO	WALL S H1 I	WALL S H1 LGTH	WALL S H1 NO	WALL S V2 LGTH	WALL S V2 NO	WALL S REINFORCING STEEL LBS	WALL S CONCRETE CUBIC YARDS	WALL T G1 ⊖	WALL T G1 LGTH	WALL T G1 NO	WALL T H2 ⊖	WALL T H2 LGTH	WALL T H2 NO	WALL T REINFORCING STEEL LBS	WALL T CONCRETE CUBIC YARDS	BOTTOM SLAB M1 LGTH	BOTTOM SLAB M1 NO	BOTTOM SLAB REINFORCING STEEL LBS	BOTTOM SLAB CONCRETE CUBIC YARDS	LINE NUMBER
INSIDE DIAMETER	1	12		12 x 12	1'- 11	3'- 1	2	2'- 8	4'- 4	2	1'- 11	2	18.0	0.081	1'- 11	3'- 1	4	2'- 8	4'- 4	2	1'- 5	1	22.8	0.067	1'- 11	3'- 1	4	10	1'-8	4	17.3	0.049	2'- 8	8	14.3	0.194	1
	2	18	18 x 18	18 x 18	2'- 5	3'- 7	↑	3'- 2	4'- 10	3	2'- 5	2	25.8	0.125	2'- 5	3'- 7	↑	3'- 2	4'- 10	3	1'- 8	1	31.2	0.092	2'- 5	3'- 7	↑	↑	↑	6	21.6	0.063	3'- 2	8	16.9	0.265	2
	3	24	24 x 24	24 x 24	2'- 11	4'- 1		3'- 8	5'- 4	3	2'- 11	3	31.1	0.179	2'- 11	4'- 1		3'- 8	5'- 4	3	1'- 11	1	35.0	0.120	2'- 11	4'- 1				6	23.7	0.076	3'- 8	10	24.5	0.346	3
	4	30	30 x 30		3'- 5	4'- 7		4'- 6	6'- 2	4	3'- 5	4	44.4	0.262	3'- 5	4'- 7		4'- 6	6'- 2	4	2'- 2	2	47.7	0.170	3'- 5	4'- 7				8	28.0	0.110	4'- 6	12	36.1	0.505	4
	5	36	36 x 36		3'- 11	5'- 1		5'- 0	6'- 8	4	3'- 11	4	48.9	0.337	3'- 11	5'- 1		5'- 0	6'- 8	4	2'- 5	3	53.9	0.205	3'- 11	5'- 1				8	30.1	0.127	5'- 0	12	40.1	0.614	5
	6	42	42 x 42		4'- 5	5'- 7		5'- 6	7'- 2	5	4'- 5	5	63.8	0.422	4'- 5	5'- 7		5'- 6	7'- 2	5	2'- 8	3	66.0	0.242	4'- 5	5'- 7				10	34.4	0.144	5'- 6	14	51.4	0.735	6
	7	48	48 x 48		4'- 11	6'- 1		6'- 2	7'- 10	5	4'- 11	5	70.0	0.530	4'- 11	6'- 1		6'- 2	7'- 10	5	2'- 11	4	74.0	0.296	4'- 11	6'- 1				10	36.5	0.176	6'- 2	14	57.7	0.913	7
SPAN x RISE	8	36 x 22	36 x 24	36 x 24	2'- 9	3'- 11		5'- 0	6'- 8	3	2'- 9	4	36.4	0.232	2'- 9	3'- 11		5'- 0	6'- 8	3	1'- 10	3	40.9	0.150	2'- 9	3'- 11				6	23.0	0.088	5'- 0	12	40.1	0.614	8
	9	43 x 27	48 x 30		3'- 6	5'- 4		6'- 0	7'- 8	3	3'- 2	5	43.6	0.326	3'- 2	4'- 4		6'- 0	7'- 8	3	2'- 1	5	48.5	0.206	3'- 2	4'- 4				6	24.8	0.102	6'- 0	16	64.1	0.867	9
	10	50 x 31	60 x 36		3'- 6	4'- 8		7'- 2	8'- 10	4	3'- 6	6	60.6	0.343	3'- 6	4'- 8		7'- 2	8'- 10	4	2'- 4	5	64.1	0.271	3'- 6	4'- 8				8	28.4	0.124	7'- 2	16	76.6	1.215	10
	11	58 x 36	60 x 36		3'- 11	5'- 1		7'- 2	8'- 10	4	3'- 11	6	63.2	0.488	3'- 11	5'- 1		7'- 2	8'- 10	4	2'- 5	5	66.1	0.275	3'- 11	5'- 1				8	30.1	0.139	7'- 2	16	76.6	1.215	11
	12	65 x 40	72 x 42		4'- 3	5'- 5		8'- 2	9'- 10	4	4'- 3	7	72.2	0.608	4'- 3	5'- 5		8'- 2	9'- 10	4	2'- 7	6	74.0	0.340	4'- 3	5'- 5				8	31.5	0.151	8'- 2	18	98.2	1.561	12
	13	72 x 44	72 x 48		4'- 7	5'- 9	2	8'- 2	9'- 10	5	4'- 7	7	84.7	0.657	4'- 7	5'- 9	4	8'- 2	9'- 10	5	2'- 9	6	86.3	0.328	4'- 7	5'- 9	4	10	1'-8	10	35.1	0.164	8'- 2	18	98.2	1.561	13

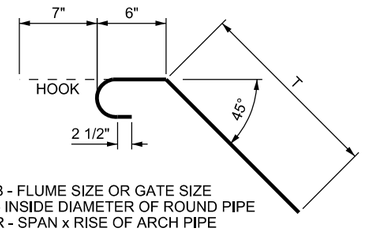


SCREW GATE INSTALLATION DIAGRAM

DESIGN DATA

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f ' c = 4,000 psi; fy = 60,000 psi; n = 8



A x B - FLUME SIZE OR GATE SIZE
I.D. - INSIDE DIAMETER OF ROUND PIPE
S x R - SPAN x RISE OF ARCH PIPE

180° STANDARD HOOK

GENERAL NOTES:

1. REFERENCE DB SERIES STD DWGS.
2. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
3. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE COATING ON REINFORCING BARS.
4. USE CLASS AA (AE) CONCRETE.
5. USE TYPE II CEMENT (LOW ALKALI).
6. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
7. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
8. REFER TO EACH FULL LINE IN TABLE FOR QUANTITIES FOR ONE WALL OR SLAB OF THE TYPE SPECIFIED. USE THIS DRAWING IN CONJUNCTION WITH THE ROADWAY PLAN AND PROFILE, AND ROADWAY SUMMARY SCHEDULE TO DETERMINE THE SPECIFICS CONCERNING EACH DIVERSION BOX.

NOTES:

1. SEE STD DWG DB 4 FOR TRANSITION STRUCTURE FROM DIVERSION BOX TO TRAPEZOIDAL SHAPED CHANNEL WITH BOTTOM WIDTH OF 1 FT-0 INCH.
2. ALL DIMENSIONS ARE ROUNDED TO THE NEAREST WHOLE INCH. THOSE DIMENSIONS SHOWN FOR REBAR ARE OUT-TO-OUT OF BAR.
3. USE "∝" AND "ω" DIMENSIONS NOT AVERAGE LENGTH OF REBAR WHEN LAYING-OUT SET REBAR.

4 USE STANDARD 180 DEGREE HOOK FOR K2 BAR AS NOTED.

5. USE #5 REBARS FOR K1, K2, G1 AND H1 MARK NUMBERS. ALL REMAINING MARK NUMBERS ARE #4 REBARS.
6. SAME SIZE BOX IS REQUIRED FOR BOTH METAL PIPE AND CONCRETE PIPE.

REVISIONS

NO.	DATE	APPR.	REMARKS

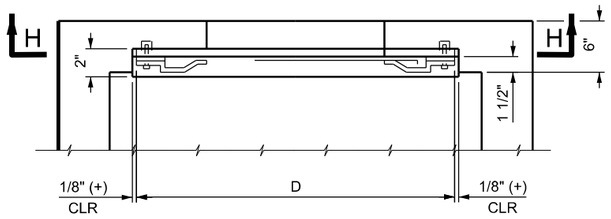
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

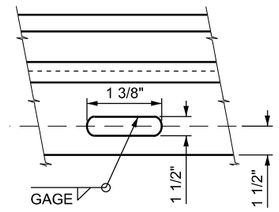
STANDARD DRAWING TITLE
STANDARD DIVERSION BOX W / INTERCHANGEABLE WALLS, QUANTITIES SCHEDULE

STD. DWG. NO.
DB 2B

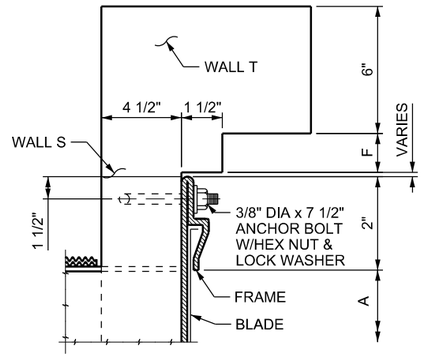
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\DB02B.dgn
23-JUN-2020



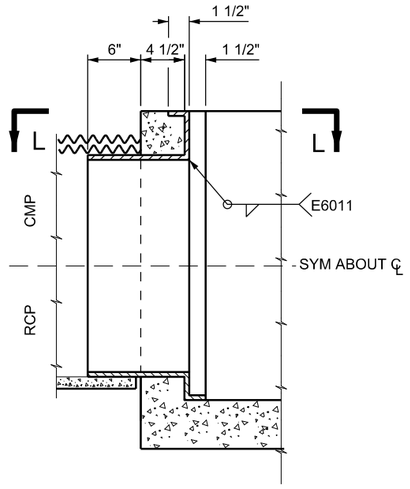
PARTIAL PLAN
TYPE Ga



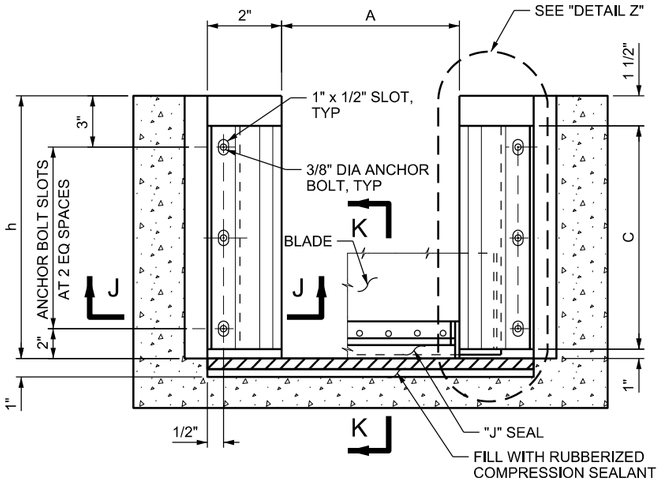
DETAIL A



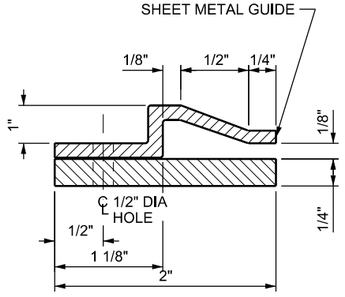
SECTION L-L



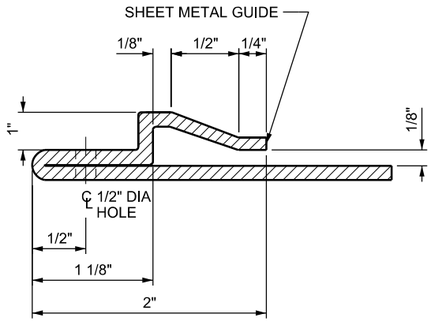
SECTION G-G



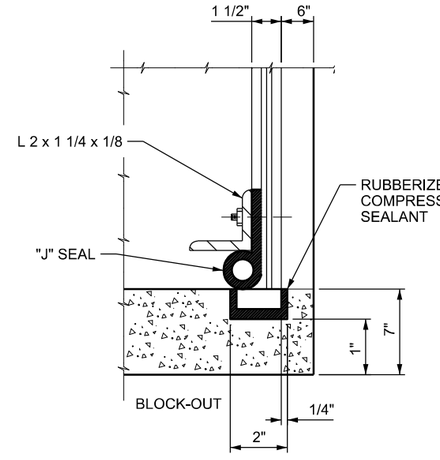
SECTION H-H
REQUIRED WITH FLUME



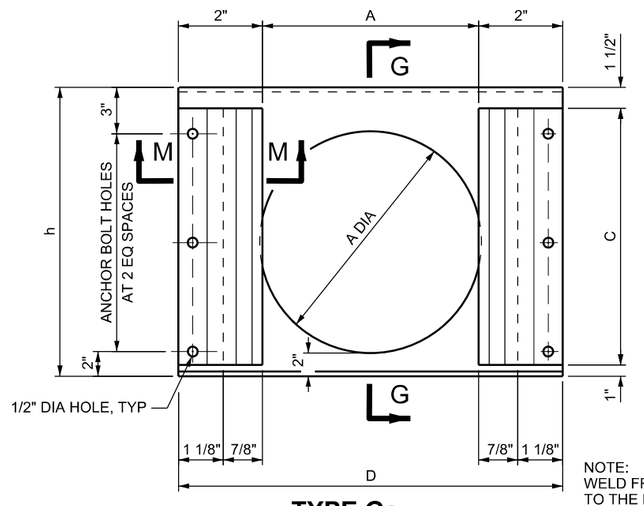
SECTION J-J



SECTION M-M

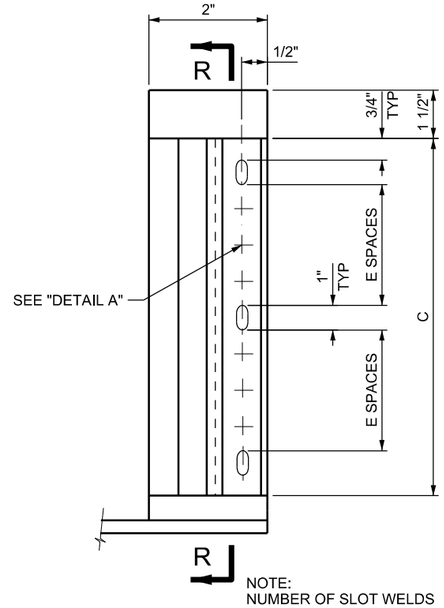


SECTION K-K



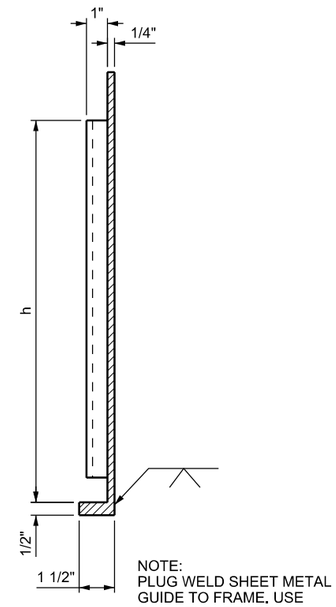
TYPE Ga
REQ'D WITH PIPE
ROUND PIPE SHOWN, ARCH PIPE SIMILAR

NOTE:
WELD FRAME WATER-TIGHT TO THE END OF THE METAL PIPE. GAGE OF METAL PIPE IS THE SAME AS THE GAGE OF THE FRAME.



DETAIL Z

NOTE:
NUMBER OF SLOT WELDS IS ONE LESS THAN THE NUMBER OF E SPACES.



SECTION R-R

NOTE:
PLUG WELD SHEET METAL GUIDE TO FRAME, USE E6011 ELECTRODE.

DESIGN DATA

STRUCTURAL STEEL: Fy = 36,000 psi

STRUCTURAL CONCRETE: f ' c = 4,000 psi; fy = 60,000 psi; n = 8

GENERAL NOTES

1. REFERENCE DB SERIES STD DWGS.
2. ALL BOLTS: A 307 BOLTS UNLESS OTHERWISE INDICATED.
3. GALVANIZED FASTENERS: CONFORM TO ASTM STANDARDS A 307 AND A 164.

NOTES:

1 INSTALL SHEET METAL FRAME PERPENDICULAR TO THE FLOOR OF THE BOX PRIOR TO CASTING THE WALLS. BE CAREFUL NOT TO SCAR OR OTHERWISE DAMAGE THE FAYING SURFACES BETWEEN THE BLADE AND THE FRONT FACE OF THE FRAME SO THAT FRAME REMAINS WATER-TIGHT WHEN CLOSED.

2. FABRICATE THE BLADE AND FRAME OF ZINC COATED STEEL. CONFORM TO AASHTO M 218.

REVISIONS				
NO.	DATE	APPR.	REMARKS	

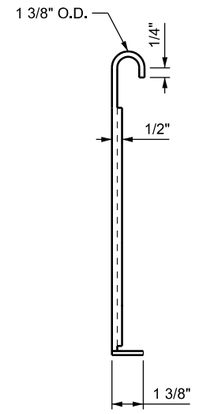
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

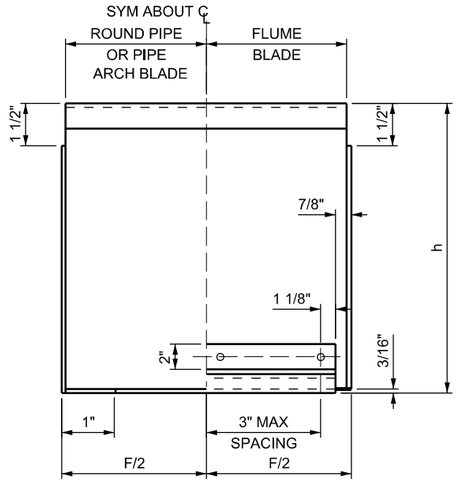
STANDARD DIVERSION BOX
W / INTERCHANGEABLE
WALLS, HAND SLIDE GATE
DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 2C

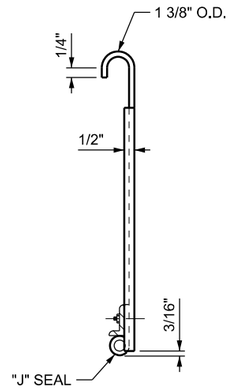
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\DB02C.dgn
23-JUN-2020



SECTION THRU PIPE OR PIPE ARCH BLADE



HAND SLIDE GATE BLADE



SECTION THRU FLUME BLADE

DIMENSION SCHEDULE														
GATE SIZE		FLUME							PIPE OR PIPE ARCH					
A	B	FRAME		GUIDE			BLADE		SHEET METAL FRAME		BLADE			
		D	h	C	GA	E	F	GA	A	h	D	GA	F	GA
12"	12"	1'- 4¼"	1'- 9	1'- 6 ½"	16	2	1'- 1 ½"	16	12"	1'- 9	1'- 4 ¼"	16	1'- 1 ½"	16
18"	18"	1'- 10¼"	2'- 3	2'- 0 ½"	14	3	1'- 7 ½"	14	18"	2'- 3	1'- 10 ¼"	14	1'- 7 ½"	14
24"	24"	2'- 4¼"	2'- 9	2'- 6 ¼"	10	4	2'- 1 ½"	10	24"	2'- 9	2'- 4 ¼"	10	2'- 1 ½"	10
36"	24"	3'- 5¼"	2'- 7	2'- 4 ½"	10	4	3'- 1 ½"	8	36"	2'- 7	3'- 5 ¼"	10	3'- 1 ½"	8

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. USE STRUCTURAL CARBON FOR ALL BAR AND ANGLE STEEL CONFORMING TO AASHTO DESIGNATION M 270, GRADE 36. HOT-DIP GALVANIZE AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111.
3. FABRICATE GUIDES, BLADES, AND SHEET METAL FRAMES OF HAND SLIDE GATES OF ZINC COATED STEEL CONFORMING TO THE REQUIREMENTS OF SPECIFICATION ASTM A 653.
4. "J" SEALS: MOLDED OR EXTRUDED NEOPRENE OR EPDM (ETHYLENE PROPYLENE) OF PROPER LENGTH, CURED TO ENSURE A DENSE HOMOGENEOUS CROSS SECTION FREE FROM PITTING, BLISTERS OR POROSITY, MEETING THE FOLLOWING SPECIFICATIONS WHEN TESTED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF ASTM D 412, D 471, D 2240 AND D 395.

   SHORE A DUROMETER HARDNESS: 60 ± 5

	NEOPRENE	EPDM
MINIMUM ELONGATION:	450%	35%
ULTIMATE TENSILE STRENGTH:	2,500 psi	2,000 psi
COMPRESSION SET (MAX):	30%	25%

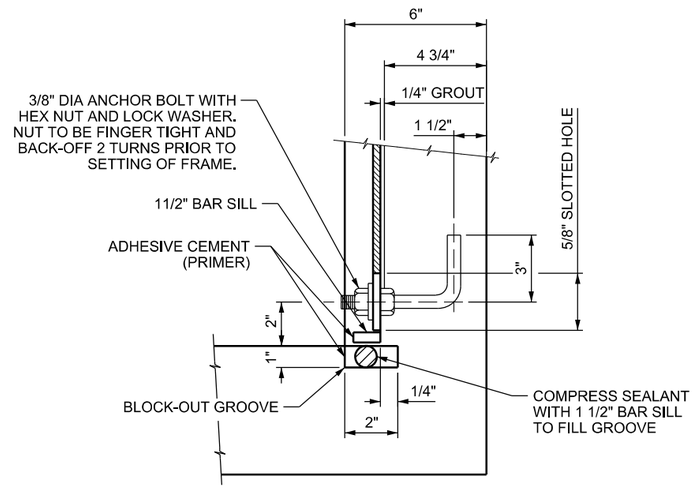
   BOTH MATERIALS
   ABSORPTION (2 DAYS): 5% BY WEIGHT
   TENSILE STRENGTH (48 HOURS IN OXYGEN 8 PERCENT OF BEGINNING STRENGTH @ 70°C AND 300 psi PRESSURE)
   ACCURATELY LOCATE AND DRILL ALL HOLES IN SEAL WITH 1/8 INCH OVERSIZE HOLLOW CORE DRILL.
5. COMPRESSION SEALANT: 1 1#2 INCH DIA., TOP GRADE BUTYL RUBBER OF DENSE, HIGHLY COMPRESSIBLE, STABLE MATERIAL WITH GOOD SAG AND ADHESION PROPERTIES PRODUCED FROM BLENDS OF REFINED HYDROCARBON RESINS AND PLASTICIZING COMPOUNDS, REINFORCED WITH INERT MINERAL FILLERS CONTAINING NO SOLVENTS, IRRITATING FUMES OR OBNOXIOUS ODORS NOT DEPENDENT ON OXIDIZING, EVAPORATING OR CHEMICAL ACTION FOR ADHESIVE OR COHESIVE STRENGTH HAVING THE FOLLOWING PROPERTIES:

CHEMICAL COMPOSITION COMPONENTS	MIN	MAX	ASTM SPEC
BITUMEN (HYDROCARBON PLASTIC CONTAIN) % BY WEIGHT:	50	70	D4,D140
INERT MINERAL FILLER % BY WEIGHT	30	50	D545
VOLATILE MATTER % BY WEIGHT	2.0		D6

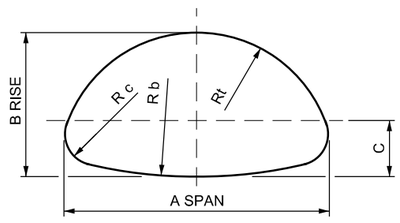
PHYSICAL PROPERTIES	REQUIRED	
SPECIFIC GRAVITY @ 77°F (25°C)	1.20 TO 1.35	D7
DUCTILITY @ 77°F 25°C MIN	5.0 c. m.	D113
SOFTENING POINT @ 77°F MIN	320°F	D36
FLASH POINT c.o.c. MIN	600°F	D92
FIRE POINT c.o.c. MIN	625°F	D92
PENETRATION		
77°F (25°C) 150 gs. 5 sec	50 to 120	D217

   TESTS

   REJECT IF ONE OR MORE TEST SPECIMENS, OF THE LOT REPRESENTING THE SPECIMEN, FAIL TO MEET ASTM REQUIREMENTS
6. BOTH FRAMES CAN BE USED WITH TYPE "G" HAND SLIDE GATES. SPECIFY WHETHER TYPE Ga OR Gb FRAME IS REQUIRED. SEE STD DWG DB 2C FOR FRAME TYPES. NORMALLY THE NUMBER OF GATES EQUAL THE NUMBER OF OPENINGS LESS ONE.
7. THE RUBBER SEAL FOR FLUSH BOTTOM CLOSURE: CONFORM TO ASTM D 2000.
8. MAKE FLUSH WITH FLOOR OF BOX TOP OR BAR SILL AFTER FRAME HAS BEEN PROPERLY PLUMBED AND LEVELED. GROUT FRAME IN PLACE WITH A CEMENT GROUT.

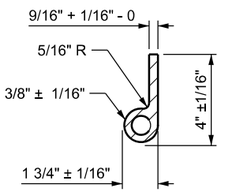


INSTALLATION SKETCH A

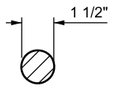


PIPE-ARCH DIMENSIONS					
SPAN	RISE	LAYOUT DIMENSIONS			
		C	Rc	Rt	Rb
36"	22"	6 1/4"	5"	18 1/4"	73 1/4"

NOTE:
PIPE-ARCH LAYOUT IN SHEET METAL FRAME TO CONFORM TO THESE DIMENSIONS.

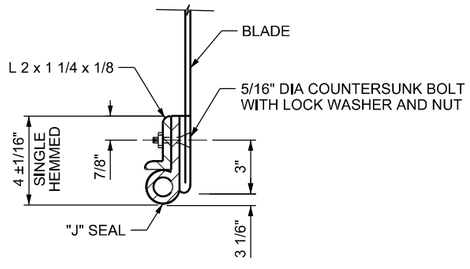


"J" SEAL



COMPRESSION SEALANT

FLEXIBLE JOINT SEALANT TYP CROSS-SECTION



PARTIAL SECTION THRU FLUME BLADE

REVISIONS				
NO.	DATE	APPR.	REMARKS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX TYPE G HAND SLIDE GATE DETAILS

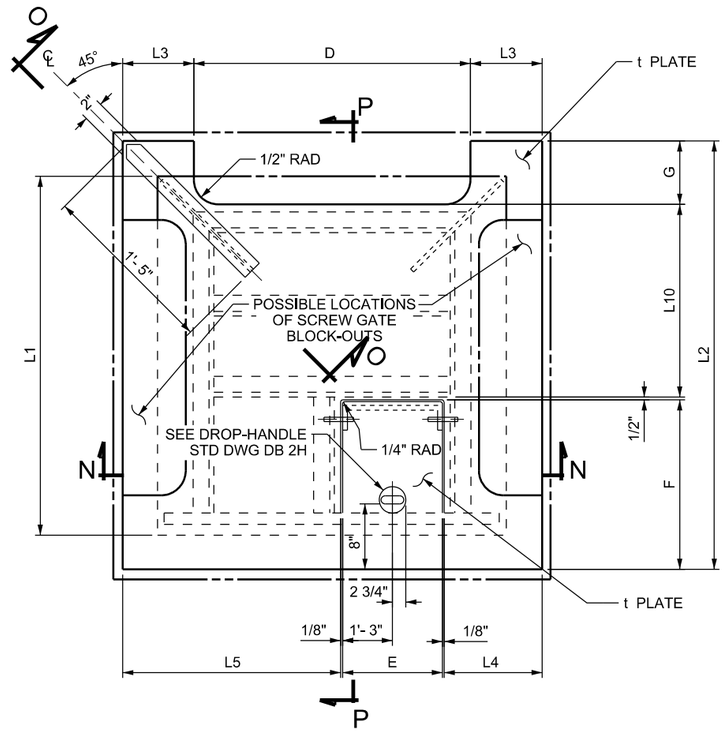
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 2D

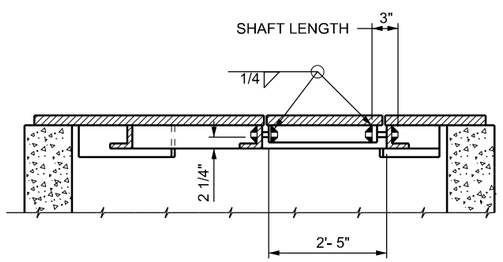
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB)\DB02D.dgn
23-JUN-2020

SOLID COVER TYPE A, SUB-FRAME TYPE I DIMENSIONS

LINE NO.	SCREW GATE		WALL SIZE	BLOCK-OUT		HINGED LID			COVER PLATE					SUB-FRAME TYPE I						
	A	B	L1	D	G	E	F	t	I 2	t	L 3	L 4	L 5	L 6	L 7	L 8	L 9	L10	L11	L12
1	36	36	4'- 4"	3'- 5 1/4"	8 1/2"	2'-6	3'- 4 5/8"	1/4"	5' 3"	1/4"	10 7/8"	1'- 0"	1'- 8 3/4"	6 1/2"	8"	9 3/4"	9 3/16"	1'- 1 3/8"	4'- 3 1/2"	3'- 3"
2	42	42	4'- 10"	4'- 0 1/2"	9 1/2"			1/4"	5'- 9"	1/4"	10 1/4"	1'- 1"	2'- 1 3/4"	7 1/2"	1'- 0"	1'- 2 3/4"	10 5/8"	1'- 6 3/8"	4'- 9 1/2"	3'- 7"
3	48	48	5'- 6"	4'- 7 1/2"	9 1/2"			1/4"	6'- 5"	1/4"	10 3/4"	1'- 1"	2'- 9 3/4"	7 1/2"	1'- 8"	1'- 10 3/4"	10 5/8"	2'- 2 3/8"	5'- 5 1/2"	4'- 3"
4	36	24	4'- 4"	3'- 5 1/4"	8 1/2"			1/4"	5'-3"	1/4"	10 7/8"	1'- 0"	1'- 8 3/4"	6 1/2"	8"	9 3/4"	9 3/16"	1'- 1 3/8"	4'- 3 1/2"	3'- 3"
5	48	30	5'- 4"	4'- 6 1/4"	9 1/2"			1/4"	6'- 3"	1/4"	10 3/8"	1'- 1"	2'- 7 3/4"	7 1/2"	1'- 6"	1'- 8 3/4"	10 5/8"	2'- 0 3/8"	5'- 3 1/2"	4'-1"
6	60	36	6'- 6"	5'- 7 1/4"	9 1/2"			3/8"	7'- 5"	3/8"	10 7/8"	1'- 1"	3'- 9 3/4"	7 1/2"	2'- 8"	2'- 10 3/4"	10 5/8"	3'- 2 3/8"	6'- 5 1/2"	5'- 3"
7	72	42	7'- 6"	6'- 7 1/4"	9 1/2"			3/8"	8'- 5"	3/8"	10 7/8"	1'- 1"	4'- 9 3/4"	7 1/2"	3'- 8"	3'- 10 3/4"	10 5/8"	4'- 2 3/8"	7'- 5 1/2"	6'- 3"
8	72	48	7'- 6"	6'- 7 1/4"	9 1/2"	2'-6	3'- 4 5/8"	3/8"	8'- 5"	3/8"	10 7/8"	1'- 1"	4'- 9 3/4"	7 1/2"	3'- 8"	3'- 10 3/4"	10 5/8"	4'- 2 3/8"	7'- 5 1/2"	6'- 3"



SOLID COVER TYPE A PLAN



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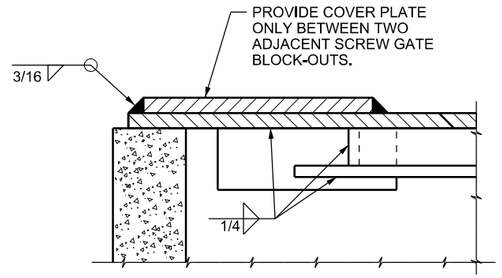

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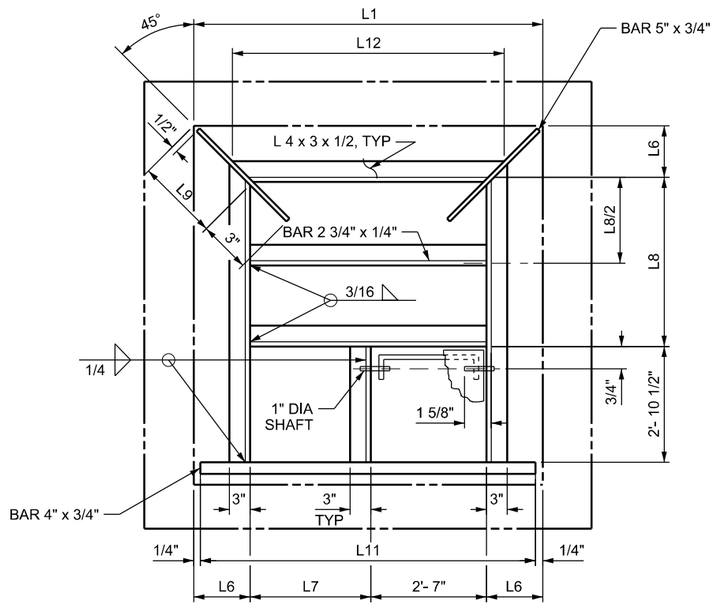
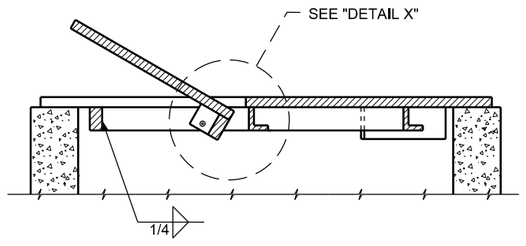
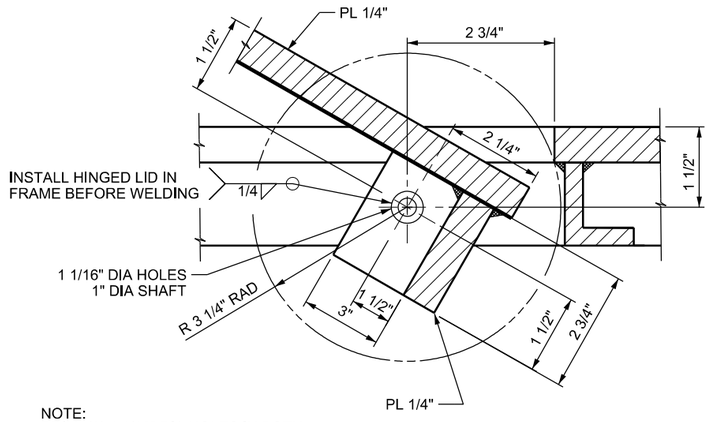


SUB-FRAME TYPE I PLAN



SECTION P-P



NOTE:
DRILL (2) 1 1/16" DIA HOLES IN BOTH SUB-FRAME AND HINGED LID.

DETAIL X

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. USE HINGED LID (SOLID COVER PLATE) ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

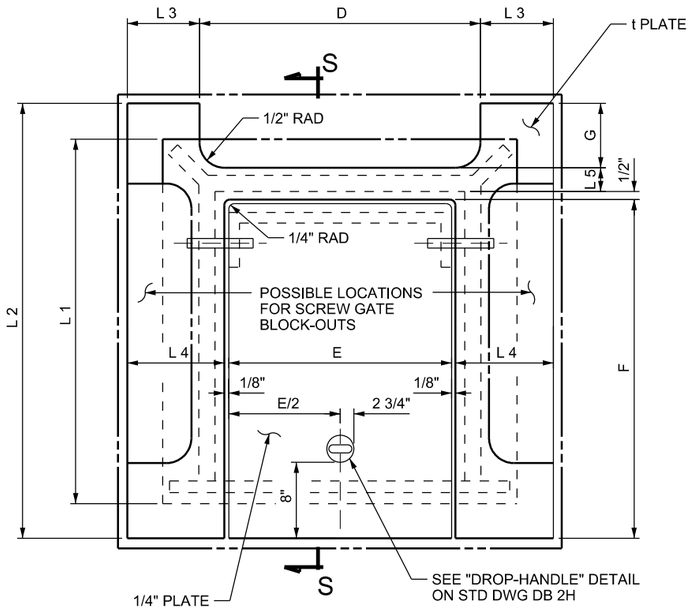
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX
HINGED LID
(SOLID COVER PLATE)
TYPE A DETAILS
TYPE I PLAN

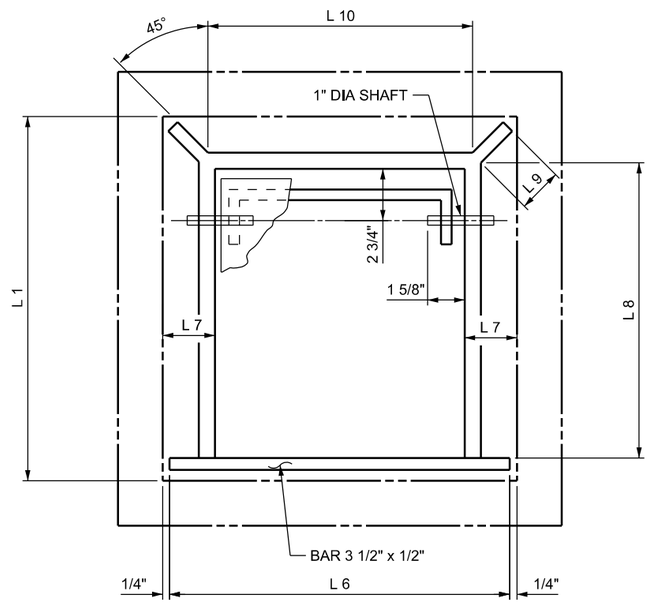
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 2E

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB\DB02E.dgn
23-JUN-2020



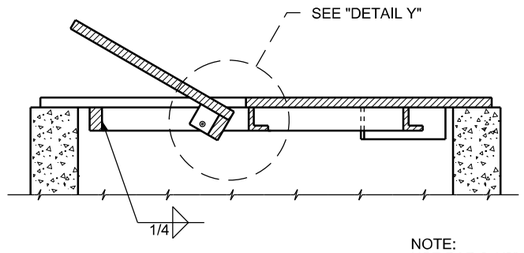
SOLID COVER TYPE A PLAN



SUB-FRAME TYPE II PLAN

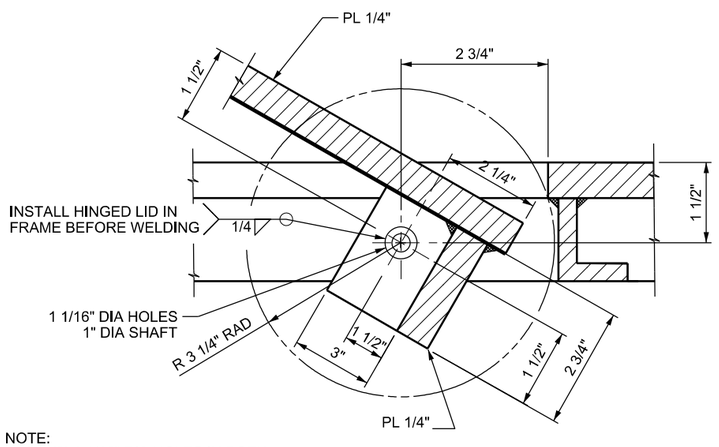
SOLID COVER TYPE A, SUB-FRAME TYPE II DIMENSIONS

LINE NO.	SCREW GATE		WALL SIZE	BLOCK-OUT		HINGED LID			COVER PLATE					SUB-FRAME TYPE II				
	A	B	L1	D	G	E	F	t	L2	t	L3	L4	L5	L6	L7	L8	L9	L10
1	18	18	2'- 6"	1'- 10 ¼"	8 ½"	1'- 8 ¼"	2'- 6 ½"	¼"	3'- 5"	¼"	9 ⅜"	10 ¼"	1 ½"	2'- 5 ½"	4 ¾"	2'- 0 ½"	4 ¼"	1'- 11 ½"
2	24	24	3'- 0"	2'- 4 ¼"	8 ½"	2'- 2 ½"	3'- 0 ½"	¼"	3'- 11"	¼"	9 ⅜"	10 ¼"	1 ½"	2'- 11 ½"	4 ¾"	2'- 6 ¼"	4 ¼"	2'- 5 ⅛"
3	30	30	3'- 10"	2'- 11 ¼"	8 ½"	2'- 6"	3'- 10 ½"	¼"	4'- 9"	¼"	10 ⅞"	1'- 1 ⅜"	1 ½"	3'- 9 ½"	7 ⅞"	3'- 4 ¼"	4 ¼"	3'- 3 ⅛"



NOTE:
USE BAR 3 1/2" x 1/2" FOR ALL MEMBERS
OF SUB-FRAME EXCEPT AS NOTED.

SECTION S-S



NOTE:
DRILL (2) 1 1/16" DIA HOLES IN BOTH
SUB-FRAME AND HINGED LID.

DETAIL Y

NOTES:

1. REFERENCE DB SERIES STD DWGS.
2. USE HINGED LID (SOLID COVER PLATE) ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

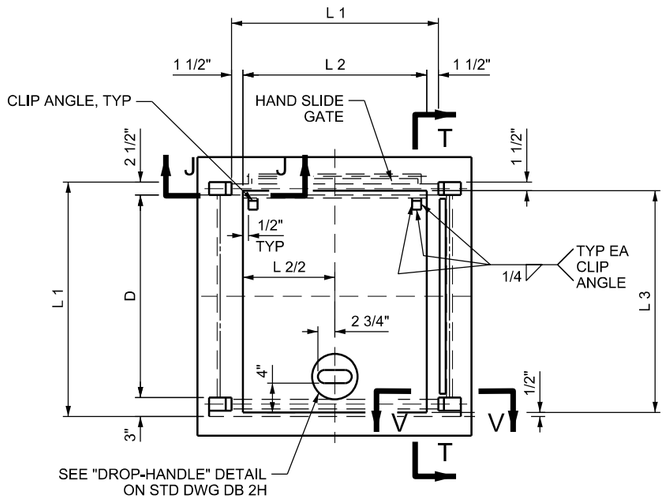
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

STANDARD DIVERSION BOX
HINGED LID
(SOLID COVER PLATE)
TYPE A DETAILS
TYPE II PLAN

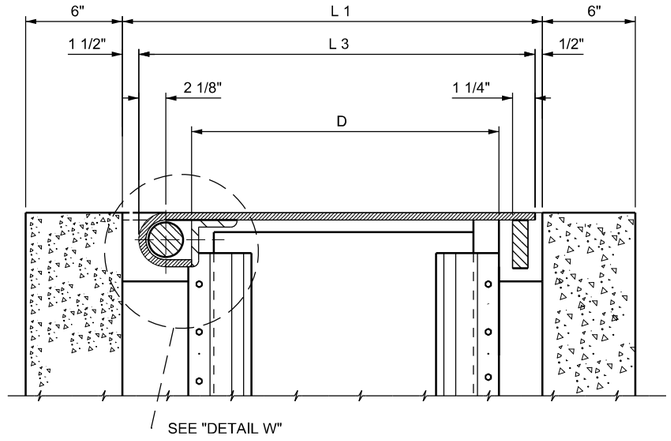
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 2F

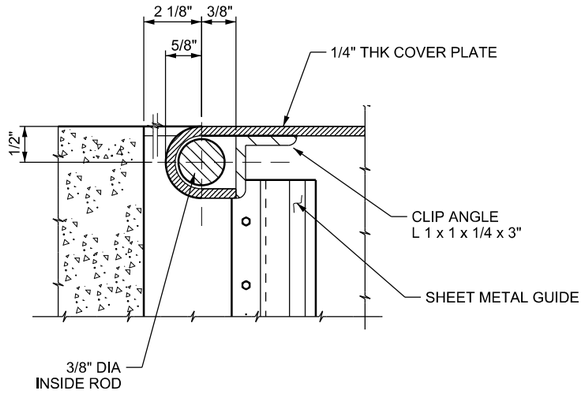
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB)\DB02F.dgn
23-JUN-2020



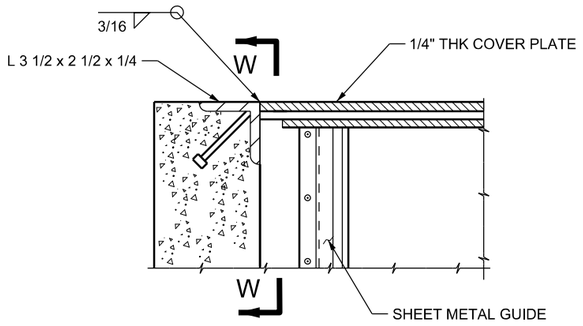
SOLID COVER TYPE B PLAN



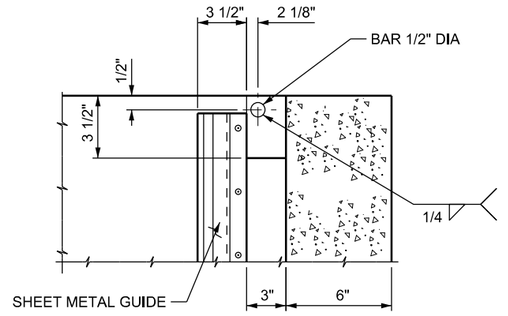
SECTION T-T



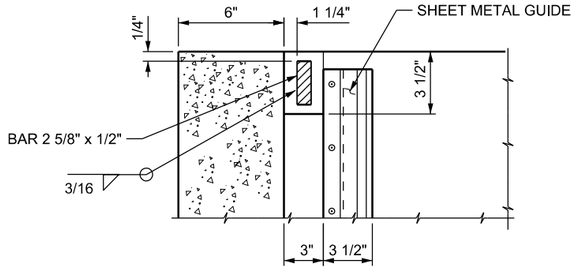
DETAIL W



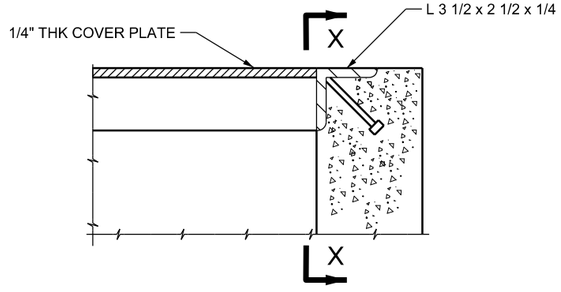
SECTION J-J



SECTION W-W



SECTION X-X



SECTION V-V

SOLID COVER TYPE B DIMENSIONS						
LINE NO	HAND SLIDE GATE		WALL SIZE	COVER PLATE		
	A	B	L 1	D	L 2	L 3
1	12"	12"	2'- 0"	1'- 6 ½"	1'- 9"	1'- 10"
2	18"	18"	2'- 6"	2'- 0 ½"	2'- 3"	2'- 4"
3	24"	24"	3'- 0"	2'- 6 ½"	2'- 9"	2'- 10"

DESIGN DATA

LOADING - COVER PLATES ARE DESIGNED FOR A LOAD OF 600 lbs/sq ft
Fy = 36,000 psi

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. PREFORMED JOINT MATERIAL: AASHTO DESIGNATION M 213
3. ALL STRUCTURAL STEEL EITHER STRUCTURAL CARBON STEEL CONFORMING TO AASHTO DESIGNATION M 270, GRADE 36 OR A RAISED PATTERN CARBON STEEL (U.S. STEEL S 300) OR USED IN SIDEWALK LOCATIONS ONLY.
4. HOT DIP GALVANIZE HINGED LID SOLID COVERS AFTER FABRICATION IN ACCORDANCE WITH AASHTO DESIGNATION M 111 (ASTM A 123).
5. PROVIDE A RUBBED FINISH FOR ALL BEARING SURFACES AT TOP OF WALL, AT THE DISCRETION OF THE ENGINEER, RECESS THE COVER PLATE THE THICKNESS OF THE COVER PLATE, AND USE A CEMENT GROUT ON ALL BEARING SURFACES TO LEVEL THE HINGED LID WHEN HINGED LID IS PLACED IN SIDEWALK LOCATIONS.
6. USE HINGED LID (SOLID COVER) ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.
7. AUTOMATICALLY END WELD THE 1/2 INCH x 4 1/8 INCH H4-L NELSON CONCRETE ANCHOR TO THE FILLET OF THE ANGLE. CENTER ANCHOR ABOUT FILLET. SEE SECTION V-V.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

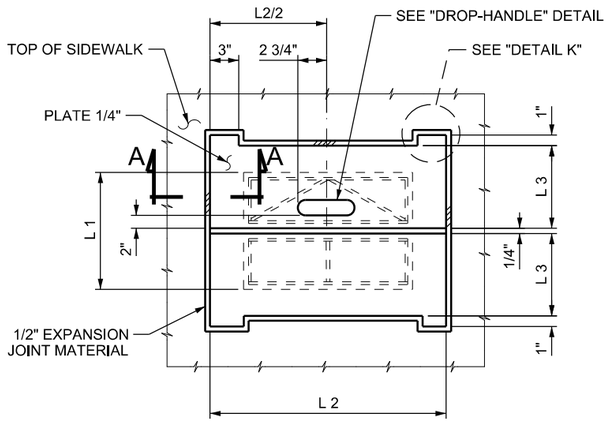
STANDARD DIVERSION BOX HINGED LID SOLID COVER TYPE B DETAILS

STANDARD DRAWING TITLE

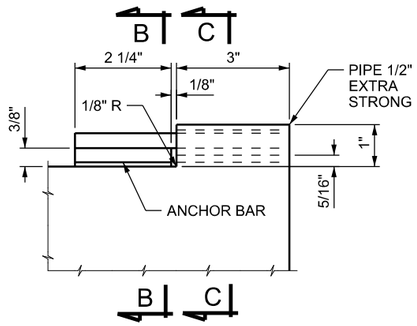
STD. DWG. NO.

DB 2G

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\DB020c.dgn
23-JUN-2020

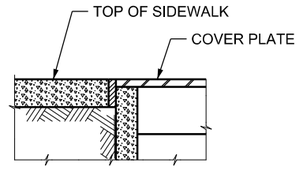


SOLID COVER TYPE C PLAN



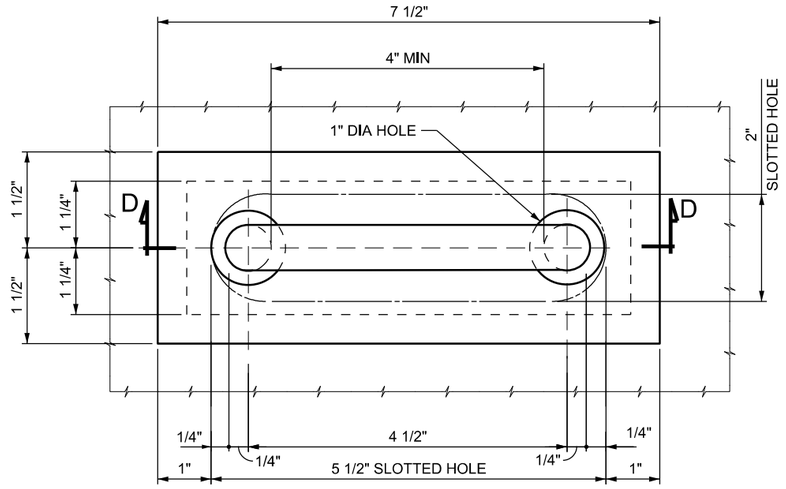
DETAIL K

PAINT THIS SIGN ON COVER PLATE AFTER FABRICATION WITH 2" HIGH LETTERS: "RAISE COVER PLATE TO CHANGE GATES"

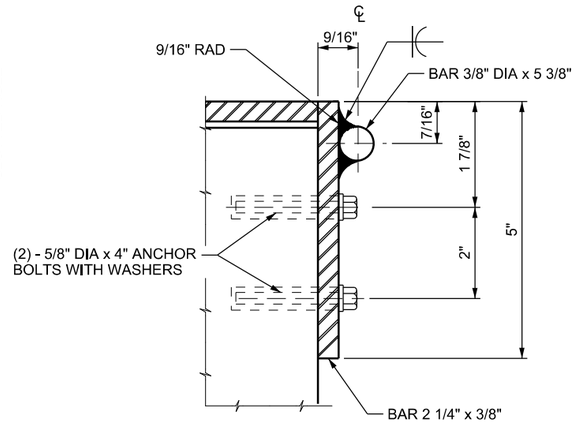


SECTION A-A

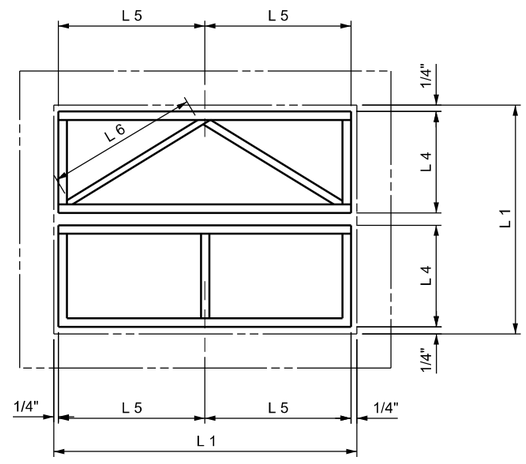
SOLID COVER TYPE C SUB-FRAME TYPE III DIMENSIONS										
LINE NO	HAND SLIDE GATE		WALL SIZE	COVER PLATE			SUB-FRAME TYPE III			
	A	B	L1	L2	L3	t	L4	L5	L6	BAR SIZE
1	12"	12"	2'- 0"	3'- 0"	1'- 5 7/8"	1/4"	-	-	-	-
2	18"	18"	2'- 6"	3'-6"	1'- 8 7/8"	1/4"	-	-	-	-
3	24"	24"	3'- 0"	4'- 0"	1'- 11 7/8"	3/16"	1'- 4 3/4"	1'- 5 3/4"	1'- 11"	3 1/2" x 1/2"
4	36"	36"	4'- 4"	5'- 4"	2'- 1 7/8"	3/16"	2'- 0 3/4"	2'- 1 3/4"	2'- 10 1/4"	3 1/2" x 1/2"



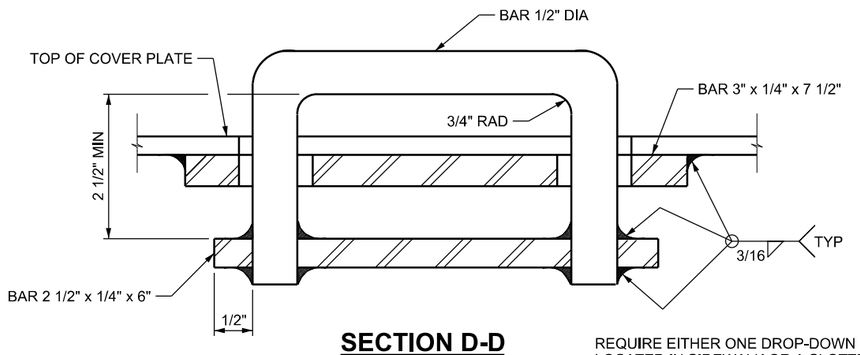
PLAN DROP HANDLE



SECTION B-B

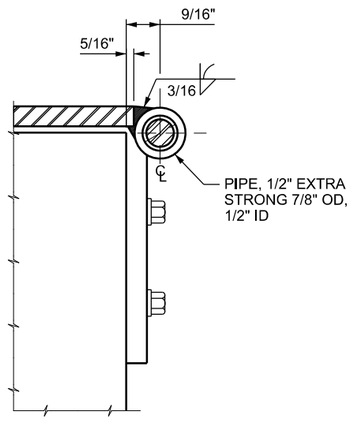


SUB-FRAME TYPE III



SECTION D-D DROP HANDLE

REQUIRE EITHER ONE DROP-DOWN HANDLE IF LOCATED IN SIDEWALK OR A SLOTTED HAND HOLE 2" x 5 1/2" FOR EACH DIVERSION BOX COVER



SECTION C-C

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. USE HINGED LID (SOLID COVER) ONLY IN APPLICATIONS THAT WILL NOT CARRY TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

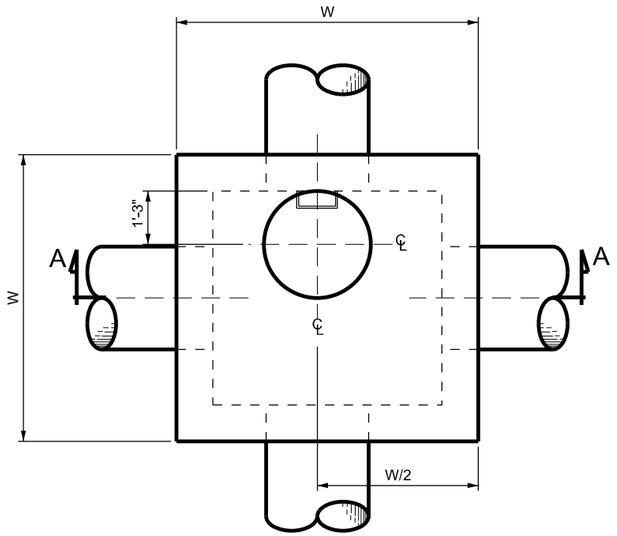
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX HINGED LID SOLID COVER TYPE B AND C DETAILS

STANDARD DRAWING TITLE

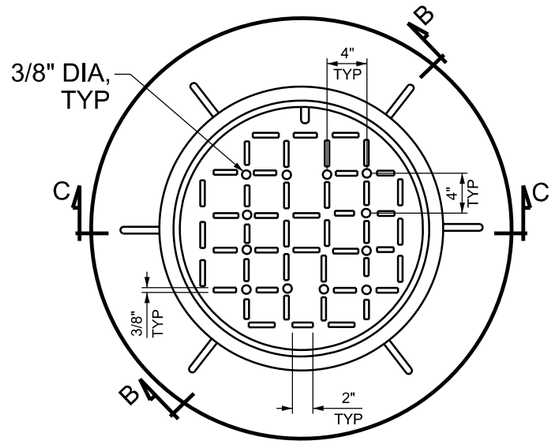
STD. DWG. NO.
DB 2H

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC_DB\DB02H.dgn
23-JUN-2020

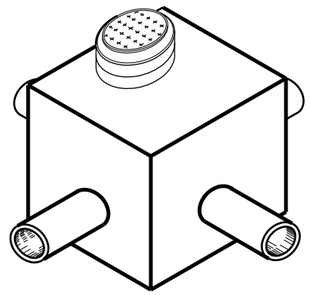


BOX PLAN

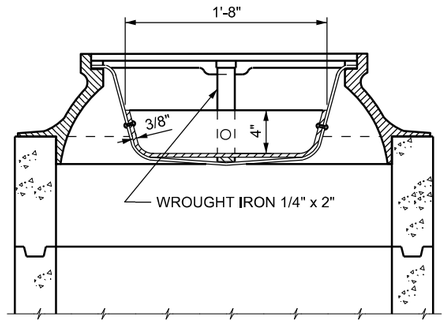
FURNISH PRECAST GRADE RINGS IN HEIGHTS OF 4", 6" OR 8",
TOTAL HEIGHT OF GRADE RINGS NOT TO EXCEED 1'-0"



MANHOLE PLAN

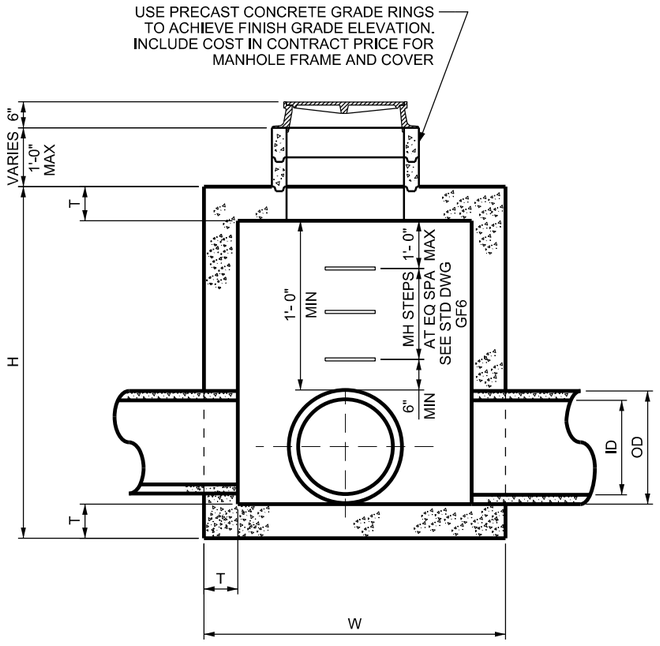


ISOMETRIC VIEW

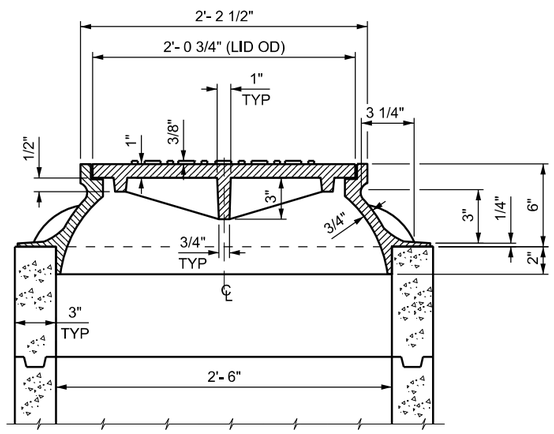


SECTION B-B

(PAN SECTION - LID REMOVED)



SECTION A-A



SECTION C-C

(LID SECTION - PAN REMOVED)

DESIGN DATA

STRUCTURAL CONCRETE: f 'c = 4,000 psi; fy = 60,000 psi; n = 8

QUANTITIES

STRUCTURAL CONCRETE
REINFORCING STEEL
— SEE SCHEDULE OF INSTALLATION

INDEX OF SHEETS

DB 3A - STANDARD DIVERSION BOX WITH MANHOLE COVER SITUATION AND LAYOUT
DB 3B - STANDARD DIVERSION BOX WITH MANHOLE COVER UP TO 42" RCP AND UP TO 54" CMP (SCHEDULE OF INSTALLATION)
DB 3C - STANDARD DIVERSION BOX WITH MANHOLE COVER 48" TO 72" RCP AND 60" TO 84" CMP (SCHEDULE OF INSTALLATION)

GENERAL NOTES

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60 RESPECTIVELY.
2. FIELD CUT AND BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH COVER. REPAIR ANY DAMAGE OR CUTS TO THE EPOXY COATING ON REINFORCING BARS.
3. USE CLASS AA (AE) CONCRETE.
4. USE TYPE II CEMENT (LOW ALKALI).
5. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL.
6. PROVIDE MANHOLE COVER THAT CONFORMS TO AASHTO M 105 AND M 306.
7. FURNISH MANHOLE COVER IN EITHER DUCTILE IRON (ASTM A 536 GRADE 60) OR GRAY CAST IRON (AASHTO M 105, CLASS 30B).
8. SEE ROADWAY PLANS FOR NUMBER, LOCATION, AND SIZE OF PIPE.
9. PROVIDE 3/4 INCH CHAMFER ON ALL EXPOSED CONCRETE CORNERS.
10. SEE STD DWG GF 6 FOR MANHOLE STEP DETAIL.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DIVERSION BOX WITH MANHOLE COVER SITUATION AND LAYOUT

STANDARD DRAWING TITLE

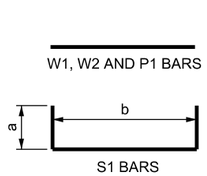
STD. DWG. NO.
DB 3A

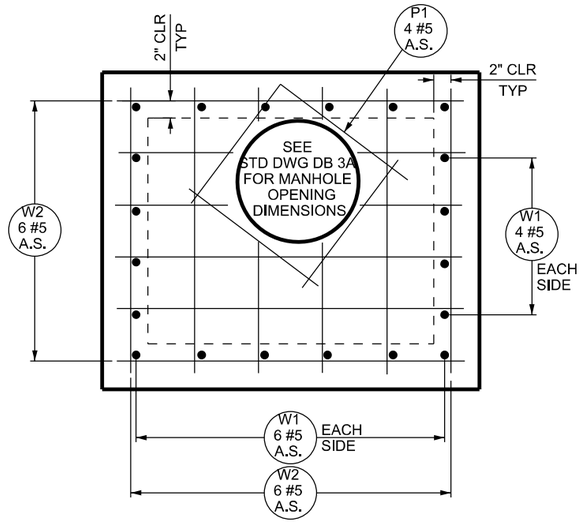
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC,DB)\DB03A.dgn
23-JUN-2020

SCHEDULE OF INSTALLATION

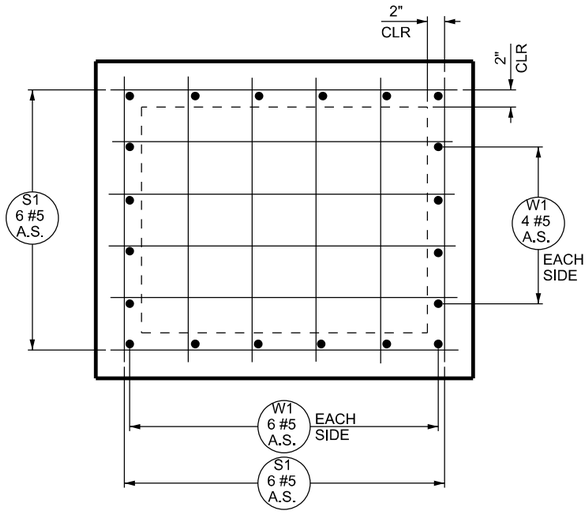
LINE	DIMENSIONS H	W	T	A	MAX PIPE DIA RCP	MAX PIPE DIA CMP	REINFORCING STEEL S1 a	S1 b	S1 LGTH	S1 QT	W1 LGTH	W1 QT	W2 N	W2 LGTH	W2 QT	P1 LGTH	P1 QT	MAN STEP QT	QUANTITIES CONC CU YD	REINF STEEL LBS	FRAME COVER LBS	LINE
1	4'- 0	5'- 0	8"	10"	15"	18"	18"	4'- 0	7'- 0	12	3'- 0	20	2	4'- 8	20	3'-6	4	2	2.255	262.1	245	1
2	4'- 4	5'- 0		6"	18"	21"		4'- 0	7'- 0		3'- 4		3	4'- 8	24			2	2.397	288.6		2
3	4'- 8	5'- 0		8"	24"	24"		4'- 0	7'- 0		3'- 8		3	4'- 8	24			2	2.540	295.5		3
4	5'- 0	6'- 0		10"	24"	30"		5'- 0	8'- 0		4'- 0		3	5'- 8	24			3	3.588	340.0		4
5	5'- 4			6"	27"	36"					4'- 4		4		28			3	3.764	370.6		5
6	5'- 8			8"	30"	36"					4'- 8		4		28			3	3.939	377.6		6
7	6'- 0			10"	36"	42"					5'- 0		4		28			4	4.115	384.5		7
8	6'- 4			6"	36"	48"					5'- 4		5		32			4	4.290	415.1		8
9	6'- 8			8"	42"	48"					5'- 8		5		32			4	4.466	422.1		9
10	7'- 0			10"		54"					6'- 0		5		32			5	4.641	429.0		10
11	7'- 4			6"							6'- 4		6		36			5	4.817	459.6		11
12	7'- 8			8"							6'- 8		6		36			5	4.993	466.6		12
13	8'- 0			10"							7'- 0		6		36			6	5.168	473.5		13
14	8'- 4			6"							7'- 4		7		40			6	5.344	504.1		14
15	8'- 8			8"							7'- 8		7		40			6	5.519	511.1		15
16	9'- 0			10"							8'- 0		7		40			7	5.695	518.0		16
17	9'- 4			6"							8'- 4		8		44			7	5.871	548.6		17
18	9'- 8			8"							8'- 8		8		44			7	6.046	555.6		18
19	10'- 0			10"							9'- 0		8		44			8	6.223	562.5		19
20	10'- 4			6"							9'- 4		9		48			8	6.397	593.1		20
21	10'- 8			8"							9'- 8		9		48			8	6.573	600.1		21
22	11'- 0			10"							10'- 0		9		48			9	6.748	607.0		22
23	11'- 4			6"							10'- 4		10		52			9	6.924	637.6		23
24	11'- 8			8"							10'- 8		10		52			9	7.100	644.6		24
25	12'- 0			10"							11'- 0		10		52			10	7.275	651.5		25
26	12'- 4			6"							11'- 4		11		56			10	7.451	682.1		26
27	12'- 8			8"							11'- 8		11		56			10	7.626	689.1		27
28	13'- 0			10"							12'- 0		11		56			11	7.802	696.0		28
29	13'- 4			6"							12'- 4		12		60			11	7.978	726.6		29
30	13'- 8			8"							12'- 8		12		60			11	8.153	733.6		30
31	14'- 0			10"							13'- 0		12		60			12	8.329	740.5		31
32	14'- 4			6"							13'- 4		13		64			12	8.504	771.1		32
33	14'-8			8"							13'- 8		13		64			12	8.680	778.1		33
34	15'-0			10"							14'- 0		13		64			13	8.855	785.0		34
35	15'- 4			6"							14'- 4		14		68			13	9.031	815.6		35
36	15'- 8			8"							14'- 8		14		68			13	9.206	822.6		36
37	16'- 0			10"							15'- 0		14		68			14	9.382	829.5		37
38	16'- 4			6"							15'- 4		15		72			14	9.558	860.1		38
39	16'- 8			8"							15'- 8		15		72			14	9.733	867.1		39
40	17'- 0			10"							16'- 0		15		72			15	9.909	874.0		40
41	17'- 4			6"							16'- 4		16		76			15	10.084	904.6		41
42	17'- 8			8"							16'- 8		16		76			15	10.260	911.6		42
43	18'- 0			10"							17'- 0		16		76			16	10.436	918.5		43
44	18'- 4			6"							17'- 4		17		80			16	10.611	949.1		44
45	18'- 8			8"							17'- 8		17		80			16	10.787	956.1		45
46	19'- 0			10"							18'- 0		17		80			17	10.962	963.0		46
47	19'- 4			6"							18'- 4		18		84			17	11.138	993.6		47
48	19'- 8			8"							18'- 8		18		84			17	11.314	1000.6		48
49	20'- 0			10"							19'- 0		18		84			18	11.489	1007.5		49
50	20'- 4			6"							19'- 4		19		88			18	11.665	1038.1		50
51	20'- 8			8"							19'- 8		19		88			18	11.840	1045.1		51
52	21'- 0			10"							20'- 0		19		88			19	12.016	1052.0		52
53	21'- 4			6"							20'- 4		20		92			19	12.192	1082.6		53
54	21'- 8			8"							20'- 8		20		92			19	12.367	1089.6		54
55	22'-0			10"							21'- 0		20		92			20	12.543	1096.5		55
56	22'- 4			6"							21'- 4		21		96			20	12.718	1127.1		56
57	22'- 8			8"							21'- 8		21		96			20	12.894	1134.1		57
58	23'- 0			10"							22'- 0		21		96			21	13.069	1141.0		58
59	23'- 4			6"							22'- 4		22		100			21	13.245	1171.6		59
60	23'- 8			8"							22'- 8		22		100			21	13.421	1178.6		60
61	24'- 0			10"							23'- 0		22		100			22	13.596	1185.5		61
62	24'- 4			6"							23'- 4		23		104			22	13.772	1216.1		62
63	24'- 8			8"							23'- 8		23		104			22	13.947	1223.1		63
64	25'- 0	6'-0	8"	10"	42"	54"	18"	5'-0	8'-0	12	24'- 0	20	23	5'- 8	104	3'- 6	4	23	14.123	1230.0	245	64

TABLE A			
CMP		RCP	
DIA	CU YD	DIA	CU YD
12"	0.037	12"	0.019
15"	0.053	15"	0.030
18"	0.071	18"	0.044
21"	0.095	21"	0.059
24"	0.121	24"	0.078
27"	0.151	30"	0.121
30"	0.184	36"	0.175
33"	0.221	42"	0.238
36"	0.261	48"	0.310
42"	0.350	54"	0.393

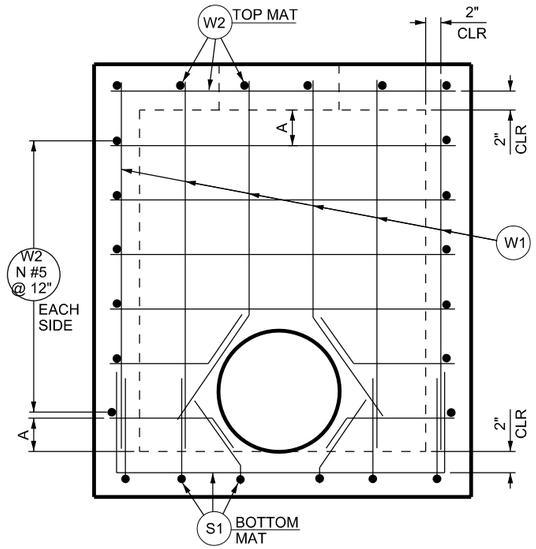




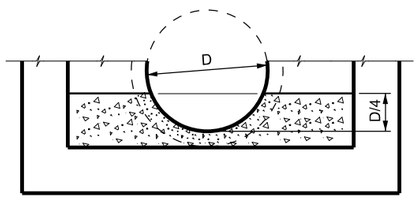
PLAN OF TOP SLAB



PLAN OF BOTTOM SLAB



TYPICAL WALL ELEVATION



FORMED INVERT DETAIL

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. DEDUCT CONCRETE DISPLACED BY PIPES FROM CONCRETE QUANTITIES SHOWN IN SCHEDULE OF INSTALLATION IN ACCORDANCE WITH "TABLE A."
3. FORM THE BOTTOM SLAB OF THE BOX TO FIT THE INVERT OF THE PIPES WHEN REQUIRED ACCORDING TO THE DETAIL SHOWN ON THIS SHEET (FORMED INVERT).
4. QUANTITIES SHOWN IN THE SCHEDULE OF INSTALLATION ARE FOR ONE UNIT ONLY.
5. FIELD CUT OR BEND REINFORCING STEEL AS NECESSARY TO CLEAR PIPES AND MAINTAIN 2 INCH MINIMUM CLEARANCE.
6. UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE OUT-TO-OUT OF BARS.
7. WEIGHT QUANTITIES FOR MANHOLE FRAME AND COVER ARE SHOWN FOR INFORMATION ONLY.
8. SEE STD DWG DB 3A FOR DIMENSIONS. SEE STD DWG GF 6 FOR MANHOLE STEP DETAILS.
9. PIPE DIAMETERS SHOWN IN TABLES AND SCHEDULES ARE INSIDE DIAMETERS.
10. ADD AN ADDITIONAL AMOUNT OF CONCRETE TO QUANTITIES SHOWN IN THE SCHEDULE OF INSTALLATION WHEN FORMED INVERT IS REQUIRED.
11. MAXIMUM PIPE DIMENSIONS SHOWN IN SCHEDULE OF INSTALLATION ARE FOR PIPES PERPENDICULAR TO WALLS OF BOX. DETERMINE CLEARANCES FOR SKEWED PIPES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 DATE
APPROVED
DEPUTY DIRECTOR

STANDARD DIVERSION BOX WITH MANHOLE COVER UP TO 42 INCH RCP AND UP TO 54 INCH CMP

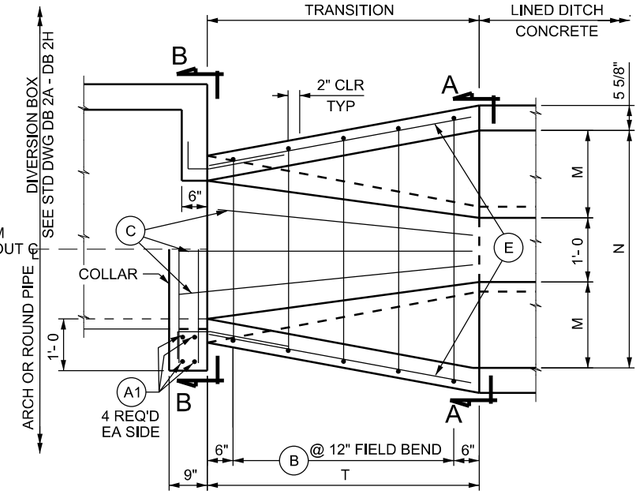
STANDARD DRAWING TITLE

STD. DWG. NO.
DB 3B

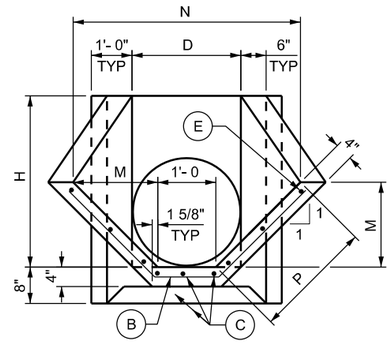
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB)\DB03B.dgn
23-JUN-2020

SCHEDULE

LINE	PIPE DIA INCHES	PIPE ARCH (IN)		DIVERSION BOX		DIMENSIONS					TRANSITION ONE EACH B1 a	B1 b	B1 f	B1 LENGTH	B2 a	B2 b	B2 f	B2 LENGTH	B3 a	B3 b	B3 f	B3 LENGTH	B4 a	B4 b	B4 f	B4 LENGTH	B5 a	B5 b	B5 f	B5 LENGTH	B6 a	B6 b	B6 f	B6 LENGTH	B7 a	B7 b	B7 f	B7 LENGTH	C LENGTH	C NO.BARS	E A	E LENGTH	E NO.BARS	COLLAR A1 LENGTH	A1 NO.BARS	A2 LENGTH	A2 NO.BARS	A3 LENGTH	A3 NO.BARS	A4 LENGTH	A4 NO.BARS	LINE
	D	S	R	H	A	H	T	M	N	P	a	b	f	LENGTH	a	b	f	LENGTH	a	b	f	LENGTH	a	b	f	LENGTH	a	b	f	LENGTH	a	b	f	LENGTH	a	b	f	LENGTH	LENGTH	NO.BARS	A	LENGTH	NO.BARS	LENGTH	NO.BARS	LENGTH	NO.BARS	LENGTH	NO.BARS	LENGTH	NO.BARS	
1	12"	--	--	1'- 9"	12"	1'- 9"	4'- 0"	8"	2'- 4"	11 3/8"	1'- 6"	1'- 7"	93°	4'- 8"	1'- 5"	1'- 4"	101°	4'-1"	1'- 3"	1'- 2"	111°	3'- 7"	1'- 2"	1'- 0"	126°	3'- 2"	--	--	--	--	--	--	--	--	--	--	--	--	4'- 5"	1	3'- 10"	5'- 10"	4	2'- 0"	8	1'- 4"	8	--	-	2'- 8"	8	1
2	18"	--	--	2'- 3"	18"	2'- 3"	4'-0"	1'- 0"	3'- 0"	1'- 5"	1'- 11"	2'- 1"	94°	6'- 1"	1'- 9"	1'- 10"	102°	5'- 5"	1'- 7"	1'- 7"	114°	4'- 8"	1'- 3"	1'- 6"	128°	4'- 3"	--	--	--	--	--	--	--	--	--	--	--	--	4'- 5"	2	3'- 10"	5'-10"	4	2'- 6"		1'- 10"		--	-	3'- 2"		2
3	24"	--	--	2'- 9"	24"	2'- 9"	4'-0"	1'- 6"	4'- 0"	2'- 1 ½"	2'- 5"	2'- 7"	94°	7'- 7"	2'- 0"	2'- 4"	104°	6'- 8"	2'- 2"	2'- 2"	115°	6'- 0"	1'- 4"	2'- 1"	128°	5'- 6"	--	--	--	--	--	--	--	--	--	--	--	--	4'- 5"	2	3'- 10"	5'-10"	6	3'- 0"		2'- 6"		--	-	3'- 8"		3
4	30"	--	--	3'- 3"	30"	3'- 3"	5'- 0"	1'- 10"	4'- 8"	2'- 7 ⅛"	2'- 10"	3'- 1"	93°	9'- 0"	2'- 5"	2'- 10"	101°	8'- 1"	2'- 8"	2'- 8"	110°	7'- 5"	1'- 7"	2'- 7"	120°	6'- 9"	1'- 4"	2'- 7"	130°	6'- 6"	--	--	--	--	--	--	--	--	5'- 5"	3	4'- 10"	6'- 10"	6	3'- 6"		2'- 8"		--	-	4'- 2"		4
5	36"	--	--	3'- 9"	36"	3'- 9"	6'- 0"	2'- 3"	5'- 6"	3'- 2 ⅛"	3'- 4"	3'- 7"	93°	10'- 6"	2'- 11"	3'- 4"	100°	9'- 7"	3'- 2"	3'- 2"	107°	8'- 11"	2'- 2"	3'- 2"	115°	8'- 6"	1'- 9"	3'- 1"	123°	7'- 11"	1'- 4"	3'- 2"	131°	7'- 8"	--	--	--	--	6'- 5"	3	5'- 10"	7'- 10"	8	4'- 0"		2'- 10"		--	-	4'- 8"		5
6	42"	--	--	4'- 3"	42"	4'- 3"	7'- 0"	2'- 8"	6'- 4"	3'- 9 ¼"	3'- 10"	4'- 2"	93°	12'- 2"	3'- 5"	3'- 11"	98°	11'- 3"	3'- 10"	3'- 10"	105°	10'- 8"	2'- 8"	3'- 8"	111°	10'- 0"	2'- 2"	3'- 8"	118°	9'- 6"	1'- 9"	3'- 8"	125°	9'- 1"	1'- 4"	3'- 8"	132°	8'- 8"	7'- 5"	4	6'- 10"	8'- 10"	8	4'- 6"		3'- 2"		--	-	5'- 2"		6
7	48"	--	--	4'- 9"	48"	4'- 9"	7'- 0"	3'- 2"	7'- 4"	4'- 5 ¾"	4'- 4"	4'- 8"	93°	13'- 8"	3'- 10"	4'- 5"	99°	12'- 8"	4'- 4"	4'- 4"	105°	12'- 0"	2'- 10"	4'- 3"	112°	11'- 4"	2'- 4"	4'- 3"	119°	10'- 10"	1'- 10"	4'- 3"	125°	10'- 4"	1'- 4"	4'- 4"	132°	10'- 0"	7'- 5"	4	6'- 10"	8'- 10"	10	5'- 0"		3'- 5"	8	--	-	5'- 8"		7
8	--	36"	22"	2'- 7"	36"	2'- 7"	4'-0"	1'- 8"	4'- 4"	2'- 4 ¼"	3'- 3"	2'- 5"	95°	8'- 1"	2'- 8"	2'- 4"	106°	7'- 4"	2'- 3"	2'- 3"	117°	6'- 7"	1'- 5"	2'- 4"	129°	6'- 1"	--	--	--	--	--	--	--	--	--	--	--	--	4'- 5"	3	3'- 10"	5'- 10"	4	2'- 10"		3'- 0"	4	2'- 3"	4	4'- 8"		8
9	--	43"	27"	3'- 0"	43"	3'- 0"	4'-0"	2'- 2"	5'- 4"	3'- 0 ¾"	3'- 9"	2'- 11"	95°	9'- 7"	3'- 0"	2'- 9"	107°	8'- 6"	2'- 10"	2'- 10"	119°	7'- 11"	1'- 6"	2'- 11"	130°	7'- 4"	--	--	--	--	--	--	--	--	--	--	--	--	4'- 5"	4	3'- 10"	5'- 10"	4	3'- 3"		3'- 2"		2'- 5"		5'- 3"		9
10	--	50"	31"	3'- 4"	50"	3'- 4"	5'- 0"	2'- 6"	6'- 0"	3'- 6 ⅜"	4'- 4"	3'- 3"	94°	10'- 10"	3'- 8"	3'- 2"	104°	10'- 0"	3'- 2"	3'- 2"	113°	9'- 3"	2'- 3"	3'- 3"	123°	8'- 9"	1'- 6"	3'- 5"	131°	8'- 4"	--	--	--	--	--	--	--	--	5'- 5"	5	4'- 10"	6'- 10"	6	3'- 7"		3'- 5"		2'- 5"		5'- 10"		10
11	--	58"	36"	3'- 9"	58"	3'- 9"	6'- 0"	3'- 0"	7'- 0"	4'- 3"	5'- 1"	3'- 8"	94°	12'- 5"	4'- 4"	3'- 8"	102°	11'- 8"	3'- 8"	3'- 8"	110°	10'- 11"	2'- 11"	3'- 9"	118°	10'- 5"	2'- 3"	3'- 11"	125°	10'- 1"	1'- 6"	4'- 1"	132°	9'- 8"	--	--	--	--	6'- 5"	5	5'- 10"	7'- 10"	8	4'- 0"		3'- 6"		2'- 7"		6'- 6"		11
12	--	65"	40"	4'- 1"	65"	4'- 1"	6'- 0"	3'- 4"	7'- 8"	4'- 8 ½"	5'- 7"	4'- 0"	94°	13'- 7"	4'- 9"	3'- 11"	102°	12'- 7"	4'- 0"	4'- 0"	110°	11'- 11"	3'- 2"	4'- 1"	118°	11'- 4"	2'- 4"	4'- 4"	125°	11'- 0"	1'- 7"	4'- 7"	132°	10'- 9"	--	--	--	--	6'- 5"	6	5'- 10"	7'- 10"	8	4'- 4"		4'- 0"		3'- 5"		7'- 1"		12
13	--	72"	44"	4'- 5"	72"	4'- 5"	7'- 0"	3'- 9"	8'- 6"	5'- 3 ⅝"	6'- 2"	4'- 4"	93°	14'- 10"	5'- 5"	4'- 4"	100°	14'- 1"	4'- 4"	4'- 4"	107°	13'- 4"	3'- 10"	4'- 5"	113°	12'- 8"	3'- 1"	4'- 7"	119°	12'- 3"	2'- 4"	4'- 9"	125°	11'- 10"	1'- 6"	5'- 0"	131°	11'- 6"	7'- 5"	6	6'- 10"	8'- 10"	10	4'- 8"	8	4'- 0"	4	3'- 0"	4	7'- 8"	8	13

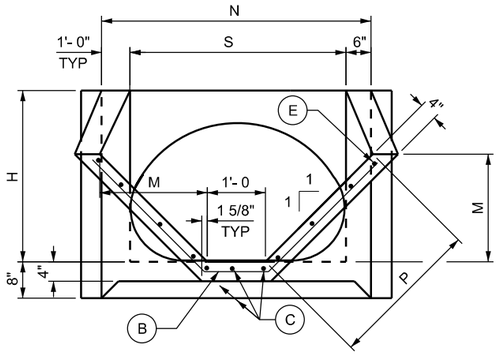


PLAN



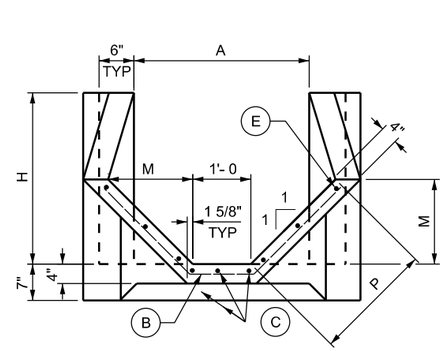
SECTION A-A

(ROUND PIPE INSTALLATION)



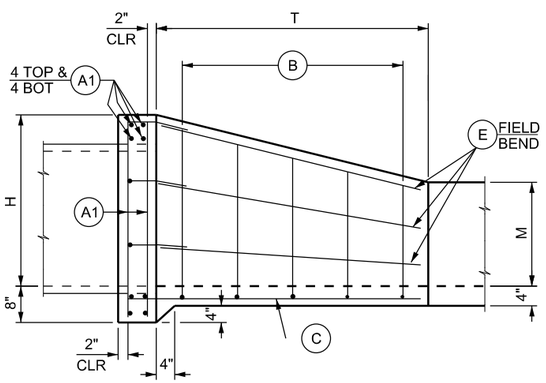
SECTION A-A

(ARCH PIPE INSTALLATION)

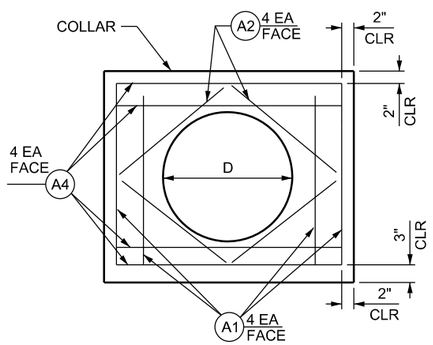


SECTION A-A

(DIVERSION BOX INSTALLATION)

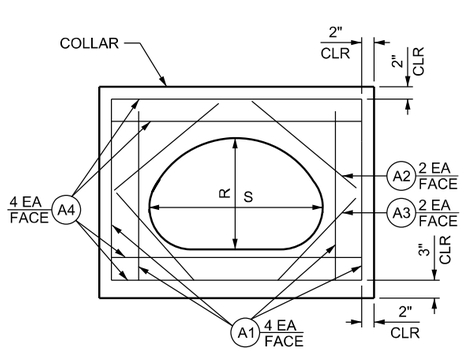


ELEVATION



SECTION B-B

(ROUND PIPE INSTALLATION)



SECTION B-B

(ARCH PIPE INSTALLATION)

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD
BRIDGE DESIGN AND INTERIM SPECIFICATIONS

f 'c = 4,000 psi; fy = 60,000 psi; n = 8

QUANTITIES				
LINE	CONCRETE		REINF STEEL	
	TRANS-ITION	COLLAR	TRANS-ITION	COLLAR
	LB	LB	CU YD	CU YD
1	29	32.1	0.2614	0.2014
2	35	40.1	0.3351	0.2836
3	47	49.1	0.4219	0.3796
4	64	55.2	0.6174	0.4896
5	90	61.5	0.8587	0.6134
6	115	69.6	1.1392	0.7511
7	133	75.3	1.2887	0.9028
8	43	54.0	0.4503	0.4514
9	50	60.3	0.5325	0.5687
10	77	66.9	0.7429	0.6852
11	107	72.4	1.0151	0.8383
12	115	81.8	1.1100	0.9786
13	150	85.6	1.4140	1.1296

NOTES

1. REFERENCE DB SERIES STD DWGS.
2. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO AASHTO M 284 OR M 111 AND M 31 GRADE 60.
3. TYPE II CEMENT (LOW ALKALI) REQUIRED.
4. DEDUCT CONCRETE DISPLACED BY PIPE FROM THOSE CONCRETE QUANTITIES GIVEN IN SCHEDULE.
5. ADJUST CONCRETE QUANTITIES ACCORDINGLY IF PIPE SIZES OTHER THAN SHOWN ARE USED OR IF PIPES ARE SKEWED.
6. USE #4 REINFORCING STEEL SPACED EQUALLY AT 12 INCH ±.

NO.	DATE	APPR.	REMARKS
			REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

STANDARD TRANSITION CONCRETE LINED DITCH TO PIPE OR DIVERSION BOX

STANDARD DRAWING TITLE

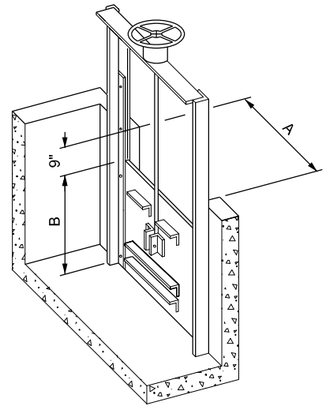
STD. DWG. NO.
DB 4

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB\DB04.dgn
23-JUN-2020

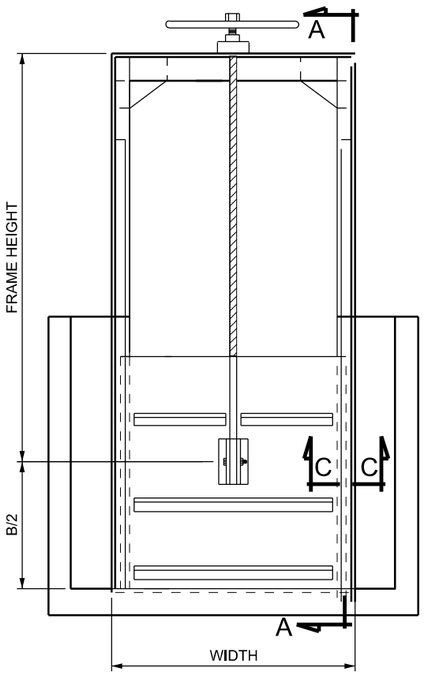
STANDARD SCREW GATE AND FRAME DIMENSIONS FOR 5'-0 OF HEAD OR LESS

SIZE OF CLEAR ** OPENING	A	18"	24"	18"	24"	30"	36"	48"	24"	30"	36"	42"	48"	24"	30"	36"	42"	48"	60"	24"	30"	36"	42"	48"	60"	72"	24"	30"	36"	42"	48"
	B	18"	18"	24"	24"	24"	24"	24"	30"	30"	30"	30"	30"	36"	36"	36"	36"	36"	36"	42"	42"	42"	42"	42"	42"	42"	48"	48"	48"	48"	48"
MINIMUM GATE DIMENSION	HEIGHT	18"	18"	24"	24"	24"	24"	24"	30"	30"	30"	30"	30"	36"	36"	36"	36"	36"	36"	42"	42"	42"	42"	42"	42"	42"	48"	48"	48"	48"	48"
	WIDTH	22"	28"	22"	28"	34"	41"	53"	28"	34"	41"	47"	52"	29"	35"	41"	47"	54"	67"	29"	35"	41"	47"	54"	67"	79"	30"	36"	42"	48"	54"
* FRAME HEIGHTS	5'- 0	X	X	X	X	X	X		X	X				X	X					X	X						X	X			
	6'- 0	X	X	X	X	X	X		X	X	X	X		X	X	X	X			X	X	X	X				X	X	X	X	
	7'- 0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X			X	X	X	X	X
	8'- 0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X			X	X	X	X	X
	10'- 0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
STEM DIAMETER WHEEL DIAMETER		1.12" 10"	1.12" 10"	1.12" 10"	1.12" 10"	1.12" 10"	1.12" 14"	1.12" 24"	1.12" 14"	1.12" 14"	1.12" 14"	1.12" 18"	1.50" 24"	1.12" 14"	1.12" 18"	1.12" 18"	1.50" 24"	1.50" 24"	1.50" 30"	1.12" 18"	1.12" 18"	1.50" 24"	1.50" 24"	1.50" 30"	1.50" 24"	2.00" 30"	1.50" 24"	1.50" 24"	1.50" 24"	1.50" 30"	1.50" 30"

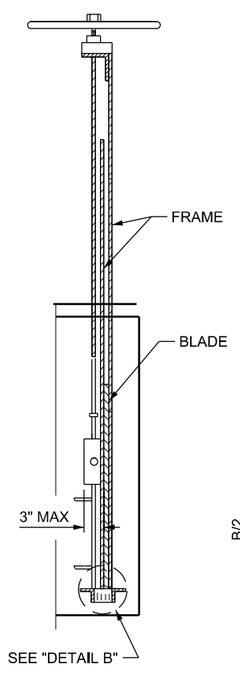
- X INDICATES THE FRAME HEIGHT OPTIONS AVAILABLE WITH THE SPECIFIC GATE SIZES
- ** USE SCREW GATES SELECTED FROM THESE BASIC SIZE WITH EITHER FLUMES, ROUND PIPE OR PIPE ARCH INSTALLATIONS.



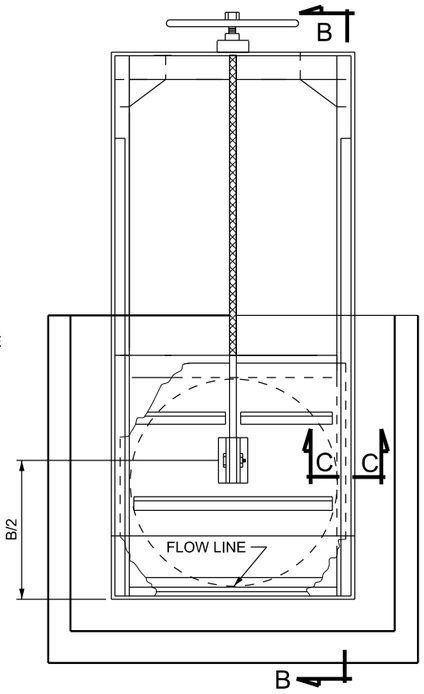
FLUME OUTLET



SCREW GATE INSTALLATION FOR FLUME OUTLET

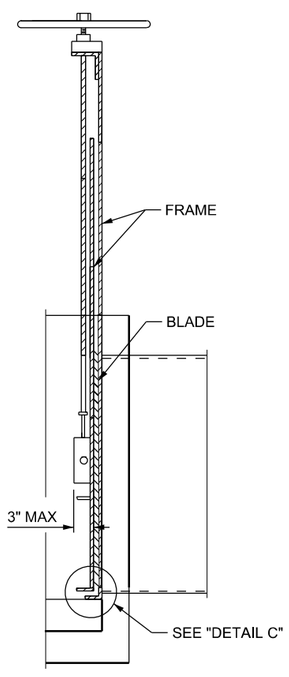


SECTION A-A

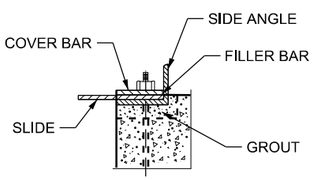


SCREW GATE INSTALLATION FOR PIPE OUTLET

ARCH PIPE INSTALLATION SIMILAR

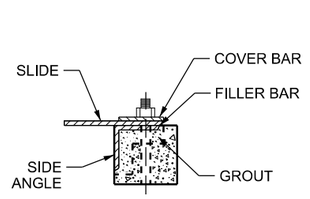


SECTION B-B



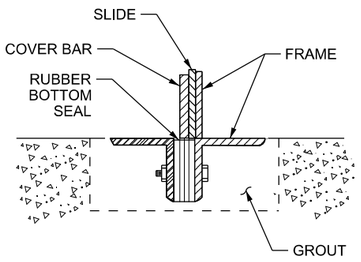
SECTION C-C

FLAT BACK SEAT OPTION

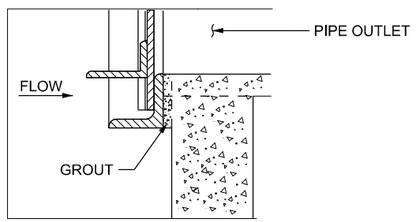


SECTION C-C

SPIGOT BACK SEAT OPTION

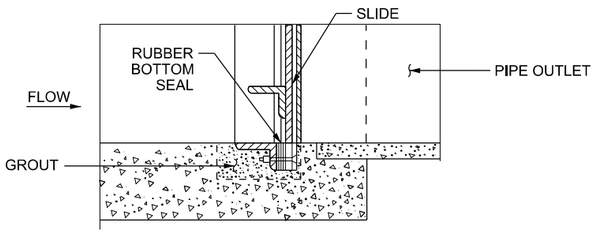


DETAIL B



DETAIL C

TYPICAL WALL SILL INSTALLATION



PIPE FLOOR SILL INSTALLATION

NOTES

1. USE LIFT GATE WHEN OPENING IS EQUAL TO OR EXCEEDS AN AREA OF 5 SQ FT.
2. GATES AND FRAMES: OF THE TYPE SHOWN ARE TO BE EITHER THE FLAT BACK SEAT OR SPIGOT BACK SEAT TYPES WITH A THROUGH FLUSH BOTTOM OPENING. EQUIVALENT GATE AND FRAME TYPES ACCEPTABLE, SUBJECT TO THE APPROVAL OF SHOP DRAWING BY THE ENGINEER.
3. DESIGN SLIDE GATES AND FRAMES FOR NOT LESS THAN 5 FT OF FACE PRESSURE ABOVE THE GATE OPENING AND ZERO BACK PRESSURE. SUBMIT TO THE ENGINEER FOR APPROVAL IN ALL CASES OF INSTALLATION. THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS ARE TO INCLUDE LIFTING DEVICE TYPE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 DATE

APPROVED

DEPUTY DIRECTOR

STANDARD SCREW GATE AND FRAME

STANDARD DRAWING TITLE

STD. DWG. NO.

DB 5

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 4 (CC, DB\DB05.dgn
23-JUN-2020

ROUND CORRUGATED STEEL PIPE
3" x 1" CORRUGATIONS

THICKNESS INCH	0.064	0.079	0.109	0.138	0.168
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT				
36	81	102	143	184	225
42	70	87	122	157	193
48	61	76	107	138	159
54	54	68	95	122	150
60	49	61	85	110	135
66	44	55	78	100	122
72	40	51	71	92	112
78	37	47	66	85	104
84	35	43	61	78	96
90	32	40	57	73	90
96		38	53	69	84
102		36	50	65	79
108			47	61	75
114			45	58	71
120			42	55	67
126				52	64
132				50	61
138				48	58
144					56

ROUND CORRUGATED STEEL PIPE
5" x 1" CORRUGATIONS

THICKNESS INCH	0.064	0.079	0.109	0.138	0.168
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT				
36	72	90	127	163	200
42	62	77	109	140	171
48	54	68	95	122	150
54	48	60	84	109	133
60	43	54	76	98	120
66	39	49	69	89	109
72	36	45	63	81	100
78	33	41	58	75	92
84	31	38	54	70	85
90	29	36	50	65	80
96		34	47	61	75
102		32	44	57	70
108			42	54	66
114			40	51	63
120			38	49	60
126				46	57
132				44	54
138				42	52
144					50

ROUND CORRUGATED STEEL PIPE
2 2/3" x 1/2" CORRUGATIONS

THICKNESS INCH	0.064	0.079	0.109	0.138	0.168
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT				
12	213	266	372	479	586
15	170	212	298	383	469
18	142	177	248	319	391
21	121	152	213	274	335
24	106	133	186	239	293
27	94	118	165	213	260
30	85	106	149	191	234
36	71	88	124	159	195
42	60	76	106	137	167
48	53	66	93	119	146
54		59	82	106	130
60			74	95	117
66				87	106
72				79	97
78					86
84					75

ROUND CORRUGATED STEEL PIPE
3/4" x 3/4" X 7 1/2" SPIRAL RIB PIPE

THICKNESS INCH	0.064	0.079	0.109
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT		
24	56	70	99
30	45	56	79
36	37	47	66
42	32	40	56
48	28	35	49
54	25	31	44
60	22	28	39
66		25	36
72		23	33
78			30
84			28

CORRUGATED STEEL PIPE ARCHES
2 2/3" x 1/2" CORRUGATIONS

PIPE DIM SPAN X RISE INCH	CORNER RADIUS INCH	MINIMUM THICKNESS INCH	MAXIMUM FILL HEIGHT FT
17 x 13	3	0.064	11
21 x 15	3	0.064	9
24 x 18	3	0.064	7
28 x 20	3	0.064	5
35 x 24	4	0.064	6
42 x 29	4 1/2	0.064	5
49 x 33	5 1/2	0.079	5
57 x 38	6 1/2	0.109	6
64 x 43	7	0.109	5
71 x 47	8	0.138	5
77 x 52	8 1/2	0.168	5
83 x 57	9	0.168	5

CORRUGATED STEEL PIPE ARCHES
3" x 1" OR 5" x 1" CORRUGATIONS

PIPE DIM SPAN X RISE INCH	CORNER RADIUS INCH	MIN THICKNESS INCH	MAXIMUM FILL HEIGHT FT
53 x 41	7	0.109	7
60 x 46	8	0.109	7
66 x 51	9	0.109	9
73 x 55	12	0.109	10
81 x 59	14	0.109	11
87 x 63	14	0.109	10
95 x 67	16	0.109	11
103 x 71	16	0.109	10
112 x 75	18	0.109	10
117 x 79	18	0.109	10
128 x 83	18	0.138	8
137 x 87	18	0.138	7
142 x 91	18	0.168	7

NOTES:

1. TABLES ARE FOR PIPE WITH HELICAL LOCK SEAMS.
2. MEASURE MAXIMUM FILL HEIGHT FROM TOP OF PIPE TO TOP OF PAVEMENT SURFACE AT HIGHEST FILL SECTION.
3. REFER TO STD DWG DG 4 FOR MINIMUM FILL HEIGHT REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

MAXIMUM FILL HEIGHT
FOR STEEL DRAINAGE PIPE
STANDARD DRAWING TITLE

STD. DWG. NO.
DG 1

DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\DG01.dgn
23-JUN-2020

ROUND CORRUGATED ALUMINUM PIPE 3" x 1" CORRUGATIONS					
THICKNESS INCH	0.060	0.075	0.105	0.135	0.164
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT				
36	59	74	101	133	163
42	50	63	89	114	140
48	44	55	78	100	122
54	39	49	69	89	109
60	35	44	62	80	98
66	32	40	56	73	89
72	29	37	52	66	81
78		34	43	61	75
84			42	57	70
90			41	53	65
96			38	49	60
102				44	54
108				40	49
114					44
120					40

ROUND CORRUGATED ALUMINUM PIPE 2 2/3" x 1/2" CORRUGATIONS					
THICKNESS INCH	0.060	0.075	0.105	0.135	0.164
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT				
12	155	193	271	348	426
15	124	154	216	279	340
18	103	129	180	232	284
21	88	110	154	199	243
24	77	96	135	174	213
27	68	86	120	155	189
30	62	77	108	139	170
36	51	64	90	116	142
42	44	55	77	99	121
48			66	86	106
54			54	70	87
60				57	71
66					57
72					45

ROUND CORRUGATED ALUMINUM PIPE 3/4" x 3/4" x 7 1/2" CORRUGATIONS SPIRAL RIB PIPE				
THICKNESS INCH	0.060	0.075	0.105	0.135
PIPE DIAMETER INCH	MAXIMUM FILL HEIGHT FT			
18	55	76		
21	47	65	105	
24	41	57	92	
30	33	45	73	
36	27	38	61	86
42		32	52	74
48			46	65
54			40	57
60			36	52
66				47
72				43

CORRUGATED ALUMINUM PIPE ARCHES 2 2/3" x 1/2" CORRUGATIONS			
PIPE DIM SPAN x RISE INCH	CORNER RADIUS INCH	MINIMUM THICKNESS INCH	MAXIMUM FILL HEIGHT FT
17 x 13	3	0.060	11
21 x 15	3	0.060	9
24 x 18	3	0.060	7
28 x 20	3	0.060	5
35 x 24	4	0.060	6
42 x 29	4 1/2	0.060	5
49 x 33	5 1/2	0.075	5
57 x 38	6 1/2	0.135	6
64 x 43	7	0.135	5
71 x 47	8	0.164	5

CORRUGATED ALUMINUM PIPE ARCHES 3" X 1" CORRUGATIONS			
PIPE DIM SPAN x RISE INCH	CORNER RADIUS INCH	MINIMUM THICKNESS INCH	MAXIMUM FILL HEIGHT FT
53 x 41	7	0.105	7
60 x 46	8	0.105	7
66 x 51	9	0.105	9
73 x 55	12	0.105	10
81 x 59	14	0.105	11
87 x 63	14	0.105	10
95 x 67	16	0.105	11
105 x 71	16	0.135	10
112 x 75	18	0.135	10
117 x 79	18	0.164	10

NOTES:

1. TABLES ARE FOR PIPE WITH HELICAL LOCK SEAMS.
2. MEASURE MAXIMUM FILL HEIGHT FROM TOP OF PIPE TO TOP OF PAVEMENT SURFACE AT HIGHEST FILL SECTION.
3. REFER TO STD DWG DG 4 FOR MINIMUM FILL HEIGHT REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE — AUGUST 2020 — DATE
APPROVED
DEPUTY DIRECTOR

MAXIMUM FILL HEIGHT FOR ALUMINUM DRAINAGE PIPE
STANDARD DRAWING TITLE

STD. DWG. NO.
DG 2

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\DG02.dgn
23-JUN-2020

REINFORCED CONCRETE CIRCULAR PIPE

PIPE DIA	PIPE CLASSES			
	II	III	IV	V
INCH	MAXIMUM FILL HEIGHT FT			
18	16	22	34	52
21	16	22	34	52
24	16	22	34	52
27	16	22	34	52
30	15	22	34	52
36	15	22	33	51
42	15	22	33	51
48	15	22	33	51
54	15	21	33	51
60	14	21	32	51
66	14	21	32	50
72	14	20	32	50
78	14	20	31	49
84	13	20	31	49
90	13	20	31	49
96	13	19	31	49
102	13	19	30	48
108	12	19	30	48

REINFORCED CONCRETE ELLIPTICAL PIPE

SPAN X RISE	EQUIV DIA	PIPE CLASSES			
		II	III	IV	V
INCH	INCH	MAXIMUM FILL HEIGHT FT			
23 X 14	18	-	12	20	30
30 X 19	24	-	13	21	30
38 X 24	30	9	14	21	30
45 X 29	36	9	14	21	30
53 X 34	42	10	14	21	30
60 X 38	48	10	14	21	30
68 X 43	54	10	14	21	30
76 X 48	60	10	14	21	30
83 X 53	66	10	14	21	30
91 X 58	72	10	15	21	30

THERMOPLASTIC CIRCULAR PIPE

PIPE DIA	PIPE TYPE			
	DUAL WALL HDPE SMOOTH LINED	DUAL WALL POLYPROPYLENE SMOOTH LINED	STEEL REINFORCED THERMOPLASTIC RIBBED	POLYVINYL CHLORIDE (PVC)
INCH	MAXIMUM FILL HEIGHT FT			
18	19	18	N/A	24
24	17	16	N/A	25
30	14	18	50	23
36	15	16	50	22
42	15	18	50	N/A
48	13	17	30	N/A
54	14	N/A	30	N/A
60	14	17	30	N/A

NOTES:

1. MEASURE MAXIMUM FILL HEIGHT FROM TOP OF PIPE TO TOP OF PAVEMENT SURFACE AT HIGHEST FILL SECTION.
2. REFER TO STD DWG DG 4 FOR MINIMUM FILL HEIGHT REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
AUGUST 2020 — DATE

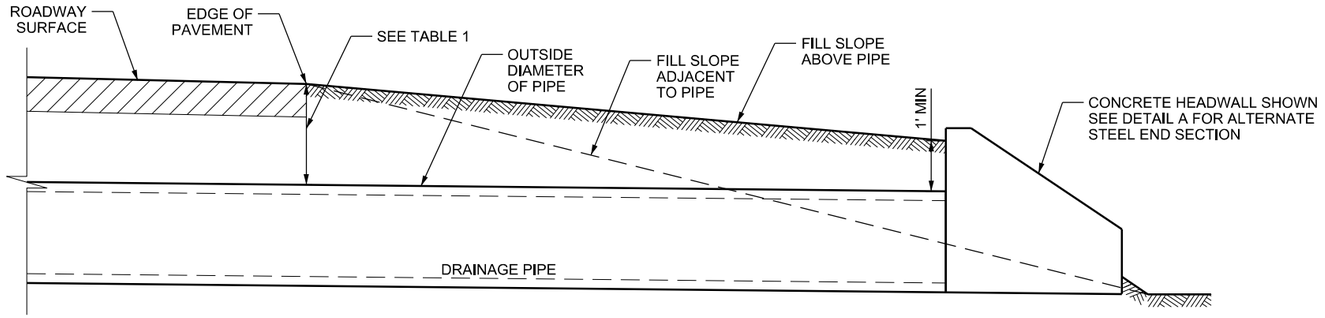
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

MAXIMUM FILL HEIGHT FOR THERMOPLASTIC AND REINFORCED CONCRETE DRAINAGE PIPE

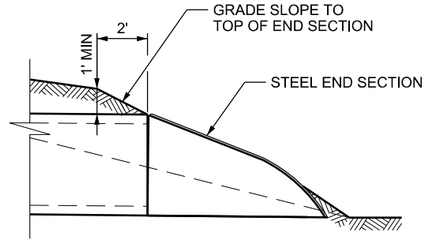
STANDARD DRAWING TITLE

STD. DWG. NO.
DG 3

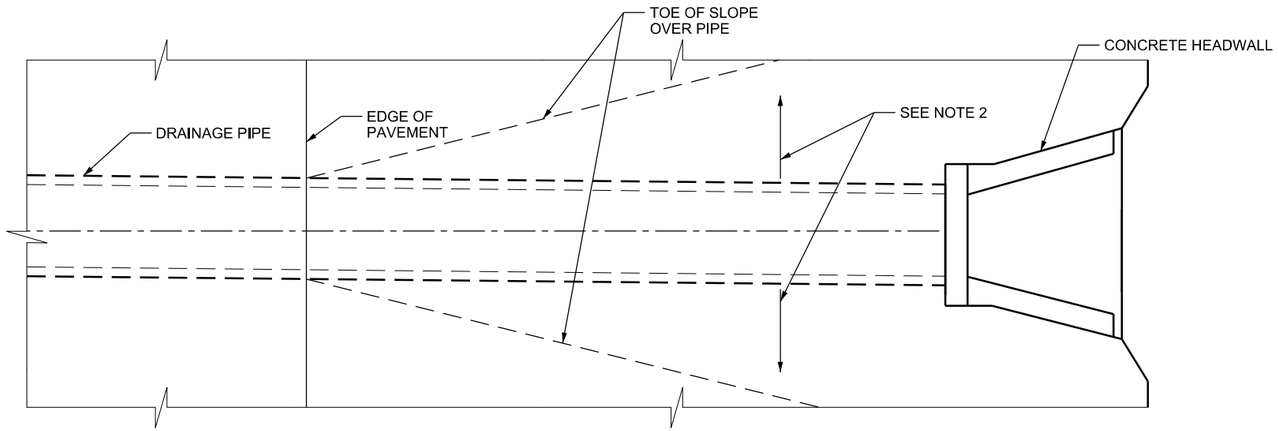
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF\DG03.dgn



ELEVATION



DETAIL A



PLAN

TABLE 1. MINIMUM PIPE FILL HEIGHT UNDER ROADWAY SURFACE

ROADWAY SURFACE TYPE	PIPE TYPE		
	CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE	CIRCULAR THERMOPLASTIC *	CIRCULAR AND ARCH CORRUGATED STEEL
FLEXIBLE PAVEMENT OR UNPAVED	1' - 6"	2'	2'
RIGID PAVEMENT	1' - 6"	1' - 6"	1' - 6"

* MINIMUM FILL HEIGHT FOR THERMOPLASTIC PIPE LARGER THAN 48 INCH DIAMETER IS HALF THE PIPE DIAMETER (D/2).

NOTES:

1. MINIMUM FILL HEIGHT IS ADEQUATE ONLY FOR FINISHED CONSTRUCTION. PROVIDE ADEQUATE COVER TO PROTECT PIPE FROM DAMAGE DURING CONSTRUCTION.
2. GRADE FILL SLOPES OVER THE PIPE TO MEET CLEAR ZONE REQUIREMENTS OR NO STEEPER THAN 4:1 (H:V).

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/30/2018	JGE	REMOVED DESIGN INFORMATION FROM THE DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

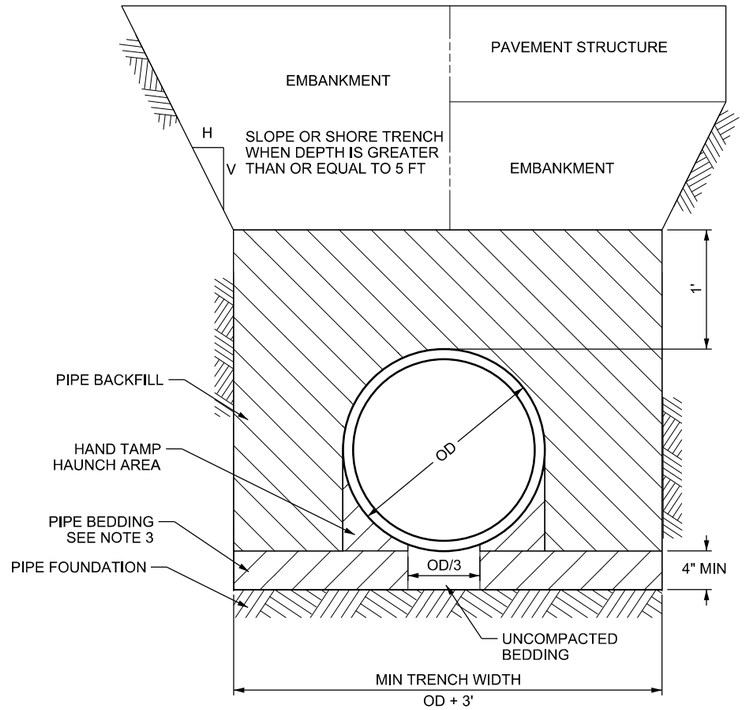
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

MINIMUM FILL HEIGHT FOR DRAINAGE PIPE

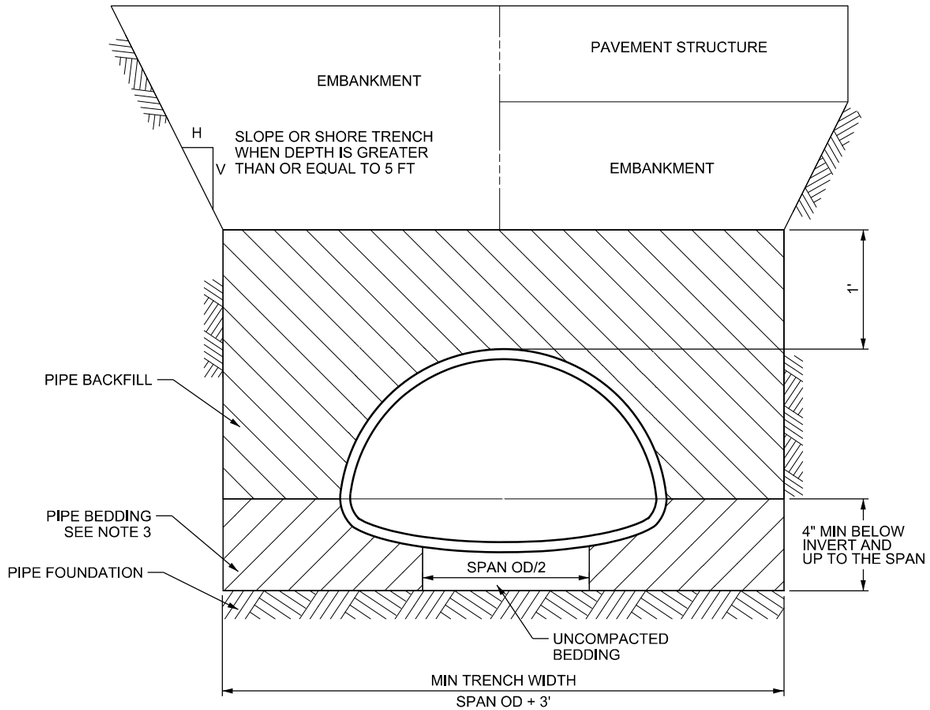
STANDARD DRAWING TITLE

STD. DWG. NO.
DG 4

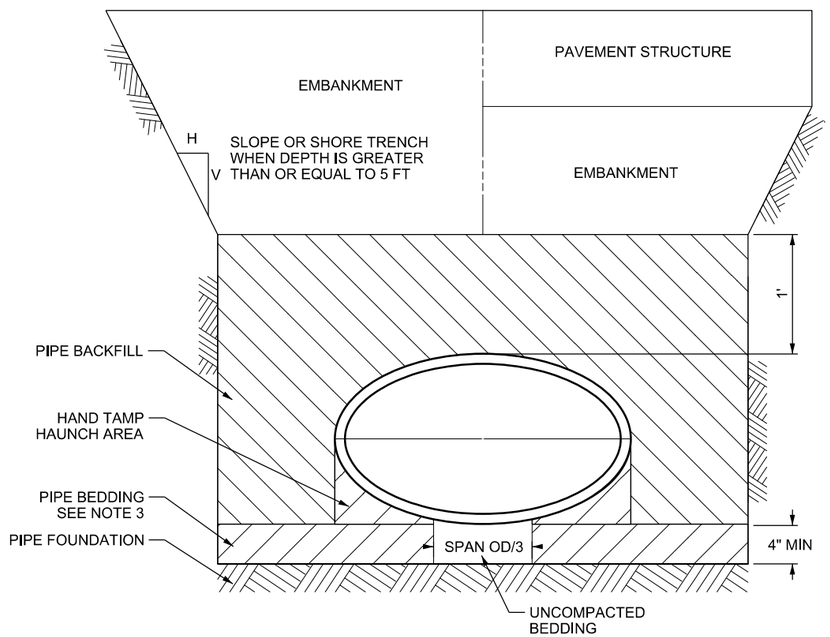
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\DG04.dgn
23-JUN-2020



CIRCULAR PIPE



PIPE ARCH



ELLIPTICAL PIPE

NOTES:

1. PLACE PLASTIC PIPE ONLY WITHIN A TRENCH. PLACE FILL MATERIAL AT OR ABOVE THE PIPE BACKFILL ELEVATION BEFORE EXCAVATION OF THE TRENCH WHEN PLACED IN AN EMBANKMENT.
2. INCREASE THE WIDTH OF THE TRENCH 2 FT ON EACH SIDE OF THE PIPE WHEN THE SURROUNDING MATERIAL IS UNSUITABLE.
3. INCREASE THE PIPE BEDDING THICKNESS TO 6 INCHES FOR FOUNDATIONS THAT CONTAIN ROCK OR OTHER UNYIELDING MATERIAL. REMOVE BOULDERS OR ROCKS WITHIN BEDDING AREA.
4. DO NOT DISTURB THE INSTALLED PIPE OR EMBEDMENT OR LEAVE VOIDS WHEN USING TRENCH BOXES AND SHIELDS.

REVISIONS

NO.	DATE	APPR.	REMARKS

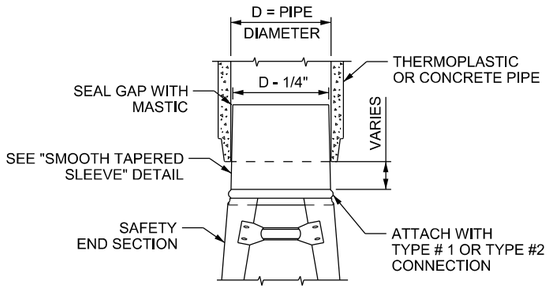
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

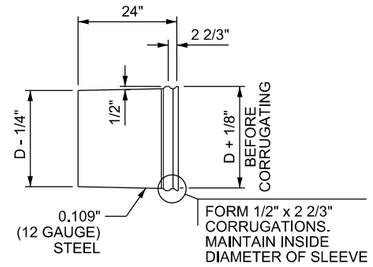
DRAINAGE PIPE INSTALLATION
STANDARD DRAWING TITLE

STD. DWG. NO.
DG 5

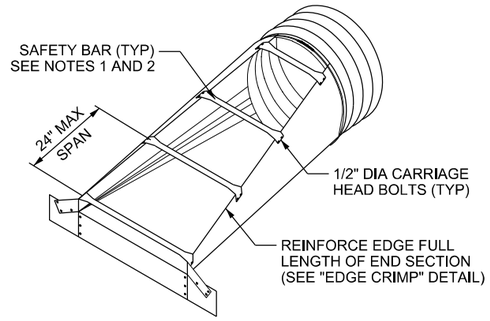
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\DG05.dgn
23-JUN-2020



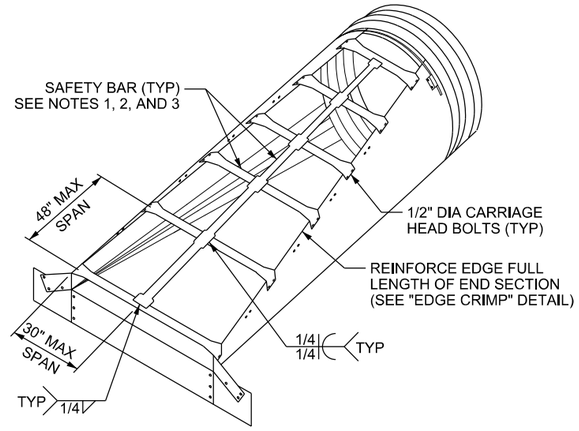
THERMOPLASTIC OR CONCRETE PIPE CONNECTION



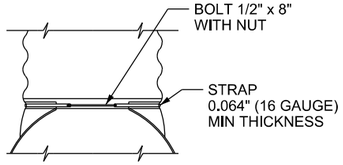
SMOOTH TAPERED SLEEVE



SAFETY END SECTION - PARALLEL

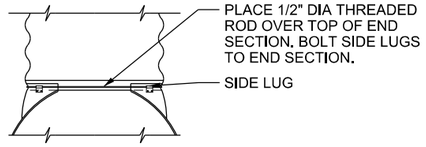


SAFETY END SECTION - CROSSING



TYPE #1 CONNECTOR

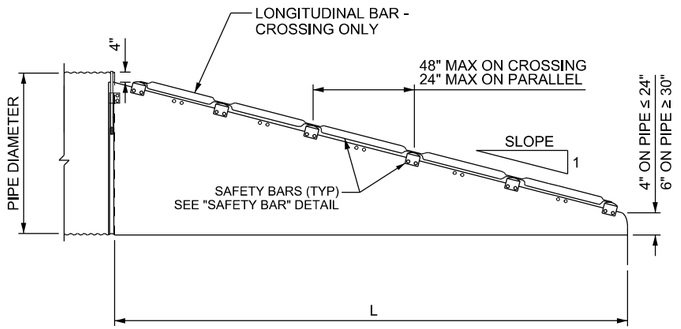
FOR USE ON CORRUGATED METAL PIPE ≤ 24" DIA



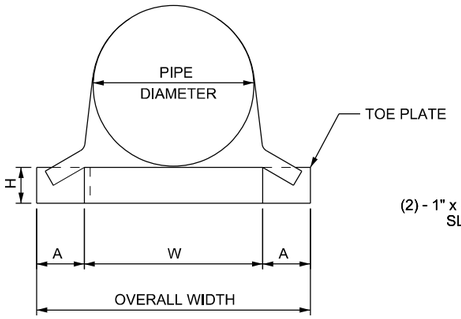
TYPE #2 CONNECTOR

FOR USE ON CORRUGATED METAL PIPE ≥ 30" DIA

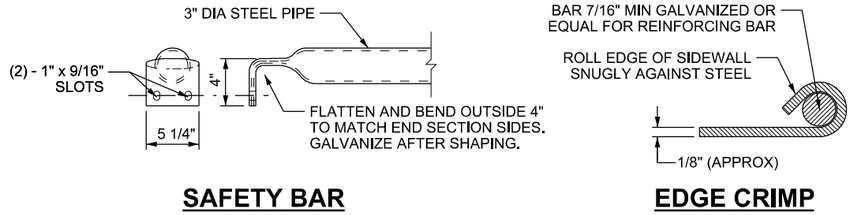
CORRUGATED METAL PIPE CONNECTION



SAFETY END SECTION - ELEVATION



SAFETY END SECTION FRONT VIEW



SAFETY BAR

EDGE CRIMP

STEEL SAFETY END SECTIONS FOR ELLIPTICAL PIPE

PIPE SIZE (INCHES)		MIN METAL THICK INCH/GAUGE	DIMENSIONS (INCHES)					
SPAN X RISE	EQUIV DIA			H	W	OVERALL WIDTH	L	
							SLOPE = 4	SLOPE = 6
23 X 14	18	0.064/16	8	6	29	45	16	24
30 X 19	24	0.064/16	8	6	36	52	36	54
38 X 24	30	0.079/14	12	9	44	68	56	84
45 X 29	36	0.109/12	12	9	51	83	76	114
53 X 34	42	0.109/12	16	12	59	91	96	144

STEEL SAFETY END SECTIONS FOR ARCHED PIPE

PIPE SIZE (INCHES)		MIN METAL THICK INCH/GAUGE	DIMENSIONS (INCHES)						
SPAN X RISE	EQUIV DIA		A	H	W	OVERALL WIDTH	L		
							SLOPE = 4	SLOPE = 6	SLOPE = 10*
21 X 15	18	0.064/16	8	6	27	43	20	30	70
28 X 20	24	0.064/16	8	6	34	50	40	60	120
35 X 24	30	0.079/14	12	9	41	65	56	84	160
42 X 29	36	0.109/12	12	9	48	72	76	114	210
49 X 33	42	0.109/12	16	12	55	87	92	138	

* MINIMUM THICKNESS OF ALL 10:1 SLOPE END SECTIONS IS 0.109" / 12 GAUGE

STEEL SAFETY END SECTIONS FOR CIRCULAR PIPE

PIPE DIA (INCHES)	MIN METAL THICK INCH/GAUGE	DIMENSIONS (INCHES)						
		A	H	W	OVERALL WIDTH	L		
						SLOPE = 4	SLOPE = 6	SLOPE = 10*
18	0.064/16	8	6	24	40	32	48	100
24	0.064/16	8	6	30	46	56	84	160
30	0.109/12	12	9	36	60	80	120	220
36	0.109/12	12	9	42	66	104	156	280
42	0.109/12	16	12	48	80	128	192	

* MINIMUM THICKNESS OF ALL 10:1 SLOPE END SECTIONS IS 0.109" / 12 GAUGE

NOTES:

1. PROVIDE SLOTTED HOLES FOR SAFETY BAR ATTACHMENT.
2. NUMBER OF BARS REQUIRED VARIES DEPENDING ON THE LENGTH AND WIDTH OF THE END SECTION.
3. ADD LONGITUDINAL BAR WHEN WIDTH EXCEEDS 30 INCHES. WELD BARS TO CREATE ONE PIECE STRUCTURE.
4. USE GALVANIZED HARDWARE FOR CONNECTIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/30/2018	JGE	REMOVED DESIGN INFORMATION FROM THE DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

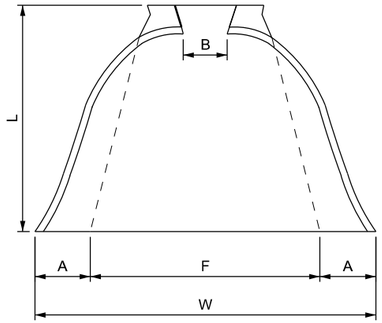
CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 DATE

DEPUTY DIRECTOR

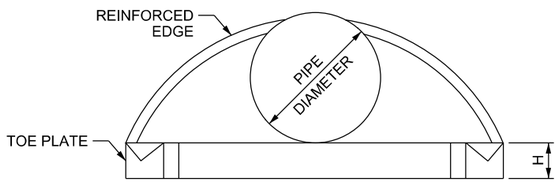
STANDARD DRAWING TITLE: STEEL SAFETY END SECTIONS

STD. DWG. NO. DG 6

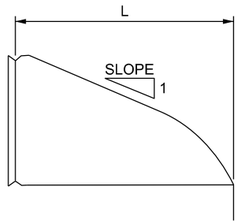
DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF)\DG06.dgn
23-JUN-2020



PLAN



ELEVATION



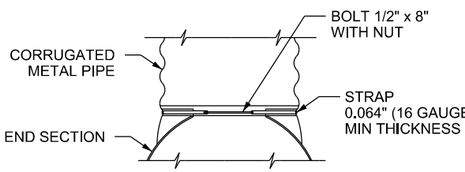
TYPICAL CROSS SECTION

STEEL END SECTIONS FOR ARCHED PIPE

PIPE SIZE (INCHES)		MIN METAL THICK INCH/GAUGE	APPROX. SLOPE	DIMENSIONS (INCHES)					
SPAN X RISE	EQUIV DIA			A	B	H	F	L	W
21 X 15	18	0.064/16	2	6	11	6	34	24	58
28 X 20	24	0.064/16	2	7	16	6	46	32	66
35 X 24	30	0.079/14	1.9	9	16	6	58	39	72
42 X 29	36	0.079/14	1.9	11	18	7	73	46	88
49 X 33	42	0.109/12	1.8	12	21	9	82	53	105

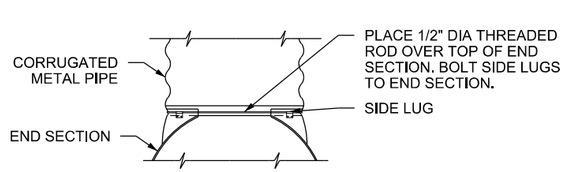
STEEL END SECTIONS FOR CIRCULAR PIPE

PIPE DIA (INCHES)	MIN METAL THICK INCH/GAUGE	APPROX. SLOPE	DIMENSIONS (INCHES)					
			A	B	H	F	L	W
18	0.064/16	2.1	7	10	6	34	31	58
24	0.064/16	2.1	9	13	6	46	41	72
30	0.079/14	2.1	11	16	8	55	51	88
36	0.079/14	2	13	19	9	70	60	105
42	0.109/12	2.1	15	25	10	82	69	122



TYPE #1 CONNECTOR

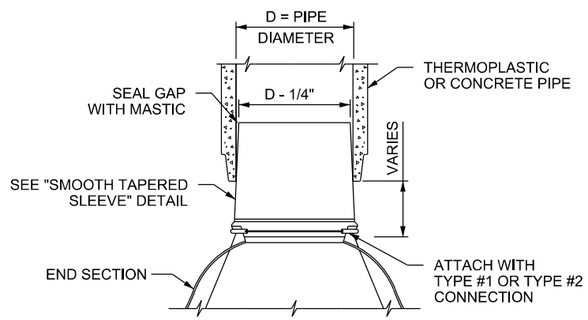
FOR USE ON CORRUGATED METAL PIPE ≤ 24" DIA



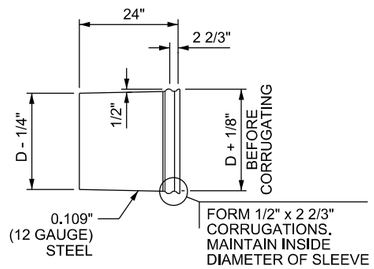
TYPE #2 CONNECTOR

FOR USE ON CORRUGATED METAL PIPE ≥ 30" DIA

CORRUGATED METAL PIPE CONNECTION



THERMOPLASTIC OR CONCRETE PIPE CONNECTION



SMOOTH TAPERED SLEEVE

NOTES:

1. DO NOT USE THESE END SECTIONS WITHIN THE CLEAR ZONE.
2. DIMENSIONS OF END SECTION CAN VARY FROM THOSE SHOW IN THE TABLES DUE TO DIFFERENT MANUFACTURER'S CONFIGURATIONS.
3. USE GALVANIZED HARDWARE FOR CONNECTIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

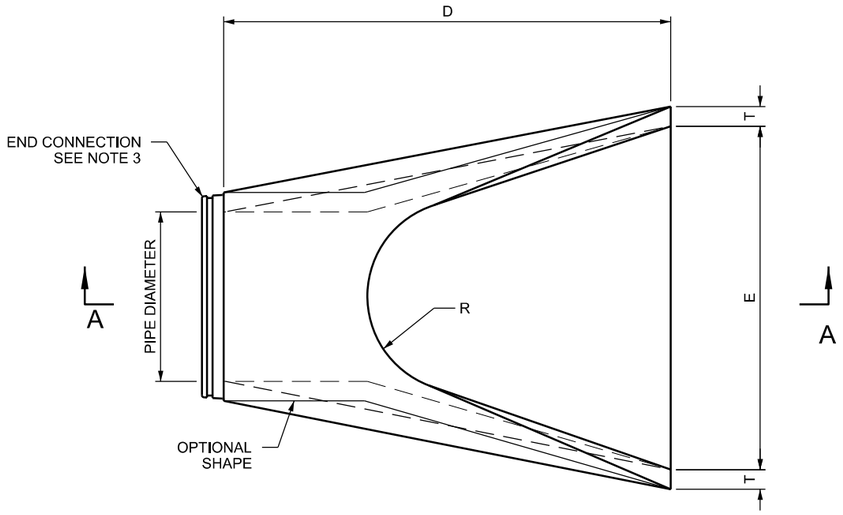
AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
AUGUST 2020 — DATE
APPROVED
DEPUTY DIRECTOR

STEEL END SECTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.
DG 7

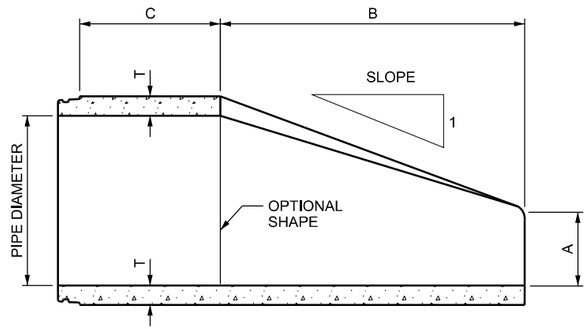
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\DG07.dgn
23-JUN-2020



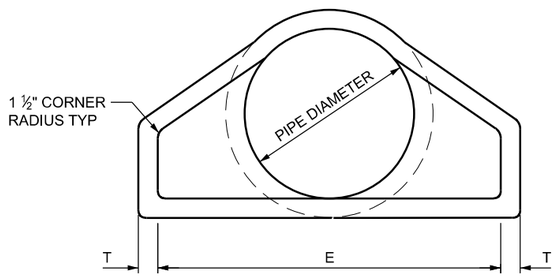
PLAN

CONCRETE END SECTIONS FOR ELLIPTICAL PIPE									
PIPE SIZE (INCHES)		APPROX. SLOPE	DIMENSIONS (INCHES)						
SPAN X RISE	EQUIV DIA		A	B	C	D	E	R	T
23 X 14	18	3.1	8	27	45	72	36	6	2 ¾
30 X 19	24	2.8	8 ½	39	33	72	48	7	3 ¼
38 X 24	30	2.9	9 ½	54	18	72	60	9	3 ½
45 X 29	36	2.7	11 ¼	60	36	96	72	12	4 ½
53 X 34	42	2.6	15 ¾	60	36	96	78	13	5

CONCRETE END SECTIONS FOR CIRCULAR PIPE								
PIPE DIA (INCHES)	APPROX. SLOPE	DIMENSIONS (INCHES)						
		A	B	C	D	E	R	T
18	2.4	9	27	46	73	36	12	2 ½
24	2.5	9 ½	43 ½	30	73 ½	48	14	3
30	2.5	12	54	19 ¾	73 ¾	60	15	3 ½
36	2.5	15	63	34 ¾	97 ¾	72	20	4
42	2.5	21	63	35	98	78	22	4 ½



SECTION A-A



END VIEW

NOTES:

1. DO NOT USE THESE END SECTIONS WITHIN THE CLEAR ZONE.
2. DIMENSIONS OF END SECTION CAN VARY FROM THOSE SHOW IN THE TABLES DUE TO DIFFERENT MANUFACTURER'S CONFIGURATIONS.
3. USE THE SAME JOINT MATERIAL AND CONNECTION AS IN THE ADJOINING PIPE. DRAWING INDICATES SPIGOT STYLE JOINT ONLY, OTHER TYPES OF JOINTS (TONGUE, GROOVE, BELL) ARE TO BE FURNISHED AS REQUIRED.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED

DEPUTY DIRECTOR

CONCRETE END SECTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.

DG 8

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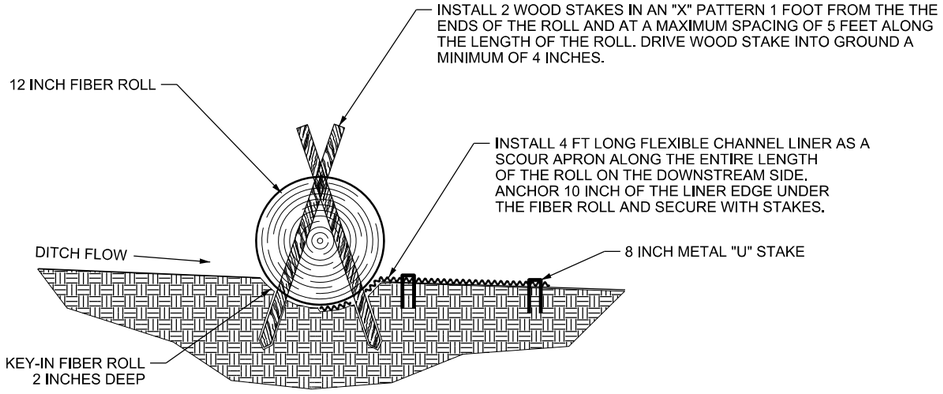

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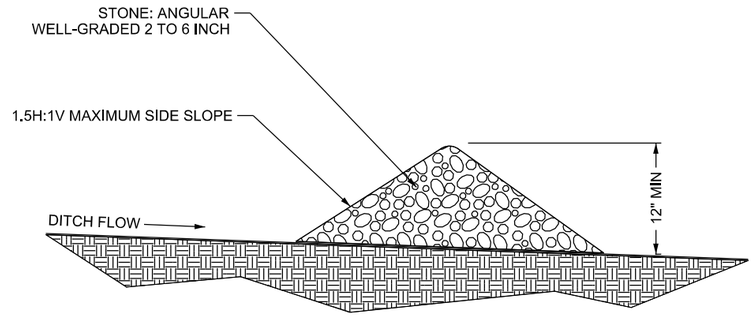

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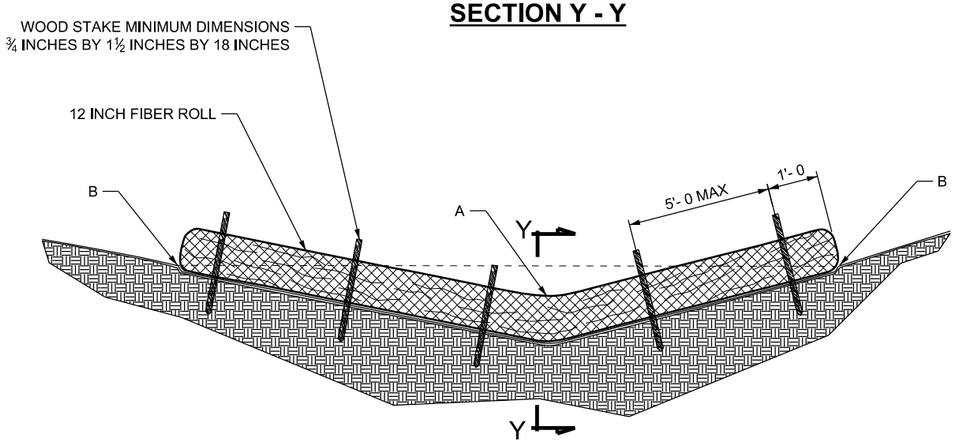
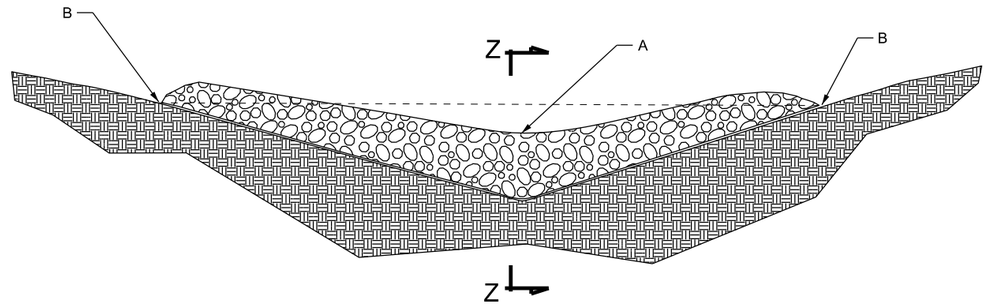


ELEVATION

CHECK DAM - FIBER ROLL

MATERIAL QUANTITY CHART		
DITCH SIDE SLOPE	LENGTH (FT) OF 12 INCH DIAMETER FIBER ROLL REQUIRED FOR HALF OF DITCH	CUBIC YARDS OF STONE REQUIRED FOR HALF OF DITCH
2:1	2.5	0.17
3:1	3.5	0.24
4:1	4.7	0.31
6:1	7.0	0.45
8:1	9.4	0.60
10:1	11.7	0.75
12:1	14	0.90

EXAMPLE: A CUT DITCH WITH A 6:1 FORE SLOPE AND A 2:1 BACK SLOPE WOULD REQUIRE A 9.5 (7.0 + 2.5) FT MIN. FIBER ROLL OR 0.62 (0.45 + 0.17) CUBIC YARD MIN. OF STONE.



ELEVATION

CHECK DAM - STONE

NOTES:

1. PLACE A CHECK DAM AT EVERY ONE FT DROP IN ELEVATION ALONG THE CUT DITCH.
2. PLACE CHECK DAMS PERPENDICULAR TO THE FLOW LINE OF THE DITCH.
3. DO NOT PLACE CHECK DAMS ACROSS NATURAL STREAM BEDS.
4. PLACE STONE CHECK DAMS OUTSIDE OF CLEAR ZONES.
5. INSTALL CHECK DAMS WITH POINT "A" A MINIMUM OF 4 INCHES LOWER THAN POINT "B".
6. REMOVE CHECK DAMS BY SPREADING STONE OR BREAKING APART AND SPREADING FIBER ROLL MATRIX MATERIAL WITHIN CUT DITCH OR COMPLETELY REMOVING FIBER ROLL.

REVISIONS				
NO.	DATE	APPR.		REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

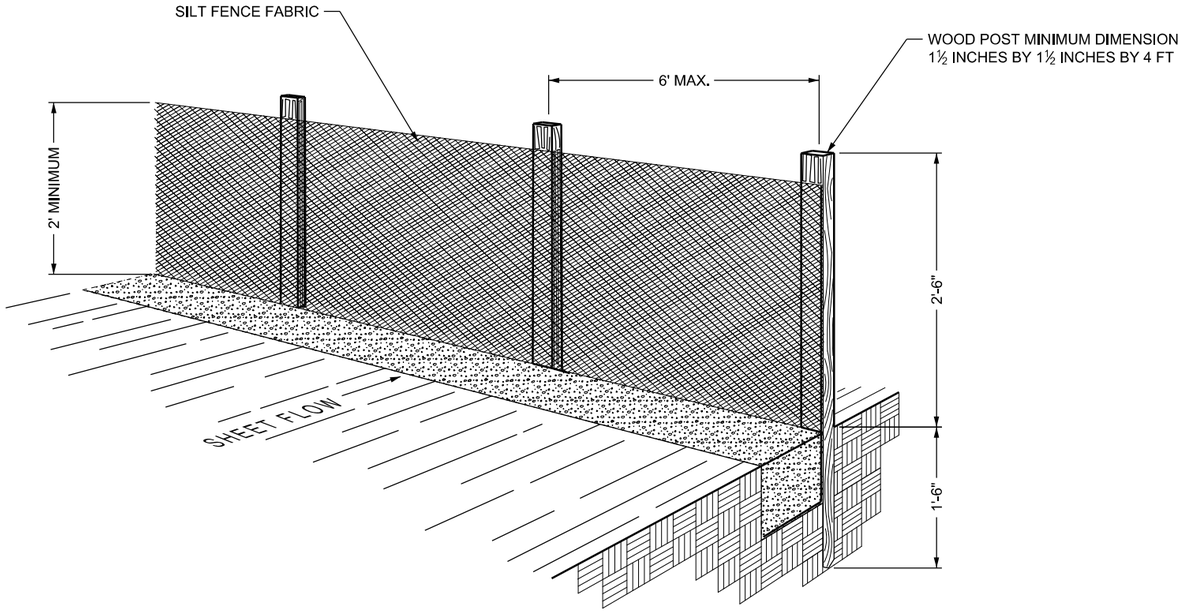
AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

TEMPORARY EROSION CONTROL (CHECK DAMS)

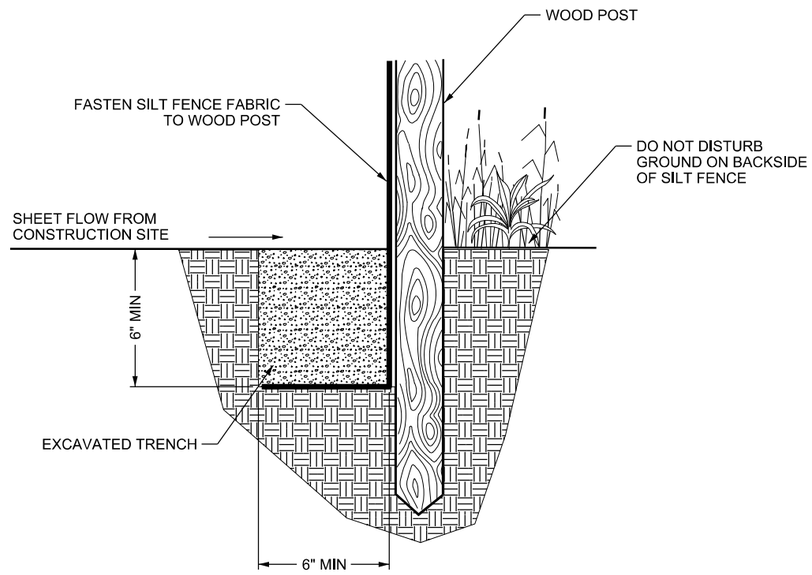
STANDARD DRAWING TITLE

STD. DWG. NO.
EN 1

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF)\EN01.dgn
23-JUN-2020



PERSPECTIVE VIEW



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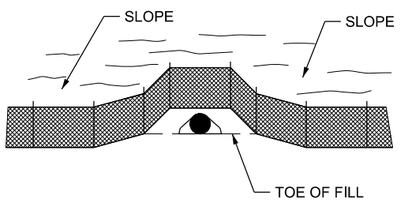
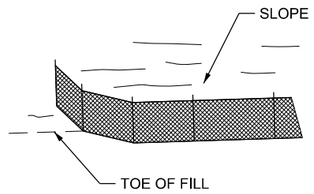
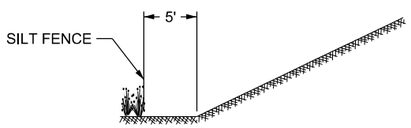


AROUND A PIPE OUTLET



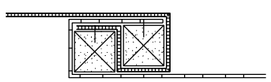
AT END OF SILT FENCE

SEE NOTE 6



AT TOE OF FILL SLOPE

SEE NOTE 1



SPLICES (TOP VIEW)

SEE NOTE 8

SILT FENCE INSTALLATIONS

NOTES:

1. POSITION THE SILT FENCE 5 FT BEYOND THE TOE OF SLOPE. INSTALL SILT FENCE AT TOE OF SLOPE WHEN PLACING WITHIN OR IMMEDIATELY ADJACENT TO A WETLAND.
2. ALIGN THE FENCE ALONG THE CONTOUR AS MUCH AS POSSIBLE TO AVOID CREATING LOW POINTS ALONG THE SILT FENCE. PROVIDE AN OPENING IN THE FENCE AND INSTALL A SEDIMENT TRAP WHERE EXCESSIVE RUNOFF WILL ACCUMULATE AT A LOW POINT.
3. SECURE FIRMLY INTO GROUND BY EXCAVATING TRENCH, PLACING SILT FENCE FABRIC THEN BACKFILLING WITH EXCAVATED TRENCH MATERIAL.
4. SECURE SILT FENCE FABRIC TO WOOD POST ACCORDING TO MANUFACTURER RECOMMENDATIONS.
5. MINIMIZE DISTURBANCE WHEN EXCAVATING THE TRENCH.
6. SILT FENCE INSTALLATION EQUIPMENT MAY BE USED AS AN ALTERNATIVE INSTALLATION METHOD IF BOTTOM 6 INCHES OF SILT FENCE FABRIC IS TRENCHED FIRMLY INTO GROUND AND MEETS ALL OTHER REQUIREMENTS.
7. RUN THE ENDS OF THE FENCE SLIGHTLY UP SLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE ENDS OF THE SILT FENCE.
8. DO NOT PLACE SILT FENCE ACROSS AREAS OF CONCENTRATED FLOWS.
9. AVOID USING SPLICES ALONG THE FENCE AS MUCH AS POSSIBLE. OVERLAP THE END POSTS AND TWIST 180 DEGREES BEFORE STAKING THE WOOD POSTS WHEN NECESSARY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
TEMPORARY EROSION CONTROL (SILT FENCE)

STD. DWG. NO.
EN 2

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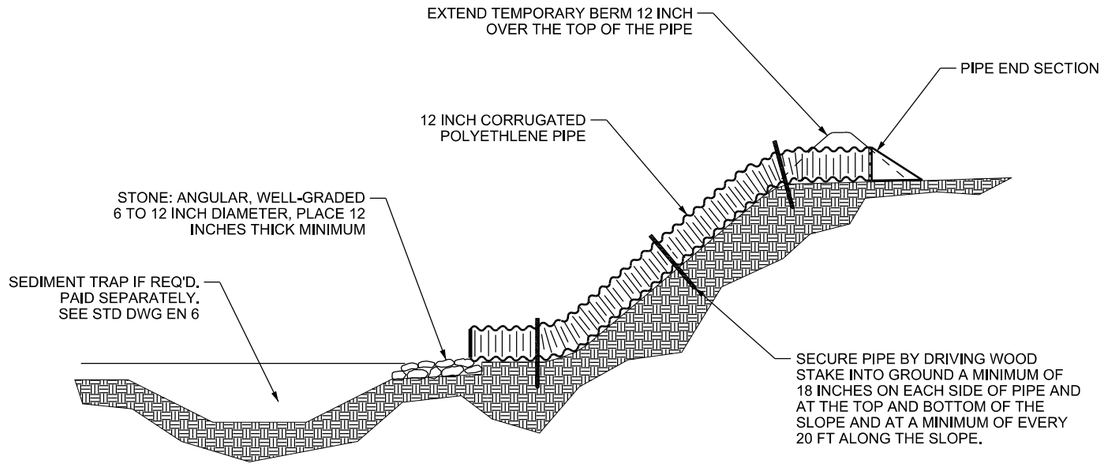
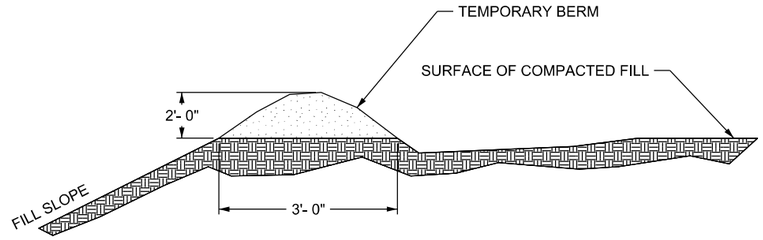
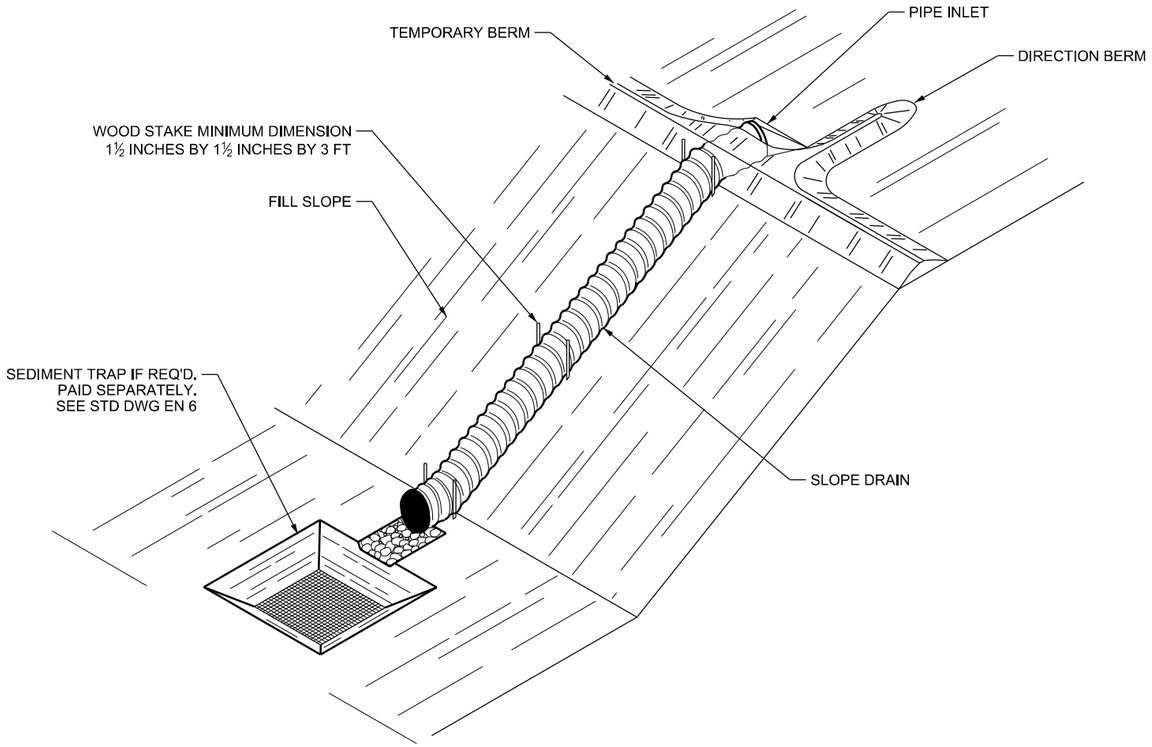
23-JUN-2020



SLOPE DRAIN SECTION



TEMPORARY BERM SECTION



SLOPE DRAIN ISOMETRIC

NOTES FOR TEMPORARY BERM:

1. COMPACT SOIL OF TEMPORARY BERM TO MINIMUM DIMENSIONS SHOWN ABOVE TO PREVENT EROSION.
2. MAINTAIN THE TEMPORARY BERM FROM ANY EROSION.
3. REMOVE TEMPORARY BERM WHEN SURROUNDING AREAS HAVE MET FINAL STABILIZATION MEASURES OR AS NECESSARY.

NOTES FOR SLOPE DRAIN:

1. COMPACT THE SOIL SURFACE AND BERMS OF THE INLET TO PREVENT WATER FROM UNDERMINING THE PIPE AND ERODING THE SLOPE. REPAIR ANY EROSION AROUND THE INLET, OUTLET, OR SLOPE IMMEDIATELY.
2. SECURE THE PIPE TO THE GROUND SURFACE.
3. EXTEND THE SLOPE DRAIN INLET BEYOND TEMPORARY BERM TO CAPTURE RUNOFF.
4. EXTEND THE SLOPE DRAIN OUTLET A MINIMUM OF 3 FT BEYOND THE TOE OF THE SLOPE.
5. PROVIDE STONE FOR OUTLET PROTECTION.
6. INSTALL SEDIMENT TRAP AT PIPE OUTLET IF NOT POSSIBLE PROVIDE SEDIMENT TRAP AT PIPE INLET.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

TEMPORARY EROSION CONTROL (SLOPE DRAIN AND TEMPORARY BERM)

STANDARD DRAWING TITLE

STD. DWG. NO.
EN 3

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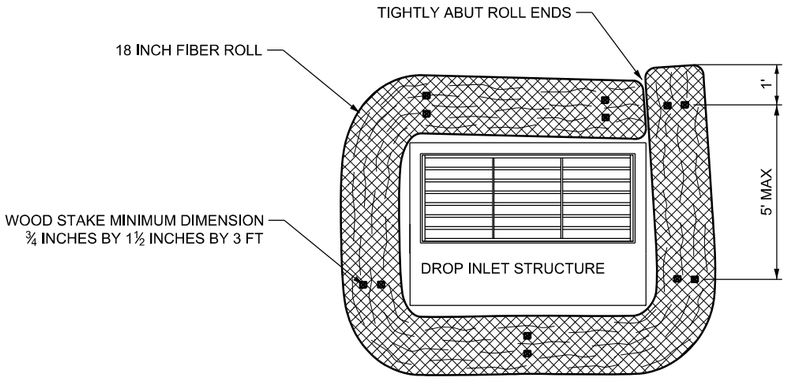
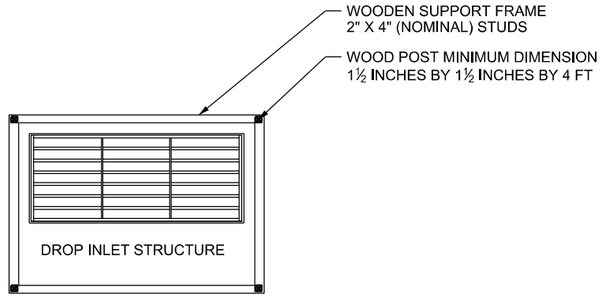
23-JUN-2020



PLAN



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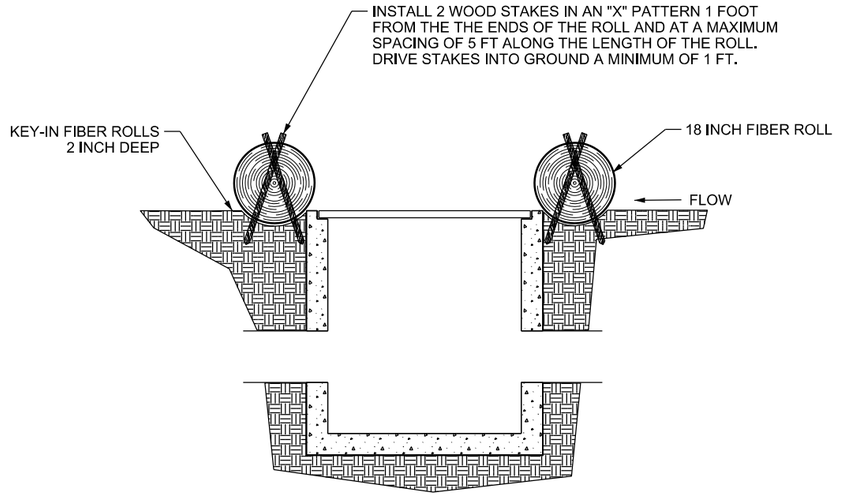

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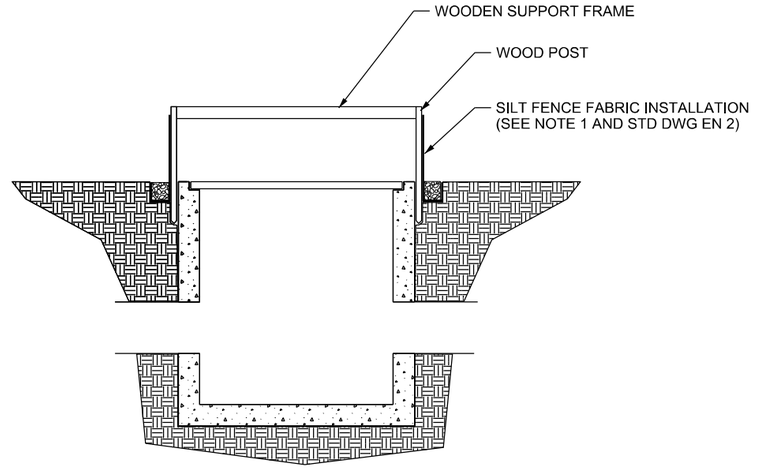


SECTION

DROP-INLET BARRIER - FIBER ROLL

NOTES:

1. KEY-IN FIBER ROLLS AROUND THE PERIMETER OF THE DROP INLET STRUCTURE AND STAKE AS SHOWN.
2. OVERLAP THE ENDS OF THE FIBER ROLL AT LEAST 18 INCHES.
3. INSTALL FIBER ROLLS IN MEDIAN AREAS SO THAT THE TOPS ARE NOT HIGHER IN ELEVATION THAN THE ADJACENT ROADWAY.

DROP-INLET BARRIER - SILT FENCE

NOTES:

1. ENTRENCH THE BOTTOM 18 INCH OF SILT FENCE SECURELY IN THE GROUND AROUND THE PERIMETER OF THE DROP INLET.
2. DRIVE POSTS AT EACH CORNER OF THE INLET STRUCTURE. PLACE ANOTHER POST OR POSTS BETWEEN THEM IF THE DISTANCE BETWEEN CORNER POSTS EXCEEDS 4 FT.
3. BUILD WOODEN SUPPORT FRAME MADE OF WOOD STUDS AND SECURE TO THE TOP OF POSTS.
4. CONSTRUCT SILT FENCE IN MEDIAN AREAS SO THAT THE TOP OF SILT FENCE IS NOT HIGHER IN ELEVATION THAN THE ADJACENT ROADWAY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED

DEPUTY DIRECTOR

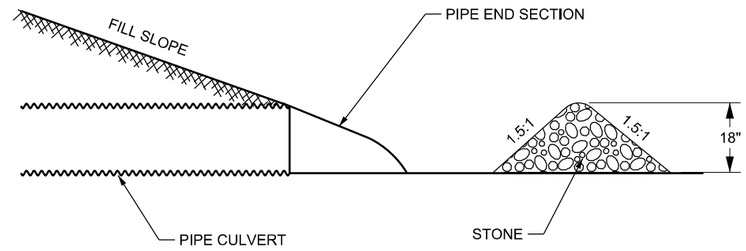
TEMPORARY
EROSION CONTROL
(DROP-INLET BARRIERS)

STANDARD DRAWING TITLE

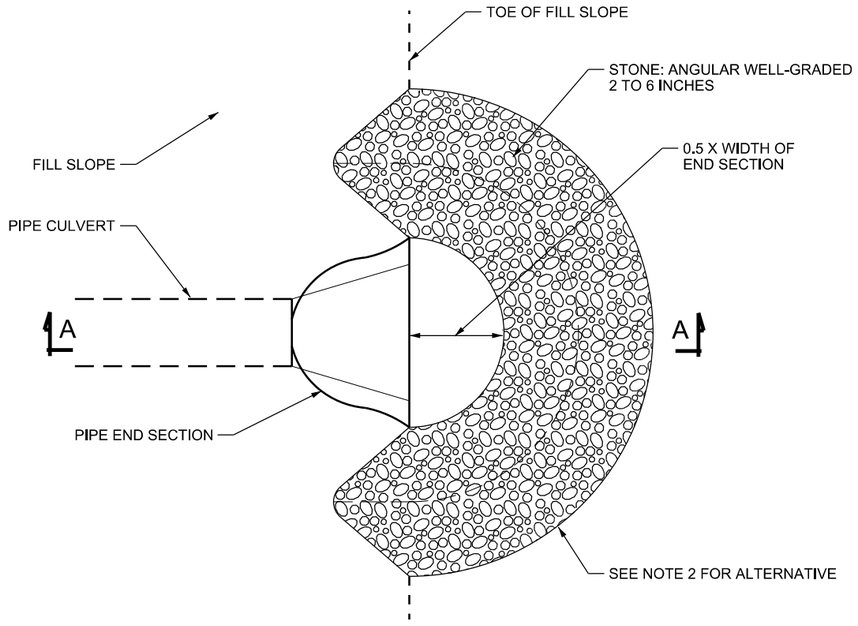
STD. DWG. NO.

EN 4

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF)\EN04.dgn
23-JUN-2020



SECTION A - A



PLAN

PIPE-INLET BARRIER - STONE

NOTES:

1. REMOVE THE BARRIER BY SPREADING THE STONE ALONG THE CUT DITCH.
2. AN 18-INCH FIBER ROLL MAY BE USED AS AN ALTERNATIVE TO A STONE BARRIER. STAKE AND KEY-IN FIBER ROLL AS SHOWN IN EN SERIES STD DWGS.
3. ALLOW RUNOFF TO FLOW THROUGH THE BARRIER AND ENTER THE PIPE CULVERT.
4. DO NOT PLACE BARRIERS ACROSS NATURAL CHANNELS FLOWING TO THE PIPE INLET.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

AUGUST 2020
DATE

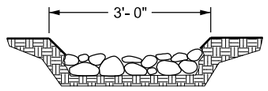
DEPUTY DIRECTOR

TEMPORARY
EROSION CONTROL
(PIPE-INLET BARRIERS)

STANDARD DRAWING TITLE

STD. DWG. NO.
EN 5

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\EN05.dgn



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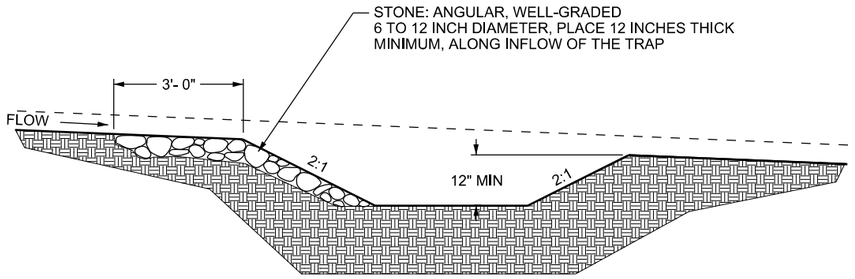

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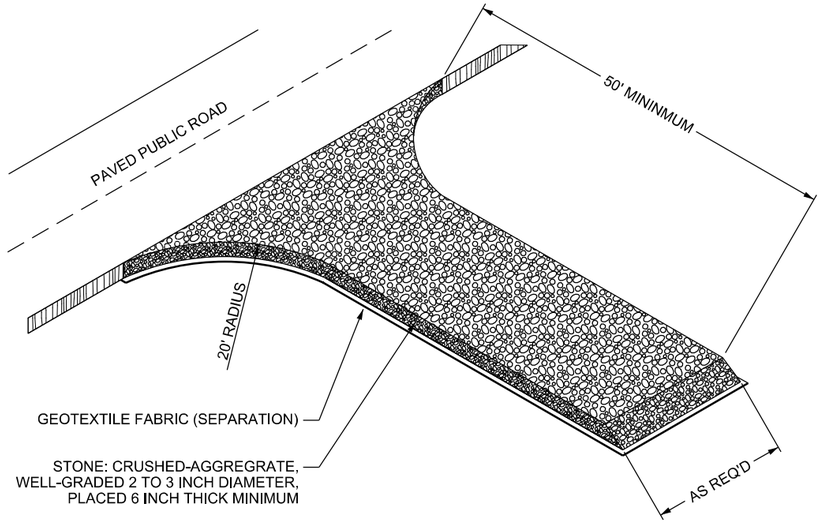
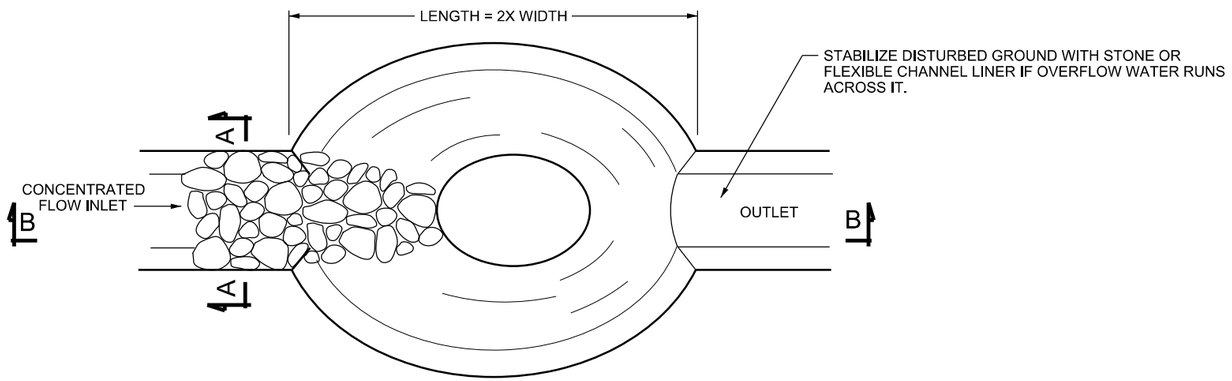


STABILIZED CONSTRUCTION ENTRANCE



SEDIMENT TRAP PLAN

NOTES FOR STABLILIZED CONSTRUCTION ENTRANCE:

1. PLACE GEOTEXTILE FABRIC BENEATH LIMITS OF STONE.
2. PREVENT VEHICLES LEAVING THE CONSTRUCTION SITE TO TRACK MUD ONTO PAVED ROADS.

NO.	DATE	APPR.	REMARKS

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

TEMPORARY EROSION CONTROL (SEDIMENT TRAP AND STABILIZED CONSTRUCTION ENTRANCE)
STANDARD DRAWING TITLE

STD. DWG. NO.
EN 6

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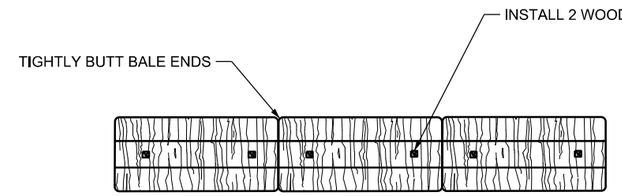
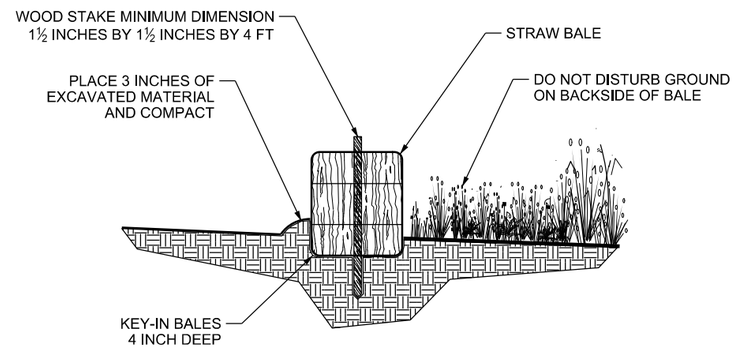
23-JUN-2020



STRAW BALE BARRIER PLAN



SECTION

NOTES FOR STRAW BALEBARRER:

1. PLACE STRAW BALE BARRIERS BEFORE EARTH DISTURBING ACTIVITIES.
2. DO NOT PLACE STRAW BALE BARRIERS ACROSS AREAS OF CONCENTRATED FLOW.
3. REMOVE BALES AND WOOD STAKES, LEVEL AND SEED THE AREA. BALES MAY BE BUSTED APART AND SPREAD AS MULCH.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

TEMPORARY EROSION CONTROL (STRAW BALE BARRIER)

STANDARD DRAWING TITLE

STD. DWG. NO.

EN 7

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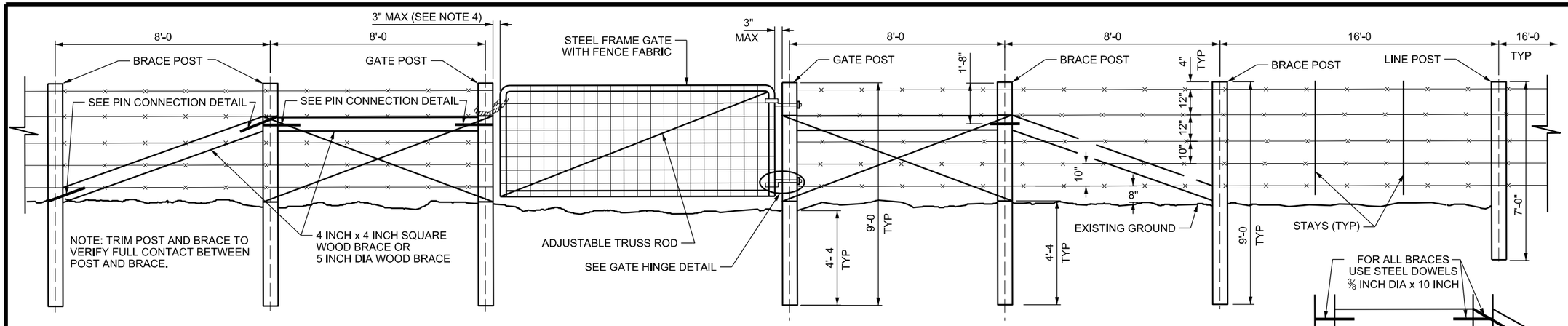
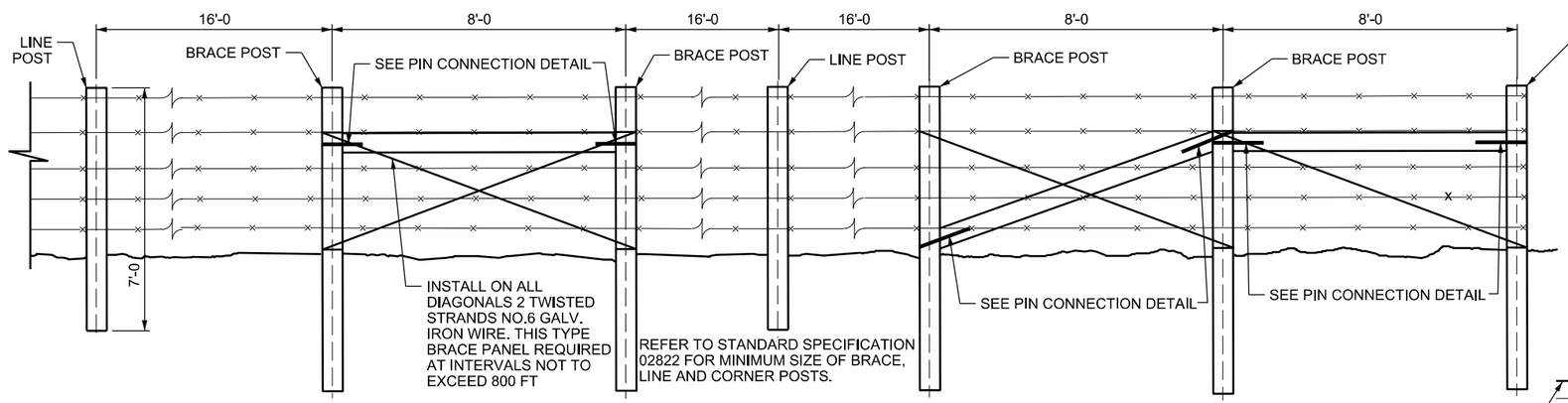


GATE BRACE

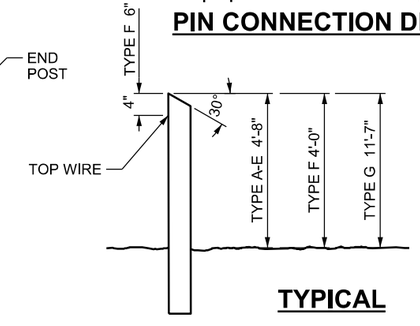
GATE BRACE

PIN CONNECTION DETAIL



LINE BRACE

TERMINAL BRACE



TYPICAL

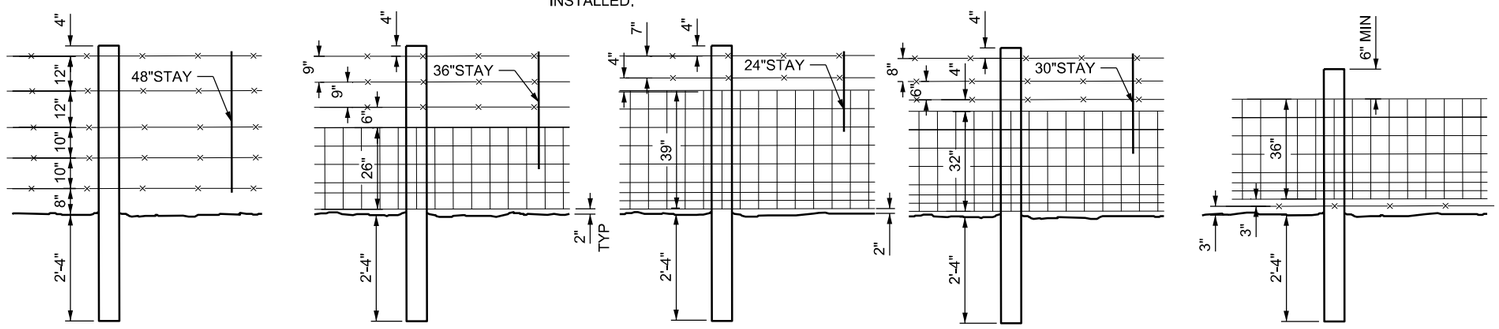
GATE HINGE DETAIL

WOOD POSTS

INSTALLATION WITH WOOD POST

NOTES: (TYPE A SHOWN, ALL OTHERS SIMILAR)

1. POST SIZE, SPACING AND BRACING FOR TYPES A,B,D,E AND F FENCE THE SAME AS SHOWN IN INSTALLATION WITH WOOD POSTS ABOVE. USE TWO STAYS EVENLY SPACED BETWEEN EACH SET OF POSTS.
2. SEE STD DWG FG 1B FOR BRACE TO CORNER POST DETAILS.
3. GATE FRAME USE STEEL PIPE 1.875 INCH OUTSIDE DIAMETER WITH WEIGHT OF 2.72 LB/FT.
4. PROVIDE AT LEAST A 4 INCH GAP BETWEEN GATE FRAMES TO ALLOW FOR LATCH WHERE DOUBLER GATES ARE INSTALLED.



TYPE A

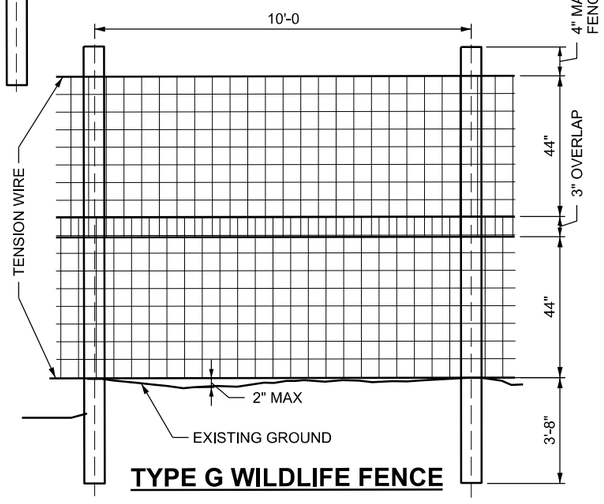
TYPE B

TYPE D

TYPE E

TYPE F

TO BE INSTALLED IN DEER COUNTRY



TYPE G WILDLIFE FENCE

DESIGN NOTES:

A. INSTALL 4 FT GATE ON TYPE G WILDLIFE FENCE ADJACENT TO ANIMAL CROSSING STRUCTURES.

NOTES:

1. 3 INCH MIN OVERLAP REQUIRED AND TIE OR CLAMP TOGETHER EVERY 18 INCHES USING HOG RINGS OR OTHER TYPES OF TIES OR CLAMPS.
2. PLACE BOTTOM TENSION WIRE AND FENCE FABRIC AT EXISTING GROUND AT POSTS AND WITHIN 2 INCHES OF EXISTING GROUND BETWEEN POSTS.
3. TIE OR CLAMP BOTTOM AND TOP TENSION WIRE TO FENCE FABRIC EVERY 24 INCHES USING HOG RINGS OR OTHER TYPES OF TIES OR CLAMPS.
4. A SINGLE FENCE FABRIC MAY BE USED IF MEETS OVERALL MINIMUM DIMENSIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

STANDARD DRAWING TITLE

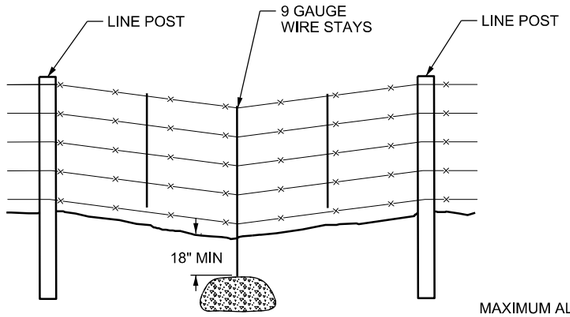
RIGHT OF WAY
FENCE AND GATES
(WOOD POST)

STD. DWG. NO.

FG 1A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG01A.dgn
23-JUN-2020

INSTALLATION WITH WOOD POSTS (TYPICAL)

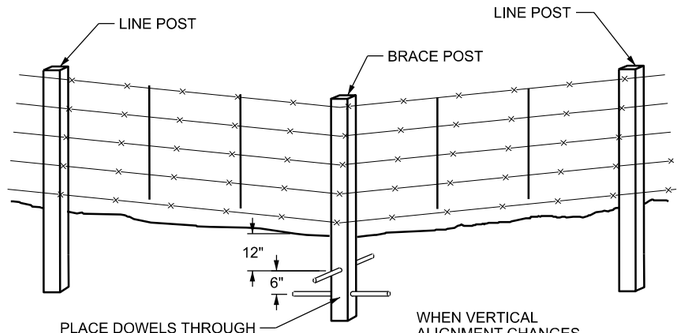


PLACE 100 LB MINIMUM ROCK OR CONCRETE AFTER THE FENCE FABRIC IS STRETCHED

2-9 GAUGE WIRES SPLICED TO STAY AND BOTTOM WIRE

MAXIMUM ALLOWABLE GAP BEFORE PLACING TIE DOWN
TYPE A-10"
TYPE B,D, & E-4"
TYPE F-5"
TYPE G-1"

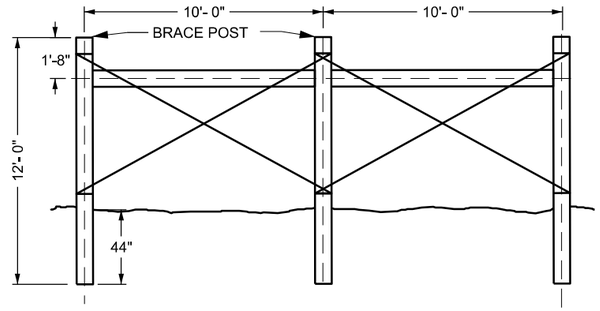
TYPICAL SAG SECTION



PLACE DOWELS THROUGH WOOD POST TO ANCHOR (#4 EPOXY COATED REBAR- 18" MINIMUM LENGTH)

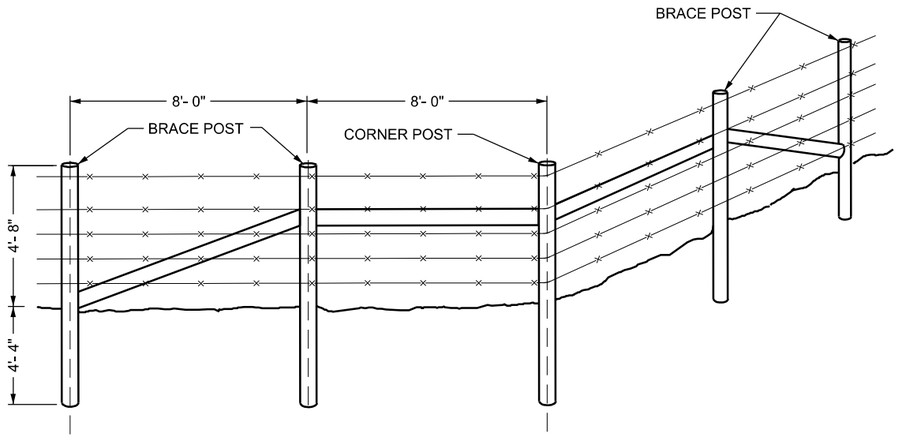
WHEN VERTICAL ALIGNMENT CHANGES 3' IN 8' USE LINE BRACE

TYPICAL VERTICAL ALIGNMENT CHANGE



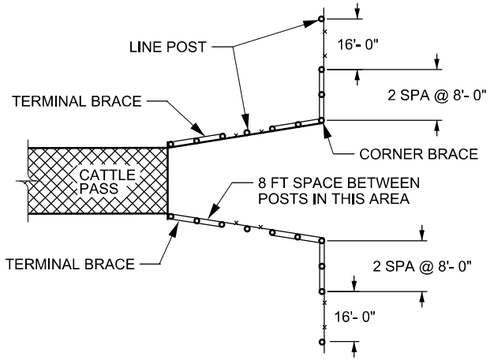
LINE BRACE FOR TYPE G FENCE

BRACE AT INTERVALS NOT EXCEEDING 400 FT

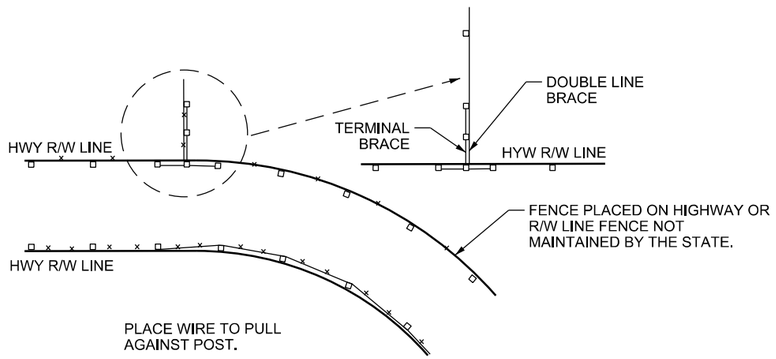


CORNER BRACE

USE CORNER BRACE ON ALL FENCE LINE DEVIATION WHEN WOOD POSTS ARE USED

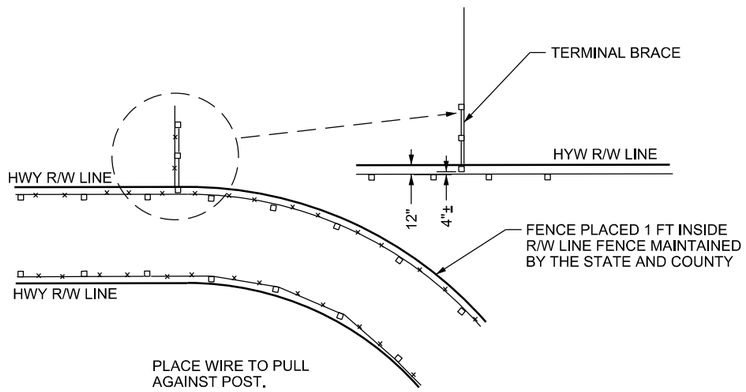


CATTLE PASS FENCE DETAIL



PLACE WIRE TO PULL AGAINST POST.

POST & WIRE LOCATION



PLACE WIRE TO PULL AGAINST POST.

