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October 2, 2015

BY EMAIL AND U.S. MAIL

Richard Tyler McGrath, Esq.
Senior Assistant Attorney General
Chief, Construction Litigation Section
Office of the Attorney General
Commonwealth of Virginia
900 E. Main Street, 2nd Floor
Richmond, VA 23219

Re: VDOT Testing of the ET PLUS Tangent W-Beam Guardrail Terminal (GR-9)

Dear Richard:

I am writing to follow up on Trinity's inspection of the test articles and one of the vehicles for **Test Numbers 5 and 6** at the KARCO test facility in Adelanto, California on October 1, 2015. Beginning on page 2 is a summary of the issues raised by Trinity, and VDOT's response.

As an initial matter, Test Numbers 5 and 6 are not being conducted pursuant to NCHRP Report 350 criteria. "Shallow angle" tests are outside the testing criteria set forth in Report 350. The testing that you are proposing to subject the ET Plus System to is NOT set forth in any of the "test levels" that are a part of Report 350. Instead, VDOT is "testing" the ET Plus System to criteria that *no* extruding w-beam guardrail terminal was designed to meet. VDOT has singled out the ET Plus for these made-up tests at KARCO. VDOT is not subjecting any of the competing products that the Commonwealth is presently installing (*e.g.*, the SKT, X-Tension and X-Lite) to the same, non-standard tests.

As you know, the AASHTO-FHWA Joint Task Force ("Task Force 2") recently released its guardrail terminal crash analysis. A copy of the Task Force 2 Report is available at <http://www.fhwa.dot.gov/guardrailsafety/safetyanalysis/>. The Report concludes that the ET Plus System operates as designed and is fully compliant with federal safety standards. Nonetheless, VDOT is moving forward with its non-standard tests today.

The Task Force 2 Report identified "performance limitations" that affect *all* types of extruding w-beam guardrail terminals. *See* Report at 7. These limitations include performance in shallow angle impacts like those that VDOT intends to use on the ET Plus System. In light of these known performance limitations, Task Force 2 concluded that "additional crash testing of existing

NCHRP Report 350-compliant extruding w-beam guardrail terminals [like the ET Plus] *would not be informative* because the performance limitations identified for these terminals fall outside of the NCHRP 350 testing matrices.” Report at 8 (emphasis added). The shallow angle testing proposed by VDOT falls outside of the Report 350 crash testing criteria. Thus, as Task Force 2 said, such non-standard testing would “not be informative” in assessing the crashworthiness of the ET Plus System. Therefore, we can only assume that your intent in performing this unprecedented testing, is to try and obtain some result that you can attempt to use in the Virginia litigation. This assumption is bolstered by the fact that you have permitted a contingent of news media to come to the testing facility, while you have denied access to those individuals requested by Trinity.

Notwithstanding that the fact that VDOT’s testing today is both irrelevant and uninformative to the national dialogue on Report 350 end terminal systems, Trinity provides the following inspection notes for your review:

FIRST SMALL CAR TEST VEHICLE INSPECTION

1. Trinity noted that the test vehicle (2000 Chevy Metro) had obvious, prior front end damage, the hood had been replaced, the latch had been damaged and bent, the radiator support had been damaged and repaired, the radiator had been replaced, the A/C coils had been pushed into the exhaust manifold, and the driver’s headlight was cracked. A check of CarFax revealed that this same 2000 Chevy Metro had been involved in a rear-end collision with another vehicle in 2004. VDOT decided to cancel the small car test that was scheduled for October 1, and use a different small car test vehicle. Trinity has not yet inspected the replacement small car but it scheduled to do so at 11:30 a.m. Pacific time today.
2. Trinity was not permitted to inspect the accelerometer that was to be mounted in the 2000 Chevy Metro. However, Trinity noted that if VDOT’s method of mounting the accelerometer in the test vehicle was identical to the prior tests at KARCO, then the accelerometer could be susceptible to erroneous readings. VDOT responded that no adjustments would be made prior to testing.
3. Trinity was not permitted to inspect any crash dummy or ballast installed in the small car. VDOT responded that a dummy would be used (without specifying the position) and that no ballast would be used in the small car test.

SECOND SMALL CAR TEST VEHICLE INSPECTION

Trinity has not yet inspected the replacement small car but is scheduled to do so at 11:30 a.m. Pacific time today.

