DISTRICT II

OHIO DEPARTMENT OF TRANSPORTATION

PLAN NO.

BRIDGE PAINTING

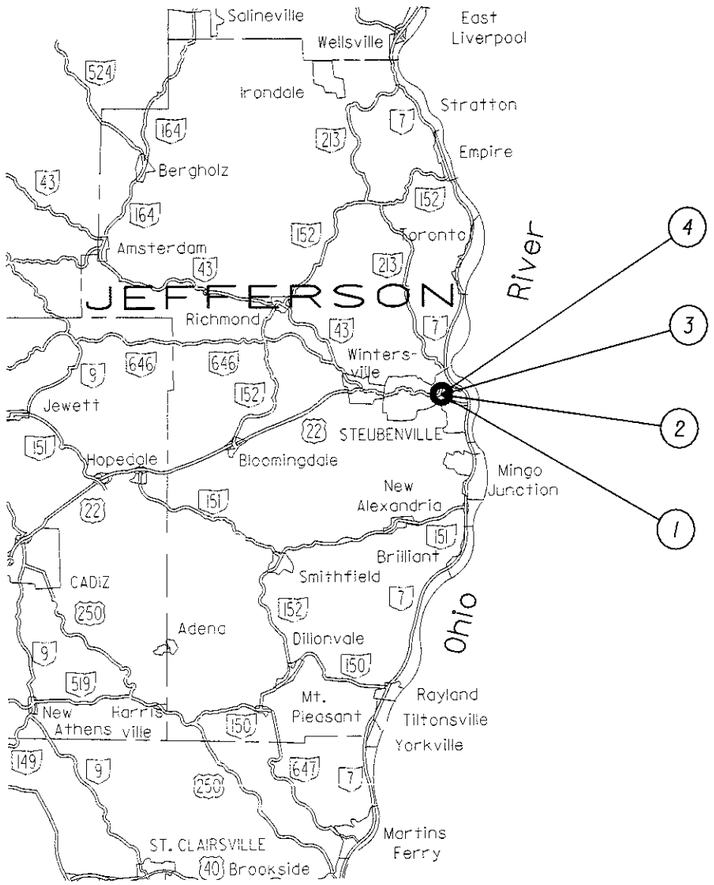
The Standard 1997 Specifications of the State of Ohio, Department of Transportation, including changes and Supplemental Specifications listed in the plans and proposal govern these improvements.

I hereby approve these plans and declare that the making of these improvements will require the closing of the highways to traffic on Parts No. None and that detours will be provided by State forces. The closing to traffic of the highways will not be required on Parts No. 1 thru 4 and provisions for the maintenance and safety of traffic will be as indicated in the proposal.

APPROVED DATE 8/19/01 — DISTRICT DEPUTY DIRECTOR

APPROVED DATE 8-23-01 — DIRECTOR, DEPARTMENT OF TRANSPORTATION

LOCATION MAP



1. BRIDGE NO. JEF-43-0033
2. BRIDGE NO. JEF-43-0063
3. BRIDGE NO. JEF-43-0063 A
4. BRIDGE NO. JEF-43-0092

● BRIDGES TO BE PAINTED

JEF - SR 43 - 0.33
010448 PID - 18905
Dist 11 10/17/01

ENGINEERS SEAL:

STATE OF OHIO
JOHN P. BARNHOUSE
E-62295
REGISTERED PROFESSIONAL ENGINEER

SIGNED: J. P. Barnhouse
DATE: 7-19-01

STANDARD CONSTRUCTION DRAWINGS	
TC-41.20	01-19-01
TC-42.20	04-20-01
MT-35.10	04-20-01
MT-95.30M	04-25-94
MT-95.31M	04-25-94
MT-95.32M	04-25-94
MT-95.40M	04-25-94
MT-95.41M	04-25-94
MT-96.11M	01-30-95
MT-96.20M	01-30-95
MT-96.25	04-20-01
MT-97.10M	04-25-94
MT-98.14M	06-24-93
MT-102.10M	01-30-95
MT-102.20M	01-30-95
MT-105.10M	04-25-94
MT-105.11M	04-25-94
MT-110.30M	03-01-96

SUPPLEMENTAL SPECIFICATIONS	
806	9-9-97
815	2-22-00
910	7-11-00

FEDERAL PROJECT NO. TE21-G000(620)

PID NO. 18905

CONSTRUCTION PROJECT NO.

TITLE SHEET

JEF-43-0.33

1/8

GENERAL PROVISIONS

The Contractors attention is called to all of Section 100 of the Construction and Material Specifications of the Ohio Department of Transportation and specifically to the items listed below as provided for in this section.

COOPERATION OF CONTRACTOR

The Contractor shall leave his ladders, platform or scaffold in place for a sufficient length of time and in such a manner as to permit the Engineer or Inspector to safely examine the work performed.

PRIOR INSPECTION OF WORK

Prospective bidders are required to make an inspection of the bridges in the field and to review the plans and specifications before submitting bids.

PAINTING QUANTITIES

Painting calculations on all parts of this plan have an additional 25% (for rolled beams) and 30% (for plate girders) for cross frames, bearing assemblies, scuppers, etc.

PAINT COLOR

The Urethane Finish Coat shall be Federal Color No. 15526-Blue.

MOBILIZATION

The Contractor shall, on any contract for which his bid exceeds $50,000.00, include an amount to cover any applicable expenditures referred to under Item 624 of the current Construction and Material Specifications. Payment shall be the lump sum price bid for Item 624, Mobilization.

ITEM 201 - CLEARING AND GRUBBING

Although there are no trees or stumps specifically marked for removal within the project limits, a lump sum quantity for Item 201, Clearing and Grubbing has been included in the General Summary. All trees and stumps underneath the structures and/or within 20 feet of the structures shall be removed accordingly, as directed by the Engineer.

All provisions as set forth in the specifications under this item shall be followed, and all costs shall be included in the lump sum price bid for Item 201, Clearing and Grubbing.

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.

614, TEMPORARY TRAFFIC SIGNALS

All temporary traffic signals shall have hardware installed with the controller to switch power to a portable generator. The Contractor 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 cost's for materials, equipment, and labor shall be included in the contract price for Item 614, Maintaining Traffic, As Per Plan.

FLOODLIGHTING

Floodlighting of the work site for operations conducted during night time periods shall be accomplished so that the lights do not cause glare to the drivers on the roadway. To ensure the adequacy of the floodlight placement, the Contractor and the Engineer shall drive throughout the work site each night when the lighting is in place and operative prior to commencing any work. If glare is detected, the light placement and shielding shall be adjusted to the satisfaction of the Engineer before work proceeds.

Payment for all labor, equipment and materials shall be included in the lump sum contract price for Item 614, Maintaining Traffic, As Per Plan.

CONVERSION OF METRIC STANDARD DRAWINGS

The metric standard drawings referenced in this plan shall be converted to English units using the SI (Metric) to English Conversion Factors provided in section 109.011 of the 1997 Construction and Materials Specifications. The appendix of ASTM E 380 shall be utilized for any additional conversion factors required. Conversions shall be appropriately precise and shall reflect standard industry English values where suitable.

ITEM 642 - PAVEMENT MARKINGS

The following estimated quantities have been carried to the General Summary for use as Directed by the Engineer for pavement marking replacement.

Item 642 - Lane Line, Type I - - - - - - - - - - - - - - 0.30 Mile
Item 642 - Center Line, Type I - - - - - - - - - - - - - 0.20 Mile
Item 642 - Cannelizing Line, Type I - - - - - - - - - - - 100 Lin Ft
Item 642 - Transverse Line, Type I - - - - - - - - - - - 120 Lin Ft
Item 642 - Lane Arrow, Type I (LEFT TURN) - - - - - - 2 Each
Item 642 - Word on Pavement, 72", Type I (ONLY) - - - - 1 Each

GENERAL NOTES

JEF-43-0.33

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ITEM 614, MAINTAINING TRAFFIC, AS PER PLAN

A minimum of one lane of traffic shall be maintained at all times by use of the existing pavement and bridge deck for Bridge No's. JEF-43-0063, JEF-43-0063A and JEF-43-0092.

A minimum of one lane in each direction shall be maintained under Bridge No's. JEF-43-0033, JEF-43-0063, JEF-43-0063A, and JEF-43-0092.

All existing lanes for all bridges shall be open to traffic between November 15 and March 15. November 15 shall be considered to constitute an interim completion date, and liquidated damages shall be assessed according to Section 108.07 for each calendar day that all lanes are not open and available to traffic.

No extensions of time shall be granted for delays in material deliveries, unless such delays are industry-wide, or for labor strikes, unless such strikes are area-wide.

Should the Contractor fail to meet any of these requirements, the Contractor shall be assessed liquidated damages in accordance with Section 108.07.

Length and duration of lane closures and restrictions shall be at the approval of the Engineer. It is the intent to minimize the impact to the traveling public. Lane closures or restrictions over segments of the project in which no work is anticipated within a reasonable time frame, as determined by the Engineer, shall not be permitted. The level of utilization of maintenance of traffic devices shall be commensurate with the work in progress.

The Contractor shall provide the name and phone number for a contact person(s) who can be reached 24 hours to the Engineer at the preconstruction conference for the sole purpose of maintaining the construction zone(s).

Prior to restricting any lanes, the Contractor shall submit for approval to the Engineer a detailed schematic of the maintenance of traffic phasing for each bridge. The schematic, as a minimum for each phase, shall show the location of all maintenance of traffic signing, drums, portable concrete barrier, temporary signals, and temporary pavement markings. The schematic(s) shall be submitted for approval, by the Engineer, a minimum of 7 calendar days prior to installation.

SEQUENCE OF OPERATIONS FOR JEF-43-0033 :

Painting operations for the JEF-43-0033 (Railroad bridge) shall be accomplished in phases and shall maintain a minimum of one lane of traffic in each direction. Lane closures shall be accomplished in one of the following ways :

1. Daily lane closures using cones or drums and the requirements of SCD's MT-95.31M and MT-95.32M to maintain a minimum of one lane of traffic in each direction. The Contractor shall remove all equipment daily and place the equipment at a storage sight. No night lane closures shall be permitted using this method.

2. Continuous lane closures using portable concrete barrier and the requirements of SCD MT-95.41M. All requirements of SCD MT-95.41M shall be strictly adhered to and any changes to meet field conditions must be approved by the Engineer.

The Contractor shall detour pedestrian traffic while the bridge is being painted per SCD MT-110.30M.

SEQUENCE OF OPERATIONS FOR JEF-43-0063, JEF-43-0063A, & JEF-43-0092 :

The Contractor may choose to place their equipment on the bridge deck or place all painting equipment beneath the bridge deck for bridges JEF-43-0063, JEF-43-0063A and JEF-43-0092.

If the Contractor chooses to place his equipment on the bridge deck, the lane closure to traffic across the bridge shall be accomplished in one of the following ways :

1. Daily lane closures using cones or drums and flaggers to control alternating one way traffic for JEF-43-0092. The Contractor shall remove all equipment from the bridge deck daily and place the equipment behind guardrail or at a storage sight. No night lane closures shall be permitted using this method.

2. Daily lane restrictions using the existing roadway and shoulder per SCD MT-102.20M for bridges JEF-43-0063 and JEF-43-0063A. The Contractor shall remove all equipment from the bridge deck daily and place the equipment behind guardrail or at a storage sight. No night lane closures shall be permitted using this method.

3. Continuous lane closures using portable concrete barrier and the requirements of SCD MT-96.11M or MT-102.10M. All requirements of SCD MT-96.11M and MT-102.10M shall be strictly adhered to and any changes to meet field conditions must be approved by the Engineer.

If the Contractors containment system obstructs vertical clearances or blocks a traveled lane or chooses to place the equipment under or adjacent to the bridge, one lane of traffic in each direction shall be maintained using SCD's MT-95.30M or MT102.20M for daily lane closures or SCD's MT-95.40M or MT-102.10M for continuous lane closures.

All equipment and supplies must remain within the right of way, behind guardrail or portable concrete barrier.

All work and traffic control devices shall be in accordance with Item 614 and other applicable portions of the Specifications, as well as the Ohio Manual of Uniform Traffic Control Devices, Current Edition, Latest Revision. Payment for all labor, equipment, and materials, including but not limited to portable concrete barrier, temporary pavement markings, object markers, barrier reflectors and temporary raised pavement markers shall be included in the lump sum contract price for Item 614, Maintaining Traffic, As Per Plan.

GENERAL NOTES

JEF-43-0.33

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BRIDGE NO. JEF-43-				ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	AS PER PLAN SHEET NO.
0033 PART 1	0063 PART 2	0063A PART 3	0092 PART 4						
LUMP	- -	- -	- -	SPECIAL	10000300	LUMP		PREMIUM ON RAILROADS' PROTECTIVE PUBLIC LIABILITY AND PROPERTY DAMAGE LIABILITY INSURANCE (SEE PROPOSAL NOTE)	
- -	LUMP	LUMP	- -	201	11000	LUMP		CLEARING AND GRUBBING	
0.30	- -	- -	- -	642	00200	0.30	MILE	LANE LINE, TYPE I	
0.20	- -	- -	- -	642	00300	0.20	MILE	CENTER LINE, TYPE I	
100	- -	- -	- -	642	00400	100	LIN FT	CHANNELIZING LINE, TYPE I	
120	- -	- -	- -	642	00700	120	LIN FT	TRANSVERSE LINE, TYPE I	
2	- -	- -	- -	642	01300	2	EACH	LANE ARROW, TYPE I (LEFT)	
1	- -	- -	- -	642	01400	1	EACH	WORD ON PAVEMENT, 72", TYPE I (ONLY)	
13500	9200	6350	11450	815	00050	40500	SQ FT	SURFACE PREPARATION OF EXISTING STEEL, SYSTEM OZEU	
13500	9200	6350	11450	815	00056	40500	SQ FT	FIELD PAINTING OF EXISTING STEEL, PRIME COAT, SYSTEM OZEU	
13500	9200	6350	11450	815	00060	40500	SQ FT	FIELD PAINTING OF EXISTING STEEL, INTERMEDIATE COAT, SYSTEM OZEU	
13500	9200	6350	11450	815	00066	40500	SQ FT	FIELD PAINTING OF EXISTING STEEL, FINISH COAT, SYSTEM OZEU	
111	85	60	115	815	00504	371	MAN HOUR	GRINDING FINS, TEARS, SLIVERS	
LUMP	LUMP	LUMP	LUMP	614	11001	LUMP		MAINTAINING TRAFFIC, AS PER PLAN	
LUMP	LUMP	LUMP	LUMP	624	10000	LUMP		MOBILIZATION	
- -	- -	- -	- -	806	16000	2	MONTH	FIELD OFFICE, TYPE A	

CALCULATED JAS
CHECKED JPB

GENERAL SUMMARY

JEF-43-0.33

M&R-511
Rev. 1-94

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

County JEFFERSON
S.R. 43
Section JEF-43-0.33
Structure No. JEF-43-0033

PLAN FOR STRUCTURES

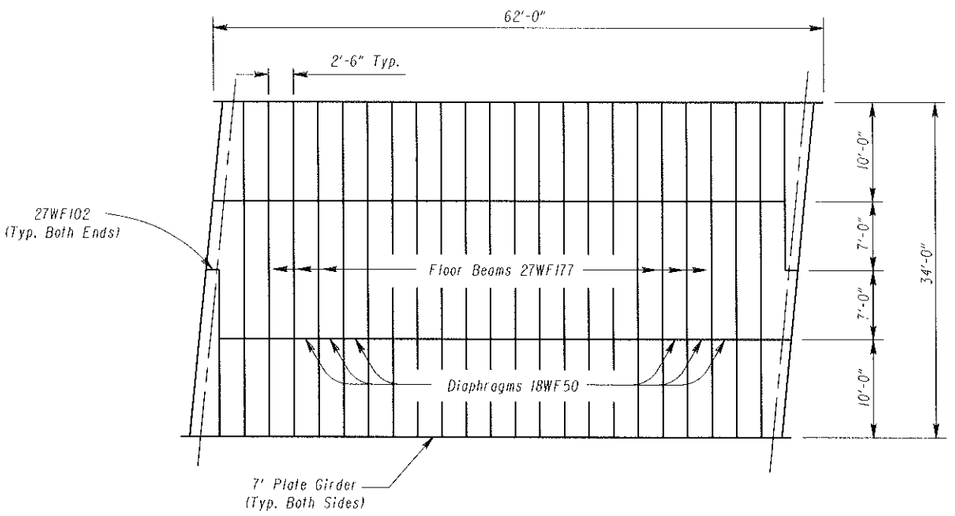
Norfolk & Southern (Subway) Over S.R. 43

DESCRIPTION OF WORK REQUIRED

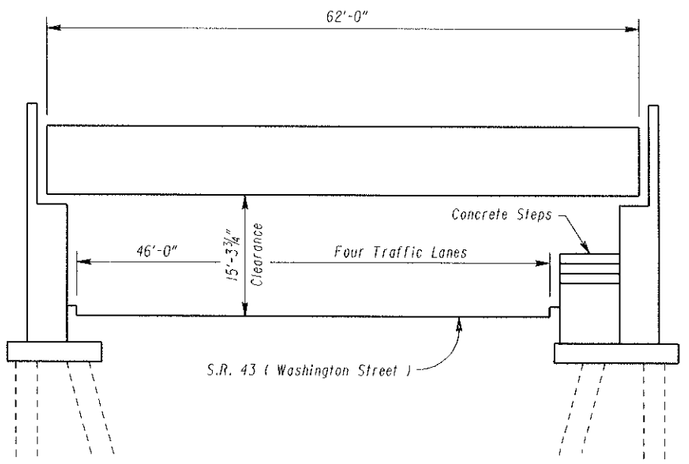
Structure Data:

Part 1

Type: Steel Girder Thru
Length: 62'-0"
Width: 34'-0"
Rail: Steel Girder
Min. Vertical Clearance: 15'-3¾"



FRAMING PLAN



ELEVATION

8 5	JEF-43-0.33	FRAMING PLAN

M&R-5H
Rev. 1-94

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

County JEFFERSON
S.R. 43
Section JEF-43-0.63
Structure No. JEF-43-0063
Ramp A Over S.R. 43

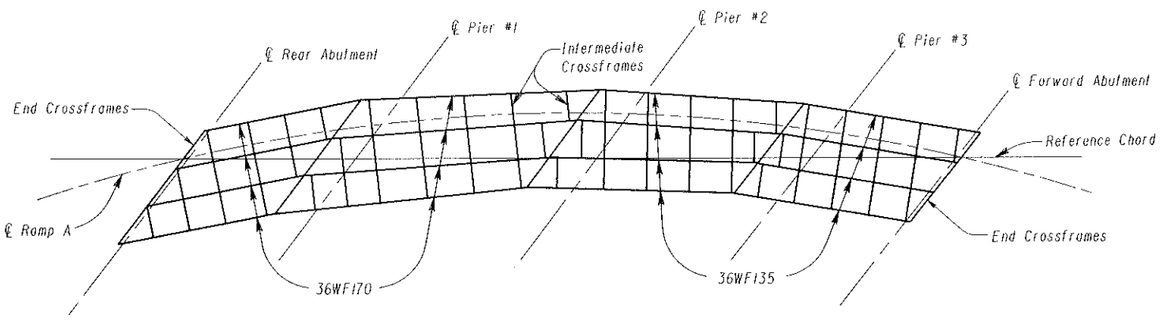
PLAN FOR STRUCTURES

DESCRIPTION OF WORK REQUIRED

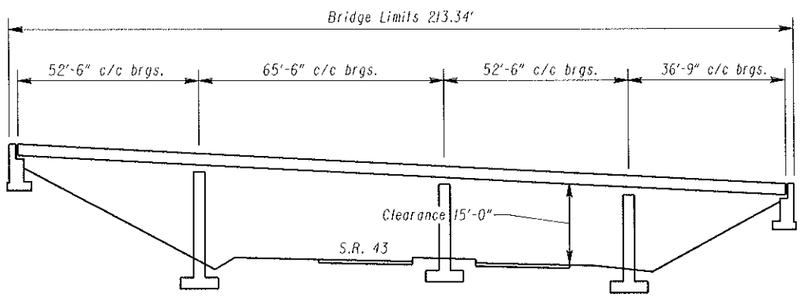
Part 2

Structure Data:

Type: Continuous Steel Beam w/Reinforced Concrete Deck and Substructure
Length: 213.34'
Width: 26'-0" f/f Parapet
Rail: Concrete Parapet w/Aluminum Railing and 1'-0" Wide Safety Curb
Min. Vertical Clearance: 15'-0"



FRAMING PLAN



ELEVATION

8 / 9	JEF-43-0.33	FRAMING PLAN

M&R-511
Rev. 1-94

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

PLAN FOR STRUCTURES

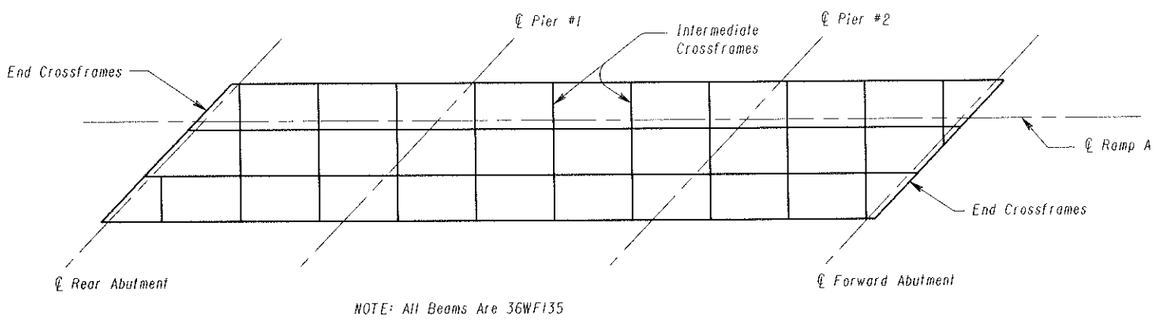
County JEFFERSON
S.R. 43
Section JEF-43-0.63
Structure No. JEF-43-0063 A
Adam St. Ramp A Over Ramp B

DESCRIPTION OF WORK REQUIRED

Part 3

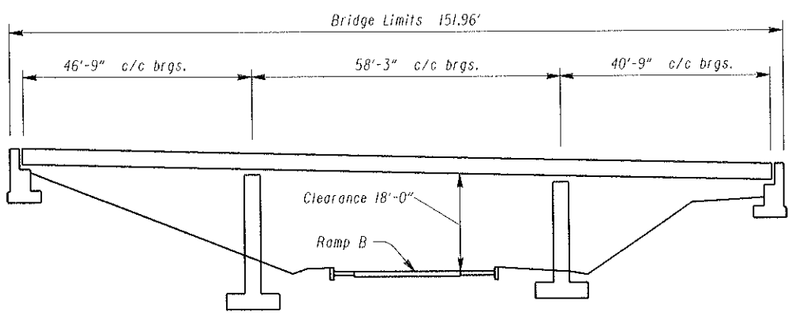
Structure Data:

Type: Continuous Steel Beam w/Reinforced Concrete Deck and Substructure
Length: 151.96'
Width: 28'-0" f/f Parapet
Rail: Concrete Parapet w/Aluminum Railing and 1'-0" Wide Safety Curb
Min. Vertical Clearance: 18'-0"



NOTE: All Beams Are 36WF135

FRAMING PLAN



ELEVATION

8 / 7	JEF-43-0.33	FRAMING PLAN

M&R-511
Rev. 1-94

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

PLAN FOR STRUCTURES

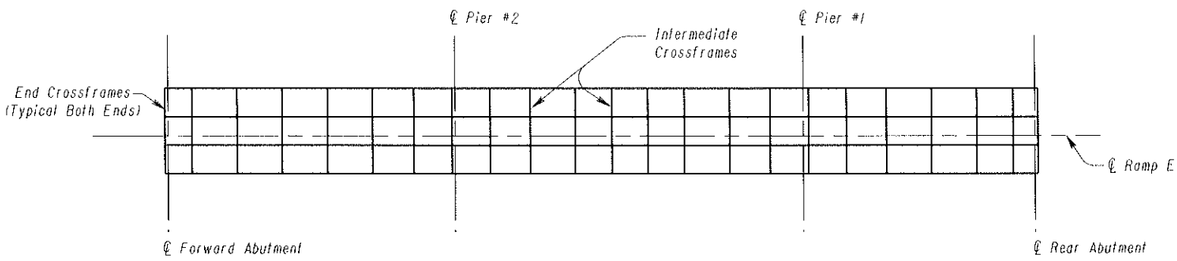
County JEFFERSON
S.R. 43
Section JEF-43-0.92
Structure No. JEF-43-0092
Lawson Ave. Ext. Over S.R. 43

DESCRIPTION OF WORK REQUIRED

Structure Data:

Part 4

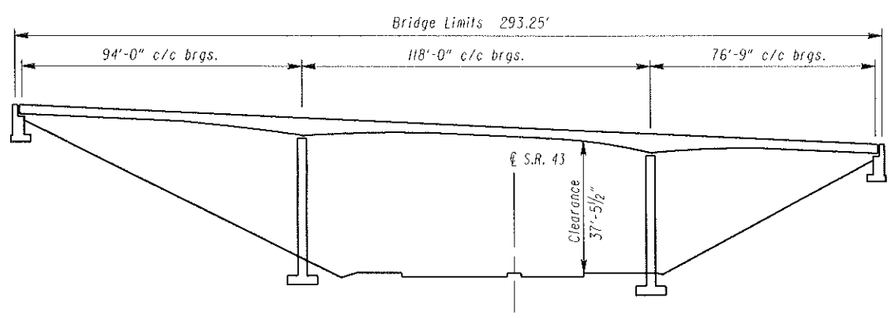
Type: Steel Girder
Length: 62.00'
Width: 34'-0"
Rail: Concrete Parapet w/Aluminum Railing and 1'-0" Wide Safety Curb
Min. Vertical Clearance: 37'-5½"



NOTE: All Girders Vary in Size From 36" to 68"

FRAMING PLAN

Note: There is Pedestrian Fencing the Total Length of This Bridge



ELEVATION

8 8	JEF-43-0.33	FRAMING PLAN

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 806

FIELD OFFICE
September 9, 1997

806.01 Description. This item shall consist of providing, maintaining and subsequently removing a field office for the exclusive use of the Department for the duration of the contract at a location approved by the Engineer. The field office will be designated as Type A, B or C.

806.02 General. The field office shall be available and completely functional at a time directed by the Engineer. The office shall have a minimum ceiling height of 2.1 m (7 feet) and have provisions for maintaining room temperature between 20 and 27 C (68 and 80 F). The Type C field office shall have a separate enclosed room for the Engineer. The Contractor shall provide and maintain telephone and electric service. One phone shall be connected to a recorded answering device. One speaker phone shall be required for Type B or Type C facilities. All field office types shall have one copying machine ;the copier shall be provided with all necessary maintenance and paper supplies, and be capable of producing multiple copies of documents up to 216 by 356 mm (8 1/2 by 14-inch) in size. The Type B and Type C field offices shall have a facsimile machine.

The office shall be provided with potable hot and cold water. The office shall also have neat, sanitary, enclosed toilet accommodations; associated lavatory and sanitary supplies shall be furnished. Portable facilities may be provided with the approval of the Engineer.

On all projects requiring moisture and density control of construction materials, the field office shall contain a storage box for a nuclear density gauge in accordance with drawings on file with the Director.

Additional requirements for field office and office equipment are as specified in the following table:

FIELD OFFICE

Item	Type A	Type B	Type C
Floor Space, m^2 (sq. ft.).....	14 (150)	46 (500)	93 (1000)
Telephone	2	4	4
Base Radio & 4-Hand Held Units[1]	--	--	1
10 Column Electronic Calculator with Tape	1	2	3
Desk and Chair Set	1	3	5
Work Tables, 750 by 1800 mm (30 by 72-inch)	1	2	3
4 Drawer, Legal Size, Lockable Metal File Cabinet	--	1	2
2 Drawer, Metal File Cabinet ...	1	2	2
Portable Fire Extinguishers - Type 2A10BC-5#	1	1	2
All Weather Parking Spaces ...	4	8	10
Plan Rack[2]	1	1	2

1. Units shall be capable of transmitting and receiving voice communication between office and any area on the project site.
2. Capable of handling the breakdown of 559x864 mm (22x34 inch) sized plans in to 10 sections.

The preceding requirements for the field office may be modified only upon written approval of the Engineer.

806.03 Computer Equipment for Field Office. Where required, the Contractor shall furnish, install, and maintain the following computer hardware and software in the field office required by this item for the life of the contract. All computer hardware and software furnished shall be for the exclusive use of the Engineer and staff and shall be operable at the same time as the field office.

This system shall not experience down time exceeding 48 hours from notification by the Engineer. The Contractor shall replace stolen, vandalized, or units otherwise inoperable within 48 hours after notification by the Engineer. Upon completion of the contract, the hardware and software furnished by the Contractor shall remain the property of the Contractor.

Computer Hardware

(1) One IBM PC compatible computer with an Intel Pentium processor (or equal) operating at a minimum 200 MHz. The computer shall be provided with the following **minimum** requirements:

a. 2.1 Gigabyte hard disk
b. 32 Megabytes RAM

c. one 3.5 inch., 1.44 MB floppy drive
d. one 8x CD-ROM drive
e. 101 key keyboard
f. 15 inch Hi-Res Super VGA Color Monitor 1024 X 768 resolution with .28 dot pitch and Hi-Res Super VGA Card with 2 Megabytes of Video RAM.
g. 2 Button Microsoft compatible mouse with appropriate software, compatible with required software.
h. At least 1 parallel port and 1 serial interface port and 1 mouse port.
I. one 56K firmware upgradeable 3Com compatible modem

(2) Hewlett Packard LaserJet compatible (PCL3 emulation) 6 page per minute printer or approved equal and parallel printer cable.

(3) Surge Protector. 15 amp six outlet with circuit breaker control, phone line circuit surge protection and a surge indicator light.

Computer Software

The Contractor shall furnish, load, and maintain the following software on the computers provided in the field offices: Microsoft Windows 95 (with games removed) and the Corel Professional Edition Office Suite Version 8.

All computer hardware and software shall be maintained by the Contractor during the life of the contract. Information for proposed "equal" equipment shall be submitted to the Engineer and be approved prior to use.

Along with the furniture under 806.02, the Contractor shall also provide the necessary stands, tables, etc. to accommodate the computer system.

806.04 Basis of Payment. The field office will be paid for at the contract price bid, which price shall be full compensation for furnishing, maintaining and subsequently removing the field office and all incidentals necessary to complete this item. The field office and any required computer equipment shall be paid on a monthly basis. The contract bid price shall be full compensation for furnishing, setting up, maintaining, and subsequently removing the specified computer hardware and software from the field office.

Item	Unit	Description
806	Month	Field office, Type_____
806	Month	Computer equipment for field office

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 815

FIELD PAINTING OF EXISTING STEEL, SYSTEM OZEU

May 30, 1996

815.01 DESCRIPTION. This item shall consist of furnishing all necessary labor, materials, and equipment to clean and paint all existing steel surfaces as specified herein.

815.02 MATERIALS. A three coat paint system consisting of: Organic Zinc Prime Coat, Epoxy Intermediate Coat and a Urethane Finish Coat. The Contractor shall select a coating system meeting the requirements of Supplemental Specification 910 entitled OZEU Structural Steel Paint. The approved list of coatings meeting this specification is on file at the Office of Materials Management and District Office.

815.03 QUALITY CONTROL Quality control will consist of the following items:

A. Contractor Quality Control Specialist. Before any work begins, the Contractor shall designate one individual on each project as a Quality Control Specialist (only one person per project will be necessary unless the Contractor is working at more than 3 sites simultaneously). In which case, it will be necessary to provide an additional Quality Control Specialist for each additional three (or portion of three) sites being painted simultaneously. This person will not be a Foreman or member of the Contractor's production staff (ie. he will not abrasive blast, paint, recover spent abrasives, etc.). He will not be involved in any other miscellaneous tasks (ie. mixing paint, running errands, running or working on equipment, etc.) while any production work is taking place. Documentation that personnel performing quality control related functions are qualified shall be submitted to the Engineer prior to allowing the Quality Control Specialist (QCS) to begin work. Documentation/verification shall be provided to the Engineer that the QCS has received formal training from one of the following: KTA Tator, S. G. Pinney, or Corrosion Control Consultants. He shall be equipped with material safety data sheets, product data sheets, tools and equipment to provide quality control on all facets of the work and shall have a thorough understanding of the plans and specifications pertaining to this project. He shall be responsible for inspecting the equipment at the specified intervals, the abrasives, and the work, at all quality control points. He shall also be responsible for verifying that all work is done within the specified work limitations. He shall cooperate with the Inspector and compare and document quality control readings. He shall have the authority to stop work and the responsibility to inform the Contractor's Foreman of nonconforming work.

B. Quality Control Points. Quality control points (QCP) are points in time when one phase of the work is complete and ready for inspection by both the Contractor and the Engineer prior to continuing with the next operational step. At these points: The Contractor shall afford access to inspect all affected surfaces. If inspection indicates a deficiency, that phase of the work shall be corrected in accordance with these specifications prior to beginning the next phase of work. Discovery of defective work or material after a Quality Control Point is past or failure of the final product before final acceptance, shall not in any way prevent rejection or obligate the State of Ohio to final acceptance.

Quality Control Points (QCP)	**PURPOSE**
1. Solvent Cleaning	Remove asphaltic cement, oil, grease, salt, dirt, etc. followed by washdown
2. Grinding Flange Edges	Remove sharp corners, as detailed on plans
3. Containment/Waste Disposal	Contain, collect & dispose of abrasive blasting debris
4. Abrasive Blasting	Blasted surface to receive paint
5. Prime Coat Application	Check surface cleanliness; apply prime coat; check coating thickness
6. Removing Fins, Tears, slivers	Remove surface defects and slivers
7. Caulking	Caulk areas detailed on plans
8. Intermediate Coat Application	Check surface cleanliness; apply intermediate coat, check coating thickness
9. Finish Coat Application	Check surface cleanliness, apply finish coat, check coating thickness
10. Final Review	Visual inspection of system for Acceptance and check total system thickness.

815.04 SURFACE PREPARATION. This item shall also consist of solvent cleaning (if required), abrasive blasting, and providing a wash facility for the Engineer and Inspectors.

A. Solvent Cleaning (QCP #1) If specifically required by plan note, the bridge shall be solvent cleaned to remove all traces of asphaltic cement, oil, grease, diesel fuel deposits, and other soluble contaminants, (QCP #1) (see SSPC-SP 1 Solvent Cleaning for recommended practices). Under no circumstances shall any abrasive blasting be done to areas with asphaltic cement, oil, grease, or diesel fuel deposits. All solvent cleaned areas shall be subsequently washed before abrasive blasting as detailed below.

Washing shall be accomplished with potable water having a nozzle pressure of at least 7 MPa(1,000 PSI)and a delivery rate of not less than 15 L (4 gallon) per minute. The Contractor, shall provide equipment specifications to verify the above. The equipment shall also be equipped with gauges to verify the pressure. The nozzle shall be held at a maximum of 300 mm (12 inches) from the surface being washed.

B. Grinding Flange Edges (QCP #2) . If a pay item for this work is shown on the plans, all exposed bottom flange edges of longitudinal rolled and welded beams in areas designated on the plans shall be rounded to a radius of 3 mm plus or minus 1.5 mm (1/8 inch plus or minus 1/16 inch) before abrasive blasting. This work may be done without weather and temperature restrictions.

C. Containment/Waste Disposal (QCP #3). Waste material generated by abrasive blasting operations is a solid waste and shall be handled as follows: (1) Contained, (2) Collected, (3) Stored, (4) Evaluated, (5) Properly disposed.

All equipment shall be parked on ground covers free of cuts, tears or holes to prevent contamination of pavement or soil and to protect area under and around equipment.

The Contractor shall erect an enclosure to completely surround (around and under) the blasting operations. The ground cannot be used as the bottom of the enclosure unless completely covered with plastic or tarps.

The enclosure shall be constructed of flexible materials such as tarpaulins or containment screens (specifically designed for this purpose), or of rigid materials such as plywood. All materials shall be maintained free of tears, cuts or holes; however, flexible material used for the sides of the enclosure only may be weaved to contain a maximum of 15 percent holes and a minimum of 85 percent material. All seams shall be overlapped a minimum of 150 mm (6 inches) and fastened together at 300 mm (12 inch) centers, or fastened and overlapped in a manner that insures a seal which does not allow openings between the screens in the containment. The vertical sides of the enclosure shall extend completely up to the bottom of the deck on a steel beam bridge. All blasting operations on a truss type bridge shall be completely enclosed, including top side. Bulkheads shall be used between beams to enclose the blasting area.

Vacuum blasting may be used in lieu of containment, providing that the vacuum blasting equipment is manufactured and marketed for this purpose and is equipped with controls which automatically shut down the blasting operation if the blast head brushes are not held in contact with the surface being cleaned.

All debris collected by these operations, removed from equipment or filters, or that has fallen to the ground, shall be collected and stored at the bridge site, if practical, for testing, evaluation and disposal. If not practical, an alternate location shall be mutually agreed upon by the Engineer and Contractor. Additionally, centralized cleaning stations for recyclable steel, ferric oxide, or aluminum oxide grit (if used) shall be set up at a location mutually agreed upon by the Contractor and Engineer. Storage shall be in steel containers and shall have lids which shall be locked at the end of each workday.

The Contractor shall obtain the services of a testing laboratory to obtain directly from the project site and evaluate a composite representative sample of the abrasive blasting debris for each bridge site. The person taking the sample will be an employee of the testing laboratory.

The composite sample shall consist of individual samples taken from all containers which are on the site at the time of the sampling. These individual samples shall be blended together to comprise one composite sample. The individual samples shall be of equal size. There shall be one individual sample taken from each drum and four randomly spaced individual samples taken from each container other than drums.

The individual samples shall be taken with stainless steel tools and placed into either clean glass or plastic containers.

All sampling shall be done in the presence of the Engineer. In addition to the above mentioned requirements, the sampling shall also comply with the requirements of U.S. EPA Publication SW 846.

A Chain of Custody must also accompany all composite samples. Included in this document shall be in the name of the person taking the sample, the Company for which he works, the date and time which the sample was taken, the bridge from which it was taken, the Township and Municipality where the bridge is located and signatures of all persons involved in the Chain of Custody, including dates of possession.

The sampling shall be done within the first week of production blasting at each bridge. If the sampling is not done within the time allotted above, all blasting and painting operations on the bridge from which waste was generated, shall promptly cease.

The composite sample shall be tested for lead and chromium in accordance with U.S. EPA Publication SW 846. The test results and Chain of Custody records shall immediately be forwarded to the Director. If the material is hazardous, the Contractor shall also forward the names of the hauler and treatment facility to the Director. Any additional testing required by the hauler, treatment facility, or landfill will be paid for by Contractor.

All federal, state and local environmental protection laws, regulations and ordinances including, but not limited to, air quality, waste containment and waste removal must be observed during the performance of this contract.

In respect to enforcement of the above mentioned laws, bidders are advised that various governmental bodies have this responsibility. It is the responsibility of the bidders to comply with those laws as enforced by those various governmental bodies.

The existing paint being removed from these bridges may contain lead or chromium. The Contractor is responsible to assure that workers take proper safety precautions when working in this environment (see bid proposal note entitled "Safety").

Hazardous Waste: If the tests reveal that the maximum concentration of either lead or chromium exceeds 5.0 milligrams per liter, the waste shall be treated as a hazardous waste and the steel containers shall be labeled as a hazardous waste. The Director will then obtain a generator number assigned to the State.

All containers of waste material which have been classified as hazardous shall be stored in a secured location until proper disposal. The storage site shall be surrounded with 1.5 m (5 foot) high chain link fence fabric supported by traffic sign drive posts at 3 m (10 foot) center to center. Drive posts shall be embedded into the ground at least 0.6 m (2 feet) deep. The fencing shall be secured with padlocks at the end of each day. Signs shall be posted in obvious locations on the enclosure warning of the hazardous material.

The Contractor shall then arrange for hauling, treating and disposal of all hazardous waste. All hazardous waste shall be disposed of after the Director has obtained a generator number. In every case, any and all hazardous waste shall be disposed of within 60 days after it is generated. Failure to comply with the 60 day disposal requirement shall be considered by the Department as a breach of contract by the Contractor and all abrasive blasting and painting of structural steel on the project shall immediately cease until the hazardous waste is properly disposed. Upon such breach, the Department shall cease processing all pay estimates and notification of the breach shall be sent to the Contractor's surety. Further, any fines or liens assessed by any governmental agency which has jurisdiction over the disposal of this material shall be the responsibility of the Contractor. The hauling and disposal shall be by a firm licensed by U.S. EPA and who shall also be responsible for providing the Uniform Hazardous Waste Manifest (EPA Form 8700-22A).

The Contractor shall decontaminate or dispose of all collection/ containment equipment in accordance with EPA guidelines.

Non-Hazardous Solid Waste: If the waste is determined to be non- hazardous as verified by test results which have been reviewed by the Director, it shall be hauled and disposed of at a facility which is licensed to accept non-hazardous solid waste. Prior to disposal of any material, the Contractor shall submit the test results and documentation that the disposal facility is licensed by the EPA to accept non-hazardous solid waste, to the Engineer. The Contractor shall obtain and provide the Engineer with a receipt documenting disposal of waste material at the approved landfill.

D. Abrasive Blasting (QCP #4), Prior to any abrasive blasting, all dirt, sand, bird nestings, bird droppings and other debris shall be completely removed from the scuppers, bulb angles, pier and abutment seats.

All steel to be painted shall be blast cleaned according to SSPC-SP10 and as shown SSPC-Vis 1-89 (pictorial surface preparation standards for painting steel surfaces). Steel shall be maintained in a blast cleaned condition until it has received a prime coat of paint.

The back side of end cross frame assemblies which are 75 mm (3 inches) or closer to backwalls may be commercial blast cleaned according to SSPC-SP6.

Galvanized steel (including corrugated steel bridge flooring), adjacent concrete which has been coated or sealed, and other surfaces not intended to be painted, shall be covered and protected to prevent damage from blasting and painting operations. Any adjacent coatings damaged during the blasting operation shall be repaired at the Contractor's expense.

The abrasive shall be a recyclable steel, ferric oxide, or aluminum oxide grit. After each use and prior to reuse, the grit shall be cleaned of paint chips, rust, mill scale and other foreign material by equipment specifically designed for such cleaning. The Contractor is responsible for assuring recycling and cleaning equipment is capable of operating with the chosen blasting media.

Abrasives shall also be checked for oil contamination before use. A small sample of abrasives shall be added to ordinary tap water. Any detection of a oil film on the surface of the water shall be cause for rejection. This test shall be conducted on each load of abrasives delivered to the job site.

The resultant surface profile shall be a minimum of 40 µm (1.5 mils) and a maximum of 90 µm (3.5 mils). Abrasives of a size suitable to develop the required surface profile shall be used. Any abrasive blasting which is done when the steel temperature is less than 3° C(5° F) above the dew point shall be reblasted when the steel temperature is at least 3° C(5° F) above the dew point. Dew point shall be defined as the temperature at which moisture condenses on the steel surfaces.

All abrasives and residue shall be removed from all surfaces to be painted. All steel blast cleaned in any one day shall be kept dust free and prime coated the same day. Failure to prime coat the same day will require reblasting before prime coating. No dust or abrasives from adjacent work shall be left on the finish coat. The Quality Control Specialist shall perform the following test (and the Inspector will verify) to insure that the air is not contaminated: blow air from the nozzle for 30 seconds onto a white cloth or blotter held in a rigid frame. If any oil or other contaminants are present on the cloth or blotter, abrasive blasting shall be suspended until the problem is corrected and the operation is verified by another test. This test shall be done at the start of each shift and at 4 hour intervals. The abrasive shall be tested for oil contamination at the same time.

Abrasive blasting and painting may take place simultaneously on any one bridge as long as abrasive blasting debris and/or dust by the blowing operation does not come in contact with freshly painted surfaces.

The Material Safety Data Sheet (MSDS) shall be provided at the preconstruction meeting for all abrasives to be used on this project. No work shall start until the MSDS has been submitted.

The Contractor shall provide the Engineer and Inspectors a wash facility with running water to permit washing of face and hands during the surface

preparation operation. It shall at all times contain an adequate supply of potable water, soap and towels. The Contractor shall be responsible to properly contain, test and dispose of the waste water. The wash facility shall be located at each bridge site in an area that will not be contaminated by the blasting debris.

E. Prime, Intermediate and Finish Coat Application (QCP #5, #8, & #9). Each coat of paint shall be in a proper state of cure or dryness before the application of succeeding coats. Paint shall be considered ready for overcoating when an additional coat can be applied without the development of any detrimental film irregularities, such as lifting, wrinkling or loss of adhesion of the undercoat. The time interval between coating applications shall be in compliance with manufacturer's written instructions and no more than 30 days between the prime and intermediate coats and 13 days between the intermediate and finish coats. These maximum recoat times include weather related days. No additional time for weather delays will be allowed. Any coat which has cured more than the above allotted time without overcoating shall be removed and the steel reblasted to SP 10.

The completion date (month and year) of the finish coat and the letters OZEU shall be stenciled on the steel in 100 mm (4 inch) letters with a black urethane paint. This date shall be applied at four locations near the end of each outside beam on the outside web visible from the road or as directed by the Engineer.

