

Snowplowable Delineation Alternatives

Preface: NCDOT has moved away from the use of cast-iron snowplowable pavement markers. There have been incidences of cast-iron markers coming out of the pavement and causing damage to vehicles. Because of this the Signing & Delineation Unit has tested alternatives. The following shows several alternatives that have been tested and do well depending on the situation in which they were installed.

Note: These options are not ranked in order. The best option should be chosen based on the location in the state and the conditions that are present.

Option 1: Polycarbonate H-shaped Marker



Slot Dimensions

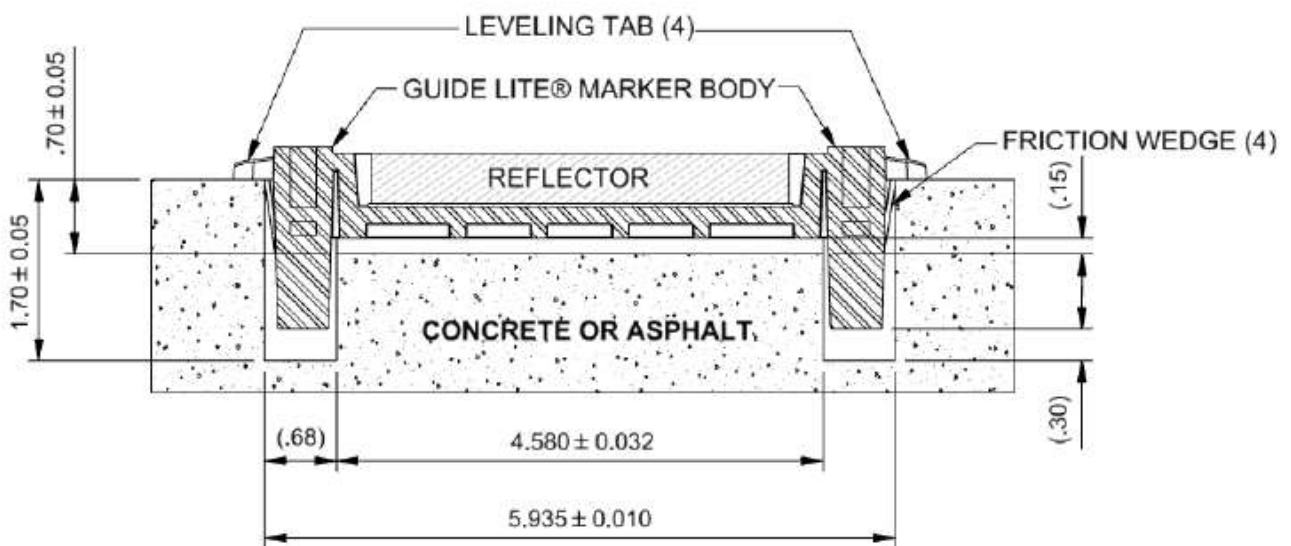
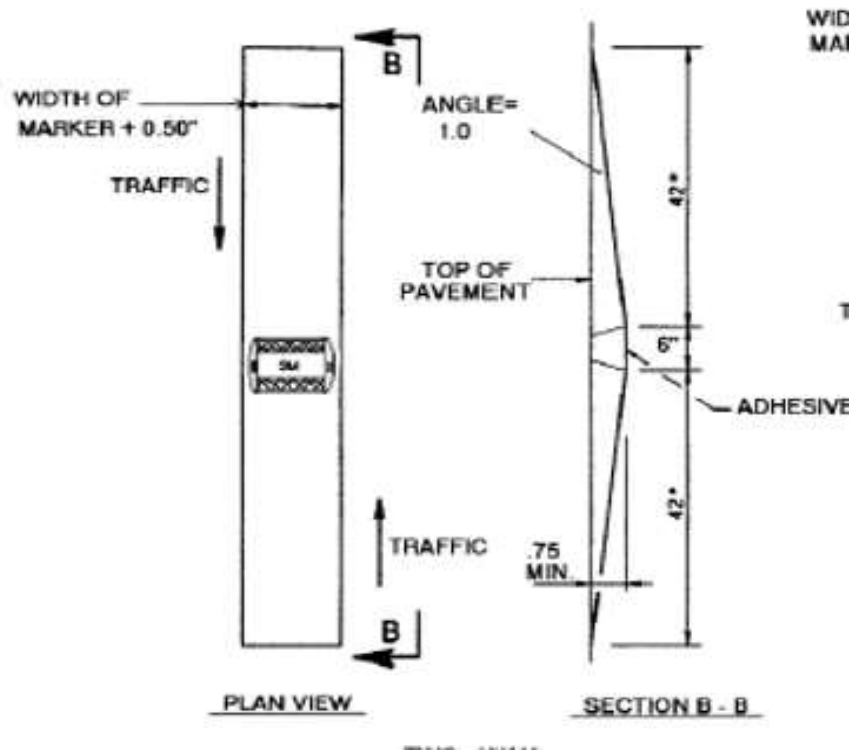


