OHIO DEPARTMENT OF TRANSPORTATION

CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223

JOHN KASICH, GOVERNOR • JERRY WRAY, DIRECTOR

July 17th, 2012

Mark R. Kehrli, Director
Federal Highway Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Mr. Kehrli:

In accordance with MUTCD Section 1A.10, the Ohio Department of Transportation requests permission to experiment with a warning sign depicting a Single Lane Crossover symbol.

Nature of the Problem:

Single Lane Crossovers, sometimes referred to as a contra flow lane scenario, are a commonly used method of Temporary Traffic Control; however there currently is no pictorial warning sign that is applicable for use. This method of TTC, depicted in the attached Plan Insert Sheets, poses changes to the flow of traffic that necessitate the design of a warning sign specific to its components.

PIS 209572, Median Crossover of Passing Lane Short Distance
PIS 209573, Median Crossover of Express Lane Long Distance

Description of the Proposed Change:

ODOT proposes the addition of a new sign WX-X "Single Lane Crossover." The sign design was developed from a mixture of components of the now deleted W9-3a "Center Lane Closed" sign, the W1-4b sign, and the W6-1 sign.

The Single Lane Crossover sign uses the lane shift arrow from the W1-4bL sign to illustrate the wide lane shifting movement that occurs in the crossover lane in this TTC setup. This arrow represents a wider lane shift than arrows in other sign designs (W6-2, W9-3a, etc.) and provides a visual warning to the road user of the impending shift.

The "median" in the sign design comes from an altered version of the median in the W6-1 sign. The W6-1 median's height was increased by 50% and its width was decreased by 25%. This creates a more slender, elongated figure which is a better representation of the barrier that would separate the crossover lane from its origin.

There is currently no sign or Typical Application that depicts this scenario. A combination of the addition of the new sign, together with improvements to the TTC strategies used in PIS' 209572 and 209573, creates a safer environment for road users by better conveying the geometric changes to the traffic flow.

The new sign would be deployed in place of the W9-3a sign in the attached Plan Insert Sheets (209572 and 209573).

Illustration:

Attached to this submission is a proposed Sign Design Manual sheet of the Single Lane Crossover sign, together with the existing sheets for W9-3a, W6-1, and W4-1b.

Legal Statement:

The Ohio Department of Transportation agrees that the concept of this traffic control device is not protected by a patent or copyright.

Experiment Locations and Time Frame:

ODOT proposes that every current project that uses this method of TTC be fitted with this sign as per the attached PIS's (note that the attached PIS's have the new sign replacing the W9-3a, while the linked drawings above do not). As such, no comparison can be made between projects that have the sign and projects that do not. ODOT feels that the implementation of this sign is an overall safety benefit, and as such does not want to have projects without the new sign design on the road.

The projects listed below will be a part of the experiment:

PID	County – Route – Log
89029	Allen – IR75 – 0.21
77474	Medina – IR76 – 7.61
25869	Ashtabula – IR90 – 22.06
25508	Mahoning – IR680 – 4.29
77885	Stark – IR77 – 0.00
76411*	Trumble – IR80 – 4.70
18710	Summit – IR271 – 2.33
85540	Licking – IR70 – 13.37
76191	Franklin – IR270 – 2.60
86916	Morrow – IR71 – 12.19
86921*	Delaware – IR71 – 11.5
86067	Franklin – IR270 – 36.94
84664	Clark – IR70 – 13.98
77248	Montgomery – IR75 – 6.36
85367	Montgomery – US35 – 19.59
82316	Miami – IR75 – 16.20
83583	Shelby – IR75 – 3.72
82278	Hamilton – IR75 – 5.58
76257	Hamilton – IR75 – 2.30
75479	Lake – IR90 – 13.10
77419	Cuyahoga – IR77 – 9.50
84013	Belmont – IR70 – 17.52

* Design build project that might use Single Lane Crossover

The signs will be manufactured by ODOT's sign shop located at 1606 West Broad Street, Columbus Ohio, 43223. They will then be distributed to the above listed projects and installed at the time that the contraflow lane is installed (or immediately, if the lane is already installed).

Evaluation plan:

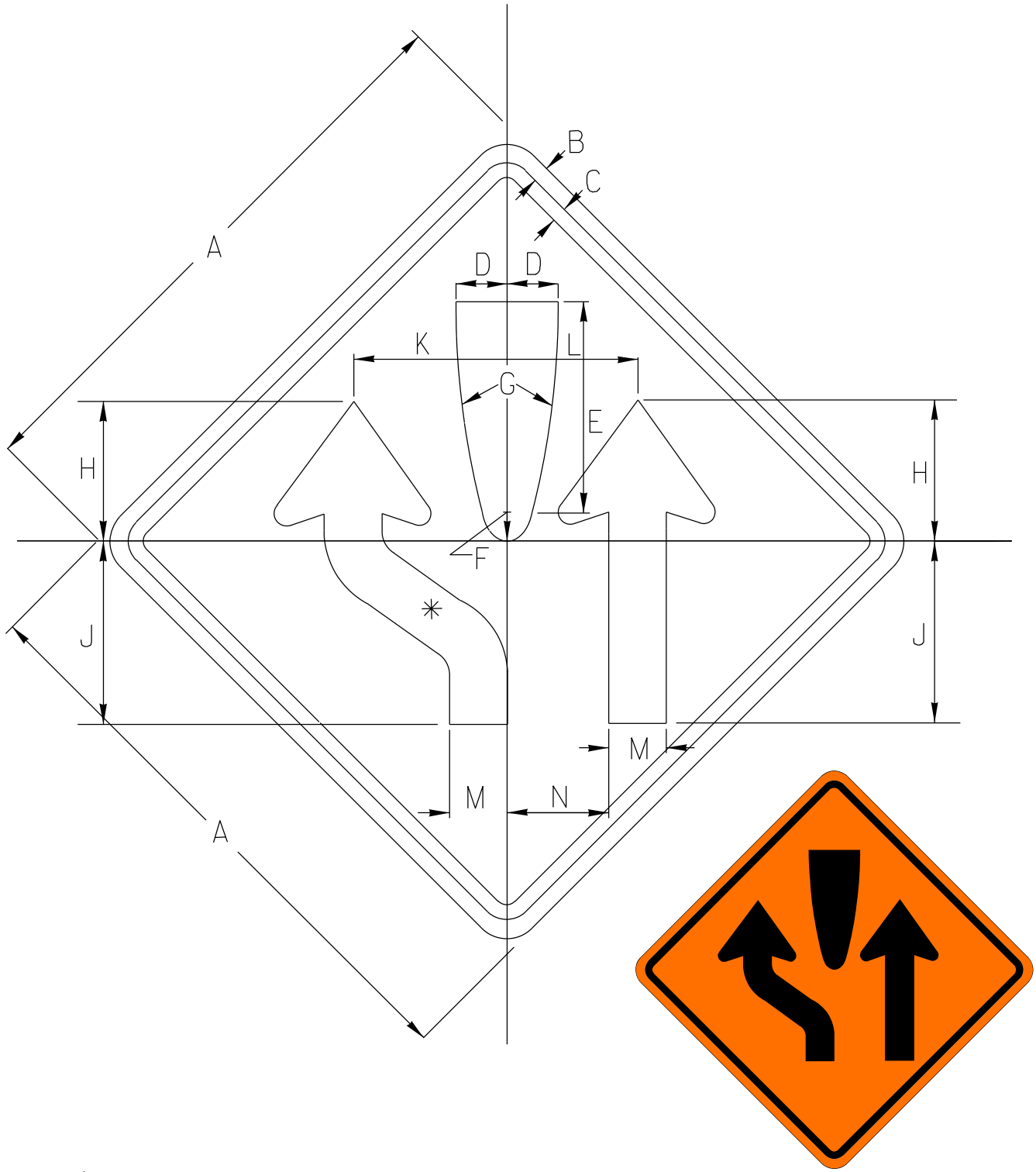
Following the installation of the proposed sign, engineers from Central Office shall visit the construction projects to observe the sign's impact on road user comprehension of the TTC setup. Project engineers will be asked to keep track of sign performance and driver comprehension and relay concerns to Central Office via email. Crash reports corresponding to the work zone will be queried when made available by the Department of Public Safety, specifically accidents that occur at the diverge point of the crossover. The data from these reports will be analyzed to determine any outstanding safety issues with the setup.

ODOT will provide semi-annual progress reports for the duration of the experiment to FHWA. It is proposed that the experiment end after the 2013 summer construction season, on October 15th. Following the experiment's completion, a final report will be submitted to FHWA within 3 months.