F. Removing Fins, Tears, Slivers (QCP #6). All fins, tears, slivers or any other burred or sharp edges that become evident after priming, shall be removed by grinding. All ground surfaces shall be retextured to produce a profile of 40 to 90 µm (1.5 to 3.5 mils) and reprimed prior to application of the intermediate coat. The Contractor may also begin removing fins, tears and slivers after blasting and prior to priming.

Temperature and weather restrictions do not apply to this item. Reapplying primer shall comply with weather restrictions.

G. Caulking (QCP #7). Caulking (if a pay item) will be performed in areas of the bridge where depicted/described in the plans.

H. Job Site Visual Standards. Job site visual standards include preparation of test section, subsequent test section, and photographs of approved test section. Job site visual standards shall be used in addition to the SSPC-Vis-1-89 standard for blasting. Before any abrasive blasting is started, the Contractor will prepare a test section on the first bridge to be painted. The test section will be a representative area to be blast cleaned [approximately 2 - 3 m^2 (20-30 square feet)]. The test section area shall be photographed and the steel surface checked for the proper profile after the Engineer and the Contractor agree that the area has been blast cleaned according to plan requirements. Only after a test section area has been approved and documented by photographs and replica tape, may the Contractor proceed with his blast cleaning operations. The job site visual standards (photographs) shall be used in addition to plan specifications to determine acceptance of blast cleaning procedures, but in all cases of dispute, the SSPC-Vis-1-89 standard shall govern. If, in the opinion of the Contractor or Engineer, a subsequent bridge is not indicative of the bridge on which the test section was performed, he may request another test section.

815.05 TESTING EQUIPMENT. The Contractor shall provide the Engineer the following testing equipment in good working order, for the duration of the project. When the Contractor's people are working at different locations simultaneously, additional test equipment shall be provided for each crew for the type of work being performed. When no test equipment is available, no work shall be performed.

1. A camera with the following features and 5 (unless otherwise specified on plans) rolls of color film: A) Uses self developing color print film, B) Lens with auto focus system, C) Focuses from 0.6 m (2 feet) to infinity, D) Built-in fill flash.
2. One Spring micrometer and 3 rolls of extra-coarse replica tape.
3. One Positector 2000 or 6000, Quanix 2200, or Elcometer A345FBI1; and the calibration plates, 38-200 µm and 250-625 µm (1.5 -8 mils and 10-25 mils) as per the NBS calibration standards in accordance with ASTM D 1186.
4. One Sling Psychrometer including Psychometric tables - Used to relative humidity and dew point temperature.
5. Two steel surface thermometers accurate within 1° C(2° F) or One portable infrared thermometer available from:

   Model: Raynger ST Series (-18° C to 400°C)
   Manufacturer: Raytek Inc.
   Santa Cruz, Ca.
   (800)227-8074

   or approved equal to the portable infrared thermometer
6. Flashlight 2-D cell
7. SSPC Visual Standard for Abrasive Blast Cleaned Steel SSPC-Vis 1-89
8. One Recorder Thermometer capable of recording the date, time, and temperature over a period of at least 12 hours.

815.06 HANDLING. All paint and thinner shall be delivered to the project site in original, unopened containers with labels intact. Minor damage to containers is acceptable provided the container has not been punctured. Thinner containers shall be a maximum of 19 L (5 gallons).

Paint shall be stored at the temperature recommended by the manufacturer to prevent paint deterioration.

Each container of paint and thinner shall be clearly marked or labeled to show paint identification, component, color, lot number, stock number, date of manufacture, and information and warnings as may be required by Federal and State laws.

All containers of paint and thinner shall remain unopened until required for use. The label information shall be legible and shall be checked at the time of use. Solvent used for cleaning equipment is exempt from the above requirements.

Paint which has livered, gelled or otherwise deteriorated during storage shall not be used: However, thixotropic materials which can be stirred to attain normal consistency may be used. The oldest paint of each kind shall be used first. No paint shall be used which has surpassed its shelf life.

Paint may be considered as eligible for payment for material on hand as specified in 109.07. However, only paint which the Contractor can prove to

the Engineer will be used during the construction season shall be eligible for payment. The Contractor shall provide the Engineer calculations indicating the total m^2 (square feet) of steel to be painted during the construction season. He shall also provide calculations showing the total number of liters (gallons) required. The Contractor shall be responsible to store the paint on the project in such manner to prevent theft and adverse temperatures. He shall provide thermometers capable of monitoring the maximum high and low temperatures within the storage facility. The Contractor is responsible for properly disposing of all unused paint and paint containers.

The Contractor shall furnish shipping invoices for all materials used on the project to the Engineer, prior to use.

815.07 MIXING AND THINNING. All ingredients in any container of paint shall be thoroughly mixed immediately before use and shall be agitated often enough during application to maintain a uniform composition; however, the primer shall be continuously mixed by an automated agitation system (hand held mixers not allowed). Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container. The paint shall be mixed with a high shear mixer (such as a Jiffy Mixer). Paddle mixers or paint shakers are not allowed. Paint shall not be mixed or kept in suspension by means of an air stream bubbling under the paint surface.

All paint shall be strained after mixing. Strainers shall be of a type to remove only skins and undesirable matter, but not pigment.

No thinner shall be added to the paint without the Engineer's approval, and only if necessary for proper application as recommended by the manufacturer. When the use of thinner is permissible, thinner shall be added slowly to the paint during the mixing process. All thinning shall be done under supervision of the Engineer. In no case shall more thinner be added than that recommended by the manufacturer's printed instructions. Only thinners recommended and supplied by the paint manufacturer may be added to the paint. No other additives shall be added to the paint.

Catalysts, curing agents, or hardeners which are in separate packages shall be added to the base paint only after the base paint has been thoroughly mixed. The proper volume of catalyst shall then be slowly poured into the required volume of base with constant agitation. Liquid which has separated from the pigment shall not be poured off prior to mixing. The mixture shall be used within the pot life specified by the manufacturer. Therefore only enough paint shall be catalyzed for prompt use. Most mixed, catalyzed paints cannot be stored, and unused portions of these shall be discarded at the end of each working day.

815.08 COATING APPLICATION. Coating application will be as follows.

A. General All structural steel, scuppers, expansion joints (except top surface), steel railing, exposed steel piling, drain troughs and other areas as indicated in the plans shall be painted. Galvanized surfaces shall not be painted unless otherwise noted on plans.

The following methods of application are permitted for use by this specification, as long as they are compatible with the paint being used: brush, spray, or any combination of these methods unless specified differently in the plans. Daubers, small diameter rollers or sheepskins may be used for places of difficult access when no other method is practical and in all cases shall be used where cross-frame angles are located within 50 mm (2 inches) of the bottom flange and where end cross frames are within 150 mm (6 inches) of the backwall and bottom of bottom flanges around bearings less than 150 mm (6 inches) in height.

If the surface is degraded or contaminated after surface preparation and before painting, the surface shall be restored before painting application. In order to prevent degradation or contamination of cleaned surface, the prime coat of paint shall be applied the same day of blast cleaning as required in surface preparation above.

Cleaning and painting shall be so programmed that dust or other contaminants do not fall on wet, newly-painted surfaces. Surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Overspray and pigeon droppings shall be removed with a stiff bristle brush, wire screen, or a water wash with sufficient pressure to remove overspray without damaging the paint. The overspray must be removed before applying the next coat. All abrasives and residue shall be removed from painted surfaces, before recoating, with a vacuum system equipped with a brush type cleaning tool.

No visible abrasives from adjacent work shall be left on the finish coat. Abrasives on the finish coat shall be removed.

If brush application of the coating is used, it shall produce a smooth coat. Care shall be taken to work the paint into all crevices, corners, and around all bolt and rivet heads.

B. Spray Application (General). All spray application of paint shall be in accordance with the following:

Primer ingredients shall be kept uniformly mixed in the spray pot or container during application by continuous, automated mechanical agitation (hand held mixers not allowed).

Spray equipment shall be kept clean so that dirt, dried paint and other foreign materials are not deposited in the paint film. Any solvent left in the equipment shall be completely removed before using.

Paint shall be applied in a uniform layer with overlapping at the edges of the spray pattern. The border of the spray pattern shall be painted first; with the painting of the interior of the spray pattern to follow, before moving to the next spray pattern area. A spray pattern area is such that the gun shall be held perpendicular to the surface and at a distance which will ensure that a wet layer of paint is deposited on the surface. The trigger of the gun should be released at the end of each stroke. All bolts and rivet heads shall be sprayed from at least 2 directions or brushed to assure coverage.

Each spray operator shall demonstrate to the Engineer his ability to apply the paint as specified. Any operator who does not demonstrate this ability shall not spray.

If mud cracking occurs, the affected area shall be cleaned to bare metal in accordance with surface preparation above and repainted.

All gaps and crevices 3 mm (1/8 inch) or less shall be filled with primer.

All spray equipment used shall be suitable for use with the specified paint. Paint manufacturer's equipment recommendations shall be followed to avoid paint application problems.

If air spray is used, traps or separators shall be provided to remove oil and condensed water from the air. The traps or separators must be of adequate size and must be drained periodically during operations. The following test shall be made by the Contractor and verified by the Engineer to insure that the traps or separators are working properly.

Air shall be blown from the spray gun for 30 seconds onto a white cloth or blotter held in a rigid frame. If any oil, water or other contaminants are

present on the cloth or blotter, painting shall be suspended until the problem is corrected and the operation is verified by repeating this test.

This test shall be made at the start of each shift and at 4 hour intervals. This is not required for an airless sprayer.

Spray application of all coats shall not be used unless the operation is totally enclosed to prevent overspray damage to the ground, public and private property, any and all vegetation, streams, lakes, etc. This containment shall be accomplished with tarps, plywood or other shields. If brush is used, more than one coat may be necessary to produce the required thickness.

C. Application Approval. The beginning of the application of each of the three different coats shall be subject to inspection and approval to detect any defects which might result from the Contractor's methods. If defects are discovered, the Contractor shall make all necessary adjustments to his method of application to eliminate them before proceeding with coat application.

D. Temperature. Paint shall not be applied when the temperature of the air, steel, or paint is below 10° C (50° F). Paint shall not be applied when the steel surface temperature is expected to drop below 10^0 C (50° F) before the paint has cured for the minimum times specified below:

	10° C (50° F)	16° C (60° F)	21° C (70° F)
Primer	4 hrs.	3 hrs.	2 hrs.
Intermediate	6 hrs.	5 hrs.	4 hrs.
Finish	8 hrs.	6 hrs.	4 hrs.

The above temperatures and times shall be monitored with the recording thermometer.

A heated enclosure may be used. The heat within the enclosure may be supplied by any means which will maintain the required temperature continuously and uniformly in all parts of the enclosure. The heat will be supplied as required to maintain the required minimum temperature until the coating has cured.

If combustion type heating units are used, they will be vented away from the enclosure, and exhaust fumes will not be permitted to enter the enclosure. No open combustion of any kind will be permitted in the enclosure.

E. Moisture. Paint shall not be applied when the steel surface temperature is less than 3° C (5° F) above the dew point. Paint shall not be applied to wet or damp surfaces or on frosted or ice-coated surfaces. Paint shall not be applied when the relative humidity is greater than 85%. Paint shall not be applied during rain, fog or mist unless the above moisture criteria is met.

F. Repair Procedures. Damaged areas, and areas which do not comply with the requirements of this specification, shall have the paint removed and all defects corrected. The steel should then be retextured to a near white condition to produce a profile of between 40 to 90 μm (1.5 to 3.5 mils). This profile should be measured immediately prior to the application of the prime coat to insure that the profile is not destroyed during the feathering procedure.

The existing paint should be feathered to expose a minimum of 13 mm (½ inch) of each coat.

During the reapplication of the paint, care shall be used to insure that each paint coat is applied only within the following areas. The prime coat shall only be applied to the surface of the bare steel and the existing prime coat which has been exposed by feathering. The prime coat shall not be applied to the adjacent intermediate coat. The intermediate coat shall only be applied to the new prime coat and the existing feathered intermediate coat. The intermediate coat shall not be applied to the adjacent finish coat. The finish coat shall only be applied to the new intermediate coat and the existing finish coat which has been feathered or lightly sanded. The finish coat shall not extend beyond the areas which have been feathered or lightly sanded.

At the perimeter of the repair area, the first two coats shall be applied by brush. The finish coat shall be applied by either brush or spray.

It may be necessary to make several applications in order to achieve the proper thickness for each coat.

During the application of the prime coat, the paint shall be continuously mixed.

All surface preparation and painting shall still be done in accordance with the specifications. In lieu of abrasive blasting, alternate methods of surface preparation may be allowed.

All repairs shall be made in a manner to blend the patched area with the adjacent coating. The finished surface of the patched area shall have a smooth, even profile with the adjacent surface.

The Contractor shall submit his method of correcting runs in writing to the Director for approval.

G. Continuity. Each coat of paint shall be applied as a continuous film of uniform thickness free of all defects such as holidays, runs, sags, etc. All thin spots or areas missed shall be repainted and permitted to dry before the next coat of paint is applied.

H. Dry Film Thickness. Prime thickness, cumulative prime and intermediate thickness, and cumulative prime, intermediate and finish thickness shall be determined by use of Type 2 magnetic gage in accordance with the following:

Five separate spot measurements shall be made, spaced evenly over each 9 m^2 (100 square feet)of area to be measured. These measurements shall be taken on flanges, webs, cross bracing, stiffeners, etc. Three gage readings shall be made for each spot measurement of either the substrate or the paint. The probe shall be moved a distance of 25 to 75 mm (1 to 3 inches) for each new gage reading. Any unusually high or low gage reading that cannot be repeated consistently shall be discarded. The average (mean) of the 3 gage readings shall be used as the spot measurement. The average of five spot measurements for each such 9 m^2 (100 square foot) area shall not be less that the specified thickness. No single spot measurement in any 9 m^2 (100 square foot) area shall be less than 80% of the specified minimum thickness nor greater than 150% of the maximum specified thickness. Any one of 3 readings which are averaged to produce each spot measurement, may under run or overrun by a greater amount. The 5 spot measurements shall be made for each 9 m^2 (100 square feet) of area as follows:

1. For structures not exceeding 27 m^2 (300 square feet) in area, each 9 m^2 (100 square foot) area shall be measured.
2. For structures not exceeding 90 m^2 (1,000 square feet) in area, three 9 m^2 (100 square foot) areas shall be randomly selected and measured.
3. For structures exceeding 90 m^2 (1,000 square feet) in area, the first 90 m^2 (1,000 square feet) shall be measured as stated in section 2 and for each additional 90 m^2 (1,000 square feet), or increment thereof, one 9 m^2 (100 square foot) area shall be randomly selected and measured.

4. If the dry film thickness for any 9 m^2 (100 square foot) area (sections 2 & 3) is not in compliance with the requirements of paragraph 1 of this section, then each 9 m^2 (100 square foot) area shall be measured.

5. Other size areas or number of spot measurements as specified in the contract plans shall be measured.
Each coat of paint shall have the following thickness measured above the peaks:

	Min. Spec. Thickness	Max. Spec. Thickness	Min. Spot	Max. Spot
Prime	75 µm (3.0 mil)	125 µm (5.0 mil)	60 µm (2.4mil)	188 µm (7.5mil)
Intermediate	125 µm (5.0 mil)	175 µm (7.0 mil)	100 µm (4.0 mil)	263 µm (10.5 mil)
Sub Total	200 µm (8.0 mil)	300 µm (12.0 mil)	160 µm (6.4 mil)	450 µm (18.0 mil)
Finish	50 µm (2.0 mil)	100 µm (4.0 mil)	40 µm (1.6 mil)	150 µm (6.0 mil)
Total	250 µm (10.0 mil)	400 µm (16.0 mil)	200 µm (8.0 mil)	600 µm (24.0 mil)

Film thicknesses greater than the maximum specified thicknesses that do not exhibit defects (such as runs, sags, bubbles, mudcracking, etc.) and for which the Contractor has received a written statement from the coating manufacturer stating that this excessive thickness is not detrimental, may remain in place at the discretion of the Director.

For any spot or maximum average thickness over 600 µm (24 mils) it will be necessary for the Contractor to prove to the Department that the excess thickness will not be detrimental to the coating system. This shall be accomplished by providing the Director, for approval, certified test data proving that the excessive thickness will adequately bond to the steel when subjected to thermal expansion and contraction. This thermal expansion and contraction test shall take place over five 5 cycles of a temperature ranges from -29^0 C to 49 ^{0} C (-20 ^{0} F to 120 ^{0} F). After the thermal contraction and expansion cycles have taken place, the tested system shall be subjected to pull off tests and the results compared to the results of pull off tests which have been performed on a paint system with the proper thicknesses. In addition to the certified test results, it will also be necessary for the Contractor to provide the Director a written statement from the paint manufacturer stating that this excessive thickness is not detrimental.

If the Director does not approve the excessive coating thicknesses or the Contractor elects not to provide the required written statement from the paint manufacturer and the certified test results when required, the Contractor, at his own expense, shall remove and replace the coating. The removal and replacement of the coating shall be done as specified in 815.08 F Repair Procedures.

815.09 CAULKING QCP #7. The material shall be a two component, 100% solids epoxy and shall be one of the following:

MANUFACTURER

Mark 270 Poly-Carb Solon, OH 216-248-1223	KOP-COAT A-788 Splash Zone Compound Carboline Company Hamilton, OH 513-896-1919
Sikadur Injection Gel Sika Chemical Corp. Lyndhurst, N.J. 201-933-8801	OR Other Commercially Available, 100% Solid, Non-Sag, Non-Shrink Epoxy Based System Capable Of Filling Voids Up To 25 mm (1 inch) Wide

815.10 SAFETY REQUIREMENTS AND PRECAUTIONS. The Contractor shall meet the applicable safety requirements of the Ohio Industrial Commission and the Occupational Safety and Health Administration (OSHA), in addition to the scaffolding requirements specified below.

The Material Safety Data Sheets (MSDS) shall be provided at the preconstruction meeting for all paints, thinners and abrasives used on this project. No work shall start until the MSDS has been submitted.

815.11 INSPECTION ACCESS. In addition to the requirements of 105.11, the Contractor shall furnish, erect, and move scaffolding and other appropriate equipment, to permit the Inspector the opportunity to closely observe all affected surfaces. This opportunity shall be provided to the Inspector during all phases of the work and continue for a period of at least 10 working days after each structure has been completely painted.

When scaffolding, or the hangers attached to the scaffolding are supported by horizontal wire ropes, or when scaffolding is placed directly under the

surface to be painted, the following requirements shall be complied with:

A. When scaffolding is suspended 1092 mm (43 inches) or more below the surface to be painted, two guardrails shall be placed on all sides of the scaffolding. One guardrail shall be placed at 1067 mm (42 inches) above the scaffolding and the other guardrail at 508 mm (20 inches) above the scaffolding.

B. When the scaffolding is suspended at least 533 mm (21 inches) but less than 1092 mm (43 inches) below the surface to be painted, one guardrail shall be placed on all sides of the scaffolding at 508 mm (20 inches) above the scaffolding.

C. Two guardrails shall be placed on all sides of scaffolding not previously mentioned. The guardrails shall be placed at 1067 mm (42 inches) and 508 mm (20 inches) above scaffolding, as previously mentioned.

D. All scaffolding must be at least 610 mm (24 inches) wide when guardrail is used and 711 mm (28 inches) wide when the scaffolding is suspended less than 533 mm (21 inches) below the surface to be painted and guardrail is not used. If 2 or more scaffolding are laid parallel to achieve the proper width, they must be rigidly attached to each other to preclude any differential movement.

E. All guardrail shall be constructed as a substantial barrier which is securely fastened in place and is free from protruding objects such as nails, screws and bolts. There shall be an opening in the guardrail, properly located, to allow the Inspector access onto the scaffolding.

F. The rails and uprights shall be either metal or wood. If pipe railing is used, the railing shall have a nominal diameter of no less than 38 mm (1.5 inches). If structural steel railing is used, the rails shall be 50x50x9 mm (2x2x3/8 inch) steel angles or other metal shapes of equal or greater strength. If wood railing is used, the railing shall be 50x100 mm (2x4 inches) (nominal) stock. All uprights shall be spaced at no more than 2.4 m (8 feet) on center. If wood uprights are used, the uprights shall be 50x100 mm (2x4 inches) (nominal) stock.

G. When the surface to be inspected is more than 4.57 m (15 feet) above the ground or water, and the scaffolding is supported from the structure being painted, the Contractor shall provide the Inspector with a safety harness (not a safety belt) and lifeline. The lifeline shall not allow a fall greater than 1.8 m (6 feet). The Contractor shall provide a method of attaching the lifeline to the structure independent of the scaffolding, cables, or brackets supporting the scaffolding.

H. When scaffolding is more than 762 mm (2.5 feet) above the ground, the Contractor shall provide a ladder for access onto the scaffolding. The ladder and any equipment used to attach the ladder to the structure shall be capable of supporting 113 kg (250 pounds) with a safety factor of at least four. All rungs, steps, cleats, or treads shall have uniform spacing and shall not exceed 305 mm (12 inches) on center. At least one side rail shall extend at least 914 mm (36 inches) above the landing near the top of the ladder.

I. An additional landing shall be required when the distance from the ladder to the point where the scaffolding may be accessed, exceeds 305 mm (12 inches). The landing shall be a minimum of at least 610 mm (24 inches) wide and 610 mm (24 inches) long. It shall also be of adequate size and shape so that the distance from the landing to the point where the scaffolding is accessed does not exceed 305 mm (12 inches). The landing shall be rigid and firmly attached to the ladder; however, it shall not be supported by the ladder. The scaffolding shall be capable of supporting a minimum of 454 kg (1000 pounds).

J. In addition to the aforementioned requirements, the Contractor shall be responsible to observe and comply with all Federal, State and local laws, ordinances, regulations, orders and decrees.

K. The Contractor shall furnish all necessary traffic control to permit inspection during and after all phases of the project.

815.12 PROTECTION OF PERSONS AND PROPERTY. The Contractor shall collect, remove and dispose of all buckets, rags or other discarded materials and shall leave the job site in a clean condition.

The Contractor shall protect all portions of the structure, which are not to be painted, against damage or disfigurement by splashes, spatters, and smirches of paint. Deck bottoms and backwalls are exempt from this requirement.

When or where any direct or indirect damage or injury is done to public or private property, the Contractor shall restore, at his own expense, such property, to a condition similar or equal to that existing before such damage or injury was done.

815.13 POLLUTION CONTROL The Contractor shall take all necessary precautions to comply with pollution control laws, rules or regulations of Federal, State or local agencies and as required in this specification.

815.14 WORK LIMITATIONS. Abrasive blasting and painting shall be done between April 1 and October 31. Even though the Contractor is permitted to work prior to May 1, April is considered a winter month and no extension due to adverse weather conditions will be granted for this period. Additional work limitations on specific bridges/projects may be required by plan note.

