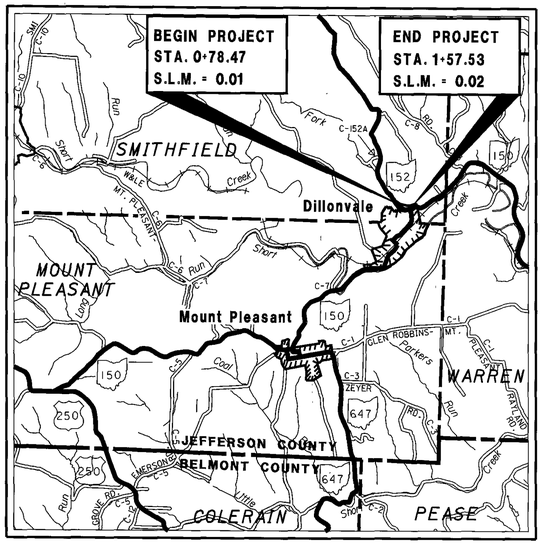


LOCATION MAP

LATITUDE: N40° 12′ 10″ LONGITUDE: W80° 46′ 20″

SCALE IN MILES
0 1 2 3 4

PORTION TO BE IMPROVED
STATE & FEDERAL ROUTES
OTHER ROADS

JEF - SR 152-0.01
050537 PID - 21729
Dist 11 10/19/2005

DESIGN DESIGNATION

CURRENT ADT (2005)	1260
DESIGN YEAR ADT (2025)	1500
DESIGN HOURLY VOLUME (2025)	165
DIRECTIONAL DISTRIBUTION	60%
TRUCKS (24 HOUR B&C)	3%
DESIGN SPEED	35 MPH
LEGAL SPEED	35 MPH

DESIGN FUNCTIONAL CLASSIFICATION - RURAL COLLECTOR
NHS PROJECT - NO

DESIGN EXCEPTION	DATE	SHEET
HORIZONTAL ALIGNMENT	6/15/04	13
SUPERELEVATION	6/15/04	13

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:
O.D.O.T.
DISTRICT 11
NEW PHILADELPHIA, OHIO

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

JEF-152-0.01

VILLAGE OF DILLONVALE
JEFFERSON COUNTY

INDEX OF SHEETS

PROJECT DESCRIPTION

IMPROVEMENT OF 79.06 FEET (0.01 MILES) OF S.R. 152 IN THE VILLAGE OF DILLONVALE OF JEFFERSON COUNTY BY REHABILITATING STRUCTURE JEF-152-0001 OVER THE PINEY FORK CREEK. THE REHABILITATION INCLUDES REPLACEMENT OF THE BRIDGE DECK, BRIDGE RAILING, SIDEWALKS, AND MINIMAL APPROACH ROADWAY WORK.

PROJECT EDA	N/A MAINTENANCE
CONTRACTOR EDA	N/A MAINTENANCE
NOI EDA	N/A MAINTENANCE

2005 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 EXCEPT AS NOTED ON SHEET NO. 5, AND THAT THE PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

ENGINEERS SEAL
STATE OF OHIO JOHN P. BARNHOUSE E-62295 REGISTERED PROFESSIONAL ENGINEER
SIGNED: John P. Barnhouse
DATE: 7-18-05

STANDARD CONSTRUCTION DRAWINGS

BP-3.1	7/16/04	MT-96.11	4/19/02	TC-41.20	1/19/01	PCB-91	7/19/02		
BP-5.1	7/28/00	MT-96.20	4/19/02	TC-42.20	7/16/04				
		MT-96.21	4/19/02	TC-52.10	4/20/01				
		MT-96.25	4/20/01	TC-52.20	4/20/01				
		MT-96.26	4/20/01						
DM-4.3	7/19/02	MT-97.10	4/19/02						
DM-4.4	7/19/02	MT-101.20	10/18/02						
		MT-101.60	10/18/02						
		MT-101.70	10/18/02					SPECIAL PROVISIONS	
		MT-105.10	10/18/02						
RM-4.2	4/18/03	MT-105.11	10/18/02					NWP #3 & #33	3/16/05
		MT-110.10	10/18/02						
		MT-110.20	10/18/02						

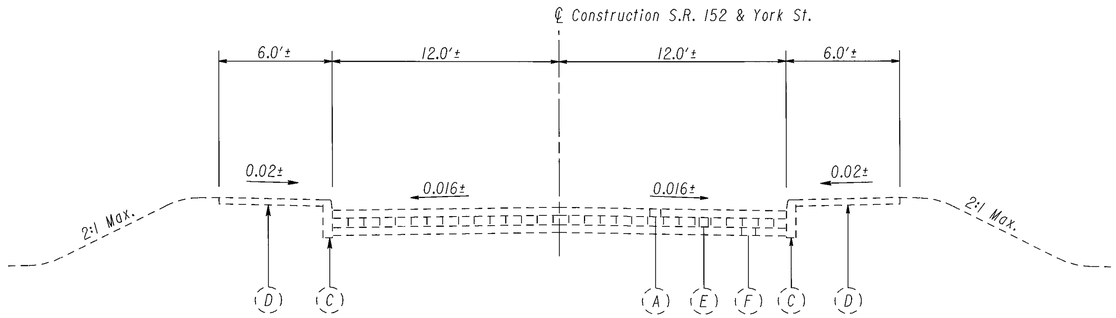
SUPPLEMENTAL SPECIFICATIONS

800	7/15/05
832	4/17/04
833	2/12/03
898	7/16/04

APPROVED
DATE 7/18/05 DISTRICT DEPUTY DIRECTOR

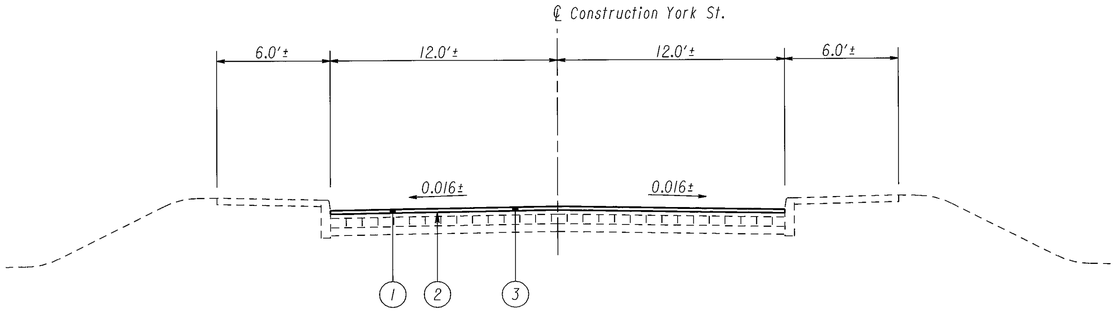
APPROVED Gordon Proctor
DATE 8-4-05 DIRECTOR, DEPARTMENT OF TRANSPORTATION

FEDERAL PROJECT NO. NON-FEDERAL
PID NO. 21729
CONSTRUCTION PROJECT NO.
RAILROAD INVOLVEMENT NONE
JEF-152-0.01
1/31



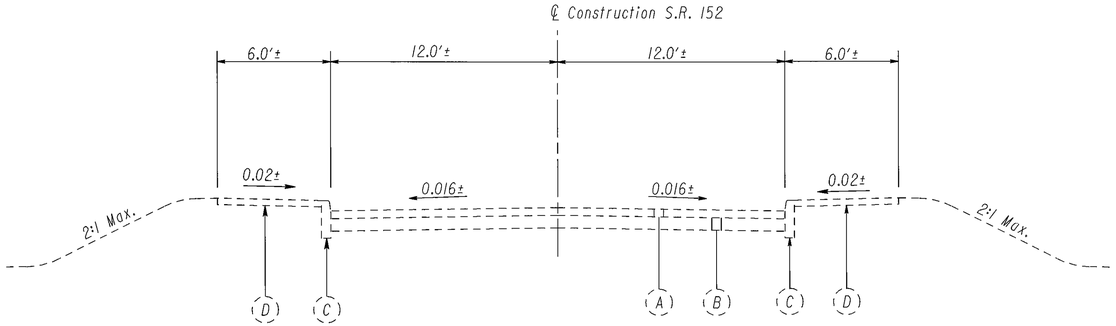
EXISTING SECTION - S.R.152 & YORK ST.

Section Applies:
Sta. 0+00 to Sta. 0+52 = 52' (S.R. 152)
Sta. 0+00 to Sta. 0+48 = 48' (YORK ST.)



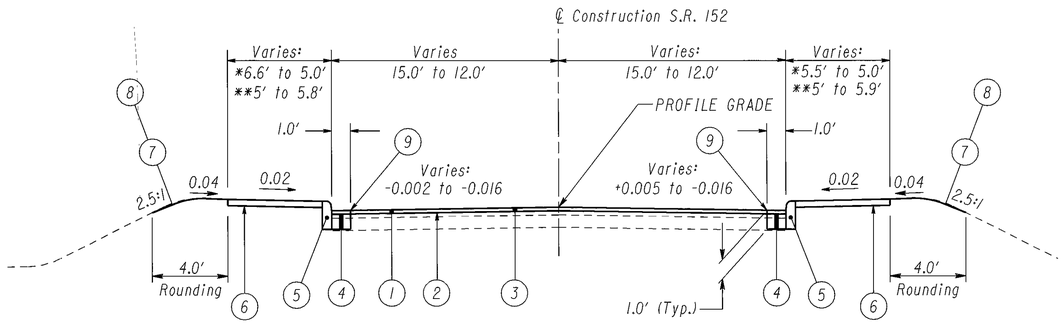
NORMAL SECTION - YORK ST.

Section Applies:
Sta. 0+00 to Sta. 0+48 = 48'



EXISTING SECTION - S.R.152

Section Applies:
Sta. 0+52 to Sta. 0+78.47 = 26.47'
Sta. 1+57.53 to Sta. 2+13.58 = 56.05'



NORMAL SECTION - S.R. 152

Section Applies:

Sta. 0+50.00 to Sta. 2+13.58 = 163.58'
Deduct for Structure No. JEF-152-0001
Sta. 0+78.47 to Sta. 1+57.53 = -79.06'
Total = 84.52'

**Before Structure*
***After Structure*

PLANING LIMITS:

2¼" @ STA. 0+50.00 TO 0" @ STA. 0+70.30
⅞" @ STA. 1+57.53 TO ½" @ STA. 1+65.37 to 2½" @ STA. 2+13.58

LEGEND

1 — *ITEM 448 - 2¼" ASPHALT CONCRETE SURFACE COURSE, TYPE I, PG64-22, AS PER PLAN*
2 — *ITEM 407 - TACK COAT (APPLIED AT 0.075 GAL./S.Y.)*
3 — *ITEM 254 - PAVEMENT PLANING, ASPHALT CONCRETE (VARIABLE DEPTH)*
4 — *ITEM 301 - ASPHALT CONCRETE BASE, PG64-22*
5 — *ITEM 609 - CURB, TYPE 6*
6 — *ITEM 608 - 4" CONCRETE WALK*
7 — *ITEM 659 - SEEDING AND MULCHING*
8 — *ITEM 209 - LINEAR GRADING*
9 — *ITEM 252 - FULL DEPTH PAVEMENT SAWING*

A — *EXISTING ASPHALT CONCRETE SURFACE COURSE*
B — *EXISTING ASPHALT CONCRETE BASE COURSE*
C — *EXISTING 6" CONCRETE CURB*
D — *EXISTING 4" CONCRETE SIDEWALK*
E — *EXISTING BRICK PAVEMENT*
F — *EXISTING AGGREGATE BASE*

CALCULATED TKD
CHECKED JPB

TYPICAL SECTIONS

JEF-152-0.01

CALCULATED TXB | CHECKED JPB

GENERAL NOTES

CLEARING AND GRUBBING

ALTHOUGH THERE ARE NO TREES OR STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE LIMITS OF THE PROJECT, A LUMP SUM QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY FOR ITEM 201, CLEARING AND GRUBBING. ALL PROVISIONS AS SET FORTH IN THE SPECIFICATIONS UNDER THIS ITEM SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 201, CLEARING AND GRUBBING.

UTILITIES

LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

AMERICAN ELECTRIC POWER
P.O. BOX 99
47687 NATIONAL ROAD
ST. CLAIRSVILLE, OHIO 43950
740-699-7845

VERIZON
6223 NORWALK ROAD
MEDINA, OHIO 44256
330-364-0501

COMCAST CABLE COMMUNICATIONS, INC.
P.O. BOX 469
908 NATIONAL ROAD
BRIDGEPORT, OHIO 43912
740-699-5635

DILLONVALE-MT. PLEASANT WASTE WATER DEPT.
RHODES STREET EXTENSION
P.O. BOX 686
DILLONVALE, OHIO 43917
740-769-2016

DILLONVALE WATER DEPT.
BOX 488 MAIN STREET
CITY BUILDING
DILLONVALE, OHIO 43917
740-769-2668

THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED FROM THE OWNERS AS REQUIRED BY O.R.C. SECTION 153.64.

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.

ELEVATION DATUM

ALL ELEVATIONS ARE ASSUMED ELEVATIONS.

WORK LIMITS

THE WORK LIMITS SHOWN ON THESE PLANS ARE FOR PHYSICAL CONSTRUCTION ONLY. THE INSTALLATION AND OPERATION OF ALL TEMPORARY TRAFFIC CONTROL AND TEMPORARY TRAFFIC CONTROL DEVICES REQUIRED BY THESE PLANS SHALL BE PROVIDED BY THE CONTRACTOR WHETHER INSIDE OR OUTSIDE THESE WORK LIMITS.

STREAM CHANNEL EXCAVATION

THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT ANY INCIDENTAL DISCHARGES ASSOCIATED WITH THE EXCAVATION AND HAULING OF MATERIAL FROM THE STREAM CHANNEL. THIS PERTAINS TO ANY EXCAVATION OPERATIONS SUCH AS, FOUNDATION PIER OR ABUTMENT EXCAVATION, CHANNEL CLEANOUT, EXCAVATION FOR ROCK CHANNEL PROTECTION AND REMOVAL OF ANY TEMPORARY FILL ASSOCIATED WITH CONSTRUCTION OPERATIONS.

DEMOLITION DEBRIS

THE CONTACTOR SHALL TAKE PRECAUTIONS TO AVOID AND/OR LIMIT DEMOLITION DEBRIS FROM ENTERING THE STREAM. ANY MATERIAL THAT DOES FALL INTO THE STREAM SHALL BE REMOVED AS SOON AS POSSIBLE.

EXISTING PLANS

EXISTING PLANS ENTITLED JEF-152-0.01 (1950) MAY BE INSPECTED IN THE ODOT DISTRICT 11 OFFICE IN NEW PHILADELPHIA, OHIO.

SEEDING AND MULCHING

SEEDING AND MULCHING SHALL BE APPLIED TO ALL AREAS OF EXPOSED SOIL BETWEEN THE RIGHT-OF-WAY LINES, AND WITHIN THE CONSTRUCTION LIMITS FOR AREAS OUTSIDE THE RIGHT-OF-WAY LINES COVERED BY WORK AGREEMENT OR SLOPE EASEMENT. QUANTITY CALCULATIONS FOR SEEDING AND MULCHING ARE BASED ON THESE LIMITS.

INSTREAM WORK

INSTREAM WORK WILL BE LINITED WHERE PRACTICABLE AND ONLY CLEAN, NON-ERODIBLE MATERIAL WILL BE USED FOR FORDS, COFFERDAMS, OR OTHER EQUIPMENT ACCESS PADS. THIS TEMPORARY PLACED MATERIAL WILL BE REMOVED AND THE STREAM BOTTOM RESTORED TO NEAR NATURAL CONDITIONS WHEN THE WORK IS COMPLETED.

ITEM 448 ASPHALT CONCRETE SURFACE COURSE TYPE 1, PG64-22, AS PER PLAN

MATERIAL FURNISHED FOR FINE AND COARSE AGGREGATES USED IN THIS ITEM SHALL EXCLUDE ALL STONE AND CRUSHED CARBONATE STONE. PLACE ASPHALT IN 2 LIFTS.

ITEM 252 FULL DEPTH PAVEMENT SAWING

THIS ITEM SHALL BE USED TO ENSURE A SOUND NEAT CLEAN EDGE FOR THE FULL EXISTING PAVEMENT DEPTH.

(S.R. 152) STA. 0+64.64 LT. TO STA. 0+83.93 LT.	19.29 FT.
(S.R. 152) STA. 1+64.78 LT. TO STA. 2+24.58 LT.	59.80 FT.
(S.R. 152) STA. 1+52.12 RT. TO STA. 0+06.12 RT. (YORK ST.)	17.92 FT.
(S.R. 150) STA. 360+36.65 RT. TO STA. 360+53.62 RT.	17.00' FT.
(S.R. 152) STA. 0+73.01 RT. TO (S.R. 150) STA. 362+56.01 LT.	145.54 FT.
STA. 0+78.47	31.93 FT.
STA. 1+57.53	31.93 FT.
TOTAL =	323.41 FT.
	USE 324 FT.

JEF-152-0.01

ITEM 614, MAINTAINING TRAFFIC

THE CONTRACTOR SHALL MAINTAIN TRAFFIC AT ALL TIMES AND IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 614. ALTERNATING ONE-WAY TRAFFIC SHALL BE MAINTAINED AS SHOWN IN THE PLAN AND STANDARD CONSTRUCTION DRAWINGS BY USE OF THE EXISTING PAVEMENT, THE EXISTING STRUCTURE AND THE PROPOSED STRUCTURE.

THE ROADWAY IS PERMITTED TO HAVE A LANE CLOSURE FOR A PERIOD NOT LONGER THAN 65 CONSECUTIVE CALENDAR DAYS (TOTAL FOR BOTH PHASE ONE AND TWO). LIQUIDATED DAMAGES WILL BE ASSESSED IN ACCORDANCE WITH 108.07 FOR EACH CALENDAR DAY A LANE REMAINS CLOSED TO TRAFFIC BEYOND THE APPROVED 65 DAY CLOSURE PERIOD.

ALTERNATING ONE-WAY TRAFFIC SHALL BE MAINTAINED DURING PHASES 1 THROUGH 2 BY USE OF WORK ZONE TRAFFIC SIGNALS, STANDARD CONSTRUCTION DRAWINGS AND PLAN SHEETS. TRAFFIC SHALL BE SEPARATED FROM THE WORK AREA BY MEANS OF ITEM 622 - PORTABLE CONCRETE BARRIER, 32".

THE CONTRACTOR SHALL DESIGN, FURNISH, INSTALL AND MAINTAIN A TRAFFIC DETECTOR ON EACH TRAFFIC APPROACH, WITH THE EXCEPTION OF S.R. 150 APPROACHES, WHICH WILL RELIABLY DETECT ALL LEGAL TRAFFIC APPROACHING (BUT NOT LEAVING) THE SIGNAL AS IT PASSES OR WAITS IN THE DESIGNATED DETECTOR ZONE SHOWN IN THE PLANS. DETECTOR DESIGNS WHICH DO NOT PROVIDE RELIABLE DETECTION, FREE FROM FALSE CALLS, SHALL BE IMMEDIATELY REPLACED BY THE CONTRACTOR.

PRIOR TO OPERATING THE WORK ZONE SIGNAL SYSTEM, THE CONTRACTOR AND THE ENGINEER SHALL EXPLAIN THE OPERATION OF THE WORK ZONE SIGNAL SYSTEM TO THE VILLAGE AND ITS REPRESENTATIVES.

THE CONTRACTOR SHALL ALSO DESIGN, FURNISH, INSTALL AND MAINTAIN TEMPORARY PEDESTRIAN SIGNAL HEADS, PUSH BUTTONS AND TEMPORARY SUPPORTS FOR THE S.R. 150 PEDESTRIAN CROSSING AS SHOWN ON SHEET NO'S. 7 AND 8.

PRIOR TO THE BEGINNING OF ANY CONSTRUCTION THAT WILL REQUIRE THE CLOSURE OF EXISTING LANES TO TRAFFIC, ALL WORK ZONE SIGNALS, SIGNS, LIGHTS, PORTABLE CONCRETE BARRIER, GATES AND BARRICADES AND WORK ZONE PAVEMENT MARKINGS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. WORK ZONE PAVEMENT MARKINGS, RAISED PAVEMENT MARKINGS, AND PORTABLE CONCRETE BARRIER INSTALLATION SHALL BE ACCOMPLISHED IN ONE DAY, WITH FLAGGERS BEING UTILIZED FOR THE PROTECTION OF VEHICULAR TRAFFIC DURING THE INSTALLATION OF THESE ITEMS. WHEN THE ABOVE REQUIREMENTS HAVE BEEN SATISFIED, SIGNAL CONTROLLED ALTERNATING ONE-WAY TRAFFIC MAY BEGIN.

ALL TEMPORARY TRAFFIC SIGNAL AND PEDESTRIAN SIGNAL LABOR, EQUIPMENT AND MATERIALS ARE TO BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR 614, MAINTAINING TRAFFIC. THESE ITEMS WILL NOT BE SEPARATELY ITEMIZED IN THE PLAN.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE SPECIFICATIONS, AS WELL AS THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR 614, MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

CONSTRUCTION NOISE

ACTIVITIES AND LAND USE ADJACENT TO THIS PROJECT MAY BE AFFECTED BY CONSTRUCTION NOISE. IN ORDER TO MINIMIZE ANY ADVERSE CONSTRUCTION NOISE IMPACTS, ANY POWER-OPERATED CONSTRUCTION-TYPE DEVICE SHALL NOT BE OPERATED BETWEEN THE HOURS STARTING AT 9:00 P.M. AND CONTINUING THRU TO 6:00 A.M. IN ADDITION, ANY SUCH DEVICE SHALL NOT BE OPERATED AT ANY TIME IN SUCH A MANNER THAT THE NOISE CREATED SUBSTANTIALLY EXCEEDS THE NOISE CUSTOMARILY AND NECESSARILY ATTENDANT TO THE REASONABLE AND EFFECIENT PERFORMANCE OF SUCH EQUIPMENT.

TEMPORARY ORANGE PLASTIC CONSTRUCTION FENCE

TEMPORARY ORANGE PLASTIC CONSTRUCTION FENCE SHALL BE PLACED AS SHOWN IN THE PLAN FOR THE PROTECTION OF PEDESTRIAN TRAFFIC. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THAT THE FENCE IS IN GOOD CONDITION AND PROPERLY PLACED AND MAINTAINED. THE FENCE SHALL MEET THE REQUIREMENTS OF STANDARD DRAWING MT-110.10.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 607 - FENCE MISC: ORANGE PLASTIC CONSTRUCTION FENCE - - - 150 FT.

ITEM 614, BARRIER REFLECTORS AND OBJECT MARKERS

BARRIER REFLECTORS AND OBJECT MARKERS SHALL BE INSTALLED ON ALL PORTABLE CONCRETE BARRIER USED FOR TRAFFIC CONTROL. BARRIER REFLECTORS, OBJECT MARKERS AND THEIR INSTALLATION SHALL CONFORM TO ITEM 626, EXCEPT THAT THE SPACING SHALL BE 50 FEET.

NOTIFICATION OF WORK ZONE LANE RESTRICTIONS

THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST EIGHTEEN (18) DAYS PRIOR TO IMPLEMENTING ANY WORK ZONE RESTRICTIONS THAT WILL REDUCE THE WIDTH OR VERTICAL CLEARANCE OF ANY LANE ON WHICH TRAFFIC WILL BE MAINTAINED DURING CONSTRUCTION.

THE ENGINEER SHALL IMMEDIATELY NOTIFY THE DISTRICT ROADWAY SERVICES MANAGER TO ADVISE THE OFFICE OF HIGHWAY MANAGEMENT OF THE RESTRICTIONS.

OVERHEAD MOUNTED WORK ZONE SIGNALS

SIGNALS SHALL BE OVERHEAD MOUNTED IN ACCORDANCE WITH THE DETAILS SHOWN ON SCD MT-96.21.

ITEM 622, PORTABLE CONCRETE BARRIER

IT IS ANTICIPATED THAT THE SAME BARRIER WILL BE USED IN VARIOUS PHASES OF CONSTRUCTION. MOVEMENT OF THE CONCRETE BARRIER BETWEEN PHASES SHALL BE ACCOMPLISHED IN ONE WORKING DAY. FLAGGERS SHALL BE UTILIZED FOR PROTECTION OF VEHICULAR TRAFFIC UNTIL MOVEMENT OF THE BARRIER IS COMPLETE.

WORK ZONE TRAFFIC SIGNALS

ALL WORK ZONE TRAFFIC SIGNALS SHALL HAVE HARDWARE INSTALLED WITH THE CONTROLLER TO SWITCH POWER TO A PORTABLE GENERATOR. THE CONTRATOR SHALL HAVE ON THE PROJECT A COMPATIBLE PORTABLE GENERATOR AT ALL TIMES WHILE THE TRAFFIC SIGNALS ARE OPERATIONAL. THE PORTABLE GENERATOR SHALL HAVE THE ELECTRICAL CAPACITY TO POWER THE TEMPORARY TRAFFIC SIGNALS IN THE EVENT OF AN ELECTRICAL POWER OUTAGE.

IN LIEU OF THE PRECEDING REQUIREMENTS, THE SIGNAL HEADS SHALL BE LIGHT EMITTING DIODE (LED) TRAFFIC SIGNALS. THE LED SHALL BE DIALIGHT, 12" TRAFFIC SIGNAL BULBS WITH A MINIMUM OF 190 CLUSTERS OR AN APPROVED EQUAL. THE CONTROLLER FOR THE LED SHALL HAVE AN AUTOMATIC BATTERY BACKUP SYSTEM IN THE EVENT OF AN ELECTRICAL POWER OUTAGE. THE BATTERY BACKUP SYSTEM SHALL HAVE A MINIMUM CAPACITY TO OPERATE THE TRAFFIC SIGNALS FOR A 24 HOUR PERIOD WITHOUT RECHARGING.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PERIODICALLY RECHARGING OR REFUELING THE SYSTEM TO KEEP THE SIGNALS FUNCTIONING FOR THE ENTIRE DURATION OF THE POWER OUTAGE. ALL COSTS FOR MATERIALS, EQUIPMENT, AND LABOR SHALL BE INCLUDED IN THE CONTRACT PRICE FOR ITEM 614, MAINTAINING TRAFFIC.

ITEM 614 - WORK ZONE IMPACT ATTENUATOR (BIDIRECTIONAL)

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING EITHER OF THE FOLLOWING IMPACT ATTENUATORS:

1) THE QUADGUARD CZ, (24 INCHES WIDE SIX-BAY) WORK ZONE IMPACT ATTENUATOR MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC., ONE EAST WACKER DRIVE, CHICAGO, IL 60601 (TELEPHONE: 312-467-6750)

THE LENGTH OF THE SIX-BAY QUADGUARD CZ IS 20'-9". INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AS DETAILED ON THE FOLLOWING PRE-APPROVED SHOP DRAWINGS:

DRAWING NUMBER	DRAWING NAME	DRAWING/ REVISION DATE	ODOT APPROVAL DATE
QSCZCVR-T4	QUARDGUARD CZ SYSTEM FOR CONSTRUCTION ZONES	5/13/99 REV. J	8/27/99
35-40-10	QUADGUARD SYSTEM CONCRETE PAD, CZ, QG	11/19/97 REV. D	8/27/99
35-40-16	QUADGUARD SYSTEM BACKUP ASSEMBLY, CZ, QG	7/30/99 REV. F	8/27/99
35405IZ	QUADGUARD CZ SYSTEM NOSE ASSEMBLY, CZ, QG, 24, 30, 36	5/17/99	8/27/99
35-40-18	TRANSITION ASSEMBLY, 4 OFFEST, QG	6/25/99 REV. F	8/27/99
35400260	QUADGUARD SYSTEM PCMB ANCHOR ASSEMBLY	11/19/97 REV. C	8/27/99

2) THE TRACC (TRINITY ATTENUATING CRASH CUSHION) MANUFACTURED BY SYRO INC., 1170 N. STATE STREET, GIRARD, OHIO 44420 (TELEPHONE: 330-545-4373).

THE TRACC IS 21'-0" LONG AND 2'-7" WIDE. INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AS DETAILED ON THE FOLLOWING PRE-APPROVED SHOP DRAWINGS:

DRAWING NUMBER	DRAWING NAME	DRAWING/ REVISION DATE	ODOT APPROVAL DATE
SS450 SS450M	CRASH-CUSHION ATTENUATING TERMINAL PLAN, ELEVATION & SECTIONS	3/12/99 REV. 1	8/27/99
SS455	TRACC TRANSITION TO W-BEAM MEDIAN BARRIER PLAN, ELEVATION & SECTIONS	2/18/99	8/27/99
SS461	TRACC TRANSITION TO CONCRETE SAFETY SHAPE BARRIER PLAN, ELEVATION & SECTIONS	6/30/99 REV. 1	8/27/99
SS462	TRACC TRANSITION TO CONCRETE BARRIER SINGLE SLOPE PLAN, ELEVATION & SECTIONS	6/30/99	8/27/99

3) THE GREAT CZ IMPACT ATTENUATOR MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC.

THIS ATTENUATOR MAY BE USED UNTIL JANUARY 1, 2007 IF THE ITEM WAS PURCHASED BEFORE OCTOBER 1, 1998 AND IS IN THE CONTRACTOR'S INVENTORY.

THE CONTRACTOR SHALL PROVIDE A REPLACEMENT UNIT WHEN AN IMPACT IS SEVERE ENOUGH TO REQUIRE COMPLETE REPLACEMENT OF THE ATTENUATOR. THE CONTRACTOR SHALL HAVE A SPARE PARTS PACKAGE AVAILABLE ON THE PROJECT SITE AT ALL TIMES WHEN AN ATTENUATOR IS IN PLACE. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF ONE COMPLETE SPARE PARTS PACKAGE FOR EVERY ONE TO SIX UNITS INSTALLED ON THE PROJECT SITE. FOR EXAMPLE, FIVE INSTALLED UNITS REQUIRE ONE SPARE PARTS PACKAGE AND SEVEN INSTALLED UNITS REQUIRE TWO SPARE PARTS PACKAGES.

WHEN BIDIRECTIONAL DESIGNS ARE SPECIFIED, THE CONTRACTOR SHALL SUPPLY APPROPRIATE TRANSITIONS. PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT PRICE BID FOR ITEM 614, WORK ZONE IMPACT ATTENUATOR (BIDIRECTIONAL), EACH, AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS NECESSARY TO CONSTRUCT, MAINTAIN, REPAIR, REPLACE OR RELOCATE A COMPLETE AND FUNCTIONAL IMPACT ATTENUATOR SYSTEM, INCLUDING ALL RELATED BACKUPS, TRANSITIONS, LEVELING PADS, HARDWARE AND GRADING, NOT SEPARATELY SPECIFIED, AS REQUIRED BY THE MANUFACTURER.

DETOUR NOTIFICATION

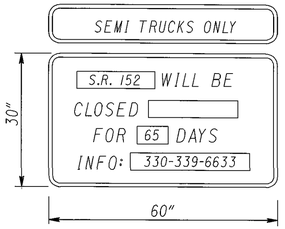
THE CONTRACTOR SHALL ADVISE THE DISTRICT ROADWAY SERVICE MANAGER (330-339-6633) AND THE DILLONVALE VILLAGE ADMINISTRATOR EIGHTEEN (18) DAYS IN ADVANCE OF WHEN THE TRUCK DETOUR ROUTE SHOULD BE IN EFFECT. ODOT SHALL PROVIDE SIGNS, SUPPORTS AND HARDWARE REQUIRED FOR THE DETOUR ROUTE. ODOT SHALL THEN INSTALL, MAINTAIN, REMOVE AND SALVAGE THE SAME THROUGHOUT THE DETOUR LIMITATIONS OF PHASE 1 AND 2.

DETOUR DURATION

THE DETOUR ROUTE SHALL BE IN EFFECT DURING CONSTRUCTION PHASES 1 AND 2 FOR SEMI TRUCK TRAFFIC ONLY.

ITEM 614, MAINTAINING TRAFFIC (NOTICE OF CLOSURE SIGN)

NOTICE OF CLOSURE SIGNS, AS DETAILED IN THESE PLANS, SHALL BE ERECTED BY THE CONTRACTOR AT LEAST TWO WEEKS IN ADVANCE OF THE SCHEDULED ROAD CLOSURE. THE SIGNS SHALL BE ERECTED ON THE RIGHT-HAND SIDE OF THE ROAD FACING TRAFFIC. THEY SHALL BE PLACED SO AS NOT TO INTERFERE WITH THE VISIBILITY OF ANY OTHER TRAFFIC CONTROL SIGNS. ON ROADWAYS, THEY SHOULD BE ERECTED AT THE POINT OF CLOSURE. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR ITEM 614, MAINTAINING TRAFFIC.



OFFICIAL SEMI TRUCK DETOUR

CALCULATED TXB
CHECKED JPB

MAINTENANCE OF TRAFFIC NOTES

JEF-152-0.01

PHASE CONSTRUCTION SEQUENCE :

PHASE 1

1. REMOVE PORTION OF EXISTING SIDEWALK FROM THE RIGHT SIDE OF STRUCTURE WITH USE OF FLAGGERS TO MAINTAIN TRAFFIC.
2. CONSTRUCT CURB RAMP CR-1 ADJACENT TO BANK.
3. INSTALL AND MAINTAIN CONSTRUCTION SIGNS, AND SIGNALS. FOR DETAILS NOT SHOWN, SEE SCD MT-96.11 AND SHEET NO. 7 AND 9.
4. INSTALL AND MAINTAIN PORTABLE CONCRETE BARRIER, (PCB), ANCHORED, BRIDGE MOUNTED ON THE BRIDGE. INSTALL WORK ZONE PAVEMENT MARKINGS AND WORK ZONE RAISED PAVEMENT MARKERS AS SHOWN ON THE PLANS.
5. MAINTAIN TWO-WAY TRAFFIC WITH ONE LANE ON NORTHBOUND PORTION OF S.R. 152, VIA SIGNAL CONTROL PER STANDARD CONSTRUCTION DRAWINGS AND DETAILS SHOWN ON SHEET NO. 7 AND 9.
6. REMOVE LEFT PORTION OF SUPERSTRUCTURE, ABUTMENT, CURB AND SIDEWALK AS DETAILED IN THE PLAN.
7. CONSTRUCT LEFT PORTION OF SUPERSTRUCTURE, ABUTMENTS, CURB, SIDEWALK AND RAILING.

PHASE 2

1. INSTALL AND MAINTAIN PORTABLE CONCRETE BARRIER, (PCB), UNANCHORED, BRIDGE MOUNTED ON THE BRIDGE. INSTALL WORK ZONE PAVEMENT MARKINGS AND WORK ZONE RAISED PAVEMENT MARKERS AS SHOWN ON THE PLANS.
2. MAINTAIN TWO-WAY TRAFFIC WITH ONE LANE ON SOUTHBOUND PORTION OF S.R. 152, VIA SIGNAL CONTROL PER STANDARD CONSTRUCTION DRAWINGS AND DETAILS SHOWN ON SHEET NO. 8 AND 9.
3. REMOVE RIGHT PORTION OF SUPERSTRUCTURE, ABUTMENT, CURB AND SIDEWALK AS DETAILED IN THE PLAN.
4. CONSTRUCT RIGHT PORTION OF SUPERSTRUCTURE, ABUTMENTS, CURB, SIDEWALK AND RAILING.

PHASE 3

1. COMPLETE RESURFACING, PAVEMENT MARKING OPERATIONS AND CURB RAMPS WITH USE OF FLAGGERS TO MAINTAIN TRAFFIC.

MAINTENANCE OF TRAFFIC QUANTITIES

	Sheet No.	Reference	614 Barrier Reflector, Type B2 (EACH)	614 Object Marker, Two Way (EACH)	614 Work Zone Impact Attenuator (Bidirectional) (EACH)	614 Work Zone Edge Line, Class I, 740.06, Type I (MILE)	614 Work Zone Stop Line, Class I, 740.06, Type I (FT)	614 Work Zone Center Line, Class I, 642 Paint (MILE)	614 Work Zone Dotted Line, Class I, 642 Paint, (Yellow) (FT)	614 Work Zone Dotted Line, Class I, 642 Paint, (White) (FT)	614 Work Zone Crosswalk Line, Class I, 740.06, TYPE I (FT)		622 Portable Concrete Barrier, 32" (FT)	622 Portable Concrete Barrier, 32", Bridge Mounted (FT)
PHASE 1	7	MT-1						0.03						
	7	MT-2					13							
	7	MT-3							188					
	7	MT-4								202				
	7	MT-5						0.03						
	7	MT-6					13							
	7	MT-7			1									
	7	MT-8					13							
	7	MT-9						0.03						
	7	MT-10				0.01								
	7	MT-11									118			
	7	MT-12									63			
	7	MT-13									57			
	7	MT-14					12							
	7	PCB-1	6	6									170	90
PHASE 2	8	MT-15									63			
	8	PCB-2	5	5									100	90
		Sub-total							188	202				
Totals Carried to General Summary			11	11	1	0.01	51	0.09	390		301		270	180

ITEM 614 - WORK ZONE RAISED PAVEMENT MARKERS

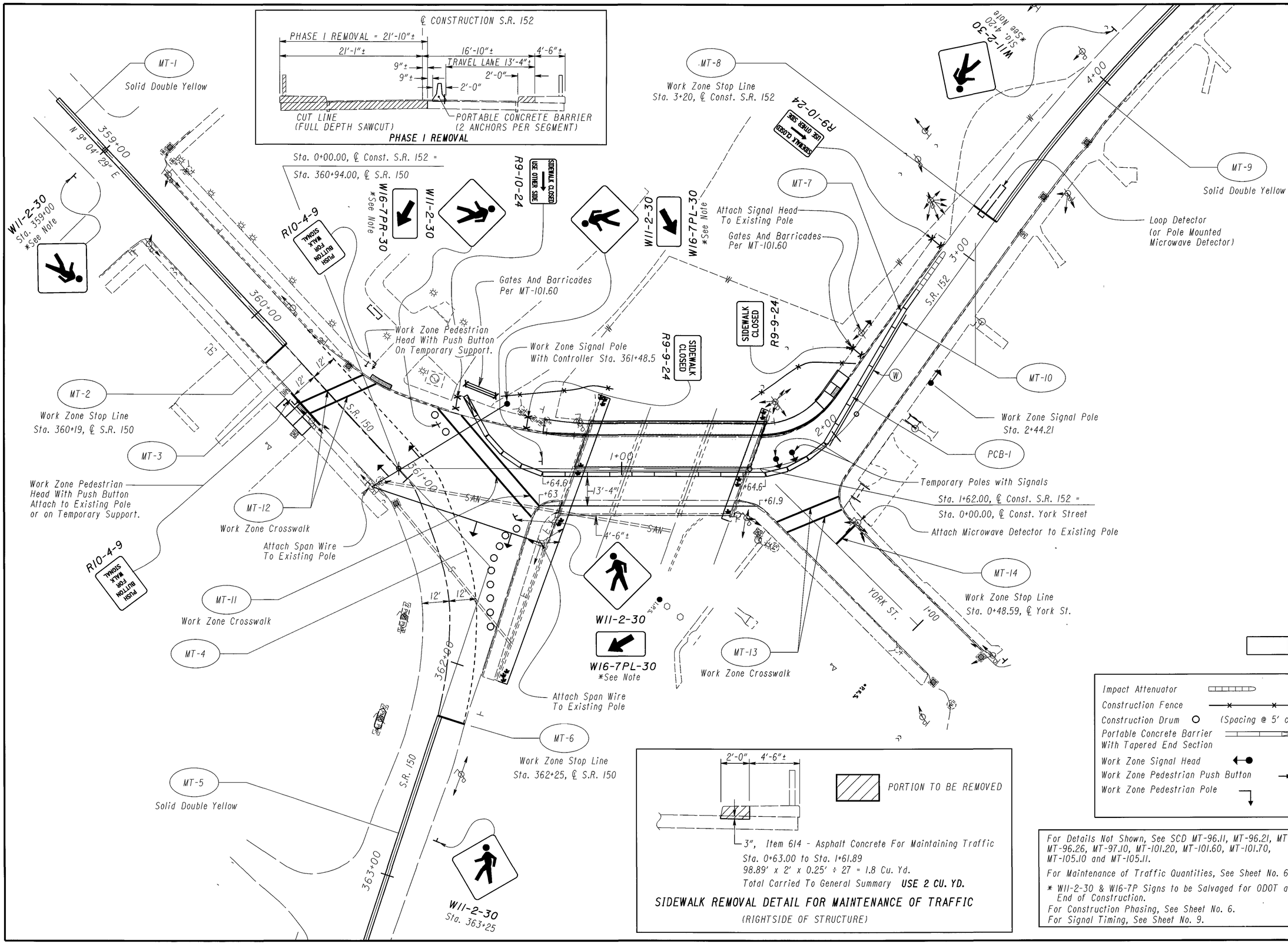
	STATIONING FROM	STATIONING TO	SIDE	SPACING FEET	TYPE A W	TYPE A Y	TYPE A Y/Y	REMARKS (LINE TYPE)
PHASE 1	358+69, S.R. 150	360+19, S.R. 150	℄	20			18	Supplement Centerline
	358+69, S.R. 150	362+25, S.R. 150	Rt.	5	72			Simulate Edge Line
	0+64.6, ℄ Const. 152	3+20, ℄ Const. 152	Rt.	5	52	52		Simulate Edge Line
	0+64.6, ℄ Const. 152	1+64.6, ℄ Const. 152	Lt.	5	21	21		Simulate Edge Line
	3+20, ℄ Const. 152	4+70, ℄ Const. 152	℄	20			18	Supplement Centerline
	362+25, ℄ S.R. 152	363+75, ℄ S.R. 152	℄	20			18	Supplement Centerline
PHASE 2	360+19, S.R. 150	1+64.6, ℄ Const. 152	Lt.	5	44	44		Simulate Edge Line
	0+74.6, ℄ Const. 152	1+64.6, ℄ Const. 152	Rt.	5	19	19		Simulate Edge Line
	1+64.6, ℄ Const. 152	3+20, ℄ Const. 152	Lt.	5	33			Simulate Edge Line
	Sub-total				241	136	54	
Totals Carried to General Summary					431			

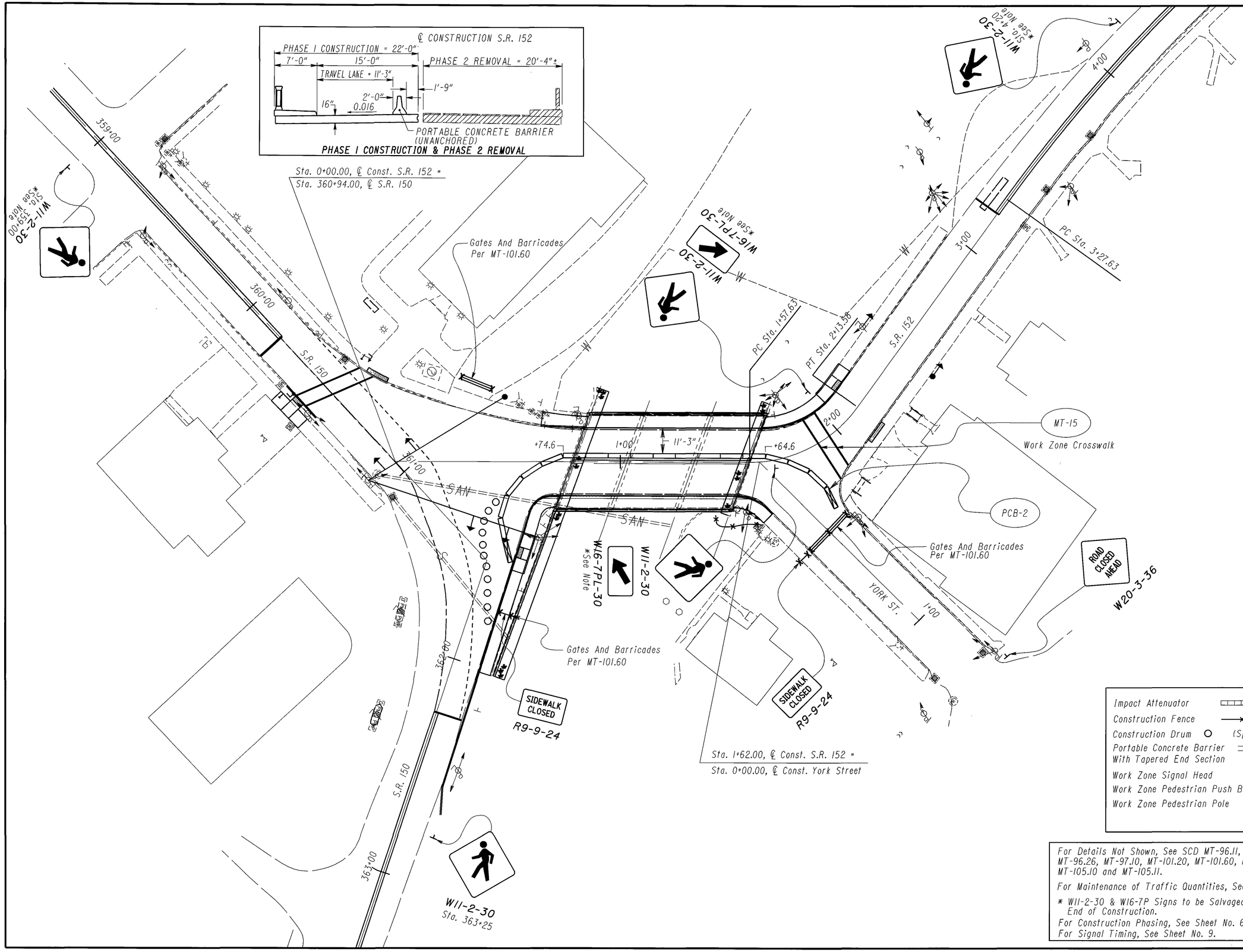
NOTE : SIDE is in relation to increasing station.

CALCULATED TKD
CHECKED JPB

MAINTENANCE OF TRAFFIC

JEF-152-0.01


℄ CONSTRUCTION S.R. 152
PHASE I REMOVAL = 21'-10"±
21'-1"±
16'-10"±
4'-6"±
TRAVEL LANE 13'-4"±
9"±
9"±
2'-0"
2'-0"
CUT LINE
(FULL DEPTH SAWCUT)
PORTABLE CONCRETE BARRIER
(2 ANCHORS PER SEGMENT)
PHASE I REMOVAL
Sta. 0+00.00, ℄ Const. S.R. 152 =
Sta. 360+94.00, ℄ S.R. 150
MT-1
Solid Double Yellow
N 9° 04' 29" E
359+00
360+00
W11-2-30
Sta. 359+00
*See Note
R10-4-9
PUSH BUTTON FOR WALK SIGNAL
W16-7PR-30
*See Note
W11-2-30
R9-10-24
SIDEWALK CLOSED
USE OTHER SIDE
W16-7PL-30
*See Note
Attach Signal Head
To Existing Pole
Gates And Barricades
Per MT-101.60
Gates And Barricades
Per MT-101.60
Work Zone Pedestrian
Head With Push Button
On Temporary Support.
Work Zone Signal Pole
With Controller Sta. 361+48.5
SIDEWALK CLOSED
R9-9-24
SIDEWALK CLOSED
R9-9-24
MT-2
Work Zone Stop Line
Sta. 360+19, ℄ S.R. 150
MT-3
Work Zone Pedestrian
Head With Push Button
Attach to Existing Pole
or on Temporary Support.
R10-4-9
PUSH BUTTON FOR WALK SIGNAL
MT-12
Work Zone Crosswalk
Attach Span Wire
To Existing Pole
MT-11
Work Zone Crosswalk
MT-4
MT-5
Solid Double Yellow
MT-6
Work Zone Stop Line
Sta. 362+25, ℄ S.R. 150
Attach Span Wire
To Existing Pole
W11-2-30
W16-7PL-30
*See Note
MT-13
Work Zone Crosswalk
W11-2-30
Sta. 363+25
363+00
362+00
361+00
0+00
1+00
2+00
3+00
4+00
S.R. 150
S.R. 152
YORK ST.
MT-8
Work Zone Stop Line
Sta. 3+20, ℄ Const. S.R. 152
R9-10-24
SIDEWALK CLOSED
USE OTHER SIDE
W11-2-30
*See Note
MT-7
MT-9
Solid Double Yellow
Loop Detector
(or Pole Mounted
Microwave Detector)
MT-10
Work Zone Signal Pole
Sta. 2+44.21
PCB-1
Temporary Poles with Signals
Sta. 1+62.00, ℄ Const. S.R. 152 =
Sta. 0+00.00, ℄ Const. York Street
Attach Microwave Detector to Existing Pole
MT-14
Work Zone Stop Line
Sta. 0+48.59, ℄ York St.
+64.6
+63
+64.6
+61.9
13'-4"
4'-6"±
5.4%
5.4%
2'-0"
4'-6"±
PORTION TO BE REMOVED
3", Item 614 - Asphalt Concrete For Maintaining Traffic
Sta. 0+63.00 to Sta. 1+61.89
98.89' x 2' x 0.25' ÷ 27 = 1.8 Cu. Yd.
Total Carried To General Summary USE 2 CU. YD.
SIDEWALK REMOVAL DETAIL FOR MAINTENANCE OF TRAFFIC
(RIGHTSIDE OF STRUCTURE)
Work Area
Impact Attenuator
Construction Fence
Construction Drum
(Spacing @ 5' c/c)
Portable Concrete Barrier
With Tapered End Section
Work Zone Signal Head
Work Zone Pedestrian Push Button
Work Zone Pedestrian Pole
For Details Not Shown, See SCD MT-96.11, MT-96.21, MT-96.25, MT-96.26, MT-97.10, MT-101.20, MT-101.60, MT-101.70, MT-105.10 and MT-105.11.
For Maintenance of Traffic Quantities, See Sheet No. 6.
* W11-2-30 & W16-7P Signs to be Salvaged for ODOT at End of Construction.
For Construction Phasing, See Sheet No. 6.
For Signal Timing, See Sheet No. 9.
HORIZONTAL SCALE IN FEET
0
20
40
CALCULATED TKD
CHECKED JPB
MAINTENANCE OF TRAFFIC
PHASE 1
JEF-152-0.01
7
31



For Details Not Shown, See SCD MT-96.11, MT-96.21, MT-96.25, MT-96.26, MT-97.10, MT-101.20, MT-101.60, MT-101.70, MT-105.10 and MT-105.11.

For Maintenance of Traffic Quantities, See Sheet No. 6.

* W11-2-30 & W16-7P Signs to be Salvaged for ODOT at End of Construction.

For Construction Phasing, See Sheet No. 6.

For Signal Timing, See Sheet No. 9.

HORIZONTAL SCALE IN FEET
0 20 40

CALCULATED TKD
CHECKED JPB

MAINTENANCE OF TRAFFIC PHASE 2

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8
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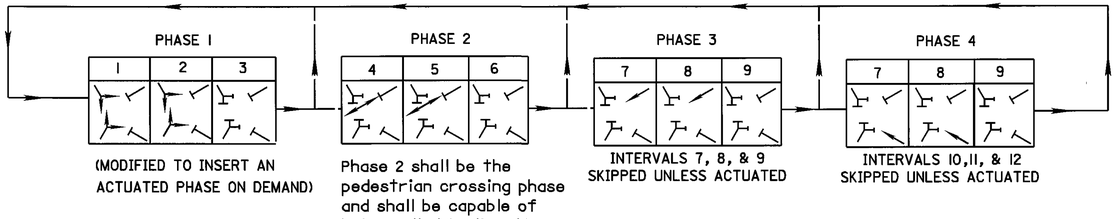
SIGNAL TIMING CHART (Assuming 6 Phase Actuated)						
INTERVAL	PHASE					
	1	2	3	4	5	6
MINIMUM GREEN	---	20	---	7	---	7
VEHICLE INTERVAL	---	---	---	3	---	3
MAXIMUM GREEN	---	---	---	20	---	20
CLEARANCE INTERVAL	10	---	20	---	15	---
WALK	---	---	9	---	---	---
FLASHING DONT WALK		---	8	---	---	---
DONT WALK	---	---	3	---	---	---
YELLOW	---	3	---	3	---	3
ALL RED	---	4	---	---	---	---
MEMORY	---	---	---	---	---	---
RECALL	---	---	---	---	---	---
CALL TO NON-ACTUATED	---	ON	---	---	---	---



(MODIFIED TO INSERT AN ACTUATED PHASE ON DEMAND)

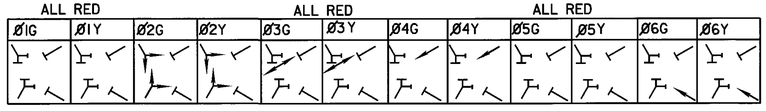
Phase 2 shall be the pedestrian crossing phase and shall be capable of being called in directly by pedestrian pushbutton. Phase 2 shall also serve as a clearance phase to follow Phase 1 when another vehiclar phase (Phase 3 and/or 4) is called in.

INTERVALS 7, 8, & 9 SKIPPED UNLESS ACTUATED

INTERVALS 10,11, & 12 SKIPPED UNLESS ACTUATED

USING A PRETIMED CONTROL

OR



Phase 2 green shall be on recall and does not require to be actuated.
Phases 4 and 6 green shall be actuated by detectors at approach to the work zone.
Phases 1, 3, and 5 are dummy phases to time All-Red intervals.
Phase 3 shall also serve as the pedestrian phase and shall be capable of actuation by pedestrian push-button.
Phase 2 shall have an All-Red clearance interval of its own. This is in addition to the Phase 3 clearance phase.
Phase 6 detection shall be removed or de-activated during construction Phase 2.
Timing initialization shall be on Phase One.

USING A 6 PHASE ACTUATED CONTROL

SIGNAL PHASING

CALCULATED TXB CHECKED JPB

MAINTENANCE OF TRAFFIC SIGNAL TIMING

JEF-152-0.01

SHEET NUMBER											ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	AS PER PLAN SHEET NO.
3	4					12										
															ROADWAY	
LUMP											201	11000	LUMP		CLEARING AND GRUBBING	
						1008					202	30000	1008	SQ FT	WALK REMOVED	
						199					202	32000	199	FT	CURB REMOVED	
						108					203	10000	108	CU YD	EXCAVATION	
						3					209	60200	3	STATION	LINEAR GRADING	
	150										607	98000	150	FT	FENCE, MISC.: ORANGE PLASTIC CONSTRUCTION FENCE	
						856					608	10000	856	SQ FT	4" CONCRETE WALK	
						2					608	49001	2	EACH	CURB RAMP, AS PER PLAN	
						116					608	52001	116	SQ FT	CURB RAMP, AS PER PLAN	
						40					608	98000	40	SQ FT	WALKWAY, MISC.: TRUNCATED DOMES	
															EROSION CONTROL	
						85					601	34100	85	CU YD	ROCK CHANNEL PROTECTION, TYPE B WITHOUT FILTER	
						45					659	00300	45	CU YD	TOPSOIL	
						400					659	10000	400	SQ YD	SEEDING AND MULCHING	
						0.05					659	20000	0.05	TON	COMMERCIAL FERTILIZER	
						0.08					659	31000	0.08	ACRE	LIME	
						3					659	35000	3	M GAL	WATER	
											832	30000	1000	EACH	EROSION CONTROL	
															PAVEMENT	
324											252	01500	324	FT	FULL DEPTH PAVEMENT SAWING	
						345					254	01000	345	SQ YD	PAVEMENT PLANING, ASPHALT CONCRETE	
						20					301	46000	20	CU YD	ASPHALT CONCRETE BASE, PG64-22	
						30					407	10000	30	GALLON	TACK COAT	
						9					408	10000	9	GALLON	PRIME COAT	
						25					448	47021	25	CU YD	ASPHALT CONCRETE SURFACE COURSE, TYPE I, PG64-22, AS PER PLAN	3
						230					609	26000	230	FT	CURB, TYPE 6	
															TRAFFIC CONTROL	
						0.03					642	00300	0.03	MILE	CENTER LINE, TYPE I	
															STRUCTURES	
															FOR BRIDGE NO. JEF-152-0001 QUANTITIES, SEE SHEET NO. 20.	

CALCULATED CCW
CHECKED TKB

GENERAL SUMMARY

JEF-152-0.01

SHEET NUMBER											ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	AS PER PLAN SHEET NO.
	4		6	7												
															MAINTENANCE OF TRAFFIC	
			1								614	12338	1	EACH	WORK ZONE IMPACT ATTENUATOR (BIDIRECTIONAL)	
			431								614	12800	431	EACH	WORK ZONE RAISED PAVEMENT MARKER	
				2							614	13000	2	CU YD	ASPHALT CONCRETE FOR MAINTAINING TRAFFIC	
			11								614	13302	11	EACH	BARRIER REFLECTOR, TYPE B2	
			11								614	13360	11	EACH	OBJECT MARKER, TWO WAY	
			0.09								614	21100	0.09	MILE	WORK ZONE CENTER LINE, CLASS I, 642 PAINT	
			0.01								614	22200	0.01	MILE	WORK ZONE EDGE LINE, CLASS I, 740.06, TYPE I	
			390								614	24200	390	FT	WORK ZONE DOTTED LINE, CLASS I, 642 PAINT	
			51								614	26400	51	FT	WORK ZONE STOP LINE, CLASS I, 740.06, TYPE I	
			301								614	27400	301	FT	WORK ZONE CROSSWALK LINE, CLASS I, 740.06, TYPE I	
			270								622	40020	270	FT	PORTABLE CONCRETE BARRIER, 32"	
			180								622	40040	180	FT	PORTABLE CONCRETE BARRIER, 32", BRIDGE MOUNTED	
	LUMP										614	11000	LUMP		MAINTAINING TRAFFIC	
											619	16000	4	MONTH	FIELD OFFICE, TYPE A	
											623	10000	LUMP		CONSTRUCTION LAYOUT STAKES	
											624	10000	LUMP		MOBILIZATION	

CALCULATED CCW
CHECKED TKB

GENERAL SUMMARY

JEF-152-0.01

11
31

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CALCULATED TKB CHECKED CCW

ESTIMATED QUANTITIES

ITEM 254 - PAVEMENT PLANING, ASPHALT CONCRETE (VARIABLE DEPTH)

STA. 0+50.00 TO STA. 0+70.30
PLANIMETERED AREA - 728.06 SQ. FT. ÷ 9 = 80.90 SQ. YD.

STA. 1+57.53 TO STA. 2+13.58 (YORK ST. INCLUDED)
PLANIMETERED AREA - 2368.65 SQ. FT. ÷ 9 = 263.18 SQ. YD.
TOTAL = 344.08 SQ. YD.
USE 345 SQ. YD.

ITEM 448 - 2¼" ASPHALT CONCRETE SURFACE COURSE, TYPE I, PG64-22, AS PER PLAN (PLACE ASPHALT IN 2 LIFTS)

STA. 0+50.00 TO STA. 0+78.47
PLANIMETERED AREA - 978.04 SQ. FT. x (2¼" ÷ 12) ÷ 27 = 6.79 CU. YD.

STA. 1+57.53 TO STA. 2+13.58 (YORK ST. INCLUDED)
PLANIMETERED AREA - 2368.65 SQ. FT. x (2¼" ÷ 12) ÷ 27 = 16.45 CU. YD.

(S.R. 150) STA. 360+36.65 RT. TO STA. 360+53.62 RT. (ALONG CURB)
17' x 1' x (2¼" ÷ 12) ÷ 27 = 0.12 CU. YD.

(S.R. 152) STA. 0+56.79 RT. TO (S.R. 150) STA. 362+56.01 LT. (ALONG CURB)
123' x 1' x (2¼" ÷ 12) ÷ 27 = 0.85 CU. YD.
TOTAL = 24.21 CU. YD.
USE 25 CU. YD.

ITEM 407 - TACK COAT APPLIED AT 0.075 GAL/S.Y.

STA. 0+50.00 TO STA. 0+78.47
PLANIMETERED AREA - 978.04 SQ. FT. ÷ 9 x 0.075 GAL./SQ. YD. = 8.15 GAL.

STA. 1+57.53 TO STA. 2+13.58 (YORK ST. INCLUDED)
PLANIMETERED AREA - 2368.65 SQ. FT. ÷ 9 x 0.075 GAL./SQ. YD. = 19.73 GAL.

(S.R. 150) STA. 360+36.65 RT. TO STA. 360+53.62 RT. (ALONG CURB)
17' x 1' ÷ 9 x 0.075 GAL./SQ. YD. = 0.14 GAL.

