Installation Manual

Next Generation Terminal

NextGen Safety, LLC

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1. General Information about the NGT

The Next Generation Terminal (NGT) is a tangent, re-directive and non-gating W-beam end terminal system. ***Installers must strictly adhere to the installation instructions contained herein.*** The NGT is tension-based and requires that the cable be inserted through the terminal head and attached to the anchor post so that the system will not loosen or disengage when struck by a vehicle.

The NGT has been successfully crash tested in accordance with the American Association of State and Highway Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH) criteria Test Level 3 (100 km/hr). All crash test reports, videos, photos, data, and other supporting documentation can be found at the following website:

https://www.nextgensafety.net

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 NGT.

2. NGT Design and Pay Length Options

The NGT is a system comprised of numerous parts, including standard and specialized guardrail, plug-welded posts, a terminal head, an anchor post, and connecting hardware. All these parts have been designed or specified to fulfill a specific purpose. Therefore, they must all be installed according to the instructions herein to facilitate proper functionality. ***It is critical that only the specified parts be assembled in accordance with the instructions provided herein. If they are not, the system may not work properly, and serious injury or death may occur if the system is impacted.***

If the NGT is intended to attach to a rigid barrier, a transition to gradually increase the stiffness in the W-Beam is required. The following pay length options are allowable with the NGT. Consult with your state or governing authority for the applicable pay length option.

- 37.5 ft. – This pay length option extends from approximately ½ the length of the NGT Impact Head (where the NGT Anchor Guardrail ends) to the mid-span splice of Midwest Guardrail System ("MGS") guardrail after standard **Post 10**.
- 40 ft. – This pay length option extends from the center point of the NGT Anchor Post (in front of the NGT Impact Head) to the mid-span splice of MGS guardrail after **Post 10**.
- 50 ft. – This pay length extends from approximately ½ the length of the NGT Impact Head (where the NGT Anchor Guardrail ends) to the mid-span splice of MGS guardrail after **Post 12**.

8" or 12" Blocks with the Next Generation Terminal

The NGT uses 8" or 12" offset blocks and is designed to be attached to a strong post W-beam guardrail system (using 8" or 12" offset blocks) that have been tested and accepted under the MASH crash testing criteria.[1] The W-beam barrier that the applicable agency or authority has shown "downstream" of the NGT must be 31" above the finished grade with mid-span splices or a transition should be installed to achieve same.

Offset/Flare for the NGT

As a tangent terminal, no offset is required for the NGT. However, a straight flare offset of 1-ft but no more than 2-ft (25:1 maximum) is recommended over a 50 ft length.

[1] The use of either 8" or 12" blocks is well established. For example, in FHWA Letter CC-126A, the FHWA acknowledged that the use of either depth block is common practice dating back to NCHRP 350 era roadside hardware. Like other devices, the NGT was tested with 8" block because that is the more severe condition. The use of 12" block is believed to perform better than 8" blocks as it reduces the risk of wheels snagging on posts in re-directional impacts and rail contact with posts in head on impacts.

Further, the FHWA no longer provides any modification eligibility letters after the initial "entry" of a device. ***See FHWA Open Letter to all in the highway safety hardware and roadside design community dated May 26, 2017***. Instead, the FHWA encourages manufacturers and state or local authorities "to collaborate and deploy manufacturers' innovative modifications in a timely manner and/or respond to State-specific needs requiring significant and non-significant modifications – without the need of another Federal-aid eligibility letter from FHWA."