815.15 METHOD OF MEASUREMENT. Field painting of structural steel is based on a square meter (square foot) pay item. All field painting will include 3 coats of paint; prime coat, intermediate coat, and finish coat.

On steel beam and steel girder bridges, the surface area is based on a nominal measurement of the beams; ie. 2 times the beam depth plus 3 times the flange width. In addition to this nominal measurement, a percentage is added to account for incidentals such as cross frames, bearing assemblies, stiffeners, expansion joints, scuppers, etc. Thus, it is not necessary for the Inspector to field measure every detail of the bridge to verify quantities. Some extremely complex bridges, such as trusses, will be paid for as lump sum. In the case of a quantity dispute, exact field measurements of all painted surfaces and/or calculations will govern.

Grinding fins, tears, slivers is based on the manhours expended only by the workmen who are actually doing the grinding and will include all the time when the workmen are performing grinding and repairing prime coat and not limited to the actual grinding duration (ie. all hours of the workmen when assigned to grinding regardless of actual grinding time).

Grinding of flange edges: This pay item includes all labor and equipment to grind the bottom flange edges denoted in the plans. Each meter (one linear foot) of beam represents 4 m (4 linear feet) of edge grinding.

Caulking: Includes all labor, materials and equipment to caulk areas described in the plans. Each meter (linear foot) of caulk (regardless of width or

thickness) shall be measured for payment.

Surface Preparation: This lump sum or m^2 (square feet) item includes all labor, materials and equipment necessary to: contain, collect, store, evaluate, ship, treat and dispose of all waste materials generated by this project and to prepare the surface as required by these specifications, prior to applying the prime coat.

815.16 BASIS OF PAYMENT. Payment for field painting will be made at the contract prices for:

Item	Unit	Description
815	Square meter (square foot), lump sum	Surface preparation of existing steel, System OZEU
815	Square meter (square foot), lump sum	Field painting of existing steel, prime coat, System OZEU
815	Square mete, (square foot), Lump sum	Field Painting of existing steel, Intermediate coat, System OZEU
815	Square meter (square foot), Lump sum	Field Painting of existing steel, Finish coat, System OZEU
815	Man Hour	Grinding Fins, Tears, Slivers
815	Meter (Linear foot)	Grinding Flange Edges
815	Meter (Linear foot)	Caulking

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 910
OZEU STRUCTURAL STEEL PAINT

July 28, 1998

910.01 Description. This specification covers the formulation and testing of a three coat structural steel paint system consisting of an organic zinc prime coat, an epoxy intermediate coat and a urethane finish coat (OZEU). Material requirements for the respective coats shall be as follows.

910.02 Organic Zinc Prime Coat. The organic zinc prime coat shall consist of a zinc dust filled, two or three-component epoxy polyamide, and selected additives as required:

A. Physical Requirements.

	Minimum
Total Solids, % by weight of paint, ASTM D 2369	70
Pigment, % by weight of total solids, ASTM D 2371	83
Total zinc dust, % by weight of pigment	93
Total zinc, % by weight, of total solids, by calculation	77
Total solids, % by volume, ASTM D 2697	45
Color, greenish gray, approximating FS-595B-34159, Visual comparison	
Pot Life at 25° C (77° F) and 50% Relative Humidity (R.H.), hours	6

By observation of Ford B cup viscosity, pot life is deemed exceeded if the viscosity rose more than 30% or if gelled particles appear in the mix. A one liter (quart) container of mixed material is used.

B. Qualitative Requirements.

Mixing shall conform to Section 5.2, SSPC-Paint 20 using only a high shear (Jiffy) mixer.
Storage life - Section 5.4, SSPC-Paint 20
Mudcracking - Section 5.7, SSPC-Paint 20

C. Material Quality Assurance : Analysis for each component.

1. Three-component systems.
   a. Resin

Nonvolatiles, % by weight	± 2
Density	± 0.02g/mL (± 0.2 lb. per gal.)
Viscosity	± 5 KU or ± 5 sec., Ford Cup

   b. Hardener

Nonvolatiles, % by weight	± 2
Density	± 0.02g/mL (± 0.2 lb. per gal.)
Viscosity	± 5 KU or ± 5 sec., Ford Cup

   c. Zinc

Total Zinc metal, % by weight	± 2

2. Two-component systems.
   a. Zinc/Resin Component

Total Zinc metal, % by weight	± 2
Density	± 2%
Viscosity	Dependent on test
Nonvolatiles, % by weight	± 2

   b. Hardener Component

	Variance*
Nonvolatiles, % by weight	± 2
Density	± 0.02g/mL (± 0.2 lb. per gal.)
Viscosity	± 5 KU or ± 5 sec., Ford Cup

* Variance within the mean of the tests of the previously submitted sample for qualification.

910.03 Epoxy Intermediate Coat. The epoxy intermediate coat shall be a two-part product composed of a base component and a curing agent suitable for application over the epoxy-polyamide zinc rich primer.

The base component shall contain an epoxy resin together with color pigments, mineral fillers, gellant, leveling agent, and volatile solvents. The curing agent component shall contain a liquid polyamide resin and volatile solvent. The coating shall also meet the following:

A. Physical Requirements

1. Color: White, meeting or exceeding, FS-595B-37875 as per ASTM E 1347
2. Components: Two, mixed prior to application
3. Volume solids, ASTM D 2697: 50.0% minimum

4. Pot life: 6 hours, minimum @ 25° C (77°F)
   By observation of Ford B cup viscosity, pot life is deemed exceeded if the viscosity rose more than 30% or if gelled particles appear in the mix. A one liter (quart) container of mixed material is used.
5. Curing Time:
   a. Set-to-touch, ASTM D 1640: 4 hours Maximum @ 25°C (77°F)
   b. Dry To recoat, ASTM D 1640: 24 hours Maximum @ 25°C (77°F)
   c. Full cure: 7 days @ 10°C (50°F), Maximum
      No pick-up when rubbed with a cloth soaked in Methyl Ethyl Ketone
6. Fineness of Grind, ASTM D 1210: Hegman 3 minimum
7. Volatile Organic Compounds, maximum, ASTM D 3960:
   0.419 g/mL (3.5 lbs./gal.), as applied.

B. Material Quality Assurance for each component.

TEST	VARIANCE*
Density	± 2%
Viscosity	Dependent on test
Total Solids, % by weight	± 2
Pigment, % by weight	± 2
Nonvolatile Vehicle, % by weight	± 2

*Variance shall be within the noted range based upon the test average of the previously submitted sample.

910.04 Urethane Finish Coat. The urethane finish coat shall be a two-component polyester and/or acrylic aliphatic urethane and shall be suitable for use as a finish coat over the white epoxy polyamide intermediate coat.

A. Physical Requirements.

1. Finish: Specular Gloss, 60 degree, ASTM D 523: 85% minimum;
   70% minimum after 3000 hours weathering resistance
2. Volume Solids, ASTM D 2697: 42% minimum
3. Cure (Dry) Time at 25°C (77°F) and 50% RH
   Set to touch ASTM D 1640: 30 Minutes, minimum
   4 Hours, maximum
4. Pot Life: 4 hours minimum at 25°C (77°F)
   By observation of Ford B cup viscosity, pot life is deemed exceeded if the viscosity rose more than 30% or if gelled particles appear in the mix. A one liter (quart) container of mixed material is used.
5. Volatile Organic Compounds, ASTM D 3960: maximum, 0.419 g/mL (3.5 lbs./gal.), as applied.
6. Colors**

Gray FS-595B - 16440 - Use for the gloss test
Green FS-595B - 14260
Blue FS-595B - 15450
**Contractor's choice unless specified on plans.

B. Material Quality Assurance: Analysis for each component.

TEST	VARIANCE*
Density	± 2%
Viscosity,	Dependent on test
Total Solids, by Weight	± 2%
Pigment, by Weight	± 2%
Nonvolatile Vehicle, by weight	± 2%

*Variance shall be within the noted range based upon the test average of the previously submitted sample.

910.05 Performance Requirements. The coating system, which consists of the organic zinc prime coat, the epoxy intermediate coat, and the urethane topcoat, shall be tested prior to use.

Three panels for each of the specified tests shall be prepared to the requirements of the ASTM D 609 except that the thickness shall be 3 mm (1/8 inch) minimum and the steel shall be ASTM A 36/A 36 M hot rolled steel. The surface shall be blast cleaned (using coal slag abrasive) to equal, as nearly as is practical, the standard Sa 2-1/2 of ASTM D 2200 (Steel Structures Painting Council SSPC-SP10 meets this requirement), and the surface shall have a nominal height of profile of 25 to 88 μm (1 to 3.5) mils verified by using appropriate replica tape. The panels shall be coated and permitted to cure in accordance with the manufacturer's printed instructions. The dry film coating thickness in the system to be tested shall be as follows:

Organic Zinc: 75 - 125 μm (3.0 - 5.0 Mils)
Epoxy: 125 - 175 μm (5.0 - 7.0 Mils)
Urethane: 50 - 100 μm (2.0 - 4.0 Mils)

The coating system shall pass each of the following tests:

A. Fresh water resistance test (ASTM D 870). The panels shall be scribed as per ASTM D 1654 to the depth of the base metal in the form of an "X" having at least 50 mm (2-inch) legs and then immersed in fresh tap water at 25 ± 3ºC (75 ± 5ºF). After 30 days of immersion, the panels shall show no rusting nor shall the coating show any blistering, softening or discoloration. Blistering shall be rated by ASTM D 714.

B. Salt water resistance test (ASTM D 870). The panel shall be scribed as specified in "A" above and then immersed in a water solution of 5 percent sodium chloride at 25 ±

3ºC (75 ± 5ºF). The panels shall show no rust nor shall the coating exhibit any blistering or softening after 7, 14, and 30 days. Blistering shall be rated by ASTM D 714. The sodium chloride solution shall be replaced with a fresh solution after examination at 7 and 14 days.

C. Weathering resistance test. The panels shall be tested in accordance with ASTM D 4587 Method D, utilizing Ultra Violet A 340 bulbs. The panels shall be placed on test at the beginning of a wet cycle. After 3000 hours continuous exposure, the coating shall show no blistering or loss of adhesion, nor shall the panels show any rusting. The 60 degree specular gloss measurements shall be performed on the sprayed panels utilized for this test. The three initial measurements (one per panel) will be average together. The three final measurements also will be averaged together.

D. Salt fog resistance test. The panels shall be scribed as specified in "A" above, and then tested in accordance with ASTM B 117. After 3000 hours of continuous exposure the coating shall show no loss of bond nor shall it show rusting or blistering beyond 2 mm (1/16 inch) form the center of the scribe mark. Blistering shall be rated by ASTM D 714.

E. Elcometer adhesion test, ASTM D 4541. The panels shall be tested in accordance with the following: lightly sand the coating surface and aluminum dolly and apply a quick set adhesive. Allow adhesive to cure overnight. Scribe the coating and adhesive around the dolly prior to testing. Make a minimum of four trials to failure and report the four trials. No trial shall be less than 2.8 Mpa (400 psi). Fracture at the primer-blast interface shall be caused for rejection.

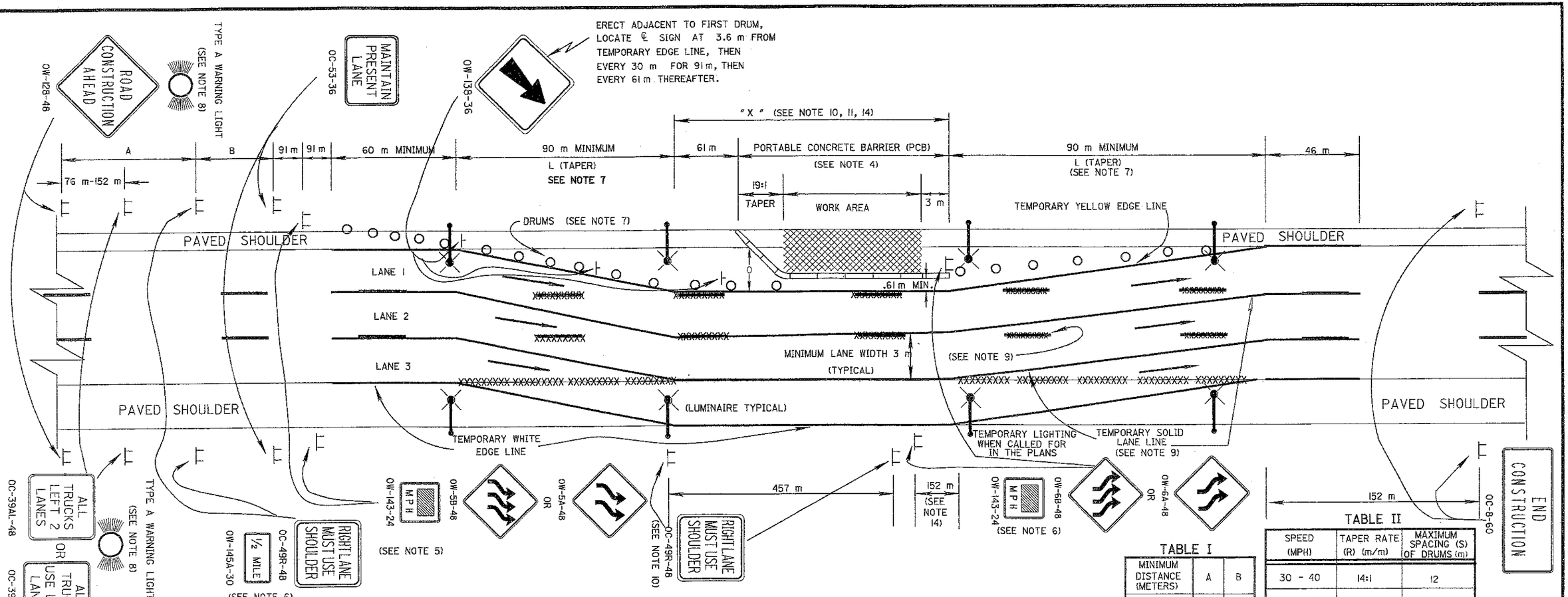
910.06 Prequalification. Prior to approval, copies of the manufacturer's certified test data showing that the coating system complies with the performance requirements of this specification shall be submitted to the Engineer of Tests, 1600 W. Broad St., Columbus, Ohio 44223. The certified test data shall also state the following physical properties for each coating: Density, g/mL (lbs. per gal.); Solids, % by weight; Solids, % by volume; Viscosity; Drying time; Volatile Organic Compounds content, g/mL (lb. per gallon).

The test data shall be developed by an independent testing laboratory approved by the Lab and shall include the brand name of the paint, name of manufacturer, number of lots tested, and date of manufacture.

The following items shall also be submitted to the Lab prior to approval: manufacturer's technical data sheet for each coating; material Safety Data Sheet for each coating; enough components to produce a 4 liter (one gallon) sample of each coating; and, a one liter (one quart) sample of the thinner to be used with each coating.

When the coating has been approved by the Director, further performance testing by the manufacturer will not be required unless the formulation or manufacturing process has been changed, in which case new certified test results will be required.

910.07 Sampling. Acceptance variances shall be established by the Laboratory.



GENERAL NOTES:

1. THE LOCATION OF THE TRANSITION TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THIS TRAFFIC CONTROL PLAN SHOULD BE USED WHEN THE WORK AREA EXTENDS INTO EITHER THE RIGHT OR LEFT HAND LANE OF A MULTIPLE LANE DIVIDED HIGHWAY AND IT IS NOT DESIRABLE, FOR CAPACITY REASONS, TO REDUCE THE NUMBER OF AVAILABLE LANES. THE MINIMUM RESULTANT WIDTH OF ANY LANE IS 3 m. THE PLAN SHOWN IS FOR A LEFT-LANE CLOSURE. WHEN THERE IS A RIGHT-LANE CLOSURE, MAKE THE FOLLOWING SIGN SUBSTITUTIONS: AN OC-49L FOR THE OC-49R: AN OC-39AR, FOR THE OC-39AL: AN OW-6A OR OW-6B FOR THE OW-5A OR OW-5B: AND AN OW-5A OR OW-5B, FOR THE OW-6A OR OW-6B.

4. PORTABLE CONCRETE BARRIER (PCB) AS DESCRIBED IN STANDARD CONSTRUCTION DRAWINGS SHALL BE USED FOR THIS WORK PROTECTION PLAN. THE TAPER RATE FOR THE BARRIER APPROACH TAPER SHOULD BE 20 TO 1. WHEN USED TO PROTECT WORK AREAS AT LANE CLOSURES ON MULTI-LANE ROADWAYS. PCB'S SHOULD BE PRECEEDED BY CHANNELIZING DEVICES TO DIRECT TRAFFIC FROM THE CLOSED LANE AT LEAST 91 m PRIOR TO THE BEGINNING OF THE PCB.

   PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS AT 7.6 m C-C (MAX.) ALTERNATED WITH TOP MOUNTED OBJECT MARKERS (229 X 381 mm) AT 7.6 m C-C (MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS AT 7.6 m C-C VERTICAL ORANGE REFLECTORIZED STRIPES ON PADDLES (51 X 305 mm) AT 3.8 m C-C (MAX.)
1270 mm HIGH	BARRIER REFLECTORS AT 3.8 m C-C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 X 381 mm) TOP MOUNTED AT EACH END

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

6. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE PAVEMENT TAPER (L). DISTANCES LESS THAN 1 MILE MAY BE EXPRESSED IN FEET.

7. THE TAPER RATE OF DRUMS SHALL BE BASED UPON THE AVERAGE APPROACH SPEED OR SPEED LIMIT WHICHEVER IS GREATER AND SHALL BE (R) AS SHOWN IN TABLE II. EXECPT THAT THE RESULTING LENGTH OF TAPER SHOULD NOT BE LESS THAN 90 m, THE TAPER (L) SHALL EQUAL THE TAPER RATE (R) MULTIPLIED BY THE OFFSET (O). A MINIMUM OF FIVE CHANNELIZING DEVICES SHALL BE USED TO FORM THE TAPER ON THE SHOULDER.

8. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON OW-128 SIGNS, AND OC-39AL SIGNS ARE REQUIRED.

9. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPM'S) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY LINES SHALL BE APPLIED. TEMPORARY LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE-C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, TEMPORARY MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10 AND THE ORGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

10. THE MAXIMUM SPACING OF THE OC-49R, NEAR THE WORK AREA IS 457 m. WHEN THE DISTANCE "X" IS LESS THAN 518 m. THE SECOND OC-49R SHOULD BE DELETED. ALSO IF IT WOULD BE WITHIN 61 m OF THE OW-6A OR OW-6B SIGN THE OC-49R SIGN SHOULD BE DELETED.

11. LIGHTING POLES NOT LOCATED BEHIND EXISTING GUARDRAIL SHALL BE SET BACK 12.0 m FROM EDGE OF THE NEAREST TRAFFIC LANE (INCLUDING ANY SHOULDER OR TEMPORARY PAVEMENT USED AS A TRAFFIC LANE). WHERE LOCAL CONDITIONS PREVENT THE 12.0 m SET BACK, IT MAY BE REDUCED TO 9.0 m WITH THE APPROVAL OF THE ENGINEER. WHEN LOCATED BEHIND EXISTING GUARDRAIL, LIGHT POLES SHALL BE A MINIMUM OF .9 m CLEAR FROM BACK OF GUARDRAIL POST TO FACE OF POLE. ANY POLES PROVIDED FOR POWER SERVICE SHALL BE SET BACK AT LEAST AS FAR AS THE LIGHTING POLES. SPACING AND TYPE OF LUMINAIRES SHALL PROVIDE AN AVERAGE ILLUMINATION OF 10.8 lux TO 12.9 lux WITH MAXIMUM UNIFORMITY RATIOS OF 4:1 AVERAGE TO MINIMUM AND 10:1 MAXIMUM TO MINIMUM THROUGHOUT THE LIGHTED AREA. WHEN TAPERS ARE REQUIRED TO BE LIGHTED AND DIMENSION "X" IS LESS THAN 610 m LIGHTING SHALL BE CONTINUOUS BETWEEN TAPERS.

12. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

13. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

14. IF DISTANCE "X" IS LESS THAN 305 m, PLACE THE OW-6A OR OW-6B SIGN AT THE MID POINT OF DISTANCE "X".

TABLE I

MINIMUM DISTANCE (METERS)	A	B
MAJOR STANDARD	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488

TABLE II

SPEED (MPH)	TAPER RATE (R) (m/m)	MAXIMUM SPACING (S) OF DRUMS (m)
30 - 40	14:1	12
45 - 55	28:1	12
60 - 65	33:1	18

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

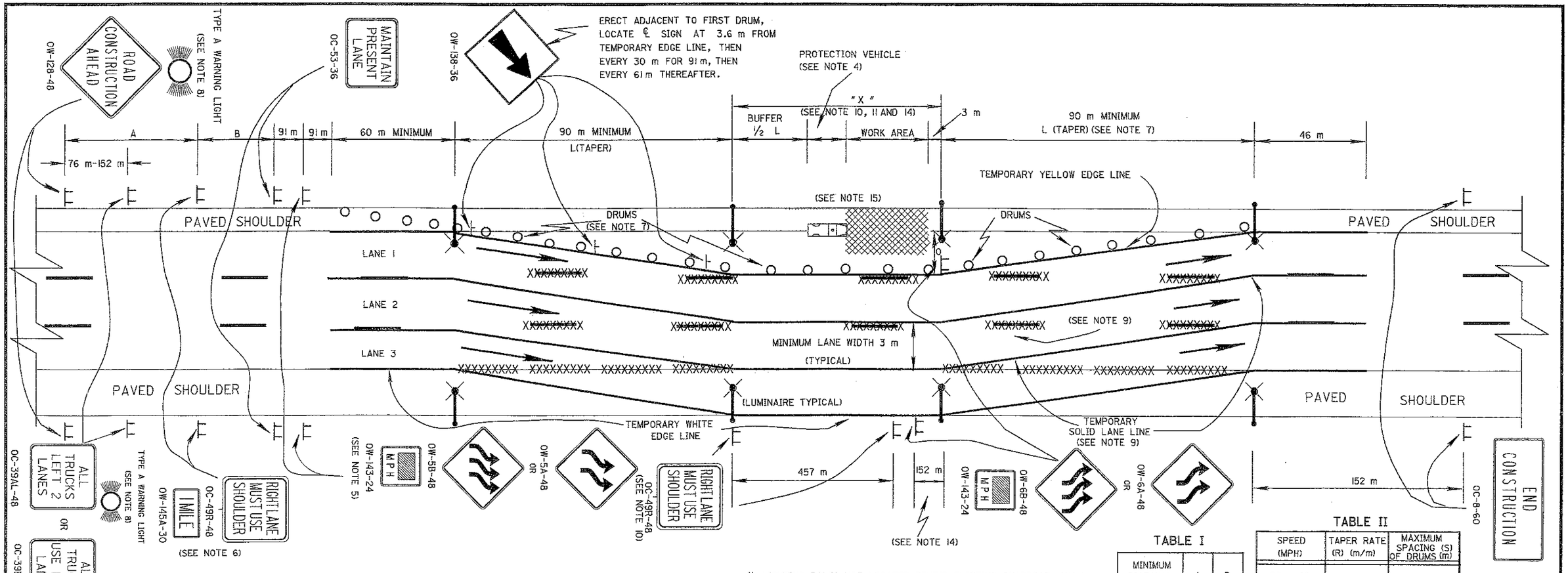
DATE 01/30/95

TRANSITION PLAN FOR USE OF SHOULDER WITH PCB

STANDARD CONSTRUCTION DRAWING MT-102.10M

APPROVED Lloyd Cuzzo ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. THE LOCATION OF THE TRANSITION TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THIS TRAFFIC CONTROL PLAN SHOULD BE USED WHEN THE WORK AREA EXTENDS INTO EITHER THE RIGHT OR LEFT HAND LANE OF A MULTIPLE LANE DIVIDED HIGHWAY AND IT IS NOT DESIRABLE, FOR CAPACITY REASONS, TO REDUCE THE NUMBER OF AVAILABLE LANES. THE MINIMUM RESULTANT WIDTH OF ANY LANE IS 3 m. THE PLAN SHOWN IS FOR A LEFT-LANE CLOSURE. WHEN THERE IS A RIGHT-LANE CLOSURE, MAKE THE FOLLOWING SIGN SUBSTITUTIONS: AN OC-49L, FOR THE OC-49R: AN OC-39AR, FOR THE OC-39AL: AN OW-6A OR OW-6B FOR THE OW-5A OR OW-5B: AND AN OW-5A OR OW-5B FOR THE OW-6A OR OW-6B.

