8. DRAINAGE

8A. CATCH BASINS AND COVERS

8A5 Inlet and Manhole Covers
- sheet a: *Inlet Covers Type A, H, A-S, H-S and Z*
- sheet b: *Inlet Covers Type B, B-A, C, MS, MS-A,DW and WM*
- sheet c: *Inlet Covers Type F, HM, HM-S, S, T, HM-GJ, and HM-GJ-S*
- sheet d: *Inlet Covers Type V, V-B, and VV-B*
- sheet e: *Inlet Covers Type BW; Manhole Covers* Type *K, J, J-S, L and M*

8A8 Catch Basins 3-FT, 4-FT, 5-FT and 6-FT Diameter

8A9 Catch Basins 2x3-FT and 2.5x3-FT

8B. MANHOLES

8B9 Manholes 3-FT, 4-FT, 5-FT, 6-FT, 7-FT, 8-FT, 9-FT and 10-FT Diameter

8B10 Manholes 3x3-FT, 4x4-FT, 5x5-FT, and 6x6-FT

8B11 Manholes Variable Tee and Special 4-FT Diameter

8C. INLETS

8C6 Inlets 3-FT and 4-FT Diameter

8C7 Inlets 2x2-FT, 2x2.5-FT, 2x3-FT, 2.5x3-FT and 2x3.5-FT

8C8 Inlets Median 1 and 2 Grate

8C9 Inlets Median 3 and 4 Grate

8D. CURB AND GUTTER, AND SURFACE DRAINS

8D1 Concrete Curb and Gutter
- sheet a: *Concrete Curb and Gutter*
- sheet b: *Concrete Curb Ties and Curb and Gutter Applications*

8D2 Concrete Surface Drains Flume Type at Structures
a b c

8D3 Concrete Surface Drains Drop Inlet Type at Structures
a b

8D4 Concrete Surface Drains and Asphaltic Flumes

8D5 Curb Ramps
- sheet a: *Curb Ramps Types 1 and 1-A*
- sheet b: *Curb Ramps Types 2 and 3*
- sheet c: *Curb Ramps Type 4A and 4A1*
- sheet d: *Curb Ramps Type 4B and 4B1*
- sheet e: *Curb Ramps Type 5, 6, 7A, 7B & 8*
- sheet f: *Curb Ramps Radial Detectable Warning Field Applications*
- sheet g: *Curb Ramps Rectangular and Radial Detectable Warning Plates*
- sheet h: *Blended Transitions Type 1 And 2*

8D13 Slotted Corrugated Metal Pipe Surface Drains

8D14 Slotted Vane Drain

8D15 Edgedrains

sheet a: *Edgedrain Outlet and Outfall Markers*
sheet b: *Edgedrain and Base Aggregate Open Graded*
sheet c: *Edgedrain and Base Aggregate Open Graded*

8D16 Concrete Gutter, Curb and Gutter and Pavement Ties
8D17 Manholes, Manhole and Inlet Covers

8E. EROSION CONTROL DEVICES

8E5 Sodded Backslope Flume and Intercepting Embankment
8E8 Typical Installations of Erosion Bales/Temporary Ditch Checks
8E9 Silt Fence
8E10 Inlet Protection Type A, B, C and D
8E11 Turbidity Barrier
8E12 Silt Screen
8E14 Tracking Pad
8E15 Culvert Pipe Checks

8F. PIPE AND CULVERT

8F1 Apron Endwalls for Culvert Pipe
8F2 Apron Endwalls for Pipe Arch and Elliptical Pipe
8F3 Details for Pipe Cattle Pass, Concrete Endwalls and Steps
8F4 Joint Ties for Concrete Pipe and Concrete Collar Detail
8F6 Reinforced Concrete Apron Endwall for Pipe Underdrain
8F7 Steel Apron Endwalls for Culvert Pipe and Pipe Arch Sloped Side Drains
8F8 Steel Apron Endwalls for Culvert Pipe and Pipe Arch Sloped Cross Drains
8F10 Concrete Masonry Endwalls for Culvert Pipe and Pipe Arch

9. INTERSECTION DESIGN

9A. GEOMETRIC LAYOUTS

9A1 At-Grade Side Road Intersections
sheet a: *At-Grade Side Road Intersection, Types B1, B2, C and D and Tee Intersection Bypass Lane*
sheet b: *At-Grade Side Road Intersection, Types A1 and A2*
9A11 Driveway and Sidewalk Ramps Types X and Y
9A12 Driveway and Sidewalk Ramps Type Z
9A13 Driveways with Curb & Gutter Returns
9A14 Driveways without Curb & Gutter
9A15 Driveways without Curb & Gutter Resurfacing Projects Rural

9B. CONDUIT

9B2 Conduit
9B4 Pull Box
9B16 Pull Box Non-Conductive

9C. BASES

9C2 Concrete Bases Types 1, 2, 5 and 6
9C3 Transformer/Pedestal Bases
9C4 Concrete Base Bolt Repair
9C5 Concrete Control Cabinet Bases
9C6 Concrete Control Cabinet Base, Type 9, Special

9C8 Concrete Base, Type 7
9C9 Concrete Base, Type 8
9C10 Transformer Base for 15-Inch Bolt Circle
9C11 Concrete Base Type 10
9C12 Concrete Base Type 13
a b
9C13 Concrete Base Type 10 and Type 13 Extension
9C14 Concrete Control Cabinet Base, Type L
9C15 Concrete Base Type 10 Special
9C16 Concrete Base Type 10 Special Extension

