



FY 2023-24 STANDARD PLANS FOR ROAD CONSTRUCTION

*Effective for Projects with Lettings in the Fiscal Year (FY) from
July 1, 2023 through June 30, 2024*

FY 2023-24 Standard Plans for
Road and Bridge Construction
Topic No. 625-010-003

UFTI-T2 Center
2100 NE Waldo Road, Bldg. 1604, Ste. 106
Gainesville, FL 32609
(352) 273 - 1670
www.techtransfer.ce.ufl.edu

State of Florida Department of Transportation
Office of Design
Mail Station 32
605 Suwannee Street
Tallahassee, Florida 32399-0450

ABBREVIATIONS

FY 2023-24 STANDARD PLANS

Abbreviation	Meaning
A	
AASHTO	American Association Of State Highway And Transportation Officials
AC	Alternating Current
Accel.	Acceleration
ACI	American Concrete Institute
ADA	Americans With Disabilities Act
ADT	Average Daily Traffic
AFAD	Automated Flagger Assistance Device
AISC	American Institute Of Steel Construction
AISI	American Iron and Steel Institute
Alt.	Alternate
Alum.	Aluminum
ANSI	American National Standards Institute
AOS	Apparent Opening Size
APL	Approved Products List
App.	Approach
Approx.	Approximate
ARTBA	American Road & Transportation Builders Association
Asph.	Asphalt
Assem.	Assembly
ASTM	American Society For Testing And Materials
ATPB	Asphalt Treated Permeable Base
Auxil.	Auxiliary
AWG	American Wire Gauge
AWS	American Welding Society
B	
Bot.	Bottom
Brkwy.	Breakaway
b/w	Between
C	
CC, C to C	Center to Center
C & G	Curb And Gutter
C.C.	Crash Cushion
CCTV	Closed-Circuit Television
CFR	Code of Federal Regulations
CFRP	Carbon Fiber Reinforced Polymer
cfs, CFS	Cubic Feet Per Second
CIP, C.I.P. or C-I-P	Cast In Place
CJP	Complete Joint Penetration
Ckt.	Circuit
☐	Center Line
Cl.	Clearance
CMP	Corrugated Metal Pipe
Con.	Connection
Conc.	Concrete
Const.	Construct or Construction
Cont.	Continuation or Continuous
Corr.	Corrugated
Cov.	Cover
CP	Concrete Pipe

Abbreviation	Meaning
C	
CSIP	Cost Savings Initiative Proposal
CSL	Cross-hole Sonic Logging
CTPB	Cement Treated Permeable Base
Ctr., Ctrs.	Center
Cu. Ft.	Cubic Feet
Cu. Yd., CY,	Cubic Yard
D	
D	Depth, Distance or Diameter
Dia. or Ø	Diameter
Dbl.	Double
Decel.	Deceleration
Deg.	Degree
Dim.	Dimension
Dist.	Distance
DMM	Domestic Mail Manual
DPI	Ditch Point Intersection
Dt	Ditch
DTOE	District Traffic Operations Engineer
E	
e	Superelevation Rate
E.P. or EOP	Edge Of Pavement
EA or Ea.	Each
EIA	Electronic Industries Alliance
El. or Elev.	Elevation
Embed.	Embedment
EPDM	Ethylene Propylene Diene Monomer
Eq.	Equation or Equal
Equip.	Equipment
etc.	Et Cetera (And So Forth)
ETP	Electronic Tough Pitch
Ex.	Example
Exist.	Existing
Exp.	Expansion
Ext.	Extension
F	
FAC	Florida Administrative Code
FC	Friction Course
Fdn.	Foundation
F.L. or f_l	Flow Line
Fl.	Florida
FDEP	Florida Department Of Environmental Protection
FDOT	Florida Department Of Transportation
FHWA	Federal Highway Administration
FIB	Florida-I Beam
F.S.	Florida Statutes
FS	Far Side
FSB	Florida Slab Beam
Ft.	Foot or Feet
FTP	Florida Traffic Plans

Abbreviation	Meaning
G	
G	Shear Modulus
g	Gram
Ga.	Gauge or Gage
Galv.	Galvanized
GFI	Ground Fault Interrupter
GFRP	Glass Fiber Reinforced Polymer
Grd.	Ground
H	
Hd.	Head
H.S., HS	High Strength
HDPE	High Density Polyethylene
Horiz.	Horizontal
HP	Horsepower or H-Pile
HSHV	High Strength Horizontal Vertical
I	
ID, I.D.	Inside Diameter or Identification
in.	Inch(es)
Inc.	Incorporated
Int.	Interior
Inv.	Invert
ITS	Intelligent Transportation Systems
J	
JCT	Junction
Jt.	Joint
K	
k	kip
kip	1000 Pounds
ksi	Kips Per Square Inch
kVA	Kilovolt Ampere
L	
L	Length
LA	Limited Access
lb or lbs.	Pound(s)
lb/sy	Pounds Per Square Yard
lbf	Pound force
LBR	Lime rock Bearing Ratio
LF	Linear Foot (Feet)
Lgth.	Length
Long.	Longitudinally or Longitudinal
LRFD	Load Resistance Factor Design
LRS	Low-Relaxation Strand
LS	Lump Sum
LSD	Lump Sum per Day
Lt.	Left

ABBREVIATIONS

FY 2023-24 STANDARD PLANS

Abbreviation	Meaning
M	
<i>m</i>	Meter
<i>m²</i>	Meter Square
<i>Mach.</i>	Machine
<i>MAS</i>	Motorist Awareness System
<i>MASH</i>	Manual for Assessing Safety Hardware (AASHTO)
<i>Max.</i>	Maximum
<i>MES</i>	Mitered End Section
<i>M.H.</i>	Manhole or Mounting Height
<i>MHW</i>	Mean High Water
<i>Mid.</i>	Middle
<i>Mil or Mils</i>	One-Thousandth Of An Inch
<i>Min.</i>	Minimum or Minute
<i>Misc.</i>	Miscellaneous
<i>MLW</i>	Mean Low Water
<i>mm</i>	Millimeter
<i>Mod.</i>	Modification
<i>MOT</i>	Maintenance Of Traffic
<i>MPH or mph</i>	Miles Per Hour
<i>MUTCD</i>	Manual On Uniform Traffic Control Devices
N	
<i>N</i>	Standard Penetration Number
<i>NA or N/A</i>	Not Available or Not Applicable
<i>NC</i>	Normal Crown
<i>NCHRP</i>	National Cooperative Highway Research Program
<i>NDCBU</i>	Neighborhood Delivery And Collection Box Unit
<i>NEMA</i>	National Electrical Manufacturers Association
<i>NHW</i>	Normal High Water
<i>No.</i>	Number
<i>Nom.</i>	Nominal
<i>NPS</i>	Nominal Pipe Size
<i>NPT</i>	National Pipe Thread
<i>NS or N.S.</i>	Near Side
<i>NS</i>	Non-Structural
<i>NTS</i>	Not To Scale
O	
<i>O.C.</i>	On Center
<i>O to O or O.O.</i>	Out to Out
<i>O.B.G.</i>	Optional Base Group
<i>OD or O.D.</i>	Outside Diameter
<i>Oz.</i>	Ounce
P	
<i>Pavt.</i>	Pavement
<i>PBR</i>	Pedestrian/Bicycle Railing
<i>PC</i>	Point Of Curvature
<i>PCC</i>	Plain Cement Concrete
<i>pcf</i>	Pounds per Cubic Foot
<i>PCMS</i>	Portable Changeable Message Sign
<i>P.E. or PE</i>	Professional Engineer

Abbreviation	Meaning
P	
<i>Pen.</i>	Penetration
<i>PPB</i>	Pier Protection Barrier
<i>PPP</i>	Polypropylene pipe
<i>Prest.</i>	Prestressed
<i>PRS</i>	Portable Regulatory Sign
<i>psf</i>	Pounds Per Square Foot
<i>PSI or psi</i>	Pounds Per Square Inch
<i>PT</i>	Point of Tangency or Pressure Treated
<i>PTFE</i>	Polytetrafluoroethylene
<i>PVC</i>	Polyvinyl Chloride
Q	
<i>Q</i>	Flow Volume
<i>Qty.</i>	Quantity
R	
<i>R or Rad.</i>	Radius
<i>Rt.</i>	Right
<i>R/W</i>	Right Of Way
<i>RC</i>	Reverse Crown
<i>RCP</i>	Reinforced Concrete Pipe
<i>Rd.</i>	Road or Round
<i>Rdwy.</i>	Roadway
<i>Rect.</i>	Reticuline or Rectangular
<i>Ref.</i>	Reference
<i>Reinf.</i>	Reinforced or Reinforcement
<i>Req. or Reqd.</i>	Required
<i>RGS</i>	Rigid Galvanized Steel
<i>RPM</i>	Raised Pavement Markers
<i>R/R or RR</i>	Railroad
<i>RSDU</i>	Radar Speed Display Unit
<i>RU</i>	Rack Unit
<i>RX</i>	Receive
S	
<i>S or s</i>	Speed, Spacing or Second
<i>Sch.</i>	Schedule
<i>SHBR</i>	Special Height Bicycle Railing
<i>Shldr.</i>	Shoulder
<i>SHW</i>	Seasonal High Water
<i>SIP</i>	Stay In Place
<i>SP</i>	Superpave
<i>Spa., Spcg. or Sp.</i>	Space(ing)(s)
<i>Spec.</i>	Specification
<i>sq</i>	Square
<i>Sq. Ft., SF, sf or S.F.</i>	Square Foot
<i>sq. in.</i>	Square Inch
<i>Sq. Yd., SY or S.Y.</i>	Square Yard
<i>SR</i>	State Road
<i>FSB</i>	Florida Slab Beam
<i>SS</i>	Stainless Steel

Abbreviation	Meaning
S	
<i>St. or ST.</i>	Street
<i>Sta.</i>	Station
<i>Std.</i>	Standard
<i>Stg.</i>	Strong
<i>Stl.</i>	Steel
<i>SW</i>	Skewed Angle
<i>Swk.</i>	Sidewalk
<i>SYM</i>	Symmetrical
T	
<i>T or t</i>	Thickness, Tangent Distance or Time
<i>Tan</i>	Tangent
<i>T&G</i>	Tongue and Groove
<i>TCP</i>	Traffic Control Plan(s)
<i>TCZ</i>	Traffic Control Zone
<i>Temp.</i>	Temperature or Temporary
<i>Theo.</i>	Theoretical
<i>THW or THWN</i>	Insulation (Flame Retardant, Moisture And Heat Resistant Thermoplastic)
<i>TMA</i>	Truck/Trailer Mounted Attenuator
<i>TN</i>	Ton
<i>Trans.</i>	Transition or Transverse
<i>TTC</i>	Temporary Traffic Control
<i>TVSS</i>	Transient Voltage Surge Suppression
<i>TX</i>	Transmit
<i>Typ.</i>	Typical
U	
<i>UL</i>	Underwriters Laboratories
<i>UPS</i>	Uninterruptible Power Supply
<i>USPS</i>	United States Postal Service
<i>Util.</i>	Utilities
<i>UV</i>	Ultraviolet
V	
<i>Veh.</i>	Vehicle
<i>Vert.</i>	Vertical
<i>VPD or Vpd.</i>	Vehicles Per Day
W	
<i>W</i>	Width or Wide
<i>WT</i>	Weight
<i>WWM</i>	Welded Wire Mesh
<i>WWR</i>	Welded Wire Reinforcing
Y	
<i>Yd.</i>	Yard
<i>Yr.</i>	Year

**STANDARD PLANS
FY 2023-24 REVISIONS LOG**

Standard Plans Index	Description
102-120	<i>Sheet 2: Added tension link details.</i>
102-200	<i>Sheet 1: Changed the bridge design type in General Notes. Sheet 2: Removed double bearing note. Sheet 3: Corrected the raker beam connection; Removed double bearing Notes. Sheet 4: Removed double bearing Notes and details. Sheet 5: Removed double bearing Notes and details. Sheet 6: Added slight gap between beam stops and beam.</i>
102-201	<i>Sheet 2: Updated guardrail backplate details to add clarifying information and remove errors.</i>
102-604	<i>Sheet 1: Deleted Note 6 "District Traffic Operations Engineer must approve temporary signal phasing modifications prior to beginning or work". Added note to Specification 102-9.</i>
102-606	<i>Deleted Note 2 "District Traffic Operations Engineer must approve the installation and timing of temporary signals modifications prior to beginning or work. Adjust timing based on changing field conditions as approved by the Worksite Traffic Supervisor. Obtain approval from the District Traffic Operations Engineer for any timing changes that are either reoccurring or last longer than 24 hours". Added note to Specification 102-9.</i>
102-607	<i>Sheet 1: Deleted "Flashing" from the Arrow Board Mode.</i>
102-615	<i>Sheet 1: Deleted Note 3 and added to Specification 102-9.</i>
102-680	<i>Deleted Note 2 and added Note to Specification 102-9.</i>
350-001	<i>Sheet 1: Deleted Notes 1 and 2; Added Note from Sheet 2; Deleted Contraction Joint (Vibro Case Method); Moved the Dowel Bars Cap, Dowel Bar Layout, and Relation of the Tie Bars to Dowel Bars details to New Sheet 2. Moved the Joint Seal Dimensions details from Sheet 2. Sheet 2: Added the Dowel Bars Cap, Dowel Bar Layout, and Relation of the Tie Bars to Dowel Bars details. Sheet 3: Large Right Turn, Standard Intersection, and Skewed Intersection Details.. Sheet 4: Includes Isolation Joint Details. Sheet 5: Changed note language; Added 15' dimensions to 2-Thru Lane details.</i>
400-090	<i>Sheet 1: Updated Note 9 into 2 Notes.</i>

Standard Plans Index	Description
415-010	<i>Sheet 1: Added new bar bend type.</i>
425-060	<i>Sheet 2: EDITORIAL - Revise both Section A-A Details to show the short side #5s in the slab on the bottom of the long side #4s.</i>
455-001	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-030	<i>Reverted to the previous version of the Standard.</i>
455-031	<i>Reverted to the previous version of the Standard.</i>
455-054	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-060	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-101	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-154	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-160	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-400	<i>Sheet 1: Changed Class V (Special) concrete to Class V.</i>
455-440	<i>Sheet 1: Changed Class V (Special) concrete to Class V. Sheet 2: Updated Dimension B which takes into account the latest FRP bar bending radius's; Removed note 5 which was only required because of dimension B.</i>
515-022	<i>Sheet 3: Corrected the relative location and dimensions of the base plate and post with respect to the edge of the bullet rail.</i>
521-001	<i>Sheet 1: Note 1 - Changed Concrete Surface Finish Class 3 to General Surface Finish; Note 7 - Clarified that doweled joint connection includes Wall Coping barriers. Sheet 2: Changed "NOTES" heading to "MEDIAN BARRIER NOTES" to clarify applicability throughout Index; Note 2 - Changed wording of "Space joints" to "Place joints" to clarify need for joints; Elevation - Removed junction slab callout; Note 5 - Replaced existing redundant note with "Minor Grade Separation" note. Sheet 13: Elevation - Added Wall Coping Barrier to callout at dowel connection; Changed "NOTES" heading to "SHOULDER BARRIER NOTES" to clarify applicability throughout Index. Sheet 19: Section A-A Option 'B' - Corrected height callout of 36" Height Traffic Railing to remove 1/16" CADD error. Sheet 20: Elevation - Added Wall Coping Barrier to callout at dowel connection.</i>

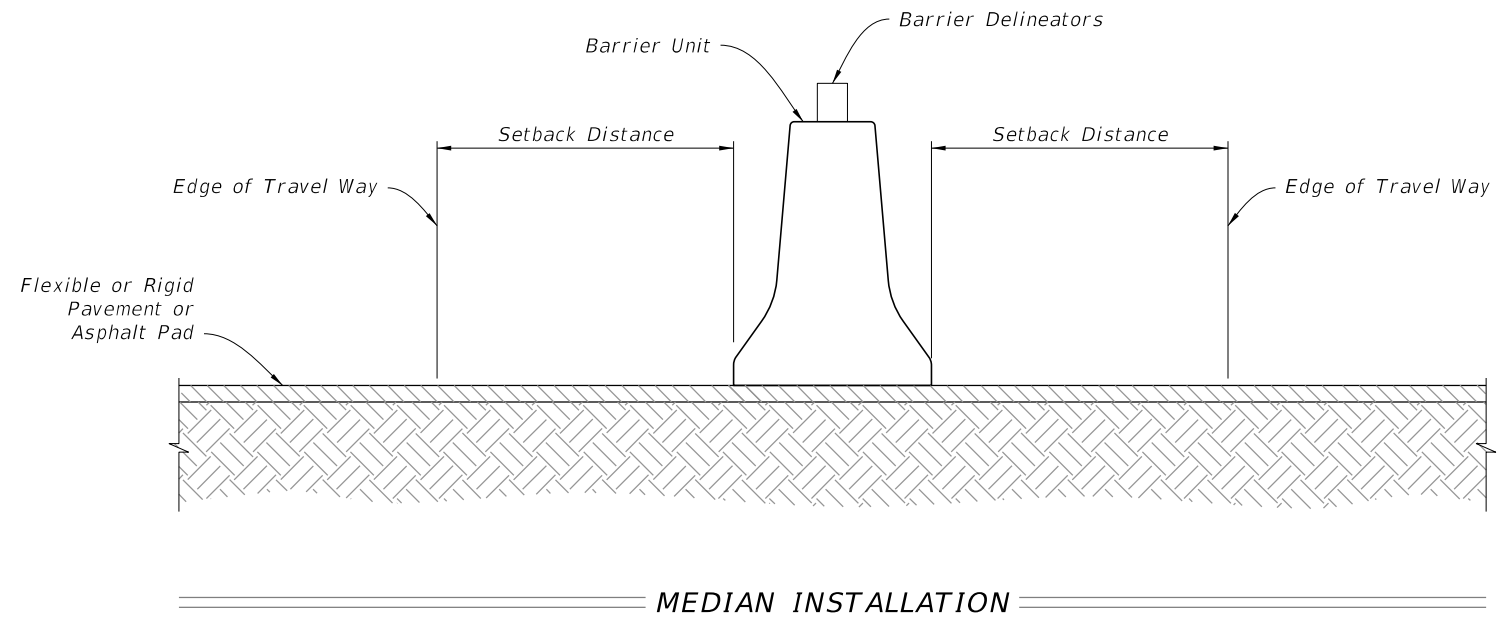
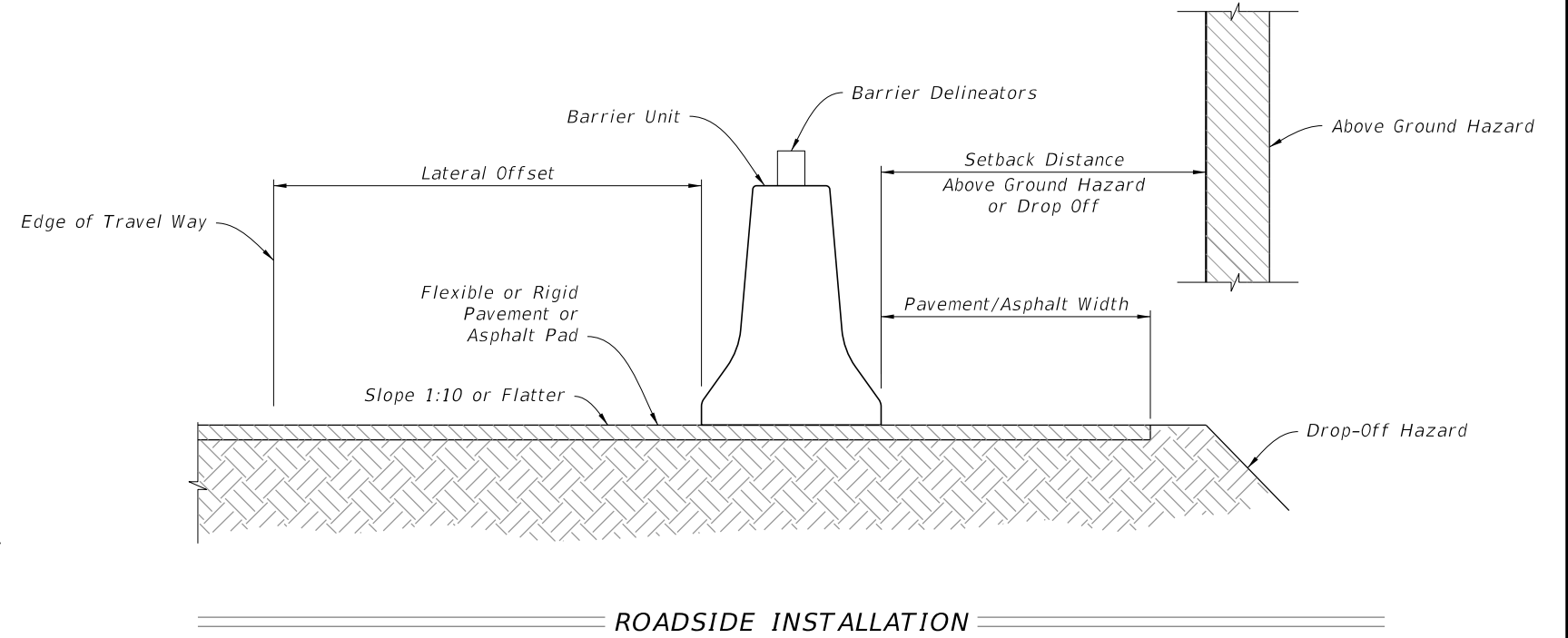
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000-511	Superelevation Transitions - Low Speed Roadways
000-525	Ramp Terminals
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425-090	Safety Modifications for Inlets In Box Culverts

GENERAL NOTES:

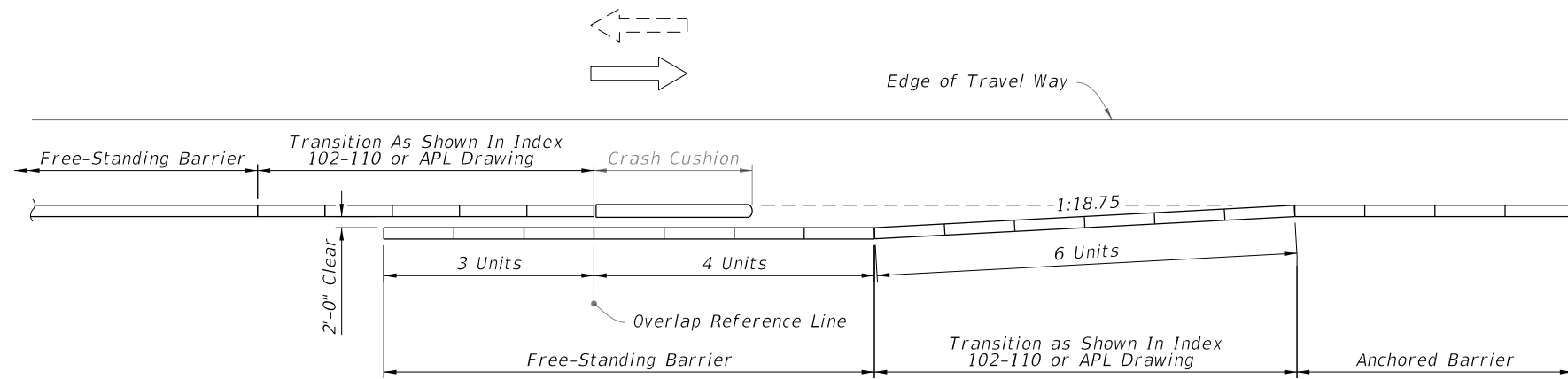
1. Temporary barrier systems may be any of the following:
 - A. Type K Temporary Concrete Barrier System (Index 102-110) installed as either Free-Standing or Anchored.
 - B. Proprietary Temporary Barrier Systems on the Approved Product List (APL).
 - a. Concrete Barrier (Free-Standing or Anchored)
 - b. Steel Barrier (Anchored)
 - c. Water Filled Barrier (Free-Standing)
2. Where existing flexible pavement is not present, construct a minimum 2" thick temporary Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification 339 with the exception that the use of a pre-emergent herbicide is not required.
3. For Barrier Delineators, see Specification 102. Mount on top of temporary barriers. Color must match adjacent longitudinal pavement marking.
4. Remove all grass debris, loose dirt, and sand for the pavement, bridge deck, or asphalt pad surface within the barrier footprint just prior to placement of the temporary barrier.
5. Ensure the setback distance is clear of any grass, construction debris, stockpiled materials, equipment, and objects.
6. Transitions are required between Type K Barrier and free-standing, anchored, back-filled or other types of temporary barrier. See Index 102-110 for transitions between Type K Barrier and permanent bridge or traffic railing. Refer to the APL for transitions allowed for Proprietary Temporary Barrier Systems.
7. Anchoring (Bolting) of temporary barrier or crash cushions is not permitted on bridge superstructures that contain post-tensioned tendons within the concrete deck (top flange of concrete box girders) or on bridge superstructures consisting of longitudinally prestressed, transversely post-tensioned, solid or voided concrete slab units.
8. Anchor abutting segments of temporary barrier terminated with a Crash Cushion as shown in Index 102-110 or the APL.
9. The requirements of this Index do not apply to Temporary Low Profile Barrier, See Index 102-120.
10. Setback requirements below cover most Temporary Barrier options. Provide additional setback distance for APL products that require additional setback (deflection) space.



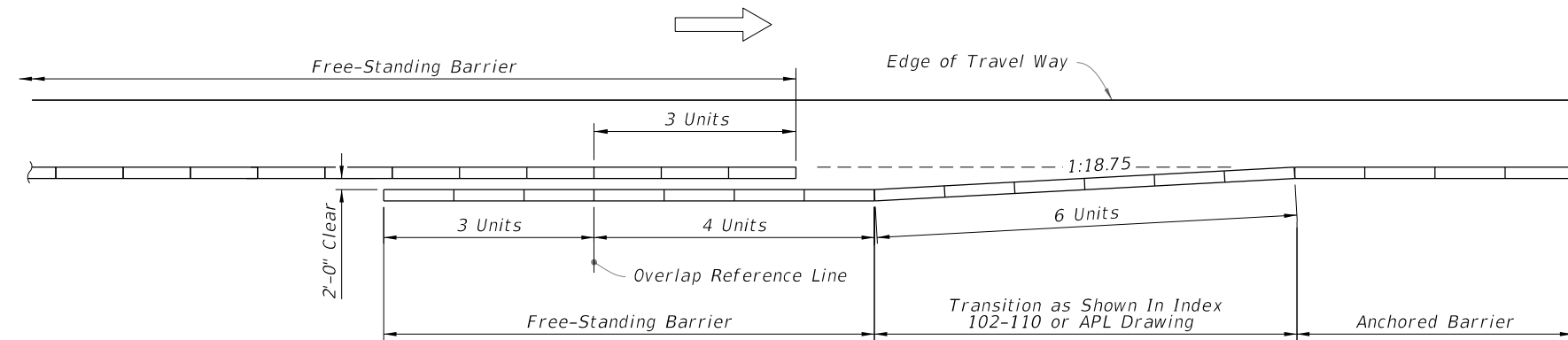
INSTALLATION DATA			
CONDITION	LATERAL OFFSET	SETBACK DISTANCE	PAVEMENT / ASPHALT WIDTH
Anchored	2' Min.	2' Min. (See Note)	1' Min.
Free-standing	2' Min.	4' Min.	4' Min.

NOTE: For Bridge Decks see Index 102-110 or APL.

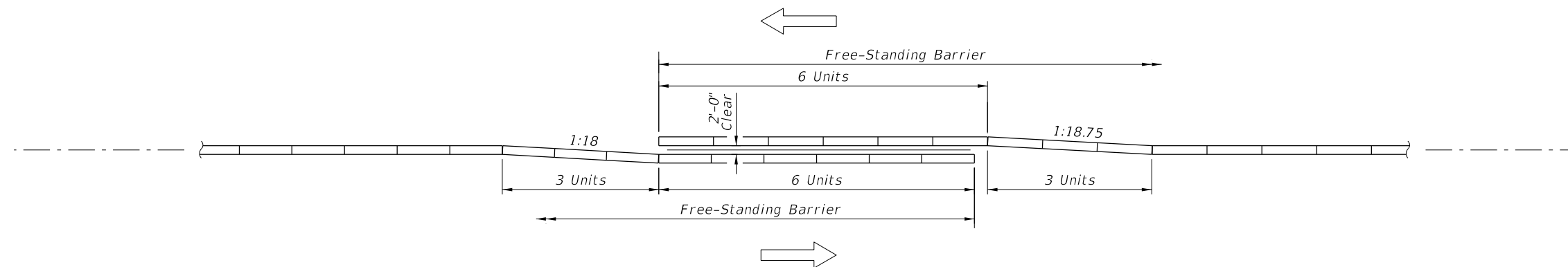
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APPROACH SHOULDER BARRIER TRANSITION ON UNDIVIDED FACILITIES



APPROACH SHOULDER BARRIER TRANSITION ON DIVIDED FACILITIES



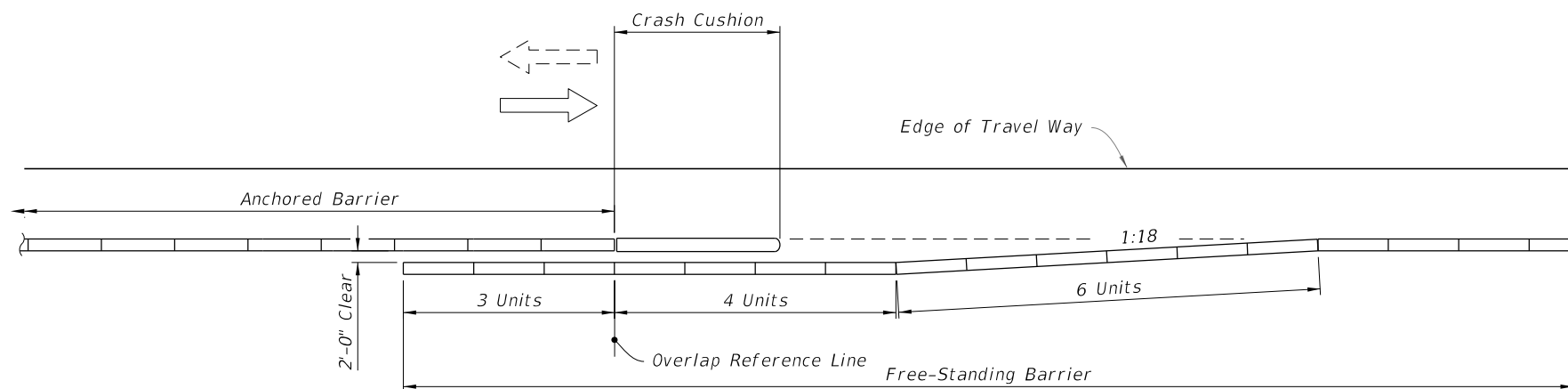
MEDIAN BARRIER TRANSITION

SYMBOL:

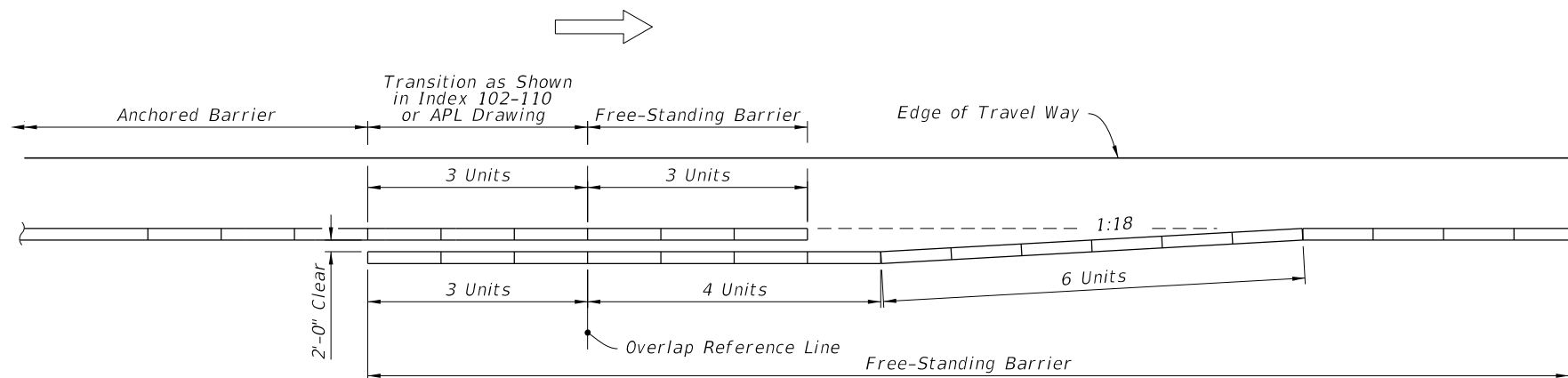
→ Direction of Traffic

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DEPARTURE SHOULDER BARRIER TRANSITION ON UNDIVIDED FACILITIES




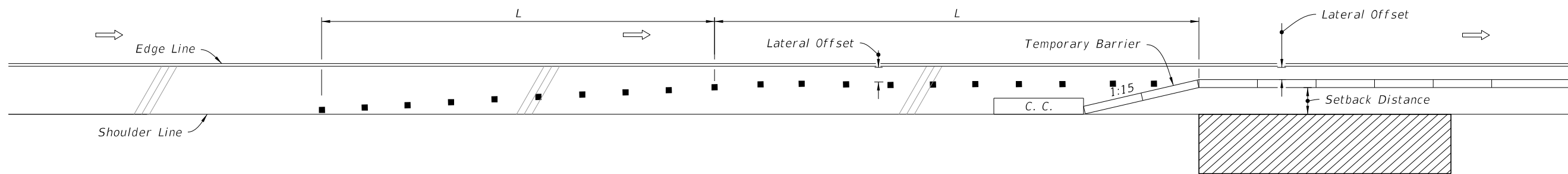
DEPARTURE (TRAILING) SHOULDER BARRIER TRANSITION ON DIVIDED FACILITIES

SYMBOL:

⇒ Direction of Traffic

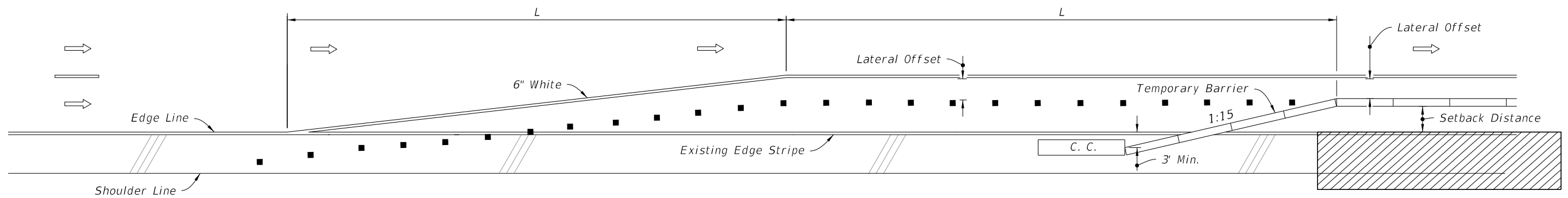
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LAST REVISION 11/01/20	REVISION DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TEMPORARY BARRIER	INDEX 102-100	SHEET 3 of 4
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BARRIER AND TRANSITION LOCATED ON SHOULDERS

(Right Lane Shown - Inverted For Left Lane)



BARRIER AND TRANSITION WITH LANE DROP ON MULTILANE FACILITIES

(Right Lane Merge Left Shown - Inverted For Left Lane Merge Right)


NOTE:

L = Taper Length, See Index 102-600 for "L" and channelizing device spacing values.

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Crash Cushion
-  Lane Identification and Direction of Traffic

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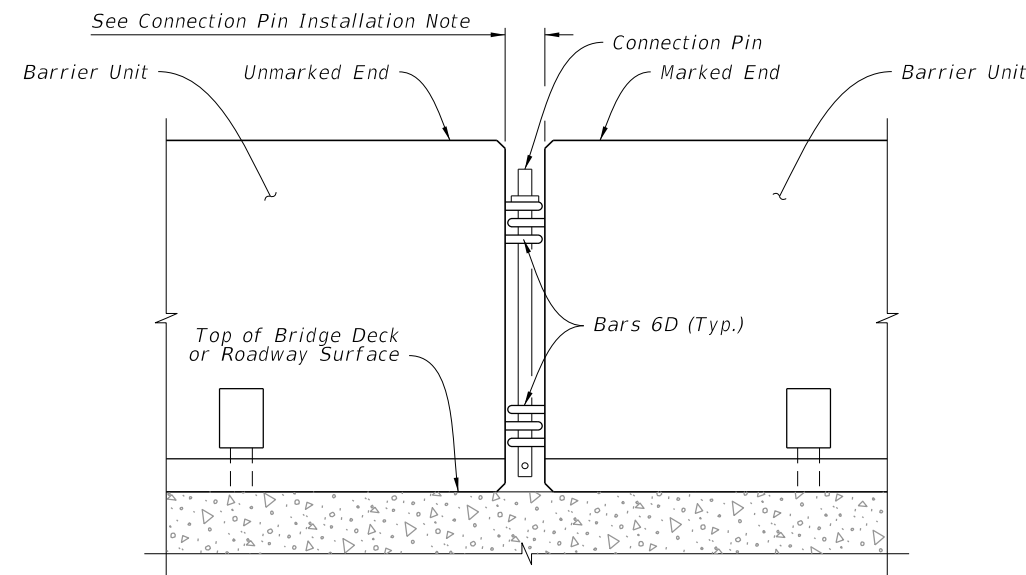
LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TEMPORARY BARRIER	INDEX 102-100	SHEET 4 of 4
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GENERAL NOTES:

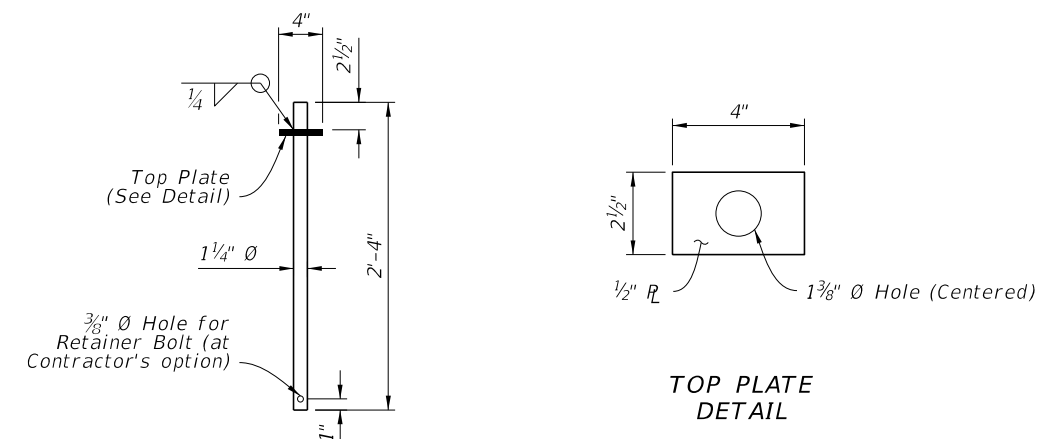
1. Meet the requirements of Index 102-100.
2. For fabrication details see Sheets 15 thru 17.
3. **HANDLING:** Do not lift or move the Barrier Units by using Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.
4. **CONNECTION PIN ASSEMBLY:** Use steel for Connection Pin and Top Plate assemblies in accordance with ASTM A36 or ASTM A709 Grade 36. Nondestructive testing of welds is not required. At the Contractor's option, a 3/8" diameter hole may be provided at the bottom of the Connection Pin, as shown, for the installation of a vandal resistance bolt.
5. **CONNECTION PIN INSTALLATION:** Initially set Barrier Units by using a 3 5/8" wooden block between ends of adjacent units. Install Connection Pin between adjacent Barrier Units as shown, then pull newly placed Barrier Unit away from adjacent Barrier Unit to remove slack between Connection Pin and Bars 6D (except as shown on Sheet 2). Do not use Barrier Units unconnected.
6. **REUSE OF CONNECTION PINS AND STAKES:** Connection pins and stakes may be reused if they have the structural integrity of new pins.
7. **REMOVAL OF BOLTS, STAKES AND KEEPER PINS:** Upon removal or relocation of Barrier Units, remove all Anchor Bolts and completely fill the remaining holes in bridge decks, approach slabs and roadway rigid pavements that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification 930 or with an Epoxy Resin Compound, Type F or Q, in accordance with Specification 926. If a flexible pavement is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.
8. **TYPE K ANCHORED TO FREE-STANDING TRANSITIONS:** Use the 3-3-2-1 Anchorage Transition Detail when transitioning Free-Standing and Anchored Units or when connecting Free-Standing runs to Crash Cushions, as shown in this Index.

THRIE-BEAM GUARDRAIL SPLICE INSTALLATION NOTES:

1. **THRIE-BEAM GUARDRAIL:** Provide Thrie-Beam Guardrail for splices meeting the requirements of specification 967 and as follows: Two panels per splice (One panel per side) of Class B (10 Gauge), or Four panels per splice (Two nested panels per side) of Class A (12 Gauge). Use a 12'-6" guardrail panel. Provide and install all other associated metallic guardrail components (Terminal Connectors, Shoulder Bolts, Hex Bolts and Nuts, Filler Plates, etc.) in accordance with Index 536-001. Install five Guardrail Anchor Bolts at each end of each splice in any of the standard seven anchor bolt holes in the Thrie-Beam Terminal Connector. If reinforcing steel is encountered when drilling holes for Guardrail Anchor Bolts in Type K Barrier Units, shift Thrie-Beam Terminal Connector so as to clear reinforcing steel within the given tolerances or select a different bolt hole to use. Do not drill or cut through reinforcing steel within Type K Barrier Units. Drilling or cutting through reinforcing steel within permanent concrete traffic railings is permitted.
2. **GUARDRAIL OFFSET BLOCKS:** Provide and install timber Offset Blocks meeting the requirements of Specification 967. Field trim Offset Blocks as required for proper fit. Utilize Offset Blocks as shown and required in order to prevent bending or kinking of Thrie-Beam Guardrail panels.
3. **CONCRETE FOR FILLING TAPERED TRAFFIC RAILING TOES:** Provide concrete for filling tapered toes of Traffic Railings as shown meeting the material requirements of Specification 346, any Class, or a commercially available pre-bagged concrete mix (3000 psi minimum compressive strength). Sampling, testing, evaluation and certification of the concrete in accordance with Specification 346 is not required. Saturate with water the surfaces upon and against which the concrete fill will be placed prior to placing concrete. Place and finish concrete fill using forms or by hand methods to the general configurations shown so as to provide a smooth shape transition between the Type K Barrier and the adjacent traffic railing. A low slump is desirable if placing and finishing concrete by hand methods. Cure the concrete fill by application of a curing compound, or by covering with a wet tarp or burlap for a minimum of 24 hours. Completely remove the concrete fill upon relocation or removal of the Type K Temporary Concrete Barrier.

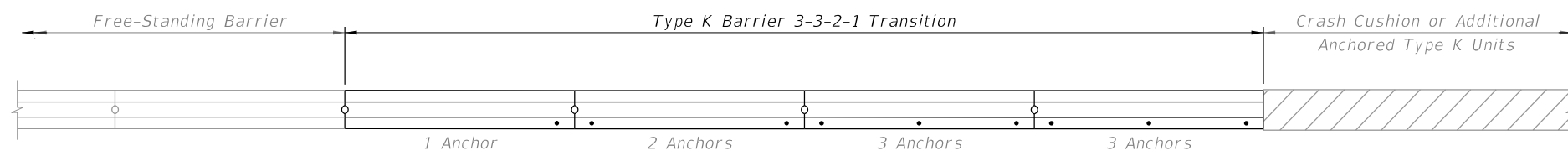
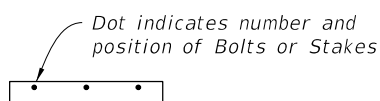


DETAIL OF CONNECTION BETWEEN BARRIER UNITS




CONNECTION PIN DETAIL

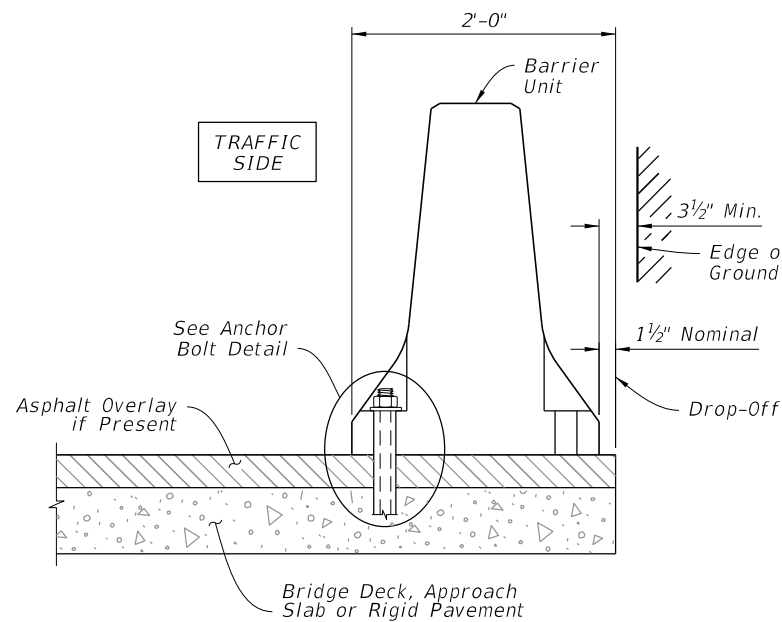
SYMBOL:



3-3-2-1 ANCHORAGE TRANSITION DETAIL

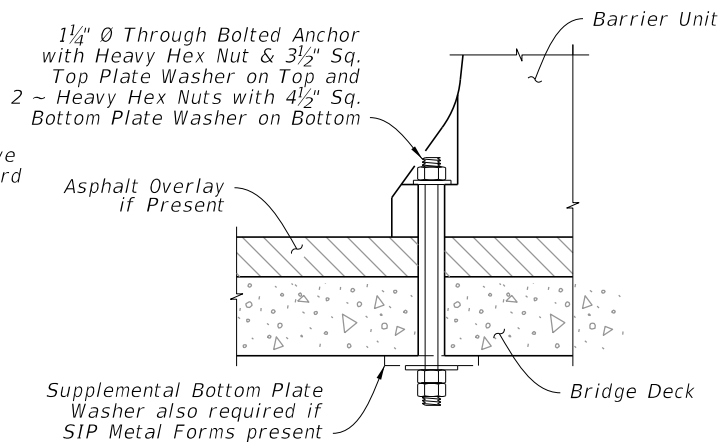
10/20/2022 8:45:05 AM

LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 1 of 17
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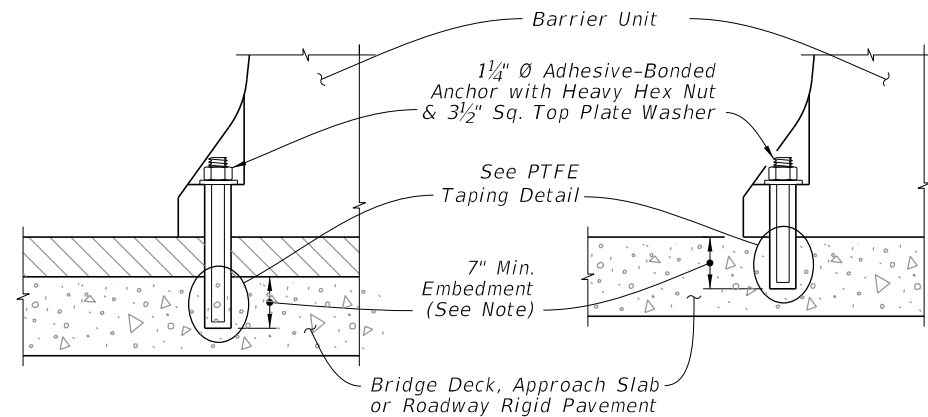


NOTE: Traffic Side for Transition to Median Traffic Railings, see Sheet 6

TYPICAL SECTION

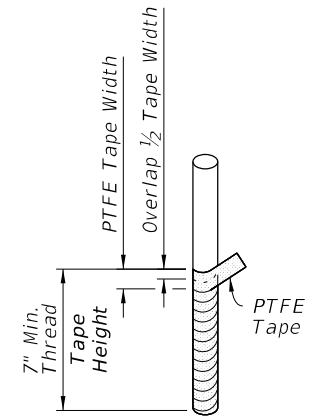


THROUGH BOLTED ANCHOR



WITH ASPHALT OVERLAY

WITHOUT ASPHALT OVERLAY



PTFE TAPING DETAIL

NOTE: Wrap threads with a single overlapping layer of PTFE tape to facilitate removal of anchors.

ADHESIVE BONDED ANCHOR INSTALLATION

NOTES FOR BOLTED INSTALLATIONS:

Bridge deck shown, approach slab or rigid pavement similar; installation adjacent to drop-off shown, median transition installation similar.

LIMITATION OF USE: This installation technique can only be used on rigid pavement and concrete bridge decks as shown. Anchor Bolts must not be installed on both sides of the Barrier Units. Do not bolt down Barrier Units across bridge finger or modular expansion joints.

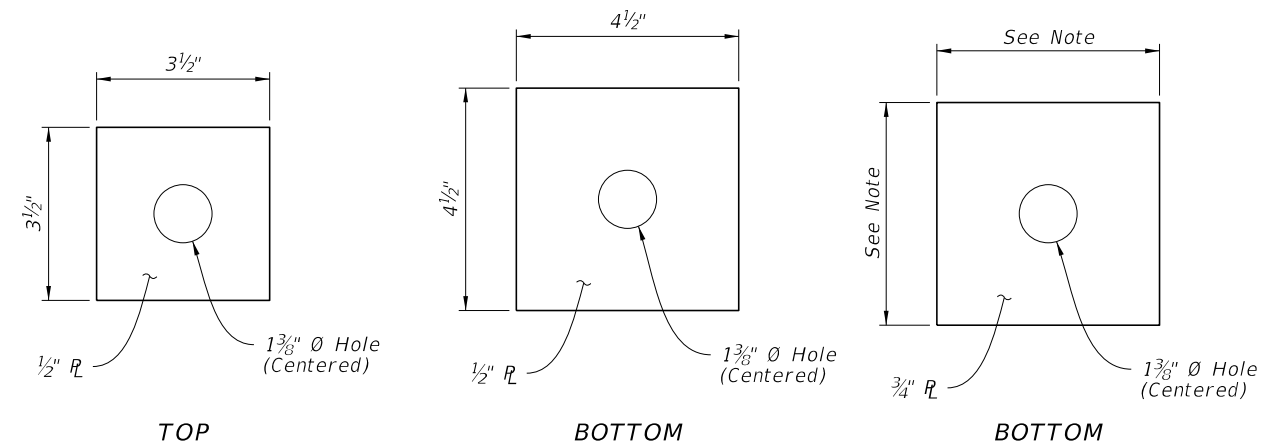
ANCHOR BOLTS, NUTS AND WASHERS: When using Adhesive-Bonded Anchor Bolts, use fully threaded rods in accordance with ASTM F 1554 Grade 36. Install Anchor Bolts for through bolting in accordance with ASTM A 307 or ASTM F 1554 Grade 36. Install nuts in accordance with ASTM A 563 or ASTM A 194. Install Flat Washers in accordance with ASTM F 436 and Plate Washers in accordance with ASTM A 36 or ASTM A 709 Grade 36.

Install three (3) Anchor Bolts per Barrier Unit on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of Anchor Bolts required in Transition Installations see Sheets 8 and 9 and Index 102-100. Drilling through deck reinforcing steel to install Anchor Bolts is permitted. Unless otherwise shown in the Plans, at the Contractor's option Barrier Units may be installed by through bolting (where geometrically possible) or by the use of Adhesive-Bonded Anchor Bolts. Do not drill into or otherwise damage the tops of supporting beams or girders, bridge deck expansion joints or drains. Install Anchor Bolts and Nuts so that the maximum extension beyond the face of the Barrier Units is 1/2". Snug tighten the Nuts on the Anchor Bolts. For through bolted installations, snug tighten the double Nuts on the underside of the deck against each other to minimize the potential for loosening.

Omit one (1) Anchor Bolt within a single Barrier Unit if a conflict exists between the Anchor Bolt location and a bridge deck expansion joint or drain. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

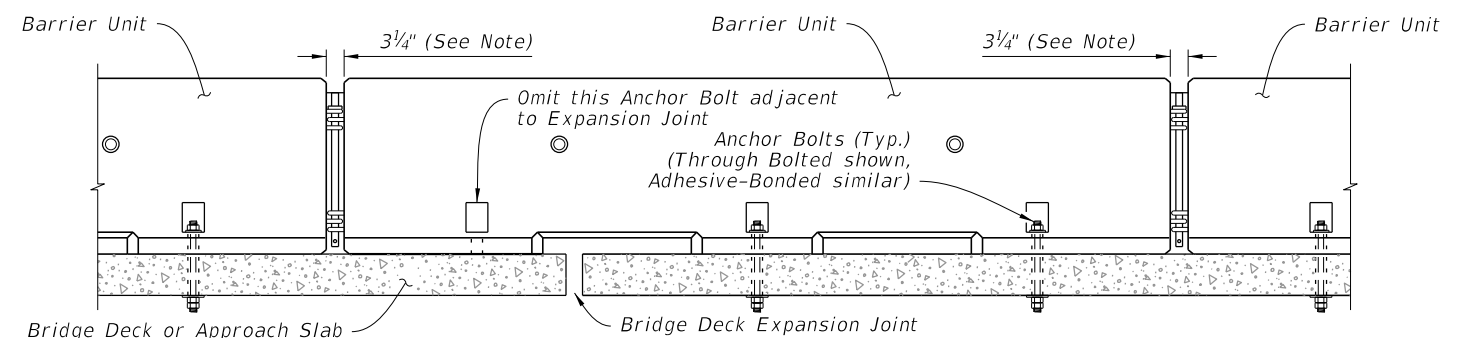
Omit one (1) Anchor Bolt within a single Barrier Unit as shown in the Treatment at Bridge Deck Expansion Joint Schematic if the Barrier Unit straddles a bridge deck expansion joint. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

ADHESIVE-BONDING MATERIAL SYSTEMS: When using Adhesive Bonding Material Systems for Anchor Bolts, Use Type HSHV in accordance with Specification 937 and installed them in accordance with Specification 416. Prior to installation of the Barrier Units in the Plan location(s), install a demonstration Barrier Unit using the proposed production installation method, at a location approved by the Engineer. In lieu of the production test requirements of Specification 416, install six (6) Adhesive-Bonded Anchor Bolts in the demonstration Barrier Unit and test each Anchor Bolt with a 29,800 pound tensile proof load. Install and test additional demonstration Barrier Units when requested by the Engineer. Remove the test Anchor Bolts after testing as directed by the Engineer.