Figure 8 - Section View Showing Slot Dimensions and Marker Position in Slot

This is the most common marker currently used by NCDOT. Although there have been issues in heavily snowplowed parts of the state, this has been a good alternative. Divisions 2, 4, and 10 have had no issues with the use of this product. In heavily snowplowed areas the issues have not been markers coming out of the road and striking vehicles. The damage has been to the markers, lenses, and parts of the marker which cause other minor damages to vehicles and reduce the life of the marker.

These markers were initially installed in Division 4 in 2017 and performed well. They have been reviewed in other portions of the state and have performed well. This might not be the best option in higher elevation locations in the state.

Option 2: Inlaid Raised Pavement Marker



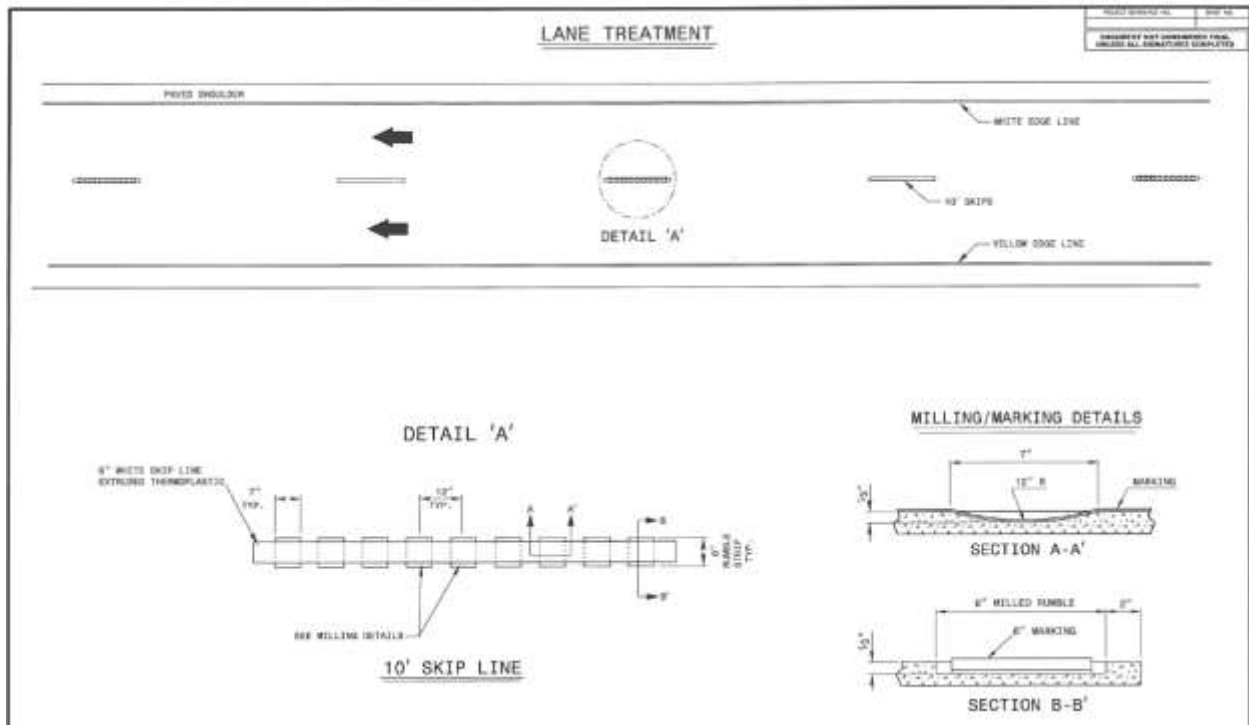
This is a treatment that has been used effectively by other states in the past. It places the marker slightly below the surface of the pavement, reducing snowplow strikes. The concern is that cutting a groove to this depth will create a “trap” for debris and water. This is more of a concern in geographically flatter parts of the state. The groove dimensions can vary if the marker can be seen by the driver.

