

AFB20 (2) Int'l Research



Ohio's Median Design Practices
July 23, 2006 - Jackson, CA



Background

ODOT Facts

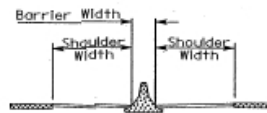
- **35th State in Size** (100,000 km² – 40,000 sq. miles)
- **7th Largest Population** (over 10 million)
- **5th Highest Traffic Volume**
- **4th Largest in Freight Hauled by Truck**
- **10th Largest Network** (31,000 km - 19,300 miles)
- **4th Largest Interstate Network**
- **2nd Largest Bridge Inventory** (approx. 42,000)



Median Cross Sections

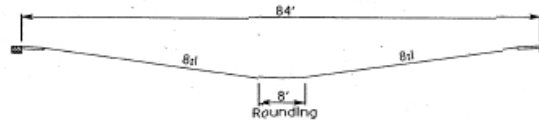
TYPICAL MEDIAN DESIGNS	304-1E
	REFERENCE SECTIONS 304.3

BARRIER MEDIAN



20% - 320 km

DEPRESSED MEDIANS



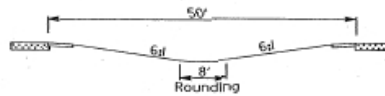
25 m

31% - 500 km



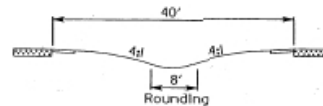
18 m

17% - 270 km



15 m

12% - 200 km



12 m

13% - 210 km



Median Cross Sections



Depressed Median with 2.4 m Rounded Ditch



Median Cross Sections

- ① SLOPE VARIES TO SUIT CONDITIONS
L2 DESIRABLE AND MAXIMUM
L3 MAXIMUM FOR MOWING
- ② 28° MAXIMUM Δ ANGLE OF BERM - SHOULDER SLOPE INTERCEPTS
- ③ BERM TRANSITION OFFSET OPTIONAL FOR APPROACHING TRAFFIC END.
- ④ 3 m MINIMUM RADIUS ROUNDING WHEN CONDITIONS PERMIT.