NOTE: Dimension as required to span SIP Metal Form Corrugations plus 1/2" Minimum overlap each side.

PLATE WASHER DETAIL



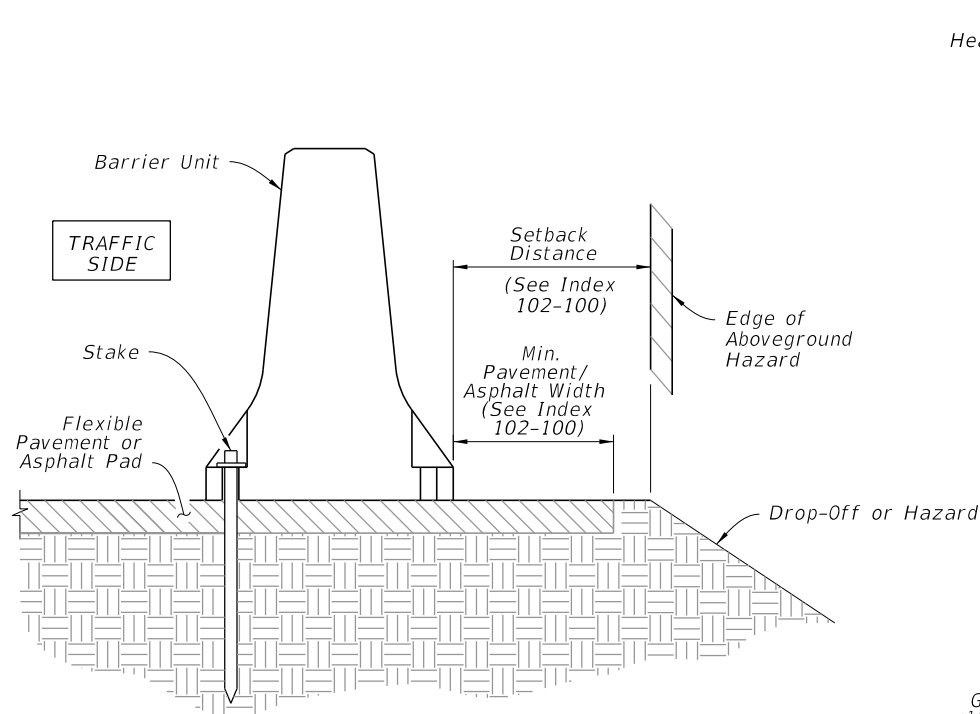
NOTE: To accommodate movement at Expansion Joint, set Barrier Units with 3 3/4" gap at locations shown.

TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC

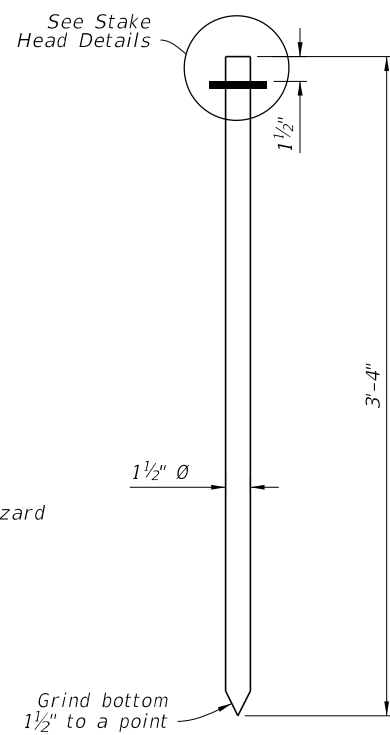
ANCHORED INSTALLATIONS - BOLTED

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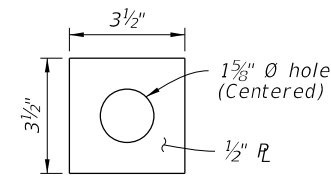
LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 2 of 17
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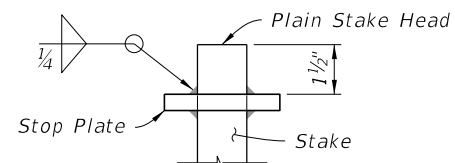
NOTE: Traffic Side for transition to median traffic railings, see Sheet 6
TYPICAL SECTION



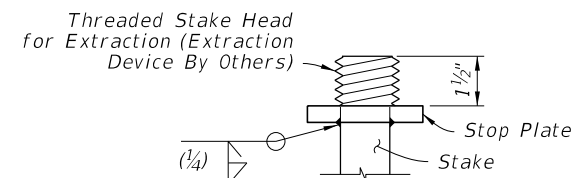
STAKE DETAIL



STOP PLATE DETAIL



PLAIN STAKE HEAD DETAIL



OPTIONAL EXTRACTION STAKE HEAD DETAIL

STAKED INSTALLATION NOTES:

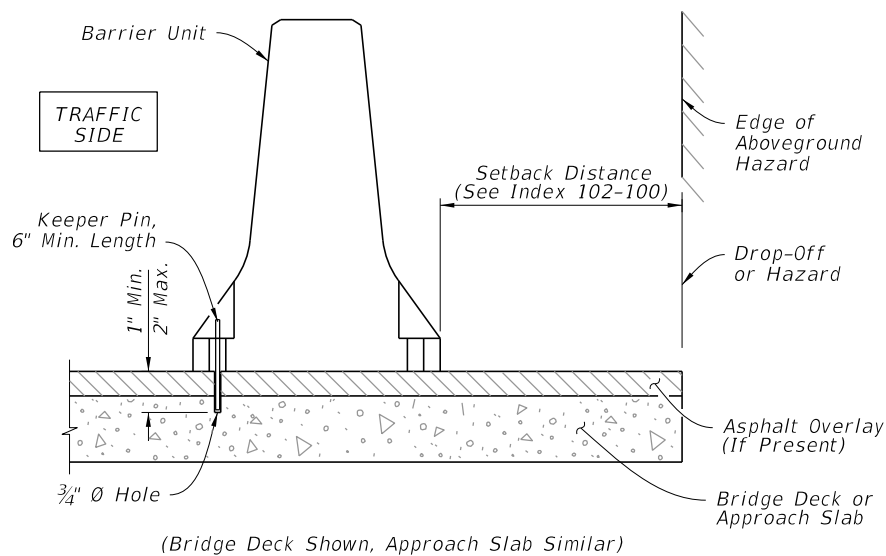
LIMITATION OF USE: This installation technique can only be used on flexible pavement or an Asphalt Pad as shown. Stakes must not be installed on both sides of the Barrier Units.

STAKES: Provide steel for Stake assemblies in accordance with ASTM A 36 or ASTM A 709 Grade 36. Weld in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Welding metal are E60XX or E70XX. Nondestructive testing of welds is not required.

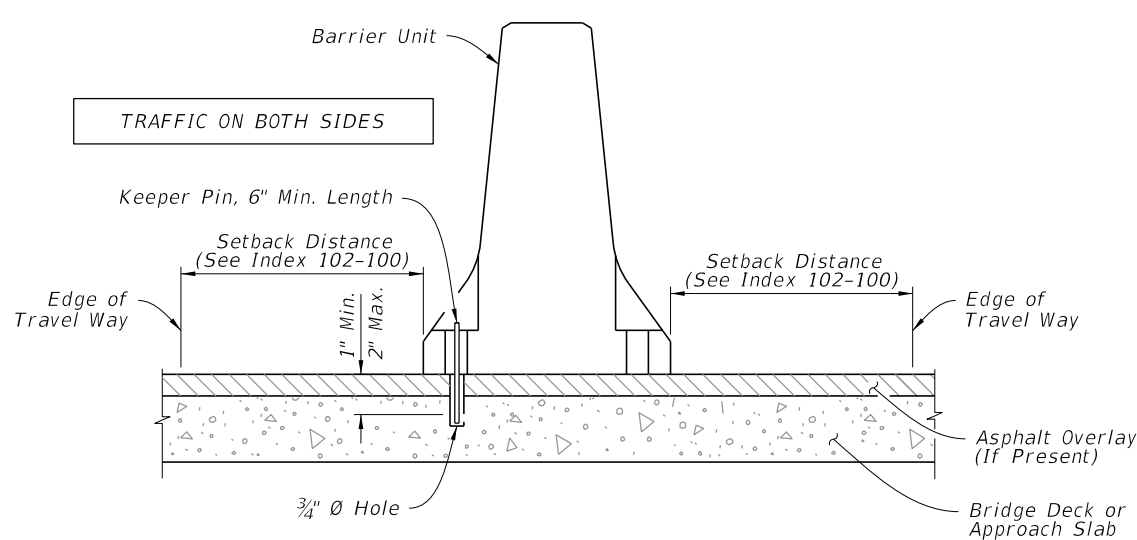
Install three (3) Stakes on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of stakes required in Transition Installations see Sheets 4, 5 and 6 and Index 102-100. Install Stakes so that the Stop Plate is snug against the bottom of the Anchor Blockout.

BURIED UTILITIES: Prior to installation of Stakes verify locations of all adjacent buried utilities, drainage structures, pipes, etc. If conflicts between Stake locations and buried elements exist, a maximum of two (2) Stakes within a single Barrier Unit may be omitted if the adjacent Barrier Units are installed with the standard three (3) Stakes.

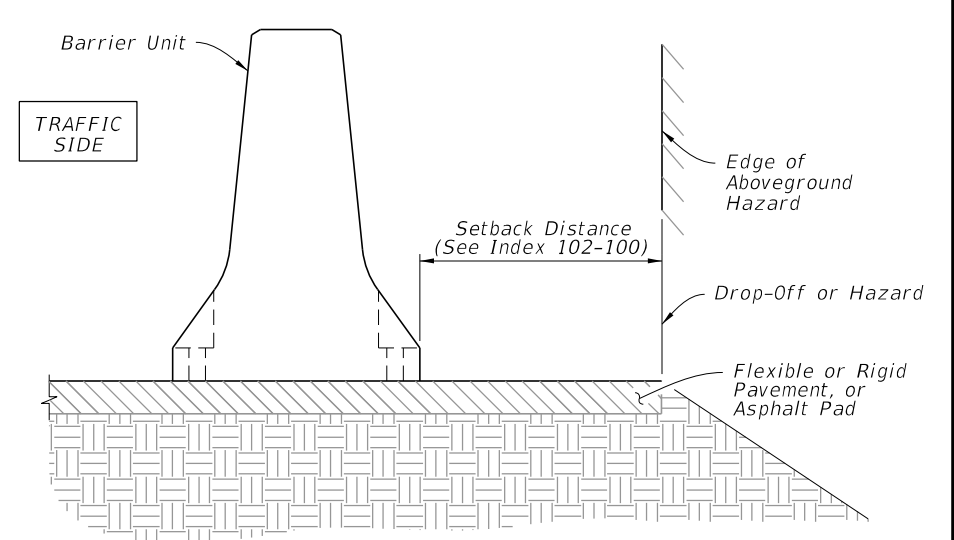
ANCHORED INSTALLATIONS - STAKED



TYPICAL BRIDGE SECTION



TYPICAL MEDIAN SECTION



TYPICAL ROADWAY SECTION

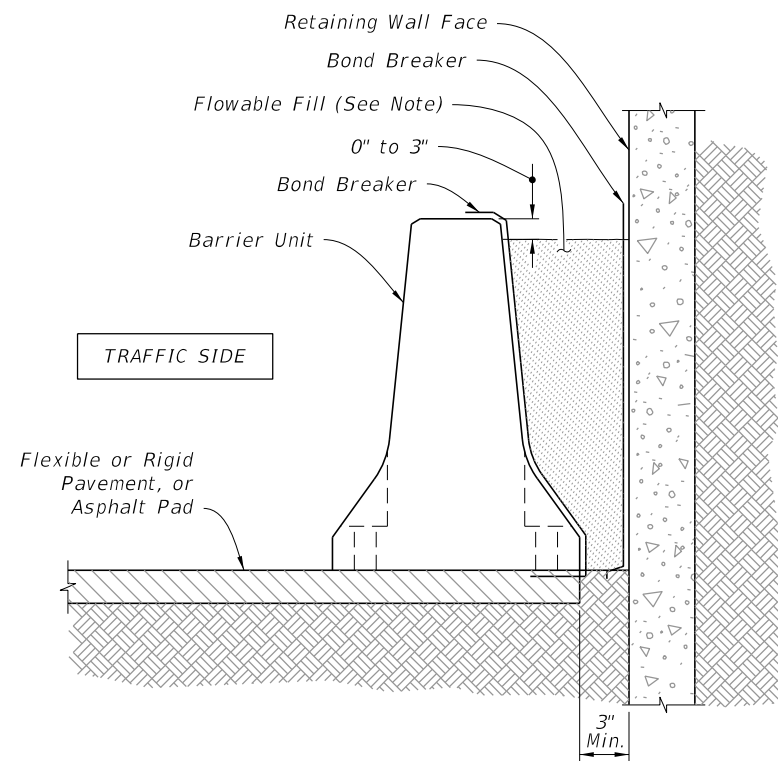
FREE-STANDING INSTALLATION NOTES:

1. For Bridge Decks only, use Keeper Pins that are 1#2" diameter, smooth steel bar in accordance with ASTM A36 or ASTM A709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit as shown.
2. If traffic is on both sides of the Barrier (i.e. Median Installation), alternate Keeper Pin locations from side to side of Barrier Units along the length of the installation. If traffic is on only one side of the barrier install keeper pins on the traffic side as shown.
3. Do not drill into or otherwise damage bridge deck expansion joints or drains.

FREE-STANDING INSTALLATION

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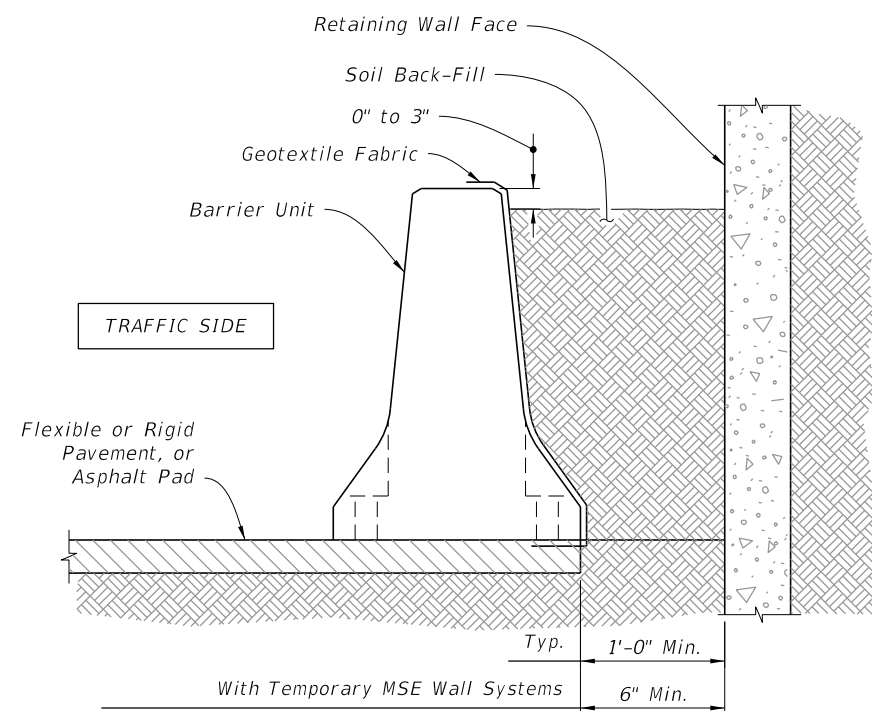
LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 3 of 17
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NOTE:
Provide Excavatable Flowable Fill in accordance with Specification 121.

TYPICAL SECTION
ADJACENT TO RETAINING WALL WITH FLOWABLE FILL BACK-FILL

FLOWABLE FILL BACK-FILL ROADSIDE INSTALLATIONS

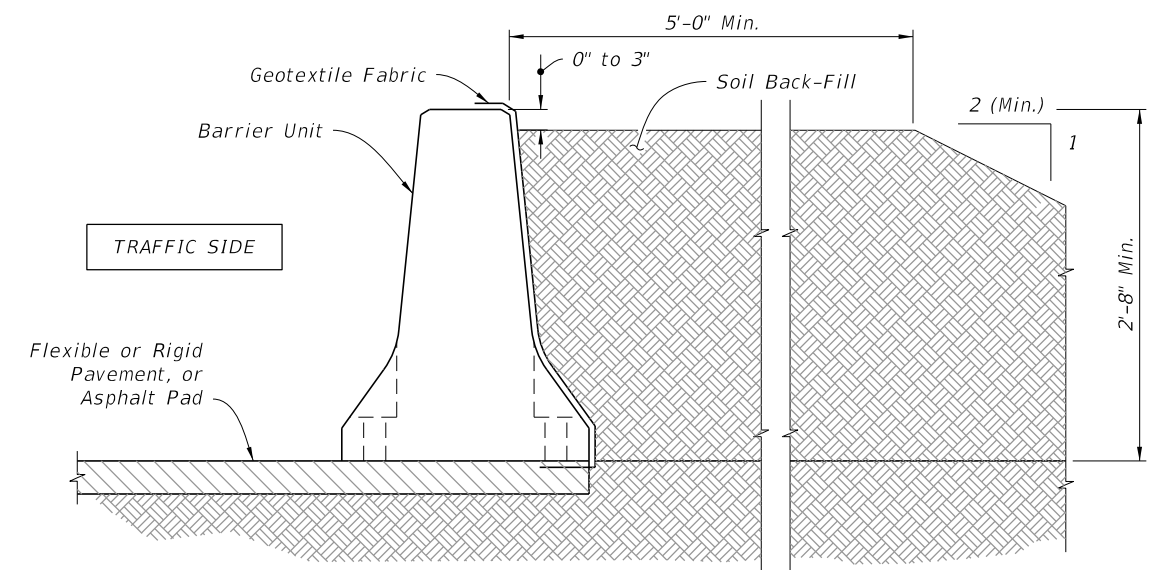


NOTES:

SOIL BACK-FILL MATERIAL: Provide Back-Fill Material consisting of any available clean soil. Compact Back-Fill Material until the soil mass is firm and unyielding. Provide erosion control as specified in the Plans. If none is specified in the Plans, provide erosion control as required to maintain the integrity of the Back Fill embankment.

GEOTEXTILE FABRIC: Provide Type D-5 Geotextile Fabric in accordance with Specification 985 to contain Back Fill Material behind Barrier Units. Geotextile Fabric may be continuous over the length and height of the installation or may be individual pieces as required to cover the Lift/Drain Slots and open vertical joints between Barrier Units.


TYPICAL SECTION
ADJACENT TO RETAINING WALL WITH SOIL BACK-FILL

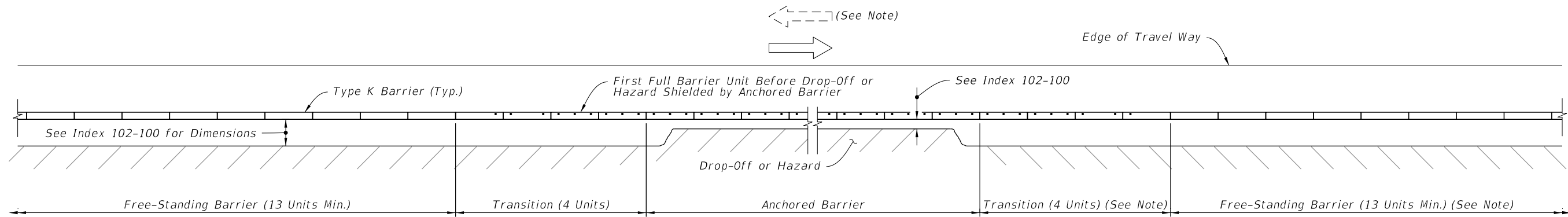


TYPICAL SECTION
WITH SOIL BACK-FILL

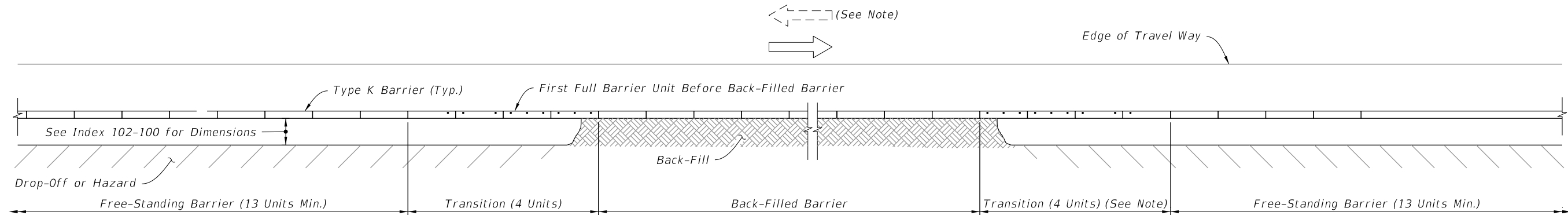
SOIL BACK-FILLED ROADSIDE INSTALLATIONS

10/20/2022 8:45:08 AM

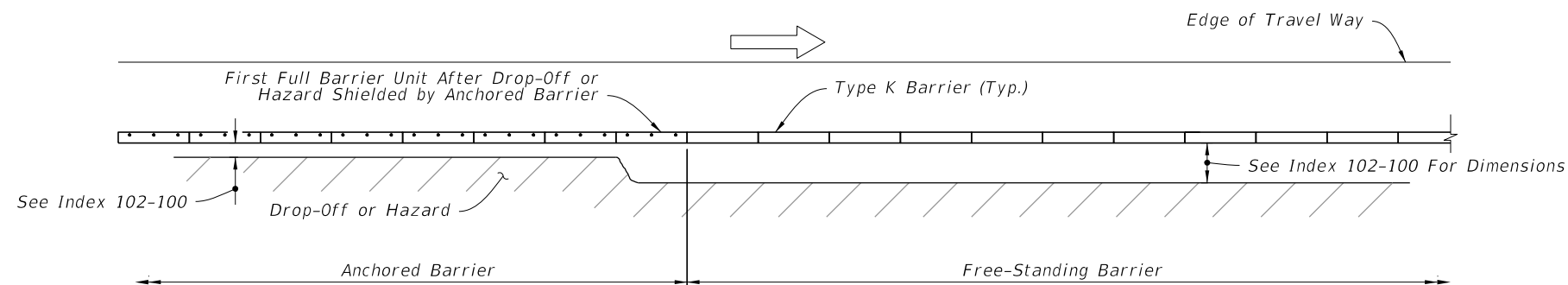
LAST REVISION 11/01/17	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX	SHEET
						102-110



APPROACH TRANSITION FROM FREE-STANDING TO ANCHORED TYPE K TEMPORARY CONCRETE BARRIERS



APPROACH TRANSITION FROM FREE-STANDING TO BACK-FILLED TYPE K TEMPORARY CONCRETE BARRIERS

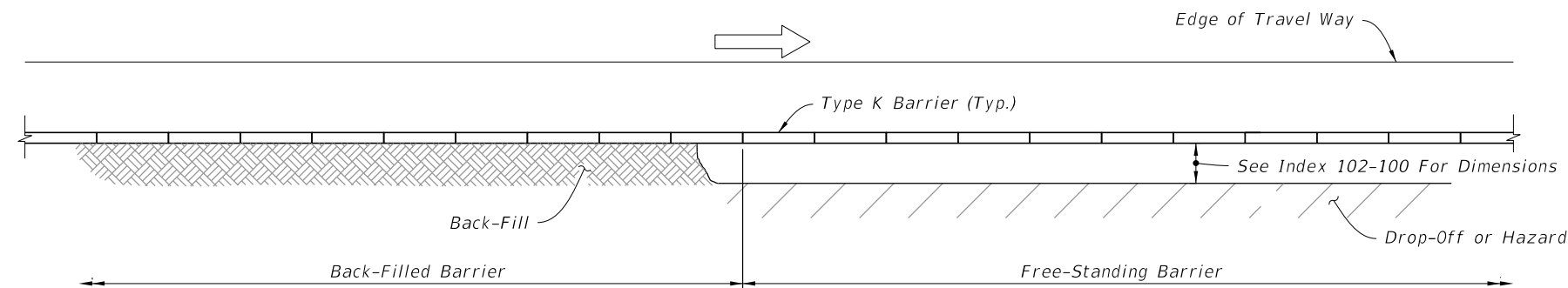


TRAILING END TRANSITION FROM ANCHORED TO FREE-STANDING TYPE K TEMPORARY CONCRETE BARRIERS

NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.


SYMBOLS:

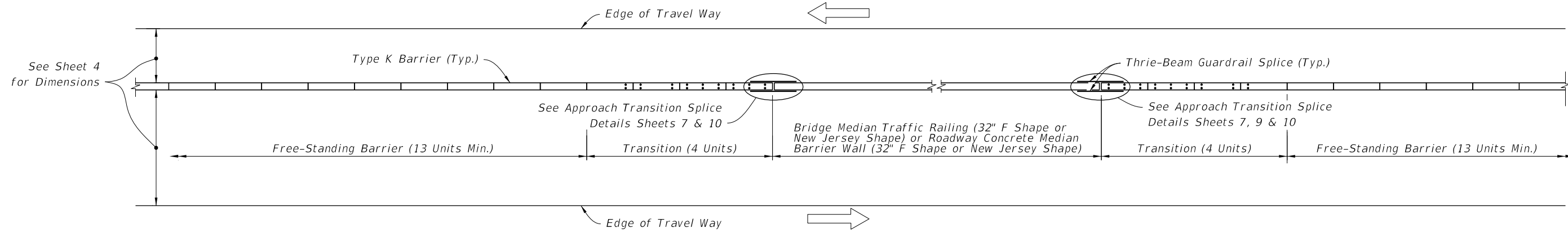
- Dot indicates number and position of Bolts or Stakes
- Direction of Traffic



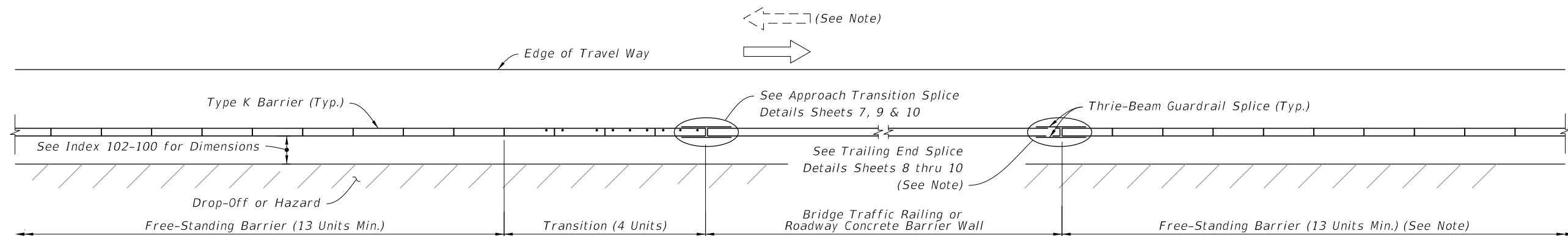
TRAILING END TRANSITION FROM BACK-FILLED TO FREE-STANDING TYPE K TEMPORARY CONCRETE BARRIERS

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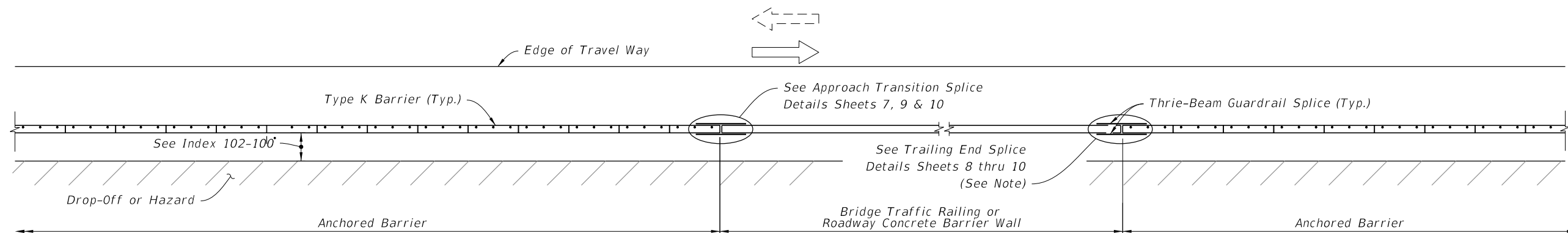
LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 5 of 17
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TRANSITION FROM FREE-STANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE MEDIAN TRAFFIC RAILING OR ROADWAY MEDIAN CONCRETE BARRIER WALL



TRANSITION FROM FREE-STANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL



TRANSITION FROM ANCHORED TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL

NOTE:

Where Barrier is located within clear zone of opposing traffic, Approach Transition is required.


SYMBOLS:

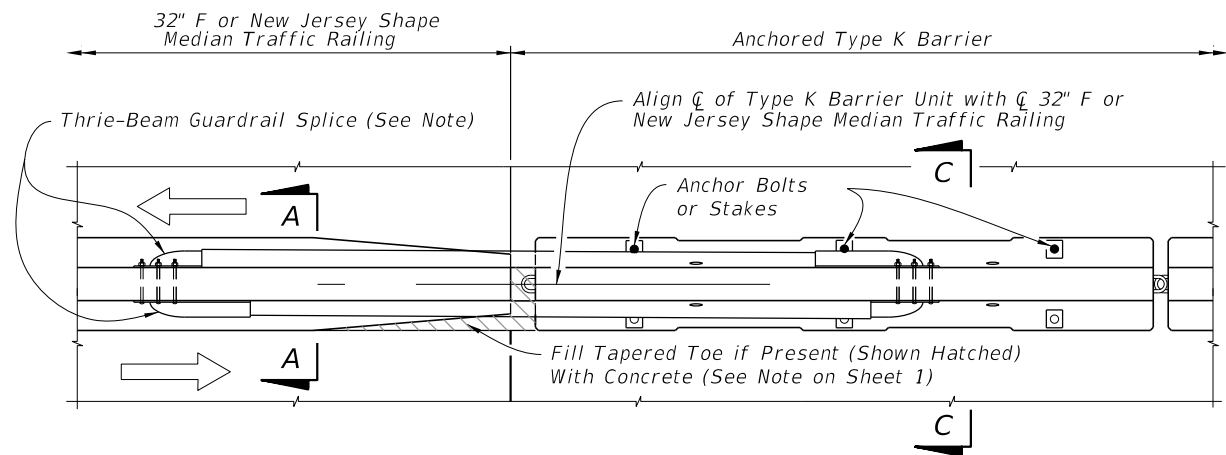
Dot indicates number and position of Bolts or Stakes



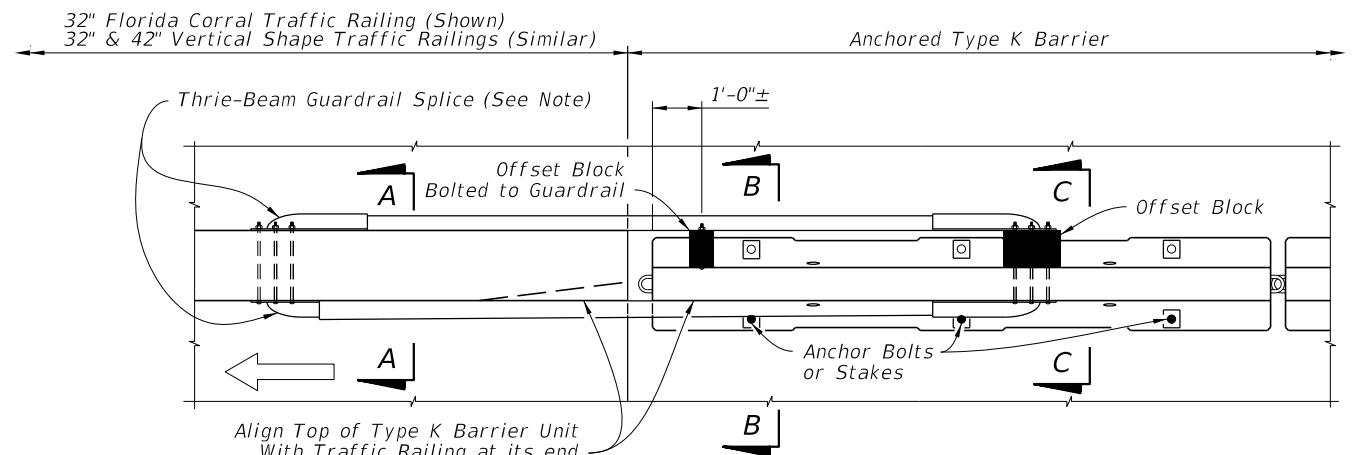
⇒ Direction of Traffic

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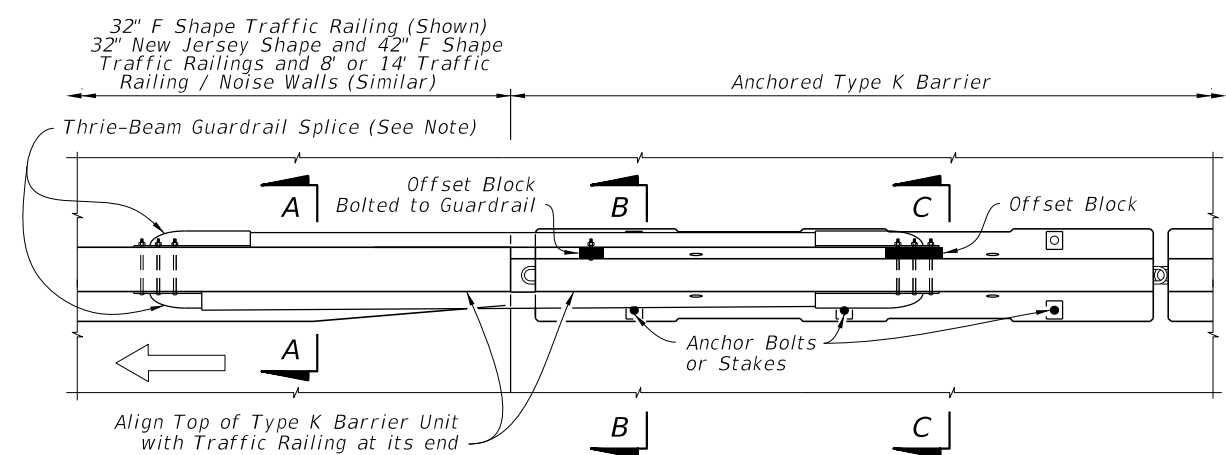
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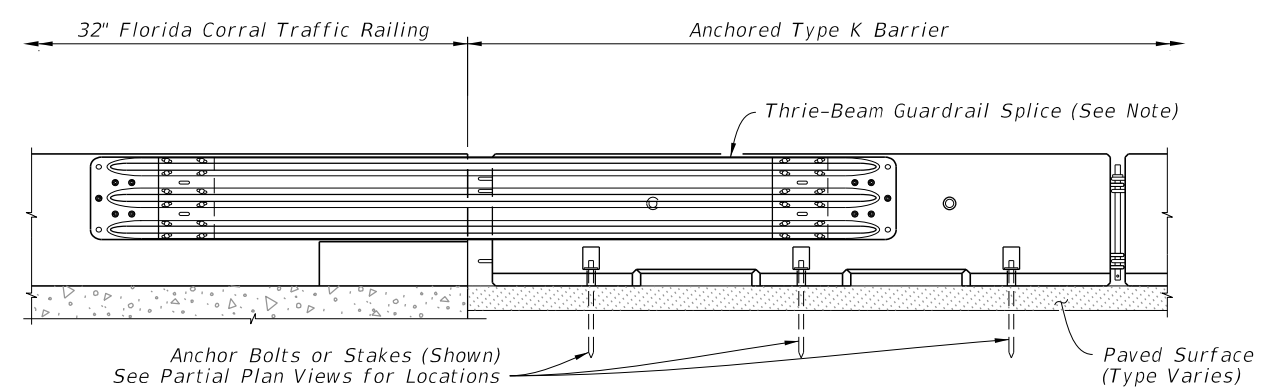
PARTIAL PLAN VIEW AT MEDIAN TRAFFIC RAILING



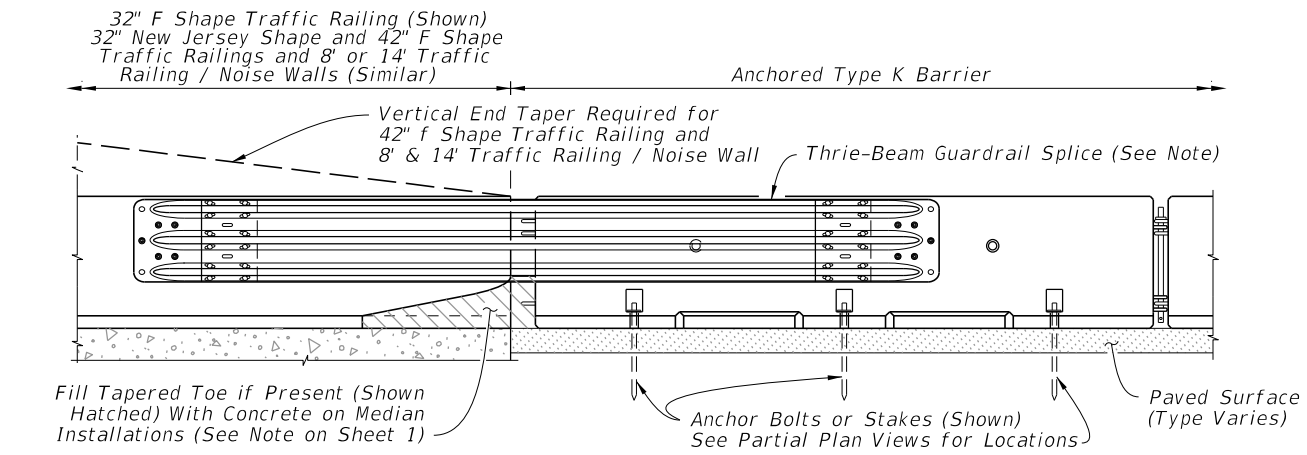
PARTIAL PLAN VIEW



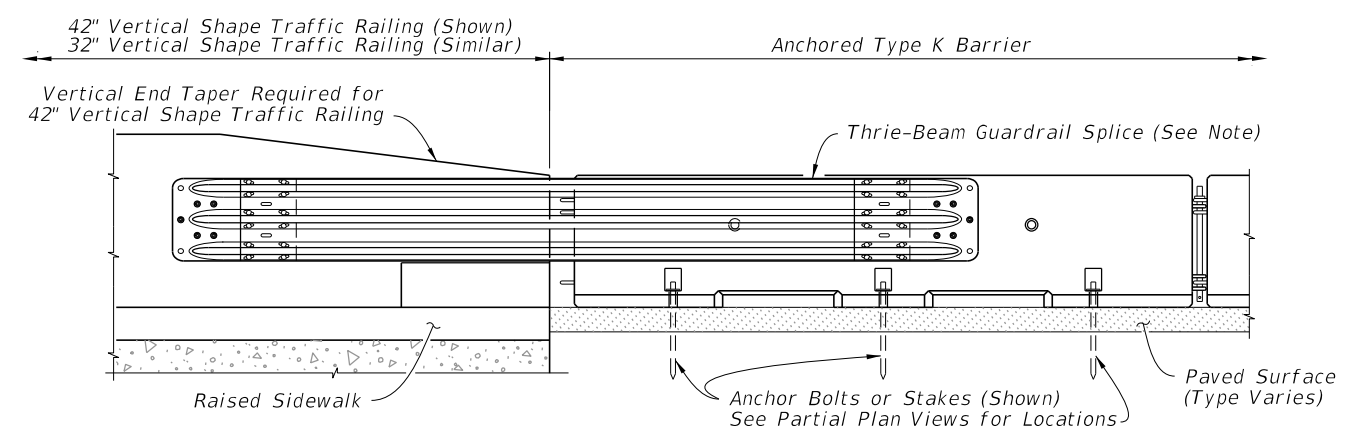
PARTIAL PLAN VIEW AT SHOULDER TRAFFIC RAILING



PARTIAL ELEVATION VIEW - FLORIDA CORRAL TRAFFIC RAILING



PARTIAL ELEVATION VIEW



PARTIAL ELEVATION VIEW - VERTICAL SHAPE TRAFFIC RAILINGS

APPROACH TRANSITION SPLICE DETAIL FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS AND 8' & 14' TRAFFIC RAILING / NOISE WALLS (CONCRETE BARRIER WALL SIMILAR)

SYMBOL:
 Direction of Traffic

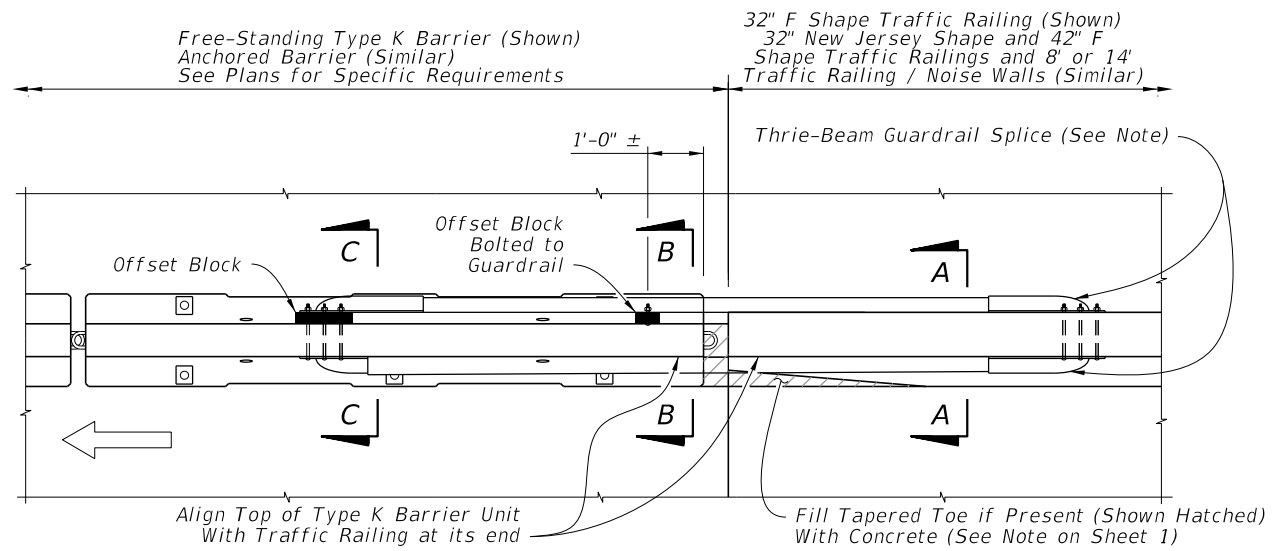
NOTE:
 See Thrie-Beam Guardrail Positioning Detail, Sheet 10 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 1.

APPROACH TRANSITION SPLICE DETAIL FOR FLORIDA CORRAL AND VERTICAL SHAPE TRAFFIC RAILINGS

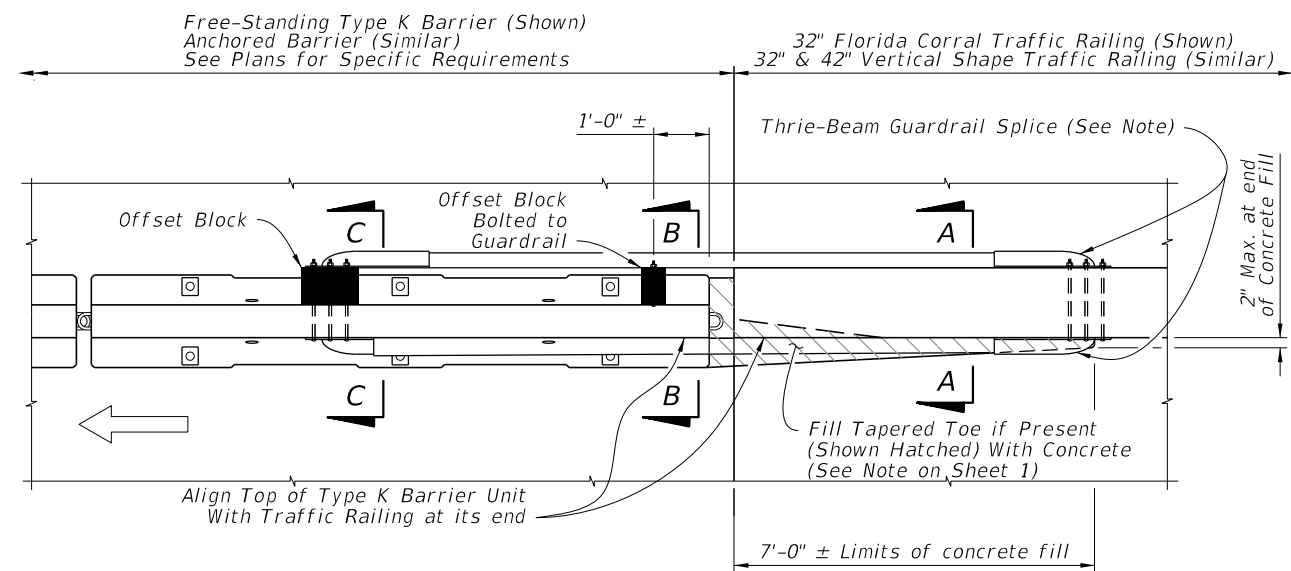
CROSS REFERENCES:
 See Sheet 10 for Section A-A, Section B-B and Section C-C.

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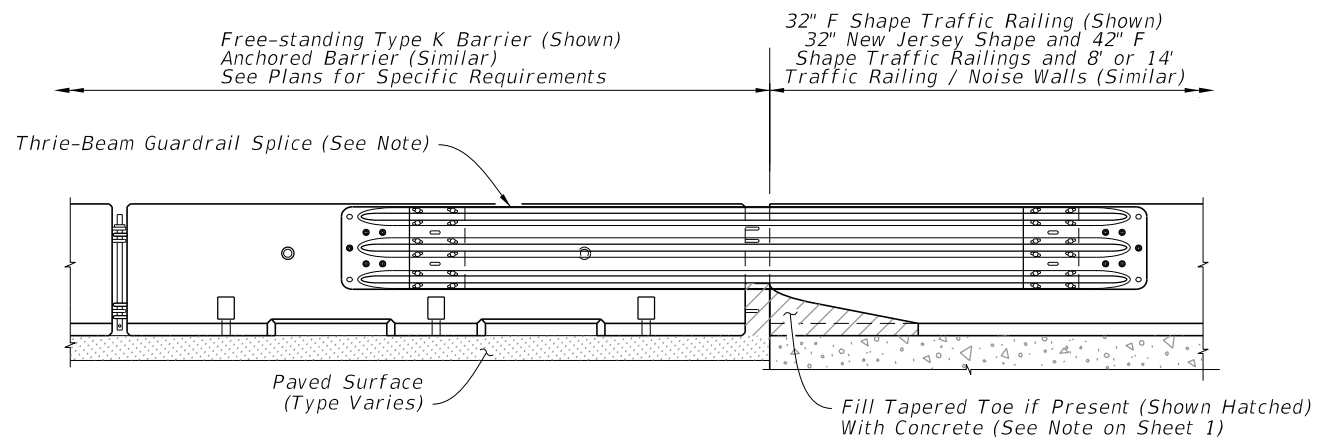
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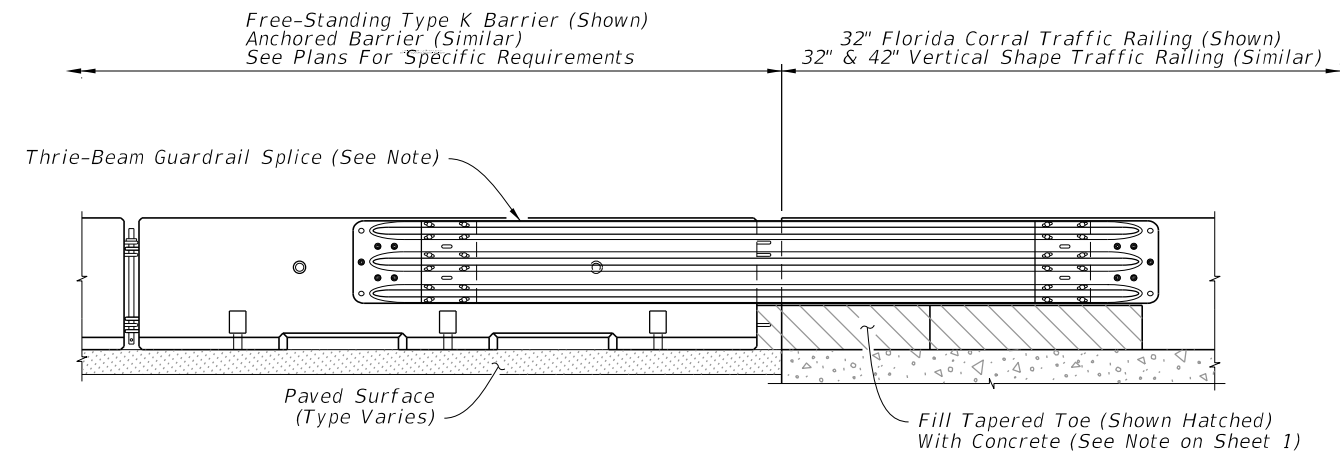
PARTIAL PLAN VIEW



PARTIAL PLAN VIEW



PARTIAL ELEVATION VIEW



PARTIAL ELEVATION VIEW

**TRAILING END SPLICE DETAIL
FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS
AND 8' & 14' TRAFFIC RAILING / NOISE WALLS**

**TRAILING END SPLICE DETAIL
FOR FLORIDA CORRAL AND VERTICAL
SHAPE TRAFFIC RAILINGS**

SYMBOL:

➔ Direction of Traffic

NOTE:

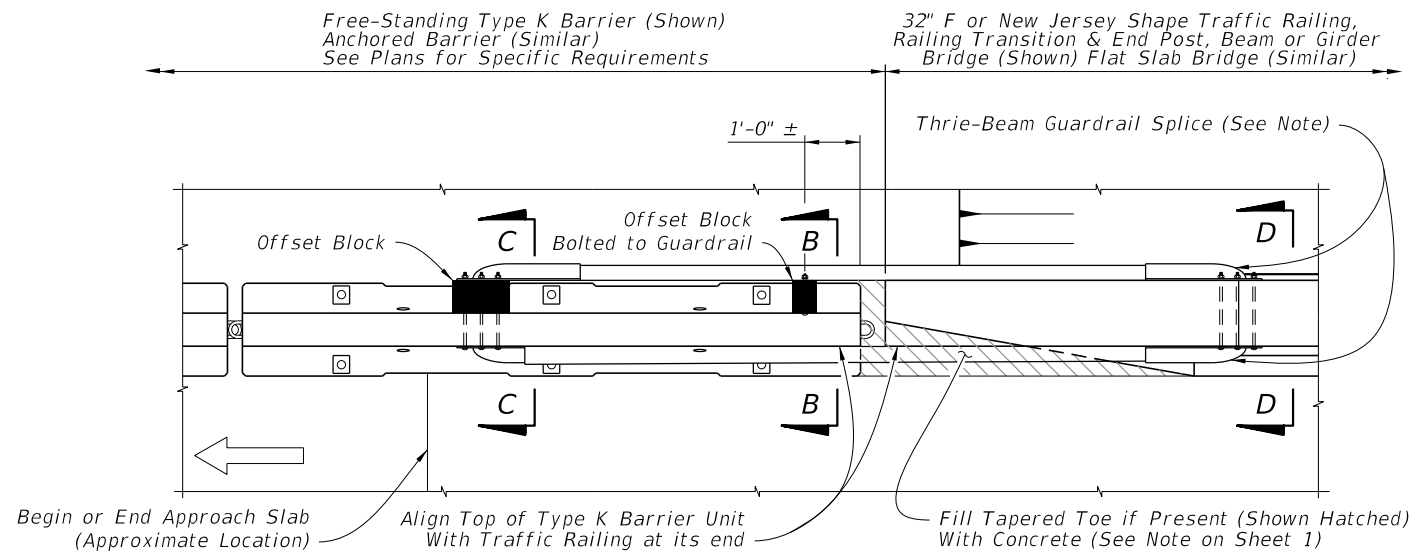
See Thrie-Beam Guardrail Positioning Detail, Sheet 10 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 1.