Respectfully,

Jerry Wray, Director
Ohio Department of Transportation

JW:mho

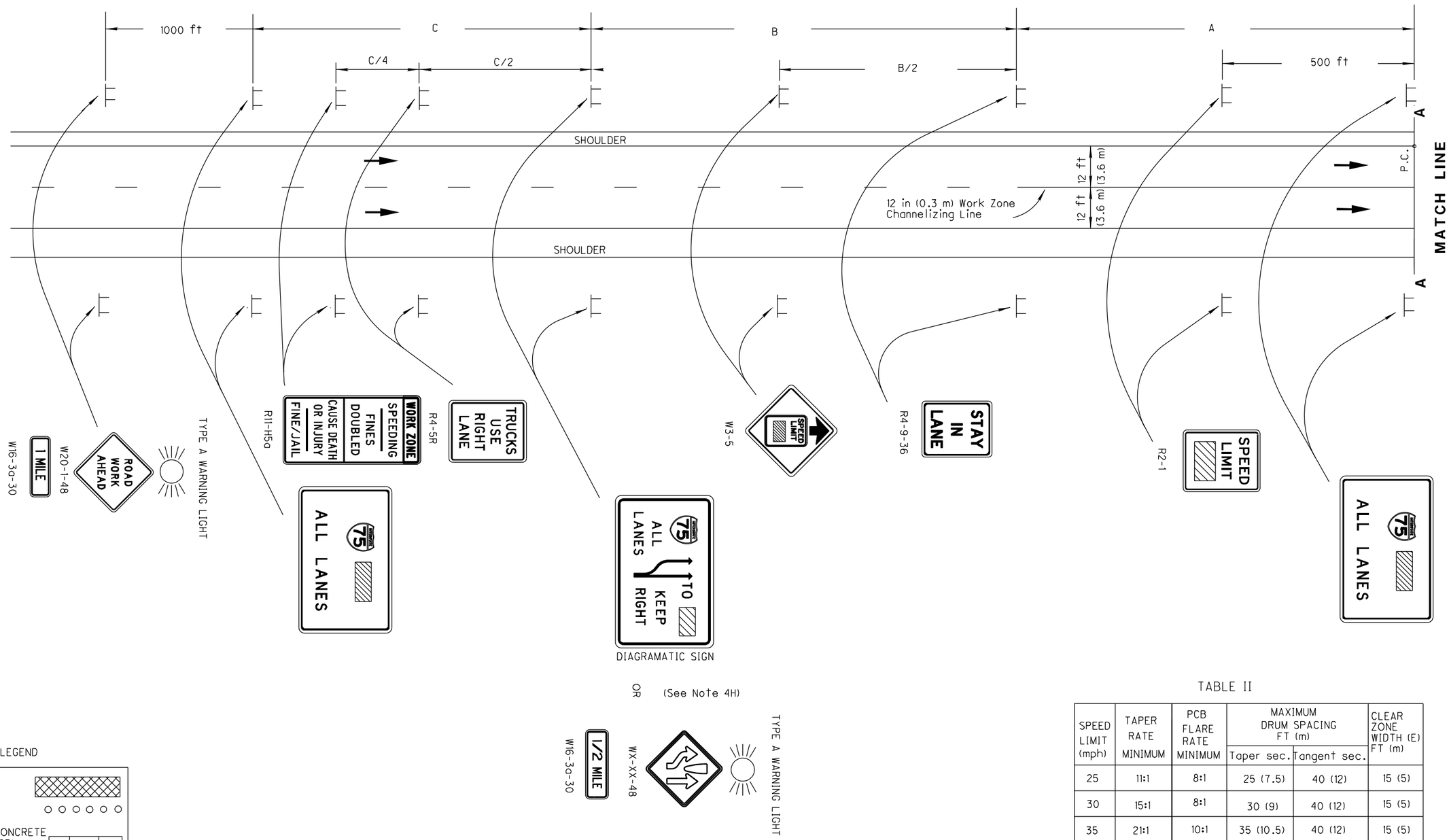


*Reduce W1-4 Arrow 30%
For Standard Arrow details see Appendix A.

ALL DIMENSIONS IN INCHES												
A	B	C	D	E	F	G	H	J	K	L	M	N
48	0.75	1.25	3.937	19.687	2.953	44.227	10.246	15.37	12.326	8	4.16	5.92

PIS 209572

WITH EXPERIMENTAL SIGN



LEGEND

- WORK AREA
- DRUMS
- PORTABLE CONCRETE BARRIER (PCB)
- PCB WITH GLARE SCREEN
- TAPERED END
- ATTENUATOR
- PCB "Y" CONNECTING SEGMENT
- REMOVE EXISTING MARKINGS
- DIRECTION OF TRAVEL

TABLE I (SIGN SPACING)

ROAD TYPE	DISTANCE BETWEEN SIGNS FT(m)		
	A	B	C
FREEWAY & EXPRESSWAY	1000 (300)	1500 (450)	2640 (800)

TABLE II

SPEED LIMIT (mph)	TAPER RATE MINIMUM	PCB FLARE RATE MINIMUM	MAXIMUM DRUM SPACING FT (m)		CLEAR ZONE WIDTH (E) FT (m)
			Taper sec.	Tangent sec.	
25	11:1	8:1	25 (7.5)	40 (12)	15 (5)
30	15:1	8:1	30 (9)	40 (12)	15 (5)
35	21:1	10:1	35 (10.5)	40 (12)	15 (5)
40	27:1	11:1	40 (12)	80 (24)	15 (5)
45	45:1	13:1	45 (13.5)	80 (24)	19 (6)
50	50:1	14:1	50 (15)	80 (24)	19 (6)
55	55:1	16:1	55 (16.5)	80 (24)	23 (7)
60	60:1	17:1	60 (18)	120 (36)	30 (9)
65	65:1	19:1	65 (19.5)	120 (36)	30 (9)