Installed on NC 885 in fall of 2019 and inspected spring of 2020. All markers were in place at the time of inspection.



[NC 885 Toll](#)

Option 3: Rumble Skips



Installed on NC 117 near Mt. Olive in 2019. Inspected in 2022 and performed well.



[Rumble Skips](#)

Install rumble skip lines in place of every other center skip line. This will consist of a rumble strip with a durable pavement marking skip line placed on top.

Option 4: Inlaid Cradle Marker

NC 885 Toll



Installed at the following locations.

US 301- Installed 2020. Inspected in 2022 and no markers are missing at the time of inspection.

[Cradle Markers - US 301 - Whitakers](#)

I-85 – Installed in 2019. Inspected in 2023 and no markers are missing at the time of inspection.

[Cradle Markers - I-85](#)

Rock Service Station Road – Installed in 2018. Inspected in 2023 and no markers are missing at the time of inspection.

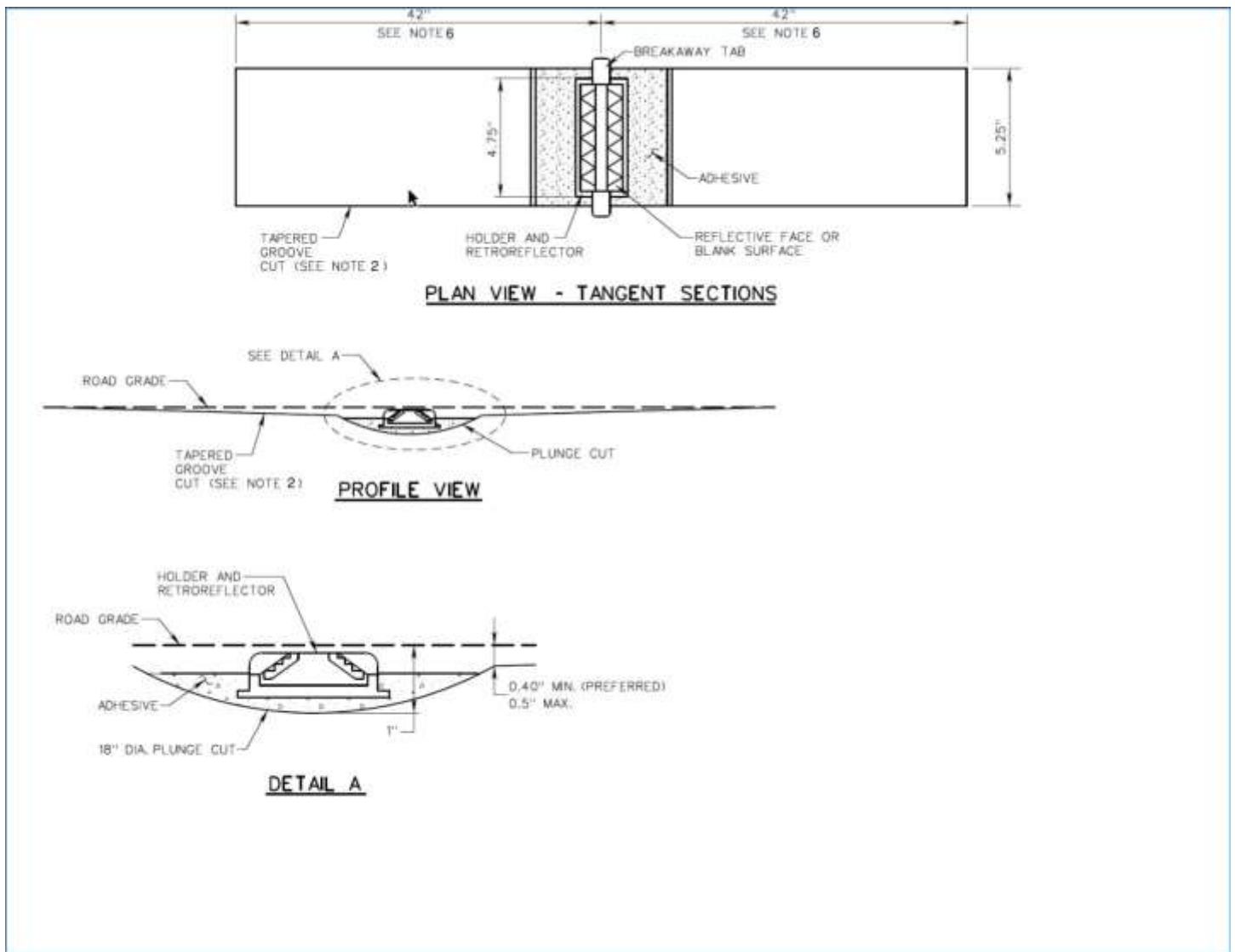
[Cradle Markers - Rock Service Station Road](#)

NC 147 Toll – Installed in 2019. Inspected in 2020 but the road has since been resurfaced to with inlaid markings installed.