CROSS REFERENCES:

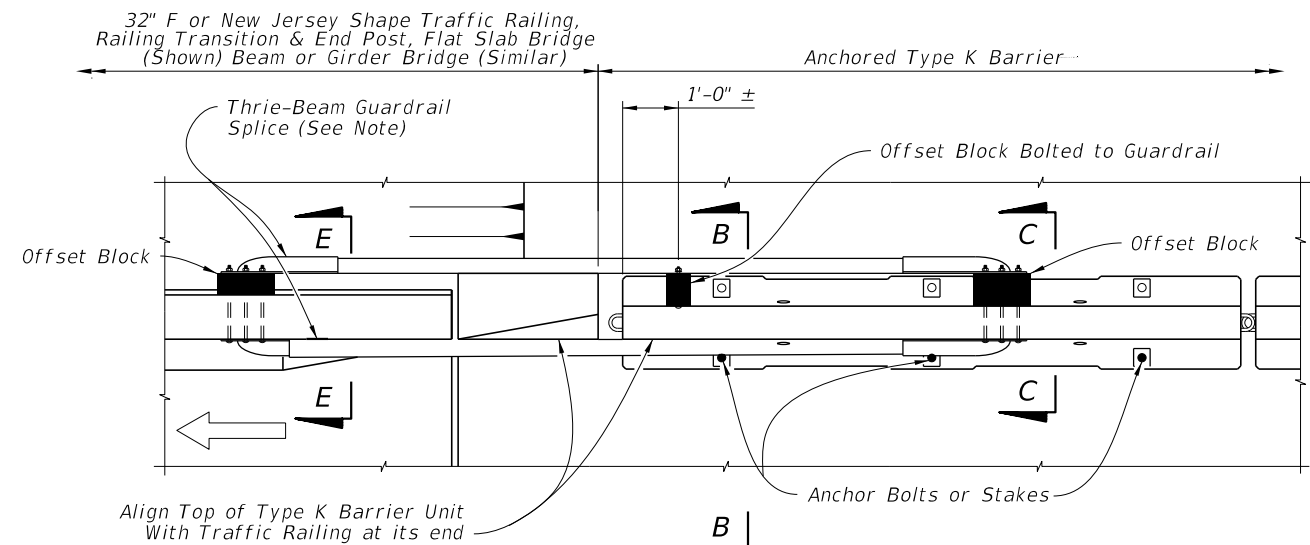
See Sheet 10 for Section A-A, Section B-B and Section C-C.

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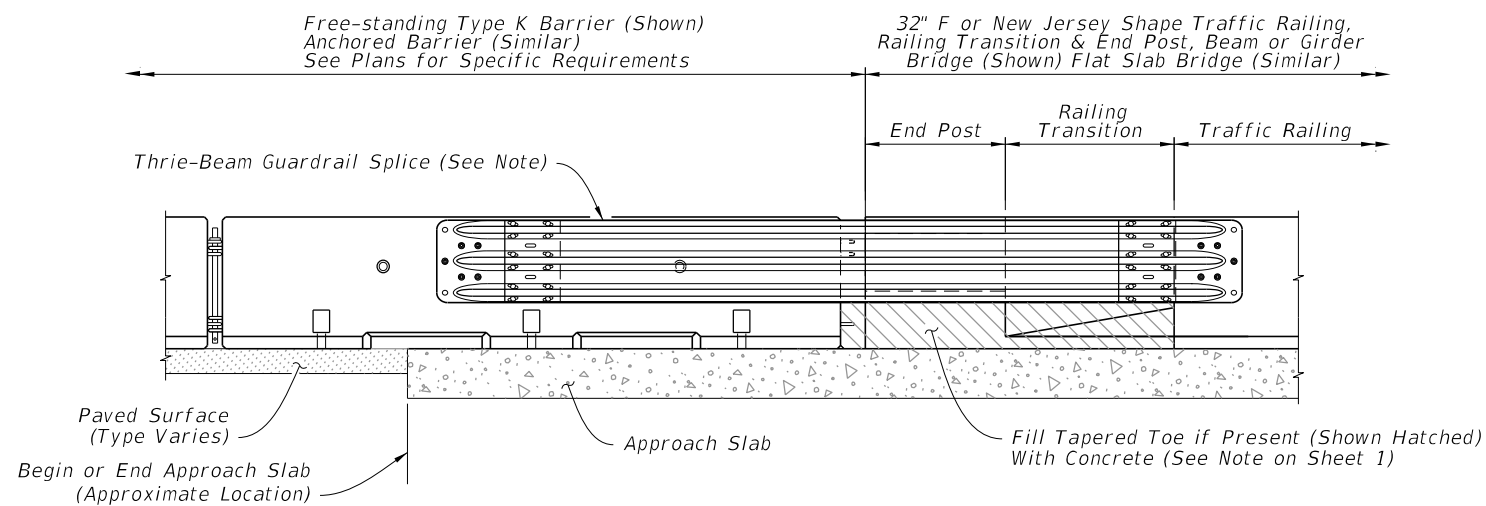
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PARTIAL PLAN VIEW

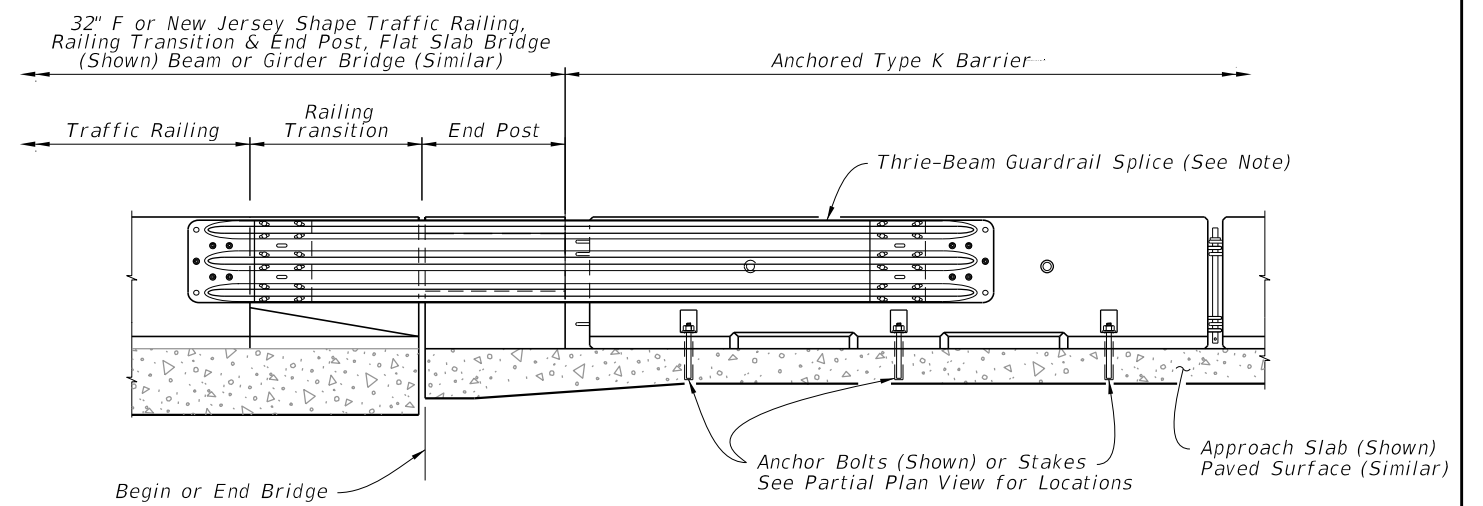


PARTIAL PLAN VIEW



PARTIAL ELEVATION VIEW

CROSS REFERENCES:
See Sheet 10 for Section B-B,
Section C-C and Section D-D.



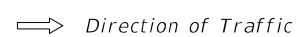
PARTIAL ELEVATION VIEW

CROSS REFERENCES:
See Sheet 10 for Section B-B,
Section C-C and Section E-E.

TRAILING END SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS
WITH RAILING TRANSITION AND END POST

APPROACH TRANSITION SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS
WITH RAILING TRANSITION AND END POST


SYMBOL:

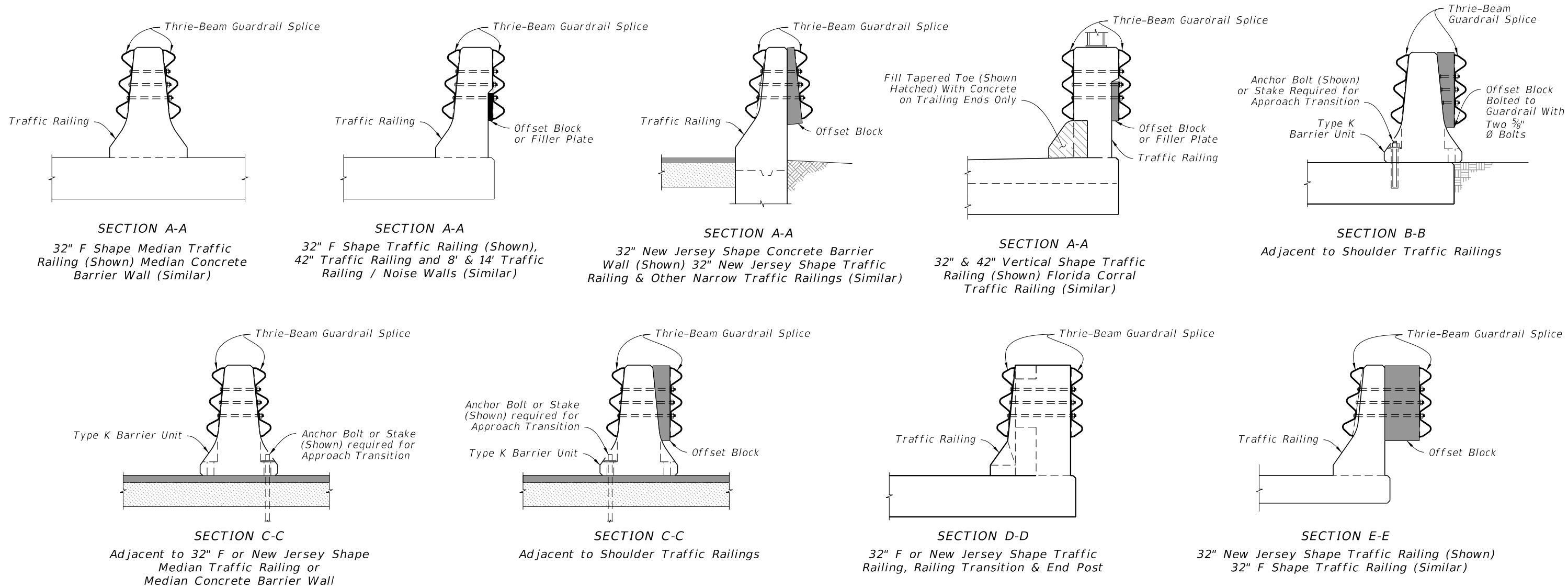


NOTE:

See Thrie-Beam Guardrail Positioning Detail,
Sheet 10 and Notes for Thrie-Beam Guardrail
Splice Installations, Sheet 1.

10/20/2022 8:45:13 AM

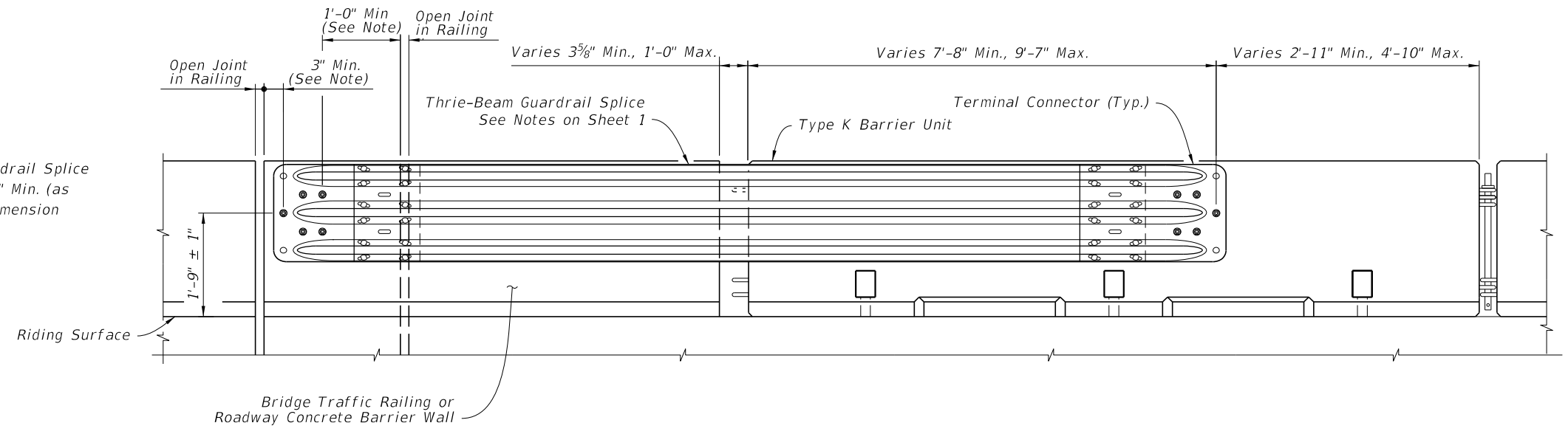
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CROSS SECTIONS

NOTE:

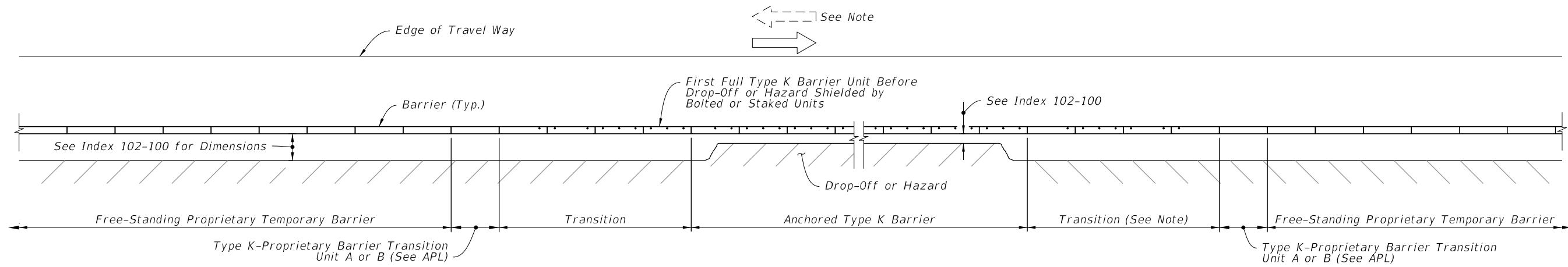
Shift Thrie-Beam Guardrail Splice beyond Open Joint 1'-0" Min. (as shown) when 3" Min. dimension can not be obtained



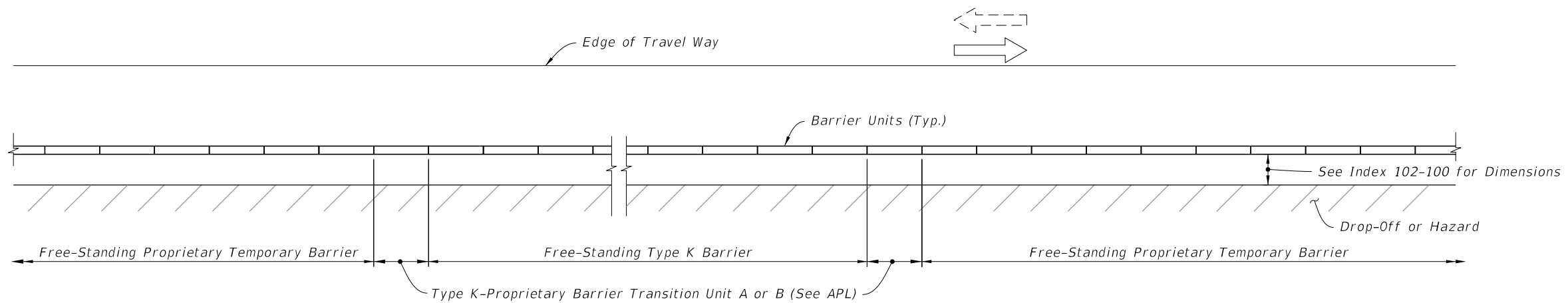
THRIE-BEAM GUARDRAIL POSITIONING DETAIL

10/20/2022 8:45:14 AM

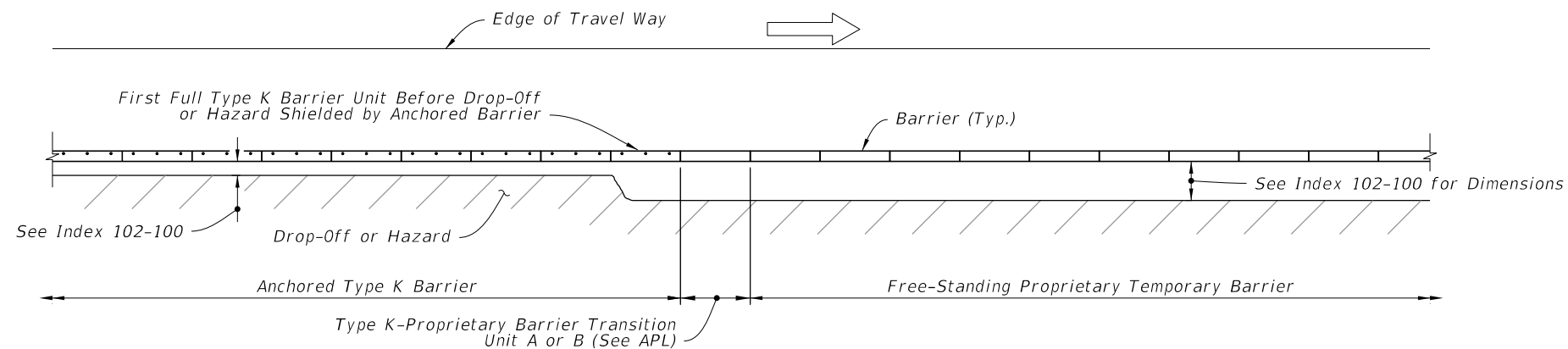
LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 10 of 17
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APPROACH TRANSITION FROM FREE-STANDING PROPRIETARY TEMPORARY BARRIERS TO ANCHORED TYPE K TEMPORARY CONCRETE BARRIERS



APPROACH AND TRAILING END TRANSITIONS FROM FREE-STANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREE-STANDING PROPRIETARY TEMPORARY BARRIERS



TRAILING END TRANSITION FROM ANCHORED TYPE K TEMPORARY CONCRETE BARRIERS TO FREE-STANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

NOTE:

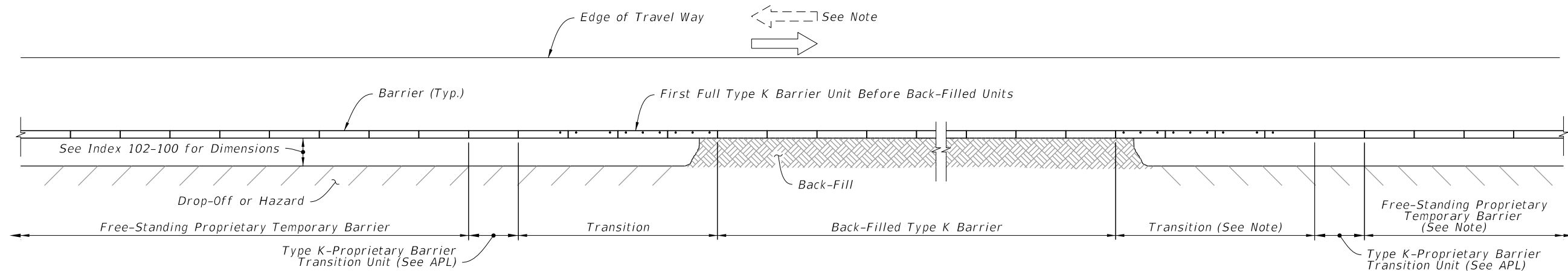
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

SYMBOLS:

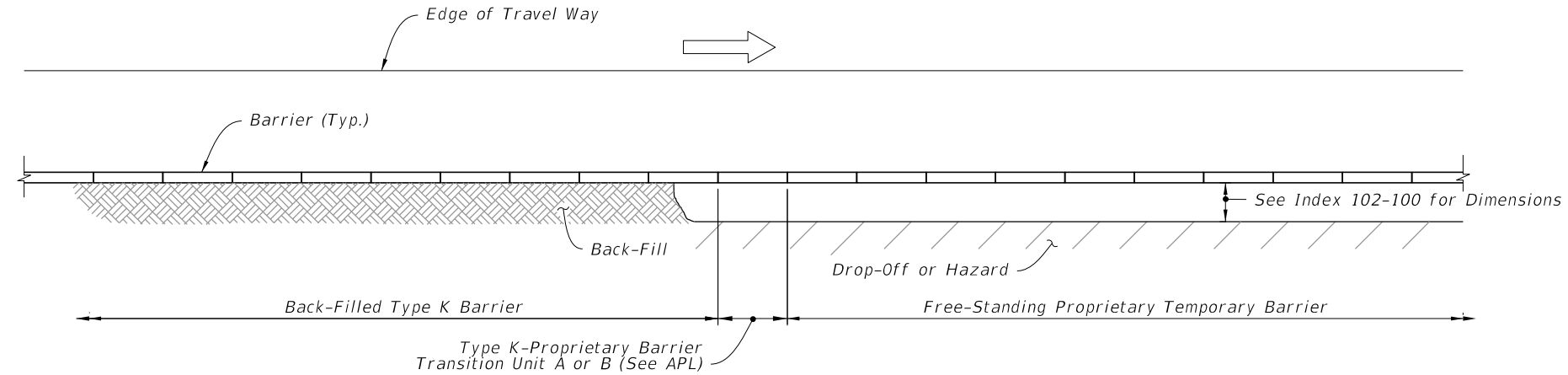
- Dot indicates number and position of Bolts or Stakes
- Direction of Traffic

10/20/2022 8:45:15 AM

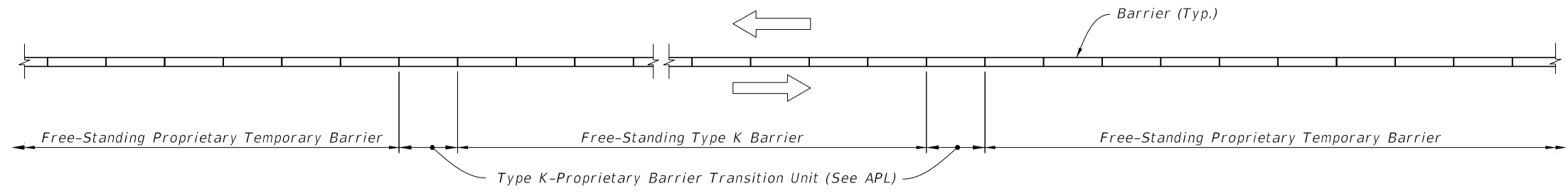
LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 11 of 17
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APPROACH TRANSITION FROM FREE-STANDING PROPRIETARY TEMPORARY BARRIERS TO BACK-FILLED TYPE K TEMPORARY CONCRETE BARRIERS



TRAILING END TRANSITION FROM BACK-FILLED TYPE K TEMPORARY CONCRETE BARRIERS TO FREE-STANDING PROPRIETARY TEMPORARY BARRIERS



MEDIAN APPROACH AND TRAILING END TRANSITIONS FROM FREE-STANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREE-STANDING PROPRIETARY TEMPORARY BARRIERS

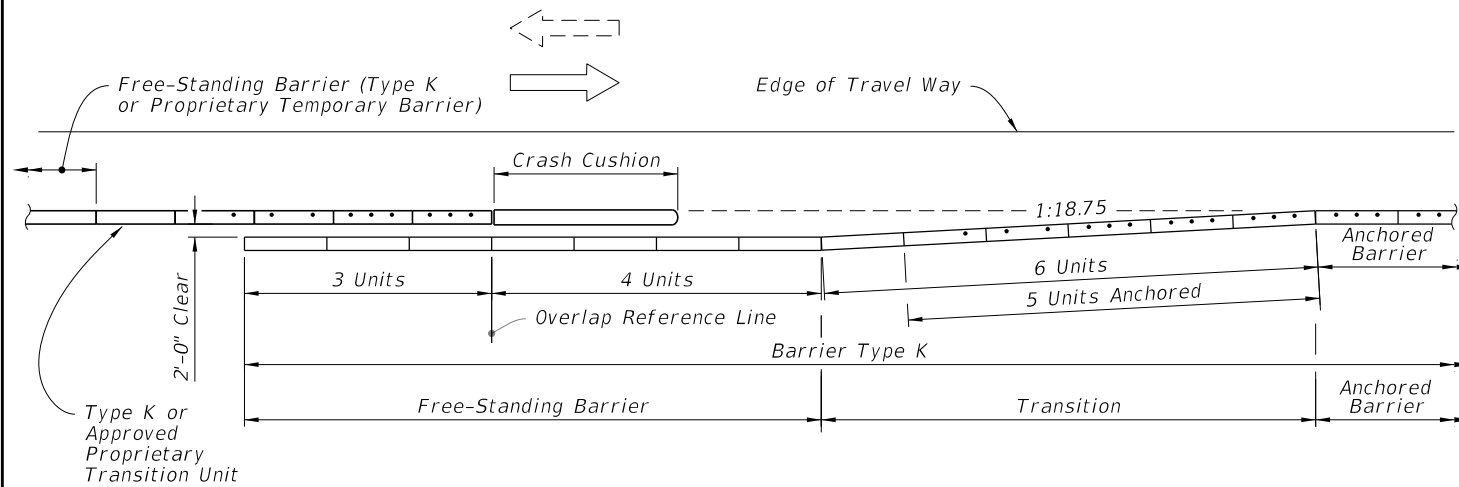
NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

SYMBOLS:
Dot indicates number and position of Bolts or Stakes
→ Direction of Traffic

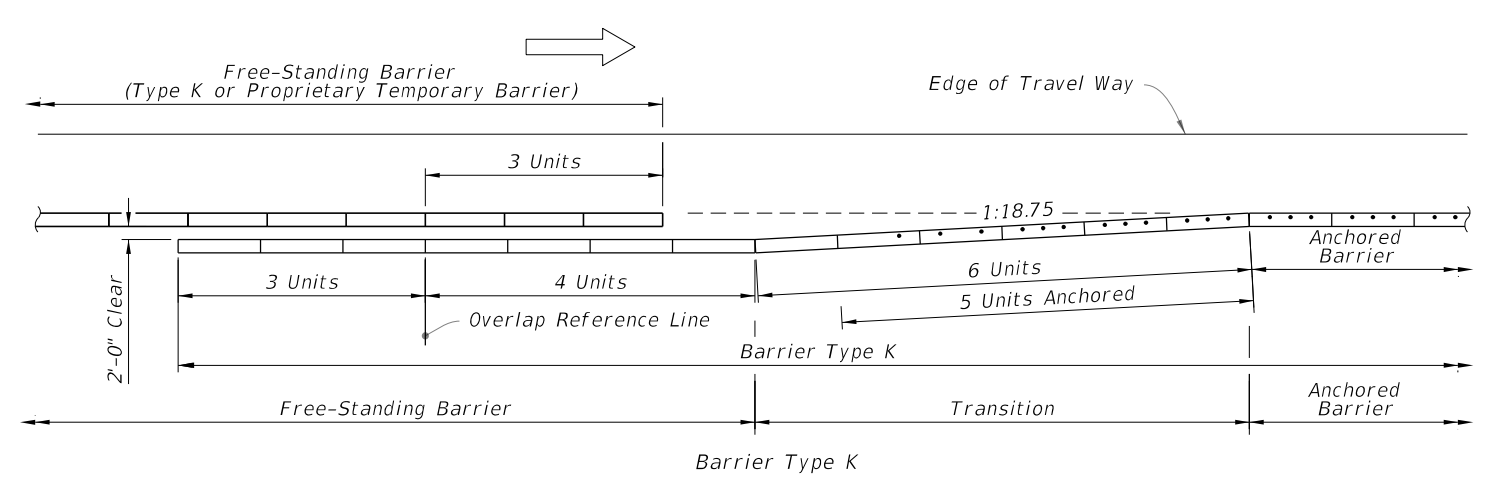
TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

10/20/2022 8:45:16 AM

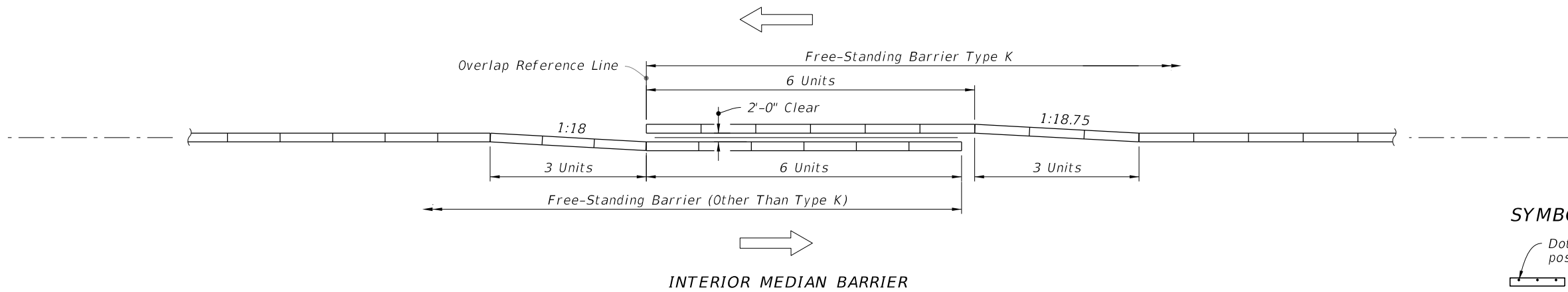
LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 12 of 17
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APPROACH SHOULDER BARRIER ON UNDIVIDED FACILITIES



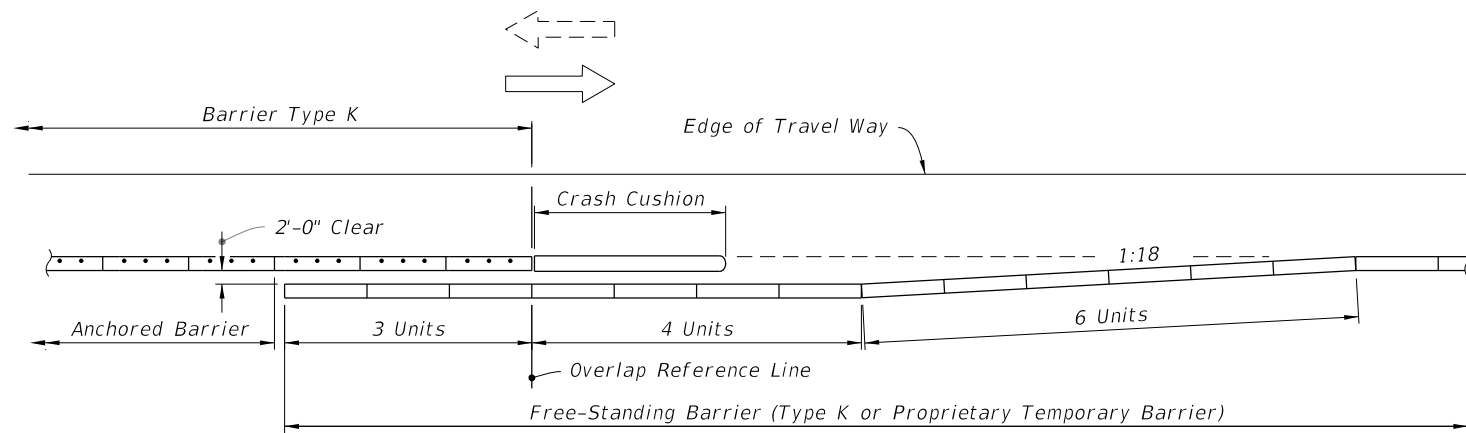
APPROACH SHOULDER BARRIER ON DIVIDED FACILITIES



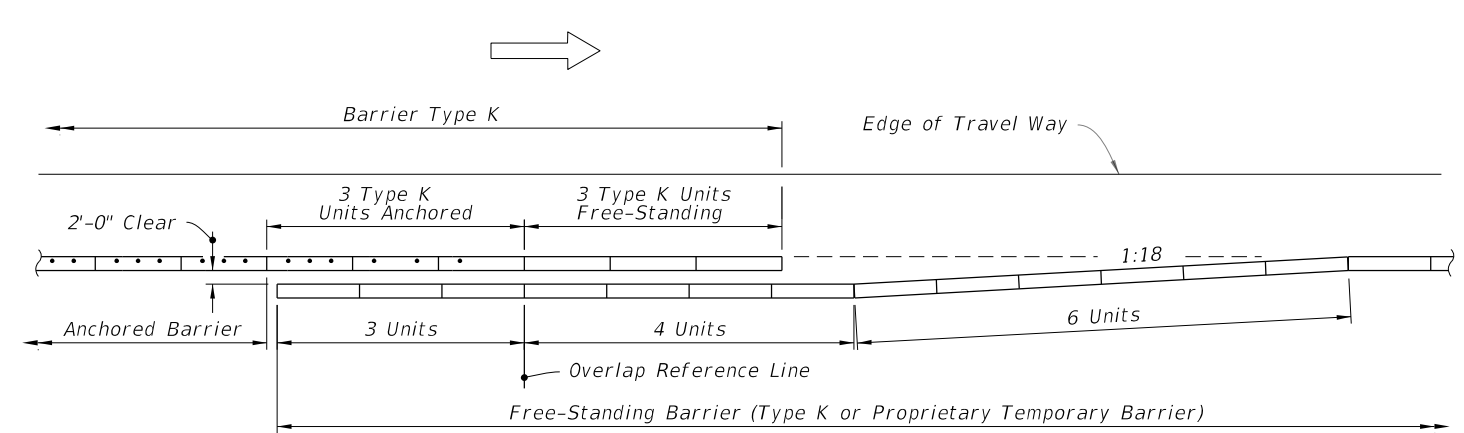
INTERIOR MEDIAN BARRIER

SYMBOLS:

- Dot indicates number and position of Bolts or Stakes
- Direction of Traffic



DEPARTURE (TRAILING) SHOULDER BARRIER ON UNDIVIDED FACILITIES
(BARRIER TYPE K ON BRIDGES AND APPROACH SLABS)



DEPARTURE (TRAILING) SHOULDER BARRIER ON DIVIDED FACILITIES
(BARRIER TYPE K ON BRIDGES AND APPROACH SLABS)

CONTINUATION OF BARRIER • FROM OTHER TYPE BARRIERS TO BARRIER TYPE K

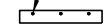

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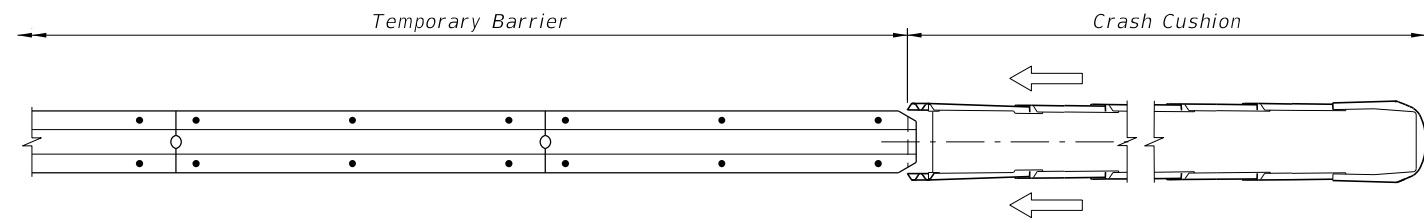
LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 13 of 17
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NOTE:

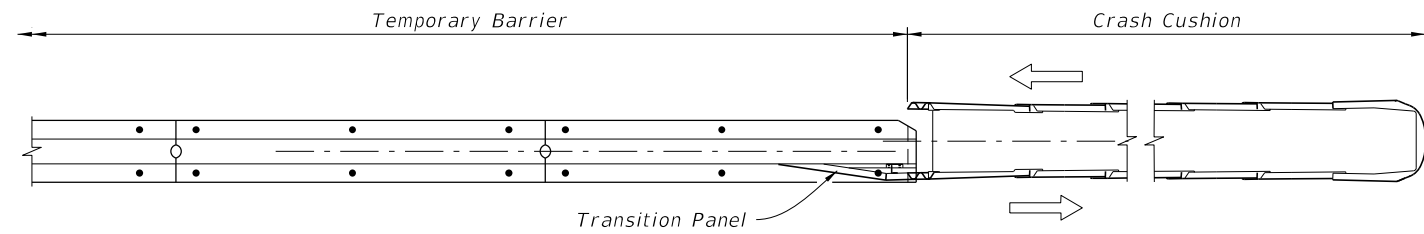
When subjected to reverse direction hits, construct Transition Panels from Temporary Barrier to Crash Cushions; for additional details refer to the applicable crash cushion drawings on the APL.

SYMBOLS:

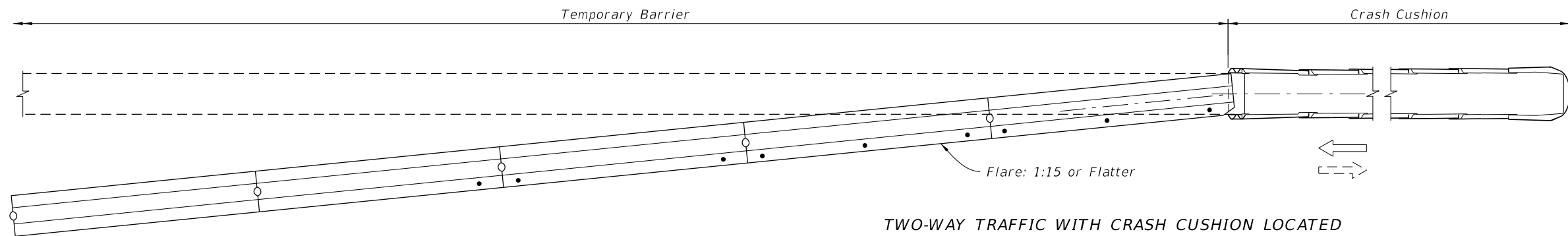
-  Dot indicates number and position of Bolts or Stakes
-  Direction of Traffic



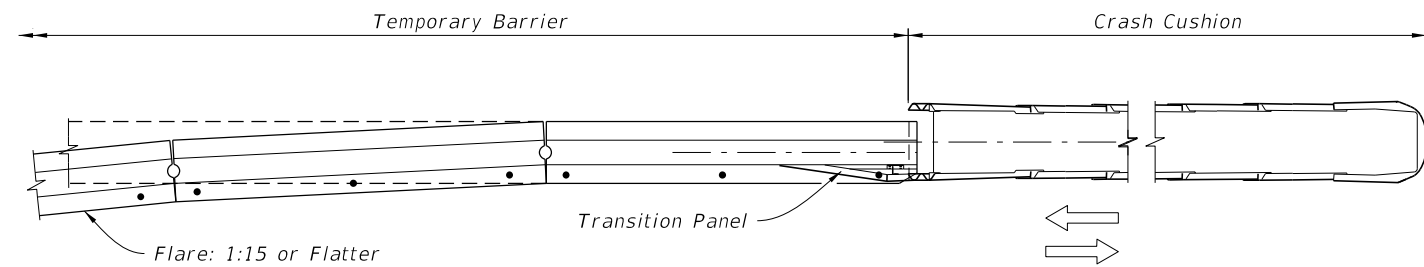
UNIDIRECTIONAL - SEPARATED TRAFFIC



BIDIRECTIONAL - SEPARATED TRAFFIC



TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC




TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED WITHIN OPPOSING LANE CLEAR ZONE

===== END TREATMENT WHEN SHIELDED BY A CRASH CUSHION =====
SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

SHIELDING ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)

10/20/2022 8:45:18 AM

LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 14 of 17
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FABRICATION NOTES:

In order to maintain crashworthiness of the Barrier System, do not substitute different grades, sizes, shapes or types of reinforcing steel for those shown for constructing Type K Barrier Units. Also, do not substitute different type, size, length or material grade anchor bolts, nuts, washers, adhesives, connector pins, stakes, keeper pins, or guardrail components for installing Type K Barrier Units.

FABRICATOR PREQUALIFICATIONS:

- A. The Concrete Plant that meets the requirements;
 - a. Specification 450 for prestressed concrete
 - b. Specification 105 for precast.

CONCRETE:

- A. Construct Barrier Units with Class IV concrete in accordance with Specification 346.
- B. Specification 346-10 is not applicable.
- C. Barrier Units represented by concrete acceptance strength tests which fall below 5000 psi will be rejected.

REINFORCING STEEL:

- A. Use only steel reinforcing that meet ASTM A 615, Grade 60, with the exception of Bars 6D1, 6D2 and 6D3.
- B. Bars 6D1, 6D2 and 6D3 use steel reinforcing that meets ASTM A 706, with the exception that a 2 $\frac{3}{4}$ " diameter pin must be used for the 180 degree bend test.
- C. After steel reinforcing fabrication, hot dip galvanized in accordance with Specification 962 or coated with a cold galvanizing compound in accordance with Specification 562, all or part of Bars 6D.
- D. At the Fabricator's option, the entire length of Bars 6D may be galvanized or coated.
- E. The minimum limit of galvanizing or coating is shown in the Bending Diagrams.
- F. Install Bars 6D within $\frac{1}{8}$ " of the plan dimensions.
- G. Correct placement of Bars 6D is critical for proper fit up and performance of individual Barrier Units.
- H. At the option of the Fabricator, Deformed Welded Wire Fabric in accordance with Specification 931 and the details shown on Sheet 15 may be utilized in lieu of Bars 4A and 5B.
- I. All dimensions in the Bending Diagrams are out to out.
- J. Install all reinforcing steel with a 2" minimum cover, except as noted.

LIFTING SLEEVE ASSEMBLY:

- A. Inclusion of the Lifting Sleeve Assemblies is optional.
- B. Use steel in accordance with ASTM A 53 for the Pipe Sleeve.
- C. Hot-dip galvanize the Lifting Sleeve Assemblies after their fabrication in accordance with the Specifications.


SURFACE FINISH:

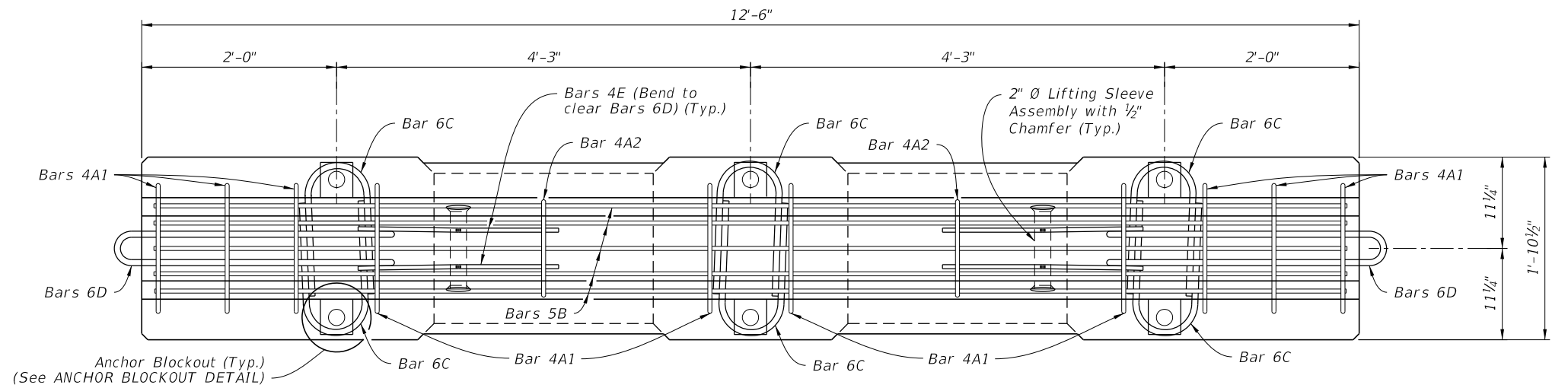
- A. Construct Barrier Units in accordance with Specifications 400 and 521.
- B. Finish the top and sides of the Barrier Units with a General Surface Finish.
- C. Finish the bottom of the Barrier Units to a dense uniform surface by floating in lieu of the General Surface Finish.
- D. Use stationary metal forms or stationary timber forms with a form liner.

MARKING:

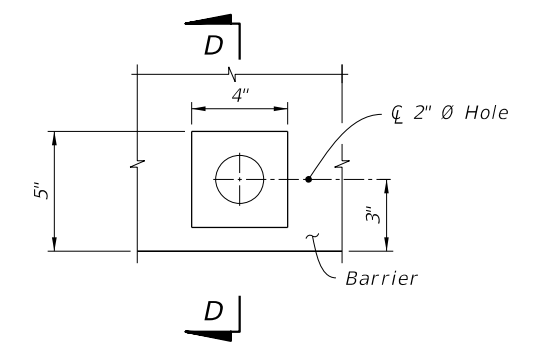
- A. Permanently mark the top left end of each Barrier Unit by the use of an embedded and anchored metallic plate with letters and figures a minimum of 0.5" tall.
- B. Ink stamps are not allowed.
- C. Permanently mark with the following information:
 - Type K1
 - Fabricator's name or symbol
 - Date of manufacture (day, month and year)

9/23/2021 2:38:43 PM

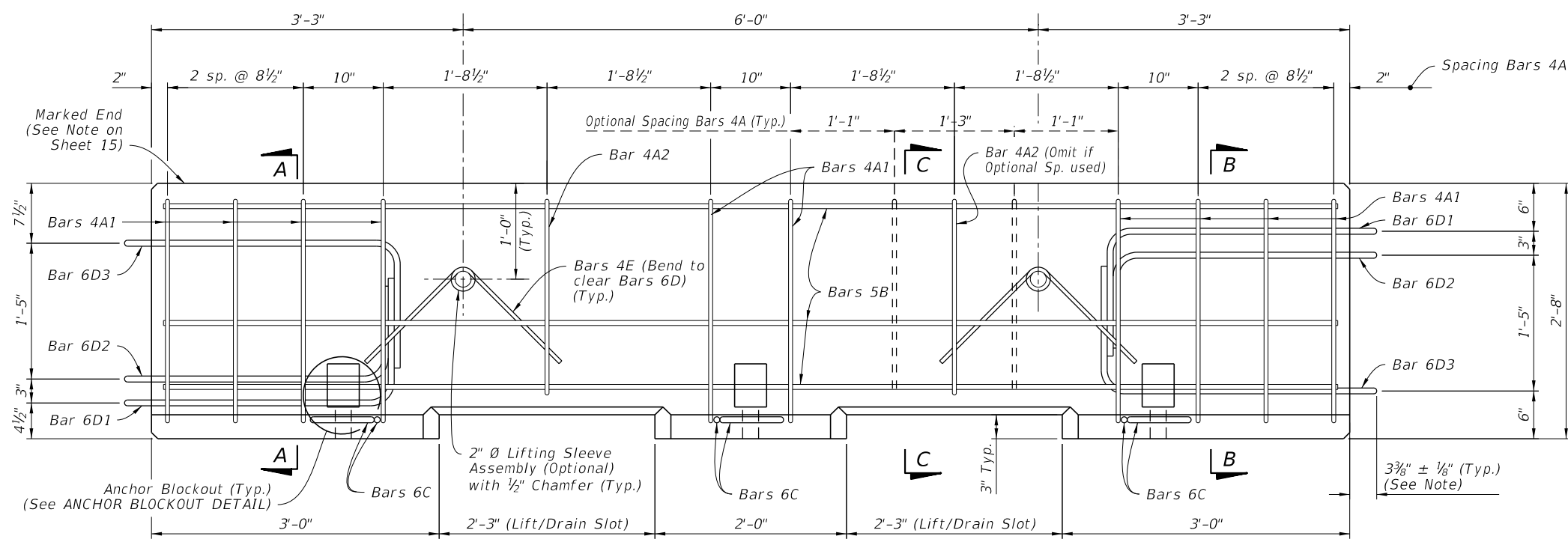
LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2022-23 STANDARD PLANS	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX 102-110	SHEET 15 of 17
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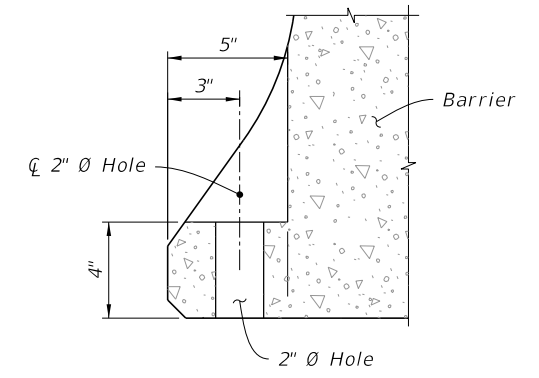
PLAN VIEW



PLAN VIEW

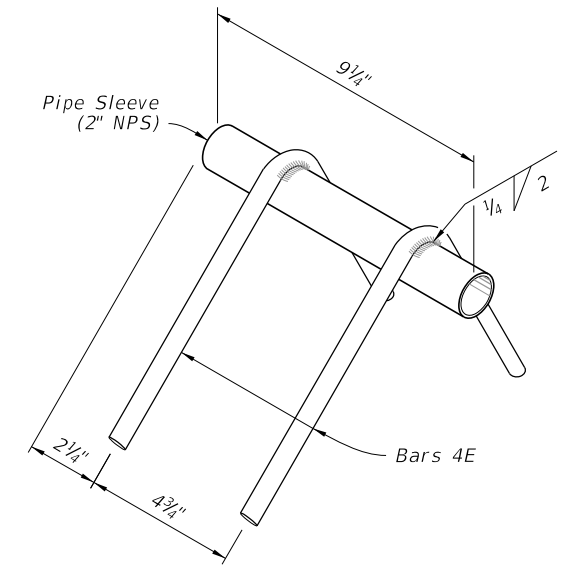


ELEVATION VIEW



SECTION D-D
(Reinforcement Not shown)

ANCHOR BLOCKOUT DETAIL



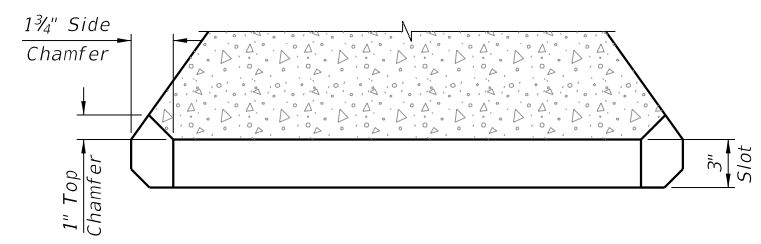
LIFTING SLEEVE ASSEMBLY DETAIL
(OPTIONAL)

NOTE:
Measured for end to barrier unit to outside edge of Bars 6D.

ESTIMATED TEMPORARY CONCRETE BARRIER QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY	1.29
Reinforcing Steel	LB	218

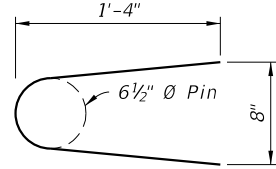
The above quantities are for one Barrier Unit.

Cross References:
For Section A-A, Section B-B and Section C-C see Sheet 17.

