

WSDOT Guardrail Terminal and Anchor Identification Guide

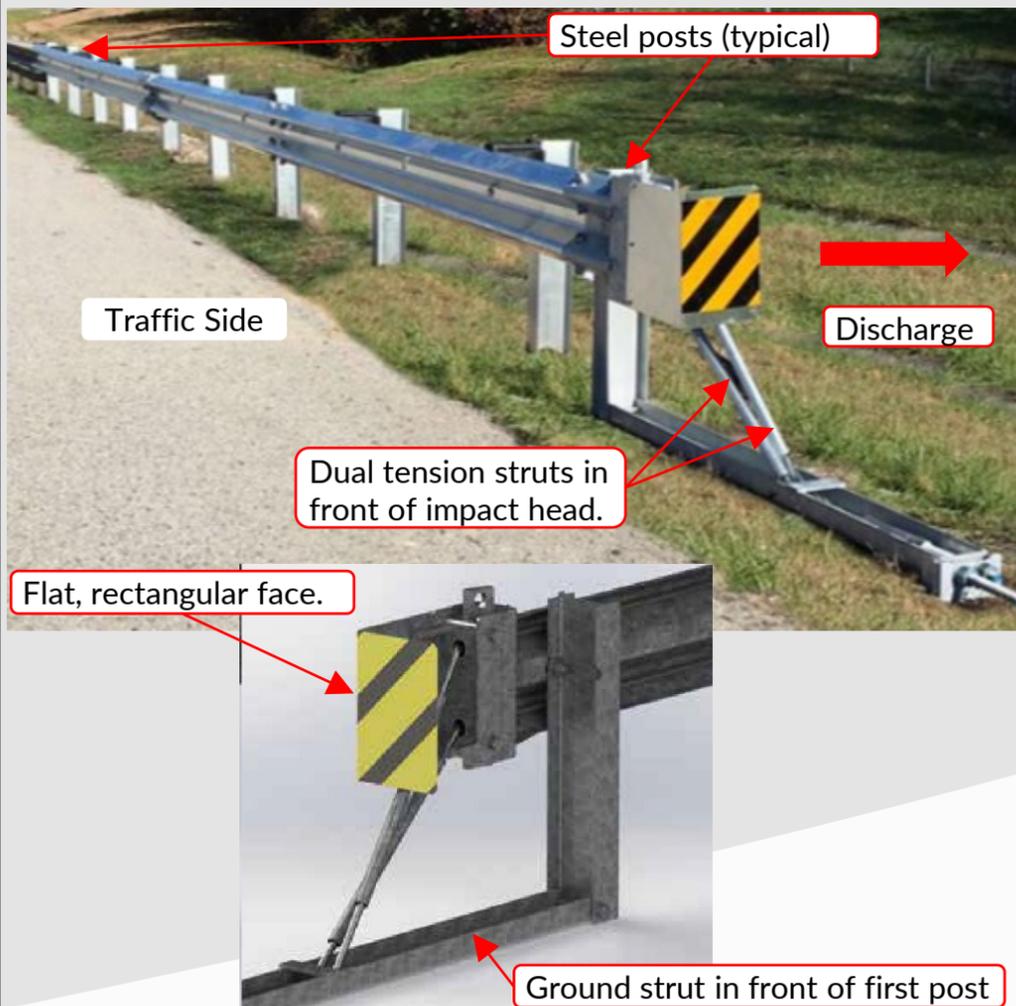
Terminals

MASH Terminals

This guide is for educational purposes only.
See Design Manual M22-01 for design guidance. Contact HQ Design for assistance
if you encounter a guardrail terminal or anchor not shown in this guide.

Max-Tension

TL-3 and TL-2 models produced by manufacturer.
Proprietary: Lindsay Corporation
<https://www.lindsay.com/usca/en/infrastructure/brands/barrier-systems/solutions/end-treatments/max-tension/>
See WSDOT [Standard Plan](#) C-22.40 (TL-3) and C-22.45 (TL-2)



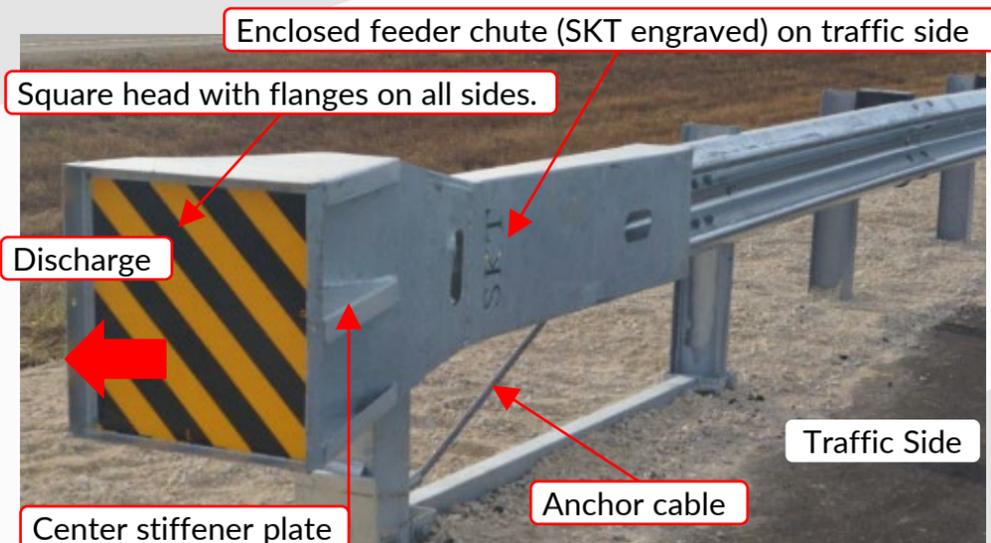
MSKT MASH-compliant Sequential Kinking Terminal

TL-3 and TL-2 models produced by manufacturer.
Proprietary: Road Systems, Inc. <https://roadsystems.com/mash-mskt/>
See WSDOT [Standard Plan](#) C-22.40 (TL-3) and C-22.45 (TL-2)



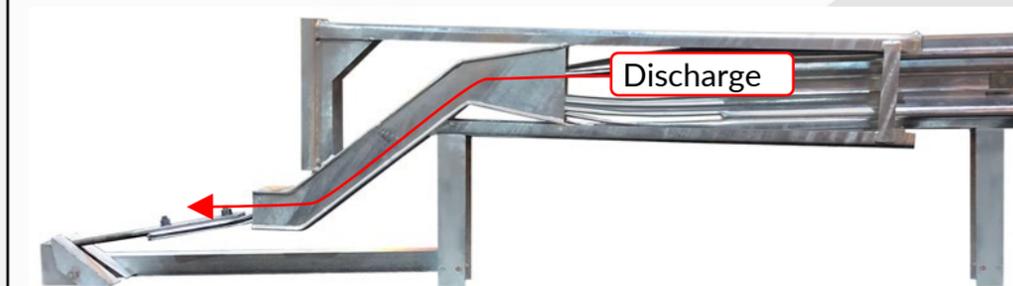
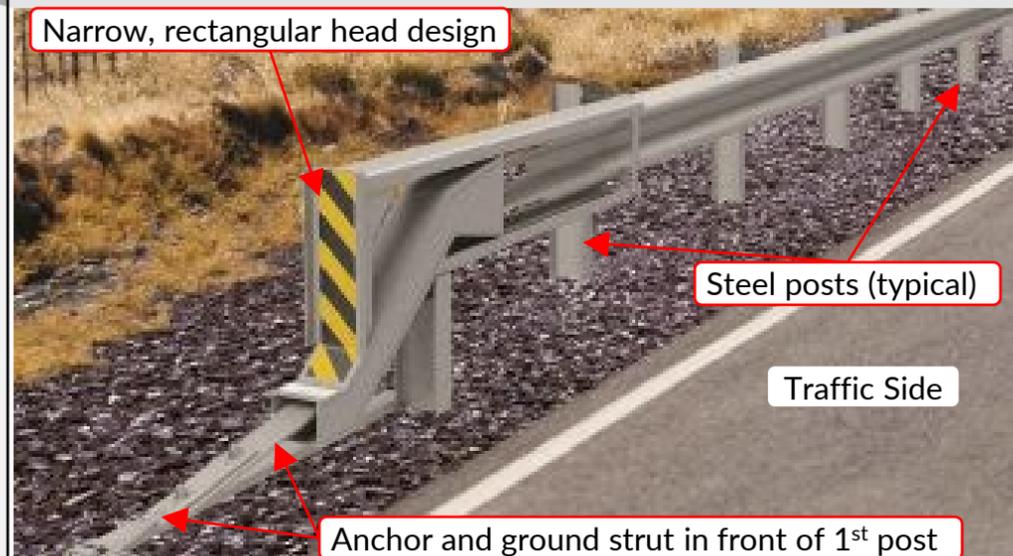
The MASH MSKT is an updated version of the NCHRP 350 SKT. The MSKT and SKT terminals look very similar. See Page 6 of this guide for additional information on the SKT to help determine similarities and differences between the MASH MSKT terminal and the NCHRP 350 SKT terminal.

Note: Repaired NCHRP 350 SKTs may have an MSKT head with an enclosed feeder chute installed so that they look like an MSKT. An MSKT will have **BOTH** a ground strut and steel posts. An SKT will have steel posts without a ground strut, or wooden posts with a ground strut (see page 6).



SoftStop

TL-3 and TL-2 models produced by manufacturer
Proprietary: Valtir LLC <https://valtir.com/product/softstop-system/>
See WSDOT [Standard Plan](#) C-22.40 (TL-3) and C-22.45 (TL-2)



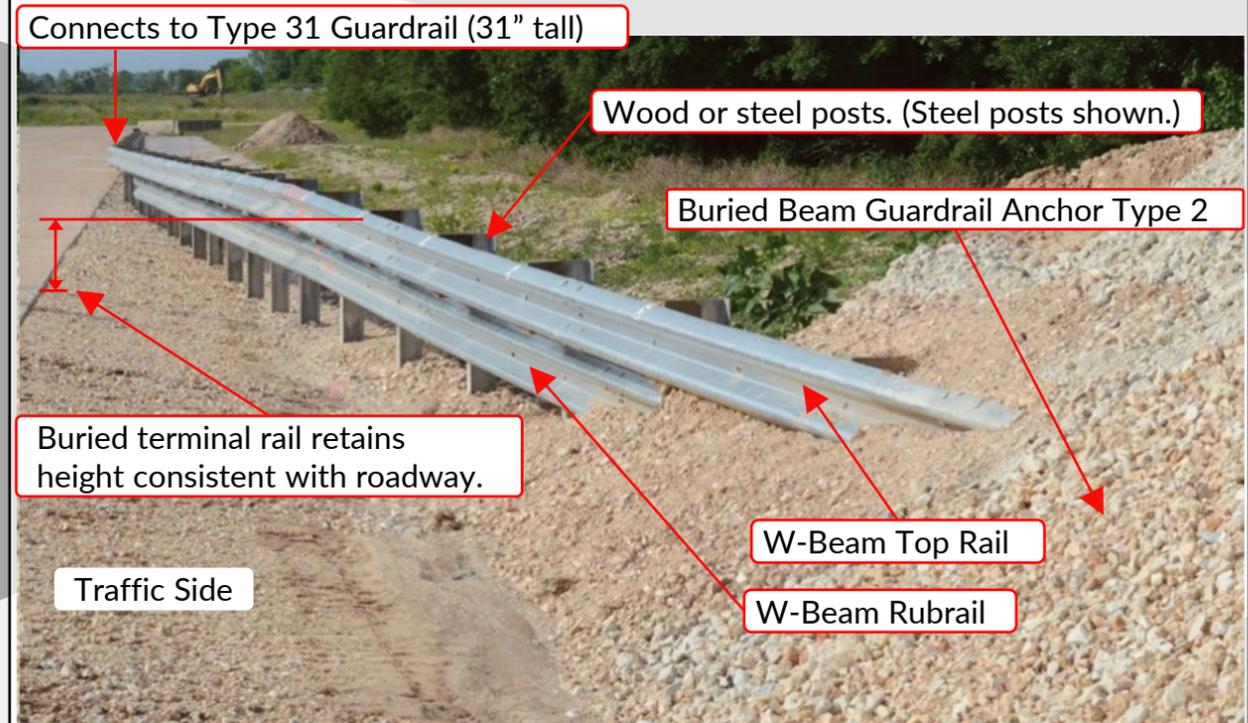
SGET

TL-3 model produced by manufacturer.
Proprietary: [SPIG Industries, LLC](#)
See WSDOT [Standard Plan](#) C-22.40