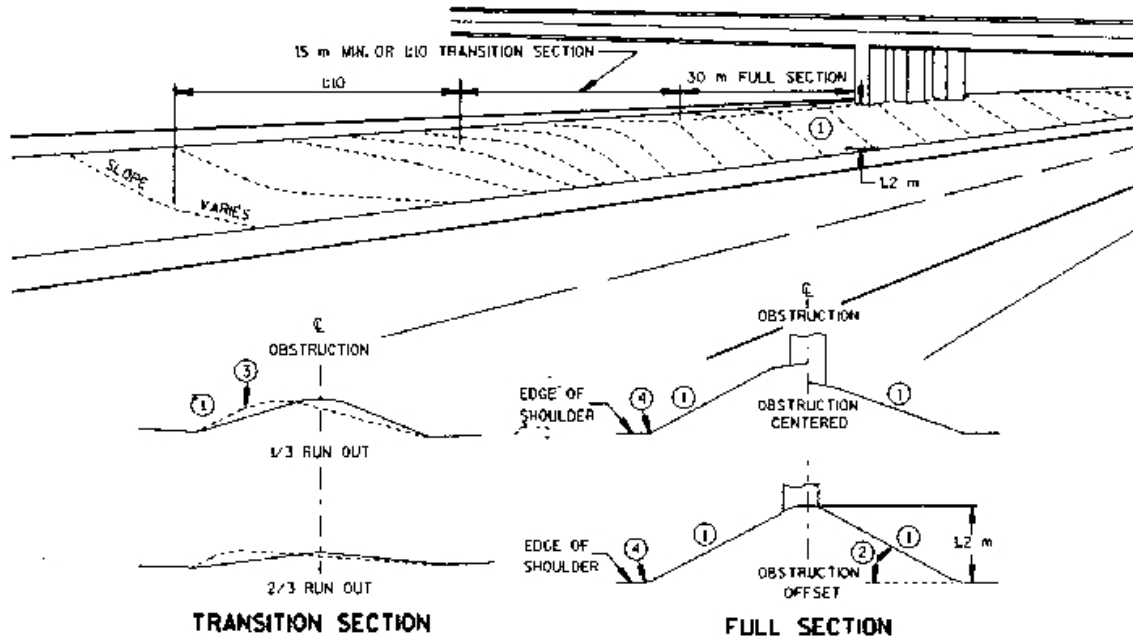


FIGURE 6.7 Schematic Drawing of a Median Berm

Mounded Median



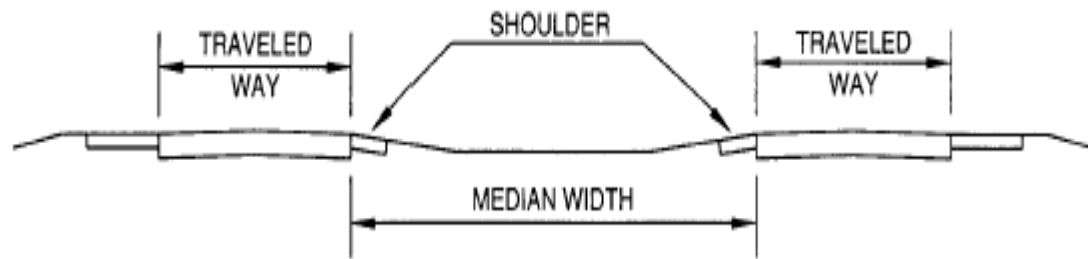
Median Cross Sections



Mounded Median
110 km, 7%



Current Median Warrants

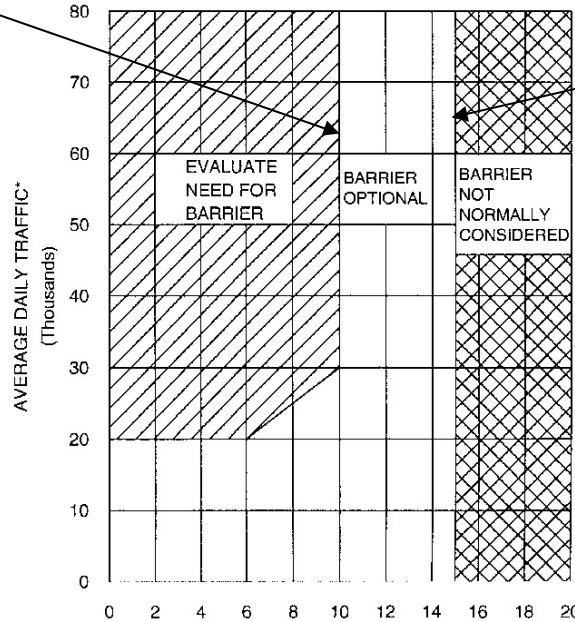


AASHTO RDG

Current Median Warrants

10 m

15 m



AASHTO RDG – Fig. 6-1



Current Median Warrants

600 Roadside Design

601.2 Median Barrier Warrants

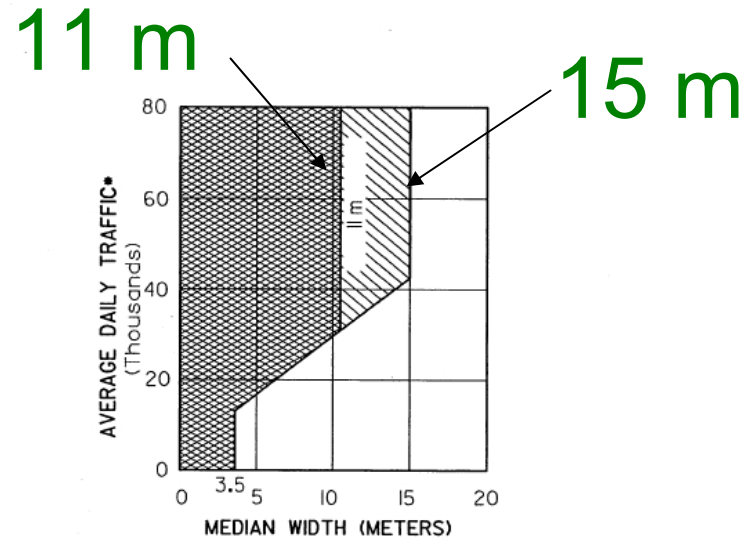
A median barrier is a longitudinal barrier used to separate opposing traffic on a high-speed controlled-access divided highway having relatively flat, traversable medians. **Figure 601-2** may be used to determine the need for median barriers, which is based on the width of the median and the volume of traffic on the facility. A median barrier may be either Type 5 Barrier Design guardrail or concrete barrier. If the median is wide enough so that the barrier is not likely to be impacted on the opposite side, i.e. it is outside the clear zone of opposing traffic, then roadside barrier warrants should be used.