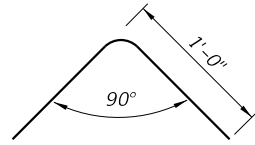


SECTION THRU LIFT/DRAIN SLOT

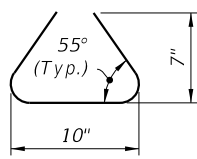
9/23/2021 2:38:44 PM



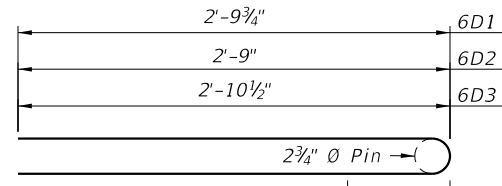
BAR 6C



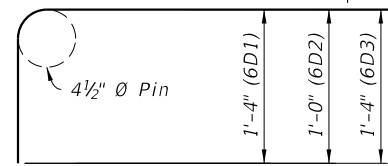
BAR 4E



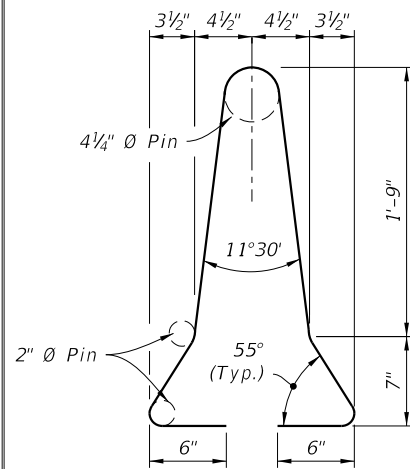
NO. 4 DRAIN BAR OVER DRAIN SLOTS (CONVENTIONAL STEEL)



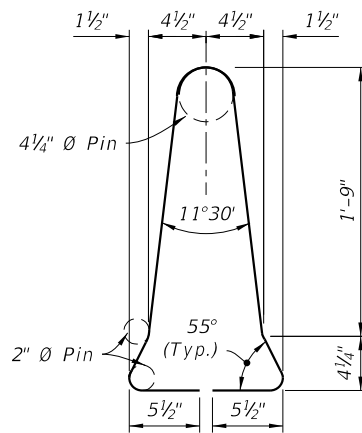
TOP VIEW



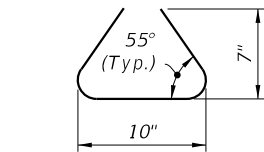
SIDE VIEW BARS 6D1, 6D2 & 6D3



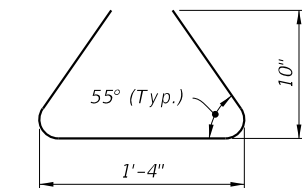
STIRRUP BAR 4A1



STIRRUP BAR 4A2



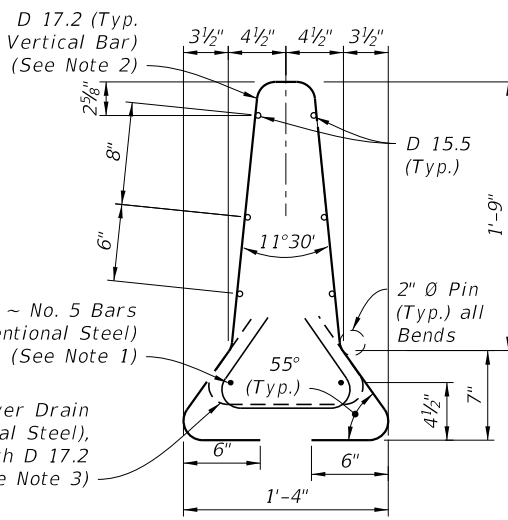
NO. 4 DRAIN BAR OVER DRAIN SLOTS (CONVENTIONAL STEEL)



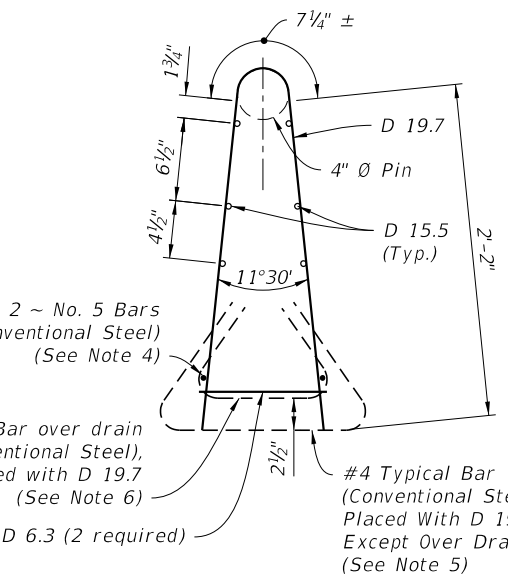
NO. 4 TYPICAL BAR (CONVENTIONAL STEEL)

2 ~ No. 5 Bars (Conventional Steel) (See Note 4)
No. 4 Drain Bar over drain slots (Conventional Steel), placed with D 19.7 (See Note 6)
D 6.3 (2 required)

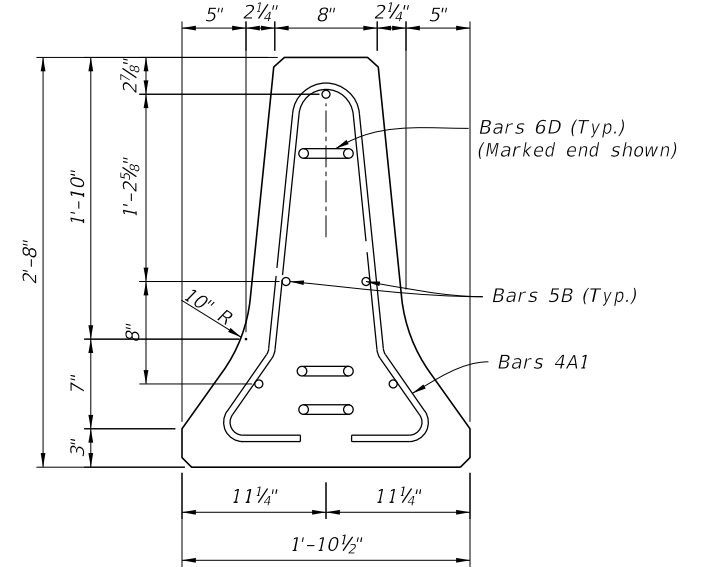
CONFIGURATION TWO



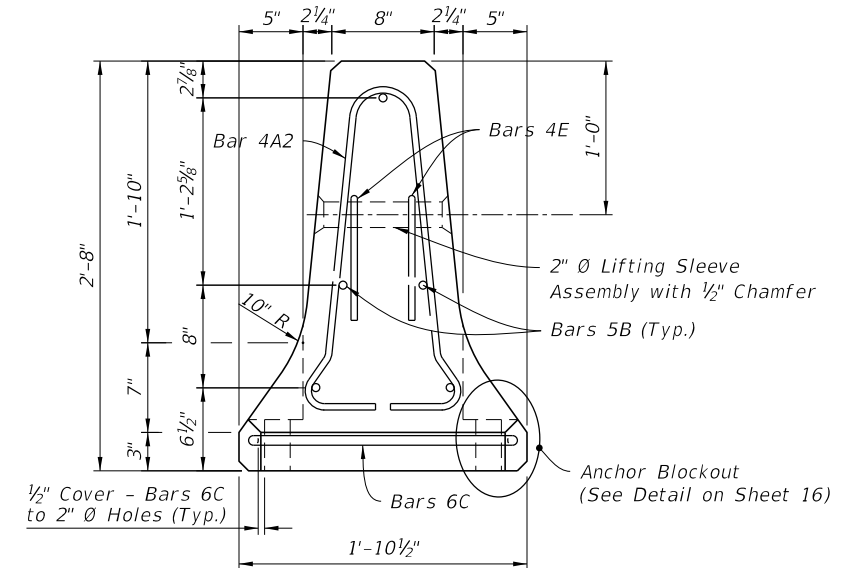
CONFIGURATION ONE



CONFIGURATION TWO



SECTION A-A (SHOWN) (SECTION B-B SIMILAR)



SECTION C-C (Bars 6D not shown for clarity)

BILL OF REINFORCING STEEL			
MARK	SIZE	NUMBER	LENGTH
A1	4	10	6'-1"
A2	4	2	5'-5"
B	5	5	12'-3" (Straight)
C	6	6	3'-1"
D1	6	2	8'-4"
D2	6	2	7'-6"
D3	6	2	8'-6"
E	4	4	2'-0"

NOTES:

- Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
- Match D17.2 spacing to Bars 4A in the Elevation View, Sheet 15.
- Field trim D17.2 to clear drain slot by 2".
- Place 2 ~ No. 5 Bars (12'-3" long) tied to D 19.7 inside of bottom Welded Wire Reinforcement cage as shown.
- Match D19.7 spacing to Bars 4A in the Elevation View, Sheet 15.
- Field trim D19.7 to clear drain slot by 2".

NOTES:

- Provide 3/4" Chamfer at top and bottom corners of Barrier.
- Provide a minimum of 2" cover on the top and bottom.
- Provide a minimum of 1 3/4" cover on both sides.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

ALTERNATE REINFORCING STEEL DETAIL WELDED WIRE REINFORCEMENT

CROSS SECTION

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LAST REVISION	DESCRIPTION:
11/01/17	



FY 2022-23 STANDARD PLANS

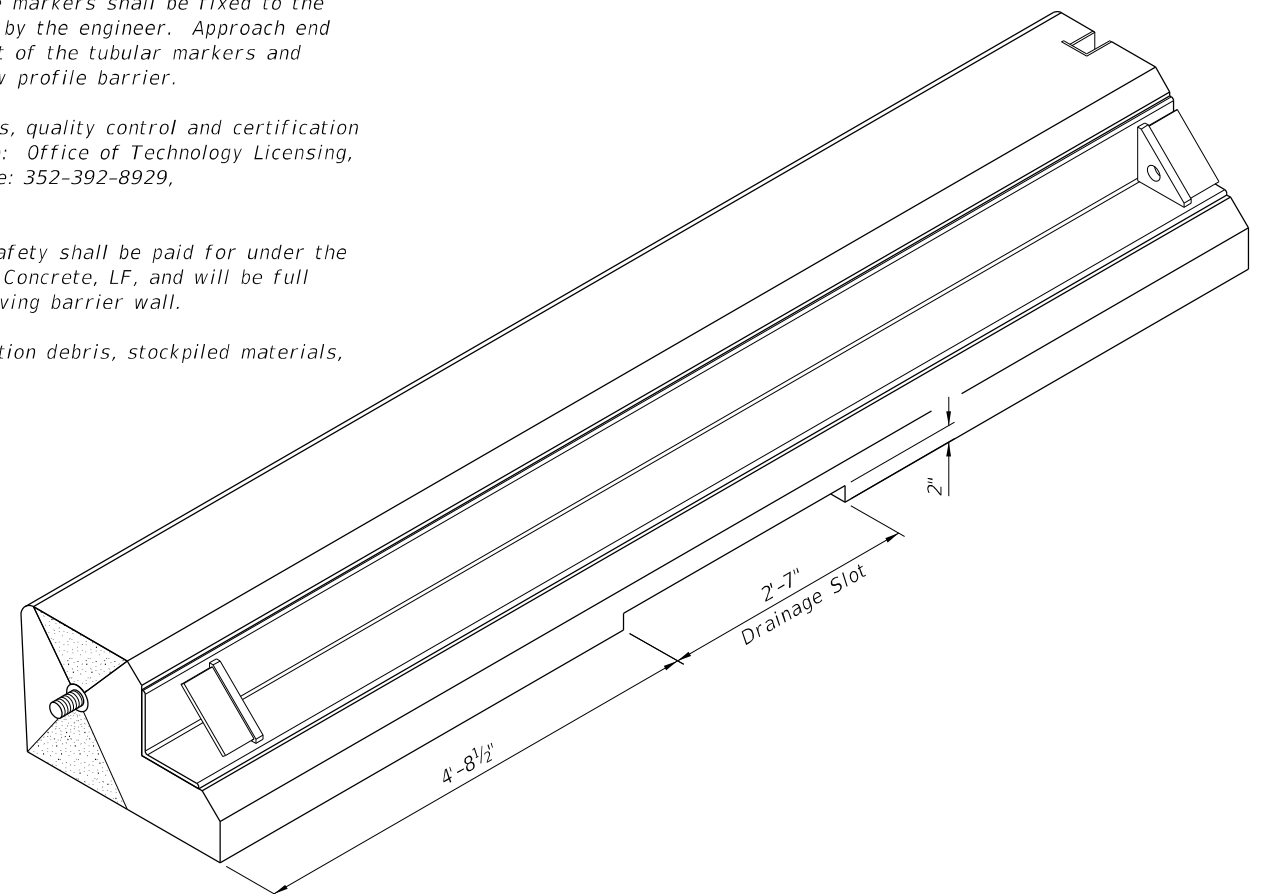
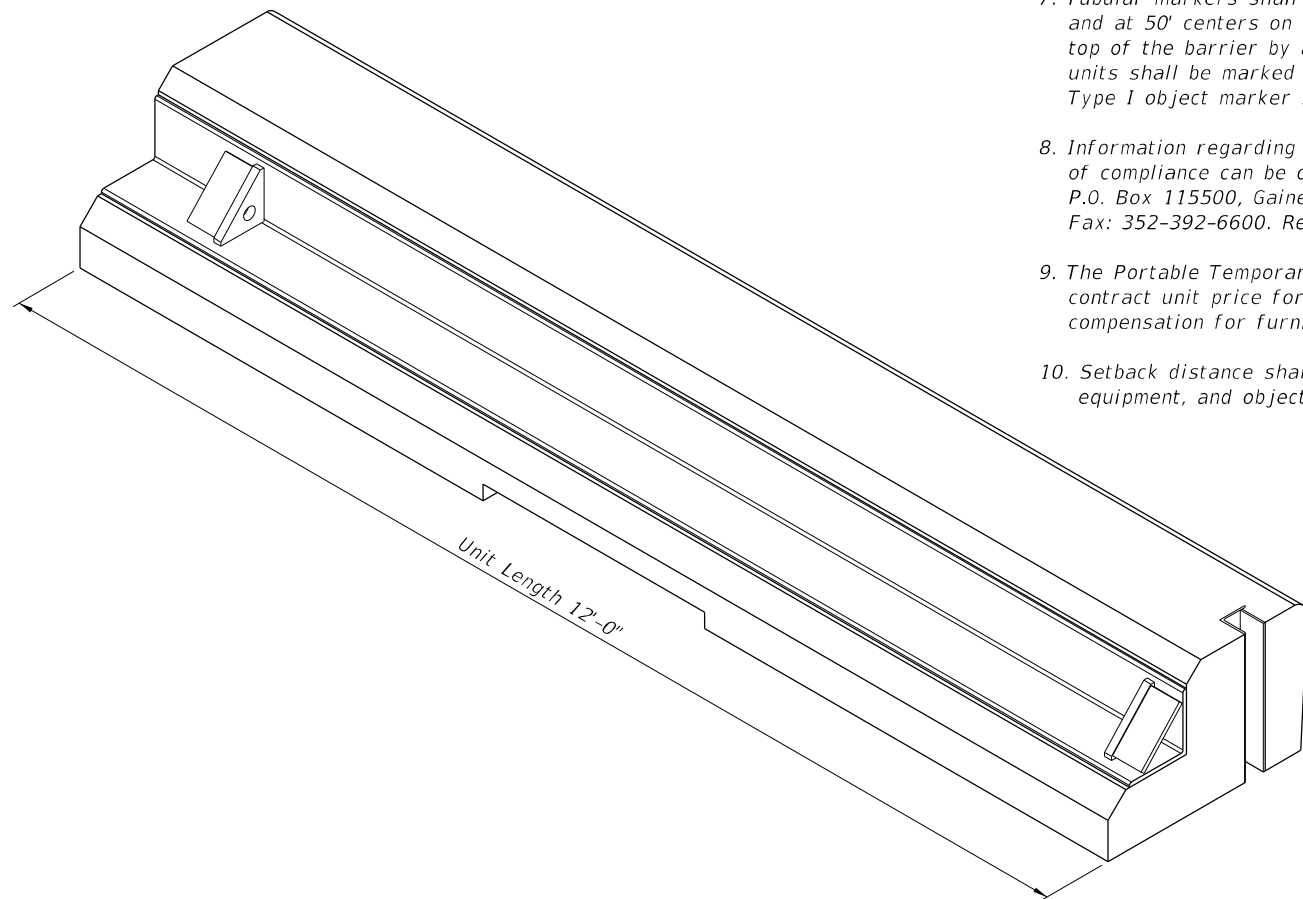
TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

INDEX 102-110

SHEET 17 of 17

GENERAL NOTES:


1. Pursuant to 35 United States Code, Chapter 18, also known as the Bayh Dole Act of 1980, the non mountable curb was developed through federal funding. The 'Portable Temporary Low Profile Barrier For Roadside Safety' is a licensed design by the University Of Florida. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This Index is provided by the Florida Department Of Transportation solely for use by the Department and its assignees. The purpose for this Index is to indicate the approval of use of the barrier on the State Highway System; to provide sufficient pictorials for identifying the barrier unit; and, to provide general installation geometry for the barrier.
3. This legally mandated relationship is unique to federally funded University patents that Department contractors use on Contracts. Pursuant to federal law, the University may pursue royalties for a valid patent. Only those barrier units cast by producers licensed by the University Of Florida will be allowed for installation on the State Highway System in Florida. Barrier wall units shall conform to Specification 521 and shall be produced in Department-approved plants with quality control plans for precasting concrete barrier walls. Each barrier wall unit shall be permanently marked with an identification that is traceable to the manufacturer, the producing precast concrete plant and the date of production. This permanent identification mark will serve as certification that the unit has been manufactured in accordance with University of Florida drawings and specifications, and the approved quality control program.
4. The low profile barrier is to be installed only with hardware and accessories furnished by the licensed barrier producer. Units shall be used for no purpose other than as interconnected segments in a run of barrier. Low profile barrier wall units shall maintain firm contact with adjoining units. Nuts on tensioning rods shall be installed snug tight.
5. The low profile barrier is applicable for work zone speeds of 45 mph or less.
6. If the plans specify Low Profile Barrier then substitution with other barrier types is not permitted.
7. Tubular markers shall be orange in color and installed along the run of barrier at the ends and at 50' centers on tangents and 25' centers on radii. The markers shall be fixed to the top of the barrier by an adhesive or other method approved by the engineer. Approach end units shall be marked with a Type I object marker. The cost of the tubular markers and Type I object marker shall be included in the cost of the low profile barrier.
8. Information regarding licensing, shop drawings, specifications, quality control and certification of compliance can be obtained from the University Of Florida: Office of Technology Licensing, P.O. Box 115500, Gainesville, Florida, 32611-5500. Telephone: 352-392-8929, Fax: 352-392-6600. Reference UF#11052.
9. The Portable Temporary Low Profile Barrier For Roadside Safety shall be paid for under the contract unit price for Barrier Wall (Temporary) Low Profile Concrete, LF, and will be full compensation for furnishing, installing, maintaining and removing barrier wall.
10. Setback distance shall be kept clear of any grass, construction debris, stockpiled materials, equipment, and objects.

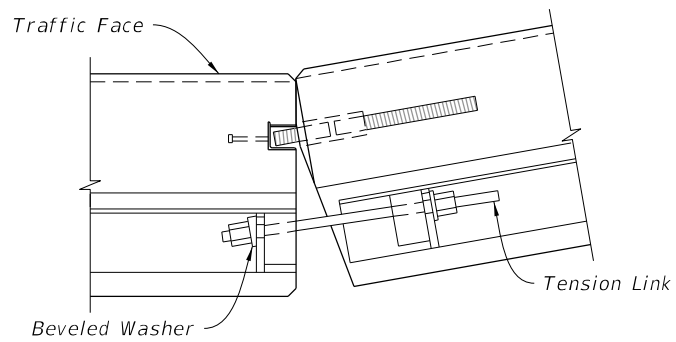


BACKSIDE AND END PICTORIAL VIEWS

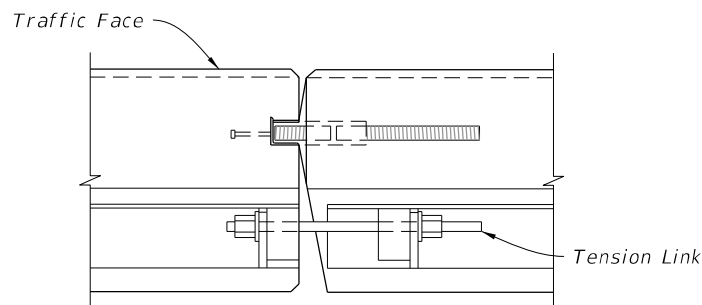
PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

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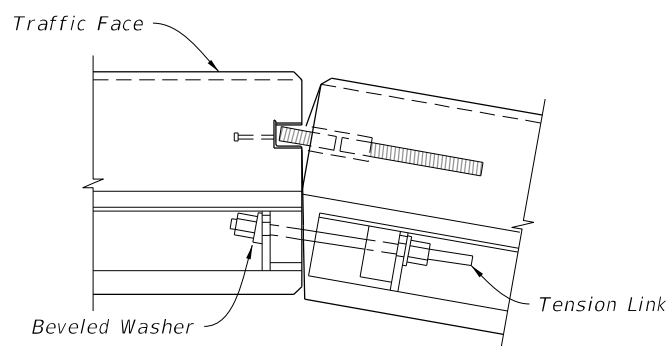
LAST REVISION 11/01/19	REVISION	DESCRIPTION:	 FY 2024-25 STANDARD PLANS	LOW PROFILE BARRIER	INDEX 102-120	SHEET 1 of 5
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CONCAVE CONNECTION

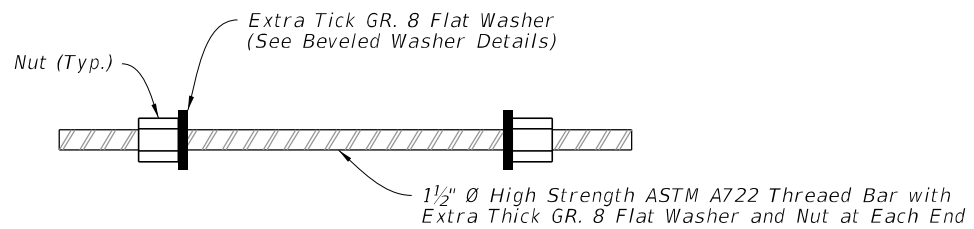


PARALLEL CONNECTION

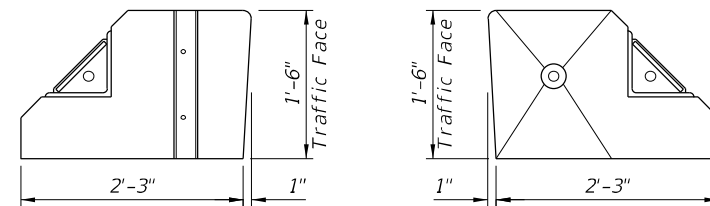


CONVEX CONNECTION

PLAN VIEWS OF CONNECTIONS



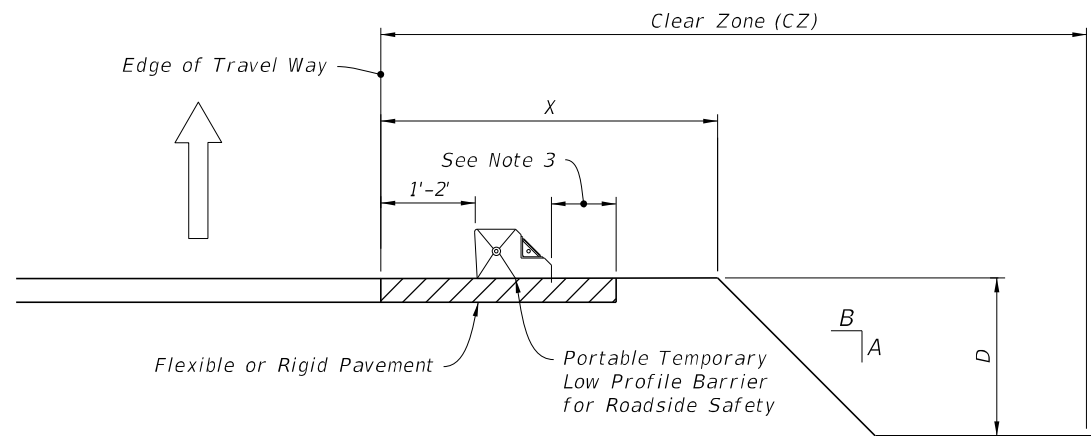
TENSION LINK DETAIL



FLAT FACE FEMALE END

BEVELED FACE MALE END

END VIEWS



SETBACK DISTANCE AT DROP-OFFS

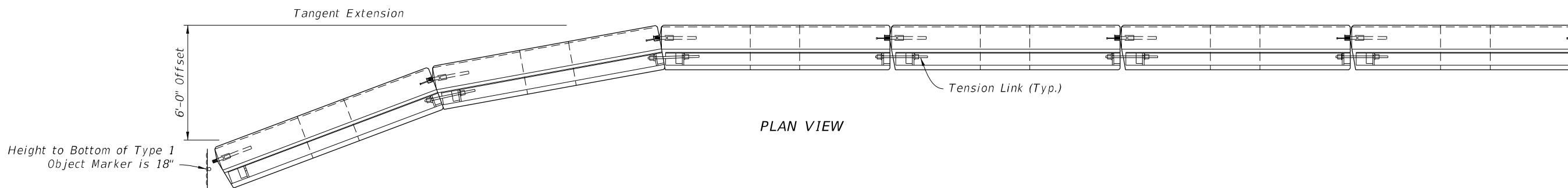
NOTES:

1. LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement.
2. ASPHALT PAD: Where existing pavement is not present, construct 2" Asphalt Pad using miscellaneous asphalt pavement in accordance with Specification 339 with the exception that the use of a pre-emergent herbicide is not required. Payment for asphalt pad will be included in the cost of the barrier.
3. Minimum 9" on 1:10 or flatter slopes for 'Portable Temporary Low Profile Barrier For Roadside Safety.' For values A, B, D and X see Index 102-600.

SYMBOLS:

- Type I Object Marker
- ⇒ Direction of Traffic

WORK ZONE SPEED	LATERAL OFFSET	SETBACK DISTANCE
45 MPH OR LESS	1' MIN, 2' PREFERRED	9"



PLAN VIEW

APPROACH END OFFSET

9/28/2023 8:15:37 AM

LAST REVISION 11/01/22

DESCRIPTION:

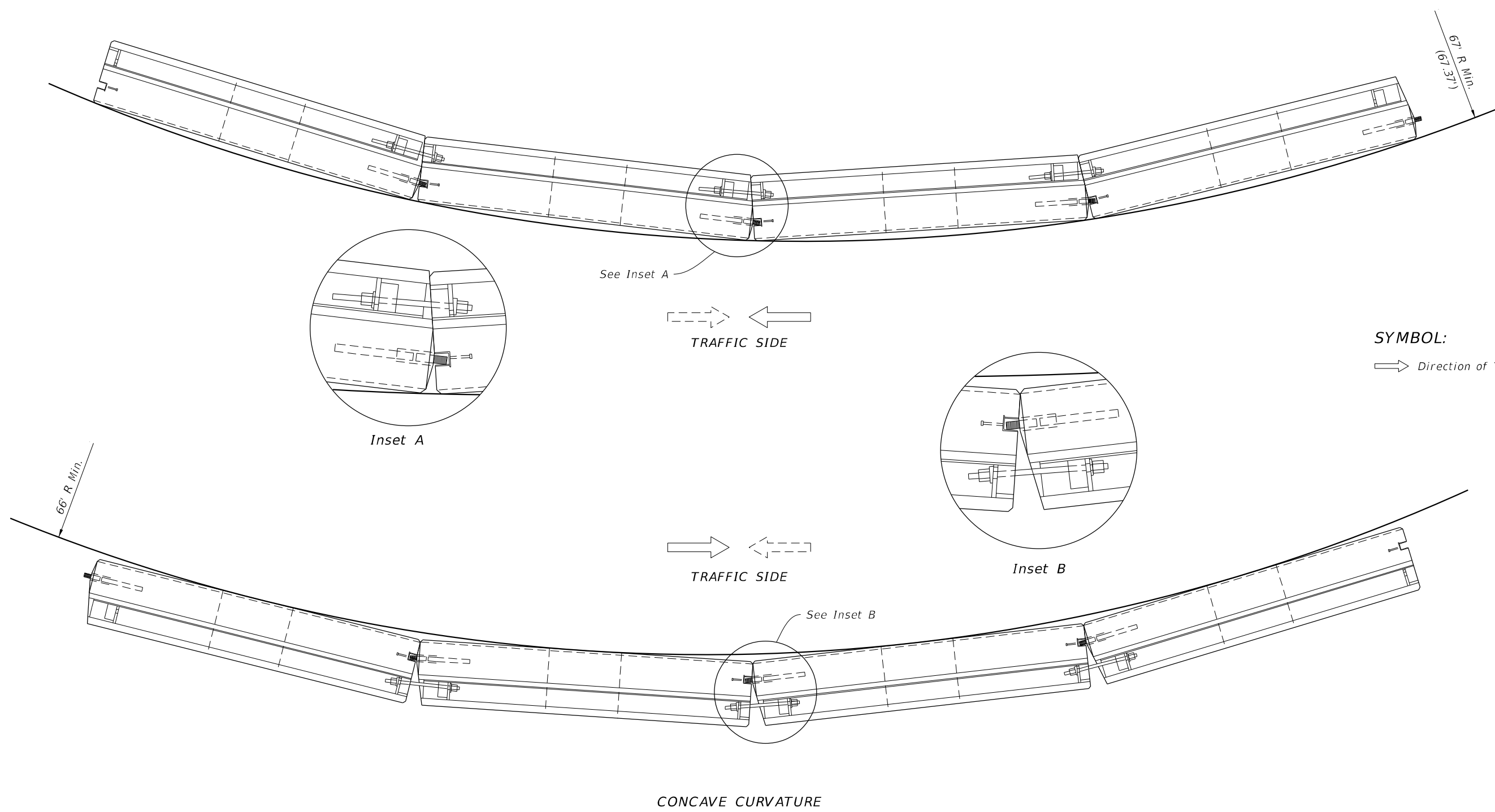


FY 2024-25
STANDARD PLANS


LOW PROFILE BARRIER

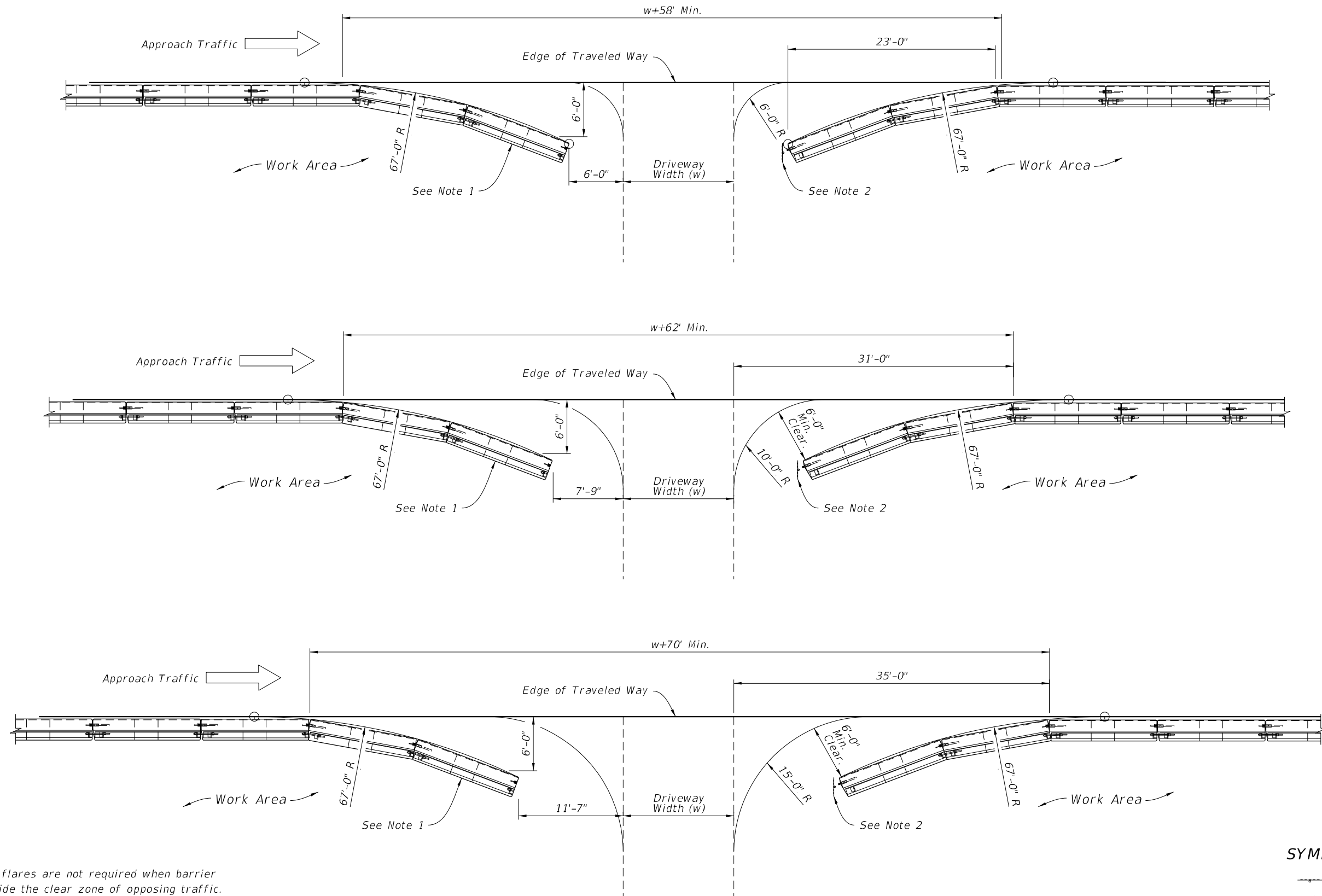
INDEX
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9/28/2023 8:15:42 AM

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NOTES:


1. Trailing end flares are not required when barrier located outside the clear zone of opposing traffic.
2. Type 1 Object Marker to be installed when trailing end flare falls within the clear zone of opposing traffic.

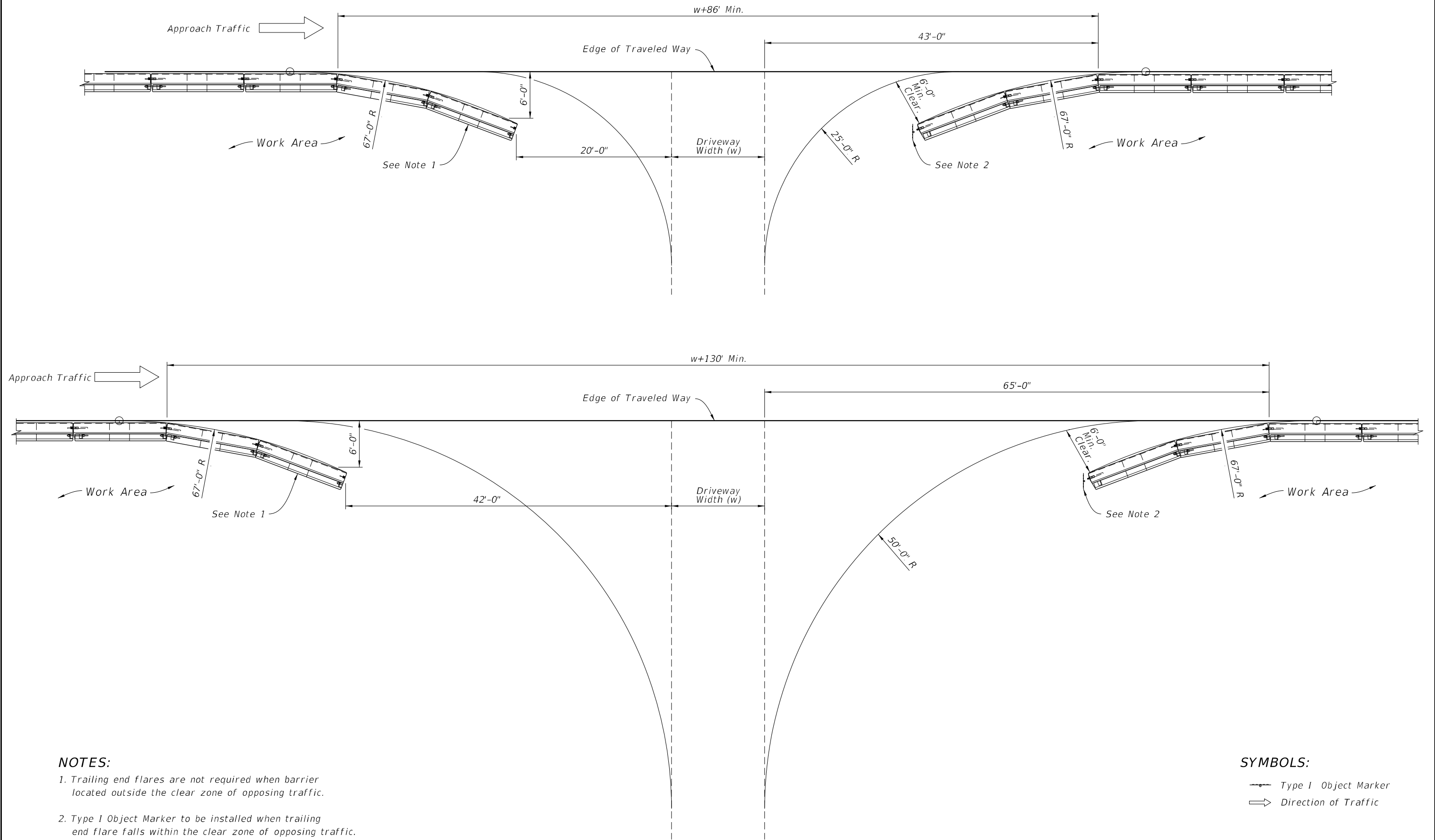
SYMBOLS:

- Type 1 Object Marker
- ⇒ Direction of Traffic

BARRIER OPENINGS AT DRIVEWAYS

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9/28/2023



LAST REVISION 11/01/19	REVISION	DESCRIPTION:	 FY 2024-25 STANDARD PLANS	LOW PROFILE BARRIER	INDEX 102-120	SHEET 4 of 5
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NOTES:


1. Trailing end flares are not required when barrier located outside the clear zone of opposing traffic.
2. Type 1 Object Marker to be installed when trailing end flare falls within the clear zone of opposing traffic.

SYMBOLS:

-  Type 1 Object Marker
-  Direction of Traffic

BARRIER OPENINGS AT DRIVEWAYS

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9/28/2023

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4	Flagger Control Survey Work Zones Signs
5	Work Zone Sign Supports
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GENERAL NOTES:

- This Index contains information specific to the Federal and State guidelines and standards for the preparation of traffic control plans and for the execution of traffic control in work zones, for construction and maintenance operations and utility work on highways, roads and streets on the State Highway System. Certain requirements in this Index are based on the high volume nature of State Highways. For highways, roads and streets off the State Highway System, the local agency (City/County) having jurisdiction may adopt requirements based on the minimum requirements provided in the MUTCD.
- Use this Index in accordance with the Plans and Indexes 102-601 through 102-680. Indexes 102-601 through 102-680 are Department-specific typical applications of commonly encountered situations. Adjust device location or number thereof as recommended by the Worksite Traffic Supervisor and approved by the Engineer. Devices include, but are not limited to, flaggers, portable temporary signals, signs, pavement markings, and channelizing devices. Comply with MUTCD or applicable Department criteria for any changes and document the reason for the change.
- Except for emergencies, any road closure on State Highway System must comply with Section 335.15, F.S.

Work Zone Speed (mph)	Max. Spacing (feet)			
	Cones or Temporary Tubular Markers		Type I Barricades, Type II Barricades, Vertical Panels, or Drums	
	Taper	Tangent	Taper	Tangent
≤ 45	25	50	25	50
≥ 50	25	50	50	100

Work Zone Speed (mph)	Min. Length (feet)
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	$L = WS$

Where: W = width of offset in feet
S = speed in mph

Road Type	Min. Spacing (feet)
Arterials and Collectors with Work Zone Speed ≤ 40 mph	200
Arterials and Collectors with Work Zone Speed ≥ 45 mph	500
Limited Access Roadways *	1,500

* For Limited access roadways with work zone speed ≤ 55 mph, the minimum spacing may be reduced in accordance with the MUTCD and as approved by the Engineer.

Work Zone Speed (mph)	Min. Length (feet)
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

Note: When Buffer Length "B" cannot be attained due to geometric constraints, use the greatest length possible, but not less than 155 feet.

DEFINITIONS:

Regulatory Speed (In Work Zones)

The maximum permitted travel speed posted for the work zone is indicated by the regulatory speed limit signs. The work zone speed must be shown or noted in the plans. This speed should be used as the minimum design speed to determine runout lengths, departure rates, flare rates, lengths of need, clear zone widths, taper lengths, crash cushion requirements, marker spacings, superelevation and other similar features.

Advisory Speed

The maximum recommended travel speed through a curve or a hazardous area.

Travel Way

The portion of the roadway for the movement of vehicles. For traffic control through work zones, travel way may include the temporary use of shoulders and any other permanent or temporary surface intended for use as a lane for the movement of vehicular traffic.

- a. *Travel Lane:* The designated widths of roadway pavement marked to carry through traffic and to separate it from opposing traffic or traffic occupying other traffic lanes.
- b. *Auxiliary Lane:* The designated widths of roadway pavement marked to separate speed change, turning, passing and climbing maneuvers from through traffic.

Detour, Lane Shift, and Diversion

A detour is the redirection of traffic onto another roadway to bypass the temporary traffic control zone. A lane shift is the redirection of traffic onto a different section of the permanent pavement. A diversion is the redirection of traffic onto a temporary roadway, usually adjacent to the permanent roadway and within the limits of the right of way.

Aboveground Hazard

An aboveground hazard is any object, material or equipment other than traffic control devices that encroaches upon the travel way or that is located within the clear zone which does not meet the Department's safety criteria, i.e., anything that is greater than 4" in height and is firm and unyielding or doesn't meet breakaway requirements.

TEMPORARY TRAFFIC CONTROL DEVICES:

1. All temporary traffic control devices shall be ON the Department's Approved Products List (APL). Ensure the appropriate APL number is permanently marked on the device in a readily visible location.
2. All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, temporary traffic control devices that are no longer appropriate shall be removed or covered. Do not store temporary traffic control devices on the shoulder, sidewalk, or other roadway facility not affected by the work when work is suspended.
3. Arrow Boards, Portable Changeable Message Signs, Radar Speed Display Trailer, Portable Regulatory Signs, and any other trailer mounted device shall be delineated with a channelizing device placed at each corner when in use and shall be moved outside the travel way and clear zone or be shielded by a barrier or crash cushion when not in use.

OVERHEAD WORK:

Work is only allowed over a traffic lane when one of the following options is used:

OPTION 1 (OVERHEAD WORK USING A MODIFIED LANE CLOSURE)

Overhead work using a modified lane closure is allowed if all of the following conditions are met:

- a. Work operation is located in a signalized intersection and limited to signals, signs, lighting and utilities.
- b. Work operations are 60 minutes or less.
- c. Speed limit is 45 mph or less.
- d. Aerial lift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- e. Aerial lift equipment is placed directly below the work area to close the lane.
- f. Traffic control devices are placed in advance of the vehicle/equipment closing the lane using a minimum 100 foot taper.
- g. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.

OPTION 2 (OVERHEAD WORK ABOVE AN OPEN TRAFFIC LANE)

Overhead work above a open traffic lane is allowed if all of the following conditions are met:

- a. Work operation is located on a utility pole, light pole, signal pole, or their appurtenances.
- b. Work operations are 60 minutes or less.
- c. Speed limit is 45 mph or less.
- d. No encroachment by any part of the work activities and equipment within an area bounded by 2 feet outside the edge of travel way and 18 feet high.
- e. Aerial lift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- f. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.
- g. Adequate precautions are taken to prevent parts, tools, equipment and other objects from falling into open lanes of traffic.
- h. Other Governmental Agencies, Rail facilities, or Codes may require a greater clearance. The greater clearance required prevails as the rule.

OPTION 3 (OVERHEAD WORK ADJACENT TO AN OPEN TRAFFIC LANE)

Overhead work adjacent to an open traffic lane is allowed if all of the following conditions are met:

- a. Work operation is located on a utility pole, light pole, signal pole, or their appurtenances.
- b. Work operations are 1 day or less.
- c. Speed limit is 45 mph or less.
- d. No encroachment by any part of the work activities and equipment within 2 foot from the edge of travel way up to 18' height. Above 18' in height, no encroachment by any part of the work activities and equipment over the open traffic lane (except as allowed in Option 2 for work operations of 60 minutes or less).
- e. Aerial lift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- f. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.
- g. Adequate precautions are taken to prevent parts, tools, equipment and other objects from falling into open lanes of traffic.
- h. Other Governmental Agencies, Rail facilities, or Codes may require a greater clearance. The greater clearance required prevails as the rule.

OVERHEAD WORK: (Cont.)

OPTION 4 (OVERHEAD WORK MAINTAINING TRAFFIC WITH NO ENCROACHMENT BELOW THE OVERHEAD WORK AREA)

Traffic shall be detoured, shifted, diverted or paced as to not encroach in the area directly below the overhead work operations in accordance with the appropriate index drawing or detailed in the plans. This option applies to, but not limited to, the following construction activities:

- a. Beam, girder, segment, and bent/pier cap placement.
- b. Form and falsework placement and removal.
- c. Concrete placement.
- d. Railing construction located at edge of deck.
- e. Structure demolition.

OPTION 5 (CONDUCTOR/CABLE PULLING ABOVE AN OPEN TRAFFIC LANE)

Overhead cable and/or de-energized conductor installations initial pull to proper tension shall be done in accordance with the appropriate Index or temporary traffic control plan.

Continuous pulling operations of secured cable and/or conductors are allowed over open lane(s) of traffic with no encroachment by any part of the work activities, materials or equipment within the minimal vertical clearance above the travel way. The utility shall take precautions to ensure that pull ropes and conductors/cables at no time fall below the minimum vertical clearance.

On Limited Access facilities, a site specific temporary traffic control plan is required. The temporary traffic control plan shall include:

- a. The temporary traffic control set up for the initial pulling of the pull rope across the roadway.
- b. During pulling operations, advance warning consisting of no less than a Changeable Message Sign upstream of the work area with alternating messages, "Overhead Work Ahead" and "Be Prepared to Stop" followed by a traffic control officer and police vehicle with blue lights flashing during the pulling operation.

RAILROADS:

Railroad crossings affected by a construction project should be evaluated for traffic controls to reduce queuing on the tracks. The evaluation should include as a minimum: traffic volumes, distance from the tracks to the intersections, lane closure or taper locations, signal timing, etc.


SIGHT DISTANCE:

1. Tapers: Transition tapers should be obvious to drivers. If restricted sight distance is a problem (e.g., a sharp vertical or horizontal curve), the taper should begin well in advance of the view obstruction. The beginning of tapers should not be hidden behind curves.
2. Intersections: Traffic control devices at intersections must provide sight distances for the road user to perceive potential conflicts and to traverse the intersection safely. Construction equipment and materials shall not restrict intersection sight distance.

ABOVEGROUND HAZARD:

1. Aboveground hazards (see definitions) are to be considered work areas during working hours and treated with appropriate work zone traffic control procedures. During nonworking hours, all objects, materials and equipment that constitute an aboveground hazard must be stored/placed outside the travel way and clear zone or be shielded by a barrier or crash cushion.
2. For aboveground hazards within a work zone the clear zone required should be based on the regulatory speed posted during construction.

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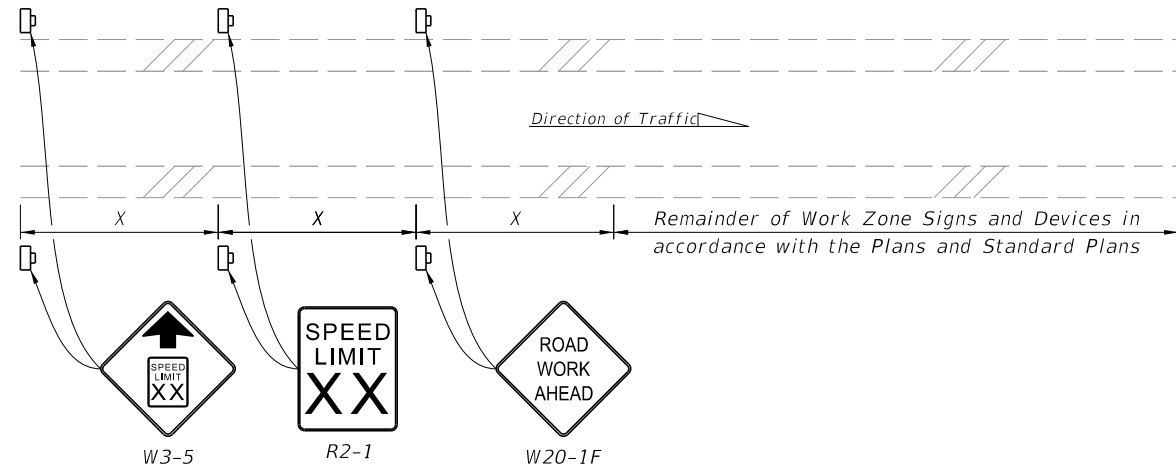
LAST REVISION 11/01/20	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES	INDEX 102-600	SHEET 2 of 11
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CLEAR ZONE WIDTHS FOR WORK ZONES:

The term 'clear zone' describes the unobstructed relatively flat area, impacted by construction, extending outward from the edge of the traffic lane. The table below gives clear zone widths in work zones for medians and roadside conditions other than for roadside canals; where roadside canals are present, clear zone widths are to conform with the distances to canals as described in the FDOT Design Manual 215.2.

WORK ZONE SPEED (MPH)	TRAVEL LANES & MULTILANE RAMPS (feet)	AUXILIARY LANES & SINGLE LANE RAMPS (feet)
60-70	30	18
55	24	14
45-50	18	10
30-40	14	10
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB	4' BEHIND FACE OF CURB

NOTE: For temporary conditions where existing curb has been removed but not reconstructed, curb and gutter values may be used.



NOTES:

1. X = Work Zone Sign Spacing
2. When called for in the Plans, use this detail in accordance with the Plans and Standard Plans. Place the speed reduction signs (W3-5 and R2-1) in advance of the "Road Work Ahead" sign (W20-1F) as shown.
3. Do not use this detail in conjunction with the Motorist Awareness System.
4. For speed reductions greater than 10 MPH, reduce the speed in 10 MPH increments of 'X' distance. Do not reduce the speed below the minimum statutory speed for the class of facility.
5. Place additional "Speed Limit" signs (R2-1) at intervals of no more than one mile for rural conditions and 1,000 feet for urban conditions.
6. For undivided roadways, omit the signs shown in the median.
7. Remove temporary regulatory speed signs as soon as the conditions requiring the reduced speed no longer exist. Once the work zone regulatory speeds are removed, the regulatory speed existing prior to construction will automatically go back into effect.

SPEED REDUCTION SIGNING

SUPERELEVATION:

Horizontal curves constructed in conjunction with work zone traffic control should have the required superelevation applied to the design radii. Under conditions where normal crown controls curvature, the minimum radii that can be applied are listed in the table below.

WORK ZONE POSTED SPEED	MINIMUM RADIUS
MPH	feet
70	4090
65	3130
60	2400
55	1840
50	1390
45	1080
40	820
35	610
30	430
Superelevate When Smaller Radii is Used	

OVERWEIGHT/OVERSIZE VEHICLES:

Restrictions to Lane Widths, Heights or Load Capacity can greatly impact the movement of over dimensioned loads. The Contractor shall notify the Engineer who in turn shall notify the State Permits Office, phone no. (850) 410-5777, at least seven calendar days in advance of implementing a maintenance of traffic plan which will impact the flow of overweight/oversized vehicles. Information provided shall include location, type of restriction (height, width or weight) and restriction time frames. When the roadway is restored to normal service the State Permits Office shall be notified immediately.

LANE WIDTHS:

Lane widths of through roadways should be maintained through work zone travel ways wherever practical. Provide minimum widths for work zone travel lanes as follows: 11' for Interstate with at least one 12' lane provided in each direction, unless formally excepted by the Federal Highway Administration; 11' for all other limited access roadways; and 10' for all other facilities.

HIGH-VISIBILITY SAFETY APPAREL:

All high-visibility safety apparel shall meet the requirements of the International Safety Equipment Association (ISEA) and the American National Standards Institute (ANSI) for "High-Visibility Safety Apparel", and labeled as ANSI/ISEA 107-2004 or newer. The apparel background (outer) material color shall be either fluorescent orange-red or fluorescent yellow-green as defined by the standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. Class 3 apparel may be substituted for Class 2 apparel. Replace apparel that is not visible at 1,000 feet.

WORKERS: All workers within the right-of-way shall wear ANSI/ISEA Class 2 apparel. Workers operating machinery or equipment in which loose clothing could become entangled during operation shall wear fitted high-visibility safety apparel. Workers inside the bucket of a bucket truck are not required to wear high-visibility safety apparel.

UTILITIES: When other industry apparel safety standards require utility workers to wear apparel that is inconsistent with FDOT requirements such as NFPA, OSHA, ANSI, etc., the other standards for apparel may prevail.

FLAGGERS: For daytime activities, Flaggers shall wear ANSI/ISEA Class 2 apparel. For nighttime activities, Flaggers shall wear ANSI/ISEA Class 3 apparel.

LENGTH OF LANE CLOSURES:

For interstates and state highways with a posted speed of 55MPH or greater, lane closures must not exceed 3 miles (includes taper, buffer, and work zone) in any given direction and must not close two consecutive interchanges.

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FLAGGER CONTROL:

Regulatory Speed (In Work Zones)

Where flaggers are used, a FLAGGER symbol or legend sign must replace the WORKERS symbol or legend sign.

The flagger must be clearly visible to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagging instructions, and to permit traffic to reduce speed or to stop as required before entering the work site. Flaggers shall be positioned to maintain maximum color contrast between the Flagger's high-visibility safety apparel and equipment and the work area background.

Hand-Signaling Devices

STOP/SLOW paddles are the primary hand-signaling device. The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. If the STOP/SLOW paddle is placed on a rigid staff, the minimum length of the staff, measured from the bottom of the paddle to the end of the staff that rests on the ground, must not be less than 6 ft. STOP/SLOW paddles shall be at least 24 inches wide with letters at least 6 inches high and should be fabricated from light semirigid material. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at night-time, the STOP/SLOW paddle shall be retroreflectorized.

Flag use is limited to immediate emergencies, intersections, and when working on the centerline or shared left turn lanes where two (2) flaggers are required and there is opposing traffic in the adjacent lanes. Flags, when used, shall be a minimum of 24 inches square, made of a good grade of red material, and securely fastened to a staff that is approximately 36 inches in length. When used at nighttime, flags shall be retroreflectorized red.

Flashlight, lantern or other lighted signal that will display a red warning light shall be used at night.

Flagger Stations

Flagger stations shall be located far enough in advance of the work area so that approaching road users will have sufficient distance to stop before entering the work area. When used at nighttime, the flagger station shall be illuminated.

SURVEY WORK ZONES:

The SURVEY CREW AHEAD symbol or legend sign shall be the principal Advance Warning Sign used for Traffic Control Through Survey Work Zones and may replace the ROAD WORK AHEAD sign when lane closures occur, at the discretion of the Party Chief.

When Traffic Control Through Work Zones is being used for survey purposes only, the END ROAD WORK sign as called for on certain 102 Series of Indexes should be omitted.

Survey Between Active Traffic Lanes or Shared Left Turn Lanes

The following provisions apply to Main Roadway Traffic Control Work Zones. These provisions must be adjusted by the Party Chief to fit roadway and traffic conditions when the Survey Work Zone includes intersections.