OFFICE OF TRAFFIC ENGINEERING

DESIGNED | REVIEWED

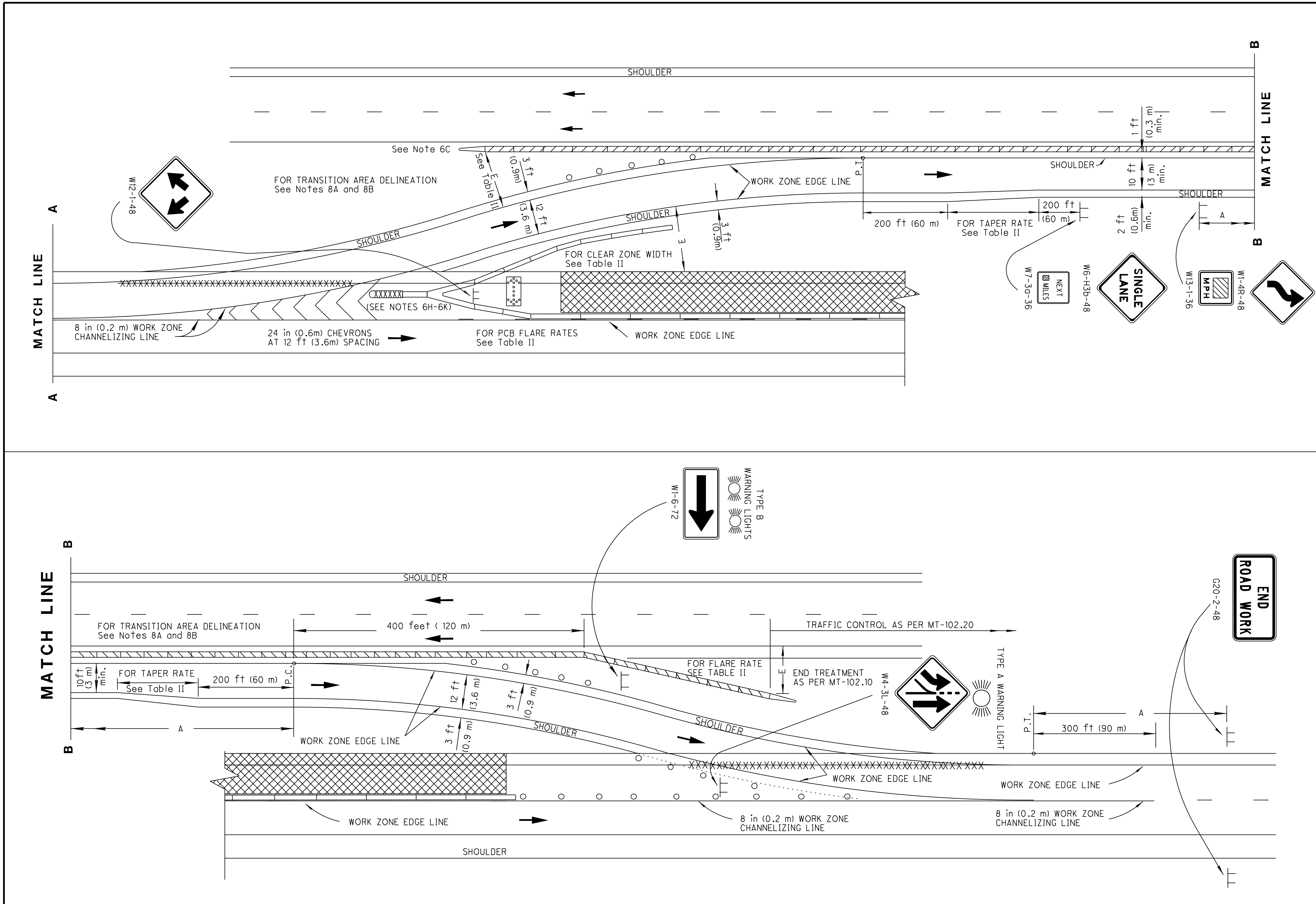
REVISION DATE PROPOSAL | CHECKED

PIS NUMBER 209572

PLAN INSERT SHEET

MEDIAN CROSSOVER OF PASSING LANE SHORT DISTANCE

1 / 3



OFFICE OF TRAFFIC ENGINEERING

DESIGNED | REVIEWED

REVISION DATE: PROPOSAL | CHECKED

PIS NUMBER: 209572

PLAN INSERT SHEET

MEDIAN CROSSOVER OF PASSING LANE SHORT DISTANCE

2 / 3

GENERAL NOTES:

GENERAL

1A. This Standard Construction Drawing presents information which is applicable to crossover design. Additional information, applicable to Maintenance of Traffic on multilane highways can be found on the MT-95.30 and MT-95.40 series drawings, on MT-95.50 and on the MT-102 series drawings.

1B. Standard Construction Drawing MT-101.70 shall be used with this drawing.

DESIGN SPEED

2. The design speed used for taper rates should typically be the permanent legal speed. However, on construction projects for which the speed limit is reduced, the reduced speed may be used in determining the taper rate when the taper is not the first active construction area within the project.

TAPERS

3. The minimum acceptable length of taper shall be determined by multiplying the width of offset by the taper rate. The taper rate is provided in Table II.

SIGNING

4A. The advisory speed plaque (W13-1) shall be used when specified in the plans.

4B. The spacing between work zone signs, as shown in Table I, are minimums. Maximum spacing should not be greater than 1.5 times the distances shown in Table I.

4C. Sign spacing should be adjusted to avoid conflict with existing signs. Minimum spacing to existing signs shall be 200 feet (60m) for speeds of 45 mph or less and a minimum of 400 feet (120m) for speeds 50 mph or greater.

4D. Sign locations should be adjusted to provide adequate sight distance for the existing vertical and horizontal roadway alignment.

4E. If the tangent distance along the temporary diversion is less than 2000 feet (600 m), place the second Reverse Curve (W1-4) sign at the mid-point of the tangent.

4F. If the tangent distance along the temporary diversion is 600 feet (180 m) or less, then the double Reverse Curve sign (W24-1) may be used in place of the first Reverse Curve sign, eliminating the need for the second Reverse Curve sign.

4G. The W6-H3b sign shall be provided along directional single-lane roadways over 3 miles (4.8 km). Spacing of the W6-H3b shall be at approximatly 1 mile (1.6 km).

4H. A diagramatic sign shall be provided when detailed in the plan. Otherwise a W9-3a sign assembly shall be provided.

4J. The ALL LANES signs and the Diagramatic sign shall have white legends on a green background, similar to the E6-2 series sign and the E4-H1 sign. However these signs shall be flat sheet signs on sign posts. The size of the signs shall be as specified in the plans.

4K. Signing for exit ramps located within the limits of the crossover lane should be as shown in the plan. Signing shall specify which exits are not accessable from the crossover lane.

4L. Additional information shall be provided in the form of fixed signs and/or changeable message boards as called for in the plans.

4M. Sign spacing on major conventional highways shall be as called for in Table I for freeway & expressway spacing unless otherwise determined by the Engineer.

PAVEMENT MARKING

5A. The existing conflicting pavement markings and reflectors from the raised pavement markers shall be removed and the appropriate color work zone edge lines shall be applied.

5B. Work zone edge lines shall be provided along the tangent section when called for in the plans.

5C. Work zone pavement markings which would conflict with the final traffic lanes shall be removable (CMS 740.06 Type I) tape unless the area will be resurfaced prior to project completion.

5D. After completion of the work, pavement markings other than CMS 740.06, Type I shall be removed in accordance with CMS 614.11I. The original markings and raised pavement marker reflectors shall be restored at no additional cost unless separately itemized in the plans.

5E. Edge lines shall be of the appropriate color for the direction of travel. If the temporary edge lines are located on the same alignment as existing lines, the temporary lines may be painted over top of the existing lines (with subsequent over painting if necessary during the life of the work stage to maintain day and night color) if other than on the final surface. If on the final surface, all marking shall be removable tape as per 5C above.

5F. A 12 inch (0.3 m) channelizing line shall be provided in between the crossover lane and the through lane in advance of the "exit" gore, as shown on sheet 1 of 3. All other channelizing lines shown on this drawing shall be of standard 8 inch (0.2 m) width.

5G. If the intended location of the beginning of the channelizing line, as called for in the detail, is on a curve, then the beginning of the channelizing line should be relocated upstream a distance of 500 feet (150 m).

5H. If the beginning of the channelizing line would be located near an exit ramp, then the beginning of the channelizing line shall be relocated upstream a distance of 1000 feet in advance of the beginning of the exit ramp deceleration lane.

