KYTC's Standard Drawing Update

Wednesday, September 4th

2024 PARTNERING CONFERENCE
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KTC

Jeff Jasper, PE (KTC)

Research Engineer

Corinne Schurman, PE (KYTC)

Transportation Engineer I

"Partners in Service – Delivering Safety, Mobility and Quality of Life for All"

Presentation Agenda

- Session Takeaway
- History and Overview, including NCHRP350 to MASH
- Proprietary Products Selection Committee
- Programmatic Changes for KYTC's Standard Drawings and Sepias
- Website update
- Showcasing the Bullnose
- Questions/comments/discussion

Session Takeaway

OUR GOAL, AT THE CONCLUSION OF THIS SESSION, IS TO INFORM THE INDUSTRY OF STANDARD DRAWING CHANGES THAT HAVE HAPPENED OR ARE HAPPENING, BOTH ON A NATIONAL-LEVEL AND KYTC-LEVEL.

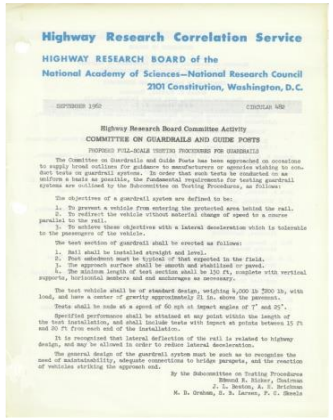
HOW DOES OUR PRESENTATION LINK TO THE PARTNERING THEME,

"Partners in Service – Delivering Safety, Mobility and Quality of Life for All"?

ROADSIDE SAFETY!

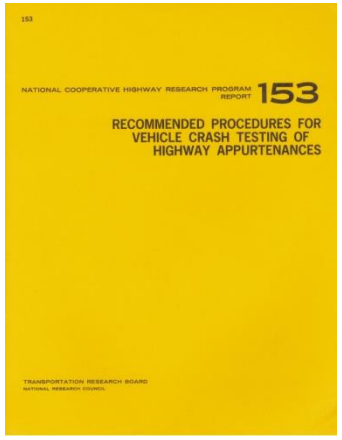
HISTORY AND OVERVIEW

What has been our industry-driven policy to follow?

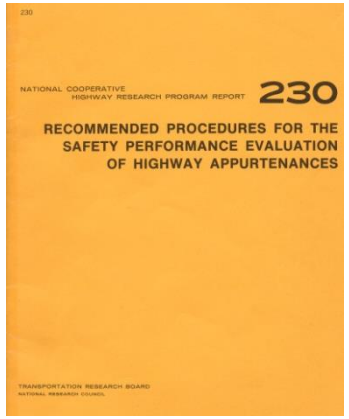

Highway Research Correlation Service
HIGHWAY RESEARCH BOARD of the
National Academy of Sciences—National Research Council
2101 Constitution, Washington, D.C.

Highway Research Board Committee Activity
COMMITTEE ON GUARDRAILS AND GUIDE POSTS

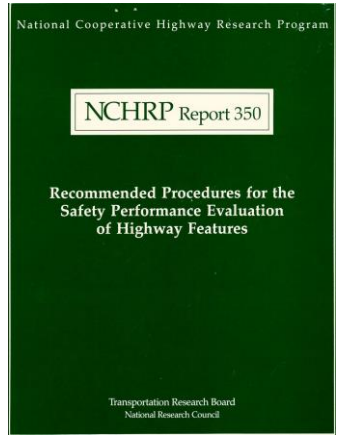
1962


NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 153
RECOMMENDED PROCEDURES FOR VEHICLE CRASH TESTING OF HIGHWAY APPURTENANCES
TRANSPORTATION RESEARCH BOARD
NATIONAL RESEARCH COUNCIL

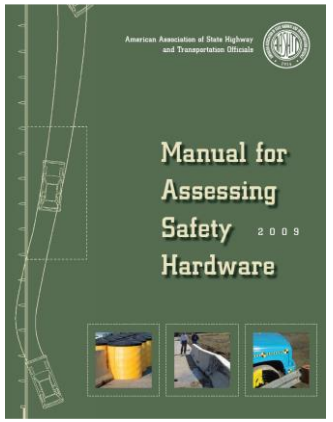
1974


NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 230
RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY APPURTENANCES
TRANSPORTATION RESEARCH BOARD
NATIONAL RESEARCH COUNCIL

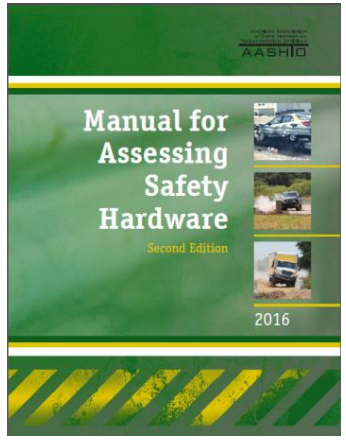
1981


National Cooperative Highway Research Program
NCHRP Report 350
Recommended Procedures for the Safety Performance Evaluation of Highway Features
Transportation Research Board
National Research Council

1993


American Association of State Highway and Transportation Officials
Manual for Assessing Safety Hardware 2009

2009


AASHTO
Manual for Assessing Safety Hardware
Second Edition
2016

2016

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HISTORY AND OVERVIEW

NCHRP 350
1800 lbs Car
20 degrees

MASH
2420 lbs Car
25 degrees

How has testing criteria changed for roadside safety?

NCHRP 350
4400 lbs Pickup
25 degrees

MASH
5000 lbs Pickup
25 degrees

What about Electric Vehicles?

