



CUY-90-14.90

PID 77332/85531

APPENDIX EX-85

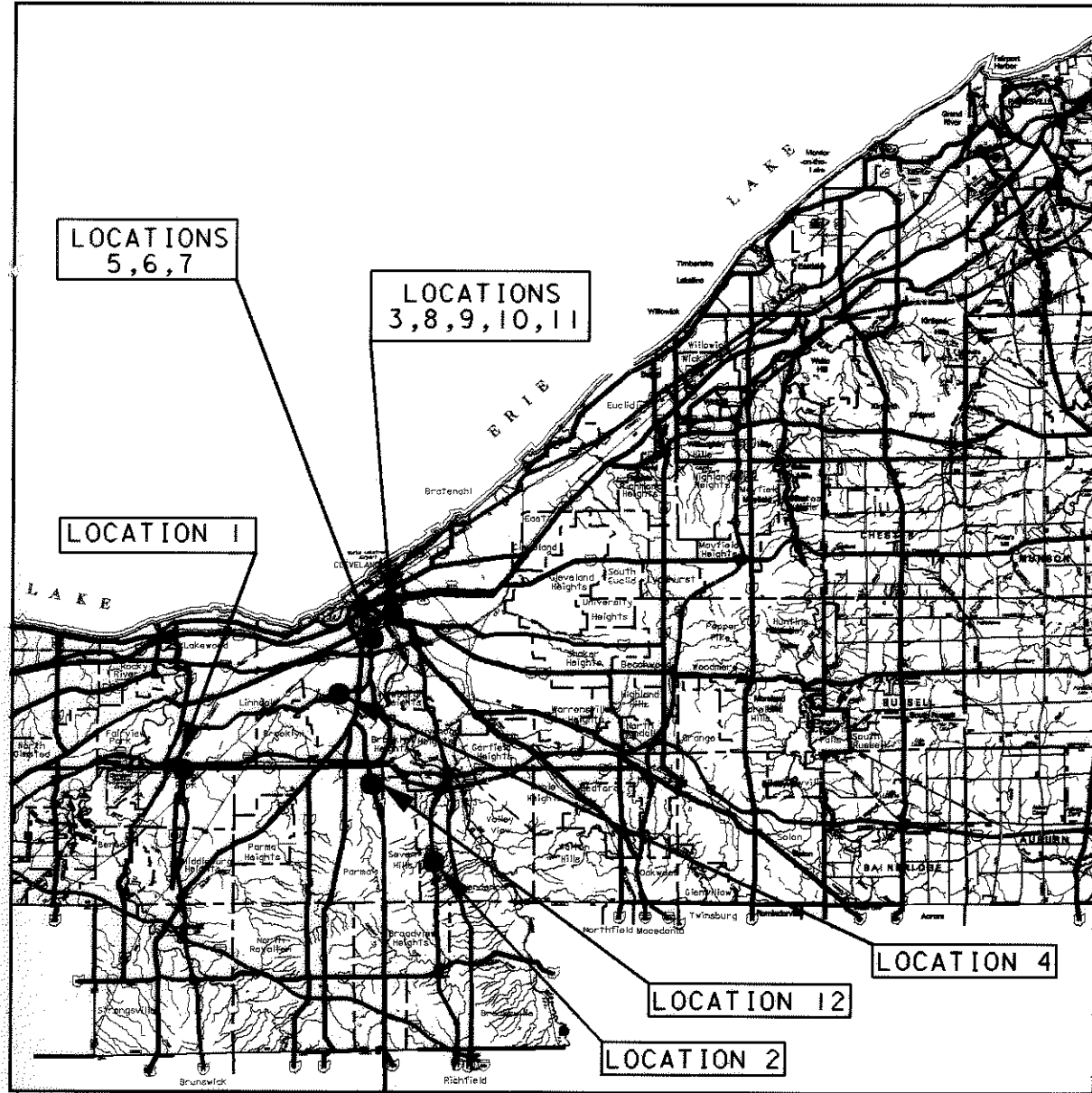
**BH-FY2004 WS/VAR PID 75203
(Reference Document)**

State of Ohio
Department of Transportation
Jolene M. Molitoris, Director

**Innerbelt Bridge
Construction Contract Group 1 (CCG1)**

OHIO DEPARTMENT OF TRANSPORTATION

D12 - BH-FY2004 WS/Various Sections
 040236 PID - 75203
 Dist 12 4/7/2004



LOCATION	BRIDGE NO.	STRUCTURAL FILE NO.	CITY,VILLAGE, OR TOWNSHIP
1	CUY-480R-0856ES	1804472	BROOK PARK/CLEVELAND
2	CUY-77-0645R	1806211	INDEPENDENCE
3	CUY-77-1575	1806904	CLEVELAND
4	CUY-90-1391	1807854	CLEVELAND
5	CUY-90-1490R	1807625	CLEVELAND
6	CUY-90-1490L	1809342	CLEVELAND
7	CUY-90-1506WB	1807684	CLEVELAND
8	CUY-90-1628L	1807498	CLEVELAND
9	CUY-90-1640WB	1807773	CLEVELAND
10	CUY-77R-1597L	1807919	CLEVELAND
11	CUY-90-1651L	1817900	CLEVELAND
12	CUY-176-0931	1810057	PARMA

D12 - BH - FY2004 WS

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PROJECT DESCRIPTION

Wearing surface replacements, patching

2002 SPECIFICATIONS

The standard specifications of the State of Ohio, Department of Transportation, including changes and supplemental specifications listed in the proposal shall govern this improvement.

I hereby approve these plans and declare that the making of this improvement will not require the closing to traffic of the highway and that provisions for the maintenance and safety will be as set forth on plans and estimates.

LATITUDE: N41°22'12"

LONGITUDE: W81°39'06"

STANDARD CONSTRUCTION DRAWINGS				SUPPLEMENTAL SPECIFICATIONS	
MT-35.10	4/20/01			848	2/08/02
MT-95.30	4/19/02	MT-105.10	10/18/02	954	9/9/97
MT-95.31	4/19/02	MT-105.11	10/18/02	832	2/12/03
MT-95.32	4/19/02	TC-41.10	1/19/01	833	2/12/03
MT-98.12	4/19/02	TC-41.20	1/19/01		
MT-98.13	4/19/02	TC-52.10	4/20/01		
MT-98.14	4/19/02	TC-52.20	4/20/01	SPECIAL PROVISIONS	
MT-98.15	4/19/02	TC-65.10	10/19/01		
MT-98.16	4/19/02	TC-65.11	10/19/01		
MT-98.19	10/18/02	TC-65.12	10/19/01		

UNDERGROUND UTILITIES

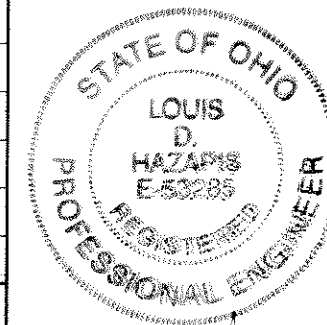
TWO WORKING DAYS
BEFORE YOU DIG

CALL 1-800-362-2764 (TOLL FREE)

OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

PLAN PREPARED BY:

ODOT - DISTRICT TWELVE
 PRODUCTION DEPARTMENT
 5500 TRANSPORTATION BLVD.
 GARFIELD HEIGHTS, OHIO 44125



Louis D. Hazaris
12/18/03

Approved: *[Signature]*
Date: *[Signature]* District Deputy Director of Transportation

Approved: *[Signature]*
Date: 2-5-04 Director, Department of Transportation

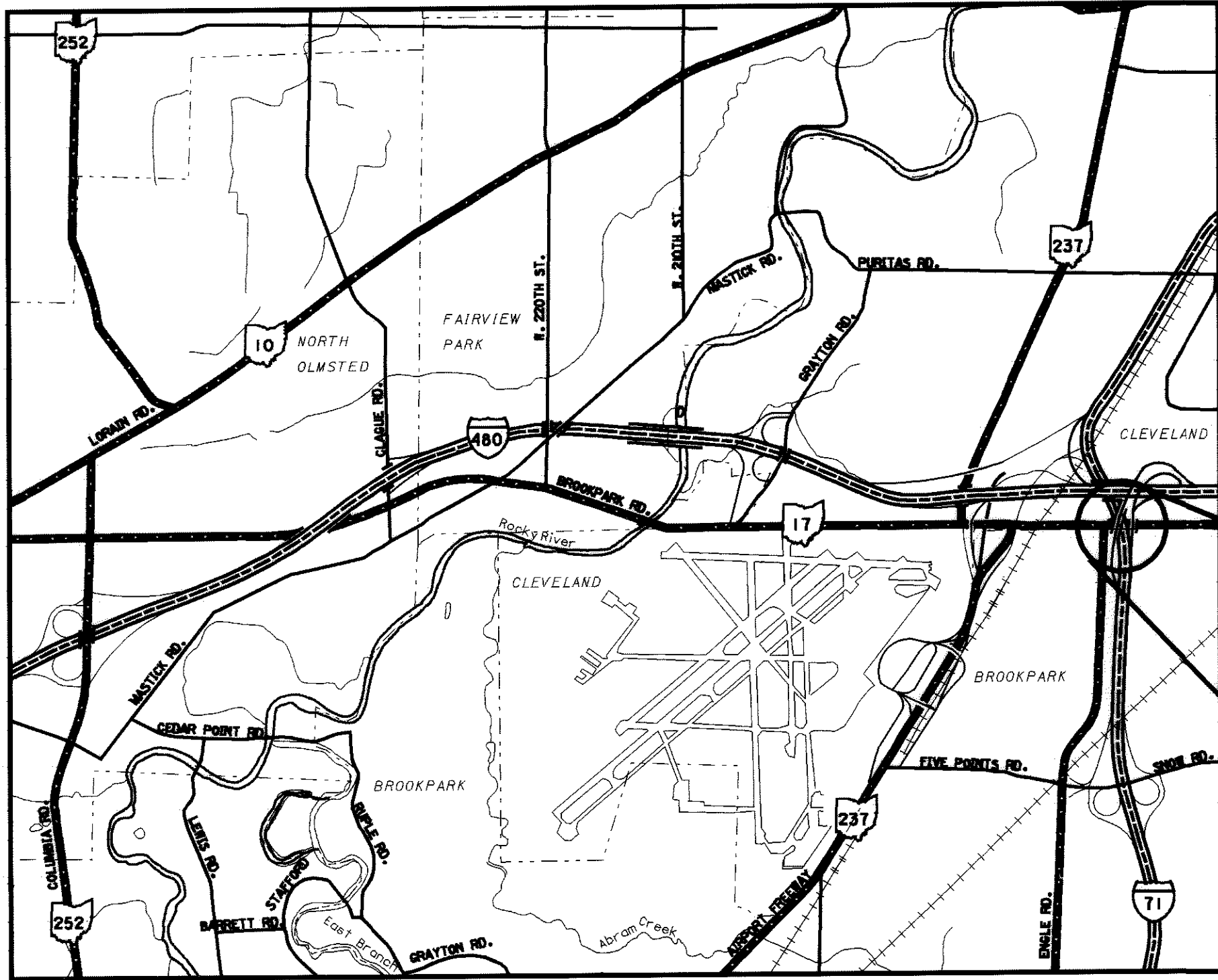
FEDERAL PROJECT NO.
E 033 (390)

PID NO.
75203

CONSTRUCTION PROJECT NO.

RAILROAD INVOLVEMENT
NONE

D12 BH FY2004 WS



LOCATION 1
 CUY-480R-0856ES
 SFN 18044721

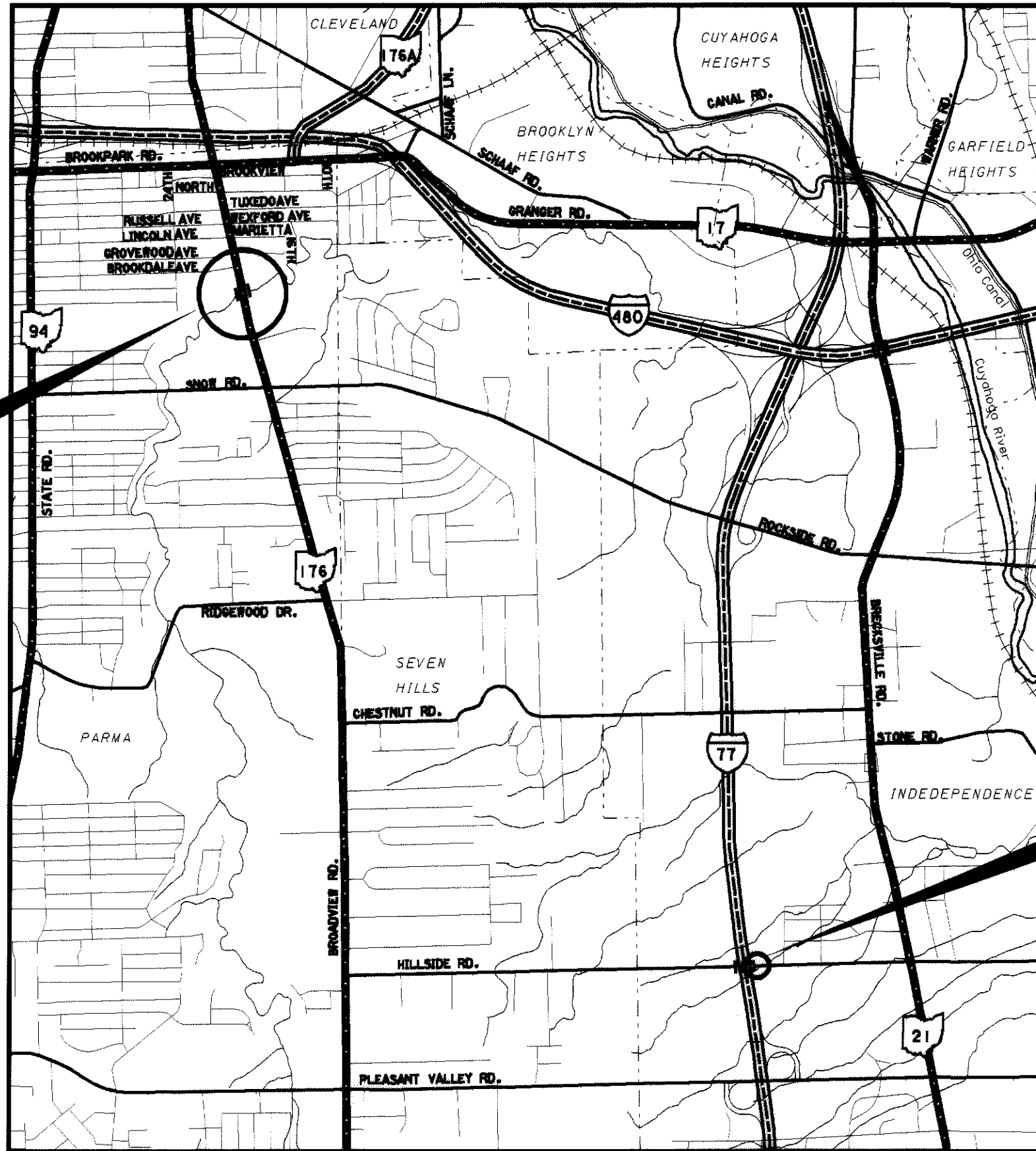


LOCATION MAP

D12 BH FY2004 WS

1 / 3

2 / 28



LOCATION 12
 CUY-176-0931
 SFN 1810057

LOCATION 2
 CUY-77-0645R
 SFN 1806211



LOCATION MAP

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LOCATION MAP

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LOCATION 7
CUY-90-1506WB
SFN 1807684

LOCATION 5
CUY-90-1490L
SFN 1809342

LOCATION 6
CUY-90-1490R
SFN 1807625

LOCATION 4
CUY-90-1391
SFN 1807854

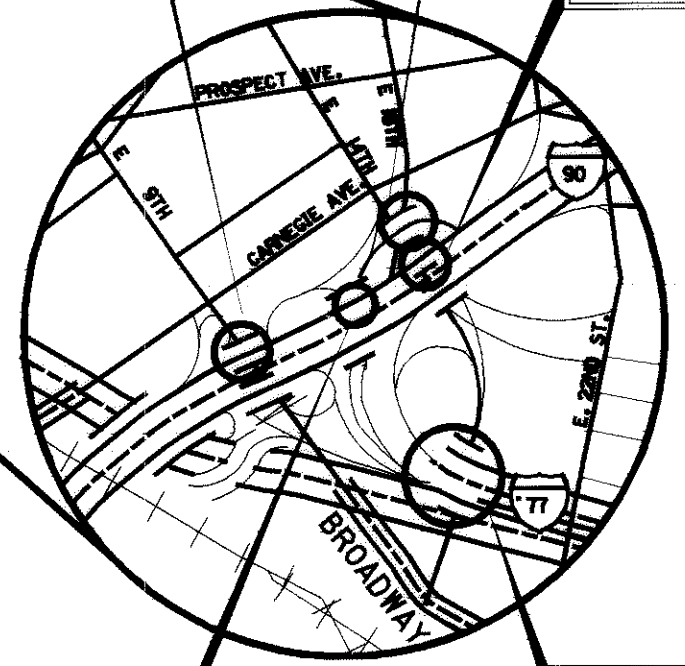
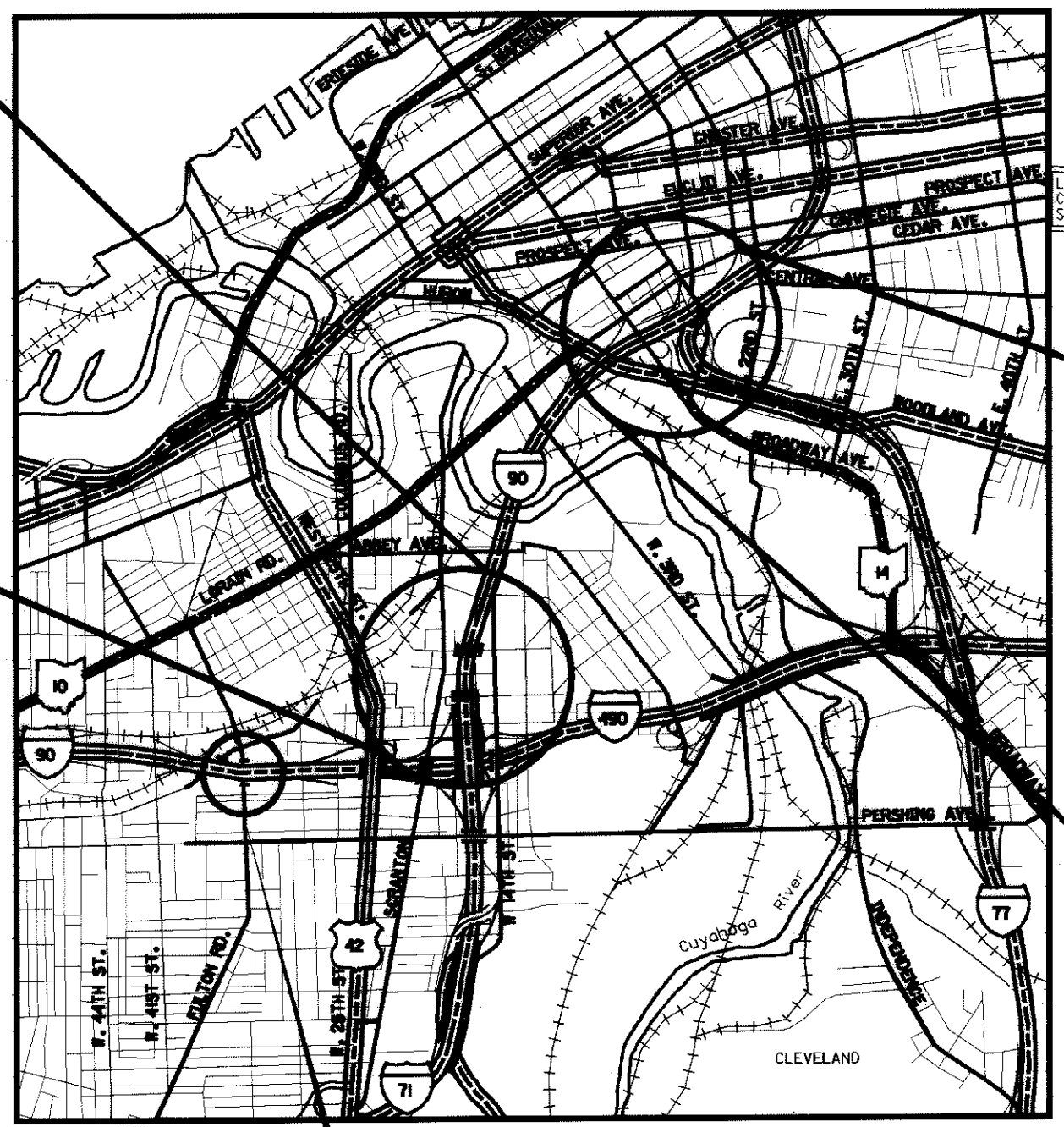
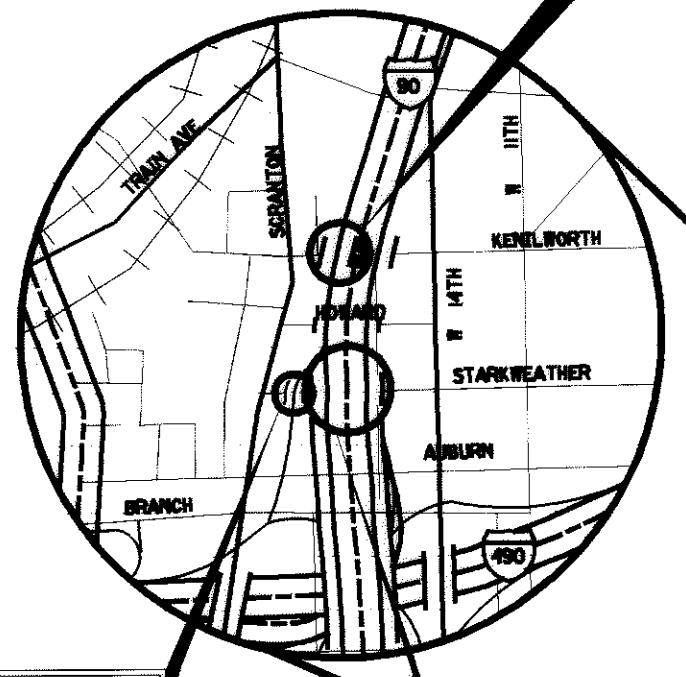
LOCATION 8
CUY-90-1628L
SFN 1807498

LOCATION 10
CUY-77R-1597L
SFN 1807919

LOCATION 11
CUY-90-1651L
SFN 1807900

LOCATION 3
CUY-77-1575
SFN 1806904

LOCATION 9
CUY-90-1640 WB
SFN 1807773



REFERENCE SHALL BE MADE TO STANDARD DRAWINGS:

LISTED ON THE TITLE SHEET.

AND TO SUPPLEMENTAL SPECIFICATIONS:

LISTED ON THE TITLE SHEET.

AND TO PROPOSAL NOTES:

SEE PROPOSAL NOTES 512

CONVERSION OF METRIC STANDARD DRAWINGS:

THE METRIC STANDARD DRAWINGS REFERENCED IN THIS PLAN SHALL BE CONVERTED TO ENGLISH UNITS USING THE SI (METRIC) TO ENGLISH CONVERSION FACTORS PROVIDED IN SECTION 109.011 OF THE CMS. THE APPENDIX OF ASTM E 380 SHALL BE UTILIZED FOR ANY ADDITIONAL CONVERSION FACTORS REQUIRED. CONVERSIONS SHALL BE APPROXIMATELY PRECISE AND SHALL REFLECT STANDARD INDUSTRY ENGLISH VALUES WHERE SUITABLE.

EXISTING STRUCTURE VERIFICATION:

DETAILS AND DIMENSIONS SHOWN ON THESE PLANS PERTAINING TO THE EXISTING STRUCTURE HAVE BEEN OBTAINED FROM PLANS OF THE EXISTING STRUCTURE AND FROM FIELD OBSERVATIONS AND MEASUREMENTS. CONSEQUENTLY, THEY ARE INDICATIVE OF THE EXISTING STRUCTURE AND THE PROPOSED WORK BUT THEY SHALL BE CONSIDERED TENTATIVE AND APPROXIMATE. THE CONTRACTOR IS REFERRED TO C.M.S. SECTIONS 102.05 AND 105.02. THE ORIGINAL CONSTRUCTION PLANS OF THE EXISTING BRIDGE ARE AVAILABLE UPON REQUEST AT THE DISTRICT 12 OFFICE OF THE OHIO DEPARTMENT OF TRANSPORTATION, GARFIELD HEIGHTS, OHIO.

CONTRACT BID PRICES SHALL BE BASED UPON A RECOGNITION OF THE UNCERTAINTIES DESCRIBED ABOVE AND UPON A PRE-BID EXAMINATION OF THE EXISTING STRUCTURE BY THE CONTRACTOR. HOWEVER, ALL PROJECT WORK SHALL BE BASED ON ACTUAL DETAILS AND DIMENSIONS WHICH HAVE BEEN VERIFIED BY THE CONTRACTOR IN THE FIELD.

CONTINGENCY QUANTITIES:

THE CONTRACTOR SHALL NOT ORDER MATERIALS OR PERFORM WORK FOR ITEMS DESIGNATED BY PLAN NOTE TO BE USED "AS DIRECTED BY THE ENGINEER" UNLESS AUTHORIZED BY THE ENGINEER. THE ACTUAL WORK LOCATIONS AND QUANTITIES USED FOR SUCH ITEMS SHALL BE INCORPORATED INTO THE FINAL CHANGE ORDER GOVERNING COMPLETION OF THIS PROJECT.

COOPERATION BETWEEN CONTRACTORS:

THE CONTRACTOR SHALL COOPERATE AND COORDINATE HIS OPERATIONS WITH THE CONTRACTORS ON OTHER PROJECTS THAT MAY BE IN FORCE DURING THE LIFE OF THE CONTRACT. NO WAIVER OF ANY PROVISIONS OF 105.08 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS IS INTENDED.

LIMITATIONS OF OPERATIONS:

THE CONTRACTOR'S ACTIVITIES AND WORK SCHEDULE SHALL BE CONSTRAINED BY THE FOLLOWING SPECIAL LIMITATIONS:

1. MAINTENANCE OF TRAFFIC RESTRICTIONS (REFER TO THE MAINTENANCE OF TRAFFIC SHEETS IN THIS PLAN).
2. ALL WORK SHALL BE COMPLETED BY OCT 20, 2004.

ITEM 202 - RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN:

RAISED PAVEMENT MARKERS SHALL BE REMOVED FROM THE ROADWAY IN SUCH A MANNER THAT PREVENTS DAMAGE TO THE CASTINGS. REMOVED MARKERS SHALL BE COLLECTED, STORED IN 55 GALLON DRUMS (WITH THE AMOUNT CLEARLY MARKED) AND THEN DELIVERED TO THE ODOT WARRENSVILLE YARD, 25609 EMERY ROAD, WARRENSVILLE HEIGHTS, OHIO 44128 (SR 175 AT THE INTERSECTION OF I-271 AND EMERY RD), BY THE CONTRACTOR, AS DIRECTED BY THE ENGINEER. THE PROJECT ENGINEER SHALL GIVE THE WARRENSVILLE TRAFFIC DEPARTMENT (292-5801) FORTY-EIGHT (48) HOUR NOTICE PRIOR TO ANY DELIVERIES. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR FURNISHING ALL TRANSFER/RECEIVING DOCUMENTATION TO THE YARD. ALL COSTS ASSOCIATED WITH THE REMOVAL, STORAGE, AND DELIVERY OF THESE MARKERS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 202 - RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY TO BE USED THROUGHOUT THIS PROJECT.

ITEM 202 - RAISED PAVEMENT MARKERS
REMOVED FOR STORAGE, AS PER PLAN 58 EA

ITEM 646, AS PER PLAN:

PRIOR TO ANY WEARING SURFACE REPLACEMENT, THE CONTRACTOR SHALL FIELD SURVEY THE LOCATIONS OF THE EXISTING PAVEMENT MARKINGS WITHIN THE PROJECT LIMITS. THIS SURVEY SHALL BE USED TO PLACE THE TEMPORARY AND PROPOSED FINAL PAVEMENT MARKINGS IN THE LOCATIONS OF THE ORIGINAL PAVEMENT MARKINGS.

NEW "LANE ARROW" MARKINGS POSITIONS SHALL MATCH THE EXISTING CONDITIONS.

ALL COSTS ASSOCIATED WITH THIS SURVEY SHALL BE INCLUDED IN THE UNIT BID PRICE FOR THE APPROPRIATE ITEM 646, AS PER PLAN. (I.E., COST ASSOCIATED WITH THE SURVEY OF LANE LINES SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 646 - LANE LINE, AS PER PLAN.)

ITEM 621 - RAISED PAVEMENT MARKER, INSTALLATION ONLY:

MATERIALS SUPPLIED BY THE DEPARTMENT:

CASTINGS SHALL BE SUPPLIED WITH REFLECTORS.

ALL MATERIALS ARE TO BE CONTRACTOR FURNISHED, EXCEPT THAT THE DEPARTMENT SHALL SUPPLY RPM MATERIALS IN THE QUANTITIES SHOWN HEREIN TO THE CONTRACTOR. PAY ITEMS FOR THE DEPARTMENT SUPPLIED MATERIALS SHALL BE INDICATED AS "INSTALLATION ONLY". THE TYPE OF DEPARTMENT SUPPLIED MATERIAL SHALL BE RAISED PAVEMENT MARKER CASTINGS WITH PRISMATIC RETROREFLECTORS.

THE CONTRACTOR SHALL PICK UP THE DEPARTMENT SUPPLIED RPM MATERIALS AT THE WARRENSVILLE MAINTENANCE YARD.

THE CONTRACTOR SHALL PICK UP AND LOAD DEPARTMENT SUPPLIED RPM MATERIALS AT THE SPECIFIED LOCATION(S) FOR TRANSPORT TO THE WORK SITE OR TO THE CONTRACTOR'S STORAGE FACILITY.

THE ABOVE WORK INCLUDING ALL LABOR, EQUIPMENT AND MATERIAL NEEDED TO PERFORM THE WORK SHALL BE CONSIDERED INCIDENTAL TO THE RESPECTIVE PAY ITEM.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY TO SUPPLY THE CONTRACTOR WITH RECYCLED RAISED PAVEMENT MARKER WITH PRISMATIC REFLECTORS.

ITEM 621 - RAISED PAVEMENT MARKER
INSTALLATION ONLY 58 EA

PROPOSED WORK

LOCATION 1: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS.

LOCATION 2: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS. NORTHBOUND STRUCTURE.

LOCATION 3: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS. WORK SHALL OCCUR NB, SB AND ENTRANCE RAMP.

LOCATION 4: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS.

LOCATION 5: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS. THIS LOCATION INCLUDES 90EB, 71NB, 71SB. SEE SITE PLAN P. 18

LOCATION 6: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS. THIS LOCATION INCLUDES 90WB ONLY.

LOCATION 7: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS. THIS LOCATION INCLUDES 90WB ONLY.

LOCATIONS 8,9,10 AND 11: EACH LOCATION SHALL RECEIVE PATCHING TREATMENT AS PER THE DIRECTION OF THE ENGINEER.

LOCATION 12: WEARING SURFACE REPLACEMENT ON STRUCTURE AND APPROACH SLABS.

REPLACEMENT ON EACH APPROACH SLAB OF LOCATIONS 1-11 SHALL BE EDGELINE TO EDGELINE. LOCATION 12 SHALL BE SIDEWALK TO SIDEWALK. IN OTHER WORDS, THE APPROACH SLAB WIDTH EQUALS THE BRIDGE DECK WIDTH.

GENERAL NOTES

D12 BH FY2004 WS

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CHECKED

ITEM 848 - SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (----- THICK):

ITEM 848 - SURFACE PREPARATION USING HYDRODEMOLITION, AS PER PLAN:

ITEM 848 - SUPERPLASTICIZED DENSE CONCRETE OVERLAY (VARIABLE THICKNESS), MATERIAL ONLY, AS PER PLAN:

ITEM 848 - WEARING COURSE REMOVED, ASPHALT AS PER PLAN:

ITEM 848 - EXISTING CONCRETE OVERLAY REMOVED, AS PER PLAN (----- THICK):

THESE ITEMS SHALL BE PERFORMED PER SUPPLEMENTAL SPECIFICATION "BRIDGE DECK REPAIR AND OVERLAY WITH CONCRETE USING HYDRO-DEMOLITION" WITH THE FOLLOWING REVISIONS:

AT ALL INTERSTATE LOCATIONS, THE CONTRACTOR SHALL PROVIDE A MINIMUM OF 6' (3' AT LOCATIONS 7 AND 9) BETWEEN THE EDGE OF THE WORKZONE AND THE BIDWELL MACHINE DURING WEARING SURFACE PLACEMENT OPERATIONS.

(SEE 848.18) THE REMOVAL OPERATIONS SHALL NOT BEGIN IF SUSTAINED RAINS (5 HOURS OR MORE WITH BREAKS BETWEEN SHOWERS LESS THAN 1 1/2 HOURS) ARE PREDICTED WITHIN 48 HOURS OF COMMENCEMENT.

(SEE 848.04, 848.05, AND 848.06) ALL GOARSE AGGREGATE SHALL HAVE AN ABSORPTION OF 1.00% OR GREATER AS DEFINED PER ASTM C127.

(SEE 848.21) THE FINAL DECK SOUNDING MAY TAKE PLACE WITHIN 24 HOURS OF A RAIN, AND THE DECK DOES NOT HAVE TO BE COMPLETELY DRY.

(SEE 848.23) FULL DEPTH REPAIR IS NOT REQUIRED IF LESS THAN ONE HALF OF THE DECK ORIGINAL CONCRETE THICKNESS IS SOUND.

(SEE 848.29) THE WET CURE TIME IS REDUCED FROM 72 HOURS TO 24 HOURS OR UNTIL A BEAM BREAK OF 600 PSI IS ACHIEVED, WHICHEVER IS GREATER. AFTER THE 24 HOUR WET CURE, THE FINISHED OVERLAY SURFACE SHALL BE CURED BY SPRAYING A UNIFORM APPLICATION OF CURING MATERIAL OF 705.07, TYPE I OR II, AS PER CMS 511.14 METHOD (B) MEMBRANE CURING. IF THE CURING COMPOUND CAN NOT BE PLACED WITHIN THE SAME SHORT TERM CLOSURE PERIOD AS THE OVERLAY, THE CONTRACTOR MAY ALLOW TRAFFIC ONTO THE OVERLAY, AND SHALL, AT THE NEXT AVAILABLE SHORT TERM CLOSURE PERIOD, APPLY THE MEMBRANE CURING COMPOUND.

(SEE 848.29) TRAFFIC WILL NOT BE PERMITTED ON THE FINISHED OVERLAY SURFACE UNTIL AFTER THE COMPLETION OF THE 24 HOUR WET CURE, AND AFTER TWO TEST BEAMS HAVE ATTAINED AN AVERAGE MODULUS OF RUPTURE OF 600 PST (4.2 MPa).

(SEE 848.30) THE OVERLAY SURFACE EVAPORATION RATE REQUIREMENTS ARE IN EFFECT FROM 9:30 AM TO 11:00 PM. THEY ARE NOT IN EFFECT FROM 11:00 PM TO 9:30 AM.

(SEE 848.31) FOR EACH PHASE, THE CONTRACTOR SHALL PROVIDE ENOUGH MATERIAL FOR TWO BEAM BREAKS EACH AT 12 HOURS, 24 HOURS, 36 HOURS, AND 48 HOURS. THE DEPARTMENT WILL PERFORM THE BEAM BREAK TESTS AND DOCUMENT THE TIME OF THE POUR, THE TIME OF THE BEAM BREAK TESTS, AND THE MODULUS OF RUPTURE FOR EACH BEAM UNTIL THE MODULUS OF RUPTURE OF THE TWO TESTS IS NOT LESS THAN 650 PSI (4.5 MPa). TRAFFIC IS ALLOWED ON THE OVERLAY AT 600 PSI (4.5 MPa).

IF THE CONTRACTOR CAN NOT COMMENCE POUR BY 25 HOURS PRIOR TO THE TRAFFIC OPENING REQUIREMENT DESIGNATED IN THE MOT RESTRICTIONS, THE CONTRACTOR SHALL FOLLOW ITEM SPECIAL - STRUCTURE, MISC.: EMERGENCY ASPHALT PAVING OPERATION ON STANDBY.

THESE ITEMS AND NOTE SHALL ALSO BE APPLIED TO THE APPROACH SLABS AS INDICATED IN THE PLANS.

THE CONTRACTOR SHALL REMOVE THE EXISTING ASPHALTIC CONCRETE COURSE TO THE ORIGINAL CONCRETE PAVEMENT. THE DEPTH OF REMOVAL SHALL BE CONSISTENT ALONG THE ENTIRE APPROACH SLAB. THE COMPLETED OPERATION SHALL REVEAL THE UNDERLYING CONCRETE SURFACE SUCH THAT, WHEN THE OVERLAY OPERATION IS COMPLETED, THE APPROACH SLAB END ADJACENT TO THE BRIDGE SHALL BE FLUSH WITH THE STRUCTURE. SIMILARLY, THE APPROACH SLAB END NEXT TO THE ROADWAY SHALL BE FLUSH WITH THE ROADWAY.

UNLESS OTHERWISE INDICATED IN THE PLANS, OVERLAY THE APPROACH SLABS EDGELINE TO EDGELINE.

ALL OTHER REQUIREMENTS OF THE SUPPLEMENTAL SPECIFICATION SHALL REMAIN IN EFFECT.

ITEM 614 - MAINTAINING TRAFFIC, MISC.: EMERGENCY ASPHALT PAVING OPERATION ON STANDBY:

THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO HAVE AN ASPHALT CONCRETE SUPPLIER AND ASPHALT PAVING COMPANY ON CALL ON SUNDAYS THAT THE BRIDGE DECK OVERLAY IS SCHEDULED. IF THE CONTRACTOR HAS NOT STARTED TO POUR THE CONCRETE OVERLAY BY 25 HOURS PRIOR TO THE TRAFFIC OPENING REQUIREMENT DESIGNATED IN THE MOT RESTRICTIONS, THE PROJECT ENGINEER WILL DIRECT THE CONTRACTOR TO STOP OPERATIONS AND PAVE THE BRIDGE WITH ASPHALT. THE ASPHALT CONTRACTOR WILL HAVE THE ABILITY TO MOBILIZE OPERATIONS WITHIN 12 HOURS. THIS INCLUDES PROVIDING 404 ASPHALT AND A PAVING CREW WITH COMPACTION EQUIPMENT.

THE PAVING AND ALL EXISTING TRAFFIC CONTROL MUST BE IN PLACE ACCORDING TO THE TRAFFIC OPENING REQUIREMENT DESIGNATED IN THE MOT RESTRICTIONS.

THE FOLLOWING ITEMS SHALL BE USED IN THIS OPERATION:

ITEM	UNIT	DESCRIPTION
614	CU. YD.	BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC
848	SQ. YD.	WEARING COURSE REMOVED, ASPHALT, AS PER PLAN

AND SHALL BE PAID FOR UNDER THIS ITEM SPECIAL - STRUCTURE, MISC.: EMERGENCY ASPHALT PAVING OPERATION ON STANDBY.

THE STATE WILL PAY FOR ALL COSTS ASSOCIATED WITH PLACING AND REMOVING THE ASPHALT IF THE CONTRACTOR WAS NOT RESPONSIBLE FOR THE DELAY. IF THE CONTRACTOR WAS RESPONSIBLE FOR THE DELAY, HE WILL HAVE TO PAY ALL THE COST ASSOCIATED WITH THE PLACEMENT AND REMOVAL OF THE ASPHALT.

PAYMENT FOR ALL OF THE ABOVE SHALL BE AT THE UNIT PRICE BID PER EACH FOR ITEM SPECIAL - STRUCTURE, MISC.: EMERGENCY ASPHALT PAVING OPERATION ON STANDBY WHICH SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS NECESSARY TO COMPLETE THE ABOVE WORK.

ITEM 519 - PATCHING CONCRETE STRUCTURE

THIS ITEM SHALL INCLUDE THE REMOVAL OF ALL LOOSE AND DISINTEGRATED CONCRETE FROM THE ABUTMENT BACKWALL, BREAST WALL AND BRIDGE SEAT AS PER CMS 519. THE ABUTMENT SHALL BE RESTORED AND REFORMED TO AN ACCEPTABLE CONDITION. TO BE USED FOR THE WEST ABUTMENTS OF LOCATIONS 9 (CUI-90-1640) AND 11 (CUI-90-1651L).

ITEM 509 - EPOXY COATED REINFORCING STEEL, AS PER PLAN

THE CONTRACTOR SHALL PROVIDE 400 POUNDS OF REBAR FOR DECKS WHICH REQUIRE ADDITIONAL REBAR. REFERENCE 509.09.

NOTE TO CONTRACTOR

CORES FROM EACH STRUCTURE LISTED ON THE TITLE SHEET WERE TAKEN. THE CONTRACTOR MAY VISIT THE DISTRICT 12 OFFICE TO VIEW THE CORES.

ITEM 512 - TYPE D WATERPROOFING, AS PER PLAN

THE CONTRACTOR SHALL INSTALL TYPE D WATERPROOFING ON THE APPROACH SLABS OF STRUCTURES 1,2,3,4,5,6,7, AND 12. THE WATER-PROOFING SHALL BE PLACED IN THE JOINTS BETWEEN THE SLAB AND THE ROADWAY AND ALONG THE JOINTS BETWEEN THE SLAB AND EACH SHOULDER. SEE DRAWING P. 24

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CALCULATED CHECKED GENERAL NOTES

D12 BH FY2004 WS 6/28

NOTES:

* - THIS QUANTITY SHALL BE USED AS DIRECTED BY THE ENGINEER. ALL OR A PORTION OF THIS QUANTITY IS SUBJECT TO NON-PERFORMANCE WITHOUT PENALTY TO THE STATE OF OHIO.

■ - THE TRANSVERSE LINE AND CHANNELIZING LINE QUANTITIES FOR LOCATION 11 SHALL ALSO BE USED FOR LOCATION 10

LOCATION

ITEM	ITEM EXTENSION	DESCRIPTION	TOTAL	UNIT	LOCATION												GENERAL					
					1	2	3	4	5	6	7	8	9	10	11	12						
					CUY-480R-0856ES 1804472 OVER J-71 480WB TO 7/15B	CUY-77-0645R 1806211 OVER HILLSIDE RD	CUY-77-1575 1806904 J-77 OVER E. 14TH ST	CUY-90-1391 1807854 I-90 OVER FULTON RD	CUY-90-1490R 1807625 I-90 OVER STARKWEATHER AVE	CUY-90-1490L 1809342 I-90 OVER STARKWEATHER AVE	CUY-90-1506 WB 1807684 I-90 OVER KENILWORTH AVE	CUY-90-1628 L 1807498 I-90 OVER E. 9TH ST	CUY-90-1640 1807773 WB ONLY I-90 OVER RAMPS	CUY-77R1597L 1807919 OVER E. 14TH ST	CUY-90-1651 L 1807900 OVER E. 14TH ST	CUY-176-0931 1810057 OVER WEST CREEK						
		TRAFFIC CONTROL																				
202	54101	RAISED PAVEMENT MARKER REMOVED FOR STORAGE, * AS PER PLAN	58	EACH	3	3	8	9	10	1	4	4	5	2	7	2						
614	20100	WORK ZONE LANE LINE, CLASS 1, 642 PAINT *	1.0	MILE									1									1.0
614	21100	WORK ZONE CENTER LINE, CLASS 1, 642 PAINT *	0.07	MILE																		0.07
614	23200	WORK ZONE CHANNELIZING LINE, CLASS 1, 642 PAINT *	5280	LIN FT																		5280
619	16010	FIELD OFFICE, TYPE B	6	MONTH																		6
621	00200	RAISED PAVEMENT MARKER, INSTALLATION ONLY *	58	EACH	3	3	8	9	10	1	4	4	5	2	7	2						
646	10001	EDGE LINE, AS PER PLAN	1.6	MILE	0.15	0.08	0.41	0.14	0.16	0.08	0.08	0.11	0.14	0.13	0.14	0						
646	10101	LANE LINE, AS PER PLAN	1.5	MILE	0.07	0.08	0.20	0.29	0.16	0.04	0.13	0.11	0.14	0.06	0.14	0.07						
646	10201	CENTER LINE, AS PER PLAN	0.07	MILE	0	0	0	0	0	0	0	0	0	0	0	0.07						
646	10301	CHANNELIZING LINE, AS PER PLAN ■	582	LIN FT	0	0	0	0	382	0	0	0	0	0	200	0						
646	10601	TRANSVERSE LINE, AS PER PLAN ■	224	LIN FT	0	0	0	0	144	0	0	0	0	0	80	0						
646	20301	LANE ARROW, AS PER PLAN	2	EACH												2						
		MAINTENANCE OF TRAFFIC																				
614	18000	MAINTAINING TRAFFIC, MISC.: EMERGENCY ASPHALT PAVING OPERATION ON STANDBY	24	EACH																		
614	11100	LAW ENFORCEMENT OFFICER WITH PATROL CAR *	336	HR																		
614	11000	MAINTAINING TRAFFIC	LUMP	LUMP																		
624	10000	MOBILIZATION	LUMP	LUMP																		

GENERAL SUMMARY

D12 BH FY2004 WS

NOTES:

- * - THIS QUANTITY SHALL BE USED AS DIRECTED BY THE ENGINEER. ALL OR A PORTION OF THIS QUANTITY IS SUBJECT TO NON-PERFORMANCE WITHOUT PENALTY TO THE STATE OF OHIO.
- ▲ - REMOVAL DEPTH MAY VARY BETWEEN STRUCTURES. SEE BRIDGE DATA SHEET TO DETERMINE PROPOSED REMOVAL DEPTH FOR EACH STRUCTURE.

LOCATION

ITEM	ITEM EXTENSION	DESCRIPTION	TOTAL	UNIT	LOCATION												GENERAL			
					1	2	3	4	5	6	7	8	9	10	11	12				
		STRUCTURE																		
512	55801	TYPE D WATERPROOFING, AS PER PLAN	371	SQ YD	27	34	51	70	63	29	62									35
519	11100	PATCHING CONCRETE STRUCTURE	400	SQ FT									200			200				
SPECIAL	519E12300	PATCHING CONCRETE BRIDGE DECKS, TYPE B	2915	SQ YD								520	1260	475	660					
509	10001	EPOXY COATED REINFORCING STEEL, AS PER PLAN *	400	POUND	50	50	50	50	50	50	50	0	0	0	0	50				
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (1.5" THICK)	908	SQ YD							908									
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (2.0" THICK)	3923	SQ YD	1502	1165														1256
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (2.5" THICK)	7166	SQ YD			3981	3185												
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (3.0" THICK)	1980	SQ YD											1980					
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (3.5" THICK)	9872	SQ YD					3190		2900		3782							
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (5.0" THICK)	2983	SQ YD								1558		1425						
848	20001	SURFACE PREPARATION USING HYDRODEMOLITION, AS PER PLAN	26832	SQ YD	1502	1165	3981	3185	3190	908	2900	1558	3782	1425	1980	1256				
848	30201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY (VARIABLE THICKNESS), MATERIAL ONLY, AS PER PLAN	1303	CU YD	76	54	198	140	148	43	146	75	199	72	99	53				
848	50000	HAND CHIPPING	7812	SQ YD	456	322	1186	840	885	258	877	453	1194	431	593	317				
848	50100	TEST SLAB *		LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP				
848	50200	FULL-DEPTH REPAIR *	8	CU YD	1	1	1	1	1	1	1	0	0	0	0	1				
848	50301	WEARING COURSE REMOVED, ASPHALT, AS PER PLAN ▲	3393	SQ YD	133	200	422	666	533	133	267	200	200	133	200	306				
848	50321	EXISTING CONCRETE OVERLAY REMOVED, AS PER PLAN ▲	23437	SQ YD	1368	965	3560	2519	2656	775	2632	1358	3582	1292	1780	950				

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GENERAL SUMMARY

D12 BH FY2004 WS

R:\PROJECTS\PID75203\GNY75203_SMA.dgn 23-MAR-2004 2:23PM I:\hr.edf 002228

NOTES:

* - THIS QUANTITY SHALL BE USED AS DIRECTED BY THE ENGINEER. ALL OR A PORTION OF THIS QUANTITY IS SUBJECT TO NON-PERFORMANCE WITHOUT PENALTY TO THE STATE OF OHIO.

▲ - REMOVAL DEPTH MAY VARY BETWEEN STRUCTURES. SEE BRIDGE DATA SHEET TO DETERMINE PROPOSED REMOVAL DEPTH FOR EACH STRUCTURE.

LOCATION

ITEM	ITEM EXTENSION	DESCRIPTION	TOTAL	UNIT	LOCATION												GENERAL		
					1	2	3	4	5	6	7	8	9	10	11	12			
		STRUCTURE																	
512	55801	TYPE D WATERPROOFING, AS PER PLAN	371	SQ YD	27	34	51	70	63	29	62								35
519	11100	PATCHING CONCRETE STRUCTURE	400	SQ FT									200						200
SPECIAL	519E12300	PATCHING CONCRETE BRIDGE DECKS, TYPE B	350	SQ YD									50	200	50	50			
509	10001	EPOXY COATED REINFORCING STEEL, AS PER PLAN *	400	POUND	50	50	50	50	50	50	50	0	0	0	0	0			50
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (1.5" THICK)	908	SQ YD							908								
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (2.0" THICK)	3923	SQ YD	1502	1165													1256
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (2.5" THICK)	7166	SQ YD			3981	3185											
848	10201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (3.5" THICK)	4939	SQ YD					3190		1749		0						
848	20001	SURFACE PREPARATION USING HYDRODEMOLITION, AS PER PLAN	16936	SQ YD	1502	1165	3981	3185	3190	908	1749	0	0	0	0	0			1256
848	30201	SUPERPLASTICIZED DENSE CONCRETE OVERLAY (VARIABLE THICKNESS), MATERIAL ONLY, AS PER PLAN	794	CU YD	76	54	198	140	148	43	82	0	0	0	0	0			53
848	50000	HAND CHIPPING	4758	SQ YD	456	322	1186	840	885	258	494	0	0	0	0	0			317
848	50100	TEST SLAB *		LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP	LUMP								LUMP
848	50200	FULL-DEPTH REPAIR *	8	CU YD	1	1	1	1	1	1	1	0	0	0	0	0			1
848	50301	WEARING COURSE REMOVED, ASPHALT, AS PER PLAN ▲	2660	SQ YD	133	200	422	666	533	133	267	0	0	0	0	0			306
848	50321	EXISTING CONCRETE OVERLAY REMOVED, AS PER PLAN ▲	14276	SQ YD	1368	965	3560	2519	2656	775	1483	0	0	0	0	0			950

GENERAL SUMMARY

D12 BH FY2004 WS

LEGEND:

SDC-SUPERPLASTICIZED DENSE CONCRETE
 LMC-LATEX MODIFIED CONCRETE
 MSC-MICRO SILICA MODIFIED CONCRETE
 IC-INTEGRAL CONCRETE
 AC-ASPHALT CONCRETE

* - REPRESENTS WEARING SURFACE THICKNESS ONLY

NOTE: FINAL OVERLAYS SHALL
 MATCH TO EXISTING ELEVATIONS.