9D. CONTROL CABINETS

9D1 Cabinet Service Installation (Meter Breaker Pedestal)
9D2 Signal Control Cabinet
9D3 Post Mounted Controller Service Installation
9D4 Lighting Control Cabinet 120/240 Volt
9D5 L30 Lighting Control Cabinet 240/480 Volt

9E. POLE MOUNTINGS FOR TRAFFIC SIGNALS & LIGHTING UNITS

9E1 Pole Mountings
sheet a: *Pole Mountings for Traffic Signals Type 2*
sheet b: *Pole Mountings for Traffic Signals and Lighting Units Type 3 (Heavy Duty)*
sheet c: *Pole Mountings for Traffic Signals and Lighting Units Type 4*
sheet d: *Pole Mountings for Lighting Units Type 5 (30 feet)*
sheet e: *Pole Mountings for Lighting Units Type 6 (35 feet)*
sheet f: *Pole Mountings for Lighting Unit, Type 17 (40 feet)*
sheet g: *Hardware Details for Pole Mountings*
9E2 Freeway Lighting Unit Pole Wiring
9E3 Non-Freeway Lighting Unit Pole Wiring
9E4 Walkway Lighting Unit and Concrete Base, Type 11
9E5 Traffic Signal Standard Ornamental Bracket Mountings (Typical) for 13 ft. or 15 ft.
9E6 Traffic Signal Standard Poly Bracket Mountings (Typical) 13 ft. or 15 ft.
9E7 Traffic Signal Standard Pedestrian and Flasher Typical Mounting Details
9E8 Type 9, Type 10, Type 9/10 Special, Type 12 and Type 13 Poles with Monotube Arms
sheet a: *Type 9 Pole 15'-30' Monotube Arm*
sheet b: *Type 9 Special Pole 35' Monotube Arm*
sheet c: *Type 9 Special Pole 40' Monotube Arm*
sheet d: *Type 9 Special Pole 45' Monotube Arm*
sheet e: *Type 10 Pole 15'-30' Monotube Arm*
sheet f: *Type 10 Special Pole 35' Monotube Arm*
sheet g: *Type 10 Special Pole 40' Monotube Arm*
sheet h: *Type 10 Special Pole 45' Monotube Arm*
sheet i: *Type 12 Pole 35'-55' Monotube Arm*
sheet j: *Type 13 Pole 35'-55' Monotube Arm*
sheet k: *General Notes and Hardware Details for Type 9, Type 10, Type 9/10 Special, Type 12 and Type 13 Poles with Monotube Arms*
9E12 Over Height Poles and Monotube Arms
sheet a: *Over Height Type 9 Pole 15' - 30' Monotube Arm*
sheet b: *Over Height Type 9 Pole 35' Monotube Arm*

sheet c: *Over Height Type 9 Pole 40' Monotube Arm*
sheet d: *Over Height Type 9 Pole 45' Monotube Arm*
sheet e: *Over Height Type 10 Pole 15' - 30' Monotube Arm*
sheet f: *Over Height Type 10 Pole 35'' Monotube Arm*
sheet g: *Over Height Type 10 Pole 40' Monotube Arm*
sheet h: *Over Height Type 10 Pole 45' Monotube Arm*
sheet i: *Over Height Type 12 Pole 35' - 55' Monotube Arm*
sheet j: *Over Height Type 13 Pole 35' - 55' Monotube Arm*
sheet k: *General Notes and Hardware Details for Over Height Type 9, 10, 12 and 13 Poles with Monotube Arms*

9F. LOOP DETECTORS

9F1 Details for the Installation of Temporary Traffic Signal Loop Detector Wires in any Existing Pavement
9F4 Loop Detector Installed in New Concrete Pavement Round CSCP Pullbox
9F7 Loop Detector Installed in New Concrete Base with new Asphaltic Overlay Round CSCP Pullbox
9F8 Loop Detector Placed in Crushed Aggregate Base (New Asphaltic Pavement)
9F9 Loop Detector Placed in Crushed Aggregate Base (New Concrete Pavement)
9F10 Loop Detector Installed in Existing or New Asphaltic Pavement with New Asphaltic Overlay
9F11 Loop Detector Installed in Existing Concrete Pavement with New Asphaltic Overlay
9F12 Loop Detector Installed in Existing Concrete Pavement
9F13 Loop Detector Installed in Existing Asphaltic Pavement
9F14 Loop Detector Installed in New Concrete Pavement Round CSCP Pull Box 45 Degree Elbows to Pull Box
9F15 Loop Detector Installed in Base Course with Pull (Splice) Box Off Roadway (Options)
sheet a: *Loop Detector Installed in Base Course with Pull (Splice) Box Off Roadway (Option 1)*
sheet b: *Loop Detector Installed in Base Course with Pull (Splice) Box Off Roadway (Option 2)*
sheet c: *Loop Detector Installed in Base Course with Pull (Splice) Box Off Roadway (Option 3)*
9F16 Two Loop Detectors Installed in New Concrete Pavement Round CSCP Pull Box 45 Degree Elbows to Pull Box