4. 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 VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 400 m.

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

6. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE PAVEMENT TAPER (L). DISTANCES LESS THAN 1 MILE MAY BE EXPRESSED IN FEET.

7. THE TAPER RATE OF DRUMS SHALL BE BASED UPON THE AVERAGE APPROACH SPEED OR SPEED LIMIT WHICHEVER IS GREATER AND SHALL BE (R) AS SHOWN IN TABLE II. EXCEPT THAT THE RESULTING LENGTH OF TAPER SHOULD NOT BE LESS THAN 90 m MIN. THE TAPER (L) SHALL EQUAL THE TAPER RATE (R) MULTIPLIED BY THE OFFSET (O). A MINIMUM OF FIVE CHANNELIZING DEVICES SHALL BE USED TO FORM TAPER ON THE SHOULDER.

8. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON OW-128 SIGNS AND OC-39AL SIGNS ARE REQUIRED.

9. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPM'S) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY LINES SHALL BE APPLIED. TEMPORARY LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE-C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, TEMPORARY MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10 AND THE ORGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED.

10. THE MAXIMUM SPACING OF THE OC-49R, NEAR THE WORK AREA IS 457 m. WHEN THE DISTANCE "X" IS LESS THAN 518 m THE SECOND OC-49R SHOULD BE DELETED. ALSO IF IT WOULD BE WITHIN 61 m OF THE OW-6A OR OW-6B SIGN THE OC-49R SIGN SHOULD BE DELETED.

11. LIGHTING POLES NOT LOCATED BEHIND EXISTING GUARDRAIL SHALL BE SET BACK 12.0 m FROM EDGE OF THE NEAREST TRAFFIC LANE (INCLUDING ANY SHOULDER OR TEMPORARY PAVEMENT USED AS A TRAFFIC LANE). WHERE LOCAL CONDITIONS PREVENT THE 12.0 m SET BACK, IT MAY BE REDUCED TO 9.0 m WITH THE APPROVAL OF THE ENGINEER. WHEN LOCATED BEHIND EXISTING GUARDRAIL, LIGHT POLES SHALL BE A MINIMUM OF .9 m CLEAR FROM BACK OF GUARDRAIL POST TO FACE OF POLE. ANY POLES PROVIDED FOR POWER SERVICE SHALL BE SET BACK AT LEAST AS FAR AS THE LIGHTING POLES. SPACING AND TYPE OF LUMINAIRES SHALL PROVIDE AN AVERAGE ILLUMINATION OF 10.8 lux TO 12.9 lux WITH MAXIMUM UNIFORMITY RATIOS OF 4:1 AVERAGE TO MINIMUM AND 10:1 MAXIMUM TO MINIMUM THROUGHOUT THE LIGHTED AREA. WHEN TAPERS ARE REQUIRED TO BE LIGHTED AND DIMENSION "X" IS LESS THAN 610 m LIGHTING SHALL BE CONTINUOUS BETWEEN TAPERS.

12. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

13. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

14. IF DISTANCE "X" IS LESS THAN 305 m, PLACE THE OW-6A OR OW-6B SIGN AT THE MID POINT OF DISTANCE "X".

15. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	A	B
MAJOR STANDARD	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488

TABLE II

SPEED (MPH)	TAPER RATE (R) (m/m)	MAXIMUM SPACING (S) OF DRUMS (m)
30 - 40	14:1	12
45 - 55	28:1	12
60 - 65	33:1	18

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE 01/30/95

TRANSITION PLAN FOR USE OF SHOULDER WITH DRUMS

STANDARD CONSTRUCTION DRAWING **MT-102.20M**

APPROVED Lloyd Cressy ENGR. OF DESIGN SERVICES

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 0.6 m BEHIND FACE OF CURB.

   c) UNCURBED ROADWAY- 3.7 m FROM EDGE OF TRAFFIC LANE OR 1.8 m FROM EDGE OF PAVED OR USEABLE SHOULDER, WHICHEVER IS GREATER.

   d) BEHIND GUARDRAIL OR BARRIER - PREFERABLY 0.6 m BEHIND FACE OF GUARDRAIL (MINIMUM 0.3 m) FOR SIGNS ON CLASS A SUPPORTS: 1.2 m FOR CLASS B OR C SUPPORTS: 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 - 1.5 m WHEN PARKED CARS, CONSTRUCTION EQUIPMENT, ETC WILL NOT OBSCURE SIGN VISIBILITY.

   b) RURAL AREAS WITH PARKED CARS OR CONSTRUCTION EQUIPMENT - 2.1 m

   c) URBAN - 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 122 m TO 183 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 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 SHALL BE USED FOR EXPOSED LOCATIONS ON HIGHWAYS WHERE TRAFFIC APPROACH SPEEDS OF LESS THAN 40 MPH ARE ENCOUNTERED. THEY ARE ALSO SUITABLE FOR USE IN ALL APPLICATIONS DEFINED FOR CLASS C SUPPORTS.

3) CLASS C:

SUPPORTS MAY ONLY BE USED WHERE FULLY PROTECTED BY GUARDRAIL, CONCRETE BARRIER AND IN LOCATIONS POSITIVELY PROTECTED FROM TRAFFIC SUCH AS ON RETAINING WALLS OR WHERE TRAFFIC APPROACH SPEEDS ARE LESS THAN 25 MPH.

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 9 m FROM EDGE OF PAVEMENT	WITHIN 9 m FROM EDGE OF PAVEMENT
40 AND HIGHER	A, B OR C	A OR B	A OR B **	A ONLY
26 TO 39	A, B OR C	A OR B	A OR B	A OR B
0 TO 25	A, B OR C	A, B OR C	A, B OR C	A, B OR C

* IF SUPPORTS ARE BEHIND GUARDRAIL BUT NOT FULLY 1.7 m BEHIND FACE OF RAIL OR IF SIGN IS NOT 0.3 m BEHIND FACE OF CONCRETE BARRIER.

** 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 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 0.3 m DEEP BY 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.

CLASS A SUPPORTS

FIXED SUPPORTS

1) ALL #2 AND #3 POST WHEN INSTALLED SINGLY OR IN PAIRS (SIDE BY SIDE) ACCORDING TO THE DETAILS OF TC-41.20M. THE NUMBER OF SUPPORTS SHALL BE AS SHOWN ON TC-52.10M AND TC-52.20M.

2) THE FOLLOWING POST TYPES, WHEN INSTALLED SINGLY, BY IMBEDMENT OR DRIVING INTO EARTH TO A DEPTH OF ABOUT 1.1 m.

   a) - UP TO 102 X 102 mm WOOD.

   b) - UP TO 51 mm DIAMETER SCHEDULE 40 STEEL PIPE.

   c) - UP TO 76 mm DIAMETER SCHEDULE 40 ALUMINUM PIPE.

   d) - UP TO 56.4 mm SQUARE, 12 GAUGE WALL, PUNCHED STEEL POST.

   e) - UP TO 152 X 203 mm WOOD WITH BREAKAWAY HOLES SHOWN BELOW.

3) THE FOLLOWING POST TYPES WHEN INSTALLED IN PAIRS (SIDE BY SIDE) WITH LESS THAN 2 m BETWEEN POSTS, BY IMBEDMENT OR DRIVING INTO EARTH TO A DEPTH OF ABOUT 1.1 m :

   a) - UP TO 102 X 102 mm WOOD.

   b) - UP TO 51mm DIAMETER SCHEDULE 40 STEEL PIPE.

   c) - UP TO 76 mm DIAMETER SCHEDULE 40 ALUMINUM PIPE.

   d) - UP TO 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-41.10M WITH A MINIMUM CLEAR DISTANCE BETWEEN SUPPORTS OF 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-105.11M)

METRIC

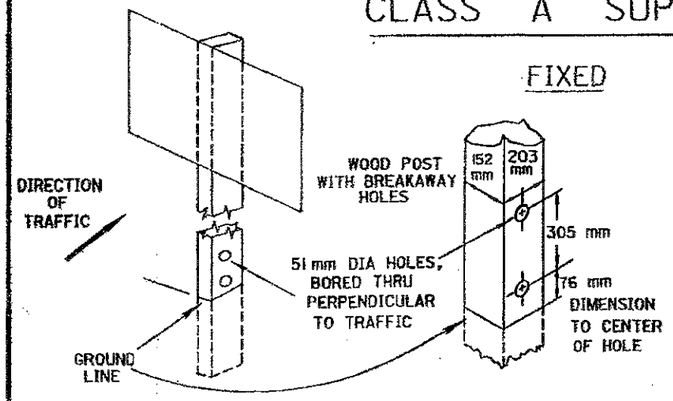
BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

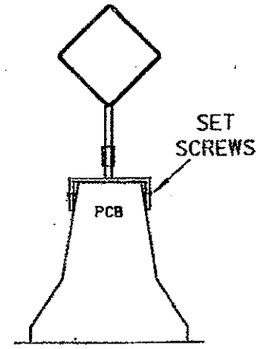
MAINTENANCE OF TRAFFIC	DATE 04/25/94
TEMPORARY SIGN SUPPORT	
STANDARD CONSTRUCTION DRAWING MT-105.10M	
APPROVED Jay Braga ENGR. OF DESIGN SERVICES	

WCC

CLASS A SUPPORTS

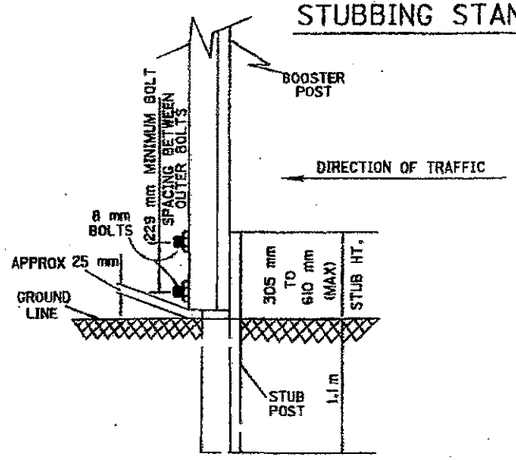
FIXED





CLASS A SUPPORTS

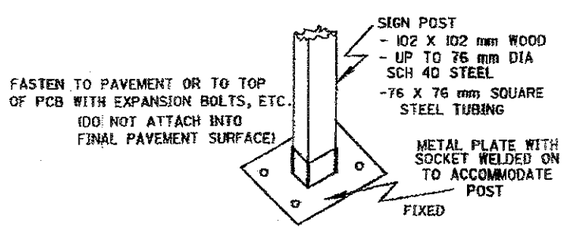
STUBBING STANDARD

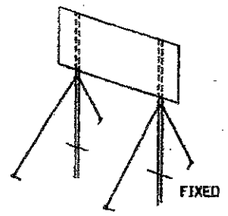


NOTES

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 1.5 kg/m LESS THAN STUB POST

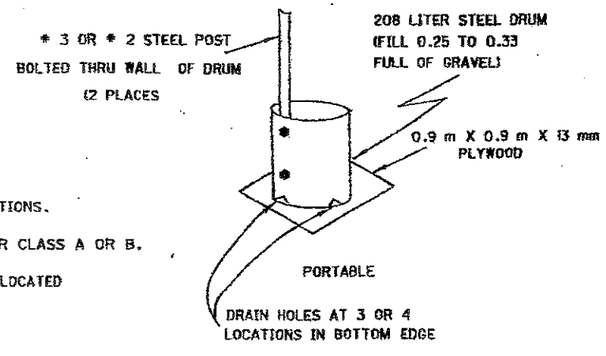
CLASS B SUPPORTS





ANY CLASS A SIGN POST WITH GUY WIRES ADDED TO INCREASE SIGN CARRYING ABILITY. (GUY WIRES SHALL NOT BE HEAVIER THAN 3.2 mm DIA. BRAIDED CABLE. GUY ANCHORS SHALL NOT EXTEND MORE THAN 152 mm ABOVE GROUND SURFACE).

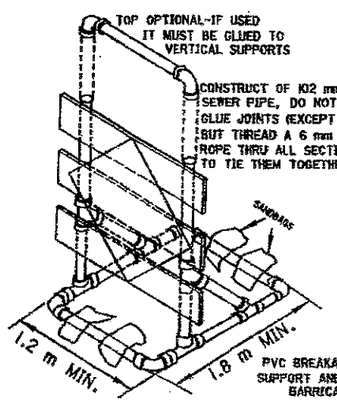
CLASS C SUPPORTS

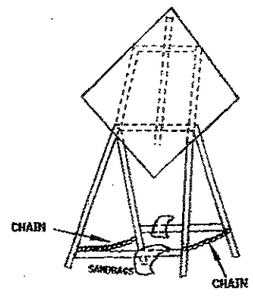


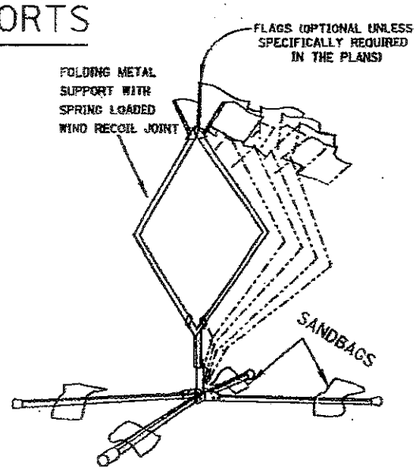
1. ALL BEAM TYPE SUPPORTS WITHOUT BREAKAWAY CONNECTIONS.
2. SUPPORTS SIMILAR TO BUT LARGER THAN PERMITTED FOR CLASS A OR B.
3. THE STEEL DRUM(S) SHOWN BELOW MAY BE USED ONLY WHEN LOCATED BEHIND GUARDRAIL OR BARRIER.

CLASS A SUPPORTS

PORTABLE







NOTES

RAIL MATERIALS:

25 X 203 mm OR 51 X 203 mm COMMON LUMBER
203 mm X (16 mm TO 25 mm) THICK EXTERIOR PLYWOOD
EXTRUDED PLASTIC OR FORMED SHEET METAL WITH A 203 mm WIDE SURFACE AND OF SUFFICENT STIFFNESS TO RESIST TYPICAL WIND LOADS OF UP TO 147 kg/m², BUT HAVING A WEIGHT OF NOT MORE THAN 7.5 kg/m.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE 04/25/94

TEMPORARY SIGN SUPPORT

STANDARD CONSTRUCTION DRAWING MT-105.11M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC

(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					
	< 0.6 m DROPOFF	0.6 m - 1.5 m DROPOFF	> 1.5 m DROPOFF	DIRT/MUD SPLASHED	EQUIPMENT WHICH MOVES OR HAS EXPOSED MOVING PARTS	OPERATION WHICH THROWS STONE/ETC.
< 1.5 m	A-H	E-H	F-G	G	G-H	G ①
1.5 m - 3.0 m	A-H	E-H	E-H	G	E-H	G ①
> 3.0 m - 9.0 m	A-H	C-H	E-H	N/A	D-H	G ①
> 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 0.7 m HIGH AND SPACED AT 1.5 m INTERVALS.

B. DRUMS TO DELINEATE PEDESTRIAN WALKWAYS SHALL BE SPACED AT 1.5 m INTERVALS.

C. MARKER TAPE SHALL BE BRIGHT FLUORESCENT ORANGE APPROXIMATELY 75 mm WIDE. ATTACHMENT TO DRUMS/CONES SHALL BE STRONG AND WATERPROOF.

D. WOOD RAILING SHALL BE A MINIMUM OF A 51 mm X 102 mm RAIL AT 813 mm ABOVE GROUND. IT SHALL BE SECURED TO 51 mm X 102 mm POSTS AT NOT MORE THAN 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:

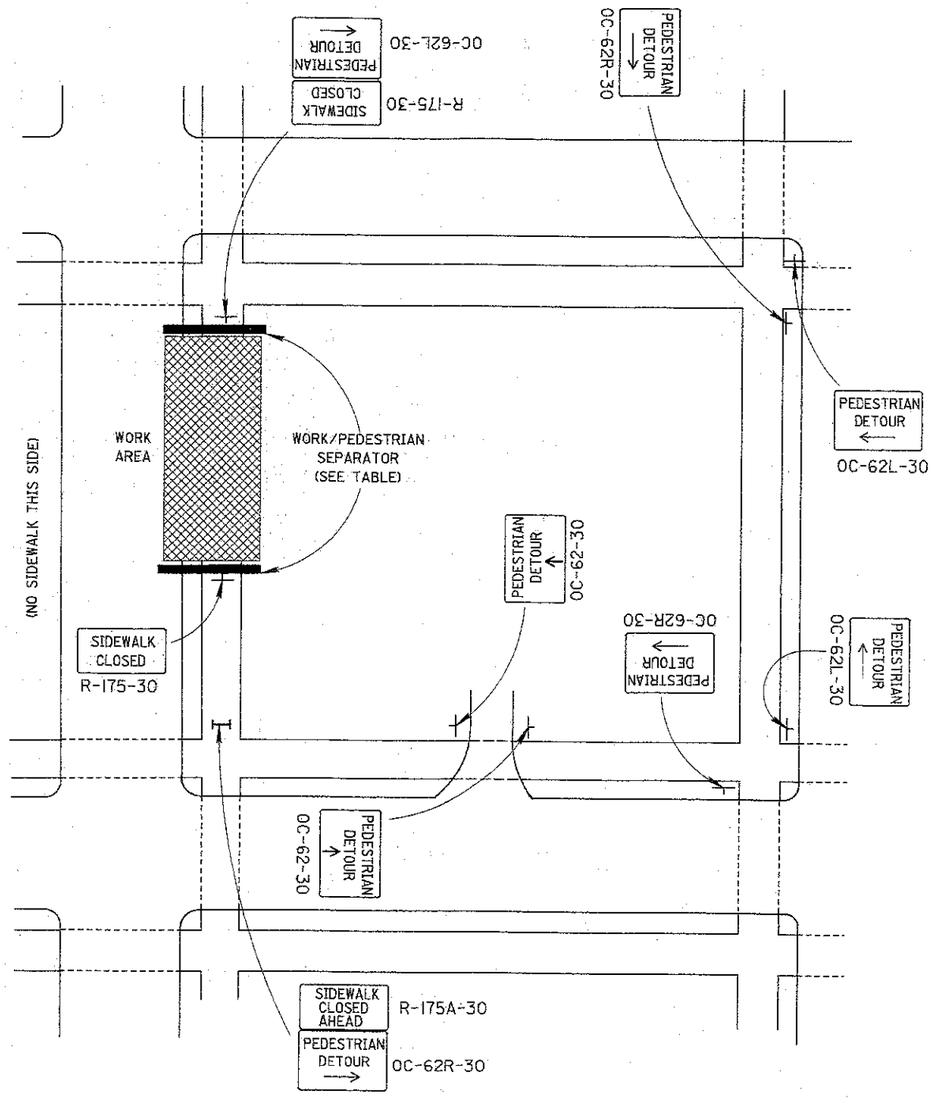
1) A HORIZONTAL TRANSVERSE LOAD OF 45 kg AT EACH POST TOP.
2) A VERTICAL LOAD OF 113 kg AT MIDPOINT BETWEEN EACH POST.

E. WOOD SNOW FENCE SHALL BE NOMINALLY 1067 mm HIGH, SECURELY SUPPORTED BY WOOD OR STEEL POSTS AT 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 1.8 m SPACING. IT SHALL BE NOMINALLY 1067 mm HIGH AND THE TOP EDGE SHALL NOT SAG BELOW 762 mm (305 mm SAG). EITHER OF THE FENCE SECTIONS WITH EXTENSIVE BROKEN SLATS OR HOLES GREATER THAN 305 mm X 305 mm SHALL BE REPAIRED OR REPLACED.

F. CHAIN LINK FENCE, TYPE CLT SHALL CONFORM TO 607 AND APPROPRIATE DETAILS ON STANDARD DRAWINGS F-1M, F-3M AND F-4M, EXCEPT THAT MATERIALS NEED NOT BE NEW NOR SHALL CERTIFICATION AND TESTS BE REQUIRED.

G. PLYWOOD WALLS SHALL BE A MINIMUM OF 16 mm EXTERIOR PLYWOOD, SUPPORTED BY 51 mm X 102 mm OR HEAVIER FRAMING SECURELY ANCHORED AND BUTTRESSED TO RESIST WIND LOAD AND/OR PERSONS. THEY SHALL BE DESIGNED FOR A MINIMUM WIND LOADING OF 138 kPa (OR LARGER IF LOCAL CODES REQUIRE). HEIGHT OF THE WORK/PEDESTRIAN SEPARATORS SHALL NOT BE LESS THAN 2.1 m ABOVE THE WALKWAY.