POST & WIRE LOCATION

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 DATE

APPROVED

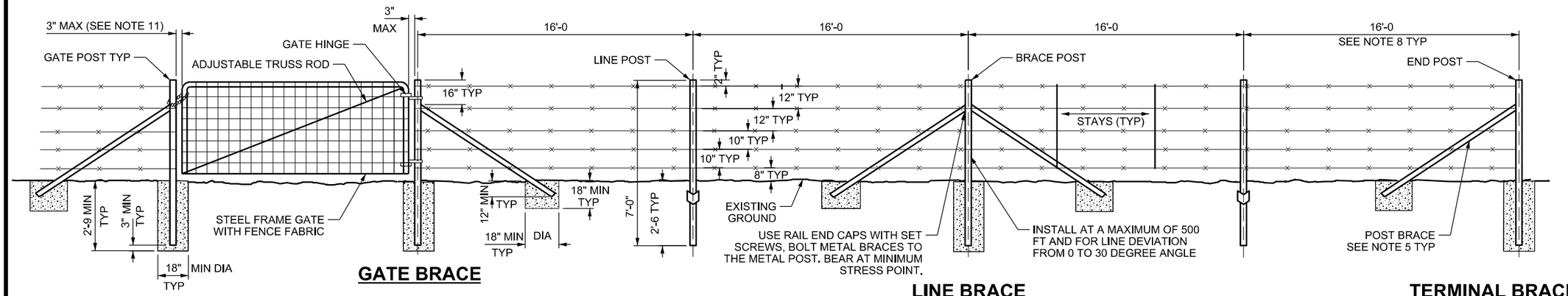
DEPUTY DIRECTOR

RIGHT OF WAY
FENCE AND GATES
(WOOD POST)

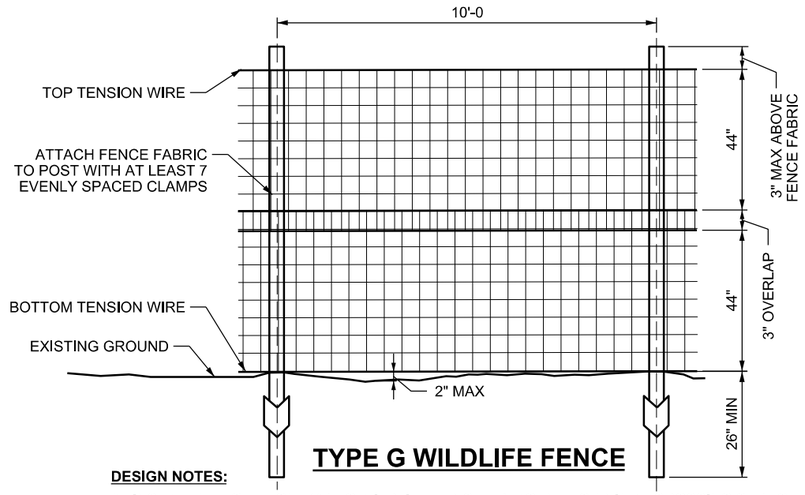
STANDARD DRAWING TITLE

STD. DWG. NO.
FG 1B

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\FG01B.dgn
23-JUN-2020



GATE BRACE | **LINE BRACE** | **TERMINAL BRACE**



TYPE G WILDLIFE FENCE

DESIGN NOTES:

A. INSTALL 4 FT GATE ON TYPE G WILDLIFE FENCE ADJACENT TO ANIMAL CROSSING STRUCTURES.

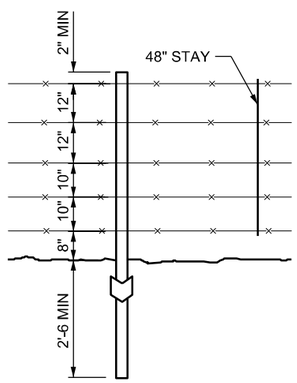
NOTES:

1. 3 INCH MIN OVERLAP REQUIRED AND TIE OR CLAMP TOGETHER EVERY 18 INCHES USING HOG RINGS OR OTHER TYPES OF TIES OR CLAMPS.
2. PLACE BOTTOM TENSION WIRE AND FENCE FABRIC AT EXISTING GROUND AT POSTS AND WITHIN 2 INCHES OF EXISTING GROUND BETWEEN POSTS.
3. TIE OR CLAMP BOTTOM AND TOP TENSION WIRE TO FENCE FABRIC EVERY 24 INCHES USING HOG RINGS OR OTHER TYPES OF TIES OR CLAMPS.
4. A SINGLE FENCE FABRIC MAY BE USED IF MEETS OVERALL MINIMUM DIMENSIONS.

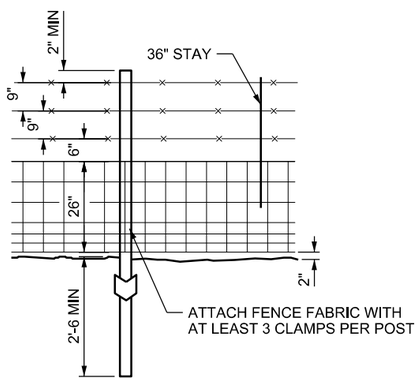
INSTALLATION WITH METAL POSTS

NOTES: (TYPE A SHOWN, ALL OTHERS SIMILAR)

1. SET GATE POST, BRACE POST, END POST, CORNER POST, AND POST BRACE IN CLASS "B" CONCRETE. SEE STD DWG FG 2B FOR CORNER BRACE DETAIL.
2. LINE POSTS FOR TYPE A, B, D, E, F & G FENCE
   A. "T", "Y", OR "U" STEEL CHANNEL SECTIONS, MINIMUM WEIGHT 1.33 LB/FT OF LENGTH OR STEEL PIPE,1.900 INCH OUTSIDE DIAMETER SCHEDULE 40 PIPE, WEIGHT 2.72 LB/FT OF LENGTH OR HIGH TENSILE TRIPLE COATED STEEL PIPE, WEIGHT 2.23 LB/FT OF LENGTH.
   B. LINE POSTS FOR TYPE A, B, D, E, & F FENCE: 7 FT LENGTH.
   C. LINE POSTS FOR TYPE G FENCE: 10 FT LENGTH.
3. BRACE POSTS, CORNER POSTS, AND END POSTS
   A. TYPE A, B, D, E, & F FENCES USE 2.5 INCH x 2.5 INCH x 0.25 INCH STEEL ANGLE, MINIMUM WEIGHT 4.10 LB/FT OR STEEL PIPE 2.375 INCH OUTSIDE DIAMETER, WEIGHT 3.65 LB/FT OR HIGH TENSILE TRIPLE COATED STEEL, 2.375 INCH OUTSIDE DIAMETER WEIGHT 3.11 LB/FT.
   B. TYPE G FENCE USE STEEL PIPE 2.375 INCH OUTSIDE DIAMETER, WEIGHT 3.65 LB/FT OR HIGH TENSILE TRIPLE COATED STEEL, 2.375 INCH OUTSIDE DIAMETER WEIGHT 3.11 LB/FT.
4. GATE POSTS
   A. GATE WIDTHS 6 FT AND LESS USE STEEL PIPE WITH OUTSIDE DIAMETER 2.375 INCH AND WEIGHT 3.65 LB/FT OR HIGH TENSILE TRIPLE COATED STEEL, 2.375 INCH OUTSIDE DIAMETER WEIGHT 3.11 LB/FT.
   B. GATE WIDTHS GREATER THAN 6 FT USE STEEL PIPE WITH OUTSIDE DIAMETER 3.50 INCH AND WEIGHT 7.58 LB/FT.
5. POST BRACES TO MATCH POST TYPE AND SIZE.
6. USE CORNER BRACE ON FENCE LINE DEVIATIONS GREATER THAN 30 DEGREE ANGLE. USE CORNER BRACE ON TYPE G FENCE WITH DEVIATIONS GREATER THAN 17 DEGREE ANGLE. SEE STD DWG FG 2B FOR CORNER BRACE DETAILS.
7. TERMINATE FENCE FABRIC AND BARBED WIRE AT EACH CORNER POST.
8. USE 10 FT SPACING IN AREAS OF FARM ANIMAL USE OR AS SHOWN.
9. SPACING AND BRACING ARE AS SHOWN IN INSTALLATION WITH METAL POST ABOVE FOR FENCE TYPES A, B, D, E AND F POST SIZE. SPACE 2 STAYS EVENLY BETWEEN EACH SET OF POSTS.
10. GATE FRAME USE STEEL PIPE 1.875 INCH OUTSIDE DIAMETER WITH WEIGHT OF 2.72 LB/FT.
11. WHERE DOUBLE GATES ARE INSTALLED PROVIDE AT LEAST A 4 INCH GAP BETWEEN GATE FRAMES TO ALLOW FOR LATCH.



TYPE A



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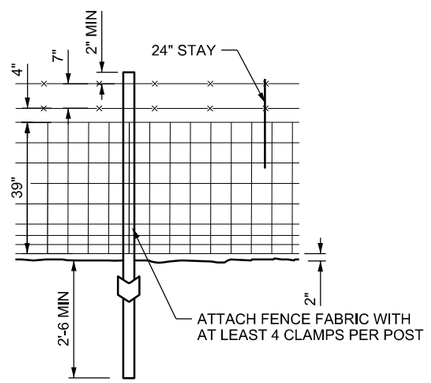
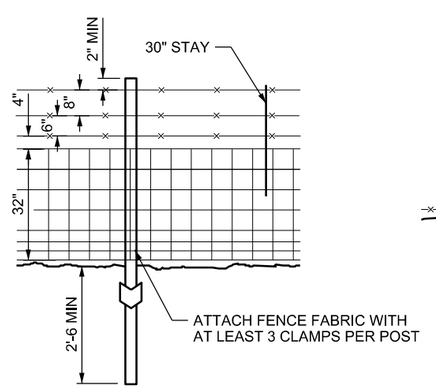
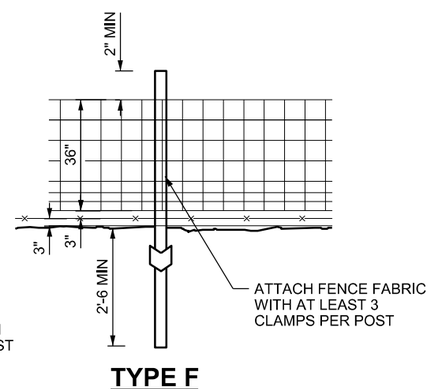


TYPE D



TYPE E



TYPE F

TO BE INSTALLED IN DEER COUNTRY

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 DATE

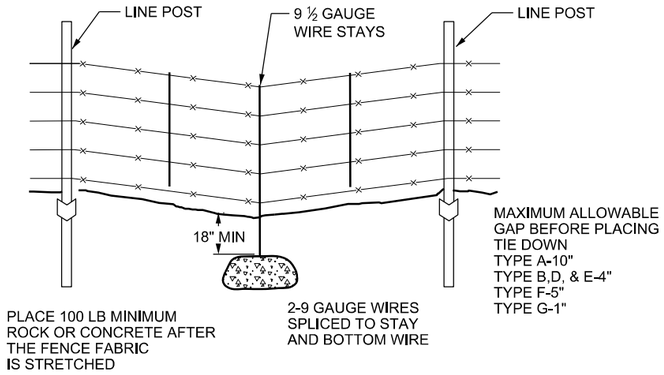
APPROVED
DEPUTY DIRECTOR

RIGHT OF WAY
FENCE AND GATES
(METAL POST)

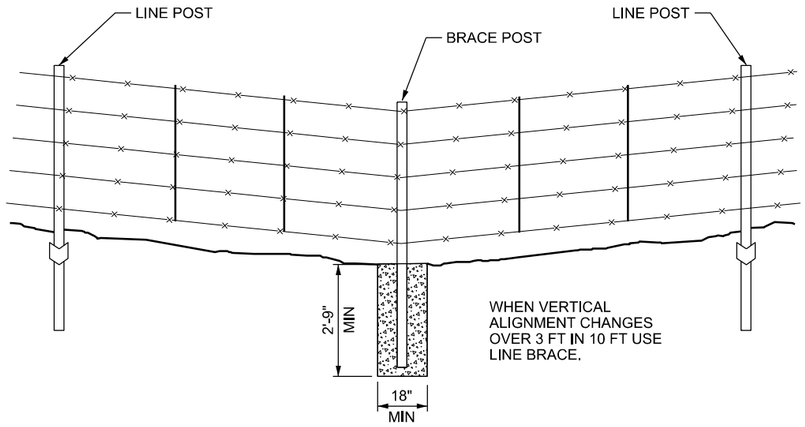
STANDARD DRAWING TITLE

STD. DWG. NO.
FG 2A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF)\FG02A.dgn
23-JUN-2020

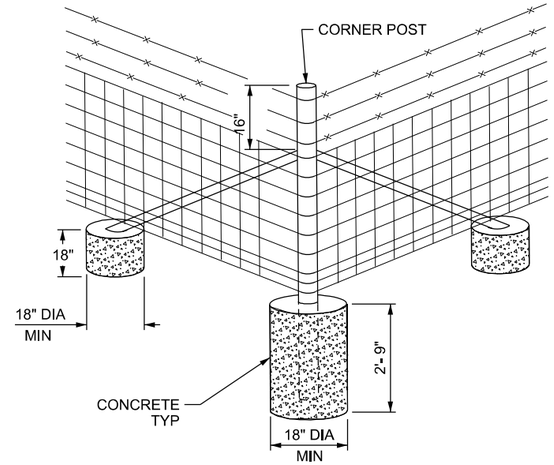


TYPICAL SAG SECTION



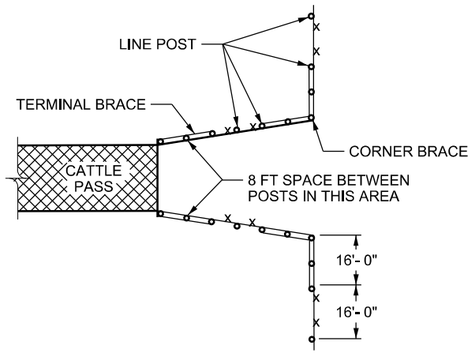
TYPICAL VERTICAL ALIGNMENT CHANGE

INSTALLATION WITH METAL POSTS (TYPICAL)



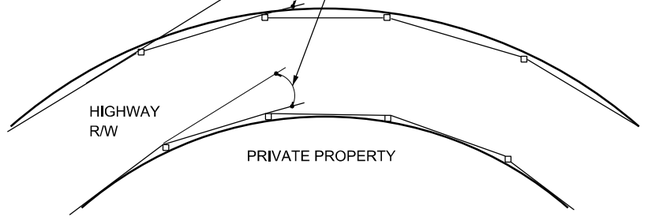
CORNER BRACE

SEE NOTE 6 STD DWG FG 2A



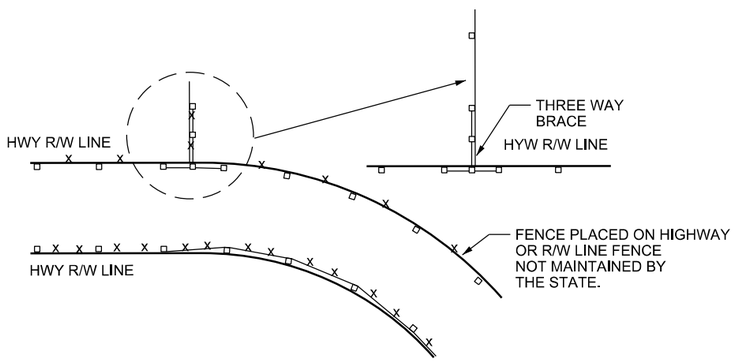
CATTLE PASS FENCE DETAIL

NOTE: LAP THE 50 INCH MESH WIRE 4 INCH TIE OR CLAMP 50 INCH MESH WIRE TOGETHER. THE SPACING NOT TO EXCEED 2 FT SPACING OF CONNECTINGS.



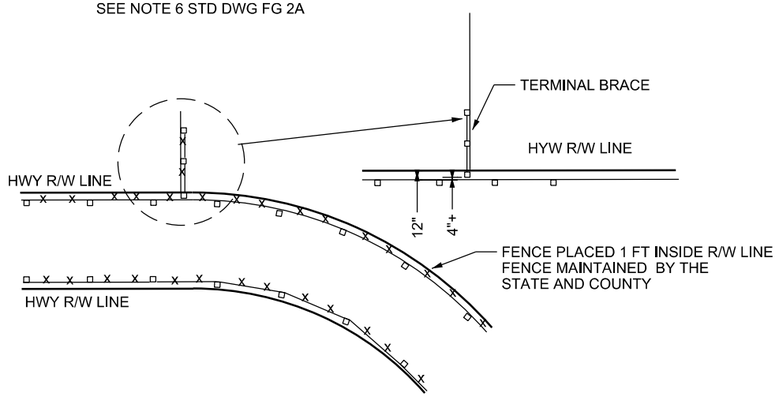
DEER BARRIER ON CURVES

SEE NOTE 6 STD DWG FG 2A



POST & WIRE LOCATION

PLACE WIRE TO PULL AGAINST POST



POST & WIRE LOCATION

PLACE WIRE TO PULL AGAINST POST

REVISIONS				
NO.	DATE	APPR.	REMARKS	

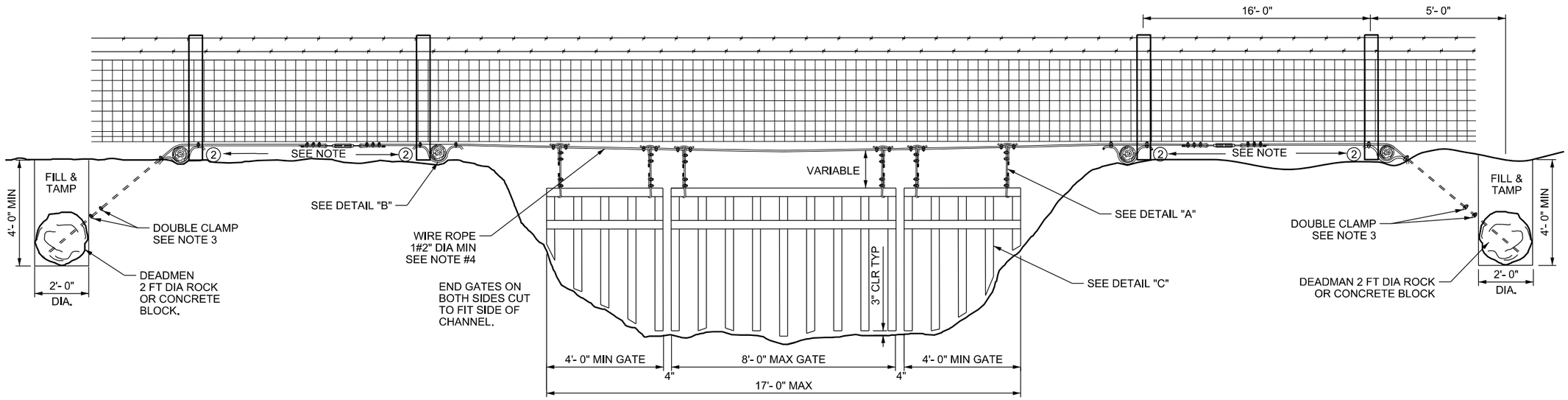
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL		AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED		AUGUST 2020
DEPUTY DIRECTOR		DATE

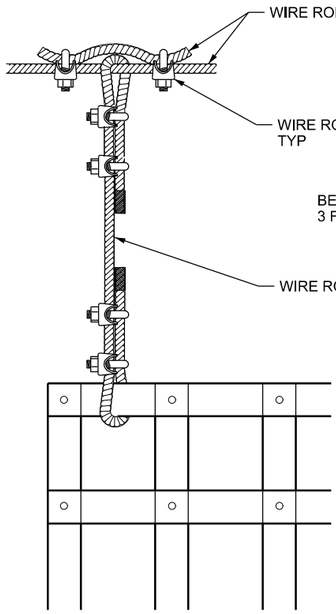
STANDARD DRAWING TITLE
RIGHT OF WAY
FENCE AND GATES
(METAL POST)

STD. DWG. NO.
FG 2B

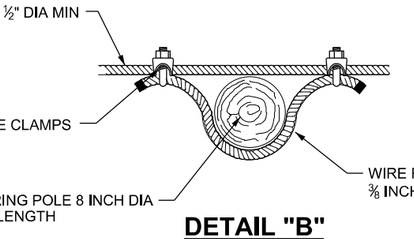
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG02B.dgn
23-JUN-2020



INSTALLATION DETAIL



DETAIL "A"



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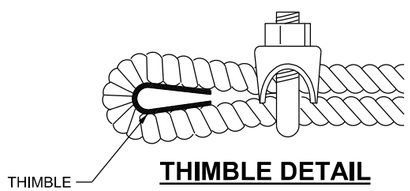
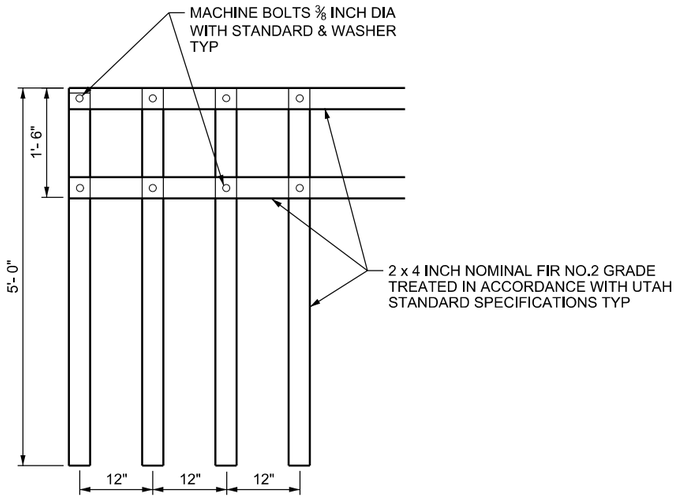
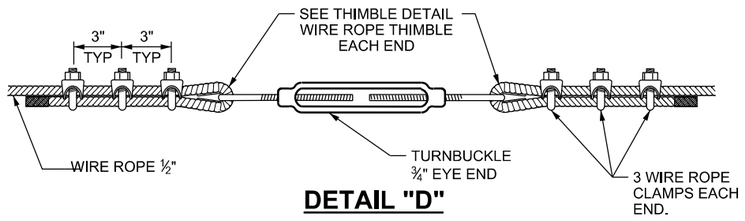


THIMBLE DETAIL



DETAIL "C"



DETAIL "D"

NOTES:

1. INSTALL BEARING POLES, DEADMAN, AND TURN BUCKLE THE SAME ON BOTH SIDES ON THE CHANNEL.
2. INSTALL WIRE ROPE ON THE UPSTREAM SIDE OF THE FENCE POSTS.
3. WRAP WIRE ROPE AROUND ROCK AND CLAMP WITH A DOUBLE CLAMP.
4. USE ½ INCH DIA WIRE 6 x 12 INCH WITH A BREAKING STRENGTH OF 10,000 LB.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

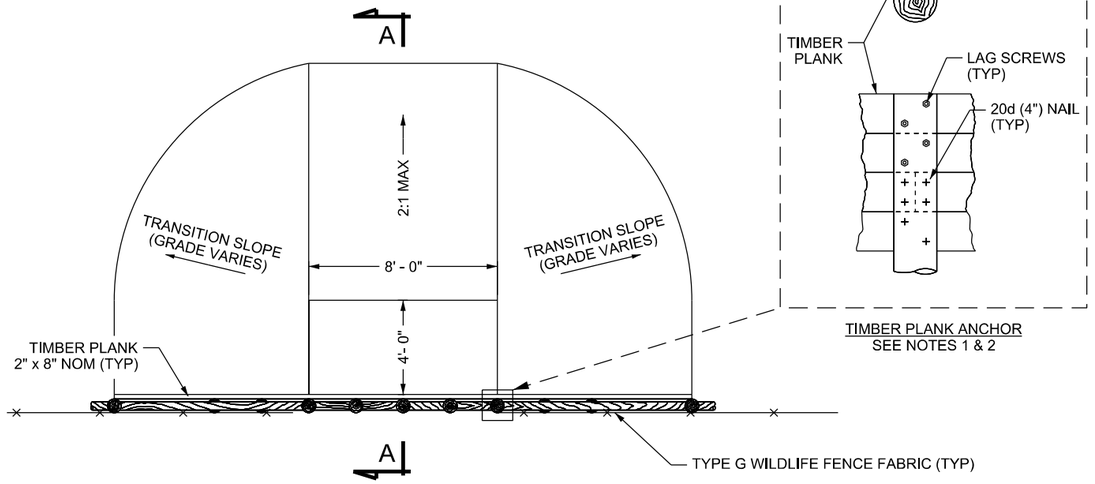
RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE — DATE: AUGUST 2020
APPROVED
DEPUTY DIRECTOR

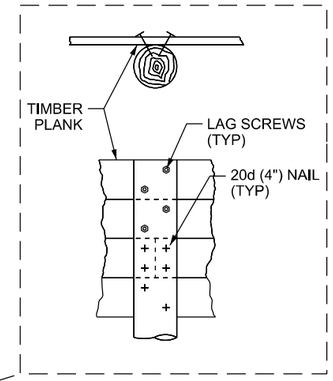
SWING GATES TYPE I
FOR GATES
LESS THAN 17 FT

STANDARD DRAWING TITLE

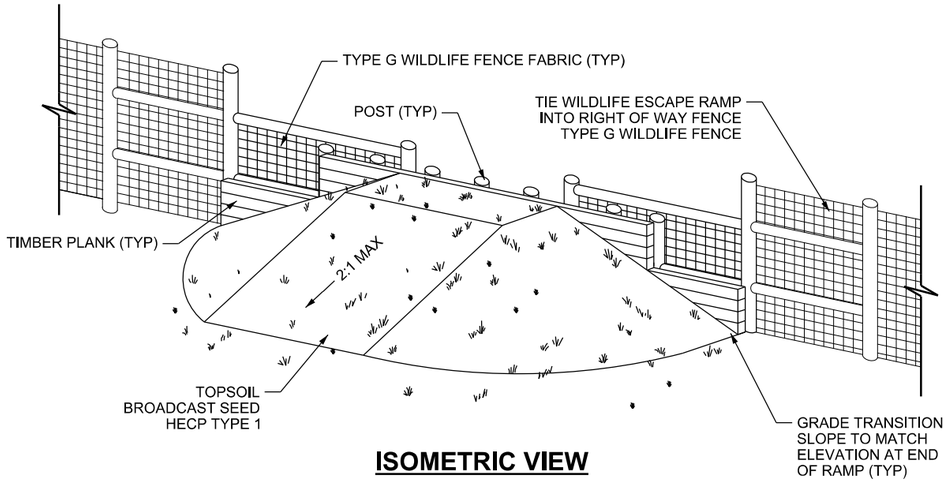
STD. DWG. NO.
FG 3

DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG03.dgn
23-JUN-2020

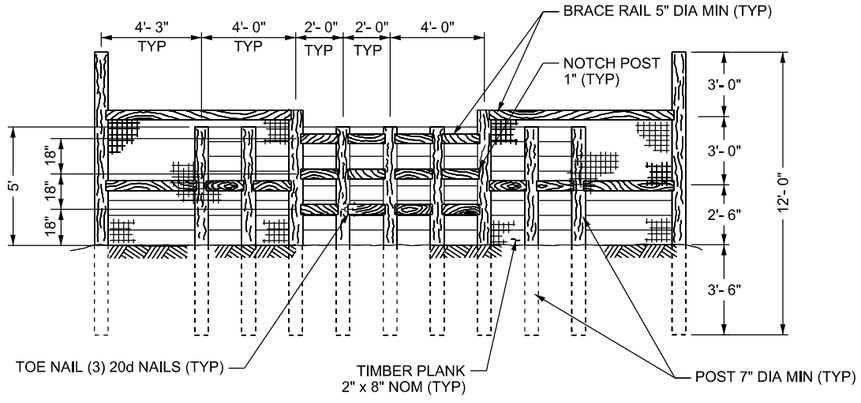




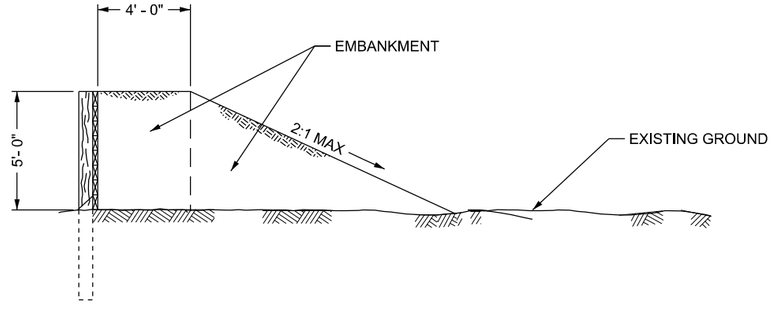
TIMBER PLANK ANCHOR
SEE NOTES 1 & 2



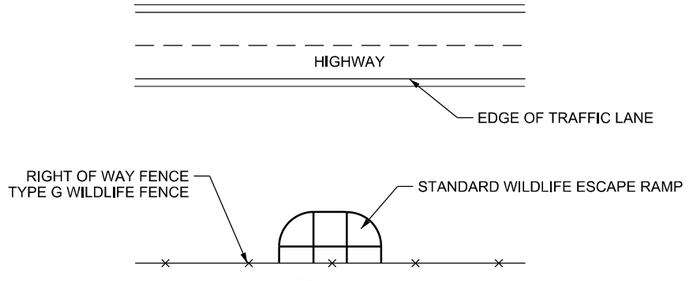
ISOMETRIC VIEW



SECTION



SECTION A-A



PLAN

NOTES:

1. ATTACH THE UPPER TWO PLANKS TO EACH POST USING TWO LAG SCREWS (5/16 INCH x 4 INCH ZINC PLATTED STEEL).
2. ATTACH OTHER PLANKS TO EACH POSTS USING TWO 20d (4 INCH) NAILS PER PLANK.
3. SEE STD DWG FG 1A, FG 1B, FG 2A, AND FG 2B FOR RIGHT OF WAY FENCE DETAILS.
4. USE TIMBER PLANKS FOR ALL HORIZONTAL BACKING.
5. SECURE BRACE RAILS TO POSTS AT NOTCHED LOCATIONS BY DRIVING THREE 20d (4 INCH) NAILS THROUGH THE RAILS AND INTO POSTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

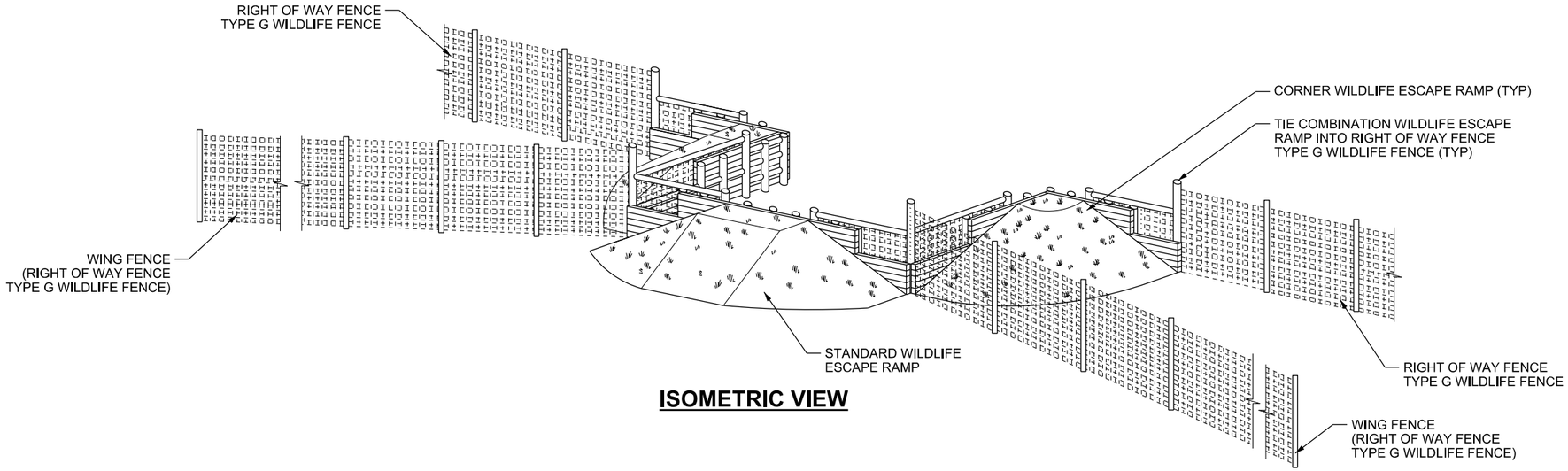
RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

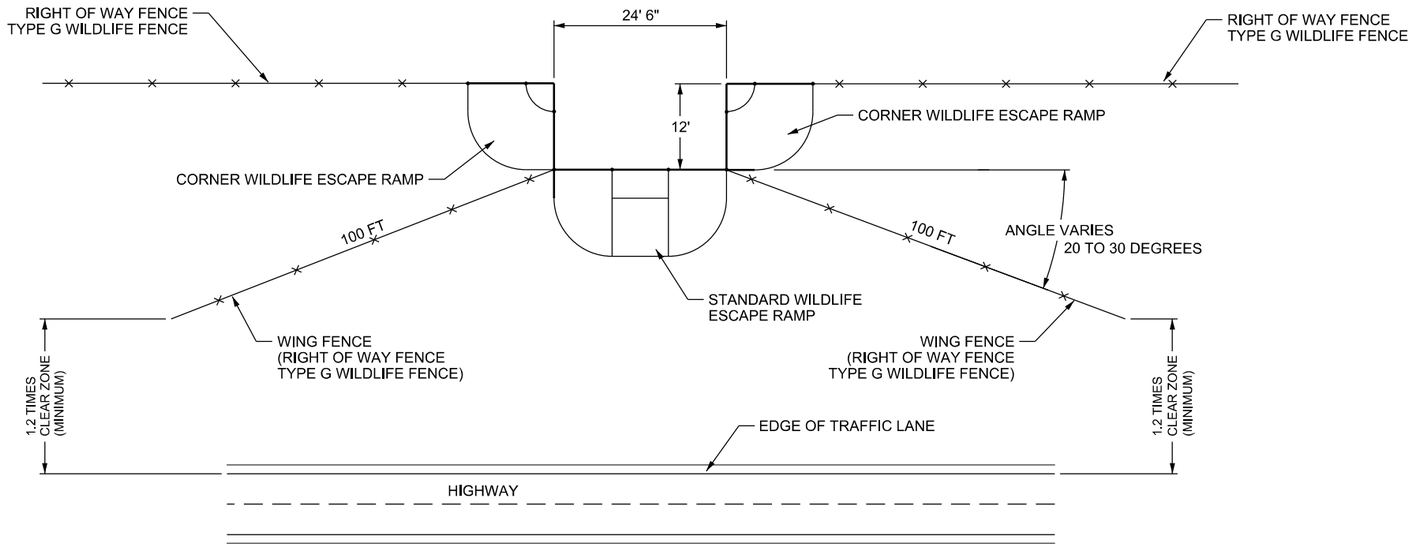
STANDARD DRAWING TITLE
STANDARD
WILDLIFE ESCAPE
RAMP DETAILS

STD. DWG. NO.
FG 4A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG04A.dgn
23-JUN-2020



ISOMETRIC VIEW



PLAN

NOTES:

1. MATCH POST TYPE OF WING FENCE (TYPE G WILDLIFE FENCE) IN COMBINATION WILDLIFE ESCAPE RAMP TO POST TYPE OF ADJACENT RIGHT OF WAY FENCE.
2. SEE STD DWG FG 1A, FG 1B, FG 2A, AND FG 2B FOR RIGHT OF WAY FENCE DETAILS.
3. SEE STD DWG FG 4A FOR STANDARD WILDLIFE ESCAPE RAMP DETAILS.
4. SEE STD DWG FG 4C FOR CORNER WILDLIFE ESCAPE RAMP DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

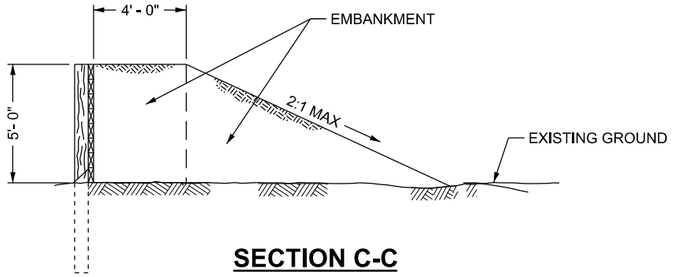
COMBINATION WILDLIFE ESCAPE RAMP DETAILS

STANDARD DRAWING TITLE

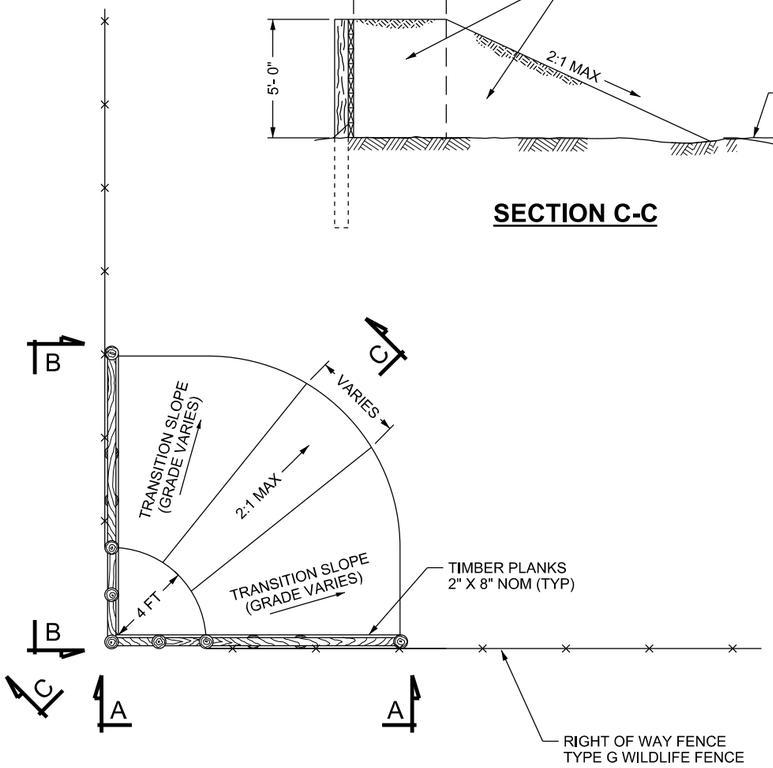
STD. DWG. NO.

FG 4B

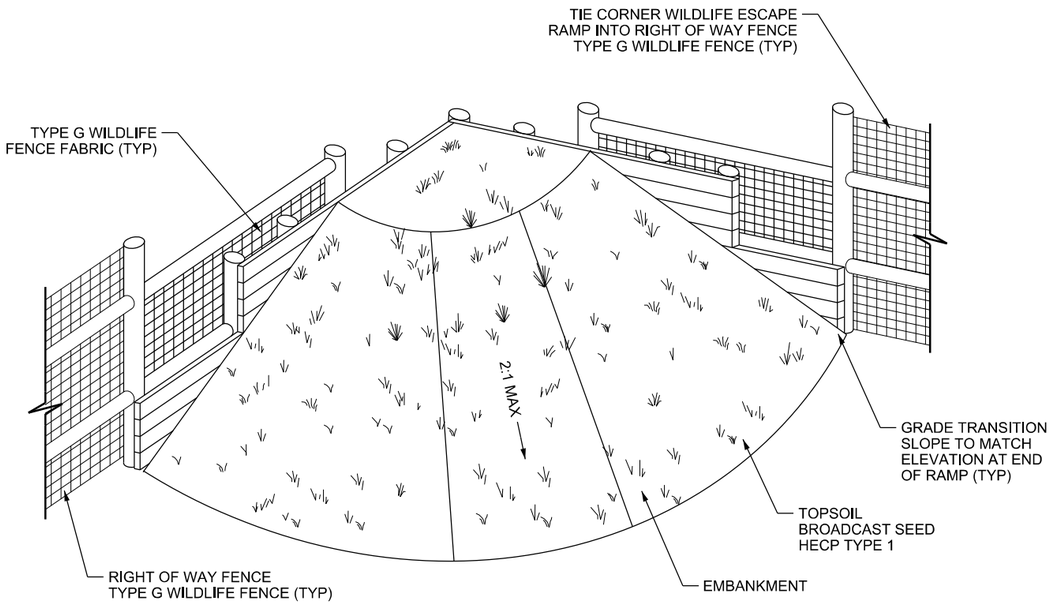
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG04B.dgn



SECTION C-C



PLAN



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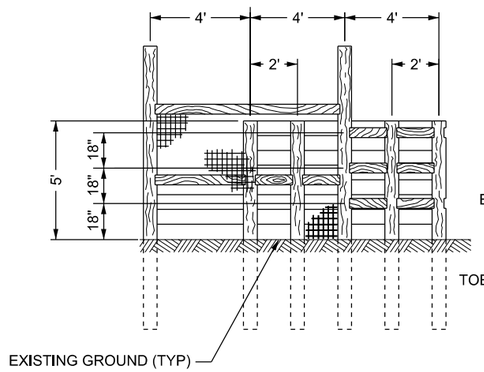
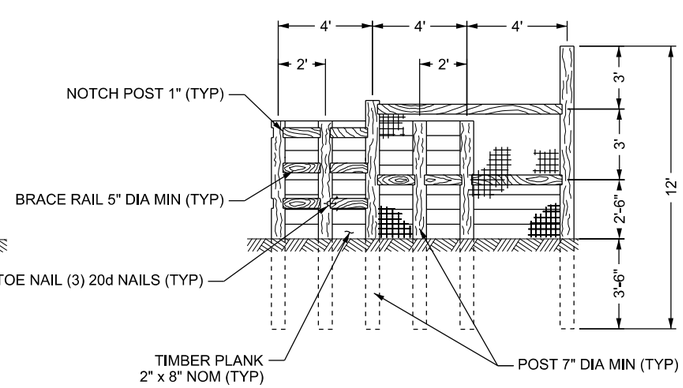
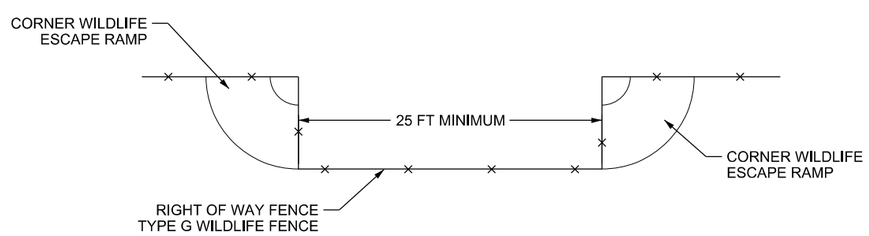


SECTION B-B



SECTION A-A



DUAL CORNER WILDLIFE ESCAPE RAMP

NOTES:

1. USE TIMBER PLANKS FOR ALL HORIZONTAL BACKING.
2. SEE STD DWG FG 4A FOR TIMBER PLANKS ANCHOR DETAIL.
3. SEE STD DWG FG 1A, FG 1B, FG 2A, AND FG 2B FOR RIGHT OF WAY FENCE DETAILS.
4. SECURE BRACE RAILS TO POSTS AT NOTCHED LOCATIONS BY DRIVING THREE 20d NAILS THROUGH THE RAILS AND INTO POSTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

AUGUST 2020
DATE

CORNER
WILDLIFE ESCAPE
RAMP DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
FG 4C

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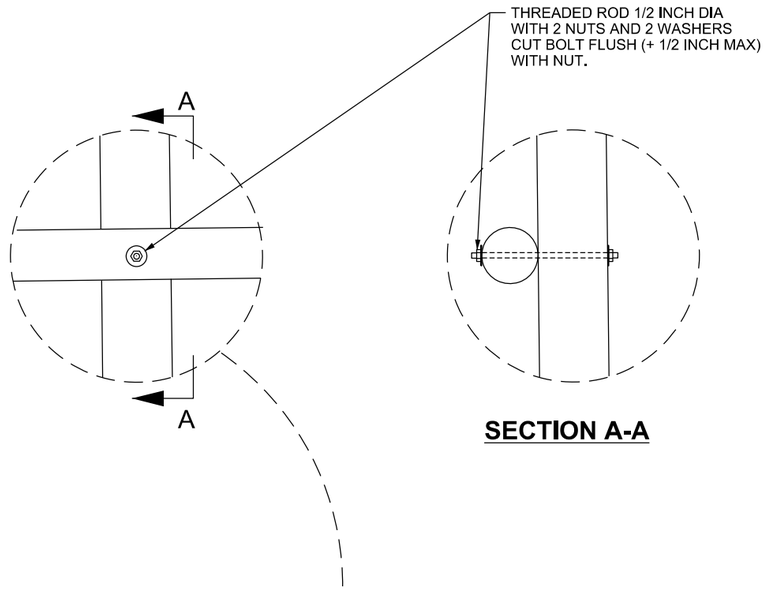
23-JUN-2020



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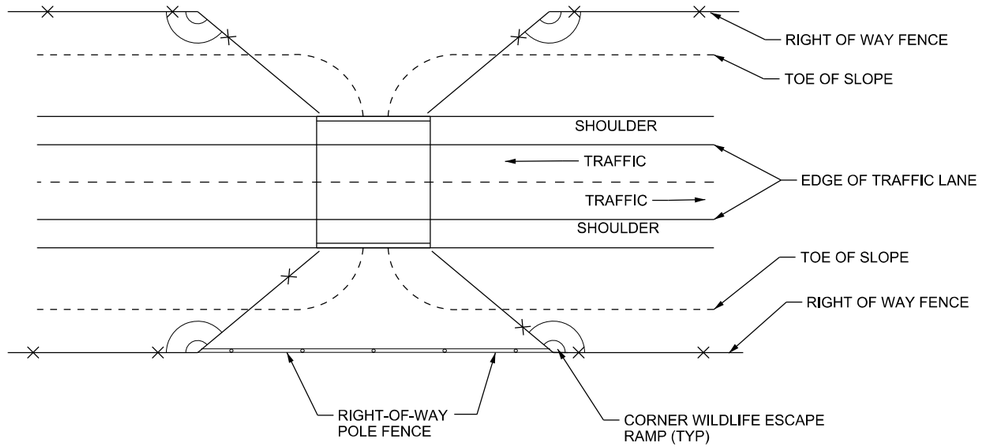
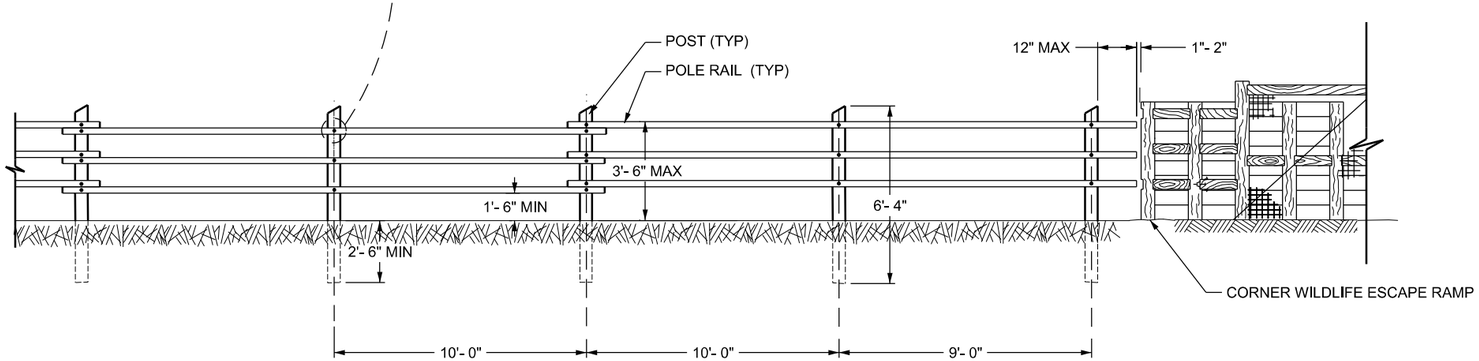


PLAN



SECTION

1. RIGHT-OF-WAY POLE FENCE IS TO BE USED TO KEEP LIVESTOCK OUT OF CULVERT OR BRIDGE. THIS FENCE SHOULD ONLY BE USED IN COOPERATION WITH THE LAND OR LIVESTOCK OWNER.
2. CONNECT RAILS TO POSTS WITH 1/2 INCH DIAMETER THREADED ROD. DRILL A 5/8 INCH DIAMETER HOLE THROUGH POST AND POLE.
3. EXTEND HORIZONTAL RAIL A MAXIMUM OF 12 INCH PAST END POST.
4. ALTERNATE RAILS TO ALLOW OVERLAP FOR ATTACHMENT TO POSTS.
5. TOP RAIL SHOULD BE INSTALLED NO MORE THAN 3 1/2 FT ABOVE GROUND.
6. BOTTOM RAIL SHOULD BE INSTALLED AT LEAST 1 1/2 FT ABOVE GROUND.
7. MIDDLE RAIL TO BE INSTALLED EVENLY BETWEEN BOTTOM AND TOP RAIL.
8. SEE STD DWG FG 4C FOR CORNER WILDLIFE ESCAPE RAMP DETAILS.

REVISIONS				
NO.	DATE	APPR.		REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

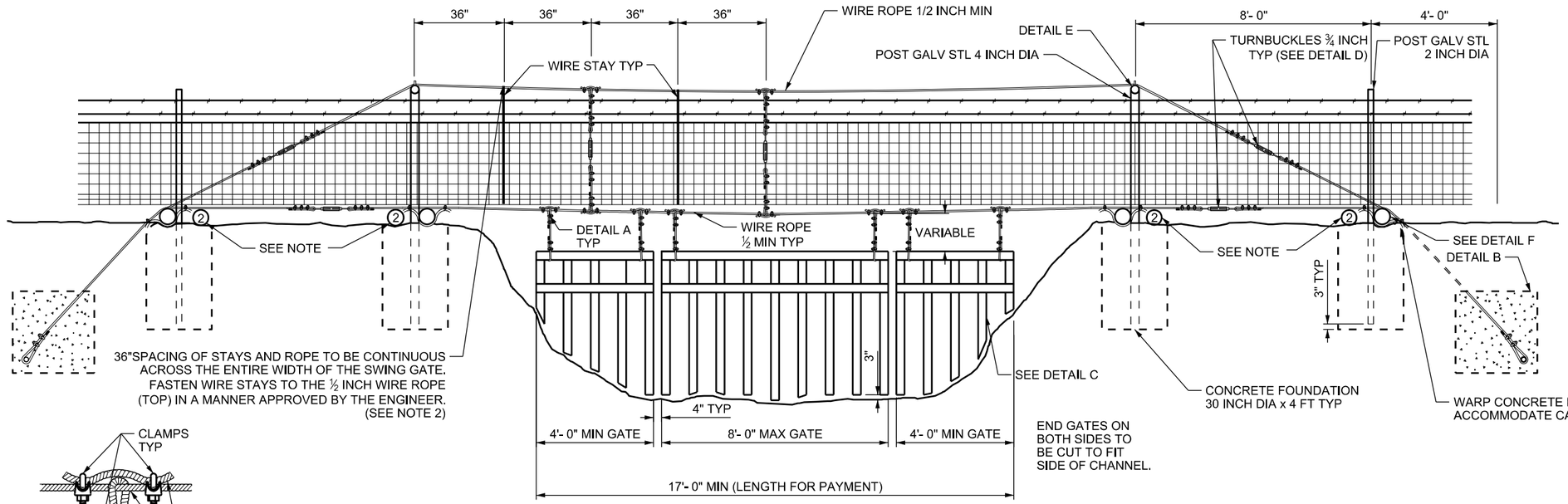
DEPUTY DIRECTOR

RIGHT OF WAY POLE FENCE DETAILS

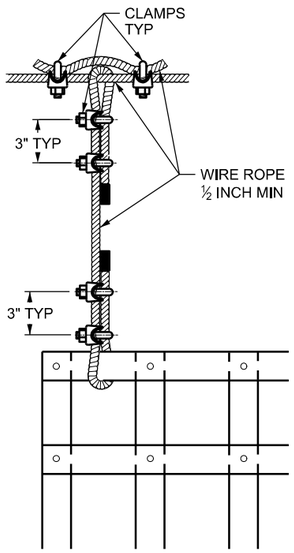
STANDARD DRAWING TITLE

STD. DWG. NO.
FG 4D

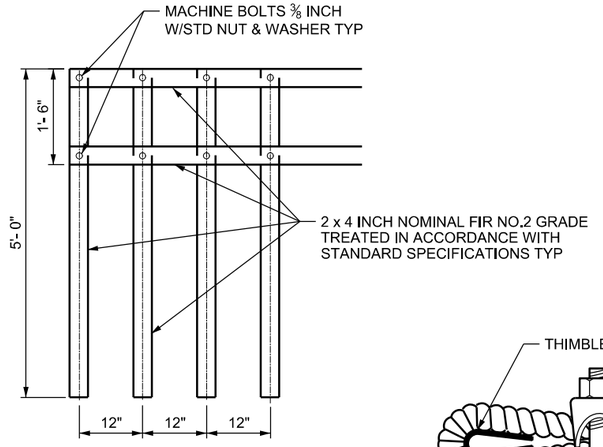
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG04D.dgn
23-JUN-2020



INSTALLATION DETAIL



DETAIL A



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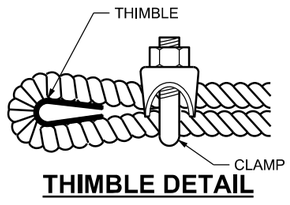
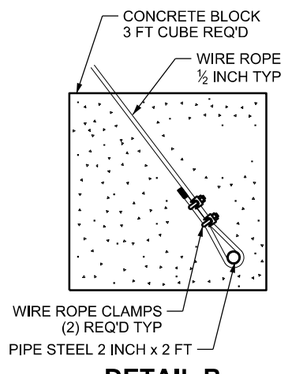


THIMBLE DETAIL



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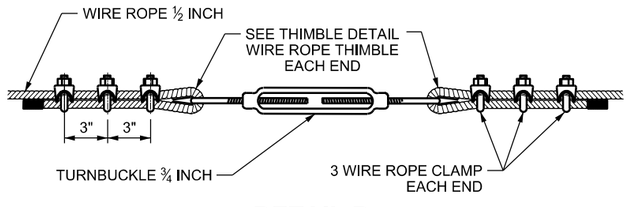

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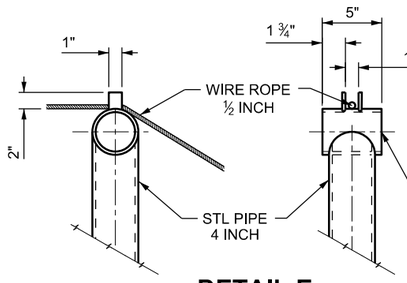

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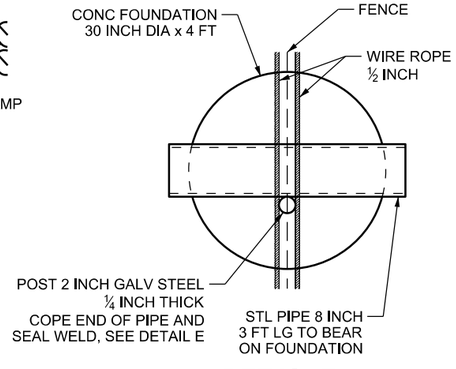

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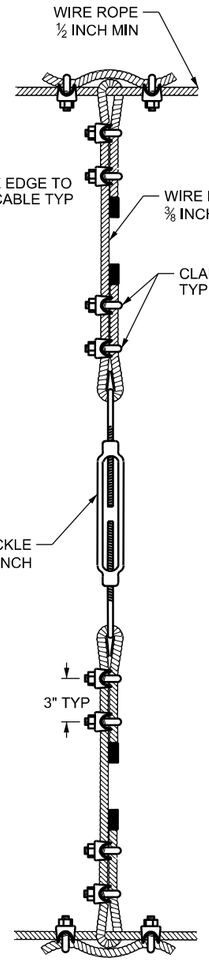


DETAIL G

NOTES:

1. INSTALL BEARING PIPES, CONCRETE BLOCKS AND TURN BUCKLES ON BOTH SIDES OF CHANNEL.
2. INSTALL WIRE ROPE ON THE UPSTREAM SIDE OF THE POSTS. USE ½ INCH DIA WIRE 6 x 12 INCH WITH A BREAKING STRENGTH OF 10,000 lb.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

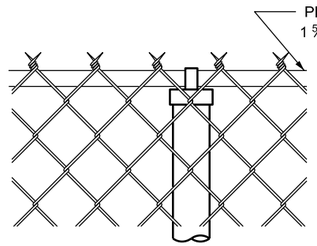
SWING GATES TYPE II FOR GATES WIDER THAN 17 FT

STANDARD DRAWING TITLE

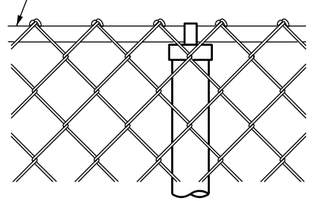
STD. DWG. NO.

FG 5

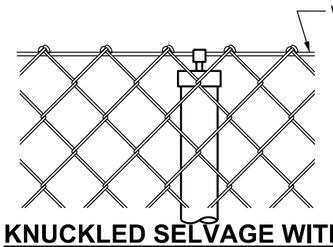
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG05.dgn
23-JUN-2020



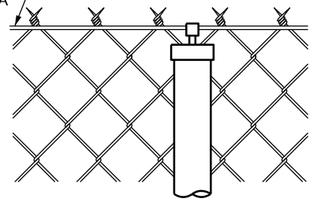
TWISTED & BARBED SELVAGE TYPE I



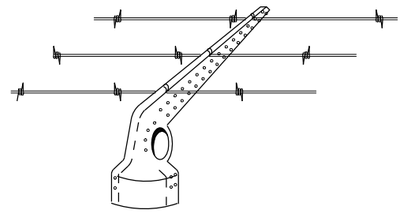
KNUCKLED SELVAGE TYPE II



KNUCKLED SELVAGE WITH TENSION WIRE TYPE III

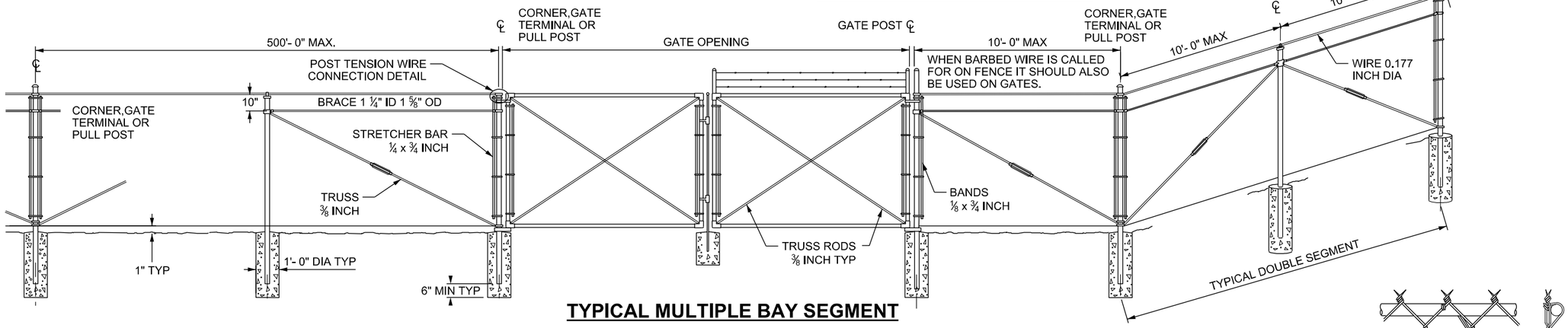


TWISTED & BARBED SELVAGE WITH TENSION WIRE TYPE IV



BARBED WIRE AND ARM

(WHEN REQUIRED)

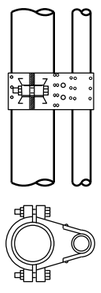


TYPICAL MULTIPLE BAY SEGMENT

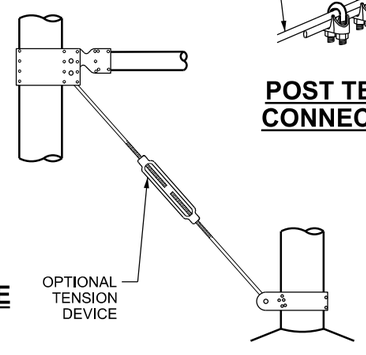
HEIGHT	GATE OPENING	GATE POST	GATE FRAME
UNDER 6 FT	SINGLE TO 6 FT OR DOUBLE TO 12 FT	2"	1"
	SINGLE OVER 6 TO 8 FT OR DOUBLE OVER 12 TO 16 FT	2½"	1½""
	SINGLE OVER 8 TO 12 FT OR DOUBLE TO 16 TO 24 FT	3½"	
6 FT AND OVER *	SINGLE TO 6 FT OR DOUBLE TO 12 FT	2½"	1½"
	SINGLE OVER 6 TO 13 FT OR DOUBLE OVER 12 TO 24 FT	3½"	
	SINGLE OVER 13 TO 18 FT OR DOUBLE OVER 24 TO 36 FT	6"	
	SINGLE OVER 18 FT OR DOUBLE OVER 36 FT	8"	

* GATES OVER 6 FT IN HEIGHT AND WIDER THAN 12 FT WILL REQUIRE (3) INDUSTRIAL PRESSED STEEL HINGES.

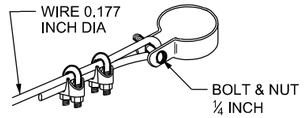
HEIGHT OF FABRIC	DEPTH OF POSTS	LENGTH OF END CORNER OR PULL POSTS	LENGTH OF LINE POSTS	SIZE OF POSTS							
				END, CORNER & PULL POSTS				LINE POST MIN.SIZE			
				NOM SIZE	OUTSIDE DIA	PIPE WEIGHT ASTM F 1083	PIPE WEIGHT ASTM F1043 GROUP IC	NOM SIZE	OUTSIDE DIA.	PIPE WEIGHT ASTM F 1083	PIPE WEIGHT ASTM F1043 GROUP IC
7 FT	3 FT	10 FT	9'- 8"	2 ½"	2.875"	5.80	4.64	2"	2.375"	3.65	3.11
6 FT	3 FT	9 FT	8'- 8"	2"	2.375"	3.65	3.11	1½"	1.900"	2.72	2.28
5 FT	3 FT	8 FT	7'- 8"	2"	2.375"	3.65	3.11	1½"	1.900"	2.72	2.23
4 FT	2 FT	6 FT	5'- 8"	2"	2.375"	3.65	3.11	1½"	1.900"	2.72	2.23
3 FT	2 FT	5 FT	4'- 8"	2"	2.375"	3.65	3.11	1½"	1.900"	2.72	2.23



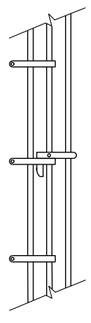
TOP GATE HINGE



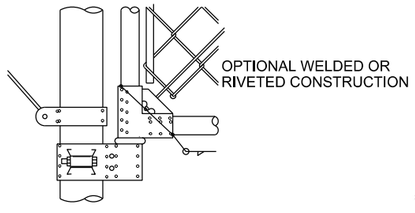
BRACE & TRUSS CONNECTIONS



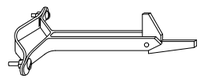
POST TENSION WIRE CONNECTION DETAIL



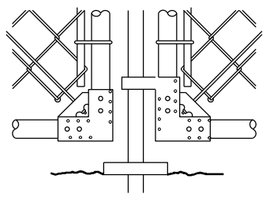
DROP ROD ASSY



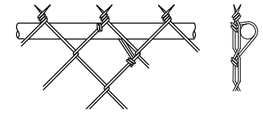
GATE HINGE DETAIL BOTTOM

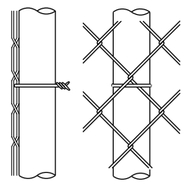


GATE HOLD BACK DETAIL



GATE STOP DETAIL





PIPE POST TIE

NOTES:

1. POSTS: USE ASTM F 1083 SCHEDULE 40 PIPE OR, ASTM F 1043 GROUP IC (HIGH STRENGTH) PIPE OF THE SIZE SHOWN IN THE CHART. WEIGHT IN LB/FT WITH TOLERANCE OF 10 PERCENT. OTHER TYPES OF POSTS WITH EQUAL OR GREATER SECTION MODULUS MAY BE USED IF APPROVED BY THE ENGINEER.
2. GALVANIZE SCHEDULE 40 PIPE ACCORDING TO ASTM F 1083.
3. COAT HIGH STRENGTH PIPE ACCORDING TO ASTM F 1043 GROUP IC. USE TYPE B COATINGS.
4. TRUSS RODS AND BRACES NOT REQUIRED ON FABRIC HEIGHTS LESS THAN 5 FT.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	6/28/18	CGW	POST SIZE TABLE: ASTM REF. ADDED AND C-SECTION DIM. REMOVED. NOTES REVISED.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

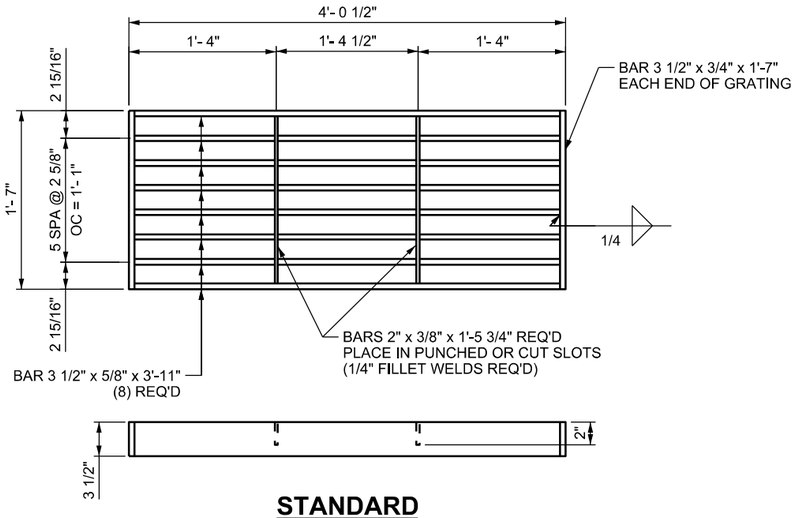
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CHAIN LINK FENCE

STANDARD DRAWING TITLE

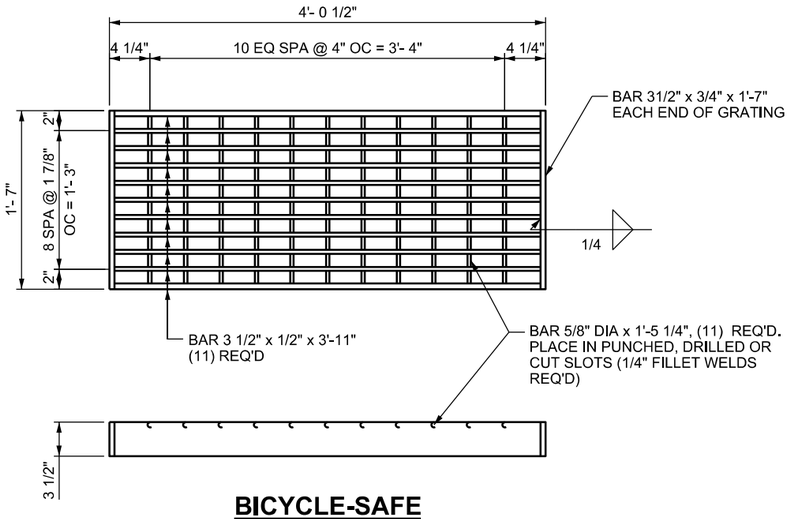
STD. DWG. NO.
FG 6

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\FG06.dgn
23-JUN-2020



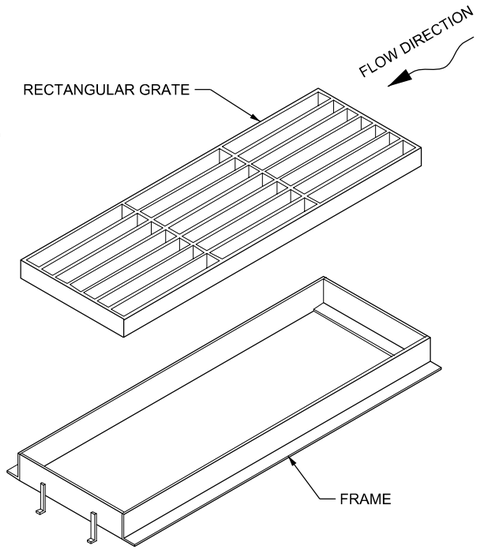
STANDARD

WEIGHT: 272 LB
OPEN AREA: 4.48 FT^2

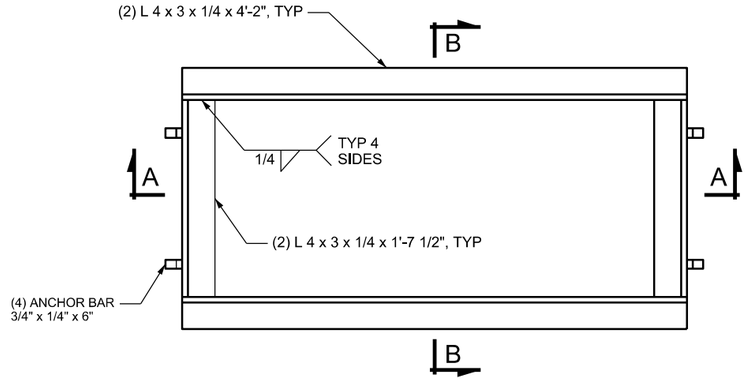


BICYCLE-SAFE

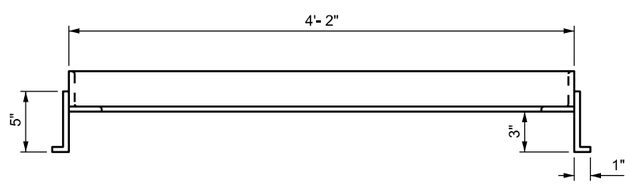
WEIGHT: 297 LB
OPEN AREA: 3.54 FT^2



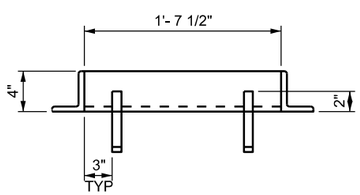
RECTANGULAR GRATE



PLAN



SECTION A-A



SECTION B-B

FRAME

WEIGHT: 68 LB

DESIGN DATA

HL-93 LOADING IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS.

STRUCTURAL STEEL: Fy = 36,000 psi

NOTES

1. FURNISH RECTANGULAR GRATE AND FRAME IN STRUCTURAL STEEL.
2. WELD ALL JOINTS WITH A 1/4 INCH FILLET WELD UNLESS NOTED OTHERWISE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

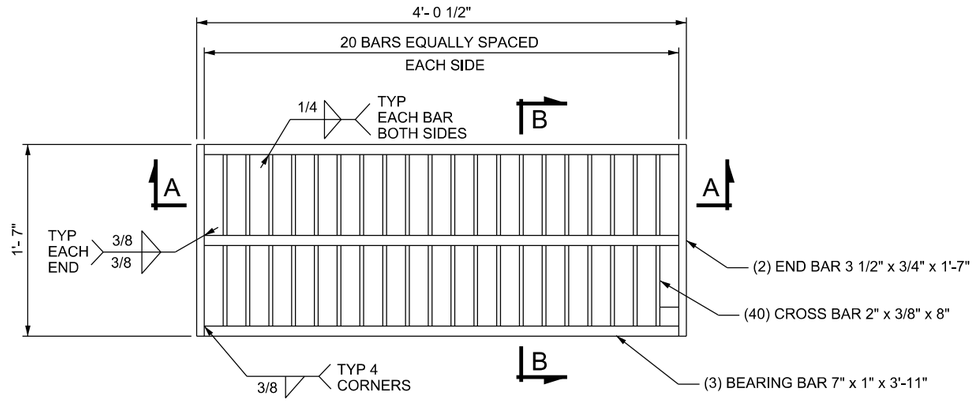
CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

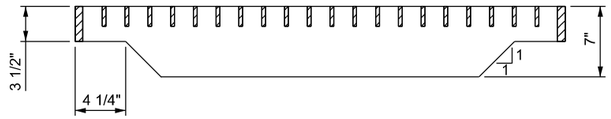
RECTANGULAR GRATE AND FRAME
STANDARD DRAWING TITLE

STD. DWG. NO.
GF 1

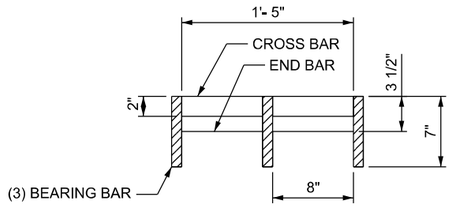
DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\GF01.dgn
23-JUN-2020



PLAN



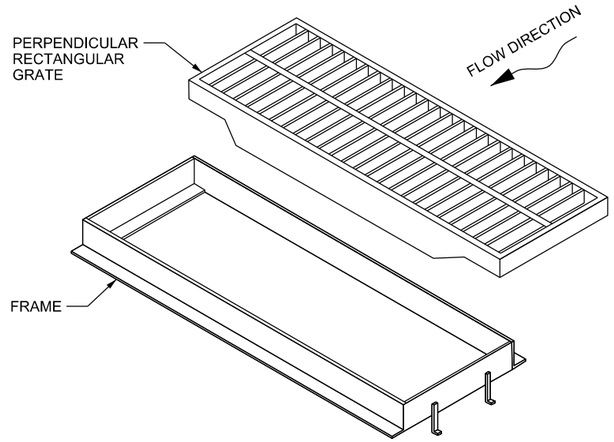
SECTION A-A

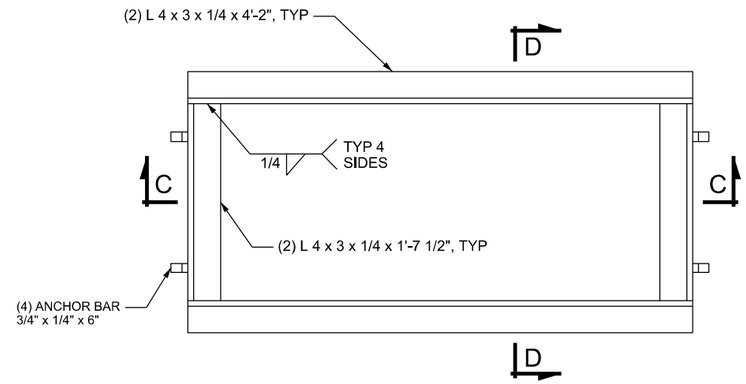


SECTION B-B

PERPENDICULAR RECTANGULAR GRATE

WEIGHT: 341 LB
OPEN AREA: 4.39 FT^2





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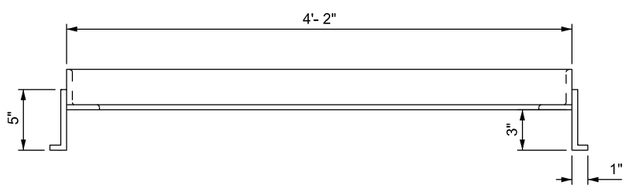
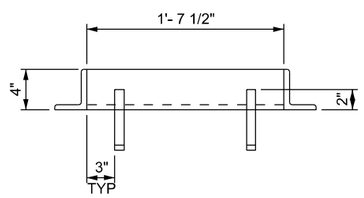


SECTION C-C



SECTION D-D

FRAME

WEIGHT: 68 LB

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

NOTES

1. FURNISH RECTANGULAR GRATE AND FRAME IN STRUCTURAL STEEL.
2. WELD ALL JOINTS WITH A 1/4 INCH FILLET WELD UNLESS NOTED OTHERWISE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/30/2018	JGE	REMOVED DESIGN INFORMATION FROM THE DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

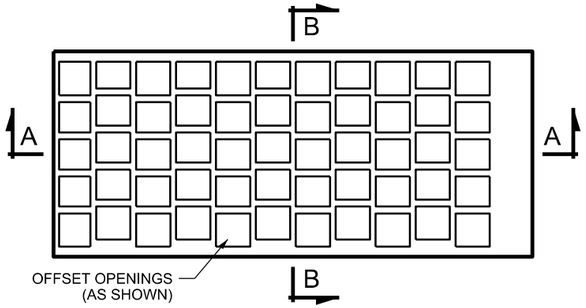
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

PERPENDICULAR RECTANGULAR GRATE AND FRAME

STANDARD DRAWING TITLE

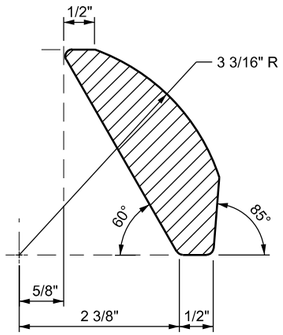
STD. DWG. NO.
GF 2

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG_EN_FG_GF)\GF02.dgn
23-JUN-2020

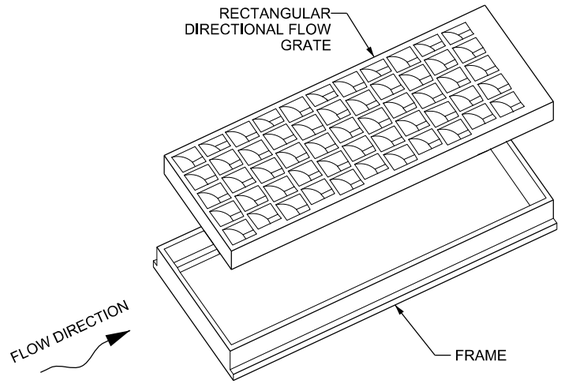


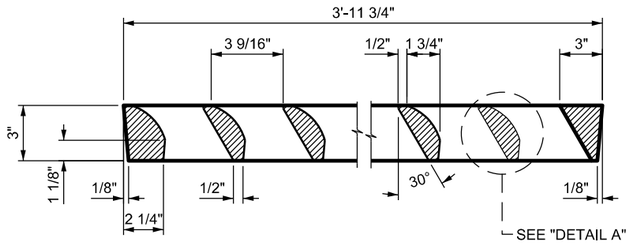
RECTANGULAR DIRECTIONAL FLOW GRATE

WEIGHT: 266 LB

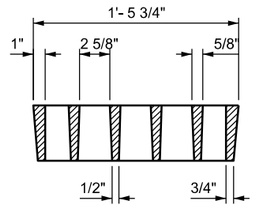


DETAIL A

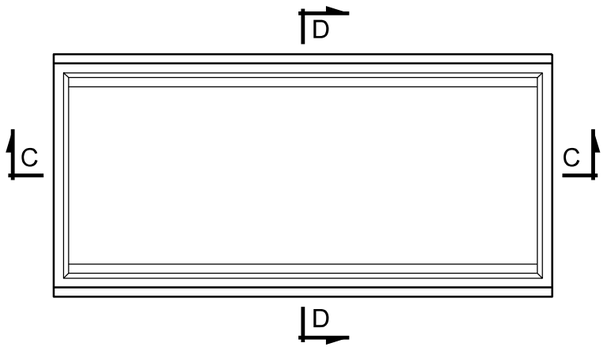




SECTION A-A

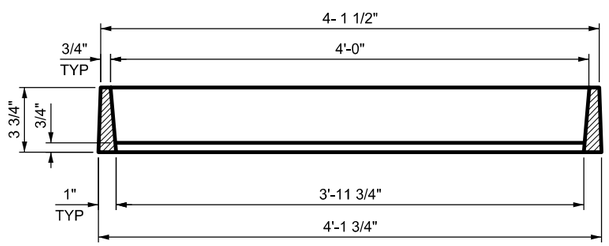


SECTION B-B

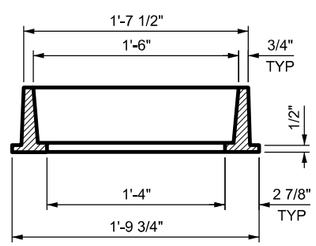


FRAME

WEIGHT: 160 LB



SECTION C-C



SECTION D-D

NOTES

1. FURNISH RECTANGULAR DIRECTIONAL FLOW GRATE AND FRAME IN EITHER GREY IRON OR DUCTILE IRON.
2. INSTALLATION REQUIRES SUPPORT UNDER LONGITUDINAL AXIS OF FRAME.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

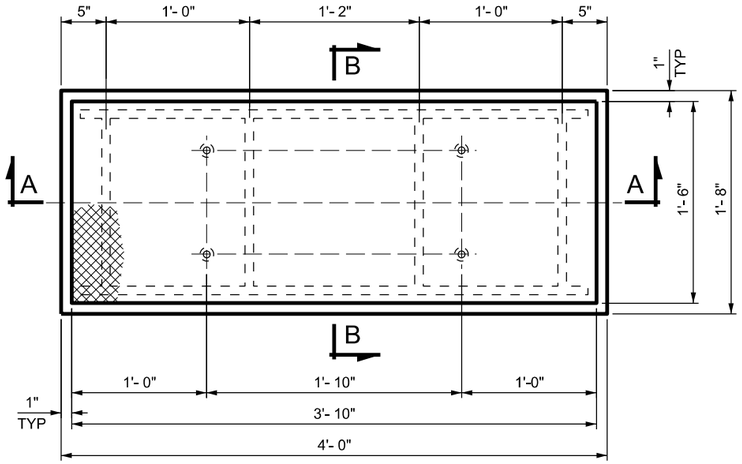
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

RECTANGULAR DIRECTIONAL FLOW GRATE AND FRAME

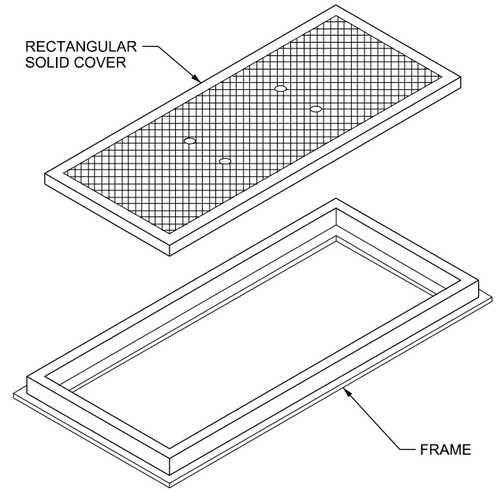
STANDARD DRAWING TITLE

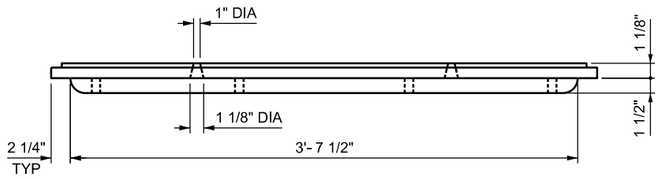
STD. DWG. NO.
GF 3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\GF03.dgn
23-JUN-2020

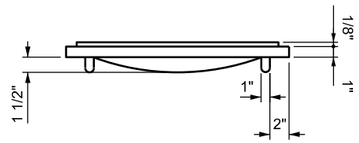


RECTANGULAR SOLID COVER

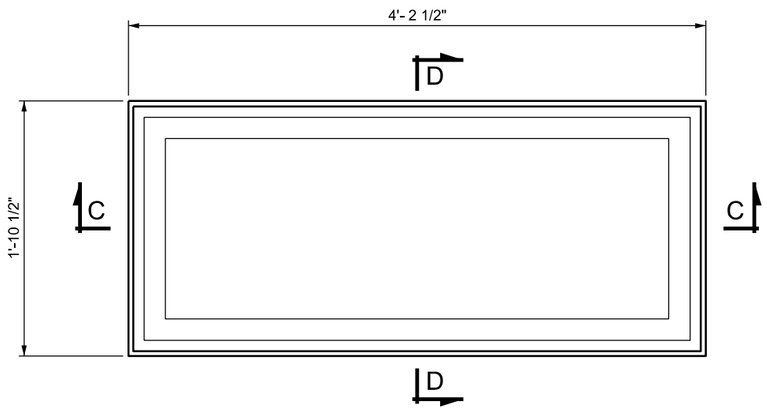




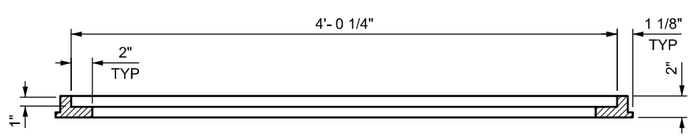
SECTION A-A



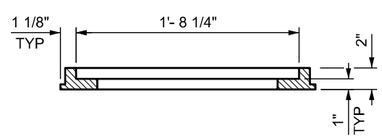
SECTION B-B



FRAME



SECTION C-C



SECTION D-D

NOTES

1. FURNISH RECTANGULAR SOLID COVER AND FRAME IN EITHER GREY IRON OR DUCTILE IRON.
2. INSTALLATION REQUIRES SUPPORT UNDER LONGITUDINAL AXIS OF FRAME.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

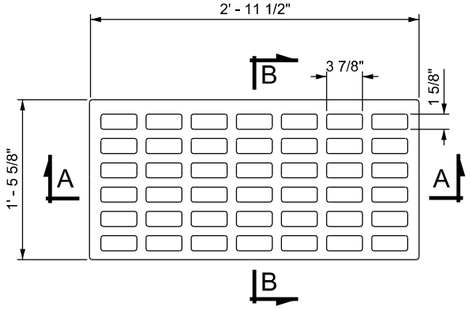
AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

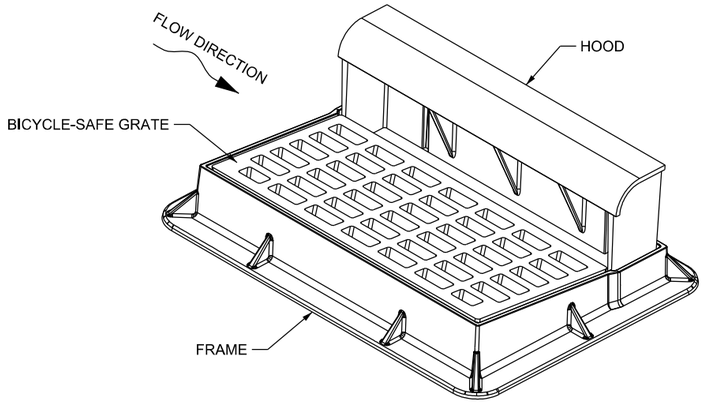
AUGUST 2020 — DATE
APPROVED
DEPUTY DIRECTOR

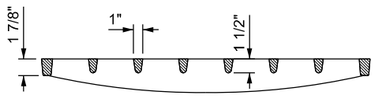
RECTANGULAR SOLID COVER AND FRAME
STANDARD DRAWING TITLE

STD. DWG. NO.
GF 4

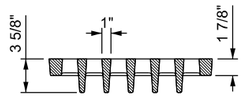
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\GF04.dgn
23-JUN-2020





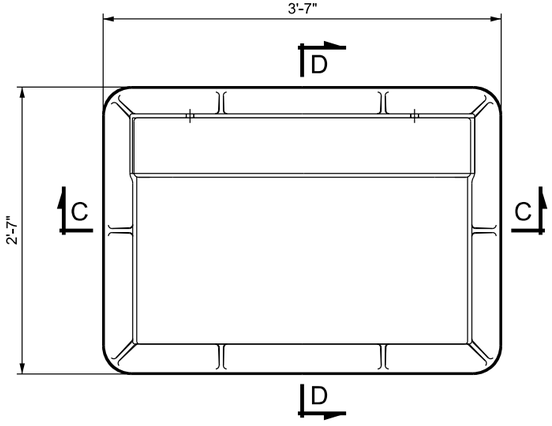


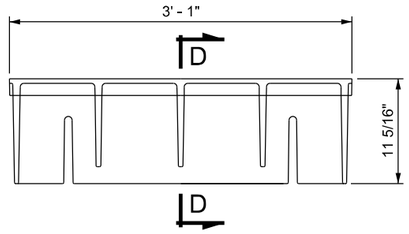
SECTION A-A



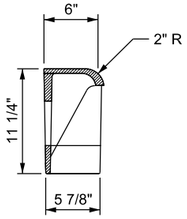
SECTION B-B

BICYCLE-SAFE GRATE



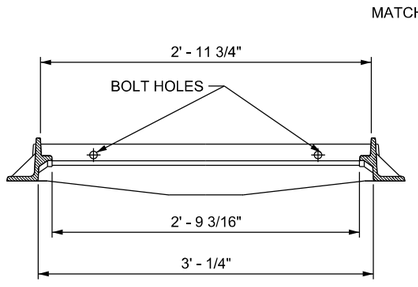


FRONT VIEW

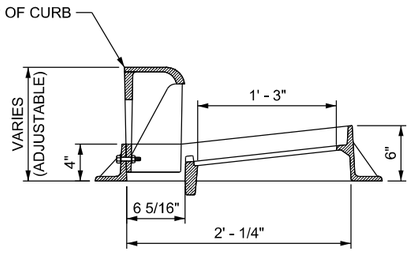


SECTION E-E

HOOD



SECTION C-C



SECTION D-D

FRAME

NOTES

1. FURNISH OPEN CURB INLET GRATE AND FRAME IN EITHER GREY IRON OR DUCTILE IRON.
2. DIMENSIONS OF THE GRATE AND FRAME MAY VARY DUE TO DIFFERENT MANUFACTURER'S CONFIGURATIONS.
3. DELIVER FRAME FULLY ASSEMBLED AND BOLTED TOGETHER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

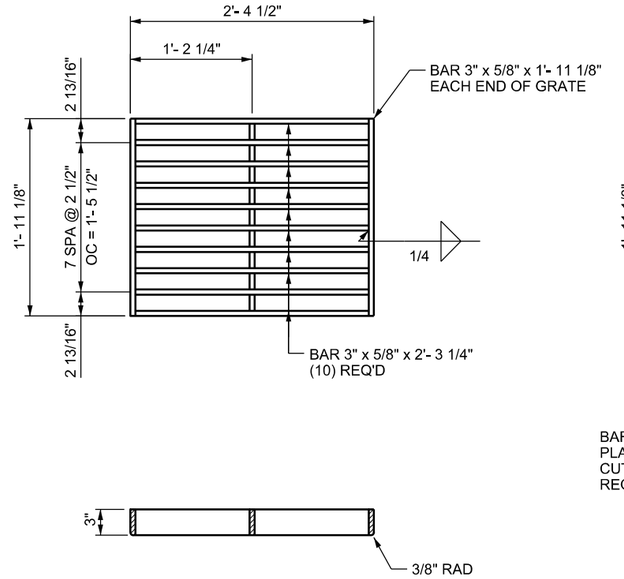
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

OPEN CURB INLET GRATE AND FRAME

STANDARD DRAWING TITLE

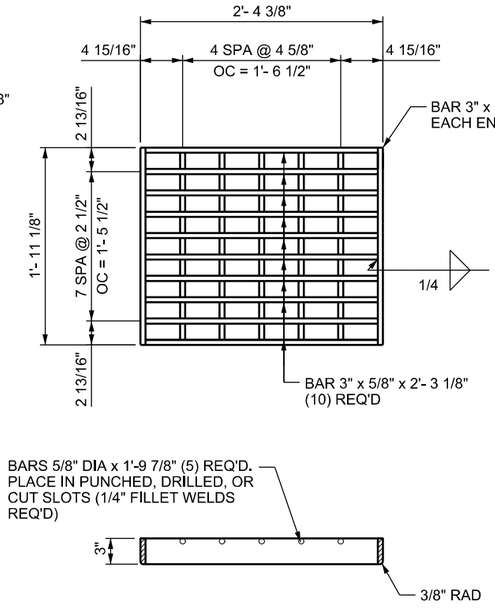
STD. DWG. NO.
GF 5

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\GF05.dgn
23-JUN-2020



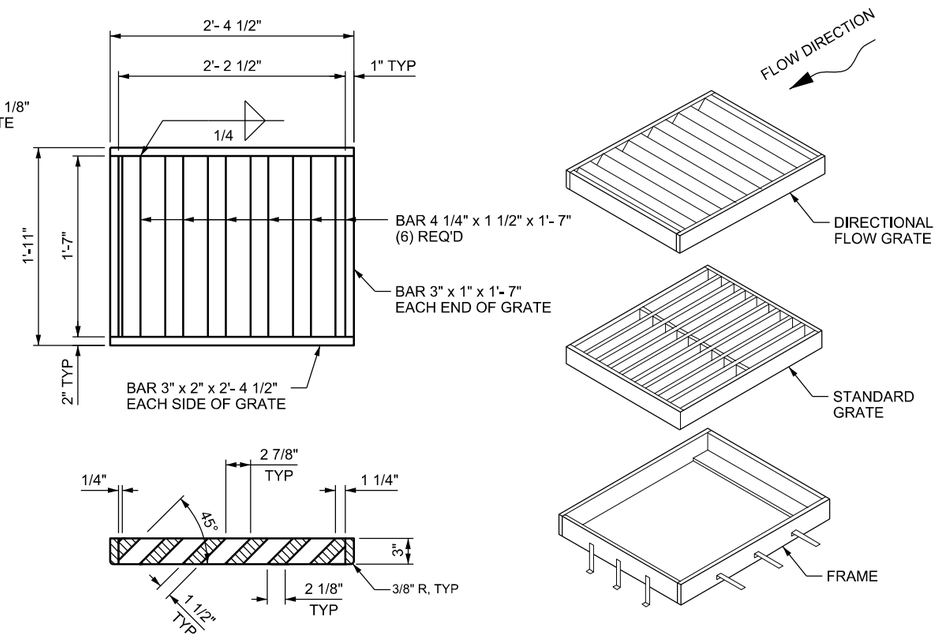
STANDARD

WEIGHT: 179 LB
OPEN AREA: 3.10 FT^2



BICYCLE-SAFE

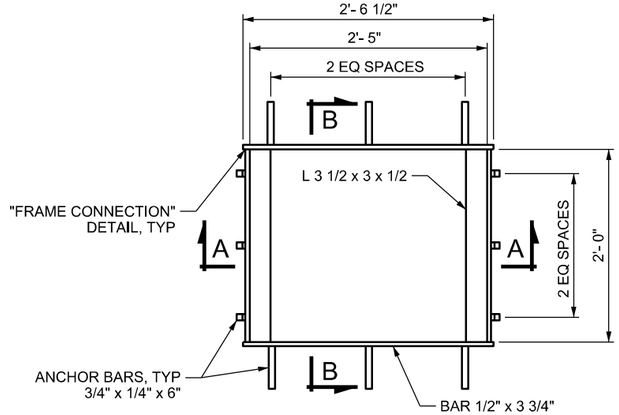
WEIGHT: 179 LB
OPEN AREA: 2.73 FT^2

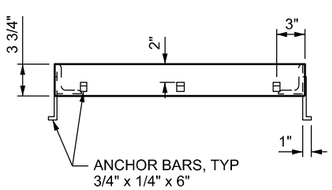


DIRECTIONAL FLOW

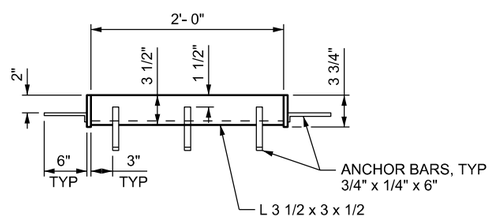
WEIGHT: 314 LB

2 FT X 2 FT GRATE





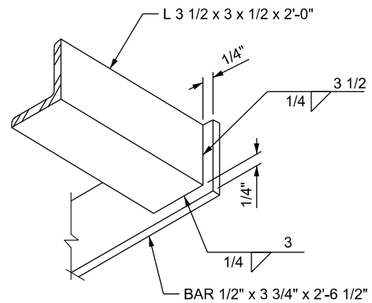
SECTION A-A



SECTION B-B

FRAME

77 LB



FRAME CONNECTION

DESIGN DATA

HL-93 IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL STEEL: Fy = 36,000 psi

NOTES

1. FURNISH RECTANGULAR GRATE AND FRAME IN STRUCTURAL STEEL.
2. WELD ALL JOINTS WITH A 1/4 INCH FILLET WELD UNLESS NOTED OTHERWISE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

AUGUST 2020
DATE

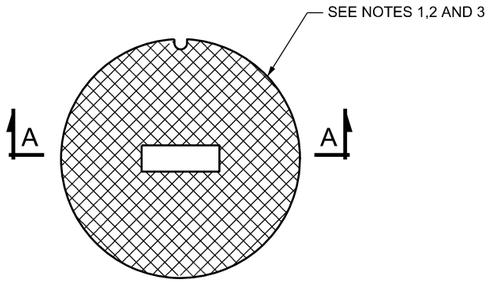
DEPUTY DIRECTOR

2 FT x 2 FT
GRATE AND FRAME

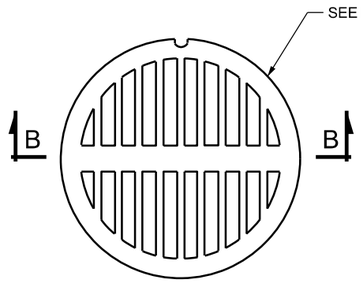
STANDARD DRAWING TITLE

STD. DWG. NO.
GF 6

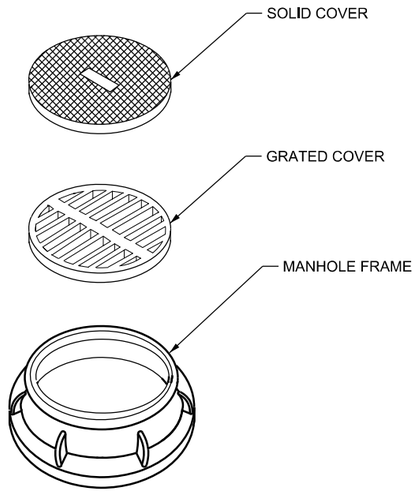
DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\GF06.dgn
23-JUN-2020

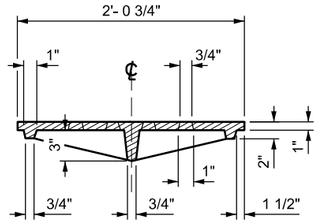


SOLID

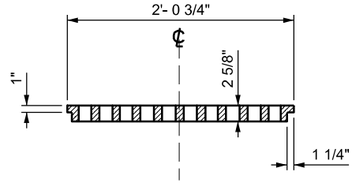


GRATED



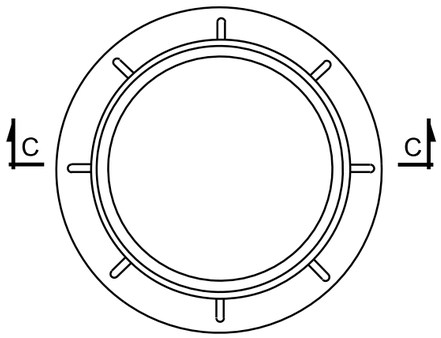


SECTION A-A

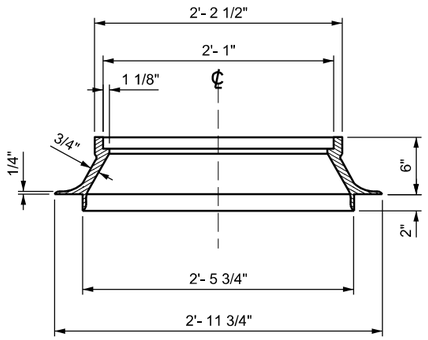


SECTION B-B

MANHOLE COVER



FRAME PLAN



SECTION C-C

NOTES

1. FURNISH MANHOLE COVER AND FRAME IN EITHER GREY IRON OR DUCTILE IRON.
2. CAST A NON-SLIP AND NON-TRIP SURFACE INTO THE SOLID COVER.
3. CAST THE TYPE OF UTILITY INTO THE SOLID COVER ("STORM DRAIN", "SEWER", "WATER", FOR EXAMPLE)
4. DIMENSIONS OF THE GRATE OPENINGS MAY VARY DUE TO DIFFERENT MANUFACTURER'S CONFIGURATIONS.
5. ESTIMATED WEIGHT OF SOLID COVER AND FRAME 402 LB.
6. ESTIMATED WEIGHT OF GRATED COVER AND FRAME 385 LB.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	8/30/2018	JGE	CORRECTED LEADER NOTE REFERENCES.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

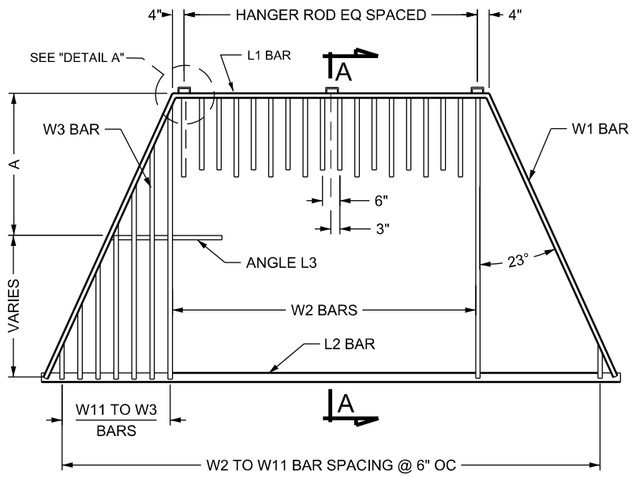
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

MANHOLE COVER AND FRAME

STANDARD DRAWING TITLE

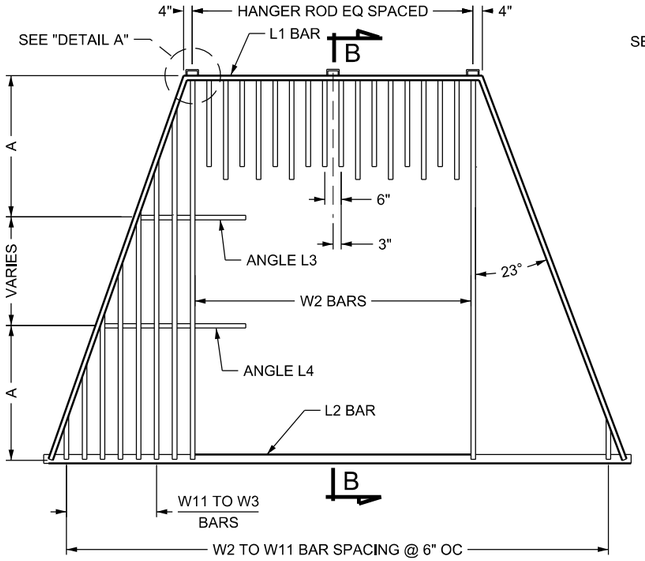
STD. DWG. NO.
GF 7

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF)\GF07.dgn
23-JUN-2020



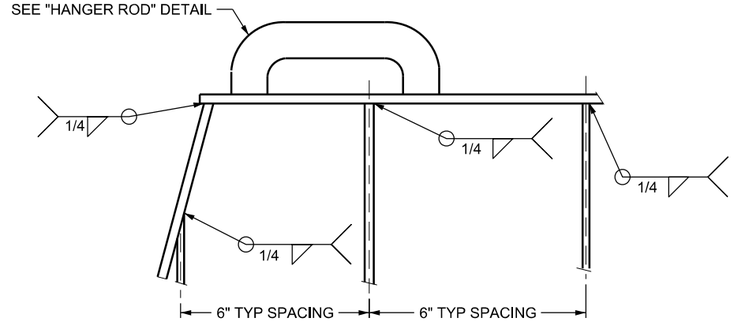
STEEL GRATING

SEE STD DWG GF 11 & GF 12 FOR LINES 1 THRU 48

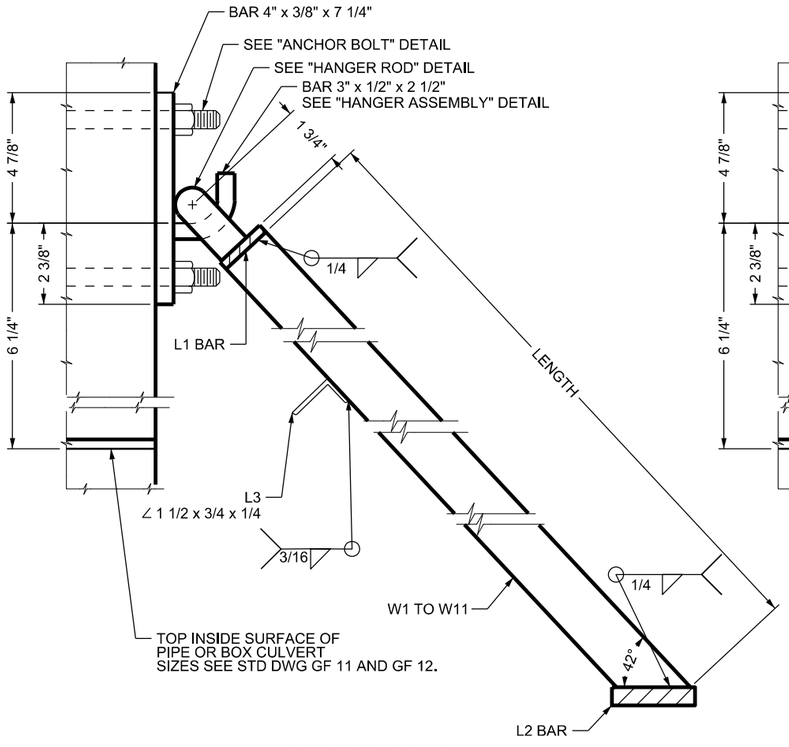


STEEL GRATING

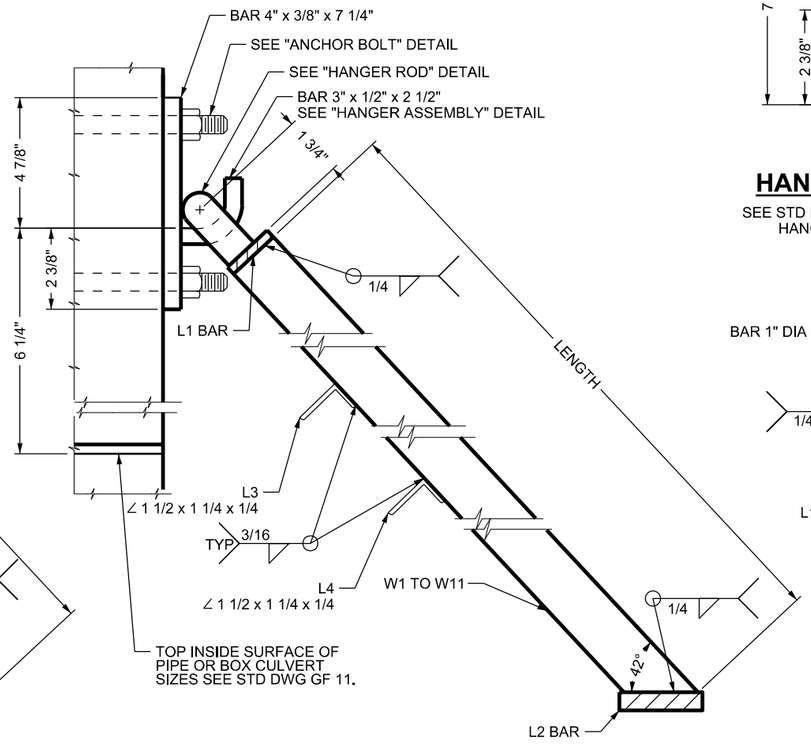
SEE STD DWG GF 12 FOR LINES 48 THRU 90



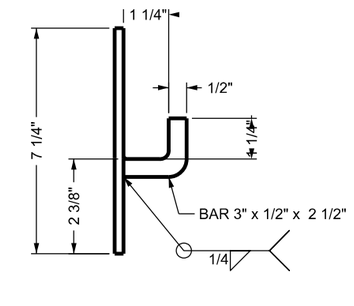
DETAIL A



SECTION A-A

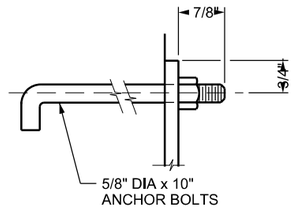


SECTION B-B



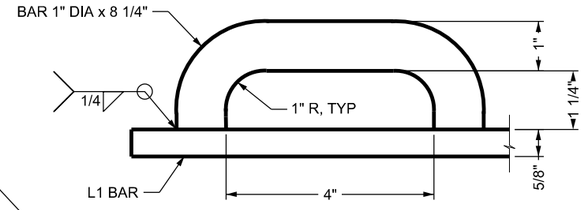
HANGER ASSEMBLY

SEE STD DWG GF 11 FOR "ALTERNATE HANGER ASSEMBLY" DETAIL



ANCHOR BOLT

TWO ANCHOR BOLTS PER HANGER (WEIGHT FOR BOLT & NUT 0.97 LB)



HANGER ROD

SEE STD DWG GF 11 FOR "ALTERNATE HANGER ROD" DETAIL (WEIGHT OF HANGER RODS 1.84 LB EACH)

DESIGN DATA

STRUCTURAL STEEL: Fy = 36,000 psi

NO.	DATE	APPR.	REVISIONS	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR — AUGUST 2020 DATE

STANDARD TRASH RACKS 90 DEGREE CROSSING ANGLE

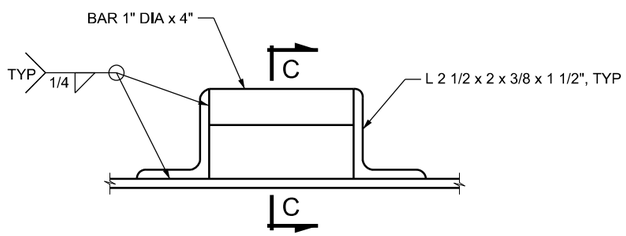
STANDARD DRAWING TITLE

STD. DWG. NO.

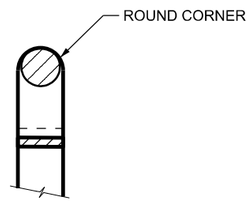
GF 8A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF)\GF08A.dgn
23-JUN-2020

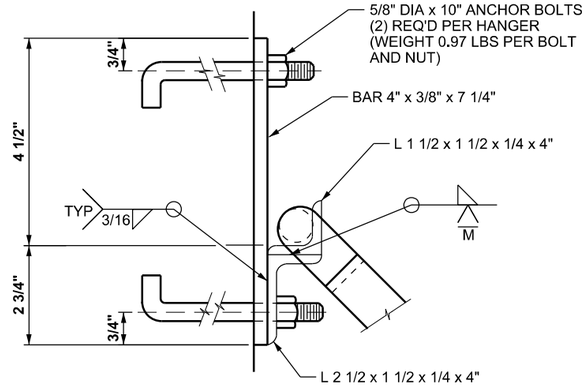
TO BE USED FOR (NOM.SIZE)								TRANSVERSE BARS									MAIN BARS															
								1- EACH REQUIRED									2- EACH			2-EACH REQUIRED									W1 TO W11		NO. OF HANGER ASSEMBLY AND HANGER ROD	WEIGHT OF STRUCT STL
								L1			L2			L3	L4		W1	W2		W3	W4	W5	W6	W7	W8	W9	W10	W11				
LINE	BOX CULVERTS	CORRUGATED METAL PIPES	CORRUGATED PIPE ARCHES	CONCRETE PIPE	MULTI-PLATE ELLIPSES	MULTI-PLATE PIPE ARCHES	A	LENGTH	THICK	WIDTH	LENGTH	THICK	WIDTH	LENGTH	LENGTH		LENGTH	LENGTH	NO	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	THICK	WIDTH		
1		18"	29" x 18"	18"			1'- 5"	1'- 5"	¼"	1 ¼"	3'- 11 ¾"	½"	1 ⅝"	2'- 8"	0		3'- 2 ¾"	2'- 11 ⅝"	2	2'- 10 ⅛"	1'- 8 ⅛"	0'- 6 ⅛"								¼"	1 ¼"	2	55.8
2							1'- 5"	2'- 4"			4'- 10 ⅝"			3'- 7"			3'- 2 ¾"	2'- 11 ⅝"	4	2'- 9"	1'- 7"	0'- 5"										67.5
3		21"		21"			1'- 7"	1'- 8"			4'- 6 ½"			3'- 1"			3'- 7 ⅛"	3'- 4 ⅛"	4	2'- 4 ¼"	1'- 2 ⅛"											64.5
4		24"		24"			1'- 10"	1'- 11"			5'- 1 ¼"			3'- 6"			4'- 0 ⅛"	3'- 8 ⅝"	4	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"										74.5
5			36" x 22"				1'- 10"	2'- 11"			5'- 10 ¾"			4'- 6"			3'- 9 ¼"	3'- 5 ⅜"	6	2'- 9 ¼"	1'- 7 ¼"	0'- 5 ¼"										84.4
6				27"			2'- 0"	2'- 2"			5'- 8 ⅛"			3'- 11"			4'- 5 ½"	4'- 1 ⅛"	4	3'- 8 ¼"	2'- 6 ¼"	1'- 4 ¼"										84.4
7			43" x 27"				2'- 0"	3'- 6"			7'- 0 ⅛"			5'- 3"			4'- 5 ½"	4'- 1 ⅛"	6	4'- 0 ⅛"	2'- 10 ⅞"	1'- 8 ⅜"	0'- 6 ⅛"									105.7
8			50" x 31"				2'- 3"	4'- 1"			8'- 0 ⅜"			6'- 0"			5'- 0"	4'- 7 ¼"	8	4'- 1"	2'- 11"	1'- 9"	0'- 7"										125.9
9	24" x 24"						1'- 10"	1'- 11"			5'- 1 ⅜"			3'- 6"			4'- 0 ⅛"	3'- 8 ⅜"	4	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"										74.5
10		30"		30"			2'- 2"	2'- 5"			6'- 3"			4'- 4"			4'- 10 ⅜"	4'- 5 ⅜"	4	4'- 4 ¼"	3'- 2 ¼"	2'- 0 ¼"	0'- 10 ¼"										96.2
11	36" x 24"						1'- 10"	2'- 11"			6'- 1 ⅜"			4'- 6"			4'- 0 ½"	3'- 8 ⅜"	6	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"										89.0
12	48" x 24"						1'- 10"	3'- 11"			7'- 1 ⅜"			5'- 6"			4'- 0 ½"	3'- 8 ⅜"	8	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"										103.6
13	60" x 24"						1'- 10"	4'- 11"			8'- 1 ⅜"			6'- 6"			4'- 0 ½"	3'- 8 ⅜"	10	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"										118.1
14	72" x 24"						1'- 10"	5'- 11"			9'- 1 ⅜"			7'- 6"			4'- 0 ½"	3'- 8 ⅜"	12	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"									2	132.7
15	84" x 24"						1'- 10"	6'- 11"			10'- 1 ⅜"			8'- 6"			4'- 0 ½"	3'- 8 ⅜"	14	3'- 0 ¼"	1'- 10 ¼"	0'- 8 ¼"									3	153.1
16	96" x 24"						1'- 10"	7'- 11"			11'- 1 ¾"			9'- 6"			4'- 0 ½"	3'- 8 ⅜"	16	3'- 0 ¼"	1'- 10 ½"	0'- 8 ¼"									3	167.6
17				33"			2'- 5"	2'- 8"	¼"		6'- 9 ⅛"			4'- 9"			5'- 3 ¼"	4'- 10 ⅛"	6	3'- 10 ¼"	2'- 8 ¼"	1'- 6 ¼"									3	113.0
18		36"		36"			2'- 7"	2'- 11"	⅜"		7'- 4 ½"			5'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	6	4'- 5 ⅞"	3'- 3 ⅛"	2'- 1 ⅞"	0'- 11 ⅛"									2	121.4
19			58" x 36"				2'- 7"	4'- 9"			9'- 2 ½"			7'- 0"			5'- 7 ⅞"	5'- 2 ⅜"	10	4'- 3 ⅝"	3'- 1 ⅜"	1'- 11 ⅝"	0'- 9 ⅛"										155.4
20	36" x 36"						2'- 7"	2'- 11"			7'- 4 ½"			5'- 2"			5'- 7 ⅞"	5'- 6 ½"	6	4'- 5 ⅞"	3'- 3 ½"	2'- 1 ⅞"	0'- 11 ⅛"										121.4
21				39"			2'- 9"	3'- 2"			7'- 11 ⅜"			5'- 7"			6'- 0 ¾"	5'- 11 ⅜"	6	5'- 2"	4'- 0"	2'- 10"	1'- 8"	0'-6"										135.0
22		42"		42"			2'- 11"	3'- 5"			8'- 6 ¼"			5'- 11"			6'- 5 ½"	5'- 2 ⅜"	6	5'- 9 ⅞"	4'- 7 ½"	3'- 5 ⅝"	2'- 3 ½"	1'-1 ⅛"										148.5
23	48" x 36"						2'- 7"	3'- 11"			8'- 4 ½"			6'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	8	4'- 5 ⅞"	3'- 3 ⅛"	2'- 1 ⅞"	0'- 11 ⅛"										139.8
24	60" x 36"						2'- 7"	4'- 11"			9'- 4 ½"			7'- 2"			5'- 7 ⅞"	5'- 8 ⅜"	10	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅛"										158.2
25			65" x 40"				2'- 10"	5'- 4"			10'- 2 ¾"			7'- 9"			6'- 2 ⅜"	5'- 2 ⅜"	10	5'- 5 ¾"	4'- 3 ¼"	3'- 1 ¾"	1'- 11 ¾"	0'-9 ¾"									2	180.1
26	72" x 36"						2'- 7"	5'- 11"			10'- 4 ½"			8'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	12	4'- 6"	3'- 4"	2'- 2"	1'- 0"									3	182.5
27			72" x 44"				3'- 1"	5'- 11"			11'- 2 ⅞"			8'- 7"			6'- 8 ⅜"	5'- 2 ⅜"	12	5'- 5 ⅞"	4'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"	0'-9 ⅞"									4	212.4
28	84" x 36"						2'- 7"	6'- 11"			11'- 4 ½"			9'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	14	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"										200.8
29	96" x 36"						2'- 7"	7'- 11"			12'- 4 ½"			10'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	16	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"										219.3
30	108" x 36"						2'- 7"	8'- 11"			13'- 4 ½"			11'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	18	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"										237.7
31	120" x 36"						2'- 7"	9'- 11"			14'- 4 ½"			12'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	20	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"									3	258.4
32	132" x 36"						2'- 7"	10'- 11"			15'- 4 ½"			13'- 2			5'- 7 ⅞"	5'- 2 ⅜"	22	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"									4	280.3
33	144" x 36"						2'- 7"	11'- 11"	⅜"	1 ¼"	16'- 4 ½"		1 ⅝"	14'- 2"			5'- 7 ⅞"	5'- 2 ⅜"	24	4'- 5 ⅞"	3'- 3 ⅞"	2'- 1 ⅞"	0'- 11 ⅞"									4	298.7
34		48"		48"			3'- 4"	3'- 11"	¼"	1 ½"	9'- 8 ⅛"		2"	6'- 10"			7'- 3 ⅜"	6'- 8 ¾"	8	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ½"	2'- 6 ⅜"	1'- 4 ⅜"									4	196.0
35	48" x 48"						3'- 4"	3'- 11"			9'- 8 ½"			6'- 10"			7'- 3 ⅜"	6'- 8 ¾"	8	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ½"	2'- 6 ⅜"	1'- 4 ⅜"								1 ¼"	5	201.8
36		54"		54"			3'- 8"	4'- 5"			10'- 9 ⅞"			7'- 7"			8'- 1 ⅜"	7'- 5 ¾"	8	7'- 4 ¼"	6'- 2 ¼"	3'- 0 ¼"	3'- 10 ¼"	2'- 8 ¼"	1'- 6 ¼"						1 ½"	2	246.3
37	60" x 48"						3'- 4"	4'- 11"			10'- 8 ⅛"			7'- 10"			7'- 3 ⅜"	6'- 8 ¾"	10	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ½"	2'- 6 ⅜"	1'- 4 ⅜"								1 ¼"	2	206.6
38	72" x 48"							5'- 11"			11'- 8 ½"			8'- 10"					12													2	228.7
39	84" x 48"							6'- 11"			12'- 8 ½"			9'- 10"					14													2	250.9
40	96" x 48"							7'- 11"			13'- 8 ½"			10'- 10"					16													3	278.9
41	108" x 48"							8'- 11"			14'- 8 ½"			11'- 10"					18													3	301.1
42	120" x 48"							9'- 11"			15'- 8 ½"			12'- 10"					20													3	323.2
43	132" x 48"							10'- 11"			16'- 8 ½"			13'- 10"					22													4	351.2
44	144" x 48"						3'- 4"	11'- 11"	¼"	1 ½"	17'- 8 ½"	½"	2"	14'- 10"	0		7'- 3 ⅜"	6'- 8 ¾"	24	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ½"	2'- 6 ⅜"	1'- 4 ⅜"					¼"	1 ¼"	4	373.4



ALTERNATE HANGER ROD



SECTION C-C



ALTERNATE HANGER ASSEMBLY

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
STANDARD
TRASH RACKS

STD. DWG. NO.
GF 8B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF)\GF888.dgn
23-JUN-2020

TO BE USED FOR (NOM.SIZE)								TRANSVERSE BARS								MAIN BARS																	
								1- EACH REQUIRED								2- EACH			2-EACH REQUIRED													NO. OF HANGER ASSEMBLY AND HANGER ROD	WEIGHT OF STRUCT STEEL
								L1			L2			L3	L4	W1	W2		W3	W4	W5	W6	W7	W8	W9	W10	W11	W1 TO W11					
LINE	BOX CULVERTS	CORRUGATED METAL PIPES	CORRUGATED PIPE ARCHES	CONCRETE PIPE	MULTI-PLATE ELLIPSES	MULTI-PLATE PIPE ARCHES	A	LENGTH	THICK	WIDTH	LENGTH	THICK	WIDTH	LENGTH	LENGTH	LENGTH	LENGTH	NO	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	THICK	WIDTH			
45	156" x 48"						3'- 4"	12'- 11"	¼"	1 ½"	18'- 8 ⅛"	½"	2"	15'- 10"	0	7'- 3 ⅞"	6'- 8 ¾"	26	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ⅜"	2'- 6 ⅜"	1'- 4 ⅜"					¼"	1 ¼"	4	395.6
46	168" x 48"						3'- 4"	13'- 11"	↑	↑	19'- 8 ⅛"	↑	↑	16'- 10"	0	7'- 3 ⅞"	6'- 8 ¾"	28	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ⅜"	2'- 6 ⅜"	1'- 4 ⅜"					↑	1 ¼"	5	423.5
47	180" x 48"						3'- 4"	14'- 11"			20'- 8 ⅛"			17'- 10"	0	7'- 3 ⅞"	6'- 8 ¾"	30	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ⅜"	2'- 6 ⅜"	1'- 4 ⅜"						1 ¼"	5	445.7
48	192" x 48"						3'- 4"	15'- 11"			21'- 8 ⅛"			18'- 10"	0	7'- 3 ⅞"	6'- 8 ¾"	32	6'- 0 ⅜"	4'- 10 ⅜"	3'- 8 ⅜"	2'- 6 ⅜"	1'- 4 ⅜"						1 ¼"	5	467.9
49						73" x 55"	2'- 6"	6'- 0"			12'- 6 ¼"			8'- 2"	10'- 4 ½"	8'- 3 ⅜"	7'- 1 ¼"	12	7'- 0"	5'- 10"	4'- 8"	3'- 6"	2'- 4"	1'- 2"					1 ½"	6	339.1
50						76" x 57"	2'- 8"	6'- 3"	¼"		12'- 11 ⅞"			8'- 6 ½"	10'- 8 ½"	8'- 6 ⅜"	7'- 10 ¼"	12	7'- 8 ½"	6'- 4 ½"	5'- 2 ⅛"	4'- 0 ½"	2'- 10 ½"	1'- 8 ½"	0'- 6 ½"				↑		6	357.5
51		60"		60"			2'- 8"	4'- 11"	⅜"		11'- 11 ½"			7'- 2 ½"	9'- 8"	8'- 11 ⅛"	8'- 2 ½"	10	7'- 6"	6'- 4"	5'- 2"	4'- 0"	2'- 10"	1'- 8"	0'- 6"						2	310.7
52					56" x 62"		2'- 9"	4'- 7"			11'- 10 ½"			6'- 11 ½"	9'- 6"	9'- 2 ½"	8'- 5 ⅛"	10	7'- 4 ⅜"	6'- 2 ⅜"	5'- 0 ⅜"	3'- 10 ⅜"	2'- 8 ⅜"	1'- 6 ⅜"						2	309.3
53						81" x 59"	2'- 8"	5'- 8"			13'- 7 ⅜"			8'- 11 ½"	11'- 4"	8'- 9 ¾"	8'- 1 ⅛"	14	7'- 1 ⅛"	5'- 11 ⅛"	4'- 9 ⅛"	3'- 7 ⅛"	2'- 5 ⅛"	1'- 3 ½"						3	367.2
54						84" x 61"	2'- 9"	8'- 11"			14'- 1"			9'- 3 ½"	11'- 9"	9'- 1"	8'- 4 ½"	14	7'- 7 ¾"	6'- 5 ¾"	5'- 3 ¾"	4'- 1 ¾"	2'- 11 ¾"	1'- 9 ¾"	0'- 7 ¾"						3	387.1
55						87" x 63"	2'- 10"	7'- 2"			14'- 6 ⅜"			9'- 7"	12'- 1"	9'- 4 ⅛"	8'- 7"	14	8'- 2 ⅛"	7'- 0 ⅛"	5'- 10 ⅛"	4'- 8 ½"	3'- 6 ⅛"	2'- 4 ½"	1'- 2 ⅛"						3	405.7
56	60" x 60"						2'- 8"	4'- 11"			11'- 11 ⅛"			7'- 2 ½"	9'- 8"	8'- 11 ¼"	8'- 2 ½"	10	7'- 6"	6'- 4"	5'- 2"	4'- 0"	2'- 10"	1'- 8"	0'- 6"						2	310.7
57		66"		66"			2'- 11"	5'- 5"			13'- 11 ¼"			7'- 11"	10'- 7"	9'- 8 ⅝"	8'- 11 ¼"	10	8'- 9 ¾"	7'- 7 ¾"	6'- 5 ¾"	5'- 3 ¾"	4'- 1 ¾"	2'- 11 ⅜"	1'- 9 ¾"	0'- 7 ¾"					3	365.5
58							↑	5'- 11"			12'- 11 ½"			8'- 5"	10'- 5 ½"	8'- 11 ⅛"	8'- 2"	12	7'- 5"	6'- 4"	5'- 2"	4'- 0"	2'- 10"	1'- 8"	0'- 6"						4	354.5
59	84" x 60"							6'- 11"			13'- 11 ⅛"			9'- 5"	11'- 5 ½"	↑	↑	14	↑	↑	↑	↑	↑	↑	↑						3	380.8
60	96" x 60"							7'- 11"			14'- 11 ½"			10'- 5"	12'- 5 ½"			16													3	412.8
61	108" x 60"							8'- 11"			15'- 11 ½"			11'- 5"	13'- 5 ½"			18													3	444.8
62	120" x 60"							9'- 11"			16'- 11 ½"			12'- 5"	14'- 5 ½"			20													4	482.7
63	132" x 60"							10'- 11"			17'- 11 ½"			13'- 5"	15'- 5 ½"			22													4	514.7
64	144" x 60"							11'- 11"			18'- 11 ½"			14'- 5"	16'- 5 ½"			24													4	546.6
65	156" x 60"							12'- 11"			19'- 11 ½"			15'- 5"	17'- 5 ½"			26													5	584.6
66	168" x 60"							13'- 11"			20'- 11 ½"			16'- 5"	18'- 5 ½"			28													5	616.8
67	180" x 60"							14'- 11"			21'- 11 ½"			17'- 5"	19'- 5 ½"			30													5	648.6
68	192" x 60"						2'- 11"	15'- 11"			22'- 11 ⅝"			18'- 5"	20'- 5 ½"	8'- 11 ⅛"	8'- 2"	32	7'- 5"	6'- 4"	5'- 2"	4'- 0"	2'- 10"	1'- 8"	0'- 6"						6	686.5
69					62" x 68"		3'- 0"	5'- 1"			12'- 11 ⅞"			7'- 8"	10'- 5"	10'- 0 ¼"	9'- 2 ½"	10	8'- 8 ½"	7'- 6 ⅜"	6'- 4 ⅜"	5'- 2 ⅜"	4'- 0 ⅜"	2'- 10 ⅜"	1'- 8 ⅜"	0'- 6⅜"					6	380.7
70						92" x 63"	2'- 11"	7'- 7"			15'- 2"			10'- 1"	12'- 6"	9'- 7 ⅜"	8'- 10"	16	7'- 8 ⅛"	6'- 6 ⅛"	5'- 4 ⅛"	4'- 2 ⅛"	3'- 0 ⅛"	1'- 10 ⅜"	0'- 8 ⅛"						3	432.2
71						95" x 67"	3'- 0"	7'- 10"			15'- 7 ½"			10'- 5"	13'- 1"	9'- 10 ⅝"	9'- 1"	16	8'- 3 ⅜"	7'- 1 ⅜"	5'- 11 ⅜"	4'- 9 ⅜"	3'- 7 ⅜"	2'- 5 ⅛"	1'- 3 ⅜"						3	452.2
72						98" x 69"	3'- 2"	8'- 1"	⅜"		16'- 0 ⅛"			10'- 9"	13'- 4 ½"	10'- 1 ⅜"	9'- 4"	16	8'- 9 ⅞"	7'- 7 ⅛"	6'- 5 ⅜"	5'- 3 ⅞"	4'- 1 ⅞"	2'- 11 ⅜"	1'- 9 ⅞"	0'- 7 ½"				1 ½"	3	473.8
73		72"		72"			3'- 2"	5'- 11"	½"		14'- 2 ⅞"			8'- 8"	11'- 8"	10'- 6 ⅜"	9'- 8 ⅜"	12	9'- 0"	7'- 10"	6'- 8"	5'- 6"	4'- 4"	3'- 2"	2'- 0"	0'- 10"				1 ¾"	4	472.8
74					67" x 75"		3'- 4"	5'- 6"			14'- 1 ¾"			8'- 4 ½"	11'- 3 ½"	10'- 11 ½"	10'- 0 ⅞"	10	10'- 0 ⅜"	8'- 10 ⅜"	7'- 8 ⅝"	6'- 6 ⅝"	5'- 4 ⅜"	4'- 2 ⅝"	3'- 0 ⅜"	1'- 10 ⅝"	0'- 8 ⅝"				4	475.6
75						103" x 71"	3'- 2"	8'- 6"			16'- 8 ⅝"			11'- 3"	14'- 0"	10'- 5"	9'- 6 ⅞"	16	9'- 6 ⅜"	8'- 4 ⅝"	7'- 2 ⅜"	5'- 0 ⅝"	4'- 10 ⅜"	3'- 8 ⅛"	2'- 6 ⅜"	1'- 4 ⅝"					4	570.8
76						106" x 73"	3'- 3"	8'- 9"			17'- 2 ½"			11'- 6 ½"	14'- 4 ⅛"	10'- 8 ¼"	9'- 9 ⅞"	18	8'- 11 ⅛"	7'- 9 ⅛"	6'- 7 ⅛"	6'- 3 ½"	4'- 3 ½"	3'- 1 ⅛"	1'- 11 ⅛"	0'- 9 ⅛"					4	598.4
77						112" x 75"	3'- 4"	9'- 3"			17'- 10 ¾"			12'- 1 ½"	15'- 0 ½"	10'- 11 ½"	10'- 0 ¼"	18	9'- 9 ⅛"	8'- 7 ⅛"	7'- 5 ⅛"	6'- 3 ⅛"	5'- 1 ⅛"	3'- 11 ⅛"	2'- 9 ⅛"	1'- 7 ⅛"					4	632.1
78						114" x 77"	3'- 5"	9'- 5"			18'- 3 ⅜"			12'- 4"	15'- 4"	11'- 2 ¾"	10'- 9 ⅞"	18	10'- 2 ½"	9'- 0 ½"	7'- 10 ½"	6'- 8 ¼"	5'- 6 ½"	4'- 4 ½"	3'- 2 ½"	2'- 0 ½"	0'- 10 ½"				3	651.1
79	72" x 72"						3'- 2"	5'- 11"			14'- 2 ⅞"			8'- 8"	11'- 6 ½"	10'- 6 ⅜"	9'- 8 ⅜"	12	9'- 0"	7'- 10"	6'- 8"	5'- 6"	4'- 4"	3'- 2"	2'- 0"	0'- 10"					3	467.0
80	84" x 72"						↑	6'- 11"			15'- 2 ⅞"			9'- 8"	12'- 6 ½"	↑	↑	14	↑	↑	↑	↑	↑	↑	↑	↑					3	508.1
81	96" x 72"							7'- 11"			16'- 2 ⅞"			10'- 8"	13'- 6 ½"			16													3	549.1
82	108" x 72"							8'- 11"			17'- 2 ⅞"			11'- 8"	14'- 6 ½"			18													4	595.9
83	120" x 72"							9'- 11"			18'- 2 ½"			12'- 8"	15'- 6 ½"			20													4	636.9
84	132" x 72"							10'- 11"			19'- 2 ⅞"			13'- 8"	16'- 6 ½"			22													4	678.0
85	144" x 72"							11'- 11"			20'- 2 ⅞"			14'- 8"	17'- 6 ½"			24													5	724.8
86	156" x 72"							12'- 11"			21'- 2 ½"			15'- 8"	18'- 6 ½"			26													5	765.8
87	168" x 72"							13'- 11"			22'- 0 ½"			16'- 8"	19'- 6 ½"			28													5	806.9
88	180" x 72"						↓	14'- 11"			23'- 2 ⅞"			17'- 8"	20'- 6 ½"	↓	↓	30	↓	↓	↓	↓	↓	↓	↓	↓					6	853.7
89	192" x 72"						3'- 2"	15'- 11"	↓	↓	24'- 2 ⅞"	↓	↓	18'- 8"	21'- 6 ½"	10'- 6 ⅜"	9'- 8 ⅜"	32	9'- 0"	7'- 10"	6'- 8"	5'- 6"	4'- 4"	3'- 2"	2'- 0"	0'- 10"			↓	↓	6	894.7
90						96" x 74"	3'- 3"	7'- 11"	½"	1 ½"	16'- 5 ⅝"	½"	2"	10'- 8 ½"	13'- 8"	10'- 10"	9'- 11 ⅝"	15	9'- 10"	8'- 8"	7'- 6"	6'- 4"	5'- 2"	4'- 0"	2'- 10"	1'- 8"		¼"	1 ¾"		3	540.7

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020

CHAIRMAN STANDARDS COMMITTEE — DATE: AUGUST 2020
APPROVED

DEPUTY DIRECTOR

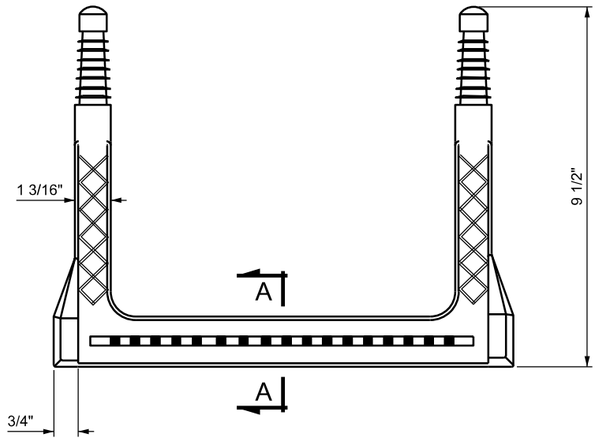
STANDARD DRAWING TITLE

STANDARD TRASH RACKS

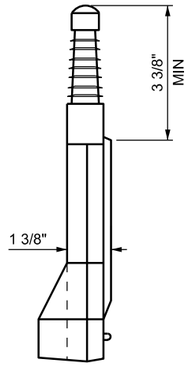
STD. DWG. NO.

GF 8C

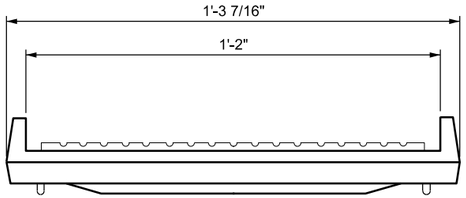
23-JUN-2020 DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG, EN, FG, GF\GF88C.dgn



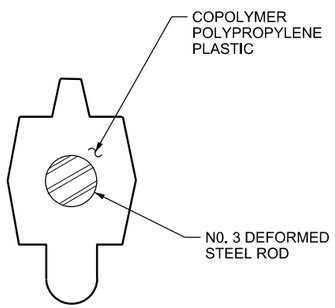
PLAN



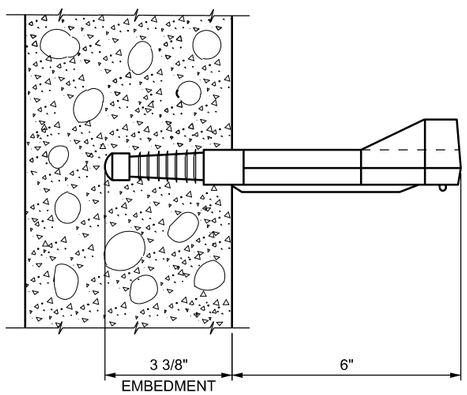
RIGHT SIDE VIEW



END VIEW



SECTION A-A



EMBEDMENT DETAIL

NOTES

1. VERTICALLY ALIGN AND UNIFORMLY SPACE STEPS WITH A MINIMUM SPACING OF 12 INCHES AND A MAXIMUM SPACING OF 16 INCHES UNLESS SHOWN OTHERWISE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

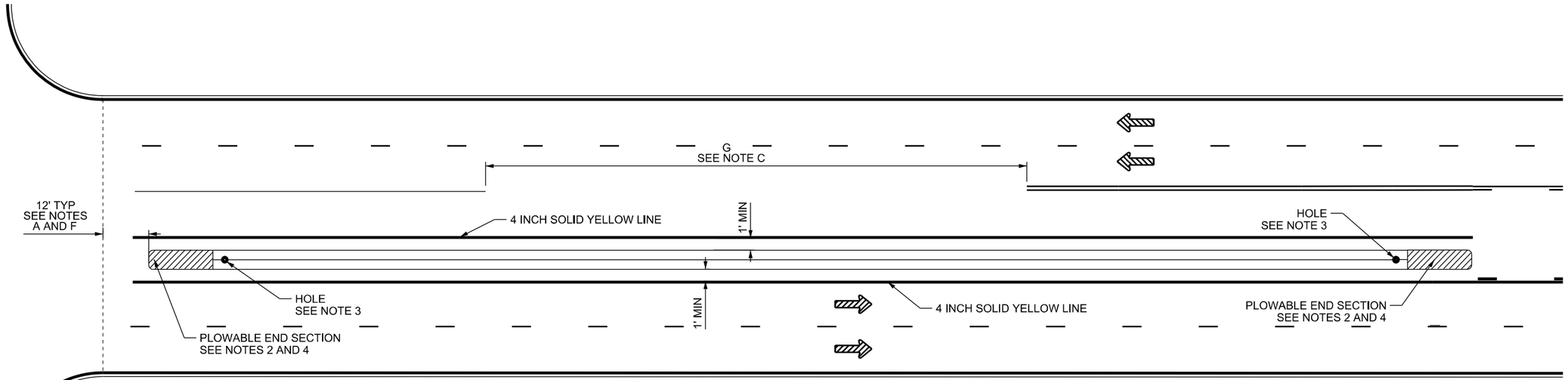
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

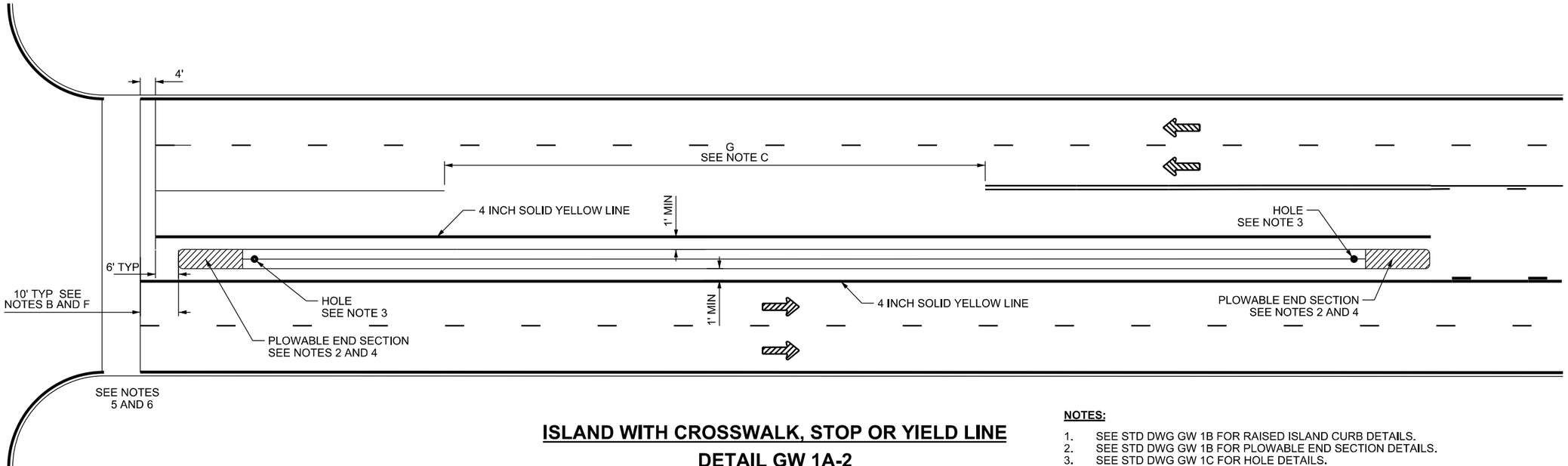
MANHOLE STEPS
STANDARD DRAWING TITLE

STD. DWG. NO.
GF 9

DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 5 (DG,EN,FG,GF\GF9.dgn
23-JUN-2020



ISLAND WITHOUT CROSSWALK, STOP OR YIELD LINE
DETAIL GW 1A-1



ISLAND WITH CROSSWALK, STOP OR YIELD LINE
DETAIL GW 1A-2

NOTES:

1. SEE STD DWG GW 1B FOR RAISED ISLAND CURB DETAILS.
2. SEE STD DWG GW 1B FOR PLOWABLE END SECTION DETAILS.
3. SEE STD DWG GW 1C FOR HOLE DETAILS.
4. PAINT PLOWABLE END SECTION TO MATCH ADJACENT EDGE LINE.
5. SEE STD DWG ST 1 FOR STANDARD CROSSWALK, STOP AND YIELD LINE MARKINGS.
6. SEE STD DWG ST 1 FOR SCHOOL CROSSWALK, STOP AND YIELD LINE MARKINGS.

DESIGN-ONLY NOTES:

A. PLACE ISLAND IN RELATION TO PC/PT OF CURB SHOULDER.
B. PLACE ISLAND IN RELATION TO CROSSWALK, STOP OR YIELD LINE.
C. SEE UDOT ROADWAY DESIGN MANUAL DM DRAWINGS FOR GAP LENGTH.
D. LENGTH OF ISLAND DETERMINED BY REGION TRAFFIC ENGINEER.
E. SEE UDOT ROADWAY DESIGN MANUAL DM DRAWINGS FOR PAVEMENT MARKING DETAILS.
F. SETBACK FOR BEGINNING OF PLOWABLE END SECTION MAY INCREASE FOR SITE SPECIFIC APPLICATIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	REVISED REFERENCES FOR THE ST SERIES STANDARD DRAWINGS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

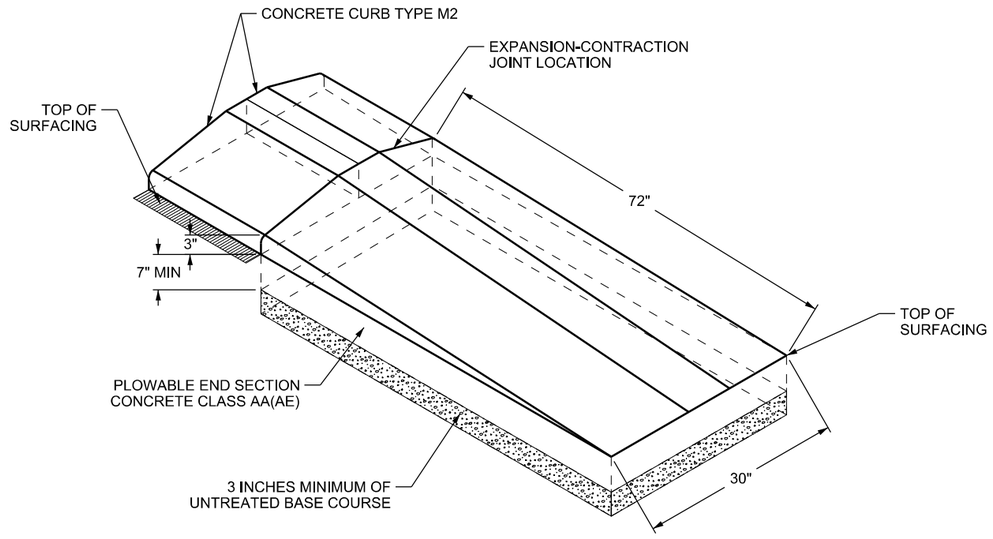
DEPUTY DIRECTOR

RAISED ISLAND

STANDARD DRAWING TITLE

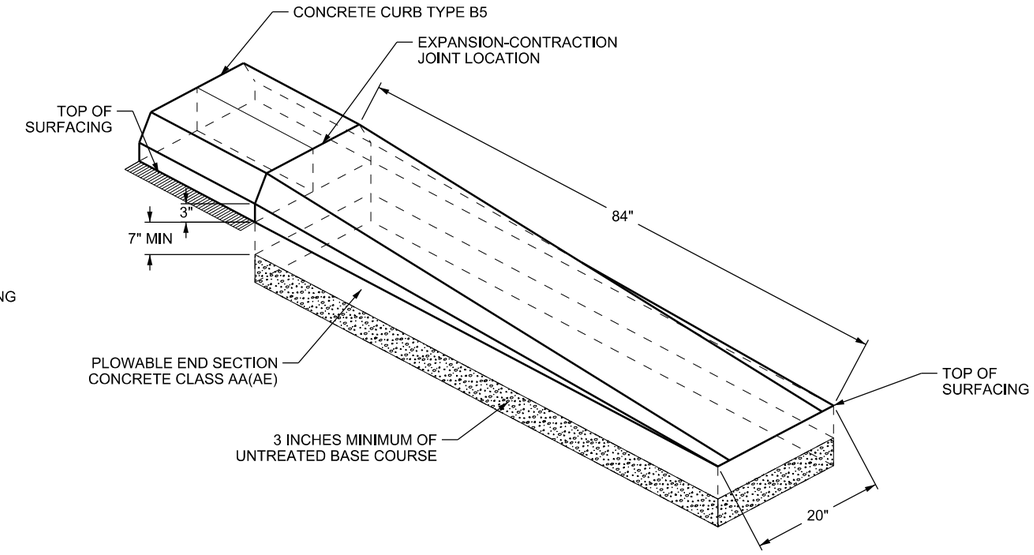
STD. DWG. NO.
GW 1A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW01A.dgn
23-JUN-2020



PLOWABLE END SECTION DETAIL

TYPE "M2" CURB



PLOWABLE END SECTION DETAIL

TYPE "B5" CURB

NOTES:

1. SEE STD DWG GW 2A FOR M2 AND B5 CURB DETAILS.
2. PAINT PLOWABLE END SECTION TO MATCH ADJACENT EDGE LINE.
3. SEE STD DWG GW 1C FOR HOLE DETAILS.
4. SEE STD DWG GW 1D FOR MEDIAN REFLECTOR DETAILS.
5. SEE STD DWG GW 3A FOR EXPANSION-CONTRACTION JOINT DETAILS.

DESIGN-ONLY NOTES:

A. RAISED ISLAND IS TWO TYPE M2 OR TYPE B5 CURBS TYPICALLY PLACED BACK-TO-BACK.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

RAISED ISLAND AND PLOWABLE END SECTION

STANDARD DRAWING TITLE

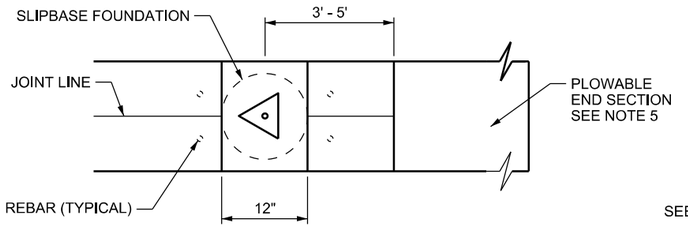
STD. DWG. NO.

GW 1B

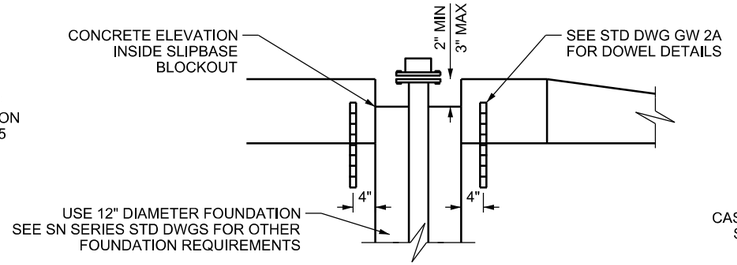
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW01B.dgn
23-JUN-2020

B3 SLIPBASE IN NARROW ISLANDS

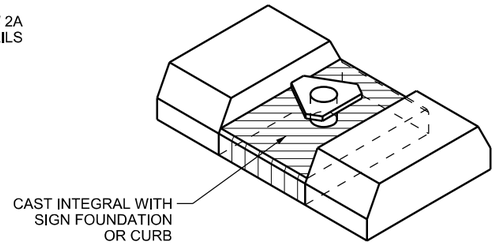
ISLANDS LESS THAN 30" WIDE



PLAN VIEW



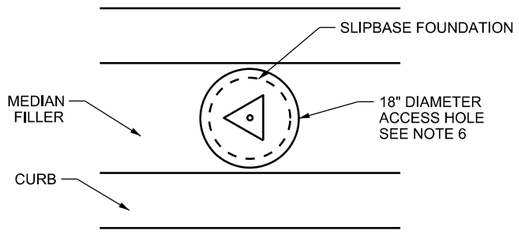
CROSS SECTION AT SIGN



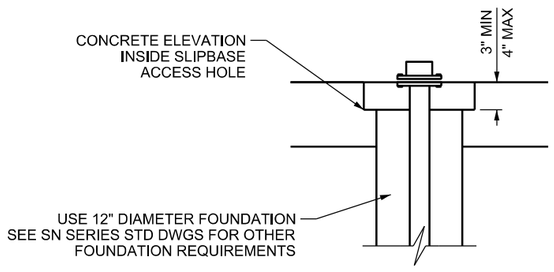
BLOCKOUT DETAIL

B3 SLIPBASE IN INTERMEDIATE WIDTH ISLANDS

ISLANDS 30" TO 72" WIDE



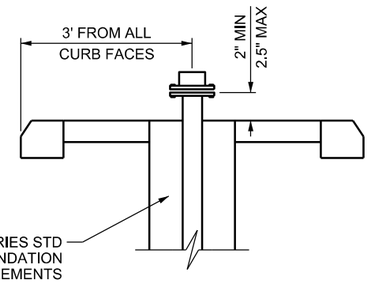
PLAN VIEW



CROSS SECTION AT SIGN

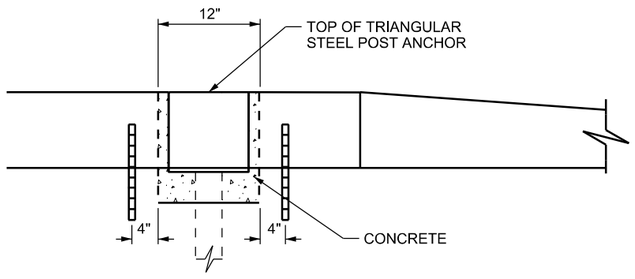
B3 SLIPBASE IN WIDE ISLANDS

ISLANDS GREATER THAN 72" WIDE



TUBULAR STEEL POST DETAIL FOR RAISED ISLAND

SEE NOTE 3



NOTES:

1. PLACE TOP OF SLIPBASE STUD POST FLUSH WITH THE TOP OF THE ISLAND (EXCLUDING WIDE ISLANDS) WITH A TOLERANCE OF + ⅛ INCH.
2. SEE SN SERIES STD DWGS FOR SLIPBASE DETAILS.
3. SEE SN SERIES STD DWGS FOR TUBULAR STEEL POST BASE.
4. KEEP EDGE OF SIGN BEHIND FACE OF CURB AS SHOWN ON STD DWG SN 7A. DO NOT EXCEED 3 INCH OVERHANG WHEN SIGN IS WIDER THAN ISLAND.
5. PAINT PLOWABLE END SECTION TO MATCH ADJACENT EDGE LINE.
6. ACCESS HOLE MAY BE FORMED OR CORE DRILLED. ACCESS HOLE MAY BE SQUARE PROVIDED CONTRACTION JOINTS ARE CUT OR TOOLED AT EACH CORNER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

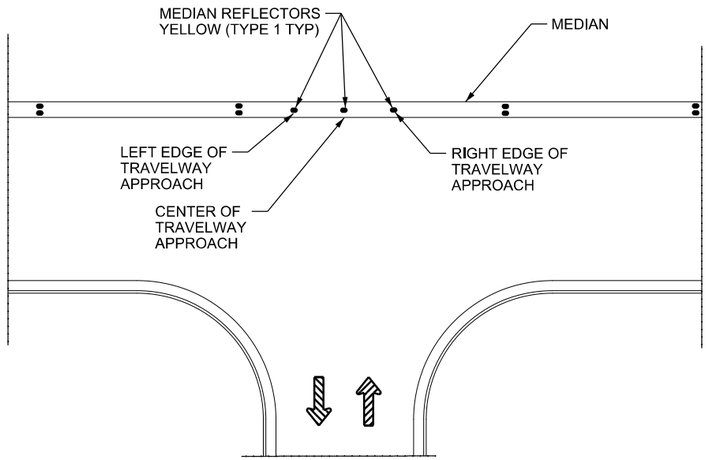
RAISED ISLAND DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.

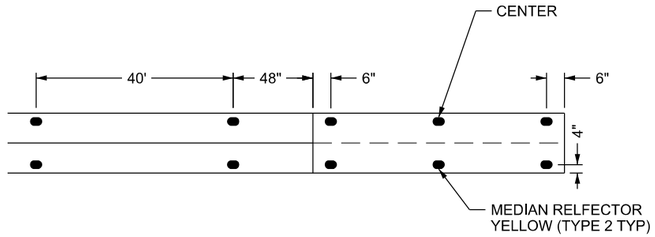
GW 1C

DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW01C.dgn
23-JUN-2020



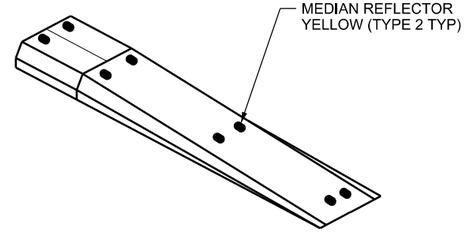
MEDIAN REFLECTOR PLACEMENT DETAIL AT MINOR CROSS STREET

SEE NOTE 3



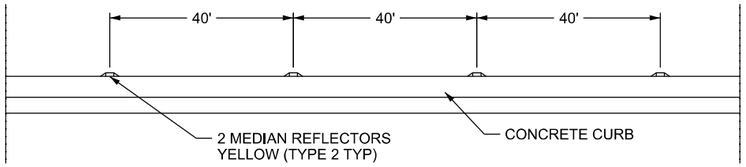
END SECTION PLAN VIEW

TYPE B SHOWN, TYPE M SIMILAR



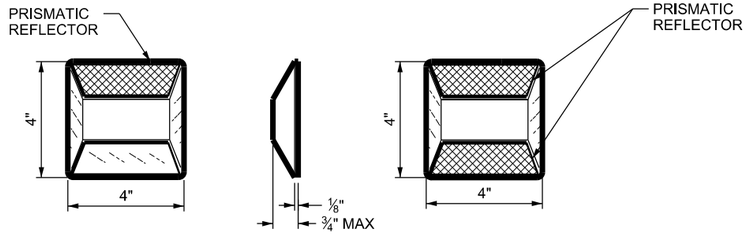
END SECTION ISOMETRIC VIEW

TYPE B SHOWN, TYPE M SIMILAR



MEDIAN REFLECTOR PLACEMENT DETAIL

ELEVATION VIEW



TYPE 1 TYPE 2

MEDIAN REFLECTOR DETAIL

TYP (MAY VARY BY MANUFACTURER)

NOTES:

1. DO NOT PLACE REFLECTORS ON JOINTS.
2. PLACE REFLECTIVE SURFACE TO FACE APPROACHING TRAFFIC.
3. PLACE THREE ADDITIONAL REFLECTORS AT EVERY CROSS STREET OR DRIVEWAY. ROTATE THE REFLECTIVE SURFACES TO FACE THE CROSS STREET OR DRIVEWAY.
4. MATCH REFLECTOR COLOR TO ADJACENT PAVEMENT MARKINGS.

DESIGN-ONLY NOTES:

A. ONLY USE MEDIAN REFLECTORS AT THE DIRECTION OF THE REGION TRAFFIC ENGINEER.

B. USE 40 FT SPACING BETWEEN MEDIAN REFLECTORS. 80 FT SPACING MAY BE USED AT THE DIRECTION OF THE REGION TRAFFIC ENGINEER.

C. USE TYPE 2 REFLECTORS FOR MEDIAN.

D. USE TYPE 1 REFLECTORS FOR CROSS STREETS AND DRIVEWAYS.

E. SEE STD DWG GW 1A FOR REQUIRED PAVEMENT MARKINGS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL

AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED

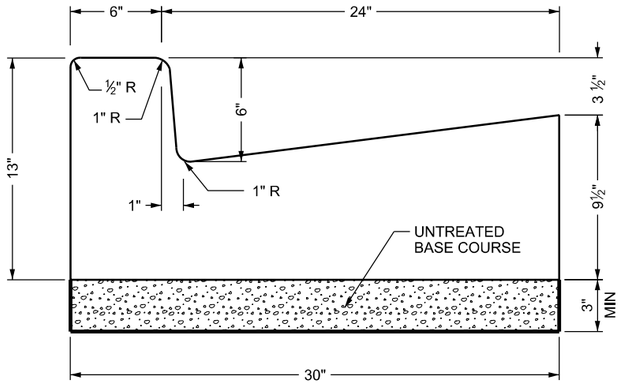
DEPUTY DIRECTOR

MEDIAN REFLECTOR DETAILS

STANDARD DRAWING TITLE

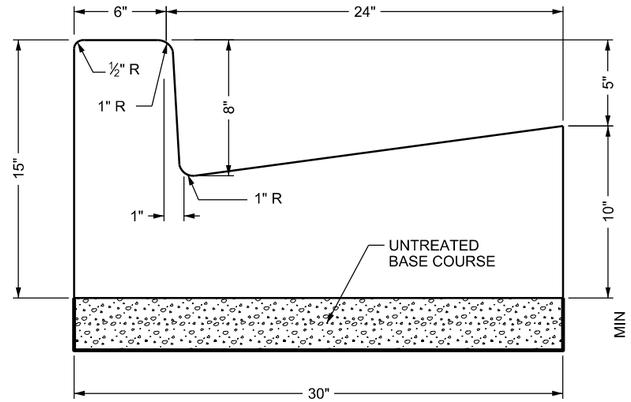
STD. DWG. NO.
GW 1D

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\GW01D.dgn
23-JUN-2020



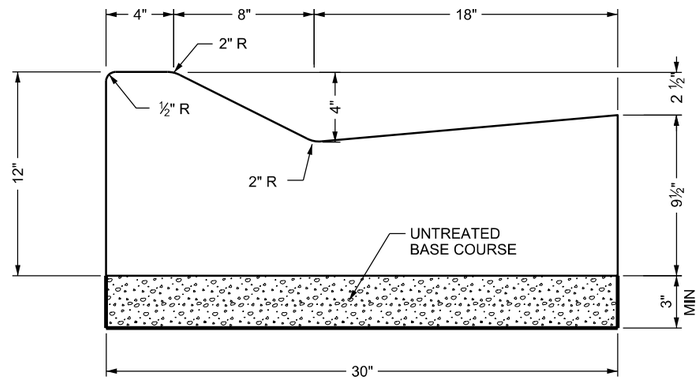
TYPE B1 CURB & GUTTER

AREA = 1.929 SQ FT



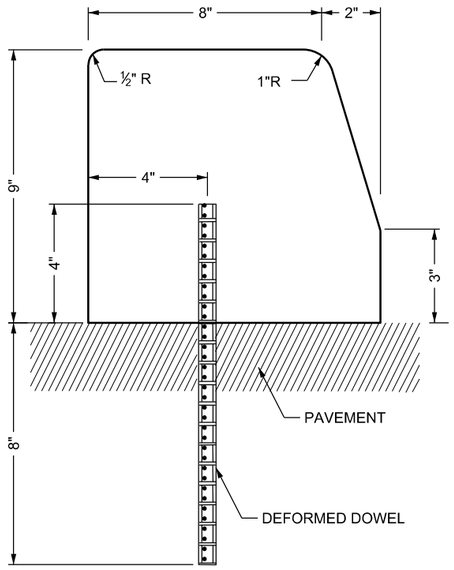
TYPE B2 CURB & GUTTER

AREA = 2.059 SQ FT



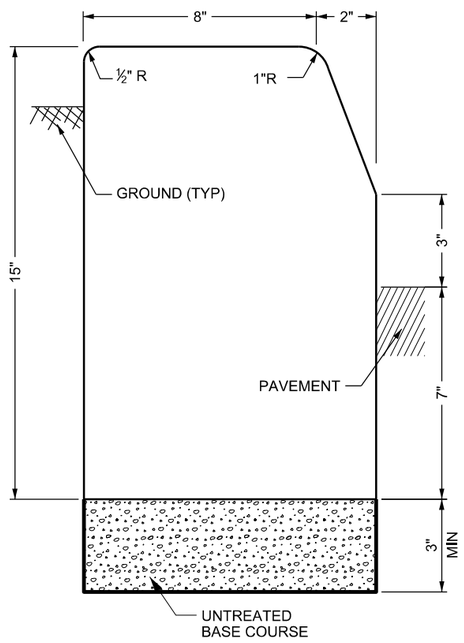
TYPE M1 CURB & GUTTER

AREA = 1.982 SQ FT



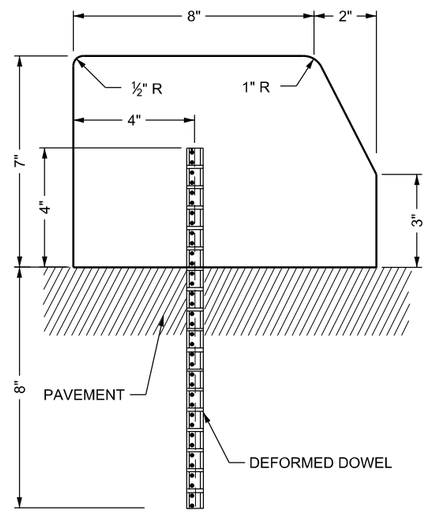
TYPE B3 CURB

AREA = 0.580 SQ FT



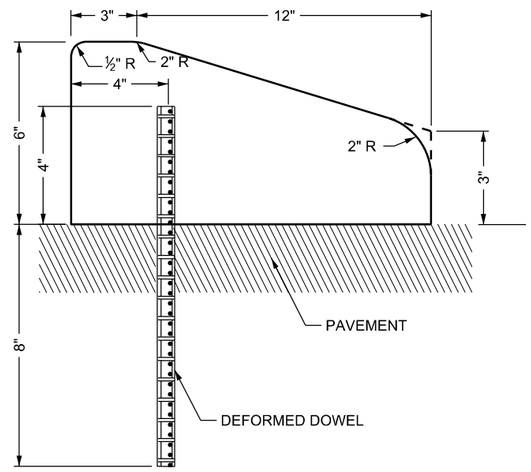
TYPE B4 CURB

AREA = 1.033 SQ FT



TYPE B5 CURB
RAISED MEDIAN

AREA = 0.490 SQ FT



TYPE M2 CURB

AREA = 0.484 SQ FT

NOTES:

1. USE ¾ INCH DEFORMED DOWELS ON 5 FT MAXIMUM CENTERS.
2. PRECAST CURBS:
   - A. MINIMUM OF 10 FT IN LENGTH.
   - B. DOWELS AT A MINIMUM OF 3 PER 10 FT LENGTH.
   - C. INCLUDE ADEQUATE REINFORCING STEEL TO WITHSTAND HANDLING STRESSES.
3. MEASURE CURB HEIGHT VERTICALLY FROM THE FLOW LINE OF THE GUTTER TO TOP BACK OF CURB.
4. REFER TO STD DWG GW 2B FOR CURB AND GUTTER AT ADA ACCESSES.

DESIGN-ONLY NOTES:

- A. DRAINAGE CURBS: TYPE B1, B2 & M1.
- B. MOUNTABLE CURBS: TYPES M1 & M2. REFER TO THE AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS FOR APPLICATION.
- C. USE CURBS TYPES B1, B2, B3, B4 & B5 WITH DESIGN SPEED UP TO 40 MPH EXCEPT IN PREDOMINATELY URBAN OR RAPIDLY DEVELOPING RURAL AREAS WHERE CURBS MAY BE USED WITH DESIGN SPEEDS UP TO 50 MPH.
- D. USE TYPE B4 ONLY AS BORDER CURB.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/31/17	CGW	LEVELED BOTTOM OF CURB AND GUTTER SECTIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE — RECOMMENDED FOR APPROVAL

AUGUST 2020 — DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

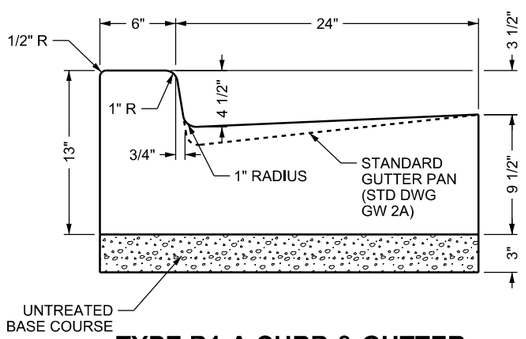
CONCRETE CURB AND GUTTER TYPES

STANDARD DRAWING TITLE

STD. DWG. NO.

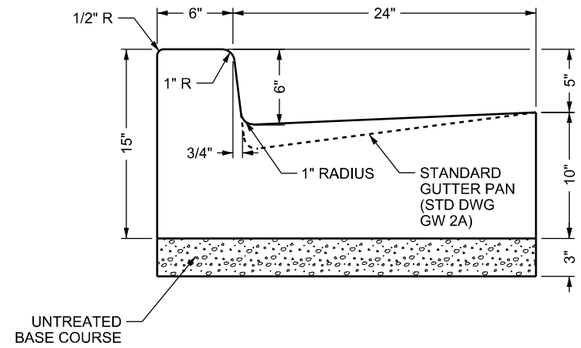
GW 2A

DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW02A.dgn
23-JUN-2020



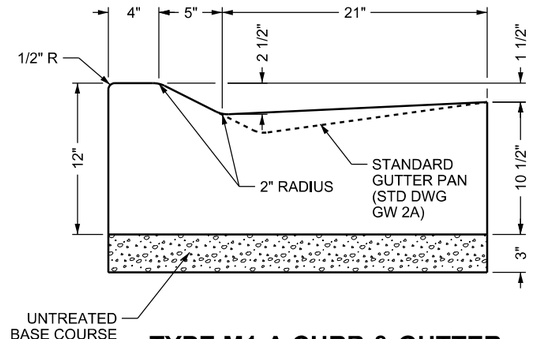
TYPE B1-A CURB & GUTTER

GUTTER PAN SLOPE REDUCED FOR ADA ACCESS
AREA = 2.050 SQ FT



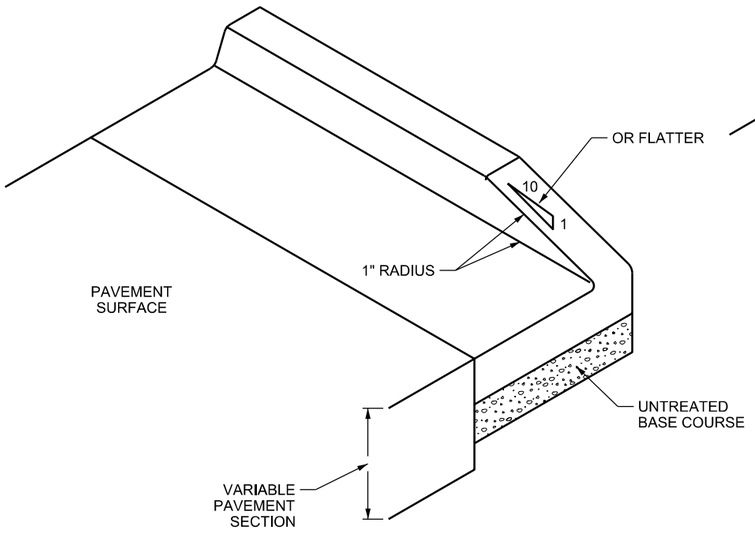
TYPE B2-A CURB & GUTTER

GUTTER PAN SLOPE REDUCED FOR ADA ACCESS
AREA = 2.221 SQ FT

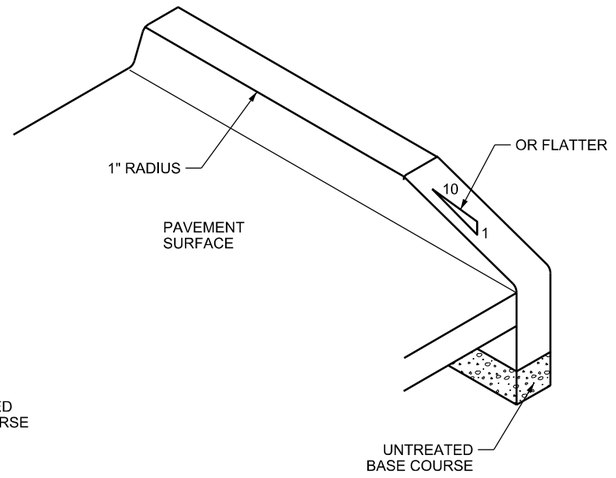


TYPE M1-A CURB & GUTTER

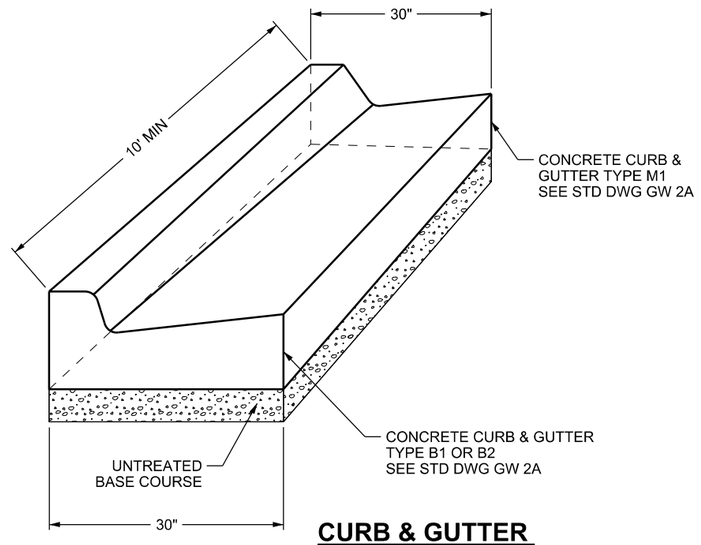
GUTTER PAN SLOPE REDUCED FOR ADA ACCESS
AREA = 2.164 SQ FT



TYPICAL CURB & GUTTER END DETAIL



TYPICAL CURB END DETAIL



CURB & GUTTER TRANSITION DETAIL

NOTE:

1. FLATTEN GUTTERS AS SHOWN AT ADA ACCESS LOCATIONS. FLATTEN GUTTER BETWEEN ACCESSES AS WELL AS AT CURB ACCESSES WHERE MORE THAN ONE ACCESS WILL BE CONSTRUCTED AT A CORNER.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/31/17	CGW	LEVELED BOTTOM OF CURB AND GUTTER SECTIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

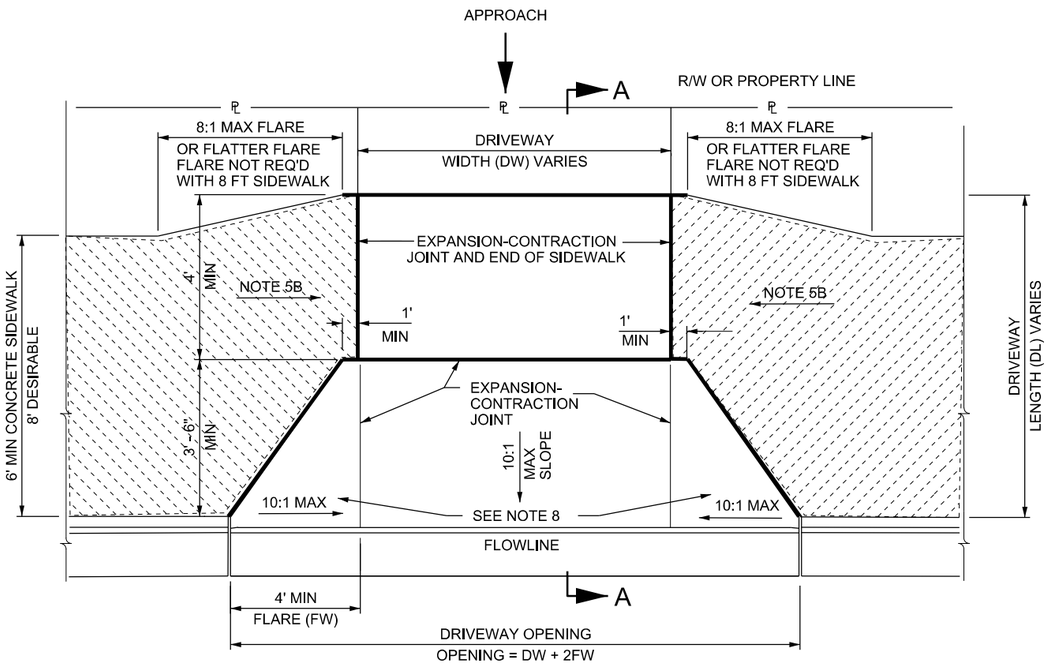
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

CONCRETE CURB AND GUTTER DETAILS

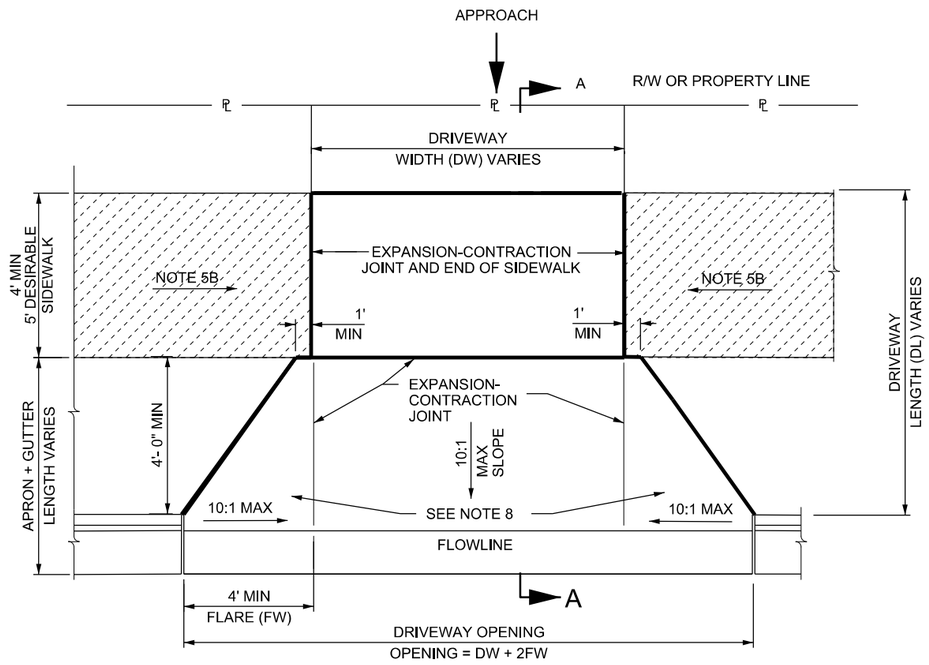
STANDARD DRAWING TITLE

STD. DWG. NO.
GW 2B

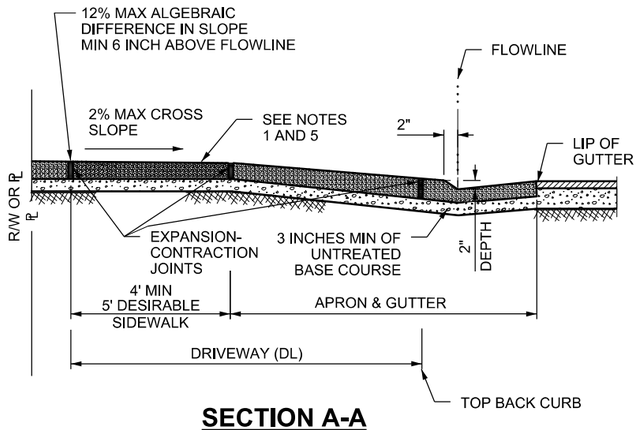
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW02B.dgn
23-JUN-2020



FLARED DRIVEWAY WITH ADJACENT SIDEWALK

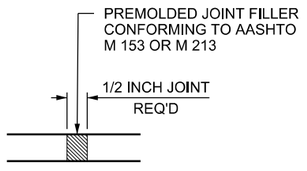


FLARED DRIVEWAY WITH PARKSTRIP



SECTION A-A

DRIVEWAY FLARE AREA CHART	
FLARED DRIVEWAY	
DISTANCE FROM BACK OF CURB TO SIDEWALK	FLARE AREA
3 FT	18 ft^2
4 FT	24 ft^2
6 FT	36 ft^2
8 FT	48 ft^2
10 FT	60 ft^2
ADD (DL)(DW) FOR	
TOTAL QUANTITY	
QUANTITY CALCULATED USING A 6 INCH CURB	



EXPANSION-CONTRACTION JOINT DETAIL

NOTES:

1. SIDEWALK CROSS SLOPE DIMENSIONS SHOWN ARE NOT SUBJECT TO CONVENTIONAL INDUSTRY TOLERANCES. CONSTRUCT SIDEWALKS AND RAMPS SUCH THAT THE MAXIMUM OR MINIMUM VALUES ARE NOT EXCEEDED. WORK THAT EXCEEDS THOSE VALUES WILL NOT BE ACCEPTED.
2. MAXIMUM DISTANCE BETWEEN CONTROL JOINTS 10 FT LATERALLY AND LONGITUDINALLY SPACED EQUALLY.
3. PROVIDE EXPANSION-CONTRACTION JOINTS IN CONCRETE SIDEWALK AT 30 FT INTERVALS AND WHERE CONCRETE SIDEWALK BUTTS AGAINST DRIVEWAY.
4. SIDEWALK INSIDE THE DRIVEWAY LIMITS IS PAID AS PART OF DRIVEWAY, NOT AS PART OF SIDEWALK.
5. FLARED CONCRETE DRIVEWAY
   A. RESIDENTIAL = 6 INCH THICK, COMMERCIAL = 7 INCH THICK. USE THESE THICKNESSES FOR APRON, SIDEWALK WITHIN DRIVEWAY AREA, APPROACH AND FLARE.
   B. DEPRESS THE LONGITUDINAL SLOPE OF THE SIDEWALK AT A MAXIMUM RATE OF 5 PERCENT TO MEET THE APRON - APPROACH ELEVATION IF THE GRADES SHOWN ON THE SLOPE DETAIL CANNOT BE MET. THE TOP BACK OF SIDEWALK IS TO BE A MINIMUM 6 INCHES ABOVE THE FLOWLINE OF CURB AND GUTTER AT ALL TIMES.
6. USE CLASS AA(AE) CONCRETE FOR SIDEWALK AND DRIVEWAYS.
7. USE UNTREATED BASE COURSE UNDER ALL SIDEWALKS AND DRIVEWAYS.
8. QUANTITIES FOR DRIVEWAYS INCLUDE FLARES TO TOP BACK OF CURB. CURB AND GUTTER PAID SEPARATELY THROUGH DRIVEWAY LOCATIONS.
9. REMOVE EXISTING SIDEWALK AND REPLACE BACK TO NEAREST EXPANSION-CONTRACTION JOINT.
10. APPROACH IS FROM EXISTING DRIVEWAY TIE-IN TO TOP-BACK-CURB AND IS PART OF DRIVEWAY QUANTITIES.

DESIGN-ONLY NOTES:

A. DRIVEWAY DIMENSIONS (MAX.& MIN.) ARE LOCATED IN UDOT "ADMINISTRATIVE RULE R930-6 ACCOMMODATION OF UTILITIES AND THE CONTROL AND PROTECTION OF STATE HIGHWAY RIGHTS OF WAY."

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/31/17	CGW	INCREASED MINIMUM APRON DEPTH TO 3.5 FT

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

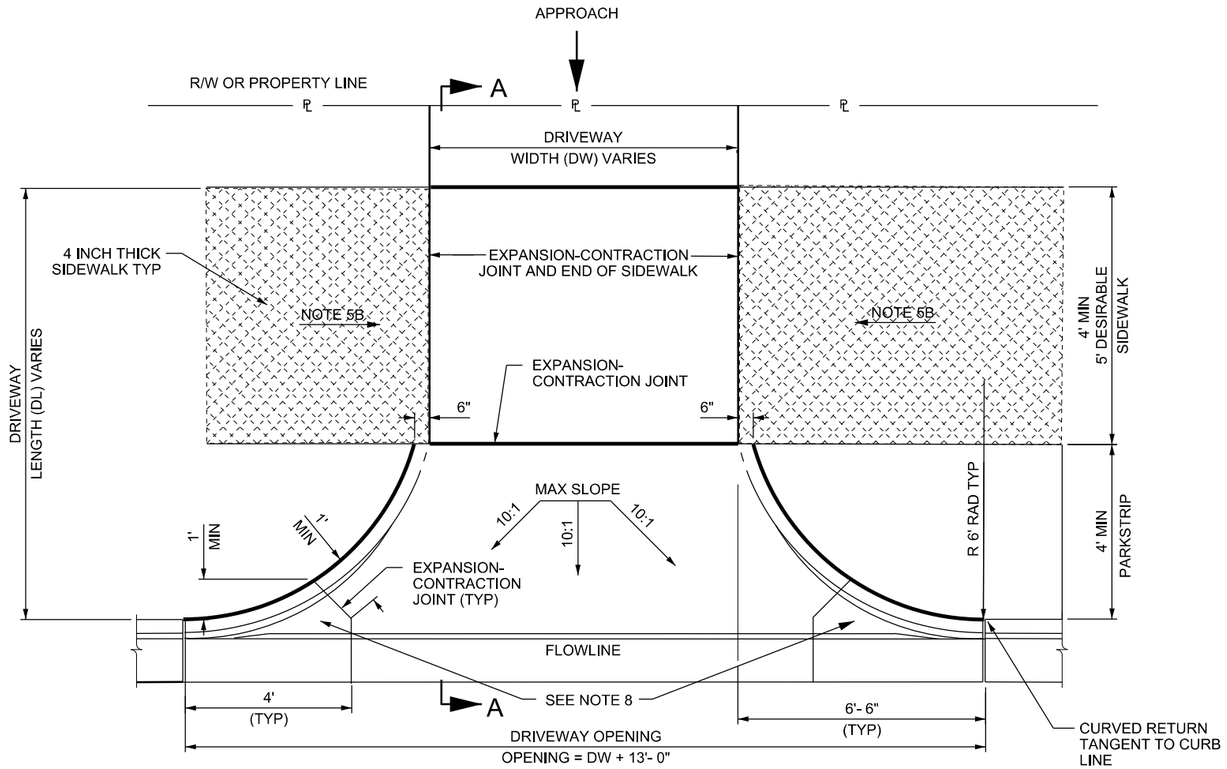
DEPUTY DIRECTOR

CONCRETE DRIVEWAYS AND SIDEWALKS

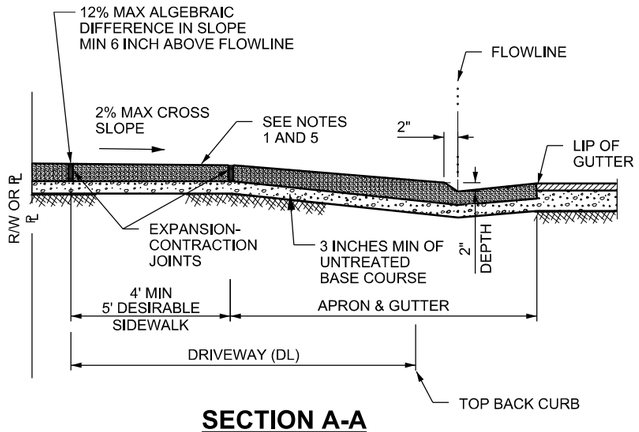
STANDARD DRAWING TITLE

STD. DWG. NO.
GW 3A

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\GW03A.dgn



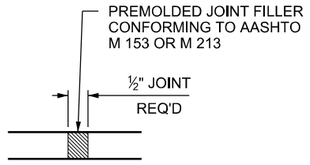
OPEN CONCRETE DRIVEWAY



SECTION A-A

DRIVEWAY FLARE AREA CHART	
OPEN DRIVEWAY	
PARKSTRIP WIDTH	FLARE AREA
4 FT	15.00 ft²
5 FT	15.40 ft²
6 FT	15.45 ft²

NOTES:
1. 6 FT RADIUS TYPICAL
2. ft² QUANTITY FOR BOTH SIDES OF DRIVEWAY



EXPANSION-CONTRACTION JOINT DETAIL

NOTES:

1. SIDEWALK CROSS SLOPE DIMENSIONS SHOWN ARE NOT SUBJECT TO CONVENTIONAL INDUSTRY TOLERANCES. CONSTRUCT SIDEWALKS AND RAMPS SUCH THAT THE MAXIMUM OR MINIMUM VALUES ARE NOT EXCEEDED. WORK THAT EXCEEDS THOSE VALUES WILL NOT BE ACCEPTED.
2. MAXIMUM DISTANCE BETWEEN CONTROL JOINTS 10 FT LATERALLY AND LONGITUDINALLY SPACED EQUALLY.
3. PROVIDE EXPANSION-CONTRACTION JOINTS IN CONCRETE SIDEWALK AT 30 FT INTERVALS AND WHERE CONCRETE SIDEWALK BUTTS AGAINST DRIVEWAY.
4. SIDEWALK INSIDE THE DRIVEWAY LIMITS IS PAID AS PART OF DRIVEWAY, NOT AS PART OF SIDEWALK.
5. OPEN CONCRETE DRIVEWAY
   A. RESIDENTIAL = 6 INCH THICK, COMMERCIAL = 7 INCH THICK. USE THESE THICKNESSES FOR APRON, SIDEWALK WITHIN DRIVEWAY AREA, APPROACH AND RADII.
   B. DEPRESS THE LONGITUDINAL SLOPE OF THE SIDEWALK AT A MAXIMUM RATE OF 5 PERCENT TO MEET THE APRON - APPROACH ELEVATION IF THE GRADES SHOWN ON THE SLOPE DETAIL CANNOT BE MET. THE TOP BACK OF SIDEWALK IS TO BE A MINIMUM 6 INCHES ABOVE THE FLOWLINE OF CURB AND GUTTER AT ALL TIMES.
6. USE CLASS AA(AE) CONCRETE FOR SIDEWALK AND DRIVEWAYS.
7. USE UNTREATED BASE COURSE UNDER ALL SIDEWALKS AND DRIVEWAYS.
8. QUANTITIES FOR DRIVEWAYS INCLUDE FLARES TO TOP BACK OF CURB. CURB AND GUTTER PAID SEPARATELY THROUGH DRIVEWAY LOCATIONS.
9. REMOVE EXISTING SIDEWALK AND REPLACE BACK TO NEAREST EXPANSION-CONTRACTION JOINT.
10. APPROACH IS FROM EXISTING DRIVEWAY TIE-IN TO TOP-BACK-CURB AND IS PART OF DRIVEWAY QUANTITIES.

DESIGN-ONLY NOTES:

A. DRIVEWAY DIMENSIONS (MAX.& MIN.) ARE LOCATED IN UDOT "ADMINISTRATIVE RULE R930-6 ACCOMMODATION OF UTILITIES AND THE CONTROL AND PROTECTION OF STATE HIGHWAY RIGHTS OF WAY."

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL

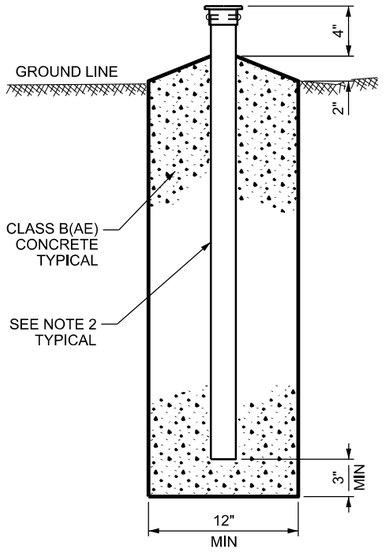
AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

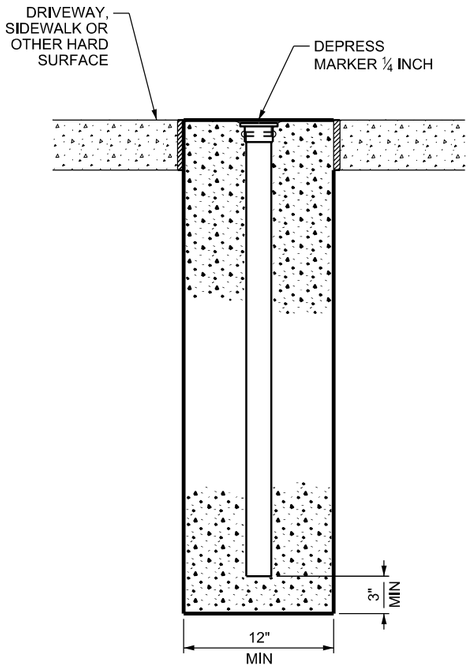
CONCRETE DRIVEWAYS AND SIDEWALKS

STANDARD DRAWING TITLE

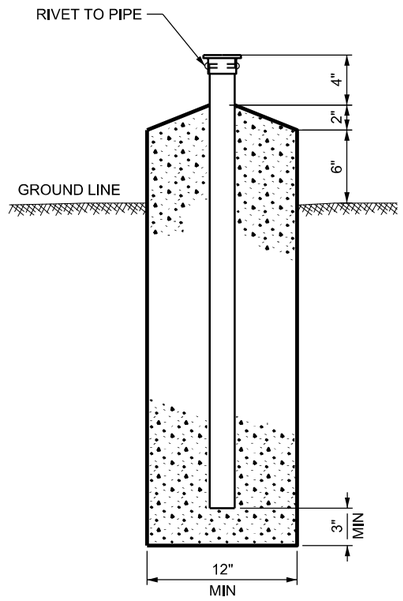
STD. DWG. NO.
GW 3B

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\GW03B.dgn
23-JUN-2020





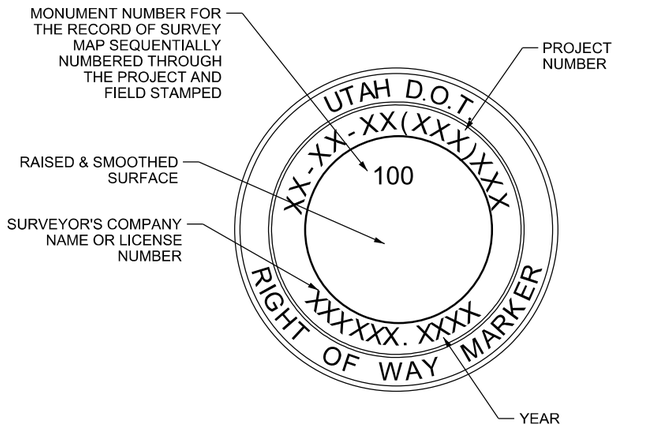
"A"

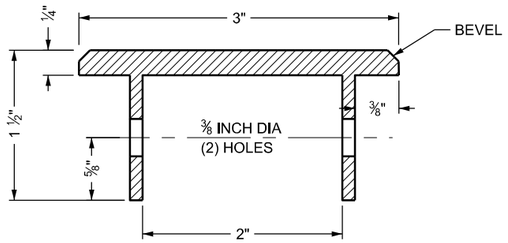


"B"

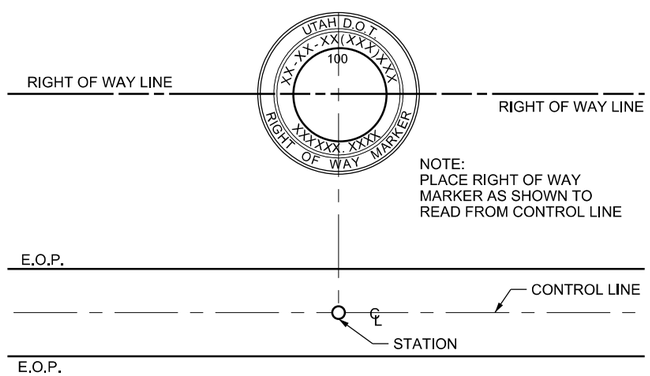
STANDARD INSTALLATION

ALTERNATE INSTALLATIONS





BRONZE CAP DETAIL "A"



NOTES:

1. SEE STANDARD SPECIFICATION 02896.
2. USE 1 ½ INCH x 36 INCH NOM. (TYP) GALVANIZED PIPE.
3. USE RIVETS TO SECURE BRONZE CAP TO PIPE.
4. PLACE RIGHT OF WAY MARKERS AT EACH ANGLE POINT IN A RIGHT OF WAY LINE. PLACE RIGHT OF WAY MARKERS ON EACH RIGHT OF WAY LINE OPPOSITE THE PS, SC, CS, AND ST OR OPPOSITE THE PC AND PT. WHERE THE RIGHT OF WAY PARALLELS THE CENTER LINE OF THE HIGHWAY AROUND A CURVE.
5. PLACE ADDITIONAL RIGHT OF WAY MARKERS SO THAT NO INTERVAL WILL EXCEED 1000 FT. PLACE INTERMEDIATE MARKERS PREFERABLY ON SECTION LINES OR INTERSECTING PROPERTY LINES.
6. GRIND TO A SMOOTH SURFACE ALL EXPOSED SURFACES OF THE BRONZE CAP.
7. DEPRESS ALL LETTERS MINIMUM OF 1/16 INCH.
8. USE 3/16 INCH HIGH LETTERS AND NUMBERS.
9. USE ALTERNATE "A" INSTALLATION WHEN PLACING TOP OF BRONZE CAP FLUSH WITH HARD SURFACE AREA.
10. USE ALTERNATE "B" INSTALLATION WHEN PLACING MARKERS IN HEAVY BRUSH OR FOREST LANDS.
11. TABULATE RIGHT-OF-WAY MARKERS SHOWING MARKER NUMBER, STATION, OFFSET, ELEVATION, AND PROJECT COORDINATES ON THE RECORD OF SURVEY MAP.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

RIGHT OF WAY MARKER

STANDARD DRAWING TITLE

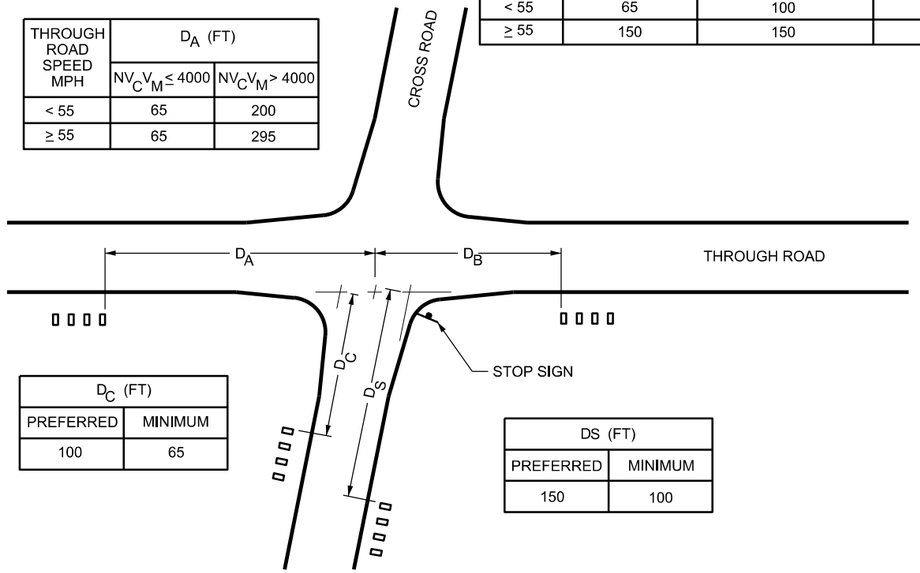
STD. DWG. NO.