(S.R. 152) STA. 0+56.79 RT. TO (S.R. 150) STA. 362+56.01 LT. (ALONG CURB)
123' x 1' ÷ 9 x 0.075 GAL./SQ. YD. = 1.03 GAL.
TOTAL = 29.05
USE 30 GAL.

ITEM 301 - ASPHALT CONCRETE BASE, PG64-22

QUANTITY FOR BACKFILL AGAINST PROPOSED CURB:
(S.R. 152) STA. 0+64.64 LT. TO STA. 0+83.93 LT.
19.29' x 1' x 1' ÷ 27 = 0.71 CU. YD.

(S.R. 152) STA. 1+64.78 LT. TO STA. 2+24.58 LT.
59.80' x 1' x 1' ÷ 27 = 2.21 CU. YD.

(S.R. 152) STA. 1+52.12 RT. TO STA. 0+06.12 RT. (YORK ST.)
17.92' x 1' x 1' ÷ 27 = 0.66 CU. YD.

(S.R. 150) STA. 360+36.65 RT. TO STA. 360+53.62 RT.
17' x 1' x 1' ÷ 27 = 0.63 CU. YD.

(S.R. 152) STA. 0+73.01 RT. TO (S.R. 150) STA. 362+56.01 LT.
145.54' x 1' x 1' ÷ 27 = 5.39 CU. YD.

QUANTITY FOR BACKFILL AT THE REAR AND FORWARD END OF THE STRUCTURE:
STA. 0+78.47
STA. 1+57.53
31.93' x 3' (WIDTH) x 1.33' (DEPTH) ÷ 27 = 4.72 CU. YD. x 2 = 9.44 CU. YD.
TOTAL = 19.04 CU. YD.
USE 20 CU. YD.

ITEM 408 - PRIME COAT APPLIED AT 0.4 GAL/S.Y.

QUANTITY FOR THE REAR AND FORWARD END OF THE STRUCTURE:
STA. 0+78.47 TO STA. 0+75.47
STA. 1+57.53 TO STA. 1+60.53
31.93' x 3' ÷ 9 x 0.4 GAL./SQ. YD. x 2 = 8.51 GAL.
TOTAL = 8.51 GAL.
USE 9 GAL.

ITEM 209 - LINEAR GRADING

(S.R.152) STA. 0+64.6 LT. TO STA. 0+83.90 LT.
19.3' ÷ 100 = 0.2 STATIONS

(S.R. 152) STA. 1+68.79 LT. TO STA. 2+24.58 LT.
55.79' ÷ 100 = 0.6 STATIONS

(S.R. 152) STA. 0+73.01 RT. TO (S.R. 150) STA. 362+68.00 LT.
157.9' ÷ 100 = 1.6 STATIONS

(S.R. 152) STA. 1+50.19 RT. TO STA. 1+61.84 RT.
15.5' ÷ 100 = 0.2 STATIONS

(S.R. 150) STA. 360+36.35 RT. TO STA. 360+53.62 RT.
17' ÷ 100 = 0.2 STATIONS

TOTAL = 2.8 STATIONS
USE 3 STATIONS

ITEM 659 - SEEDING AND MULCHING

LENGTH FOR SEEDING AND MULCHING MATCH THAT USED FOR ITEM 209 - LINEAR GRADING, WIDTH IS AN AVERAGE

300' x 6' AVG. ÷ 9 = 200 SQ. YD.
+200 SQ. YD. (FOR AROUND BRIDGE)
Total = Use 400 SQ. YD.

ITEM 659 - COMMERCIAL FERTILIZER

400 SQ. YD. x 9 x (20 LBS. + 10 LBS.)/1000 SQ. FT. ÷ 2000 = 0.05 TON.
TOTAL = USE 0.05 TON

ITEM 659 - LIME

400 SQ. YD. x 9 ÷ 43560 SQ. FT./ACRE = 0.08 ACRE
TOTAL = USE 0.08 ACRE

ITEM 659 - WATER

400 SQ. YD. x 9 x 300 GAL./1000 SQ. FT./1000 x 2 = 2.2 M GAL.
TOTAL = USE 3 M GAL.

ITEM 659 - TOP SOIL

400 SQ. YD. ÷ 1000 SQ. YD. x 111 CU. YD. = 44.40 CU. YD.
TOTAL = USE 45 CU. YD.

ITEM 642 - CENTER LINE, TYPE I (Solid Double Yellow)

(S.R. 152) STA. 0+50.00 TO STA. 2+13.58

163.6' ÷ 5280 = 0.03 MILE
TOTAL = USE 0.03 MILE

ITEM 203 - EXCAVATION

QUANTITY FOR THE EXISTING SANDBAR TO BE REMOVED
PLANIMETERED AREA - 969 SQ. FT. x 3' (DEPTH) ÷ 27 = 107.7 CU. YD.
USE 108 CU. YD.

ITEM 601 - ROCK CHANNEL PROTECTION, TYPE B, WITHOUT FILTER

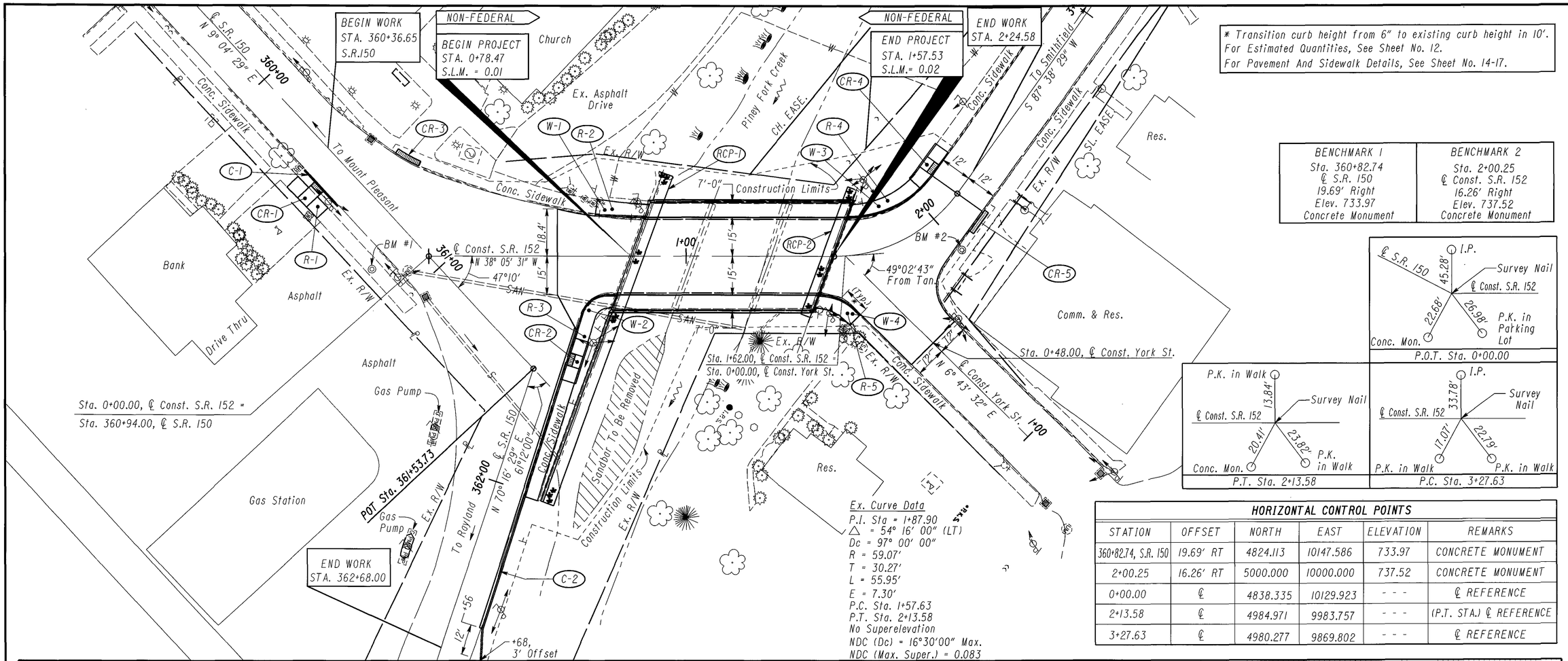
(RCP-1) 138.0 ' x 4' x 3' ÷ 27 = 61.33 CU. YD. (REAR END OF STRUCTURE)

(RCP-2) 53.0' x 4' x 3' ÷ 27 = 23.56 CU. YD. (FORWARD END OF STRUCTURE)
TOTAL = 84.89 CU. YD.
USE 85 CU. YD.

REFERENCE NO.	PLAN SHEET NO.	STATION FROM	STATION TO	SIDE	202 WALK REMOVED	202 CURB REMOVED	608 4" CONCRETE WALK	608 CURB RAMP, AS PER PLAN EACH	608 CURB RAMP, AS PER PLAN DESIGN	608 CURB RAMP, AS PER PLAN SQ. FT.	608 CURB RAMP, AS PER PLAN DESIGN	608 WALKWAY MISC., TRUNCATED DOMES SQ. FT.	608 WALKWAY MISC., TRUNCATED DOMES DESIGN	609 CURB, TYPE 6	REMARKS
					SQ. FT	FT	SQ. FT.	EACH	DESIGN	SQ. FT.	DESIGN	SQ. FT.	DESIGN	FT.	
R-1	13	360+36.65, S.R. 150	360+53.62, S.R. 150	RT	108	19.0									
R-2	13	0+64.64, S.R. 152	0+83.93, S.R.152	LT	106	19.3									
R-3	13	0+73.01, S.R. 152	362+02.20, S.R. 150	RT	450	91.5									
R-4	13	1+64.78, S.R. 152	2+24.58, S.R. 152	LT	246	50.3									
R-5	13	1+52.12, S.R. 152	0+20.22, YORK ST.	RT	98	19									
CR-1	13	360+36.65, S.R. 150	360+53.62, S.R. 150	RT						116	F				SEE SHT. NO. 15-17
CR-2	13	361+54.24, S.R. 150	0+56.49, S.R. 152	RT S.R.152				1	B						SEE SHT. NO. 15-17
CR-3	13	360+55.72, S.R. 150	360+65.55, S.R. 150	LT								20	8		SEE SHT. NO. 15-17
CR-4	13	2+04.94, S.R. 152	2+24.58, S.R. 152	LT				1	B						SEE SHT. NO. 15-17
CR-5	13	2+06.14, S.R. 152	2+14.52, S.R. 152	RT								20	8		SEE SHT. NO. 15-17
W-1	13	0+64.64, S.R. 152	0+83.93, S.R.152	LT			108							19	
W-2	13	0+73.01, S.R. 152	362+02.20, S.R. 150	LT			432							74	
W-3	13	1+65.78, S.R. 152	2+04.94, S.R. 152	LT			230							33	
W-4	13	1+52.12, S.R. 152	0+20.22, YORK ST.	RT			86							18	
C-1	13	360+36.65, S.R. 150	360+55.62, S.R. 150	RT										19	
C-2	13	362+02.20, S.R. 150	362+68.00, S.R. 150	LT										67	
TOTALS (CARRIED TO GENERAL SUMMARY)					1008	199.1	856	2		116		40		230	

Totals Carried to General Summary

JEF-152-0.01



* Transition curb height from 6" to existing curb height in 10'.
For Estimated Quantities, See Sheet No. 12.
For Pavement And Sidewalk Details, See Sheet No. 14-17.

BENCHMARK 1	BENCHMARK 2
Sta. 360+82.74 ℄ S.R. 150 19.69' Right Elev. 733.97 Concrete Monument	Sta. 2+00.25 ℄ Const. S.R. 152 16.26' Right Elev. 737.52 Concrete Monument

P.O.T. Sta. 0+00.00

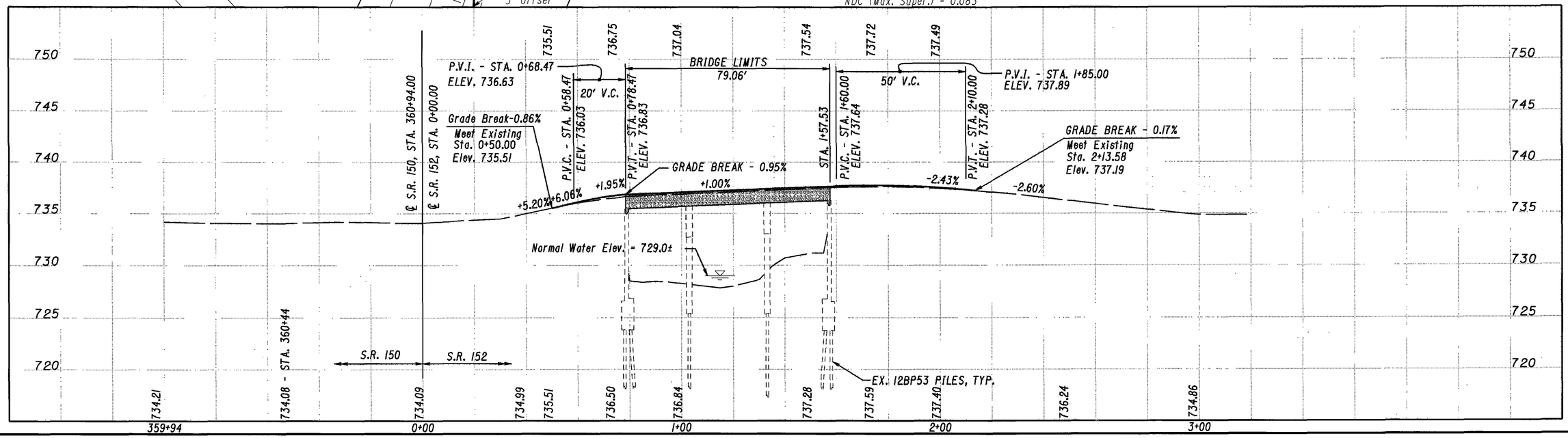
P.T. Sta. 2+13.58

P.C. Sta. 3+27.63

Ex. Curve Data
P.I. Sta = 1+87.90
△ = 54° 16' 00" (LT)
Dc = 97° 00' 00"
R = 59.07'
T = 30.27'
L = 55.95'
E = 7.30'
P.C. Sta. 1+57.63
P.T. Sta. 2+13.58
No Superelevation
NDC (Dc) = 16°30'00" Max.
NDC (Max. Super.) = 0.083

HORIZONTAL CONTROL POINTS

STATION	OFFSET	NORTH	EAST	ELEVATION	REMARKS
360+82.74, S.R. 150	19.69' RT	4824.113	10147.586	733.97	CONCRETE MONUMENT
2+00.25	16.26' RT	5000.000	10000.000	737.52	CONCRETE MONUMENT
0+00.00	℄	4838.335	10129.923	- - -	℄ REFERENCE
2+13.58	℄	4984.971	9983.757	- - -	(P.T. STA.) ℄ REFERENCE
3+27.63	℄	4980.277	9869.802	- - -	℄ REFERENCE



PLAN AND PROFILE
STA. 359+94, S.R. 152 TO STA. 3+25, S.R. 152

HORIZONTAL SCALE IN FEET
0 20 40

CALCULATED TKB
CHECKED JPB

JEF-152-0.01

13
31

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Ex. Curve Data

P.I. Sta = 1+87.90
△ = 54° 16' 00" (LT)
Dc = 97° 00' 00"
R = 59.07'
T = 30.27'
L = 55.95'
E = 7.30'
P.C. Sta. 1+57.63
P.T. Sta. 2+13.58
No Superelevation

Sta. 0+00.00, ℄ Const. S.R. 152
Sta. 360+94.00, ℄ S.R. 150

Sta. 1+62.00, ℄ Const. S.R. 152
Sta. 0+00.00, ℄ York St.

Bridge Limits = 79.06'

℄ Const. S.R. 152 N 38° 05' 31" W

℄ S.R. 150 N 9° 04' 29" E

York Street N 6° 43' 32" E

℄ Const. S.R. 152 S 81° 38' 29" W

℄ S.R. 150 N 70° 16' 29" E

POT Sta. 361+53.73

47°10'

61°12'

49°02'43"

360+00

361+00

362+00

2+00

1+00

+36.65
+53.62
+55.72
+64.64
+78.47
+83.93
+73.01
+55.2
+02.20
+64.78
+57.53
+52.12
+20.22 (York St.)
+48
+06.14
+13.58
+24.58

PC Sta. 1+57.63
PT Sta. 2+13.58

2'-0"
10'-0"
6'-0"
5'-0"
5'-7"
12'
18'-5"
15'-0"
15'-7½"
7'
15'
5'-5"

CR-1
CR-2
CR-3
CR-4
CR-5
C-1
C-2
W-1
W-2
W-3
W-4

Ex. Conc. Walk
Conc. Walk

For Quantities, See Sheet No. 12.

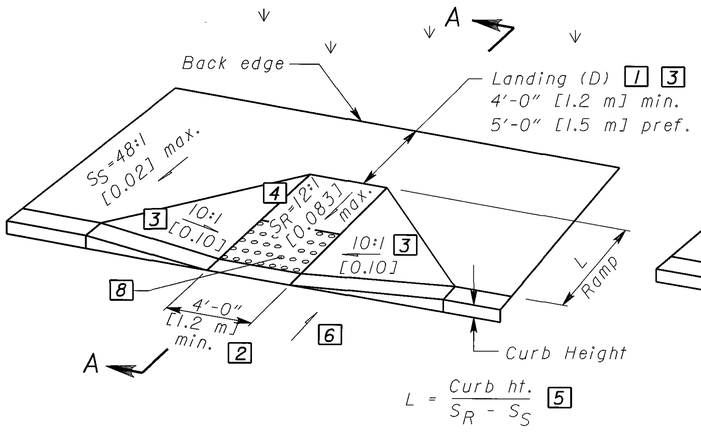
HORIZONTAL SCALE IN FEET
0 10 20

CALCULATED TKB
CHECKED JPB

PAVEMENT DETAILS

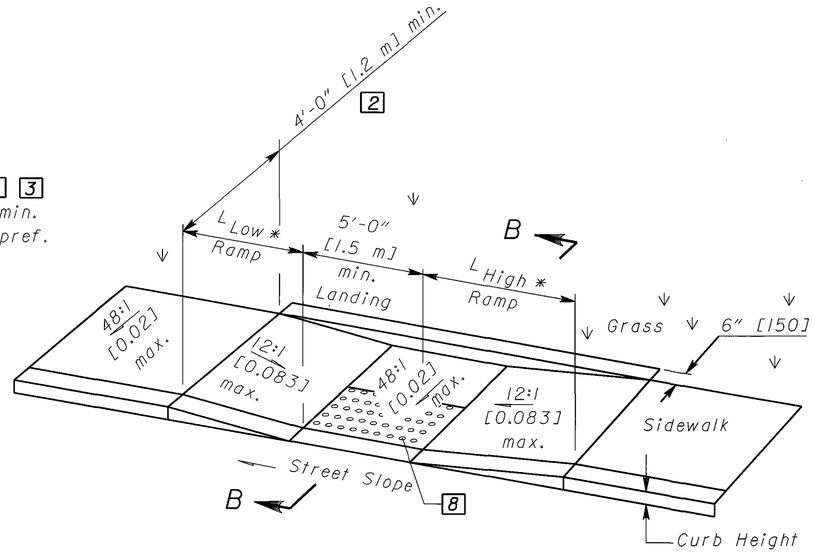
JEF-152-0.01

14
31



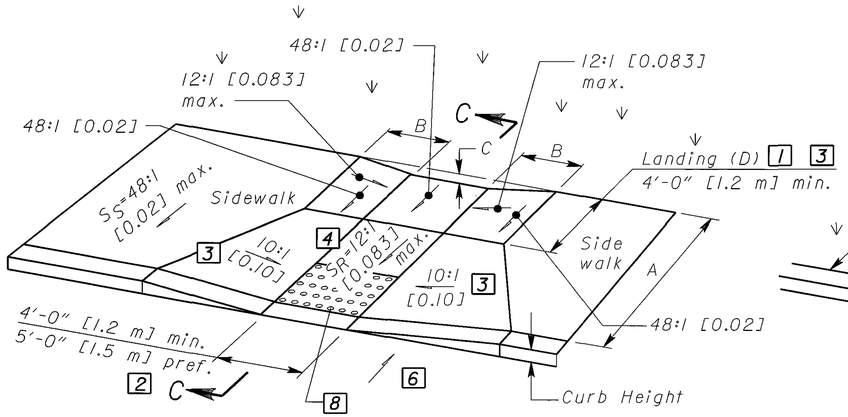
See Sht. 3/3 for SECTION A-A

PERPENDICULAR CURB RAMP DETAIL



See Sht. 3/3 for SECTION B-B

PARALLEL CURB RAMP DETAIL (DOUBLE)

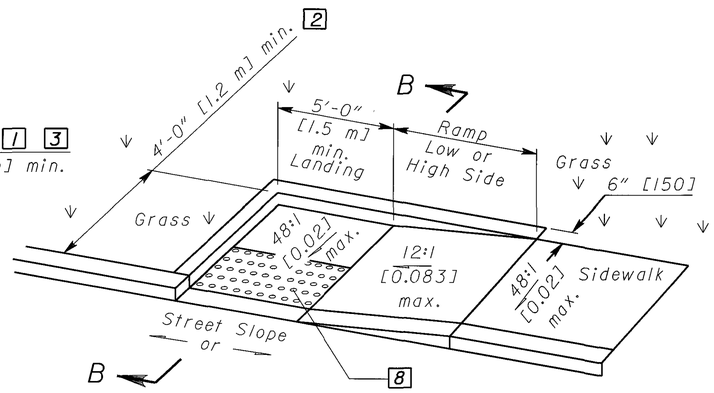


See Sht. 3/3 for SECTION C-C

COMBINED CURB RAMP DETAIL

$B = C / 0.083$

$C = [\text{Curb ht.} + A(S_S)] - [(A-D)S_R + D(0.02)]$



See Sht. 3/3 for SECTION B-B

PARALLEL CURB RAMP DETAIL (SINGLE)

Street Slope	Ramp Length @ 1"/ft [0.083]	
	$L_{LOW\ SIDE}$ *	$L_{HIGH\ SIDE}$ *
0.01	5'-5" [1.6 m]	6'-10" [2.1 m]
0.02	4'-10" [1.5 m]	7'-11" [2.4 m]
0.03	4'-5" [1.3 m]	9'-5" [2.9 m]
0.04	4'-1" [1.2 m]	11'-8" [3.6 m]
0.05	3'-9" [1.1 m]	15'-2" [4.6 m]

* Measured along the back of a 6" [150] high curb.

$$L_{HIGH} = \frac{\text{Curb ht.}}{0.083 - \text{Street Slope}}$$ 7

$$L_{LOW} = \frac{\text{Curb ht.}}{0.083 + \text{Street Slope}}$$ 7

LEGEND

1 May be reduced to 3'-0" [915] in existing sidewalks if the landing is unconstrained along the back edge.

2 May be reduced to 3'-4" [1.02 m] in existing sidewalks to better fit the walk configuration or where site conditions are restricted by narrow walks, pole foundations, drainage inlets, etc. The width may be tapered.

3 Where landing width (D) has been reduced to 3'-0" [915] the flared sides shall have a maximum slope of 12:1 [0.083].

Flared sides are not required where the edges of a curb ramp are protected by landscaping or other barriers to travel by wheel chair users or pedestrians across the edge of the curb ramp. However, if the flared sides are used in these areas, they may be of any slope.

4 The slope of the ramp toward the curb is preferred to be 12:1 [0.083] or flatter related to the horizontal, but the maximum slope shall be 12:1 [0.083] relative to the existing or proposed walk slope.

In existing sidewalks, where the maximum ramp slope (S_R) is not feasible, it may be reduced as follows:

A) 10:1 [0.10] for a max. rise of 6" [150],
B) 8:1 [0.125] for a max. rise of 3" [75],
C) 6:1 [0.167] over a max. run of 2'-0" [610] for historic areas where a flatter slope is not feasible.

5 The minimum length of a perpendicular ramp is 6' [2.0 m] from the back of a 6" [150] curb and may be increased where feasible to obtain a flatter ramp slope or to better blend with the walk configuration.

6 Gutter counter slopes at the foot of perpendicular curb ramps should not exceed 20:1 [0.05] over a distance of 2'-0" [610] from the curb.

7 Dimensions derived by equation are nominal. Construct ramps to meet required slopes and existing conditions.

8 Detectable Warnings (truncated domes) are to be installed in the location shown. Dimensions of the domes are 24" [610] from the back of the curb by the width of the ramp. See NOTES on sheet 3/3.

7-12-02

CURB RAMPS WITH TRUNCATED DOMES

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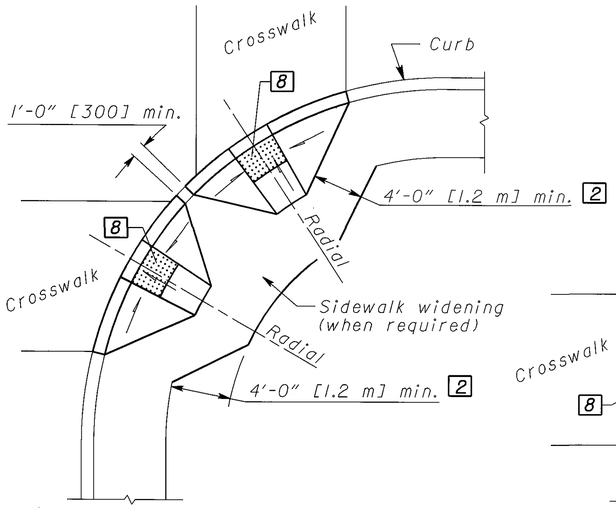
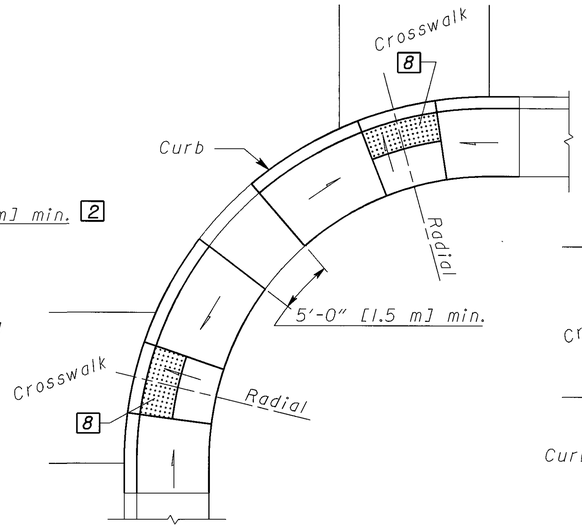
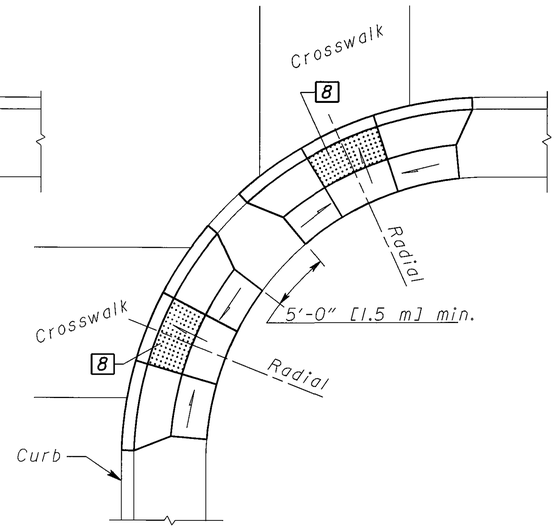


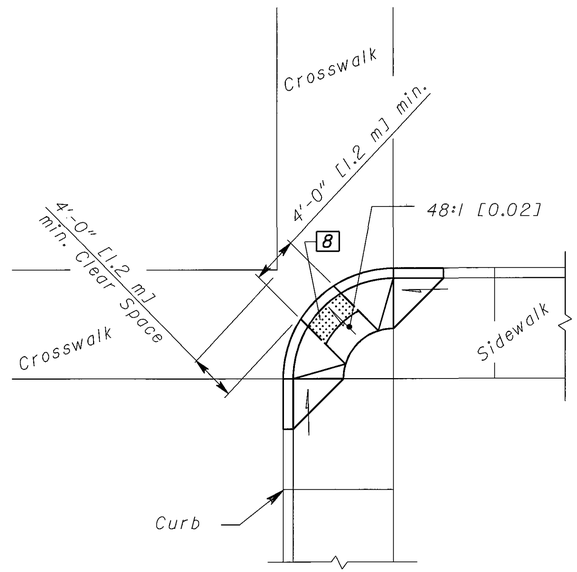
DESIGN A
PERPENDICULAR RAMP



DESIGN B
PARALLEL RAMP



DESIGN C
COMBINATION RAMP



DESIGN D
DIAGONAL RAMP

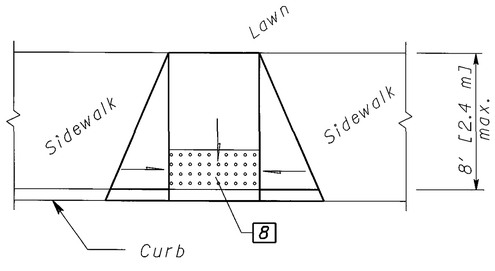
Use in existing walks only and when site constraints prohibit other designs. The diagonal ramp may be perpendcular, parallel or combination.

Avoid using where curb radii are less than 20'-0" [6.0 m].

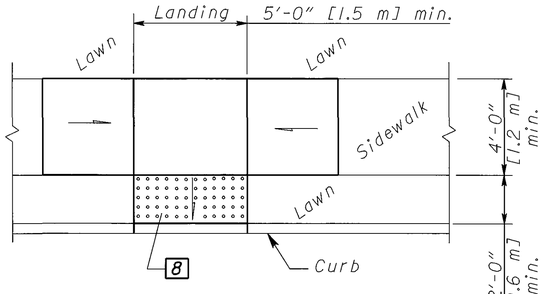
CORNER CURB RAMP DESIGNS

(See Curb Ramp Details on Sht. 1/3 for additional requirements.)

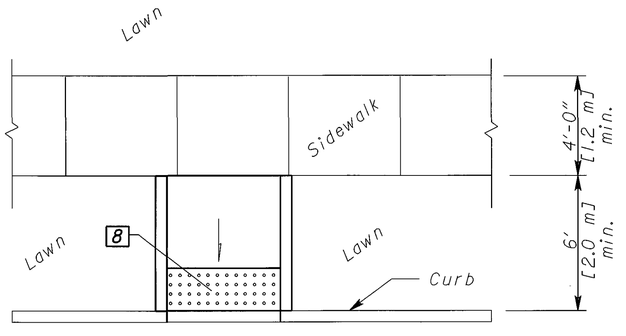
For Legend, See Sheet 1/3.



DESIGN E
PERPENDICULAR RAMP



DESIGN F
PARALLEL RAMP



DESIGN G
PERPENDICULAR RAMPS
w/o FLARES

MID BLOCK CURB RAMP DESIGNS

(See Curb Ramp Details on Sht. 1/3 for additional requirements.)

7-12-02

CURB RAMPS WITH TRUNCATED DOMES

JEF-152-0.01

NOTES

SURFACE TEXTURE: Texture of concrete surfaces shall be obtained by coarse brooming transverse to the ramp slopes and shall be rougher than adjacent walk.

TRUNCATED DOMES: Install detectable warnings (truncated domes) for a distance of 24" [610] from the back of the curb for the entire width of the ramp opening as shown on details on Sheet 1/3.

Pavers will meet ASTM C 902 Class SX, Type I, or C 936, or C 1272 Type R.

Acceptable manufacturers and products are:

1) Whitacre-Greer Fireproofing Company,
   1400 S. Mahoning Ave, Alliance, OH, 44601, (800) WG PAVER
   ADA Paver, 4"x8"x2-1/4", Clear Red (Rustic) #30.

2) Hanover Architectural Products,
   240 Bender Rd., Hanover, PA. 17331, (717) 637-0500
   Detectable Warning Paver, 12"x12"x2", or 24"x24"x2",
   Red or Quarry Red.

3) Endicott Clay Products,
   PO Box 17, Fairbury, NE, 68352, (402) 729-5804
   Handicap Detectable Warning Paver,
   4"x8"x2-1/4", Red Blend.

Pavers will laid on top of a 4" [100] unreinforced concrete base. Setting bed and joints to be mortared in accordance with manufacturer's instruction, or with a maximum 1/2" [13] thick bed of latex modified cement mortar. Mortar joints to a width not greater than 5/32" [4] and not less than 1/16" [1.5]. Pavers shall not be directly touching each other unless they have spacing bars.

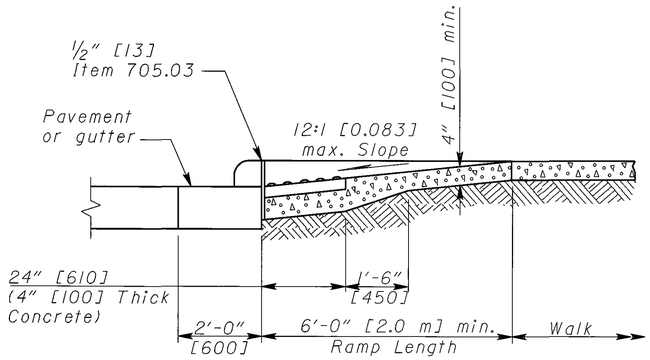
Mortared joints are to be flush with top surface and struck so as to give a smooth surface. Pavers shall be laid such that joints are level with adjoining joints so as to provide a smooth transition from brick to brick and brick to concrete surface.

The surface of any two adjacent units should not differ by more than 1/8" [3] in height. Bricks shall be placed in a running bond pattern. Face of all brick shall be clean of cement and protected so as to avoid chipping during constructionn.

EXPANSION JOINTS: shall be provided in the curb ramp as extensions of walk joints and consistent with Item 608.03 requirements for a new concrete walk. A 1/2" [13] Item 705.03 expansion joint filler shall be provided around the edge of ramps built in existing concrete walk. Lines shown on this drawing indicate the ramp edge and slope changes and are not necessarily joint lines.

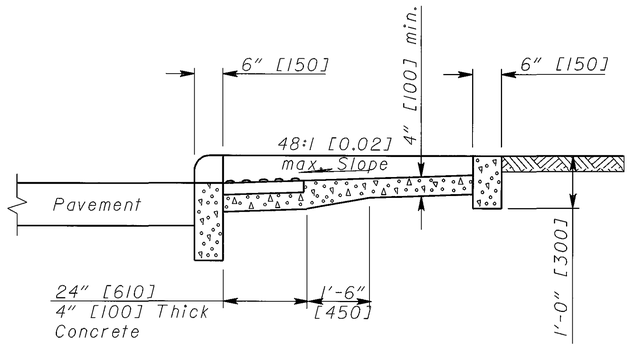
PAYMENT: Walk and curb, Items 608 and 609, shall be measured through the curb ramp area paid for under their respective Items. **Item 608 - Curb Ramp, As Per Plan, Each** constructed in new curb and walk shall include the cost of any additional materials and installation (including truncated domes), grading, forming and finishing.

Item 608 - Curb Ramp. As Per Plan, Square Foot, constructed in existing curb and walk shall include the cost of furnishing and installing all materials (including truncated domes), grading, forming, and finishing of the curb and walk of the curb ramp. Removal of existing curb and walk shall be paid for under Item 202.



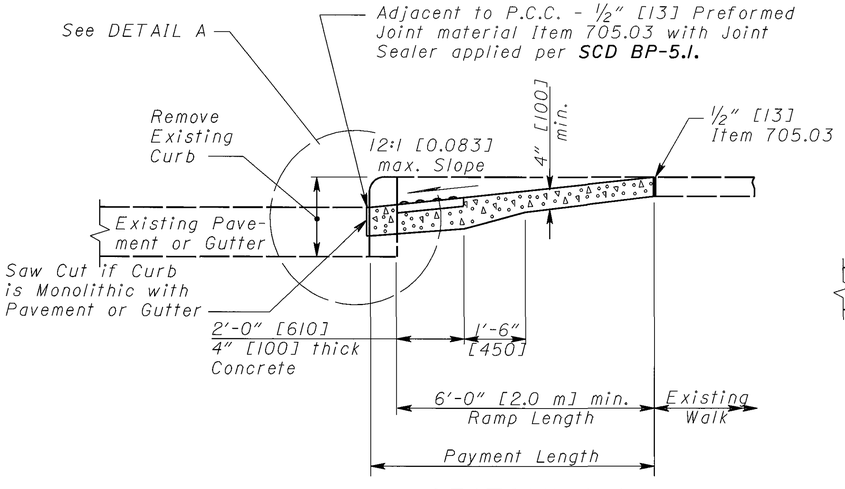
SECTION A-A
NORMAL DETAIL

See Sheet 1 of 3.
(Gutter shown)



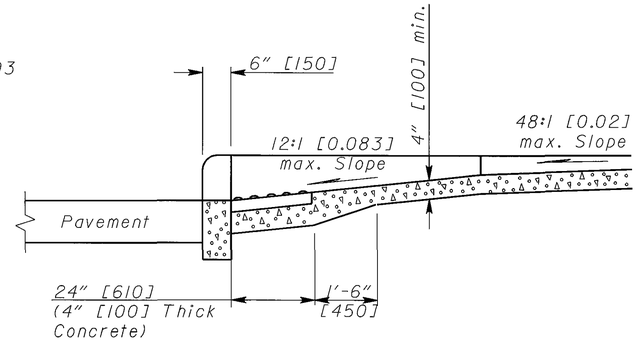
SECTION B-B

See Sheet 1 of 3.



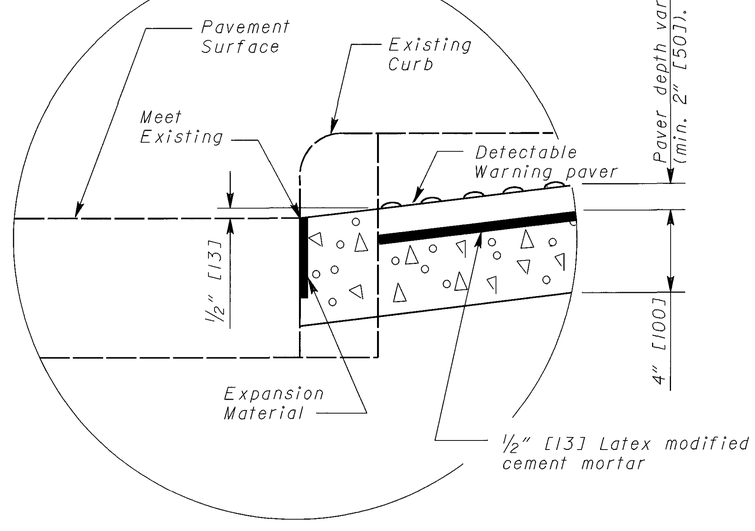
SECTION A-A
EXISTING WALK DETAIL

See Sheet 1 of 3.



SECTION C-C

See Sheet 1 of 3.



DETAIL A

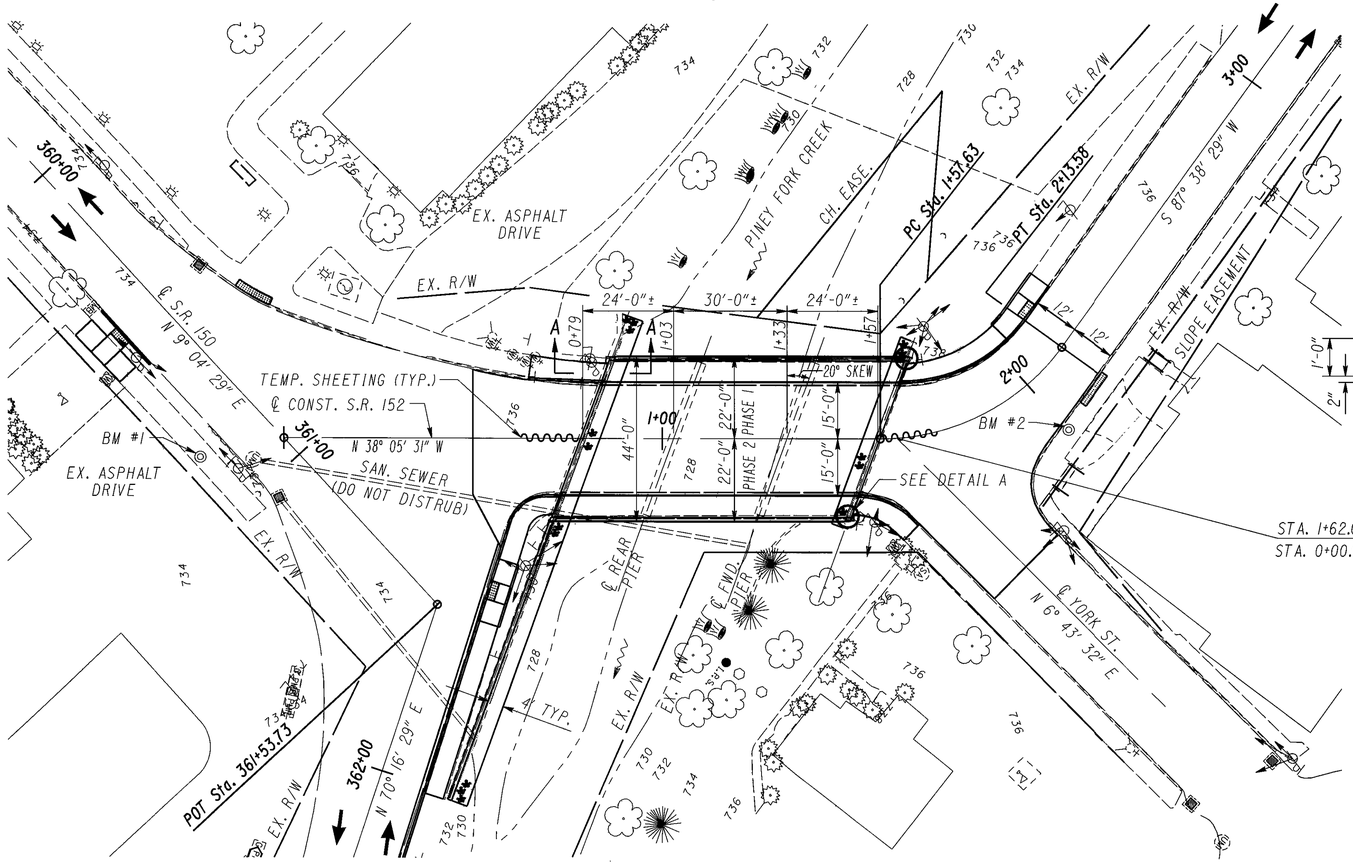
7-12-02

CURB RAMPS WITH TRUNCATED DOMES

JEF-152-0.01

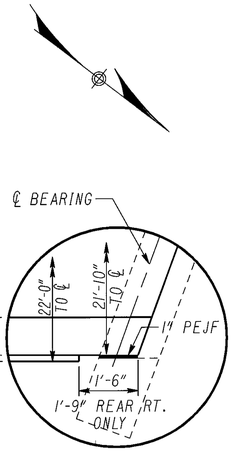
3 / 3

17
31



PLAN

PROFILE ALONG ℄ CONSTRUCTION S.R. 152



DETAIL A

STA. 1+62.00, ℄ CONST. S.R. 152 = STA. 0+00.00, ℄ CONST. YORK ST.

NOTES:

1.) EXISTING ABUTMENT INFORMATION BELOW GRADE WAS OBTAINED FROM EXISTING PLANS AND NOT FIELD VERIFIED.

PROPOSED WORK:

THE PROPOSED WORK INCLUDES THE FOLLOWING:

1.) INSTALL PORTABLE CONCRETE BARRIER AND REMOVE THE EXISTING CONCRETE DECK AS SHOWN IN PHASE 1.

2.) CONSTRUCT PHASE 1 PORTION OF PROPOSED STRUCTURE.

3.) INSTALL PORTABLE CONCRETE BARRIER ON PHASE 1 CONSTRUCTION (UNANCHORED) AND MAINTAIN TRAFFIC FOR PHASE 2 CONSTRUCTION.

4.) REMOVE REMAINDER OF EXISTING DECK.

5.) CONSTRUCT REMAINING PORTION OF PROPOSED STRUCTURE.

6.) REMOVE PORTABLE CONCRETE BARRIER.

7.) REMOVE AND RECONSTRUCT RAILING ON RETAINING WALL.

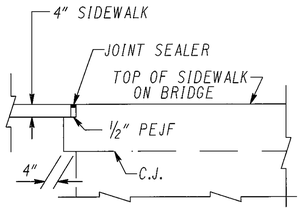
TRAFFIC DATA
CURRENT ADT (2005) - 1300 DESIGN YEAR ADT (2025) - 1500

EX. CURVE DATA - S.R. 152

P.I. STA. = 1+87.90
△ = 54° 16' 00" (LT)
Dc = 97° 00' 00"
R = 59.07'
T = 30.27'
L = 55.95'
E = 7.30'
NO SUPERELEVATION
NDC (Dc) = 16°30'00" MAX.
NDC (MAX. SUPER.) = 0.083

BENCH MARK #1	BENCH MARK #2
STA. 360+82.74 ℄ S.R. 150, 19.69' RIGHT ELEV. 733.97 CONCRETE MONUMENT	STA. 2+00.25 ℄ S.R. 152, 16.26' RIGHT ELEV. 737.52 CONCRETE MONUMENT

EXISTING DRAINAGE DATA
DRAINAGE AREA = 22 SQ. MI.



SECTION A-A
(TYPICAL, AT BRIDGE ENDS)

EXISTING STRUCTURE

TYPE : 3 SPAN CONTINUOUS REINFORCED CONCRETE SLAB DECK ON REINFORCED CONCRETE SUBSTRUCTURE
SPAN LENGTH : 24' - 30' - 24' c/c BEARINGS
ROADWAY WIDTH : 28' F/F CURB
LOADING : HS-15
SKEW : 20° 00' 00" LT. FWD. ALIGNMENT : TANGENT
WEARING SURFACE : ASPHALT CONCRETE
STRUCTURAL FILE NO. : 4102673 APPROACH SLAB : NONE
DATE BUILT : 1950

PROPOSED STRUCTURE

PROPOSED WORK : NEW CONTINUOUS REINFORCED CONCRETE SLAB DECK ON EXISTING CONCRETE SUBSTRUCTURE
SPAN LENGTH : 24' - 30' - 24' c/c BEARINGS
ROADWAY WIDTH : 30'-0" F/F CURB
LOADING : HS20-44 AND THE ALTERNATE MILITARY LOADING
SKEW : 20° 00' 00" LT. FWD. CROWN : NORMAL 0.016
ALIGNMENT : TANGENT
WEARING SURFACE : 1" MONOLITHIC CONCRETE
APPROACH SLAB : NONE LATITUDE : N 40° 12' 10"
LONGITUDE : W 80° 46' 20"

DESIGN AGENCY: O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT
DATE: 11-22-04
REVIEWED: SAL
STRUCTURE FILE NUMBER: 4102673
DRAWN: TKB
REVISED:
DESIGNED: JPB
CHECKED: TKB

JEFFERSON COUNTY
STA. 0+78.47
STA. 1+57.53

SITE PLAN
BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

1/14

18/31

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REFERENCES:

REFERENCE SHALL BE MADE TO STANDARD DRAWINGS:

PCB-91 (REVISED) : 7-19-02

AND TO SUPPLEMENTAL SPECIFICATIONS:

898 DATED 07-16-04

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002, AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN DATA:

DESIGN LOADING:

HS20-44 AND THE ALTERNATE MILITARY LOADING

FUTURE WEARING SURFACE (FWS) OF 60 LBS/FT.

DESIGN STRESSES:

QC/QA CONCRETE, CLASS QSC2 (SUPERSTRUCTURE), COMPRESSIVE STRENGTH 4500 PSI

REINFORCING STEEL - ASTM A615 OR A996
GRADE 60 MINIMUM YIELD STRENGTH 60,000 P.S.I.

DECK PROTECTION METHOD:

DECK PROTECTION METHOD : EPOXY COATED REINFORCING STEEL, 2½" CONCRETE COVER, SEALING OF CONCRETE SURFACES

MONOLITHIC WEARING SURFACE:

MONOLITHIC WEARING SURFACE IS ASSUMED, FOR DESIGN PURPOSES, TO BE 1" THICK.

EXISTING STRUCTURE PLANS:

THE FOLLOWING PREVIOUS PLAN OF THE EXISTING BRIDGE IS AVAILABLE FOR REFERENCE AT THE DISTRICT 11 OFFICE OF THE OHIO DEPARTMENT OF TRANSPORTATION, 2201 REISER AVENUE, S.E., NEW PHILADELPHIA, OHIO 44663:

JEF-152-0.01 ORIGINAL CONSTRUCTION PLAN (1950)

ITEM SPECIAL - MISC.: WORK INVOLVING ASBESTOS CONTAINING MATERIALS:

ASBESTOS ABATEMENT

PAST CONSTRUCTION PLANS FOR THE SUBJECT BRIDGE INDICATE THAT APPROXIMATELY 40 SQUARE FEET OF HALF INCH, PREMOLDED EXPANSION JOINT FILLER AND 30 SQUARE FEET OF QUARTER INCH, PREMOLDED EXPANSION JOINT FILLER ARE LOCATED ON THE STRUCTURE. IT IS COMMON FOR THIS TYPE OF MATERIAL TO CONTAIN ASBESTOS. THIS EXPANSION JOINT FILLER COULD NOT BE LOCATED DURING A VISUAL INSPECTION OF THE BRIDGE. THEREFORE, IT IS ASSUMED THAT THE FILLER IS STILL LOCATED ON THE BRIDGE AND THAT IT IS A NONFRIABLE ASBESTOS CONTAINING MATERIAL. THE PHYSICAL INSPECTION REVEALED TWO ADDITIONAL SOURCES OF ASBESTOS. A BLACK TAR GASKET-LIKE MATERIAL LOCATED BETWEEN THE CEMENT END WALLS WAS TESTED AND IDENTIFIED AS CONTAINING 10% ASBESTOS. APPROXIMATELY 16 SQUARE FEET OF THE BLACK GASKET-LIKE MATERIAL WAS IDENTIFIED BETWEEN THE CEMENT END WALLS. A SIMILAR GASKET-LIKE SUBSTANCE LOCATED BETWEEN THE CEMENT WALLS WAS TESTED AND FOUND TO CONTAIN 4.1% ASBESTOS. APPROXIMATELY 24 SQUARE FEET OF THIS BLACK GASKET-LIKE MATERIAL WAS IDENTIFIED BETWEEN THE CEMENT WALL. CONSTRUCTION WILL REQUIRE THE REMOVAL AND DISPOSAL OF THESE MATERIALS. THE CONTRACTOR SHALL ENSURE THAT ASBESTOS CONTAINING MATERIALS DO NOT BECOME FRIABLE (BROKEN-UP OR DISPERSED) AND THAT NO VISIBLE FIBER EMISSIONS WILL OCCUR. ADDITIONALLY, THE REMOVAL AND DISPOSAL OF THE ASBESTOS CONTAINING MATERIAL SHALL COMPLY WITH CHAPTER 3745-20 OF THE OHIO ADMINISTRATIVE CODE, THE NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS (NESHAP) AND APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS (29 CFR 1926.1101).

BASIS OF PAYMENT

THE CONTRACTOR SHALL FURNISH ALL THE LABOR, EQUIPMENT, AND MATERIALS NECESSARY TO PROPERLY REMOVE, ENCAPSULATE, HANDLE, TRANSPORT, AND DISPOSE OF ASBESTOS CONTAINING MATERIALS IN A LANDFILL LICENSED BY THE LOCAL HEALTH DEPARTMENT AND PERMITTED BY THE OHIO ENVIRONMENTAL PROTECTION AGENCY - DIVISION OF AIR POLLUTION CONTROL TO ACCEPT ASBESTOS CONTAINING MATERIAL. PAYMENT FOR THIS WORK SHALL BE MADE AT THE CONTRACT PRICE BID OF LUMP SUM.

ITEM 202 - PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN :

DESCRIPTION:

THIS WORK SHALL CONSIST OF THE REMOVAL OF THE CONCRETE SLAB, BRIDGE RAILING INCLUDING RAILING ON THE RETAINING WALL, ASPHALT WEARING COURSE INCLUDING APPURTENANCES AND PORTIONS OF SPECIFIED SUBSTRUCTURES. THE PROVISIONS OF ITEM 202 APPLY EXCEPT AS SPECIFIED BY THE FOLLOWING NOTES. CARE SHALL BE TAKEN DURING DECK REMOVALS TO PROTECT PORTIONS OF SUCH SYSTEMS THAT ARE TO BE SALVAGED AND INCORPORATED INTO THE PROPOSED STRUCTURE. IN THIS RESPECT, THE USE OF EXPLOSIVES, HEADACHE BALLS AND/OR HOE RAM TYPE OF EQUIPMENT IS PROHIBITED.

PROTECTION OF TRAFFIC:

PRIOR TO DEMOLITION OF ANY PORTIONS OF THE EXISTING SUPERSTRUCTURE, SUBMIT PLANS FOR THE PROTECTION OF TRAFFIC (VEHICULAR, PEDESTRIAN, ETC.) ADJACENT TO THE STRUCTURE TO THE DIRECTOR AT LEAST 30 DAYS BEFORE CONSTRUCTION BEGINS. THESE PLANS SHALL INCLUDE PROVISIONS FOR ANY DEVICES AND STRUCTURES THAT MAY BE NECESSARY TO ENSURE SUCH PROTECTION. ALL COSTS ASSOCIATED WITH THIS TRAFFIC PROTECTION WILL BE INCLUDED WITH ITEM 202 FOR PAYMENT.

REMOVAL METHODS:

CONCRETE MAY BE REMOVED BY CUTTING AND BY MEANS OF HAND OPERATED PNEUMATIC HAMMERS EMPLOYING POINTED OR BLUNTED CHISEL TYPE TOOLS.

SUBSTRUCTURE CONCRETE REMOVAL SHALL BE BY MEANS OF APPROVED PNEUMATIC HAMMERS EMPLOYING POINTED AND BLUNT CHISEL TOOLS. HYDRAULIC HOE-RAM TYPE HAMMERS WILL NOT BE PERMITTED. THE WEIGHT OF THE HAMMER SHALL NOT BE MORE THAN 35 POUNDS FOR REMOVAL WITHIN 18 INCHES OF PORTIONS TO BE PRESERVED. OUTSIDE THE 18 INCH LIMIT, HAMMERS NOT EXCEEDING 90 POUNDS, MAY BE USED UPON THE APPROVAL OF THE ENGINEER. PNEUMATIC HAMMERS SHALL NOT BE PLACED IN DIRECT CONTACT WITH REINFORCING STEEL THAT IS TO BE RETAINED IN THE REBUILT STRUCTURE.

CUT LINE CONSTRUCTION JOINT PREPARATION:

SAW CUT BOUNDARIES OF PROPOSED CONCRETE REMOVALS 1 INCH DEEP. REMOVE CONCRETE TO A ROUGH SURFACE. THE EXISTING REINFORCING STEEL, IF REQUIRED IN THE PLANS, SHALL BE LEFT IN PLACE. INSTALL DOWEL BARS IF SPECIFIED. PRIOR TO CONCRETE PLACEMENT ABRASIVELY CLEAN JOINT SURFACES AND EXISTING EXPOSED REINFORCEMENT TO REMOVE LOOSE AND DISINTEGRATED CONCRETE AND LOOSE RUST. THE JOINT SURFACE AND EXPOSED REINFORCEMENT SHALL BE THOROUGHLY CLEANED OF ALL DIRT, DUST, RUST OR OTHER FOREIGN MATERIAL BY THE USE OF WATER, AIR UNDER PRESSURE, OR OTHER METHODS THAT PRODUCE SATISFACTORY RESULTS. EXISTING REINFORCING STEEL DOES NOT HAVE TO HAVE A BRIGHT STEEL FINISH BUT ALL PACK AND LOOSE RUST SHALL BE REMOVED. EXISTING CONCRETE SURFACES WHICH NEW CONCRETE WILL BE PLACED AGAINST SHALL BE WET, BUT WITHOUT FREE WATER, AT THE TIME OF CONCRETE PLACEMENT.

LOADING LIMITATIONS:

NO PART OF THE STRUCTURE SHALL BE SUBJECTED TO UNIT STRESSES THAT EXCEED 136.5% OF ALLOWABLE UNIT STRESSES AS DEFINED IN THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES DUE EITHER TO DEMOLITION, ERECTION OR CONSTRUCTION METHODS, OR TO THE USE OR MOVEMENT OF DEMOLITION OR ERECTION EQUIPMENT ON OR ACROSS THE STRUCTURE. SUBMIT STRUCTURAL ANALYSIS COMPUTATIONS, BY AN OHIO REGISTERED PROFESSIONAL ENGINEER, SHOWING THE ALLOWABLE STRESSES AND THE MAXIMUM STRESSES PRODUCED BY THE REMOVAL METHODS OR EQUIPMENT TO THE DIRECTOR AT LEAST 20 DAYS BEFORE CONSTRUCTION BEGINS.

MEASUREMENT & PAYMENT:

THE DEPARTMENT WILL MEASURE THE QUANTITY OF REMOVALS ON A LUMP SUM BASIS. THE DEPARTMENT WILL PAY FOR THE ACCEPTED QUANTITIES OF REMOVALS AT THE CONTRACT PRICE FOR ITEM 202, PORTIONS OF STRUCTURE REMOVED, AS PER PLAN.

UTILITY LINES

THE UTILITIES SHALL BEAR ALL EXPENSE INVOLVED IN RELOCATING THE AFFECTED UTILITY LINES. THE CONTRACTOR AND UTILITIES ARE TO COOPERATE BY ARRANGING THEIR WORK IN SUCH A MANNER THAT INCONVENIENCE TO EITHER WILL BE HELD TO A MINIMUM.

THE ABANDONED WATER LINE ATTACHED TO THE BRIDGE SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. ALL COSTS ASSOCIATED WITH THIS REMOVAL WILL BE INCLUDED WITH ITEM 202 FOR PAYMENT.

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 CMS SECTIONS 102.05 AND 105.02.

BASE CONTRACT BID PRICES UPON A RECOGNITION OF THE UNCERTAINTIES DESCRIBED ABOVE AND UPON A PREBID EXAMINATION OF THE EXISTING STRUCTURE. HOWEVER, THE DEPARTMENT WILL PAY FOR ALL PROJECT WORK BASED UPON ACTUAL DETAILS AND DIMENSIONS THAT HAVE BEEN VERIFIED IN THE FIELD.

ITEM 519 - PATCHING CONCRETE STRUCTURES, AS PER PLAN :

PRIOR TO THE SURFACE CLEANING SPECIFIED IN 519.04, AND WITHIN 24 HOURS OF PLACING PATCHING MATERIAL, BLAST CLEAN ALL SURFACES TO BE PATCHED INCLUDING THE EXPOSED REINFORCING STEEL. ACCEPTABLE METHODS INCLUDE HIGH-PRESSURE WATER BLASTING WITH OR WITHOUT ABRASIVES IN THE WATER, ABRASIVE BLASTING WITH CONTAINMENT, OR VACUUM ABRASIVE BLASTING.

MAINTENANCE OF TRAFFFIC:

FOR MAINTENANCE OF TRAFFIC PLAN, QUANTITIES AND NOTES,

SEE SHEETS 4/31 THROUGH 9/31

ITEM 503 - UNCLASSIFIED EXCAVATION, AS PER PLAN :

THE BACKFILL MATERIAL BEHIND THE ABUTMENTS SHALL BE TYPE B GRANULAR MATERIAL, 703.16.C, PLACED AND COMPACTED IN 6 INCH LIFTS.

ITEM 509 REINFORCING STEEL, REPLACEMENT OF EXISTING REINFORCING STEEL, AS PER PLAN :

REPLACE ALL EXISTING REINFORCING BARS DEEMED BY THE ENGINEER TO BE UNUSABLE BECAUSE OF CORROSION. THE DEPARTMENT WILL MEASURE THE REPLACEMENT REINFORCING STEEL BY THE NUMBER OF POUNDS ACCEPTED IN PLACE.

REPLACE ALL EXISTING REINFORCING STEEL BARS WHICH ARE TO BE INCORPORATED INTO THE NEW WORK AND ARE DEEMED BY THE ENGINEER TO BE MADE UNUSABLE BY CONCRETE REMOVAL OPERATIONS WITH NEW EPOXY COATED REINFORCING STEEL OF THE SAME SIZE AT NO COST TO THE DEPARTMENT.