3. Bill of Materials

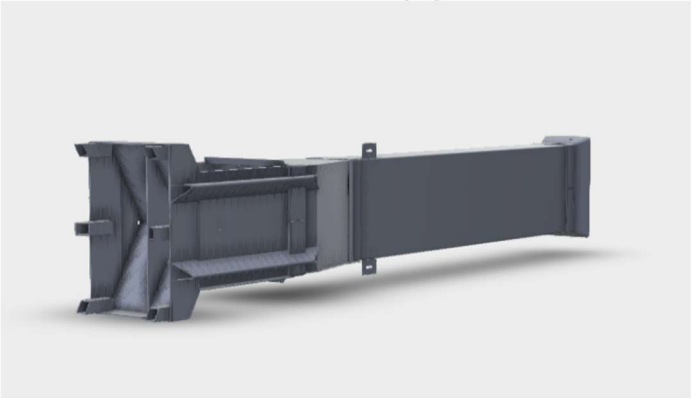
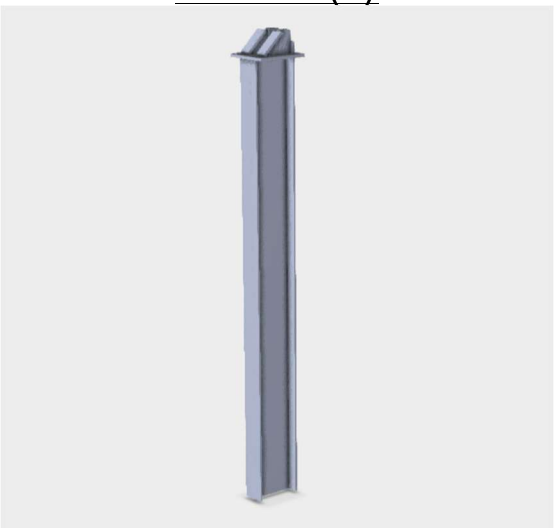
PROPRIETARY PARTS	
FIGURE 2(A) 	**NGT Impact Head** [Part No. NGT-1000] Quantity **1 EA**
FIGURE 2(B) 	**NGT Anchor Guardrail** [Part No. NGT-2000] Quantity **1 EA**
FIGURE 2(C) 	**NGT Anchor Post** **(w/ Anchor Cap)** [Part No. NGT-3000] Quantity **1 EA**

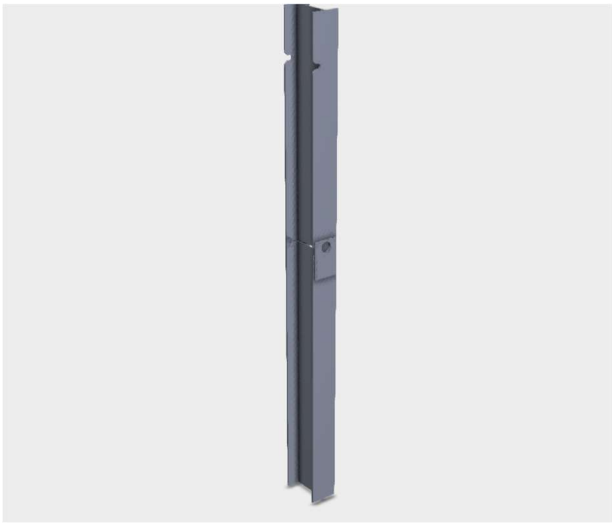
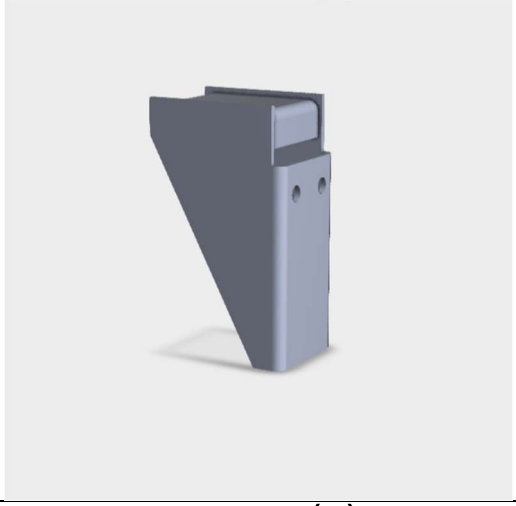
FIGURE 2(D) 	**NGT First Post** (*no tapered slots*) [Part No. NGT-4000] Quantity **1EA**
FIGURE 2(E) 	**NGT Standard Plug-Welded Posts** (*w/ tapered slots*) [Part No. NGT-4100] Quantity **8 EA**

FIGURE 2(F) 	**NGT Shelf Bracket** [Part No. NGT-5000] Quantity **1 EA**
FIGURE 2(G) 	**NGT Notched Blockouts** [Part No. NGT-6000] Quantity **2 EA**

Standard Parts	Quantity (EA)
Standard MGS 12'6" W-Beam Guardrail	1
Standard Guardrail Posts (Post 10 and beyond)	1+
NGT Object Marker*	1
Option 1: 8" Blocks & NGT Hardware	**Quantity (EA)**
Standard 6"x8"x14" Blockouts	7
1" Hex Nut	1
1" Washer	1
5/8" X 1.25" SPLICE BOLTS	8
5/8" DBL RECESSED NUTS	17
1/2"x 1 1/2" HEX BOLT GR 5	2
1/2" WASHER	4
1/2" HEX NUT	2