GW 4

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\GW04.dgn
23-JUN-2020

THROUGH ROAD SPEED MPH	D_A (FT)	
	$NV_CV_M \leq 4000$	$NV_CV_M > 4000$
< 55	65	200
≥ 55	65	295

THROUGH ROAD SPEED MPH	D_B(FT)		
	$\frac{V_M}{1.5N - 0.5} \leq 50$	$50 < \frac{V_M}{1.5N - 0.5} \leq 400$	$\frac{V_M}{1.5N - 0.5} > 400$
< 55	65	100	100
≥ 55	150	150	200



D_C (FT)	
PREFERRED	MINIMUM
100	65

DS (FT)	
PREFERRED	MINIMUM
150	100

V_C = AVERAGE DAILY TRAFFIC ON CROSS ROAD VEHICLES PER DAY

V_M = AVERAGE DAILY TRAFFIC ON THROUGH ROAD VEHICLES PER DAY

N = NUMBER OF MAILBOXES AT MAIL STOP

MINIMUM CLEARANCE DISTANCE TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS

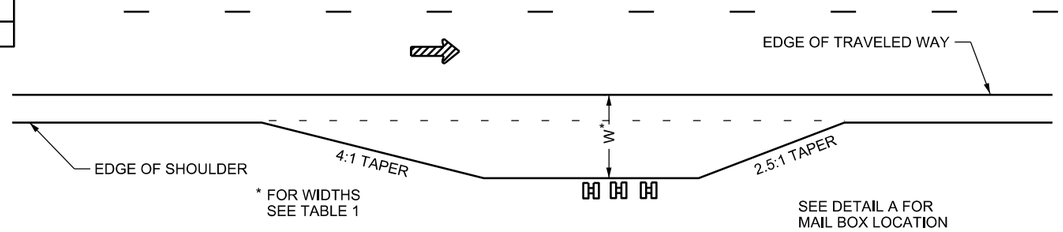
TABLE 1

HIGHWAY TYPE AND TRAFFIC CONDITIONS	WIDTH(W) OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX - FT		DISTANCE ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURNOUT OR USABLE SHOULDER - INCHES	
	PREFERRED	MINIMUM	PREFERRED	MINIMUM
RURAL HIGHWAY ADT OVER 10,000	> 12	8	8 TO 12	0
RURAL HIGHWAY ADT = 1,500 TO 10,000	12	8		
RURAL HIGHWAY ADT = 100 TO 1500	10	8		
RURAL ROAD ADT UNDER 100	8	6		
RURAL ROAD ADT UNDER 50 SPEED = 40 MPH OR LESS	6	2		
RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER	2	0		* *
CURBED RESIDENTIAL STREET	NOT APPLICABLE		8 TO 12 BEHIND TRAFFIC FACE OF CURB	6 BEHIND TRAFFIC FACE OF CURB

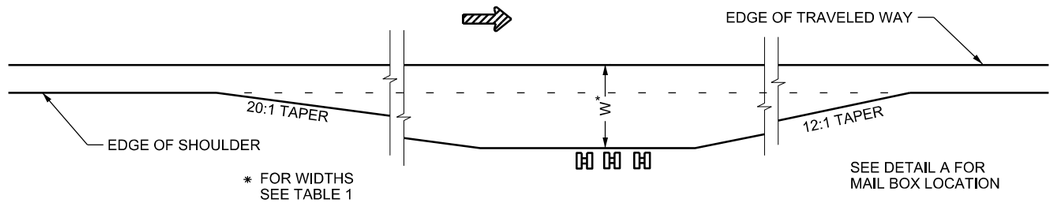
ADT = AVERAGE DAILY TRAFFIC

* * THIS MAY BE REDUCED TO ZERO, IF A TURN OUT IS PROVIDED.

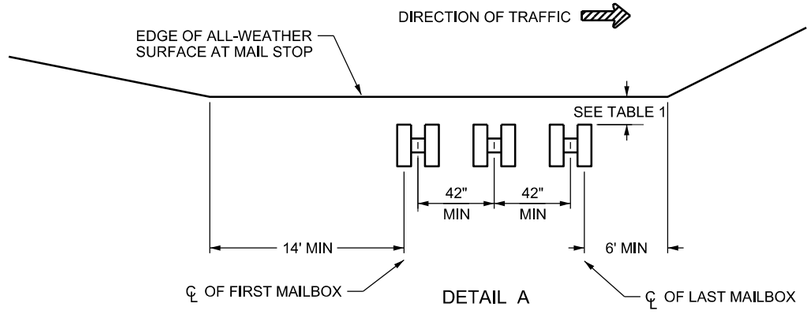
LATERAL PLACEMENT OF MAILBOXES



MAIL STOP LAYOUT FOR ROADS CARRYING LOW TRAFFIC SPEEDS ≤ 40 MPH OR FOR LOCAL AND COLLECTOR ROADS CARRYING ≤ 400 ADT



MAIL STOP LAYOUT FOR ROADS CARRYING HIGH SPEED TRAFFIC > 40 MPH



MAILBOX LOCATION AT MAIL STOP

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE

APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

NEWSPAPER AND MAILBOX STOP LAYOUT

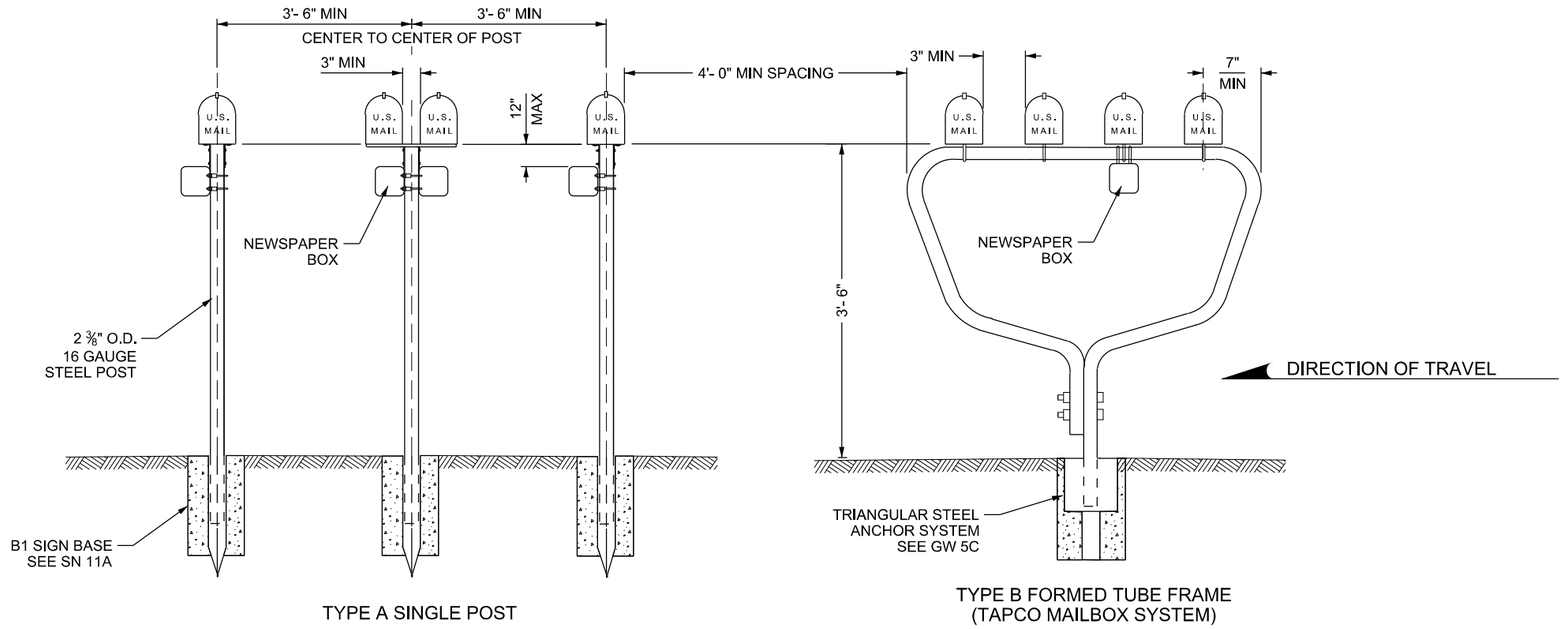
STANDARD DRAWING TITLE

STD. DWG. NO.

GW 5A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\GW05A.dgn

23-JUN-2020

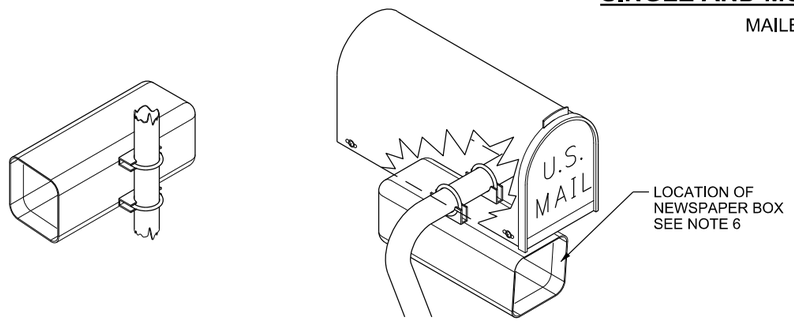


TYPE A SINGLE POST

TYPE B FORMED TUBE FRAME (TAPCO MAILBOX SYSTEM)

SINGLE AND MULTIPLE MAILBOX ASSEMBLIES

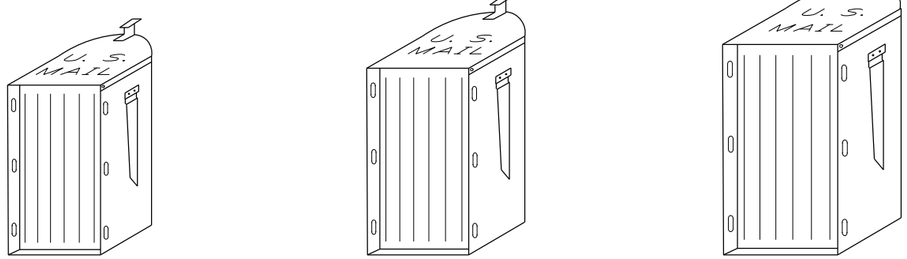
MAILBOX PLACEMENT DIMENSIONS



NEWSPAPER BOX TYPE A

NEWSPAPER BOX TYPE B

ONLY INSTALL NEWSPAPER BOX IF REQUESTED BY PROPERTY OWNER.



SIZE NO. 1 MAILBOX

(19 INCH x 6 ½ INCH x 8 ½ INCH)

SIZE NO. 2 MAILBOX

(21 INCH x 8 INCH x 10 ½ INCH)

SIZE NO. 3 MAILBOX

(23 ½ INCH x 11 ½ INCH x 13 ½ INCH)

APPROXIMATE MAILBOX SIZES

SEE NOTE 4

USE SIZE NO. 1 MAILBOX UNLESS PROPERTY OWNER REQUESTS A LARGER MAILBOX.

NOTES

1. MAILBOX BASES AND SUPPORTS ARE DEFINED AS FOLLOWS:
   TYPE "A": SINGLE POST WITH BASE FOR THE MOUNTING OF A SINGLE OR DOUBLE MAILBOX WITH OR WITHOUT NEWPAPER BOX.
   TYPE "B": A SINGLE POINT FORMED MOUNTING TUBE WITH BASE FOR THE MOUNTING OF THREE OR FOUR MAILBOXES WITH OR WITHOUT NEWSPAPER BOXES.
2. INSTALL MAILBOX MOUNTING HARDWARE ACCORDING TO MANUFACTURER'S REQUIREMENTS.
3. USE ONE OF THE FOLLOWING MOUNTING BASES, POSTS, AND HARDWARE:
   A) TAPCO V-LOC MAILBOX SYSTEM.
   B) OTHER MAILBOX SYTEMS THAT MEET MASH CRASHWORTHINESS REQUIREMENTS MAY BE USED WITH ENGINEER'S APPROVAL.
4. USE ANY COMMERCIALLY AVAILABLE MAILBOX MEETING POST OFFICE REQUIREMENTS AND DETAILS ON THIS DRAWING.
5. MOUNT NO MORE THAN TWO MAILBOXES AND TWO NEWSPAPER BOXES USING TYPE "A" POST. MOUNT NEWSPAPER BOX UNDER MAILBOX AND DIRECTLY TO SUPPORT TYPE "A." MOUNT NO MORE THAN FOUR MAILBOXES AND FOUR NEWSPAPER BOXES ON TYPE "B" FRAME.
6. DO NOT EXTEND NEWSPAPER BOXES BEYOND THE FRONT OF THE MAILBOX WHEN THE MAILBOX DOOR IS CLOSED.
7. USE 2 INCH OR 2 ¼ INCH DIAMETER U-CLAMPS WITH ⅜ INCH DIAMETER THREADED BOLT END INCLUDING FLAT WASHERS, LOCK WASHERS, HEX NUTS, AND APPROPRIATE U-CLAMP SADDLE FOR ALL DEPICTED U-CLAMPS OR SOMETHING SIMILAR.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	4/30/20	JW	MASH UPDATES

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

NEWSPAPER AND MAILBOX SUPPORTS

STANDARD DRAWING TITLE

STD. DWG. NO.

GW 5B

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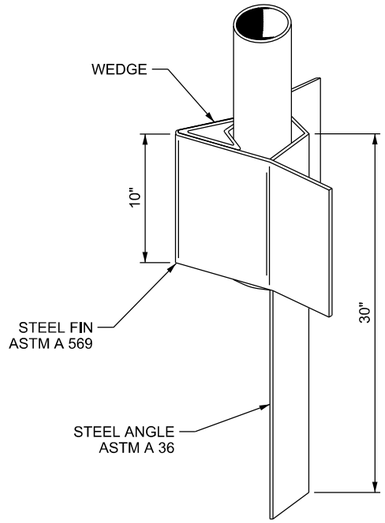
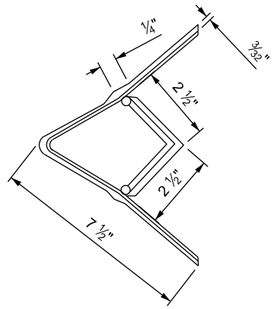
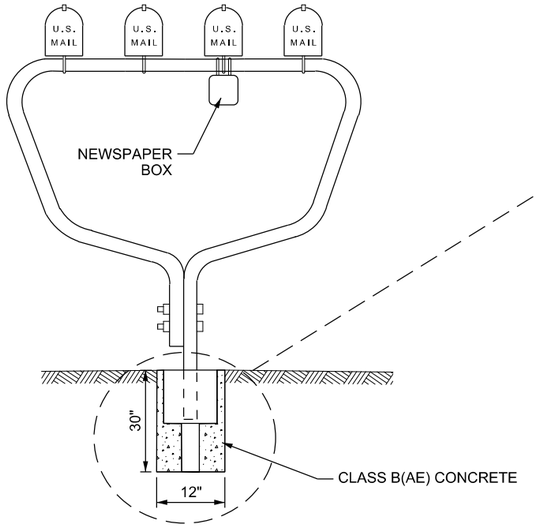
23-JUN-2020



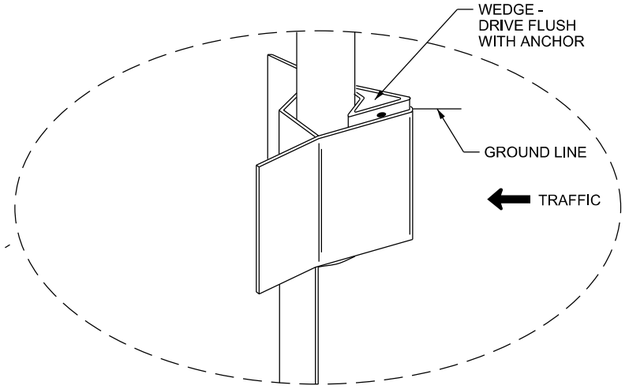


TOP VIEW



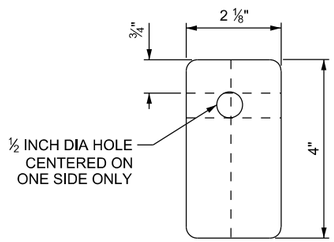
TRIANGULAR STEEL ANCHOR SYSTEM

(TAPCO MAILBOX SYSTEM)

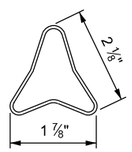


TRIANGULAR STEEL ANCHOR

GALVANIZE AFTER FABRICATION



SIDE VIEW



TOP VIEW

WEDGE

NO.	DATE	APPR.	REMARKS
1	4/30/20	JW	MASH UPDATES

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

STANDARD DRAWING TITLE

TRIANGULAR STEEL ANCHOR SYSTEM

STD. DWG. NO.

GW 5C

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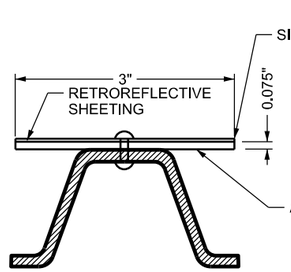
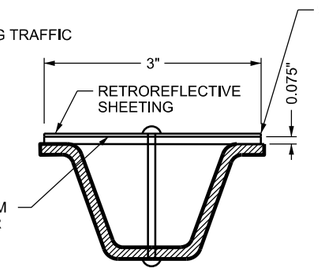
23-JUN-2020



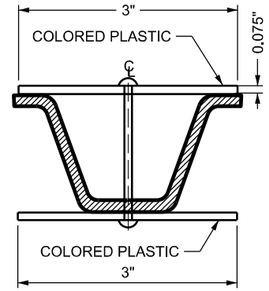
PREFERRED DELINEATOR INSTALLATION

SEE NOTE 3



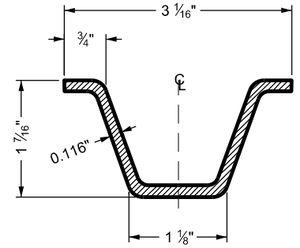
OPTIONAL DELINEATOR INSTALLATION

SEE NOTE 3



CULVERT/MAINTENANCE MARKER INSTALLATION

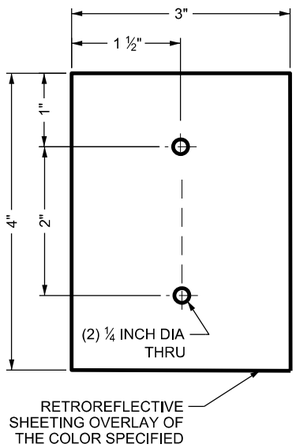
FOR 2 LB/FT POST WITH COLORED PLASTIC ATTACHED. SEE NOTE 2



CROSS SECTION

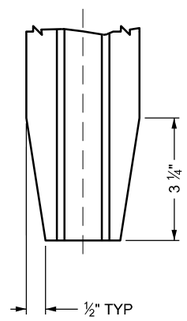
FOR 2 LB/FT POST

BARRIER REFLECTORS

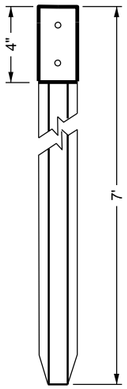


DELINEATOR PLATE

SEE NOTE 3

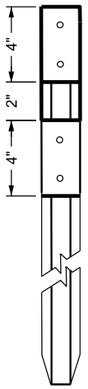


POST TAPER DETAIL



TYPE I

SINGLE UNIT
SEE NOTE 1

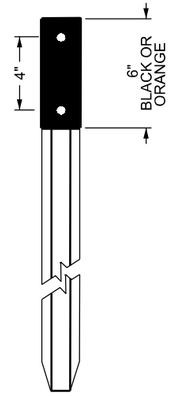


TYPE II

DOUBLE UNIT
SEE NOTES 1, 5

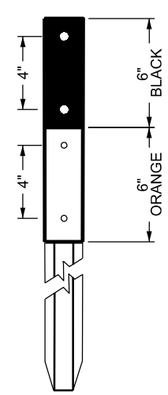
DELINEATORS

(OF COLOR SPECIFIED)



MAINTENANCE/CULVERT MARKER

SEE NOTE 2



MAINTENANCE/CULVERT MARKER

SEE NOTE 2

NOTES:

1. USE GALVANIZED STEEL POSTS FABRICATED WITH 5⁄16 INCH HOLES ON 1 INCH SPACING OR FLEXIBLE DELINEATORS AS SPECIFIED IN STANDARD SPECIFICATION 02842. PUNCH HOLES ON THE CENTERLINE OF THE POST. PLACE TOP HOLE 1 INCH FROM THE TOP OF POST. PUNCH HOLES THE FULL LENGTH OF THE POST.

2. ATTACH 3 X 6 X 1⁄10 INCH COLORED PLASTIC OF THE COLOR SPECIFIED ON CULVERT AND MAINTENANCE MARKERS.
   A. USE BLACK FOR CULVERT MARKERS.
   B. USE ORANGE FOR MAINTENANCE MARKERS.
   C. USE BLACK ABOVE ORANGE WHEN BOTH MARKERS (MAINTENANCE AND CULVERT) ARE REQUIRED ON ONE DELINEATOR.

3. INSTALL DELINEATOR PLATE ON THE SIDE OF THE POST FACING TRAFFIC. PREFERRED ORIENTATION OF POST TO ONCOMING TRAFFIC IS AS SHOWN. HOWEVER, EXISTING POST WITH THE OPPOSITE ORIENTATION IS ACCEPTABLE. INSTALL WITH TWO ¼ INCH DIAMETER EXPANSION RIVETS. INSTALL ON OPPOSITE SIDE WITH TWO ¼ INCH POP RIVETS WITH BACKING WASHERS.

4. REFER TO SN SERIES STD DWGS FOR FREEWAY CROSSOVER DELINEATION MARKINGS AND HARDWARE.

5. USE TYPE II DELINEATORS ON ENTRANCE AND EXIT RAMPS ONLY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

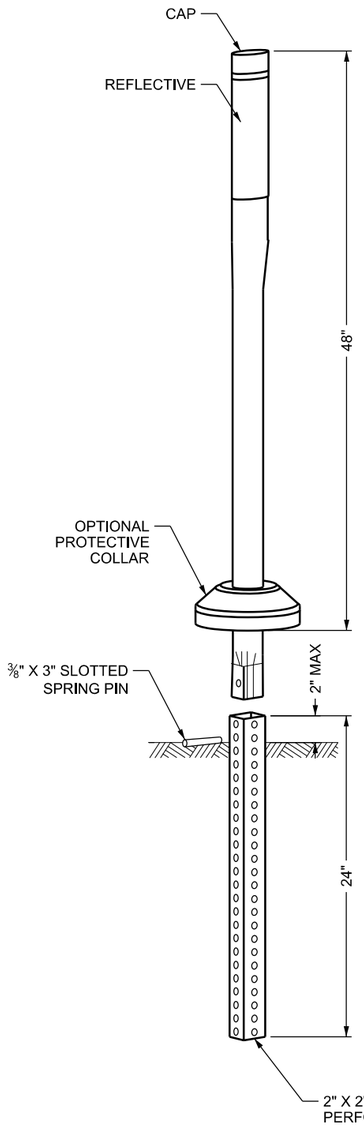
DELINEATION HARDWARE

STANDARD DRAWING TITLE

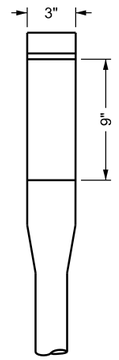
STD. DWG. NO.

GW 6A

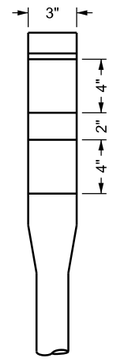
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\GW06A.dgn



FLEXIBLE DELINEATOR POSTS



TYPE I



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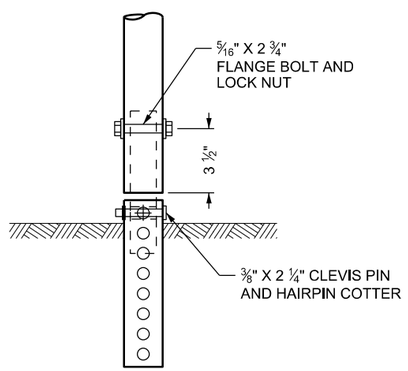
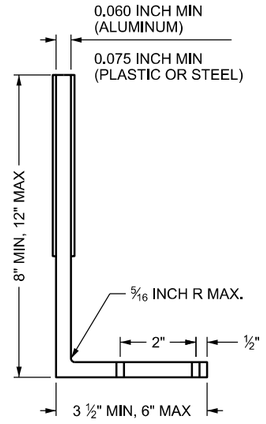


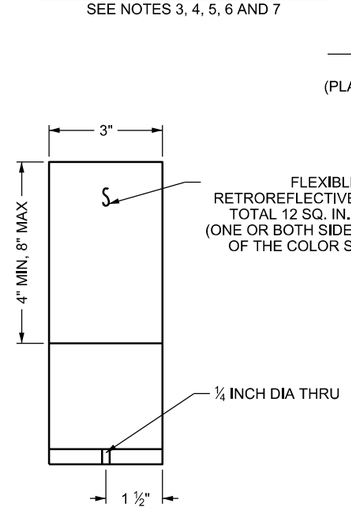
OPTIONAL BASE FOR FLEXIBLE POSTS

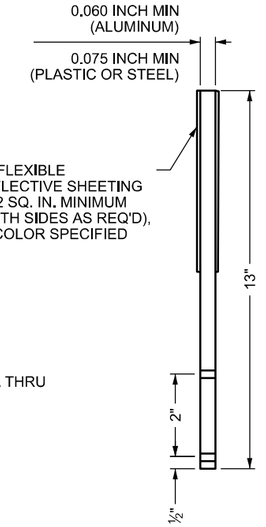
BARRIER REFLECTORS

SEE NOTES 3, 4, 5, 6 AND 7

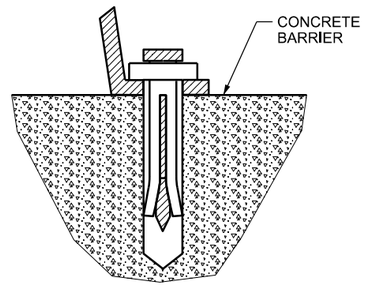


"L" REFLECTOR





STRAIGHT REFLECTOR



METAL HIT ANCHORS

SEE NOTE 3

NOTES:

1. MATCH FLEXIBLE DELINEATOR POST COLOR TO THE ADJACENT PAVEMENT MARKING LINE COLOR.
2. INSTALL FLEXIBLE DELINEATOR REFLECTOR ON THE SIDE OF THE POST FACING TRAFFIC.
3. MOUNT BARRIER REFLECTORS ON CONCRETE AND BRIDGE PARAPETS WITH TWO ¼ x ¼ INCH METAL HIT ANCHORS WITH NON-METALLIC WASHERS.
4. MOUNT BARRIER REFLECTORS ON CONCRETE BARRIER AS SHOWN ON STD DWG BA 1B.
5. MOUNT STRAIGHT REFLECTORS ON WOOD POSTS WITH TWO 2 ½ INCH ELECTRO GALVANIZED RING SHANK NAILS WITH NEOPRENE WASHERS.
6. MOUNT STRAIGHT REFLECTORS ON STEEL POSTS WITH TWO ¼ x ¾ INCH BOLTS AND SELF LOCKING NUTS.
7. MOUNT BARRIER REFLECTORS ON GUARDRAIL POSTS AS SHOWN ON STD DWG BA 4A.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/27/2020	JW	UPDATED REFLECTOR THICKNESS AND MATERIAL.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

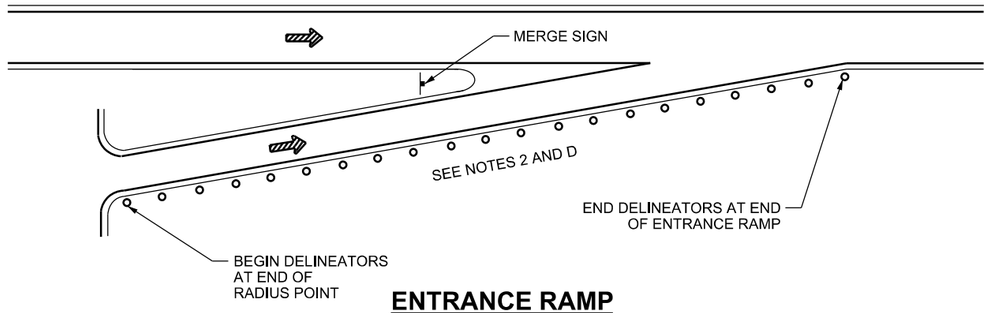
STANDARD DRAWING TITLE

BARRIER AND FLEXIBLE DELINEATION HARDWARE

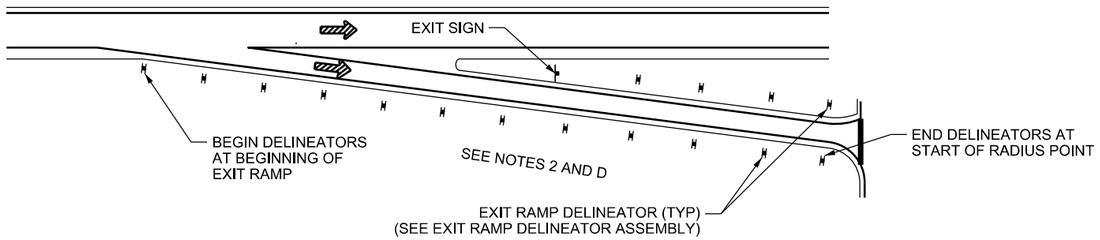
STD. DWG. NO.

GW 6B

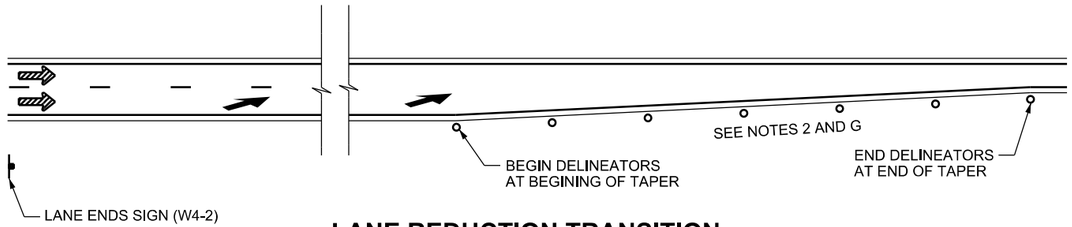
DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW06B.dgn
23-JUN-2020



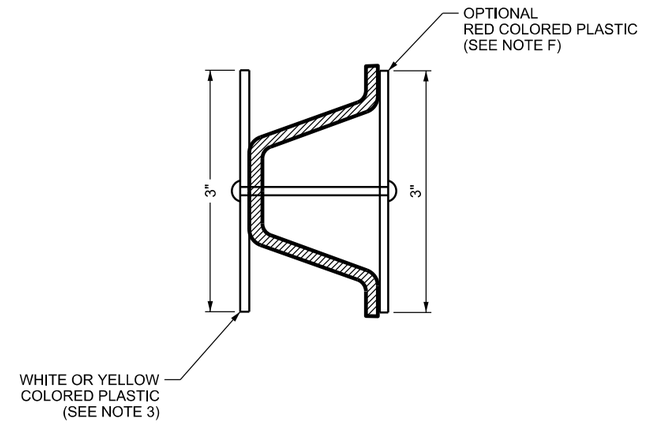
ENTRANCE RAMP



EXIT RAMP

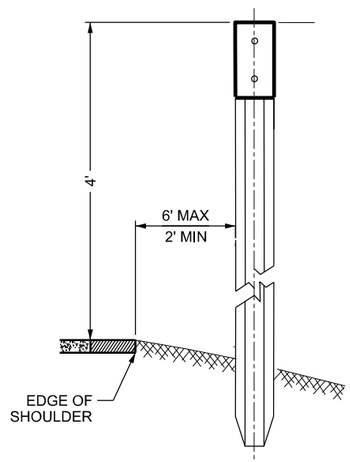


LANE REDUCTION TRANSITION

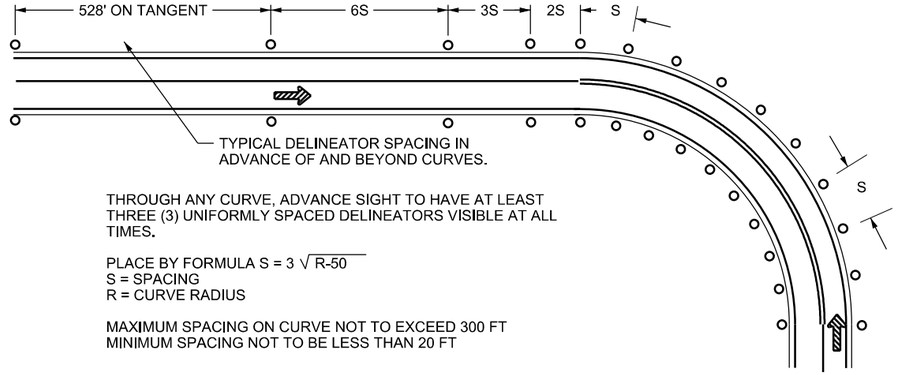


EXIT RAMP DELINEATOR ASSEMBLY

USE FOR 2 LB/FT POST WITH COLORED PLASTIC ATTACHED



DELINEATOR

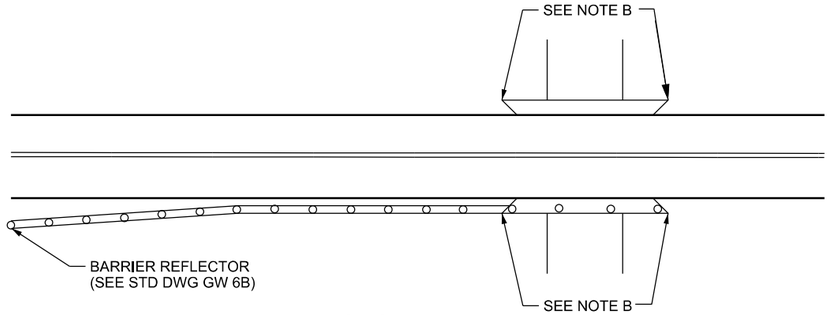


THROUGH ANY CURVE, ADVANCE SIGHT TO HAVE AT LEAST THREE (3) UNIFORMLY SPACED DELINEATORS VISIBLE AT ALL TIMES.

PLACE BY FORMULA $S = 3\sqrt{R-50}$
S = SPACING
R = CURVE RADIUS

MAXIMUM SPACING ON CURVE NOT TO EXCEED 300 FT
MINIMUM SPACING NOT TO BE LESS THAN 20 FT

DELINEATOR SPACING FORMULA



BARRIER REFLECTOR DETAIL

(SEE NOTE A)

NOTES:

1. BARRIERS ARE DEFINED AS BEING GUARDRAIL, CONCRETE BARRIER, AND BRIDGE PARAPET WALL.
2. USE CONSISTENT MOUNTING HEIGHT AT EACH LOCATION.
3. MATCH REFLECTOR COLOR TO THE ADJACENT PAVEMENT MARKING LINE COLOR. INSTALL THE YELLOW OR WHITE REFLECTORS ON POSTS TO FACE TRAFFIC.

DESIGN-ONLY NOTES:

A. SPACE BARRIER REFLECTORS A MAXIMUM 100 FT IN PERMANENT APPLICATIONS AND 50 FT FOR TEMPORARY APPLICATIONS. REFLECTOR COLOR TO MATCH THE ADJACENT PAVEMENT MARKING LINE.

B. INSTALL APPROPRIATE OBJECT MARKER OM3-R (OR L OR C) IN PLACE OF DELINEATOR AT LEADING EDGE OF BRIDGE PARAPET OR HEADWALL IF GUARDRAIL IS NOT PRESENT.

C. CHEVRON ALIGNMENT (W1-8) SIGNS MAY BE USED WHEN ADDITIONAL EMPHASIS AND GUIDANCE FOR A CHANGE IN HORIZONTAL ALIGNMENT IS NEEDED. THE W1-8 SIGN MAY BE USED TO SUPPLEMENT STANDARD DELINEATORS ON CURVES. THE W1-8 SIGN MAY BE USED TO SUPPLEMENT OR AS AN ALTERNATE TO THE LARGE ARROW (W1-6) SIGN. SEE STD DWG SN 7 FOR CHEVRON ALIGNMENT SIGN DETAILS.

D. SPACE TYPE II DELINEATORS AT 300 FT ON TANGENTS ALONG ALL ENTRANCE AND EXIT RAMPS AS SHOWN. USE DELINEATOR SPACING FORMULA FOR ALL RAMP CURVES.

E. USE DELINEATORS ON THE LEFT SIDE OF ENTRANCE AND EXIT RAMPS FOR RIGHT HAND CURVES UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.

F. RED REFLECTORS MAY BE INSTALLED ON BACK SIDES OF DELINEATOR POSTS IN AREAS WHERE WRONG WAY DRIVERS ARE OF CONCERN.

G. SPACE 7 TYPE I DELINEATORS EQUALLY SPACED THROUGH LENGTH OF LANE REDUCTION TAPER.

NO.	DATE	APPR.	REVISIONS
1	8/29/19	MRB	ADDED DELINEATOR PLACEMENT DETAIL FOR LANE REDUCTIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020 — DATE
APPROVED
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
DELINEATION APPLICATION

STD. DWG. NO.
GW 7A

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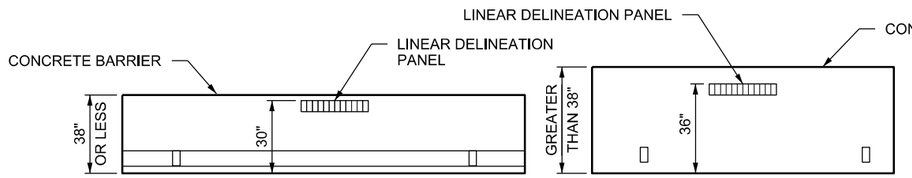
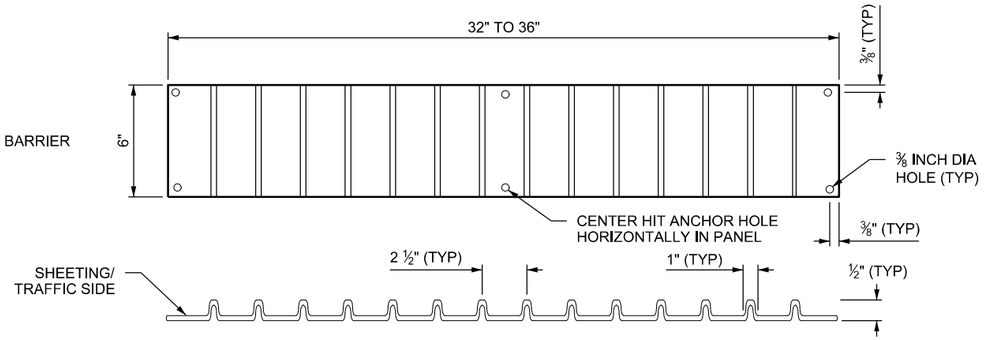
23-JUN-2020



LINEAR DELINEATION PANEL PLACEMENT ON CONCRETE BARRIER DETAIL

SEE NOTE 6



LINEAR DELINEATION PANEL (TYP)

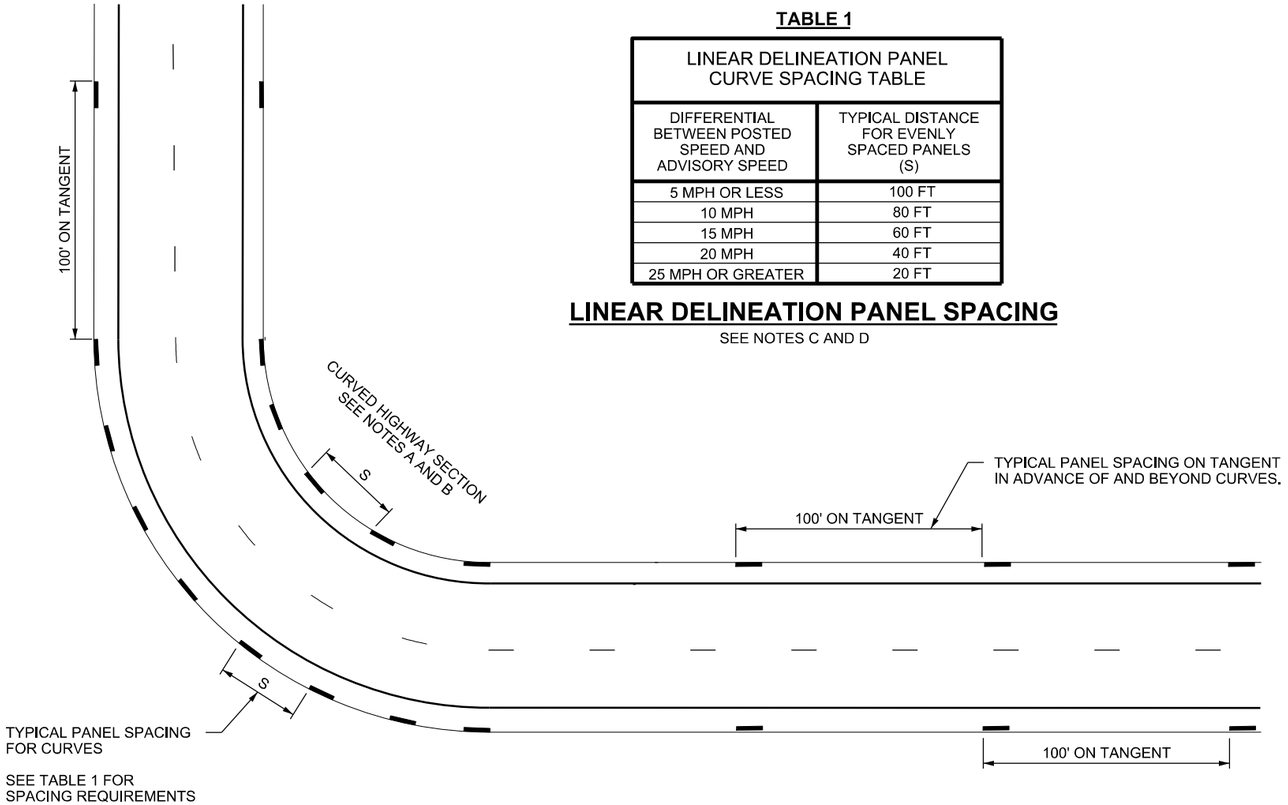
SEE NOTES 1, 2, AND 3

TABLE 1

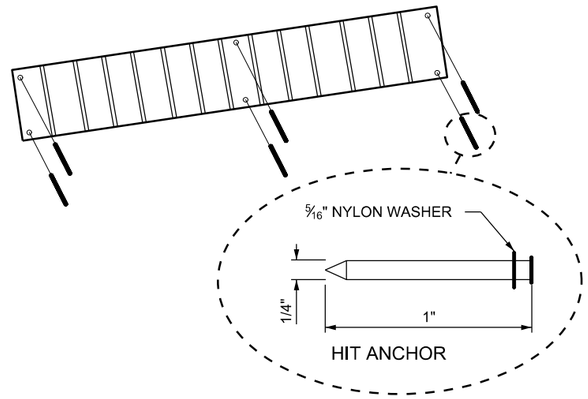
LINEAR DELINEATION PANEL CURVE SPACING TABLE	
DIFFERENTIAL BETWEEN POSTED SPEED AND ADVISORY SPEED	TYPICAL DISTANCE FOR EVENLY SPACED PANELS (S)
5 MPH OR LESS	100 FT
10 MPH	80 FT
15 MPH	60 FT
20 MPH	40 FT
25 MPH OR GREATER	20 FT

LINEAR DELINEATION PANEL SPACING

SEE NOTES C AND D



LINEAR DELINEATION PANEL SPACING DETAIL



HIT ANCHOR DETAIL

SEE NOTES 4 AND 5

NOTES:

1. USE PANELS OF THE SAME COLOR AS THE EDGE LINE.
2. USE RETROREFLECTIVE SHEETING MEETING THE REQUIREMENTS OF STANDARD SPECIFICATION 02890.
3. USE ALUMINUM SUBSTRATE.
4. PRE-DRILL SIX, ¼ INCH x 1 INCH HOLES IN THE BARRIER.
5. USE ¼ INCH x 1 INCH STAINLESS STEEL HIT ANCHORS WITH 5/16 INCH NYLON WASHERS TO SECURE PANEL TO BARRIER.
6. MAY BE USED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE BARRIER.

DESIGN-ONLY NOTES:

A. BEGIN REDUCED PANEL SPACING AT START OF CURVE IN THE DIRECTION OF TRAVEL.

B. END PANELS AT THE END OF THE CURVE IN THE DIRECTION OF TRAVEL, OR AT THE LOCATION DETERMINED BY THE REGION TRAFFIC ENGINEER.

C. SPACE PANELS AS FOLLOWS:
   A. USE MAXIMUM SPACING OF 100 FT ON TANGENTS AND CURVES.
   B. USE MINIMUM SPACING OF 20 FT ON CURVES.

D. SPACING MAY BE ADJUSTED BETWEEN THE MAXIMUM AND THE MINIMUM SPACING REQUIREMENTS AT THE DIRECTION OF THE REGION TRAFFIC ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

LINEAR DELINEATION PANEL AND INSTALLATION DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
GW 7B

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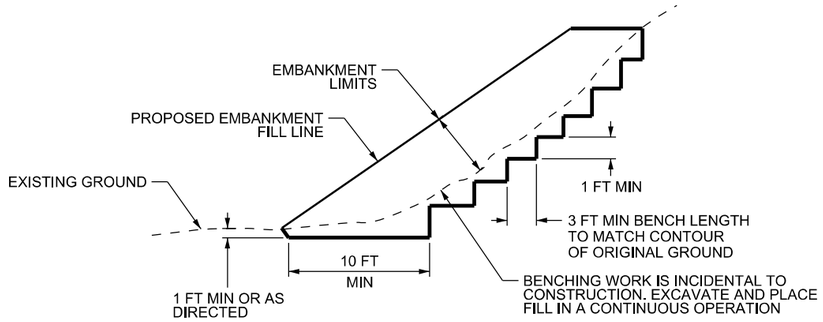
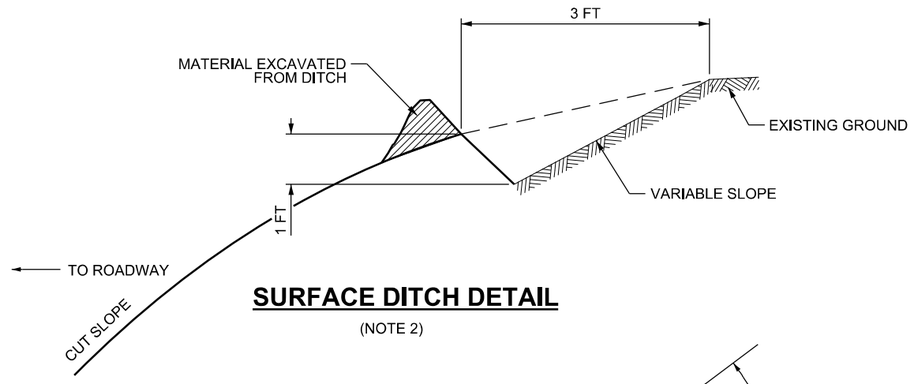
23-JUN-2020



BENCHED SLOPE DETAIL

(NOTE 3)



SURFACE DITCH DETAIL

(NOTE 2)

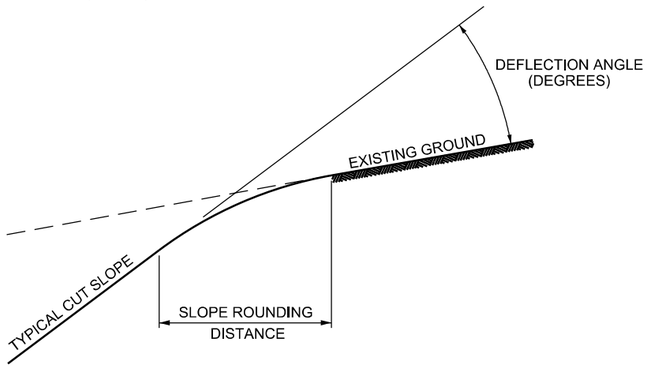
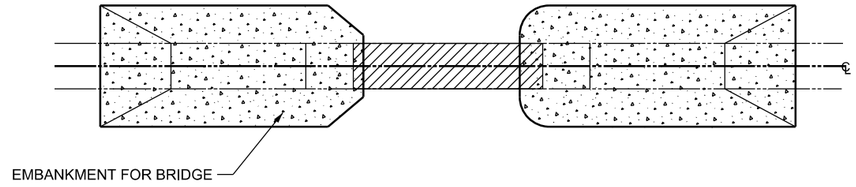


TABLE 1 - COMMON DEFLECTION ANGLE (DEGREES)

				EXISTING SLOPE									
	H:V			1:1.5	1:1	2:1	3:1	4:1	5:1	6:1	8:1	10:1	20:1
		% SLOPE		150%	100%	50%	33%	25%	20%	17%	13%	10%	5%
			DEG	56	45	27	18	14	11	9	7	6	3
PROPOSED SLOPE	1:2	200%	63	7	18	37	45	49	52	54	56	58	61
	1:1.5	150%	56	-	11	30	38	42	45	47	49	51	53
	1:1	100%	45	-	-	18	27	31	34	36	38	39	42
	2:1	50%	27	-	-	-	8	13	15	17	19	21	24
	3:1	33%	18	-	-	-	-	4	7	9	11	13	16
	4:1	25%	14	-	-	-	-	-	3	5	7	8	11

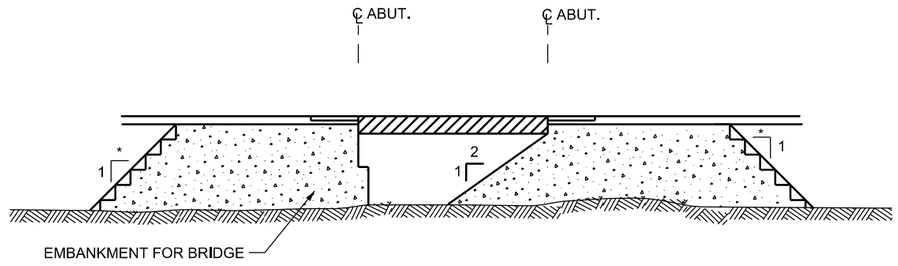
CUT SLOPE ROUNDING DETAIL

(NOTE 4)



EMBANKMENT FOR BRIDGE

PLAN VIEW APPROACH EMBANKMENTS



EMBANKMENT FOR BRIDGE

CL PROFILE VIEW APPROACH EMBANKMENTS

* THEORETICAL SLOPE MAXIMUM OF 1:1 TO TRANSITION BETWEEN EMBANKMENT MATERIALS.

TABLE 2 - SLOPE ROUNDING DISTANCE (FT)

		SLOPE HEIGHT (FT) (NOTE 5)			
		5-10	>10-15	>15-20	>20
DEFLECTION ANGLE	<10°	NO SLOPE ROUNDING NEEDED			
	10°-20°	2	4	5	6
	20°-30°	4	8	10	12
	30°-40°	6	12	15	18
	40°+	8	16	20	24

NOTES:

1. TRANSITION FROM FLAT TO STEEPER CUT AND FILL SLOPES IN SUFFICIENT DISTANCE TO PROVIDE A NATURAL PLEASING APPEARANCE.
2. INSTALL SURFACE DITCH (OPTIONAL) WHEN SHEET FLOW DRAINAGE IS CONCENTRATED TOWARDS AND HAS POTENTIAL TO ERODE THE CUT SLOPE OR CREATE OTHER HAZARDS. DRAIN SURFACE DITCH TO NATURAL DRAINAGE OR ROADSIDE DITCH. PROVIDE OTHER MEASURES TO PROTECT CUT SLOPES AND PREVENT OTHER HAZARDS IF SURFACE DITCH IS OMITTED.
3. BENCH EXISTING SLOPE PER CENTRAL GEOTECHNICAL RECOMMENDATIONS.
4. FIND THE COMMON DEFLECTION ANGLE IN TABLE 1 AND THEN USE TABLE 2 TO FIND THE SLOPE ROUNDING DISTANCE FOR CUT SLOPE ROUNDING DETAIL. THE GREATER NUMBER OF MULTIPLE DISTANCES MAY BE USED TO AVOID FREQUENT ROUNDING DISTANCE CHANGES.
5. THE CUT SLOPE HEIGHT IS FROM THE BOTTOM TO THE TOP OF THE CUT BEFORE ROUNDING.
6. DO NOT EXCEED 2H:1V OR STEEPER SLOPES WITHOUT APPROVAL FROM THE ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

SURFACE DITCH, BENCHED SLOPE AND EMBANKMENT FOR BRIDGE PLACEMENT DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
GW 8

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\GW08.dgn
23-JUN-2020

DIMENSION REFERENCE TABLE (PROWAG R302 - R305)				
	ITEM	MAX. RUNNING SLOPE	MAX. CROSS SLOPE	MIN. DIMENSIONS
(S)	SIDEWALK	RD GRADE (IN ROW) 5.0% (OUT OF ROW)	2.0%	4 FT WIDE (i)
(T)	TURNING SPACE	2.0%	2.0% (iv), (v)	4 FT X 4 FT (ii), (viii)
(R)	RAMP	8.3% (iii)	2.0% (iv), (v)	4 FT WIDE (viii)
(C)	CLEAR SPACE	5.0% (vi)	2.0% (iv), (v)	4 FT X 4 FT
	AT-GRADE ACCESS	(SEE DEFINITION)	2.0% (iv), (v)	4 FT WIDE
	CROSSWALK	5.0%	2.0% (iv), (v)	10 FT WIDE
(F1)	FLARE WITHIN SIDEWALK	10.0% (vii)	-	-
(F2)	FLARE NOT IN SIDEWALK	25.0% (vii)	-	-

(i) SIDEWALK WIDTH IS EXCLUSIVE OF THE WIDTH OF THE CURB. PROVIDE 5 FT X 5 FT PASSING SPACES AT 200 FT MAX. INTERVALS WHERE SIDEWALK WIDTH IS LESS THAN 5 FT (PROWAG R302.3 - R302.4). DRIVEWAYS OR OTHER PAVED SURFACES MAY BE USED AS A PASSING SPACE WHERE A MINIMUM 5 FT WIDE AREA MEETING SIDEWALK REQUIREMENTS IS PROVIDED.

(ii) USE A 5 FT MIN. DEPTH IN THE DIRECTION OF THE RAMP RUN FOR PERPENDICULAR RAMPS WHERE TURNING SPACE IS CONSTRAINED AT THE BACK OF SIDEWALK. (PROWAG R304.2.1)
USE A 5 FT MIN. WIDTH IN THE DIRECTION OF THE STREET CROSSING FOR PARALLEL RAMPS WHERE TURNING SPACE IS CONSTRAINED ON 2 OR MORE SIDES (PROWAG R304.3.1)
TURNING SPACE IS CONSTRAINED BY ANY VERTICAL DIFFERENCE GREATER THAN 3.0 IN.

(iii) LENGTH OF 8.3% MAX RUNNING SLOPE IS NOT REQUIRED TO EXCEED 15 FT. STEEPEN GRADE TO MATCH EXISTING WITHIN AT LEAST 15 FT OR THE NEXT NEAREST JOINT IF THE MAX RUNNING SLOPE CAN NOT BE MET IN 15 FT. (PROWAG R304.2.2, R304.3.2).

(iv) DO NOT EXCEED 2.0% CROSS SLOPE FOR CROSSINGS WHERE THERE IS STOP OR YIELD SIGN.
DO NOT EXCEED 5.0% CROSS SLOPE FOR CROSSINGS WHERE THERE IS NO STOP OR YIELD SIGN OR WHERE THERE IS A TRAFFIC SIGNAL DESIGNED FOR A GREEN PHASE. (PROWAG R302.6)

(v) MATCH THE HIGHWAY GRADE AT MIDBLOCK CROSSINGS (PROWAG R302.6.2)

(vi) FLATTEN GUTTER SLOPE TO 5.0 PERCENT MAX AND MAINTAIN CLEAR SPACE RUNNING SLOPE ACROSS ENTIRE CURB CUT. (PROWAG R304.5.4) (SEE STD DWG PA 3, DETAIL A)

(vii) MEASURE FLARE SLOPE PARALLEL TO CURB LINE. FLARES NOT IN THE SIDEWALK ARE PERMITTED TO BE A VERTICAL CURB FACE WHEN ACCESS FROM PLOWS IS NOT EXPECTED.

(viii) MATCH TURNING SPACE, RAMP, AND AT-GRADE ACCESS WIDTH TO CURB CUT AT PROJECTED BACK OF CURB.

DEFINITIONS

SINGLE DIAGONAL (APEX) RAMP: A CURB RAMP THAT SERVES BOTH PEDESTRIAN STREET CROSSINGS (PROWAG R207.2)

AT-GRADE ACCESS: A RAISED PEDESTRIAN STREET CROSSING OR SIMILAR CONNECTION BETWEEN THE PEDESTRIAN ACCESS ROUTE AT THE LEVEL OF THE SIDEWALK AND THE LEVEL OF THE PEDESTRIAN STREET CROSSING THAT HAS NO CHANGE IN GRADE BETWEEN ADJACENT PEDESTRIAN ACCESS ROUTE ELEMENTS.

CLEAR SPACE: A SPACE BEYOND THE BOTTOM GRADE BREAK OF THE RAMP, PROVIDED WITHIN THE WIDTH OF THE PEDESTRIAN STREET CROSSING AND WHOLLY OUTSIDE THE PARALLEL VEHICLE TRAVEL LANE (PROWAG R304.5.5)

COMBINATION RAMP: RAMPS THAT PROVIDE A COMBINATION OF CONFORMING PARALLEL AND PERPENDICULAR RAMPS

CROSS SLOPE: THE GRADE THAT IS PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL (PROWAG R105.5)

CURB CUT: THE AREA WHERE THE CURB IS CUT FLUSH TO THE FLOWLINE OF THE GUTTER OR ADJACENT ROADWAY EXCLUDING SLOPED CURB AT THE SIDES.

EXISTING PHYSICAL CONSTRAINTS: INCLUDE, BUT ARE NOT LIMITED TO, UNDERLYING TERRAIN, RIGHT-OF-WAY AVAILABILITY, UNDERGROUND STRUCTURES, ADJACENT DEVELOPED FACILITIES, DRAINAGE, OR THE PRESENCE OF A NOTABLE NATURAL OR HISTORIC FEATURE. (PROWAG R202.3.1)

GRADE BREAK: THE LINE WHERE TWO SURFACE PLANES WITH DIFFERENT GRADES MEET.

FLARE: A SLOPED SURFACE THAT PROVIDES A GRADED TRANSITION ON THE SIDE OF A CURB RAMP BETWEEN THE CURB AND THE TURNING SPACE, MEASURED PARALLEL TO THE CURB.

PARALLEL RAMP: CURB RAMPS THAT HAVE A RUNNING SLOPE THAT IS IN-LINE WITH THE DIRECTION OF SIDEWALK TRAVEL AND LOWER THE SIDEWALK TO A LEVEL TURNING SPACE WHERE A TURN IS MADE TO ENTER THE PEDESTRIAN STREET CROSSING. (PROWAG ADVISORY R304.1)

PEDESTRIAN ACCESS ROUTE: A CONTINUOUS AND UNOBSTRUCTED PATH OF TRAVEL PROVIDED FOR PEDESTRIANS WITH DISABILITIES WITHIN OR COINCIDING WITH A PEDESTRIAN CIRCULATION PATH (PROWAG R105.5)

PEDESTRIAN CIRCULATION PATH: A PREPARED EXTERIOR OR INTERIOR SURFACE PROVIDED FOR PEDESTRIAN TRAVEL IN THE PUBLIC RIGHT-OF-WAY. (PROWAG R105.5)

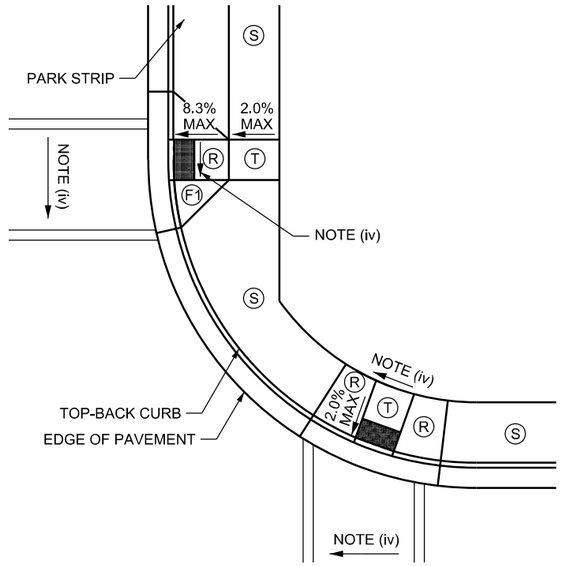
PERPENDICULAR RAMP: CURB RAMPS THAT HAVE A RUNNING SLOPE THAT CUTS THROUGH OR IS BUILT UP TO THE CURB AT RIGHT ANGLES OR MEETS THE GUTTER BREAK AT RIGHT ANGLES WHERE THE CURB IS CURVED. (PROWAG ADVISORY R304.1)

PROWAG: "PROPOSED ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY". THE DOCUMENT USED AS THE PRIMARY RESOURCE FOR INFORMATION SHOWN (SEE NOTE 1).

RAMP (R): A SLOPED SURFACE FROM ONE PEDESTRIAN ACCESS ROUTE (PAR) ELEVATION TO ANOTHER.

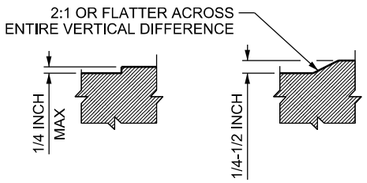
RUNNING SLOPE: THE GRADE THAT IS PARALLEL TO THE DIRECTION OF PEDESTRIAN TRAVEL (PROWAG R105.5)

TURNING SPACE: SPACE AT THE TOP AND BOTTOM OF A RAMP TO ALLOW FOR DIRECTIONAL CHANGE, PERMITTED TO OVERLAP OTHER TURNING SPACES AND CLEAR SPACES (PROWAG R304.2.1, R304.3.1)



CROSSING SLOPES DETAIL

CONFIGURATIONS SHOWN ARE EXAMPLES ONLY



VERTICAL SURFACE DISCONTINUITIES

NOTE 6

DESIGN NOTES APPLICABLE TO PA SERIES:

A. CONVENTIONAL INDUSTRY TOLERANCES DO NOT APPLY TO DESIGN WORK. (PROWAG ADVISORY R103.1)

B. PROVIDE A NO PEDESTRIAN (R9-3) SIGN AND A USE CROSSWALK (R9-3BP) PLAQUE (L OR R) IF PEDESTRIAN CROSSING IS PROHIBITED AT UNMARKED CROSSWALKS. (PROWAG ADVISORY R206) (SEE STD DWG PA 3 DETAIL B)

C. A SINGLE DIAGONAL CORNER (APEX) RAMP IS PERMITTED TO SERVE BOTH PEDESTRIAN CROSSINGS IN SITUATIONS WHERE EXISTING PHYSICAL CONSTRAINTS PREVENT THE USE OF A CURB RAMP, AT-GRADE ACCESS, OR A COMBINATION OF CURB RAMPS AND AT-GRADE ACCESS. (PROWAG R207.2) USE OF A SINGLE DIAGONAL RAMP IS DISCOURAGED AND IS ONLY TO BE USED AT THE APPROVAL OF THE REGION TRAFFIC ENGINEER.

D. ONLY A (4.0 FT) PORTION OF THE SIDEWALK IS REQUIRED TO COMPLY WITH THE REQUIREMENTS LISTED HEREIN WHERE SIDEWALKS ARE WIDER THAN 4.0 FT. (PROWAG ADVISORY R302.3)

E. PROVIDE A FIRM, STABLE, AND SLIP RESISTANT SURFACE FOR ALL PEDESTRIAN ACCESS ROUTES (PROWAG R302.7)

GENERAL NOTES APPLICABLE TO PA SERIES:

1. INFORMATION PROVIDED IS BY REFERENCE FROM THE UNITED STATES ACCESS BOARD DOCUMENT "PROPOSED ACCESSIBILITY GUIDELINES FOR PEDESTRIAN FACILITIES IN THE PUBLIC RIGHT-OF-WAY" (PROWAG).
2. THE USE OF ALTERNATIVE DESIGNS, PRODUCTS, OR TECHNOLOGIES THAT MEET OR EXCEED THE REQUIREMENTS SHOWN IS PERMITTED. (PROWAG R102)
3. PROVIDE AN ALTERNATE PEDESTRIAN ACCESS ROUTE COMPLYING WITH SECTIONS 6D.01, 6D.02, AND 6G.05 OF THE MUTCD WHEN A PEDESTRIAN CIRCULATION PATH IS TEMPORARILY CLOSED. COMPLY WITH SECTIONS 6F.63, 6F.68, AND 6F.71 OF THE MUTCD WHERE PEDESTRIAN BARRICADES AND CHANNELIZING DEVICES ARE PROVIDED. (PROWAG R205)
4. CONNECT THE PEDESTRIAN ACCESS ROUTES AT EACH PEDESTRIAN STREET CROSSING WITH A CURB RAMP, AT-GRADE ACCESS, OR A COMBINATION OF CURB RAMPS AND AT-GRADE ACCESSES. (PROWAG R207.1)
5. LOCATE THE CURB RAMP (EXCLUDING FLARED SIDES) OR AT-GRADE ACCESS COMPLETELY WITHIN THE CROSSWALK (PROWAG R207.1)
6. CONSTRUCT ALL GRADE BREAKS TO BE FLUSH (PROWAG R302.7.1) PREVENT OR CORRECT ANY VERTICAL DIFFERENCES IN SURFACES GREATER THAN 0.5 IN. BEVEL VERTICAL DIFFERENCES BETWEEN 0.25 IN AND 0.5 IN WITH A SLOPE NOT STEEPER THAN 2H:1V ACROSS THE ENTIRE VERTICAL DIFFERENCE. (PROWAG R302.7.2) (SEE DETAIL BELOW)
7. CONSTRUCT GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. DO NOT PLACE GRADE BREAKS ON THE SURFACES OF RAMP RUNS AND TURNING SPACES. (PROWAG R304.5.2)
8. SITE CONDITIONS MAY VARY. CONFIGURATION OF RAMP, AT-GRADE ACCESS, TURNING SPACE, AND CLEAR SPACE MAY BE ALTERED, BUT THEY MUST MEET DIMENSIONS AND SLOPES SHOWN HERE. THE USE OF ITEMS SUCH AS FLARES AND CURBWALLS ARE AT THE DISCRETION OF THE ENGINEER.
9. DO NOT USE DIRECTIONAL ACCESSES WHEN PEDESTRIANS CAN APPROACH THE DETECTABLE WARNING SURFACE FROM MORE THAN ONE DIRECTION.
10. CONSTRUCT ALL PEDESTRIAN ACCESS ROUTE ELEMENTS SO MAXIMUM OR MINIMUM VALUES ARE NOT EXCEEDED.
11. PROVIDE TOOLED JOINTS ON ALL GRADE BREAKS.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	2/28/19	CGW	REPLACED BLENDED TRANSITION WITH AT-GRADE ACCESS
1	2/22/18	CGW	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR — AUGUST 2020 DATE

GENERAL PEDESTRIAN ACCESS

STANDARD DRAWING TITLE

STD. DWG. NO.

PA 1

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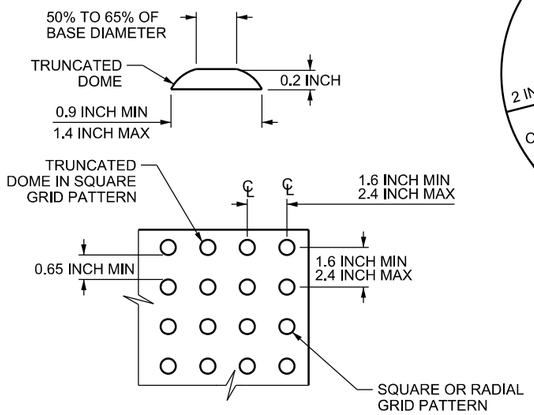
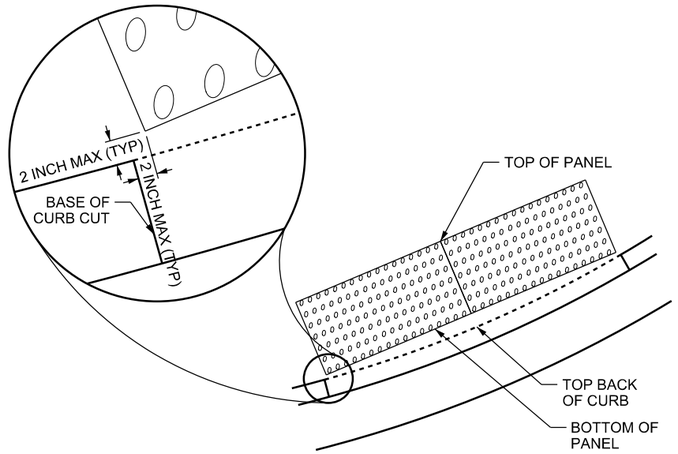


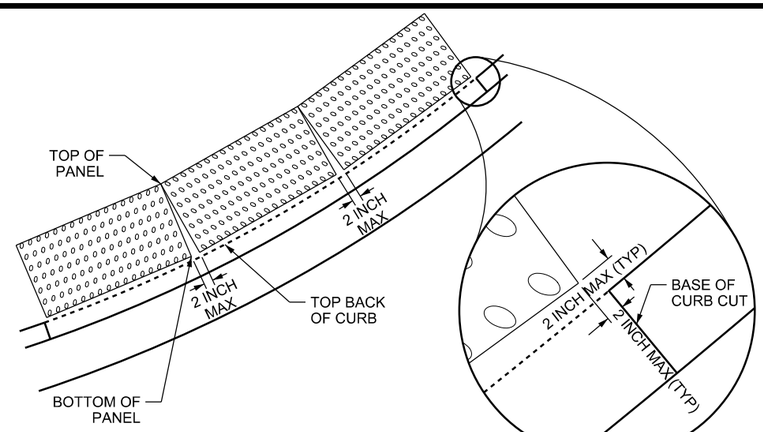
DETECTABLE WARNING SURFACE DETAIL A

(PROWAG R305)



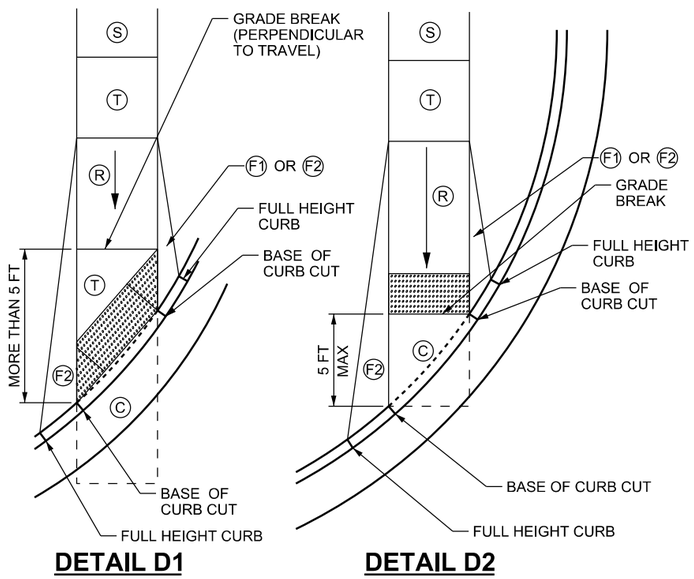
DETECTABLE WARNING SURFACE PANEL WITHOUT GAP (PREFERRED) DETAIL B

SEE NOTES 4 AND 5



DETECTABLE WARNING SURFACE PANEL WITH GAP - DETAIL C

SEE NOTES 4 AND 5



DETAIL D1

DETAIL D2

DETECTABLE WARNING SURFACE PLACEMENT FOR DIRECTIONAL CURB RAMPS DETAIL D

SEE NOTE 5

NOTES:

1. REFER TO STD DWG PA 1 FOR DIMENSION TABLE AND GENERAL NOTES.
2. DETECTABLE WARNING SURFACES ARE NOT REQUIRED AT PEDESTRIAN REFUGE ISLANDS THAT ARE CUT-THROUGH AT STREET LEVEL AND ARE LESS THAN 6.0 FT IN LENGTH. THE SIGNAL SHOULD BE TIMED FOR A COMPLETE CROSSING OF THE STREET WHERE SIGNALIZED AND THE CUT-THROUGH ISLAND DOES NOT HAVE DETECTABLE WARNING SURFACES. (PROWAG R208.2)
3. PROVIDE DETECTABLE WARNING SURFACE THAT CONTRASTS WITH ADJACENT ACCESS ROUTE, GUTTER, STREET, AND FLARES, EITHER DARK-ON-LIGHT OR LIGHT-ON-DARK. (PROWAG R305.1.3)
4. PLACE DETECTABLE WARNING SURFACE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS 2 FT MINIMUM IN THE DIRECTION OF PEDESTRIAN TRAVEL FOR THE FULL WIDTH OF THE RAMP (EXCLUDING FLARES), BLENDED TRANSITION, OR TURNING SPACE (PROWAG R305.1.4). USE OF PRODUCTS DESIGNED TO MATCH THE EXACT CURB RADII ARE ACCEPTABLE. USE A 4 FT MINIMUM CURB CUT WIDTH FOR SINGLE-DIRECTION CROSSWALKS AND AN 8 FT MINIMUM FOR BI-DIRECTIONAL. CURB CUT WIDTHS LESS THAN 8 FT (4 FT MIN) MAY BE USED FOR BI-DIRECTIONAL CROSSWALKS UPON APPROVAL OF THE REGION TRAFFIC ENGINEER. DETECTABLE WARNING SURFACE WIDTHS IN 4 FT INCREMENTS ARE PREFERRED.
5. PLACE DETECTABLE WARNING SURFACE ON PERPENDICULAR CURB RAMPS AS FOLLOWS (PROWAG R 305.2.1):
   A. PLACE DETECTABLE WARNING SURFACES AT THE BACK OF CURB WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE IN FRONT OF THE BACK OF CURB.
   B. PLACE DETECTABLE WARNING SURFACES ON THE RAMP RUN WITHIN 2 INCHES OF THE BOTTOM GRADE BREAK WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BREAK TO THE BACK OF CURB IS 5.0 FT OR LESS. (SEE DETAIL D2)
   C. PLACE DETECTABLE WARNING SURFACES ON THE LOWER LANDING AT THE BACK OF CURB WHERE THE ENDS OF THE BOTTOM GRADE BREAK ARE BEHIND THE BACK OF CURB AND THE DISTANCE FROM EITHER END OF THE BOTTOM GRADE BRAKE TO THE BACK OF CURB IS MORE THAN 5.0 FT. (DETAIL D1)
6. PLACE DETECTABLE WARNING SURFACES AT THE BACK OF CURB ON PARALLEL CURB RAMPS. (PROWAG R305.2.2)
7. PLACE DETECTABLE WARNING SURFACES ON EACH SIDE OF THE RAIL CROSSING AT PEDESTRIAN AT-GRADE RAIL CROSSINGS NOT LOCATED WITHIN A STREET OR HIGHWAY. PLACE THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE RAIL CROSSING BETWEEN 6.0 FT MINIMUM AND 15.0 FT MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. PLACE DETECTABLE WARNING SURFACES ON THE SIDE OF THE GATES OPPOSITE THE RAIL WHERE PEDESTRIAN GATES ARE PROVIDED. (PROWAG R305.2.5) EXTEND THE DETECTABLE WARNING SURFACE THE ENTIRE SIDEWALK/APPROACH WIDTH. (PROWAG R305.1.4)
8. PLACE DETECTABLE WARNING SURFACES AT THE FLUSH TRANSITION BETWEEN THE STREET AND SIDEWALK WHEN THERE IS AN AT-GRADE ACCESS AND THERE IS NO GRADE CHANGE BETWEEN THE SIDEWALK AND THE STREET. (PROWAG R305.2.3)
9. THE TURNING SPACE IS PERMITTED TO OVERLAP OTHER TURNING SPACES AND CLEAR SPACES. (PROWAG R304.2.1, R304.3.1)
10. GRIND OFF REMAINING PORTION OF ANY CUT DOMES WHEN DETECTABLE WARNING SURFACE IS CUT. SEAL ALL CUT PANEL EDGES TO PREVENT WATER DAMAGE.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	2/28/19	CGW	RELOCATED REFUGE DETAIL TO PA 4, REMOVED 7TH AND 11TH NOTES, NEWSED NOTES 6,7,9
1	2/22/18	CGW	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

STANDARD DRAWING TITLE

DETECTABLE WARNING SURFACE PEDESTRIAN ACCESS

STD. DWG. NO.

PA 2

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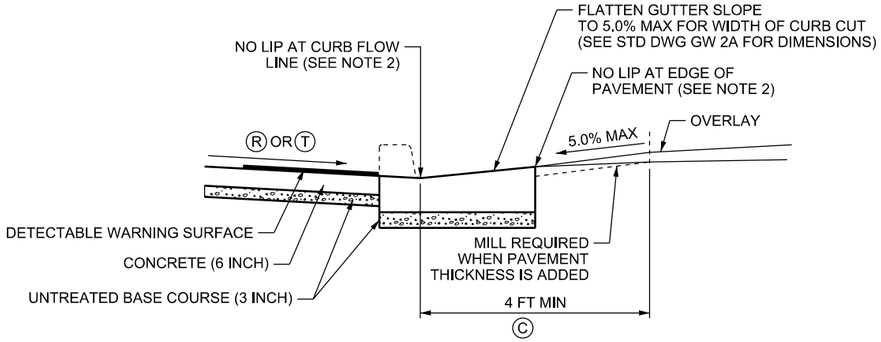
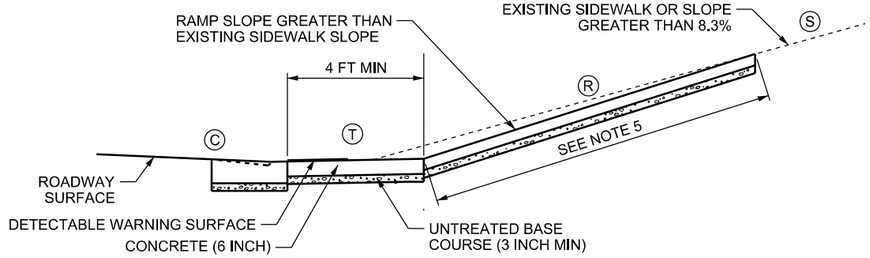
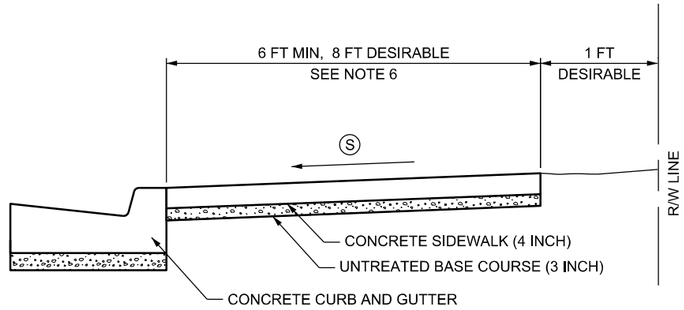


CLEAR SPACE
DETAIL A

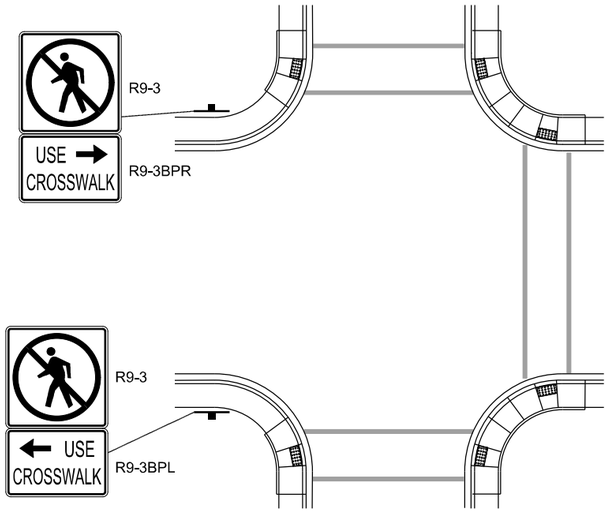


RAMP SLOPE STEEPENED TO MATCH EXISTING GRADE

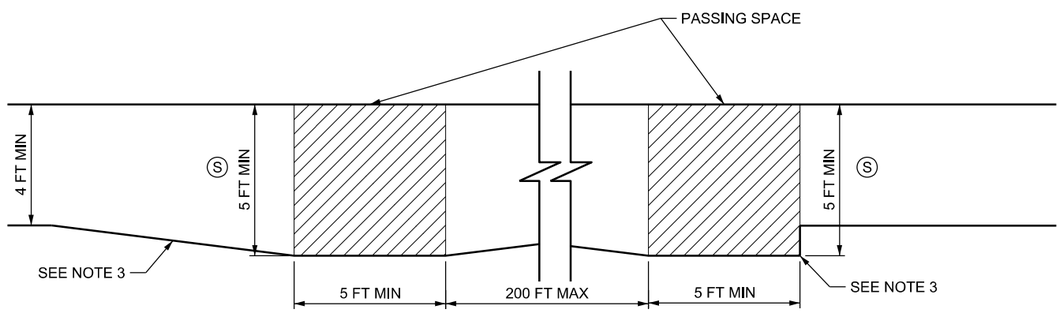
15-FT MAXIMUM RAMP SLOPE DETAIL
DETAIL D



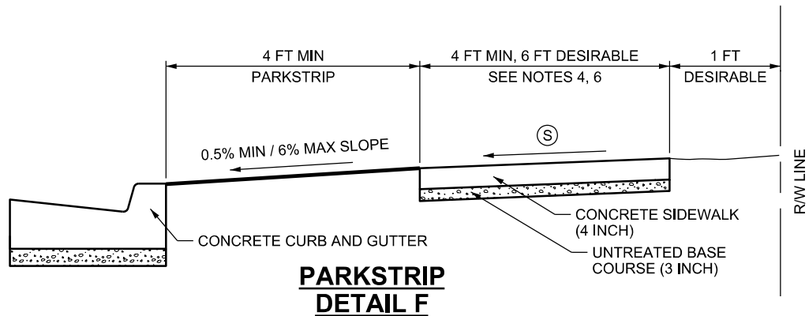
NO PARKSTRIP
DETAIL E



SIGNING FOR PROHIBITED PEDESTRIAN CROSSING
DETAIL B



PASSING SPACE
DETAIL C
SEE NOTE 4



PARKSTRIP
DETAIL F

NOTES:

1. REFER TO STD DWG PA 1 FOR DIMENSION TABLE AND GENERAL NOTES.
2. SEE STD DWG PA 1, NOTE 6 FOR VERTICAL DIFFERENCE ALLOWANCES OR TREATMENTS.
3. FLARE AT A RATE EQUAL TO THE PANEL WIDTH TO ALLOW TRANSITIONS ACROSS WHOLE PANELS WHEN A TAPER RATE IS USED TO TRANSITION FROM AND TO A PASSING SPACE. USE A 5:1 FLARE RATE FOR A 5 FT WIDE SIDEWALK FOR EXAMPLE. TAPER RATE MAY BE MODIFIED OR OMITTED WHERE SITE CONDITIONS PROHIBIT USE.
4. SIDEWALK WIDTH IS EXCLUSIVE OF THE WIDTH OF THE CURB. PROVIDE 5 FT X 5 FT PASSING SPACES AT 200 FT MAX. INTERVALS WHERE SIDEWALK WIDTH IS LESS THAN 5 FT (PROWAG R302.3 - R302.4). DRIVEWAYS AND OTHER PAVED AREAS MAY BE USED AS A PASSING SPACE WHERE A MINIMUM 5 FT WIDE AREA MEETING SIDEWALK REQUIREMENTS IS PROVIDED.
5. STEEPEN GRADE TO MATCH EXISTING WITHIN AT LEAST 15 FT OR THE NEXT NEAREST JOINT IF THE MAX RUNNING SLOPE CAN NOT BE MET IN 15 FT. (PROWAG R304.2.2, R304.3.2). IN CONDITIONS WHERE THE SIDEWALK IS NEAR OR ATTACHED TO THE CURB AND GUTTER, MOVE THE TURNING SPACE AWAY FROM THE RAMP SLOPE TO ALLOW FOR THE 8.3% MAXIMUM GRADE.
6. THE FOLLOWING MINIMUM WIDTHS ARE REQUIRED FROM BACK OF CURB TO BACK OF SIDEWALK AT DRIVEWAY LOCATIONS TO MEET GRADING REQUIREMENTS:
   - TYPE B1 CURB AND GUTTER: 7.67 FT
   - TYPE B2 CURB AND GUTTER: 9.75 FT
   - TYPE M2 CURB AND GUTTER: 5.08 FT

REVISIONS

NO.	DATE	APPR.	REMARKS
2	2/28/19	CGW	NAMING FOR UTBC AND CONCRETE REVISED, REFERENCE IN DT F UPDATED
1	2/22/18	CGW	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

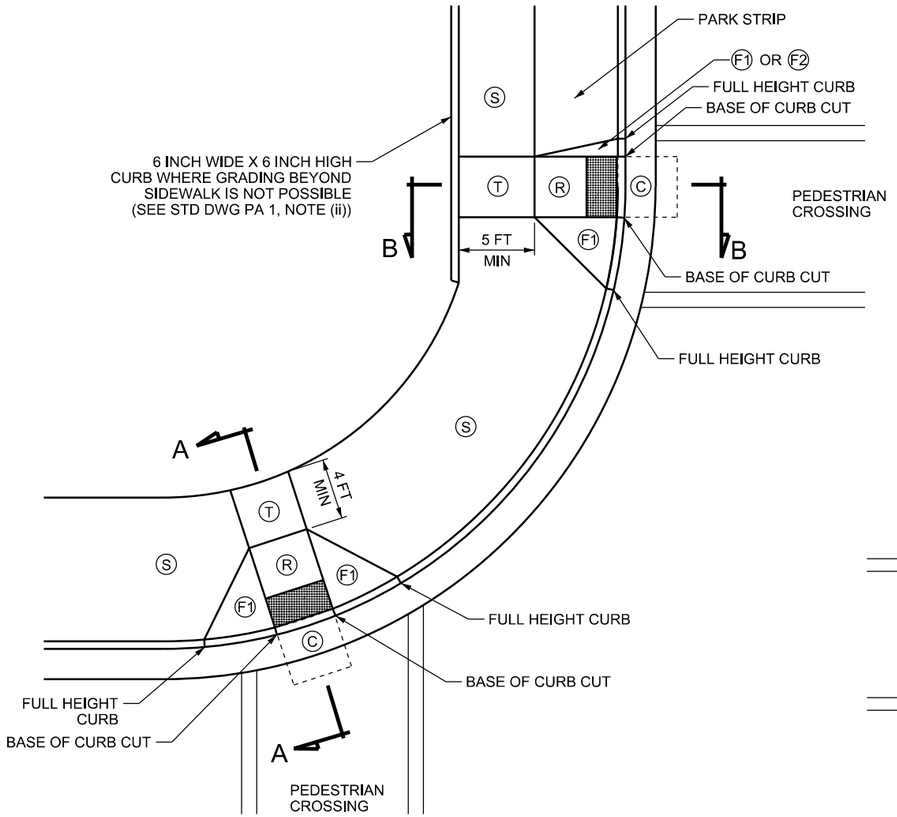
DEPUTY DIRECTOR

PEDESTRIAN ACCESS DETAILS

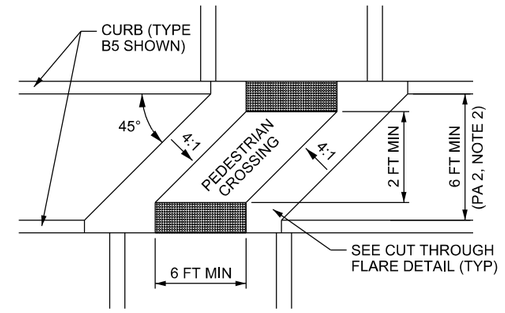
STANDARD DRAWING TITLE

STD. DWG. NO.
PA 3

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\PA 83.dgn
23-JUN-2020

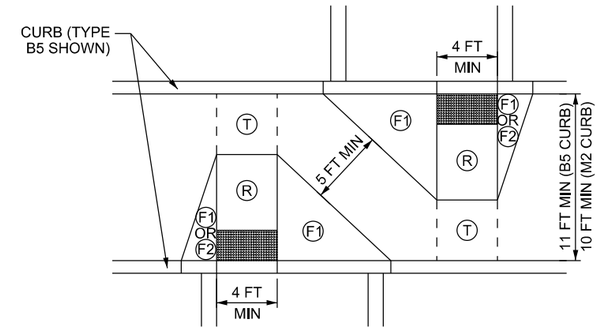


DUAL PERPENDICULAR RAMP AT CORNER OPTION



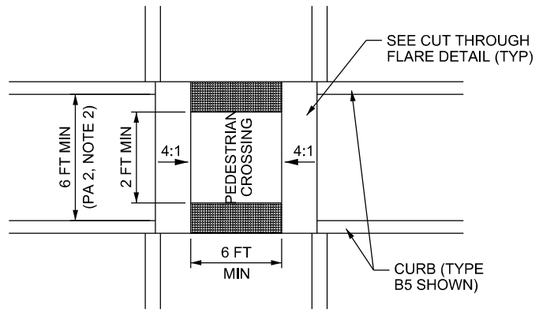
PEDESTRIAN REFUGE - ANGLED CUT THROUGH EXAMPLE

PREFERRED APPLICATION, ORIENT AS SHOWN



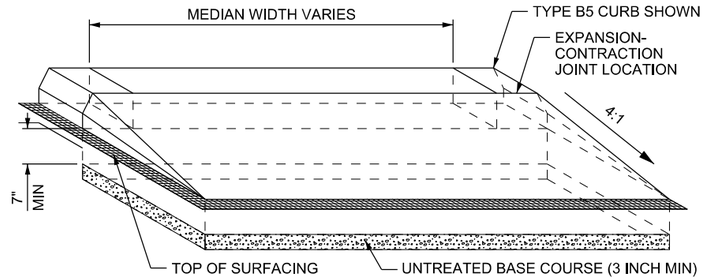
PEDESTRIAN REFUGE - PERPENDICULAR CURB RAMP EXAMPLE

ORIENT AS SHOWN

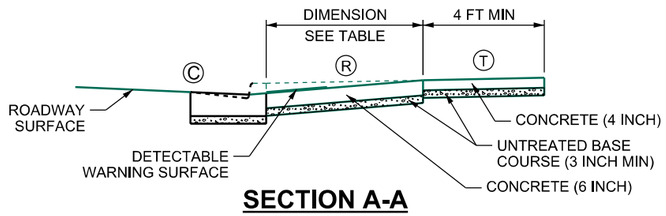


PEDESTRIAN REFUGE - CUT THROUGH EXAMPLE

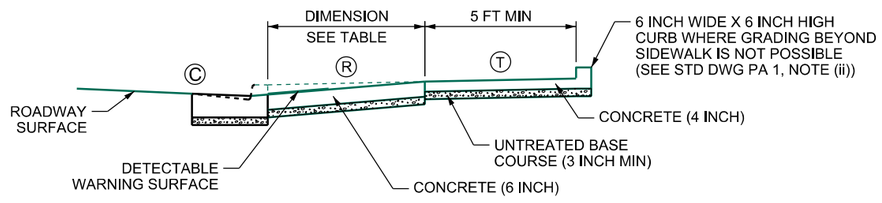
LIMITED USE WHEN ANGLED CUT THROUGH CAN NOT BE PLACED



CUT THROUGH FLARE DETAIL



SECTION A-A



SECTION B-B

MIN CONSTRUCTABLE DIMENSIONS		
CURB TYPE	SLOPE	MINIMUM DIMENSION (FT)*
B1-A	5%	11.6
B1-A	8.3%	5.2
B2-A	5%	15.75
B2-A	8.3%	7.2
M1-A	5%	5.75
M1-A	8.3%	2.3

* MIN LENGTHS ASSUME 2% SIDEWALK/PARKSTRIP CROSS SLOPE

NOTES:

1. REFER TO STD DWG PA 1 FOR DIMENSION TABLE AND GENERAL NOTES.
2. REFER TO STD DWG PA 2 FOR DETECTABLE WARNING SURFACE DETAILS.
3. REFER TO STD DWG PA 3, DETAIL A FOR CLEAR SPACE DETAIL.
4. RAMPS SHOWN ON THIS DRAWING ARE ACCEPTABLE FOR USE AT MID-BLOCK OR CORNER INSTALLATIONS.
5. PROVIDE TOOLED JOINTS ON ALL GRADE BREAKS.
6. PLACE REFUGE AS SHOWN WHEN RAISED MEDIAN CAN NOT BE PLACED ON BOTH SIDES OF CROSSWALK.
7. 4 FT MINIMUM WIDTH WHEN CUT THROUGH FLARE IS USED, 5 FT MINIMUM WIDTH WHEN CURBS ARE USED (CONSTRAINED ON TWO SIDES).
8. USE CROSSWALK SLOPES. SEE STD DWG PA 1, NOTES (iv) AND (v).
9. CUT THROUGH FLARE CAN BE OMITTED WHEN NOT IN THE DIRECTION OF PLOWING OPERATIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	2/28/19	CGW	REMOVED BLENDED TRANSITION, ADDED REFUGE ISLAND DETAILS
1	2/22/18	CGW	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUGUST 2020 DATE
DEPUTY DIRECTOR	

PERPENDICULAR AND MEDIAN REFUGE PEDESTRIAN ACCESS

STANDARD DRAWING TITLE

STD. DWG. NO.

PA 4

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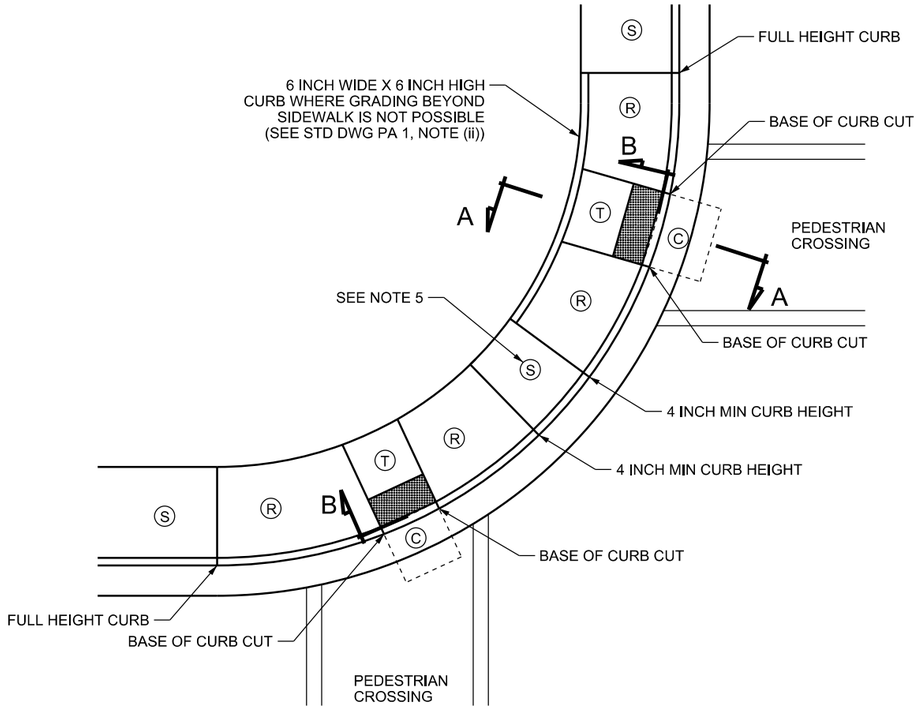
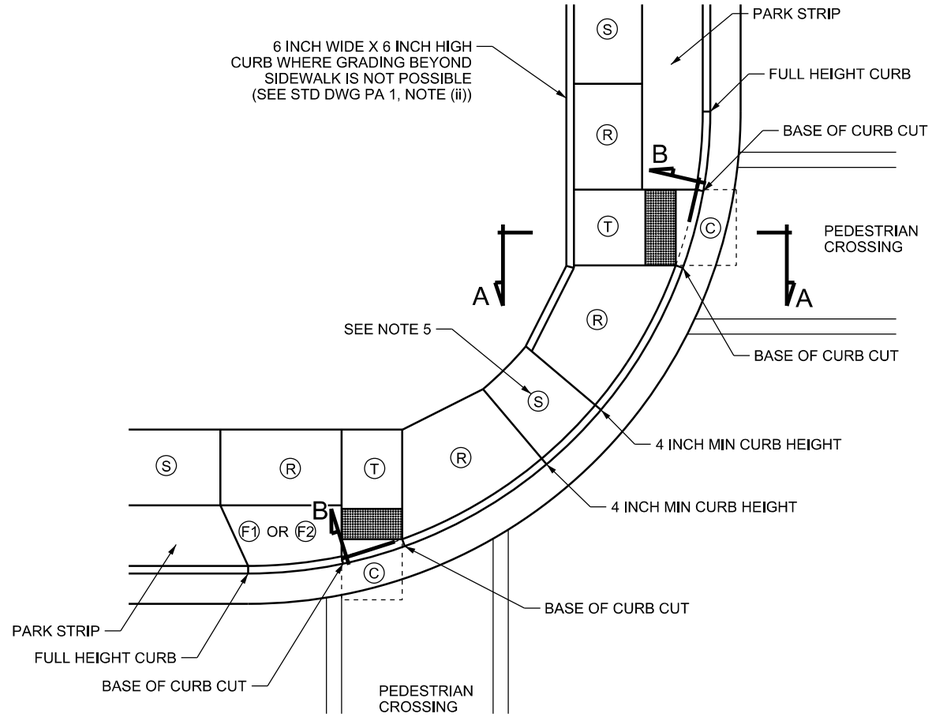
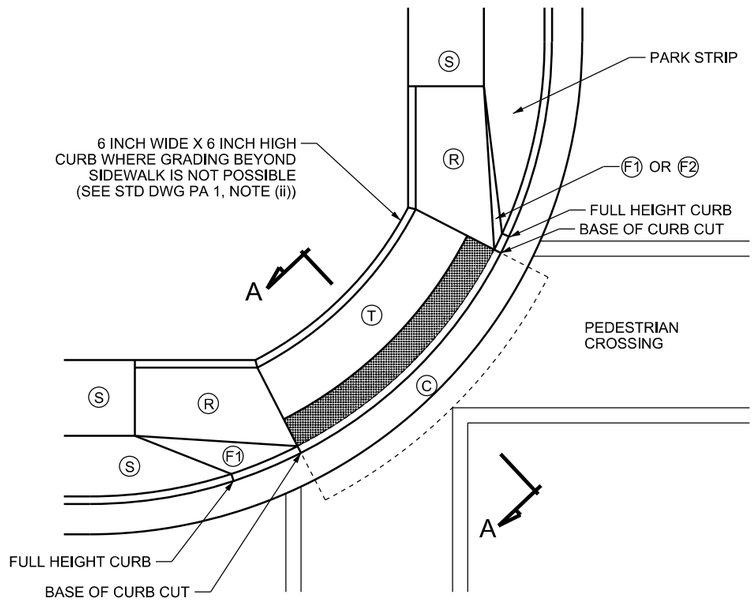
23-JUN-2020



DUAL PARALLEL RAMP AT CORNER OPTION

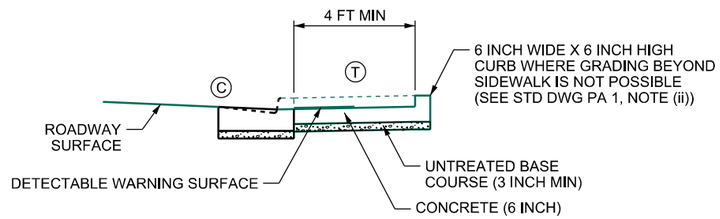


DUAL PARALLEL RAMP AT CORNER OPTION

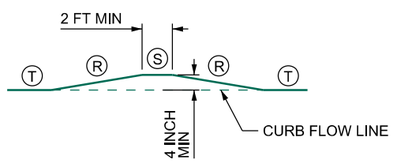


SINGLE DIAGONAL CORNER (APEX) RAMP OPTION

SEE STD DWG PA 1, NOTE C



SECTION A-A



SECTION B-B

SEE NOTE 5

NOTES:

1. REFER TO STD DWG PA 1 FOR DIMENSION TABLE AND GENERAL NOTES.
2. REFER TO STD DWG PA 2 FOR DETECTABLE WARNING SURFACE DETAILS.
3. REFER TO STD DWG PA 3, DETAIL A FOR CLEAR SPACE DETAIL.
4. RAMPS SHOWN ON THIS DRAWING ARE ACCEPTABLE FOR USE AT MID-BLOCK OR CORNER INSTALLATIONS.
5. PROVIDE A MINIMUM 2 FT WIDE SPACE BETWEEN ADJACENT RAMPS. THE CURB HEIGHT OF THIS SPACE IS A MINIMUM 4 INCHES TALL FROM CURB FLOW LINE TO TOP OF CURB. 2 FT WIDE SPACE CAN BE OMITTED WHERE THE ALGEBRAIC GRADE DIFFERENCE BETWEEN THE RAMPS DOES NOT EXCEED 13.3%. PROVIDE A 4 INCH MINIMUM CURB HEIGHT IN ALL CASES.
6. PROVIDE TOOLED JOINTS ON ALL GRADE BREAKS.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	2/28/19	CGW	REVISED NOTE 5
1	2/22/18	CGW	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

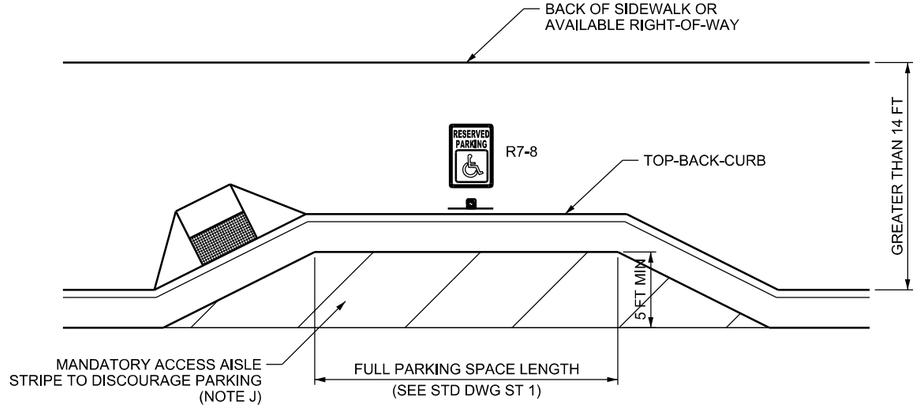
DEPUTY DIRECTOR

AUGUST 2020
DATE

STANDARD DRAWING TITLE
PARALLEL
PEDESTRIAN ACCESS

STD. DWG. NO.
PA 5

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\PA 05.dgn
23-JUN-2020

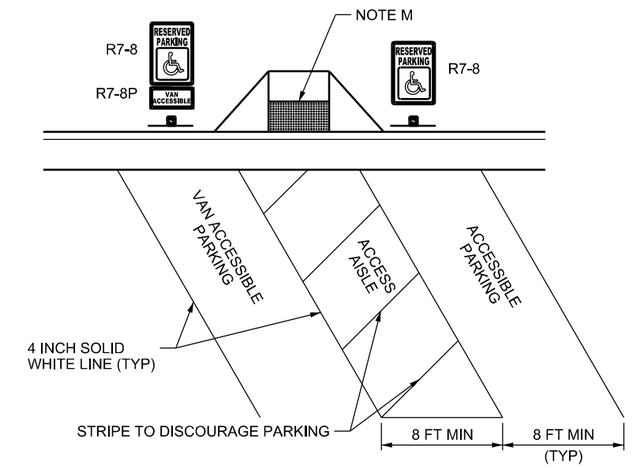


ON-STREET ACCESS AISLE

NOTES I AND J

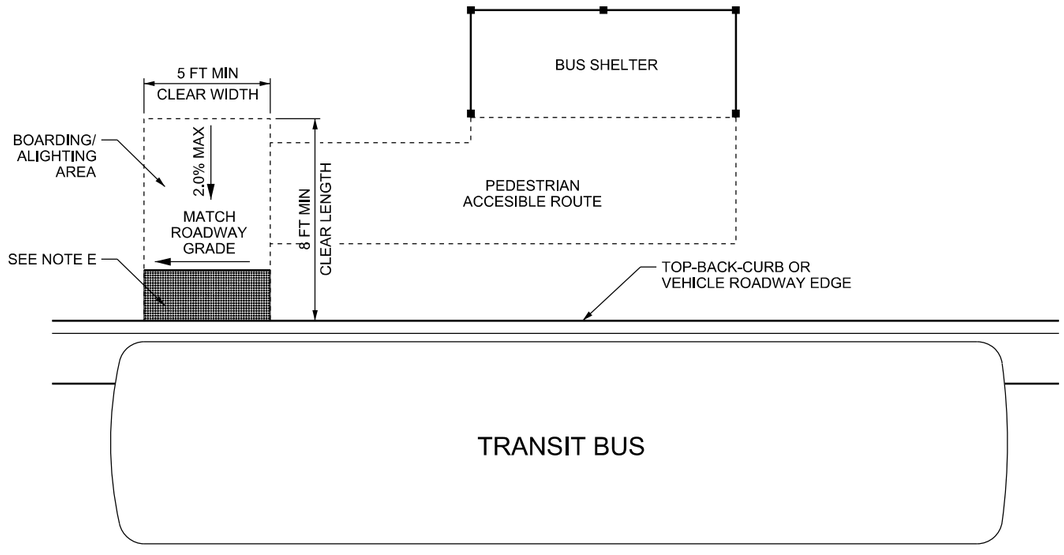
PROWAG R214

ACCESSIBLE ON-STREET PARKING	
TOTAL SPACES ON THE BLOCK PERIMETER	MIN REQUIRED ACCESSIBLE SPACES
1 TO 25	1
26 TO 50	2
51 TO 75	3
76 TO 100	4
101 TO 150	5
151 TO 200	6
OVER 200	4% OF TOTAL



RESERVED ACCESSIBLE PARKING

NOTES:
1. PROVIDE ONE VAN ACCESSIBLE STALL FOR EVERY EIGHT ACCESSIBLE STALLS.
2. REFER TO LOCAL JURISDICTION FOR NUMBER OF STALLS, ANGLE, STALL DEPTHS, MANUEVERING AISLE WIDTHS, AND ANY OTHER REQUIREMENTS.



TRANSIT SHELTER DETAIL

(BUS SHOWN FOR ILLUSTRATION, RAIL SIMILAR)
PROWAG R306

DESIGN NOTES:

A. PROVIDE A CONTINUOUS AND DETECTABLE EDGE TREATMENT ALONG THE STREET SIDE OF THE SIDEWALK AT ROUNDABOUTS, WHERE SIDEWALKS ARE FLUSH AGAINST THE CURB AND PEDESTRIAN STREET CROSSING IS NOT INTENDED. DO NOT USE DETECTABLE WARNING SURFACES FOR EDGE TREATMENT. PROVIDE A BOTTOM EDGE 15 IN MAXIMUM ABOVE THE SIDEWALK WHERE CHAINS, FENCING, OR RAILINGS ARE USED FOR EDGE TREATMENT. (PROWAG R306.3.1)

B. PROVIDE A PEDESTRIAN ACTIVATED SIGNAL FOR EACH MULTI-LANE SEGMENT OF EACH PEDESTRIAN STREET CROSSING, INCLUDING THE SPLITTER ISLAND AT ROUNDABOUTS WITH MULTI-LANE PEDESTRIAN STREET CROSSINGS. CLEARLY IDENTIFY WHICH PEDESTRIAN STREET CROSSING SEGMENT THE SIGNAL SERVES. (PROWAG R306.3.2)

C. PROVIDE PEDESTRIAN ACTIVATED SIGNALS AT PEDESTRIAN STREET CROSSINGS AT MULTI-LANE CHANNELIZED TURN LANES AT SIGNALIZED INTERSECTIONS OTHER THAN ROUNDABOUTS WITH PEDESTRIAN STREET CROSSINGS.

D. THE BOARDING AND ALIGHTING AREA CAN BE LOCATED EITHER WITHIN OR OUTSIDE OF THE SHELTER, WHERE A TRANSIT SHELTER IS PROVIDED. (PROWAG R308.1.1)

E. PLACE DETECTABLE WARNING SURFACES ON BOARDING PLATFORMS AT TRANSIT STOPS FOR BUSES AND RAIL VEHICLES WHERE THE EDGES OF THE BOARDING PLATFORM ARE NOT PROTECTED BY SCREENS OR GUARDS. (PROWAG R208)

F. COORDINATE THE HEIGHT OF VEHICLE FLOOR AND THE STATION PLATFORM SO AS TO MINIMIZE THE VERTICAL AND HORIZONTAL GAPS PER U.S.D.O.T. REGULATIONS (49 CFR PARTS 37 AND 38). (PROWAG R308.1.2.1)

G. IDENTIFY ACCESSIBLE PARKING SPACES BY SIGNS (MUTCD R7-8 SERIES). ACCESSIBLE PARKING SPACES SHOULD BE LOCATED WHERE THE STREET HAS THE LEAST CROWN AND GRADE AND CLOSE TO KEY DESTINATIONS. (PROWAG R309.1)

H. COUNT EACH 20.0 FT OF BLOCK PERIMETER WHERE PARKING IS PERMITTED AS ONE PARKING SPACE WHERE PARKING PAY STATIONS ARE PROVIDED AND THE PARKING IS NOT MARKED. (PROWAG R214)

I. DO NOT ENCROACH ON THE VEHICULAR TRAVEL LANE WITH THE ACCESS AISLE. THE ACCESS AISLE CAN BE ON EITHER THE DRIVER OR PASSENGER SIDE OF THE VEHICLE. (PROWAG R309.2.1)

J. AN ACCESS AISLE IS NOT REQUIRED WHERE:
- NO WORK IS BEING DONE ON THE STREET OR SIDEWALK ADJACENT TO THE PARKING SPACES OR
- THE WIDTH OF THE SIDEWALK OR THE AVAILABLE RIGHT-OF-WAY IS LESS THAN OR EQUAL TO 14.0 FT
LOCATE THE ACCESSIBLE PARKING SPACES AT THE END OF THE BLOCK FACE WHERE AN ACCESS AISLE IS NOT REQUIRED. (PROWAG R309.2.1.1, R309.2.2)

K. VERIFY THE SIDEWALK ADJACENT TO ACCESSIBLE PARALLEL PARKING SPACES IS FREE OF SIGNS, STREET FURNITURE, AND OTHER OBSTRUCTIONS TO PERMIT DEPLOYMENT OF A VAN SIDE-LIFT OR RAMP OR THE VEHICLE OCCUPANT TO TRANSFER TO A WHEELCHAIR OR SCOOTER. (PROWAG R309.2)

L. PROVIDE AN ACCESS AISLE 8.0 FT WIDE MINIMUM STREET LEVEL THE FULL LENGTH OF THE PARKING SPACE, CONNECTED TO A PEDESTRIAN ACCESS ROUTE MARK SO AS TO DISCOURAGE PARKING IN THE ACCESS AISLE WHERE PERPENDICULAR OR ANGLED PARKING IS USED. TWO PARKING SPACES ARE PERMITTED TO SHARE A COMMON ACCESS AISLE. CONNECT THE ACCESS AISLE TO THE PEDESTRIAN ACCESS ROUTE WITH CURB RAMPS OR BLENDED TRANSITIONS. DO NOT LOCATE CURB RAMPS WITHIN THE ACCESS AISLE. (PROWAG R309.3, R309.4)

M. DETECTABLE WARNING SURFACES ARE NOT REQUIRED ON CURB RAMPS AND BLENDED TRANSITIONS THAT CONNECT THE ACCESS AISLE TO THE SIDEWALK, INCLUDING WHERE THE SIDEWALK IS AT THE SAME LEVEL AS THE PARKING SPACES, UNLESS THE CURB RAMPS AND BLENDED TRANSITIONS ALSO SERVE PEDESTRIAN STREET CROSSINGS. (PROWAG R309.4)

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	NEW DRAWING
2	8/29/19	MRB	REVISED REFERENCE TO ST DRAWING

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR — AUGUST 2020 — DATE

ROUNDABOUT, TRANSIT SHELTER, AND ON-STREET PARKING

STANDARD DRAWING TITLE

STD. DWG. NO.
PA 6

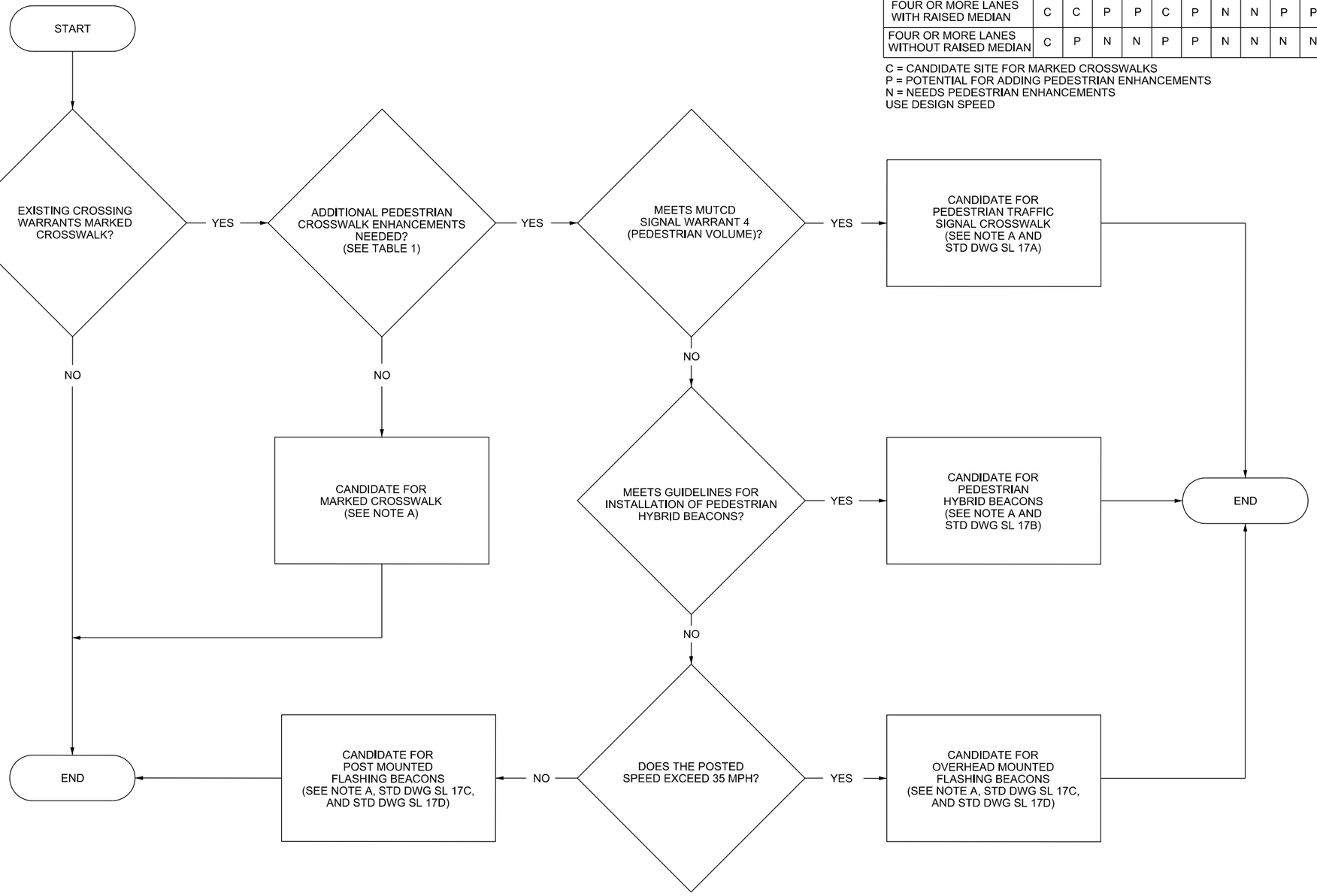
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\PA 06.dgn

TABLE 1

RECOMMENDATIONS FOR INSTALLING MARKED CROSSWALKS AND ENHANCEMENTS

ROADWAY TYPE (NUMBER OF LANES AND MEDIAN TYPE)	ADT < 9,000				ADT 9,000 TO 12,000				ADT 12,000 TO 15,000				ADT > 15,000			
	30 MPH	35 MPH	40 MPH	45 MPH	30 MPH	35 MPH	40 MPH	45 MPH	30 MPH	35 MPH	40 MPH	45 MPH	30 MPH	35 MPH	40 MPH	45 MPH
TWO LANES	C	C	P	P	C	C	P	P	C	C	N	N	C	P	N	N
THREE LANES	C	C	P	P	C	P	P	P	P	P	N	N	P	N	N	N
FOUR OR MORE LANES WITH RAISED MEDIAN	C	C	P	P	C	P	N	N	P	P	N	N	N	N	N	N
FOUR OR MORE LANES WITHOUT RAISED MEDIAN	C	P	N	N	P	P	N	N	N	N	N	N	N	N	N	N

C = CANDIDATE SITE FOR MARKED CROSSWALKS
P = POTENTIAL FOR ADDING PEDESTRIAN ENHANCEMENTS
N = NEEDS PEDESTRIAN ENHANCEMENTS
USE DESIGN SPEED



PROCESS FOR WARRANTING PEDESTRIAN ENHANCEMENTS

DESIGN NOTES:

A. SCHEDULE WARRANTING FIELD REVIEW WITH REGION TRAFFIC OPERATIONS ENGINEER AND TRAFFIC & SAFETY ENGINEER.

DESIGN ONLY DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

MARKED PEDESTRIAN CROSSWALK ENHANCEMENT FLOWCHART

STANDARD DRAWING TITLE

STD. DWG. NO.
PA 7

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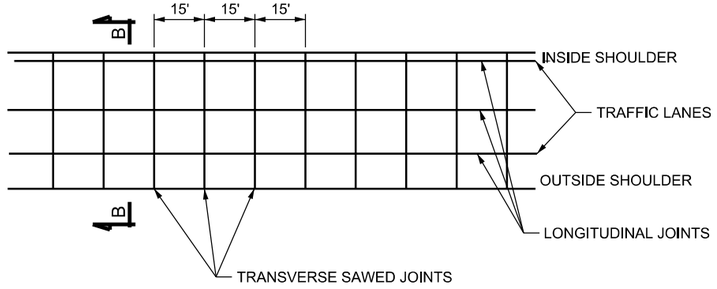
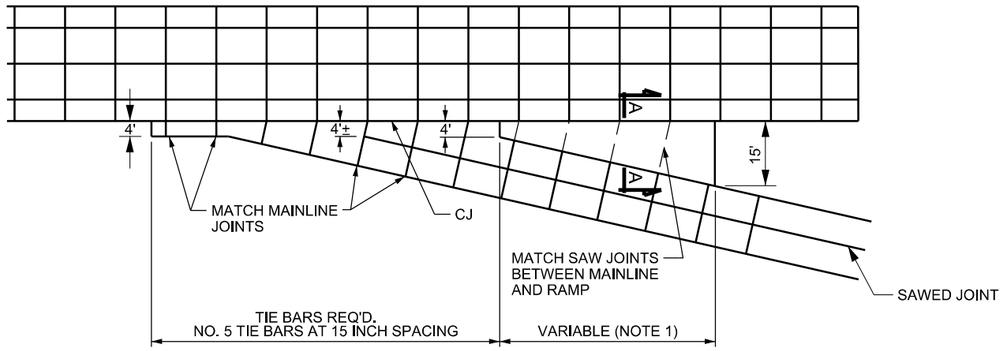
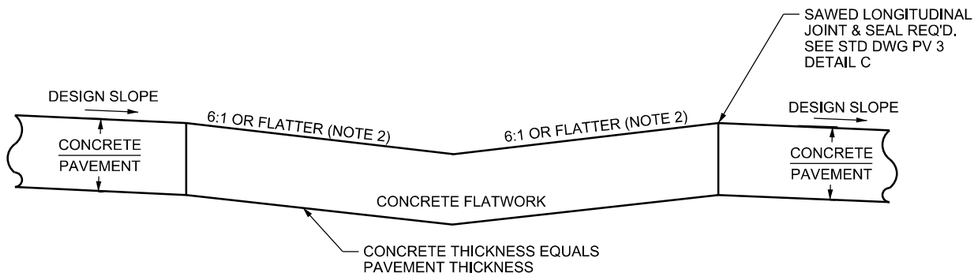
23-JUN-2020



TYPICAL JOINT LOCATION DETAIL

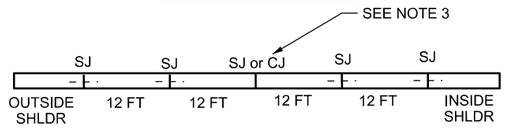


SHOULDER TRANSITION FOR RAMPS AND RAMP GORE PAVING DETAIL

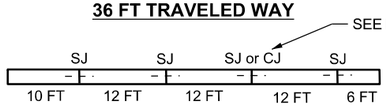


SECTION A-A

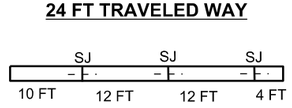
48 FT TRAVELED WAY



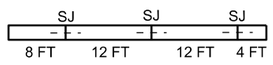
36 FT TRAVELED WAY



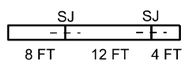
24 FT TRAVELED WAY



24 FT RAMP

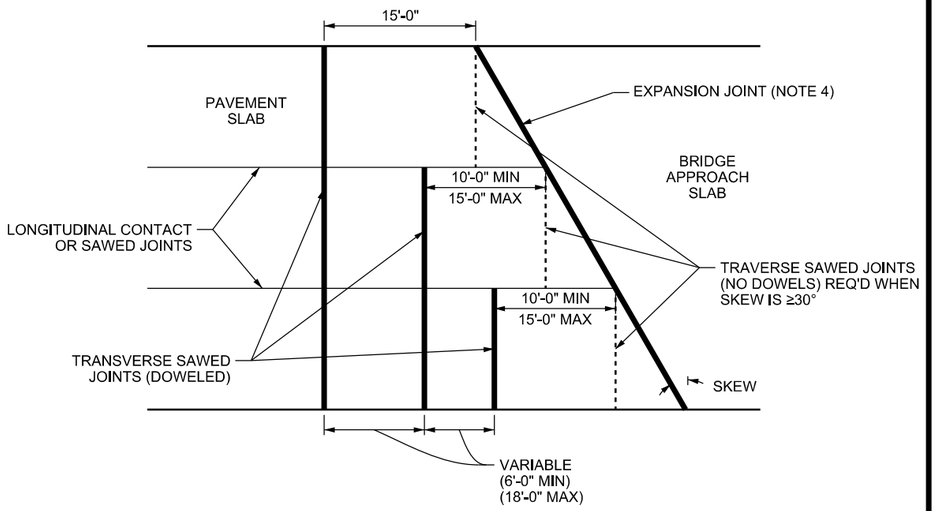


12 FT RAMP



CJ - CONTACT JOINT
SJ - SAWED JOINT

SECTION B-B
REQUIRED PAVING CONFIGURATIONS



SKEWED APPROACH SLAB

NOTES:

1. ESTIMATED QUANTITIES FOR CONCRETE FLATWORK ARE CALCULATED ON TANGENT SECTION. IN ALL CASES LENGTH OF GORE PAVING WILL BE CARRIED AHEAD UNTIL THE DISTANCE BETWEEN PAVING IS 15 FT.
2. SLOPE MAY VARY TO MEET DESIGN CONDITIONS ON RAMP AND MAINLINE, GRADE TO DRAIN, ADJUST FOR FIELD CONDITIONS.
3. CONTACT JOINT (CJ) TIE BARS REQUIRED AT ALL LOCATIONS WHERE CONCRETE IS TO BE EXTENDED SEE STD DWG PV 2 AND PV 3 FOR JOINT DETAILS.
4. SEE STRUCTURE PLANS FOR EXPANSION JOINT DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10-26-17	SA	ADDED THE SKEWED APPROACH SLAB DETAILS, CHANGES TO NOTES

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

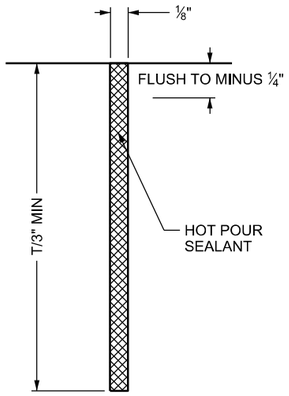
JOINTS FOR HIGHWAYS WITH CONCRETE TRAFFIC LANES AND SHOULDERS

STANDARD DRAWING TITLE

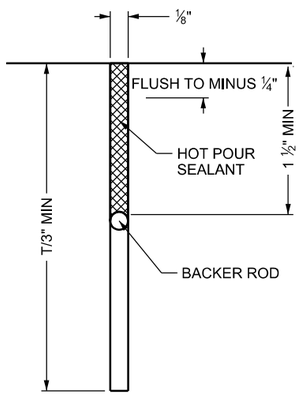
STD. DWG. NO.

PV 1

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\PV01.dgn

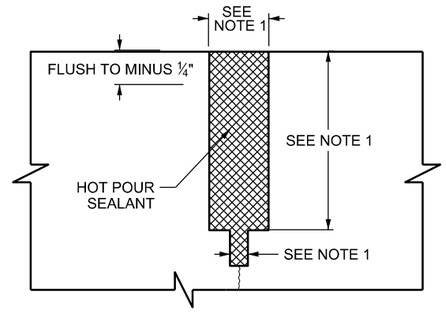


DETAIL "A"



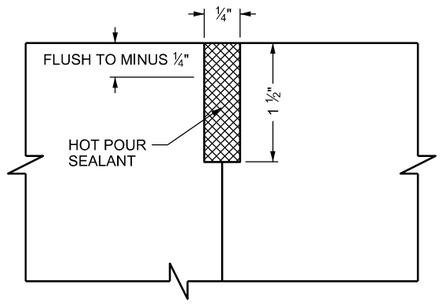
DETAIL "B"

OPTIONAL INSTALLATION

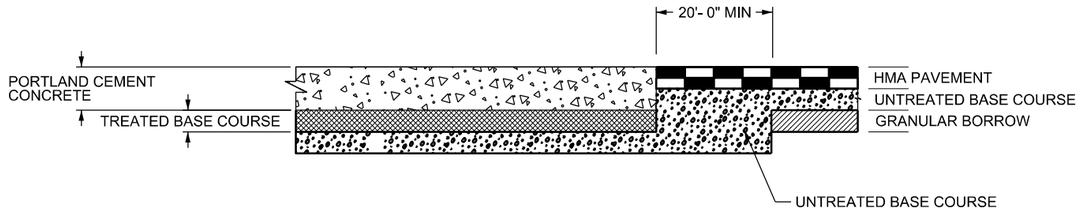


DETAIL "D"

REHABILITATION OF EXISTING SILICONE JOINT



DETAIL "C"



DETAIL "E"

CONCRETE TO FLEXIBLE PAVEMENT TRANSITION

NOTES:

1. DIMENSIONS MAY VARY DEPENDING ON ORIGINAL JOINT CONSTRUCTION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10-26-17	SA	SHEET NUMBER CHANGED, NOTES

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR — DATE

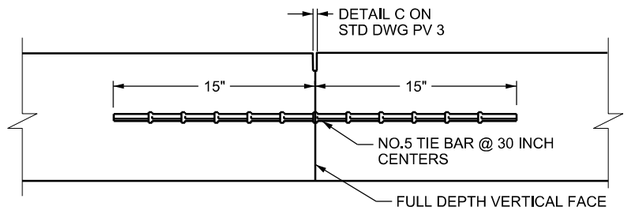
CONCRETE PAVEMENT DETAILS 1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.

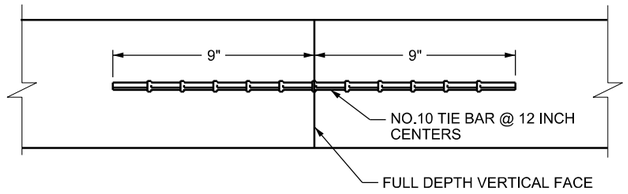
PV 2

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\PV02.dgn

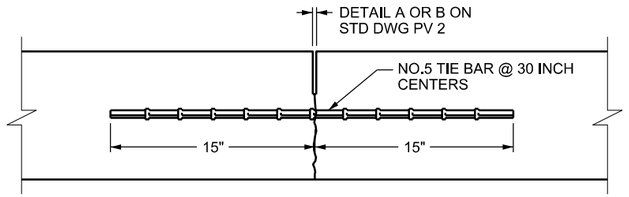


LONGITUDINAL CONTACT JOINT DETAIL "A"

NOTE: NO. 5 TIE BAR @ 15 INCH CENTERS
IF DRILLED AND EPOXIED.

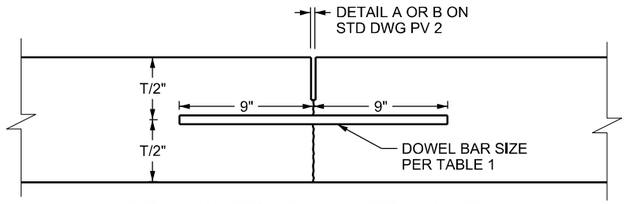


MID-PANEL CONTACT JOINT DETAIL "B"



LONGITUDINAL SAWED JOINT DETAIL "C"

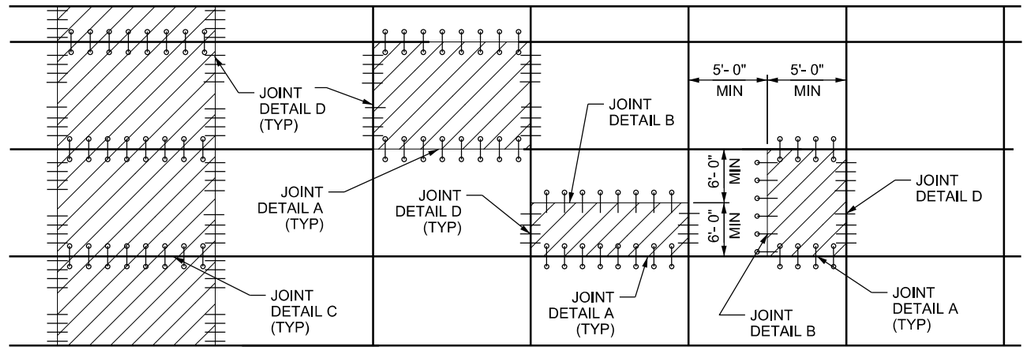
(T/3 SAW CUT W/ AGGREGATE INTERLOCK BELOW)



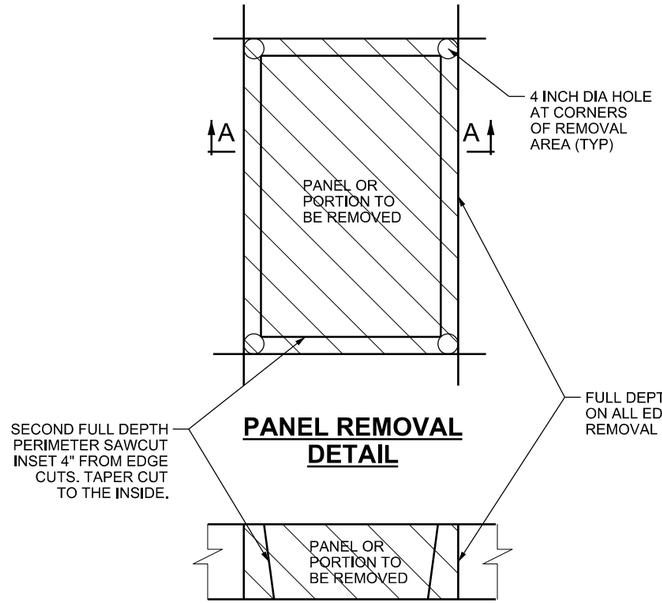
TRANSVERSE SAWED JOINT (LOAD TRANSFER DOWEL BAR JOINT) DETAIL "D"

INSTALL DOWEL BARS PARALLEL TO THE CENTERLINE
AND TO THE PAVEMENT SURFACE.
LIMIT DEVIATIONS FROM PARALLEL TO ± ¼ INCH
IN THE LENGTH OF THE DOWEL BAR.

JOINT SECTION DETAILS

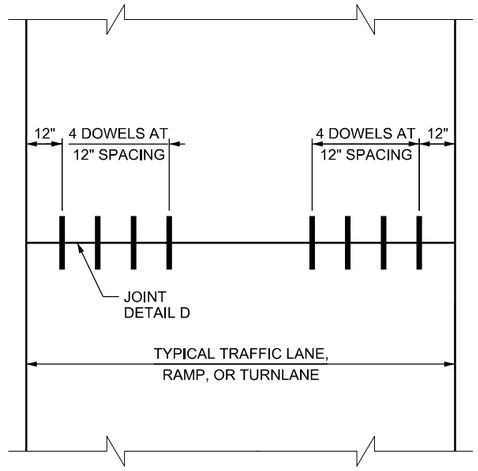


TYPICAL PAVEMENT PANEL REPLACEMENT



PANEL REMOVAL DETAIL

SECTION A-A



LOAD TRANSFER DOWEL BAR LAYOUT FOR NEW PAVEMENT

TABLE 1	
PAVEMENT THICKNESS	DOWEL BAR DIAMETER
LESS THAN 9"	1"
≥ 9" AND < 11"	1.25"
11" OR GREATER	1.5"

NOTES:

1. COAT ALL BARS ACCORDING TO STANDARD SPECIFICATION 03211.
2. USE DEFORMED REINFORCING BAR FOR TIE BARS.
3. USE SMOOTH DOWEL BARS.
4. MAKE FULL DEPTH SAWCUT AROUND ALL EDGES OF PANELS OR PORTIONS REPLACED. MINIMIZE OVERCUT INTO ADJACENT PANELS.
5. REPLACE THE ENTIRE PANEL WHEN REPLACING A PARTIAL PANEL IF THE WIDTH OF REMAINING PORTION IS LESS THAN THE MINIMUM SHOWN.
6. DO NOT INSTALL DOWEL BARS IN THE SHOULDERS UNLESS DIRECTED TO DO SO BY THE PROJECT SPECIFIC SPECIAL PROVISION OR PLAN SHEET.
7. PARTIAL PANEL REPLACEMENTS APPLY ONLY TO THE REHABILITATION OF EXISTING PAVEMENTS AND NOT TO PROJECTS CONSTRUCTING NEW OR ORIGINAL PAVEMENT. REPAIRS TO PAVEMENT ON NEW PROJECTS REQUIRE FULL PANEL REPLACEMENT.
8. ELIMINATE TIE BARS THAT INTERFERE WITH "LOAD TRANSFER DOWEL BARS".

NO.	DATE	APPR.	REMARKS
1	10-26-17	SA	SHEET NUMBER CHANGED, NOTES AND DETAIL TITLES CHANGED

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CONCRETE PAVEMENT DETAILS 2 OF 2
STANDARD DRAWING TITLE

STD. DWG. NO.
PV 3

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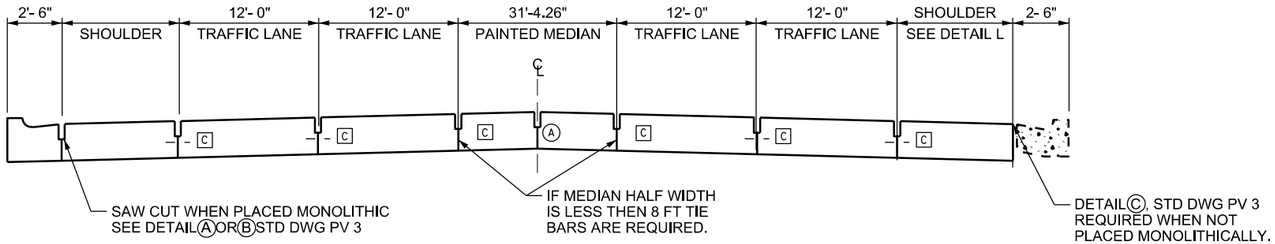
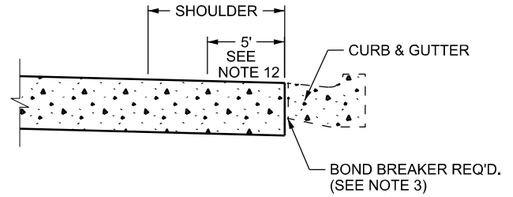
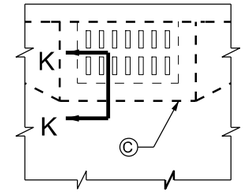
23-JUN-2020



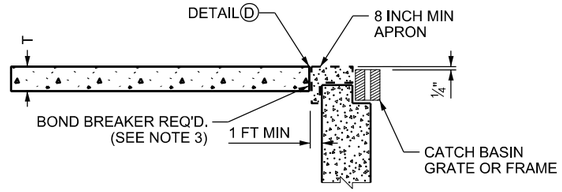
PAVEMENT TRANSITION



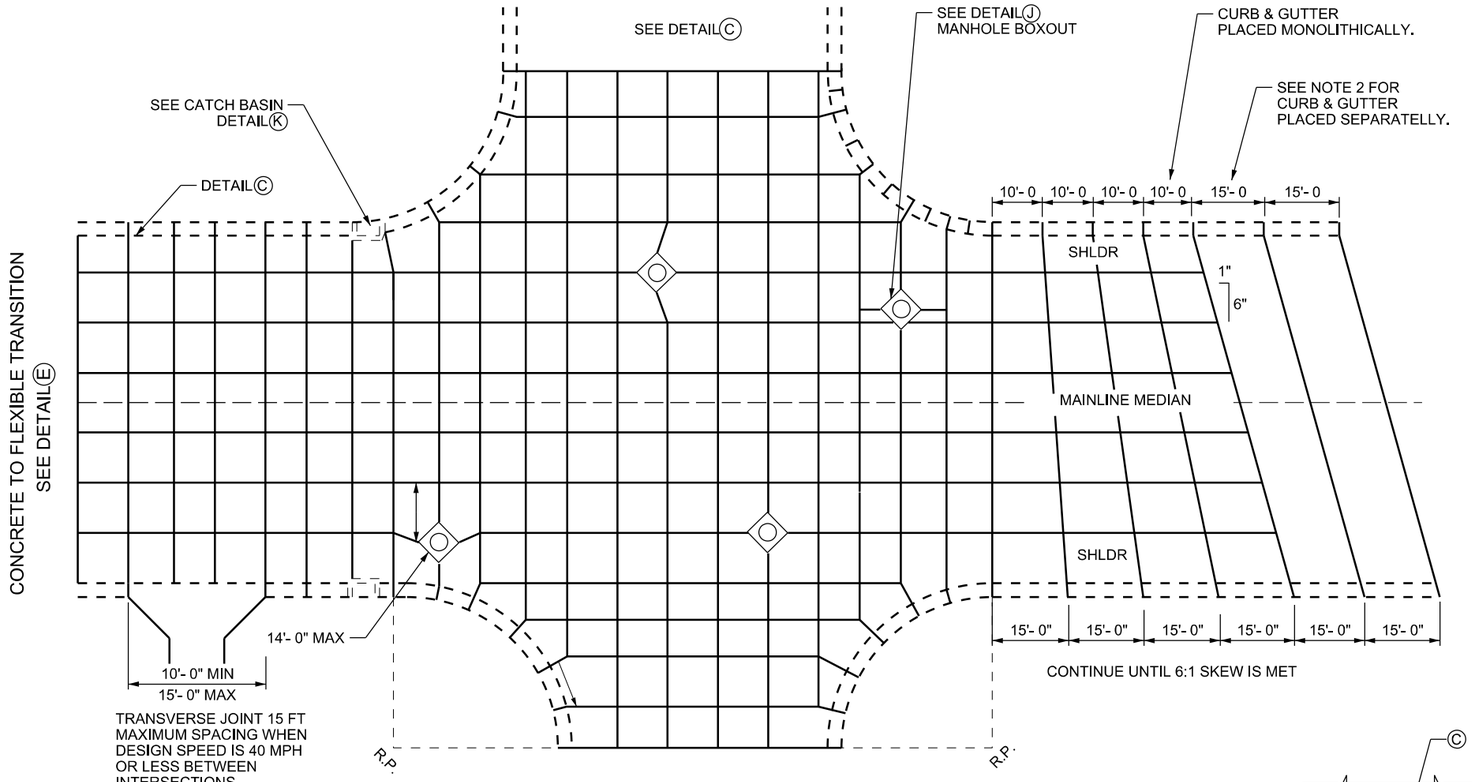
DETAIL L



CATCH BASIN
DETAIL K



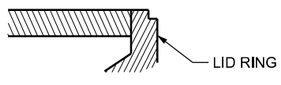
SECTION K- K



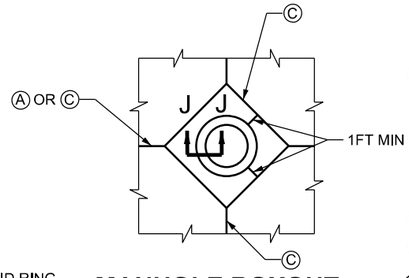
CONCRETE TO CONCRETE TRANSITION

SEE NOTE 7.

INTERSECTION JOINT LAYOUT



SECTION J- J



MANHOLE BOXOUT
DETAIL J

NOTES:

1. CURB & GUTTER JOINTS TO BE CONTINUOUS WITH PAVEMENT WHEN PLACED MONOLITHICALLY WITH PAVEMENT.
2. CURB & GUTTER JOINTS NORMAL TO THE FLOWLINE AND AT ONE HALF THE PAVEMENT JOINT SPACING, WHEN PLACED SEPARATELY FROM THE PAVEMENT.
3. PLACE A BOND BREAKER AS SHOWN IN DETAIL L AND SECTION K-K WHERE CONCRETE PAVEMENT IS PLACED AGAINST EXISTING CURB & GUTTER, DRIVEWAYS AND WALKWAYS.
4. REFER TO PROJECT SPECIFICATIONS FOR JOINT INFORMATION AND DETAILS.
5. PREFERRED TRANSVERSE JOINT LOCATIONS ARE: MORE THAN 5 FT FROM LARGE APPURTENANCES WITH NO BOXOUT: OR AT THE CORNER OF RECTANGULAR BOXOUTS OR APPURTENANCES.
6. SHORTEN ONE OR MORE PANELS EITHER SIDE OF OPENING TO PERMIT JOINT TO FALL AT CORNERS OF RECTANGULAR STRUCTURES WHEN A JOINT FALLS WITHIN 5 FT OF OR CONTACTS BASINS, MANHOLES, OR OTHER STRUCTURES.
7. DETAIL C REQUIRED. WHEN CROSS STREET IS CONCRETE AND AT STRUCTURES.
8. SEE STD DWG GW 3 FOR CURB & GUTTERS DETAILS.
9. SEE STD DWG GW 6 FOR DRIVEWAY DETAILS.
10. LETTER INSIDE ◯ DENOTES DETAIL, STD DWG PV 3
11. LETTER INSIDE □ DENOTES DETAIL, STD DWG PV 4
12. SLOPE OF 5 FT SECTION NEXT TO CURB AND GUTTER MAY BE STEEPENED TO MATCH LIP OF EXISTING GUTTER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

AUGUST 2020
DATE

URBAN CONCRETE
PAVEMENT DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
PV 5

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23-JUN-2020

RUMBLE STRIP TABLES

UNDIVIDED ROADWAY		
SHOULDER WIDTH	GROOVE WIDTH	RUMBLE STRIP LOCATION
> 4 FT	6 INCHES	A
2 FT TO 4 FT	6 INCHES	B
1 FT TO 2 FT	6 INCHES	C
< 1 FT	——	NO RUMBLE STRIP
CENTERLINE	6 INCHES	SEE STD DWGS PV 7B & PV 8

NON-FREEWAY DIVIDED ROADWAY		
SHOULDER WIDTH	GROOVE WIDTH	RUMBLE STRIP LOCATION
< 6 FT	8 INCHES	B
≥ 6 FT	12 INCHES	A

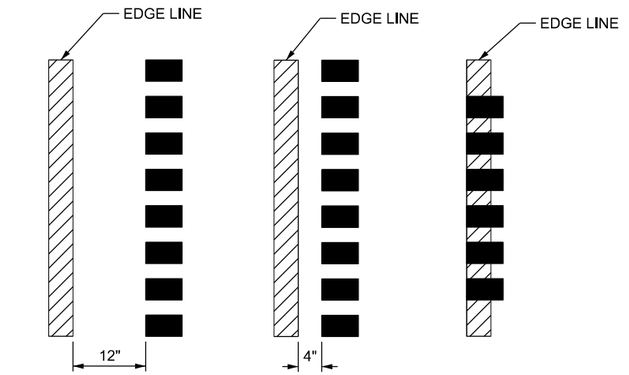
FREEWAY		
SHOULDER WIDTH	GROOVE WIDTH	RUMBLE STRIP LOCATION
ALL	12 INCHES	A

NON-BICYCLE ROUTE

SHOULDER WIDTH	GROOVE WIDTH	RUMBLE STRIP LOCATION
< 3 FT (SEE NOTE 10)	——	NO RUMBLE STRIP
3 FT TO < 4 FT	6 INCHES	C
4 FT TO < 6 FT	6 INCHES	B
> 6 FT	6 INCHES	A
FREEWAY - ALL	12 INCHES	A

BICYCLE ROUTE

(SEE NOTE 9)



SHOULDER RUMBLE STRIP LOCATIONS

NOTES:

1. DO NOT PLACE RUMBLE STRIPS ON STRUCTURES OR APPROACH SLABS.
2. DO NOT PLACE RUMBLE STRIPS WITHIN 6 INCHES OF PCCP TRANSVERSE JOINTS.
3. APPLY FLUSH OR SEAL COAT UNIFORMLY ON ALL RUMBLE STRIPS ON BITUMINOUS PAVEMENT SURFACES. SEE STANDARD SPECIFICATION 02761.
4. MILL RUMBLE STRIPS TO LEAVE A RECTANGULAR SHAPE WITH UNIFORM EDGES. DO NOT DAMAGE ADJACENT PAVEMENT DURING MILLING OPERATION.
5. RESTART RUMBLE STRIP SEQUENCE (SEE STD DWG PV 7A & 7B) WHEN RUMBLE STRIPS ARE HALTED OR INTERRUPTED, EXCEPT WHEN TRANSVERSE JOINTS ARE ENCOUNTERED ON PCCP, MANUALLY INTERRUPT SEQUENCE SO RUMBLE STRIPS DO NOT GO THROUGH TRANSVERSE JOINT WHILE MAINTAINING SEQUENCE LENGTH.
6. INSTALL RUMBLE STRIPS ONLY WHERE A MINIMUM UNINTERRUPTED LENGTH OF 100 FT CAN BE INSTALLED. DISCONTINUE RUMBLE STRIPS WHEN SHOULDER WIDTH VARIES AND WHEN WIDTH IS LESS THAN SHOWN IN RUMBLE STRIP TABLES. RESUME WHEN WIDTH IS SUFFICIENT AS SHOWN IN RUMBLE STRIP TABLES, FOR MORE THAN A 100 FT IN LENGTH.
7. SEE STD DWG PV 6B FOR RUMBLE STRIP MILL DETAIL.
8. SHOULDER WIDTH IS DEFINED AS THE EFFECTIVE SHOULDER WIDTH.
9. USE BICYCLE ROUTE TABLE FOR NATIONAL, STATE AND LOCAL BICYCLE ROUTES.
10. USE SHOULDER RUMBLE STRIP LOCATION TYPE C WITH A GROOVE WIDTH OF 6 INCHES WHEN SHOULDER WIDTH IS LESS THAN 3 FT AT THE DIRECTION OF THE REGION TRAFFIC ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
RUMBLE STRIPS LOCATION DETAILS

STD. DWG. NO.
PV 6A

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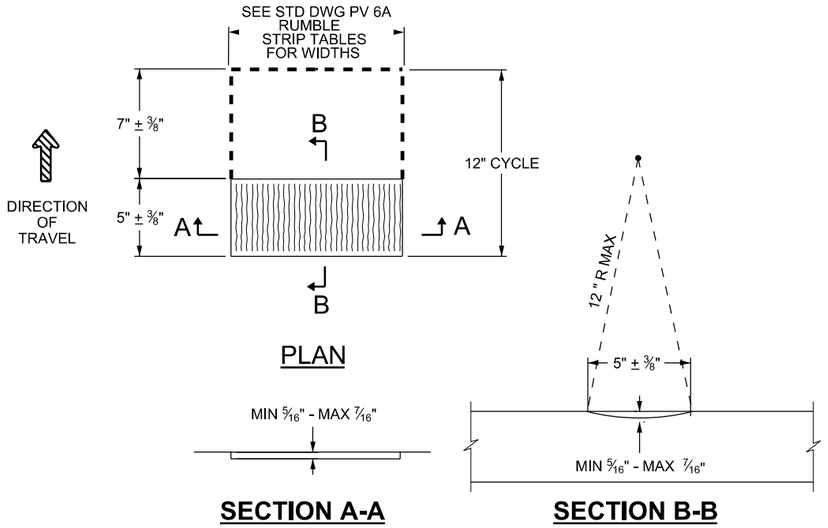
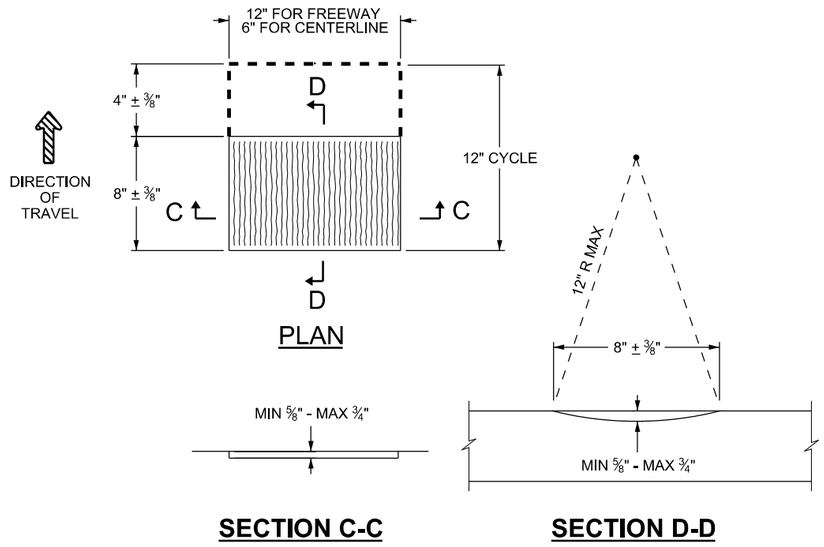
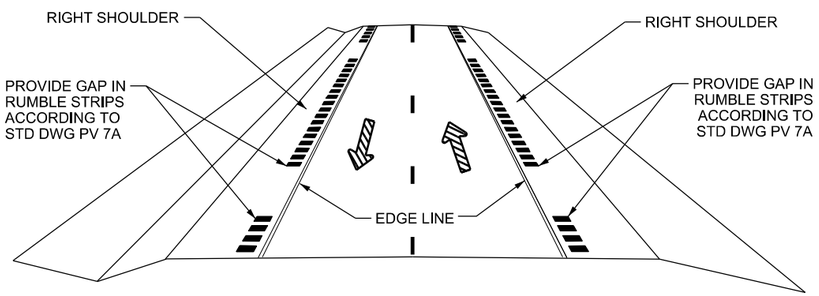
23-JUN-2020



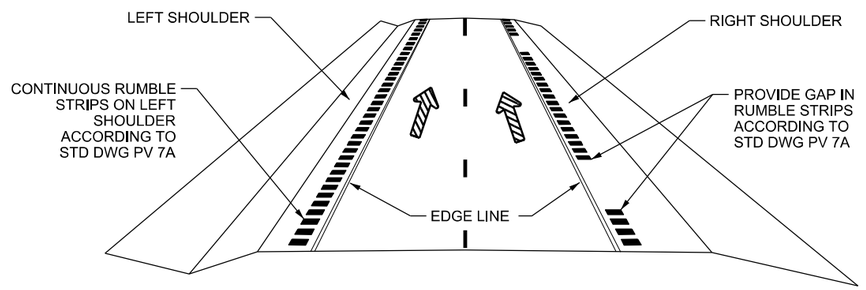
NON-FREEWAY SHOULDER RUMBLE STRIP MILL DETAILS



FREEWAY AND CENTERLINE RUMBLE STRIP MILL DETAILS



UNDIVIDED HIGHWAY



DIVIDED HIGHWAY & FREEWAY

NOTES:

1. DO NOT PLACE RUMBLE STRIPS ON STRUCTURES OR APPROACH SLABS.
2. DO NOT PLACE RUMBLE STRIPS WITHIN 6 INCHES OF PCCP TRANSVERSE JOINTS.
3. APPLY FLUSH OR SEAL COAT UNIFORMLY ON ALL RUMBLE STRIPS ON BITUMINOUS PAVEMENT SURFACES. SEE STANDARD SPECIFICATION 02761.
4. MILL RUMBLE STRIPS TO LEAVE A RECTANGULAR SHAPE WITH UNIFORM EDGES. DO NOT DAMAGE ADJACENT PAVEMENT DURING MILLING OPERATION.
5. RESTART RUMBLE STRIP SEQUENCE (SEE STD DWG PV 7A & 7B) WHEN RUMBLE STRIPS ARE HALTED OR INTERRUPTED, EXCEPT WHEN TRANSVERSE JOINTS ARE ENCOUNTERED ON PCCP, MANUALLY INTERRUPT SEQUENCE SO RUMBLE STRIPS DO NOT GO THROUGH TRANSVERSE JOINT WHILE MAINTAINING SEQUENCE LENGTH.
6. INSTALL RUMBLE STRIPS ONLY WHERE A MINIMUM UNINTERRUPTED LENGTH OF 100 FT CAN BE INSTALLED. DISCONTINUE RUMBLE STRIPS WHEN SHOULDER WIDTH VARIES AND WHEN WIDTH IS LESS THAN SHOWN IN RUMBLE STRIP TABLES. RESUME WHEN WIDTH IS SUFFICIENT AS SHOWN IN RUMBLE STRIP TABLES, FOR MORE THAN A 100 FT IN LENGTH.
7. SEE STD DWG PV 6A FOR RUMBLE STRIP TABLES WITH GROOVE WIDTH AND LOCATION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

RUMBLE STRIPS
DEPTH AND
LOCATION DETAILS
STANDARD DRAWING TITLE

STD. DWG. NO.
PV 6B

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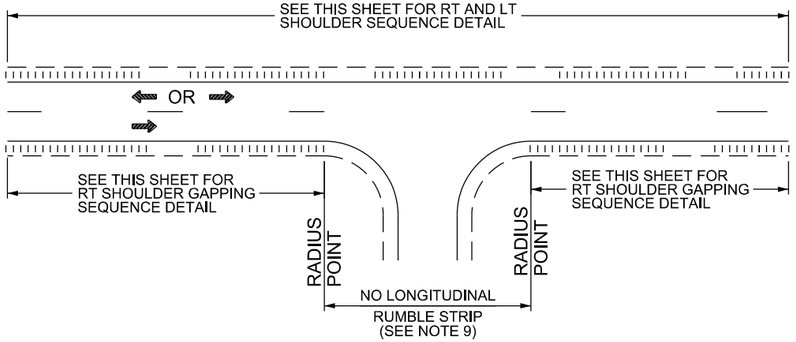
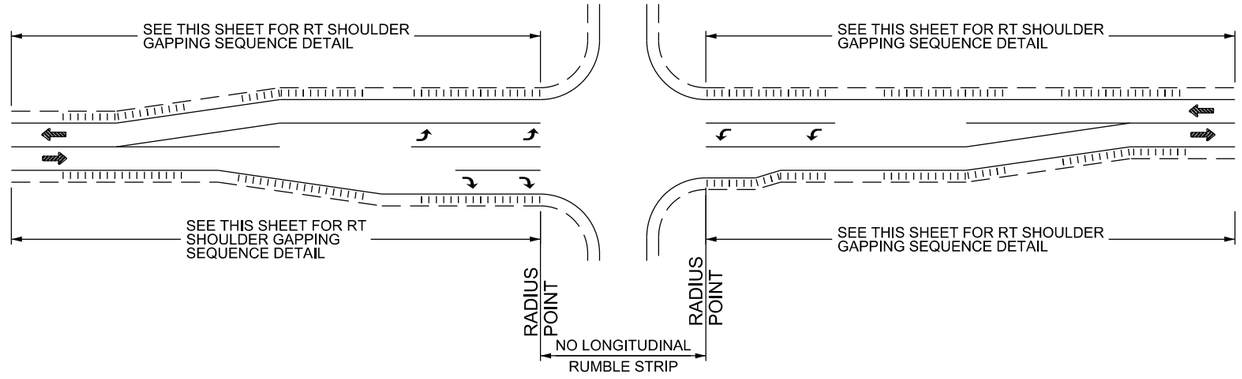
23-JUN-2020

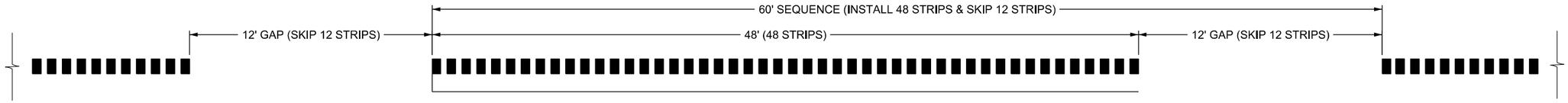


TYPICAL SHOULDER INSTALLATION AT DRIVEWAY OR ACCESS DETAIL

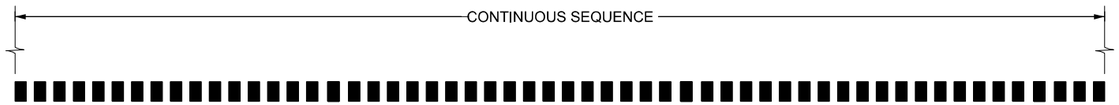
USE CONTINUOUS RUMBLE STRIP ON LEFT SHOULDER IN ONE WAY TRAFFIC SITUATIONS



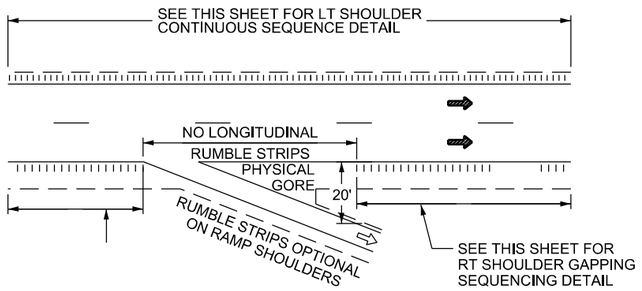
TYPICAL SHOULDER INSTALLATION AT INTERSECTION DETAIL



TYPICAL RIGHT SHOULDER GAPPING SEQUENCE DETAIL



TYPICAL LEFT SHOULDER CONTINUOUS SEQUENCE DETAIL



TYPICAL SHOULDER INSTALLATION ON EXIT RAMP DETAIL ENTRANCE RAMP SIMILAR

NOTES:

1. DO NOT PLACE RUMBLE STRIPS ON STRUCTURES OR APPROACH SLABS.
2. DO NOT PLACE RUMBLE STRIPS WITHIN 6 INCHES OF PCCP TRANSVERSE JOINTS.
3. APPLY FLUSH OR SEAL COAT UNIFORMLY ON ALL RUMBLE STRIPS ON BITUMINOUS PAVEMENT SURFACES. SEE STANDARD SPECIFICATION 02761.
4. MILL RUMBLE STRIPS TO LEAVE A RECTANGULAR SHAPE WITH UNIFORM EDGES. DO NOT DAMAGE ADJACENT PAVEMENT DURING MILLING OPERATION.
5. RESTART RUMBLE STRIP SEQUENCE (SEE STD DWG PV 7A & 7B) WHEN RUMBLE STRIPS ARE HALTED OR INTERRUPTED, EXCEPT WHEN TRANSVERSE JOINTS ARE ENCOUNTERED ON PCCP, MANUALLY INTERRUPT SEQUENCE SO RUMBLE STRIPS DO NOT GO THROUGH TRANSVERSE JOINT WHILE MAINTAINING SEQUENCE LENGTH.
6. INSTALL RUMBLE STRIPS ONLY WHERE A MINIMUM UNINTERRUPTED LENGTH OF 100 FT CAN BE INSTALLED. DISCONTINUE RUMBLE STRIPS WHEN SHOULDER WIDTH VARIES AND WHEN WIDTH IS LESS THAN SHOWN IN RUMBLE STRIP TABLES. RESUME WHEN WIDTH IS SUFFICIENT AS SHOWN IN RUMBLE STRIP TABLES, FOR MORE THAN A 100 FT IN LENGTH.
7. SEE STD DWG PV 6A FOR RUMBLE STRIP TABLES WITH GROOVE WIDTH AND LOCATION.
8. SEE STD DWG PV 6B FOR RUMBLE STRIP MILL DETAILS.
9. DO NOT PLACE SHOULDER RUMBLE STRIPS THROUGH INTERSECTIONS. DO NOT PLACE SHOULDER RUMBLE STRIPS THROUGH DRIVEWAYS AND ACCESSES WITH NON-CONTINUOUS EDGE LINES. INSTALL SHOULDER RUMBLE STRIP THROUGH DRIVEWAYS AND ACCESSES WITH CONTINUOUS EDGE LINES. SEE DETAILS ON THIS SHEET.
10. SEE STD DWG PV 7B FOR CENTER LINE RUMBLE STRIP APPLICATIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

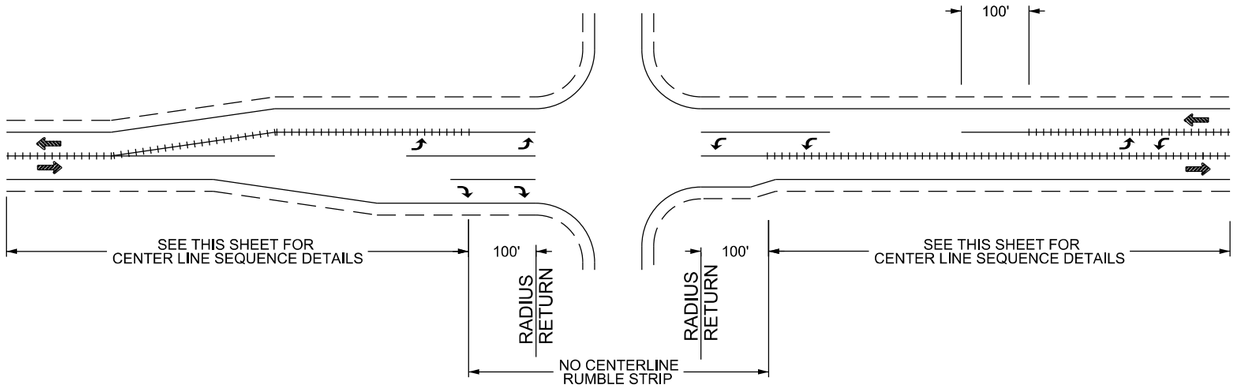
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

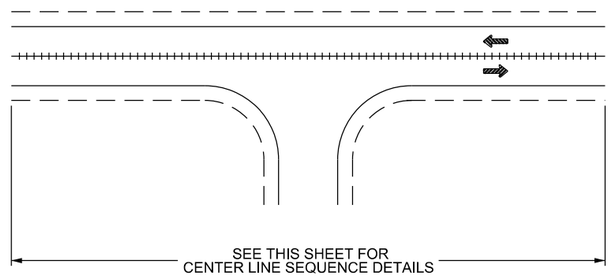
STANDARD DRAWING TITLE: TYPICAL RUMBLE STRIP SHOULDER SEQUENCING AND APPLICATIONS

STD. DWG. NO. PV 7A

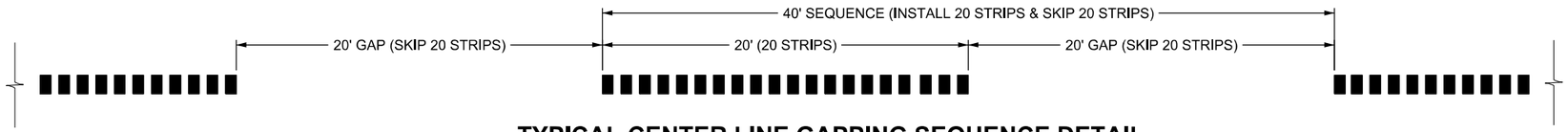
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW, PA, PV)\PV07A.dgn
23-JUN-2020



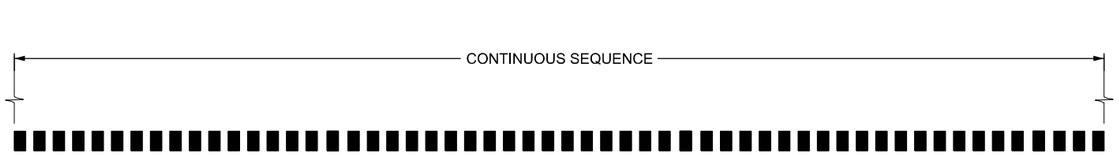
TYPICAL INSTALLATION FOR AN INTERSECTION OR TURN LANE



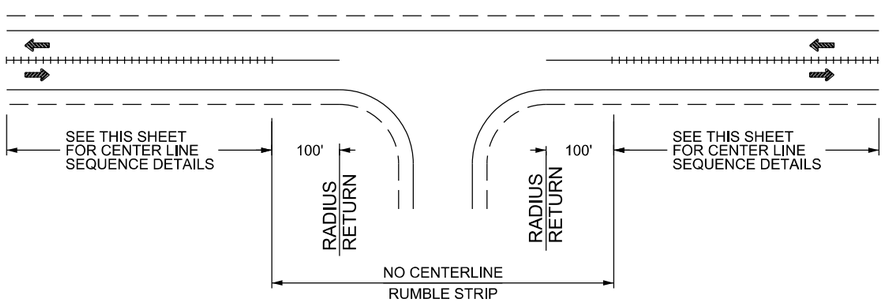
TYPICAL CENTER LINE INSTALLATION AT DRIVEWAYS AND ACCESSES WITH CONTINUOUS CENTER LINE



TYPICAL CENTER LINE GAPPING SEQUENCE DETAIL



TYPICAL CENTER LINE CONTINUOUS SEQUENCE DETAIL



TYPICAL CENTER LINE INSTALLATION AT DRIVEWAY AND ACCESSES WITH NON CONTINUOUS CENTER LINE

NOTES:

1. DO NOT PLACE RUMBLE STRIPS ON STRUCTURES OR APPROACH SLABS.
2. DO NOT PLACE RUMBLE STRIPS WITHIN 6 INCHES OF PCCP TRANSVERSE JOINTS.
3. APPLY FLUSH OR SEAL COAT UNIFORMLY ON ALL RUMBLE STRIPS ON BITUMINOUS PAVEMENT SURFACES. SEE STANDARD SPECIFICATION 02761.
4. MILL RUMBLE STRIPS TO LEAVE A RECTANGULAR SHAPE WITH UNIFORM EDGES. DO NOT DAMAGE ADJACENT PAVEMENT DURING MILLING OPERATION.
5. RESTART RUMBLE STRIP SEQUENCE (SEE STD DWG PV 7A & 7B) WHEN RUMBLE STRIPS ARE HALTED OR INTERRUPTED, EXCEPT WHEN TRANSVERSE JOINTS ARE ENCOUNTERED ON PCCP, MANUALLY INTERRUPT SEQUENCE SO RUMBLE STRIPS DO NOT GO THROUGH TRANSVERSE JOINT WHILE MAINTAINING SEQUENCE LENGTH.
6. SEE STD DWG PV 6A FOR RUMBLE STRIP TABLES WITH GROOVE WIDTH AND LOCATION.
7. SEE STD DWG PV 6B FOR RUMBLE STRIP MILL DETAIL.
8. SEE STD DWG PV 7A & 7B FOR RUMBLE STRIP SEQUENCING.
9. DO NOT PLACE CENTERLINE RUMBLE STRIPS THROUGH INTERSECTIONS. DO NOT PLACE CENTER LINE RUMBLE STRIPS THROUGH DRIVEWAYS AND ACCESSES WITH NON-CONTINUOUS CENTER LINE. PLACE CENTER LINE RUMBLE STRIP THROUGH DRIVEWAYS AND ACCESSES WITH CONTINUOUS CENTER LINE. SEE DETAILS ON THIS SHEET.
10. SEE STD DWG PV 7A FOR SHOULDER RUMBLE STRIP APPLICATIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

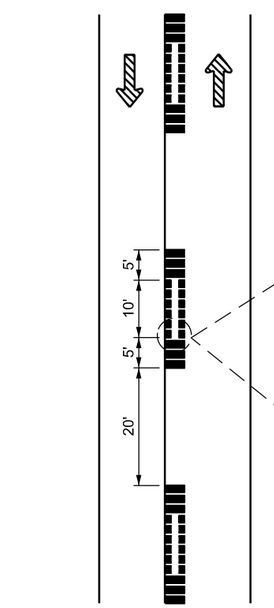
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

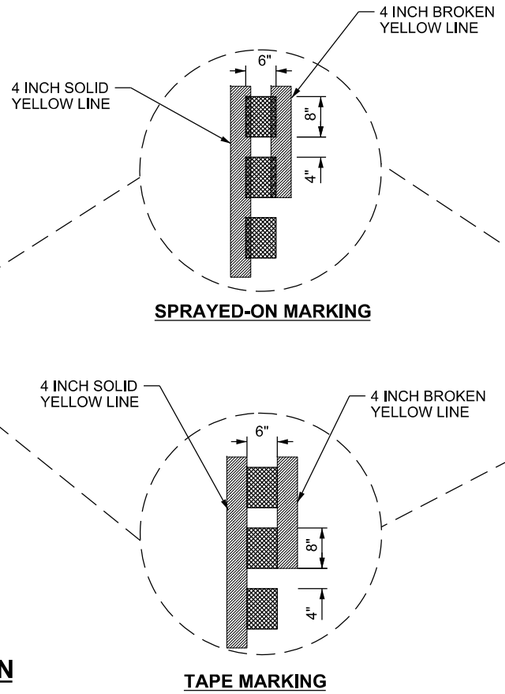
TYPICAL RUMBLE STRIP CENTER LINE SEQUENCING AND APPLICATION

STANDARD DRAWING TITLE

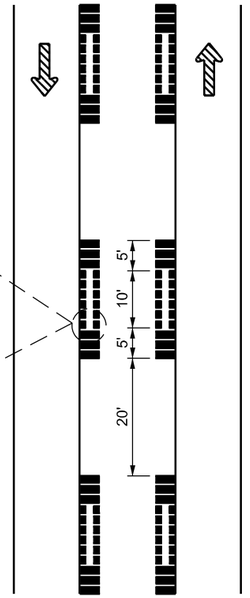
STD. DWG. NO.
PV 7B

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\PV07B.dgn

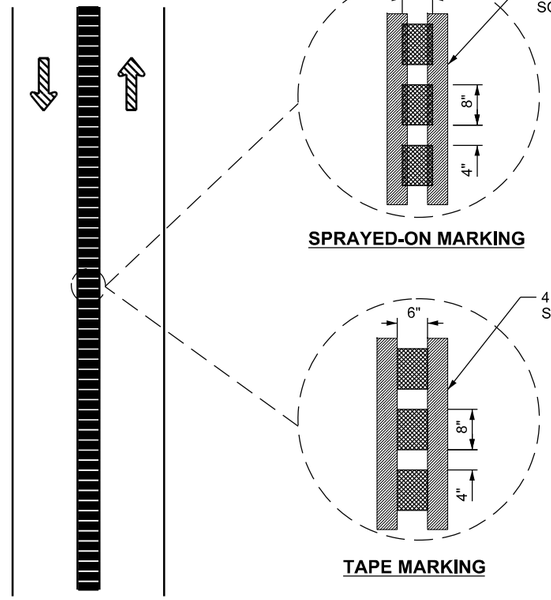


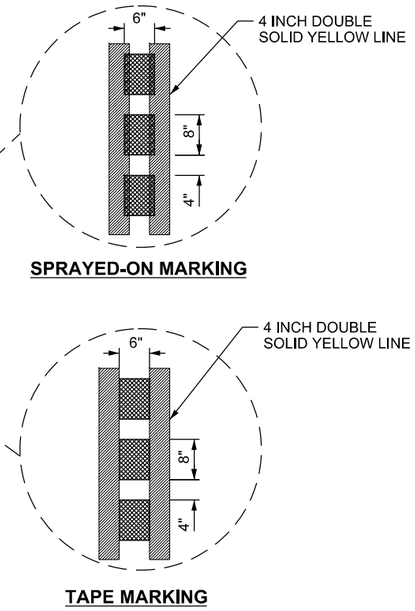


TYPICAL TWO-WAY WITH ONE-DIRECTION NO-PASSING ZONE



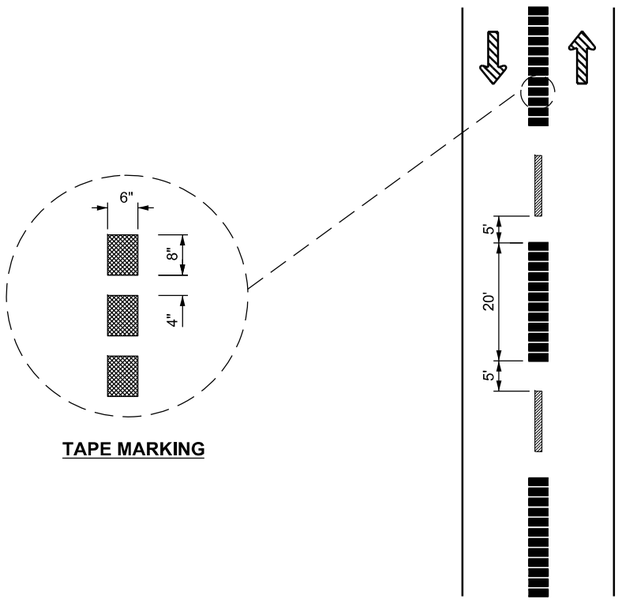
TYPICAL TWO-WAY WITH LEFT TURN LANE



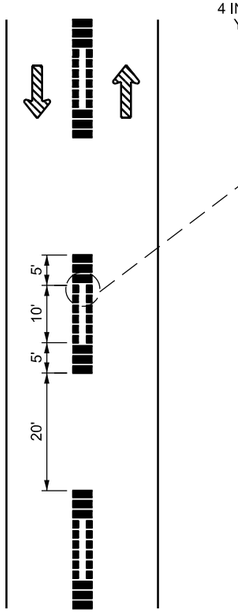


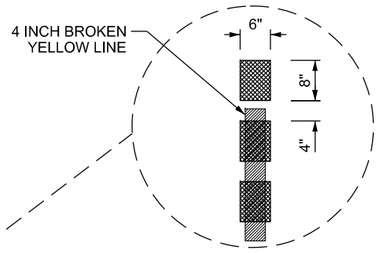
TYPICAL TWO-WAY WITH NO PASSING ZONES

TAPE MARKING



TYPICAL TWO-DIRECTION PASSING ZONE (TAPE MARKING)





SPRAYED-ON MARKING

TYPICAL TWO-DIRECTION PASSING ZONE (SPRAYED-ON MARKINGS)

NOTES:

1. DO NOT PLACE RUMBLE STRIPS ON STRUCTURES OR APPROACH SLABS.
2. DO NOT PLACE RUMBLE STRIPS WITHIN 6 INCHES OF PCCP TRANSVERSE JOINTS.
3. APPLY FLUSH OR SEAL COAT UNIFORMLY ON ALL RUMBLE STRIPS ON BITUMINOUS PAVEMENT SURFACES. SEE STANDARD SPECIFICATION 02761.
4. CENTER SPRAYED-ON MARKINGS ON RUMBLE STRIPS.
5. PLACE TAPE MARKINGS MIDWAY BETWEEN BROKEN LINES.
6. SEE STD DWG PV 7B FOR CENTERLINE RUMBLE STRIP DETAIL.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

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DEPUTY DIRECTOR DATE

TYPICAL RUMBLE STRIP CENTERLINE APPLICATION

STANDARD DRAWING TITLE

STD. DWG. NO.

PV 8

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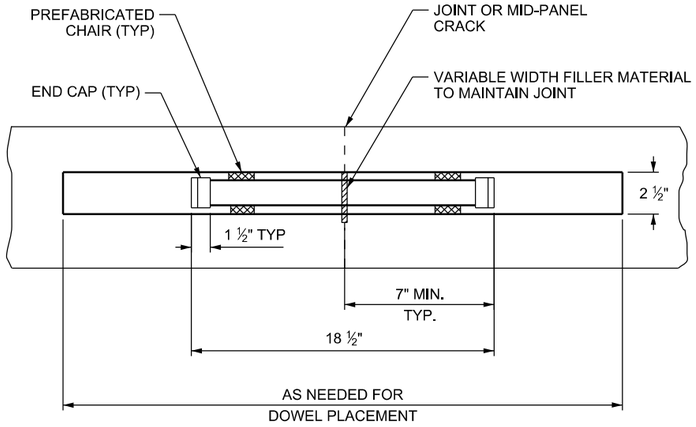
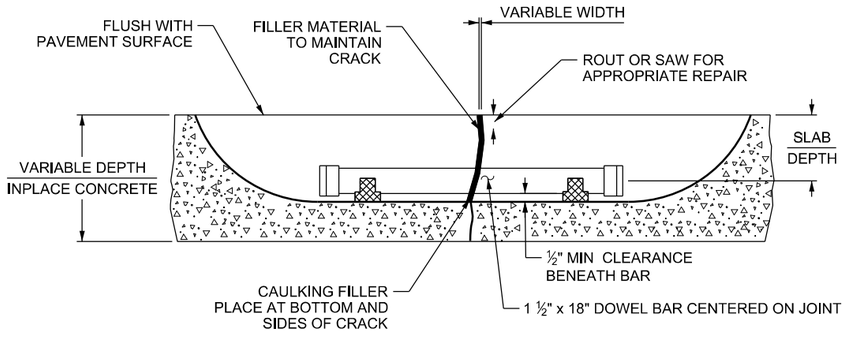
23-JUN-2020

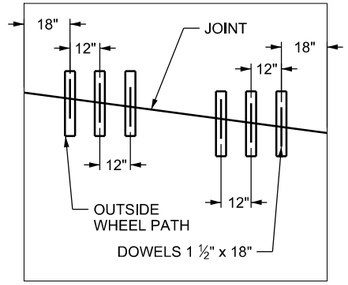


PLAN



ELEVATION

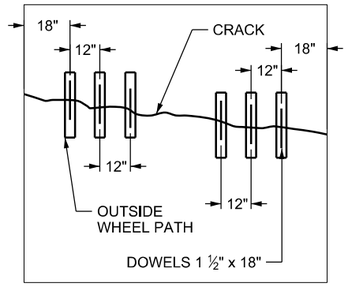
SEE NOTE 2



TYPICAL LANE

SEE NOTES 3 & 4

JOINT RETROFIT DOWEL LAYOUT



CRACK RETROFIT DOWEL LAYOUT

(FOR MID-PANEL CRACK)

NOTES:

1. THIS REPAIR IS INTENDED TO BE USED TO ESTABLISH AND RESTORE LOAD TRANSFER AT JOINTS OR CRACKS
2. PROVIDE ½ INCH MINIMUM CLEARANCE AROUND BAR EXCEPT FOR DEPTH OF COVER.
3. PROVIDE DOWEL BARS PARALLEL TO THE CENTERLINE AND TO THE PAVEMENT SURFACE.
4. LIMIT DEVIATIONS FROM PARALLEL TO ¼ INCH IN THE LENGTH OF THE DOWEL BARS.

REVISIONS

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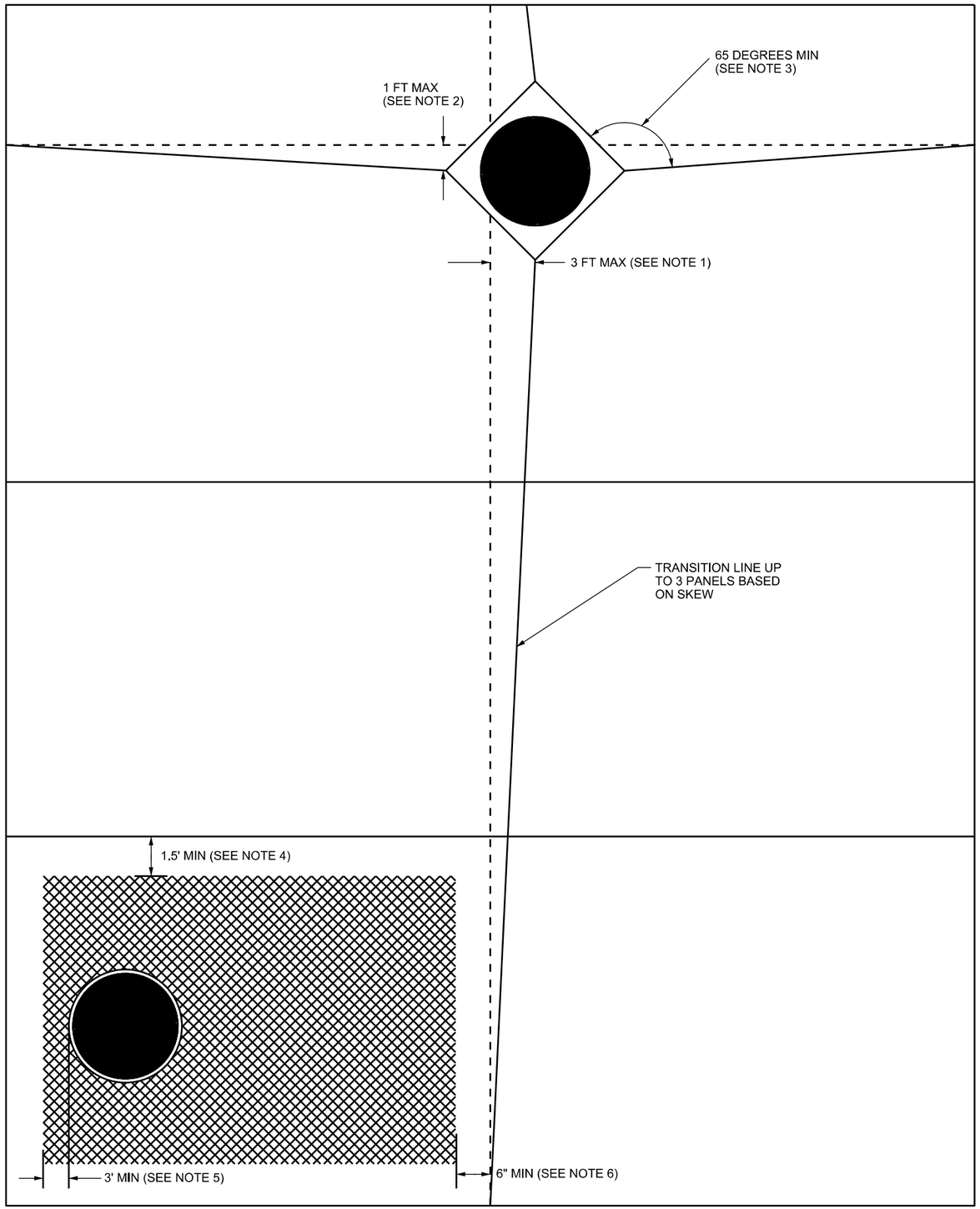
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

DOWEL BAR RETROFIT

STANDARD DRAWING TITLE

STD. DWG. NO.
PV 9

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\PV09.dgn



UTILITY ORIENTATION/ADJUSTMENT OPTIONS IN PCCP

NOTES:

OPTION 1: PLACE BLOCKOUT AND ADJUST LONGITUDINAL AND TRANSVERSE JOINTS.
- 1 - LONGITUDINAL SKEW NO MORE THAN 3 FT.
- 2 - SKEW TRANSVERSE JOINT UP TO 1 FT OVER 1 PANEL.
- 3 - ANGLE BETWEEN TRANSVERSE JOINT AND BLOCKOUT TO BE 65 DEGREES OR GREATER.

OPTION 2: PLACE REINFORCING MESH AROUND MANHOLE LID.
- 4 - 1.5 FT MINIMUM CLEARANCE FROM DOWELED JOINT. DO NOT PLACE MESH ACROSS TRANSVERSE JOINT.
- 5 - 3 FT MINIMUM MESH COVERAGE FROM LID PERIMETER.
- 6 - 6 NCHES MINIMUM FROM LONGITUDINAL JOINT.
- 7 - INSTALLATION DEPTH OF MESH IS MIDSLAB +/- 1.5 INCHES.
- 8 - USE NO. 6 GAUGE 6 INCHES x 6 INCHES GALVANIZED MESH.