HISTORY AND OVERVIEW

KYTC'S Published Guidance, implemented through Standard Drawings!

NCHRP 350

DESIGN MEMORANDUM NO. 10-98

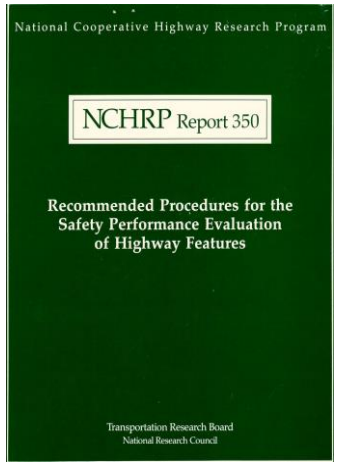
TO: Chief District Engineers
Active Consultants
Construction Engineers
Active Consultants

FROM: John B. Sacksteder, P.E.
Director, Division of Highway Design

Dexter Newman, Director
Director, Division of Construction

DATE: September 11, 1998

SUBJECT: NCHRP 350 Guardrail and Safety Devices



SUBJECT: NCHRP 350 Guardrail and Safety Devices

On October 1, 1998, new FHWA requirements for Guardrail and other safety devices go into effect. These requirements primarily consist of complying with the NCHRP 350 crash test. In order to comply with these new requirements, changes had to be made to the Standards Drawings. Although there are numerous drawings that are effected, these changes can be generalized into four categories:

MASH

COMMONWEALTH OF KENTUCKY
TRANSPORTATION CABINET
Frankfort, Kentucky 40622
www.transportation.ky.gov/

Matthew G. Bevin
Governor

Greg Thomas
Secretary

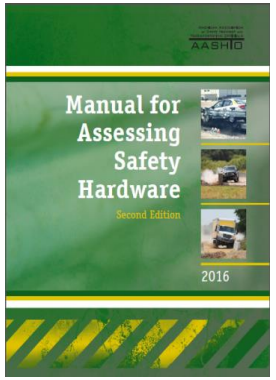
State Highway Engineer Memo 2017-01

TO: Chief District Engineers
District Project Development Staff
District Project Delivery and Preservation Staff
KYTC Central Office Directors
SHE Office Staff
Active Contractors
Active Consultants

FROM: Patty B. Dunaway, PE
State Highway Engineer

DATE: November 1, 2017

SUBJECT: Manual for Assessing Safety Hardware (MASH) 2016 Implementation
For Guardrail, Cast-in-Place Concrete Barriers and End Treatments



The Cabinet has adopted the new AASHTO Manual for Assessing Safety Hardware (MASH) testing criteria for safety hardware, as recommended by AASHTO and FHWA. Only safety hardware evaluated using the current edition of MASH criteria will be allowed for new permanent installations and full replacements as of the dates mentioned within this memorandum on the NHS. The listing of Sepia Drawings included herein all had some change, deletion or addition as part of this process.

PROPRIETARY PRODUCTS SELECTION COMMITTEE

- PURPOSE & PROCESS OVERVIEW
- IMPLEMENTED CHANGES: END TREATMENTS/CRASH CUSHIONS
  - NEW CLASS D: example on I-75 south, at northern split with I-64

TEAM KENTUCKY
TRANSPORTATION CABINET

Roadside Safety Hardware - Proprietary Products Selection Process

Subject
Definition of the Process

CLASS	SPEED (MPH)	ATTENUATOR					SUGGESTED ADT* RANGE (P.C.P.L.) **
		MODEL	PRODUCT NAME	MANUFACTURER	WIDTH	LENGTH	
B	45 & LESS	TL2	SCI 70 GM IMPACT ATTENUATOR SMART CUSHION	HILL AND SMITH OF COLUMBUS, OHIO	24"	13'-6"	UP TO 12,000
			3-BAY QUADGUARD M10	VALTIR OF DALLAS, TEXAS	24"	13'-0"	
B	OVER 45	TL3	SCI 100 GM SMART CUSHION	HILL AND SMITH OF COLUMBUS, OHIO	24"	21'-6"	UP TO 12,000
			6-BAY QUADGUARD M10	VALTIR OF DALLAS, TEXAS	24"	22'-0"	
C	OVER 45	TL3	SCI 100 GM SMART CUSHION	HILL AND SMITH OF COLUMBUS, OHIO	24"	21'-6"	≥15,000
			QUADGUARD ELITE M10	VALTIR OF DALLAS, TEXAS	24"	27'-2"	
D	OVER 45	TL3	REACT M	VALTIR OF DALLAS, TEXAS	38 ¾"	22'- 2 ¾"	≥15,000

*AVERAGE DAILY TRAFFIC **PASSENGER CARS PER LANE

Implementing MASH

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PROPRIETARY PRODUCTS SELECTION COMMITTEE

VISIT OUR SEPIA PAGE FOR ALL REFLECTED CHANGES!