INSPECTION OF BRIDGES FOR BATS :

PRIOR TO ANY DEMOLITION/REMOVAL OF THE EXISTING STRUCTURE, THE CONTRACTOR SHALL CAREFULLY EXAMINE THE UNDERSIDE OF THE STRUCTURE FOR THE PRESENCE OF BATS. IF ANY BATS ARE FOUND, THE ODOT DISTRICT 11 ENVIRONMENTAL COORDINATOR SHOULD BE CONTACTED AT 330-339-6633 BEFORE COMMENCING WITH THE BRIDGE'S DEMOLITION.

ITEM 517 - RAILING (DEFLECTOR PARAPET TYPE), AS PER PLAN :

THIS RAIL HAS BEEN SUCCESSFULLY EVALUATED BY FULL-SCALE IMPACT TESTS CONDUCTED IN ACCORDANCE WITH NCHRP REPORT 230. TEST DOCUMENTATION MAY BE FOUND IN RESEARCH REPORT 1185-1, "AESTHETICALLY PLEASING CONCRETE BEAM AND POST BRIDGE RAIL-TEXAS TYPE 411", OF RESEARCH STUDY 2-5-88/89-1185-1, "AESTHETICALLY PLEASING BRIDGE RAILS", TEXAS TRANSPORTATION INSTITUTE MARCH 1989.

SHOP DRAWINGS WILL NOT BE REQUIRED FOR THIS RAIL.

FACE OF RAIL AND PARAPET SHALL BE VERTICAL TRANSVERSELY UNLESS OTHERWISE APPROVED BY THE ENGINEER.

ALL CONCRETE FOR RAILING SHALL BE AS PER CMS ITEM 517. A RUBBED FINISH PER CMS 511.18B SHALL BE APPLIED TO ALL RAILING SURFACES.

ALL PARTS OF THE RAILING INCLUDING CONCRETE AND REINFORCING STEEL ARE INCLUDED IN THE PRICE BID PER FOOT OF RAIL.

DESIGN AGENCY: O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT
DESIGNED: JPB | DRAWN: JPB | REVIEWED: SAL | DATE: 11-22-04
CHECKED: TKB | REVISED: | STRUCTURE FILE NUMBER: 4102673

GENERAL NOTES

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

2/14
19/31

CALCULATED BY : JPB DATE : 10-29-04
CHECKED BY : TKB DATE : 11-15-04

ESTIMATED QUANTITIES

ITEM	ITEM EXT.	TOTAL	UNIT	DESCRIPTION	SUPERSTRUCTURE	ABUTMENTS	PIERS	GENERAL	See Structure Sht. No.
202	11203	LUMP		PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN				LUMP	2/14
503	11100	LUMP		COFFERDAMS, CRIBS AND SHEETING				LUMP	
503	21301	LUMP		UNCLASSIFIED EXCAVATION, AS PER PLAN				LUMP	2/14
509	10000	37,335	POUND	EPOXY COATED REINFORCING STEEL	37,048			307	
509	20001	150	POUND	REINFORCING STEEL, REPLACEMENT OF EXISTING REINFORCING STEEL, AS PER PLAN				150	2/14
510	10000	214	EACH	DOWEL HOLES WITH NONSHRINK, NONMETALLIC GROUT				214	
512	10050	414	SQ YD	SEALING OF CONCRETE SURFACES (NON-EPOXY)	338			76	
512	10100	307	SQ YD	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)		100	137	70	
512	10600	40	FT	CONCRETE REPAIR BY EPOXY INJECTION			40		
512	33300	22	SQ YD	TYPE A WATERPROOFING		22			
516	13200	8	SQ FT	½" PREFORMED EXPANSION JOINT FILLER				8	
516	13600	16	SQ FT	1" PREFORMED EXPANSION JOINT FILLER		16			
516	31000	22	FT	JOINT SEALER				22	
517	73201	237	FT	RAILING (DEFLECTOR PARAPET TYPE), AS PER PLAN	158			79	2/14
519	11101	61	SQ FT	PATCHING CONCRETE STRUCTURE, AS PER PLAN		51	10		2/14
SPECIAL	69098400	LUMP		MISC.: WORK INVOLVING ASBESTOS CONTAINING MATERIALS				LUMP	
898	11100	206	CU YD	QC/QA CONCRETE, CLASS QSC2, SUPERSTRUCTURE	206				

DESIGN AGENCY
O.D.O.T.
DISTRICT 11
PRODUCTION DEPARTMENT

DATE 11-22-04
REVIEWED SAL
STRUCTURE FILE NUMBER 4102673

DRAWN JPB
REVISED

DESIGNED JPB
CHECKED TKB

ESTIMATED QUANTITIES
BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

3/14

20/31

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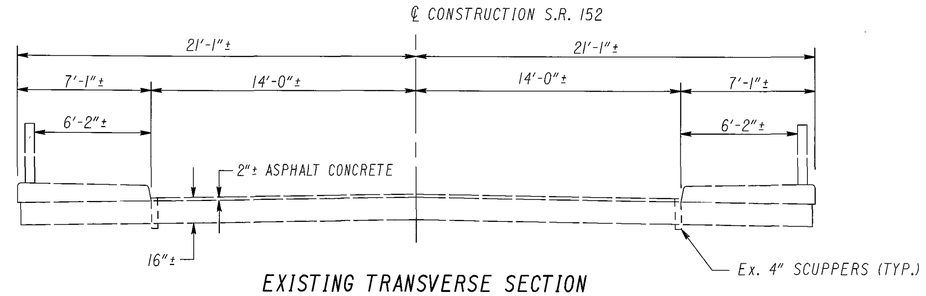

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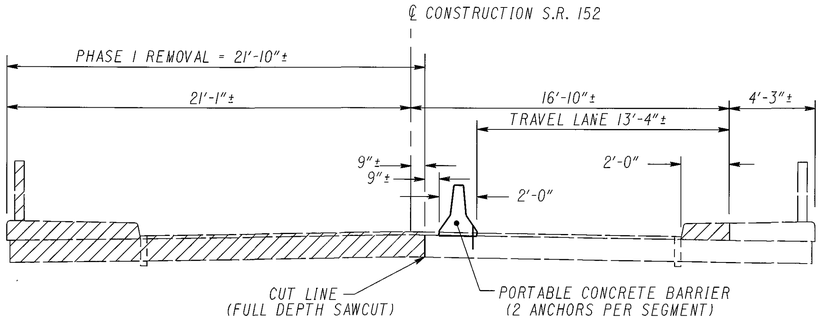
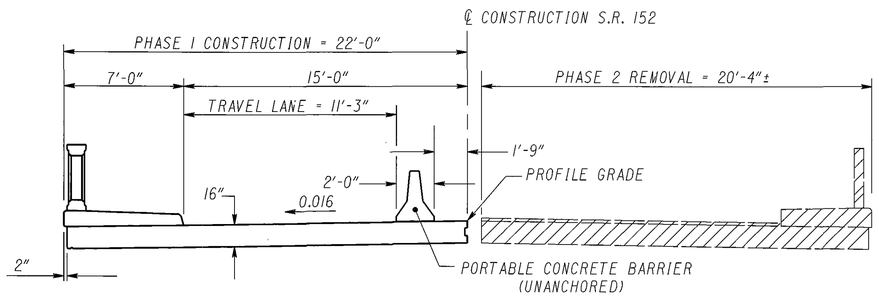
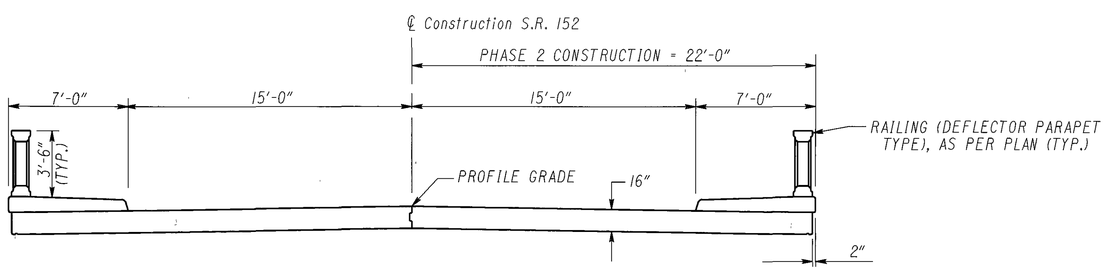


PHASE 1 REMOVAL



PHASE 1 CONSTRUCTION & PHASE 2 REMOVAL



PHASE 2 CONSTRUCTION

PHASE 1 REMOVAL

1.) ERECT AND ANCHOR THE PORTABLE CONCRETE BARRIER ON THE EXISTING STRUCTURE AS SHOWN PER STD. DWG. PCB-91. MAINTAIN 1-LANE, 2-WAY TRAFFIC.

2.) SAWCUT THE EXISTING DECK FULL DEPTH AS SHOWN ON THE PLANS.

3.) REMOVE THE LEFT PORTION OF THE EXISTING SUPERSTRUCTURE AS SHOWN. PATCH PORTIONS OF THE REAR AND FORWARD ABUTMENTS AND PIERS.

PHASE 1 CONSTRUCTION & PHASE 2 REMOVAL

4.) CONSTRUCT THE LEFT PORTION OF THE PROPOSED SUPERSTRUCTURE. PLACE THE PROPOSED BRIDGE RAILING ON THE LEFT PORTION OF THE DECK.

5.) PLACE THE PORTABLE CONCRETE BARRIER UNANCHORED ON THE NEWLY CONSTRUCTED DECK AS SHOWN. MAINTAIN 1-LANE, 2-WAY TRAFFIC.

6.) REMOVE THE REMAINDER OF THE EXISTING SUPERSTRUCTURE AS SHOWN.

PHASE 2 CONSTRUCTION

7.) CONSTRUCT THE RIGHT PORTION OF THE PROPOSED SUPERSTRUCTURE. PLACE THE PROPOSED BRIDGE RAILING ON THE RIGHT PORTION OF THE DECK.

8.) APPLY THE HMWM RESIN TO THE DECK.

9.) REMOVE THE UNANCHORED PORTABLE CONCRETE BARRIER ACROSS THE STRUCTURE.

10.) SAWCUT GROOVES INTO DECK SURFACE.

11.) REMOVE AND CONSTRUCT THE RAILING ON RETAINING WALL.

PORTION OF STRUCTURE TO BE REMOVED

DESIGN AGENCY
O.D.O.T.
DISTRICT 11
PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
TKB	TKB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

PHASE CONSTRUCTION DETAILS

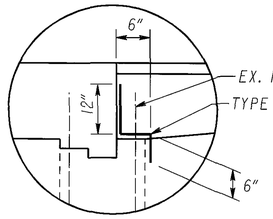
BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

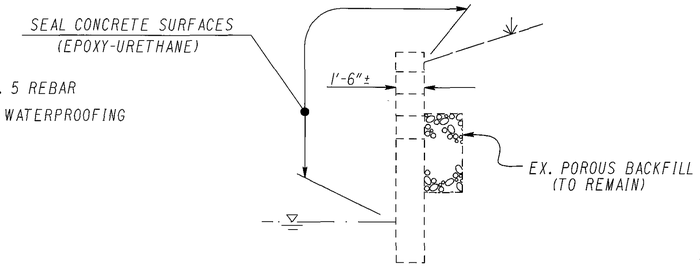
4 / 14

21 / 31

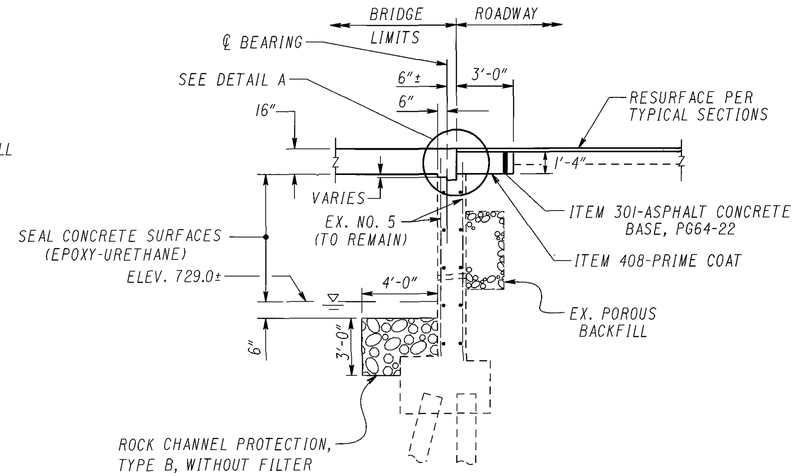
LEGEND:
EX. - EXISTING
C.J. - CONSTRUCTION JOINT
EL. - ELEVATION
P.E.J.F. - PREFORMED EXPANSION JOINT FILLER
STA. - STATION
TYP. - TYPICAL
E.F. - EACH FACE



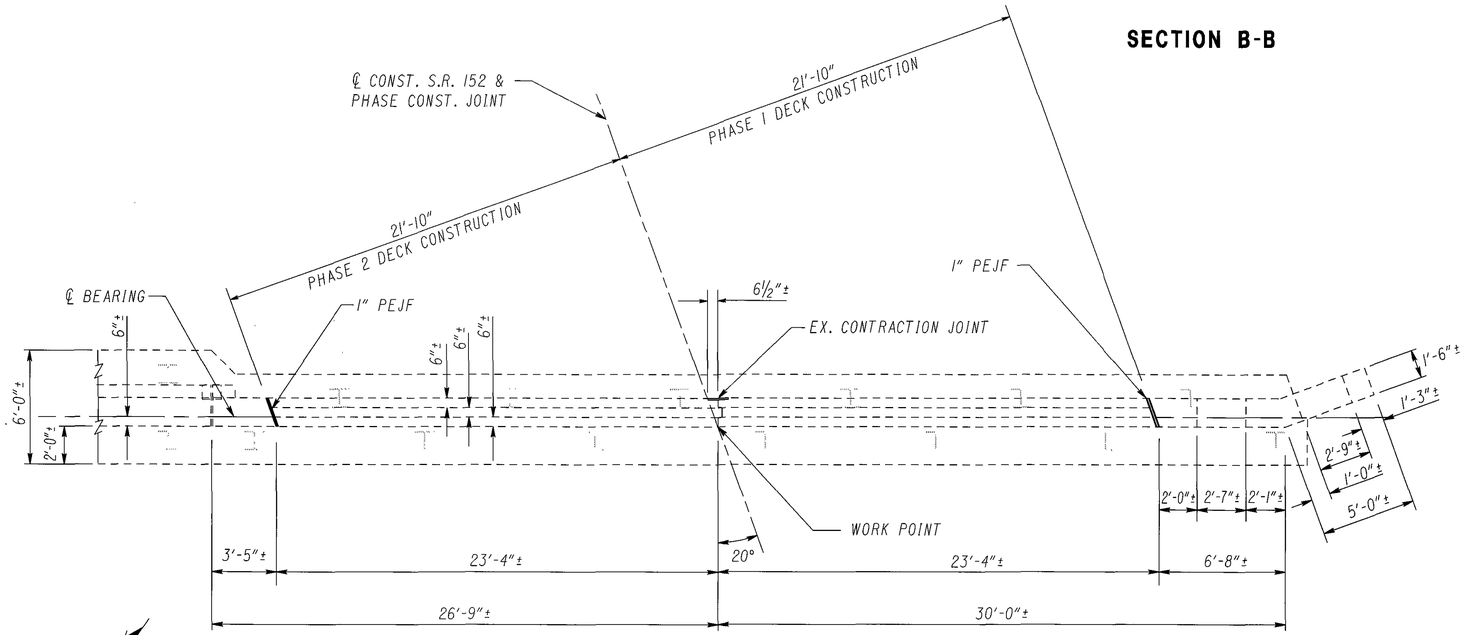
DETAIL A



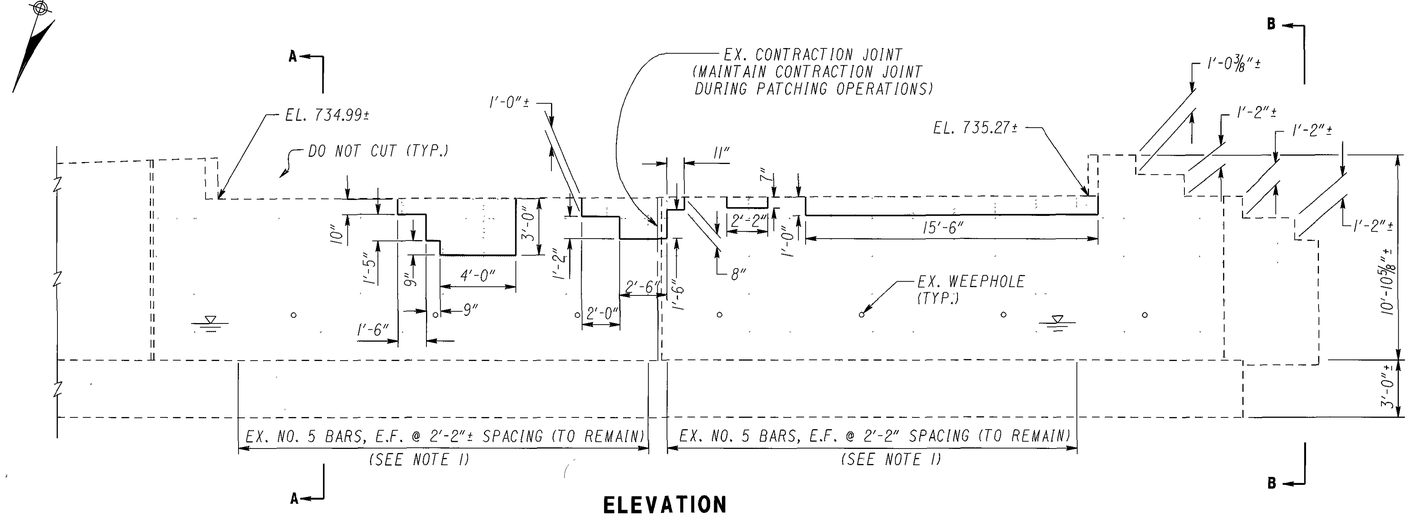
SECTION B-B



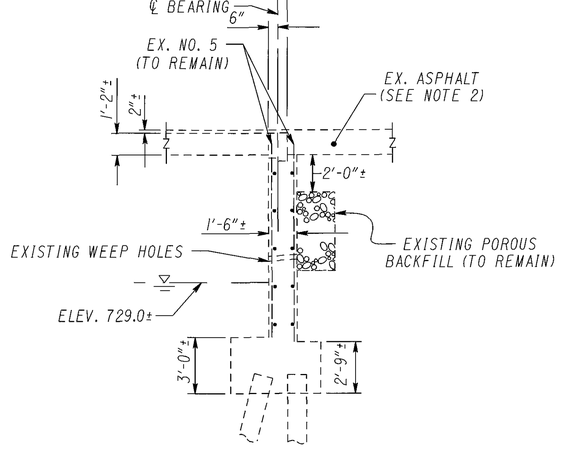
SECTION A-A
(PROPOSED SECTION)



PLAN



ELEVATION
(DECK NOT SHOWN)



SECTION A-A
(EXISTING SECTION)

NOTES:

1.) DO NOT CUT, REMOVE OR DAMAGE THESE BARS. DOWELLING IS PROHIBITED UNLESS APPROVED BY THE DESIGN ENGINEER.

2.) EXISTING PLANS SHOW ASPHALT PLACED AGAINST THE BRIDGE DECK, HOWEVER THIS WAS NOT FIELD VERIFIED. IF CONCRETE IS ENCOUNTERED, DO NOT REMOVE, CALL THE DISTRICT DESIGN ENGINEER FOR ASSISTANCE.

PORTIONS OF STRUCTURE TO BE PATCHED

DESIGN AGENCY: O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT
DESIGNED: JPB
DRAWN: TKB
CHECKED: TKB
REVIEWED: SAL
DATE: 11-22-04
REVISED:
STRUCTURE FILE NUMBER: 4102673

REAR ABUTMENT DETAILS
BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

5/14
22/31

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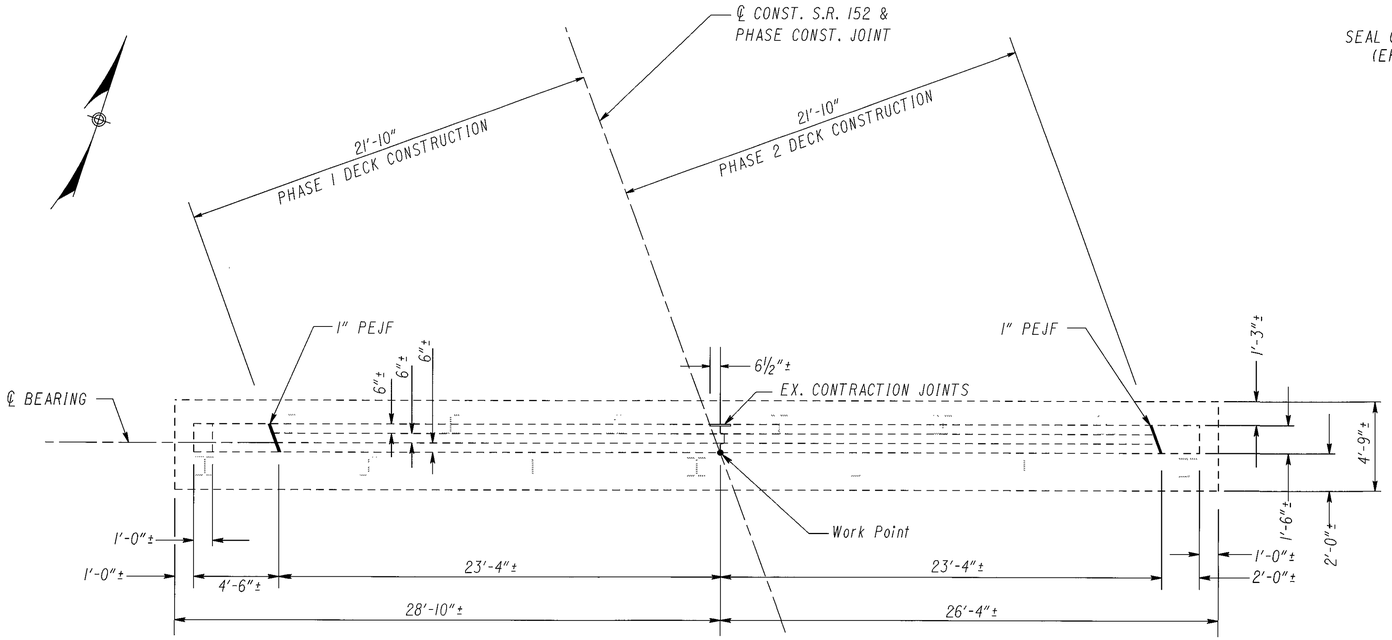
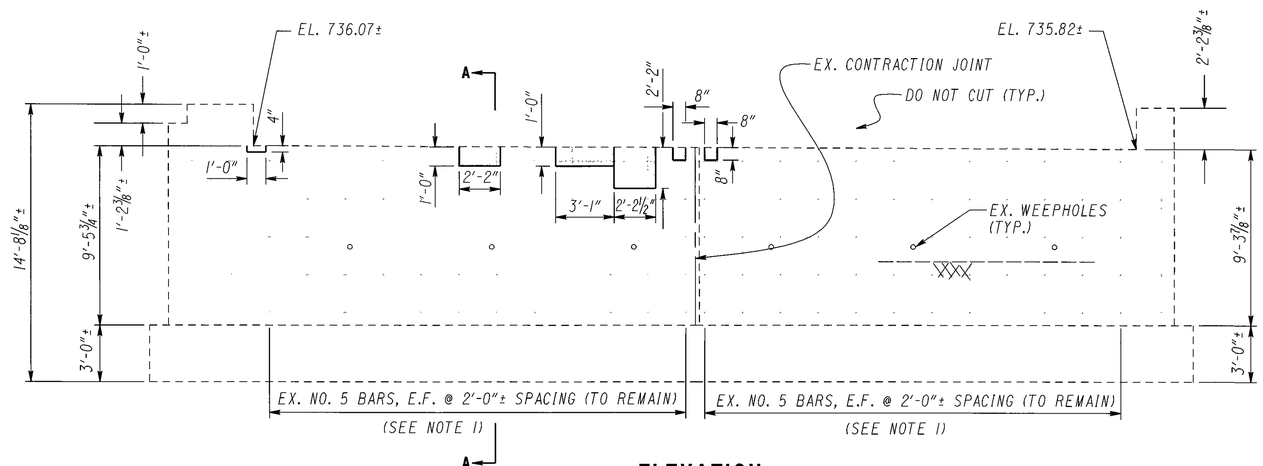
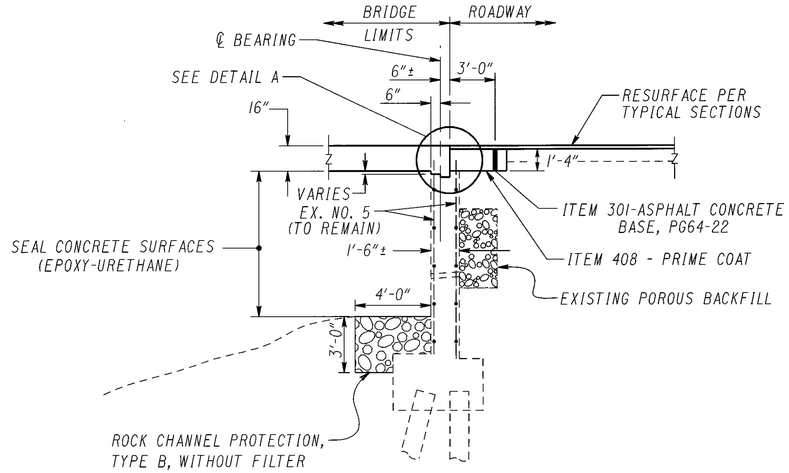
LEGEND:
EX. - EXISTING
C.J. - CONSTRUCTION JOINT
EL. - ELEVATION
P.E.J.F. - PREFORMED EXPANSION JOINT FILLER
STA. - STATION
TYP. - TYPICAL
E.F. - EACH FACE



PLAN



ELEVATION
(DECK NOT SHOWN)



SECTION A-A
(PROPOSED)

SECTION A-A
(EXISTING SECTION)

NOTES:

1.) DO NOT CUT, REMOVE OR DAMAGE THESE BARS. DOWELLING IS PROHIBITED UNLESS APPROVED BY THE DESIGN ENGINEER.

2.) EXISTING PLANS SHOW ASPHALT PLACED AGAINST THE BRIDGE DECK, HOWEVER THIS WAS NOT FIELD VERIFIED. IF CONCRETE IS ENCOUNTERED, DO NOT REMOVE, CALL THE DISTRICT DESIGN ENGINEER FOR ASSISTANCE.

3.) FOR DETAIL A, SEE SHEET NO. 5/14 .

PORTIONS OF STRUCTURE TO BE PATCHED

DESIGN AGENCY
O.D.O.T.
DISTRICT 11
PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
JPB	TKB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
TKB		4102673	

FORWARD ABUTMENT DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

6/14

23/31

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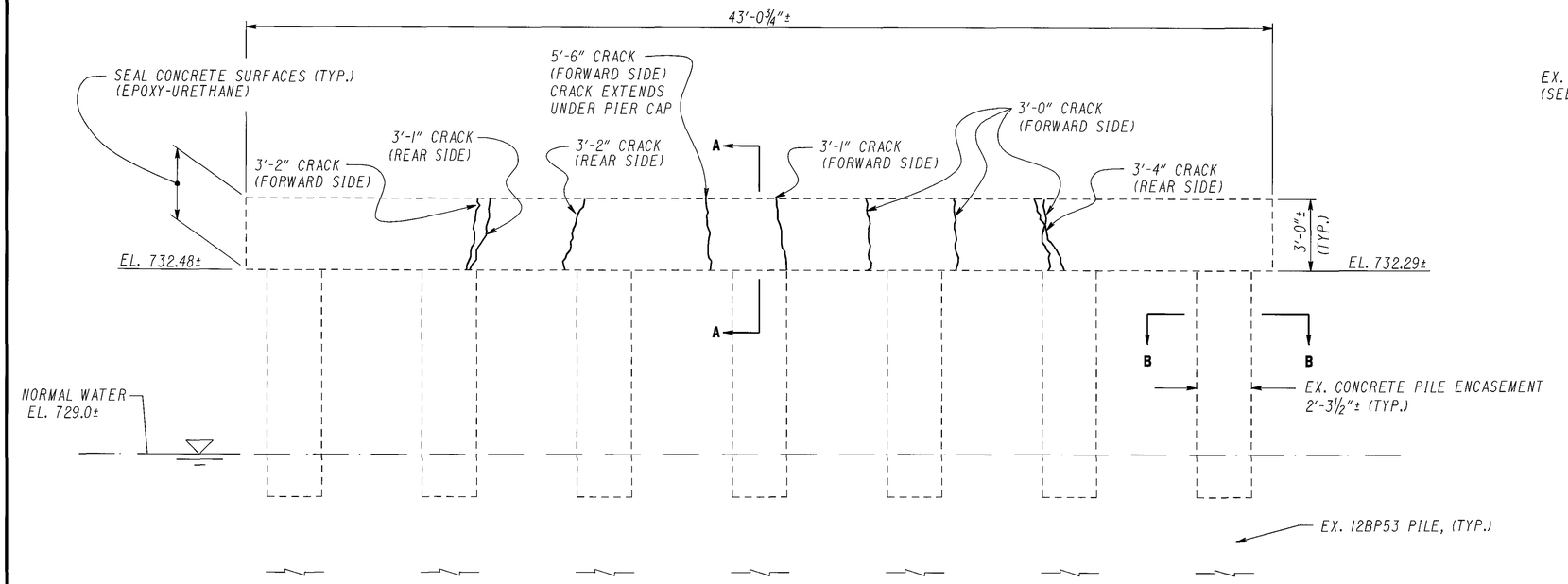
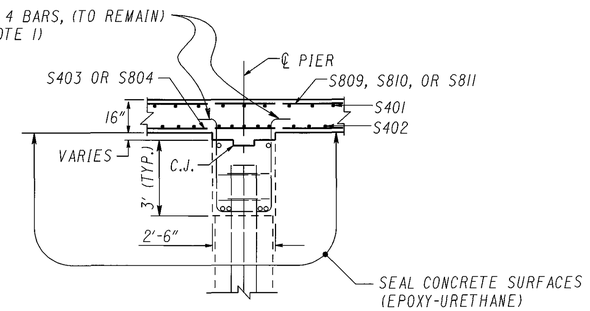


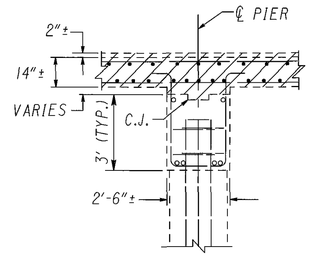
REAR PIER

(DECK NOT SHOWN)



SECTION A-A

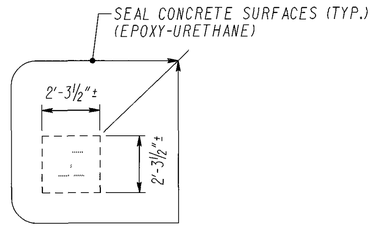
(PROPOSED SECTION)



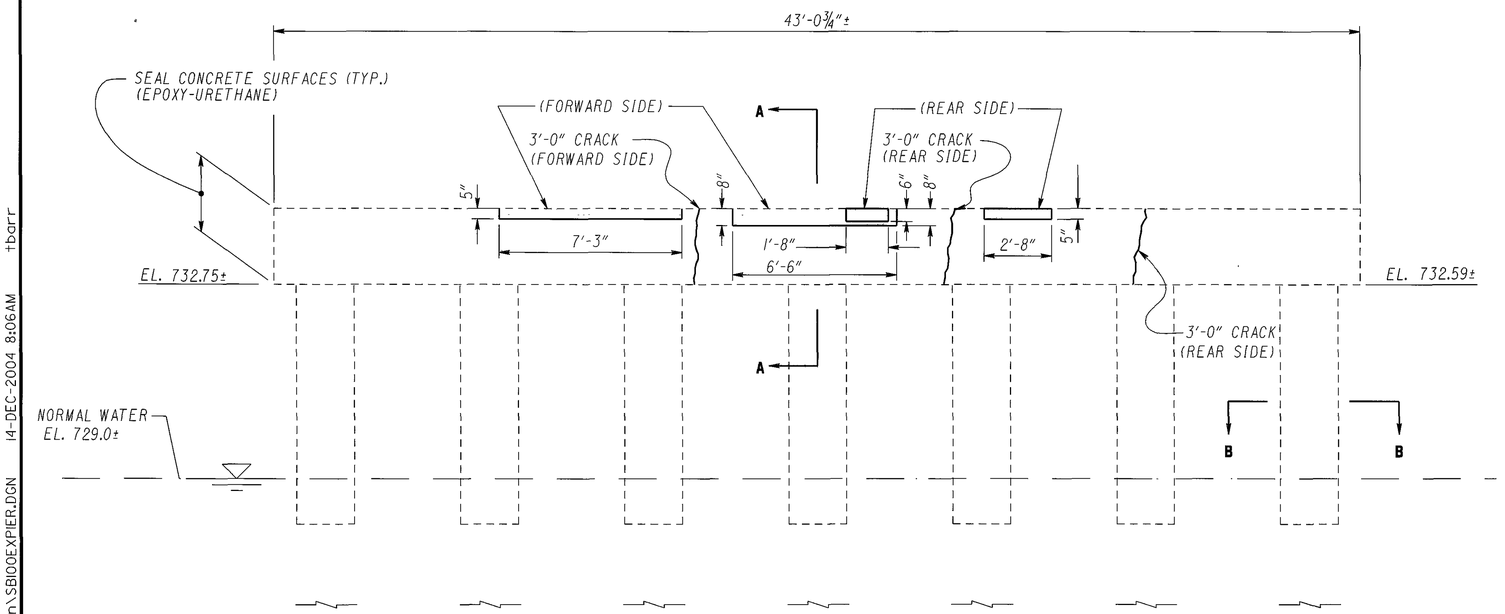
SECTION A-A

(EXISTING SECTION)

PORTIONS OF STRUCTURE REMOVED



SECTION B-B



FORWARD PIER

(DECK NOT SHOWN)

NOTES:

1.) DO NOT CUT, REMOVE, OR DAMAGE THESE BARS. DOWELLING IS PROHIBITED UNLESS APPROVED BY DESIGN ENGINEER.

2.) FILL CRACKS WITH EPOXY INJECTION PRIOR TO SEALING CONCRETE SURFACES.

APPROXIMATE AREAS REQUIRING REPAIR BY PATCHING, ACTUAL AREAS SHALL BE RESOUNDED AND FIELD VERIFIED BY THE ENGINEER.

DESIGN AGENCY
O.D.O.T. - DISTRICT 11
PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
TKB	TKB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

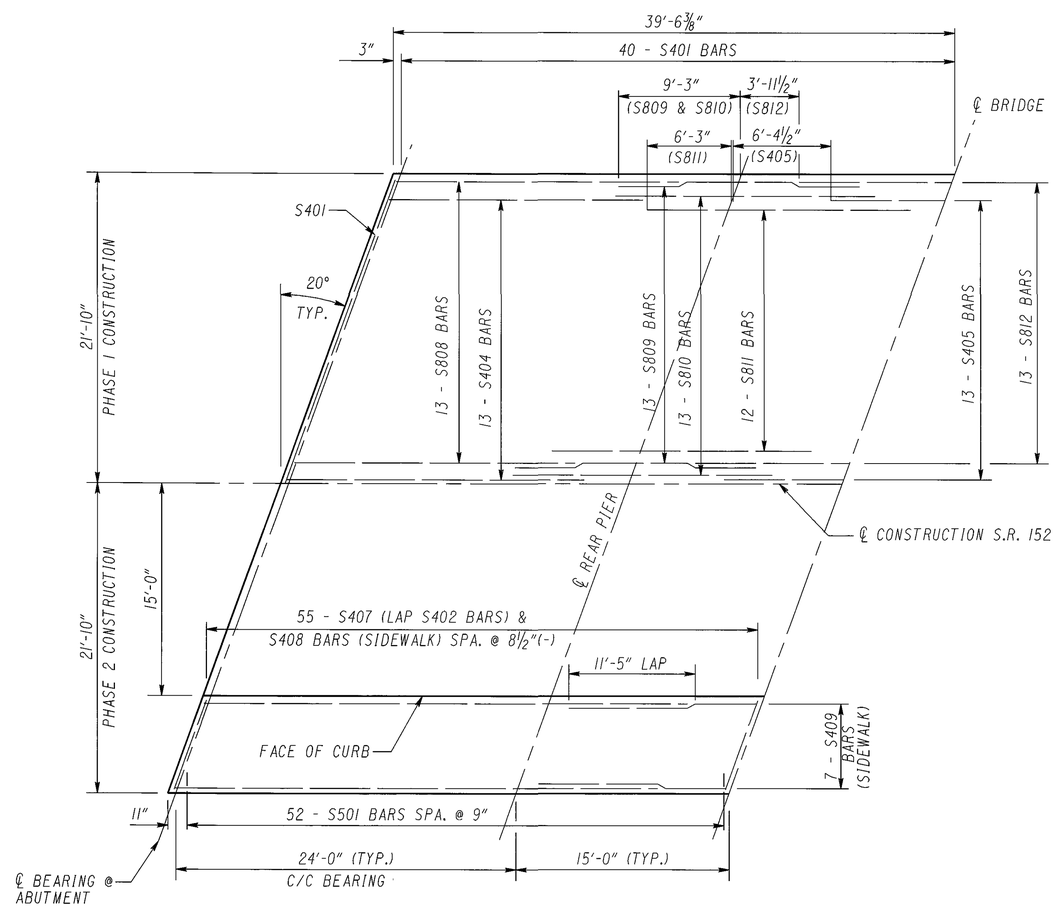
PIER DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

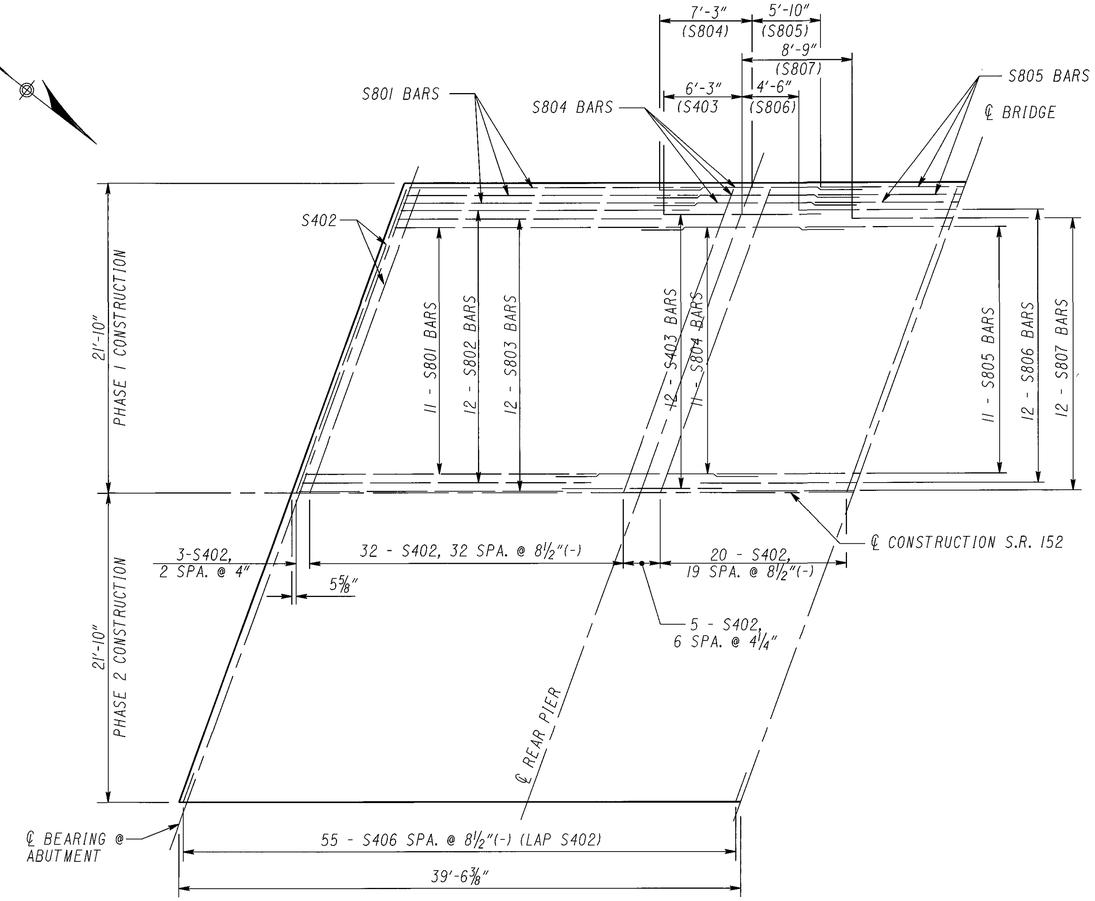
7/14

24/31



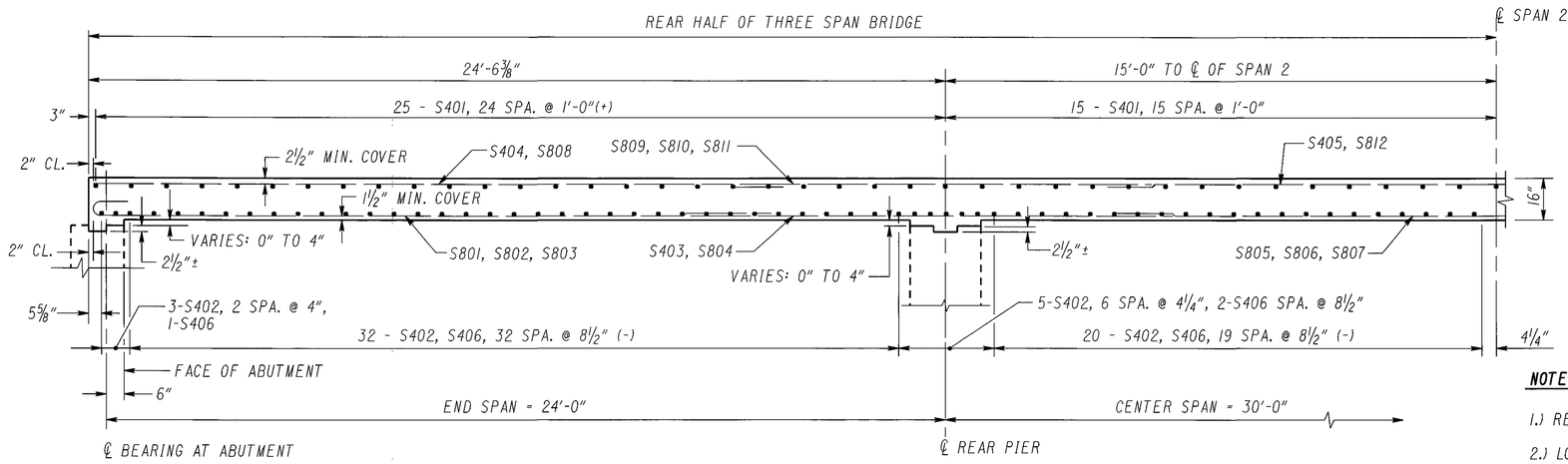
STEEL IN TOP OF SLAB

REBAR SYMMETRIC ABOUT ℄ CONSTRUCTION AND CENTER OF BRIDGE



STEEL IN BOTTOM OF SLAB

REBAR SYMMETRIC ABOUT ℄ CONSTRUCTION AND CENTER OF BRIDGE



PARTIAL LONGITUDINAL SECTION

LEGEND

SPA. - SPACES
ABUT. - ABUTMENT
FWD. - FORWARD
C.J. - CONSTRUCTION JOINT
STA. - STATION
CL. - CLEARANCE

NOTES:

1.) REINFORCING STEEL IS SYMMETRIC ABOUT THE REFERENCE CHORD/CONSTRUCTION JOINT.

2.) LONGITUDINAL BARS SHALL BE PLACED PARALLEL TO CENTERLINE OF THE ROADWAY AND TRANSVERSE BARS PARALLEL TO PIERS AND ABUTMENTS.

3.) PLACEMENT OF CONCRETE DECK SLAB SHALL BE CONTINUOUS. CONSTRUCTION JOINTS SHALL BE PROVIDED ONLY IF A DECK POUR CANNOT BE COMPLETED DUE TO INCLEMENT WEATHER CONDITIONS. THE CONSTRUCTION JOINT SHALL CONFORM TO THE REQUIREMENTS OF 511 IN THE CMS.

DESIGN AGENCY: O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
CCW	CCW	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

DECK SLAB DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

8 / 14

25 / 31

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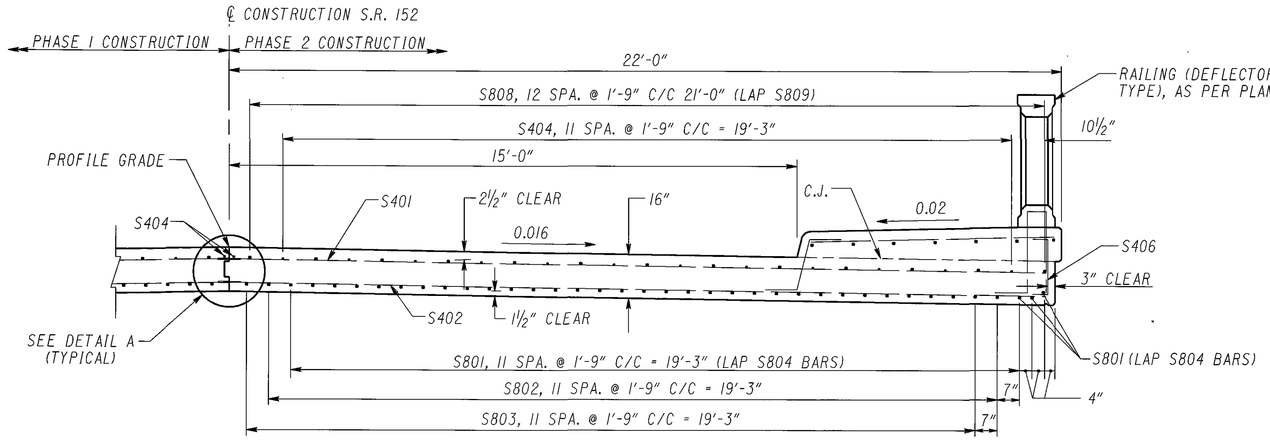
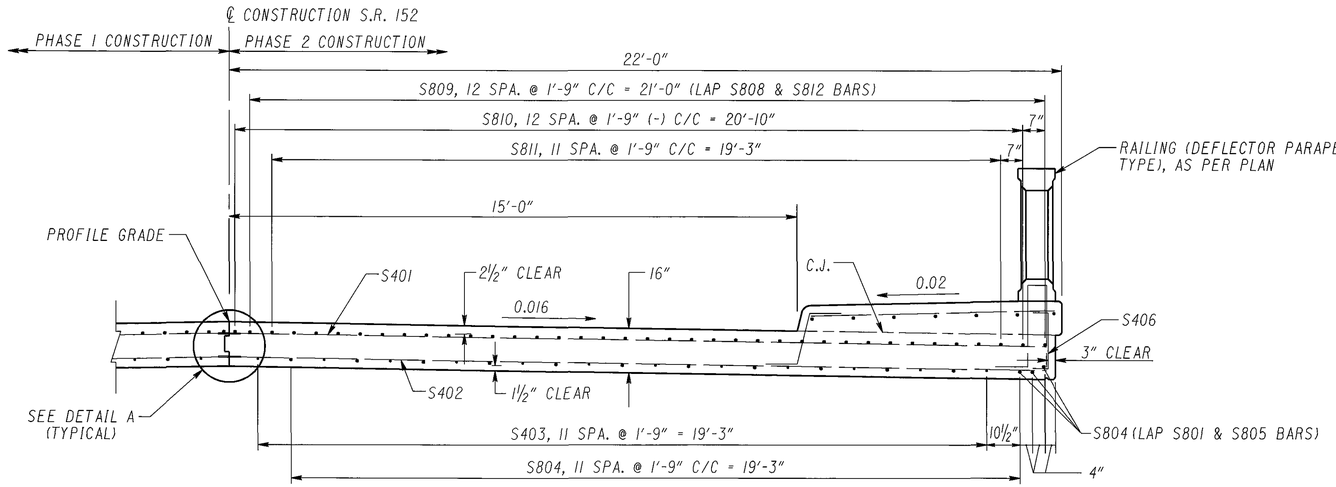
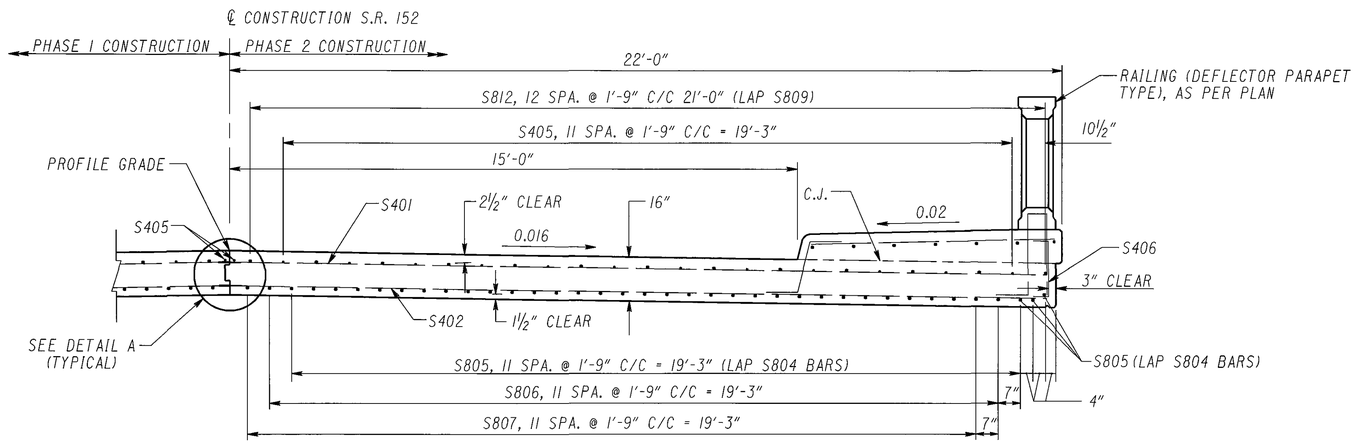


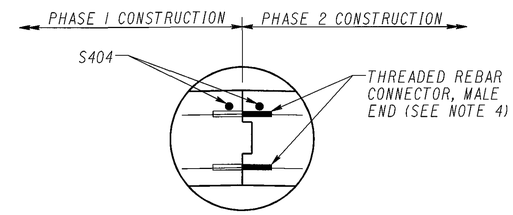
END SPANS



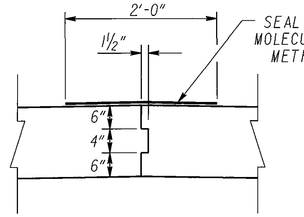
OVER PIERS



CENTER SPAN

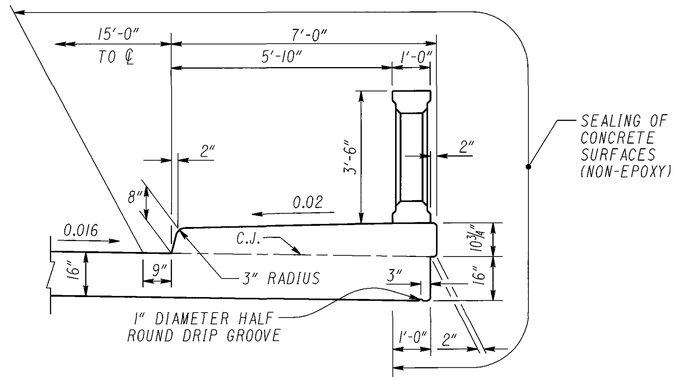


DETAIL A

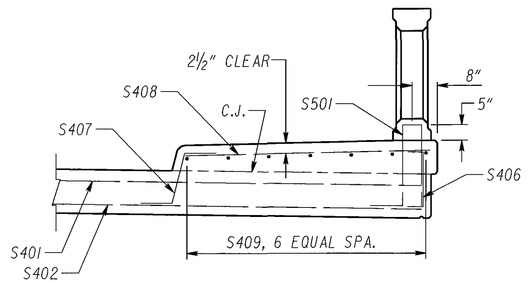


CONSTRUCTION JOINT

SEAL JOINT 2'-0" WIDE WITH HMWM TO BE INCLUDED WITH BRIDGE DECK CONCRETE FOR PAYMENT



DECK EDGE DETAIL



DECK EDGE & SIDEWALK REINFORCING DETAIL

LEGEND

SPA. - SPACES
C/C - CENTER TO CENTER
C.J. - CONSTRUCTION JOINT

NOTES:

1.) FOR REINFORCING STEEL LIST, SEE STRUCTURE SHEET NO. 14/14.
2.) THE NON-EPOXY SEALER CAN BE APPLIED 28 DAYS AFTER THE CONCRETE POUR BUT NO LATER THAN NOVEMBER 1st.
3.) THE REINFORCING STEEL IS SYMMETRIC ABOUT THE CONSTRUCTION JOINT.
4.) MECHANICAL REINFORCING STEEL CONNECTORS SHALL BE CAPABLE OF DEVELOPING 125% OF THE YIELD STRENGTH OF THE REINFORCING BAR.
5.) FOR RAILING DETAILS, SEE STRUCTURE SHEET NO. 10/14 AND 11/14.

DESIGN AGENCY O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
JPB	JPB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
TKB		4102673	

DECK DETAILS-TRANSVERSE SECTION

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

9/14

26/31

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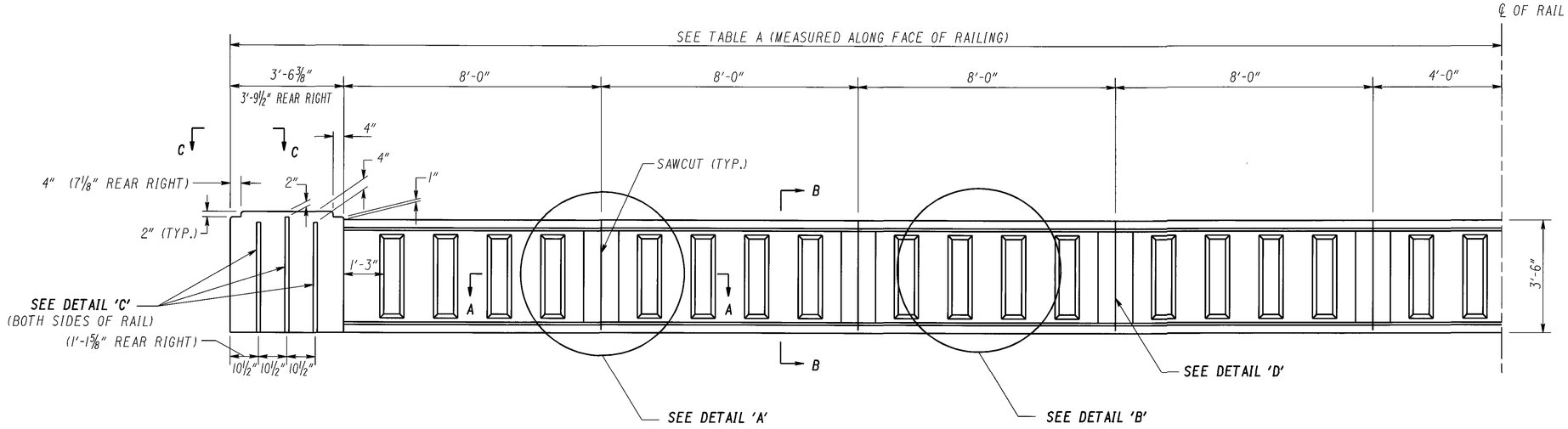
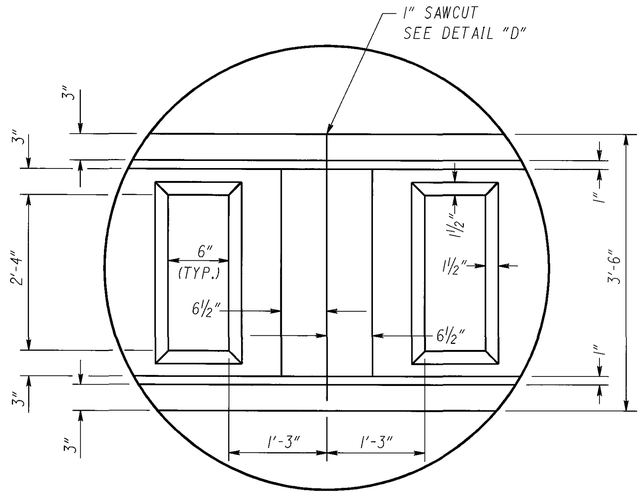


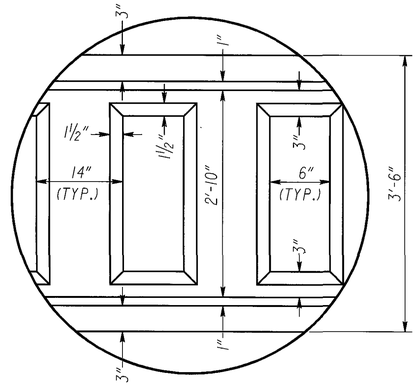
HALF ELEVATION - LEFT SIDE

(SYMMETRIC ABOUT ℄ OF RAIL)

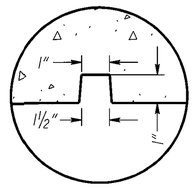
TABLE A	
SIDE	**LENGTH**
LEFT REAR	39'-6 3/8"
LEFT FORWARD	39'-6 3/8"
RIGHT REAR	39'-9 1/2"
RIGHT FORWARD	39'-6 3/8"



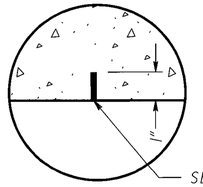
DETAIL 'A'



DETAIL 'B'



DETAIL 'C'



DETAIL 'D'

NOTES :

1.) FOR SECTION A-A, SEE SHEET NO. 11/14.

2.) FOR SECTION B-B, SEE SHEET NO. 11/14.

3.) FOR VIEW C-C, SEE SHEET NO. 11/14.

4.) SEAL THE PERIMETER OF THE CONTROL JOINT TO A MINIMUM DEPTH OF ONE INCH WITH A POLYURETHANE OR POLYMERIC MATERIAL CONFORMING TO ASTM C920, TYPE S. LEAVE THE BOTTOM ONE-HALF INCH OF BOTH THE INSIDE AND OUTSIDE FACES OF THE PARAPET UNSEALED TO ALLOW ANY WATER WHICH MAY ENTER THE JOINT TO ESCAPE.