REVISIONS

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UTILITY ORIENTATION/ ADJUSTMENT OPTIONS IN PCCP

STANDARD DRAWING TITLE

STD. DWG. NO.
PV 10

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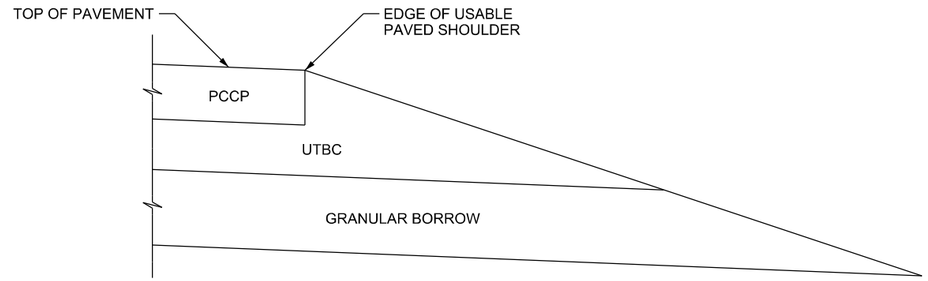
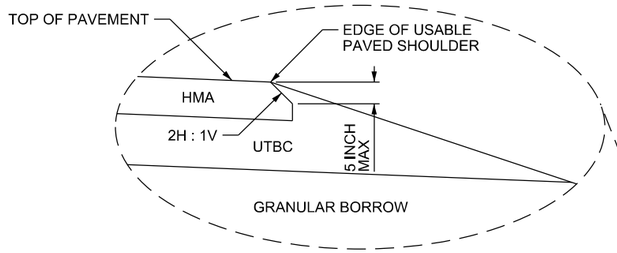
23-JUN-2020



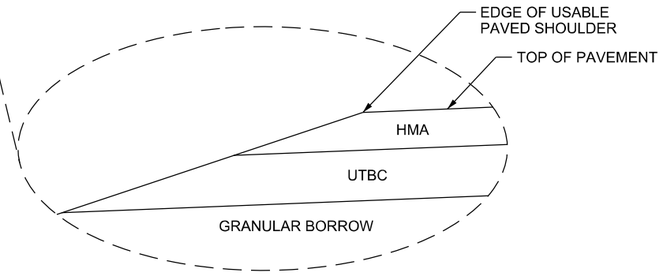
PCCP EDGE DETAIL



HMA EDGE OPTION 1

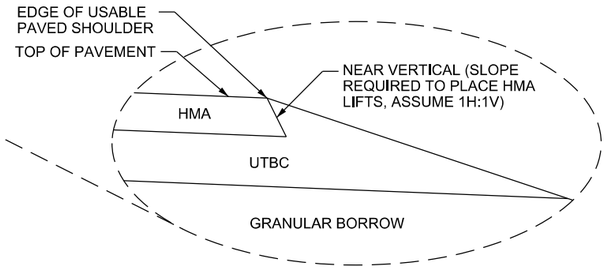
(NOTE 2)

HMA PAVEMENT EDGE DETAIL



HMA EDGE OPTION 2

(NOTE 2)



HMA EDGE OPTION 3

(NOTE 2)

NOTES:

1. PROVIDE MEASURES TO CAPTURE AND CONVEY DRAINAGE AWAY FROM PAVEMENT SECTION. MAINTAIN A MINIMUM 1 FT VERTICAL DISTANCE BELOW THE BOTTOM OF GRANULAR BORROW LAYER TO THE BOTTOM OF THE CUT DITCH OR FILL LINE OR PER PLAN.
2. REFER TO PROJECT PLAN SHEETS TO IDENTIFY WHICH EDGE DETAIL TO USE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

	DATE
RECOMMENDED FOR APPROVAL	AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUGUST 2020
DEPUTY DIRECTOR	DATE

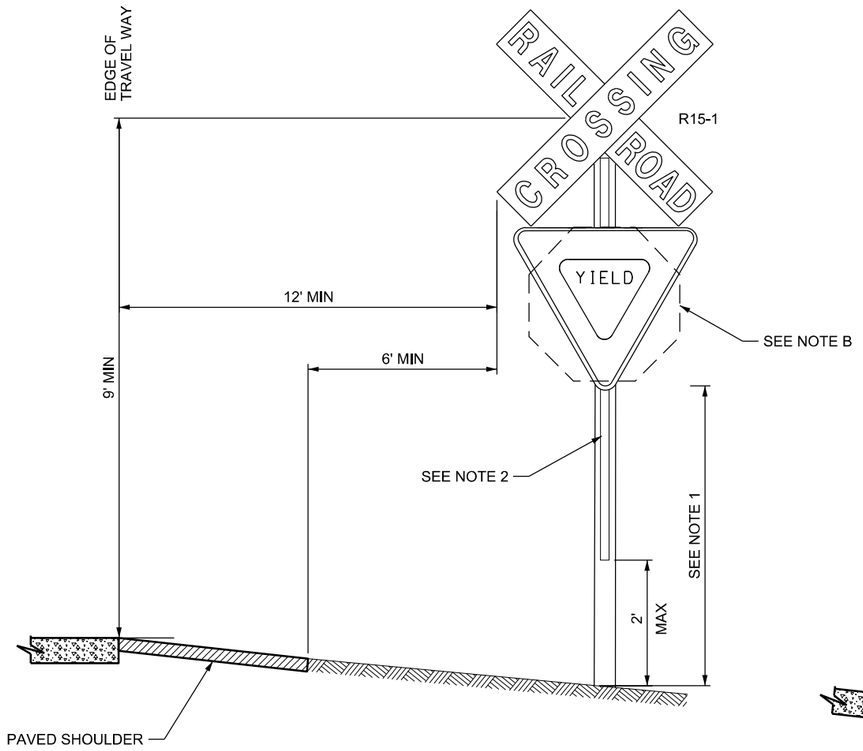
EDGE DETAIL

STANDARD DRAWING TITLE

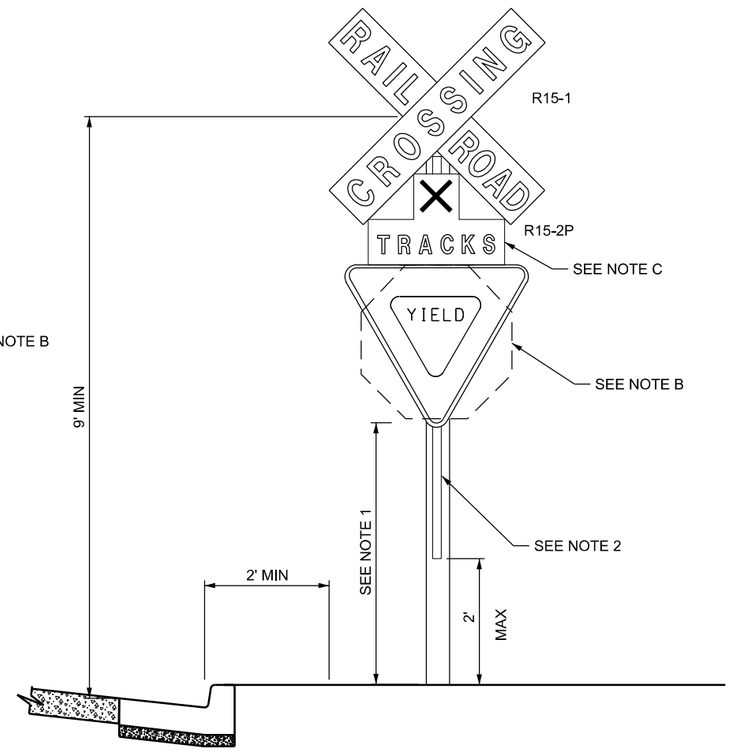
STD. DWG. NO.

PV 11

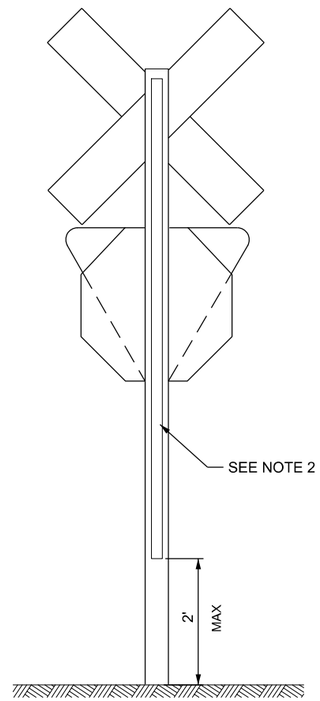
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 6 (GW,PA,PV)\PV11.dgn



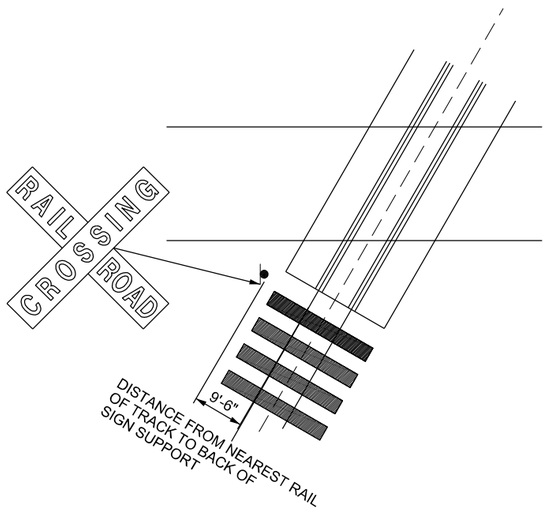
RURAL LOCATION
DETAIL A



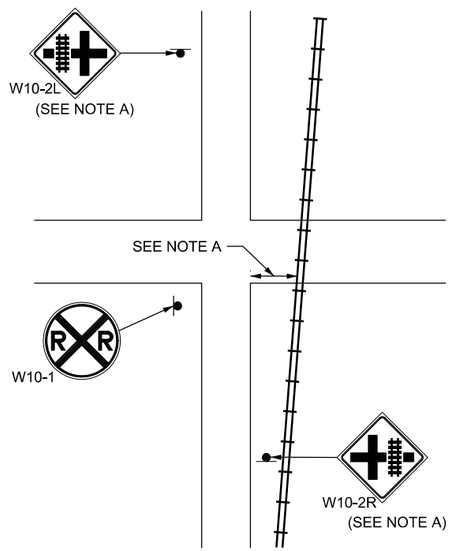
URBAN LOCATION
DETAIL B



BACK (TYP)
DETAIL C



CROSSBUCK PLACEMENT
DETAIL D



CROSSING NEAR INTERSECTION
DETAIL E

DESIGN-ONLY NOTES:

A. PROVIDE APPROPRIATE W10 SERIES SIGNS WHEN DISTANCE BETWEEN NEAREST RAIL AND EDGE OF ROADWAY IS 100 FT OR LESS.

B. USE YIELD (R1-2) OR STOP (R1-1) SIGNS ONLY AT PASSIVE CROSSINGS, SEE MUTCD.

C. USE NUMBER OF TRACKS (R15-2P) PLAQUE SIGN WHEN MORE THAN ONE TRACK EXISTS.

NOTES:

1. SEE STD DWG SN 7A FOR MOUNTING HEIGHT.

2. PLACE A 2 INCH WIDE WHITE RETROREFLECTIVE STRIP ON BACK AND FRONT OF ALL CROSSBUCK SUPPORTS.

REVISIONS

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UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

SIGNS AT
RAILROAD CROSSING

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 1

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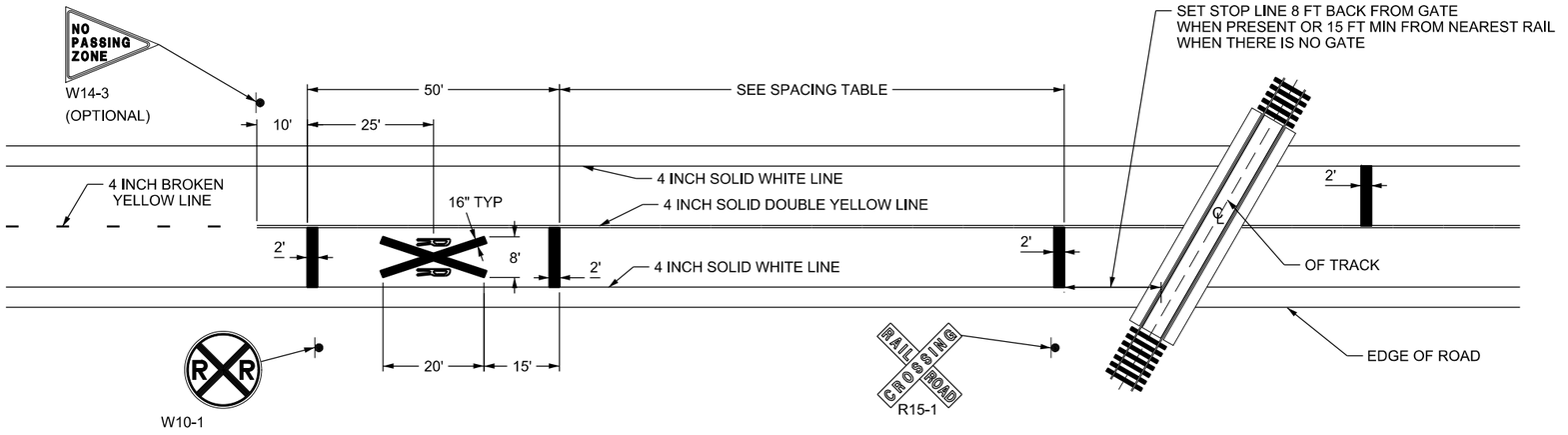
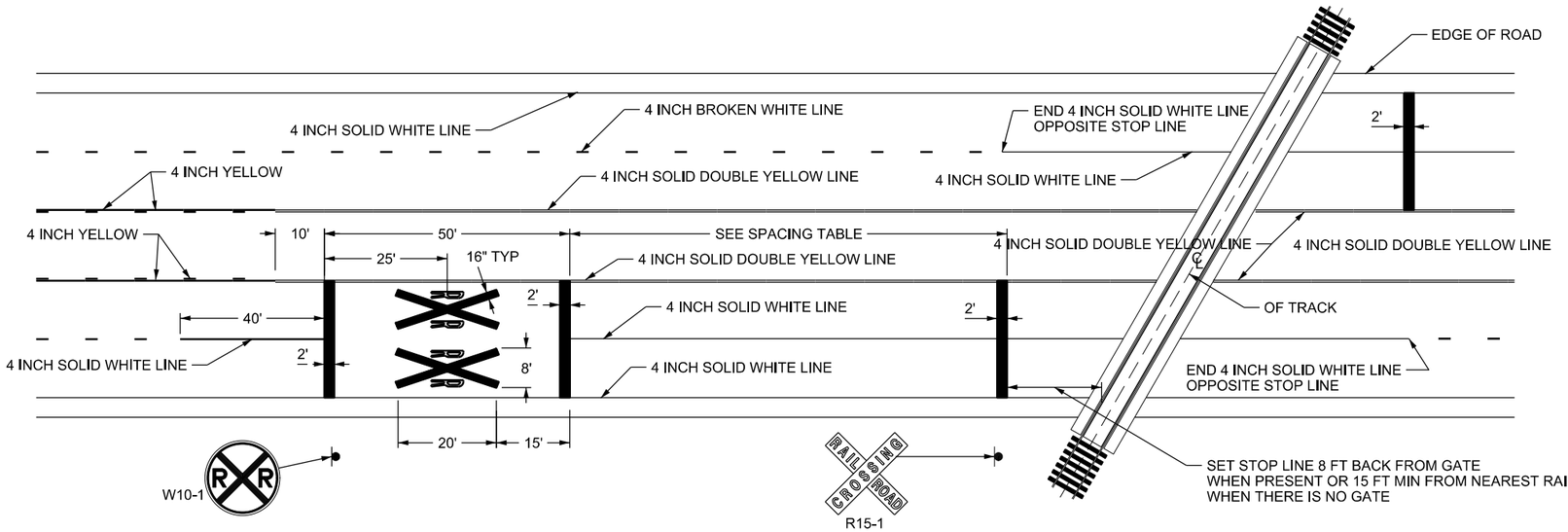


TWO LANE FACILITY
DETAIL A



MULTI-LANE FACILITY
DETAIL B

SPACING TABLE	
SPEED LIMIT MPH	MIN DISTANCE (FT)
65 - 70	750
55 - 60	550
45 - 50	375
35 - 40	225
25 - 30	100

NOTES:

1. PLACE PAVEMENT MARKINGS CONSISTING OF AN "RXR," TRANSVERSE LINES, AND NO-PASSING MARKINGS. USE MARKINGS IN EACH APPROACH LANE ON ALL PAVED APPROACHES TO GRADE CROSSING WHERE GRADE CROSSING SIGNALS OR AUTOMATIC GATES ARE PRESENT AND AT ALL OTHER GRADE CROSSINGS WHERE THE POSTED SPEED IS 40 MPH OR GREATER. PLACE PAVEMENT MARKINGS AT OTHER CROSSINGS AS DIRECTED BY THE REGION TRAFFIC ENGINEER.
2. EXTEND TRANSVERSE LINES ACROSS ALL APPROACH LANES ON MULTI-LANE ROADS. USE INDIVIDUAL "RXR" MARKINGS IN EACH APPROACH LANE.
3. USE THE STANDARD HIGHWAY SIGNS AND MARKING BOOK FOR DIMENSIONS OF "RXR" PAVEMENT MARKINGS.
4. SEE STD DWG RR 1 FOR ALL SIGN DETAILS AND INSTALLATION INFORMATION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

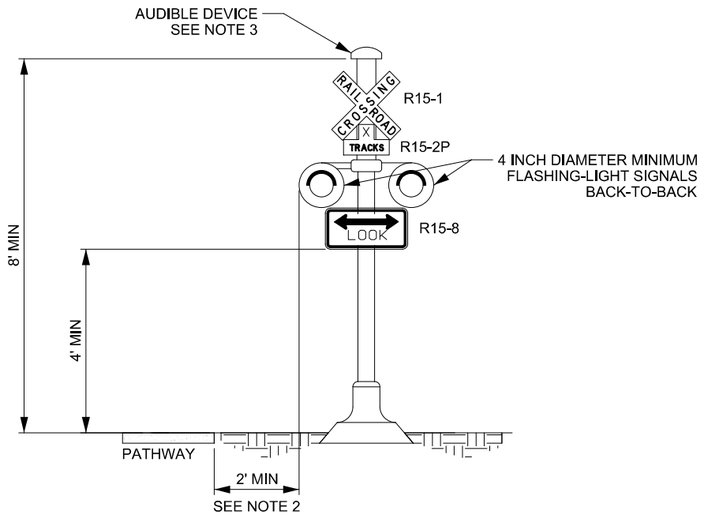
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

PAVEMENT MARKINGS AT RAILROAD CROSSING

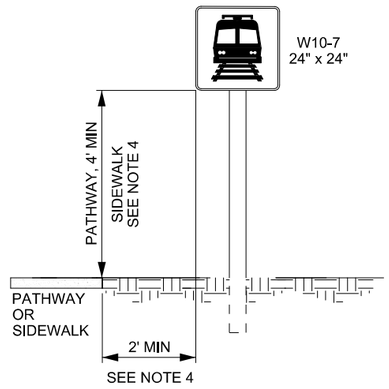
STANDARD DRAWING TITLE

STD. DWG. NO.
RR 2

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\RR02.dgn

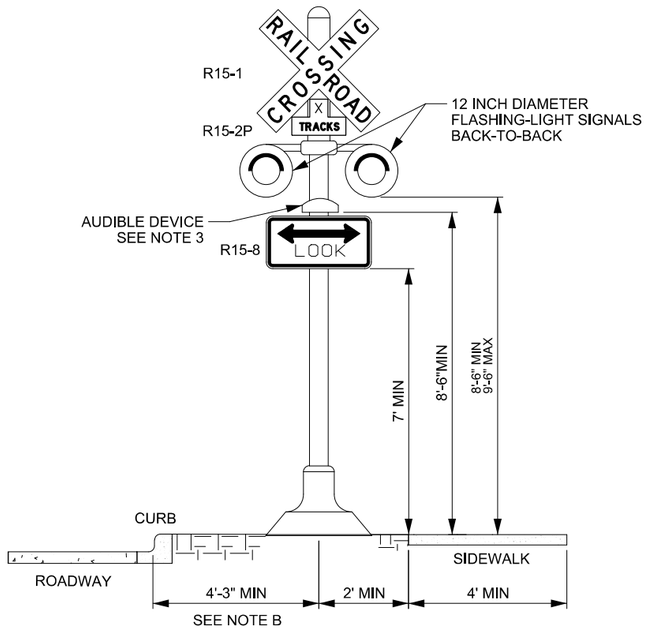


PATHWAY FLASHING-LIGHT SIGNALS
DETAIL A



TRAIN ACTIVATED
BLANKOUT SIGN
DETAIL B

TABLE 1		
SIGN SIZES		
SIGN	DETAIL A	DETAIL C
R15-1	24" X 4 1/2"	48" X 9"
R15-2P	13 1/2" x 9"	27" x 18"
R15-8	18" x 9"	36" x 18"



SHARED ROADWAY/PEDESTRIAN
FLASHING-LIGHT SIGNALS
DETAIL C

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - CAN BE EITHER A SIDEWALK OR A PATHWAY.

B. USE A LATERAL OFFSET OF A MINIMUM OF 4 FT 3 INCHES FROM THE FACE OF CURB AND A MINIMUM OF 8 FT 3 INCHES FROM THE EDGE OF THE TRAVELED WAY TO THE CENTER OF THE VEHICLE GATE SIGNAL POLE WHEN NO CURB IS PRESENT.

C. USE A NUMBER OF TRACKS (R15-2P) PLAQUE WHEN THERE IS MORE THAN 1 TRACK.

D. SEE TABLE 1 FOR SIGN SIZES.

NOTES:

1. DIRECT FLASHING-LIGHT SIGNALS TO ALL PEDESTRIAN APPROACHES. INSTALL ADDITIONAL FLASHING-LIGHT SIGNALS AS NECESSARY.
2. MAY USE A LATERAL OFFSET OF 2 FT TO THE CENTER OF THE SIGNAL POLE WHEN THE MOUNTING HEIGHT OF THE LOOK (R15-8) SIGN ADJACENT TO A PATHWAY IS 8 FT OR GREATER.
3. PLACE THE AUDIBLE DEVICE ON THE FRONT SIDE OF THE POLE WHERE IT DOES NOT CONFLICT WITH THE SIGNS OR FLASHING-LIGHT SIGNALS.
4. SEE STD DWG SN 7A FOR MOUNTING HEIGHT AND LATERAL OFFSET WHEN THE W10-7 BLANKOUT SIGN IS USED AT A LOCATION OTHER THAN A PATHWAY SUCH AS A SIDEWALK, A STATION PLATFORM OR A ROADWAY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

ACTIVE PEDESTRIAN CONTROLS FOR RAILROAD CROSSINGS SHEET 1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 3A1

DGN File: L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL) IRR03A1.dgn
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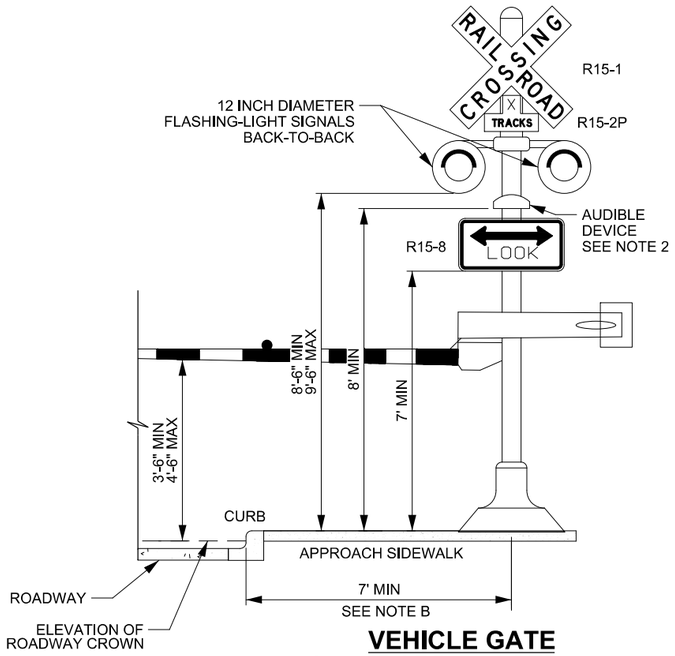
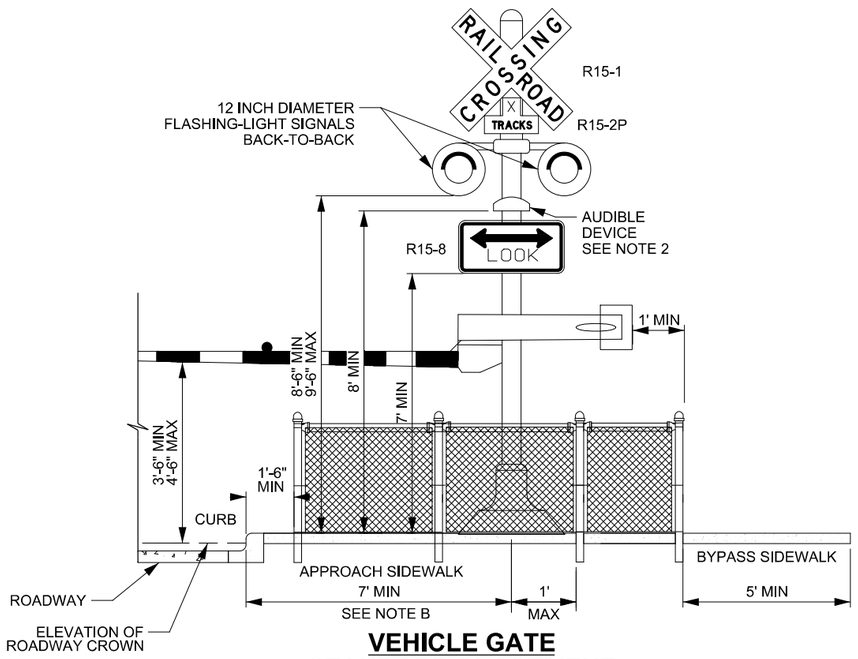


VEHICLE GATE
STANDARD PLACEMENT
DECISION AREA <10'
DETAIL D

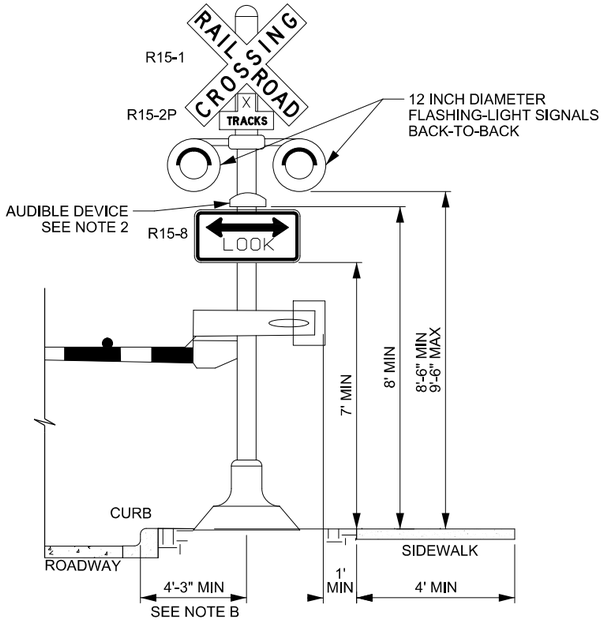
SEE NOTE C AND D



VEHICLE GATE
STANDARD PLACEMENT
DECISION AREA ≥10'
DETAIL F

SEE NOTE C AND D

TABLE 2			
SIGN SIZES			
SIGN	DETAIL D	DETAIL E	DETAIL F
R15-1	48" X 9"	48" X 9"	48" X 9"
R15-2P	27" x 18"	27" x 18"	27" x 18"
R15-8	36" x 18"	36" x 18"	36" x 18"



VEHICLE GATE
ALTERNATE PLACEMENT
DETAIL E

SEE NOTE C

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. USE A LATERAL OFFSET OF A MINIMUM OF 4 FT 3 INCHES FROM THE FACE OF CURB AND A MINIMUM OF 8 FT 3 INCHES FROM THE EDGE OF THE TRAVELED WAY TO THE CENTER OF THE VEHICLE GATE SIGNAL POLE WHEN NO CURB IS PRESENT.

C. LOCATE VEHICLE GATES BEHIND THE SIDEWALK UNLESS SITE SPECIFIC CONDITIONS RESTRICT GATE ARM LENGTHS SUCH AS OVERHEAD UTILITIES, MULTIPLE TRAFFIC LANES, OR CONDITIONS THAT REQUIRE A GATE LONGER THAN 32 FT. LOCATE VEHICLE GATES IN FRONT OF THE SIDEWALK ACCORDING TO THE ALTERNATE PLACEMENT (DETAIL E) IF SITE SPECIFIC CONDITIONS PREVENT STANDARD PLACEMENT OF VEHICLE GATES BEHIND THE SIDEWALK (DETAILS D AND F).

D. SEE STD DWG RR 5A2 FOR DECISION AREA DETAILS.

E. SEE STD DWG RR 4A2 FOR CHANNELIZING BARRIER OR FENCE DETAILS.

NOTES:

1. DIRECT FLASHING-LIGHT SIGNALS TO ALL PEDESTRIAN APPROACHES. INSTALL ADDITIONAL FLASHING-LIGHT SIGNALS AS NECESSARY.

2. PLACE THE AUDIBLE DEVICE ON THE FRONT SIDE OF THE POLE WHERE IT DOES NOT CONFLICT WITH THE SIGNS OR FLASHING-LIGHT SIGNALS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 — DATE

DEPUTY DIRECTOR

ACTIVE PEDESTRIAN CONTROLS FOR RAILROAD CROSSINGS SHEET 2 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 3A2

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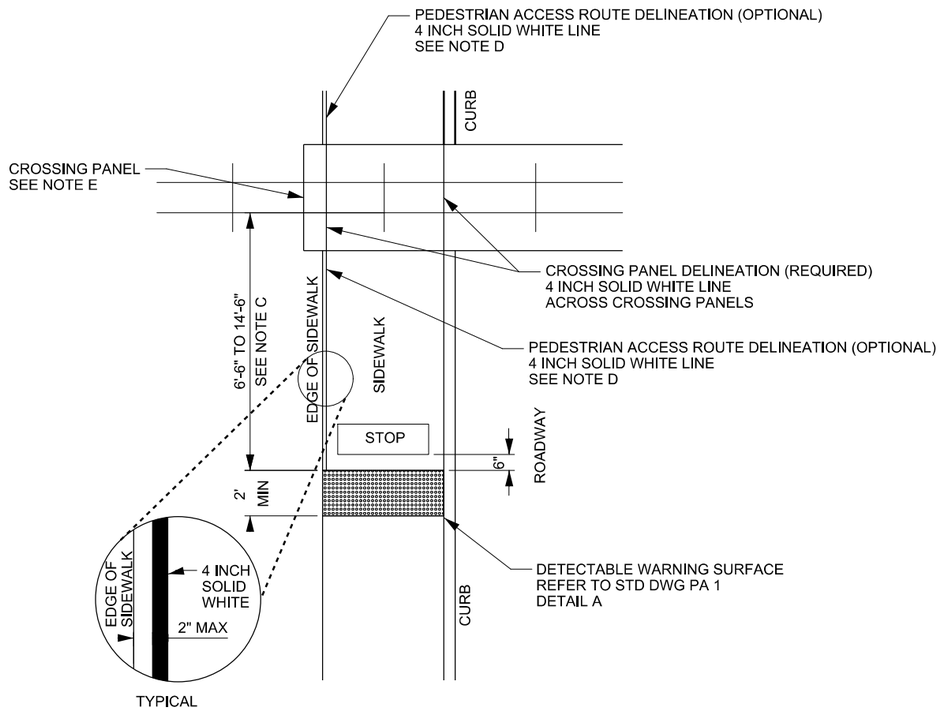
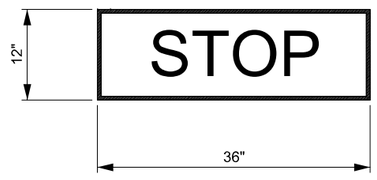
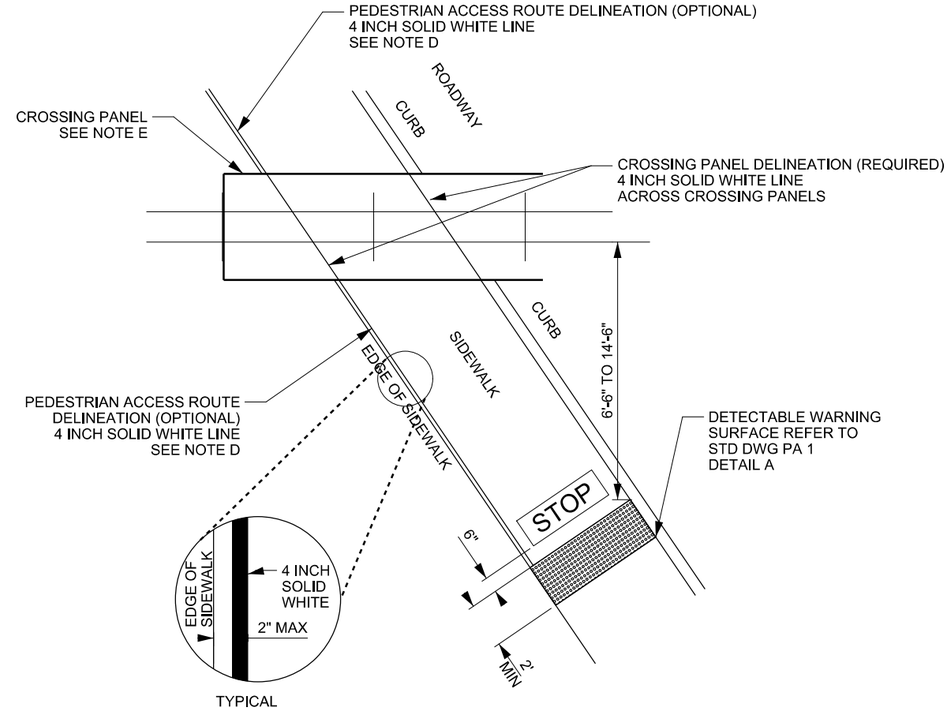


PLACEMENT OF DETECTABLE WARNING SURFACE (PERPENDICULAR CROSSING) DETAIL A



"STOP" PAVEMENT MARKING DETAIL C

SEE NOTES 1 AND 2



PLACEMENT OF DETECTABLE WARNING SURFACE (SKEWED CROSSING) DETAIL B

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PEDESTRIAN ACCESS ROUTES DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PEDESTRIAN ACCESS ROUTE.

B. USE "STOP" PAVEMENT MARKING IN STREET RUNNING ALIGNMENTS WHERE THERE IS A STATION ENTRANCE (SEE STD DWG RR 6, DETAIL A, AND STD DWG RR 7, DETAIL A) AND IN SEMI-EXCLUSIVE ALIGNMENTS IN QUADRANTS WHERE PEDESTRIANS ARE NOT CONTROLLED BY GATES.

C. MAXIMIZE SIGHT DISTANCE BY PLACING THE DETECTABLE WARNING SURFACE (DWS) WITHIN THE PRESCRIBED DISTANCES. THE PREFERRED DISTANCE IS 10 FT FROM NEAREST RAIL OR 2 FT FROM FLASHING-LIGHT SIGNALS OR AUTOMATIC GATES. EXTEND DWS FULL WIDTH OF THE PEDESTRIAN ACCESS ROUTE. VERIFY THE DWS IS OUTSIDE THE TRAIN'S DYNAMIC ENVELOPE AND OUTSIDE THE SWING PATH OF VEHICLE OR PEDESTRIAN GATE COUNTERWEIGHTS.

D. DELINEATE PEDESTRIAN ACCESS ROUTE UP TO THE CROSSING PANEL WITH A 4 INCH SOLID WHITE LINE IN SEMI-EXCLUSIVE ALIGNMENTS WHEN PEDESTRIAN ACCESS ROUTE IS NOT OTHERWISE DEFINED THROUGH CONTRASTING COLOR OR TEXTURE. MATCH PEDESTRIAN ACCESS ROUTE DELINEATION TO CROSSING PANEL DELINEATION.

E. EXTEND CROSSING PANEL A MINIMUM OF 2 FT BEYOND SIDEWALK.

NOTES:

1. USE 8 INCH RED LETTERS ON WHITE NON-SLIP THERMOPLASTIC BACKGROUND WITH 1 INCH RED BORDER OR 8 INCH WHITE LETTERS ON RED NON-SLIP THERMOPLASTIC BACKGROUND WITH 1 INCH WHITE BORDER. BOND TO PAVEMENT.
2. DO NOT EXCEED THE ADA THICKNESS REQUIREMENTS OF 1/4 INCH VERTICAL OR 1/2 INCH BEVELED FOR THE STOP PAVEMENT MARKING.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

PASSIVE PEDESTRIAN CONTROLS FOR RAILROAD CROSSINGS SHEET 1 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 4A1

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR_SLC\RR04A1.dgn
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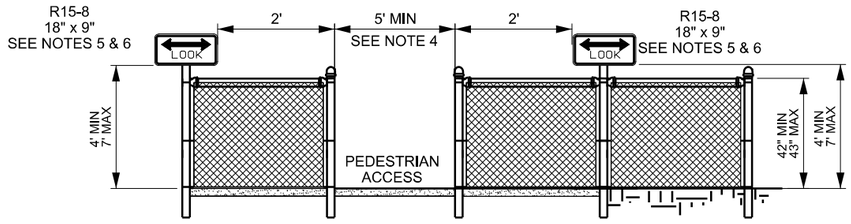
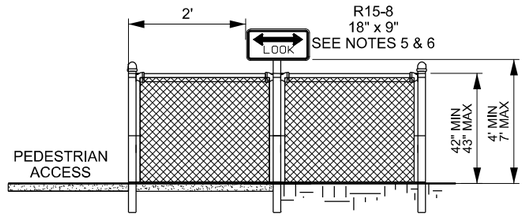


CHANNELIZING FENCE/BARRIER DETAIL D1

SEE NOTES 2 AND B



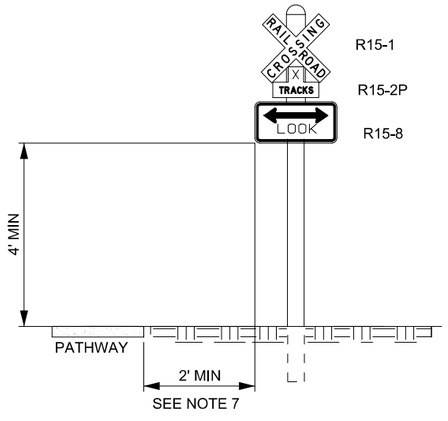
CHANNELIZING FENCE/BARRIER DETAIL D2

SEE NOTES 2 AND B

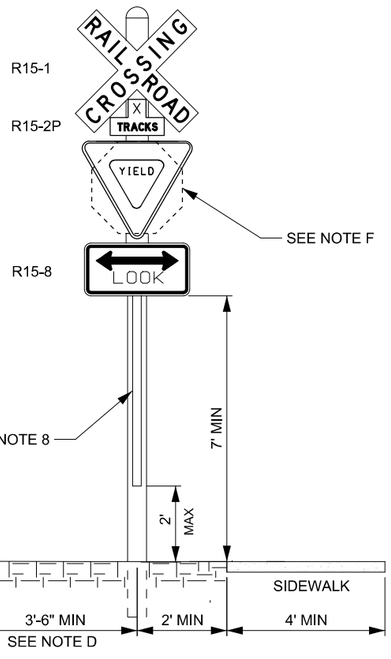
CHANNELIZING LANDSCAPING DETAIL E

SEE NOTE 6

TABLE 1				
SIGN SIZES				
SIGN	DETAIL D1	DETAIL D2	DETAIL F	DETAIL G
R15-1	--	--	24" X 4 1/2"	48" X 9"
R15-2P	--	--	13 1/2" x 9"	27" x 18"
R15-8	18" x 9"	18" x 9"	18" x 9"	36" x 18"



PATHWAY PEDESTRIAN PASSIVE CONTROLS DETAIL F



SHARED ROADWAY/PEDESTRIAN PASSIVE CONTROLS DETAIL G

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. USE CHANNELIZING FENCE OR BARRIER TO DEFINE PEDESTRIAN ACCESSES AND TO RESTRICT ERRANT PEDESTRIAN MOVEMENT.

C. USE CHANNELIZING LANDSCAPE TO RESTRICT ERRANT PEDESTRIAN MOVEMENT ONLY. DO NOT USE TO DEFINE PEDESTRIAN ACCESSES.

D. USE A LATERAL OFFSET OF A MINIMUM OF 3 FT 6 INCHES FROM THE FACE OF CURB AND A MINIMUM OF 7 FT 6 INCHES FROM THE EDGE OF THE TRAVELED WAY TO THE CENTER OF THE SIGN POLE WHEN NO CURB IS PRESENT.

E. USE A NUMBER OF TRACKS (R15-2P) PLAQUE WHEN THERE IS MORE THAN 1 TRACK.

F. USE YIELD OR STOP SIGNS ONLY AT PASSIVE CROSSINGS. SEE MUTCD.

G. SEE TABLE 1 FOR SIGN SIZES.

NOTES:

1. ADJUST CHANNELIZATION AND BARRIER LAYOUT SHOWN ON THIS DRAWING AS NECESSARY BASED ON SITE SPECIFIC SITUATIONS, WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
2. USE 2 INCH MAXIMUM MESH FOR CHAIN LINK CHANNELIZING FENCES NEAR GRADE CROSSINGS.
3. PLACE FENCE TOP RAIL AS SHOWN IN PLANS.
4. MATCH WIDTH OF PEDESTRIAN ACCESS TO SIDEWALK OR CROSSWALK WIDTH.
5. PLACE LOOK (R15-8) SIGN TO FACE PEDESTRIANS APPROACHING TRACKS ON BOTH SIDES OF THE CROSSING.
6. PLACE TWO LOOK (R15-8) SIGNS BACK TO BACK WHEN CHANNELIZING FENCE OR BARRIER IS INSTALLED BETWEEN TRACKS.
7. MAY USE A LATERAL OFFSET OF 2 FT TO THE CENTER OF THE SIGN POLE WHEN THE MOUNTING HEIGHT OF THE LOOK (R15-8) SIGN ADJACENT TO A PATHWAY IS 8 FT OR GREATER.
8. PLACE A 2 INCH WIDE WHITE RETROREFLECTIVE STRIP ON BACK AND FRONT OF ALL CROSSBUCK SUPPORTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED
DEPUTY DIRECTOR

PASSIVE PEDESTRIAN CONTROLS FOR RAILROAD CROSSINGS SHEET 2 OF 2

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 4A2

DGN File: L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR_SL)_ IRR04A2.dgn
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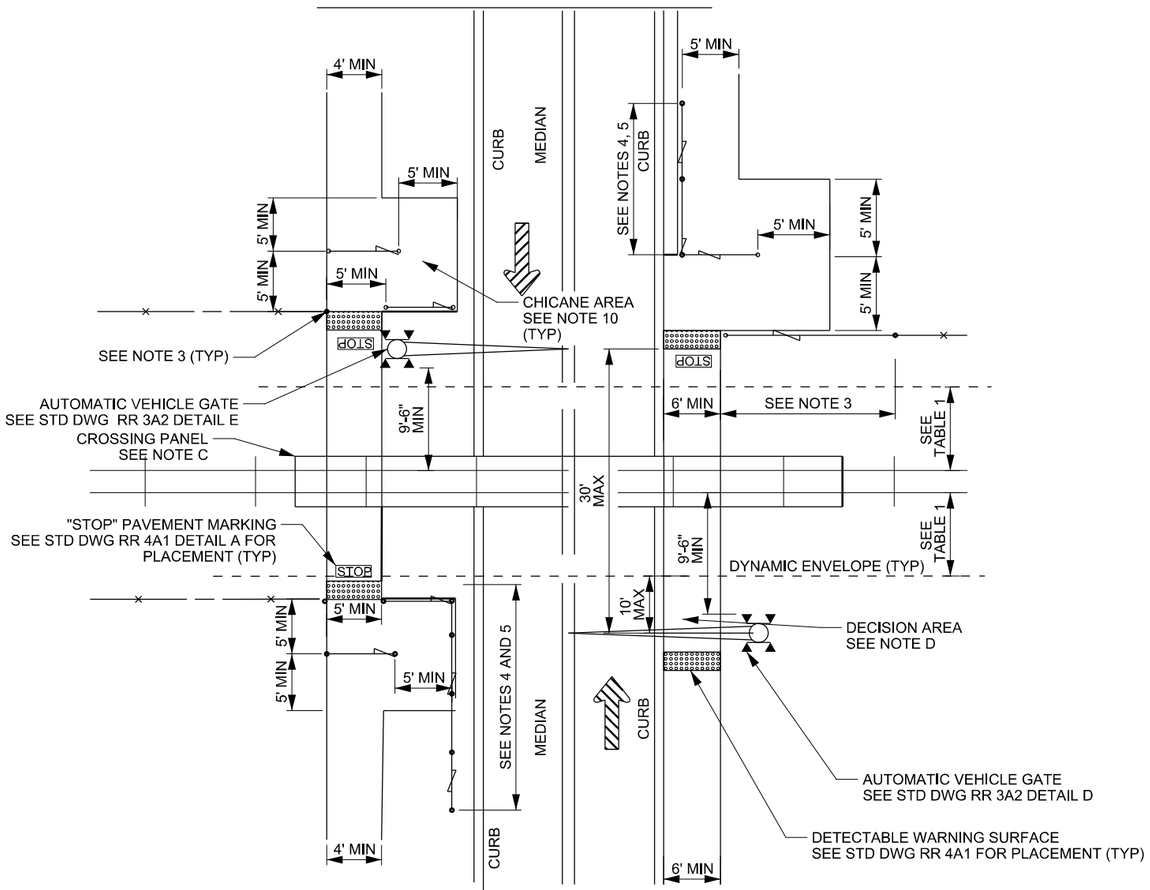
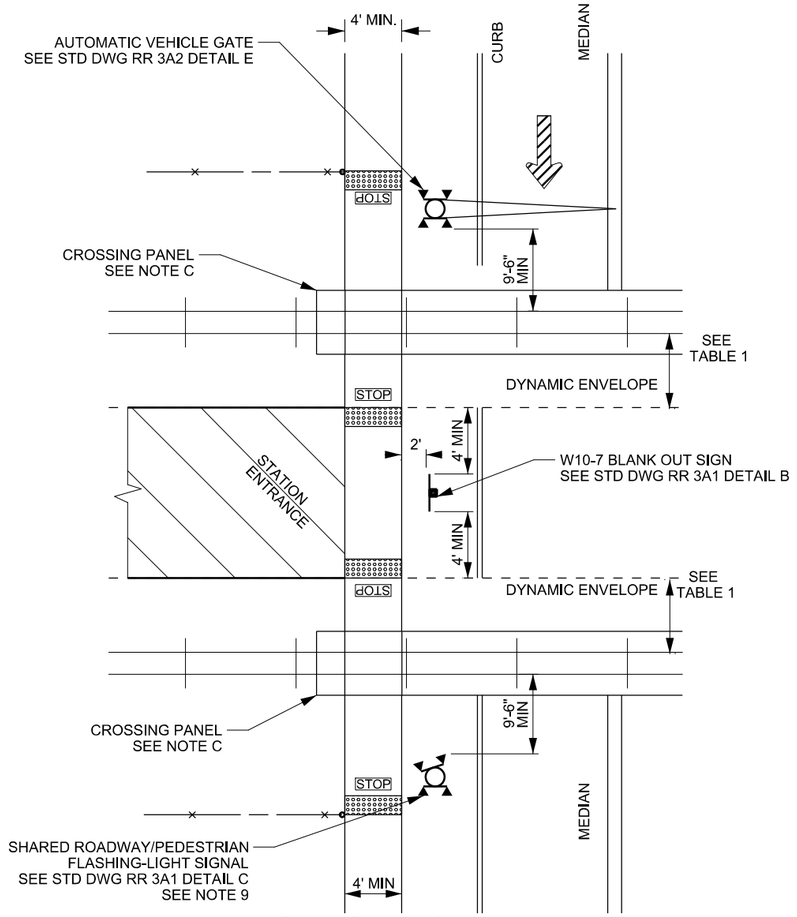


PERPENDICULAR CROSSINGS
DETAIL A



FLASHING-LIGHT SIGNALS
DETAIL B

TABLE 1	
DYNAMIC ENVELOPE WIDTH	
VEHICLE TYPE	WIDTH*
LIGHT RAIL/TROLLEY ONLY	4'-6"
SHARED USE	6'-0"
HEAVY RAIL	6'-0"

* MEASURED FROM EDGE OF NEAREST RAIL

LEGEND:

- CHANNELIZING FENCE/BARRIER OR CHANNELIZING LANDSCAPING SEE STD DWG RR 4A2 DETAILS D1, D2, AND E
- CHANNELIZING FENCE/BARRIER SEE STD DWG RR 4A2 DETAILS D1 AND D2
- RIGHT-OF-WAY FENCE

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT -OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE, OR THE LATERAL LINE OF A ROADWAY, AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. PROVIDE DENSE LANDSCAPING WHEN USED IN PLACE OF CHANNELIZING FENCING OR BARRIER TO RESTRICT PEDESTRIANS FROM USING LOCATIONS OTHER THAN PEDESTRIAN ACCESSES.

C. EXTEND CROSSING PANEL A MINIMUM OF 2 FT BEYOND SIDEWALK.

D. INSTALL GATE AND BYPASS ACCORDING TO STD DWG RR 3A2 DETAIL F WHEN THE DISTANCE BETWEEN THE GATE AND THE DYNAMIC ENVELOPE IS GREATER THAN 10 FT OR THE DISTANCE BETWEEN THE DETECTABLE WARNING SURFACE AND THE GATE ON THE OPPOSITE SIDE OF THE CROSSING IS GREATER THAN 30 FT.

NOTES:

1. ADJUST CHANNELIZATION AND BARRIER LAYOUT SHOWN ON THIS SHEET AS NECESSARY BASED ON SITE SPECIFIC CONDITIONS, WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
2. ALIGN CROSSING ENTRANCES TO MINIMIZE CROSSING DISTANCE AND MAXIMIZE VISIBLITY IN BOTH DIRECTIONS.
3. EXTEND CHANNELIZING FENCE OR BARRIER PARALLEL TO TRACKS 25 FT MINIMUM OR EXTEND RIGHT-OF-WAY FENCE TO CONTROL DEVICES.
4. EXTEND CHANNELIZING FENCE OR BARRIER PARALLEL TO ROADWAY IN NON-GATED QUADRANTS 25 FT MINIMUM OR TO RIGHT-OF-WAY LIMITS.
5. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.
6. DO NOT OBSTRUCT SIGHT DISTANCE WITH FENCING OR BARRIERS. USE A CHANNELIZING FENCE OR BARRIER WITH A MINIMUM HEIGHT OF 42 INCHES AND A MAXIMUM HEIGHT OF 43 INCHES WHEN NEAR GRADE CROSSINGS.
7. PLACE THE DETECTABLE WARNING SURFACE ACCORDING TO STD DWG RR 4A1, DETAILS A AND B, FOR LOCATIONS OTHER THAN EMERGENCY EXIT SWING GATES, AUTOMATIC VEHICLE GATES, OR ROADWAY/PEDESTRIAN FLASHING-LIGHT SIGNALS.
8. SEE STD DWG RR 4A1 FOR "STOP" PAVEMENT MARKING DETAILS.
9. ANGLE AND LOUVRE BACK FLASHING-LIGHT SIGNALS FOR PEDESTRIAN VISIBILITY ONLY.
10. ADJUST SIDEWALK WIDTH THROUGH CHICANE AREA TO PROVIDE 5 FT MINIMUM GAP BETWEEN FENCE POSTS AND EDGE OF SIDEWALK TO ACCOMODATE BICYCLE TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE
APPROVED

AUGUST 2020
DATE

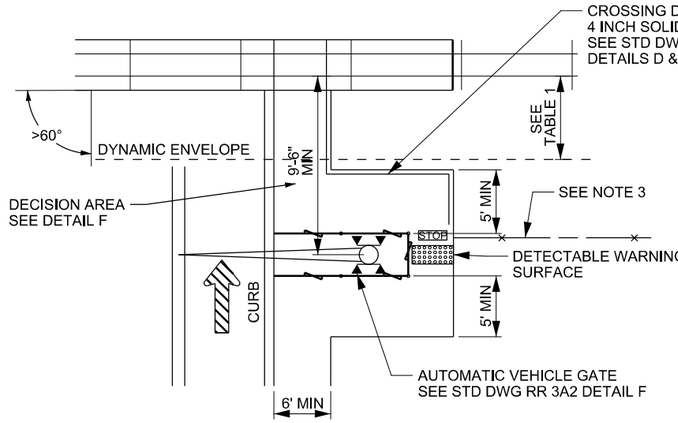
DEPUTY DIRECTOR

PEDESTRIAN CONTROLS
SEMI-EXCLUSIVE
RAILROAD ALIGNMENTS
SHEET 1 OF 2

STANDARD DRAWING TITLE

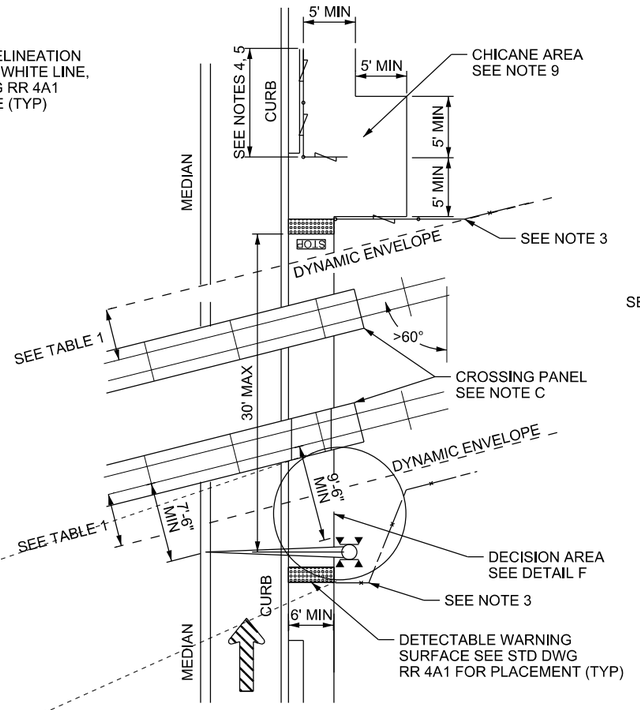
STD. DWG. NO.
RR 5A1

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\RR05A1.dgn
23-JUN-2020

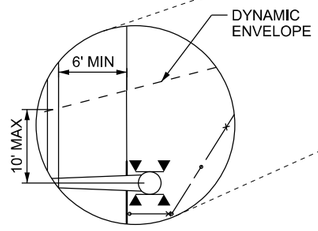


PERPENDICULAR AND ANGLE CROSSINGS > 60°
DECISION AREA ≥ 10 FT
DETAIL C

SEE NOTE D

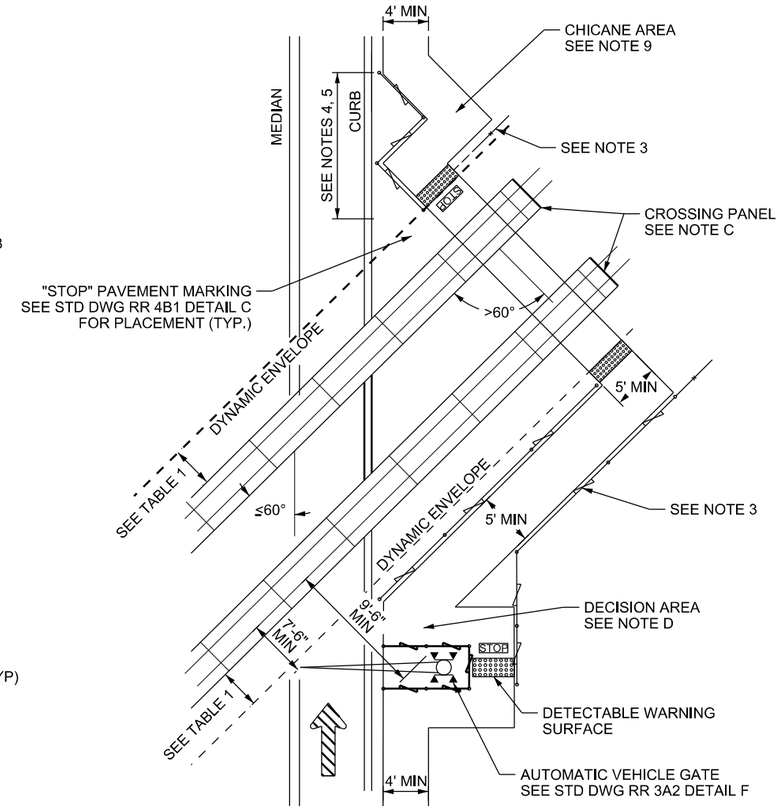


ANGLE CROSSINGS > 60°
DECISION AREA < 10 FT
DETAIL D



DECISION AREA
DETAIL F

SEE NOTE D



ANGLE CROSSINGS ≤ 60°
DETAIL E

TABLE 1	
DYNAMIC ENVELOPE WIDTH	
VEHICLE TYPE	WIDTH*
LIGHT RAIL/TROLLEY ONLY	4'-6"
SHARED USE	6'-0"
HEAVY RAIL	6'-0"

* MEASURED FROM EDGE OF NEAREST RAIL

LEGEND:

- CHANNELIZING FENCE/BARRIER OR CHANNELIZING LANDSCAPING SEE STD DWG RR 4A2 DETAILS D1, D2, AND E
- CHANNELIZING FENCE/BARRIER SEE STD DWG RR 4A2 DETAILS D1 AND D2
- RIGHT-OF-WAY FENCE

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. PROVIDE DENSE LANDSCAPING WHEN USED IN PLACE OF CHANNELIZING FENCING OR BARRIER TO RESTRICT PEDESTRIANS FROM USING LOCATIONS OTHER THAN PEDESTRIAN ACCESSES.

C. EXTEND CROSSING PANEL A MINIMUM OF 2 FT BEYOND SIDEWALK.

D. INSTALL GATE AND BYPASS ACCORDING TO STD DWG RR 3A2 DETAIL F WHEN THE DISTANCE BETWEEN THE GATE AND THE DYNAMIC ENVELOPE IS GREATER THAN 10 FT OR THE DISTANCE BETWEEN THE DETECTABLE WARNING SURFACE AND THE GATE ON THE OPPOSITE SIDE OF THE CROSSING IS GREATER THAN 30 FT.

NOTES:

1. ADJUST CHANNELIZATION AND BARRIER LAYOUT SHOWN ON THIS DRAWING AS NECESSARY BASED ON SITE SPECIFIC CONDITIONS, WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
2. ALIGN CROSSING ENTRANCES TO MINIMIZE CROSSING DISTANCE AND MAXIMIZE VISIBILITY IN BOTH DIRECTIONS.
3. EXTEND CHANNELIZING FENCE OR BARRIER PARALLEL TO TRACKS 25 FT MINIMUM OR EXTEND RIGHT-OF-WAY FENCE TO CONTROL DEVICES.
4. EXTEND CHANNELIZING FENCE OR BARRIER PARALLEL TO ROADWAY IN NON-GATED QUADRANTS 25 FT MINIMUM OR TO RIGHT-OF-WAY LIMITS.
5. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.
6. DO NOT OBSTRUCT SIGHT DISTANCE WITH FENCING OR BARRIERS. USE A CHANNELIZING FENCE OR BARRIER WITH A MINIMUM HEIGHT OF 42 INCHES AND A MAXIMUM HEIGHT OF 43 INCHES WHEN NEAR GRADE CROSSINGS.
7. PLACE THE DETECTABLE WARNING SURFACE ACCORDING TO STD DWG RR 4A1, DETAILS A AND B, FOR LOCATIONS OTHER THAN AUTOMATIC VEHICLE GATES OR ROADWAY AND PEDESTRIAN FLASHING-LIGHT SIGNALS.
8. SEE STD DWG RR 4A1 FOR "STOP" PAVEMENT MARKING DETAILS.
9. ADJUST SIDEWALK WIDTH THROUGH CHICANE AREA TO PROVIDE 5 FT MINIMUM GAP BETWEEN FENCE POSTS AND EDGE OF SIDEWALK TO ACCOMODATE BICYCLE TRAFFIC.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

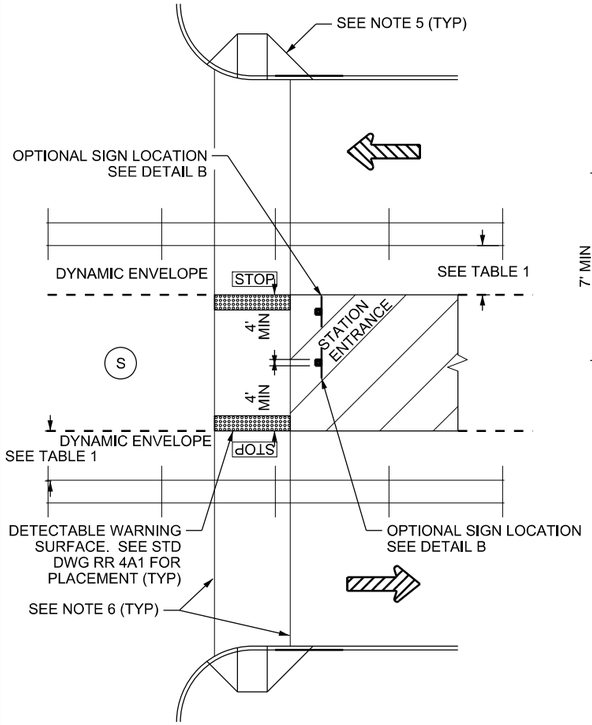
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

PEDESTRIAN CONTROLS
SEMI-EXCLUSIVE
RAILROAD ALIGNMENTS
SHEET 2 OF 2

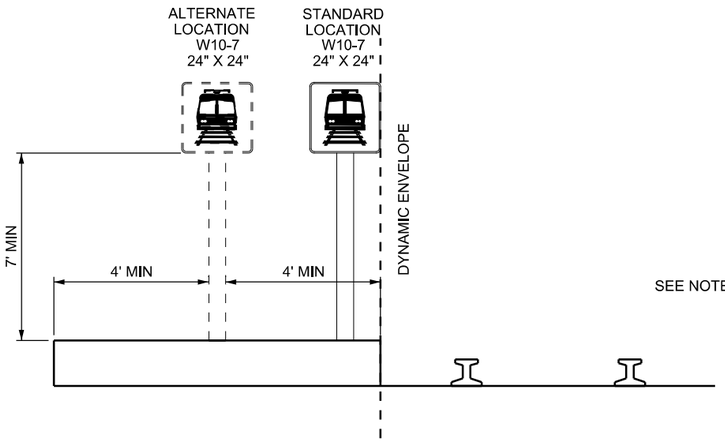
STANDARD DRAWING TITLE

STD. DWG. NO.
RR 5A2

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\RR05A2.dgn
23-JUN-2020

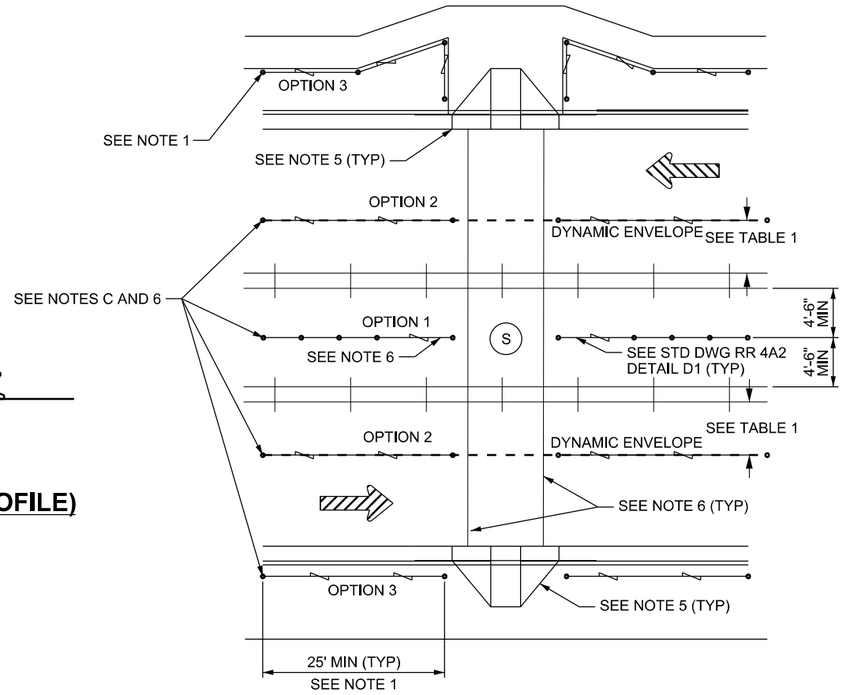


BLANK-OUT SIGNS AT STATION ENTRANCES (PLAN) DETAIL A



BLANK-OUT SIGN AT STATION ENTRANCE (PROFILE) DETAIL B

SEE NOTE B



MID-BLOCK CROSSINGS STREET RUNNING ALIGNMENTS DETAIL C

TABLE 1	
DYNAMIC ENVELOPE WIDTH	
VEHICLE TYPE	WIDTH*
LIGHT RAIL/TROLLEY ONLY	4'-6"
SHARED USE	6'-0"
HEAVY RAIL	6'-0"

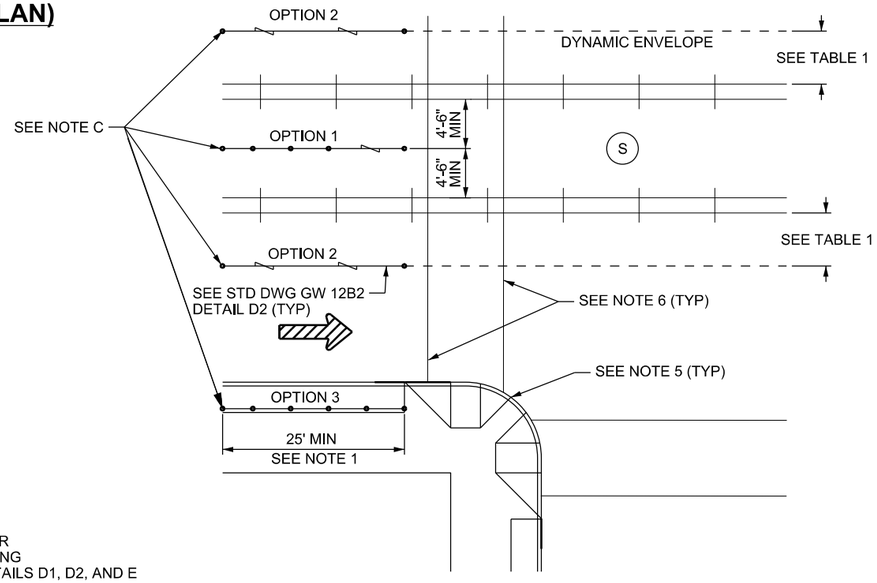
* MEASURED FROM EDGE OF NEAREST RAIL

LEGEND:

CHANNELIZING FENCE/BARRIER OR CHANNELIZING LANDSCAPING SEE STD DWG GW RR 4A2 DETAILS D1, D2, AND E

CHANNELIZING FENCE/BARRIER SEE STD DWG GW RR 4A2 DETAILS D1 AND D2

(S) SIGNALIZED INTERSECTION



INTERSECTIONS STREET RUNNING ALIGNMENTS DETAIL D

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. PLACE A W10-7 BLANK-OUT SIGN IN THE ALTERNATE LOCATION ONLY IF THE 4 FT MINIMUM CLEARANCE CAN BE PROVIDED TO EITHER SIDE OF THE SIGN.

C. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.

D. PROVIDE DENSE LANDSCAPING WHEN USED IN PLACE OF CHANNELIZING FENCING OR BARRIER TO RESTRICT PEDESTRIANS FROM USING LOCATIONS OTHER THAN PEDESTRIAN ACCESSES.

NOTES:

1. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.
2. DO NOT OBSTRUCT SIGHT DISTANCE WITH FENCING OR BARRIERS. USE A CHANNELIZING FENCE OR BARRIER WITH A MINIMUM HEIGHT OF 42 INCHES AND A MAXIMUM HEIGHT OF 43 INCHES WHEN NEAR GRADE CROSSINGS.
3. ADJUST CHANNELIZATION AND BARRIER LAYOUT FROM THE LAYOUT SHOWN ON THIS DRAWING AS NECESSARY BASED ON SITE SPECIFIC SITUATIONS WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
4. PLACE THE DETECTABLE WARNING SURFACE ACCORDING TO STD DWG RR 4A1, DETAILS A AND B, FOR LOCATIONS OTHER THAN AUTOMATIC VEHICLE GATES OR ROADWAY AND PEDESTRIAN FLASHING-LIGHT SIGNALS.
5. REFER TO PA SERIES STD DWGS FOR PEDESTRIAN RAMP DETAILS.
6. REFER TO ST SERIES STD DWGS FOR CROSSWALK MARKING DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	UPDATED REFERENCES FOR THE ST STD DWGS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

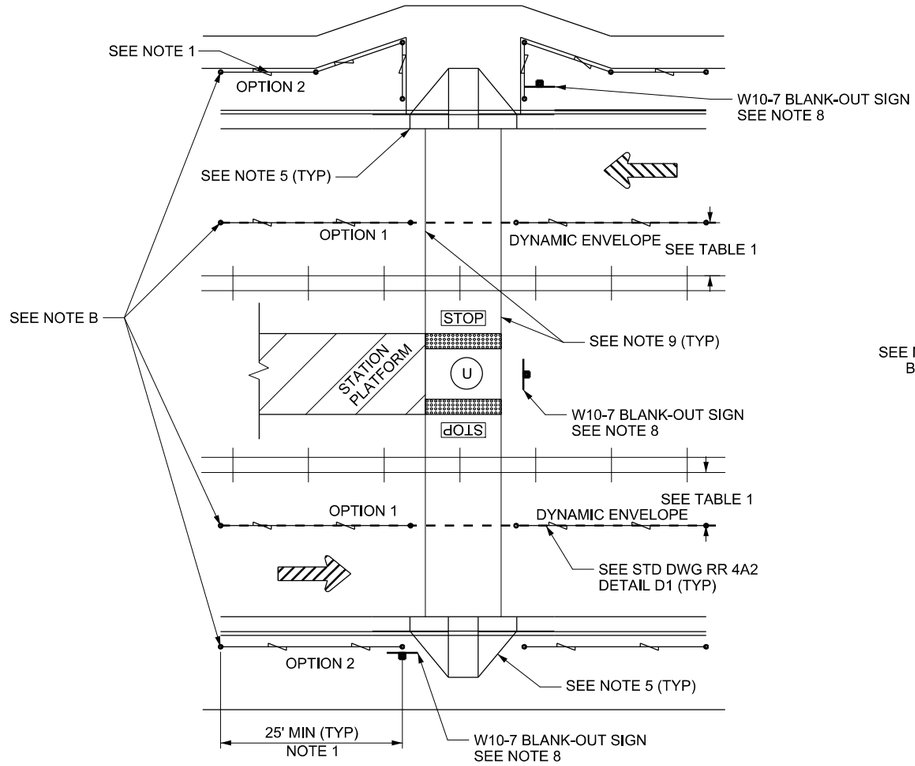
DEPUTY DIRECTOR

PEDESTRIAN CONTROLS
STREET RUNNING
RAILROAD ALIGNMENT
SIGNALIZED
INTERSECTIONS

STANDARD DRAWING TITLE

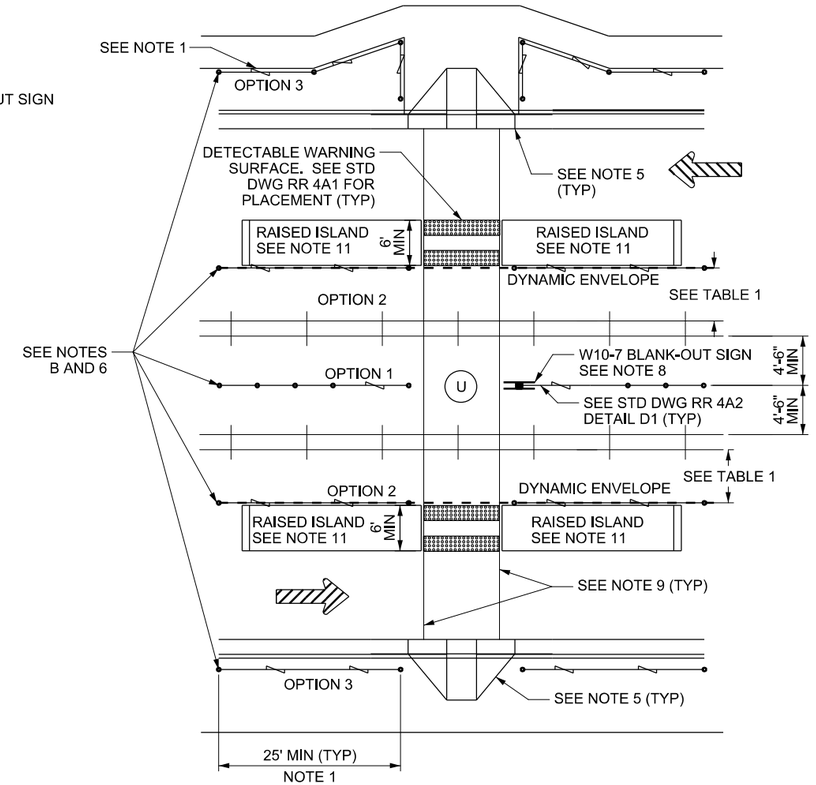
STD. DWG. NO.
RR 6

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\RR06.dgn
23-JUN-2020



MID-BLOCK STATION ACCESS STREET RUNNING ALIGNMENTS DETAIL A

SEE NOTE 1



MID-BLOCK CROSSINGS STREET RUNNING ALIGNMENTS DETAIL B

SEE NOTE 1

TABLE 1	
DYNAMIC ENVELOPE WIDTH	
VEHICLE TYPE	WIDTH*
LIGHT RAIL/TROLLEY ONLY	4'-6"
SHARED USE	6'-0"
HEAVY RAIL	6'-0"

* MEASURED FROM EDGE OF NEAREST RAIL

LEGEND:

- CHANNELIZING FENCE/BARRIER OR CHANNELIZING LANDSCAPING SEE STD DWG RR 4A2 DETAILS D1, D2, AND E
- CHANNELIZING FENCE/BARRIER SEE STD DWG RR 4A2 DETAILS D1 AND D2
- (U) UNSIGNALIZED INTERSECTION

DESIGN-ONLY NOTES:

A. DEFINITIONS:
1. STREET RUNNING ALIGNMENT - A RAILROAD ALIGNMENT IN WHICH TRAINS OPERATE IN MIXED TRAFFIC WITH ALL TYPES OF ROAD USERS. THE ALIGNMENT IS TYPICALLY SEPARATED FROM TRAFFIC BY A CURB OR STRIPING.
2. SEMI-EXCLUSIVE ALIGNMENT - A RAILROAD ALIGNMENT THAT IS IN A SEPARATE RIGHT-OF-WAY OR ALONG A ROADWAY WHERE MOTOR VEHICLES, PEDESTRIANS, AND BICYCLES HAVE LIMITED ACCESS AND CROSS AT DESIGNATED LOCATIONS ONLY. THE ALIGNMENT IS TYPICALLY SEPARATED BY FENCING OR BARRIERS BETWEEN CROSSINGS.
3. DYNAMIC ENVELOPE - THE CLEARANCE REQUIRED FOR THE TRAIN OR LIGHT RAIL TRANSIT EQUIPMENT OVERHANG.
4. SIDEWALK - THAT PORTION OF A STREET BETWEEN THE CURB LINE OR THE LATERAL LINE OF A ROADWAY AND THE ADJACENT PROPERTY LINE THAT IS PAVED OR IMPROVED AND INTENDED FOR USE BY PEDESTRIANS.
5. PATHWAY - A PUBLIC WAY OUTSIDE OF THE TRAVELED WAY AND PHYSICALLY SEPARATED FROM THE ROADWAY BY OPEN SPACE OR BARRIER. PATHWAYS DO NOT INCLUDE SIDEWALKS.
6. PEDESTRIAN ACCESS ROUTE - EITHER A SIDEWALK OR A PATHWAY.

B. PLACE CHANNELIZING FENCE OR BARRIER WHEN USED ACCORDING TO OPTION 1 UNLESS SITE SPECIFIC CONDITIONS SUCH AS RIGHT-OF-WAY AVAILABILITY, CHANNELIZATION TYPE, OR SIGHT DISTANCE REQUIRE ALTERNATE PLACEMENT. CONSTRUCT FENCING A MINIMUM OF 25 FT PARALLEL TO THE TRACKS.

C. PROVIDE DENSE LANDSCAPING WHEN USED IN PLACE OF CHANNELIZING FENCING OR BARRIER TO RESTRICT PEDESTRIANS FROM USING LOCATIONS OTHER THAN PEDESTRIAN ACCESSES.

NOTES:

1. PLACE CHANNELIZING FENCE OR BARRIER 18 INCHES FROM THE FACE OF CURB OR ADJACENT TO THE SIDEWALK WHICHEVER PROVIDES GREATER CLEARANCE FOR ROAD USERS WHEN CHANNELIZING FENCE OR BARRIER RUNS PARALLEL TO THE ROADWAY.
2. DO NOT OBSTRUCT SIGHT DISTANCE WITH FENCING OR BARRIERS. USE A CHANNELIZING FENCE OR BARRIER WITH A MINIMUM HEIGHT OF 42 INCHES AND A MAXIMUM HEIGHT OF 43 INCHES WHEN NEAR GRADE CROSSINGS.
3. ADJUST CHANNELIZATION AND BARRIER LAYOUT FROM THE LAYOUT SHOWN ON THIS DRAWING AS NECESSARY BASED ON SITE SPECIFIC SITUATIONS WHILE MAINTAINING COMPLIANCE WITH THE MINIMUMS SHOWN.
4. PLACE THE DETECTABLE WARNING SURFACE ACCORDING TO STD DWG RR 4A1, DETAILS A AND B, FOR LOCATIONS OTHER THAN AUTOMATIC VEHICLE GATES OR ROADWAY OR PEDESTRIAN FLASHING-LIGHT SIGNALS.
5. SEE PA SERIES STD DWGS FOR PEDESTRIAN RAMP DETAILS.
6. INSTALL CHANNELIZING FENCE OR BARRIER WITH A LOOK (R15-8) SIGN ACCORDING TO STD DWG RR 4A2 DETAIL D1 UNLESS SIGHT DISTANCE RESTRICTIONS NECESSITATE W10-7 BLANK-OUT SIGNS. REPLACE R15-8 LOOK SIGNS WITH W10-7 BLANK-OUT SIGNS, IF REQUIRED.
7. INSTALL CHANNELIZING FENCE OR BARRIER WITH A LOOK (R15-8) SIGN ACCORDING TO STD DWG RR 4A2 DETAIL D2 UNLESS SIGHT DISTANCE RESTRICTIONS NECESSITATE W10-7 BLANK-OUT SIGNS. INSTALL CHANNELIZING FENCE OR BARRIER ACCORDING TO DETAIL A ON THIS SHEET IF BLANK-OUT SIGNS ARE REQUIRED.
8. INSTALL W10-7 BLANK-OUT SIGN ACCORDING TO STD DWG RR 3A1, DETAIL B.
9. SEE ST SERIES STD DWGS FOR CROSSWALK MARKING DETAILS.
10. SEE STD DWG PA 2, MEDIAN BREAK EXAMPLE, FOR PEDESTRIAN REFUGE DETAILS.
11. SEE STD DWG GW 1B FOR RAISED ISLAND AND PLOWABLE END SECTION DETAILS.

NO.	DATE	APPR.	REVISIONS	REMARKS
1	8/29/19	MRB	UPDATED REFERENCES FOR THE ST STD DWGS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

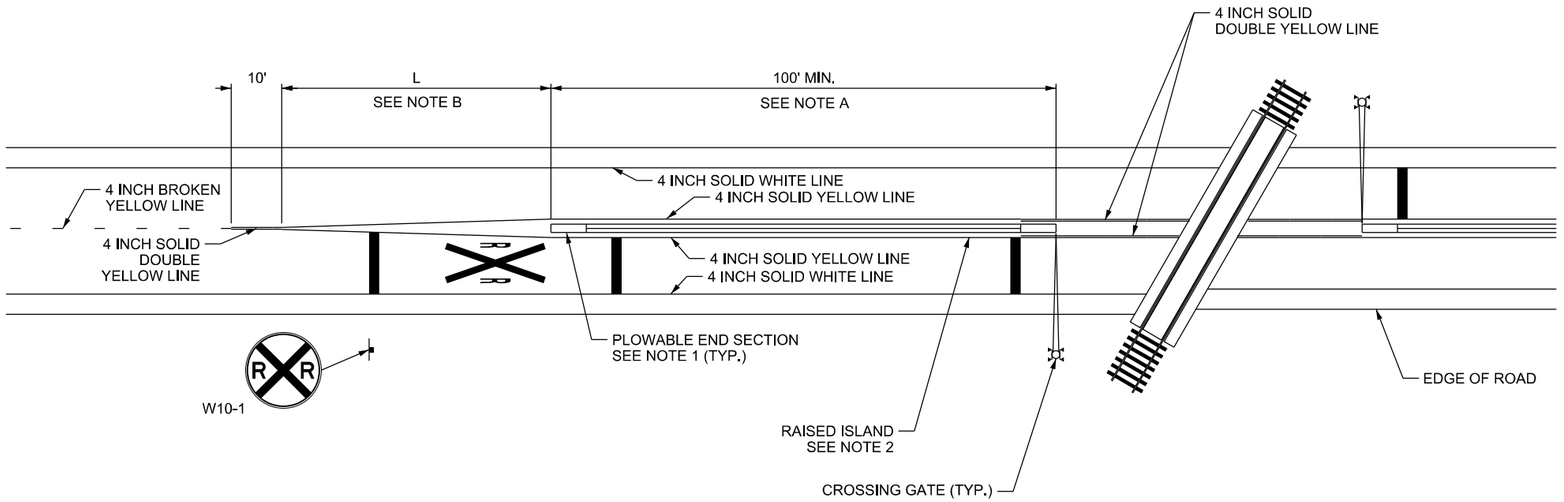
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

PEDESTRIAN CONTROLS
STREET RUNNING
RAILROAD ALIGNMENT
UNSIGNALIZED
INTERSECTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.
RR 7

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\RR07.dgn



DESIGN-ONLY NOTES:

A. RAISED ISLAND LENGTH MAY BE REDUCED TO 60 FT MINIMUM IF NEARBY INTERSECTIONS PREVENT INSTALLATION OF A FULL LENGTH BARRIER UPON APPROVAL FROM THE ENGINEER.

B. SEE TABLE 1 ON UDOT ROADWAY DESIGN MANUAL DM 4.1 FOR TAPER LENGTH "L."

NOTES:

1. PLACE PLOWABLE END SECTIONS AT BOTH ENDS OF RAISED ISLAND. SEE STD DWG GW 01B FOR PLOWABLE END SECTION DETAILS.
2. USE TYPE B5 CURB. SEE STD DWG GW 01A FOR RAISED ISLAND DETAILS.
3. SEE STD DWG RR 2 FOR PAVEMENT MARKING INFORMATION.
4. TYPICAL PLACEMENT FOR BOTH SIDES OF RAILROAD CROSSING.
5. DELINEATE EACH END OF RAISED ISLAND.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

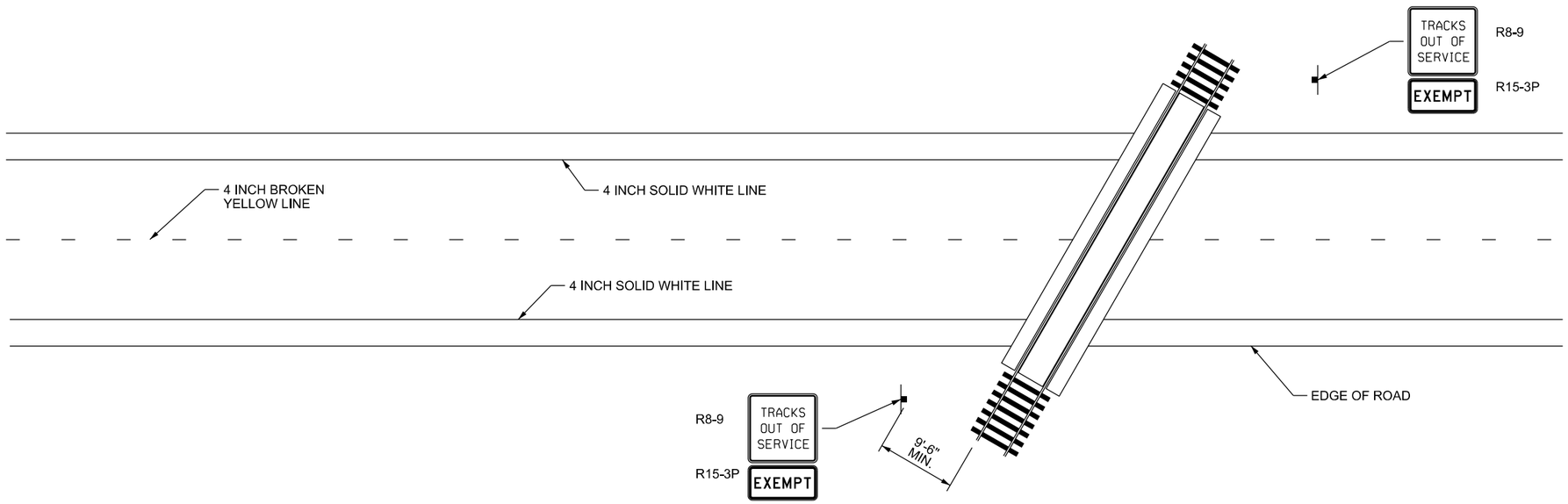
RAISED ISLAND PLACEMENT AT RAILROAD CROSSINGS

STANDARD DRAWING TITLE

STD. DWG. NO.

RR 8

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\RR08.dgn



NOTES:

1. SEE STD DWG SN 7A FOR MOUNTING HEIGHT AND OFFSET.
2. REMOVE ALL WARNING DEVICES AND RAILROAD SPECIFIC PAVEMENT MARKINGS.
3. TYPICAL PLACEMENT FOR BOTH SIDES OF RAILROAD CROSSING.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 — DATE

DEPUTY DIRECTOR

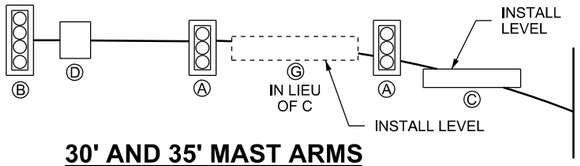
SIGNING AND STRIPING AT INACTIVE RAILROAD CROSSINGS

STANDARD DRAWING TITLE

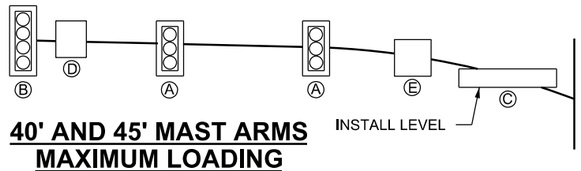
STD. DWG. NO.

RR 9

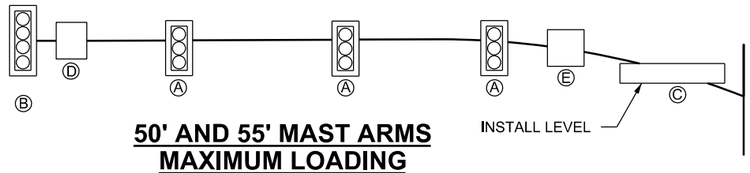
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\RR09.dgn



30' AND 35' MAST ARMS MAXIMUM LOADING
(SEE NOTES 8 AND A)



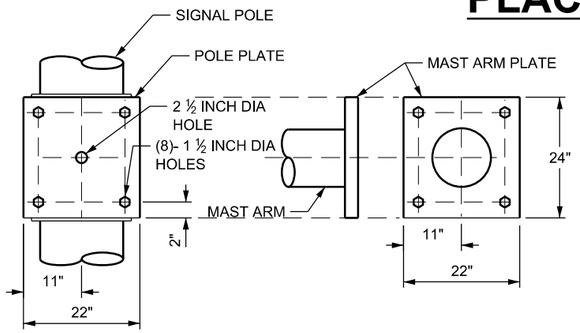
40' AND 45' MAST ARMS MAXIMUM LOADING
(SEE NOTES 8 AND A)



50' AND 55' MAST ARMS MAXIMUM LOADING
(SEE NOTES 8 AND A)

FIELD CUT END OF MAST ARM IF 25 FOOT MAST ARM LENGTH IS REQUIRED. INSTALL CUSTOM ARM END CAP.

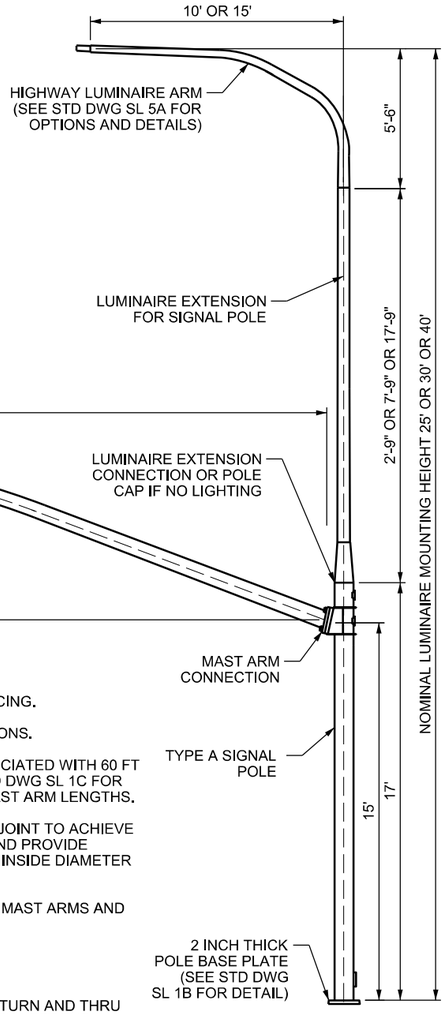
TYPICAL SIGNAL HEAD & SIGN PLACEMENT FOR MAXIMUM LOADING

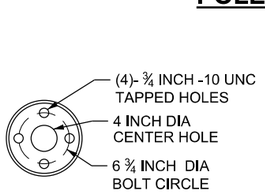


30' TO 55' MAST ARM AND POLE PLATE DETAIL

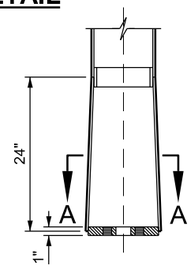
DEVICE	DESCRIPTION/SIZE	MAXIMUM PROJECTED AREA (SF)	*MAXIMUM WEIGHT (LBS)	MOUNTING (SEE STD DWG SL 3 SERIES)
Ⓐ SIGNAL	12", 3-SECTION WITH BACK PLATE	8.7	55	BRACKET
Ⓑ SIGNAL	12", 4-SECTION WITH BACK PLATE	11.1	72	BRACKET
Ⓖ SIGN	STREET SIGN 18" x 96", OR 30" X 60"	12.5	24	OPTION A
Ⓒ SIGN	STREET SIGN 24" x 120", (MAX) OR	20.0	38	OPTION B
	18" X 96", OR 30" x 60"	12.5	24	
Ⓓ SIGN	SIGN 30" x 36" (MAX)	7.5	15	OPTION A
Ⓔ SIGN	BLANKOUT SIGN 36" x 36" (MAX)	9.0	80	BRACKET

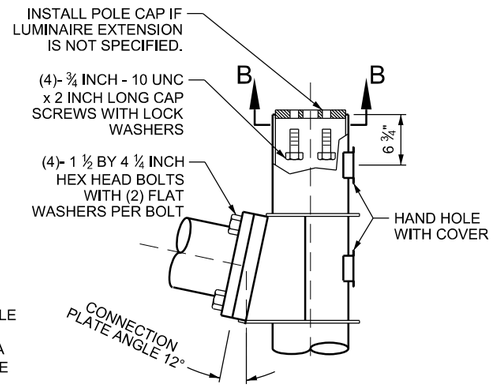
* DOES NOT ACCOUNT FOR PROGRAMMABLE HEADS. SEE NOTE A.

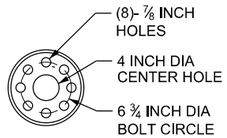




SECTION A-A

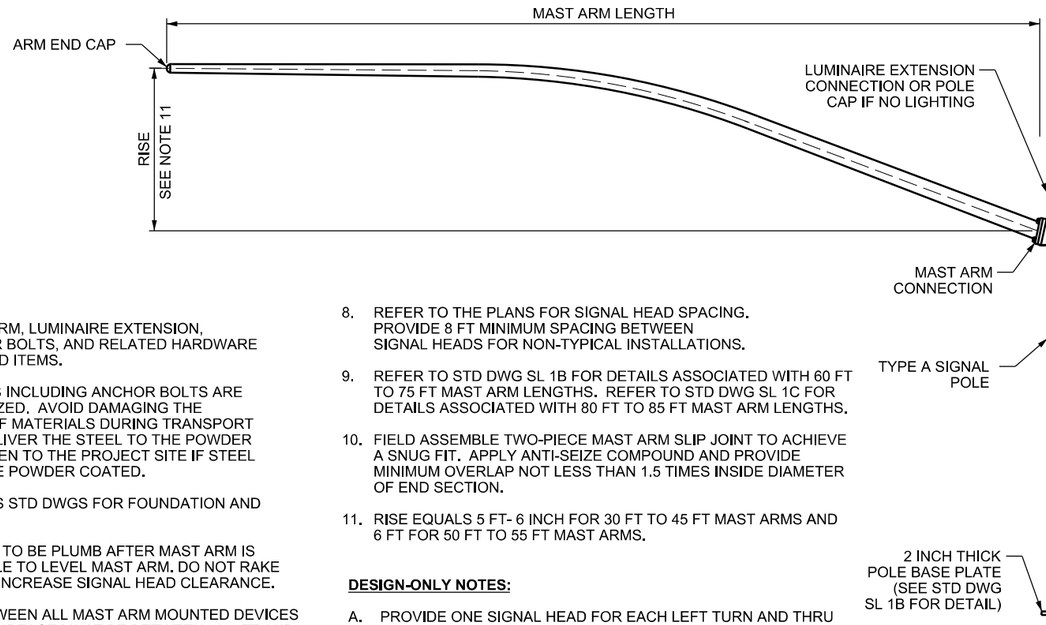






SECTION B-B

30' TO 55' MAST ARM POLE EXTENSION AND CONNECTION DETAIL



GENERAL NOTES:

1. SIGNAL POLE, MAST ARM, LUMINAIRE EXTENSION, FOUNDATION ANCHOR BOLTS, AND RELATED HARDWARE ARE STATE FURNISHED ITEMS.
2. ALL STEEL MATERIALS INCLUDING ANCHOR BOLTS ARE HOT-DIPPED GALVANIZED. AVOID DAMAGING THE GALVANIZED FINISH OF MATERIALS DURING TRANSPORT AND PLACEMENT. DELIVER THE STEEL TO THE POWDER COATING FACILITY THEN TO THE PROJECT SITE IF STEEL MATERIALS ARE TO BE POWDER COATED.
3. REFER TO SL 2 SERIES STD DWGS FOR FOUNDATION AND POLE BASE DETAILS.
4. INSTALL SIGNAL POLE TO BE PLUMB AFTER MAST ARM IS ATTACHED. RAKE POLE TO LEVEL MAST ARM. DO NOT RAKE THE SIGNAL POLE TO INCREASE SIGNAL HEAD CLEARANCE.
5. THE CLEARANCE BETWEEN ALL MAST ARM MOUNTED DEVICES AND THE ROADWAY SURFACE MUST BE BETWEEN 18.5 FT AND 21 FT. A 17.5 FT CLEARANCE IS ALLOWED WITH APPROVAL FROM THE REGION TRAFFIC OPERATIONS ENGINEER.
6. MOUNT ALL SIGNAL HEAD ASSEMBLIES AT THE SAME BOTTOM ELEVATION +/- 2 INCHES FOR EACH MAST ARM.
7. PROVIDE SIGNAL HEAD BRACKET MOUNT FOR ATTACHING SIGNAL HEADS AND SIGNS TO MAST ARM. SEE SL 3 SERIES STD DWGS FOR DETAILS.
8. REFER TO THE PLANS FOR SIGNAL HEAD SPACING. PROVIDE 8 FT MINIMUM SPACING BETWEEN SIGNAL HEADS FOR NON-TYPICAL INSTALLATIONS.
9. REFER TO STD DWG SL 1B FOR DETAILS ASSOCIATED WITH 60 FT TO 75 FT MAST ARM LENGTHS. REFER TO STD DWG SL 1C FOR DETAILS ASSOCIATED WITH 80 FT TO 85 FT MAST ARM LENGTHS.
10. FIELD ASSEMBLE TWO-PIECE MAST ARM SLIP JOINT TO ACHIEVE A SNUG FIT. APPLY ANTI-SEIZE COMPOUND AND PROVIDE MINIMUM OVERLAP NOT LESS THAN 1.5 TIMES INSIDE DIAMETER OF END SECTION.
11. RISE EQUALS 5 FT- 6 INCH FOR 30 FT TO 45 FT MAST ARMS AND 6 FT FOR 50 FT TO 55 FT MAST ARMS.

DESIGN-ONLY NOTES:

A. PROVIDE ONE SIGNAL HEAD FOR EACH LEFT TURN AND THRU LANE. CENTER LEFT TURN SIGNAL HEADS WITH LEFT TURN APPROACH LANES AND CENTER THRU SIGNAL HEADS WITH THRU ACCEPTANCE LANES WHERE POSSIBLE. PROVIDE TWO THRU HEADS SPACED AT 8 FT TO 10 FT FOR ONE THRU LANE ROADWAYS. CONTACT THE ENGINEER FOR LOADING APPROVAL IF MAST ARM LOADING EXCEEDS LOADING SHOWN OR IF USING PROGRAMMABLE SIGNAL HEADS.

NO.	DATE	APPR.	REMARKS
1	8/31/17	JS	UPDATED NOTES AND TABLE.

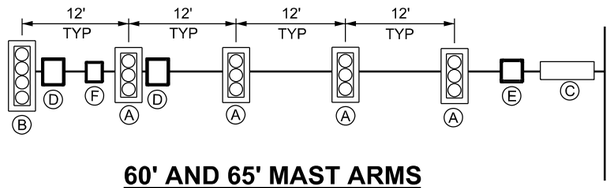
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

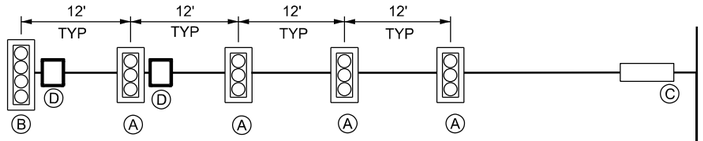
TRAFFIC SIGNAL MAST ARM POLE AND LUMINAIRE EXTENSION 30 FT THROUGH 55 FT
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 1A

DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL01A.dgn
23-JUN-2020



60' AND 65' MAST ARMS MAXIMUM LOADING
(SEE STD DWG SL 1A, NOTES 8 AND A)

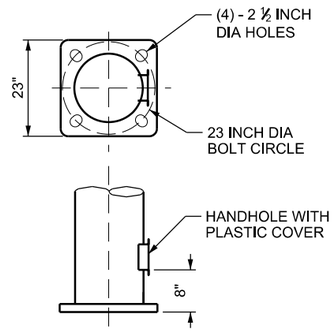


70' AND 75' MAST ARMS MAXIMUM LOADING
(SEE STD DWG SL 1A, NOTES 8 AND A)

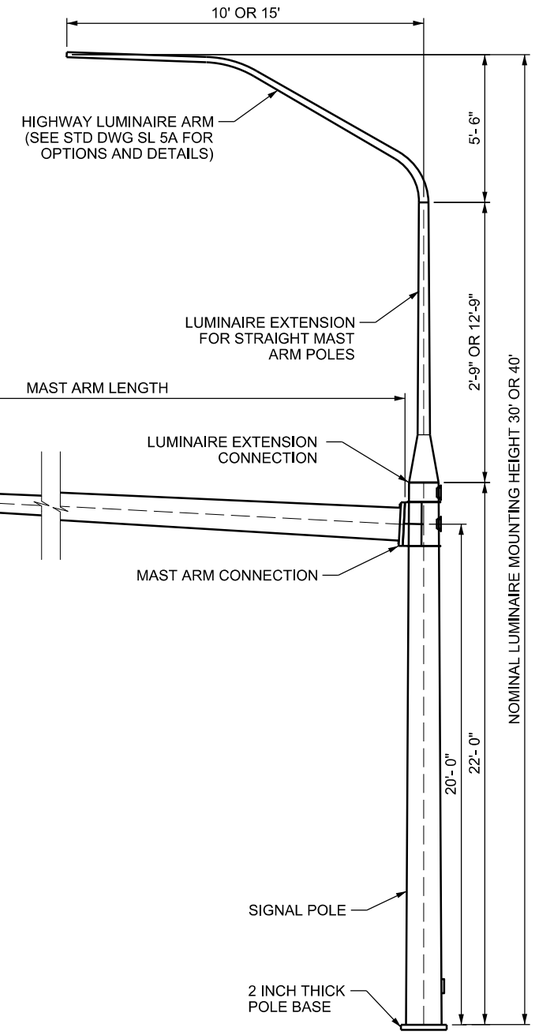
TYPICAL SIGNAL HEAD & SIGN PLACEMENT FOR MAXIMUM LOADING

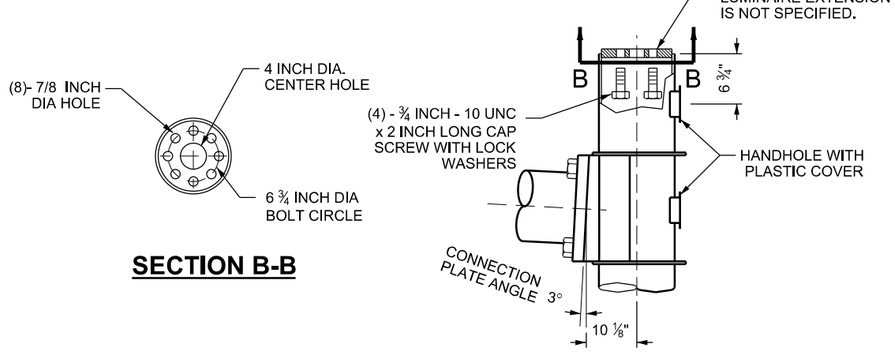
DEVICE	DESCRIPTION/SIZE	MAXIMUM PROJECTED AREA (SF)	*MAXIMUM WEIGHT (LBS)	MOUNTING (SEE STD DWG SL 3 SERIES)
Ⓐ SIGNAL	12", 3-SECTION WITH BACK PLATE	8.7	55	BRACKET
Ⓑ SIGNAL	12", 4-SECTION WITH BACK PLATE	11.1	72	BRACKET
Ⓒ SIGN	STREET SIGN 18" x 96", OR	12.0	23	OPTION A
	24" x 120", (MAX) OR	20.0	38	OPTION B
	30" x 60"	12.5	24	OPTION A
Ⓓ SIGN	SIGN 30" x 36" (MAX)	7.5	15	OPTION A
Ⓔ SIGN	BLANKOUT SIGN 36" x 36" (MAX)	9.0	80	BRACKET
Ⓕ SIGN	SIGN 24" x 24"	4.0	8	OPTION A

*DOES NOT ACCOUNT FOR PROGRAMMABLE HEADS. SEE STD DWG SL 1A, NOTE A.

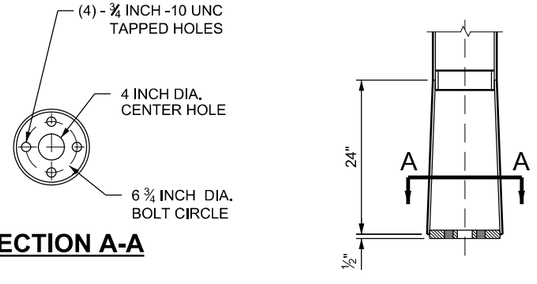


TYPICAL BASE PLATE DETAIL



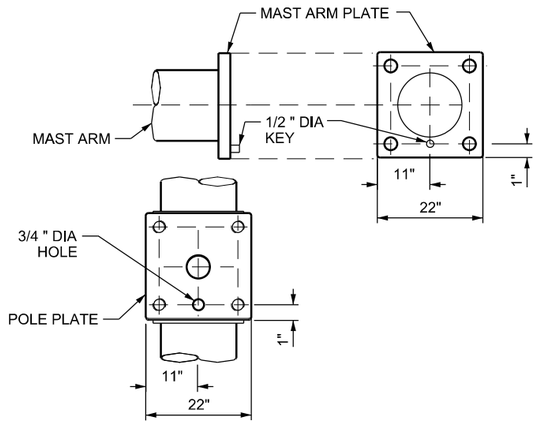


SECTION B-B



SECTION A-A

60' THRU 75' MAST ARM POLE EXTENSION AND CONNECTION DETAIL



60' THRU 75' MAST ARM AND POLE KEY DETAIL

NOTE:

1. SEE STD DWG SL 1A FOR SIGNAL POLE AND MAST ARM GENERAL NOTES.

NO.	DATE	APPR.	REVISIONS
1	8/31/17	JS	UPDATED TABLE, REVISED CALLOUTS.

REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

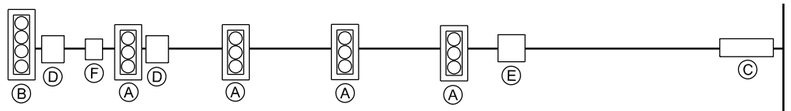
RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

TRAFFIC SIGNAL MAST ARM POLE AND LUMINAIRE EXTENSION 60 FT THROUGH 75 FT

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 1B

DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL01B.dgn
23-JUN-2020



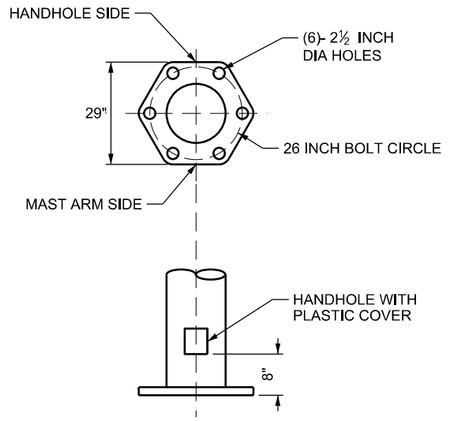
80' AND 85' MAST ARMS MAXIMUM LOADING

(SEE STD DWG SL 1A, NOTES 8 AND A)

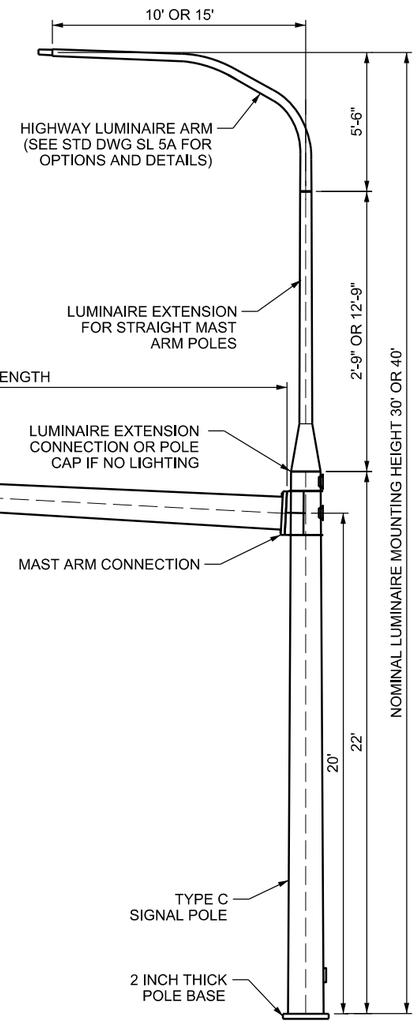
TYPICAL SIGNAL HEAD & SIGN PLACEMENT FOR MAXIMUM LOADING

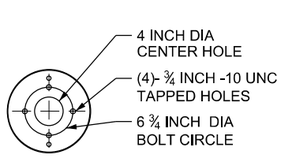
DEVICE	DESCRIPTION/SIZE	MAXIMUM PROJECTED AREA (SF)	*MAXIMUM WEIGHT (LBS)	MOUNTING (SEE STD DWG SL 3 SERIES)
Ⓐ SIGNAL	12", 3-SECTION WITH BACK PLATE	8.7	55	BRACKET
Ⓑ SIGNAL	12", 4-SECTION WITH BACK PLATE	11.1	72	BRACKET
Ⓒ SIGN	STREET SIGN 18" x 96", OR	12.0	23	OPTION A
	24" x 120", (MAX) OR	20.0	38	OPTION B
	30" x 60"	12.5	24	OPTION A
Ⓓ SIGN	SIGN 30" x 36" (MAX)	7.5	15	OPTION A
Ⓔ SIGN	BLANKOUT SIGN 36" x 36" (MAX)	9.0	80	BRACKET
Ⓕ SIGN	SIGN 24" x 24"	4.0	8	OPTION A

*DOES NOT ACCOUNT FOR PROGRAMMABLE HEADS. SEE STD DWG SL 1A, NOTE A.

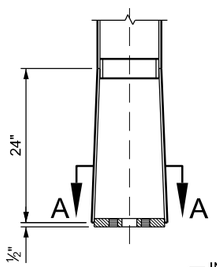


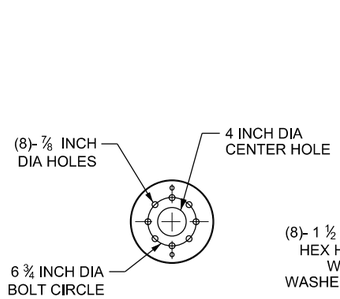
BASE PLATE DETAIL



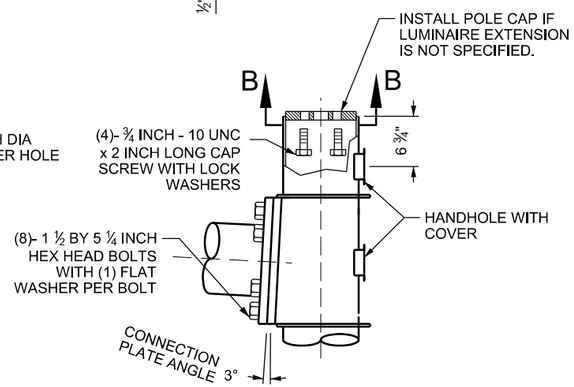


SECTION A-A

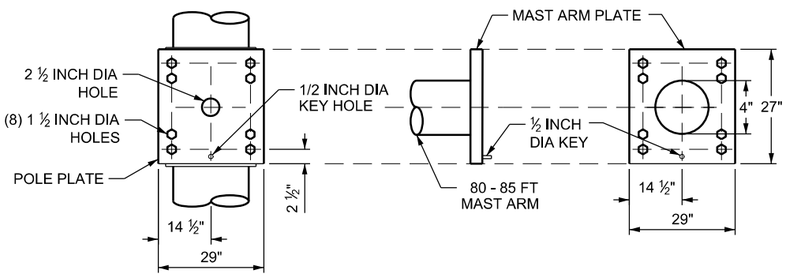




SECTION B-B



80' TO 85' MAST ARM POLE EXTENSION AND CONNECTION DETAIL



80' TO 85' MAST ARM AND POLE PLATE DETAIL

NOTE:

1. SEE STD DWG SL 1A FOR SIGNAL POLE AND MAST ARM GENERAL NOTES.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/31/17	JS	UPDATED DETAIL, CALLOUTS, AND TABLE.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 DATE

DEPUTY DIRECTOR

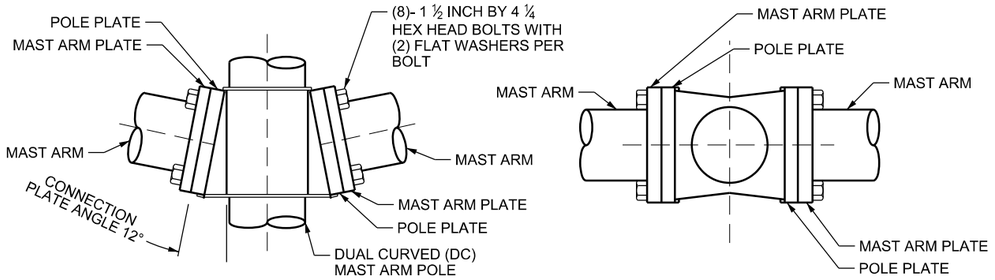
TRAFFIC SIGNAL MAST ARM POLE AND LUMINAIRE EXTENSION 80 FT THROUGH 85 FT

STANDARD DRAWING TITLE

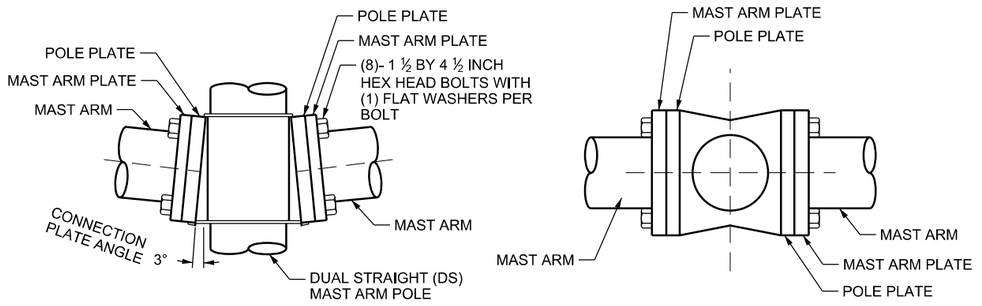
STD. DWG. NO.

SL 1C

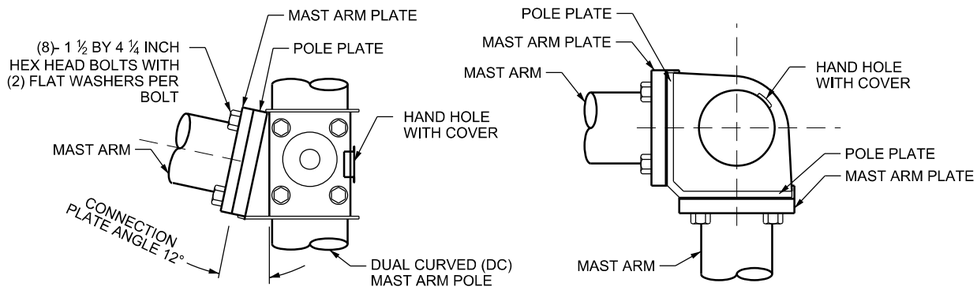
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR_SL)\SL01C.dgn
23-JUN-2020



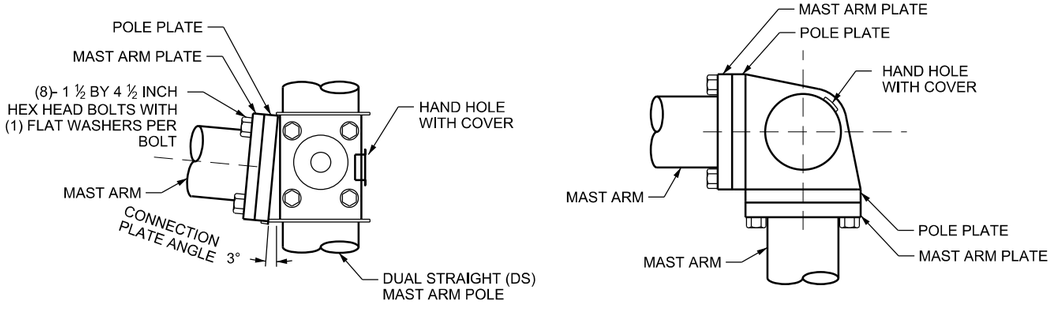
CURVED 180° 30' TO 45' DUAL MAST ARM POLE CONNECTION DETAIL



STRAIGHT 180° 40' TO 55' DUAL MAST ARM POLE CONNECTION DETAIL



CURVED 90° 30' TO 45' DUAL MAST ARM POLE CONNECTION DETAIL



STRAIGHT 90° 40' TO 55' DUAL MAST ARM POLE CONNECTION DETAIL

DUAL CURVED MAST ARM CONNECTIONS

(SEE NOTE 3)

DUAL STRAIGHT MAST ARM CONNECTIONS

(SEE NOTE 4)

NOTES:

1. SEE STD DWG SL 1A FOR SIGNAL POLE AND MAST ARM GENERAL NOTES.
2. MAXIMUM LOADING CASES APPLY TO EACH MAST ARM.
3. SEE STD DWG SL 1A FOR MAXIMUM LOADING AND DETAILS FOR CURVED MAST ARMS.
4. SEE STD DWG SL 1B FOR MAXIMUM LOADING AND DETAILS FOR STRAIGHT MAST ARMS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

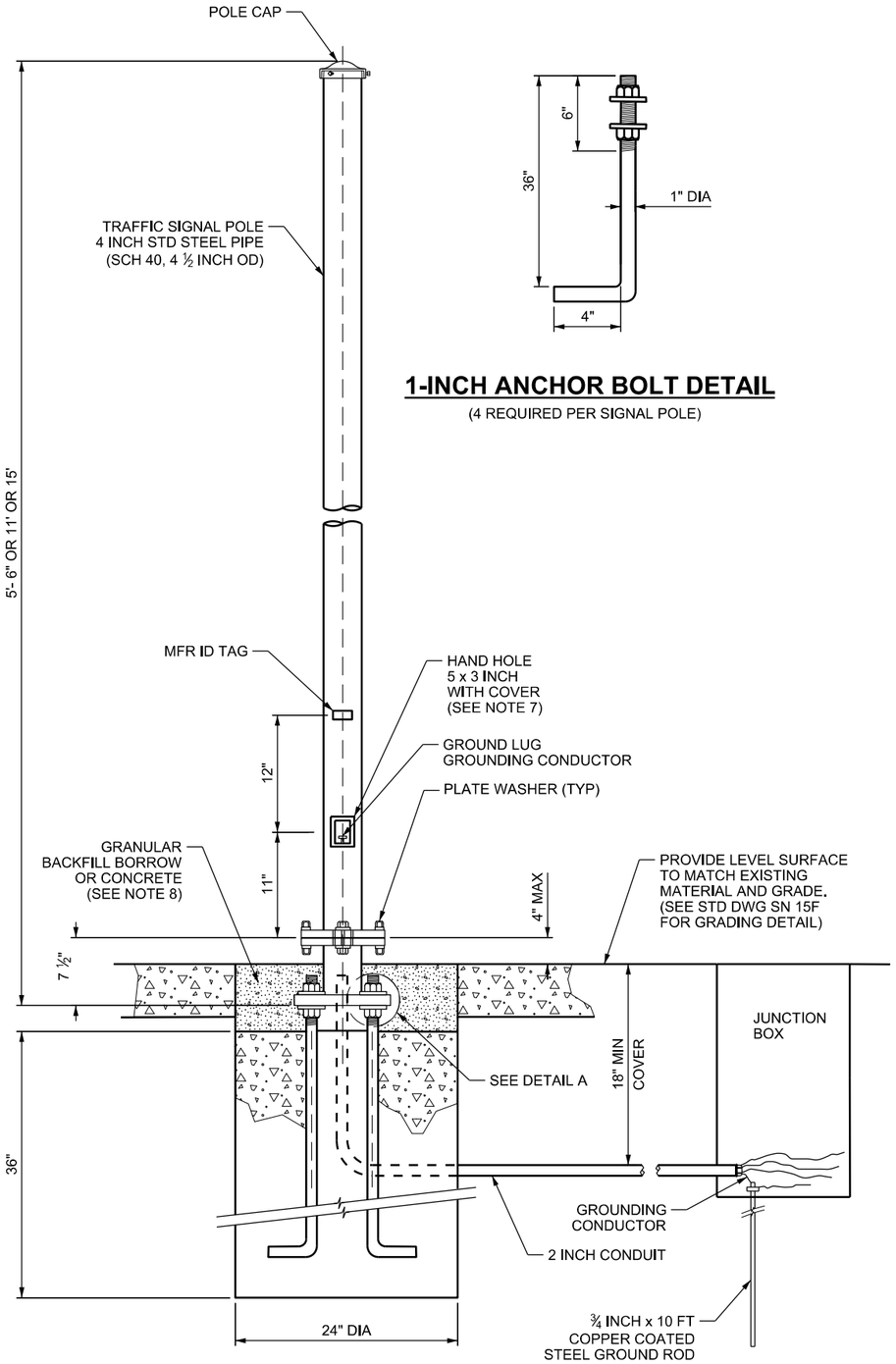
TRAFFIC SIGNAL DUAL MAST ARM POLE

STANDARD DRAWING TITLE

STD. DWG. NO.

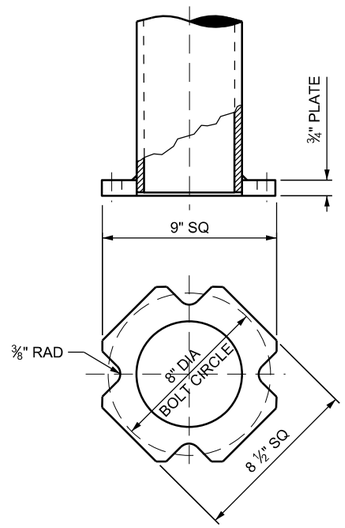
SL 1D

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\SL01D.dgn
23-JUN-2020

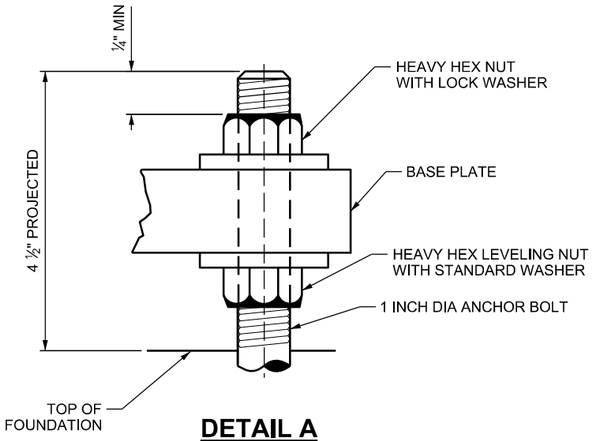


1-INCH ANCHOR BOLT DETAIL

(4 REQUIRED PER SIGNAL POLE)



POLE BASE



DETAIL A

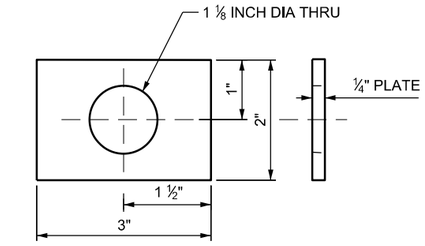
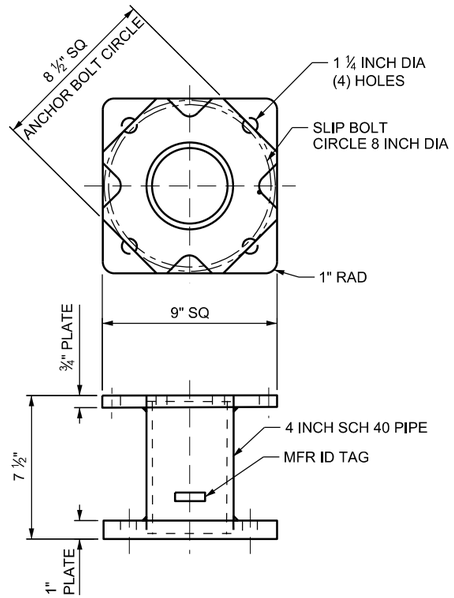


PLATE WASHER

FOR SLIP BASE BOLTS
(2 REQUIRED EACH BOLT)



GROUND BASE

NOTES:

1. TRAFFIC SIGNAL POLE, SLIP BASE, FOUNDATION ANCHOR BOLTS, AND RELATED HARDWARE ARE STATE FURNISHED ITEMS.
2. ALL STEEL MATERIALS INCLUDING ANCHOR BOLTS ARE HOT-DIPPED GALVANIZED. AVOID DAMAGING THE GALVANIZED FINISH OF MATERIALS DURING TRANSPORT AND PLACEMENT.
3. USE CLASS AA(AE) CAST-IN-PLACE CONCRETE FOR FOUNDATION. CAP CONDUIT ON BOTH ENDS PRIOR TO PLACING CONCRETE.
4. USE STATE FURNISHED ⅝ x 3 INCH SLIP BOLTS. TORQUE EACH BOLT TO 80 FT-LBS. RELEASE AND RE-TORQUE TO 70 FT-LBS.
5. SEE STD DWG SN 15F FOR BREAKAWAY SUPPORT STUB HEIGHT MEASUREMENT.
6. REFER TO STD DWG SL 3B AND SL 6A FOR SIGNAL AND PEDESTRIAN HEAD DETAILS.
7. ORIENT SIGNAL POLE SUCH THAT A TECHNICIAN FACING THE HAND HOLE WILL FACE THE ROADWAY OR ONCOMING TRAFFIC.
8. MATCH EXISTING SURFACE IF SURROUNDING MATERIAL IS NOT CONCRETE. USE GRANULAR BACKFILL BORROW, IF FOUNDATION IS NOT SURROUNDED BY SURFACE TREATMENT, FROM TOP OF FOUNDATION TO FINISHED GRADE.

NO.	DATE	APPR.	REMARKS
1	8/31/17	JS	REVISED DETAIL, CALLOUTS AND NOTES.

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

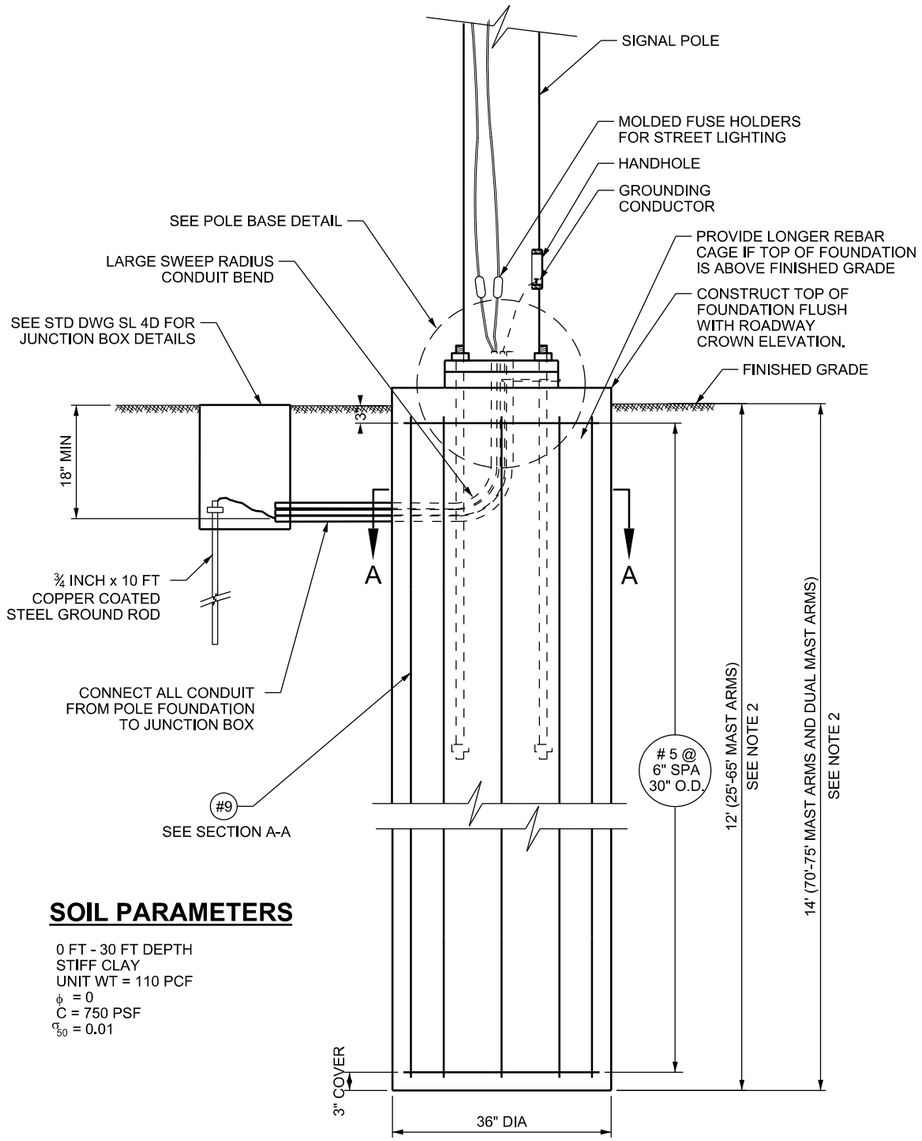
DEPUTY DIRECTOR

TRAFFIC SIGNAL POLE

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 1E

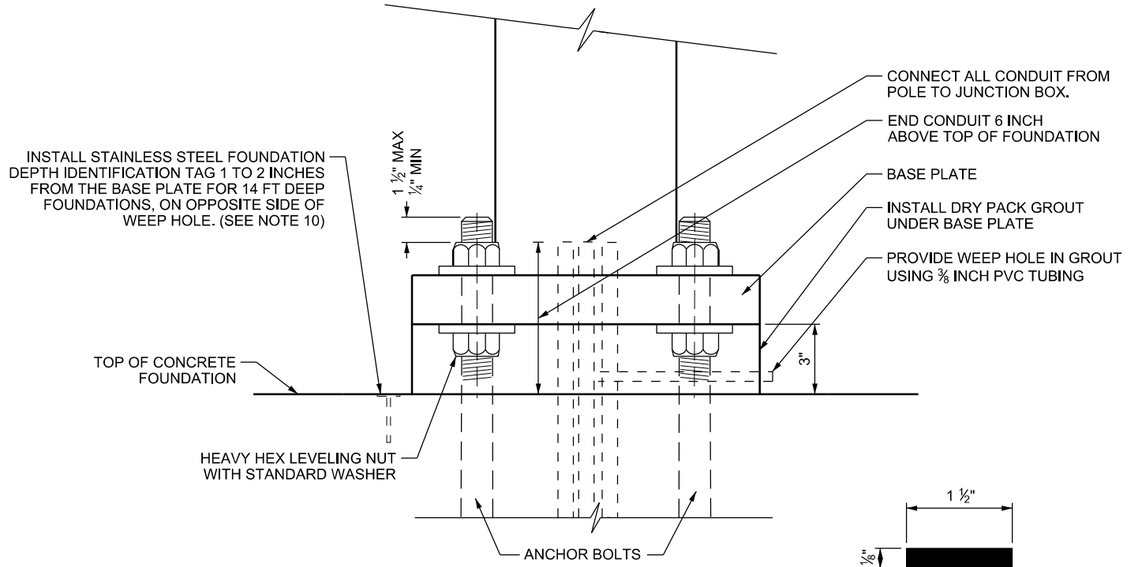
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\SL1E.dgn
23-JUN-2020



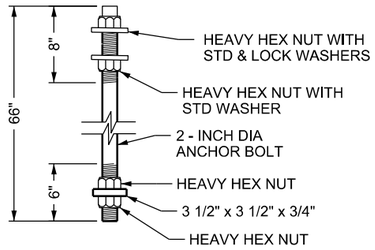
POLE FOUNDATION

SOIL PARAMETERS

0 FT - 30 FT DEPTH
STIFF CLAY
UNIT WT = 110 PCF
ϕ = 0
C = 750 PSF
ε_{50} = 0.01

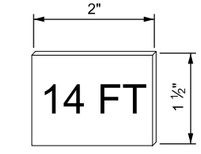


POLE BASE DETAIL



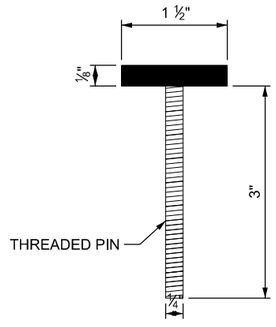
2-INCH ANCHOR BOLT DETAIL

(4 REQUIRED PER SIGNAL POLE)



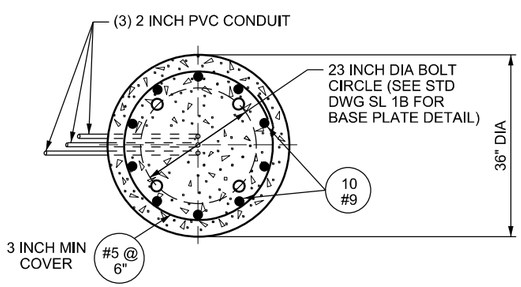
FOUNDATION DEPTH IDENTIFICATION TAG

TOP VIEW



FOUNDATION DEPTH IDENTIFICATION TAG

ELEVATION VIEW



SECTION A-A

NOTES:

1. USE STATE FURNISHED 2 x 66 INCH ANCHOR BOLTS. TIGHTEN EACH BOLT TO SNUG-TIGHT PLUS ⅓ TURN. DO NOT WELD ANCHOR BOLT TO THE REINFORCING STEEL.
2. CAST FOUNDATIONS IN PLACE AGAINST UNDISTURBED EARTH. 12 FT FOUNDATIONS WILL HAVE 12 FT OF ITS LENGTH BELOW FINISH GRADE AND 14 FT FOUNDATIONS WILL HAVE 14 FT OF ITS LENGTH BELOW FINISH GRADE. USE A CIRCULAR FORM FOR THE TOP 18 INCHES OF FOUNDATION EMBEDMENT.
3. DO NOT WELD REINFORCING STEEL.
4. PLACE ALL CONDUIT IN SAME TRENCH WHERE POSSIBLE.
5. USE COATED REBAR AND CLASS AA(AE) CONCRETE FOR FOUNDATION.
6. CAP CONDUIT ON BOTH ENDS PRIOR TO FOUNDATION POUR.
7. FOUNDATION MAY BE A MAXIMUM OF 18 INCHES ABOVE THE CROWN IF ROADWAY IS A HIGH LOAD ROUTE.
8. PROVIDE MINIMUM 10 FT HORIZONTAL EDGE-TO-EDGE CLEARANCE BETWEEN SIGNAL MAST ARM FOUNDATIONS.
9. PROVIDE AND INSTALL FOUNDATION DEPTH IDENTIFICATION TAG IN FOUNDATIONS 14 FT DEEP. INSTALL 1 TO 2 INCHES FROM THE BASE PLATE AS SHOWN. DRILL HOLE AND INSTALL TAG IN EPOXY FILLED MEDIUM 24 HOURS AFTER CONCRETE IS PLACED IF TAG IS NOT INSTALLED DURING CONCRETE PLACEMENT.
10. CONSTRUCT TOP OF FOUNDATION ELEVATION TO MATCH ELEVATION AT BACK OF SIDEWALK; OR 2 PERCENT GRADE HIGHER THAN TBC; OR WITH THE ROADWAY CENTERLINE OVER WHICH THE MAST ARM WILL HANG, WHICHEVER IS HIGHEST.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

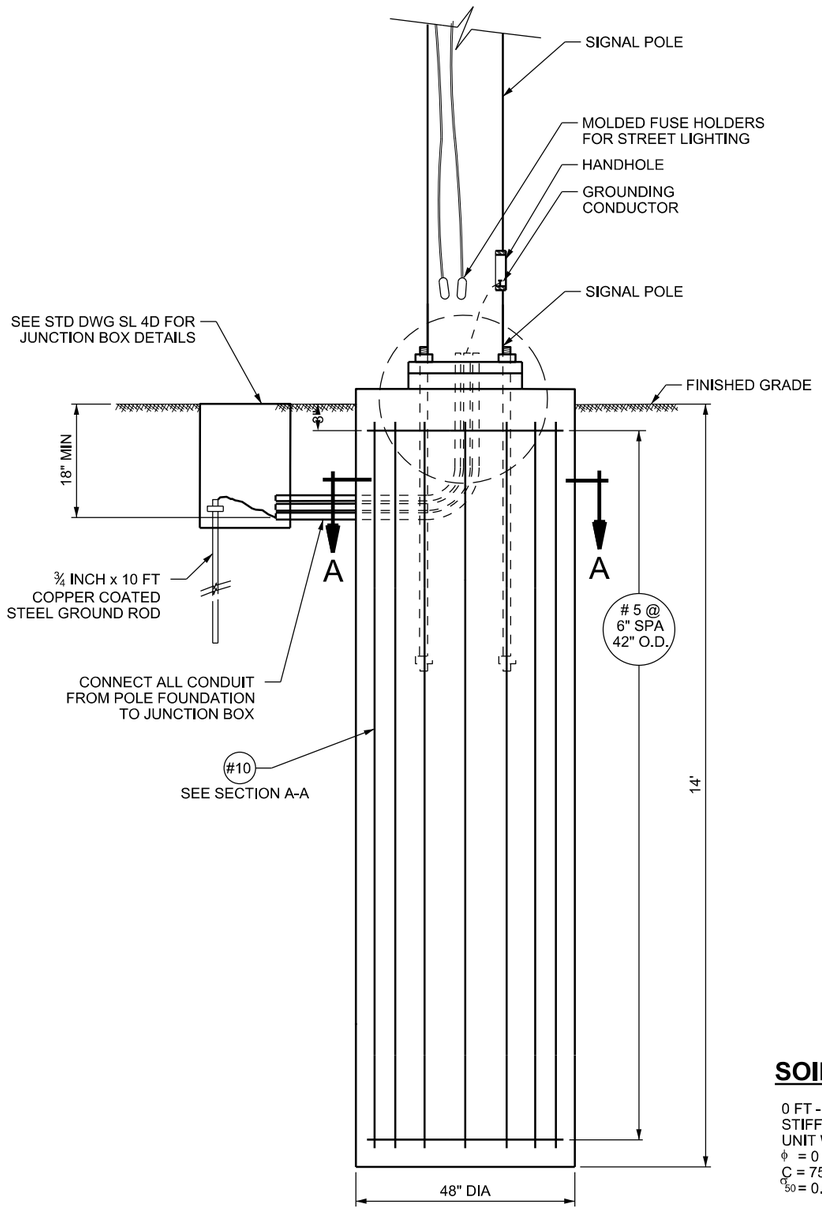
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

TRAFFIC SIGNAL MAST ARM
POLE FOUNDATION
25 FT THROUGH 75 FT

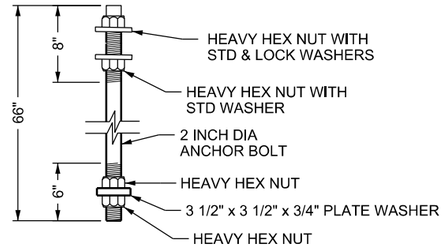
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 2A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL02A.dgn
23-JUN-2020

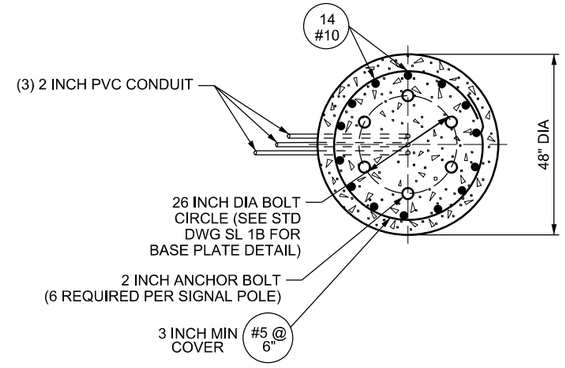


80'- 85' POLE FOUNDATION



2-INCH ANCHOR BOLT DETAIL

(6 REQUIRED PER SIGNAL POLE)



SECTION A-A

SOIL PARAMETERS

0 FT - 30 FT DEPTH
STIFF CLAY
UNIT WT = 110 PCF
ϕ = 0
C = 750 PSF
ε_{50} = 0.01

NOTES:

1. USE STATE FURNISHED 2 x 66 INCH ANCHOR BOLTS. TIGHTEN EACH BOLT TO SNUG-TIGHT PLUS ⅓ TURN. DO NOT WELD ANCHOR BOLT TO THE REINFORCING STEEL.
2. CAST FOUNDATIONS IN PLACE AGAINST UNDISTURBED EARTH. FOUNDATIONS WILL HAVE 14 FT OF ITS LENGTH BELOW FINISH GRADE. USE A CIRCULAR FORM FOR THE TOP 18 INCHES OF FOUNDATION EMBEDMENT.
3. DO NOT WELD REINFORCING STEEL.
4. PLACE ALL CONDUIT IN SAME TRENCH WHERE POSSIBLE.
5. USE COATED REBAR AND CLASS AA(AE) CONCRETE FOR FOUNDATION.
6. CAP CONDUIT ON BOTH ENDS PRIOR TO FOUNDATION POUR.
7. FOUNDATION MAY BE A MAXIMUM OF 18 INCHES ABOVE THE CROWN IF ROADWAY IS A HIGH LOAD ROUTE.
8. PROVIDE MINIMUM 10 FT HORIZONTAL EDGE-TO-EDGE CLEARANCE BETWEEN SIGNAL MAST ARM FOUNDATIONS.
9. PROVIDE AND INSTALL FOUNDATION DEPTH IDENTIFICATION TAG. SEE STD DWG SL 2A FOR POLE BASE DETAIL AND FOUNDATION DEPTH IDENTIFICATION TAG DETAILS.
10. CONSTRUCT TOP OF FOUNDATION ELEVATION TO MATCH ELEVATION AT BACK OF SIDEWALK; OR 2 PERCENT GRADE HIGHER THAN TBC; OR WITH THE ROADWAY CENTERLINE OVER WHICH THE MAST ARM WILL HANG, WHICHEVER IS HIGHEST.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED

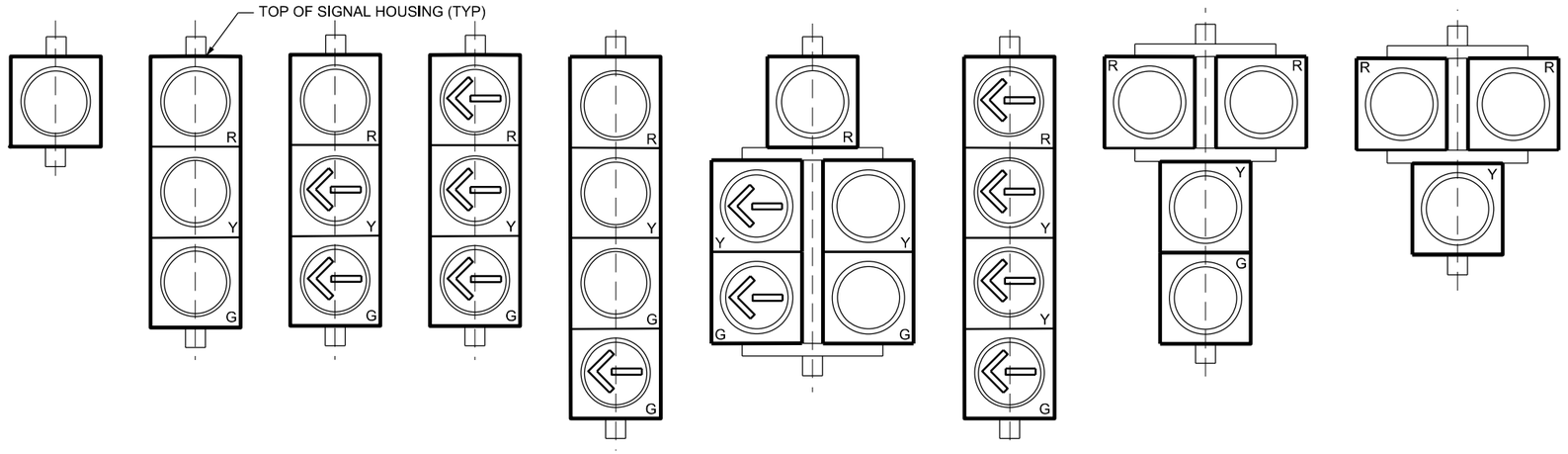
DEPUTY DIRECTOR

TRAFFIC SIGNAL MAST ARM POLE FOUNDATION 80 FT AND 85 FT

STANDARD DRAWING TITLE

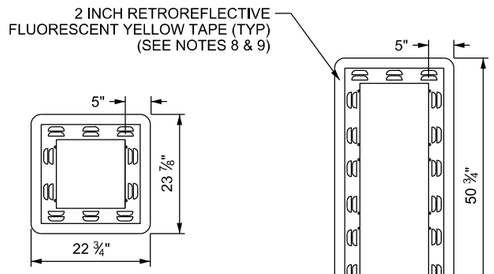
STD. DWG. NO.
SL 2B

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR_SL)\SL02B.dgn

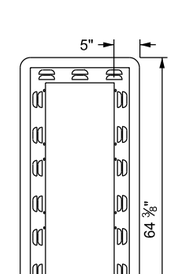


TYPE 0 **TYPE I** **TYPE II** **TYPE III** **TYPE IV** **TYPE V** **TYPE VI** **TYPE VII** **HYBRID BEACON**

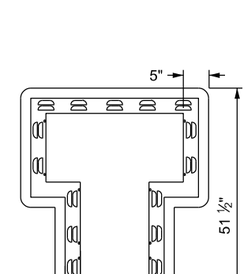
BACKPLATE FOR TYPE 0 SIGNAL HEAD



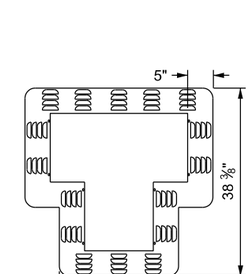
BACKPLATE FOR TYPE I, II, & III SIGNAL HEAD



BACKPLATE FOR TYPE IV, & VI SIGNAL HEAD



BACKPLATE FOR TYPE VII SIGNAL HEAD



BACKPLATE FOR HYBRID BEACON SIGNAL HEAD

LOUVERED BACKPLATE DETAILS

MAXIMUM MOUNTING HEIGHT OF SIGNAL FACES BETWEEN 40 FT AND 49 FT FROM STOP LINE (SEE NOTE A)

HORIZONTAL DISTANCE FROM STOP LINE (FT)	HEIGHT TO TOP OF SIGNAL HOUSING ABOVE PAVEMENT (FT)
40	21
42	21.7
44	22.4
46	23.1
48	23.8
49	24.2

NOTES:

1. USE 12 x 12 INCH BALLCAP/CUTAWAY VISORS FOR TRAFFIC SIGNALS. USE FULL VISORS WHEN THE INTERSECTION IS SKEWED.
2. APPLY A BEAD OF SILICONE AROUND VISORS.
3. ALL EXTERIOR AND INTERIOR OF THE SIGNAL HOUSING, DOOR, AND OUTSIDE OF VISOR TO BE HIGHWAY YELLOW. INSIDE OF VISOR IS PAINTED FLAT BLACK. BOTH SIDES OF BACKPLATES PRIMED AND PAINTED FLAT BLACK.
4. LOCATE TERMINAL BLOCK IN TOP SECTION FOR TYPE I, II, III, IV, AND VI SIGNAL HEADS. REFER TO STD DWG SL 3C FOR WIRE PATH AND TERMINAL BLOCK LOCATIONS FOR TYPE V, TYPE VII, AND HYBRID BEACON SIGNAL HEADS.
5. INSTALL TYPE V, TYPE VII, AND HYBRID BEACON SIGNAL ASSEMBLIES SO THAT HINGED SIGNAL FACES SWING OPEN TO THE OUTSIDE.
6. ORIENT ALL LED LENSES FOR TOP UPWARD ALIGNMENT UNLESS OTHERWISE SPECIFIED ON PLAN SHEETS.
7. PROVIDE BACKPLATE FOR ALL TYPE 0, I, II, III, IV, VI, VII, HYBRID BEACON SIGNAL HEADS. PROVIDE BACKPLATE FOR TYPE V SIGNAL HEADS ONLY AS SPECIFIED.
8. INSTALL 2 INCH RETROREFLECTIVE YELLOW TAPE-ASTM TYPE XI AROUND OUTSIDE EDGE OF BACKPLATES EXCEPT AS STATED IN NOTE 9.
9. DO NOT APPLY RETROREFLECTIVE TAPE TO SIGNAL HEADS ON RAMP METERS, PEDESTRIAN HYBRID BEACONS, PEDESTRIAN FLASHING BEACONS, AWS, OR REDUCED SPEED SCHOOL ZONE ASSEMBLIES.
10. RIVETED ASSEMBLY OF MULTI-PIECE BACKPLATES IS REQUIRED.
11. ALL SIGNAL HEAD FUNCTIONS TO BE CONTROLLED BY THE SIGNAL CONTROLLER IN THE SIGNAL CABINET.

DESIGN-ONLY NOTES:

A. OBTAIN APPROVAL FOR PLACEMENT OF SIGNAL FACES LESS THAN 50 FT FROM STOP LINE FROM THE ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

TRAFFIC SIGNAL HEADS

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 3A

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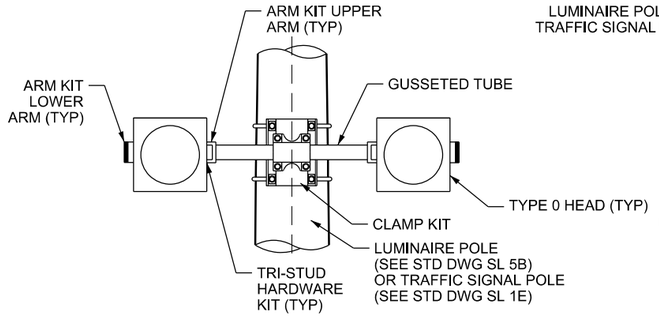
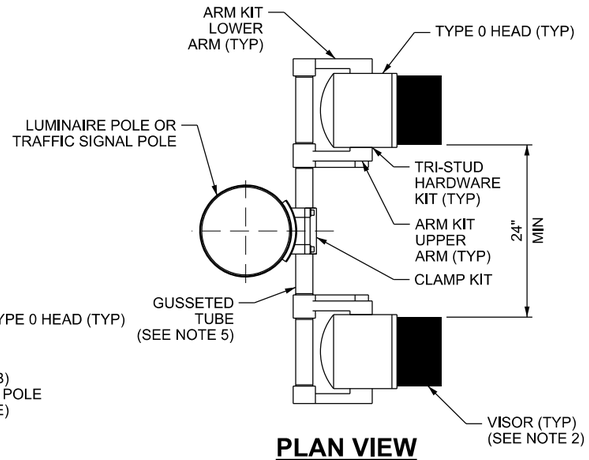
23-JUN-2020



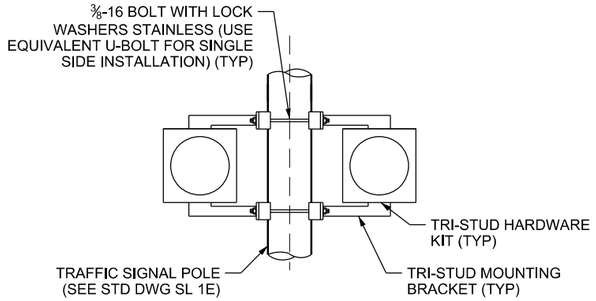
ELEVATION VIEW



PLAN VIEW

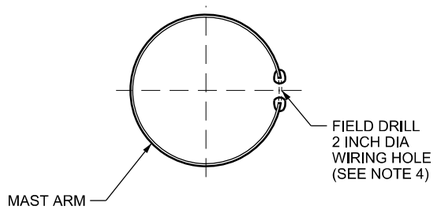
TYPE 0 POST MOUNT - CLAMP BRACKET

LUMINAIRE POLE OR
4 ½ INCH OD SIGNAL POLE (OPTIONAL)

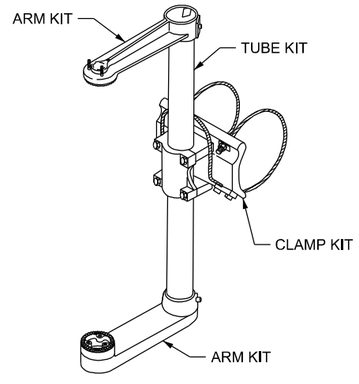


TYPE 0 POST MOUNT - BOLT BRACKET

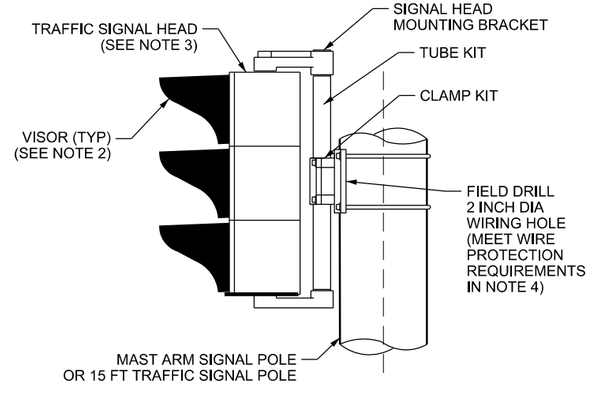
4 ½ INCH OD SIGNAL POLE (PREFERRED)



WIRE ENTRY HOLE DETAIL



SIGNAL HEAD MOUNTING BRACKET DETAIL



SIGNAL POLE MOUNT

NOTES:

1. SEE STD DWG SL 1A FOR SIGNAL POLE AND MAST ARM GENERAL NOTES.
2. SEE STD DWG SL 3A FOR SIGNAL HEAD DETAILS, BACK PLATE, AND VISOR REQUIREMENTS.
3. PROVIDE AN 8 FT MINIMUM AND 19 FT MAXIMUM CLEARANCE FROM BOTTOM OF NEARSIDE SIGNAL HEADS, INCLUDING BACK PLATES AND BRACKETS, TO TOP OF SIDEWALK OR PAVEMENT CROWN ELEVATION.
4. FIELD DRILL 2 INCH DIAMETER WIRING HOLE ALONG THE HORIZONTAL CENTROID OF THE MAST ARM AT EACH SIGNAL HEAD LOCATION. DEBURR THE HOLE PRIOR TO INSTALLING SIGNAL HEAD BRACKET.
5. PROVIDE A SINGLE GUSSETED TUBE THAT EXTENDS THROUGH BOTH UPPER ARM KITS AND THREADS INTO LOWER ARM KITS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

TRAFFIC SIGNAL MOUNTING

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 3B

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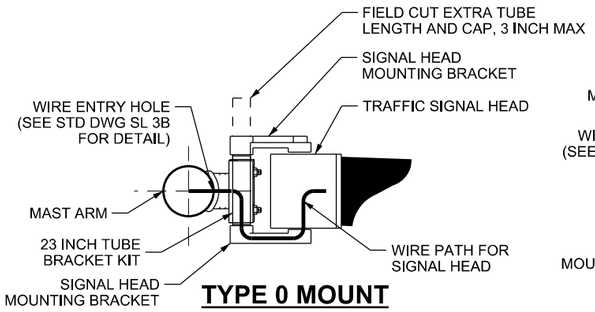
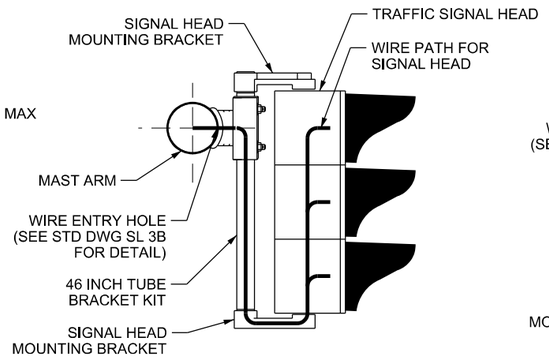
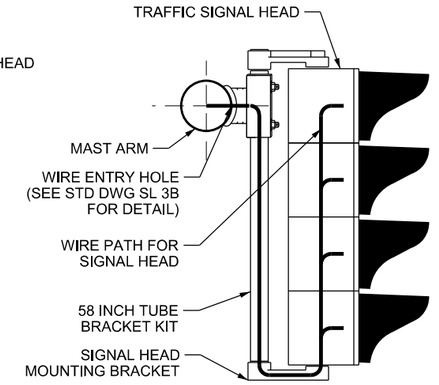


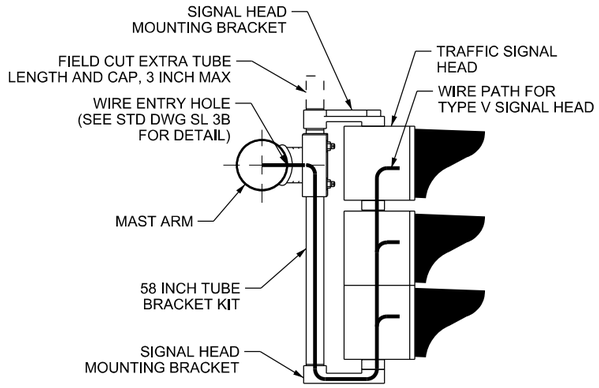
TYPE 0 MOUNT



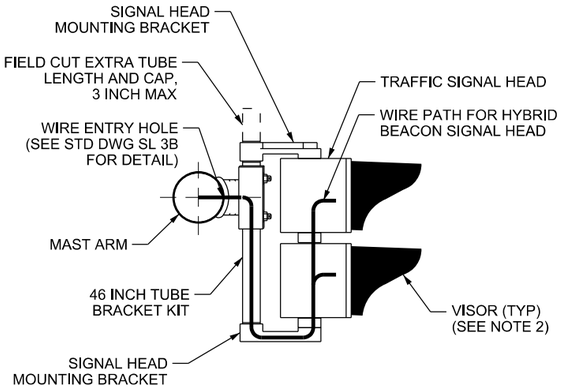
TYPE I, II, AND III MOUNT



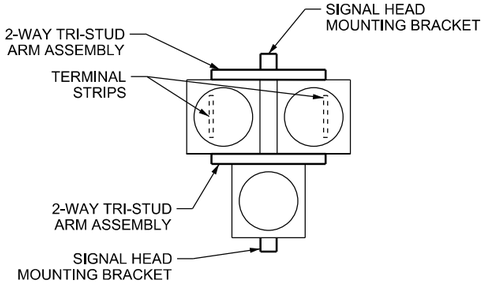
TYPE IV AND VI MOUNT



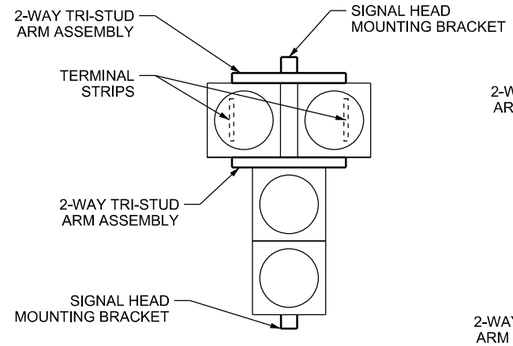
TYPE V AND VII MOUNT



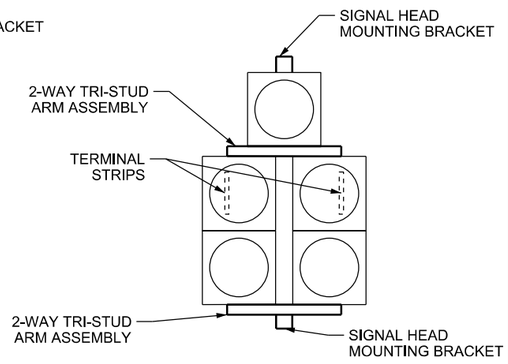
HYBRID BEACON MOUNT



HYBRID BEACON CONFIGURATION



TYPE VII CONFIGURATION



TYPE V CONFIGURATION

NOTES:

1. SEE STD DWG SL 1A FOR SIGNAL POLE AND MAST ARM GENERAL NOTES.
2. SEE STD DWG SL 3A FOR SIGNAL HEAD DETAILS, BACK PLATE, AND VISOR REQUIREMENTS.
3. PROVIDE AND INSTALL SIGNAL HEAD MOUNTING BRACKET. PROVIDE 24 INCH SLACK IN WIRE IN SIGNAL HEAD SO SIGNAL HEAD CAN ADJUST UP AND DOWN THE FULL EXTENT OF THE TUBE.
4. DO NOT STRIP BACK SIGNAL CABLE OUTER SHEATHING EXCEPT WITHIN THE SIGNAL HEAD. MAINTAIN THE OUTER SHEATHING THROUGH THE TUBE BRACKET KIT AND MOUNTING BRACKET.
5. SEE STD DWG SL 3B FOR SIGNAL HEAD MOUNTING BRACKET DETAIL.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
AUGUST 2020 — DATE

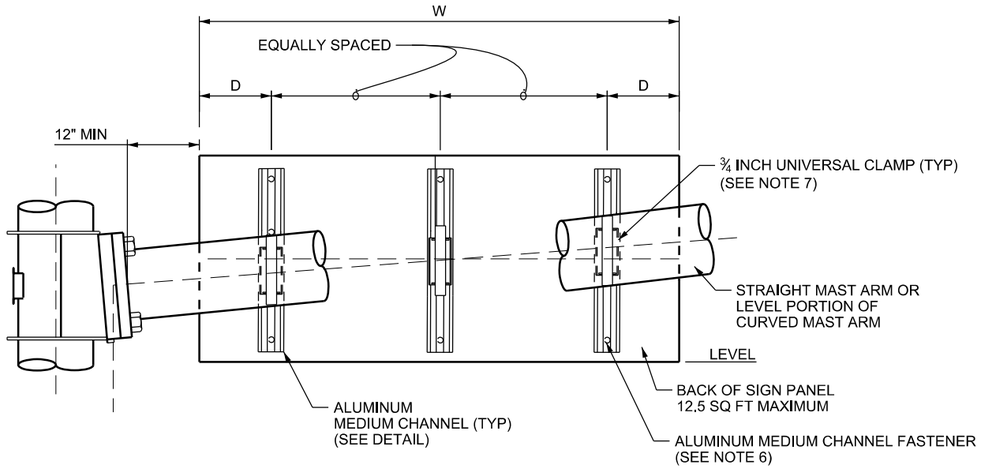
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

TRAFFIC SIGNAL MOUNTING

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 3C

23-JUN-2020 DGN File:L:\StandardDrawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\SL03C.dgn

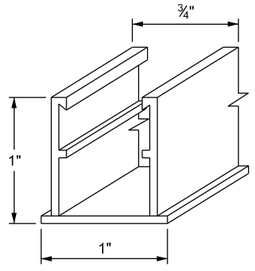


OPTION A MAST ARM SIGN MOUNT

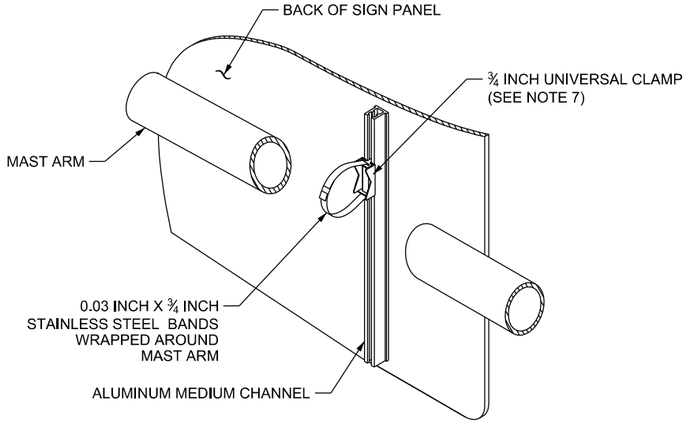
(SEE TABLE 1)
(SEE NOTE 3)

TABLE 1
DIMENSIONS OF OPTION A

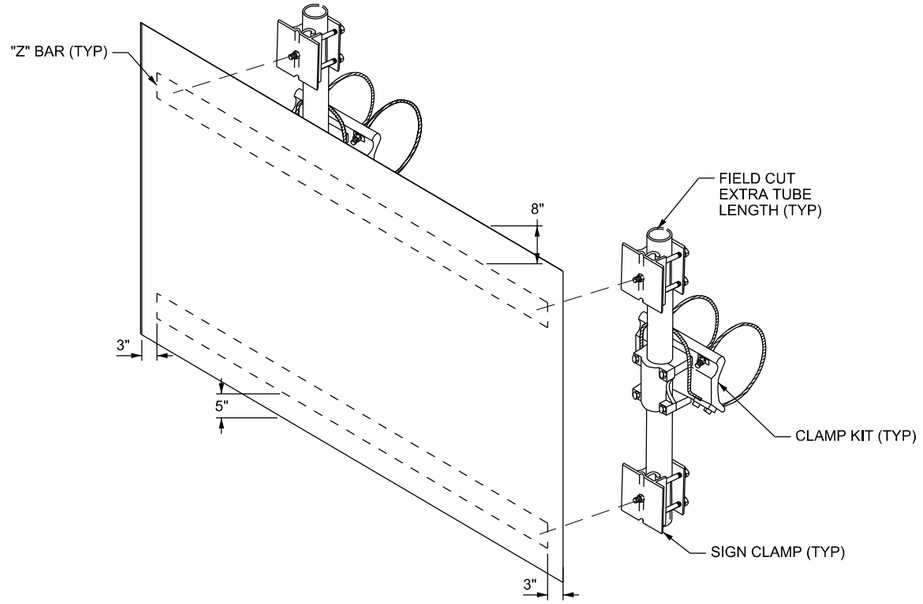
WIDTH OF SIGN (W, INCH)	D (INCH)	NUMBER OF MEDIUM CHANNELS
W ≤ 48	W/4	2
48 < W ≤ 96	12	3



ALUMINUM MEDIUM CHANNEL DETAIL

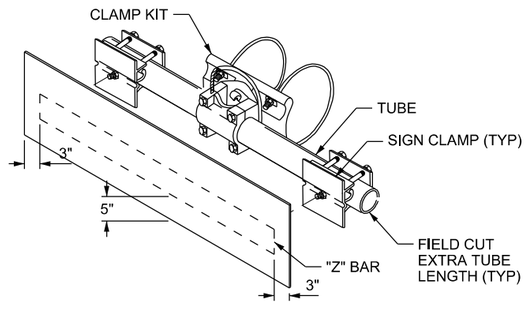


OPTION A INSTALLATION DETAIL



OPTION B MAST ARM SIGN MOUNT FOR LARGE SIGNS

HEIGHT: 24 TO 36 INCHES
(SEE NOTES 4 AND 5)



OPTION B MAST ARM SIGN MOUNT FOR SMALL SIGNS

HEIGHT: 18 INCHES OR LESS
(SEE NOTES 4 AND 5)

NOTES:

1. SEE SL 1 SERIES STD DWGS FOR MOUNTING OPTION ASSIGNMENTS OF MAST ARM SIGNS.
2. PROVIDE MINIMUM 18 FT- 6 INCH CLEARANCE FROM THE BOTTOM OF THE SIGN OR SIGN MOUNTING ASSEMBLY TO THE HIGHEST POINT ON THE ROADWAY SURFACE UNDER THE SIGN.
3. USE MAST ARM SIGN MOUNT OPTION A ONLY FOR SIGNS LESS THAN OR EQUAL TO 12.5 SQ FT ON STRAIGHT MAST ARMS OR ON THE LEVEL PORTION OF CURVED MAST ARMS.
4. USE 2 SIGN CLAMPS FOR SIGNS UP TO 3 FT LONG. USE 4 SIGN CLAMPS FOR SIGNS 3 FT TO 8 FT LONG. USE 6 SIGN CLAMPS FOR SIGNS LONGER THAN 8 FT.
5. MOUNT CENTER OF "Z" BAR 5 INCHES FROM THE BOTTOM EDGE OF SIGN. PROVIDE 3 INCHES FROM ENDS OF "Z" BAR TO BOTH EDGES OF SIGN. CONNECT THE OUTERMOST SIGN CLAMP 3 INCHES FROM THE ENDS OF THE "Z" BAR. USE STAINLESS STEEL TRUSS BOLTS FOR SIGN FASTENING. SEE STD DWG SN 9B.
6. ATTACH THE ALUMINUM MEDIUM CHANNEL TO SIGN PANEL WITH STAINLESS STEEL BOLTS, TAPPING SCREWS OR POP RIVETS AS SPECIFIED. USE ADHESIVE ONLY WHEN SHOP APPLIED. NO FIELD ADHESIVE IS ALLOWED.
7. ADJUST UNIVERSAL CLAMP LOCATION TO LEVEL SIGN. SEE STD DWG SN 10 FOR ¾ INCH UNIVERSAL CLAMP DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DEPUTY DIRECTOR — AUGUST 2020 DATE

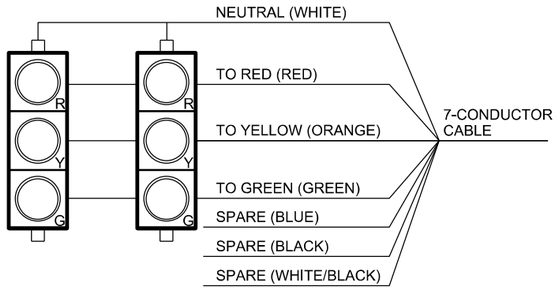
CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 DATE

MAST ARM SIGN MOUNTING

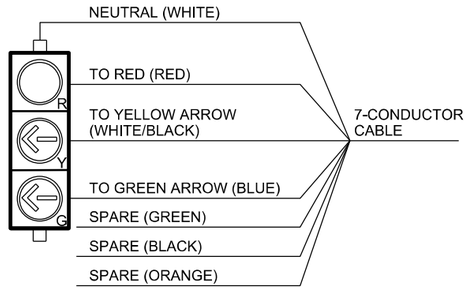
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 3D

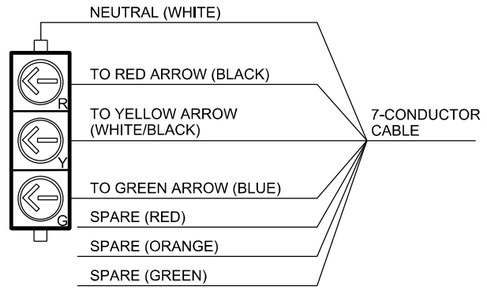
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL03D.dgn
23-JUN-2020



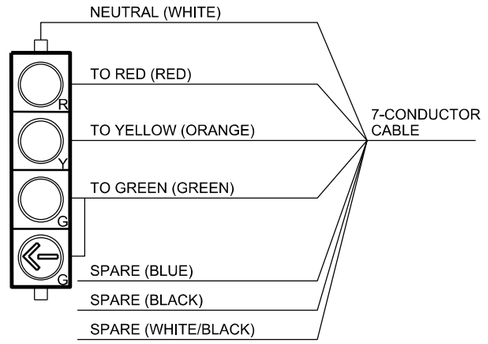
TYPE I SIGNAL HEAD WIRE ASSIGNMENT



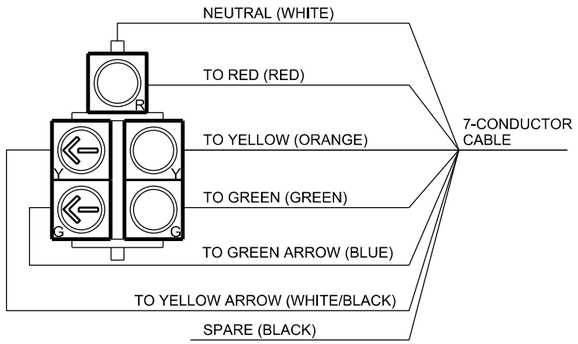
TYPE II SIGNAL HEAD WIRE ASSIGNMENT



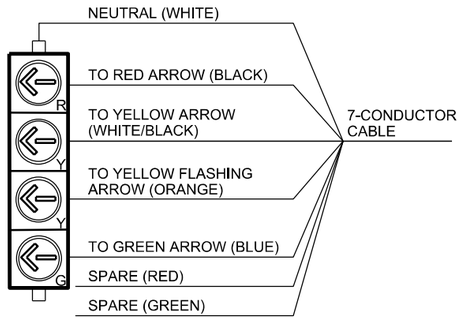
TYPE III SIGNAL HEAD WIRE ASSIGNMENT



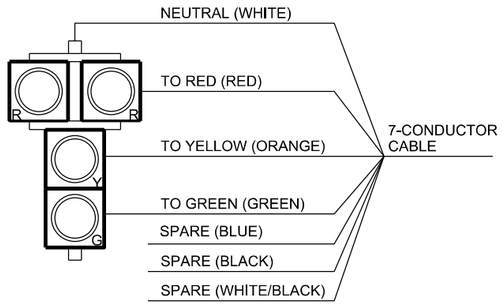
TYPE IV SIGNAL HEAD WIRE ASSIGNMENT



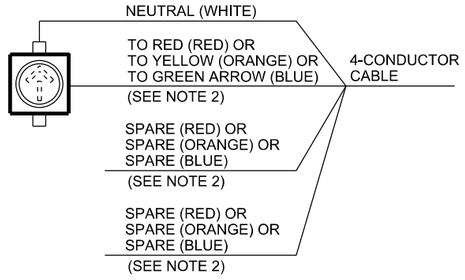
TYPE V SIGNAL HEAD WIRE ASSIGNMENT



TYPE VI SIGNAL HEAD WIRE ASSIGNMENT



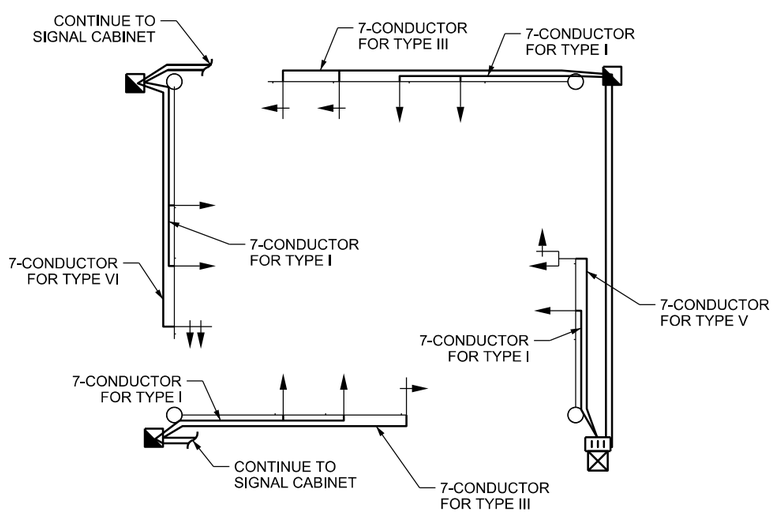
TYPE VII SIGNAL HEAD WIRE ASSIGNMENT



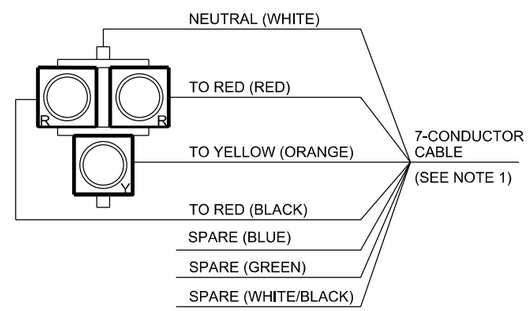
TYPE 0 SIGNAL HEAD WIRE ASSIGNMENT

LEGEND

- MAST ARM SIGNAL POLE
- TYPE I SIGNAL HEAD
- TYPE III SIGNAL HEAD
- TYPE V SIGNAL HEAD
- TYPE VI SIGNAL HEAD
- SIGNAL JUNCTION BOX
- TYPE IIII JUNCTION BOX
- SIGNAL CABINET



TYPICAL WIRING DIAGRAM (DEPICTING VARIOUS LEFT TURN TREATMENTS)



HYBRID BEACON WIRE ASSIGNMENT

NOTES:

1. A 4-CONDUCTOR MAY BE USED FOR HYBRID BEACONS AS APPROVED BY THE ENGINEER.

DESIGN-ONLY NOTES:

A. A 4-CONDUCTOR MAY BE USED FOR HYBRID BEACONS AS APPROVED BY THE ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

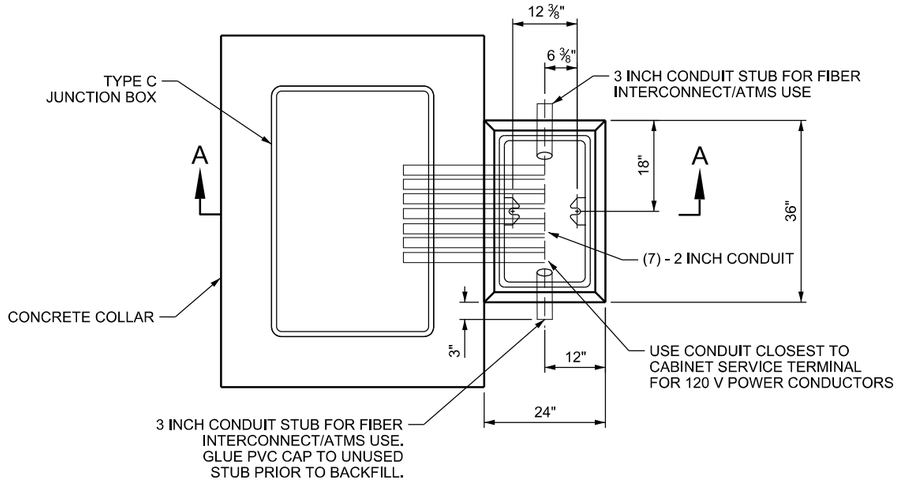
DEPUTY DIRECTOR

TRAFFIC SIGNAL HEAD WIRING

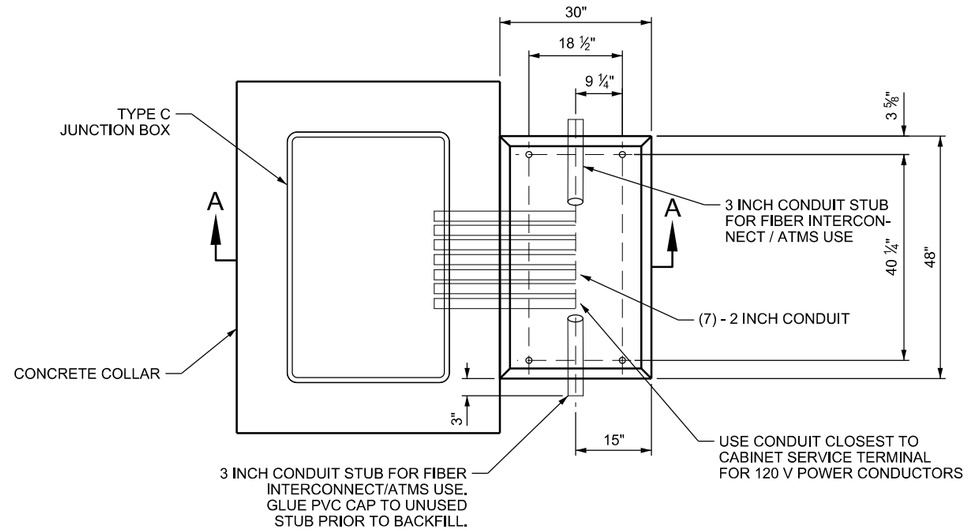
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 3E

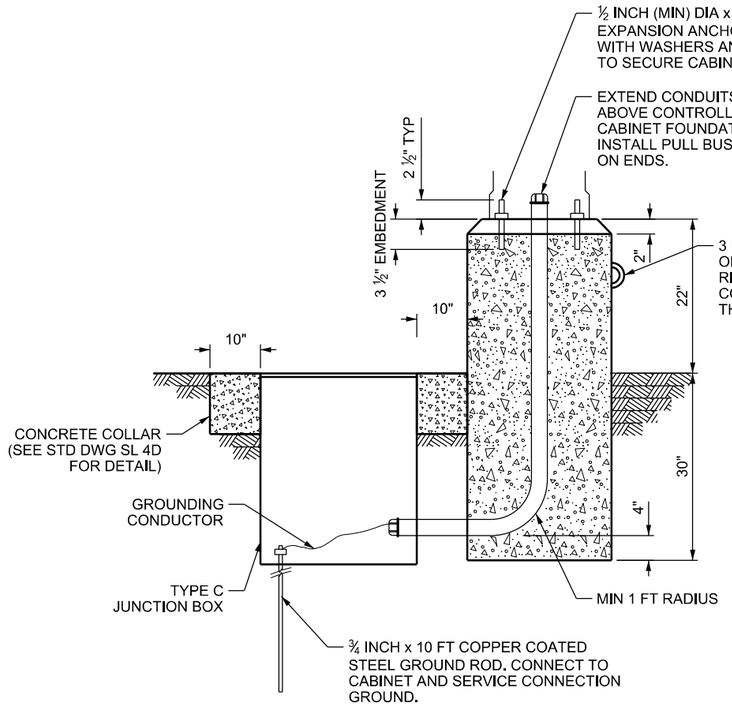
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\SL03E.dgn
23-JUN-2020



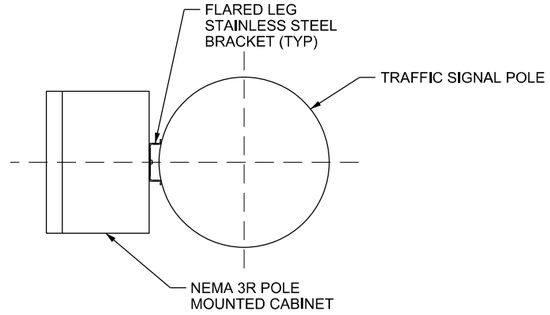
TYPE 5 CABINET BASE



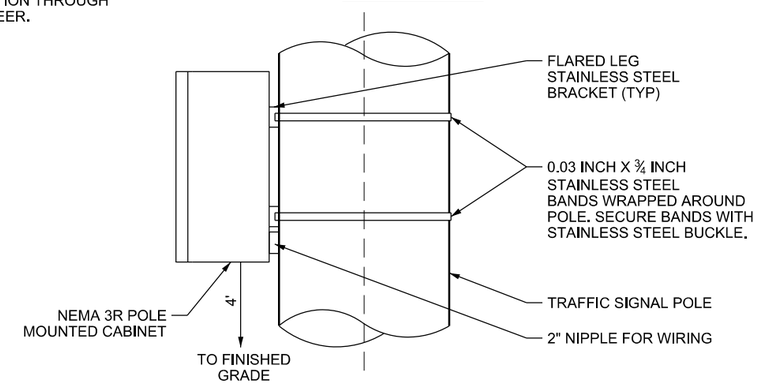
TYPE 6 CABINET BASE



SECTION A-A



PLAN VIEW



ELEVATION VIEW

POLE MOUNTED SIGNAL CABINET

NOTES:

1. ATTACH THE GROUNDED SIDE OF THE SERVICE PEDESTAL POWER SUPPLY TO GROUND ROD IN THE TYPE C JUNCTION BOX.
2. MAINTAIN 1 INCH MINIMUM SPACING BETWEEN CONDUITS IN CABINET BASE. CAP OR PLUG CONDUITS AT BOTH ENDS UNTIL USED.
3. GROUND CABINET BY CONNECTING GROUND WIRE TO GROUND ROD IN TYPE C JUNCTION BOX.
4. SEAL ALL CONDUIT ENDS WITH 2 INCHES OF DUCT SEAL AFTER WIRING IS COMPLETE.
5. USE CONCRETE CLASS AA (AE) FOR SIGNAL CABINET BASE AND JUNCTION BOX COLLAR. SIGNAL CABINET BASE MAY BE PRECAST OR CAST-IN-PLACE. CAST-IN-PLACE IS PREFERRED FOR NEW CONSTRUCTION. OBTAIN WRITTEN APPROVAL FROM THE ENGINEER TO USE PRECAST ON NEW CONSTRUCTION.
6. INSTALL PULL BUSHING ON ALL CONDUIT ENDS BEFORE INSTALLING WIRING.

DESIGN-ONLY NOTES:

A. USE POLE MOUNTED CABINET AT FLASHING BEACON ASSEMBLY ONLY. TYPE 6 CABINET REQUIRED AT ALL OTHER SIGNAL APPLICATIONS UNLESS SUBSTITUTION IS APPROVED BY REGION SIGNAL ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

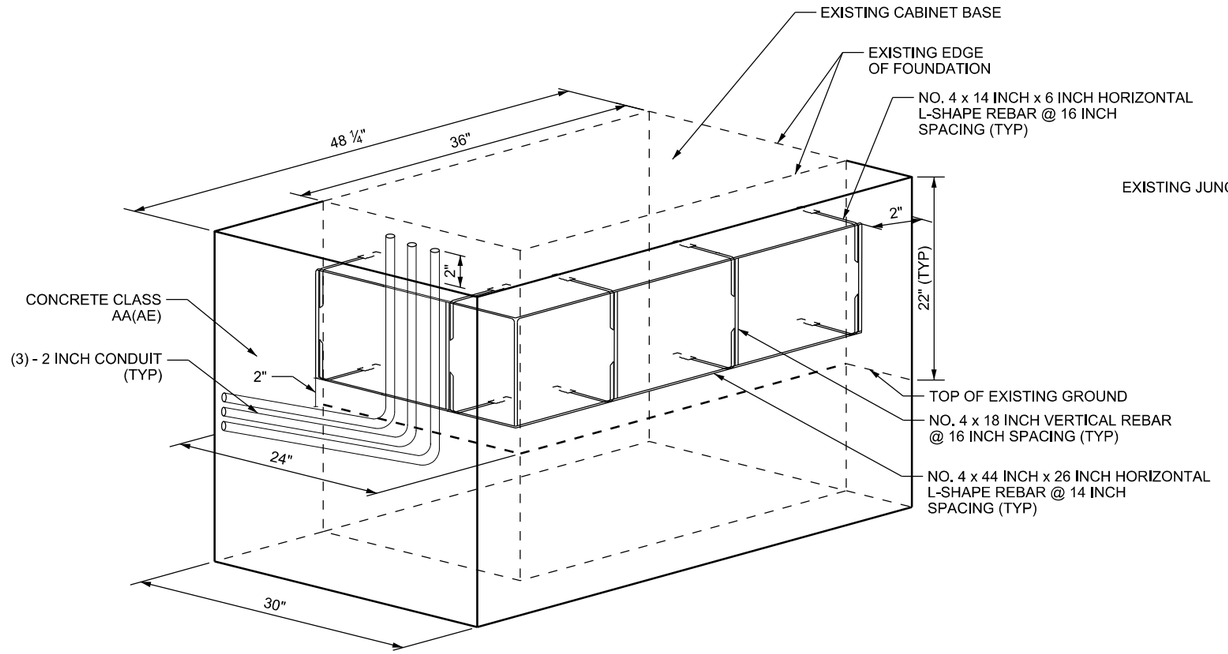
AUGUST 2020
DATE

TRAFFIC SIGNAL
CABINET BASE
AND POLE MOUNTED
CABINET

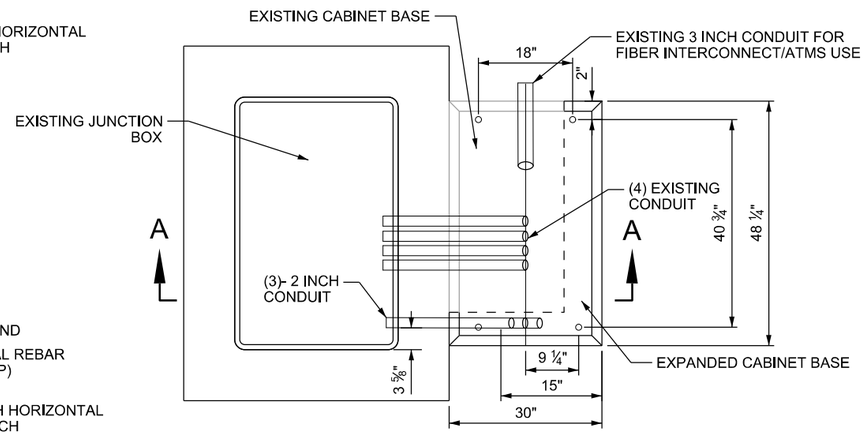
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 4A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL04A.dgn
23-JUN-2020

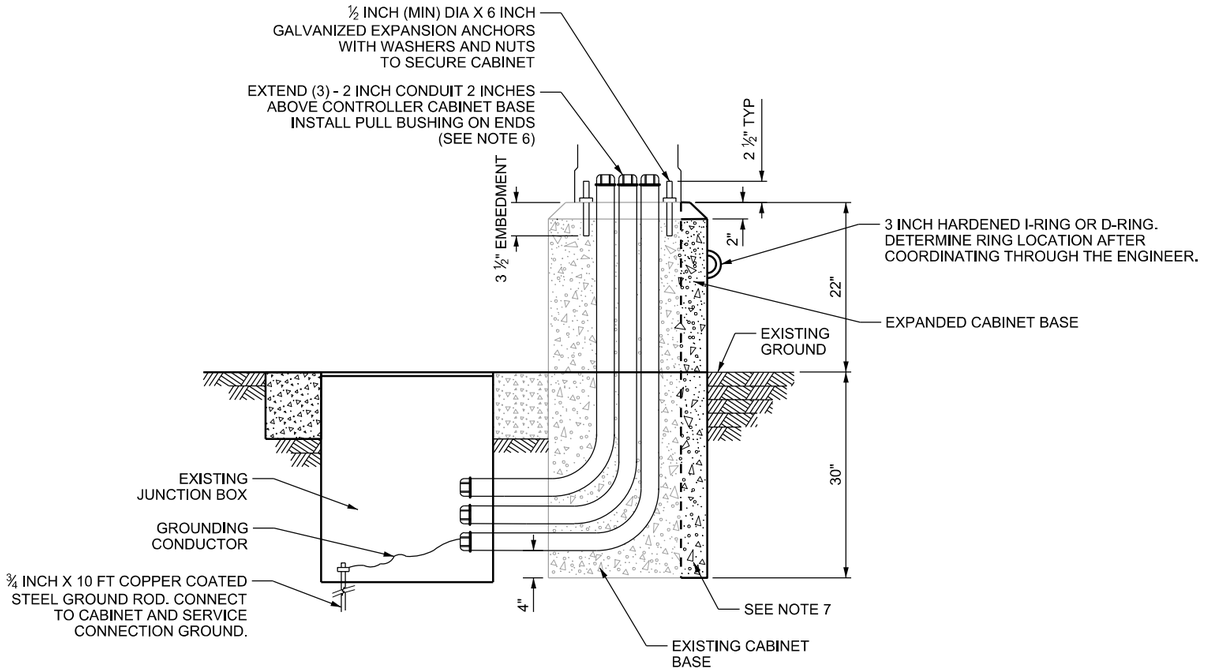


ISOMETRIC VIEW



PLAN VIEW

TYPE 6 CABINET BASE EXPANSION



SECTION A-A

NOTES:

1. MAINTAIN 1 INCH MINIMUM SPACING BETWEEN CONDUITS IN CABINET BASE.
2. GROUND CABINET BY CONNECTING GROUND WIRE TO GROUND ROD IN EXISTING JUNCTION BOX.
3. SEAL ALL CONDUIT ENDS WITH 2 INCHES OF DUCT SEAL AFTER WIRING IS COMPLETE.
4. USE CONCRETE CLASS AA (AE) FOR SIGNAL CABINET BASE EXPANSION.
5. INSTALL PULL BUSHING ON ALL CONDUIT ENDS BEFORE INSTALLING WIRING.
6. INSTALL NEW CONDUITS WITH A MINIMUM 1 INCH CLEARANCE INSIDE THE NEW CABINET FLANGE.
7. EXTEND CABINET EXPANSION BASE TO THE FOLLOWING DEPTHS:
   A. PRE-CAST: BOTTOM OF EXISTING BASE
   B. CAST-IN-PLACE: AS DEEP AS EXISTING BASE PERMITS

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

TRAFFIC SIGNAL CABINET BASE EXPANSION

STANDARD DRAWING TITLE

STD. DWG. NO.