LOCATION	BRIDGE NO. STRUCTURE FILE NO. FEATURE INTERSECTED	BRIDGE LIMITS (FT)	ROADWAY WIDTH (FT)	SKEW DEGREES	APPROACH SLAB LENGTH	APPROACH SLAB WIDTH	NUMBER OF LANES ON	STRUCTURE				APPROACH SLAB			
								EXISTING WEARING SURFACE TYPE	NOMINAL THICKNESS OF (INCHES) ITEM 848-EXISTING CONCRETE OVERLAY REMOVED, AS PER PLAN	DEPTH OF ITEM 848-SURFACE PREPARATION USING HYDRODEMOLITION, (INCHES) AS PER PLAN	THICKNESS OF ITEM 848- SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, (INCHES) AS PER PLAN	EXISTING WEARING SURFACE TYPE	DEPTH OF ITEM 848-SURFACE PREPARATION USING HYDRODEMOLITION, (INCHES) AS PER PLAN	NOMINAL THICKNESS OF ITEM 848-WEARING COURSE REMOVED, ASPHALT, AS PER PLAN (INCHES)	THICKNESS OF ITEM 848- SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, (INCHES) AS PER PLAN
1	CUY-480R-0856ES 1804472 OVER I-71 480WB TO 71SB	342	30	52	25	24	2	CONCRETE	2.0	1	3.0	AC	1	2.0	3.0
2	CUY-77-0645R 1806211 OVER HILLSIDE RD	157	51	7	25	36	3	LMC	2.0	1	3.0	AC	1	2.0	3.0
3	CUY-77-1575 1806904 I-77 OVER E. 14TH ST	307	102	VARIES	25	E-15 16 SB 24 NB 36	6	SDC	2.5	1	3.5	AC	1	2.5	3.5
4	CUY-90-1391 1807854 I-90 OVER FULTON RD	139	160	0	25	60	10	SDC	2.5	1	3.5	AC	1	2.5	3.5
5	CUY-90-1490R 1807625 I-90 OVER STARKWEATHER AVE	166	139	0	25	60 EB 36 WB	8	SDC	3.5	1	4.5	AC	1	3.5	4.5
6	CUY-90-1490L 1809342 I-90 OVER STARKWEATHER AVE	166	38	5	25	24	2	SDC	1.5	1	2.5	AC	1	1.5	2.5
7	CUY-90-1506 WB 1807684 I-90 OVER KENILWORTH AVE	170	135	12	25	48	4	SDC	3.5	1	4.5	AC	1	3.5	4.5
8	CUY-90-1628 L 1807498 I-90 OVER E. 9TH ST	236	48	2	25	36	3	SDC	*5.0						
9	CUY-90-1640 1807773 WB ONLY I-90 OVER RAMPS	309	102	VARIES	25	36	3	SDC	*3.5						
10	CUY-77R-1597L 1807919 OVER E. 14TH ST	287	36	VARIES	25	24	2	SDC	*5.0						

I:\PROJECTS\PID75203\DGN\75203_SMA.dgn 17-DEC-2003 11:02AM jthreac

BRIDGE DATA		DESIGNED JWJ	CHECKED NRC	DRAWN JWJ	REVIEWED M/JM	DATE 12/03	STRUCTURE FILE NUMBER THIS SHEET	DESIGN AGENCY DISTRICT TWELVE PRODUCTION DEPARTMENT	
D12 BH FY2004 WS		9 28							

LEGEND:

SDC-SUPERPLASTICIZED DENSE CONCRETE
 LMC-LATEX MODIFIED CONCRETE
 MSC-MICRO SILICA MODIFIED CONCRETE
 IC-INTEGRAL CONCRETE
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* - REPRESENTS WEARING SURFACE THICKNESS ONLY

NOTE: FINAL OVERLAYS SHALL
 MATCH TO EXISTING ELEVATIONS.

LOCATION	BRIDGE NO. STRUCTURE FILE NO. FEATURE INTERSECTED	BRIDGE LIMITS (FT)	ROADWAY WIDTH (FT)	SKEW DEGREES	APPROACH SLAB LENGTH	APPROACH SLAB WIDTH	NUMBER OF LANES ON	STRUCTURE				APPROACH SLAB			
								EXISTING WEARING SURFACE TYPE	NOMINAL THICKNESS OF (INCHES) ITEM 848-EXISTING CONCRETE OVERLAY REMOVED, AS PER PLAN	DEPTH OF ITEM 848-SURFACE PREPARATION USING HYDRODEMOLITION, (INCHES) AS PER PLAN	THICKNESS OF ITEM 848- SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, (INCHES) AS PER PLAN	EXISTING WEARING SURFACE TYPE	DEPTH OF ITEM 848-SURFACE PREPARATION USING HYDRODEMOLITION, (INCHES) AS PER PLAN	NOMINAL THICKNESS OF ITEM 848-WEARING COURSE REMOVED, ASPHALT, AS PER PLAN (INCHES)	THICKNESS OF ITEM 848- SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, (INCHES) AS PER PLAN
1	CUY-480R-0856ES 1804472 OVER I-71 480WB TO 71SB	342	30	52	25	24	2	CONCRETE	2.0	1	3.0	AC	1	2.0	3.0
2	CUY-77-0645R 1806211 OVER HILLSIDE RD	157	51	7	25	36	3	LMC	2.0	1	3.0	AC	1	2.0	3.0
3	CUY-77-1575 1806904 I-77 OVER E. 14TH ST	307	102	VARIES	25	E-15 16 SB 24 NB 36	6	SDC	2.5	1	3.5	AC	1	2.5	3.5
4	CUY-90-1391 1807854 I-90 OVER FULTON RD	139	160	0	25	60	10	SDC	2.5	1	3.5	AC	1	2.5	3.5
5	CUY-90-1490R 1807625 I-90 OVER STARKWEATHER AVE	166	139	0	25	60 EB 36 WB	8	SDC	3.5	1	4.5	AC	1	3.5	4.5
6	CUY-90-1490L 1809342 I-90 OVER STARKWEATHER AVE	166	38	5	25	24	2	SDC	1.5	1	2.5	AC	1	1.5	2.5
7	CUY-90-1506 WB 1807684 I-90 OVER KENILWORTH AVE	170	78.5	12	25	48	4	SDC	3.5	1	4.5	AC	1	3.5	4.5
8	CUY-90-1628 L 1807498 I-90 OVER E. 9TH ST	236	48	2	25	36	3	SDC	*5.0						
9	CUY-90-1640 1807773 WB ONLY I-90 OVER RAMPS	309	102	VARIES	25	36	3	SDC	*3.5						
10	CUY-77R-1597L 1807919 OVER E. 14TH ST	287	36	VARIES	25	24	2	SDC	*5.0						

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DESIGN AGENCY
 DISTRICT TWELVE
 PRODUCTION DEPARTMENT

DATE 12/03
 REVIEWED MJM
 DRAWN JMT
 CHECKED NRC
 STRUCTURE FILE NUMBER
 THIS SHEET

BRIDGE DATA

D12 BH FY2004 WS

LEGEND:

SDC-SUPERPLASTICIZED DENSE CONCRETE
 LMC-LATEX MODIFIED CONCRETE
 MSC-MICRO SILICA MODIFIED CONCRETE
 IC-INTEGRAL CONCRETE
 AC-ASPHALT CONCRETE

* - REPRESENTS WEARING SURFACE THICKNESS ONLY

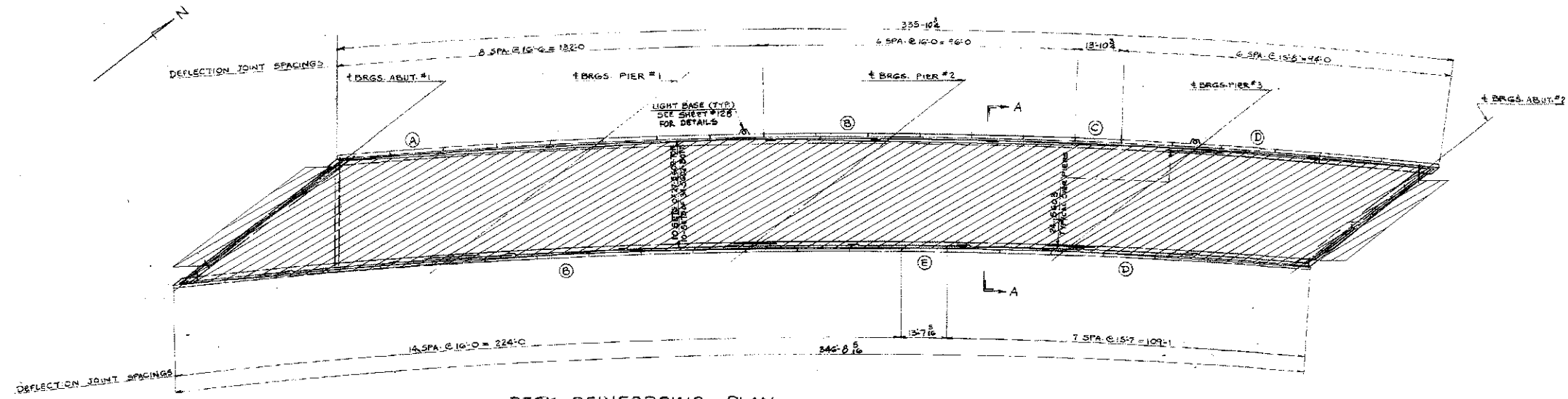
NOTE: FINAL OVERLAYS SHALL MATCH TO EXISTING ELEVATIONS.

LOCATION	BRIDGE NO. STRUCTURE FILE NO. FEATURE INTERSECTED	BRIDGE LIMITS (FT)	ROADWAY WIDTH (FT)	SKEW	APPROACH SLAB LENGTH	APPROACH SLAB WIDTH	NUMBER OF LANES ON	STRUCTURE				APPROACH SLAB					
								EXISTING WEARING SURFACE TYPE	NOMINAL THICKNESS OF (INCHES) ITEM 848-EXISTING CONCRETE OVERLAY REMOVED, AS PER PLAN	DEPTH OF ITEM 848-SURFACE PREPARATION USING HYDRODEMOLITION, AS PER PLAN (INCHES)	THICKNESS OF ITEM 848- SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (INCHES)	EXISTING WEARING SURFACE TYPE	DEPTH OF ITEM 848-SURFACE PREPARATION USING HYDRODEMOLITION, AS PER PLAN (INCHES)	NOMINAL THICKNESS OF ITEM 848-WEARING COURSE REMOVED, ASPHALT, AS PER PLAN (INCHES)	THICKNESS OF ITEM 848- SUPERPLASTICIZED DENSE CONCRETE OVERLAY USING HYDRODEMOLITION, AS PER PLAN (INCHES)		
11	CUY-90-1651 L 1807900 OVER E. 14TH ST	307	48	VARIES	25	36	3	SDC	* 3.0				AC				
12	CUY-176-0931 1810057 OVER WEST CREEK	133	54	15	25	48	4	AC	2.0	1		3.0	AC	1	2.0	3.0	

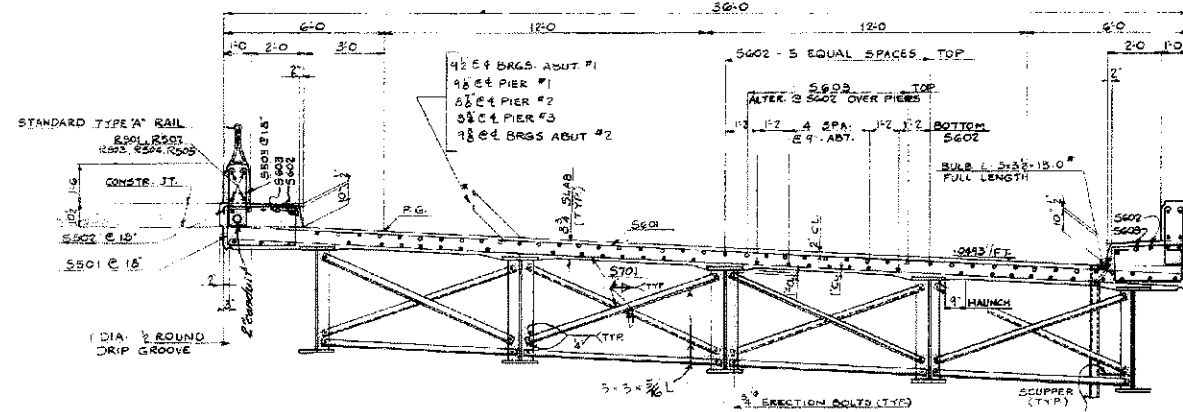
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BRIDGE DATA		DESIGN AGENCY DISTRICT TWELVE PRODUCTION DEPARTMENT
DESIGNED JMT	DRAWN JMT	DATE 12/03
CHECKED NRC	REVIEWED MJM	STRUCTURE FILE NUMBER THIS SHEET
D12 BH FY2004 WS		10 28

LOCATION 1



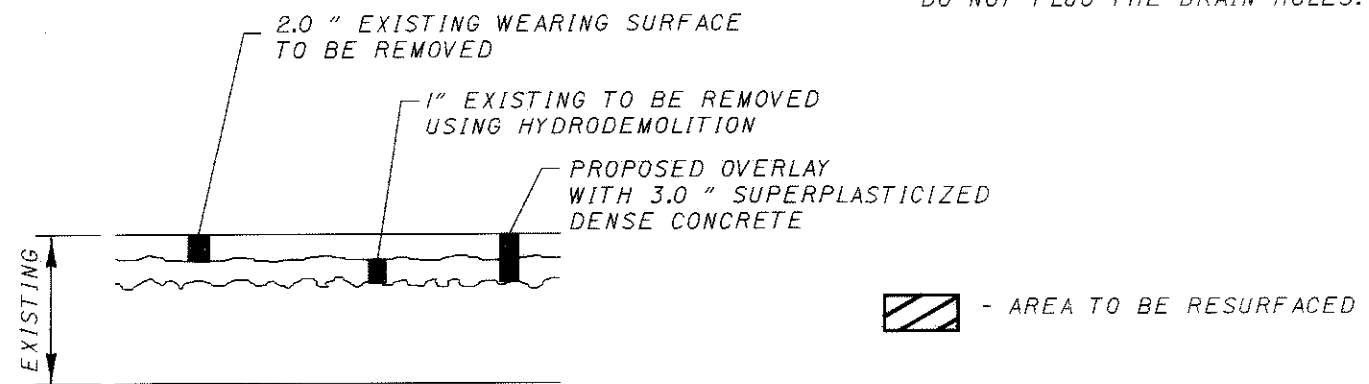
DECK REINFORCING PLAN



SECTION AA

PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.



TYPICAL SECTION DETAIL

I:\PROJECTS\PIB\5203\DCN\SP_CUY7L.dgn 17-DEC-2003 11:44AM jthreac

SITE PLAN/ CROSS SECTION
 BRIDGE NO. CUY-480R-0856ES
 OVER I-71 AND SR17

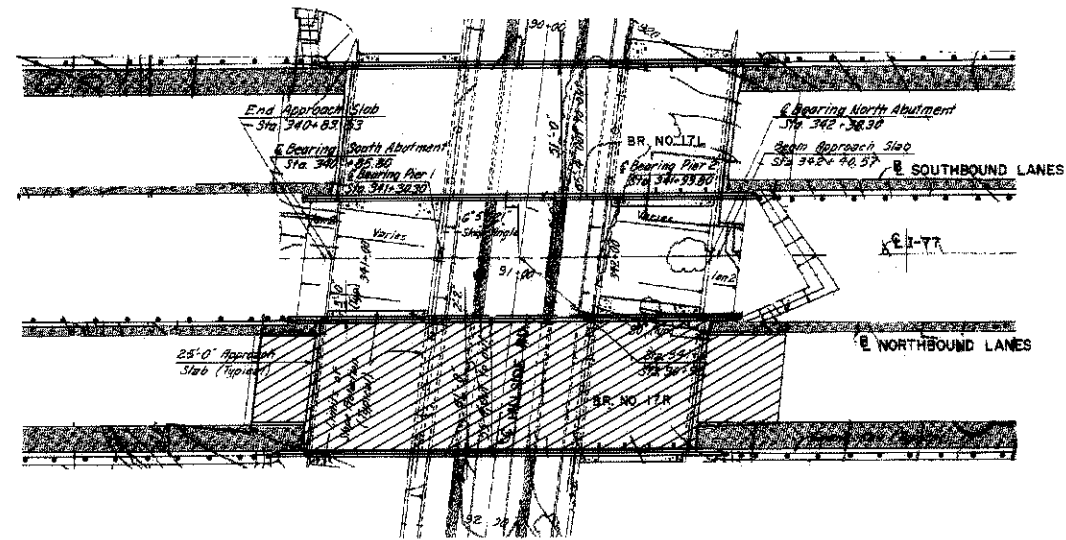
D12 BH FY2004 WS

DESIGN AGENCY
 DISTRICT TWELVE
 PRODUCTION DEPT


DATE
 12/02/03
 REVISED
 JMT
 STRUCTURE FILE NUMBER
 1804472

DESIGNED
 CHECKED
 DRAWN
 JMT
 REVISED

LOCATION 2

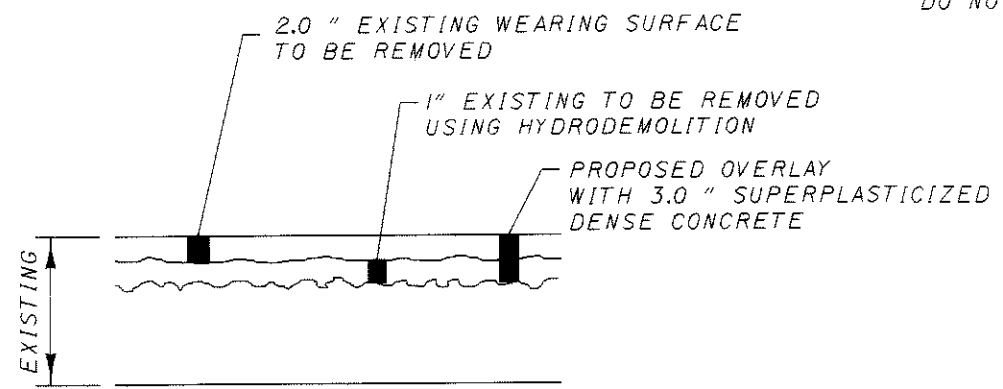


PLAN
Scale: 1" = 30'

 - AREA TO BE RESURFACED

PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.



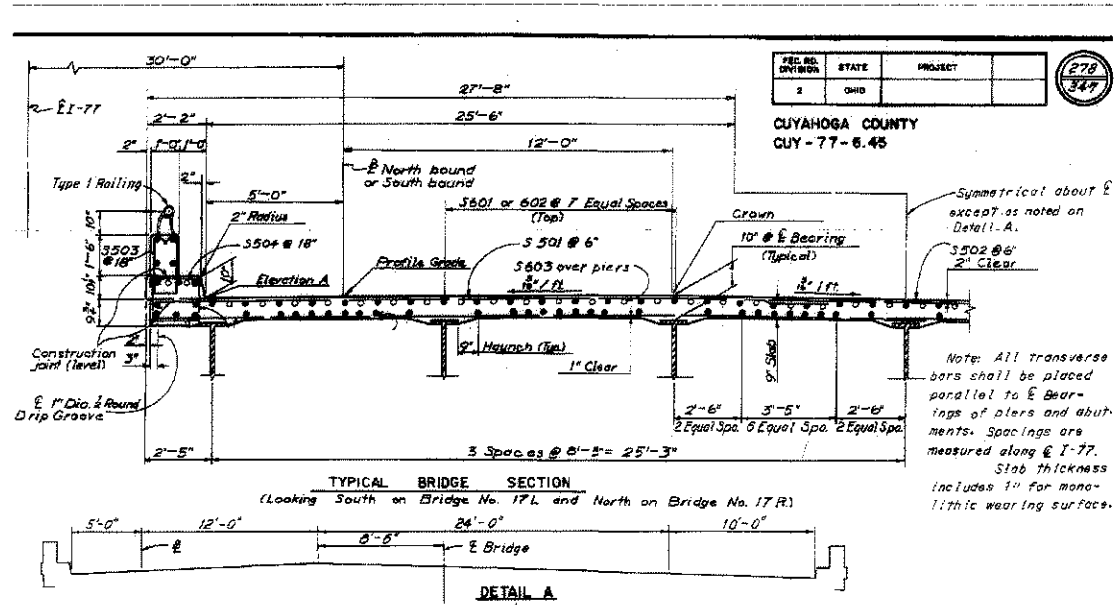
TYPICAL SECTION DETAIL

I:\PROJECTS\15203\DCNSP\CUY77_0645.dgn 17-DEC-2003 11:23AM jthrcat

DESIGN AGENCY	DISTRICT TWELVE
DATE	12/02/03
REVISIONS	STRUCTURE FILE NUMBER
1806211	
DESIGNED	CHECKED
DRAWN	REVISED
JWT	JWT
SITE PLAN	
BRIDGE NO. CUY-77-0645R	
OVER HILLSIDE RD	
D12 BH FY2004 WS	1/2
12	28



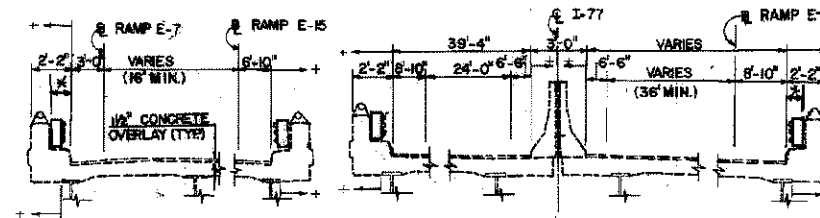
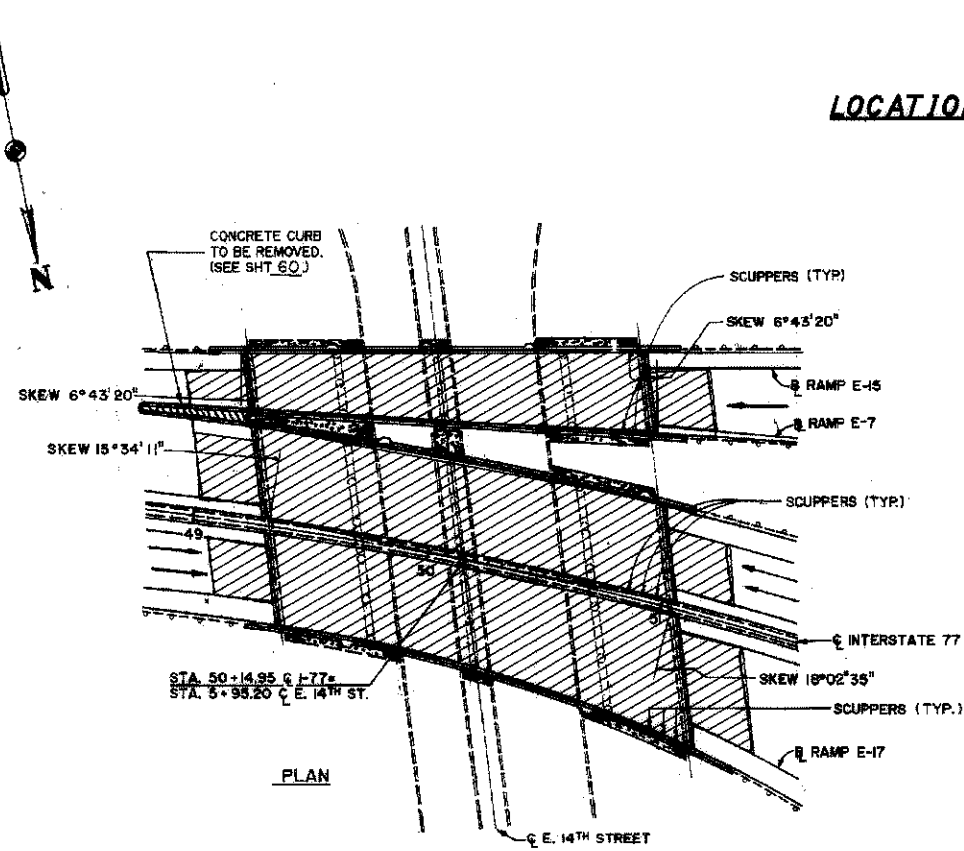
LOCATION 2




BEAM	TOP OF PAVEMENT ELEVATIONS												
	E Brng. S. Abut.	SPAN 1			SPAN 2			SPAN 3			E Brng. N. Abut.		
	a	b	c	E Pier 1	a	b	c	E Pier 2	a	b	c		
A	931.26	931.15	931.04	930.93	930.82	930.66	930.50	930.34	930.18	930.07	929.96	929.85	929.74
B	931.40	931.29	931.18	931.07	930.96	930.80	930.64	930.48	930.32	930.21	930.10	929.99	929.88
C	931.55	931.44	931.32	931.21	931.10	930.94	930.78	930.63	930.47	930.36	930.24	930.13	930.02
D	931.69	931.58	931.46	931.35	931.24	931.08	930.92	930.77	930.61	930.50	930.39	930.27	930.16
E	931.83	931.72	931.61	931.49	931.38	931.22	931.07	930.91	930.75	930.64	930.53	930.41	930.30
F	931.77	931.60	931.49	931.38	931.26	931.11	930.95	930.79	930.63	930.52	930.41	930.30	930.18
G	931.59	931.48	931.37	931.25	931.14	930.98	930.83	930.67	930.51	930.40	930.29	930.17	930.06
ELEVATION A													
West Curb	931.25	931.18	931.04	930.93	930.81	930.67	930.52	930.35	930.18	930.07	929.96	929.85	929.73
East Curb	931.58	931.48	931.37	931.25	931.14	931.00	930.85	930.68	930.51	930.39	930.29	930.18	930.06

H	927.08	926.97	926.85	926.73	926.63	926.48	926.32	926.16	926.00	925.89	925.78	925.67	925.55
J	927.22	927.11	927.00	926.89	926.78	926.62	926.46	926.30	926.14	926.03	925.92	925.81	925.70
K	927.36	927.25	927.14	927.03	926.92	926.76	926.60	926.44	926.28	926.17	926.06	925.95	925.84
L	927.24	927.13	927.02	926.91	926.80	926.64	926.48	926.32	926.16	926.05	925.94	925.83	925.72
M	927.12	927.01	926.90	926.79	926.68	926.52	926.36	926.20	926.04	925.93	925.82	925.71	925.60
N	927.00	926.89	926.78	926.67	926.55	926.40	926.24	926.08	925.92	925.81	925.70	925.59	925.47
P	926.88	926.77	926.65	926.54	926.43	926.27	926.12	925.96	925.80	925.69	925.58	925.46	925.35
ELEVATION A													
West Curb	927.08	926.97	926.85	926.73	926.63	926.48	926.32	926.16	926.00	925.89	925.78	925.67	925.55
East Curb	926.88	926.77	926.65	926.54	926.43	926.27	926.12	925.96	925.80	925.69	925.58	925.47	925.35

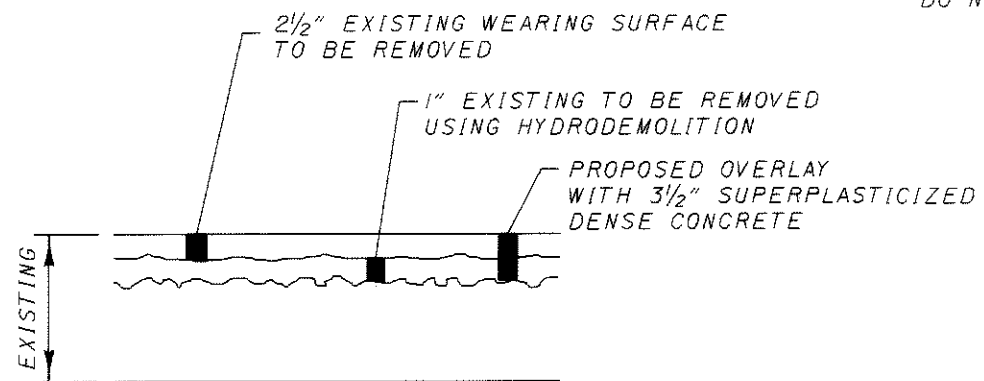
LOCATION 3



 - AREA TO BE RESURFACED

PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.



I:\PROJECTS\PID\5203\DCN\SP_CUY77_1575.dgn 17-DEC-2003 11:25AM j1hr:eat

DESIGN AGENCY
DISTRICT TWELVE
PRODUCTION DEPT

DATE
12/02/03
STRUCTURE FILE NUMBER
1806904

DRAWN
JWT
REVISER

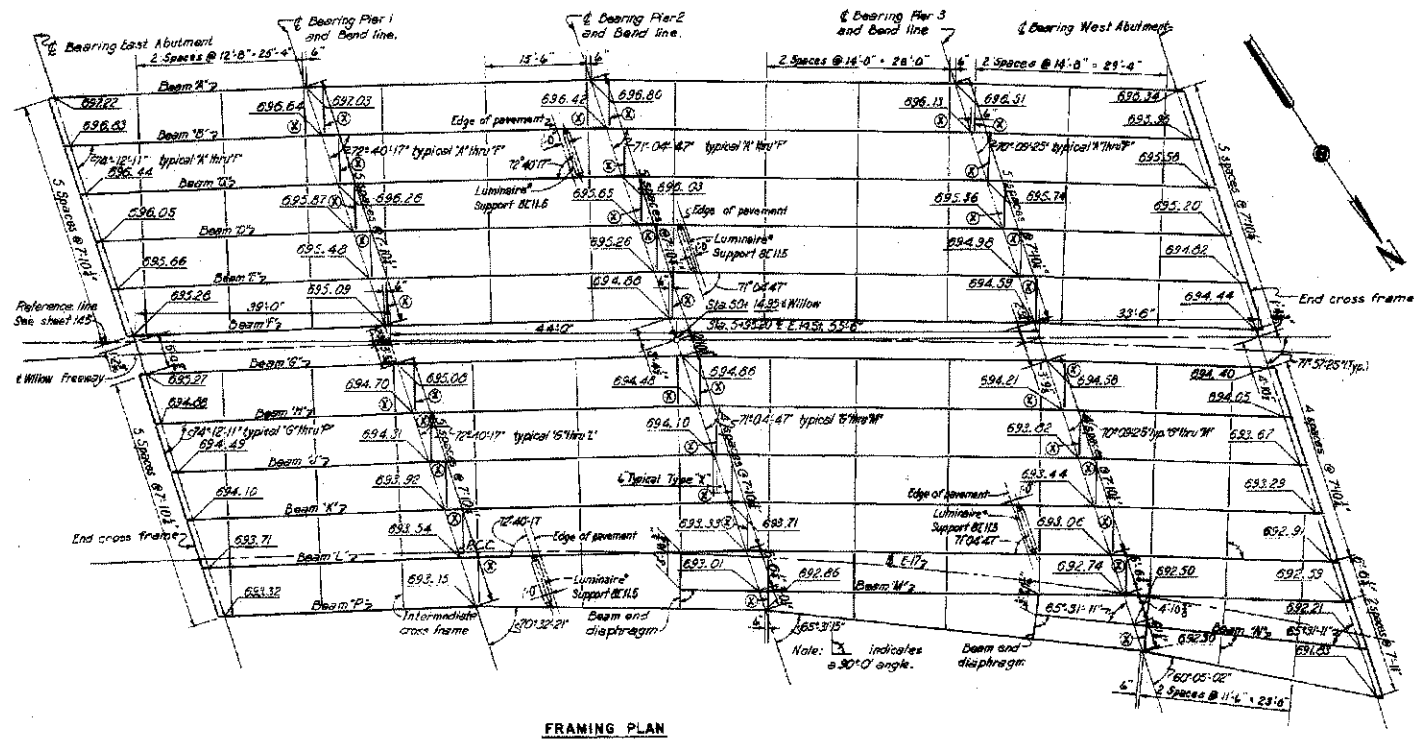
DESIGNED
CHECKED

SITE PLAN/ CROSS SECTION
BRIDGE NO. CUY-77-1575
OVER E. 14TH ST.

D12 BH FY2004 WS

1 / 3

14
28



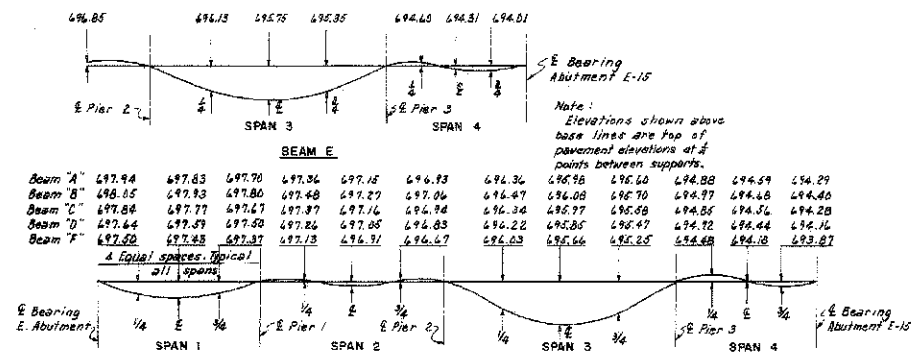
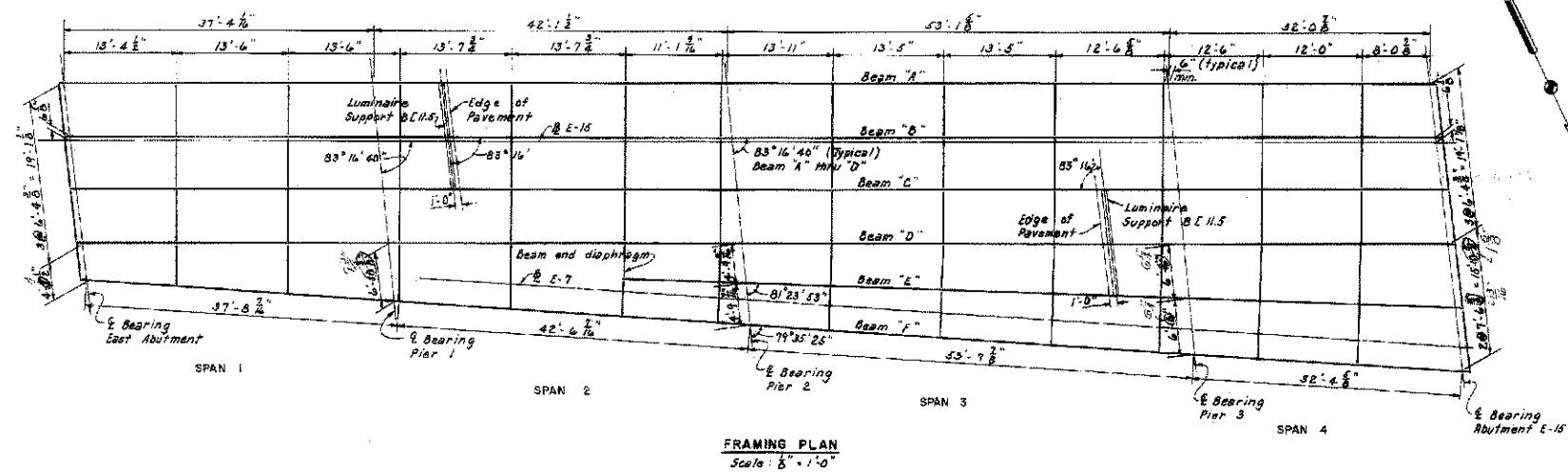
FRAMING PLAN

LOCATION 3

BEAM	TOP OF PAVEMENT ELEVATIONS											
	SPAN 1			SPAN 2			SPAN 3			SPAN 4		
	1/4	C	3/4	1/4	C	3/4	1/4	C	3/4	1/4	C	3/4
A	697.17	697.12	697.07	696.97	696.91	696.86	696.72	696.65	696.59	696.46	696.42	696.38
B	696.78	696.73	696.68	696.58	696.52	696.47	696.34	696.28	696.18	696.08	696.04	696.00
C	696.39	696.34	696.30	696.20	696.14	696.09	695.95	695.88	695.81	695.70	695.66	695.62
D	696.00	695.98	695.91	695.81	695.75	695.70	695.57	695.49	695.42	695.32	695.28	695.24
E	695.61	695.57	695.52	695.42	695.36	695.31	695.18	695.11	695.04	694.93	694.89	694.85
F	695.23	695.18	695.14	695.04	694.98	694.92	694.80	694.73	694.66	694.53	694.51	694.47
G	695.22	695.17	695.12	695.02	694.96	694.91	694.79	694.72	694.65	694.53	694.49	694.45
H	694.83	694.78	694.74	694.64	694.58	694.54	694.41	694.34	694.27	694.18	694.12	694.09
J	694.44	694.40	694.35	694.25	694.20	694.15	694.02	693.95	693.88	693.78	693.74	693.70
K	694.05	694.00	693.98	693.87	693.81	693.78	693.64	693.57	693.50	693.40	693.36	693.32
L	693.66	693.62	693.59	693.48	693.42	693.38	693.25	693.18	693.12	693.02	692.98	692.94
M						693.09	692.93	692.86	692.80	692.70	692.66	692.63
N							692.64	692.48	692.43	692.33	692.28	
P	693.28	693.23	693.19	693.07	693.00	692.98	692.71	692.57	692.43	692.18	692.06	691.94

* Denotes end of beam

LOCATION 3



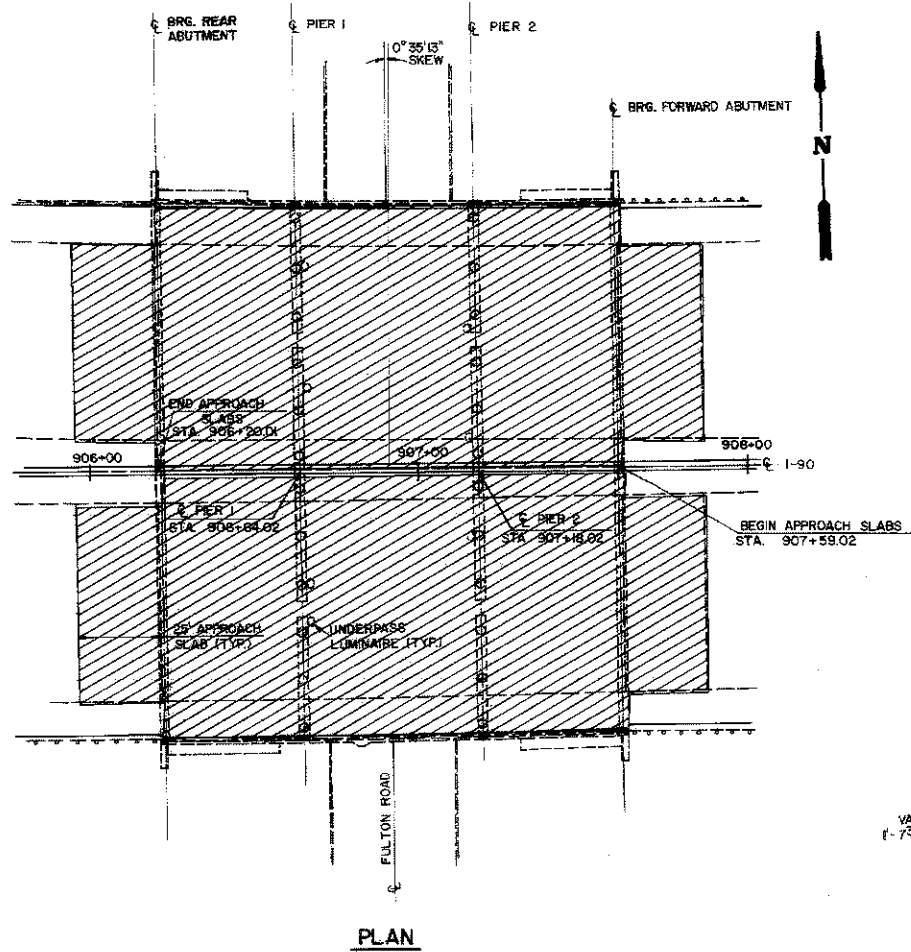
BEAMS A THRU D AND F
BEAM DEFLECTION DIAGRAMS

BEAM	EAST ABUTMENT		SPAN 1			PIER NO. 1			SPAN 2			PIER NO. 2			SPAN 3			PIER NO. 3			SPAN 4			ABUTMENT E-15		
	TOP OF BEAM	TOP OF PVMT.	D.L. DEFL.	D.L. DEFL.	D.L. DEFL.	TOP OF BEAM	TOP OF PVMT.	D.L. DEFL.	D.L. DEFL.	D.L. DEFL.	TOP OF BEAM	TOP OF PVMT.	D.L. DEFL.	D.L. DEFL.	D.L. DEFL.	TOP OF BEAM	TOP OF PVMT.	D.L. DEFL.	D.L. DEFL.	D.L. DEFL.	TOP OF BEAM	TOP OF PVMT.	CON	TOT		
	ELEVATION	ELEVATION	CON	TOT	CON	TOT	ELEVATION	ELEVATION	CON	TOT	CON	TOT	ELEVATION	ELEVATION	CON	TOT	ELEVATION	ELEVATION	CON	TOT	CON	TOT	CON	TOT		
A	697.25	698.05	3/8	3/8	1/2	1/2	696.73	697.53	0	0	1/4	1/4	0	0	695.90	696.70	3/8	3/8	1/2	1/2	694.30	695.10	0	0	693.20	694.00
B	697.30	698.10	3/8	3/8	1/2	1/2	696.87	697.67	0	0	0	0	696.02	696.82	1/2	1/2	694.40	695.20	0	0	0	0	0	0	693.30	694.10
C	697.10	697.90	3/8	3/8	1/2	1/2	696.95	697.75	0	0	0	0	695.90	696.70	1/2	1/2	694.30	695.10	0	0	0	0	0	0	693.30	694.10
D	696.80	697.60	3/8	3/8	1/2	1/2	696.62	697.42	0	0	0	0	695.77	696.57	1/2	1/2	694.10	694.90	0	0	0	0	0	0	693.00	693.80
E																										
F	696.74	697.54	3/8	3/8	1/2	1/2	696.49	697.29	0	0	0	0	695.64	696.44	3/8	3/8	694.00	694.80	0	0	0	0	0	0	692.70	693.50

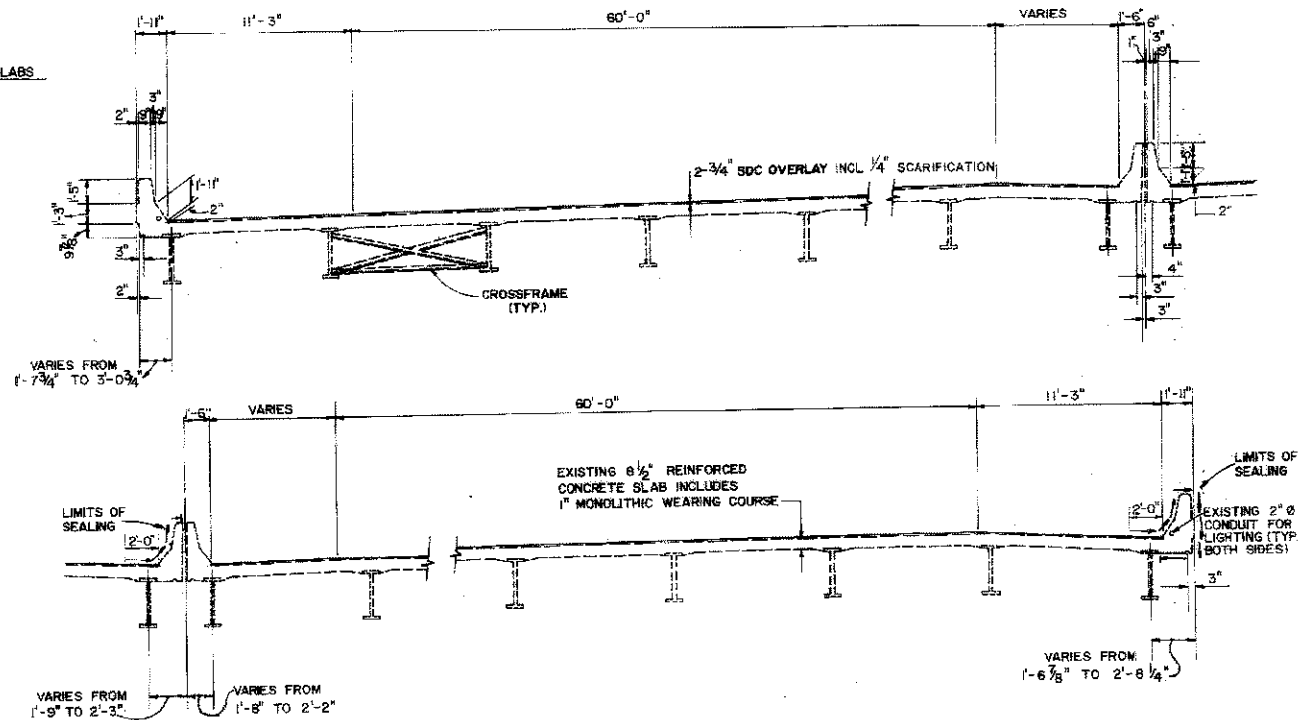
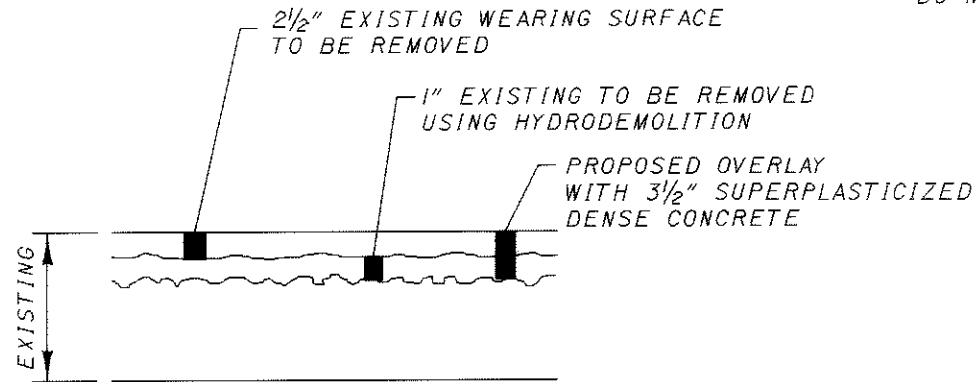
LOCATION 4

PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.

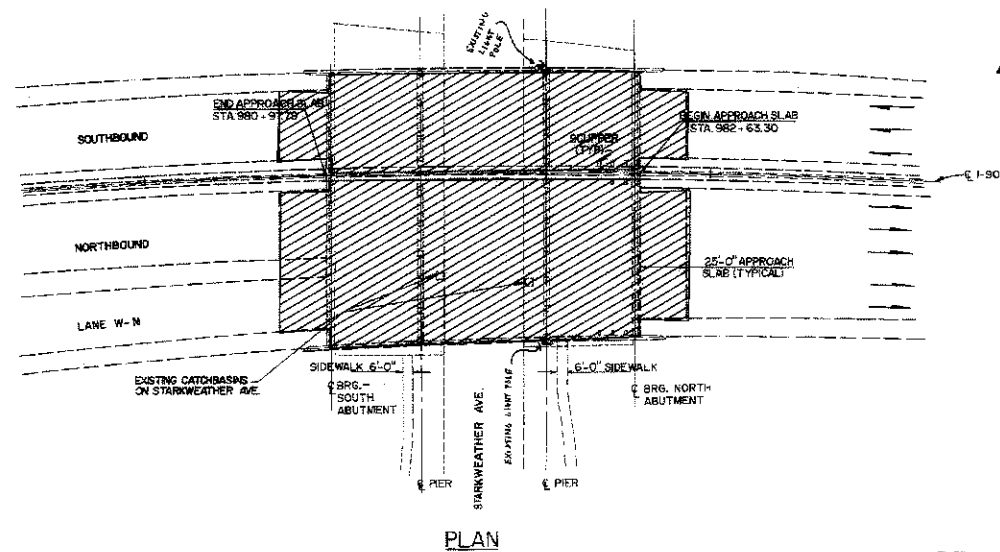


- AREA TO BE RESURFACED



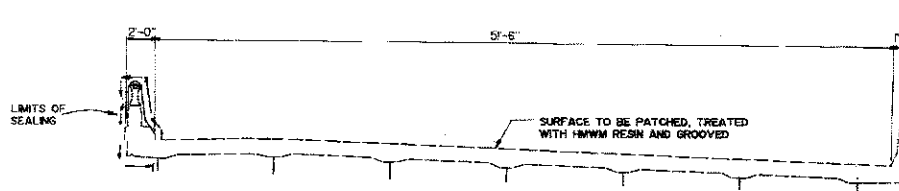
DESIGN AGENCY	DISTRICT TWELVE
DATE	12/02/03
REVIEWED	STRUCTURE FILE NUMBER 1807854
DRAWN	REVISED
DESIGNED	CHECKED
SITE PLAN/ CROSS SECTION	
BRIDGE NO. CUY-90-1391 OVER FULTON RD	
D12 BH FY2004 WS	
17 28	

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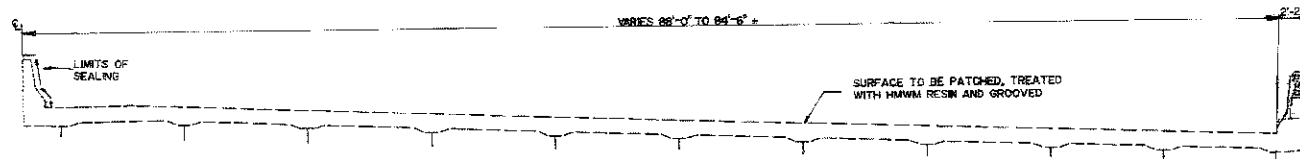


LOCATION 5

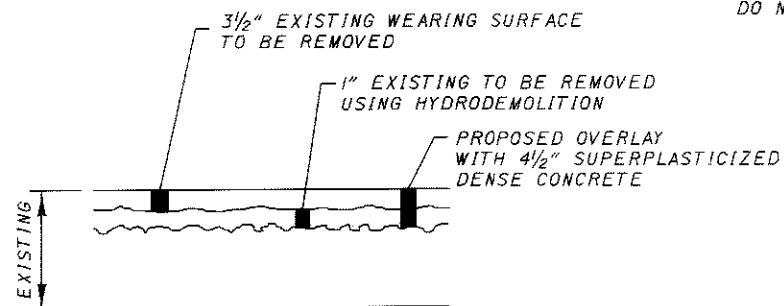
- AREA TO BE RESURFACED



CROSS SECTION CUY-90-1490R, SOUTHBOUND LANES



CROSS SECTION CUY-90-1490R, NORTHBOUND LANES



TYPICAL SECTION DETAIL

PROPOSED WORK

- DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
- APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
- DO NOT PLUG THE DRAIN HOLES.

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DESIGN AGENCY
DISTRICT TWELVE
PRODUCTION DEPT

REVIEWED DATE 12/02/03
JWT
STRUCTURE FILE NUMBER 1807625

DRAWN
JWT
REVISED

DESIGNED
CHECKED

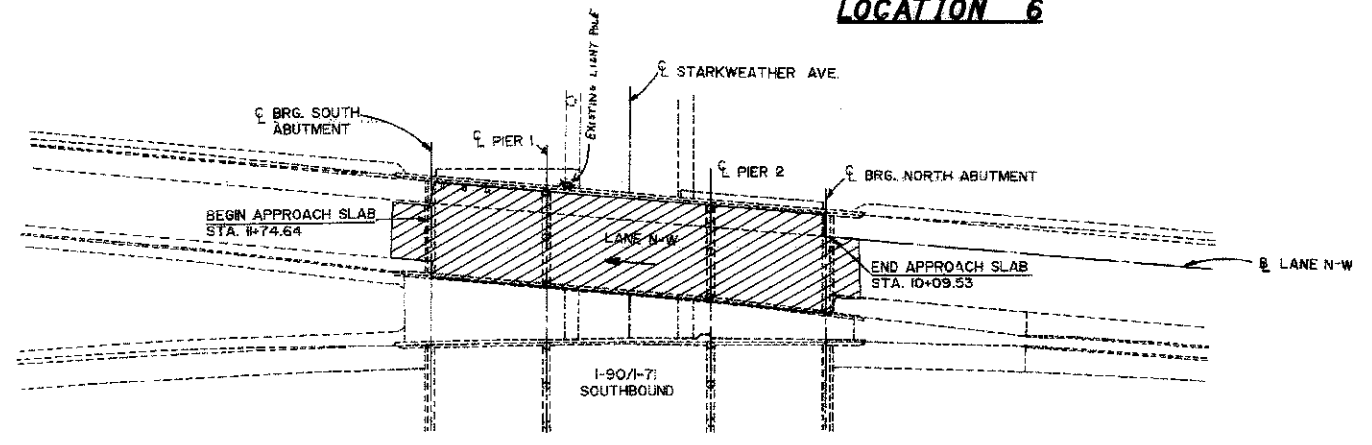
SITE PLAN/ CROSS SECTION
BRIDGE NO. CUY-90-1490R
OVER STARKWEATHER AVE

D12 BH FY2004 WS

18
28

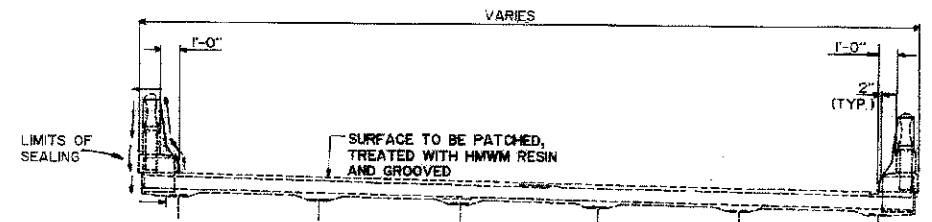


LOCATION 6

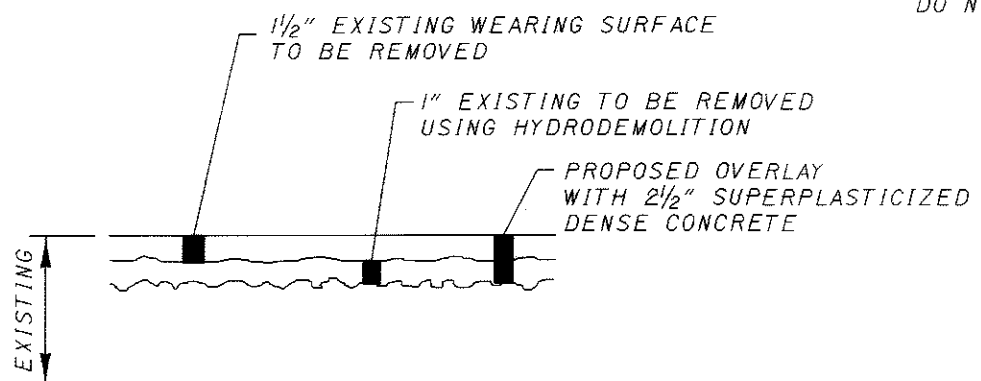


PLAN

- AREA TO BE RESURFACED



TRANSVERSE SECTION



TYPICAL SECTION DETAIL

PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.