DESIGN AGENCY
O.D.O.T.
DISTRICT 11
PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
TKB	TKB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

RAILING DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

10/14

27/31

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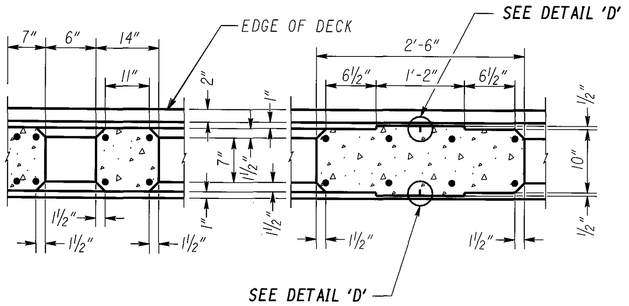
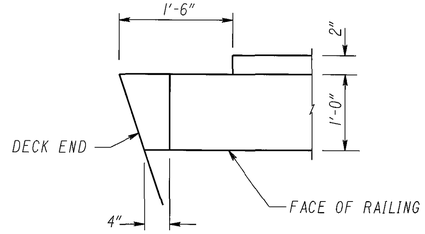
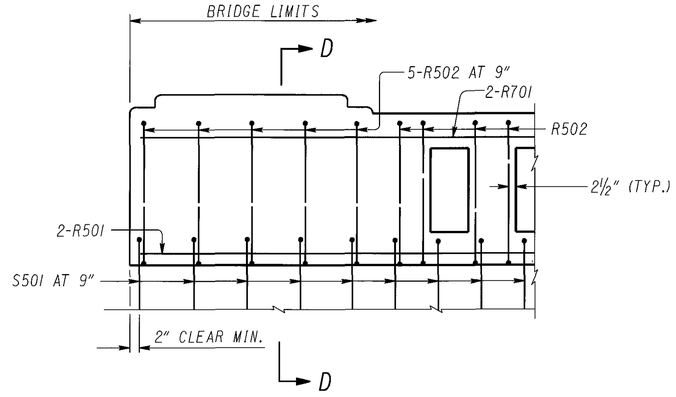


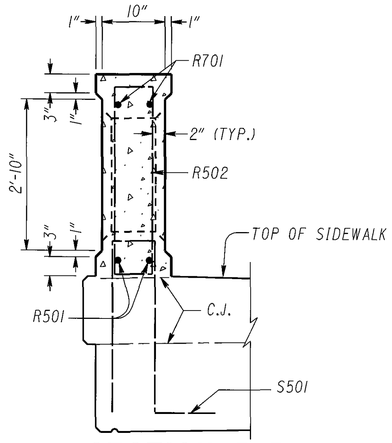
SECTION A-A



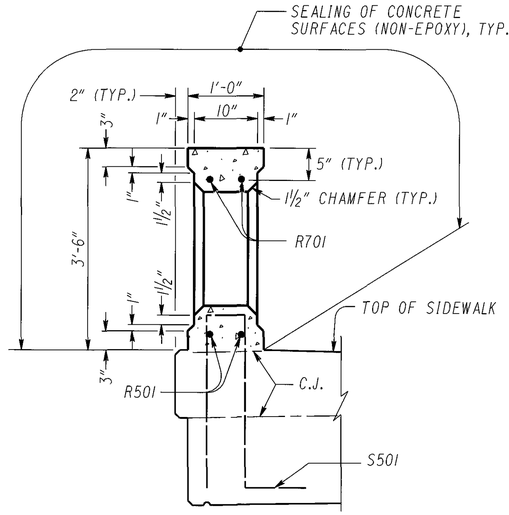
VIEW C-C



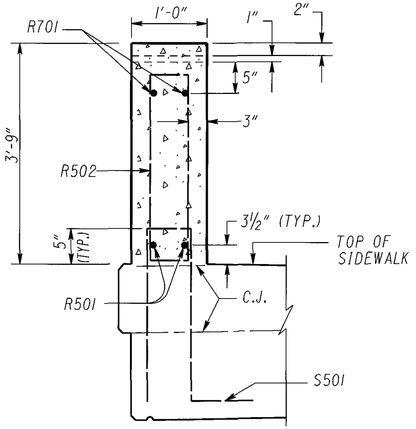
TYPICAL REINFORCING PLACEMENT



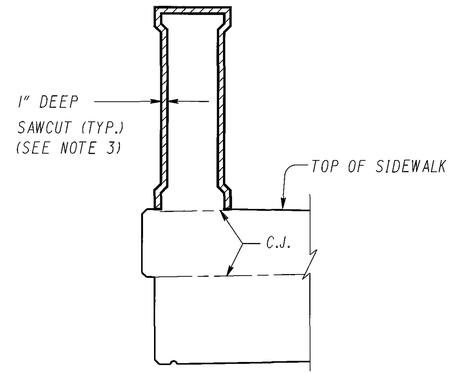
SECTION B-B



SECTION THRU WINDOW



SECTION D-D

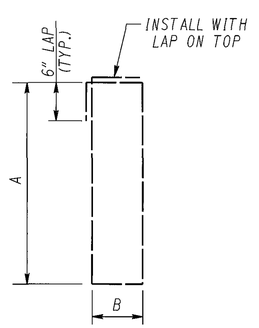


SECTION THRU SAWCUT CONTROL JOINT

EPOXY COATED REINFORCING STEEL LIST (SEE NOTE 1)

MARK	NUMBER				LENGTH	WEIGHT	TYPE	DIMENSIONS	
	PHASE 1	PHASE 2	RETAINING WALL	TOTAL		(LBS.)		A	B
RAILING :									
R501	6	6	- -	12	30'-0"	376	ST.		
R502	100	100	102	302	8'-0"	2520	5	3'-3"	6"
R503	- -	- -	2	2	3'-0"	7	ST.		
R504	- -	- -	2	2	37'-2"	78	ST.		
R701	6	6	- -	12	30'-0"	736	ST.		
R702	- -	- -	2	2	3'-2"	13	ST.		
R703	- -	- -	2	2	37'-2"	152	ST.		
TOTAL : (FOR INFORMATION ONLY)						3882			

LAP LENGTHS:
#5 BAR - 3'-2" MINIMUM
#7 BAR - 4'-10" MINIMUM



TYPE 5

NOTES:

1.) *REINFORCING STEEL LIST IS FOR INFORMATION ONLY. THE COST OF REINFORCING STEEL IS TO BE INCLUDED WITH THE COST OF RAILING.*

2.) *FOR DETAIL D, SEE SHEET NO.* 10/14.

3.) *CONTROL JOINTS FOR CONCRETE RAILING: SAWCUT 1" DEEP CONTROL JOINTS ALONG THE PERIMETER OF THE RAILING AS SOON AS THE SAW CAN BE OPERATED WITHOUT DAMAGING THE CONCRETE.*

USE AN EDGE GUIDE, FENCE OR JIG TO ENSURE THAT THE CUT JOINT IS STRAIGHT, TRUE AND ALIGNED ON ALL FACES OF THE PARAPET. THE JOINT WIDTH SHALL BE THE WIDTH OF THE SAW BLADE, A NOMINAL WIDTH OF ¼ INCH.

SEAL THE PERIMETER OF THE CONTROL JOINT TO A MINIMUM DEPTH OF ONE INCH WITH A POLYURETHANE OR POLYMERIC MATERIAL CONFORMING TO ASTM C920, TYPE S. LEAVE THE BOTTOM ONE-HALF INCH OF BOTH THE INSIDE AND OUTSIDE FACES OF THE RAILING UNSEALED TO ALLOW ANY WATER WHICH MAY ENTER THE JOINT TO ESCAPE.

DESIGN AGENCY O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
TKB	TKB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

RAILING DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

11 / 14

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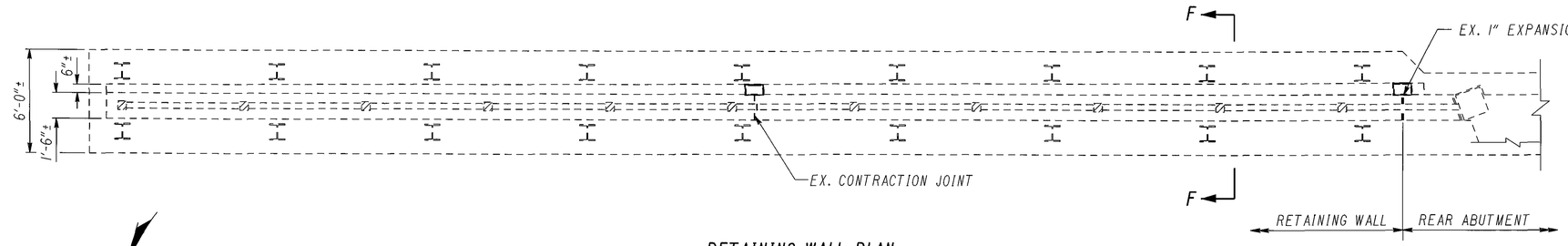
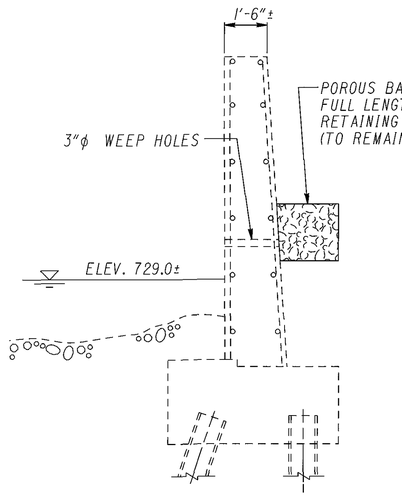
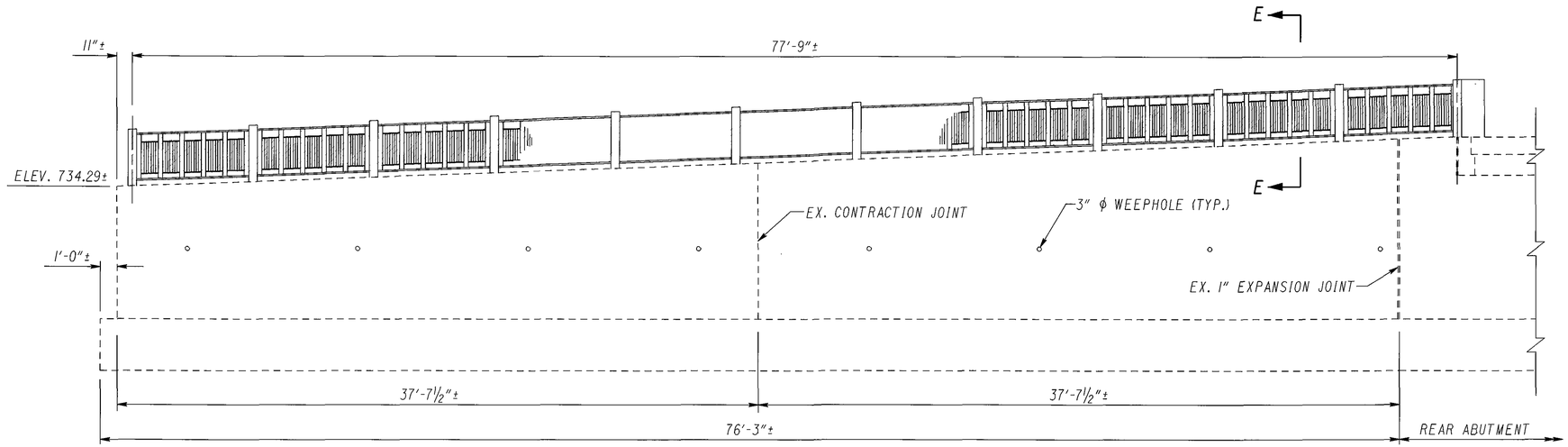


RETAINING WALL PLAN

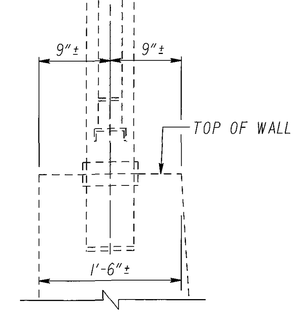


SECTION F-F

(SHOWN WITHOUT EXISTING RAILING)



RETAINING WALL ELEVATION



SECTION E-E

NOTES:

1.) REMOVE POSTS FLUSH WITH TOP OF RETAINING WALL.

- PORTIONS OF STRUCTURE TO BE REMOVED.

DESIGN AGENCY: O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
CCW	CCW	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

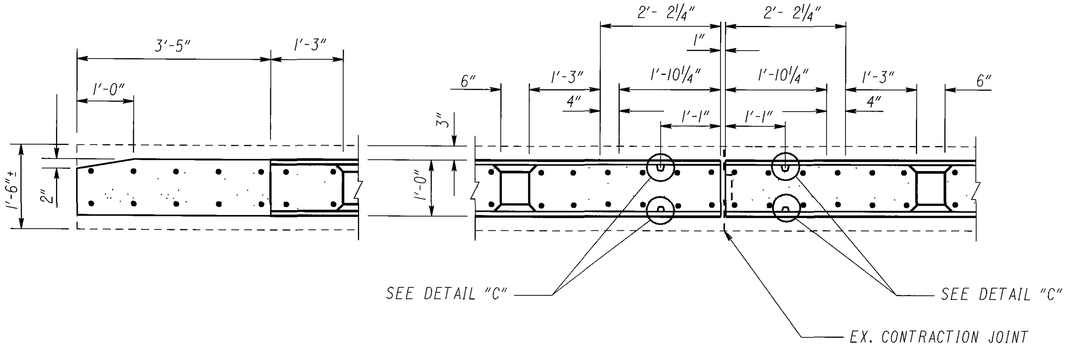
RETAINING WALL DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

12/14

29/31

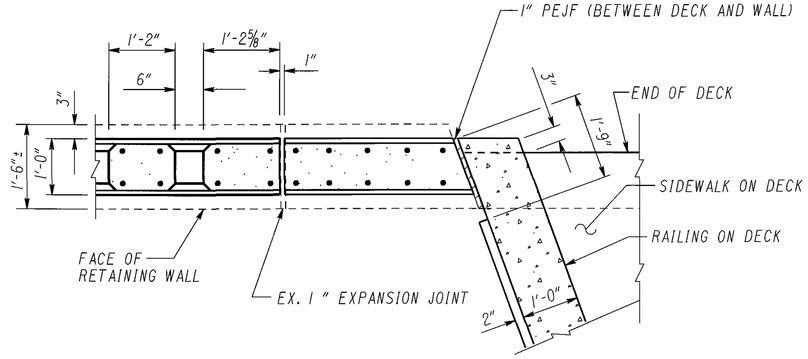


SECTION G-G

FOR DETAILS NOT SHOWN, SEE SECTION A-A

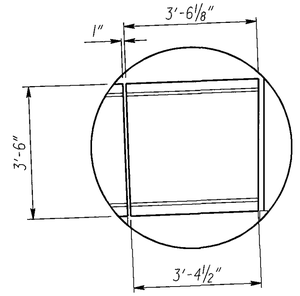
SECTION H-H

FOR DETAILS NOT SHOWN, SEE SECTION A-A

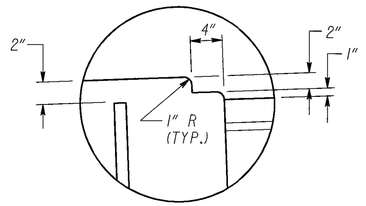


SECTION I-I

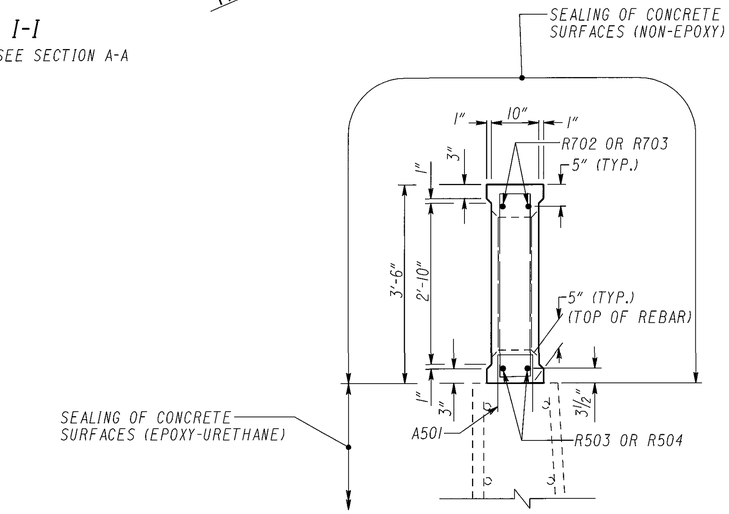
FOR DETAILS NOT SHOWN, SEE SECTION A-A



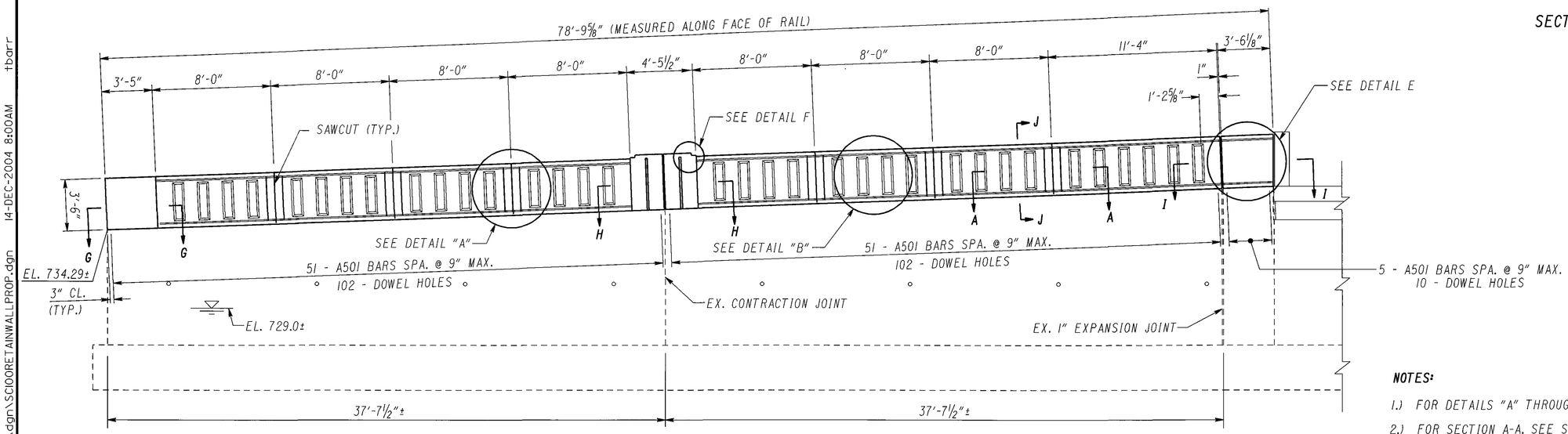
DETAIL E



DETAIL F



SECTION J-J



RETAINING WALL ELEVATION

NOTES:

1.) FOR DETAILS "A" THROUGH "D," SEE SHEET NO. 10/14 .

2.) FOR SECTION A-A, SEE SHEET NO. 11/14 .

3.) FOR SECTION THRU WINDOW, SEE SHEET NO. 11/14 .

4.) FOR FOR SECTION THROUGH SAWCUT CONTROL JOINT, SEE SHEET NO. 11/14 .

5.) FOR REINFORCING STEEL LIST, SEE SHEET NO. 11/14 .

DESIGN AGENCY
O.D.O.T.
DISTRICT 11
PRODUCTION DEPARTMENT

DESIGNED	DRAWN	REVIEWED	DATE
TKB	TKB	SAL	11-22-04
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JPB		4102673	

RETAINING WALL DETAILS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01

13/14

30/31

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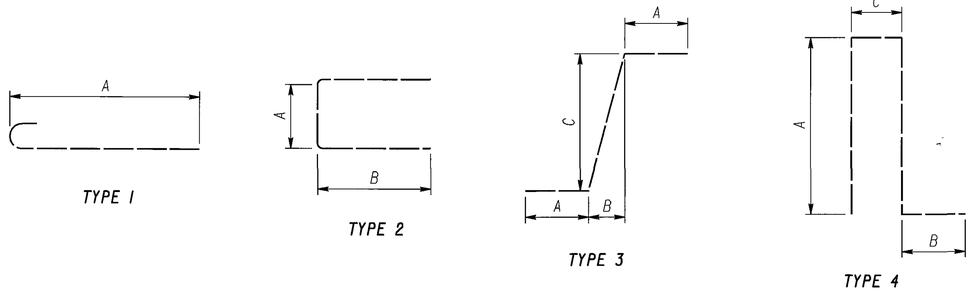
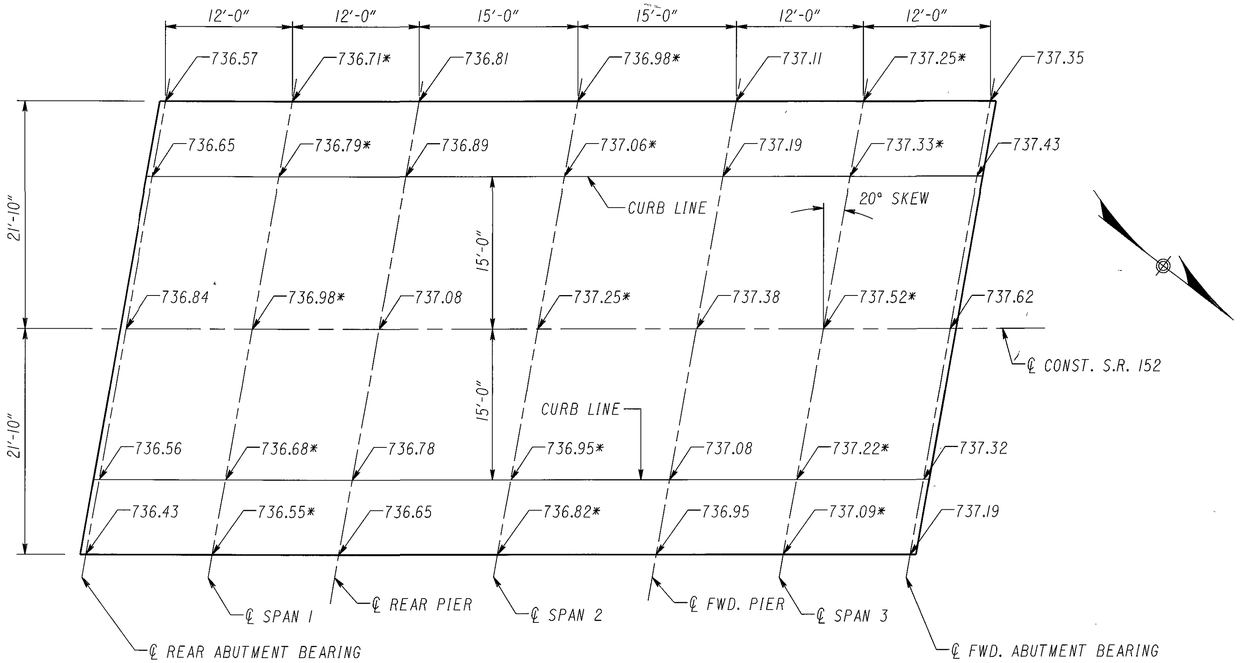
EPOXY COATED REINFORCING STEEL LIST

MARK	NUMBER PHASE 1	NUMBER PHASE 2	NUMBER TOTAL	LENGTH	WEIGHT	TYPE	DIMENSION A	DIMENSION B	DIMENSION C
SUPERSTRUCTURE :									
**S401	80	80	160	21'-11"	2450	STR.			
**S402	120	120	240	21'-11"	3675	STR.			
S403	24	24	48	12'-6"	401	STR.			
S404	26	26	52	17'-1"	593	STR.			
S405	12	12	24	17'-3"	277	STR.			
S406	110	110	220	4'-2"	612	2	1'-10"	1'-3"	
S407	110	110	220	2'-11"	429	3	10"	4"	1'-4½"
S408	110	110	220	6'-6"	955	STR.			
S409	21	21	42	30'-0"	842	STR.			
S501	104	104	208	5'-9"	1241	4	2'-5"	10"	6"
S801	28	28	56	20'-2"	3016	STR.			
S802	24	24	48	20'-0"	2564	STR.			
S803	24	24	48	18'-5"	2361	1	17'-3"		
S804	28	28	56	16'-0"	2393	STR.			
S805	14	14	28	18'-4"	1371	STR.			
S806	12	12	24	16'-9"	1074	STR.			
S807	12	12	24	16'-9"	1074	STR.			
S808	26	26	52	19'-6"	2708	STR.			
S809	26	26	52	17'-6"	2430	STR.			
S810	26	26	52	18'-10"	2615	STR.			
S811	24	24	48	18'-10"	2414	STR.			
S812	13	13	26	22'-1"	1533	STR.			
RETAINING WALL:									
A501	- -	107	107	2'-9"	307	2	6"	1'-3"	
TOTAL WEIGHT					37,335				

BENDING DIAGRAMS





SCREED ELEVATIONS
(PRIOR TO SIDEWALK PLACEMENT)

REINFORCING STEEL NOTES :

1. THE BAR SIZE NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST DIGIT WHERE THREE DIGITS ARE USED, AND THE FIRST TWO DIGITS WHERE FOUR ARE USED, INDICATES THE BAR SIZE NUMBER. FOR EXAMPLE, S501 IS A NO. 5 BAR. BAR DIMENSIONS SHOWN ARE OUT TO OUT UNLESS OTHERWISE NOTED. R INDICATES INSIDE RADIUS, UNLESS OTHERWISE NOTED.
2. ALL REINFORCING STEEL SHALL BE EPOXY COATED.
3. "STR" IN THE TYPE COLUMN INDICATES STRAIGHT BARS.
4. ALL DIMENSIONS ARE OUT TO OUT.
5. REFER TO C.M.S. SECTION 509.05 FOR STANDARD BEND DIMENSIONS.
6. ALL REINFORCING STEEL CLEARANCES ARE 2" UNLESS OTHERWISE NOTED.
7. ** - REQUIRES MECHANICAL CONNECTOR

MECHANICAL CONNECTORS :

AN APPROVED TYPE OF MECHANICAL CONNECTOR FOR REINFORCING SHALL BE PROVIDED. INSTALLATION OF CONNECTORS SHALL CONFORM WITH RECOMMENDED MANUFACTURER'S PROCEDURES. IF A DOWEL BAR SPLICE IS FURNISHED, THE MINIMUM DOWEL BAR LENGTH TO BE INCLUDED WITH THE CONNECTOR SHALL BE GIVEN BY THE DIMENSION "L" SHOWN BELOW :

#4 REINFORCING BAR L = 2'-11"

SCREED ELEVATIONS NOTES :

1. THE SCREED ELEVATIONS SHOWN ARE FOR THE SURFACE OF THE DECK PRIOR TO CONCRETE PLACEMENT. ALLOWANCE HAS BEEN MADE FOR THE ANTICIPATED CALCULATED DEAD LOAD DEFLECTION OF THE CONCRETE. ADDITIONALLY, ELEVATIONS MARKED WITH * SHALL BE ADJUSTED UPWARDS TO COMPENSATE FOR THE ANTICIPATED DEFLECTION OF THE FALSEWORK DUE TO THE WEIGHT OF THE CONCRETE DECK.
2. THE SCREED ELEVATIONS SHOWN ARE FOR THE SURFACE OF THE DECK PRIOR TO PLACEMENT OF THE SIDEWALK.

DESIGN AGENCY O.D.O.T. DISTRICT 11 PRODUCTION DEPARTMENT

DESIGNED CCW | DRAWN CCW | REVIEWED SAL | DATE 11-22-04

CHECKED JPB | REVISED | STRUCTURE FILE NUMBER 4102673

REINFORCING STEEL LIST & SCREED ELEVATIONS

BRIDGE NO. JEF-152-0001
OVER PINEY FORK CREEK

JEF-152-0.01
PID 21729

14/14

31/31

SPECIAL PROVISIONS

WATERWAY PERMITS FOR

CRS: JEF-152-0.01 (PID 21729)

U.S. ARMY CORPS OF ENGINEERS
PERMIT NUMBER: NWP #3 & #33

OHIO EPA
PERMIT NUMBER: _____

EFFECTIVE DATE: March 16, 2005

NATIONWIDE PERMIT #3 - MAINTENANCE

Activities related to:
(i) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, or current construction codes or safety standards which are necessary to make repair, rehabilitation, or replacement, are permitted, provided the adverse environmental effects resulting from such repair, rehabilitation, or replacement are minimal. Currently serviceable means useable as is or with some maintenance, but not so degraded as to essentially require reconstruction. This NWP authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the District Engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(ii) Discharges of dredged or fill material, including excavation, into all waters of the United States to remove accumulated sediments and debris in the vicinity of, and within, existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and the placement of new or additional rip rap to protect the structure, provided the permittee notifies the District Engineer in accordance with General Condition 13. The removal of sediment is limited to the minimum necessary to restore the waterway in the immediate vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend further than 200 feet in any direction from the structure. The placement of rip rap must be the minimum necessary to protect the structure or to ensure the safety of the structure. All excavated materials must be deposited and retained in an upland area unless otherwise specifically approved by the District Engineer under separate authorization. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the District Engineer.

(iii) Discharges of dredged or fill material, including excavation, into all waters of the United States for activities associated with the restoration of upland areas damaged by a storm, flood, or other discrete event, including the construction, placement, or installation of upland protection structures and minor dredging to remove obstructions in water of the US. (Uplands lost as a result of a storm, flood, or other discrete event can be replaced without a Section 404 permit provided the uplands are

restored to their original pre-event location. This NWP is for the activities in waters of the US associated with the replacements of the uplands.) The permittee must notify the District Engineer, in accordance with General Condition 13, within 12 months of the date of the damage and the work must commence, or be under contract to commence, within two years of the date of the damage. The permittee should provide evidence, such as a recent topographic survey or photographs, to justify the extent of the proposed restoration. The restoration of the damaged areas cannot exceed the contours, or ordinary high water mark, that existed before the damage. The District Engineer retains the right to determine the extent of the pre-existing conditions and the extent of any restoration work authorized by this permit. Minor dredging to remove obstructions from the adjacent waterbody is limited to 50 cubic yards below the plane of the ordinary high water mark, and is limited to the amount necessary to restore the pre-existing bottom contours of the waterbody. The dredging may not be done primarily to obtain fill for any restoration activities. The discharge of dredged or fill material and all related work needed to restore the upland must be part of a single and complete project. This permit cannot be used in conjunction with NWP 18 or NWP 19 to restore damaged upland areas. This permit cannot be used to reclaim historic lands lost, over an extended period, to normal erosion processes.

This permit does not authorize maintenance dredging for the primary purpose of navigation and beach restoration. This permit does not authorize new stream channelization or stream relocation projects. Any work authorized by this permit must not cause more than minimal degradation of water quality, more than minimal changes to the flow characteristics of the stream, or increase flooding (See General Conditions 9 and 21).

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure of fill that does not qualify for the Section 404(f) exemption for maintenance.

Nationwide 3 Specific Regional Conditions

i. Notification required prior to the use of vertical sheet piling and closed structures in the special habitat waters of Lake Erie (See General Conditions, Critical Resource waters (1)).

ii. The Pre-Construction Notification (PCN) for activities involving the removal of accumulated sediments and debris in the vicinity of existing structures, to restore the waterway to the approximate dimensions that existed when the structure was built, must include evidence of such dimensions. If this information is not available, the PCN must include evidence of the existing depths immediately outside the proposed work area.

WATER QUALITY CERTIFICATION

Pursuant to Section 401 of the Clean Water Act, the Ohio Environmental Protection Agency hereby certifies that activities authorized by these Permits, undertaken in accordance with all of the special and general conditions listed below, will comply with the applicable provisions of the Clean Water Act and applicable Ohio water quality standards. Those NWPs with no special Water Quality Certification (WQC) conditions remain subject to general WQC conditions unless otherwise indicated (Reference 1 below).

Water Quality Certification – Special Conditions:

The Ohio State Certification General Limitations and Conditions apply to this nationwide permit.

Ohio State Water Quality Certification Special Conditions and Limitations:

1. Total surface water and vegetation impacts on either side of the replacement structure shall be limited to the greater of 25 feet beyond the structure, or 25 feet beyond the toe of the slope of the structure's approach embankment. [Where the use of a crane is necessary to conduct a maintenance activity, total impacts shall not exceed 50 feet on either side of the structure or approach embankment]. In either case, total impacts, including the structure, shall not exceed 200 feet [except for stabilization projects]. Width shall be measured at the structure's narrowest point as it crosses the waterbody, and be measured parallel to stream flow.

2. Culvert replacement:
   a. This Certification shall only authorize minor deviations from the existing structure's centerline and minor deviations in culvert dimensions, unless these deviations are necessary to follow current safety standards.

3. Bridge Replacement:
   a. This Certification shall only authorize minor deviations from the existing structure's centerline, unless these deviations are necessary to follow current safety standards.
   b. Bridge replacements shall not result in additional lanes unless necessary to follow current safety standards.

4. Maintenance or repair of existing fills (stabilization projects):
   a. Impacts from maintenance or repair of existing fills shall not exceed the dimensions of the fill prior to the damage; and
   b. This nationwide shall not authorize the replacement of existing structures that are open to the flow of water with structures that are not open to the flow of water.

5. For replacement vertical bulkheads, the following conditions apply:
   a. For ship channels and harbors adjacent to federal navigation channels within the following harbors: Sandusky Harbor, Huron Harbor, Vermilion Harbor, Lorain Harbor, Conneaut Harbor, Port Clinton Harbor, Rocky River Harbor, Cleveland Harbor, Fairport Harbor, Ashtabula Harbor, and Toledo Harbor, 1,000 feet of existing vertical bulkheads may be replaced if recessed areas for aquatic habitat, or other aquatic habitat improvements, are incorporated within the design and construction of the replacement vertical bulkhead;
   b. For all other areas, except Lake Erie, Lake Erie Islands, or Sandusky Bay, up to 1,000 feet of existing vertical bulkheads may be replaced. Toe stone shall be placed at the base of these replacement vertical bulkheads except in areas where the shoreline is composed of bedrock and slopes are predominately greater than 75 percent;

c. Replacement vertical bulkheads are not to be placed more than one foot waterward of the intersection of the ordinary high water level of the waterbody and the existing shoreline;

d. Minor dredging necessary for the installation of the replacement vertical bulkhead is authorized;

e. Placement of fill between the replacement vertical bulkhead and existing shoreline is authorized; and

f. Toe stone shall be placed at the base of these replacement vertical bulkheads except in areas where the original shoreline is composed of bedrock and slopes are predominately greater than 75 percent or where the placement of toe stone would interfere with shipping activity. When required, toe stone shall be placed at an average rate of one-third the total height of the replacement vertical bulkhead at a 2:1 slope.

6. Removal of accumulated sediment:

a. Removal of accumulated sediment shall occur only once per year, except in cases of emergency situations which threaten life of property.

B. Removal of accumulated sediments shall be limited to low-flow conditions whenever practicable, except in cases of emergency situations which threaten life or property.

NATIONWIDE PERMIT #33 - TEMPORARY CONSTRUCTION, ACCESS and DEWATERING

Temporary structures, work and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided that the associated primary activity is authorized by the Corps of Engineers or the USCG, or for other construction activities not subject to the Corps or USCG regulations. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must be of materials, and placed in a manner, that will not be eroded by expected high flows. The use of dredged material may be allowed if it is determined by the District Engineer that it will not cause more than minimal adverse effects on aquatic resources. Temporary fill must be entirely removed to upland areas, or dredged material returned to its original location, following completion of the construction activity, and the affected areas must be restored to the pre-project conditions. Cofferdams cannot be used to dewater wetlands or other aquatic areas to change their use. Structures left in place after cofferdams are removed require a Section 10 permit if located in navigable waters of the U.S. (See 33 CFR part 322). The permittee must notify the District Engineer in accordance with the "Notification" General Condition. The notification must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources. The District Engineer will add Special Conditions, where necessary, to ensure environmental adverse effects is minimal. Such conditions may include: limiting the temporary work to the minimum necessary; requiring seasonal restrictions; modifying the restoration plan; and requiring alternative construction methods (e.g. construction mats in wetlands where practicable.). **(Sections 10 and 404)**

WATER QUALITY CERTIFICATION

Pursuant to Section 401 of the Clean Water Act, the Ohio Environmental Protection Agency hereby certifies that activities authorized by these Permits, undertaken in accordance with all of the special and general conditions listed below, will comply with the applicable provisions of the Clean Water Act and applicable Ohio water quality standards. Those NWPs with no special Water Quality Certification (WQC) conditions remain subject to general WQC conditions unless otherwise indicated (Reference 1 below).

Water Quality Certification – Special Conditions:

The Ohio State Certification General Limitations and Conditions apply to this nationwide permit.

Ohio State Certification Special Limitations and Conditions:

1) Temporary shall be defined as less than one year in duration;
2) This Nationwide Permit does not authorize construction, or maintenance, or modification of marina basins;
3) This Nationwide Permit does not authorize activities in special aquatic sites as defined in 40 CFR 230.3(q-1);
4) This Nationwide Permit shall not authorize temporary construction access and dewatering associated with mining activities.

NATIONWIDE PERMIT CONDITIONS

GENERAL CONDITIONS:

The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. No activity may cause more than a minimal adverse effect on navigation.

2. Proper Maintenance. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

4. Aquatic Life Movements. No activity may substantially disrupt the necessary life-cycle movements of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

5. Equipment. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions which may have been added by the division engineer (see 33 CFR 330.4(e) and with any case specific conditions added by the Corps or by the State or tribe in its section 401 Water Quality Certification and Coastal Zone management Act consistency determination.

7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

8. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water Quality.

(a) In certain States and tribal lands an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)).

(b) For NWPs 12, 14, 17, 18, 32, 39, 40, 42, 43, and 44, where the State or tribal 401 certification (either generically or individually) does not require or approve water quality management measures, the permittee must provide water quality management measures that will ensure that the authorized work does not result in more than minimal degradation of water quality (or the Corps determines that compliance with state or local standards, where applicable, will ensure no more than minimal adverse effect on water quality). An important component of water quality management includes stormwater management that minimizes degradation of the downstream aquatic system, including water quality (refer to General Condition 21 for stormwater management requirements). Another important component of water quality management is the establishment and maintenance of vegetated buffers next to open waters, including streams (refer to General Condition 19 for vegetated buffer requirements for the NWPs). This condition is only applicable to projects that have the potential to affect water quality. While appropriate measures must be taken, in most cases it is not necessary to conduct detailed studies to identify such measures or to require monitoring.

10. Coastal Zone Management. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).

11. Endangered Species.

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, or is located in the designated critical habitat and shall not begin work on the activity until notified by the District Engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the FWS or NMFS, the District Engineer may add species-specific regional endangered species conditions to the NWPs.

(b) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the National Marine Fisheries Service (NMFS), both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their World Wide Web pages at http://www.fws.gov/r9endspp/endspp.html and http://www.nmfs.noaa.gov/prot_res/overview/es.html, respectively.

12. Historic properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

13. Notification.

(a) Timing: where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a preconstruction notification (PCN) as early as possible. The District Engineer must determine if the PCN is complete within 30 days of the date of receipt and can request the additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the District Engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the District Engineer. The prospective permittee shall not begin the activity:

(1) Until notified in writing by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified in writing by the District or Division Engineer that an individual permit is required; or

(3) Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Notification: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.);

(4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 40, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));

(5) For NWP 7 (Outfall Structures and Maintenance), the PCN must include information regarding the original design capacities and configurations of those areas of the facility where maintenance dredging or excavation is proposed.

(6) For NWP 14 (Linear Transportation Crossings), the PCN must include a compensatory mitigation proposal to offset permanent losses of waters of the US and a statement describing how temporary losses of waters of the US will be minimized to the maximum extent practicable;

(7) For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the

activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing;

(8) For NWP 27 (Stream and Wetland Restoration Activities), the PCN must include documentation of the prior condition of the site that will be reverted by the permittee.

(9) For NWP 29 (Single-Family Housing), the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 1/4 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 1/4 acre in size, formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(10) For NWP 31 (Maintenance of Existing Flood Control Facilities), the prospective permittee must either notify the District Engineer with a PCN prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information identifying the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site;

(11) For NWP 33 (Temporary Construction, Access, and Dewatering), the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources;

(12) For NWPs 39, 43, and 44, the PCN must also include a written statement to the District Engineer explaining how avoidance and minimization for losses of waters of the US were achieved on the project site;

(13) For NWP 39 and NWP 42, the PCN must include a compensatory mitigation proposal to offset losses of waters of the US or justification explaining why

compensatory mitigation should not be required. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;
(14) For NWP 40 (Agricultural Activities), the PCN must include a compensatory mitigation proposal to offset losses of waters of the US. This NWP does not authorize the relocation of greater than 300 linear-feet of existing serviceable drainage ditches constructed in non-tidal streams unless, for drainage ditches constructed in intermittent non-tidal streams, the District Engineer, waives this criterion in writing, and the District Engineer has determined that the project complies with all terms and conditions of this NWP, and that any adverse impacts of the project on the aquatic environment are minimal, both individually and cumulatively;
(15) For NWP 43 (Stormwater Management Facilities), the PCN must include, for the construction of new stormwater management facilities, a maintenance plan (in accordance with state and local requirements, if applicable) and a compensatory mitigation proposal to offset losses of waters of the US. For discharges that cause the loss of greater than 300 linear feet of an intermittent stream bed, to be authorized, the District Engineer must determine that the activity complies with the other terms and conditions of the NWP, determine adverse environmental effects are minimal both individually and cumulatively, and waive the limitation on stream impacts in writing before the permittee may proceed;
(16) For NWP 44 (Mining Activities), the PCN must include a description of all waters of the US adversely affected by the project, a description of measures taken to minimize adverse effects to waters of the US, a description of measures taken to comply with the criteria of the NWP, and a reclamation plan (for all aggregate mining activities in isolated waters and non-tidal wetlands adjacent to headwaters and any hard rock/mineral mining activities);
(17) For activities that may adversely affect Federally-listed endangered or threatened species, the PCN must include the name(s) of those endangered or threatened species that may be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work; and
(18) For activities that may affect historic properties listed in, or eligible for listing in, the National Register of Historic Places, the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property.

(c) Form of Notification: The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(18) of General Condition 13. A letter containing the requisite information may also be used.

(d) District Engineer's Decision: In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either:

(1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit;
(2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or
(3) that the project is authorized under the NWP with specific modifications or conditions.

Where the District Engineer determines that mitigation is required in order to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitgation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

(e) Agency Coordination: The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. For activities requiring notification to the District Engineer that result in the loss of greater than ½ acre of waters of the US, the District Engineer will provide

immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(f) Wetland Delineations: Wetland Delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than 1/4-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

14. Compliance Certification. Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:

(a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;

(b) A statement that any required mitigation was completed in accordance with the permit conditions; and

(c) The signature of the permittee certifying the completion of the work and mitigation .

15. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).

16. Water Supply Intakes. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in the proximity of a public water supply intake except where the activity is for repair of the public water supply intake structures or adjacent bank stabilization.

17. Shellfish Beds. No activity, including structures and work in navigable waters of the US or discharges of dredged or fill material, may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWP 4.

18. Suitable Material. No activity, including structures and work in navigable waters of the US discharges of dredged or fill material, may consist of unsuitable material (e.g. trash, debris, car bodies, asphalt, etc.) and material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the CWA).

19. Mitigation. The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse affects on the aquatic environment that are more than minimal.

(a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.

(d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWPs. For example, 1/4-acre of wetlands cannot be created to change a 3/4-acre loss of wetlands to a ½-acre loss associated with NWP 39 verification. However, ½-acre of created wetlands can be used to reduce the impacts of a ½-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.

(e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed;

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineer may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open

waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.

(g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the US.

(h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

20. Spawning Areas. Activities, including structures and work in navigable waters of the US or discharges of dredged or fill material, in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized.

21. Management of Water Flows. To the maximum extent practicable, the activity must be designed to maintain preconstruction downstream flow conditions (e.g., location, capacity, and flow rates). Furthermore, the activity must not permanently restrict or impede the passage of normal or expected high flows (unless the primary purpose of the fill is to impound waters) and the structure or discharge of dredged or fill material must withstand expected high flows. The activity must, to the maximum extent practicable, provide for retaining excess flows from the site, provide for maintaining surface flow rates from the site similar to preconstruction conditions, and provide for not increasing water flows from the project site, relocating water, or redirecting water flow beyond preconstruction conditions. Stream channelizing will be reduced to the minimal amount necessary, and the activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site, unless the activity is part of a larger system designed to manage water flows. In most cases, it will not be a requirement to conduct detailed studies and monitoring of water flow. This condition is only applicable to projects that have the potential to affect waterflows. While appropriate measures must be taken, it is not necessary to conduct detailed studies to identify such measures or require monitoring to ensure their effectiveness. Normally, the Corps will defer to state and local authorities regarding management of water flow.

22. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to the acceleration of the passage of water, and/or the restricting its flow shall be minimized to the maximum extent practicable. This includes structures and work in navigable waters of the US, or discharges of dredged or fill material.

23. Waterfowl Breeding Areas. Activities, including structures and work in navigable waters

of the US or discharges of dredged or fill material, into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

24. Removal of Temporary Fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

25. Designated Critical Resource Waters. Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, National Wild and Scenic Rivers, critical habitat for Federally listed threatened and endangered species, coral reefs, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the District Engineer after notice and opportunity for public comment. The District Engineer may also designate additional critical resource waters after notice and opportunity for comment.

(a) Except as noted below, discharges of dredged or fill material into waters of the US are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, and 44 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters. Discharges of dredged or fill materials into waters of the US may be authorized by the above NWPs in National Wild and Scenic Rivers if the activity complies with General Condition 7. Further, such discharges may be authorized in designated critical habitat for Federally listed threatened or endangered species if the activity complies with General Condition 11 and the USFWS or the NMFS has concurred in a determination of compliance with this condition.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with General Condition 13, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The District Engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

26. Fills Within 100-Year Floodplains. For purposes of this General Condition, 100-year floodplains will be identified through the existing Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps or FEMA-approved local floodplain maps.

(a) Discharges in Floodplain; Below Headwaters. Discharges of dredged or fill material into waters of the US within the mapped 100-year floodplain, below headwaters (i.e., five cfs), resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, 43, and 44.

(b) Discharges in Floodway; Above Headwaters. Discharges of dredged or fill material into waters of the US within the FEMA or locally mapped floodway, resulting in permanent above-grade fills, are not authorized by NWPs 39, 40, 42, and 44.

(c) The permittee must comply with any applicable FEMA-approved state or local floodplain management requirements.

27. Construction Period. For activities that have not been verified by the Corps and the project

was commenced or under contract to commence by the expiration date of the NWP (or modification or revocation date), the work must be completed within 12-months after such date (including any modification that affects the project). For activities that have been verified and the project was commenced or under contract to commence within the verification period, the work must be completed by the date determined by the Corps. For projects that have been verified by the Corps, an extension of a Corps approved completion date may be requested. This request must be submitted at least one month before the previously approved completion date.

FURTHER INFORMATION

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other Federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

DEFINITIONS

Best Management Practices (BMPs): BMPs are policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural. A BMP policy may affect the limits on a development.

Compensatory Mitigation: For purposes of Section 10/404, compensatory mitigation is the restoration, creation, enhancement, or in exceptional circumstances, preservation of wetlands and/or other aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Creation: The establishment of a wetland or other aquatic resource where one did not formerly exist.

Enhancement: Activities conducted in existing wetlands or other aquatic resources that increase one or more aquatic functions.

Ephemeral Stream: An ephemeral stream has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Farm Tract: A unit of contiguous land under one ownership that is operated as a farm or part of a farm.

Flood Fringe: That portion of the 100-year floodplain outside of the floodway (often referred to as "floodway fringe").

Floodway: The area regulated by Federal, state, or local requirements to provide for the discharge of the base flood so the cumulative increase in water surface elevation is no more than a designated amount (not to exceed one foot as set by the National Flood Insurance Program) within the 100-year floodplain.

Independent Utility: A test to determine what constitutes a single and complete project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Intermittent Stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water from stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of Waters of the US: Waters of the US that include the filled area and other waters that are permanently adversely affected by flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent above-grade, at-grade, or below-grade fills that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the US is the threshold measurement of the impact to existing waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and values. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Impacts to ephemeral streams are not included in the linear foot measurement of loss of stream bed for the purpose of determining compliance with the linear foot limits of NWPs 39, 40, 42, and 43. Water of the US temporarily filled, flooded, excavated, or drained, but restored to preconstruction contours and elevations after construction, are not included in the measurement of loss of waters of the US.

Non-tidal Wetland: A non-tidal wetland is a wetland (i.e., a water of the US) that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open Water: An area that, during a year with normal patterns of precipitation, has standing or flowing water for sufficient duration to establish an ordinary high water mark. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. The term "open water" includes rivers, streams, lakes, and ponds. For the purposes of the NWPs, this term does not include ephemeral

waters.

Perennial Stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Permanent Above-grade Fill: A discharge of dredged or fill material into waters of the US, including wetlands, that results in a substantial increase in ground elevation and permanently converts part or all of the waterbody to dry land. Structural fills authorized by NWPs 3, 25, 36, etc. are not included.

Preservation: The protection of ecologically important wetlands or other aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include protection of upland areas adjacent to wetlands as necessary to ensure protection and/or enhancement of the overall aquatic ecosystem.

Restoration: Re-establishment of wetland and/or other aquatic resource characteristics and function(s) at a site where they have ceased to exist, or exist in a substantially degraded state.

Riffle and Pool Complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Single and Complete Project: The term single and complete project is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers (see definition of independent utility). For linear projects, the single and complete project (i.e., a single and complete crossing) will apply to each crossing of a separate water of the US (i.e., a single waterbody) at that location. An exception is for linear projects crossing a single waterbody several times at separate and distant locations: each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies.

Stormwater Management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater Management Facilities: Stormwater management facilities are those facilities,

including but not limited to, stormwater retention and detention ponds and BMPs, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream Bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream Channelization: The manipulation of a stream channel to increase the rate of water flow through the stream channel. Manipulation may include deepening, widening, straightening, armoring, or other activities that change the stream cross-section or other aspects of stream channel geometry to increase the rate of water flow through the stream channel. A channelized stream remains a water of the US, despite the modifications to increase the rate of water flow.

Tidal Wetland: A tidal wetland is a wetland (i.e., water of the US) that is inundated by tidal waters. The definition of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line (i.e., spring high tide line) and are inundated by tidal waters two times per lunar month, during spring high tides.

Vegetated Buffer: A vegetated upland or wetland area next to rivers, streams, lakes, or other open waters which separates the open water from developed areas, including agricultural land. Vegetated buffers provide a variety of aquatic habitat functions and values (e.g., aquatic habitat for fish and other aquatic organisms, moderation of water temperature changes, and detritus for aquatic food webs) and help improve or maintain local water quality. A vegetated buffer can be established by maintaining an existing vegetated area or planting native trees, shrubs, and herbaceous plants on land next to open-waters. Mowed lawns are not considered vegetated buffers because they provide little or no aquatic habitat functions and values. The establishment and maintenance of vegetated buffers is a method of compensatory mitigation that can be used in conjunction with te restoration, creation, enhancement, or preservation of aquatic habitats to ensure that activities authorized by NWPs result in minimal adverse effects to the aquatic environment. (See General Condition 19.)

Vegetated Shallows: Vegetated shallows are special aquatic sties under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: A waterbody is any area that in a normal year has water flowing or standing above

ground to the extent that evidence of an ordinary high water mark is established. Wetlands contiguous to the waterbody are considered part of the waterbody.

REGIONAL GENERAL CONDITIONS

1. Notifications for all Nationwide permits should include a location map (USGS topographical map) and project drawings on 8.5" x 11" paper.

2. Nationwide Permits shall not authorize any activity which impact bogs and/or fens.

3. No Nationwide permit may be used in Lake Erie for purposes of diverting water from the Great Lakes.

4. In order to determine if a project meets the terms and conditions of the Ohio EPA's 401 water quality certification, two copies of the following information is necessary:

(a) All wetland delineations must include the latest approved version of the Ohio Rapid Assessment Method (ORAM) for wetland evaluation, long form. (This will assist OEPA in determining the category of wetland the applicant proposes to impact.)

(b) Photographs of the wetland.

NOTE: This information is in addition to the required information listed under General Condition 13 (Notification) of the NWP.

5. Notification is required for all work in the following designated Critical Resource Waters:

Special Habitat water of Lake Erie: Special habitat waters of Lake Erie including the shoreline, off shore islands, rock outcrops, and adjacent waters within the boundaries defined as 82 22' 30" West Longitude, 83 07' 30" West Longitude, 41 33' 00" North Latitude and 42 00' 00" North Latitude.

Piping Plover Critical Habitat: In Ohio, two areas have been designated critical habitat for the piping plover (Charadrius melodus) and are defined as lands 0.62 miles inland from normal high water line. Unit OH-1, extends from the mouth of Sawmill Creek to the western property boundary of Sheldon Marsh State Natural Area, Erie County, encompassing approximately 2.0 miles. Unit OH-2, extends from the eastern boundary line of Headland Dunes Nature Preserve to the western boundary of the Nature Preserve and Headland Dunes State Park, Lake County, encompassing approximately 0.5 mile.

Big and Little Darby Creeks (National Wild and Scenic River System): Big Darby Creek from Champaign-Union County line downstream to the Conrail railroad trestle and from the confluence with the Little Darby Creek downstream to the Scioto River. Little

Darby Creek from the Lafayette-Plain City Road Bridge downstream to within 0.8 mile from the confluence with Big Darby Creek. Total designation is approximately 82 miles.

Little Beaver Creek (National Wild and Scenic River System): Little Beaver Creek main stem, from the confluence of West Fork with Middle Fork near Williamsport to mouth; North Fork from confluence of Brush Run and North Fork to confluence of North Fork with main stem at Fredericktown; Middle Fork from vicinity of Co. Rd. 901 (Elkton Road) bridge crossing to confluence of Middle Fork with West Fork near Williamsport; West Form from vicinity of Co. Rd. 914 (Y-Camp Road) bridge crossing east to confluence of West Fork with Middle Fork near Williamsport. Total designation is 33 miles

Little Miami River: (Scenic component of the National System from Clifton to Foster) The portion from Foster to the Ohio River was designated a Recreational component of the National System. Total designation is 92 miles.

6. Notification is required for all activities in state Wild and Scenic Rivers (see list below). The following are **State Wild and Scenic Rivers**:

Little Miami River - Clermont County line at Loveland to headwaters, including North Fork, Clermont County line at Loveland to confluence with East Fork and from the confluence with East Fork to Ohio River. Miles designated (approximate): 105

Sandusky River - US Rt. 30 in Upper Sandusky to Roger Young Memorial Park in Fremont. Miles designated (approximate): 65

Olentangy River - Delaware Dam to Old Wilson Road in Worthington. Miles designated (approximate): 22

Little Beaver Creek - Wild segments - West Fork from 1/4 mile downstream from Twp. Rd. 914 to confluence with Middle Fork. North Fork from Twp. Rd. 952 to confluence with Little Beaver Creek. Little Beaver Creek from confluence of West and Middle Forks downstream to 3/4 mile north of Grimm's Bridge. Scenic segments - North Fork from Ohio-Pennsylvania line downstream to Jackman Road. Middle Fork from Elkton Rd. (Twp. Rd. 901) downstream to confluence with West Fork. Little Beaver Creek from 3/4 mile north of Grimm's Bridge downstream to the Ohio-Pennsylvania line. Miles designated (approximate): Wild 20, Scenic 16

Grand River - Wild segment - from Harpersfield covered bridge downstream to Norfolk and Western Railroad trestle south of Painesville. Scenic segment - from St. Rt. 322 bridge in Ashtabula County downstream to Harpersfield covered bridge. Miles designated (approximate): Scenic 33, Wild 23

Upper Cuyagoga River - Troy-Burton Township line in Geauga County to US Rt. 14.

Miles designated (approximate): 25

Maumee River - Scenic segment - Ohio-Indiana line to St. Rt. 24 bridge west of Defiance. Recreational segment - St. Rt. 24 bridge west of Defiance to US Rt. 25 bridge near Perrysburg. Miles designated (approximate): Scenic 43, Recreational 53

Stillwater River System - Recreational segment - Englewood dam to confluence with Great Miami River. Scenic segments - Stillwater River from Riffle Road bridge in Darke Co. to Englewood dam. Greenville Creek from the Ohio-Indiana state line to the confluence with the Stillwater. Miles designated (approximate): Scenic 83, Recreational 10

Chagrin River - Aurora Branch from St. Rt. 82 bridge downstream to confluence with Chagrin. Chagrin River from confluence with Aurora Branch downstream to St. Rt. 6 bridge. East Branch from Heath Road bridge downstream to confluence with Chagrin. Miles designated (approximate): 49

Big and Little Darby Creeks - Big Darby Creek from the Champaign-Union County line downstream to the U.S. Rt. 40 Bridge, from the northern boundary of Battelle-Darby Creek Metro Park to the confluence with the Little Darby Creek downstream to the Scioto River. Little Darby Creek from the Lafayette-Plain City Road Bridge downstream to the confluence with Big Darby Creek. Miles designated (approximate): 84

Kokosing River - Knox/Morrow County line to confluence with Mohican River. North Branch of Kokosing from confluence with East Branch downstream to confluence with main stem. Miles designated (approximate): 48

OHIO STATE CERTIFICATION GENERAL LIMITATIONS AND CONDITIONS (WATER QUALITY CERTIFICATION)

1. Streams

a) Temporary or permanent impacts to intermittent and perennial streams for any single and complete project are limited to a maximum of two hundred (200) linear feet [except for NWPs 3, 12, 21, 27, and 41];

b) Temporary or permanent impacts to ephemeral streams for any single and complete project are limited to a maximum of three hundred (300) linear feet [except for NWPs 3, 12, 21, 27, and 41];

c) Temporary or permanent impacts to Exceptional Warmwater Habitat (EWH), Cold Water Habitat (CWH), Seasonal Salmonid (SS), or any equivalent designation, or with an antidegradation category of State Resource Water, Superior High Quality Water (except as it applies to Lake Erie), Outstanding National Resource Waters, or Outstanding High

Quality Waters are prohibited [except for NWP 3 and maintenance activities covered under NWP 7, 12, and 33];

d) Temporary or permanent impacts to the designated portions of national or state scenic rivers are prohibited [except for NWP 3 and maintenance activities under NWP 12];

e) Stream reconstruction activities shall adhere to natural channel design techniques;

f) Off-site stream or buffer improvements and/or mitigative measures required by the Corps:

i. In order of priority, these measures shall focus on 1) the stream segment being impacted, 2) upstream segments and tributaries, 3) the receiving stream. The measures should, to the extent practicable, consider the causes and sources of impairment of the stream where the measures would be undertaken if the stream is listed as impaired in the most recent final report submitted to the United States environmental protection agency by the director of Ohio EPA to fulfill the requirements of Section 303(d) of the Clean Water Act. The current list of impaired streams, as of the date of this certification, can be found on the Ohio EPA web site at (Tables 1 through 6):
http://www.epa.state.oh.us/dsw/tmdl/303dnotc.html

ii. If the applicant cannot find appropriate mitigation on streams listed in section a) above, mitigation shall be in the Ohio EPA 8-digit watershed.

g) On-site stream or buffer improvements and/or mitigative measures required by the Corps:

i. Vegetative buffers on both stream banks an appropriate length; and

ii. A minimum width of 25 feet for preservation of existing vegetative buffers; or
iii. A minimum width of 50 feet for re-vegetating buffers cleared during construction.

h) Compensatory mitigation for linear projects (e.g., highways) in streams may be mitigated for by the following, in descending order of practicability:

i. Stream impacts associated with a linear project may be mitigated on-site, defined as within one mile of the linear project, in each Ohio EPA 8-digit watershed as shown in OAC 3745-1-54(F)(2); or
ii. Stream impacts associated with a linear project may be mitigated at a single stream mitigation location or stream mitigation bank (if and when such a bank is established), acceptable to the director, within each Ohio EPA 8-digit watershed in which the impacts occur; or
iii. If no stream mitigation bank, acceptable to the director, is located within the Ohio EPA 8-digit watershed in which the impact occurs, then mitigation may occur in another Ohio EPA 8-digit watershed impacted by the linear project; at a

single stream mitigation location, or a stream mitigation bank acceptable to the director; or
iv. In no stream mitigation bank exists within any of the watersheds connected with the linear project, then mitigation should occur within the watershed in which the largest impacts (in terms of area) occur.

2. Wetlands

a) Temporary or permanent impacts to Category 3 wetlands are prohibited.

b) Temporary or permanent impacts to Category 1 and 2 wetlands for any single and complete project are limited to a maximum total of ½ acre [except for NWP 21 & 27].

c) Wetland mitigation shall adhere to the requirements set forth in Ohio EPA's Wetland Water Quality Standards (OAC 3745-1-50 through 54). [In the event that suitable mitigation cannot be located on-site (within one mile) or within the watershed, mitigation may be located outside of the watershed if there are significant ecological reasons to do so].