(A) A STAY IN YOUR LANE (MOT-1-06) sign shall be added to the Advance Warning Sign sequence as the second most immediate sign from the work area.

(B) Elevation Surveys-Cones may be used at the discretion of the Party Chief to protect prism holder and flagger(s). Cones, if used, may be placed at up to 50' intervals along the break line throughout the work zone.

SURVEY WORK ZONES: (Cont.)

(C) Horizontal Control-With traffic flow in the same direction, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' towards the flow of traffic.

(D) Horizontal Control-With traffic flow in opposite directions, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' in both directions towards the flow of traffic.

SIGNS:

SIGN MATERIALS

Mesh signs and non-retroreflective vinyl signs may only be used for daylight operations. Non-retroreflective vinyl signs must meet the requirements of Specifications Section 994.

Retroreflective vinyl signs meeting the requirements of Specification Section 994 may be used for daylight or night operations not to exceed 1 day except as noted in the Indexes.

Rigid or Lightweight sign panels may be used in accordance with the vendor APL drawing for the sign stand to which they are attached.

INTERSECTING ROAD SIGNING

Signing for the control of traffic entering and leaving work zones by way of intersecting crossroads shall be adequate to make drivers aware of work zone conditions. When Work operations exceed 60 minutes, place the ROAD WORK AHEAD sign on the side street entering the work zone.

ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING

Adjoining work zones may not have sufficient spacing for standard placement of signs and other traffic control devices in their advance warning areas or in some cases other areas within their traffic control zones. Where such restraints or conflicts occur or are likely to occur, one of the following methods will be employed to avoid conflicts and prevent conditions that could lead to misunderstanding on the part of the traveling public as to the intended travel way by the traffic control procedure applied:

(A) For scheduled projects the engineer in responsible charge of project design will resolve anticipated work zone conflicts during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.

(B) Unanticipated conflicts arising between adjoining in progress highway construction projects will be resolved by the Resident Engineer for projects under his residency, and, by the District Construction Engineer for in progress projects under adjoining residencies.

(C) The District Maintenance Engineer will resolve anticipated and occurring conflicts within scheduled maintenance operations.

(D) The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance works; between routine maintenance work, unscheduled work and/or permitted work; and, between unit controlled maintenance works and highway construction projects.

SIGNS: (Cont.)

SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING

Existing or temporary traffic control signs that are no longer applicable or are inconsistent with intended travel paths shall be removed or fully covered.

Sign blanks or other available coverings must completely cover the existing sign. Rigid sign coverings shall be the same size as the sign it is covering, and bolted in a manner to prevent movement.

Sign covers are incidental to work operations and are not paid for separately.

SIGNING FOR DETOURS, LANE SHIFTS AND DIVERSIONS

Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway. The reverse curve (W1-4) warning sign should be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

EXTENDED DISTANCE ADVANCE WARNING SIGN

Advance Warning Signs shall be used at extended distance of one-half mile or more when limited sight distance or the nature of the obstruction may require a motorist to bring their vehicle to a stop. Extended distance Advanced Warning Signs may be required on any type roadway, but particularly be considered on multilane divided highways where vehicle speed is generally in the higher range (45 MPH or more).

UTILITY WORK AHEAD SIGN

The UTILITY WORK AHEAD (W21-7) sign may be used as an alternate to the ROAD WORK AHEAD or the ROAD WORK XX FT (W20-1) sign for utility operations on or adjacent to a highway.

LENGTH OF ROAD WORK SIGN

The length of road work sign (G20-1) bearing the legend ROAD WORK NEXT _____ MILES is required for all projects of more than 2 miles in length. The number of miles entered should be rounded up to the nearest mile. The sign shall be located at begin construction points.


GROOVED PAVEMENT AHEAD SIGN

The GROOVED PAVEMENT AHEAD sign is required 500 feet in advance of a milled or grooved surface open to traffic. The W8-15P placard shall be used in conjunction with the GROOVED PAVEMENT AHEAD sign.

END ROAD WORK SIGN

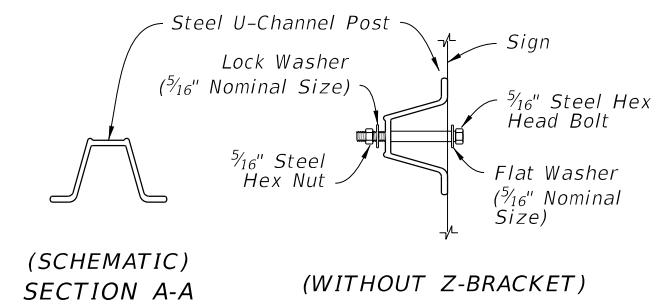
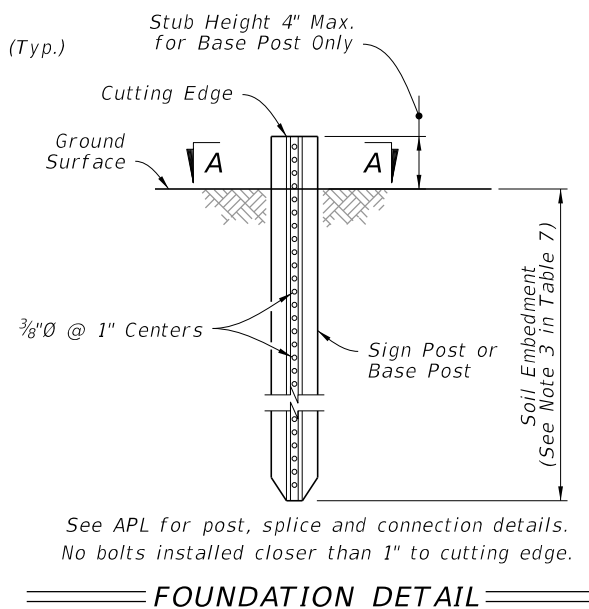
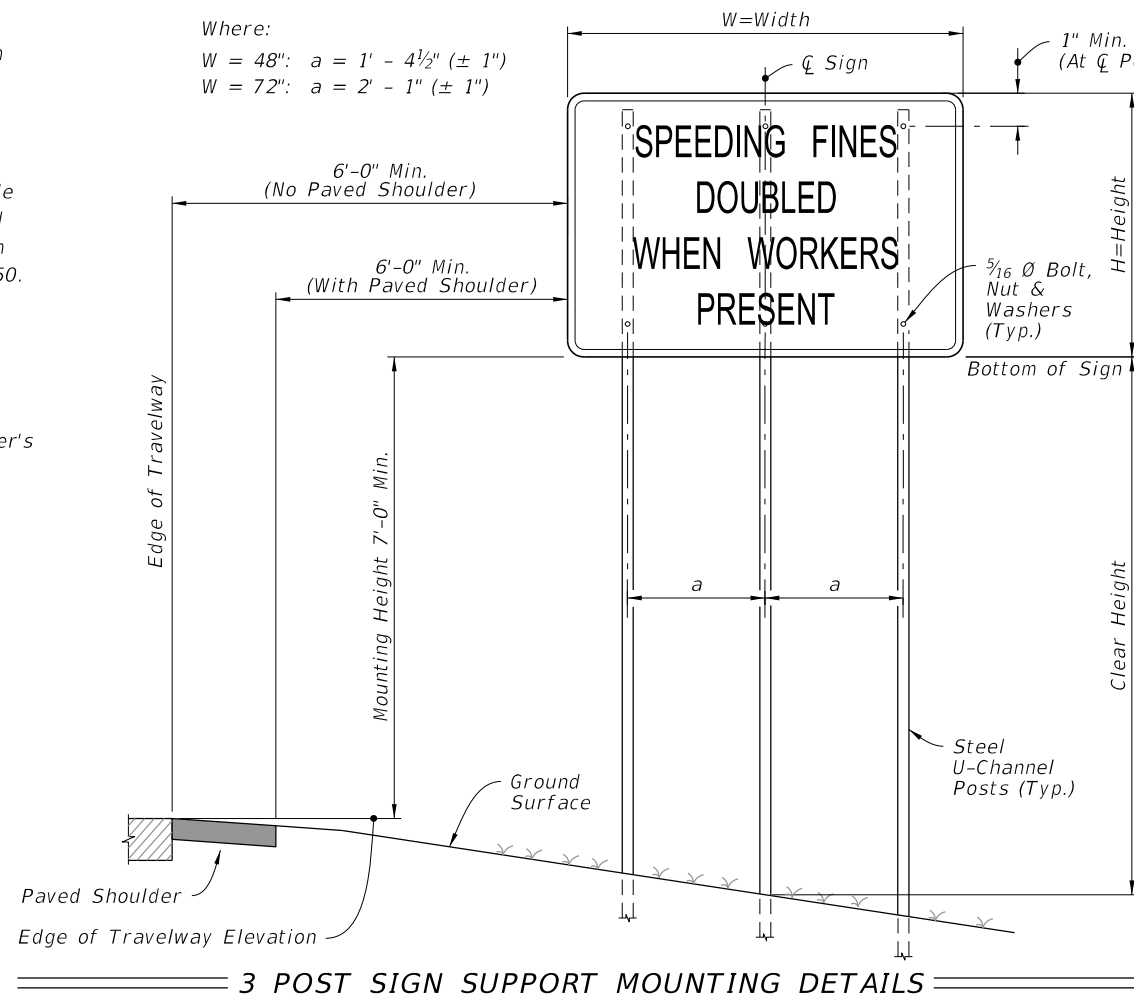
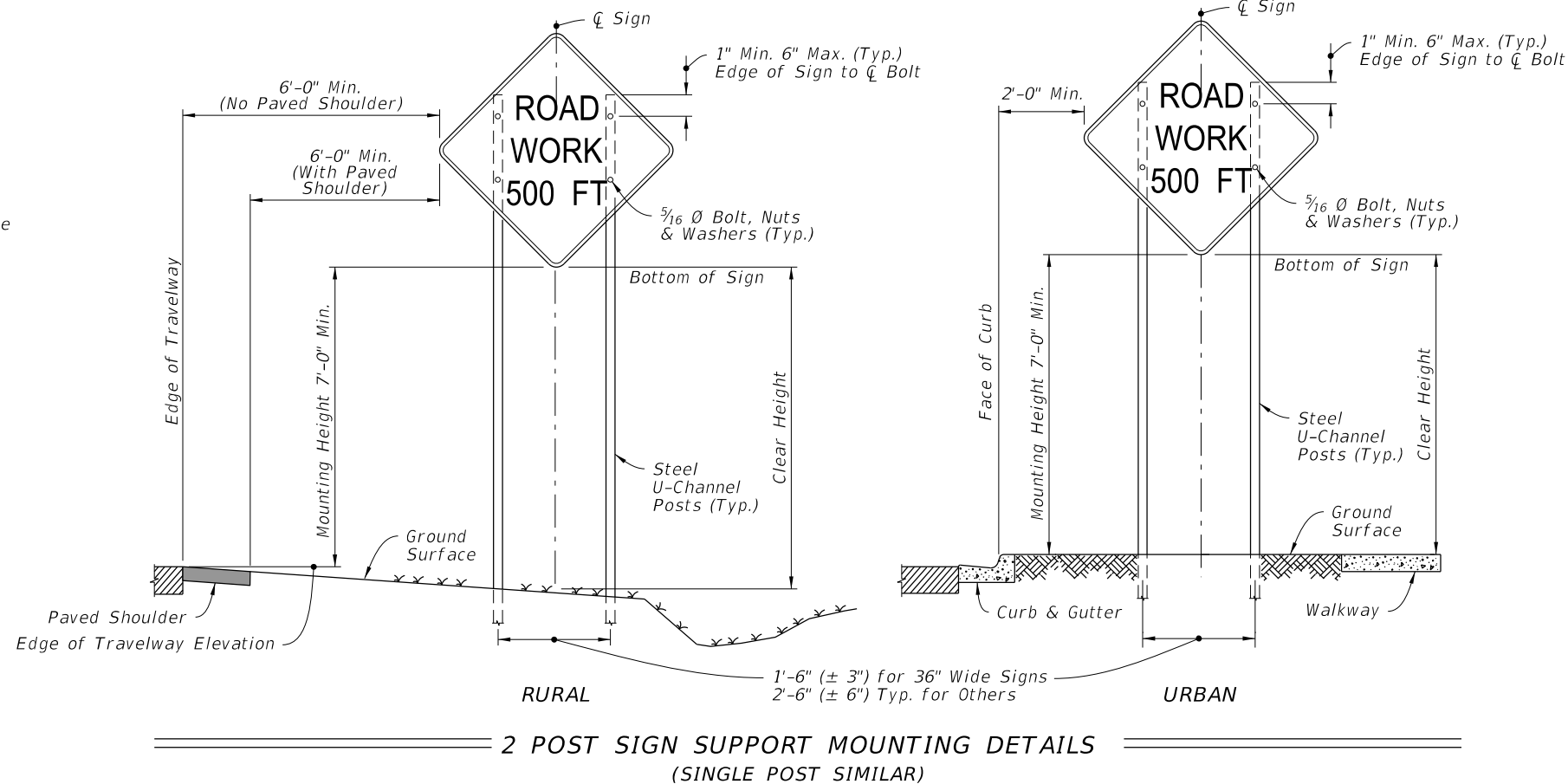
The END ROAD WORK sign (G20-2) should be installed on all projects, but may be omitted where the work operation is less than 1 day. The sign should be placed approximately 500 feet beyond the end of a construction or maintenance project unless other distance is called for in the plans. When other Construction or Maintenance Operations occur within 1 mile this sign should be omitted and signing coordinated in accordance with Index 102-600, ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING.

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NOTES:

- All signs shall be post mounted when work operations exceed one day except for:
 - Road closure signs mounted in accordance with the vendor drawing for the Type III Barricade shown on the APL.
 - Pedestrian and bicycle advanced warning or pedestrian regulatory signs mounted on sign supports in accordance with the vendor drawing shown on the APL.
 - Median barrier mounted signs per Index 700-013.
 - Bridge mounted signs per Index 700-012.
- Unless shielded with barrier or outside of the Clear Zone, signs mounted on temporary supports or barricades, and barricade/sign combination must be crashworthy in accordance with NCHRP 350 requirements and included on the Approved Products List (APL).
- Use only approved systems listed on the Department's Approved Products List (APL).
- Manufacturers seeking approval of U-Channel and steel square tube sign support assemblies for inclusion on the Approved Products List (APL) must submit a APL application, design calculations (for square tube only), and detailed drawings showing the product meets all the requirements of this Index.
- Provide 3 lb/ft Steel U-Channel Posts with a minimum section modulus of 0.43 in³ for 60 ksi steel, a minimum section modulus of 0.37 in³ for 70 ksi steel, or a minimum section modulus of 0.34 in³ for 80 ksi steel.
- Provide 4 lb/ft Steel U-Channel Posts with a minimum section modulus of 0.56 in³ for 60 ksi steel, or a minimum section modulus of 0.47 in³ for 70 ksi or 80 ksi steel.
- U-channel posts shall conform with ASTM A 499, Grade 60, or ASTM A 576, Grade 1080 (with a minimum yield strength of 60 ksi). Square tube posts shall conform with ASTM A 653, Grade 50, or ASTM A 1011, Grade 50.
- Sign attachment bolts, washers, nuts, and spacers shall conform with ASTM A307 or A 36.
- Install 4 lb/ft Steel U-Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the APL.
- The contractor may install 3 lb/ft Steel U-Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the APL.
- Install all posts plumb.
- The contractor may set posts in preformed holes to the specified depth with suitable backfill tamped securely on all sides, or drive 3 lb/ft sign posts and any size base post in accordance with the manufacturer's detail shown on the APL.



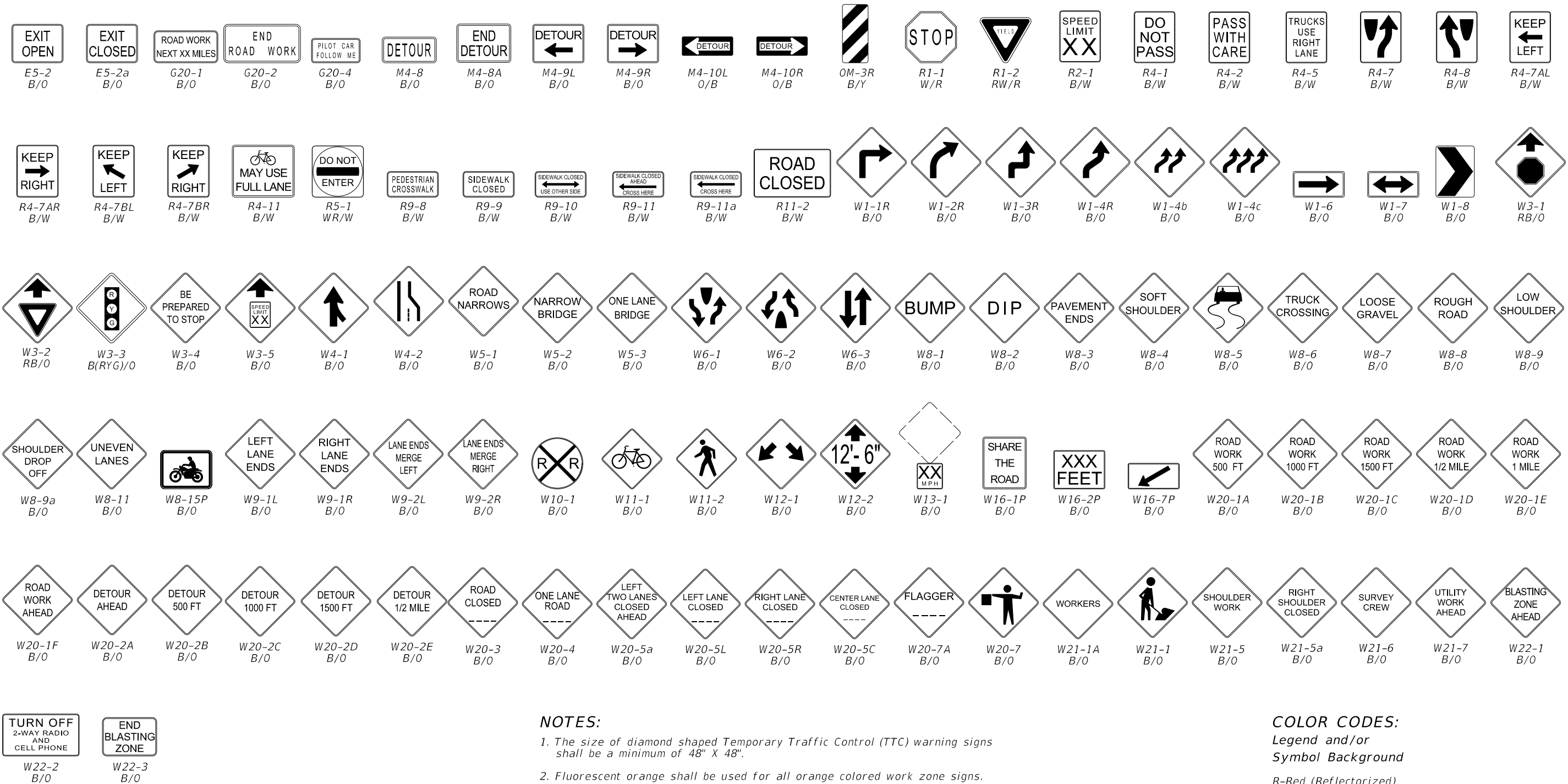
**TABLE 7
POST AND FOUNDATION
TABLE FOR
WORK ZONE SIGNS**

SIGN SHAPE	SIGN SIZE (inches)	NUMBER OF STEEL U CHANNEL POSTS
Octagon	30x30	1
Triangle	36x36x36	1
	48x48x48	1
	60x60x60	2
Rectangle (W x H)	24x18	1
	24x30	1
	30x24	1
	36x18	1
	36x24	1
	48x18	1
	48x24	1
	36x48	2
	48x30	2
	48x36	2
Square	30x30	1
	36x36	2
	48x48	2
	48x48	2
Diamond	48x48	2
Circle	36Ø	2

Notes For Table:

- Use 3 lb/ft posts for Clear Height up to 10' and 4 lb/ft posts for Clear Height up to 12'.
- Minimum foundation depth is 4.0' for 3 lb/ft posts and 4.5' for 4 lb/ft posts.
- For both 3 lb/ft and 4 lb/ft base or sign posts installed in rock, a minimum cumulative depth of 2' of rock layer is required.
- The soil plate as shown on the APL vendor drawing is not required for base posts or sign posts installed in existing rock (as defined in Note 3), asphalt roadway, shoulder pavement or soil under sidewalk.
- For diamond warning signs with supplement plaque (up to 5 ft² in area), use 4 lb/ft posts for up to 10 ft Clear Height (measure to the bottom of diamond warning sign).

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NOTES:

1. The size of diamond shaped Temporary Traffic Control (TTC) warning signs shall be a minimum of 48" X 48".
2. Fluorescent orange shall be used for all orange colored work zone signs.
3. The sign shields, symbols and messages contained on this sheet are provided for ready reference to those signs used in the development of the 102 Series of Indexes and are commonly used in the development of traffic control plans. For additional signs and sign detail information refer to the STANDARD HIGHWAY SIGNS MANUAL as specified in the MUTCD. Special signs for traffic control plans will be as approved by the State Traffic Plans Engineer.

The sign codes shown on this sheet are for the purpose of identifying cell names found in the Traffic Control Cell Library (TCZ.Cel).

The STANDARD HIGHWAY SIGNS MANUAL should be referenced for the official sign codes for use in the development of traffic control plans.

See Index 700-102 for MOT sign details.


COLOR CODES:

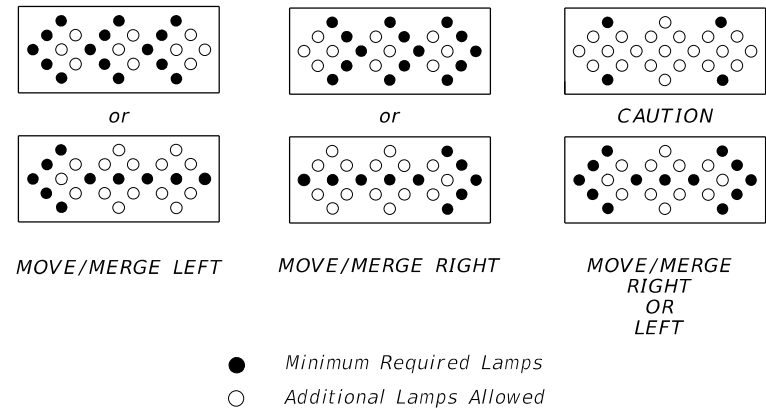
Legend and/or Symbol Background

- R-Red (Reflectorized)
- Y-Yellow (Reflectorized)
- G-Green (Reflectorized)
- O-Orange (Reflectorized)
- B-Black (Non-Reflectorized)
- W-White (Reflectorized)

COMMONLY USED WARNING AND REGULATORY SIGNS IN WORK ZONES

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MODES

NOTES:

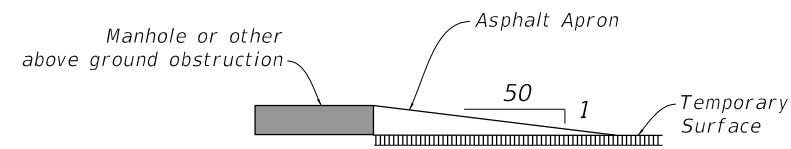
An arrow board in the arrow or chevron mode shall be used only for stationary or moving lane closures on multilane roadways.

For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow board shall be used only in the caution mode.

A single arrow board shall not be used to merge traffic laterally more than one lane. When arrow boards are used to close multiple lanes, a single board shall be used at the merging taper for each closed lane.

When Advance Warning Arrow Boards are used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.

ADVANCE WARNING ARROW BOARDS



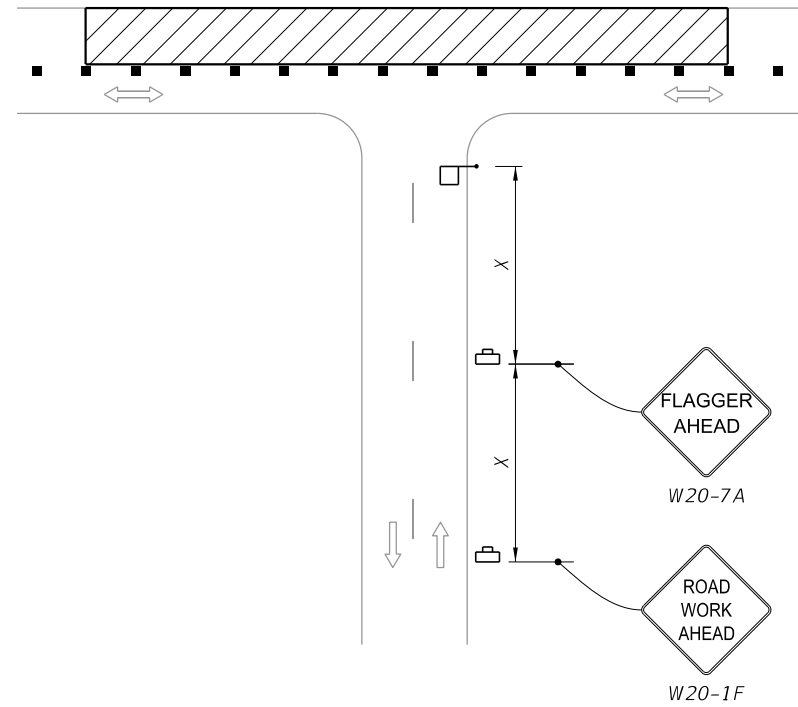
NOTES:

Manholes extending 1" or more above the travel lane and crosswalks having an uneven surface greater than 1/4" shall have a temporary asphalt apron constructed as shown above.

All transverse joints that have a difference in elevation of 1" or more shall have a temporary asphalt apron constructed as shown above.

The apron is to be removed prior to constructing the next lift of asphalt. The cost of the temporary asphalt shall be included in the contract unit price for Maintenance of Traffic, LS.

MANHOLES/CROSSWALKS/JOINTS



NOTE:

Optionally, use "Flagger Ahead" sign with text (W20-7A) instead of "Flagger Ahead" sign with symbol (W20-7).

SIDE ROAD INTERSECTING THE WORK ZONE

SIGNALS:

Existing traffic signal operations that require modification in order to carry out work zone traffic control shall be included in the Plans and be approved by the District Traffic Operations Engineer.

Refer to Specification 102-9 for additional information.

CHANNELIZING DEVICES:

Channelizing devices for work zone traffic control shall be as prescribed in Part VI of the MUTCD, subject to supplemental revisions provided in the contract documents and the 102 Series of Indexes. Lighting Devices must not be used to supplement channelization. Omit tapers and channelizing devices for paved shoulders less than 4' in width.

CHANNELIZING DEVICE CONSISTENCY:

Barricades, vertical panels, cones, tubular markers and drums shall not be intermixed within either the lateral transition or within the tangent alignment.

TRUCK/TRAILER-MOUNTED ATTENUATORS:

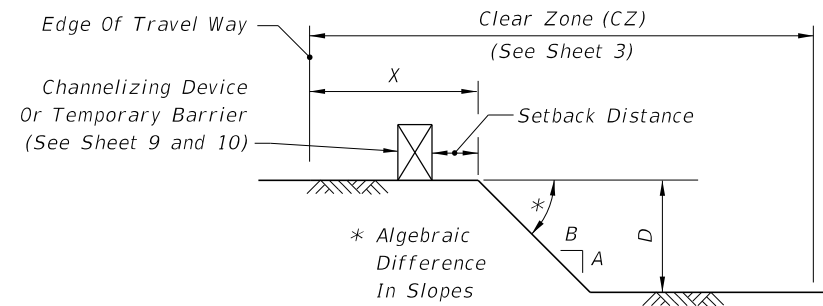
Truck/Trailer-mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index 102-607. For short-term, stationary operations, see Part VI of the MUTCD.

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DROP-OFF CONDITION NOTES

1. These conditions and treatments can be applied only in work areas that fall within a properly signed work zone.
2. When drop-offs occur within the clear zone due to construction or maintenance activities, protection devices are required (See Table 8). A drop-off is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 3" with slope (A:B) steeper than 1:4. In superelevated sections, the algebraic difference in slopes should not exceed 0.25 (See Drop-off Condition Detail).
3. Drop-offs may be mitigated by placement of slopes with optional base material per Specifications Section 285. Slopes shallower than 1:4 may be required to avoid algebraic difference in slopes greater than 0.25. Include the cost for the placement and removal of the material in Maintenance of Traffic, LS. Use of this treatment in lieu of a temporary barrier is not eligible for CSIP consideration. Conduct daily inspections for deficiencies related to erosion, excessive slopes, rutting or other adverse conditions. Repair any deficiencies immediately.
4. For Setback Distance, refer to the Index or Approved Products List (APL) drawing of the selected barrier.
5. For Conditions 1 and 3 provided in Table 8, any drop-off condition that is created and restored within the same work period will not be subject to use of temporary barriers; however, channelizing devices will be required.
6. When permanent curb heights are $\geq 6"$, no channelizing device will be required. For curb heights $< 6"$, see Table 8.



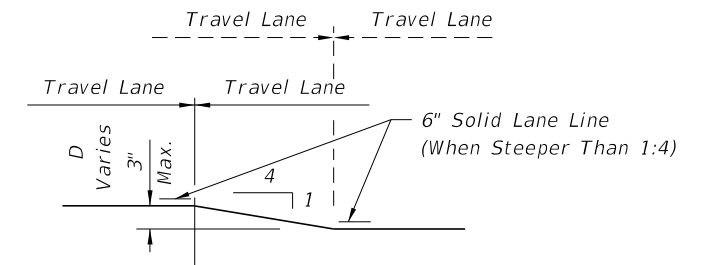
DROP-OFF CONDITION DETAIL

**Table 8
Drop-off Protection Requirements**

Condition	X (ft)	D (in.)	Device Required
1	0-12	> 3	Temporary Barrier
2	> 12-CZ	> 3 to ≤ 5	Channelizing Device
3	0-CZ	> 5	Temporary Barrier
4	Removal of Bridge or Retaining Wall Barrier		Temporary Barrier
5	Removal of portions of Bridge Deck		Temporary Barrier

TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING NOTES

1. This treatment applies to resurfacing or milling operations between adjacent travel lanes.
2. Whenever there is a difference in elevation between adjacent travel lanes, the W8-11 sign with "UNEVEN LANES" is required at intervals of 1/2 mile maximum.
3. If D is 1 1/2" or less, no treatment is required.
4. Treatment allowed only when D is 3" or less.
5. If the slope is steeper than 1:4 (not to be steeper than 1:1), the R4-1 and MOT-1-06 signs shall be used as a supplement to the W8-11; this condition should never exceed 3 miles in length.



TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING DETAIL

PEDESTRIAN WAY DROP-OFF CONDITION NOTES

1. A pedestrian way drop-off is defined as:
 - a. a drop in elevation greater than 10" that is closer than 2' from the edge of the pedestrian way
 - b. a slope steeper than 1:2 that begins closer than 2' from the edge of the pedestrian way when the total drop-off is greater than 60"
2. Protect any drop-off adjacent to a pedestrian way with pedestrian longitudinal channelizing devices, temporary barrier wall, or approved handrail.

DROP-OFFS IN WORK ZONES

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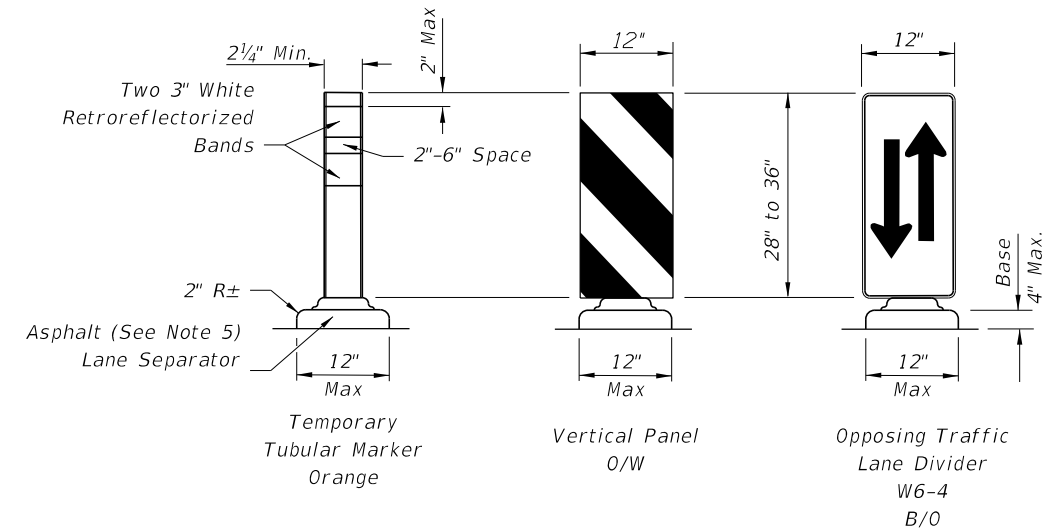
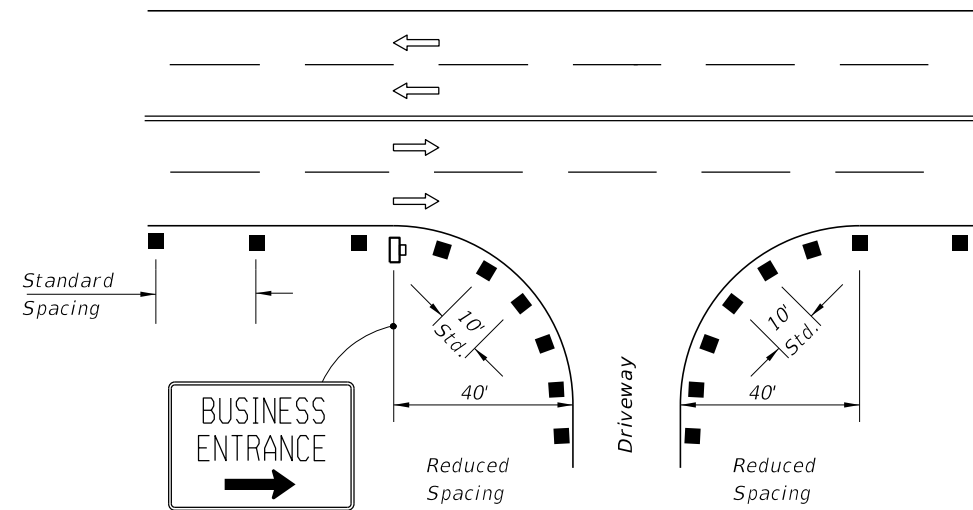
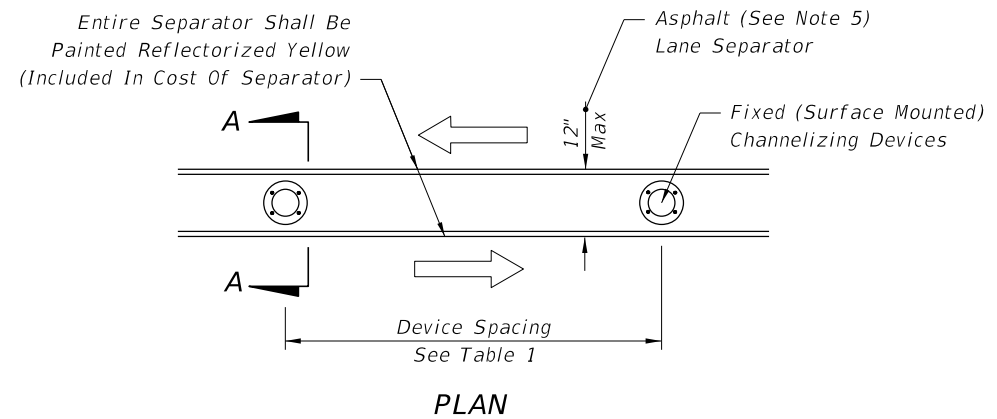


FY 2023-24
STANDARD PLANS

GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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102-600

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FIXED (SURFACE MOUNTED) CHANNELIZING DEVICES SECTION A-A

1. For single business entrances, place one 24" x 36" business sign for each driveway entrance affected. Signs shall show specific business names. Logos may be provided by business owners. Standard BUSINESS ENTRANCE sign in Index 700-102 may be used when approved by the Engineer.
2. When several businesses share a common driveway entrance, place one 24" x 36" standard BUSINESS ENTRANCE sign in accordance with Index 700-102 at the common driveway entrance.
3. Channelizing devices shall be placed at a reduced spacing on each side of the driveway entrance, but shall not restrict sight distance for the driveway users.
4. Business entrance signs are intended to guide motorist to business entrances moved/modified or disturbed during construction projects. Business entrance signs are not required where there is minimal disruption to business driveways which is often the case with resurfacing type projects.

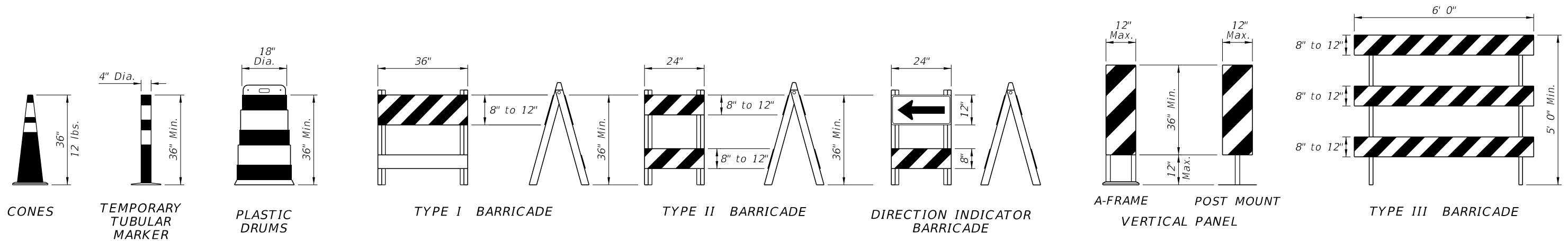
PLACEMENT OF BUSINESS ENTRANCE SIGNS AND CHANNELIZING DEVICES AT BUSINESS ENTRANCE

1. Temporary lane separators shall be supplemented with any of the following approved fixed (surface mounted) channelizing devices: temporary tubular markers, vertical panels, or opposing traffic lane divider panels. Opposing traffic lane divider panels (W6-4) shall only be used as center lane dividers to separate opposing vehicular traffic on a two-lane, two-way operation. Temporary Tubular Markers, Vertical Panels and Opposing Traffic Lane Divider panels shall not be intermixed within the limits where the temporary lane separator is used. The connection between the channelizing device and the temporary lane separator curb shall hold the channelizing device in a vertical position.
2. Reflectorized materials shall have a smooth sealed outer surface which will display the same approximate color day and night. Furnish channelizing devices having retroreflective sheeting meeting the requirements of Section 990.
3. 12" openings for drainage shall be constructed in the asphalt and portable temporary lane separator at a maximum spacing of 25' in areas with grades of 1% or less or 50' in areas with grades over 1% as directed by the Engineer.
4. Tapered ends shall be used at the beginning and end of each run of the temporary lane separator to form a gradual increase in height from the pavement level to the top of the temporary lane separator.
5. The Contractor has the option of using portable temporary lane separators containing fixed channelizing devices in lieu of the temporary asphalt separator and channelizing devices detailed on this sheet. The portable temporary lane separator shall come in portable sections that can be connected to maintain continuous alignment between the separate curb sections. Each temporary lane separator section shall be 36 inches to 48 inches in total length. Portable temporary lane separators shall duplicate the color of the pavement marking. Portable temporary lane separators shall be one of those listed on the Approved Products List.

TEMPORARY LANE SEPARATOR

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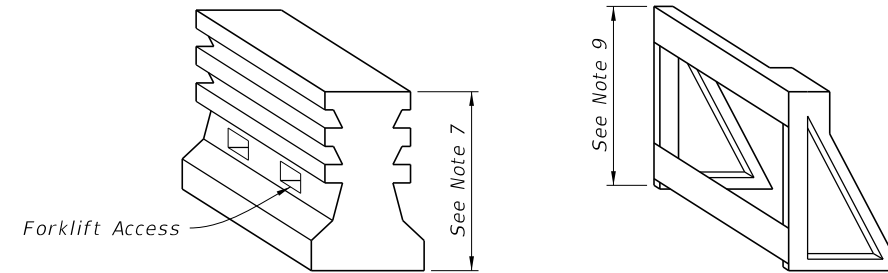
LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES	INDEX 102-600	SHEET 9 of 11
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CHANNELIZING DEVICES

CHANNELIZING DEVICE NOTES:

- The details shown on this sheet are for the following purposes:
 - For ease of identification and
 - To provide information that supplements or supersedes that provided by the MUTCD.
- The Type III Barricade shall have a unit length of 6'-0" only. When barricades of greater lengths are required those lengths shall be in multiples of the 6'-0" unit.
- No sign panel should be mounted on any channelizing device unless the channelizing device/sign combination was found to be crashworthy and the sign panel is mounted in accordance with the vendor drawing for the channelizing device shown on the Approved Products List (APL).
- Ballast shall not be placed on top rails or any striped rails or higher than 13" above the driving surface.
- The direction indicator barricade may be used in tapers and transitions where specific directional guidance to drivers is necessary. If used, direction indicator barricades shall be used in series to direct the driver through the transition and into the intended travel lane.
- The splicing of sheeting is not permitted on channelizing devices or MOT signs.
- For rails less than 3'-0" long, 4" stripes shall be used.
- Cones shall:
 - Be used only in active work zones where workers are present.
 - Be reflectorized as per the MUTCD with Department-approved reflective collars when used at night.
- For pedestrian longitudinal channelizing devices, the device shall have a minimum of 8" continuous detectable edging above the walkway. A gap not exceeding a height of 2" is allowed to facilitate drainage. The top surface of the device shall be a minimum height of 32" and have a 1/8" or less difference in any plane at all connection points between the devices to facilitate hand trailing. The bottom and the top surface of the device shall be in the same vertical plane. If pedestrian drop-off protection is required, the device shall have a footprint or offset of at least 2', otherwise the device must be at least 42" in height above the walkway and be anchored or ballasted to withstand a 200 lb lateral point load at the top of the device.



PEDESTRIAN LONGITUDINAL CHANNELIZING DEVICES

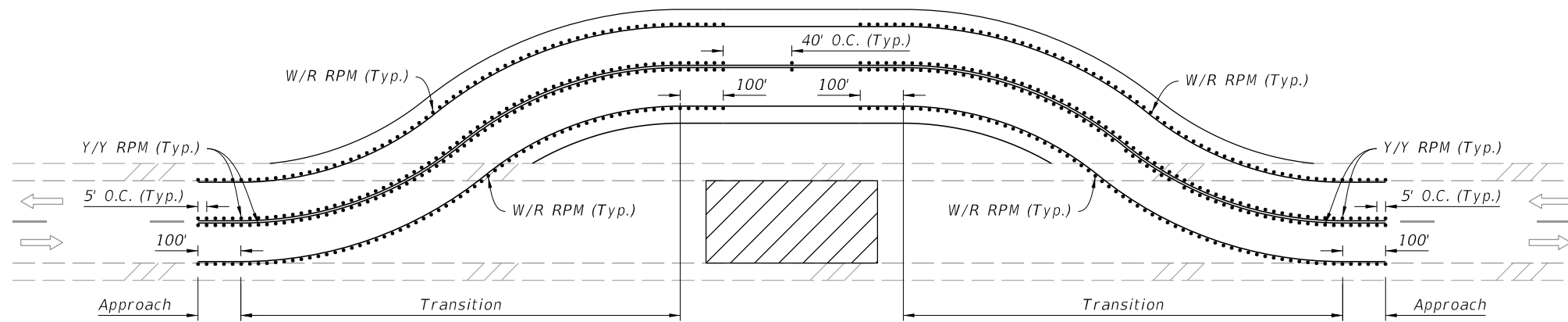
TEMPORARY BARRIER NOTES:

- Where a barrier is specified, any of the types below may be used in accordance with the applicable Index:

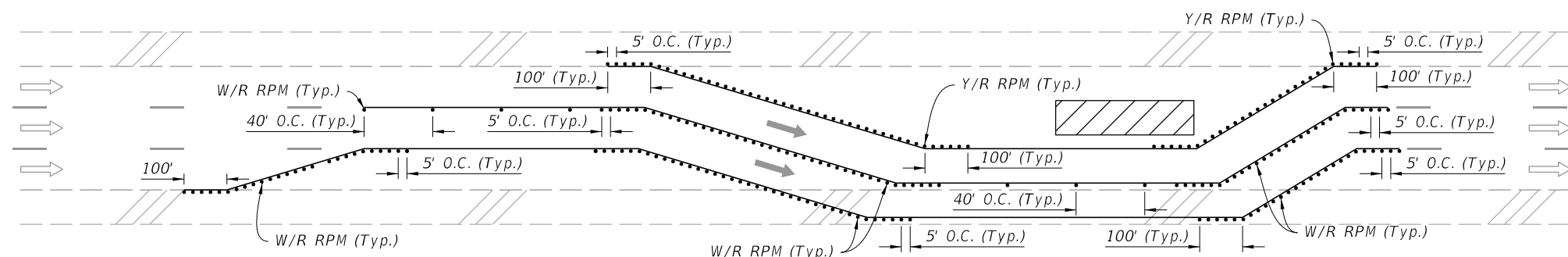
Index	Description
102-100	Temporary Barrier
102-120	Low Profile Barrier
536-001	Guardrail

- Trailer Mounted Barriers may be used to provide positive protection for workers within the work areas. APL drawings may be used as a guide to develop project specific Temporary Traffic Control Plans that are signed and sealed by the Contractor's Engineer.

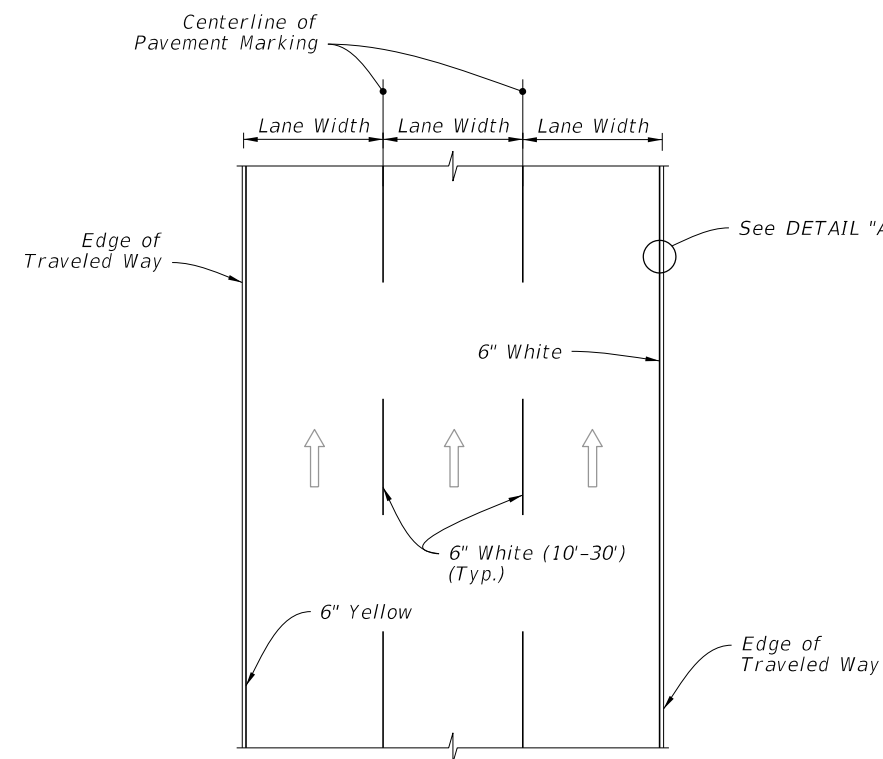
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RPM PLACEMENT ON TWO-LANE ROADWAYS



RPM PLACEMENT ON MULTILANE ROADWAYS
(Lane Shift Shown, Other Multilane Typical Applications Similar)



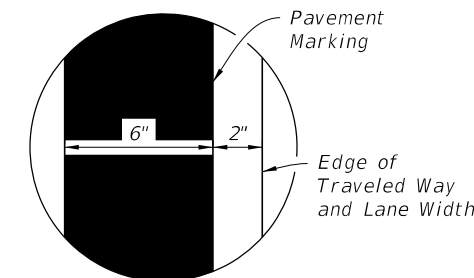
PLAN VIEW

NOTES:

1. Install RPMs as a supplement to:
 - a. All lane lines
 - b. Edge lines in transitions (e.g., merges, diversions, lane shifts)
 - c. Edge lines of gore areas
2. Extend pavement marking and 5' RPM spacing by 100' in each direction for all transitions regardless of the line type.
3. Place RPMs in accordance with this detail and Index 706-001.

SYMBOLS:

- Work Area
- Lane Identification and Direction of Traffic



DETAIL "A"

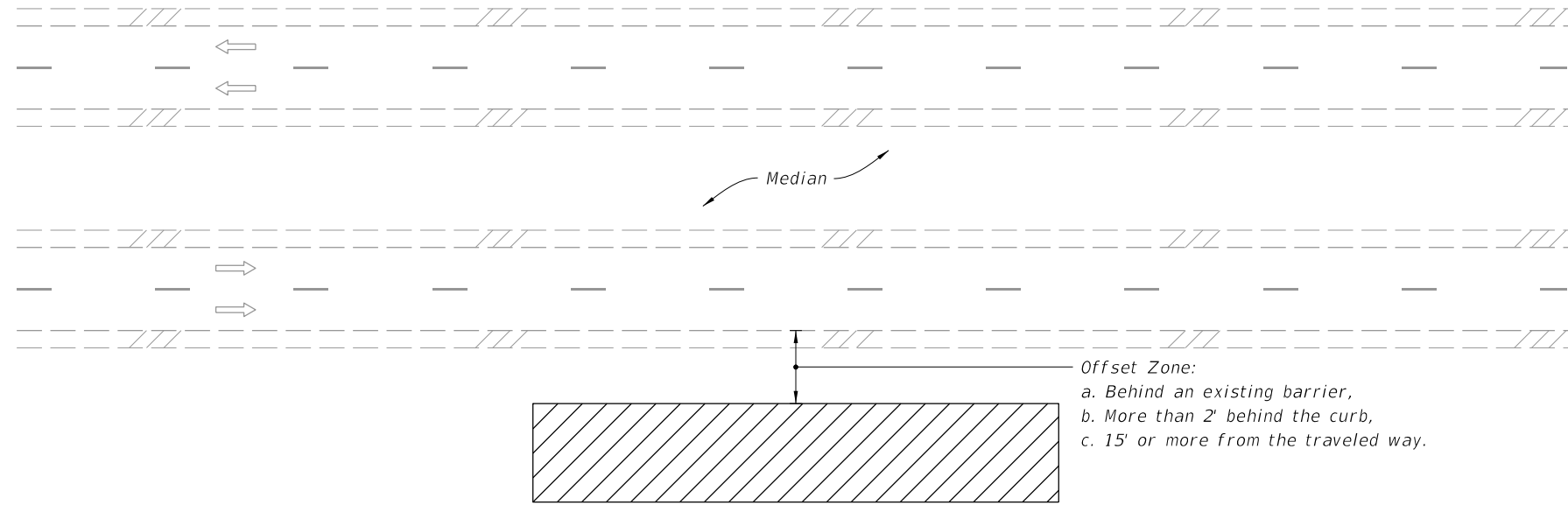
RPM PLACEMENT IN WORK ZONES

PAVEMENT MARKINGS PLACEMENT

WORK ZONE PAVEMENT MARKINGS

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===== MULTILANE ROADWAY SHOWN, TWO-LANE ROADWAY SIMILAR =====

NOTES:

1. This Index applies to Two-Lane, Two-Way and Multilane Roadways, including Medians of divided roadways, with work beyond the shoulder.
2. Use Index 102-602 when the work operation (excluding establishing and terminating the work area) requires that two or more work vehicles cross the Offset Zone in any one hour period.
3. Use Index 102-660 when Work Area encroaches a Sidewalk.