9G. TEMPORARY TRAFFIC SIGNALS

9G1 Span Wire Temporary Traffic Signal
a b c d e f g
9G2 Bridge Temporary Traffic Signal Installation
a b c

9H. INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

9H1 Base ITS Controller Cabinet
9H3 2 Circuit Meter Breaker Pedestal
9H4 2 Circuit Electrical Service Meter Breaker Pedestal and Breaker Disconnect Box
9H5 Cabinet Breaker Disconnect Box Installation
9H6 Signal Assembly Advance Flasher Type 1
9H7 Signal Assembly Ramp Control Side mount
9H8 Communications Manhole Detail
9H9 Communication Vault Type 1
9H10 Communication Vault Type Round
9H11 Identification Plaque Requirements and Placement
9H14 Wireless Detection Sensor Mounting
9H15 Microwave Detector Assembly and Mounted Controller Installation
9H16 Wireless Antenna Installation

10. FREEWAY LIGHTING DESIGN

10A. GENERAL

10A1 Electrical Handhole Wiring
10A2 Identification Plaques Light Poles
10A3 Circuit Identification Plaques Sign Bridges
10A4 Identification Plaques Underdeck and High Mast Lighting
10A5 Electrical Details Ground Mount Light Poles Isolated Neutral Systems
10A6 Electrical Details Ground Mount Light Poles Grounded Neutral Systems
10A7 Electrical Details Ground Mount Light Poles Phase-to-Phase Systems
10A8 Electrical Details Structure Mount Light Poles Isolated Neutral Systems
10A9 Electrical Details Structure Mount Light Poles Grounded Neutral Systems
10A10 Electrical Details Structure Mount Light Poles Phase-to-Phase Systems
10A11 Electrical Details Median Mount Light Poles Isolated Neutral Systems
10A12 Electrical Details Median Mount Light Poles Grounded Neutral Systems
10A14 Electrical Details High Mast Lighting
a b
10A15 Electrical Details Underdeck Lighting
a b
10A17 Poles
sheet a: *Poles, Type 7 Aluminum - 35' - 10" Shaft*
sheet b: *Poles, Type A Aluminum 47'- 6" Shaft*
sheet c: *Poles, Type E Aluminum 49' – 0" Shaft*
sheet d: *Poles, Type F Aluminum 49' – 0" Shaft*
10A18 Luminaire Arms
sheet a: *Luminaire Arms, Single Member 6-inch Clamp*
sheet b: *Luminaire Arms, Truss Type 6-inch Clamp*

11. GEOMETRIC DESIGN

11A. MEDIANS

11A1 Maintenance Crossover for Freeways
11B1 Concrete Corrugated Median
11B2 Concrete Median Nose

12. STRUCTURES

12A. GENERAL

12A3 Name Plate (Structures)
12A4 Structure Identification Plaques, Ramp Gates, Sign Bridges, Overhead Sign Supports and Traffic Signals

13. PAVEMENT DESIGN

13A. GENERAL

13A3 Concrete Pavement Shoulders
13A5 Shoulder Rumble Strip, Milling
a b
13A7 Continuously Reinforced Concrete Pavement Repair and Replacement
13A8 Asphaltic Rumble Strips at Intersection

13A9 Concrete Rumble Strips at Intersection
13A10 2-Lane Rural Shoulder Rumble Strip, Milling
sheet a: *Shoulder Rumble Strips - Asphalt*
sheet b: *Shoulder Rumble Strips - Concrete*
sheet c: *Shoulder Rumble Strips – Asphalt, Sinusoidal*
sheet d: *Shoulder Rumble Strips – Concrete, Sinusoidal*
sheet e: *Edge Line Rumble Strips – Asphalt*
sheet f: *Edge Line Rumble Strips – Concrete*
sheet g: *Shoulder and Edge Line Rumble Strips – Crossings, Intersections, Bridges, Driveways*
sheet h: *Shoulder and Edge Line Rumble Strips – Railroad, Passing, Climbing and Bypass Lanes*
13A11 2-Lane Rural Center Line Rumble Strip, Milling
sheet a: *Centerline Rumble Strips – Asphalt*
sheet b: *Centerline Rumble Strips – Concrete*
sheet c: *Centerline Rumble Strips – Asphalt, Sinusoidal*
sheet d: *Centerline Rumble Strips – Concrete, Sinusoidal*

13B. APPROACH DETAILS

13B1 Pavement Details for Railroad Approach
sheet a: *Pavement Details for Railroad Approach*
sheet b: *Typical Sections for Railroad Approach*
13B2 Concrete Pavement Approach Slab
sheet a: *Concrete Pavement Approach Slab*
sheet b: *Structural Approach Slab and Concrete Pavement Approach Slab*

13C. JOINTS

13C1 Concrete Pavement Longitudinal Joints and Ties
13C4 Urban Non-Doweled Concrete Pavement
13C8 Concrete Pavement Partial Depth Repair
13C9 Concrete Pavement Repair and Replacement
a b c
13C10 Retrofit Dowel Bars
13C11 Rural Doweled Concrete Pavement
a b
13C13 Urban Doweled Concrete Pavement
13C14 Base Patching Concrete
a b c
13C15 Concrete Base
a b
13C16 Detail for Right Turn Lane/ Tee Intersection Bypass Lane on a Concrete Roadway
a b
13C18 Concrete Pavement Jointing
sheet a: *Concrete Pavement Jointing*
sheet b: *Concrete Placement Steel Reinforcement*
sheet c: *Concrete Pavement Joint Types*
sheet d: *Concrete Pavement Jointing at Utility Fixtures*
sheet e: *Concrete Pavement Jointing and Steel Reinforcement in Roundabouts*
sheet f: *Concrete Pavement Intersection Boxout for Integral Curb and Gutter*
sheet g: *Concrete Pavement Jointing Acceleration/Deceleration Lane*
13C19 HMA Longitudinal Joints