Beam Guardrail Type 31 – Buried Terminal Type 2

TL-3
Non-proprietary
See WSDOT [Standard Plan](#) C-22.16



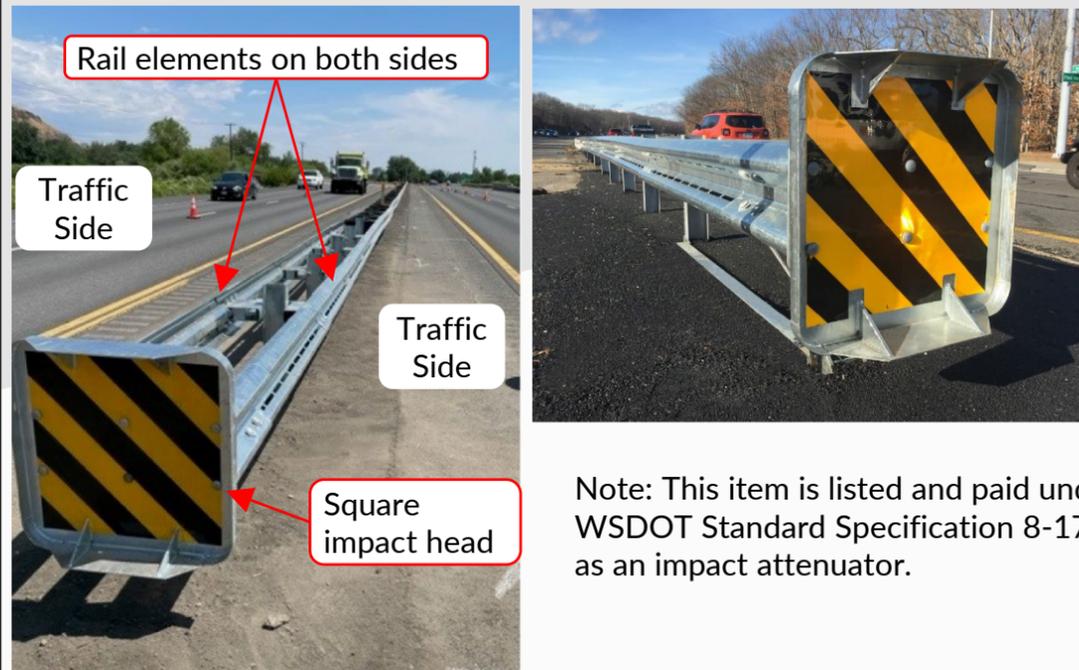
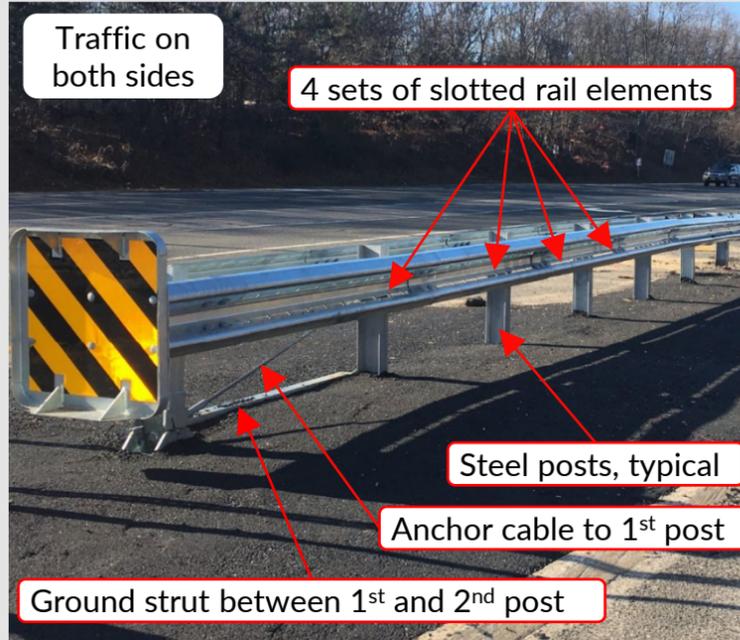
See page 16 in the Anchor section of this guide for buried Beam Guardrail Anchor Type 2.

MASH Terminals

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MATT Terminal (Median Attenuating Trend Terminal)

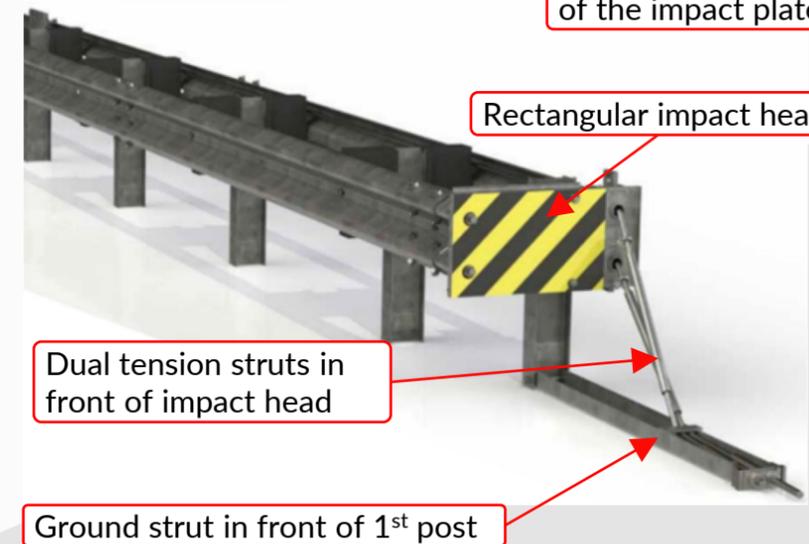
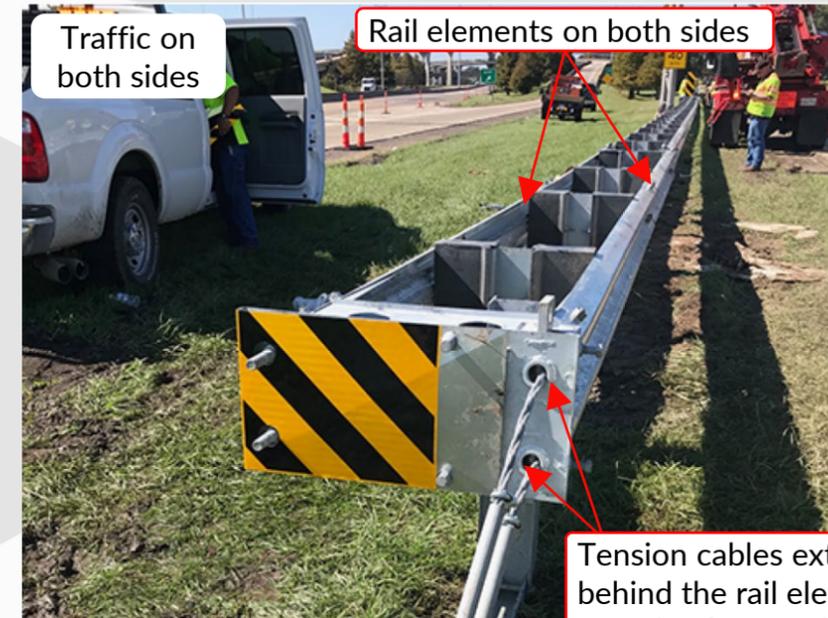
TL-3 model produced by manufacturer.
Proprietary: [Valtir LLC](#)



Note: This item is listed and paid under WSDOT Standard Specification 8-17 as an impact attenuator.

MAX-Tension Median Terminal

TL-3 Model produced by manufacturer
Proprietary: [Lindsay Corporation](#)



Note: This item is listed and paid under WSDOT Standard Specification 8-17 as an impact attenuator.

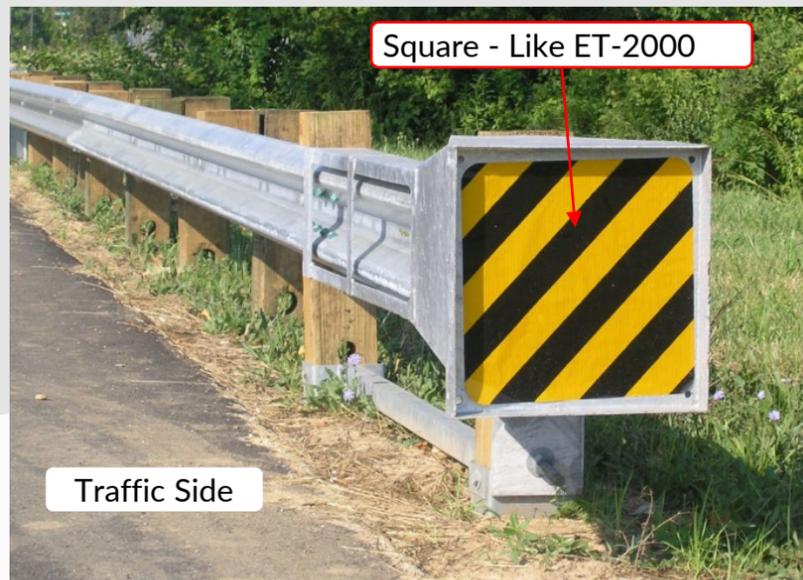
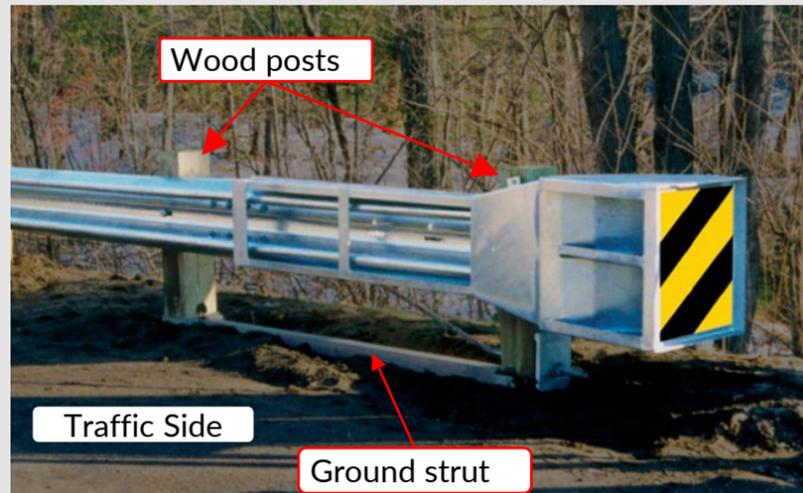
NCHRP 350 Terminals

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SKT (Sequential Kinking Terminal)

Wood Post

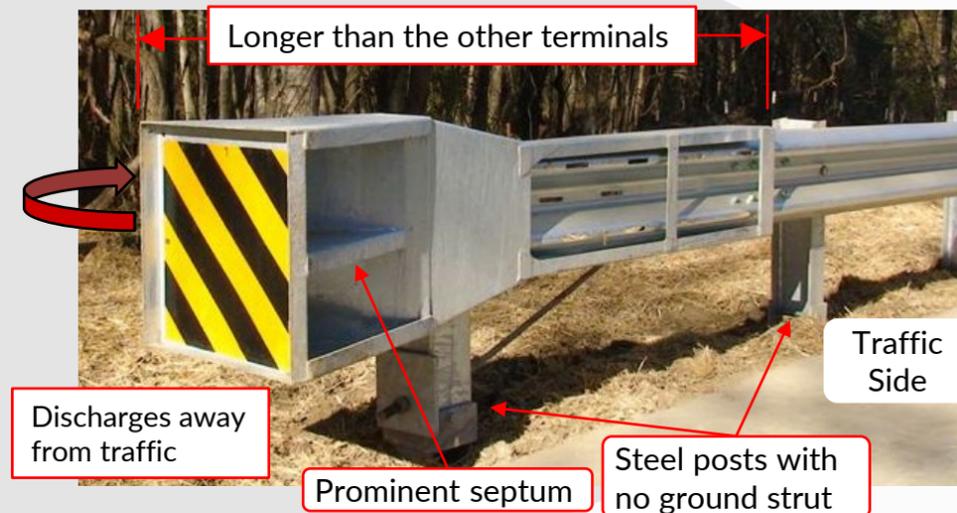
TL-3 model produced by manufacturer
Proprietary: [Road Systems, Inc.](#)



Some SKT Terminals still have a ground strut and wood posts. If the terminal has a ground strut and steel posts, it is an MSKT and NOT an SKT.

