

# Designing a Thrie Beam Bullnose Terminal



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## General Bullnose Parameters

The Bullnose Terminal Section has been designed and MASH tested by Midwest Roadside Safety Facility.

This design manual is for the MASH TL-3 bullnose system. The bullnose is a non-proprietary, three-beam, median barrier system used to shield median hazards found between divided highways. When a vehicle impacts the radiused nose of a bullnose, the barrier captures the vehicle, collapses inward, and dissipates energy to safely decelerate the vehicle. Impacts along the sides of the barrier are redirected similar to standard guardrail systems.

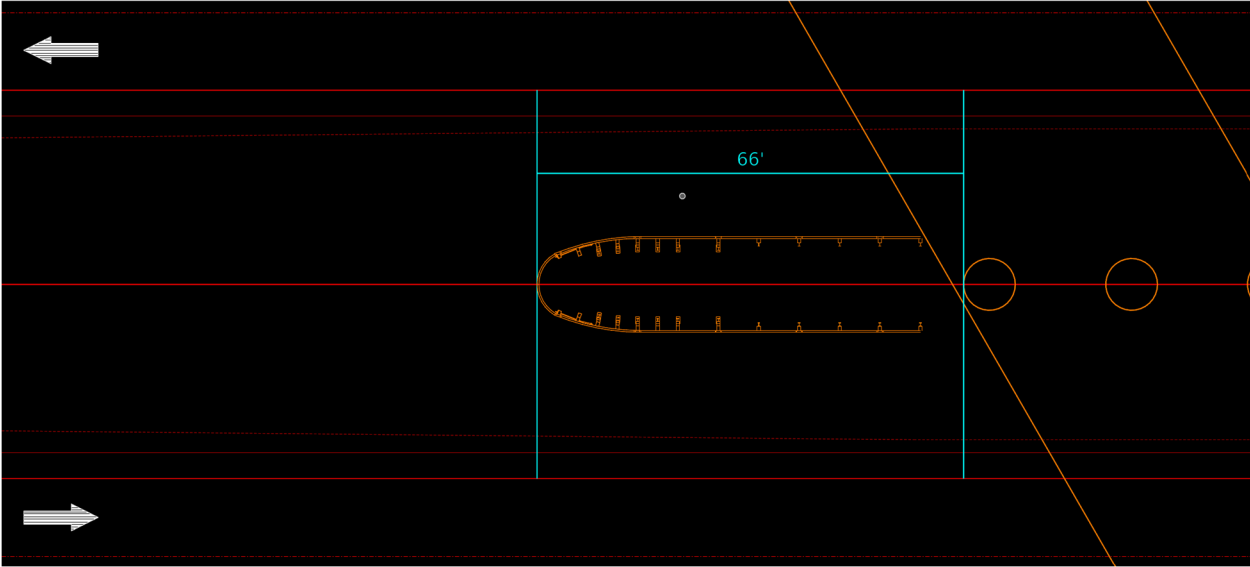
The bullnose system was designed and crash tested as a non-gating, redirective crash cushion to meet the requirements of the American Association of State and Highway Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH 2016) criteria Test Level 3, which specifies impact at 62 mph. It is the responsibility of the installer to utilize a design approved by the State DOT and to follow all required State procedures and these instructions when installing the bullnose system.

When designing a bullnose terminal, many aspects are variable. However, within the limits of the bullnose pay limit, it is critical that post 13A to 13B adhere to the standards laid out by KYTC.