14. INCIDENTAL DESIGN

14A. PRESERVATION DETAILS

14A1 Tree Preservation Details

14A2 Tree Planting Detail

14B. VEHICLE BARRIER SYSTEMS

14B7 Concrete Barrier Temporary Precast

a b c d e f g h i j k l m n

14B8 Crash Cushion/Sand Barrel Array and Other Temporary Barrier Layout Details

sheet a: *End Treatments and General Note*

sheet b: *End Treatments and Transitions from Unanchored barrier to Anchored Barrier*

sheet c: *Overlapping of Temporary Barrier and Temporary Barrier Downstream of Hazard*

sheet d: *Connecting Temporary Barrier to Permanent Barrier and Overlapping Downstream Temporary Barrier with Permanent Barrier*

sheet e: *Median Installation*

14B11 Concrete Barrier (Double Faced)

14B15 Steel Plate Beam Guard, Class "A", Installation and Elements

a b c

14B16 Anchorage for Steel Plate Beam Guard Type 2

a b

14B18 Steel Plate Beam Guard, Class "A"

sheet a: *Steel Plate Beam Guard, Class "A" (at Bridges, Obstacles and Sideroads/Driveways)*

sheet b: *Steel Plate Beam Guard, Class "A" at Median Approach to Bridges at Median Piers and Sign Supports*

14B20 Steel Thrie Beam Structure Approach

sheet a: *Steel Thrie Beam Structure Approach*

sheet b: *Steel Thrie Beam Structure Approach, Connection to Square End Parapets*

sheet c: *Steel Thrie Beam Structure Approach, Connection to Vertical Faced Parapets*

sheet d: *Steel Thrie Beam Structure Approach, Connection to Sloped End Parapets*

sheet e: *Steel Thrie Beam Structure Approach, Connection to Bridge Railing Types "F" and "W"*

sheet f: *Steel Thrie Beam Structure Approach, Connection to Bridge Railing Type "M"*

sheet g: *Steel Thrie Beam Structure Approach, Connector Plate Detail*

sheet h: *Steel Thrie Beam Structure Approach, Single Slope Attachment*

14B22 Concrete Barrier, Single Faced (with Anchorage)

a b

14B24 Steel Plate Beam Guard Energy Absorbing Terminal

a b c

14B25 Steel Plate Beam Guard, Class "A", Over Low Fill Culverts

14B26 Steel Thrie Beam Bullnose Terminal

a b c d e f g h

14B27 Steel Plate Beam Guard Short Radius Terminal

a b c

14B28 Guardrail Mow Strip

a b

14B29 Safety Edge

14B32 Concrete Barrier Single Slope (CBSS)

sheet a: *Concrete Barrier Single Slope-Standard, Barrier on Bridge, Delineation*

sheet b: *Concrete Barrier Single Slope-Steel Reinforcement*

sheet c: *Concrete Barrier Single Slope Fixed Object Protection*

sheet d: *Concrete Barrier Single Slope-Drainage and Joint Detail*
sheet e: *Concrete Barrier Single Slope-Cold Joint and Height Transition*
sheet f: *Concrete Barrier Single Slope-End Anchor and Median Barrier, Reinforcement*
sheet g: *Concrete Barrier Single Slope and Retaining Wall*
sheet h: *Concrete Barrier Single Slope-Retrofit and Repair*

14B33 Concrete Barrier Single Slope Thrie Beam Anchorage
sheet a: *Concrete Barrier Single Slope 32-inch Thrie Beam Anchorage - Barrier Layout*
sheet b: *Concrete Barrier Single Slope 32-inch Thrie Beam Anchorage - Steel Layout #1*
sheet c: *Concrete Barrier Single Slope 32-inch Thrie Beam Anchorage - Steel Layout #2*
sheet d: *Concrete Barrier Single Slope 36-inch Thrie Beam Anchorage - Barrier Layout*
sheet e: *Concrete Barrier Single Slope 36-inch Thrie Beam Anchorage - Steel Layout #1*
sheet f: *Concrete Barrier Single Slope 36-inch Thrie Beam Anchorage - Steel Layout #2*
sheet g: *Concrete Barrier Single Slope 42-inch Thrie Beam Anchorage - Barrier Layout*
sheet h: *Concrete Barrier Single Slope 42-inch Thrie Beam Anchorage - Steel Layout #1*

14B34 Concrete Barrier Single Slope for Runs under 40-Feet Long
sheet a: *32-inch, 36-inch and 42-inch Concrete Barrier Single Slope Class B*
sheet b: *56-Inch Concrete Barrier Single Slope Class B*
sheet c: *Concrete Barrier Single Slope Type B*