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SITE PLAN/ CROSS SECTION
 BRIDGE NO. CUY-90-1490L
 OVER STARKWEATHER AVE

D12 BH FY2004 WS
 11 1

DESIGN AGENCY
 DISTRICT TWELVE
 PRODUCTION DEPT

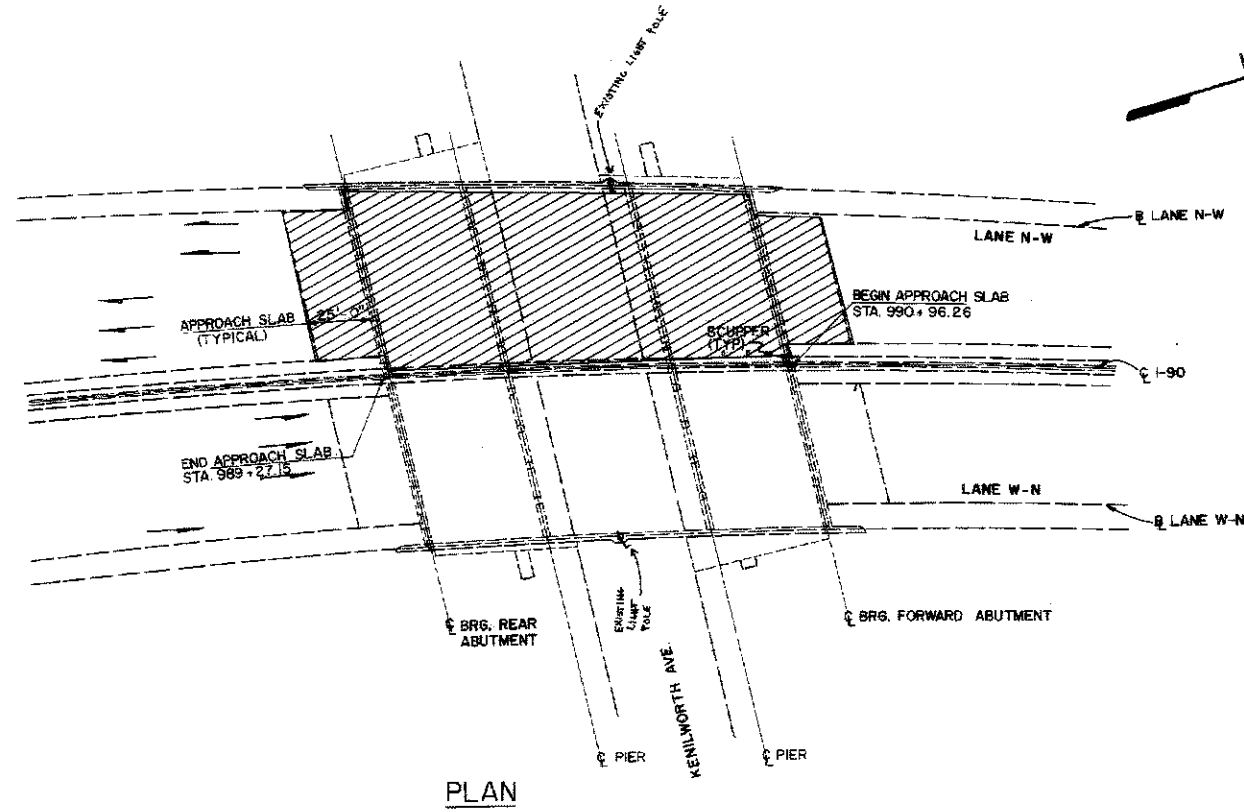
REVIEWED
 DATE 12/02/03
 STRUCTURE FILE NUMBER 1809342

DRAWN
 REVISED
 CHECKED

LOCATION 7

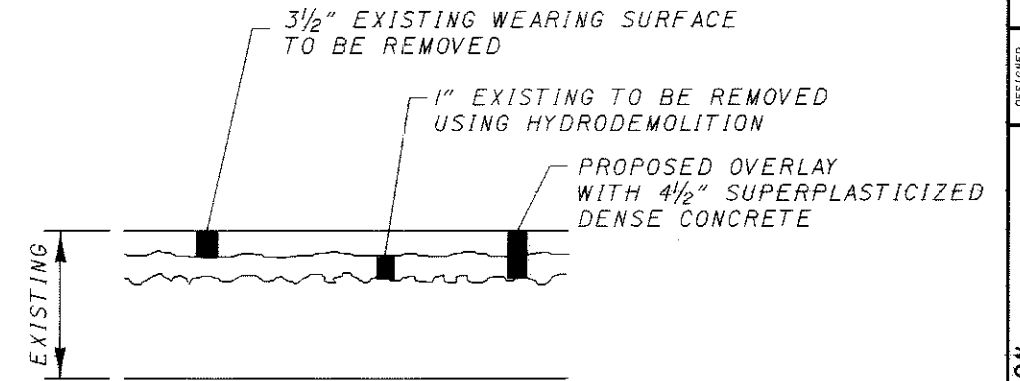
PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.

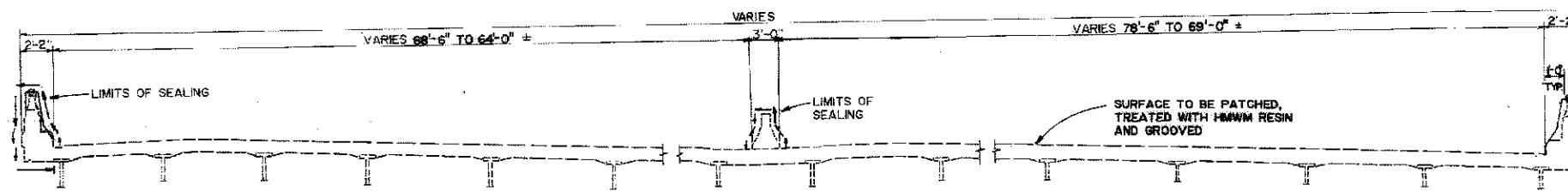


PLAN

- AREA TO BE RESURFACED



TYPICAL SECTION DETAIL



TYPICAL CROSS SECTION

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SITE PLAN/ CROSS SECTION
 BRIDGE NO. CUY-90-1506 WB
 OVER KENILWORTH AVE

D12 BH FY2004 WS

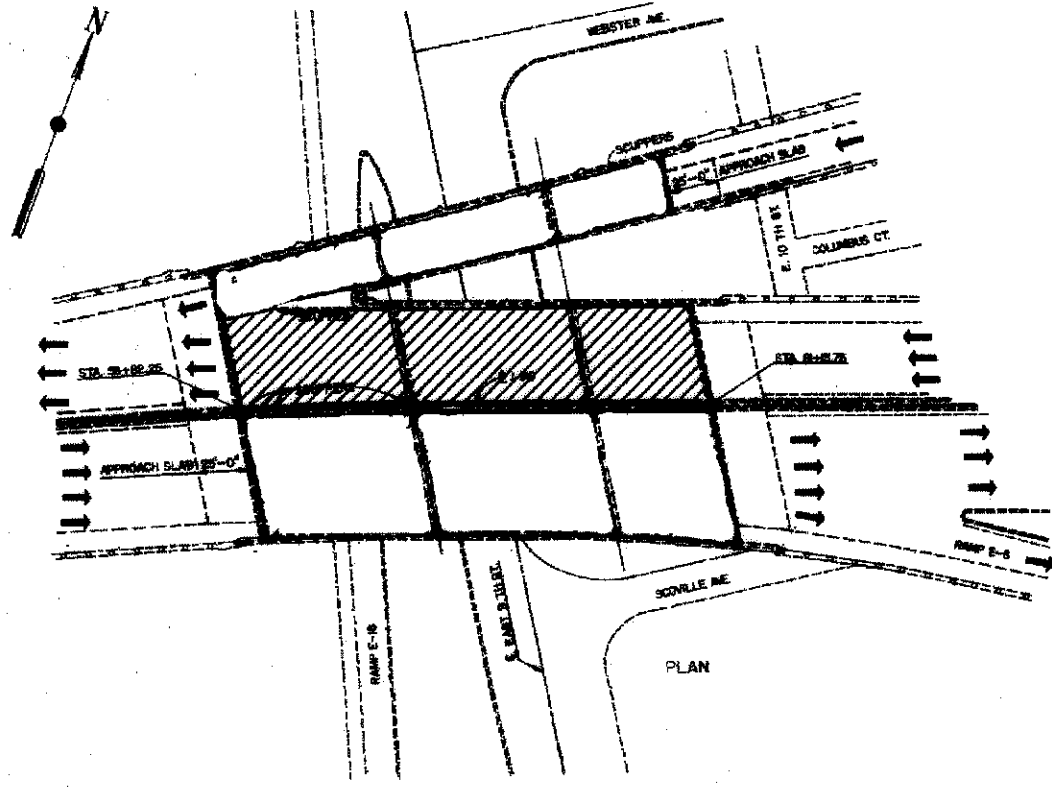
DESIGN AGENCY
 DISTRICT TWELVE
 PRODUCTION DEPT

DATE
 12/02/03
 REVIEWED
 JMT
 STRUCTURE FILE NUMBER
 1807684

DRAWN
 JMT
 DESIGNED
 CHECKED

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LOCATION 8



PROPOSED WORK

DECK AND APPROACH SLABS-PATCH AS DIRECTED BY THE ENGINEER
ITEM SPECIAL-519E12300 PATCHING CONCRETE BRIDGE DECKS, TYPE B

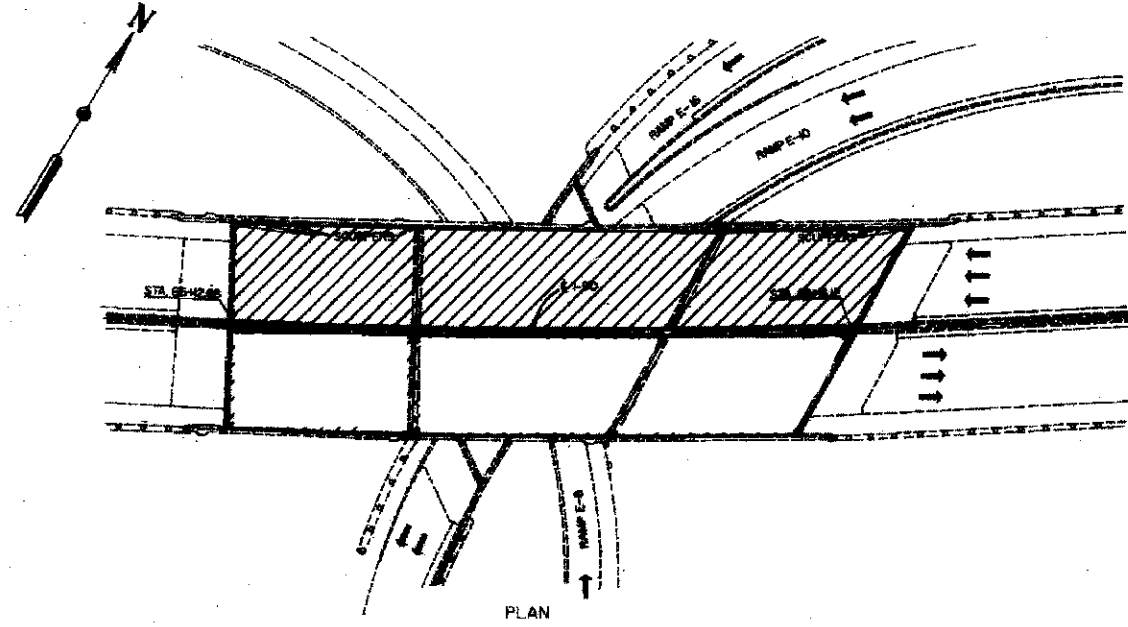


- AREA WHICH MAY REQUIRE PATCHING

DESIGNED	CHECKED
DRAWN JWT	REVISED
REVIEWED JWT	STRUCTURE FILE NUMBER 1807498
DATE 12/02/03	DESIGN AGENCY DISTRICT TWELVE PRODUCTION DEPT

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LOCATION 9



PROPOSED WORK

DECK AND APPROACH SLABS-PATCH AS DIRECTED BY THE ENGINEER
ITEM SPECIAL-519E12300 PATCHING CONCRETE BRIDGE DECKS, TYPE B



- AREA WHICH MAY REQUIRE PATCHING

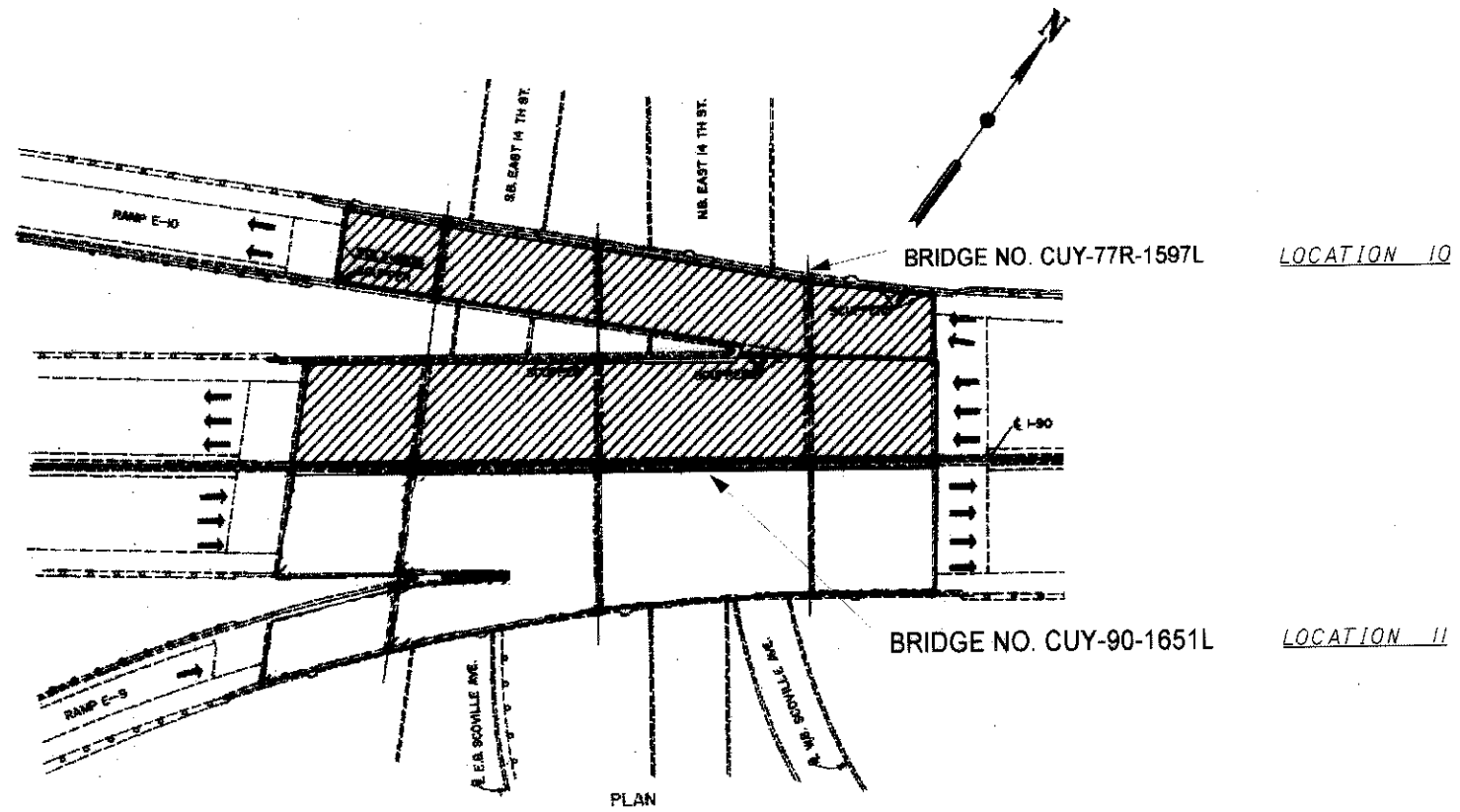
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D12 BH FY2004 WS

SITE PLAN
BRIDGE NO. CUY-90-1640 WB
OVER RAMP

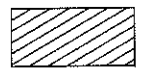
DESIGNED	CHECKED
DRAWN	REVISED
REVIEWED	STRUCTURE FILE NUMBER
DATE	1807773

DESIGN AGENCY
DISTRICT TWELVE
PRODUCTION DEPT



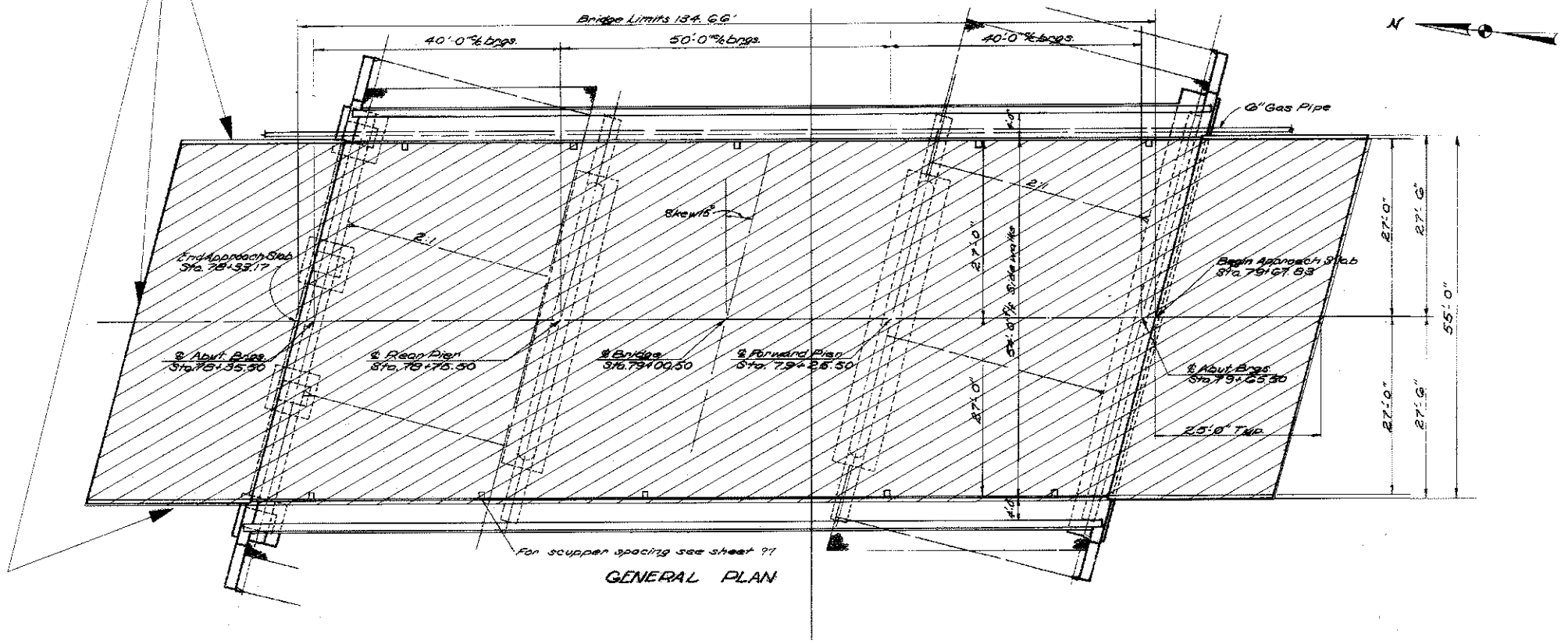
PROPOSED WORK

DECK AND APPROACH SLABS-PATCH AS DIRECTED BY THE ENGINEER
 ITEM SPECIAL-519E12300 PATCHING CONCRETE BRIDGE DECKS, TYPE B



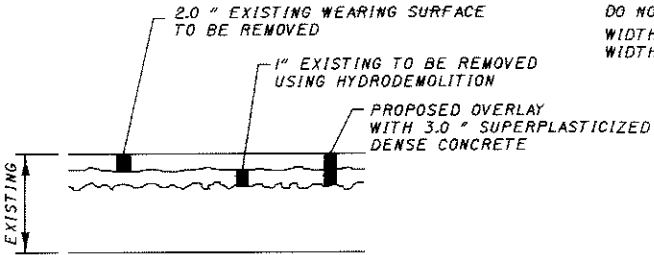
- AREA WHICH MAY REQUIRE PATCHING

LOCATIONS OF ITEM 512 TYPE D WATERPROOFING, AS PER PLAN
SEE GENERAL NOTES P. 6



PROPOSED WORK

DECK - REMOVE AND REPLACE EXISTING CONCRETE OVERLAY WITH SDC USING HYDRODEMOLITION.
 APPROACH SLABS - REMOVE AND REPLACE EXISTING WEARING SURFACES WITH SDC USING HYDRODEMOLITION.
 DO NOT PLUG THE DRAIN HOLES.
 WIDTH OF APPROACH SLAB EQUALS WIDTH OF DECK



TYPICAL SECTION DETAIL

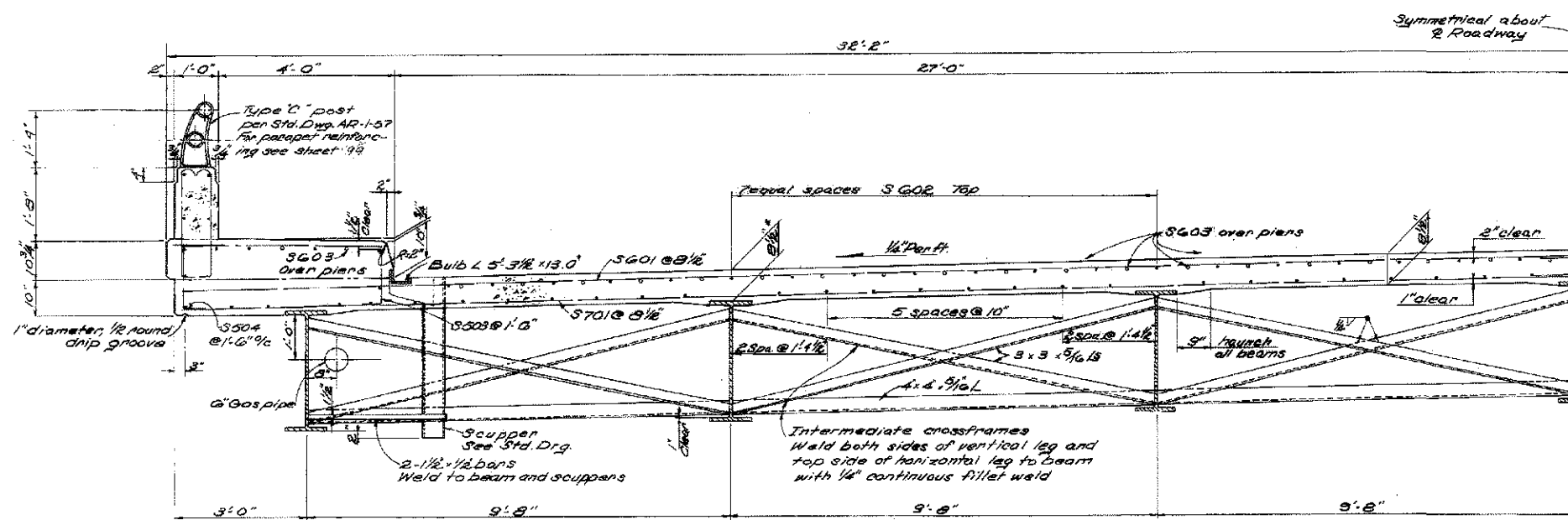
- AREA TO BE RESURFACED

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DESIGN AGENCY DISTRICT TWELVE PRODUCTION DEPT.	
DATE 11/20/03	REVIEWED JWT
STRUCTURE FILE NUMBER 1810057	STRUCTURE FILE NUMBER 1810057
DRAWN JWT	CHECKED
DESIGNED	REVISOR
SITE PLAN	
BRIDGE NO. CUY-176-0931 OVER WEST CREEK	
D12 BH FY2004 WS	
1 / 2	
24 28	

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LOCATION 12



HALF TRANSVERSE SECTION

ITEM 614 - MAINTAINING TRAFFIC:

GENERAL

GENERALLY THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS AS TO MAKE THE PROPOSED REPAIR WITH A MINIMUM OF HAZARD, DELAY AND INCONVENIENCE TO THE MOTORISTS USING THE HIGHWAY. FURTHERMORE, IN ADDITION TO THE CONSTRUCTION AND MATERIAL SPECIFICATIONS, THE FOLLOWING SPECIFIC PROVISIONS ARE MANDATORY.

NOTIFICATION

SINCE FUNCTIONAL TRAFFIC CONTROL IS A MAJOR CONCERN ON THIS PROJECT, IT IS ESSENTIAL THAT THE MOTORING PUBLIC BE ADEQUATELY FOREWARNED OF FUTURE LANE CLOSURES AND TRAFFIC CONSTRICTIONS. THEREFORE, THE CONTRACTOR SHALL SUBMIT A SCHEDULE TO THE OHIO DEPARTMENT OF TRANSPORTATION INDICATING THE LOCATIONS AND DATES OF THE LANE CLOSURES AT LEAST THREE (3) DAYS PRIOR TO THE IMPLEMENTATION OF ANY SUCH CLOSURES. THE CONTRACTOR SHALL ALSO NOTIFY THE LOCAL LAW ENFORCEMENT AGENCIES OF LANE CLOSURES AT LEAST THREE (3) DAYS PRIOR TO IMPLEMENTATION.

MOT RESTRICTIONS

ALL DETOURS SHALL BE IN THE TRAFFIC MANAGEMENT PLAN PROVIDED BY THE CONTRACTOR. COSTS ASSOCIATED WITH THE DETOUR OR TRAFFIC MANAGEMENT PLAN SHALL BE PAID FOR UNDER 614 LUMP SUM.
NO OTHER 3 LANE CLOSURES ARE PERMITTED.

ANY ROADWAY NOT LISTED IN THE "DISTRICT 12 PERMITTED LANE CLOSURE TIMES" SHALL NOT HAVE ANY CLOSURES WEEKDAYS FROM 7am-9am AND 3pm-6pm.

NO LANE OR SHOULDER CLOSURES SHALL BE IN PLACE WHEN NO WORK IS BEING PERFORMED.

EXIT AND ENTRANCE RAMPS LANES SHALL REMAIN OPEN AT ALL TIMES AND EXHIBIT A MINIMUM WIDTH OF TEN (10) FEET, UNLESS OTHERWISE SPECIFIED.

AT LEAST ONE 11 FOOT WIDE LANE IN EACH DIRECTION SHALL BE OPEN AT ALL TIMES.

LANE CLOSURES MAY ONLY BE IMPLEMENTED AT THE TIMES PERMITTED BY THE "DISTRICT 12, PERMITTED LANE CLOSURE TIMES" LIST, WHICH IS LOCATED ON THE ODOT WEB SITE:

www.dot.state.oh.us/d12t12/workzone/laneclo.htm

THE LATEST REVISION, AT 14 DAYS PRIOR TO THE BID DATE, SHALL BE IN EFFECT FOR THIS PROJECT.

WITH THE FOLLOWING EXCEPTIONS ON EACH BRIDGE:

- LOCATION 1, CUY-480R-0856ES, 480WB TO 715B
1 LANE CAN BE CLOSED EACH WEEKEND FOR 2 WEEKENDS FROM 7PM FRI TO 6AM MON
- LOCATION 2, CUY-77-0645R, NORTHBOUND
2 LANES CAN BE CLOSED EACH WEEKEND FOR 2 WEEKENDS FROM 9PM FRI TO 6AM MON
- LOCATION 3, CUY-77-1575
NB: 2 LANES CAN BE CLOSED EACH WEEKEND FOR 2 WEEKENDS FROM 8PM FRI TO 6AM MON
SB: 1 LANE CAN BE CLOSED EACH WEEKEND FOR 2 WEEKENDS FROM 9PM FRI TO 6AM MON
RAMP E-15 CAN BE CLOSED FOR 1 WEEKEND FROM 8PM FRI TO 6AM MON
- LOCATION 4, CUY-90-1391
EB: 2 LANES CAN BE CLOSED EACH WEEKEND FOR 3 WEEKENDS.
CLOSE 3 LANES WHEN POURING
WB: SAME AS EB
FROM 7PM FRI TO 6AM MON (EB AND WB)

- LOCATIONS 5 (CUI-90-1490R), 6 (CUI-90-1490L), AND 7 (CUI-90-1506), WB ONLY.
1 LANE OF LOCATION 6, LANES 1 AND 2 OF THE WB DIRECTION OF LOCATION 5 AND LANES 1 AND 2 OF LOCATION 7 SHALL BE CLOSED SIMULTANEOUSLY FOR 1 WEEKEND. 1 LANE OF LOCATION 6, LANES 3 AND 4 OF LOCATIONS 5 AND 7 SHALL BE CLOSED SIMULTANEOUSLY FOR 1 WEEKEND.
FOR THE EB DIRECTION OF LOCATION 5: 90EB CAN BE CLOSED 1 WEEKEND AND 71NB CAN BE CLOSED 1 WEEKEND.

- LOCATIONS 8 (CUI-90-1628L), 9 (CUI-90-1640), 10 (CUI-77R-1597L), AND 11 (CUI-90-1651L)
CLOSE 2 LANES FOR LOCATIONS 8,9 AND 11 FOR 1 WEEKEND AND REDIRECT TRAFFIC TO 77SB

- LOCATION 10, CUI-77R-1597L
CLOSE THE 77SB ON RAMP (E-13) FOR 1 WEEKEND

THE FOLLOWING SHALL EMPLOY STANDARD MOT OPERATIONS

- LOCATION 12, CUI-176-0931
CLOSURE TIMES SHALL BE CONSISTENT WITH THE DISTRICT 12 PERMITTED LANE CLOSURE REFERENCE MAP AND INFORMATION

MAINTENANCE OF TRAFFIC SCHEME (AT ALL LOCATIONS)

THE CONTRACTOR SHALL DEVISE A SIMPLE MAINTENANCE OF TRAFFIC SCHEME, WHICH SHALL BE STAMPED BY A PROFESSIONAL ENGINEER (SCHEME MAY BE A HAND SKETCH) AND PRESENTED TO THE DISTRICT WORKZONE TRAFFIC CONTROL ENGINEER AND PROJECT ENGINEER FOR APPROVAL AT LEAST TWO WEEKS PRIOR TO IMPLEMENTATION.

THE MAINTENANCE OF TRAFFIC SCHEME SHALL PRESENT, IN GENERAL, THE METHODS FOR MAINTAINING TRAFFIC THAT THE CONTRACTOR PROPOSES TO USE FOR CONDUCTING THE REQUIRED WORK IN A SAFE AND EFFICIENT MANNER. THE CONTRACTOR SHALL USE A TYPE III BARRICADE WITH FLASHING LIGHTS AND LANE CLOSED SIGN ACROSS THE ROADWAY WIDTH OF EACH STRUCTURE. POSITION THE BARRICADES ACROSS THE ENTIRE WIDTH OF THE CLOSED LANES SUCH THAT APPROACHING VEHICLES CAN EASILY RECOGNIZE THEM. THE BARRICADES SHALL REMAIN IN PLACE DURING THE ENTIRE CURING PROCESS. THE MAINTENANCE OF TRAFFIC SCHEME SHALL BE IN CONFORMANCE WITH THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD), LATEST REVISION, THE REFERENCED STANDARD CONSTRUCTION DRAWINGS, THE ATTACHED MAINTENANCE OF TRAFFIC SHEETS, AND THE SPECIFICATIONS. THE CONTRACTOR SHALL NOT COMMENCE WORK UNTIL THE MAINTENANCE OF TRAFFIC SCHEME HAS BEEN APPROVED.

THE ENGINEER SHALL PRESENT A TRAFFIC MANAGEMENT PLAN FOR EACH LOCATION. THE TRAFFIC MANAGEMENT PLAN WILL SHOW DETOURS ROUTES AND SIGNING, PLACEMENT OF PORTABLE CHANGEABLE MESSAGE SIGNS, ALTERNATE ROUTES THAT CAN BE USED BY TRAFFIC, ADVANCE WARNING TO TRAFFIC OF UP COMING CLOSURES AND RESTRICTIONS, MESSAGES THAT CAN BE BROADCAST ON ODOT'S HIGHWAY ADVISORY RADIO STATION, AND ALL OTHER DETAILS THAT WOULD INVOLVE MANAGING TRAFFIC AROUND OR THROUGH THE WORK AREA. THIS PLAN CAN BE HAND SKETCHED AND PRESENTED TO THE DISTRICT WORK ZONE TRAFFIC ENGINEER AND PROJECT ENGINEER FOR APPROVAL. IT MUST BE STAMPED BY A PROFESSIONAL ENGINEER. ALL WORK SHALL BE CONDUCTED FROM WITHIN A ONE, TWO, OR THREE LANE CLOSURE USING DRUMS ACCORDING TO THE RESTRICTIONS AND THE CONCEPTS PRESENTED IN MT-95.30M AND ASSOCIATED STANDARD CONSTRUCTION DRAWINGS MT-98.12M THRU MT-98.16M (SEE TITLE SHEET), AND THESE PLANS.

IF DURING THE PROJECT, THE ENGINEER DETERMINES THAT THE APPROVED MAINTENANCE OF TRAFFIC PLAN IS NOT PERFORMING AS DESIRED, THE WORK SHALL BE SUSPENDED UNTIL THE PROBLEM IS RESOLVED TO THE SATISFACTION OF THE ENGINEER AND THE MAINTENANCE OF TRAFFIC PLAN IS REVISED ACCORDINGLY. ANY COSTS OR DELAYS INCURRED AS A RESULT OF THE FAILURE OF THE MAINTENANCE OF TRAFFIC PLAN IS REVISED ACCORDINGLY. ANY COSTS OR DELAYS INCURRED AS A RESULT OF THE FAILURE OF THE MAINTENANCE OF TRAFFIC PLAN IS REVISED ACCORDINGLY. ANY COSTS OR DELAYS INCURRED AS A RESULT OF THE FAILURE OF THE MAINTENANCE OF TRAFFIC PLAN IS REVISED ACCORDINGLY.

DURING NON-WORKING HOURS, ALL LANES SHALL BE IN FULL OPERATION WITH ALL TRAFFIC CONTROL SIGNS, EXCEPT OW-124 (ROAD CONSTRUCTION AHEAD) SIGNS, REMOVED OR COVERED AND ALL CHANNELIZING DEVICES REMOVED FROM THE PAVEMENT SURFACES. CHANNELIZING DEVICES MAY BE STORED OR DEPLOYED TEMPORARILY ADJACENT TO THE SHOULDER TO MINIMIZE THE NIGHTLY TRAFFIC CONTROL SET-UP TIME.

CONSTRUCTION EQUIPMENT, PRIVATE VEHICLES AND MATERIALS SHALL NOT BE PARKED OR STORED ON THE ROADWAY ADJACENT TO THE ROADWAY WITHIN THE 30 FOOT CLEAR ZONE OF THE TRAVELED LANES.

NOTWITHSTANDING THE ABOVE, NO LANE OR SHOULDER CLOSURES SHALL OCCUR DURING THE PERIOD BEGINNING AT 12:00 NOON ON THE DAY PRECEDING AND CONTINUING UNTIL NOON ON THE DAY FOLLOWING LEGAL HOLIDAYS AND HOLIDAY WEEKENDS SUCH AS MEMORIAL DAY, FOURTH OF JULY, AND LABOR DAY.

FURTHERMORE, NO LANE CLOSURES SHALL BE IMPLEMENTED OR IN PLACE DURING INCREASED TRAFFIC VOLUMES CAUSED BY SPECIAL EVENTS WITH A SEATING CAPACITY OVER 40,000 (IN LIEU OF NOTE 1 IN THE "DISTRICT 12, PERMITTED LANE CLOSURE TIMES" LIST), OR WHEN THE ENGINEER DEEMS THE CLIMATOLOGICAL CONDITIONS TOO HAZARDOUS.

PAYMENT FOR ALL THE ITEMS REQUIRED TO MAINTAIN TRAFFIC IN ACCORDANCE WITH THESE REQUIREMENTS SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC.

MAINTENANCE OF TRAFFIC SYSTEMS

A. WHEN REQUIRED

WHENEVER ANY PART OF THE TRAVELED SURFACE IS BEING WORKED UPON OR IS OTHERWISE NOT SUITABLE FOR SAFE AND CONVENIENT USE BY VEHICLES, TRAFFIC CONTROL DEVICES SUFFICIENT TO PROTECT SUCH AREAS TO ASSURE THE SAFE AND CONVENIENT PASSAGE OF VEHICULAR TRAFFIC SHALL BE INSTALLED AND MAINTAINED. SUCH TRAFFIC CONTROL DEVICES AND THE MANNER IN WHICH THEY ARE USED SHALL BE CONSISTENT WITH THESE PLANS AND THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (HEREINAFTER REFERRED TO AS THE "MANUAL"). THE TRAFFIC CONTROL DEVICE SYSTEM SHALL CONSTITUTE THE MINIMUM PROVISIONS FOR TRAFFIC CONTROL FOR EACH PARTICULAR SITUATION. WHENEVER THE ENGINEER DEEMS IT NECESSARY ESPECIALLY WHERE A GRADE, CURVE, OR MERGE CONDITIONS EXIST, HE MAY DIRECT THAT ADDITIONAL OR ALTERNATIVE DEVICES BE USED.

B. CONDITIONS

DURING ALL PARTS OF THIS PROJECT, SIGNING, BARRICADES, FLASHING ARROWS, ETC. SHALL BE LOCATED AS INDICATED IN THE MANUAL OR AS SHOWN ON THE MAINTENANCE OF TRAFFIC SHEETS.

C. ADVANCE WARNING SIGNS

ALL ADVANCE WARNING SIGNS FOR ANY CONDITION WHICH RESTRICTS TRAFFIC SHALL BE ERECTED BEFORE ANY SUCH RESTRICTION IS PUT INTO EFFECT. ALL SUCH SIGNS SHALL BE COVERED OR REMOVED FROM THE VIEW OF TRAFFIC WHENEVER THEY ARE NOT APPLICABLE.

D. FLASHING ARROW REQUIREMENT

FLASHING ARROWS SHALL BE FURNISHED AS SHOWN ON THE MAINTENANCE OF TRAFFIC PLANS.

E. PROTECTION OF PUBLIC

WHENEVER ANY WORK IS BEING DONE OVER A TRAVELED LANE OR SHOULDER, THE CONTRACTOR SHALL SUPPLY SUFFICIENT SAFETY EQUIPMENT AS APPROVED BY THE DIRECTOR TO PROTECT THE TRAVELING PUBLIC FROM ANY CONSTRUCTION DEBRIS. IF TRAVELED LANES UNDER STRUCTURES ARE TO BE CLOSED FOR REASONS OF SAFETY, METHOD AND TIME OF CLOSURE MUST BE APPROVED PRIOR TO IMPLEMENTATION. PERSONAL CARS SHALL NOT BE PARKED WITHIN THE L/A.

F. LAW ENFORCEMENT OFFICER WITH PATROL CAR

THE CONTRACTOR SHALL PROVIDE AND PAY ALL COST FOR THE SERVICES OF LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR THE EXCLUSIVE PURPOSE OF CONTROLLING TRAFFIC AS DETERMINED BY THE ENGINEER. THE NUMBER OF OFFICERS AND CARS REQUIRED FOR THIS PURPOSE SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE OFFICERS SHALL MOVE THEIR PATROL CARS AS NECESSARY TO INSURE THEIR CONSTANT PRESENCE AT THE POINT(S) OF SLOWDOWN, STOPPAGE OR BACK-UP. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE ARRANGEMENTS FOR SCHEDULING AND PAYMENT OF LAW ENFORCEMENT OFFICER WITH PATROL CAR.

PAYMENT FOR ALL OF THE ABOVE SHALL BE INCLUDED IN THE MAN HOUR PRICE BID FOR ITEM 614 - LAW ENFORCEMENT OFFICER WITH PATROL CAR.

G. WORKSITE TRAFFIC SUPERVISOR (AT ALL LOCATIONS)

THE CONTRACTOR SHALL EMPLOY (OTHER THAN THE SUPERINTENDENT) AND SUBJECT TO THE APPROVAL OF THE ENGINEER, A CERTIFIED WORKSITE TRAFFIC SUPERVISOR (WTS). THE WTS MAY BE CERTIFIED FROM ONE OF THE FOLLOWING ORGANIZATIONS:

- 1) AMERICAN TRAFFIC SAFETY SERVICE ASSOCIATION A.T.S.S.A. PHONE NUMBER 1-800-272-8772) CERTIFIED WORKSITE TRAFFIC SUPERVISOR (WTS)
- 2) THE NATIONAL SAFETY COUNCIL, TRAFFIC CONTROL ZONES SUPERVISORS COURSE, PHONE NO. 1-800-441-5103
- 3) NATIONAL HIGHWAY INSTITUTE, DESIGN AND OPERATION OF WORK ZONE TRAFFIC CONTROL, PHONE NO. 1-703-235-0528

THE WTS POSITION IS ESTABLISHED FOR THE PURPOSE OF MONITORING AND CORRECTING ANY TRAFFIC CONTROL DEFICIENCIES IN THE WORK ZONE. THE WTS SHALL OVERSEE ALL OPERATIONS THAT AFFECT THE MOVEMENT OF VEHICULAR AND PEDESTRIAN TRAFFIC THROUGH THE WORK ZONE.

THE WTS SHALL BE PRESENT WHEN THE CONTRACTOR OR SUBCONTRACTOR INSTALLS A TRAFFIC RESTRICTION, LANE CLOSURE, ETC. IN LIEU OF THE WTS BEING PRESENT WHEN A SUBCONTRACTOR HAS A WORKZONE IN PLACE, THE CONTRACTOR MAY USE HIS OWN PERSONNEL THAT IS A CERTIFIED WTS. THE CONTRACTOR OR SUBCONTRACTOR MUST PRESENT A COPY OF HIS WTS CERTIFICATE TO THE PROJECT ENGINEER. A WTS MUST BE PRESENT WHEN THE WORK ZONE IS BEING SET UP. HE MUST APPROVE THE WORK ZONE BEFORE HE LEAVES OR PERFORMS OTHER DUTIES.

THE RESTRICTIONS ARE SHORT TERM. THE WTS SHALL MONITOR THE ZONE FOR COMPLIANCE. DURING THE LANE CLOSURE HE SHALL MAKE SURE ALL TRAFFIC CONTROL ITEMS ARE FUNCTIONING PROPERLY. TRAFFIC CONTROL WILL BE THE WTS' MAIN DUTY DURING IMPLEMENTATION OF ZONES OR SHORT TERM ZONES. THE WTS SHALL HAVE THE AUTHORITY TO HAVE DEFICIENCIES CORRECTED AS SOON AS POSSIBLE. THE WTS SHALL PROVIDE THE DISTRICT WORK ZONE TRAFFIC CONTROL ENGINEER A SKETCH OF THE TRAFFIC CONTROL PLAN (TCP) EVERYDAY THERE IS TO BE A SHORT TERM TRAFFIC RESTRICTION, LANE CLOSURE, ETC. THIS TCP SHALL SHOW HOW THE WORK ZONES ARE TO BE IMPLEMENTED.

THE WTS SHALL BE AVAILABLE ON A 24-HOUR BASIS TO REPAIR AND/OR REPLACE DAMAGED OR MISSING TRAFFIC CONTROL DEVICES. A 24-HOUR PHONE NUMBER SHALL BE MADE AVAILABLE TO THE PROJECT ENGINEER IN ORDER TO CONTACT THE WTS. THE WTS SHALL HAVE A PAGER AND THE PHONE NUMBER PROVIDED TO THE PROJECT ENGINEER.

FAILURE OF THE CONTRACTOR TO COMPLY WITH ANY OF THE ABOVE, SHALL CONSTITUTE CAUSE FOR THE PROJECT ENGINEER TO DEDUCT \$500.00 PER DAY FROM MONEY DUE TO THE CONTRACTOR NOT AS A PENALTY, BUT AS A LIQUIDATED DAMAGE.

PAYMENT FOR THE WTS SHALL BE INCLUDED UNDER THE LUMP SUM ITEM 614 - MAINTAINING TRAFFIC.

H. FAILURE TO COMPLY

IF THERE IS ANY FAILURE TO COMPLY WITH PROVISION FOR TRAFFIC CONTROL SET OUT IN THESE PLANS AND NOTES, OR WITH THE PROVISIONS OF THE "MANUAL", THE HIGHWAY IN THE VICINITY OF THE WORK AREA SHALL NOT BE CONSIDERED IN A CONDITION FOR THE SAFE AND CONVENIENT USE BY THE TRAVELING PUBLIC. ANY FAILURE TO KEEP THE HIGHWAY, IN THE VICINITY OF THE WORK AREA, IN A CONDITION FOR THE SAFE AND CONVENIENT USE BY THE TRAVELING PUBLIC SHALL BE CONSIDERED A BREACH OF THIS CONTRACT. WORK SHALL BE SUSPENDED UNTIL THE CONTRACTOR COMPLIES WITH THE PROVISION OF THE AFOREMENTIONED ITEMS.

MAINTENANCE OF TRAFFIC CONTROL MATERIAL

A. SIGNS

SIGN DIMENSIONS AND SPECIFICATIONS, INCLUDING LETTER SIZES SHALL BE AS PROVIDED IN THE "MANUAL", OR IN DESIGN DRAWINGS PROVIDED BY THE DEPARTMENT OF TRANSPORTATION. THE SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER PRIOR TO THE START OF THIS PROJECT.

WORK ZONE MARKING SIGNS

WORK ZONE MARKING SIGNS SHALL BE ERECTED PER ITEM 614.04 OF THE CMS.

B. SIGN SUPPORTS

SIGN SUPPORTS SHALL BE AS SHOWN ON STANDARD DRAWINGS MT-105.I0 AND MT-105.II.

C. FLASHING ARROWS

THE ELECTRIC FLASHING ARROW SHALL BE AS SHOWN ON STANDARD CONSTRUCTION DRAWING MT-35.I0.

D. CONES

CONES SHALL BE LOCATED AS SHOWN IN THE "MANUAL" AND THE TRAFFIC CONTROL PLANS.

E. DRUMS

DRUMS SHALL BE LOCATED AS SHOWN ON THE TRAFFIC CONTROL PLANS AND ARE REQUIRED FOR NIGHTTIME CLOSURES.

F. FLOODLIGHTING

FLOODLIGHTING OF THE WORK SITE FOR OPERATIONS CONDUCTED DURING NIGHT TIME PERIODS SHALL BE ACCOMPLISHED SO THAT THE LIGHTS DO NOT CAUSE GLARE TO THE DRIVERS ON THE ROADWAY. TO ENSURE ADEQUACY OF THE FLOODLIGHT PLACEMENT, THE CONTRACTOR AND ENGINEER SHALL DRIVE THROUGH THE WORK SITE EACH NIGHT WHEN THE LIGHTING IS IN PLACE AND OPERATIVE PRIOR TO COMMENCING ANY WORK. IF GLARE IS DETECTED THE LIGHT PLACEMENT AND SHIELDING SHALL BE ADJUSTED TO THE SATISFACTION OF THE ENGINEER BEFORE WORK PROCEEDS.

PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR MAINTAINING TRAFFIC.

G. PORTABLE CHANGEABLE MESSAGE SIGN, AS PER PLAN

THE CONTRACTOR SHALL FURNISH, INSTALL, MAINTAIN, AND REMOVE WHEN NO LONGER NEEDED, UP TO FOUR (4) PORTABLE CHANGEABLE MESSAGE SIGN(S) AT EACH CLOSURE. THE PCMS SHALL BE OF THE TYPE SHOWN ON THE LIST OF APPROVED PCMS MAINTAINED BY THE DIRECTOR. THE PCMS SHALL BE A CLASS I OR II TYPE UNIT.

THE PORTABLE CHANGEABLE MESSAGE SIGN SHALL BE MOUNTED ON A TRAILER. NO FLIP DISC SIGNS ARE PERMITTED. THE LOCATION OF THE PCMS SHALL BE AS DIRECTED BY THE ENGINEER. THE ENGINEER SHALL BE PROVIDED ACCESS TO EACH SIGN UNIT AND SHALL BE PROVIDED WITH APPROPRIATE TRAINING AND OPERATION INSTRUCTIONS.

THE PCMS SHALL CONTAIN A CELLULAR TELEPHONE LINK WHICH WILL ALLOW REMOTE SIGN ACTIVATION, DEACTIVATION, MESSAGE CHANGES, MESSAGE ADDITIONS AND REVISIONS TO TIME OF DAY PROGRAMS. THE SYSTEM SHALL ALSO PERMIT VERIFICATION OF CURRENT AND PROGRAMMED MESSAGES.

THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER THE SOFTWARE NECESSARY TO CONTROL THE PCMS REMOTELY.

THE PCMS SHALL BE EQUIPPED WITH A MYRIAD SAFETY BEAM OR AN APPROVED EQUAL AS DETERMINED BY THE ENGINEER. THE MYRIAD SAFETY BEAM SENDS OUT A SIGNAL THAT ACTIVATES RADAR DETECTORS. THE BEAM IS APPROVED BY THE F.C.C. THE MYRIAD SAFETY BEAM SHALL USE THE SAME POWER SUPPLY AS THE PCMS. THE MYRIAD SAFETY BEAM SHALL BE ABLE TO BE ACTIVATED WITH THE PCMS RUNNING OR NOT. THE MYRIAD SAFETY BEAM IS DISTRIBUTED BY THE TRIPLEX GROUP, INC., P.O. BOX 428, NEW HOPE, PA 18938, PHONE (215) 862-5077.

AT THE DIRECTION OF THE ENGINEER THE PCMS MAY BE REMOVED FOR PERIODS OR TIMES WHEN NOT IN USE. NO PAYMENT WILL BE MADE FOR THESE TIMES (EX. WINTER MONTHS).

THERE SHALL BE AT LEAST ONE CLASS I OR II CHANGEABLE MESSAGE SIGNS AT EACH WEARING SURFACE REPLACEMENT OPERATION.

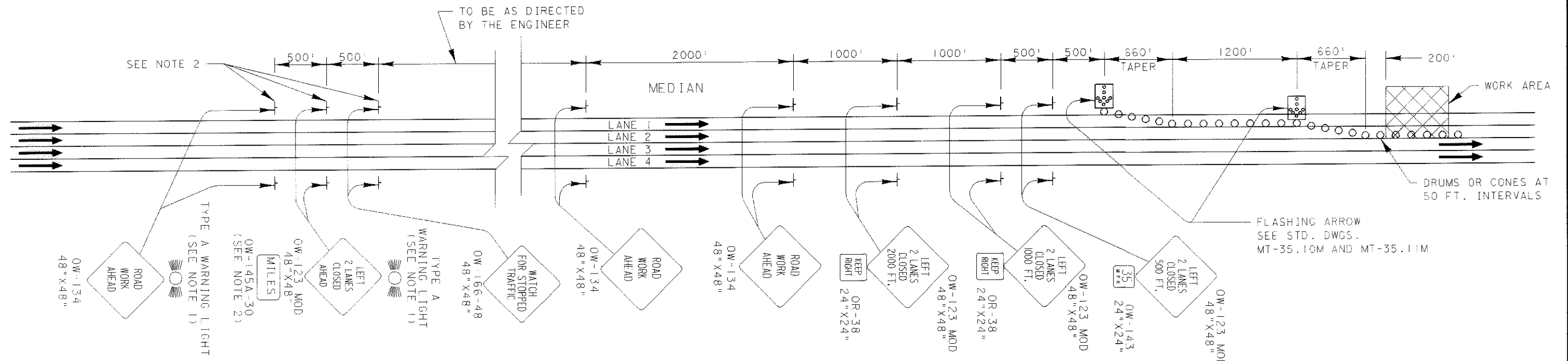
PAYMENT FOR THE PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE AT THE LUMP SUM UNIT PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC.