SL 4B

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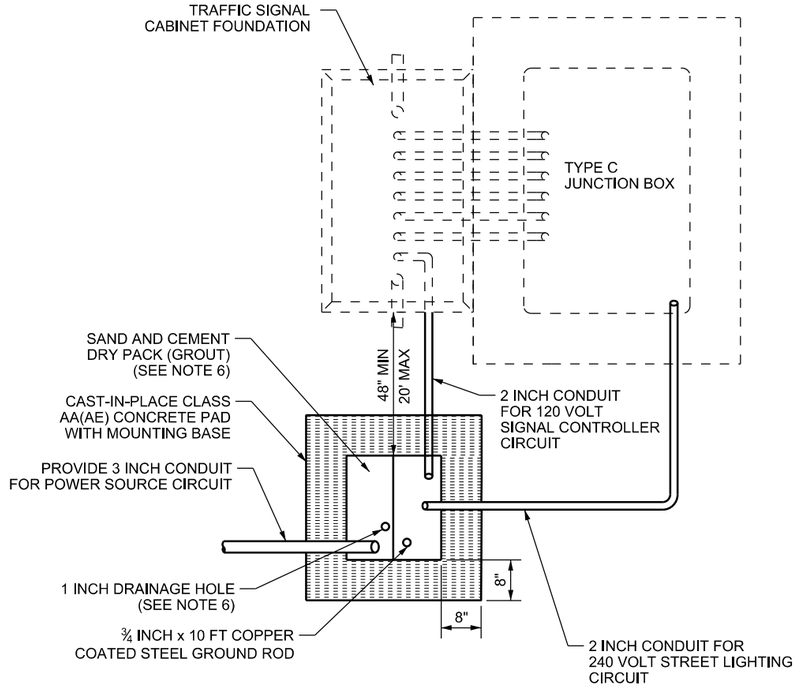
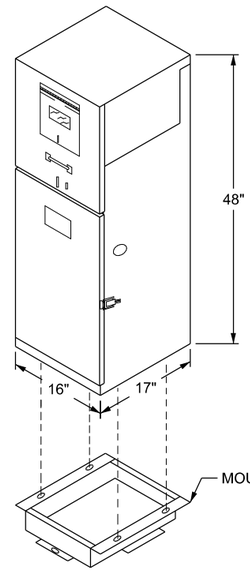
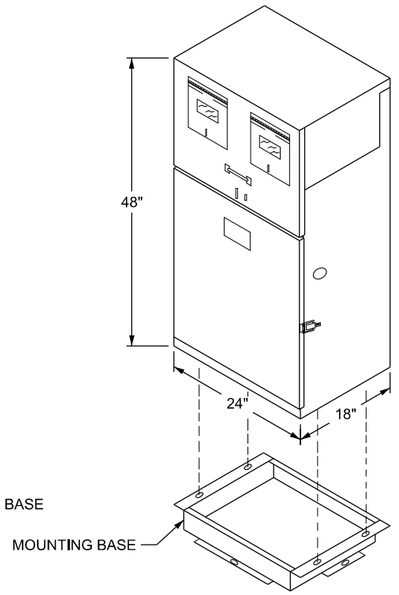
23-JUN-2020





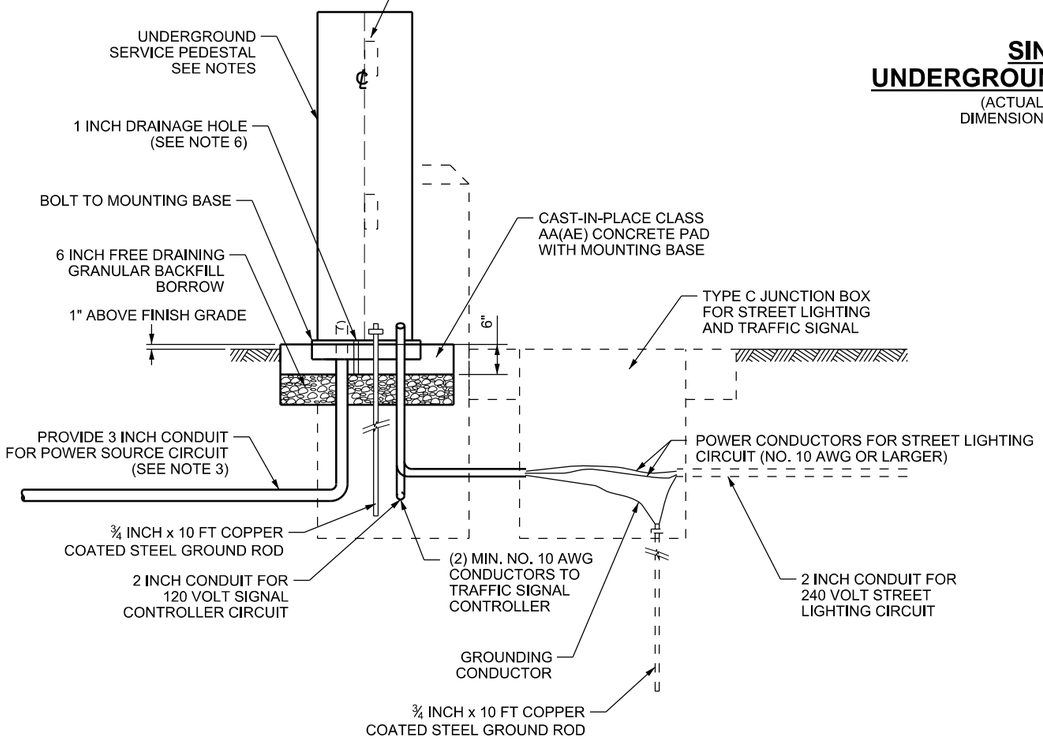
SINGLE METER UNDERGROUND SERVICE PEDESTAL

(ACTUAL DIMENSIONS MAY VARY,
DIMENSIONS FOR INFORMATION ONLY)



DUAL METER UNDERGROUND SERVICE PEDESTAL

(ACTUAL DIMENSIONS MAY VARY,
DIMENSIONS FOR INFORMATION ONLY)



NOTES:

1. LOCATE SERVICE PEDESTAL ON EITHER SIDE OF TRAFFIC SIGNAL CABINET FOUNDATION AS SHOWN. LOCATION MAY BE MODIFIED TO BEST SUIT FIELD CONDITIONS WITH ENGINEER'S APPROVAL. MAINTAIN 48 INCH MINIMUM CLEARANCE AROUND EACH UNIT WITH DOORS OPENED TO ANY POSITION. PLACE UNDERGROUND SERVICE PEDESTAL WITHIN 20 FT OF CABINET.
2. LOCATE SERVICE PEDESTAL AND CONTROLLER SO WATER DRAINS AWAY FROM FOUNDATIONS AND JUNCTION BOXES. SITE PREPARATION, INCLUDING GRADING, MAY BE REQUIRED BEFORE PLACING EQUIPMENT.
3. PROVIDE SINGLE-PHASE, 3-WIRE, 100A SERVICE. COORDINATE WITH LOCAL UTILITIES REGARDING SERVICE CONDUCTORS.
4. PROVIDE UNDERGROUND SERVICE PEDESTAL PER STANDARD SPECIFICATION 16530 AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
5. SEE STD DWG SL 4D FOR JUNCTION BOX DETAILS.
6. INSTALL SAND AND CEMENT DRY PACK (GROUT) WITHIN MOUNTING BASE AFTER INSTALLATION OF CONDUITS AND GROUND ROD. PROVIDE 1-INCH DRAINAGE HOLE AT LOW POINT TO ALLOW DRAINAGE FROM TOP OF GROUT.
7. CAST PEDESTAL MOUNTING BASE INTO CONCRETE PEDESTAL PAD.
8. PROVIDE 6 FT MINIMUM LATERAL OFFSET BETWEEN GROUND RODS WITHIN SERVICE PEDESTAL AND TYPE C JUNCTION BOX.

REVISIONS

NO.	DATE	APPR.	REMARKS
2	6/27/19	MMA	ADDED NOTE 8.
1	8/31/17	JS	REVISED CALLOUTS AND NOTES.

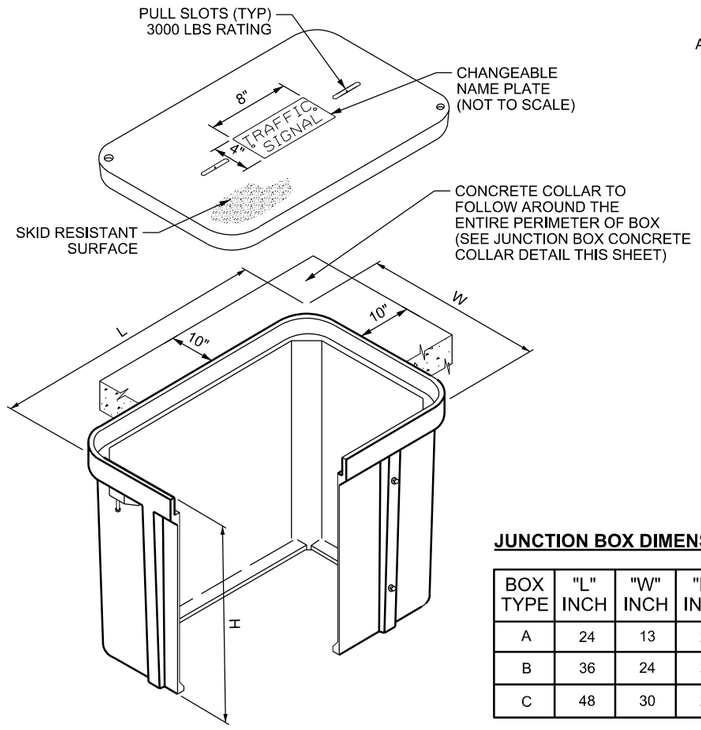
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

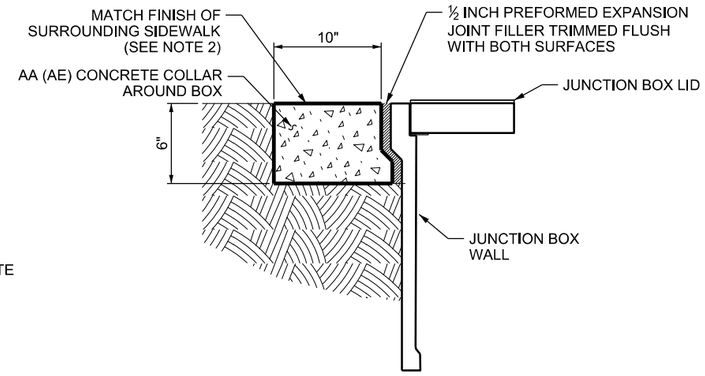
UNDERGROUND SERVICE PEDESTALS
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 4C

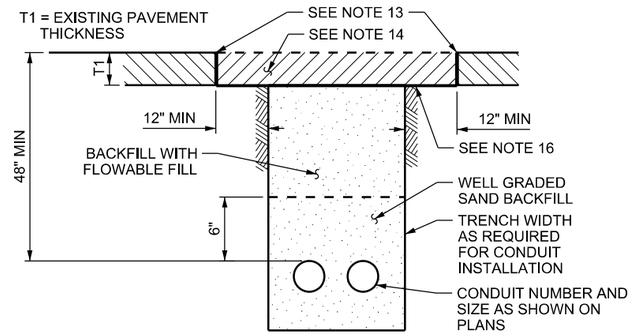
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\SL04C.dgn
23-JUN-2020



JUNCTION BOX CONCRETE COLLAR DETAIL



CONDUIT TRENCHED IN ASPHALT PAVEMENT DETAIL

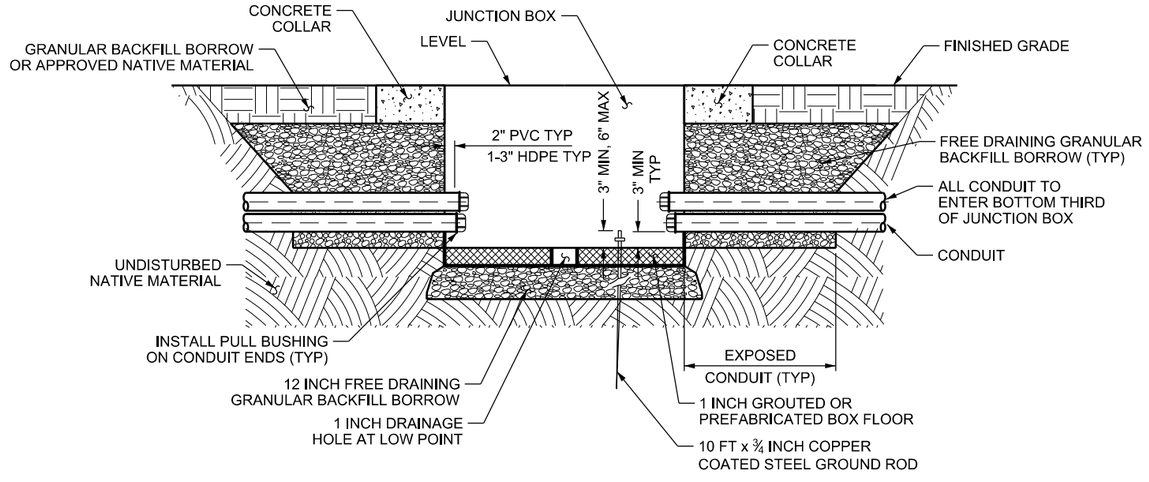


JUNCTION BOX DIMENSIONS

BOX TYPE	"L" INCH	"W" INCH	"H" INCH	LOADING
A	24	13	24	TIER 22
B	36	24	24	TIER 22
C	48	30	24	TIER 22

MINIMUM CONDUIT DEPTH

DEPTH (INCH)	AREA
24	OUTSIDE OF PAVEMENT (TRENCHED)
48	UNDER PAVEMENT SURFACE (TRENCHED)
36	OUTSIDE 20 FT OF PAVEMENT EDGE (BORED)
48	HIGHWAY RIGHT-OF-WAY UNDER ASPHALT PAVEMENT SURFACE (BORED)
60	WITHIN 20 FT OF PAVEMENT EDGE (BORED)



JUNCTION BOX CONDUIT PENETRATION DETAIL

NOTES:

1. DO NOT PLACE JUNCTION BOXES IN THE TRAVELED WAY OR ON ROADWAY SHOULDERS.
2. CONCRETE SIDEWALK/FLATWORK TAKES THE PLACE OF CONCRETE COLLARS ON ANY OR ALL SIDES. DO NOT PLACE SEPARATE CONCRETE COLLAR WITHIN CONCRETE SIDEWALK/FLATWORK.
3. SEAL ALL CONDUITS INSIDE JUNCTION BOX WITH 2 INCHES OF DUCT SEAL AFTER ALL WIRING IS COMPLETE.
4. INSTALL PULL BUSHING ON ALL CONDUIT ENDS BEFORE INSTALLING WIRING.
5. CONFORM TO ANSI/SCTE-77 "SPECIFICATION FOR UNDERGROUND ENCLOSURE INTEGRITY" TIER 22 LOADING FOR ALL JUNCTION BOXES. TIER 22 ID PLATE TO BE VISIBLE ON BOX.
6. EXTEND GROUND ROD A MINIMUM OF 3 INCHES AND A MAXIMUM OF 6 INCHES ABOVE BOTTOM OF JUNCTION BOX.
7. USE GROUND ROD CLAMP AND A SPLIT BOLT FOR BONDING TO GROUND ROD. ATTACH NOT MORE THAN 4 WIRES PER CLAMP.
8. DO NOT CUT GROUND RODS TO A LENGTH LESS THAN 10 FT.
9. PROVIDE CLEAR SPACE OF AT LEAST 36 INCHES FOR PERSONNEL TO PULL LID OFF BOX WITHOUT CONFLICT.
10. ATTACH NAME PLATE USING ADHESIVE ACCORDING TO THE MANUFACTURES DIRECTION AND MEETING OR EXCEEDING THE FOLLOWING SPECIFICATIONS:
    A. TENSILE STRENGTH - 1200 PSI
    B. SERVICE TEMPERATURE, CURED - SUBZERO TO +140° F
    C. CURE TIME - 24 HOURS
    INSERT TWO NON-CORRODING TAMPER RESISTANT SCREWS AFTER APPLYING ADHESIVE.
11. CHANGEABLE NAME PLATES ARE NOT REQUIRED ON POLYMER CONCRETE COVERS, CONTRACTOR MAY USE STAMPED COVERS.
12. PROVIDE TYPE C JUNCTION BOXES WITH A SPLIT LID.
13. SAW CUT PAVEMENT EDGES. APPLY A HOT-POUR RUBBERIZED ASPHALT JOINT SEALANT OR APPROVED EQUAL, APPLIED AFTER PATCH IS INSTALLED.
14. USE DEPARTMENT APPROVED MATERIAL FOR ALL BACKFILL AND PAVEMENT PATCHES.
15. INSTALL DETECTABLE PULL TAPE IN ALL EMPTY CONDUITS.
16. EVENLY APPLY TACK COAT ON FINAL BACKFILL BEFORE INSTALLING T-PATCH.
17. DO NOT TRENCH THROUGH ASPHALT WITHOUT WRITTEN APPROVAL OF THE ENGINEER.
18. USE COMPRESSION COUPLINGS WHEN CONNECTING HDPE TO PVC CONDUIT.
19. RESERVE TOPMOST CONDUITS FOR FUTURE USE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

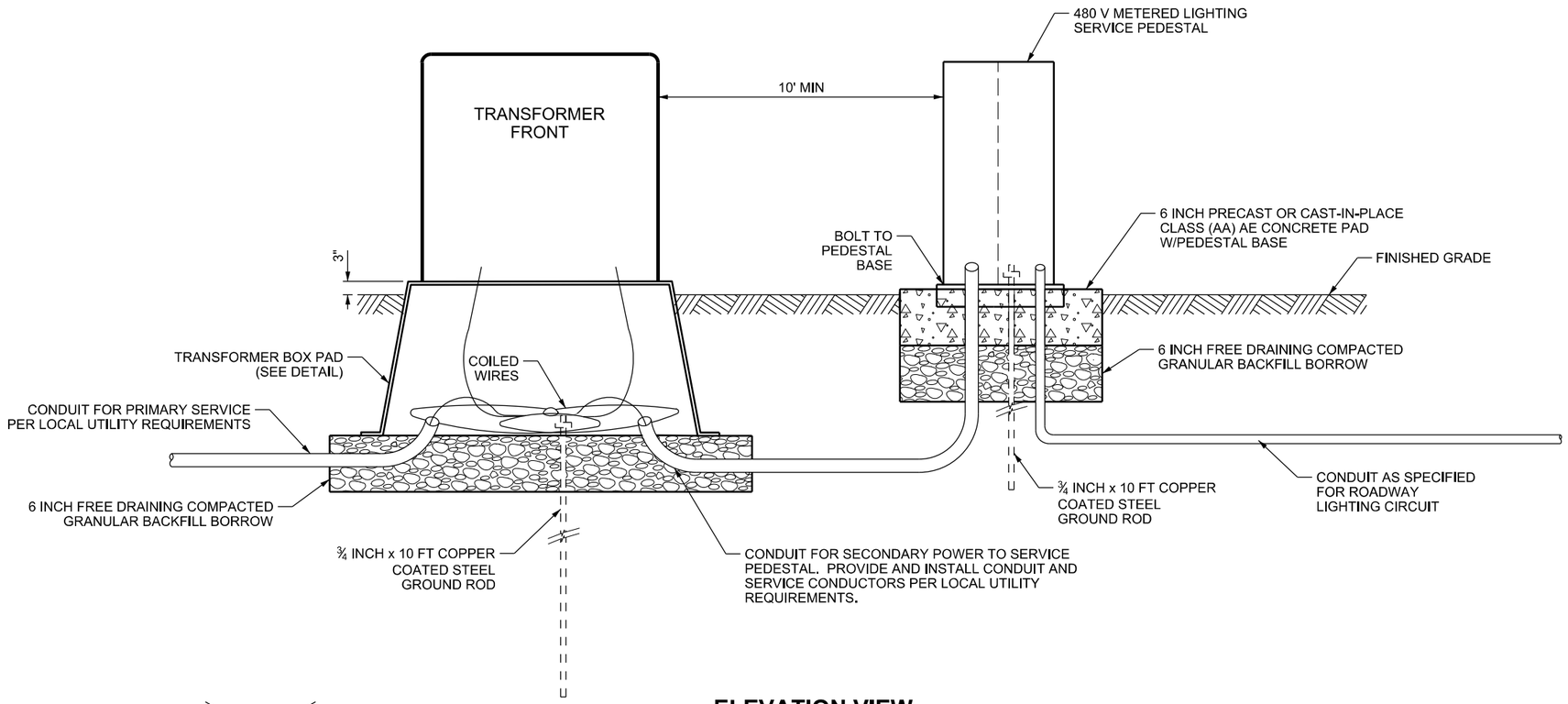
	DATE
RECOMMENDED FOR APPROVAL	AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUGUST 2020
DEPUTY DIRECTOR	DATE

TRAFFIC SIGNAL JUNCTION BOX AND CONDUIT

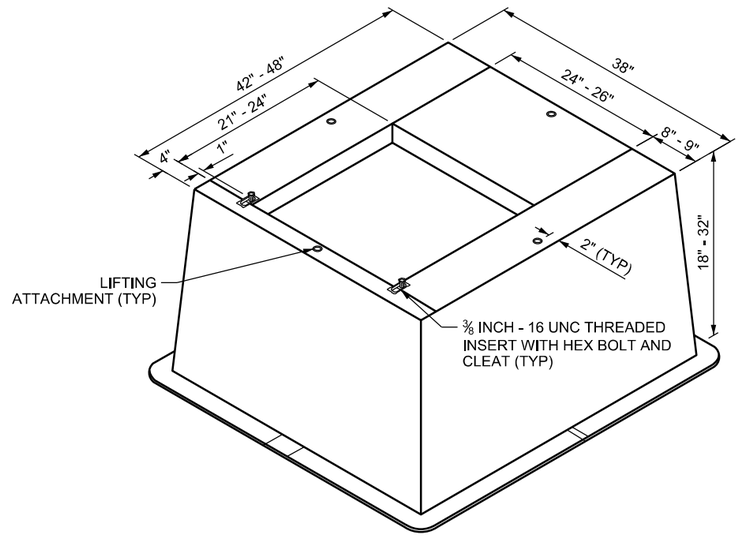
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 4D

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL04D.dgn



ELEVATION VIEW



TRANSFORMER BOX PAD DETAIL

NOTES:

1. LOCAL UTILITY SERVICE POINT MUST BE SINGLE PHASE VOLTAGE WITH DISCONNECTING PROVISIONS. LOCAL UTILITY WILL INSTALL PRIMARY SERVICE CONNECTION CONDUCTORS IN CONTRACTOR FURNISHED CONDUIT.
   A. CONTACT LOCAL UTILITY TO VERIFY PRIMARY VOLTAGE AND CONNECTION TYPE.
   B. NOTIFY LOCAL UTILITY A MINIMUM 30 DAYS IN ADVANCE OF DESIRED POWER SOURCE CONNECTION.
2. PROVIDE 480 VOLT GROUND-MOUNT TRANSFORMER ACCORDING TO LOCAL UTILITY REQUIREMENTS AND CAPACITY AS SPECIFIED IN PROJECT PLANS.
3. CONFORM TO PACIFICORP SPECIFICATION ZG 411 FOR TRANSFORMER BOX PAD MATERIAL UNLESS OTHERWISE SPECIFIED ON PROJECT PLANS.
4. LOCATE SERVICE PEDESTAL ON EITHER SIDE OF TRANSFORMER AS SPECIFIED. LOCATION MAY BE MODIFIED TO BEST SUIT FIELD CONDITIONS PER THE ENGINEER'S APPROVAL. MAINTAIN 48 INCH MINIMUM CLEARANCE AROUND EACH UNIT WITH DOORS OPENED TO ANY POSITION.
5. LOCATE SERVICE PEDESTAL AND TRANSFORMER SO WATER DRAINS AWAY FROM FOUNDATIONS AND JUNCTION BOXES. SITE PREPARATION INCLUDING GRADING MAY BE REQUIRED BEFORE PLACING EQUIPMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

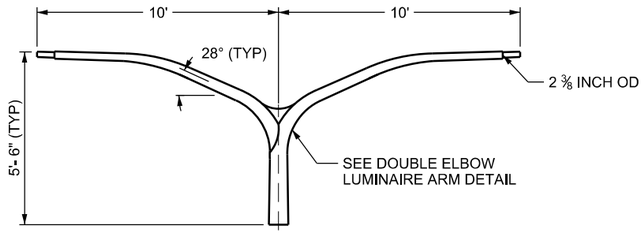
DEPUTY DIRECTOR

SINGLE TRANSFORMER SUBSTATION

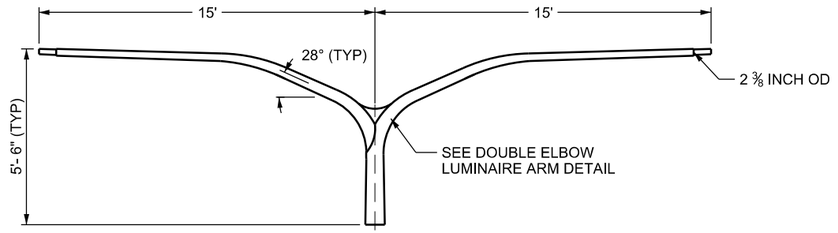
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 4E

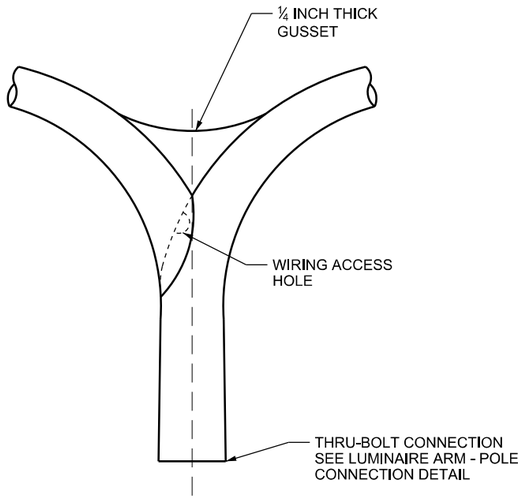
23-JUN-2020
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR,SL)\SL04E.dgn



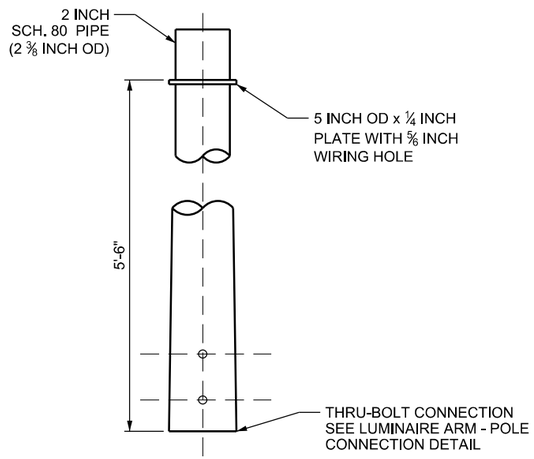
10' DUAL LUMINAIRE ARM



15' DUAL LUMINAIRE ARM

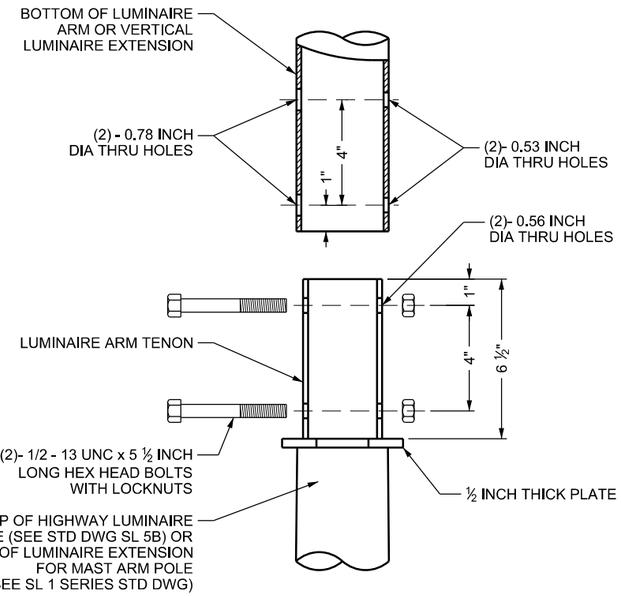


DOUBLE ELBOW LUMINAIRE ARM DETAIL

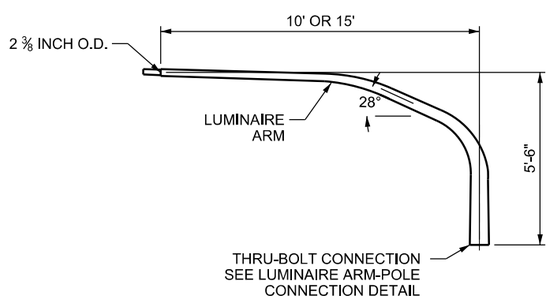


VERTICAL LUMINAIRE EXTENSION

(IN LIEU OF LUMINAIRE ARM)



LUMINAIRE ARM - POLE CONNECTION DETAIL



LUMINAIRE ARM DETAILS

NOTES:

1. LUMINAIRE ARMS, VERTICAL EXTENSION, AND RELATED HARDWARE ARE STATE FURNISHED MATERIALS.
2. ALL STEEL MATERIALS INCLUDING ANCHOR BOLTS ARE HOT-DIPPED GALVANIZED. AVOID DAMAGING THE GALVANIZED FINISH OF MATERIALS DURING TRANSPORT AND PLACEMENT. DELIVER THE STEEL TO THE POWDER COATING FACILITY THEN TO THE PROJECT SITE IF STEEL MATERIALS ARE TO BE POWDER COATED.

DESIGN-ONLY NOTES:

A. USE EITHER A TYPE A (250 WATT) OR TYPE B (400 WATT) LED. COORDINATE LED TYPE WITH REGION SIGNAL ENGINEER. LED'S ARE STATE FURNISHED MATERIALS.

B. A VERTICAL LUMINAIRE EXTENSION MAY BE USED IN LIEU OF A LUMINAIRE ARM TO AVOID OVERHEAD CONFLICTS OR AS SPECIFIED BY THE ENGINEER. A STATE FURNISHED VERTICAL LUMINAIRE ADAPTER IS REQUIRED TO INSTALL THE LED WHEN USING A VERTICAL LUMINAIRE EXTENSION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

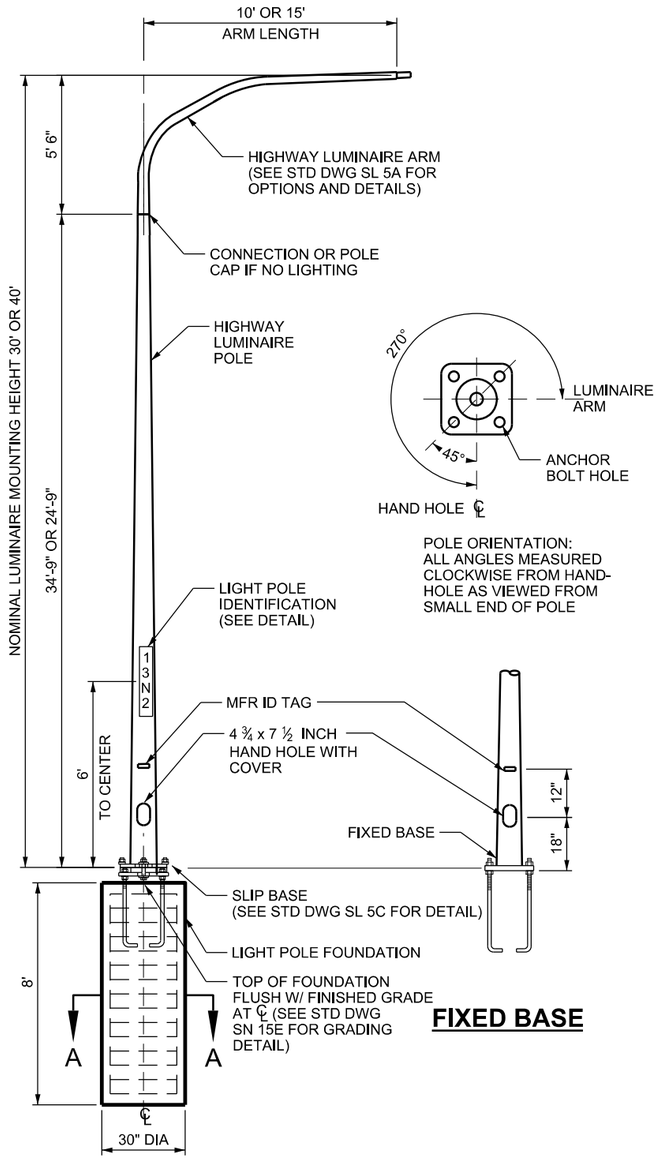
AUGUST 2020 — DATE
AUGUST 2020 — DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

HIGHWAY LUMINAIRE ARM AND VERTICAL EXTENSION
STANDARD DRAWING TITLE

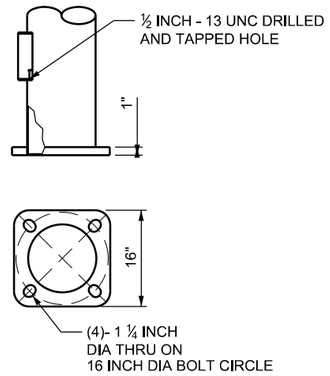
STD. DWG. NO.
SL 5A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL05A.dgn
23-JUN-2020

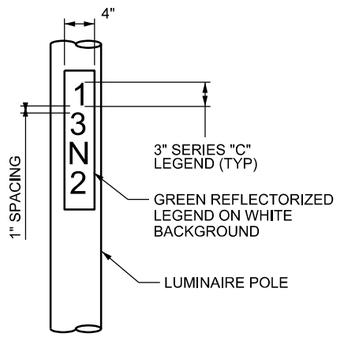


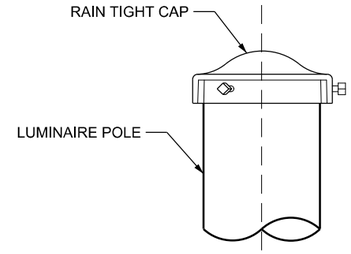
FIXED BASE

POLE ORIENTATION:
ALL ANGLES MEASURED
CLOCKWISE FROM HAND-
HOLE AS VIEWED FROM
SMALL END OF POLE

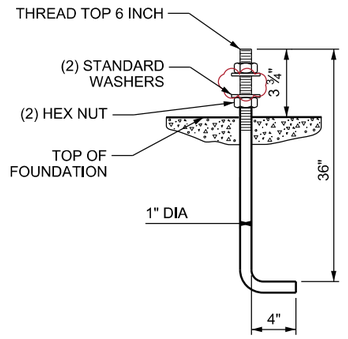


FIXED BASE PLATE DETAIL

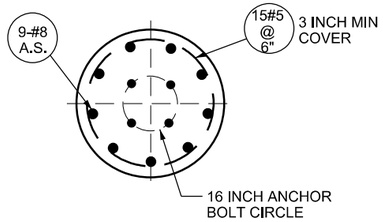




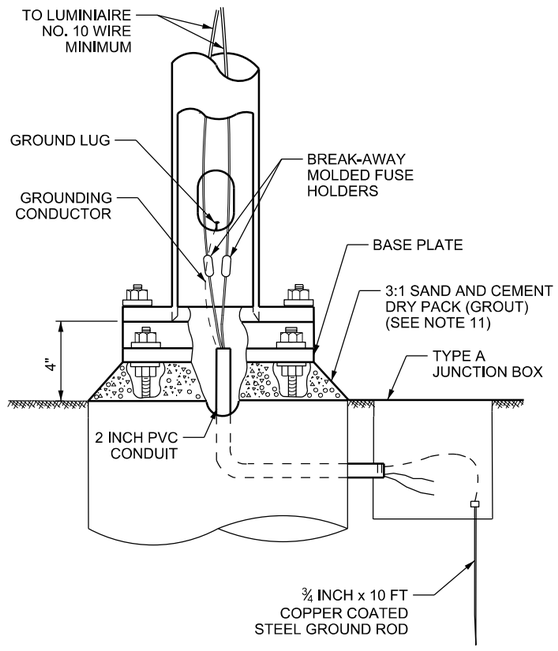
LUMINAIRE POLE CAP DETAIL



1 - INCH ANCHOR BOLT



SECTION A-A



TYPICAL ELECTRICAL CONNECTIONS

NOTES:

1. LUMINAIRE POLE ASSEMBLY CONSISTS OF A POLE, ARM, BASE, INTERNAL CONDUCTORS, IDENTIFICATION, SPLICES, MOLDED CONNECTORS, FUSE HOLDERS, ANCHOR BOLTS, HARDWARE AND SLIP BASE OR FIXED BASE.
2. LUMINAIRE POLE WITH BASE, LED HEADS, LUMINAIRE ARM OR VERTICAL ATTACHMENT, ANCHOR BOLTS, AND RELATED HARDWARE ARE STATE FURNISHED ITEMS.
3. ALL STEEL MATERIALS INCLUDING ANCHOR BOLTS ARE HOT-DIPPED GALVANIZED, AVOID DAMAGING THE GALVANIZED FINISH OF MATERIALS DURING TRANSPORT AND PLACEMENT.
4. ORIENT ALL LUMINAIRE ARMS AT RIGHT ANGLES TO THE SURVEY LINE OF ROADWAY UNLESS OTHERWISE SPECIFIED ON PLAN SHEETS. ORIENT ALL LUMINAIRE POLES SUCH THAT A TECHNICIAN FACING THE HAND HOLE WILL FACE THE ROADWAY OR ONCOMING TRAFFIC.
5. PLUMB POLE FROM THE CENTERLINE AT BASEPLATE TO THE CENTERLINE AT CONNECTION AFTER ARM EXTENSION, LUMINAIRE, AND ALL ELECTRICAL ACCESSORIES ARE IN PLACE.
6. LOCATE LUMINAIRE POLE BEHIND SIGNS WHEN THERE IS CONFLICT.
7. INSTALL RAIN TIGHT CAP ON LUMINAIRE POLE IF NO LUMINAIRE ARM OR VERTICAL LUMINAIRE ATTACHMENT WILL BE INSTALLED.
8. USE SLIP BASE ON ALL LUMINAIRE POLES EXCEPT THOSE LOCATED ON STRUCTURES OR SPECIFIED ON PLANS. SEE STD DWG SL 5C FOR SLIP BASE DETAILS.
9. USE EPOXY COATED REBAR AND CLASS AA(AE) CONCRETE FOR ALL FOUNDATIONS.
10. CAST ALL FOUNDATIONS IN PLACE AGAINST UNDISTURBED EARTH. DO NOT WELD REINFORCING STEEL.
11. INSTALL DRY PACK GROUT AFTER LUMINAIRE POLE IS PLACED IN FINAL POSITION. GROUT MAY BE PLACED VERTICALLY FLUSH WITH THE BASE PLATE OR UP TO A 45 DEGREE ANGLE.

DESIGN-ONLY NOTES:

A. THE DEPARTMENT ASSUMES RESPONSIBILITY FOR LUMINAIRE POLE AND LIGHTING WHEN TRAFFIC SIGNAL OR PEDESTRIAN EQUIPMENT IS MOUNTED TO POLE. OBTAIN APPROVAL FROM TRAFFIC AND SAFETY SIGNAL AND LIGHTING ENGINEER FOR PLACEMENT OF THIS EQUIPMENT ON LUMINAIRE POLES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

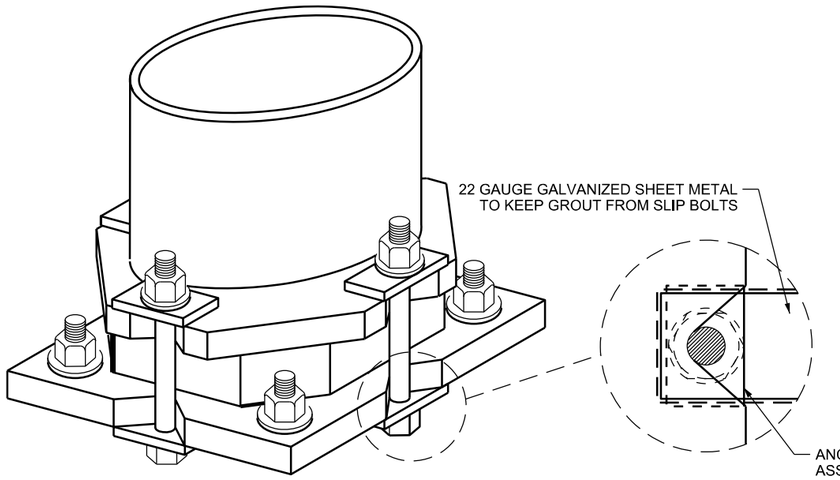
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

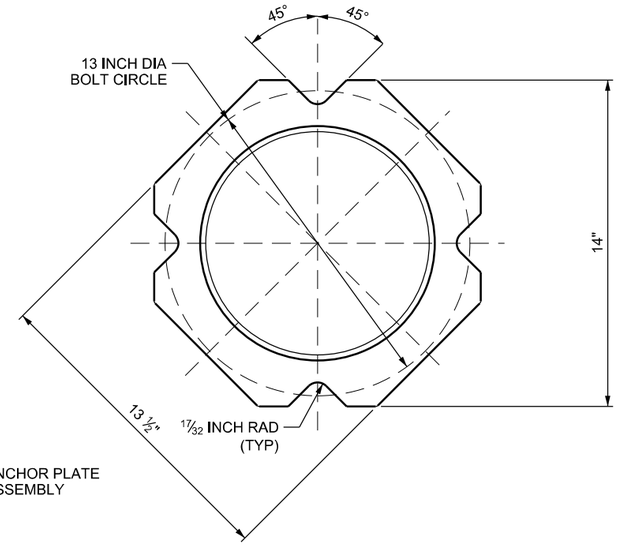
HIGHWAY LUMINAIRE GROUND MOUNTED POLE

STANDARD DRAWING TITLE

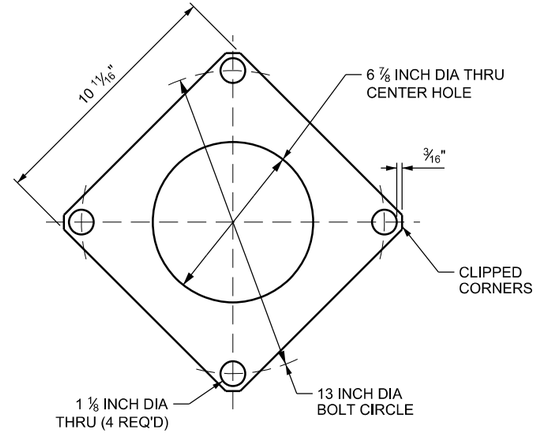
STD. DWG. NO.
SL 5B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL05B.dgn
23-JUN-2020





POLE BASE PLATE



KEEPER PLATE

(28 GAUGE STAINLESS STEEL)

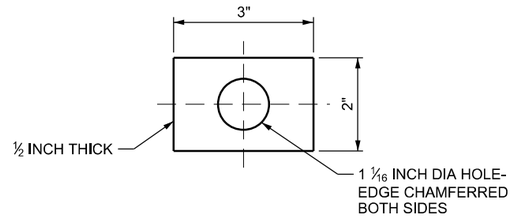
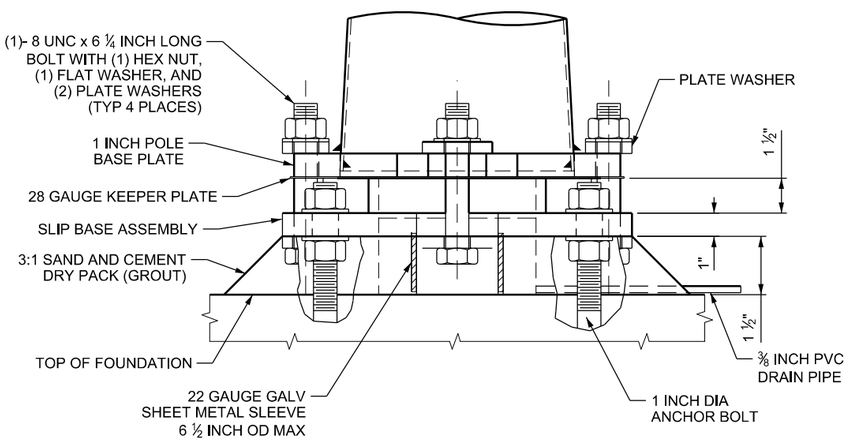
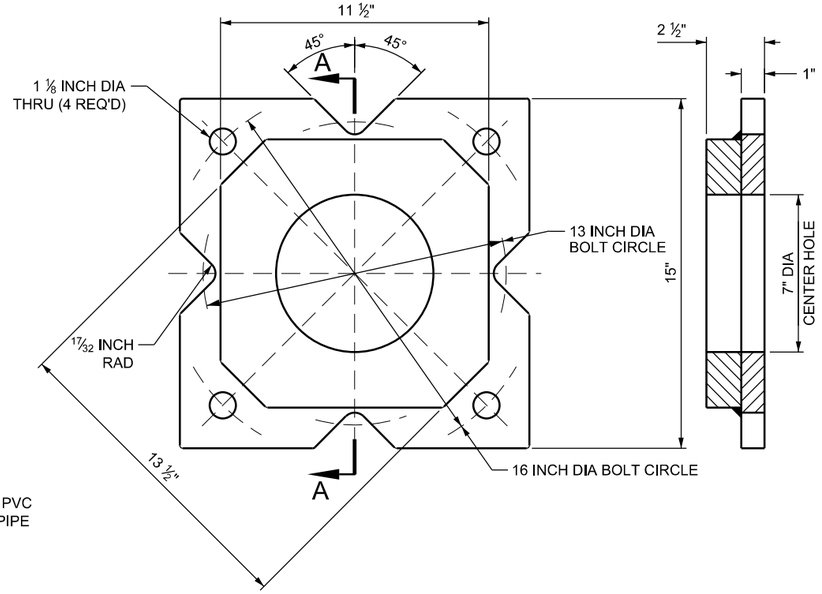


PLATE WASHER



SLIP BASE DETAIL



SLIP BASE ASSEMBLY

SECTION A-A

NOTES:

1. PLACE ANCHOR PLATE ASSEMBLY ON ANCHOR BOLT LEVELING NUTS AND SECURE IN PLACE.
2. ERECT LUMINAIRE POLE AND SECURE WITH 1 INCH DIA HIGH STRENGTH BOLTS. INSTALL BOLTS IN THE SLOTS SO THE BOLT SHANKS ARE IN CONTACT WITH THE LIGHT POLE PLATE AND ANCHOR PLATE ASSEMBLY.
3. ALL STEEL MATERIALS INCLUDING ANCHOR BOLT ARE HOT-DIPPED GALVANIZED. AVOID DAMAGING THE GALVANIZED FINISH OF MATERIALS DURING TRANSPORT AND PLACEMENT.
4. TORQUE ALL SLIP BOLTS TO 80 FT-LBS. RELEASE AND RE-TORQUE TO 70 FT-LBS.

REVISIONS				
NO.	DATE	APPR.		REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

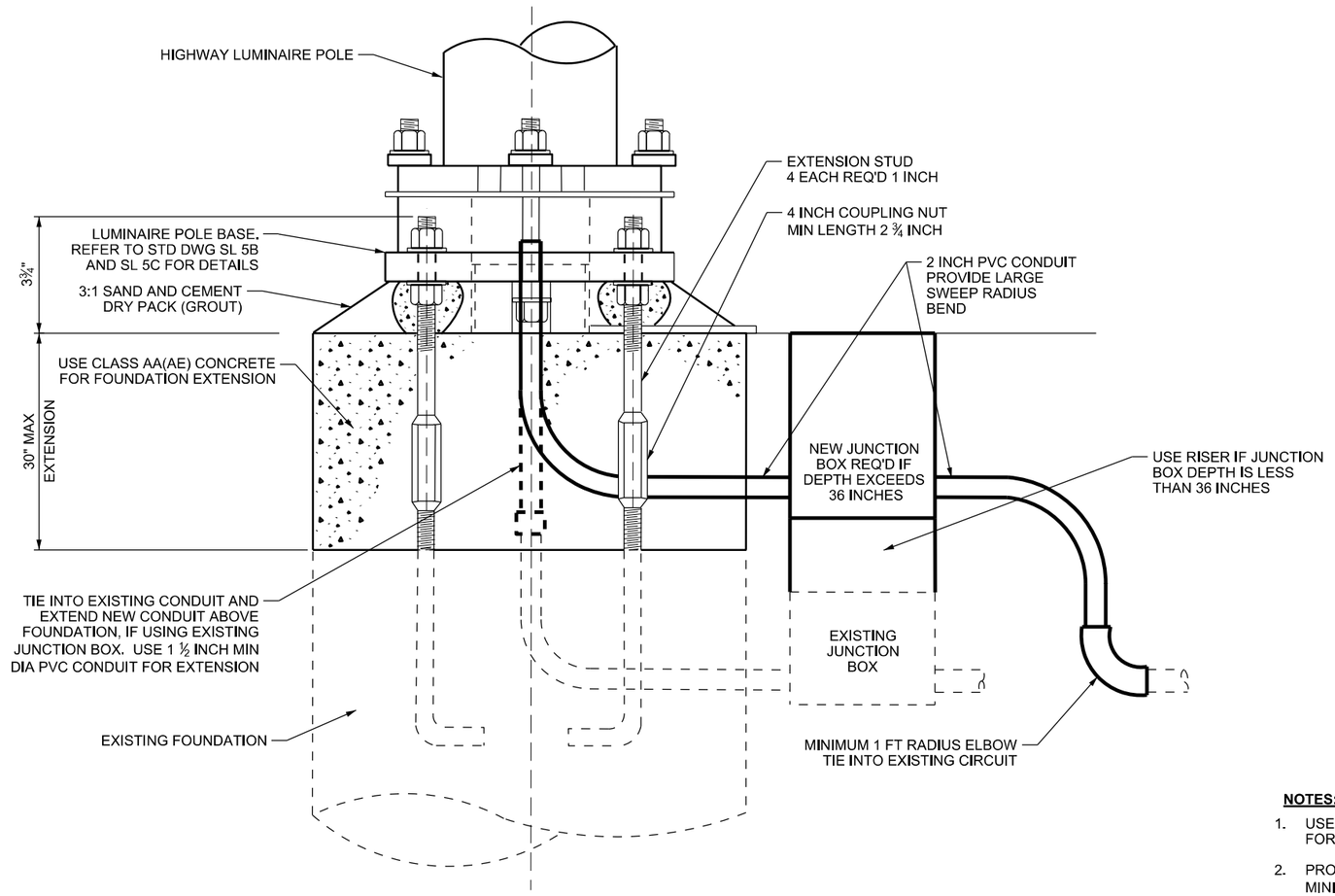
RECOMMENDED FOR APPROVAL	AUGUST 2020	DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUGUST 2020	DATE
DEPUTY DIRECTOR		

HIGHWAY LUMINAIRE
SLIP BASE DETAILS

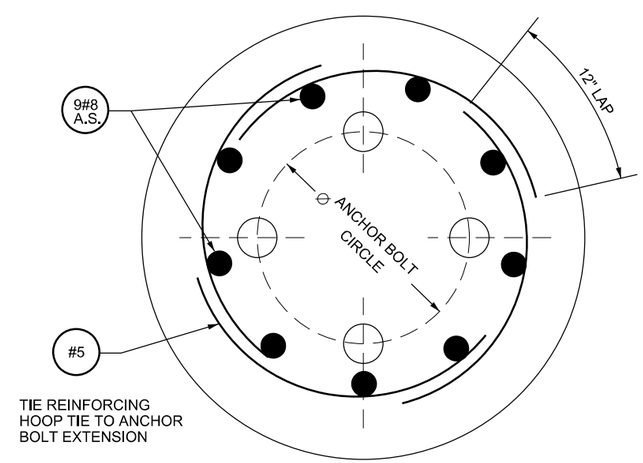
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 5C

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL05C.dgn
23-JUN-2020



FOUNDATION EXTENSION DETAIL



REINFORCEMENT DETAIL

SPACING GUIDE FOR REINFORCING STEEL HOOP TIE	
RISE IN FOUNDATION EXTENSION	NO. OF RINGS
6 INCH TO 12 INCH 12 INCH TO 30 INCH	2 3
TOP RING 3 INCH CONCRETE COVER	

NOTES:

1. USE COUPLING NUTS AND EXTENSION STUDS ON EXISTING LUMINAIRE POLE FOUNDATION FOR ANY EXTENSION HEIGHT REQUIRED.
2. PROVIDE COUPLING NUTS CONFORMING WITH ASTM A 307 SPECIFICATIONS WITH A MINIMUM LENGTH OF 2 ¾ INCH COUPLING NUTS IN ACCORDANCE WITH ASTM A 123, OR ZINC PLATED IN ACCORDANCE WITH ASTM A152.
3. USE 1 INCH DIA EXTENSION STUDS CONFORMING TO ASTM A307. GALVANIZE EXTENSION STUDS CONFORMING TO ASTM A 123 OR ZINC PLATE CONFORMING TO ASTM A 153.
4. ATTACH COUPLING NUTS TO EXISTING ANCHOR BOLTS. INSTALL EXTENSION STUDS TO PROVIDE 3 ¾ INCH PROJECTION ABOVE TOP OF NEW FOOTING. EXTEND AND PLACE CONDUIT AS SHOWN. PLACE REINFORCING STEEL AS SHOWN MEETING ASTM A 615 GRADE 60 REQUIREMENTS. DO NOT WELD REINFORCING STEEL. FORM AND CAST FOUNDATION EXTENSION WITH CLASS AA(AE) CONCRETE.
5. REINSTALL BREAKAWAY SLIP BASE PLATE BOTTOM AND SPACER PLATE ON EXTENDED ANCHOR BOLT LEVELING NUTS.
6. ERECT AND PLUMB POLE. INSTALL SLIP BOLT SHANKS IN CONTACT WITH PLATES. TORQUE SLIP BOLTS TO 80 FT-LBS. RELEASE AND RE-TORQUE TO 70 FT-LBS.
7. GROUT AFTER LUMINAIRE POLE IS SECURED IN FINAL POSITION.
8. RECONSTRUCT FOUNDATION EXTENSION TO A MAXIMUM OF 30 INCHES. USE EXISTING CONDUIT AND JUNCTION BOX. EXTEND CONDUIT AS SHOWN. ADD JUNCTION BOX RISERS TO MATCH GRADE FOR A MAXIMUM JUNCTION BOX DEPTH OF 36 INCHES. INSTALL NEW JUNCTION BOX AND CONDUIT SYSTEM AS SHOWN IF GREATER THAN 36 INCHES IN DEPTH.
9. ADJUST PULL BOXES (NOT LOCATED AT LUMINAIRE POLE) TO MATCH GRADE BY ADDING RISERS FOR A MAXIMUM JUNCTION BOX DEPTH OF 36 INCHES. INSTALL NEW JUNCTION BOX AND CONDUIT SYSTEM AS SHOWN IF GREATER THAN 36 INCHES IN DEPTH.
10. PROVIDE NEW CONDUIT LENGTH AND CONFIGURATION NECESSARY TO COUPLE THE EXISTING CONDUIT THROUGH FOUNDATION EXTENSION.
11. REMOVE ABANDONED JUNCTION BOXES, FILL HOLE WITH LOCAL MATERIAL, AND COMPACT TO MATCH ADJACENT GRADE.

REVISIONS

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STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

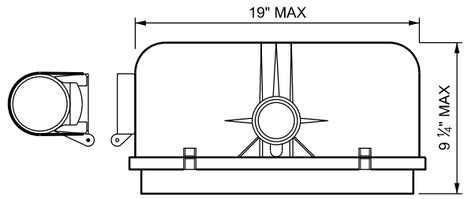
DEPUTY DIRECTOR

HIGHWAY LUMINAIRE POLE FOUNDATION EXTENSION

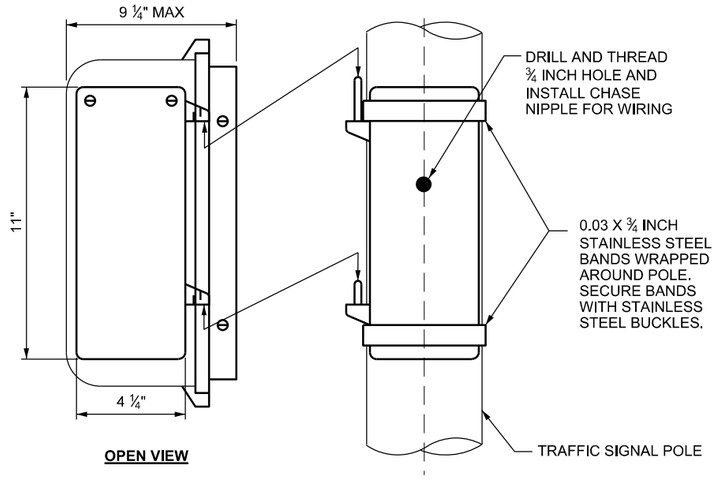
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 5D

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR, SL)\SL05D.dgn
23-JUN-2020

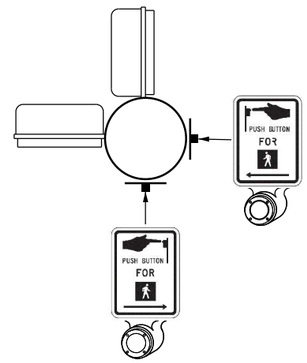


TOP VIEW



OPEN VIEW

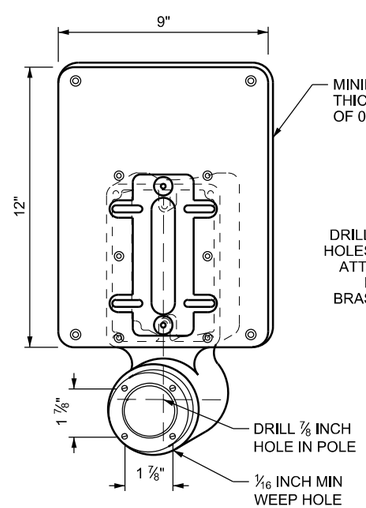
TYPICAL MOUNTING OF PEDESTRIAN SIGNAL AND PUSH BUTTON ON A SIGNAL POLE



MOUNTING OF PEDESTRIAN SIGNAL ON A SINGLE SIGNAL POLE

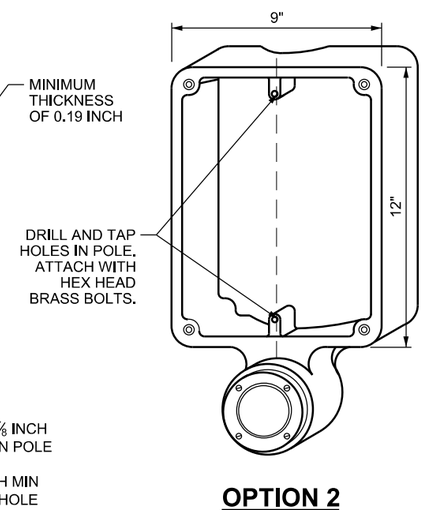
(NOTE 6)

CLAMSHELL MOUNTING HARDWARE



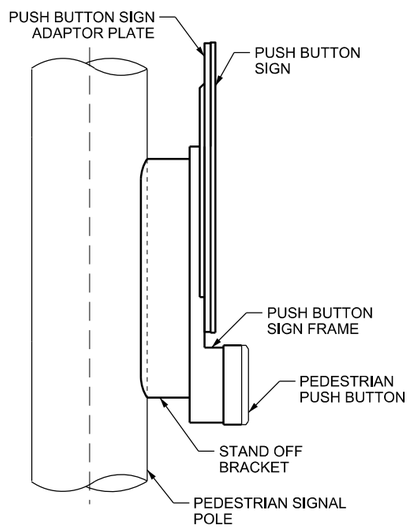
OPTION 1

FRAME TO ACCOMMODATE
5 X 7 INCH SIGN WITH ADAPTOR
PLATE FOR 9 X 12 INCH SIGN



OPTION 2

FRAME TO ACCOMMODATE
9 X 12 INCH SIGN



PUSH BUTTON FRAME STAND OFF BRACKET

(OPTION 1 SHOWN)
(NOTE 5)

NOTES

1. MOUNT PEDESTRIAN SIGNAL HEADS 9 FT 3 INCHES +/- 6 INCHES VERTICAL CLEARANCE FROM TURNING SPACE TO BOTTOM OF PEDESTRIAN SIGNAL HOUSING.
2. MOUNT PUSH BUTTONS 42 ± 2 INCHES ABOVE TURNING SPACE. MAX. HEIGHT OF 46 INCHES AND MIN. OF 36 INCHES MAY BE ALLOWED UPON APPROVAL OF THE ENGINEER.
3. MOUNT PUSH BUTTON 10 INCHES OR LESS FROM EDGE OF A TURNING SPACE COMPLIANT AREA PER STANDARD DRAWING PA SERIES. MAXIMUM DISTANCE OF 18 INCHES MAY BE ALLOWED UPON APPROVAL OF THE ENGINEER.
4. INSTALL PUSH BUTTONS AND PEDESTRIAN SIGNAL HEADS PARALLEL TO CROSSWALKS.
5. PROVIDE FRAME STANDOFF BRACKETS WHEN MOUNTING TWO SIGN FRAMES TO ONE PEDESTRIAN POLE.
6. PROVIDE DOUBLE SIDED (R10-3L, R10-3R) SIGN ON OPPOSITE FACES. POINT ARROW ON SIGN IN DIRECTION PEDESTRIAN WILL PROCEED ACROSS ROADWAY.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	6/27/19	JS	REMOVED SIGN DETAIL, REVISED NOTES, ADDED PLACEMENT DETAIL
1	2/22/18	JS	UPDATED NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 — DATE

DEPUTY DIRECTOR

PEDESTRIAN SIGNAL ASSEMBLY

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6A

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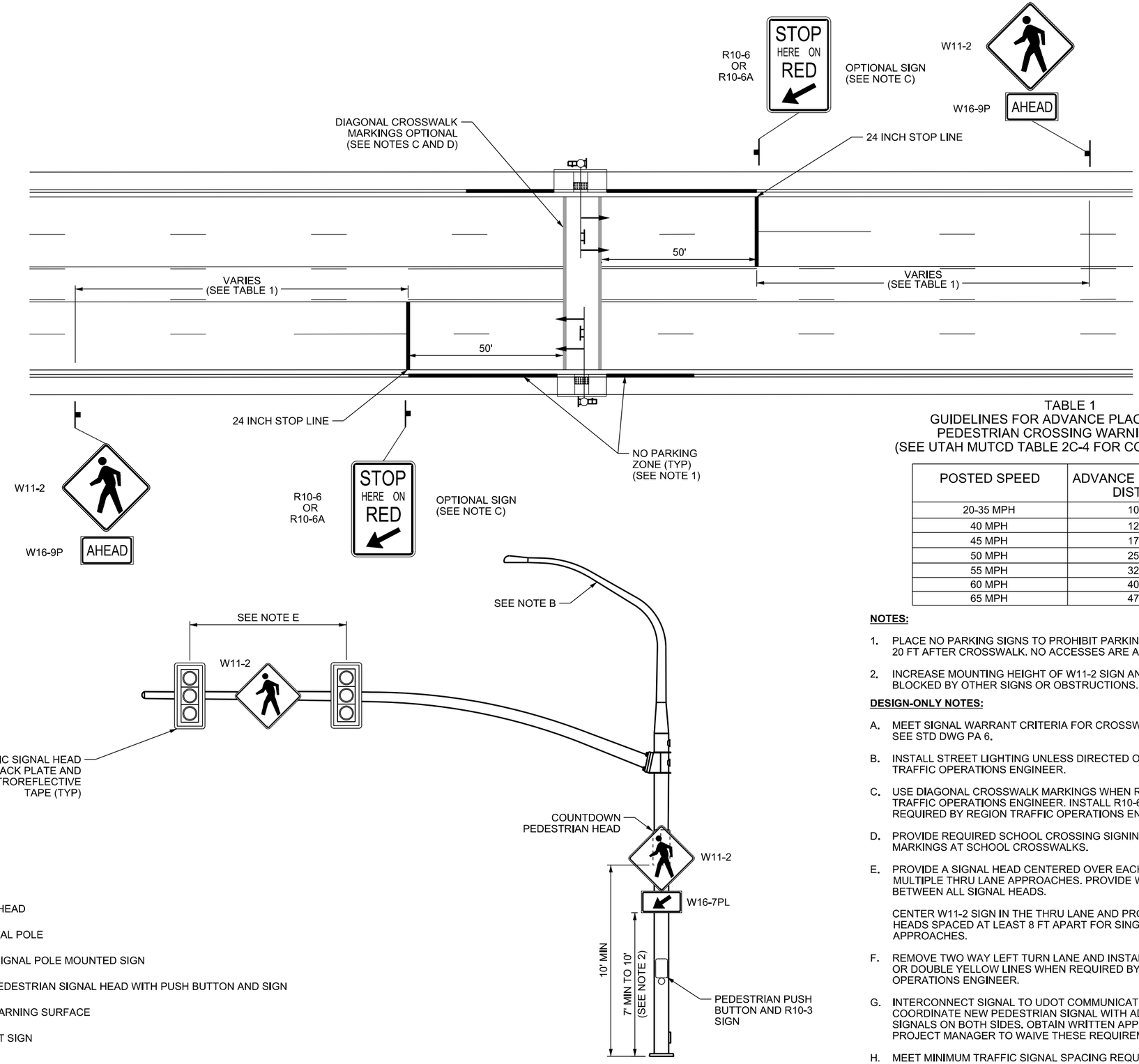
23-JUN-2020



LEGEND

- TYPE 1 SIGNAL HEAD
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH PUSH BUTTON AND SIGN
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN

TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF
PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH	125 FT
45 MPH	175 FT
50 MPH	250 FT
55 MPH	325 FT
60 MPH	400 FT
65 MPH	475 FT

NOTES:

1. PLACE NO PARKING SIGNS TO PROHIBIT PARKING 50 FT BEFORE AND 20 FT AFTER CROSSWALK. NO ACCESSES ARE ALLOWED IN THIS AREA.
2. INCREASE MOUNTING HEIGHT OF W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS.

DESIGN-ONLY NOTES:

A. MEET SIGNAL WARRANT CRITERIA FOR CROSSWALK INSTALLATION. SEE STD DWG PA 6.

B. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

C. USE DIAGONAL CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER. INSTALL R10-6 OR R10-6A SIGNS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

D. PROVIDE REQUIRED SCHOOL CROSSING SIGNING AND PAVEMENT MARKINGS AT SCHOOL CROSSWALKS.

E. PROVIDE A SIGNAL HEAD CENTERED OVER EACH THRU LANE FOR MULTIPLE THRU LANE APPROACHES. PROVIDE W11-2 SIGN CENTERED BETWEEN ALL SIGNAL HEADS.

CENTER W11-2 SIGN IN THE THRU LANE AND PROVIDE TWO SIGNAL HEADS SPACED AT LEAST 8 FT APART FOR SINGLE THRU LANE APPROACHES.

F. REMOVE TWO WAY LEFT TURN LANE AND INSTALL A RAISED MEDIAN OR DOUBLE YELLOW LINES WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

G. INTERCONNECT SIGNAL TO UDOT COMMUNICATIONS NETWORK. COORDINATE NEW PEDESTRIAN SIGNAL WITH ADJACENT TRAFFIC SIGNALS ON BOTH SIDES. OBTAIN WRITTEN APPROVAL FROM ATMS PROJECT MANAGER TO WAIVE THESE REQUIREMENTS.

H. MEET MINIMUM TRAFFIC SIGNAL SPACING REQUIREMENTS.

I. FOLLOW SIGNALIZED INTERSECTION DESIGN GUIDELINES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR
DATE

PEDESTRIAN SIGNAL CROSSWALK

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6B

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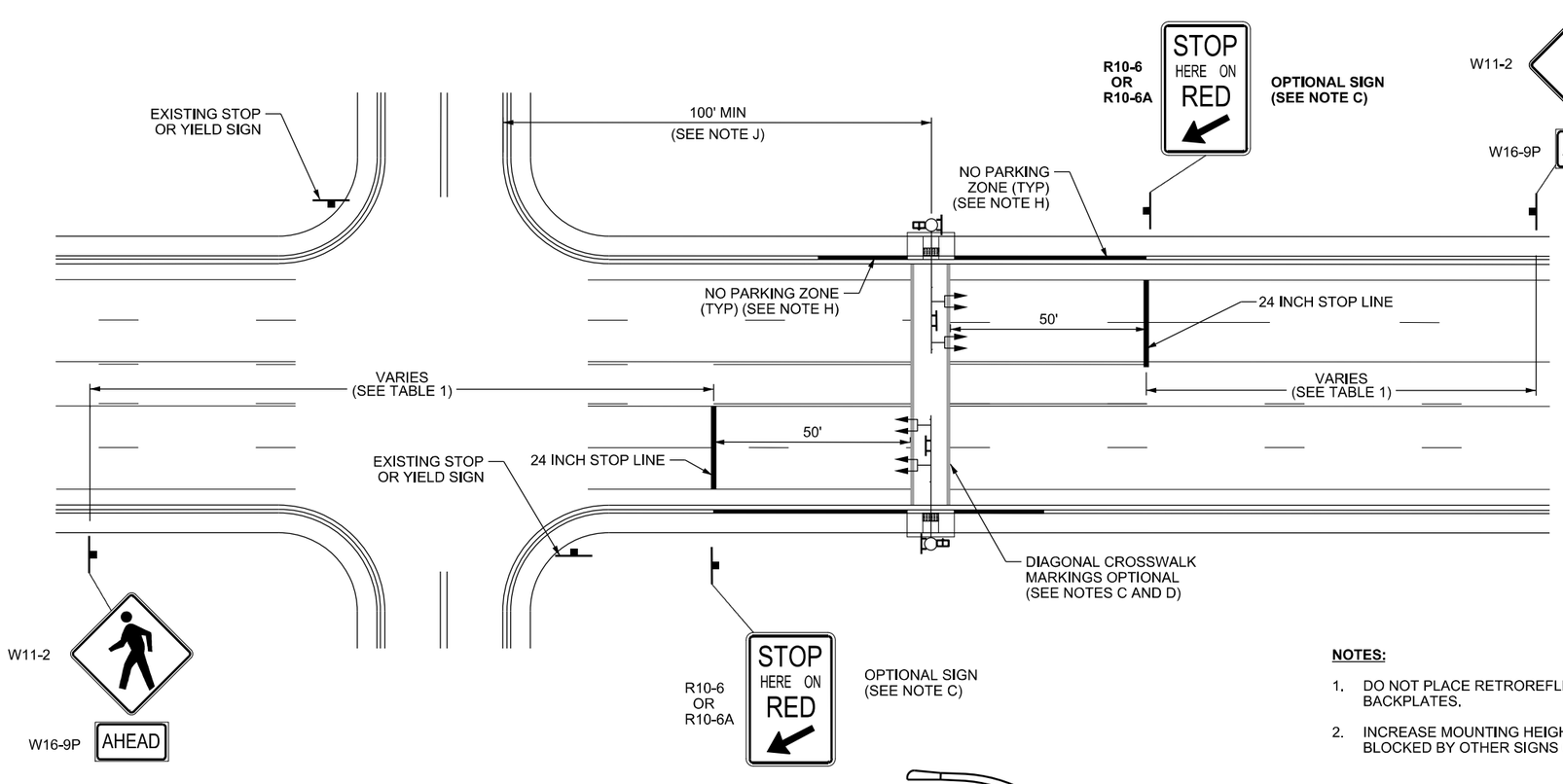


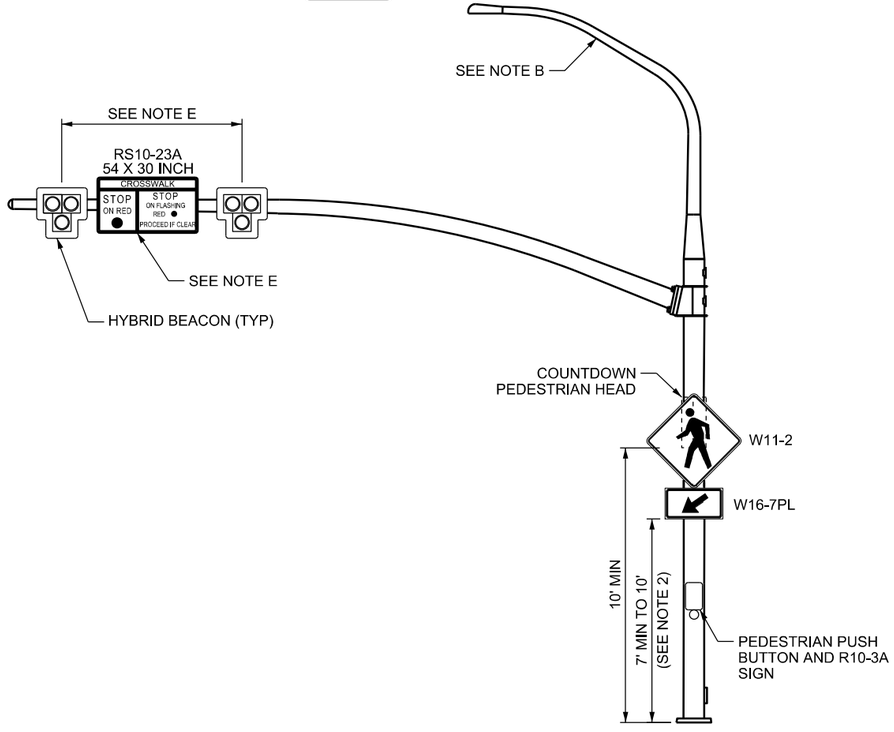


TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	MINIMUM ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH	125 FT
45 MPH	175 FT
50 MPH	250 FT
55 MPH	325 FT
60 MPH	400 FT
65 MPH	475 FT

LEGEND

- 12" DIAMETER HYBRID BEACON
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH PUSH BUTTON AND SIGN
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON HYBRID BEACON BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS.

DESIGN-ONLY NOTES:

A. MEET PEDESTRIAN HYBRID BEACON SIGNAL GUIDELINES. SEE STD DWG PA 6.

B. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

C. USE DIAGONAL CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER. INSTALL R10-6 OR R10-6A SIGNS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

D. PROVIDE REQUIRED SCHOOL CROSSING SIGNING AND PAVEMENT MARKINGS AT SCHOOL CROSSWALKS.

E. CENTER HYBRID BEACON IN EACH THRU LANE. PROVIDE RS10-23A SIGN CENTERED BETWEEN ALL HYBRID BEACONS. FOR SINGLE THRU LANE APPROACHES, CENTER RS10-23A SIGN IN THE LANE AND SPACE HYBRID BEACONS AT LEAST 10 FT APART.

F. REMOVE TWO WAY LEFT TURN LANE AND INSTALL A RAISED MEDIAN OR DOUBLE YELLOW LINES WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

G. INTERCONNECT SIGNAL TO UDOT COMMUNICATIONS NETWORK. COORDINATE NEW PEDESTRIAN HYBRID BEACON WITH ADJACENT TRAFFIC SIGNALS ON BOTH SIDES. OBTAIN WRITTEN APPROVAL FROM ATMS PROJECT MANAGER TO WAIVE THESE REQUIREMENTS.

H. PLACE NO PARKING SIGNS TO PROHIBIT PARKING 50 FT BEFORE AND 20 FT AFTER CROSSWALK. NO ACCESSES ARE ALLOWED IN THIS AREA.

I. MEET MINIMUM TRAFFIC SIGNAL SPACING REQUIREMENTS.

J. INSTALL THE PEDESTRIAN HYBRID BEACON AT LEAST 100 FT FROM SIDE STREETS AND DRIVEWAYS THAT ARE CONTROLLED BY STOP OR YIELD SIGNS. DO NOT INSTALL IN LEFT TURN LANE, STORAGE, GAP, OR DECELERATION AREAS. DO NOT INSTALL IN POTENTIAL FUTURE LEFT TURN LANE IF CURRENTLY MARKED AS A TWO WAY LEFT TURN LANE.

K. PLACE HYBRID BEACON ASSEMBLIES ON A SINGLE OR TWO SEPARATE MAST ARMS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

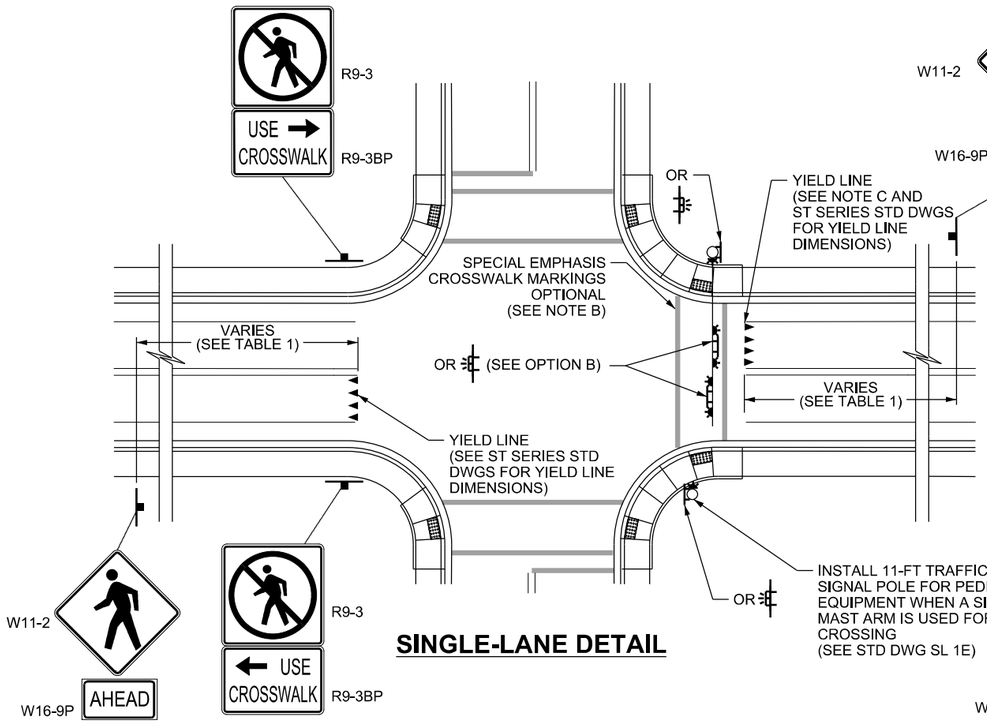
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

PEDESTRIAN HYBRID BEACON CROSSWALK (HAWK)

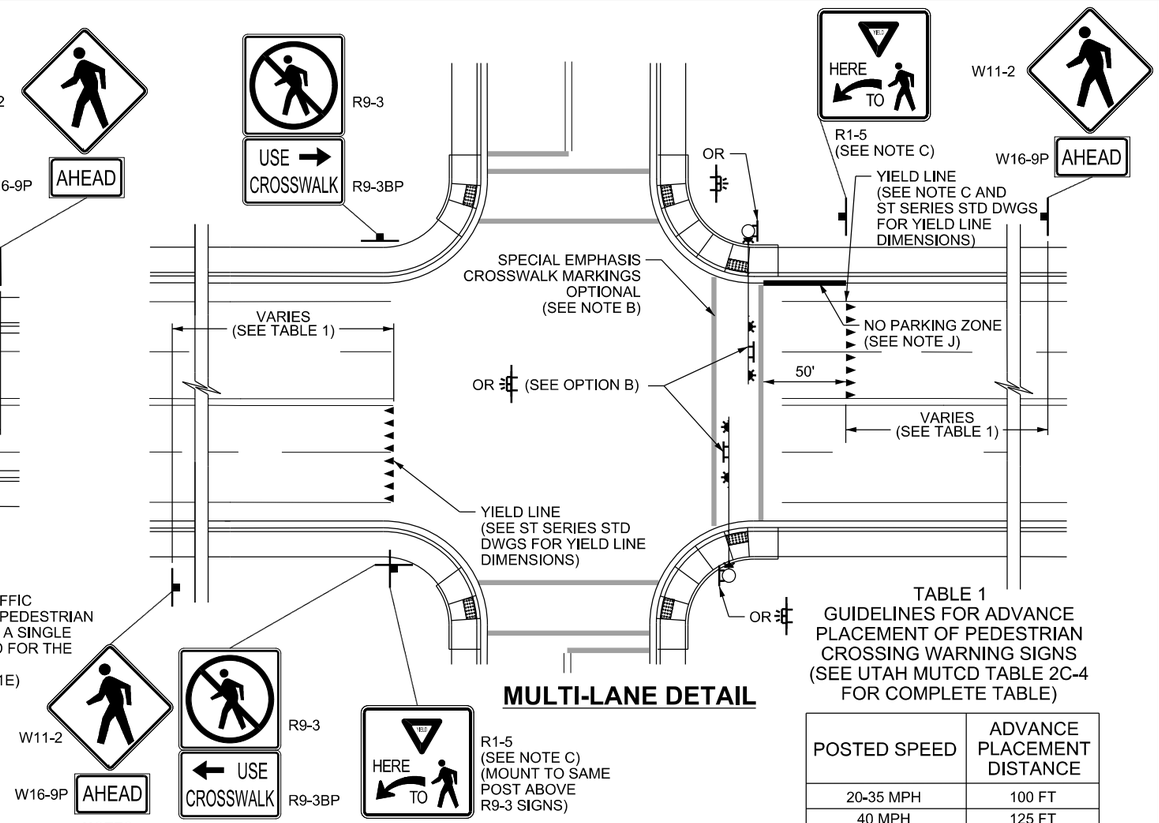
STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6C

DGN File: L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 7 (RR_SL\SL06C.dgn
23-JUN-2020



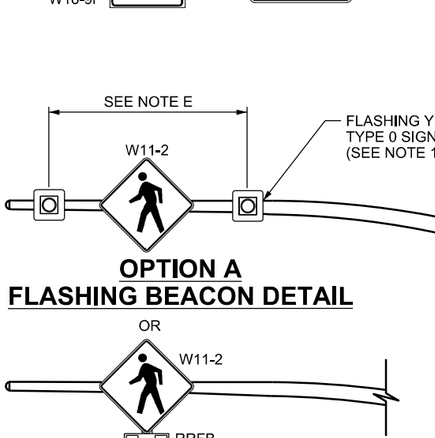
SINGLE-LANE DETAIL



MULTI-LANE DETAIL

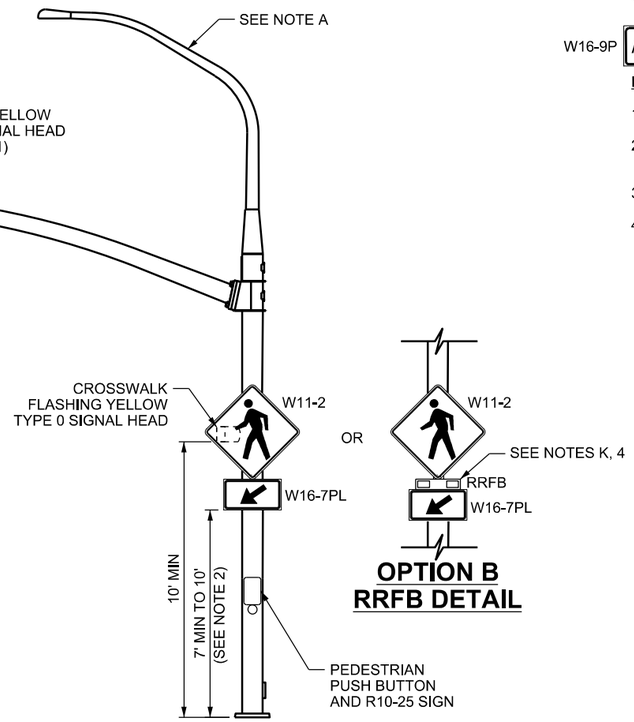
TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH	125 FT
45 MPH	175 FT



OPTION A
FLASHING BEACON DETAIL

OPTION B
RRFB DETAIL



OPTION A
FLASHING BEACON DETAIL

OPTION B
RRFB DETAIL

LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION B

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF POLE-MOUNTED W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10 FT MOUNTING HEIGHT TO BOTTOM OF W16-7PL PLAQUE IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING BY R1-5 SIGN.
3. INSTALL RRFB TO MAST ARM USING THE CLAMP ASSEMBLY AS SHOWN ON SL 3D. EXTEND TUBE BELOW W11-2 SIGN TO INSTALL RRFB.
4. INSTALL RRFB WITH INTEGRATED PEDESTRIAN CONFIRMATION PILOT LIGHT.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE SPECIAL EMPHASIS CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER. SEE ST SERIES STD DWGS.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK AT INTERSECTIONS ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. PROVIDE A TYPE 0 SIGNAL HEAD CENTERED OVER EACH THRU LANE, FOR MULTIPLE THRU LANE APPROACHES. PROVIDE W11-2 SIGNS CENTERED BETWEEN ALL TYPE 0 SIGNAL HEADS.

CENTER W11-2 SIGN IN THE THRU LANE AND PROVIDE TWO TYPE 0 SIGNAL HEADS SPACED AT LEAST 8 FT APART, FOR SINGLE THRU LANE APPROACHES.

F. DO NOT INSTALL FLASHING BEACON CROSSWALK ON ROADWAYS WITH POSTED SPEEDS GREATER THAN 45 MPH UNLESS DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

G. PLACE FLASHING BEACON ASSEMBLIES ON A SINGLE OR TWO SEPARATE MAST ARMS.

H. DO NOT INSTALL FLASHING BEACON CROSSWALK IN A REDUCED SPEED SCHOOL ZONE.

I. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

J. PLACE "NO PARKING" SIGNS TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK. NO ACCESSES ARE ALLOWED IN THIS AREA.

K. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECTANGULAR RAPID FLASHING BEACON (RRFB).

L. RRFB CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

M. DO NOT MIX FLASHING BEACON TYPES (OPTION A AND OPTION B) AT A CROSSWALK.

N. LOCATE RRFB AND SIGN ON MAST ARM CENTERED OVER THE TRAVEL LANES.

NO.	DATE	APPR.	REVISIONS	REMARKS
1	8/29/2019	JS	ADDED RRFB OPTION FOR OVERHEAD. ADDED RRFB NOTES.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

OVERHEAD FLASHING BEACON AT AN INTERSECTION CROSSWALK

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6D

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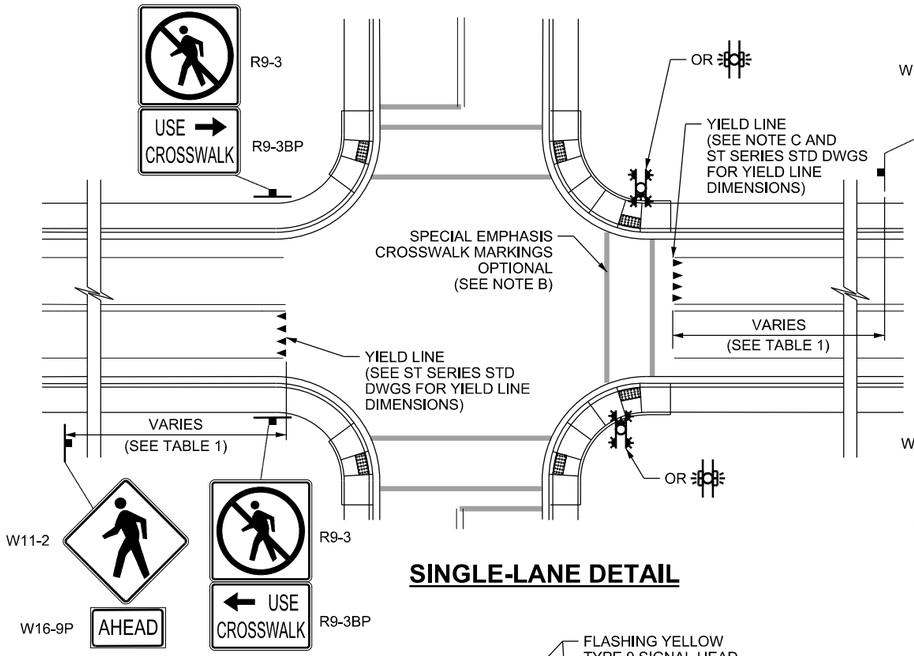
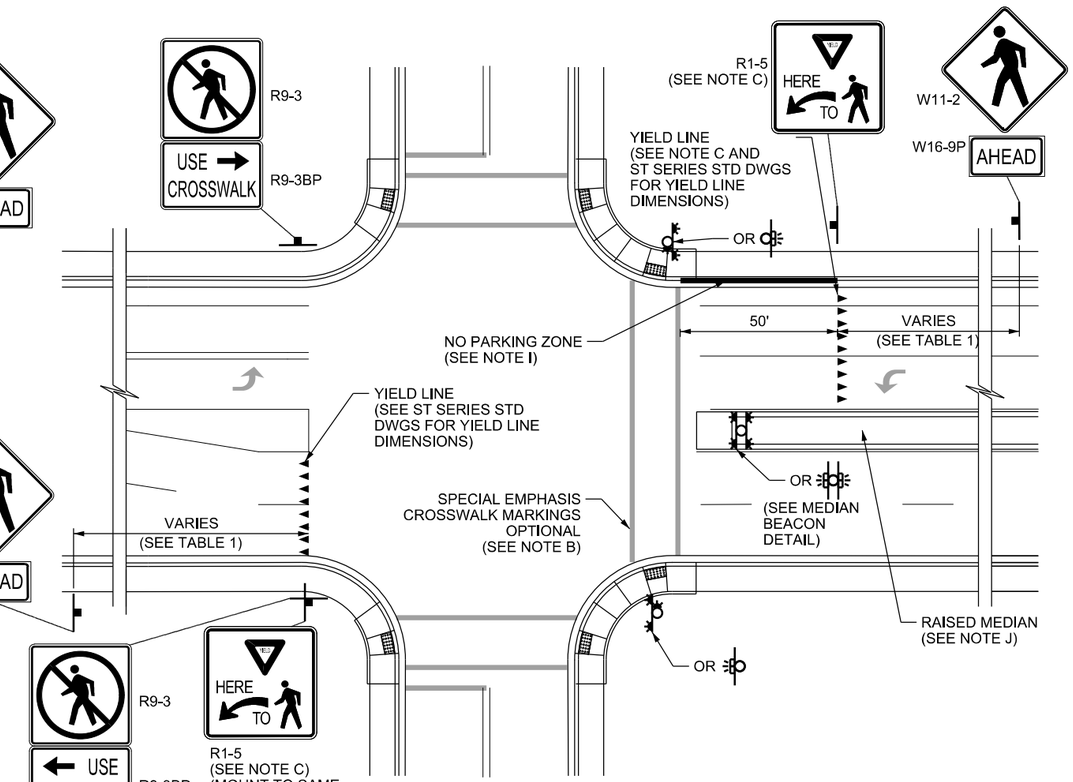


SINGLE-LANE DETAIL



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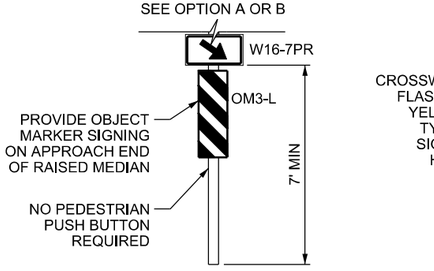
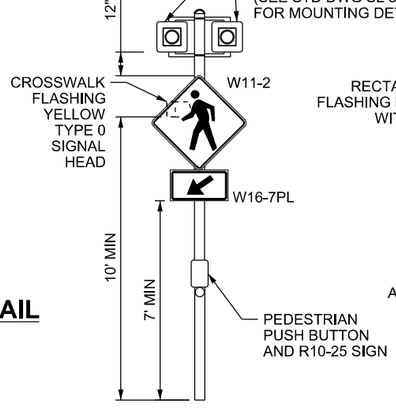


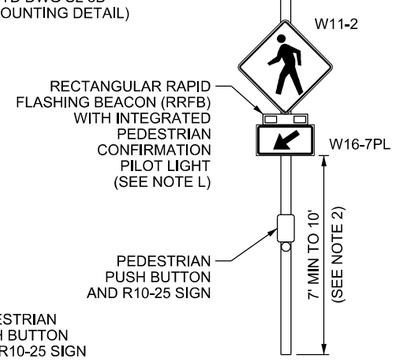
MEDIAN BEACON DETAIL

15 FT TRAFFIC SIGNAL
POLE / LUMINAIRE POLE
(SEE NOTES A, J, K, AND
STD DWG SL 1E)



OPTION A
FLASHING BEACON DETAIL

15 FT TRAFFIC
SIGNAL POLE / LUMINAIRE POLE
(SEE NOTES A, H AND
STD DWG SL 1E)



OPTION B
RRFB DETAIL

15 FT TRAFFIC
SIGNAL POLE / LUMINAIRE POLE
(SEE NOTES A, H, AND
STD DWG SL 1E)

LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION A: BACK-TO-BACK (SEE NOTE K)
- OPTION B
- OPTION B: BACK-TO-BACK (SEE NOTE K)

TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF
PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH (SEE NOTE E)	125 FT

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10-FT TO BOTTOM OF SIGN MOUNTING HEIGHT FOR OPTION B ON OUTSIDE SHOULDER IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING FROM R1-5 SIGN.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE SPECIAL EMPHASIS CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER. SEE ST SERIES STD DWGS.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK AT INTERSECTIONS ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. DO NOT USE POST-MOUNTED FLASHING BEACON CROSSWALK WHEN POSTED SPEED EXCEEDS 35 MPH UNLESS OTHERWISE DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

F. DO NOT INSTALL FLASHING BEACON CROSSWALK WITHIN A REDUCED SPEED SCHOOL ZONE.

G. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

H. DO NOT INSTALL POST-MOUNTED FLASHING BEACONS WHERE THERE ARE FOUR OR MORE LANES, INCLUDING TURNING LANES, IN ONE DIRECTION.

I. PLACE "NO PARKING" SIGNS TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK. NO ACCESSES ARE ALLOWED IN THIS AREA.

J. RAISED MEDIAN CONFIGURATION DETERMINED BY LOCATION NEEDS. SEE GW SERIES STD DWGS. MEET LATERAL OFFSET REQUIREMENTS.

K. BACK-TO-BACK CONSISTS OF W11-2 AND W16-7PL SIGNS AND FLASHING BEACONS FACING OPPOSITE DIRECTIONS MOUNTED ON THE SAME POLE.

L. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECTANGULAR RAPID FLASHING BEACON.

M. RECTANGULAR RAPID FLASHING BEACON CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

N. DO NOT MIX POST-MOUNTED BEACON TYPES AT A CROSSWALK.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	JS	UPDATED NOTES, CALLOUTS AND GRAPHICS. DELETED RRFB FROM STD DWGS.
2	8/30/18	JS	ADDED RRFB OPTION, CHANGED SINGLE LANE DETAIL TO HAVE OPTION A BACK-TO-BACK.
3	8/29/19	MRB	UPDATED REFERENCES FOR THE ST SERIES STANDARD DRAWINGS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 DATE

DEPUTY DIRECTOR

POST-MOUNTED FLASHING BEACON AT AN INTERSECTION CROSSWALK

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6E

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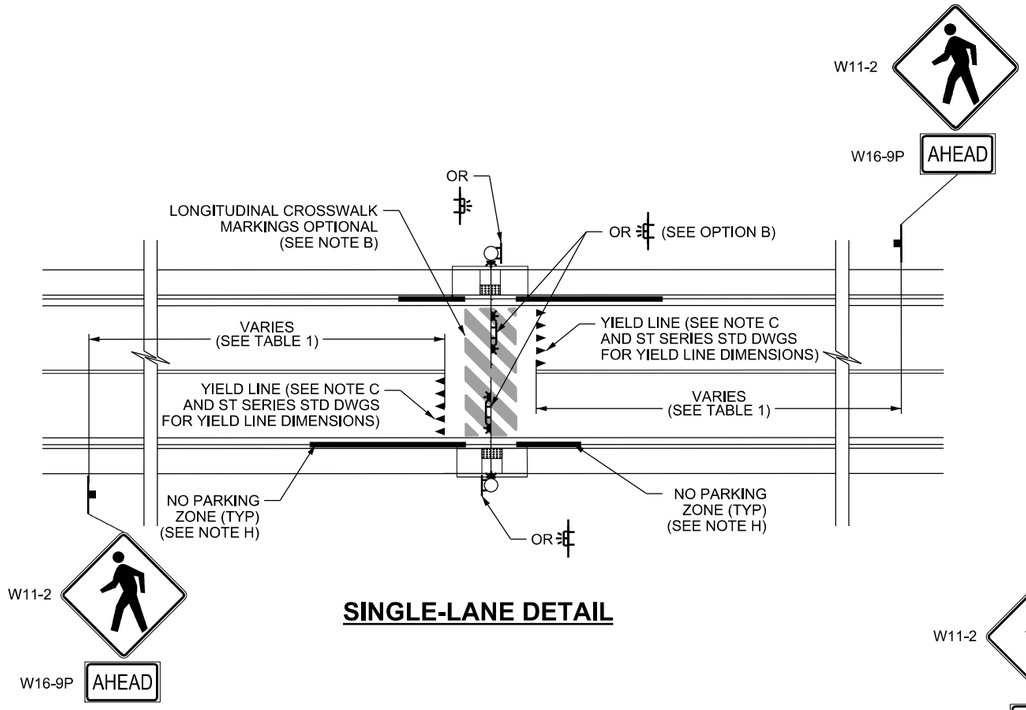
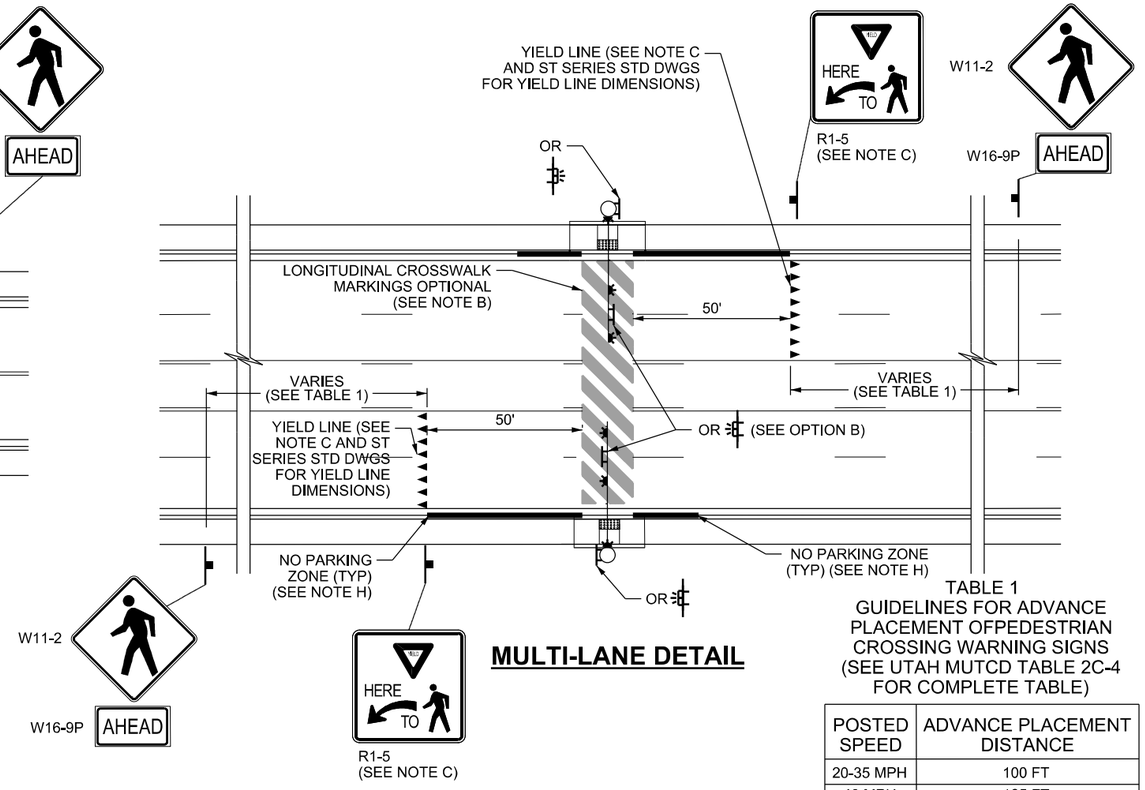
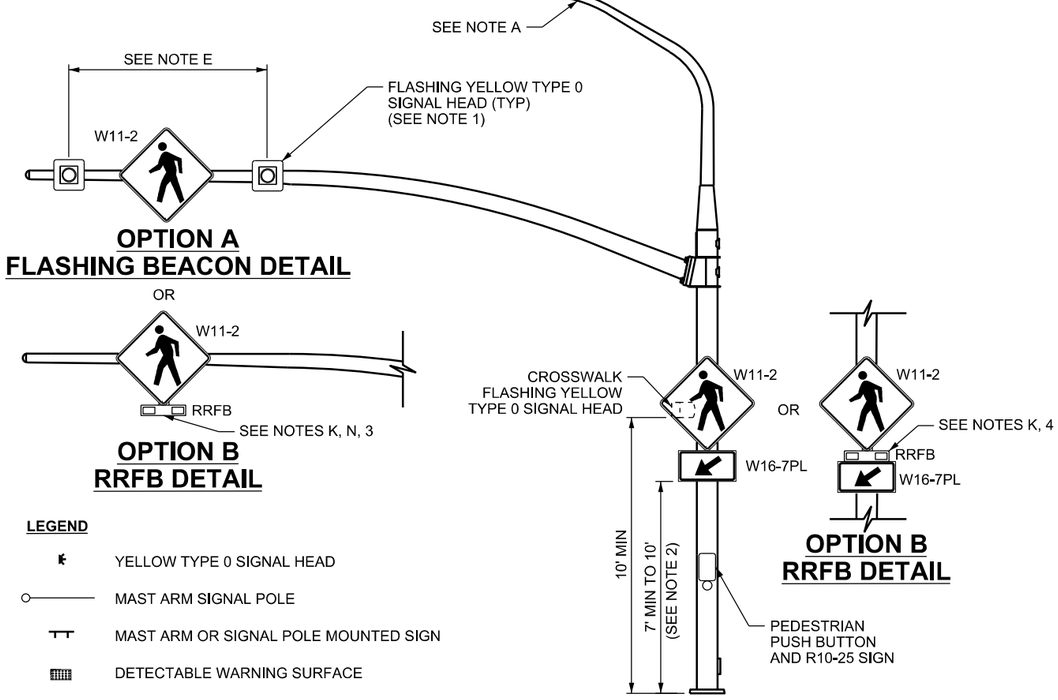


SINGLE-LANE DETAIL



MULTI-LANE DETAIL



LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION B

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF POLE-MOUNTED W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10 FT MOUNTING HEIGHT TO BOTTOM OF W16-7PL PLAQUE IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING BY R1-5 SIGN.
3. INSTALL RRFB TO MAST ARM USING THE CLAMP ASSEMBLY AS SHOWN ON SL 3D. EXTEND TUBE BELOW W11-2 SIGN TO INSTALL RRFB.
4. INSTALL RRFB WITH INTEGRATED PEDESTRIAN CONFIRMATION PILOT LIGHT.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE LONGITUDINAL CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. PROVIDE A TYPE 0 SIGNAL HEAD CENTERED OVER EACH THRU LANE, FOR MULTIPLE THRU LANE APPROACHES. PROVIDE W11-2 SIGNS CENTERED BETWEEN ALL TYPE 0 SIGNAL HEADS.

CENTER W11-2 SIGN IN THE THRU LANE AND PROVIDE TWO TYPE 0 SIGNAL HEADS SPACED AT LEAST 8 FT APART, FOR SINGLE THRU LANE APPROACHES.

F. DO NOT INSTALL FLASHING BEACON CROSSWALK ON ROADWAYS WITH POSTED SPEEDS GREATER THAN 45 MPH UNLESS DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

G. PLACE FLASHING BEACON ASSEMBLIES ON A SINGLE OR TWO SEPARATE MAST ARMS.

H. PLACE "NO PARKING SIGNS" TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK AND 20 FT AFTER CROSSWALK FOR EACH APPROACH. NO ACCESSES ARE ALLOWED IN THIS AREA.

I. DO NOT INSTALL FLASHING BEACON CROSSWALK WITHIN A REDUCED SPEED SCHOOL ZONE.

J. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

K. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECANGULAR RAPID FLASHING BEACON (RRFB).

L. RRFB CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

M. DO NOT MIX FLASHING BEACON TYPES (OPTION A AND OPTION B) AT A CROSSWALK.

N. LOCATE RRFB AND SIGN ON MAST ARM CENTERED OVER THE TRAVEL LANES.

TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OFPEDESTRIAN CROSSING WARNING SIGNS (SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH	125 FT
45 MPH	175 FT

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/2019	JS	ADDED RRFB OPTION FOR OVERHEAD. ADDED RRFB NOTES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

OVERHEAD FLASHING BEACON AT A MIDBLOCK CROSSWALK

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 6F

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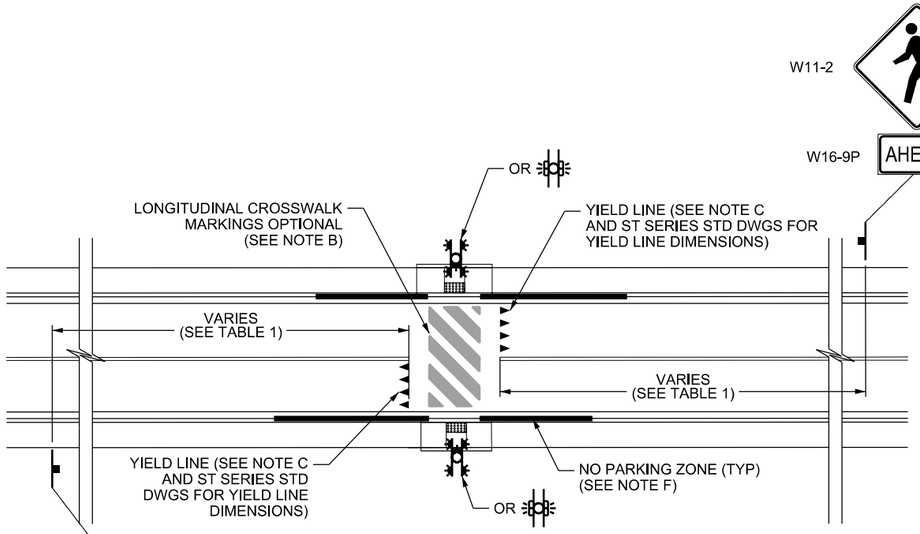
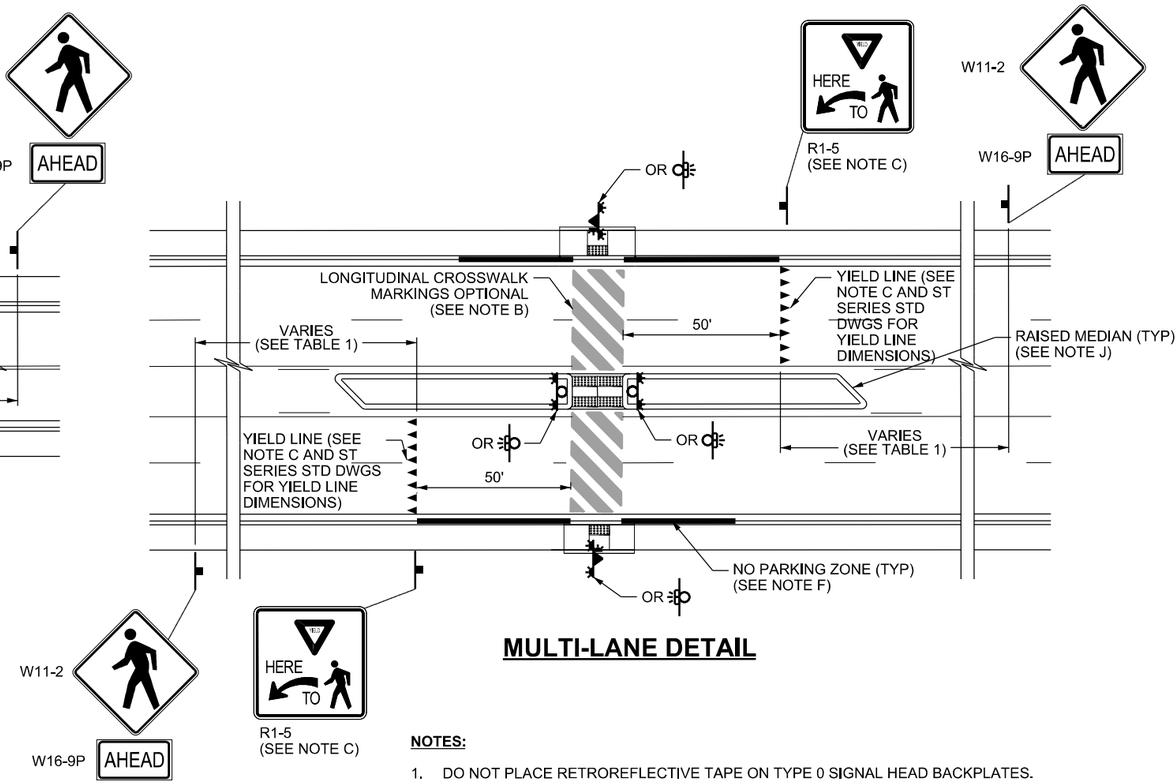
23-JUN-2020



SINGLE-LANE DETAIL



MULTI-LANE DETAIL

TABLE 1
GUIDELINES FOR ADVANCE PLACEMENT OF PEDESTRIAN CROSSING WARNING SIGNS
(SEE UTAH MUTCD TABLE 2C-4 FOR COMPLETE TABLE)

POSTED SPEED	ADVANCE PLACEMENT DISTANCE
20-35 MPH	100 FT
40 MPH (SEE NOTE E)	125 FT

NOTES:

1. DO NOT PLACE RETROREFLECTIVE TAPE ON TYPE 0 SIGNAL HEAD BACKPLATES.
2. INCREASE MOUNTING HEIGHT OF W11-2 SIGN AND W16-7PL PLAQUE IF BLOCKED BY OTHER SIGNS OR OBSTRUCTIONS. USE A 10-FT TO BOTTOM OF SIGN MOUNTING HEIGHT FOR OPTION B ON OUTSIDE SHOULDER IN MULTI-LANE SITUATIONS TO PREVENT VISUAL BLOCKING FROM R1-5 SIGN.

DESIGN-ONLY NOTES:

A. INSTALL STREET LIGHTING UNLESS DIRECTED OTHERWISE BY REGION TRAFFIC OPERATIONS ENGINEER.

B. USE LONGITUDINAL CROSSWALK MARKINGS WHEN REQUIRED BY REGION TRAFFIC OPERATIONS ENGINEER.

C. PLACE YIELD LINE 4 FT FROM CROSSWALK ON SINGLE-LANE APPROACHES OR 50 FT FOR MULTI-LANE APPROACHES. USE "YIELD HERE TO PEDESTRIANS" R1-5 SIGN FOR MULTI-LANE APPROACHES.

D. REFER TO UTAH MUTCD PART 7 FOR REQUIREMENTS AT SCHOOL CROSSINGS.

E. DO NOT USE POST-MOUNTED FLASHING BEACON CROSSWALK WHEN POSTED SPEED EXCEEDS 35 MPH UNLESS OTHERWISE DIRECTED BY REGION TRAFFIC OPERATIONS ENGINEER.

F. PLACE "NO PARKING" SIGNS TO PROHIBIT PARKING 50 FT BEFORE CROSSWALK AND 20 FT AFTER CROSSWALK FOR EACH APPROACH. NO ACCESSES ARE ALLOWED IN THIS AREA.

G. A MULTI-LANE APPROACH HAS TWO OR MORE LANES MOVING TOWARD THE INTERSECTION, INCLUDING TURNING LANES.

H. DO NOT INSTALL FLASHING BEACON CROSSWALK WITHIN A REDUCED SPEED SCHOOL ZONE.

I. DO NOT INSTALL POST-MOUNTED FLASHING BEACONS WHERE THERE ARE FOUR OR MORE LANES, INCLUDING TURNING LANES, IN ONE DIRECTION.

J. RAISED MEDIAN DIMENSIONS DETERMINED BY LOCATION NEEDS. SEE GW SERIES STD DWGS. MEET LATERAL OFFSET REQUIREMENTS.

K. BACK-TO-BACK CONSISTS OF W11-2 AND W16-7P SIGNS AND FLASHING BEACONS FACING OPPOSITE DIRECTIONS MOUNTED ON THE SAME POLE.

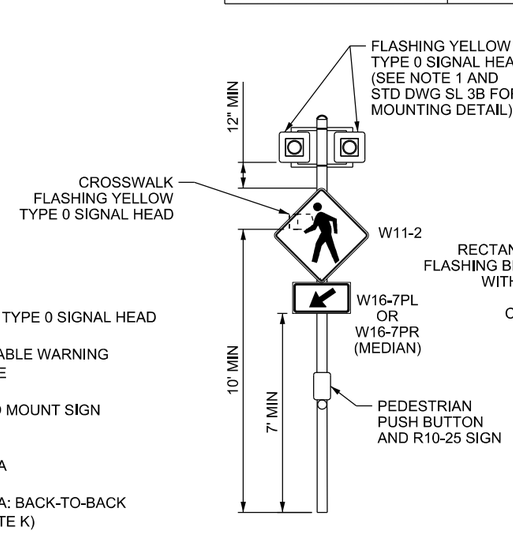
L. MEET FHWA INTERIM APPROVAL (IA-21) REQUIREMENTS FOR RECTANGULAR RAPID FLASHING BEACON.

M. RECTANGULAR RAPID FLASHING BEACONS CAN ONLY BE USED ON NON-CONTROLLED APPROACHES.

N. DO NOT MIX POST-MOUNTED BEACON TYPES AT A CROSSWALK.

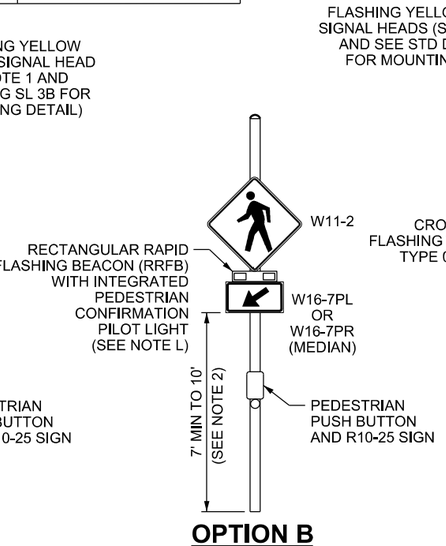
LEGEND

- YELLOW TYPE 0 SIGNAL HEAD
- DETECTABLE WARNING SURFACE
- GROUND MOUNT SIGN
- OPTION A
- OPTION A: BACK-TO-BACK (SEE NOTE K)
- OPTION B
- OPTION B: BACK-TO-BACK (SEE NOTE K)
- OPTION C



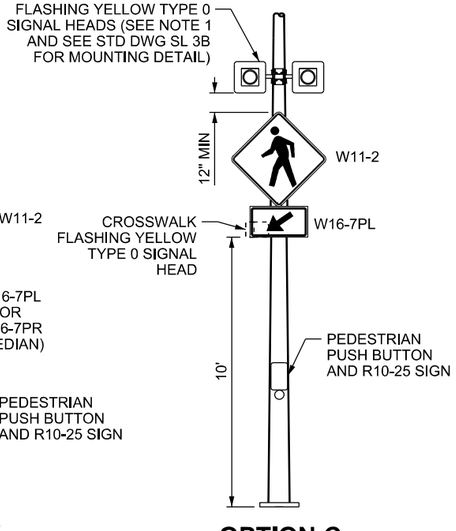
OPTION A
FLASHING BEACON DETAIL

15 FT TRAFFIC
SIGNAL POLE / LUMINAIRE POLE
(SEE NOTES A, I AND
STD DWG SL 1E)



OPTION B
RRFB DETAIL

15 FT TRAFFIC
SIGNAL POLE / LUMINAIRE POLE
(SEE NOTES A, I, AND
STD DWG SL 1E)



OPTION C
HIGH-MOUNT
FLASHING BEACON DETAIL

LUMINAIRE POLE
(SEE NOTES A, I AND
STD DWG SL 5B)

NO.	DATE	APPR.	REMARKS
1	2/22/18	JS	REVISED CALLOUTS, NOTES AND GRAPHICS. DELETED RRFB FROM STD DWGS. DELETED YIELD LINE DISTANCE TABLE.
2	8/30/18	JS	ADDED RRFB OPTION. CHANGED SINGLE LANE DETAIL TO HAVE OPTION A BACK-TO-BACK.
3	8/29/19	MRB	UPDATED REFERENCES FOR THE ST SERIES STANDARD DRAWINGS

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVAL — AUGUST 2020 DATE

DEPUTY DIRECTOR

STANDARD DRAWING TITLE
POST-MOUNTED FLASHING BEACON AT A MIDBLOCK CROSSWALK

STD. DWG. NO.
SL 6G

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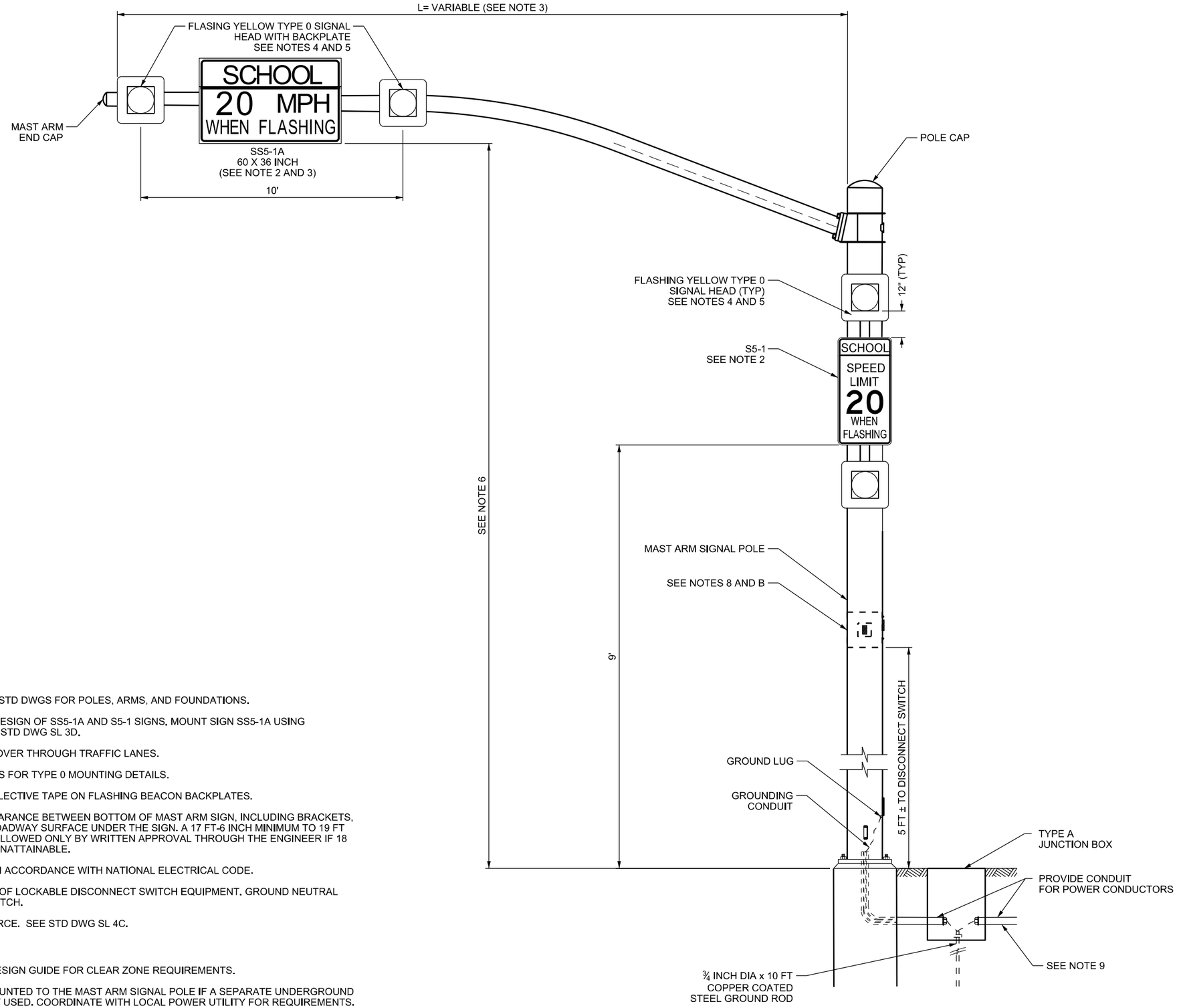

NOTES:

1. SEE SL 1 AND SL 2 SERIES STD DWGS FOR POLES, ARMS, AND FOUNDATIONS.
2. SEE STD DWG SL 7C FOR DESIGN OF SS5-1A AND S5-1 SIGNS. MOUNT SIGN SS5-1A USING SIGN MOUNT OPTION B ON STD DWG SL 3D.
3. CENTER OVERHEAD SIGN OVER THROUGH TRAFFIC LANES.
4. SEE SL 3 SERIES STD DWGS FOR TYPE 0 MOUNTING DETAILS.
5. DO NOT PLACE RETROREFLECTIVE TAPE ON FLASHING BEACON BACKPLATES.
6. PROVIDE 18 FT-6 INCH CLEARANCE BETWEEN BOTTOM OF MAST ARM SIGN, INCLUDING BRACKETS, AND HIGHEST POINT OF ROADWAY SURFACE UNDER THE SIGN. A 17 FT-6 INCH MINIMUM TO 19 FT MAXIMUM CLEARANCE IS ALLOWED ONLY BY WRITTEN APPROVAL THROUGH THE ENGINEER IF 18 FT-6 INCH CLEARANCE IS UNATTAINABLE.
7. INSTALL POWER SUPPLY IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE.
8. USE 30 AMP WEATHERPROOF LOCKABLE DISCONNECT SWITCH EQUIPMENT. GROUND NEUTRAL TO THE FRAME AT THE SWITCH.
9. CONNECT TO POWER SOURCE. SEE STD DWG SL 4C.

DESIGN-ONLY NOTES:

A. USE AASHTO ROADSIDE DESIGN GUIDE FOR CLEAR ZONE REQUIREMENTS.

B. A METER BASE MAY BE MOUNTED TO THE MAST ARM SIGNAL POLE IF A SEPARATE UNDERGROUND SERVICE PEDESTAL IS NOT USED. COORDINATE WITH LOCAL POWER UTILITY FOR REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

AUGUST 2020
DATE

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CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED

DEPUTY DIRECTOR

OVERHEAD SCHOOL SPEED LIMIT ASSEMBLY

STANDARD DRAWING TITLE

STD. DWG. NO.

SL 7A

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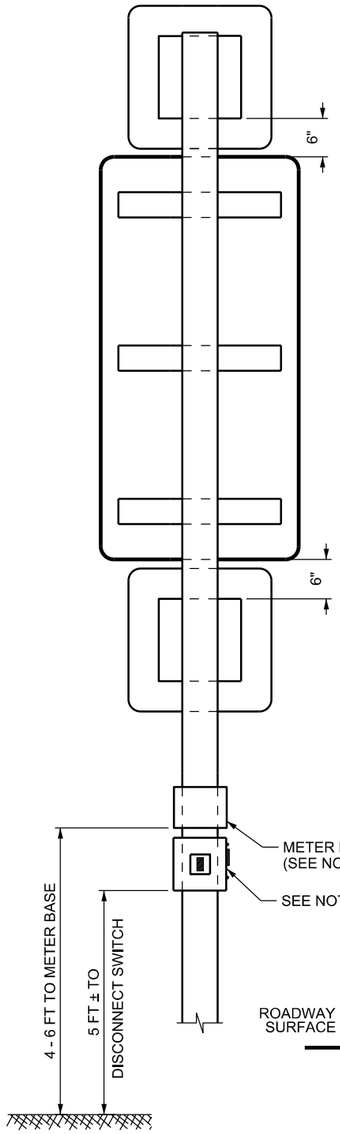
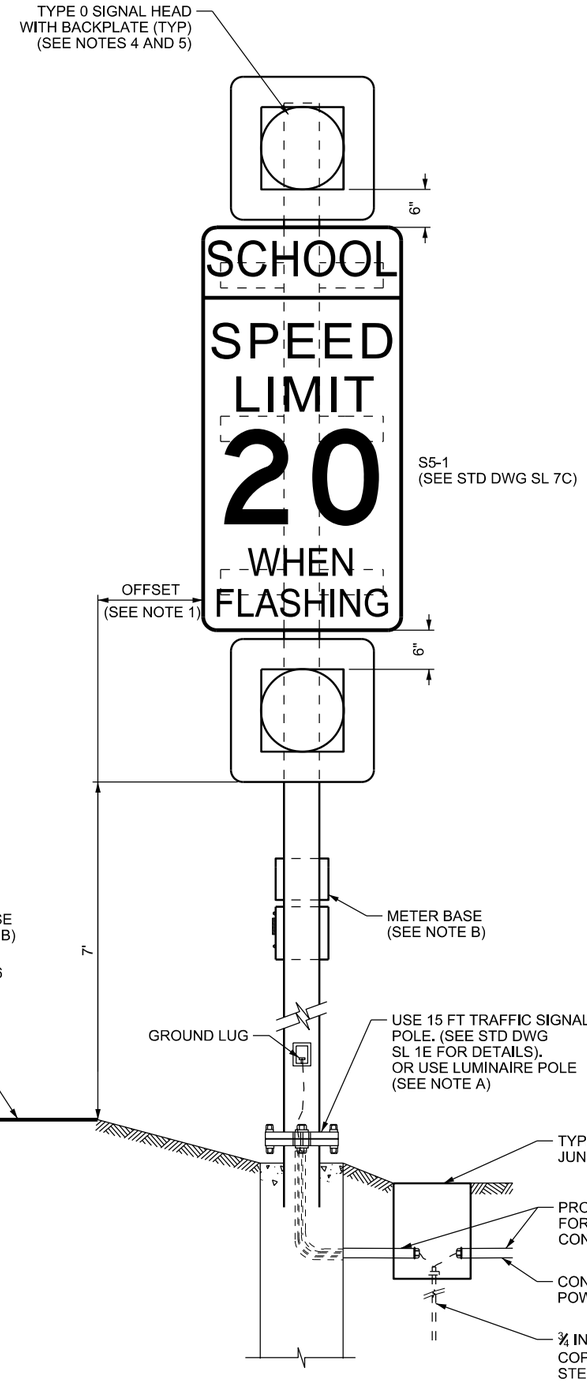
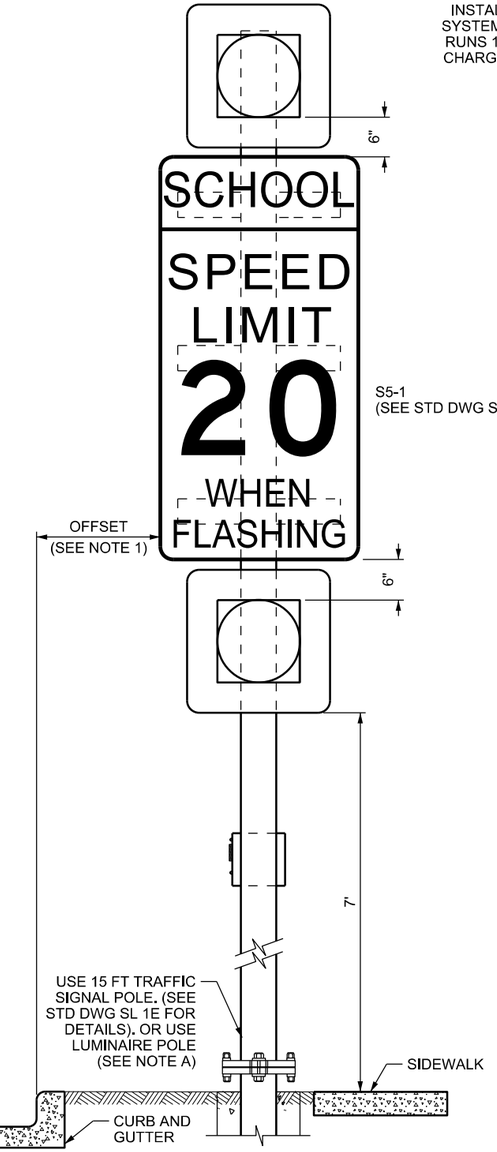


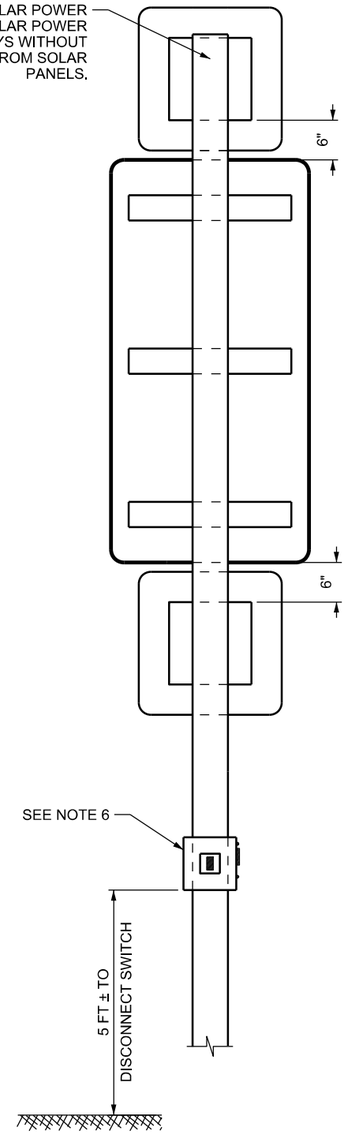


UTILITY POWER OPTION



NOTES:

1. OFFSET SIGN ASSEMBLY A MINIMUM OF 18 INCHES FROM FACE OF CURB OR 6 FT FROM TRAVELED WAY IN ABSENCE OF CURB.
2. INSTALL FACE OF SIGN AT 90 DEGREE ANGLE TO THE EDGE OF ROADWAY.
3. INSTALL POWER SUPPLY IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE.
4. SEE SL 3 SERIES STD DWGS FOR TYPE 0 MOUNTING DETAILS.
5. DO NOT PLACE RETROREFLECTIVE TAPE ON FLASHING BEACON BACKPLATES.
6. USE 30 AMP WEATHERPROOF LOCKABLE DISCONNECT SWITCH EQUIPMENT. GROUND NEUTRAL TO THE FRAME AT THE SWITCH.



SOLAR POWER OPTION

DESIGN-ONLY NOTES:

A. A LUMINAIRE POLE WILL BE NECESSARY FOR 72 INCH TALL SIGN S5-1 TO ATTAIN REQUIRED CLEARANCES AND HEIGHTS. SEE STD DWG SL 5B FOR LUMINAIRE POLE DETAILS.

B. A METER BASE MAY BE MOUNTED TO THE MAST ARM SIGNAL POLE IF A SEPARATE UNDERGROUND SERVICE PEDESTAL IS NOT USED. COORDINATE WITH LOCAL POWER UTILITY FOR REQUIREMENTS.

C. DO NOT USE OVERSIZED S5-1 SIGNS ON 15 FT TRAFFIC POLES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
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CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

POST-MOUNTED SCHOOL SPEED LIMIT ASSEMBLY

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 7B

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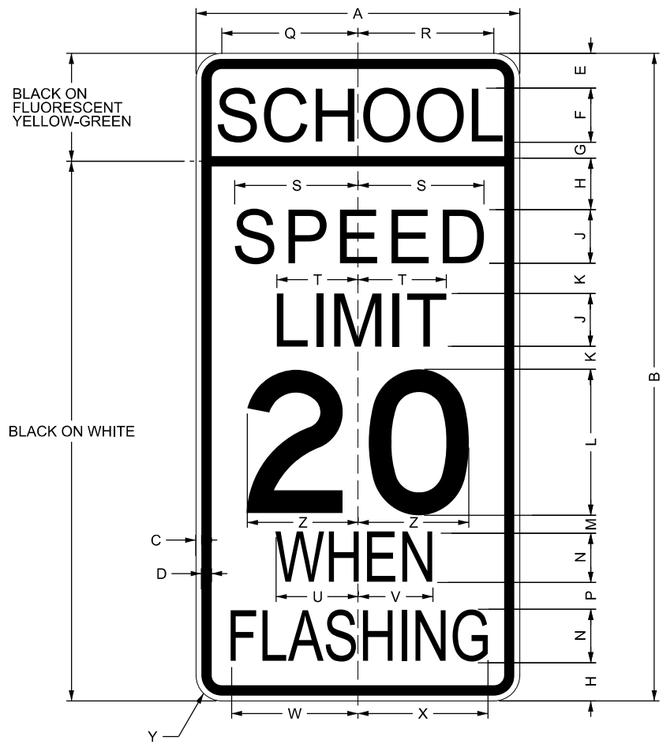
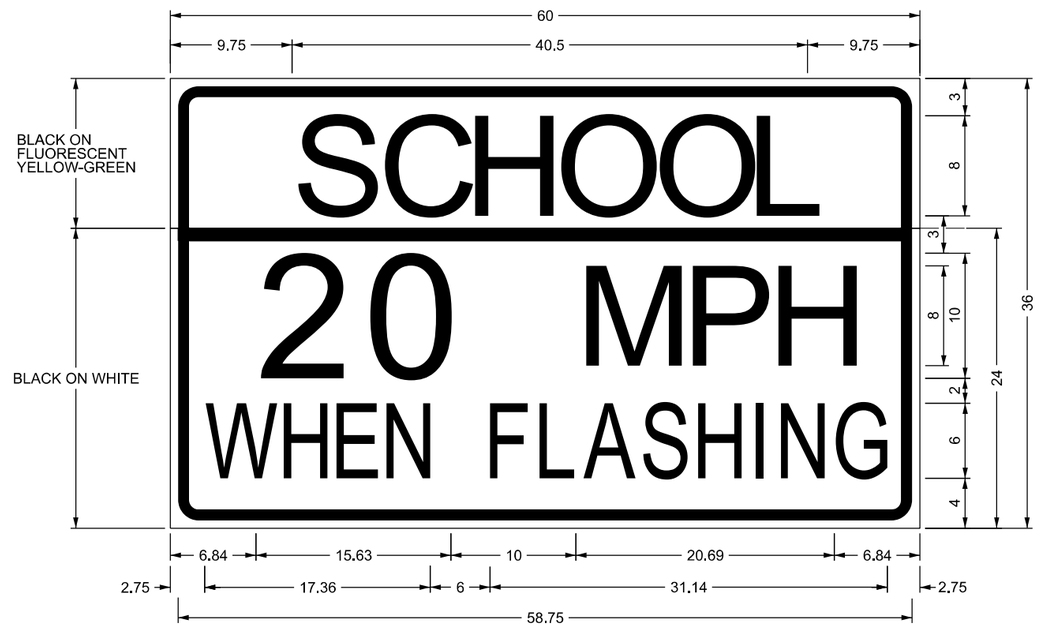


S5-1

SIGN	DIMENSION (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
CONVENTIONAL ROAD	24	48	3/8	5/8	2 1/2	4D	1 1/2	4	4E	2	10E
OVERSIZE	36	72	5/8	7/8	3 3/4	6D	2 1/4	6	6E	4	14E

SIGN	DIMENSION (INCHES)											
	M	N	P	R	S	T	U	V	W	X	Y	Z
CONVENTIONAL ROAD	3	2 1/2 D	2	10 1/4	9 9/16	7 7/16	5 3/16	5 1/8	9 3/16	9 5/8	1 1/2	9 1/4
OVERSIZE	4	4D	2	15 3/8	14 3/8	11	6 15/16	6 13/16	12 1/4	12 7/8	2 1/4	13 7/8



SS5-1a SCHOOL 20 MPH WHEN FLASHING Sign Overhead;
2.25" Radius, 0.88" Border, 0.63" Indent, Black on Fluorescent yellow green;
"SCHOOL" D;
2.25" Radius, 0.88" Border, 0.63" Indent, Black on White;
"20 MPH" D; "WHEN FLASHING" C;

NOTES:

1. USE RETROREFLECTIVE SIGN SHEETING FOR ALL BACKGROUND COLORS AS NOTED.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
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DEPUTY DIRECTOR

SCHOOL SPEED LIMIT SIGNING

STANDARD DRAWING TITLE

STD. DWG. NO.

SL 7C

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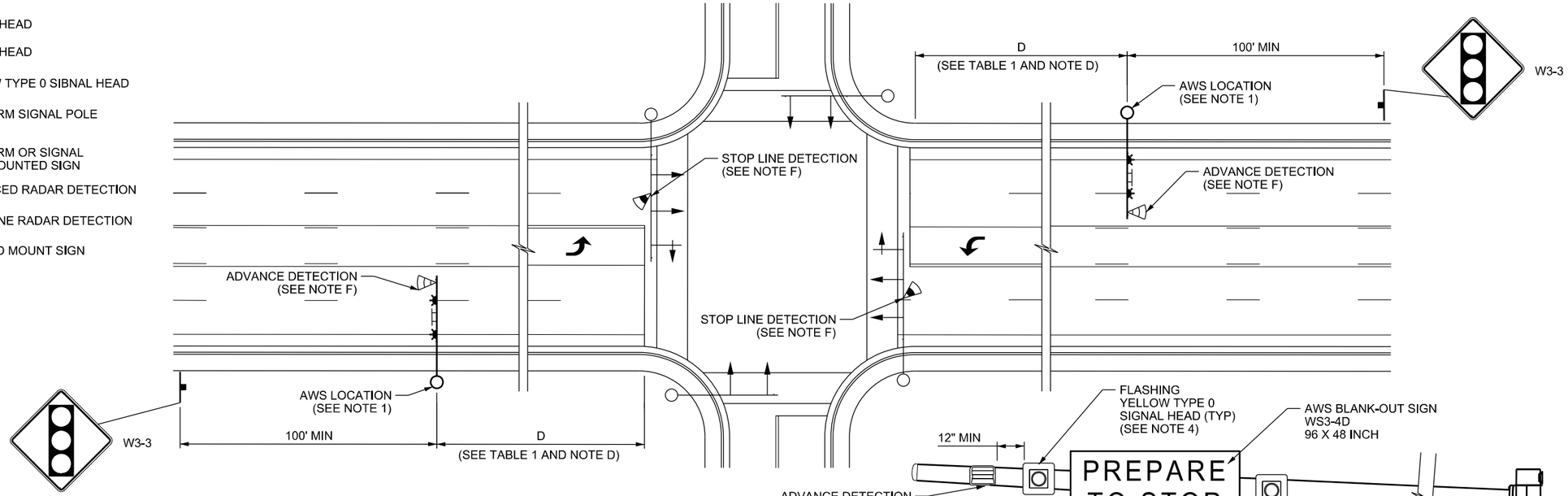
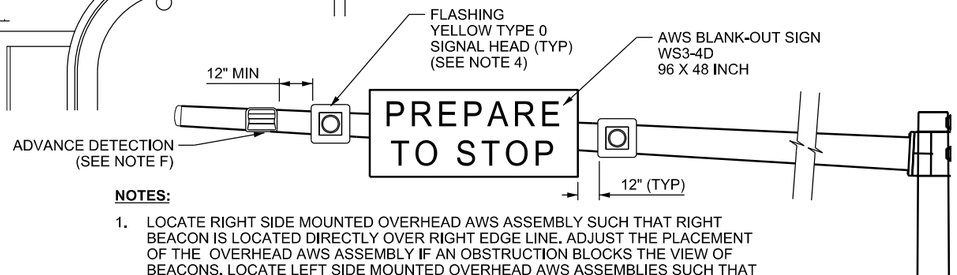
LEGEND

- SIGNAL HEAD
- SIGNAL HEAD
- YELLOW TYPE 0 SIBNAL HEAD
- MAST ARM SIGNAL POLE
- MAST ARM OR SIGNAL POLE MOUNTED SIGN
- ADVANCED RADAR DETECTION
- STOP LINE RADAR DETECTION
- GROUND MOUNT SIGN





NOTES:

1. LOCATE RIGHT SIDE MOUNTED OVERHEAD AWS ASSEMBLY SUCH THAT RIGHT BEACON IS LOCATED DIRECTLY OVER RIGHT EDGE LINE. ADJUST THE PLACEMENT OF THE OVERHEAD AWS ASSEMBLY IF AN OBSTRUCTION BLOCKS THE VIEW OF BEACONS. LOCATE LEFT SIDE MOUNTED OVERHEAD AWS ASSEMBLIES SUCH THAT LEFT BEACON IS LOCATED DIRECTLY OVER LEFT EDGE LINE.
2. BEACONS FLASH YELLOW ALTERNATELY, LEFT AND RIGHT.
3. USE A TYPE C POLE WITH A COMPATIBLE FOUNDATION WHEN OPTION C OVERHEAD BLANK-OUT SIGN IS INSTALLED. FIELD CUT TYPE C COMPATIBLE MAST ARM TO REQUIRED LENGTH AND CAP END. PROVIDE SUFFICIENT MAST ARM LENGTH FOR AWS ASSEMBLY AND DETECTION EQUIPMENT PLACEMENT. THE MAXIMUM OPTION C MAST ARM LENGTH IS 50 FT.
4. DO NOT PLACE RETROREFLECTIVE TAPE ON FLASHING BEACON BACKPLATES.
5. PROVIDE 18 FT-6 INCH CLEARANCE BETWEEN BOTTOM OF AWS STATIC SIGN OR AWS BLANK-OUT SIGN, INCLUDING BRACKETS, AND HIGHEST POINT OF ROADWAY SURFACE UNDER THE SIGN. PROVIDE 17 FT-6 INCH MINIMUM CLEARANCE WITH APPROVAL FROM THE ENGINEER. PROVIDE 19 FT-6 INCH MINIMUM CLEARANCE ON APPROVED HIGH-LOAD ROUTES. SIGN WS3-4D IS STATE FURNISHED.

DESIGN-ONLY NOTES:

A. TABLE 1 IS BASED ON A 5-SECOND LEAD FLASH TIME. THE DISTANCE (D) MAY BE ADJUSTED TO PROVIDE A 3-SECOND MINIMUM TO A 6-SECOND MAXIMUM LEAD FLASH TIME USING THE FORMULA: $D = (t + 2.5)1.47V_d - 70$
WHERE: t = LEAD FLASH TIME (SEC.) V_d = AWS DESIGN SPEED (MPH)

FOR DOWNGRADE APPROACHES OF 2 PERCENT OR GREATER ADD DISTANCE D_g TO D: $D_g = \frac{V_d^2}{9.32 - 30G} \quad \frac{V_d^2}{9.32}$

WHERE: G = PERCENT GRADE DIVIDED BY 100

B. AWS DESIGN SPEED (V_d) IS 10 MPH SLOWER THAN ROADWAY DESIGN SPEED.

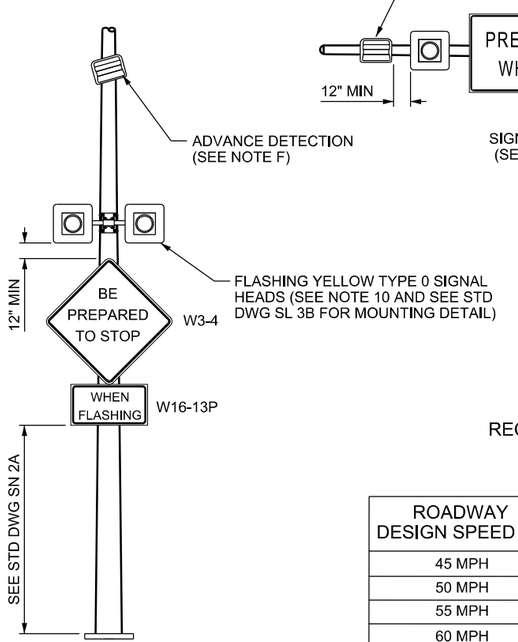
C. PLACE AWS TO PROVIDE 2 SECONDS MINIMUM SIGHT DISTANCE ON APPROACH.

D. INSTALL AWS ASSEMBLY THE SAME DISTANCE FROM THE STOP BAR IN BOTH DIRECTIONS IF AWS WARRANT CRITERIA ARE MET FOR BOTH DIRECTIONS OR AS DIRECTED BY THE REGION TRAFFIC OPERATIONS ENGINEER. PROVIDE DETECTION IN BOTH DIRECTIONS AT A MINIMUM ACCORDING TO NOTE F.

E. COORDINATE WITH THE REGION TRAFFIC OPERATIONS ENGINEER TO DETERMINE WHICH OPTION TO USE. DO NOT INSTALL POST-MOUNTED AWS ON MULTI-LANE APPROACH WITHOUT APPROVAL FROM REGION TRAFFIC OPERATIONS ENGINEER.

F. INSTALL ADVANCE DETECTION THE SAME DISTANCE FROM THE STOP BAR IN BOTH DIRECTIONS. STOP LINE DETECTION REQUIRED AT INTERSECTION IN BOTH DIRECTIONS FOR ALL LANES. PLACE ADVANCE DETECTION AS CLOSE TO CENTER OF THRU LANES AS POSSIBLE WHILE MAINTAINING SPACING AS SHOWN.

G. PROTECT WITH AN APPROVED BARRIER OR GUARDRAIL SYSTEM WHEN POLE PLACEMENT IS WITHIN ROADSIDE CLEAR ZONE.



OPTION A
POST MOUNTED SIGN

HIGHWAY LUMINAIRE POLE
(SEE NOTE E
SEE STD DWG SL 5B)

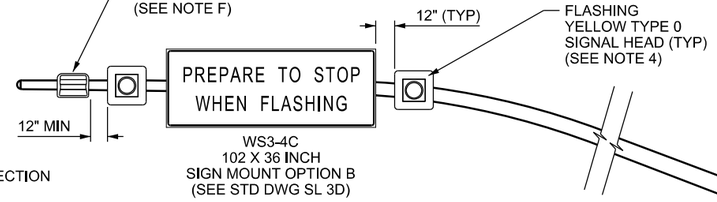


TABLE 1
RECOMMENDED PLACEMENT
OF AWS ASSEMBLY
(SEE NOTE A)

ROADWAY DESIGN SPEED (V)	AWS DESIGN SPEED (V_d)	DISTANCE FROM STOP LINE (D)
45 MPH	35 MPH	315 FT
50 MPH	40 MPH	370 FT
55 MPH	45 MPH	430 FT
60 MPH	50 MPH	485 FT
65 MPH	55 MPH	540 FT
70 MPH	60 MPH	595 FT
75 MPH	65 MPH	650 FT

OPTION B
OVERHEAD
STATIC SIGN

TYPE A MAST ARM SIGNAL POLE
(SEE NOTE E, 5, AND G
SEE STD DWG SL 1A
AND SL 2 SERIES STD DWGS)

OPTION C
OVERHEAD
BLANK-OUT
SIGN

TYPE C MAST ARM SIGNAL POLE
(SEE NOTE E, 3, 5, AND G
SEE STD DWG SL 1C)

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
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AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

ADVANCE WARNING SIGNAL (AWS) SYSTEM

STANDARD DRAWING TITLE

STD. DWG. NO.
SL 8

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23-JUN-2020

GENERAL NOTES (APPLIES TO ALL SN SERIES STANDARD DRAWINGS):

NOTES:

1. TURN THE SIGN SLIGHTLY AWAY FROM THE ROAD WHERE MIRROR REFLECTION FROM THE SIGN FACE IS ENCOUNTERED TO SUCH A DEGREE AS TO REDUCE LEGIBILITY. TURN SIGNS TOWARDS THE ROAD IF SIGN IS INSTALLED 30 FT OR MORE FROM THE EDGE OF PAVEMENT. THE ANGLE OF PLACEMENT IS DETERMINED BY THE DIRECTION OF APPROACHING TRAFFIC RATHER THAN BY THE ROADWAY EDGE AT THE POINT WHERE THE SIGN IS LOCATED ON CURVED ALIGNMENTS.

2. PLACE THE REFERENCE SIGN AT THE TRUE MILEPOINT, WHERE POSSIBLE. PLACE AS FAR AS 30 FEET FROM THE TRUE MILEPOINT, IN EITHER DIRECTION IF A REFERENCE SIGN CANNOT BE PLACED AT THE TRUE MILEPOINT. OMIT THE SIGN, IF THE SIGN CANNOT BE PLACED WITHIN 30 FEET OF THE TRUE MILEPOINT.

3. INSTALL ALL GROUND MOUNTED SIGNS WITHIN UDOT RIGHT OF WAY ON BREAKAWAY BASE AND POST.

4. USE ELECTRONIC ELEMENTS THAT ARE CONSISTENT WITH CURRENT UDOT PRACTICES AS DETERMINED BY THE TRAFFIC MANAGEMENT DIVISION IF A SIGN INCLUDES VARIABLE OR ELECTRONIC ELEMENTS.

5. USE BA SERIES STD DWGS (MEDIAN SMALL SIGN SECTIONS) ON NEW PROJECTS FOR SMALL SIGNS INSTALLED IN CENTER MEDIAN.

6. PRECAST FOUNDATION MAY BE USED ON GROUND MOUNT SIGNS.

7. INSTALL RED DELINEATORS ON THE BACKSIDE OF ALL DELINEATOR POST, ON ALL INTERSTATE AND FREEWAY OFF RAMPS. THE "DO NOT ENTER" AND "WRONG WAY" SIGNS WILL HAVE A 4 INCH RED RETROREFLECTIVE STRIP ON THE POST.

8. DO NOT INSTALL SIGN BASE UNTIL FINAL GRADE HAS BEEN COMPLETED.

DESIGN-ONLY NOTES:

A. USE UTAH MUTCD, UTAH STANDARD HIGHWAY SIGNS, UTAH SIGN MANUAL AND STANDARD HIGHWAY SIGN MANUAL FOR ALL SIGN DESIGN.

B. SEE STRUCTURES DESIGN AND DETAILING MANUAL FOR OVERHEAD SIGNS DETAILS .

C. SIGNS WITHIN A 15 FT RADIUS SHOULD BE INSTALLED ON THE SAME POST IF ALLOWED BY THE MUTCD.

D. COORDINATE WITH THE LOCAL ENTITY AND UTILITIES BEFORE INSTALLING SIGNS ON LIGHT POLES, DECORATIVE LIGHT POLES, AND GUIDE WIRE POLES.

E. USE A 30 X 36 INCH SPEED LIMIT SIGN ON RURAL ROADS WHERE SPEED LIMIT EXCEEDS 45 MPH.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
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RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

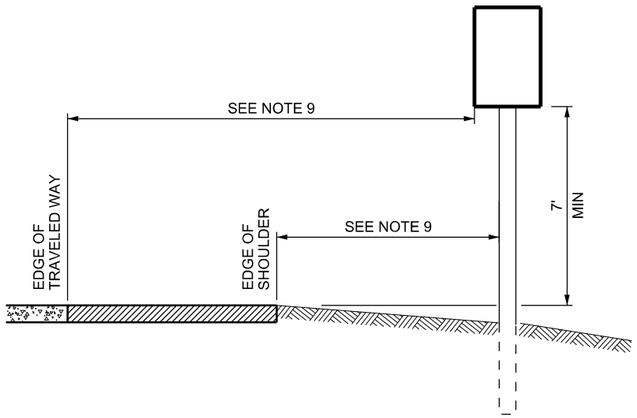
DEPUTY DIRECTOR

SIGN DRAWING SERIES
GENERAL NOTES

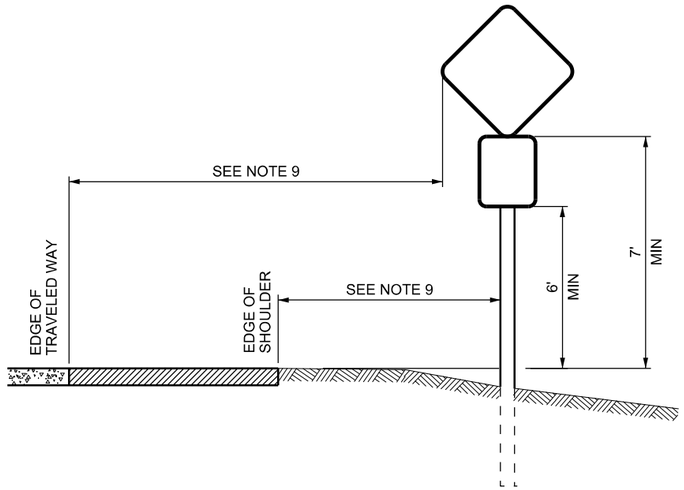
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 1

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN01.dgn



W/O SUPPLEMENTAL SIGN



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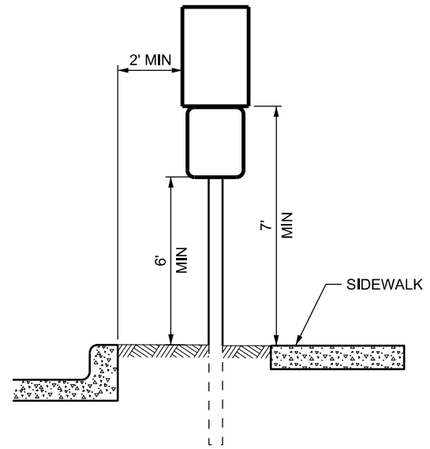
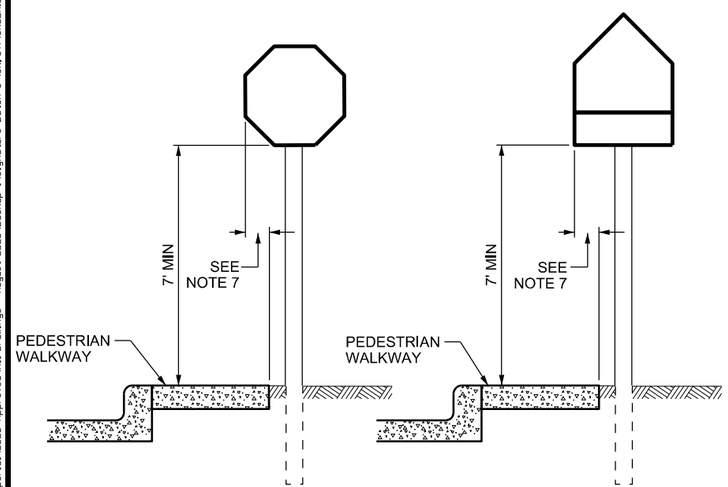


W/CURB & GUTTER

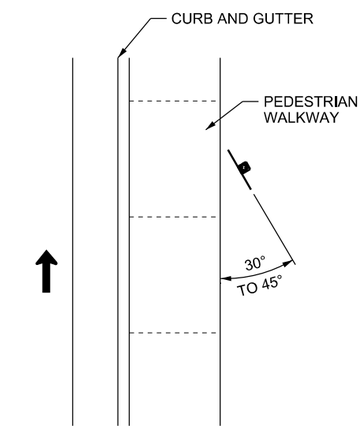
SEE NOTE 5 & 7

SINGLE SUPPORT SIGNS

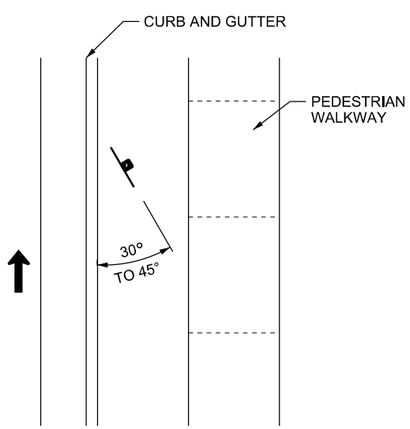


OVER PEDESTRIAN WALKWAY
OR BICYCLE MOVEMENT

SEE NOTE 5 & 7



BEHIND ADJACENT
PEDESTRIAN WALKWAY



BEHIND
CURB & GUTTER

SINGLE SUPPORT SIGNS

PARKING SIGNS

SEE NOTE 6

NOTES:

1. MINIMUM MOUNTING HEIGHT FOR SIGNS IS THE BOTTOM OF THE PRIMARY SIGN WHEN THERE IS NOT A SUPPLEMENTAL SIGN, OR THE BOTTOM OF THE SUPPLEMENTAL SIGN WHEN USED.
2. PLACE SIGN BEHIND PEDESTRIAN WALKWAY AT 7 FT MIN HEIGHT WHEN SIDEWALK IS ADJACENT TO CURB AND GUTTER.
3. MINIMUM SIGN HEIGHT MAY BE REDUCED ON CONVENTIONAL ROADS IN RURAL AREAS TO 6 FT MIN EXCEPT IN LOCATIONS OVER PEDESTRIAN OR BICYCLE MOVEMENTS.
4. SIGN MINIMUM MOUNTING HEIGHT IS SHOWN. MAXIMUM MOUNTING HEIGHT IS 1 FT ABOVE MIN MOUNTING HEIGHT.
5. MAINTAIN ADA REQUIREMENTS WHEN INSTALLING SIGN WITHIN SIDEWALK.
6. PLACE PARKING REGULATION SIGNS AT AN ANGLE NOT LESS THAN 30 DEGREES NOR MORE THAN 45 DEGREES WITH THE LINE OF TRAFFIC FLOW IN ORDER TO BE VISIBLE TO APPROACHING TRAFFIC.
7. PROVIDE A 7 FT MIN MOUNTING HEIGHT FOR ALL SIGNS AND PLAQUES WHEN SIGN ENCROACHES 4 INCH OR MORE LATERALLY ABOVE A PEDESTRIAN WALK WAY.
8. SEE STD DWG SN 2B FOR MEDIAN BARRIER MOUNT DETAIL.
9. INSTALL SIGNS 15 FT FROM TRAVELED WAY OR 6 FT FROM THE EDGE OF SHOULDER, WHICHEVER IS GREATER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

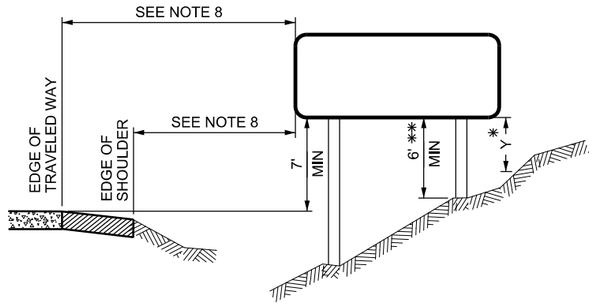
DEPUTY DIRECTOR

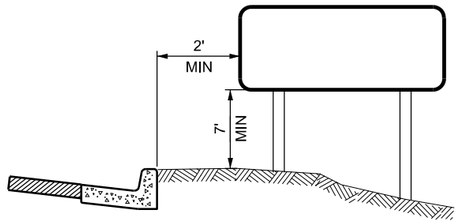
PLACEMENT OF
GROUND MOUNT SIGNS

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 2A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN02A.dgn
23-JUN-2020

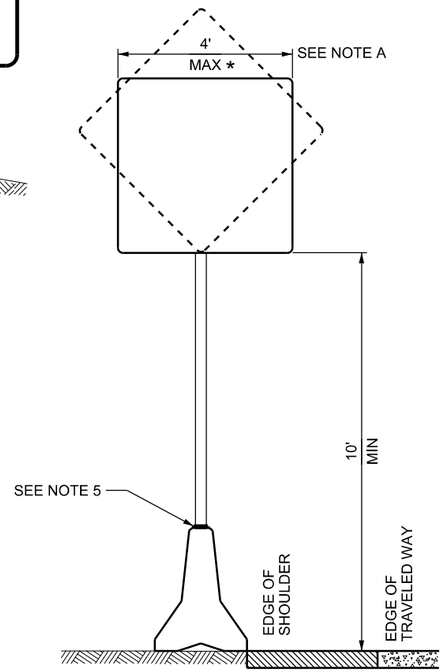


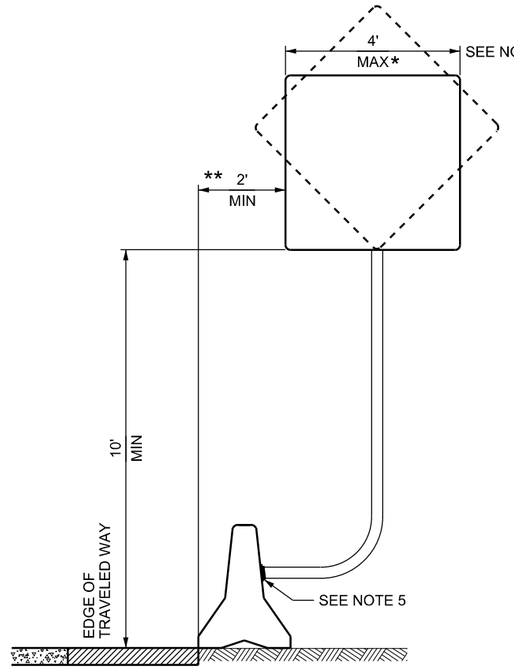


MULTIPLE SUPPORT SIGNS

* Y= 3 FT MIN GROUND TO ANY POINT OF SIGN PANEL OUTSIDE OF CLEAR ZONE

** 7 FT MIN WITHIN CLEAR ZONE



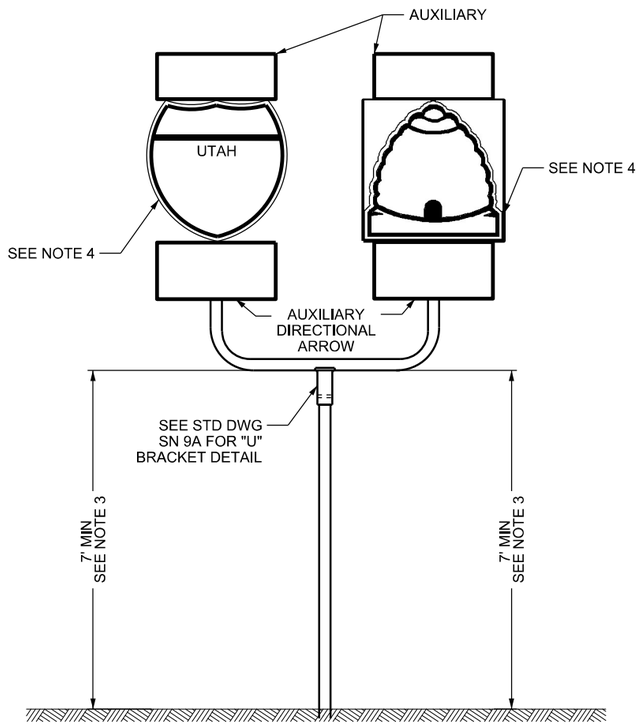


MEDIAN BARRIER MOUNT

SHOULDER BARRIER MOUNT

* INCLUDES 4 FT x 4 FT DIAMOND WARNING SIGN

** MINIMUM DISTANCE REDUCED TO 1 FT- 2 INCHES FOR 4 FT x 4 FT DIAMOND SIGN



ROUTE SIGN ASSEMBLY

ROUTE SIGNS MIN SIZE		
	1 & 2 DIGIT (INCHES)	3 DIGIT (INCHES)
FREEWAY & EXPRESSWAY	36 x 36	45 x 36
CONVENTIONAL	24 x 24	30 x 24

NOTES:

1. PLACE NEAR EDGE OF SIGNS A MINIMUM OF 6 FT FROM TRAFFIC FACE OF BARRIER WHEN PLACED BEHIND BARRIER.
2. PROVIDE A 7 FT MIN MOUNTING HEIGHT FOR ALL SIGNS AND PLAQUES WHEN SIGN ENCROACHES 4 INCH OR MORE LATERALLY ABOVE PEDESTRIAN WALKWAY.
3. SIGN MINIMUM MOUNTING HEIGHT IS SHOWN. MAXIMUM MOUNTING HEIGHT IS 1 FT ABOVE MINIMUM MOUNTING HEIGHT.
4. MOUNT PRIMARY ROUTE SIGNS AT SAME HEIGHT.
5. REFER TO SN 14 SERIES STD DWGS FOR MEDIAN AND SHOULDER BARRIER SIGN MOUNTING BRACKET DETAILS.
6. SEE STD DWG SN 15B2 TO DETERMINE POST SIZES.
7. MOUNT THE LOWEST SIGN IN THE ROUTE SIGN ASSEMBLY AT THE HEIGHT PRESCRIBED FOR SINGLE SIGNS.
8. INSTALL SIGNS 15 FT FROM TRAVELED WAY OR 6 FT FROM THE EDGE OF PAVEMENT, WHICHEVER IS GREATER.

DESIGN-ONLY NOTES:

A. NO LIMIT TO SIGN WIDTH WHEN SIGN MOUNTING HEIGHT IS 17 FT OR HIGHER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

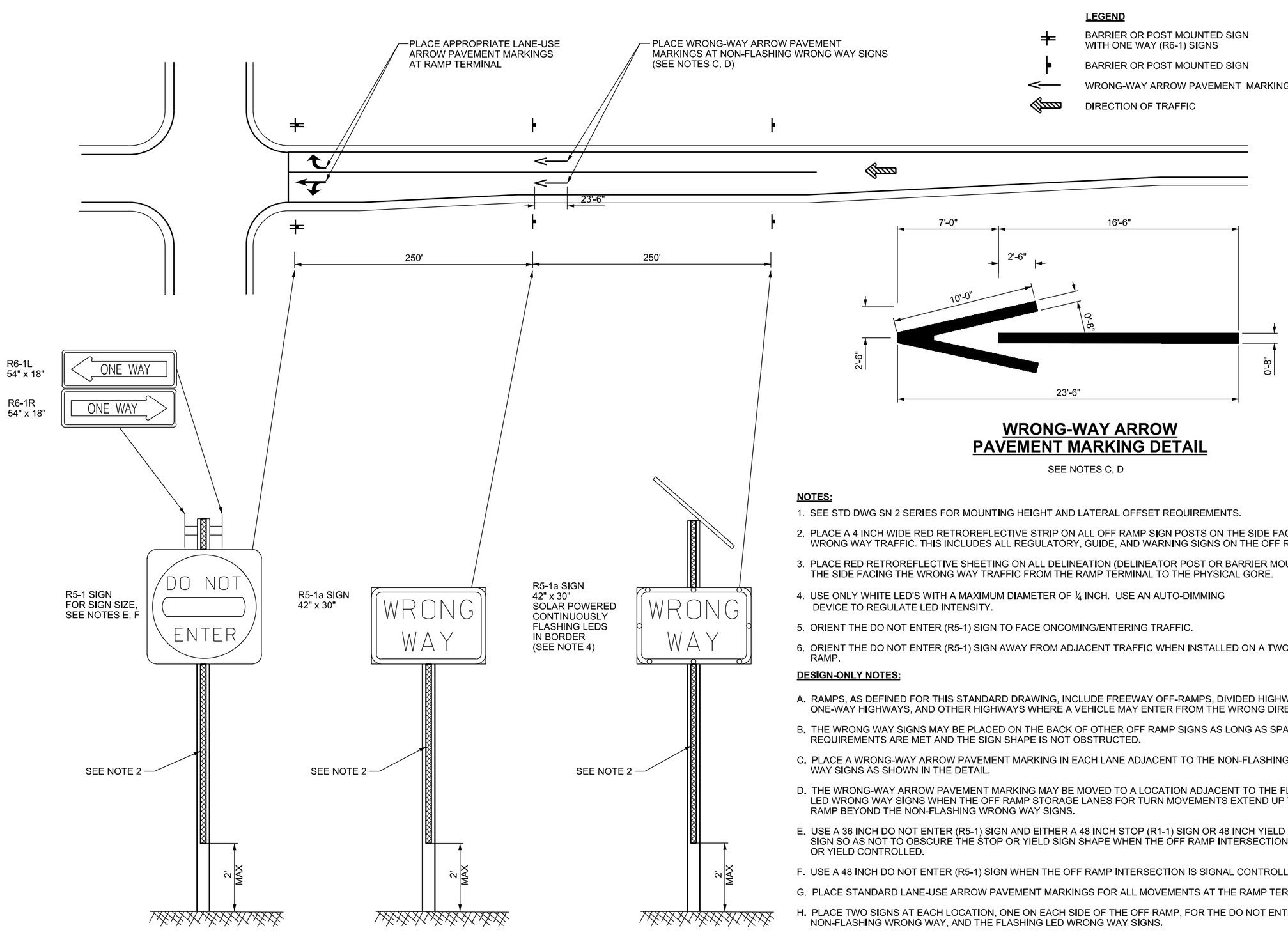
PLACEMENT OF GROUND MOUNT AND BARRIER MOUNT SIGNS

STANDARD DRAWING TITLE

STD. DWG. NO.

SN 2B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN02B.dgn
23-JUN-2020



LEGEND

- BARRIER OR POST MOUNTED SIGN WITH ONE WAY (R6-1) SIGNS
- BARRIER OR POST MOUNTED SIGN
- WRONG-WAY ARROW PAVEMENT MARKING
- DIRECTION OF TRAFFIC

WRONG-WAY ARROW PAVEMENT MARKING DETAIL

SEE NOTES C, D

NOTES:

1. SEE STD DWG SN 2 SERIES FOR MOUNTING HEIGHT AND LATERAL OFFSET REQUIREMENTS.
2. PLACE A 4 INCH WIDE RED RETROREFLECTIVE STRIP ON ALL OFF RAMP SIGN POSTS ON THE SIDE FACING THE WRONG WAY TRAFFIC. THIS INCLUDES ALL REGULATORY, GUIDE, AND WARNING SIGNS ON THE OFF RAMP.
3. PLACE RED RETROREFLECTIVE SHEETING ON ALL DELINEATION (DELINEATOR POST OR BARRIER MOUNT) ON THE SIDE FACING THE WRONG WAY TRAFFIC FROM THE RAMP TERMINAL TO THE PHYSICAL GORE.
4. USE ONLY WHITE LED'S WITH A MAXIMUM DIAMETER OF ¼ INCH. USE AN AUTO-DIMMING DEVICE TO REGULATE LED INTENSITY.
5. ORIENT THE DO NOT ENTER (R5-1) SIGN TO FACE ONCOMING/ENTERING TRAFFIC.
6. ORIENT THE DO NOT ENTER (R5-1) SIGN AWAY FROM ADJACENT TRAFFIC WHEN INSTALLED ON A TWO-WAY RAMP.

DESIGN-ONLY NOTES:

A. RAMPS, AS DEFINED FOR THIS STANDARD DRAWING, INCLUDE FREEWAY OFF-RAMPS, DIVIDED HIGHWAYS, ONE-WAY HIGHWAYS, AND OTHER HIGHWAYS WHERE A VEHICLE MAY ENTER FROM THE WRONG DIRECTION.

B. THE WRONG WAY SIGNS MAY BE PLACED ON THE BACK OF OTHER OFF RAMP SIGNS AS LONG AS SPACING REQUIREMENTS ARE MET AND THE SIGN SHAPE IS NOT OBSTRUCTED.

C. PLACE A WRONG-WAY ARROW PAVEMENT MARKING IN EACH LANE ADJACENT TO THE NON-FLASHING WRONG WAY SIGNS AS SHOWN IN THE DETAIL.

D. THE WRONG-WAY ARROW PAVEMENT MARKING MAY BE MOVED TO A LOCATION ADJACENT TO THE FLASHING LED WRONG WAY SIGNS WHEN THE OFF RAMP STORAGE LANES FOR TURN MOVEMENTS EXTEND UP THE OFF RAMP BEYOND THE NON-FLASHING WRONG WAY SIGNS.

E. USE A 36 INCH DO NOT ENTER (R5-1) SIGN AND EITHER A 48 INCH STOP (R1-1) SIGN OR 48 INCH YIELD (R1-2) SIGN SO AS NOT TO OBSCURE THE STOP OR YIELD SIGN SHAPE WHEN THE OFF RAMP INTERSECTION IS STOP OR YIELD CONTROLLED.

F. USE A 48 INCH DO NOT ENTER (R5-1) SIGN WHEN THE OFF RAMP INTERSECTION IS SIGNAL CONTROLLED.

G. PLACE STANDARD LANE-USE ARROW PAVEMENT MARKINGS FOR ALL MOVEMENTS AT THE RAMP TERMINAL.

H. PLACE TWO SIGNS AT EACH LOCATION, ONE ON EACH SIDE OF THE OFF RAMP, FOR THE DO NOT ENTER, NON-FLASHING WRONG WAY, AND THE FLASHING LED WRONG WAY SIGNS.

I. FLASHING LED SIGN ASSEMBLIES MAY BE OMMITTED UPON APPROVAL OF THE REGION TRAFFIC ENGINEER WHEN GEOMETRIC CONSIDERATIONS OR OTHER FACTORS AFFECT THEIR INSTALLATION.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	WRONG WAY SIGN SIZE UPDATED FOR CONSISTENCY, NOTES 4 AND I UPDATED

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

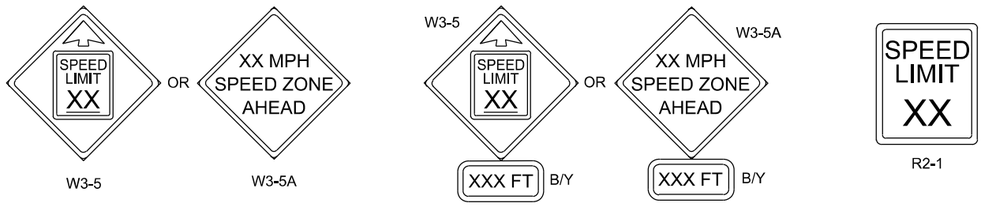
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

WRONG WAY SIGNING, DELINEATION, AND MARKINGS FOR OFF-RAMPS AND DIVIDED HIGHWAYS

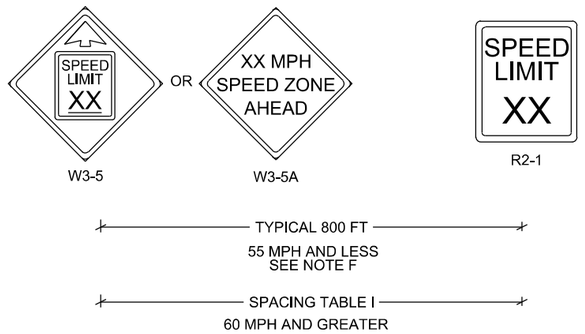
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 2C

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,STY)\SN02C.dgn

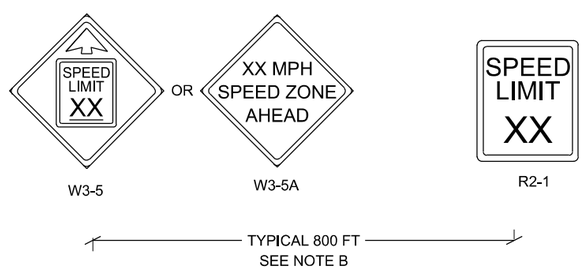


SPEED REDUCTION OF 20 MPH OR 25 MPH THREE SIGN SEQUENCE



SPEED REDUCTION OF 15 MPH TWO SIGN SEQUENCE

SEE NOTE C



SPEED REDUCTION OF 10 MPH OR LESS (OPTIONAL) TWO SIGN SEQUENCE

APPROACH SPEED (MPH)

REDUCED SPEED (MPH)	80	75	70	65	60	55	50	45	40	35	30
75	500										
70	830	460									
65	1150	780	420								
60	1440	1070	710	380							
55	1710	1330	980	650	340						
50	1960	1580	1230	900	590	310					
45		1800	1450	1120	810	530	270				
40			1650	1320	1010	730	470	230			
35				1490	1190	910	640	410	190		
30					1340	1060	790	560	350	150	
25						1180	920	690	470	280	120
20							1030	790	580	390	220
15								870	660	470	300

MINIMUM SIGN SPACING (FT)

TABLE 1

SEE NOTES E AND F

DESIGN-ONLY NOTES:

A. USE MINIMUM R2-1 SIGN SIZE OF 36 INCHES x 48 INCHES FOR CONVENTIONAL ROADS AND EXPRESSWAYS.

USE R2-1 SIGN SIZE OF 48 INCHES x 60 INCHES FOR FREEWAYS.

USE W3-5 (OR W3-5A) SIGN SIZE OF 48 INCHES x 48 INCHES FOR FREEWAYS AND EXPRESSWAYS.

USE W3-5 (OR W3-5A) SIGN SIZE OF 36 INCHES x 36 INCHES FOR CONVENTIONAL ROADS.

B. USE TABLE 1 FOR OPTIONAL SIGN SPACING UPON DIRECTION OF THE REGION TRAFFIC ENGINEER.

C. USE OF THREE SIGN SEQUENCE IS OPTIONAL FOR SPEED REDUCTION OF 15 MPH.

D. DO NOT MIX W3-5 WITH W3-5A SIGNS IN THE SAME SIGNING SEQUENCE.

E. STEP SPEED LIMIT DOWN IN INCREMENTS WHEN SPEED REDUCTION IS 30 MPH OR GREATER.

F. USE SINGLE SPEED REDUCTION OF 30 MPH UPON DIRECTION OF THE REGION TRAFFIC ENGINEER. USE THREE SIGN SEQUENCE AND MINIMUM SIGN SPACING TABLE 1.

DESIGN ONLY DRAWING

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	ADDED CLARIFICATION TO NOTE A

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

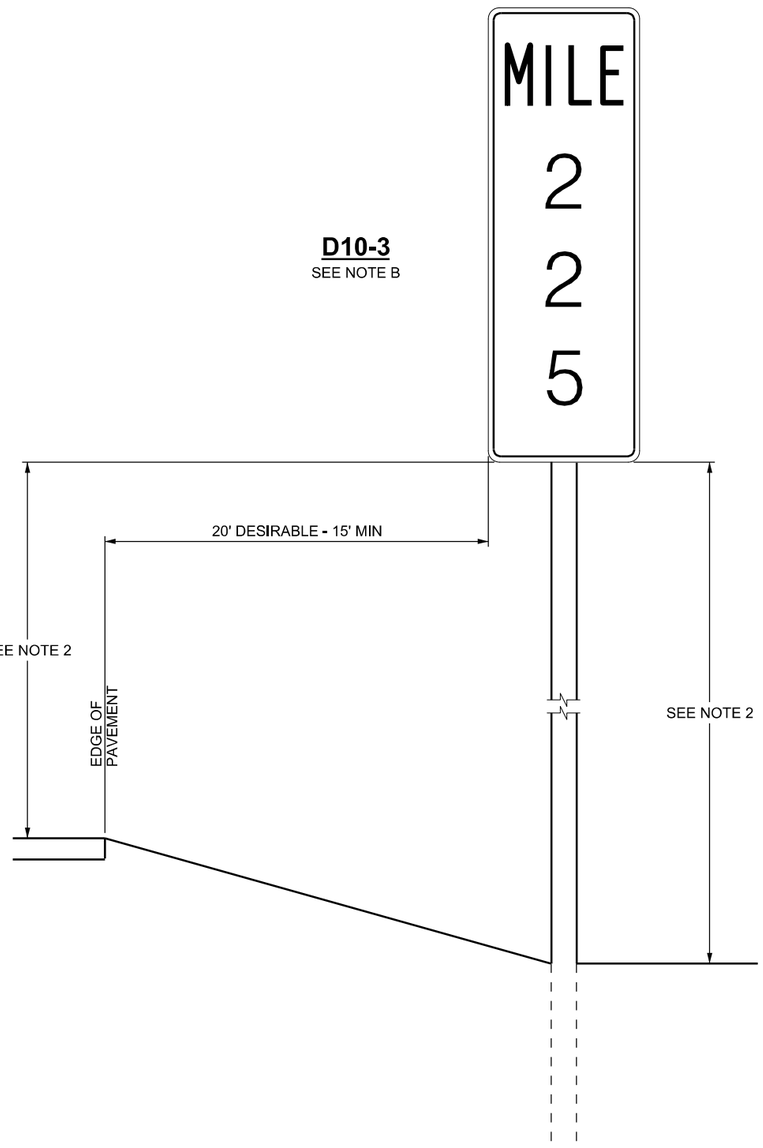
SPEED REDUCTION SIGN SEQUENCE

STANDARD DRAWING TITLE

STD. DWG. NO.

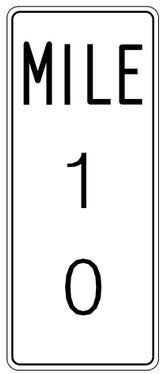
SN 3

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN03.dgn
23-JUN-2020



D10-3
SEE NOTE B

TYPICAL INSTALLATION
SEE NOTE 4



D10-2
SEE NOTE B

D10-1
SEE NOTE B

NOTES:

1. RETROREFLECTIVE WHITE LEGEND AND BORDER ON A RETROREFLECTIVE GREEN BACKGROUND. SEE STANDARD SPECIFICATION 02890 FOR SIGN SHEETING REQUIREMENTS.
2. DO NOT EXCEED 8 FT MOUNTING HEIGHT FROM BOTTOM OF SIGN TO THE TRAVELED WAY. MAINTAIN 4 FT MINIMUM HEIGHT ABOVE PAVEMENT EDGE. MAINTAIN 7 FT MINIMUM HEIGHT OVER PEDESTRIAN WALKWAYS.
3. SEE SN 9 SERIES STD DWGS FOR SIGN MOUNTING OPTIONS AND REQUIREMENTS.
4. SEE SN 11 AND SN 12 SERIES STD DWGS FOR SIGN BASE AND POST OPTIONS.

DESIGN-ONLY NOTES:

A. USE 12 INCH WIDE FOR FREEWAYS AND EXPRESSWAYS USE 10 INCH WIDE ON ALL OTHER HIGHWAYS.

B. SEE STANDARD HIGHWAY SIGNS AND MARKINGS FOR SIGN DESIGN DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

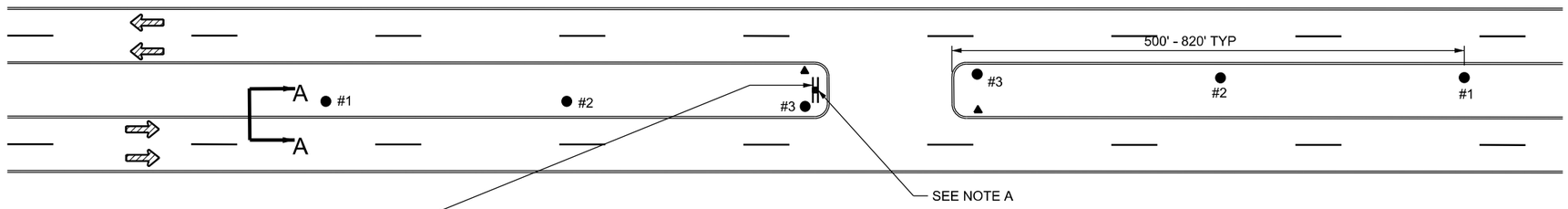
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

TYPICAL INSTALLATION FOR MILEPOST SIGNS
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 4

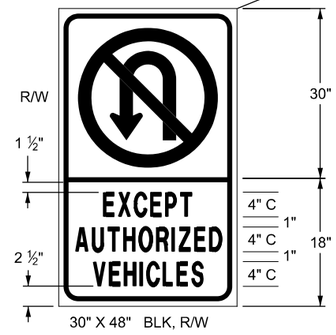
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch B (SN,ST)\SN04.dgn
23-JUN-2020



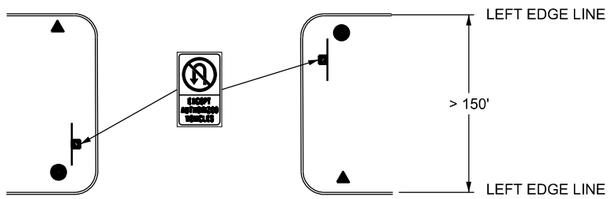
FREEWAY CROSSOVER

LEGEND

- ● FREEWAY CROSSOVER MARKER
- ▲ TYPE 2 DELINEATOR

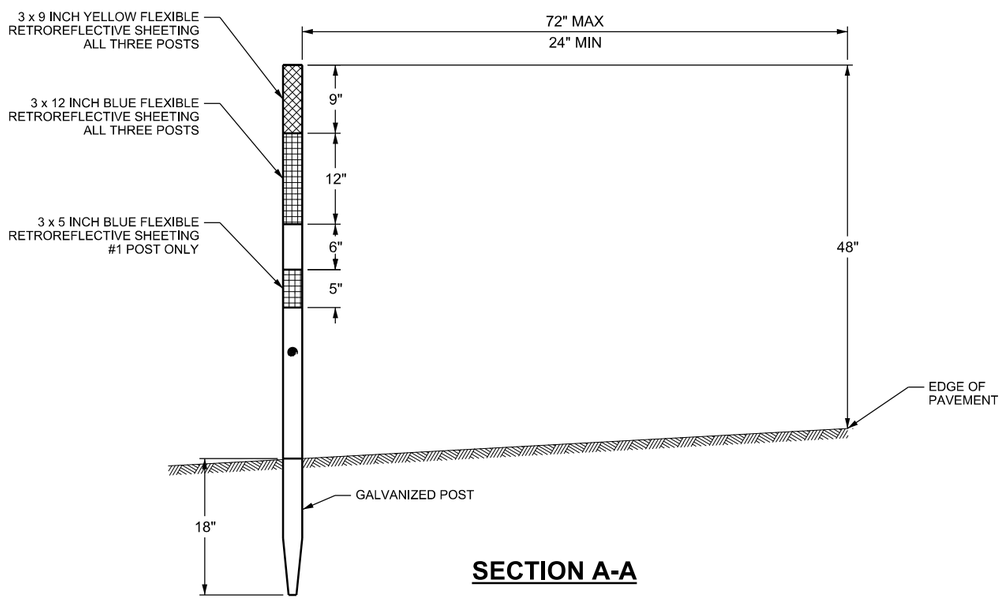


RS5-11 NO U-TURN EXCEPT AUTHORIZED VEHICLES SIGN



FREEWAY CROSSOVER WITH MEDIAN GREATER THAN 150'

SEE NOTE A



SECTION A-A

NOTES:

1. USE EXISTING DELINEATOR SPACING WHEN POSSIBLE.
   POST #2 SPACED EVENLY BETWEEN POST #1 & #3.
   POST #3 PLACED 10 FT IN ADVANCE OF POINT OF TANGENCY.
2. SEE STANDARD SPECIFICATION 02890 FOR RETROREFLECTIVE SHEETING REQUIREMENTS.
3. SEE GW SERIES STD DWGS FOR POST DETAILS.

DESIGN-ONLY NOTES:

A. USE TWO RS5-11a SIGNS BACK-TO-BACK.

B. USE A RS5-11a SIGN AT EACH END OF CROSSING ADJACENT TO APPROACHING TRAFFIC WHERE THE LEFT EDGE LINES ARE SEPARATED BY MORE THAN 150 FT.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	CHANGED DELINEATOR POST RETROREFLECTIVE COLORS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

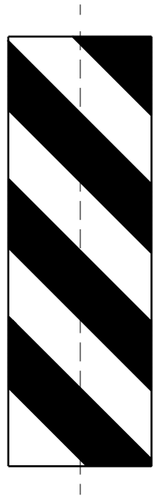
FREEWAY CROSSOVER SIGNING

STANDARD DRAWING TITLE

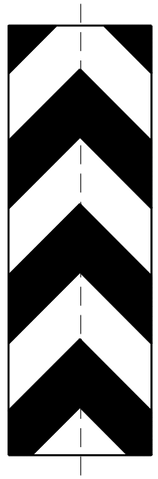
STD. DWG. NO.

SN 5

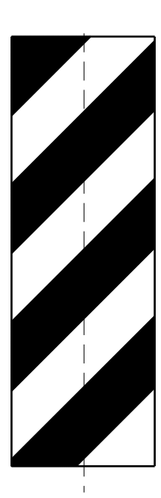
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN05.dgn
23-JUN-2020



TRAFFIC PASS RIGHT
OM3-L

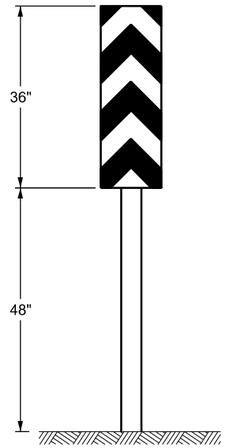


TRAFFIC PASS EITHER SIDE
OM3-C



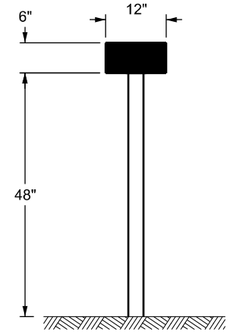
TRAFFIC PASS LEFT
OM3-R

TYPE 3 OBJECT MARKERS



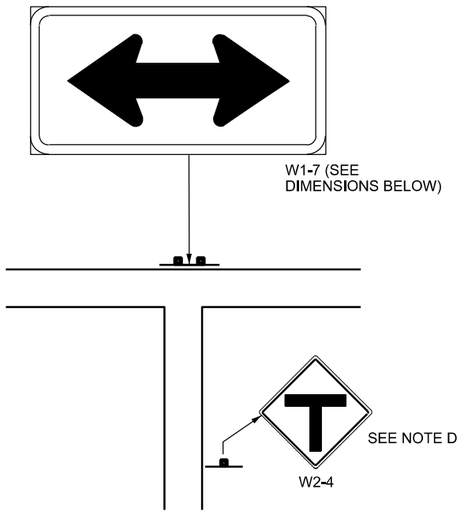
OBJECT MARKERS
MOUNTING HEIGHT DETAIL

OM3-C SHOWN (TYP)



OVERPASS MARKER

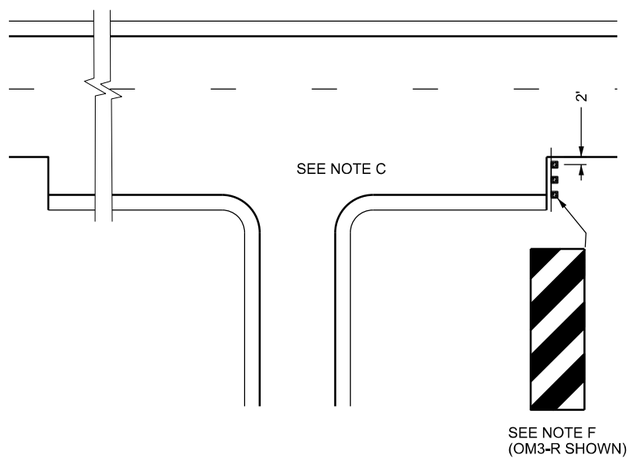
(SEE NOTE F)
OM2-2H SHOWN (TYP)



USE 96 INCH X 48 INCH FOR RURAL INTERSECTIONS
USE 72 INCH X 36 INCH FOR URBAN INTERSECTIONS
(SEE NOTE E FOR ADDITIONAL SIGN SIZING INFORMATION)

SEE STD DWG SN 14B FOR POST SPACING
SEE STD DWG SN 2A FOR SIGN MOUNTING HEIGHT

'T' INTERSECTION SIGNING



PAVEMENT TRANSITION

DESIGN-ONLY NOTES:

A. USE TYPE 3 OBJECT MARKERS TO MARK THE ENDS OF OBSTRUCTIONS WITHIN THE CLEAR ZONE. INSTALL THE MARKERS AS FOLLOWS:
- 5 FT OR LONGER OBSTRUCTION (IN THE DIRECTION OF TRAFFIC): ON EACH SIDE OF BOTH ENDS OF OBSTRUCTION ON TWO-WAY ROADWAYS, AND ON EACH SIDE OF THE APPROACH END ON ONE-WAY ROADWAYS FOR NARROW BRIDGES.
- LESS THAN 5 FT IN LENGTH OR LESS THAN 4 FT WIDE: BACK-TO-BACK ON ONE POST AT THE OBSTRUCTION
- 4-8 FT WIDE : MINIMUM OF 2 OBJECT MARKERS EVENLY SPACED
- WIDER THAN 8 FT: MIN OF 3 OBJECT MARKERS EVENLY SPACED

B. USE TYPE 3 OBJECT MARKER TO MARK THE APPROACH TO THE ENDS OF BARRIERS THAT DO NOT HAVE A CRASH CUSHION OR END TREATMENT INSTALLED.