7/16" X 1 1/2" HEX BOLT GR 5	2
7/16" WASHER	4
7/16" HEX NUT	2
5/16" X 1" HEX BOLT GR 5	1
5/16" WASHER	2
5/16" Hex Nut	1
5/8" X 8" POST BOLTS	2
5/8" X 10" POST BOLTS	7
Option 2: 12" Blocks & NGT Hardware	**Quantity (EA)**
Standard 6"x12"x14" Blockouts	7
1" Hex Nut	1
1" Washer	1
5/8" X 1.25" SPLICE BOLTS	8
5/8" DBL RECESSED NUTS	17
1/2"x 1 1/2" HEX BOLT GR 5	2
1/2" WASHER	4
1/2" HEX NUT	2
7/16" X 1 1/2" HEX BOLT GR 5	2
7/16" WASHER	4
7/16" HEX NUT	2
5/16" X 1" HEX BOLT GR 5	1
5/16" WASHER	2
5/16" Hex Nut	1
5/8" X 12" POST BOLTS	2
5/8" X 14" POST BOLTS	7

** The face of the NGT Impact Head should be delineated with an object marker that meets the governing State or applicable agency's specifications for better night visibility. Please check with your preferred distributor for applicable delineation.*

3. Site Preparation and Required Tools

3.1 Site Preparation / Grading

The NGT is a tangent terminal and no offset is required. However, a flare rate of no greater than 25:1 is allowable under the guidelines published in the *Roadside Design Guide*. If the installation is offset from the edge of the pavement, it is recommended to grade the soil prior to installation to provide a flat surface adjacent to the pavement. There should be at least two (2) feet of level graded soil behind the posts (field side) in the

NGT system. Any portion of the system that is in the ground, or left in the ground after a break away event, should be less than 4 inches above grade.

Soil Conditions & Rock Drilling

All posts in the NGT system post may also be installed by auguring and backfilling if approved by the appropriate state or governing authority. When auguring, the initial hole must be large enough to allow adequate room for proper compaction of the soil during backfill. ***Ensure the compacted backfill does not allow for settling or lateral movement of the posts.*** If allowed by the state or governing authority, any rock encountered may be drilled and the posts may be placed in the drilled holes. Installers should follow recommended state or governing authority practices for drilling rock.

Note on Pavement Conditions: ***The plug-welded posts in the NGT system should not be embedded in pavement exceeding applicable governing standards. When encountering pavement exceeding allowable depths, a hole should be cut from the pavement as a "leave out" to install the posts. Check with applicable state or governing authorities for instructions.***