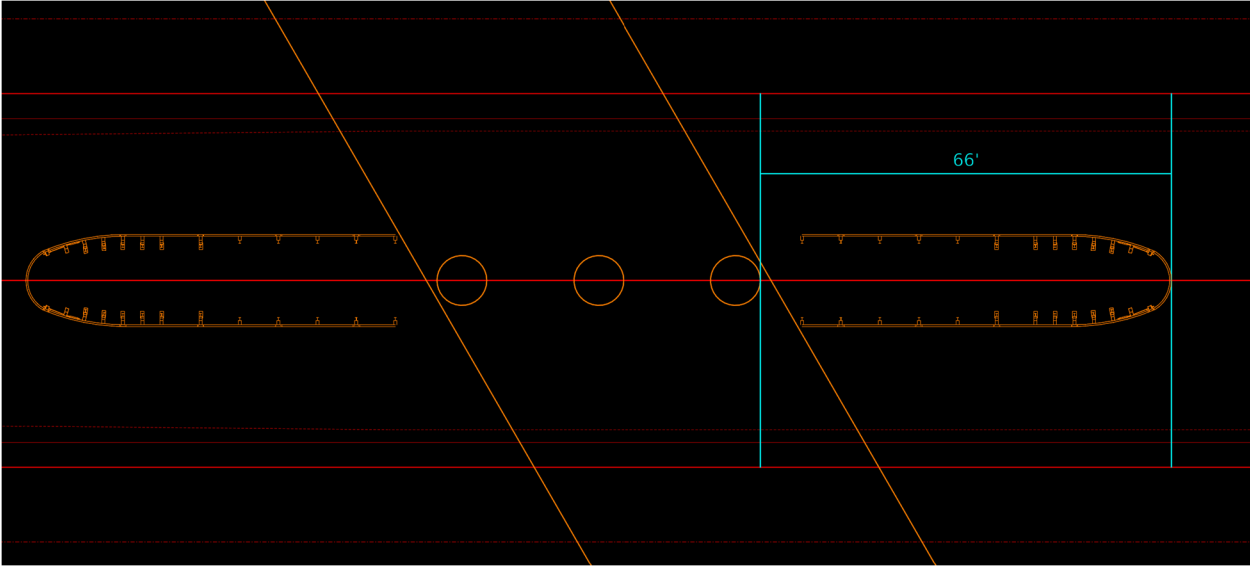
# Designing a Symmetrical Bullnose Terminal

\*Symmetrical Bullnose Terminals shall be placed as far away from the traffic way as practical while still meeting minimum widths.

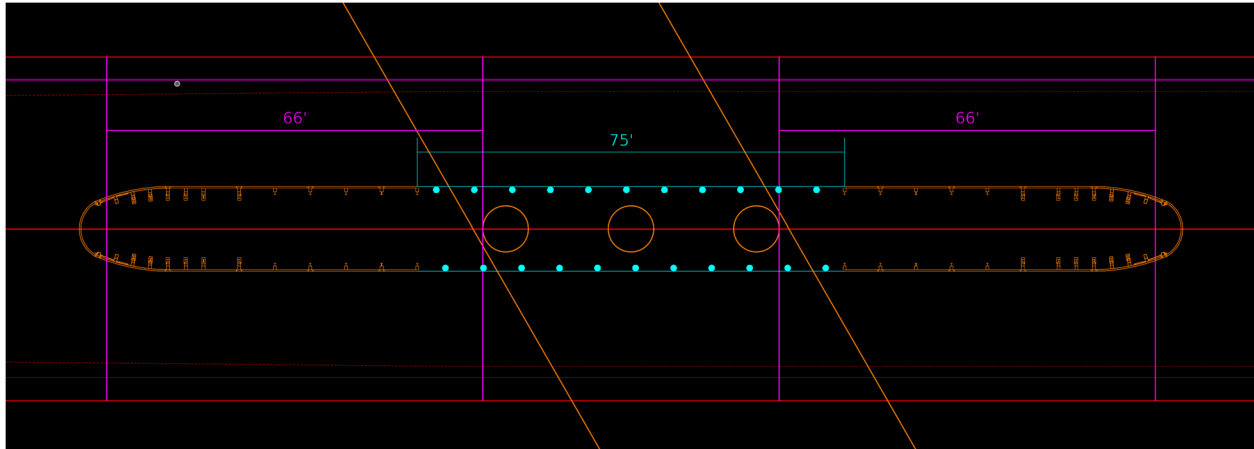
The beginning of a Symmetrical Bullnose Terminal must begin 66' from the front of the fixed object or obstacle. Place the Symmetrical Bullnose Terminal Cell provided by KYTC.



The same 66' should apply at the other end of the obstacle.



Adjust the spacing of the Terminals to ensure the guardrail between will be devisable by 12.5'.