14B35 Single-Faced NJ Shape Concrete Barrier to Single Slope Concrete Barrier Transitions
sheet a: *32-Inch Single-Faced NJ Shape to 32-Inch Single Slope Concrete Barrier Transition -Transition Layout*
sheet b: *32-Inch Single-Faced NJ Shape to 32-Inch Single Slope Concrete Barrier Transition - Steel Layout*
sheet c: *32-Inch Single-Faced NJ Shape to 36-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet d: *32-Inch Single-Faced NJ Shape to 36-Inch Single Slope Concrete Barrier Transition - Steel Layout*
sheet e: *42-Inch Single-Faced NJ Shape to 42-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet f: *42-Inch Single-Faced NJ Shape to 42-Inch Single Slope Concrete Barrier Transition - Steel Layout*

14B36 F Shape Concrete Barrier to Single Slope Concrete Barrier Transitions
sheet a: *32-Inch Single-Faced F Shape to 32-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet b: *32-Inch Single-Faced F Shape to 32-Inch Single Slope Concrete Barrier Transition - Steel Layout*
sheet c: *32-nch Single-Faced F Shape to 36-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet d: *32-Inch Single-Faced F Shape to 36-Inch Single Slope Concrete Barrier Transition - Steel Layout*
sheet e: *42-Inch Single-Faced F Shape to 42-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet f: *42-Inch Single-Faced F Shape to 42-Inch Single Slope Concrete Barrier Transition - Steel Layout*
sheet g: *51-Inch Single-Faced F Shape to 42-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet h: *51-Inch Single-Faced F Shape to 42-Inch Single Slope Concrete Barrier Transition - Steel Layout*
sheet i: *51-Inch Single-Faced F Shape to 56-Inch Single Slope Concrete Barrier Transition - Transition Layout*
sheet j: *51-Inch Single-Faced F Shape to 56-Inch Single Slope Concrete Barrier Transition - Steel Layout*

14B37 Double-Faced NJ Shape Concrete Barrier to Single Slope Concrete Barrier Transitions
sheet a: *32-Inch Double-Faced NJ Shape to 36-Inch Single Slope Concrete Barrier Transition – Transition Layout*
sheet b: *32-Inch Double-Faced NJ Shape to 36-Inch Single Slope Concrete Barrier Transition - Steel Layout*

14B38 Double-Faced F Shape Concrete Barrier to Single Slope Concrete Barrier Transitions
sheet a: *32-Inch Double-Faced F Shape to 32-Inch Single Slope Transition - Transition Layout*
sheet b: *32-Inch Double-Faced F Shape to 32-Inch Single Slope Transition - Steel Layout*
sheet c: *32-Inch Double-Faced F Shape to 36-Inch Single Slope Transition - Transition Layout*
sheet d: *32-Inch Double-Faced F Shape to 36-Inch Single Slope Transition - Steel Layout*

14B39 Height Transitions for Single Slope Concrete Barrier
sheet a: *32-inch to 36-inch Single Slope Concrete Barrier Height Transition*
sheet b: *36-inch to 42-inch Single Slope Concrete Barrier Height Transition*
sheet c: *42-inch to 56-inch Single Slope Concrete Barrier Height Transition*

14B40 Vertical Faced Concrete Barrier to Single Slope Concrete Barrier Transitions
sheet a: *32-Inch Vertical to 32-Inch Single Slope Transition - Transition Layout*

sheet b: *32-Inch Vertical to 32-Inch Single Slope Transition - Steel Layout*
sheet c: *32-Inch Vertical to 36-Inch Single Slope Transition - Transition Layout*
sheet d: *32-Inch Vertical to 36-Inch Single Slope Transition - Steel Layout*
sheet e: *42-Inch Vertical to 42-Inch Single Slope Transition - Transition Layout*
sheet f: *42-Inch Vertical to 42-Inch Single Slope Transition - Steel Layout*
sheet g: *51-Inch Vertical to 42-Inch Single Slope Transition - Transition Layout*
sheet h: *51-Inch Vertical to 42-Inch Single Slope Transition - Steel Layout*
sheet i: *56-Inch Vertical to 56-Inch Single Slope Transition - Transition Layout*
sheet j: *56-Inch Vertical to 56-Inch Single Slope Transition - Steel Layout*

14B41 Single Slope Roadside Retaining Wall
sheet a: *Single Slope Roadside Retaining Wall - Cross Section and Steel Details*
sheet b: *Single Slope Roadside Retaining Wall - Placement and Drainage*

14B42 Midwest Guardrail System (MGS) Guardrail
sheet a: *Midwest Guardrail System (MGS) - Installation Cross Sections, Post and Block Details*
sheet b: *MGS - Bolt, Post Spacing, Reflector Detail*
sheet c: *MGS - Block-out Depth, Bolt Detail, Beam Lapping, Alternative Wood Block-out and Adjusting post spacing for Obstructions*
sheet d: *MGS - Missing Post Details*

14B43 Midwest Guardrail System Long Span (MGS L)
sheet a: *Midwest Guardrail System Long Span (MGS L) Two-way Road Layout*
sheet b: *Midwest Guardrail System Long Span (MGS L) One-way Road Layout*
sheet c: *Midwest Guardrail System Long Span (MGS L) Cross Section and CRT Post Details*

14B44 Midwest Guardrail System (MGS) Terminal
sheet a: *Midwest Guardrail System (MGS) Energy Absorbing Terminal (EAT) - Layout*
sheet b: *MGS EAT - Ground Strut, Anchor Cable Box, Bearing Plate*
sheet c: *MGS EAT - Post Details, Block Detail, Marker Post Detail, Reflective Sheeting Detail*