G. WORK VEHICLES

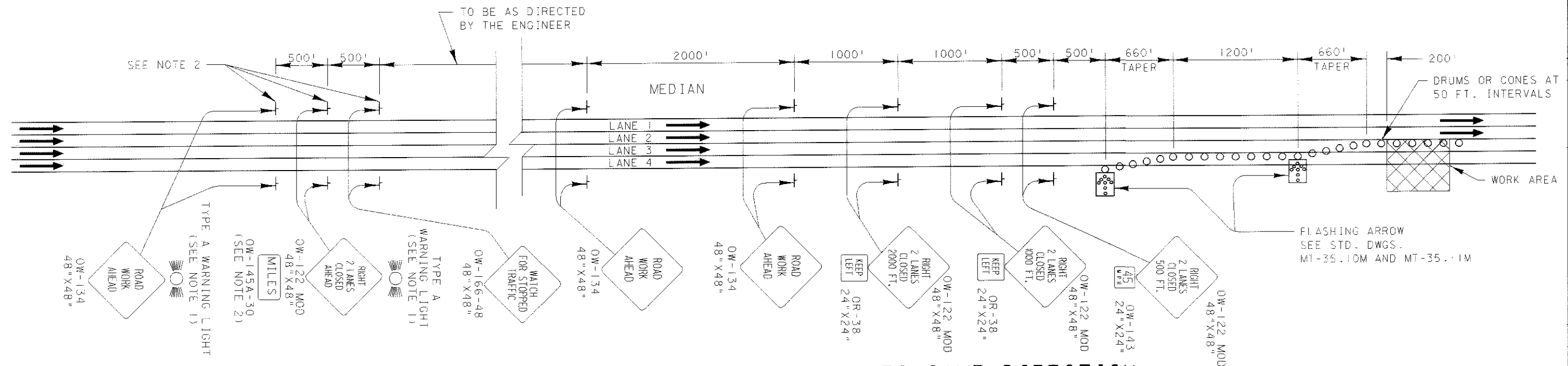
ALL WORK VEHICLES LICENSED TO OPERATE ON THE HIGHWAY, INCLUDING TRUCKS, SHALL BE EQUIPPED WITH A FLASHING, ROTATING OR OSCILLATING AMBER LIGHT VISIBLE TO ALL DIRECTIONS OF TRAFFIC FOR A MINIMUM OF ONE-HALF KILOMETER IN BRIGHT SUNLIGHT AND SHALL BE OPERATED WITH LIGHTED HEAD AND TAIL LAMPS. THE AMBER LIGHT SHALL BE IN OPERATION AT ALL TIMES WITHIN THE WORK ZONE AND WHILE TRAVELING TO AND FROM THE WORK ZONE WHENEVER THE VEHICLE SPEED IS BELOW 55 MPH. VEHICLE HAZARD LAMPS DO NOT SATISFY THIS REQUIREMENT. ALL OTHER EQUIPMENT SHALL BE EQUIPPED WITH A FLASHING, ROTATING OR OSCILLATING AMBER LIGHT VISIBLE IN ALL DIRECTIONS OF TRAFFIC FOR A MINIMUM OF ONE-HALF KILOMETER IN BRIGHT SUNLIGHT. THE AMBER LIGHT SHALL BE IN OPERATION WHILE THE EQUIPMENT IS WITHIN THE WORK ZONE.

PAYMENT

PAYMENT FOR PROVIDING, ERECTING, MAINTAINING AND REMOVING TEMPORARY MAINTENANCE OF TRAFFIC CONTROL DEVICES, INCLUDING WORK ZONE MARKING SIGNS, SHALL BE MADE UNDER THE LUMP SUM PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC UNLESS SEPARATELY ITEMIZED.



LEFT 2 LANES CLOSED FOR 3 OR 4 LANES SAME DIRECTION



RIGHT 2 LANES CLOSED FOR 3 OR 4 LANES SAME DIRECTION

GENERAL NOTES:

1. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE "ROAD WORK AHEAD" AND "RIGHT(OR LEFT) 2 LANES CLOSED AHEAD" SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.
2. EXTRA ADVANCE WARNING SIGN GROUPS CONSISTING OF OW-128, OW-122 MOD, OR OW 123 MOD AND OW-166 SIGNS PLUS DISTANCE PLATES MAY BE SPECIFIED IN THE PLANS OR REQUIRED TO BE ERRECTED AT THE DIRECTION OF THE ENGINEER.

TEMPORARY SIGN SUPPORT REQUIREMENTS

A. PLACEMENT OF SIGNS WHICH WILL REMAIN MORE THAN ONE DAY:

- 1) Lateral placement to nearest edge of signs shall be as follows:
 - A) On the right side of the road for approaching traffic (except for dual mounted signs and signs designated in the plans for left side mounting).
 - B) Curbed roadway - minimum 2' (0.6 m) behind face of curb.
 - C) Uncurbed roadway - 12' (3.6 m) from edge of traffic lane or 6' (1.8 m) from edge of paved or useable shoulder, whichever is greater.
 - D) Behind guardrail or barrier - preferably 2' (0.6 m) behind face of guardrail (minimum 1' (0.3 m)) for signs on class a supports; 4' (1.2 m) for Class B or C supports; 1' (0.3 m) behind face of Concrete Barrier unless barrier top mounting is required by the plan.
- 2) Vertical clearance of signs, measured above roadway elevation, shall be as follows:
 - A) Rural - 5' (1.5 m) when parked cars, construction equipment, etc will not obscure sign visibility.
 - B) Rural areas with parked cars or construction equipment - 7' (2.1 m)
 - C) Urban - 7' (2.1 m)
 - D) Care shall be taken to assure that signs will not be obscured by construction equipment, trees, weeds or other obstacles. Brush, weeds or grass within the right of way shall be trimmed as necessary. Signs shall normally be visible to traffic 400' (120 m) to 600' (180 m) in advance of the sign.
- 3) Supports for signs which will remain in place more than one day shall be fixed rather than portable except in situations where the sign must rest on permanent pavement or other surface which would be damaged by insertion of post type supports.

B. PLACEMENT OF SIGNS WHICH WILL REMAIN FOR ONE DAY OR LESS:

- 1) Same as A-1 above except that signs may be placed on the roadway only if they do not intrude into a traffic lane in use.
- 2) Minimum of 1' (0.3 m) above roadway

C. CLASSES OF SUPPORTS:

All temporary sign supports shall be of the following types:

1) CLASS A:

Supports shall be used for exposed locations on highways where traffic approach speeds of 40 MPH and higher are encountered. They are also suitable for use in all other locations.

2) CLASS B:

Supports may only be used where fully protected by guardrail, concrete barrier and in locations positively protected from traffic such as on retaining walls.

D. TRAFFIC APPROACH SPEEDS:

Traffic approach speeds shall be the locally posted speed (not advisory speed signs) or the measured actual (85th percentile) speed (if available) of approaching traffic, whichever is higher, adjacent to the sign location.

TABLE

APPROACH SPEED (MPH)	COMPLETELY PROTECTED BY GUARDRAIL OR BARRIER	PARTLY PROTECTED BY GUARDRAIL OR BARRIER *	GREATER THAN 30' (9 m) FROM EDGE OF PAVEMENT	WITHIN 30' (9 m) FROM EDGE OF PAVEMENT
40 AND HIGHER	A OR B	A OR B	A OR B **	A ONLY
26 TO 39	A OR B	A OR B	A OR B	A OR B
0 TO 25	A OR B	A OR B	A OR B	A OR B

* If supports are behind guardrail but not fully 5'6" (1.7 m) behind face of rail or if sign is not 1' (0.3 m) behind face of concrete barrier.

** 30' (9 m) criterion is based upon straight roadway and a slope of 6 to 1 or flatter. Supports on the outside of curves or located down a slope (steeper than 6 : 1) will require use of class a supports.

E. BALLASTING

Ballasting of portable supports shall be with sandbags placed within 1' (0.3 m) of the ground. In no case shall hard objects be used for ballast.

F. STRENGTH OF SIGN SUPPORTS

The Contractor shall choose sign supports of adequate strength and with adequate foundations and anchorage to support the sign sizes erected. Proprietary devices shall not be loaded beyond the limits recommended by the manufacturer. Slip base type breakaway beam connections shall be at least partially embedded in concrete consisting of a 1' (0.3 m) deep by 1' (0.3 m) diameter collar. Sign supports which fail under typical wind load conditions shall be immediately modified or replaced with a support of adequate strength.

G. PROHIBITED SUPPORTS

The following support types shall not be permitted on projects:

- 1) Supports fabricated from automotive axle differential assemblies and similarly heavy assemblies which cannot be considered breakaway type.
- 2) Supports consisting of vertical posts with angled braces made from drivepost or other rigid elements.
- 3) Supports that are not NCHRP 350 compliant.

CLASS A SUPPORTS FIXED SUPPORTS

- 1) All #2 and #3 posts when installed singly or in pairs (side by side) according to the details of TC-41.20. The number of supports shall be as shown on TC-52.10 and TC-52.20.
- 2) The following post types, when installed singly, by imbedment or driving into earth to a depth of about 42 inches (1.1 m).
 - A) - up to 4"x4" (102x102 mm) wood.
 - B) - up to 2" (51 mm) diameter schedule 40 steel pipe.
 - C) - up to 3" (76 mm) diameter schedule 40 aluminum pipe.
 - D) - up to 2 1/4" (56.4 mm) square, 12 gauge wall, punched steel post.
 - E) - up to 6"x8" (152x203 mm) wood with breakaway holes shown on MT-105.11.
- 3) The following post types when installed in pairs (side by side) with less than 6'-5/8" (2 m) between posts, by imbedment or driving into earth to a depth of about 42 inches (1.1 m):
 - A) - up to 4"x4" (102x102 mm) wood.
 - B) - up to 2" (51 mm) diameter schedule 40 steel pipe.
 - C) - up to 3" (76 mm) diameter schedule 40 aluminum pipe.
 - D) - up to 2" (51 mm) square, 14 gauge wall, punched steel post.
- 4) Fixed Type III Barricades:
- 5) All breakaway connection beam supports, when installed according to the proper details shown on TC-41.10 with a minimum clear distance between supports of 7' (2.1 m) for supports larger than w6 x 9.
- 6) Any breakaway post or post and connection which has been crash tested and approved by the FHWA as satisfying the breakaway criteria described in 630.06.

(CONTINUED ON MT-105.11)

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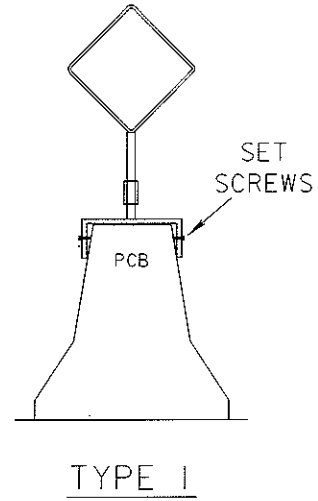
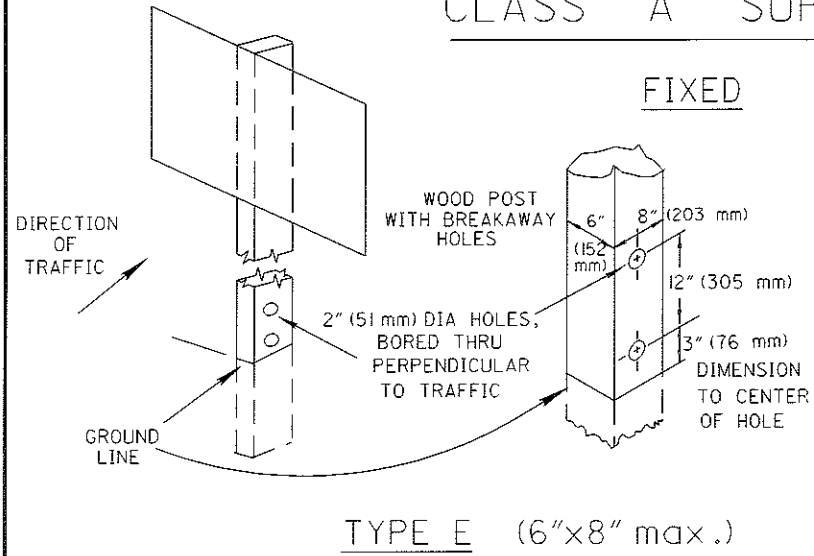
TEMPORARY SIGN SUPPORT I

OFFICE OF TRAFFIC
ENGINEERING

MT-105.10

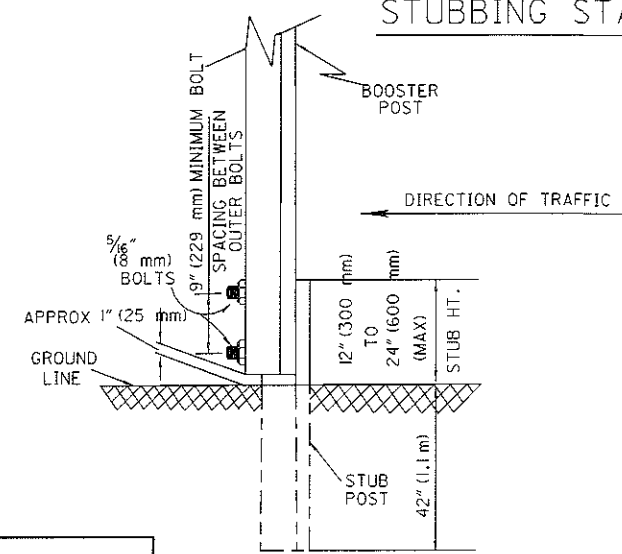
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CLASS A SUPPORTS



CLASS A SUPPORTS

STUBBING STANDARD



NOTES

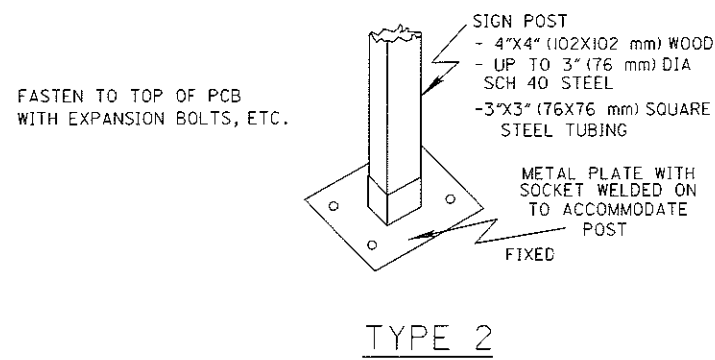
1. FOR USE WITH #3 POST OR SMALLER ONLY
2. BOLTS SHALL BE STEEL OR ALUMINUM
3. A MINIMUM OF TWO FASTENERS SHALL BE USED PER ASSEMBLY
4. BOOSTER POST SHALL BE MOUNTED BEHIND STUB POST
5. BOOSTER POST SHALL BE THE SAME OR 1LB/FT (1.5 kg/m) LESS THAN STUB POST

TYPE E (6"x8" max.)

TYPE I

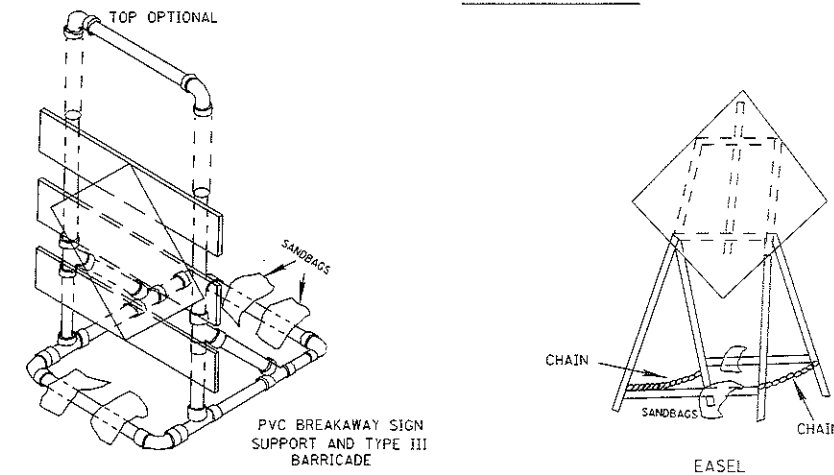
CLASS A SUPPORTS

PORTABLE

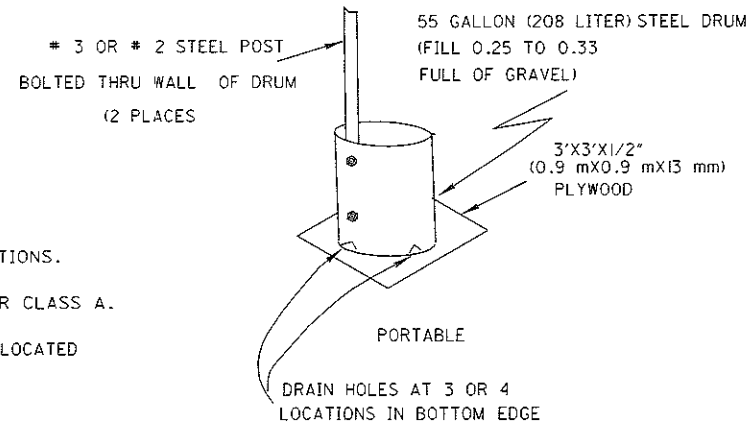


TYPE 2

NOTE: SPECIFIC INFORMATION SEE MT-105.10

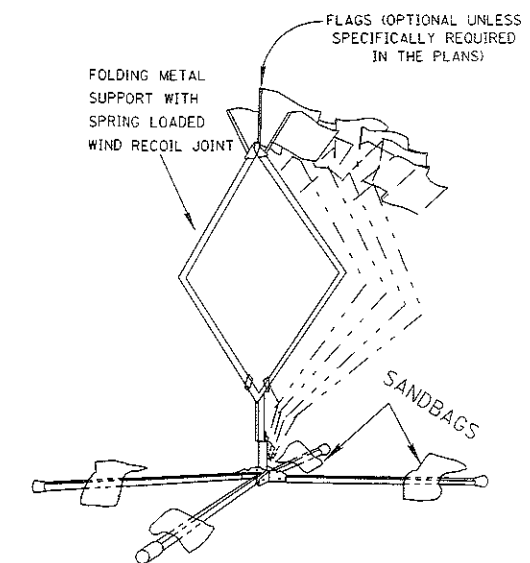


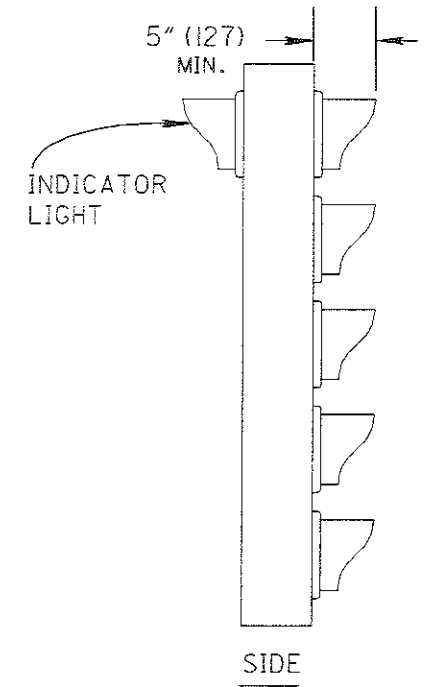
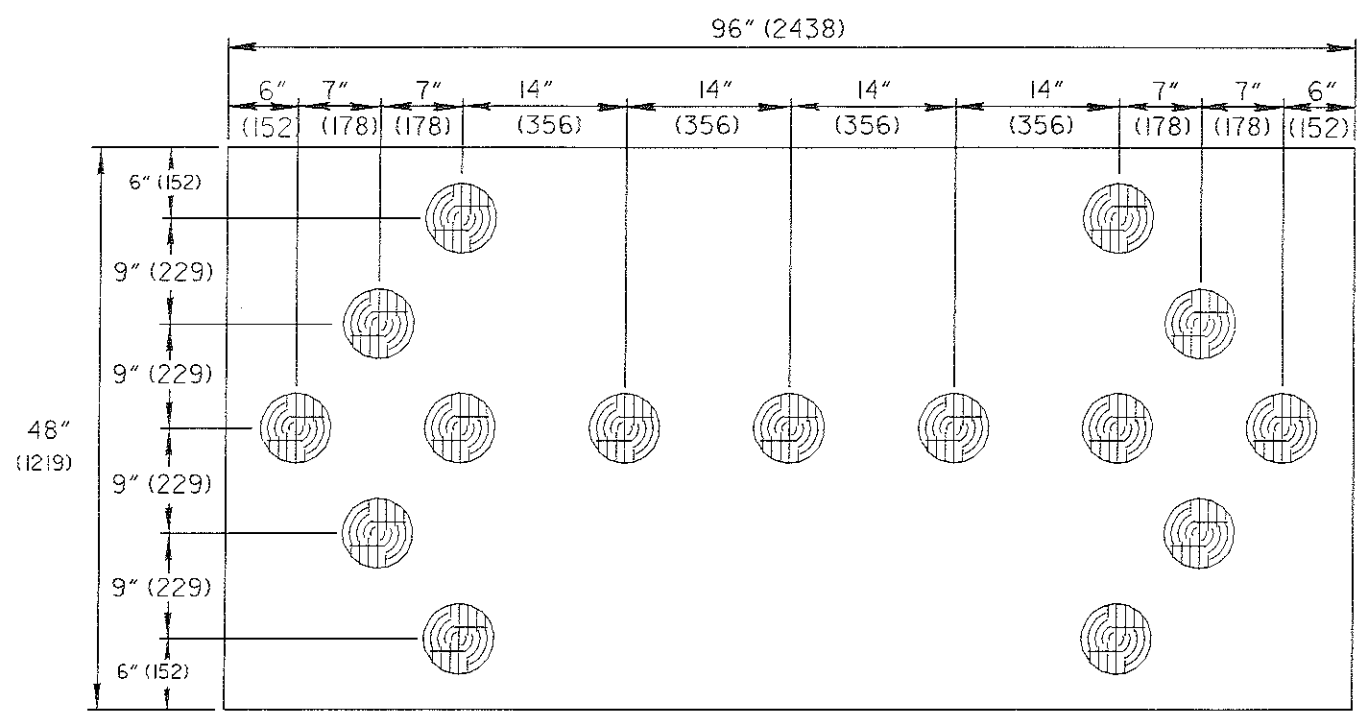
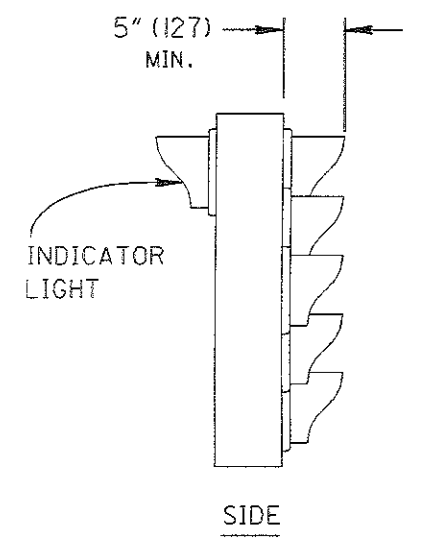
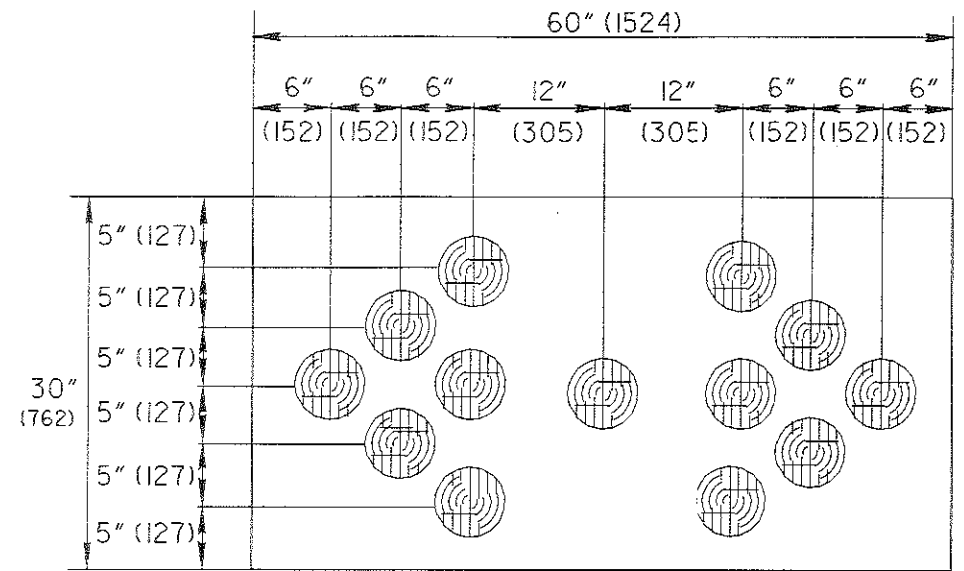
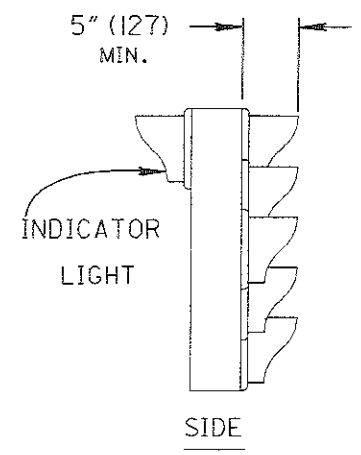
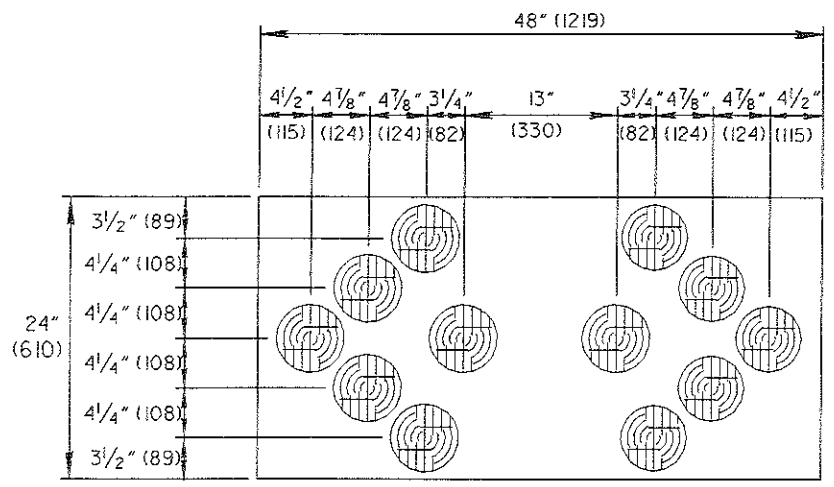
CLASS B SUPPORTS



PORTABLE

1. ALL BEAM TYPE SUPPORTS WITHOUT BREAKAWAY CONNECTIONS.
2. SUPPORTS SIMILAR TO BUT LARGER THAN PERMITTED FOR CLASS A.
3. THE STEEL DRUM(S) SHOWN BELOW MAY BE USED ONLY WHEN LOCATED BEHIND GUARDRAIL OR BARRIER.





ALL DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.

FLASHING ARROW PANEL

The flashing arrow panel shall consist of the following components:

- A. flasher panel
- B. lamps
- C. controls
- D. power supply
- E. mounting

A. Flasher panel

The flasher panel shall be of exterior type plywood or corrosion resistant metal construction of adequate design and strength. The panel finish shall be flat black.

A flasher panel shall be one of three sizes. The type A panel shall be a nominal 24" (610 mm) high by 48" (1219 mm) wide. Type B shall be a nominal 30" (762 mm) high by 60" (1524 mm) wide. Type C shall be a nominal 48" (1219 mm) high by 96" (2438 mm) wide.

Flashing arrow panels shall normally utilize high output (4412A and 4415A) lamps powered by an engine driven generator when permitted by the plans. The contractor may also furnish units powered by a solar array and batteries or only batteries. However, these units shall not be used where the approaching traffic would be on a horizontal curve in excess of 3 degrees. These units shall not be used if the approaching traffic, closer than 1 mile (1.6 km) [1/2 mile (.8 km) where speed limits are less than 40 MPH], is more than 5 1/2 degrees horizontally or 2 degrees vertically from the central axis of the lens units.

B. Lamps

For engine powered generator units, lamps shall be ANSI Number 4412a (PAR 46) for type B and C and 4415a (PAR 36) for type A. The lamp shall be fitted with an upper hood of not less than 180° at least 5" (127 mm) long. Arrow panels may use a lower power (wattage) lamp than the standard arrow panels. The lamps shall be approximately 5" (127 mm) diameter with a parabolic reflector. The lamp shall provide improved light distribution control by means of high quality reflectors and refractors. The light output from each lamp of the arrow shall not be less than shown in figure 1 when operating at full daytime brightness.

The lamps shall be securely mounted and positioned in the panel perpendicular to the panel face and oriented so that the lamp location lug (on back of the lamp) is on the horizontal center line through the lens. The lug will be on the right side of the lamp as viewed from the front.

The lamps shall be wired in circuits that can be switched to display any one of the following messages: left arrow, right arrow, left and right, and caution bar. A minimum of three indicator lights shall be placed on the back of the panel to indicate which message mode is in operation.

Each panel shall contain the following number of lamps as a minimum: type A-12 lamps, type B-13 lamps, type C-15 lamps.

CANDLE POWER CHART

				100					4°	
		100	150	200	150	100			2°	
100	150	200	250	350	250	200	150	100	0° HORIZONTAL	
		100	150	200	150	100			- 2°	
				100					- 4°	
10°	7.5°	5°	2.5°	0°	2.5°	5°	7.5°	10°		
LEFT			CENTER				RIGHT			

- (1) Measurements expressed in candela.
- (2) Color of output light shall be yellow to light yellow.

Figure 1

C. Controls

Each flashing arrow panel shall contain a flasher control and a dimmer control unit housed in a cabinet which can be locked.

1. Flasher control

The flash rate for the sign panel shall be 25 to 40 flashes per minute. The flasher shall not cause electromagnetic interference. The lamps shall have a minimum "on time" of 50% and a maximum of 66%.

2. Dimmer control

Lamp intensity shall be variable by means of a photoelectrically controlled circuit which shall reduce lamp output during low ambient light conditions. Lamp intensity shall be at the nighttime level whenever the ambient illumination is in or below the range 2 foot-candle (21 lux) to 5 foot-candle (54 lux) and shall be at daytime level when ambient illumination is in or above the range 5 foot-candle (54 lux) to 10 foot-candle (108 lux). If controls provide for continuous adjustment of lamp intensity with respect to ambient illumination, then lamp intensity shall increase linearly from nighttime intensity at 5 foot-candle (54 lux) to daytime intensity at 3250 foot-candle (35,000 lux). A time delay shall be built into the control to prevent false operation due to light flashes. The photoelectric control shall contain a switch which shall override the photoelectric control.

D. Power supply

The flashing arrow panel shall operate from power sources capable of continuously furnishing the proper voltage to the lamps a minimum of 24 hours without attendance.

D. Cont.

Motor generators, if used shall be of modern design to provide low emission of pollutants and shall be properly muffled. The motor generator shall be enclosed in a mesh enclosure which can be locked. The fuel tank shall have a cap which can be locked. Motor generators supplying power to a flashing arrow sign shall not be used to supply power to other equipment. Gasoline fueled engines shall not be used.

Battery and solar/battery units shall have a no-charge-life of not less than 15 days. No-charge-life is the number of consecutive days that the system can continue to function (double arrow mode, normal dimming during 12 hour night, full output during 12 hour day) starting with a full battery charge and with no additional charge being provided by the solar cells. The no-charge-life may be based upon calculations providing that manufacturer's ratings and efficiency calculations are furnished for each major component.

E. Mounting

The flashing arrow panel may be trailer or vehicle mounted or mounted on a rigid supporting device suitable for maintaining it in the designated position. Each of the mounting methods shall be suitably stable such as to prevent movement due to high winds or passage of large vehicles.

When a trailer is used, construction shall be such as to transport the flashing arrow panel and appurtenances adequately and legally as well as support them properly during operation. The trailer shall be equipped with devices which shall provide leveling and stability during operation.

Minimum arrow panel mounting height shall be 7 feet (2.1m) above the pavement surface (measured to the bottom of the panel).

Use and operation

The flashing arrow panel shall be located as shown in the maintenance of traffic drawings or as directed by the Engineer and operated continuously during traffic maintained periods. The Contractor shall supply all fuel, lubricants and parts necessary to obtain continuous operation and shall provide all service. The Contractor shall inspect the operation of the unit daily, including weekends and holidays. The Contractor shall arrange with the Engineer, an acceptable method of obtaining service for a malfunctioning panel within 30 minutes of a reported malfunction. Lamp intensity shall be adjusted to provide minimum legibility distances of 1/2 mile (.8 km) type A, 3/4 mile (1.21 km) type B and 1 mile (1.6 km) type C.

Type C panels shall be used for stationary operations on high speed 55 MPH or greater, high volume roadways. Type B shall be used for stationary operations on intermediate speed 40-50 MPH facilities, and type A on low speed 20-35 MPH facilities.

In addition, type B panels shall be used for moving operations on freeways and expressways and type A for moving operations on other facilities.

Battery and solar/battery units shall be fully charged when first set up. They shall have gauges to indicate approximate battery charge remaining. The Contractor shall verify daily that the unit is operating satisfactorily and the remaining battery charge is sufficient for at least 2 more days.

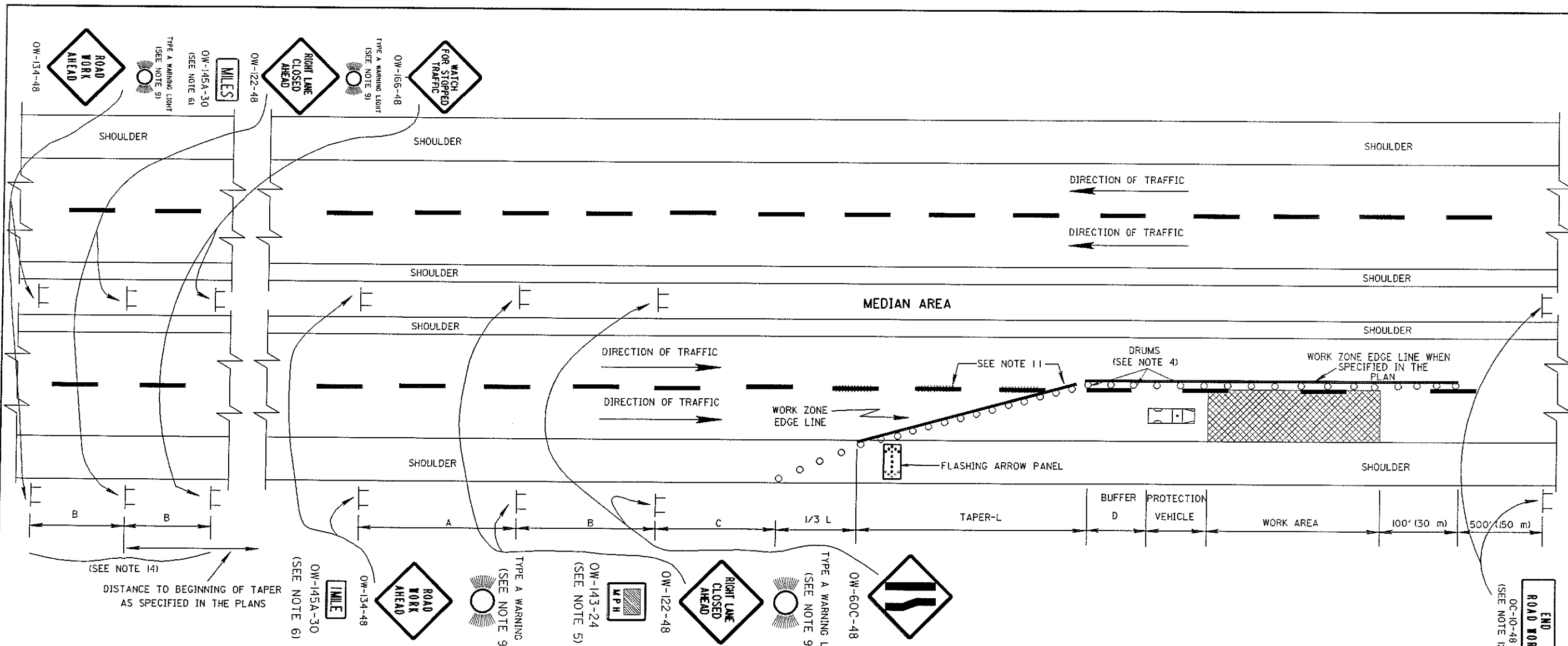
Flashing arrow panels are not to be used on two lane-two way roadways.

When left unattended the control cabinet, motor generator enclosure and fuel tank shall be locked.

Type A and type B panels used in moving operations may be powered by the vehicle's electrical system but shall not be left unattended when so powered.

When not in use, the flashing arrow panel shall be stored at a location which will not be hazardous to traffic or pedestrians.

The panels shall be designed for operation in 100% humidity and temperatures from -20 to + 130 degrees Fahrenheit (-29 to + 54 degrees Celsius).



GENERAL NOTES:

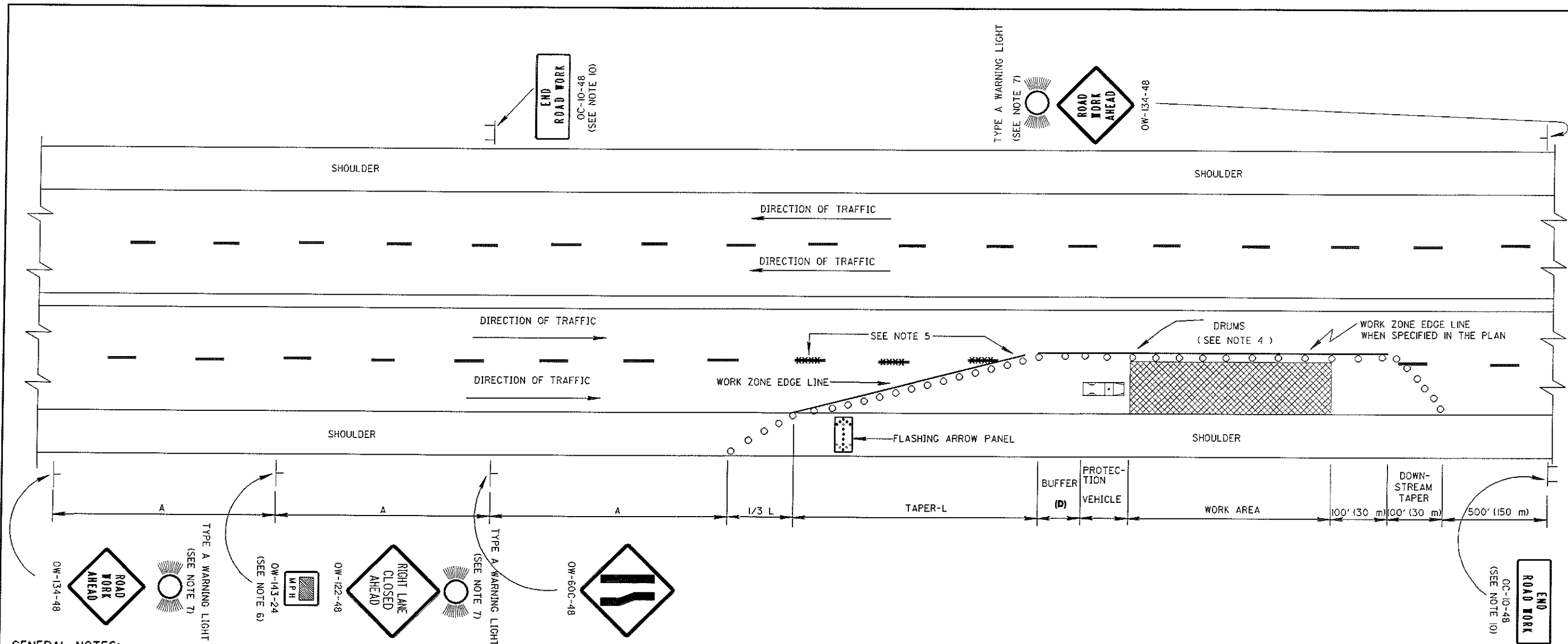
- The location of the merging taper and the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.
- The spacing between proposed signs should be adjusted to not conflict with and to provide a minimum of 200 ft (60 m) clearance to existing signs.
- The taper length (L) and spacing (s) of drums shall conform to table II. Drum spacing (s) shall be used for the merging taper, the buffer area and for the first 1000 ft (300 m) of the work area and at other hazardous locations as directed by the engineer. The maximum drum spacing for the balance of the work area is to be two times the spacing (s) in table II. A minimum of 5 drums shall be used to close the shoulder.
- Cones having a minimum height of 28 inches (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
- The advisory speed sign OW-143 shall be used when specified in the plan.
- The distance plate OW-145A shall indicate the distance to the beginning of the merging taper (L). Distances less than one mile may be expressed in feet. The plaque may be omitted if extra advance sign groups are not used.
- The protection vehicle, located close to the work, shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area. The vehicle shall be equipped with a 360 degree rotating or flashing amber beacon clearly visible a minimum of 1/4 mile (400 m). Other protective devices may be used in lieu of the protection vehicle shown when approved by the Engineer.
- The flashing arrow panel shall meet the requirements of Standard Construction Drawing MT-35.10.
- Type A flashing warning lights shown on the OW-134 and OW-122 (123) signs are required whenever a night lane closure is necessary
- When work is being performed in the lane adjacent to the median on a divided highway, OW-123 signs shall be substituted for the OW-122 signs and OW-60D signs shall be substituted for the OW-60C signs.
- If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and the appropriate color work zone edge line shall be applied along the taper. Work zone edge lines which would conflict with final traffic lanes shall be removable (740.06 type I) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.06 type I shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.
- The DC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.
- OW-134 signs shall be provided on entrance ramps and/or side roads located within the work limits or the advance warning sign group. Within the length of closure, provision shall be made to control traffic entering from intersecting streets and driveways. Three drums shall be placed on each side across the closed lane at each intersection and driveway.
- Extra advance warning sign groups consisting of OW-134, OW-122 and OW-166 signs plus distance plates may be specified in the plans or required to be erected at the direction of the Engineer.
- All material and equipment shall be removed from the closure and the work area when no work is being done.
- The speed limit chosen for design of tapers shall be the normal legal speed except where the legal speed limit is reduced due to the construction and the subject lane closure is not the first active construction area encountered by traffic within the project.
- This drawing should be used on projects with dropoffs less than 5' in the work area. Projects with dropoffs greater than 5' in the work area should refer to MT-95.40 or MT-95.41.

TABLE I

MINIMUM DISTANCE FT (METERS)	A	B	C
MAJOR STANDARD	500 (150)	500 (150)	500 (150)
FREEWAY & EXPRESSWAY	2600 (780)	1600 (480)	1000 (300)

TABLE II

NORMAL SPEED LIMIT (MPH)	MINIMUM TAPER (L) FT (m)	MAXIMUM SPACING (S) OF DRUMS FT (m)	BUFFER (D) FT (m)
30-40	320 (98)	30 (9)	170 (52)
45-55	660 (201)	40 (12)	335 (102)
60-65	780 (238)	60 (18)	485 (148)



GENERAL NOTES:

- The location of the merging taper and the Advance Warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.
- The spacing between proposed signs should be adjusted to not conflict with and to provide a minimum of 200 ft (60 m) clearance to existing signs.
- This taper length (L) and spacing (S) of drums shall conform to table I. Drum spacing (s) shall be used for the merging taper, the buffer area and for the first 1000 ft (300 m) of the work area and at other hazardous locations as directed by the Engineer. The maximum drum spacing for the balance of the work area is to be two times the spacing (s) in table I. A minimum of 5 drums shall be used to close the shoulder and the downstream taper.
- Cones having a minimum height of 28 inches (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
- If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and the appropriate color work zone edge line shall be applied along the taper. Work zone edge lines which would conflict with final traffic lanes shall be removable (740.06 type 1) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.06 type 1 shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.
- The advisory speed sign OW-143 shall be used when specified in the plan.
- Type A flashing warning lights shown on the OW-134 and OW-122 signs are required whenever a night lane closure is necessary.
- The flashing arrow panel shall meet the requirements of Standard Construction Drawing MT-35.10.
- The protection vehicle, located close to the work, shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area. The vehicle shall be equipped with a 360 degree rotating or flashing amber beacon clearly visible a minimum of 1/4 mile (400 m). Other protective devices may be used in lieu of the protection vehicle shown when approved by the Engineer.
- The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.

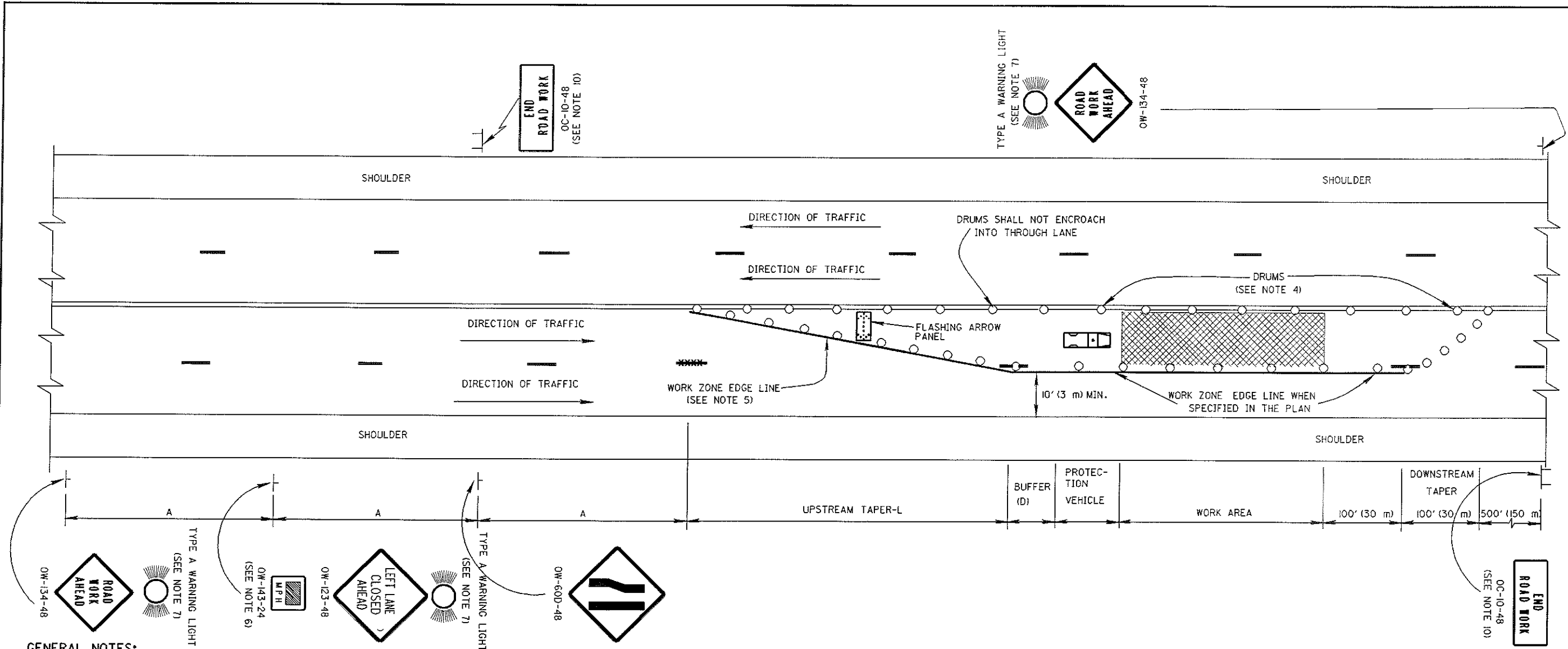
- OW-134 signs shall be provided on entrance ramps and/or side roads located within the work limits or the Advance Warning sign group. Within the length of closure, provision shall be made to control traffic entering from intersecting streets and driveways. Three drums shall be placed on each side across the closed lane at each intersection and driveway.
- All material and equipment shall be removed from the closure and the work area when no work is being done.
- The speed limit chosen for design tapers shall be the normal legal speed except where the legal speed limit is reduced due to the construction and the subject lane closure is not the first active construction area encountered by traffic within the project.
- 36 inch (900 mm) warning signs sizes may be used when the legal speed limit is 40 MPH or less.
- This drawing should be used on projects with dropoffs less than 5' in the work area. Projects with dropoffs greater than 5' in the work area should refer to MT-95.40 or MT-95.41.

TABLE I

SPEED LIMIT (MPH)	MINIMUM TAPER (L) FT (m)	MAXIMUM SPACING (S) OF DRUMS FT (m)	BUFFER (B) FT (m)
20-25	125 (38)	20 (6)	55 (17)
30-40	320 (98)	30 (9)	170 (52)
45-55	660 (201)	40 (12)	335 (102)

TABLE II

MINIMUM DISTANCE FT (m)	A
URBAN (≤ 40 MPH)	200 (60)
URBAN (≥ 45 MPH)	350 (105)
MAJOR STANDARD	500 (150)



GENERAL NOTES:

1. The location of the merging taper and the Advance Warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.
2. The spacing between proposed signs should be adjusted not to conflict with and to provide a minimum of 200 ft (60 m) clearance to existing signs.
3. The taper length (L) and spacing (S) of drums for the merging taper shall conform to table I. Drums placed along the centerline shall be spaced at (s). Drum spacing (s) shall also be used for the buffer area and for the first 1000 ft (300 m) of the work area and at other locations as directed by the Engineer. The maximum drum spacing for the balance of the work area except along the centerline is to be two times the spacing (s) in table I. A minimum of 5 drums shall be used in the downstream taper.
4. Cones having a minimum height of 28 inches (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.

5. If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and the appropriate color work zone edge lines shall be applied along the taper. Work zone edge lines which would conflict with final traffic lanes shall be removable (740.06 type I) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.06 type I shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.
6. The advisory speed sign OW-143 shall be used when specified in the plan.
7. Type A flashing warning lights shown on the OW-134 and OW-123 signs are required whenever a night lane closure is necessary.
8. The flashing arrow panel shall meet the requirements of Standard Construction Drawing MT-35.10.
9. The protection vehicle, located close to the work, shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area.

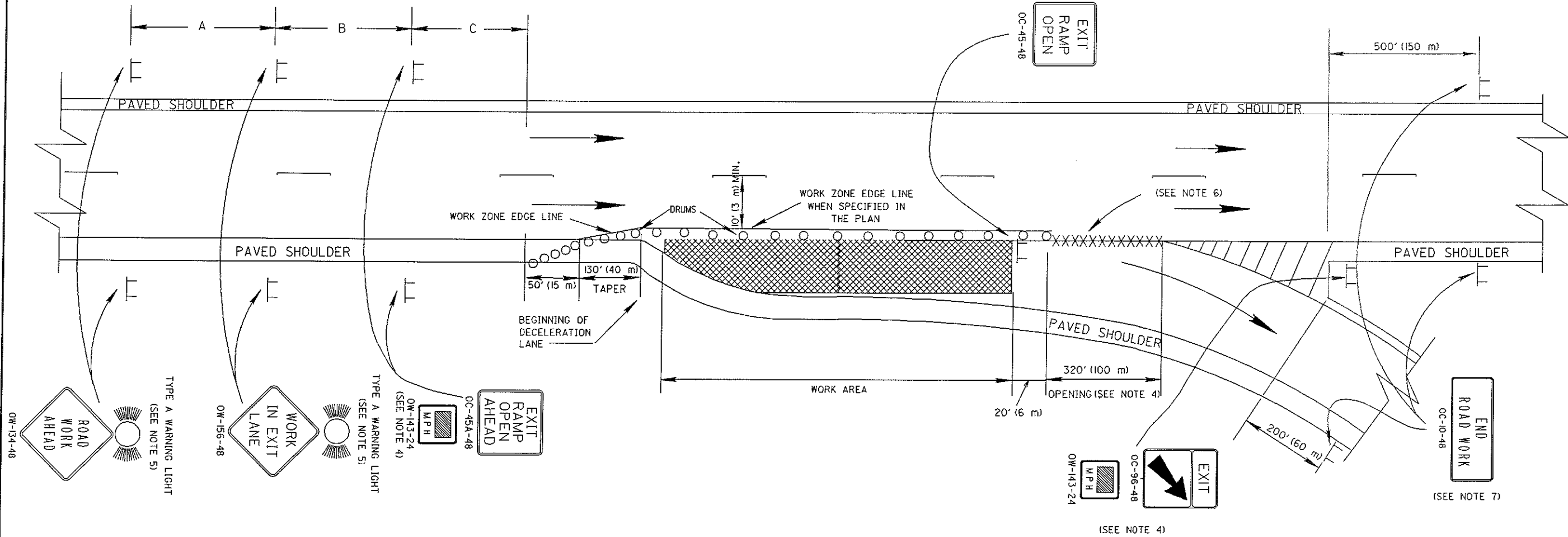
9. The vehicle shall be equipped with a 360 degree rotating cont. or flashing amber beacon clearly visible a minimum of 1/4 mile (400 m). Other protective devices may be used in lieu of the protection vehicle shown when approved by the Engineer.
10. The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.
11. OW-134 signs shall be provided on entrance ramps and/or side roads located within the work limits or the Advance Warning sign group. Within the length of closure, provision shall be made to control traffic entering from intersecting streets and driveways. Three drums shall be placed on each side across the closed lane at each intersection and driveway.
12. All material and equipment shall be removed from the closure and the work area when no work is being done.
13. The speed chosen for design of tapers shall be the normal legal speed except where the legal speed limit is reduced due to the construction and the subject lane closure is not the first active construction area encountered by traffic within the project.
14. 36 inch (900 mm) warning sign sizes may be used when the legal speed limit is 40 mph or less.
15. This drawing should be used on projects with dropoffs less than 5' in the work area. Projects with dropoffs greater than 5' in the work area should refer to MT-95.40 or MT-95.41.