C. SEE ST SERIES STD DWGS FOR PAVEMENT MARKINGS AND STRIPING OF PAVEMENT TRANSITION.

D. PLACE THE W2-4 SIGN IN ADVANCE OF AN UNCONTROLLED INTERSECTION IF THE W1-7 SIGN IS NOT USED. THE W2-4 SIGN MAY BE USED WHEN PLACING THE W1-7 SIGN. PLACE INTERSECTION WARNING SIGNS AN ADEQUATE DISTANCE FROM THE INTERSECTION TO ALLOW A PROPER RESPONSE. SEE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES TABLE 2C-4 FOR ADVISORY DISTANCES AND MORE INFORMATION.

E. ALTERNATE W1-7 SIGN DIMENSIONS (NOT LESS THAN THOSE SHOWN IN THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES) MAY BE USED UPON APPROVAL OF THE REGION TRAFFIC ENGINEER. CONSIDER SIGHT DISTANCE, LIGHTING, TRAFFIC, AND ADJACENT PROPERTY OWNERS VISIBILITY AND SIGHT RESTRICTIONS WHEN DETERMINING ALTERNATE DIMENSIONS.

F. INSTALL OVERPASS MARKER 2 FT BEHIND PARAPET.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	UPDATED NOTES A, B, AND D TO F. REVISED ALTERNATE OPTIONS FOR T-INTERSECTION SIGNING

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

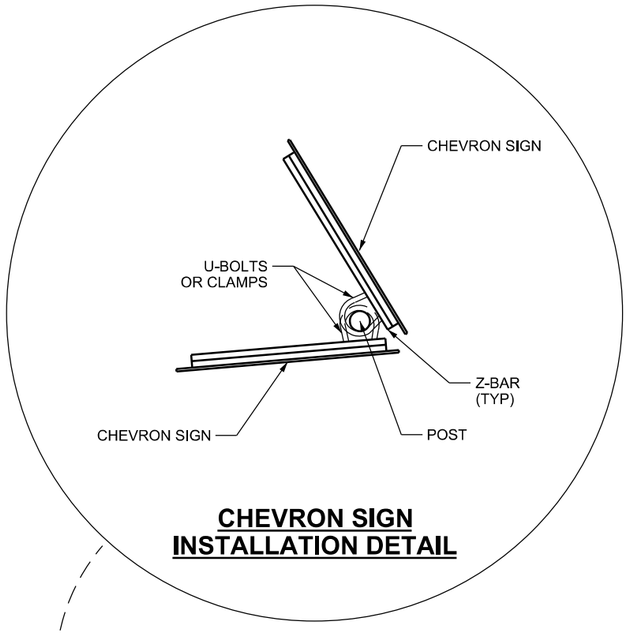
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

OBJECT MARKERS
"T" INTERSECTION AND
PAVEMENT TRANSITION
GUIDANCE

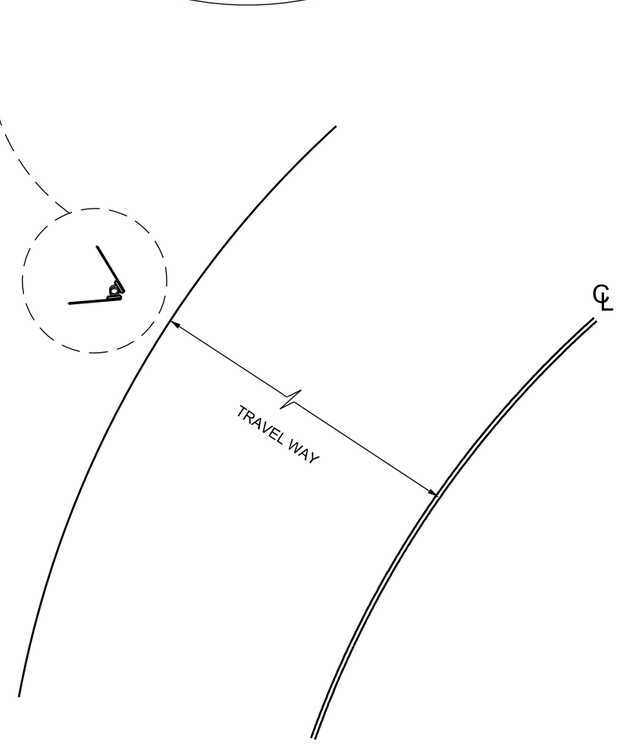
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 6

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch B (SN,ST)\SN06.dgn
23-JUN-2020



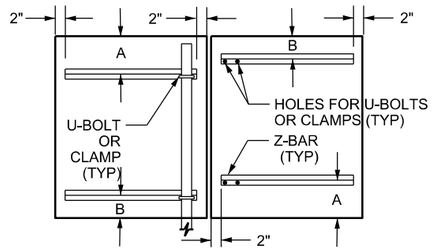
CHEVRON SIGN INSTALLATION DETAIL



TOP VIEW

TABLE III
PLACEMENT OF Z-BAR

SIGN HEIGHT (INCHES)	A (INCHES)	B (INCHES)
18	4 ½	2 ½
24	5 ½	3 ½
30	6 ½	4 ½
36	7 ½	4 ½
48	8 ½	5 ½



VIEW OF BACK OF SIGN PANEL

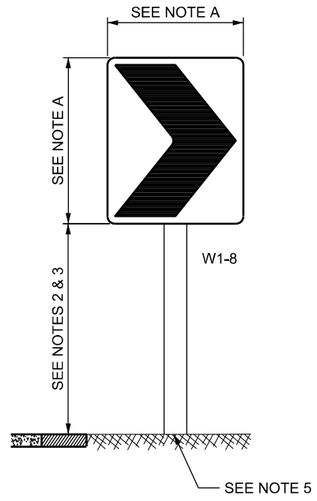
TABLE II
DESIGN SPEED

TYPE OF HORIZONTAL ALIGNMENT SIGN	TYPE OF HORIZONTAL				
	5 MPH	10 MPH	15 MPH	20 MPH	25 MPH OR MORE
CHEVRON (W1-8) AND OR ONE DIRECTION LARGE ARROW (W1-6)	OPTIONAL	OPTIONAL	REQUIRED	REQUIRED	REQUIRED

TABLE I
TYPICAL SPACING OF CHEVRON ALIGNMENT SIGNS ON HORIZONTAL CURVES

ADVISORY SPEED (MPH)	OR	CURVE RADIUS (FT)	SIGN SPACING (FT)
15 MPH OR LESS	OR	LESS THAN 200	40
25 TO 30	OR	200 TO 400	80
35 TO 45	OR	401 TO 700	120
50 TO 60	OR	701 TO 1250	160
MORE THAN 60	OR	MORE THAN 1250	200

NOTE: DO NOT USE THIS TABLE TO DETERMINE THE ADVISORY SPEED OF THE CURVE



CHEVRON ALIGNMENT SIGN

NOTES:

1. USE 7 FT MIN, 7 FT 6 INCH MAX MOUNTING HEIGHT.
2. USE CONSISTENT MOUNTING HEIGHT AT EACH LOCATION.
3. SEE SN 9 SERIES STD DWGS FOR MOUNTING U-BOLTS OR CLAMP DETAILS.
4. SEE SN SERIES STD DWGS FOR POST SIZES AND BASE DETAILS.
5. SEE SN 2 SERIES STD DWGS FOR LATERAL OFFSET REQUIREMENTS.

DESIGN-ONLY NOTES:

A. USE W1-8 SIGN SIZE AS FOLLOWS:

a) CONVENTIONAL ROADS: USE 24 x 30 INCHES.
b) EXPRESSWAYS: USE 30 x 36 INCHES.
c) FREEWAYS: USE 36 x 48 INCHES.

B. USE CHEVRON ALIGNMENT (W1-8) SIGNS WHEN ADDITIONAL EMPHASIS AND GUIDANCE FOR A CHANGE IN HORIZONTAL ALIGNMENT IS NEEDED. THE W1-8 SIGN MAY BE USED TO SUPPLEMENT STANDARD DELINEATORS OR THE LARGE ARROW (W1-6) SIGN.

INSTALL THE W1-8 SIGNS ON THE OUTSIDE OF A TURN OR CURVE. INSTALL IN LINE WITH AND AT APPROXIMATELY A RIGHT ANGLE TO APPROACHING TRAFFIC.

THE APPROXIMATE SPACING OF CHEVRON ALIGNMENT SIGNS ON THE TURN OR CURVE MEASURED FROM THE POINT OF CURVATURE (PC) SHOULD BE AS SHOWN IN TABLE 1. CHEVRON ALIGNMENT SIGNS SHOULD BE VISIBLE FOR A SUFFICIENT DISTANCE TO PROVIDE THE ROAD USER WITH ADEQUATE TIME TO REACT TO THE CHANGE IN ALIGNMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS

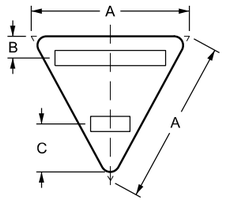
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CHEVRON ALIGNMENT SIGNS
STANDARD DRAWING TITLE

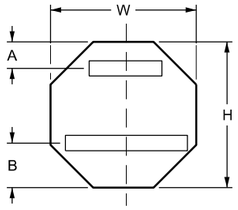
STD. DWG. NO.
SN 7

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN_ST)\SN07.dgn
23-JUN-2020



TRIANGLE SIGN

A	B	C	BAR LENGTH
36"	5"	12"	1-24" 1-10"
48"	5"	14"	1 - 36" 1 - 12"

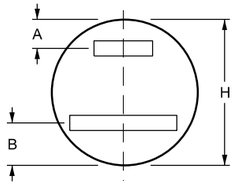


OCTAGON SIGN

H/W	A	B	BAR LENGTH
36"	8"	10"	1 - 12" 1 - 28"
48"	12"	14"	1 - 18" 1 - 40"

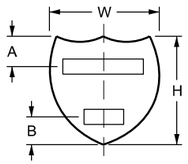
PENTAGON SIGN

H/W	A	B	BAR LENGTH
36"	10"	5"	1 - 12" 1 - 30"
48"	14"	5"	1 - 12" 1 - 42"



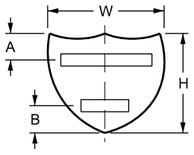
ROUND SIGN

H	A	B	BAR LENGTH
36"	8"	11"	1 - 12" 1 - 26"



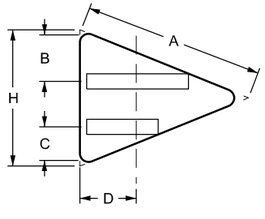
INTERSTATE SHIELD (2 DIGITS)

W	H	A	B	BAR LENGTH
36"	36"	11"	9"	1 - 30" 1 - 12"
48"	48"	14"	12"	1 - 42" 1 - 18"



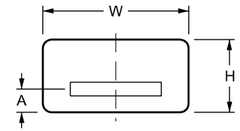
INTERSTATE SHIELD (3 DIGITS)

W	H	A	B	BAR LENGTH
45"	36"	11"	9"	1 - 38" 1 - 18"
60"	48"	14"	12"	1 - 54" 1 - 45" 1 - 18"

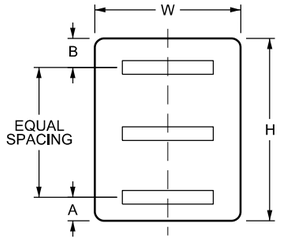


PENNANT SIGN

H	A	B	C	D	BAR LENGTH
30"	40"	10"	8"	12"	1-21" 1-16"
36"	48"	13"	10"	15"	1-27" 1-20"
48"	64"	18"	12"	20"	1-40" 1-24"



FOR SIGNS WITH H < 18"
USE 1 BAR _



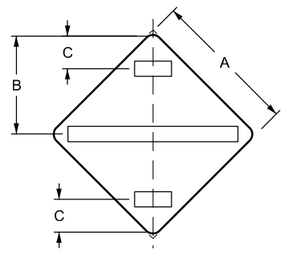
FOR SIGNS WITH 18" < H < 36"
USE 2 BARS _

FOR SIGNS WITH 36" < H < 60"
USE 3 BARS _

FOR SIGNS WITH H > 60"
USE 4 BARS

RECTANGULAR SIGNS

W	A	B	BAR LENGTH
12" TO 21"	5"	8"	W - 4" SEE NOTE 3
24" TO 30"	5"	8"	W - 6" SEE NOTE 3
36" TO 120"	5"	8"	W - 6"



DIAMOND SIGN

A	B	C	BAR LENGTH
30"	CENTERED	9"	2 - 12" 1 - 36"
36"	CENTERED	10"	2 - 12" 1 - 43"
48"	CENTERED	12"	2 - 12" 1 - 60"
60"	CENTERED	15"	2 - 18" 1 - 77"

NOTES:

1. TYPES OF MOUNTING BAR THAT MAY BE USED:
   A. Z-BAR - REFER TO STD DWG SN 9B FOR REQUIREMENTS.
   B. LARGE CORNER ANGLE CHANNEL - REFER TO STD DWG SN 10 FOR REQUIREMENTS.
2. AFFIX MOUNTING BAR TO SIGN PANEL AS SHOWN ON SN 9 SERIES STD DWGS.
3. SIGN PANELS 30 INCHES WIDE AND LESS DO NOT REQUIRE MOUNTING BAR UNLESS PLACED ON A COMMON POST WITH OTHER SIGNS REQUIRING MOUNTING BAR. USE THE SAME STYLE OF MOUNTING BAR FOR ALL SIGNS ON A COMMON POST.
4. ADJUST MOUNTING BAR AND FASTENER PLACEMENT SLIGHTLY TO MINIMIZE IMPACT TO THE LEGEND DEPENDING ON SIGN LEGEND AND STYLE OF MOUNTING BAR USED.
5. REFER TO STD DWG SN 7 FOR BAR PLACEMENT ON SIGNS PLACED BACK-TO-BACK AT AN ANGLE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN, STANDARDS COMMITTEE
APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

MOUNTING BAR PLACEMENT FOR SMALL SIGNS

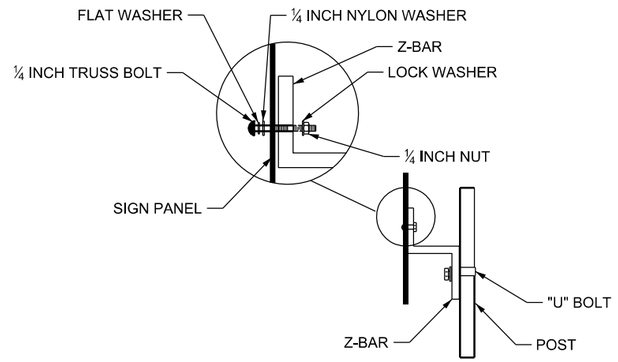
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 8

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch B (SN,ST)\SN08.dgn

ATTACHMENT TO POST WITH Z-BAR AND U-BOLT

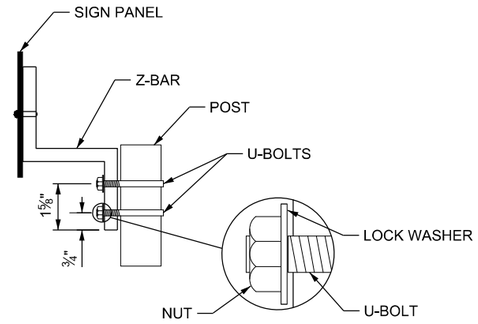
FOR SIGN PANEL 36 INCH WIDE



1. USE THIS INSTALLATION WHEN SIGN IS ON A SINGLE POST WITH MULTIPLE Z-BARS.
2. USE A LONG U-BOLT. REFER TO STD DWG SN 9B FOR U-BOLT REQUIREMENTS.
3. STAINLESS STEEL POP-RIVETS WITH WASHER MAY BE SUBSTITUTED FOR TRUSS BOLT.

ATTACHMENT TO POST - SINGLE Z-BAR AND DOUBLE U-BOLT

FOR SIGN PANELS WITH 24 INCH HEIGHT OR LESS

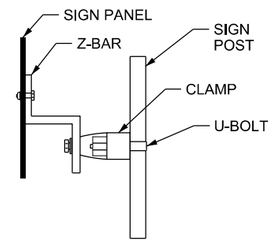


1. USE THIS INSTALLATION WHEN SIGN PANEL HAS ONLY ONE Z-BAR AND IS ATTACHED TO A SINGLE PANEL.
2. USE TWO LONG U-BOLTS. REFER TO STD DWG SN 9B FOR U-BOLT REQUIREMENTS.

ATTACHMENT TO POST WITH Z-BAR AND CLAMP

FOR DOUBLE POST APPLICATIONS

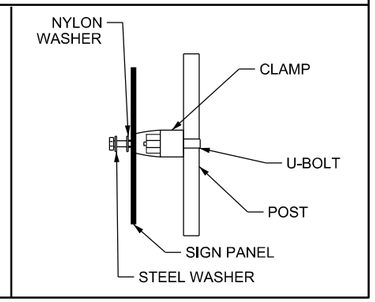
Z-BAR AND SADDLE REQUIRED WHEN SIGN IS MOUNTED ON DOUBLE POSTS.



ATTACHMENT TO POST WITH CLAMP

FOR SIGN PANEL 30 INCH WIDE OR LESS

1. USE WITH P3, P4, AND P5 POSTS ON A SINGLE POST. DO NOT USE WITH MULTIPLE POSTS.
2. REFER TO STD DWG SN 9B FOR CLAMP AND HARDWARE REQUIREMENTS.



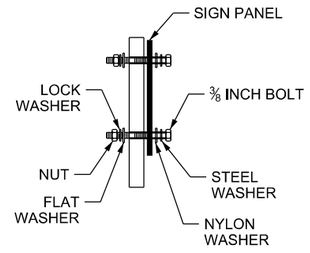
SIGN PANEL TO POST DIRECT CONNECTION

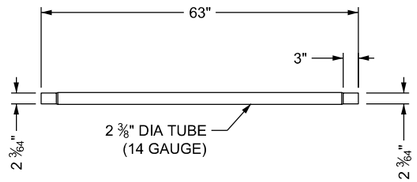
FOR SIGN PANEL 30 INCH WIDE OR LESS WITH PREPUNCHED POST

BOLT & WASHER REQUIREMENTS

1. USE WITH P1 AND P2 POSTS.
2. HARDWARE:
   - ⅜ x 3 INCH LONG BOLT
   - ⅜ INCH DIA HEX HEAD BOLT WITH NUT
   - ⅜ INCH DIA STEEL FLAT WASHER
   - ⅜ INCH DIA STEEL LOCK WASHER
   - ⅜ INCH DIA NYLON WASHER
3. GALVANIZE ALL STEEL COMPONENTS EXCEPT AS NOTED.

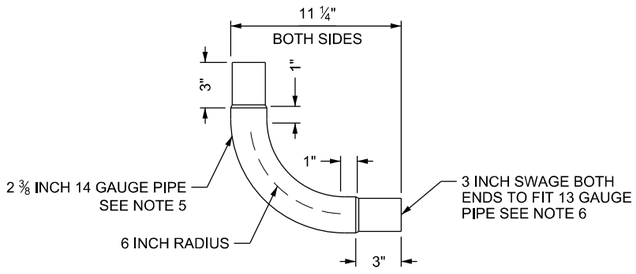
ASSEMBLY





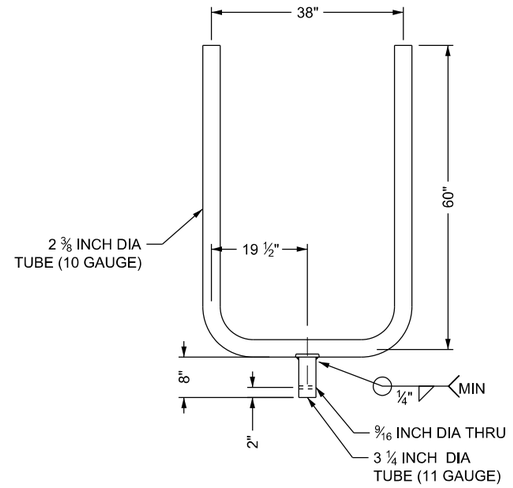
EXTENSION

SEE NOTES 4 AND 7



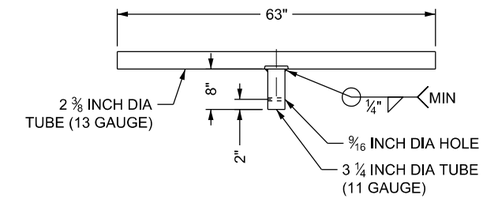
90 DEGREE POST EXTENSION

SEE NOTE 6



"U" BRACKET

SEE NOTE 7



"T" BRACKET

SEE NOTE 7

NOTES:

1. GALVANIZE PIPE TO MEET ASTM A 513.
2. COAT WELD JOINTS WITH ZINC RICH PAINT.
3. CUTTING OF "T" OR "U" BRACKET OR EXTENSION TO MEET REQUIRED LENGTH OR HEIGHT IS ACCEPTABLE. COAT CUT ENDS WITH ZINC RICH PAINT.
4. SWAGE ENDS OF EXTENSION TO PROVIDE A SNUG FIT IN A 2 ⅜ INCH DIA (10 BWG) TUBING.
5. 2 ⅜ INCH DIA 14 BWG TUBING PER ASTM A 787 AWG FABRICATED FROM GALVANIZED STEEL SHEET 0.083 INCH THICK, ASTM A 653 SS GRADE G90. REMETALIZE WELD SEAM USING ZINC WIRE ACCORDING TO ASTM B 833. TUBE OD WILL BE TREATED WITH CHROMATE CONVERSION SOLUTION AND PROTECTED WITH CLEAR ACRYLIC FILM.
6. BEND 90 DEGREES AND SWAGE 3 INCH ON BOTH ENDS. SWAGE TO BE 1 INCH FROM TANGENT POINT OF BEND RADIUS TO SHOULDER OF SWAGE. SWAGE TO FIT SNUG IN 13 GAUGE PIPE.
7. SWAGE 3 INCH ON BOTH ENDS. SWAGE TO FIT SNUG IN 13 GAUGE PIPE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	UPDATED REFERENCES AND NOTE 6, ADDED NOTE 7

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

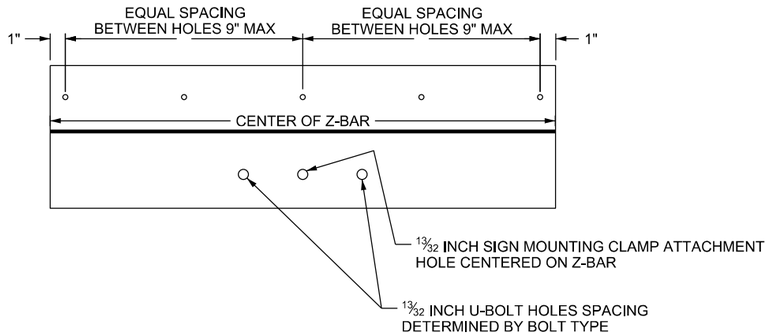
TUBULAR STEEL SIGN MOUNTING REQUIREMENTS

STANDARD DRAWING TITLE

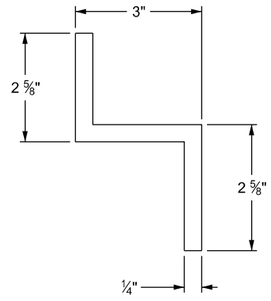
STD. DWG. NO.

SN 9A

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN09A.dgn
23-JUN-2020



Z-BAR DETAIL



Z-BAR END VIEW

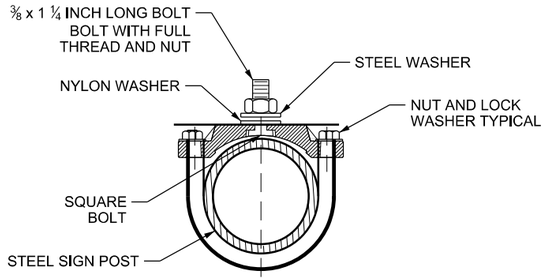
Z-BAR ASTM B 221-6061T6

DIMENSIONS FOR MOUNTING CLAMPS

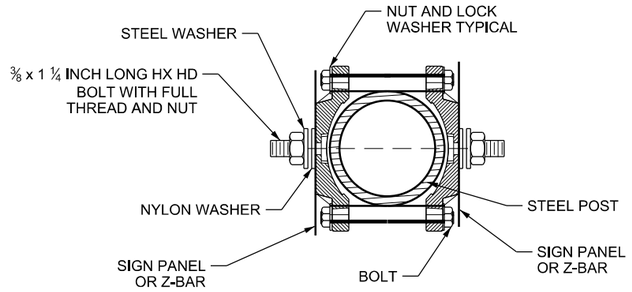
POST TYPE	A	B	C	D	E	F	H	I	L	R1	R2
P1 - P2	3 3/4	2 3/4	1 1/2	1 1/8	1/2	3/16	1	2 11/16	1 7/32	1 1/4	1 3/16
P3 - P4 - P5	4 1/4	3 1/4	2	1 1/4	1/2	1/4	1	3 3/16	1 15/32	1 1/2	1 7/16

DIMENSIONS FOR STEEL CLAMP

POST TYPE	SIZE	J	K	L	M	N	GA
P1 - P2	2 3/4	4 3/16	3 3/16	4 1/4	2 7/8	1 7/8	12
P3 - P4 - P5	3 1/4	4 13/16	3 11/16	4 1/2	3 3/8	2 1/8	12

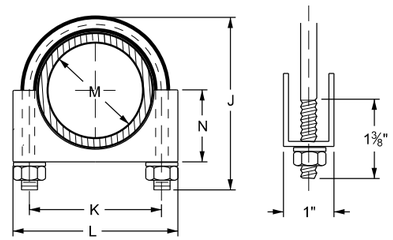


TYPICAL SINGLE BRACKET

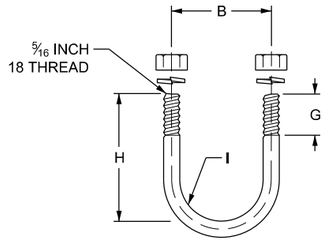


TYPICAL BACK TO BACK

P1 AND P2 BOLT LENGTH 3/8 x 4 INCH LONG
P3, P4, & P5 BOLT LENGTH 3/8 x 4 1/2 INCH LONG
WITH STEEL LOCK WASHER AND NUT



STEEL CLAMP



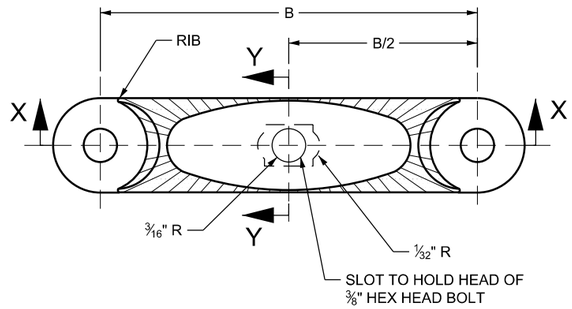
U-BOLT

USE 9/32 OR 5/16 INCH DIA U-BOLTS.

USE AMERICAN STANDARD REGULAR SEMI-FINISHED HEX NUTS AND LOCKWASHERS.

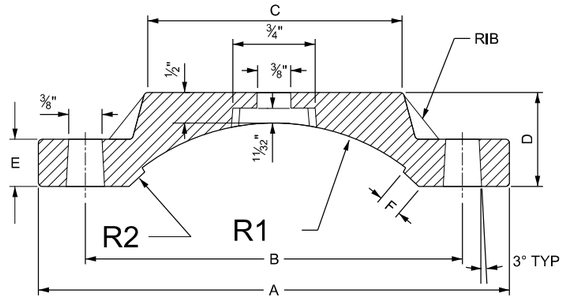
USE A U-BOLT WITH A "H" LENGTH OF 4 1/2 INCH WHEN SIGN PANEL HAS Z-BAR. MOUNT SIGN PANEL DIRECTLY TO SIGN SUPPORT. NO MOUNTING CLAMP REQUIRED.

SIGN MOUNTING CLAMP FOR SOCKET OR SLIPBASE

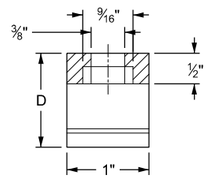


PIPE CLAMP CASTING

PIPE CLAMP CASTING: ASTM B 85
OR ALUMINUM ALLOY ANSI 360.0



SECTION X-X



SECTION Y-Y

NOTES:

1. USE GALVANIZING CONFORMING TO ASTM A 135 FOR ALL COMPONENTS NOT MADE FROM ALUMINUM.
2. REFER TO STD DWG SN 9A FOR SIGN MOUNTING REQUIREMENTS.

NO.	DATE	APPR.	REMARKS
REVISIONS			

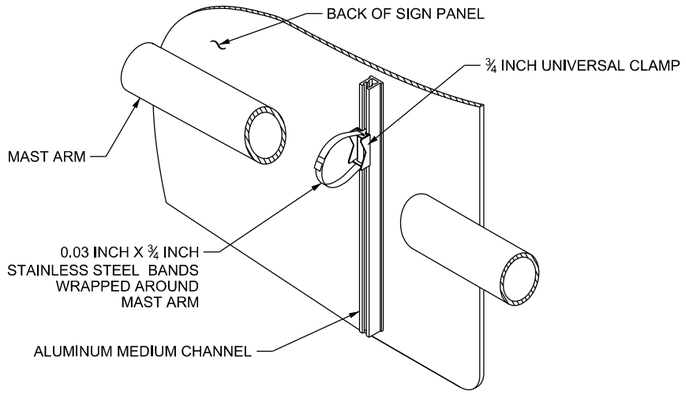
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

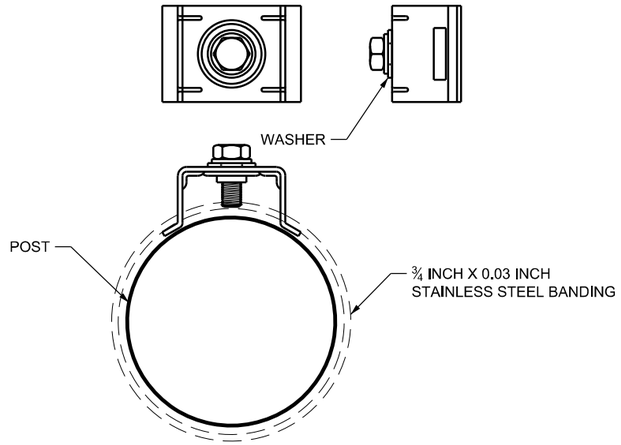
TUBULAR STEEL
SIGN MOUNTING
HARDWARE
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 9B

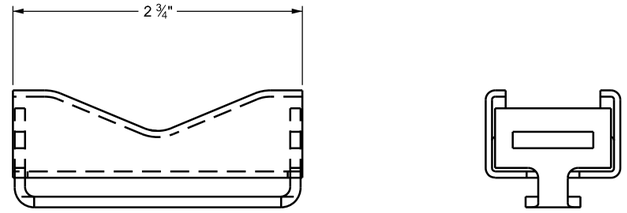
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,STY\SN09B.dgn
23-JUN-2020



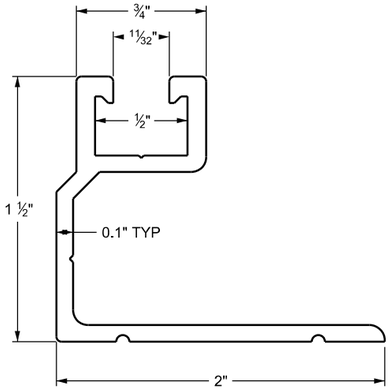
MAST ARM SIGN MOUNTING



¾ INCH THREADED STRAPPING BRACKET

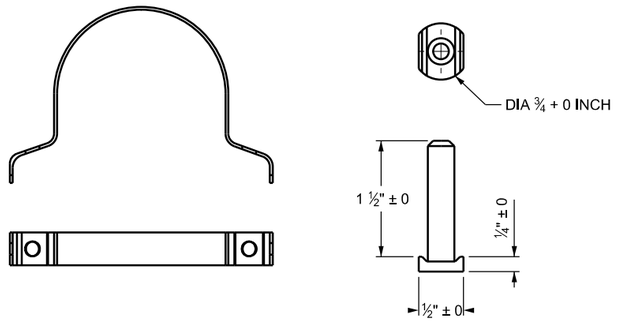


¾ INCH UNIVERSAL CLAMP

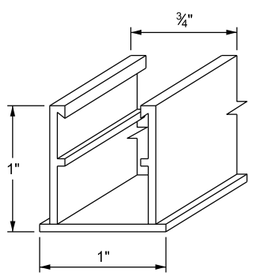


LARGE CORNER ANGLE CHANNEL

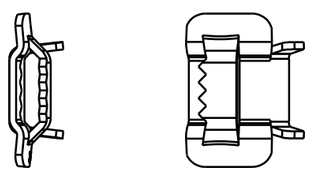
SEE NOTE 3



CLAMP FOR LARGE CORNER ANGLE



ALUMINUM MEDIUM CHANNEL



¾ INCH STRAPPING BUCKLE

NOTES:

1. USE WITH ¾ INCH STAINLESS STEEL BANDING.
2. ATTACH LARGE CORNER ANGLE TO SIGN PANEL WITH BOLTS, TAPPING SCREWS, OR POP RIVETS AS SPECIFIED. USE VHP TAPE ONLY WHEN SHOP APPLIED. NO FIELD APPLIED ADHESIVE IS ALLOWED.
3. USE Z-BAR OR LARGE CORNER ANGLE INTERCHANGEABLY AT Z-BAR LOCATIONS SHOWN ON STD DWG SN 8.
4. SEE SL SERIES STD DWGS FOR MAST ARM SIGN MOUNTING DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

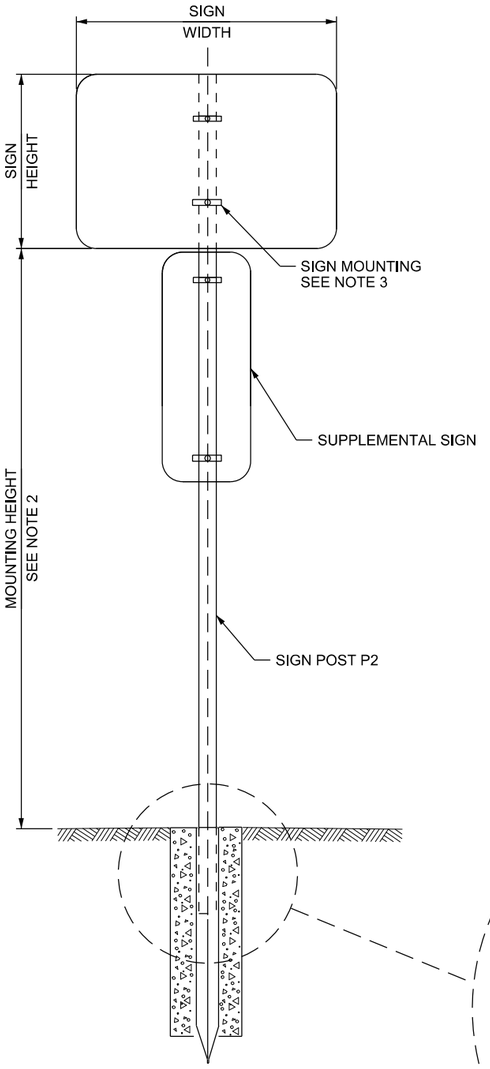
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

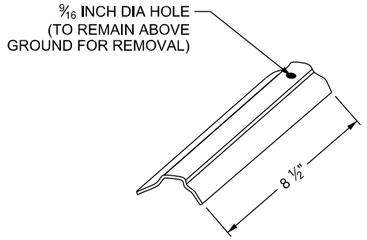
BANDING MOUNTING BRACKETS AND CLAMPS

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 10

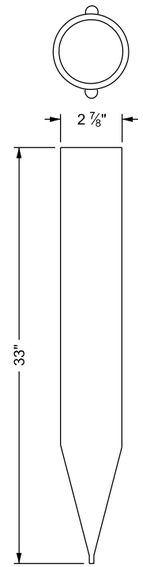
DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN10.dgn
23-JUN-2020





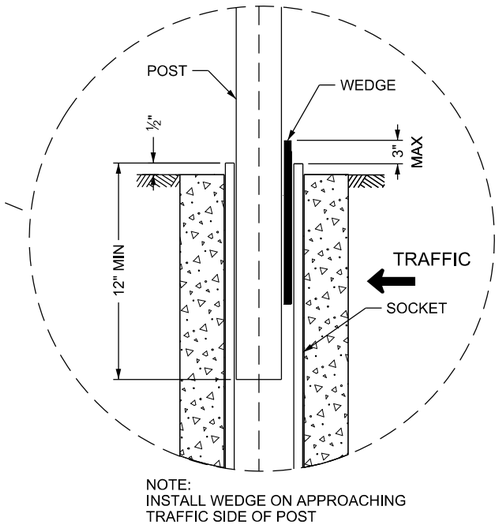
WEDGE

11 GA GALVANIZED
STEEL ASTM A 526 G-90

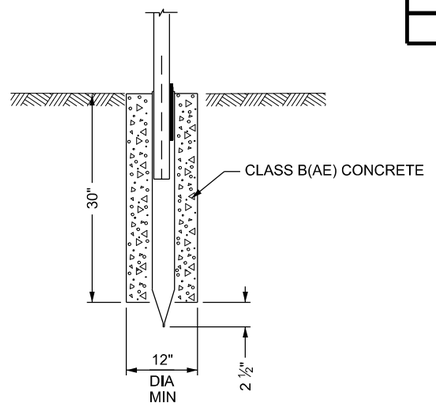


TUBULAR SOCKET

12 GA GALVANIZED
STEEL ASTM A 787



NOTE:
INSTALL WEDGE ON APPROACHING
TRAFFIC SIDE OF POST



CONCRETE FOUNDATION

SEE NOTE 1

SMALL SIGN TUBULAR STEEL POST BASE (B1)

(SOCKET SYSTEM)
(SINGLE POST APPLICATION ONLY)

POST SELECTION GUIDE *					
	SIGN WIDTH (FT.)				
		1	2	2.5	3
SIGN HEIGHT(FT.)	1	P2	P2	P2	P2
	2	P2	P2	P2	P2
	2.5	P2	P2	P2	P2
	3	P2	P2	P2	P2
	4	P2	P2	P2	P2

* POST SELECTION GUIDE ASSUMES A 7 FT MOUNTING HEIGHT FROM BOTTOM OF SIGN. INCREASE POST ONE SIZE FOR ADDITIONAL FOOT OF MOUNTING HEIGHT. MAXIMUM MOUNTING HEIGHT 8 FT. ANOTHER SIGN BASE OPTION IS REQUIRED IF MOUNTING HEIGHT REQUIREMENTS ARE GREATER.

POST SIZE DETERMINED BY BASE MANUFACTURER'S WIND LOADING REQUIREMENTS.

POST DETAIL CHART (SINGLE POST ONLY)			
POST TYPE	OUTSIDE DIAMETER	WALL THICKNESS	MATERIAL AND COATING REQUIREMENTS
P2 **	2 3/8 INCH	0.095 INCH (13 GAUGE)	SEE SECTION 02891
**DO NOT USE "T" OR "U" BRACKET ON P2 POSTS.			

NOTES:

1. CONCRETE FOUNDATION REQUIRED IN ALL INSTALLATIONS.
2. REFER TO SN 2 SERIES STD DWGS FOR MOUNTING HEIGHT AND OFFSET REQUIREMENTS.
3. REFER TO STD DWG SN 8 FOR SIGN MOUNTING REQUIREMENTS.
4. ALLOW FOR 7 DAY CURE TIME BEFORE INSTALLING SIGN POST.
5. PRE-PUNCH POST WITH 3/8 INCH HOLES, MOUNT SIGN DIRECTLY TO POST OR USE MOUNTING CLAMP SHOWN ON SN 9B. SPACING OF HOLES FROM TOP IN INCHES ARE AS FOLLOWS:

   1, 3, 10, 16, 21, 23, 24, 27, 33, 37, 39, AND 45

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	REVISED NOTE B FOR CONSISTENCY WITH OTHER DRAWINGS
2	4/30/20	JW	MASH UPDATES

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

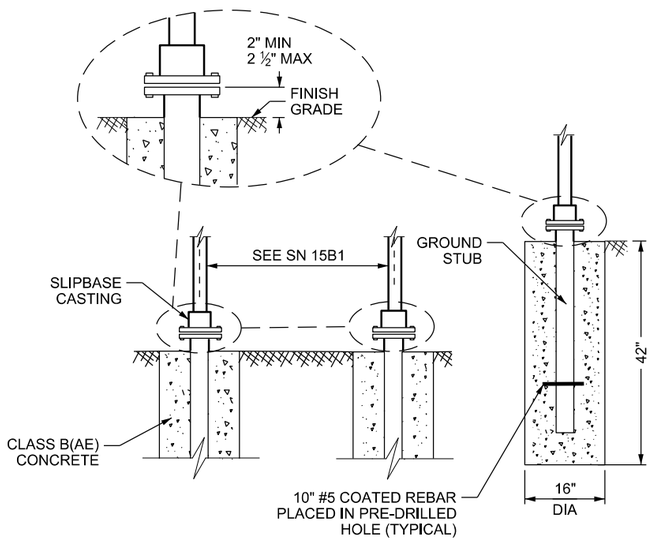
SMALL SIGN TUBULAR STEEL POST BASE WITH CONCRETE (B1) (SOCKET SYSTEM)
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 11A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN11A.dgn
23-JUN-2020

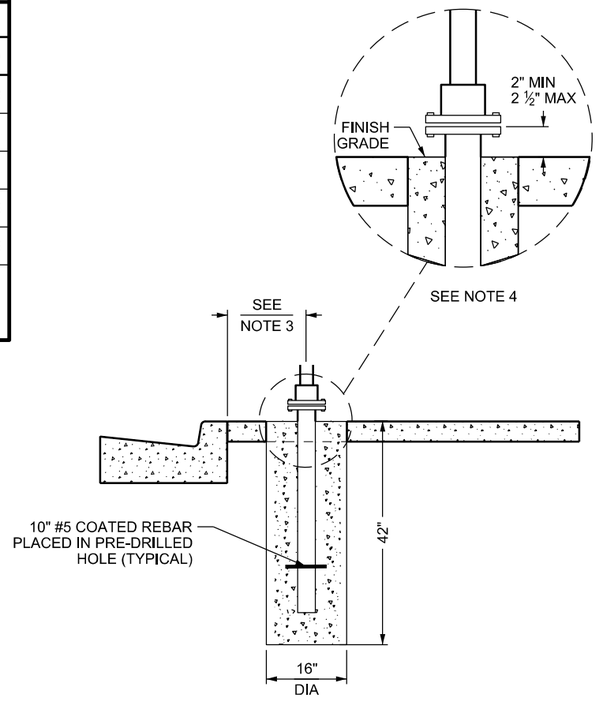
POST SELECTION SINGLE POST APPLICATION							
		SIGN WIDTH (FT.)					
			2	2.5	3	4	5
SIGN HEIGHT(FT.)	1					P3	P3
	2					P3	P3
	2.5					P3	P3
	3					P4	P4
	4					P4	P4
	5		P3	P3	P4	P4	P5
	6		P3	P3	P4	P5	P5
	7		P3	P3	P4	P5	P5

POST SELECTION DOUBLE POST APPLICATION							
		SIGN WIDTH (FT.)					
		5	6	7	8	9	10
SIGN HEIGHT(FT.)	2	P3	P3	P3	P3	P3	P3
	3	P3	P3	P3	P3	P4	P4
	4	P3	P3	P4	P4	P4	P4
	5	P4	P4	P4	P4	P5	P5
	6	P4	P4	P5	P5	P5	P5
	7	P4	P5	P5	P5	P5	
	8	P5	P5	P5	P5		



SLIPBASE GROUND STUB FOUNDATION DETAIL

APPLIES TO SINGLE AND DOUBLE POST APPLICATIONS



SLIPBASE DETAIL FOR SIDEWALK

NOTES:

1. REFER TO STD DWG SN 12B FOR POST REQUIREMENTS.
2. REFER TO SN 9 SERIES STD DWGS FOR MOUNTING AND HARDWARE REQUIREMENTS.
3. REFER TO SN 2 SERIES STD DWGS FOR HEIGHT AND OFFSET REQUIREMENTS.
4. CORE DRILL SLIPBASE HOLE. INSTALL SLIPBASE AFTER PLACEMENT OF FINISHED GRADE.
5. PLACE TOP OF SLIPBASE STUB FLUSH WITH TOP OF THE ISLAND, WITH A TOLERANCE OF + ⅛ INCH, FOR ISLAND INSTALLATION (DO NOT PLACE BELOW TOP OF CURB).
6. USE THE LOWER VALUE WHEN THE SIGN WIDTH OR HEIGHT FALLS BETWEEN TWO VALUES, FOR POST AND SPACING REQUIREMENTS.
7. ALLOW FOR 7 DAY CURE TIME BEFORE INSTALLING SIGN POST. PRECAST SIGN FOUNDATION MAY BE USED.
8. SEE STD DWG SN 15F FOR BREAKAWAY SUPPORT STUB HEIGHT MEASUREMENT.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	ADDED NOTE A AND POST SIZES TO SMALLER SIGNS IN TABLES, UPDATED SHEET TITLE
2	04/30/20	JW	MASH AND CONCRETE UPDATE

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

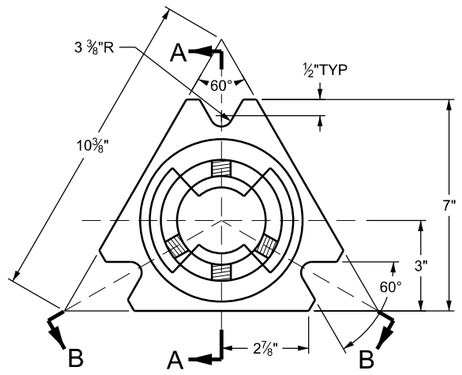
STANDARD DRAWING TITLE

SLIPBASE SIGN BASE (B3) INSTALLATION

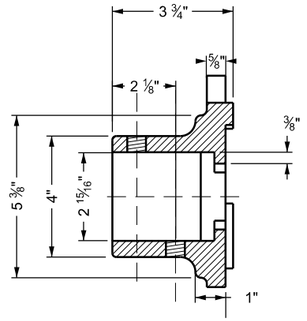
STD. DWG. NO.

SN 12A

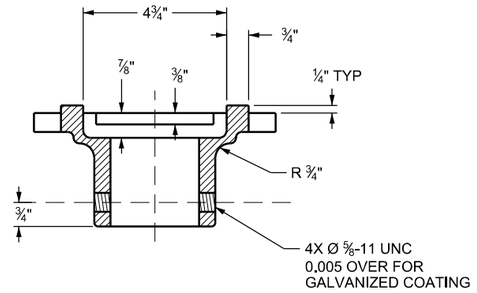
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN12A.dgn
23-JUN-2020



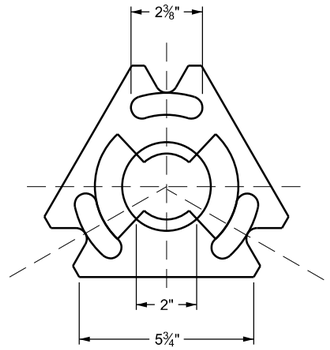
TOP VIEW



SECTION A-A

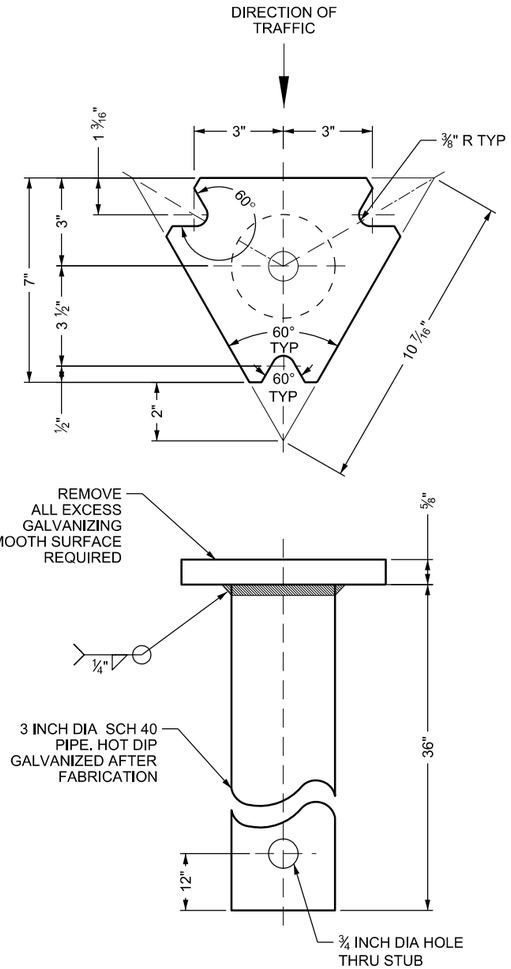


SECTION B-B



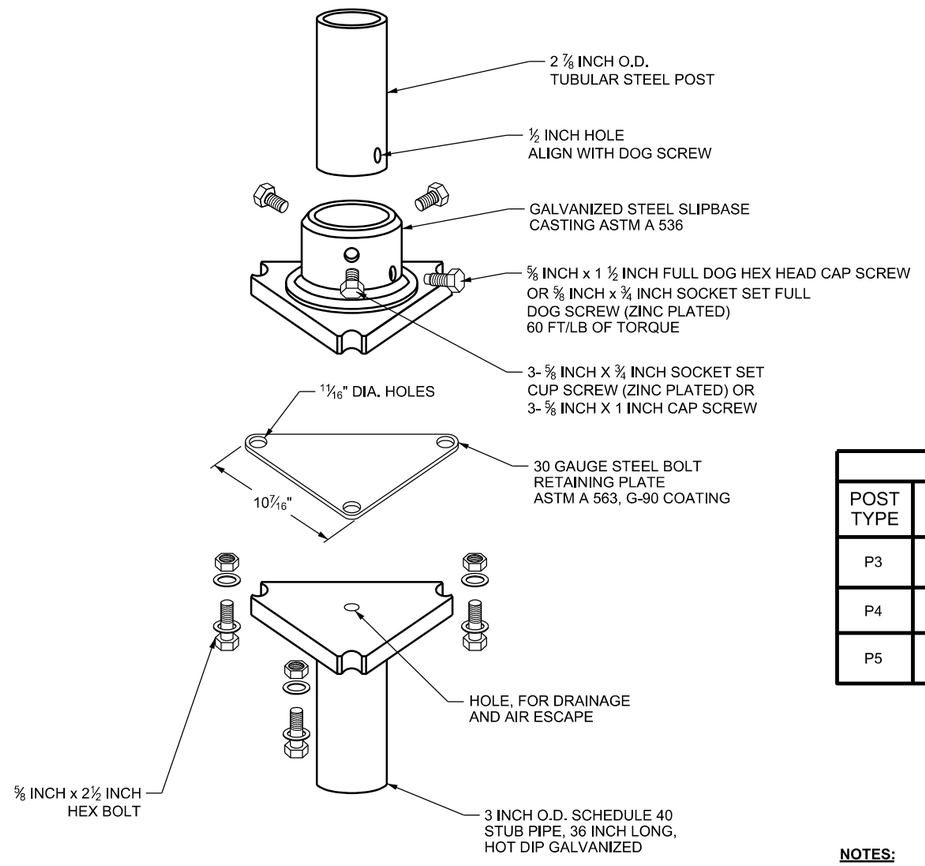
BOTTOM VIEW

SLIPBASE CASTING



SLIPBASE GROUND STUB BASE

ASTM A 536



TYPICAL ASSEMBLY

POST DETAIL CHART			
POST TYPE	OUTSIDE DIAMETER	WALL GAUGE THICKNESS	MATERIAL AND COATING REQUIREMENTS
P3	2 ⅞ INCH	0.134 INCH (BWG 10)	SEE STANDARD SPECIFICATION 02891
P4	2 ⅞ INCH	0.160 INCH (NP 40)	
P5	2 ⅞ INCH	0.276 INCH (SCH 80)	

NOTES:

1. REFER TO STD DWG SN 12A FOR SLIPBASE GROUND STUB FOUNDATION DETAIL.
2. TORQUE BOLTS 40 TO 80 FT-LBS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

ROUND POST
SLIPBASE
SIGN BASE (B3)
HARDWARE

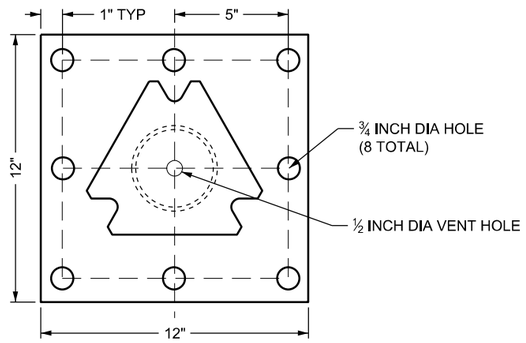
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 12B

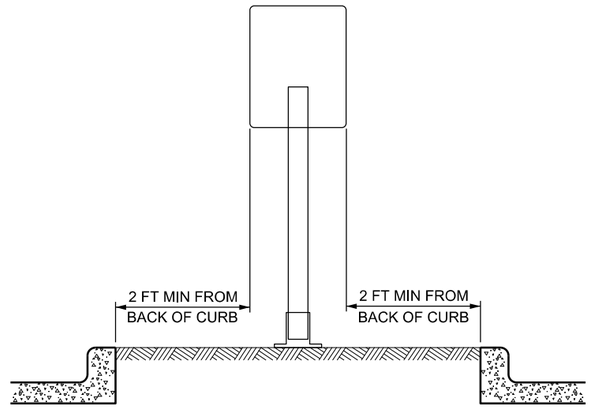
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,STY\SN12B.dgn
23-JUN-2020

BASE PLATE FABRICATION REQUIREMENTS:
BASE PLATE: ½ INCH ASTM A 36 PLATE STEEL
PIPE STUB: 3 INCH NOMINAL SCHEDULE 40,
ASTM A 53 GBR
TOP PLATE: MEET REQUIREMENTS OF
STD DWG SN 12A
GROUND STUB TOP PLATE REQUIREMENTS

MEET ASTM A 123 GALVANIZING AFTER FABRICATION IS COMPLETED.

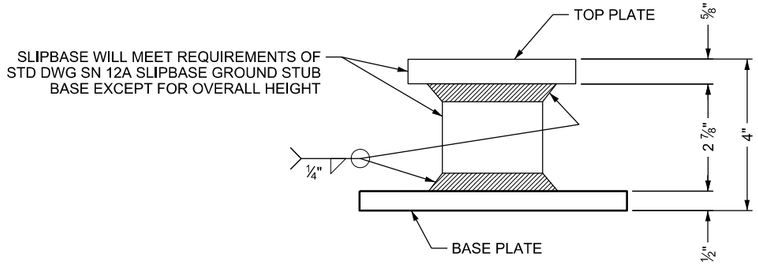


BASE PLATE DETAIL



PLACEMENT DETAIL

SEE NOTE 4



MOUNTING HARDWARE:

8- EACH ⅝ x 6 INCH MECHANICAL WEDGE ANCHORS.
8- EACH ⅝ INCH FLAT WASHERS
8- EACH ⅝ INCH LOCK WASHERS
8- EACH ⅝ INCH NUTS
ALL HARDWARE WILL BE GALVANIZED OR ZINC PLATED.

INSTALLATION REQUIREMENTS:
DRILL: (8) - ⅝ INCH HOLES 6 ½ INCH DEEP, CLEAN HOLE PRIOR TO INSTALLING ANCHORS

SLIPBASE TUBULAR STEEL SIGN BASE SURFACE MOUNT (B4A) FOR 2 7/8 INCH POSTS (P3, P4 OR P5 POSTS)

NOTES:

1. USE P3, P4, OR P5 POST. SEE STD DWGS SN 12B AND SN 12C.
2. REFER TO STD DWG SN 12A FOR ACCEPTABLE TOP CASTING AND ASSEMBLY REQUIREMENTS.
4. REFER TO SN 2 SERIES STD DWGS FOR OFFSET NOT ADDRESSED IN PLACEMENT DETAIL AND FOR HEIGHT REQUIREMENT.
5. DO NOT INSTALL SIGN BASE ON PLOWABLE END SECTIONS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

STANDARD DRAWING TITLE
SURFACE MOUNTED TUBULAR STEEL SIGN BASE (B4A)

STD. DWG. NO.
SN 12D

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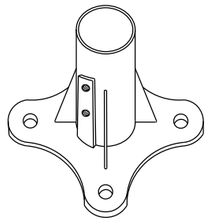
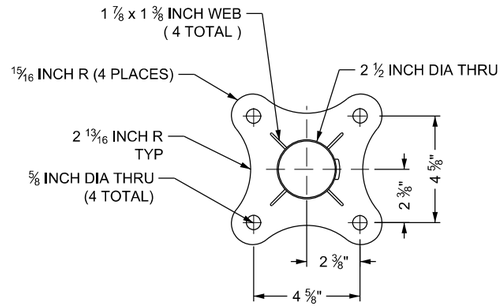
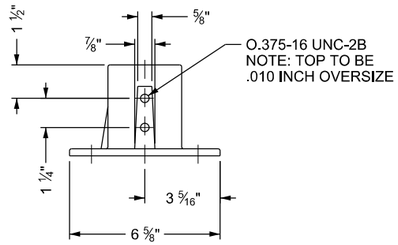
23-JUN-2020

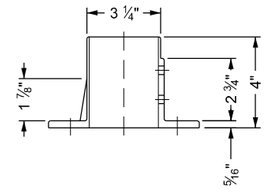


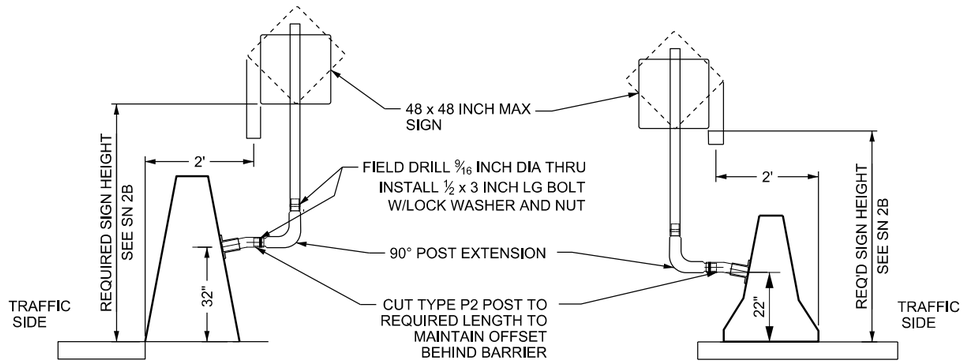
BASE CASTING

ASTM A 536 65-45-12
DUCTILE IRON
SEE NOTE A







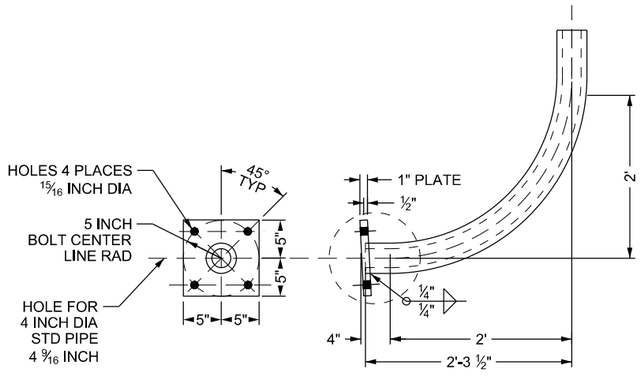


HORIZONTAL INSTALLATION NOTE: USE A 90 DEGREE POST EXTENSION WHEN MOUNTED HORIZONTALLY. REFER TO STD DWG SN 9A FOR POST EXTENSION REQUIREMENTS. FORM SIGN SUPPORT SYSTEM SO SIGN POST IS PLUMB.

HORIZONTAL INSTALLATION

MOUNTING HARDWARE:
4- EACH ½ x 4 INCH MECHANICAL WEDGE ANCHORS.
4- EACH ½ INCH FLAT WASHERS
4- EACH ½ INCH LOCK WASHERS
4- EACH ½ INCH NUTS
2- EACH BEVELED WASHERS. REQUIRED FOR HORIZONTAL MOUNTING ONLY.
ALL HARDWARE WILL BE GALVANIZED OR ZINC PLATED.

INSTALLATION REQUIREMENTS:
DRILL: 4 - ½ INCH HOLES 4 ½ INCHES DEEP,
CLEAN HOLE PRIOR TO INSTALLING ANCHORS



SIDE MOUNTED BARRIER BASE

TUBULAR STEEL SIGN BASE SURFACE MOUNT (B4B)
FOR 2 3/8 INCH DIAMETER POSTS (P1 OR P2 POSTS)

NOTES:

1. USE P1 OR P2 POST. REFER TO STD DWG SN 11A.

DESIGN-ONLY NOTES:

A. USE BASE CASTING INSTALLATION ONLY ON ROADS WITH POSTED SPEED OF 45 MPH OR LOWER AND ONLY IN RETROFIT INSTALLATIONS AS DIRECTED BY THE REGION TRAFFIC ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	RENUMBERED NOTES AND UPDATED NOTE A AND SIDE MOUNTED BARRIER DETAIL TITLE

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

SIDE MOUNTED TUBULAR STEEL SIGN BASE (B4B)

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 13

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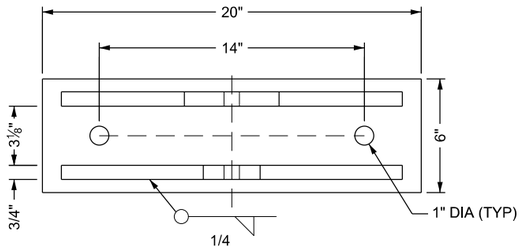
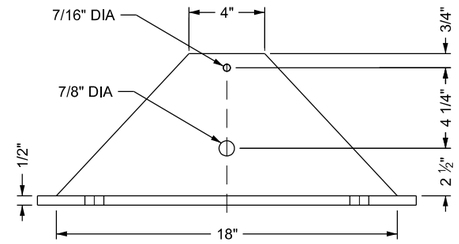
23-JUN-2020

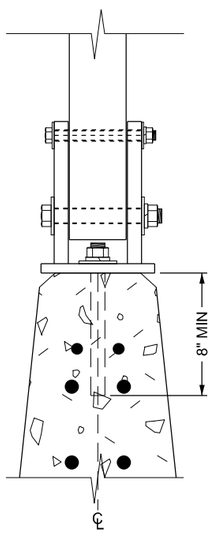


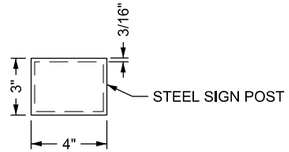
TOP VIEW



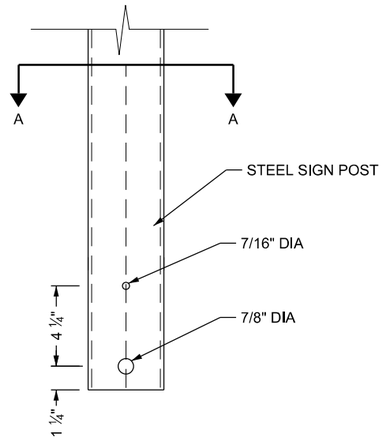
SIDE VIEW

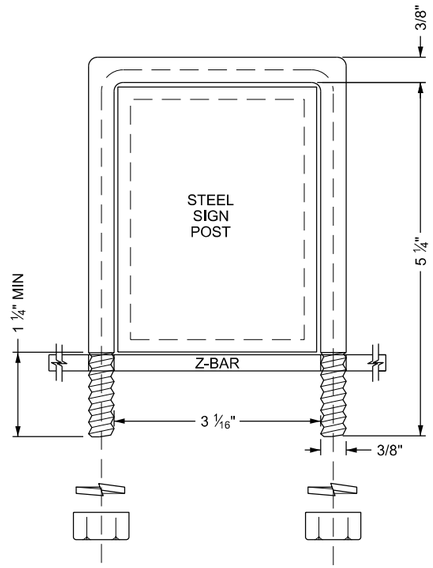
PIVOT SIGN BASE



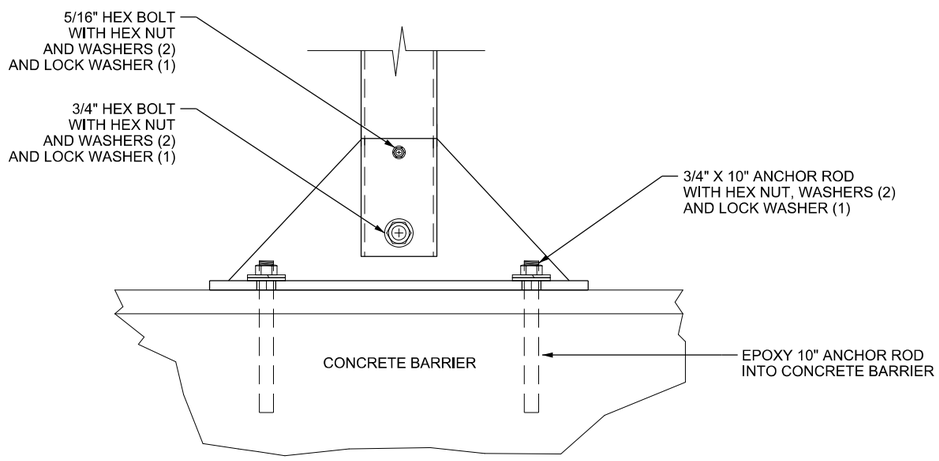


SECTION A-A





BRACKET DETAIL



NOTES:

1. USE 32 SQ FT MAXIMUM SIGN PANEL AREA.
2. USE SIGN BASE IN MEDIAN APPLICATIONS ONLY, WITH MINIMUM SHOULDER WIDTH OF 4 FT AND MINIMUM BARRIER HEIGHT OF 32 INCH.
3. REFER TO STD DWG SN 2B FOR SIGN MOUNTING HEIGHT AND WIDTH REQUIREMENTS.
4. POST LENGTH DETERMINED BY SIGN SIZE.
5. USE ASTM A 36 STEEL FOR PIVOT SIGN BASE.
6. MEET ASTM A 123 GALVANIZING AFTER FABRICATION IS COMPLETE.
7. STEEL SIGN POST TO MEET STANDARD SPECIFICATION 02891.
8. USE BOLTS, NUTS AND WASHERS CONFORMING TO ASTM F3125, GRADE A325.
9. DURING INSTALLATION, IF REBAR IS ENCOUNTERED, ADJUST THE BRACKET LOCATION LONGITUDINALLY. FILL ANY UNUSED HOLES WITH EPOXY.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	2/28/2019	JW	NEW DRAWING.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

MEDIAN CONCRETE BARRIER PIVOT SIGN BASE

STANDARD DRAWING TITLE

STD. DWG. NO.

SN 14

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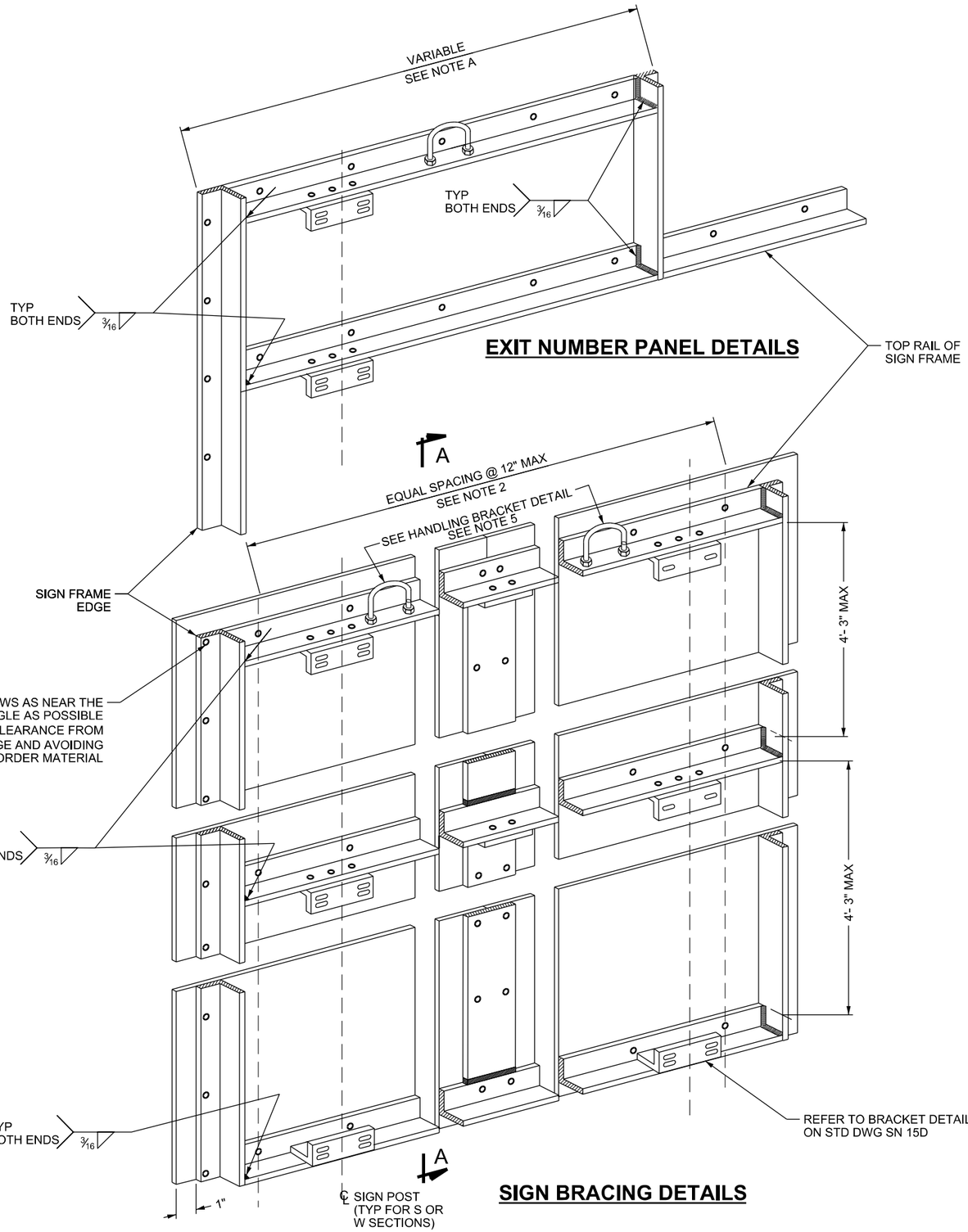
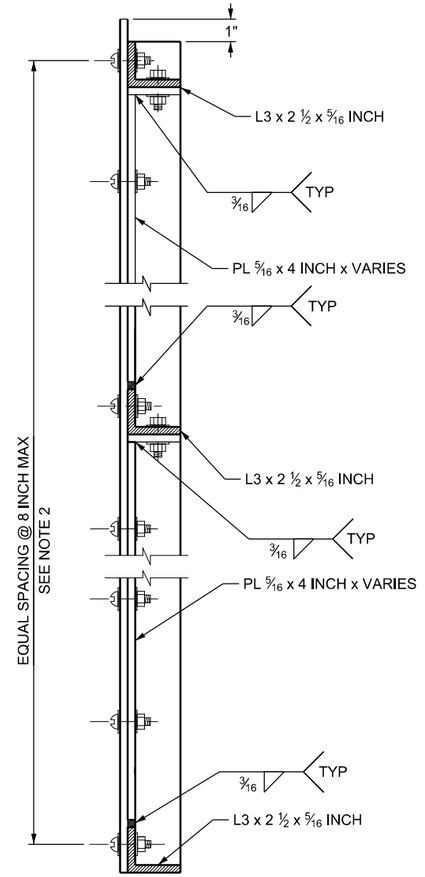
23-JUN-2020



EXIT NUMBER PANEL DETAILS

SIGN BRACING DETAILS



SECTION A-A

NOTES:

1. REFER TO STD DWG SN 15B1 FOR GENERAL NOTES.
2. USE ¼ INCH STAINLESS STEEL FASTENERS WITH A NYLON WASHER AND A STAINLESS STEEL WASHER. FASTENERS MAY BE EITHER 18-8 ROUND HEAD MACHINE SCREWS THAT CONFORM TO ASTM A 314, CLASS 304 WITH A STAINLESS NUT OR POP-RIVETS THAT CONFORM TO ASTM A 502, GRADE 1.
3. USE GALVANIZED HARDWARE EXCEPT AS NOTED.
4. GALVANIZE FRAME TO MEET AASHTO M 111 (ASTM A 123).
5. REFER TO STD DWG SN 15D FOR SIGN FRAME BRACKET DETAILS.
6. BUILD BOTTOM OF SIGNS WITH SUBSTRATE FLUSH WITH THE FRAME. BUILD SIDES AND TOP OF SIGN WITH UP TO 1 INCH OVERHANG FROM FRAME.
7. THIS DRAWING DOES NOT APPLY TO OVERHEAD SIGNS.

DESIGN- ONLY NOTES:

A. DESIGN EXIT NUMBER PANEL WIDTH FOR EACH SIGN.

B. USE AN EXIT NUMBER PANEL WIDTH EQUAL TO THE SIGN PANEL WIDTH WHEN THE WIDTH DIFFERENTIAL IS 1 FT- 6 INCHES OR LESS.

REVISIONS				
NO.	DATE	APPR.		REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

GROUND MOUNT SIGN
FRAME FABRICATION
DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 15A

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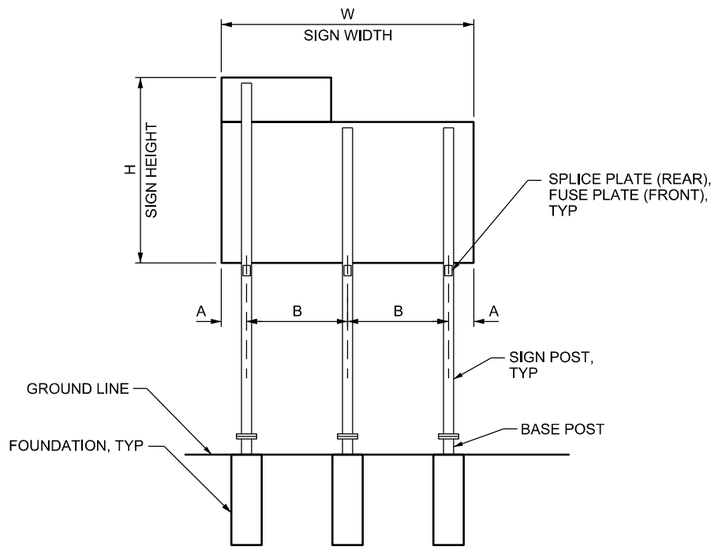
23-JUN-2020



TYPICAL ELEVATION

TWO POSTS		
SIGN WIDTH, W	POST SPACING	
	A	B
6 FT	1'- 0"	4'- 0"
7 FT	1'- 0"	5'- 0"
8 FT	1'- 0"	6'- 0"
9 FT	1'- 0"	7'- 0"
10 FT	1'- 0"	8'- 0"
11 FT	1'- 6"	8'- 0"
12 FT	2'- 0"	8'- 0"
13 FT	2'- 6"	8'- 0"
14 FT	3'- 0"	8'- 0"
15 FT	3'- 6"	8'- 0"
16 FT	4'- 0"	8'- 0"

THREE AND FOUR POSTS			
SIGN WIDTH, W		POST SPACING	
3 POSTS	4 POSTS	A	B
17 FT	25 FT	1'- 0"	7'- 6"
18 FT	26 FT	1'- 0"	8'- 0"
19 FT	27 FT	1'- 6"	8'- 0"
20 FT	28 FT	2'- 0"	8'- 0"
21 FT	29 FT	2'- 6"	8'- 0"
22 FT	30 FT	3'- 0"	8'- 0"
23 FT	31 FT	3'- 6"	8'- 0"
24 FT	32 FT	4'- 0"	8'- 0"

TABLE NOTES

1. ROUND DOWN SIGN WIDTH TO FIND "B" WHEN SIGN WIDTH FALLS BETWEEN TWO VALUES IN THE TABLE.
2. INCREASE "A" SO THAT SIGN IS CENTERED ON THE POST GROUP.

DESIGN DATA

AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 1ST EDITION 2015

STRUCTURAL STEEL:	Fy = 35 KSI (PIPE) Fy = 36 KSI (S- AND W-SHAPES; PLATES)
STRUCTURAL CONCRETE:	f'c = 3.0 KSI n = 8 CLASS A(AE) fy (REINF) = 60 KSI
WIND:	EXTREME EVENT WIND SPEED = 76 MPH SERVICE WIND SPEED = 76 MPH EXPOSURE CATEGORY D
FATIGUE:	FATIGUE CATEGORY I NATURAL WIND GUST = 11.2 MPH
SOIL:	SEE SOIL CONDITIONS TABLE ON STD DWG SN 15B2 TOP 1.5D (CONCRETE SHAFT) OF COHESIVE SOILS DOES NOT CONTRIBUTE IN EMBEDMENT CALCULATIONS

SN 15 SERIES STD DWGS GENERAL NOTES:

1. USE STRUCTURAL STEEL CONFORMING TO ASTM A 53, GRADE B FOR PIPE (STANDARD WEIGHT) AND ASTM A 36 FOR S- AND W-SHAPES AND PLATES.
2. USE BOLTS, NUTS, AND WASHER CONFORMING TO ASTM F3125, GRADE A325.
3. USE A ¼ INCH FILLET WELD FOR MATERIAL LESS THAN OR EQUAL TO ¾ INCH. USE A 5/16 INCH FILLET WELD FOR MATERIAL GREATER THAN ¾ INCH.
4. SAW CUT OR SHEAR PLATES. NO FLAME CUTTING IS ALLOWED.
5. MEET AASHTO M 111 (ASTM A 123) FOR GALVANIZING AFTER FABRICATION IS COMPLETED.
6. REFER TO STD DWG SN 2A AND 2B FOR SIGN HEIGHT AND SIGN OFFSET REQUIREMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	5/25/2020	JW	CONCRETE CLASS UPDATE TO CLASS A(AE).
1	5/25/2020	JW	REMOVED REVISION NOTES AND DESIGN NOTE.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

FREEWAY SIGN GENERAL REQUIREMENTS

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 15B1

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JUN-2020

POST AND FOUNDATION TABLE

SIGN HEIGHT, H	SIGN WIDTH, W — ONE POST			TWO POSTS												THREE POSTS		FOUR POSTS	
	3'-0"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0" TO 24'- 0"	25'-0"	26'-0" TO 32'-0"
1'-0"				S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-9"	S3 x 5.7 3'-9"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S3 x 5.7 4'-0"/4'-0"	S4 x 9.5 4'-0"/4'-0"	S3 x 5.7 4'-0"/4'-0"	S4 x 9.5 4'-0"/4'-0"
1'- 6"				S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-6"	S3 x 5.7 3'-9"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-0"/4'-0"	S4 x 9.5 4'-3"/4'-0"
2'- 0"				S3 x 5.7 3'-9"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S3 x 5.7 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"
2'- 6"				S3 x 5.7 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"
3'- 0"	3" Ø 4'-0"/4'-0"	4" Ø 4'-0"/4'-0"	4" Ø 4'-3"/4'-0"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-0"/3'-9"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-3"
4'- 0"	4" Ø 4'-0"/4'-0"	4" Ø 4'-3"/4'-0"	5" Ø 4'-6"/4'-0"	S4 x 9.5 4'-3"/3'-9"	S4 x 9.5 4'- 3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S4 x 9.5 4'-3"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"
5'- 0"	4" Ø 4'-3"/4'-0"	5" Ø 4'-6"/4'-0"	5" Ø 4'-6"/4'-3"	S4 x 9.5 4'-3"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"
6'- 0"	5" Ø 4'-6"/4'-0"	5" Ø 4'-9"/4'-3"	6" Ø 4'-9"/4'-3"	S4 x 9.5 4'-6"/4'-0"	S6 x 12.5 4'-6"/4'-0"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 12.5 5'-0"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"
7'- 0"	5" Ø 4'-9"/4'-0"	6" Ø 5'-0"/4'-3"	6" Ø 5'-0"/4'-6"	S6 x 12.5 4'-9"/4'-0"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 5'-6"/4'-9"
8'- 0"	5" Ø 4'-9"/4'-3"	6" Ø 5'-0"/4'-3"	6" Ø 5'-6"/4'-6"	S6 x 12.5 4'-9"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"
9'- 0"	6" Ø 5'-0"/4'-3"	6" Ø 5'-6"/4'-6"	8" Ø 5'-6"/4'-6"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-0"/4'-3"	S6 x 12.5 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/5'-0"	W10 x 19 6'-0"/5'-0"	S8 x 18.4 6'-0"/5'-0"	W10 x 19 6'-0"/5'-0"	S8 x 18.4 6'-0"/5'-0"	W10 x 19 6'-0"/5'-0"	
10'- 0"	6" Ø 5'-6"/4'-3"	8" Ø 5'-6"/4'-6"	8" Ø 6'-0"/5'-0"	S6 x 12.5 5'-6"/4'-3"	S6 x 17.25 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"	S8 x 18.4 5'-6"/4'-6"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-6"	W10 x 19 6'-6"/5'-6"	W10 x 19 6'-6"/5'-6"	
11'- 0"				S6 x 17.25 5'-6"/4'-6"	S6 x 17.25 5'-6"/4'-6"		S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-6"	W10 x 22 6'-6"/5'-6"	W10 x 19 6'-6"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 19 6'-6"/5'-6"	W10 x 22 7'-0"/5'-6"	
12'- 0"				S6 x 17.25 5'-6"/4'-6"			S8 x 18.4 6'-0"/4'-9"	S8 x 18.4 6'-0"/4'-9"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	
13'- 0"							S8 x 18.4 6'-6"/4'-9"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 26 7'-0"/5'-6"	W10 x 26 7'-0"/5'-6"	W10 x 26 7'-6"/5'-6"	W10 x 26 7'-0"/5'-6"	W10 x 26 7'-6"/5'-6"	
14'- 0"							W10 x 19 6'-6"/5'-0"	W10 x 19 6'-6"/5'-0"	W10 x 19 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 26 7'-6"/5'-6"	W10 x 26 7'-6"/6'-0"	W10 x 26 7'-6"/5'-6"	W10 x 30 7'-6"/6'-0"	W10 x 26 7'-6"/5'-6"	W10 x 30 7'-6"/6'-0"	
15'- 0"							W10 x 19 7'-0"/5'-0"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 22 7'-0"/5'-6"	W10 x 26 7'-6"/5'-6"	W10 x 26 7'-6"/5'-6"	W10 x 26 7'-6"/5'-6"	W10 x 30 7'-6"/6'-0"	W10 x 30 7'-6"/6'-0"	W10 x 30 8'-0"/6'-0"	W10 x 30 7'-6"/6'-0"	W10 x 30 8'-0"/6'-0"	
16'- 0"							W10 x 22 7'-0"/6'-0"	W10 x 22 7'-0"/6'-0"	W10 x 22 7'-6"/6'-0"	W10 x 26 7'-6"/6'-0"	W10 x 30 7'-6"/6'-0"	W10 x 30 7'-6"/6'-6"	W10 x 30 8'-0"/6'-6"	W10 x 30 8'-0"/6'-6"	W10 x 30 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 30 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	
17'- 0"							W10 x 22 7'-0"/6'-0"	W10 x 22 7'-6"/6'-0"	W10 x 26 7'-6"/6'-0"	W10 x 26 7'-6"/6'-0"	W10 x 30 8'-0"/6'-6"	W10 x 30 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	
18'- 0"							W10 x 22 7'-6"/6'-0"	W10 x 26 7'-6"/6'-0"	W10 x 26 7'-6"/6'-0"	W10 x 30 8'-0"/6'-6"	W10 x 30 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	
19'- 0"							W10 x 26 7'-6"/6'-0"	W10 x 26 8'-0"/6'-0"	W10 x 30 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 45 8'-6"/7'-0"	W10 x 39 8'-6"/6'-6"	W10 x 45 8'-6"/7'-0"	W10 x 39 8'-6"/6'-6"	W10 x 45 8'-6"/7'-0"	
20'- 0"							W10 x 26 8'-0"/6'-0"	W10 x 30 8'-0"/6'-6"	W10 x 39 8'-0"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	
21'- 0"							W10 x 30 8'-0"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 49 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 49 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 49 9'-0"/7'-0"	
22'- 0"							W10 x 30 8'-0"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 8'-6"/6'-6"	W10 x 39 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 45 9'-0"/7'-0"	W10 x 49 9'-6"/7'-0"	W10 x 49 9'-6"/7'-0"	W10 x 49 9'-6"/7'-0"	W10 x 49 9'-6"/7'-0"	W10 x 49 9'-6"/7'-0"	W10 x 49 9'-6"/7'-0"	

SEE NOTE 3

SEE NOTE 6

SEE NOTE 4

TABLE KEY

TOP VALUE: PIPE DIAMETER (Ø) OR STRUCTURAL SHAPE

BOTTOM VALUE: MINIMUM FOUNDATION EMBEDMENT - SOFT OR LOOSE SOIL/MEDIUM SOIL

SOIL CONDITIONS TABLE

SOFT OR LOOSE SOIL		MEDIUM SOIL	
COHESIVE	GRANULAR	COHESIVE	GRANULAR
MOIST UNIT WEIGHT = 110 PCF COHESION (C) = 750 PSF STRAIN FACTOR (E50) = 0.01 SOIL MODULUS (K) = 100 PCI	UNIT WEIGHT = 115 PCF SHEAR STRENGTH = 30° SOIL MODULUS (K) = 50 PCI	MOIST UNIT WEIGHT = 125 PCF COHESION (C) = 1,500 PSF STRAIN FACTOR (E50) = 0.007 SOIL MODULUS (K) = 500 PCI	UNIT WEIGHT = 125 PCF SHEAR STRENGTH = 34° SOIL MODULUS (K) = 90 PCI

NOTES:

1. SEE STD DWG SN 15B1 FOR GENERAL NOTES.
2. USE THE HIGHER VALUES WHEN SIGN HEIGHT OR WIDTH FALLS BETWEEN TWO VALUES.
3. USE OF Z-BAR IS PERMITTED FOR SIGN APPLICATIONS WITHIN NOTE 3 AREA, SEE STD DWG SN 8. DO NOT USE Z-BAR FOR MULTIPANEL SIGN APPLICATIONS.
4. USE SOLID POSTS (NON-BREAKAWAY) WITHIN NOTE 4 AREA. PLACE W10 X 39 AND LARGER POSTS BEHIND BARRIER AND OUTSIDE BARRIER LENGTH OF NEED.
5. USE EMBEDMENT VALUES FOR SOFT OR LOOSE SOIL CONDITIONS UNLESS OTHERWISE SHOWN.
6. CONTACT UDOT CENTRAL TRAFFIC AND SAFETY FOR SIGN SIZES NOT LISTED IN POST AND FOUNDATION TABLE.
7. USE FOUNDATION DEPTH FROM THE POST AND FOUNDATION TABLE UNDER THE SOFT OR LOOSE SOIL CONDITION UNLESS STATED OTHERWISE IN THE PROJECT CONTRACT OR APPROVED BY THE ENGINEER BASED ON A GEOTECHNICAL ENGINEERING ANALYSIS THAT DEMONSTRATES THAT THE SITE MEETS OR EXCEEDS THE MEDIUM SOIL CONDITION FROM THE SOIL CONDITIONS TABLE.
8. SOLID (NON-BREAKAWAY) POSTS SHOULD BE USED WHEN SIGN IS PROTECTED FROM VEHICLE IMPACTS BY PLACEMENT BEHIND BARRIER AND OUTSIDE THE LENGTH OF NEED.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/22/18	CGW	ADDED MISSING NOTE 3 REFERENCE TO TABLE AND UPDATED NOTE 4.
2	2/28/19	JW	ADDED SOLID POST REQUIREMENT REFERENCE TO TABLE.
2	2/28/19	JW	ADDED NEW NOTE 4, RENUMBERED NOTE 4 TO 5.
3	5/25/20	JW	ADDED NOTE 6, REMOVED POSTS FROM TABLE FOR CRASHWORTHINESS.
3	5/25/20	JW	REMOVED DESIGN ONLY NOTE A. MOVED DESIGN ONLY NOTE B TO NOTES

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

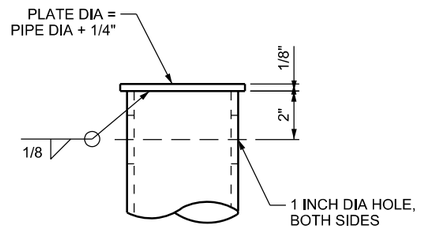
FREEWAY SIGN POST AND FOUNDATION REQUIREMENTS

STANDARD DRAWING TITLE

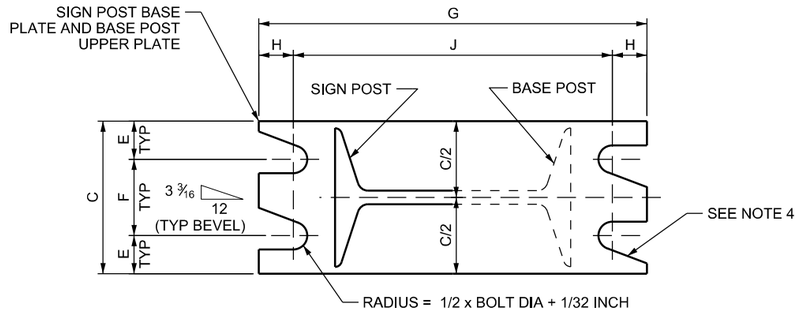
STD. DWG. NO.

SN 15B2

DGN File: D:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\SN15B2.dgn
JUN-2020

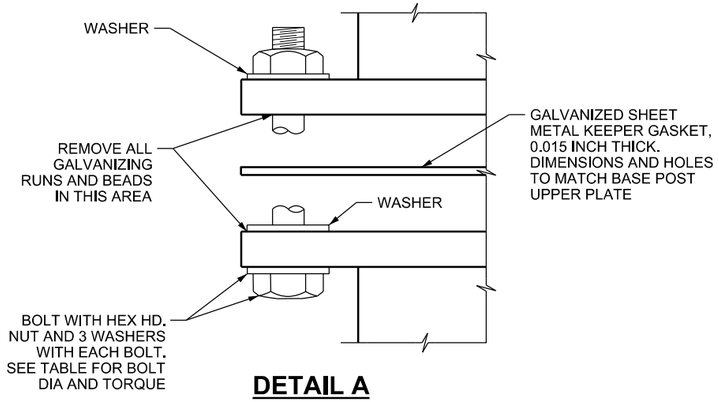


TOP OF PIPE DETAIL

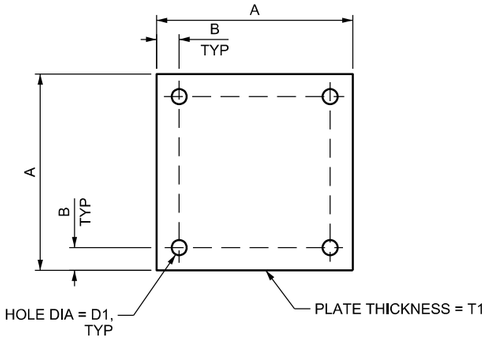


SECTION A - A

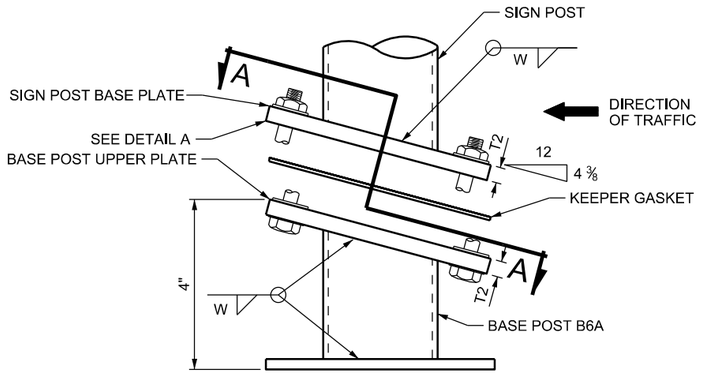
BASE POST B6B SHOWN,
B6A AND B6C SIMILAR



DETAIL A

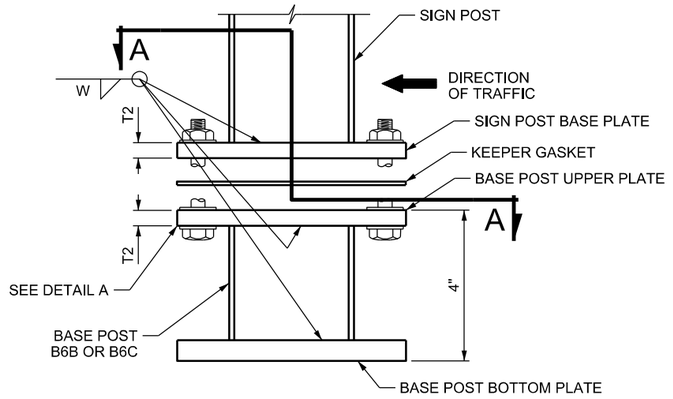


BASE POST BOTTOM PLATE DETAIL



BASE POST B6A ELEVATION

SEE NOTE 5



BASE POST B6B AND B6C ELEVATION

BASE CONNECTION TABLE

POST SIZE	BASE POST	BASE POST BOTTOM PLATE					BASE POST UPPER PLATE AND SIGN POST BASE PLATE								
		ANCHOR BOLT	A	B	D1	T1	BOLT SIZE AND TORQUE	C	E	F	G	H	J	T2	W
3" DIA STD PIPE	B6A	7/8" DIA x 2'- 6"	7 1/2"	1 1/2"	1"	3/4"	1/2" DIA x 2 1/2" 10 FT-LB TORQUE	4 1/2"	1"	2 1/2"	7 1/2"	3/4"	6"	3/4"	1/4"
4" DIA STD PIPE		7/8" DIA x 2'- 6"	8 1/2"	1 1/2"	1"	7/8"		5 1/2"	1"	3 1/2"	8 1/2"	3/4"	7"	3/4"	1/4"
5" DIA STD PIPE		7/8" DIA x 2'- 6"	10 1/2"	1 3/4"	1"	1"	5/8" DIA x 3 1/2" 24 FT-LB TORQUE	6 1/2"	1 1/4"	4"	10 1/4"	7/8"	8 1/2"	1"	1/4"
6" DIA STD PIPE			10 1/2"	1 3/4"	1"	1"		7 1/2"	1 1/4"	5"	11 1/2"	7/8"	9 3/4"	1"	5/16"
8" DIA STD PIPE		7/8" DIA x 2'- 6"	1'- 0 1/2"	2"	1"	1 1/4"		9 1/2"	1 1/4"	7"	1'- 2"	7/8"	1'- 0 1/4"	1"	5/16"
S3 x 5.7	B6B	7/8" DIA x 2'- 6"	7 1/2"	1 1/2"	1"	3/4"	1/2" DIA x 2 1/2" 10 FT-LB TORQUE	3"	3/4"	1 1/2"	7 1/2"	3/4"	6"	5/8"	3/16"
S4 x 9.5		7/8" DIA x 2'- 6"	8 1/2"	1 1/2"	1"	7/8"		3 1/2"	3/4"	2"	7 1/2"	3/4"	6"	5/8"	1/4"
S6 x 12.5		7/8" DIA x 2'- 6"	10 1/2"	1 3/4"	1"	1"	5/8" DIA x 3" 24 FT-LB TORQUE	4 1/2"	1 1/8"	2 1/4"	10"	3/4"	8 1/2"	3/4"	5/16"
S6 x 17.25		7/8" DIA x 2'- 6"	10 1/2"	1 3/4"	1"	1"		4 1/2"	1 1/8"	2 1/4"	10"	3/4"	8 1/2"	3/4"	5/16"
S8 x 18.4		7/8" DIA x 2'- 6"	1'- 0 1/2"	2"	1"	1 1/4"		5"	1 1/8"	2 3/4"	12"	3/4"	10 1/2"	3/4"	5/16"
W10 x 19	B6C	1 1/4" DIA x 2'- 6"	1'- 3"	2 1/4"	1 3/8"	1 3/4"	3/4" DIA x 3 1/2" 38 FT-LB TORQUE	6"	1 1/4"	3 1/2"	1'- 2 1/2"	7/8"	1'- 0 3/4"	1"	5/16"
W10 x 22		1 1/4" DIA x 2'- 6"	1'- 3"	2 1/4"	1 3/8"	1 3/4"		7"	1 1/2"	4"	1'- 3"	7/8"	1'- 1 1/4"	1"	5/16"
W10 x 26		1 1/4" DIA x 2'- 6"	1'- 3"	2 1/4"	1 3/8"	1 3/4"		7"	1 1/2"	4"	1'- 3"	7/8"	1'- 1 1/4"	1"	5/16"
W10 x 30		1 1/4" DIA x 2'- 6"	1'- 3"	2 1/4"	1 3/8"	1 3/4"	1" DIA x 3 1/2" 55 FT-LB TORQUE	7"	1 1/2"	4"	1'- 3"	7/8"	1'- 1 1/4"	1 1/8"	5/16"
W10 x 39		1 1/4" DIA x 2'- 6"	1'- 5 1/2"	2 1/2"	1 3/8"	1 3/4"		9"	1 3/4"	5 1/2"	1'- 3"	7/8"	1'- 1 1/4"	1 1/8"	5/16"
W10 x 45		1 1/4" DIA x 2'- 6"	1'- 5 1/2"	2 1/2"	1 3/8"	1 3/4"		9"	1 3/4"	5 1/2"	1'- 3"	7/8"	1'- 1 1/4"	1 1/8"	5/16"
W10 x 49		1 1/4" DIA x 2'- 6"	1'- 5 1/2"	2 1/2"	1 3/8"	1 3/4"		11"	1 3/4	7 1/2"	1'- 3"	7/8"	1'- 1 1/4"	1 1/8"	5/16"

NOTES:

1. REFER TO STD DWG SN 15B1 FOR GENERAL NOTES.
2. TIGHTEN BOLTS ONLY TO THE TORQUE LIMITS SHOWN IN THE TABLE. DO NOT OVER TIGHTEN.
3. USE THE SAME SHAPE FOR SIGN POST AND BASE POST.
4. BEVELS SHOWN IN SECTION A-A ARE FOR INSTALLATIONS ON RIGHT SHOULDER AND IN GORE. BEVELS ARE OPPOSITE HAND FROM THAT SHOWN FOR INSTALLATION ON LEFT SHOULDER.
5. USE BASE POST B6A FOR PIPE POST APPLICATIONS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
6. USE ASTM F1554 STEEL FOR ANCHOR BOLTS. USE GRADE 36 UNLESS NOTED OTHERWISE. FULLY TORQUE ANCHOR BOLTS.

DESIGN-ONLY NOTES:

A. DO NOT USE INCLINE BASE WHERE THERE IS A POTENTIAL OF A BACKSIDE IMPACT.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	2/28/2019	JW	MODIFIED PLATE AND BOLT DIMENSIONS.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

FREEWAY SIGN BASE POST REQUIREMENTS (B6A, B6B, AND B6C)

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 15C

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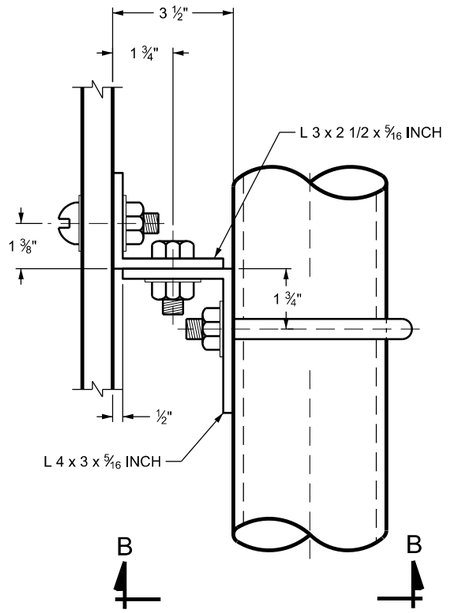
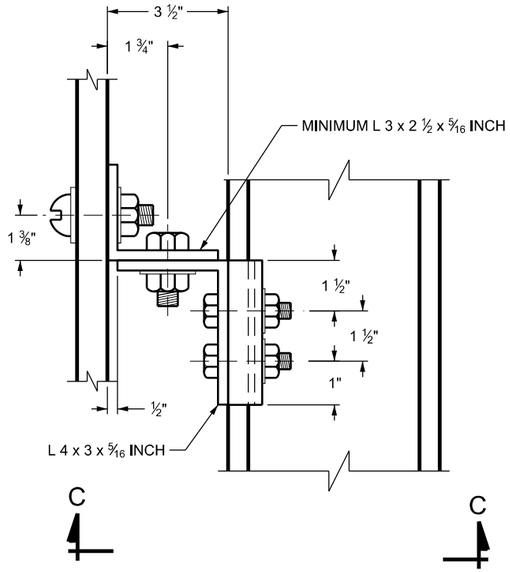
23-JUN-2020



BRACKET DETAIL



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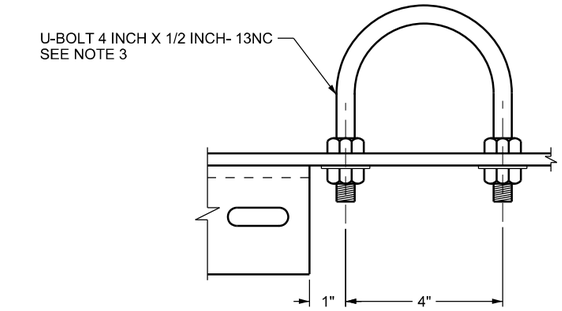
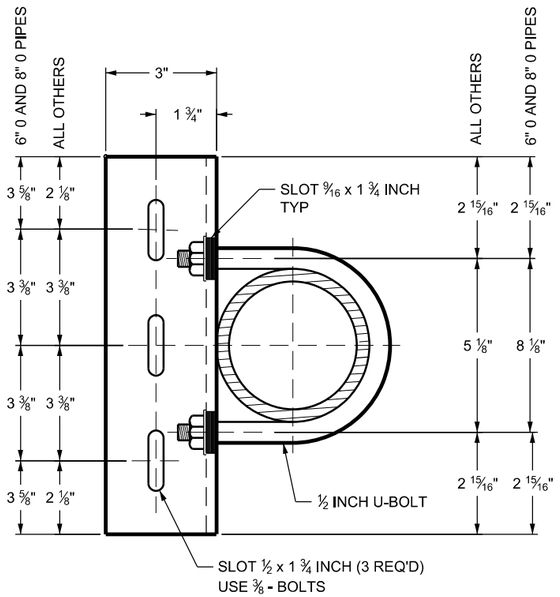


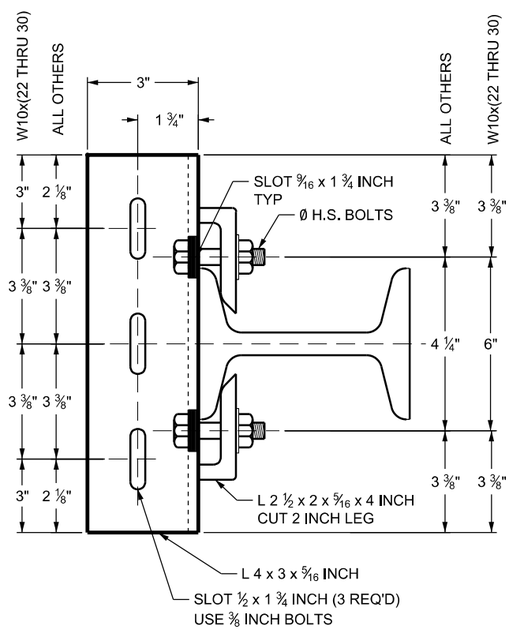
HANDLING BRACKET DETAIL

BRACKET DETAIL
SIDE VIEW
(FOR PIPE POST) SEE NOTE 2



SECTION B-B
TOP VIEW

BRACKET DETAIL
SIDE VIEW
(FOR S OR W POST) SEE NOTE 2



SECTION C-C
TOP VIEW

NOTES:

1. REFER TO STD DWG SN 15B1 FOR GENERAL NOTES.
2. Z-BAR TO POST ATTACHMENT ACCEPTABLE ACCORDING TO STD DWG SN 15B2 SIGN PANEL POST FOUNDATION TABLE.
3. USE GALVANIZED HARDWARE EXCEPT AS NOTED.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

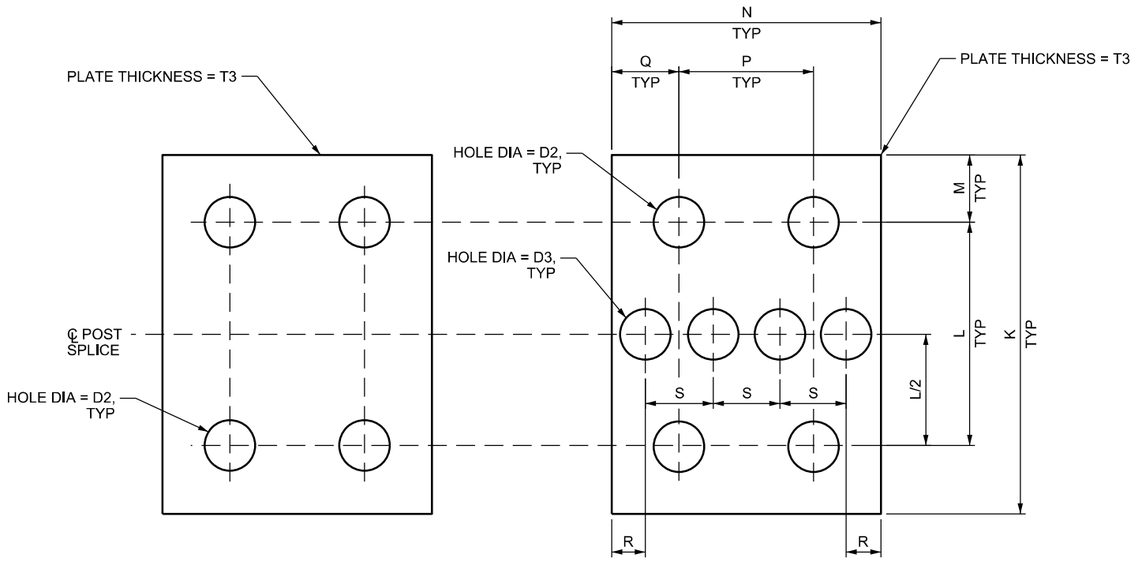
FREEWAY SIGN BRACKET DETAILS

STANDARD DRAWING TITLE

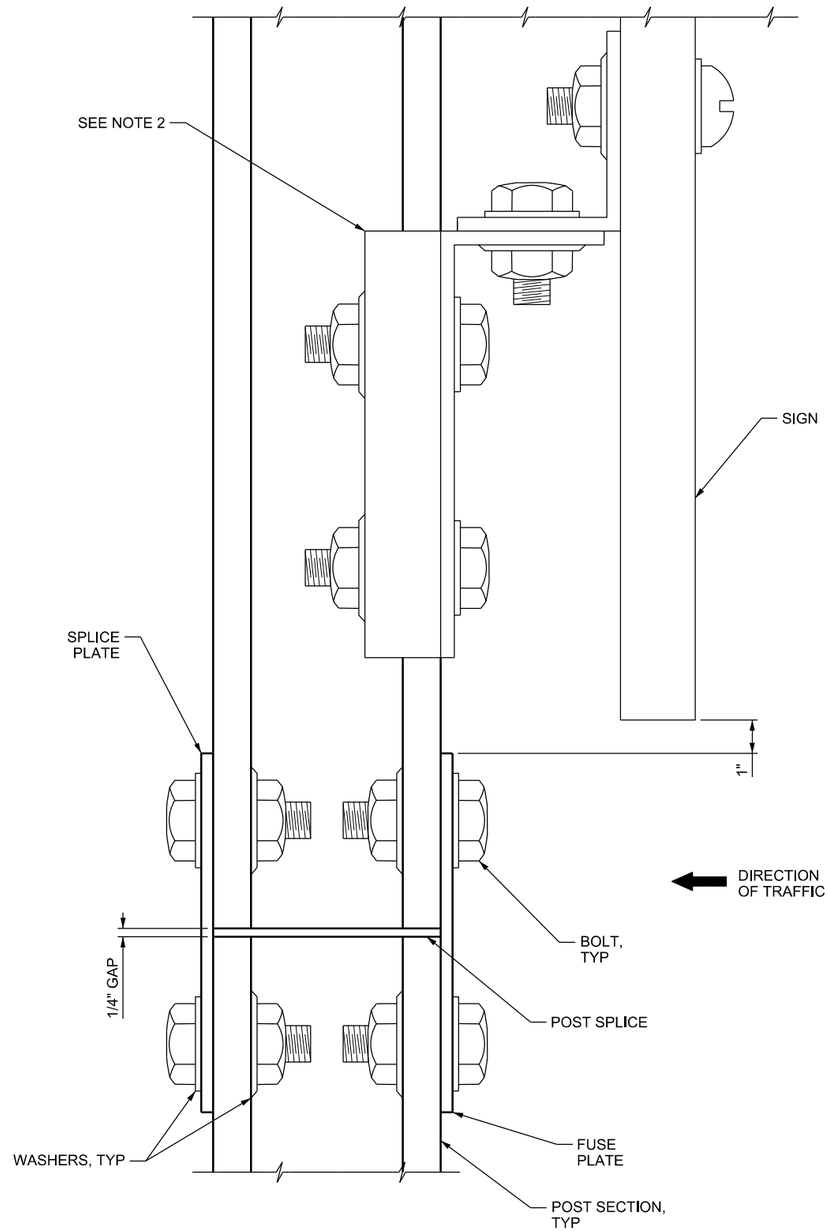
STD. DWG. NO.
SN 15D

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN15D.dgn
23-JUN-2020

FUSE PLATE AND SPLICE PLATE TABLE												
POST SIZE	K	L	M	N	P	Q	R	S	D2	D3	T3	BOLT SIZE
S3 x 5.7	3 1/2"	2 1/4"	5/8"	2 3/8"	1 1/2"	7/16"	11/32"	9/16"	5/8"	3/8"	1/4"	1/2"
S4 x 9.5	4 1/4"	2 1/4"	1"	2 5/8"	1 1/2"	9/16"	15/32"	9/16"	5/8"	3/8"	5/16"	1/2"
S6 x 12.5	4 3/4"	2 1/2"	1 1/8"	4"	2"	1"	1/2"	1"	5/8"	3/4"	3/8"	1/2"
S6 x 17.25	4 3/4"	2 1/2"	1 1/8"	4"	2"	1"	1/2"	1"	3/4"	3/4"	3/8"	5/8"
S8 x 18.4	5"	2 1/2"	1 1/4"	5 1/4"	2 1/4"	1 1/2"	3/4"	1 1/4"	7/8"	1 1/8"	3/8"	3/4"
W10 x 19	6"	3"	1 1/2"	5 3/4"	2 1/4"	1 3/4"	13/16"	1 3/8"	7/8"	1 1/8"	3/8"	3/4"
W10 x 22	6"	3"	1 1/2"	5 3/4"	3 3/4"	1"	13/16"	1 3/8"	1"	1 1/8"	3/8"	7/8"
W10 x 26	6"	3"	1 1/2"	5 3/4"	3 3/4"	1"	13/16"	1 3/8"	1"	1 1/8"	1/2"	7/8"
W10 x 30	6"	3"	1 1/2"	5 3/4"	3 3/4"	1"	13/16"	1 3/8"	1"	1 1/8"	1/2"	7/8"
W10 x 39	USE SOLID (NON-BREAKAWAY) POSTS. PLACE W10 X 39 AND LARGER POSTS BEHIND BARRIER AND OUTSIDE BARRIER LENGTH OF NEED.											
W10 x 45												
W10 x 49												



SPLICE PLATE (REAR) DETAIL **FUSE PLATE (FRONT) DETAIL**



POST BREAK-AWAY ASSEMBLY

NOTES:

1. REFER TO STD DWG SN 15B1 FOR GENERAL NOTES.
2. SEE BRACKET DETAIL ON STD DWG SN 15A OR STD DWG SN 9A FOR Z-BAR DETAILS.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	2/28/2019	JW	MODIFIED FUSE PLATE INFORMATION.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

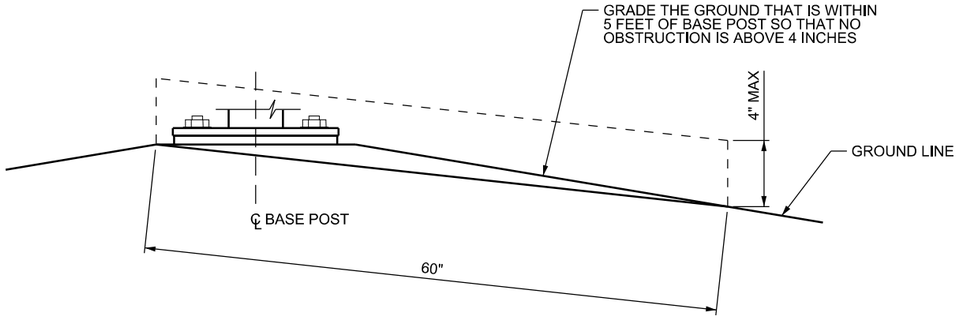
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

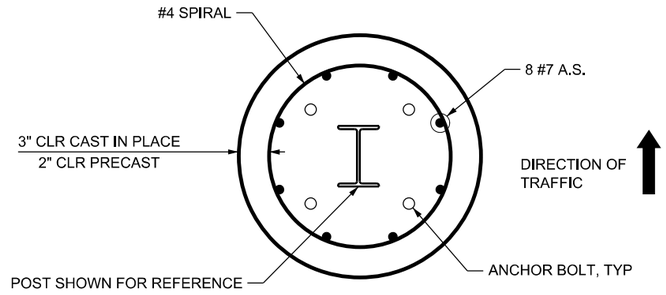
STANDARD DRAWING TITLE
FREEWAY SIGN
FUSE PLATE
REQUIREMENTS

STD. DWG. NO.
SN 15E

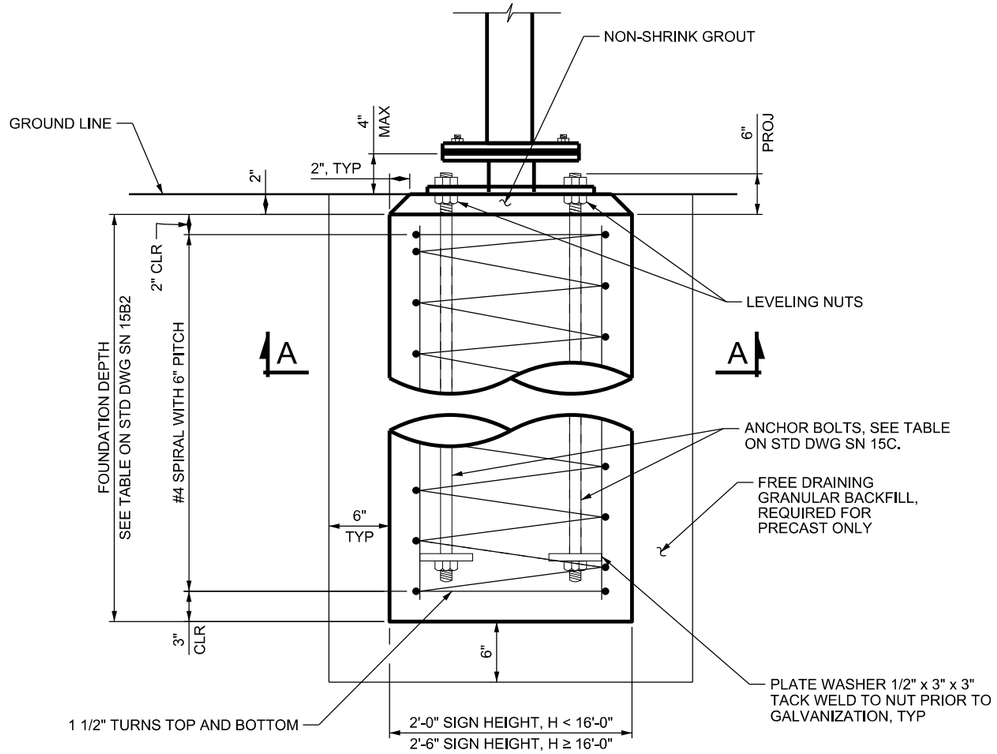
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN15E.dgn
23-JUN-2020



FOUNDATION GRADING DETAIL



SECTION A-A



FOUNDATION ELEVATION

NOTES:

1. USE THIS FOUNDATION FOR SIGN BASES B6A, B6B, OR B6C.
2. REFER TO STD DWG SN 15B1 FOR GENERAL NOTES.
3. REFER TO SIGN POST AND FOUNDATION TABLE ON STD DWG SN B2.
4. USE CONCRETE CLASS A(AE).
5. USE COATED DEFORMED CARBON STEEL BARS CONFORMING TO AASHTO M111 OR ASTM A775 AND AASHTO M31 GRADE 60, RESPECTIVELY.
6. COAT OR GALAVANIZE PLATE WASHERS.
7. REFER TO THE AASHTO ROADSIDE DESIGN GUIDE (CHAPTER 4) FOR BREAKAWAY SUPPORT (BASE POST) STUB HEIGHT REQUIREMENTS.

NO.	DATE	APPR.	REMARKS
1	5/25/2020	JW	CONCRETE CLASS UPDATE TO CLASS A(AE)
1	5/25/2020	JW	MOVED DESIGN ONLY NOTES TO NOTES

REVISIONS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

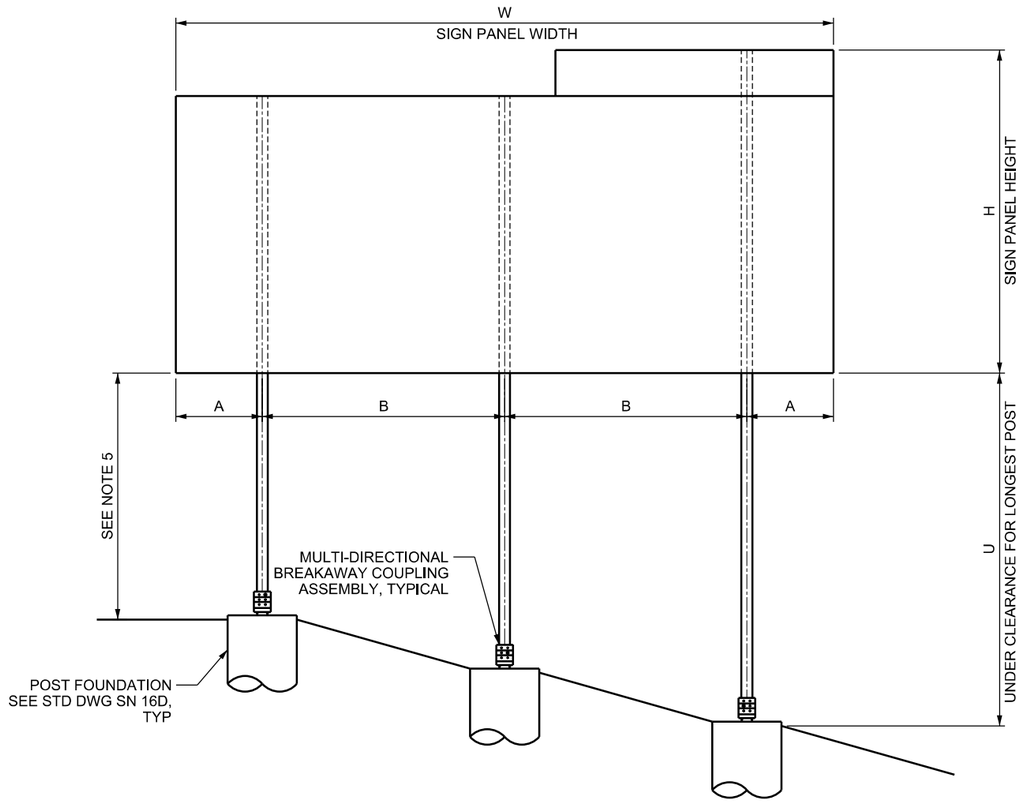
STANDARD DRAWING TITLE

FREEWAY SIGN FOUNDATION REQUIREMENTS

STD. DWG. NO.

SN 15F

DGN Files:D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\SN15F.dgn
25-JUN-2020



POST SPACING DIAGRAM

3-POST OPTION SHOWN, OTHERS SIMILAR

TWO POSTS		
SIGN WIDTH, W	POST SPACING	
	A	B
6 FT	1'- 0"	4'- 0"
7 FT	1'- 0"	5'- 0"
8 FT	1'- 0"	6'- 0"
9 FT	1'- 0"	7'- 0"
10 FT	1'- 0"	8'- 0"
11 FT	1'- 6"	8'- 0"
12 FT	2'- 0"	8'- 0"
13 FT	2'- 6"	8'- 0"
14 FT	3'- 0"	8'- 0"
15 FT	3'- 6"	8'- 0"
16 FT	4'- 0"	8'- 0"

THREE AND FOUR POSTS			
SIGN WIDTH, W		POST SPACING	
3 POSTS	4 POSTS	A	B
17 FT	25 FT	1'- 0"	7'- 6"
18 FT	26 FT	1'- 0"	8'- 0"
19 FT	27 FT	1'- 6"	8'- 0"
20 FT	28 FT	2'- 0"	8'- 0"
21 FT	29 FT	2'- 6"	8'- 0"
22 FT	30 FT	3'- 0"	8'- 0"
23 FT	31 FT	3'- 6"	8'- 0"
24 FT	32 FT	4'- 0"	8'- 0"

TABLE NOTES

1. ROUND DOWN SIGN WIDTH TO FIND "B" WHEN SIGN WIDTH FALLS BETWEEN TWO VALUES IN THE TABLE.
2. INCREASE "A" SO THAT SIGN IS CENTERED ON THE POST GROUP.

DESIGN DATA

AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS

STRUCTURAL STEEL: Fy = 35 KSI (PIPE)
Fy = 36 KSI (S- AND W-SHAPES; PLATES)

STRUCTURAL CONCRETE: f'c = 3.0 KSI n = 8 CLASS A(AE) fy (REINF) = 60 KSI

WIND: EXTREME EVENT WIND SPEED = 76 MPH
SERVICE WIND SPEED = 76 MPH
EXPOSURE CATEGORY D

FATIGUE: FATIGUE CATEGORY I
NATURAL WIND GUST = 11.2 MPH

SOIL: SEE SOIL CONDITIONS TABLE ON STD DWG SN 16D
TOP 1.5D (CONCRETE SHAFT) OF COHESIVE SOILS
DOES NOT CONTRIBUTE IN EMBEDMENT CALCULATIONS

SN 16 SERIES STD DWGS GENERAL NOTES:

1. USE STRUCTURAL STEEL CONFORMING TO ASTM A 36.
2. USE BOLTS, NUTS, AND WASHERS CONFORMING TO ASTM F3125, GRADE A325.
3. SAW CUT OR SHEAR PLATES. NO FLAME CUTTING IS ALLOWED.
4. MEET AASHTO M 111 (ASTM A 123) FOR GALVANIZING AFTER FABRICATION IS COMPLETED.
5. REFER TO STD DWG SN 2A AND 2B FOR SIGN HEIGHT AND SIGN OFFSET REQUIREMENTS.
6. SEE TABLES ON STD DWG SN 16B AND 16C FOR POST SIZES.
7. SEE STD DWG SN 16E, SN 16F, AND SN 16G FOR COMPONENT AND ASSEMBLY DETAILS FOR MULTI-DIRECTIONAL BREAKAWAY SYSTEMS.
8. SUPPLIER SUPPLIES FOUNDATION TEMPLATE.
9. SEE STD DWG SN 15A FOR SIGN FRAME DETAILS AND STD DWG SN 15D FOR SIGN BRACKET DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	5/25/2020	JW	CONCRETE CLASS UPDATE TO CLASS A(AE).
1	5/25/2020	JW	REMOVED DESIGN NOTE.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR STEEL I-BEAM SUPPORTS, GENERAL REQUIREMENTS

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 16A

DGN Files:D:\StandardsandSpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\SN16A.dgn
25-JUN-2020

STEEL I-BEAM POST SELECTION TABLE - TWO POSTS

H	U	SIGN PANEL WIDTH, W										
		6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
4'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	9'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	10'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	11'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12
	12'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 12
5'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	9'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	10'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12
	11'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 16
	12'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16
6'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12
	9'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16
	10'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16
	11'	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	12'	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18
7'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16
	9'	W6 x 9	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16
	10'	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	11'	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18
	12'	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18
8'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	9'	W6 x 9	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18
	10'	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18
	11'	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	12'	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
9'	8'	W6 x 9	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	9'	W6 x 9	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18
	10'	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	11'	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	12'	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
10'	8'	W6 x 12	W6 x 12	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18
	9'	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	10'	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	11'	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	12'	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21
11'	8'	W6 x 12	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	9'	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21
	10'	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21
	11'	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21
	12'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W10 x 22	W10 x 22
12'	8'	W6 x 12	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21
	9'	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21
	10'	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	11'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W10 x 22	W10 x 22
	12'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22
13'	8'	W6 x 16	W6 x 16	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	9'	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21	W10 x 22
	10'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22
	11'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	12'	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22

STEEL I-BEAM POST SELECTION TABLE - TWO POSTS (CONTINUED)

H	U	SIGN PANEL WIDTH, W										
		6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
14'	8'	W6 x 16	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22
	9'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22
	10'	W8 x 18	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	11'	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	12'	W8 x 18	W8 x 18		W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26
15'	8'	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W8 x 18	W8 x 18	W8 x 18	W8 x 21	W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W8 x 18	W8 x 18		W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	11'	W8 x 18	W8 x 18		W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	12'	W8 x 18			W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26
16'	8'	W8 x 18	W8 x 18		W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W8 x 18	W8 x 18		W8 x 21	W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W8 x 18			W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	11'	W8 x 18			W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26
	12'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26
17'	8'	W8 x 18			W8 x 21	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W8 x 18			W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W8 x 18			W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26
	11'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'				W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
18'	8'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26
	9'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26
	10'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'				W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'				W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
19'	8'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'				W10 x 22	W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	10'				W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'				W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30
20'	8'				W10 x 22	W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'				W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	10'				W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30
	12'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30
21'	8'				W10 x 22	W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'				W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30
	10'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30
	11'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30
	12'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30	W14 x 30
22'	8'				W10 x 22	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30
	9'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30
	10'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30
	11'				W12 x 26	W12 x 26	W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	12'				W12 x 26	W12 x 26	W14 x 30	W14 x 30	W14 x 30	W14 x 30	W14 x 30	W14 x 30

SEE NOTE 2

NOTES:

1. SEE STD DWG SN 16A FOR GENERAL NOTES AND DESIGN DATA.
2. CONTACT UDOT CENTRAL TRAFFIC AND SAFETY FOR SIGN SIZES NOT LISTED IN STEEL I-BEAM POST SELECTION TABLE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	5/25/2020	JW	REMOVED POSTS FROM TABLE (CRASHWORTHINESS)
1	5/25/2020	JW	ADDED NOTE 2.

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR STEEL I-BEAM SIGN SUPPORTS, TWO POSTS

STANDARD DRAWING TITLE

STD. DWG. NO.

SN 16B

STEEL I-BEAM POST SELECTION TABLE
THREE OR FOUR POSTS

H	U	SIGN PANEL WIDTH, W			
		17'	18' - 24'	25'	26' - 32'
4'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	9'	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	10'	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	11'	W6 x 12	W6 x 12	W6 x 12	W6 x 12
	12'	W6 x 12	W6 x 12	W6 x 12	W6 x 12
5'	8'	W6 x 9	W6 x 9	W6 x 9	W6 x 9
	9'	W6 x 9	W6 x 12	W6 x 9	W6 x 12
	10'	W6 x 12	W6 x 12	W6 x 12	W6 x 12
	11'	W6 x 12	W6 x 16	W6 x 12	W6 x 16
	12'	W6 x 16	W6 x 16	W6 x 16	W6 x 16
6'	8'	W6 x 12	W6 x 12	W6 x 12	W6 x 12
	9'	W6 x 12	W6 x 16	W6 x 12	W6 x 16
	10'	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	11'	W6 x 16	W8 x 18	W6 x 16	W8 x 18
	12'	W6 x 16	W8 x 18	W6 x 16	W8 x 18
7'	8'	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	9'	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	10'	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	11'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	12'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
8'	8'	W6 x 16	W6 x 16	W6 x 16	W6 x 16
	9'	W6 x 16	W8 x 18	W6 x 16	W8 x 18
	10'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	11'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	12'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
9'	8'	W6 x 16	W8 x 18	W6 x 16	W8 x 18
	9'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	10'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	11'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	12'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
10'	8'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	9'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	10'	W8 x 18	W8 x 18	W8 x 18	W8 x 18
	11'	W8 x 18	W8 x 21	W8 x 18	W8 x 21
	12'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
11'	8'	W8 x 18	W8 x 21	W8 x 18	W8 x 21
	9'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	10'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	11'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	12'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
12'	8'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	9'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	10'	W8 x 21	W8 x 21	W8 x 21	W8 x 21
	11'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	12'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
13'	8'	W8 x 21	W10 x 22	W8 x 21	W10 x 22
	9'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	11'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	12'	W10 x 22	W10 x 22	W10 x 22	W10 x 22

STEEL I-BEAM POST SELECTION TABLE
THREE OR FOUR POSTS (CONTINUED)

H	U	SIGN PANEL WIDTH, W			
		17'	18' - 24'	25'	26' - 32'
14'	8'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	11'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	12'	W10 x 22	W12 x 26	W10 x 22	W12 x 26
15'	8'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	11'	W10 x 22	W12 x 26	W10 x 22	W12 x 26
	12'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
16'	8'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	10'	W10 x 22	W12 x 26	W10 x 22	W12 x 26
	11'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
17'	8'	W10 x 22	W10 x 22	W10 x 22	W10 x 22
	9'	W10 x 22	W12 x 26	W10 x 22	W12 x 26
	10'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
18'	8'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	10'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
19'	8'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	10'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	12'	W12 x 26	W14 x 30	W12 x 26	W14 x 30
20'	8'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	10'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	11'	W12 x 26	W14 x 30	W12 x 26	W14 x 30
	12'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
21'	8'	W12 x 26	W12 x 26	W12 x 26	W12 x 26
	9'	W12 x 26	W14 x 30	W12 x 26	W14 x 30
	10'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	11'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	12'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
22'	8'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	9'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	10'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	11'	W14 x 30	W14 x 30	W14 x 30	W14 x 30
	12'	W14 x 30	W14 x 30	W14 x 30	W14 x 30

NOTES:

1. SEE STD DWG SN 16A FOR GENERAL NOTES AND DESIGN DATA.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE

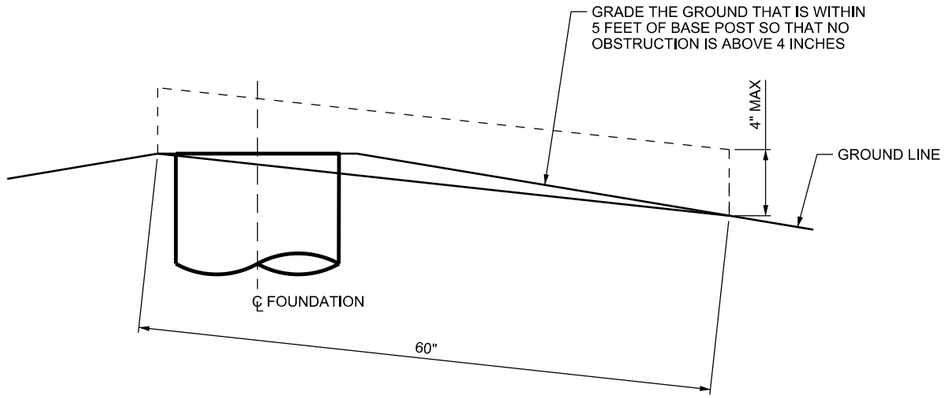
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR STEEL I-BEAM SIGN SUPPORTS, THREE AND FOUR POSTS

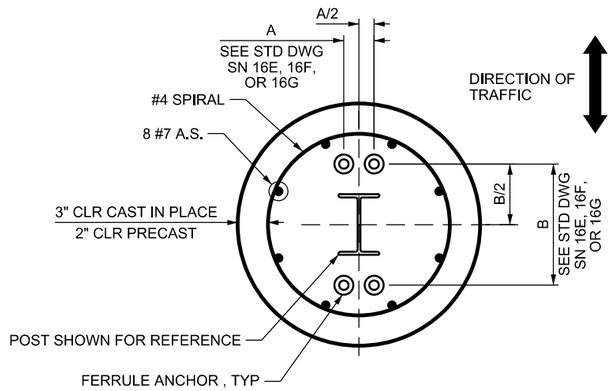
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 16C

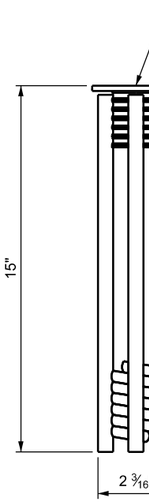
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN16C.dgn



FOUNDATION GRADING DETAIL



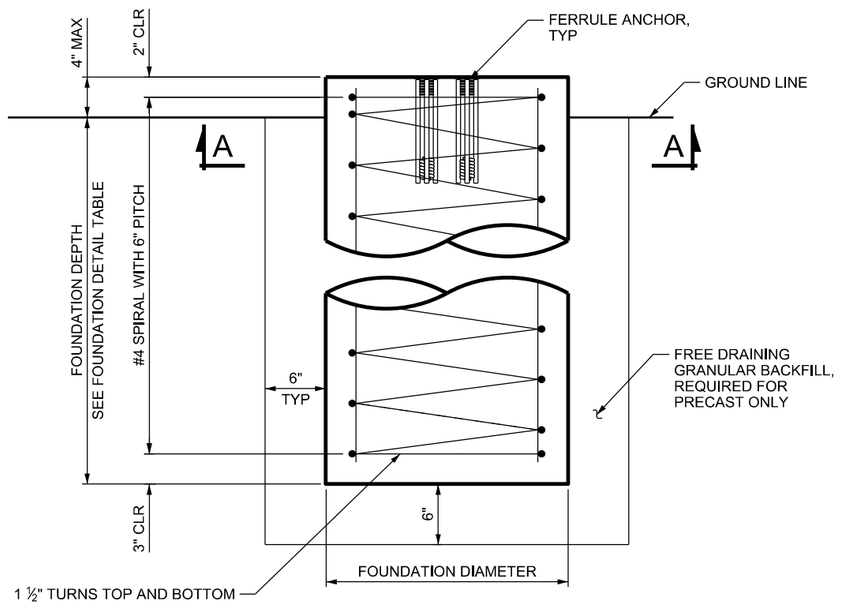
SECTION A-A



FERRULE ANCHOR

FOUNDATION DETAIL TABLE			
POST SIZE	FERRULE ANCHOR SIZE	FOUNDATION DIAMETER	MINIMUM FOUNDATION DEPTH SOFT OR LOOSE/MEDIUM SOIL
W6x9	5/8"	2'-0"	5'-0"/4'-6"
W6x12	1"	2'-0"	5'-6"/4'-6"
W6x16	1"	2'-0"	6'-0"/5'-0"
W8x18	1"	2'-0"	6'-6"/5'-6"
W8x21	1"	2'-0"	7'-0"/6'-0"
W10x22	1"	2'-6"	8'-0"/6'-6"
W12x26	1"	2'-6"	9'-0"/7'-0"
W14x30	1"	2'-6"	10'-0"/7'-6"

SOIL CONDITIONS TABLE			
SOFT OR LOOSE SOIL		MEDIUM SOIL	
COHESIVE	GRANULAR	COHESIVE	GRANULAR
MOIST UNIT WEIGHT = 110 PCF COHESION (C) = 750 PSF STRAIN FACTOR (E50) = 0.01 SOIL MODULUS (K) = 100 PCI	UNIT WEIGHT = 115 PCF SHEAR STRENGTH = 30° SOIL MODULUS (K) = 50 PCI	MOIST UNIT WEIGHT = 125 PCF COHESION (C) = 1,500 PSF STRAIN FACTOR (E50) = 0.007 SOIL MODULUS (K) = 500 PCI	UNIT WEIGHT = 125 PCF SHEAR STRENGTH = 34° SOIL MODULUS (K) = 90 PCI



FOUNDATION ELEVATION

NOTES:

1. USE THIS FOUNDATION FOR SIGN BASES B7A, B7B, OR B7C.
2. REFER TO STD DWG SN 16A FOR GENERAL NOTES.
3. USE CONCRETE CLASS A(AE).
4. USE COATED DEFORMED CARBON STEEL BARS CONFORMING TO AASHTO M111 OR ASTM A775 AND AASHTO M31 GRADE 60, RESPECTIVELY.
5. COAT OR GALAVANIZE FERRULE ANCHORS.
6. VERIFY UTILITY LOCATIONS BEFORE CONSTRUCTION.
7. USE FOUNDATION DEPTH FROM THE FOUNDATION DETAIL TABLE UNDER THE SOFT OR LOOSE SOIL CONDITION UNLESS STATED OTHERWISE IN THE PROJECT CONTRACT OR APPROVED BY THE ENGINEER BASED ON A GEOTECHNICAL ENGINEERING ANALYSIS THAT DEMONSTRATES THAT THE SITE MEETS OR EXCEEDS THE MEDIUM SOIL CONDITION FROM THE SOIL CONDITIONS TABLE.
8. REFER TO THE AASHTO ROADSIDE DESIGN GUIDE (CHAPTER 4) FOR BREAKAWAY SUPPORT STUB HEIGHT REQUIREMENTS.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	5/25/2020	JW	CONCRETE CLASS UPDATE TO CLASS A(AE)	
1	5/25/2020	JW	MOVED DESIGN NOTES TO NOTES.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR STEEL I-BEAM SIGN SUPPORTS, FOUNDATION DETAILS

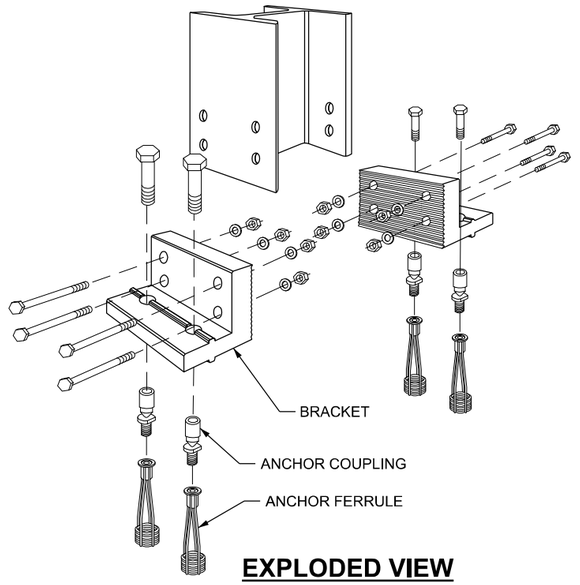
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 16D

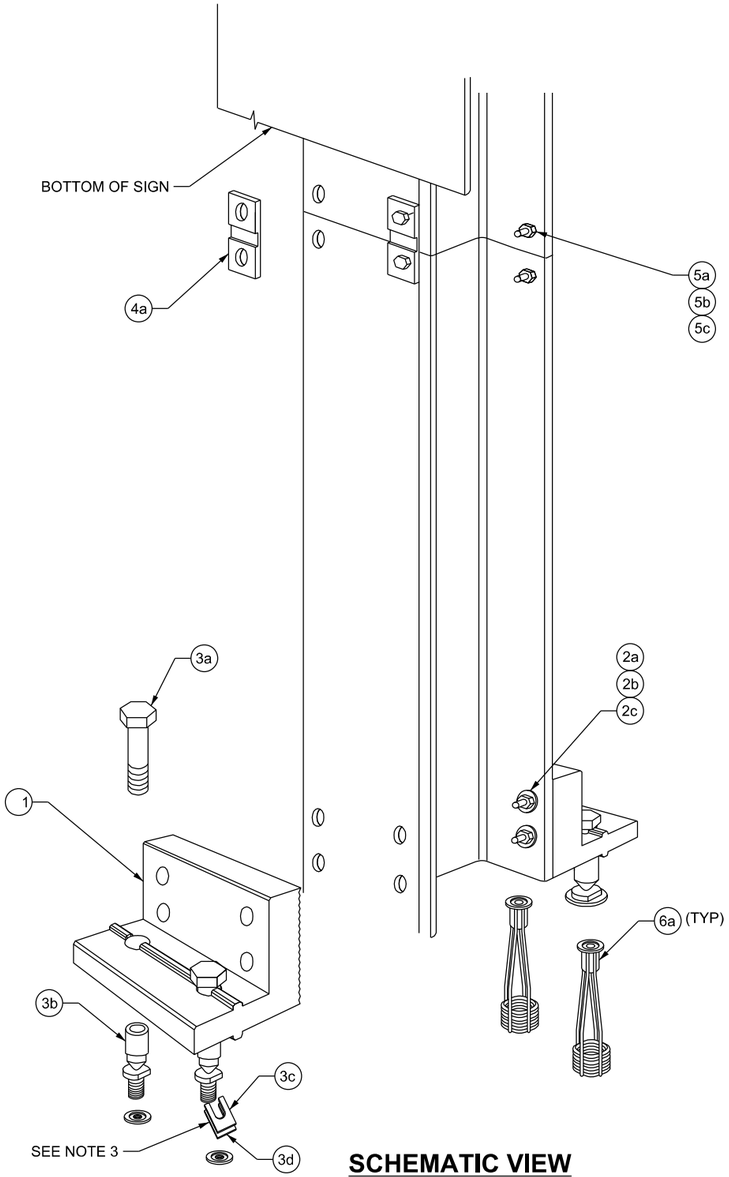
DGN File: D:\Standards\SpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\SN16D.dgn
25-JUN-2020

ITEM	DESCRIPTION	SIZE	SPECIFICATION	QUANTITY/POST
1	BRACKET		ALUMINUM (6061-T6)	2
2	BRACKET HARDWARE ASSEMBLY, INCLUDES:			1
2a	BOLT	1/2"	ASTM A325, GALV. ASTM A153	8
2b	LOCK WASHER	1/2"	ANSI B18-21-1, GALV. ASTM A153	8
2c	NUT	1/2"	ASTM A563 GR. DH, GALV. ASTM A153	8
3	COUPLING AND SPECIAL BOLT ASSEMBLY, INCLUDES:			1
3a	SPECIAL BOLT	5/8"	ASTM A449, GALV. ASTM A153/B695	4
3b	COUPLING	5/8"	AMS 6378D, GALV. ASTM A153, POLYESTER COAT	4
3c	SHIM	14 GAUGE	GALV. STEEL SHEET	2
3d	SHIM	16 GAUGE	GALV. STEEL SHEET	2
4	HINGE ASSEMBLY, INCLUDES:			1
4a	HINGE PLATE	1"	AISI 4130 STEEL, GALV. ASTM A123	4
5	HINGE HARDWARE ASSEMBLY, INCLUDES:			1
5a	BOLT	1/2"	ASTM A325, GALV. ASTM A153	8
5b	LOCK WASHER	1/2"	ANSI B18-21-1, GALV. ASTM A153	8
5c	NUT	1/2"	ASTM A563 GR. DH, GALV. ASTM A153	8
6	ANCHOR ASSEMBLY, INCLUDES:			1
6a	ANCHOR	5/8"	AISI 1038 ROD, AISI 1008 COIL	4

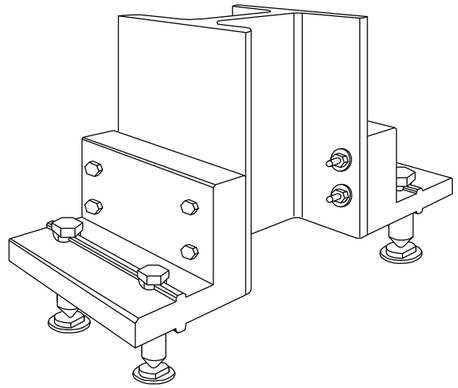
HARDWARE LIST



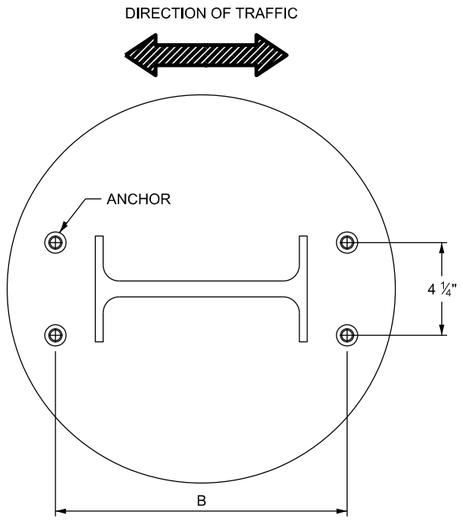
EXPLODED VIEW



SCHEMATIC VIEW



COMPLETED VIEW



PLAN VIEW OF FOOTING

NOTES:

1. INSTALL FASTENERS, EXCEPT FOR SPECIAL BOLT AND COUPLING, WITH LOCKWASHERS. FASTENERS DO NOT HAVE SPECIFIC TORQUE REQUIREMENTS. MAKE FASTENERS TIGHT AS POSSIBLE WITH CONVENTIONAL WRENCHES UNLESS NOTED OTHERWISE.
2. DO NOT USE MORE THAN TWO SHIMS UNDERNEATH ANY ONE COUPLING AND NO MORE THAN THREE SHIMS UNDERNEATH ANY TWO COUPLINGS.
3. SEE STD DWG SN 16A THRU SN 16D FOR POST AND FOUNDATION REQUIREMENTS.
4. USE ON W6X9 POSTS.

DESIGN-ONLY NOTES:

A. CONFORM TO THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR SIGN POSTS, (B7A)

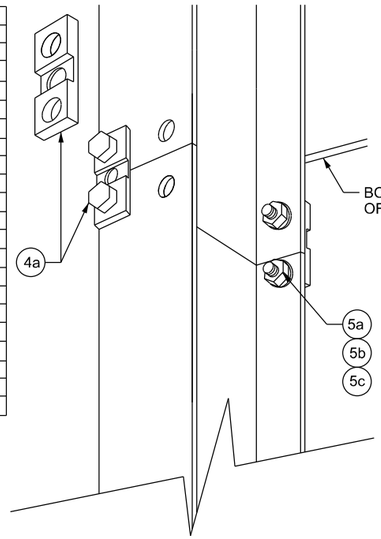
STANDARD DRAWING TITLE

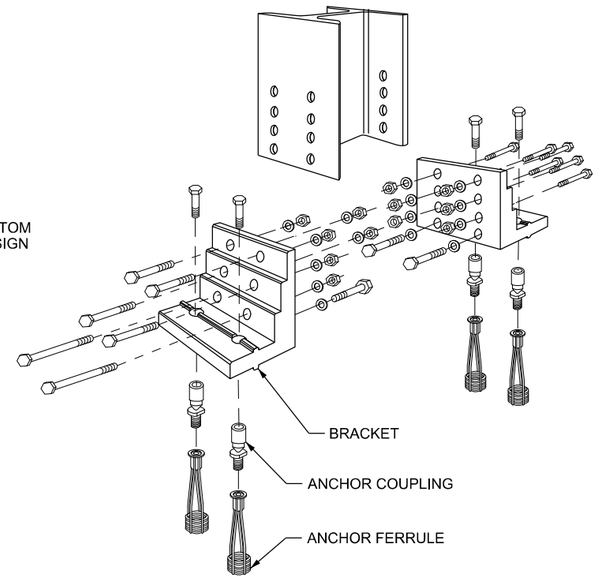
STD. DWG. NO.
SN 16E

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN16E.dgn
23-JUN-2020

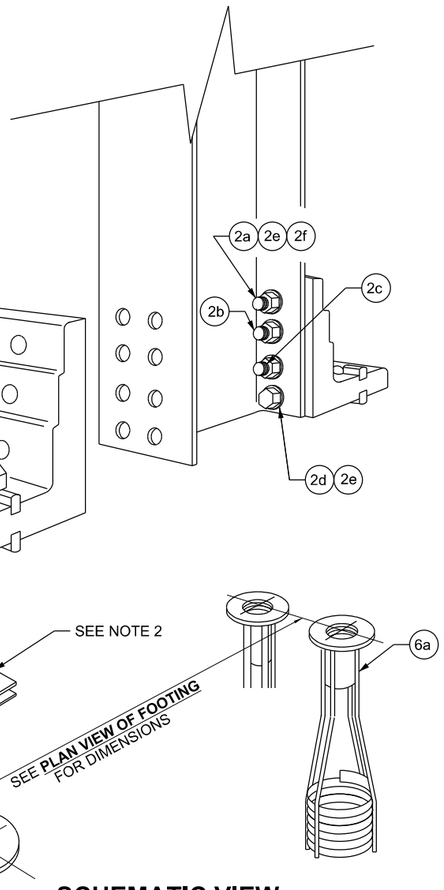
HARDWARE LIST

ITEM	DESCRIPTION	SIZE	SPECIFICATOIN	QUANTITY/POST
1	BRACKET		ALUMINUM (6061-T6)	2
2	BRACKET HARDWARE ASSEMBLY, INCLUDES:			1
2a	BOLT	1/2"	ASTM A325, GALV. ASTM A153	4
2b	BOLT	1/2"	ASTM A325, GALV. ASTM A153	4
2c	BOLT	1/2"	ASTM A325, GALV. ASTM A153	4
2d	CAPSCREW	1/2"	ASTM A307, GALV. ASTM A153	4
2e	LOCK WASHER	1/2"	ANSI B18-21-1, GALV. ASTM A153	16
2f	NUT	1/2"	ASTM A563 GR. DH, GALV. ASTM A153	12
2g	SHIM	14 GAUGE	GALV. STEEL SHEET	2
2h	SHIM	16 GAUGE	GALV. STEEL SHEET	2
3	COUPLING AND SPECIAL BOLT ASSEMBLY, INCLUDES:			1
3a	SPECIAL BOLT	1"	ASTM A449, GALV. ASTM A153/B695	4
3b	COUPLING	1"	AMS 6378D, GALV. ASTM A153, POLYESTER COAT	4
4	HINGE ASSEMBLY, INCLUDES:			1
4a	HINGE PLATE		AISI 4130 STEEL, GALV. ASTM A123	4
5	HINGE HARDWARE ASSEBLY, INCLUDES:			1
5a	BOLT	3/4"	ASTM A325, GALV. ASTM A153	8
5b	LOCK WASHER	3/4"	ANSI B18-21-1, GALV. ASTM A153	8
5c	NUT	3/4"	ASTM A325, GALV. ASTM A153	8
6	ANCHOR ASSEMBLY, INCLUDES:			1
6a	ANCHOR	1"	AISI 1045 ROD, AISI 1008 COIL	4

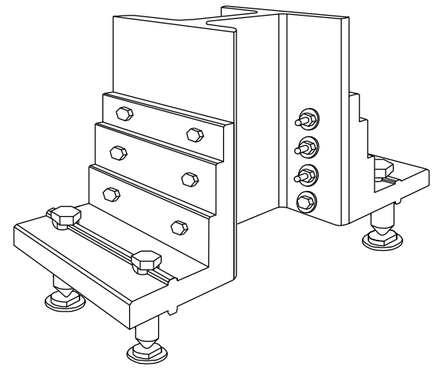




EXPLODED VIEW

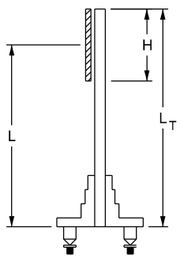


SCHEMATIC VIEW



COMPLETED VIEW

L= L_T - H/2

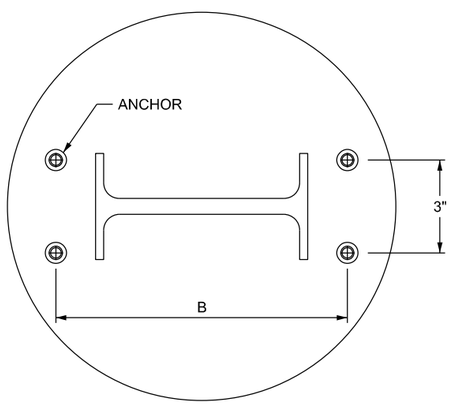


BRACKET SELECTION TABLE

SELECT CORRECT BRACKET NUMBER FROM TABLE, USING THE "L" VALUE FROM THE LONGEST POST. USE FIGURE TO THE LEFT TO DETERMINE "L".

POST SIZE	BRACKET #1		BRACKET #2		BRACKET #3	
	MIN. 'L'	MAX. 'L'	MIN. 'L'	MAX. 'L'	MIN. 'L'	MAX. 'L'
6"	12'	29'	9'	12'	0	9'
8"	14'	29'	10'	14'	0	10'

DIRECTION OF TRAFFIC



B (BRACKET #1)= DEPTH OF POST + 8"
B (BRACKET #2)= DEPTH OF POST + 8 1/8"
B (BRACKET #3)= DEPTH OF POST + 8 3/16"

PLAN VIEW OF FOOTING

NOTES:

1. INSTALL FASTENERS, EXCEPT FOR SPECIAL BOLT AND COUPLING, WITH LOCKWASHERS. FASTENERS DO NOT HAVE SPECIFIC TORQUE REQUIREMENTS. MAKE FASTENERS TIGHT AS POSSIBLE WITH CONVENTIONAL WRENCHES UNLESS NOTED OTHERWISE.
2. DO NOT USE MORE THAN TWO SHIMS UNDERNEATH ANY ONE COUPLING AND NO MORE THAN THREE SHIMS UNDERNEATH ANY TWO COUPLINGS.
3. SEE STD DWG SN 16A THRU SN 16D FOR POST AND FOUNDATION REQUIREMENTS.
4. USE ON W6X12, W6X16, W8X18, AND W8X21 POSTS.

DESIGN-ONLY NOTES:

A. CONFORM TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
AUGUST 2020 — DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR SIGN POSTS, (B7B)

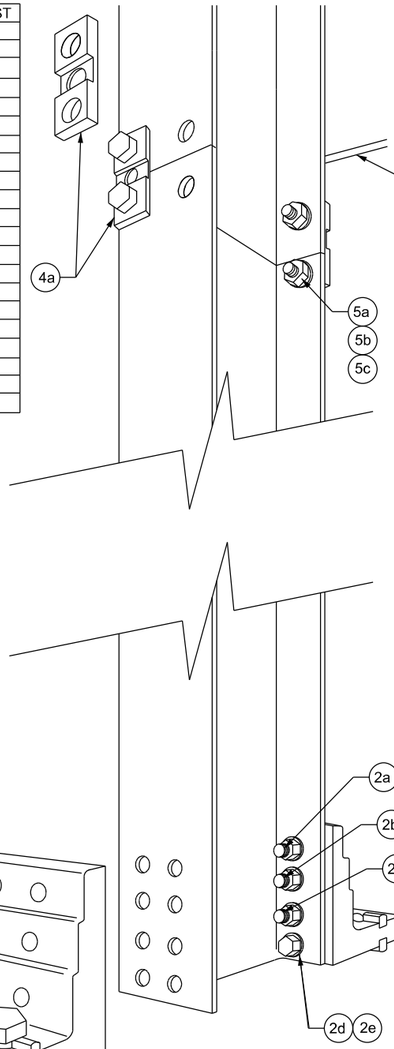
STANDARD DRAWING TITLE

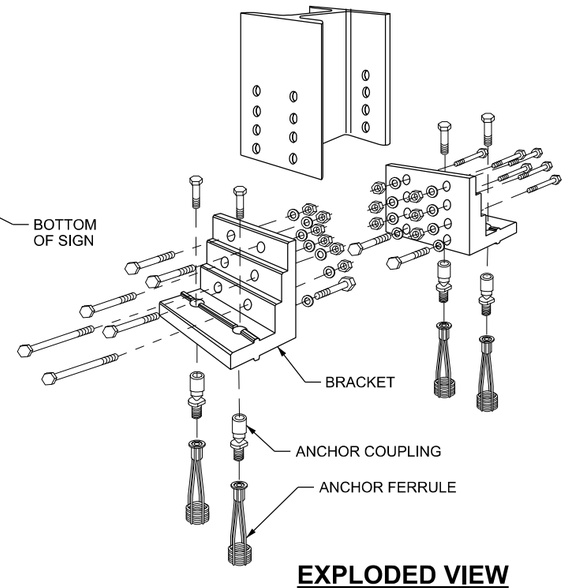
STD. DWG. NO.
SN 16F

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch B (SN,ST)\SN16F.dgn
23-JUN-2020

HARDWARE LIST

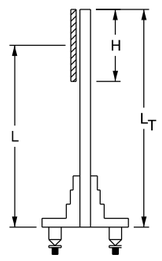
ITEM	DESCRIPTION	SIZE	SPECIFICATION	QUANTITY/POST
1	BRACKET		ALUMINUM (6061-T6)	2
2	BRACKET HARDWARE ASSEMBLY, INCLUDES:			1
2a	BOLT	5/8"	ASTM A325, GALV. ASTM A153	4
2b	BOLT	3/8"	ASTM A325, GALV. ASTM A153	4
2c	BOLT	5/8"	ASTM A325, GALV. ASTM A153	4
2d	CAPSCREW	5/8"	ASTM A307, GALV. ASTM A153	4
2e	LOCK WASHER	5/8"	ANSI B18-21-1, GALV. ASTM A153	16
2f	NUT	5/8"	ASTM A563 GR. DH, GALV. ASTM A153	12
2g	SHIM	14 GAUGE	GALV. STEEL SHEET	2
2h	SHIM	16 GAUGE	GALV. STEEL SHEET	2
3	COUPLING AND SPECIAL BOLT ASSEMBLY, INCLUDES:			1
3a	SPECIAL BOLT	1"	ASTM A449, GALV. ASTM A153/B695	4
3b	COUPLING	1"	AMS 6378D, GALV. ASTM A153, POLYESTER COAT	4
4	HINGE ASSEMBLY, INCLUDES:			1
4a	HINGE PLATE		AISI 4130 STEEL, GALV. ASTM A123	4
5	HINGE HARDWARE ASSEMBLY, INCLUDES:			1
5a	BOLT	3/4"	ASTM A325, GALV. ASTM A153	8
5b	LOCK WASHER	3/4"	ANSI B18-21-1, GALV. ASTM A153	8
5c	NUT	3/4"	ASTM A325, GALV. ASTM A153	8
6	ANCHOR ASSEMBLY, INCLUDES:			1
6a	ANCHOR	1"	AISI 1045 ROD, AISI 1008 COIL	4





EXPLODED VIEW

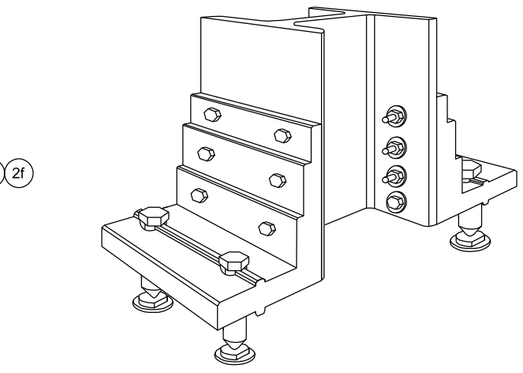
$L = L_T - H/2$



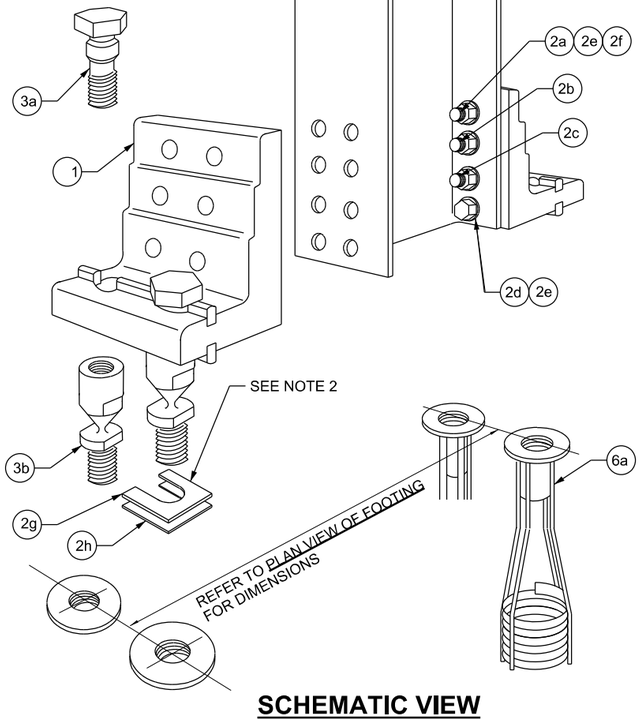
BRACKET SELECTION TABLE

SELECT CORRECT BRACKET NUMBER FROM TABLE, USING THE "L" VALUE FROM THE LONGEST POST. USE FIGURE TO THE LEFT TO DETERMINE "L".

POST SIZE	BRACKET #1		BRACKET #2		BRACKET #3	
	MIN. 'L'	MAX. 'L'	MIN. 'L'	MAX. 'L'	MIN. 'L'	MAX. 'L'
10"	16'	29'	11'	16'	0	11'
12"	18'	29'	13'	18'	0	13'
14"	19'	29'	14'	19'	0	14'

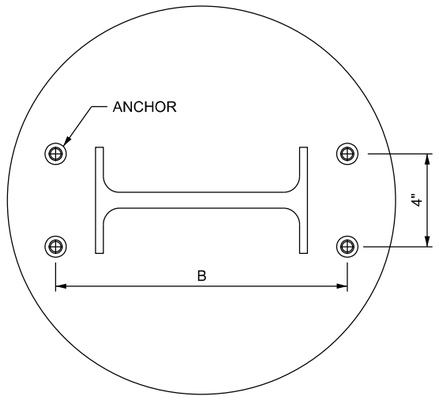


COMPLETED VIEW



SCHEMATIC VIEW

DIRECTION OF TRAFFIC



B (BRACKET #1)= DEPTH OF POST + 8"
B (BRACKET #2)= DEPTH OF POST + 8 1/8"
B (BRACKET #3)= DEPTH OF POST + 8 3/16"

PLAN VIEW OF FOOTING

NOTES:

1. INSTALL FASTENERS, EXCEPT FOR SPECIAL BOLT AND COUPLING, WITH LOCKWASHERS. FASTENERS DO NOT HAVE SPECIFIC TORQUE REQUIREMENTS. MAKE FASTENERS AS TIGHT AS POSSIBLE WITH CONVENTIONAL WRENCHES UNLESS NOTED OTHERWISE.
2. DO NOT USE MORE THAN TWO SHIMS UNDERNEATH ANY ONE COUPLING AND NO MORE THAN THREE SHIMS UNDERNEATH ANY TWO COUPLINGS.
3. SEE STD DWG SN 16A THRU 16D FOR POST AND FOUNDATION REQUIREMENTS.
4. USE ON W10X22, W10X26, W12X26, AND W14X30 POSTS.

DESIGN-ONLY NOTES:

A. CONFORM TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR SIGN POSTS, (B7C)

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 16G

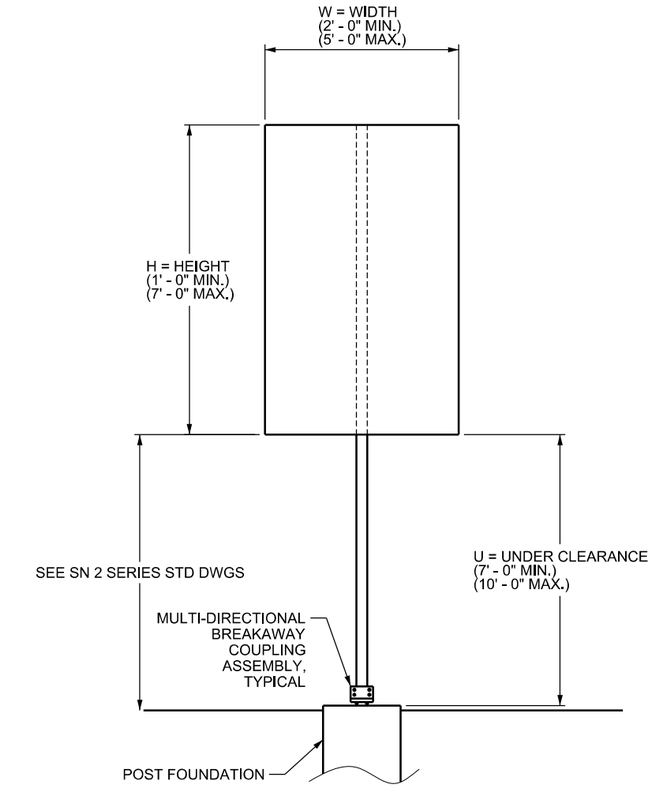
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,STY\SN16G.dgn
23-JUN-2020

ROUND STEEL PIPE POST SELECTION GUIDE
SINGLE POST APPLICATION

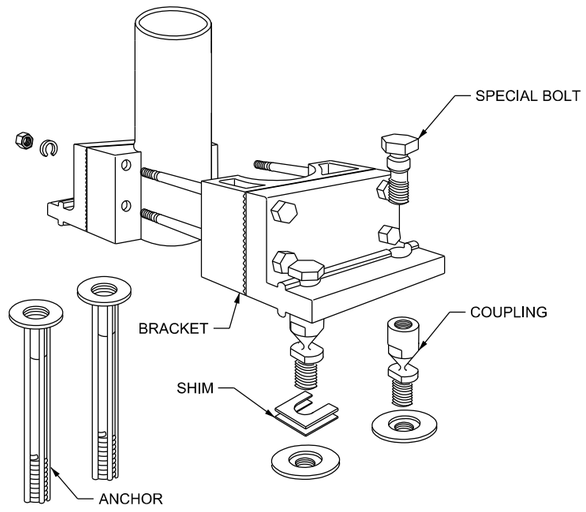
H (feet)	U (feet)	PANEL WIDTH, W (feet)			
		2'	3'	4'	5'
1'	7'	-	-	P3	P3
	8'	-	-	P3	P3
	9'	-	-	P3	P3
	10'	-	-	P3	P3
2'	7'	-	-	P3	P3
	8'	-	-	P3	P3
	9'	-	-	P3	P3.5
	10'	-	-	P3	P3.5
3'	7'	-	-	P3	P3.5
	8'	-	-	P3.5	P3.5
	9'	-	-	P3.5	P3.5
	10'	-	-	P3.5	P4
4'	7'	P3	P3.5	P3.5	P4
	8'	P3	P3.5	P3.5	P4
	9'	P3	P3.5	P4	P4
	10'	P3.5	P3.5	P4	P4.5
5'	7'	P3	P3.5	P4	P4
	8'	P3.5	P3.5	P4	P4.5
	9'	P3.5	P4	P4	P4.5
	10'	P3.5	P4	P4.5	P4.5
6'	7'	P3.5	P4	P4.5	P4.5
	8'	P3.5	P4	P4.5	P4.5-80
	9'	P3.5	P4	P4.5	P4.5-80
	10'	P3.5	P4.5	P4.5-80	P4.5-80
7'	7'	P3.5	P4	P4.5	P4.5-80
	8'	P3.5	P4.5	P4.5-80	P4.5-80
	9'	P4	P4.5	P4.5-80	P4.5-80
	10'	P4	P4.5	P4.5-80	-

POST DETAIL CHART			
POST TYPE	OUTSIDE DIAMETER	WALL THICKNESS	NOMINAL PIPE SIZE
P3.0	2.875"	0.203"	2.5" Sch. 40
P3.5	3.5"	0.216"	3" Sch. 40
P4.0	4.0"	0.226"	3.5" Sch. 40
P4.5	4.5"	0.237"	4" Sch. 40
P4.5-80	4.5"	0.337"	4" Sch. 80

ALL POST MATERIAL IN ACCORDANCE WITH ASTM A53, TYPE E STEEL PIPE, GALVANIZED TO MEET AASHTO M 232.



SINGLE POST SIGN ELEVATION VIEW



ROUND PIPE SIGN POST

NOTES:

1. DETERMINE THE SIGN DIMENSIONS AND POST HEIGHT REQUIREMENTS. SEE DIAGRAM, THIS SHEET.

   W = SIGN WIDTH (HORIZONTAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   H = SIGN DEPTH (VERTICAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   U = UNDER-PANEL HEIGHT (VERTICAL DIMENSION), MEASURED FROM THE TOP OF THE FOUNDATION TO THE BOTTOM OF THE SIGN PANEL. ROUND UP TO NEAREST FOOT.

2. ENTER THE POST SELECTION TABLE WITH THE REQUIRED W, AND H, AND DETERMINE THE APPROPRIATE POST SIZE, WITH THE DETAILS SHOWN IN THE TABLE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY BASE FOR ROUND AND SQUARE POST, (B7D)

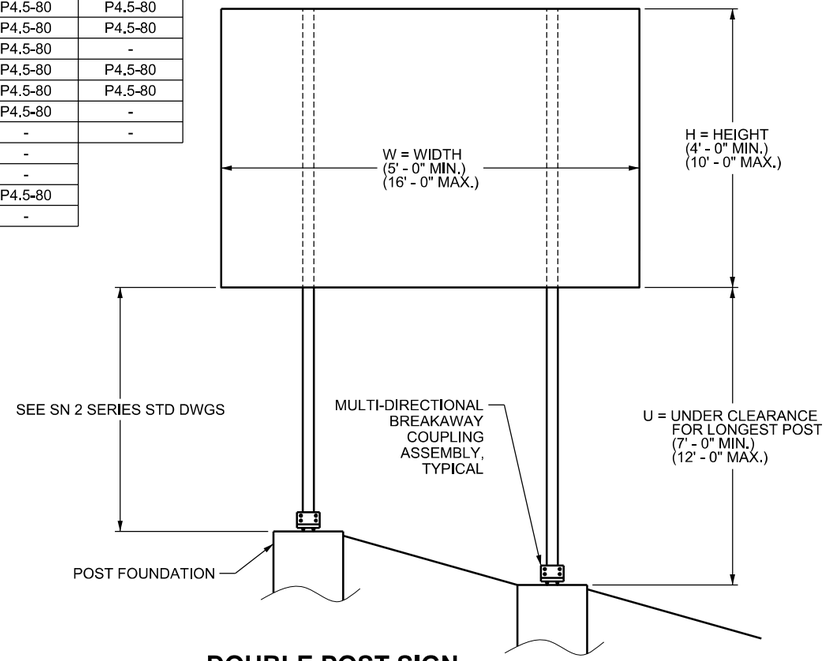
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 17A

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\SN17A.dgn

ROUND STEEL PIPE POST SELECTION GUIDE
DOUBLE POST APPLICATION

H (feet)	U (feet)	PANEL WIDTH, W (feet, round up to nearest foot)											
		5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
4'	7'	P3	P3	P3.5	P3.5	P3.5	P3.5	P4	P4	P4	P4	P4.5	P4.5
	8'	P3	P3.5	P3.5	P3.5	P4	P4	P4	P4	P4.5	P4.5	P4.5	P4.5
	9'	P3	P3.5	P3.5	P3.5	P4	P4	P4	P4.5	P4.5	P4.5	P4.5	P4.5-80
	10'	P3.5	P3.5	P3.5	P4	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80
	11'	P3.5	P3.5	P4	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80
	12'	P3.5	P3.5	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80	-
5'	7'	P3.5	P3.5	P3.5	P4	P4	P4	P4.5	P4.5	P4.5	P4.5	P4.5-80	P4.5-80
	8'	P3.5	P3.5	P3.5	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80
	9'	P3.5	P3.5	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80	-
	10'	P3.5	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80	-	-
	11'	P3.5	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80	-	-	
	12'	P4	P4	P4	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80	-	-	-	
6'	7'	P3.5	P3.5	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	P4.5-80	
	8'	P3.5	P4	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	-	-	
	9'	P3.5	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	-	-		
	10'	P4	P4	P4.5	P4.5	P4.5	P4.5-80	P4.5-80	-	-			
	11'	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	-	-	-			
	12'	P4	P4.5	P4.5	P4.5-80	P4.5-80	-	-	-				
7'	7'	P3.5	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80				
	8'	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	-				
	9'	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	-	-				
	10'	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	-					
	11'	P4	P4.5	P4.5-80	P4.5-80	P4.5-80	-	-					
	12'	P4.5	P4.5	P4.5-80	P4.5-80	-	-	-					
8'	7'	P4	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80					
	8'	P4	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	-					
	9'	P4.5	P4.5	P4.5-80	P4.5-80	P4.5-80	-	-					
	10'	P4.5	P4.5	P4.5-80	P4.5-80	-	-						
	11'	P4.5	P4.5-80	P4.5-80	-	-							
	12'	P4.5	P4.5-80	P4.5-80	-	-							
9'	7'	P4.5	P4.5	P4.5	P4.5-80	P4.5-80							
	8'	P4.5	P4.5	P4.5-80	P4.5-80	-							
	9'	P4.5	P4.5-80	P4.5-80	-	-							
	10'	P4.5	P4.5-80	P4.5-80	-								
	11'	P4.5-80	P4.5-80	-	-								
	12'	P4.5-80	-	-	-								
10'	7'	P4.5	P4.5-80	P4.5-80	P4.5-80								
	8'	P4.5	P4.5-80	P4.5-80	-								
	9'	P4.5-80	P4.5-80	-	-								
	10'	P4.5-80	-	-									
	11'	P4.5-80	-										
	12'	-											



DOUBLE POST SIGN
ELEVATION VIEW

POST DETAIL CHART			
POST TYPE	OUTSIDE DIAMETER	WALL THICKNESS	NOMINAL PIPE SIZE
P3.0	2.875"	0.203"	2.5" Sch. 40
P3.5	3.5"	0.216"	3" Sch. 40
P4.0	4.0"	0.226"	3.5" Sch. 40
P4.5	4.5"	0.237"	4" Sch. 40
P4.5-80	4.5"	0.337"	4" Sch. 80

ALL POST MATERIAL ACCORDING TO ASTM A53 STEEL PIPE, GALVANIZED TO MEET AASHTO M 232.

NOTES:

1. DETERMINE THE SIGN DIMENSIONS AND POST HEIGHT REQUIREMENTS. SEE DIAGRAM, THIS SHEET.

   W = SIGN WIDTH (HORIZONTAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   H = SIGN DEPTH (VERTICAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   U = UNDER-PANEL HEIGHT (VERTICAL DIMENSION), MEASURED FROM THE TOP OF THE FOUNDATION TO THE BOTTOM OF THE SIGN PANEL AT THE TALLEST POST. ROUND UP TO NEAREST FOOT.

2. ENTER THE POST SELECTION TABLE WITH THE REQUIRED W, AND H, AND DETERMINE THE APPROPRIATE POST SIZE, WITH THE DETAILS SHOWN IN THE TABLE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED
DEPUTY DIRECTOR

MULTI-DIRECTIONAL
BREAKAWAY BASE FOR
ROUND PIPE DOUBLE POST,
(B7D)

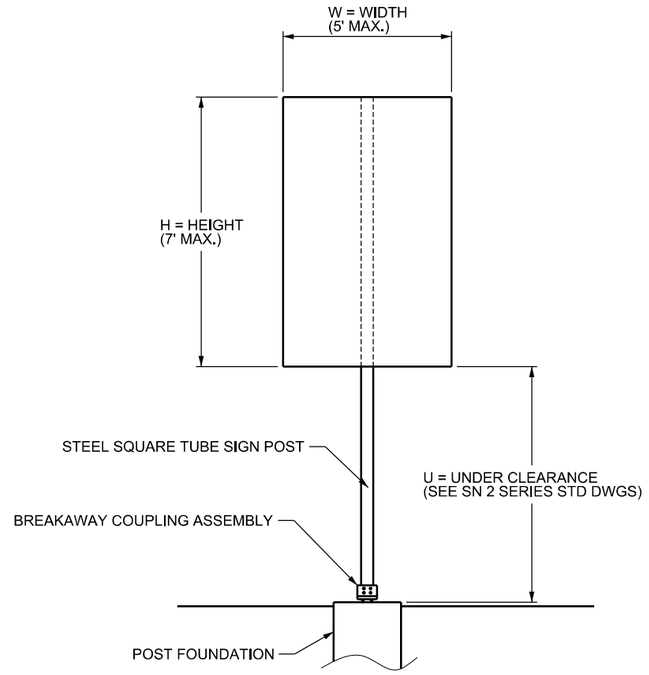
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 17B

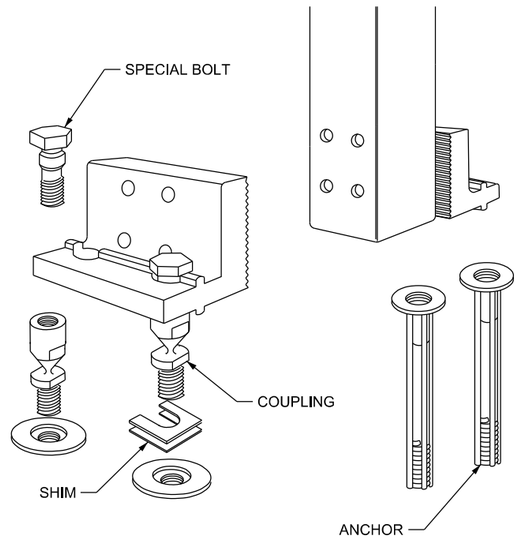
DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN17B.dgn
23-JUN-2020

SQUARE STEEL TUBE POST SELECTION GUIDE
SINGLE POST APPLICATION

H (FEET)	U (FEET)	PANEL WIDTH, W (FEET)			
		2	3	4	5
1	7	-	-	4x4x3/16	4x4x3/16
	8	-	-	4x4x3/16	4x4x3/16
	9	-	-	4x4x3/16	4x4x3/16
	10	-	-	4x4x3/16	4x4x3/16
2	7	-	-	4x4x3/16	4x4x3/16
	8	-	-	4x4x3/16	4x4x3/16
	9	-	-	4x4x3/16	4x4x3/16
	10	-	-	4x4x3/16	4x4x3/16
3	7	-	-	4x4x3/16	4x4x3/16
	8	-	-	4x4x3/16	4x4x3/16
	9	-	-	4x4x3/16	4x4x3/16
	10	-	-	4x4x3/16	4x4x3/16
4	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	10	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
5	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	10	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
6	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	10	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
7	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4
	10	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4



SINGLE POST SIGN ELEVATION VIEW



SQUARE TUBE SIGN POST

POST DETAIL CHART			
POST TYPE	OUTSIDE DIMENSIONS	WALL THICKNESS	WEIGHT PER FOOT
4x4x3/16	4"x4"	0.1875"	9.42 lbs/ft
4x4x1/4	4"x4"	0.2500"	12.21 lbs/ft

ALL POST MATERIAL IN ACCORDANCE WITH ASTM A 500, GRADE B STEEL SQUARE TUBE, GALVANIZED TO MEET AASHTO M 232.

NOTES:

1. DETERMINE THE SIGN DIMENSIONS AND POST HEIGHT REQUIREMENTS. SEE DIAGRAM, THIS SHEET.

   W = SIGN WIDTH (HORIZONTAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   H = SIGN DEPTH (VERTICAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   U = UNDER-PANEL HEIGHT (VERTICAL DIMENSION), MEASURED FROM THE TOP OF THE FOUNDATION TO THE BOTTOM OF THE SIGN PANEL. ROUND UP TO NEAREST FOOT.

2. ENTER THE POST SELECTION TABLE WITH THE REQUIRED W, H, AND U, AND DETERMINE THE APPROPRIATE POST SIZE, WITH DETAILS SHOWN IN THE TABLE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
AUGUST 2020
DATE
APPROVED
DEPUTY DIRECTOR

MULTI-DIRECTIONAL BREAKAWAY COUPLING SYSTEM FOR SQUARE TUBE SIGN SUPPORTS SINGLE POST

STANDARD DRAWING TITLE

STD. DWG. NO.
SN 17C

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST\SN17C.dgn
23-JUN-2020

SQUARE STEEL TUBE POST SELECTION GUIDE
DOUBLE POST APPLICATION

H (FEET)	U (FEET)	PANEL WIDTH, W (FEET, ROUND UP TO NEAREST FOOT)											
		5	6	7	8	9	10	11	12	13	14	15	16
4	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
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	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	10	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	11	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4
	12	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4
5	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4
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	11	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	4x4x1/4	4x4x1/4	-
	12	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	4x4x1/4	-	-	
6	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	
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	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	4x4x1/4	-	
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	11	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	4x4x1/4	-			
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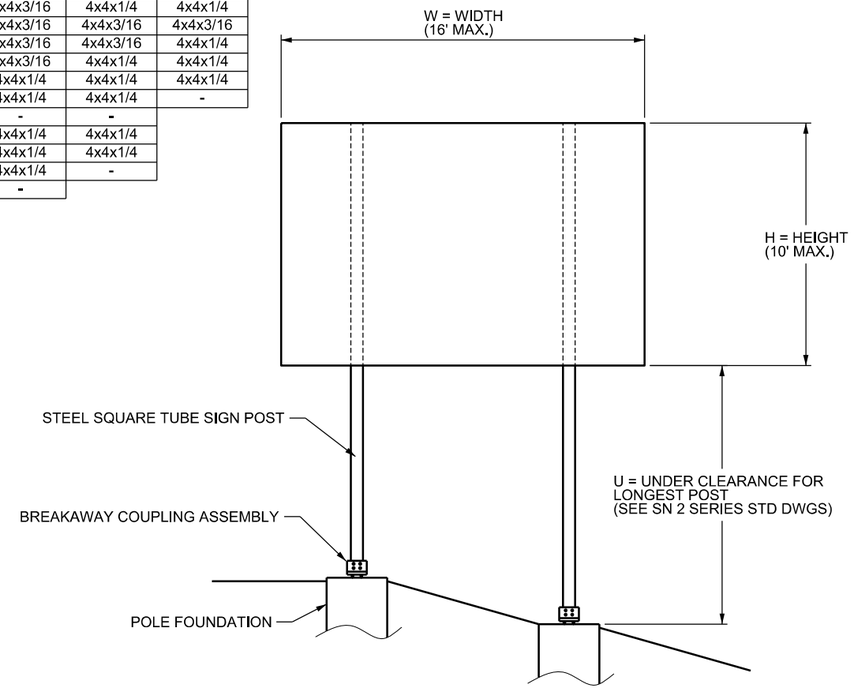
7	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4				
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4				
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	-				
	10	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	-					
	11	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	-					
	12	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	-						
8	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16						
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4						
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4						
	10	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	-						
	11	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4	-							
	12	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4	-							
9	7	4x4x3/16	4x4x3/16	4x4x3/16	4x4x3/16								
	8	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4								
	9	4x4x3/16	4x4x3/16	4x4x3/16	4x4x1/4								
	10	4x4x3/16	4x4x3/16	4x4x1/4	4x4x1/4								
	11	4x4x3/16	4x4x1/4	4x4x1/4	-								
	12	4x4x1/4	4x4x1/4	-	-								
10	7	4x4x3/16	4x4x3/16	4x4x3/16									
	8	4x4x3/16	4x4x3/16	4x4x1/4									
	9	4x4x3/16	4x4x1/4	4x4x1/4									
	10	4x4x3/16	4x4x1/4	4x4x1/4									
	11	4x4x3/16	4x4x1/4	-									
	12	4x4x1/4	-										



DOUBLE POST SIGN
ELEVATION VIEW

POST DETAIL CHART			
POST TYPE	OUTSIDE DIMENSIONS	WALL THICKNESS	WEIGHT PER FOOT
4x4x3/16	4"x4"	0.1875"	9.42 lbs/ft
4x4x1/4	4"x4"	0.2500"	12.21 lbs/ft

ALL POST MATERIAL IN ACCORDANCE WITH ASTM A 500, GRADE B STEEL SQUARE TUBE, GALVANIZED TO MEET AASHTO M 232.

NOTES:

1. DETERMINE THE SIGN DIMENSIONS AND POST HEIGHT REQUIREMENTS. SEE DIAGRAM, THIS SHEET.

   W = SIGN WIDTH (HORIZONTAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   H = SIGN DEPTH (VERTICAL DIMENSION), INCLUDING SUPPLEMENTAL SIGN PANELS. ROUND UP TO NEAREST FOOT.

   U = UNDER-PANEL HEIGHT (VERTICAL DIMENSION), MEASURED FROM THE TOP OF THE FOUNDATION TO THE BOTTOM OF THE SIGN PANEL. ROUND UP TO NEAREST FOOT.

2. ENTER THE POST SELECTION TABLE WITH THE REQUIRED W, H, AND U, AND DETERMINE THE APPROPRIATE POST SIZE, WITH DETAILS SHOWN IN THE TABLE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

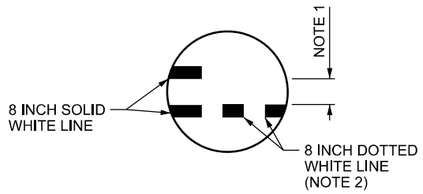
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

MULTI-DIRECTIONAL
BREAKAWAY COUPLING
SYSTEM FOR SQUARE
TUBE SIGN SUPPORTS
DOUBLE POST

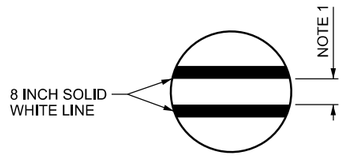
STANDARD DRAWING TITLE

STD. DWG. NO.
SN 17D

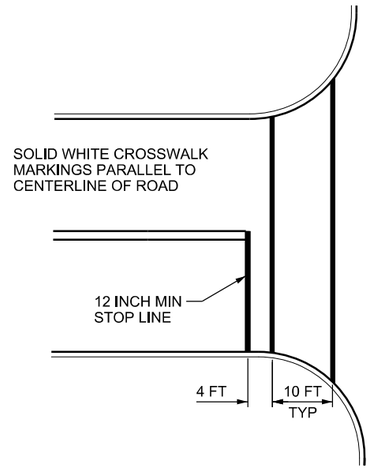
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\SN17D.dgn
23-JUN-2020



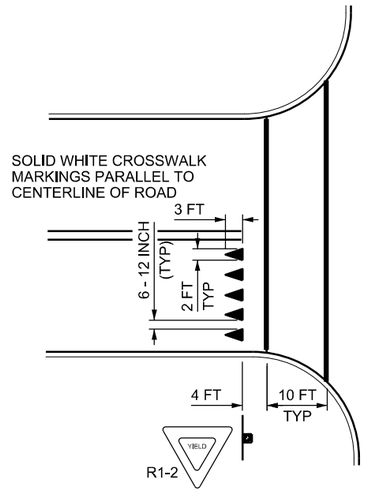
HOV LANE STRIPING DETAIL FOR TRANSITION FROM PROHIBITED MOVEMENT TO ACCESS OPENING



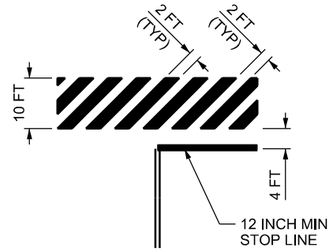
HOV LANE STRIPING DETAIL FOR PROHIBITED MOVEMENTS



STOP OR SIGNAL CONTROL

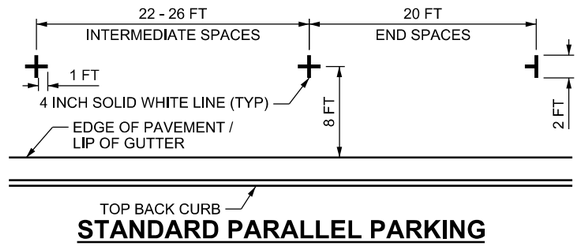


YIELD CONTROL



SPECIAL EMPHASIS CROSSWALK

SOLID WHITE DIAGONAL LINES AT 45° TO DIRECTION OF TRAVEL



STANDARD PARALLEL PARKING

PAVEMENT MARKING LINE DIMENSIONS			
TYPE	WIDTH (INCHES)	LENGTH (FT)	GAP (FT)
SOLID LINE	4	CONTINUOUS	N/A
SOLID LINE	8	CONTINUOUS	N/A
BROKEN LINE	4	10	30
LANE DROP	8	3	9
DOTTED LINE	4	2	6
DOTTED LINE	8	2	6

NOTES:

1. USE 32 INCH (INSIDE TO INSIDE) SEPARATION BETWEEN DOUBLE SOLID WHITE LINES.
2. PLACE 8 INCH DOTTED WHITE LINE AS THE EXTENSION OF THE 8 INCH SOLID WHITE LINE ADJACENT TO THE GENERAL PURPOSE LANE.
3. MAINTAIN 4 INCH SPACE BETWEEN TWO 4 INCH SOLID YELLOW LINES OR BETWEEN 4 INCH SOLID YELLOW LINE AND 4 INCH BROKEN YELLOW LINE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	MOVED ALL DESIGNER INFORMATION TO THE UDOT RDM. DELETED ST 4 TO ST 18

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020

CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020

DEPUTY DIRECTOR

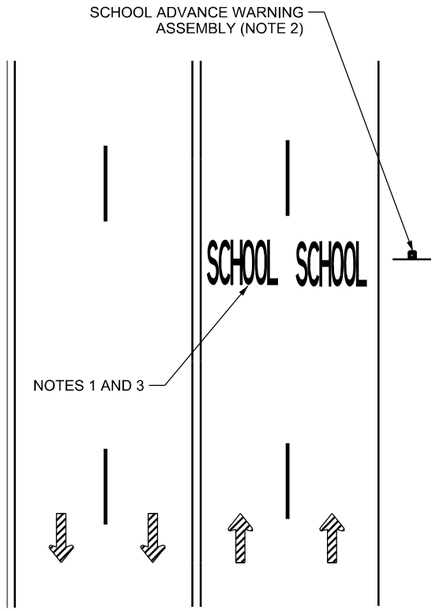
TYPICAL PAVEMENT MARKINGS

STANDARD DRAWING TITLE

STD. DWG. NO.