Steel Post

TL-3 model produced by manufacturer
Proprietary: [Road Systems, Inc.](#)



Some SKT Terminals still have a ground strut and wood posts. If the terminal has a ground strut and steel posts, it is an MSKT and NOT an SKT.

Repaired With MSKT Head

TL-3 model produced by manufacturer
Proprietary: [Road Systems, Inc.](#)



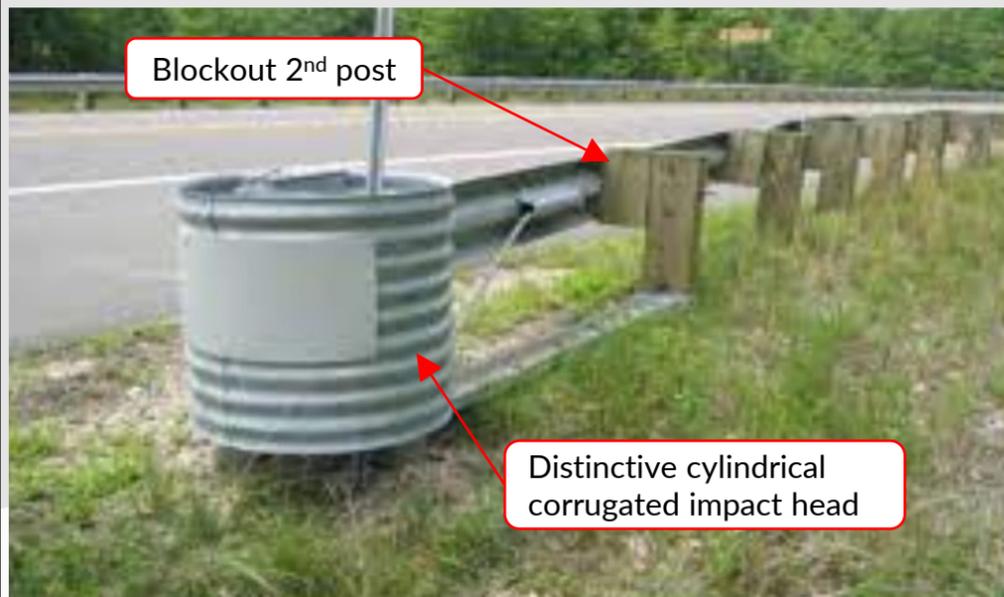
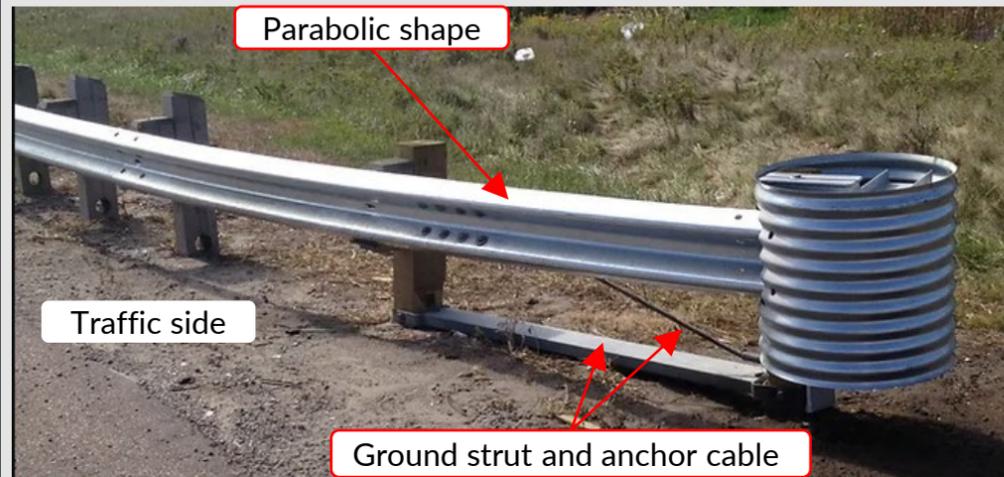
The manufacturer allows damaged NCHRP 350 SKT terminal heads to be replaced with MASH MSKT heads. The MASH MSKT terminal heads with the solid chute cover are interchangeable with and can be used on SKT terminals. See the post and strut configurations in the other entries on this page to identify if a terminal is an SKT or MSKT. Replacing an older terminal head with an MSKT terminal head does **NOT** retrofit NCHRP 350 SKT to MASH MSKT.

NCHRP 350 Terminals

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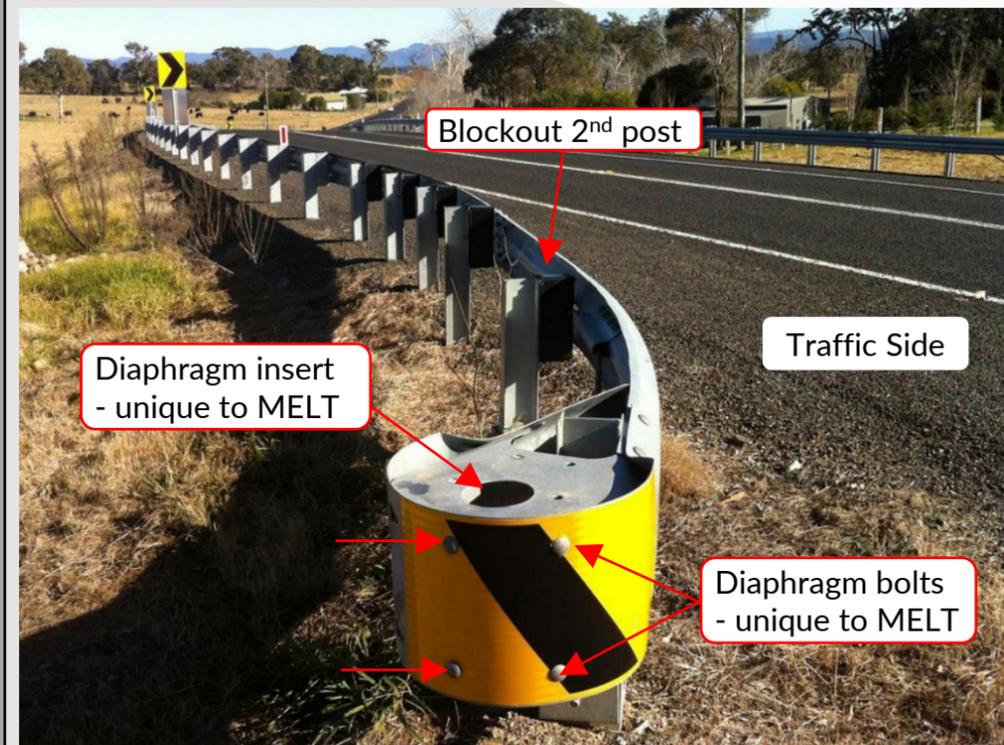
ELT Eccentric Loader Terminal

TL-3
Non-proprietary



MELT Modified Eccentric Loader Terminal

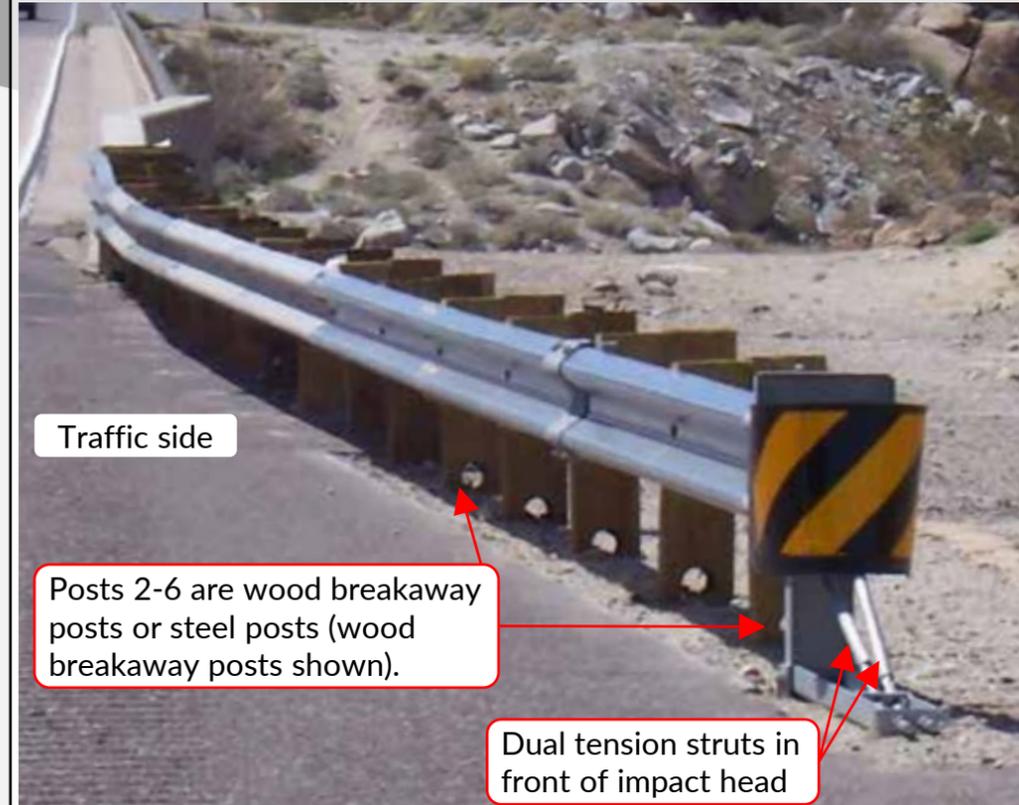
TL-2
Non-proprietary



Same design as the ELT except for the nose design.