3. General

a) Impacts shall be measured linearly from upstream to downstream, including the length of stream impoundments, when calculating the total length of stream impacts [except for NWP 12, for which impacts shall be measured bank-to-bank].

b) NWPs cannot be combined to increase any of the aforementioned limitations.

c) Authorization under this Certification does not relieve the permittee from the responsibility of obtaining any other federal, state or local permits, approvals or authorizations required by law including without limitation, National Pollutant Discharge Elimination System (NPDES) permits or Permits to install (PTIs).

d) In order to control pollution of public waters by soil sediment from accelerated stream channel erosion and flood plain erosion caused by accelerated stormwater runoff from development areas, permittees shall comply with Ohio Administrative Code 1501:15-1-05 Stream Channel and Floodplain Erosion, or successor rule, as applicable to the project pursuant to OAC 1501:15-1-02.

e) OAC 1501:15-1-05 states that the peak rates of runoff from an area after development may be no greater than the peak rates of runoff from the same area before development for all twenty-four-hour storms from one to one-hundred-year frequency.

f) Locally required post development stormwater ponds shall incorporate specific design features for water quality such as those listed in Chapter One of the Ohio Department of Natural Resource's *Rainwater and Land Development: Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection, 2nd Ed. Mecklenburg.*

Dan. Ohio Department of Natural Resources, Division of Soil and Water Conservation, 1996 (or successor document), to the extent allowed by local stormwater requirements. These features include: infiltration trenches, extended detention, wet pools, forebays, aquatic benches and wetlands, optimum flow length, reverse flow pipe, optimum pool depth, shading and buffer plants, and runoff reuse.

g) The Best Management Practices (BMPs) listed below shall be utilized with all NWPs when applicable.

i. The filling of, and discharge of dredged material into, Category 3 wetlands is prohibited under this permit;
ii. Only suitable material, free of toxic contaminants in other than trace quantities, shall be used as fill material;
iii. The use of asphalt and rubber tires as fill is prohibited under this permit;
iv. All hydric topsoil removed from a trench shall be separated and saved for later placement as the topmost backfill layer when the trench is refilled;
v. The stockpiling of side-cast dredged material in wetlands in excess of three (3) months is prohibited;
vi. The applicant will comply with all requirements for final stabilization of the site contained in applicable NPDES construction stormwater permits for the site;
vii. Vegetated buffer strips extending to the top of both stream banks and beyond as stipulated by the Corps or Ohio EPA, using native tree and shrub species with rapid growth characteristics, shall be planted as soon as practicable after impacting stream channel slopes;
viii. Impacts to surface water buffer vegetation shall be minimized to the maximum extent practicable;

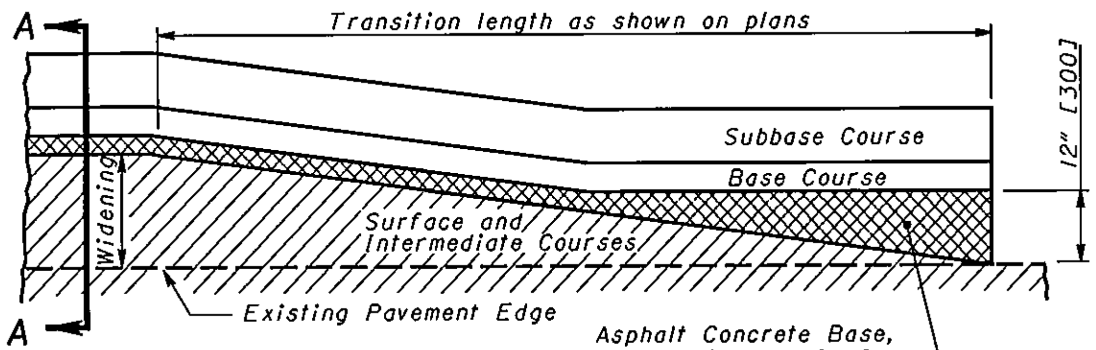
ix. Excavating equipment shall not be placed below the Ordinary High Water Mark (OHWM) of any surface water, except when no other alternative is practicable. When no other alternative is practicable to placing excavating equipment below the OHWM, entry to surface waters shall be through a single point of access per stream bank whenever practicable to minimize disturbance to buffer vegetation;
x. In-stream activities shall not result in the permanent destabilization of the stream banks or stream bed so that aquatic habitat from turbidity, erosion or scouring is minimized;
xi. In-stream work shall be conducted during low-flow conditions whenever practicable in order to minimize adverse impacts to water quality away from the project site, except in cases of emergency situations which threaten life or property;
xii. All dredged material placed at an upland site shall be controlled so that sediment runoff to remaining streams and wetlands is minimized to the maximum extent practicable; and
xiii. Disturbed areas shall be controlled so that sediment runoff to remaining streams and wetlands is minimized to the maximum extent practicable.

INFORMATION ON NATIONWIDE PERMIT VERIFICATION

Verification of the applicability of this Nationwide permit is valid for two years from the date of affirmation unless the Nationwide permit is modified, suspended or revoked. This verification will remain valid for two years if during this two year period the Nationwide permit is reissued without modification or your activity complies with any subsequent permit modification. Please note that if you commence or are under contract to commence this activity in reliance of your permit prior to the date this Nationwide permit is suspended or revoked, or is modified such that your activity no longer complies with the terms and conditions, you have twelve months from the date of permit modification, expiration, or revocation to complete the activity under the present terms and conditions of this permit, unless this permit has been subject to the provisions of discretionary authority.

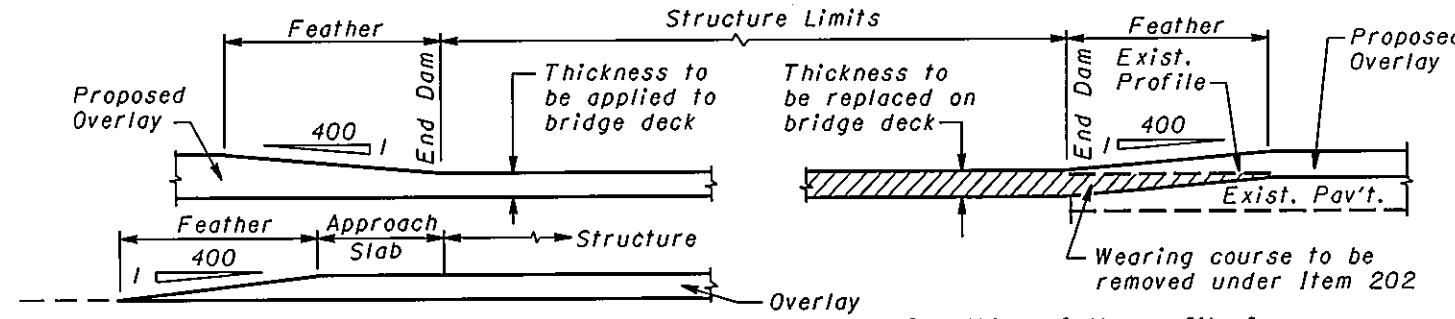
It is your responsibility to remain informed of changes to the Nationwide Permit program. A public notice announcing any changes will be issued when they occur. Finally, note that if your activity is not undertaken within the two year period or the project specifications have changed, you must immediately notify this office to determine the need for further approval or reverification.

Possession of this permit does not obviate you of the need to contact all appropriate state and/or local government officials to insure that the project complies with their requirements.



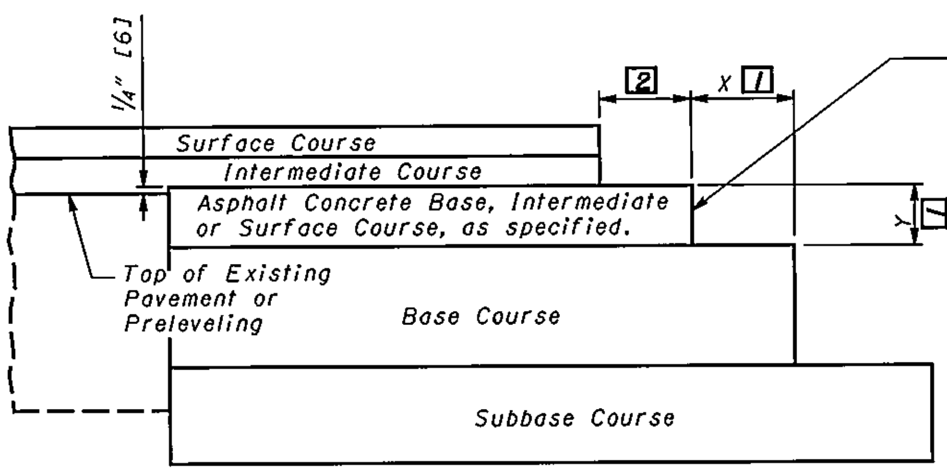
PLAN

MERGING EDGE OF PAVEMENT WIDENING WITH EDGE OF EXISTING PAVEMENT



Details assume non-settled approach slabs. Smoothing of the profile for settlement is required per plan grades or as directed by the Engineer.

FEATHERING AT STRUCTURES



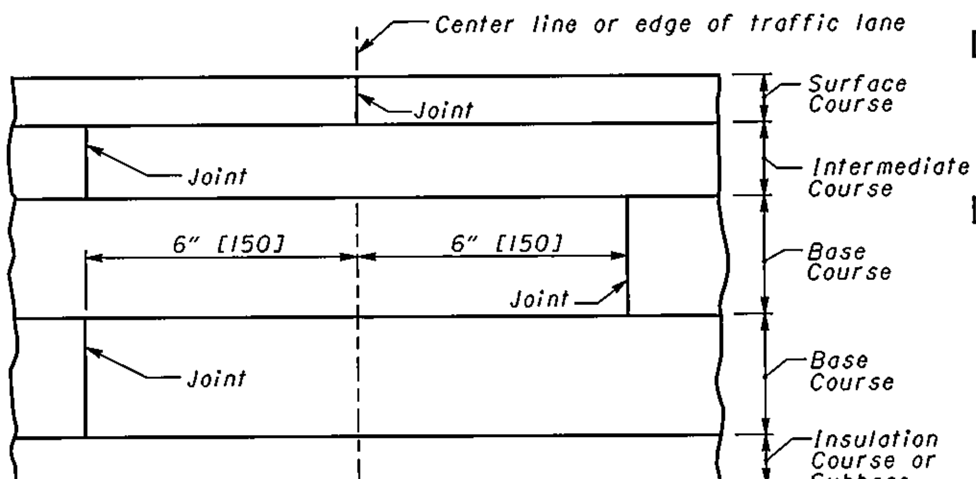
The Asphalt Concrete in the upper part of the base widening shall finish approximately 1/4" [6] above the edge of the existing pavement where no preleveling is used. Where a preleveling (using intermediate course material) is specified it shall be placed prior to excavation of the widening trench and the upper course of the base widening shall finish approximately 1/4" [6] above the preleveling.

SECTION A-A

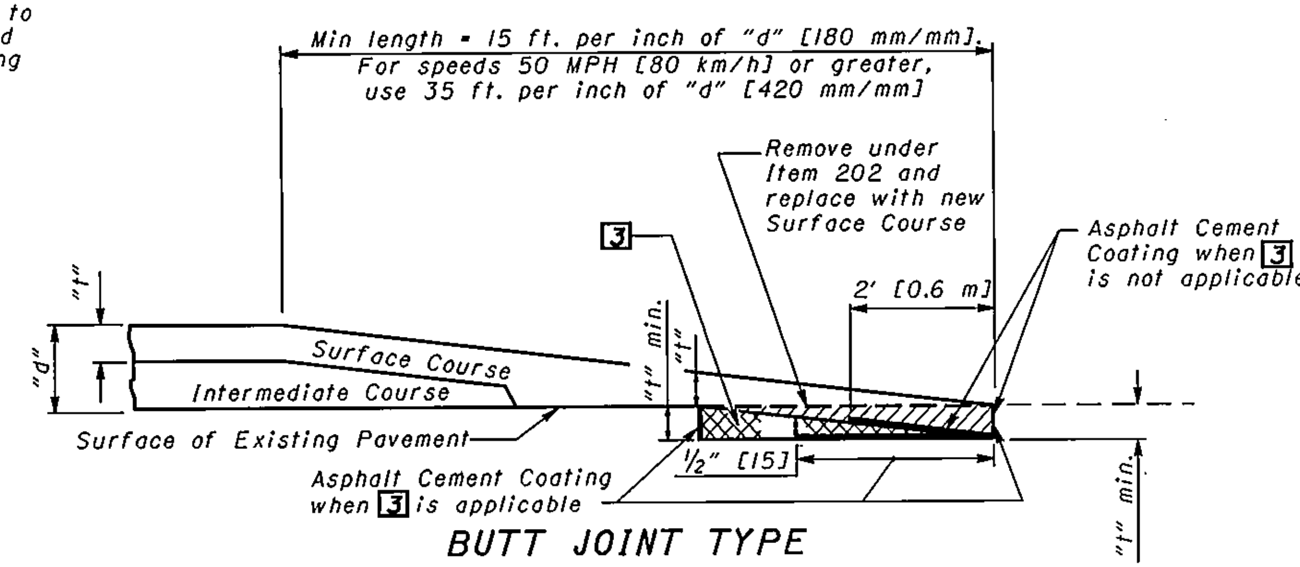
COURSE DETAIL FOR WIDENING

LEGEND

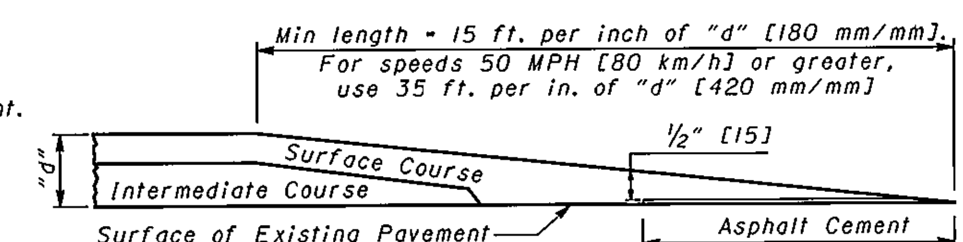
1. The extended width (X) of a base or subbase course shall be equal to the depth (Y) of the overlaying course or 6" [150], whichever is greater, or as shown on the plans.
2. The extended width shall be equal to the thickness of the surface course plus the intermediate course, or 4 inches [100], whichever is greater.
3. Permissible removal and replacement.



LAPPING LONGITUDINAL JOINTS



BUTT JOINT TYPE



TAPER EDGE TYPE

NOTE: Either butt or taper type may be used unless type is specified by the plan.

PLACING FEATHERED AREAS

Values for "t" and "d" are obtained from the plan.

THIS DRAWING REPLACES BP-3.1 DATED 7-28-00.

OHIO DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN ENGINEER
7-16-04
DATE

STDS. ENGR. D. Focke

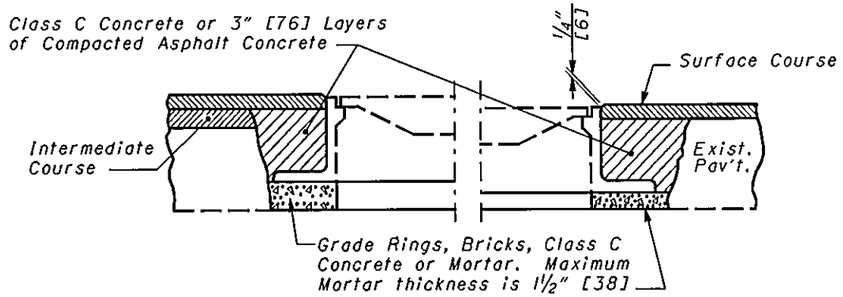
All metric dimensions in brackets [ ] are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

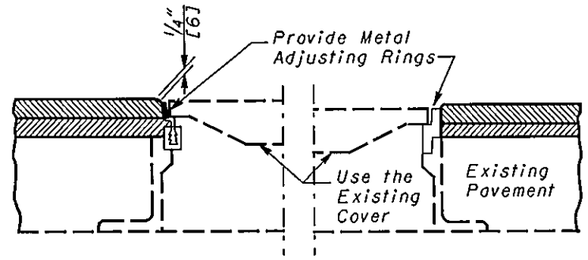
STANDARD ROADWAY CONSTRUCTION DRAWING
ASPHALT PAVING

NUMBER BP-3.1

1/2



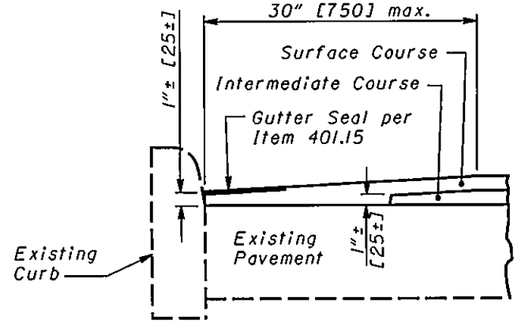
USING CONCRETE OR MORTAR



USING METAL ADJUSTING RINGS

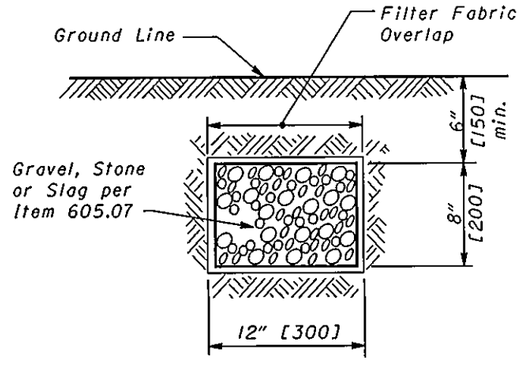
Metal adjusting rings shall:
(a) attach securely to the existing frame by welding or mechanical devices;
(b) consist either of cast metal having an integral rim and seat, or be fabricated metal with a sturdy connection between the seat and rim; and
(c) provide an even seat for the manhole cover.
In addition, the adjusting ring type shall be a design acceptable to the local governmental agency responsible for street and sewer maintenance. Any installation unacceptable to the Engineer shall be replaced by the Contractor at his expense.

MANHOLES ADJUSTED TO GRADE



Special care shall be taken during construction to obtain maximum compaction of bituminous concrete in gutters.

GUTTER FINISH



Aggregate drains to be placed where and as directed by Engineer. Provide Filter Fabric when specified as a separate pay item.

AGGREGATE DRAIN

THIS DRAWING REPLACES BP3.1 DATED 7-28-00.

OHIO DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN ENGINEER
7-16-04
DATE

STDS. ENGR.
D. Focke

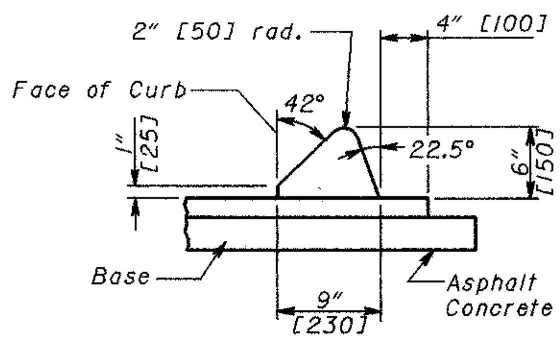
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

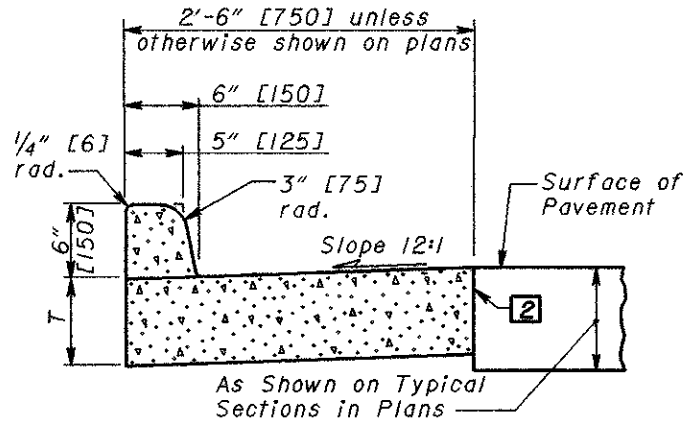
STANDARD ROADWAY CONSTRUCTION DRAWING
ASPHALT PAVING

NUMBER
BP-3.1

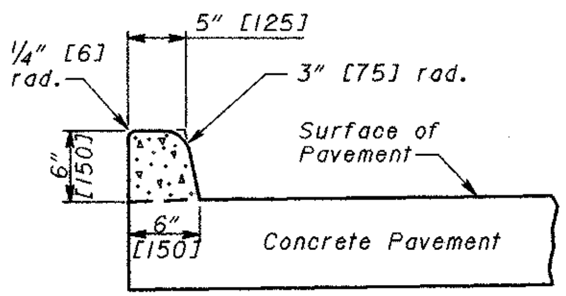
2/2



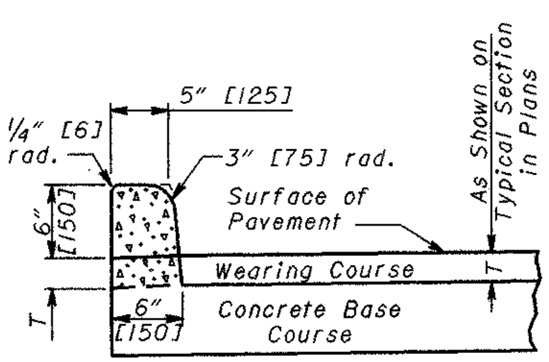
TYPE 1



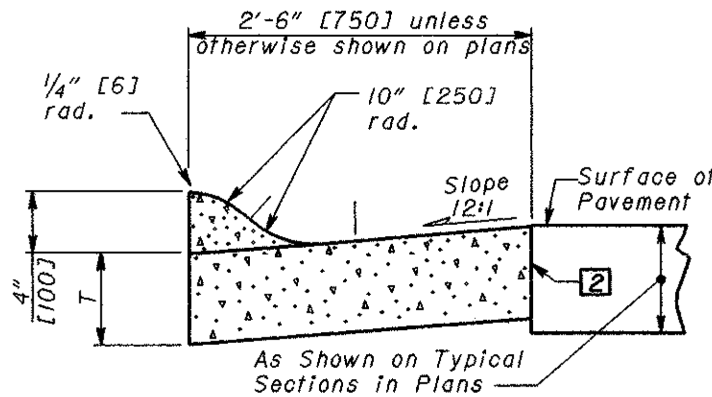
TYPE 2



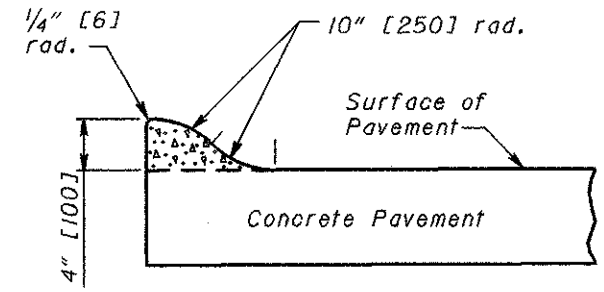
TYPE 2-A



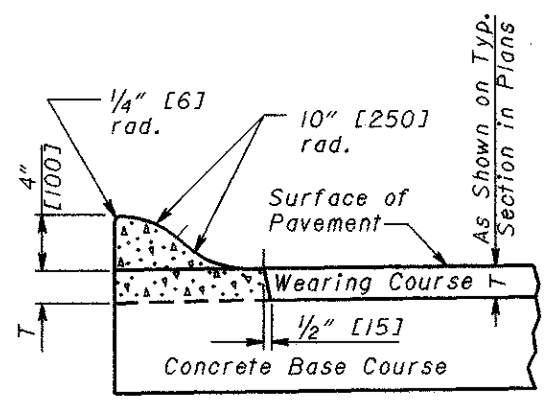
TYPE 2-B



TYPE 3



TYPE 3-A



TYPE 3-B

NOTES

GENERAL: This drawing shows alternate types of curb that may be used on various types of pavement. The typical section of the project shows the type to be used, also the thickness of the edge of the pavement or the edge of the curb and gutter section.

JOINTS: 1" [25] expansion joints shall extend up to the top of the curb and shall be constructed in the curb and gutter section in such a manner that the joint seal will extend the full width of the gutter and into the curb face a sufficient distance to seal the joint to an elevation of at least 2" [50] above the flow line of the gutter. Dowel bars shall be used in the curb and gutter section at expansion joints and to the surface fo the pavement.
Transverse expansion joint material shall meet the requirements of Item 705.03.

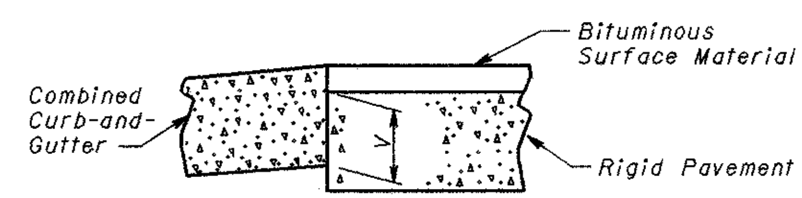
GUTTER PLATE THICKNESS: Thickness of gutter plate "T" shall be 9" [230] unless otherwise shown on the plans.

TOLERANCES: Dimensional tolerances are as follows:
Curbs: -1/32" to +1/4" [-1 to +5],
Gutters: 0 to +1/2" [0 to +12].

LEGEND

1 Expansion joint material and joint sealer are not required for the portion of the curb that is adjacent to a flexible pavement type. Both materials are required, as detailed, for the full height of rigid pavement and concrete bases.

2 Butt joints shall be provided between combined curb-and-gutter and new or existing rigid pavements, with tie bars or hook bolts provided at intervals of 5' [1.5 m]. See **SCD BP-2.1** for details of tie bars and hook bolts.
If the combined curb-and-gutter adjoins a new rigid base or an existing rigid base or pavement that is to be surfaced with bituminous material, a butt joint shall also be provided. However, tie bars or hook bolts shall be omitted when the vertical overlap ("V" in detail below) between the curb-and-gutter and rigid pavement is less. than 7" [175].



THIS DRAWING REPLACES BP-5.1M DATED 10-28-94.

OHIO DEPARTMENT OF TRANSPORTATION
5-28-00
ROADWAY DESIGN ENGINEER
DATE

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

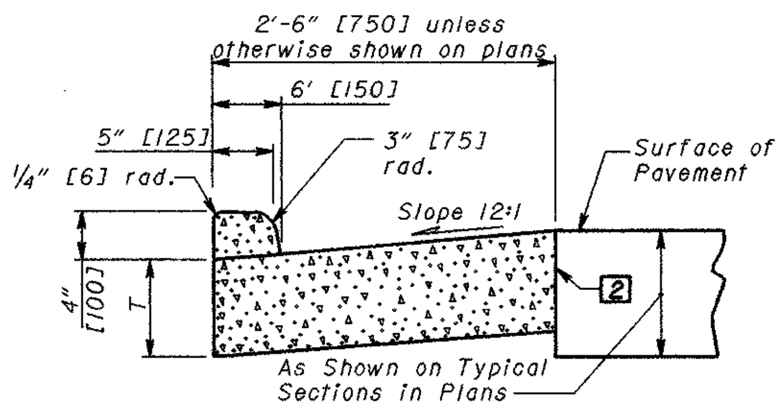
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

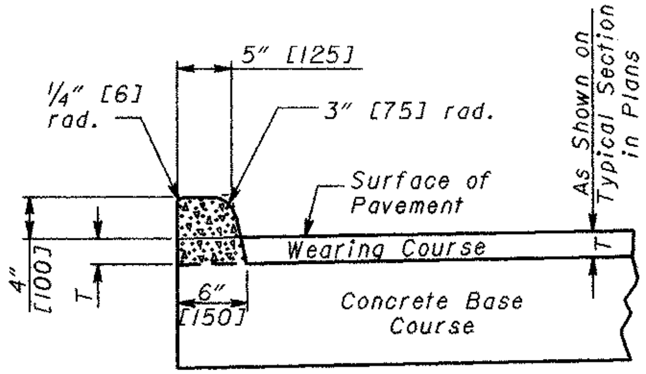
STANDARD ROADWAY CONSTRUCTION DRAWING
CONCRETE CURBS AND COMBINED CURB AND GUTTERS

NUMBER BP-5.1

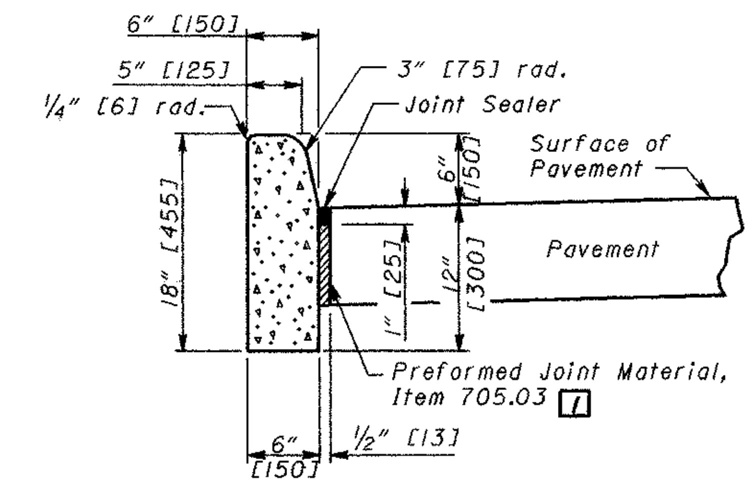
1/2



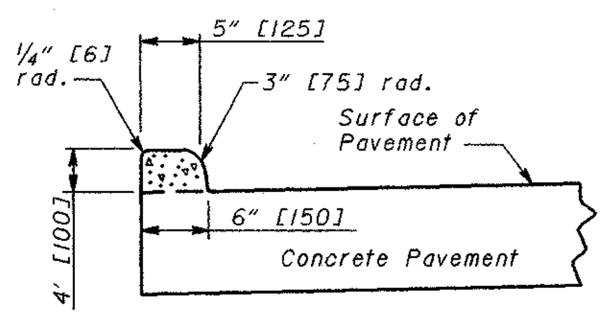
TYPE 4



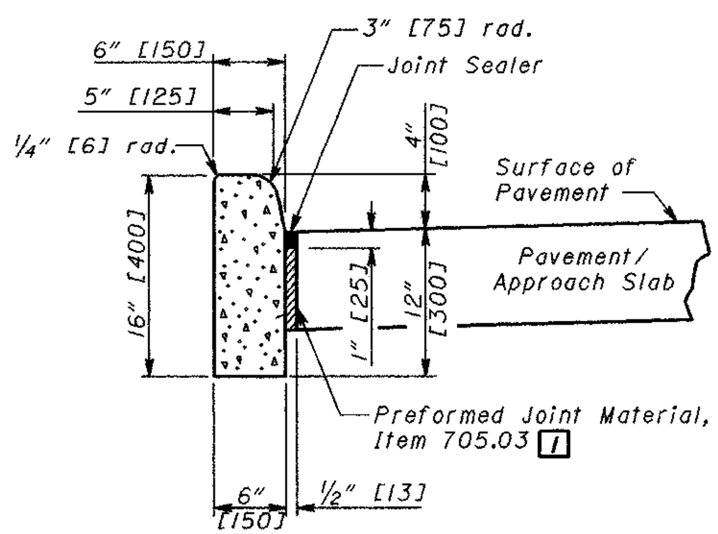
TYPE 4-B



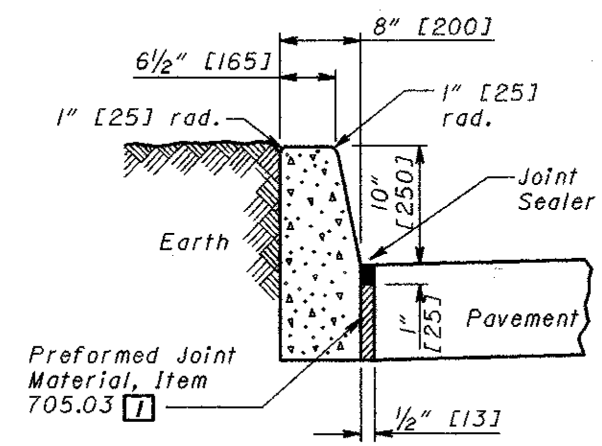
TYPE 6



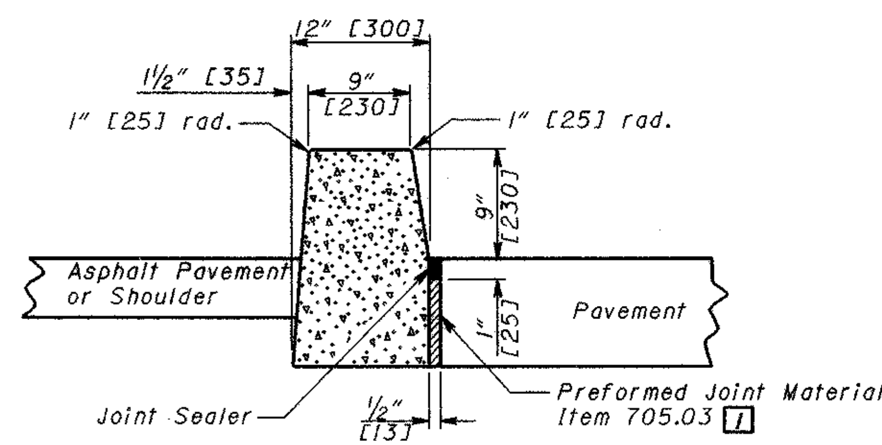
TYPE 4-A



TYPE 4-C



TYPE 7



TYPE 8

See Sheet 1 of 2 for Notes and Legend.

THIS DRAWING REPLACES BP-5.1M DATED 10-28-94.

OHIO DEPARTMENT OF TRANSPORTATION

ROADWAY DESIGN ENGINEER | DATE -28-00

REVISIONS

STDS. ENGR. M. Evans

DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

CONCRETE CURBS AND COMBINED CURB AND GUTTERS

NUMBER BP-5.1

NOTES

MATERIAL: Furnish straw or hay bales. Use 30" [0.8 m] long 2"x2" [50x50] wooden stakes, reinforcing bars or fence posts to stake the bales in place. The use of filter fabric fence in lieu of straw or hay bales will be allowed. Furnish 30" [0.8 m] wide filter fabric with sound wood supports with maximum on-center spacing of 10' [3.0m]. Use filter fabric conforming to 712.09 Type C.

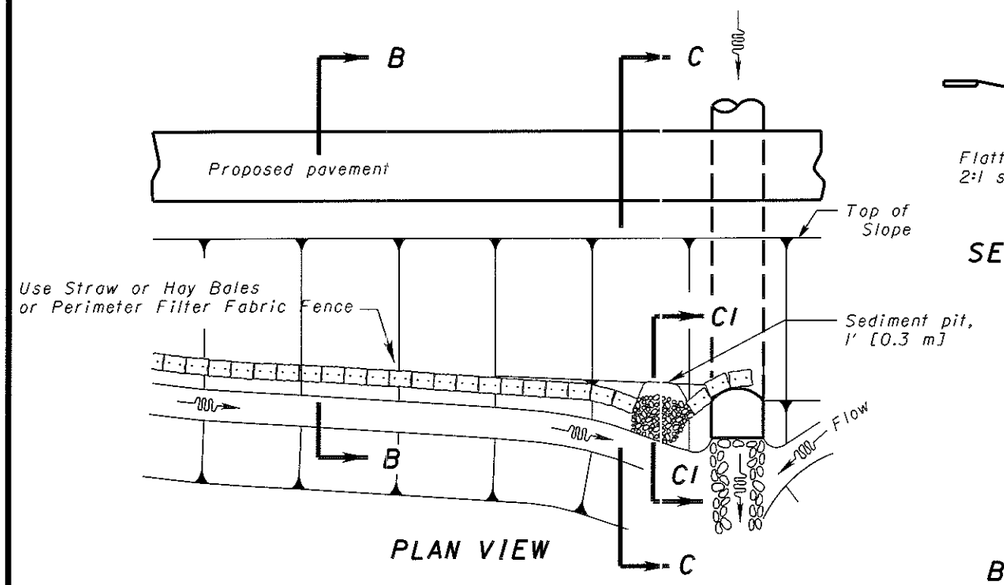
Use sand and gravel for the sediment pit filter material.

CONSTRUCTION: Trench the filter fabric fence as detailed for perimeter filter fabric fence. **(see DM-4.4)**

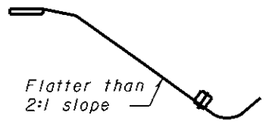
When straw or hay bales are used conform to the following: Tightly place each bale adjacent to one another. Entrench 2" [50] to 3" [75] into the ground prior to staking. Firmly stake each bale with at least two stakes. Use loose hay or straw to fill the voids under and between the bales.

Construct a 3'x3'x1' [1 m x 1 m x 0.3 m] pit for the sediment pit filter material. Fill with filter material 1' [0.3 m] above ground level.

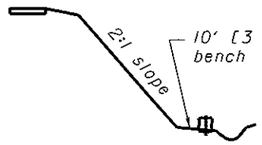
PAYMENT: The Department will pay for the accepted quantities at the contract prices in feet [meters] as follows: **Item 207 - Bale Filter Dike.**



PLAN VIEW



SECTION B-B



SECTION C-C

SECTION CI-CI

BALE FILTER DIKE

NOTES

MATERIAL: Furnish materials conforming to Item 203 Embankment and Item 601 Rock Channel Protection, Type C or D with filter. Furnish construction fence consisting of 4'-0" [1.3 m] high plastic fence with 6' [2 m] long metal fence posts.

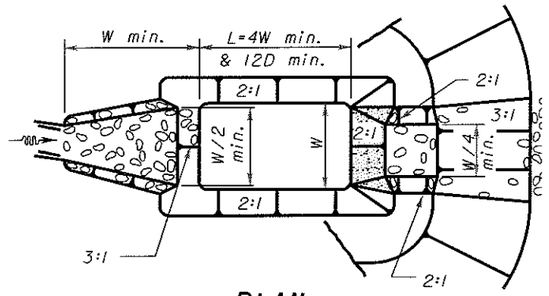
CONSTRUCTION: Construct the Basin and Dams as detailed. Constuct the construction fence in urban areas or in high pedestrian traffic areas. Construct the fence to completely surround the sediment basin or dam. Place the fence post on 8' [2.6 m] centers 2' [0.6 m] deep. Securely attach the plastic construction fence to the fence post.

PAYMENT: The Department will pay for the accepted quantities at the contract prices as follows:

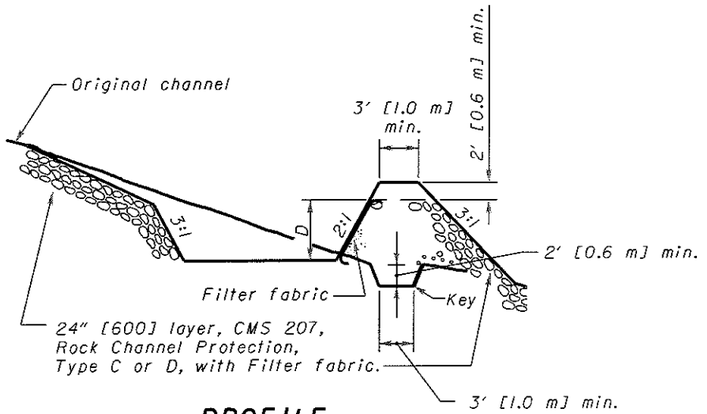
Item 207 - Sediment Basins and Dams in cubic yards [cubic meters]

Item 207 - Rock Channel Protection Type C or D with filter in cubic yards [cubic meters]

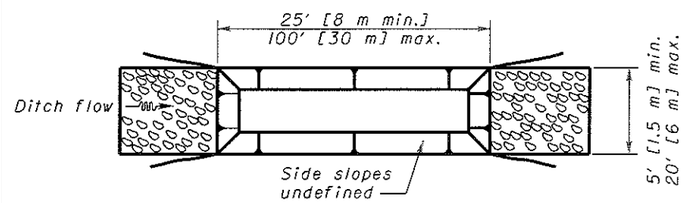
Item 207 - Construction Fence per foot [meter]



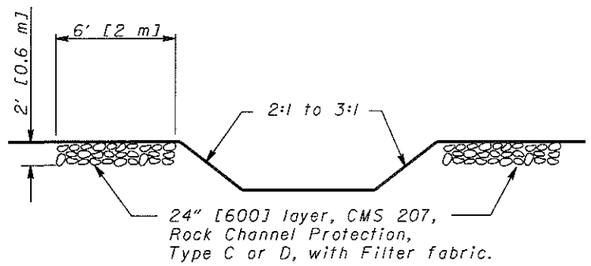
PLAN



PROFILE
SEDIMENT DAM



PLAN



PROFILE
SEDIMENT BASIN

OHIO DEPARTMENT OF TRANSPORTATION
Tim Keller
ENGINEER OF BRIDGES

DATE
4-29-99
7-19-02

HYDRAULIC ENGINEER
D. Gruver

All metric dimensions [in brackets] are in millimeters unless otherwise noted.

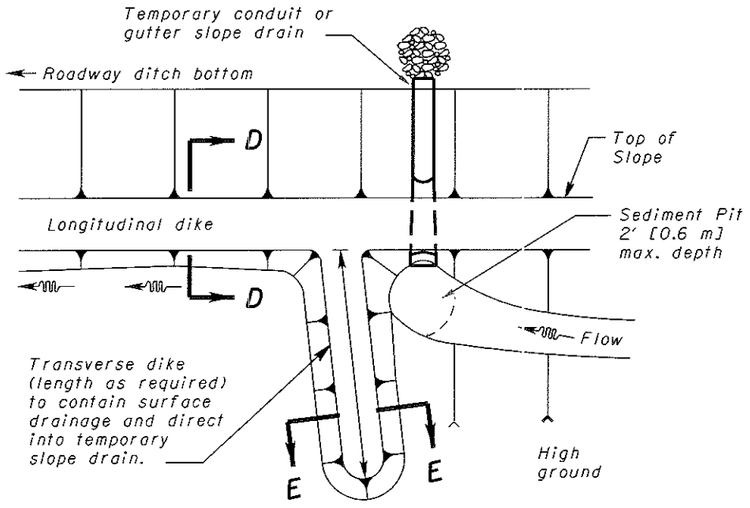
OFFICE OF STRUCTURAL ENGINEERING

STANDARD HYDRAULIC CONSTRUCTION DRAWING

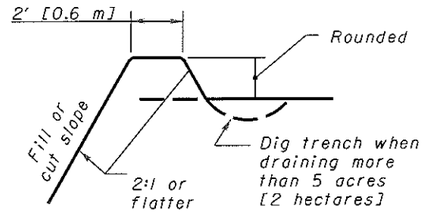
SEDIMENT AND EROSION CONTROLS

NUMBER
DM-4.3

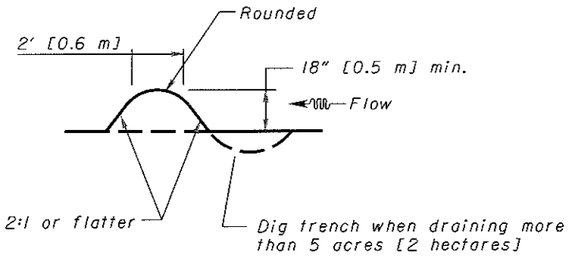
DIKES AND SLOPE PROTECTION



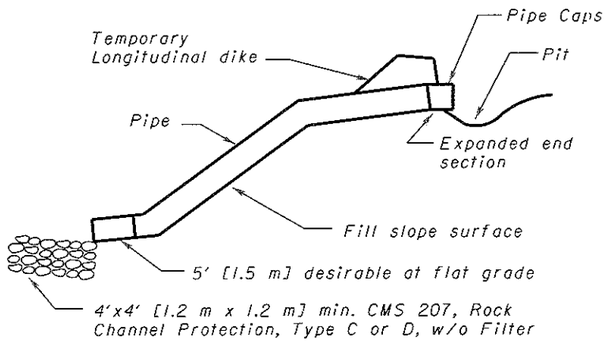
PLAN VIEW



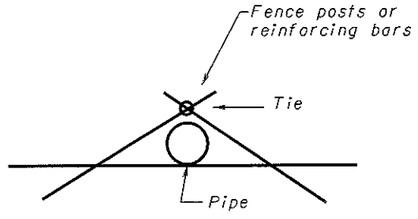
SECTION D-D



SECTION E-E



CONDUIT SLOPE DRAIN



TIE-DOWN SLOPE DRAIN

NOTES

MATERIAL: Furnish materials conforming to Item 203 Embankment and Item 601 Rock Channel Protection, Type C or D, without filter.

Furnish the following for the slope drains: corrugated steel pipe, corrugated or smooth plastic pipe, pipe caps with: holes that comprise at least 30 percent of the cross sectional area of the cap and specifically designed to connect to the pipe, reinforcing bars or fence posts and sand and gravel for the sediment pit filter material.

CONSTRUCTION: Construct as detailed. Compact the dike to 85% of the maximum density as determined by Supplement 1015.

Use reinforcing bars or fence posts to tie down the slope drains and to keep the pipe from moving.

Construct a 3'x3'x2' [1 m x 1 m x 0.6 m] pit for the sediment pit filter material. Fill with filter material to the ground level.

BASIS OF PAYMENT: The Department will pay for the accepted quantities at the contract prices as follows:

Item 207 - Dikes in cubic yards [cubic meters]

Item 207 - Slope Drains in feet [meters]

Item 207 - Rock Channel Protection Type C or D without filter in cubic yards [cubic meters]

TEMPORARY SLOPE DRAINS RECOMMENDED SIZES

AREA in acres [hectares]	PIPE SIZES	
	Smooth	Corrugated
0-4 [0-1.6]	6" [150]	6" [150]
4-8 [1.6-3.2]	8" [200]	12" [300]
8-12 [3.2-4.9]	10" [250]	15" [375]

OHIO DEPARTMENT OF TRANSPORTATION
Tim Keller
ENGINEER OF BRIDGES

DATE
4-29-99
7-19-02

HYDRAULIC ENGINEER
D. Gruver

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

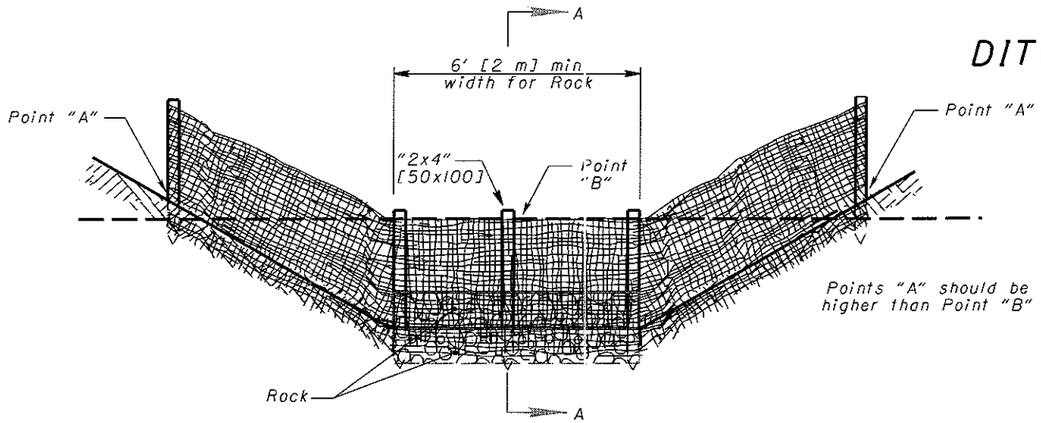
OFFICE OF STRUCTURAL ENGINEERING

STANDARD HYDRAULIC CONSTRUCTION DRAWING
SEDIMENT AND EROSION CONTROLS

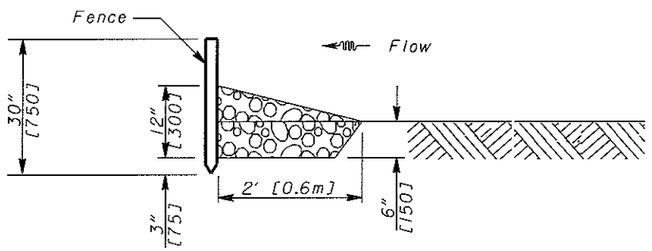
NUMBER
DM-4.3

2 / 2

DITCH CHECKS

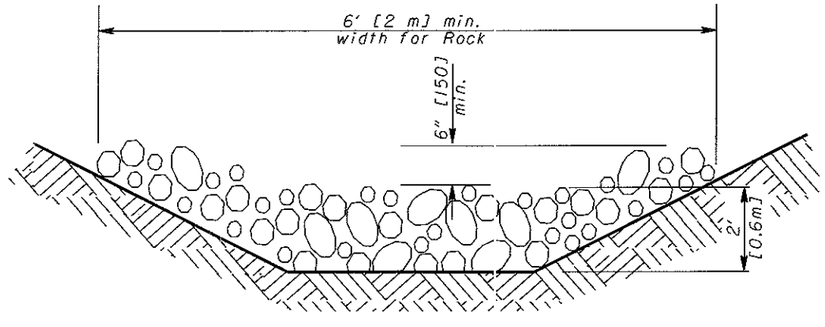


ELEVATION VIEW OF FLAT BOTTOM DITCH



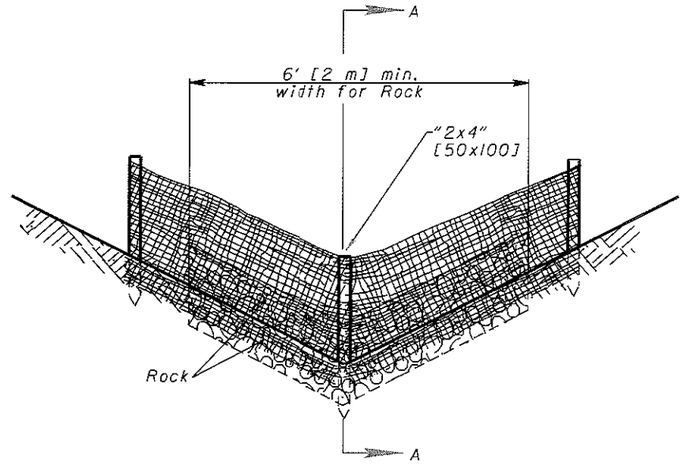
SIDE VIEW OF FLAT BOTTOM AND V DITCH

SECTION A-A



Minimum dimensions: 2' [0.6 m] high x 6' [2 m] wide x 3' [0.9 m] long

ELEVATION VIEW
ROCK CHECK



ELEVATION VIEW OF "V" DITCH

NOTES

FILTER FABRIC DITCH CHECKS:

MATERIALS: Furnish filter fabric ditch checks consisting of the following materials:

1. 30" [0.8 m] wide filter fabric with sound wood supports with maximum on-center spacing of 10' [3.0 m]. Use filter fabric conforming to 712.09 Type C.
2. A vertically driven "2x4" [50x100] stake in the center of the ditch
3. Gravel or limestone material conforming to one of the following gradations No. 1 through No. 4 on Table 703.01-1.

CONSTRUCTION: Trench the filter fabric fence as detailed for PERIMETER FILTER FABRIC FENCE. (see Sheet 2/2) Place a vertical "2x4" [50x100] stake in the center of the ditch with the top level to the top of the fence and at least 6" [150] below the bottom of the ditch. Excavate for and place the gravel or limestone on the upstream side of the ditch check.

PAYMENT: The Department will pay for the accepted quantities at the contract prices in feet [meters] as follows: **Item 207 - Filter Fabric Ditch Check.**

ROCK CHECKS:

MATERIALS: Furnish material conforming to Item 601 Rock Channel Protection Type C or D without filter.

CONSTRUCTION: Place the rock outside the traffic clear zone in the ditch.

PAYMENT: The Department will pay for the accepted quantities at the contract prices in cubic yards [cubic meters] as follows: **Item 207 - Rock Channel Protection Type C or D without filter.**

OHIO DEPARTMENT OF TRANSPORTATION
ENGINEER OF BRIDGES

DATE
4-29-02
7-19-02

HYDRAULIC ENGINEER
D. Gruver

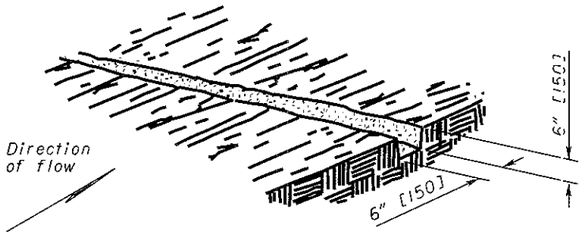
All metric dimensions [in brackets [ ]] are in millimeters unless otherwise noted.

OFFICE OF STRUCTURAL ENGINEERING

STANDARD HYDRAULIC CONSTRUCTION DRAWING
CONSTRUCTION EROSION CONTROL

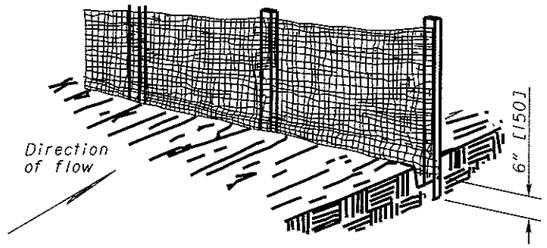
NUMBER
DM-4.4

PERIMETER FILTER FABRIC FENCE



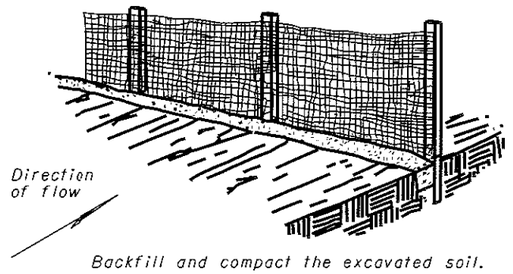
Excavate a 6"x6" [150x150] trench along the proposed fence line.

STEP 1



Place fabric and support stakes and extend fabric into the trench.

STEP 2



Backfill and compact the excavated soil.

STEP 3

NOTES

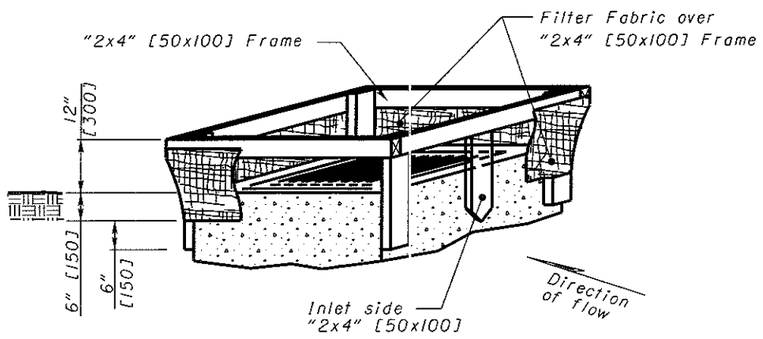
MATERIALS: Furnish 30" [0.8 m] wide filter fabric with sound wood supports with maximum on-center spacing of 10' [3.0 m]. Use filter fabric conforming to 712.09 Type C. The Contractor may elect to use straw or hay bales. Use 30" [750] long 2"x2" [50x50] wooden stakes, reinforcing bars or fence posts for the straw or hay bales.

CONSTRUCTION: Trench the filter fabric fence as detailed. The Ccontractor may elect to trench the fence detailed on steps 1 through 3 in one plowing operation.

When straw or hay bales are used conform to the following: Tightly place each bale adjacent to one another. Entrench 2" [50] to 3" [75] into the ground prior to staking. Firmly stake each bale with at least two stakes. Use loose hay or straw to fill the voids under or between the bales.

PAYMENT: The Department will pay for the accepted quantities at the contract prices in feet [meters] as follows: **Item 207 - Perimeter Filter Fabric Fence.**

INLET PROTECTION



INLET PROTECTION

NOTES

MATERIALS: Furnish inlet protection consisting of 18" [0.5 m] wide filter fabric fence with a securely nailed "2x4" [50x100] wood frame with a vertically driven "2x4" [50x100] on the inlet or flow side of the structure. Use filter fabric conforming to 712.09 Type C.

CONSTRUCTION: Construct an 18" [0.5 m] wide filter fabric fence supported around a storm drain inlet or catch basin with a securely nailed "2x4" [50x100] wood frame. Excavate a 6" [150] trench around the inlet, and drive support posts 6" [150] below the excavated trench bottom. Stretch the fabric around the frame. Secure it tightly ensuring that 6" [150] of fabric is in the trench. Overlap the fabric on one side of the inlet so that the fabric ends are not attached to the same post. Backfill and compact the excavated soil tightly onto the fabric. Place a vertical "2x4" [50x100] in the center of the inlet so that the top is at the top of the fence and the bottom is at least 6" [150] below the bottom of the ditch.

PAYMENT: The Department will pay for the accepted quantites at the contract prices in feet [meters] as follows: **Item 207 - Inlet Protection.**

OHIO DEPARTMENT OF TRANSPORTATION
Tim Keller
ENGINEER OF BRIDGES

DATE
4-29-02
7-19-02

HYDRAULIC ENGINEER
D. Gruver

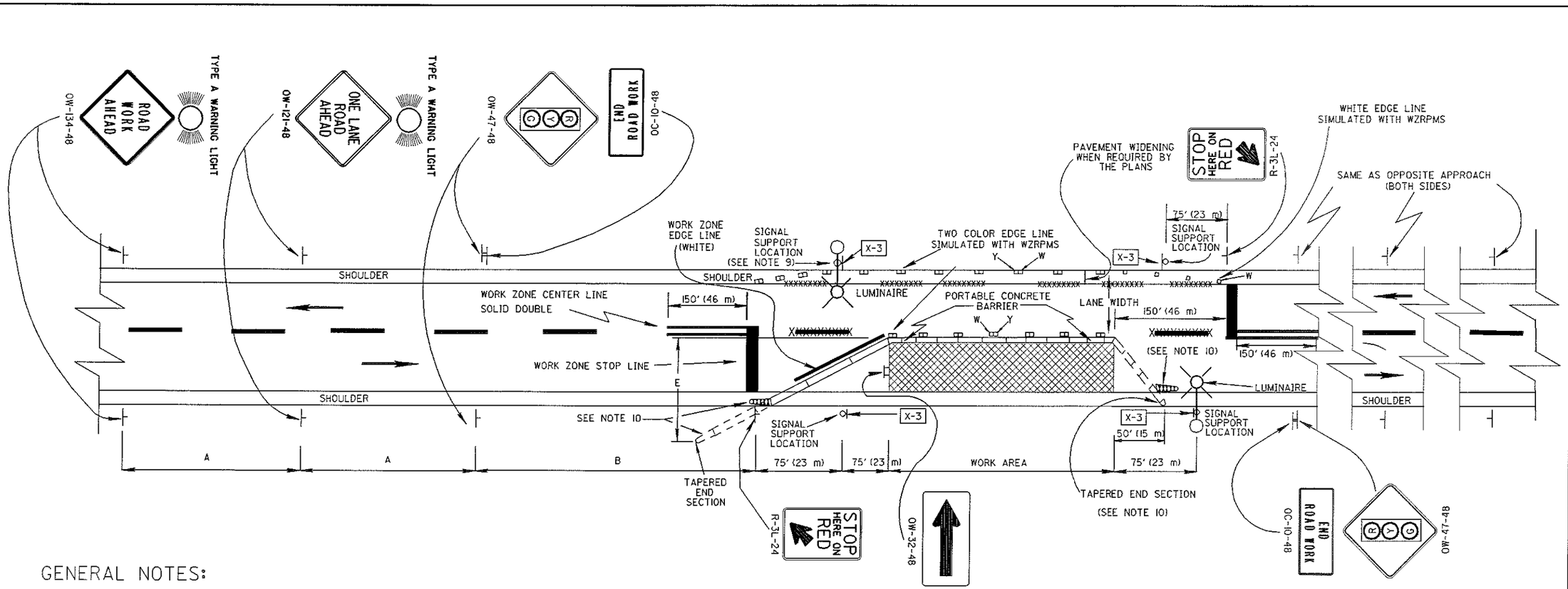
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

OFFICE OF STRUCTURAL ENGINEERING

STANDARD HYDRAULIC CONSTRUCTION DRAWING
CONSTRUCTION EROSION CONTROL

NUMBER
DM-4.4

2/2



GENERAL NOTES:

1. Initial signal timing and phasing shall be as shown in the plans. Changes shall be approved by the Engineer.

2. Signals shall be installed and operated in accordance with the requirements of Part 6 of the Ohio Manual of Uniform Traffic Control Devices.

3. Work zone center line, solid, double, shall be installed and maintained when existing center line , solid double is not in place. 12" (300 mm) stop lines shall be installed. Work Zone Raised Pavement Markers (WZRPMs) to simulate a two color edge line shall be provided. Existing conflicting pavement markings and raised pavement marker reflectors shall be removed. 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.

4. The horizontal or vertical alignment of the roadway may require adjustments in the location of the Advance Warning signs or the signal heads. Tree or brush trimming to provide adequate sight distance to sign and signals shall be provided as directed by the Engineer. The distances shown for Advance Warning Sign spacings in Table I are minimum.

5. 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.

