

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

ROY COOPER GOVERNOR J. ERIC BOYETTE Secretary

<u>GUIDELINES FOR INTERFACING ATYPICAL EQUIPMENT WITH TRAFFIC</u> <u>SIGNAL CONTROL EQUIPMENT ON THE STATE HIGHWAY SYSTEM</u>

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Purpose

The purpose of these guidelines is to provide instructions on how to interface nonstandard equipment into new or existing traffic signal installations along with how to properly document the installation. The objective of these guidelines is to ensure smooth and consistent installations of state-of-the-art and innovative technologies while minimizing or eliminating any potential unwanted side effects.

Scope

These guidelines apply to equipment that is not considered to be typical and interfaces in with the traffic signal control equipment.

Some examples of *typical* equipment that are not covered by these guidelines are:

- Signal and pedestrian indications
- Inductive loop detectors
- Pedestrian push buttons

Some examples of *atypical* equipment that are covered by these guidelines are:

- Red light traffic control photographic systems
- Connected vehicle technology systems
- Cabinet monitoring systems

Interfacing

Installed equipment shall be galvanically isolated from the traffic signal control equipment. Galvanic isolation refers to the installed equipment being electrically and physically isolated from the traffic signal control equipment; no direct conduction path is permitted.

Physical or electrical connections to the traffic signal control equipment are not allowed unless specifically approved by the Department prior to installation of the equipment. Physical or electrical connections to the load switch driver circuits (24Vdc) or the load switch signal circuits (120Vac) of any outputs that are in use are not allowed.

If required, sensing of any field indication (including red, yellow, and green) shall be done with an approved electrically isolated method at the field terminals inside of the controller cabinet. Examples of approved means for sensing are those utilizing "donut" current transformers or Hall-effect devices.

Installed equipment shall not affect the operation of the traffic signal control equipment.

The equipment being installed may be required to have its own electrical service. Consult the Department prior to installation to determine if service can be provided to the equipment from the controller cabinet.

When atypical equipment is removed from an intersection, any modifications to accommodate the installation of the equipment shall also be removed and the traffic signal shall be restored to its original condition.

Documentation

Equipment interfacing with traffic signal control equipment shall have wiring diagrams and other pertinent information documented. The wiring diagrams shall show how the equipment is wired into the traffic signal control equipment for the specific installation and not be a 'typical' drawing.

Equipment wiring diagrams and any other documentation shall be provided to the Department prior to installation of the equipment.

A copy of the equipment wiring diagrams and any other documentation shall be stored at the intersection in addition to a copy provided to the Department for archiving.

Certain changes to the operation of a traffic signal shall be documented in a revised signal plan, including electrical and programming details, approved and sealed by a Professional Engineer registered in North Carolina prior to implementing in the field. Examples of changes requiring a new signal plan include, but are not limited to, the following:

- Changes to the traffic signal vehicle detection configuration
- The revision of existing or addition of new emergency vehicle preemption
- Additional logic statements that affect the operation of the traffic signal

Any document that conveys any engineering knowledge, analysis, judgement, or recommendations must be sealed by a Professional Engineer registered in North Carolina.

If you need additional information or would like to submit a request for an atypical equipment connection, please contact the State ITS & Signals Management Engineer.