TABLE I

SPEED LIMIT (MPH)	MINIMUM TAPER (L) FT (m)	MAXIMUM SPACING (S) OF DRUMS FT (m)	BUFFER (D) FT (m)
20-25	125 (38)	20 (6)	55 (17)
30-40	320 (98)	30 (9)	170 (52)
45-55	660 (201)	40 (12)	335 (102)

TABLE II

MINIMUM DISTANCE FT (m)	A
URBAN (≤ 40 MPH)	200 (60)
URBAN (≥ 45 MPH)	350 (105)
MAJOR STANDARD	500 (150)



GENERAL NOTES:

1. The location of the Advance Warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.
2. The spacing between proposed signs should be adjusted to not conflict with and to provide a minimum of 200' (60 m) clearance to existing signs, except the OW-96-48 sign which may be adjacent to the GF sign in the gore.
3. Along the closure drums shall be spaced at 20' (6 m) center to center. A minimum of 5 drums shall be used to close the shoulder. Cones having a minimum height of 28" (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
4. The opening to the ramp shall be 320' (100 m) or more, whenever possible. A lesser opening may be provided if no other alternative is available. When a lesser opening is provided, Advisory Speed plaques (OW-143) shall be added to the OW-96 and OC-45A signs as follows:

Opening	Advisory speed
290' (90 m)	50 mph
260' (80 m)	45 mph
230' (70 m)	40 mph
200' (60 m)	35 mph

If a 200' (60 m) opening cannot be provided, the ramp should be closed.

4. The Advisory Speed displayed shall not be greater than would otherwise be required to accommodate the permanent ramp geometry near the exit. Advisory speeds within 10 MPH of the legal speed limit need not be displayed. If no speed reduction is required then the existing sign should be used. If a reduction is required then the existing sign should be covered and the sign configuration shown should be used.

5. Type A flashing warning lights shown on the OW-134 and OW-156 signs are required whenever a night lane closure is necessary.

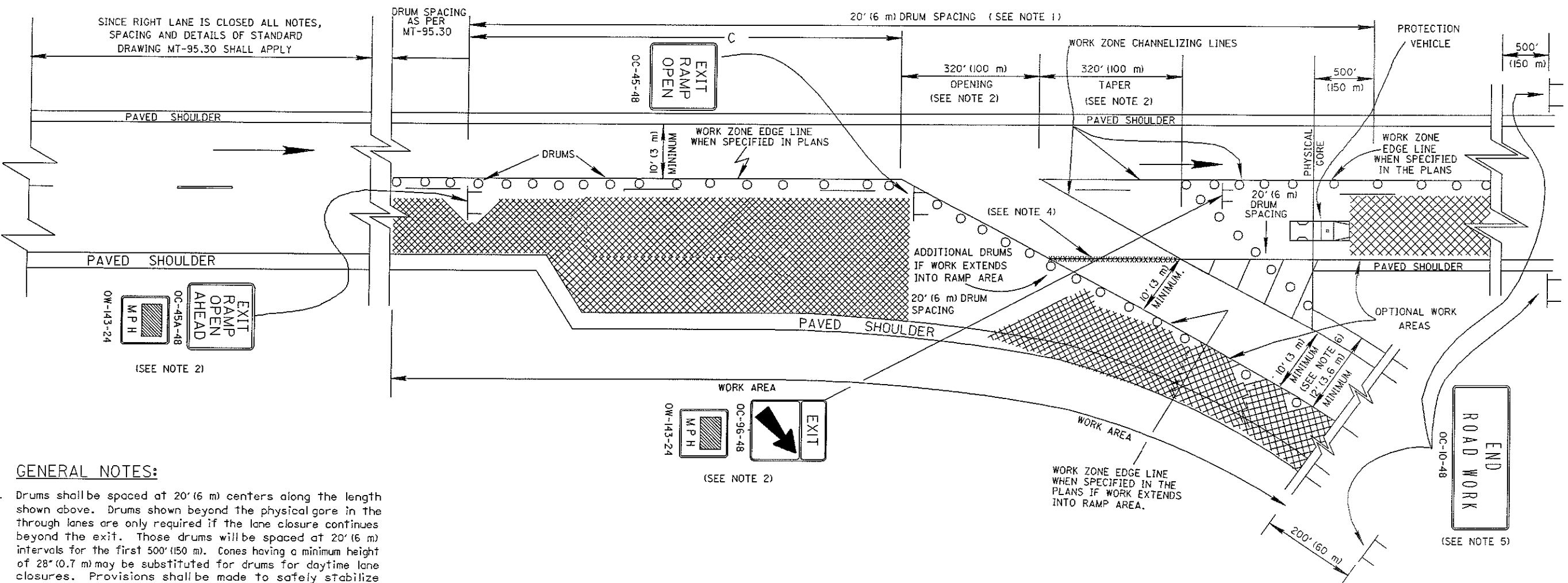
6. If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and the appropriate color work zone edge lines shall be applied along the taper. Work zone edge lines which would conflict with final traffic lanes shall be removable (740.05 Type I) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.05 Type I shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.

7. The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.

8. All material and equipment shall be removed from the closure and the work area when no work is being done.

TABLE I
MINIMUM DISTANCE - FT (m)

	A	B	C
FREEWAY & EXPRESSWAY	2600 (780)	1600 (480)	1000 (300)



GENERAL NOTES:

- Drums shall be spaced at 20' (6 m) centers along the length shown above. Drums shown beyond the physical gore in the through lanes are only required if the lane closure continues beyond the exit. Those drums will be spaced at 20' (6 m) intervals for the first 500' (150 m). Cones having a minimum height of 28' (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
- The opening to the ramp and the taper across the closed lane should each be 320' (100 m) or more whenever possible. A lesser opening and/or taper may be provided if no other alternative is available. The opening shall never be less than the taper, but may be more. When lesser opening and/or taper lengths are provided, advisory speed plaques (OW-143) shall be added to the OC-96 and OC-45A signs as follows:

Opening/taper	Advisory speed
290' (90 m)	50 mph
260' (80 m)	45 mph
230' (70 m)	40 mph
200' (60 m)	35 mph

If 200' (60 m) minimum dimensions cannot be provided, the ramp should be closed.

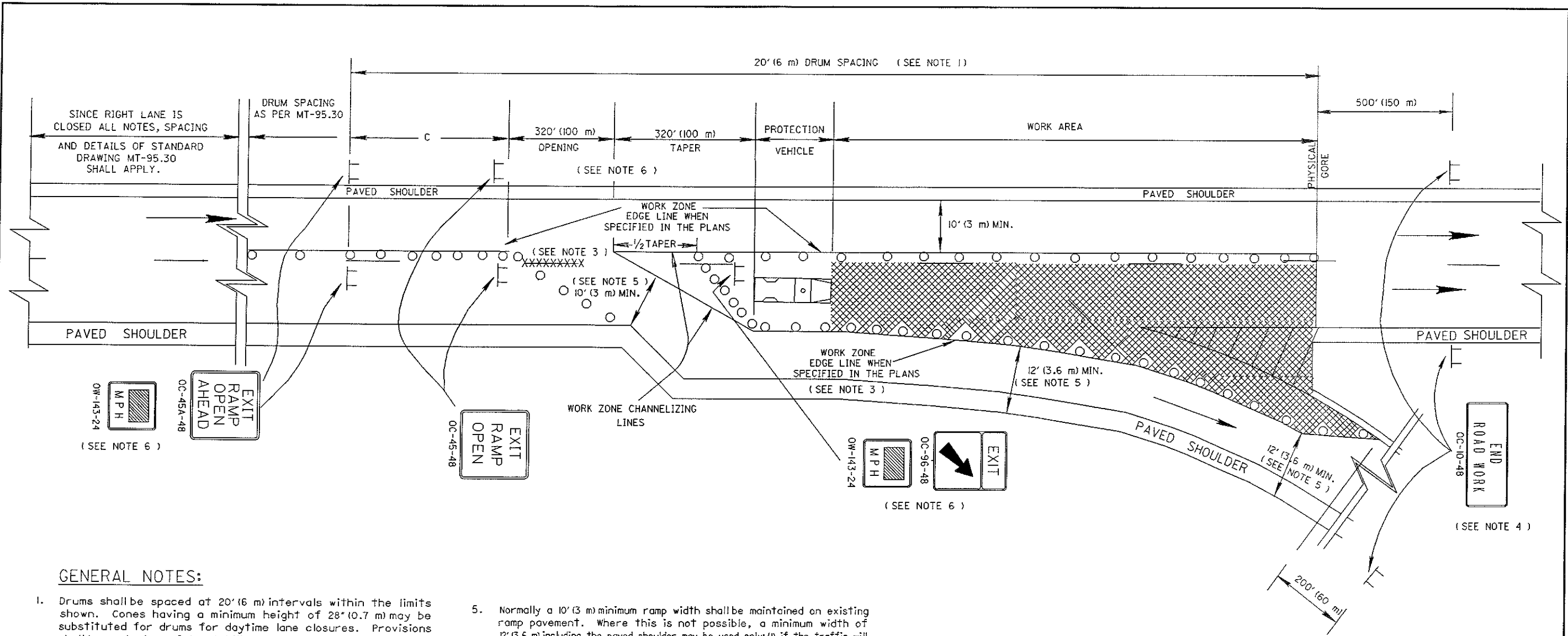
The advisory speed displayed shall not be greater than would otherwise be required to accommodate the permanent ramp geometry near the exit.

Advisory speeds within 10 mph of the legal speed limit need not be displayed.
- The protection vehicle located close to the work shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area. The vehicle shall be equipped with a 360 degree rotating or flashing amber beacon clearly visible a minimum of one quarter mile (400 m). Other protective devices may be used in lieu of the protection vehicle shown when approved by the Engineer.

- If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and a) work zone channelizing lines shall be applied and b) the appropriate color work zone edge lines shall be applied when specified in the plans. Work zone channelizing lines and edge lines which would conflict with final traffic lanes shall be removable (740.06 Type I) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.06 Type I shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.
- The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.
- Normally a 10' (3 m) minimum ramp width shall be maintained on existing ramp pavement. Where this is not possible, a minimum width of 12' (3.6 m) including the paved shoulder may be used only: (1) if the traffic will be on the shoulder less than one day and the shoulder is in good condition, or (2) if the shoulder pavement is strengthened to hold the anticipated load.
- All material and equipment shall be removed from the closure and the work area when no work is being done.

TABLE 1

MINIMUM DISTANCE - FT (m)	
	C
FREEWAY & EXPRESSWAY	1000 (300)



GENERAL NOTES:

1. Drums shall be spaced at 20' (6 m) intervals within the limits shown. Cones having a minimum height of 28" (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
2. The protection vehicle located close to the work shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area. The vehicle shall be equipped with a 360 degree rotating or flashing amber beacon clearly visible a minimum of one quarter mile (400 m). Other protective devices may be used in lieu of the protection vehicle shown when approved by the Engineer.
3. If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and a) work zone channelizing lines shall be applied and b) the appropriate color work zone edge lines shall be applied when specified in the plans. Work zone channelizing lines and edge lines which would conflict with final traffic lanes shall be removable (740.06 Type I) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.06 Type I shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.
4. The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.

5. Normally a 10' (3 m) minimum ramp width shall be maintained on existing ramp pavement. Where this is not possible, a minimum width of 12' (3.6 m) including the paved shoulder may be used only: (1) if the traffic will be on the shoulder less than one day and the shoulder is in good condition, or (2) if the shoulder pavement is strengthened to hold the anticipated load.
6. The opening to the ramp and the taper in advance of the closed lane should each be 320' (100 m) or more whenever possible. A lesser opening and/or taper length may be provided if no other alternative is available. The opening shall never be less than the taper, but may be more. When lesser opening and/or taper lengths are provided, advisory speed plaques (OW-143) shall be added to the OC-96 and OC-45A signs as follows:

Opening/taper	Advisory speed
290' (90 m)	50 mph
260' (80 m)	45 mph
230' (70 m)	40 mph
200' (60 m)	35 mph

If 200' (60 m) minimum dimension cannot be provided, the ramp should be closed.

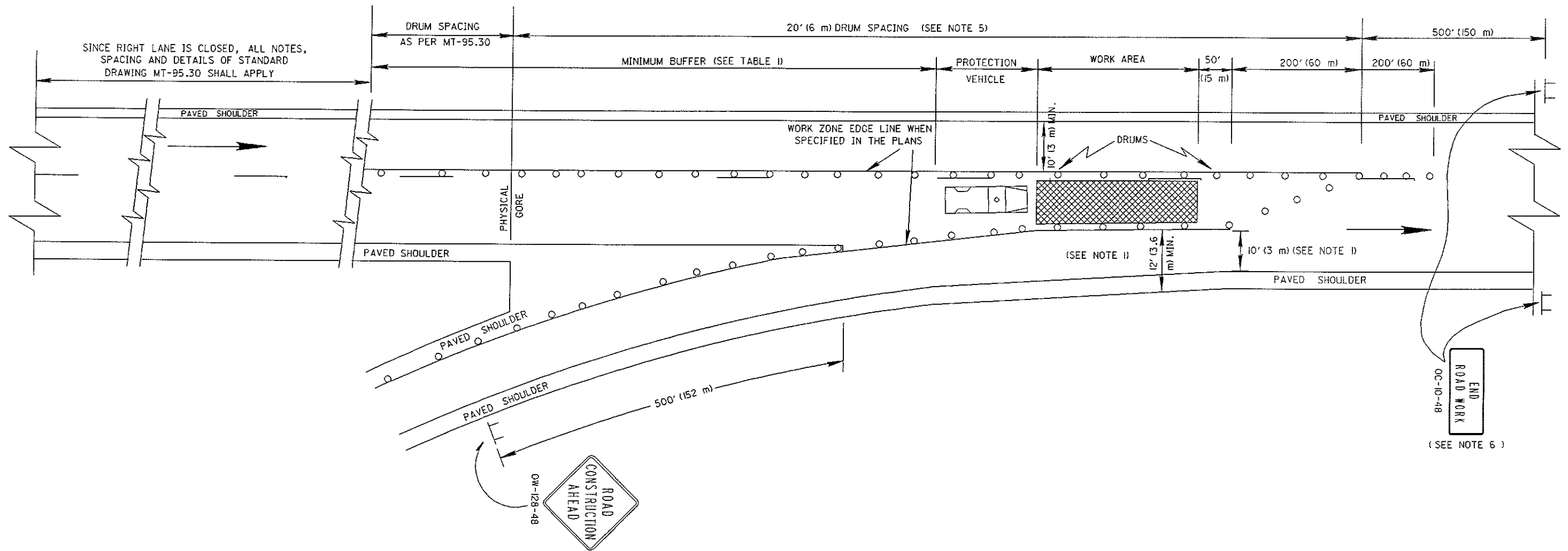
The advisory speed displayed shall not be greater than would otherwise be required to accommodate the permanent ramp geometry near the exit.

Advisory speeds within 10 mph of the legal speed limit need not be displayed.

7. All material and equipment shall be removed from the closure and the work area when no work is being done.

TABLE I

MINIMUM DISTANCE - FT (m)	
	C
FREEWAY & EXPRESSWAY	1000 (300)

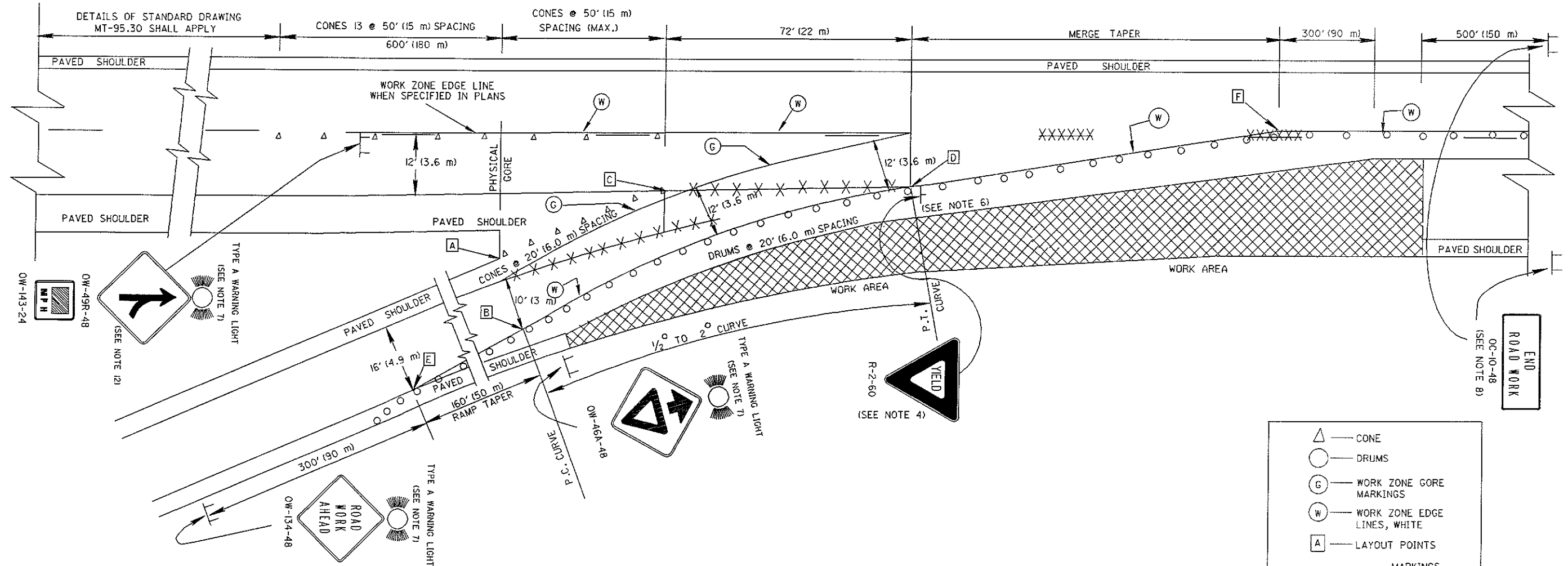


GENERAL NOTES:

1. This work area traffic control application shall be employed only when the lateral clearance between the channelizing devices at the right edge of the work area and the edge of the ramp pavement is 10' (3 m) or more. Normally a 10' (3 m) minimum ramp width shall be maintained on existing ramp pavement. Where this is not possible, a minimum width of 12' (3.6 m) including the paved shoulder may be used only: (1) if the traffic will be on the shoulder less than one day and the shoulder is in good condition, or (2) if the shoulder pavement is strengthened to hold the anticipated load. When the ramp is closed appropriate detour signs shall be provided.
2. When the ramp is not long enough to allow sign placement as specified above, they may be spaced proportionately within the space available as determined by the Engineer (a 200' (60 m) minimum spacing must be maintained).
3. The protection vehicle located close to the work area shall be in place and unoccupied whenever workers are in the work area. This vehicle shall be removed from the pavement whenever workers are not in the work area. The vehicle shall be equipped with a 360 degree rotating or flashing amber beacon visible a minimum of one quarter mile (400 m). Other protective devices may be used in lieu of the protection vehicle shown when approved by the Engineer.
4. If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed and the appropriate color work zone edge lines shall be applied when specified in the plans. Work zone edge lines which would conflict with final traffic lanes shall be removable (740.05 Type D) tape unless the area will be resurfaced in the next work phase. After completion of the work, pavement markings other than 740.05 shall be removed in accordance with 641.10. The original markings and raised pavement marker reflectors shall be restored at no additional cost.
5. Drums shall be spaced at 20' (6 m) intervals on both sides of the work area within the limits shown. Cones having a minimum height of 28" (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
6. The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.
7. All material and equipment shall be removed from the closure and the work area when no work is being done.

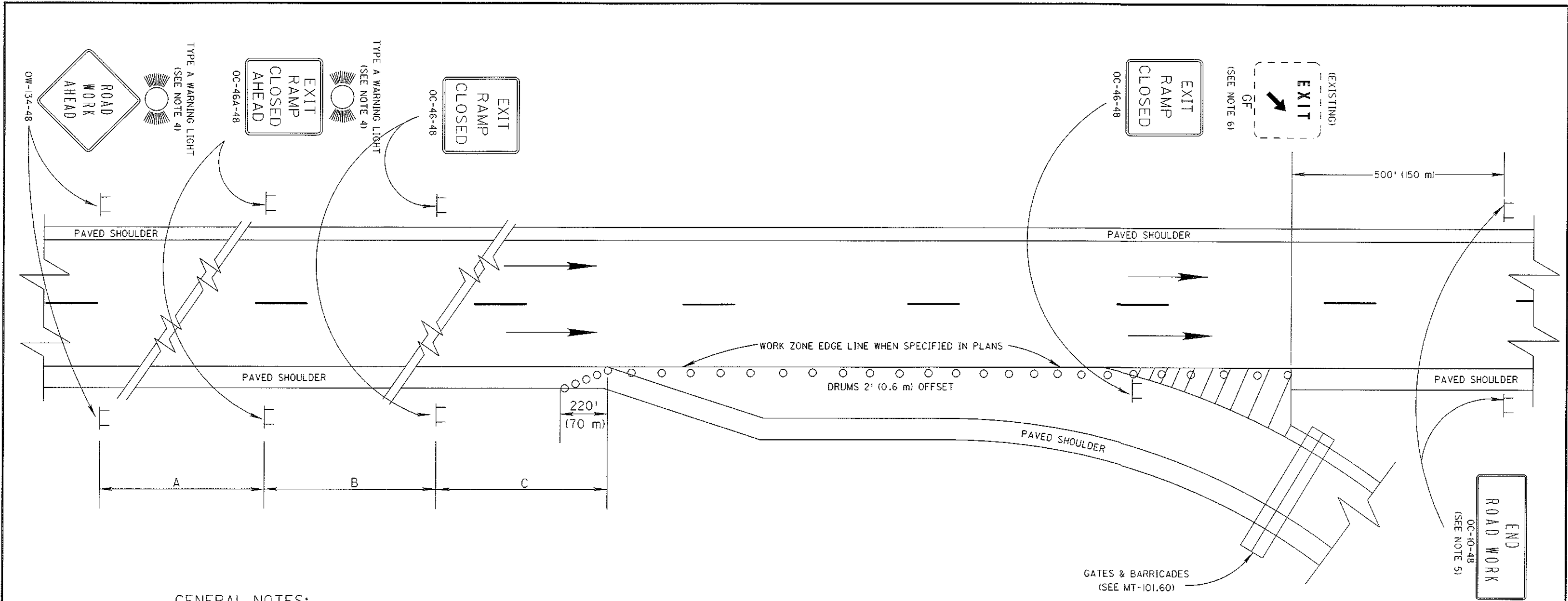
TABLE I

SPEED LIMIT (MPH)	BUFFER AREA FT (METERS)
45 - 50	280 (85)
60 - 65	485 (145)



GENERAL NOTES :

- This work area traffic control application shall be employed when: (1) the lateral clearance between channelizing devices at the right edge of the work area and the edge of pavement is less than 10' (3 m) (12' (3.6 m) if the shoulder pavement is used) as shown on drawing MT-98.15, and (2) the required ramp tapers and curves can be provided as shown except as described in note 4. In the event the work zone condition would permit the use of either MT-98.15 or MT-98.16, MT-98.15 shall be used. This traffic control measure shall not be placed in effect until immediately before the Contractor is fully prepared to perform the work on the ramp or lane adjacent to it. Once this measure is placed into effect, the Contractor shall expeditiously pursue the work (working continuously with full crew in the ramp area on all normal working days) until it is completed and shall immediately open the area to normal traffic or, as a minimum, revert to the methods shown on MT-98.15. It is the intent that the longest merging taper length possible shall be chosen, commensurate with the requirements of construction.
- The ramp taper shall desirably be located to provide a 10' (3 m) minimum path between drums and the paved shoulder in the gore. The ramp traffic may be placed on the paved gore as shown above only if: (1) the traffic will use the paved shoulder pavement less than one day and the shoulder pavement is in good condition and is level and smooth or (2) if the shoulder pavement is adequately strengthened, leveled and smoothed to carry the anticipated load. A minimum of 3 drums shall be used to close the ramp shoulder.
- When the ramp is not long enough to allow sign placement as specified above, they may be spaced proportionately within the space available as determined by the Engineer. A 200' (60 m) minimum spacing must be maintained.
- It will be necessary to move the location of any existing yield sign. In these cases, the permanent R-2 sign installation shall be removed (and subsequently restored) and the temporary installation shall be mounted appropriately. If the required distances (ramp taper, curve and merge taper) cannot be obtained, the Engineer may approve slightly lower values for a short time, in which case the yield sign shall be removed and a 48" (1200 mm) stop sign placed appropriately to be visible to ramp traffic but not be obtrusive to mainline traffic.
- If the construction operation requires the lane closure for more than one day then the existing conflicting pavement markings and reflectors from the raised pavement markers (RPMs) shall be removed at no additional cost. The appropriate color temporary edge lines shall be applied along the taper. Work zone pavement markings which would conflict with final traffic lanes shall be removable (740.05 Type D) tape unless the area will be resurfaced in the next work phase. After completion of the work, work zone pavement markings shall be removed in accordance with 641.10 and the original markings and raised pavement marker reflectors shall be restored at no additional cost.
- Drum spacing adjacent to the mainline and on the ramp shall be not more than 20' (6 m) C - C in the area from the physical gore to 300' (90 m) beyond the merge taper. Cones having a minimum height of 28" (0.7 m) may be substituted for drums for daytime lane closures. Cones shall be reflectorized and safely stabilized.
- Type A flashing warning lights are required on the OW-134, OW-49R and the OW-46 signs whenever a night lane closure is necessary.
- The OC-10 signs are only required for lane closures of more than one day and may be omitted if they fall within the limits of a construction project.
- From the end of the gore area graded shoulder (point A), locate the PC of the curve by measuring perpendicular to the ramp centerline 10' (3 m) of ramp pavement, not including paved shoulder width (point B). From the end of the gore area paved shoulder (point C), locate the PT of the curve by measuring 72' (22 m) from point C along the edge of pavement extended (point D).
- Placement of drums shall begin at (point E) 160' (50 m) upstream from the previously located PC (point B) and at the right edge of ramp pavement. From this point a drum taper shall be placed to the PC (point B) and then along a curve as shown to the PT (point D) where a 48" (min.) merge taper shall meet mainline traffic control (point F).
- All material and equipment shall be removed from the closure and the work area when no work is being done.
- It is intended that the merge sign OW-49R-48 be located to the right of the through lane as shown. However if the sign cannot be located as shown due to the activity at the location, the sign may be located to the left of the through lane as an alternate location.



GENERAL NOTES:

1. The location of the Advance Warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment.
2. The spacing between proposed signs should be adjusted to not conflict with and to provide a minimum of 200' (60 m) clearance to existing signs.
3. Along the closure, drums shall be spaced at 20' (6 m) center to center. A minimum of 5 drums shall be used to close the shoulder. Cones having a minimum height of 28" (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to safely stabilize the cones to prevent them from blowing over. If this cannot be achieved, drums shall be used.
4. Type A flashing warning lights shown on the OW-134 and OC-46A signs are required whenever a night closure is necessary.
5. The OC-10 signs are only required for ramp closures of more than one day and may be omitted if they fall within the limits of a construction project.
6. The existing gore sign must be covered when the OC-96 signs are in place.

TABLE I

MINIMUM DISTANCE - FT (m)			
	A	B	C
FREEWAY & EXPRESSWAY	2600 (780)	1600 (480)	1000 (300)

**State of Ohio
Department of Transportation
Supplemental Specification 832
Temporary Sediment and Erosion Control**

February 12, 2003

- 832.01 Description**
- 832.02 Definitions**
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832.01 Description This work consists of furnishing and locating TSEC (Temporary Sediment and Erosion Control) BMP (Best Management Practices) for both project and off project EDA (Earth Disturbing Activity) areas and developing a SWPPP (Storm Water Pollution Prevention Plan) if required. Furnish these TSEC BMP prior to any EDA. Furnish a SWPPP if required prior to any EDA. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal, State, or local agencies, adhere to the more restrictive laws, rules, or regulations.

832.02 Definitions

- BMP** Best Management Practices
- CMS** Construction and Material Specifications of the Ohio Department of Transportation Dated January 1, 2002
- Earth Disturbing Activity (EDA)** Means any activity that exposes bare ground or an erodible material to storm water and anywhere 2002 CMS Item 659 Seeding, SS 870 Seeding, 2002 CMS Item 660 Sodding, or SS 870 Sodding is being furnished
- EPA** Environmental Protection Agency
- Isolated Wetland Permit** Ohio EPA permit allowing the discharge of fill material into an isolated wetland
- NOI** Notice of Intent

- NOT** Notice of Termination
- NPDES** National Pollutant Discharge Elimination System
- OEPA** Ohio EPA
- OES** Office of Environmental Services-ODOT
- OWPCA** Ohio Water Pollution Control Act
- OHWM** Ordinary High Water Mark; the USACE's jurisdictional limits involving streams; usually equivalent to a 2 year high water elevation.
- PCN** Pre-Construction Notification for 404 permit
- SCD** Standard Construction Drawing
- Supplemental Specification 833 (SS 833)** OEPA NPDES Construction Effluent Guidelines Permit
- SWPPP** Storm Water Pollution Prevention Plan
- TSEC** Temporary Sediment and Erosion Control
- USACE** United States Army Corps of Engineers
- 404 Permit** USACE permit authorizing discharge of fill material into Waters of the US, per Section 404 of the Clean Water Act
- 401 Water Quality Certification (401 WQC)** Ohio EPA permit authorizing discharge of fill material, per Section 401 of the Clean Water Act

832.03 Standard Construction Drawing References

- Bale Filter Dike SCD DM-4.3/4.4
- Construction Fence SCD DM-4.3
- Dikes SCD DM-4.3
- Filter Fabric Ditch Check SCD DM-4.4
- Inlet Protection SCD DM-4.4
- Perimeter Filter Fabric Fence SCD DM-4.4
- Rock Channel Protection Type C or D with/without Filter SCD DM-4.3/4.4
- Sediment Basins and Dams SCD DM-4.3
- Slope Drains SCD DM-4.3

832.04 Requirements. Furnish and locate TSEC BMP to represent and warrant compliance with the Clean Water Act, 33 USC Section 1251 et seq. and the OWPCA, ORC 6111.01 et seq., all conditions of 404 permit/401 WQC/Isolated Wetland Permit, and related rules, local government agency requirements, specifications, SCD, and permits. Furnish a SWPPP to represent and warrant compliance with SS 833, related rules, specifications, SCD, and permits.

Post Construction controls as described in SS 833 are not a part of this specification. All post construction controls are furnished in the project.

832.05 Provisions These provisions survive the completion and/or termination of the contract. The following provisions must be followed:

A. Provision 1. If a governmental agency or a local governmental authority finds a violation of the above noted requirements, or that the TSEC BMP are incomplete, or that the SWPPP is incomplete or that the implementation of the SWPPP is not being performed correctly or completely, full responsibility will be borne by the Contractor to make all corrections.

B. Provision 2. If a governmental agency or a local governmental authority furnishes an assessment, damage judgment or finding, fine, penalty, or expense for a violation of the above noted requirements, or that the TSEC BMP are incomplete, or that the SWPPP is incomplete or that the implementation of the SWPPP is not being performed correctly or completely, the Contractor will reimburse the Department within 10 Calendar Days of the amount for any of the above. The Department may withhold the amount of money requested for the above from the Contractor's next pay estimate and deliver that sum to the governmental agency or local governmental authority issuing the assessment, damage judgment or finding, fine, penalty or expense.

C. Provision 3. The Contractor agrees to indemnify and hold harmless the Department, and will reimburse the Department for any assessments, damage judgment or finding, fine, penalty, or expense as a result of the failure of performing this portion of the Contract. The Department may withhold the amount of any assessments, damage judgment or finding, fine, penalty or expense from the Contractor's next pay estimate.

D. Provision 4. If a governmental agency or a local governmental authority furnishes a stop work order for a violation of the above noted requirements, or that the TSEC BMP are incomplete, or that the SWPPP is incomplete or that the implementation of the SWPPP is not being performed correctly or completely the Department will find the Contractor in default.

E. Provision 5. If the Department finds a violation of the above noted requirements, or that the TSEC BMP are incomplete, or that the SWPPP is incomplete or that the implementation of the SWPPP is not being performed correctly or completely, the Contractor will make all corrections. The Department may withhold and continue to withhold progress payments until such corrections are made.

832.06 EDA Requirements. Comply with 2002 CMS 105.16 when EDA (including borrow and waste areas) are involved, unless the areas in question have been cleared through prior environmental studies. If a project is identified on the plan title sheet as a Maintenance Project, only A, B, and C below apply. Furnish TSEC BMP for any EDA as follows:

A. Project Identified EDA = 0, Contractor EDA = 0, Total EDA = 0 Acre: There are no requirements.

B. Project Identified EDA = 0, Contractor EDA > 0, Total EDA < 1 Acre: Furnish TSEC BMP for the EDA areas. These TSEC BMP will not be compensated. No SWPPP, NOI (Notice of Intent), NOT (Notice of Termination), or, weekly inspections are required.

C. Project Identified EDA = 0, Contractor EDA \geq 1, Total EDA \geq 1 Acre: Furnish a NOI, SWPPP with TSEC BMP, and a NOT for those EDA areas. The NOI, SWPPP and those TSEC BMP, and the NOT will not be compensated.

D. Project Identified EDA < 1, Contractor EDA > 0, Total EDA < 1 Acre: Furnish TSEC BMP for the EDA areas. These TSEC BMP will be compensated. No NOI, SWPPP, NOT, or, weekly inspections are required. The Department will furnish a NOI and NOT.

E. Project Identified EDA < 1, Contractor EDA > 0, Total EDA \geq 1 Acre: Furnish a SWPPP with TSEC BMP for the EDA areas. The SWPPP, and these TSEC BMP will be compensated. The Department will furnish a NOI and NOT.

F. Project Identified EDA \geq 1, Contractor EDA \geq 0, Total EDA \geq 1 Acre: Furnish a SWPPP with TSEC BMP for the EDA areas. The SWPPP, and these TSEC BMP will be compensated. The Department will furnish a NOI and NOT.

832.07 TSEC BMP Materials. Furnish commercial fertilizer, seed, and mulch materials conforming to 2002 CMS Item 659.

Furnish filter fabric ditch checks, rock checks, inlet protection, perimeter filter fabric fence, bale filter dikes, sediment basins and dams, dikes, slope drains, and rock channel protection materials as specified on the SCD. Furnish construction ditch and slope protection conforming to the requirements of 2002 CMS Item 670. The seeding and mulching of the mats are not required. The Department may accept other materials as BMP.

832.08 Furnish and Locate TSEC BMP. Furnish and locate the TSEC BMP as required or as outlined in the Ohio Department of Transportation Location Design Manual Volume II - Drainage Design, or as outlined in the SWPPP. Keep TSEC BMP functional until the areas are fully stabilized.

Construct items A, B, and D through G below according to the SCD.

A. Perimeter Controls. Use perimeter filter fabric fence to protect the project from sheet flow runoff from off Right-of-Way and off construction limit locations. Use perimeter filter fabric fence to protect the following project items from sheet flow runoff: water bodies, wetlands, or other significant items shown on the plans.

Use dikes to prevent sediment flow from coming onto the project and to non-vegetated barren areas on the project.

Install perimeter filter fabric fence and dikes before any clearing and grubbing operations.

Ensure that the ponding of water behind the perimeter filter fabric fence or dike will not damage property or risk the safety of life.

B. Inlet Protection. Construct the inlet protection for existing inlets at the beginning of construction and for new inlets immediately after completing the sump. Ensure that the ponding of water behind the inlet will not damage property or risk the safety of life.

C. Construction Seeding and Mulching. Apply seed and mulch materials according to 2002 CMS Item 659 as modified below. When straw mulch is used, apply at a rate of 2 tons per acre (0.5 metric ton/1000 m²). Seed and mulch during and after construction, and before or during winter shut down to stabilize EDA areas and as required. Fertilize construction seeding areas at one-half the application rate specified in 2002 CMS Item 659. If project conditions prevent fertilizing the soil and preparing the seedbed, then the fertilizing and preparation requirements of 2002 CMS Item 659 may be waived. Do not place construction seed on frozen ground.

D. Slope Protection. Place dikes, install slope drains, and construct ditches to divert water from bare non-vegetated areas and to protect cut and fill slopes. Protect the side slopes from erosion by placing dikes at the top of fill slopes.

Before furnishing a cut slope, construct a ditch at the top of the cut slope to reduce runoff coming on the slope.

Furnish Construction Slope Protection at the required locations or at the locations shown on the SWPPP as the slopes are constructed. Furnish all permanent slope protection as final grade is complete.

E. Ditch Checks and Ditch Protection. Place filter fabric ditch checks or rock checks across a ditch and perpendicular to the flow to protect the ditch from erosion and to filter sediment from the flowing water.

Place ditch checks as soon as the ditch is cut. If working on a ditch, replace the ditch checks by the end of the workday.

Install filter fabric ditch checks for drainage areas less than or equal to 2 acres (0.8 ha) as shown in the SCD. Install rock checks for drainage areas between 2 to 5 acres (0.8 to 2.0 ha) as shown in the SCD.

Install ditch checks in conjunction with sediment basins and dams.

Furnish Construction Ditch Protection at the required locations or at the locations shown on the SWPPP as the ditches are cut. Furnish all permanent ditch protection as final grade is complete.

F. Bale Filter Dike. Install bale filter dike a few feet (meters) from the toe of a slope to filter and direct sediment to an appropriate control item before the runoff enters a water body on or off the Project limits.

Use the bale filter dike to collect sediment from:

1. Areas less than 1/4 acre (0.1 ha) for each sediment pit.
2. Slopes with a length of less than 100 feet (30 m) and having a maximum 2:1 slope.

Use a sediment pit every 100 feet (30 m) for a 2:1 slope for every 1/4 acre (0.1 ha). Use a greater spacing of the sediment basin for flatter slopes.

Begin constructing bale filter dikes within 7 days of commencing grubbing operations. Complete the construction of the bale filter dike before starting the grading operations.

G. Sediment Basins and Dams. Construct basins and dams at concentrated and critical flow locations to settle out sediment before the water leaves the EDA area. Use basins at the bottom of a ravine, at a culvert inlet, or outlet, along or at the end of a ditch and at any concentrated water exit point of the project. Construct the basins to retain 67 cubic yards (125 m³) of water for every acre (1.0 ha) of drainage area. Use a series of smaller basins or dams as a substitute for a larger basin or dam.

Begin constructing sediment basins and dams within 7 days of commencing grubbing operations. Complete the construction of the sediment basins and dams before starting the grading operations.

When needed construct construction fence around the sediment basins or dams.

H. River, Stream, and Water Body Protection. Protect all streams or water bodies passing through or on the project using Perimeter Filter Fabric Fence or Bale Filter Dike to line the water edge. Divert project water flow using dikes and slope protection. The Contractor may use a combination of items listed in one through seven above and other TSEC BMP.

I. Stream Relocation. Fully stabilize the new stream channel with erosion control mats, or 70 percent grass growth before diverting flow into the new channel. This also applies to ditches that incorporate stream flow. This also applies to Temporary Channels

J. Stream and River Crossings (Causeways) Fording of streams and rivers is not allowed. Evaluate the 404/401 permits to determine whether or not a temporary causeway has been permitted by the USACE/OEPA. If a temporary causeway has been permitted, construct the causeway per the 404/401 permits and the application for those permits. Particular attention should be given to the configuration of the temporary causeway, the surface area (acreage) of temporary fill, and volume of temporary fill that was permitted and contained in the permit application. The project engineer will consult with the Office of Environmental Services (OES) for any technical questions regarding 404/401 permits.

If the Contractor determines that a temporary causeway will be required and has not been permitted through the 404/401 permit process, the Contractor must coordinate the temporary causeway with the project engineer and OES. The temporary causeway will be coordinated with the USACE through the pre-construction notification (PCN) process for authorization under the 404 nationwide permit (NWP) program. Supply the project engineer/OES with the following information:

1. a plan and profile drawing showing the temporary causeway with OHWM elevation
2. volume of temporary fill below the OHWM
3. the surface area of temporary fill below the OHWM
4. a restoration plan for the area affected by the causeway
5. time frames for placement and removal of the temporary causeway.

The time frame allowed for the coordination of the temporary causeway will be 60 days, at a minimum, and the temporary fill will not occur prior to the 404 NWP being authorized by the USACE. All coordination with the USACE and/or OEPA will be performed through OES.

Begin planning and installing causeways as early in construction as possible to avoid conflicts with 404/401 permits or other environmental commitments that have been included in the construction plans.

Make every attempt to minimize disturbance to water bodies during construction, maintenance and removal of the causeway. Construct the causeway as narrow as practical. Make the causeway in shallow areas rather than deep pools where possible. Minimize clearing, grubbing, and excavation of stream banks, bed, and approach sections. Construct the causeway as to not erode stream banks or allow sediment deposits in the channel.

Construct the causeway to a water elevation at least 1 foot (0.3 m) above the normal water elevation. If the causeway fills more than one-third the width of the stream, then use culvert pipes to allow the movement of aquatic life. Normal downstream flows will be maintained. Ensure that any ponding of water behind the causeway will not damage property or cause a human safety concern.

The following minimum requirements apply where culverts are used.

1. Furnish culverts on the existing stream bottom.
2. Avoid a drop in water elevation at the downstream end of the culvert.
3. Furnish culverts with a diameter at least two times the depth of normal stream flow measured at the causeway centerline or with a minimum diameter of 18 inches (0.5 m) whichever is greater
4. Furnish a sufficient number of culverts to completely cross the channel from stream bank to stream bank with no more than 10 feet (3 m) between each culvert.

For all fill and surface material placed in the channel, around the culverts, or on the surface of the causeway, furnish clean, non-erodible, nontoxic dumped rock fill, Type B, C, or D, as specified in 2002 CMS 703.19.B. Extend rock fill up the slope from original stream bank for 50 feet (10 m) to catch and remove erodible material from equipment.

When the Contractor has finished work requiring the causeway, all portions of the causeway (including all rock and culverts) will be removed in its entirety. The material will not be disposed in other waters of the US or isolated wetland. The stream bottom affected by the causeway will be restored to its pre-construction elevations.

K. Other Temporary Construction Access Fills in Streams or Rivers. Evaluate if a temporary construction access fill(s), other than a causeway, is required. This may include, but is not limited to, cofferdams, access pads, temporary bridges, etc. If required, evaluate the existing 404/401 permit and application in the same manner as in 832.08(J), to determine if the temporary fill activity has been permitted.

If the Contractor requires temporary construction access fill(s) below the OHWM and those temporary fill(s) have not been permitted, then the Contractor will follow the coordination procedures set forth in 832.08(J). All temporary construction access fills will be removed following completion of its use and the affected stream bottom will be restored to its pre-construction elevations.

L. Concrete washout areas TSCE BMP. For the purpose of payment this BMP is part

of the concrete work for payment.

M. Project access TSEC BMP locations. For the purpose of payment this BMP is part of the total project for payment.

N. Project fueling and refueling TSEC BMP locations. For the purpose of payment this BMP is part of the total project for payment.

O. All other TSEC BMP: All other TSEC BMP that are required but not specifically referenced will not be paid as a separate item but will be included by the Contractor as part of the total project cost.

832.09 Maintenance. Properly maintain all TSEC BMP. Dispose of silt removed from TSEC BMP according to 2002 CMS 105.16. If a recorded rain event is greater than 0.5 inches (13mm) the Department will pay to replace all TSEC BMP that have failed. Remove all TSEC BMP before the project is accepted. Dispose of the removed materials according to 2002 CMS 105.16 and 2002 CMS 105.17. Maintain the TSEC BMP until the up-slope permanent grass coverage is 70 percent or better. At this stage, remove the TSEC BMP.

A Perimeter Filter Fabric Fence, Filter Fabric Ditch Checks, Rock Checks, Inlet Protection, Dikes, and Bale Filter Dikes. Remove trapped sediment when it reaches half the height of the lowest section. Make appropriate corrections when the TSEC BMP becomes nonfunctional.

B Sediment Basins and Dams. Remove deposited sediment when sediments reduce the initial volume of the sediment basin or dam by one-half. Make appropriate corrections when these TSEC BMP fail. Remove dams and basins after the up slope has been stabilized.

832.10 Storm Water Pollution Prevention Plan. If required, prepare the SWPPP as outlined in this specification and Supplemental Specification 833. Additional guidance can be found in the Ohio Department of Transportation Location and Design Manual Volume II - Drainage Design and the Ohio Department of Transportation Location and Design Manual Volume III- Highway Plans. Examples of some of the design and information requirements that must be shown on the SWPPP are as follows:

- A. A Professional Engineer qualified in TSEC BMP must design and sign the SWPPP.
- B. Locate the required TSEC BMP for both on and off project EDA areas.
- C. Furnish quantity totals for all TSEC BMP.
- D. Locate the following a minimum of 100 Ft. (30 m) from the water's edge of any

stream, ephemeral stream, wetland, or body of water:

- 1. Concrete or asphalt plant areas
- 2. Material and equipment staging or storage areas
- 3. Dewatering Areas
- 4. Concrete truck wash out areas
- 5. Construction access locations
- 6. Vehicle fueling and refueling locations

E. Furnish an implementation schedule for each construction sequence.

F. For any additional requirements, See 2002 CMS 107.19

G. Furnish the total EDA areas in acres.

H. Locate all slopes that will be inactive for 21 calendar days or longer.

I. Furnish the name of the individual on site who is in charge of the SWPPP and the TSEC BMP practices.

J. Describe the type of construction activities that will be taking place.

K. Furnish a quantity for Item 832 Sediment Removal for removing sediment from basins and dams, inlet protection, ditch checks, rock checks, perimeter filter fabric fence, bale filter dikes, and all other types of filter fabrics, straw or hay bales, or any other TSEC BMP.

L. Furnish signatures of all contractors and subcontractors involved in TSEC practices (see App. B).

If there are plan sheets which meet any of the SS 833 requirements use that information. Design files may be furnished to the awarded Contractor in electronic form in the future.

832.11 SWPPP Review. Furnish the initial SWPPP to the Department for review. Allow ten working days for the Department to review the SWPPP. Allow another ten working days to review any revised submitted SWPPP. No time extensions to the contract will be granted for the above referenced review times. The Department's review will only ensure that the following items have been furnished:

- A. The type and location of TSEC BMP with totals.
- B. A schedule of placing TSEC BMP.
- C. The applicable requirements of those contained in SS832.10.

Revise the accepted SWPPP as needed. These revisions to the accepted SWPPP will be at no additional cost to the Department unless caused solely by the Department. Payment for Department caused revisions to the SWPPP will be included as part of the revised work.

832.12 Inspections. Perform SS 833 required inspections. The inspection reports are to be prepared for projects that have a SWPPP. Submit a copy of the inspection reports to the project. Use the report form furnished in Appendix A.

832.13 Compensation. The Department will furnish Item 832 Lump Sum Erosion Control with an amount in the proposal to pay for TSEC BMP work. This amount is an estimate by the Department of the total cost of TSEC BMP work. If the TSEC BMP work exceeds this amount the TSEC BMP work will still be paid at the pre-determined prices. The pre-determined prices are located in the Proposal. All TSEC BMP work will be paid at the proposal pre-determined unit price times the correctly installed TSEC BMP number of units. The payment due will be deducted from Item 832 Lump Sum Erosion Control.

The Department will only pay for one accepted SWPPP regardless of the number of Construction phases, revisions, or project redesigns.

832.14 Method of Measurement

- A. The Department will measure the SWPPP plan as each.
- B. The Department will measure Construction Seeding and Mulching by the number of square yards (square meters).
- C. The Department will measure Slope Drains by the number of feet (meters).
- D. The Department will measure Sediment Basins and Dams by the number of cubic yards (cubic meters) of excavation and embankment.
- E. The Department will measure Perimeter Filter Fabric Fence, Bale Filter Dike and Construction Fence by the number of feet (meters).
- F. The Department will measure Filter Fabric Ditch Check by the number of feet (meters).
- G. The Department will measure Inlet Protection by the number of feet (meters).
- H. The Department will measure Dikes by the number of cubic yards (cubic meters) of excavation and embankment.
- I. The Department will measure Construction Ditch Protection and Construction Slope Protection by the number of square yards (square meters).

J. The Department will measure Rock Channel Protection, Type C or D (with or without filter) by the number of cubic yards (cubic meters).

K. The Department will measure Sediment Removal by the number of cubic yards (cubic meters).

832.15 Basis of Payment

- A. The Department will not pay if temporary erosion and sediment control Items are required due to the Contractor's negligence, carelessness, or failure to install permanent controls.
- B. The Department will not pay for causeway work specified.
- C. The Department will not pay to replace TSEC BMP that has failed due to lack of proper maintenance or installation.
- D. The Department will not pay for concrete washout areas.
- E. The Department will not pay for project access locations.
- F. The Department will not pay for all other TSEC BMP that are required but not specifically referenced as a separate item but will be included by the Contractor as part of the total project cost.
- G. The Department will pay for the following Erosion Control Items (TSEC BMP) that are properly placed at the pre-determined price in the proposal conforming to 832.13.

Item	Unit	Description
832	Square Yard (Square Meter)	Construction Seeding and Mulching
832	Foot (Meter)	Slope Drains
832	Cubic Yard (Cubic Meter)	Sediment Basins and Dams
832	Foot (Meter)	Perimeter Filter Fabric Fence
832	Foot (Meter)	Bale Filter Dike
832	Foot (Meter)	Filter Fabric Ditch Check
832	Foot (Meter)	Inlet Protection
832	Cubic Yard (Cubic Meter)	Dikes
832	Square Yard (Square Meter)	Construction Ditch Protection
832	Square Yard (Square Meter)	Construction Slope Protection
832	Cubic Yard (Cubic Meter)	Rock Channel Protection Type C or D with Filter
832	Cubic Yard (Cubic Meter)	Rock Channel Protection Type C or D without Filter

- 832 Cubic Yard (Cubic Meter) Sediment Removal
 - 832 Foot (Meter) Construction Fence
- H. The Department will pay the contract price for each SWPPP plan.
- | Item | Unit | Description |
|------|------|---------------------------------------|
| 832 | Each | Storm Water Pollution Prevention Plan |

Appendix A

Weekly and Rain Event Erosion Control Checklist

Contractor _____
 Project Number _____ Co.-Rt.-Sec. _____ Date _____

R=Replacement W=Working M=Maintenance I=Install D=Delete Rain Amt Inspection _____
 Date _____

Station	To	Station	Side	Offset	Balloon Ref.	Perimeter control	Inlet Protection	Constr. Seed	Dikes Fill Slopes	Ditch Cut Slopes	Slope Drains	FF Ditch Checks	Rock Ditch Ch	Bale Filter Dike	Sediment Basins	Stream Relocate	Stream Crossing	Date Work Was Complete	
	To																		
	To																		
	To																		
	To																		
	To																		
	To																		
	To																		
	To																		
	To																		
	To																		

Notes:

Total Station-to-Station Inspected

Inspect By Signature _____ Title _____ Date Given To _____
 ODOT

Appendix B

Signature list

Signature	Printed Name	Title	Company	Date

Designer Note:

This supplemental specification 832 will be provided on all projects along with supplemental specification 833. Provide proposal note 205 only as required.

State Of Ohio
Department of Transportation

Supplemental Specification 833
Ohio Environmental Protection Agency National Pollutant Discharge Elimination System
Construction Effluent Guidelines Permit
February 12, 2003

Ohio EPA Permit No.: OHC000002
Effective Date: April 21, 2003

Expiration Date: April 20, 2008

**OHIO ENVIRONMENTAL PROTECTION AGENCY
AUTHORIZATION FOR STORM WATER DISCHARGES ASSOCIATED
WITH CONSTRUCTION ACTIVITY UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et. seq. hereafter referred to as "the Act") and the Ohio Water Pollution Control Act [Ohio Revised Code ("ORC") Chapter 6111], dischargers of storm water from sites where construction activity is being conducted, as defined in Part I.B of this permit, are authorized by the Ohio Environmental Protection Agency, hereafter referred to as "Ohio EPA," to discharge from the outfalls at the sites and to the receiving surface waters of the state identified in their Notice of Intent ("NOI") application form on file with Ohio EPA in accordance with the conditions specified in Parts I through VII of this permit.

This permit is conditioned upon payment of applicable fees, submittal of a complete NOI application form and written approval of coverage from the director of Ohio EPA in accordance with Ohio Administrative Code ("OAC") Rule 3745-38-06.

Original signed by Christopher Jones
Christopher Jones
Director

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PART VI. REOPENER CLAUSE**PART VII. DEFINITIONS****PART I. COVERAGE UNDER THIS PERMIT****A. Permit Area.**

This permit covers the entire State of Ohio.

B. Eligibility.

1. Construction activities covered. Except for storm water discharges identified under Part I.B.2, this permit may cover all new and existing discharges composed entirely of storm water discharges associated with construction activity that enter surface waters of the state or a storm drain leading to surface waters of the state.

For the purposes of this permit, construction activities include any clearing, grading, excavating, grubbing and/or filling activities that disturb the threshold acreage described in the next paragraph. Discharges from trench dewatering are also covered by this permit as long as the dewatering activity is carried out in accordance with the practices outlined in Part III.G.2.g.iv of this permit.

Prior to March 10, 2003, only construction activities disturbing five or more acres of total land were required to obtain NPDES construction storm water permit coverage. On and after March 10, 2003, construction activities disturbing one or more acres of total land will be eligible for coverage under this permit. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale.