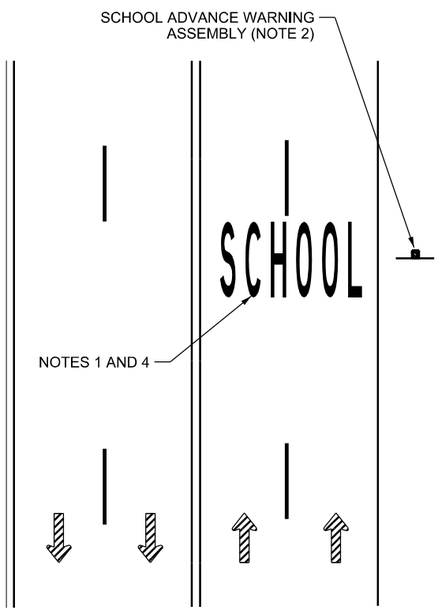
ST 1

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN_ST\ST01.dgn
23-JUN-2020



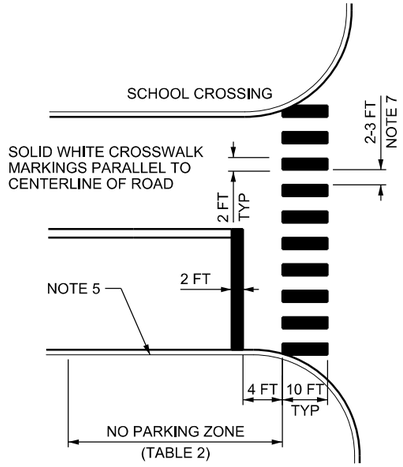
STANDARD

ONE MESSAGE PER LANE
ANY NUMBER OF LANES

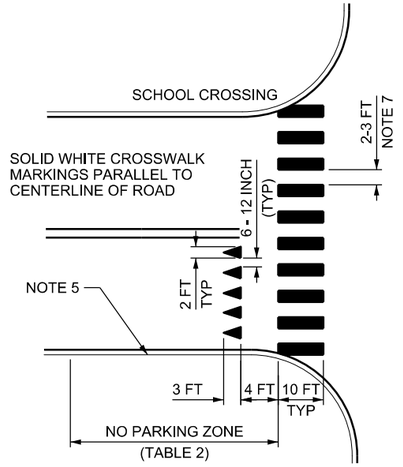


OPTION

ONE MESSAGE PER TWO LANES
EVEN NUMBER OF LANES ONLY



STOP OR SIGNAL CONTROL



YIELD CONTROL

TABLE 2	
NO PARKING ZONE	
SPEED (MPH) (NOTE B)	LENGTH (FT)
25	60
30	85
35	115
40	150
45	190
50	230

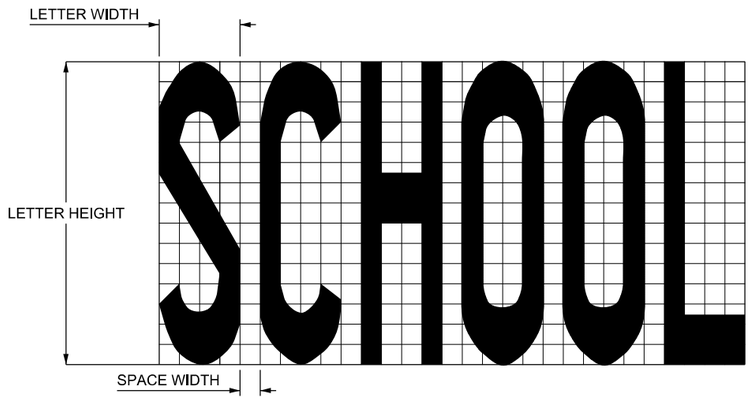


TABLE 1			
RECOMMENDED LETTER SIZES			
ONE-LANE MESSAGE			
LANE WIDTH (FT)	LETTER WIDTH (INCHES)	SPACE WIDTH (INCHES)	MINIMUM LETTER HEIGHT (FT)
12	18	5	6
11.5	17.5	4.5	6
11	16.5	4.25	6
10.5	15.75	4	6
10	15	3.75	6
TWO-LANE MESSAGE			
ALL	32	8	10

NOTES:

1. PLACE ALL SCHOOL MESSAGES, PAVEMENT MARKINGS, AND SIGNING IN CONFORMANCE WITH THE UTAH TRAFFIC CONTROLS FOR SCHOOL ZONES (SECTION 7 OF THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES).
2. PLACE SCHOOL MESSAGE ADJACENT TO SCHOOL ADVANCE WARNING ASSEMBLY.
3. SINGLE LANE MESSAGES (STANDARD):
   - MAXIMUM MESSAGE WIDTH NOT TO EXCEED LANE WIDTH LESS 10 INCHES (FOR EXAMPLE, 12 FT TRAFFIC LANE WIDTH LESS 10 INCHES EQUALS 11 FT 2 INCHES MAXIMUM MESSAGE WIDTH).
   - MESSAGE TO BE COMPLETELY CONTAINED WITHIN TRAFFIC LANE, AND NOT ENCROACH UPON LANE STRIPING OR OTHER PAVEMENT MARKINGS.
4. TWO LANE MESSAGES (OPTIONAL):
   - USE TWO-LANE MESSAGE ONLY WHEN THERE ARE AN EVEN NUMBER OF LANES.
   - USE TWO-LANE MESSAGE UPON APPROVAL OF THE REGION TRAFFIC ENGINEER.
   - ONE-HALF OF MESSAGE TO BE CONTAINED IN EACH TRAFFIC LANE. PAVEMENT MESSAGE TO BE WITHIN GAP OF 4 INCH BROKEN WHITE LINE BETWEEN LANES.
5. RED CURB MARKING IS OPTIONAL FOR "NO PARKING" ZONE.
6. NON-STATE ROUTES MAY USE 9 FT WIDE CROSSWALK MARKINGS.
7. VARY PLACEMENT OF CROSSWALK MARKINGS WITH A SPACING OF 2-3 FT TO AVOID WHEEL PATHS.
8. ESTABLISH A "NO PARKING" ZONE PRIOR TO SCHOOL CROSSING, SEE TABLE 2.

NO.	DATE	REVISIONS	APPR.
1	8/29/19	MRB MOVED ALL DESIGNER INFORMATION TO THE UDOT RDM. DELETED ST 4 TO ST 18	

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

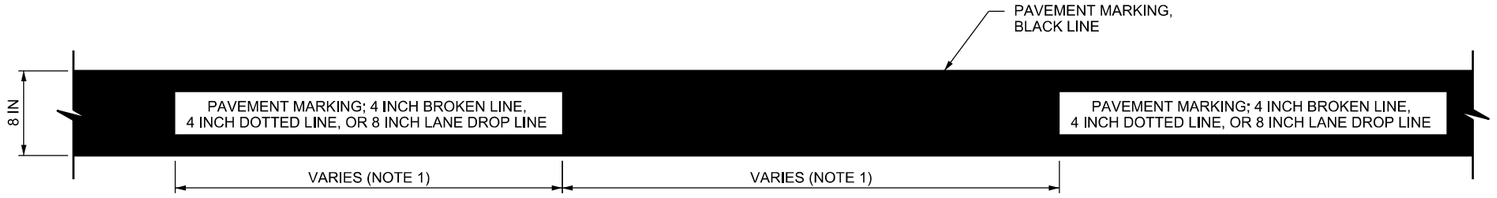
SCHOOL CROSSING AND SCHOOL MESSAGE

STANDARD DRAWING TITLE

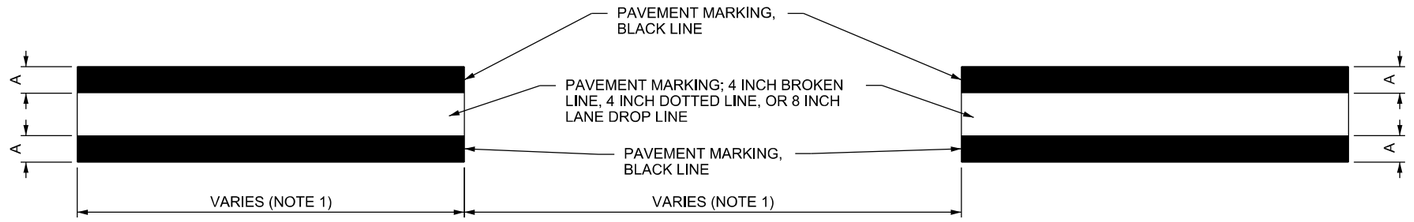
STD. DWG. NO.

ST 2

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN, ST)\ST02.dgn
23-JUN-2020

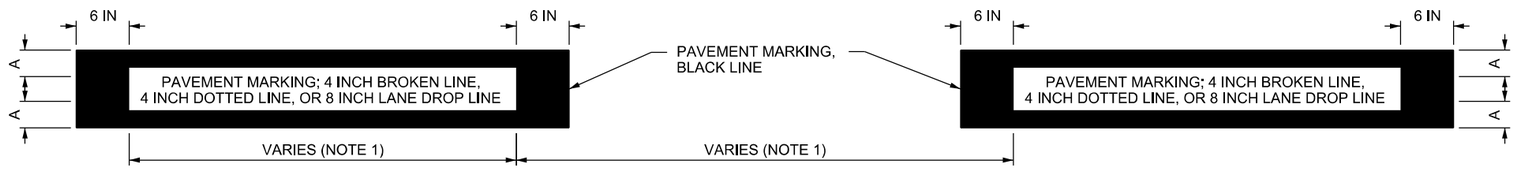


CONTINUOUS CONTRAST PAVEMENT MARKING



BACKGROUND CONTRAST PAVEMENT MARKING OPTION 1

DIMENSION "A"	
PAINT	TAPE
2-3 INCHES	1.5 INCH MIN



BACKGROUND CONTRAST PAVEMENT MARKING OPTION 2

NOTES:

1. SEE STD DWG ST 1 FOR LINE DIMENSIONS.
2. USE BACKGROUND CONTRAST PAVEMENT MARKING OPTION 1 WHEN BLACK AND WHITE LINES ARE APPLIED SIMULTANEOUSLY.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	8/29/19	MRB	REVISED NOTES, CHANGED SHEET NUMBER FROM ST 9 TO ST 3

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

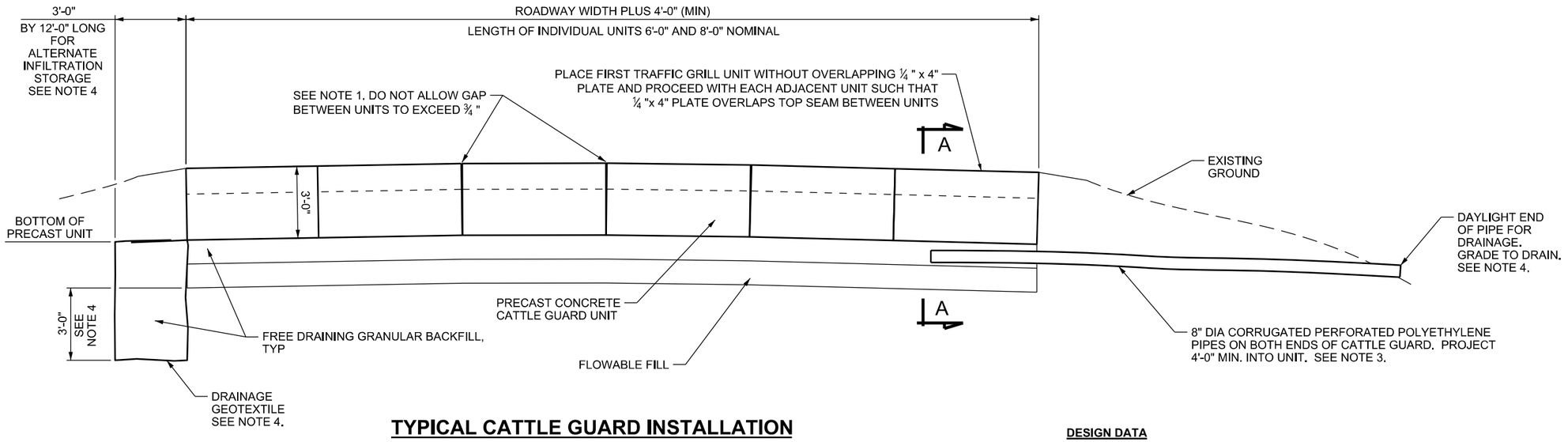
CONTRAST PAVEMENT MARKINGS FOR CONCRETE PAVEMENT

STANDARD DRAWING TITLE

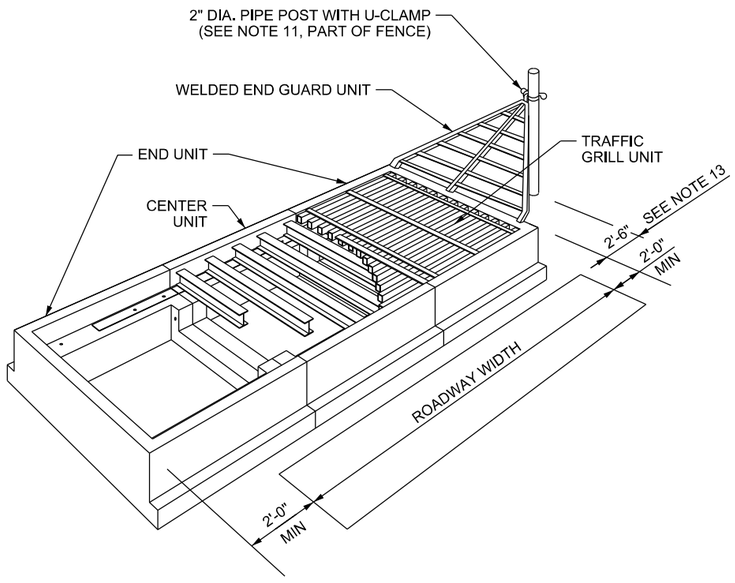
STD. DWG. NO.

ST 3

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 8 (SN,ST)\ST03.dgn

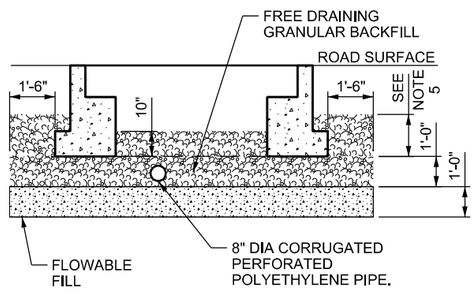


TYPICAL CATTLE GUARD INSTALLATION



ISOMETRIC VIEW

SOME ELEMENTS NOT SHOWN FOR CLARITY



SECTION A-A

AT END UNIT WALL

DESIGN DATA

HL-93 LOADING ACCORDING TO AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL CONCRETE
145 PCF f'c = 4.0 KSI n = 8 CLASS AA(AE)

REINFORCING STEEL
fy = 60 KSI

STRUCTURAL STEEL
Fy = 36 KSI

GENERAL NOTES:

1. TOP OF CATTLE GUARD PARALLEL TO THE PROFILE GRADE AND SUPERELEVATION.
2. OVER-EXCAVATE SOIL 2 FT AND BACKFILL WITH FLOWABLE FILL TOPPED BY COMPACTED FREE DRAINING GRANULAR BACKFILL.
3. WRAP BURIED ENDS IN NON-WOVEN DRAINAGE GEOTEXTILE FILTER FABRIC.
4. PROVIDE FREE DRAINING GRANULAR BACKFILL IN AN INFILTRATION STORAGE WRAPPED IN DRAINAGE GEOTEXTILE IF SITE CONDITIONS DO NOT PERMIT EXTENDING THE PIPE TO DAYLIGHT.
5. BACKFILL TO BOTTOM OF PAVEMENT SECTION.
6. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO ASTM A 775 OR AASHTO M 111 AND AASHTO M 31 GRADE 60.
7. USE STRUCTURAL STEEL CONFORMING TO AASHTO M 270 GRADE 36 AND GALVANIZE AFTER FABRICATION IN ACCORDANCE WITH AASHTO M 111 (ASTM A 123).
8. USE BOLTS THAT CONFORM TO ASTM A 307, WASHERS THAT CONFORM TO ASTM F 436, AND NUTS THAT CONFORM TO ASTM A 563.
9. ANY MODIFICATION REQUIRES APPROVAL BY THE ENGINEER.
10. USE CONCRETE CLASS AA(AE).
11. SEE FG SERIES STANDARD DRAWINGS FOR FENCE INSTALLATION DETAILS.
12. A DRAFT MAY BE INCLUDED ON INSIDE FACES OF THE PRECAST UNIT. DO NOT DISRUPT LOCATION OF ATTACHED ELEMENTS OR CONFLICT WITH TRAFFIC GRILL UNIT DIMENSIONS. MAINTAIN VERTICAL EXTERIOR FACES.
13. INSTALL WELDED END GUARD UNIT AT 45° ANGLE TO ROADWAY SURFACE.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/25/18	JWC	COMPLETE REVISION TO CATTLE GUARD

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE

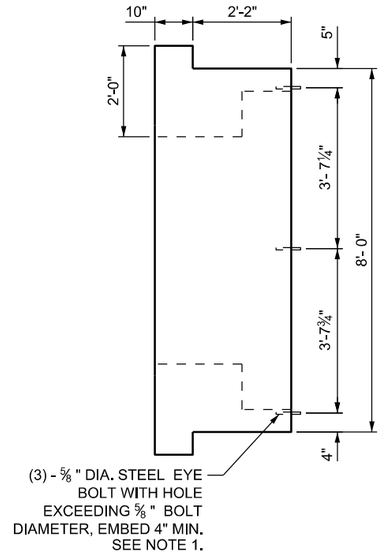
AUGUST 2020 — DATE
APPROVED
DEPUTY DIRECTOR

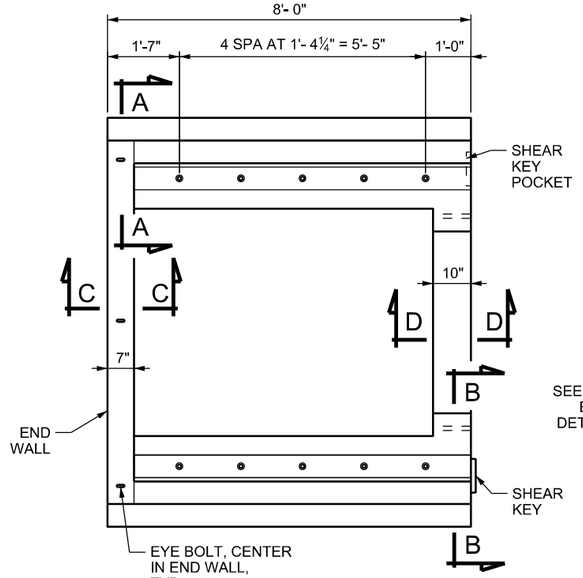
PRECAST CONCRETE CATTLE GUARD - GENERAL

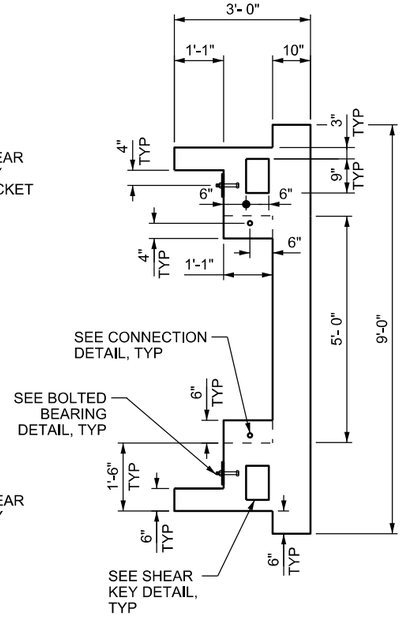
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 1A

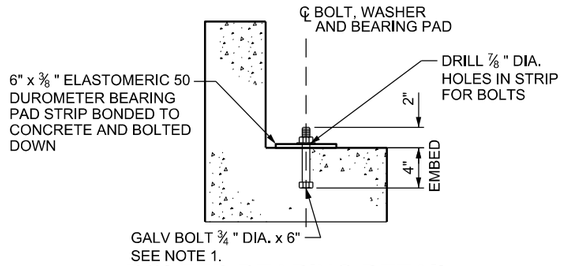
23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\SW01A.dgn







8'-0" END UNIT



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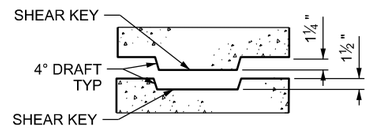

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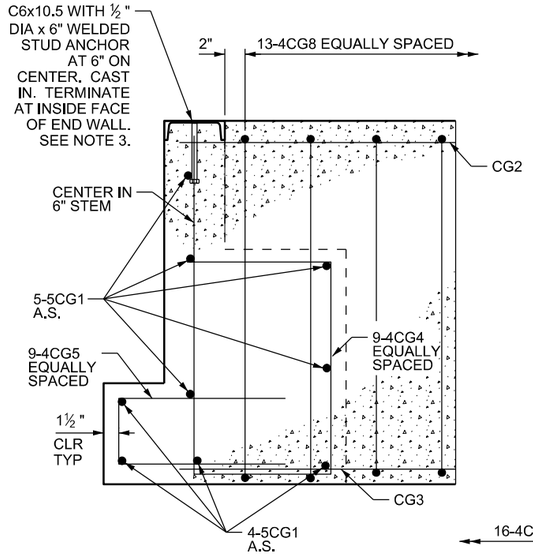
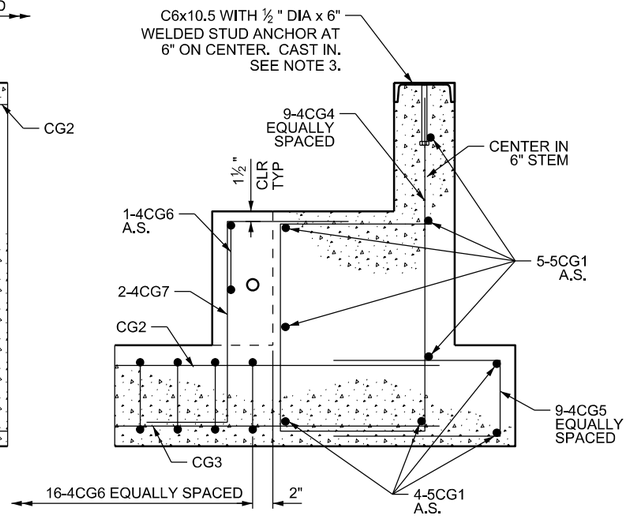
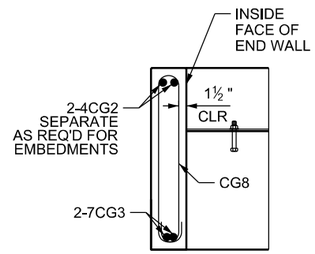


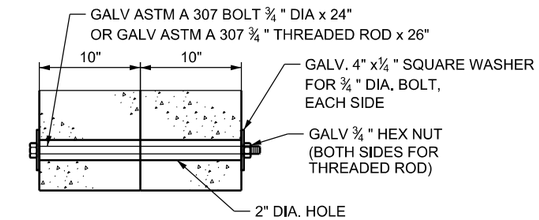
SECTION A-A



SECTION B-B



SECTION C-C



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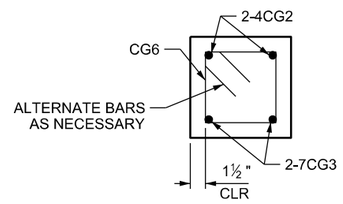


SECTION D-D

REINFORCING STEEL SCHEDULE FOR END UNIT

MARK	LOCATION	SIZE	REQ'D	LENGTH	TOTAL	SKETCH
CG1	CATTLE GUARD	5	18	7'-8"	138'-0"	
CG2	CATTLE GUARD	4	4	7'-8"	30'-8"	
CG3	CATTLE GUARD	7	4	7'-8"	30'-8"	
CG4	CATTLE GUARD	4	18	6'-8"	120'-0"	
CG5	CATTLE GUARD	4	18	3'-5"	61'-6"	1'-5", 7", 1'-1½", 2'-9", 1'-8", 1'-1½"
CG6	CATTLE GUARD	4	18	3'-1"	55'-6"	135° STD. HOOK, 7", 7", 1'-2", 1'-8"
CG7	CATTLE GUARD	4	4	3'-6"	14'-0"	90° STD. HOOK
CG8	CATTLE GUARD	4	13	6'-10"	88'-10"	180° STD. HOOK, 2'-9", 4"

STRUCTURAL STEEL PER UNIT

ITEM	REQ'D	SIZE	LENGTH
CHANNEL	2	C6x10.5	7'- 5"
STUD ANCHOR	30	½ " DIA	0'- 6"

NOTES:

1. FERRULE LOOP INSERTS SIZED FOR A BOLT OF EQUIVALENT DIAMETER TO THAT SHOWN MAY BE USED INSTEAD OF EMBEDDED BOLTS. FABRICATOR TO INCLUDE ASSOCIATED BOLT, OR EYE BOLT, OF LENGTH APPROPRIATE FOR FERRULE.
2. PROVIDE EMBEDDED LIFTING DEVICES CAPABLE OF SUPPORTING 20,000 LB MINIMUM TO LIFT THE PRECAST CATTLE GUARD UNIT INTO ITS FINAL POSITION.
3. WEEPHOLES ARE PERMITTED IN THE CHANNEL SECTION TO RELEASE ENTRAPPED AIR.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	2/27/20	JWC	CORRECTED NUMBER OF CG6 BARS IN SCHEDULE
2	2/28/19	JWC	REVISED LENGTH OF CG4 BAR
1	10/25/18	JWC	COMPLETE REVISION TO CATTLE GUARD

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

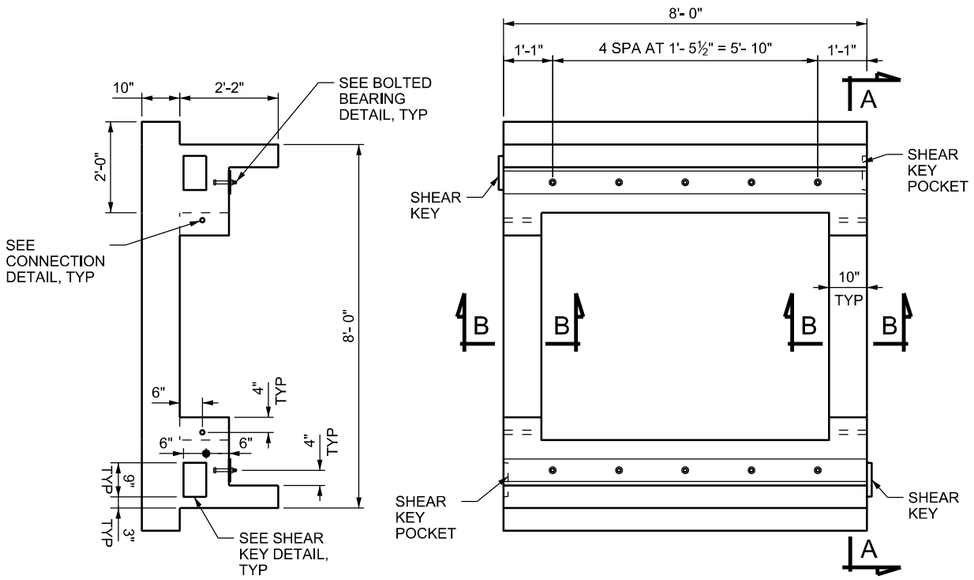
RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

8'-0" PRECAST CONCRETE CATTLE GUARD END UNIT

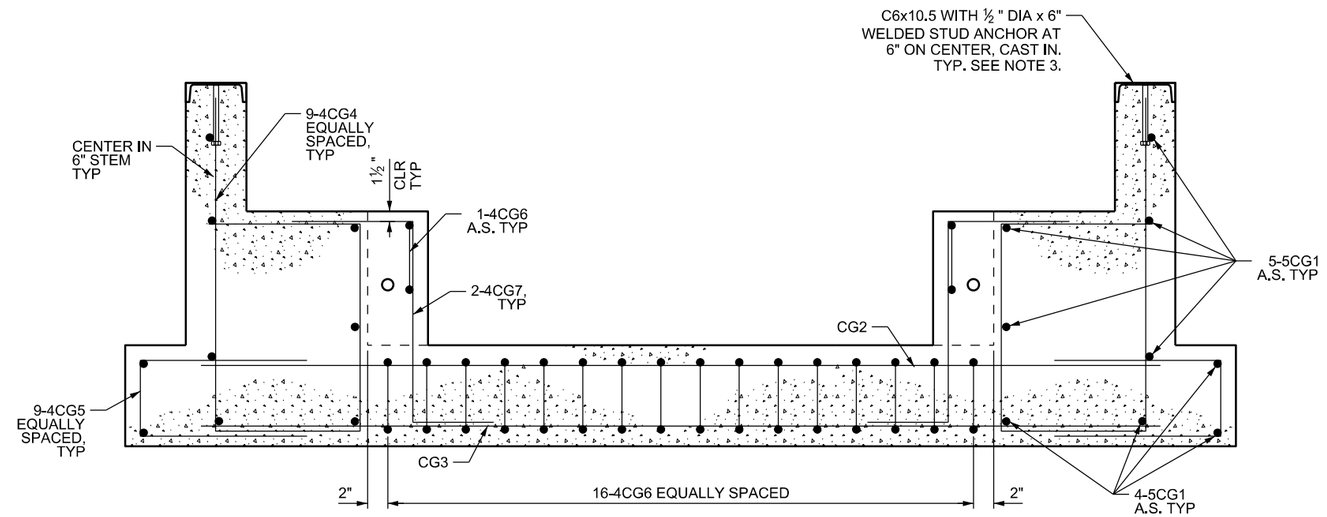
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 1B

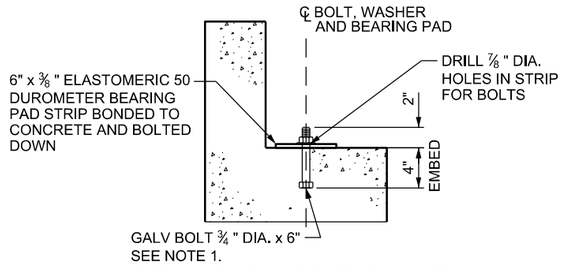
DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 ISW, TC\SW01B.dgn
23-JUN-2020



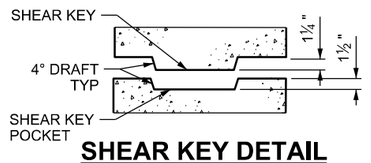
8'-0" CENTER UNIT



SECTION A-A



BOLTED BEARING DETAIL



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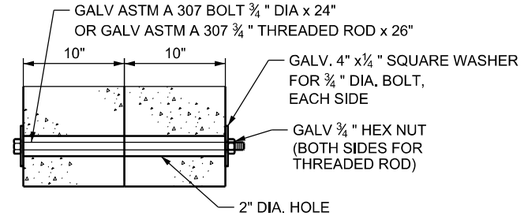

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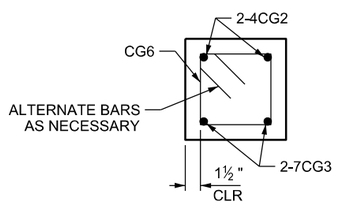


SECTION B-B

REINFORCING STEEL SCHEDULE FOR CENTER UNIT

MARK	LOCATION	SIZE	REQ'D	LENGTH	TOTAL	SKETCH
CG1	CATTLE GUARD	5	18	7'-8"	138'-0"	
CG2	CATTLE GUARD	4	4	7'-8"	30'-8"	
CG3	CATTLE GUARD	7	4	7'-8"	30'-8"	
CG4	CATTLE GUARD	4	18	6'-8"	120'-0"	
CG5	CATTLE GUARD	4	18	3'-5"	61'-6"	1'-5", 7", 1'-1½", 2'-9", 1'-8", 1'-1½"
CG6	CATTLE GUARD	4	36	3'-1"	111'-0"	135° STD. HOOK, 7", 7"
CG7	CATTLE GUARD	4	8	3'-6"	28'-0"	90° STD. HOOK, 1'-2", 1'-8"

STRUCTURAL STEEL PER UNIT

ITEM	REQ'D	SIZE	LENGTH
CHANNEL	2	C6x10.5	8'- 0"
STUD ANCHOR	32	½ " DIA	0'- 6"

NOTES:

1. FERRULE LOOP INSERTS SIZED FOR A BOLT OF EQUIVALENT DIAMETER TO THAT SHOWN MAY BE USED INSTEAD OF EMBEDDED BOLTS. FABRICATOR TO INCLUDE ASSOCIATED BOLT, OR EYE BOLT, OF LENGTH APPROPRIATE FOR FERRULE.
2. PROVIDE EMBEDDED LIFTING DEVICES CAPABLE OF SUPPORTING 20,000 LB MINIMUM TO LIFT THE PRECAST CATTLE GUARD UNIT INTO ITS FINAL POSITION.
3. WEEPHOLES ARE PERMITTED IN THE CHANNEL SECTION TO RELEASE ENTRAPPED AIR.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	2/27/20	JWC	CORRECTED SPACING OF ANCHORS AND NUMBER OF CG6 BARS IN SCHEDULE
2	2/28/19	JWC	REVISED LENGTH OF CG4 BAR
1	10/25/18	JWC	COMPLETE REVISION TO CATTLE GUARD

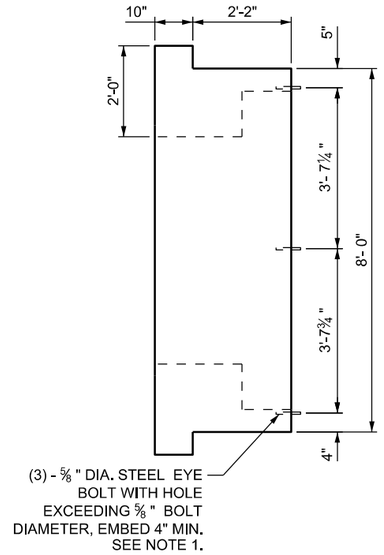
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

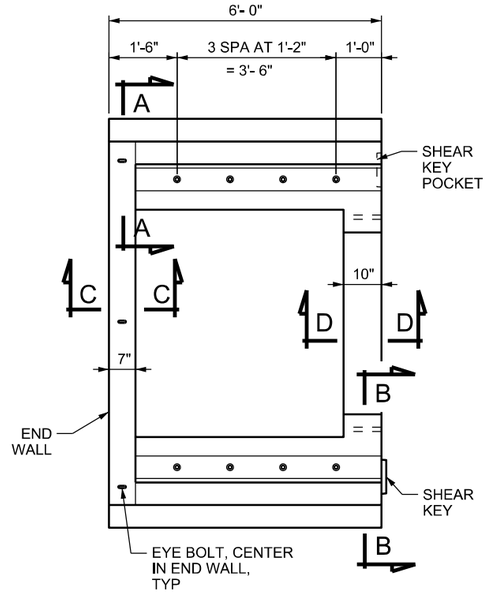
RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

STANDARD DRAWING TITLE
8'-0" PRECAST CONCRETE CATTLE GUARD CENTER UNIT

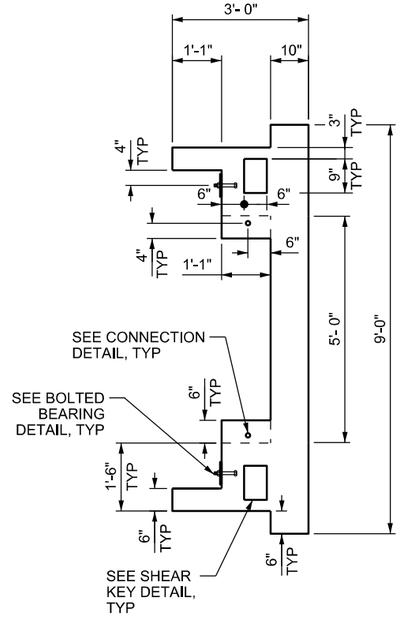
STD. DWG. NO.
SW 1C

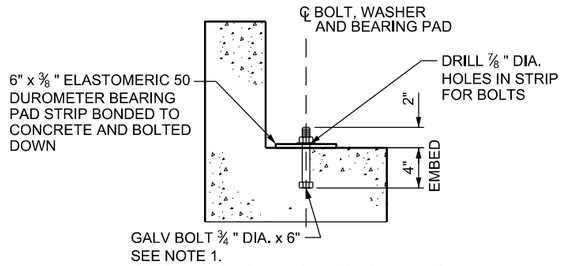
DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 ISW, TC\SW01C.dgn
23-JUN-2020



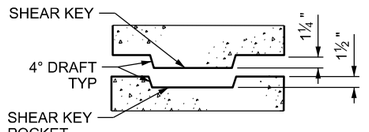


6'-0" END UNIT





BOLTED BEARING DETAIL



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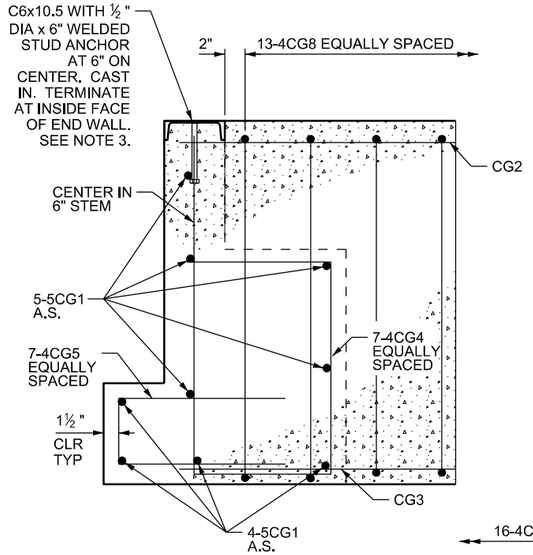
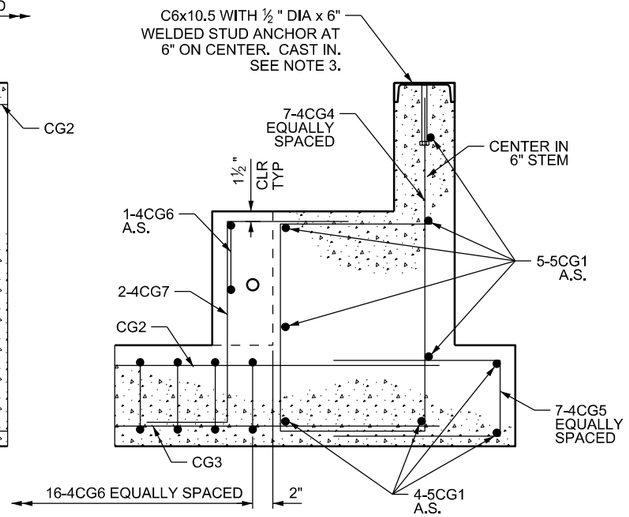
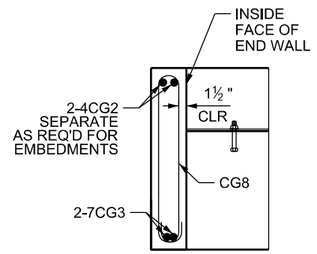


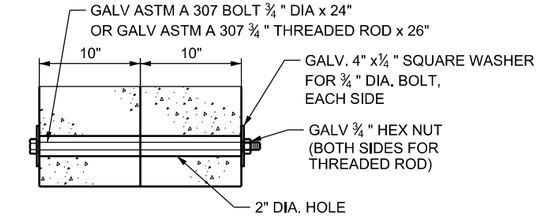
SECTION A-A



SECTION B-B



SECTION C-C



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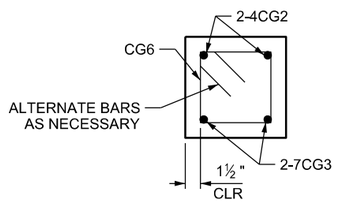

SECTION D-D

REINFORCING STEEL SCHEDULE FOR END UNIT

MARK	LOCATION	SIZE	REQ'D	LENGTH	TOTAL	SKETCH
CG1	CATTLE GUARD	5	18	7'-8"	138'-0"	
CG2	CATTLE GUARD	4	4	7'-8"	30'-8"	
CG3	CATTLE GUARD	7	4	7'-8"	30'-8"	
CG4	CATTLE GUARD	4	14	6'-8"	93'-4"	
CG5	CATTLE GUARD	4	14	3'-5"	47'-10"	1'-5" 7"

MARK	LOCATION	SIZE	REQ'D	LENGTH	TOTAL	SKETCH
CG6	CATTLE GUARD	4	18	3'-1"	55'-6"	135° STD. HOOK 7" 7" 1'-2" 1'-8"
CG7	CATTLE GUARD	4	4	3'-6"	14'-0"	90° STD. HOOK
CG8	CATTLE GUARD	4	13	6'-10"	88'-10"	2'-9" 180° STD. HOOK 6" 4"

1'-1½" 2'-9" 1'-8" 1'-1½"

STRUCTURAL STEEL PER UNIT

ITEM	REQ'D	SIZE	LENGTH
CHANNEL	2	C6x10.5	5'- 5"
STUD ANCHOR	22	½ " DIA	0'- 6"

NOTES:

1. FERRULE LOOP INSERTS SIZED FOR A BOLT OF EQUIVALENT DIAMETER TO THAT SHOWN MAY BE USED INSTEAD OF EMBEDDED BOLTS. FABRICATOR TO INCLUDE ASSOCIATED BOLT, OR EYE BOLT, OF LENGTH APPROPRIATE FOR FERRULE.
2. PROVIDE EMBEDDED LIFTING DEVICES CAPABLE OF SUPPORTING 20,000 LB MINIMUM TO LIFT THE PRECAST CATTLE GUARD UNIT INTO ITS FINAL POSITION.
3. WEEPHOLES ARE PERMITTED IN THE CHANNEL SECTION TO RELEASE ENTRAPPED AIR.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	2/27/20	JWC	CORRECTED NUMBER OF CG6 BARS IN SCHEDULE
2	2/28/19	JWC	REVISED LENGTH OF CG4 BAR
1	10/25/18	JWC	NEW DRAWING, COMPLETE REVISION TO CATTLE GUARD

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

6'-0" PRECAST CONCRETE CATTLE GUARD END UNIT

STANDARD DRAWING TITLE

STD. DWG. NO.
SW 1D

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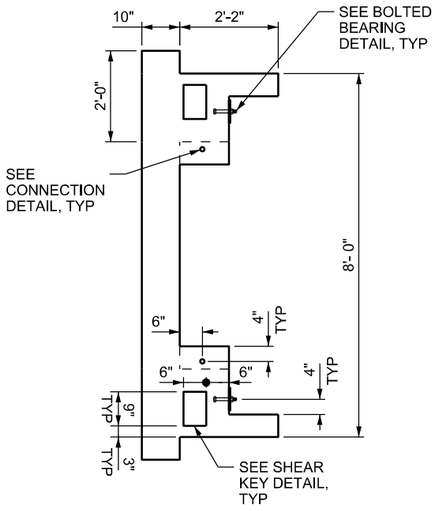
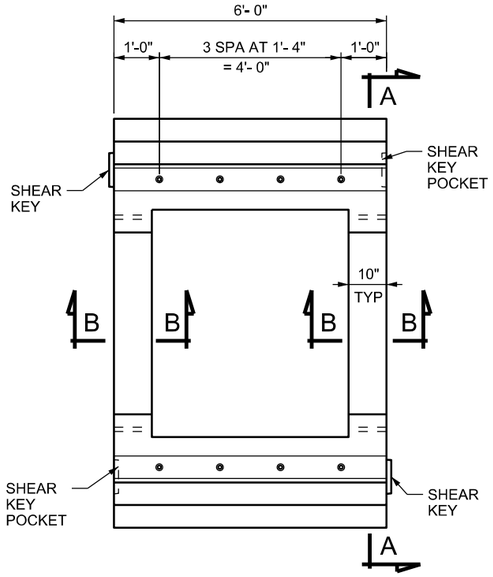
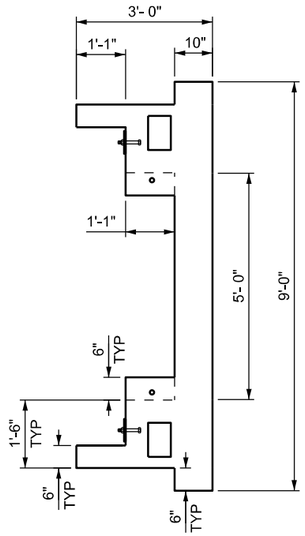
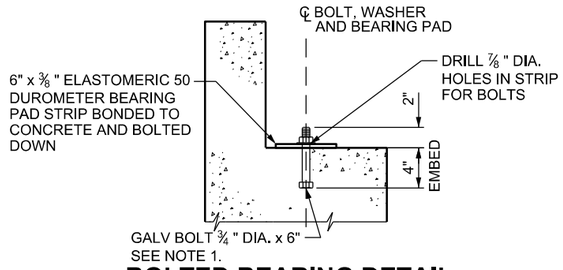
23-JUN-2020



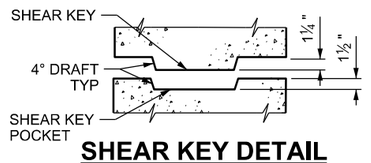




6'-0" CENTER UNIT



BOLTED BEARING DETAIL



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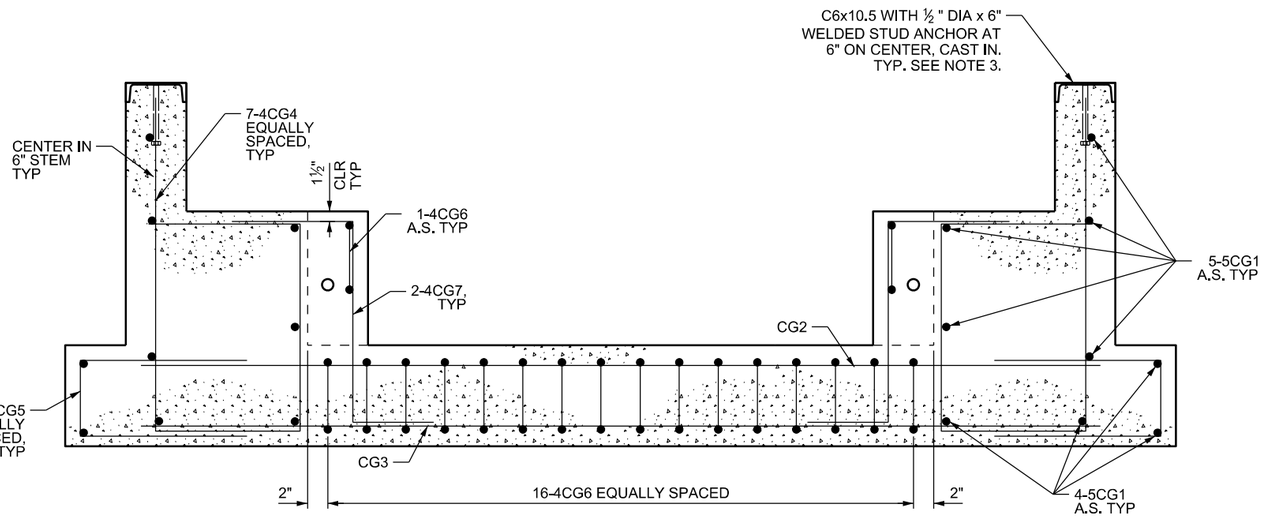
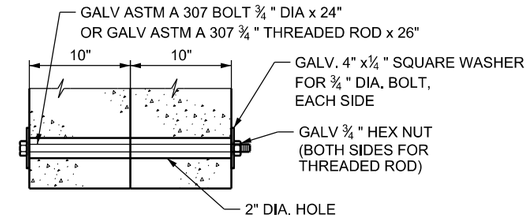


SECTION A-A



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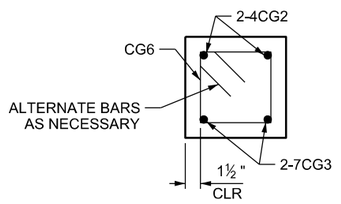


SECTION B-B

REINFORCING STEEL SCHEDULE FOR CENTER UNIT

MARK	LOCATION	SIZE	REQ'D	LENGTH	TOTAL	SKETCH
CG1	CATTLE GUARD	5	18	7'-8"	138'-0"	
CG2	CATTLE GUARD	4	4	7'-8"	30'-8"	
CG3	CATTLE GUARD	7	4	7'-8"	30'-8"	
CG4	CATTLE GUARD	4	14	6'-8"	93'-4"	
CG5	CATTLE GUARD	4	14	3'-5"	47'-10"	1'-5" 7"
CG6	CATTLE GUARD	4	36	3'-1"	111'-0"	135° STD. HOOK 7" 7"
CG7	CATTLE GUARD	4	8	3'-6"	28'-0"	90° STD. HOOK 1'-2" 1'-8"

1'-1½" 2'-9" 1'-8" 1'-1½"

STRUCTURAL STEEL PER UNIT

ITEM	REQ'D	SIZE	LENGTH
CHANNEL	2	C6x10.5	6'- 0"
STUD ANCHOR	24	½ " DIA	0'- 6"

NOTES:

1. FERRULE LOOP INSERTS SIZED FOR A BOLT OF EQUIVALENT DIAMETER TO THAT SHOWN MAY BE USED INSTEAD OF EMBEDDED BOLTS. FABRICATOR TO INCLUDE ASSOCIATED BOLT, OR EYE BOLT, OF LENGTH APPROPRIATE FOR FERRULE.
2. PROVIDE EMBEDDED LIFTING DEVICES CAPABLE OF SUPPORTING 20,000 LB MINIMUM TO LIFT THE PRECAST CATTLE GUARD UNIT INTO ITS FINAL POSITION.
3. WEEPHOLES ARE PERMITTED IN THE CHANNEL SECTION TO RELEASE ENTRAPPED AIR.

REVISIONS

NO.	DATE	APPR.	REMARKS
3	2/27/20	JWC	CORRECTED NUMBER OF CG6 BARS IN SCHEDULE
2	2/28/19	JWC	REVISED LENGTH OF CG4 BAR
1	10/25/18	JWC	NEW DRAWING, COMPLETE REVISION TO CATTLE GUARD

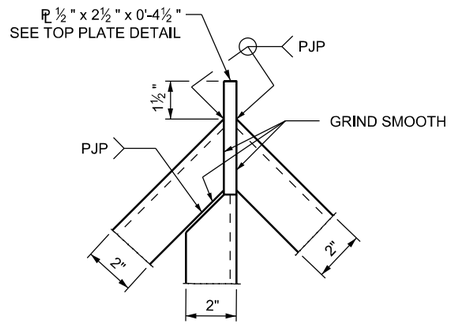
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
CHAIRMAN STANDARDS COMMITTEE APPROVED — DATE: AUGUST 2020
DEPUTY DIRECTOR

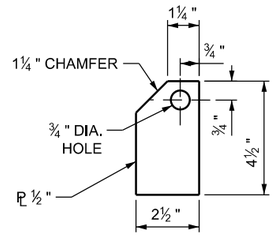
STANDARD DRAWING TITLE
6'-0" PRECAST CONCRETE CATTLE GUARD CENTER UNIT

STD. DWG. NO.
SW 1E

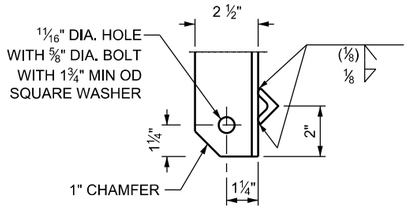
DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\SW01E.dgn
23-JUN-2020



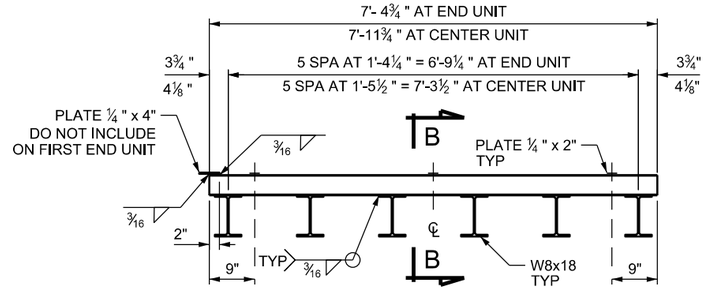
TOP JOINT DETAIL



TOP PLATE DETAIL

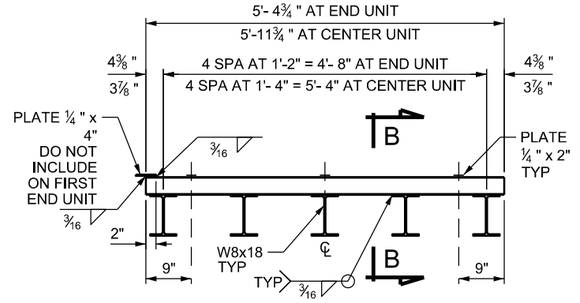


BASE DETAIL



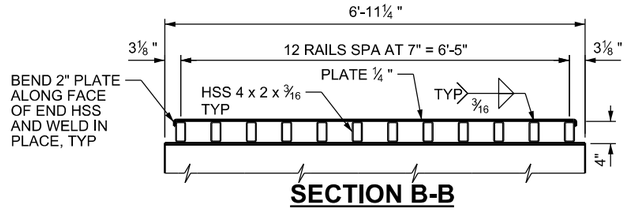
8'-0" TRAFFIC GRILL UNIT

APPROXIMATE WEIGHT 1,400 LB

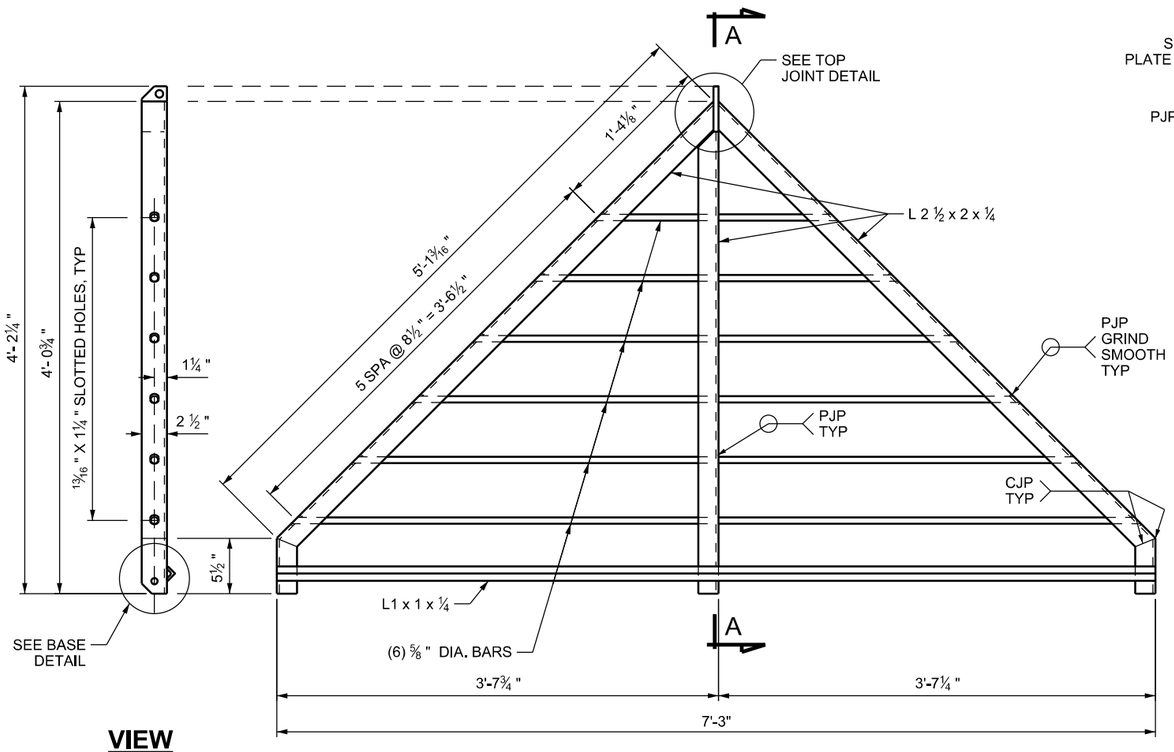


6'-0" TRAFFIC GRILL UNIT

APPROXIMATE WEIGHT 1,100 LB

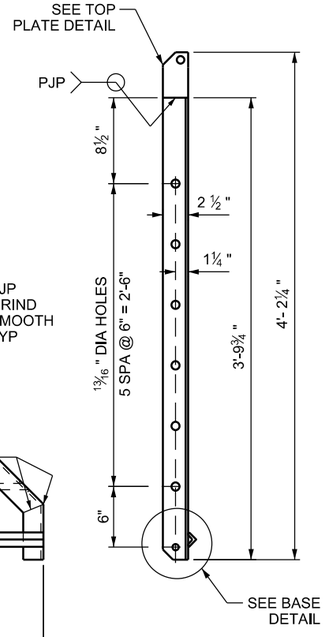


SECTION B-B



VIEW

OTHER SIDE SIMILAR



SECTION A-A

WELDED END GUARD UNIT

WT.W/BOLTS, U-CLAMP 105 LBS (2 REQUIRED)

STRUCTURAL STEEL PER UNIT

8'- 0" END UNIT			
ITEM	REQ'D	SIZE	LENGTH
BEAM	6	W8 x 18	6'-11¼ "
HSS	13	4 x 2 x 3/16	7'- 4¾ "
2" PLATE	3	¼" x 2"	7'- 0"
4" PLATE	1*	¼ " x 4"	6'- 7"

* DO NOT INCLUDE ON FIRST TRAFFIC GRILL UNIT

8'- 0" CENTER UNIT			
ITEM	REQ'D	SIZE	LENGTH
BEAM	6	W8 x 18	6'-11¼ "
HSS	13	4 x 2 x 3/16	7'-11¾ "
2" PLATE	3	¼ " x 2"	7'- 0"
4" PLATE	1	¼ " x 4"	6'- 7"

6'- 0" END UNIT			
ITEM	REQ'D	SIZE	LENGTH
BEAM	5	W8 x 18	6'-11¼ "
HSS	13	4 x 2 x 3/16	5'- 4¾ "
2" PLATE	3	¼ " x 2"	7'- 0"
4" PLATE	1*	¼ " x 4"	6'- 7"

* DO NOT INCLUDE ON FIRST TRAFFIC GRILL UNIT

6'- 0" CENTER UNIT			
ITEM	REQ'D	SIZE	LENGTH
BEAM	5	W8 x 18	6'-11¼ "
HSS	13	4 x 2 x 3/16	5'-11¾ "
2" PLATE	3	¼ " x 2"	7'- 0"
4" PLATE	1	¼ " x 4"	6'- 7"

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	10/25/18	JWC	NEW DRAWING, COMPLETE REVISION TO CATTLE GUARD	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL

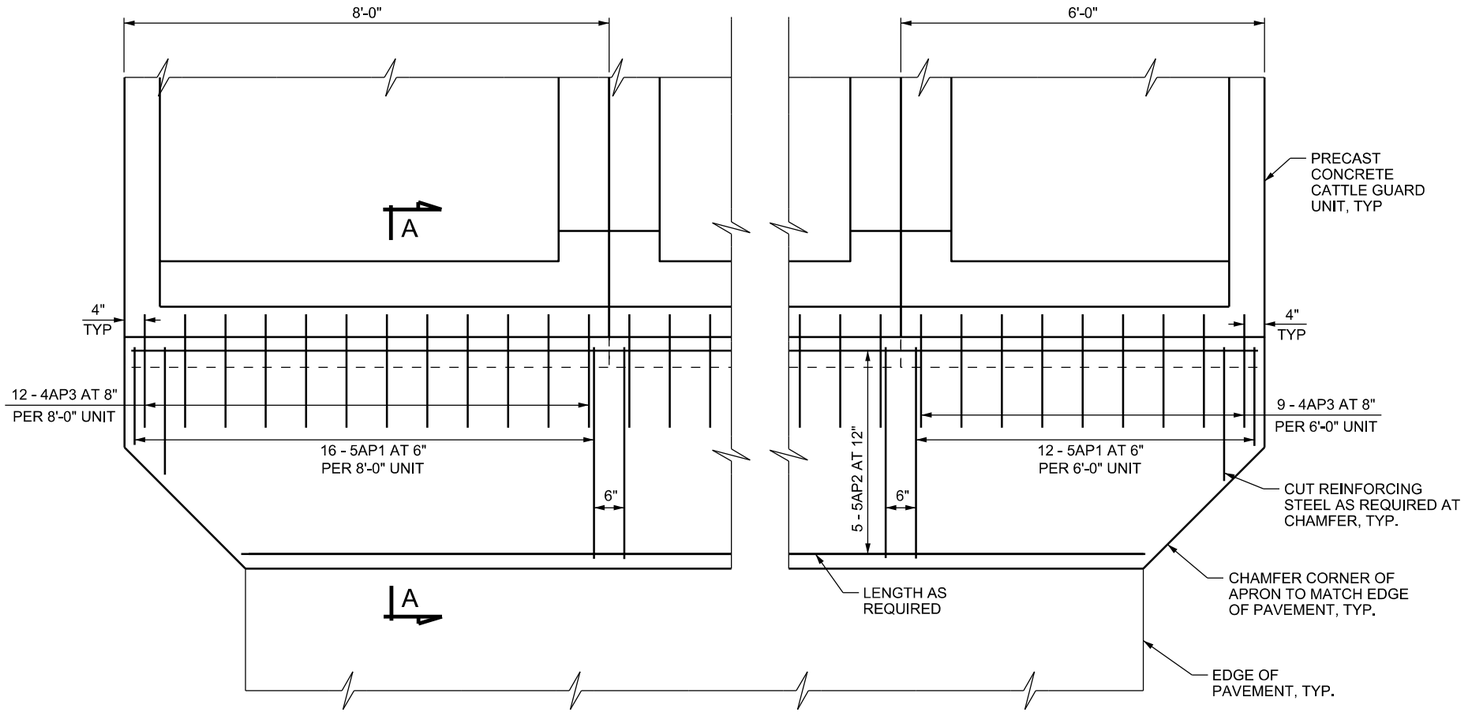
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

WELDED END GUARD UNIT AND TRAFFIC GRILL UNIT

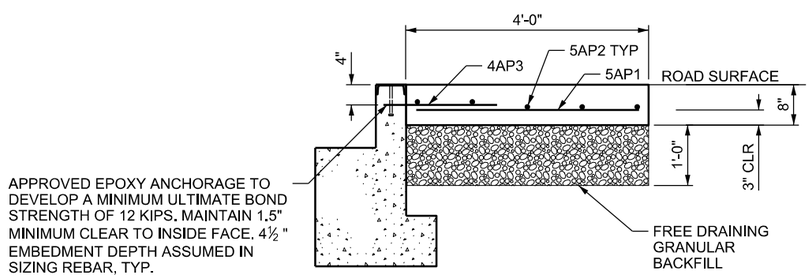
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 1F

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\SW8F.dgn
23-JUN-2020



OPTIONAL CAST-IN-PLACE APRON - PLAN



SECTION A-A

REINFORCING STEEL SCHEDULE						
MARK	LOCATION	SIZE	REQ'D	LENGTH	TOTAL	SKETCH
AP1	APRON	5	AS REQ'D	3'-8"	AS REQ'D	
AP2	APRON	5	5	AS REQ'D	AS REQ'D	———
AP3	APRON	4	AS REQ'D	1'-10½"	AS REQ'D	

DESIGN DATA

HL-93 LOADING ACCORDING TO AASHTO LRFD BRIDGE DESIGN AND INTERIM SPECIFICATIONS

STRUCTURAL CONCRETE
145 PCF f'c = 4.0 KSI n = 8 CLASS AA(AE)

REINFORCING STEEL
fy = 60 KSI

GENERAL NOTES:

1. USE COATED DEFORMED-CARBON REINFORCING STEEL BARS CONFORMING TO ASTM A 775 OR AASHTO M 111 AND M 31 GRADE 60.
2. ANY MODIFICATION REQUIRES APPROVAL BY THE ENGINEER.
3. USE CONCRETE CLASS AA(AE).
4. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL UNLESS NOTED OTHERWISE.

ITEM	LOCATION	EST QTY	UNIT
FREE DRAINING GRANULAR BACKFILL (PLAN QUANTITY)	6'-0" UNIT	1.8	CU YD
FREE DRAINING GRANULAR BACKFILL (PLAN QUANTITY)	8'-0" UNIT	2.4	CU YD
REINFORCING STEEL - COATED	6'-0" UNIT	180	LB
REINFORCING STEEL - COATED	8'-0" UNIT	250	LB
STRUCTURAL CONCRETE	6'-0" UNIT	1.2	CU YD
STRUCTURAL CONCRETE	8'-0" UNIT	1.6	CU YD

REVISIONS

NO.	DATE	APPR.	REMARKS
1	10/25/18	JWC	NEW DRAWING

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

PRECAST CONCRETE CATTLE GUARD - OPTIONAL CIP APRON
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 1G

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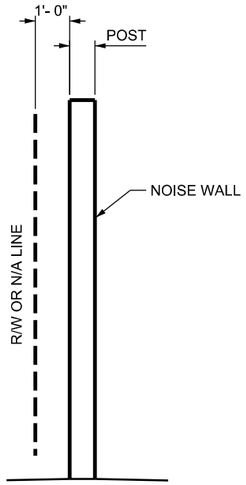
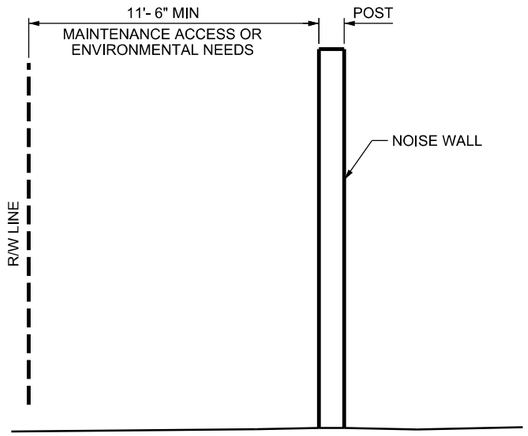
23-JUN-2020

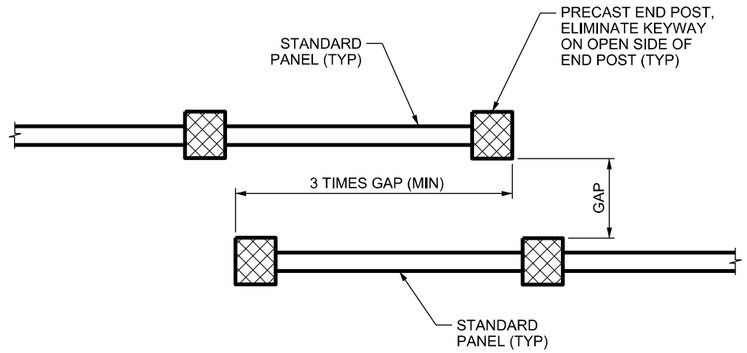


SECTION - ADJACENT TO R/W OR N/A LINE

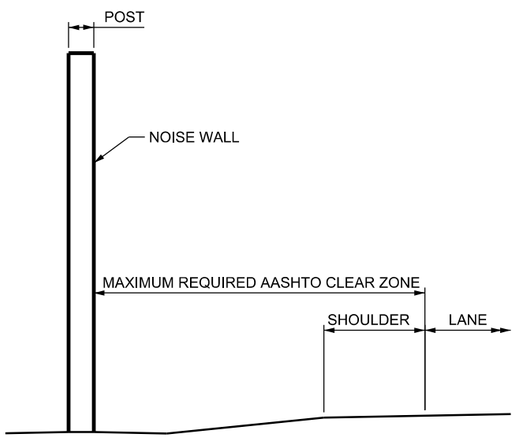


SECTION - ADJACENT TO R/W

WITH MAINTENANCE ACCESS

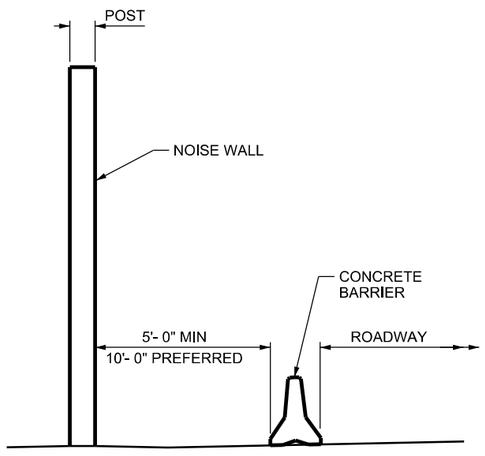


WALL OVERLAP PLAN



SECTION - ADJACENT TO ROADWAY

WITHOUT BARRIER



SECTION - ADJACENT TO ROADWAY

WITH BARRIER

NOTES

1. SLOPE FINISHED GRADE TO DRAIN AWAY FROM WALL.
2. PROVIDE MAINTENANCE ACCESS BETWEEN NOISE WALL AND R/W LINE WHEN NOISE WALL IS NOT PLACED 1 FT INSIDE OF R/W LINE.
3. CONNECT R/W FENCE TO BOTH ENDS OF WALL WHEN PLACING NOISE WALL 1 FT INSIDE OF R/W OR N/A LINE.
4. DO NOT PLACE WALL OUTSIDE OF N/A LINE.
5. OVERLAP NOISE WALL AS SHOWN WHEN AN OPENING IS REQUIRED. SEE PLANS FOR END TREATMENT.
6. REFER TO THE AASHTO ROADSIDE DESIGN GUIDE, FOR THE MAXIMUM REQUIRED CLEAR ZONE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

NOISE WALL
PLACEMENT OPTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.
SW 2

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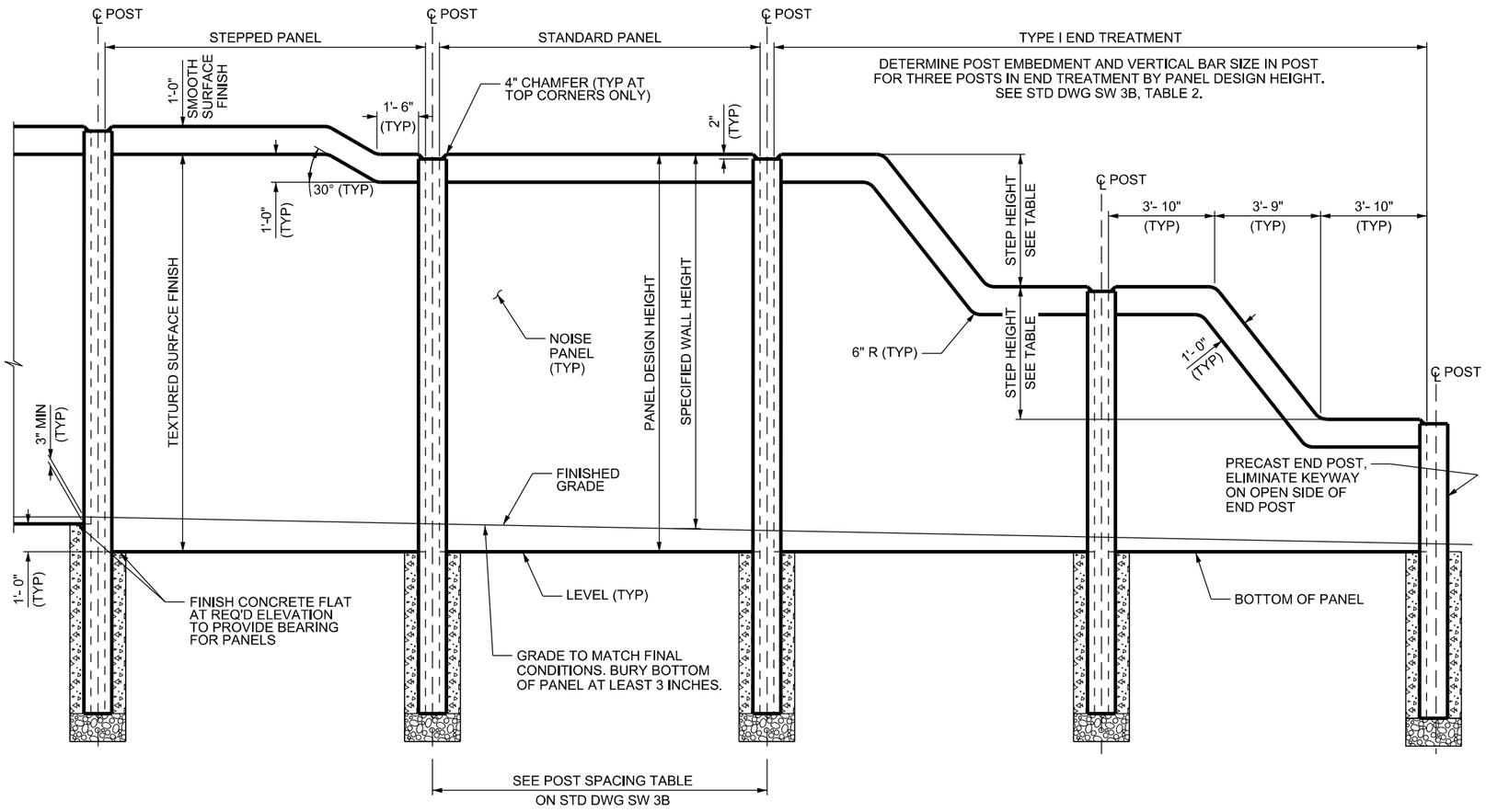
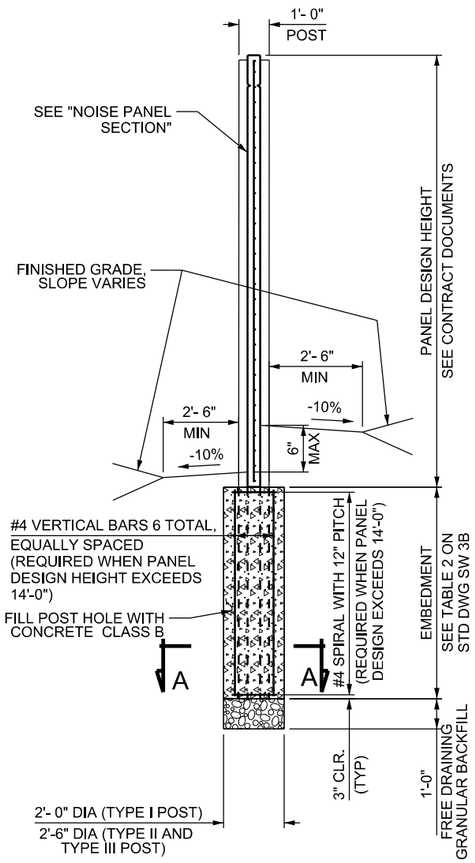
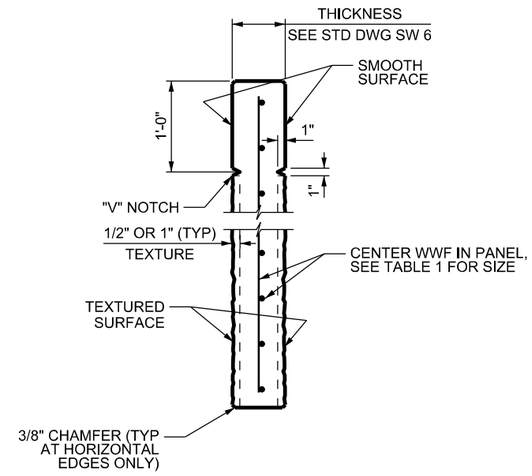
24-JUN-2020



TYPICAL ELEVATION



TYPICAL SECTION



NOISE PANEL SECTION

TABLE 1

PANEL DESIGN HEIGHT	PANEL REINFORCEMENT
≤ 6'-0"	WWF 6x6 - W10xW10
7'-0"	WWF 6x6 - W10xW10
8'-0"	WWF 6x6 - W10xW10
9'-0"	WWF 6x6 - W10xW10
10'-0"	WWF 6x6 - W10xW10
11'-0"	WWF 6x6 - W10xW10
12'-0"	WWF 6x6 - W10xW10
13'-0"	WWF 6x6 - W20xW20
14'-0"	WWF 6x6 - W20xW20
15'-0"	WWF 6x6 - W20xW20
16'-0"	WWF 6x6 - W20xW20
17'-0"	WWF 6x6 - W20xW20

TYPE I END TREATMENT DIMENSIONS

NOISE PANEL DESIGN HEIGHT	STEP HEIGHT	NUMBER OF STEPS
≤ 7'-0"	NONE	NONE
8'-0"	3'-0"	1
9'-0"	4'-0"	1
10'-0"	4'-0"	1
11'-0"	5'-0"	1
12'-0"	3'-6"	2
13'-0"	4'-0"	2
14'-0"	4'-6"	2
15'-0"	4'-6"	2
16'-0"	5'-0"	2
17'-0"	5'-6"	2

DESIGN DATA

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

PRECAST PANELS & POSTS: CONCRETE CLASS AAA(AE) f'c= 5,000 psi;
fy (REINF) = 60,000 psi; n=8

POST HOLES: CONCRETE CLASS B f'c= 2,500 psi
fy (REINF) = 60,000 psi; n = 10

NOTES

1. CHAMFER EXPOSED CONCRETE CORNERS AS SHOWN.
2. SEE CONTRACT DOCUMENTS FOR LOCATION AND SPECIFIED HEIGHT OF PRECAST NOISE WALL.
3. ALL NOISE PANELS ARE:
   HEIGHT: 6 FT MIN TO 17 FT MAX (1 FT INCREMENTS)
   LENGTH: 11 FT - 5 INCHES LONG
   THICKNESS: 7 INCHES
4. DETERMINE PANEL HEIGHTS AND LOCATIONS OF PANEL STEPS TO PROVIDE SPECIFIED MINIMUM WALL HEIGHT THROUGHOUT ENTIRE LENGTH OF WALL, EXCLUDING END TREATMENTS.
5. CHANGE ELEVATION AT TOP OF NOISE WALL WITH STEPPED PANEL AS SHOWN ON THIS SHEET.
6. BEGIN AND END NOISE WALL WITH END TREATMENT SPECIFIED IN THE CONTRACT DOCUMENTS. TYPE I END TREATMENT SHOWN ON THIS SHEET.
7. EVENLY SPACE PILASTER POSTS AT 200 FT MAXIMUM INTERVAL WHEN REQUIRED. SEE STD DWG SW 5 FOR PRECAST PILASTER POST DETAILS. SEE CONTRACT DOCUMENTS FOR EXACT LOCATIONS.
8. FORM A TEXTURED SURFACE FINISH ON BOTH SIDES OF NOISE PANEL. SEE CONTRACT DOCUMENTS FOR PRESCRIBED TEXTURED SURFACE FINISHES.
9. SEE STD DWG SW 3B FOR SECTION A-A.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/28/2018	RDC	REVISED CONCRETE CLASS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

PRECAST CONCRETE NOISE WALL 1 OF 2
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 3A

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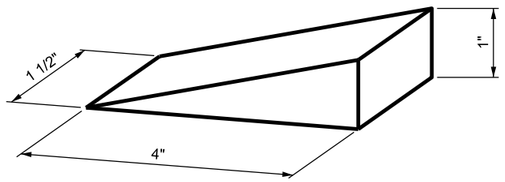
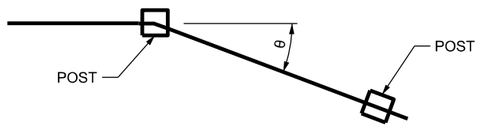
23-JUN-2020



WOOD SHIM DETAIL



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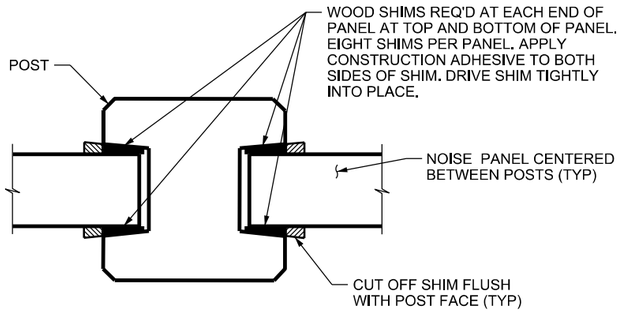
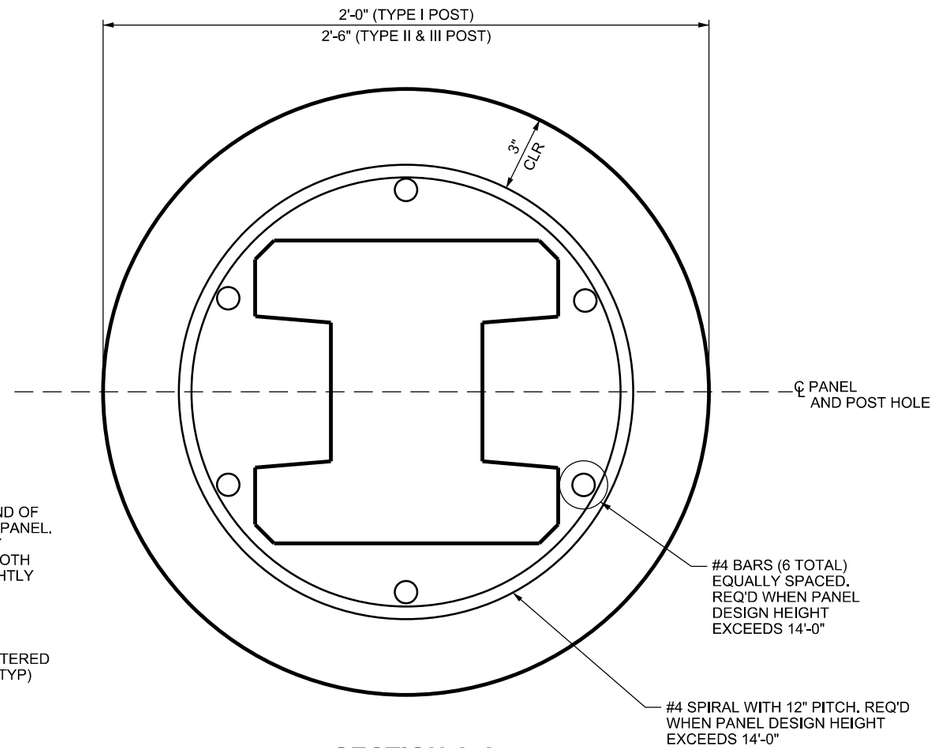




SECTION A-A

SEE STD DWG SW 3A FOR LOCATION;
TYPE I POST SHOWN. TYPE II POST, TYPE III POSTS,
AND PILASTER SIMILAR

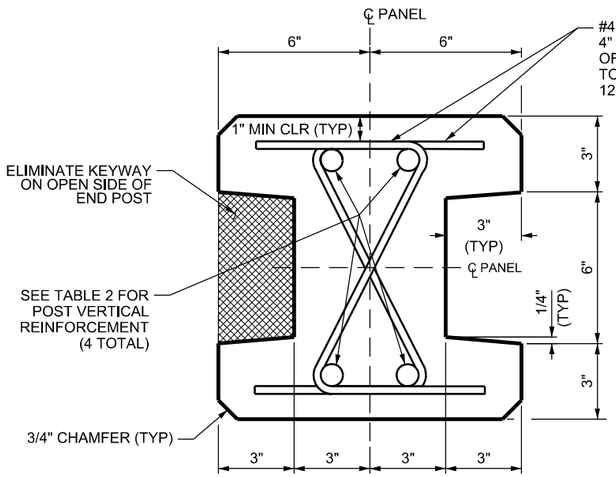
POST SPACING	
℄ POST TO ℄ POST	REQ'D SPACING
TYPE I TO TYPE I	12'- 0"
TYPE I TO TYPE II	12'- 2"
TYPE I TO TYPE III SIDE A	12'- 0"
TYPE I TO TYPE III SIDE B	12'- 4"
TYPE II TO TYPE II	12'- 4"
TYPE II TO TYPE III SIDE A	12'- 4"
TYPE II TO TYPE III SIDE B	12'- 6"
TYPE III SIDE A TO TYPE III SIDE A	12'- 0"
TYPE III SIDE A TO TYPE III SIDE B	12'- 4"
TYPE III SIDE B TO TYPE III SIDE B	12'- 8"

PILASTER POST IS TYPE I

TABLE 2		
PANEL DESIGN HEIGHT	POST	
	VERTICAL BAR SIZE	EMBEDMENT
≤ 6'-0"	#5	5'- 6"
7'-0"	#5	5'- 6"
8'-0"	#5	5'- 6"
9'-0"	#5	5'- 6"
10'-0"	#5	5'- 6"
11'-0"	#6	5'- 9"
12'-0"	#6	6'-0"
13'-0"	#7	6'-3"
14'-0"	#7	6'-6"
15'-0"	#8	6'-9"
16'-0"	#9	7'-3"
17'-0"	#9	7'-3"

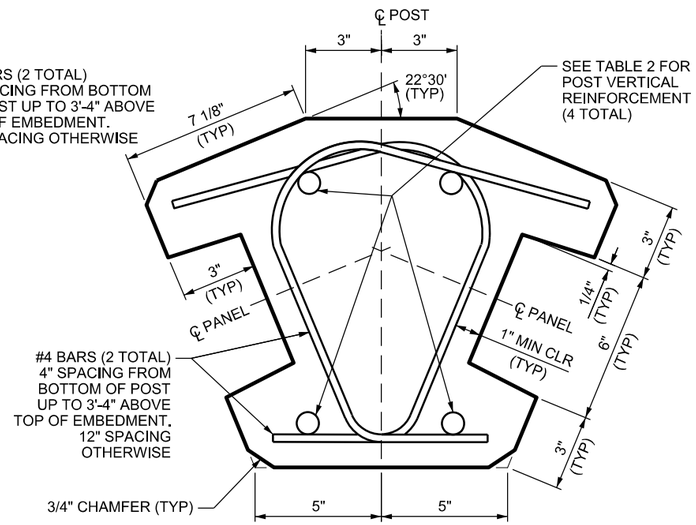
POST & NOISE PANEL DETAIL

TYPE I POST SHOWN
TYPE II POST, TYPE III POSTS, AND PILASTER SIMILAR



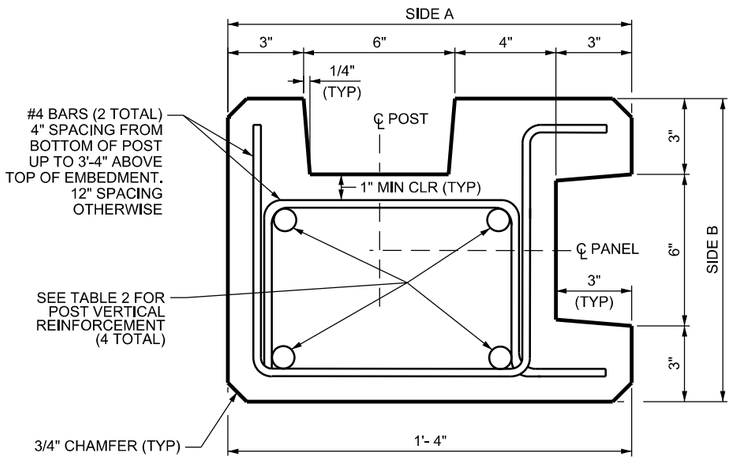
SECTION THROUGH TYPE I POST

θ = 0° TO 10°



SECTION THROUGH TYPE II POST

θ = 35° TO 55°



SECTION THROUGH TYPE III POST

θ = 80° TO 100°

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

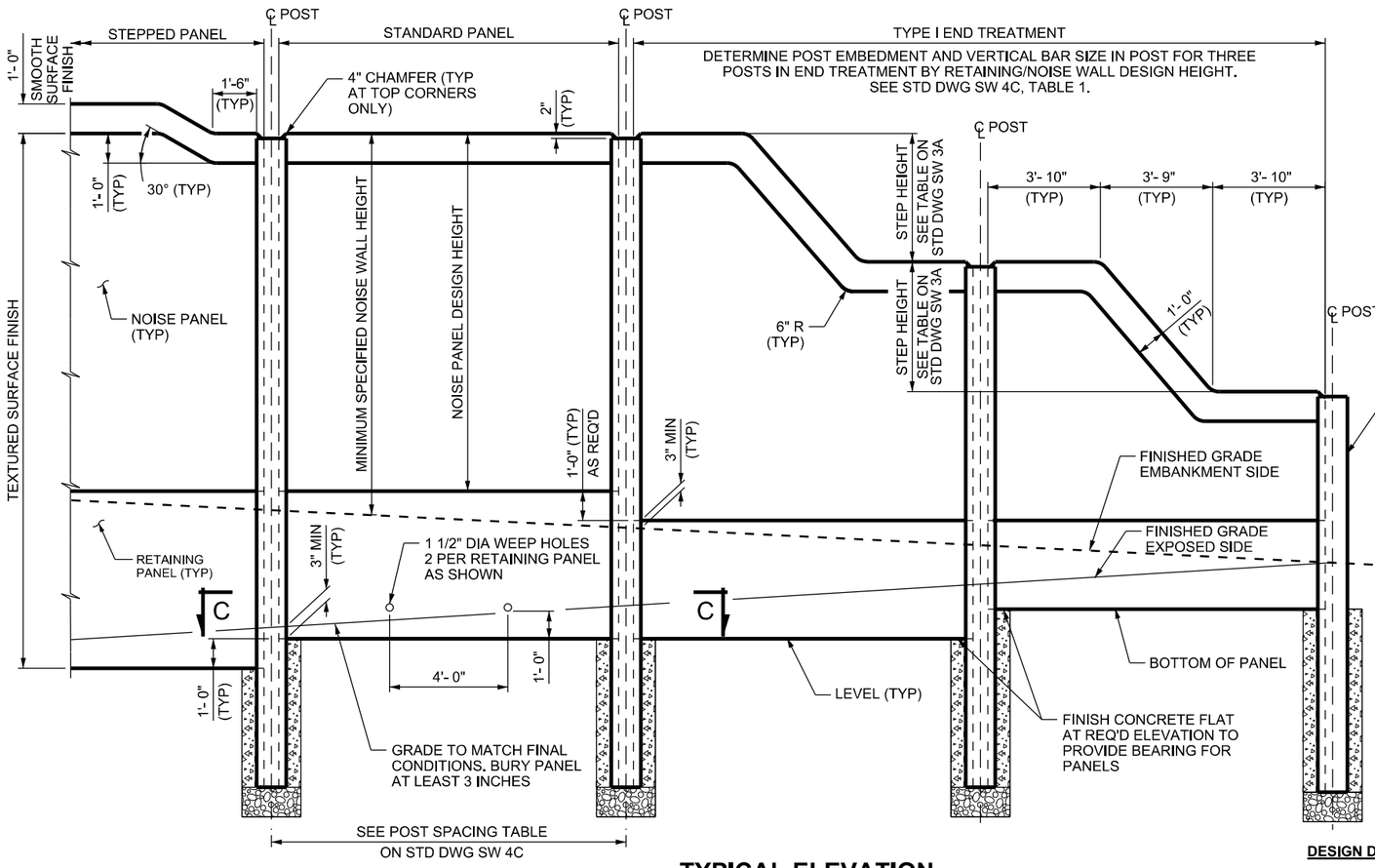
AUGUST 2020
DATE

PRECAST CONCRETE NOISE WALL 2 OF 2

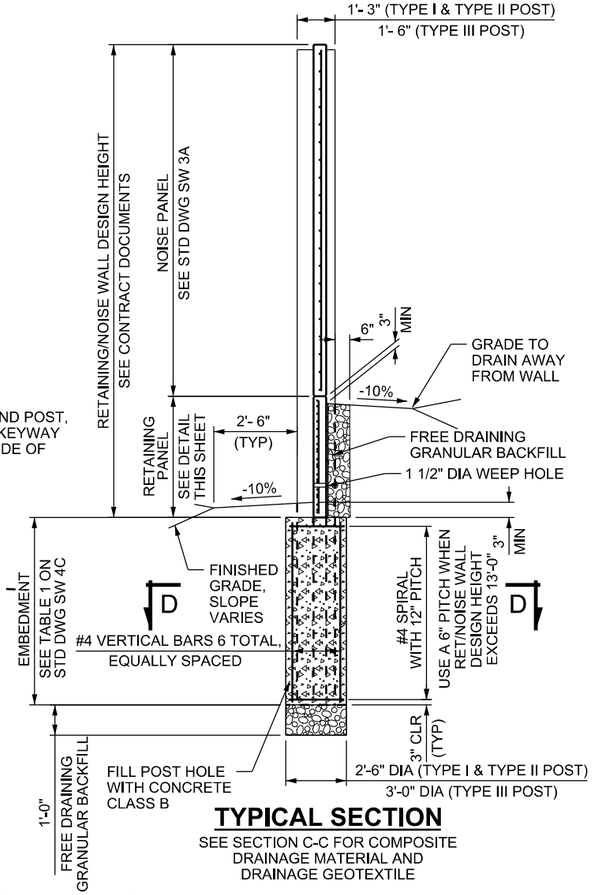
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 3B

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\SW03B.dgn

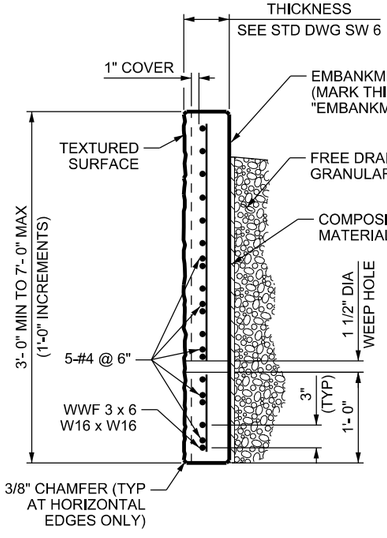


TYPICAL ELEVATION

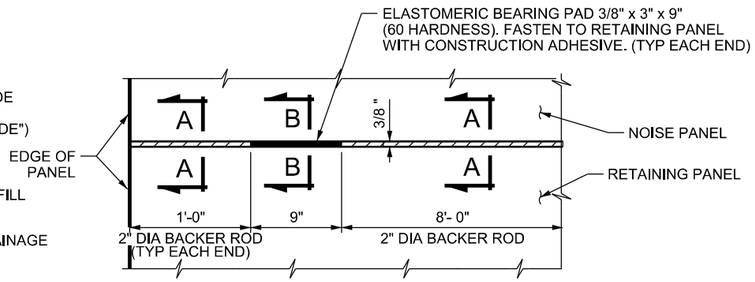


TYPICAL SECTION

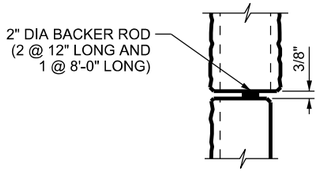
SEE SECTION C-C FOR COMPOSITE DRAINAGE MATERIAL AND DRAINAGE GEOTEXTILE



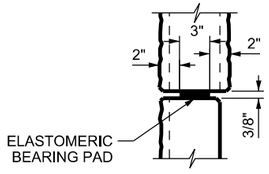
RETAINING PANEL SECTION



PANEL CONNECTION DETAIL



SECTION A-A



SECTION B-B

DESIGN DATA

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

PRECAST PANELS & POSTS: CONCRETE CLASS AAA(AE) f'c = 5,000 psi;
fy (REINF) = 60,000 psi; n=8

POST HOLES: CONCRETE CLASS B f'c = 2,500 psi
fy (REINF) = 60,000 psi; n=10

NOTES

1. CHAMFER EXPOSED CONCRETE CORNERS AS SHOWN.
2. SEE CONTRACT DOCUMENTS FOR LOCATION AND HEIGHT OF PRECAST RETAINING/NOISE WALL.
3. PROVIDE MINIMUM SPECIFIED NOISE WALL HEIGHT THROUGHOUT ENTIRE WALL LENGTH, EXCLUDING END TREATMENT.
4. ALL PANELS ARE:

	RETAINING PANEL	TRANSITION PANEL
HEIGHT:	7 FT MAX (1 FT INCREMENTS)	11 FT MAX (1 FT INCREMENTS)
LENGTH:	11 FT 5 INCHES LONG	11 FT 5 INCHES LONG
THICKNESS:	6 INCHES	7 INCHES

5. SEE STD DWG SW 4B FOR SECTION C-C AND RETAINING PANEL DETAILS. SEE STD DWG SW 4C FOR SECTION D-D.
6. MAXIMUM HEIGHT OF RETAINING/NOISE WALL IS 19 FT.
7. SEE STD DWG SW 3A FOR NOISE PANEL DETAILS.
8. CHANGE ELEVATION AT TOP OF RETAINING/NOISE WALL WITH STEPPED NOISE PANEL AS SHOWN ON THIS SHEET.
9. BEGIN AND END RETAINING/NOISE WALL WITH END TREATMENT SPECIFIED IN THE CONTRACT DOCUMENTS. TYPE I END TREATMENT SHOWN ON SHEET SW 3A.
10. EVENLY SPACE PILASTER POSTS AT 200 FT MAXIMUM INTERVALS WHEN REQUIRED. SEE STD DWG SW 5 FOR PRECAST PILASTER POST DETAILS. SEE CONTRACT DOCUMENTS FOR EXACT LOCATIONS.
11. FORM A TEXTURED SURFACE FINISH ON EXPOSED SIDE OF RETAINING PANEL. SEE CONTRACT DOCUMENTS FOR PRESCRIBED TEXTURED SURFACE FINISH.
12. NOISE PANEL AND RETAINING PANEL MAY BE COMBINED. SEE STD DWG SW 4B FOR DETAILS.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/28/2018	RDC	REVISED CONCRETE CLASS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

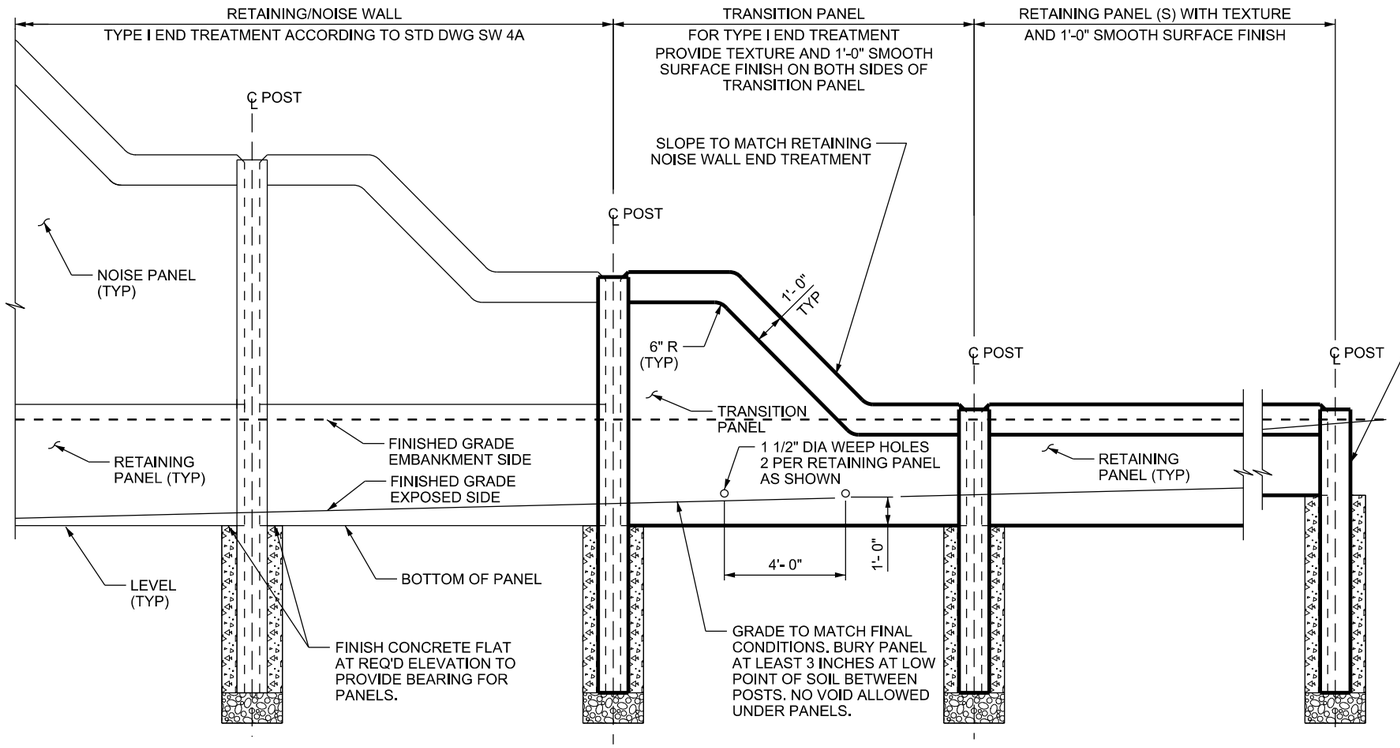
AUGUST 2020 DATE
AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

PRECAST CONCRETE RETAINING/NOISE WALL
1 OF 3
STANDARD DRAWING TITLE

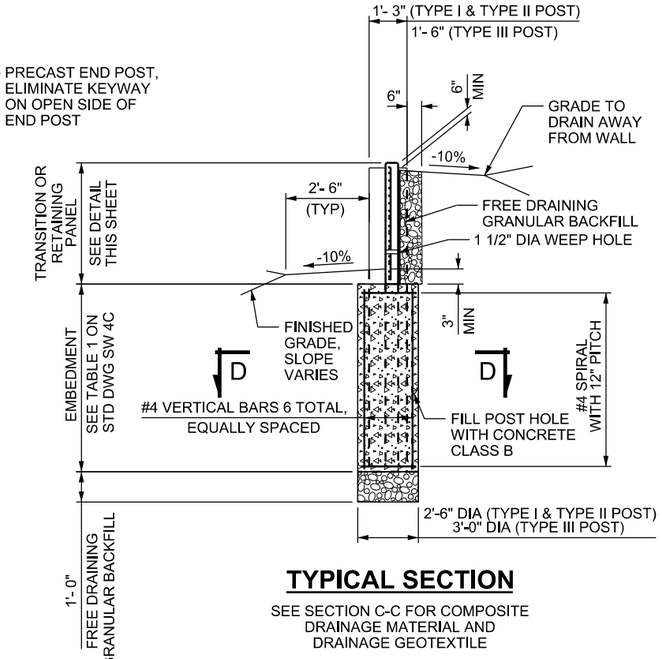
STD. DWG. NO.
SW 4A

DGN File:\\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\SW04A.dgn
23-JUN-2020



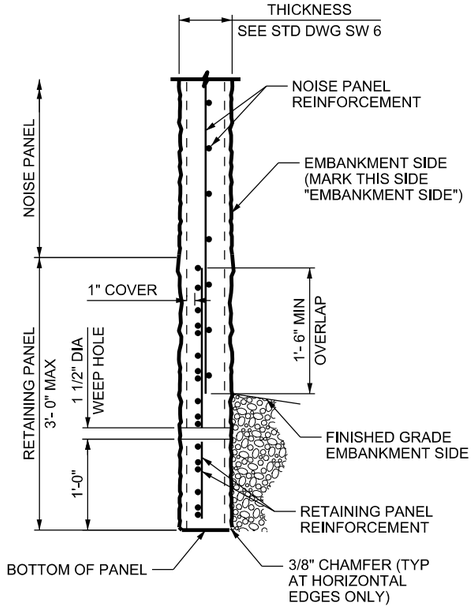
TYPICAL ELEVATION

TRANSITION TO RETAINING ONLY WALL

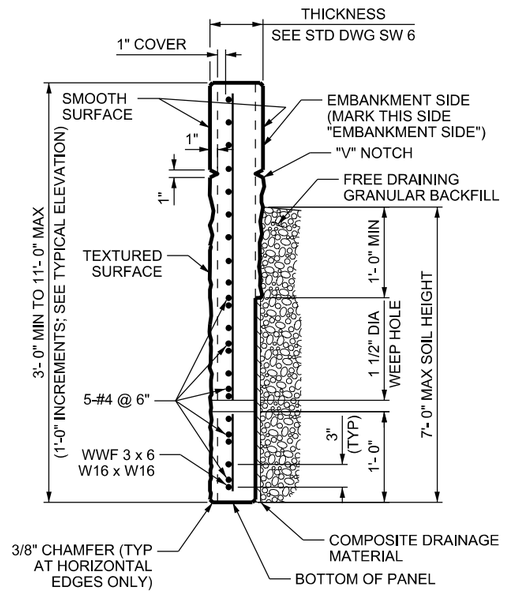


TYPICAL SECTION

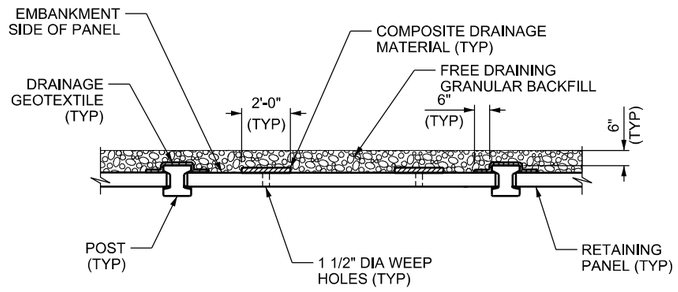
SEE SECTION C-C FOR COMPOSITE DRAINAGE MATERIAL AND DRAINAGE GEOTEXTILE



COMBINED NOISE/RETAINING PANEL SECTION



TRANSITION PANEL SECTION



NOTE: PLACE FREE DRAINING GRANULAR BACKFILL, COMPOSITE DRAINAGE MATERIAL, AND DRAINAGE GEOTEXTILE FROM THE TOP OF FINISHED GRADE TO THE BOTTOM OF RETAINING PANEL.

SECTION C-C

SEE STD DWG SW 4A FOR LOCATION

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

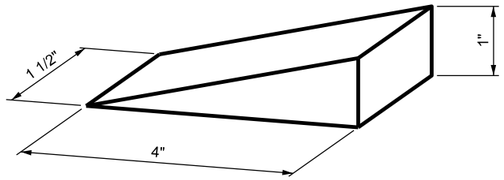
PRECAST CONCRETE RETAINING/NOISE WALL 2 OF 3

STANDARD DRAWING TITLE

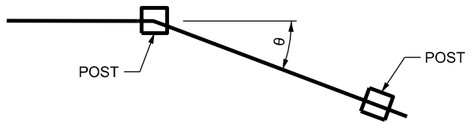
STD. DWG. NO.

SW 4B

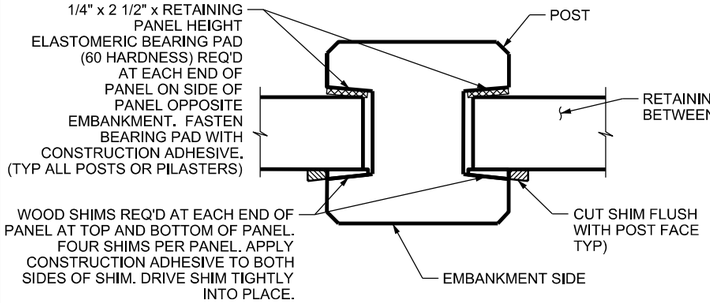
23-JUN-2020 DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\Sw04Bdgn



WOOD SHIM DETAIL

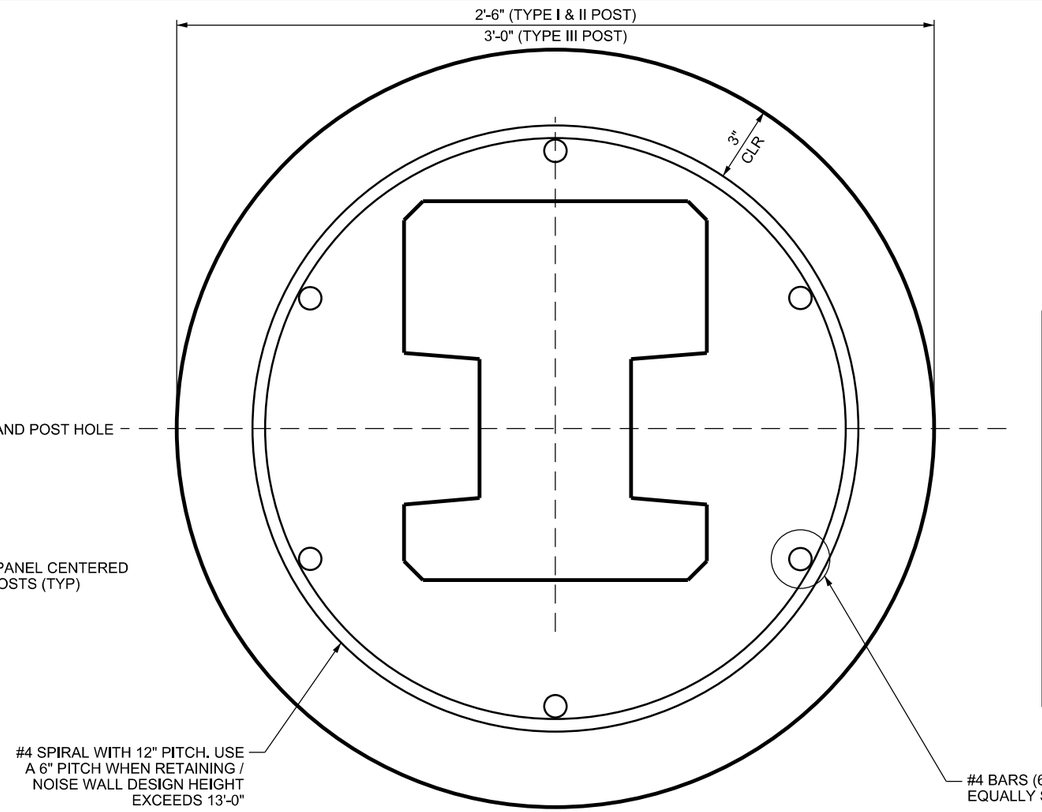


θ DETAIL



POST & RETAINING PANEL DETAIL

TYPE I POST SHOWN
TYPE II POST, TYPE III POST, AND PILASTER SIMILAR



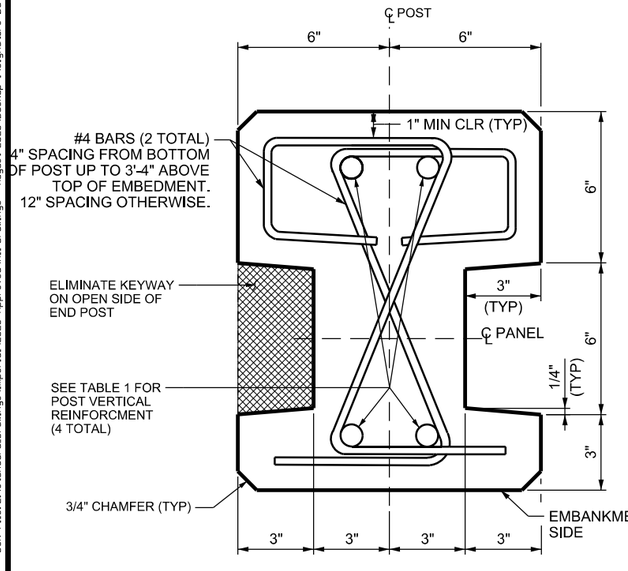
SECTION D-D

SEE STD DWG SW 4A AND SW 4B FOR LOCATION;
TYPE I POST SHOWN. TYPE II POST, TYPE III POSTS,
AND PILASTER SIMILAR

POST SPACING	
℄ POST TO ℄ POST	REQ'D SPACING
TYPE I TO TYPE I	12'-0"
TYPE I TO TYPE II	12'-2"
TYPE I TO TYPE III	12'-3"
TYPE II TO TYPE II	12'-4"
TYPE II TO TYPE III	12'-5"

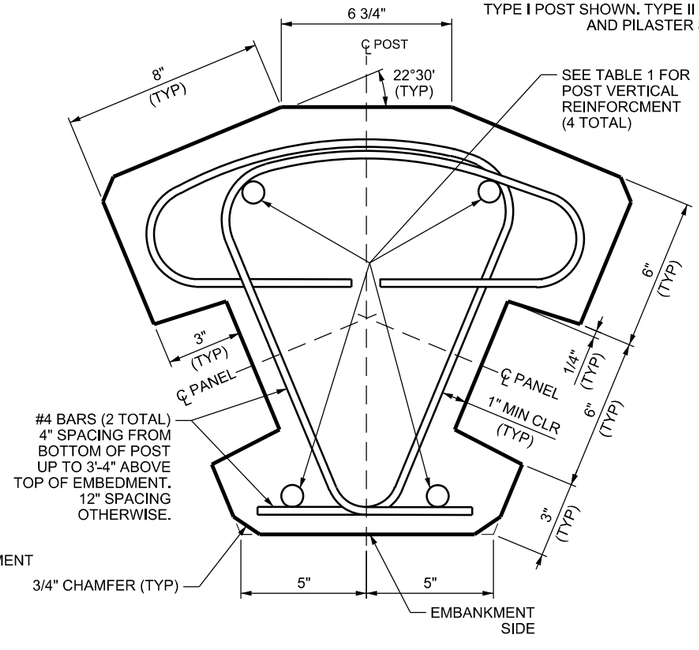
PILASTER POST IS TYPE I

TABLE 1		
RETAINING/ NOISE WALL HEIGHT	POST	
	VERTICAL BAR SIZE	EMBEDMENT
≤ 7'-0"	#7	9'-0"
8'-0"	#7	9'-3"
9'-0"	#7	9'-6"
10'-0"	#7	9'-8"
11'-0"	#7	9'-11"
12'-0"	#7	10'-0"
13'-0"	#7	10'-3"
14'-0"	#8	10'-6"
15'-0"	#8	10'-8"
16'-0"	#8	10'-10"
17'-0"	#9	11'-0"
18'-0"	#9	11'-2"
19'-0"	#9	11'-4"



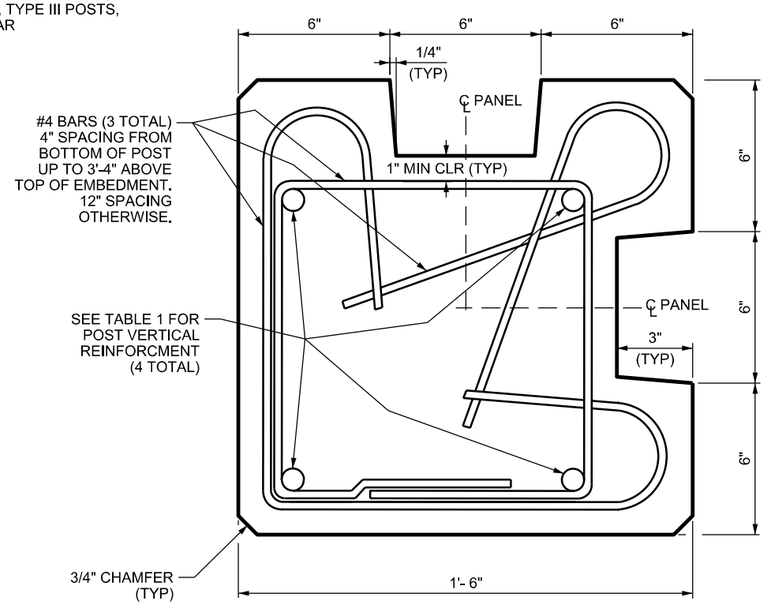
SECTION THROUGH TYPE I POST

θ = 0° TO 10°



SECTION THROUGH TYPE II POST

θ = 35° TO 55°



SECTION THROUGH TYPE III POST

θ = 80° TO 100°

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

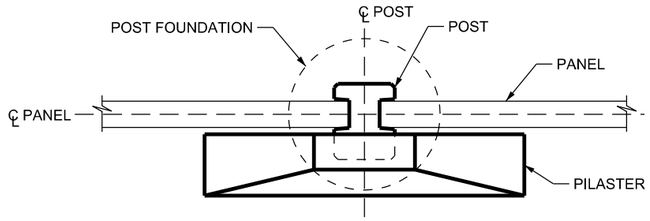
AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
AUGUST 2020 — DATE
APPROVED
DEPUTY DIRECTOR

PRECAST CONCRETE RETAINING/NOISE WALL 3 OF 3

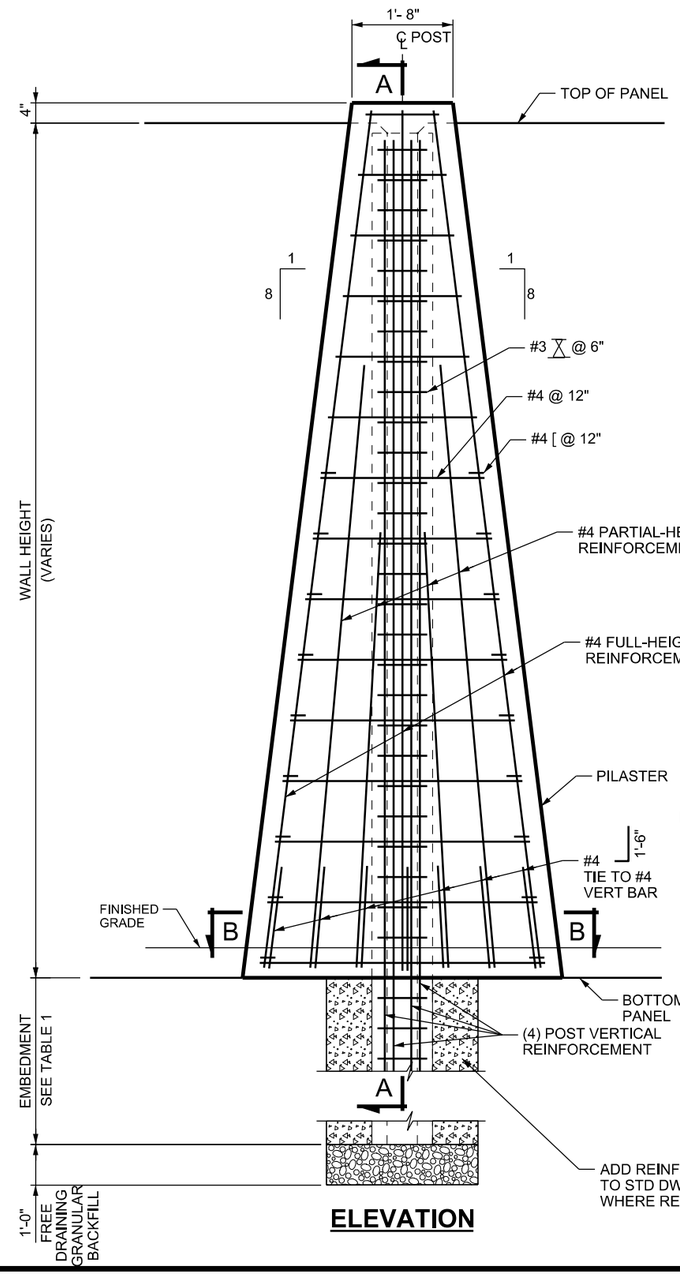
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 4C

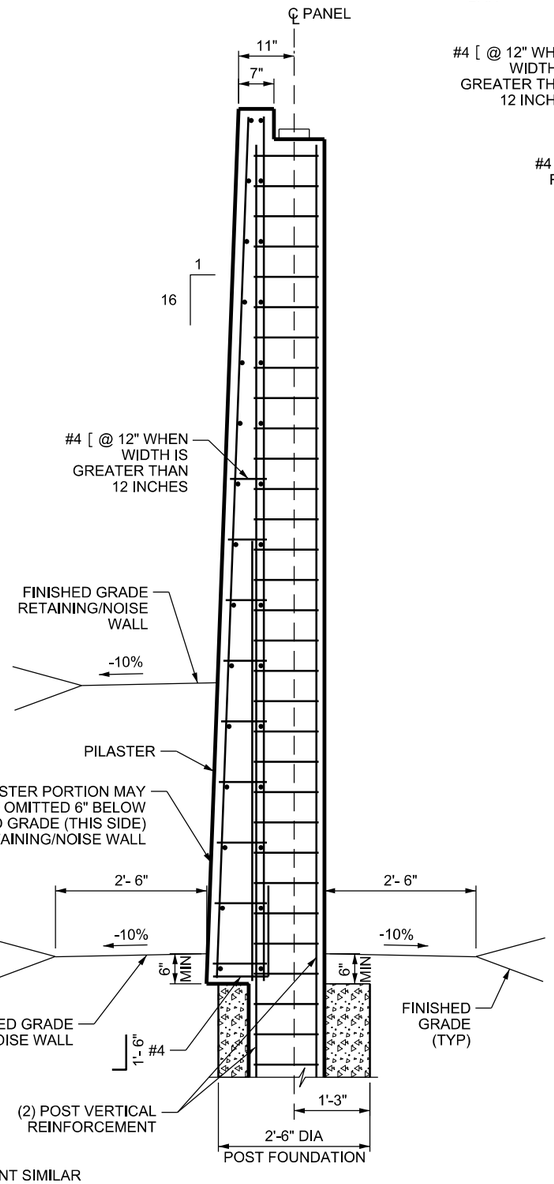
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\SW04C.dgn
23-JUN-2020



PLAN

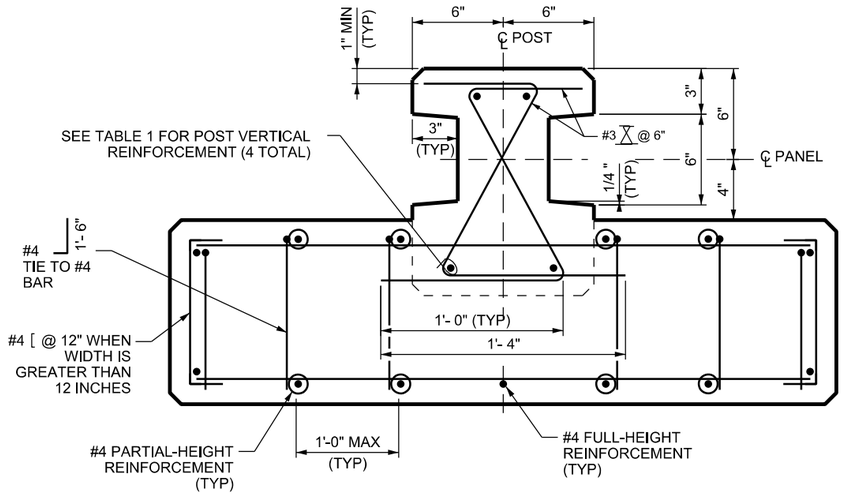


ELEVATION



SECTION A-A

RETAINED SOIL SHOWN ON PILASTER SIDE OF POST.
SOIL MAY ALSO BE RETAINED ON OPPOSITE SIDE OF POST.



SECTION B-B

TABLE 1 - NOISE WALL

WALL HEIGHT	POST	
	VERTICAL BAR SIZE	EMBEDMENT
≤ 6'-0"	#5	5'-6"
7'-0"	#5	6'-4"
8'-0"	#5	7'-3"
9'-0"	#5	8'-2"
10'-0"	#7	9'-0"
11'-0"	#7	9'-11"
12'-0"	#8	10'-10"
13'-0"	#8	11'-9"
14'-0"	#8	12'-8"
15'-0"	#10	13'-6"
16'-0"	#10	14'-5"
17'-0"	#10	15'-4"

TABLE 1 - RETAINING/ NOISE WALL

WALL HEIGHT	POST	
	VERTICAL BAR SIZE	EMBEDMENT
≤ 7'-0"	#7	9'-0"
8'-0"	#7	9'-3"
9'-0"	#7	9'-6"
10'-0"	#7	9'-8"
11'-0"	#7	9'-11"
12'-0"	#8	10'-10"
13'-0"	#8	11'-9"
14'-0"	#8	12'-8"
15'-0"	#10	13'-6"
16'-0"	#10	14'-5"
17'-0"	#10	15'-4"
18'-0"	#11	16'-3"
19'-0"	#11	17'-2"

DESIGN DATA

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

PRECAST PANELS & POSTS: CONCRETE CLASS AAA(AE) f'c = 5,000 psi;
fy (REINF) = 60,000 psi; n=8

POST HOLES: CONCRETE CLASS B f'c = 2,500 psi
fy (REINF) = 60,000 psi; n=10

NOTES

1. CHAMFER ALL EXPOSED CONCRETE CORNERS 3/4 INCH EXCEPT WHERE SPECIFIED OTHERWISE.
2. PROVIDE 2 INCH CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE SPECIFIED OTHERWISE.
3. ALL EXPOSED SURFACES TO HAVE A SMOOTH SURFACE FINISH.
4. DO NOT PLACE PILASTERS ON WALLS GREATER THAN 19 FT HIGH.
5. EVENLY SPACE PILASTER POSTS AT 200 FT MAXIMUM INTERVALS. SEE CONTRACT DOCUMENTS FOR EXACT LOCATIONS.
6. PLACE PILASTER ON HIGHWAY SIDE OF NOISE WALLS.
7. PLACE PILASTER ON HIGHWAY SIDE OF RETAINING/NOISE WALLS.
8. PLACE 1 FT WIDE DRAINAGE GEOTEXTILE ALONG JOINT BETWEEN PILASTER AND PANEL (2 LOCATIONS PER PILASTER) FROM THE TOP OF FINISHED GRADE TO THE BOTTOM OF RETAINING PANEL WHEN PILASTER IS ON EMBANKMENT SIDE OF RETAINING/NOISE WALLS. WRAP FREE DRAINING GRANULAR BACKFILL AROUND PILASTER.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	06/28/2018	RDC	REVISED CONCRETE CLASS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
AUGUST 2020 DATE
APPROVED
DEPUTY DIRECTOR

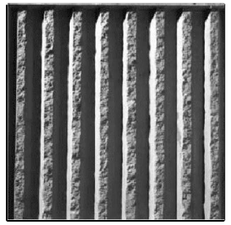
PRECAST PILASTER POST
STANDARD DRAWING TITLE

STD. DWG. NO.
SW 5

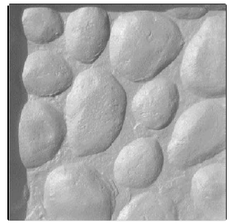
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW,TC)\SW05.dgn

ASHLAR STONE

EXPOSED AGGREGATE

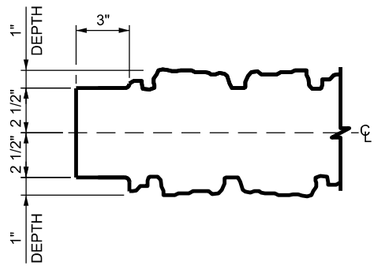


FRACTURED FIN

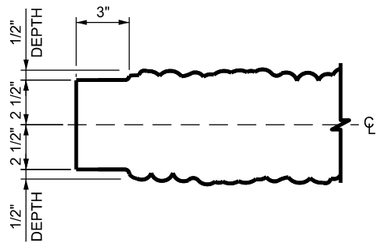


RIVER ROCK

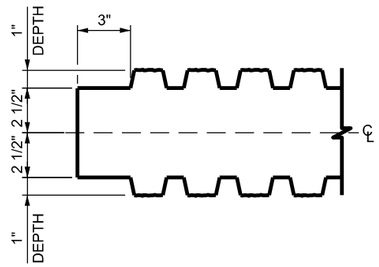
STACKED STONE



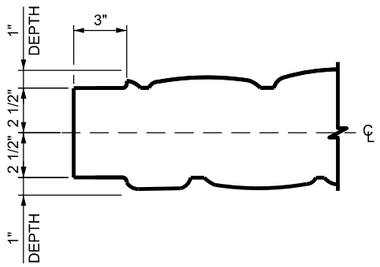
SECTION A-A



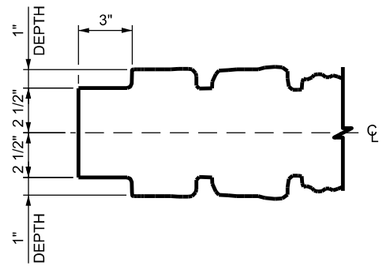
SECTION A-A



SECTION A-A



SECTION A-A



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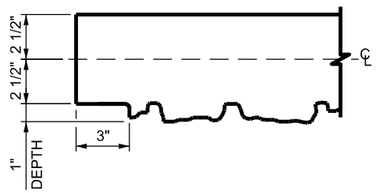

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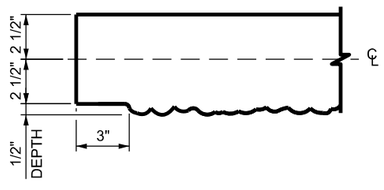

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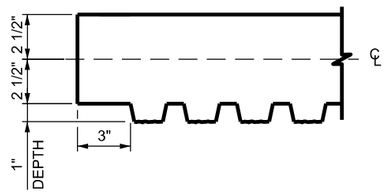

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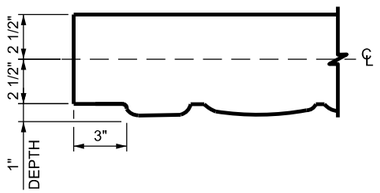

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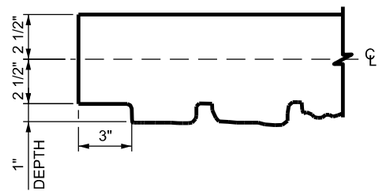

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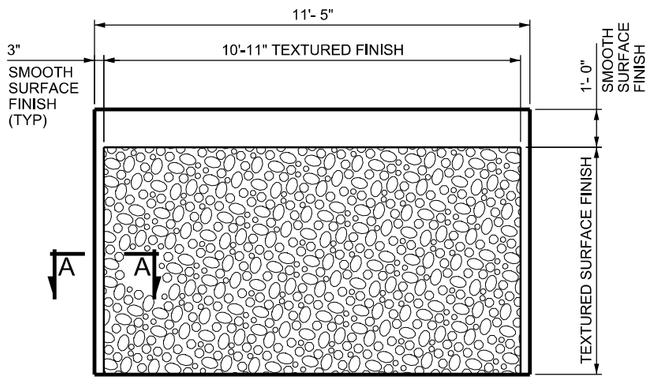
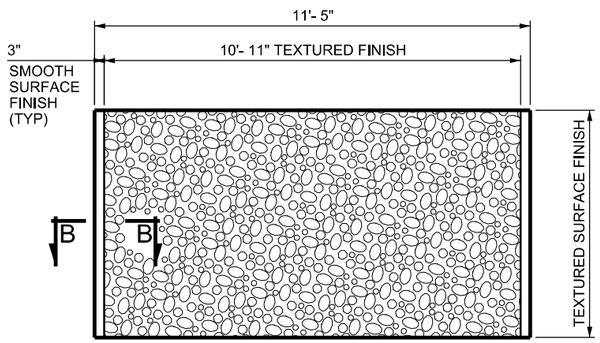


TYPICAL NOISE PANEL

BOTH FACES SIMILAR



TYPICAL RETAINING PANEL

EMBANKMENT SIDE FACE SMOOTH SURFACE FINISH

NOTES

1. SEE STD DWG SW 3A FOR ADDITIONAL NOISE PANEL DETAILS.
2. SEE STD DWG SW 4A AND SW 4B FOR ADDITIONAL RETAINING PANEL DETAILS.
3. FORM TEXTURED SURFACE FINISH USING FORM LINERS.
4. PROVIDE A TEXTURED SURFACE FINISH ON BOTH SIDES OF NOISE PANELS.
5. PROVIDE A SMOOTH SURFACE FINISH ON THE EMBANKMENT SIDE AND A TEXTURED SURFACE FINISH ON THE EXPOSED SIDE OF RETAINING PANELS.
6. USE THE EXPOSED AGGREGATE OPTION TO MATCH AN EXISTING EXPOSED AGGREGATE NOISE WALL.
7. SUBMIT FOR APPROVAL SAMPLES OF THE TEXTURED SURFACE FINISHES SPECIFIED IN THE CONTRACT DOCUMENTS PRIOR TO CASTING THE PANELS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

PRECAST CONCRETE PANEL SURFACE TEXTURE OPTIONS

STANDARD DRAWING TITLE

STD. DWG. NO.

SW 6

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23-JUN-2020

GENERAL NOTES (APPLIES TO ALL TC SERIES STANDARD DRAWINGS):

1. USE UDOT STANDARDS FOR TRAFFIC CONTROL. USE THE UTAH MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR TRAFFIC CONTROL ELEMENTS NOT SHOWN IN THE TC SERIES STD DWGS.
2. USE STANDARD HIGHWAY SIGNS & MARKING BOOK FOR SIZE AND DESIGN OF STANDARD SIGNS.
3. SEE STD DWG TC 2A AND TC 2B FOR WORK ZONE SIGNING AND DEVICE REQUIREMENTS.
4. USE MINIMUM SIGN SIZE OF 48 x 48 INCHES FOR DIAMOND WORK ZONE WARNING SIGNS.
5. COVER OR REMOVE NON-APPLICABLE SIGNING, BOTH EXISTING AND WORK ZONE SIGNS.
6. REMOVE NON-APPLICABLE PAVEMENT MARKINGS FOR OPERATIONS LONGER THAN 3 DAYS.
7. REMOVE OR RELOCATE NON-APPLICABLE PORTABLE SIGN SUPPORTS AND SIGNS BEYOND TWICE THE WORK CLEAR ZONE (WCZ) DISTANCE, SEE STD DWG TC 3A, TABLE 1.
8. REFER TO STANDARD SPECIFICATION 01554 FOR FLAGGING REQUIREMENTS AT OPERATING TRAFFIC SIGNALS.
9. PRE-CONSTRUCTION POSTED SPEED LIMIT: THE PERMANENT POSTED SPEED LIMIT PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
10. USE LANE WIDTH RESTRICTIONS OF LESS THAN 12 FT ONLY WHEN APPROVED BY THE ENGINEER WITH THE FOLLOWING MINIMUMS:
    A. PRE-CONSTRUCTION POSTED SPEED LIMIT LESS THAN 55 MPH, MINIMUM LANE WIDTH 10 FT.
    B. PRE-CONSTRUCTION POSTED SPEED LIMIT OF 55 MPH OR GREATER, MINIMUM LANE WIDTH 11 FT.
11. CLEAN AND RESTORE PAVEMENT MARKINGS, BOTH ON AND OFF THE PROJECT, THAT ARE OBSCURED BY WORK OPERATIONS AT THE END OF EACH DAY'S OPERATION.
12. OBTAIN APPROVAL FOR REGULATORY AND ADVISORY SPEED REDUCTIONS THROUGH THE ENGINEER. USE SPEED REDUCTIONS ONLY DURING IMPACTED TIMES AND AREAS.
13. RESTORE PRE-CONSTRUCTION POSTED SPEED LIMITS DURING TIMES AND IN LOCATIONS WHERE TRAFFIC IS NOT BEING IMPACTED BY WORK ACTIVITIES. SEE POLICY 06C-61.
14. USE AN ADDITIONAL W3-5 SETUP TO STEP DOWN THE SPEED IF MORE THAN A 20 MPH DROP IS REQUIRED.
15. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCES. USE THE WORK ZONE POSTED SPEED LIMIT TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
16. DO NOT USE TUBULAR MARKERS AS LANE CLOSURE TAPER DEVICES. USE DRUMS OR DIRECTION INDICATOR BARRICADES AS LANE CLOSURE TAPER DEVICES FOR SPEEDS 50 MPH AND GREATER.
17. USE A DOWNSTREAM TAPER FOR OPERATIONS LONGER THAN 3 DAYS.
18. ARROW BOARD PLACEMENT:
    A. PLACE ARROW BOARD ON THE SHOULDER OF THE ROADWAY OR, IF PRACTICAL, FURTHER FROM THE TRAVELED LANE. PLACE ARROW BOARD IN FIRST 1/3 OF TAPER IN THE CLOSED LANE WHEN NO ADEQUATE SHOULDER IS AVAILABLE. DELINEATE WITH RETROREFLECTIVE DEVICES.
    B. REMOVE ARROW BOARD WHEN NOT BEING USED OR SHIELDED BEHIND A TRAFFIC BARRIER AND TURNED AWAY FROM TRAFFIC. DELINEATE WITH RETRORELECTIVE DEVICES IF THE PREVIOUS TWO OPTIONS ARE NOT FEASIBLE.
    C. VERIFY THAT SIGN FACE IS ORIENTED TO FACE ONCOMING TRAFFIC.
19. USE AN APPROVED WORK ZONE CRASH CUSHION OR END TREATMENT SYSTEM WITH TEMPORARY PRECAST CONCRETE BARRIER WHEN APPROACH ENDS ARE WITHIN THE AASHTO CLEAR ZONE. USE APPROVED TRUCK MOUNTED ATTENUATOR SYSTEM FOR ONLY 72 HOURS OR LESS.
20. USE PROPER LENGTH OF NEED FOR TEMPORARY BARRIER AS PER THE REQUIREMENTS OF THE ROADSIDE DESIGN GUIDE. USE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO THE WORK ZONE FOR THE DESIGN OF THE REQUIRED LENGTH OF NEED. SEE STD DWG TC 3A FOR THE WORK ZONE FLARE RATE REQUIREMENT FOR TEMPORARY BARRIER. APPROVAL FROM THE ENGINEER IS REQUIRED FOR MODIFICATION TO THE REQUIRED FLARE RATE.
21. USE STEEL PLATE AHEAD SIGN (W8-24) IN ADVANCE OF PLATE WHEN STEEL PLATES ARE PLACED ON THE ROADWAY. PLACE BUMP SIGN (W8-1) WITH A DIAGONAL DOWNWARD POINTING ARROW (W16-7P) PLAQUE ADJACENT TO THE STEEL PLATE.
22. USE IDENTICAL LEGEND SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.
23. PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) IN THE FOLLOWING ORDER OF PREFERENCE:
    A. PROVIDE THE TPAR ON THE SAME SIDE OF THE ROADWAY AS THE DISRUPTED ROUTE UTILIZING SIDEWALK DIVERSION. SEE STD DWG TC 6C.
    B. PROVIDE THE TPAR ON THE OTHER SIDE OF THE ROADWAY. SEE STD DWG TC 6D.
    C. PROVIDE A TPAR DETOUR WITH TRAILBLAZING SIGNS. SEE STD DWG TC 6D.
24. DO NOT USE AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs).
25. DO NOT USE PROMOTIONAL OR OTHER INFORMATIONAL IDENTIFICATIONS OF PUBLIC OFFICIALS, CONTRACTORS, ORGANIZATIONAL AFFILIATIONS, RELATED LOGOS AND SYMBOLS ON TRAFFIC CONTROL DEVICES. MARKINGS TO SHOW OWNERSHIP ON NON-REFLECTIVE SURFACES ARE ACCEPTABLE.
26. MEET STANDARD SPECIFICATION 01554 FOR CRASH WORTHINESS OF DEVICES.
27. REMOVE OR COVER ALL WORK ZONE REDUCED SPEED LIMIT ASSEMBLIES (RS2-1a) AND THE WORK ZONE REDUCED SPEED LIMIT AHEAD (W3-5 SERIES) SIGNS WHEN NO ONE IS WORKING, EXCEPT AS APPROVED BY THE ENGINEER. DO NOT COVER THE SPEED LIMIT ASSEMBLIES (RS2-1a) IF THE ASSEMBLIES ARE THE PRE-CONSTRUCTION POSTED SPEED LIMIT.
28. PROVIDE THE DISTANCE 2L BETWEEN EACH MANEUVER FOR MULTIPLE LANE DROPS, SHIFTS OR BOTH.

REVISIONS

NO.	DATE	APPR.	REMARKS
	10/31/19	JW	UPDATED NOTE 23

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL	AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUGUST 2020 DATE
DEPUTY DIRECTOR	

TRAFFIC CONTROL
DRAWING SERIES
GENERAL NOTES
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 1

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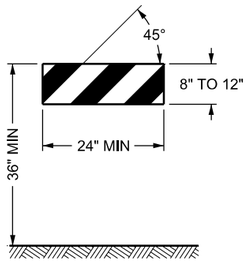
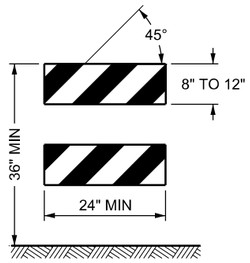
23-JUN-2020



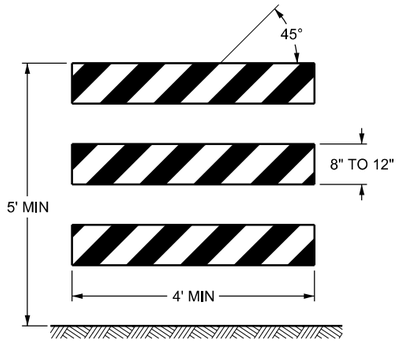
TYPE I BARRICADE

SEE NOTES 1, 2, & 6



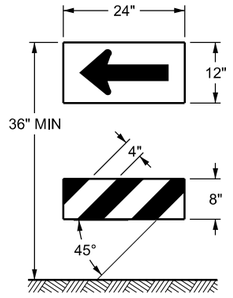
TYPE 2 BARRICADE

SEE NOTES 1, 2, & 6



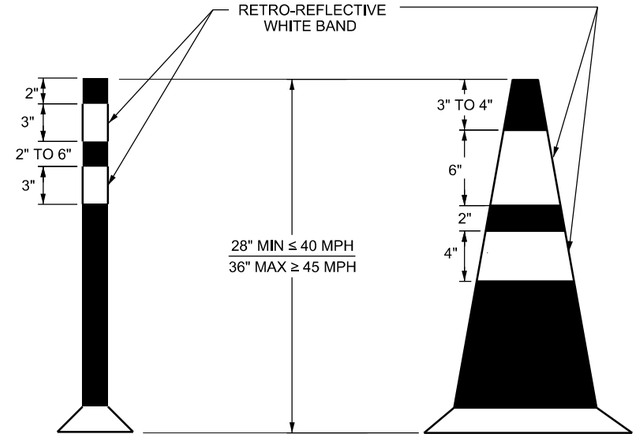
TYPE 3 BARRICADE

SEE NOTES 1, 2, & 6



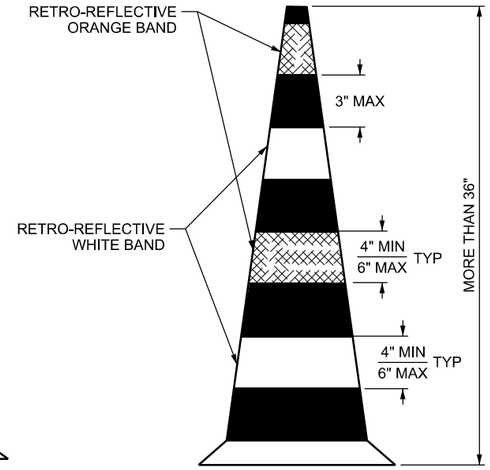
DIRECTION INDICATOR BARRICADE

SEE NOTES 1, 2, 6, & 7



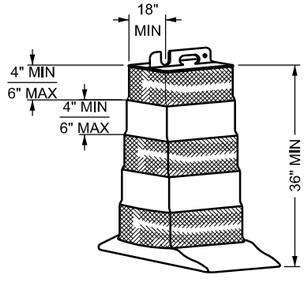
TUBULAR MARKER

SEE NOTE 4

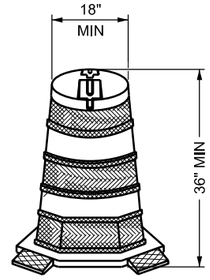


CONES

NOTES 8, 9,10,11 & 12



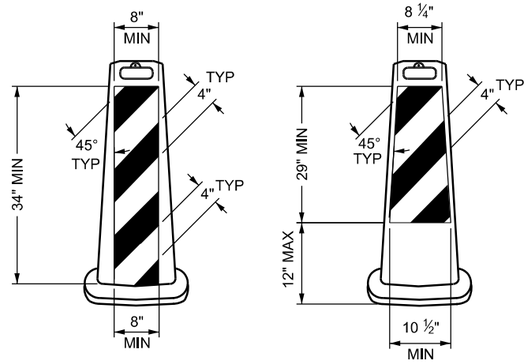
ONE-PIECE RECTANGULAR
W/RETROREFLECTIVE BANDS



TWO-PIECE ROUND
W/RETROREFLECTIVE BANDS

DRUMS

SEE NOTES 3 & 10



VERTICAL PANEL

SEE NOTES 1 & 5

NOTES:

1. USE A MINIMUM OF 270 SQUARE INCHES OF RETROREFLECTIVE MATERIAL PLACED ON BARRICADES AND VERTICAL PANELS WHEN USED ON FREEWAYS OR ROADWAYS WITH A POSTED SPEED GREATER THAN 45 MPH. PLACE BARRICADES AND VERTICAL PANELS IN SUCH A MANNER THAT THEY ARE VISIBLE TO APPROACHING TRAFFIC.
2. USE SANDBAGS WITH SAND OR OTHER COMPARABLE SOFT MATERIAL AS BALLAST. DO NOT PLACE BALLAST HIGHER THAN 12 INCHES ABOVE THE ROADWAY AND DO NOT COVER ANY RETROREFLECTIVE AREA OF RAILS OR SIGNS.
3. USE DRUMS OR DIRECTIONAL BARRICADES AS LANE CLOSURE TAPER DEVICES FOR SPEEDS 50 MPH AND GREATER.
4. USE TUBULAR MARKERS FOR DAY-TIME USE ONLY. DO NOT USE TUBULAR MARKERS AS A LANE CLOSURE TAPER DEVICE.
5. USE 6 INCH STRIPE WIDTH WHERE THE HEIGHT OF THE RETROREFLECTIVE MATERIAL ON VERTICAL PANEL IS 36 INCHES OR MORE.
6. USE 6 INCH STRIPE WIDTH. A 4 INCH STRIPE WIDTH MAY BE USED WHEN RAIL LENGTH IS LESS THAN 36 INCHES.
7. USE A DIRECTION INDICATOR BARRICADE WITH A ONE-DIRECTION LARGE ARROW (W1-6) SIGN MOUNTED ABOVE A DIAGONAL STRIPED, HORIZONTALLY ALIGNED, RETROREFLECTIVE RAIL.
8. USE RETROREFLECTORIZED CONES FOR MAXIMUM VISIBILITY.
9. PROVIDE RETROREFLECTORIZATION OF CONES THAT ARE 28 TO 36 INCHES HIGH BY USING A 6 INCH WIDE WHITE BAND LOCATED 3 TO 4 INCHES FROM THE TOP OF THE CONE AND AN ADDITIONAL 4 INCH WIDE WHITE BAND LOCATED APPROXIMATELY 2 INCHES BELOW THE 6 INCH BAND.
10. PROVIDE RETROREFLECTORIZATION OF CONES THAT ARE MORE THAN 36 INCHES HIGH BY USING HORIZONTAL, CIRCUMFERENTIAL, ALTERNATING ORANGE AND WHITE RETROREFLECTIVE STRIPES THAT ARE 4 TO 6 INCHES WIDE. USE A MINIMUM OF TWO ORANGE AND TWO WHITE STRIPES FOR EACH CONE, WITH THE TOP STRIPE BEING ORANGE. DO NOT EXCEED 3 INCHES WIDE FOR ANY NON-RETROREFLECTIVE SPACES BETWEEN THE ORANGE AND WHITE STRIPES.
11. DO NOT USE CONES ON FREEWAYS, DIVIDED HIGHWAYS, OR ROADS WITH A SPEED OF 55 MPH OR GREATER. THIS RESTRICTION DOES NOT APPLY TO INCIDENT MANAGEMENT AND PAVEMENT MARKING OPERATIONS.
12. DO NOT USE CONES FOR LONG TERM STATIONARY OPERATIONS. REMOVE CONES FROM THE ROADWAY AT THE END OF EACH WORKDAY, WITH THE FOLLOWING EXCEPTION:

    CONES MAY BE USED FOR UP TO 3 DAYS AND 2 NIGHTS FOR OPERATIONS WHERE WORKERS ARE CONTINUALLY PRESENT AND WORK IS ACTIVELY UNDERWAY. REPLACE CONES WITH VERTICAL PANELS, DRUMS, AND BARRICADES WHEN WORKERS ARE NO LONGER PRESENT OR WHEN WORK EXTENDS THROUGH ADDITIONAL NIGHTS.
13. MAINTAIN AN ACCESSIBLE AND DETECTABLE PEDESTRIAN FACILITY ALONG THE ALTERNATE PEDESTRIAN ROUTE WHEN THE TEMPORARY TRAFFIC CONTROL ZONE AFFECTS EXISTING ACCESSIBLE AND DETECTABLE PEDESTRIAN FACILITIES. USE A CONTINUOUS DETECTABLE BOTTOM AND TOP SURFACE DETECTABLE BY LONG CANE USERS WHEN CHANNELIZATION DEVICES ARE USED TO CHANNELIZE PEDESTRIANS. THE BOTTOM OF THE BOTTOM SURFACE WILL BE NO HIGHER THAN 2 INCHES ABOVE THE GROUND. THE TOP OF THE TOP SURFACE WILL BE NO LOWER THAN 32 INCHES ABOVE THE GROUND.

REVISIONS				
NO.	DATE	APPR.	REMARKS	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
RECOMMENDED FOR APPROVAL

AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED

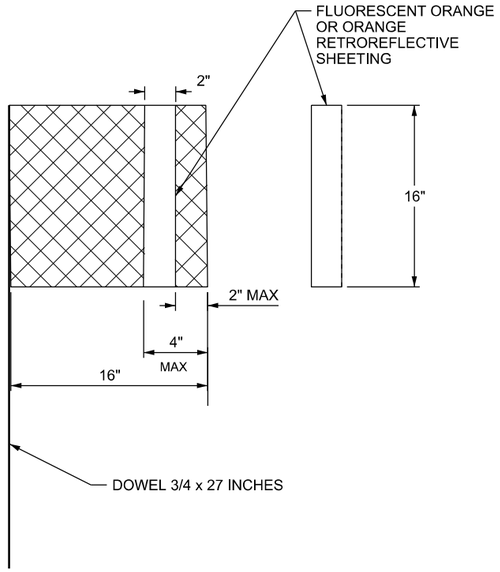
DEPUTY DIRECTOR

WORK ZONE CHANNELIZATION DEVICES

STANDARD DRAWING TITLE

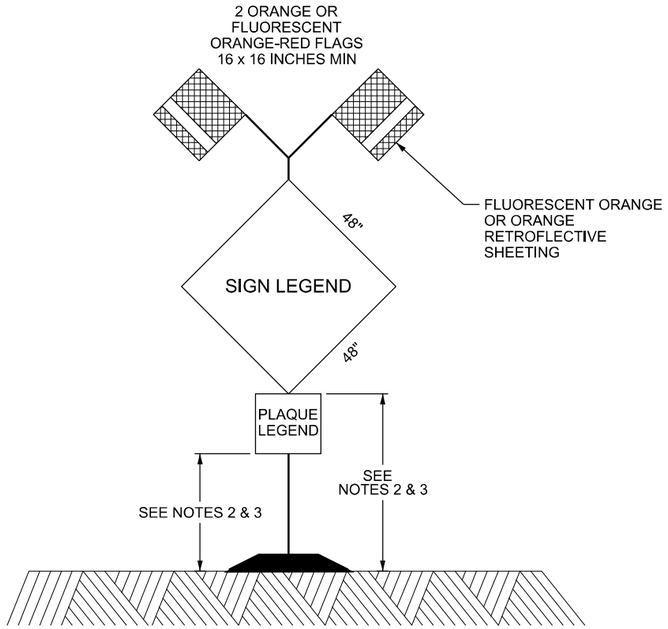
STD. DWG. NO.
TC 2A

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 ISW, TC\TC02A.dgn



FLAG DETAIL

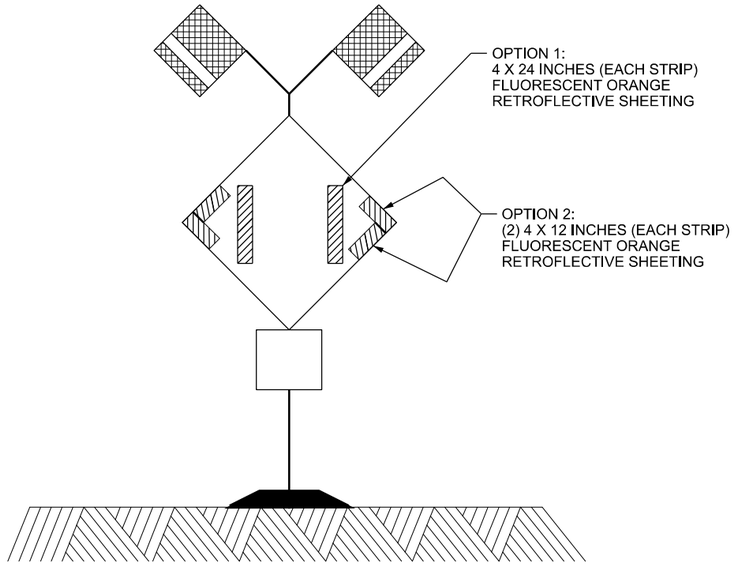
SEE NOTE 8



TYPICAL PORTABLE SIGN SUPPORTS INSTALLATION WITH FLAGS TRAFFIC SIDE DETAIL

SEE NOTES 4 & 6

SEE NOTES 1 & 6



TYPICAL PORTABLE SIGN SUPPORTS INSTALLATION WITH FLAGS BACK SIDE DETAIL

SEE NOTE 5

NOTES:

1. CLOSE ROADWAYS WITH TYPE 3 BARRICADES. EXTEND THE BARRICADES ACROSS INTENDED ROAD CLOSURE A MINIMUM OF 3/4 OF THE ROADWAY STARTING FROM THE CENTER OF THE ROADWAY AND EXTENDING IN BOTH DIRECTIONS TOWARD THE SHOULDERS. PLACE A "ROAD CLOSED" SIGN (R11-2) OVER THE CENTER LINE AND THE APPROPRIATE "DETOUR" ARROW SIGNS (M4-10 L OR R) ON EACH SIDE OF THE "ROAD CLOSED" SIGN. DETOUR ARROWS ARE NOT REQUIRED IF DETOUR IS NOT AT ROAD CLOSURE.
2. USE A 12 INCH MINIMUM MOUNTING HEIGHT TO THE BOTTOM OF THE LOWEST SIGN FOR SIGNS ON PORTABLE SUPPORTS.
3. USE A 36 INCH MINIMUM MOUNTING HEIGHT TO THE BOTTOM OF THE LOWEST SIGN FOR SIGNS ON PORTABLE SUPPORTS PLACED AMONG CHANNELIZING DEVICES.
4. USE A MINIMUM 7 FT MOUNTING HEIGHT FOR ALL GROUND MOUNTED SIGNS. REFER TO SN SERIES STD DWGS.
5. PLACE TWO FLUORESCENT ORANGE STRIPS OF RETROREFLECTIVE SHEETING, 4 x 24 INCHES, WITHIN 12 INCHES FROM THE RIGHT AND LEFT EDGES ON THE BACK OF SIGNS USED WITH PORTABLE SUPPORTS.
6. USE SANDBAGS WITH SAND OR OTHER COMPARABLE SOFT MATERIAL AS BALLAST. DO NOT PLACE BALLAST HIGHER THAN 12 INCHES ABOVE THE ROADWAY AND DO NOT COVER ANY RETROREFLECTIVE AREA OF RAILS OR SIGNS.
7. USE PERMANENT OR PORTABLE SIGN SUPPORTS THAT MEET THE 7 FT MINIMUM MOUNTING HEIGHT WHEN USED FOR MORE THAN 7 DAYS. SIGNS ON PORTABLE SIGN SUPPORTS THAT DO NOT MEET THE 7 FT MINIMUM MOUNTING HEIGHT MAY BE USED FOR 7 DAYS OR LESS, UNLESS APPROVED BY THE ENGINEER.
8. USE 2 x 16 INCHES FLUORESCENT ORANGE OR ORANGE RETROREFLECTIVE SHEETING SECURELY FASTENED WITHIN 4 INCHES FROM THE OUTSIDE EDGE OF FLAG. VERIFY THE SHEETING IS VISIBLE FROM EACH SIDE.

REVISIONS				
NO.	DATE	APPR.	REMARKS	
1	2/27/2020	JW	CLARIFIED NOTE 7 PER MUTCD	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

WORK ZONE SIGNING

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 2B

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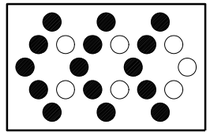
23-JUN-2020



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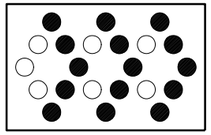
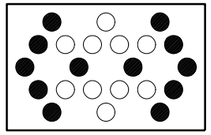


MERGE RIGHT

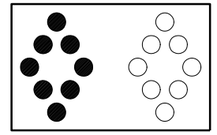
CHEVRON ARROW

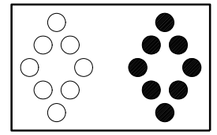
SEE NOTE 2



MERGE RIGHT OR LEFT

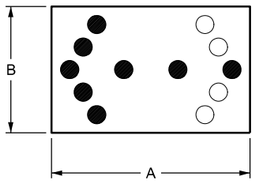
FLASHING DOUBLE ARROW



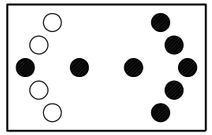


ALTERNATING DIAMOND

FLASHING CAUTION



MERGE LEFT



MERGE RIGHT

FLASHING ARROW

(OPTIONAL)
SEE NOTE 3

ARROW BOARD DIMENSIONS

	TYPE B	TYPE C
A	60 INCHES	96 INCHES
B	30 INCHES	48 INCHES

NOTES:

1. PLACE THE ARROW BOARD MOUNTING HEIGHT OF A MINIMUM OF 7 FT, MEASURED VERTICALLY FROM THE BOTTOM OF THE BOARD TO THE ROADWAY BELOW IT OR TO THE ELEVATION OF THE NEAR EDGE OF THE ROADWAY.
2. SEQUENTIAL ARROW MAY BE USED.
3. FLASHING ARROW MAY ONLY BE USED ON A 12 ELEMENT DISPLAY.
4. USE SHOULDER TAPER TO DELINEATE ARROW BOARD WHEN ON SHOULDER.
5. TYPE B - 4 INCH DIA SEALED - BEAM ELEMENT
   TYPE C - 5 INCH DIA SEALED - BEAM ELEMENT
6. DO NOT USE ARROW BOARDS TO INDICATE A LANE SHIFT.

REVISIONS

NO.	DATE	APPR.	REMARKS

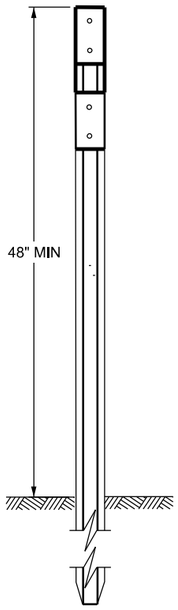
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

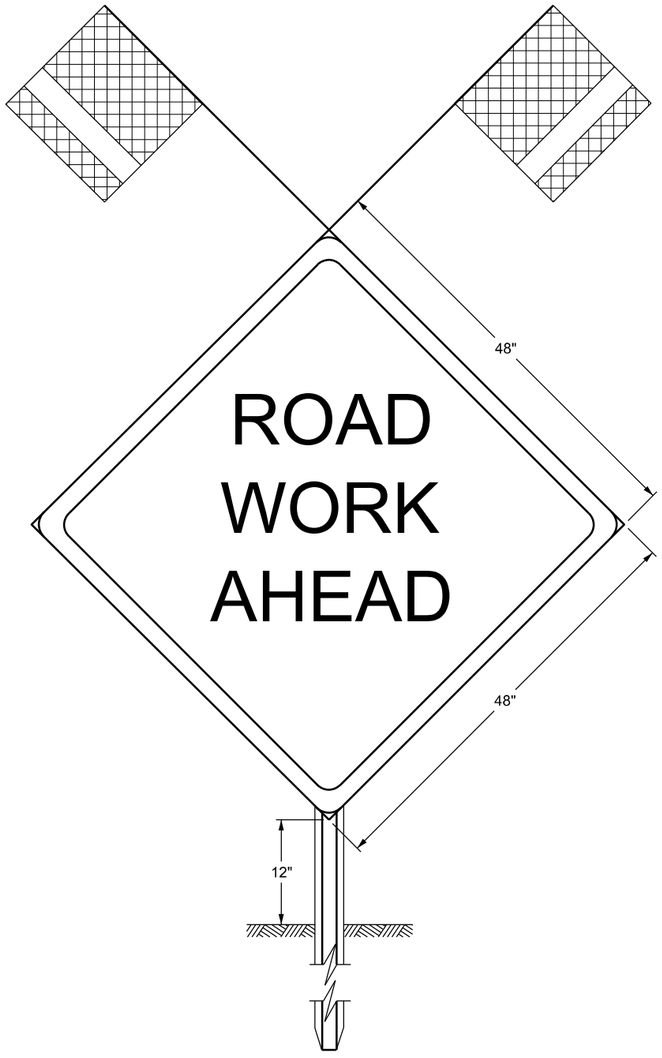
STANDARD DRAWING TITLE
WORK ZONE
ADVANCED WARNING
ARROW BOARDS

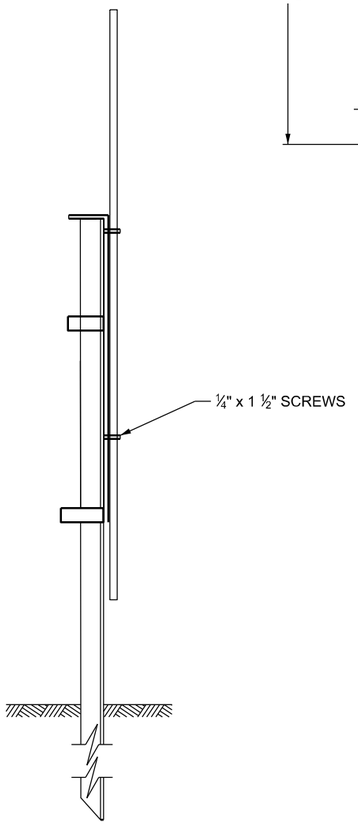
STD. DWG. NO.
TC 2C

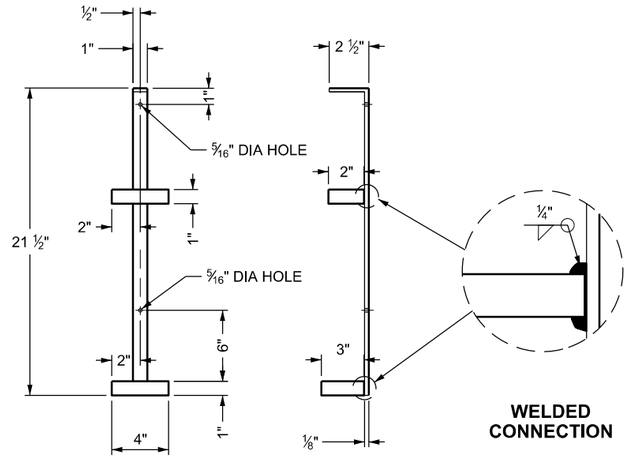
DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC02C.dgn
23-JUN-2020



DELINEATOR







SIGN BRACKET

NOTES:

1. USE WITH FABRIC OR FLEXIBLE SIGN SUBSTRATE ONLY. DO NOT USE ALUMINUM, PLYWOOD, OR COMPOSITE SUBSTRATE.
2. USE DURING DAYLIGHT PERIOD ONLY.
3. REMOVE BRACKET AND SIGN PRIOR TO NIGHTTIME.
4. MAY BE USED ON METAL AND FLEXIBLE DELINEATORS.
5. USE ASTM A 36 STEEL FOR BRACKET. WELD SQUARE LOOPS ONTO VERTICAL METAL PIECE. PAINT OR GALVANIZE SIGN BRACKET AFTER WELDING IS COMPLETED.
6. ATTACH TRAFFIC CONTROL SIGN TO BRACKET WITH SCREWS THROUGH THE 5/16 INCH HOLES SHOWN.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

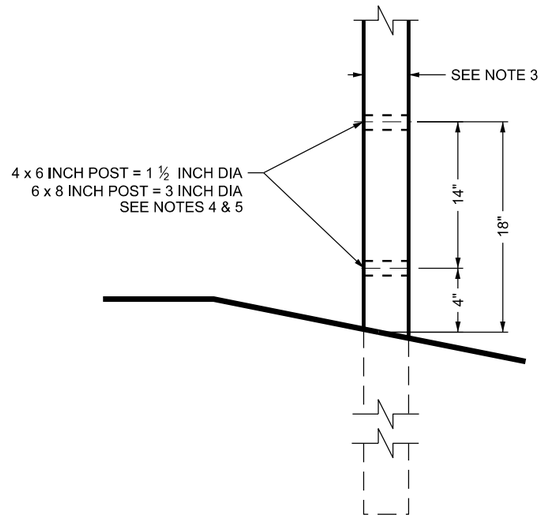
DELINEATOR MOUNTED
WORK ZONE
SIGN BRACKET

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 2D

DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC02D.dgn
23-JUN-2020



WEAKENED POST DETAIL

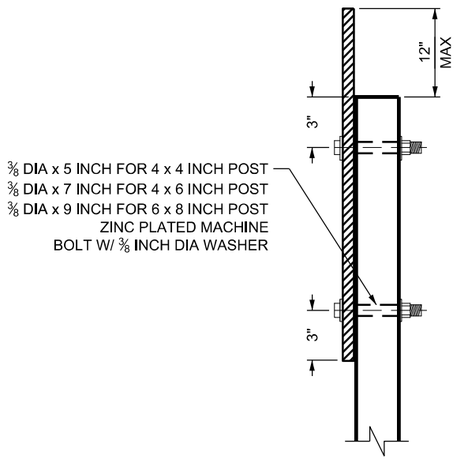
SEE NOTES 6 & 8

TIMBER SIGN POSTS (NOMINAL)

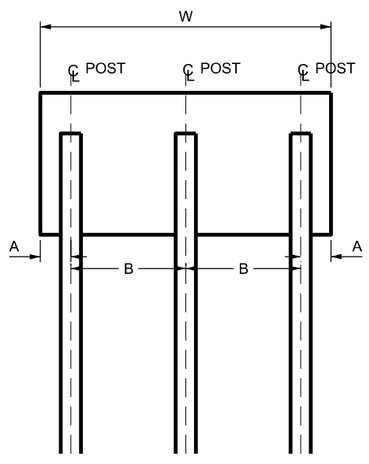
SIGN WIDTH (INCHES)

SIGN HEIGHT (INCHES)	12	24	36	48	60	72	84	96	108	120	132	144
12	1 - 4x4 4	1 - 4x4 4	1 - 4x4 4	1 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4
18	1 - 4x4 4	1 - 4x4 4	1 - 4x4 4	1 - 4x6 4	2 - 4x4 4	2 - 4x4 4	2 - 4x4 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4
24	1 - 4x4 4	1 - 4x4 4	1 - 4x6 4	1 - 4x6 4	2 - 4x4 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4
30	1 - 4x4 4	1 - 4x4 4	1 - 4x6 4	1 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	3 - 4x6 4	3 - 4x6 4
36	1 - 4x4 4	1 - 4x6 4	1 - 4x6 4	1 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	3 - 4x6 4	3 - 4x6 4	3 - 4x6 4	3 - 4x6 4
42	1 - 4x4 4	1 - 4x6 4	1 - 4x6 4	1 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4	3 - 4x6 4	3 - 4x6 4	3 - 4x6 4	2 - 6x8 5	2 - 6x8 5
48	1 - 4x4 4	1 - 4x6 4	1 - 4x6 4	2 - 4x6 4	2 - 4x6 4	2 - 4x6 4		3 - 4x6 4	3 - 4x6 4	2 - 6x8 5	2 - 6x8 5	2 - 6x8 5
54	1 - 4x4 4	1 - 4x6 4	1 - 6x8 5	2 - 4x6 4	2 - 4x6 4	1 - 6x8 5		2 - 6x8 5	2 - 6x8 5	2 - 6x8 5	2 - 6x8 5	2 - 6x8 5
60	1 - 4x6 4	1 - 4x6 4	1 - 6x8 5	2 - 4x6 4	1 - 6x8 5	1 - 6x8 5		2 - 6x8 5	2 - 6x8 5	2 - 6x8 5	2 - 6x8 5	2 - 6x8 5
66	1 - 4x6 4	1 - 4x6 4	1 - 6x8 5	2 - 4x6 4	1 - 6x8 5			2 - 6x8 5	2 - 6x8 5	2 - 6x8 5	2 - 6x8 5	
72	1 - 4x6 4	1 - 6x8 5	1 - 6x8 5	1 - 6x8 5	1 - 6x8 5			2 - 6x8 5	2 - 6x8 5	2 - 6x8 5		

LEGEND: 2 - 4x6 / 5 — NUMBER & SIZE (INCH x INCH) OF POSTS; MINIMUM EMBEDMENT DEPTH IN FEET



SIDE VIEW



MULTIPLE POST SIGN

TWO POSTS		
SIGN WIDTH	POST SPACING	
W	A	B
4 FT	0'- 6"	3'- 0"
5 FT	0'- 6"	4'- 0"
6 FT	1'- 0"	4'- 0"
7 FT	1'- 0"	5'- 0"
8 FT	0'- 6"	7'- 0"
9 FT	1'- 0'	7'- 0"
10 FT	1'- 0"	8'- 0"
11 FT	1'- 6"	8'- 0"
12 FT	2'- 0"	8'- 0"

THREE POSTS		
SIGN WIDTH	POST SPACING	
W	A	B
8 FT	1'- 0"	3'- 0"
9 FT	1'- 0"	3'- 6"
10 FT	1'- 0"	4'- 0"
11 FT	1'- 6"	4'- 0"
12 FT	2'- 0"	4'- 0"

NOTES:

1. USE PERMITTED IN WORK ZONES.
   a. INSTALL AFTER NOTICE TO PROCEED IS GIVEN.
   b. REMOVE WHEN DIRECTED BY ENGINEER.
   c. DO NOT INSTALL WITHIN 50 FT OF AN INTERSECTION.
2. USE PERMITTED BY MAINTENANCE IN EMERGENCY SITUATIONS.
   a. USE FOR A MAXIMUM OF 90 DAYS.
3. NARROW POST DIMENSION TO FACE TRAFFIC.
4. USE ONE 4 x 6 INCH POST FOR MULTIPLE SIGN INSTALLATION ON SINGLE POST.
5. FIELD DRILL TWO HOLES IN THE CENTER OF THE POST. DRILL PERPENDICULAR TO THE CENTER LINE OF THE ROAD.
6. REFER TO SECTION 06055 FOR TIMBER POSTS.
7. REFER TO SN SERIES STD DWGS FOR PLACEMENT OF GROUND MOUNTED SIGNS.
8. DIMENSIONS SHOWN ARE APPROXIMATE AND WEAKENED HOLES ARE OPTIONAL FOR TIMBER POST MOUNTED SIGNS THAT ARE PLACED BEHIND BARRIER AND OUTSIDE LENGTH OF NEED .

REVISIONS

NO.	DATE	APPR.	REMARKS
1	2/27/2020	JW	MASH UPDATES.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

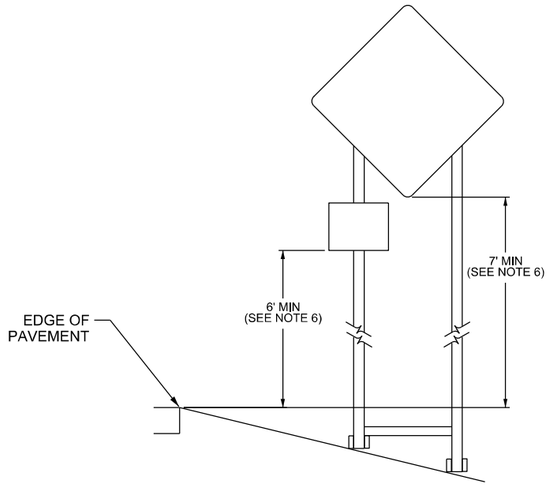
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

GROUND MOUNTED TIMBER SIGN POST

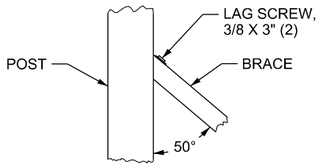
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 2E

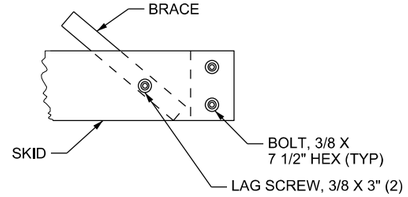
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC02E.dgn



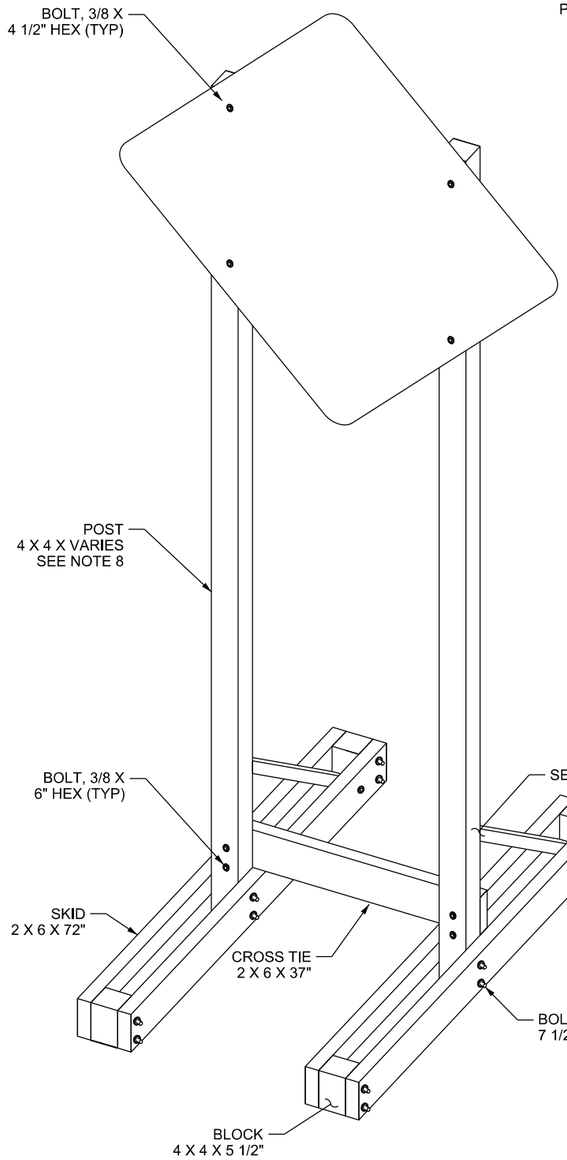
DETAIL A
UNLEVEL GROUND
SEE NOTE 5



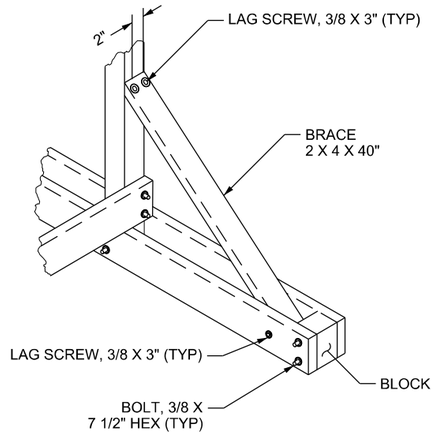
DETAIL B
UPPER CONNECTION



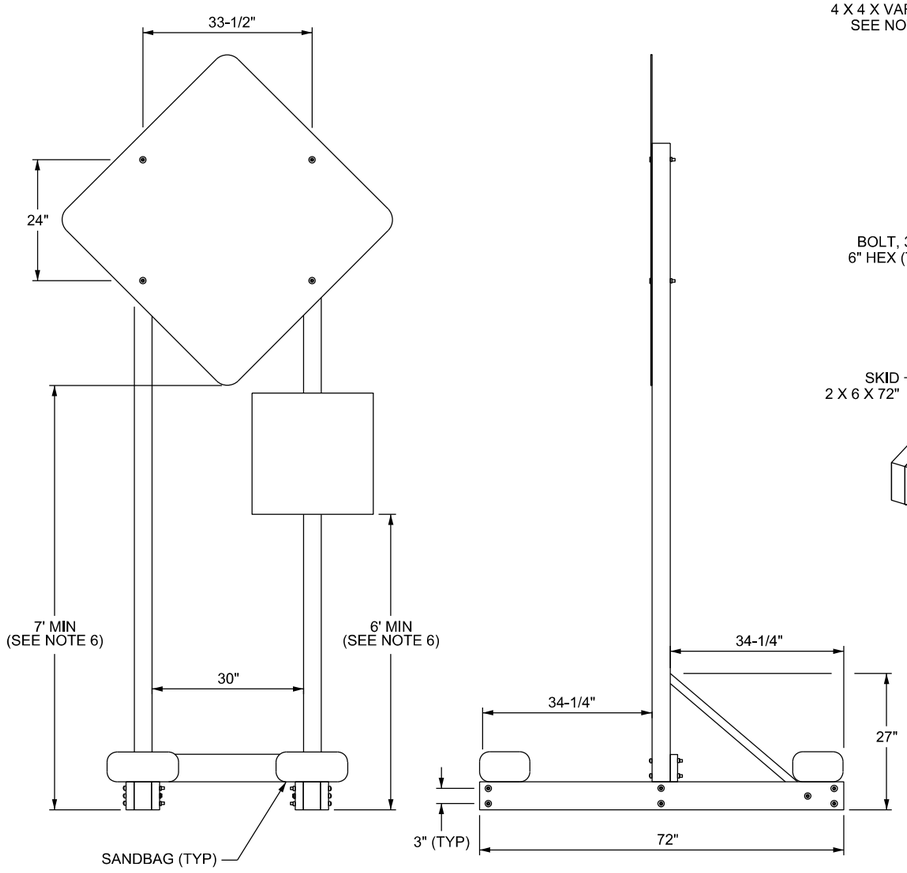
DETAIL C
LOWER CONNECTION



ISOMETRIC VIEW (FRONT)



ISOMETRIC VIEW (BACK)



ELEVATION VIEWS

NOTES:

1. ALL BOLTS MUST BE SAE GRADE 5. USE 2 FLAT WASHERS, ONE LOCK WASHER AND A HEX NUT WITH EACH BOLT. USE ONE FLAT WASHER WITH EACH LAG SCREW.
2. REFER TO SECTION 06055 FOR TIMBER POSTS.
3. USE SANDBAGS WITH SAND OR OTHER COMPARABLE SOFT MATERIAL AS BALLAST. DO NOT PLACE BALLAST HIGHER THAN 12 INCHES ABOVE THE ROADWAY AND DO NOT COVER ANY RETROREFLECTIVE AREA OF RAILS OR SIGNS.
4. MAXIMUM SIGN SIZE IS 21 SQ FT.
5. ADJUST POST LENGTHS WHEN PLACING SKID SUPPORTS ON UNLEVEL GROUND SO THE SIGN APPEARS STRAIGHT AND PLUMB. DO NOT PLACE OBJECTS UNDER SKIDS AS A MEANS OF LEVELING.
6. THE MINIMUM HEIGHT TO THE BOTTOM OF A SUPPLEMENTAL PLAQUE IS 6 FT IF A PLAQUE IS PLACED UNDER A SIGN. INCREASE POST LENGTH AS NEEDED TO MEET MINIMUM HEIGHT. ATTACH SUPPLEMENTAL PLAQUES TO THE SUPPORT NEAREST THE TRAVEL LANE.
7. LUMBER SIZES ARE NOMINAL.
8. ADJUST POST LENGTHS TO MEET SIGN MOUNTING HEIGHT REQUIREMENTS.
9. A CONSTRUCTION TOLERANCE OF ½ INCH IS ACCEPTABLE FOR ALL LUMBER LENGTHS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

SKID-MOUNTED DUAL WOOD POST TEMPORARY SIGN SUPPORT SYSTEM

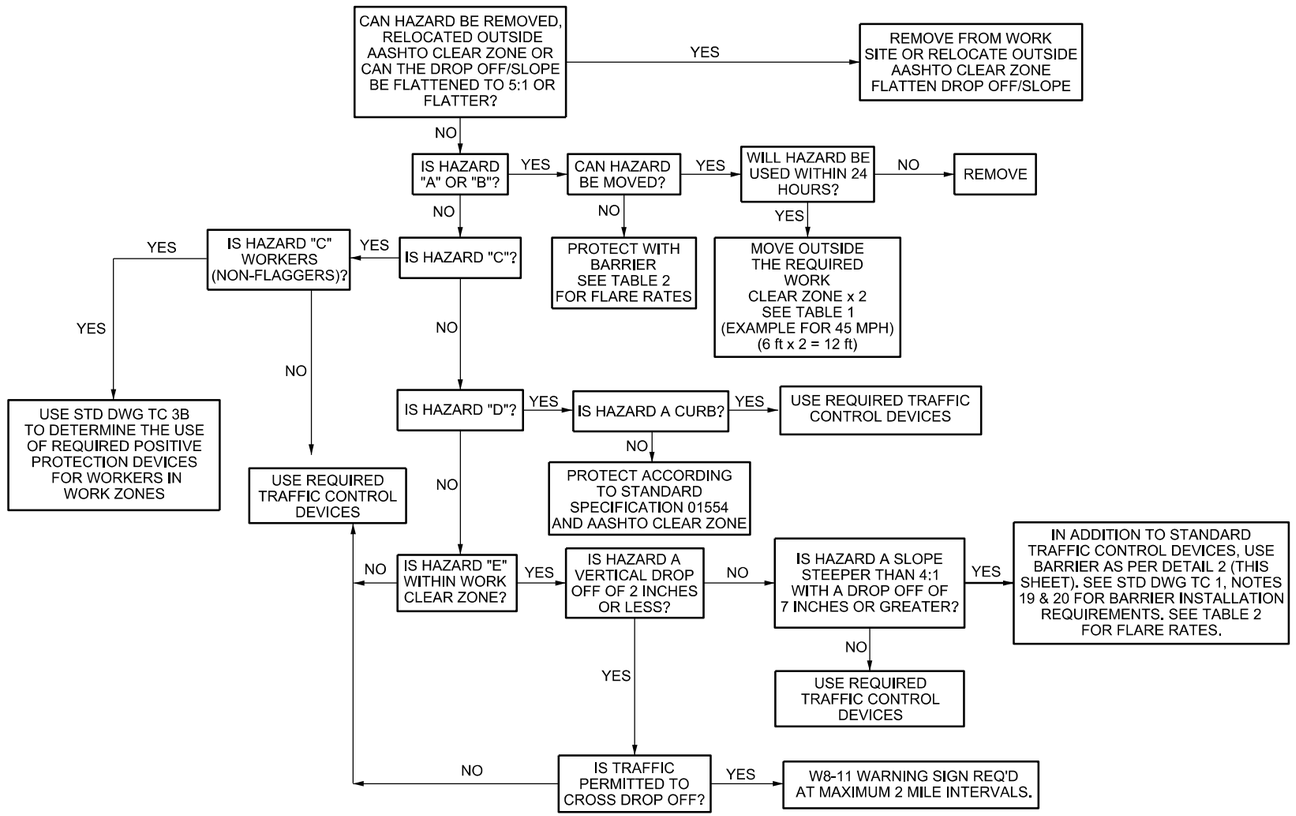
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 2F

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC02F.dgn
23-JUN-2020

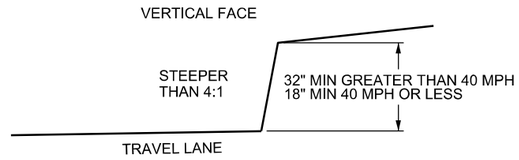
1. USE DETAIL 1 (THIS SHEET) TABLE 1 (WORK CLEAR ZONE) AND AASHTO CLEAR ZONE WHEN MITIGATING THE FOLLOWING HAZARDS:
   A. NON-WORKING EQUIPMENT OR VEHICLES
   B. STOCKPILED MATERIAL
   C. WORKING VEHICLES AND WORKERS (NON-FLAGGERS)
   D. OTHER OBJECTS AND FEATURES SUCH AS INCOMPLETE CURBS, BRIDGE PARAPETS, BARRIER BLUNT ENDS, POLES, NON-BREAKAWAY SIGN STRUCTURES
   E. SLOPES STEEPER THAN 4:1 INCLUDING VERTICAL WITH A DROP OFF OF LESS THAN OR EQUAL TO 48 INCHES. (SEE DETAIL 1 ON THIS SHEET FOR EXAMPLES)

2. MITIGATE ALL OTHER HAZARDS WITHIN AASHTO CLEARZONE AS APPROVED BY THE ENGINEER INCLUDING SLOPES STEEPER THAN 4:1 WITH A DROP OFF GREATER THAN 48 INCHES.



DETAIL 1: HAZARD MITIGATION FLOW CHART

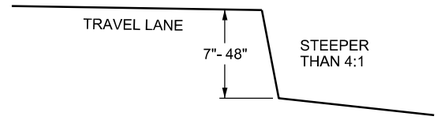
* DROP OFF IS A VERTICAL DIFFERENCE THAT MAY BE FROM THE WORK TO THE ROADWAY OR THE ROADWAY TO THE WORK.



BARRIER REQUIRED FOR SLOPES STEEPER THAN 4:1 AND GREATER THAN INDICATED HEIGHT UNLESS BACKSLOPE IS A SMOOTH UNIFORM SURFACE OF SUITABLE MATERIAL.

SLOPE MUST REMAIN STABLE AND NOT SPALL AT HEIGHT AND SPECIFIED SPEED.

SLOPE STEEPER THAN 4:1
AND VERTICAL EXCAVATION



WITHIN WORK CLEAR ZONE USE BARRIER

OUTSIDE WORK CLEAR ZONE USE DEVICES

GREATER THAN 48 INCH OBTAIN APPROVAL FROM THE ENGINEER

DETAIL 2: TYPE "E" VERTICAL DROP OFF HAZARDS

TABLE 1
WORK CLEAR ZONE

POSTED MPH	FT
40 & LESS	3
45	6
50	6.5
55	7.5
60	8
65	8.5
70	9
75	10.5
80	12

TABLE 2
WORK ZONE FLARE RATES TEMPORARY BARRIER

POSTED MPH	FLARE
70 OR GREATER	20:1
65	18:1
60	17:1
55	16:1
50	14:1
45	10:1
40 OR GREATER	6:1

NOTES:

1. USE ROADSIDE DESIGN GUIDE FOR AASHTO CLEAR ZONE, .

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

HAZARD MITIGATION
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 3A

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC03A.dgn
23-JUN-2020

	FACTOR 1 - DURATION OF SPECIFIC WORK ELEMENT (SEE NOTE 3)	POINTS	POINTS
CHOOSE ONE CONDITION	LONG TERM STATIONARY WORK WITH DURATION GREATER THAN TEN MONTHS	10	
	LONG TERM STATIONARY WORK WITH DURATION OF THREE THROUGH TEN MONTHS	8	
	LONG TERM STATIONARY WORK WITH DURATION OF MORE THAN THREE DAYS TO LESS THAN THREE MONTHS, AND THE PROCURMRNT AND INSTALLATION OF POSITVE PROTECTION DEVICES CAN BE COMPLETED PRIOR TO WORK STARTING	6	
	INTERMEDIATE TERM STATIONARY WORK, AND PROCUREMENT & INSTALLATION OF POSITIVE PROTECTION DEVICES CAN BE COMPLETED PRIOR TO WORK STARTING	3	
	SHORT TERM STATIONARY, SHORT DURATION, AND MOBILE WORK	0	
	FACTOR 2 - EXPOSURE (WORK CLEAR ZONE, SEE STD. DWG. TC 3A TABLE 1)		
CHOOSE ONE CONDITION	WORKERS ARE EXPECTED TO BE WITHIN WORK CLEAR ZONE	10	
	WORKERS ARE EXPECTED TO BE OUTSIDE OF THE WORK CLEAR ZONE, BUT WITHIN TWICE THE WORK CLEAR ZONE	6	
	WORKERS ARE EXPECTED TO BE OUTSIDE OF TWICE THE WORK CLEAR ZONE	3	
	WORKERS ARE EXPECTED TO BE OUTSIDE OF THE AASHTO CLEAR ZONE	0	
	FACTOR 3 - POSTED SPEED (PRIOR TO CONSTRUCTION)		
CHOOSE ONE CONDITION	POSTED SPEED IS 55 MPH OR GREATER	10	
	POSTED SPEED IS 40 MPH, 45 MPH, 50 MPH, OR PILOT CAR OPERATION REGARDLESS OF POSTED SPEED	6	
	POSTED SPEED IS 30 MPH OR 35 MPH	3	
	POSTED SPEED IS 25 MPH OR LESS	0	
	FACTOR 4 - LOCATION OF WORK		
CHOOSE ONE CONDITION	BRIDGE STRUCTURES, DROP-OFFS 5 FEET OR GREATER, FILLS OR CUTS STEEPER THAN 2:1, OR CONFINED AREAS WITH NO ESCAPE ROUTE FOR WORKERS	10	
	AREAS WITH BARRIERS OR OTHER IMPEDIMENTS THAT HAVE A VIABLE ESCAPE ROUTE FOR WORKERS	6	
	AREAS WITH DROP-OFFS LESS THAN 5 FEET THAT HAVE A VIABLE ESCAPE ROUTE FOR WORKERS	3	
	OPEN AREA WITH MULTIPLE ESCAPE ROUTE FOR WORKERS	0	
		TOTAL POINTS	

UNDER EACH FACTOR CHOOSE WHICH CONDITION BEST DESCRIBES EACH WORK AREA IN THE WORK ZONE. THE POINTS ACCUMULATED WILL DETERMINE WHAT ACTION NEEDS TO BE TAKEN.

RESULTS:

TOTAL IS 31 POINTS OR MORE - POSITIVE PROTECTION DEVICES ARE REQUIRED IN ADDITION TO STANDARD TRAFFIC CONTROL AND ANY OTHER MITIGATION EFFORTS.

TOTAL IS FROM 20 THRU 30 POINTS - POSITIVE PROTECTION DEVICES OR OTHER MITIGATION EFFORTS AND STANDARD TRAFFIC CONTROL ARE REQUIRED TO MITIGATE WORKER EXPOSURE. MITIGATION WILL INCLUDE, AT A MINIMUM, ONE OF THE FOLLOWING AT THE WORKER LOCATION:

1. PROVIDING POSITIVE PROTECTION DEVICES.
2. REDUCING TRAFFIC DEVICE SPACING TO A MAXIMUM OF ONE-HALF THE REQUIRED DEVICE SPACING.
3. PROVIDING A LONGITUDINAL OR LATERAL BUFFER SPACE OR BOTH AND PROVIDING A TRUCK MOUNTED ATTENUATOR.

TOTAL IS LESS THAN 20 POINTS - USE OF STANDARD TRAFFIC CONTROL IS REQUIRED.