14B45 Midwest Guardrail System (MGS) Thrie Beam Transition
sheet a: *Midwest Guardrail System (MGS) Thrie Beam Transition - Layout*
sheet b: *MGS Thrie Beam Transition - Post Details, Thrie Beam Terminal Connector Details, Splice Detail, Cross Section*
sheet c: *MGS Thrie Beam Transition - Thrie Beam Details, Post Details, Block Details*
sheet d: *MGS Thrie Beam Transition - W and Thrie Beam Connection to Bridge Parapet with Square Ends*
sheet e: *MGS Thrie Beam Transition - W and Thrie Beam Connection to Vertical Faced Parapets*
sheet f: *MGS Thrie Beam Transition - W and Thrie Beam Connection to Bridge Parapets with Sloped Ends*
sheet g: *MGS Thrie Beam Transition - Connection to W and F Bridge Parapet*
sheet h: *MGS Thrie Beam Transition - Connection to M Bridge Parapet*
sheet i: *MGS Thrie Beam Transition - Single Slope Connection Plate Details*
sheet j: *MGS Thrie Beam Transition - Connection to Single Slope Barrier*
sheet k: *MGS Thrie Beam Transition - Approach Connection to NY Bridge Parapets*
sheet l: *MGS Thrie Beam Transition - Downstream Connection to NY Bridge Parapets*

14B47 Midwest Guardrail System (MGS) Type 2 Terminal
sheet a: *Midwest Guardrail System (MGS) Type 2 Terminal - Terminal Layout*
sheet b: *MGS Type 2 Terminal - Details*
sheet c: *MGS Type 2 Terminal – Post Components and Assemblies*
sheet d: *MGS Type 2 Terminal – Ground Strut, Guardrail, Cable Assembly Components*
sheet e: *MGS Type 2 Terminal –Arm Components and Assembly, Cable Bracket Components and Assembly*
sheet f: *MGS Type 2 Terminal – Part List*
sheet g: *MGS Type 2 Terminal – Part List*

14B48 Retrofit Cantilever Blunt End
sheet a: *Retrofit Cantilever Blunt End - Elevation, Section details, Installation and Bill of Materials*

sheet b: *Retrofit Cantilever Blunt End - Components*

14B49 Retrofit Cantilever Sloped End

sheet a: *Retrofit Cantilever Sloped End - Elevation, Section Detail Installation and Bill of Materials*

sheet b: *Retrofit Cantilever Sloped End - Anchor Plate Assembly Parts and Component Details*

14B50 Thrie Beam Approach Retrofit Installation of Missing Post

sheet a: *Thrie Beam Approach Retrofit Installation of Missing Post - Missing Post Cross-Beam Layout*

sheet b: *Thrie Beam Approach Retrofit Installation of Missing Post - Missing Post Cross-Beam Components*

sheet c: *Thrie Beam Approach Retrofit Installation of Missing Post -Post Details, Bill of Materials*

14B51 Anchor Post Assembly Top Mounted

sheet a: *Anchor Post Assembly Top-Mounted - Layout and Mounting Details*

sheet b: *Anchor Post Assembly Top-Mounted - Assembly Details*

sheet c: *Anchor Post Assembly Top-Mounted - Fill, Joint Placement and Bill of Materials*

14B52 Cable Barrier Type 1

sheet a: *Cable Barrier Type 1 - Layout, Material List*

sheet b: *Cable Barrier Type 1 - Rock Excavation, Cross Section, Line Post Details*

sheet c: *Cable Barrier Type 1- Layout, Bill of Materials*

14B53 Short Radius MGS

sheet a: *Short Radius Beam Guard and Terminal (MGS) - Layout*

sheet b: *Short Radius Beam Guard and Terminal (MGS) - Short Radius Terminal Views, Detail A*

sheet c: *Short Radius Beam Guard and Terminal (MGS) - Terminal Detail B, Detail C and Detail D*

sheet d: *Short Radius Beam Guard and Terminal (MGS) - Terminal Anchor Bracket and Anchor Bracket Bearing Details*

sheet e: *Short Radius Beam Guard and Terminal (MGS) - End Section Buffer, Terminal Connector, Reflector Sheeting Parts*

sheet f: *Short Radius Beam Guard and Terminal (MGS) - Washer, Post, Tube, Plate and Terminal Post Details, Cable Assembly Detail*