This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

- a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;
- b. The support activity is not a commercial operation serving multiple unrelated construction projects and does not operate beyond the completion of the construction activity at the site it supports;
- c. Appropriate controls and measures are identified in a storm water pollution prevention plan (SWP3) covering the discharges from the support activity; and
- d. The support activity is on or contiguous with the property defined in the NOI;

Part I.B

2. Limitations on coverage. The following storm water discharges associated with construction activity are not covered by this permit:

- a. Storm water discharges that originate from the site after construction activities have been completed, including any temporary support activity, and the site has achieved final stabilization. Industrial post-construction storm water discharges may need to be covered by an NPDES permit;
- b. Storm water discharges associated with construction activity that the director has shown to be or may reasonably expect to be contributing to a violation of a water quality standard; and
- c. Storm water discharges authorized by an individual NPDES permit or another NPDES general permit;

3. Waivers. After March 10, 2003, sites whose larger common plan of development or sale have at least one, but less than five acres of land disturbance, which would otherwise require permit coverage for storm water discharges associated with construction activities, may request that the director waive their permit requirement. Entities wishing to request such a waiver must certify in writing that the construction activity meets one of the two the waiver conditions:

- a. Rainfall erosivity waiver. For a construction site to qualify for the rainfall erosivity waiver, the cumulative rainfall erosivity over the project duration must be five or less and the site must be stabilized with at least a 70 percent vegetative cover or other permanent, non-erosive cover. The rainfall erosivity must be calculated according to the method in U.S. EPA Fact Sheet 3.1 Construction Rainfall Erosivity Waiver dated January 2001. If it is determined that a construction activity will take place during a time period where the rainfall erosivity factor is less than five, a written waiver certification must be submitted to Ohio EPA at least 21 days before construction activity is scheduled to begin. If the construction activity will extend beyond the dates specified in the waiver certification, the operator must either:
 - (a) recalculate the waiver using the original start date with the new ending date (if the R factor is still less than five, a new waiver certification must be submitted) or
 - (b) submit an NOI application form and fee for coverage under this general permit at least seven days prior to the end of the waiver period (see Attachment A); or

Part I.B.3

b. TMDL (Total Maximum Daily Load) waiver. Storm water controls are not needed based on a TMDL approved or established by U.S. EPA that addresses the pollutant(s) of concern or, for non-impaired waters that do not require TMDLs, an equivalent analysis that determines allocations for small construction sites for the pollutant(s) of concern or that determines that such allocations are not needed to protect water quality based on consideration of existing in-stream concentrations, expected growth in pollutant contributions from all sources, and a margin of safety. The pollutant(s) of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. The operator must certify to the director of Ohio EPA that the construction activity will take place, and storm water discharges will occur, within the drainage area addressed by the TMDL or equivalent analysis. A written waiver certification must be submitted to Ohio EPA at least 21 days before the construction activity is scheduled to begin.

4. Prohibition on non-storm water discharges. All discharges covered by this permit must be composed entirely of storm water with the exception of the following: discharges from fire fighting activities; fire hydrant flushings; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water from trench or well point dewatering and foundation or footing drains where flows are not contaminated with process materials such as solvents. Dewatering activities must be done in compliance with Part III.G.2.g.iv of this permit. Discharges of material other than storm water or the authorized non-storm water discharges listed above must comply with an individual NPDES permit or an alternative NPDES general permit issued for the discharge.

Except for flows from fire fighting activities, sources of non-storm water listed above that are combined with storm water discharges associated with construction activity must be identified in the SWP3. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

Part I.B

5. Spills and unintended releases (Releases in excess of Reportable Quantities). This permit does not relieve the permittee of the reporting requirements of 40 CFR Part 117 and 40 CFR Part 302. In the event of a spill or other unintended release, the discharge of hazardous substances in the storm water discharge(s) from a construction site must be minimized in accordance with the applicable storm water pollution prevention plan for the construction activity and in no case, during any 24-hour period, may the discharge(s) contain a hazardous substance equal to or in excess of reportable quantities.

40 CFR Part 117 sets forth a determination of the reportable quantity for each substance designated as hazardous in 40 CFR Part 116. The regulation applies to quantities of designated substances equal to or greater than the reportable quantities, when discharged to surface waters of the state. 40 CFR Part 302 designates under section 102(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, those substances in the statutes referred to in section 101(14), identifies reportable quantities for these substances and sets forth the notification requirements for releases of these substances. This regulation also sets forth reportable quantities for hazardous substances designated under section 311(b)(2)(A) of the Clean Water Act (CWA).

C. Requiring an individual NPDES permit or an alternative NPDES general permit.

1. The director may require an alternative permit. The director may require any operator eligible for this permit to apply for and obtain either an individual NPDES permit or coverage under an alternative NPDES general permit in accordance with OAC Rule 3745-38-04. Any interested person may petition the director to take action under this paragraph.

The director will send written notification that an alternative NPDES permit is required. This notice shall include a brief statement of the reasons for this decision, an application form and a statement setting a deadline for the operator to file the application. If an operator fails to submit an application in a timely manner as required by the director under this paragraph, then coverage, if in effect, under this permit is automatically terminated at the end of the day specified for application submittal.

Part I.C

2. Operators may request an individual NPDES permit. Any owner or operator eligible for this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application with reasons supporting the request to the director in accordance with the requirements of 40 CFR 122.26. If the reasons adequately support the request, the director shall grant it by issuing an individual NPDES permit.

3. When an individual NPDES permit is issued to an owner or operator otherwise subject to this permit or the owner or operator is approved for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the alternative general permit, whichever the case may be.

D. Permit requirements when portions of a site are sold.

If an operator obtains a permit for a development, and then the operator (permittee) sells off lots or parcels within that development, permit coverage must be continued on those lots until a Notice of Termination (NOT) in accordance with Part IV.B is submitted. For developments which require the use of centralized sediment and erosion controls (i.e., controls that address storm water runoff from one or more lots) for which the conveyance of permit coverage for a portion of the development will either prevent or impair the implementation of the controls and therefore jeopardize compliance with the terms and conditions of this permit, the permittee will be required to maintain responsibility for the implementation of those controls. For developments where this is not the case, it is the permittee's responsibility to temporarily stabilize all lots sold to individual lot owners unless an exception is approved in accordance with Part III.G.4. In cases where permit coverage for individual lot(s) will be conveyed, the permittee shall inform the individual lot owner of the obligations under this permit and ensure that the Individual Lot NOI application is submitted to Ohio EPA.

Part I**E. Authorization**

1. Obtaining authorization to discharge. Operators that discharge storm water associated with construction activity must submit an NOI application form in accordance with the requirements of Part II of this permit to obtain authorization to discharge under this general permit. As required under OAC Rule 3745-38-06(E), the director, in response to the NOI submission, shall notify the applicant in writing that he/she has been granted general permit coverage to discharge storm water associated with construction activity under the terms and conditions of this permit or that the applicant must apply for an individual NPDES permit or coverage under an alternate general NPDES permit as described in Part I.C.1.

2. No release from other requirements. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations. Other permit requirements commonly associated with construction activities include, but are not limited to, section 401 water quality certifications, isolated wetland permits, permits to install sanitary sewers or other devices that discharge or convey polluted water, permits to install drinking water lines, single lot sanitary system permits and disturbance of land which was used to operate a solid or hazardous waste facility (i.e., coverage under this NPDES general permit does not satisfy the requirements of OAC Rule 3745-27-13 or ORC Section 3734.02(H)). This permit does not relieve the permittee of other responsibilities associated with construction activities such as contacting the Ohio Department of Natural Resources, Division of Water, to ensure proper well installation and abandonment of wells.

Part II. NOTICE OF INTENT REQUIREMENTS**A. Deadlines for notification.**

Initial coverage: Operators who intend to obtain initial coverage for a storm water discharge associated with construction activity under this general permit must submit a complete and accurate NOI application form and appropriate fee at least 21 days prior to the commencement of construction activity. If more than one operator, as defined in Part VII of this general permit, will be engaged at a site, each operator shall seek coverage under this general permit. Where one operator has already submitted an NOI prior to other operator(s) being identified, the additional operator shall request modification of coverage to become a co-permittee. In such instances, the co-permittees shall be covered under the same facility permit number. No additional permit fee is required.

Part II.A

Individual lot transfer of coverage: Operators must each submit an individual lot notice of intent (Individual Lot NOI) application form (no fee required) to Ohio EPA at least seven days prior to the date that they intend to accept responsibility for permit requirements for their portion of the original permitted development from the previous permittee. The original permittee may submit an Individual Lot NOT at the time the Individual Lot NOI is submitted. Transfer of permit coverage is not granted until an approval letter from the director of Ohio EPA is received by the applicant.

B. Failure to notify.

Operators who fail to notify the director of their intent to be covered and who discharge pollutants to surface waters of the state without an NPDES permit are in violation of ORC Chapter 6111. In such instances, Ohio EPA may bring an enforcement action for any discharges of storm water associated with construction activity.

C. Where to submit an NOI.

Operators seeking coverage under this permit must submit a signed NOI form, provided by Ohio EPA, to the address found in the associated instructions.

D. Additional notification.

The permittee shall make NOIs and SWP3s available upon request of the director of Ohio EPA, local agencies approving sediment and erosion control plans, grading plans or storm water management plans, local governmental officials, or operators of municipal separate storm sewer systems (MS4s) receiving drainage from the permitted site. Each operator that discharges to an NPDES permitted MS4 shall provide a copy of its Ohio EPA NOI submission to the MS4 in accordance with the MS4's requirements, if applicable.

E. Renotification.

Upon renewal of this general permit, the permittee is required to notify the director of his intent to be covered by the general permit renewal. Permittees covered under the previous NPDES general permit for storm water discharges associated with construction activity (NPDES permit number OHR100000) shall have continuing coverage under this permit. The permittees covered under OHR100000 shall submit a letter within 90 days of receipt of written notification by Ohio EPA expressing their intent that coverage be continued. There is no fee associated with these letters of intent for continued coverage. Permit coverage will be terminated after the 90-day period if the letter is not received by Ohio EPA. Ohio EPA will provide instructions on the contents of the letter and where it is to be sent within the notification letter.

PART III. STORM WATER POLLUTION PREVENTION PLAN (SWP3)**A. Storm Water Pollution Prevention Plans.**

A SWP3 shall be developed for each site covered by this permit. For a multi-phase construction project, a separate NOI shall be submitted when a separate SWP3 will be prepared for subsequent phases. SWP3s shall be prepared in accordance with sound engineering and/or conservation practices by a professional experienced in the design and implementation of standard erosion and sediment controls and storm water management practices addressing all phases of construction. The SWP3 shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction activities. In addition, the SWP3 shall describe and ensure the implementation of best management practices (BMPs) that reduce the pollutants in storm water discharges during construction and pollutants associated with post-construction activities to ensure compliance with ORC Section 6111.04, OAC Chapter 3745-1 and the terms and conditions of this permit.

B. Timing

A SWP3 shall be completed prior to the timely submittal of an NOI and updated in accordance with Part III.D. Upon request and good cause shown, the director may waive the requirement to have a SWP3 completed at the time of NOI submission. If a waiver has been granted, the SWP3 must be completed prior to the initiation of construction activities. The SWP3 must be implemented upon initiation of construction activities.

Permittees continuing coverage from the previous generation of this permit (OHR100000) that have initiated construction activity prior to the receipt of written notification from Ohio EPA to submit a letter of intent to continue coverage, as required in Part II.E, are not required to update their SWP3 as a result of this renewal (OHC000002). All permittees developing sites with coverage under OHR100000 that seek continuation of coverage do not need to update the post-construction section of their SWP3 as required in Part III.G.2.e of this permit.

C. SWP3 Signature and Review.

1. Plan Signature and Retention On Site. The SWP3 shall be signed in accordance with Part V.G. and retained on site during working hours.

2. Plan Availability

a. On-site: The plan shall be made available immediately upon request of the director or his authorized representative during working hours. A copy of the NOI and letter granting permit coverage under this general permit also shall be made available at the site.

Part III.C.2

b. By written request: The permittee must provide a copy of the SWP3 within 10 days upon written request of any of the following:

i. The director or the director's authorized representative;

ii. A local agency approving sediment and erosion plans, grading plans or storm water management plans; or

iii. In the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the operator of the system.

c. To the public: All NOIs, general permit approval for coverage letters, and SWP3s are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee shall make documents available to the public upon request or provide a copy at public expense, at cost, in a timely manner. However, the permittee may claim to Ohio EPA any portion of an SWP3 as confidential in accordance with Ohio law.

3. Plan Revision. The director or authorized representative, may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this part. Within 10 days after such notification from the director, (or as otherwise provided in the notification) or authorized representative, the permittee shall make the required changes to the SWP3 and, if requested, shall submit to Ohio EPA the revised SWP3 or a written certification that the requested changes have been made.

D. Amendments

The permittee shall amend the SWP3 whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the state or if the SWP3 proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the SWP3 may be reviewed by Ohio EPA in the same manner as Part III.C.

Part III**E. Duty to inform contractors and subcontractors.**

The permittee shall inform all contractors and subcontractors not otherwise defined as "operators" in Part VII of this general permit, who will be involved in the implementation of the SWP3, of the terms and conditions of this general permit. The permittee shall maintain a written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3. The written document shall be created and signatures shall be obtained prior to commencement of work on the construction site.

F. Total Maximum Daily Load (TMDL) allocations

If a TMDL is approved for any waterbody into which the permittee's site discharges and requires specific BMPs for construction sites, the director may require the permittee to revise his/her SWP3.

G. SWP3 Requirements

Operations that discharge storm water from construction activities are subject to the following requirements and the SWP3 shall include the following items:

1. Site description. Each SWP3 shall provide:
 - a. A description of the nature and type of the construction activity (e.g., low density residential, shopping mall, highway, etc.);
 - b. Total area of the site and the area of the site that is expected to be disturbed (i.e., grubbing, clearing, excavation, filling or grading, including off-site borrow areas);
 - c. A calculation of the runoff coefficients for both the pre-construction and post construction site conditions;
 - d. An estimate of the impervious area and percent imperviousness created by the construction activity;
 - e. Existing data describing the soil and, if available, the quality of any discharge from the site;
 - f. A description of prior land uses at the site;

Part III.G.1

- g. An implementation schedule which describes the sequence of major construction operations (i.e., grubbing, excavating, grading, utilities and infrastructure installation) and the implementation of erosion, sediment and storm water management practices or facilities to be employed during each operation of the sequence;
- h. The name and/or location of the immediate receiving stream or surface water(s) and the first subsequent named receiving water(s) and the areal extent and description of wetlands or other special aquatic sites at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project;
- i. For subdivided developments where the SWP3 does not call for a centralized sediment control capable of controlling multiple individual lots, a detail drawing of a typical individual lot showing standard individual lot erosion and sediment control practices. This does not remove the responsibility to designate specific erosion and sediment control practices in the SWP3 for critical areas such as steep slopes, stream banks, drainage ways and riparian zones.
- j. Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants covered by this permit and the best management practices to address pollutants in these storm water discharges;
- k. A copy of the permit requirements (attaching a copy of this permit is acceptable);
- l. Site map showing:
 - i. Limits of earth-disturbing activity of the site including associated off-site borrow or spoil areas that are not addressed by a separate NOI and associated SWP3;
 - ii. Soils types should be depicted for all areas of the site, including locations of unstable or highly erodible soils;
 - iii. Existing and proposed contours. A delineation of drainage watersheds expected during and after major grading activities as well as the size of each drainage watershed, in acres;

Part III.G.1.I

- iv. Surface water locations including springs, wetlands, streams, lakes, water wells, etc., on or within 200 feet of the site, including the boundaries of wetlands or stream channels and first subsequent named receiving water(s) the permittee intends to fill or relocate for which the permittee is seeking approval from the Army Corps of Engineers and/or Ohio EPA;
- v. Existing and planned locations of buildings, roads, parking facilities and utilities;
- vi. The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during the course of site development;
- vii. Sediment and storm water management basins noting their sediment settling volume and contributing drainage area;
- viii. Permanent storm water management practices to be used to control pollutants in storm water after construction operations have been completed;
- ix. Areas designated for the storage or disposal of solid, sanitary and toxic wastes, including dumpster areas, areas designated for cement truck washout, and vehicle fueling;
- x. The location of designated construction entrances where the vehicles will access the construction site;
- xi. The location of any in-stream activities including stream crossings.

2. Controls. The SWP3 must contain a description of the controls appropriate for each construction operation covered by this permit and the operator(s) must implement such controls. The SWP3 must clearly describe for each major construction activity identified in Part III.G.1.g: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which contractor is responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization). Ohio EPA recommends that the erosion, sediment, and storm water management practices used to satisfy the conditions of this permit, should meet the standards and specifications in the current edition of Ohio's Rainwater and Land Development (see definitions) manual or other standards acceptable to Ohio EPA. The controls shall include the following minimum components:

Part III.G.2

- a. Non-Structural Preservation Methods. The SWP3 must make use of practices which preserve the existing natural condition as much as feasible. Such practices may include: preserving riparian areas adjacent to surface waters of the state, preserving existing vegetation and vegetative buffer strips, phasing of construction operations in order to minimize the amount of disturbed land at any one time and designation of tree preservation areas or other protective clearing or grubbing practices. The recommended buffer that operators should leave undisturbed along a surface water of the state is 25 feet as measured from the ordinary high water mark of the surface water.
- b. Erosion Control Practices. The SWP3 must make use of erosion controls that are capable of providing cover over disturbed soils unless an exception is approved in accordance with Part III.G.4. A description of control practices designed to restabilize disturbed areas after grading or construction shall be included in the SWP3. The SWP3 must provide specifications for stabilization of all disturbed areas of the site and provide guidance as to which method of stabilization will be employed for any time of the year. Such practices may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, use of construction entrances and the use of alternative ground cover.
- i. Stabilization. Disturbed areas must be stabilized as specified in the following tables below. Permanent and temporary stabilization are defined in Part VII.

Table 1: Permanent Stabilization

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a stream and at final grade	Within two days of reaching final grade
Any other areas at final grade	Within seven days of reaching final grade within that area

Part III.G.2.b.i

Table 2: Temporary Stabilization

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a stream and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 21 days
For all construction activities, any disturbed areas that will be dormant for more than 21 days but less than one year, and not within 50 feet of a stream	Within seven days of the most recent disturbance within the area For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather
Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed.	

ii. Permanent stabilization of conveyance channels. Operators shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding (as defined in the 1996 edition of the Rainwater and Land Development manual), mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques or rock check dams.

c. Runoff Control Practices. The SWP3 shall incorporate measures which control the flow of runoff from disturbed areas so as to prevent erosion from occurring. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices shall divert runoff away from disturbed areas and steep slopes where practicable.

d. Sediment Control Practices. The plan shall include a description of structural practices that shall store runoff allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Structural practices shall be used to control erosion and trap sediment from a site remaining disturbed for more than 14 days. Such practices may include, among others: sediment settling ponds, silt fences, earth diversion dikes or channels which direct runoff to a sediment settling pond and storm drain inlet protection. All sediment control practices must be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a sediment control practice unless those are used in conjunction with a sediment settling pond.

Part III.G.2.d

The SWP3 must contain detail drawings for all structural practices.

i. Timing. Sediment control structures shall be functional throughout the course of earth disturbing activity. Sediment basins and perimeter sediment barriers shall be implemented prior to grading and within seven days from the start of grubbing. They shall continue to function until the up slope development area is restabilized. As construction progresses and the topography is altered, appropriate controls must be constructed or existing controls altered to address the changing drainage patterns.

ii. Sediment settling ponds. Concentrated storm water runoff and runoff from drainage areas, which exceed the design capacity of silt fence or inlet protection, shall pass through a sediment settling pond. For common drainage locations that serve an area with 10 or more acres disturbed at one time, a temporary (or permanent) sediment settling pond must be provided until final stabilization of the site. The permittee may request approval from Ohio EPA to use alternative controls if it can demonstrate the alternative controls are equivalent in effectiveness to a sediment settling pond. It is recommended for drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used.

The sediment settling pond shall be sized to provide at least 67 cubic yards of storage per acre of total contributing drainage area. When determining the total contributing drainage area, off-site areas and areas which remain undisturbed by construction activity must be included unless runoff from these areas is diverted away from the sediment settling pond and is not co-mingled with sediment-laden runoff. The depth of the sediment settling pond must be less than or equal to five feet. The configuration between inlets and the outlet of the basin must provide at least two units of length for each one unit of width (> 2:1 length:width ratio). Sediment must be removed from the sediment settling pond when the design capacity has been reduced by 40 percent (This is typically reached when sediment occupies one-half of the basin depth). When designing sediment settling ponds, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls must be used where site limitations would preclude a safe design. The use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal is encouraged.

Part III.G.2.d

iii. Silt Fence and Diversions. Sheet flow runoff from denuded areas shall be intercepted by silt fence or diversions to protect adjacent properties and water resources from sediment transported via sheet flow. Where intended to provide sediment control, silt fence shall be placed on a level contour. This permit does not preclude the use of other sediment barriers designed to control sheet flow runoff. The relationship between the maximum drainage area to silt fence for a particular slope range is shown in the table below.

Maximum drainage area (in acres) to 100 linear feet of silt fence	Range of slope for a particular drainage area (in percent)
0.5	< 2%
0.25	≥ 2% but < 20%
0.125	≥ 20% but < 50%

Storm water diversion practices shall be used to keep runoff away from disturbed areas and steep slopes where practicable. Such devices, which include swales, dikes or berms, may receive storm water runoff from areas up to 10 acres.

iv. Inlet Protection. Other erosion and sediment control practices shall minimize sediment laden water entering active storm drain systems, unless the storm drain system drains to a sediment settling pond.

v. Stream Protection. If construction activities disturb areas adjacent to streams, structural practices shall be designed and implemented on site to protect all adjacent streams from the impacts of sediment runoff. No structural sediment controls (e.g., the installation of silt fence or a sediment settling pond in-stream) shall be used in a stream. For all construction activities immediately adjacent to surface waters of the state, it is recommended that a setback of at least 25-feet, as measured from the ordinary high water mark of the surface water, be maintained in its natural state as a permanent buffer. Where impacts within this setback area are unavoidable due to the nature of the construction activity (e.g., stream crossings for roads or utilities), the project shall be designed such that the number of stream crossings and the width of the disturbance within the setback area are minimized.

vi. Modifying Controls. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the permittee must replace or modify the control for site conditions.

Part III.G.2

e. Post-Construction Storm Water Management Requirements. So that receiving stream's physical, chemical, and biological characteristics are protected and stream functions are maintained, post-construction storm water practices shall provide perpetual management of runoff quality and quantity. To meet the post-construction requirements of this permit, the SWP3 must contain a description of the post-construction BMPs that will be installed during construction for the site and the rationale for their selection. The rationale must address the anticipated impacts on the channel and floodplain morphology, hydrology, and water quality.

Detail drawings and maintenance plans must be provided for all post - construction BMPs. Maintenance plans shall be provided by the permittee to the post-construction operator of the site (including homeowner associations) upon completion of construction activities (prior to termination of permit coverage). For sites located within a community with a regulated municipal separate storm sewer system (MS4), the permittee, land owner, or other entity with legal control of the property may be required to develop and implement a maintenance plan to comply with the requirements of the MS4. Maintenance plans must ensure that pollutants collected within structural post-construction practices, be disposed of in accordance with local, state, and federal regulations. Permittees, except for those regulated under the small MS4 program, are not responsible under this permit for operation and maintenance of post-construction practices once coverage under this permit is terminated.

This permit does not preclude the use of innovation or experimental post-construction storm water management technologies. However, the director may require discharges from such structures to be monitored to ensure compliance with Part III.G.2.e of this permit. The installation of structural controls in certain scenarios may also require a separate permit under section 404 of the CWA. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. However, post-construction storm water BMPs that discharge pollutants from point sources once construction is completed, may in themselves, need authorization under a separate NPDES permit.

Linear construction projects, (e.g., pipeline or utility line installation), which do not result in the installation of impervious surface, are not required to comply with the conditions of Part III.G.2.e of this permit. However, linear construction projects must be designed to minimize the number of stream crossings and the width of disturbance.

Part III.G.2.e

Large Construction Activities. For all large construction activities (involving the disturbance of five or more acres of land or will disturb less than five acres, but is a part of a larger common plan of development or sale which will disturb five or more acres of land), the post construction BMP(s) chosen must be able to detain storm water runoff for protection of the stream channels, stream erosion control, and improved water quality. Structural (designed) post-construction storm water treatment practices shall be incorporated into the permanent drainage system for the site. The BMP(s) chosen must be sized to treat the water quality volume (WQ_v) and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1. The WQ_v shall be equivalent to the volume of runoff from a 0.75-inch rainfall and shall be determined according to one of the two following methods:

- i. Through a site hydrologic study approved by the local municipal permitting authority that uses continuous hydrologic simulation and local long-term hourly precipitation records or
- ii. Using the following equation: $WQ_v = C * P * A / 12$
 where:
 WQ_v = water quality volume in acre-feet
 C = Runoff Coefficient appropriate for storms less than 1 inch (see Table 1)
 P = 0.75 inch precipitation depth
 A = area draining into the BMP in acres

**Table 1
Runoff Coefficients Based on the Type of Land Use**

Land Use	Runoff Coefficient
Industrial & Commercial	0.8
High Density Residential (>8 dwellings/acre)	0.5
Medium Density Residential (4 to 8 dwellings/acre)	0.4
Low Density Residential (<4 dwellings/acre)	0.3
Open Space and Recreational Areas	0.2

Where the land use will be mixed, the runoff coefficient should be calculated using a weighted average. For example, if 60% of the contributing drainage area to the storm water treatment structure is Low Density Residential, 30% is High Density Residential, and 10% is Open Space, the runoff coefficient is calculated as follows $(0.6)(0.3) + (0.3)(0.5) + (0.1)(0.2) = 0.35$.

Part III.G.2.e

An additional volume equal to 20 percent of the WQ_v shall be incorporated into the BMP for sediment storage and/or reduced infiltration capacity. Ohio EPA recommends that BMPs be designed according to the methodology included in the Rainwater and Land Development manual or in another design manual acceptable for use by Ohio EPA. BMPs shall be designed such that the drain time is long enough to provide treatment, but short enough to provide storage available for successive rainfall events as described in Table 2 below.

**Table 2
Target Draw Down (Drain) Times for Structural
Post-Construction Treatment Control Practices**

Best Management Practice	Drain Time of WQ _v
Infiltration	24 - 48 hours
Vegetated Swale and Filter Strip	24 hours
Extended Detention Basin (Dry Basins)	48 hours
Retention Basins (Wet Basins)*	24 hours
Constructed Wetlands (above permanent pool)	24 hours
Media Filtration, Bioretention	40 hours

* Provide both a permanent pool and an extended detention volume above the permanent pool, each sized at 0.75 * WQ_v

The permittee may request approval from Ohio EPA to use alternative structural post-construction BMPs if the permittee can demonstrate that the alternative BMPs are equivalent in effectiveness to those listed in Table 2 above. Construction activities shall be exempt from this condition if it can be demonstrated that the WQ_v is provided within an existing structural post-construction BMP that is part of a larger common plan of development or if structural post-construction BMPs are addressed in a regional or local storm water management plan. Public entities (i.e., the state, counties, townships, cities, or villages) shall comply with the post-construction storm water management requirements of Part III.G.2.e for roadway construction projects initiated after March 10, 2006 and where practicable for projects initiated as of the effective date of this permit and thereafter. For redevelopment projects (i.e., developments on previously developed property), post-construction practices shall either ensure a 20 percent net reduction of the site impervious area, provide for treatment of at least 20 percent of the WQ_v, or a combination of the two.

Part III.G.2.e

Small Construction Activities. For all small land disturbance activities (which disturb one or more, but less than five acres of land and is not a part of a larger common plan of development or sale which will disturb five or more acres of land), a description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed must be included in the SWP3. Structural measures should be placed on upland soils to the degree attainable.

i. Such practices may include, but are not limited to: storm water detention structures (including wet basins); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWP3 shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed pre-development levels.

ii. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., no significant changes in the hydrological regime of the receiving water).

f. Surface Water Protection. If the project site contains any streams, rivers, lakes, wetlands or other surface waters, certain construction activities at the site may be regulated under the CWA and/or state isolated wetland permit requirements. Sections 404 and 401 of the Act regulate the discharge of dredged or fill material into surface waters and the impacts of such activities on water quality, respectively. Construction activities in surface waters which may be subject to CWA regulation and/or state isolated wetland permit requirements include, but are not limited to: sewer line crossings, grading, backfilling or culverting streams, filling wetlands, road and utility line construction, bridge installation and installation of flow control structures. If the project contains streams, rivers, lakes or wetlands or possible wetlands, the permittee must contact the appropriate U.S. Army Corps of Engineers District Office. (CAUTION: Any area of seasonally wet hydric soil is a potential wetland - please consult the Soil Survey and list of hydric soils for your County, available at your county's Soil and Water Conservation District. If you have any questions about Section 401 water quality certification, please contact the Ohio Environmental Protection Agency, Section 401 Coordinator.)

Part III.G.2.f

U.S. Army Corps of Engineers (Section 404 regulation): Huntington, WV District (304) 529-5210 (Muskingum, Hocking and Scioto River Basin)
Buffalo, NY District (716) 879-4329 (Lake Erie Basin)
Pittsburgh, PA District (412) 395-7152 (Mahoning River Basin)
Louisville, KY District (502) 315-6678 (Little & Great Miami River Basin)
Ohio Environmental Protection Agency (Section 401 regulation):
Columbus, OH (614) 644-2001 (all of Ohio)

g. Other controls.

i. Non-Sediment Pollutant Controls. No solid (other than sediment) or liquid waste, including building materials, shall be discharged in storm water runoff. The permittee must implement all necessary BMPs to prevent the discharge of non-sediment pollutants to the drainage system of the site or surface waters of the state. Under no circumstance shall concrete trucks wash out directly into a drainage channel, storm sewer or surface waters of the state. No exposure of storm water to waste materials is recommended.

ii. Off-site traffic. Off-site vehicle tracking of sediments and dust generation shall be minimized.

iii. Compliance with other requirements. The SWP3 shall be consistent with applicable State and/or local waste disposal, sanitary sewer or septic system regulations, including provisions prohibiting waste disposal by open burning and shall provide for the proper disposal of contaminated soils to the extent these are located within the permitted area.

iv. Trench and ground water control. There shall be no turbid discharges to surface waters of the state resulting from dewatering activities. If trench or ground water contains sediment, it must pass through a sediment settling pond or other equally effective sediment control device, prior to being discharged from the construction site. Alternatively, sediment may be removed by settling in place or by dewatering into a sump pit, filter bag or comparable practice. Ground water dewatering which does not contain sediment or other pollutants is not required to be treated prior to discharge. However, care must be taken when discharging ground water to ensure that it does not become pollutant laden by traversing over disturbed soils or other pollutant sources.

Part III.G.2

h. Maintenance. All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All sediment control practices must be maintained in a functional condition until all up slope areas they control are permanently stabilized. The SWP3 shall be designed to minimize maintenance requirements. The applicant shall provide a description of maintenance procedures needed to ensure the continued performance of control practices.

i. Inspections. At a minimum, procedures in an SWP3 shall provide that all controls on the site are inspected at least once every seven calendar days and within 24 hours after any storm event greater than one-half inch of rain per 24 hour period. The permittee shall assign qualified inspection personnel (those with knowledge and experience in the installation and maintenance of sediment and erosion controls) to conduct these inspections to ensure that the control practices are functional and to evaluate whether the SWP3 is adequate and properly implemented in accordance with the schedule proposed in Part III.G.1.g of this permit or whether additional control measures are required. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWP3 shall be observed to ensure that those are operating correctly. Discharge locations shall be inspected to ascertain whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.

The permittee shall maintain for three years following the submittal of a notice of termination form, a record summarizing the results of the inspection, names(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWP3 and a certification as to whether the facility is in compliance with the SWP3 and the permit and identify any incidents of non-compliance. The record and certification shall be signed in accordance with Part V.G. of this permit.

i. When practices require repair or maintenance. If the inspection reveals that a control practice is in need of repair or maintenance, with the exception of a sediment settling pond, it must be repaired or maintained within three days of the inspection. Sediment settling ponds must be repaired or maintained within 10 days of the inspection.

Part III.G.2.i

ii. When practices fail to provide their intended function. If the inspection reveals that a control practice fails to perform its intended function and that another, more appropriate control practice is required, the SWP3 must be amended and the new control practice must be installed within 10 days of the inspection.

iii. When practices depicted on the SWP3 are not installed. If the inspection reveals that a control practice has not been implemented in accordance with the schedule contained in Part III.G.1.g of this permit, the control practice must be implemented within 10 days from the date of the inspection. If the inspection reveals that the planned control practice is not needed, the record must contain a statement of explanation as to why the control practice is not needed.

3. Approved State or local plans. All dischargers regulated under this general permit must comply, except those exempted under state law, with the lawful requirements of municipalities, counties and other local agencies regarding discharges of storm water from construction activities. All erosion and sediment control plans and storm water management plans approved by local officials shall be retained with the SWP3 prepared in accordance with this permit. Applicable requirements for erosion and sediment control and storm water management approved by local officials are, upon submittal of a NOI form, incorporated by reference and enforceable under this permit even if they are not specifically included in an SWP3 required under this permit. When the project is located within the jurisdiction of a regulated municipal separate storm sewer system (MS4), the permittee must certify that the SWP3 complies with the requirements of the storm water management program of the MS4 operator.

4. Exceptions. If specific site conditions prohibit the implementation of any of the erosion and sediment control practices contained in this permit or site specific conditions are such that implementation of any erosion and sediment control practices contained in this permit will result in no environmental benefit, then the permittee shall provide justification for rejecting each practice based on site conditions. Exceptions from implementing the erosion and sediment control standards contained in this permit will be approved or denied on a case-by-case basis.

PART IV. NOTICE OF TERMINATION REQUIREMENTS**A. Failure to notify.**

The terms and conditions of this permit shall remain in effect until a signed Notice of Termination (NOT) form is submitted. Failure to submit an NOT constitutes a violation of this permit and may affect the ability of the permittee to obtain general permit coverage in the future.

B. When to submit a NOT

1. Permittees wishing to terminate coverage under this permit must submit an NOT form in accordance with Part V.G. of this permit. Compliance with this permit is required until an NOT form is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT form is submitted.

2. All permittees must submit an NOT form within 45 days of completing all permitted land disturbance activities. Enforcement actions may be taken if a permittee submits an NOT form without meeting one or more of the following conditions:

- a. Final stabilization (see definition in Part VII) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);
- b. Another operator(s) has assumed control over all areas of the site that have not been finally stabilized;
- c. For residential construction only, temporary stabilization has been completed and the lot, which includes a home, has been transferred to the homeowner. (Note: individual lots without housing which are sold by the developer must undergo final stabilization prior to termination of permit coverage.); or
- d. An exception has been granted under Part III.G.4.

C. How to submit a NOT

Permittees must use Ohio EPA's approved NOT form. The form must be completed and mailed according to the instructions and signed in accordance with Part V.G of this permit.

PART V. STANDARD PERMIT CONDITIONS.**A. Duty to comply.**

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of ORC Chapter 6111, and is grounds for enforcement action.

2. Ohio law imposes penalties and fines for persons who knowingly make false statements or knowingly swear or affirm the truth of a false statement previously made.

B. Continuation of an expired general permit.

An expired general permit continues in force and effect until a new general permit is issued.

C. Need to halt or reduce activity not a defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to mitigate.

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Duty to provide information.

The permittee shall furnish to the director, within 10 days of written request, any information which the director may request to determine compliance with this permit. The permittee shall also furnish to the director upon request copies of records required to be kept by this permit.

F. Other information.

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI, SWP3, NOT or in any other report to the director, he or she shall promptly submit such facts or information.

Part V**G. Signatory requirements.**

All NOIs, NOTs, SWP3s, reports, certifications or information either submitted to the director or that this permit requires to be maintained by the permittee, shall be signed.

1. These items shall be signed as follows:

a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

i. A president, secretary, treasurer or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation; or

ii. The manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal or other public agency: By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA).

2. All reports required by the permits and other information requested by the director shall be signed by a person described in Part V.G.1 of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

Part V.G.2

a. The authorization is made in writing by a person described in Part V.G.1 of this permit and submitted to the director;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator of a well or well field, superintendent, position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

c. The written authorization is submitted to the director.

3. Changes to authorization. If an authorization under Part V.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 of this permit must be submitted to the director prior to or together with any reports, information or applications to be signed by an authorized representative.

H. Certification.

Any person signing documents under this section shall make the following certification: *"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

I. Oil and hazardous substance liability.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under section 311 of the CWA or 40 CFR Part 112. 40 CFR Part 112 establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable surface waters of the State or adjoining shorelines.

Part V**J. Property rights.**

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

K. Severability.

The provisions of this permit are severable and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

L. Transfers.

Ohio NPDES general permit coverage is transferable. Ohio EPA must be notified in writing sixty days prior to any proposed transfer of coverage under an Ohio NPDES general permit. The transferee must inform Ohio EPA it will assume the responsibilities of the original permittee transferor.

M. Environmental laws.

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper operation and maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWP3s. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

O. Inspection and entry.

The permittee shall allow the director or an authorized representative of Ohio EPA, upon the presentation of credentials and other documents as may be required by law, to:

Part V.O

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

PART VI. REOPENER CLAUSE

A. If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with construction activity covered by this permit, the permittee of such discharge may be required to obtain coverage under an individual permit or an alternative general permit in accordance with Part I.C of this permit or the permit may be modified to include different limitations and/or requirements.

B. Permit modification or revocation will be conducted according to ORC Chapter 6111.

PART VII. DEFINITIONS

A. "Act" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92- 500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117 and Pub. L. 100-4, 33 U.S.C. 1251 et. seq.

B. "Best management practices (BMPs)" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices (both structural and non-structural) to prevent or reduce the pollution of surface waters of the state. BMP's also include treatment requirements, operating procedures and practices to control plant and/or construction site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage.

C. "Commencement of construction" means the initial disturbance of soils associated with clearing, grubbing, grading, placement of fill or excavating activities or other construction activities.

D. "Concentrated storm water runoff" means any storm water runoff which flows through a drainage pipe, ditch, diversion or other discrete conveyance channel.

E. "Director" means the director of the Ohio Environmental Protection Agency.

Part VII

F. "Discharge" means the addition of any pollutant to the surface waters of the state from a point source.

G. "Disturbance" means any clearing, grading, excavating, filling, or other alteration of land surface where natural or man-made cover is destroyed in a manner that exposes the underlying soils.

H. "Final stabilization" means that either:

1. All soil disturbing activities at the site are complete and a uniform perennial vegetative cover (e.g., evenly distributed, without large bare areas) with a density of at least 70 percent cover for the area has been established on all unpaved areas and areas not covered by permanent structures or equivalent stabilization measures (such as the use of mulches, rip-rap, gabions or geotextiles) have been employed. In addition, all temporary erosion and sediment control practices are removed and disposed of and all trapped sediment is permanently stabilized to prevent further erosion; or

2. For individual lots in residential construction by either:

a. The homebuilder completing final stabilization as specified above or

b. The homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or

3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters of the state and which are not being returned to their pre-construction agricultural use, must meet the final stabilization criteria in (1) or (2) above.

I. "Individual Lot NOI" means a Notice of Intent for an individual lot to be covered by this permit (see parts I and II of this permit).

J. "Larger common plan of development or sale"- means a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.

Part VII

K. "MS4" means municipal separate storm sewer system which means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) that are:

1. Owned or operated by the federal government, state, municipality, township, county, district(s) or other public body (created by or pursuant to state or federal law) including special district under state law such as a sewer district, flood control district or drainage districts or similar entity or a designated and approved management agency under section 208 of the act that discharges into surface waters of the state; and
2. Designed or used for collecting or conveying solely storm water,
3. Which is not a combined sewer and,
4. Which is not a part of a publicly owned treatment works.

L. "National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and enforcing pretreatment requirements, under sections 307, 402, 318 and 405 of the CWA. The term includes an "approved program."

M. "NOI" means notice of intent to be covered by this permit.

N. "NOT" means notice of termination.

O. "Operator" means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with an SWP3 for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

As set forth in Part II.A, there can be more than one operator at a site and under these circumstances, the operators shall be co-permittees.

P. "Owner or operator" means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

Part VII

Q. "Permanent stabilization" means the establishment of permanent vegetation, decorative landscape mulching, matting, sod, rip rap and landscaping techniques to provide permanent erosion control on areas where construction operations are complete or where no further disturbance is expected for at least one year.

R. "Percent imperviousness" means the impervious area created divided by the total area of the project site.

S. "Point source" means any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or the floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

T. "Rainwater and Land Development" is a manual describing construction and post-construction best management practices and associated specifications. A copy of the manual may be obtained by contacting the Ohio Department of Natural Resources, Division of Soil & Water Conservation.

U. "Riparian area" means the transition area between flowing water and terrestrial (land) ecosystems composed of trees, shrubs and surrounding vegetation which serve to stabilize erodible soil, improve both surface and ground water quality, increase stream shading and enhance wildlife habitat.

V. "Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

W. "Sediment settling pond" means a sediment trap, sediment basin or permanent basin that has been temporarily modified for sediment control, as described in the latest edition of the Rainwater and Land Development manual.

X. "State isolated wetland permit requirements" means the requirements set forth in Sections 6111.02 through 6111.029 of the ORC.

Y. "Storm water" means storm water runoff, snow melt and surface runoff and drainage.

Z. "Surface waters of the state" or "water bodies" means all streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways which are situated wholly or partially within the boundaries of the state, except those private waters which do not combine or effect a junction with natural surface or underground waters. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the ORC are not included.

Part VII

AA. "SWP3" means storm water pollution prevention plan.

BB. "Temporary stabilization" means the establishment of temporary vegetation, mulching, geotextiles, sod, preservation of existing vegetation and other techniques capable of quickly establishing cover over disturbed areas to provide erosion control between construction operations.

CC. "Water Quality Volume (WQ_v)" means the volume of storm water runoff which must be captured and treated prior to discharge from the developed site after construction is complete. WQ_v is based on the expected runoff generated by the mean storm precipitation volume from post-construction site conditions at which rapidly diminishing returns in the number of runoff events captured begins to occur.

Designer Note:

This is ODOT's general permit issued by Ohio Environmental Protection Agency.

This supplemental specification will be provided with both supplemental specification 832 and proposal note 205.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 848

BRIDGE DECK REPAIR AND OVERLAY
WITH CONCRETE USING HYDRO-DEMOLITION

February 8, 2002

848.01	Description
848.02	Bridge Decks with No Existing Rigid Concrete Overlay
848.03	Bridge Decks with an Existing Rigid Concrete Overlay
848.04	Micro-silica Modified Concrete Materials
848.05	Latex Modified Concrete Materials
848.06	Superplasticized Dense Concrete Materials.
848.07	Mixers - Micro-silica Modified or Superplasticized Dense Concrete
848.08	Mixers - Continuous Mobile for Latex Modified Concrete
848.09	Finishing Machine
848.10	Finishing Machine Rail and Supports
848.11	Hydro-demolition Equipment
848.12	Proportioning and Mixing of Micro-silica Modified Concrete
848.13	Proportioning and Mixing of Latex Modified Concrete
848.14	Proportioning and Mixing of Superplasticized Dense Concrete.
848.15	Test Slab
848.16	Preparation of Existing Deck
848.17	Removal of Existing Asphaltic Concrete Overlays
848.18	Removal of Existing Concrete Overlays
848.19	Removal of Existing Concrete Overlay, Variable Thickness
848.20	Concrete Removal by Hydro-demolition
848.21	Resounding
848.22	Cleaning
848.23	Full Depth Repair
848.24	Preparation Prior to Overlay Placement
848.25	Finishing Machine Dry Run
848.26	Placing, Consolidating and Finishing
848.27	Curing
848.28	Curing Application LMC Overlays
848.29	Curing Application MSC and SDC Overlays.
848.30	Limitation on Placing Operations
848.31	Sampling and Testing
848.32	Method of Measurement

848.33 Basis of Payment

848.01 Description. This work shall consist of furnishing the necessary labor, materials and equipment to repair and overlay concrete bridge decks in accordance with these specifications and in reasonably close conformity with the grades, thickness, and cross sections shown on the plans or as directed by the Engineer. This work shall include the removal of patches other than sound portland cement concrete and all loose and unsound concrete by hydro-demolition; preparation of the sound existing concrete surface; removal, forming and concrete for full-depth repairs; blast cleaning or high pressure water cleaning; furnishing, placing, finishing, texturing and curing of a micro silica modified concrete (MSC) overlay, a latex modified concrete (LMC) overlay, or a superplasticized dense concrete (SDC) overlay, as specified; and all other operations necessary to complete this work according to these specifications and to the satisfaction of the Engineer.

Removal of flexible (asphalt) concrete overlays and rigid concrete overlays are included as part of this work if the following bid items are part of the project plans:

Item 848, Wearing Course Removed, Asphalt,

Item 848, Existing Concrete Overlay Removed ____ Nominal Thickness

Item 848, Removal Debonded, Deteriorated Existing Variable Thickness Concrete Overlay

848.02 Bridge Decks with No Existing Rigid Concrete Overlay. The overlay surface shall be finished to a dimension "T" above the surface of the existing portland cement concrete deck. The existing deck shall be removed to a uniform depth of "D" across its entire surface. The uniform removal depth will be exceeded where unsound concrete is encountered. Unless the plans state otherwise, "D" shall be 25 mm (1 inch).

848.03 Bridge Decks with an Existing Rigid Concrete Overlay. When a rigid concrete overlay exists on a deck, the thickness of concrete "D" to be removed and the thickness of the new overlay "T" replaced is a function of the existing concrete overlay thickness and shall be as called out in the plans. The cost of removing the rigid concrete overlay shall be included in the price bid for Item 848, Existing Concrete Overlay Removed ____ Nominal Thickness and an additional item 848, Removal Debonded, Deteriorated Existing Variable Thickness Concrete Overlay. The second bid item is intended for the removal of unsound variable thickness overlay concrete not removed in the 848, Existing Concrete Overlay Removed, ____ Nominal Thickness.

Spalled or delaminated tops of backwalls shall be repaired with the specified overlay material for the bridge deck (variable thickness).

848.04 Micro-silica Modified Concrete Materials. The materials shall conform to the following requirements:

Fine aggregate (natural sand)	703.02*
Coarse aggregate (No.8)	703.02*
Portland cement, Type I or IA	701.04** or 701.01
Water	499.02
Chemical admixture	705.12, ASTM C 494, Type A or D
Air-entraining admixture	705.10
Superplasticizing admixture (High Range Water Reducer)	705.12, ASTM C 494, Type F
Curing materials	705.05 or 705.06, White opaque
Micro-silica admixture	ASTM C 1240***

* Deleterious material shall not exceed one-half the requirement for superstructure aggregate. Sodium sulfate soundness loss shall not exceed that specified for superstructure concrete in 703.02.

** Only one brand of cement shall be used for each bridge deck overlay unless otherwise permitted by the Engineer.

*** Micro-silica admixture shall meet ASTM C 1240 and be from a source approved by the Office of Materials Management, 1600 W. Broad St., Columbus, Ohio. The use of micro-silica admixtures in dissolvable bags shall not be allowed.

The Contractor will obtain a written statement from the manufacturers of the chemical admixtures verifying the compatibility of the combination of materials and the sequence in which they are combined. The manufacturers will further designate a technical representative from their company or the ready-mix supplier to be in charge of the dispensing of the admixture products. The technical representatives shall act in an advisory capacity and will report to the Contractor and the Engineer any operations and procedures which are considered by the representative as being detrimental to the integrity of the placement. The manufacturer's technical representative will be present during concrete placement unless his presence is waived by the Engineer.

848.05 Latex Modified Concrete Materials. The materials shall conform to the following requirements:

Fine aggregate (natural sand)	703.02*
Coarse aggregate (No. 8)	703.02*
Portland cement, Type I	701.04**
Water	499.02
Latex emulsion	SS No. 953***
Curing materials	705.05 or 705.06, white opaque

* Deleterious material shall not exceed one half the requirement for superstructure

aggregate, and the sodium sulfate soundness loss shall not exceed that specified for superstructure concrete in 703.02.

**705.10 admixture shall not be used.

***The latex emulsion shall be protected from freezing and prolonged exposure to temperatures in excess of 29°C (85°F). Emulsions in storage facilities shall be re-circulated in accordance with the manufacturer's recommendations.

848.06 Superplasticized Dense Concrete Materials. The materials shall conform to the following requirements:

Fine aggregate (natural sand)	703.02*
Coarse aggregate (No. 8)	703.02*
Portland cement, Type I or IA**	701.04 or 701.01
Water	499.02
Chemical admixture	705.12, ASTM C 494, Type A or D
Air-entraining admixture	705.10
Superplasticizing admixture (High Range Water Reducer)	705.12, ASTM C 494, Type F
Curing materials	705.05 or 705.06, white opaque

* Deleterious material shall not exceed one half the requirement for superstructure aggregate, and the sodium sulfate soundness loss shall not exceed that specified for superstructure concrete in 703.02.

** Only one brand of cement shall be used for each bridge deck overlay unless otherwise permitted by the Engineer.

Note: The Contractor shall obtain a written statement from the manufacturer of the superplasticizing admixture that he is satisfied with the compatibility of the combination of materials and the sequence in which they are combined. The manufacturer shall further designate a technical representative from the ready-mix supplier or his company to be in charge of dispensing the admixture products. Operations and procedures which are considered by the designated representative as being detrimental to the integrity of the overlay will not be permitted.

848.07 Mixers - Micro-silica Modified or Superplasticized Dense Concrete. Concrete shall be mixed in a central mixing plant or by a ready-mixed concrete truck capable of discharging concrete having a maximum water-cementitious ratio of 0.36. Mixing equipment shall meet the requirements of 499.06(B). Admixtures shall be introduced into

the concrete in such a manner that will disperse them throughout the entire load. Batch plants shall meet the requirements of 499.06(A) and shall be located such that the maximum time required from start of mixing to completion of discharge of the concrete at the site of work shall not exceed 90 minutes.

848.08 Mixers - Continuous Mobile for Latex Modified Concrete. Requirements for continuous mobile mixers for latex modified concrete are as follows. The proportioning and mixing equipment shall be an integral mobile unit having the capacity and continuous mixing capability to permit the finishing operations to proceed at a constant rate so that final finishing can be completed prior to the formation of a plastic film on the LMC surface. It shall consistently produce a uniformly blended mixture within the specified air content and slump limits. The mixer shall also:

- (1) Be capable of producing not less than 4.6 m³ (6 cubic yards) of LMC without recharging.
- (2) Be equipped with a recording meter with a ticket printout device to record an indication of the cement quantity being introduced into the mix. The metering device shall be accurate within a tolerance of -1 to +3 percent.
- (3) Be equipped with a latex metering device to indicate volume dispensed. The metering device shall be accurate within a tolerance of -1 to +2 percent. In addition the latex tank shall have a stand pipe marked in liters (gallons).
- (4) Be equipped with a water flow indicator, and have a water flow control that is readily adjustable to provide for minor variations in aggregate moisture content. The flow indicator shall be accurate within a tolerance of \pm 1 percent in the range of expected use.
- (5) Be equipped with a control to regulate the quantity of each of the LMC components to permit production of a mix having the specified composition. To ensure that the mixer can accurately proportion and blend all components of the LMC on a continuous or intermittent basis, the mixer shall be calibrated prior to the start of the overlay placement.

The Engineer may require re-calibration of the cement, latex, and water metering devices as he deems necessary.

- (6) Be capable of discharging mixed LMC through a conventional chute directly in front of the finishing machine.
- (7) Be kept clean, free of partially dried or hardened materials, and properly operating at all times.

848.09 Finishing Machine. An approved self-propelled finishing machine shall be used with supports outside the prepared deck surface to be overlaid, except where hand finishing equipment is authorized. The finishing machine shall be equipped with forward and reverse drive mechanisms that enable precise velocity control of the machine while it is moving in either direction. It shall be equipped with one or more rotating rollers. It shall be equipped with augers and either a vibrating pan or vibrating rollers. Vibrating frequency for pans and rollers shall be variable from 1500 to 5000 pulses per minute. The Contractor shall furnish the necessary verification of these vibration frequencies. Screeds shall have provisions for raising above the finished concrete surface.

The placing and finishing equipment shall be designed so that the elapsed time between depositing concrete and final finishing shall not exceed 10 minutes.

848.10 Finishing Machine Rail and Supports. Finishing machines shall be supported by rail and supports made of steel. Rail shall be furnished in sections not less than 3 m (10 feet) in length and be of sufficient cross-section so that the weight of the finishing machine causes zero vertical deflection while in motion. Rail shall be straight with no sections exceeding a tolerance of 3 mm in 3.0 m (1/8-inch in 10 feet) in any direction. Rail supports shall be screw-type adjustable saddles and shall be of sufficient number under the rail so that zero vertical deflection occurs under the weight of the finishing machine.

848.11 Hydro-demolition Equipment. The hydro-demolition equipment shall be a self-propelled machine that utilizes a high pressure water jet stream capable of removing concrete to the depth specified herein and/or as shown on the plans and be capable of removing rust and concrete particles from reinforcing steel. Hand held high pressure [690 bar (10000 psi) minimum] wands or 16 kg (35 lb.) maximum jackhammers operated at no more than a 45 degree angle from horizontal shall be used in areas that are inaccessible to the self-propelled machine or in patching areas that require work to remove the remaining unsound concrete.

