GUARDRAILS FACT SHEET

What do guardrails do?

- Highway guardrails work to keep a vehicle from impacting other roadside obstacles (bridges, signs, culverts, trees, rocks, etc.), running off the road into oncoming traffic or off the side down a steep embankment. Transportation engineers typically only design and install guardrails when the roadside conditions pose a greater threat than the guardrail itself, which is also considered a roadway obstruction.

- The most common type of guardrail in use today is the steel W-Beam. Guardrail functions as a system with the guardrail, posts, connection of rail to the posts and to each other, and the end caps (or anchors/terminals) all playing an integral role in how the guardrail will function upon impact.

- Following a federal safety test, guardrails are placed onto an approved products list for state Departments of Transportation to consider when designing and installing.

- The most recent approval designation has been NCHRP 350 which was adopted in 1993 with implementation in 1998. Colorado began to install these products soon thereafter. Federal guidelines are now moving towards a newer safety designation and products list called the Manual for Assessing Safety Hardware or MASH.

What has happened?

- In 1998, a new federal standard of guardrail systems was approved and Colorado began installation soon thereafter around the state of Colorado.

- This summer, June 2016, a woman crashed on northbound I-25 at mile post 252 near Johnstown. She hit a guardrail on CDOT's system and was seriously injured. Recently, Fox31 and Chris Halsne began a story about why the guardrail system may have failed.

- In 2012, CDOT installed new guardrail systems as part of a larger project on north I-25. The guardrail installations consisted of a Road System rail and a Road System end cap called FLEAT 350. The products are on the approved NCHRP 350 product list.
  - The end cap is the metal structure at the end of a guard rail system designed to deflect vehicles and absorb the energy of a crash.

- In 2014 a crash damaged the rail in this area. CDOT replaced the rail with a Trinity product and kept the original Road System end cap. The two systems are not designed to work together, but the pieces do attach.

Has this happened on other installations?

- Late last week, CDOT immediately began to review other installations in the area of the accident (North I-25) and determined that twenty other installations are incompatible including the repair that had been done to the 2016 crash site. CDOT replaced those installations this week.

- As a result, CDOT has immediately ordered a statewide inventory of all 42,000 guardrails and the 15,000 involving the identified products as there could be a small percentage with an incompatible installation.
What will CDOT do?

- **Inventory:** Complete inspections of all guardrail installations (weather permitting) by next week.
  - The inspections are currently 50% complete (with focus on interstates)
    - Of that, we have currently identified 144 incompatible installations statewide or approximately less than 1%

- **Replacement:** CDOT will replace all incompatible guardrail systems immediately.
  - In the instance where the systems can be “swapped”, CDOT will replace rail and end caps with compatible installations.
  - All installations will be crash worthy and meet current federal standards (NCHRP 350).
    - Note: MASH upgrades are being phased in by the federal government over the next several years.
  - It is anticipated that it will take several weeks to complete all replacements.

- **Procedures:** CDOT will immediately review:
  - Design and Specification Plans: Review all designs for consistency, safety and compatibility.
  - Logistics Plans: Review all storage of inventory and to ensure that products are properly labeled with clear instruction on installation and use, as well as approach for inspection.
  - Training: Review and revise all training standards on guardrail installations. Retrain all maintenance staff in guardrail installation and repair.

- Colorado is working directly with the American Association of Highway Transportation Officials (AASHTO) and Federal Highway Administration (FHWA) to elevate guardrail compatibility nationally with other DOTs.