H. 813 mm PORTABLE CONCRETE BARRIER AS PER 622.



⊢--TYPE II BARRICADE WITH SIGN
(SEE NOTE 6)

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 2.1 m VERTICAL CLEARANCE. SIGNS MOUNTED ON BARRICADES OR SEPARATORS SHALL HAVE A MINIMUM 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. AT NIGHT, TEMPORARY LIGHTING SHALL BE PROVIDED FOR SEPARATORS AND PEDESTRIAN DETOUR SIGNS WHICH ARE NOT OTHERWISE LIGHTED ADEQUATELY. ILLUMINATION SHALL PROVIDE A MINIMUM OF 13.0 LUX ON TEMPORARY WALKWAYS. ILLUMINATION FIXTURES MAY CONSIST OF FLOODLIGHTS OR OTHER PROTECTED FIXTURES MOUNTED AT LEAST 3.0 m ABOVE GROUND AND CONTROLLED BY PHOTOCELLS. ILLUMINATION SUPPORTS MAY BE STANDARD HIGHWAY LIGHTING POLES, 102 mm X 102 mm WOOD POST OR OTHER SUPPORT APPROVED BY THE ENGINEER.

5. 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.

6. MOUNT ON TYPE II BARRICADE AND PLACE NOT TO BLOCK MORE THAN ONE-HALF THE SIDEWALK.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

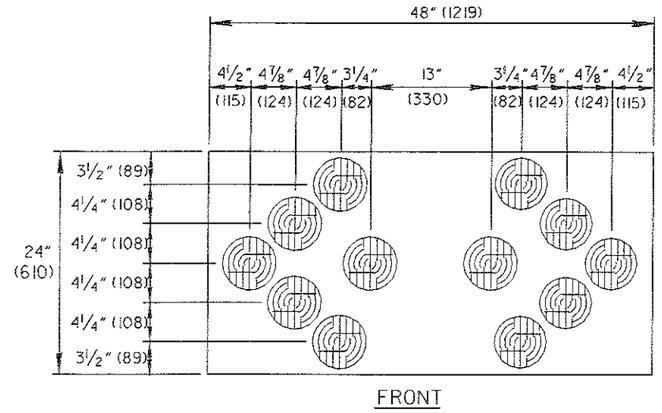
DETOUR OF PEDESTRIANS TO ANOTHER FACILITY

DATE 03/01/96

STANDARD CONSTRUCTION DRAWING MT-110.30M

APPROVED _____ ADMINISTRATOR

metric units



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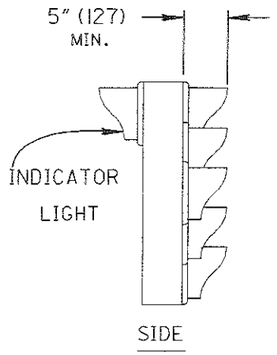
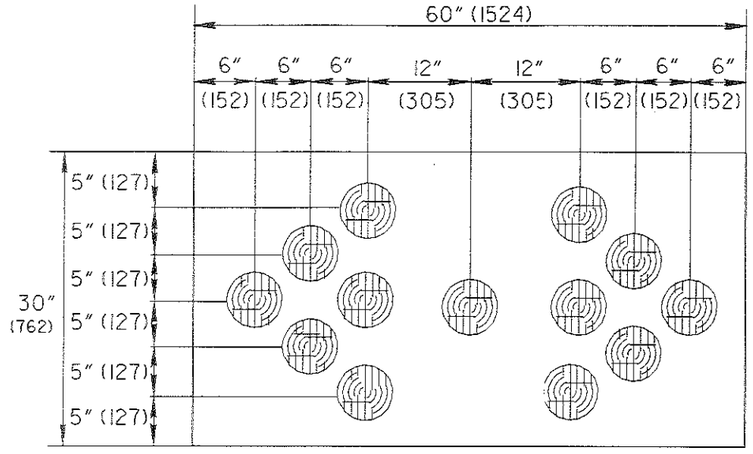


SIDE

TYPE A PANEL



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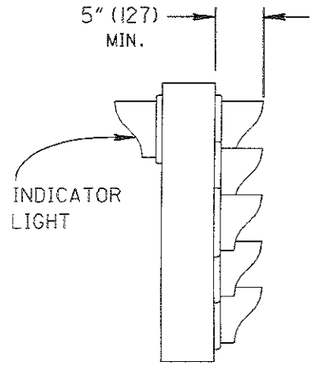
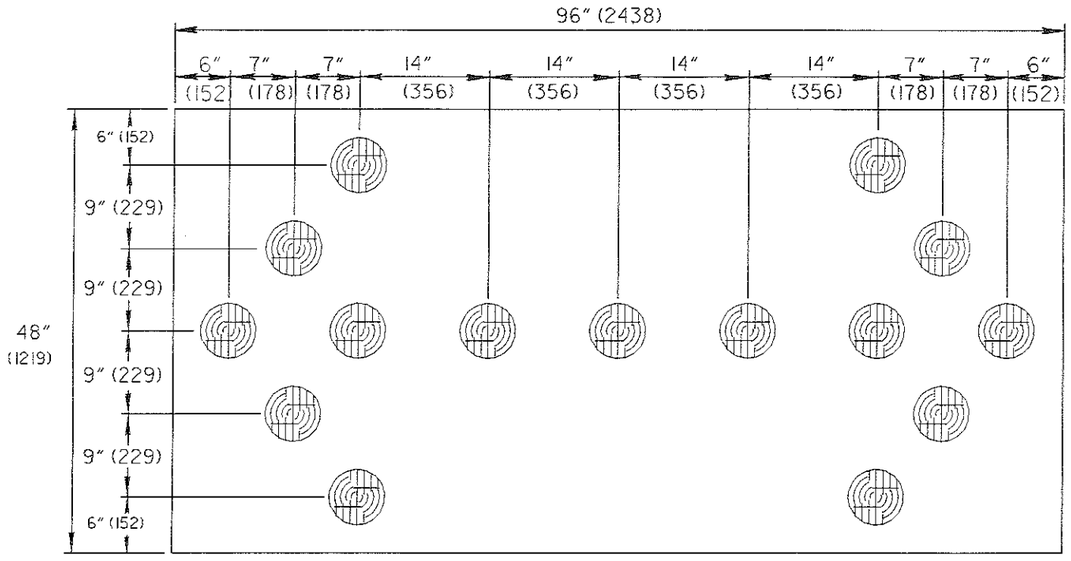


SIDE

TYPE B PANEL



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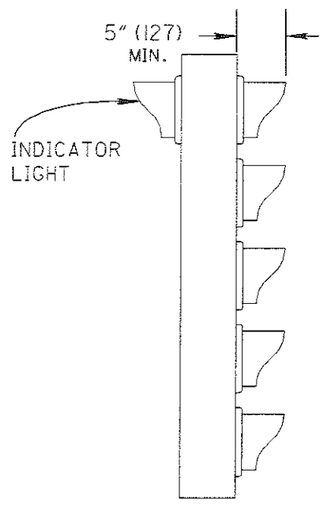


SIDE

TYPE C PANEL

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

4-20-01

FLASHING ARROW PANEL

OFFICE OF TRAFFIC ENGINEERING

MT-35.10

FLASHING ARROW PANEL

The flashing arrow panel shall consist of the following components:

A. flasher panel

B. lamps

C. controls

D. power supply

E. mounting

A. Flasher panel

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

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

Flashing arrow panels shall normally utilize high output (4412A and 4415A) lamps powered by an engine driven generator when permitted by the plans. The contractor may also furnish units powered by a solar array and batteries or only batteries. However, these units shall not be used where the approaching traffic would be on a horizontal curve in excess of 3 degrees. These units shall not be used if the approaching traffic, closer tha 1 mile (1.6 km) [1/2 mile (.8 km) where speed limits are less than 40 MPH], is more than 5½ degrees horizontally or 2 degrees vertically from the central axis of the lens units.

B. Lamps

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

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

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

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

CANDLE POWER CHART

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

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

Figure 1

C. Controls

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

1. Flasher control

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

2. Dimmer control

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

D. Power supply

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

D. Cont.

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

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

E. Mounting

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

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

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

Use and operation

The flashing arrow panel shall be located as shown in the maintainence of traffic drawings or as directed by the Engineer and operated continuously during traffic maintained periods. The Contractor shall supply all fuel, lubricants and parts necessary to obtain continuous operation and shall provide all service. The Contractor shall inspect the operation of the unit daily, including weekends and holidays. The Contractor shall arrange with the Engineer, an acceptable method of obtaining service for a malfunctioning panel within 30 minutes of a reported malfunction. Lamp intensity shall be adjusted to provide minimum legibility distances of ½ mile (.8 km) type A, ¾ mile (1.21 km) type B and 1 mile (1.6 km) type C.

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

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

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

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

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

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

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

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

JAM

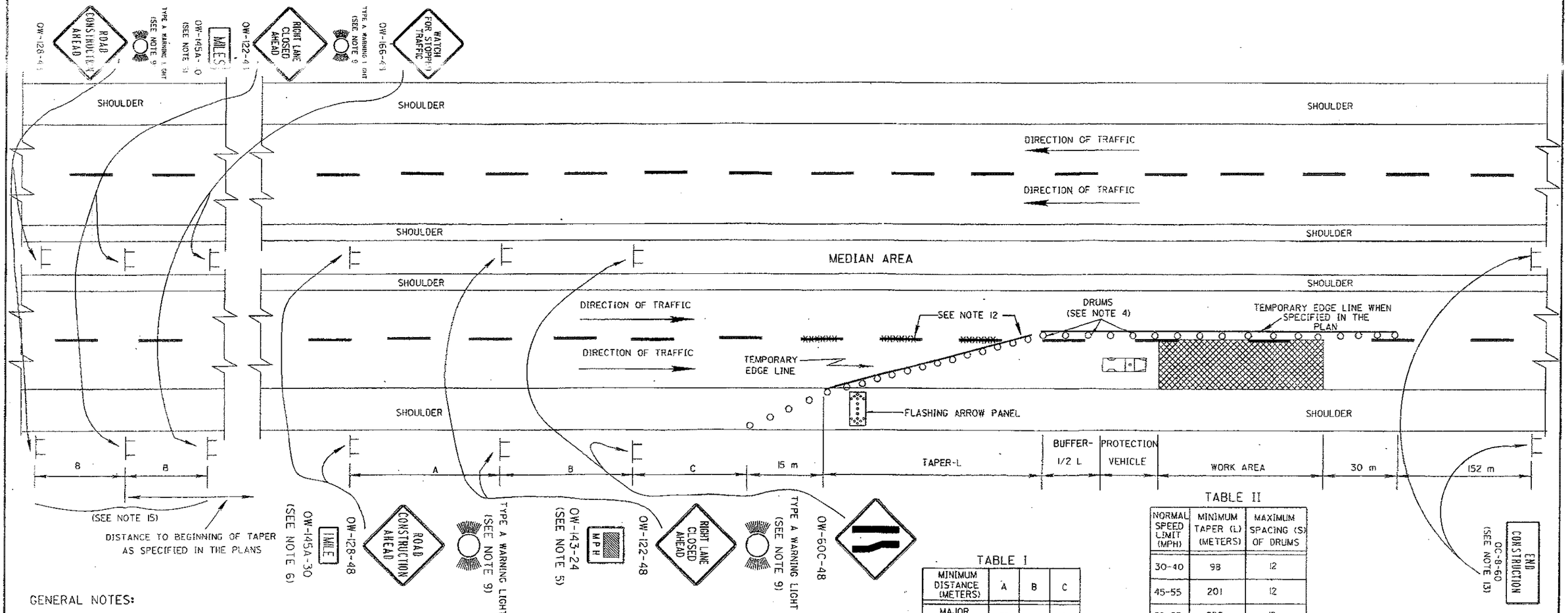


TABLE I

MINIMUM DISTANCE (METERS)	A	B	C
MAJOR STANDARD	152	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

TABLE II

NORMAL SPEED LIMIT (MPH)	MINIMUM TAPER (L) (METERS)	MAXIMUM SPACING (S) OF DRUMS
30-40	98	12
45-55	201	12
60-65	238	18

GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61m CLEARANCE TO EXISTING SIGNS.

3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE II. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER, THE BUFFER AREA AND FOR THE FIRST 305 m OF THE WORK AREA AND AT OTHER HAZARDOUS LOCATIONS AS DIRECTED BY THE ENGINEER. THE MAXIMUM DRUM SPACING FOR THE BALANCE OF THE WORK AREA IS TO BE TWO TIMES THE SPACING (S) IN TABLE II. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER.

4. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

6. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE MERGING TAPER (L). DISTANCES LESS THAN ONE MILE MAY BE EXPRESSED IN FEET. THE PLAQUE MAY BE OMITTED IF EXTRA ADVANCE SIGN GROUPS ARE NOT USED.

7. THE PROTECTION VEHICLE, LOCATED CLOSE TO THE WORK, SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

8. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

9. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-122 - (123) SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY

10. WHEN WORK IS BEING PERFORMED IN THE LANE ADJACENT TO THE MEDIAN ON A DIVIDED HIGHWAY, OW-123 SIGNS SHALL BE SUBSTITUTED FOR THE OW-122 SIGNS AND OW-60D SIGNS SHALL BE SUBSTITUTED FOR THE OW-60C SIGNS.

11. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

12. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS

12. CONT. THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

13. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

14. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMPS AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ON EACH SIDE ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

15. EXTRA ADVANCE WARNING SIGN GROUPS CONSISTING OF OW-128, OW-122 AND OW-166 SIGNS PLUS DISTANCE PLATES MAY BE SPECIFIED IN THE PLANS OR REQUIRED TO BE ERECTED AT THE DIRECTION OF THE ENGINEER.

16. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

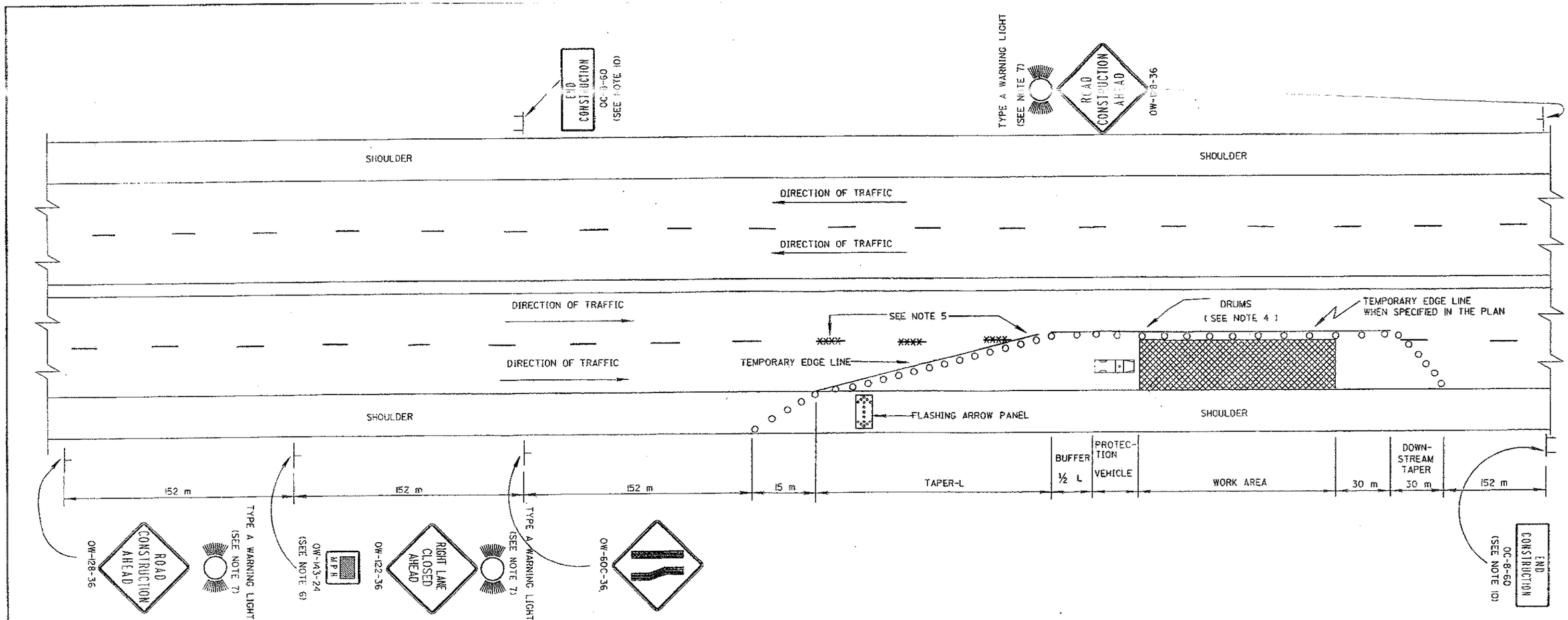
DATE 04/25/94

CLOSING RIGHT OR LEFT LANE OF A MULTI-LANE DIVIDED HIGHWAY WITH DRUMS

STANDARD CONSTRUCTION DRAWING MT-95.30M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THIS TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE I. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER, THE BUFFER AREA AND FOR THE FIRST 305 m OF THE WORK AREA AND AT OTHER HAZARDOUS LOCATIONS AS DIRECTED BY THE ENGINEER. THE MAXIMUM DRUM SPACING FOR THE BALANCE OF THE WORK AREA IS TO BE TWO TIMES THE SPACING (S) IN TABLE I. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER AND THE DOWNSTREAM TAPER.

4. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

5. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS THE

5. CONT. AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

6. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

7. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-122 SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.

8. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

9. 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 VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

10. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

11. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMPS AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ON EACH SIDE ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

12. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

SPEED LIMIT (MPH)	MINIMUM TAPER (L) (METERS)	MAXIMUM SPACING (S) OF DRUMS
20-25	38	6
30-40	98	12
45-55	201	12

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE 04/25/94

CLOSING RIGHT LANE OF A MULTI-LANE UNDIVIDED HIGHWAY WITH DRUMS

STANDARD CONSTRUCTION DRAWING MT-95.31M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC

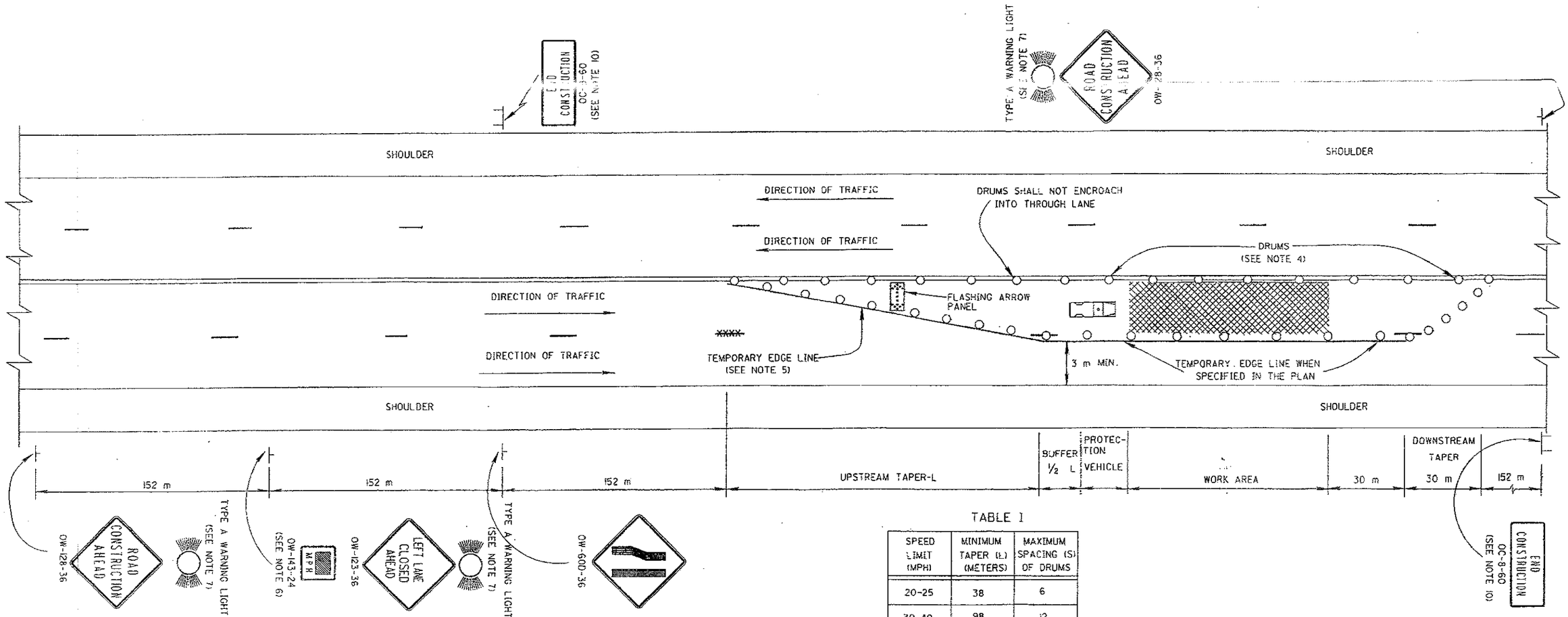


TABLE I

SPEED LIMIT (MPH)	MINIMUM TAPER (L) (METERS)	MAXIMUM SPACING (S) OF DRUMS
20-25	38	6
30-40	98	12
45-55	201	12

GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED NOT TO CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS FOR THE MERGING TAPER SHALL CONFORM TO TABLE I. DRUMS PLACED ALONG THE CENTERLINE SHALL BE SPACED AT (S). DRUM SPACING (S) SHALL ALSO BE USED FOR THE BUFFER AREA AND FOR THE FIRST 305 m OF THE WORK AREA AND AT OTHER LOCATIONS AS DIRECTED BY THE ENGINEER. THE MAXIMUM DRUM SPACING FOR THE BALANCE OF THE WORK AREA EXCEPT ALONG THE CENTERLINE IS TO BE TWO TIMES THE SPACING (S) IN TABLE I. A MINIMUM OF 5 DRUMS SHALL BE USED IN THE DOWNSTREAM TAPER.

4. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

5. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

6. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

7. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-123 SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.

8. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

9. 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 VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

10. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

11. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMPS AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTNG STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ON EACH SIDE ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

12. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

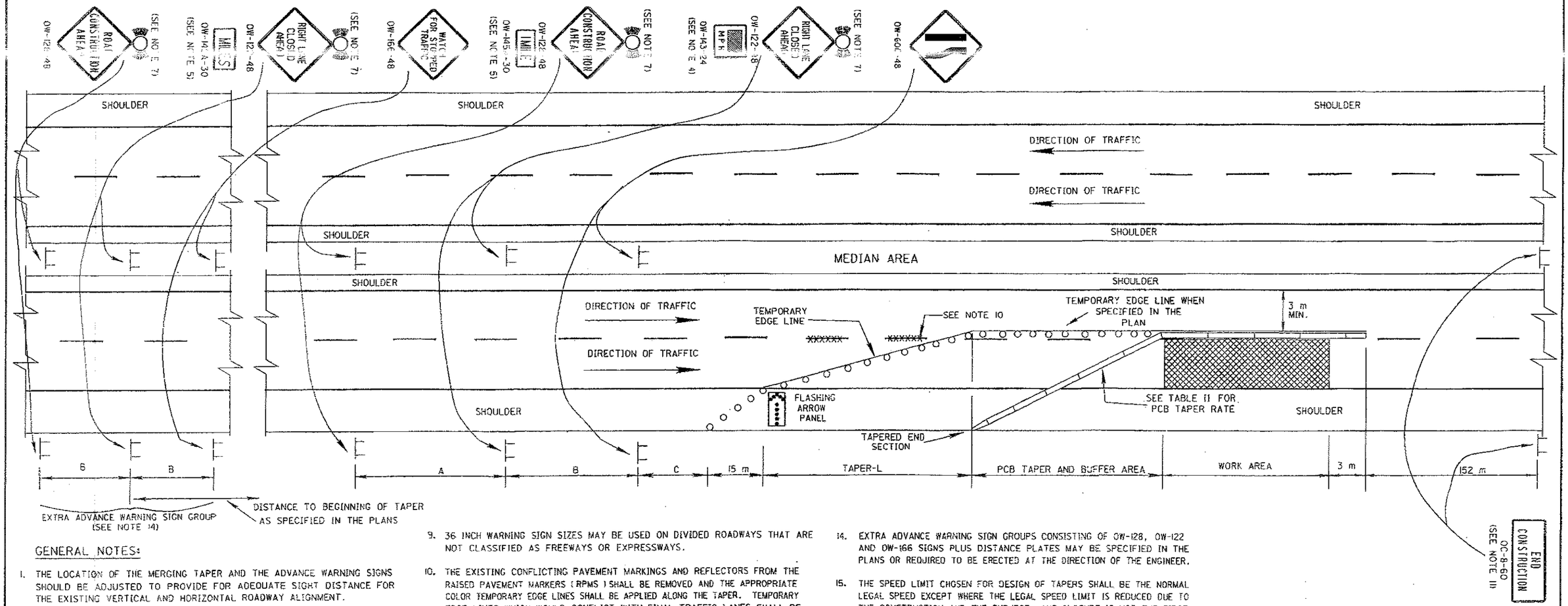
DATE 04/25/94

CLOSING LEFT LANE OF A MULTILANE UNDIVIDED HIGHWAY WITH DRUMS

STANDARD CONSTRUCTION DRAWING MT-95.32M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE II. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER AND THE BUFFER AREA. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER.

4. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

5. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE MERGING TAPER (L). DISTANCES LESS THAN ONE MILE MAY BE EXPRESSED IN FEET THE PLAQUE MAY BE OMITTED IF EXTRA ADVANCE SIGN GROUPS ARE NOT USED.

6. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

7. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW122 (123) SIGNS ARE REQUIRED.

8. WHEN WORK IS BEING PERFORMED IN THE LANE ADJACENT TO THE MEDIAN ON A DIVIDED HIGHWAY, OW-123 SIGNS SHALL BE SUBSTITUTED FOR THE OW-122 SIGNS AND OW-60D SIGNS SHALL BE SUBSTITUTED FOR THE OW-60C SIGNS.

9. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

10. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE-C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05, TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

11. THE OC-8 SIGNS MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

12. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C (MAX.) TOP MOUNTED OBJECT MARKERS (229 X 381mm) @ 7.6 m C-C (MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C VERTICAL STRIPES ON PADDLES 51X 305 mm) @ 3.8 m C-C (MAX.)
1270 mm HIGH	BARRIER REFLECTORS @ 3.8 m C- C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 X 381mm) TOP MOUNTED @ EACH END

13. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMPS AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

14. EXTRA ADVANCE WARNING SIGN GROUPS CONSISTING OF OW-128, OW-122 AND OW-166 SIGNS PLUS DISTANCE PLATES MAY BE SPECIFIED IN THE PLANS OR REQUIRED TO BE ERECTED AT THE DIRECTION OF THE ENGINEER.

15. THE SPEED LIMIT CHOSEN FOR DESIGN OF TAPERS SHALL BE THE NORMAL LEGAL SPEED EXCEPT WHERE THE LEGAL SPEED LIMIT IS REDUCED DUE TO THE CONSTRUCTION AND THE SUBJECT LANE CLOSURE IS NOT THE FIRST ACTIVE CONSTRUCTION AREA ENCOUNTERED BY TRAFFIC WITHIN THE PROJECT.

16. NO EQUIPMENT OR MATERIAL SHALL BE LOCATED OTHER THAN BEHIND THE PCB.

LEGEND

DRUMS	○ ○ ○ ○ ○ ○
PORTABLE CONCRETE BARRIER (PCB)	
REMOVE EXISTING MARKINGS	XXXXXXXXX

TABLE I

MINIMUM DISTANCE METERS	A	B	C
MAJOR STANDARD	152	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

TABLE II

SPEED LIMIT (MPH) *	MINIMUM DRUM TAPER (L) METERS	MAXIMUM SPACING (S) OF DRUMS METERS	PCB TAPER RATE
30-40	98	12	11 : 1
45-55	201	12	16 : 1
60-65	238	18	19 : 1

* SEE NOTE (15)

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

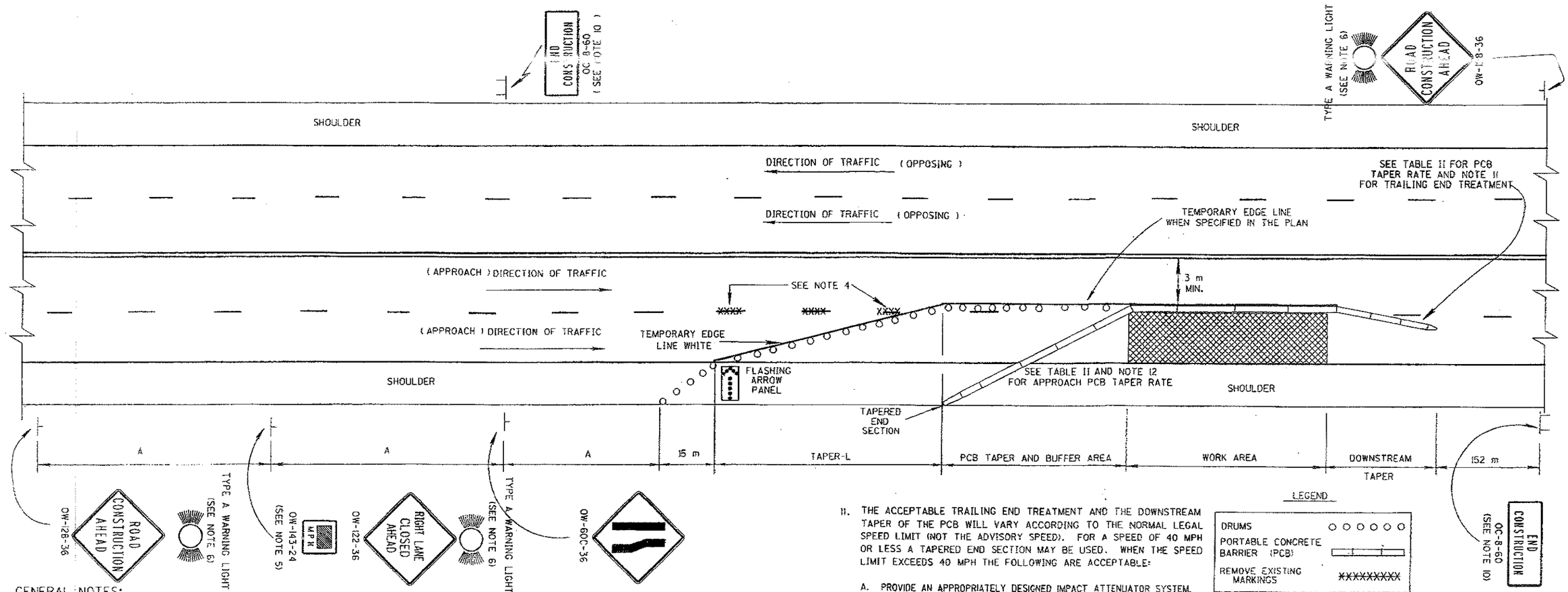
CLOSING RIGHT OR LEFT LANE OF A MULTI-LANE DIVIDED HIGHWAY WITH PORTABLE CONCRETE BARRIER

STANDARD CONSTRUCTION DRAWING MT-95.40M

APPROVED _____ ENGR. OF DESIGN SERVICES

DATE 04/25/94

WCC



GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE II. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER AND THE BUFFER AREA. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER.

4. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AT NO ADDITIONAL COST. THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY PAVEMENT MARKINGS WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE-C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

6. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-122 SIGNS ARE REQUIRED.

7. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

8. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C (MAX.) TOP MOUNTED OBJECT MARKERS (229 mm X 381 mm) @ 7.6 m C-C MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C (MAX.) VERTICAL STRIPES ON PADDLES (51 mm X 305 mm) @ 3.8 m C-C MAX.)
1270 mm HIGH	BARRIER REFLECTORS @ 7.6 m C-C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 mm X 381 mm) TOP MOUNTED @ EACH END

9. OW-128 SIGNS SHALL BE PROVIDED ON SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

10. THE OC-8 SIGNS MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

11. THE ACCEPTABLE TRAILING END TREATMENT AND THE DOWNSTREAM TAPER OF THE PCB WILL VARY ACCORDING TO THE NORMAL LEGAL SPEED LIMIT (NOT THE ADVISORY SPEED). FOR A SPEED OF 40 MPH OR LESS A TAPERED END SECTION MAY BE USED. WHEN THE SPEED LIMIT EXCEEDS 40 MPH THE FOLLOWING ARE ACCEPTABLE:

   A. PROVIDE AN APPROPRIATELY DESIGNED IMPACT ATTENUATOR SYSTEM.
   B. ON OUTSIDE EDGE OF ROAD: EXTEND PCB AT APPROPRIATE TAPER TO 9.1 m FROM EDGE OF NEAREST OPPOSING TRAFFIC LANE.

12. THE SPEED LIMIT CHOSEN FOR DESIGN OF APPROACH TAPERS SHALL BE THE NORMAL LEGAL SPEED EXCEPT WHERE THE LEGAL SPEED LIMIT IS REDUCED DUE TO THE CONSTRUCTION AND THE SUBJECT LANE CLOSURE IS NOT THE FIRST ACTIVE CONSTRUCTION AREA ENCOUNTERED BY TRAFFIC WITHIN THE PROJECT.

13. NO EQUIPMENT OR MATERIAL SHALL BE LOCATED OTHER THAN BEHIND THE PCB.

TABLE I

MINIMUM DISTANCE (METERS)	A
URBAN	61
MAJOR STANDARD	152

TABLE II

SPEED LIMIT (MPH) *	MINIMUM DRUM TAPER (L) (METERS)	MAXIMUM SPACING (S) OF DRUMS (METERS)	PCB TAPER RATE	DOWN-STREAM TAPER LENGTH (METERS)
20 - 25	38	6	7:1	17
30 - 40	98	12	11:1	20
45 - 55	201	12	16:1	21

* SEE NOTE 12

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

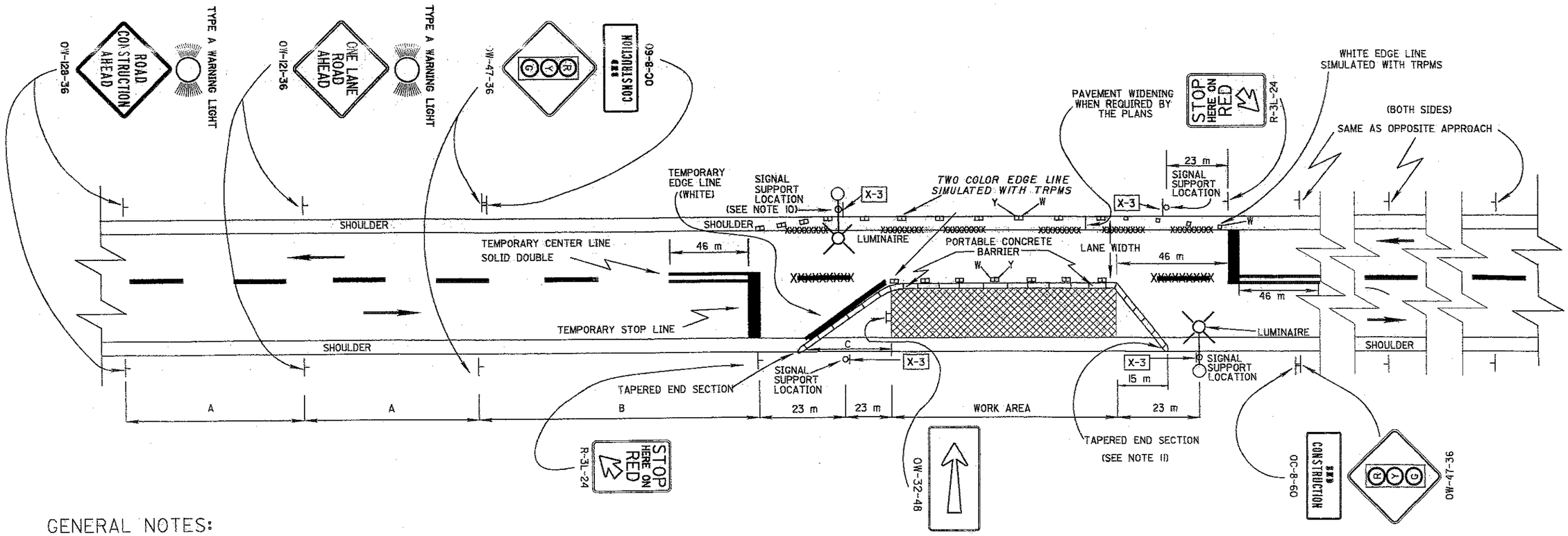
CLOSING RIGHT LANE OF A MULTI-LANE UNDIVIDED HIGHWAY WITH PORTABLE CONCRETE BARRIER

STANDARD CONSTRUCTION DRAWING MT-95.41M

DATE 04/25/94

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



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. TEMPORARY CENTER LINE, SOLID, DOUBLE, SHALL BE INSTALLED AND MAINTAINED WHEN EXISTING CENTER LINE , SOLID DOUBLE IS NOT IN PLACE. 305 mm STOP LINES SHALL BE INSTALLED. TEMPORARY RAISED PAVEMENT MARKERS (TRPMS) TO SIMULATE A TWO COLOR EDGE LINE SHALL BE PROVIDED. EXISTING CONFLICTING PAVEMENT MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE REMOVED. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

4. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS AT 7.6 m C-C (MAX.) ALTERNATED WITH TOP MOUNTED OBJECT MARKERS (229 X 381 mm) AT 7.6 m C-C (MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS AT 7.6 m C-C VERTICAL ORANGE REFLECTORIZED STRIPES ON PADDLES (305 X 305 mm) AT 3.8 m C-C (MAX.)
1270 mm HIGH	BARRIER REFLECTORS AT 3.8 m C-C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 X 381 mm) TOP MOUNTED AT EACH END

5. 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 ARE MINIMUM.

6. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

7. 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.

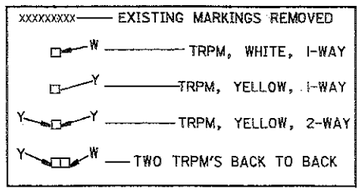
8. IF THE SIGNAL IS CHANGED TO FLASHING OPERATION, RED SHALL BE FLASHED TO ALL APPROACHES ON ALL SIGNAL HEADS.

9. EXISTING BARRIER BETWEEN TEMPORARY STOP LINES SHALL BE DELINEATED WITH ITEM 614-BARRIER REFLECTORS.

10. FOR SIDE MOUNTED SIGNALS, SEE MT-96.20M. FOR OVERHEAD MOUNTED SIGNALS, SEE MT-96.21M.

11. DURING WORKING HOURS ONLY A LENGTH OF BARRIER SUFFICIENT TO PROVIDE A 3.0 m ACCESS ON THE SHOULDER AND PART OF ROADWAY, MAY BE REMOVED FOR ACCESS. A SIMILAR BARRIER REMOVAL AT THE OPPOSITE END OF THE WORK AREA MAY ALSO BE PERMITTED ONLY WHEN NECESSARY.

DISTANCE (METERS)	A	B
URBAN	61	107
RURAL	152	229



METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

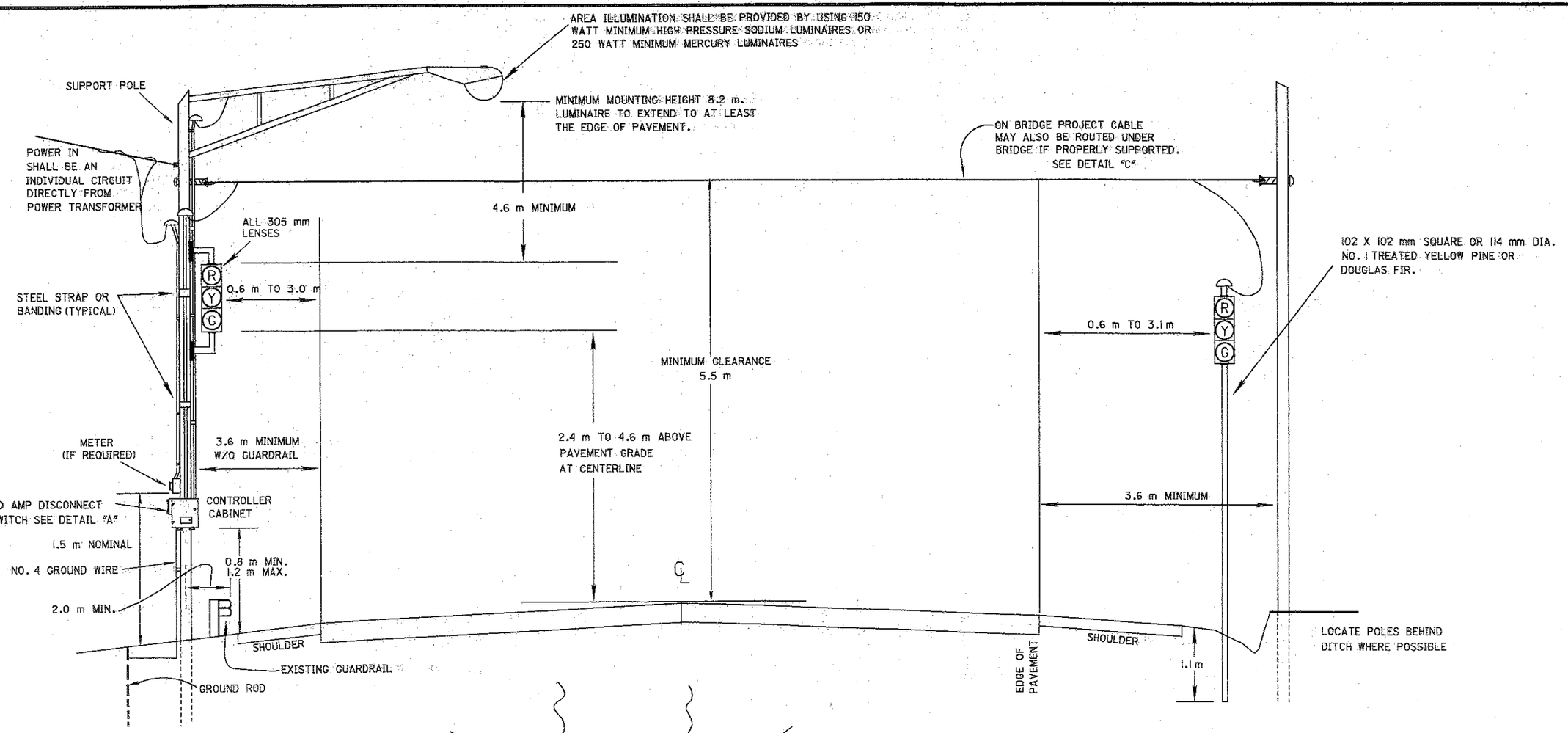
DATE 01/30/95

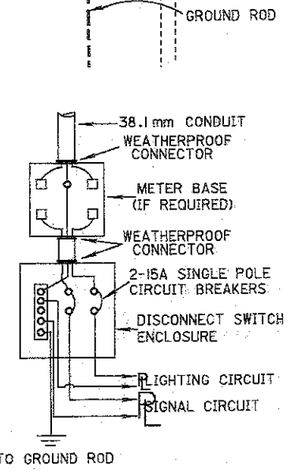
SIGNALIZED CLOSING
1 LANE OF A 2 LANE
HIGHWAY WITH PCB

STANDARD CONSTRUCTION DRAWING **MT-96.11M**

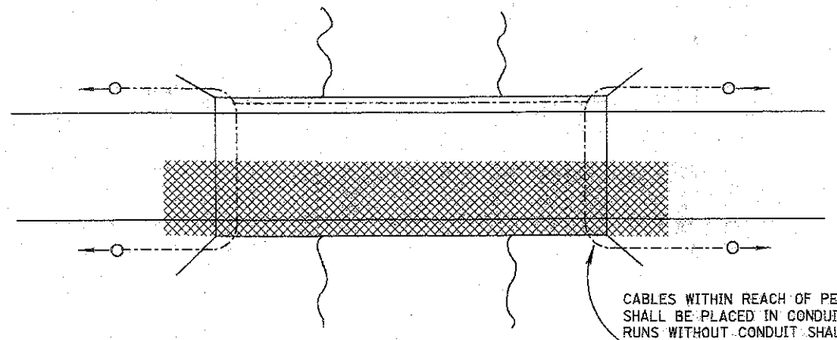
APPROVED Mary L Craig ENGR. OF DESIGN SERVICES

WCC



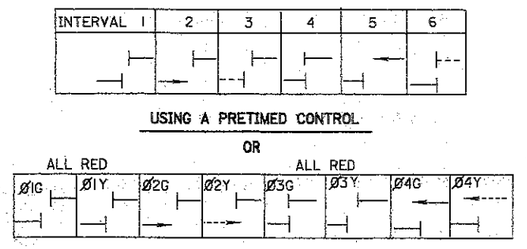


DETAIL "A"



ALTERNATE CABLE ROUTING

DETAIL "C"