PRODUCT AT KYTC
GUARDRAIL END TREATMENT TYPE 1
GUARDRAIL END TREATMENT TYPE 4A
CRASH CUSHION TYPE 9
CRASH CUSHION TYPE 9A
CRASH CUSHION TYPE 7 CLASS B
CRASH CUSHION TYPE 7 CLASS C
CRASH CUSHION TYPE 6 CLASS B/BT TL2
CRASH CUSHION TYPE 6 CLASS B/BT TL3
CRASH CUSHION TYPE 6 CLASS C/CT TL3
CRASH CUSHION TYPE 6 CLASS D

Sepia 036 Crash Cushion Type VI (One and Two Direction)

Sepia 037 Crash Cushion Type VI BT and CT (TL2 and TL3)

Sepia 038 Crash Cushion Type VII Class B and C (One and Two Direction)

Resources

Bid Code Item List (updated by construction)
CADD Standards
CADD Support Workflows & Videos
Congestion Toolbox
Design Memos
Digital Project Delivery
Drainage Submittal
Estimator
Highway Design Contacts
Highway Design Manual
Implementation of the 2018 Green Book and Low-Volume Guidance
Innovative Intersections Map
Intersection Control Evaluation (ICE) Guidance
Intersection Evaluation (ICE) Guidance Webinar
KYTC SAFERoad Solutions
Microsimulation Modeling
Partnering Conference Presentations
Project Managers Toolbox
Roundabout Design Guidance Policy
Scheduled Public Meetings
Signing Detail Sheets
Standard Drawings & Active Sepias
State Highway Engineer Policies
Work Zone Safety Policy
Utilities and Rails Manual