6. All traffic signal and lighting equipment used in this installation, such as signal or lighting cable, signal heads, luminaires or signal controller shall be in conformance with specification Items 625, 632, 633, 713, 732 and 733. However, the performance tests of 625.22e and 632.27(6), the working drawing requirements of 625.04, 632.03 and 633.03, the wiring diagram and service manual requirement of 633.04 and the testing and prequalification requirement of 633.05 are waived. Also the requirements of 733.01 concerning expansible 3-dial units and twelve signal circuits are waived. Used equipment is acceptable. Conflict monitors shall be used except with electromechanical pretimed controllers with camshaft.

7. If the signal is changed to flashing operation, red shall be flashed to all approaches on all signal heads.

8. Existing barrier between work zone stop lines shall be delineated with Item 614-barrier reflectors.

9. For side mounted signals, see MT-96.20. For overhead mounted signals, see MT-96.21.

10. A taper end section may be used in place of the impact attenuator at locations where the last full section of PCB can be extended outside of the clear zone for approaching traffic. See TABLE II for clear zone widths.

11. Work zone raised pavement markers shall be provided as per MT-101.20.

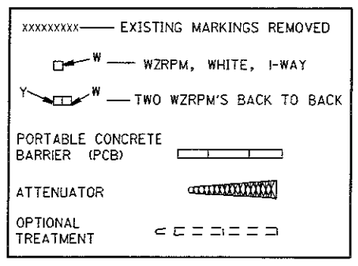
12. This standard drawing shall be used with standard drawing MT-101.70.

TABLE I

DISTANCE FT (m)	A	B	C
URBAN (≤ 40 MPH)	200 (60)	350 (105)	50 (15)
URBAN (≥ 45 MPH)	350 (105)	750 (230)	100 (30)
RURAL	500 (150)	750 (230)	100 (30)

TABLE II

SPEED LIMIT (MPH)	CLEAR ZONE WIDTH (E) FT (m)
40 OR LESS	15 (5)
45-50	19 (6)
55	23 (7)



SIGNALIZED CLOSING 1 LANE OF A 2 LANE HIGHWAY WITH PCB

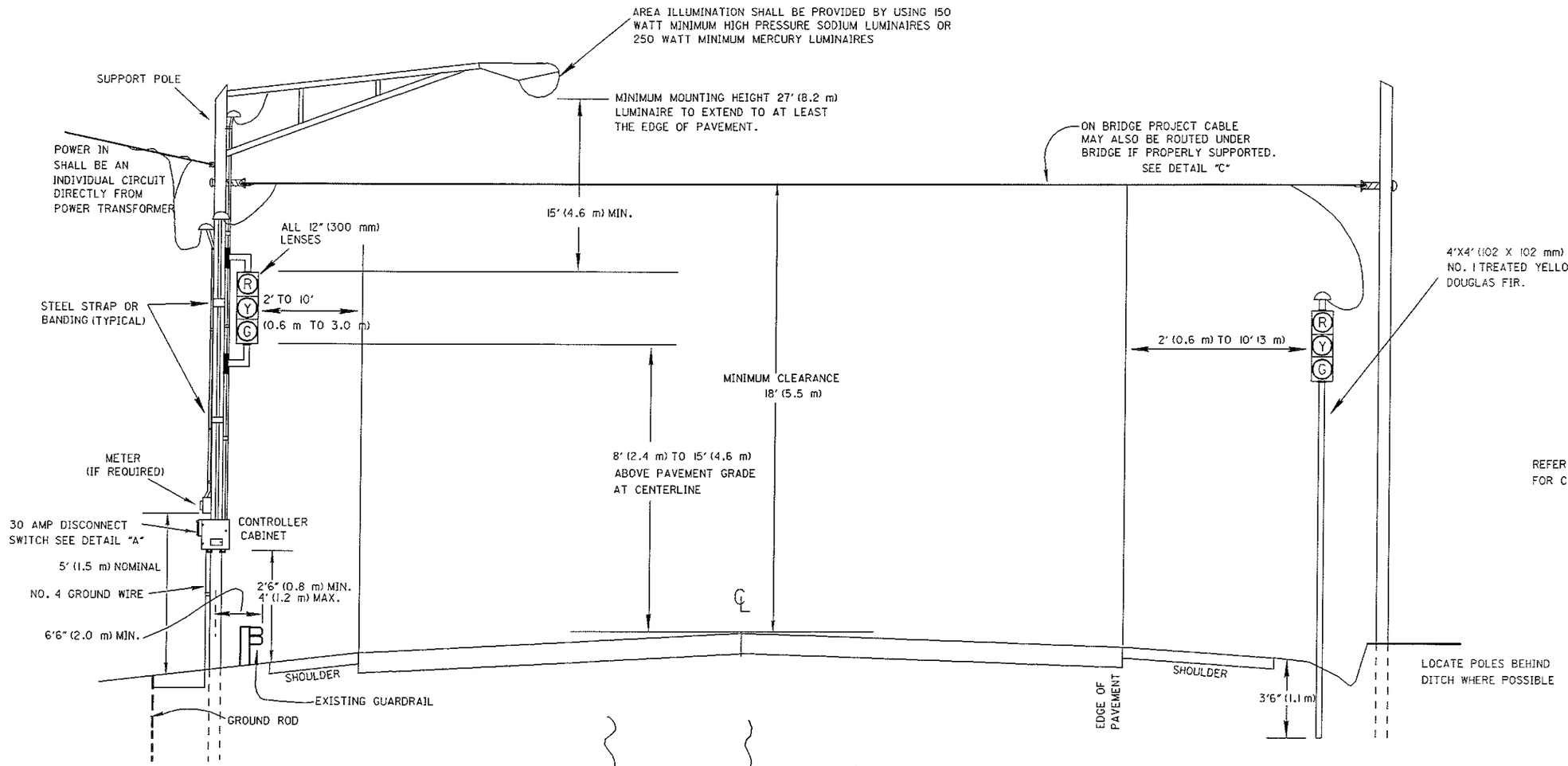
04-19-02

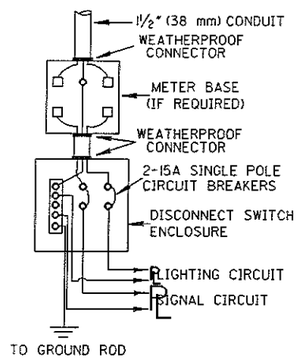
OFFICE OF TRAFFIC ENGINEERING

MT-96.11

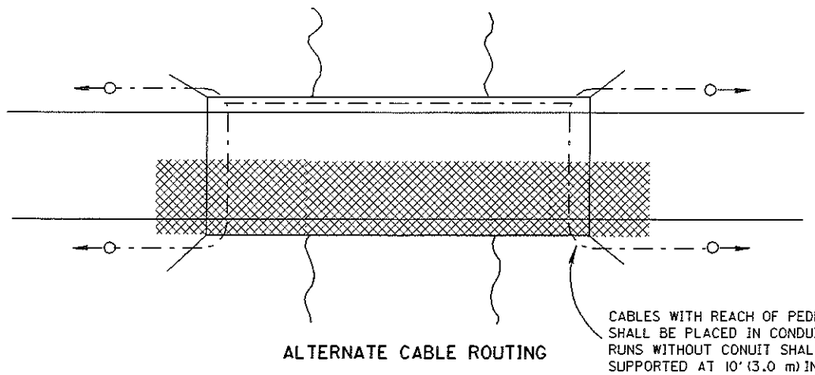
1 / 1

JAM



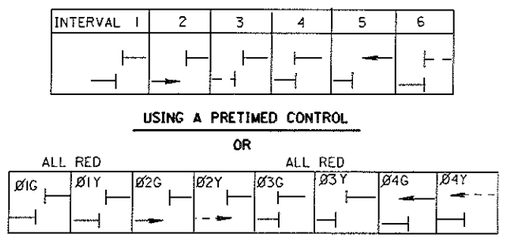


DETAIL "A"



ALTERNATE CABLE ROUTING

DETAIL "C"



USING A PRETIMED CONTROL

OR

WHEN CALLED FOR IN THE PLANS, Ø2 GREEN AND Ø4 GREEN SHALL BE ACTUATED BY DETECTORS AT APPROACH TO THE WORK ZONE. Ø1 & Ø3 ARE DUMMY PHASES TO TIME ALL RED INTERVAL. TIMING INITIALIZES ON PHASE ONE.

USING A 4 PHASE ACTUATED CONTROL

DETAIL "B"
SIGNAL PHASING

DETAILS FOR SIGNALIZED CLOSING 1 LANE OF A 2 LANE HIGHWAY SIDE MOUNTED

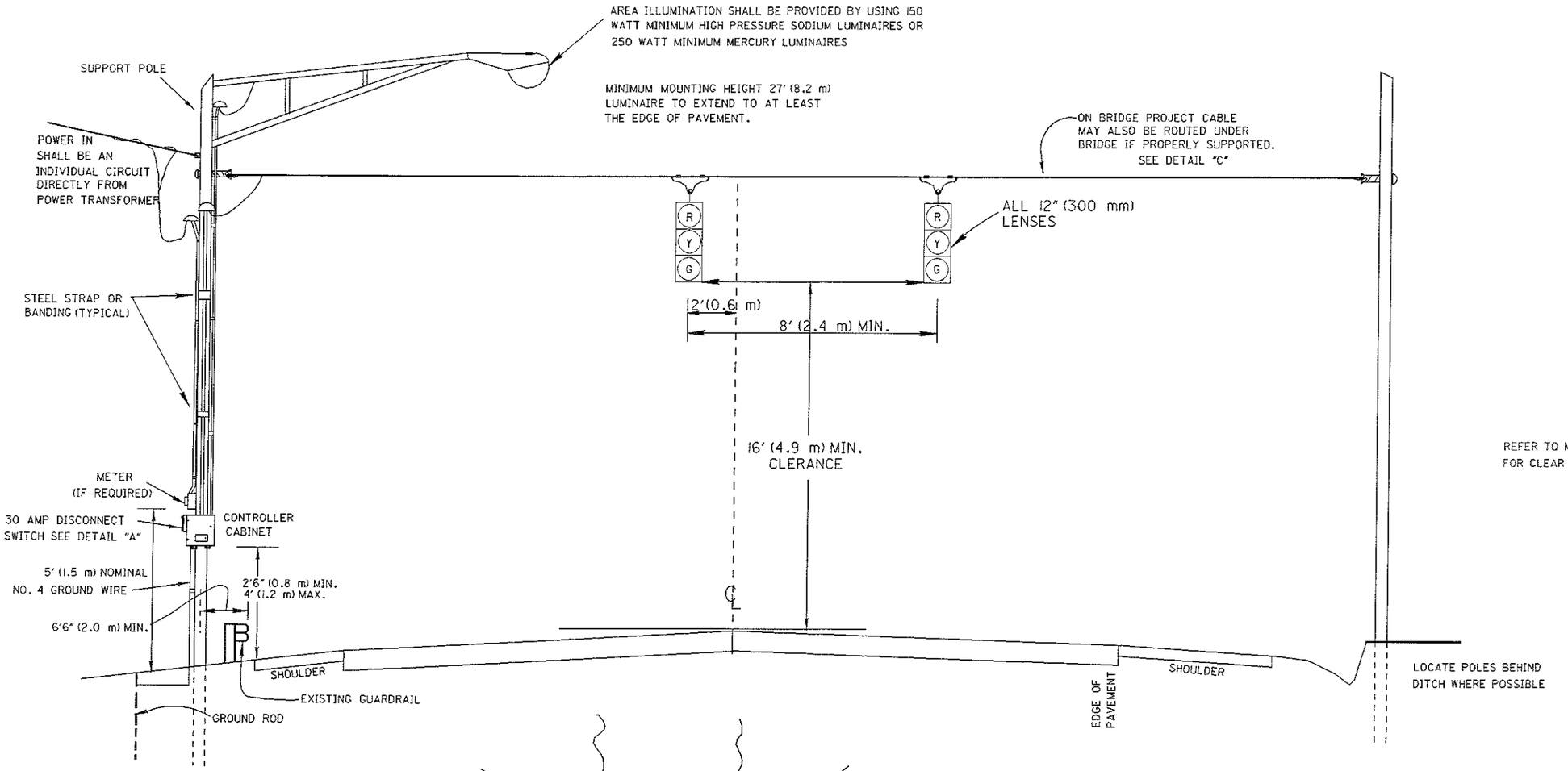
04-19-02

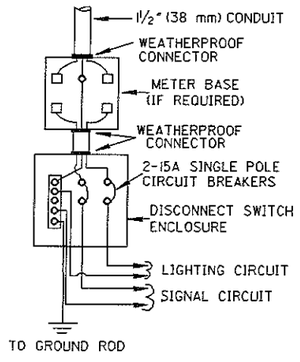
OFFICE OF TRAFFIC ENGINEERING

MT-96.20

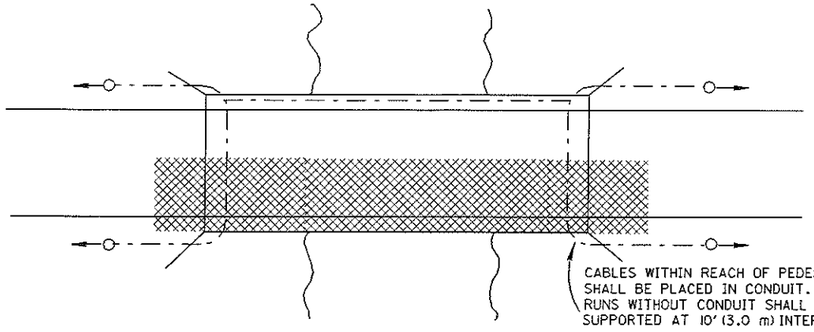
1 / 1

JAM



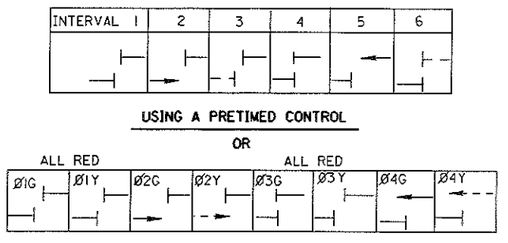


DETAIL "A"



ALTERNATE CABLE ROUTING

DETAIL "C"



USING A PRETIMED CONTROL

OR

USING A 4 PHASE ACTUATED CONTROL

WHEN CALLED FOR IN THE PLANS, Ø2 GREEN AND Ø4 GREEN SHALL BE ACTUATED BY DETECTORS AT APPROACH TO THE WORK ZONE. Ø1 & Ø3 ARE DUMMY PHASES TO TIME ALL RED INTERVAL. TIMING INITIALIZES ON PHASE ONE.

DETAIL "B"
SIGNAL PHASING

04-19-02

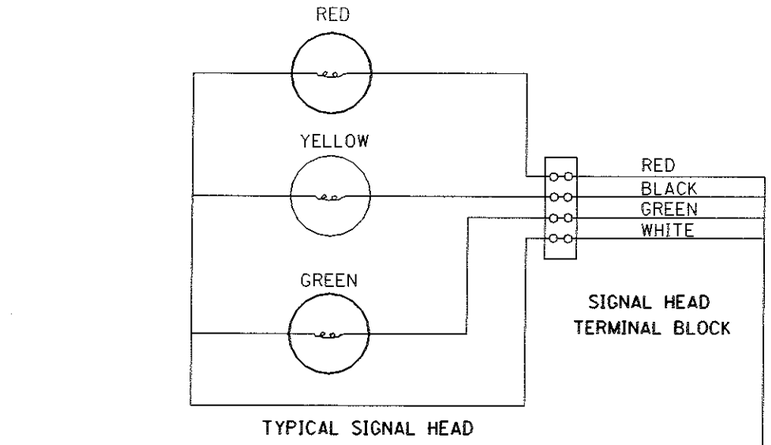
DETAILS FOR SIGNALIZED CLOSING 1 LANE OF A 2 LANE HIGHWAY-OVERHEAD MOUNTED

OFFICE OF TRAFFIC ENGINEERING

MT-96.21

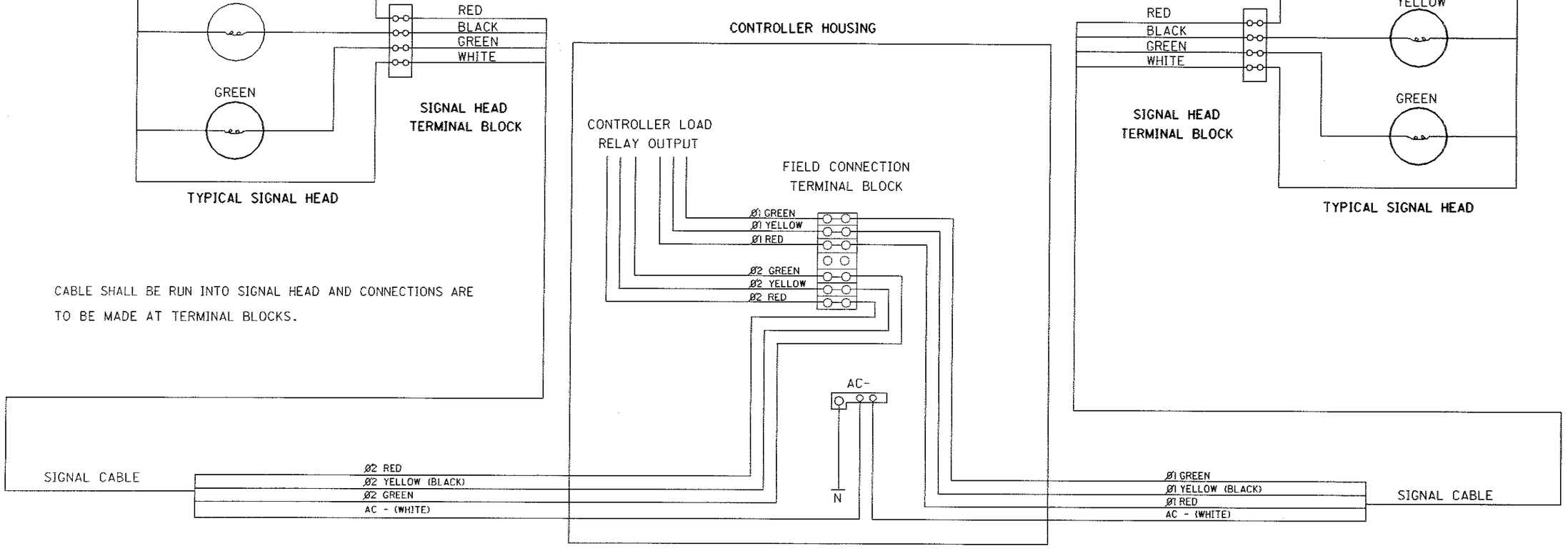
1 / 1

JAM

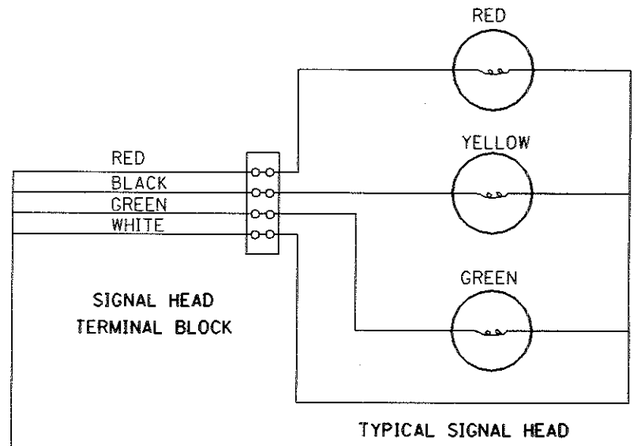


TYPICAL SIGNAL HEAD

CABLE SHALL BE RUN INTO SIGNAL HEAD AND CONNECTIONS ARE TO BE MADE AT TERMINAL BLOCKS.



TYPICAL SIGNAL HEAD HOOK-UP



TYPICAL SIGNAL HEAD

GENERAL NOTES:

1. Lightning protection, as required in 733.04, shall be provided for solid state electronic controllers and detectors.

2. Signal cable shall be 5/c No. 14 AWG as specified in 732.19. All electrical connections to be made at terminal blocks using lock fork terminals. Splices in signal cable should be avoided but if necessary splice kits shall be used. All connections at splice points shall be soldered.

3. Signal timing settings shall be as shown in the plans or provided to the Contractor by the Engineer prior to implementation of signal control. The Contractor shall periodically monitor the signal operation to determine failure or inefficient operation.

   All equipment failures including timing mechanisms and detectors shall be reported to the Engineer and fully repaired by the Contractor as soon as possible, but in no case longer than 8 hours following notification of the Contractor by the Engineer. All failures resulting in unsafe operations of the signal (i.e., signal or lamp failure, short-timing of yellow or all red intervals, mis-aimed signals, conflictiong displays) shall result in the Contractor using 2-way radios to control traffic through the work area until the signal is fully repaired. Failures shall include situations caused by traffic accidents, acts of God or any other cause whether under the control of the Contractor or not.

   If the Engineer determines that the signal operation, although in accordance with the plans and previous orders, is not providing acceptable safe and efficient movement of traffic, the Engineer shall order that appropriate changes such as timing alterations, signal or detector relocations, etc. be made to remedy the situation, at no additional cost to the State. Timing changes and signal relocations shall be implemented within four hours, detector relocations and changes within 24 hours. Failure to make required changes within these time limits shall result in the assessment of liquidated damages of $100.00 per calendar day until the changes are completed.

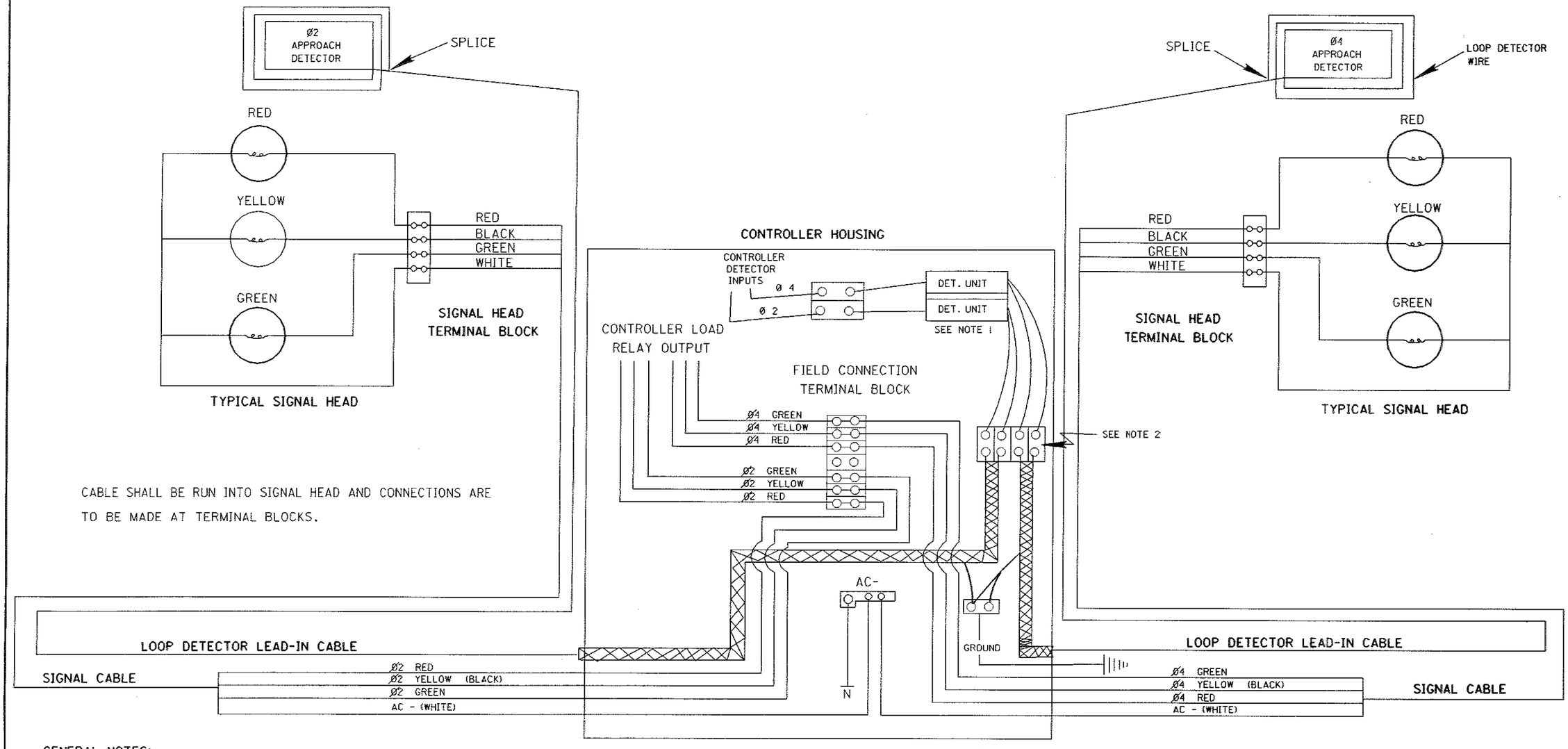
PRE-TIMED-WIRING DIAGRAM FOR SIGNALIZED CLOSING 1 LANE OF A 2 LANE HIGHWAY

4-20-01

OFFICE OF TRAFFIC ENGINEERING

MT-96.25

JAM



TYPICAL SIGNAL HEAD HOOK-UP

GENERAL NOTES:

1. Detection may be loop, magnetometer, sonic or infra-red but shall be chosen, installed and operated to provide dependable accurate detection on each approach without false calls resulting from other traffic. Cabling shown is for loop detectors. However, suitable cable types, as recommended by the manufacturers shall be used for other detectors.

2. Lightning protection, as required in 733.04 shall be provided for solid state electronic controllers and detectors.

3. Signal cable shall be 5/c No. 14 AWG as specified in 732.19. All electrical connections to be made at terminal blocks using lock fork terminals. Splices in signal cable should be avoided but if necessary splice kits shall be used. All connections at splice points shall be soldered.

4. Signal timing settings shall be as shown in the plans or provided to the Contractor by the Engineer prior to implementation of signal control. The Contractor shall periodically monitor the signal operation to determine failure or inefficient operation.

   All equipment failures including timing mechanisms and detectors shall be reported to the Engineer and fully repaired by the Contractor as soon as possible, but in no case longer than 8 hours following notification of the Contractor by the Engineer. All failures resulting in unsafe operations of the signal (i.e., signal or lamp failure, short-timing of yellow or all red intervals, mis-aimed signals, conflicting displays) shall result in the Contractor using 2-way radios to control traffic through the work area until the signal is fully repaired. Failures shall include situations caused by traffic accidents, acts of God or any other cause whether under the control of the Contractor or not.

   If the Engineer determines that the signal operation, although in accordance with the plans and previous orders, is not providing acceptable safe and efficient movement of traffic, the Engineer shall order that appropriate changes such as timing alterations, signal or detector relocations, etc. be made to remedy the situation, at no additional cost to the State. Timing changes and signal relocations shall be implemented within four hours, detector relocations and changes within 24 hours. Failure to make required changes within these time limits shall result in the assessment of liquidated damages of $100.00 per calendar day until the changes are completed.

WIRING DIAGRAM FOR SIGNALIZED ACTUATED-WIRING DIAGRAM FOR SIGNALIZED 1 LANE OF A 2 LANE HIGHWAY CLOSING 1 LANE OF A 2 LANE HIGHWAY

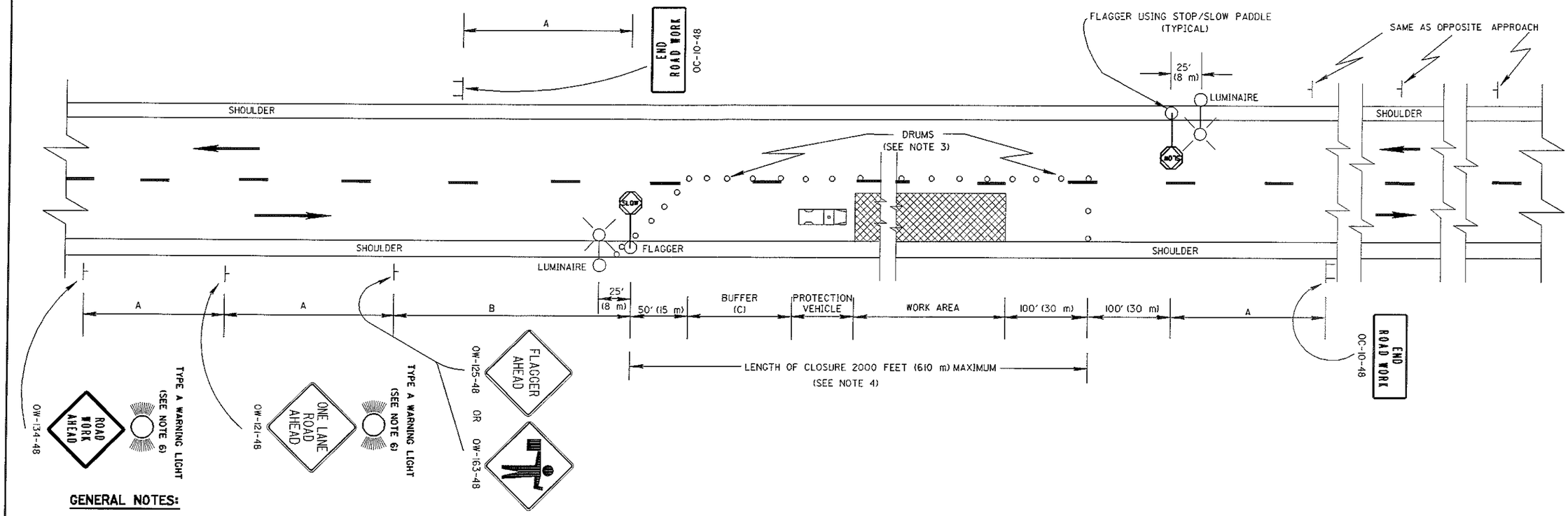
4-20-01

OFFICE OF TRAFFIC ENGINEERING

MT-96.26

1/1

JAM



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. The distances shown are minimums.

2. Flaggers, one for each direction shall be used to control traffic continuously for as long as a one lane operation is in effect. The flaggers shall be able to communicate with each other at all times.

3. Drums shall be spaced at 50' (15 m) center to center along the closure. Drums on the advance taper shall be spaced at 10' (3 m) center to center. Cones having a minimum height of 28" (0.7 m) may be substituted for drums for daytime lane closures. Provisions shall be made to stabilize the cones to prevent them from blowing over.

4. Several small work areas close together shall be combined into one work zone. However, the closure shall not be more than 2000' (610 m) long unless approved by the Engineer. The minimum length between closures shall be 2000' (610 m). Only one side of the road shall be closed in any one work zone.

5. The protection vehicle shown at the beginning of the work area shall be in place and unoccupied whenever workers are in the work area. This protection vehicle shall be removed from the pavement when workers are not in the work area. Other protective devices such as truck mounted attenuator may be used. The vehicle shall be equipped with a 360° rotation or flashing amber beacon clearly visible a minimum of on quarter mile (400 m).

6. The Type A flashing warning lights shown on the OW-134 and the OW-121 signs are required whenever a night lane closure is necessary.

7. Adequate area illumination of each flagger station shall be provided at night by using 150 watt minimum high pressure sodium luminaires or 250 watt minimum mercury luminaires. Luminaires shall be located adjacent to one flagger station for each direction of traffic as shown above. The mounting height for luminaires shall be a minimum of 27' (8.2 m) above the pavement and mounted on a support of adequate strength to provide a satisfactory installation. The overhead conductor clearance shall be a minimum of 18' (5.5 m) above the pavement. The luminaire arm shall be of sufficient length to extend to the edge of the pavement. Poles shall be erected a minimum of 6'6" (2.1 m) behind face of guardrail where existing, or 12' (3.6 m) from the edge of pavement, where possible locate the luminaires behind ditch. Lighting material shall comply with specification 713.

8. Within the length of closure, provision shall be made to control traffic entering from intersecting streets and major drives as necessary to prevent wrong way movements and to keep vehicles off of new pavement not ready for traffic. The method of control shall be subject to the approval of the Engineer.

9. 36 inch (900 mm) warning sign sizes may be used when the legal speed limit is 40 mph or less.

MINIMUM DISTANCE FT (m)	A	B	C
URBAN (≤ 40 MPH)	200 (60)	200 (60)	170 (50)
URBAN (≥ 45 MPH)	350 (105)	350 (105)	335 (100)
RURAL	500 (150)	500 (150)	335 (100)

FLAGGERS CLOSING 1 LANE OF A 2 LANE HIGHWAY STATIONARY OPERATION

04-19-02

OFFICE OF TRAFFIC ENGINEERING

MT-97.10

1/1

JAM

614 WORK ZONE RAISED PAVEMENT MARKERS

GENERAL

This item of work shall consist of furnishing, installing, maintaining and subsequently removing work zone raised pavement markers (TRPMs). The markers shall be yellow or white, as described in the plan.

MATERIAL

All markers and retroreflectors shall be of sufficient strength and properly shaped so as not to be dislodged or broken by impacts from vehicles tires, including those of high pressure truck tires loaded to 4500 pounds (2040 kilograms).

Retroreflectors shall be provided in one or two directions on each marker as required by the usage and shall return white or yellow light as is appropriate for the application.

The reflector shall have an effective area of 0.35 sq. inches (225 sq. mm) for Type A or 3.0 sq. inches (1935 sq. mm) for Type B. Its brightness or specific intensity (when tested at 0.2 degree angle of observation and the following angles of incidence) shall meet or exceed the following:

SPECIFIC INTENSITY

TYPE A

INCIDENCE ANGLE (DEGREES)	WHITE	YELLOW
0	1.0	0.6
20	0.4	0.24
45	—	—

TYPE B

	WHITE	YELLOW
0	3.0	1.8
20	1.2	0.72
45	0.3	0.2

Angle of incidence formed by a ray from light source to the marker and the normal to the leading edge of the marker face (also horizontal entrance angle).

Angle of observation formed by a ray from light source to the marker and the returned ray from the marker to the measuring receptor.

Specific intensity is the mean candlepower of the reflected light (at given incidence and divergence angles) for each foot candle (10.7 lux) at the reflector (on a plane perpendicular to the incident light) .

Type A markers are intended to provide high visibility both day and night. Their daytime visibility shall be assured by size, shape and color as follows:

1) The markers shall be a high visibility yellow or white color which will not degrade substantially due to traffic wear and which will match the color of the reflector.

2) When viewed from above, the markers shall have a visible area of not less than 14 sq. inches (9030 sq. mm).

3) When viewed from the front, parallel to the pavement, as from approaching traffic, the marker shall have a width of approximately 4 inches (100 mm) and a visible area of not less than 1.5 sq. inches (970 sq. mm).

Type B markers are intended to provide high visibility at night by retroreflecting light from automotive headlights back to the driver.

INSTALLATION

WZRPMs shall be attached to clean, dry pavement by a butyl adhesive pad, a bituminous adhesive or other construction grade adhesives (such as Franklin Panel and Metal Adhesive) suitable to anchor the marker under the above conditions. When it is necessary to attach markers to new concrete pavement with curing compound remaining, the curing compound membrane shall be removed by sandblasting or other mechanical cleaning method. Markers shall be installed in accordance with the manufacturer's recommendations.

The Contractor shall immediately replace, at his expense, any markers which fail (broken housing, housing worn to the extent that daytime visibility is significantly diminished or of an unacceptable color, detached or broken reflector, housing detached from adhesive).

Markers are likely to be removed by snow plowing operations, thus they are not considered suitable for use during the period from october 15 until april 30. The Contractor is advised to schedule his work and/or the use of these devices to avoid this period. Should the Contractor choose to use WZRPMs during this period and they are subsequently removed or destroyed by snow and ice control activities. The Contractor shall immediately, at his expense, provide a substitute traffic guidance system effective during day and night and which is acceptable to the Engineer.

The markers shall be placed accurately to depict straight or uniformly curving lines. When used to supplement work zone pavement markings, they shall be placed on or immediately adjacent to the pavement marking. Locations shall be adjusted up to 12 inches (300 mm) longitudinally or 6 inches (150 mm) laterally to avoid placement on joints, or on cracked or deteriorated pavement. Markers shall not be placed directly on pavement markings if this detracts from their ability to remain attached to the pavement.

APPLICATION

1) When required to supplement pavement marking, work zone raised pavement markers shall be placed as follows:

LINE	TYPE	SPACING
EDGE LINE	A OR B	20' (6 m) C/C
LANE LINE	A OR B	40' (12 m) C/C*
CENTER LINE (SINGLE BROKEN)	A OR B	40' (12 m) C/C*
CENTER LINE (DOUBLE/SOLID)	A OR B	2 UNITS SIDE BY SIDE 4" (100 mm) APART 20' (6 m) C/C
CHANNELIZING LINE (INCLUDES EXIT GORE NOSE)	A OR B	10' (3 m) C/C

* CENTERED IN GAP

2) When used to substitute for (replace) pavement marking, work zone raised pavement markers shall be placed as follows:

LINE	TYPE	SPACING
EDGE LINE	A	5' (1.5 m) C/C
LANE LINE	A	5 @ 2.5' (0.75 m) C/C 30' (9 m) GAP [40' (12 m) CYCLE]
CHANNELIZING LINE (INCLUDES EXIT GORE NOSE)	A	5' (1.5 m) C/C
EDGE LINE (TWO COLOR) (WHITE/YELLOW)	A	BACK TO BACK 5' (1.5 m) C/C

Yellow markers used to separate opposite flows of traffic (center lines) shall include retroreflectors for both directions. All other yellow and white markers shall provide retroreflectivity for one direction only.

REMOVAL

Removal shall be accomplished in a manner such that little or none of the adhesive remains on the pavement. Permanent pavement surfaces shall not be scarred, broken or roughened significantly.

PAYMENT

Basis of payment shall be at the contract unit price per each marker and shall include all labor, equipment, hardware and incidentals required to perform the work. It shall also include replacement at no additional cost of all work zone raised pavement markers which, in the judgement of the Engineer, fail for any reason, execpt due to failure of the pavement to which they are attached.

ITEM	UNIT	DESCRIPTION
614	EACH	WORK ZONE RAISED PAVEMENT MARKER

10-18-02

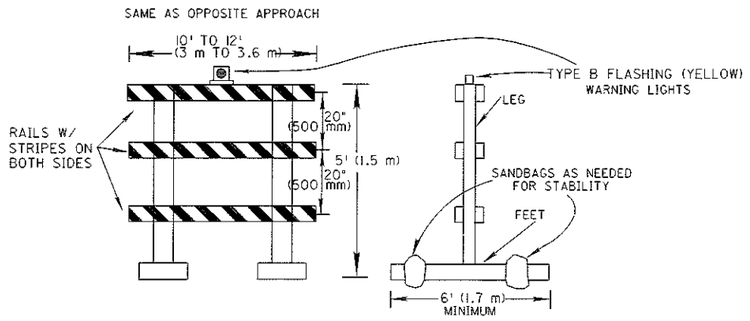
WORK ZONE RAISED PAVEMENT MARKERS

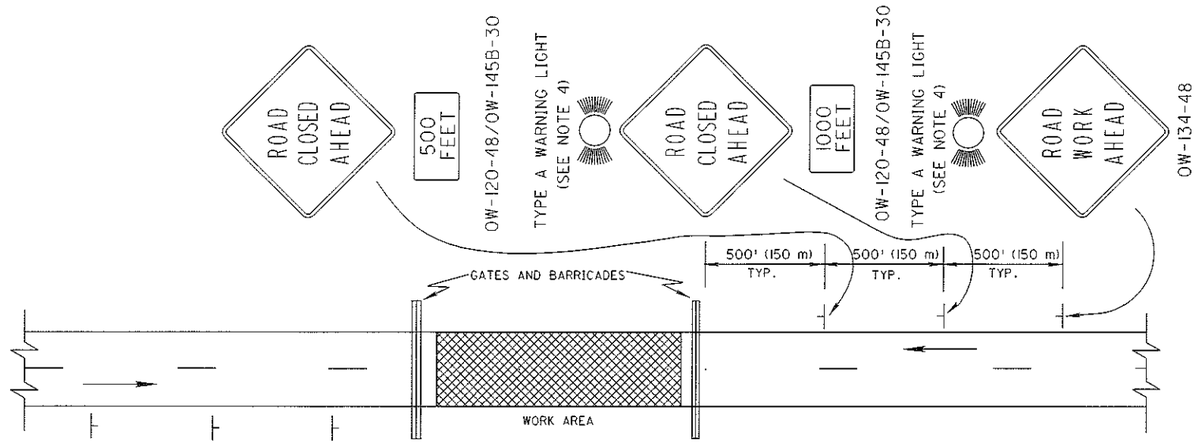
OFFICE OF TRAFFIC ENGINEERING

MT-101.20

1 / 1

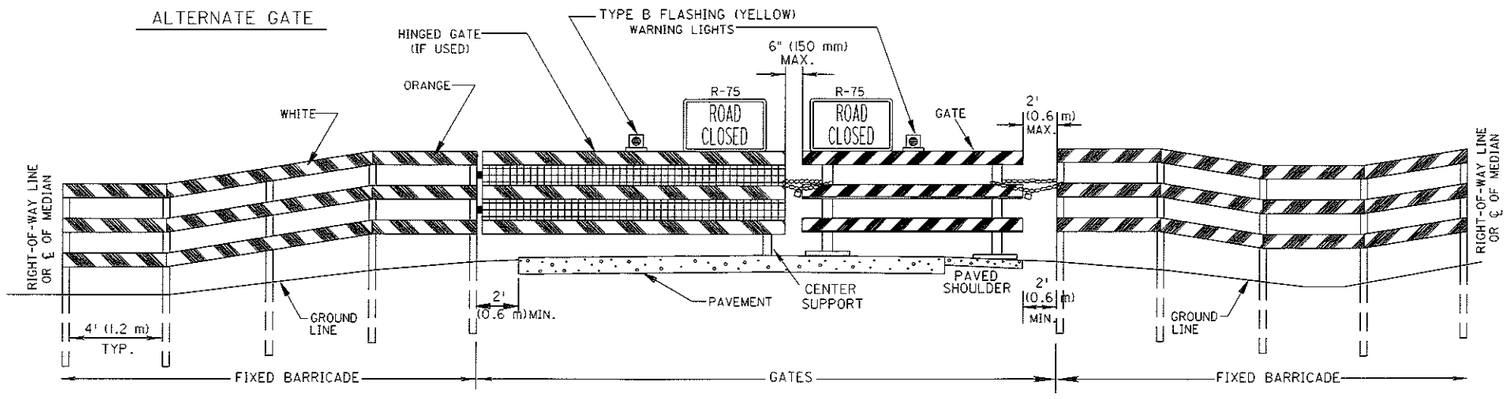
JAM





ADVANCE WARNING SIGNS FOR CLOSURE

(SEE NOTE 6)



GENERAL NOTES

1. Barricades: Barricades shall be constructed according to details shown. When the road is closed to traffic, barricades and gates shall be used to effectively close the entire roadway including the median of divided highways. In urban areas and at locations where it is impractical to extend the barricade to the Right-Of-Way line because of a sidewalk which is to remain open or other obstruction, the ends of the barricade shall be located as directed by the Engineer to effect the desired closing of the highway.

2. Painting and Reflectorization: In construction or maintenance areas all rails of the barricades and gates shall be reflectorized with orange and white reflectorized Type G sheeting in 6" (150 mm) wide alternate stripes which slope downward toward the center line of the road at an angle of 45°. Any barricade placed on the pavement must be considered as a gate. The top rail of the A-frame and all three rails of the hinged gate shall be striped on both sides. All posts, braces, gate legs, and any unstriped rails shall be painted white. (Gates and barricades used in permanent or semipermanent application shall differ only in that they shall use red and white stripes).

3. Gates: One gate shall be erected for each traffic lane. Gates shall be chained and padlocked to one another and to adjacent post of the barricades. Chains shall be 1/4" (6.4 mm) stock or larger with welded links. A hinged gate may be used and shall be supported at the center in an approved manner.

4. Type A Flashing Warning Lights:

   Type A Flashing Warning Lights are required on the OW-134 and the first OW-120 signs.

5. Type B Flashing Warning Lights:

   Each gate shall be equipped with a Type B Flashing Warning Light, conspicuously visible at all distances up to 1000' (300 m) under normal atmospheric conditions. The light shall be in operation at all times during the period the highway is closed.

6. Signs: Where the road is closed to traffic by the erection of gates and barricades, R-75 signs signs shall be mounted on the gates as shown. The Advance Warning Signs shown on this drawing will not be required when all traffic has been directed from the roadway at or just in advance of the gates and barricades such as on a Limited Access Highway or when a temporary run around similar to Figure C-24 of The Ohio Manual of Uniform Traffic Control Devices (OMUTCD) is used. Advance Warning Signs shall be required in all other situations and when required in the plans. Advance Warning Signs on an approach shall consist of two OW-120 signs with distance plaques placed about 500' (150 m) and 1000' (300 m) from the closure and a OW-134 placed about 1500' (450 m) from closure, the signs shall be placed on both sides of the road (dualled for 4-lane divided highways or when required by the plans.

7. Operation: On a 2-Lane 2-Way roadway the Contractor will normally open only the left hand gate as necessary to allow vehicles to enter and immediately close it. Both gates will not normally be opened at the same time. The Contractor shall assign an employee to assure that gates are closed and chained shut at the end of each workday.

10-18-02

GATES AND BARRICADES

GATES

OFFICE OF TRAFFIC ENGINEERING

MT-101.60

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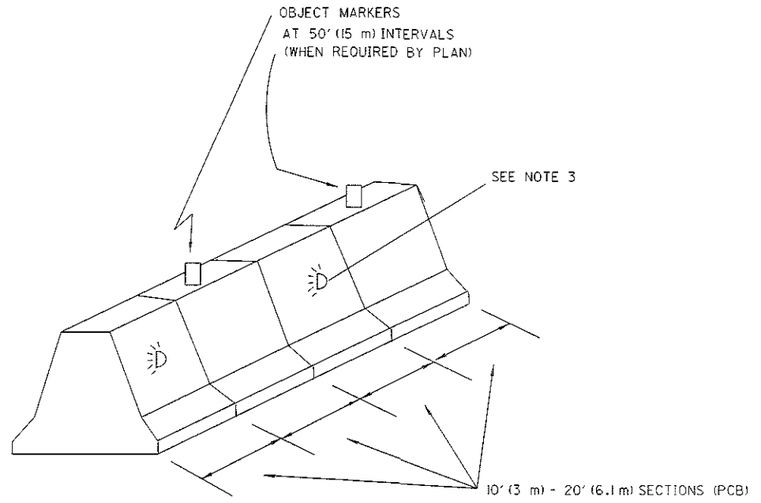
JAM

1. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
32" (813 mm) HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS @ 50' (15 m) C-C (MAX.) TOP MOUNTED OBJECT MARKERS 6"X12" (150 X 300 mm) @ 50' (15 m) C-C (MAX.)
32" (813 mm) HIGH WITH GLARE SCREEN	BARRIER REFLECTORS @ 50' (15 m) C-C VERTICAL STRIPES ON PADDLES 2"X12" (50 X 300 mm) @ 50' (7.6 m) C-C (MAX.)
50" (1270 mm) HIGH	BARRIER REFLECTORS @ 25' (7.6 m) C- C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS 6"X12" (150 X 300 mm) TOP MOUNTED @ EACH END

2. DRAWING SHALL BE USED WHEN PCB IS SPECIFIED IN THE PLANS.

3. THE TOP OF THE BARRIER REFLECTOR SHALL BE MOUNTED AT 26 INCHES (660 mm) FROM THE BASE.



REFER TO RM-4.1 and 4.2
FOR PCB CONNECTION

PORTABLE CONCRETE BARRIER (PCB)

PORTABLE CONCRETE BARRIER DELINEATION

10-18-02

PORTABLE

OFFICE OF TRAFFIC ENGINEERING

MT-101.70

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JAM

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 2¼" (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'-⅝" (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)

10-18-02

TEMPORARY SIGN SUPPORT I

OFFICE OF TRAFFIC ENGINEERING

MT-105.10

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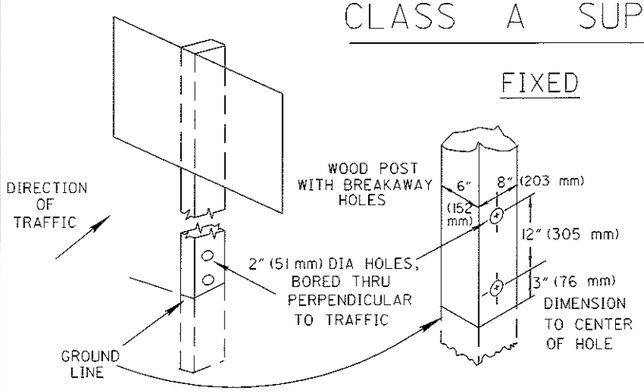
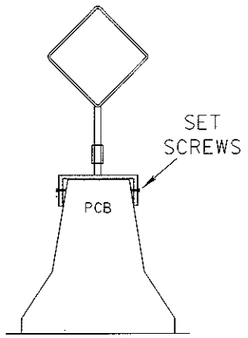
JAM

CLASS A SUPPORTS

FIXED



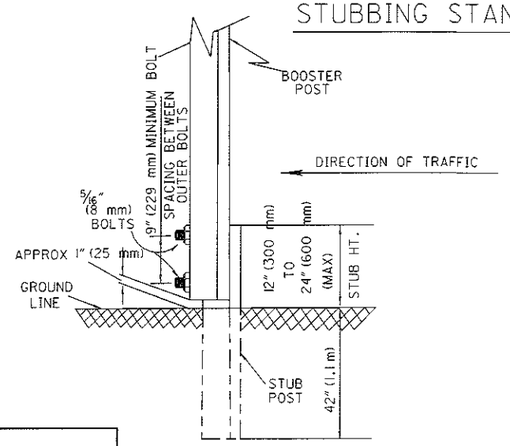
TYPE E (6"x8" max.)



TYPE I

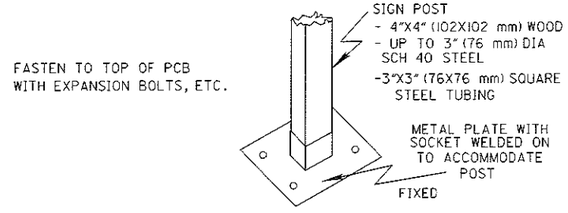
CLASS A SUPPORTS

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 1 LB/FT (1.5 kg/m) LESS THAN STUB POST

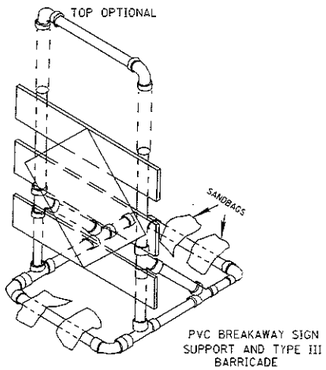


TYPE 2

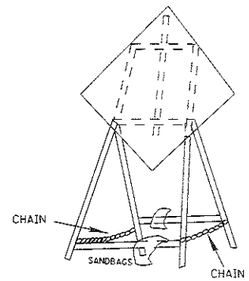
NOTE: SPECIFIC INFORMATION SEE MT-105.10

CLASS A SUPPORTS

PORTABLE

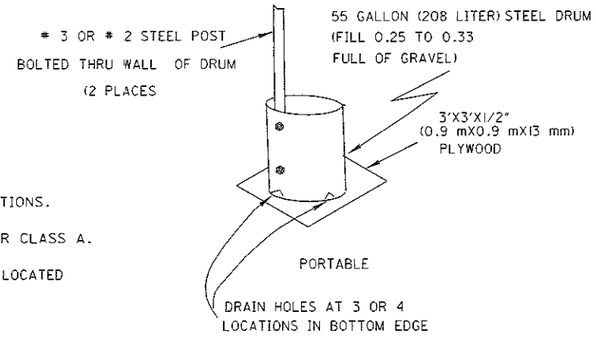


PVC BREAKAWAY SIGN SUPPORT AND TYPE III BARRICADE



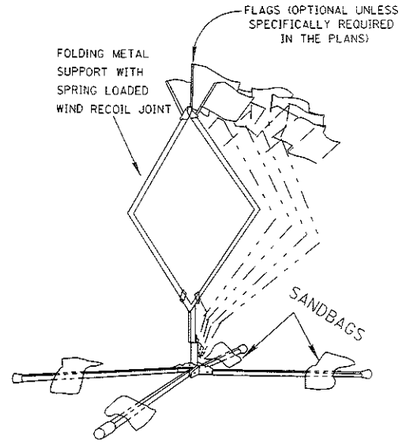
EASEL

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.



10-18-02

TEMPORARY SIGN SUPPORT II

OFFICE OF TRAFFIC ENGINEERING

MT-105.11

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JAM

(1) SEPARATOR TYPE WHEN USED BETWEEN THE WORK AREA AND A PEDESTRIAN WALKWAY:

SEPARATOR SELECTION TABLE

DISTANCE FROM SEPARATOR TO WORK ACTIVITY	WORK CHARACTERISTICS ③					
	< 2' (0.6 m) DROPOFF	2' (0.6 m - 5' (1.5 m) DROPOFF	> 5' (1.5 m) DROPOFF	DIRT/MUD SPLASHED	EQUIPMENT WHICH MOVES OR HAS EXPOSED MOVING PARTS	OPERATION WHICH THROWS STONE/ETC.
< 5' (1.5 m)	A-H	E-H	F-G	G	G-H	G ①
5' (1.5 m) - 10' (3.0 m)	A-H	E-H	E-H	G	E-H	G ①
> 10' (3.0 m) - 30' (9.0 m)	A-H	C-H	E-H	N/A	D-H	G ①
> 30' (9.0 m)	N/A	C-H	E-H	N/A	D-H	G ①

A. CONES ②
B. DRUMS ②
C. MARKER TAPE ON DRUMS OR CONES ②
D. WOOD RAILING
E. SNOW FENCE, WOOD OR ORANGE PLASTIC CONSTRUCTION FENCE
F. CHAIN LINK FENCE, TYPE CLT
G. PLYWOOD WALL
H. PORTABLE CONCRETE BARRIER

① Wall shall be of sufficient height to screen pedestrians and passing cars. It should be provided when the walkway is within range of any thrown projectiles.

② These devices are for use during daylight hours only.

③ These requirements shall not apply to paving, grinding or other similar operations.

(2) SEPARATOR REQUIREMENTS:

A. Cones to delineate pedestrian walkways shall be a minimum of 28" (0.7 m) high and spaced at 5' (1.5 m) intervals.

B. Drums to delineate pedestrian walkways shall be spaced at 5' (1.5 m) intervals.

C. Marker tape shall be bright fluorescent orange approximately 3" (75 mm) wide. Attachment to drums/cones shall be strong and waterproof.

D. Wood railing shall be a minimum of a 2"x4" (51x102 mm) rail at 32" (810 mm) above ground. It shall be secured to 2"x4" (51x102 mm) posts at not more than 6' (1.8 m) spacing with secure attachment hardware. It shall be installed and braced to be essentially rigid and able to support the following loads:

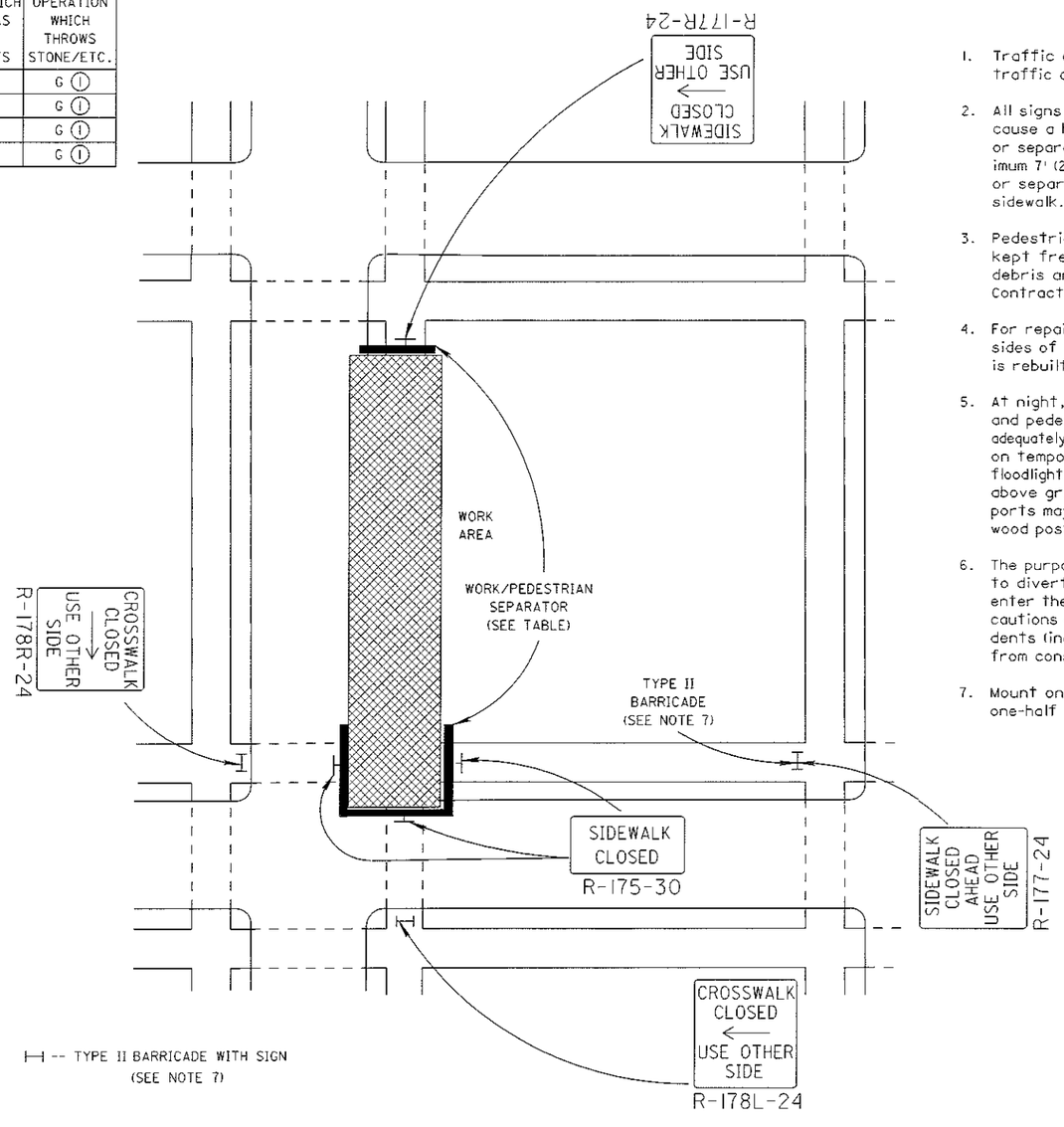
1) A horizontal transverse load of 100 pounds (45 kg) at each post top.
2) A vertical load of 250 pounds (113 kg) at midpoint between each post.

E. Wood snow fence shall be nominally 42" (1060 mm) high, securely supported by wood or steel posts at 6' (1.8 m) maximum spacing. Plastic/nylon construction fence shall be bright orange. It shall be securely fastened to wood or metal posts at not more than 6' (1.8 m) spacing. It shall be nominally 42" (1060 mm) high and the top edge shall not sag below 30" (760 mm) [12" (300 mm) sag]. Either of the fence sections with extensive broken slats or holes greater than 12"x12" (300x300 mm) shall be repaired or replaced.

F. Chain link fence, Type CLT shall conform to 607 and appropriate details on Standard Drawings F-1, F-3 and F-4, except that materials need not be new nor shall certification and tests be required.

G. Plywood walls shall be a minimum of 5/8" (16 mm) exterior plywood, supported by 2"x4" (51x102 mm) or heavier framing securely anchored and buttressed to resist wind load and/or persons. They shall be designed for a min. wind loading of 30 pounds per sq. foot (138 KPA) (or larger if local codes require). Height of the work/pedestrian separators shall not be less than 7' (2.1 m) above the walkway.

H. 32" (810 mm) Portable Concrete Barrier as per 622. If used Standard Drawing MT-101.70 shall be used.



GENERAL NOTES

1. Traffic controls for pedestrians only are shown. Vehicular traffic control shall also be provided as required.

2. All signs and barricades shall be placed so that they do not cause a hazard for pedestrians. All signs, not on barricades or separators, near or over active sidewalks shall have a minimum 7' (2.1 m) vertical clearance. Signs mounted on barricades or separators shall have a minimum 1' (0.3 m) clearance above sidewalk.