SYMBOLS:

- Work Area
- Lane Identification and Direction of Traffic





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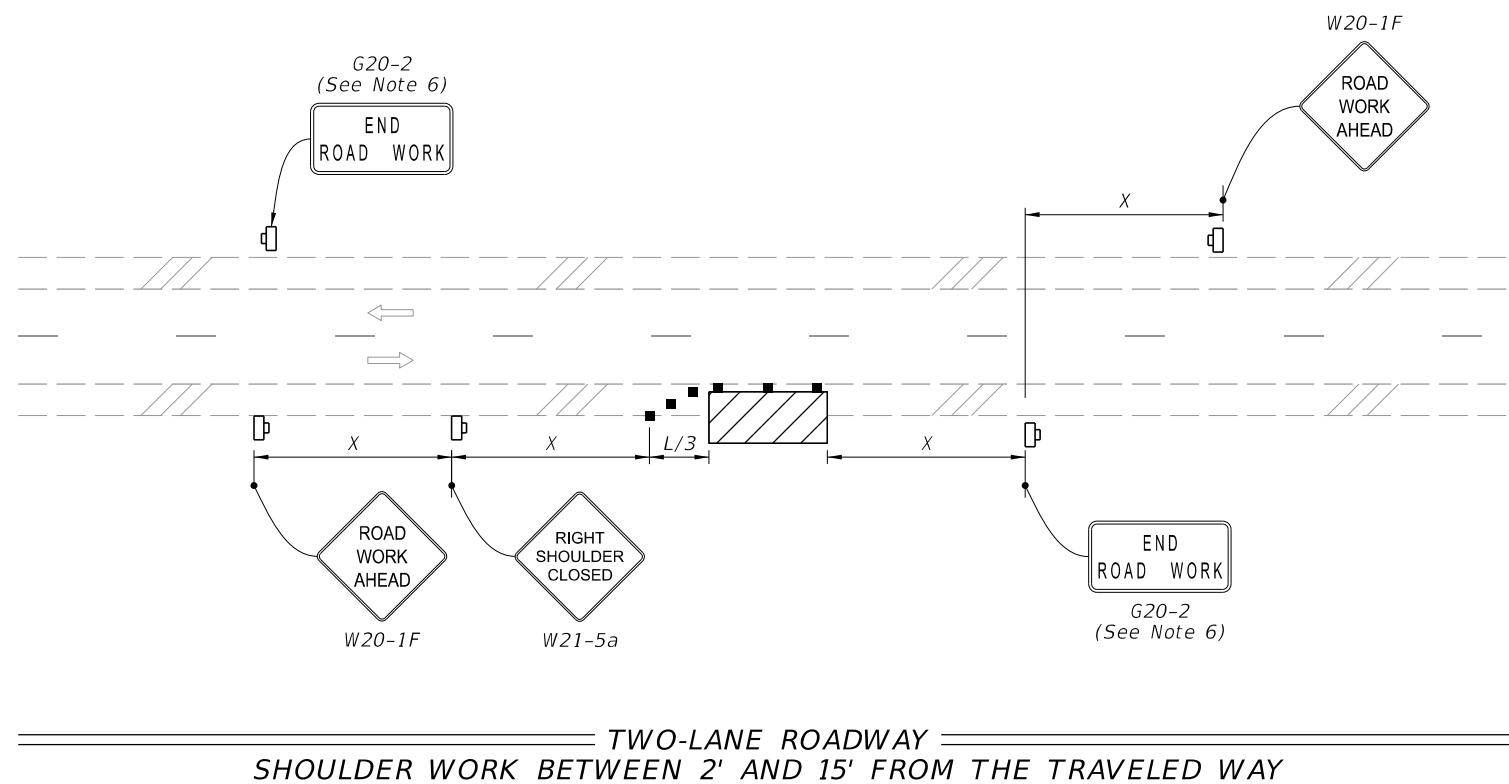
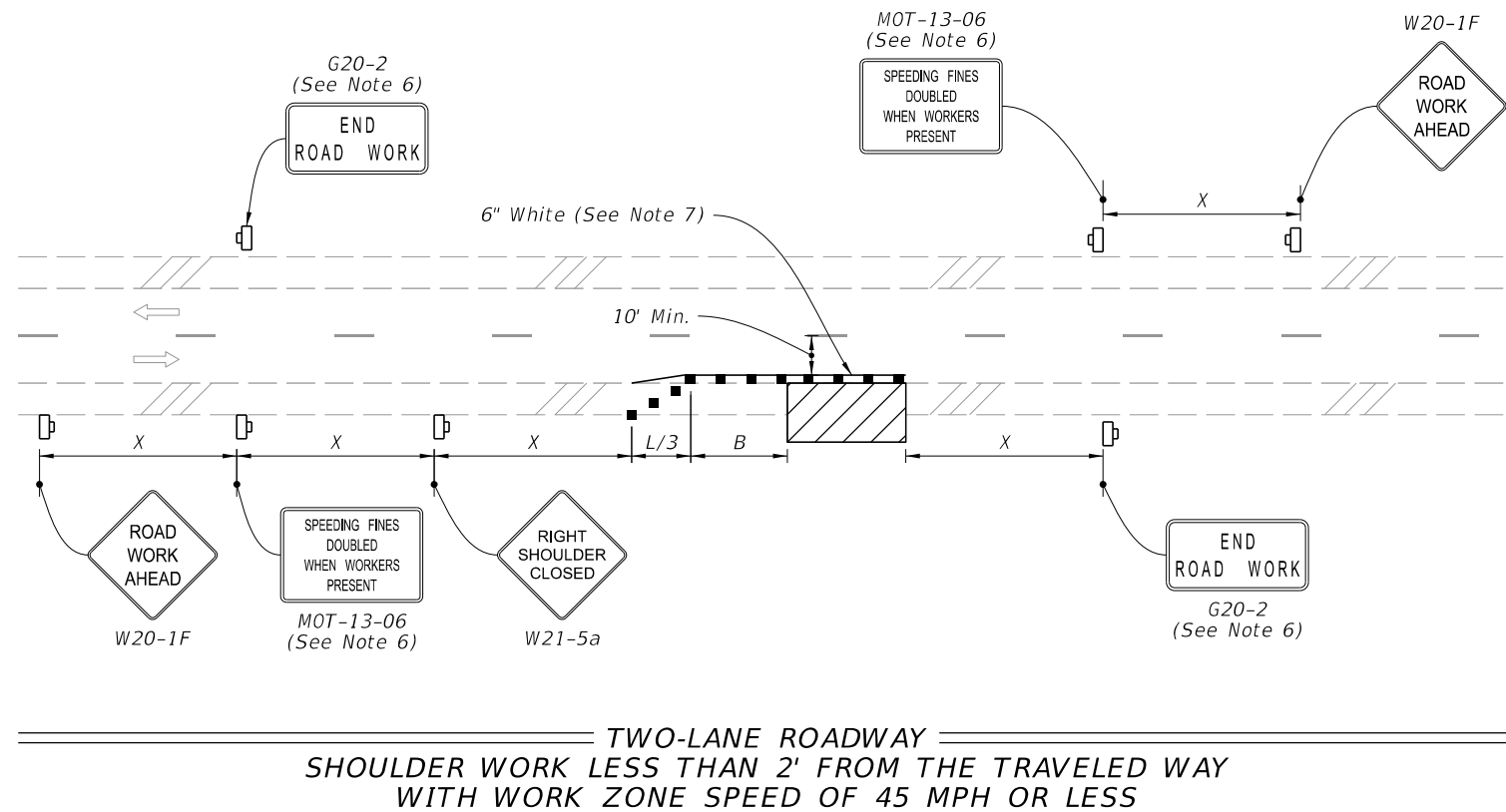
LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TWO-LANE AND MULTILANE ROADWAY, WORK BEYOND THE SHOULDER	INDEX 102-601	SHEET 1 of 1
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NOTE:


1. This Index applies to Two-Lane, Two-Way and Multilane Roadways, including Medians of divided roadways, with work on the shoulder.
2. L = Taper Length
 X = Work Zone Sign Spacing
 B = Buffer Length
See Index 102-600 for " L ", " X ", " B ", and channelizing device spacing values.
3. Where work activities are between 2' and 15' from the edge of traveled way, the Engineer may omit signs and channelizing devices for work operations 60 minutes or less.
4. When four or more work vehicles enter the through traffic lanes in a one hour period (excluding establishing and terminating the work area), use a flagger or lane closure to accommodate work vehicle ingress and egress.
5. For work less than 2' from the traveled way and work zone speed is greater than 45 MPH, use a lane closure.
6. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" Signs (G20-2) along with the associated work zone sign spacing distances may be omitted when the work operation is in place for 24 hours or less.
7. Temporary pavement markings may be omitted when the work operation is in place for 3 days or less.
8. Omit "Shoulder Closed" signs (W21-5a) along with associated work zone sign spacing distances for work on the median.
9. When there is no paved shoulder, the "Worker" sign (W21-1) may be used instead of the "Shoulder Closed" sign (W21-5a).

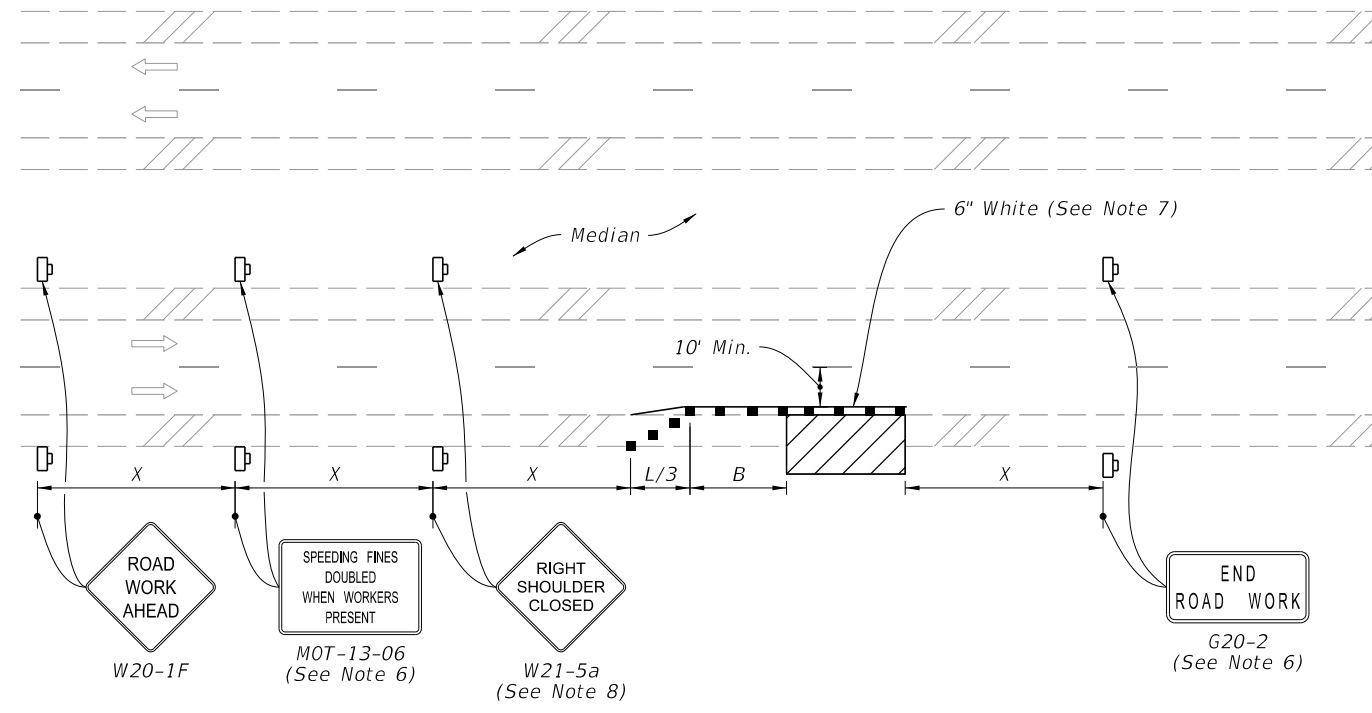
SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Lane Identification and Direction of Traffic

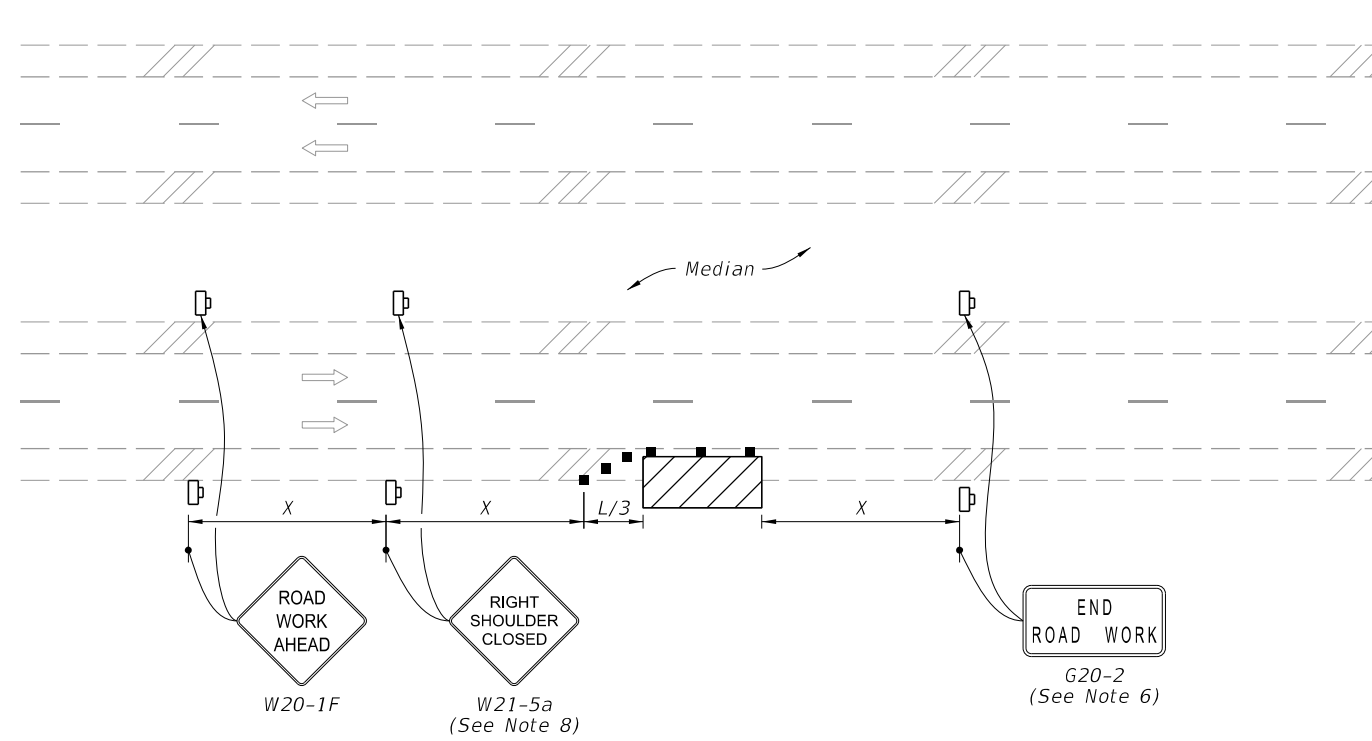


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





MULTILANE ROADWAY
 SHOULDER WORK LESS THAN 2' FROM THE TRAVELED WAY
 WITH WORK ZONE SPEED OF 45 MPH OR LESS



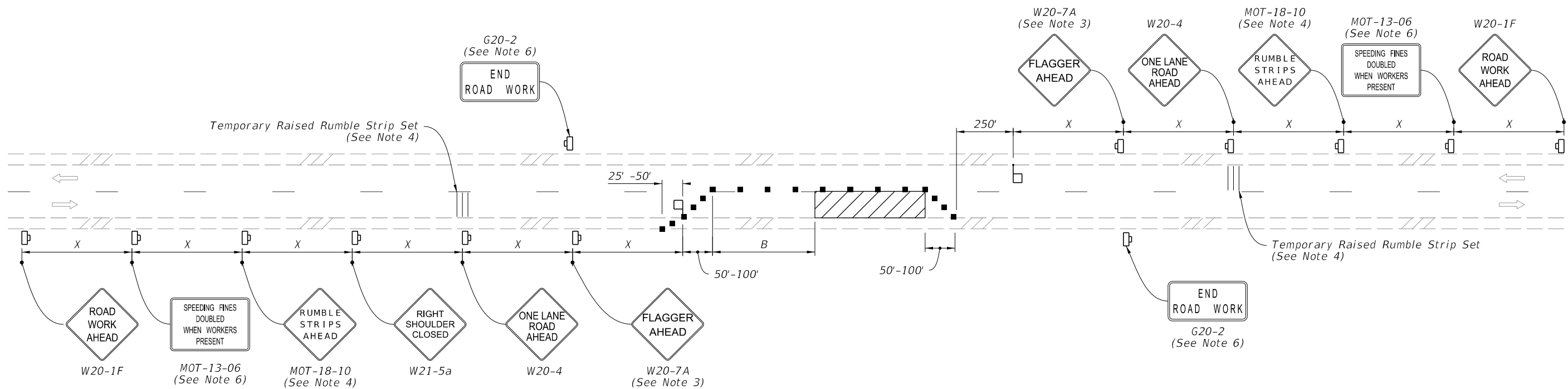
MULTILANE ROADWAY
 SHOULDER WORK BETWEEN 2' AND 15' FROM THE TRAVELED WAY

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Lane Identification and Direction of Traffic

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NOTES:

- This Index applies to Two-Lane, Two-Way Roadways with work within the traveled way.
- L = Taper Length
B = Buffer Length
X = Work Zone Sign Spacing
See Index 102-600 for "L", "B", "X" and channelizing device spacing values.
- Optionally, use "Flagger Ahead" sign with symbol (W20-7) instead of "Flagger Ahead" sign with text (W20-7A).
- Use temporary raised rumble strips when the existing posted speed is 55 mph or greater and the work duration is greater than 60 minutes. If temporary raised rumble strips are not used, omit "Rumble Strips Ahead" signs (MOT-18-10) and associated work zone sign spacing.
- Additional one-way control may be provided by the following means:
 - Flag-carrying vehicle
 - Official vehicle
 - Pilot vehicles
 - Traffic signals

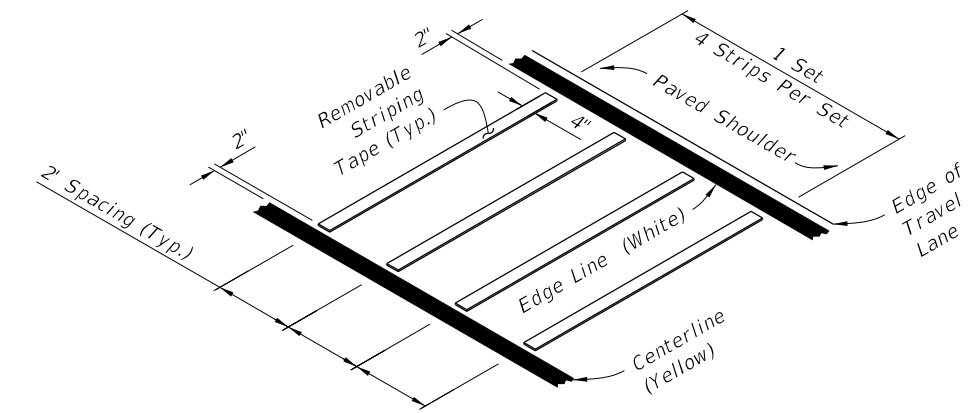
- The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" signs (G20-2), along with associated work zone sign spacing, may be omitted when the work operation will be in place for 24 hours or less.
- Automated Flagger Assistance Devices (AFADs) may be used in accordance with Specification Sections 102, 990 and the APL vendor drawings.

- Railroad Crossings:
 - If an active railroad crossing is located closer to the Work Area than the queue length plus 300 feet, extend the Buffer Space as shown on Sheet 2.
 - If the queuing of vehicles across an active railroad crossing cannot be avoided, provide a uniformed traffic control officer or flagger at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic train warning devices are in place.

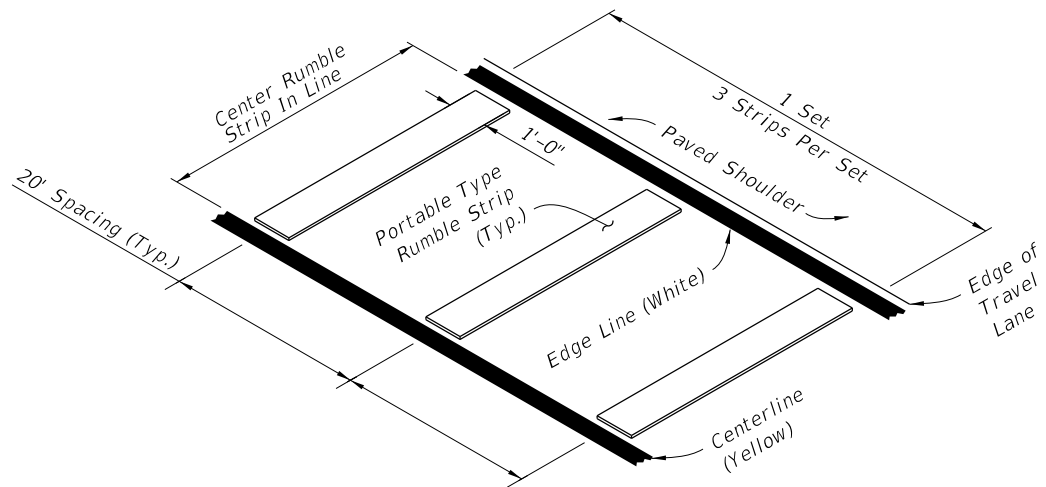
When flaggers are the sole means of one-way control, the flaggers must be in sight of each other or in direct communication at all times.

SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Flagger
- Lane Identification and Direction of Traffic



**OPTION - 1
REMOVABLE STRIPING TYPE**

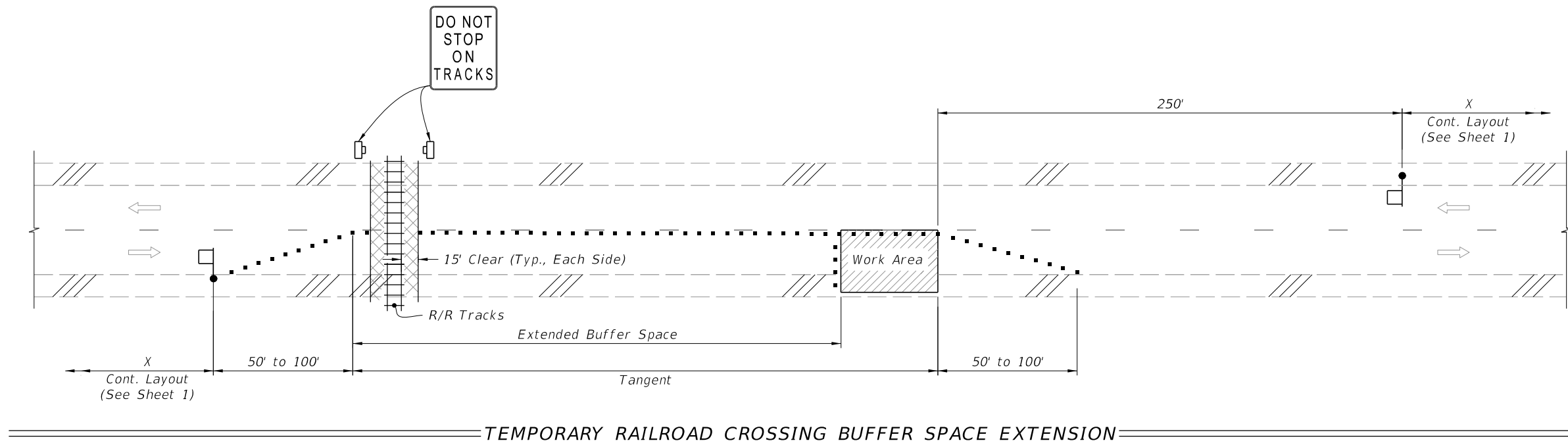


**OPTION - 2
PORTABLE TYPE**

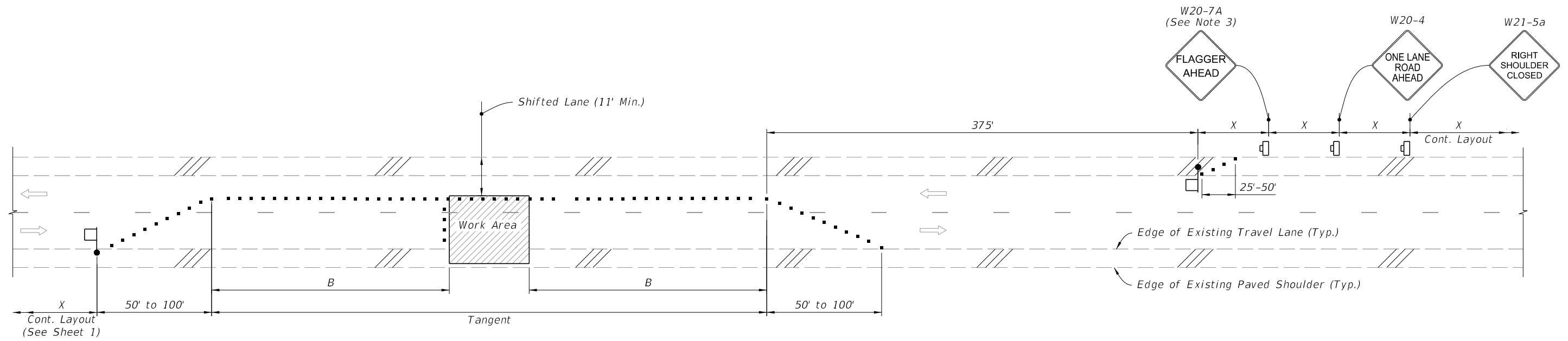
RUMBLE STRIP SETS

10/20/2022 8:45:35 AM

LAST REVISION 11/01/21	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TWO-LANE, TWO-WAY WORK WITHIN THE TRAVEL WAY	INDEX 102-603	SHEET 1 of 2
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TEMPORARY RAILROAD CROSSING BUFFER SPACE EXTENSION




TEMPORARY LANE SHIFT TO SHOULDER WHEN WORK AREA ENCROACHES ON THE CENTERLINE
(For Work Operations In place 24 Hours or Less)

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Flagger
-  Lane Identification and Direction of Traffic

SPECIAL CONDITIONS








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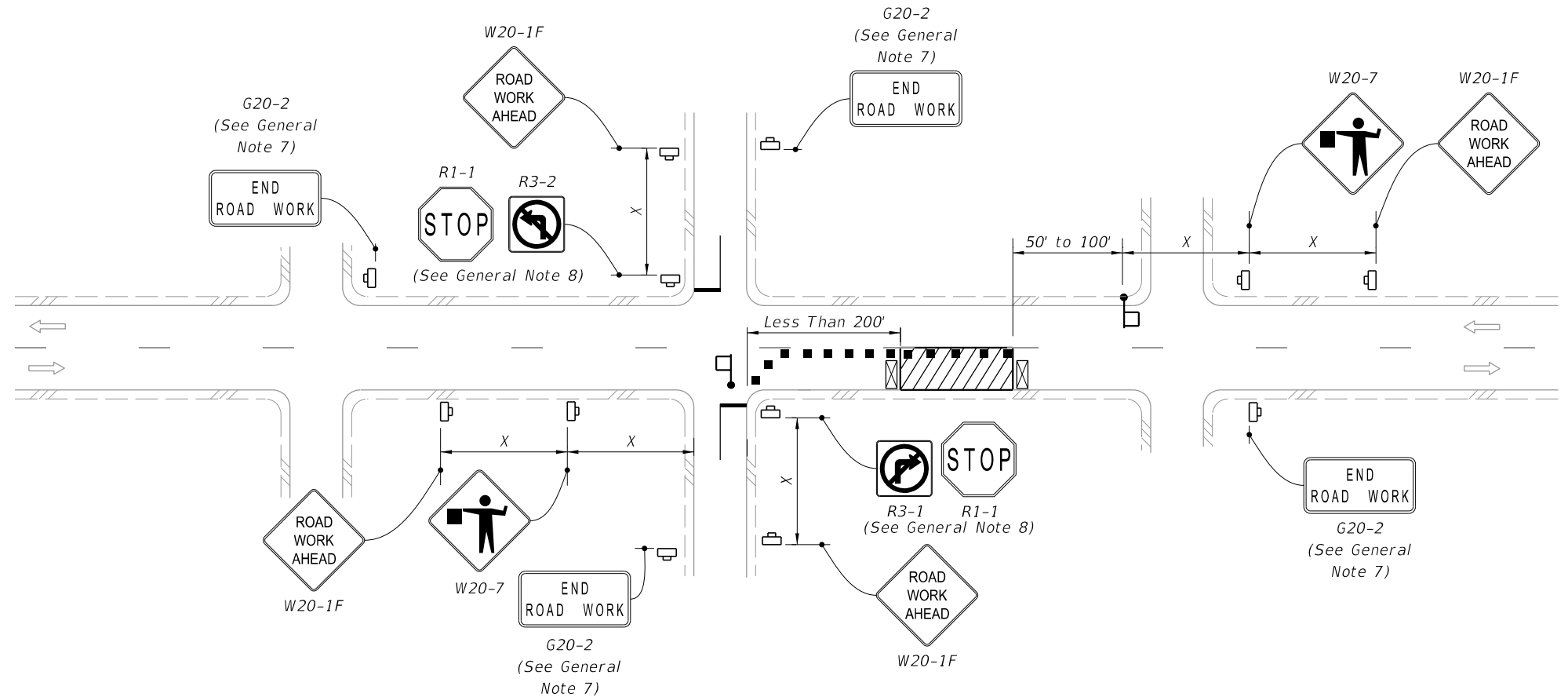
LAST REVISION 11/01/21	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TWO-LANE, TWO-WAY WORK WITHIN THE TRAVEL WAY	INDEX 102-603	SHEET 2 of 2
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GENERAL NOTES:

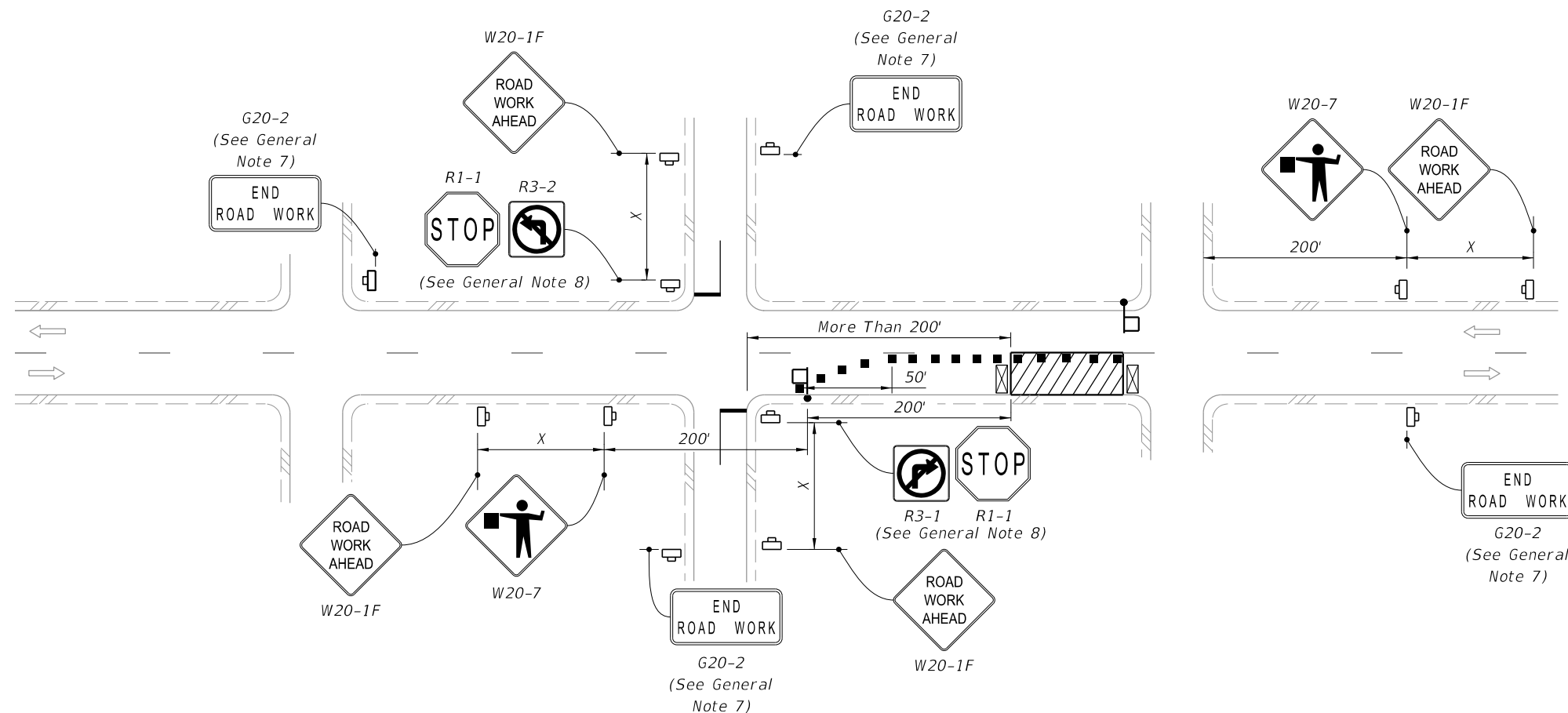
1. This Index applies to two-lane, two-way roadways with work within or near the intersection.
2. X = Work Zone Sign Spacing
See Index 102-600 for "X" and channelizing device spacing values.
3. Optionally, use "Flagger Ahead" sign with text (W20-7A) instead of "Flagger Ahead" sign with symbol (W20-7).
4. If vehicles in a parking zone block the line of sight to TCZ signs, locate and post mount signs in accordance with Index 700-101.
5. If the work area extends across a crosswalk, close the crosswalk in accordance with Index 102-660.
6. For unsignalized intersections, use Temporary Raised Rumble Strips in accordance with Index 102-603. Placement of Rumble Strips and additional signs should begin at FLAGGER sign location.
7. The "End Road Work" signs (G20-2) along with the associated work zone sign distances may be omitted when the work zone will be in place for 24 hours or less.
8. As an option to the "STOP" sign (R1-1) and Restricted Left/Right Turning Movement sign (R3-1 or R3-2), the "SIDE ROAD INTERSECTING THE WORK ZONE" flagging operation from Index 102-600 may be used.

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Type III Barricade
-  Stop Bar
-  Flagger
-  Lane Identification and Direction of Traffic



LANE CLOSURE FOR WORK LESS THAN 200' FROM INTERSECTION

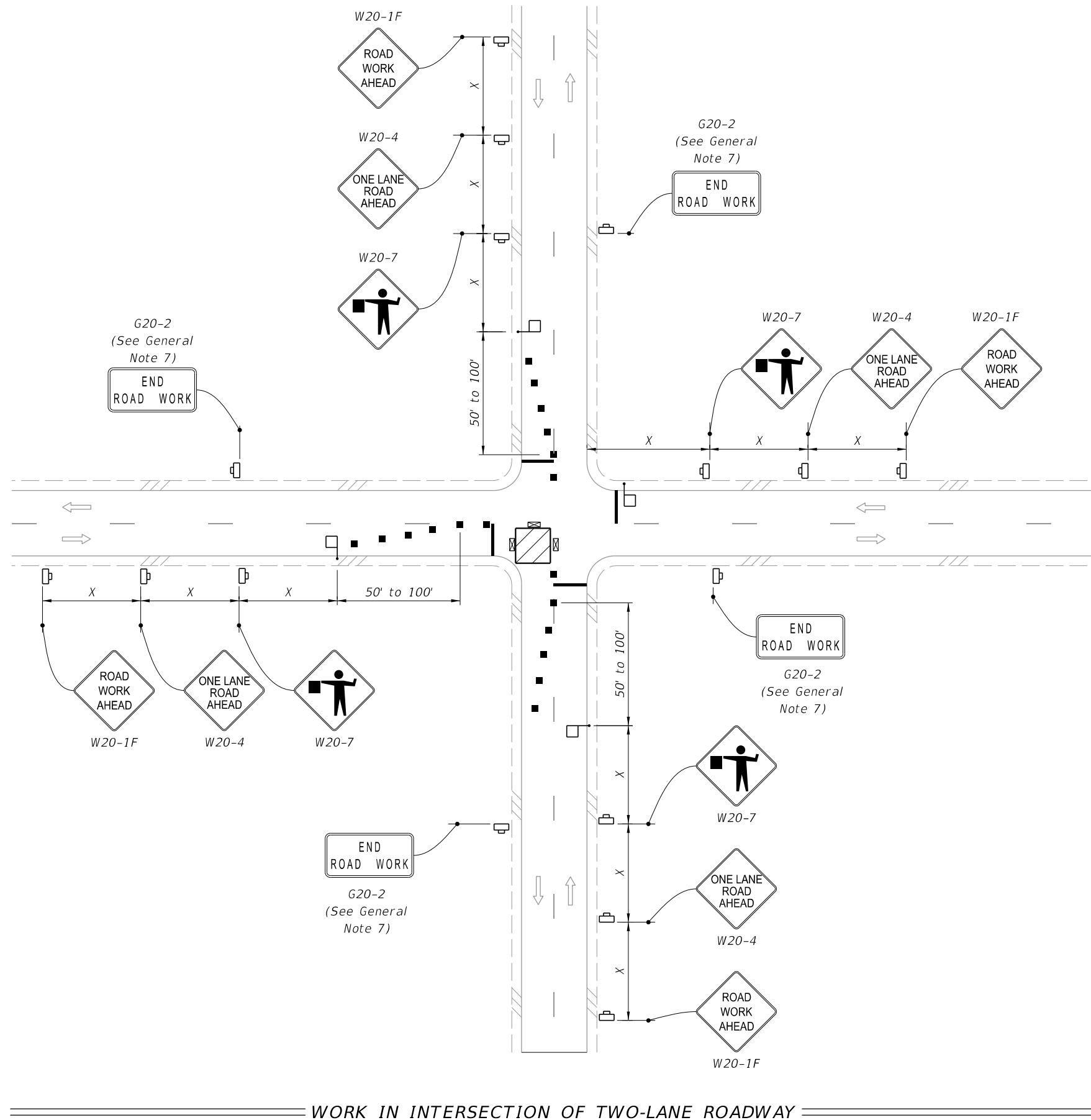


LANE CLOSURE FOR WORK MORE THAN 200' FROM INTERSECTION







10/20/2022 8:45:36 AM

LAST REVISION 11/01/22	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TWO-LANE, TWO-WAY, INTERSECTION WORK	INDEX 102-604	SHEET 1 of 2
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10/20/2022 8:45:37 AM



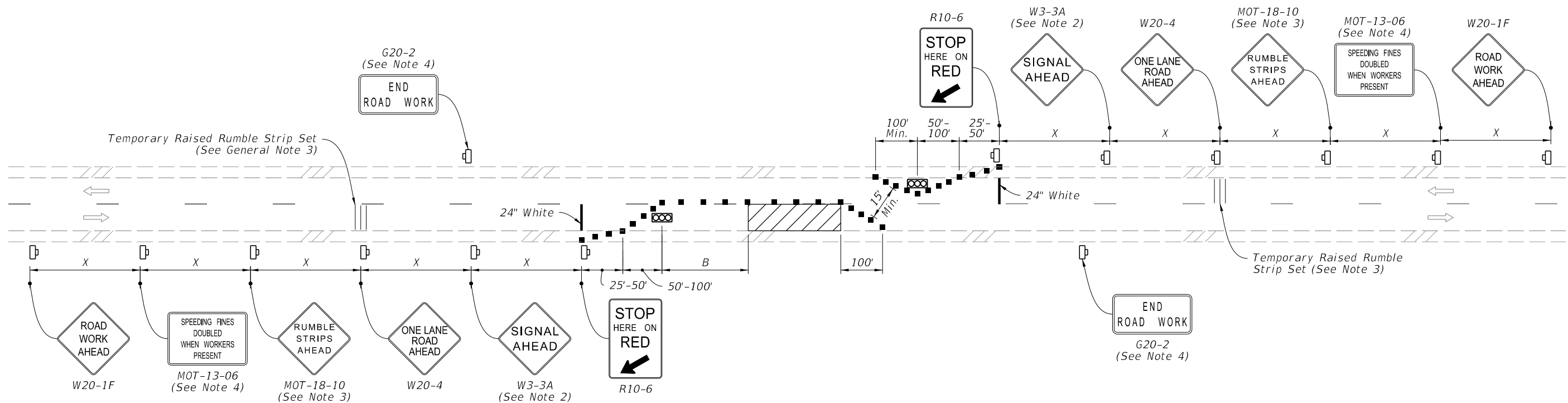
SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Type III Barricade
-  Stop Bar
-  Flagger
-  Lane Identification and Direction of Traffic

WORK IN INTERSECTION OF TWO-LANE ROADWAY

LAST REVISION 11/01/22	DESCRIPTION:
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2/2/2023 10:37:26 AM



NOTES:

1. L = Taper Length
B = Buffer Length
X = Work Zone Sign Distance
See Index 102-600 for "L", "B", "X", and channelizing device spacing values.
2. Optionally, use "Signal Ahead" signs with symbols (W3-3) instead of "Signal Ahead" signs with text (W3-3A).
3. Use temporary raised rumble strips in accordance with Index 102-603.
4. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" signs (G20-2), along with associated work zone sign distances, may be omitted when the work operation will be in place for 24 hours or less.
5. For the maximum distance between temporary traffic signals, do not exceed the distance at which the temporary traffic signals can safely communicate. When the distance temporary traffic signals is greater than 0.25 miles, use a combination of a pilot vehicle and manually-controlled temporary traffic signals.
6. Monitor temporary traffic signals by having one or more workers present during operation. In the event of a temporary traffic signal failure, use flaggers to control traffic.

SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Temporary Traffic Signal
- Lane Identification and Direction of Traffic

LAST REVISION
11/01/22

REVISION DESCRIPTION:



FY 2023-24
STANDARD PLANS

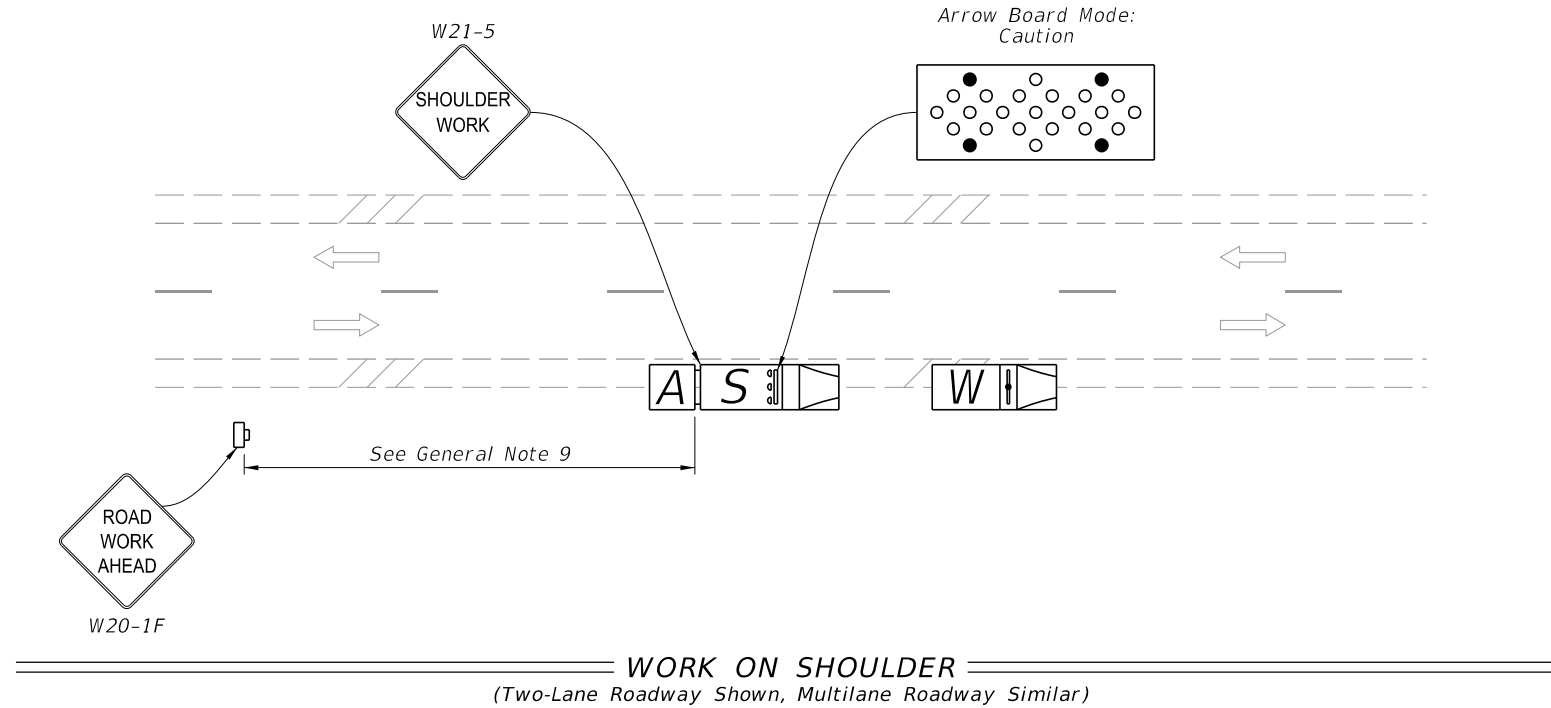
TWO-LANE ROADWAY, LANE CLOSURE USING
TEMPORARY TRAFFIC SIGNALS

INDEX
102-606

SHEET
1 of 1

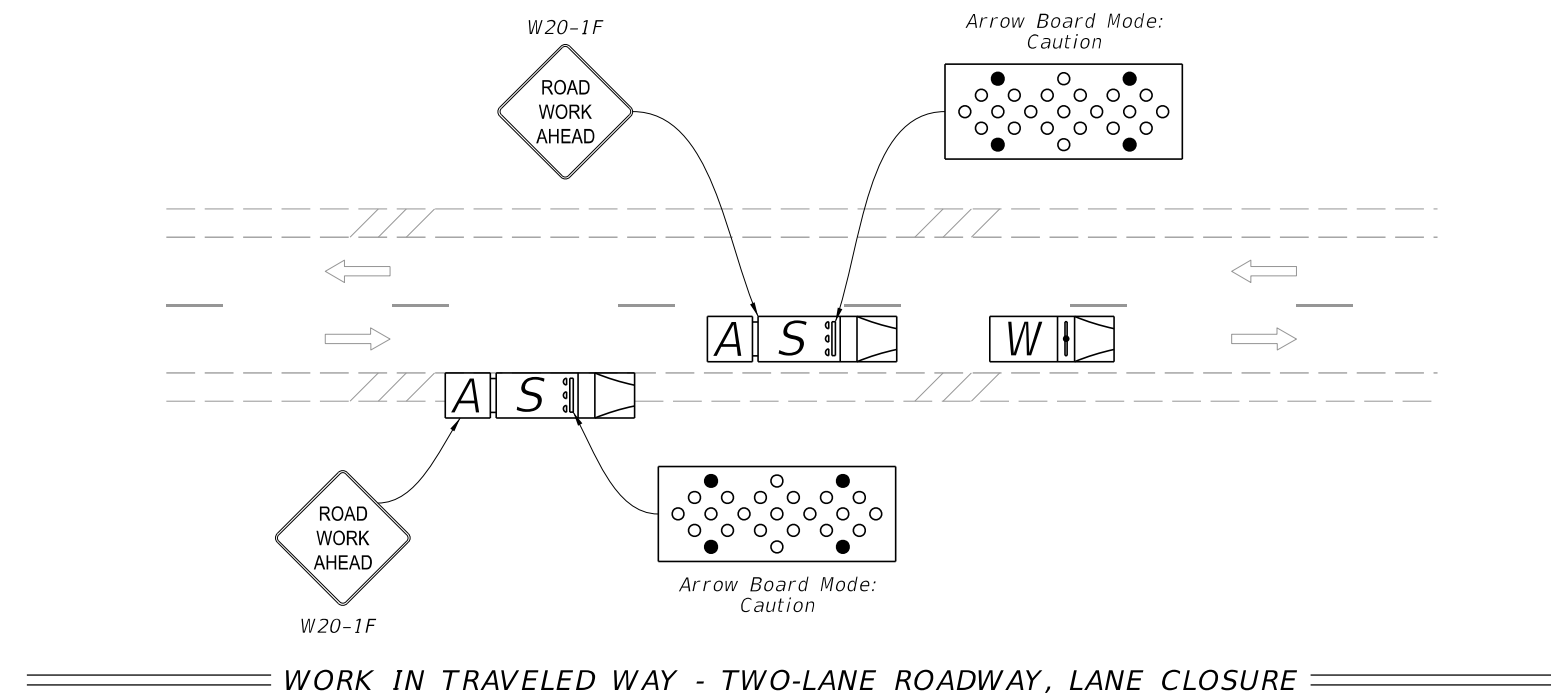
GENERAL NOTES:

1. This Index applies to two-lane, two-way and multilane roadways with work that requires a moving operation.
2. Mount vehicle-mounted signs with the bottom of the sign at a minimum height of 48 inches above the pavement. Vehicle mounted changeable message signs may be used in lieu of truck mounted static signs and arrow boards. Ensure changeable message signs flash alternately to read "Left or Right Lane" or "Two Left or Two Right Lanes", "Closed Ahead", and the arrow symbol. Do not use arrow boards in combination with truck mounted changeable message signs or obscure boards with equipment, supplies, signs, or enclosure. Cover or turn sign legends from view when work is not in progress.
3. For multilane roadways with curb and no paved shoulder, omit the shadow vehicle that would have been used on the paved shoulder. In such instances, the warning sign should be mounted on the shadow vehicle farthest from the work vehicle.
4. Where work activities within 2' of the edge of travel way are incidental (i.e., Mowing, Litter Removal), the Engineer may omit requirements for signs and the Shadow vehicle on the shoulder.
5. Minimize the longitudinal spacing between vehicles to deter road users from driving in between.
6. Use inverted plan of the illustrations for work on left side of roadways.
7. Ensure that all vehicles in the mobile operation convoy have functional two-way communication.
8. If the speed of the mobile operation exceeds the existing posted minimum speed limit on limited access roadways and one half the existing posted speed limit on other roadways, the Engineer may delete requirements for shadow vehicles and attenuators. In such situations, mount arrow board and sign on the work vehicle.
9. The distance between the advance warning sign and the work location should not exceed 5 miles.