Implementing MASH

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A COMPREHENSIVE LOOK AT MORE COMPLETED UPDATES AT KYTC

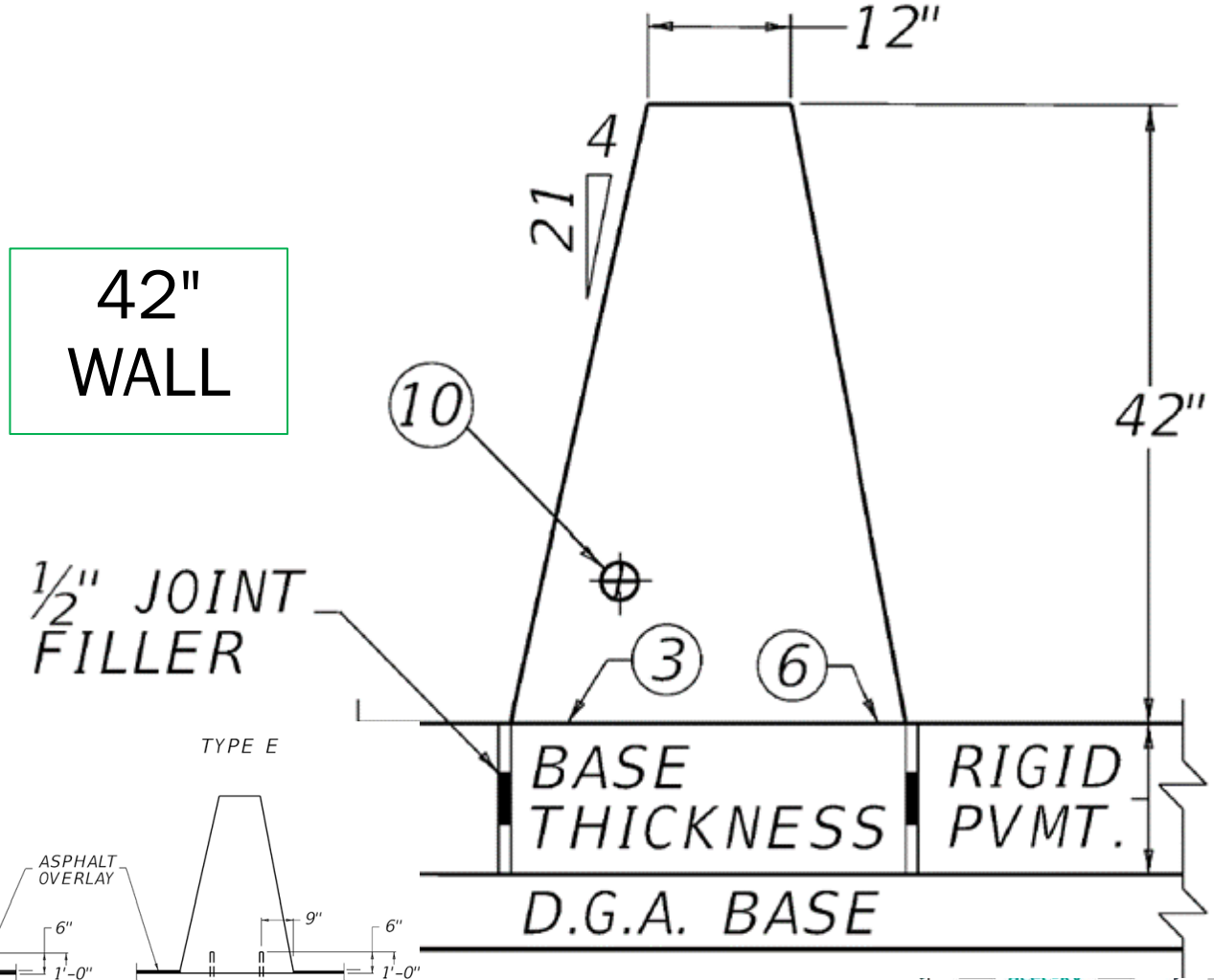
Implementing MASH

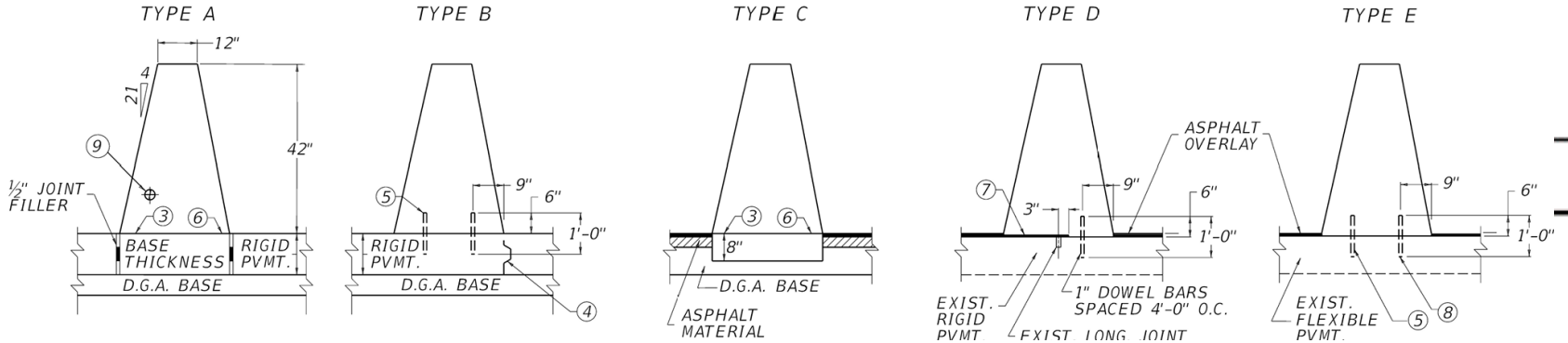
SINGLE SLOPE MEDIAN BARRIER WALL

DISCUSS: When to use it; How to bid it; How to use it; Types.

- 32” Jersey Shape Wall to the 42” TL3 Tall Wall
  - ODOT’s MASH crash tested wall
  - Preference: wall is made of unreinforced steel.
  - 28” Base Width; 12” Top Width.

42" WALL





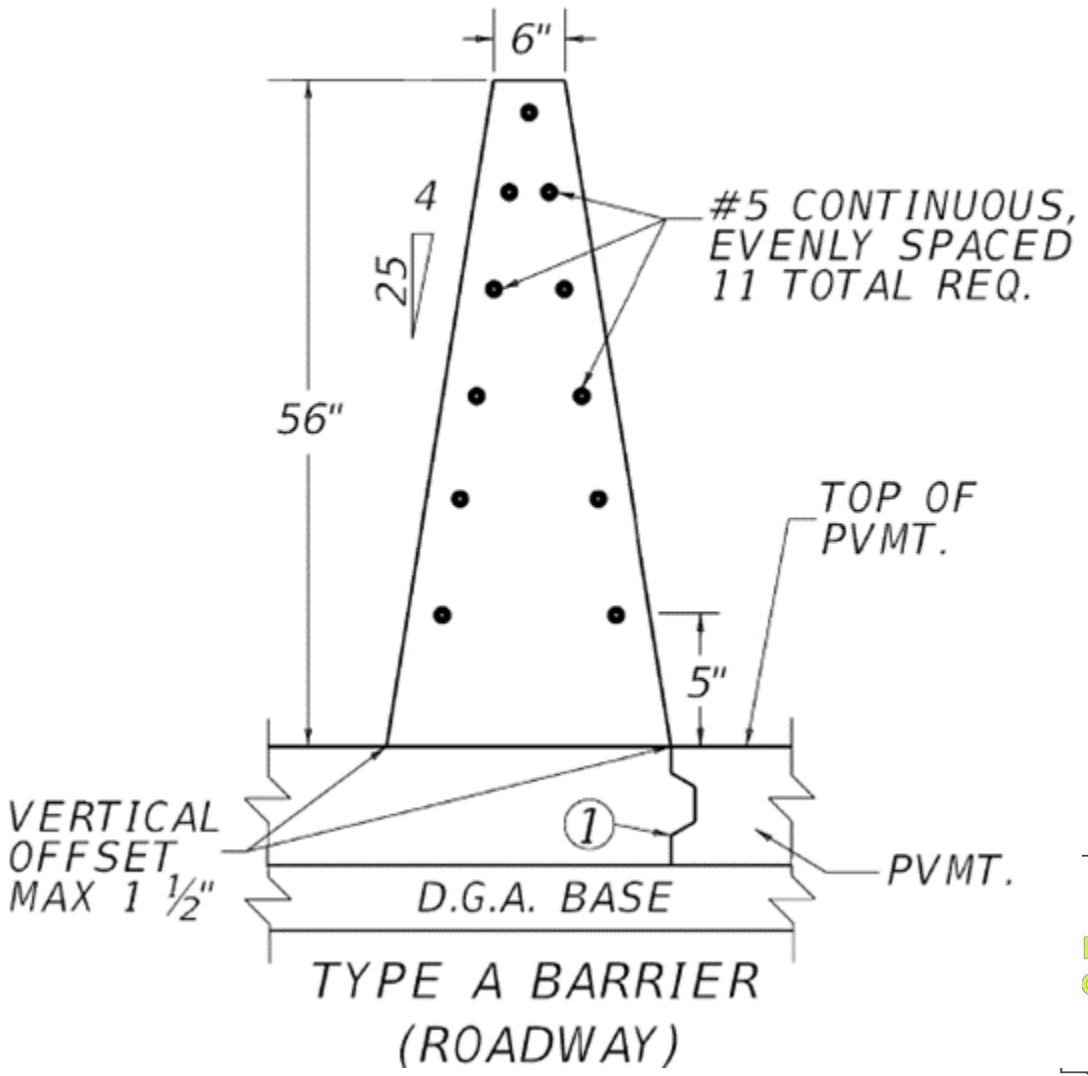
A COMPREHENSIVE LOOK AT MORE COMPLETED UPDATES AT KYTC

Implementing MASH

SINGLE SLOPE MEDIAN BARRIER WALL

- DISCUSS: When to use it; How to bid it; How to use it; Types.
- 50” Jersey Shape Wall to the 56” TL5 Tall Wall
  - CalTrans’ MASH crash tested wall
  - Preference: higher test level and therefore reinforced
  - 24” Base Width; 6” Top Width