3. Pedestrian walkways constructed by the Contractor shall be kept free of any obstructions or hazards including holes, debris and mud. Other walkways damaged or dirtied by the Contractor shall be immediately repaired or cleaned.

4. For repair or reconstruction work involving sidewalks on both sides of the street, the work shall be staged so that one side is rebuilt before the other is disrupted.

5. At night, temporary lighting shall be provided for separators and pedestrian detour signs which are not otherwise lighted adequately. Illumination shall provide a min. of 1.2 foot candles (13.0 lux) on temporary walkways. Illumination fixtures may consist of floodlights or other protected fixtures mounted at least 10' (3.0 m) above ground and controlled by photocells. Illumination supports may be standard highway lighting poles, 4"x4" (102x102 mm) wood post or other support approved by the Engineer.

6. The purpose of the traffic control devices provided hereon is to divert and guide pedestrians whose path would otherwise enter the work area. The Contractor must take additional precautions as appropriate to protect other pedestrians or residents (including children) from exposure to hazards resulting from construction operations.

7. Mount on Type II Barricade and place not to block more than one-half the sidewalk.

10-18-02

DETOUR OF PEDESTRIANS TO OTHER SIDE OF STREET

OFFICE OF TRAFFIC ENGINEERING

MT-110.20

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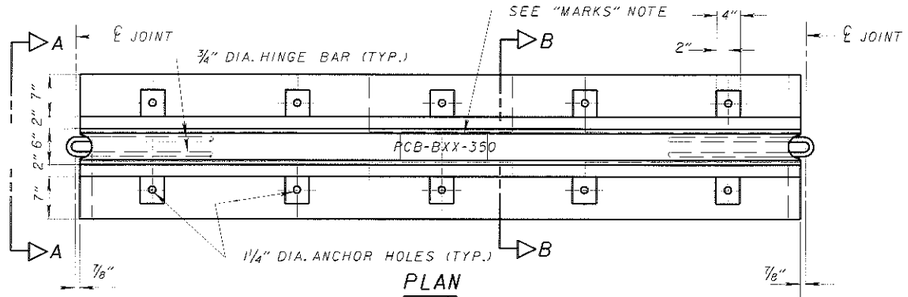
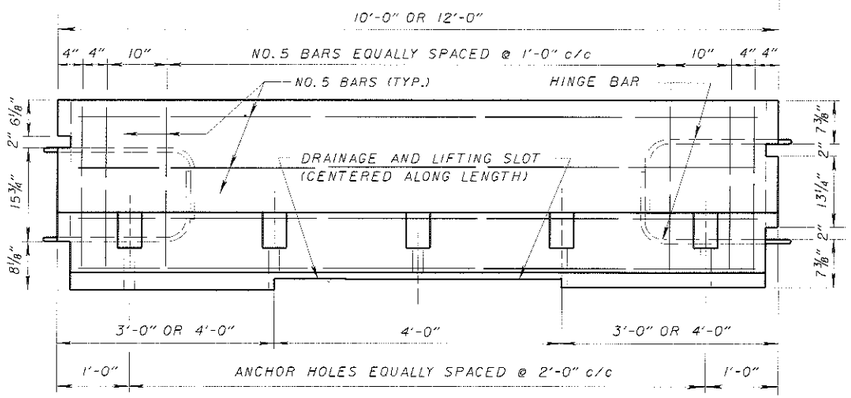
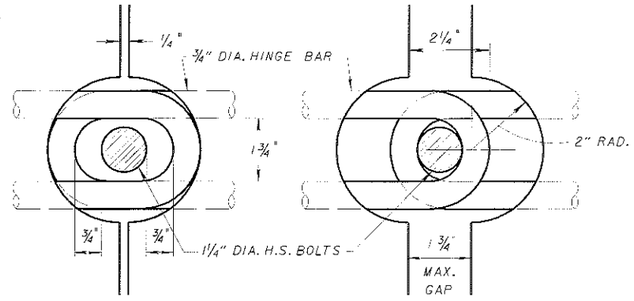


PLAN

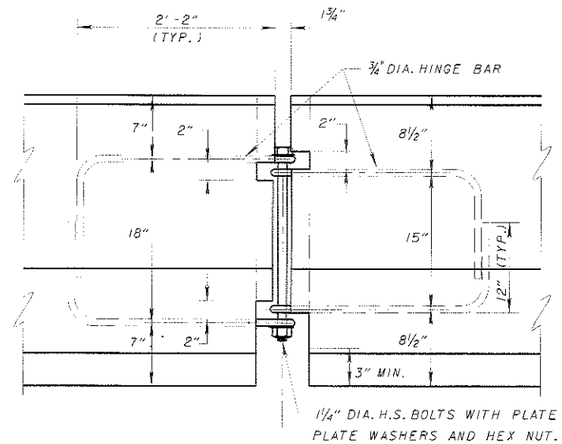


ELEVATION



(1) CLOSED JOINT (2) OPEN JOINT

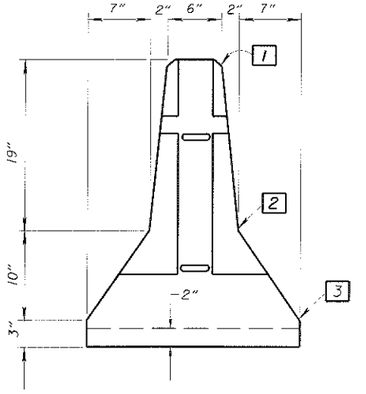
JOINT CONNECTION DETAILS



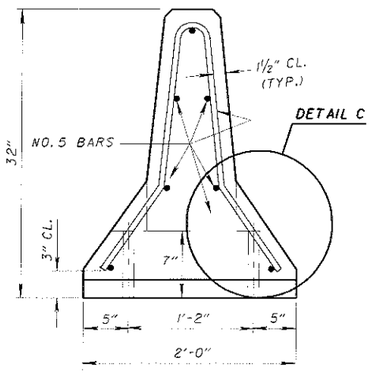
DETAIL AT HINGED CONNECTION

(1) **BARRIERS** SHALL INITIALLY BE PLACED CLOSER TOGETHER SO BOLTS CAN BE EASILY INSERT-THROUGH HINGE BAR LOOPS.

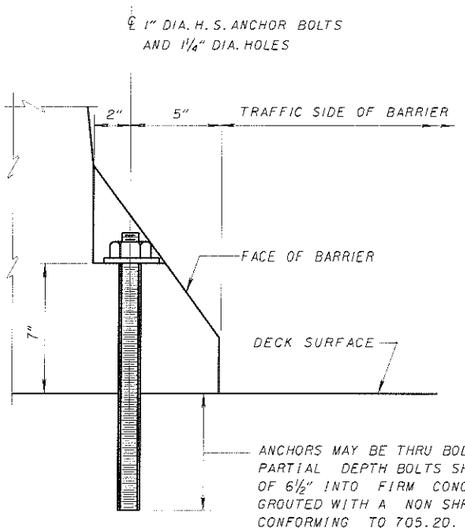
(2) **BARRIER JOINTS** SHALL BE FULLY OPEN BEFORE NUT IS TIGHTENED ONTO BOLT



VIEW A-A



SECTION B-B



ANCHORS MAY BE THRU BOLTS OR PARTIAL DEPTH BOLTS. PARTIAL DEPTH BOLTS SHALL BE EMBEDDED A MINIMUM OF 6½" INTO FIRM CONCRETE ACCORDING TO 510 AND GROUTED WITH A NON SHRINK, NON METALLIC GROUT CONFORMING TO 705.20. WHEN NO LONGER NEEDED, REMOVE ANCHORS AS DIRECTED BY THE ENGINEER. WHERE DECK IS TO REMAIN, FILL HOLES WITH GROUT, 705.20.

DETAIL C

[1] 1" RADIUS OR ¾" CHAMFER ALL TOP AND END CORNERS

[2] PERMISSIBLE 10" RADIUS

[3] PERMISSIBLE 1" RADIUS

GENERAL NOTES

DESCRIPTION: THE BRIDGE MOUNTED PORTABLE CONCRETE BARRIER IS COMPLIANT WITH NCHRP REPORT 350. UNANCHORED, THE BARRIER HAS BEEN SUCCESSFULLY CRASH TESTED TO THE TEST LEVEL 3 CRITERIA. FULLY ANCHORED ON THE TRAFFIC SIDE, THE BARRIER SATISFIES THE TEST LEVEL 4 CRITERIA.

HARDWARE: ALL BOLTS, ANCHORS, NUTS AND WASHERS SHALL CONFORM TO 711.09 (ASTM A325) AND SHALL BE GALVANIZED ACCORDING TO 711.02.

REINFORCING STEEL: FURNISH ALL REINFORCING STEEL, INCLUDING THE ¾" DIA. HINGE BARS, ACCORDING TO 509.02. GALVANIZE THE HINGE BARS ACCORDING TO 711.02 AFTER FABRICATION.

CONCRETE: FURNISH CLASS C CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

BRIDGE DECK SURFACE PREPARATION: THE CONCRETE SURFACE, WHERE THE BARRIER IS TO BE PLACED, SHALL BE FREE OF LOOSE SAND, GRAVEL, DIRT OR OTHER FOREIGN MATERIAL. LEVEL ALL SURFACE IRREGULARITIES TO THE SATISFACTION OF THE ENGINEER WITH GROUT OR ASPHALT. PLACE ROLLED ASPHALT ROOFING MATERIAL ON THE SURFACE AREAS THAT, AT THE DISCRETION OF THE ENGINEER, HAVE INSUFFICIENT ROUGHNESS TO PROVIDE THE REQUIRED FRICTION CONTACT BETWEEN THE BARRIER SEGMENTS AND THE DECK.

ANCHORS: ONCE ALL BARRIER SECTIONS HAVE BEEN PROPERLY SECURED, REMOVE ALL PORTIONS OF THE ANCHORS THAT PROTRUDE BEYOND THE FACE OF THE BARRIER.

MARKS: CLEARLY MARK ALL BARRIER SEGMENTS ON THE TOP AS SHOWN. XX INDICATES THE YEAR THE BARRIER WAS CAST. THESE MARKINGS SHALL BE PERMANENTLY IMPRESSED IN THE BARRIER USING A MINIMUM OF 2" HIGH LETTERING. EACH SEGMENT SHALL HAVE ON ITS TOP, A UNIQUE IDENTIFICATION AS TO ITS MANUFACTURER; AND, SOMEWHERE ON THE BARRIER, THE DAY AND MONTH THE BARRIER WAS MANUFACTURED.

HANDLING DEVICES MAY BE USED IN LIEU OF THE LIFTING SLOT FOR MOVING THE BARRIER. THE DESIGN OF THE DEVICES SHALL BE SUFFICIENT TO HANDLE THE WEIGHT OF THE SECTION BEING LIFTED. REMOVE ALL PORTIONS OF HANDLING DEVICES THAT PROTRUDE ABOVE THE BARRIER SURFACE.

PROJECT PLANS: THE DESIGNERS SHALL INDICATE THE FOLLOWING INFORMATION ON THE PROJECT PLANS: THE NUMBER OF ANCHORS PER SEGMENT, SPECIAL ANCHORAGE REQUIREMENTS (IF NECESSARY) AND THE LOCATION OF THE BARRIER ON THE BRIDGE DECK.

"J-J HOOKS" END CONNECTIONS MAY BE UTILIZED IN LIEU OF THE END CONNECTIONS DETAILED. NO MODIFICATIONS TO THE REINFORCING STEEL LAYOUT DETAILED HEREIN WILL BE ALLOWED. TRANSITION BARRIER SECTIONS WITH PIN AND LOOP CONNECTIONS ON ONE END AND "J-J HOOKS" ON THE OTHER SHALL BE USED TO CONNECT RUNS OF "J-J HOOKS" BARRIER TO OTHER PERMITTED BARRIER TYPES. THE HEIGHTS OF THE TRANSITION SECTIONS SHALL BE THE SAME AS THE BARRIER RUNS BEING CONNECTED. "J-J HOOKS" IS A TRADEMARK OF:
EASI-SET INDUSTRIES,
P.O. BOX 300,
MIDLAND, VA 22728.
(540)439-8911 OR (800)547-4045.

DESIGN AGENCY
OFFICE OF STRUCTURAL ENGINEERING

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
ADMINISTRATOR
DATE 4-24-02

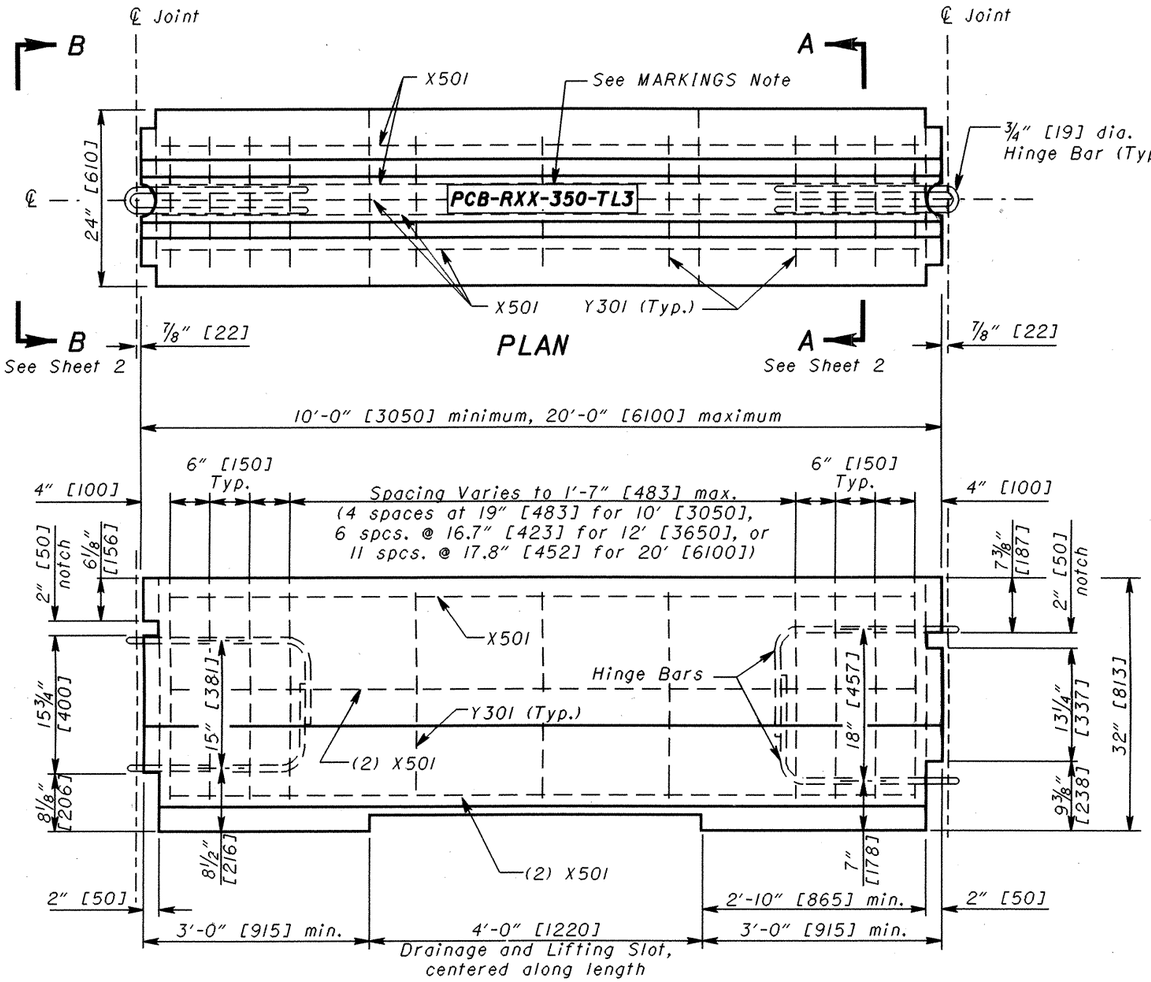
REVISIONS
07-06-99
07-19-02

REVIEWED LMW
CHECKED WTF
DESIGNED AJM
DRAWN CFJ

PCB-91

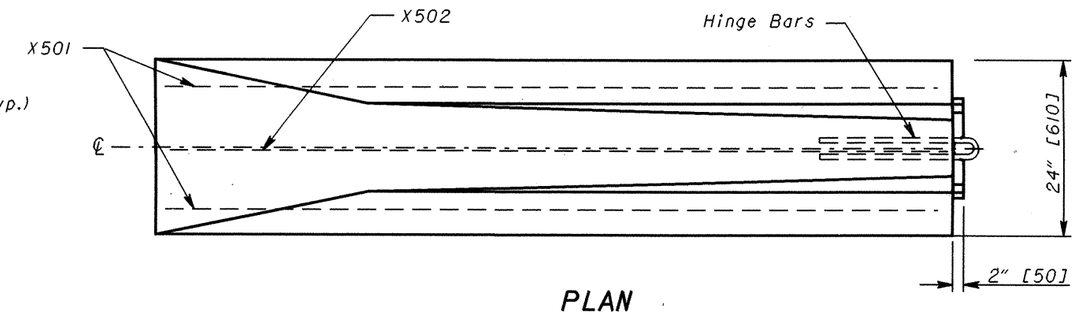
STANDARD
PORTABLE CONCRETE BARRIER
DETAILS

1 / 1

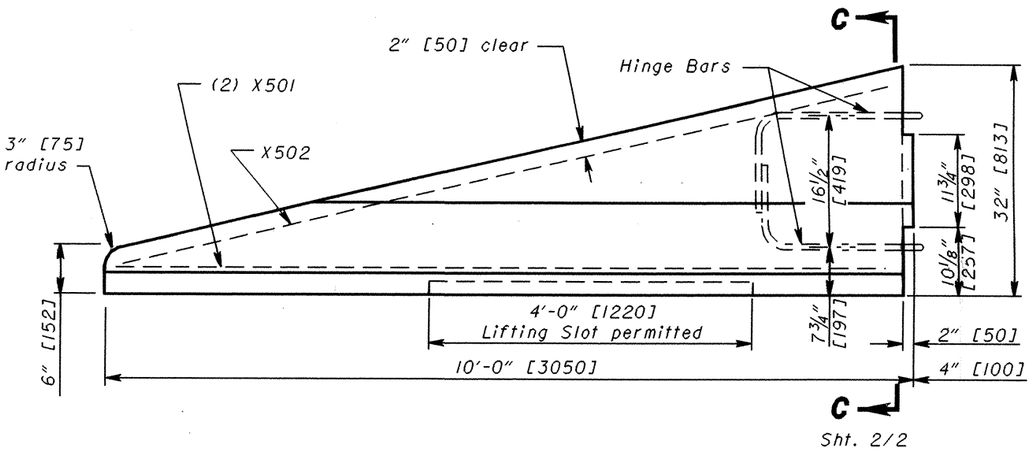


ELEVATION

32" [813-mm] BARRIER SECTION



PLAN



The Tapered End section is not a crashworthy terminal and should not be used on the approach end of temporary barrier unless it is fully located beyond the clear zone.

ELEVATION

32" [813] TAPERED END

NOTES

GENERAL: *See CMS 622 for additional information.*

PORTABLE CONCRETE BARRIER (PCB): *PCB, as shown, shall not be used on bridge deck edges. PCB, Bridge Mounted, shall be used at such locations in accordance with* ***Structural Engineering's Standard Drawing PCB-91 [PCB-91M].***

CONNECTING HARDWARE: *Bolts, washers and hex nuts shall be galvanized after fabrication per CMS 711.02 and shall meet the requirements of CMS 711.09 except that the Rotational Capacity test specified in ASTM A 325 shall be waived.*

In lieu of the pin and loop connections detailed on this Standard Construction Drawing, barrier sections with "J-J Hooks" end connections may be utilized.

Transition barrier sections with pin and loop connections on one end and "J-J Hooks" on the other shall be used to connect runs of "J-J Hooks" barrier to other permitted barrier types. The heights of the transition sections shall be the same as the barrier runs being connected.

"J-J Hooks" is a trademark of Easi-Set Industries, P.O. Box 300, Midland, VA 22728, (540) 439-8911 or (800) 547-4045.

HINGE AND REINFORCING BARS: The ¾" [19] hinge may be ASTM A-36. Rebars shall meet the requirements of CMS 509. Black steel is permitted.

HANDLING DEVICES: *Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to safely handle the weight of the section being lifted. No handling devices shall protrude from the surface of the barrier when in place.*

MARKINGS: *All barrier segments shall be marked on the top, as shown, where XX indicates the year cast. These markings shall be permanently impressed in the barrier using a minimum of 2" [50] high lettering. The tapered end section is not required to be marked.*

Each segment, including the tapered end section, shall have on its top, a unique identification as to its manufacturer. And somewhere on the barrier, the day and the month that the barrier was manufactured.

REFLECTORIZATION: *Barrier reflectors shall be installed in accordance with* ***Traffic Engineering Standard Drawing MT-95.82,*** *when specified in the plans.*

THIS DRAWING REPLACES RM-4.2 DATED 1-18-02.

OHIO DEPARTMENT OF TRANSPORTATION — 4-18-03 — DATE
STDS. ENGR. — D. Focke
ROADWAY DESIGN ENGINEER

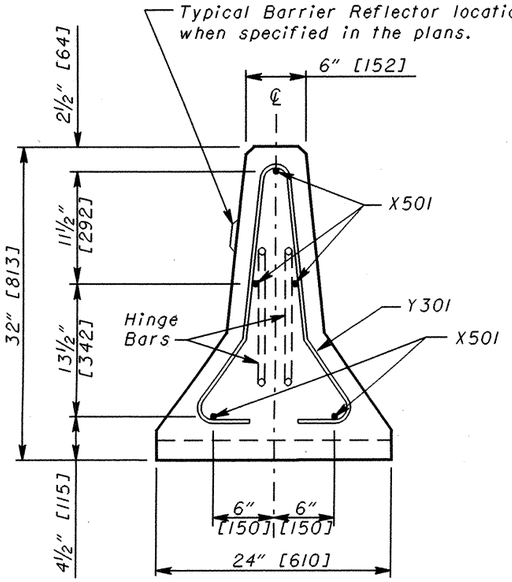
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

32" PORTABLE CONCRETE BARRIER

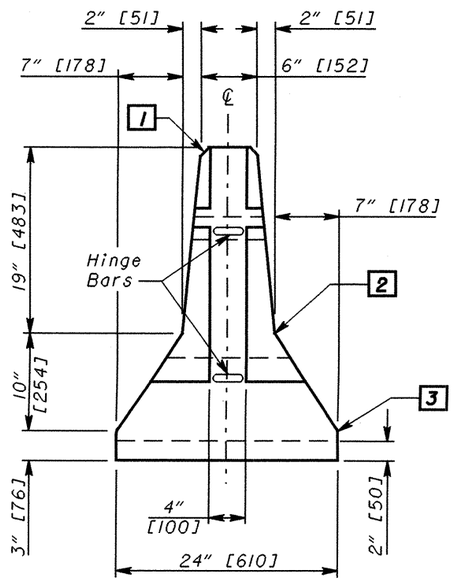
NUMBER RM-4.2



Vertical edges on Lifting Slot may be battered. Depth 2" ±¼" [50±6].

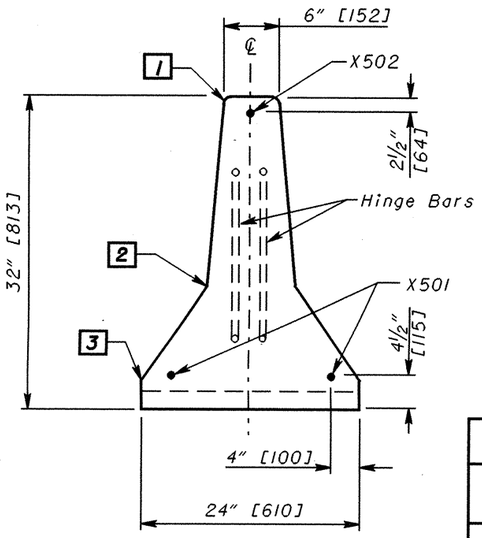
SECTION A-A

See Sheet 1.



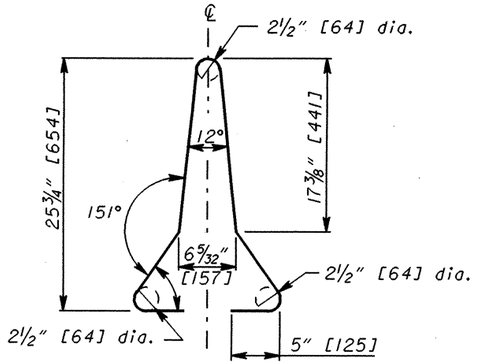
VIEW B-B

See Sheet 1.



SECTION C-C
Tapered End Section

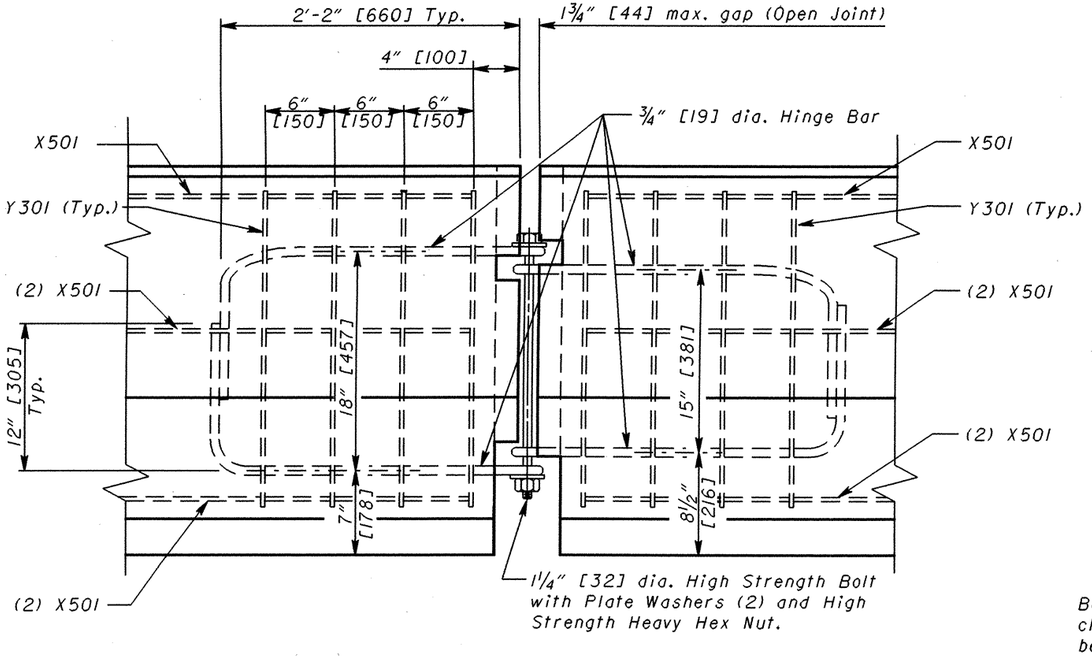
See Sheet 1.



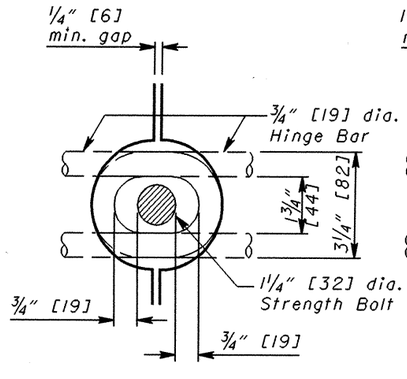
Y301
BENDING DIAGRAM

REINFORCING BAR LIST

	Mark	Bar	Bar Length	Shape	Quantity per typ. length 10' [3050]	12' [3660]	20' [6100]
BARRIER SECTION	X501	#5 [#16M]	9'-4" [2850]	Str.	5	---	---
			11'-4" [3450]	Str.	---	5	---
			19'-4" [5890]	Str.	---	---	5
	Y301	#3 [#10M]	5'-5" [1650]	Bent	11	13	18
TAPERED END	X501	#5 [#16M]	9'-6" [2900]	Str.	2	---	---
	X502	#5 [#16M]	9'-8" [2950]	Str.	1	---	---

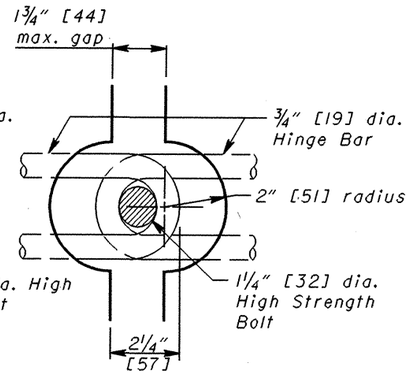


DETAIL AT HINGED CONNECTION



CLOSED JOINT

Barriers shall initially be placed close together so that Bolts can be easily inserted through Hinge Bar loop.



OPEN JOINT

Barrier joints shall be fully open before the Nut is tightened onto Bolt.

JOINT CONNECTION DETAILS

LEGEND

1. 1" [25] radius or ¾" [19] chamfer, all top and end corners.
2. Permissible 10" [250] radius.
3. Permissible 1" [25] radius.

THIS DRAWING REPLACES RM-4.2 DATED 1-18-02.

OHIO DEPARTMENT OF TRANSPORTATION — DATE 4-18-03
STDS. ENGR. D. Focke
ROADWAY DESIGN ENGINEER

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

32" PORTABLE CONCRETE BARRIER

NUMBER RM-4.2

2 / 2

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 800
REVISIONS TO THE 2005 CONSTRUCTION & MATERIAL SPECIFICATIONS
DATED 4-15-2005

SHOP DRAWING APPROVAL FOR STRUCTURES CARRYING RAILROAD TRAFFIC. In addition to the requirements of Item 501.04A, submit four copies of the prepared shop drawings at least 40 days prior to the pre-fabrication meeting to each railroad company involved for review and approval. Resolve all railroad comments prior to supplying the letter of written acceptance to the Department. The acceptance submission to the Department shall include one set of shop drawings approved by each railroad company involved; copies of all documentation between the railroad(s) and the Contractor; and four sets of Contractor accepted shop drawings for each railroad company involved.

ITEM 614 PORTABLE CHANGEABLE MESSAGE SIGN. In lieu of the requirement in 614.03 requiring the use of portable changeable message signs prequalified according to Supplement 1061 (i.e., evaluated by NTPEP), the use of portable changeable message signs prequalified via ODOT evaluation is also acceptable until December 31, 2006. (Essentially, two prequalified lists, ODOT-based and NTPEP-based, will exist until that date.) After December 31, 2006 only those portable changeable message signs prequalified according to Supplement 1061 will be allowed for use on ODOT contract projects.

ITEM 614 MAINTAINING TRAFFIC: CONFORMANCE OF WORK ZONE DEVICES TO NCHRP 350. Erect signs used on item 614 Maintaining Traffic on supports conforming to standard drawings MT-105.10, MT-105.11 at spacings conforming to TC-52.10, TC-52.20, and details conforming to TC-41.20.

The following devices must meet NCHRP 350 and acceptable written manufacturer certification submitted to the Engineer before the devices are installed on the project. Only ballasting specified by the manufacturer is allowed.

- Drums, with or without lights.
- Cones, with or without lights.
- Vertical panels, with or without lights, and the panel support.
- Portable sign supports.
- Workzone impact attenuators.
- Portable concrete barrier.
- Barricades.

This certification submission requirement is waived if the device is specified in the plans or other bid documents by manufacturer and product number, or if the device appears on the FHWA web page, http://safety.fhwa.dot.gov/fourthlevel/pro_res_road_nchrp350.htm, listing Roadway Hardware meeting NCHRP 350.

Portable concrete barrier, 32-inches high, and manufactured according to standard construction drawing RM-4.2 or J-J Hook Barrier as identified in RM-4.2 is NCHRP 350 approved. Use of RM-4.2 barrier is allowed without certification if the project verifies that the sections are marked according to RM-4.2.

Contractors are allowed to use GREAT CZ impact attenuators, manufactured by Energy Absorption Systems Inc., in their inventory for their useful life or until January 1, 2007, if they were purchased before October 1, 1998.

Contractors are allowed to use portable concrete barrier in their inventory for its useful life or until January 1, 2008, provided it was manufactured according to construction standard drawings MC-9.1 or MC-9.2 (or subsequently RM-4.1 or RM-4.2) and purchased before October 1, 2002.

SUPPLEMENT 1069 (2-08-2002). PRE-QUALIFIED AGGREGATE SUPPLIER PROGRAM. Only pre-qualified suppliers will provide aggregate materials to the Ohio Department of Transportation conforming with the requirements of the Construction and Materials Specifications. This supplement applies to all aggregates provided the Department either directly, or indirectly through a contractor or subcontractor. The program applies to all aggregate materials provided in conformance to or referenced to the 703 section of CMS.

SUPPLEMENT 1084 (10/18/02) REQUIRED FOR BRIDGE PAINT. The Department will accept bridge paint in 708.01 and 708.02 under Supplement 1084.

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

April 17, 2004

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) as required and a Co-Permittee form as 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 as shown on the plans
Co-Permittee A requirement in SS833 Part VII. Definitions O
Earth Disturbing Activity (EDA) Any activity that exposes bare ground or an erodible material to storm water and anywhere CMS Item 659 Seeding, SS 870 Seeding, CMS Item 660 Sodding, or SS 870 Sodding is being furnished
Contractor EDA Any EDA that is NOT shown on the plans as part of the project be the EDA inside the project limits or not

Project EDA Any EDA that is shown on the plans as part of the project
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. The Department will furnish the Contractor a copy of the NOI and the OEPA approval letter at or before the Pre-Construction meeting.

A Co-Permittee form is required when the project requires a SWPPP. Information about the Co-Permittee form can be found at "WWW.epa.state.oh/dsw/strom/stromform" For a copy of the Co-Permittee form see Appendix D.

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 CMS 105.16 when EDA (including borrow and waste areas) are involved, unless the areas in question have been cleared through prior environmental studies. Furnish TSEC BMP for any EDA. An encumbered amount is established in the proposal for TSEC BMP to be used for project EDA and possible Contractor EDA as outlined below.

A. The project is identified as Maintenance on the plan title sheet. All TSEC BMP used for Contractor EDA will not be compensated.
If Contractor EDA < 1 acre: no SWPPP, NOI, NOT, or weekly inspections are required.
If Contractor EDA $\geq$ 1 acre: Furnish a SWPPP, NOI, and NOT for only this area. The SWPPP, NOI and NOT will not be compensated.

Clarification: Maintenance projects are permitted to have Project Only EDA of 5 acres or less without requiring an SWPPP, NOI, NOT. The Contractor will be compensated for all TSEC BMP for all Project EDA, however, no compensation will be made for TSEC BMP used for Contractor EDA. For Maintenance projects, the Contractor and Project EDA are considered independent of one another.

Example: A culvert replacement project is labeled as Maintenance on the title sheet. All TSEC BMP used on the Project EDA will be compensated. The Contractor clears a storage site for the project that is 2 acres in size. The Contractor will need to file a NOI, and furnish a SWPPP, NOT, and weekly inspections for this work without any compensation.

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

C. 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 , NOT , or, weekly inspections are required.

D. 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.

E. 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.

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

G. Project Identified EDA $\geq$ 1, Contractor EDA $\geq$ 0, Total EDA $\geq$ 1 Acre: Furnish a SWPPP with TSEC BMP for the EDA areas and a file a Co-Permittee form. 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 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 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 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 CMS Item 659. If project conditions prevent fertilizing the soil and preparing the seed bed, then the fertilizing and preparation requirements of CMS Item 659 may be waived. Do not place construction seed on frozen ground. For areas defined below Construction Seeding and Mulching may be

applied by hand at the following rate mixture.

Area	Seed Mixture	Straw or Hay Bales
≤ 15,000 ft² (0.14 ha) > 10,000 ft² (0.1 ha)	Kentucky 31, 3 lb/1000 ft² 14.67 kg/1000 m² Annual Ryegrass 2 lb/1000ft² 9.76 kg/1000 m²	2 / 1000 ft² (0.01 ha)
≤ 10,000 ft² (.1 ha) > 5000 ft² (0.05 ha)	Kentucky 31, 4 lb/1000 ft² 19.28 kg/1000 m² Annual Ryegrass 3 lb/1000ft² 14.64 kg/1000 m²	2 / 1000 ft² (0.01 ha)
≤ 5000 ft² (0.05 ha)	Kentucky 31, 5 lb/1000 ft² 24.4 kg/1000 m² Annual Ryegrass 4 lb/1000ft² 19.28 kg/1000 m²	2 / 1000 ft² (0.01 ha)

For areas as defined above the material specifications are waived.

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 shown in the construction plans when 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 shown in the construction plans when 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 m^3) 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. No sediment basins will be constructed in a stream, a temporary channel or ditches that carry water of the United States.

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.

I. Stream Relocation, Temporary Channels and Ditches that carry waters of the United States. Fully stabilize the above with Construction Slope Protection or 70 percent grass growth before diverting flow into the new channel.

J. Concrete washout areas TSCE BMP. For the purpose of payment this BMP is part of the concrete work for payment.

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

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

M. 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 Causeways and Access Fills (Stream and River Crossings and Fills) . Fording of streams and rivers is not allowed. Evaluate the 404/401 permits to determine whether or not a causeway and access fills has been permitted by the USACE/OEPA. If a causeway and access fills has been permitted, construct the causeway and access fills per the 404/401 permits, and the application submitted for those permits. Only the surface area (acreage) of temporary fill, and volume of temporary fill that was permitted and contained in the permit application will be allowed. This information surface area (acreage) of temporary fill, and volume of temporary fill maybe furnished in the construction plans. The construction plans may furnish additional information or restrictions for causeways or access fills. The project engineer will consult with the Office of Environmental Services (OES) for any technical questions regarding 404/401 permits.

If the Contractor wants a causeway and access fills and they have not been permitted through the 404/401 permit process, the Contractor must coordinate the request for the causeway and access fills with the project engineer and OES. The Department makes no guarantee to granting the request. The causeway and access fills request will be coordinated by OES 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:

A. a plan and profile drawing showing the causeway and access fills with OHWM elevation

B. volume of temporary fill below the OHWM

C. the surface area of temporary fill below the OHWM

D. a restoration plan for the area affected by the causeway and access fills

E. time frames for placement and removal of the causeway and access fills

The time frame allowed for the coordination of the causeway and access fills will be 60 days, at a minimum, and the causeway and assess fills 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.

832.10 Causeway and Access Fills **Construction and Payment.** Begin planning and installing causeways and access fills 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. Access Fills in Streams or Rivers may include, but is not limited to, cofferdams, access pads, temporary bridges, etc.

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

Construct the causeway and access fills 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 and access fills will not damage property or cause a human safety concern.

A. The following minimum requirements apply to causeways 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 normal to the flow 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 and access fills furnish clean, non-erodible, nontoxic dumped rock fill, Type B, C, or D, as specified in 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 work requiring the causeway and access fills all portions of the causeway (including all rock and culverts) and access fills 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 and access fills will be restored to its pre-construction elevations. The causeway and access fills will not be paid as a separate item but will be included by the Contractor as part of the total project cost.

832.11 Maintenance. Properly maintain all TSEC BMP. Dispose of silt removed from TSEC BMP according to CMS 105.16. When the Contractor properly places the erosion control Items then the Department will pay for the cost to maintain or replace these items of work by the following:

If a recorded rain event is greater than 0.5 inches (13mm) the Department will pay to replace all TSEC BMP that have failed at the unit price for those Items and all of the sediment removed per the unit price for Item Sediment Removal. If a portion of a TSEC BMP is damaged and that portion is repaired but not replaced the Department will pay for that portion as if it was replaced. Example
.6 inch rain and 300 ft. of filter fabric fence was damaged out of a 900 ft. long run. The 300 ft. was stood back up and sediment was removed. How do we pay for the 300 ft of repair and sediment removed? Pay for 300 feet of new fence and Item Sediment Removal.

If a recorded rain event is less than or equal to 0.5 inches (13mm) the Department will pay to remove the sediment per the unit price for Item Sediment Removal. All properly installed TSEC BMP are furnished and located such that they are able to provide protection during a rain event that is less than or equal to 0.5 inches (13mm), therefore no other compensation is due.

If the sediment reaches a height of one-half the following TSEC BMP Perimeter Filter Fabric Fence, Filter Fabric Ditch Checks, Rock Checks, Inlet Protection, Dikes, and Bale Filter Dikes then remove trapped sediment per the unit price for Item Sediment Removal.

If the sediment reduces the initial volume of the sediment basin or dam by one-half remove deposited sediment per the unit price for Item Sediment Removal. Remove dams and basins after the up slope has been stabilized.

Remove all TSEC BMP before the project is accepted. Dispose of the removed materials including sediment according to CMS 105.16 and 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.

832.12 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 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.

832.13 SWPPP Acceptance. Furnish the initial SWPPP to the Department for acceptance. The Department will grant a start of work upon receiving the SWPPP that has a P.E. stamp. See Appendix C for a sample acceptance form. The Department may critique the following:

A. The type and location of TSEC BMP with totals.

B. The SWPPP is for this project.

C. There is no language in the SWPPP about any TSEC BMP being directed for use by the Engineer .

D. The TSEC BMP Items when priced out closely agree with the Each amount set up in the plans.

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

832.14 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.

832.15 Compensation. The Department will furnish Item 832 Each 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 Each Erosion Control.

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

832.16 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).

832.17 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 any causeway and access fills..

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:

_____

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_____

Total Station-to-Station Inspected

_____

_____

_____

_____

Inspect By Signature Title Date Given To ODOT

Appendix B

Signature list

Signature	Printed Name	Title	Company	Date

The Department has received the SWPPP for Project :_____
CO.-RT.-Sec: _____
The Submittal is Dated :_____

The Department Accepts the Submittal.

_____

Project Engineer, Project Supervisor Date

OhioEPA

Co-Permittee Notice of Intent for Coverage Under Ohio EPA Storm Water Construction General Permit

Submission of this NOI constitutes notice that the party identified in Section I of this form intends to be authorized by Ohio's NPDES general permit for storm water associated with construction activity. Becoming a permittee obligates a discharger to comply with the terms and conditions of the permit. NOTE: All necessary information must be provided on this form. Read the accompnying instructions *carefully* before completing the form. Do not use correction fluid on this form. Forms transmitted by fax will not be accepted. There is no fee associated with submitting this form.

I. Applicant Information/Mailing Address

Company (Applicant) Name: _____

Mailing (Applicant) Address: _____

City: _____ State: _____ Zip Code: _____

Contact Person: _____ Phone: _____ Fax: _____

Contact E-Mail Address: _____

II. Facility/Site Location Information

Existing Ohio EPA Facility Permit Number: _ GC _ _ _ _ _* _ G or OHR1 _ _ _ _ _

Initial Permittee Name: _____

Phone: _____

Facility/Site Name: _____

City: _____ Townships(s): _____

County(ies): _____ State: Ohio Zip Code: _____

Facility Contact Person: _____ Phone: _____ Fax: _____

Facility Contact E-Mail Address: _____

III. 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 gather and evaluate 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.

Applicant Name: _____ Title: _____

Applicant Signature: _____ Date: _____

EPA 4496 (Rev. 4/03)

Designer Note:

This supplemental specification will be provided with both supplemental specification 833 and proposal note 205.

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

TABLE OF CONTENTS

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.

   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.l

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 898

QC/QA CONCRETE FOR STRUCTURES
July 16, 2004

898.01 DESCRIPTION. This work consists of designing a concrete mix, providing an acceptable quality control plan, performing quality control sampling and testing, performing quality assurance testing.

Results of the Contractor's acceptance testing will be used to establish final pay factors, 898.15, and to calculate final payment under Basis of Payment, 898.17.

Use provisions of 511.08 thru 511.22 and 499.06 thru 499.09 except as modified by this specification or the Contractor's approved quality control plan. Place and cure all superstructure concrete according to the Class HP requirements.

898.02 DEFINITIONS AND REFERENCED SPECIFICATIONS

ACI	American Concrete Institute
AMRL	AASHTO Materials Reference Laboratory
Acceptance Tests	Compressive strength, plastic air and permeability tests that are the contractor's responsibility to obtain samples, make specimens and have tested. These test results are used for payment.
Arithmetic Mean ($\bar{X}$)	The value obtained by adding individual values and dividing by the number of individual values to obtain an average.
Certified Laboratory	An AMRL - PCC accredited laboratory
Defective Material	Concrete which is placed but fails to meet strength or air content requirements.
Design Permeability	A measurement of the concrete's resistance to the penetration of chloride ions. Tested according to AASHTO T277, as modified herein to approximate 90 day results. The value reported is reported in coulombs.
f'c	Specified Design Strength at 28 days.
f'cr	Required average compressive strength at 28 days (ACI 301 4.2.3.3)
Lot	The quantity of concrete considered to be uniform in properties. The total cubic yards (cubic meters) required in the structure of the same class of concrete.
Pay Factor	A numerical value established, based on the final quality, as an adjustment to the Contractor's final payment per bid item.
QA Samples	Quality Assurance samples of concrete taken by the Department to verify results from the contractor's quality control and acceptance tests.
QC Samples	Quality Control samples taken by the contractor, or designee, in order to control the materials and processes and insure the delivery of concrete that meets this specification. May also include acceptance samples.
Standard Deviation (S_c)	The positive square root of the square of the difference between an Individual sample value and the mean of the sample.
Sublot	Division of a Lot into a minimum of 2 or more segments for the purpose of evaluating uniformity and consistency. For this specification, a sublot is defined as 50 cubic yards (40 cubic

meters).

Substructure Concrete — Concrete used in the following bridge components: abutments, piers, footings, wingwalls, columns, pier caps, intermediate diaphragms between prestressed I-beams, cast in place piles and backwalls.

Superstructure Concrete — Concrete used in the following bridge components: Decks supported on steel or concrete beams, girders or box sections, slab bridge decks, abutment and pier diaphragms encasing prestressed I-beam or box beam members, abutment diaphragms encasing steel beams or girders; sidewalks and deflector parapets.

REFERENCED SPECIFICATIONS

ACI 301 Standard Specification for Structural Concrete

ASTM C31 Method of Making and Curing Concrete Test Specimens in the Field

ASTM C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens

ASTM C42 Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

ASTM C94 Standard Specification for Ready-Mixed Concrete

ASTM C143 Test Method for Slump of Portland Cement Concrete

ASTM C172 Method of Sampling freshly Mixed Concrete

ASTM C173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

ASTM C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C989 Standard Specification for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars

ASTM C1064 Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete

AASHTO T277 Standard Test Method for Electrical Indication of Concrete's Ability to

Resist Chloride Ion Penetration - modified by this specification

ASTM C1240 Standard Specification for Silica Fume for use as a Mineral Admixture in Hydraulic Cement Concrete, Mortar and Grout

898.03 MATERIALS

Coarse aggregate 703.02

1. Use sizes No. 8, 78, 7, 67, 57 either alone or in combination.
2. The maximum sodium sulfate soundness loss will be12 percent.
3. Unless approved by the Engineer, use the same kind and color of aggregates for all concrete above the ground line in a given substructure or superstructure unit.

Fine aggregate	703.02
Portland cement	701.01, 701.02, 701.04, 701.05 or blended cements*
Fly ash	701.13
Ground granulated blast furnace slag	701.11
Micro-silica	701.10
Air-entraining admixture	705.10
Chemical admixtures	705.12
High Molecular Weight Methacrylate Resin	705.15
Curing materials	705.05, 705.06 (white opaque) 705.07 type 1 or 1D
Joint filler - 1/4 (6 mm)	711.28 or 705.03

Seals (preformed elastomeric compression joint) 705.11

* Blended cements will be approved by the Office of Materials Management; will be certified from the plant; will have specific defined limitations on percentages of blended materials; and will be comprised of components that meet the applicable specifications.

Document and report changes in the source(s) of cement, fly ash or GGBF slag to the Engineer. Store bulk fly ash or GGBF slag in waterproof bins.

Provide a technical representative from either the admixture company or the concrete supplier to be in charge of dispensing admixtures. The representative will act in an *advisory capacity reporting to the Contractor and the Engineer any operations or* procedures considered to be detrimental to the integrity of the concrete. The technical representative will be present during concrete placement unless waived by the Contractor.

898.04 WATER Provide water free of sewage, oil, acid, strong alkalies, vegetable matter, clay or loam. Water will conform with ASTM C94. Concrete produced with either wash water or storm water shall use a reclaiming system monitoring the quality of the water to meet ASTM C94 and produce no more than 0.06% total chlorides by weight of cement into the concrete. The Department will approve the reclaiming system.

898.05 CONCRETE MIX DESIGN Develop concrete mix designs according to ACI 301, section 4, and as modified in this specification. Submit test data from a Certified Laboratory to the Office of Materials Management.

Establish the maximum air content for the concrete mix design and produce concrete within 0.5% of that maximum for the submitted data. If the test values meet the requirements of this specification, this value becomes the maximum air content, for the mix design, acceptable at the project.

The Certified Laboratory shall mix the trial batch, sample and test the samples (ACI 301, 4.2.3.4.b). Batching and sampling may be performed by an ACI Grade I Technician with the laboratory only witnessing the process. The certified laboratory shall perform the compressive strength and permeability testing.

Determine the required average compressive strength (f'cr) according to ACI 301, section 4.2.3. If there is no field data available, select the over-design of the mix from ACI 301, Table 4.2.3.3b. Follow ACI 301 section 4.2.3.4.a., or 4.2.3.4.b when using field or laboratory data, respectively, to establish a mix design. Use field test data from previous ODOT projects under this specification or other sources approved by the Office of Materials Management.

If the laboratory trial mix procedure is used to support the mix design, a single mix can be prepared, but it must meet all of the requirements of this specification. Produce the trial mix using the maximum water and all admixtures required to achieve the maximum placement slump and maximum air. Record the slump and air, and produce the strength and permeability test samples from the same mix.

Use a cement or cementitious content meeting the minimums given in TABLE 3.

TABLE 1

CONCRETE MIX DESIGN REQUIREMENTS			
Concrete Use (Class)	Specified Compressive Strength (f'c) psi (MPa)	Design Permeability (P_d) ** Coulombs	Plastic Air Content %
Substructure (QSC1)	4000 (28.0)	< 2000	TABLE 2
Superstructure (QSC2)	4500 (31.0)	< 1500	TABLE 2
Project Specific (QSC3)	As per plan	As per plan	TABLE 2

** Determine the design permeability values by testing in conformance with AASHTO T-277 except as modified as follows: Moist cure permeability samples for 7 days at 73° F (23°C) followed by 21 days of moist curing at 100° F (38°C). Perform permeability testing at 28 days.

TABLE 2

AIR CONTENT LIMITATIONS		
Aggregate Size	Maximum Air Content	Minimum Air Content
8, 7, 78	Established by the Producer as tested for each mix design	6.0%
67, 57		5.0%

Blending coarse aggregate is acceptable. Report the production blend.

TABLE 3

CONCRETE MIX DESIGN LIMITATIONS	
Minimum Cementitious Content *	565 lbs/yd^3 (335 kg/m^3)
Fly Ash	up to 30%
Ground Granulated Blast Furnace Slag	up to 30%
Micro-Silica	up to 10%
The total combination of pozzolan materials shall not exceed their individual percentage nor total more than 50% of the total cementitious content	

* The cementitious content shown above is a minimum. The Contractor is responsible for proportioning a mix that is workable and meets all of the requirements of this specification. To accomplish this, quantities above the minimum shown may be required.

898.06 MIX DESIGN DOCUMENTATION Mix designs for each class of concrete required on the project shall include certified test data documenting results for the following:

- Maximum Air Content
- Compressive Strength
- Slump
- Unit Weight
- Yield
- Aggregate Correction Factor
- Specified Design Strength (*f'c*)
- Required Over- Design Value
- Permeability

Also include:

TABLE 4

Mix Design Batching Data					
Material	**Batch Weight (SSD)**	**Source**	**Type**	**Specific Gravity**	**Absorption (%)**
Fine Aggregate	Required	Required	Required	Required	Required
Coarse Aggregate 1	Required	Required	Required	Required	Required
Coarse Aggregate 2	Required	Required	Required	Required	Required
Cement *	Required	Required	Required	Required	Not Applicable
Fly Ash	Required	Required	Required	Required	Not Applicable
GGBF	Required	Required	Required	Required	Not Applicable
Micro-silica	Required	Required	Required	Required	Not Applicable
Other	Required	Required	Required	Required	Not Applicable
Water	Required	Required	Not Applicable	Not Applicable	Not Applicable

Admixtures	Type	Brand Name	Dosage Rate
Admixture 1	Required	Required	Required
Admixture 2	Required	Required	Required
Admixture 3	Required	Required	Required
Admixture 4	Required	Required	Required
Water/Cementitious Ratio	Required		

* If a blended cement is used, indicate the components of the blended cement and the proportions of those components.

Changing sources of materials from those tested for the design submittal may require retesting of the mix for acceptance. The Department will request certification that the source changes will not adversely affect the tested mix. Changing aggregate type or size, cement type or pozzolan type or grade will require retesting.

Test any workability issues in the trial process. Unworkable mixes in the field will require a new mix and retesting. Modifying aggregate weights, excluding adjustments for specific gravity or absorption changes, by more than 3% will constitute a change to the mix design.

898.07 MIX DESIGN ACCEPTANCE Submit one copy of the mix design and test data to the Office of Materials Management at least 10 calendar days prior to placement. The mix design will be reviewed to ensure that the design parameters in TABLE 1 are met; limitations in TABLES 2 and 3 are not exceeded; and the design batching data in TABLE 4 is included.

Also submit a copy of the mix design data to the Engineer to be reviewed for compliance with the specifications and for project information and control. Do not place concrete until the mix design has been accepted.

898.08 LOT, SUBLOT AND RANDOM LOAD DETERMINATION FOR STRENGTH AND PERMIBILITY ACCEPTANCE

Use a single lot for each mix design.

Provide the Engineer with a proposed placement schedule and division of the concrete lot into a minimum of 3 sublots. The maximum size of each sublot shall be 50 yd^3. The Engineer will approve the sublot divisions. A sequential numbering system should be used for lots and sublots (i.e. Lot 1: sublot 1, sublot 2, etc).

The Engineer will determine the random load from which the Contractor will sample the concrete to perform acceptance testing as required in 898.15 as follows:

1. A starting number will be randomly chosen from TABLE 7.
2. The starting number will be multiplied by the volume of the first sublot and rounded to the nearest whole number to determine an individual yardage. The Contractor will sample the load containing this individual yardage.
3. The individual yardage and load to be sampled for the next sublots will be determined by using the next sequential number in the random number table and repeating step 2.
4. Complete sampling all sublots for the given class of concrete.
5. The Contractor will be informed of the sublot test locations at the beginning of the day's placement.

898.09 CONTRACTOR QUALITY CONTROL PLAN Develop a Quality Control Plan (QCP) defining the responsibilities, duties and frequency of quality control testing for both in-process quality control at the job site and at the concrete's source. Use either a certified

laboratory to perform all quality control responsibilities or the Contractor may perform some of the sampling and testing with an ACI certified Grade 1 Field Testing Technician. Use a certified lab to test compression and permeability samples used to establish pay factors, 898.15 and test QA samples (898.11).

Included in any QCP will be **TABLE 10** for reporting plastic air acceptance results and **TABLE 9** for reporting compressive strength and permeability. The Engineer will establish documentation for other items, such as core results for in-place evaluation, if needed.

Submit a complete QCP to the Engineer for review and acceptance with the mix design submission. Include at least the following information:

1. The name of the certified laboratory. (Include AMRL accreditation)
2. Name and certification of all laboratory, and/or Contractor's, technicians who will perform plant and/or field site sampling and testing. (Minimum: ACI Grade1 Field Testing Technician certification)
3. Method of reporting test results for compressive strength & permeability and plastic air. (Minimum requirements: The certified laboratory will furnish and certify all results using the QC/QA reporting forms, **TABLES 9** and **10**)
4. Testing equipment calibration records
5. Method for field curing specimens
6. Methods for transporting samples to the certified laboratory
7. Certified laboratory curing procedures.
8. In-process quality control program defining method of:
   (a) Raw materials certification and control
   (b) Aggregate moisture controls
   (c) Concrete delivery controls.
   (d) Minimum required rate of concrete delivery for continuous placement
   (e) Concrete plant controls
   (f) Construction site controls
   (g) Methods for curing and testing samples for form release/removal See 898.102.
   (h) Concrete placement procedures, equipment, finishing methods, curing methods, lighting, etc..
   (i) Methods of protecting concrete if inclement weather or evaporation rate exceeds specification requirements
9. Proposed modifications to construction processes of 511and 499.

Address in the QCP whether plant control includes quality control personnel monitoring the mixing process. Use the NRMCA Publication No 190, NRMCA Guideline Manual for Quality Assurance/Quality Control, as one possible source to model the Quality Control Plan.

Provide a delivery ticket conforming with 499.08.

Mix concrete in a central mixing plant or by a ready-mixed truck capable of discharging concrete with a maximum water cementitious ratio equal to or less than that required of the concrete mix. Provide mixing equipment conforming with 499.06-B. Introduce admixtures into the concrete to facilitate dispersion throughout entire load. Provide batch plants

conforming with 499.06-A. Mix, deliver and discharge concrete within 60 minutes of combining water and cement. If using an approved type B, D or G admixture, complete discharge within 90 minutes after combining the water and cement.

Establish the desired slump for each item and maintain that slump within ± 1 ½ inches (38mm). Measure the slump when performing the air and compression testing (898.10) to verify consistent results within the specified tolerance. If slump loss occurs before placement, replasticize with either water, if the maximum water/cementitious ratio is not exceeded, or admixture to restore plasticity. Recheck the air content. Reject any loads that segregate.

898.10 CONTRACTOR QUALITY CONTROL (QC) & ACCEPTANCE TESTING

Perform air content QC testing at the point of discharge from the Ready Mix concrete truck. Use the following quality control procedures during the placement:

1. Test the air content on at least the first three (3) loads of concrete delivered for each day's placement. Insure that the air content is stabilized and within the specified parameters for the mix design before extending the sampling and testing frequency.

2. Once the air content is stabilized to the Engineer's satisfaction, extend the sampling frequency to no more than one test for every three (3) loads of concrete delivered.

   If a load of concrete is tested and found to have an air content less than the minimum in TABLE 2 or above the maximum air established for the mix, do not accept and place that load unless it can be adjusted to be within the specified limits. Test at least the next three loads for air to insure that the air content is stabilized to the Engineers satisfaction. The sampling frequency may then be extended back to one test for every three (3) loads of concrete delivered.

3. For concrete delivered to the point of placement by means of pumping equipment, provide a hose at the end of the line that is at least ½" in diameter smaller than the line on the boom to provide back pressure in the system and minimize the amount of air lost in the concrete

   During the first three loads, test the concrete at the point of discharge and the point of placement to verify that the loss of air going through the pump does not exceed 1%. If the amount of air loss is not controlled to the Engineers satisfaction, make adjustments to the pump setup that results in an air loss of less than 1%. If that can not be achieved, test the air at the point of placement on every load and reduce the minimum air content in Table 2 by 1%.

4. Use methods to produce back pressure in the system other than the ½" diameter smaller hose upon approval of the Engineer. Provide a trial placement of concrete, at the most severe condition, using the proposed method to prove to the Engineer's satisfaction that the method has acceptable air loss at each of the extreme position of the pump

5. Provide the Engineer a signed copy of the plastic air results (**TABLE 10**) after each placement.

Any concrete with an air content above the maximum air or below the minimum air that is placed into the structure is defective material for the amount of material represented by the sampling frequency.

Perform the following quality control/acceptance sampling and testing for compressive strength and permeability from the load determined by the random number:

1. Sample each sublot by making one (1) set of three (3) - 6"x12" (150x300mm) quality control/acceptance compressive strength cylinders. Make additional compressive or flexural samples required to meet 898.12. Perform all required curing, transporting, capping and testing of the samples to conform to the applicable ASTM specification. Report actual test values for quality control/acceptance using **TABLE 9**.

2. Determine the concrete temperature in accordance with ASTM C1064 from the same sample taken for compressive strength. Assure compliance with 499.09 and 511.15.

3. Make one (1) - 4"x 8" (100 x 200 mm) permeability sample conforming with ASTM C 39 for each sublot. The Engineer will select three (3) of the lot's samples for testing. Test the three (3) samples to determine an average and maximum permeability for establishing a pay factor.