X-Tension

TL-3 model produced by manufacturer
Proprietary: [Lindsay Corporation](#)



NCHRP 350 Terminals

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FLEAT Flared, Energy-Absorbing Terminal

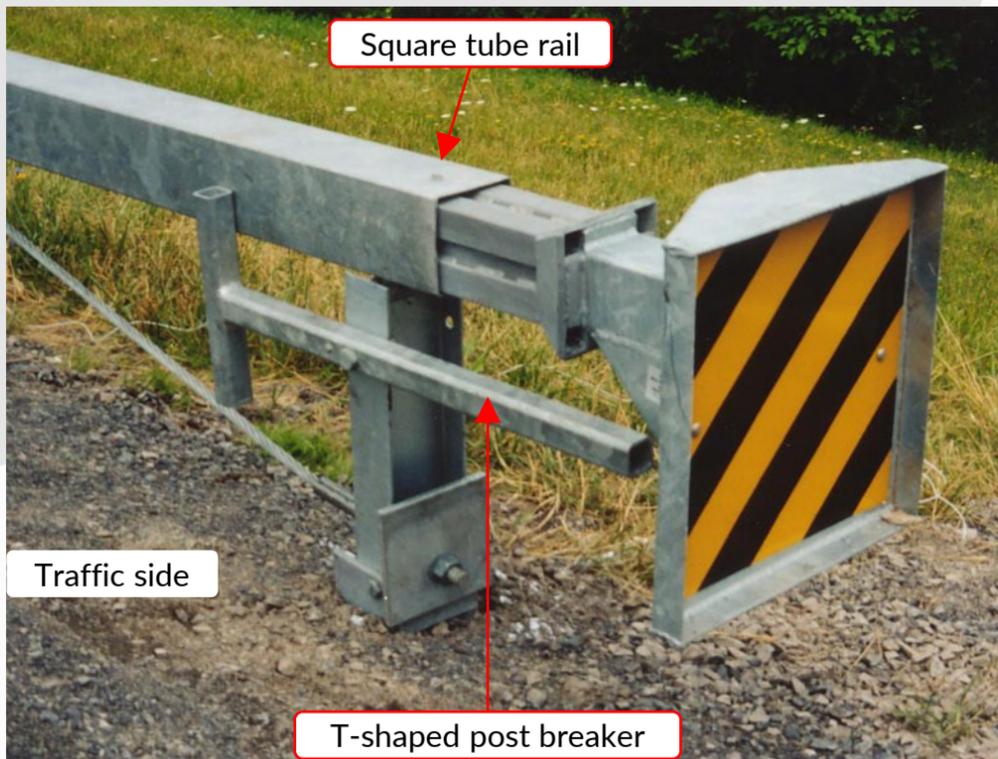
TL-3 and TL-2 models produced by manufacturer Proprietary: [Road Systems Inc.](#)
See WSDOT [Plan Sheet Library](#) TB-C4b



Extruder discharge is towards the roadway - unique to FLEAT

BEAT Bursting Energy-Absorbing Terminal

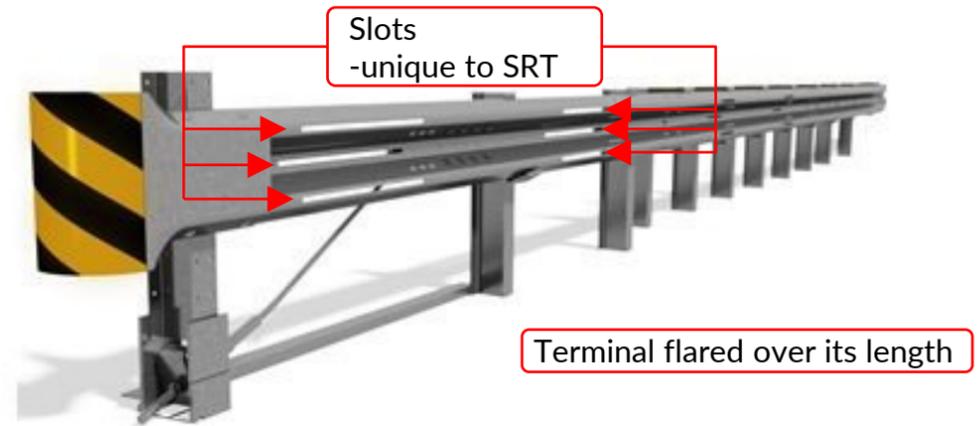
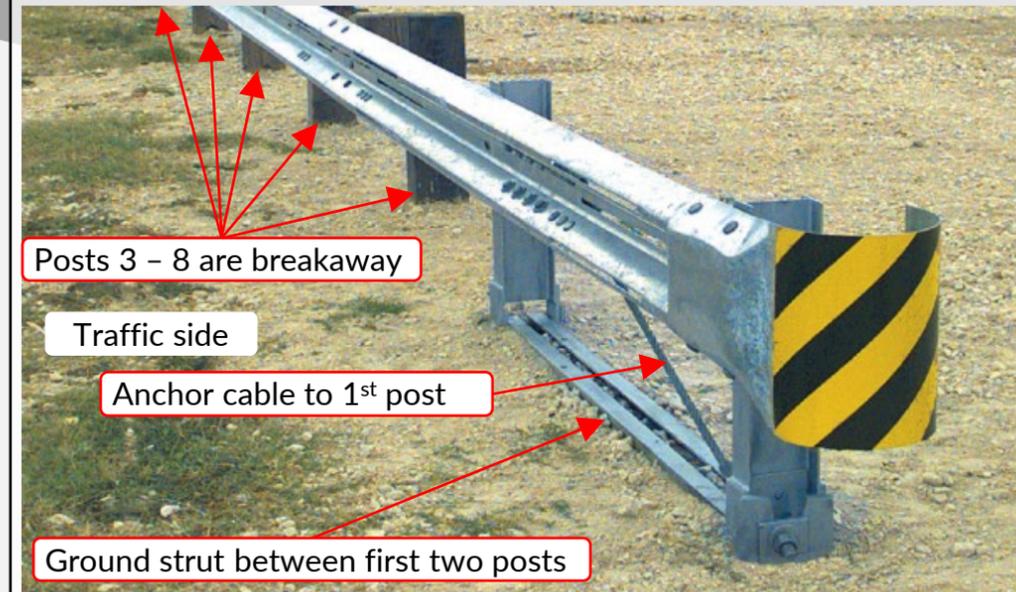
TL-3 model produced by manufacturer Proprietary: [Road Systems, Inc.](#)



The BEAT terminal connects directly to 6" x 6" box beam barrier (steel square tubing).

SRT Slotted Rail Terminal

TL-3 model produced by manufacturer Proprietary: [Valtir LLC](#)
See WSDOT [Plan Sheet library](#) TB-C4b



NCHRP 350 Terminals

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ET-Plus/ET-31

TL-3 and TL-2 models produced by manufacturer
Proprietary: [Valtir LLC](#)

CRT wood posts, or Steel Yielding Terminal (SYT) posts (CRT wood posts shown)

Rectangular head - like FLEAT



Discharge

Traffic Side

Ground strut installed on back edge of post

Flanges only on the sides -unique to ET-Plus

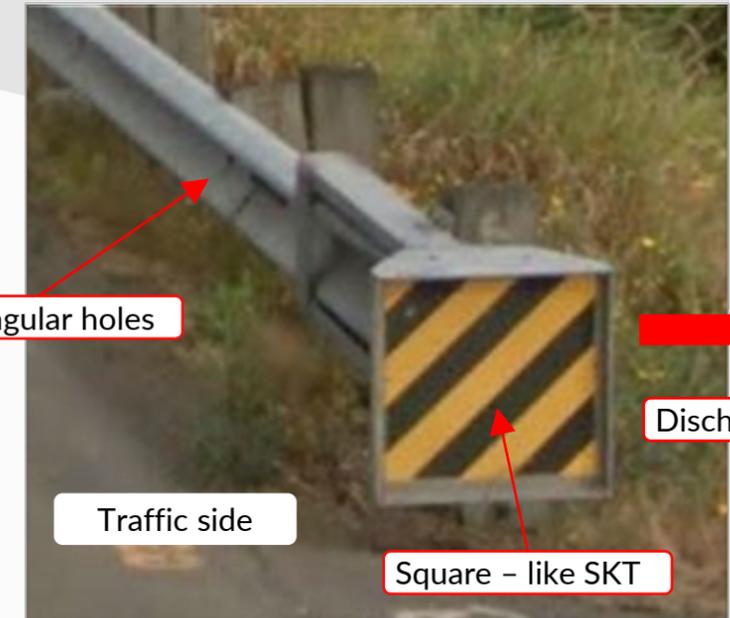


Traffic Side

One strut -unique to ET-Plus

ET-2000

TL-3 model produced by manufacturer
Proprietary: [Valtir LLC](#)



Rectangular holes

Discharge

Traffic side

Square - like SKT

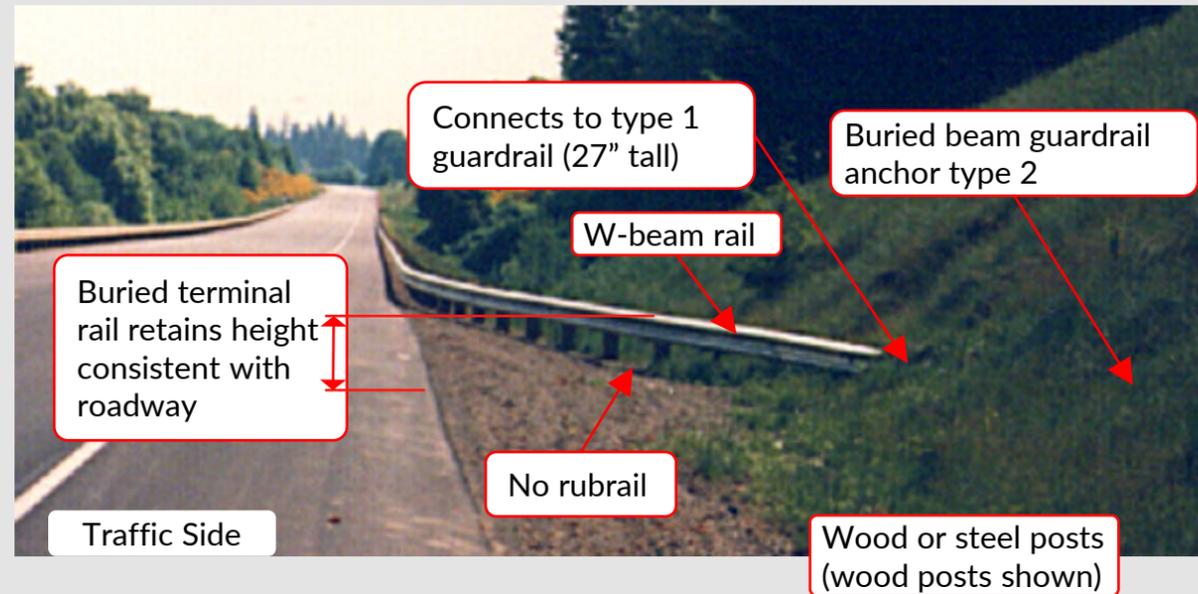


One strut - unique to ET's

Traffic side

Beam Guardrail Type 1 – Buried Terminal Type 1

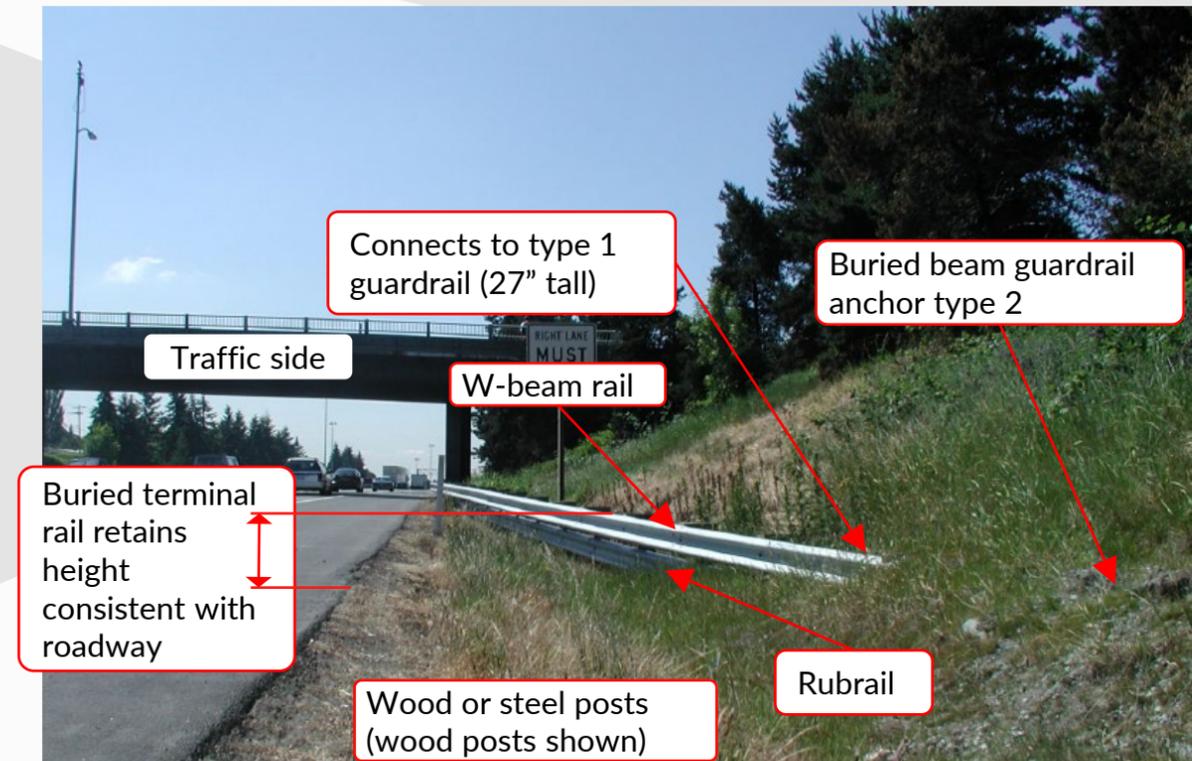
TL-3
See WSDOT [Plan Sheet Library](#) TB-10
Non-proprietary



See page 16 in the Anchor section of this guide for buried beam guardrail anchor type 2.