56" WALL



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A COMPREHENSIVE LOOK AT MORE COMPLETED UPDATES AT KYTC- SEPIA PACKETS

Active Sepia List, Continued (Sepia 042/Sepia Packet)

- Name
- _SEPIA 042 CONCRETE BARRIER WALLS COMPLETE PD PACKET
- SEPIA 042 CONCRETE BARRIER WALLS COVER PAGE

Revision: 1 [added asymmetrical detail]

Revision: 1 [added asymmetrical detail]

Revision: 1 [added asymmetrical detail]

Revision: 1 [added asymmetrical detail]

SHEET TITLE	SHEET NUMBER	TOTAL SHEETS	REVISION NUMBER
SHEET 001 CONCRETE MEDIAN BARRIER TL3 42 IN	SHEET 001	1 OUT OF 14	0
SHEET 002 CONCRETE MEDIAN BARRIER TL3 42 IN - NOTES	SHEET 002	2 OUT OF 14	0
SHEET 003 CONCRETE MEDIAN BARRIER TL3 42 IN - HORIZONTAL TRANSITIONS	SHEET 003	3 OUT OF 14	0
SHEET 004A CONCRETE MEDIAN BARRIER TL3 42 IN END SECTIONS	SHEET 004A	4A OUT OF 14	0
SHEET 004B CONCRETE MEDIAN BARRIER TL3 42 IN END SECTIONS	SHEET 004B	4B OUT OF 14	0
SHEET 005 CONCRETE MEDIAN BARRIER TL3 42 IN END SECTIONS - NOTES	SHEET 005	5 OUT OF 14	0
SHEET 006 CONCRETE MEDIAN BARRIER TL5 56 IN	SHEET 006	6 OUT OF 14	1
SHEET 007 CONCRETE MEDIAN BARRIER TL5 56 IN - NOTES	SHEET 007	7 OUT OF 14	1
SHEET 008 CONCRETE MEDIAN BARRIER TL5 56 IN - HORIZONTAL TRANSITIONS	SHEET 008	8 OUT OF 14	0
SHEET 009 CONCRETE MEDIAN BARRIER BOX INLET TL5 56 IN	SHEET 009	9 OUT OF 14	0
SHEET 010 CONCRETE MEDIAN BARRIER BOX INLET TL5 56 IN - DETAILS	SHEET 010	10 OUT OF 14	0
SHEET 011 CURB TO SINGLE SLOPE BARRIER TRANSITION	SHEET 011	11 OUT OF 14	0
SHEET 012 DELINEATORS FOR CONCRETE BARRIERS	SHEET 012	12 OUT OF 14	0
SHEET 013 CONCRETE BARRIER WALL TYPE 9T (TEMPORARY)	SHEET 013	13 OUT OF 14	0
SHEET 014 BOX BEAM STIFFENING PF TEMPORARY CONCRETE BARRIER	SHEET 014	14 OUT OF 14	0

CONCRETE BARRIER WALLS

SAFETY FIRST · DELIVERING RESULTS · EACH TEAM MEMBER & PARTNER · THE GOLDEN RULE · DIVERSITY & INCLUSION · TEAM KENTUCKY TRANSPORTATION CABINET · WE VALUE