PORTABLE CONCRETE BARRIER

6A. The portable concrete barrier (PCB) near the exiting crossover, shall extend straight on the permanent roadway to 400 feet (120 m) beyond the PC of the crossover. The PCB shall then be flared at the rate specified in Table II.

6B. The PCB shall be 32 inches (813 mm), fitted with glare screen, or may be 50 inches (1270 mm) high if NCHRP 350 compliant.

6C. PCB end treatment shall be by impact attenuator if located within the clear zone of approaching traffic.

6D. PCB end treatment may be by tapered ends if located beyond the clear zone of approaching traffic.

6E. When used, impact attenuators shall be installed parallel to traffic. The last full section of PCB, adjacent to the impact attenuator shall be located parallel to traffic. For installation procedures, refer to manufacturer's installation instructions.

6F. No reflectors or other channelizing devices shall be permitted on the face of the PCB facing the exiting crossover, from PC to end of barrier.

6G. Where portable concrete barrier (PCB) is provided at the gore, the impact attenuators shall be installed parallel to mainline traffic.

6H. Where the impact attenuator is intended to apply to two barriers within the gore, one from the through lane and one from the crossover, the two barriers shall be joined to form one unit using a PCB "Y" connecting segment. For the "Y" details, see Roadway Plan Insert Sheet "Portable Concrete Barrier 'Y' Connector Segment".

PCB cont.

Contractors may choose to install a wide impact attenuator in lieu of utlizing the concrete "Y" segment. For example, a wide impact attenuator at a minimum of 48 inches (1200 mm) wide and rated for the design speed of the roadway could be installed in place of the aforementioned (1) work zone impact attenuator (2) PCB "Y" connector segment and (3) one standard PCB section. However, if contractors use this connection method, the wider impact attenuator must still be crashworthy in accordance with NCHRP Report 350, or MASH-08 and installed as per manufacturer's instructions.

The contractor shall repair or replace a damaged unit within 24 hours of a damaging impact.

6J. Where a PCB "Y" connecting segment is provided, one standard section of PCB shall be provided between the "Y" connecting segment and the impact atenuator.

6K. Connection of the Impact attenuator to the PCB shall be by positive connection. Appropriate crashworthy transitions between the impact attenuator and the first PCB shall be installed.

6L. Where PCB is located beyond the edge of the paved shoulder, the cross slope within the clear zone, including the surface on which the PCB is placed, shall be graded at 10:1 or flatter. If the cross slope is steeper than 10:1, the PCB shall be terminated on the paved shoulder. The PCB shall be extended along the paved shoulder as necessary to satisfy the length of need, and then terminated using an impact attenuator.

6M. For installation procedures for the PCB and for the impact attenuator, refer to manufacturers' installation instructions.

6N. For details on delineation of Portable Concrete Barrier, see Standard Construction Drawing MT-101.70.

6O. PCB shall also be provided along the crossover where the work is within the clear zone of the crossover. The PCB within the gore, along the right side of the crossover lane should be flared as per Table II, with the upstream end of the PCB placed adjacent to the mainline PCB.

DRUMS

7A. Drums along the crossover curves shall be spaced at 20 feet (6 m) center-to-center.

7B. Drums used to close off a crossover shall be spaced at 10 feet (3 m) center-to-center.

7C. All other drum spacing shall be as per Table II.

7D. Drums located along the crossover ramps should be placed on the aggregate shoulder as much as possible in order to maximize the width of pavement open to traffic.

TRANSITION AREA DELINEATION

8A. Transition area delineation shall be provided, as called for in Standard Construction Drawing MT-99.30, or as otherwise called for in the plans.

8B. Additionally, RPMs at 20 feet (6 m) spacing shall be provided beside the channelizing line located between the crossover lane and the through lanes.

LIGHTING

9. Work zone lighting shall be provided as per Standard Construction Drawing MT-100.00.

GEOMETIRCS

10. Geometrics of the crossover shall be as called for in the plans.

EXISTING LONGITUDINAL RUMBLE STRIPS

11. Existing longitudinal rumble strips, located within the alignment of the crossover, shall be eliminated by pavement planing and resurfacing.