sheet g: *Short Radius Beam Guard and Terminal (MGS) - Part List*

sheet h: *Short Radius Beam Guard and Terminal (MGS) - Part List*

sheet i: *Short Radius Beam Guard and Terminal (MGS) - Part List*

14C. RECREATIONAL FACILITIES

14C1 Timber Rail Guard Fence, Curb and Guard Post and Marker Post

14C2 Historical Marker Construction

14C3 Roadside Picnic Table

14C6 Wayside Well Shelter and Pump and Well Platform

a b

14C7 Picnic Tables, Single Pedestal

a b

14D. ENVIROMENTAL FACILITIES

14D1 Turtle Exclusion Fence Climbing Turtle

15. R/W, ACCESS CONTROL AND TRAFFIC CONTROL

15A. MARKER POSTS

15A1 Marker Post for Right-of-Way

sheet a: *Marker Post for Right-of-Way*

sheet b: *Flexible Marker Post for Right-of-Way*

15A3 Flexible Marker Post for Culvert End

a b

15A4 Delineator and Delineator Post

sheet a: *Flexible Delineator Post*

sheet b: *Barrier Wall Delineator with Reflective Sheeting*

sheet c: *Delineator Post with Reflective Sheeting*

sheet d: *Channelizing Devices, Permanent Flexible Tubular Marker Post*

sheet e: *Delineator Post with Reflective Sheeting*

15A7 Object Marker for Hazardous Culverts

15B. FENCING

15B1 Fence Woven Wire

a b

15B3 Chain Link Fence

a b

15B10 Wood Gate, Double Leaf

a b c

15B11 Wood Gate, Single Leaf

a b

15B12 Pipe Gate Details

a b

15C. MARKING AND SIGNING

15C2 Barricades and Signs for Mainline, Detour, On Ramp, Off Ramp Closures and Advanced Width Restriction

sheet a: *Barricades and Signs for Mainline Closures*

sheet b: *Barricades and Signs for Various Closures*

sheet c: *Detour Signing for Mainline Closures*

sheet d: *On-Ramp Lane Closure*

sheet e: *Traffic Control, Guidance Signing for Off-Ramp Lane Closure*

sheet f: *Advanced Width Restriction Signing*

sheet g: *Traffic Control for Entrance Ramp Closure*

sheet h: *Modified Route Assembly for Detour Signing*

15C3 Barricades and Signs for Sideroad Closures

15C4 Traffic Control, Advance Warning Signs 45 M.P.H. or Greater, Two Way Undivided Road Open to Traffic

15C5 Traffic Control, Advance Warning Signs 40 M.P.H. or Less, Two Way Undivided Road Open to Traffic

15C6 Signing and Marking for Two Lane Bridges

15C7 Pavement Marking Words, Symbols and Arrows

sheet a: *Pavement Marking Symbols*

sheet b: *Pavement Marking Words*

sheet c: *Pavement Marking Arrows*

sheet d: *Roundabout Marking Arrows*

sheet e: *Pavement Marking for Bike Lanes*

15C8 Pavement Marking, Mainline and Turn Lanes

sheet a: *Longitudinal Marking (Mainline)*

sheet b: *Pavement Marking (Turn Lanes)*

sheet c: *Pavement Marking (Turn Lanes)*

sheet d: *Pavement Marking (Turn Lanes)*

15C9 Signing and Pavement Crossing, RR Truck Stopping Lane Marking Railroad Grade

sheet a: *Signing and Pavement Marking Details for Railroad - Highway Grade Crossings*

sheet b: *Railroad Truck Stopping Lane Pavement Markings*

15C11 Channelizing Devices
- sheet a: *Channelizing Devices - Flexible Tubular Marker Post*
- sheet b: *Channelizing Devices - Drums, Cones, Barricades and Vertical Panel*

15C12 Traffic Control for Lane Closure with Flagging Operation
- a b

15C14 Aerial Enforcement Bars Pavement Marking Details

15C18 Median Island Marking
- sheet a: *Pavement Markings, Median Islands*
- sheet b: *Pavement Markings, Median Island Nose*
- sheet c: Median *Pavement Markings, Double Arrow Warning Sign Placement*

15C19 Moving Pavement Marking Operations
- sheet a: *Moving Pavement Marking Operation - Two-Lane Two-Way Roadway*
- sheet b: *Moving Pavement Marking Operation – Multi-lane Undivided Roadway*
- sheet c: *Moving Pavement Marking Operation - Multi-Lane Divided Roadway*

15C20 Yield Markings

15C21 Signing and Marking for Two Lane to Four Lane Divided Transitions

15C26 End-of-Roadway Signing

15C29 Bicycle Lane Pavement Marking
- sheet a: *Bicycle Lane Marking*
- sheet b: *Bicycle Lane – Pavement Marking for Shared Lane 35 MPH or Less*

15C31 Pavement Marking (Ramps and Gores)
- sheet a: *Pavement Marking Exit Ramp and Parallel Exit Ramp*
- sheet b: *Pavement Marking Major Split Freeway to Freeway*
- sheet c: *Pavement Marking Entrance Ramp and Parallel Entrance Ramp*
- sheet d: *Pavement Marking, Lane Drop and Lane Reduction*

15C33 Stop Line and Crosswalk Pavement Marking

15C34 Standard Application for Temporary Raised Pavement Markers, Type II

15C35 Pavement Marking
- sheet a: *Pavement Marking (Intersections)*
- sheet b: *Pavement Marking (Climbing and Passing Lanes)*
- sheet c: *Pavement Marking (Climbing and Passing Lanes)*

15C36 Parking Stall Marking

15D. TRAFFIC CONTROL

15D4 Traffic Control, Ramp Construction Staging

15D5 Traffic Control, Single Lane Crossover Entrance with Barrier

15D6 Traffic Control, Two-Lane Two-Way Operation

15D7 Traffic Control, Temporary Exit Ramp Crossover

15D8 Traffic Control, Temporary Entrance Ramp Crossover

15D9 Traffic Control, Single Lane Crossover Exit

15D10 Traffic Control, Single Lane Crossover Exit with Barrier

15D11 Traffic Control, Single Lane Crossover

15D12 Traffic Control
- sheet a: *Traffic Control, Lane Closure*
- sheet b: *Traffic Control, Lane Closure, Speed Reduction*
- sheet c: *Traffic Control, Lane Closure, Dynamic Late Merge System*
- sheet d: *Traffic Control, Lane Closure, Basic Traffic Queue Warning System*

sheet e: *Traffic Control, Lane Closure, Traffic Queue Warning System*
sheet f: *Traffic Control, Lane Closure, With Temporary Rumble Strips*
sheet g: *Traffic Control, Lane Closure, Digital Speed Reduction System*