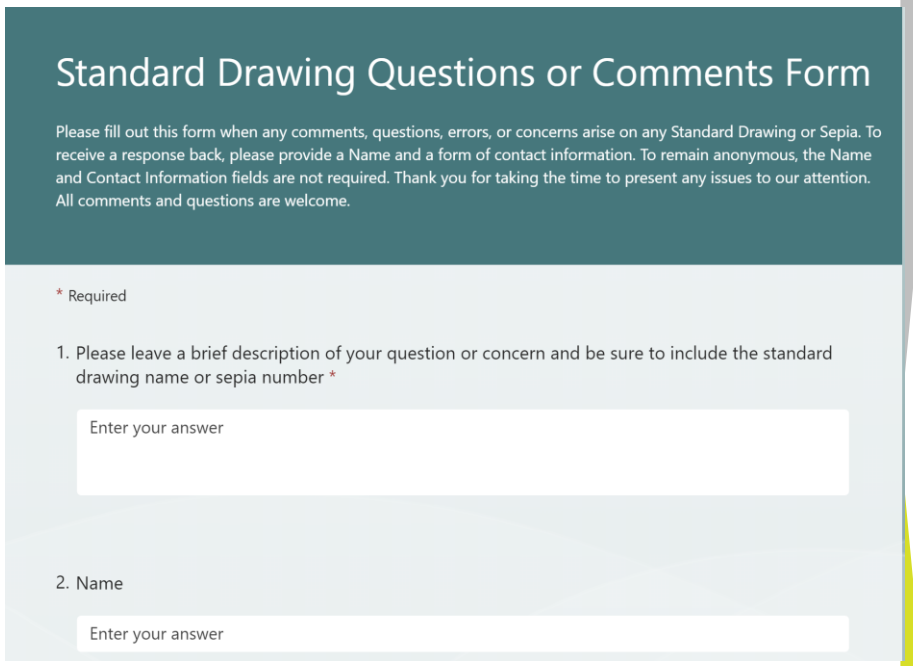
TEAM KENTUCKY® TRANSPORTATION CABINET

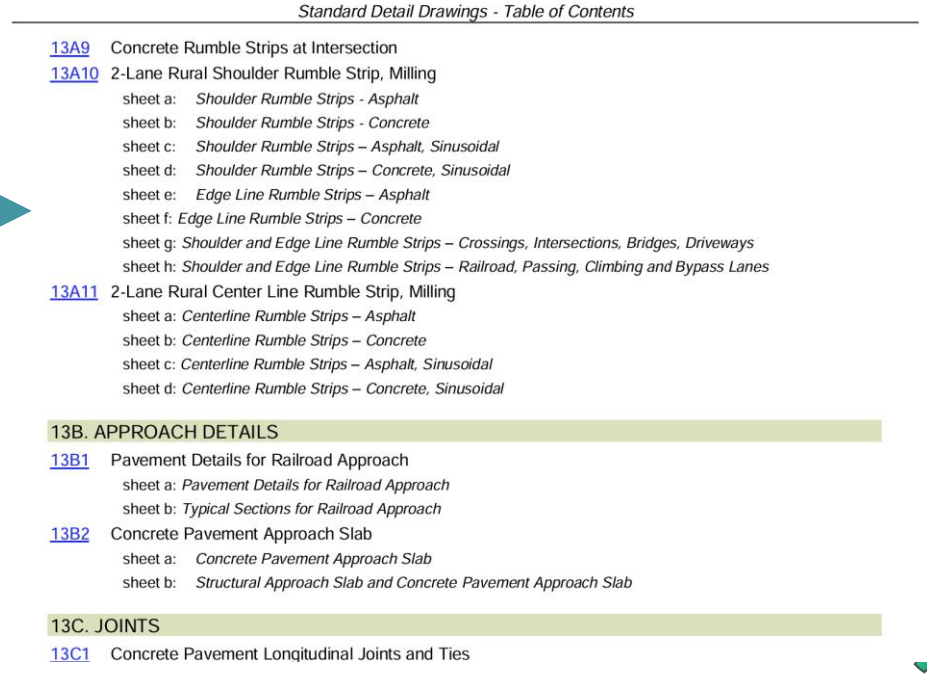
SEPIA 042: CONCRETE BARRIER WALLS [SEPIA PACKET]	RELEASE DATE: 07.26.2024 UPDATED: 08.20.2024	EFFECTIVE LETTING DATE: FOR IMMEDIATE RELEASE AND USE

COMMONWEALTH OF KENTUCKY DEPARTMENT OF HIGHWAYS	SEPIA 042: CONCRETE BARRIER WALLS	COVER SHEET FOR SEPIA 042: CONCRETE BARRIER WALLS	REVISION DATE: 08.20.2024	ITEM NO. COUNTY OF SHEET NO.

WEBSITE ENHANCEMENTS AND UPDATES

- IN THIS TRANSITIONAL PERIOD, CURRENT UPDATES ARE A *MID-STEP* IN A PLAN FOR A MAJOR OVERHAUL
- FOCUS: CLEARER COMMUNICATION OF INFORMATION
- *NEW*: COMMENT FORM
- OTHER STATES' SIMILAR VISION AND INSPIRATION
- HIGHLIGHTS/FEATURES
  - NEWLY ADDITION INFORMATION
  - RE-ORGANIZATION



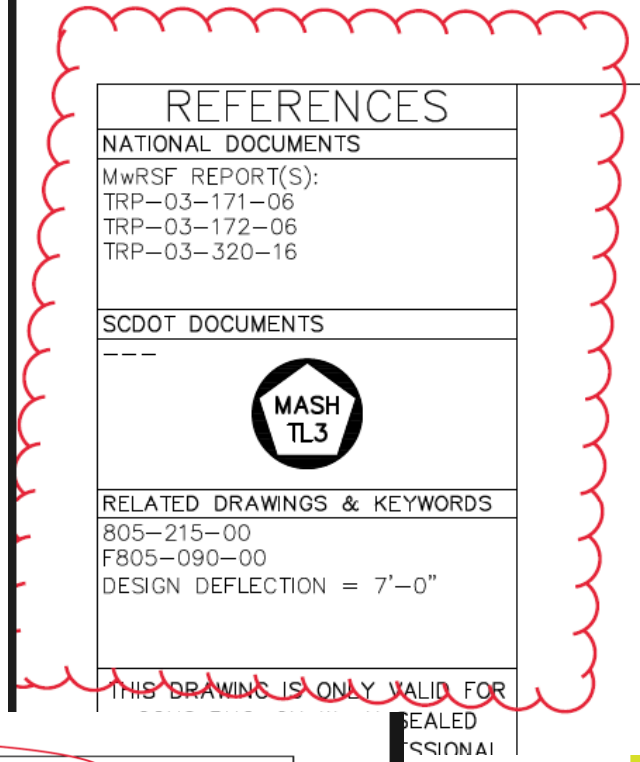


Looking ahead... How can we improve?

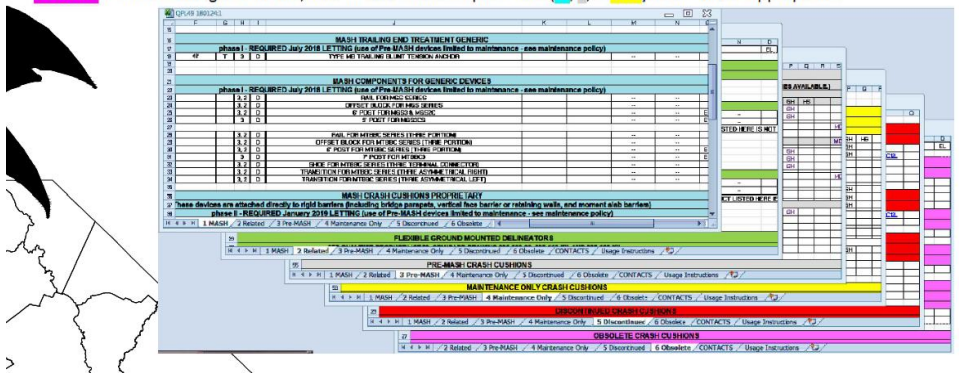
PROGRAMMATIC CHANGES

- IMPROVING THE NAMING SCHEME
- IMPROVING ORGANIZATION
- ADDING IN COLOR, LIVE PHOTOS, AND/OR QR CODES
- LINKING SHEETS AND REFERENCES (LIKE TO THE SPEC BOOK)
- MANAGING WHITE SPACE

Looking ahead… How can we improve?