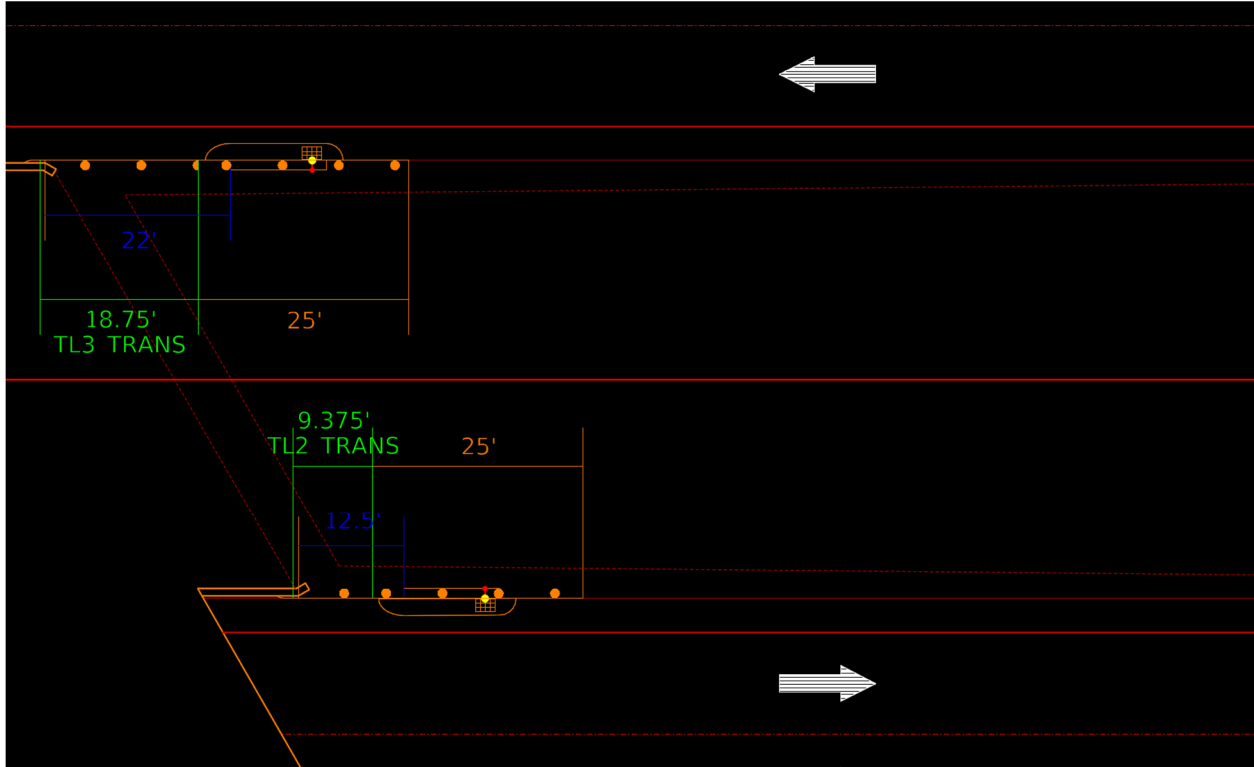


**Ensure grading around Bullnose Terminal meet standard drawing requirements.**

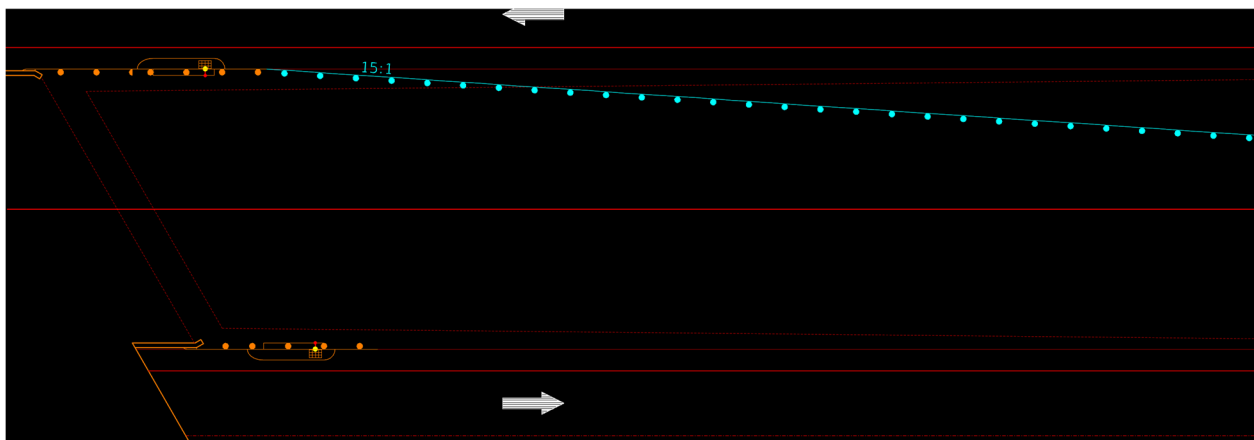
Once the entire Bullnose Terminal is laid out, the designer shall produce a chart listing Station-Offset of each post within the Bullnose Terminal.