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DESIGNED | REVIEWED

REVISION DATE: PROPOSAL | CHECKED

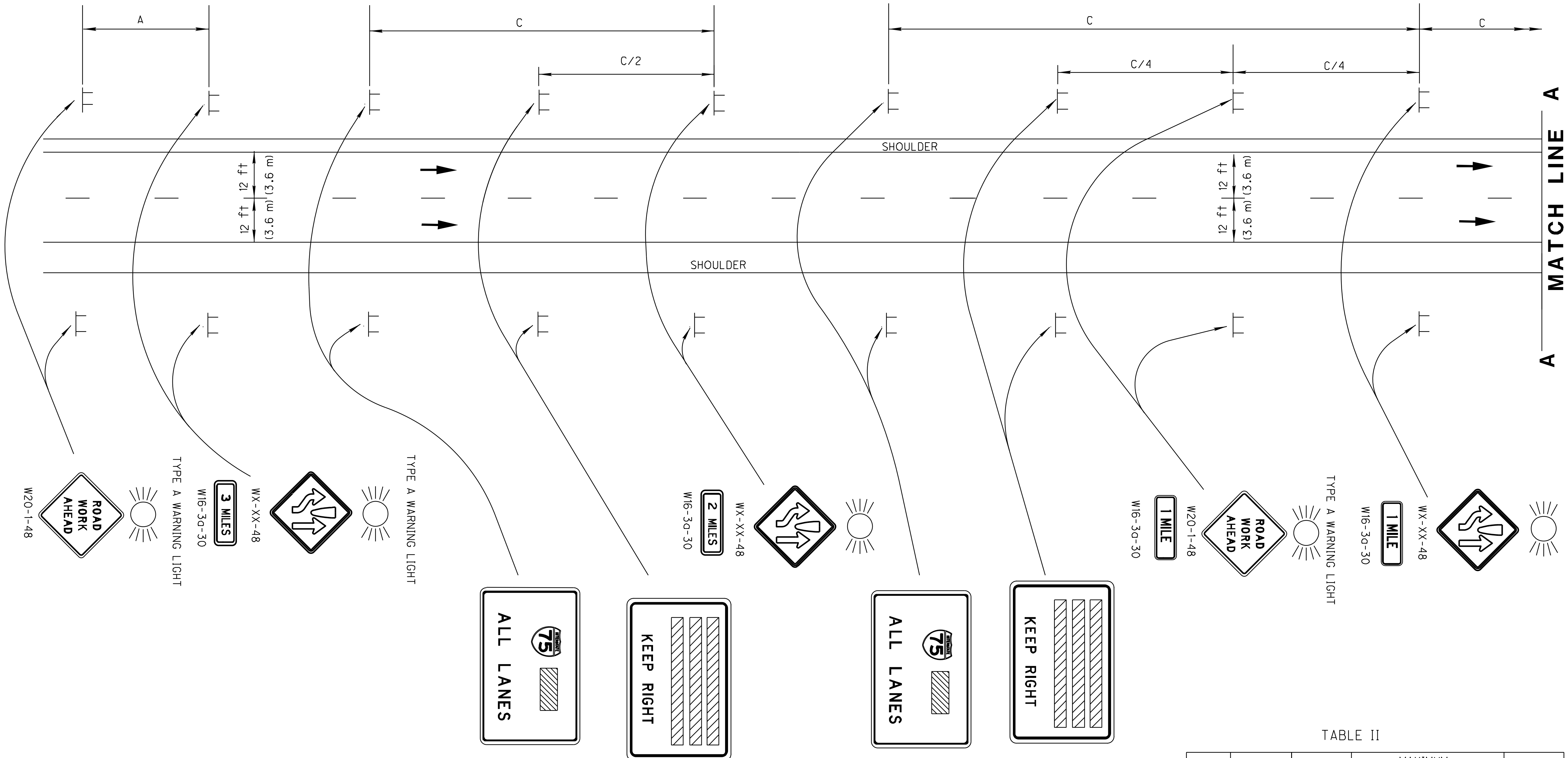
PID NUMBER: 209572

PLAN INSERT SHEET

MEDIAN CROSSOVER OF PASSING LANE SHORT DISTANCE

PIS 209573

WITH EXPERIMENTAL SIGN



LEGEND

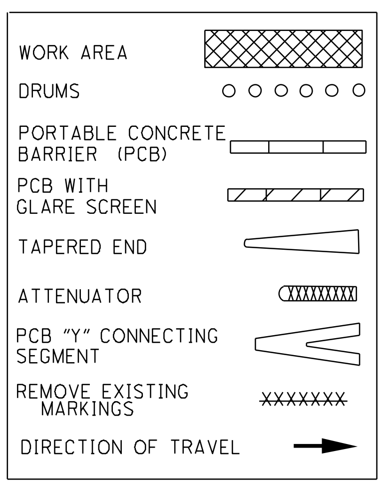


TABLE I (SIGN SPACING)

ROAD TYPE	DISTANCE BETWEEN SIGNS FT(m)		
	A	B	C
FREEWAY & EXPRESSWAY	1000 (300)	1500 (450)	2640 (800)

TABLE II

SPEED LIMIT (mph)	TAPER RATE MINIMUM	PCB FLARE RATE MINIMUM	MAXIMUM DRUM SPACING FT (m)		CLEAR ZONE WIDTH (E) FT (m)
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30	15:1	8:1	30 (9)	40 (12)	15 (5)
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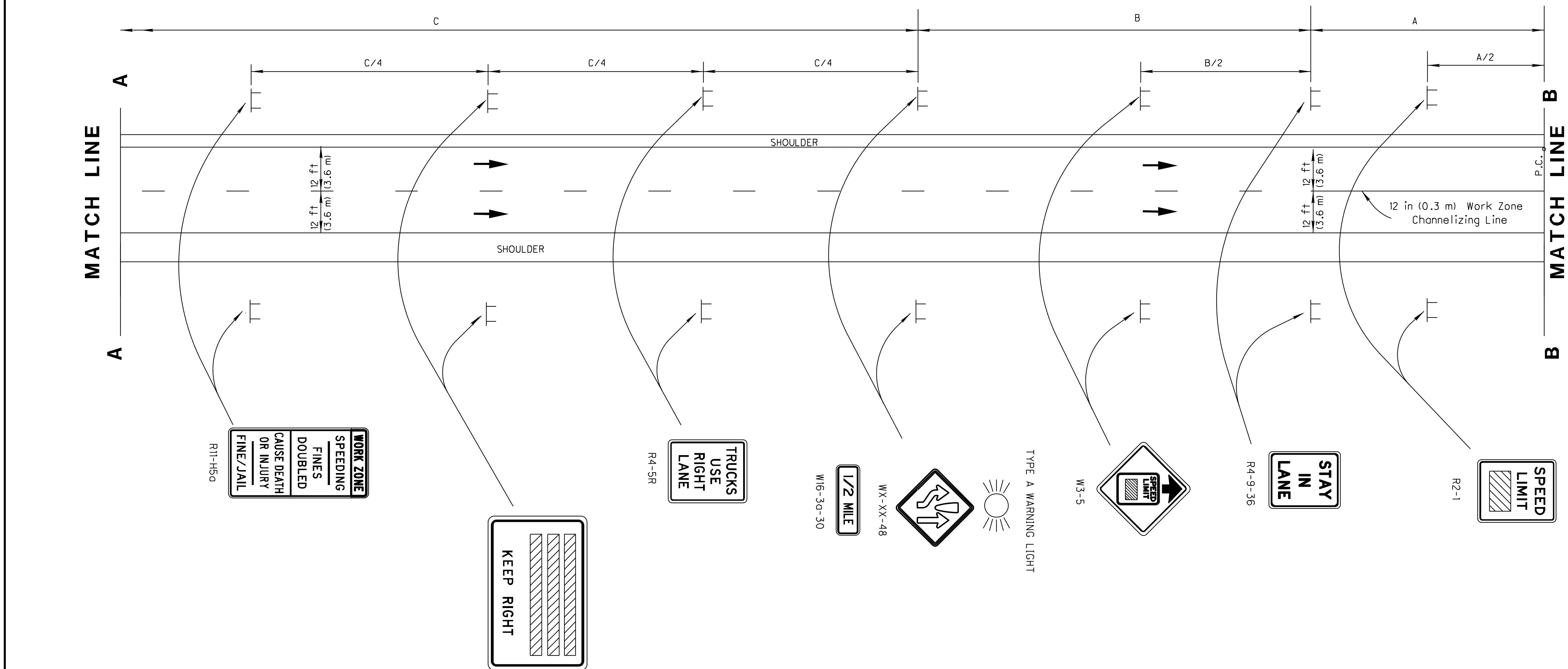
REVISION DATE PROPOSAL | CHECKED