MASH-ERA – OK for new installations & repairs
Guardrail Related – OK for new installations & repairs
Pre-MASH ERA – OK to use for new installations (until MASH devices is available) & repairs as needed
Maintenace Only – OK to use this device for repairs of existing installations of MO, D, or C devices only
Discontinued – When damaged, replace with (M, P, or MO) device where appropriate.
Obsolete – When funding is available, remove this device. Replace with (M, P, or MO) device where appropriate.



Version 7 — **Standard Detail Drawing 14B42** (sheet a - d) — May 2021

Midwest Guardrail System (MGS) Guardrail

References:

Standard Spec 614
FDM 11-45-30
CMM 625
AASHTO Roadside Design Guide
MwRSF Report TRP-03-136-03, MwRSF Report TRP-03-139-04,
MwRSF Report TRP-03-157-04, MwRSF Report TRP-03-165-07,
MwRSF Report TRP-03-170-06, MwRSF Report TRP-03-171-06
MwRSF Report TRP-03-172-06, MwRSF Report TRP-03-185-10
MwRSF Report TRP-03-188-08, MwRSF Report TRP-03-191-08
MwRSF Report TRP-03-205-09, MwRSF Report TRP-03-221-09,
MwRSF Report TRP-03-234-10, MwRSF Report TRP-03-237-10
MwRSF Report TRP-03-241-11, MwRSF Report TRP-03-243-11
MwRSF Report TRP-03-255-12, MwRSF Report TRP-03-271-12
MwRSF Report TRP-03-272-13, MwRSF Report TRP-03-274-12
MwRSF Report TRP-03-276-13, MwRSF Report TRP-03-314-15
MwRSF Report TRP-03-320-16 MwRSF Report TRP-03-326-16
MwRSF Report TRP-03-390-20, MwRSF Report TRP-03-393-19
TTI Report 0-4162-2
FHWA Memo W-Beam Guardrail Installations in Rock and in Mowing Strips March 10, 2004
FHWA Memo Roadside Design: Steel Strong Post W-beam Guardrail May 17, 2010

Bid items associated with this drawing:

ITEM NUMBER	DESCRIPTION	UNIT
614.0010	Barrier System Grading Shaping Finishing	EACH
614.0400	Adjusting Steel Plate Beam Guard	LF

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STEEL THRIE BEAM BULLNOSE TERMINAL

From post 5,
50’ (min) of clear area

FHWA Letter CC-68; MASH letter pending.

STEEL THRIE BEAM BULLNOSE TERMINAL

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STEEL THRIE BEAM BULLNOSE TERMINAL

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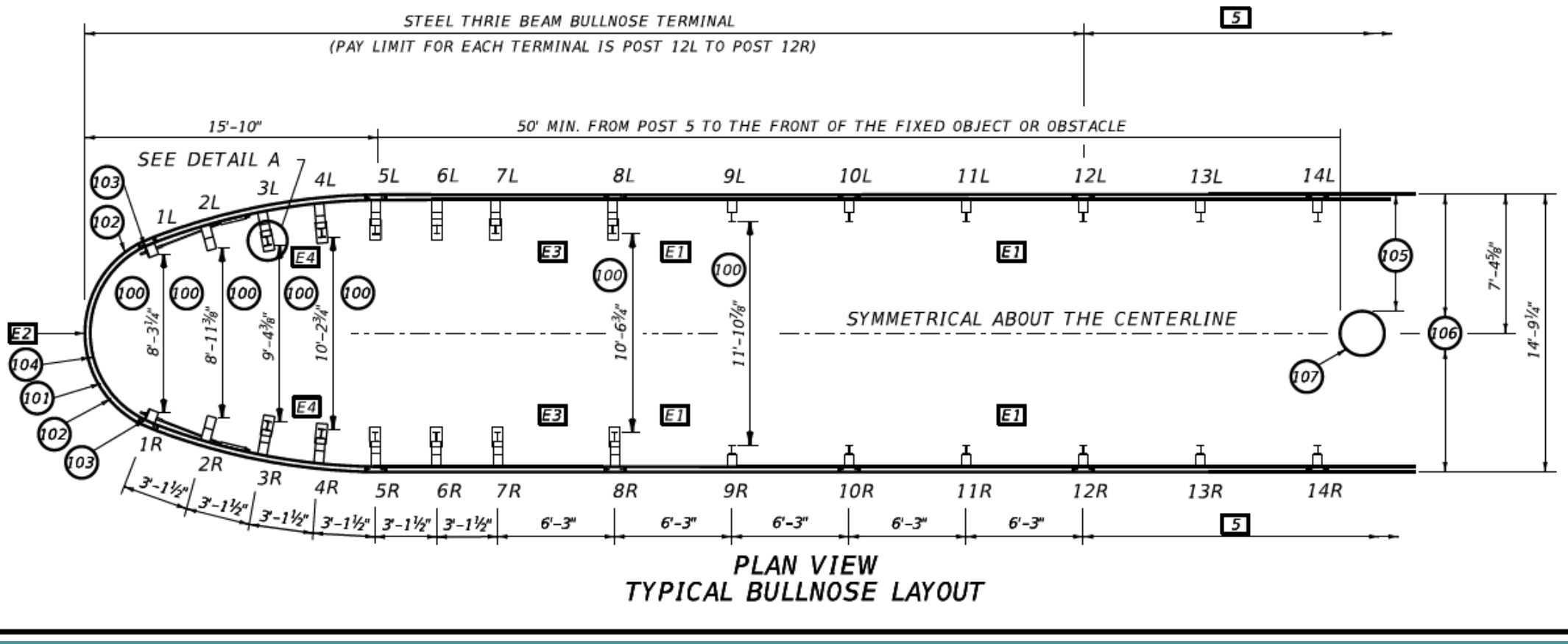
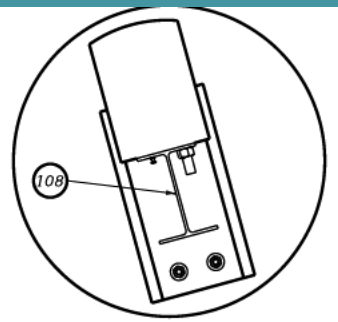