## Designing an Asymmetrical Bullnose Terminal

When trying to twin bridges – plot out the Approach Guardrail Transitions at Bridge Ends – consider if drainage is necessary. Insure even post spacing according to the standard drawing.

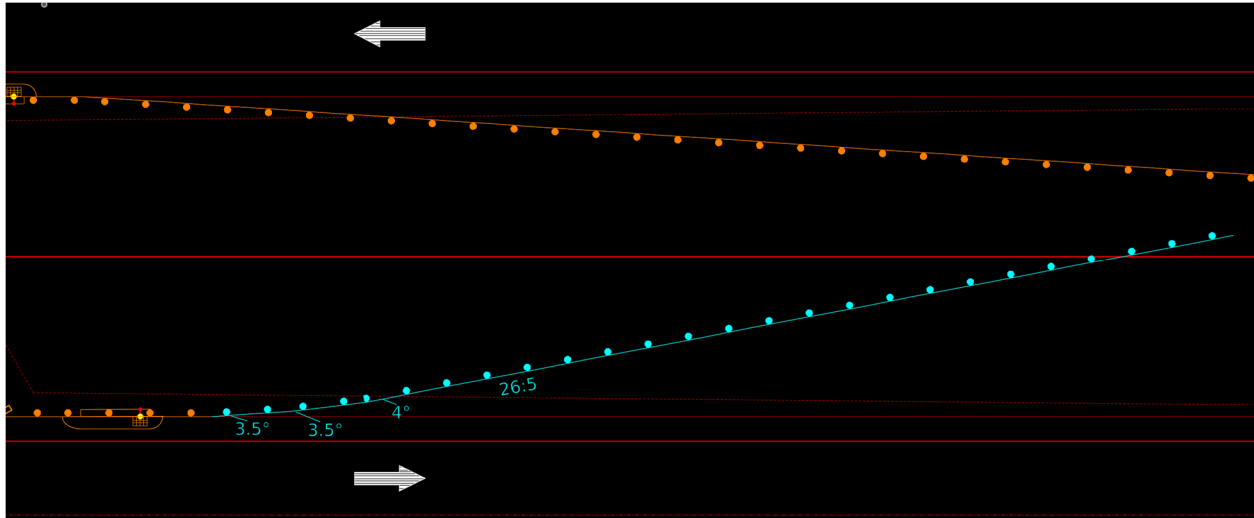


After plotting the AGT, begin on the Approach Side of the median. Taper the guardrail at 15:1 (or flatter).