Beam Guardrail Type 1 – Buried Terminal Type 2

TL-3
See WSDOT [Plan Sheet Library](#) TB-C-22.14
Non-proprietary



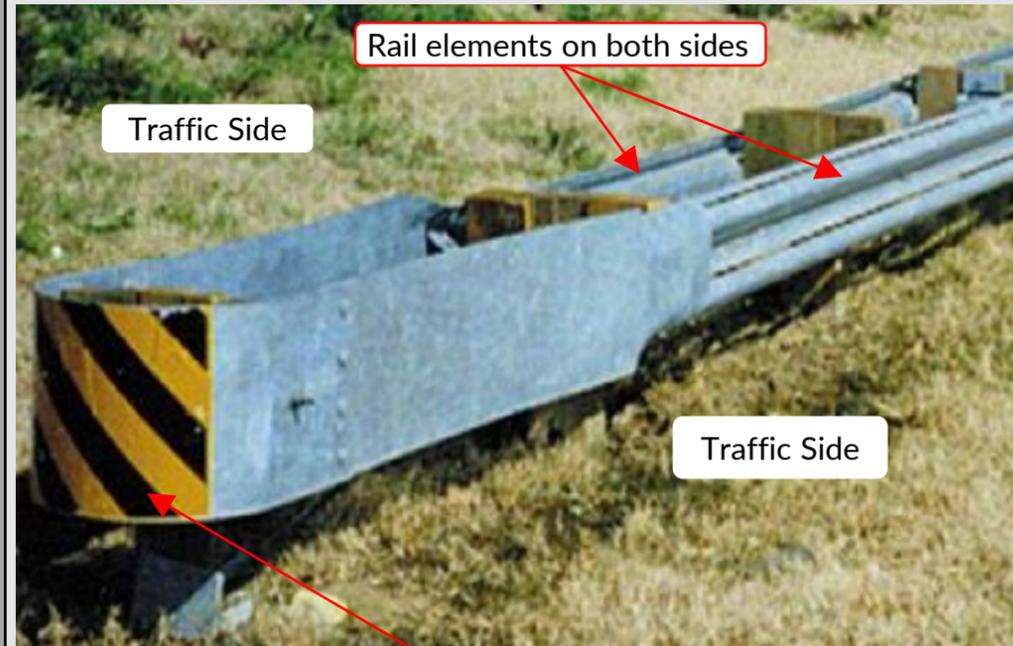
See page 16 in the Anchor section of this guide for buried beam guardrail anchor type 2.

NCHRP 350 Terminals

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CAT-350

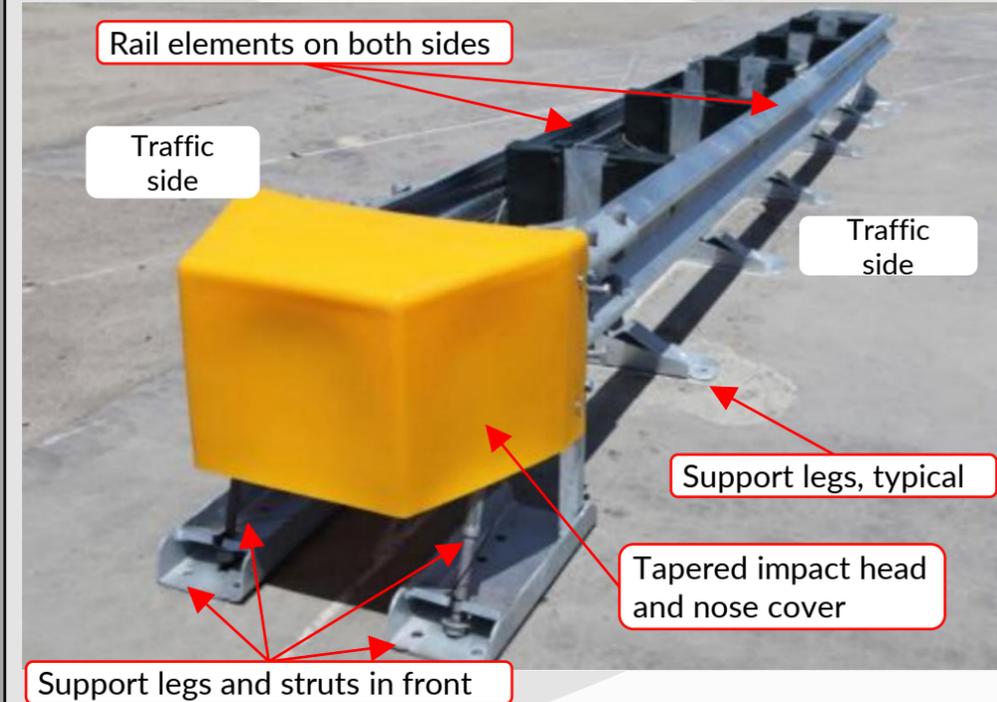
TL-3 model produced by manufacturer
Proprietary: [Valtir LLC](#)



Head curves around 1st post and attaches to 2nd post

X-TENUator Median Terminal

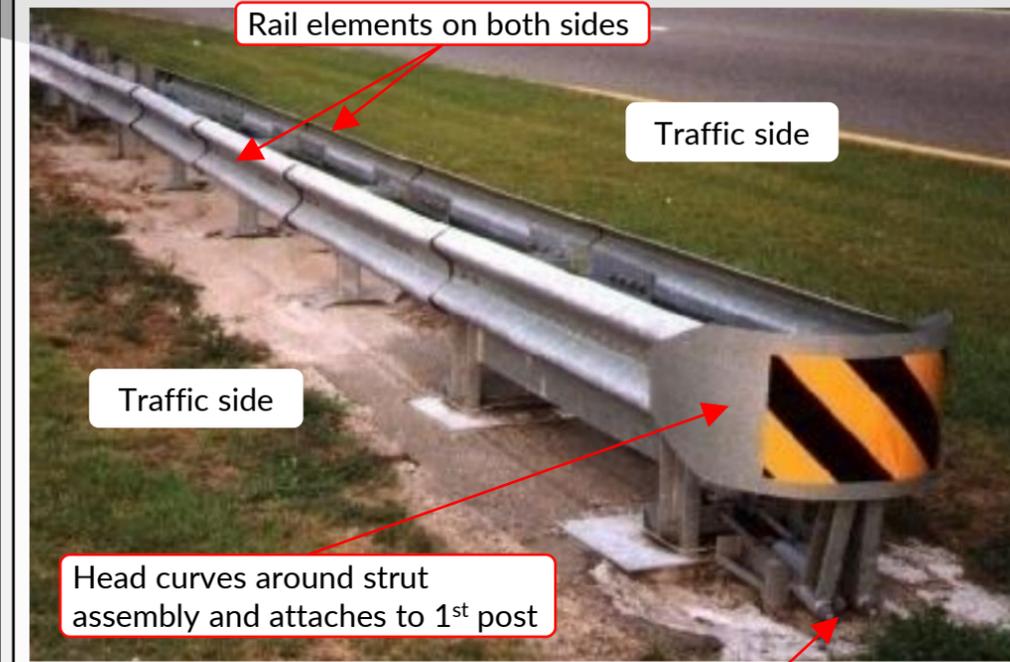
TL-3 model produced by manufacturer
Proprietary: [Lindsay Corporation](#)



Note: This item is listed and paid under WSDOT Standard Specification 8-17 as an impact attenuator

Brakemaster 350

TL-3 model produced by manufacturer. No longer in production. Repair/replacement no longer supported by manufacturer. Proprietary: [Valtir LLC](#) (formerly Energy Absorption Systems, Inc.)



Strut assembly in front of 1st post

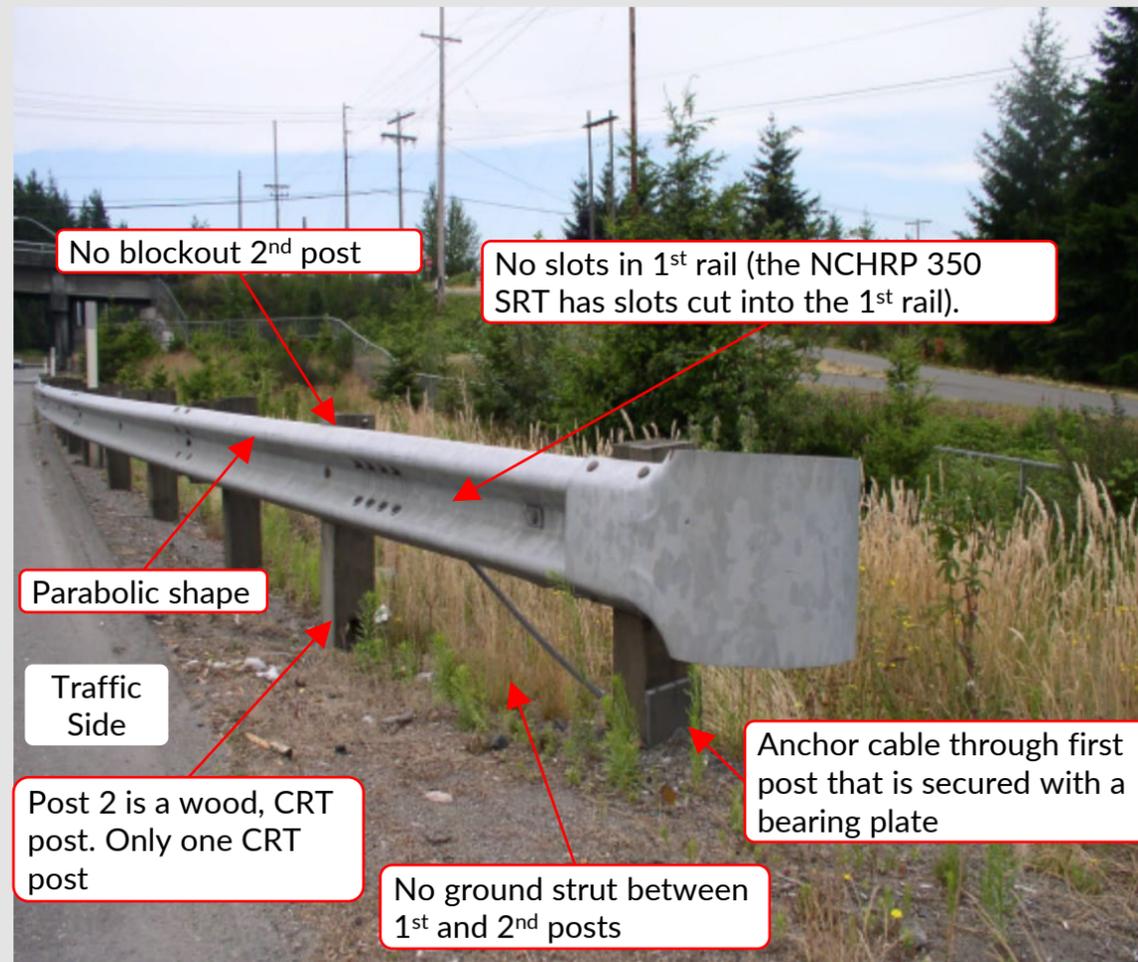
Note: This item is listed and paid under WSDOT Standard Specification 8-17 as an impact attenuator