Ohio

Current Median Warrants

MEDIAN BARRIER WARRANTS	601-2M
	REFERENCE SECTIONS 601.2



Warrants for median barriers on high-speed highways

• Based on a 5-year projection

 OPTIONAL
 WARRANTED

Ohio



Current Median Warrants

Median Protection Products

- Concrete Median Barrier
- Double Sided W-Beam
- Dual Run of W-Beam
- One Run of Single Sided W-Beam
- Generic (Untensioned) Cable



Concrete Median Barrier



Single Slope Concrete Barrier



Barrier Guardrail



Double Sided W-Beam



Are Warrants Adequate?



Warrants do prevent these.....



Are Warrants Adequate?

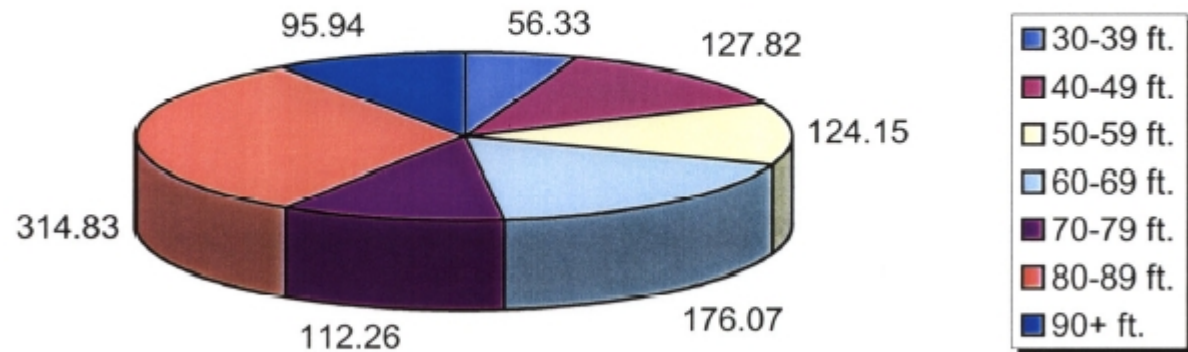


...but even with warrants, these still occur.