[Inlaid Markings - NC 147 Toll \(Now NC 885\)](#)

This is the recommended marker in North Carolina, the price shown above is based off the drawing shown below. Inlaid Cradle Markers have been used extensively in Virginia with good results. Like with option 2, there are concerns that cutting a groove to this depth will create a “trap” for debris and water. This is more of a concern in geographically flatter parts of the state.

Shown on the next page is what VDOT uses as a Standard for these types of installations. This is what is recommended in NC. The groove dimensions can vary if the marker can be seen by the driver.



Notes

1. When installed in existing pavement, all groove edges shall be at least 2 inches from any seam or pavement joint.
2. Groove cuts may be tapered or beveled. Tapered cuts shall start at road level on each end and taper at a fixed rate as shown on the profile view. Beveled groove cuts shall be at a constant 0.3"-0.4" depth.
3. Groove and plunge cuts shall be clean and dry prior to placement of adhesive.
4. The epoxy adhesive shall be thoroughly mixed until it is uniform in color and applied in accordance with the manufacturer's installation instructions.
5. Marker shall be installed as per manufacturer's installation instructions with the breakaway tabs resting on the pavement surface. The epoxy shall be filled to the level of the top of the marker holder. Epoxy shall not touch the retroreflector.
6. Total groove length may be shortened to 54" on sharp curves if approved by the engineer.
7. Grooves shall not overlap with loop detector wires.

Option 5: Inlaid Pavement Markings

- Inlaid Cold Applied Thermoplastic and Inlaid Extruded Thermoplastic
Rock Service Station Rd and NC 147 (now NC 885)



When using this method use an enhanced reflective media.

For questions on enhanced reflective media contact the Signing and Delineation Standards Engineer.

The following retroreflectivity values shall be met.

MINIMUM REFLECTOMETER REQUIREMENTS		
Item	Color	Reflectivity
Enhanced Reflectivity Media	White	450 mcd/lux/m ²
	Yellow	350 mcd/lux/m ²

These markings need to be placed at least 10 mils below the roadway surface.

Rock Service Station Road – Installed in 2018. Inspected in 2023 and no markings are missing at time of inspection. Very little damage noticed after being snowplowed.

[Inlaid Markings - Rock Service Station Road](#)

NC 147 Toll – Installed in 2019. Inspected in 2020 and no markings were damaged at time of inspection. After this route was resurfaced the Turnpike Authority chose to use inlaid markings.

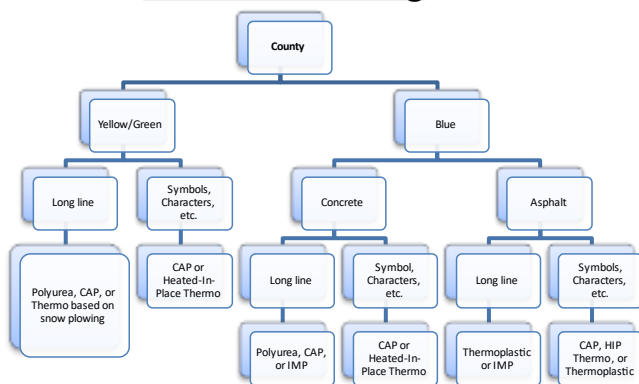
[Inlaid Markings - NC 147 Toll \(Now NC 885\)](#)

10 ft inlaid markings every 80 ft.

Pavement Marking and Marker Material Selection



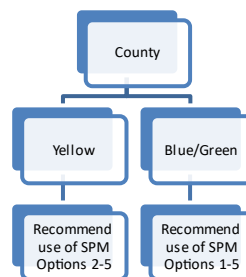
Pavement Marking



All bicycle and pedestrian markings should be skid resistant

Pavement Markers

[Recommended Pavement Marker Options](#)



Recommended Pavement Marker Options