Pre-NCHRP 350 Terminals

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BCT Buried Cable Terminal

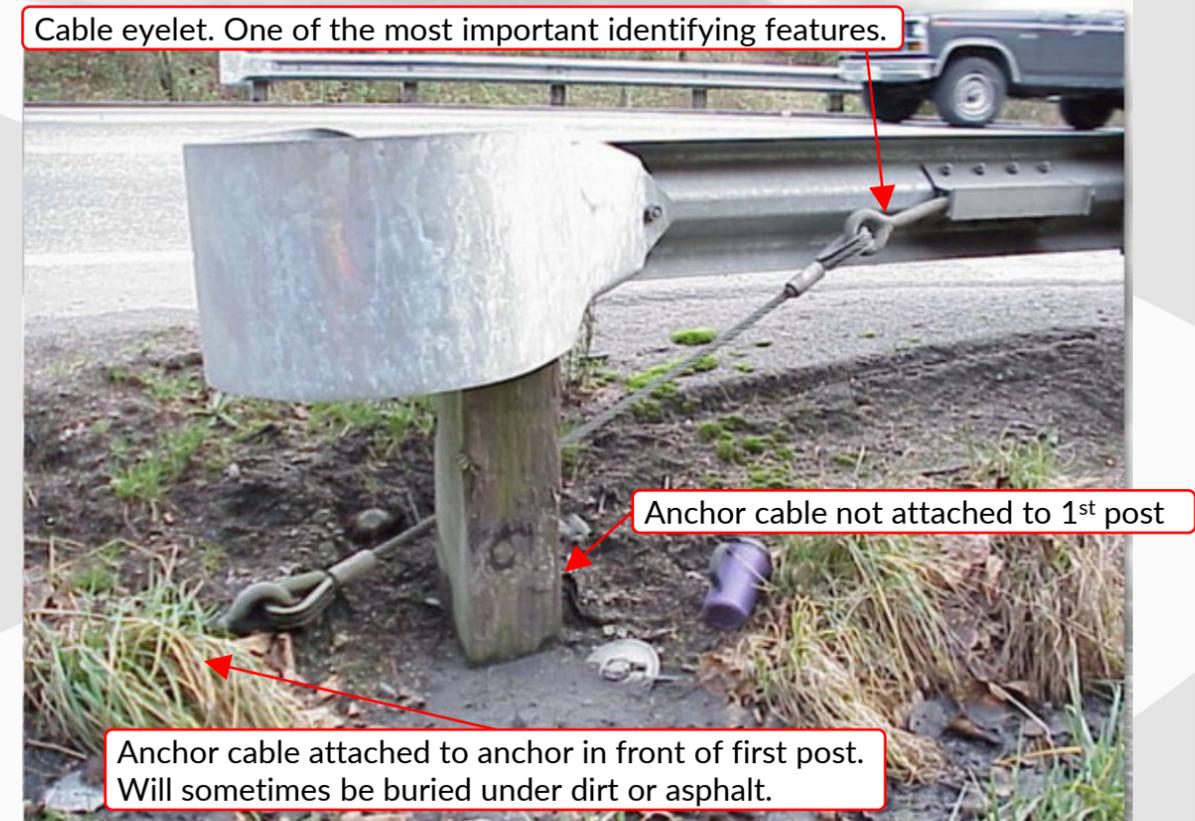
Non-proprietary



See page 14 of this guide for additional information on identification of BCT (Buried Cable Terminal) devices vs. type 1 anchors.

Type-1 Terminal

Non-proprietary

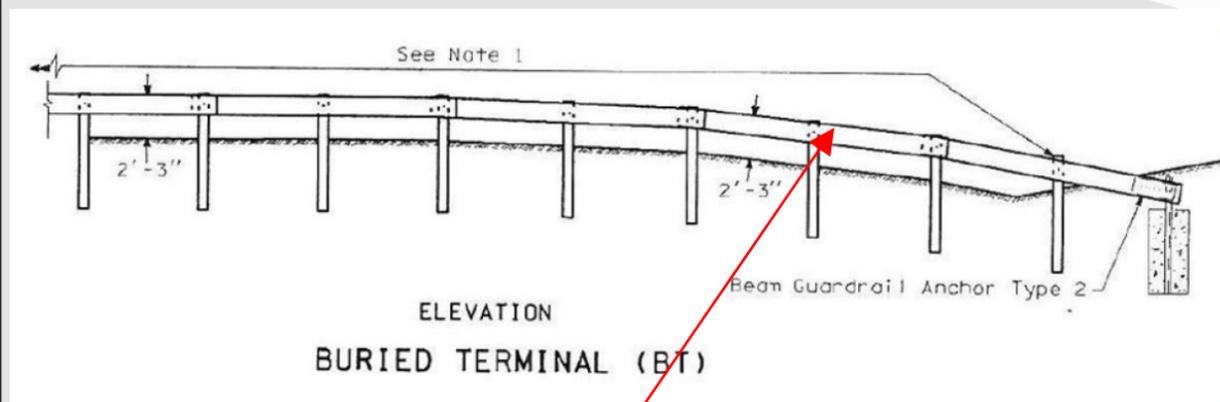


Pre-NCHRP 350 Terminals

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Buried Terminal

Non-proprietary

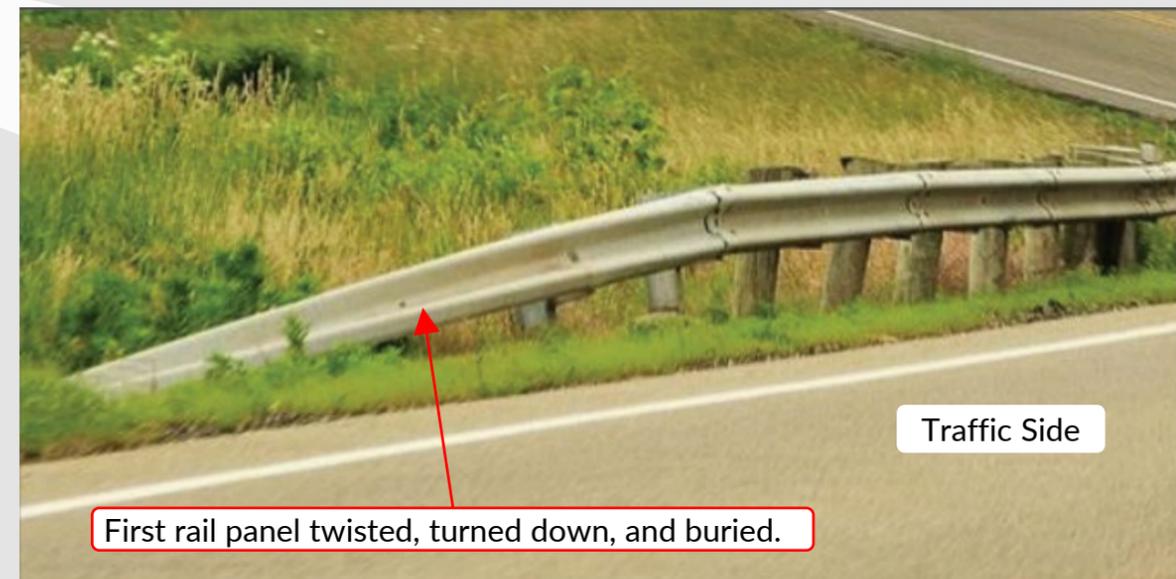


Were often designed so rail height was relative to embankment/ditch grading rather than relative to edge of paved shoulder.



Turndown End

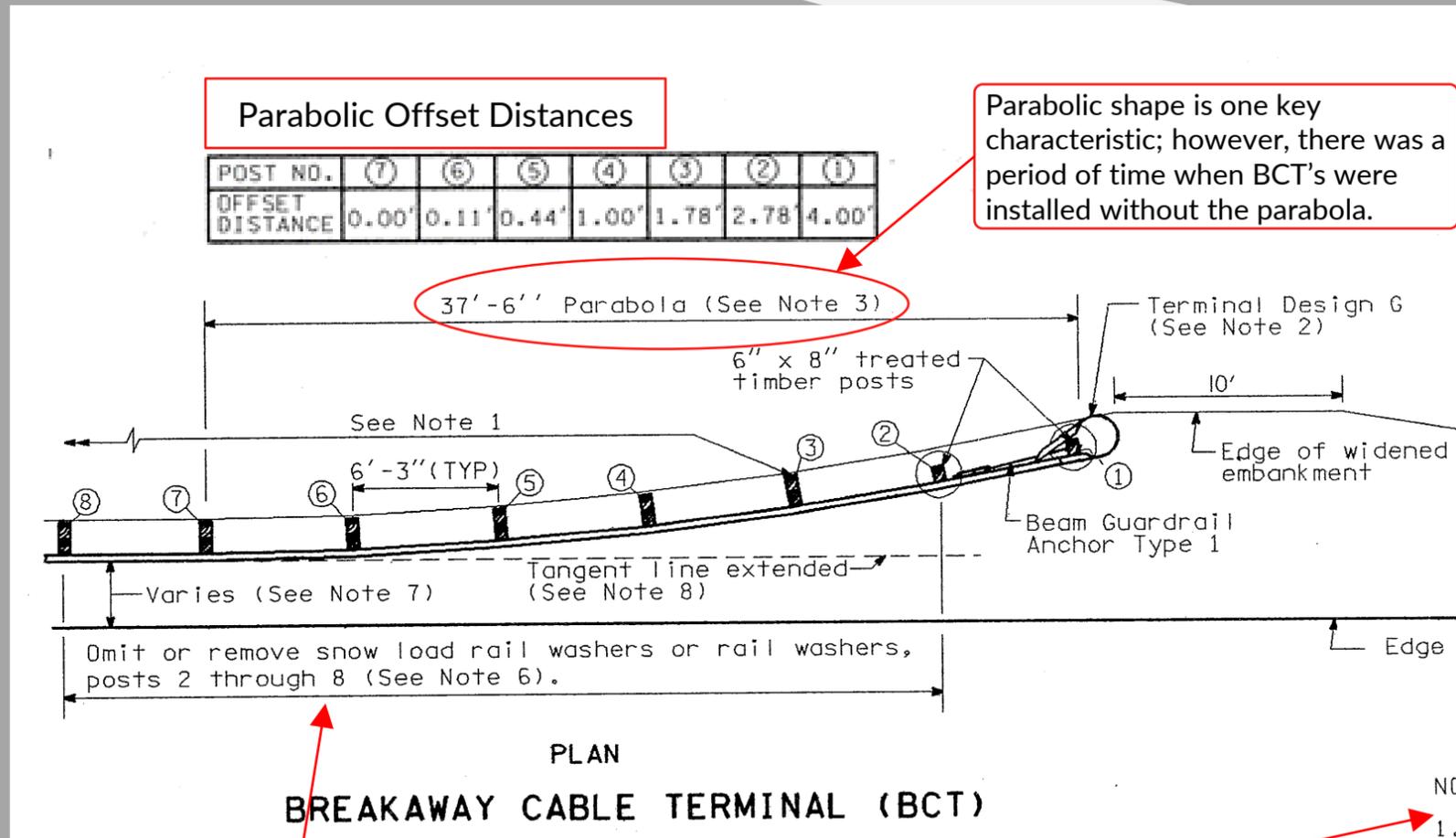
Non-proprietary



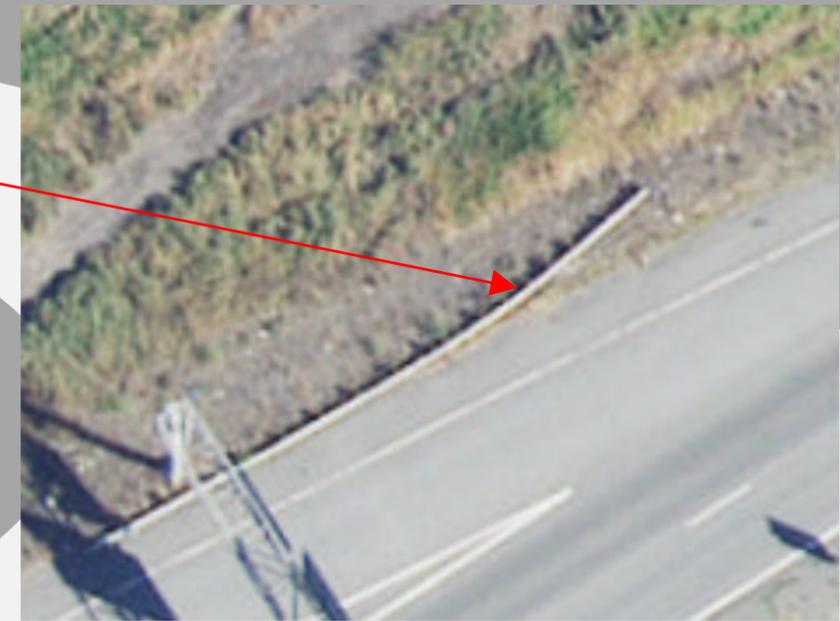
Differs from a buried terminal. Rail elements are not turned down for buried terminals and are attached to anchors buried in embankment.