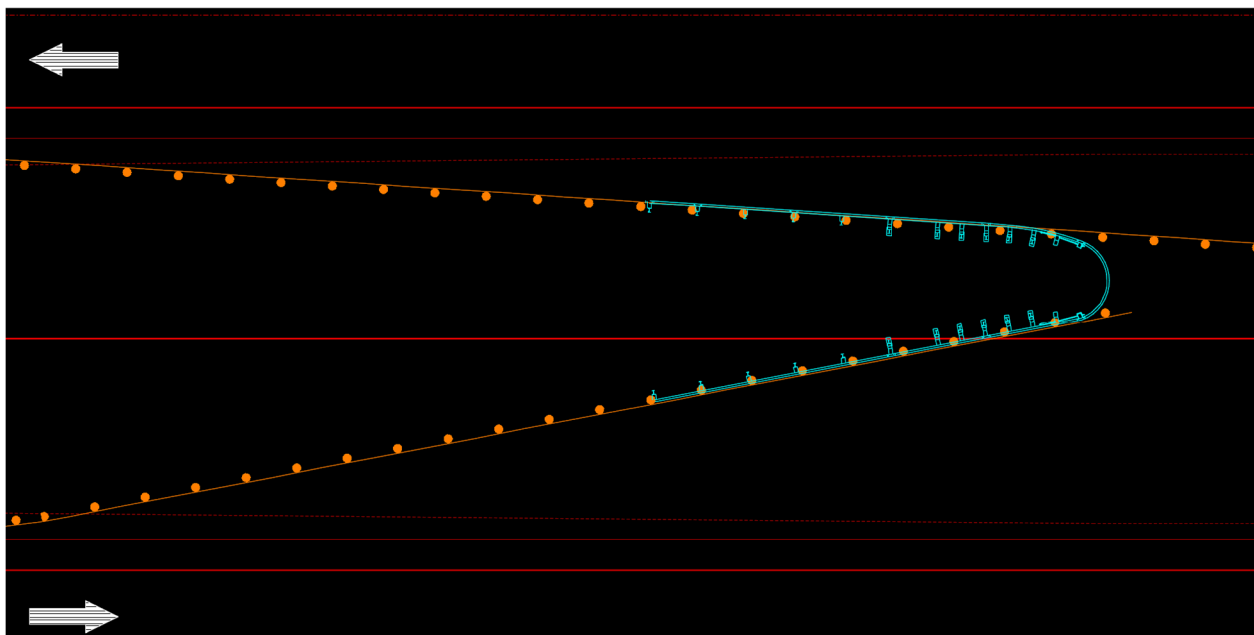


The Opposing Side has more flexibility depending on site conditions. Each run of guardrail (12.5') can be deflected 0-4.7°. In this example, 3.5° was used. Taper as

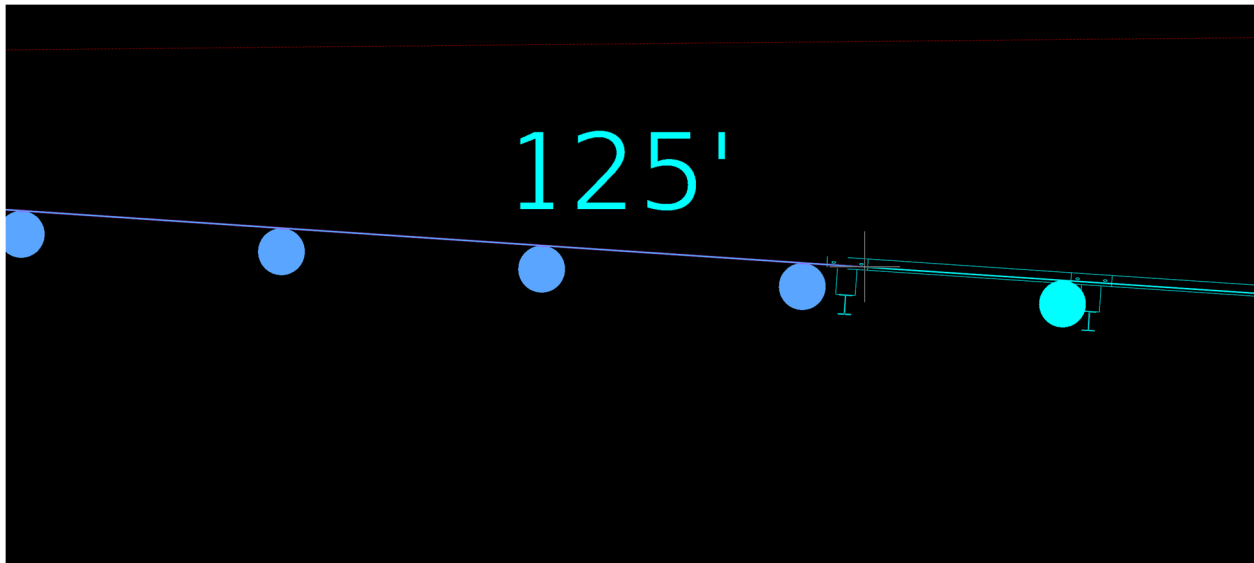
necessary, but do not exceed the 26:5 taper allowable. In a curved situation, the taper will vary, however, ensure the maximum taper 26:5.