PLAN VIEW
TYPICAL BULLNOSE LAYOUT

SYMMETRICAL BULLNOSE POST COORDINATES

POST NUMBER	X (1002)	Y (1002)	FACE OF POST FLANGE ANGLE RELATIVE TO ROADWAY
13R	0	0	0
12R	6'-3"	0	0
11R	12'-6"	0	0
10R	18'-9"	0	0
9R	25'-0"	0	0
8R	31'-3"	0'-8"	0
7R	37'-6"	0'-8"	0
6R	40'-7 1/2"	0'-8"	0
(1000) 5R	43'-9"	0'-8"	0
4R	46'-9 1/4"	0'-10"	5
3R	49'-8 5/8"	1'-3 1/4"	10
2R	52'-9 1/4"	1'-5 1/8"	16
1R	55'-10 1/2"	1'-9 1/4"	21
1L	55'-10 1/2"	10'-7 3/8"	21
2L	52'-9 1/4"	10'-11 5/8"	16
3L	49'-8 5/8"	11'-1 3/8"	10
4L	46'-9 1/4"	11'-6 5/8"	5
(1000) 5L	43'-9"	11'-8 5/8"	0
6L	40'-7 1/2"	11'-8 5/8"	0
7L	37'-6"	11'-8 5/8"	0
8L	31'-3"	11'-8 5/8"	0
9L	25'-0"	12'-4 5/8"	0
10L	18'-9"	12'-4 5/8"	0
11L	12'-6"	12'-4 5/8"	0
12L	6'-3"	12'-4 5/8"	0
13L	0	12'-4 5/8"	0



DETAIL A

SHEET 1 OF 10

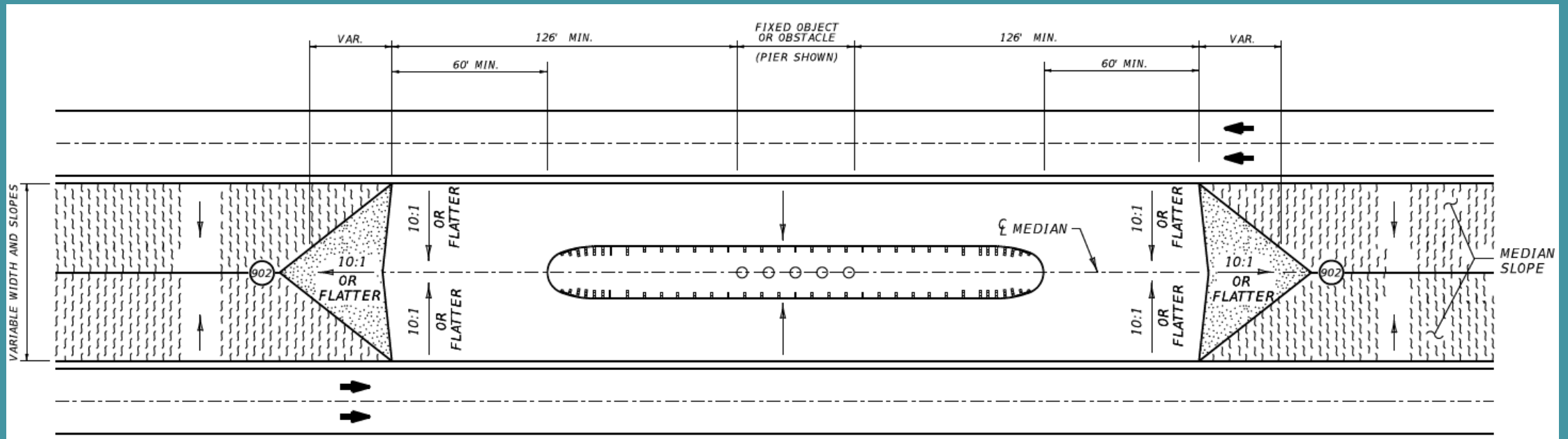
KENTUCKY
DEPARTMENT OF HIGHWAYS

STEEL THRIE BEAM
BULLNOSE TERMINAL

STANDARD DRAWING NO.

SUBMITTED _____ DIRECTOR DIVISION OF DESIGN _____ DATE

APPROVED _____ STATE HIGHWAY ENGINEER _____ DATE



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Thank you for attending our session on *KYTC's Standard Drawing Update*

Corinne Schurman, PE

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Jeff Jasper, PE

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Wednesday, September 4th (morning session)