848.12 Proportioning and Mixing of Micro-silica Modified Concrete. All required characteristics of the mix, i.e. air entrainment and slump, shall be adjusted off the deck before placement of the overlay begins. The components of the micro silica modified concrete shall be combined into a workable mixture of uniform composition and consistency. They shall be proportioned as follows:

QUANTITIES OF MATERIAL PER CUBIC METER(CUBIC YARD) (DRY WEIGHTS)*

Type of Coarse Aggregate	Coarse Aggregate kg (lbs)	Fine Aggregate kg (lbs)	Cement kg (lbs)	Micro Silica kg (lbs)	Max. Water Cementitious Ratio ^^
Gravel	805(1355)	805(1355)	415(700)	30(50)	0.36

Limestone	815(1350)	805(1355)	415(700)	30(50)	0.36
Slag	705(1190)	805(1355)	415(700)	30(50)	0.36

* The specific gravities used for determining the above weights are: natural sand 2.62, gravel 2.62, limestone 2.65, slag 2.30 and micro silica 2.20.

^ The water cementitious ratio shall be calculated based upon the total cementitious material. Cementitious material shall include Portland cement and microsilica (solids).

The proportions of coarse and fine aggregate shall be adjusted to provide the maximum amount of coarse aggregate possible and still provide a workable and finishable mix. The Contractor may modify the mixes shown by adjusting the coarse and fine aggregates up to 50 kgs (100 lbs) each, unless otherwise approved by the Engineer.

The batch weights previously described shall be corrected to compensate for the moisture contained in the aggregate at the time of use. A chemical admixture (705.12, Type A or D) shall be used. The transit mixer charge shall be limited to 3/4 of its rated capacity or 4.6 cubic meters (6 cubic yards), whichever is the smaller, unless a larger size is approved by the Engineer.

The specified cementitious content shall be maintained and a maximum water-cementitious material ratio of 0.36 shall not be exceeded. Any admixture added at the job site shall be mixed a minimum of 5 minutes at mixing speed. After all components have been added, the slump range shall be 150 mm (6 inches) plus or minus 50 mm (2 inches). The air content of plastic concrete at the time of placement shall be 8 plus or minus 2 percent.

The use of Micro-silica admixture in dissolvable bags shall not be allowed.

If a slump loss occurs after mixing and before placement, the charge may be retempered with the admixture to restore plasticity. The slump range and air content shall be rechecked to ensure conformance to the allowable values. The load shall still be placed within the 90 minute limitation as per 848.07. If the consistency of the charge after retempering is such as to cause segregation of the components, this will be cause for rejection of the load.

848.13 Proportioning and Mixing of Latex Modified Concrete. Prior to each day's placement, each mixer shall be checked to assure that specified air content, slump and yield have been attained. Trial concrete shall not be incorporated into the work. Additional testing will be done in accordance with 848.31.

The LMC shall be a workable mixture having a uniform composition and consistency with the following proportions, properties or limits:

QUANTITIES OF MATERIALS PER CUBIC METER (CUBIC YARD)(DRY WEIGHT)*

Type of Coarse Aggregate	Fine Aggregate kg (lbs)**	Coarse Aggregate kg (lbs)	Cement kg(lbs)	Latex Emulsion L (gal)	Maximum Net Water L gal)
Gravel	974 (1645)	769 (1300)	389 (658)	121 (24.5)	86 (17.5)
Limestone	974 (1645)	778 (1315)	389 (658)	121 (24.5)	86 (17.5)
Slag	974 (1645)	675 (1140)	389 (658)	121 (24.5)	86 (17.5)
Slump***	100 to 150 mm (4 to 6 inches)				

Air content of plastic mix shall not exceed 7 percent.

*The specific gravities used for determining the above weights are: natural sand 2.62, gravel 2.62, limestone 2.65 and slag 2.30.

** The dry weights are approximate. This proportion should produce good workability, but due to gradation variability, the fine aggregate content may be increased, with approval by the Engineer, as much as 8 percent by weight if the coarse aggregate is reduced an equal volume.

*** The slump shall not be measured until after the concrete has been discharged from the mixer and left undisturbed for 4 to 5 minutes. The water content may be adjusted to control the slump within the prescribed limits.

848.14 Proportioning and Mixing of Superplasticized Dense Concrete. The SDC mix shall be proportioned and mixed in accordance with 499 of the CMS except as modified herein.

All required characteristics of the mix, i.e. air entrainment and slump, shall be adjusted off the deck before placement of the overlay begins. The components for superplasticized dense concrete shall be combined into a workable mixture of uniform composition and consistency. They shall be proportioned as follows:

QUANTITIES OF MATERIAL PER CUBIC METER (CUBIC YARD), DRY WEIGHTS*

Type of Coarse Aggregate	Coarse Aggregate kg (lbs)	Fine Aggregate kg (lbs)	Cement kg (lbs)	Maximum Water-Cement Ratio
Gravel	769 (1300)	769 (1300)	489 (825)	0.36
Limestone	778 (1315)	769 (1300)	489 (825)	0.36

Slag 675 (1140) 769 (1300) 489 (825) 0.36

* The specific gravities used for determining the above weights are:
 natural sand 2.62, gravel 2.62, limestone 2.65 and slag 2.30.

The batch weights previously described shall be corrected to compensate for the moisture contained in the aggregate at the time of use. A chemical admixture (705.12, Type A or D) shall be used. The transit mixer charge shall be limited to 3/4 of its rated capacity or 4.6 m³ (6 cubic yards), whichever is the smaller, unless a larger size is approved by the Engineer.

The specified cement content shall be maintained and a maximum water-cement ratio of 0.36 shall not be exceeded. If superplasticizing admixture is added at the job site, the load shall be mixed a minimum of 5 minutes at mixing speed. After all of the superplasticizer has been added, the slump range shall be 150 ± 50 mm (6 ± 2 inches). The air content of fresh unvibrated SDC at the time of placement shall be 8 ± 2 percent. Two compressive cylinders shall be made for every other ready-mix truck load of SDC incorporated into the work.

If a slump loss occurs after addition and mixing of the superplasticizing admixture and before placement of the SDC overlay, the charge may be "re-tempered" with the admixture to restore plasticity. The slump range and air content shall be rechecked to ensure conformance to the allowable values. If the consistency of the charge after "re-tempering" is such as to cause segregation of the components, this will be cause for rejection of the load.

848.15 Test Slab. At the option of the Engineer, the Contractor shall make one or more trial batches of overlay material of the size to be hauled at least 4 days before the overlay is to be placed. He shall cast one or more small test slabs demonstrating the ability to finish and texture the concrete in accordance with 848.26. These slabs shall be 2.4 m (8 feet) long, a width which is wide enough to accommodate the tinning equipment and 32 mm (1 1/4 inch) thick.

848.16 Preparation of Existing Deck. No operations without reasonably available engineering controls that limit fugitive dust will be acceptable.

The Contractor shall be aware that there are state, regional, and local government agencies throughout the State that have requirements regarding control of dust generated by the blasting operation.

The Contractor is responsible for protecting traffic under the bridge while removing deck concrete.

848.17 Removal of Existing Asphaltic Concrete Overlays. If an item "848, Wearing Course Removed, Asphalt" is specified in the plans, the Contractor shall remove the existing asphaltic concrete course to the original concrete deck and any waterproofing material that was part of the deck. Removal shall comply with the requirements of CMS 202 and be completed before hydro-demolition is performed. This item shall be a separate operation from 848.18.

848.18 Removal of Existing Concrete Overlays. If an item "848, Existing Concrete Overlay Removed ____ Nominal Thickness" is specified in the plans, the Contractor shall remove the existing concrete overlay to the nominal specified thickness. Removal shall comply with the requirements of CMS 202 and as amended below:

Nominal thickness is defined as the specified thickness +/- 6 mm (1/4 inch).

If the Engineer determines during the nominal thickness removal that not enough existing concrete overlay is removed to expose only variable thickness existing concrete overlay islands, the Engineer will require the Contractor to adjust the removal depth, as required, until only variable thickness islands of concrete overlay are visible.

848.19 Removal of Existing Concrete Overlay, Variable Thickness. If an item "Item 848, Removal Debonded, Deteriorated Existing Variable Thickness Concrete Overlay" is specified in the plans the Contractor shall perform the following:

After removing the existing uniform concrete overlay, the Contractor shall clean the deck to allow sounding. With Contractor supplied aerosol paint, the Engineer shall sound and mark the areas of unbonded variable thickness existing concrete overlay for removal. The Contractor shall remove by chipping all obviously loose, debonded and/or deteriorated concrete overlay (variable thickness). Chipping hammers shall not be heavier than the nominal 16 kg (35 lb) class and shall be operated at an angle of less than 45 degrees from the deck surface. Concrete shall be removed in a manner that prevents cutting, elongating or damaging reinforcing steel. Any reinforcing steel damaged shall be replaced at the Contractor's expense. Additionally, any "islands" of existing overlay that will not allow the minimum uniform thickness of new concrete overlay to be obtained shall be removed. Upon the Engineer's approval of the marked removal areas, Concrete Removal by Hydro-demolition 848.20 may be performed.

848.20 Concrete Removal by Hydro-demolition. The intent of this specification is to remove all unsound concrete, both uniform and variable depth, by using hydro-demolition, not scarification or jacking.

The entire top surface of the concrete bridge deck shall be completely removed to a depth "D" of 25 mm (1 inch) or as specified in the plans. The measurement shall be nominal and shall be taken from the Portland cement concrete surface to the mortar line.

The Contractor may choose to use conventional scarifying equipment to make an initial pass across the deck to remove a portion of the total depth, "D", required. In all cases the final 25 mm (1 inch) will be removed using hydro-demolition equipment. If the Contractor's choice of using mechanical scarifying equipment results in exposing or snagging the top mat of reinforcing steel, the scarifying equipment shall be immediately stopped and any remaining removal will be by hand chipping, if necessary, and hydro-demolition.

Damaged or dislodged reinforcing steel shall be repaired or replaced at the Contractor's expense. Replacement shall include the removal of any additional concrete required to position the new reinforcing steel at the correct height and to provide the required lap splice lengths as defined in 509.

Prior to the commencement of the removal operation with hydro-demolition, the equipment shall be calibrated on an area of sound concrete as designated by the Engineer. In case of an existing overlay, calibration shall be performed on original deck concrete that is sound and not on any remaining concrete overlay material. After calibration, the equipment shall be moved to a known unsound area to verify that all unsound concrete is removed by the established recorded settings.

The Engineer shall verify the following settings:

1. Water pressure gauge
2. Machine staging control (step)
3. Nozzle size
4. Nozzle speed (travel)

During the calibration, any or all of the above settings may be modified in order to achieve removal of all unsound concrete. The settings may be changed by the Contractor to achieve total removal of unsound concrete, but the Engineer must be notified of all changes. The Engineer may change any or all of the settings in order to achieve the goal of removing unsound concrete with hydro-demolition. The removal shall be verified, as necessary, and at least every 10 m (30 feet) along the cutting path. The readings shall be documented and, if necessary, the equipment re-calibrated to insure the goal of removing all unsound concrete with hydro-demolition is achieved.

Calibration shall be required on each structure, each time hydro-demolition is performed and as required to achieve the results specified by the plan. The depth of removal shall be verified as necessary, and at least every 10 m (30 feet) along the cutting path. The readings shall be documented and, if necessary, the equipment re-calibrated to insure the specified depth of removal.

The Contractor shall block all drains on the deck and install aggregate dams every 50 meters (150 feet) 150 mm (6 inches) high by 300 mm (1 foot) wide minimum, to strain run-off. The deck shall be used as a settlement basin within itself. A settlement basin outside

or at the end of the structure is required if further straining is necessary to produce visibly clear water.

The Contractor shall provide shielding, as necessary, to insure containment of all dislodged concrete within the removal area in order to protect the traveling public from flying debris both on and under work site.

848.21 Resounding. After the hydro-demolition operation has completed the removal, and the deck is allowed to dry, the deck shall be resounded to assure that all unsound material has been removed. The final sounding of the deck shall be done by the Engineer and shall not be performed within 24 hours after a rain. In no case shall the final sounding be made unless the deck is dry. Final sounding shall consist of as many successive resoundings as required to ensure that all deteriorated and fractured concrete has been removed. Additional removal shall be performed with the hand held wand [690 bar (10000 psi) min] or 16 kg (35 lb.) maximum weight jackhammer operated at an angle of no more than 45 degrees from horizontal. If jackhammering results in the exposure of ½ of the reinforcing steel, the adjacent concrete shall be removed to a depth that will provide a minimum 19 mm (¾ inch) clearance around the reinforcing steel except where other reinforcing steel makes this impractical.

Aerosol spray paint for outlining shall be provided by the Contractor.

848.22 Cleaning. Cleaning shall be performed with a vacuum system capable of removing wet debris and water all in the same pass. Cleaning shall be done in a timely manner, before debris and water is allowed to dry on the deck surface. All exposed reinforcing steel which is left unsupported by the hydro-demolition process shall be adequately supported and protected from bending from all construction traffic.

All reinforcing steel damaged or dislodged by these operations shall be replaced with bars of the same size and coating at no additional cost to the State. Replacement shall include the removal of any additional concrete required to position the new reinforcing steel at the correct height and to supply the required lap splice lengths as defined in 509.

848.23 Full Depth Repair. Where the deck is sound for less than one half of its original depth, the concrete shall be removed full depth except for limited areas as may be designated by the Engineer. Forms shall be provided to support concrete placed in full-depth repair areas. The forms for areas of up to 0.4 square meter (4 square feet) may be suspended from wires from the reinforcing steel. For areas greater than 0.4 square meter (4 square feet), the forms shall be supported from the primary members of the superstructure or by shoring from below. Areas of full-depth repair shall have the concrete faces and reinforcing steel cleaned as described in 848.24

848.24 Preparation Prior to Overlay Placement. Not more than 24 hours prior to

placing the overlay, all surfaces to which the overlay is to bond, including exposed reinforcing and structural steel, the work face of a previously placed overlay, and the faces of curbs and barriers up to a height of at least 25 mm (1 inch) above the proposed overlay surface shall be blast cleaned. Exposed reinforcing and structural steel shall be cleaned to remove all loose and built-up rust, asphalt residue, and all other contaminants detrimental to achieving an adequate bond. Pockets of rust (corrosion cells) on exposed reinforcing steel shall be cleaned of all corrosion products. Areas of steel where the original hydroblasting was applied should normally be adequately cleaned but steel shall be inspected to assure cleanliness requirements are met. Suitable blast methods may include high pressure water blasting [690 bar (10000 psi) min], water blasting [less than 690 bar (10000 psi)] with abrasives in the water, abrasive blasting with containment, or vacuum abrasive blasting. Listed concrete surfaces shall be made free of spalls, lath, and all contaminants detrimental to achieving an adequate bond.

Bridge scuppers shall be cleaned of all foreign matter and plugged prior to placement of the overlay. Scuppers shall be unplugged to permit free drainage of water from the deck surface following overlay placement.

Vehicles other than approved construction equipment will not be permitted on those sections of the deck where hydro-demolition has begun. Contamination of the deck by construction equipment or from any other source shall be prevented.

848.25 Finishing Machine Dry Run. After the screed rails have been set to proper profile and prior to placing the overlay, the Contractor shall check the finishing machine clearance to assure the Engineer that the specified nominal thickness of overlay will be attained over the entire deck.

848.26 Placing, Consolidating and Finishing. The deck surface which will contact the overlay shall be cleaned with compressed air, wetted, and kept wet for at least one hour immediately prior to placing the overlay. Any standing water shall be removed prior to placement of the overlay. The newly exposed surfaces in full-depth repair areas shall be similarly cleaned and prepared immediately prior to placing concrete.

Overlays shall be placed, consolidated and finished to the plan surface. Hand vibrators shall be used for full-depth repair, variable depth areas, at all edges and adjacent to joint bulkheads.

Concrete for full-depth repairs shall be the overlay concrete placed either simultaneously with the overlay or, if preplaced separately from the overlay operation, the concrete may be either the overlay concrete or 511 Class S Concrete. If the full-depth repair is preplaced separately, it shall be placed up to the plan lower boundary of the overlay, given a broom finish, and cured as specified in 511.17. [on a LMC or SDC overlay project, the

faces of existing sound concrete shall be similarly wetted and coated with bonding grout prior to placing concrete.]

Contamination of the wetted deck by construction equipment or from any other source shall be prevented by placement of a clean 100 µm (4-mil) polyethylene sheet (or any other covering as approved by the Engineer) on the surface of the prepared deck.

Where reinforcing steel is exposed, the Contractor shall provide adequate supports for the concrete mixer so that reinforcing steel and its bond with the concrete will not be damaged by the weight and movement of the concrete mixer, or shall provide means to convey concrete from the mixer to the finishing machine.

After the overlay material has been consolidated and finished, it shall be textured transversely to provide a random pattern of grooves spaced at 10 mm to 45 mm (3/8 inch to 1 3/4 inch) centers with 50 percent of the spacings being less than 25 mm (1 inch). Grooves shall be approximately 4 mm (0.15 inches) deep and 2.5 mm (0.10 inches) wide. A strip of surface 225 to 300 mm (9 to 12 inches) wide adjacent to curbs and barriers shall not be textured.

At the Contractor's option an evaporation retardant may be used after finishing, or after texturing, or both. This material shall not be finished into the plastic concrete at any time. Only products specifically marketed for such usage shall be utilized. The evaporation retardant shall be applied as per the manufacturer's written recommendations and shall consist of a fine mist using a suitable sprayer. Application in a stream shall not be allowed. The wet burlap cure, 848.28 or 848.29, shall follow this operation as closely as possible.

The Contractor shall stencil the date of construction (month and year) and the letters MS, LM or SD into the overlay before it takes its final set. The date shall be located in the right-hand corner of the deck at the forward abutment. It shall be placed parallel to the edge of the overlay and centered at 300 mm (1 2 inches) in from both the edge of the overlay and end finish. The numerals shall be 75 to 100 mm (3 to 4 inches) in height, 6 mm (1/4 inch) in depth and face the centerline of the roadway.

Longitudinal joints are permitted, but only to the extent necessary to accommodate the width of the finishing machine, to facilitate changes in roadway crown, and to permit maintenance of vehicular traffic, except as approved by the Engineer. Longitudinal joints shall not be used in close proximity to faces of curbs or barriers or at edges of decks. All joints in the overlay shall be formed.

Any ponding problem which is noted prior to final acceptance of the overlay shall be corrected by the Contractor at no cost to the State.

A 3 meter (10-foot) straightedge shall be used to check the overlay directly behind the finishing machine. It shall also be used to check transversely along the edges of the overlay where hand finishing is done. Any irregularities exceeding 3 mm in 3 m (1/8 inch in 10 feet) shall be corrected immediately.

848.27 Curing. If a full-depth repair is placed separately, it shall be water-cured as described below for the applicable overlay concrete and shall have attained a modulus of rupture of 2.8 MPa (400 psi).

A cure day shall be defined as a 24-consecutive hour period of time. The temperature of the overlay surface shall be maintained above 2°C (35° F) until the curing period is completed. Any day during which the air temperature at the overlay surface falls below 7° C (45° F) shall not be counted as a cure day.

When curing is completed, all joints and abutting surfaces in the overlay shall be sealed with an approved high molecular weight methacrylate sealer meeting Supplemental Specification 954. The sealer shall be prepared and applied in accordance with the manufacturer's recommendations. Joints to be sealed shall include transverse joints in the overlay concrete, joints between overlay concrete and steel enddams, longitudinal joints between overlay concrete placements, and longitudinal joints between overlay concrete and safety curb, barriers, parapets, bulb angles, etc. In the edges of decks without curbs, the interface between the overlay and the existing deck shall be sealed in a similar manner. Any cracking which occurs prior to opening to traffic shall be sealed as above or repaired or corrected in another manner as directed by the Engineer at no cost to the State. The deck shall be sounded and any delaminated area shall be removed and replaced at the Contractor's expense.

Any improperly cured overlay may be ordered to be removed and replaced at no cost to the State. Regardless of what type of overlay, curing shall start after the concrete has been tined and the surface will not be damaged by the cure.

848.28 Curing Application LMC Overlays. As soon as the tining operation is completed, the finished overlay surface shall be covered with a single layer of clean wet burlap. The burlap shall be kept wet by a continuous flow of water through soaker hoses and covered with a 100 µm (4-mil) white opaque polyethylene film or a wet burlap - white opaque polyethylene sheet for 48 hours. After this initial wet curing period, the covering shall be removed and the surface dry-air cured for an additional 2 days before subjecting the new surface to vehicular traffic.

Traffic will not be permitted on the finished overlay surface until after completion of the 4-day cure.

848.29 Curing Application MSC and SDC Overlays. As soon as the tining operation is completed, the finished overlay surface shall be covered with a single layer of clean wet burlap. The fresh overlay surface shall receive a wet burlap cure for 3 days. For the entire curing period of 72 hours the burlap shall be kept wet by the continuous application of water through soaker hoses. Either a 100 µm (4-mil) white opaque polyethylene film or a wet burlap-white opaque polyethylene sheet shall be used to cover the wet burlap for the entire 72 hour period.

Traffic will not be permitted on the finished overlay surface until after completion of the 3 day wet cure.

848.30 Limitation on Placing Operations. Prior to overlay placement, the Engineer shall establish the Contractor's ability to place the overlay on a continuous basis and to consolidate, finish, texture, prior to the formation of plastic surface film, and commence curing.

When directed by the Engineer, a representative of the either the latex manufacturer or the micro-silica supplier shall be present during the proportioning, mixing, placing and finishing of the overlay. Operations and procedures which are considered by this representative to be detrimental to the integrity and durability of the repaired and overlaid bridge deck will not be permitted.

Once the finishing machine has made the first pass, workers shall not be allowed to walk in the freshly placed overlay.

No overlay concrete shall be placed when it is raining, when the ambient air temperature is below 7°C (45°F) or when it is predicted to fall below 7°C (45°F) for the duration of the curing period

Overlays shall be placed only when the overlay surface evaporation rate, as affected by ambient air temperature, concrete temperature, deck temperature, relative humidity and wind velocity, is 0.5 kg/m² (0.1 pound per square foot) per hour or less. The Contractor shall determine and document the atmospheric conditions, subject to verification by the Engineer. No overlay concrete shall be placed if the ambient air temperature is 29°C (85° F) or greater or predicted to go above 29 °C (85 °F) during the overlay placement regardless of the surface evaporation rate.

Figure 1 in ACI 308 (see 511.08) shall be used to determine graphically the loss of surface moisture for the overlay. In no case shall the temperature of the overlay concrete exceed 29°C (85°F) during placement. The measurement of weather parameters shall be made within 3 m (10 feet) of the placement area. No overlays shall be placed after October 15 except by specific permission of the Director.

If placement of the overlay is to be made at night, the Contractor shall submit a plan which provides adequate lighting for the work area. The plan shall be submitted at least 15 calendar days in advance and be approved by the Engineer before concrete is placed. The lights shall be so directed that they do not affect or distract approaching traffic.

During delays in the overlay concrete's placement operations of more than 10 minutes and/or when a plastic surface film develops on a LMC overlay, the work face of the overlay shall be temporarily covered with wet burlap. If an excessive delay is anticipated, a bulkhead shall be installed at the work face and the overlay placement operation terminated.

Unless otherwise authorized by the Engineer, an overlay shall not be placed adjacent to a previous overlay which has cured for less than 36 hours.

Adequate precautions shall be taken to protect the freshly placed overlay from rain.

Vehicles other than approved construction equipment will not be permitted on those sections of the deck where concrete removal operations have begun. Contamination by construction equipment or from any other source shall not be permitted.

Prior to the end of the full curing period for any section, no power driven tools heavier than a 7 kg (15 lb.) chipping hammer shall be used adjacent to the new overlay.

848.31 Sampling and Testing. After each charging of the concrete mixing unit (LMC) or transit mixer (MSC or SDC), the following testing shall be performed by the Department: Testing shall be performed at the point of discharge onto the deck.

- a. Slump
100 mm to 150 mm [4 to 6 inches](LMC)
150 mm +/- 50 mm [6 +/- 2 inches](MSC or SDC)
- b. Unit weight
- c. Air
7% max. (LMC)
8% +/- 2% (MSC or SDC)
- d. Compressive strength cylinders shall be made for every 40 cubic meters(50 cubic yards)

The Contractor shall furnish the required materials and samples without charge to the State as per 106.03.

For LMC, with all controls set for the desired mix, activate the mixer and discharge the mixed material into a 0.25 m³ (one-quarter cubic yard) container 1 x 1 x 0.25 m (36 x 36 x 9 inches). When the cement recording meter indicates a discharge of 97 kg (1 3/4 bags)

of cement or 0.25 m³ (1/4 cubic yard), the container should be filled flush with consolidated LMC. This test will be accepted as evidence of satisfactory performance for each truck.

848.32 Method of Measurement. Wearing Course Removed, Asphalt shall be measured as the actual square meters (square yards) of existing asphalt wearing course and waterproofing material removed and shall include all labor, materials, equipment required to complete the work.

Existing Concrete Overlay Removed ____ Nominal Thickness shall be measured as the actual square meters (square yards) of existing concrete overlay removed and shall include all labor, materials, and equipment required to complete the work.

Removal Debonded, Deteriorated Existing Variable Thickness Concrete Overlay shall be measured as the actual square meters (square yards) of marked removal areas defined in 848.19, and shall include all labor, materials, equipment, paint, to remove unsound variable thickness concrete overlays before hydro-demolition.

For measurement of quantities, the overlay is divided by a horizontal plane into two items, consisting of an upper part of uniform thickness "____ Concrete Overlay Using Hydro-demolition (____ mm (inches) thick)" and a lower part of variable thickness "____ Concrete Overlay (Variable Thickness) - Material Only". "Full-Depth Repair with ____ Concrete" is measured as an additional separate pay item.

____ Concrete Overlay using Hydro-demolition (____ mm (inches) thick) shall be measured as the actual deck area in square meters (square yards) overlaid. The thickness shall be as determined in 848.02 and 848.03. The bid price for this item includes the cost of furnishing, placing, finishing, texturing and curing the specified thickness overlay. Placement shall also include all labor and equipment to place the variable thickness overlay (since the variable thickness and the constant thickness overlay are placed in one operation).

Surface Preparation Using Hydro-demolition shall be measured as the actual deck area in square meters (square yards) overlaid and shall include the cost of surface preparation, hydro-demolition, milling, removal of the surface preparation debris, cleaning, and all other materials, materials, labor and equipment required to complete this work, but not specifically included in the other items for payment.

Full-Depth Repair shall be measured as the volume in cubic meters (cubic yards) based on the measured area of full-depth openings in the deck and the existing slab thickness, minus D as defined in 848.02. The bid price for this item includes the cost of removing sound concrete where the depth of sound concrete is less than half of the original thickness of the deck furnishing and installing forms and supports, furnishing and placing the overlay concrete and if the full-depth repair is preplaced, the finishing and curing

required.

_____ Concrete Overlay (variable thickness) Material Only shall be the volume in cubic meters (cubic yards) measured as the difference between the total volume (as indicated by the batch quantity tickets for the ready-mix trucks) of overlay placed and accepted, less the calculated volume of the overlay concrete (plan specified thickness), less the volume of overlay concrete used for full-depth repair, and less any wasted overlay concrete. The volume of overlay concrete remaining in the drum of the last ready-mix truck shall be weighed or measured by the Engineer. The bid price for this item includes the cost of material only, furnished to the job site. No separate payment shall be made for the placement of the concrete or for any tools, labor, equipment or incidentals necessary for such placement complete and in conformance with these notes. The intent of this item is to pay material costs only for all materials, other than uniform thickness overlay material, regardless of the depth of removal incurred and including any material required for grade correction.

Concrete for the test slabs required under 848.15 shall be paid for on a lump sum basis. All other concrete for testing purposes shall be furnished without charge to the department per 106.03.

Hand chipping shall be based on the square meters (square yards) of material removed regardless of depth. Included shall be all labor and equipment required to remove unsound concrete by jackhammer or hand held wand in accordance with 848.16 and to clean the surface and remove debris accumulated as part of this operation. Further, this item is intended for unsound areas remaining after hydro-demolition and shall not include hand chipping of concrete which is inaccessible by hydro-demolition equipment.

848.33 Basis of Payment. Payment for completed and accepted quantities as measured above will be made at the contract price bid for:

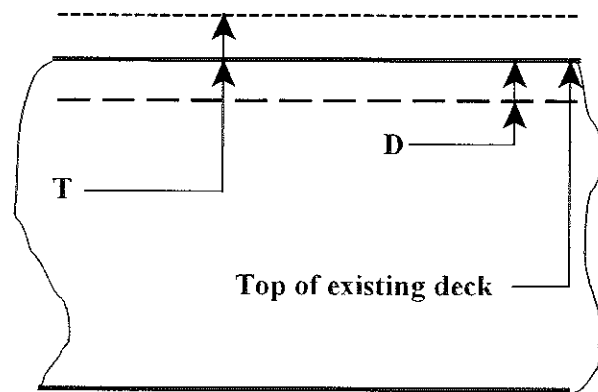
Item	Unit	Description
848	Square meter (square yard)	_____ Concrete overlay using hydro-demolition [____ mm (____ inch)] thick
848	Square meter (square yard)	Surface preparation using hydro-demolition
848	Cubic meter (cubic yard)	_____ Concrete overlay (variable thickness), material only
848	Square meter (square yard)	Hand chipping

848	Lump sum	Test slab
848	Cubic meter (cubic yard)	Full-depth repair
848	Square meter (square yard)	Wearing course removed, asphalt
848	Square meter (square yard)	Existing concrete overlay removed _____ nominal thickness
848	Square meter (square yard)	Removal debonded or deteriorated existing variable thickness concrete overlay

Designer's Note for Supplemental Specification 848:

For Bridge Decks with No existing Rigid overlay

1. Plan detailed finished height "T" (see section 848.02) specifying the final elevation of the MSC, SDC or LMC concrete overlay above the existing Portland cement concrete deck.
2. Plans shall specify a uniform removal depth "D" (see section 848.02) of the existing Portland cement concrete deck. Exception if "D" is to be 25 mm (1 inch) removal of existing deck.



BID ITEMS REQUIRED

1. If an asphaltic overlay is on the concrete bridge deck a bid item is required
848 Square meter Wearing course removed, asphalt
2. Specify the overlay. Include type (LMC, SDC or MSC), thickness () and quantity in square meter (square yard). The thickness is the total of "T" and "D"
848 Square meter (square yard) _____ Concrete overlay using hydro-demolition [___ mm (___ inch)] thick
3. Specify the removal quantities in square meter
848 Square meter (square yard) Surface preparation using hydro-demolition
4. Specify the variable thickness quantity required. Quantity shall be based on required bridge deck survey and evaluation required in section 400 of the Bridge Design Manual. Additionally type of overlay concrete (LMC, SDC or MSC) shall be specified.
848 Cubic meter (cubic yard) _____ Concrete overlay (variable thickness), material only
5. A nominal quantity of hand chipping shall be specified. Recommend 10% of the estimated variable thickness area of the deck (If 30% of deck is considered to require variable thickness repair the 30 x .10 = 3% of deck square yardage would be specified for hand chipping. Other methods for quantities that have been developed are acceptable.

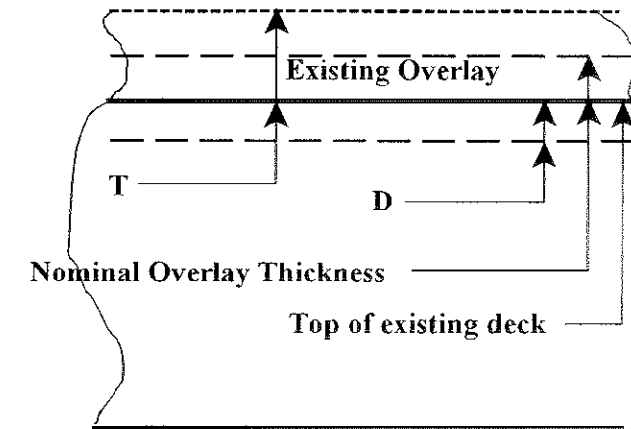
848 Square meter (square yard) Hand chipping

6. Test Slab bid item shall be included for all projects
848 Lump sum Test slab

7. Quantities shall be specified for full depth repair based on required bridge deck evaluation. Required quantities shall be based on the definition for pay item in section 848.32.
848 Cubic meter (cubic yard) Full-depth repair

Bridge Decks with an existing Rigid overlay

1. Plan detailed finished height "T" (see section 848.03) specifying the thickness of either the MSC, SDC or LMC concrete overlay. For bridge decks with an existing rigid overlay this thickness "T" is a function of the designer required finished grade and the "nominal depth" of the existing rigid concrete overlay.



2. Plans shall specify a uniform removal depth "D" (see section 848.03) of the existing Portland cement concrete deck.

3. The item "Removal of variable thickness rigid overlay" is intended to remove unsound variable thickness before the uniform hydro-demolition removal is performed.

BID ITEMS REQUIRED

(cubic yard)

1. If an asphaltic overlay is on the concrete bridge deck a bid item is required
848 Square meter Wearing course removed, asphalt
2. A nominal depth of existing concrete overlay shall be specified in addition to the square meter(square yard) quantity. The nominal depth should be based on existing plan specified verified by actual field measured depths of the existing concrete overlay based on either cores taken during the bridge deck survey and/or additional cores or drilling performed in the field to evaluate the actual thickness of the existing concrete overlay. Contact with the original overlay project's project engineer, or other original project personnel, may be beneficial in establishing the nominal depth.
848 Square meter Existing concrete overlay removed _____
(square yard) nominal thickness
3. A item removal of Debonded or Deteriorated Existing Variable Thickness Concrete Overlay, is intended for removal, by hand chipping, any debonded, unsound, variable thickness existing rigid concrete overlay before hydro-demolition is performed. The square meter (square yard) should be based on three (3) items:
 - A. Original overlay project's bridge deck survey.
 - B. New project's bridge deck survey depth measurement
 - C. Contact with the original overlay project's project engineer and other project personnel.
 The final number will be a guess. Comparison of expected variable thickness area for the new project as compared to original project may help establish a quantity.
848 Square meter Removal debonded or deteriorated existing
(square yard) variable thickness concrete overlay
4. Specify the overlay. Include type (LMC, SDC or MSC), thickness() and quantity in square meter (square yard). The thickness is the total of T and D.
848 Square meter Concrete overlay using
(square yard) hydro-demolition [_____mm (_____inch)] thick
5. Specify the removal quantities in square meter
848 Square meter Surface preparation using hydro-demolition
(square yard)
6. Specify the variable thickness quantity required. Quantity shall be based on required bridge deck survey and evaluation required in section 400 of the Bridge Design Manual. Additionally type of overlay concrete (LMC, SDC or MSC) shall be specified.
848 Cubic meter _____ Concrete overlay
(cubic yard) (variable thickness), material only
7. A nominal quantity of hand chipping shall be specified. Recommend 10% of the estimated variable thickness area of the deck (If 30% of deck is considered to require variable thickness repair the 30 x .10 = 3% of deck square yardage would be specified for hand chipping. Other methods for quantities that have been developed are acceptable.
848 Square meter Hand chipping
(square yard)
8. Test Slab bid item shall be included for all projects
848 Lump sum Test slab
9. Quantities shall be specified for full depth repair based on required bridge deck evaluation. Required quantities shall be based on the definition for pay item in section 848.32.
848 Cubic meter Full-depth repair

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 954
HIGH MOLECULAR WEIGHT METHACRYLATE (HMWM) RESIN

September 9, 1997

The high molecular weight methacrylate (HMWM) resin shall be low viscosity, non-fuming, conforming to the following:

Viscosity Less than 25 cps (brookfield viscometer, Model RVT with UL adaptor or Model LVF, # spindle and UL adaptor C@ 25 °C (77 °F) (ASTM D 2849)

Density Greater than 8.4 lbs/gal Ca 25 °C (77 °F) (ASTM D 2849)

Flash Point Greater than 93 °C (200 °F) (PenskyMartens CC) (ASTM D 93)

Vapor Pressure Less than 1.0 mm Hg C@ 25 °C (77 °F) (ASTM D 323)

TG (DSC) Greater than 58 °C (135 ° F) (ASTM D3418)

Shelf Life Must be 1 year minimum at manufacturers recommended environmental considerations.

Gel Time Greater than 40 min - 100 g mass (ASTM D 2471) (thin film)

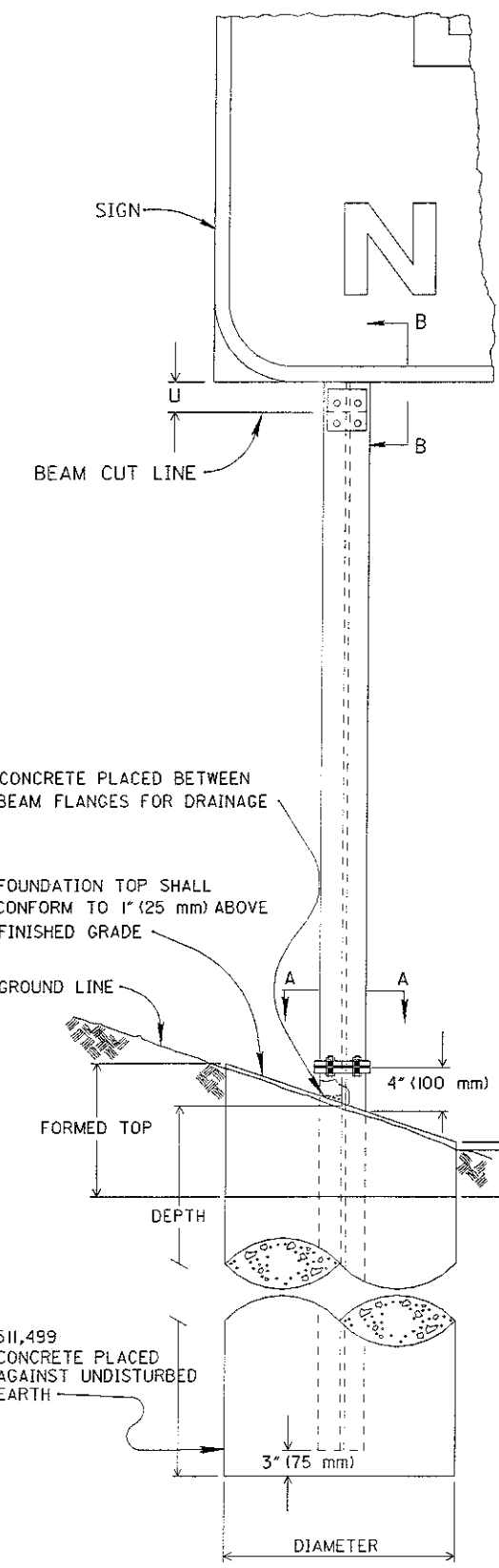
Percent Solids Greater than 90% by weight

Bond Strength Greater than 10.5MPa (1500 psi) (ASTM C 882)

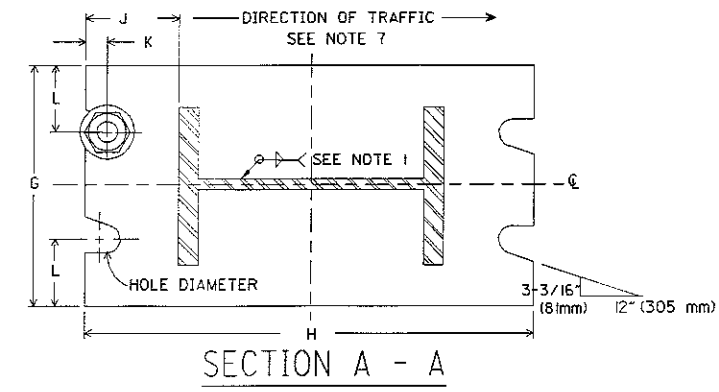
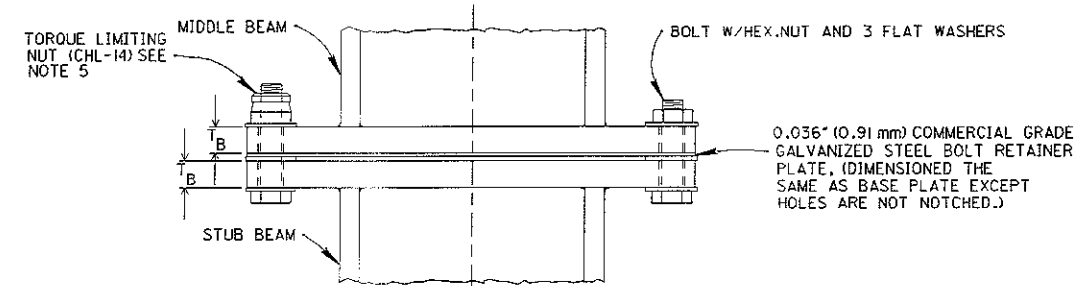
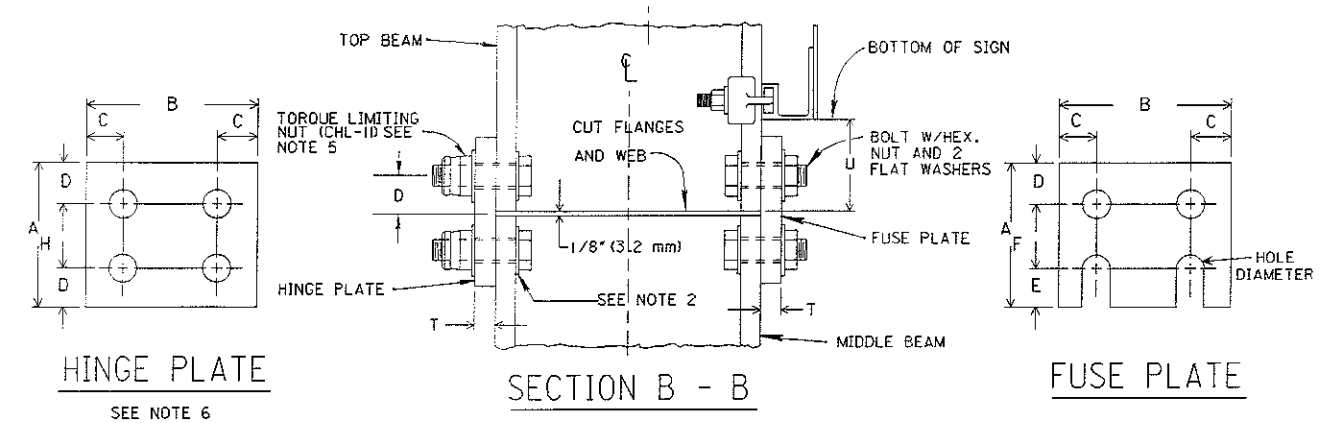
The resin shall be from the approved list in the Office of Materials Management.

NOTES

1. Base plate weld size shall be equal to the beam flange and web thickness respectively, but no less than 1/4" (6.4 mm) in either instance.
2. With the S4X7.7 (S100x11.5) beam, use malleable iron beveled washers conforming with ASTM A47 grade 3501B.
3. Tighten fuse and hinge plate connections in the shop following a method approved by the Engineer to produce the minimum bolt preload specified.
4. Use the following procedure in assembling the breakaway base plate:
After all bolts, washers, standard nuts and bolt retainer plates are in place. Tighten all standard nuts snugly with a 12" (305 mm) wrench. Loosen each bolt in turn and retighten in a systematic manner to the specified maximum torque. Calibrate wrenches at least once each working day for each bolt diameter being Torqued. Burr threads at junction with nut using a center punch.
5. In lieu of the standard nuts and procedures outlined in 3 and 4 above, the supports may be assembled using Torque limiting nuts. Tighten each nut with sufficient torque applied until the upper wrenching surface has sheared away from the structural body of the nut. Shop assemble fuse and hinge plates following this procedure. Use nuts as manufactured by HI-Shear Corp. Torrance, California; VOI SHAN Industries - Culver City, California; Standard Pressed Steel - Jenkintown, Pennsylvania or approved equal. Use the torque limiting nut part number CHL-14 for the base plate, and CHL-11 for the fuse and hinge plates.
6. For beams subject to impact from opposite directions (such as in freeway medians) provide fuse plates on both sides.
7. Notches shown for installation to the right of traffic. For installations to the left of traffic, fabricate with skewed edge of notches reversed from that shown.
8. Dimensions shown for alternate designs are approximate. Specified dimensions for alternate designs require prequalification. An approved list of suppliers can be provided by O.D.O.T. Payment for alternate designs will be based on the plan quantities for embedded beams.



SLIP BASE DESIGN

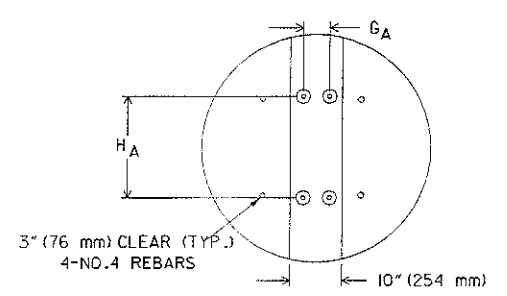
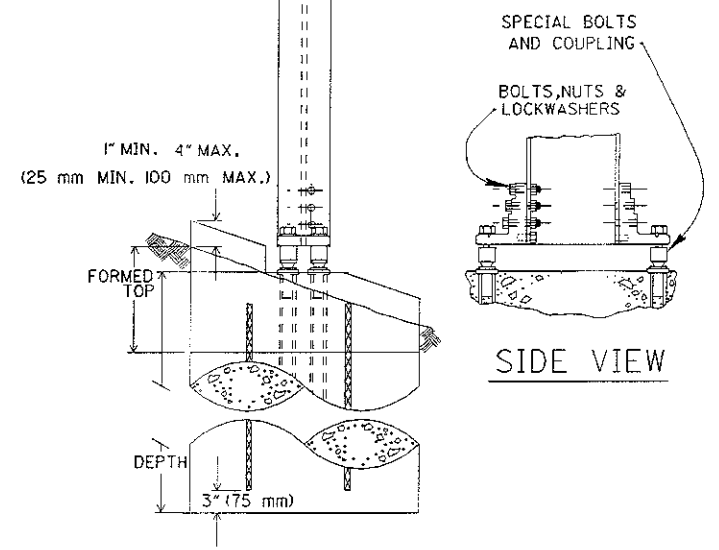
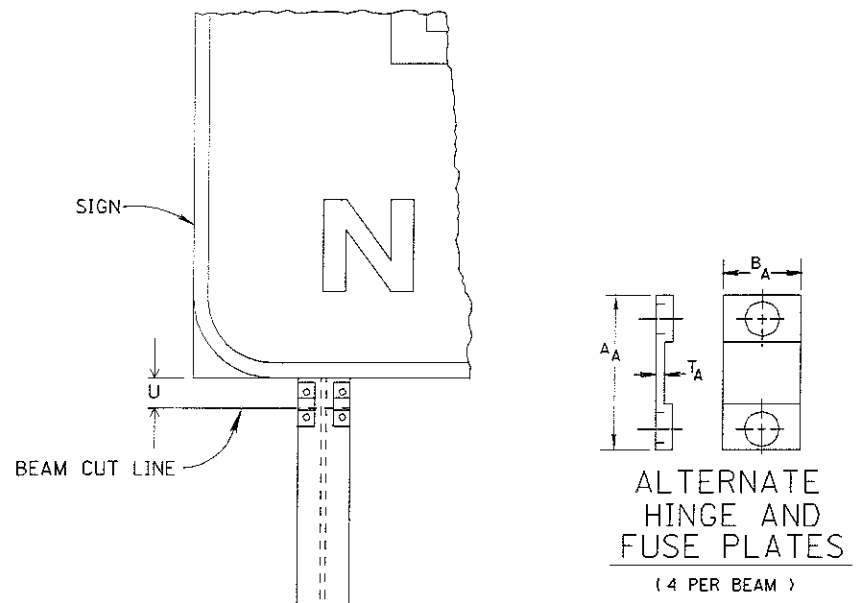


ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED

BEAM TYPE	BEAM SIZE	HINGE AND FUSE PLATE DIMENSIONS										FOUNDATIONS			BASE PLATE DIMENSIONS									
		A _H	A _F	B	C	D	E	T	U	HOLE DIA.	BOLT SIZE	MIN. PRELOAD (lb)	DIA. (feet)	DEPTH (feet)	CONCRETE cu yd/ea	G	H	J	K	L	T _B	HOLE DIA.	BOLT SIZE	MAX. TORQUE in./lbs.
S4 X 7.7	4 x 2-5/8	4-1/8	3-5/8	2-5/8	9/16	1	1/2	3/16	2-1/2	9/16	1/2	10,000	1.5	4	0.27	4	8	2	1/2	1	3/4	9/16	1/2	200
W6 X 9	5-7/8 x 4	4-1/8	3-5/8	4	7/8	1	1/2	3/16	2-1/2	9/16	1/2	10,000	1.5	5	0.33	5-1/2	10	2-1/16	1/2	1	3/4	9/16	1/2	200
W10 X 12	9-7/8 x 4	6-1/8	5-3/8	4	7/8	1-1/2	3/4	3/16	3-1/2	13/16	3/4	25,000	2.5	6	1.10	8	14-1/2	2-5/16	3/4	1-1/2	3/4	13/16	3/4	750
W8 X 18	8-1/8 x 5-1/4	7-1/8	6-1/4	5-1/4	1-1/4	1-3/4	7/8	1/4	4	15/16	7/8	35,000	2.5	6	1.10	8	14-1/2	3-1/4	3/4	1-1/2	1	13/16	3/4	750
W10 X 22	10-1/8x5-3/4	8-1/8	7-1/8	5-3/4	1-1/2	2	1	5/16	4-1/2	1-1/16	1	46,000	2.5	6.75	1.23	8	14-1/2	2-5/16	5/16	2	1	1-1/16	1	1325
W12 X 30	12-3/8x6-1/2	8-1/8	7-1/8	6-1/2	1-1/2	2	1	5/16	4-1/2	1-1/16	1	46,000	2.5	8.25	1.50	10	17	2-7/16	5/16	2	1-1/4	1-1/16	1	1325

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

BEAM TYPE	BEAM SIZE	HINGE AND FUSE PLATE DIMENSIONS										FOUNDATIONS			BASE PLATE DIMENSIONS									
		A _H	A _F	B	C	D	E	T	U	HOLE DIA.	BOLT SIZE	MIN. PRELOAD (kg)	DIA. (METER)	DEPTH (METER)	CONCRETE m ³ /EA	G	H	J	K	L	T _B	HOLE DIA.	BOLT SIZE	MAX. TORQUE N·m
S100x11.5	102 x 67	105	92	67	14	25	13	4.8	64	14	13	4535	0.5	1.2	0.24	102	203	51	13	25	19	14	13	22.6
W150x13.5	149 x 102	105	92	102	22	25	13	4.8	64	14	13	4535	0.5	1.5	0.30	140	254	52	13	25	19	14	13	22.6
W250x17.9	244 x 102	156	137	102	22	38	19	4.8	90	21	19	11339	0.8	1.8	0.91	203	368	59	19	38	19	21	19	85
W200x26.6	206 x 133	181	159	133	32	45	22	6.4	102	24	22	15875	0.8	1.8	0.91	203	368	83	19	38	25	21	19	85
W250x32.7	257 x 146	206	181	146	38	51	25	8	114	27	25	20865	0.8	2.1	1.06	203	368	59	24	51	25	27	25	150
W310x44.5	314 x 165	206	181	165	38	51	25	8	114	27	25	20865	0.8	2.5	1.26	254	432	62	24	51	32	27	25	150



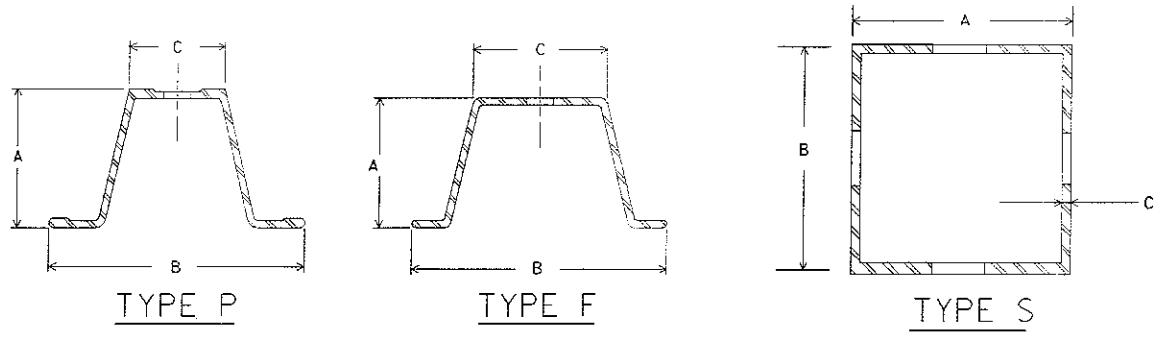
ALTERNATE DESIGN

ALTERNATE DESIGN
(SEE NOTE 8)
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED

BEAM		HINGE AND FUSE PLATE				FOUNDATIONS			BASE PLATE DIMENSIONS		
TYPE	SIZE	A _A	B _A	BOLT SIZE	T _A	DIA. (FEET)	DEPTH (FEET)	CONCRETE YD ³ / EA.	G _A	H _A	BOLT SIZE
S4 X 7.7	4 x 2-5/8	3-3/4	1	1/2	0.071	1.5	4	0.27	4-1/4	7-11/16	1/2
W6 X 9	5-7/8 x 4	3-3/4	1	1/2	0.071	1.5	5	0.33	4-1/4	9-9/16	1/2
W10 X 12	9-7/8 x 4	3-3/4	1	1/2	0.071	2.5	6	1.10	4-1/4	13-5/8	1/2
W8 X 18	8-1/8x5-1/4	4-3/4	1-1/2	3/4	0.113	2.5	6	1.10	3	16-1/4	1/2
W10 X 22	10-1/8x5-3/4	4-3/4	1-1/2	3/4	0.113	2.5	6.75	1.23	4	18-5/16	5/8
W12 X 30	12-3/8x6-1/2	4-3/4	1-1/2	3/4	0.113	2.5	8.25	1.50	4	20-7/16	5/8

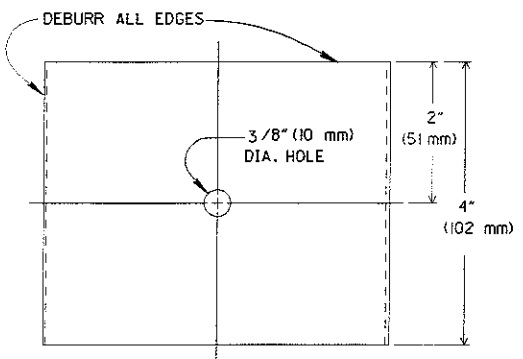
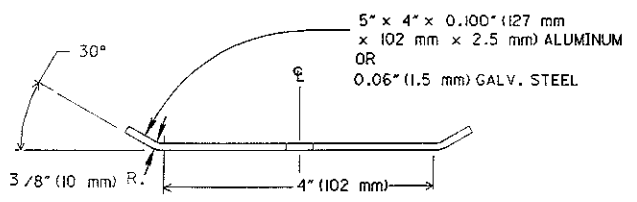
ALTERNATE DESIGN
(SEE NOTE 8)
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

BEAM		HINGE AND FUSE PLATE				FOUNDATIONS			BASE PLATE DIMENSIONS		
TYPE	SIZE	A _A	B _A	BOLT SIZE	T _A	DIA. (METER)	DEPTH (METER)	CONCRETE m ³ / EA	G _A	H _A	BOLT SIZE
S100 X 11.5	102 x 67	95	25	13	1.80	0.5	1.2	0.24	108	195	13
W150 X 13.5	149 x 102	95	25	13	1.80	0.5	1.5	0.30	108	243	13
W250 X 17.9	244 x 102	95	25	13	1.80	0.8	1.8	0.91	108	346	13
W200 X 26.6	206 x 133	121	38	19	2.87	0.8	1.8	0.91	76	413	13
W250 X 32.7	257 x 146	121	38	19	2.87	0.8	2.1	1.06	102	465	16
W310 X 44.5	314 x 165	121	38	19	2.87	0.8	2.5	1.26	102	519	16

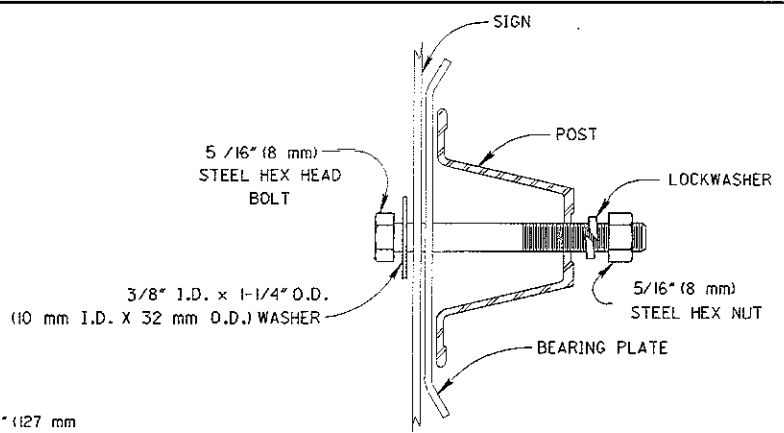


POST NO.	TYPE	LB/FT	POST DIMENSIONS (INCHES)			ANCHOR DIMENSIONS			NUMBER OF POSTS PERMITTED IN SEVEN FOOT PATH IN EXPOSED LOCATIONS
			A	B	C	A	B	C	
1	F	1.12	0.875	2.063	0.813				
	P	2.00	1.469	3.063	1.281				2
2	F	2.00	1.516	3.125	1.250				2
	S		1.750	1.750	0.083	2.000	2.000	0.105	2
3	P	3.00	1.875	3.500	1.313				2
	F	3.00	1.750	3.500	1.625				2
4	S		2.00	2.00	0.083	2.250	2.250	0.105	2
	P	4.00	TWO NO.2 POST						0
6	F	6.00	TWO NO.2 POST						0
	S		2.500	2.500	0.105	3.000	3.000	0.188	1

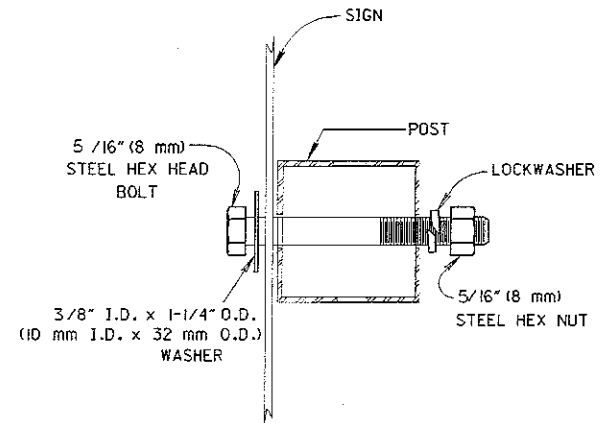
POST NO.	TYPE	Kg/m	POST DIMENSIONS (mm)			ANCHOR DIMENSIONS			NUMBER OF POSTS PERMITTED IN 2.1m PATH IN EXPOSED LOCATIONS
			A	B	C	A	B	C	
1	F	1.7	22	52	21				
	P	3.0	37	78	33				2
2	F	3.0	39	79	32				2
	S		44	44	2.1	51	51	2.7	2
3	P	4.5	48	89	33				2
	F	4.5	44	89	41				2
4	S		51	51	2.1	57	57	2.7	2
	P	6.0	TWO NO.2 POST						0
6	F	9.0	TWO NO.2 POST						0
	S		63	63	2.7	76	76	4.8	1



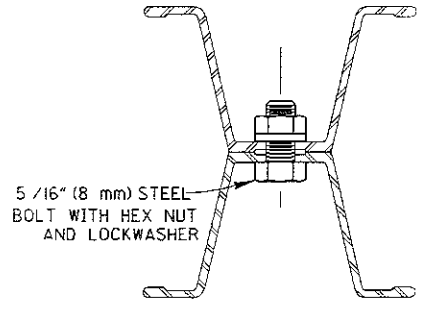
BEARING PLATE



U - CHANNEL SIGN ATTACHMENT DETAIL

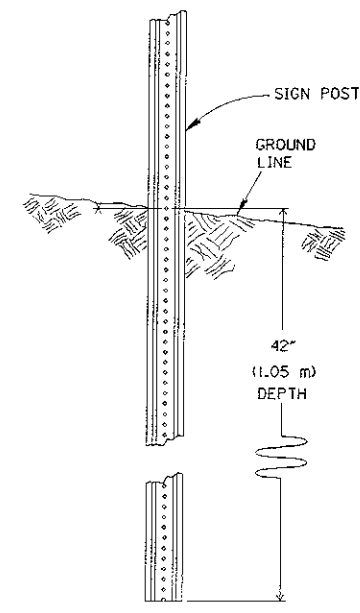


SQUARE POST SIGN ATTACHMENT DETAIL

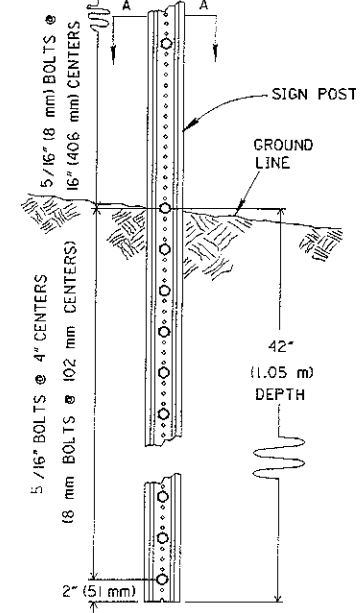


SECTION A - A

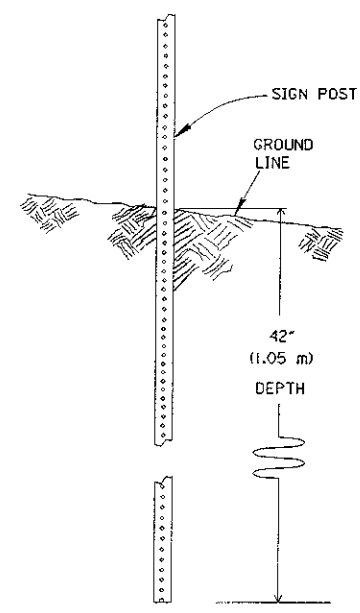
- NOTES**
1. Install number 4 type P and F posts, and number 6 type P and F posts, only in protected locations (e.g. behind guardrail). Install two post installations of number 4 type S posts within 7 foot (2.1m) path only in protected locations.
 2. Use of anchor base with No. 2 and No. 3 square post is optional. Use of anchor base with No. 4 square post is required.
 3. Square post may have die-cut knockouts or open holes.



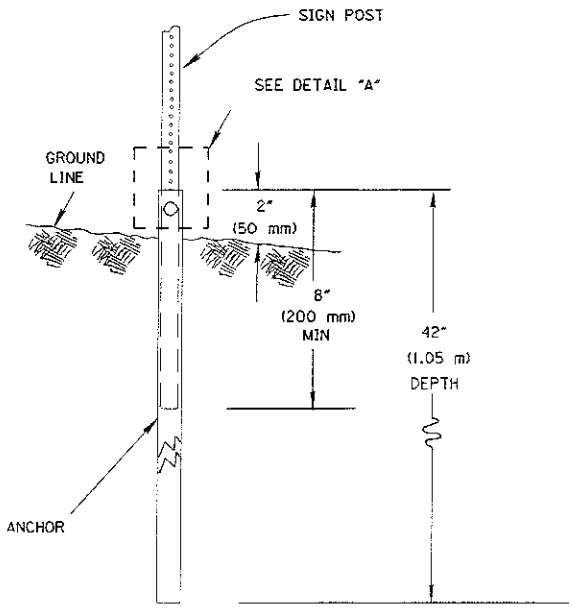
TYPICAL NO. 1, NO. 2 AND NO. 3 U - CHANNEL DRIVEN INSTALLATION



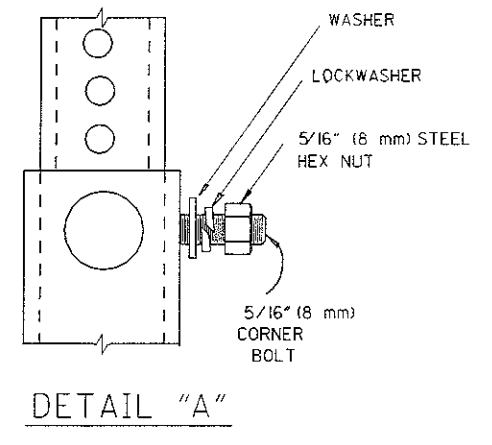
TYPICAL NO. 4 AND NO. 6 U - CHANNEL DRIVEN INSTALLATION



TYPICAL SQUARE POST DRIVEN INSTALLATION



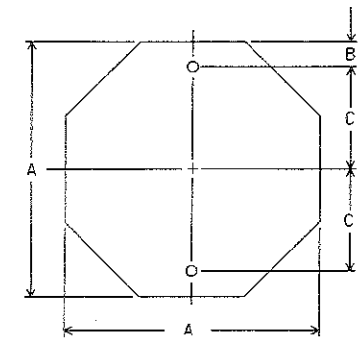
TYPICAL SQUARE POST ANCHOR BASE INSTALLATION



DETAIL "A"

NOTES

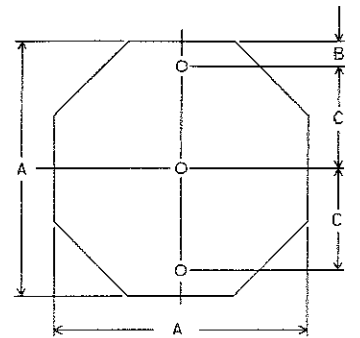
1. For each detail shown, the top table is in inches and the lower table is in millimeters unless otherwise noted.
2. All bolt holes shall be 3/8" (10 mm) in diameter, and may be drilled or punched to finished size.
3. Dimensions between bolt holes shall be to tolerance of $\pm 1/32"$ (± 0.8 mm).
4. All route shields shall be 0.063" (1.6 mm) thick and attached to extrusheet signs with aluminum blind rivets.



OCTA-1-2

A	B	C	GAUGE	SQ. FT.
18	3	6	0.063	2.25
24	3	9	0.063	4.00

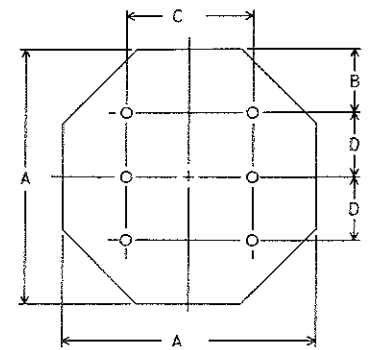
A	B	C	THICKNESS	m ²
450	75	150	1.6	0.20
600	75	225	1.6	0.36



OCTA-1-3

A	B	C	GAUGE	SQ. FT.
30	3	12	0.080	6.25
36	6	12	0.080	9.00

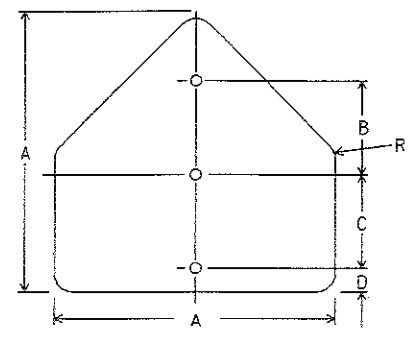
A	B	C	THICKNESS	m ²
750	75	300	2.0	0.56
900	150	300	2.0	0.81



OCTA-2-6

A	B	C	D	GAUGE	SQ. FT.
48	12	24	12	0.100	16.00

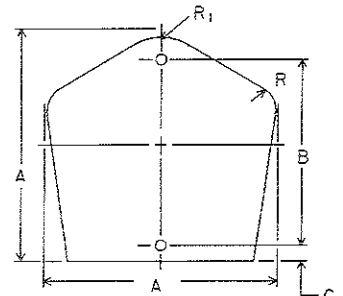
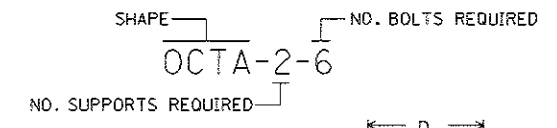
A	B	C	D	THICKNESS	m ²
1200	300	600	300	2.5	1.44



PENT-1-3

A	B	C	D	R	GAUGE	SQ. FT.
30	10	11	3	1.88	0.080	6.25
36	12	12	3	2.25	0.080	9.00
42	14	13	4	2.50	0.100	12.25

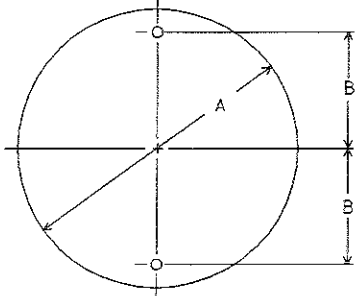
A	B	C	D	R	THICKNESS	m ²
750	250	275	75	48	2.0	0.56
900	300	300	75	57	2.0	0.81
1050	350	325	100	64	2.5	1.10



CO-1-2

A	B	C	R ₁	R	GAUGE	SQ. FT.
18	15	1	5	2	0.063	2.25
24	18	2	5.31	2.69	0.063	4.00
30	24	2	6.63	3.38	0.080	6.25

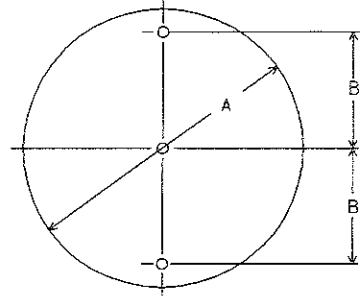
A	B	C	R ₁	R	THICKNESS	m ²
450	375	25	125	50	1.6	0.20
600	450	50	135	68	1.6	0.36
750	600	50	168	86	2.0	0.56



CIR-1-2

A	B	GAUGE	SQ. FT.
18	6	0.063	2.25
24	9	0.063	4.00

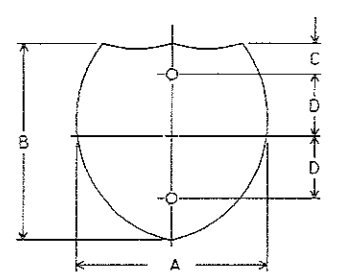
A	B	THICKNESS	m ²
450	150	1.6	0.20
600	225	2.0	0.36



CIR-1-3

A	B	GAUGE	SQ. FT.
30	12	0.080	6.25
36	15	0.080	9.00

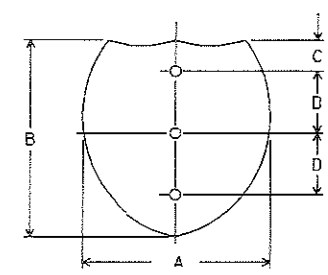
A	B	THICKNESS	m ²
750	300	2.0	0.56
900	375	2.0	0.81



I.S.-1-2

A	B	C	D	GAUGE	SQ. FT.
24	24	3	9	0.063	4.00
30	24	3	9	0.080	5.00
30	30	3	12	0.080	6.25
40	30	3	12	0.080	8.33

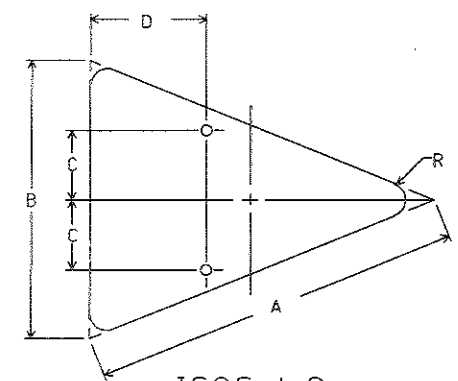
A	B	C	D	THICKNESS	m ²
600	600	75	225	1.6	0.36
750	600	75	225	2.0	0.45
750	750	75	300	2.0	0.56
1000	750	75	300	2.0	0.75



I.S.-1-3

A	B	C	D	GAUGE	SQ. FT.
36	36	6	12	0.080	9.00
48	36	6	12	0.100	12.00

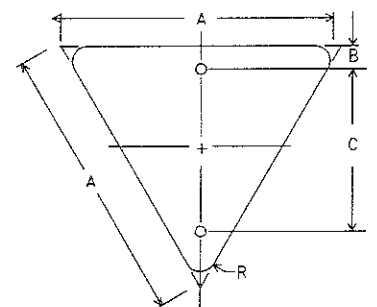
A	B	C	D	THICKNESS	m ²
900	900	150	300	2.0	0.81
1200	900	150	300	2.5	1.08



ISOS-1-2

A	B	C	D	R	GAUGE	SQ. FT.
40	30	17.50	12	1.88	0.080	3.86
48	36	9	15	2.25	0.100	5.56

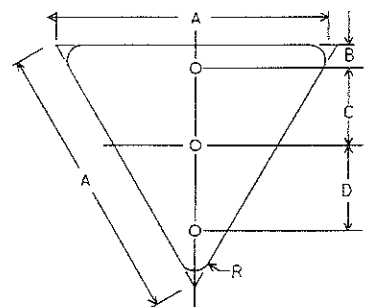
A	B	C	D	R	THICKNESS	m ²
1000	750	187	300	48	2.0	0.35
1200	900	225	375	57	2.5	0.50



TRI-1-2

A	B	C	R	GAUGE	SQ. FT.
24	2	14	1.50	0.080	1.73

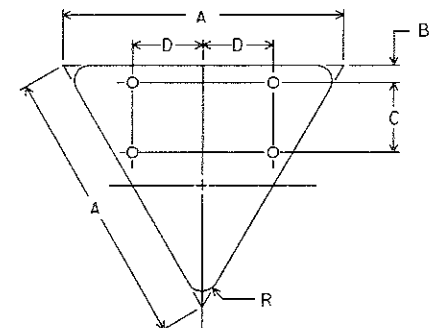
A	B	C	R	THICKNESS	m ²
600	50	350	38	2.0	0.16



TRI-1-3

A	B	C	D	R	GAUGE	SQ. FT.
36	3	10	11	2.00	0.100	3.90

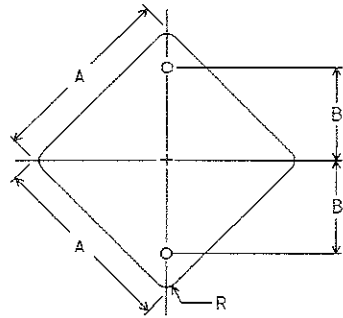
A	B	C	D	R	THICKNESS	m ²
900	75	1250	275	50	2.5	0.35



TRI-2-4

A	B	C	D	R	GAUGE	SQ. FT.
48	3	12	12	3	0.100	6.93
60	3	18	15	4	0.100	10.83

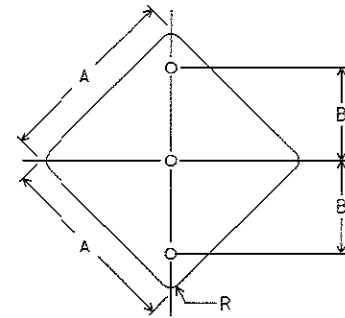
A	B	C	D	R	THICKNESS	m ²
1200	75	300	300	75	2.5	0.62
1500	75	450	375	100	2.5	0.97



DIA-1-2

A	B	R	GAUGE	SQ. FT.
18	9	11.50	0.063	2.25

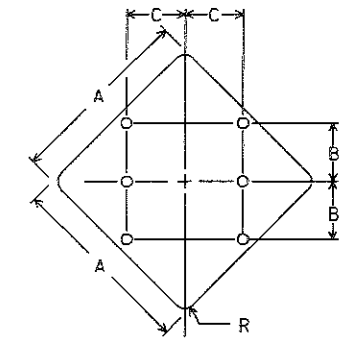
A	B	R	THICKNESS	m ²
450	225	38	1.6	0.20



DIA-1-3

A	B	R	GAUGE	SQ. FT.
24	12	11.50	0.063	4.00
30	15	1.88	0.080	6.25
36	18	2.25	0.080	9.00

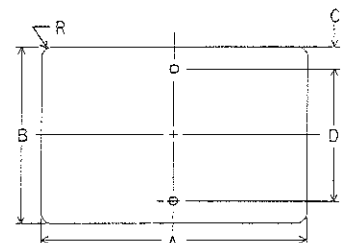
A	B	R	THICKNESS	m ²
600	300	38	1.6	0.36
750	375	48	2.0	0.56
900	450	57	2.0	0.81



DIA-2-6

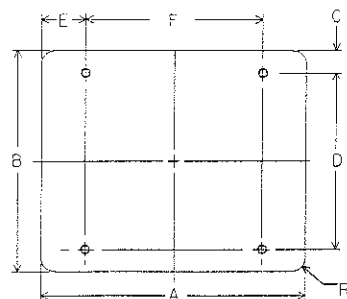
A	B	C	R	GAUGE	SQ. FT.
48	15	15	3	0.100	16.00
60	18	18	3.75	0.100	25.00

A	B	C	R	THICKNESS	m ²
1200	375	375	75	2.5	1.44
1500	450	450	95	2.5	2.25



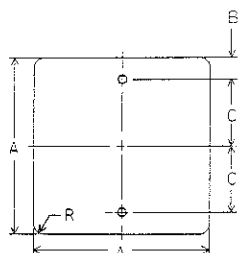
H-REC-1-2

A	B	C	D	R	GAUGE	SQ.FT.
12	4	1.00	2	1.50	0.063	0.34
12	6	1.50	3	1.50	0.063	0.50
12	9	1.50	6	1.50	0.063	0.75
18	6	1.50	3	1.50	0.063	0.75
18	12	1.50	9	1.50	0.063	1.50
21	15	1.50	12	1.50	0.063	2.19
21	18	3	12	1.50	0.063	2.63
24	6	1.50	3	1.50	0.063	1.00
24	8	1.50	5	1.50	0.063	1.33
24	10	1.50	7	1.50	0.063	1.67
24	12	1.50	9	1.50	0.063	2.00
24	18	3	12	1.50	0.063	3.00
30	8	1.50	5	1.50	0.063	1.67
30	10	1.50	7	1.50	0.063	2.08
30	12	1.50	9	1.50	0.080	2.50
30	15	1.50	12	1.50	0.080	3.13
30	16	1.50	13	1.50	0.080	3.33
30	18	3	12	1.50	0.080	3.75
30	24	3	18	1.50	0.080	5.00
36	6	1.50	3	1.50	0.080	1.50
36	12	1.50	9	1.50	0.080	3.00
36	15	1.50	12	1.50	0.080	3.75
36	18	3	12	1.50	0.080	4.50
36	24	3	18	1.50	0.080	6.00
37.5	30	3	24	1.50	0.080	7.81
42	15	1.50	12	1.50	0.080	4.38
48	20	3	14	1.50	0.080	6.67



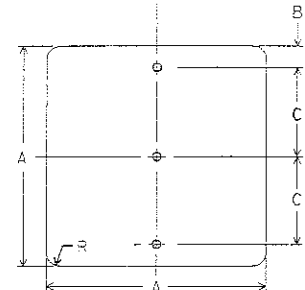
H-REC-2-4

A	B	C	D	E	F	R	GAUGE	SQ.FT.
36	24	3	18	6	24	1.50	0.080	6.00
36	30	3	24	6	24	1.88	0.080	7.50
40	20	3	14	6	28	1.50	0.080	5.56
42	36	6	24	9	24	2.25	0.100	10.50
45	36	6	24	9	27	2.25	0.100	11.25
48	8	1.50	5	9	30	1.50	0.080	2.67
48	8.50	1.50	5.50	9	30	1.50	0.080	2.83
48	14	1.50	11	9	30	1.50	0.080	4.67
48	16	1.50	13	9	30	1.50	0.080	5.33
48	18	3	12	9	30	1.50	0.080	6.00
48	24	3	18	9	30	1.88	0.100	8.00
48	30	3	24	9	30	1.88	0.100	10.00
48	36	6	24	9	30	2.25	0.100	12.00
48	42	6	30	9	30	2.25	0.100	14.00
56	8	1.50	5	12	32	1.50	0.100	3.11
60	12	1.50	9	12	36	1.50	0.080	5.00
60	24	3	18	12	36	1.50	0.100	10.00
60	30	3	24	12	36	1.88	0.100	12.50
60	36	6	24	12	36	2.25	0.100	15.00
60	40	6	28	12	36	2.25	0.100	16.67
64	8	1.50	5	12	40	1.50	0.100	3.56
66	24	3	18	12	42	1.50	0.100	11.00
66	36	6	24	12	42	2.25	0.100	16.50
72	12	1.50	9	12	48	1.50	0.100	6.00
72	18	3	12	12	48	1.50	0.100	9.00
72	24	3	18	12	48	1.50	0.100	12.00
72	36	6	24	12	48	1.50	0.100	18.00



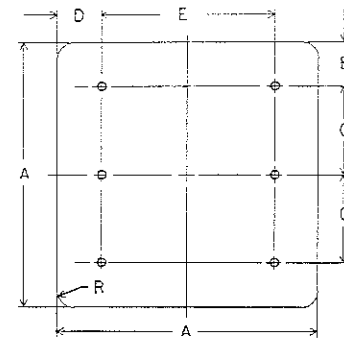
SQ-1-2

A	B	C	R	GAUGE	SQ.FT.
15	3	4.5	1.50	0.063	1.56
18	3	6	1.50	0.063	2.25
24	3	9	1.50	0.063	4.00



SQ-1-3

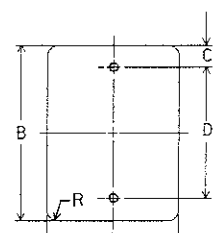
A	B	C	R	GAUGE	SQ.FT.
30	3	12	1.88	0.080	6.25
36	6	12	2.25	0.080	9.00



SQ-2-6

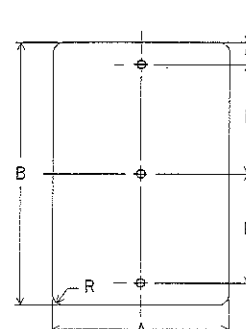
A	B	C	D	E	R	GAUGE	SQ.FT.
36	6	12	6	24	2.25	0.080	9.00
48	6	18	9	30	3.00	0.100	16.00

A	B	C	D	E	R	THICKNESS	m ²
900	150	300	150	600	57	2.0	0.81
1200	150	450	225	750	75	2.5	1.44



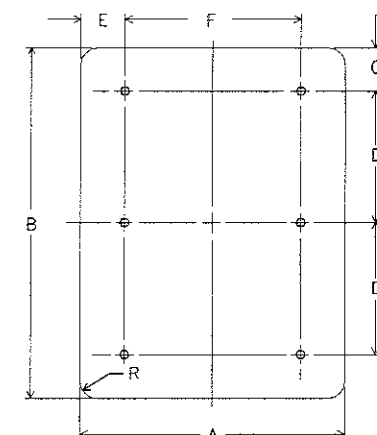
V-REC-1-2

A	B	C	D	R	GAUGE	SQ.FT.
8	26	5	16	1.50	0.063	1.44
9	12	1.50	9	1.50	0.063	0.75
12	18	1.50	15	1.50	0.063	1.50
12	24	3	18	1.50	0.063	2.00
18	24	3	18	1.50	0.063	3.00



V-REC-1-3

A	B	C	D	R	GAUGE	SQ.FT.
6	54	9	18	1.50	0.080	2.25
12	36	3	15	1.50	0.063	3.00
12	48	6	18	1.50	0.080	4.00
24	30	3	12	1.50	0.080	5.00
24	36	3	15	1.50	0.080	6.00
24	48	9	15	1.50	0.100	8.00
30	36	3	15	1.88	0.080	7.50
30	38	3	16	1.50	0.080	7.92
30	42	9	12	1.50	0.080	8.75
36	42	9	12	2.25	0.100	10.50

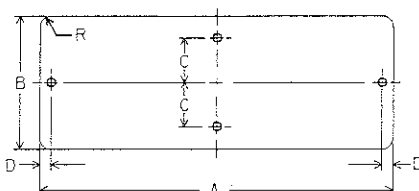


V-REC-2-6

A	B	C	D	E	F	R	GAUGE	SQ.FT.
36	48	6	18	6	24	2.25	0.080	12.00
36	54	6	21	6	24	2.25	0.100	13.50
36	60	6	24	6	24	2.25	0.100	15.00
36	72	9	27	6	24	2.25	0.100	18.00
48	54	6	21	9	30	3	0.100	18.00
48	60	6	24	9	30	3	0.100	20.00
48	96	12	36	9	30	3	0.100	32.00

A	B	C	D	R	THICKNESS	m ²
300	100	25	50	38	1.6	0.03
300	150	37.5	75	38	1.6	0.05
300	225	37.5	150	38	1.6	0.07
450	150	37.5	75	38	1.6	0.07
450	300	37.5	225	38	1.6	0.14
525	375	37.5	300	38	1.6	0.20
525	450	75	300	38	1.6	0.24
600	150	37.5	75	38	1.6	0.09
600	200	37.5	125	38	1.6	0.12
600	250	37.5	175	38	1.6	0.15
600	300	37.5	225	38	1.6	0.18
600	450	75	300	38	1.6	0.27
750	200	37.5	125	38	1.6	0.15
750	250	37.5	175	38	1.6	0.19
750	300	37.5	225	38	2.0	0.23
750	375	37.5	300	38	2.0	0.28
750	400	37.5	325	38	2.0	0.30
750	450	75	300	38	2.0	0.34
750	600	75	450	38	2.0	0.45
900	150	37.5	75	38	2.0	0.14
900	300	37.5	225	38	2.0	0.27
900	375	37.5	300	38	2.0	0.34
900	450	75	300	38	2.0	0.41
900	600	75	450	38	2.0	0.54
937	750	75	600	38	2.0	0.70
1050	375	37.5	300	38	2.0	0.39
1200	500	75	350	38	2.0	0.60

A	B	C	D	E	F	R	THICKNESS	m ²
900	600	75	450	150	600	38	2.0	0.54
900	750	75	600	150	600	48	2.0	0.68
1000	500	75	350	150	700	38	2.0	0.50
1050	900	150	600	225	600	57	2.5	0.95
1125	900	150	600	225	675	57	2.5	1.01
1200	200	37.5	125	225	750	38	2.0	0.24
1200	212	37.5	137	225	750	38	2.0	0.25
1200	350	37.5	275	225	750	38	2.0	0.42
1200	400	37.5	325	225	750	38	2.0	0.48
1200	450	75	300	225	750	38	2.0	0.54
1200	600	75	450	225	750	48	2.5	0.72
1200	750	75	600	225	750	48	2.5	0.90
1200	900	150	600	225	750	57	2.5	1.08
1200	1050	150	750	225	750	57	2.5	1.26
1400	200	37.5	125	300	800	38	2.5	0.28
1500	300	37.5	225	300	900	38	2.0	0.45
1500	600	75	450	300	900	38	2.5	0.90
1500	750	75	600	300	900	48	2.5	1.13
1500	900	150	600	300	900	57	2.5	1.35
1500	1000	150	700	300	900	57	2.5	1.50
1600	200	37.5	125	300	1000	38	2.5	0.32
1650	600	75	450	300	1050	38	2.5	0.99
1650	900	150	600	300	1050	57	2.5	1.49
1800	300	37.5	225	300	1200	38	2.5	0.54
1800	450	75	300	300	1200	38	2.5	0.81
1800	600	75	450	300	1200	38	2.5	1.08
1800	900	150	600	300	1200	38	2.5	1.62



H-REC-1-4 (ONE WAY)

A	B	C	D	R	GAUGE	SQ.FT.
36	12	4	1	1.50	0.080	3.00
48	18	6	1.50	1.50	0.080	6.00

A	B	C	D	R	THICKNESS	m ²
900	300	100	25	38	2.0	0.27
1200	450	150	38	38	2.5	0.54

SHAPE NO. BOLTS REQUIRED

H-REC-2-4

NO. SUPPORTS REQUIRED

NOTES

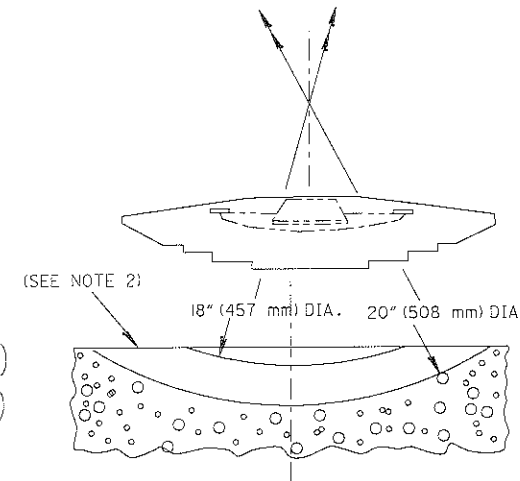
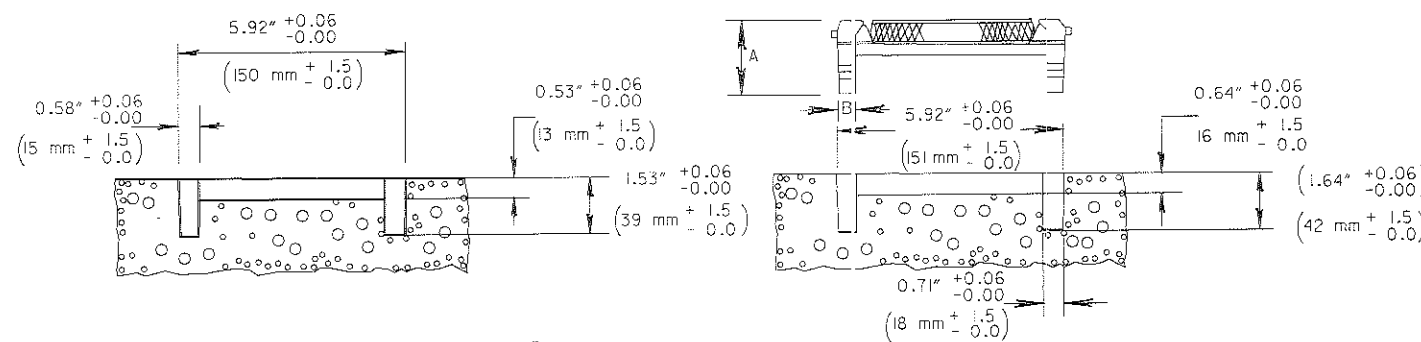
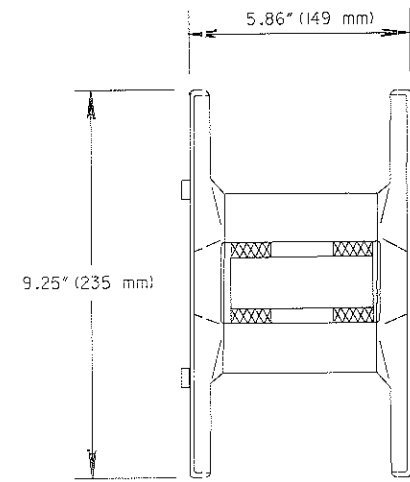
NOTES

- Center line markers shall be placed between the two lines. Markers installed along an edge line or channelizing line shall be placed so that the casting is no more than 1" (25 mm) from the near edge of the line. Markers installed along a lane line or dashed yellow center line shall be placed between and in line with the dashes. Markers shall not be placed over the lines except where the lines deviate visibly from their correct alignment, and then only with the approval of the engineer.
- To facilitate the cutting of the two parallel slots and intervening concaved surface simultaneously, it is recommended that an arbor and saw blade assembly be used. For additional details and tolerances of the casting and arbor-saw assembly contact the casting manufacture.
- For horizontal curves of 5° or greater (radius of 380 m or less), the spacing of the center line markers shall be reduced to 40' (12 m) between P.C. or T.S. and P.T. or S.T.
- For horizontal curves of 10° or greater (radius of 250 m or less) the spacing of the center line markers may be reduced to 20' (6 m) between P.C. or T.S. and P.T. or S.T. When using 20' (6 m) spacing, 12 raised pavement markers at 40' (12 m) spacing shall be installed on each end of the 20' (6 m) spacing.
- When a channelizing line is less than 80' (24 m) in length, one raised pavement marker shall be placed at each end of the line, and one shall be placed in the center of the line.
- Raised pavement markers on lane lines on freeways shall be one way white spaced at 120' (36 m). All other raised pavement makers on lane line on multilane or divided roadways shall be two way red/white spaced at 80' (24 m).

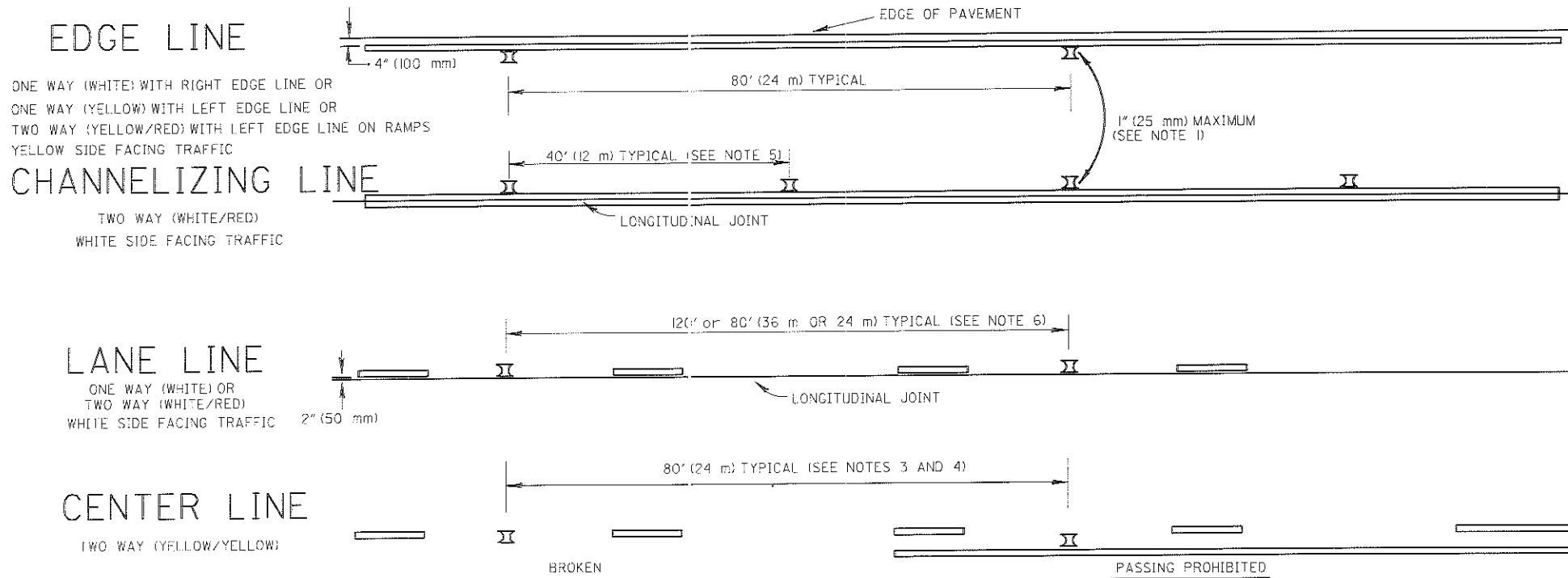
	CONVENTIONAL TYPE	LOW PROFILE TYPE
A	1.74"	1.69"
B	.46"	.59"

(METRIC)

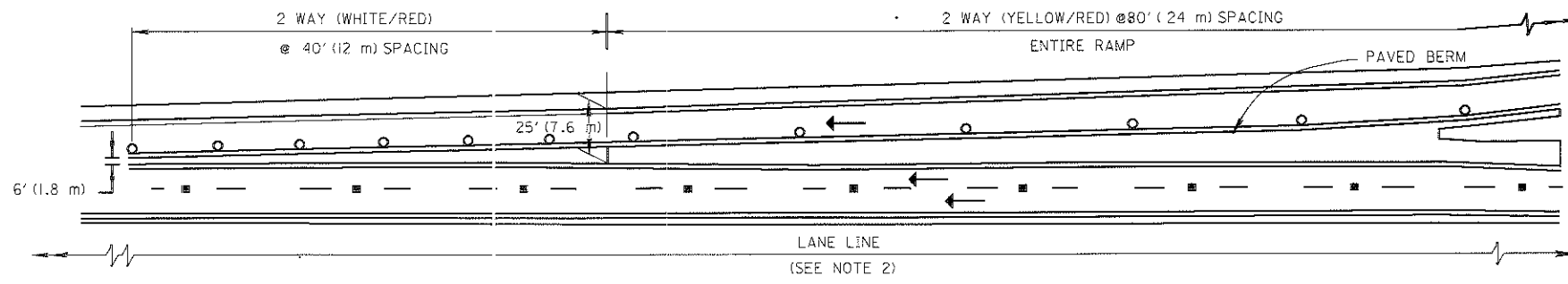
	CONVENTIONAL TYPE	LOW PROFILE TYPE
A	44 mm	43 mm
B	12 mm	15 mm



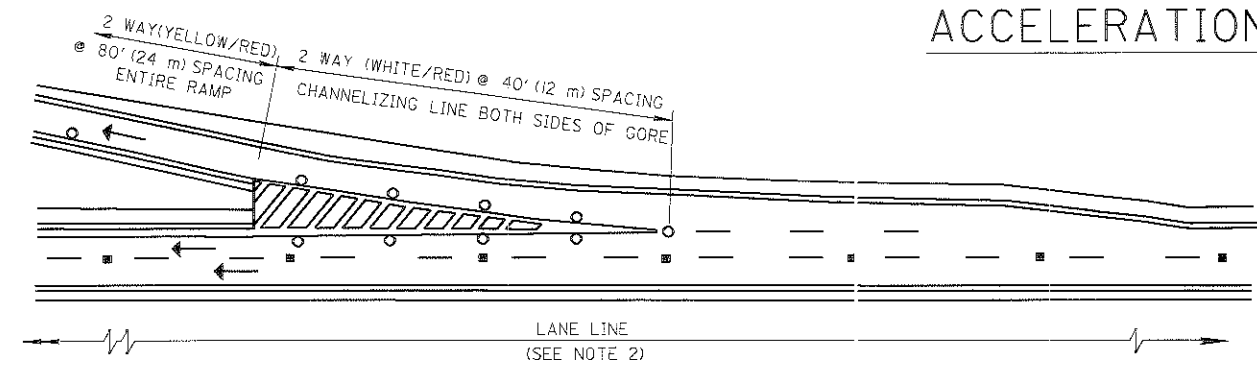
CASTING AND SAW CUT DETAILS



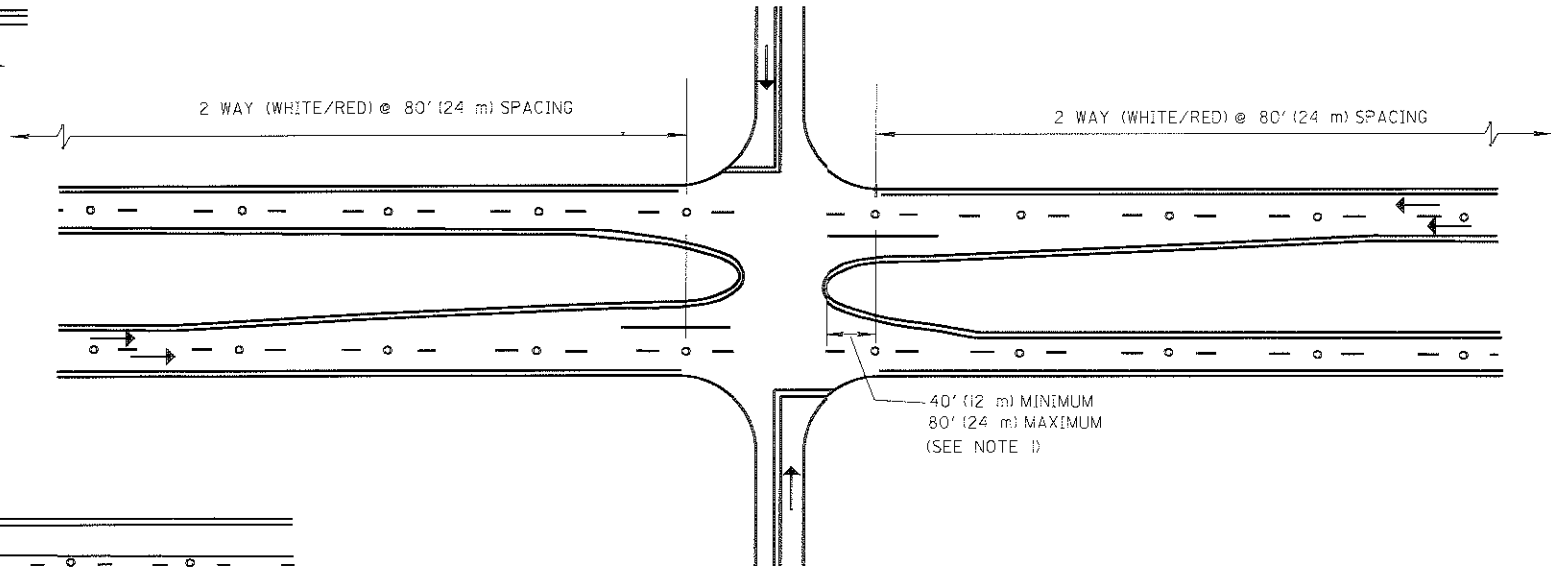
TYPICAL RAISED PAVEMENT MARKER PLACEMENT WITH LONGITUDINAL PAVEMENT MARKINGS



ACCELERATION LANE

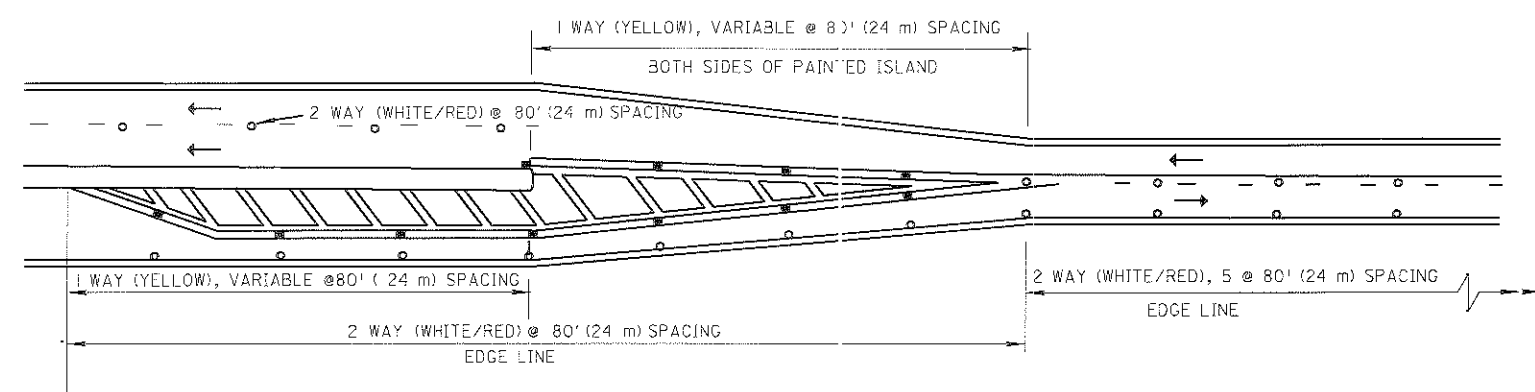


DECELERATION LANE

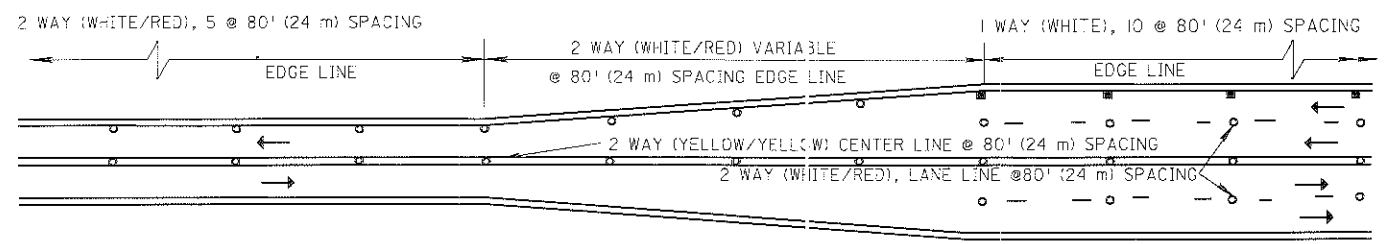


MULTILANE DIVIDED-CONTROLLED ACCESS

(SEE NOTE 2)



4 LANE DIVIDED TO 2 LANE TRANSITION



4 LANE UNDIVIDED TO 2 LANE TRANSITION

NOTES

1. Raised pavement markers shall not be placed in the directional roadways within the intersection area.
2. Raised pavement markers on lane lines on freeways shall be one way white spaced at 120' (36 m). All other raised pavement markers on lane lines on multilane or divided roadways shall be two way red/white spaced at 80' (24 m).

LEGEND

- 1 WAY REFLECTORS
- 2 WAY REFLECTORS

NOTES

1. For one lane bridges, painted center line and center line markers shall be omitted 160' (48 m) on each side and across the bridge.
2. For horizontal curves of 5° or greater (radius of 380 m or less), the spacing of the center line markers shall be reduced to 40' (12 m) between P.C. and T.S. and P.T. or S.T.
3. For horizontal curves of 10° or greater (radius of 250 m or less), the spacing of the center line markers may be reduced to 20' (6 m) between P.C. and T.S. and P.T. or S.T. When using 20' (6 m) spacing, 12 raised pavement markers at 40' (12 m) spacing shall be installed on each end of the 20' (6 m) spacing.
4. A minimum of 3 equally spaced raised pavement markers shall be installed on the back taper.
5. When a channelizing line is less than 80' (24 m) long, one raised pavement marker shall be placed at each end of the line, and one shall be placed in the center of the line.
6. Raised pavement markers shall not be placed on edge lines on a through approach.
7. All approaches at a signalized intersection shall be treated as shown in the stop approach detail.

LEGEND

- 1 WAY REFLECTORS
- 2 WAY REFLECTORS