PIS NUMBER 209573

PLAN INSERT SHEET

MEDIAN CROSSOVER OF EXPRESS LANE LONG DISTANCE

1/4



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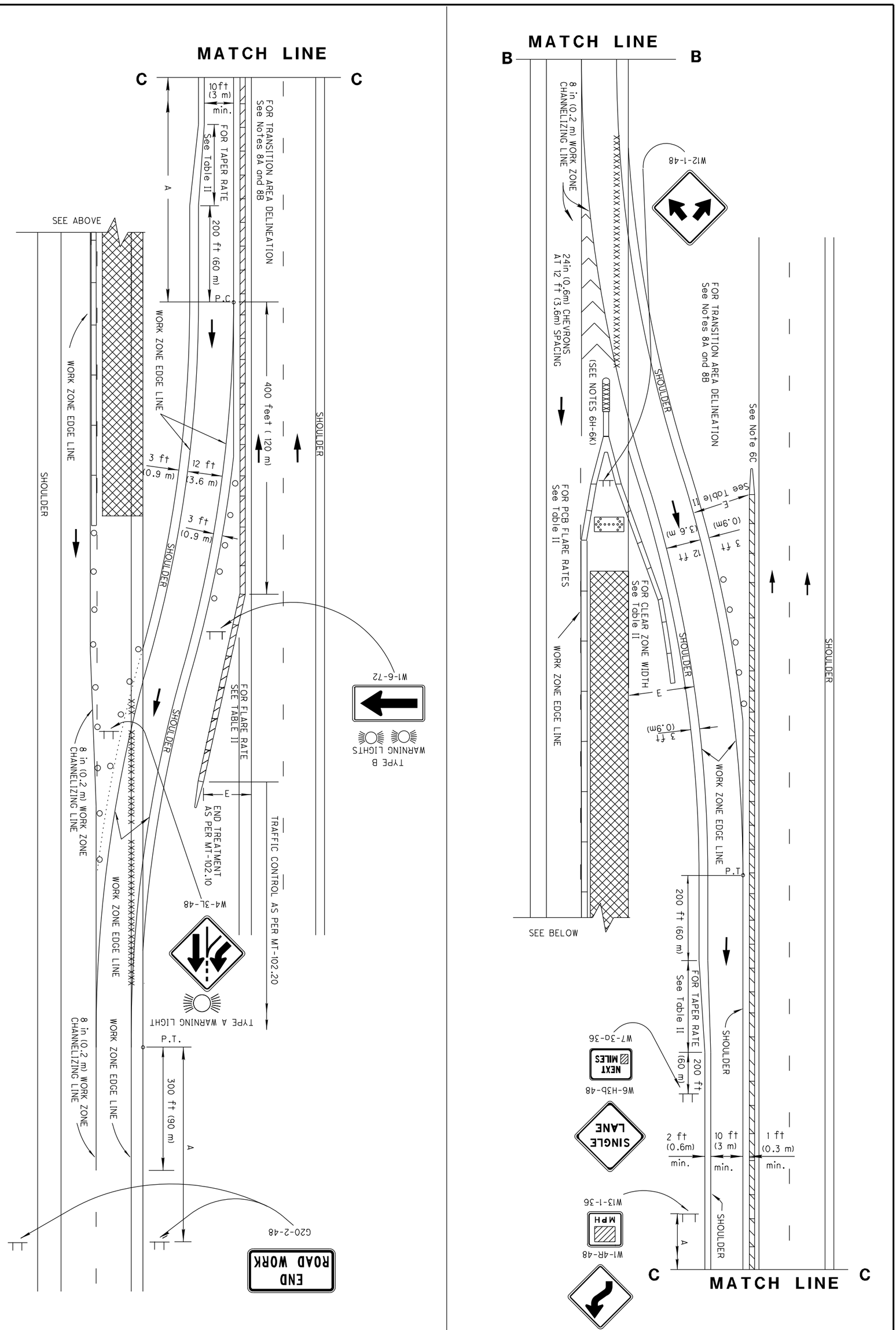
DESIGNED | REVIEWED

REVISION DATE PROPOSAL | CHECKED

PIS NUMBER 209573

PLAN INSERT SHEET

MEDIAN CROSSOVER OF EXPRESS LANE LONG DISTANCE



3/4	PLAN INSERT SHEET **MEDIAN CROSSOVER OF EXPRESS LANE** **LONG DISTANCE**	PIS NUMBER 209573	REVISION DATE PROPOSAL CHECKED	DESIGNED REVIEWED	OFFICE OF TRAFFIC ENGINEERING	

GENERAL NOTES:

GENERAL

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2. The design speed used for taper rates should typically be the permanent legal speed. However, on construction projects for which the speed limit is reduced, the reduced speed may be used in determining the taper rate when the taper is not the first active construction area within the project.