3.2 Recommended Materials and Tools

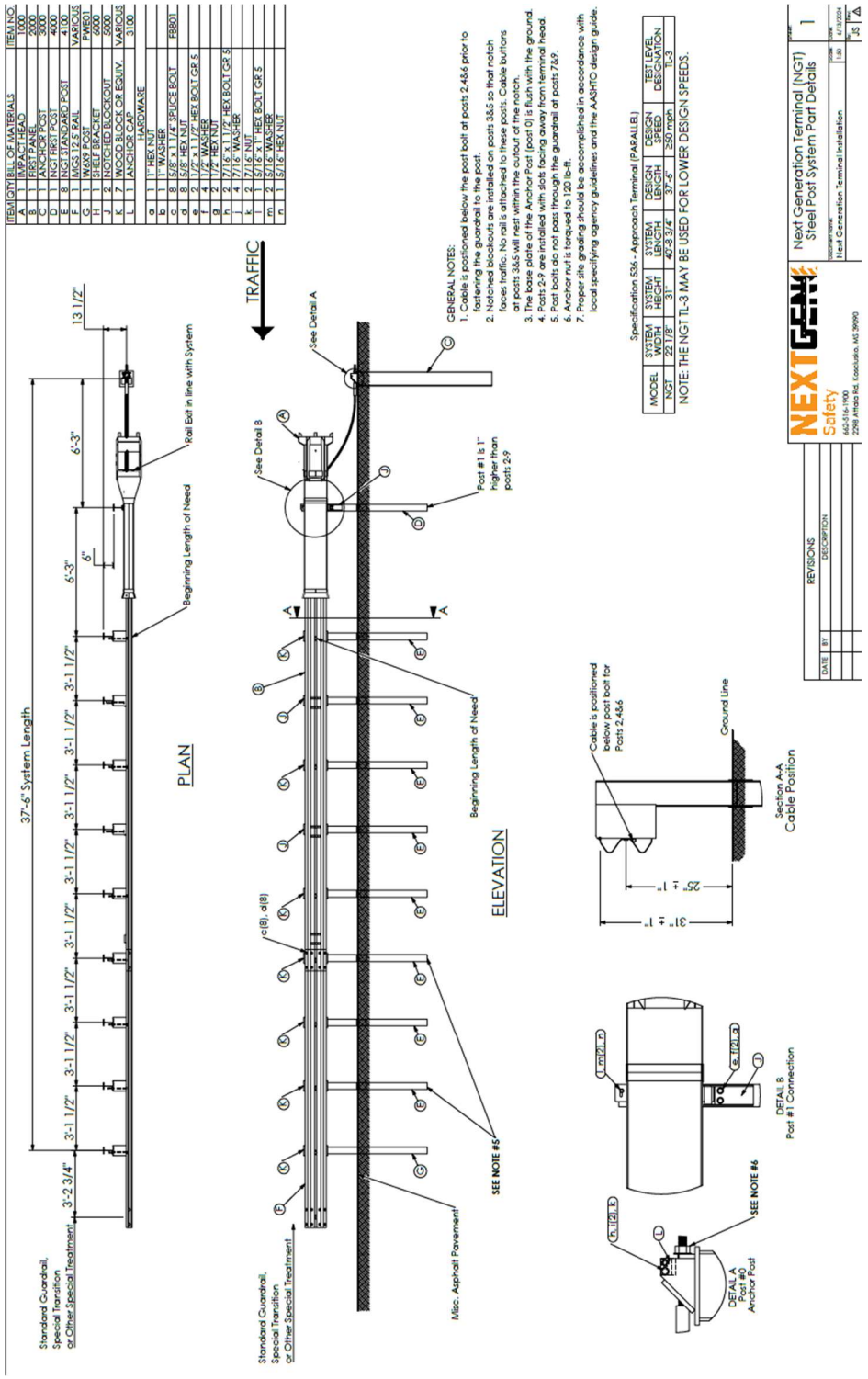
The NGT comes with all necessary components and hardware, as listed in the bill of materials. The terminal head, anchor panel, anchor post, and plug-welded posts are all prefabricated with holes and slots placed in the appropriate locations. ***Field modifications to the NGT system (drilling or cutting any holes or slots) is strictly prohibited***. Doing so may compromise the structural integrity of the system.

Recommended tools include:

Cotton string line	Adjustable wrench
Post driver	Pipe wrench (2")
Driving Cap	Hammer
Anchor Post driving cap (Available for purchase)	Spud wrench (for aligning guardrail splices)
Impact wrench	Level
Impact socket (1 1/4") with an extension, both with half-inch drives	Tape measure
Crescent wrenches (1 5/8", 3/4", 9/16")	Torque wrench

4. Installation Instructions

4.1 Overall Layout Drawing and Bill of Materials



ITEM	QTY	BILL OF MATERIALS	ITEM NO.
A	1	IMPACT HEAD	1000
B	1	FRONT PIPE	2000
C	1	ANCHOR POST	3000
D	1	NGT FIRST POST	4000
E	8	NGT STANDARD POST	4100
F	1	MGS 12.5 RAIL	VARIOUS
G	1	W6X9 POST	FW601
H	1	INSERT PIPE SLEEVE	5000
I	2	WOOD BLOCKOUT	6000
K	7	WOOD BLOCK OR EQUIV.	VARIOUS
L	1	ANCHOR CAP	3100
		HARDWARE	
a	1	1" HEX NUT	
b	1	1" WASHER	
c	8	5/8" x 1'-10" SPLICE BOLT	F3501
d	8	5/8" HEX NUT	
e	2	1/2" x 1 1/2" HEX BOLT GR 5	
f	4	1/2" WASHER	
g	2	1/2" HEX NUT	
h	2	7/16" x 1 1/2" HEX BOLT GR 5	
i	4	7/16" WASHER	
k	2	7/16" NUT	
l	1	5/16" x 1" HEX BOLT GR 5	
m	2	5/16" WASHER	
n	1	5/16" HEX NUT	

4.2 Installation Procedure

Begin the installation at the downstream (trailing) end of the NGT as described below.

