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DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
INTRADEPARTMENTAL CORRESPONDENCE

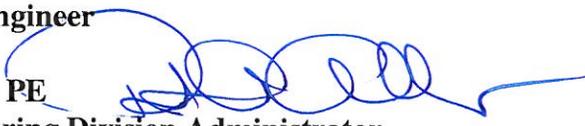
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MEMORANDUM

TO: Richard Savoie, PE
DOTD Chief Engineer

FROM: Peter A. Allain, PE 
Traffic Engineering Division Administrator

RE: Rigid Traffic Signal Supports within the Clear Zone

DATE: April 9, 2013

This memorandum is intended to update and formalize the Louisiana Department of Transportation and Development's policy for the use of rigid (non-breakaway) traffic signal supports on the state highway system.

The standard practice within the Department has been to install traffic signal supports on rigid (non-breakaway) supports within the clear zone. This practice was based on older national guidelines, which have undergone recent revisions. These include:

1. **2009 Manual on Uniform Traffic Control Devices**
2. **2011 AASHTO Policy on Geometric Design of Highways and Streets**
3. **2011 AASHTO Roadside Design Guide**

The Department's design policies are supported by state law. Under Louisiana Revised Statutes 32:235, the Department is directed to adopt a manual and specifications for a uniform system of traffic control devices. In response to this directive, on December 13, 2011, the Department adopted the 2009 Edition of the Manual on Uniform Traffic Control Devices (MUTCD).

RECOMMENDED FOR APPROVAL _____ DATE _____

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 APPROVED _____ DATE **5.29.13**

The MUTCD provides the following guidance on the location of traffic signal support poles.

2009 MUTCD, (page 493)

Section 4D.33 Lateral Offset of Signal Supports and Cabinets

Guidance:

The following items should be considered when placing signal supports and cabinets:

- A. Reference should be made to the American Association of State Highway and Transportation Officials (AASHTO) “Roadside Design Guide” (see Section 1A.11) and to the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11).*
- B. Signal supports should be placed as far as practical from the edge of the traveled way without adversely affecting the visibility of the signal indications.*
- C. Where supports cannot be located based on the recommended AASHTO clearances, consideration should be given to the use of appropriate safety devices.*
- D. No part of a concrete base for a signal support should extend more than 4 inches above the ground level at any point. This limitation does not apply to the concrete base for a rigid support. ...*

In the above section A, the AASHTO Roadside Design Guide is identified as the primary reference on placement of signal supports. The above section B, suggests supports be placed as far as practical from the edge of the traveled way. Section D states that ridge (non-breakaway) supports may be used.

Under Louisiana Revised Statutes 48:35, the Department is also directed to adopt minimum safety guidelines for design, construction, and maintenance, which conforms to the system approved by the American Association State Transportation Officials (AASHTO). The law also allows the Department to utilize any flexibility allowed by AASHTO. In 2009, the Department published a set of Minimum Design Guidelines (LAC 70:1301) defining dimensions for roadway features for various classes of roadway. As required, these Guidelines are based on the AASHTO Policy on Geometric Design of Highways and Streets, and the AASHTO Roadside Design Guide.

The AASHTO Roadside Design Guide states the following concerning traffic signal supports:

2011 Road Design Guide, (pages 4-12 to 4-13)

4.6 TRAFFIC SIGNAL SUPPORTS

Traffic signal supports include structures for post mounted traffic signals, structures with cantilever arms, overhead mounted traffic signals, and span wire mounted traffic signals.

Traffic signal supports present a special situation where a breakaway support may not be practical or desirable. As with luminaire supports, a fallen signal post support may become an obstruction. However, the potential risks associated with the temporary loss of full signalization at the intersection should be considered.

When traffic signals are installed on high-speed facilities (generally defined as those having speed limits of 80 km/h [50 mph] or greater), the signal supports and, if not mounted on one of the signal support poles, the signal support box, should be placed as far away from the roadway as practicable. Shielding these supports can be considered if they are within the clear zone for that particular roadway. Traffic signal supports with mast arms, or those that have a support on both sides of the roadway and a wire (span wire) or other components (overhead) that spans the facility, normally are not provided with a breakaway device. Post-mounted signals are commonly installed in close proximity to traffic lanes or in wide medians; therefore, consideration should be given to using breakaway devices for these supports.

Based on the above, the Roadside Design Guide allows the state the flexibility to install traffic signal supports on rigid (non-breakaway) supports.

The Department published Minimum Design Guidelines that included minimum clear zones as established in the Roadside Design Guide. Typically, roadway elements that are located within the clear zone are either breakaway or shielded with guardrail. However, both the Roadside Design Manual and the MUTCD allow the Department the flexibility to exempt traffic signal poles from both breakaway supports and shielding with guardrail.