PICKUP TRUCK TEST VEHICLE INSPECTION

1. Trinity noted that the test vehicle (2003 Chevy Silverado) had evidence of prior repairs, including a non-factory weld on the front tubular member between the frame rails in the front of the truck, the hood had been replaced and was not aligned properly, the front bumper is dented in the middle, the top bed rail is torn and indented inward, the left front headlight and plastic are damaged, and the truck does not sit level (the passenger side sits higher than the driver side) and rides high on its springs due to removal of excess weight. VDOT responded that no adjustments would be made prior to testing. This is the same vehicle scheduled to be tested by VDOT at 10 a.m. today.
2. Trinity was not permitted to inspect the accelerometer that was to be mounted in the 2003 Chevy Silverado. However, Trinity noted that if VDOT's method of mounting the accelerometer in the test vehicle was identical to the prior tests at KARCO, then the accelerometer could be susceptible to erroneous readings. VDOT responded that no adjustments would be made prior to testing.

**"LEFT" GUARDRAIL SYSTEM INSPECTION
(TO BE USED FOR THE PICKUP TRUCK TEST)**

1. Trinity noted that the guardrail system is not in alignment. The guardrail is concave (curved inward) between posts 1 and 3, and convex (curved outward) between posts 4 and 9. In other words, the 50-foot guardrail system is not straight. VDOT responded that no adjustments would be made prior to testing.
2. Trinity noted that the estimated angle of impact for the test vehicle on the end of the guardrail system is 6 degrees rather than the 5 degree impact predicted by VDOT. VDOT responded that no adjustments would be made prior to testing.
3. Trinity noted that VDOT installed the guardrail posts in native soil rather than compacted NCHRP Report 350-standard soil. The soil at KARCO is actually sandy and easily moved. VDOT responded that no adjustments would be made prior to testing.
4. Trinity noted that the exit gap on the extruder head had scoring marks, which indicates that this particular extruder head could have been involved in a prior accident and had

guardrail and splice bolts extruded through it, and that VDOT has not provided any information regarding the history or prior accidents involving this terminal head. VDOT responded that no adjustments would be made prior to testing.

5. Trinity noted that VDOT appeared to be driving the guardrail posts into the native soil, and there is evidence of witness marks on each post as proof of this pounding method. VDOT responded that no adjustments would be made prior to testing.
6. Trinity noted that VDOT installed a breakaway post at post number 9, rather than a standard line post. VDOT responded that post number 9 would be replaced prior to testing.

“RIGHT” GUARDRAIL SYSTEM INSPECTION
(TO BE USED FOR THE SMALL CAR TEST)

1. Trinity noted that the guardrail system is not in alignment. The guardrail is convex (curved outward) between posts 5 and 9. In other words, the 50-foot guardrail system is not straight. VDOT responded that no adjustments would be made prior to testing.
2. Trinity noted that the estimated angle of impact for the test vehicle on the end of the guardrail system is 6 degrees rather than the 5 degree impact predicted by VDOT. VDOT responded that no adjustments would be made prior to testing.
3. Trinity noted that VDOT installed the guardrail posts in native soil rather than compacted NCHRP Report 350-standard soil. The soil at KARCO is actually sandy and easily moved. VDOT responded that no adjustments would be made prior to testing.
4. Trinity noted that VDOT appeared to be driving the guardrail posts into the native soil, and there is evidence of witness marks on each post as proof of this pounding method. VDOT responded that no adjustments would be made prior to testing.
5. Trinity noted that the first section of guardrail was not inserted fully into the extruder terminal. VDOT responded that no adjustments would be made prior to testing.

Because Trinity’s concerns were not fully addressed by VDOT, and the tests do not conform to NCHRP Report 350 requirements, Trinity will not attend **Test Numbers 5 and 6**. Trinity will inspect the small car test vehicle at 11:30 a.m. Pacific time as noted above, however.



Richard Tyler McGrath, Esq.
Senior Assistant Attorney General
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Thank you.

Sincerely,

/s/ Matthew B. Kirsner

Matthew B. Kirsner

cc: Sarah R. Teachout, Esq.
Mr. Gregg Mitchell
Counsel of Record in Case No. CL13-698,
Circuit Court of the City of Richmond, VA