1. Install standard guardrail posts (G) at Post 10 and beyond
2. Install NGT Standard Plug-Welded Posts 9 to 2 (E)
3. Install NGT First Post 1 (D) – 6" offset from Post 2 and **one inch higher** than those in Step 2(***see more below)***
4. Install NGT Anchor Post (C) – 13.5" offset from Post 2 (7.5" offset from Post 1) (***see more below)***
5. Bolt standard blockouts to Posts #7 and #9. ***Do not pass bolts through guardrail at these posts***.
6. Bolt NGT Notched Wood Blockouts to Posts #3 and #5 (***you cannot pass bolts through NGT guardrail at these posts***)
7. Hang standard 12'6" MGS guardrail (F) and standard wood blockouts (Posts 8 and 10) between posts 10 and 7
8. Install NGT Anchor Guardrail panel with cable attachment (B) and remaining standard wood blockouts of NGT Posts #7 and #1. ***Make sure slack in cable is positioned below post bolts at Posts 2,4 and 6.***
9. Install NGT Impact Head (A) and NGT Shelf Bracket (I) – ***make sure cable passes through bottom of NGT Impact Head***
10. Fasten cable to NGT Anchor Post (C) and hand-tighten cable nut to 120 ft-lbs
11. Tighten all splice bolts and post bolts
12. Install the NGT Object Marker

Step 1: Install Standard Guardrail Posts at Post 10 and Beyond

All posts at locations #10 and beyond should be standard guardrail line posts and blockouts (according to applicable governing authority) spaced at 6'3" on center. The finished post height, measured from the finished grade to the top of the post, should be approximately 31-7/8" ± 1". (Note: the height from the finished grade to the top of the fully assembled guardrail should be 31" ± 1". This is the specification that governs post embedment. The center of the post hole is 7" below the top of the post, and half of the height of standard W-beam is about 6-1/8".)

Set up a string line extending from the guardrail posts beyond Post #10 that runs along the desired line of post installation throughout the installation and past the anchor post location. Install posts to the required height while keeping the posts vertical (plumb) and the flanges of the post parallel with the string line.

If a post moves out of position during installation such that the post bolt slot does not align with the guardrail slot, the post will need to be pulled and reset. ***Under no circumstance is it permissible to drill a hole in the guardrail.***

Step 2: Install Plug Welded Posts #9 thru #2

Posts #9 thru #2 are 6'0" W6x9 (W6x8.5) galvanized steel plug-welded posts. They can be distinguished from standard steel posts by identifying the welded assembly on the outside of each flange near the middle of the post. Additionally, the plug welded posts should differ by having a notched post bolt hole in the upper section of the post. Plug welded posts can be driven with the same equipment as standard posts from Step 1. See ***Note on Pavement Conditions*** on p. 8.

Posts #9 thru #2 should be installed with the post bolt notch facing ***downstream*** – i.e., in the direction traffic is heading, so the notch in post #2 should be open toward post #3, the notch in post #3 should be open toward post #4, and so on, all of which are on the side of the post opposite of the Impact Head. **Posts #9 thru #2 should be spaced at 3'-1.5" on center**. See detail in Figure 4 for clarification. The finished post height, measured from the finished grade to the top of the post, should be approximately 31-7/8" ± 1".

Install posts to the required height while keeping the posts vertical (plumb) and the flanges of the post parallel with the string line set up in Step 1.

If a post moves out of position during installation such that the post bolt slot does not align with the guardrail slot, the post will need to be pulled and reset. ***Under no circumstance is it permissible to drill a hole in the guardrail.***

Step 3: Install Plug Welded Post #1

NOTE: The finished post height for Post #1 is 32-7/8", or one inch higher than the other plug- welded posts.

Post #1 is a plug welded post that has two 3/8" holes in the flange of the upper section of the post. It also has two 9/16" holes in the flange near the center of the top half. It is also 73" long, one inch longer than the other plug weld posts (Posts 2-9). This post does not have any post bolt notches. Post #1 should be installed with the bolt holes facing the traffic side of the system. These holes will be used to attach the Impact Head and the shelf bracket to Post #1 later. **Post #1 should be installed 6'-3" upstream of Post #2 (center-to-center) with a 6" offset from Post 2 (likely your stringline) toward the traffic side of the system** . The finished post height for Post #1 is 32-7/8", or one inch higher than the other plug welded posts. See ***Note on Pavement Conditions*** on p. 8.