898.11 ODOT QUALITY ASSURANCE ODOT will perform QA sampling and testing as specified or as deemed necessary.

The Department will perform side by side testing with the Contractor and compare results. If the differences between the Department's and the contractor's testing is greater than the tolerances listed below, the Contractor and Engineer will determine the reason for slump and air content differences and make necessary adjustments. The Engineer may stop the placement until the reason for the difference is established and corrected. The Engineer will check one of the first three loads delivered. Once the results are within the tolerances listed below, the Engineer may reduce the QA sampling and testing frequency to 10% of the Contractor's subsequent acceptance tests.

1. Slump - ± 1 inch (25 mm)

2. Air Content - ± 1%.

The Engineer will obtain compressive strength QA samples from the same location as the Contractor's quality control/acceptance samples. QA samples will be obtained for every 10 sublots or at least one per lot. Four (4) 6" x 12" (150 x 300 mm) cylinders for each sample will be made. The Engineer will mark the cylinders with identification and the Contractor

will take ownership for handling, shipping, curing, transporting and testing the specimens.

After fourteen (14) days curing, deliver two (2) of the QA cylinders to the ODOT Laboratory. Continue to cure the other two (2) QA cylinders with the QC & acceptance cylinders at the Certified Laboratory. The Certified laboratory will test the two (2) QA cylinders with the QC & acceptance cylinders and report the 28 day test results on the accepted QCP form. The report will distinguish the QA cylinder results from the QC & acceptance results, including the sublot.

The Engineer will verify the QA and the matching QC acceptance test results are within 500 psi (3.9 MPa). Investigate the results with the Engineer to determine the reason difference is greater than 500 psi (3.9 MPa). If no reason is determined, the Engineer will require the Contractor to either non-destructively test or core the concrete represented by the cylinder tests to determine compressive strength. The additional testing will be performed by an independent laboratory hired by the Contractor. The Engineer will witness the testing and evaluate the results. The Department will reimburse the Contractor for all testing costs when the Department's results are in error. The cylinder acceptance results will be used if found valid or if cores were taken during the evaluation, use the core's test results to determine the compressive strength values for pay factors, 898.15.

The Engineer will reject a mix design when a single compressive strength QC & acceptance test result drops below 88% of *f'c* or a lot of concrete has a Percent Acceptable Material, 898.15, below 75. If the mix design is rejected, develop a new mix design according to 898.03 and 898.05.

The Engineer will reject loads and stop placement when quality control processes do not control balling, segregation, inconsistent or variable concrete indicating poor quality control. Do not restart placement until the cause of the problem is determined and corrected.

898.12 CURING AND LOADING Perform all testing required in this section as part of the quality control program. Modify 511.17 as follows:

Do not use the falsework removal and traffic loading tables of 511.17. Do not remove formwork or falsework for structure concrete, QSC1, QSC2 or QSC3, or subject it to construction or erection loads until field cured compressive strength test cylinders reach a strength of 85% of *f'c* or greater. If using flexural beams, obtain a center-point Modulus of Rupture of 650 psi (4.6MPa) or greater before opening to traffic. Do not shorten the minimum required curing time for Method (A) regardless of strength test results. Allow formwork construction if no motorized equipment applies loads to the concrete and field cured compressive strengths are 60% of *f'c*.

The Department will not approve time extensions to the project completion date for delays caused by slow strength gain of the concrete.

898.13 SLIPFORMING. Follow 511.11 except:

Reducing the established water-cementitious ratio or amount of admixture of an approved mix to achieve the desired consistency will not require a new mix design. Adjustments to the mix beyond those permitted in 898.06 will require a separate mix design conforming to 898.05.

898.14 REEVALUATION OF STRENGTH

A. If a single compressive strength acceptance test result for a sublot of concrete is less than 88% of the specified *f'c*, the Engineer will evaluate and accept or reject the material, at no cost to the Department, as follows:

The Engineer will determine the location for evaluating the strength of the sublot represented by the low compressive strength. Evaluate using either nondestructive testing or cores. If nondestructive testing is used, the results will only determine if further action is necessary. The Engineer will accept the concrete if nondestructive test results are greater than the specified *f'c* . Use the original cylinder results for calculating the compressive strength pay factor (PF_c) only if further testing confirms the original cylinder results are accurate. If further testing confirms the original results are not accurate, the Engineer will not use the original cylinder results for determining the pay factor. Then the sublot will not be used when determining the pay factor. Coring will be required if the nondestructive test results are less than the specified *f'c*.

Core the concrete at locations determined by the Engineer. Provide the cores to the Engineer for testing by the Department. Patch core holes with approved patching material. Base the final payment of the sublot and lot on the core strength results. If the core results indicate that the compressive strength of the concrete is below 88% *f'c*, submit a plan for corrective action to the Engineer for approval. If the corrective plan is not approved the Engineer will require the Contractor to:

1. Remove and replace the defective sublot at no cost to the Department, or
2. Leave the defective material in place and pay for the sublot with a pay factor of 0.75.

B. If the Percent Acceptable Material, 898.15, for a lot of concrete is below 75 per cent, submit a plan for corrective action to the Engineer for approval. If the corrective plan is not approved the Engineer will require the Contractor to:

1. Remove and replace the lot of defective material at no cost to the Department, or
2 Leave the defective material in place and pay for the lot of with a pay factor of 0.75.

898.15 PAY FACTOR DETERMINATION The Department will use pay factors (PF) to establish a final adjusted price, per lot, for each bid item quantity of concrete. The Department will calculate pay factors using the Contractor's quality control/acceptance test results, per lot. The Department will calculate a compressive strength pay factor (PF_c) and a permeability pay factor (PF_p), if applicable, for each lot.

The Department will determine PF_c as follows:

Determine arithmetic mean ($\bar{x}$) for both compressive strength using the following formula:

$$\bar{x}=(\sum x)/n$$

x = Test values
n = Total number of test values in each lot

Determine, for each lot, the sample standard deviation for compressive strength (S_c). Use the following formula:

$$S_c = [\Sigma(x - \bar{x})^2 / (n-1)]^{½}$$

x = Individual test value
n = Total number of compressive strength sublot values in each lot
$\bar{x}$ = Arithmetic mean of individual test values in each lot

Determine the compressive strength quality index (Q_{LLC}) for each lot. Use the following formula:

$$Q_{LLC} = (\bar{x} - f'c)/S_c$$

Round the Q_{LLC} value to the nearest 1/100. Using the Q_{LLC} value, enter TABLE 8 and determine the percentage of defective material for compressive strength (PD_c). Do so by first choosing the correct table based on the number of samples; Then determine the correct row by matching the whole number and first number after the decimal of the Q_{LLC}; finally determine the correct column by matching the second number after the decimal of the Q_{LLC}. Calculate the Percent Acceptable Material by subtracting the PD_c from 100%.

Percent Acceptable Material = 100 -PD_c

Determine the PF_c for the mix design lot using TABLE 5 (See example)

TABLE 5

COMPRESSIVE STRENGTH	
Percent Acceptable Material	PFc Pay Factor
98.0 - 100	1.04
95 - 97.9	1.02
85 - 94.9	1.00
75 - 84.9	.95

Below 75	See 898.14

The Department will determine an permeability pay factor (PF_p) for class QSC2 (or QSC3 if applicable) superstructure concrete. Use the permeability test results for the concrete lot. The Department will determine the pay factor for the lot by calculating a mean and maximum value from the permeability test results.

Determine the PF_p for the lot using **TABLE 6** (See example)

TABLE 6

PERMEABILITY		
Average Tested Permeability ($\bar{X}_p$)and,	No (X) Value Greater Than	PFp Pay factor for QSC2 (or QSC3 if applicable) Superstructure
<1000 for QSC2, or 2/3(P_d) for QSC3 (if applicable)	2000 for QSC2, or 4/3 (P_d) for QSC3 (if applicable)	1.02
≥1000 for QSC2, or 2/3(P_d) for QSC3 (if applicable)		1.00

898.16 METHOD OF MEASUREMENT The Department will measure the appropriate concrete item by the number of cubic yards (cubic meters) determined by calculations from plan dimensions, in place, completed and accepted. The Department will not make deductions for volume of reinforcing steel, conduits, or structural steel other than beam flanges embedded in deck slabs. The Department will not make deductions for the volume of embedded timber or concrete piles.

The Department may measure deck concrete by either volume or area using plan dimensions.

Superstructure concrete includes the concrete in deflective parapets not having a metallic railing.

The Department will calculate separate quantities of defective material due to air content, 898.10 and compressive strength 898.14.

898.17 BASIS OF PAYMENT The Department will pay for accepted quantities as follows:

The Department will not pay for the reevaluation of low strength test results, 898.14

The Department will not make separate payment for surface finish or sawing grooves in the deck. All costs are incidental to the appropriate concrete item.

The Department will initially pay the full bid price to the Contractor upon completing the work.

The Department will calculate the final adjusted payment for each item as follows:

PF_1 The final adjusted pay per cubic yard (meter) or square yard (meter), per item. Apply only to quantities of concrete placed determined to not be defective according to 898.10 or 898.14.

$$PF_1 = (\text{Contract Bid Price}) \times PFc \times PFp$$

PF_2 The final adjusted pay per cubic yard (meter) or square yard (meter) for the quantity of concrete placed in an item that contains defective concrete based on compressive strength and allowed to stay in place, according to 898.14

$$PF_2 = (\text{Contract Bid Price}) \times 0.75$$

Calculate the adjusted price per bid item by multiplying PF_1 and PF_2 by the appropriate quantities of concrete, then sum the values. Subtract the full bid price paid to the contractor from the adjusted price to determine the difference. The Department will execute final adjustments by change order upon receipt of all test data..(See example)

Item	Units	Description
898	Cubic yard (cubic meter)	QC/QA concrete class ____ ____
898	Cubic yard (cubic meter)	QC/QA concrete class QSC2 superstructure (deck)
898	Square yard (square meter)	QC/QA concrete class QSC2 superstructure (deck)
898	Cubic yard (cubic meter)	QC/QA Concrete class QSC2 superstructure (parapet)
898	Cubic yard (cubic meter)	QC/QA Concrete class ____ superstructure
898	Cubic yard (cubic meter)	QC/QA Concrete class QSC1 substructure ____

Compressive Strength Example: A 420 yd^3 bridge deck using QSC2 concrete is placed. There are 8 sublots @ 50yd^3 and1 sublot @ 20 yd^3 for the lot. The compressive strength acceptance test results are as follows: 5060, 5820, 5210, 5930, 5740, 6130, 6560, 5040 and 7080 psi.

1. Calculate the Average Strength and Standard Deviation (S_c) as follows* :

SAMPLE	COMPRESSION (X)	$X - \bar{X}$	$(X - \bar{X})^2$
1	5,060	-781	609,961
2	5,820	-21	441
3	5,210	-631	389,161
4	5,930	89	7,921
5	5,740	-101	10,201
6	6,130	289	83,521
7	6,560	719	516,961
8	5,040	-801	641,601
9	7,080	1239	1,535,121
Total	52,570	0	3,803,889
Avg. ($\bar{X}$)	**5,841**		

Formula: $S_c = [\Sigma(x - \bar{X})^2 / (n-1)]^{1/2}$
$= [3,803,889 / (9-1)]^{1/2}$
$= [3,803,889 / 8]^{1/2}$
$S_c = 690$

* This can also be calculated using standard computer programs. Make sure that the **Sample Std Dev** is used rather than the **Population Std Dev.**

2. Calculate the Quality Index (Q_{LLC}):

Formula: $Q_{LLC} = (\bar{X} - f'c)/S_c$
$= (5,841 - 4500) / 690$
$= 1341 / 690$
$= 1.94$

3. Determine the Percent Defective (PD_c) and then Percent Acceptable Material:

Go to **TABLE 8**; n = 9; Q_{LLC} = 1.94 (1.9 on the column on the left side of the table and 0.04 across the top row)
% Defective = 1.32, therefore
Percent Acceptable Material = 100 - 1.32 = **98.68 %**

4. Go to **TABLE 5** to determine the compressive strength Pay Factor **(PFc)** = **1.04** @ 98.68%

Permeability Example: The permeability results for the bridge deck in the first example are 900, 1400, 600 coulombs for QSC 2 superstructure concrete.

The Design Permeability (P_d) from **TABLE 1** = 1500 Coulombs;
The average Permeability needed to obtain an incentive (2/3 P_d) = 1000 Coulombs; and
The max permeability allowed to receive an incentive (4/3 P_d) = 2000

Results:

Average permeability ($\bar{X}_p$) = (900 + 1400 + 600)/3 = **966** and,
The maximum value = **1400**
Therefore, the Permeability Pay Factor (PFp) = **1.02**

Applying Pay Factors for Final Payment example:

Bid Price	$325.00 / yd^3
Quantity	420 yd^3
Amount paid to Contractor upon completion of work	325.00 x 420 =$136,500.00
Total payment owed to Contractor due to pay factors (PF_1)	325 x 420 x1.04 x 1.02 = $144,799.20
Amount of additional money owed to contractor via change order	$144,799.20 - $136,500.00 = +$8,299.20

TABLE 7

RANDOM NUMBERS					
0.889	0.848	0.612	0.806	0.774	0.115
0.745	0.127	0.317	0.867	0.645	0.212
0.697	0.138	0.236	0.447	0.651	0.436
0.123	0.326	0.775	0.467	0.419	0.725
0.807	0.121	0.369	0.778	0.796	0.570
0.653	0.529	0.688	0.887	0.449	0.419
0.524	0.161	0.899	0.155	0.526	0.722
0.192	0.897	0.798	0.244	0.205	0.180
0.654	0.174	0.133	0.262	0.380	0.828
0.127	0.796	0.608	0.102	0.428	0.194
0.615	0.385	0.102	0.782	0.589	0.113
0.333	0.309	0.692	0.559	0.860	0.421
0.562	0.497	0.210	0.220	0.592	0.850
0.346	0.789	0.523	0.368	0.716	0.193
0.564	0.621	0.804	0.641	0.183	0.351
0.649	0.521	0.850	0.189	0.332	0.736
0.403	0.510	0.562	0.670	0.881	0.723
0.792	0.203	0.318	0.608	0.107	0.572
0.454	0.682	0.521	0.588	0.141	0.110
0.703	0.634	0.846	0.826	0.475	0.313

TABLE 8: Estimated percent defective for compressive strength (PDc)
Sample size (n) = 2

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.66	49.33	48.99	48.66	48.32	47.99	47.65	47.32	46.98
0.1	46.64	46.31	45.97	45.64	45.30	44.97	44.63	44.30	43.96	43.62
0.2	43.29	42.95	42.62	42.28	41.95	41.61	41.28	40.94	40.60	40.27
0.3	39.93	39.60	39.26	38.93	38.59	38.26	37.92	37.58	37.25	36.91
0.4	36.58	36.24	35.91	35.57	35.23	34.90	34.56	34.23	33.89	33.56
0.5	33.22	32.89	32.55	32.21	31.88	31.54	31.21	30.87	30.54	30.20
0.6	29.87	29.53	29.19	28.86	28.52	28.19	27.85	27.52	27.18	26.85
0.7	26.51	26.17	25.84	25.50	25.17	24.83	24.50	24.16	23.83	23.49
0.8	23.15	22.82	22.48	22.15	21.81	21.48	21.14	20.81	20.47	20.13
0.9	19.80	19.46	19.13	18.79	18.46	18.12	17.79	17.45	17.11	16.78
1.0	16.44	16.11	15.77	15.44	15.10	14.77	14.43	14.09	13.76	13.42
1.1	13.09	12.75	12.42	12.08	11.75	11.41	11.07	10.74	10.40	10.07
1.2	9.73	9.40	9.06	8.72	8.39	8.05	7.72	7.38	7.05	6.71
1.3	6.38	6.04	5.70	5.37	5.03	4.70	4.36	4.03	3.69	3.36
1.4	3.02	2.68	2.35	2.01	1.68	1.34	1.01	0.67	0.34	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) = 3

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.72	49.45	49.17	48.90	48.62	48.35	48.07	47.79	47.52
0.1	47.24	46.96	46.69	46.41	46.13	45.85	45.58	45.30	45.02	44.74
0.2	44.46	44.18	43.90	43.62	43.34	43.05	42.77	42.49	42.20	41.92
0.3	41.63	41.35	41.06	40.77	40.49	40.20	39.91	39.62	39.33	39.03
0.4	38.74	38.45	38.15	37.85	37.56	37.26	36.96	36.66	36.35	36.05
0.5	35.75	35.44	35.13	34.82	34.51	34.20	33.88	33.57	33.25	32.93
0.6	32.61	32.28	31.96	31.63	31.30	30.97	30.63	30.30	29.96	29.61
0.7	29.27	28.92	28.57	28.22	27.86	27.50	27.13	26.76	26.39	26.02
0.8	28.64	25.25	24.86	24.47	24.07	23.67	23.26	22.84	22.42	21.99
0.9	21.55	21.11	20.66	20.19	19.73	19.25	18.74	18.25	17.74	17.21
1.0	16.67	16.11	15.53	14.93	14.31	13.66	12.98	12.27	11.51	10.71
1.1	9.84	8.89	7.82	6.60	5.08	2.87	0.00	0.00	0.00	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (Pdc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) = 4

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.76	49.33	49.00	48.67	48.33	48.00	47.67	47.33	47.00
0.1	46.67	46.33	46.00	45.67	45.33	45.00	44.67	44.33	44.00	43.67
0.2	43.33	43.00	42.67	42.33	42.00	41.67	41.33	41.00	40.76	40.33
0.3	40.00	39.67	39.33	39.00	38.67	38.33	38.00	37.67	37.33	37.00
0.4	36.67	36.33	36.00	35.67	35.33	35.00	34.67	34.33	34.00	33.67
0.5	33.33	33.00	32.67	32.33	32.00	31.67	31.33	31.00	30.67	30.33
0.6	30.00	29.67	29.33	29.00	28.67	28.33	28.00	27.67	27.33	27.00
0.7	26.67	26.33	26.00	25.67	25.33	25.00	24.67	24.33	24.00	23.67
0.8	23.33	23.00	22.67	22.33	22.00	21.67	21.33	21.00	20.67	20.33
0.9	20.00	19.67	19.33	19.00	18.67	18.33	18.00	17.67	17.33	17.00
1.0	16.67	16.33	16.00	15.67	15.33	15.00	14.67	14.33	14.00	13.67
1.1	13.33	13.00	12.67	12.33	12.00	11.67	11.33	11.00	10.67	10.33
1.2	10.00	9.67	9.33	9.00	8.67	8.33	8.00	7.67	7.33	7.00
1.3	6.67	6.33	6.00	5.67	5.33	5.00	4.67	4.33	4.00	3.67
1.4	3.33	3.00	2.67	2.33	2.00	1.67	1.33	1.00	0.67	0.33
1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) = 5

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.0	49.64	49.29	48.93	48.58	48.22	47.86	47.51	47.15	46.80
0.1	46.44	46.09	45.73	45.38	45.02	44.76	44.31	43.96	43.60	43.25
0.2	42.90	42.54	42.19	41.84	41.48	41.13	40.78	40.43	40.08	39.72
0.3	39.37	39.02	38.67	38.32	37.97	37.62	37.28	36.93	36.58	36.23
0.4	35.88	35.54	35.19	34.85	34.50	34.16	33.81	33.47	33.12	32.78
0.5	32.44	32.10	31.76	31.42	31.08	30.74	30.40	30.06	29.73	29.39
0.6	29.05	28.72	28.39	28.05	27.72	27.39	27.06	26.73	26.40	26.07
0.7	25.74	25.41	25.09	24.76	24.44	24.11	23.79	23.47	23.15	22.83
0.8	22.51	22.19	21.87	21.56	21.24	20.93	20.62	20.31	20.00	19.69
0.9	19.38	19.07	18.77	18.46	18.16	17.86	17.55	17.25	16.96	16.66
1.0	16.36	16.07	15.78	15.48	15.19	14.91	14.62	14.33	14.05	13.76
1.1	13.48	13.20	12.93	12.65	12.37	12.10	11.83	11.56	11.29	11.02
1.2	10.76	10.50	10.23	9.97	9.72	9.46	9.21	8.96	8.71	8.46
1.3	8.21	7.97	7.73	7.49	7.25	7.02	6.79	6.56	6.33	6.10
1.4	5.88	5.66	5.44	5.23	5.02	4.81	4.60	4.39	4.19	3.99
1.5	3.80	3.61	3.42	3.23	3.05	2.87	2.69	2.52	2.35	2.19
1.6	2.03	1.87	1.72	1.57	1.42	1.28	1.15	1.02	0.89	0.77
1.7	0.66	0.55	0.45	0.36	0.27	0.19	0.12	0.06	0.02	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) = 6

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.63	49.27	48.90	48.53	48.16	47.80	47.43	47.06	46.70
0.1	46.33	45.96	45.60	45.23	44.86	44.50	44.13	43.77	43.40	43.04
0.2	42.68	42.31	41.95	41.59	41.22	40.86	40.50	40.14	39.78	39.42
0.3	39.06	38.70	38.34	37.98	37.62	37.27	36.91	36.55	36.20	35.84
0.4	35.49	35.14	34.79	34.43	34.08	33.73	33.38	33.04	32.69	32.34
0.5	32.00	31.65	31.31	30.96	30.62	30.28	29.94	29.60	29.26	28.93
0.6	28.59	28.25	27.92	27.59	27.26	26.92	26.60	26.27	25.94	25.61
0.7	25.29	24.96	24.64	24.32	24.00	23.68	23.37	23.05	22.74	22.42
0.8	22.11	21.80	21.49	21.18	20.88	20.57	20.27	19.97	19.67	19.37
0.9	19.07	18.78	18.49	18.19	17.90	17.61	17.33	17.04	16.76	16.48
1.0	16.20	15.92	15.64	15.37	15.09	14.82	14.55	14.29	14.02	13.76
1.1	13.50	13.24	12.98	12.72	12.47	12.22	11.97	11.72	11.47	11.23
1.2	10.99	10.75	10.51	10.28	10.04	9.81	9.58	9.36	9.13	8.91
1.3	8.69	8.48	8.26	8.05	7.84	7.63	7.42	7.22	7.02	6.82
1.4	6.63	6.43	6.24	6.05	5.87	5.68	5.50	5.33	5.15	4.98
1.5	4.81	4.64	4.47	4.31	4.15	4.00	3.84	3.69	3.54	3.40
1.6	3.25	3.11	2.97	2.84	2.71	2.58	2.45	2.33	2.21	2.09
1.7	1.98	1.87	1.76	1.66	1.55	1.45	1.36	1.27	1.18	1.09
1.8	1.01	0.93	0.85	0.78	0.71	0.64	0.57	0.51	0.46	0.40
1.9	0.35	0.30	0.26	0.22	0.18	0.15	0.12	0.09	0.07	0.05
2.0	0.03	0.02	0.01	.0.00	0.00	0.00	0.00	0.00	0.00	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) = 7

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.63	49.25	48.88	48.50	48.13	47.75	47.38	47.01	46.63
0.1	46.26	45.89	45.51	45.14	44.77	44.40	44.03	43.65	43.28	42.91
0.2	42.54	42.17	41.80	41.44	41.07	40.70	40.33	39.97	39.60	39.23
0.3	38.87	38.50	38.14	37.78	37.42	37.05	36.69	36.33	35.98	35.62
0.4	35.26	34.90	34.55	34.19	33.84	33.49	33.13	32.78	32.43	32.08
0.5	31.74	31.39	31.04	30.70	30.36	30.01	29.67	29.33	28.99	28.66
0.6	28.32	27.98	27.65	27.32	26.99	26.66	26.33	26.00	25.68	25.35
0.7	25.03	24.71	24.39	24.07	23.75	23.44	23.12	22.81	22.50	22.19
0.8	21.88	21.58	21.27	20.97	20.67	20.37	20.07	19.78	19.48	19.19
0.9	18.90	18.61	18.33	18.04	17.76	17.48	17.20	16.92	16.65	16.37
1.0	16.10	15.83	15.56	15.30	15.03	14.77	14.51	14.26	14.00	13.75
1.1	13.49	13.25	13.00	12.75	12.51	12.27	12.03	11.79	11.56	11.33
1.2	11.10	10.87	10.65	10.42	10.20	9.98	9.77	9.55	9.34	9.13
1.3	8.93	8.72	8.52	8.32	8.12	7.92	7.73	7.54	7.35	7.17
1.4	6.98	6.80	6.62	6.45	6.27	6.10	5.93	5.77	5.60	5.44
1.5	5.28	5.13	4.97	4.82	4.67	4.52	4.38	4.24	4.10	3.96
1.6	3.83	3.69	3.57	3.44	3.31	3.19	3.07	2.95	2.84	2.73
1.7	2.62	2.51	2.41	2.30	2.20	2.11	2.01	1.92	1.83	1.74
1.8	1.65	1.57	1.49	1.41	1.34	1.26	1.19	1.12	1.06	0.99
1.9	0.93	0.87	0.81	0.76	0.70	0.65	0.60	0.56	0.51	0.47
2.0	0.43	0.39	0.36	0.32	0.29	0.26	0.23	0.21	0.18	0.16
2.1	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.04	0.03	0.02
2.2	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) =8

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.62	49.24	48.86	48.49	48.11	47.73	47.35	46.97	46.59
0.1	46.22	45.84	45.46	45.08	44.71	44.33	43.96	43.58	43.21	42.83
0.2	42.46	42.08	41.71	41.34	40.97	40.59	40.22	39.85	39.48	39.11
0.3	38.75	38.38	38.01	37.65	37.28	36.92	36.55	36.19	35.83	35.47
0.4	35.11	34.75	34.39	34.04	33.68	33.33	32.97	32.62	32.27	31.92
0.5	31.57	31.22	30.87	30.53	30.18	29.84	29.50	29.16	28.82	28.48
0.6	28.15	27.81	27.48	27.15	26.82	26.49	26.16	25.83	25.51	25.19
0.7	24.86	24.54	24.23	23.91	23.59	23.28	22.97	22.66	22.35	22.04
.0.8	21.74	21.44	21.14	20.84	20.54	20.24	19.95	19.66	19.37	19.08
0.9	18.79	18.51	18.23	17.95	17.67	17.39	17.12	16.85	16.57	16.31
1.0	16.04	15.78	15.51	15.25	15.00	14.74	14.49	14.24	13.99	13.74
1.1	13.49	13.25	13.01	12.77	12.54	12.30	12.07	11.84	11.61	11.39
1.2	11.17	10.94	10.73	10.51	10.30	10.09	9.88	9.67	9.47	9.26
1.3	9.06	8.87	8.67	8.48	8.29	8.10	7.91	7.73	7.55	7.37
1.4	7.19	7.02	6.85	6.68	6.51	6.35	6.19	6.03	5.87	5.71
1.5	5.56	5.41	5.26	5.12	4.97	4.83	4.69	4.56	4.42	4.29
1.6	4.16	4.03	3.91	3.79	3.67	3.55	3.43	3.32	3.21	3.10
1.7	2.99	2.89	2.79	2.69	2.59	2.49	2.40	2.31	2.22	2.13
1.8	2.04	1.96	1.88	1.80	1.72	1.65	1.58	1.51	1.44	1.37
1.9	1.31	1.24	1.18	1.12	1.07	1.01	0.96	0.91	0.86	0.81
2.0	0.76	0.72	0.67	0.63	0.59	0.55	0.52	0.48	0.45	0.42
2.1	0.39	0.36	0.33	0.30	0.28	0.26	0.23	0.21	0.19	0.17
2.2	0.16	0.14	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.05
2.3	0.04	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) =9

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.62	49.24	48.85	48.47	48.09	47.71	47.33	46.95	46.57
0.1	46.18	45.80	45.42	45.04	44.66	44.29	43.91	43.53	43.15	42.77
0.2	42.40	42.02	41.64	41.27	40.89	40.52	40.15	39.77	39.40	39.03
0.3	38.66	38.29	37.92	37.55	37.19	36.82	36.46	36.09	35.73	35.37
0.4	35.00	34.64	34.29	33.93	33.57	33.21	32.86	32.51	32.15	31.80
0.5	31.45	31.10	30.76	30.41	30.07	29.72	29.38	29.04	28.70	28.36
0.6	28.03	27.69	27.36	27.03	26.70	26.37	26.04	25.72	25.39	25.07
0.7	24.75	24.43	24.11	23.80	23.49	23.17	22.86	22.56	22.25	21.94
0.8	21.64	21.34	21.04	20.75	20.45	20.16	19.87	19.58	19.29	19.00
0.9	18.72	18.44	18.16	17.88	17.61	17.33	17.06	16.79	16.53	16.26
1.0	16.00	15.74	15.48	15.23	14.97	14.72	14.47	14.22	13.98	13.73
1.1	13.49	13.26	13.02	12.79	12.55	12.32	12.10	11.87	11.65	11.43
1.2	11.21	10.99	10.78	10.57	10.36	10.15	9.95	9.75	9.55	9.35
1.3	9.16	8.96	8.77	8.59	8.40	8.22	8.04	7.86	7.68	7.51
1.4	7.33	7.17	7.00	6.83	6.67	6.51	6.35	6.20	6.04	5.89
1.5	5.74	5.60	5.45	5.31	5.17	5.03	4.90	4.77	4.64	4.51
1.6	4.38	4.26	4.14	4.02	3.90	3.78	3.67	3.56	3.45	3.34
1.7	3.24	3.14	3.03	2.94	2.84	2.75	2.65	2.56	2.47	2.39
1.8	2.30	2.22	2.14	2.06	1.98	1.91	1.84	1.76	1.70	1.63
1.9	1.56	1.50	1.44	1.37	1.32	1.26	1.20	1.15	1.10	1.05
2.0	1.00	0.95	0.90	0.86	0.82	0.77	0.73	0.70	0.66	0.62
2.1	0.59	0.55	0.52	0.49	0.46	0.43	0.41	0.38	0.36	0.33
2.2	0.31	0.29	0.27	0.25	0.23	0.21	0.20	0.18	0.17	0.15
2.3	0.14	0.13	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.05
2.4	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.01	0.01
2.5	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) =10

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.0	49.62	49.23	48.85	48.46	48.08	47.70	47.31	46.93	46.54
0.1	46.16	45.78	45.40	45.01	44.63	44.25	43.87	43.49	43.11	42.73
0.2	42.35	41.97	41.60	41.22	40.84	40.47	40.09	39.72	39.34	38.97
0.3	38.60	38.23	37.86	37.49	37.12	36.75	36.38	36.02	35.65	35.29
0.4	34.93	34.57	34.21	33.85	33.49	33.13	32.78	32.42	32.07	31.72
0.5	31.37	31.02	30.67	30.32	29.98	29.64	29.29	28.95	28.61	28.28
0.6	27.94	26.60	27.27	26.94	26.61	26.28	25.96	25.63	25.31	24.99
0.7	24.67	24.35	24.03	23.72	23.41	23.10	22.79	22.48	22.18	21.87
0.8	21.57	21.27	20.98	20.68	20.39	20.10	19.81	19.52	19.23	18.95
0.9	18.67	18.39	18.11	17.84	17.56	17.29	17.03	16.76	16.49	16.23
1.0	15.97	15.72	15.46	15.21	14.96	14.71	14.46	14.22	13.97	13.73
1.1	13.50	13.26	13.03	12.80	12.57	12.34	12.12	11.90	11.68	11.46
1.2	11.24	11.03	10.82	10.61	10.41	10.21	10.00	9.81	9.61	9.42
1.3	9.22	9.03	8.85	8.66	8.48	8.30	8.12	7.95	7.77	7.60
1.4	7.44	7.27	7.10	6.94	6.78	6.63	6.47	6.32	6.17	6.02
1.5	5.87	5.73	5.59	5.45	5.31	5.18	5.05	4.92	4.79	4.66
1.6	4.54	4.41	4.30	4.18	4.06	3.95	3.84	3.73	3.62	3.52
1.7	3.41	3.31	3.21	3.11	3.02	2.93	2.83	2.74	2.66	2.57
1.8	2.49	2.40	2.32	2.25	2.17	2.09	2.02	1.95	1.88	1.81
1.9	1.75	1.68	1.62	1.56	1.50	1.44	1.38	1.33	1.27	1.22
2.0	1.17	1.12	1.07	1.03	0.98	0.94	0.90	0.86	0.82	0.78
2.1	0.74	0.71	0.67	0.64	0.61	0.58	0.55	0.52	0.59	0.46
2.2	0.44	0.41	0.39	0.37	0.34	0.32	0.30	0.29	0.27	0.25
2.3	0.23	0.22	0.20	0.19	0.18	0.16	0.15	0.14	0.13	0.12
2.4	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05
2.5	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01
2.6	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00

For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

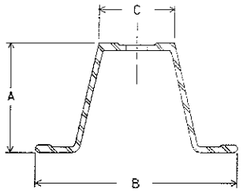
TABLE 8 (CONT.): Estimated percent defective for compressive strength (PDc)
Sample size (n) >10

Q	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	50.00	49.60	49.20	48.80	48.40	48.01	47.61	47.21	46.81	46.41
0.1	46.02	45.62	45.22	44.83	44.43	44.04	43.64	43.25	42.86	42.47
0.2	42.07	41.68	41.29	40.90	40.52	40.13	39.74	39.36	38.97	38.59
0.3	38.21	37.83	37.45	37.07	36.69	36.32	35.94	35.57	35.20	34.83
0.4	34.46	34.09	33.72	33.36	33.00	32.64	32.28	31.92	31.56	31.21
0.5	30.85	30.50	30.15	29.81	29.46	29.12	28.77	28.43	28.10	27.76
0.6	27.43	27.09	26.76	26.43	26.11	25.78	25.46	25.14	24.38	24.51
0.7	24.20	23.89	23.58	23.27	22.95	22.66	22.36	22.06	21.77	21.48
0.8	21.19	20.90	20.61	20.33	20.05	19.77	19.49	19.22	18.94	18.67
0.9	18.41	18.14	17.88	17.62	17.36	17.11	16.85	16.60	16.35	16.11
1.0	15.87	15.62	15.39	15.15	14.92	14.69	14.46	14.23	14.01	13.79
1.1	13.57	13.35	13.14	12.92	12.71	12.51	12.30	12.10	11.90	11.70
1.2	11.51	11.31	11.12	10.93	10.75	10.56	10.38	10.20	10.03	9.85
1.3	9.68	9.51	9.34	9.80	9.01	8.85	8.69	8.53	8.38	8.23
1.4	8.08	7.93	7.78	7.64	7.49	7.35	7.21	7.08	6.94	6.81
1.5	6.68	6.55	6.43	6.30	6.18	6.06	5.94	5.82	5.71	5.59
1.6	5.48	5.37	5.26	5.16	5.05	4.95	4.85	4.75	4.65	4.55
1.7	4.46	4.36	4.27	4.18	4.09	4.01	3.92	3.84	3.75	3.67
1.8	3.59	3.51	3.44	3.36	3.29	3.22	3.14	3.07	3.01	2.94
1.9	2.87	2.81	2.74	2.68	2.62	2.56	2.50	2.44	2.39	2.33
2.0	2.28	2.22	2.17	2.12	2.07	2.02	1.97	1.92	1.88	1.83
2.1	1.79	1.74	1.70	1.66	1.62	1.58	1.54	1.50	1.46	1.43
2.2	1.39	1.36	1.32	1.29	1.25	1.22	1.19	1.16	1.13	1.10
2.3	1.07	1.04	1.02	0.99	0.96	0.94	0.91	0.89	0.87	0.84
2.4	0.82	0.80	0.78	0.75	0.73	0.71	0.69	0.68	0.68	0.64
2.5	0.62	0.60	0.59	0.57	0.55	0.54	0.52	0.51	0.49	0.48
2.6	0.47	0.45	0.44	0.43	0.41	0.40	0.39	0.38	0.37	0.36
2.7	0.35	0.34	0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26
2.8	0.26	0.25	0.24	0.23	0.23	0.22	0.21	0.21	.20	.19
2.9	.19	.18	.18	.17	.16	.16	.15	.15	.14	.14
3.0	.13	.13	.13	.12	.12	.11	.11	.11	.10	.10

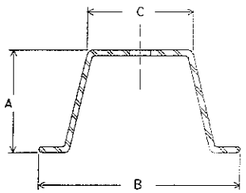
For values of Q greater than or equal to zero, the estimate of percent defective (PDc) is read directly from the table. For values of Q less than zero, the table value must be subtracted from 100. Values of Q greater than what is on the table indicate that there is 0.00 % defective material.

TABLE 9	COMPRESSIVE STRENGTH AND PERMEABILITY TEST RESULTS								
SAMPLE DATE	LOCATION	QC / QA INDICATOR	LOT	SUBLOT	CONCRETE CLASS	AIR	SLUMP	COMPRESSIVE STRENGTH (28 D)	PERMEABILITY T277 (MODIFIED)
Certified Laboratory Signature									
Contractor Signature									

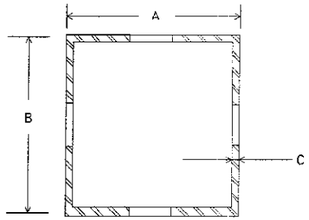
TABLE 10	PLASTIC AIR CONCRETE TEST RESULTS			
CLASS OF CONCRETE		MAX AIR		MIN AIR
SAMPLE DATE	LOAD NO.	AIR @ DISCHARGE	BACK PRESSURE METHOD	SLUMP
Certified Laboratory Signature				
Contractor Signature				



TYPE P



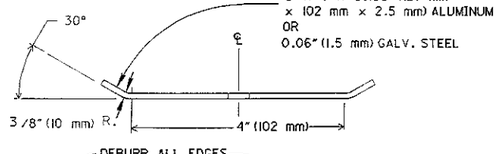
TYPE F



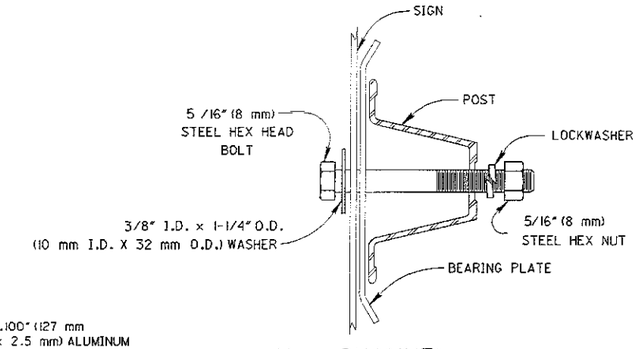
TYPE S

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

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



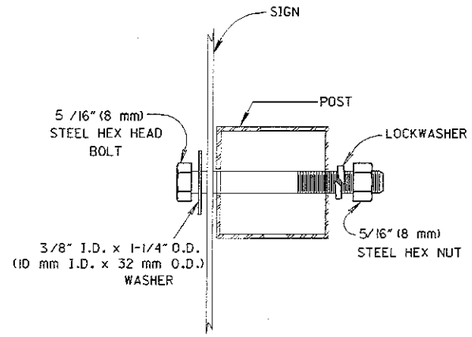
BEARING PLATE



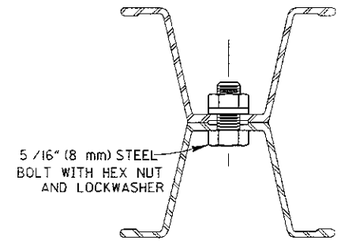
U - CHANNEL
SIGN ATTACHMENT DETAIL

NOTES

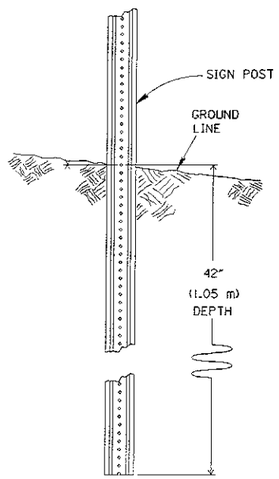
1. Install number 4 type P and F posts, and number 6 type P and F posts, only in protected locations (e.g. behind guardrail). Install two post installations of number 4 type S posts within 7 foot (2.1m) path only in protected locations.
2. Use of anchor base with No. 2 and No. 3 square post is optional.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



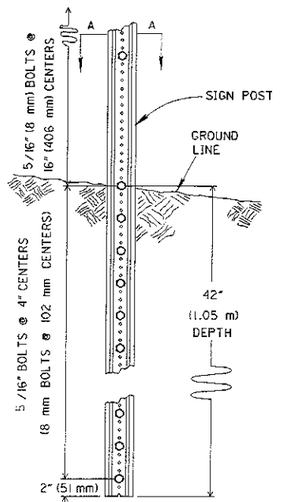
SQUARE POST
SIGN ATTACHMENT DETAIL



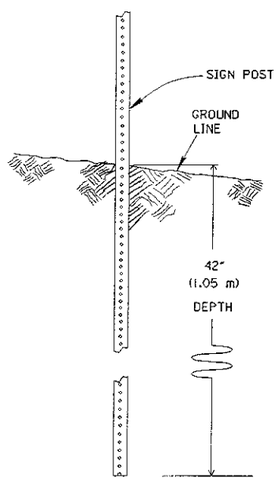
SECTION A - A



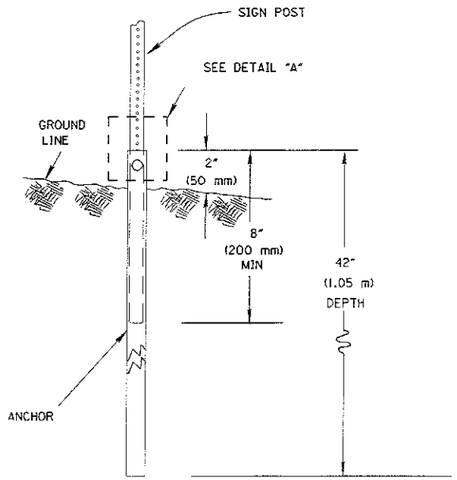
TYPICAL NO. 1, NO. 2 AND NO. 3 U - CHANNEL DRIVEN INSTALLATION



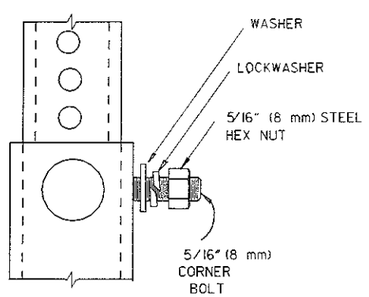
TYPICAL NO. 4 AND NO. 6 U - CHANNEL DRIVEN INSTALLATION



TYPICAL SQUARE POST DRIVEN INSTALLATION



TYPICAL SQUARE POST ANCHOR BASE INSTALLATION



DETAIL "A"

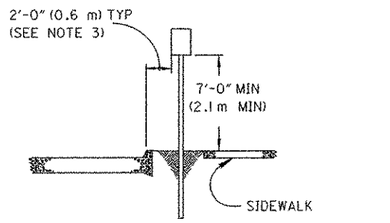
01-19-01

YIELDING POST

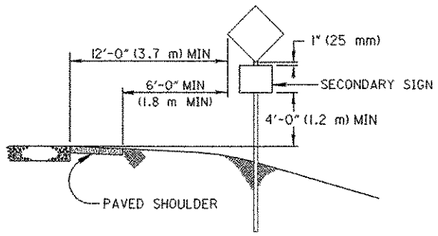
OFFICE OF TRAFFIC ENGINEERING

TC-41.20

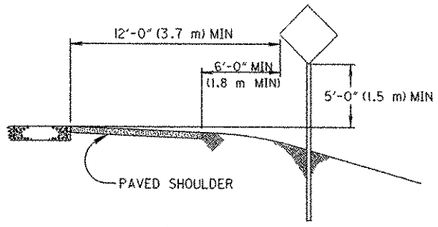
LAM



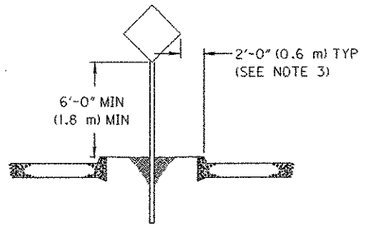
URBAN-RESIDENTIAL AND BUSINESS



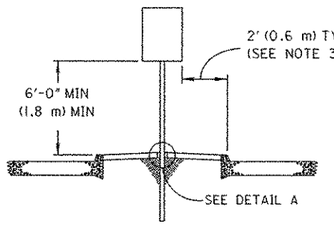
RURAL
W/SECONDARY SIGN



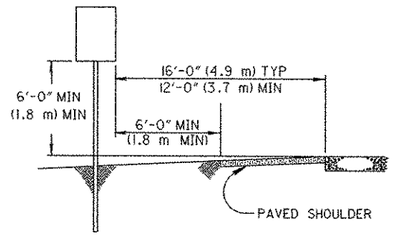
RURAL



MEDIAN



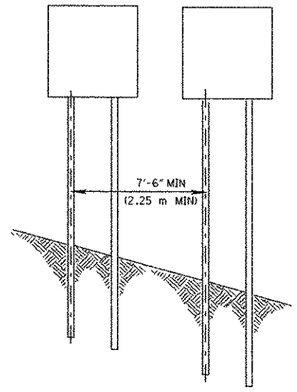
PAVED MEDIAN



MEDIAN-EXPRESSWAY OR FREEWAY

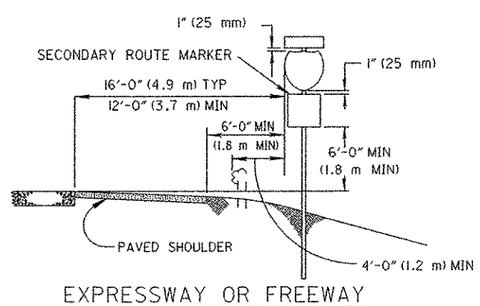
NOTES

1. See Standard Construction Drawing TC-41.20 for details on yielding supports.
2. All signs shall be placed 90° to the roadway, except parking signs with arrow shall be set at an angle of not less than 30° nor more than 45° with a line parallel to the flow of traffic.
3. A clearance of 1 foot (0.3 m) is permissible where sidewalk width is limited or where existing poles are close to the curb.
4. See Standard Construction Drawings TC-52.10 and TC-52.20 for dimensions between supports.

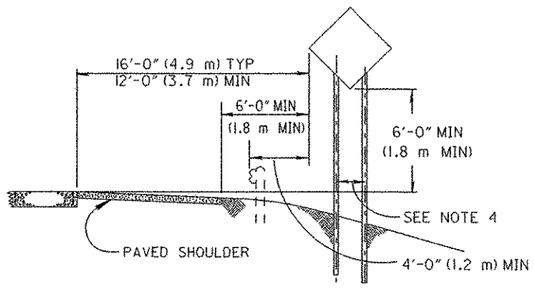


ADJACENT SIGN INSTALLATION

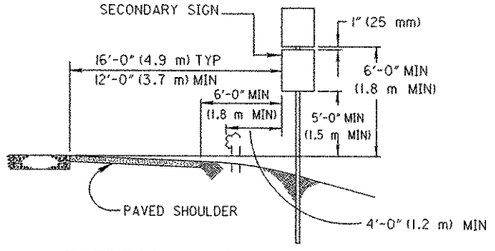
FOR NO. 2 AND NO. 3 YIELDING POST SUPPORTS IN EXPOSED LOCATIONS



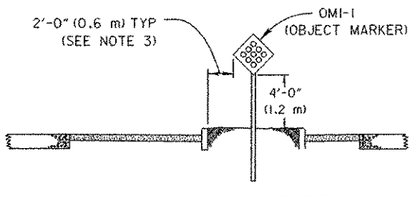
EXPRESSWAY OR FREEWAY
W/SECONDARY SIGN



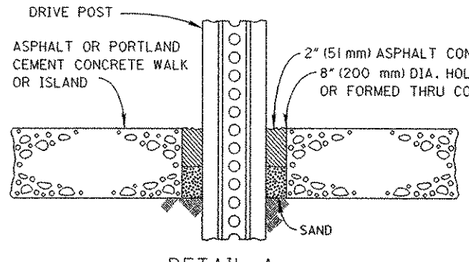
EXPRESSWAY OR FREEWAY



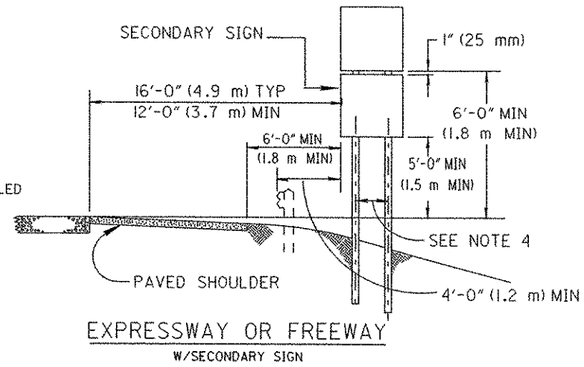
EXPRESSWAY OR FREEWAY
W/SECONDARY SIGN



EXPRESSWAY OR FREEWAY



DETAIL A



EXPRESSWAY OR FREEWAY
W/SECONDARY SIGN

07-16-04

TYPICAL FLAT SHEET SIGN PLACEMENT

OFFICE OF TRAFFIC ENGINEERING

TC-42.20

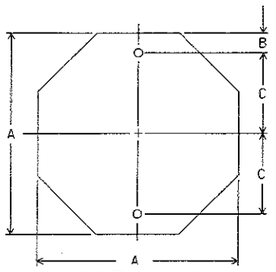
1 / 1

LAM

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 ± 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.

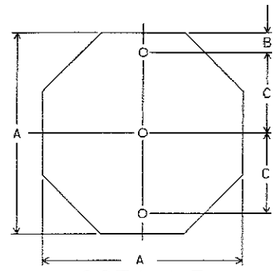
SHAPE — OCTA-2-6 — NO. BOLTS REQUIRED
NO. SUPPORTS REQUIRED



OCTA-1-2

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

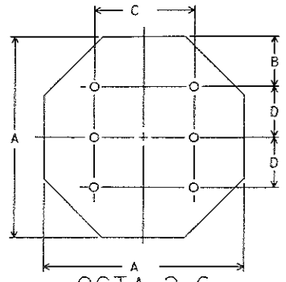
A	B	C	THICKNESS	m^2
450	75	150	1.6	0.20
600	75	225	1.6	0.36



OCTA-1-3

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

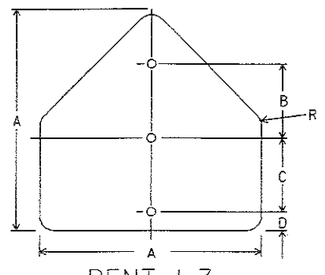
A	B	C	THICKNESS	m^2
750	75	300	2.0	0.56
900	150	300	2.0	0.81



OCTA-2-6

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

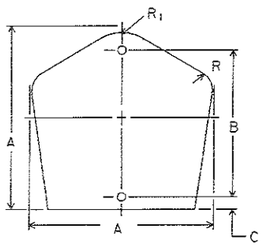
A	B	C	D	THICKNESS	m^2
1200	300	600	300	2.5	1.44



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

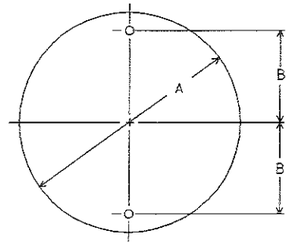
A	B	C	D	R	THICKNESS	m^2
750	250	275	75	48	2.0	0.56
900	300	300	75	57	2.0	0.81
1050	350	325	100	64	2.5	1.10



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

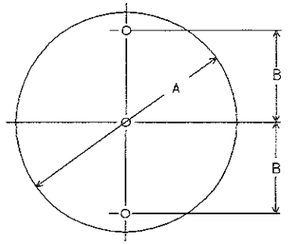
A	B	C	R_1	R	THICKNESS	m^2
450	375	25	125	50	1.6	0.20
600	450	50	135	68	1.6	0.36
750	600	50	168	86	2.0	0.56



CIR-1-2

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

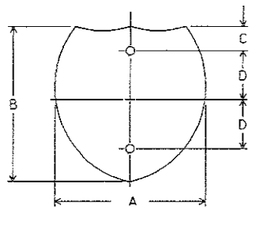
A	B	THICKNESS	m^2
450	150	1.6	0.20
600	225	2.0	0.36



CIR-1-3

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

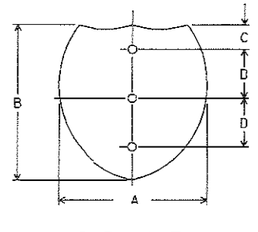
A	B	THICKNESS	m^2
750	300	2.0	0.56
900	375	2.0	0.81



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

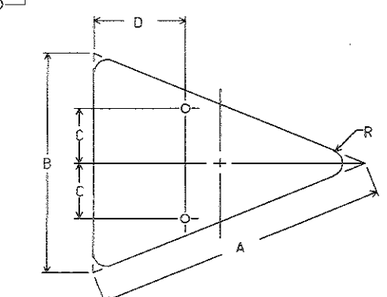
A	B	C	D	THICKNESS	m^2
600	600	75	225	1.6	0.36
750	600	75	225	2.0	0.45
750	750	75	300	2.0	0.56
1000	750	75	300	2.0	0.75



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

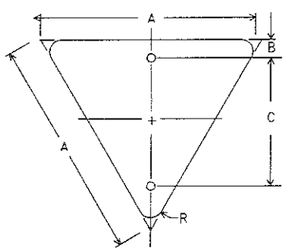
A	B	C	D	THICKNESS	m^2
900	900	150	300	2.0	0.81
1200	900	150	300	2.5	1.08



ISOS-1-2

A	B	C	D	R	GAUGE	SQ. FT.
40	30	7.50	12	1.88	0.080	3.86
48	36	9	15	2.25	0.100	5.56

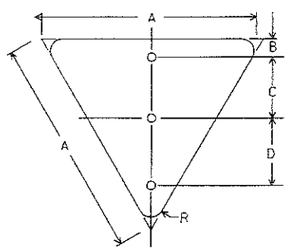
A	B	C	D	R	THICKNESS	m^2
1000	750	187	300	48	2.0	0.35
1200	900	225	375	57	2.5	0.50



TRI-1-2

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

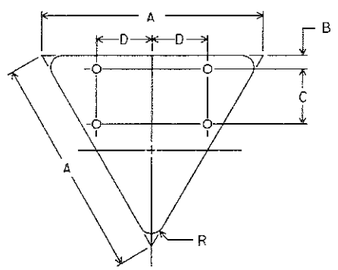
A	B	C	R	THICKNESS	m^2
600	50	350	38	2.0	0.16



TRI-1-3

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

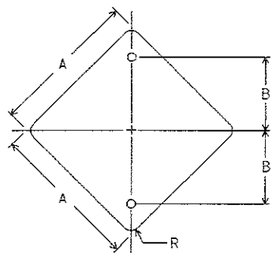
A	B	C	D	R	THICKNESS	m^2
900	75	250	275	50	2.5	0.35



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

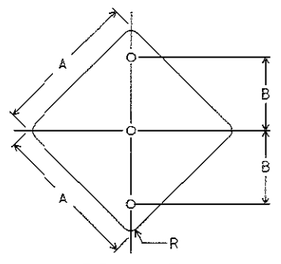
A	B	C	D	R	THICKNESS	m^2
1200	75	300	300	75	2.5	0.62
1500	75	450	375	100	2.5	0.97



DIA-1-2

A	B	R	GAUGE	SQ. FT.
18	9	1.50	0.063	2.25

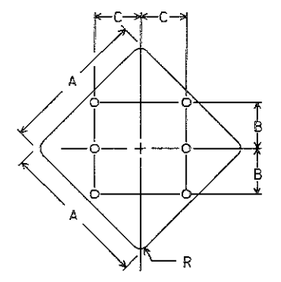
A	B	R	THICKNESS	m^2
450	225	38	1.6	0.20



DIA-1-3

A	B	R	GAUGE	SQ. FT.
24	12	1.50	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

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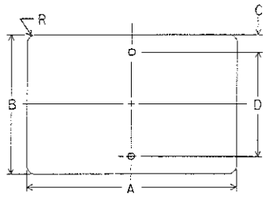
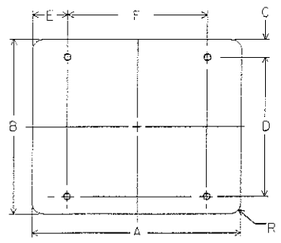


H-REC-1-2

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

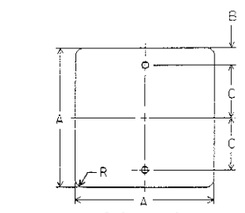
A	B	C	D	R	THICKNESS	m^2
300	100	25	50	38	1.6	0.03
300	150	37.5	75	38	1.6	0.05
300	225	37.5	150	38	1.6	0.07
450	150	37.5	75	38	1.6	0.07
450	300	37.5	225	38	1.6	0.14
525	375	37.5	300	38	1.6	0.20
525	450	75	300	38	1.6	0.24
600	150	37.5	75	38	1.6	0.09
600	200	37.5	125	38	1.6	0.12
600	250	37.5	175	38	1.6	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



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

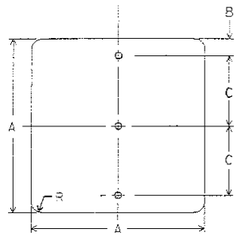
A	B	C	D	E	F	R	THICKNESS	m^2
900	600	75	450	150	600	38	2.0	0.54
900	750	75	600	150	600	48	2.0	0.68
1000	500	75	350	150	700	38	2.0	0.50
1050	900	150	600	225	600	57	2.5	0.95
1125	900	150	600	225	675	57	2.5	1.01
1200	200	37.5	125	225	750	38	2.0	0.24
1200	212	37.5	137	225	750	38	2.0	0.25
1200	350	37.5	275	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



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

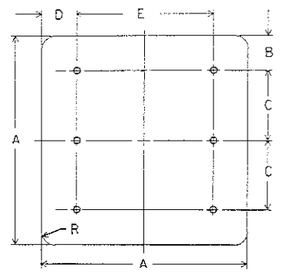
A	B	C	R	THICKNESS	m^2
375	75	112.5	38	1.6	0.14
450	75	150	38	1.6	0.20
600	75	225	38	1.6	0.36



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

A	B	C	R	THICKNESS	m^2
750	75	300	48	2.0	0.56
900	150	300	57	2.0	0.81



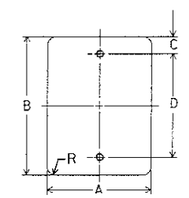
SQ-2-6

	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

* "DO NOT ENTER" SIGN

	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

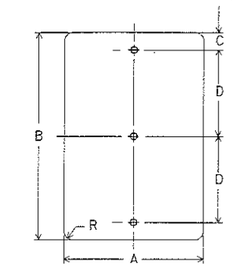
* "DO NOT ENTER" SIGN



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

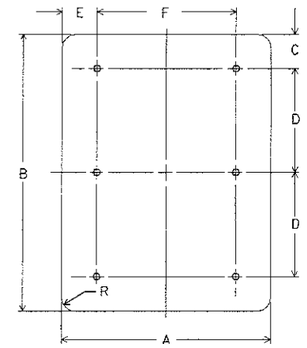
A	B	C	D	R	THICKNESS	m^2
200	650	125	400	38	1.6	0.13
225	300	37.5	225	38	1.6	0.07
300	450	37.5	375	38	1.6	0.14
300	600	75	450	38	1.6	0.18
450	600	75	450	38	1.6	0.27



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

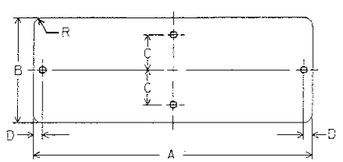
A	B	C	D	R	THICKNESS	m^2
150	1350	225	450	38	2.0	0.20
300	900	75	375	38	1.6	0.27
300	1200	150	450	38	2.0	0.36
600	750	75	300	38	2.0	0.45
600	900	75	375	38	2.0	0.54
600	1200	225	375	38	2.5	0.72
750	900	75	375	48	2.0	0.68
750	950	75	400	38	2.0	0.68
750	1050	225	300	38	2.0	0.79
900	1050	225	300	57	2.5	0.95



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	E	F	R	THICKNESS	m^2
900	1200	150	450	150	600	57	2.0	1.08
900	1350	150	525	150	600	57	2.5	1.22
900	1500	150	600	150	600	57	2.5	1.35
900	1800	225	675	150	600	57	2.5	1.62
1200	1350	150	525	225	750	75	2.5	1.62
1200	1500	150	600	225	750	75	2.5	1.80
1200	2400	300	900	225	750	75	2.5	2.88



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 — H-REC-2-4 — NO. BOLTS REQUIRED

NO. SUPPORTS REQUIRED

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 beween bolt holes shall be to tolerance of ± 1/32" (± 0.8 mm).

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