USE OF POSITIVE PROTECTION DEVICES FOR WORKERS IN WORK ZONES

NOTES:

1. POSITIVE PROTECTION DEVICES ARE DEVICES THAT CONTAIN AND REDIRECT VEHICLES AND MEET CRASH WORTHINESS CRITERIA.
2. POSITIVE PROTECTION DEVICES INCLUDE PORTABLE CONCRETE BARRIER, BALLAST FILLED BARRIERS, STEEL BARRIERS, MOVABLE BARRIERS, SHADOW VEHICLES WITH ATTENUATORS AND VEHICLE ARRESTING SYSTEMS.
3. WORK DURATION DEFINITIONS:
   A. LONG-TERM IS WORK THAT OCCUPIES A LOCATION MORE THAN THREE DAYS.
   B. INTERMEDIATE-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN ONE DAYLIGHT PERIOD UP TO 3 DAYS, OR NIGHTTIME WORK LASTING MORE THAN ONE HOUR.
   C. SHORT-TERM STATIONARY IS DAYTIME WORK THAT OCCUPIES A LOCATION FOR MORE THAN ONE HOUR WITHIN A DAYLIGHT PERIOD.
   D. SHORT DURATION IS WORK THAT OCCUPIES A LOCATION UP TO ONE HOUR.
   E. MOBILE IS WORK THAT MOVES INTERMITTENTLY OR CONTINUOUSLY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

STANDARD DRAWING TITLE
HAZARD MITIGATION AND POSITIVE PROTECTION DEVICES

STD. DWG. NO.
TC 3B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC03B.dgn
23-JUN-2020

TAPER, BUFFER ZONE & SIGN SPACING CHART

ROAD TYPE	POSTED SPEED MPH (S)	MINIMUM TAPER LENGTH (L)	LENGTH OF BUFFER (BZ)*	MINIMUM SIGN SPACING (SS)**				ONE LANE TWO-WAY FLAGGING
		12 FT LANE CLOSURE		A	B	C	D	TAPER LENGTH
		FT	FT	FT	FT	FT	FT	FT
CONVENTIONAL	30 AND LOWER	180	200	100	100	100	100	50
	35	245	250	350	350	350	175	
	40	320	305					
	45	540	360	500	500	500	250	100
	50	600	425					
	55	660	495					
	60	720	570					
	65	780	645					
FREEWAY/ EXPRESSWAY	65	780	645	1000	1640	2640	500	
	70	840	730					
	75	900	820					
	80	960	910					

* THE LENGTH OF BUFFER (BZ) MAY BE REDUCED WITH THE APPROVAL OF THE ENGINEER
** MAXIMUM SPACING IS THE GIVEN VALUE (SS) MULTIPLIED BY 1.5

1- TAPER LENGTH FORMULAS

SPEED	FORMULA
FOR SPEEDS OF 40 MPH AND LESS	$L = \frac{WS^2}{60}$
FOR SPEEDS OF 45 MPH AND GREATER	L= WS

L = TAPER LENGTH IN FEET
W = WIDTH OF SHIFT, LANE OR SHOULDER CLOSURE OFFSET IN FEET
S = SPEED IN MPH

⅓ L = FOR SHOULDER CLOSURE TAPER
½ L = FOR LANE SHIFT TAPER

2- CHANNELIZING DEVICES

A) MERGING AND SHIFTING TAPERS: USE A MINIMUM OF ONE DEVICE PER FT OF LANE CLOSURE WIDTH, PLUS ONE ADDITIONAL DEVICE TO START.

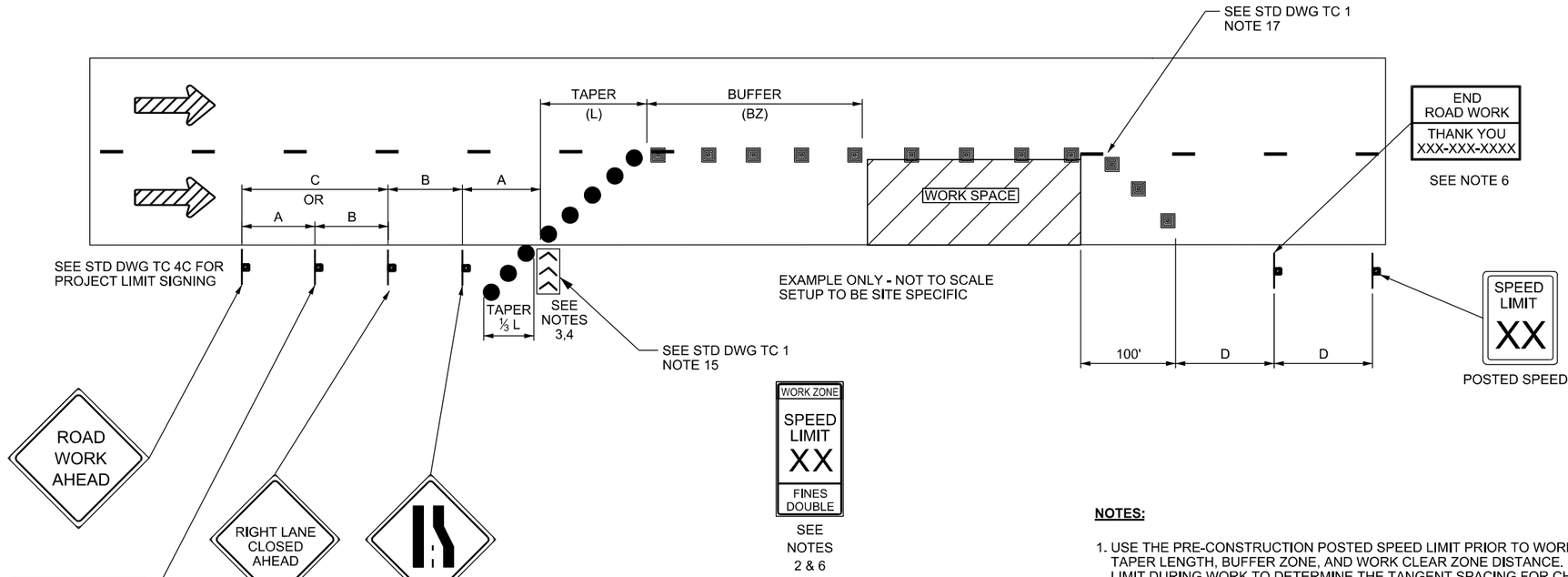
B) SHOULDER, ONE-LANE TWO-WAY, AND DOWNSTREAM TAPERS: USE A MINIMUM OF ONE DEVICE PER 3 FT OF WIDTH (OR PORTION THEREOF), PLUS ONE ADDITONAL DEVICE TO START.

C) ON TANGENT: S x 2 = SPACING UP TO 120 FT MAXIMUM.

D) LENGTH OF BUFFER ZONE (BZ) IS THE DISTANCE FROM END OF LANE CLOSURE TAPER TO WORK SPACE, OR ANY OBSTRUCTION PRIOR TO WORK SPACE.

TRAFFIC CONTROL DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- CHANNELIZING DEVICE (SEE STD DWG TC 2A)
- DRUMS OR DIRECTIONAL INDICATOR BARRICADE (SEE STD DWG TC 2A)
- FLAGGING STATION
- ARROW BOARD
- BARRIER
- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- DIRECTION OF WORK VEHICLE



STANDARD WORK ZONE SIGNING

NOTES:

1. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCE. USE THE POSTED WORK ZONE SPEED LIMIT DURING WORK TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
2. SIGN MAY BE USED IN WORK ZONES WHERE SPEED LIMIT IS NOT REDUCED.
   A. REPLACE EXISTING SPEED LIMIT SIGNS WITH RS2-6c ASSEMBLIES.
   B. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION IS USED.
3. PLACE ARROW BOARD ON SHOULDER WHEN AVAILABLE. PLACE ARROW BOARD IN FIRST 1/3 OF TAPER IN THE CLOSED LANE WHEN NO ADEQUATE SHOULDER IS AVAILABLE.
4. USE SHOULDER TAPER WHEN ARROW BOARD IS PLACED ON SHOULDER.
5. USE THE IDENTICAL LEGEND SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.
6. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
7. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEBLY.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

STANDARD WORK ZONE SIGNING GENERAL

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 4A

25-JUN-2020 DGN File:Q:\Standardsandspecs\Section\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\TC04A.dgn

TAPER, BUFFER ZONE & SIGN SPACING CHART

ROAD TYPE	POSTED SPEED MPH (S)	MINIMUM TAPER LENGTH (L)	LENGTH OF BUFFER (BZ)*	MINIMUM SIGN SPACING (SS)**				ONE LANE TWO-WAY FLAGGING
		12 FT LANE CLOSURE		A	B	C	D	TAPER LENGTH
		FT	FT	FT	FT	FT	FT	FT
CONVENTIONAL	30 AND LOWER	180	200	100	100	100	100	50
	35	245	250	350	350	350	175	
	40	320	305					
	45	540	360	500	500	500	250	100
	50	600	425					
	55	660	495					
	60	720	570					
	65	780	645					
FREEWAY/ EXPRESSWAY	65	780	645	1000	1640	2640	500	
	70	840	730					
	75	900	820					
	80	960	910					

* THE LENGTH OF BUFFER (BZ) MAY BE REDUCED WITH THE APPROVAL OF THE ENGINEER
** MAXIMUM SPACING IS THE GIVEN VALUE (SS) MULTIPLIED BY 1.5

1- TAPER LENGTH FORMULAS

SPEED	FORMULA
FOR SPEEDS OF 40 MPH AND LESS	$L=\frac{WS^2}{60}$
FOR SPEEDS OF 45 MPH AND GREATER	L= WS

L = TAPER LENGTH IN FEET
W = WIDTH OF SHIFT, LANE OR SHOULDER CLOSURE OFFSET IN FEET
S = SPEED IN MPH

⅓ L = FOR SHOULDER CLOSURE TAPER
½ L = FOR LANE SHIFT TAPER

2- CHANNELIZING DEVICES

A) MERGING AND SHIFTING TAPERS: USE A MINIMUM OF ONE DEVICE PER FT OF LANE CLOSURE WIDTH, PLUS ONE ADDITIONAL DEVICE TO START.

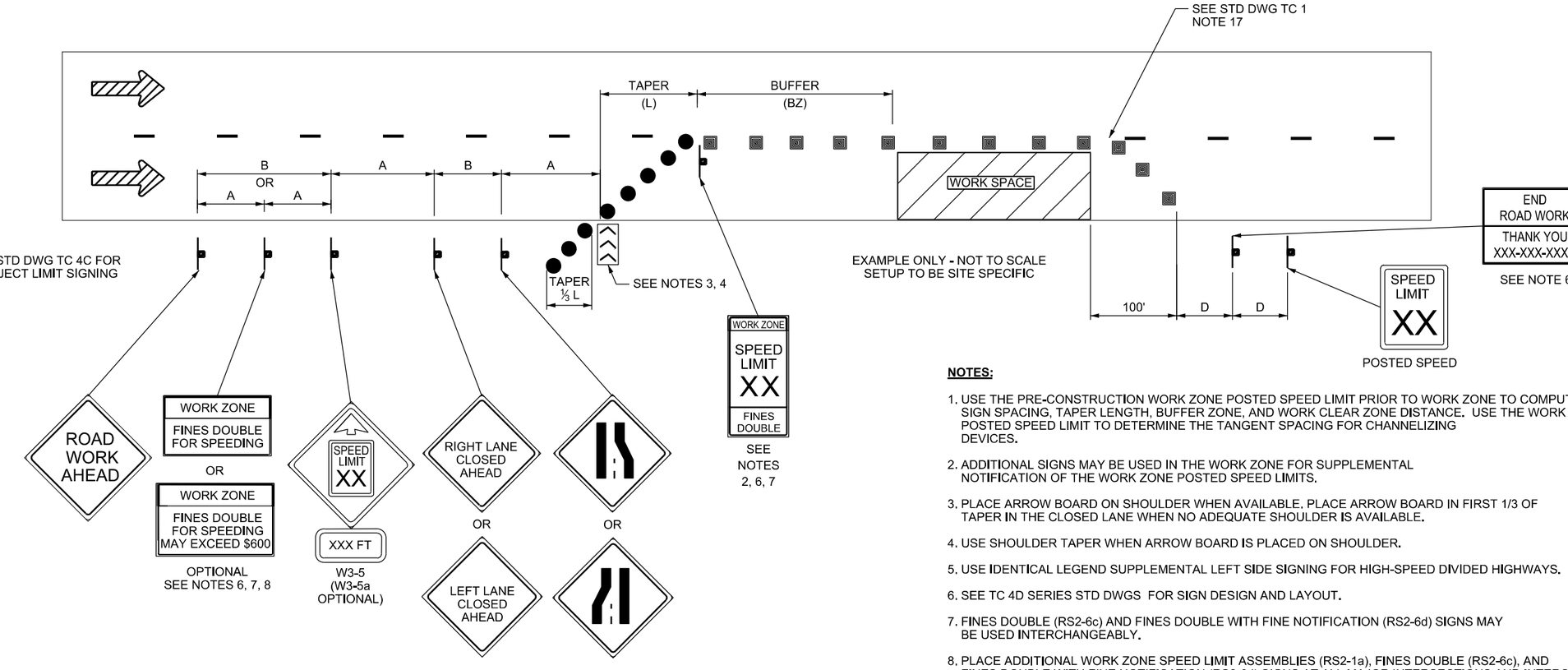
B) SHOULDER, ONE-LANE TWO-WAY, AND DOWNSTREAM TAPERS: USE A MINIMUM OF ONE DEVICE PER 3 FT OF WIDTH (OR PORTION THEREOF), PLUS ONE ADDITONAL DEVICE TO START.

C) ON TANGENT: S x 2 = SPACING UP TO 120 FT MAXIMUM.

D) LENGTH OF BUFFER ZONE (BZ) IS THE DISTANCE FROM END OF LANE CLOSURE TAPER TO WORK SPACE, OR ANY OBSTRUCTION PRIOR TO WORK SPACE.

TRAFFIC CONTROL DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- CHANNELIZING DEVICE (SEE STD DWG TC 2A)
- DRUMS OR DIRECTIONAL INDICATOR BARRICADE (SEE STD DWG TC 2A)
- FLAGGING STATION
- ARROW BOARD
- BARRIER
- DIRECTION OF TRAFFIC
- TYPE III BARRICADE
- DIRECTION OF WORK VEHICLE



REDUCED SPEED WORK ZONE SIGNING

NOTES:

1. USE THE PRE-CONSTRUCTION WORK ZONE POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCE. USE THE WORK ZONE POSTED SPEED LIMIT TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
2. ADDITIONAL SIGNS MAY BE USED IN THE WORK ZONE FOR SUPPLEMENTAL NOTIFICATION OF THE WORK ZONE POSTED SPEED LIMITS.
3. PLACE ARROW BOARD ON SHOULDER WHEN AVAILABLE. PLACE ARROW BOARD IN FIRST 1/3 OF TAPER IN THE CLOSED LANE WHEN NO ADEQUATE SHOULDER IS AVAILABLE.
4. USE SHOULDER TAPER WHEN ARROW BOARD IS PLACED ON SHOULDER.
5. USE IDENTICAL LEGEND SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.
6. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
7. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEABLY.
8. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION IS USED.
9. REDUCED SPEEDS WILL NOT BE ALLOWED WITHOUT THE APPROPRIATE APPROVAL. SEE STD DWG TC 1, NOTE 12.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

REDUCED SPEED WORK ZONE SIGNING GENERAL
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 4B1

25-JUN-2020 DGN File:Q:\Standardsandspecssection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\TC04B1.dgn

TABLE I
TAPER, BUFFER ZONE & SIGN SPACING CHART

ROAD TYPE	POSTED SPEED MPH (S)	MINIMUM TAPER LENGTH (L)	LENGTH OF BUFFER (BZ)*	MINIMUM SIGN SPACING (SS)**			
		12 FT LANE CLOSURE		A	B	C	D
		FT	FT	FT	FT	FT	FT
FREEWAY/ EXPRESSWAY	65	780	645	1000	1640	2640	500
	70	840	730				
	75	900	820				
	80	960	910				

* THE LENGTH OF BUFFER (BZ) MAY BE REDUCED WITH THE APPROVAL OF THE ENGINEER
** MAXIMUM SPACING IS THE GIVEN VALUE (SS) MULTIPLIED BY 1.5

1- TAPER LENGTH FORMULAS

SPEED	FORMULA
FOR SPEEDS OF 45 MPH AND GREATER	L= WS

L = TAPER LENGTH IN FEET
W = WIDTH OF SHIFT, LANE OR SHOULDER CLOSURE OFFSET IN FEET
S = SPEED IN MPH
½ L = FOR SHOULDER CLOSURE TAPER
½ L = FOR LANE SHIFT TAPER

CHANNELIZING DEVICES

A) MERGING AND SHIFTING TAPERS: USE A MINIMUM OF ONE DEVICE PER FT OF LANE CLOSURE WIDTH, PLUS ONE ADDITIONAL DEVICE TO START.

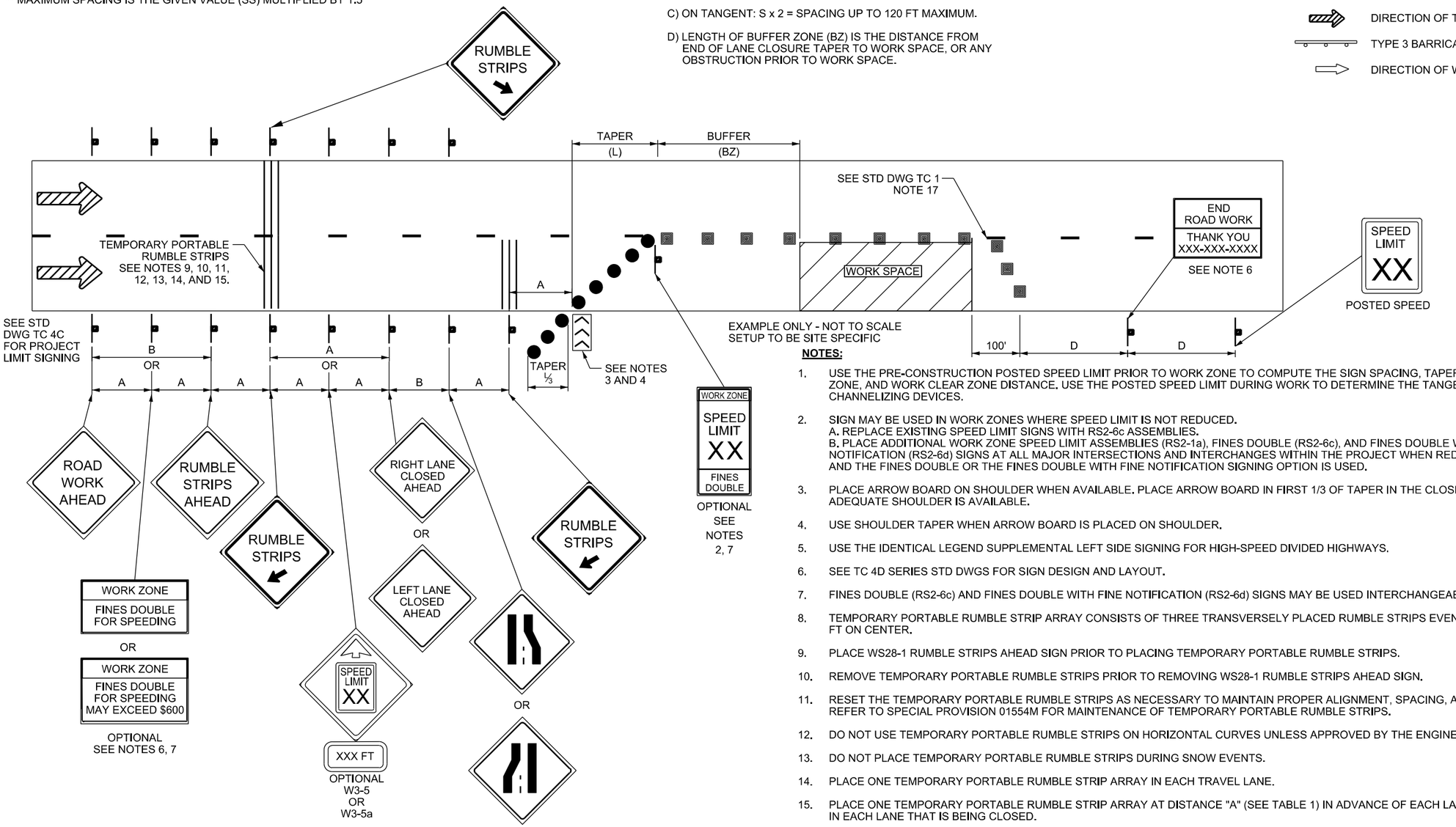
B) SHOULDER, ONE-LANE TWO-WAY, AND DOWNSTREAM TAPERS: USE A MINIMUM OF ONE DEVICE PER 3 FT OF WIDTH (OR PORTION THEREOF), PLUS ONE ADDITIONAL DEVICE TO START.

C) ON TANGENT: S x 2 = SPACING UP TO 120 FT MAXIMUM.

D) LENGTH OF BUFFER ZONE (BZ) IS THE DISTANCE FROM END OF LANE CLOSURE TAPER TO WORK SPACE, OR ANY OBSTRUCTION PRIOR TO WORK SPACE.

TRAFFIC CONTROL DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- CHANNELIZING DEVICE (SEE STD DWG TC 2A)
- DRUMS OR DIRECTIONAL INDICATOR BARRICADE
- FLAGGING STATION
- ARROW BOARD
- BARRIER
- DIRECTION OF TRAFFIC
- TYPE 3 BARRICADE
- DIRECTION OF WORK VEHICLE



NOTES:

1. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCE. USE THE POSTED SPEED LIMIT DURING WORK TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
2. SIGN MAY BE USED IN WORK ZONES WHERE SPEED LIMIT IS NOT REDUCED.
   A. REPLACE EXISTING SPEED LIMIT SIGNS WITH RS2-6c ASSEMBLIES.
   B. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION IS USED.
3. PLACE ARROW BOARD ON SHOULDER WHEN AVAILABLE. PLACE ARROW BOARD IN FIRST 1/3 OF TAPER IN THE CLOSED LANE WHEN NO ADEQUATE SHOULDER IS AVAILABLE.
4. USE SHOULDER TAPER WHEN ARROW BOARD IS PLACED ON SHOULDER.
5. USE THE IDENTICAL LEGEND SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.
6. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
7. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEABLY.
8. TEMPORARY PORTABLE RUMBLE STRIP ARRAY CONSISTS OF THREE TRANSVERSELY PLACED RUMBLE STRIPS EVENLY SPACED AT 40 FT ON CENTER.
9. PLACE WS28-1 RUMBLE STRIPS AHEAD SIGN PRIOR TO PLACING TEMPORARY PORTABLE RUMBLE STRIPS.
10. REMOVE TEMPORARY PORTABLE RUMBLE STRIPS PRIOR TO REMOVING WS28-1 RUMBLE STRIPS AHEAD SIGN.
11. RESET THE TEMPORARY PORTABLE RUMBLE STRIPS AS NECESSARY TO MAINTAIN PROPER ALIGNMENT, SPACING, AND LOCATION. REFER TO SPECIAL PROVISION 01554M FOR MAINTENANCE OF TEMPORARY PORTABLE RUMBLE STRIPS.
12. DO NOT USE TEMPORARY PORTABLE RUMBLE STRIPS ON HORIZONTAL CURVES UNLESS APPROVED BY THE ENGINEER.
13. DO NOT PLACE TEMPORARY PORTABLE RUMBLE STRIPS DURING SNOW EVENTS.
14. PLACE ONE TEMPORARY PORTABLE RUMBLE STRIP ARRAY IN EACH TRAVEL LANE.
15. PLACE ONE TEMPORARY PORTABLE RUMBLE STRIP ARRAY AT DISTANCE "A" (SEE TABLE 1) IN ADVANCE OF EACH LANE CLOSURE TAPER IN EACH LANE THAT IS BEING CLOSED.
16. RELOCATE THE TEMPORARY PORTABLE RUMBLE STRIPS AND ASSOCIATED SIGNING WHEN VEHICLE QUEUES ARE EXPECTED OR OCCUR IN ADVANCE OF TEMPORARY PORTABLE RUMBLE STRIPS.
17. REDUCED SPEEDS WILL NOT BE ALLOWED WITHOUT THE APPROVAL OF THE ENGINEER. USE THE REDUCED SPEED LIMIT AHEAD SIGN, THE FINES DOUBLE SPEED LIMIT SIGN, AND THE SPEED LIMIT SIGN.
18. USE THE STANDARDS FOUND ON THIS DRAWING ON RURAL TWO LANE FREEWAYS.

NO.	DATE	APPR.	REVISIONS	REMARKS
1	6/28/18	RT	REPLACED WS28-2 AND W16-7 ASSEMBLY WITH NEW WS28-2 SIGN.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

STANDARD DRAWING TITLE: TEMPORARY PORTABLE RUMBLE STRIPS FREEWAY

STD. DWG. NO. TC 4B2

DGN File: D:\Standardsand\SpecsSection\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\TC04B2.dgn
25-JUN-2020

TAPER, BUFFER ZONE & SIGN SPACING CHART

ROAD TYPE	POSTED SPEED MPH (S)	MINIMUM TAPER LENGTH (L)	LENGTH OF BUFFER (BZ)*	MINIMUM SIGN SPACING (SS)**				
		12 FT LANE CLOSURE		A	B	C	D	TAPER LENGTH
		FT	FT	FT	FT	FT	FT	FT
CONVENTIONAL	30 AND LOWER	180	200	100	100	100	100	50
	35	245	250	350	350	350	175	
	40	320	305					
	45	540	360	500	500	500	250	100
	50	600	425					
	55	660	495					
	60	720	570					
	65	780	645					
FREEWAY/ EXPRESSWAY	65	780	645	1000	1640	2640	500	
	70	840	730					
	75	900	820					
	80	960	910					

* THE LENGTH OF BUFFER (BZ) MAY BE REDUCED WITH THE APPROVAL OF THE ENGINEER
** MAXIMUM SPACING IS THE GIVEN VALUE (SS) MULTIPLIED BY 1.5

1- TAPER LENGTH FORMULAS

SPEED	FORMULA
FOR SPEEDS OF 40 MPH AND LESS	$L=\frac{WS^2}{60}$
FOR SPEEDS OF 45 MPH AND GREATER	L= WS

L = TAPER LENGTH IN FEET
W = WIDTH OF SHIFT, LANE OR SHOULDER CLOSURE OFFSET IN FEET
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⅓ L = FOR SHOULDER CLOSURE TAPER
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2- CHANNELIZING DEVICES

A) MERGING AND SHIFTING TAPERS: USE A MINIMUM OF ONE DEVICE PER FT OF LANE CLOSURE WIDTH, PLUS ONE ADDITIONAL DEVICE TO START.

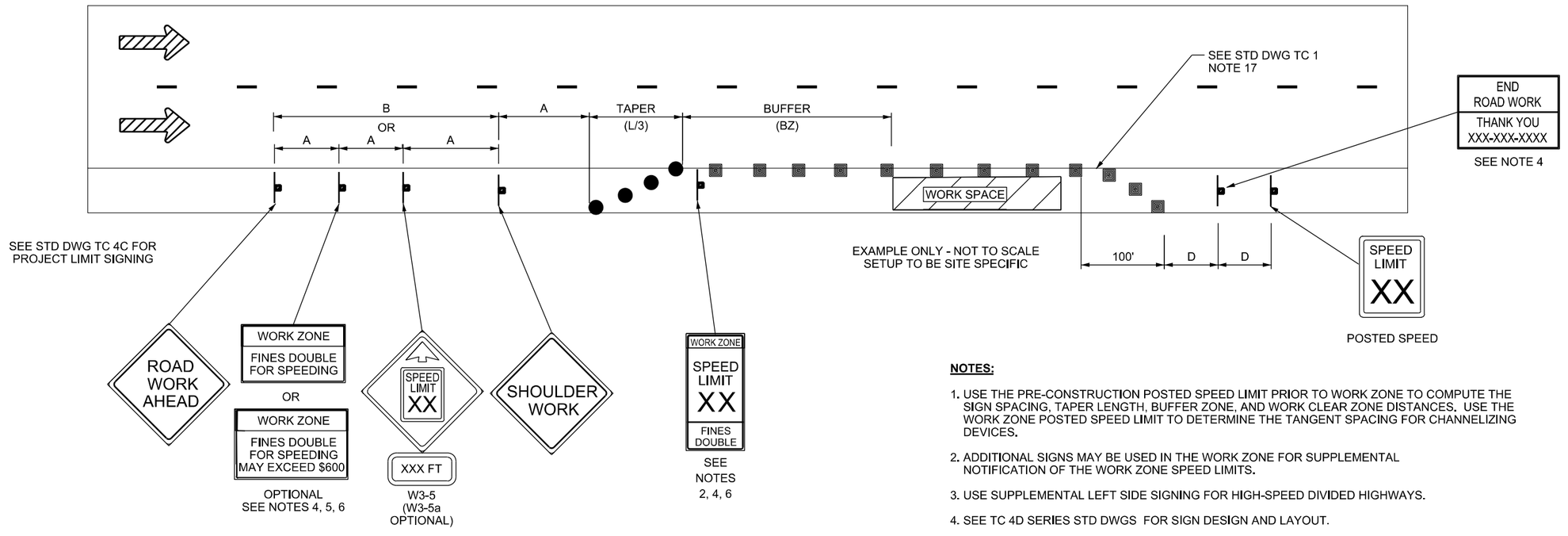
B) SHOULDER, ONE-LANE TWO-WAY, AND DOWNSTREAM TAPERS: USE A MINIMUM OF ONE DEVICE PER 3 FT OF WIDTH (OR PORTION THEREOF), PLUS ONE ADDITONAL DEVICE TO START.

C) ON TANGENT: S x 2 = SPACING UP TO 120 FT MAXIMUM.

D) LENGTH OF BUFFER ZONE (BZ) IS THE DISTANCE FROM END OF LANE CLOSURE TAPER TO WORK SPACE, OR ANY OBSTRUCTION PRIOR TO WORK SPACE.

TRAFFIC CONTROL DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- CHANNELIZING DEVICE (SEE STD DWG TC 2A)
- DRUMS OR DIRECTIONAL INDICATOR BARRICADE
- FLAGGING STATION
- ARROW BOARD
- BARRIER
- DIRECTION OF TRAFFIC
- TYPE III BARRICADE
- DIRECTION OF WORK VEHICLE



REDUCED SPEED SHOULDER WORK ZONE SIGNING

NOTES:

1. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCES. USE THE WORK ZONE POSTED SPEED LIMIT TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
2. ADDITIONAL SIGNS MAY BE USED IN THE WORK ZONE FOR SUPPLEMENTAL NOTIFICATION OF THE WORK ZONE SPEED LIMITS.
3. USE SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.
4. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
5. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEBLY.
6. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION IS USED.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

REDUCED SPEED SHOULDER WORK ZONE SIGNING GENERAL

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 4B3

25-JUN-2020 DGN File:G:\Standardsandspecs\Sector\Standards Committee\MeetingFiles\2020\4 - June 25,2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\TC04B3.dgn

TAPER, BUFFER ZONE & SIGN SPACING CHART

ROAD TYPE	POSTED SPEED MPH (S)	MINIMUM TAPER LENGTH (L)	LENGTH OF BUFFER (BZ)*	MINIMUM SIGN SPACING (SS)**				
		12 FT LANE CLOSURE		A	B	C	D	TAPER LENGTH
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1- TAPER LENGTH FORMULAS

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FOR SPEEDS OF 40 MPH AND LESS	$L=\frac{WS^2}{60}$
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A) MERGING AND SHIFTING TAPERS: USE A MINIMUM OF ONE DEVICE PER FT OF LANE CLOSURE WIDTH, PLUS ONE ADDITIONAL DEVICE TO START.

B) SHOULDER, ONE-LANE TWO-WAY, AND DOWNSTREAM TAPERS: USE A MINIMUM OF ONE DEVICE PER 3 FT OF WIDTH (OR PORTION THEREOF), PLUS ONE ADDITONAL DEVICE TO START.

C) ON TANGENT: S x 2 = SPACING UP TO 120 FT MAXIMUM.

D) LENGTH OF BUFFER ZONE (BZ) IS THE DISTANCE FROM END OF LANE CLOSURE TAPER TO WORK SPACE, OR ANY OBSTRUCTION PRIOR TO WORK SPACE.

TRAFFIC CONTROL DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- CHANNELIZING DEVICE (SEE STD DWG TC 2A)
- DRUMS OR DIRECTIONAL INDICATOR BARRICADE
- FLAGGING STATION
- ARROW BOARD
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- DIRECTION OF TRAFFIC
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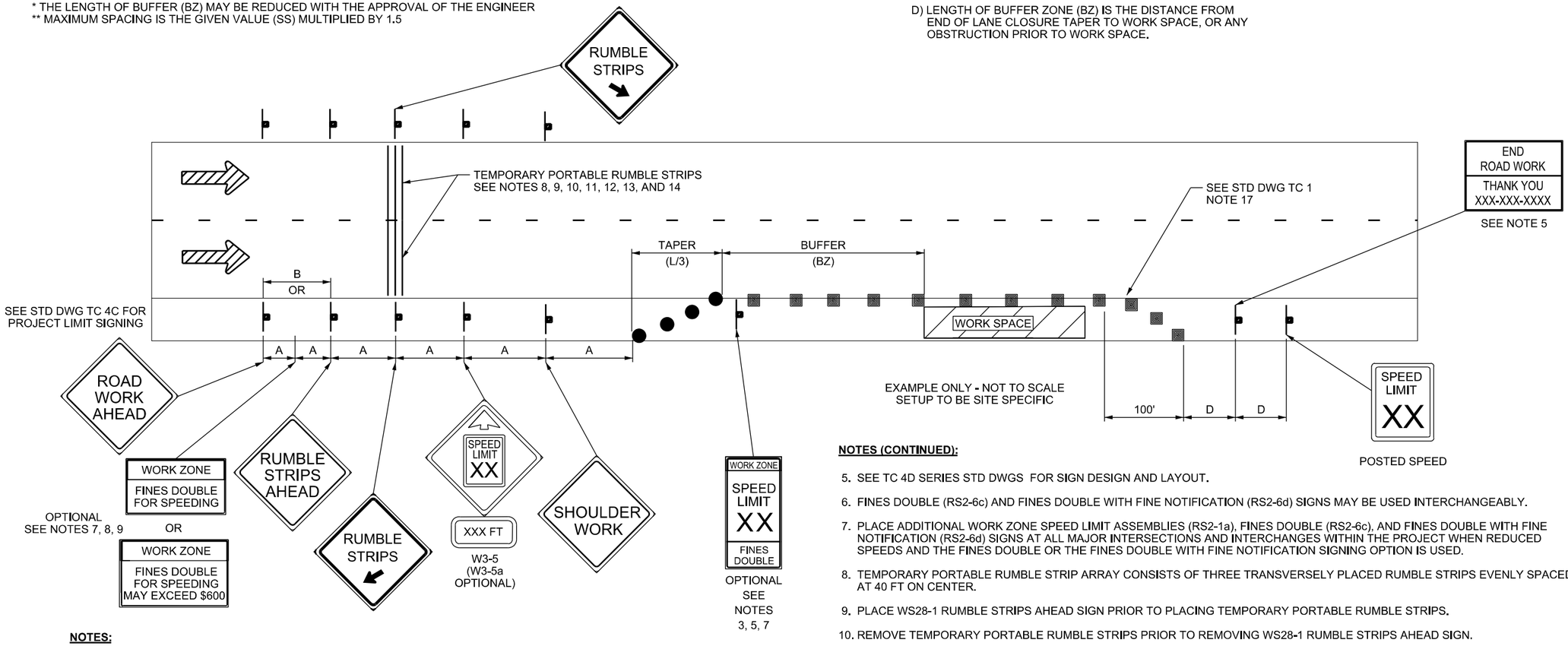


NOTES:

1. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCES. USE THE WORK ZONE REDUCED SPEED LIMIT TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
2. REMOVE OR COVER ALL WORK ZONE REDUCED SPEED LIMIT ASSEMBLIES (RS2-1a) AND THE WORK ZONE REDUCED SPEED LIMIT AHEAD (W3-5 SERIES) SIGNS WHEN NO ONE IS WORKING, EXCEPT AS APPROVED BY THE REGION TRAFFIC ENGINEER. DO NOT COVER PRE-CONSTRUCTION POSTED SPEED LIMIT ASSEMBLIES (RS2-1a).
3. ADDITIONAL SIGNS MAY BE USED IN THE WORK ZONE FOR SUPPLEMENTAL NOTIFICATION OF THE WORK ZONE SPEED LIMITS.
4. USE SUPPLEMENTAL LEFT SIDE SIGNING FOR HIGH-SPEED DIVIDED HIGHWAYS.

NOTES (CONTINUED):

5. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
6. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEABLY.
7. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION IS USED.
8. TEMPORARY PORTABLE RUMBLE STRIP ARRAY CONSISTS OF THREE TRANSVERSELY PLACED RUMBLE STRIPS EVENLY SPACED AT 40 FT ON CENTER.
9. PLACE WS28-1 RUMBLE STRIPS AHEAD SIGN PRIOR TO PLACING TEMPORARY PORTABLE RUMBLE STRIPS.
10. REMOVE TEMPORARY PORTABLE RUMBLE STRIPS PRIOR TO REMOVING WS28-1 RUMBLE STRIPS AHEAD SIGN.
11. RESET THE TEMPORARY PORTABLE RUMBLE STRIPS AS NECESSARY TO MAINTAIN PROPER ALIGNMENT, SPACING, AND LOCATION.
12. DO NOT USE TEMPORARY PORTABLE RUMBLE STRIPS ON HORIZONTAL CURVES UNLESS APPROVED BY REGION TRAFFIC ENGINEER.
13. REFER TO SPECIAL PROVISION 01554M FOR MAINTENANCE OF TEMPORARY PORTABLE RUMBLE STRIPS.
14. DO NOT PLACE TEMPORARY PORTABLE RUMBLE STRIPS DURING SNOW EVENTS.
15. RELOCATE THE TEMPORARY PORTABLE RUMBLE STRIPS AND ASSOCIATED SIGNING WHEN VEHICLE QUEUES ARE EXPECTED OR OCCUR IN ADVANCE OF TEMPORARY PORTABLE RUMBLE STRIPS.

NO.	DATE	APPR.	REVISIONS	REMARKS
1	6/28/18	RT	REPLACED WS28-2 AND W16-7 ASSEMBLY WITH NEW WS28-2 SIGN.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

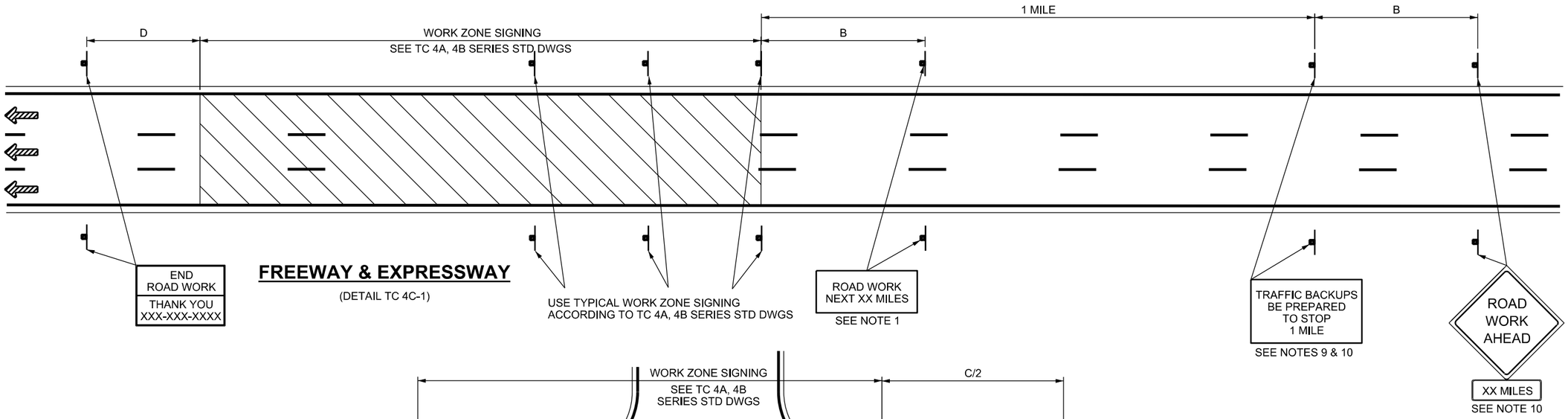
RECOMMENDED FOR APPROVAL	AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED	AUGUST 2020 DATE
DEPUTY DIRECTOR	

SHOULDER WORK ZONE
TEMPORARY PORTABLE
RUMBLE STRIPS
FREEWAY/DIVIDED
HIGHWAY

STANDARD DRAWING TITLE

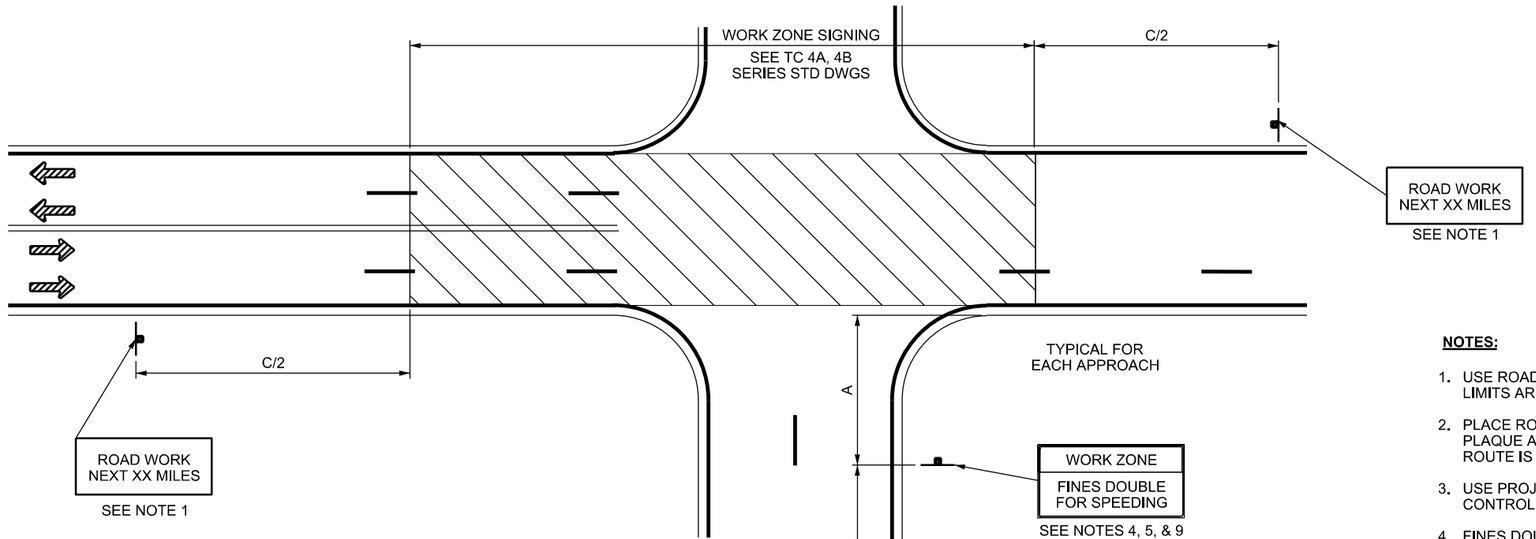
STD. DWG. NO.
TC 4B4

DGN File:G:\Standards and Specs Section\Standards Committee\MeetingFiles\2020\4 - June 25, 2020\Drawings\ApprovedFiles\IF IT ALL PASSES, THESE ARE READY FOR BOOK\TC04B4.dgn
25-JUN-2020



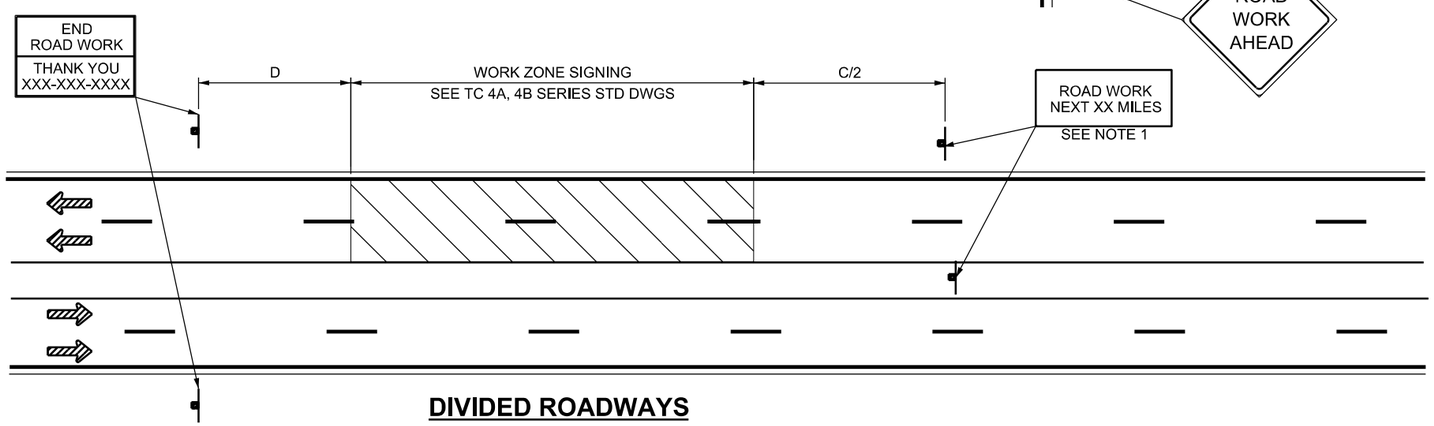
FREEWAY & EXPRESSWAY

(DETAIL TC 4C-1)



SINGLE & MULTI-LANE UNDIVIDED ROADWAYS

(SIGN SEQUENCING REQUIRED IN BOTH DIRECTIONS)
(DETAIL TC 4C-2)



DIVIDED ROADWAYS

(DETAIL TC 4C-3)

NOTES:

1. USE ROAD WORK NEXT XX MILES SIGN (G20-1) WHEN PROJECT LIMITS ARE GREATER THAN 2 MILES IN LENGTH.
2. PLACE ROAD WORK AHEAD SIGN WITH AN "XX" MILES (W16-3aP) PLAQUE AT ROUTE SEPARATION POINT IF AN ALTERNATE ROUTE IS AVAILABLE AND SIGNIFICANT DELAYS ARE EXPECTED.
3. USE PROJECT LIMIT SIGNING IN BOTH DIRECTIONS IF TRAFFIC CONTROL AFFECTS TRAFFIC IN BOTH DIRECTIONS.
4. FINES DOUBLE (RS2-6c) SIGN IS OPTIONAL.
5. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEABLY.
6. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION IS USED.
7. PLACE SIGNING ON RIGHT SHOULDER AND MEDIAN WHEN CONDITIONS PERMIT.
8. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE, AND SIGN SPACING CHART.
9. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
10. USE TRAFFIC BACKUP SIGNING WHEN VEHICLE QUEUES ARE EXPECTED OR OCCUR IN ADVANCE OF THE INSTALLED WORK ZONE ADVANCE WARNING SIGNS. PLACE TRAFFIC BACKUPS BE PREPARED TO STOP 1 MILE (WS4-3a) SIGNS TWO MILES IN ADVANCE OF THE WORK AREA. PLACE TRAFFIC BACKUPS BE PREPARED TO STOP "X" MILES (WS4-3b) SIGNS IN INCREMENTS OF ONE MILE WITH THE APPROPRIATE "X" MILES LEGEND TO STAY AHEAD OF ANTICIPATED QUEUE OF VEHICLES. PLACE ADDITIONAL ROAD WORK AHEAD SIGNS WITH A "XX" MILES (W16-3aP) PLAQUE IN ADVANCE OF FURTHERMOST UPSTREAM TRAFFIC BACKUP SIGNING.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

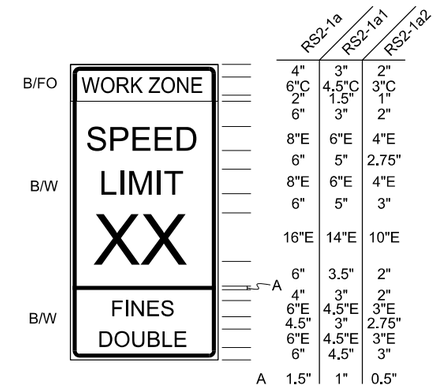
RECOMMENDED FOR APPROVAL
CHAIRMAN STANDARDS COMMITTEE
APPROVED
DEPUTY DIRECTOR

AUGUST 2020
DATE

STANDARD DRAWING TITLE
PROJECT LIMIT SIGNING

STD. DWG. NO.
TC 4C

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC04C.dgn
23-JUN-2020



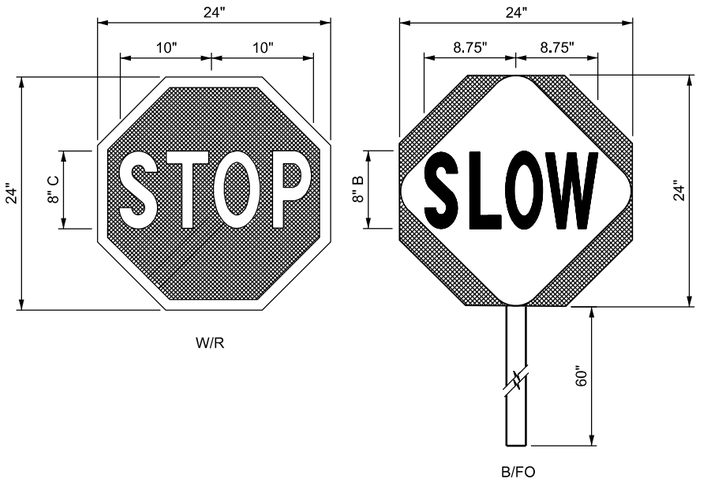
RS2-1a - 48 X 96 INCHES FREEWAY AND EXPRESSWAY
RS2-1a1 - 36 X 72 INCHES CONVENTIONAL MULTI LANE
RS2-1a2 - 24 X 48 INCHES CONVENTIONAL SINGLE LANE

RS2-1a SERIES WORK ZONE SPEED LIMIT SIGNS

96 X 48 INCHES

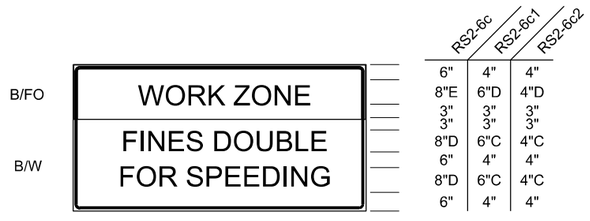
RS16-4b WORK ZONE FENDER BENDER SIGN

OPTIONAL, SEE NOTE 1



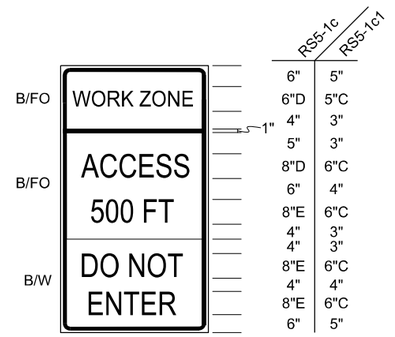
RS1-1 STOP SIGN **WS20-8a SLOW SIGN**

FLAGGER STOP - SLOW PADDLE



RS2-6c 96 X 48 INCHES OVERSIZED
RS2-6c1 60 X 36 INCHES 45 MPH AND GREATER
RS2-6c2 42 X 30 INCHES 40 MPH AND LESS

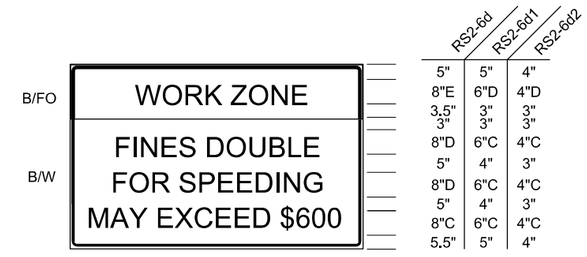
RS2-6c SERIES WORK ZONE FINES DOUBLE SIGNS



RS5-1c - 60 X 78 INCHES FREEWAY AND EXPRESSWAY
RS5-1c1 - 36 X 60 INCHES CONVENTIONAL

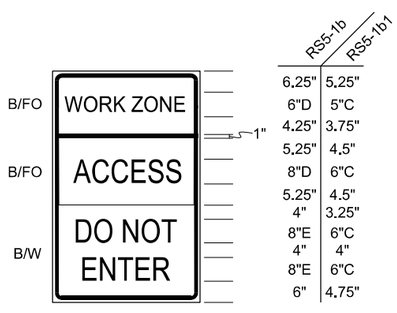
RS5-1c SERIES WORK ZONE ACCESS ADVANCE SIGNS

SEE NOTE 2



RS2-6d1 - 78 X 48 INCHES 45 MPH AND GREATER
RS2-6d2 - 54 X 36 INCHES 40 MPH AND LESS

RS2-6d SERIES WORK ZONE FINES DOUBLE SIGN WITH FINE NOTIFICATIONS



RS5-1b - 60 X 66 INCHES FREEWAY AND EXPRESSWAY
RS5-1b1 - 36 X 54 INCHES CONVENTIONAL

RS5-1b SERIES WORK ZONE ACCESS SIGNS

NOTES:

1. USE THE WORK ZONE FENDER BENDER SIGN TO REQUIRE MOTORISTS TO MOVE THEIR VEHICLE OUT OF THE TRAFFIC LANES AND TO THE NEXT EXIT IF THEY HAVE BEEN INVOLVED IN A CRASH.
2. RECOMMENDED DISTANCE TO ACCESS 500 FT FREEWAY AND EXPRESSWAY AND 250 FT CONVENTIONAL ROADS.
3. PLACE TWO FLUORESCENT ORANGE STRIPS OF RETROREFLECTIVE SHEETING, 4 x 24 INCHES, WITHIN 12 INCHES FROM THE RIGHT AND LEFT EDGES ON THE BACK OF SIGNS USED WITH PORTABLE SUPPORTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

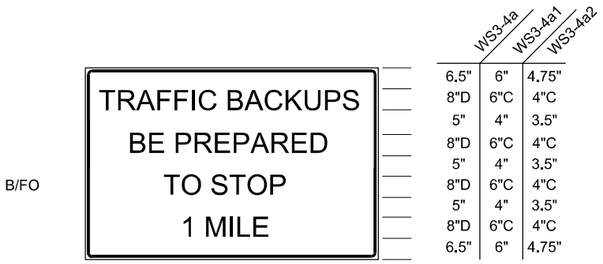
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE
RECOMMENDED FOR APPROVAL
AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED
DEPUTY DIRECTOR

WORK ZONE SPECIALTY SIGNS
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 4D1

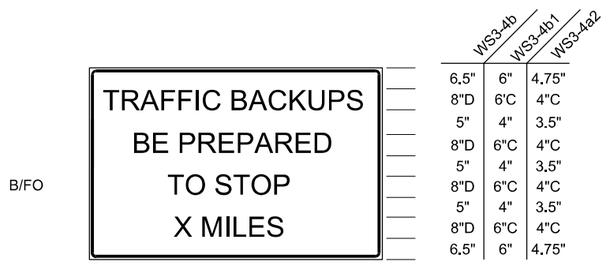
23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC04D1.dgn



WS3-4a	WS3-4a1	WS3-4a2
6.5"	6"	4.75"
8"D	6"C	4"C
5"	4"	3.5"
8"D	6"C	4"C
5"	4"	3.5"
8"D	6"C	4"C
5"	4"	3.5"
8"D	6"C	4"C
6.5"	6"	4.75"

WS3-4a - 114 X 60 INCHES FREEWAY AND EXPRESSWAY
WS3-4a1 - 72 X 48 INCHES CONVENTIONAL 45 MPH AND GREATER
WS3-4a2 - 54 X 36 INCHES CONVENTIONAL 45 MPH AND LESS

WS3-4a SERIES

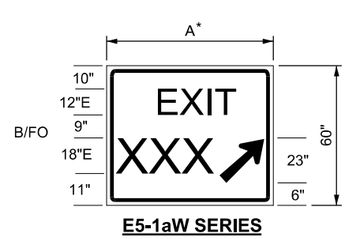


WS3-4b	WS3-4b1	WS3-4a2
6.5"	6"	4.75"
8"D	6'C	4"C
5"	4"	3.5"
8"D	6"C	4"C
5"	4"	3.5"
8"D	6"C	4"C
5"	4"	3.5"
8"D	6"C	4"C
6.5"	6"	4.75"

WS3-4b - 114 X 60 INCHES FREEWAY AND EXPRESSWAY
WS3-4b1 - 72 X 48 INCHES CONVENTIONAL 45 MPH AND GREATER
WS3-4b2 - 54 X 36 INCHES CONVENTIONAL 45 MPH AND LESS

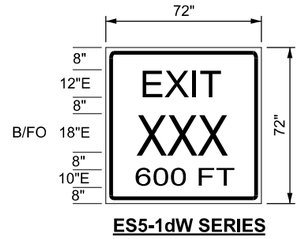
WS3-4b SERIES

WS3-4 SERIES TRAFFIC BACKUP SIGNS



E5-1aW SERIES

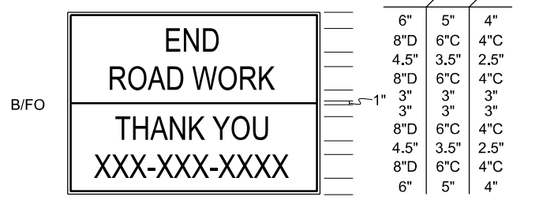
* SEE TABLE 1 FOR WIDTH



ES5-1dW SERIES

ES5-1W SERIES WORK ZONE EXIT SIGNS

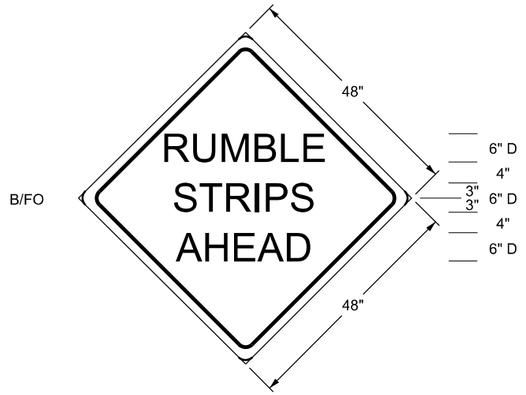
XXX EXIT NUMBER



GS20-2a2	GS20-2a	GS20-2a1
6"	5"	4"
8"D	6"C	4"C
4.5"	3.5"	2.5"
8"D	6"C	4"C
3"	3"	3"
3"	3"	3"
8"D	6"C	4"C
4.5"	3.5"	2.5"
8"D	6"C	4"C
6"	5"	4"

GS20-2a2 - 84 X 60 INCHES OVERSIZED
GS20-2a - 60 X 48 INCHES FREEWAY AND EXPRESSWAY
GS20-2a1 - 42 X 36 INCHES CONVENTIONAL
XXX CONTRACTOR'S PHONE NUMBER
NO INTERNET OR EMAIL ADDRESSES

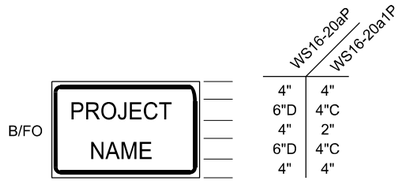
GS20-2a SERIES END ROAD WORK INFORMATION SIGNS



WS28-1 RUMBLE STRIPS AHEAD SIGN

SIGN WIDTH		
	NUMBER OF DIGITS	A
ES5-1aW1	X	78 INCHES
ES5-1aW2	XX	78 INCHES
ES5-1aW3	XXX	96 INCHES

ES5-1aW SERIES WORK ZONE EXIT GORE SIGNS TABLE 1

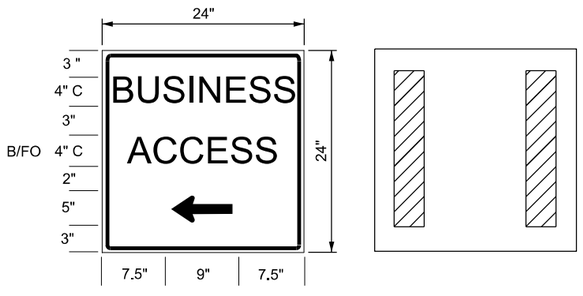


WS16-20aP	WS16-20a1P
4"	4"
6"D	4"C
4"	2"
6"D	4"C
4"	4"

WS16-20aP - 60 X 24 INCHES FREEWAY AND EXPRESSWAY
WS16-20a1P - 36 X 18 INCHES CONVENTIONAL

WS16-20aP SERIES WORK ZONE ACCESS PROJECT IDENTIFIER PLAQUES

SEE NOTE 1



FRONT

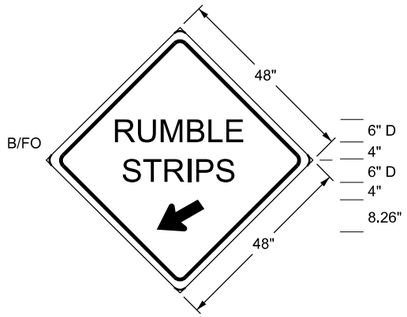
USE BLACK LEGEND ON FLUORESCENT ORANGE RETROREFLECTIVE SHEETING.

BACK

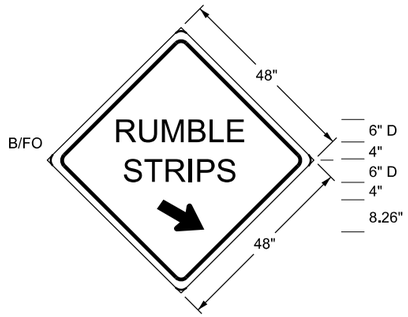
PLACE TWO 4 X 18 INCHES FLUORESCENT ORANGE RETROREFLECTIVE STRIPS VERTICALLY ON THE SIGN BACK.

GS20-5 SERIES BUSINESS ACCESS SIGNS

LEFT ARROW SHOWN



RUMBLE STRIPS (WS28-2L) SIGN



RUMBLE STRIPS (WS28-2R) SIGN

NOTES:

1. USE PROJECT IDENTIFIER ONLY. DO NOT INCLUDE PROMOTIONAL OR OTHER INFORMATIONAL IDENTIFICATIONS OF PUBIC OFFICIALS, CONTRACTORS, ORGANIZATIONAL AFFILIATIONS, RELATED LOGOS AND SYMBOLS.
2. PLACE TWO FLUORESCENT ORANGE STRIPS OF RETROREFLECTIVE SHEETING, 4 x 24 INCHES, WITHIN 12 INCHES FROM THE RIGHT AND LEFT EDGES ON THE BACK OF SIGNS USED WITH PORTABLE SUPPORTS.

NO.	DATE	APPR.	REVISIONS
1	6/28/18	RT	REPLACED WS28-2 AND W16-7 ASSEMBLY WITH NEW WS28-2 SIGN.

REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

WORK ZONE SPECIALTY SIGNS
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 4D2

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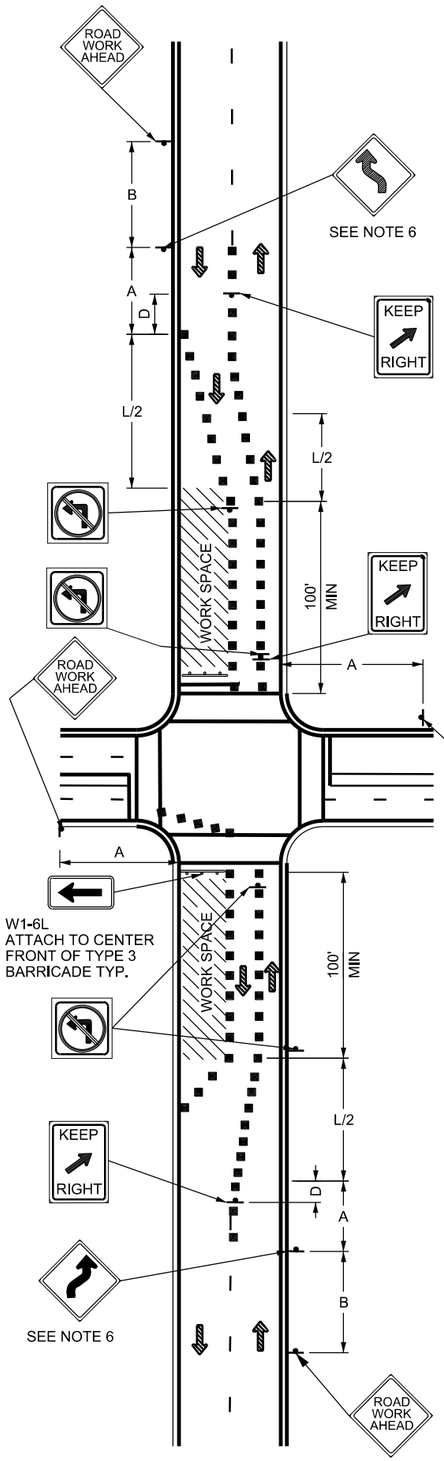
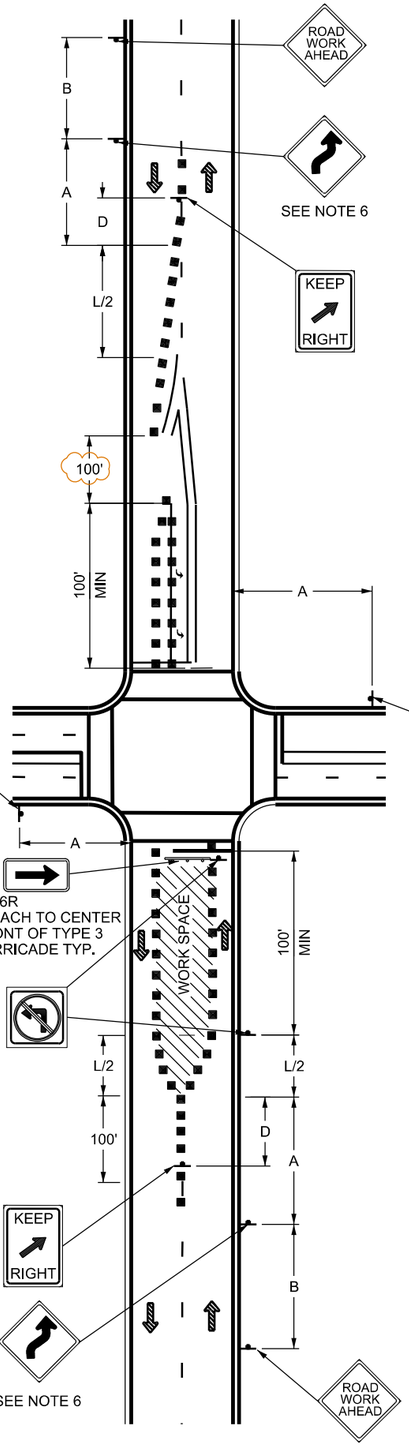
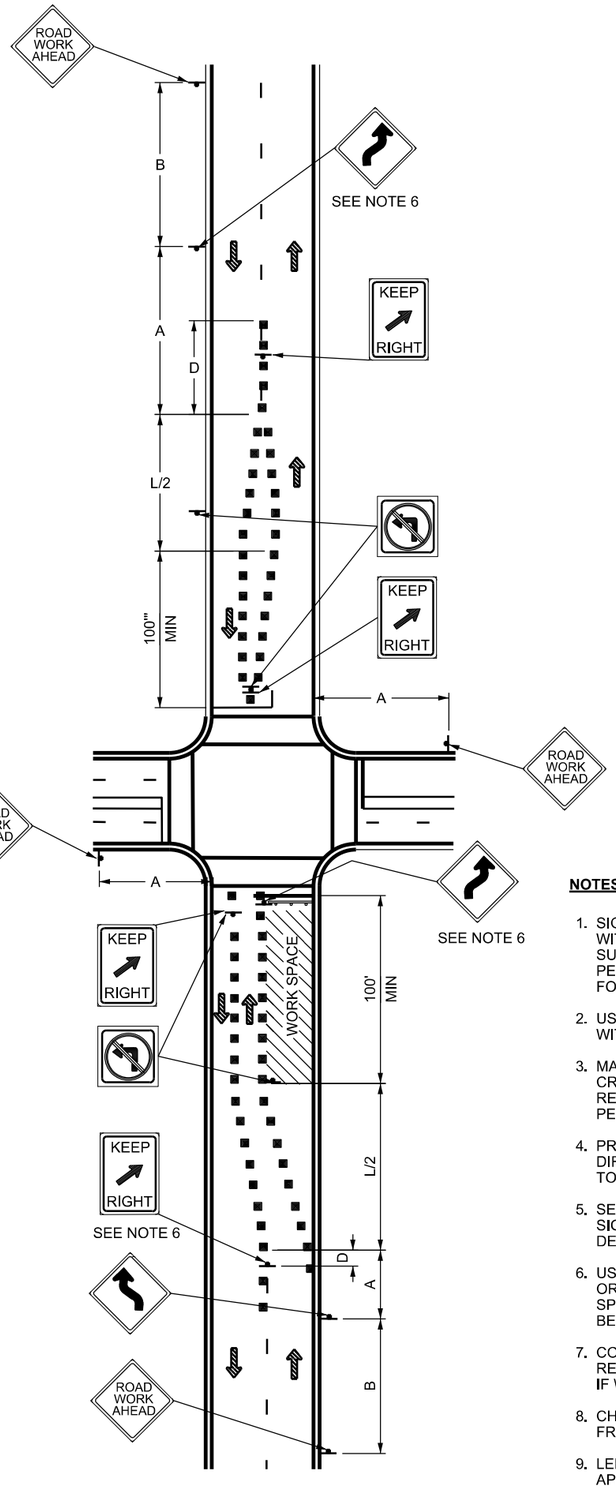
23-JUN-2020



(DETAIL TC 5-1)



(DETAIL TC 5-2)



(DETAIL TC 5-3)

NOTES:

1. SIGNING AND DEVICES SHOWN FOR 2 LANE ROADWAY WITH NO REDUCTION IN NUMBER OF LANES. SUBSTITUTE ADVANCE SIGNING AND DEVICES AS PER TYPICAL LANE CLOSURE. SEE STD DWG TC 8 FOR LANE REDUCTION ON 4 LANES OR GREATER.
2. USE OF FLAGGING OPERATION IS OPTIONAL WITH LANE CLOSURE.
3. MAINTAIN PEDESTRIAN TRAFFIC AT EXISTING CROSSWALKS AND ON EXISTING SIDEWALKS. REROUTE ACCORDING TO STD DWG TC 6 WHEN PEDESTRIAN TRAFFIC CANNOT BE MAINTAINED.
4. PROVIDE A MINIMUM 10 FT TRAFFIC LANE IN EACH DIRECTION. USE A FLAGGING OPERATION ACCORDING TO STD DWG TC 14 IF THIS CANNOT BE DONE.
5. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
6. USE APPROPRIATE SIGN SERIES (W1-3, W1-4, OR W24-1 SERIES) BASED UPON THE UPSTREAM SPEED LIMIT AND THE TANGENT DISTANCE BETWEEN CURVES.
7. CONTACT REGION TRAFFIC ENGINEER FOR REQUIREMENTS FOR DETERMINING SIGNAL NEEDS IF WORKING IN A SIGNALIZED INTERSECTION.
8. CHANGES TO SIGNAL PHASING REQUIRE APPROVAL FROM THE ENGINEER.
9. LEFT OR RIGHT TURNS MAY BE PROHIBITED WHEN APPROVED BY THE ENGINEER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

TRAFFIC CONTROL URBAN INTERSECTION WITH ROADWAYS UNDER 50MPH

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 5

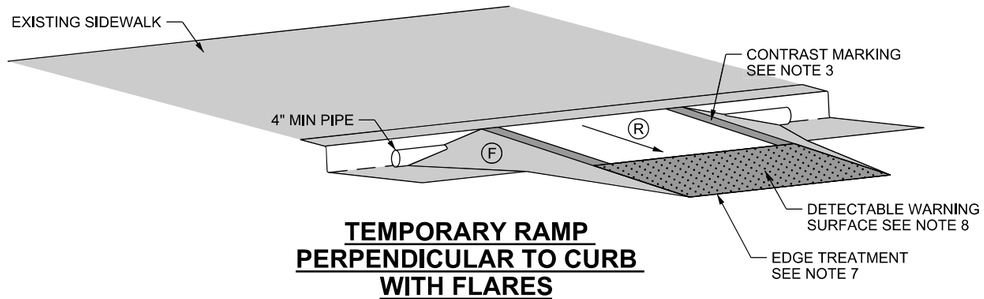
DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC05.dgn
23-JUN-2020

DIMENSION REFERENCE TABLE				
	ITEM	MAX. RUNNING SLOPE	MAX. CROSS SLOPE	MIN. DIMENSIONS
(T1)	UNCONSTRAINED TURNING SPACE (iii)	2.0%	2.0% (ii)	4 FT X 4 FT
(T2)	CONSTRAINED TURNING SPACE (iii)	2.0%	2.0% (ii)	4 FT X 5 FT IN DIRECTION OF TRAVEL
(R)	RAMP	8.3% (i)	2.0% (ii)	4 FT WIDE
(F)	FLARE	-	25.0%	-

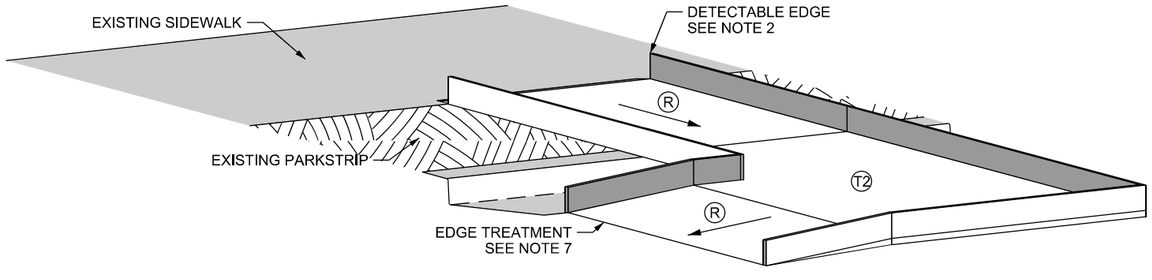
(i) STEEPEN RAMP GRADE TO MATCH EXISTING SIDEWALK WITHIN AT LEAST 15 FT OR THE NEXT NEAREST JOINT IF THE MAX RUNNING SLOPE CAN NOT BE MET IN 15 FT.

(ii) MID BLOCK CROSSINGS CAN MATCH THE STREET GRADE.

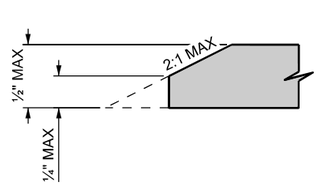
(iii) TURNING SPACE IS CONSTRAINED WHEN BACK OF WALKWAY HAS A VERTICAL EDGE GREATER THAN 3 INCH.



TEMPORARY RAMP PERPENDICULAR TO CURB WITH FLARES

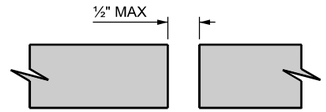


TEMPORARY RAMP PARALLEL TO CURB



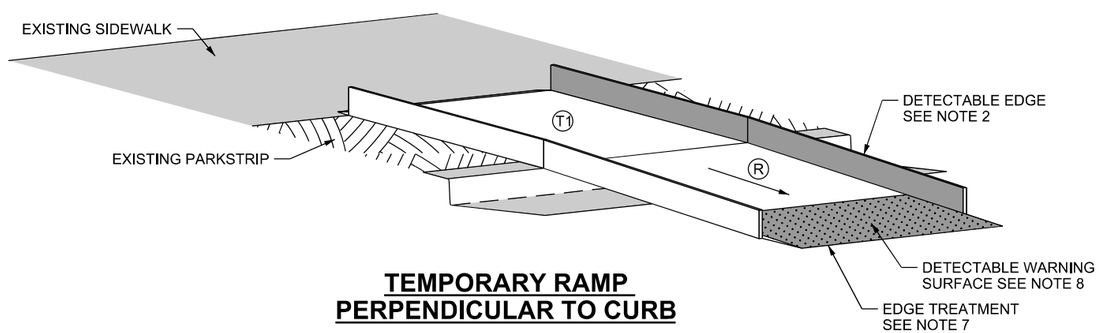
VERTICAL DISCONTINUITIES DETAIL TC 6-1

SEE NOTE 6



LATERAL DISCONTINUITIES DETAIL TC 6-2

SEE NOTE 5



TEMPORARY RAMP PERPENDICULAR TO CURB

GENERAL NOTES:

1. CONSTRUCT CURB RAMPS AND TEMPORARY WALKWAYS OF A FIRM, STABLE, AND SLIP RESISTANT SURFACE MATERIAL THAT IS CAPABLE OF SUPPORTING THE WEIGHT OF MOBILITY DEVICES AND PEDESTRIANS IN WHEELCHAIRS WITHOUT BUCKLING OR WARPING.
2. INSTALL DETECTABLE EDGE WITH 6 INCH MINIMUM HEIGHT ON TEMPORARY RAMPS AND TURNING SPACES THAT DO NOT HAVE FLARES. MARK THE DETECTABLE EDGE WITH A CONTRASTING COLOR.
3. MARK THE TEMPORARY RAMP WALKWAY EDGE WITH A CONTRASTING COLOR, 4 INCH WIDE MARKING TO BE INCLUDED IN THE WIDTH OF THE RAMP. THE MARKING IS OPTIONAL WHERE COLOR CONTRASTING DETECTABLE EDGE IS USED.
4. DO NOT BLOCK THE FLOW OF WATER IN THE GUTTER SYSTEM.
5. LIMIT WIDTH OF LATERAL JOINTS AND GAPS BETWEEN SURFACES TO ½ INCH. SEE DETAIL TC 6-2.
6. PREVENT OR CORRECT VERTICAL DISCONTINUITIES GREATER THAN ½ INCH ON TEMPORARY RAMP AND WALKWAY SURFACE. SEE DETAIL TC 6-1.
7. A THRESHOLD MEETING THE REQUIREMENTS OF A RAMP AS SHOWN IN THE DIMENSION REFERENCE TABLE CAN BE INSTALLED WHEN VERTICAL DISCONTINUITY IS GREATER THAN ½ INCH ANYWHERE IN TEMPORARY ACCESS ROUTE.
8. PROVIDE DETECTABLE WARNING SURFACE WHEN TEMPORARY RAMP CONNECTS TO A CROSSWALK. SEE STD DWG PA 2 FOR DETECTABLE WARNING SURFACE REQUIREMENTS.
9. INSTALL HANDRAILS ON BOTH SIDES OF THE TEMPORARY RAMP WHEN RAMP SURFACE IS GREATER THAN 12 INCH ABOVE SURROUNDING SURFACE. SEE STD DWG TC 6B.

REVISIONS

NO.	DATE	APPR.	REMARKS
	10/31/19	JW	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - RAMP DETAILS

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 6A

DGN File:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC06A.dgn
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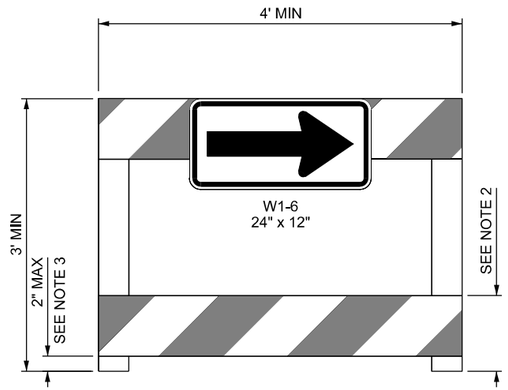
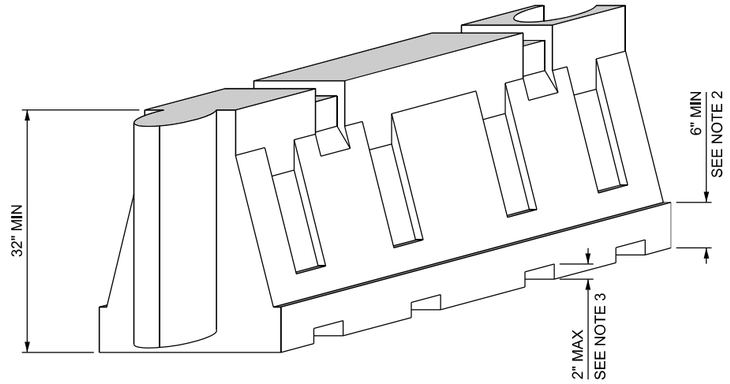


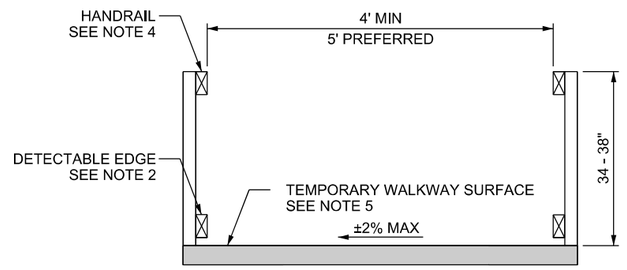
SIDEWALK TYPE 2 BARRICADE

SEE NOTE 13

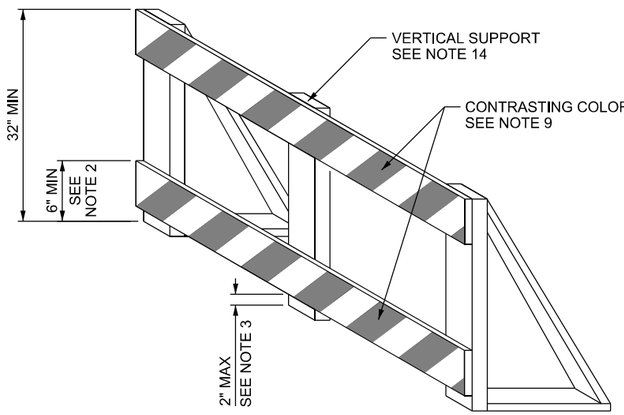


TEMPORARY PORTABLE BARRIER CHANNELIZING DEVICE

SEE NOTE 7



TEMPORARY WALKWAY SECTION



LONGITUDINAL PEDESTRIAN CHANNELIZER

SEE NOTES 4, 7, 12, 13

NOTES:

1. ALL TRIPPING HAZARDS IN THE WALKWAY NEED A DETECTABLE EDGE. LOCATE BALLAST BEHIND OR INTERNAL TO THE DEVICE. LOCATE DEVICE SUPPORT LEGS BEHIND THE DETECTABLE EDGE.
2. DETECTABLE EDGES USED AROUND BARRICADES, AND PEDESTRIAN CHANNELIZERS AND PORTABLE SIGNS, MUST BE CONTINUOUS, HAVE A HEIGHT ABOVE WALKWAY SURFACE OF AT LEAST 6 INCH, AND HAVE COLOR MARKINGS CONTRASTING WITH THE WALKWAY SURFACE.
3. MAINTAIN DRAINAGE OFF THE WALKWAY. A MAXIMUM GAP HEIGHT FROM THE WALKWAY SURFACE OF 2 INCH IS ALLOWED FOR DRAINAGE PURPOSES.
4. THE TOP SURFACE MUST MEET THE FOLLOWING WHEN HAND GUIDANCE IS REQUIRED:
   A. BE IN A VERTICAL PLANE PERPENDICULAR TO THE WALKWAY ABOVE THE DETECTABLE EDGE,
   B. BE SUPPORTED WITH MINIMAL INTERFERENCE TO THE PEDESTRIAN'S HANDS, AND
   C. BE SMOOTH AND FREE OF SHARP AND ROUGH EDGES TO PREVENT HARM TO HANDS, ARMS OR CLOTHING OF PEDESTRIANS.
5. PROVIDE A FIRM, STABLE, FREE-DRAINING AND NON-SLIP TEMPORARY WALKWAY SURFACE THAT ALLOWS NORMAL USAGE OF WHEELCHAIRS, WALKERS, STROLLERS, AND OTHER MOBILITY DEVICES.
   A. CONCRETE, HMA, STEEL, RUBBER, WOOD (¾ INCH OR THICKER), AND PLASTIC ARE ACCEPTABLE SURFACE MATERIALS.
   B. GRAVEL, UNTREATED BASE COURSE, AND OTHER UNEVEN SURFACES ARE NOT ACCEPTABLE SURFACE MATERIALS.
6. KEEP PORTABLE SIGNS AND BASES OUT OF THE PEDESTRIAN WALKWAY SURFACE. SIGNS PLACED ON WIDE SIDEWALKS MUST NOT REDUCE SIDEWALK WIDTH TO LESS THAN 4 FT.
7. CONNECT DEVICES USED TO CHANNELIZE PEDESTRIANS SUCH THAT GAPS DO NOT ALLOW PEDESTRIANS TO STRAY FROM THE CHANNELIZED PATH.
8. PLACE SIDEWALK TYPE 2 BARRICADE ACROSS AT LEAST TWO-THIRDS OF THE WIDTH OF THE CLOSED WALKWAY SURFACE.
9. APPLY CONTRASTING COLOR TO PEDESTRIAN CHANNELIZING DEVICES WHEN USED TO CHANGE DIRECTION OF DETECTABLE ROUTE. CONTRASTING COLOR IS OPTIONAL WHEN USED PARALLEL TO DETECTABLE ROUTE.
10. CONTRASTING COLORS INCLUDE YELLOW, ORANGE, AND ORANGE/WHITE RETROREFLECTIVE STRIPES.
11. PREVENT OR CORRECT VERTICAL DISCONTINUITIES GREATER THAN ½ INCH ON TEMPORARY RAMP AND WALKWAY SURFACE.
12. DEVICES USED IN ROADWAY MUST BE MASH COMPLIANT.
13. SEE STD DWG TC 2B NOTE 6 FOR BALLAST PLACEMENT.
14. PLACE VERTICAL SUPPORTS TO ENSURE STABILITY OF CHANNELIZATION DEVICE.

REVISIONS

NO.	DATE	APPR.	REMARKS
	10/31/19	JW	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE

CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE

DEPUTY DIRECTOR

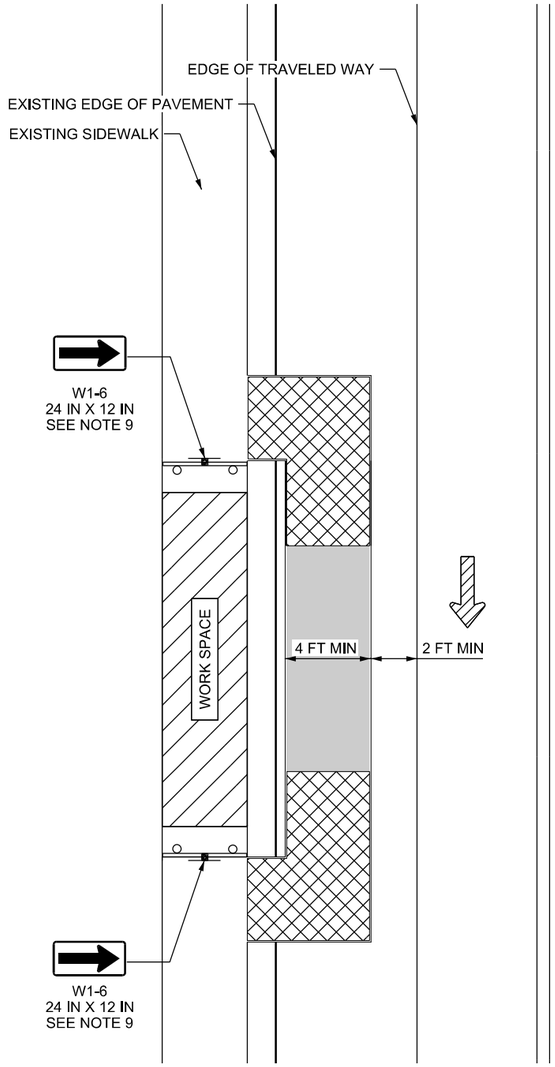
TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - WALKWAY AND DEVICE DETAILS

STANDARD DRAWING TITLE

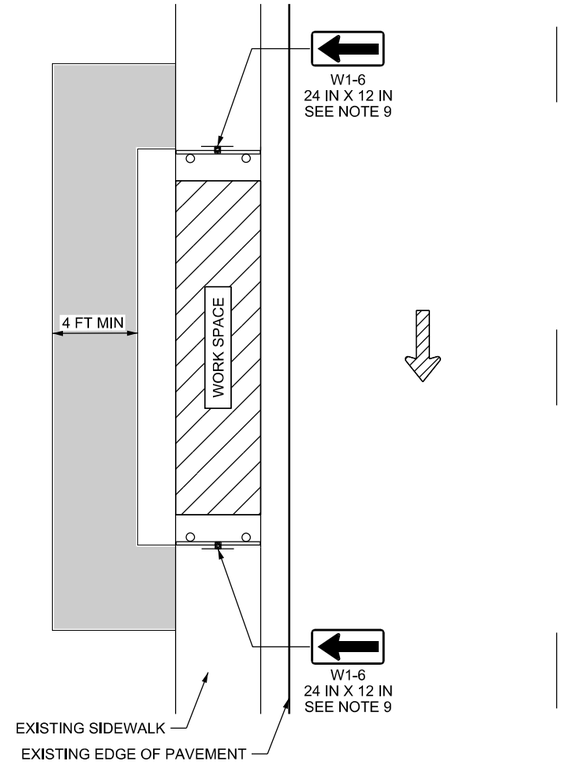
STD. DWG. NO.

TC 6B

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC06B.dgn
23-JUN-2020



SIDEWALK DIVERSION WITHIN ROADWAY



SIDEWALK DIVERSION OUT OF ROADWAY

TEMPORARY PEDESTRIAN ACCESS ROUTE DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- PEDESTRIAN CHANNELIZATION DEVICE
- DIRECTION OF TRAFFIC
- SIDEWALK TYPE 2 BARRICADE
- TEMPORARY RAMP
- TEMPORARY WALKWAY

NOTES:

1. PHASE WORK AS NECESSARY TO PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) AT ALL TIMES.
2. ONLY THE TPAR DEVICES ARE SHOWN. USE WORK SPACE SIGNING OR SHOULDER WORK SPACE SIGNING AS NEEDED.
3. MAINTAIN A TPAR THAT IS CONSISTENT WITH THE LEVEL OF ACCESSIBILITY PRESENT BEFORE CONSTRUCTION.
4. USE CONTINUOUS DETECTABLE EDGES ON ALL PEDESTRIAN CHANNELIZATION DEVICES.
5. PROVIDE A TEMPORARY WALKWAY, SEE STD DWG TC 6B NOTE 5, WITH A MINIMUM WIDTH OF 4 FT AROUND THE WORK SPACE IF SIDEWALK IS CLOSED TO PEDESTRIANS.
6. SEE STD DWG TC 8 FOR LANE CLOSURE AND LANE SHIFT DETAILS.
7. PROVIDE A 5 FT X 5 FT PASSING SPACE EVERY 200 FT WHEN TPAR IS LESS THAN 5 FT WIDE.
8. COVER TPAR WHEN THE POTENTIAL FOR FALLING MATERIAL EXISTS.
9. MOUNT SIGNS ON FRONT OF SIDEWALK TYPE 2 BARRICADE, PEDESTRIAN CHANNELIZER, OR ACCORDING TO STD DWG SN 2A.
10. PLACE TEMPORARY TRAFFIC CONTROL DEVICES SUCH THAT LINE OF SIGHT BETWEEN VEHICLE TRAFFIC AND PEDESTRIAN TRAFFIC IS NOT HINDERED.
11. USE AN OUTSIDE CORNER RADIUS OF AT LEAST 20 FT TO DEVELOP A TEMPORARY WALKWAY AROUND A CORNER ON THE ROADWAY.
12. PROTECT BLUNT ENDS WITHIN THE MAXIMUM CLEAR ZONE. CONSIDER ALL DIRECTIONS OF TRAVEL.
13. USE A SIDEWALK DIVERSION OUT OF ROADWAY WHEN RIGHT-OF-WAY IS AVAILABLE BEHIND THE BACK OF SIDEWALK. A SIDEWALK DIVERSION MAY ALSO BE PLACED IN THE PARK STRIP WHEN IT IS WIDE ENOUGH TO ACCOMMODATE THE TEMPORARY WALKWAY.

REVISIONS

NO.	DATE	APPR.	REMARKS
	10/31/19	JW	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 — DATE
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CHAIRMAN STANDARDS COMMITTEE
APPROVED
AUGUST 2020 — DATE
DEPUTY DIRECTOR

TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - DIVERSION
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 6C

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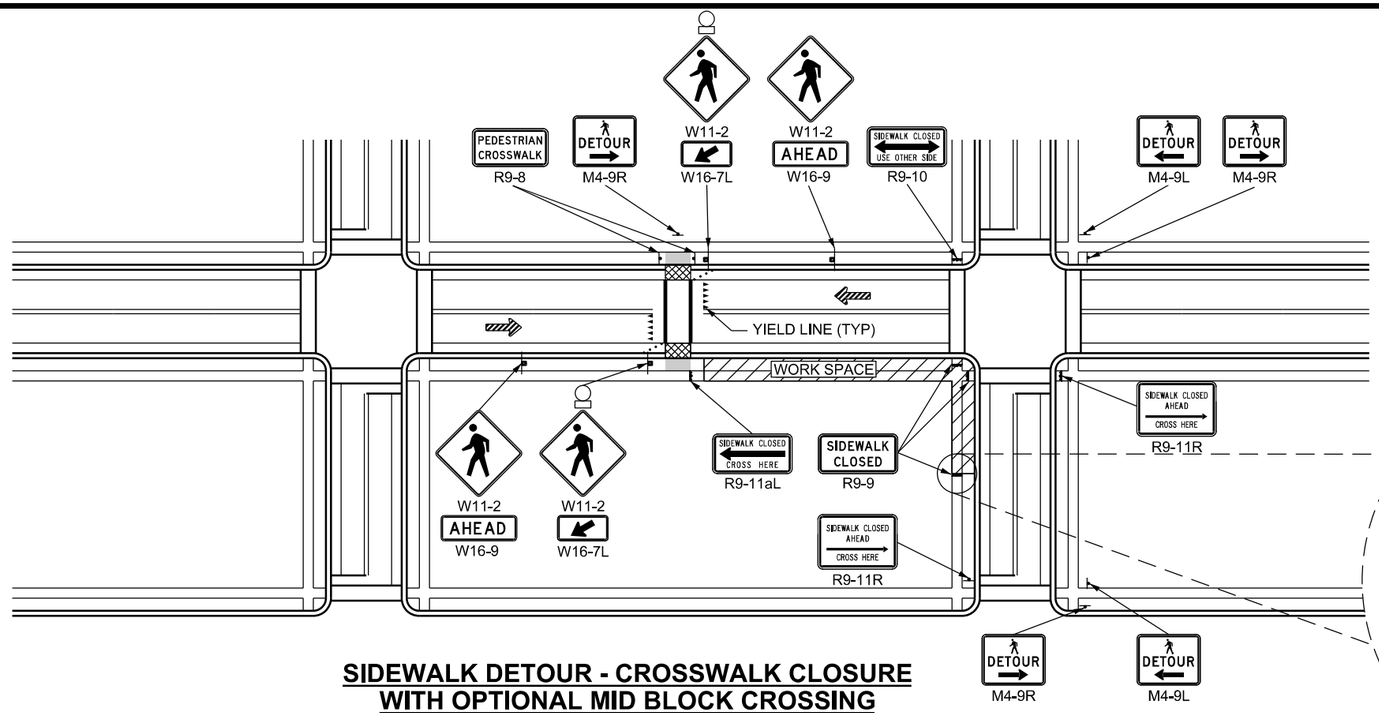
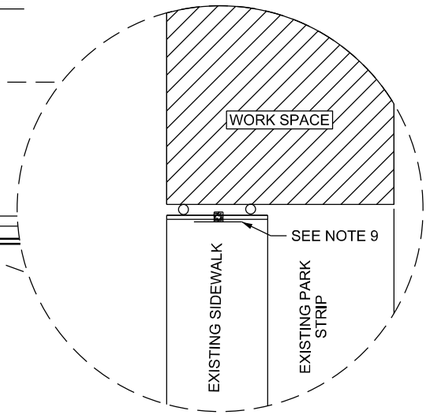


SIDEWALK DETOUR - CROSSWALK CLOSURE WITH OPTIONAL MID BLOCK CROSSING

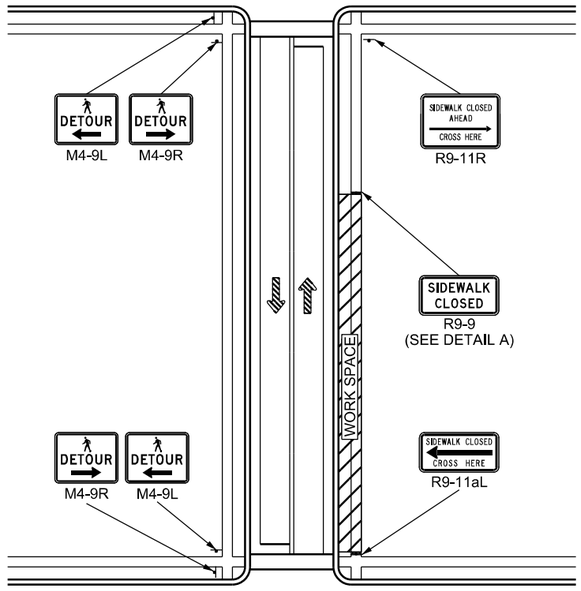
SEE NOTE 5

TEMPORARY PEDESTRIAN ACCESS ROUTE DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- DIRECTION OF TRAFFIC
- SIDEWALK TYPE 2 BARRICADE
- TEMPORARY RAMP
- TEMPORARY WALKWAY
- CHANNELIZING DEVICES
- TYPE B WARNING LIGHT



DETAIL A



SIDEWALK DETOUR - MID BLOCK CLOSURE

NOTES:

1. PHASE WORK AS NECESSARY TO PROVIDE A TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) AT ALL TIMES.
2. ONLY THE TPAR DEVICES ARE SHOWN. USE WORK SPACE SIGNING OR SHOULDER WORK SPACE SIGNING AS NEEDED.
3. MAINTAIN A PEDESTRIAN FACILITY DETECTABLE BY LONG CANE USER ALONG THE TPAR WHEN THE WORK SPACE AFFECTS EXISTING PEDESTRIAN FACILITIES. TPAR MUST PROVIDE THE LEVEL OF ACCESSIBILITY PRESENT BEFORE CONSTRUCTION.
4. USE CONTINUOUS DETECTABLE EDGES ON ALL PEDESTRIAN CHANNELIZATION DEVICES.
5. TEMPORARY MID BLOCK CROSSING MAY BE USED IF IT IS MORE THAN 600 FEET FROM SIGNALIZED CROSSING, WILL BE IN PLACE FOR LONGER THAN 14 DAYS, AND THE ROADWAY SPEED LIMIT DOES NOT EXCEED 40 MPH.
6. LOCATE TEMPORARY YIELD LINES 20 TO 50 FT IN ADVANCE OF THE TEMPORARY CROSSWALK ON UNCONTROLLED MULTI-LANE APPROACHES AND AT 5 FT FOR SINGLE LANE APPROACH. PROHIBIT STREET PARKING FOR AT LEAST 50 FT IN ADVANCE OF THE TEMPORARY CROSSWALK. USE R1-5 SERIES SIGNS ON UNCONTROLLED MULTI-LANE APPROACH. USE 10 FT MOUNTING HEIGHT OF CROSSWALK ASSEMBLY TO BOTTOM OF W16-7P TO PREVENT VISUAL BLOCKING FROM R1-5 SIGN.
7. USE TEMPORARY PAVEMENT MARKING FOR TEMPORARY CROSSWALK LINES AND YIELD LINES.
8. COVER OR DEACTIVATE PEDESTRIAN TRAFFIC SIGNAL DISPLAY CONTROLLING CLOSED CROSSWALK.
9. MOUNT SIGNS ON FRONT OF SIDEWALK TYPE 2 BARRICADE, PEDESTRIAN CHANNELIZER, OR ACCORDING TO STD DWG SN 2A.
10. PLACE TEMPORARY TRAFFIC CONTROL DEVICES SUCH THAT LINE OF SIGHT BETWEEN VEHICLE TRAFFIC AND PEDESTRIAN TRAFFIC IS NOT OBSTRUCTED.
11. CONSULT THE ENGINEER WHEN SCHOOL ROUTING PLANS ARE AFFECTED.
12. PLACE CHANNELIZATION DEVICES ON A TAPER UPSTREAM OF TEMPORARY RAMPS THAT EXTEND INTO THE SHOULDER TO DIRECT VEHICLES AND BICYCLISTS AWAY FROM THE TEMPORARY RAMP.

REVISIONS

NO.	DATE	APPR.	REMARKS
	10/31/19	JW	NEW DRAWING.

UTAH DEPARTMENT OF TRANSPORTATION
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SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE	
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DEPUTY DIRECTOR	

TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) - DETOUR

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 6D

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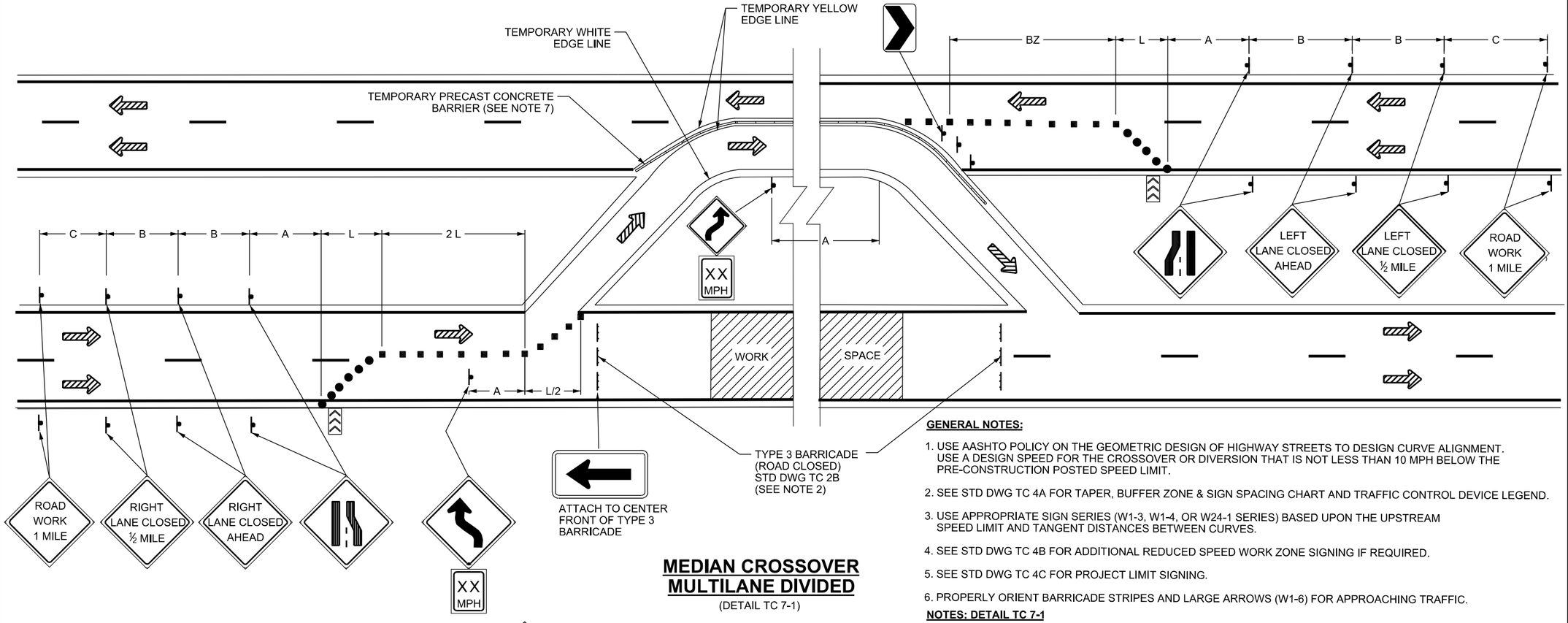
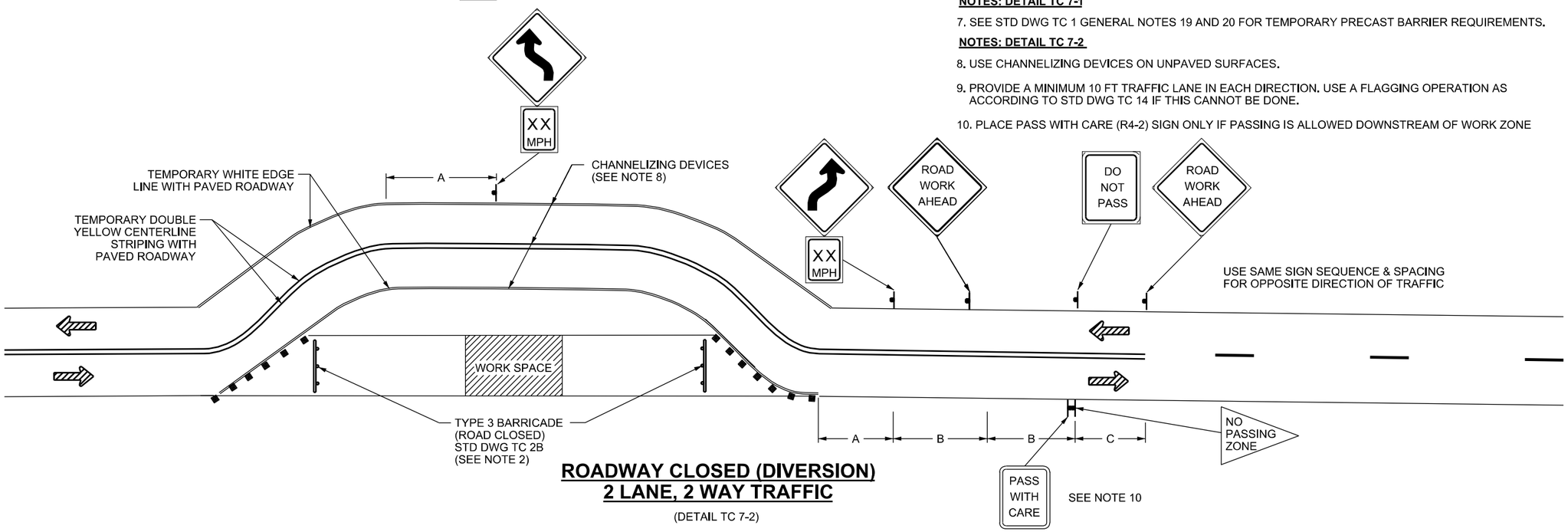
23-JUN-2020



MEDIAN CROSSOVER MULTILANE DIVIDED

(DETAIL TC 7-1)



ROADWAY CLOSED (DIVERSION) 2 LANE, 2 WAY TRAFFIC

(DETAIL TC 7-2)

GENERAL NOTES:

1. USE AASHTO POLICY ON THE GEOMETRIC DESIGN OF HIGHWAY STREETS TO DESIGN CURVE ALIGNMENT. USE A DESIGN SPEED FOR THE CROSSOVER OR DIVERSION THAT IS NOT LESS THAN 10 MPH BELOW THE PRE-CONSTRUCTION POSTED SPEED LIMIT.
2. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
3. USE APPROPRIATE SIGN SERIES (W1-3, W1-4, OR W24-1 SERIES) BASED UPON THE UPSTREAM SPEED LIMIT AND TANGENT DISTANCES BETWEEN CURVES.
4. SEE STD DWG TC 4B FOR ADDITIONAL REDUCED SPEED WORK ZONE SIGNING IF REQUIRED.
5. SEE STD DWG TC 4C FOR PROJECT LIMIT SIGNING.
6. PROPERLY ORIENT BARRICADE STRIPES AND LARGE ARROWS (W1-6) FOR APPROACHING TRAFFIC.

NOTES: DETAIL TC 7-1

7. SEE STD DWG TC 1 GENERAL NOTES 19 AND 20 FOR TEMPORARY PRECAST BARRIER REQUIREMENTS.

NOTES: DETAIL TC 7-2

8. USE CHANNELIZING DEVICES ON UNPAVED SURFACES.
9. PROVIDE A MINIMUM 10 FT TRAFFIC LANE IN EACH DIRECTION. USE A FLAGGING OPERATION AS ACCORDING TO STD DWG TC 14 IF THIS CANNOT BE DONE.
10. PLACE PASS WITH CARE (R4-2) SIGN ONLY IF PASSING IS ALLOWED DOWNSTREAM OF WORK ZONE

NO.	DATE	APPR.	REVISIONS	REMARKS
1	6/28/18	RT	UPDATED NOTE 7.	

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
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MEDIAN CROSSOVER AND 2-LANE, 2-WAY DIVERSION

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 7

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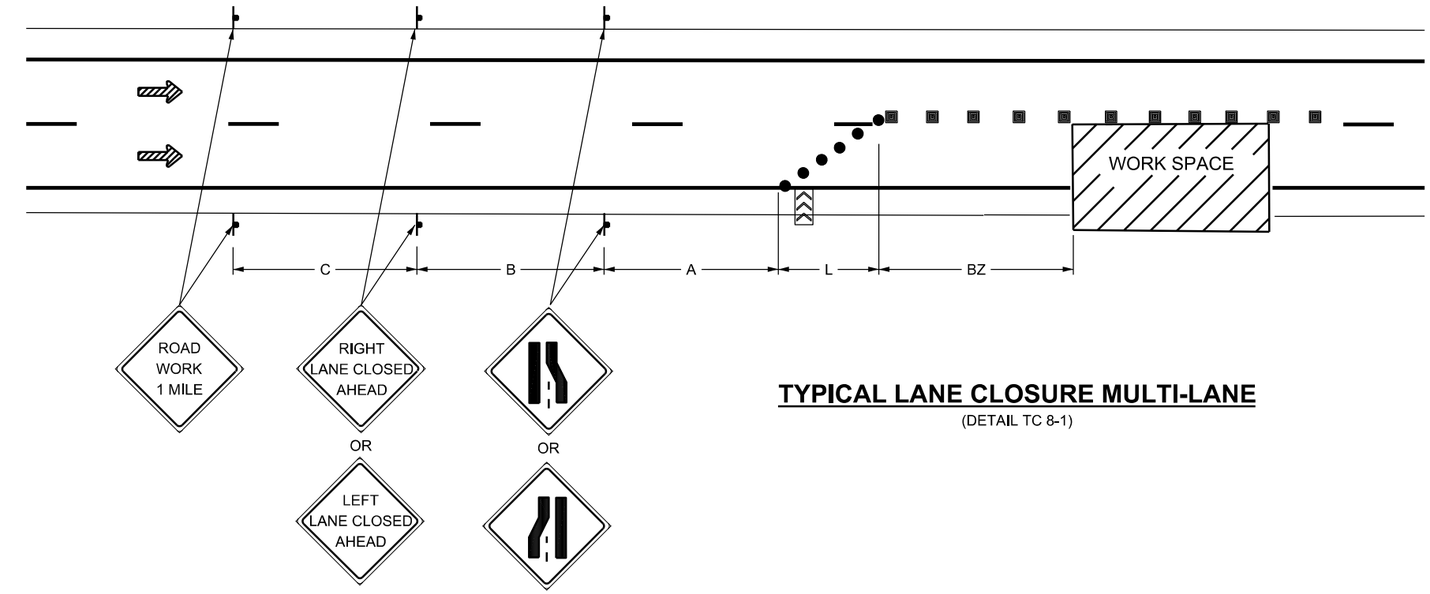
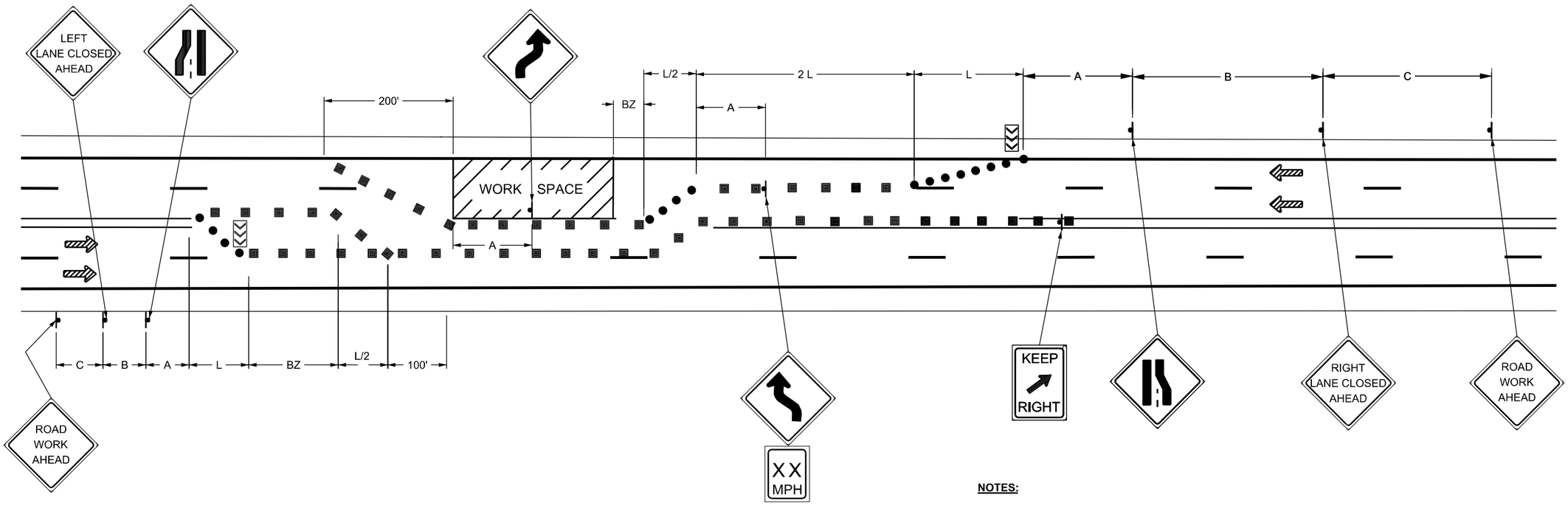
23-JUN-2020



TYPICAL LANE CLOSURE MULTI-LANE

(DETAIL TC 8-1)



HALF OF ROADWAY CLOSED MULTI-LANE UNDIVIDED

(DETAIL TC 8-2)

NOTES:

1. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
2. USE APPROPRIATE SIGN SERIES (W1-3, W1-4, OR W24-1 SERIES) BASED UPON THE UPSTREAM SPEED LIMIT AND TANGENT DISTANCES BETWEEN CURVES.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE

APPROVED — AUGUST 2020 — DATE

DEPUTY DIRECTOR

TRAFFIC CONTROL LANE CLOSURE

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 8

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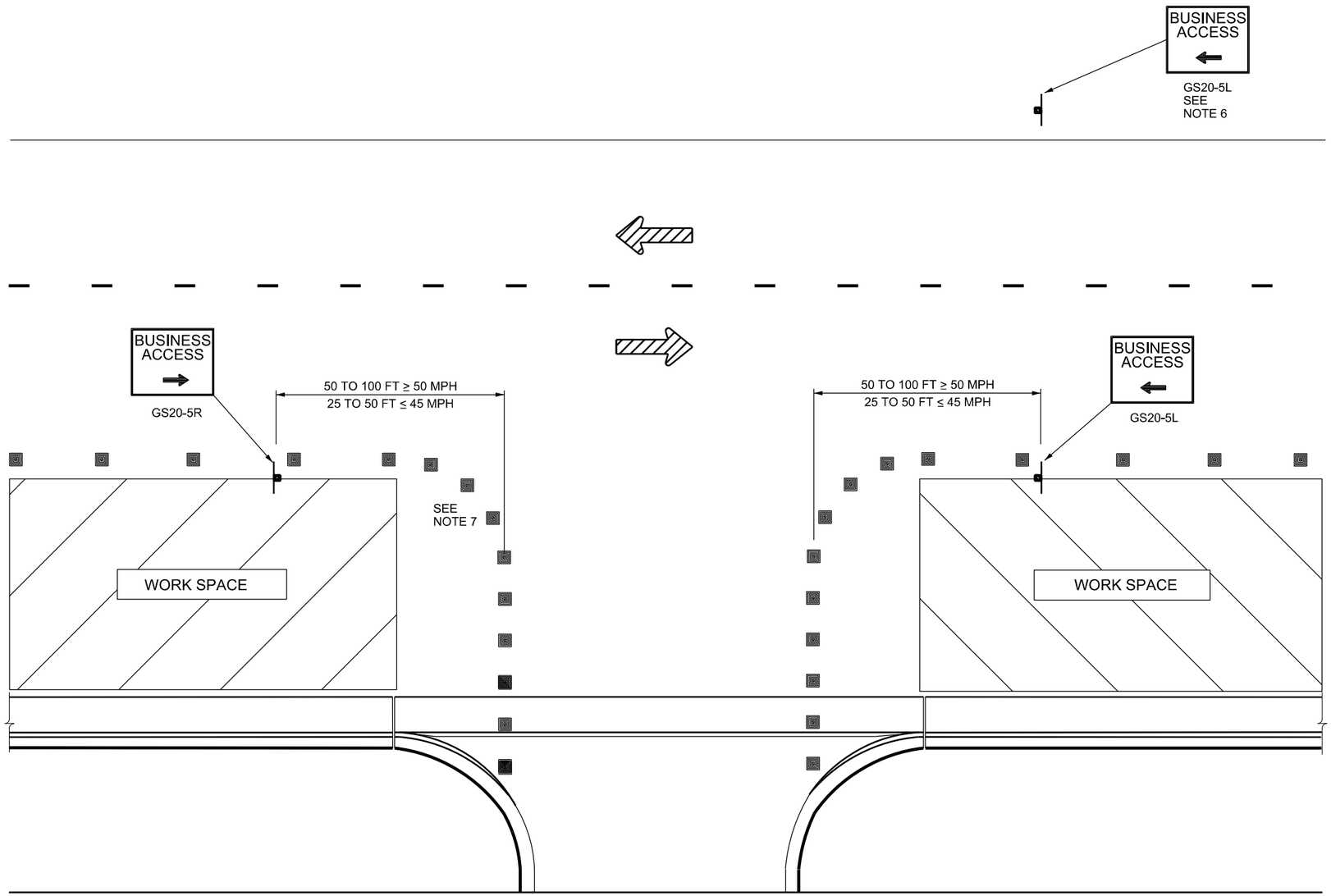

TYPICAL BUSINESS ACCESS PLAN

EXAMPLE ONLY - NOT TO SCALE
SETUP TO BE SITE SPECIFIC

NOTES:

1. USE TO DEFINE BUSINESS ACCESS WITHIN WORK ZONES.
2. USE 5 FT MINIMUM MOUNTING HEIGHT.
3. USE JOINT ACCESS WHERE PRACTICAL.
4. CONSIDER USING DIFFERENT CHANNELIZING DEVICES TO HIGHLIGHT ACCESS (USE VERTICAL PANELS ALONG ROADWAY AND BARRELS WITHIN ACCESS LIMITS, FOR EXAMPLE).
5. REFER TO STD DWG TC 4A FOR TRAFFIC CONTROL DEVICE LEGEND.
6. CONSIDER USE OF RIGHT SIDE GS20-5 SIGN WHEN REQUIRED BUSINESS ACCESS SIGN IS OBSCURED BY WORK ZONE ACTIVITIES OR OPPOSING TRAFFIC.
7. USE 10 FT MAXIMUM SPACING BETWEEN DEVICES IN DRIVEWAY.
8. REFER TO TC 4D SERIES STD DWGS FOR DESIGN OF GS20-5 BUSINESS ACCESS SIGN.
9. DO NOT PLACE BUSINESS NAME, LOGO OR OTHER ADVERTISEMENT ON OR UNDER GS20-5 SIGNS. SEE STD DWG TC 1 NOTE 25.

REVISIONS

NO.	DATE	APPR.	REMARKS
1	6/28/18	RT	UPDATED NOTE 9.

UTAH DEPARTMENT OF TRANSPORTATION
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RECOMMENDED FOR APPROVAL — DATE: AUGUST 2020
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WORK ZONE
BUSINESS ACCESS
SIGNING

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TC 9

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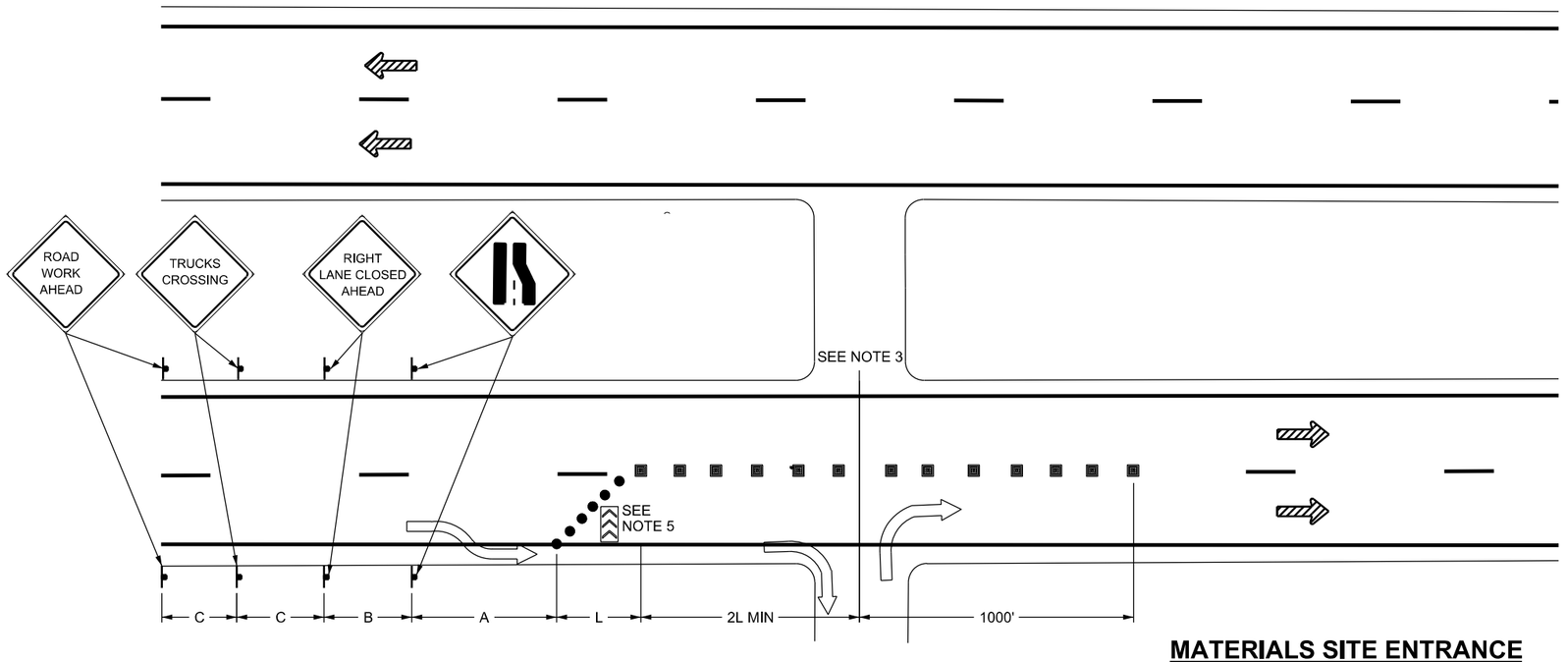
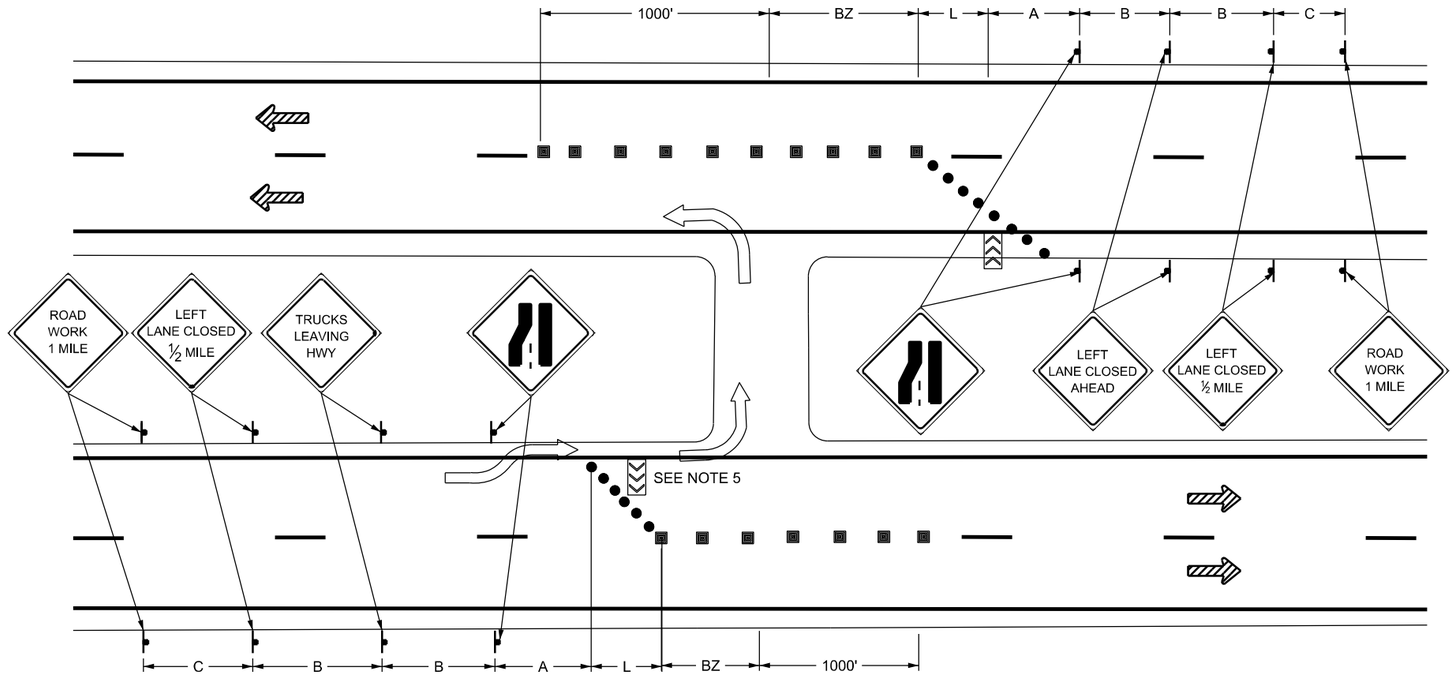


MATERIALS SITE ENTRANCE

(DETAIL TC 10-1)



MEDIAN CROSSING

(DETAIL TC 10-2)

LEDGEND

TRUCK TRAFFIC MOVEMENT

NOTES:

1. USE A MINIMUM OF THREE MILES BETWEEN TEMPORARY MEDIAN CROSSOVERS.
2. DO NOT USE A CROSSOVER WHEN AN INTERCHANGE IS WITHIN 4 MILES OF THE PROJECT, EXCEPT AS APPROVED BY THE ENGINEER.
3. CONSTRUCTION TRAFFIC CROSSING ACTIVE LANES HAS THE RESPONSIBILITY TO STOP OR YIELD TO THROUGH TRAFFIC. USE ONLY IF ADEQUATE SIGHT DISTANCE IS AVAILABLE.
4. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
5. PLACE ADVANCE WARNING ARROW PANEL IN FIRST THIRD OF TAPER IN TRAFFIC LANE WHEN EXITING VEHICLES ARE USING THE SHOULDER.
6. PLACE TYPE 3 BARRICADES WITH ROAD CLOSED (R11-2) SIGNS ACROSS AN EXCLUSIVE USE HAUL ROAD WHEN IT IS NOT IN USE.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION

SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

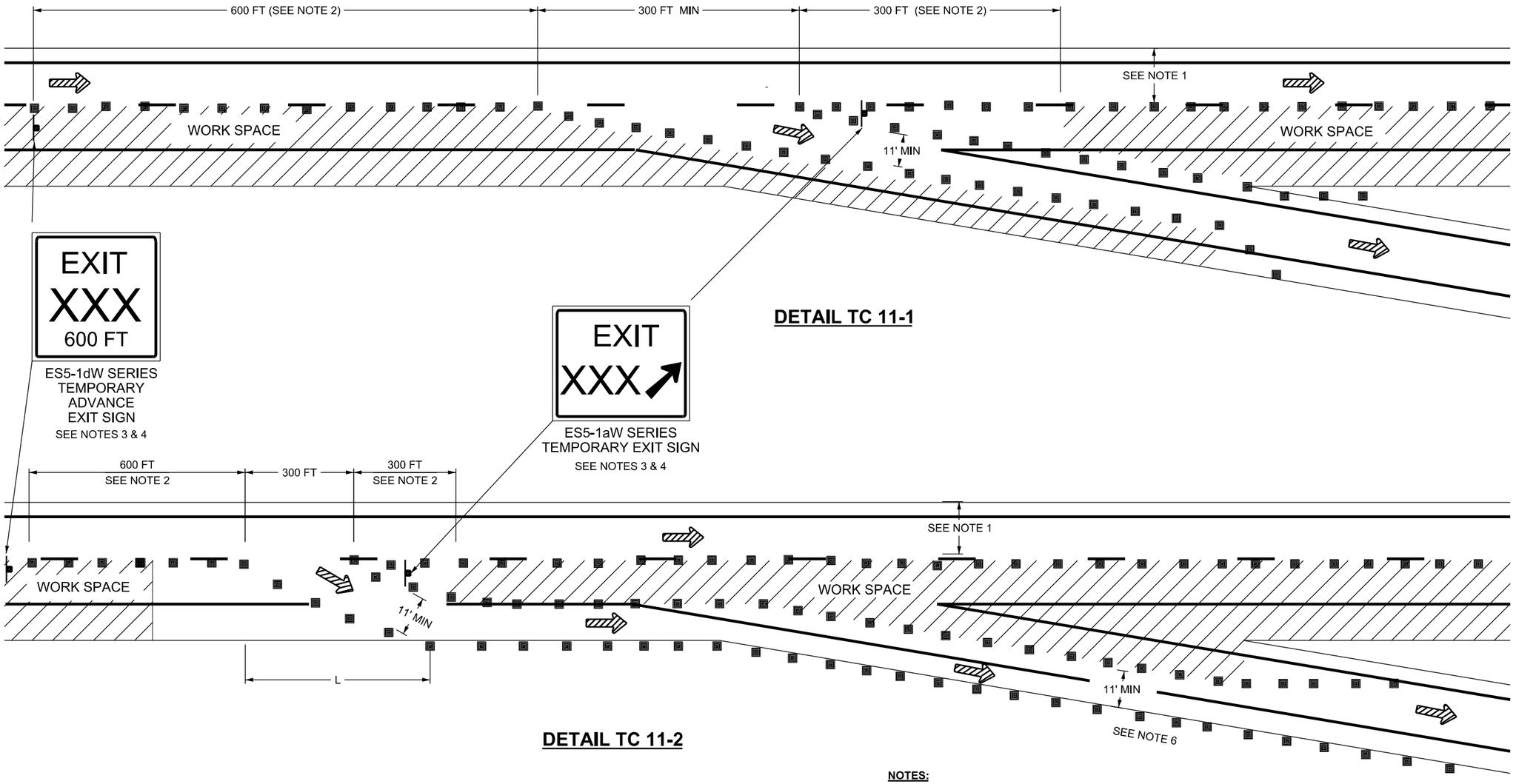
TRAFFIC CONTROL EXPRESSWAY AND FREEWAY CROSSOVER/ TURN AROUND

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 10

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC10.dgn
23-JUN-2020



DETAIL TC 11-1

DETAIL TC 11-2

NOTES:

1. MAINTAIN 12 FT TRAVEL LANE AND 2 FT SHOULDER WIDTHS.
2. USE CHANNELIZING DEVICES SPACED AT 50 FT.
3. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
4. THE EXIT RAMP SIGNS ARE SUPPLEMENTAL TO ADVANCE GUIDE SIGNS AND THE EXIT DIRECTION GUIDE SIGN. PLACE SIGN AT POINT OF GORE WHERE A 10 FT WIDTH EXISTS BETWEEN TRAFFIC FACE OF BARREL TO TRAFFIC FACE OF BARREL.
5. MAINTAIN EXISTING INTERCHANGE GUIDE SIGNS DURING WORK ACTIVITIES, OR PROVIDE TEMPORARY INTERCHANGE GUIDE SIGNS CONSISTING OF A MINIMUM OF ONE ADVANCE GUIDE SIGN AND THE EXIT DIRECTION GUIDE SIGN. DESIGN TEMPORARY SIGNS TO THE SAME STANDARDS AS EXISTING SIGNS EXCEPT WITH A BLACK LEGEND ON A FLUORESCENT ORANGE OR AN ORANGE BACKGROUND.
6. CHANNELIZING DEVICES NOT REQUIRED FOR RAMP RIGHT SHOULDER WHEN AVAILABLE PAVEMENT WIDTH IS GREATER THAN 13 FT (11 FT TRAVEL LANE AND 2 FT SHOULDER).
7. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
8. PLACE A TEMPORARY EXIT (E5-1a) SIGN IN THE TEMPORARY GORE IF THE PERMANENT EXIT SIGN IS REMOVED OR IF THE TEMPORARY GORE IS MOVED MORE THEN 200 FT UP STREAM OR IF THE TEMPORARY GORE IS MOVED DOWN STREAM FROM PERMANENT EXIT SIGN LOCATION. MOUNT THE TEMPORARY EXIT SIGN A MINIMUM OF 7 FT FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

CHAIRMAN STANDARDS COMMITTEE

AUGUST 2020
DATE

APPROVED

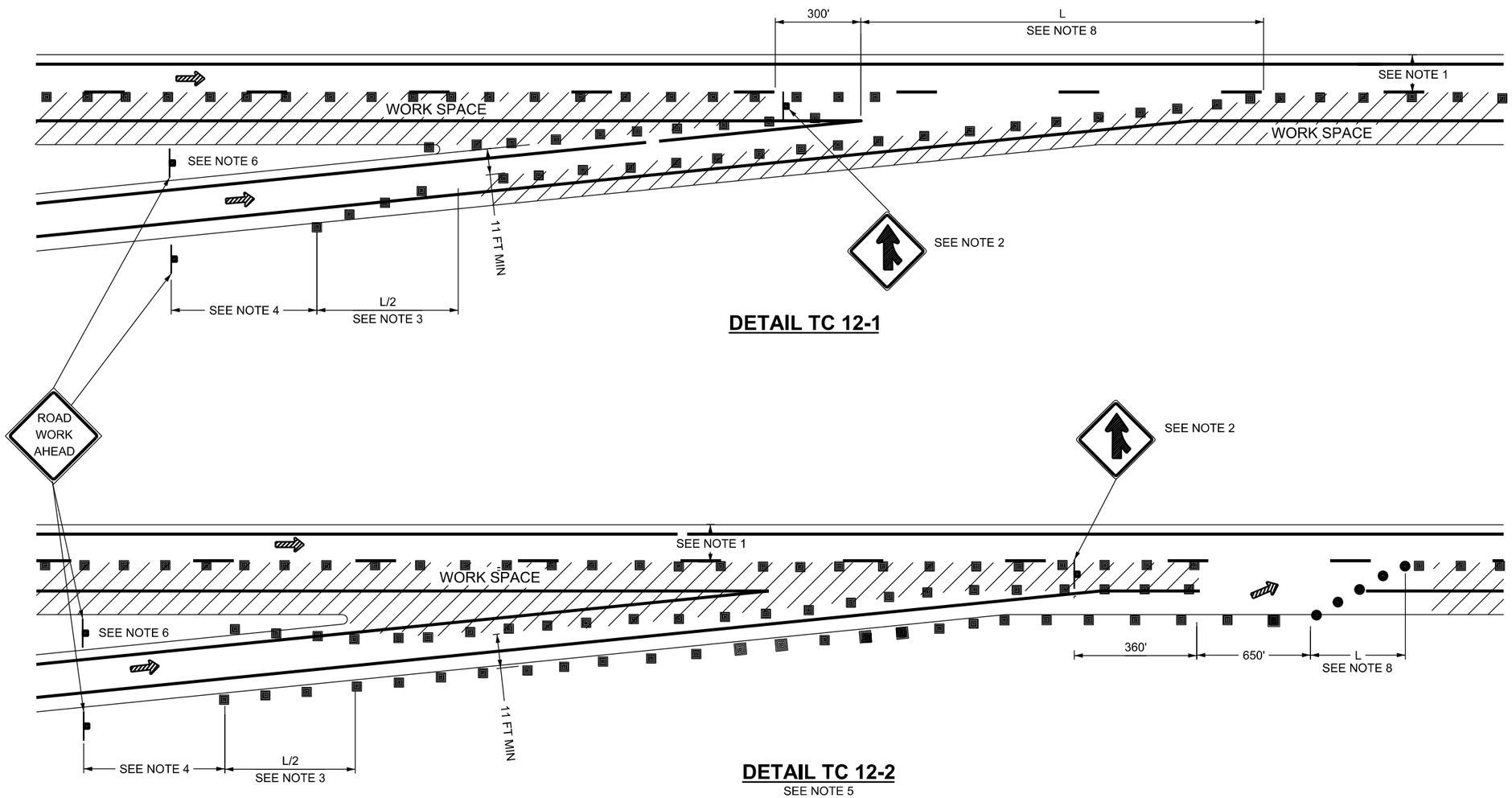
DEPUTY DIRECTOR

TRAFFIC CONTROL
EXIT RAMP GORE

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 11

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC11.dgn



DETAIL TC 12-1

DETAIL TC 12-2

SEE NOTE 5

NOTES:

1. MAINTAIN 12 FT TRAVEL LANE AND 2 FT OUTSIDE SHOULDER WIDTHS.
2. USE SUPPLEMENTAL MERGE SIGN ON ENTRANCE RAMP WHEN WORK SPACE IS WIDER THAN 12 FT OR WORK REMOVES OR OBSCURES MAINLINE MERGE SIGN. PLACE SIGN AT POINT OF GORE WHERE A 10 FT WIDTH EXISTS BETWEEN TRAFFIC FACE OF BARREL TO TRAFFIC FACE OF BARREL.
3. USE 40 MPH SPEED FOR RAMP TRAFFIC CONTROL DESIGN UNLESS POSTED OR ADVISORY SPEED IS GREATER, IN WHICH CASE USE THE HIGHEST SPEED.
4. RAMP ADVANCED WARNING SIGN DISTANCE
   250 FT SPEED = 40 MPH
   500 FT SPEED ≥ 45 MPH
5. CHANNELIZING DEVICES NOT REQUIRED ON RAMP RIGHT SHOULDER WHEN AVAILABLE PAVEMENT WIDTH IS GREATER THAN 13 FT (11 FT TRAVEL LANE AND 2 FT SHOULDER).
6. USE SUPPLEMENTAL LEFT SIDE SIGNING FOR MULTI-LANE RAMPS.
7. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
8. USE PRE CONSTRUCTION POSTED MAIN LINE SPEED LIMIT FOR "L".

REVISIONS

NO.	DATE	APPR.	REMARKS

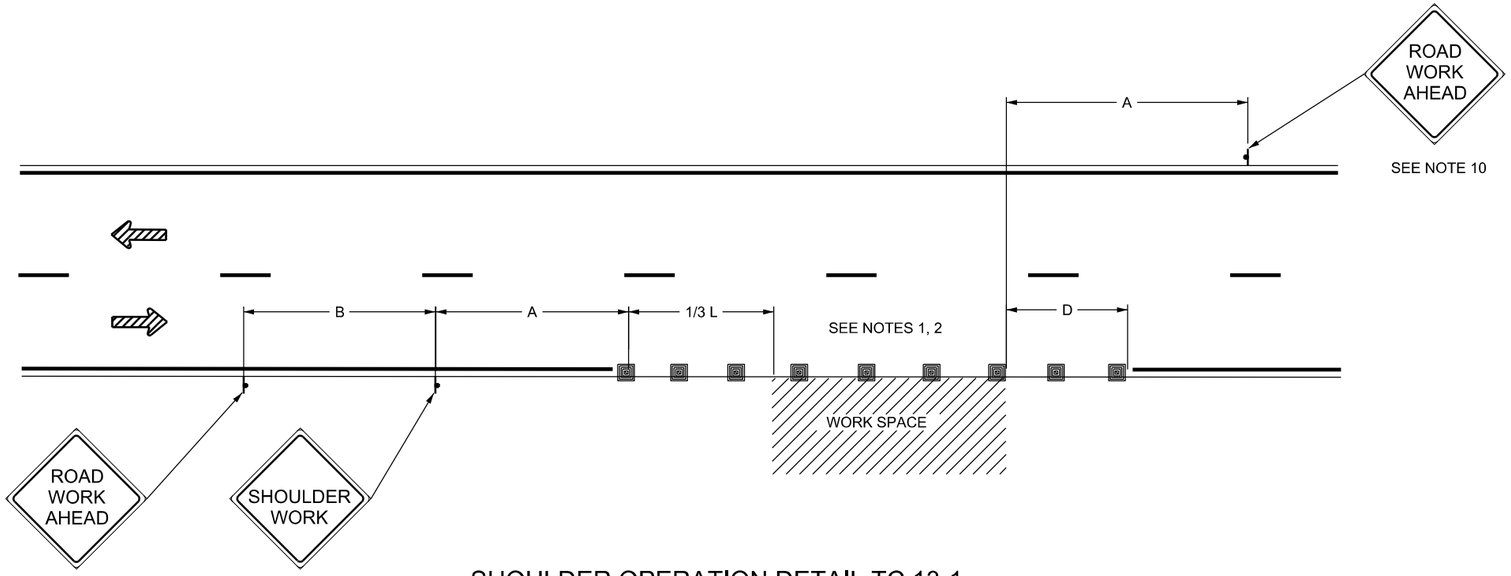
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

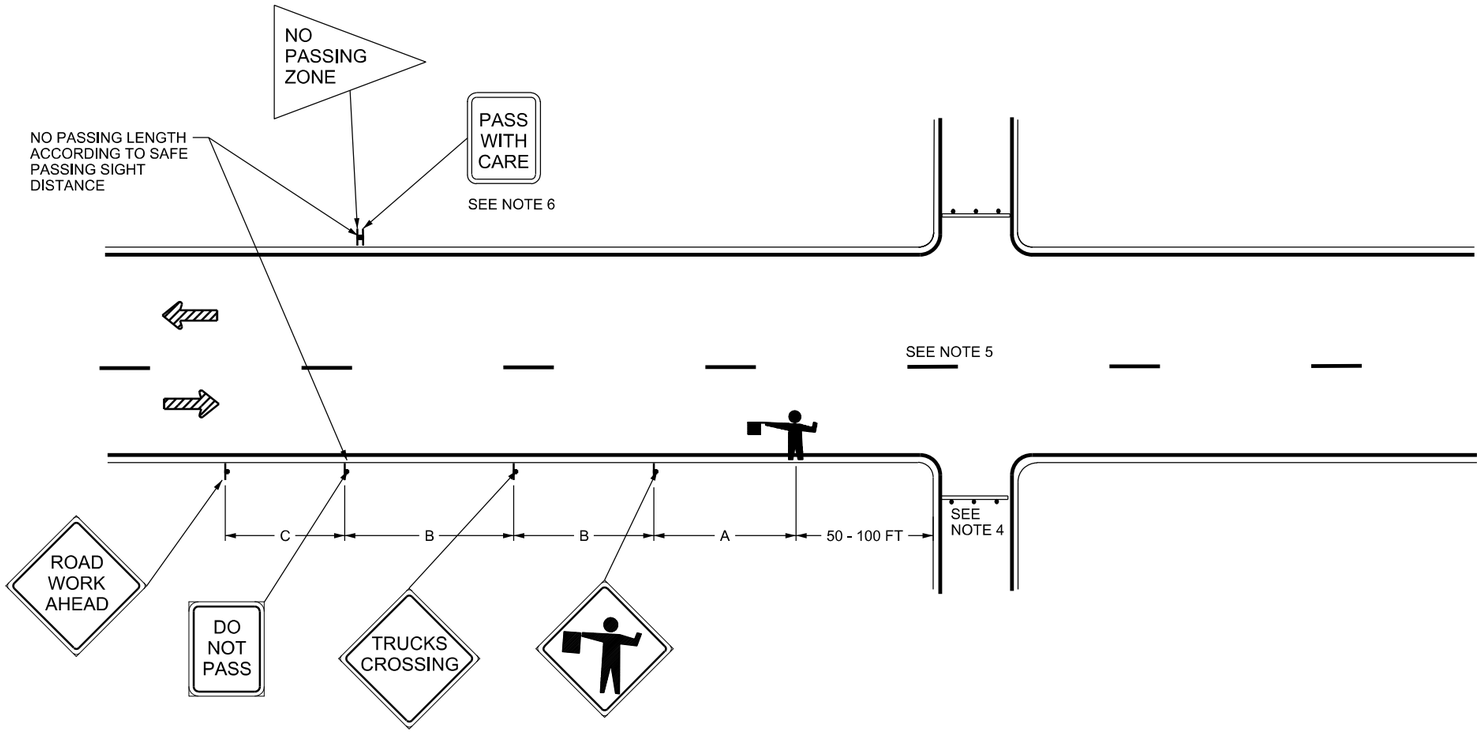
TRAFFIC CONTROL
ENTRANCE RAMP GORE
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 12

23-JUN-2020 DGN File:L:\Standard Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 ISW, TC\TC12.dgn



SHOULDER OPERATION DETAIL TC 13-1



HAUL ROAD OPERATION-TWO WAY DETAIL TC 13-2

SEE NOTES 8 & 9

NOTES:

1. USE CHANNELIZING DEVICES AS PER TC 3 SERIES STD DWGS TO SEPARATE WORK ZONE FROM TRAVEL LANE WHEN WORK DURATION EXCEEDS 1 HOUR.
2. DO NOT ENCROACH INTO LANES.
3. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
4. INSTALL TYPE 3 BARRICADES WHEN HAUL ROAD IS NOT IN USE.
5. APPLY DOUBLE YELLOW STRIPING BETWEEN NO PASSING ZONE SIGNS.
6. PLACE "PASS WITH CARE" (R4-2) SIGN ONLY IF PASSING IS ALLOWED DOWNSTREAM OF WORK ZONE.
7. SEE STD DWG TC 4C FOR PROJECT LIMIT SIGNING.
8. USE TWO FLAGGING STATIONS EACH DIRECTION AND SIGNS ON BOTH SIDES OF ROADWAY FOR MULTILANE DIVIDED HIGHWAYS AND MULTILANE ONE-WAY STREETS.
9. USE SAME SIGN SEQUENCE AND SPACING FOR OPPOSITE DIRECTION OF TRAFFIC.
10. REQUIRED ONLY ON TWO WAY OPERATION.

REVISIONS

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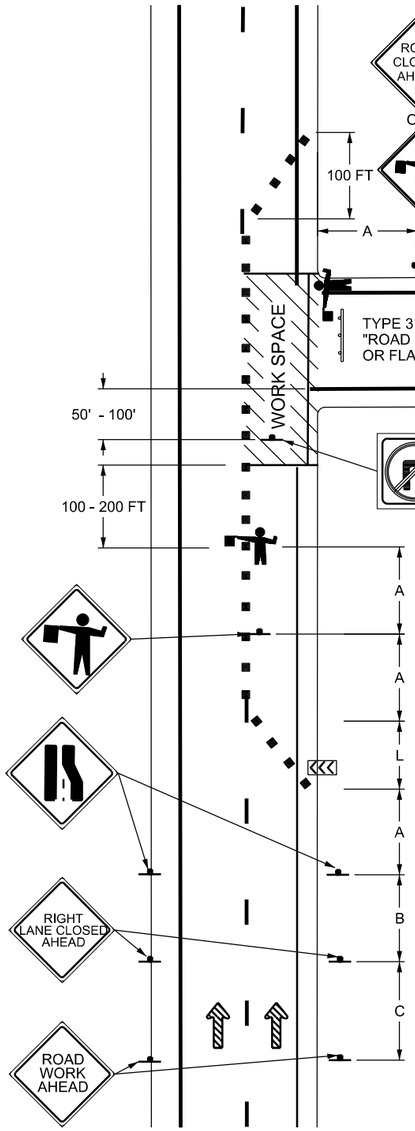
RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

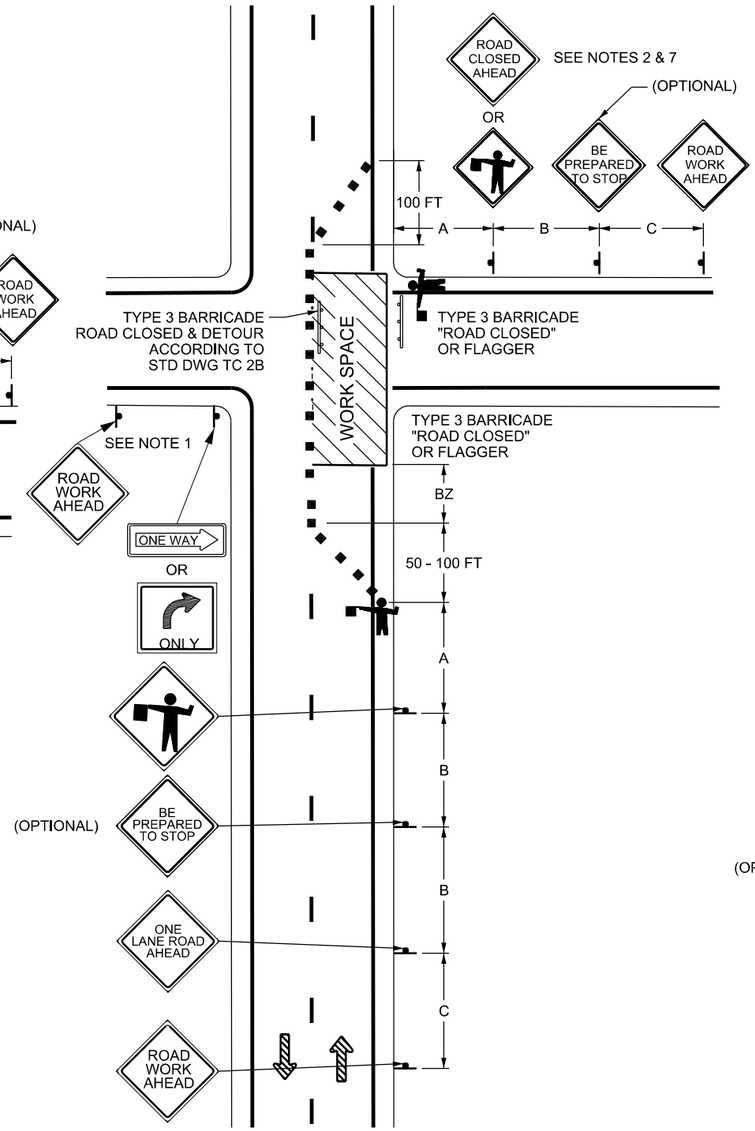
STANDARD DRAWING TITLE
TRAFFIC CONTROL
SHOULDER HAUL ROAD

STD. DWG. NO.
TC 13

DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC13.dgn
23-JUN-2020

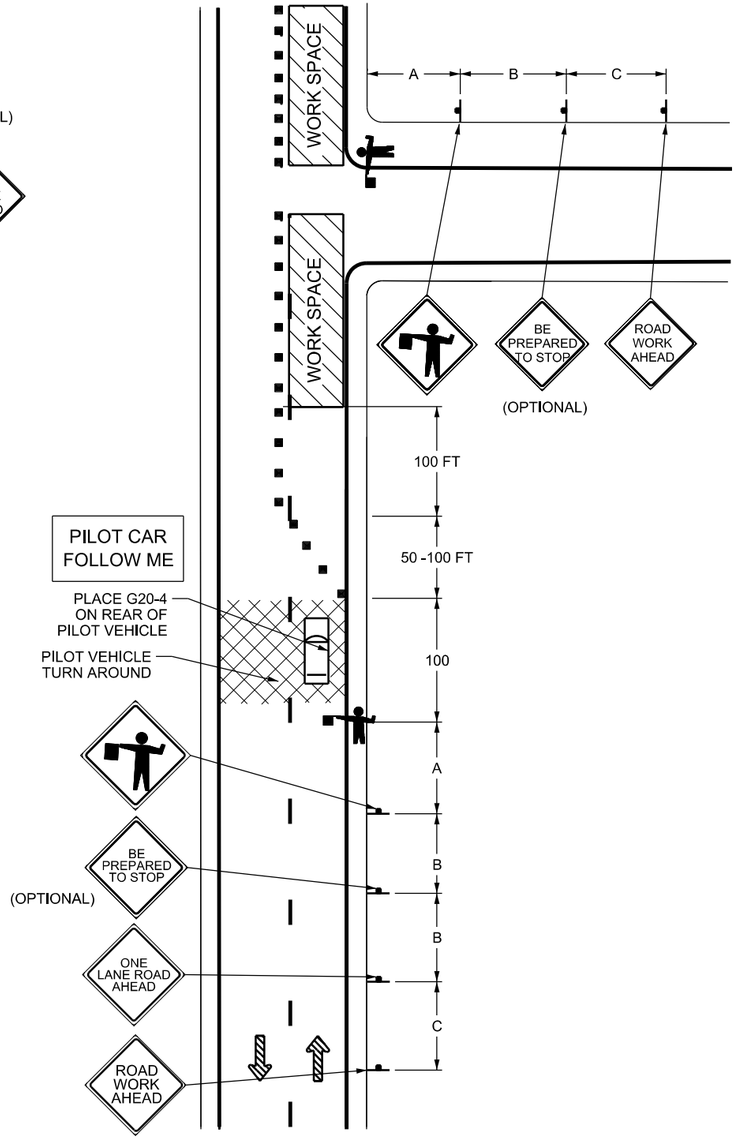


FLAGGING OPERATION - ONE WAY WITH POTENTIAL ENCROACHMENT BY WORK VEHICLE DETAIL TC 14-1



FLAGGING OPERATION - ONE-LANE, TWO-WAY TRAFFIC DETAIL TC 14-2

SEE NOTE 6



FLAGGING OPERATIONS WITH USE OF PILOT VEHICLE DETAIL TC 14-3

SEE NOTE 6

NOTES:

1. USE A FLAGGER AT ALL INTERSECTING ROADWAYS. REFER TO STANDARD SPECIFICATION 01554 FOR REQUIREMENT AT OPERATING TRAFFIC SIGNALS.
2. PROVIDE FLAGGING IF TURNING TRAFFIC CONFLICTS WITH ONE-WAY TRAFFIC.
3. PROVIDE A DETOUR WHEN ROAD CLOSURE EXCEEDS 24 HOURS.
4. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE AND SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
5. SEE STD DWG TC 4C FOR PROJECT LIMIT SIGNING.
6. USE SAME SIGN SEQUENCE, SPACING, AND FLAGGER FOR OPPOSITE DIRECTION OF TRAFFIC.
7. USE ADVANCED ROAD CLOSURE SIGNING IF ROAD CLOSED AHEAD SIGN IS USED.
8. REDUCE MULTILANE SECTION TO 1 LANE PRIOR TO FLAGGING OPERATION.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

DEPUTY DIRECTOR

TRAFFIC CONTROL FLAGGING OPERATION

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 14A

23-JUN-2020 DGN File:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC\TC14A.dgn

TAPER, BUFFER ZONE & SIGN SPACING CHART

ROAD TYPE	POSTED SPEED MPH (S)	LENGTH OF BUFFER(BZ)	MINIMUM SIGN SPACING (SS)				ONE LANE TWO-WAY FLAGGING
			A	B	C	D	TAPER LENGTH
			FT	FT	FT	FT	FT
CONVENTIONAL	50	425	500			250	100
	55	495					
	60	570					
	65	645					

CHANNELIZING DEVICES

A) SHOULDER, ONE-LANE TWO-WAY, AND DOWNSTREAM TAPERS: USE A MINIMUM OF 1 DEVICE PER 3 FT OF WIDTH (OR PORTION THEREOF), PLUS 1 ADDITONAL DEVICE TO START.

B) ON TANGENT: S x 2 = SPACING UP TO 120 FT MAXIMUM.

C) LENGTH OF BUFFER ZONE (BZ) IS THE DISTANCE FROM END OF LANE CLOSURE TAPER TO WORK SPACE, OR ANY OBSTRUCTION PRIOR TO WORK SPACE.

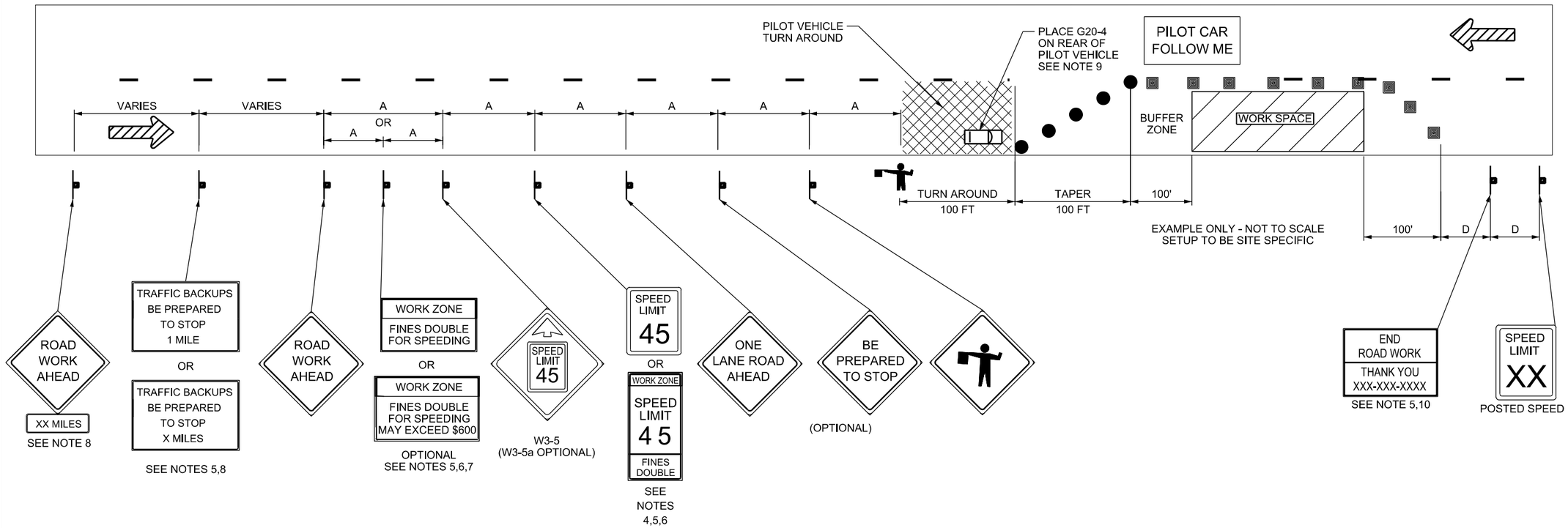
TRAFFIC CONTROL DEVICE LEGEND

- SIGN (FIXED OR PORTABLE)
- CHANNELIZING DEVICE (SEE STD DWG TC 2A)
- DRUMS OR DIRECTIONAL INDICATOR BARRICADE
- FLAGGING STATION
- DIRECTION OF TRAFFIC
- PILOT CAR

SEE STD DWG TC 4C FOR PROJECT LIMIT SIGNING

REDUCED SPEED SIGNING FOR PILOT CAR OPERATION IN A WORK ZONE (CONVENTIONAL ROADS ONLY)

SIGNING SIMILAR FOR OPPOSITE DIRECTION OF TRAVEL



NOTES:

1. MAY BE USED WITH A PILOT CAR OPERATION ON A CONVENTIONAL ROAD WITH THE APPROVAL OF THE REGION TRAFFIC ENGINEER.
2. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT BEFORE THE WORK ZONE TO COMPUTE THE SIGN SPACING, TAPER LENGTH, BUFFER ZONE, AND WORK CLEAR ZONE DISTANCE. USE THE POSTED SPEED LIMIT DURING WORK TO DETERMINE THE TANGENT SPACING FOR CHANNELIZING DEVICES.
3. REMOVE OR COVER THE WORK ZONE REDUCED SPEED LIMIT SIGN (RS2-1a) AND THE WORK ZONE REDUCED SPEED LIMIT AHEAD (W3-5 SERIES) SIGNS WHEN PILOT CARS ARE NOT IN USE.
4. ADDITIONAL SIGNS MAY BE USED IN THE WORK ZONE FOR SUPPLEMENTAL NOTIFICATION OF THE WORK ZONE SPEED LIMITS.
5. SEE TC 4D SERIES STD DWGS FOR SIGN DESIGN AND LAYOUT.
6. FINES DOUBLE (RS2-6c) AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS MAY BE USED INTERCHANGEABLY.
7. PLACE ADDITIONAL WORK ZONE SPEED LIMIT ASSEMBLIES (RS2-1a), FINES DOUBLE (RS2-6c), AND FINES DOUBLE WITH FINE NOTIFICATION (RS2-6d) SIGNS AS NEEDED AT ALL MAJOR INTERSECTIONS AND INTERCHANGES WITHIN THE PROJECT WHEN REDUCED SPEEDS AND THE FINES DOUBLE OR THE FINES DOUBLE WITH FINE NOTIFICATION SIGNING OPTION ARE USED.
8. USE TRAFFIC BACKUP SIGNING WHEN VEHICLE QUEUES ARE EXPECTED OR OCCUR IN ADVANCE OF THE INSTALLED WORK ZONE ADVANCE WARNING SIGNS. PLACE TRAFFIC BACKUPS BE PREPARED TO STOP 1 MILE (WS4-3a) SIGNS TWO MILES IN ADVANCE OF THE WORK AREA. PLACE TRAFFIC BACKUPS BE PREPARED TO STOP "X" MILES (WS4-3b) SIGNS IN INCREMENTS OF ONE MILE WITH THE APPROPRIATE "X" MILES LEGEND TO STAY AHEAD OF ANTICIPATED QUEUE OF VEHICLES. PLACE ADDITIONAL ROAD WORK AHEAD SIGNS WITH A "XX" MILES (W16-3aP) PLAQUE IN ADVANCE OF FURTHERMOST UPSTREAM TRAFFIC BACKUP SIGNING.
9. PILOT VEHICLE SPEED NOT TO EXCEED 40 MPH.
10. DO NOT USE END ROAD WORK SIGN WHEN PILOT CAR OPERATION TERMINATES WITHIN THE PROJECT LIMITS.
11. COVER PRE-CONSTRUCTION POSTED SPEED LIMIT SIGNS THAT ARE BETWEEN THE WORK ZONE REDUCED SPEED AHEAD SIGN (W3-5 SERIES) AND THE FLAGGING STATION.
12. USE ONLY ON HIGHWAYS WITH POSTED SPEEDS OF 50 MPH OR GREATER.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION

STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020 DATE — RECOMMENDED FOR APPROVAL

AUGUST 2020 DATE — CHAIRMAN STANDARDS COMMITTEE APPROVED

DEPUTY DIRECTOR

REDUCED SPEED SIGNING FOR PILOT CAR OPERATION (CONVENTIONAL ROADS)

STANDARD DRAWING TITLE

STD. DWG. NO.

TC 14B

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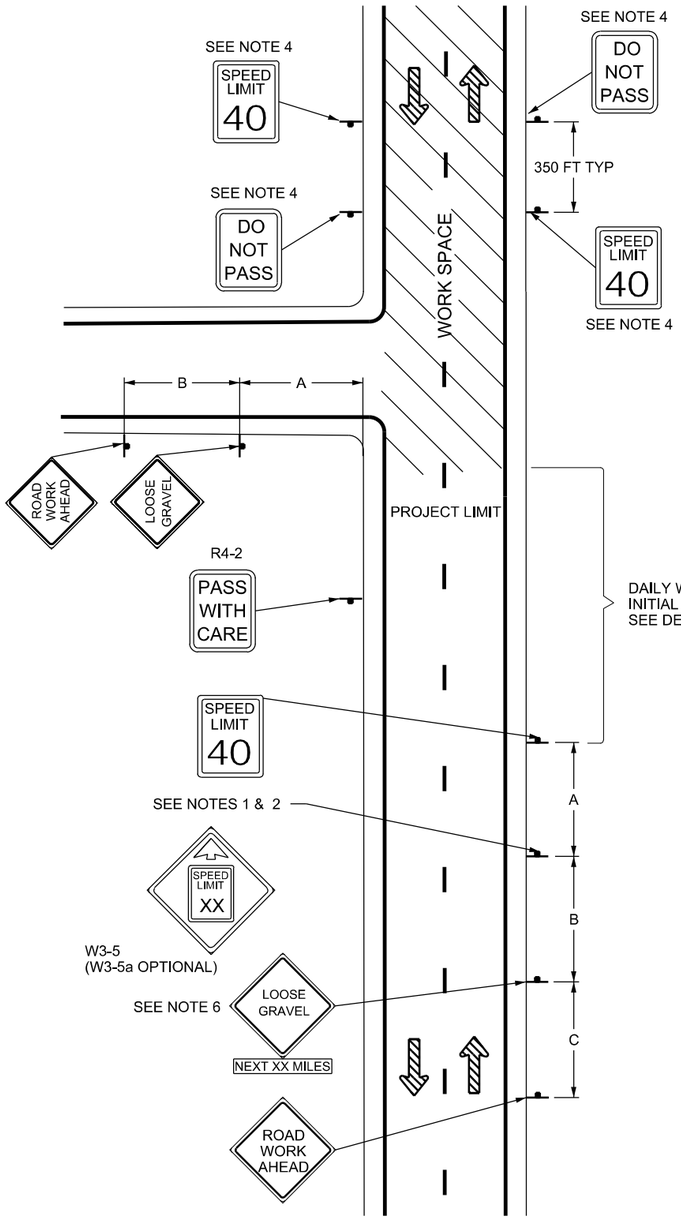
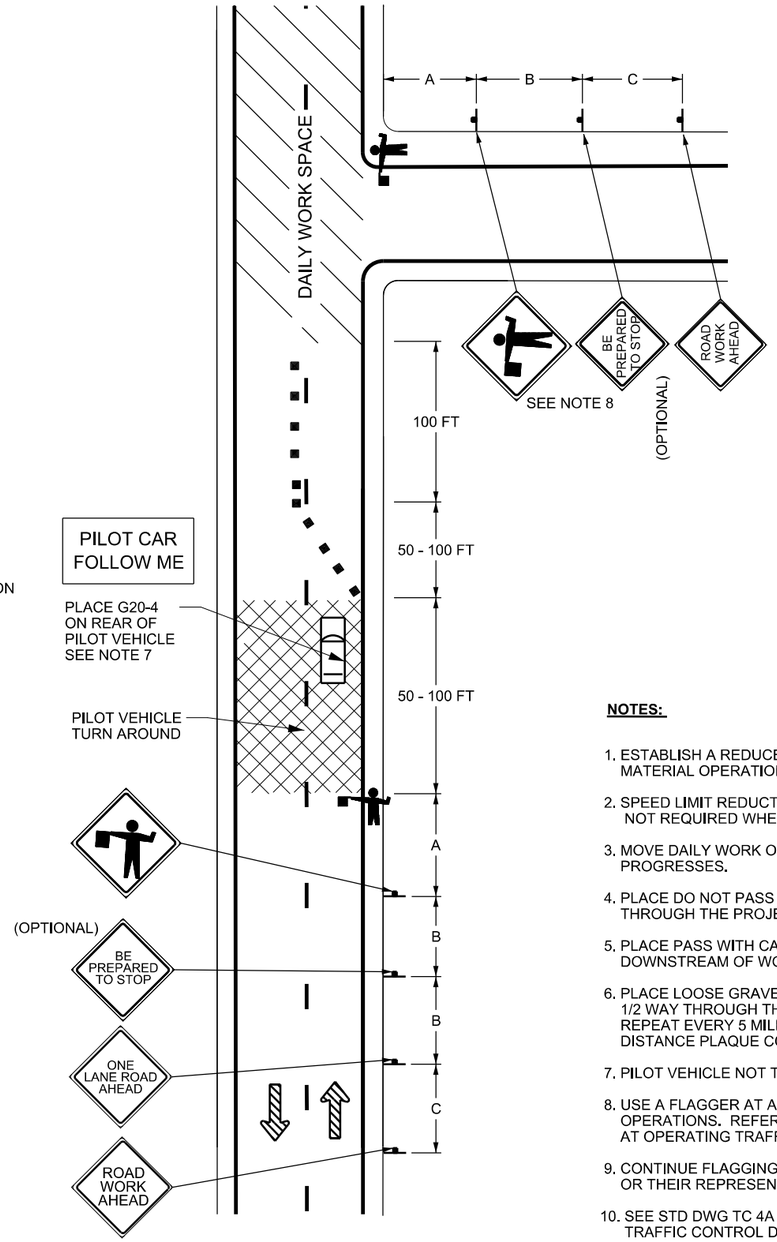
23-JUN-2020



(DETAIL TC 15-1)

PROJECT SIGNING 2 LANE-2 WAY

SEE NOTE 13



FLAGGING /PILOT VEHICLE OPERATION (DETAIL TC 15-2)

DAILY WORK OPERATION 2 LANE-2 WAY

SEE NOTE 13

NOTES:

1. ESTABLISH A REDUCED SPEED LIMIT OF 40 MPH FOR SEAL COAT AND COVER MATERIAL OPERATIONS WHEN SPEEDS ARE GREATER THAN 40 MPH.
2. SPEED LIMIT REDUCTION AHEAD (W3-5) AND SPEED LIMIT SIGNING NOT REQUIRED WHEN EXISTING SPEED LIMITS ARE 40 MPH OR LESS.
3. MOVE DAILY WORK OPERATION SIGNING, DETAIL TC 15-2, AS WORK PROGRESSES.
4. PLACE DO NOT PASS (R4-1) AND SPEED LIMIT SIGNS AT 1 MILE INTERVALS THROUGH THE PROJECT AND AFTER MAJOR INTERSECTIONS.
5. PLACE PASS WITH CARE (R4-2) SIGN ONLY IF PASSING IS ALLOWED DOWNSTREAM OF WORK ZONE.
6. PLACE LOOSE GRAVEL (W8-7) SIGN WITH APPROPRIATE DISTANCE MESSAGE 1/2 WAY THROUGH THE PROJECT IF PROJECT LENGTH IS LESS THAN 10 MILES. REPEAT EVERY 5 MILES ON LONGER PROJECTS WITH AN AUXILIARY DISTANCE PLAQUE COUNTING DOWN THE DISTANCE TO THE PROJECT LIMITS.
7. PILOT VEHICLE NOT TO EXCEED SPEED OF 40 MPH.
8. USE A FLAGGER AT ALL INTERSECTING ROADWAYS DURING DAILY WORK OPERATIONS. REFER TO STANDARD SPECIFICATION 01554 FOR REQUIREMENTS AT OPERATING TRAFFIC SIGNALS.
9. CONTINUE FLAGGING AND PILOT VEHICLE OPERATIONS UNTIL THE ENGINEER OR THEIR REPRESENTATIVE ALLOWS FREE FLOW TRAFFIC TO PROCEED.
10. SEE STD DWG TC 4A FOR TAPER, BUFFER ZONE & SIGN SPACING CHART AND TRAFFIC CONTROL DEVICE LEGEND.
11. SEE TC 4D SERIES STD DWGS FOR DESIGN AND LAYOUT OF FINES DOUBLE SIGN, FINES DOUBLE SIGN WITH FINE NOTIFICATION, AND FINES DOUBLE SPEED LIMIT ASSEMBLY IF REQUIRED.
12. SEE STD DWG TC 4C FOR PROJECT LIMIT SIGNING.
13. USE SAME SIGN SEQUENCE, SPACING AND FLAGGER FOR OPPOSITE DIRECTION OF TRAFFIC.
14. REMOVE REDUCED SPEED LIMIT RESTRICTIONS AND RETURN TO PRE-CONSTRUCTION POSTED SPEED LIMIT ONCE THE ROADWAY SURFACE HAS BEEN SWEPT AND FLUSHED AND THE AFFECTED WORK ZONE HAS APPROPRIATE PAVEMENT MARKINGS.

REVISIONS			
NO.	DATE	APPR.	REMARKS
1	2/27/2020	JW	ADDED NOTE 14.
2	4/30/2020	JW	ADDED "AND FLUSHED" TO NOTE 14

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

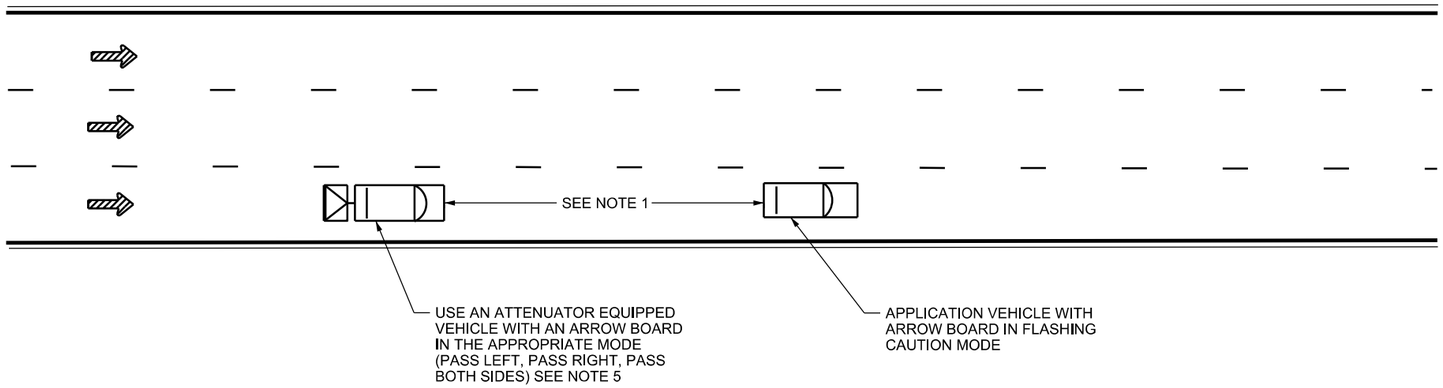
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR

TRAFFIC CONTROL
2 LANE/2 WAY
SEAL COAT WITH
COVER MATERIAL

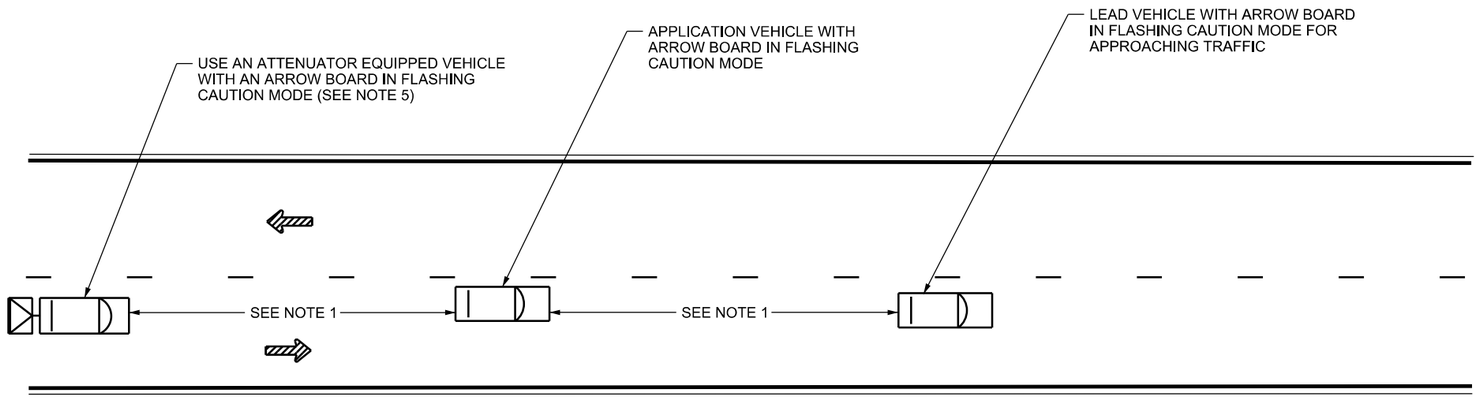
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 15

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC15.dgn



MULTILANE LANE LINES & SHOULDERS
DETAIL TC 16-1



TWO LANE-TWO WAY CENTER & SHOULDERS
DETAIL TC 16-2

NOTES:

1. DO NOT EXCEED 300 FT SPACING BETWEEN THE APPLICATING TRUCK AND THE FOLLOW OR LEAD VEHICLE.
2. NO STATIC SIGNS ARE REQUIRED WITH THESE OPERATIONS.
3. USE ROTARY STROBE LIGHTS AND EMERGENCY FLASHERS ON ALL EQUIPMENT IN OPERATION.
4. USE TYPE B ARROW BOARD. SEE STD DWG TC 2C.
5. USE MASH OR NCHRP-350 APPROVED TRUCK MOUNTED ATTENUATOR (TMA) MEETING THE REQUIREMENTS FOR THE POSTED SPEED LIMIT.

   TL-2 RATED SYSTEM FOR SPEEDS 45 ≤ MPH,
   TL-3 RATED SYSTEM FOR SPEEDS 50 ≥ MPH.
6. SEE STD DWG TC 4A FOR TRAFFIC CONTROL DEVICE LEGEND.

REVISIONS

NO.	DATE	APPR.	REMARKS

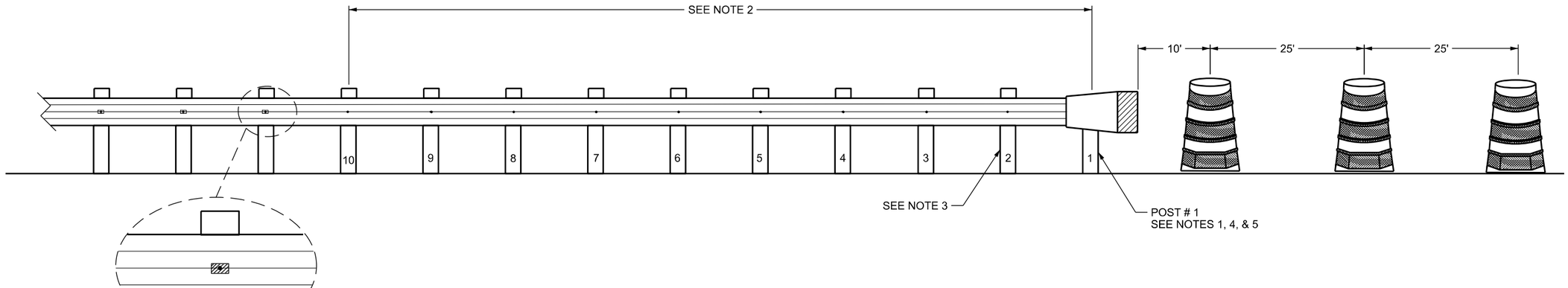
UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

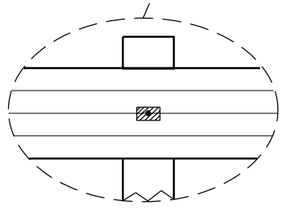
RECOMMENDED FOR APPROVAL — AUGUST 2020 — DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 — DATE
DEPUTY DIRECTOR — DATE

TRAFFIC CONTROL FOR NON-DURABLE PAVEMENT MARKING
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 16

DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC16.dgn
23-JUN-2020





SQUARE WASHER
SEE NOTE 2

WORK ZONE W-BEAM GUARDRAIL END PROTECTION USING END TREATMENT TYPE G IMPACT HEAD

INTERMEDIATE 3 DAY MAXIMUM ALLOWED USE

NOTES:

1. INSTALL IMPACT HEAD TO PROTECT EXPOSED GUARDRAIL END FOR A PERIOD NOT TO EXCEED 3 DAYS.
2. REMOVE WASHER WHEN PRESENT FROM THE FACE OF RAIL FOR A MINIMUM OF 10 POSTS BEFORE INSTALLING IMPACT HEAD.
3. REMOVE BLOCK AT POST 2. DO NOT ATTACH W-BEAM RAIL TO POST 2.
4. REMOVE BLOCK AND POST TO RAIL CONNECTION AT POST 1 BEFORE INSTALLING IMPACT HEAD.
5. SECURE IMPACT HEAD TO POST 1 ACCORDING TO MANUFACTURER'S REQUIREMENTS.
6. PLACE A MINIMUM OF 3 PLASTIC DRUMS OR VERTICAL PANELS SPACED AS SHOWN ABOVE IN ADVANCE OF IMPACT HEAD.
7. USE FOR MAINTENANCE REPAIR AND CONSTRUCTION PROJECTS.
8. USE DEPARTMENT GUIDELINES FOR CRASH CUSHIONS AND END TREATMENTS.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

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CHAIRMAN STANDARDS COMMITTEE
APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

TRAFFIC CONTROL
WORK ZONE GUARDRAIL
INTERMEDIATE
END PROTECTION
STANDARD DRAWING TITLE

STD. DWG. NO.
TC 17

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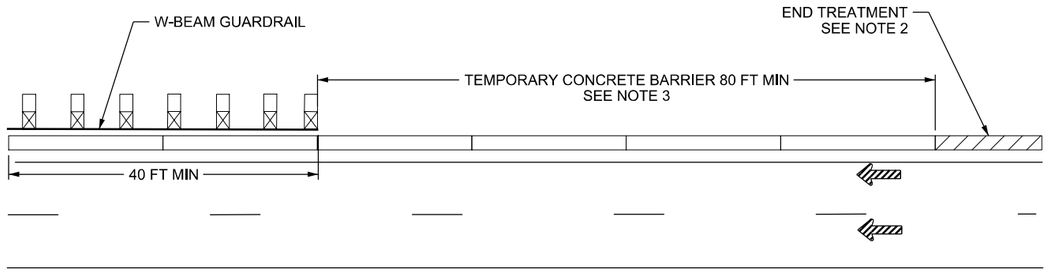
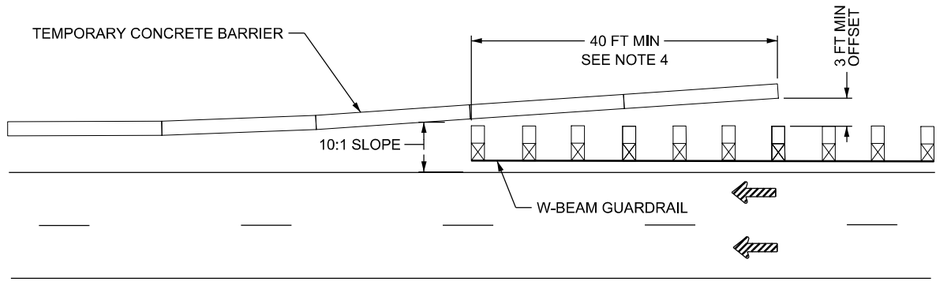
23-JUN-2020

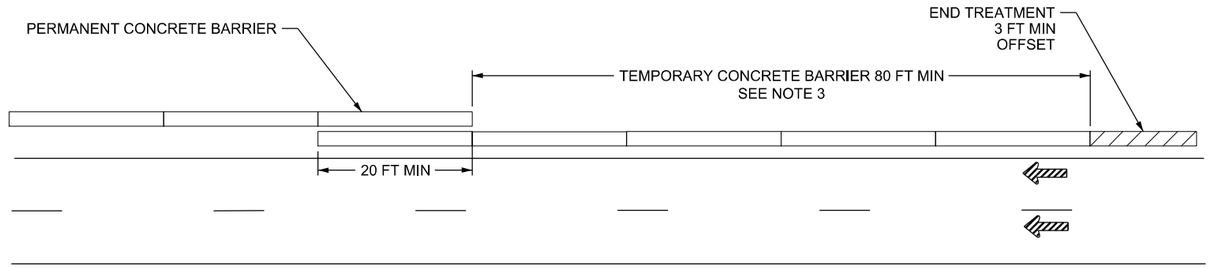


DETAIL A: TEMPORARY CONCRETE BARRIER PROTECTION FOR W-BEAM GUARDRAIL

REFER TO TC 17 FOR W-BEAM END PROTECTION OF 3 DAYS OR LESS



DETAIL B: W-BEAM GUARDRAIL WITH TEMPORARY CONCRETE BARRIER



DETAIL C: TEMPORARY CONCRETE BARRIER PROTECTION FOR PERMANENT CONCRETE BARRIER

NOTES:

1. USE THE DRAWING FOR LAYOUT OF TEMPORARY BARRIER. SEE APPLICABLE TC DRAWINGS FOR ADDITIONAL TRAFFIC CONTROL DEVICE LAYOUT REQUIREMENTS.
2. SEE THE DEPARTMENT'S GUIDELINES FOR CRASH CUSHIONS & END TREATMENTS FOR APPROVED CONSTRUCTION ZONE SYSTEMS. PLACE THE END TREATMENT AND THE LAST BARRIER PARALLEL TO TRAFFIC.
3. MEET ROADSIDE DESIGN GUIDE'S LENGTH OF NEED REQUIREMENT IF BLUNT END HAZARD OFFSET IS GREATER THAN 2 FT FROM THE BACK SIDE OF THE TEMPORARY BARRIER.
4. DO NOT PLACE CONCRETE BARRIER ON SLOPES GREATER THAN 6:1 BEHIND THE W-BEAM GUARDRAIL. THIS DETAIL APPLIES TO WORK ZONES ONLY.
5. CONCRETE BARRIER STABILIZATION PINS NOT REQUIRED IN WORK ZONE APPLICATIONS UNLESS SPECIFIED IN CONTRACT DOCUMENTS.
6. HALF BARRIER SECTIONS ALLOWED WHEN PLACED ACCORDING TO STD DWG BA 2E.

REVISIONS

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

AUGUST 2020
DATE

RECOMMENDED FOR APPROVAL

AUGUST 2020
DATE

CHAIRMAN STANDARDS COMMITTEE
APPROVED

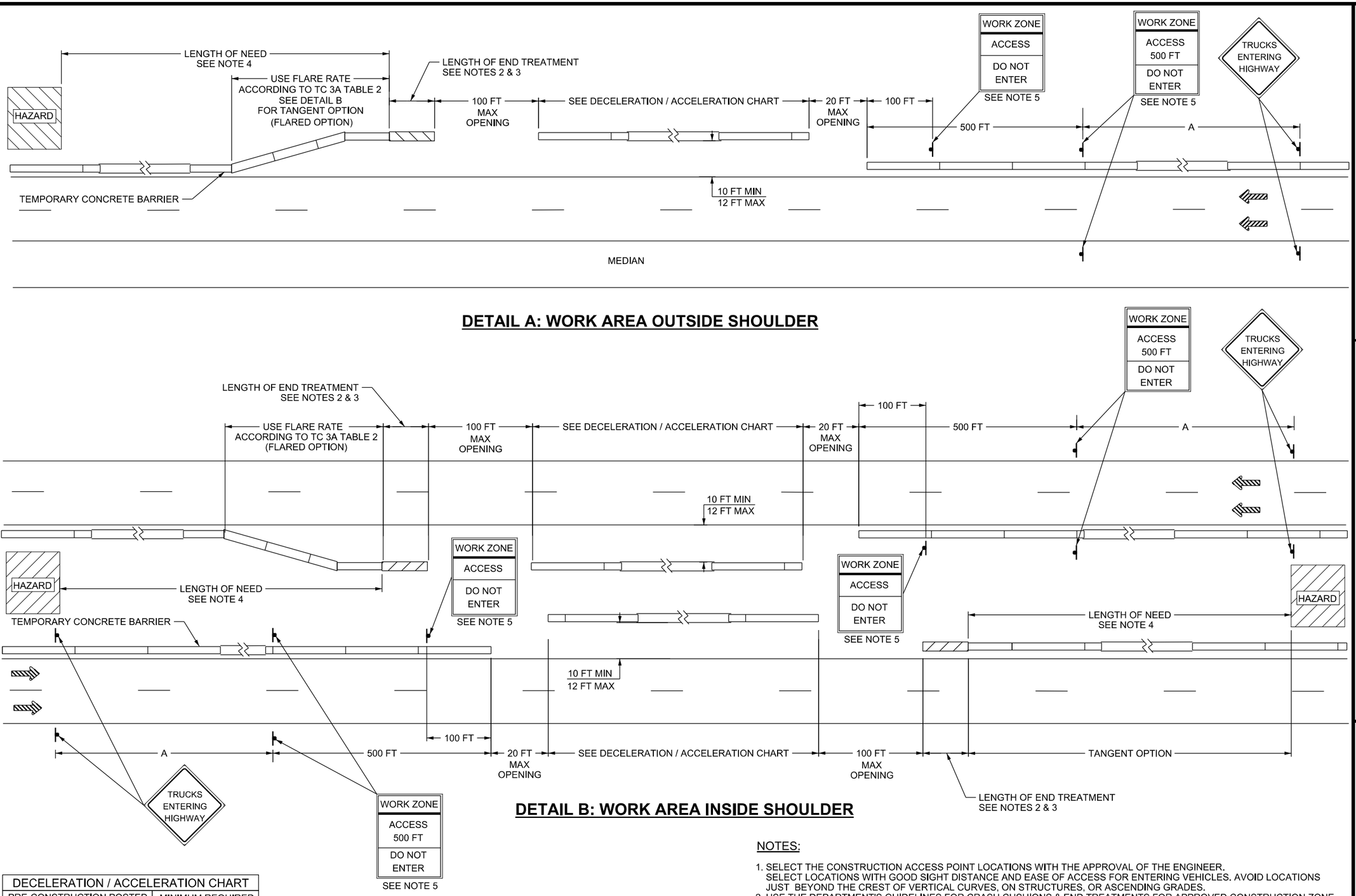
DEPUTY DIRECTOR

BLUNT END PROTECTION FOR W-BEAM GUARDRAIL AND CONCRETE BARRIER

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 18

23-JUN-2020 DGN File:L:\Standard_Drawings\Imperial\2020 Approved\All Drawings - August 2020\Backup 1\Signature Batch 9 (SW, TC)\TC18.dgn



DETAIL A: WORK AREA OUTSIDE SHOULDER

DETAIL B: WORK AREA INSIDE SHOULDER

DECELERATION / ACCELERATION CHART	
PRE-CONSTRUCTION POSTED SPEED LIMIT (MPH):	MINIMUM REQUIRED LENGTH:
55	500 FT
60	580 FT
65	660 FT
70	740 FT
75	820 FT
80	920 FT

NOTES:

1. SELECT THE CONSTRUCTION ACCESS POINT LOCATIONS WITH THE APPROVAL OF THE ENGINEER. SELECT LOCATIONS WITH GOOD SIGHT DISTANCE AND EASE OF ACCESS FOR ENTERING VEHICLES. AVOID LOCATIONS JUST BEYOND THE CREST OF VERTICAL CURVES, ON STRUCTURES, OR ASCENDING GRADES.
2. USE THE DEPARTMENT'S GUIDELINES FOR CRASH CUSHIONS & END TREATMENTS FOR APPROVED CONSTRUCTION ZONE SYSTEMS.
3. PLACE THE CRASH CUSHION / END TREATMENT AND THE LAST BARRIER SECTION PARALLEL TO TRAFFIC.
4. USE PROPER LENGTH OF NEED FOR BOTH FLARED AND TANGENT TEMPORARY BARRIER OPTIONS ACCORDING TO THE REQUIREMENTS OF THE ROADSIDE DESIGN GUIDE. USE THE PRE-CONSTRUCTION POSTED SPEED LIMIT PRIOR TO THE WORK ZONE FOR THE DESIGN OF THE REQUIRED LENGTH OF NEED.
5. SEE STD DWG TC 4D SERIES FOR SIGN DESIGN AND LAYOUT.
6. USE THE IDENTICAL LEGEND SUPPLEMENTAL SIGNING FOR "TRUCKS ENTERING HIGHWAY" AND "WORK ZONE ACCESS 500 FT" SIGNS.
7. MAINTAIN MINIMUM 2 FT SHOULDER WIDTHS.

NO.	DATE	APPR.	REVISIONS	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL — AUGUST 2020 DATE
CHAIRMAN STANDARDS COMMITTEE APPROVED — AUGUST 2020 DATE
DEPUTY DIRECTOR

CONSTRUCTION ACCESS POINTS FOR SPEEDS OF 55 MPH AND GREATER

STANDARD DRAWING TITLE

STD. DWG. NO.
TC 19

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23-JUN-2020

End of 2020 Standard Drawings

For Road and Bridge Construction