Step 4: Install the Anchor Post

The anchor post is a 6'6" W8x15 galvanized steel beam with a "bootjack" assembly welded to a plate at the top of the post. The bootjack assembly requires a driving cap (available for purchase) and two sets of 7/16" Grade 5 hardware – two bolts, four flat washers, and two nuts.

The anchor post should be installed 6'-3" upstream of Post #1 (center-to-center) with a 13-1/2" offset from Post 2 (likely your stringline) toward the traffic side of the system. This post should be oriented with the web of the W8x15 post parallel to the guardrail and such that the sloped portion of the bootjack assembly faces the Impact Head.

Drive the post until the baseplate of the bootjack assembly is flush with the finished grade. See layout details in Figure 4 for reference. **The anchor post should only be driven with the driving cap that is provided by the manufacturer to prevent damage to the bootjack assembly.**

Step 5: Install the Standard Blockouts at Posts #9 and #7

Ensure the appropriate length post bolt is selected for the blockouts that are being used in the system. Standard blockouts are used at Post #s 10 thru #7. Do not pass post bolts through the rail at Post #9 and #7 (see red circles in the below figure for reference). Instead, bolt the blockouts at Post #9 and #7 to the post prior to hanging the W-beam.

Step 6: Install the NGT Notched Wood Blockouts at Posts #5 and #3

Ensure the appropriate length post bolt is selected for the NGT Notched Blockouts that are being used in the system. NGT Notched Blockouts are used at Post #s 5 and #3. It is not possible to pass post bolts through the rail at Post #5 and #3. Instead, bolt the blockouts at Post #9 and #7 to the post prior to hanging the W-beam.

Step 7: Hang Standard Guardrail Between Post #10 and Post #7

Midwest Guardrail System (MGS) guardrail requires splices to be mid-span between posts that have 6'-3" centers. There is one 12'-6" MGS guardrail panel included in the length of the NGT, and it spans Post #10, 9, and 8. It splices into the NGT first panel at Post #7. See details in Figure 4 to ensure proper installation.

Ensure lapping of each guardrail adheres to the specifications that govern that location. It is recommended that lapping be in the direction of travel in the immediately adjacent lane of travel. Ensure (8) splice bolts and nuts are used to secure each splice. The shoulder of each splice bolt should seat inside the elliptical bolt holes.

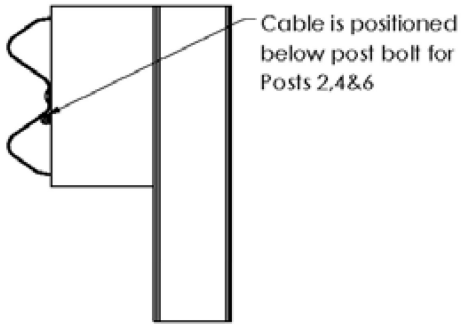
Once the splice and post bolts have been tightened, the height from the finished grade to the top of the rail should be 31" ± 1".

Step 8: Hang NGT First Panel

The first panel of W-beam in the NGT is approximately 24 feet long and includes a cable that is fused to the guardrail at five locations. It is spliced to the end of the standard W-beam segment at Post #7. Ensure lapping of each guardrail adheres to the specifications that govern that location. It is recommended that lapping be in the direction of travel in the immediately adjacent lane of travel. Ensure (8) splice bolts and nuts are used to secure the splice. The shoulder of each splice bolt should seat inside the elliptical bolt holes.

Ensure the appropriate length post bolt is selected for the blockouts that are being used in the system. The shoulder of each post bolt should seat inside the elliptical bolt holes. Standard blockouts are used at Post #s 6, 4, and 2. Notched blockouts are used at Post #s 5 and 3. It is not possible to pass a post bolt through the guardrail at Post #5 and #3 without compromising the rail. Instead, bolt the notched blockouts at Post #5 and #3 to the post prior to hanging the W-beam. See the above photo for reference.

The cable that extends along the length of the First Panel should be installed such that the slack in the cable between connection points passes underneath the post bolts at Post #s 2, 4, and 6. The cable will not pass below the blockout, but instead, the cable will rest under the W-beam corrugation. See diagram below.