KYTC has provided a cell for the asymmetrical and symmetrical bullnose. The asymmetrical cell has 15:1 slope on one side and 26:5 on the other. This can be placed to get a general idea of the width.

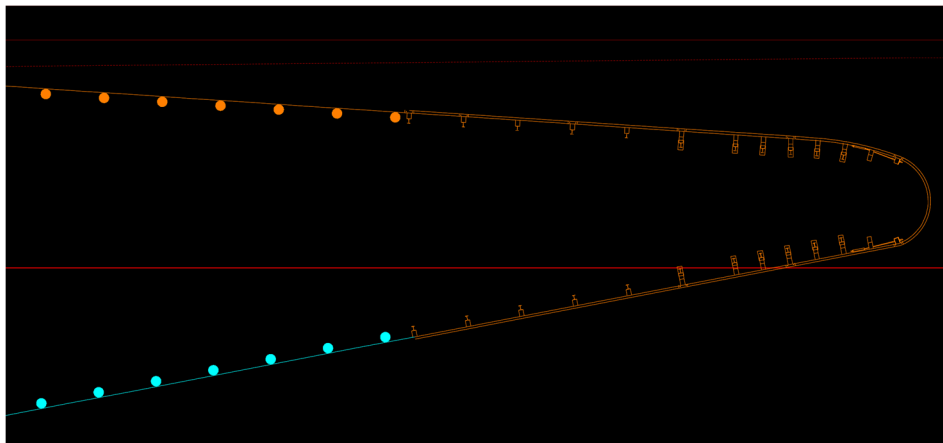


Ensure the line on the Approach Side is divisible by 12.5. Now place the cell in line with the 15:1 taper.

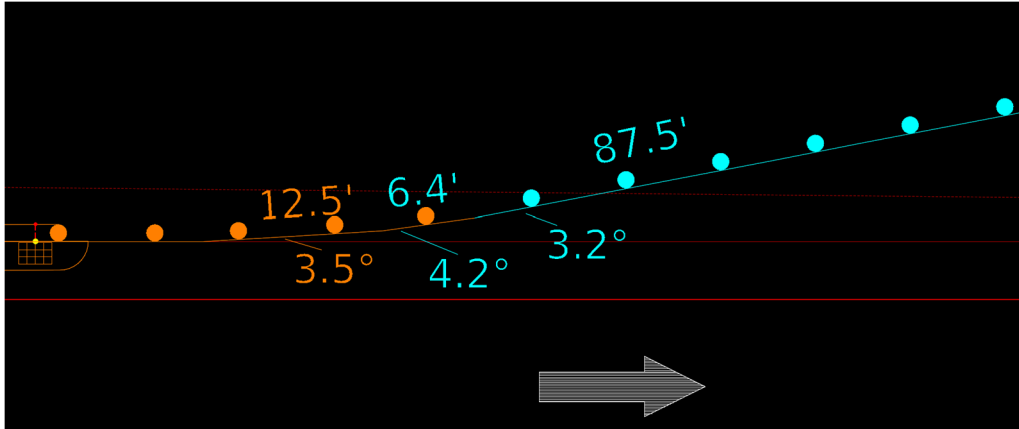


Adjust the bull nose to fit on the run of 15:1 guardrail.

Adjust the Opposing side (26:5 taper) to align with the bull nose.



Adjust the deflection angles on the Opposing side to best meet 12.5' lengths. Ensure no deflection angle is greater than  $4.7^\circ$ . Generally, one run of guardrail will be at odd length and require field cutting.



Once the entire Bullnose Terminal is laid out, the designer shall produce a chart listing Station-Offset of each post within the Bullnose Terminal.

**Ensure grading around Bullnose Terminal meet standard drawing requirements.**