15D13 Temporary Emergency Pullouts

15D14 Traffic Control, Two Lane Closure on Freeway or Expressway

15D15 Traffic Control, Ramp within Lane Closure
sheet a: *Traffic Control, Parallel Entrance Ramp within Right Lane Closure*
sheet b: *Traffic Control, Entrance Ramp within Left Lane Closure*
sheet c: *Traffic Control, Tapered Entrance Ramp within Right Lane Closure*
sheet d: *Traffic Control, Tapered Entrance Ramp within Left Lane Closure*
sheet e: *Traffic Control, Parallel Exit Ramp within Lane Closure*

15D16 Traffic Control, Exit Ramp Closure

15D20 Traffic Control, Single Lane Closure, Non-Freeway/Expressway
sheet a: *Traffic Control, Single Lane Closure, Divided Non-Freeway/Expressway*
sheet b: *Traffic Control, Single Right Lane Closure Undivided Non-Freeway/Expressway*
sheet c: *Traffic Control, Single Left Lane Closure Undivided Non-Freeway/Expressway*

15D21 Traffic Control, Intersection within Single Lane Closure
sheet a: *Traffic Control, Intersection within Single Right Lane Closure*
sheet b: *Traffic Control, Intersection within Single Left Lane Closure*

15D22 Traffic Control, Two Lane Closure, Non-Freeway/Expressway

15D23 Traffic Control, Intersection within Two Lane Closure
sheet a: *Traffic Control, Intersection within Two Right Lane Closure*
sheet b: *Traffic Control, Intersection within Two Left Lane Closure*

15D27 Traffic Control, Shoulder Closure on Divided Roadway, Speeds Greater than 40 M.P.H.

15D28 Traffic Control, Work on Shoulder or Parking Lane, Undivided Roadway

15D29 Traffic Control, Vehicle Entrance/Exit or Haul Road

15D30 Traffic Control, Pedestrian Accommodation
sheet a: *Traffic Control, Pedestrian Accommodation*
sheet b: *Traffic Control, Temporary ADA Compliant Pedestrian Accommodation*
sheet c: *Traffic Control, Temporary Pedestrian Accommodation*
sheet d: *Traffic Control, Pedestrian Accommodation*
sheet e: *Traffic Control, Pedestrian Accommodation*
sheet f: *Traffic Control, Pedestrian Accommodation*
sheet g: *Traffic Control, Pedestrian Accommodation*
sheet h: *Traffic Control, Pedestrian Accommodation*
sheet i: *Traffic Control, Pedestrian Accommodation*
sheet j: *Traffic Control, Pedestrian Accommodation*
sheet k: *Traffic Control, Pedestrian Accommodation*
sheet l: *Traffic Control, Pedestrian Accommodation*

15D31 Traffic Control, Temporary Bypass Roadway

15D32 Traffic Control, One Lane Road Stop Condition

15D33 Traffic Control, One Lane Road with Temporary Signals

15D35 Ramp Gate
a b c

15D36 Barricade Rack

15D37 Traffic Control, Flagging Operation, Roundabout

15D39 Traffic Control for Drop-off Signing

15D40 Traffic Control, Lane Shift, Multi-Lane Divided or One-Way Road
sheet a: *Traffic Control, Full Lane Shift, Non-Freeway/Expressway or Multilane Divided 45MPH or Under*

sheet b: *Traffic Control, Full Lane Shift Multilane Divided 50MPH and Greater*
sheet c: *Traffic Control, Partial Lane Shift, Non-Freeway/Expressway or Multilane Divided 45MPH or Under*
sheet d: *Traffic Control, Partial Lane Shift Multilane Divided 50MPH and Greater*

15D41 Traffic Control, Lane Shift, Multi-lane Divided
sheet a: *Traffic Control Multiple Lane Shift Divided Road*
sheet b: *Traffic Control Multiple Lane Shift Divided Road Temporary Rumble Strips*

15D42 Traffic Control, Two Lane Full Freeway Closure
15D43 Traffic Control, Short Duration Mobile Operations
15D44 Traffic Control, Signing on Roadways with Milled Surfaces
15D45 Traffic Control, Signing on Roadways with Loose Gravel
15D46 Traffic Control, One-Way Signing
15D47 Traffic Control, Ingress/Egress
sheet a: *Ingress/Egress with Barrier*
sheet b: *Ingress/Egress without Barrier*
15D48 Traffic Control, Lane Shift in Flagging Operation
15D49 Traffic Control, System Ramp Closure
15D50 Traffic Control, Added Lane Closure
sheet a: *Added Lane Closure without Lane Shift*
sheet b: *Added Lane Closure with Lane Shift*
15D51 Traffic Control, Mobile Operations on an Undivided Roadway

16. SURVEYING

16A. MONUMENTS

16A2 Geodetic Survey Monuments