TAPERS

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4D. Sign locations should be adjusted to provide adequate sight distance for the existing vertical and horizontal roadway alignment.

4E. If the tangent distance along the temporary diversion is less than 2000 feet (600 m), place the second Reverse Curve (W1-4) sign at the mid-point of the tangent.

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4G. The W6-H3b sign shall be provided along directional single-lane roadways over 3 miles (4.8 km). Spacing of the W6-H3b shall be at approximatly 1 mile (1.6 km).

4H. Diagramatic guide signs and interchange guide signs shall be provided as detailed in the plans.

4J. The guide signs shall have white legends on green background, similar to the D2 and E6 series signs and the E4-H1 sign. However, these signs shall be flat sheet signs on sign posts. The size of the signs shall be as specified in the plans.

4K. Signing for exit ramps located within the limits of the crossover lane should be as shown in the plan. Signing shall specify which exits are not accessable from the crossover lane.

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PAVEMENT MARKING

5A. The existing conflicting pavement markings and reflectors from the raised pavement markers shall be removed and the appropriate color work zone edge lines shall be applied.

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5D. After completion of the work, pavement markings other than CMS 740.06, Type I shall be removed in accordance with CMS 614.11I. The original markings and raised pavement marker reflectors shall be restored at no additional cost unless separately itemized in the plans.

5E. Edge lines shall be of the appropriate color for the direction of travel. If the temporary edge lines are located on the same alignment as existing lines, the temporary lines may be painted over top of the existing lines (with subsequent over painting if necessary during the life of the work stage to maintain day and night color) if other than on the final surface. If on the final surface, all marking shall be removable tape as per 5C above.

5F. A 12 inch (0.3 m) channelizing line shall be provided in between the crossover lane and the through lane in advance of the "exit" gore, as shown on sheet 2 of 4. All other channelizing lines shown on this drawing shall be of standard 8 inch (0.2 m) width.

5G. If the intended location of the beginning of the channelizing line, as called for in the detail, is on a curve, then the beginning of the channelizing line should be relocated upstream a distance of 500 feet (150 m).

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6C. PCB end treatment shall be by impact attenuator if located within the clear zone of approaching traffic.

6D. PCB end treatment may be by tapered ends if located beyond the clear zone of approaching traffic.

6E. When used, impact attenuators shall be installed parallel to traffic. The last full section of PCB, adjacent to the impact attenuator shall be located parallel to traffic. For installation procedures, refer to manufacturer's installation instructions.

6F. No reflectors or other channelizing devices shall be permitted on the face of the PCB facing the exiting crossover, from PC to end of barrier.

6G. Where portable concrete barrier (PCB) is provided at the gore, the impact attenuators shall be installed parallel to mainline traffic.

6H. Where the impact attenuator is intended to apply to two barriers within the gore, one from the through lane and one from the crossover, the two barriers shall be joined to form one unit using a PCB "Y" connecting segment. For the "Y" details, see Roadway Plan Insert Sheet "Portable Concrete Barrier 'Y' Connector Segment".

PCB cont.

Contractors may choose to install a wide impact attenuator in lieu of utlizing the concrete "Y" segment. For example, a wide impact attenuator at a minimum of 48 inches (1200 mm) wide and rated for the design speed of the roadway could be installed in place of the aforementioned (1) work zone impact attenuator (2) PCB "Y" connector segment and (3) one standard PCB section. However, if contractors use this connection method, the wider impact attenuator must still be crashworthy in accordance with NCHRP Report 350, or MASH-08 and installed as per manufacturer's instructions.

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6M. For installation procedures for the PCB and for the impact attenuator, refer to manufacturers' installation instructions.

6N. For details on delineation of Portable Concrete Barrier, see Standard Construction Drawing MT-101.70.

6O. PCB shall also be provided along the crossover where the work is within the clear zone of the crossover. The PCB within the gore, along the right side of the crossover lane should be flared as per Table II, with the upstream end of the PCB placed adjacent to the mainline PCB.

DRUMS

7A. Drums along the crossover curves shall be spaced at 20 feet (6 m) center-to-center.

7B. Drums used to close off a crossover shall be spaced at 10 feet (3 m) center-to-center.

7C. All other drum spacing shall be as per Table II.

7D. Drums located along the crossover ramps should be placed on the aggregate shoulder as much as possible in order to maximize the width of pavement open to traffic.

TRANSITION AREA DELINEATION

8A. Transition area delineation shall be provided, as called for in Standard Construction Drawing MT-99.30, or as otherwise called for in the plans.

8B. Additionally, RPMs at 20 feet (6 m) spacing shall be provided beside the channelizing line located between the crossover lane and the through lanes.

LIGHTING

9. Work zone lighting shall be provided as per Standard Construction Drawing MT-100.00.

GEOMETIRCS

10. Geometrics of the crossover shall be as called for in the plans.

EXISTING LONGITUDINAL RUMBLE STRIPS

11. Existing longitudinal rumble strips, located within the alignment of the crossover, shall be eliminated by pavement planing and resurfacing.

OFFICE OF TRAFFIC ENGINEERING

DESIGNED | REVIEWED

REVISION DATE: PROPOSAL | CHECKED

PID NUMBER 209573

PLAN INSERT SHEET

MEDIAN CROSSOVER OF EXPRESS LANE LONG DISTANCE