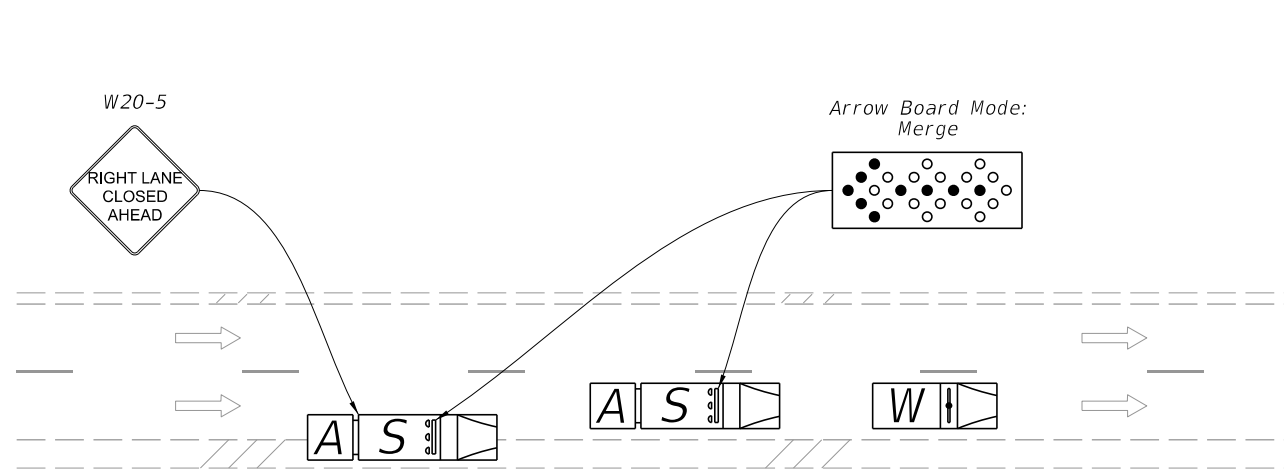
SYMBOLS:

- Lane Identification and Direction of Traffic
- Truck/Trailer Mounted Attenuator (TMA)
- Work Vehicle With Warning Lights
- Shadow (S) Vehicle With Warning Lights And Arrow Board
- Work Zone Sign

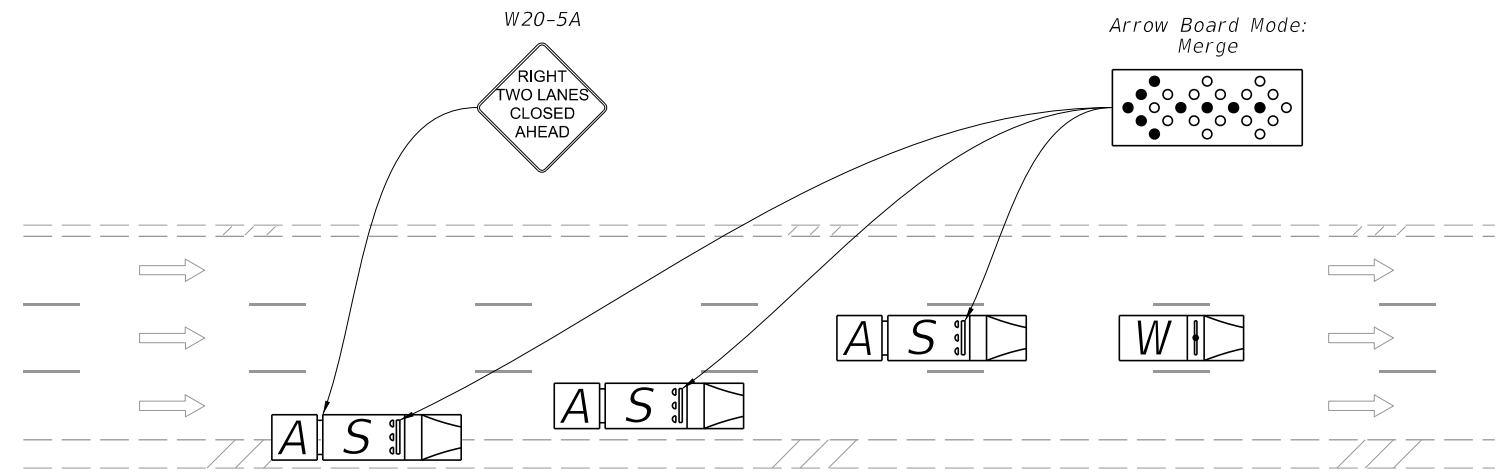


10/20/2022 8:45:38 AM

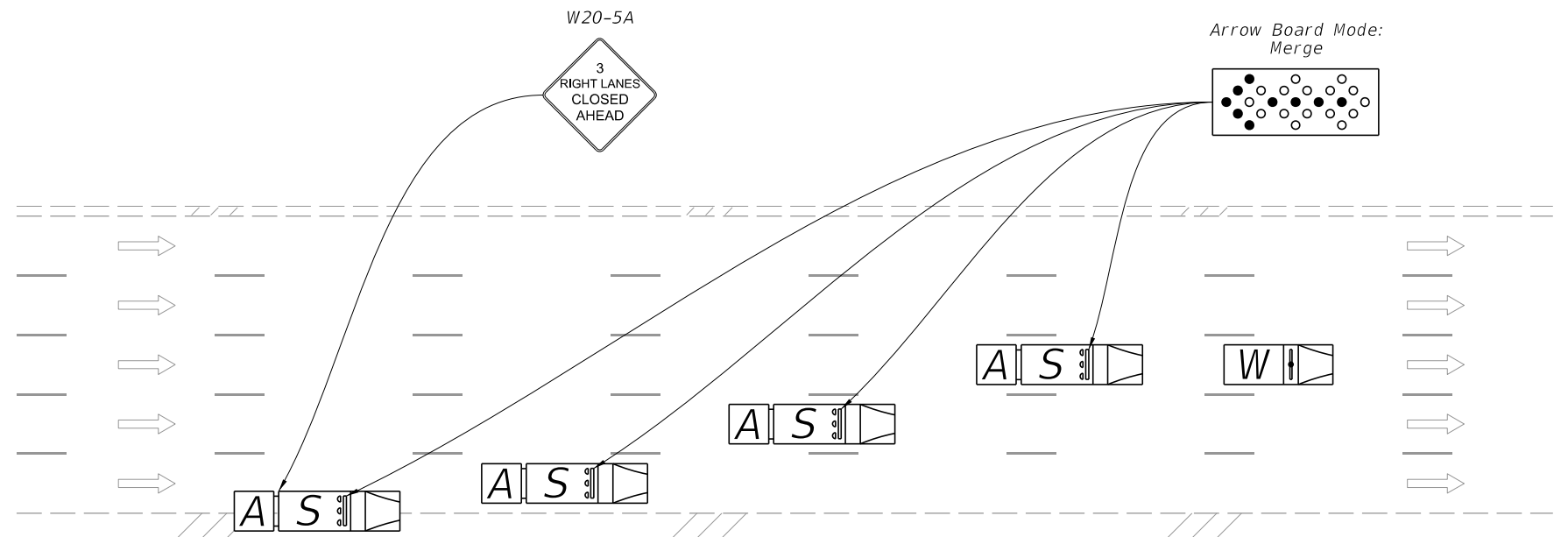
LAST REVISION 11/01/22	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MOBILE OPERATIONS	INDEX 102-607	SHEET 1 of 2
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WORK IN TRAVELED WAY - MULTILANE ROADWAY, SINGLE LANE CLOSURE







WORK IN TRAVELED WAY - MULTILANE ROADWAY, DOUBLE LANE CLOSURE




WORK IN TRAVELED WAY - MULTILANE ROADWAY, TRIPLE LANE CLOSURE

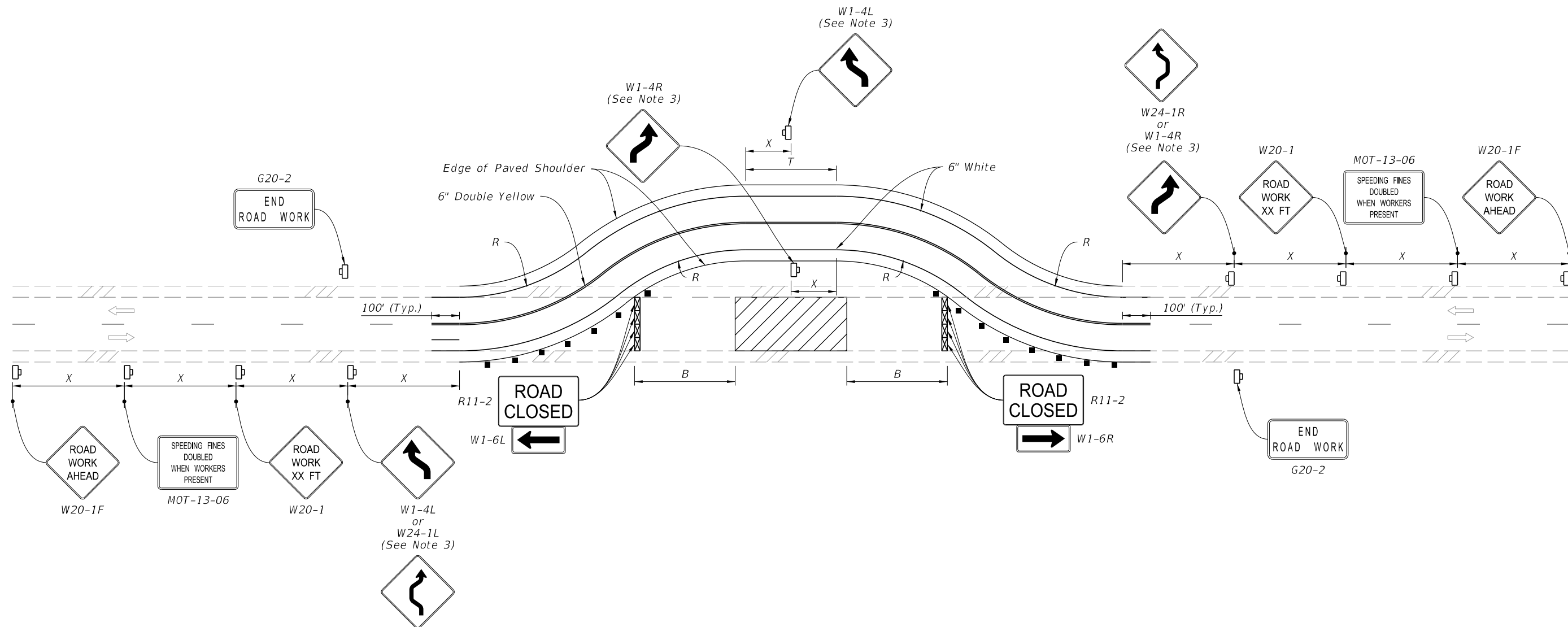
SYMBOLS:

-  Work Vehicle With Warning Lights
-  Shadow (S) Vehicle With Warning Lights And Arrow Board
-  Truck/Trailer Mounted Attenuator (TMA)
-  Lane Identification and Direction of Traffic






10/20/2022 8:45:39 AM

LAST REVISION 11/01/22	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MOBILE OPERATIONS	INDEX 102-607	SHEET 2 of 2
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10/20/2022 8:45:39 AM




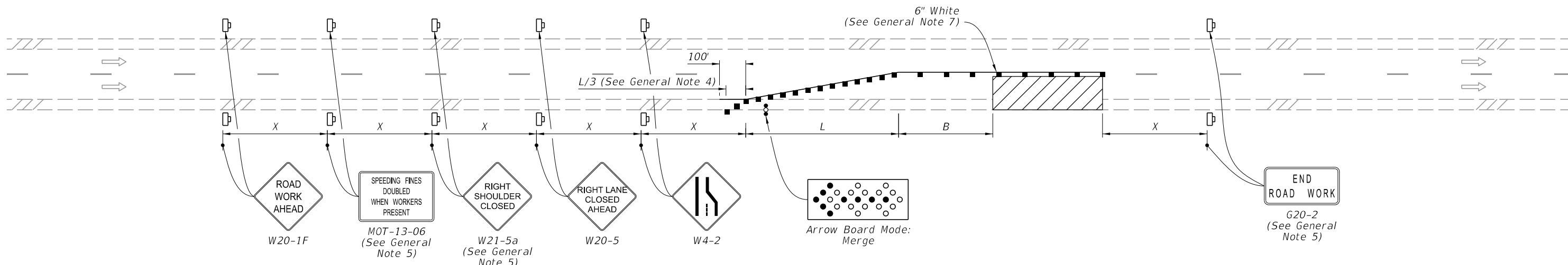
SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Type III Barricade
-  Lane Identification and Direction of Traffic

NOTES:






1. This Index applies to Two-Lane, Two-Way Roadways with temporary diversions.
2. B = Buffer Length
 X = Work Zone Sign Distance
 R = Radius of Curve
 See Index 102-600 for "B", "X", and channelizing device spacing values.
 See Plans for "R" values.
3. If the tangent distance "T" is less than 600', for each direction use a "Double Reverse Curve" sign (W24-1) instead of the first "Reverse Curve" sign (W1-4) and omit the second "Reverse Curve" sign.

LAST REVISION 11/01/20	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TWO-LANE, TWO-WAY TEMPORARY DIVERSION CONNECTION	INDEX 102-608	SHEET 1 of 1
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SINGLE LANE CLOSURE


SYMBOLS:

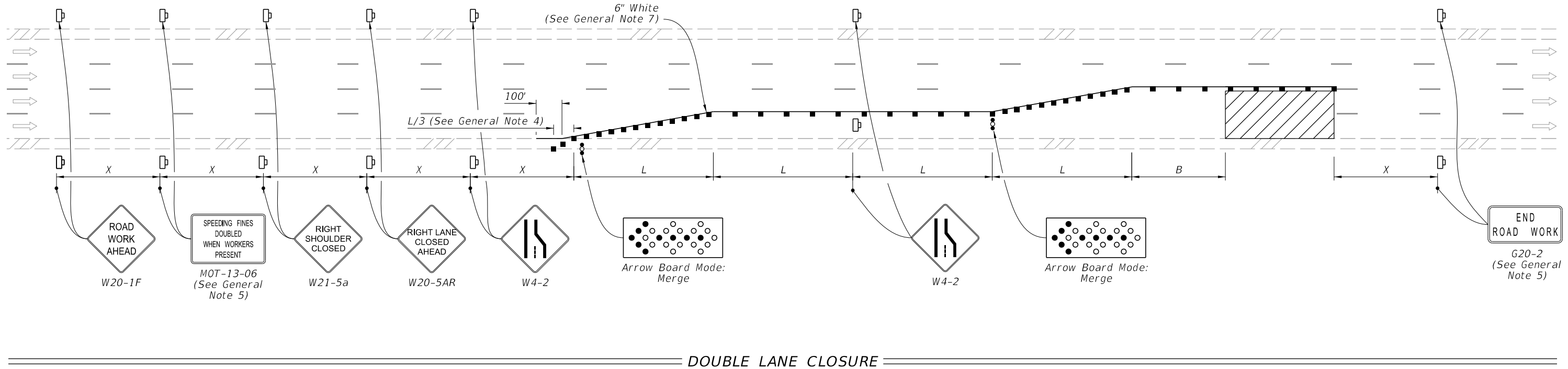
-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Arrow Board
-  Lane Identification and Direction of Traffic

GENERAL NOTE:

1. L = Taper Length
 B = Buffer Length
 X = Work Zone Sign Distance
 See Index 102-600 for " L ", " B ", " X ", and channelizing device spacing values.
2. On undivided highways the median signs as shown are to be omitted.
3. On limited access facilities, omit "Right Shoulder Closed" signs (W21-5a) and associated work zone sign spacing distances.
4. If the paved shoulder is less than 4' in width, omit the taper and channelizing devices from the paved shoulder.
5. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" signs (G20-2) and "Right Shoulder Closed" (W21-5a), along with associated work zone sign distances, may be omitted when the work operation will be in place for 24 hours or less. For Single Lane Closures, arrow boards and buffer (B) may also be omitted when the work operation will be in place for 60 minutes or less and the speed limit is 45 mph or less.
6. Use inverted plan of the illustrations for work on left side of roadways.
7. Temporary pavement markings may be omitted when the work operation is in place for 3 days or less.

2/2/2023 10:34:25 AM

LAST REVISION 11/01/21	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, LANE CLOSURES	INDEX 102-613	SHEET 1 of 5
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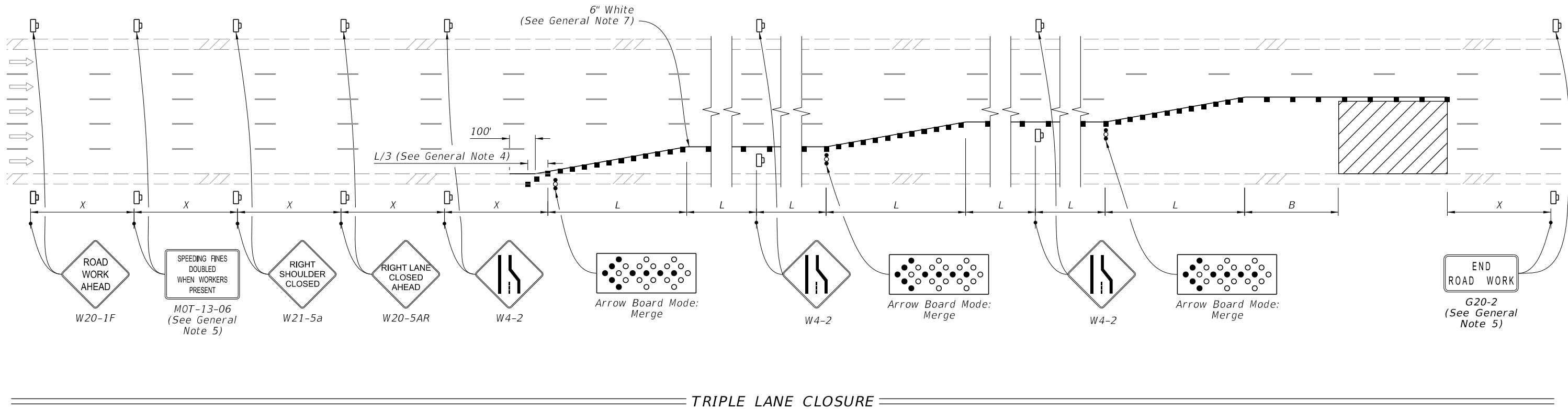


SYMBOLS:






- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Arrow Board
- Lane Identification and Direction of Traffic

2/2/2023 10:34:25 AM


LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, LANE CLOSURES	INDEX 102-613	SHEET 2 of 5
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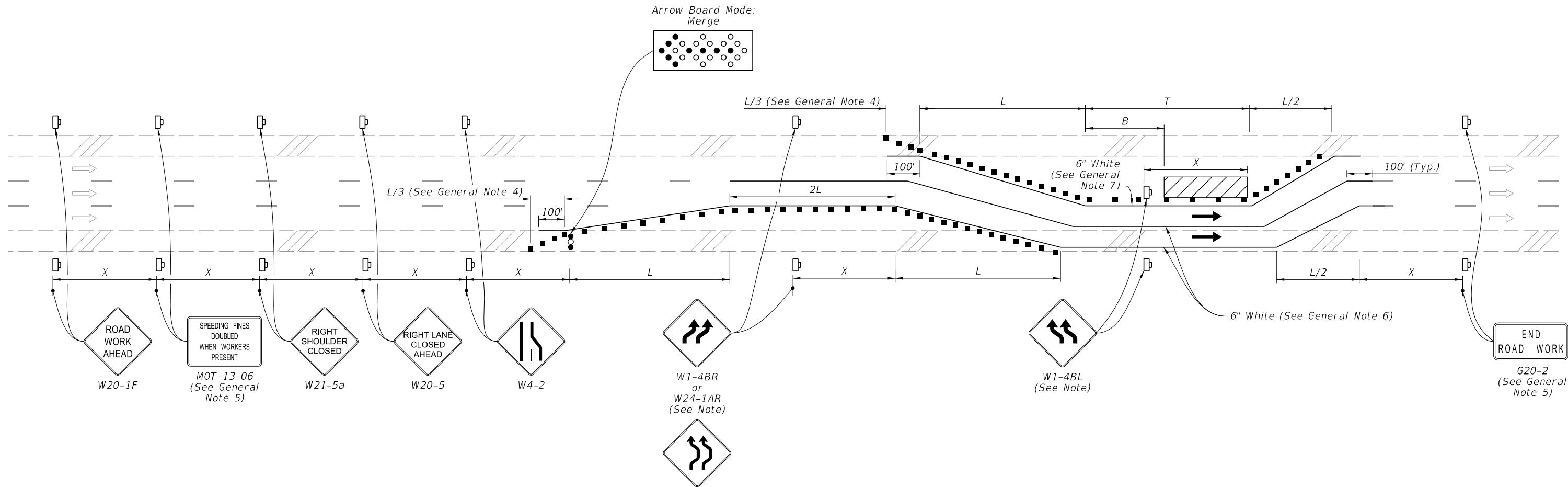


SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Arrow Board
-  Lane Identification and Direction of Traffic

2/2/2023 10:34:26 AM

LAST REVISION 11/01/20	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, LANE CLOSURES	INDEX 102-613	SHEET 3 of 5
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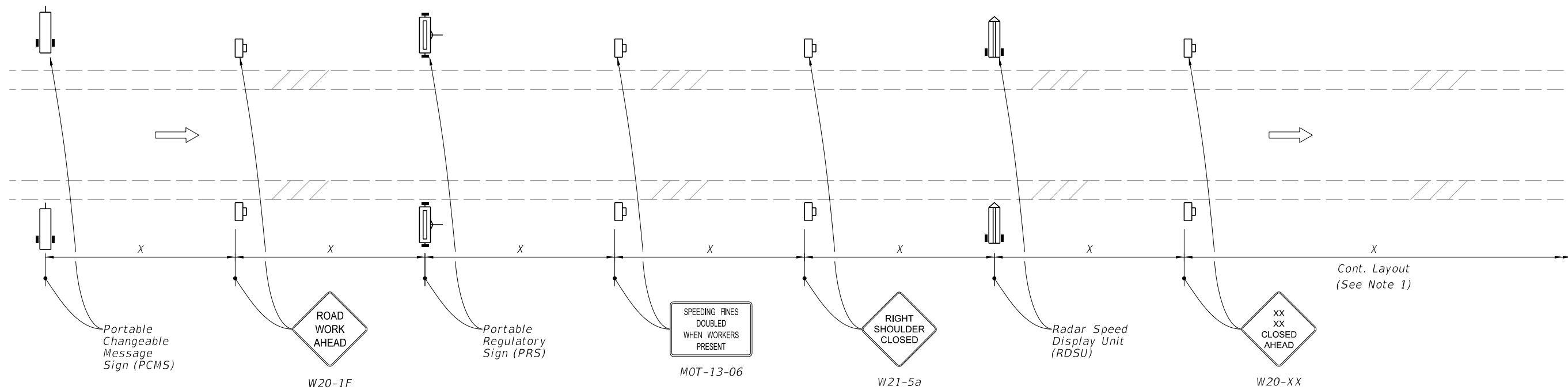


LANE CLOSURE WITH LANE SHIFT

NOTE:
 If the tangent distance "T" is less than 600', then use "Double Reverse Curve" signs (W24-1A) instead of the first pair of "Reverse Curve" signs (W1-4B) and omit the second pair of "Reverse Curve" signs.






- SYMBOLS:**
- Work Area
 - Channelizing Device (See Index 102-600)
 - Work Zone Sign
 - Arrow Board
 - Lane Identification and Direction of Traffic

2/2/2023 10:34:27 AM



MOTORIST AWARENESS SYSTEM

SYMBOLS:

-  Work Zone Sign
-  (1) PCMS= Portable Changeable (Variable) Message Sign
-  (2) PRS= Portable Regulatory Sign-Speed Limit When Flashing
-  (2) RSDU= Radar Speed Display Unit
-  Lane Identification and Direction of Traffic

NOTES:

1. Use the Motorist Awareness System (MAS) for lane closures of at least 5 days (consecutive or not) on multilane divided facilities with a posted speed of 55 or greater when workers are present and not protected by a barrier.
2. Locate the Motorist MAS devices (i.e., PCMS, PRS, and RDSU) within the advance warning signs as shown. Continue with the remainder of the work zone signs and devices in accordance with the Plans or Standard Plans after the appropriate "Lane Closed Ahead" (W20-XX) sign.
3. For a posted speed of 65 mph or greater, display speed with a ten mph reduction. For a posted speed of 60 mph, display a reduced speed of 55 mph. For areas outside of the lane closure, use the posted speed as the work zone speed.
4. Omit the PCMS in the median for roadways with three lanes or less in the same direction of traffic.

TYPICAL PCMS DISPLAY:







- With speed reduction:
 Message 1: WORKERS PRESENT AHEAD
 Message 2: SPEED REDUCED NEXT XXMI
- Without speed reduction:
 Message 1: WORKERS PRESENT AHEAD
 Message 2: NEXT XX MILES

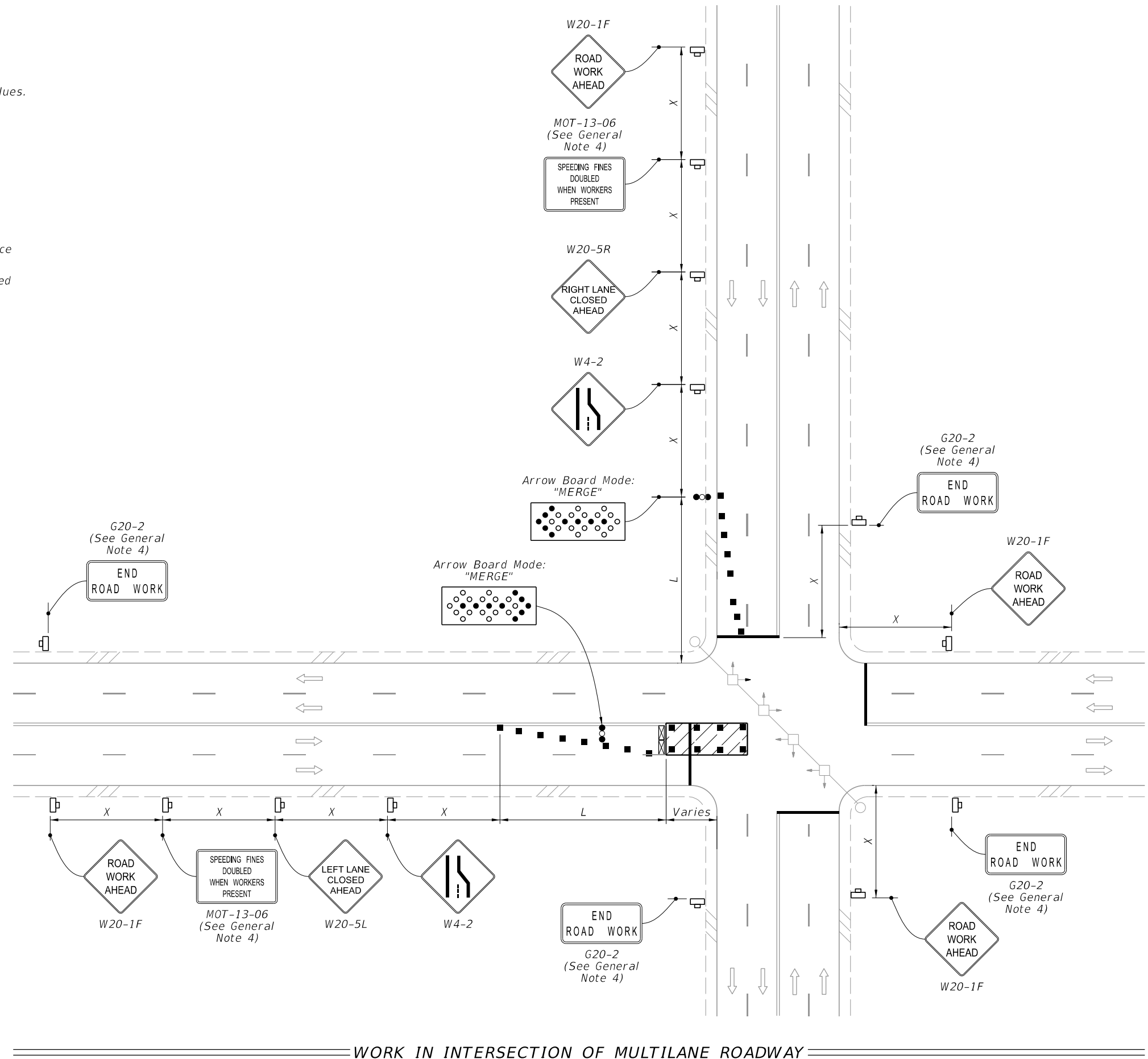
2/2/2023 10:34:28 AM

GENERAL NOTES:


1. L = Taper Length
 B = Buffer Length
 X = Work Zone Sign Distance
 See Index 102-600 for "L", "B", "X", and channelizing device spacing values.
2. If vehicles in a parking zone block the line of sight to TCZ signs, locate and post mount signs in accordance with Index 700-101.
3. Use temporary "STOP" sign (R1-1) where the existing stop bar is more than 30' from the taper, remove or cover existing sign.
4. The "Speeding Fines Doubled When Workers Present" sign (MOT-13-06) and "End Road Work" Sign (G20-2), along with associated Work Zone Sign Distances, may be omitted when the work operation will be in place for 24 hours or less. Additionally, arrow boards may be omitted when the work operation will be in place for 60 minutes or less and the speed limit is 45 mph or less.
5. If the work area extends across a crosswalk, close the crosswalk in accordance with Index 102-660.
6. Dual signs are required for divided roadways.

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Type III Barricade
-  Arrow Board
-  Stop Bar
-  Lane Identification and Direction of Traffic



10/20/2022 8:45:43 AM

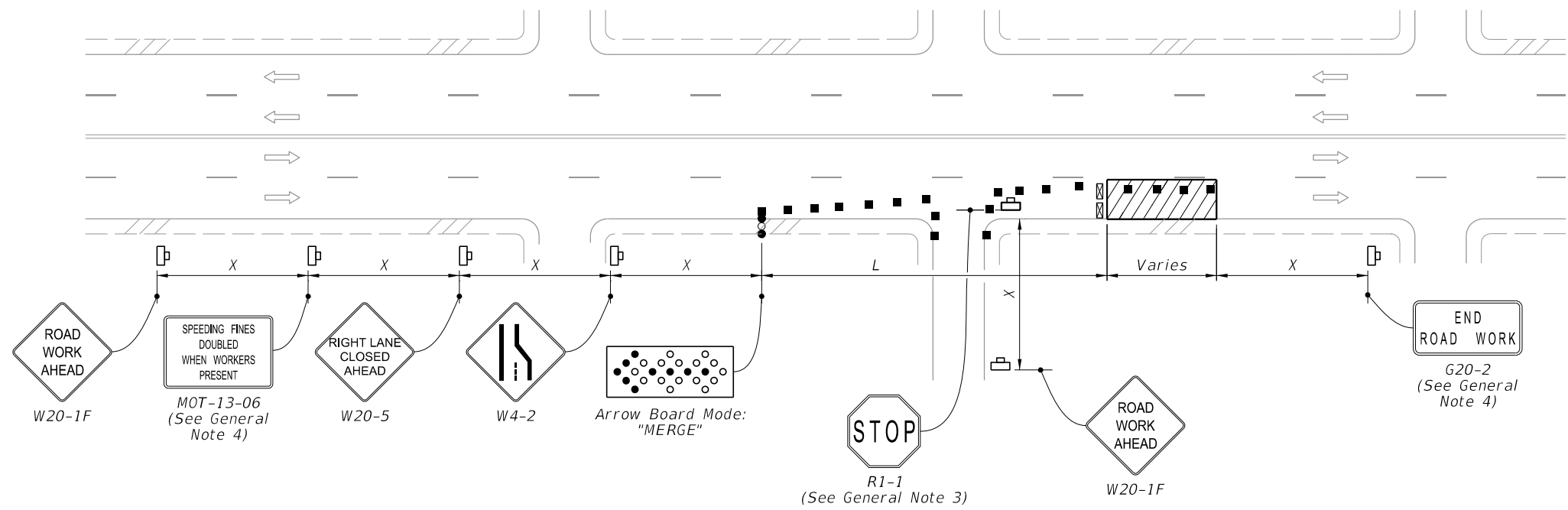
LAST REVISION 11/01/22	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, INTERSECTION WORK	INDEX 102-615	SHEET 1 of 5
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NOTE:

Confine work operations to the following lane or lane combinations:

- a. Outside travel lane
- b. Outside auxiliary lane
- c. Outside travel lane and adjoining auxiliary lane
- d. Inside travel lane
- e. Inside auxiliary lane
- f. Inside travel lane and adjoining auxiliary lane

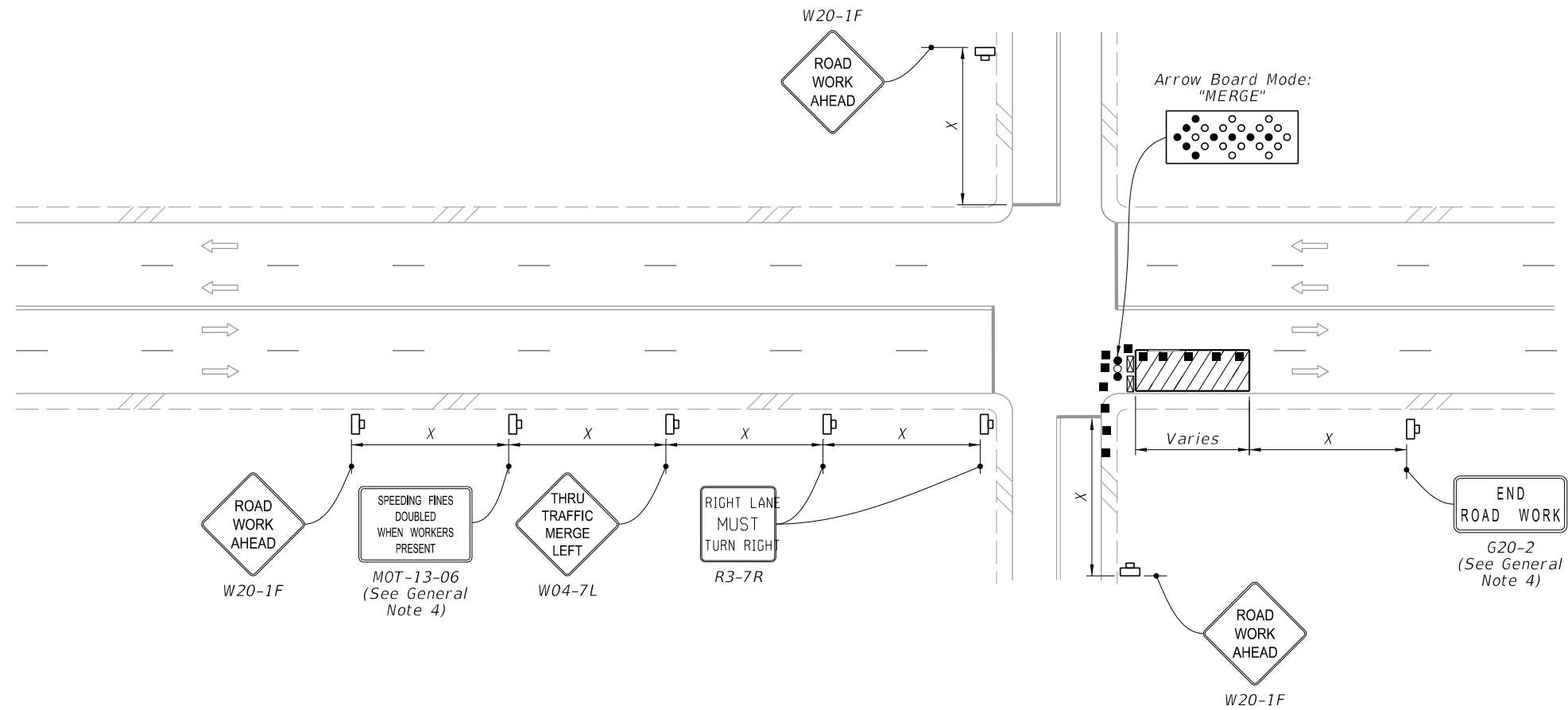
If the work area is confined to an auxiliary lane, the work area must be barricaded. Replace the RIGHT (LEFT) LANE CLOSED AHEAD signs with ROAD WORK AHEAD signs, and omit the merge symbol signs and arrow board.



RIGHT LANE CLOSED ON FAR SIDE OF MINOR SIDE STREET

SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Type III Barricade
- Arrow Board
- Stop Bar
- Lane Identification and Direction of Traffic



RIGHT LANE CLOSED ON FAR SIDE OF INTERSECTION WITH SIGNIFICANT RIGHT TURNING MOVEMENTS

11/1/2022 1:39:11 PM

LAST REVISION 11/01/22	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, INTERSECTION WORK	INDEX 102-615	SHEET 2 of 5
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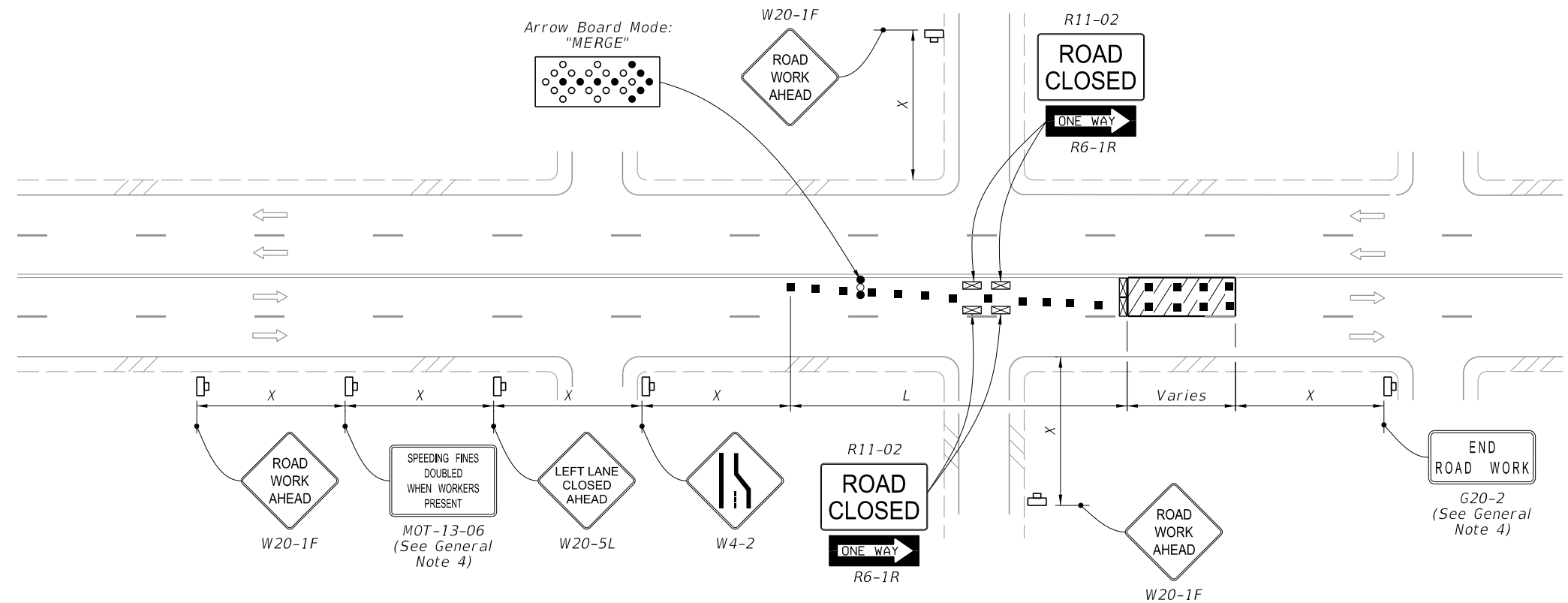
NOTES:

1. Confine work operations to the following lane or lane combinations:

- a. Outside travel lane
- b. Outside auxiliary lane
- c. Outside travel lane and adjoining auxiliary lane
- d. Inside travel lane
- e. Inside auxiliary lane
- f. Inside travel lane and adjoining auxiliary lane

If the work area is confined to an auxiliary lane, the work area must be barricaded. Replace the RIGHT (LEFT) LANE CLOSED AHEAD signs with ROAD WORK AHEAD signs, and omit the merge symbol signs and arrow board.

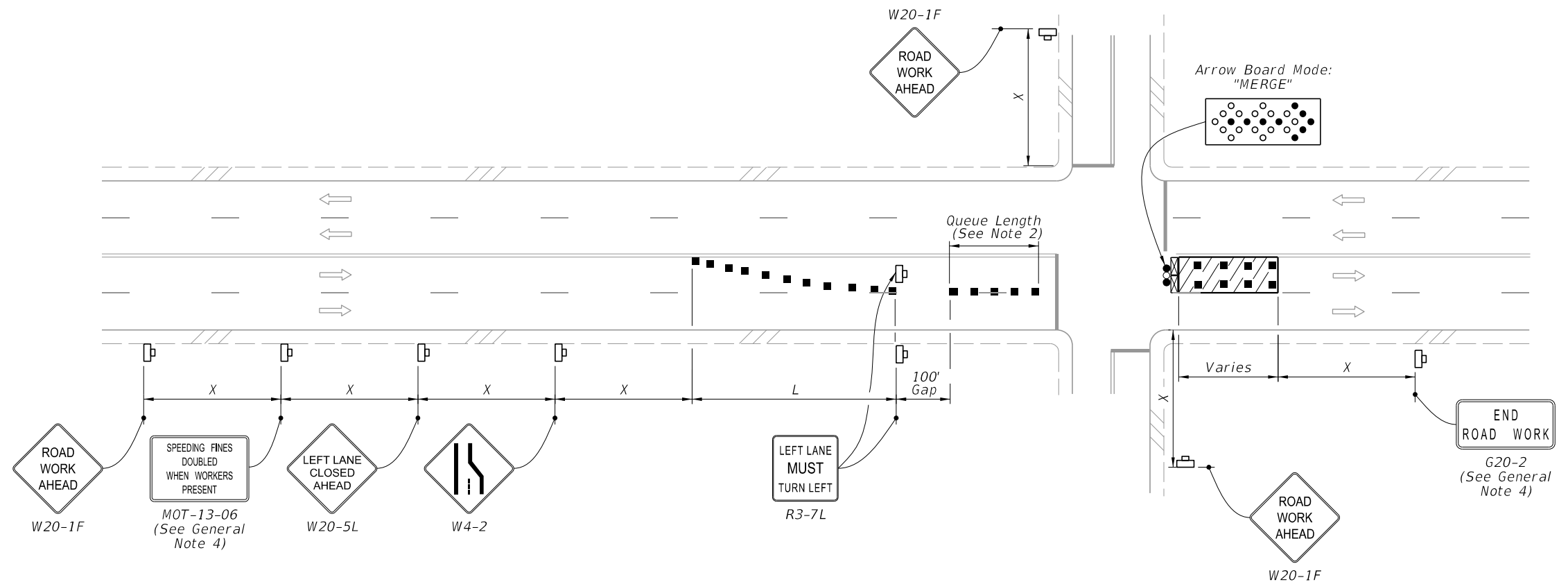
2. Provide sufficient Queue Length so that left-turning vehicles do not block through lanes.



LEFT LANE CLOSED ON FAR SIDE OF MINOR SIDE STREET - RESTRICTED TURNING MOVEMENTS

SYMBOLS:

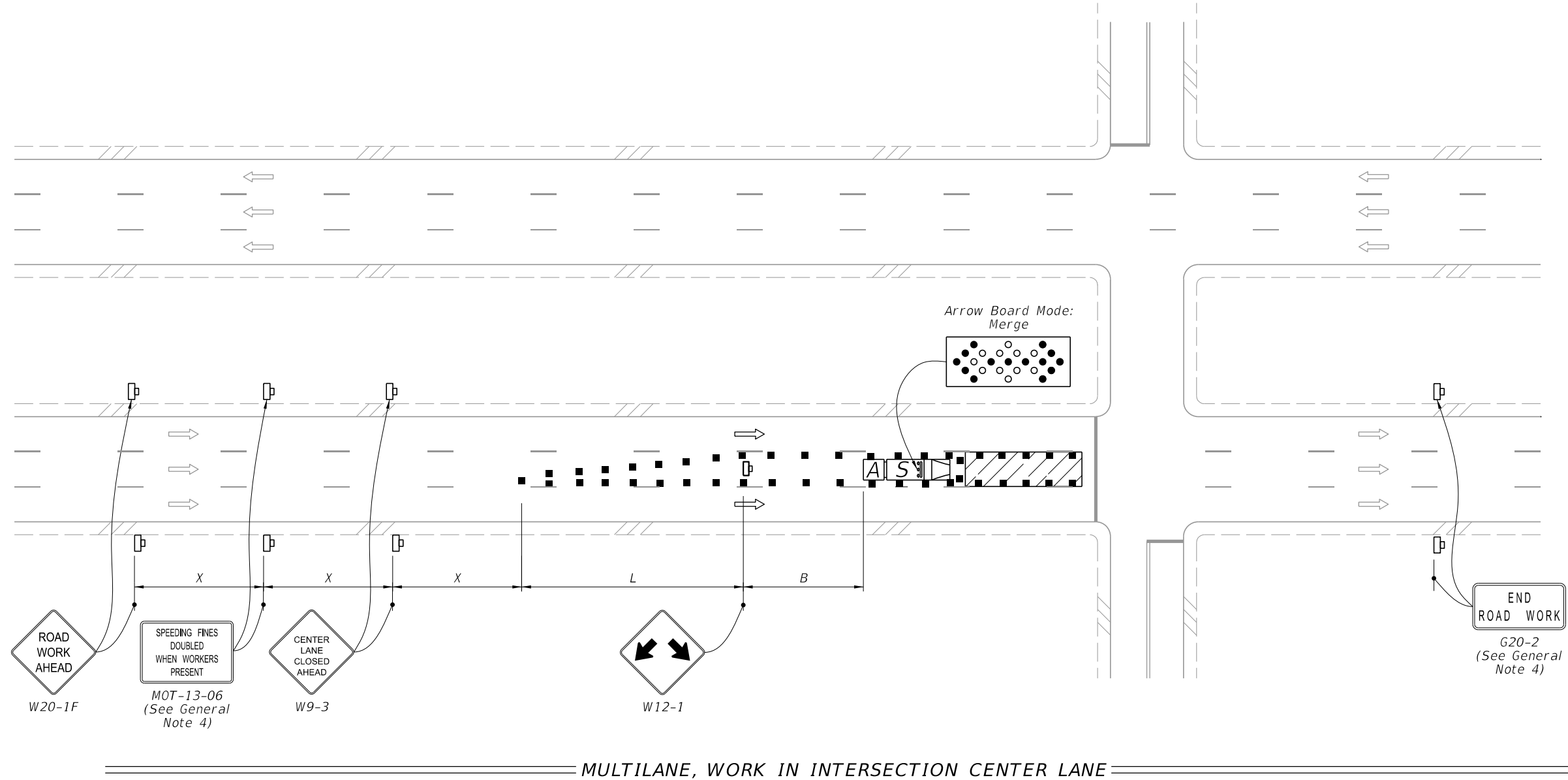
- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Type III Barricade
- Arrow Board
- Stop Bar
- Lane Identification and Direction of Traffic



LEFT LANE CLOSED ON FAR SIDE OF INTERSECTION TURNING MOVEMENTS ALLOWED

12/13/2022 8:03:16 AM

LAST REVISION 11/01/22	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, INTERSECTION WORK	INDEX 102-615	SHEET 3 of 5
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NOTES:

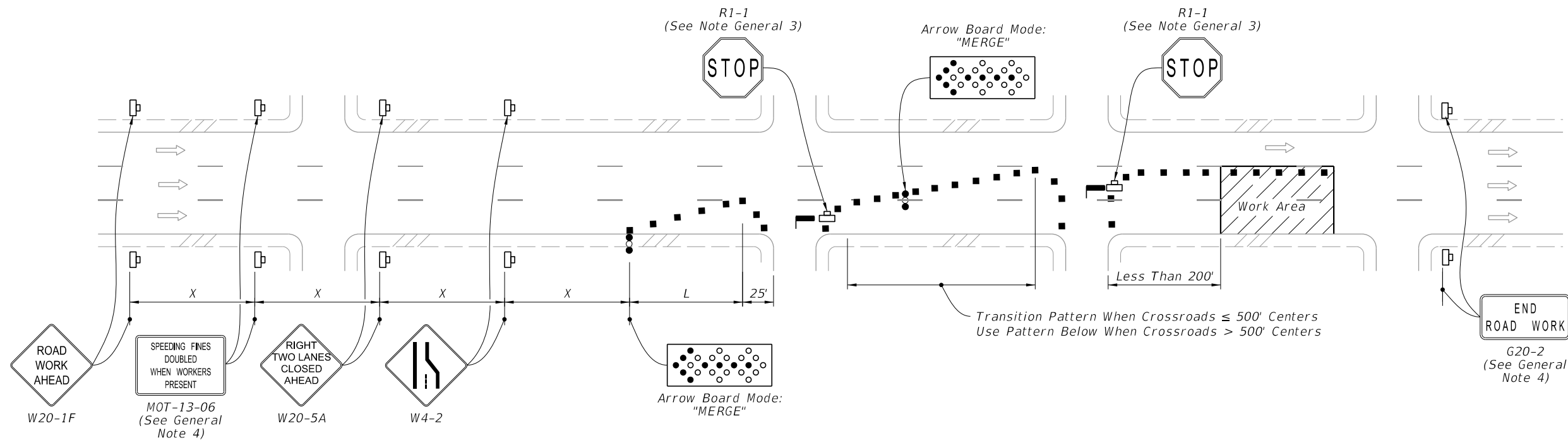
1. Confine work operations to one center travel lane and leave the adjacent travel lanes open to traffic.
2. Ensure that the merging taper only directs vehicular traffic into either the right or left lane.

SYMBOLS:

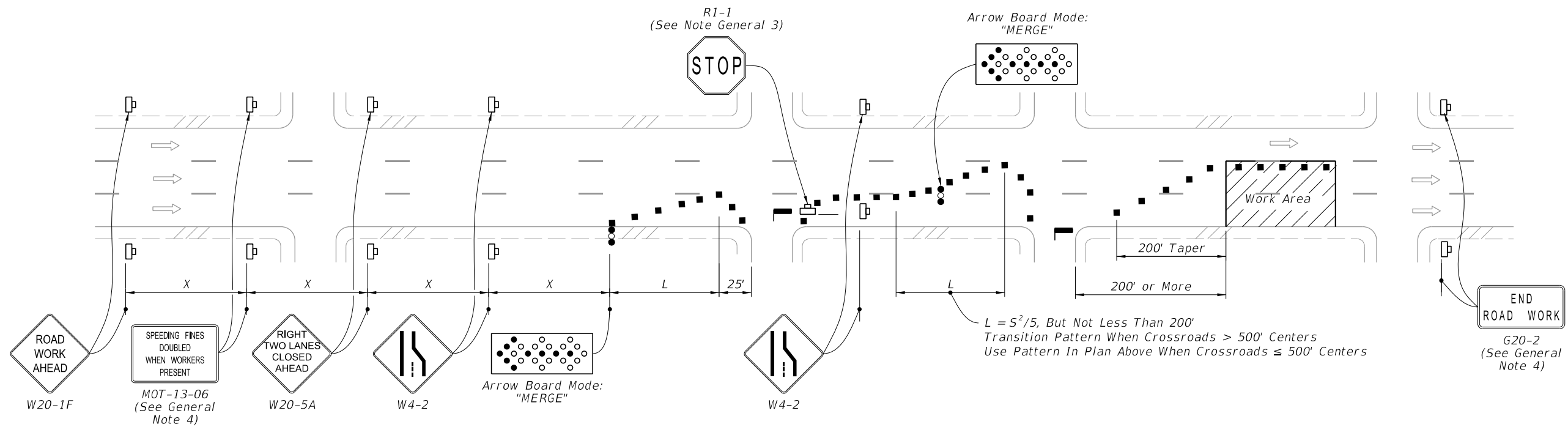
- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Type III Barricade
- Arrow Board
- Stop Bar
- Shadow (S) Vehicle With Warning Lights And Arrow Board
- Truck/Trailer Mounted Attenuator (TMA)
- Lane Identification and Direction of Traffic

10/20/2022 8:45:45 AM

LAST REVISION 11/01/22	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, INTERSECTION WORK	INDEX 102-615	SHEET 4 of 5
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DOUBLE LANE CLOSURE FOR WORK LESS THAN 200' FROM INTERSECTION



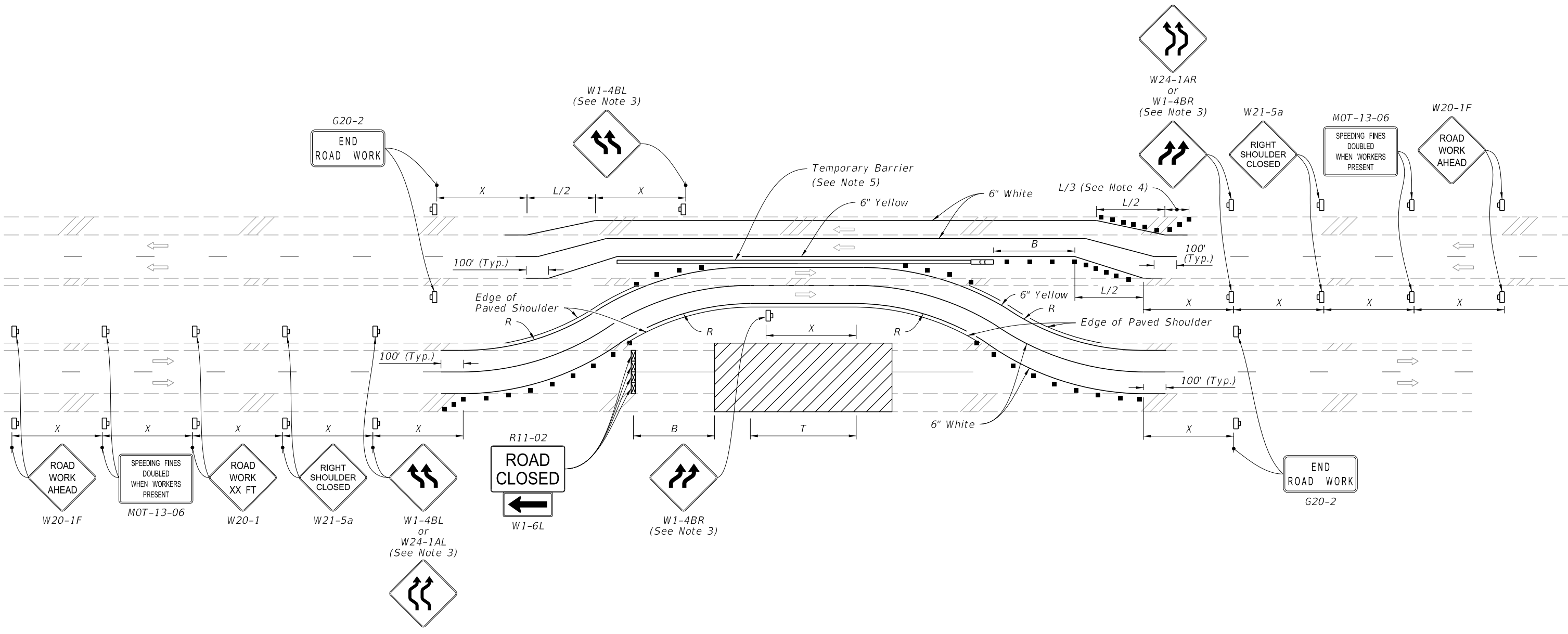
SYMBOLS: (See General Note 5)

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Arrow Board
- Stop Bar
- Lane Identification and Direction of Traffic

DOUBLE LANE CLOSURE FOR WORK MORE THAN 200' FROM INTERSECTION

10/20/2022 8:45:45 AM

LAST REVISION 11/01/22	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, INTERSECTION WORK	INDEX 102-615	SHEET 5 of 5
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TEMPORARY DIVERSION FOR DIVIDED ROADWAYS

NOTES:

1. This Index applies to multilane roadways, except with undivided roadways with 6 or more lanes, where the work requires the closure of the lanes in one direction and diversion is provided to convert the opposing traffic lanes to temporary two-way travel.
2. L = Taper Length
 B = Buffer Length
 X = Work Zone Sign Distance
 R = Radius of Curve
 See Index 102-600 for "L", "B", "X", channelizing device spacing values. See Plans for "R" values.
3. For undivided roadways with a tangent distance "T" less than 600', use "Double Reverse Curve" signs (W24-1A) instead of the first pair of "Reverse Curve" signs (W1-4B) and omit the second pair of "Reverse Curve" signs.
4. If the paved shoulder is less than 4' in width, omit the taper and channelizing devices shown on the paved shoulder.
5. Temporary Lane Separator may be used in lieu of Temporary Barrier for speed limits of 45 mph or less.