Crash Analyses

Unprotected Interstate System by Median Width
by Miles

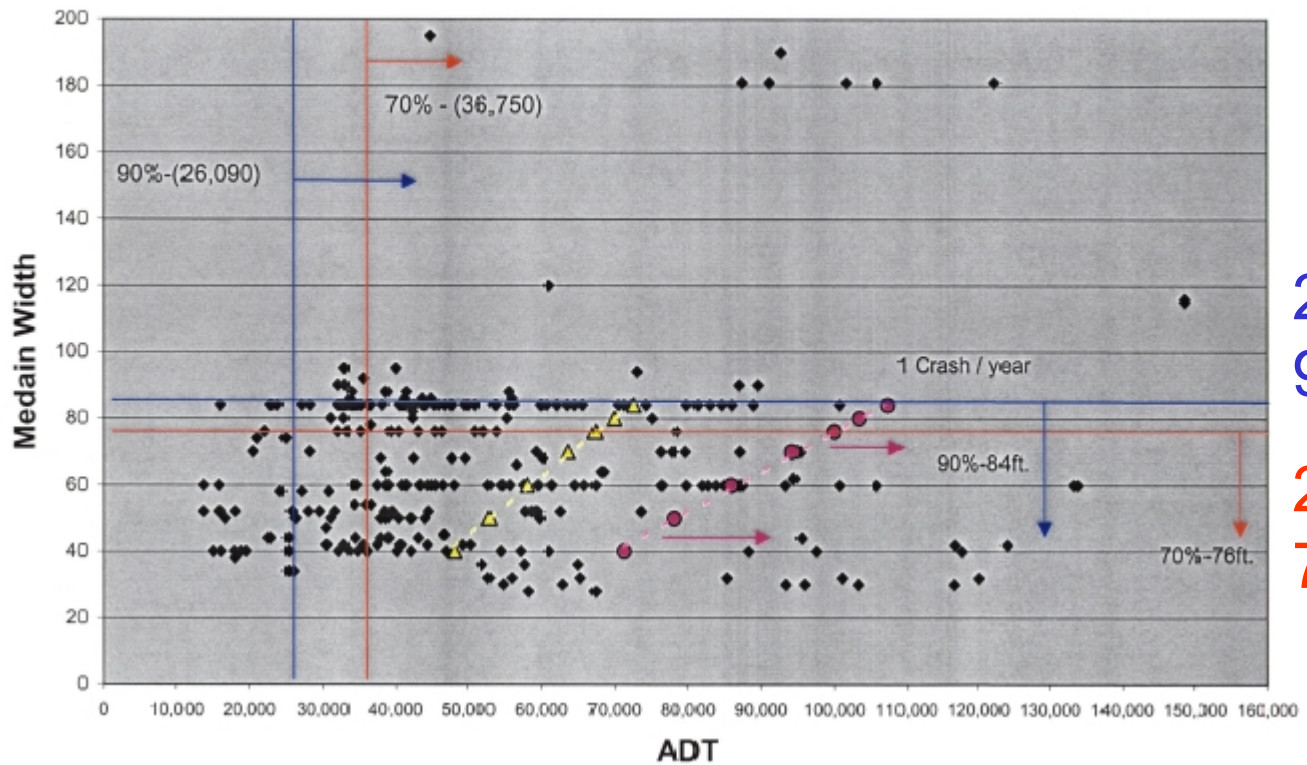


1,600 kilometers of unprotected medians



Crash Analyses

Cross-Median Crashes (2000-2003)



27 m
90%

23 m
70%



Crash Analyses

ODOT Safety and Mobility Study

- 16% of all fatal accidents are CMC
- 17 deaths annually
- 133 injury accidents
- \$28 M cost to society

CMC increased 19% over 8 years



Cross Median Crashes

Rash of Accidents on I-75

- Constructed in mid-to late 1960's
- Six lanes (3 each direction)
- Tangent alignment, or soft curves
- 1.2 meter paved inside shoulders
- 18 meter median with rounded ditch
- 6:1 median slopes



Cross Median Crashes

Rash of Accidents

In a 20 kilometer segment
beginning in 2001:

- 14 month period
- 11 cross over fatal accidents
- 14 deaths



Cross Median Crashes


Rash of Accidents

- 65 mph (100 km/hr) rural highway with urban sprawl
- 55 mph (90 km/hr) for large trucks)
- 95,000 to 72,000 ADT
- High percentage of trucks (20 to 29)



Cross Median Crashes

Median Protection Products

- Concrete barrier
- Double sided w-beam
-  **High Tensioned Cable**



Cross Median Crashes



Brifen Completed in 2003,
300 hits so far.



Cross Median Crashes

Benefits of Cable Protection

- No fatal accidents
- One penetration into opposing traffic
- 30% more accidents
- 12% of cable accidents are injury
- Most are minor injuries



Proposed Warrants



Cable seems to be effective



Proposed Warrants

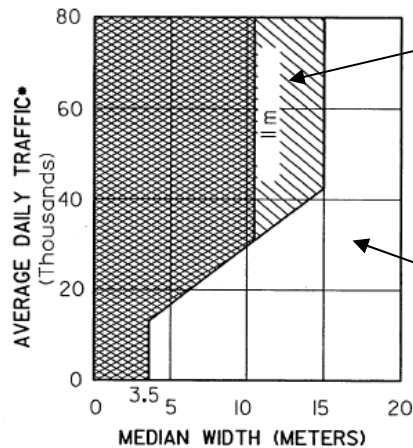


Cable does not sag after accident



Proposed Warrants

MEDIAN BARRIER WARRANTS	601-2M
	REFERENCE SECTIONS 601.2



Warrants for median barriers on high-speed highways

* Based on a 5-year projection



No longer an option – use cable, or similar

Install cable, if studies show a history of cross median crashes



Ohio

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Dean Focke, ODOT Standards Engineer

