

UPDATE

Traffic Signal Construction Changes in Pennsylvania

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Throughout history, a strong infrastructure has been the foundation for which a thriving civilization is built upon. From the building of roads

and bridges to the design of traffic signals at congested intersections, it is essential to place a high priority in preserving their intended function.

Over the past decade the United States has witnessed the crumbling of its infrastructure. With a continued focus on bridge maintenance and rehabilitation, this has left little funding for other improvements. As indicated in the [Transportation Advisory Committee's funding report](#), Pennsylvania's infrastructure is currently underfunded by \$3.5 Billion annually. In Pennsylvania, [Title 67 Section 212.5](#) places the responsibility on local municipalities to install and maintain traffic control devices.



Over the past several years, the Pennsylvania Department of Transportation (PennDOT) has been working with the traffic signal pole manufacturers and its personnel to update the PennDOT traffic signal design standards to be in compliance with the American Association of State Highway and Transportation Officials (AASHTO) "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals". On October 14, 2010, PennDOT released an updated design publication, [Publication 148 - "Traffic Standards - Signals \(TC 8800 Series\)"](#), which had not previously been updated since 1988 and referenced design specifications from 1975. Since an update to this specification has not occurred in some time, several significant modifications have occurred regarding the traffic signal structural supports which will directly impact municipalities. These publication standards apply to all traffic signal permit plans approved **after** October 14, 2010. The most significant changes include:

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- The size of traffic signal indications, signs, and the amount of equipment on each traffic signal pole requires that the additional wind and ice loadings be supported.
- The addition of new Fatigue Design requirements for the connections of the traffic signal mast arm support structures. In most cases, the Fatigue Design is the driving criteria for sizing traffic signal mast arm support structures. This design criterion is now consistent with PennDOT's traffic sign and ITS standards.
- Increases in the foundation widths and depths are due to the several factors which include conservative soil parameters and additional loading and wind surface area. Previous foundations designs did not take into account caisson calculations in which PennDOT now uses for all of its structural pole foundation calculations.

Recent issues with installation, inspection, and maintenance of traffic signal structural supports has caused PennDOT to focus on updating Publication 148. PennDOT has worked with several structural manufactures to ensure that each was approved prior to the issuance of Publication 148.

Bucks County municipalities currently maintain approximately 740 traffic signals. With significant time lapsing between when the PennDOT standards were updated and the AASHTO specification requirements were updated, the result will tremendously affect the installation and replacement costs of traffic signal structural supports. This will create many challenges for local governments to budget improvements appropriate for the maintenance and replacement of traffic signal structural supports. Additionally, several concerns have been raised recently by local contractors which will be reflected in labor and material costs include:

- New construction equipment (larger augers) has to be purchased to meet the updated foundation requirements in Publication 148.
- With larger trucks in use for longer periods of time, more complicated work zone traffic control, including possible intersection closures and detours, may be necessary.

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- With increases in foundation widths and depths, utility lines such as water, gas, and electric could pose an even greater challenge during installation.

- Foundation depths can also affect the type of material that augers will have to dig through. In some instances, very hard materials, such as blue limestone, can be encountered, which affects the time and equipment used to dig to such depths. In other instances, underground springs or water courses can be encountered, which can require additional construction techniques such as the use of caissons for installation of foundations.

- Increases to the size and number of anchor bolts which will contribute to increased labor and shipping costs.

That's the bad news, but there are exemptions for traffic signal support replacements which PennDOT identified in the [Strike-Off Letter](#) for the updated publication. This states that if a pole needs replacement and the following two conditions are met, the existing support will be considered:

- The affected municipality has an existing stockpile of new traffic signal structural supports purchased prior to October 14, 2010.

- The municipality provides verification (signed and sealed from a Professional Engineer, licensed in Pennsylvania) attesting to the structural adequacy of the existing foundation and the suitability of the stockpiles signal support material for its intended use and location.

It is expected the cost of traffic signal supports will initially be 2 to 2.5 times their current cost. Time will tell if this estimated increase is accurate as contractors become more familiar with these updated standards. In the mean time, municipalities should consider this cost increase when budgeting for traffic signal installations and upgrades.