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

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

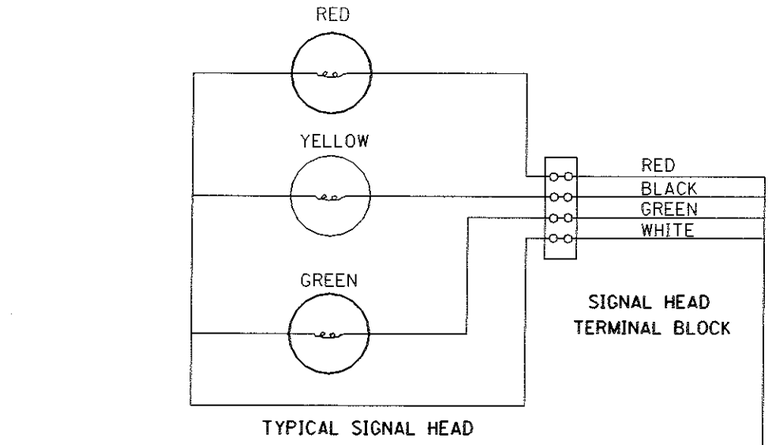
MAINTENANCE OF TRAFFIC

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

DATE 01/30/95

STANDARD CONSTRUCTION DRAWING MT-96.20M

APPROVED Mary J. Creager ENGR. OF DESIGN SERVICES



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

TYPICAL SIGNAL HEAD HOOK-UP

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

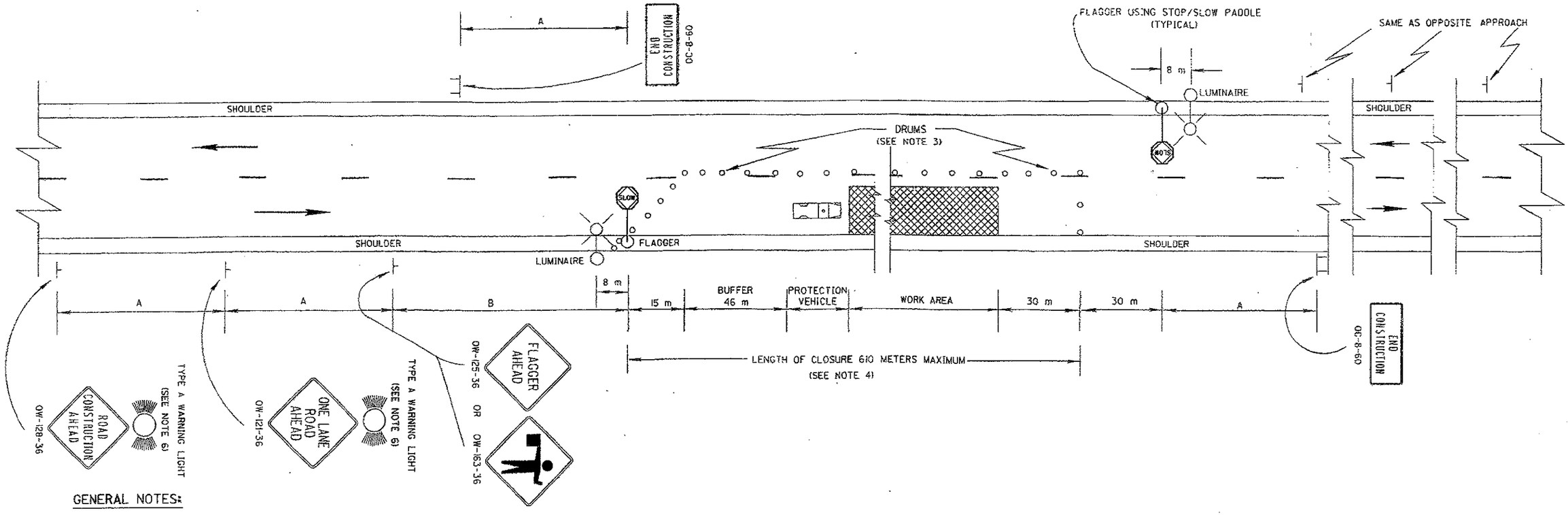
4-20-01

OFFICE OF TRAFFIC ENGINEERING

MT-96.25

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. DISTANCE B MAY ALSO BE INCREASED, PRIOR TO IMPLEMENTATION OF THE CLOSURE OR AFTER IT IS IN EFFECT, AS DIRECTED BY THE ENGINEER FOR SUCH OCCURENCES AS LONG TRAFFIC BACKUPS.

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 15 m CENTER TO CENTER ALONG THE CLOSURE. DRUMS ON THE ADVANCE TAPER SHALL BE SPACED AT 3 m CENTER TO CENTER. CONES HAVING A MINIMUM HEIGHT OF 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 610 m LONG UNLESS APPROVED BY THE ENGINEER. THE MINIMUM LENGTH BETWEEN CLOSURES SHALL BE 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 MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER. THE VEHICLE SHALL BE EQUIPPED WITH A 360° ROTATION OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m.

6. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 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 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 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 1.7 m BEHIND FACE OF GUARDRAIL WHERE EXISTING, OR 3.6 m FROM THE EDGE OF PAVEMENT. WHERE POSSIBLE LOCATE 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.

MINIMUM DISTANCE (METERS)	A	B
URBAN	61	61
RURAL	152	152

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCIDENTAL TO THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

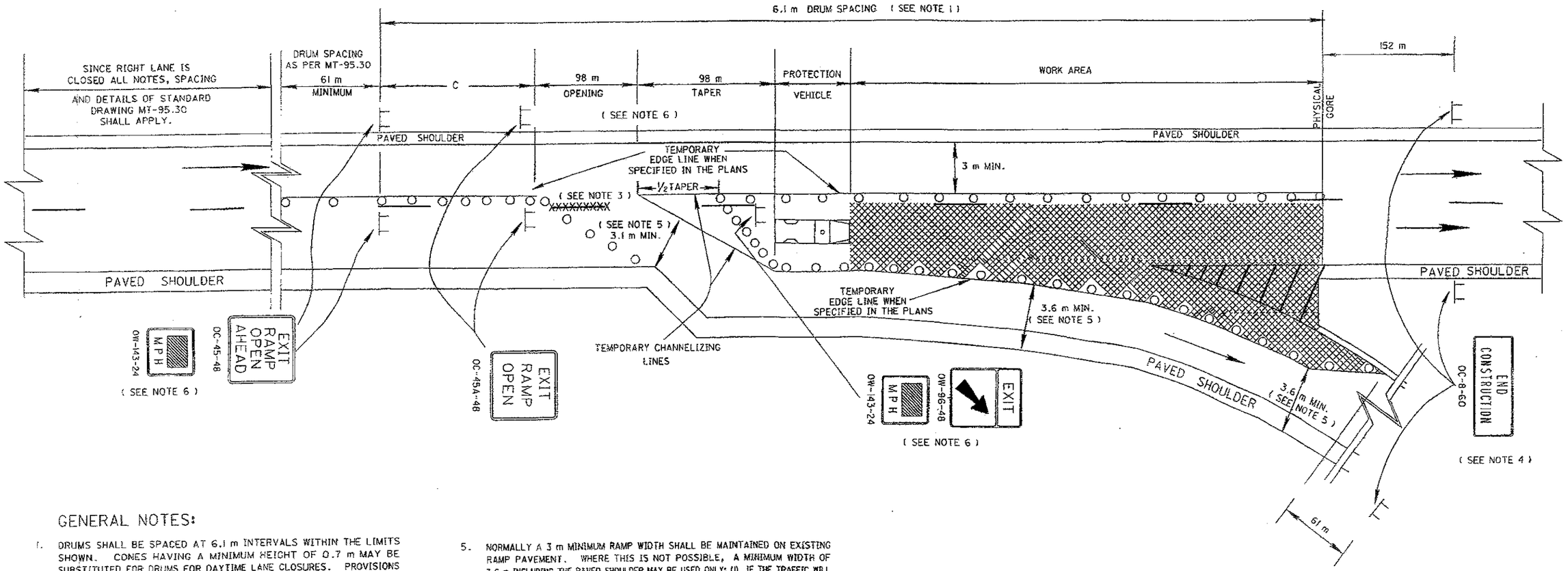
DATE 04/25/94

FLAGGERS CLOSING
1 LANE OF A 2 LANE HIGHWAY
STATIONARY OPERATION

STANDARD CONSTRUCTION DRAWING MT-97.10M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. DRUMS SHALL BE SPACED AT 6.1 m INTERVALS WITHIN THE LIMITS SHOWN. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

2. THE PROTECTION VEHICLE LOCATED CLOSE TO THE WORK SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

3. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND a) TEMPORARY CHANNELIZING LINES SHALL BE APPLIED AND b) THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED WHEN SPECIFIED IN THE PLANS. TEMPORARY CHANNELIZING LINES AND EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

4. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

5. NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD.

6. THE OPENING TO THE RAMP AND THE TAPER IN ADVANCE OF THE CLOSED LANE SHOULD EACH BE 98 m OR MORE WHENEVER POSSIBLE. A LESSER OPENING AND/OR TAPER LENGTH MAY BE PROVIDED IF NO OTHER ALTERNATIVE IS AVAILABLE. THE OPENING SHALL NEVER BE LESS THAN THE TAPER, BUT MAY BE MORE. WHEN LESSER OPENING AND/OR TAPER LENGTHS ARE PROVIDED, ADVISORY SPEED PLAQUES (OW-143) SHALL BE ADDED TO THE OW-96 AND OC-45 SIGNS AS FOLLOWS:

OPENING/TAPER	ADVISORY SPEED
88 m	80 km/h - 50 MPH
79 m	72 km/h - 45 MPH
70 m	64 km/h - 40 MPH
61 m	56 km/h - 35 MPH

IF 61 m MINIMUM DIMENSION CANNOT BE PROVIDED, THE RAMP SHOULD BE CLOSED.

THE ADVISORY SPEED DISPLAYED SHALL NOT BE GREATER THAN WOULD OTHERWISE BE REQUIRED TO ACCOMMODATE THE PERMANENT RAMP GEOMETRY NEAR THE EXIT.

ADVISORY SPEEDS WITHIN 16.1 km/h OF THE LEGAL SPEED LIMIT NEED NOT BE DISPLAYED.

7. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	
	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305
RURAL FREEWAY & EXPRESSWAY	305

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

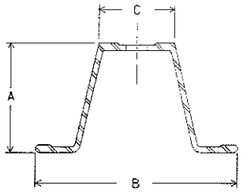
LANE CLOSURE
AT EXIT GORE

DATE 06/24/93

STANDARD CONSTRUCTION DRAWING MT-98.14M

APPROVED Daryl Creyer ENGR. OF DESIGN SERVICES

WCC



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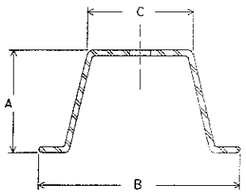
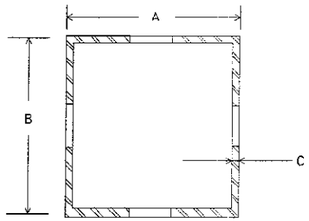


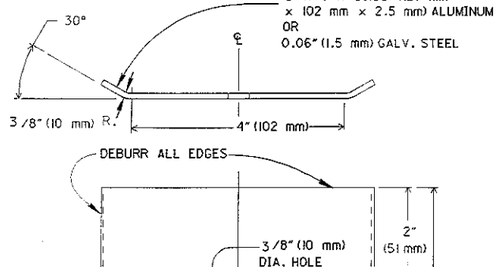
TYPE F



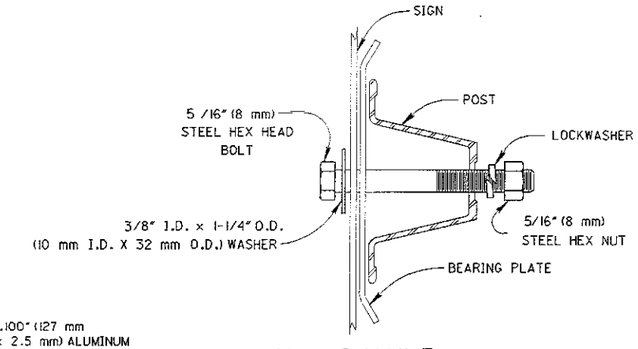
TYPE S

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



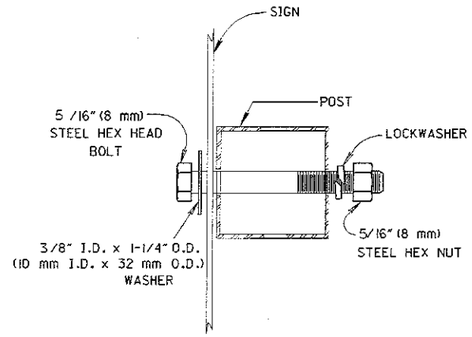
BEARING PLATE



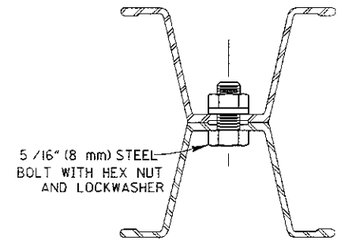
U - CHANNEL
SIGN ATTACHMENT DETAIL

NOTES

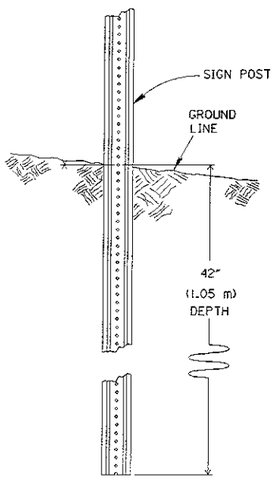
1. Install number 4 type P and F posts, and number 6 type P and F posts, only in protected locations (e.g. behind guardrail). Install two post installations of number 4 type S posts within 7 foot (2.1m) path only in protected locations.
2. Use of anchor base with No. 2 and No. 3 square post is optional.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



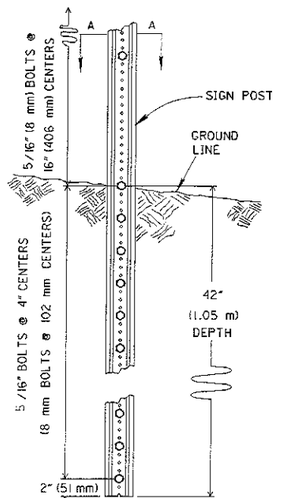
SQUARE POST
SIGN ATTACHMENT DETAIL



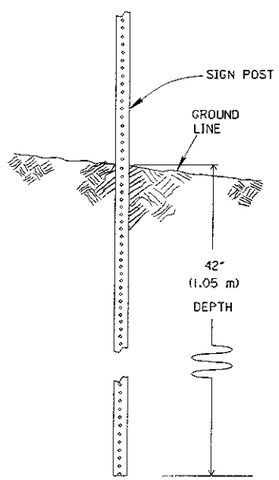
SECTION A - A



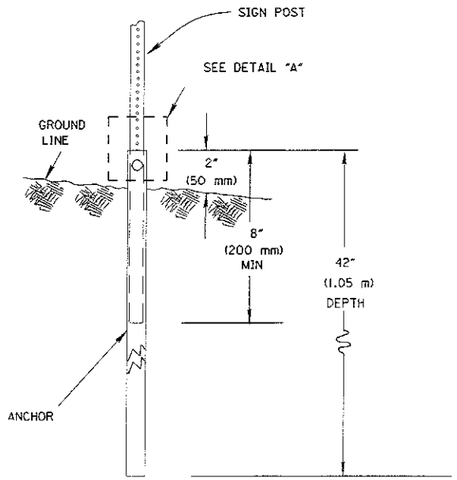
TYPICAL NO. 1, NO. 2 AND NO. 3 U - CHANNEL DRIVEN INSTALLATION



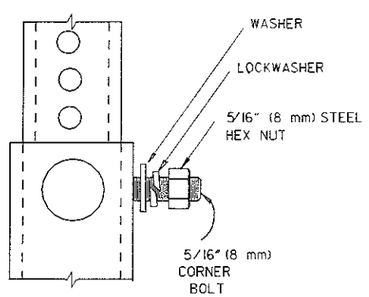
TYPICAL NO. 4 AND NO. 6 U - CHANNEL DRIVEN INSTALLATION



TYPICAL SQUARE POST DRIVEN INSTALLATION



TYPICAL SQUARE POST ANCHOR BASE INSTALLATION



DETAIL "A"

01-19-01

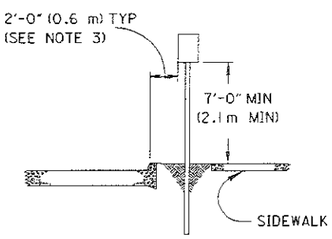
YIELDING POST

OFFICE OF TRAFFIC ENGINEERING

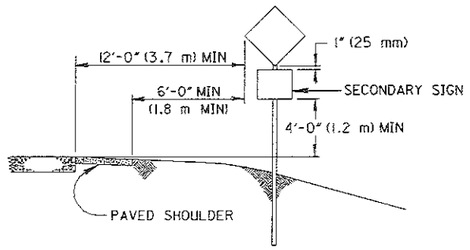
TC-41.20

1 / 1

LAM

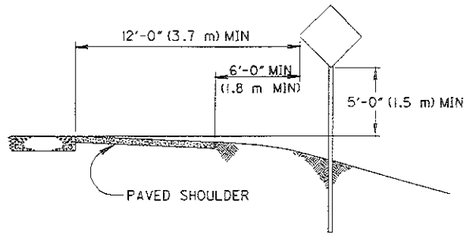


URBAN-RESIDENTIAL AND BUSINESS



RURAL

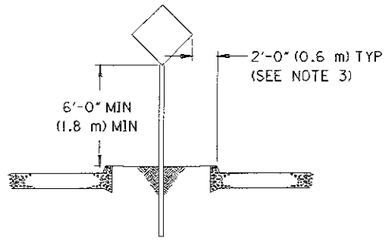
W/SECONDARY SIGN



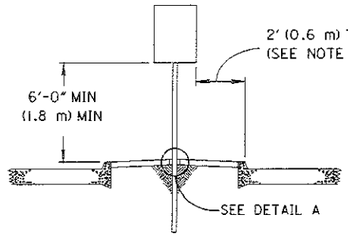
RURAL

NOTES

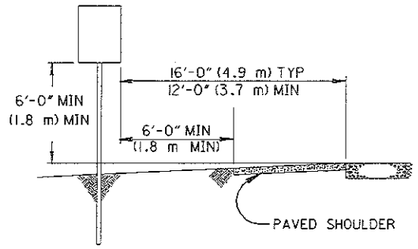
1. See drawing TC-41.20 for details on yielding supports.
2. All signs shall be placed 90° to the roadway, except parking signs with arrow shall be set at an angle of not less than 30° nor more than 45° with a line parallel to the flow of traffic.
3. A clearance of 1 foot (0.3 m) is permissible where sidewalk width is limited or where existing poles are close to the curb.
4. See drawings TC-52.10 and TC-52.20 for dimensions between supports.



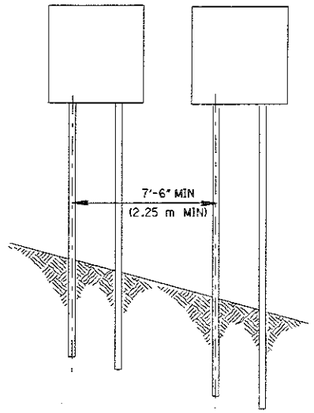
MEDIAN



PAVED MEDIAN

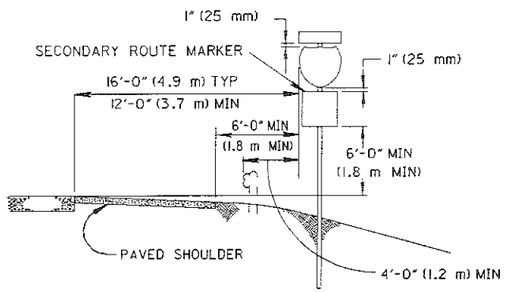


MEDIAN-EXPRESSWAY OR FREEWAY



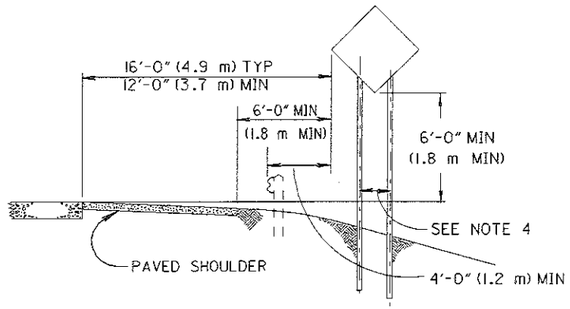
ADJACENT SIGN INSTALLATION

FOR NO. 2 AND NO. 3 YIELDING POST SUPPORTS IN EXPOSED LOCATIONS

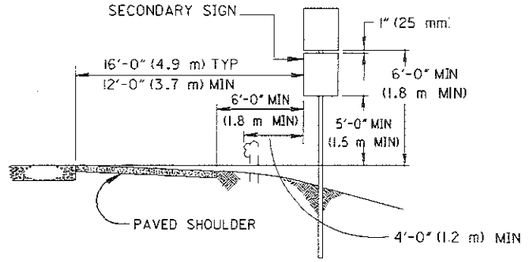


EXPRESSWAY OR FREEWAY

W/SECONDARY SIGN

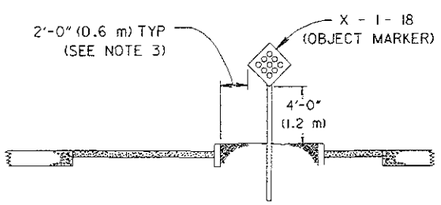


EXPRESSWAY OR FREEWAY

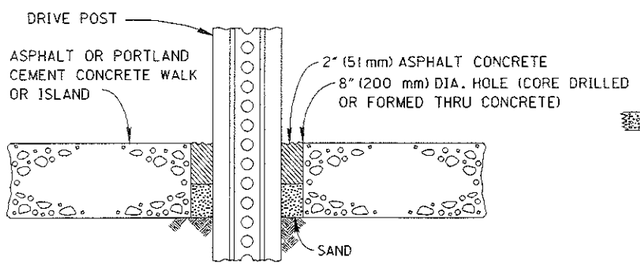


EXPRESSWAY OR FREEWAY

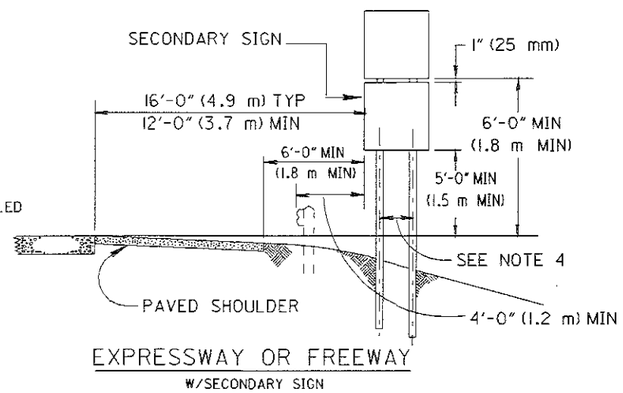
W/SECONDARY SIGN



EXPRESSWAY OR FREEWAY



DETAIL A



EXPRESSWAY OR FREEWAY

W/SECONDARY SIGN

4-20-01

TYPICAL FLAT SHEET SIGN PLACEMENT

OFFICE OF TRAFFIC ENGINEERING

TC-42.20

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