Identifying BCT's

At first glance, a BCT may not look very different from a Type 1 anchor. This is because the BCT INCLUDES a Type 1 anchor. The most distinguishing characteristic of the BCT is the parabolic flare (as shown below)

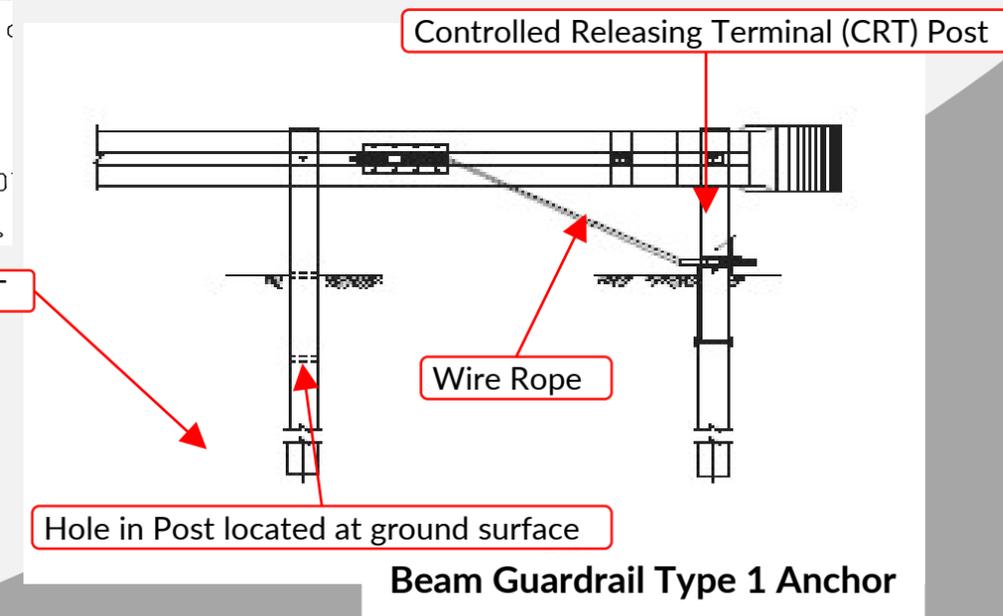


Parabolic shape is one key characteristic; however, there was a period of time when BCT's were installed without the parabola.



If constructed correctly, a BCT will not have rail washers on posts 2 through 8

Note that a Type 1 anchor is part of a BCT



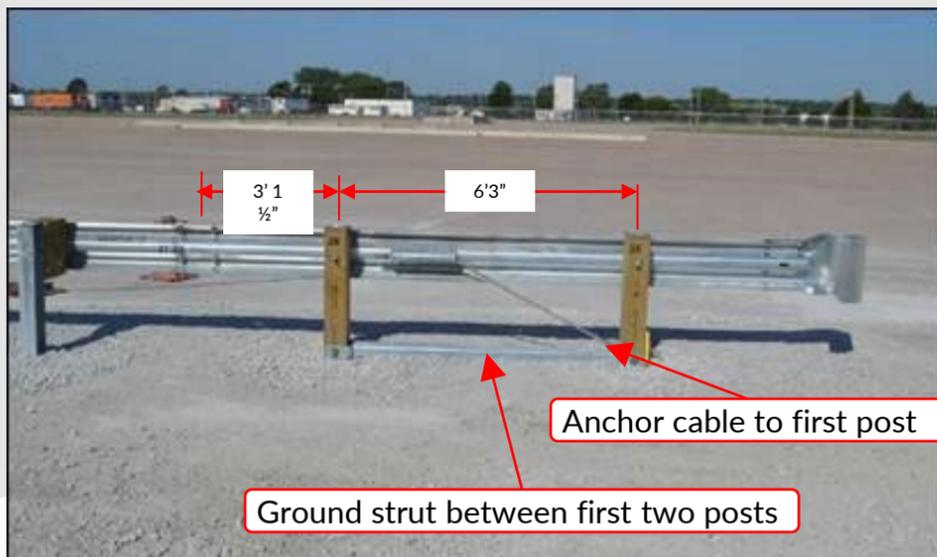
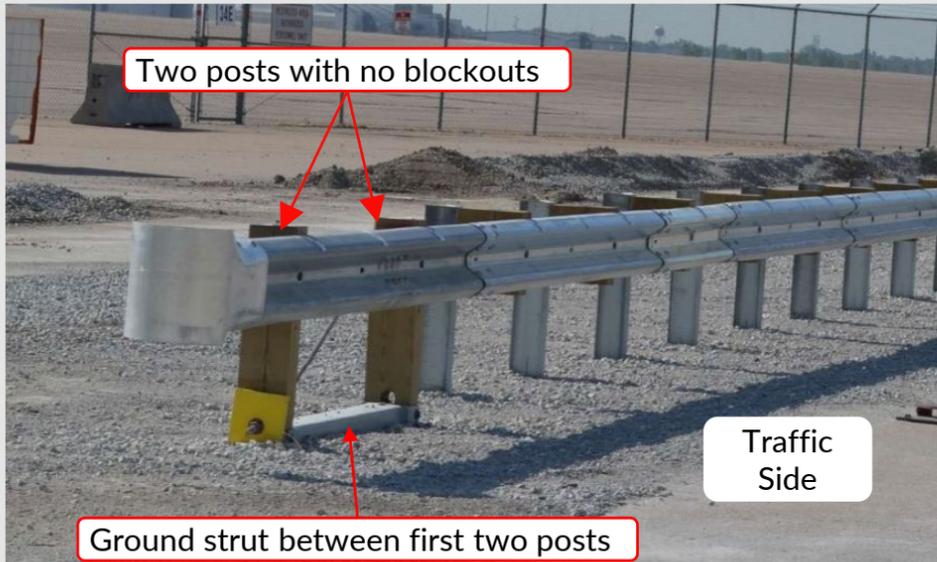
Anchors

MASH Anchors

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Beam Guardrail Anchor Type 11

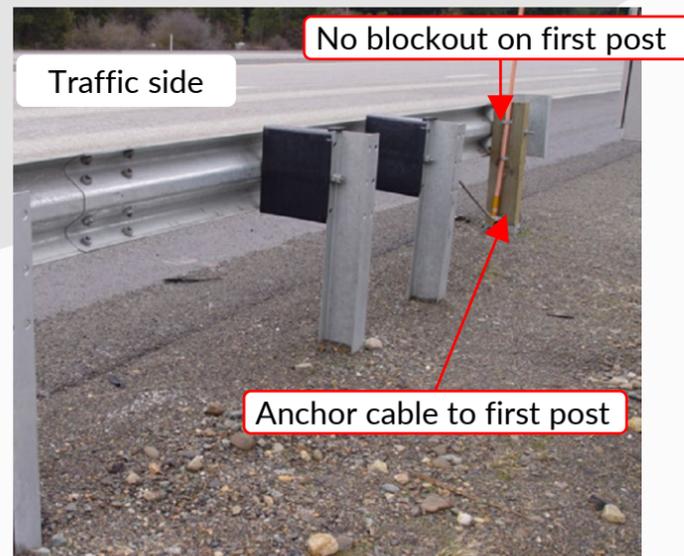
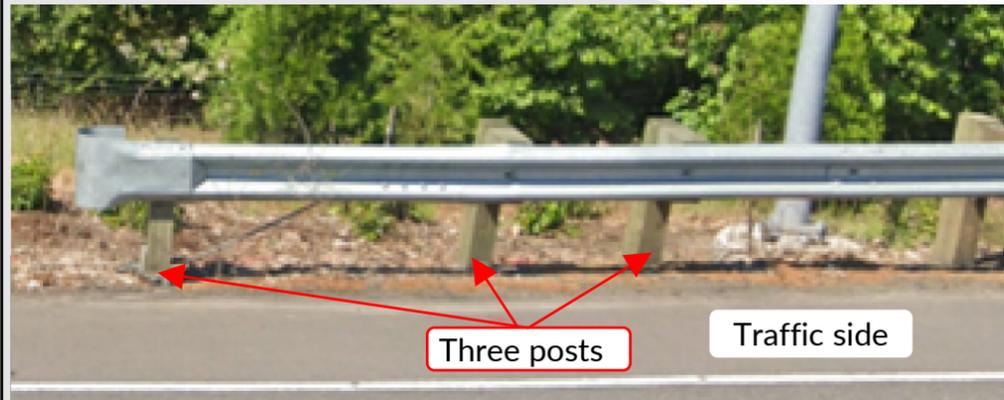
TL-3
See WSDOT [Standard Plan C23.70](#)
Non-proprietary



Note: The Type 11 Anchor differs from the Type 10 Anchor in that it has only 2 posts, post spacing is different and the Type 11 has a ground strut. Guardrail anchors are not crash worthy for head on impacts.

Beam Guardrail Anchor Type 10

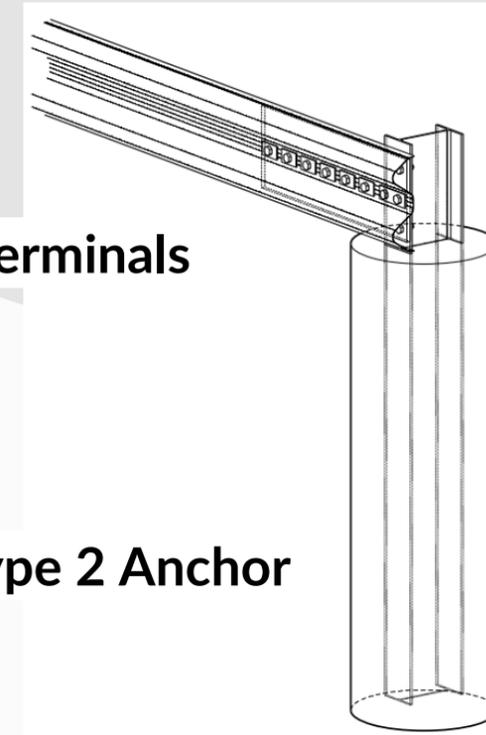
TL-3
See WSDOT [Plan Sheet Library TB-126](#)
Non-proprietary
Type 10 anchors are no longer installed on new installations and are replaced by Type 11 anchors in the Standard Plans and QPL.



Note: The Type 10 Anchor differs from the Type 11 Anchor in that it has 3 posts, post spacing is different and the Type 10 does not have a ground strut. Guardrail anchors are not crash worthy for head on impacts.