Once the splice and post bolts have been tightened, the height from the finished grade to the top of the rail should be 31" ± 1". *Tip: You may wait to tighten the post bolts at Posts 2 and 4 until after Step 9 to ensure you can slide the NGT Impact Head more easily between the NGT posts and the NGT First Panel.*

Step 9: Install NGT Impact Head and Shelf Bracket

The threaded rod on the end of the cable should be passed into the guide chute of the NGT Impact Head. It must go above the bottom ramp and below the bottom of the folder in the center of the Impact head (see photos for reference). *Care should be taken as this can be a pinch point*.

Push the NGT Impact Head onto the guardrail, pulling the cable through the bottom exit of the head. With the cable properly guided through the head and exiting from the bottom, push the NGT Impact Head as far as it can go onto the guardrail. If the post spacing is correct, the tab on the top of the head should be close to one of the holes in the top of the first post. Adjust the impact head forward or backward to align the slot in the tab with the closest hole in the post. Attach the head to the post using a single 5/16" bolt (1.0 inch long), using washers on both sides and a hex nut. Tighten with a wrench until snug (***do not use an impact gun as this will likely shear the bolt***).

(The bottom tab does not bolt to the first post. It is there for when an installation occurs on the opposite side of the road, and the terminal head must be turned over.)

Attach the shelf bracket to Post 1 underneath the terminal head using two (2) 1/2" bolts (1.5" long) with two washers and a hex nut on each bolt. There should be a small gap between the top of the shelf bracket and the bottom of the terminal head.

Step 10: Fasten Cable to Anchor Post

The anchor cap for the NGT Anchor Post may not be pre-installed in order to prevent any damage to it while driving the NGT Anchor Post. If the anchor cap is not preinstalled, retrieve it from the hardware bag. The threaded rod should be passed beneath the cap and through the U-shaped slot on the approach side of the anchor assembly. Install the anchor cap using the included 7/16" Hex Bolts, Nuts and Washers.

Next, secure the threaded rod with a washer and heavy hex nut. This cable should be tight. Use a deep socket and a large torque wrench to ensure that the torque is between 105 and 300 ft-lbs. It is recommended that a target of 120 ft-lbs be used.

If a torque wrench is not available, then deflection of the tightened cable when stepped on should be less than 1". If the cable moves more than 1" when stepped on, you should tighten further.

Step 11: Tighten all Splice and Post Bolts

Sometimes, splice and post bolts can come loose during an installation, or they are intentionally left untightened to provide maximum flexibility while installing other panels of W-beam. At this time, tighten all threaded hardware to a snug position with an appropriately sized wrench or socket. The plug welded posts have a notch rather than a hole for the post bolts to rest in. This allows the bolts to evacuate easily on end-on impacts. The corners of the slots are chamfer. This can mean that the nuts do not bite properly, especially if the slot in the rail does not line up properly with the post. Proper post placement is essential. If it is too far out of alignment that the nut cannot bite on the flange of the post, then it should be pulled and reset. **Under no circumstances is it permissible to drill a hole in the W-beam.**

Step 12: Install NGT Object Marker

After all steps have been completed, ensure that the NGT Object Marker is installed at the end of the NGT Impact Head. While holding the NGT Object Marker with both hands, slightly "bend" the NGT Object Marker such that the "bow" protrudes toward you. While bent, insert the NGT Object Marker into the cavity of the face of the NGT Impact Head. When released, the NGT Object Marker will snap back to flat and be secured behind the engagement pins (teeth) in front of it and the center gusset of the NGT Impact Head behind it.

5. Repair Instructions and Checklist

Anytime you are repairing the NGT, ensure proper traffic control is deployed to protect workers and motorists. Follow the requirements shown in the Manual on Uniform Traffic Control Devices (MUTCD).

Tools Needed

- Acetylene torch or metal saw cut or burn off the damaged rail
- Heavy duty chain to remove the impact head may be required
- Standard tools used to install highway guardrails
- Vice grip or channel lock pliers
- Sledge hammer

The following are ***general guidelines*** for repair of the Next Generation Terminal ™ system. Ultimately, it is the responsibility and determination of the state/specifying agency and the state/specifying agency's selected contractor performing the assembly or repair of the system to determine whether repairs or replacement are necessary. NextGen Safety, LLC expressly disclaims any responsibility for the choices and actions of the state/specifying agency and the state/specifying agency's selected contractor performing the assembly or repair of the system.