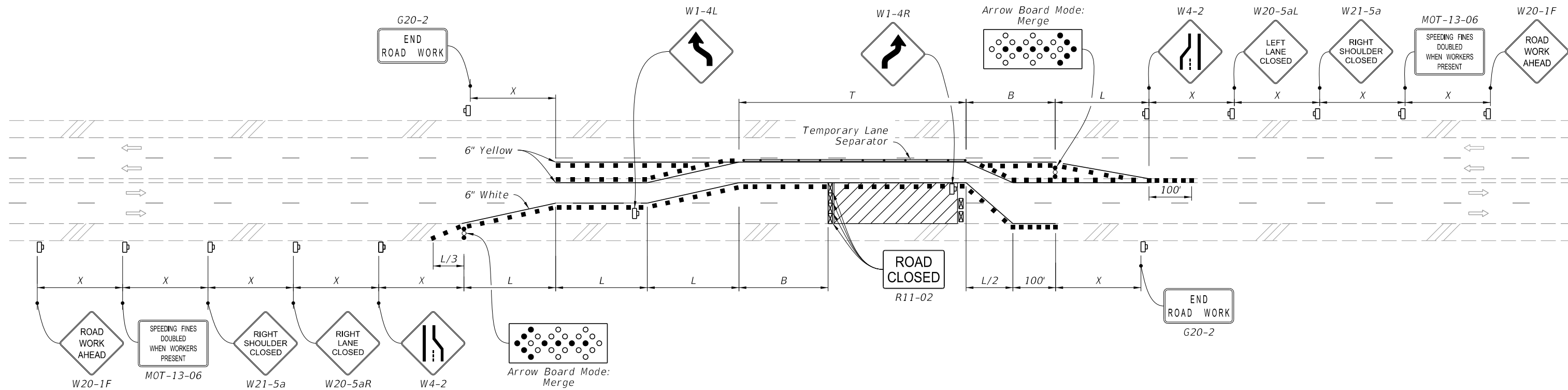
SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Type III Barricade
- Crash Cushion
- Lane Identification and Direction of Traffic

2/2/2023 10:35:05 AM

LAST REVISION 11/01/21	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, TEMPORARY DIVERSION	INDEX 102-620	SHEET 1 of 2
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2/2/2023 10:35:06 AM

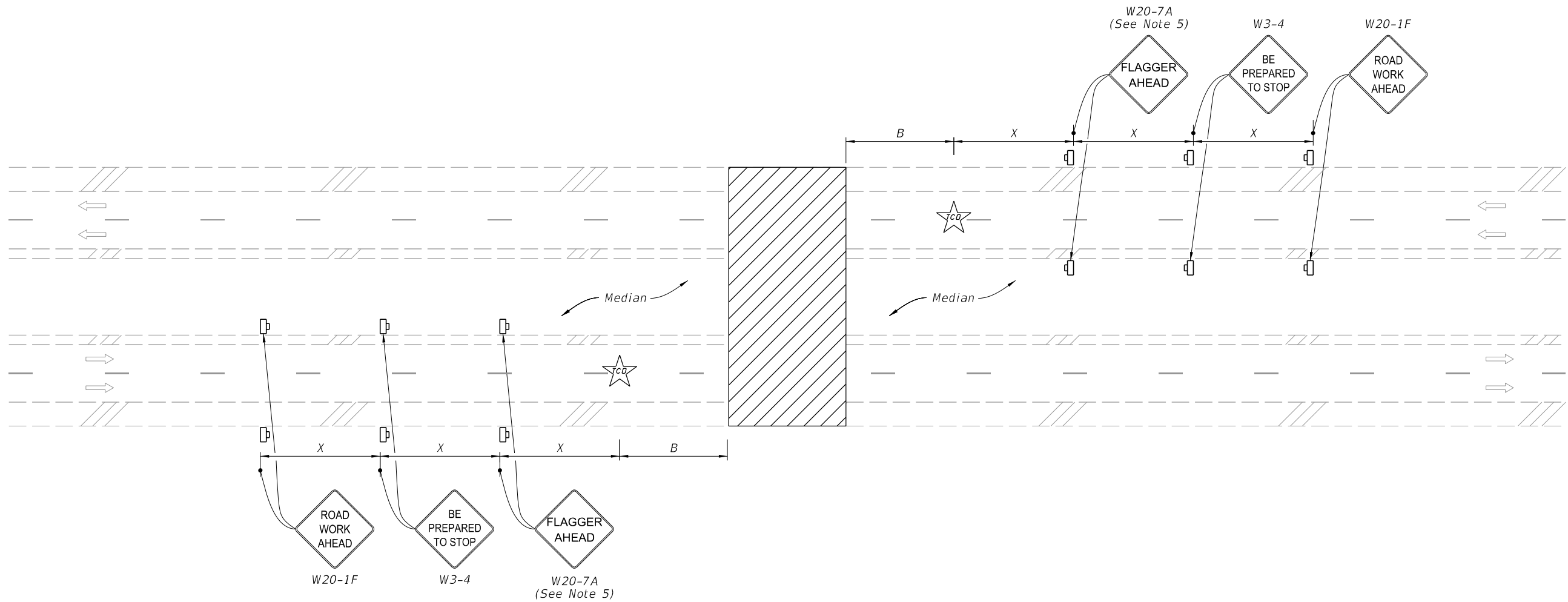


TEMPORARY DIVERSION FOR UNDIVIDED ROADWAYS

NOTE:
 Temporary pavement markings may be omitted when the work operation is in place for 3 days or less.





- SYMBOLS:**
- Work Area
 - Channelizing Device (See Index 102-600)
 - Work Zone Sign
 - Type III Barricade
 - Crash Cushion
 - Lane Identification and Direction of Traffic

LAST REVISION 11/01/21	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	MULTILANE ROADWAY, TEMPORARY DIVERSION	INDEX 102-620	SHEET 2 of 2
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(Multilane Roadway Shown, Two-Lane Roadway Similar)


SYMBOLS:

-  Work Area
-  Work Zone Sign
-  Traffic Control Officer
-  Lane Identification and Direction of Traffic

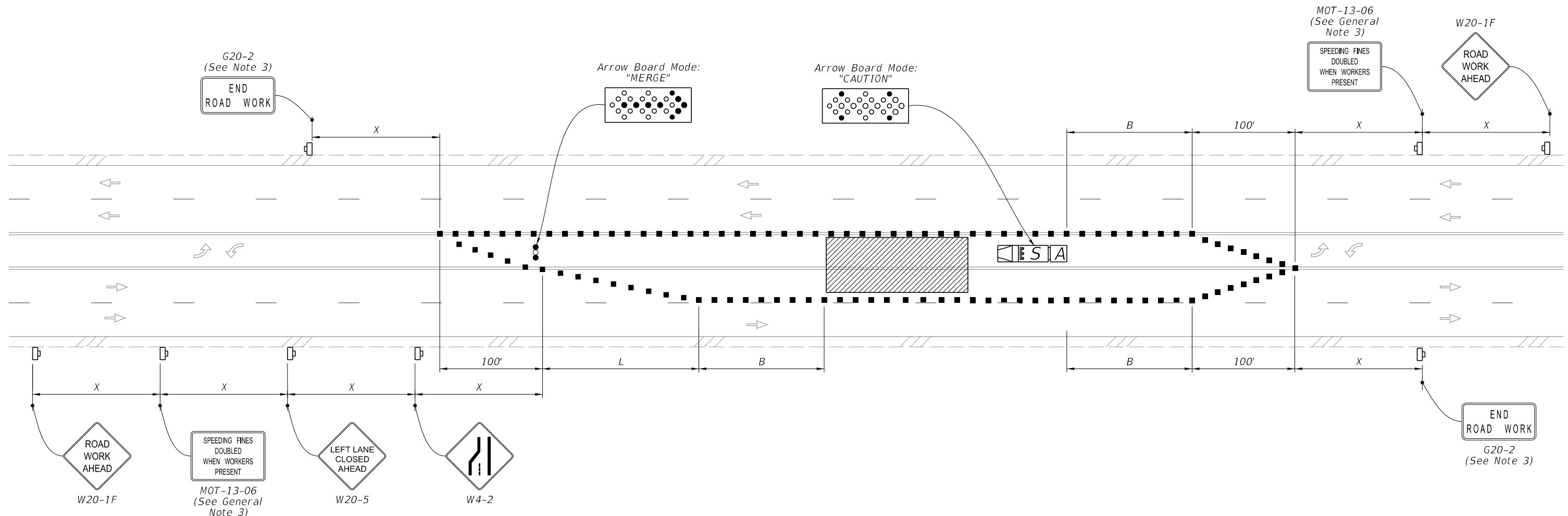
NOTES:

1. This Index applies to two-lane, two-way and multilane roadways, except limited access facilities, with temporary daytime roadway closures of 5 minutes or less.
2. B = Buffer Length
 X = Work Zone Sign Distance
See Index 102-600 for "B" and "X" values.
3. For Two-Lane Roadways, a Flagger may substitute the traffic control officer with approval of the Engineer.
4. Traffic volume or complexity of the roadway may dictate additional signs, devices or traffic control officers.
5. Optionally, use FLAGGER AHEAD sign with symbol (W20-7) instead of FLAGGER AHEAD sign with text (W20-7A).
6. Dual Signs are required for divided roadways only.

10/20/2022 8:45:47 AM

LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	TEMPORARY ROADWAY CLOSURE	INDEX 102-625	SHEET 1 of 1
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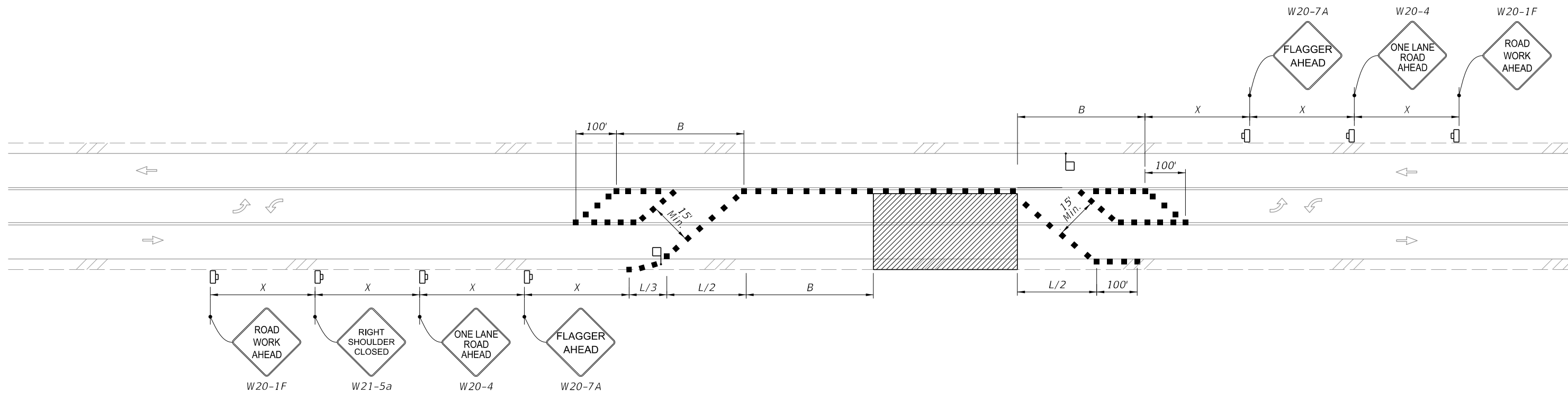
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TEMPORARY MULTILANE, TWO-WAY LEFT-TURN LANE, TURN LANE CLOSURE
 (Closure of One Inside Lane Shown, Closure of both Similar)






- SYMBOLS:**
- Work Area
 - Channelizing Device (See Index 102-600)
 - Work Zone Sign
 - Arrow Board
 - Shadow (S) Vehicle With Warning Lights And Arrow Board
 - Truck/Trailer Mounted Attenuator (TMA)
 - Lane Identification and Direction of Traffic

- GENERAL NOTES:**
1. This Index applies to roadways with work in the two-way left-turn lane.
 2. L = Taper Length
 X = Work Zone Sign Distance
 B = Buffer Length
 See Index 102-600 for "L", "X", "B", and channelizing device spacing values.
 3. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" Sign (G20-2), along with associated Work Zone Sign Distances, may be omitted when the work operation will be in place for 24 hours or less.
 4. If closure of both inside lanes on multilane roadways is needed, duplicate lane closure and merge; signs, channelizing devices, taper, and arrow board, for both directions




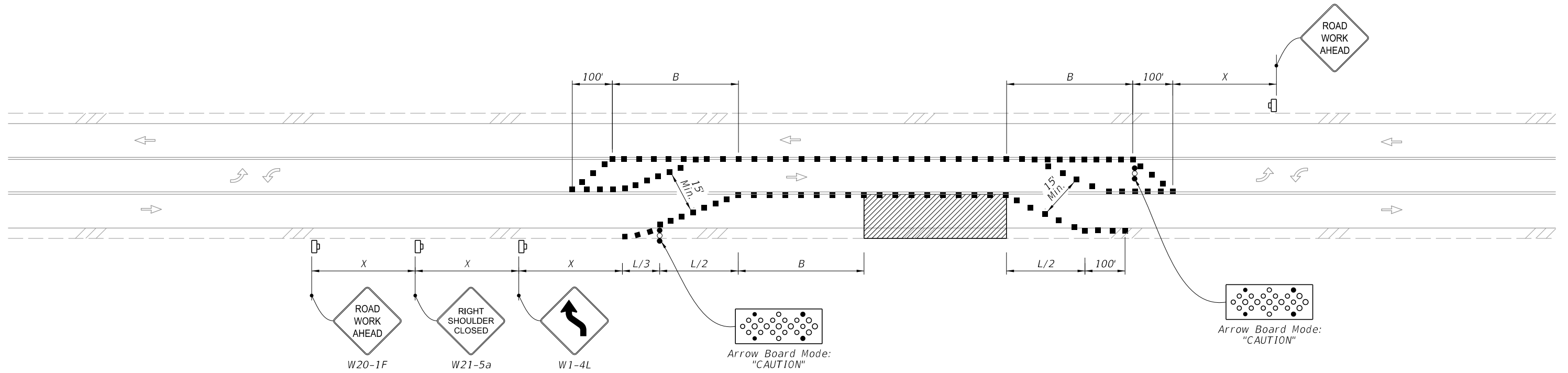
TEMPORARY TWO-WAY LEFT-TURN LANE CLOSURE, TWO-LANE, TWO-WAY ROADWAY, WORK WITHIN THE TRAVELED WAY WITH LANE CLOSURES OF 24 HRS OR LESS AND WORK ZONE SPEED OF 45 MPH OR LESS

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index 102-600)
-  Work Zone Sign
-  Flagger
-  Lane Identification and Direction of Traffic

10/20/2022 8:45:48 AM

LAST REVISION 11/01/20	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TWO-WAY LEFT-TURN LANES	INDEX 102-628	SHEET 2 of 3
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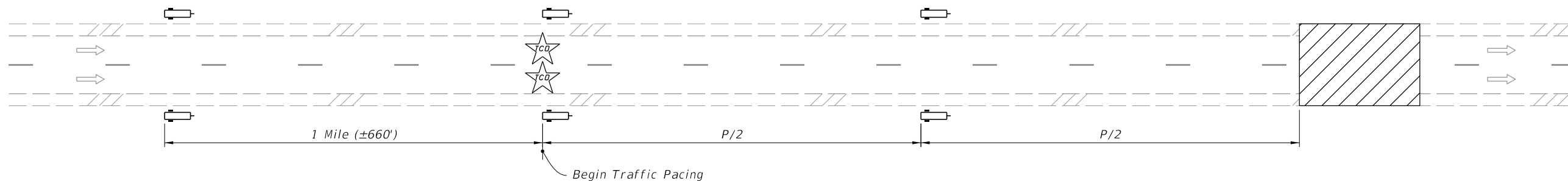
TEMPORARY SHIFT TO TWO-WAY LEFT-TURN LANE, WORK WITHIN THE TRAVELED WAY
 WITH LANE CLOSURES OF 24 HRS OR LESS AND WORK ZONE SPEED OF 45 MPH OR LESS

SYMBOLS:

- Work Area
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Arrow Board
- Flagger
- Lane Identification and Direction of Traffic

10/20/2022 8:45:49 AM

LAST REVISION 11/01/21	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	TWO-WAY LEFT-TURN LANES	INDEX 102-628	SHEET 3 of 3
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


TYPICAL PCMS DISPLAY:

During day of pacing operation:
 Message 1: ROAD WORK TONIGHT
 Message 2: EXPECT PERIODIC DELAYS

During pacing operation:
 Message 1: SLOW TRAFFIC AHEAD
 Message 2: BE PREPARED TO STOP

One week prior to pacing operation (Optional):
 Message 1: EXPECT DELAYS ON
 Message 2: (Month Day Time)

SYMBOLS:

-  Work Area
-  Portable Changeable Message Sign (PCMS)
-  Traffic Control Officer
-  Lane Identification and Direction of Traffic

NOTES:

1. P = Traffic Pacing Length
For "P" value, see Traffic Pacing Length table or calculate using Formulas.
2. See the Plans for traffic pacing restrictions.
3. Do not exceed work duration of 30 minutes or traffic pacing length of 10 miles.
4. Coordinate with the traffic control officer supervisor to provide the correct number of traffic control officers for each traffic pacing operation. Ensure traffic control officers are located at roadway access points in accordance with the pacing plan.
5. Ensure that the necessary equipment is properly positioned for the work before requesting that the traffic control officer supervisor initiate the traffic pacing operation.
6. If workers or equipment are within the traveled way during the traffic pacing operation, use a truck- or trailer-mounted attenuator with portable changeable message sign to protect the work.
7. For work durations of less than five minutes (e.g. moving large vehicles across the roadway), portable changeable message signs and truck-mounted attenuators are not required. Use traffic pacing length values from the five minute column of the table.
8. Where feasible, do not pace traffic past the last available existing egress until the work has been completed.
9. When more than one traffic pacing operation is required in a calendar day, allow sufficient time between pacing operations to permit traffic to return to normal speed and flow.
10. Maintain communications with all police vehicles throughout the traffic pacing.

TRAFFIC PACING LENGTH "P"						
Pacing Speed = 20 mph						
Work Zone Speed (mph)	Work Duration (minutes)					
	5	10	15	20	25	30
70	2.3	4.7	7.0	9.3	-	-
65	2.4	4.8	7.2	9.6	-	-
60	2.5	5.0	7.5	10.0	-	-
55	2.6	5.2	7.9	-	-	-
50	2.8	5.6	8.3	-	-	-

NOTES: (1) All lengths in the above table are in miles.
 (2) For work durations with no values shown above, calculate length using a reduced pacing speed, but not less than 10 mph.

FORMULAS:

S_w = Work Zone Speed (mph)
 S_p = Pacing Speed (mph)
 t_w = Work Duration (minutes)
 P = Traffic Pacing Length (miles)

$$P = \frac{t_w}{60} S_p \left(\frac{S_p}{S_w - S_p} + 1 \right)$$

$$P = P_c + P_w$$

P_c = distance paced vehicles must travel before the vehicles at regulatory speed have cleared the work zone

$$P_c = \left(\frac{t_w}{60} \times S_p^2 \right) / (S_w - S_p)$$

P_w = distance paced vehicles travel while work is performed





$$P_w = \left(\frac{t_w}{60} \times S_p \right)$$

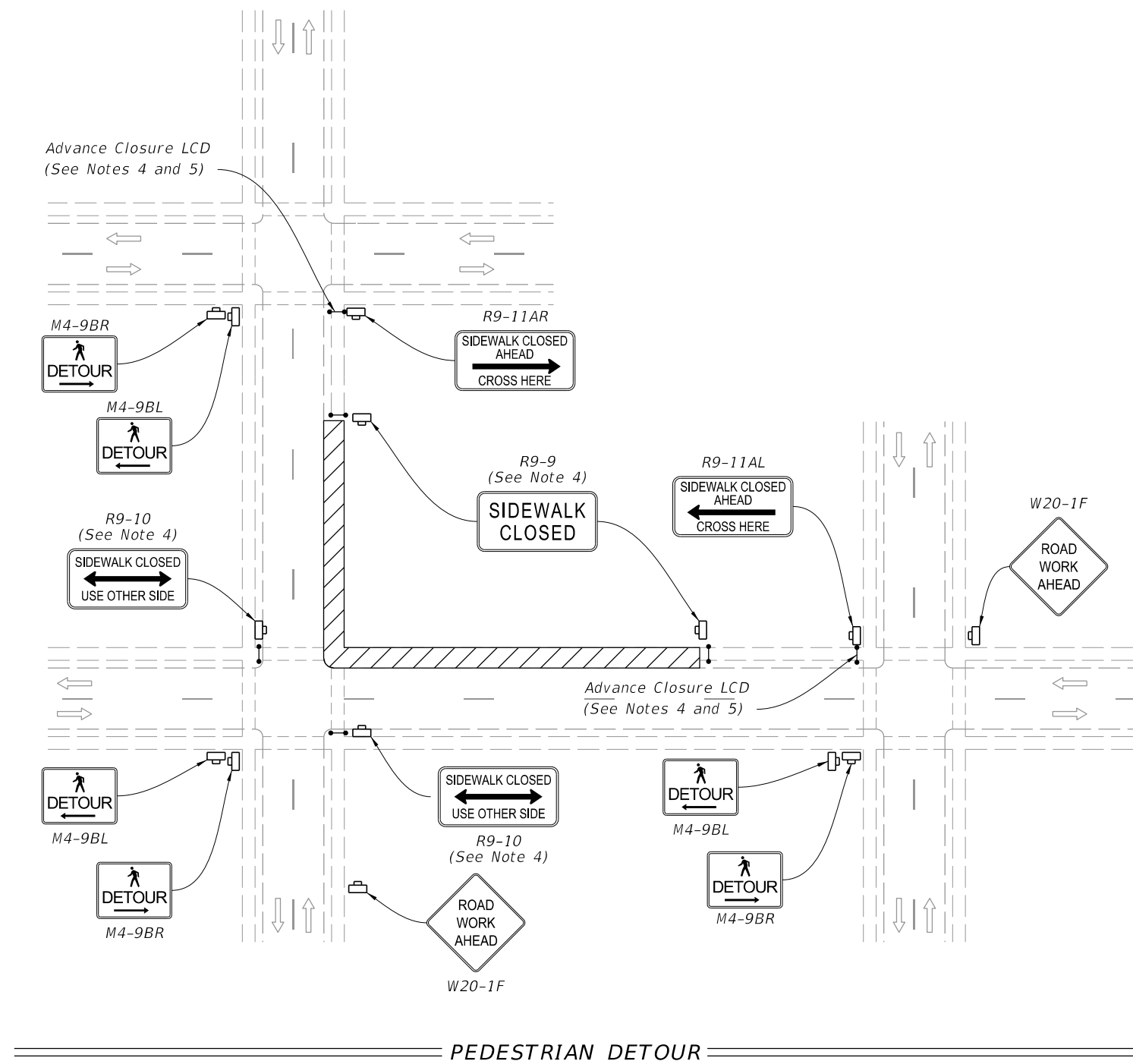
10/20/2022 8:45:50 AM

NOTES:


1. Cover or deactivate pedestrian traffic signal display(s) controlling closed crosswalks.
2. Place pedestrian LCDs across the full width of the closed sidewalk.
3. For post mounted signs located near or adjacent to a sidewalk, maintain a minimum 7' clearance from the bottom of the sign panel to the surface of the sidewalk.
4. "Sidewalk Closed" signs (R9-XX) may be mounted on pedestrian LCDs in accordance with the manufacturer's instructions.
5. Omit the Advance Closure LCD if it blocks access to other pedestrian facilities (e.g., transit stops, residences, or business entrances).

SYMBOLS:

-  Work Area
-  Work Zone Sign
-  Pedestrian Longitudinal Channelizing Device (LCD)
-  Lane Identification and Direction of Traffic



10/20/2022 8:45:50 AM









LAST REVISION 11/01/20	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	SIDEWALK CLOSURE	INDEX 102-660	SHEET 1 of 2
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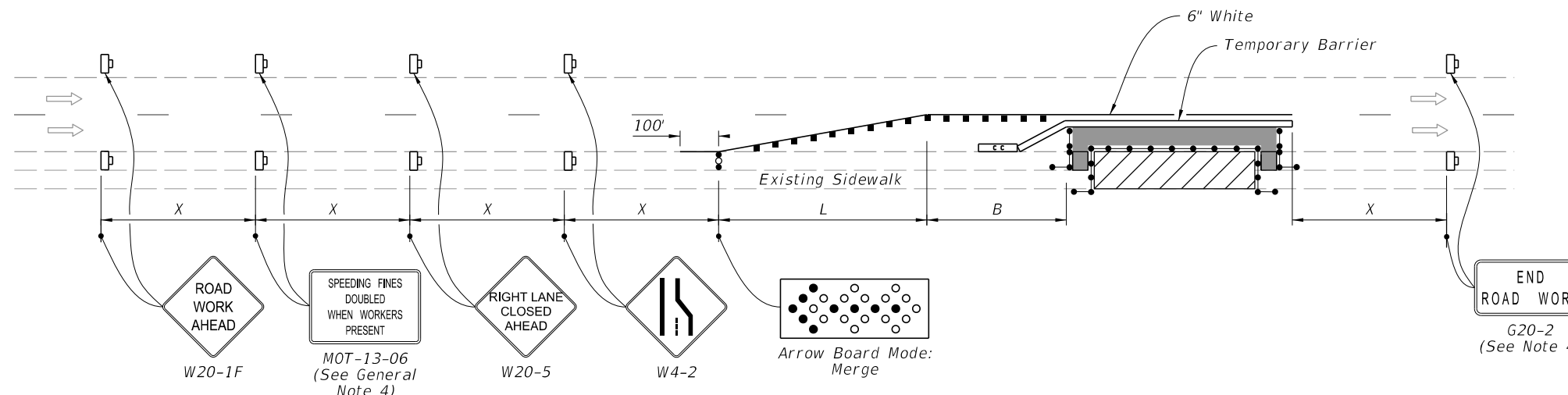
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NOTES:

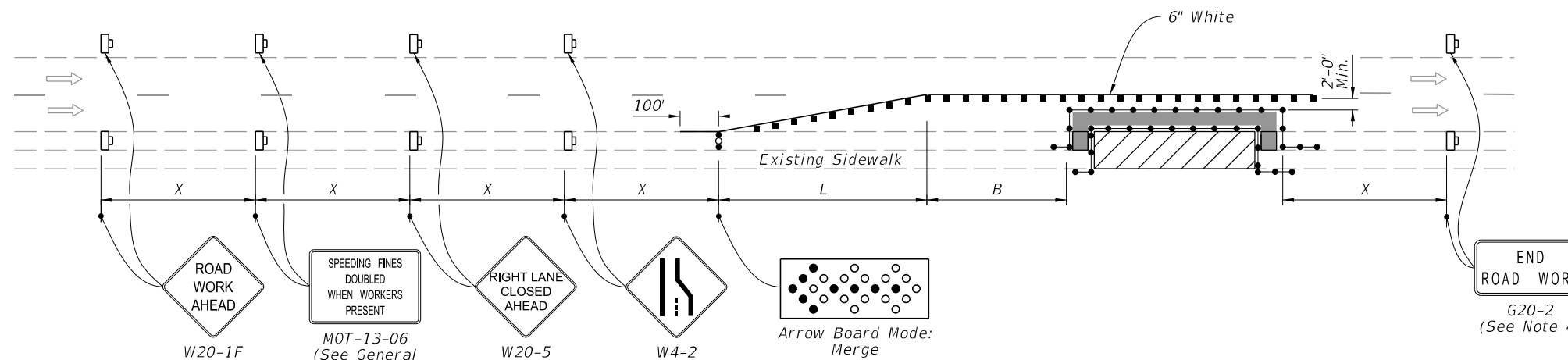
1. L = Taper Length
B = Buffer Length
X = Work Zone Sign Distance
See Index 102-600 for "L", "B", "X", channelizing device spacing values.
2. Provide a 5' wide temporary pedestrian way with a maximum cross-slope of 0.02, except where space restrictions warrant a minimum width of 4'. Provide a 5' x 5' passing space for temporary pedestrian ways less than 5' in width at intervals not to exceed 200'.
3. When temporary pedestrian ways require curb ramps, meet the requirements of Index 522-002. Detectable warnings are not required for curb ramps diverting pedestrian traffic into a closed lane.
4. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" signs (G20-2), along with associated work zone sign distances, may be omitted when the work operation will be in place for 24 hours or less.
5. Pedestrian Diversion Option 2 may only be used when called for in the Plans or as approved by an Engineer.

SYMBOLS:

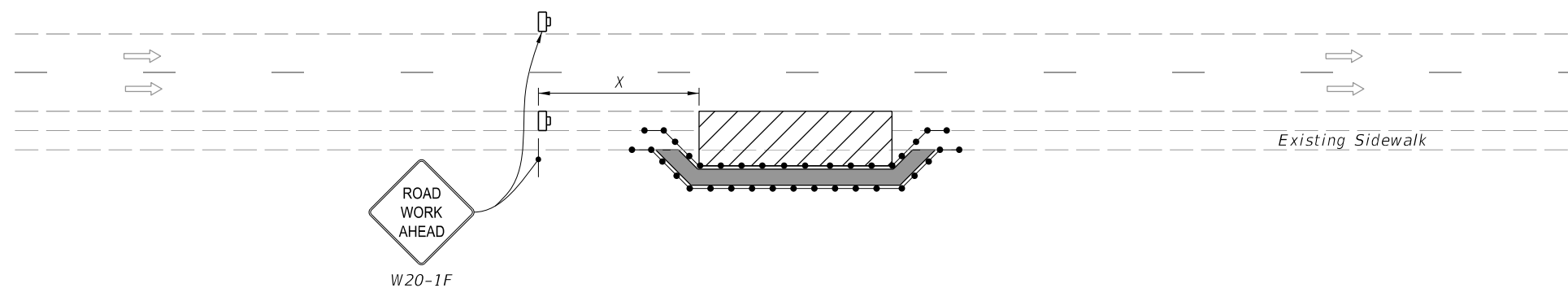
-  Work Area
-  Temporary Pedestrian Way
-  Channelizing Device (See Index 102-600)
-  Pedestrian Longitudinal Channelizing Device (LCD)
-  Work Zone Sign
-  Arrow Board
-  Crash Cushion
-  Lane Identification and Direction of Traffic



PEDESTRIAN DIVERSION - OPTION 1
(Temporary Barrier Shown, Low Profile Barrier Similar)

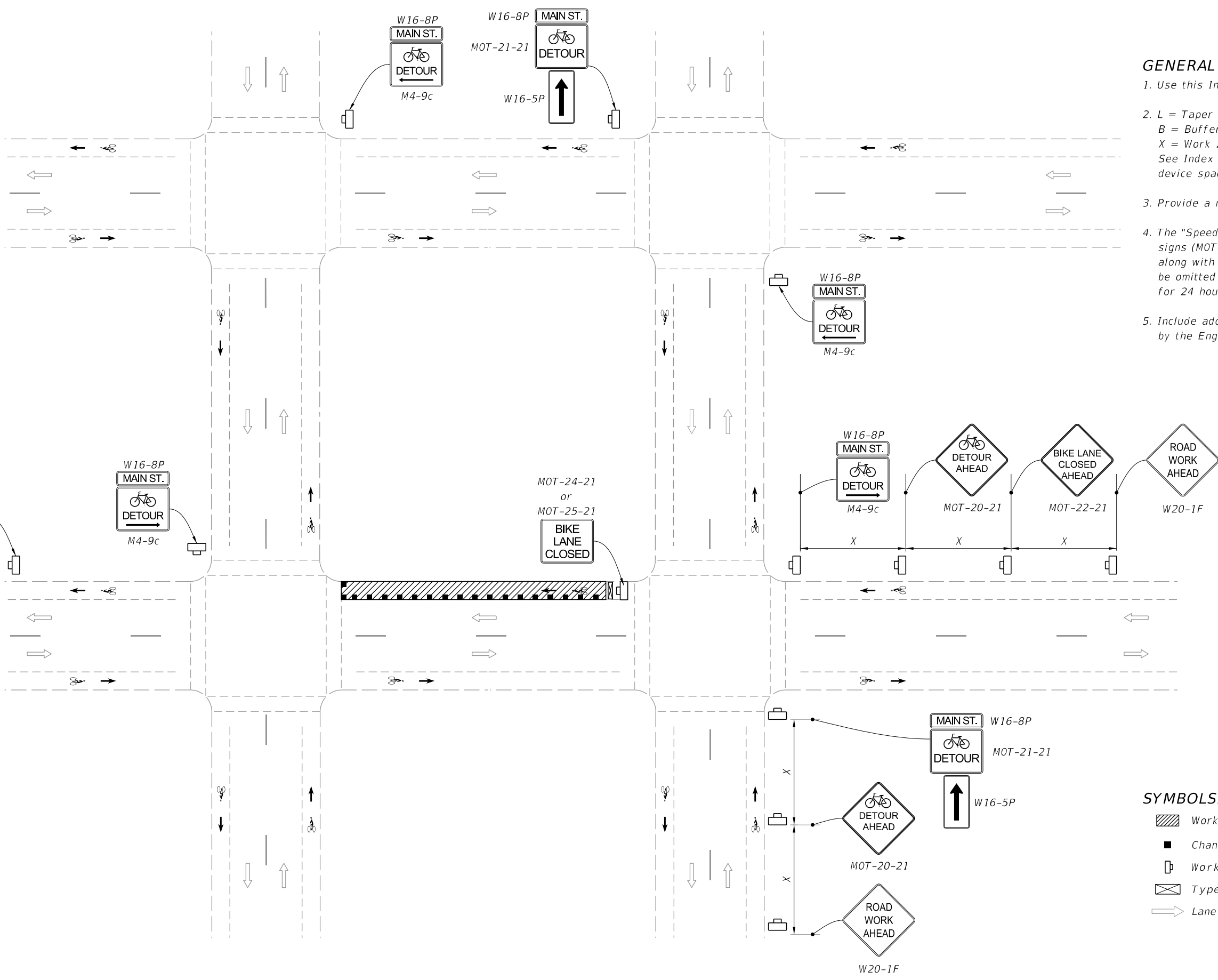


PEDESTRIAN DIVERSION - OPTION 2
(Work Zone Speed 35 mph or Less)



PEDESTRIAN SPECIAL DETOUR

10/20/2022 8:45:52 AM

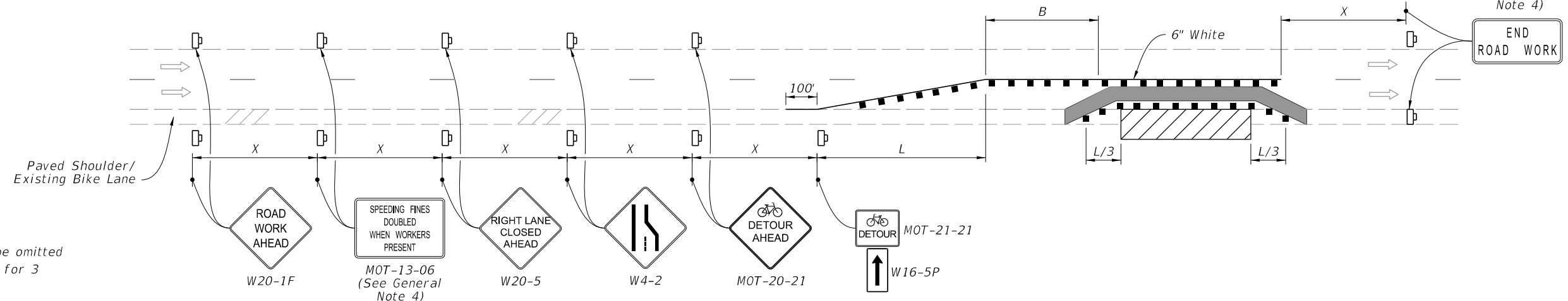


- GENERAL NOTES:**
1. Use this Index only when called for in the Plans.
 2. L = Taper Length
B = Buffer Length
X = Work Zone Sign Distance
See Index 102-600 for "L", "B", "X", channelizing device spacing values.
 3. Provide a minimum 5'-0" wide bicycle path.
 4. The "Speeding Fines Doubled When Workers Present" signs (MOT-13-06) and "End Road Work" signs (G20-2), along with associated work zone sign distances, may be omitted when the work operation will be in place for 24 hours or less.
 5. Include additional signage at intersections as required by the Engineer or shown in the Plans.

- SYMBOLS:**
- Work Area
 - Channelizing Device (See Index 102-600)
 - Work Zone Sign
 - Type III Barricade
 - Lane Identification and Direction of Traffic

=====**BICYCLE DETOUR**=====

G20-2
(See General Note 4)



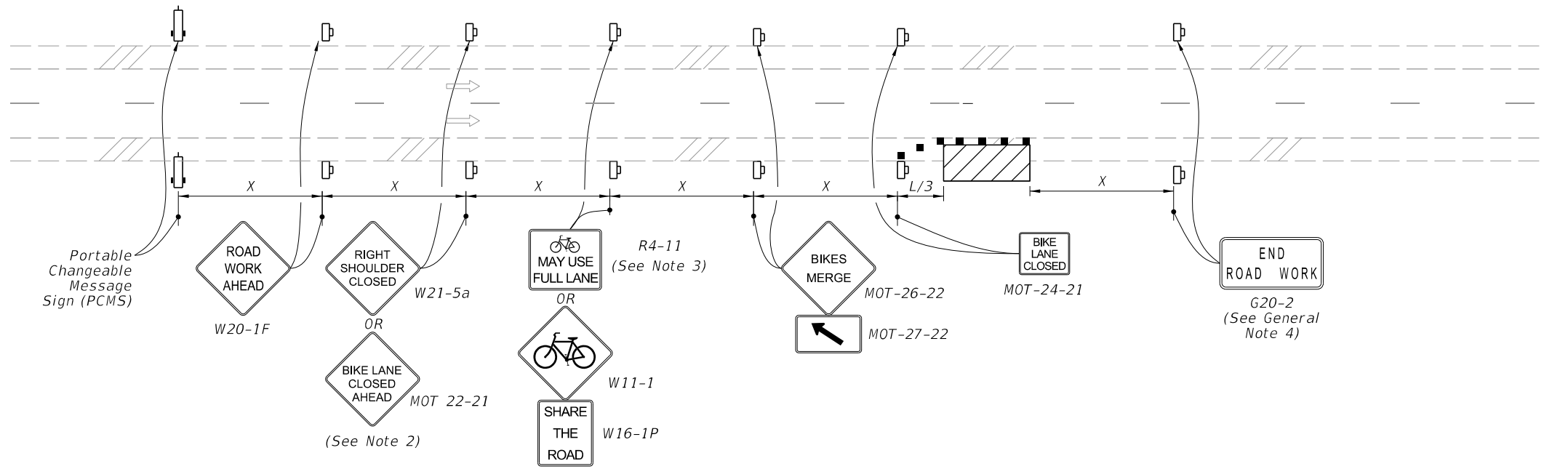
NOTES:

1. Temporary pavement markings may be omitted when the work operation is in place for 3 days or less.
2. If the Closed Bicycle Facility is a marked bicycle lane, use sign MOT 22-21 instead of sign W21-5a.
3. If the travel lane is less than 14' wide, use sign R4-11.

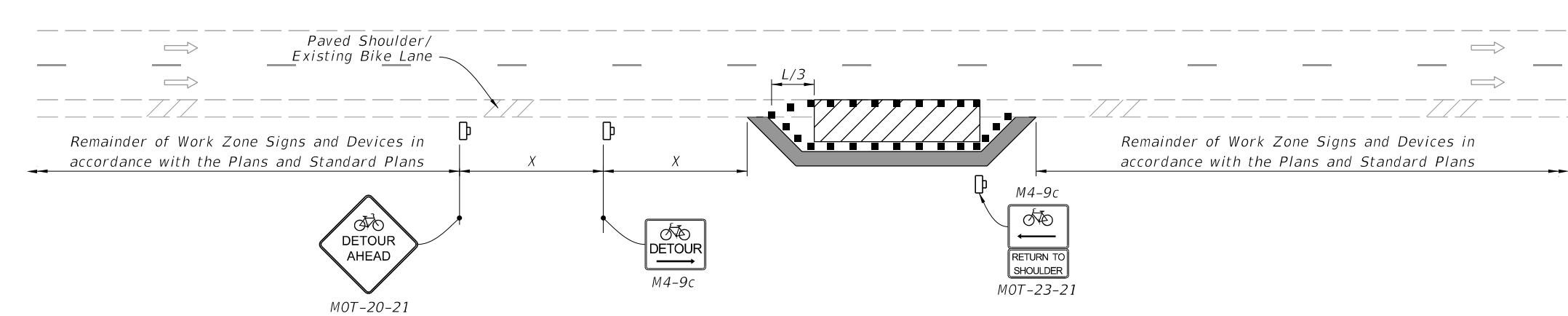
SYMBOLS:

- Work Area
- Temporary Bicycle Way
- Channelizing Device (See Index 102-600)
- Work Zone Sign
- Arrow Board
- Lane Identification and Direction of Traffic
- (1) PCMS=Portable Changeable (Variable) Message Sign

**BICYCLE FACILITY SHIFT
(With Lane Closure)**



**BICYCLE FACILITY SHIFT
(Work Zone Speed of 35 mph or Less)**



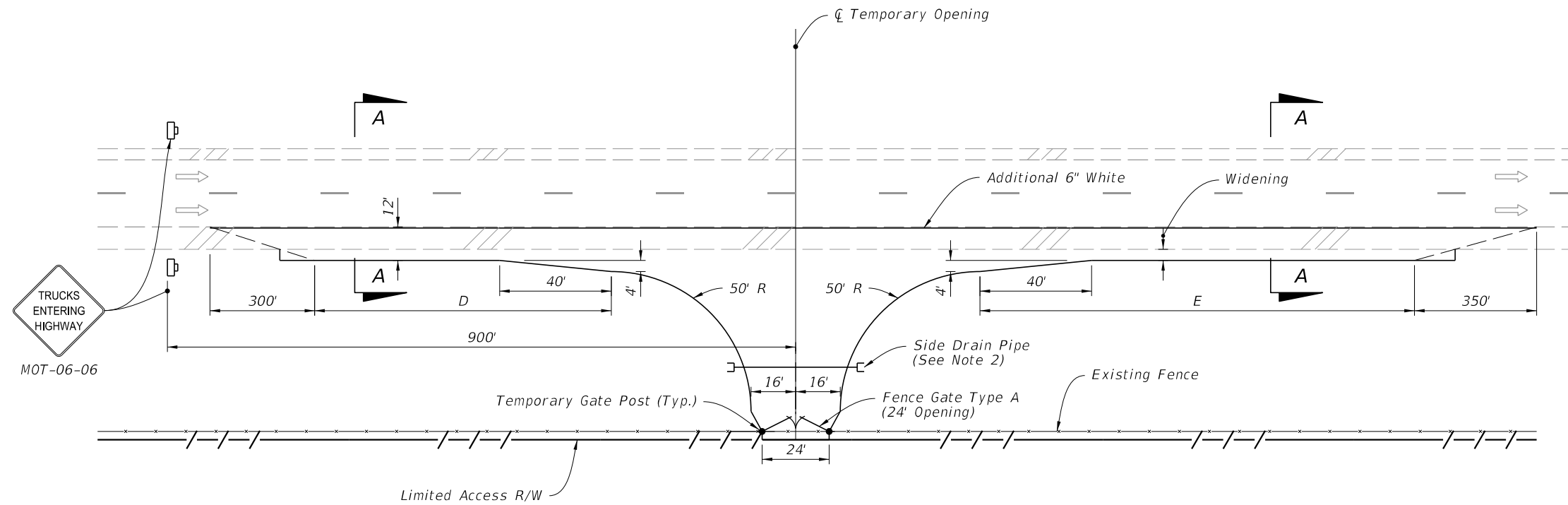
TYPICAL PCMS DISPLAY:

- Message 1: BIKE FACILITY CLOSED
- Message 2: BICYCLES ON ROAD

BICYCLE SPECIAL DETOUR

2/21/2023 11:05:19 AM

LAST REVISION 11/01/21	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	BICYCLE FACILITY CLOSURES	INDEX 102-661	SHEET 2 of 2
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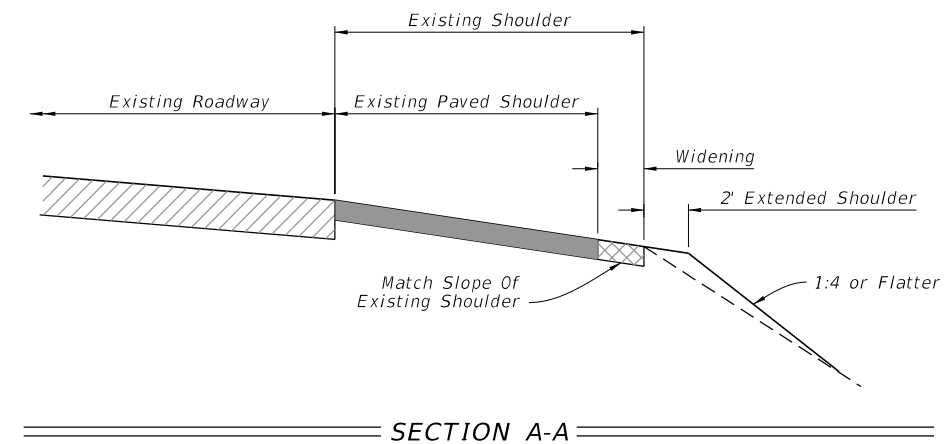
NOTES:

1. X = Work Zone Sign Distance, see Index 102-600 for "X" value.
2. Use mitered end sections for any end sections within the clear zone.
3. Match cross slope of existing shoulder for widening.
4. Provide 2' of unpaved shoulder outside of the widening.
5. No more than two (2) access openings will be allowed on each project.
6. Do not vary from the plan detail without approval of the Engineer.

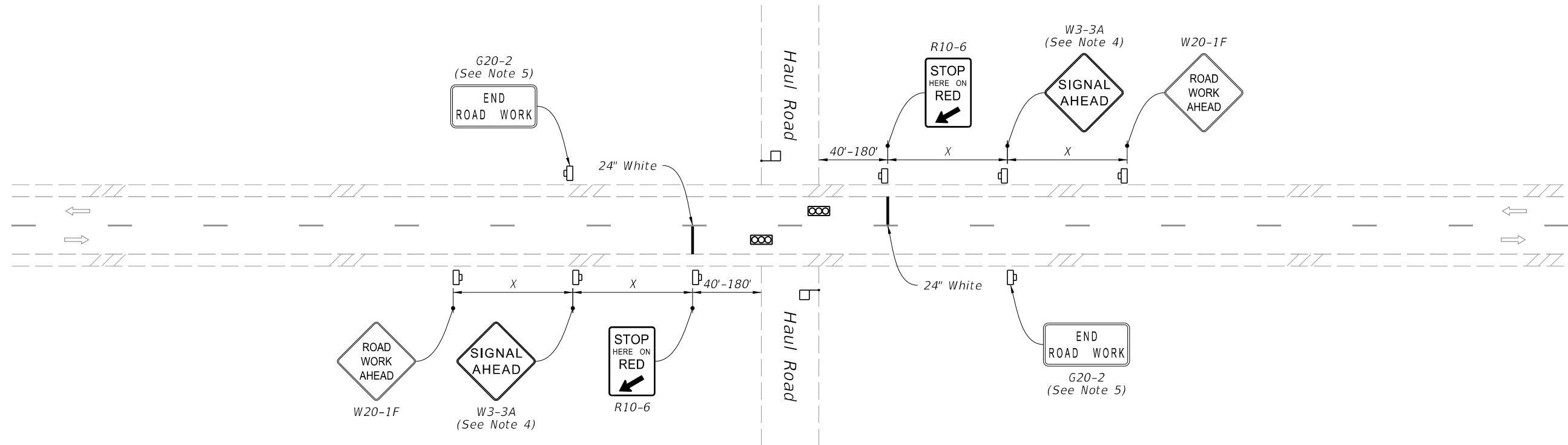
SYMBOLS:

- Work Zone Sign
- Lane Identification and Direction of Traffic

LENGTH OF ACCESS LANES		
Grade	D (feet)	E (feet)
2% or less	590	1540
3 to 4% Upgrade	530	2310
3 to 4% Downgrade	710	925



10/20/2022 8:45:53 AM



(Two-Lane Roadway Shown, Multilane Roadway Similar)

SYMBOLS:

-  Work Zone Sign
-  Temporary Traffic Signal
-  Flagger
-  Lane Identification and Direction of Traffic

NOTES:

1. This Index is intended for two-way and multilane roadways, excluding limited access facilities, with haul roads that intersect the roadway.
2. X=Work Zone Sign Distance, see Index 102-600 for "X" values.
3. Use Type III Barricades to block haul road access when the haul road is not in operation and a flagger/signal operator is not on duty, except when the haul road is an existing properly marked road.
4. Optionally, use "Signal Ahead" signs with symbols (W3-3) instead of "Signal Ahead" signs with text (W3-3A).
5. The "End Road Work" signs (G20-2) may be omitted when the work operation is in place for 24 hours or less.
6. Optionally, use temporary traffic signals for control of the haul road.

10/20/2022 8:45:53 AM


LAST REVISION 11/01/22	REVISION	DESCRIPTION:	 FY 2023-24 STANDARD PLANS	HAUL ROAD CROSSING	INDEX 102-680	SHEET 1 of 1
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TABLE 1 CHANNELIZING DEVICE SPACING				
Work Zone Speed (mph)	Maximum Spacing (feet)			
	Cones or Temporary Tubular Markers		Type I Barricades, Type II Barricades, Vertical Panels, or Drums	
	Taper	Tangent	Taper	Tangent
≤ 45	25	50	25	50
≥ 50	25	50	50	100

TABLE 2 TAPER LENGTH															
Work Zone Speed (mph)								Minimum Length (Feet)							
≤ 40								L = (WS ²)/60							
≥ 45								L = WS							
Example "L" Values															
S (mph)	W (Width of Offset in Feet)														
	4			5			8			10			12		
	L	L/2	L/3	L	L/2	L/3	L	L/2	L/3	L	L/2	L/3	L	L/2	L/3
25	42	21	14	52	26	17	83	42	28	104	52	35	125	63	42
30	60	30	20	75	38	25	120	60	40	150	75	50	180	90	60
35	82	41	27	102	51	34	163	82	54	204	102	68	245	123	82
40	107	53	36	133	67	44	213	107	71	267	133	89	320	160	107
45	180	90	60	225	113	75	360	180	120	450	225	150	540	270	180
50	200	100	67	250	125	83	400	200	133	500	250	167	600	300	200
55	220	110	73	275	138	92	440	220	147	550	275	183	660	330	220
60	240	120	80	300	150	100	480	240	160	600	300	200	720	360	240
65	260	130	87	325	163	108	520	260	173	650	325	217	780	390	260
70	280	140	93	350	175	117	560	280	187	700	350	233	840	420	280

NOTE: Unless otherwise shown: Use L for merging tapers
Use L/2 for shifting tapers
Use L/3 for shoulder tapers

TABLE 3 WORK ZONE SIGN SPACING "X"	
Road Type	Minimum Spacing (feet)
Arterials and Collectors with Work Zone Speed ≤ 40 mph	200
Arterials and Collectors with Work Zone Speed ≥ 45 mph	500
Limited Access Roadways (See Note)	1,500

NOTE:
For Limited access roadways with work zone speed ≤ 55 mph, the minimum spacing may be reduced in accordance with the MUTCD and as approved by the Engineer.

TABLE 4 BUFFER LENGTH "B"	
Work Zone Speed (mph)	Minimum Length (feet)
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

NOTE:
When Buffer Length "B" cannot be attained due to geometric constraints, use the greatest length possible, but not less than 155 feet.

TABLE 5 CLEAR ZONE WIDTHS FOR WORK ZONES		
Work Zone Speed (mph)	Travel Lanes & Multilane Ramps (feet)	Auxiliary Lanes & Single Lane Ramps (feet)
60-70	30	18
55	24	14
45-50	18	10
30-40	14	10
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB	4' BEHIND FACE OF CURB

NOTE:
For temporary conditions where existing curb has been removed but not reconstructed, curb and gutter values may be used.

TABLE 6 MINIMUM RADII FOR NORMAL CROWN	
Work Zone Posted Speed (mph)	Minimum Radius (feet)
70	4090
65	3130
60	2400
55	1840
50	1390
45	1080
40	820
35	610
30	430

Superelevate When Smaller Radii is Used

TABLE 7 POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS				
SIGN SHAPE	SIGN SIZE (inches)	NUMBER OF STEEL U CHANNEL POSTS	Notes For Table:	
Octagon	30x30	1	1. Use 3 lb/ft posts for Clear Height up to 10' and 4 lb/ft posts for Clear Height up to 12'.	
	36x36x36	1		
	48x48x48	1		
Triangle	60x60x60	2		
	24x18	1		2. Minimum foundation depth is 4.0' for 3 lb/ft posts and 4.5' for 4 lb/ft posts.
	24x30	1		
Rectangle (W x H)	30x24	1	3. For both 3 lb/ft and 4 lb/ft base or sign posts installed in rock, a minimum cumulative depth of 2' of rock layer is required.	
	36x18	1		
	36x24	1		
	48x18	1		
	48x24	1		
	36x48	2		
	48x30	2		
	48x36	2		
	54x36	2		
	48x60	3		
	72x48	3		
	Square	30x30		1
36x36		2		
48x48		2		
Diamond	48x48	2	5. For diamond warning signs with supplement plaque (up to 5 ft ² in area), use 4 lb/ft posts for up to 10 ft Clear Height (measure to the bottom of diamond warning sign).	
	48x48	2		
Circle	360	2		

TABLE 8 DROP-OFF PROTECTION REQUIREMENTS			
Condition	R (ft)	D (in.)	Device Required
1	0-12	> 3	Temporary Barrier
2	> 12-CZ	> 3 to ≤ 5	Channelizing Device
3	0-CZ	> 5	Temporary Barrier
4	Removal of Bridge or Retaining Wall Barrier		Temporary Barrier
5	Removal of portions of Bridge Deck		Temporary Barrier

9-26-21 AK

LAST REVISION
11/01/22



FY 2023-24
STANDARD PLANS

QUICK REFERENCE SHEET
102 SERIES TABLES

9-27-21 AK

LAST REVISION
11/01/22



FY 2023-24
STANDARD PLANS

QUICK REFERENCE SHEET
102 SERIES TABLES