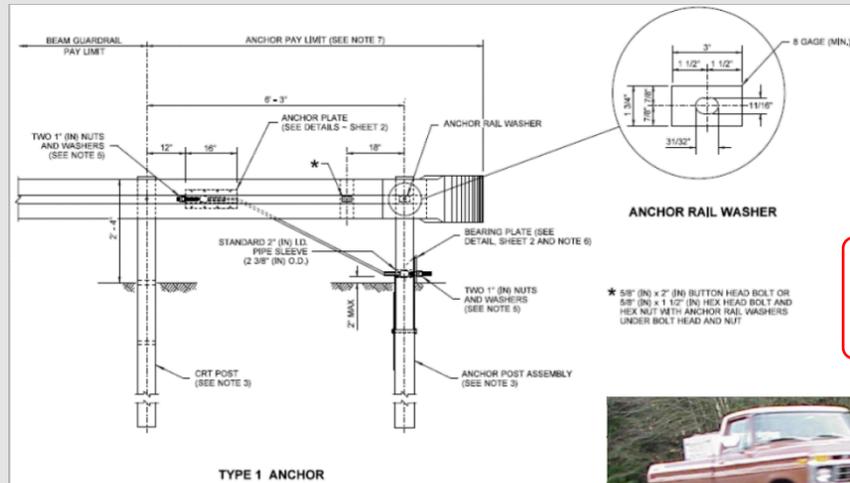
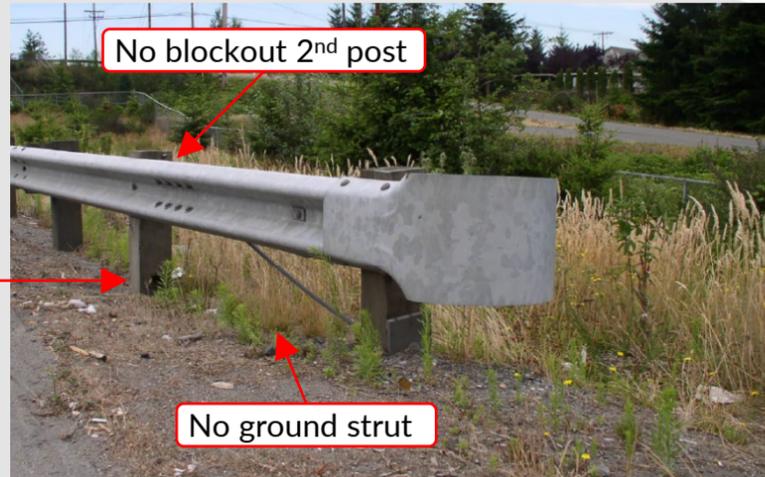
Beam Guardrail Anchor Type 2

TL-3
See WSDOT [Standard Plan C-6a](#)
Non-proprietary

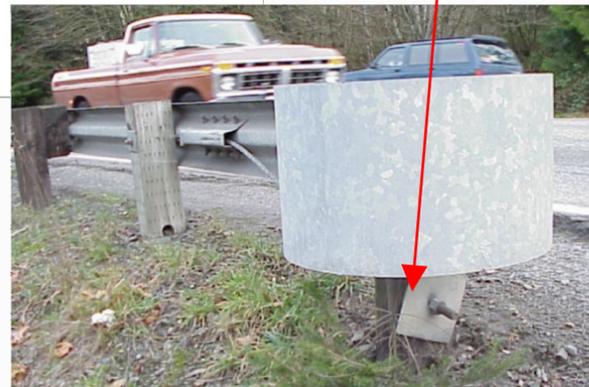


Beam Guardrail Anchor Type 1

TL-3
See WSDOT [Plan Sheet Library](#) TB-C6
Non-proprietary



Anchor cable through 1st post and secured with a bearing plate



Type 1 anchors are used for (old) beam guardrail type 1 runs and can be used on either the upstream or downstream end located beyond the Design Clear Zone where a crash-tested terminal is not needed.

Beam Guardrail Anchor Type 3

TL-3
See WSDOT [Plan Sheet Library](#) TB-50
Non-proprietary

Steel pipe in concrete foundation



The Type 3 anchor was primarily used at bridge ends. This anchor consisted of a steel pipe mounted vertically in a concrete foundation. Bridge approach guardrail was then mounted on the steel pipe.

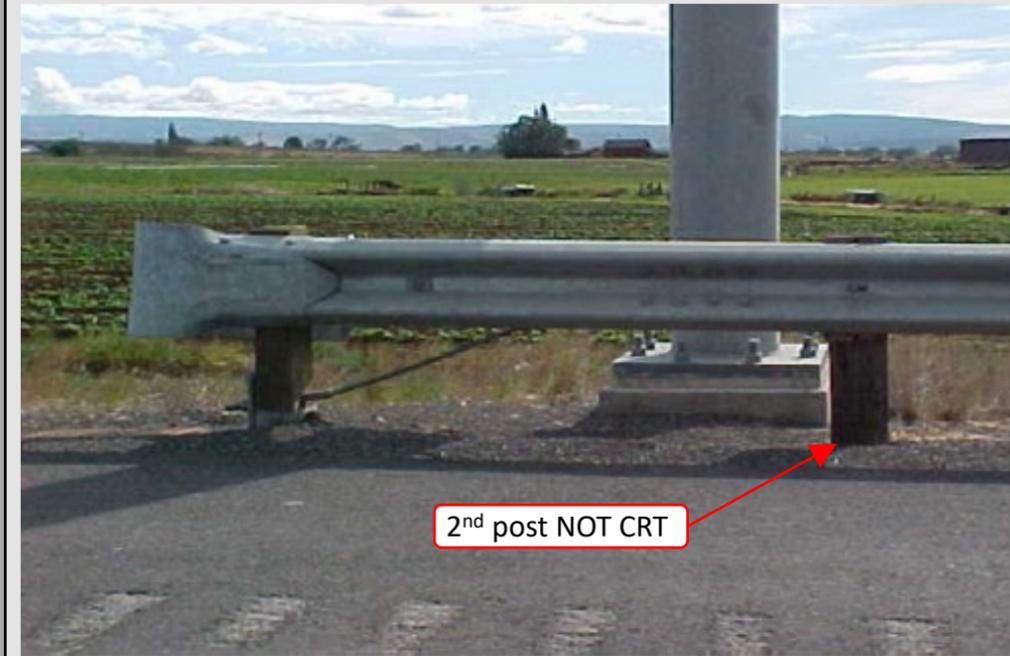


NCHRP 350 Anchors

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Beam Guardrail Anchor Type 4

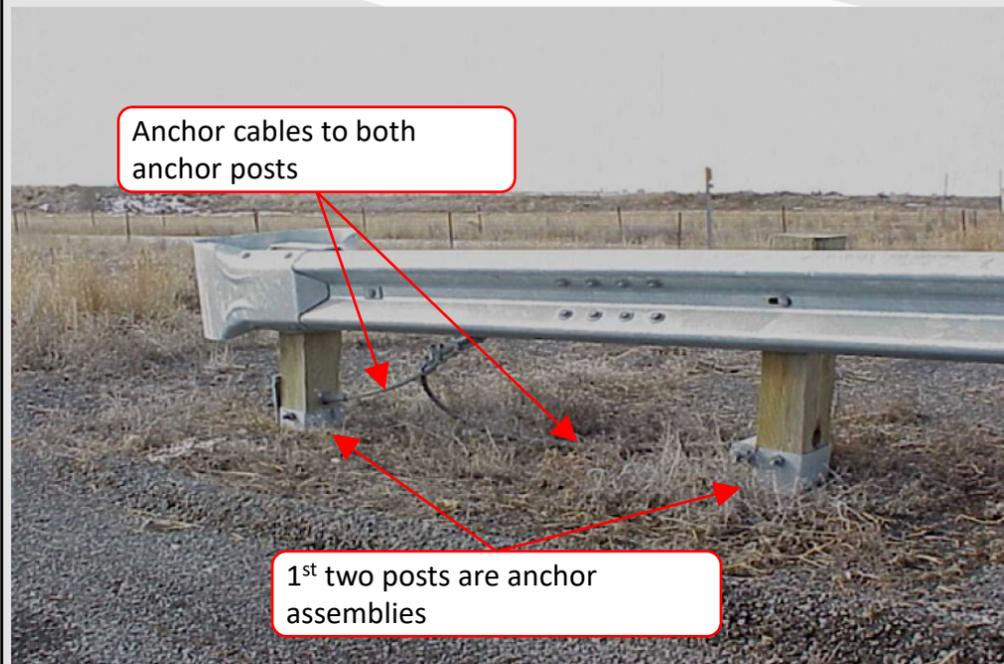
TL-3
See WSDOT [Plan Sheet Library](#) TB-C6c
Non-proprietary



Note: A Type 4 Anchor is identical to Type 1 anchor but has no CRT post and is placed on trailing ends only. Type 4 anchors are used for (Old) Beam Guardrail Type 1 where a crash-tested terminal is not needed.

Beam Guardrail Anchor Type 5

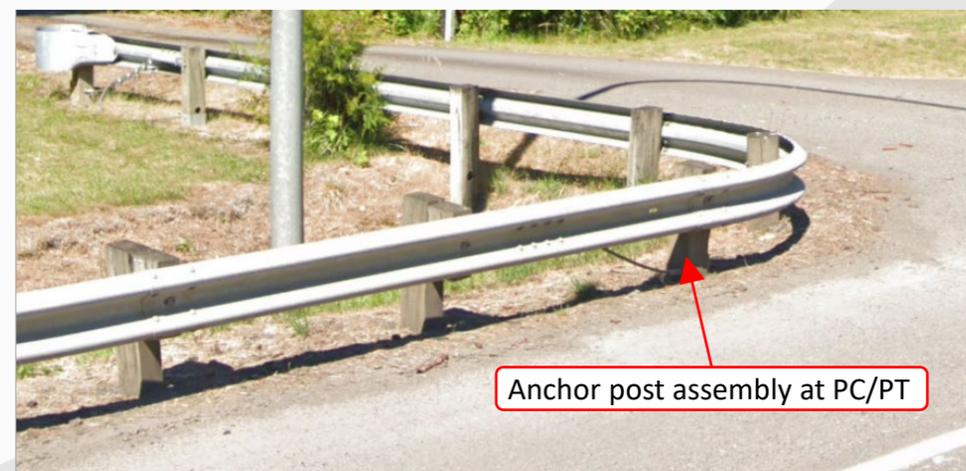
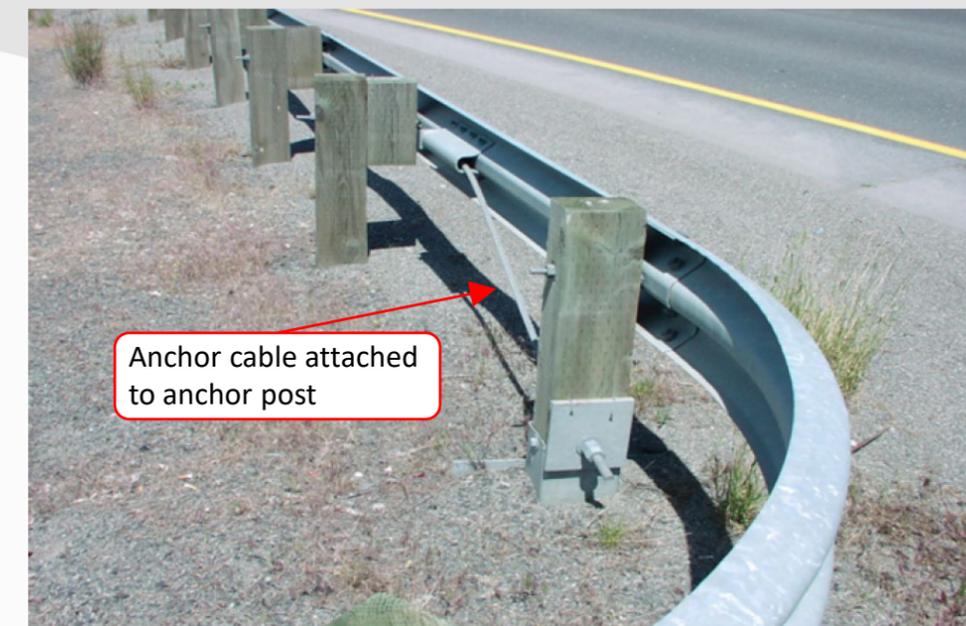
TL-3
See WSDOT [Plan Sheet Library](#) TB-C6d
Non-proprietary



Type 5 anchors are used for (old) beam guardrail type 1 with the Weak Post Intersection design.

Beam Guardrail Anchor Type 7

TL-3
See WSDOT [Plan Sheet Library](#) TB-C6f
Non-proprietary



Type 7 anchors are used for (old) beam guardrail type 1 to develop tensile strength in the middle of a guardrail run when the guardrail curves and weak posts are used.

No Obvious Design

TL-3
Non-proprietary



Contact HQ Design if there is no obvious design.

No Anchor

TL-3
Non-proprietary



Contact HQ Design if there is no anchor.