1.	Ensure only Next Generation Terminal ™ parts are used for the assembly of the Next Generation Terminal ™ and that all parts are free of damage.
2.	Check the impact head for damage (both outside and inside). If it is damaged it must be replaced.
3.	Check the NGT Anchor Post and ensure it is firmly embedded and not damaged (including the Anchor Cap and Anchor Cap Hardware). If loose or damaged, it must be replaced.
4.	Check the anchor rail assembly for damage. The anchor rail, shelf bracket, and hardware may be reusable. If any part of the anchor rail or cable attachment is damaged, it must be replaced.
5.	Check the number of broken posts and blockouts that need to be replaced, along with any damaged bolts. Inventory and pick up the reusable parts.
6.	Disconnect and remove any damaged rail from the posts
7.	Remove any damaged posts from the length of the system.
8.	Reinstall the system following the procedures listed in this manual.

6. Inspection Checklist

- ☐ Guardrail height is 31" ± 1" above finished grade.
  - **Reference:** Step 1, P. 7
- ☐ Guardrails are lapped in the proper direction.
  - **Reference:** Step 7, P. 14
- ☐ All splice bolts are securely fastened. Ensure the shoulder of each bolt is properly recessed into the face of the guardrail.
  - **Reference:** Step 11, P. 17
- ☐ All post bolts are securely fastened. Ensure the shoulder of each bolt is properly recessed into the face of the guardrail.
  - **Reference:** Step 11, P. 17
- ☐ Blockouts are 8" or 12" deep.
  - **Reference:** P. 4
- ☐ Posts #1 through #9 are plug-welded posts and installed properly. All post bolts are installed on the side of the post opposite of the Impact Head.
  - **Reference:** Step 2, P. 12
- ☐ Standard guardrail line posts are installed at post #10 and beyond.
  - **Reference:** Step 1, P. 11
- ☐ The Impact Head does not encroach on the shoulder.
- ☐ Post 1 is spaced at 6'-3" on center from Post 2 along the direction of the guardrail.
  - **Reference:** Step 3, P. 12
- ☐ Post 1 is one inch (1") higher than Posts 2-9 at 32-7/8" above grade.
  - **Reference:** Step 3, P. 12
- ☐ Posts 2 thru 9 are spaced at 3'-1.5" on center along the direction of the guardrail.
  - **Reference:** Step 2, P. 12
- ☐ Posts 9 and 10 are spaced at 6'-3" on center along the direction of the guardrail.
  - **Reference:** Step 1-2, P. 11-12
- ☐ The center of Post #1 is offset from Post #2 6" towards the traffic side.
  - **Reference:** Step 3, P. 12
- ☐ The center of Post 0 (NGT Anchor Post) is 13-1/2" from the center of post #2.
  - **Reference:** Step 4, P. 13
- ☐ The Impact Head is oriented correctly and securely fastened to Post #1 with (1) 5/16"-16 grade 5 hex bolt at the top tab, SAE flat washers, and nuts. The feeder chute of the Impact Head should be parallel to the ground when the terminal is installed properly.
  - **Reference:** Step 9, P. 15-16
- ☐ The shelf bracket is securely fastened to post #1 below the terminal head with (2) ½"-13 grade 5 hex bolts, SAE flat washers, and nuts. The feeder chute does not need to touch the shelf bracket.

- **Reference:** Step 9, P. 16

☐ The Impact Head is properly seated on the Anchor Rail with the folder touching the upstream valley of the Anchor Rail.
- **Reference:** Step 9, P. 15-16

☐ The wire rope on the anchor rail is fed through the bottom opening of the Impact Head with no snags or entanglements that would prevent proper tensioning.
- **Reference:** Step 9, P. 15-16

☐ The anchor stud is installed correctly on the Anchor Post with a 1"-8 grade 5 heavy hex nut, and SAE flat washer. This nut should be torqued to 120 ft-lb.
- **Reference:** Step 4, P. 13

☐ The Anchor Post is installed correctly. The base plate of the anchor post should be flush with the finished grade. A cap should be installed with (2) 7/16"-14 x 2" hex bolts, SAE flat washers, and nuts.
- **Reference:** Step 4, P. 13

☐ Any augered posts were properly backfilled and compacted.
- **Reference:** Section 3.1, P. 9

☐ Posts, guardrails, impact heads, anchor rails, and cables are noticeably undamaged from installation.