The Department utilizes both span wire and mast arm traffic signal installations. With the span wire installations, the signal heads are suspended from a cable that spans the intersection. With the mast arm installations, the signal heads are suspended from cantilever arms that span the intersection. In either case, if signal poles were to fall, the span wire or mast arms and signal heads would fall into the intersection. The falling hardware would be hazardous to other traveling vehicles, pedestrians, bicyclists, etc. The intersection would be blocked until a signal crew could arrive to remove the signal hardware. The loss of signal control would add significant capacity and adverse safety affects to the roadway system for hours and possibly days.

Louisiana is situated on the coast of the Gulf of Mexico and is subject to frequent high speed hurricane wind. The predicted wind loads for Louisiana and other gulf coast states are the highest in the nation. To complicate the issue, Louisiana soils are primarily part of the Mississippi River Delta which are high in organic content and provide poor structural support. The combination of significant design loads and weak soils combine to result in very large signal supports and foundations which cannot easily be mounted as breakaway supports.

Intersections have frequent crashes and therefore have a high amount of errant vehicles paths at all angles. Utilizing guardrail to shield objects is a common practice, but it is not practicable to shield signal supports at intersections. Guardrails primarily function to run parallel to the roadway and to redirect errant vehicles away from objects. However, intersections typically have traffic flows which runs perpendicular to each other such that the guardrail would be parallel to one direction of traffic and perpendicular to the other. As such, guardrail would be ineffective and may even be detrimental when struck at a perpendicular angle. In addition, guardrail at a perpendicular angle presents a very large area for these errant vehicles to hit. Based on the above, the use of guardrails around signal supports is not recommended.

State law (RS48:35) noted earlier also permits the Department to utilize any flexibilities allowed by AASHTO in the development of policies. Given the flexibility allowed in the MUTCD and Roadside Design Guide, the Department has chosen to utilize rigid (non-breakaway) traffic signal supports. These rigid traffic signal supports are allowed to be located within the recommended clear zone, and should not be shielded with guardrail or barrier rail. To reduce the chance of impact, the supports shall be installed as far away from the roadway as practicable.

The desirable clearances distances for traffic signal supports measured from the face of the support to the edge of the travel lanes are:

Desirable Clearances for Traffic Signal Supports	
ROADWAY TYPE	DESIRABLE CLEARANCE
Roadways with curbing	2 ft behind back of curb
Medians and Islands	2 ft behind back of curb
Roadways with 0-4 ft shoulders	10 ft from edge of travel or turn lane
Roadways with > 4 ft shoulders	6 ft from edge of shoulder

It is understood that the roadway width at intersections are wider due to the presence of turn lanes and corner radii. Also, the space that is available within the right-of-way is often taken up by storm sewers, underground utilities, overhead utilities, and sidewalks. In addition, signal supports must be located to meet visibility requirements of the signal heads. Because of these limitations, the above desirable clearances cannot always be achieved. Exceptions to these minimums should be approved by a licensed engineer.

This policy should be incorporated into all applicable design manuals, standard plans, special details, and projects.



STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

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March 30, 1999

M. J. "MIKE" FOSTER, JR.
GOVERNOR

KAM K. MOVASSAGHI, Ph. D. P.E.
SECRETARY

Ms. Cheryl A. Turrentine
State Risk Claims Adjuster
Office of Risk Management
P.O. Box 94095
Baton Rouge, LA 70804-9095

Reference: Carlyle Romanowski, et al
Versus
Travelers Insurance, et al
19th JDC, Docket #454177
ORM # 98R/0225ROMAN

Dear Ms. Turrentine:

In accordance with your letter of March 11, 1999, addressed to Mr. John Vaughn, we have compiled and enclosed the information you requested.

Enclosed please find a copy of "Section 4B-14" from the Manual on Uniform Traffic Control Devices (MUTCD). This manual is the standard for traffic control devices that the Department has adopted. The Legal Authority statement is also included for your reference. A copy of Engineering Directives and Standards Manual (EDSM) No. IV.7.1.5 is also attached which outlines the Department's policy regarding traffic signal installations. Also attached are standards concerning breakaway devices that was retrieved from the Federal Highway Administration's (FHWA) web site.

The MUTCD gives specific dimensions for locating traffic signal support poles. The text highlighted in "Section 4B-14" concerns the location of signal supports. In particular the manual states that "the location of the supports should be placed as far as practicable from the edge of the traveled way". The location of the pole at the subject intersection is outside of the shoulder on the front slope of the incline area between the shoulder and service road. This is the only practical area that the pole can be located. The other highlighted text refers to the foundation of support poles. This statement gives exception for non-breakaway support poles and is an indication that non-breakaway poles are an acceptable signal support.

The information highlighted on EDSM No. IV.7.1.5 reiterates the requirements in the aforementioned Manual for installing steel poles. The directive adds other requirements for installing poles. One is that the poles must be located within the Department's right of way. This means that the signal could be designed that would place the poles farther from the intersection. However, the outside limit would be the right of way line. Generally, utility companies use the area next to the right of way, and we often have difficulty locating poles in

Ms. Cheryl A. Turrentine

March 30, 1999

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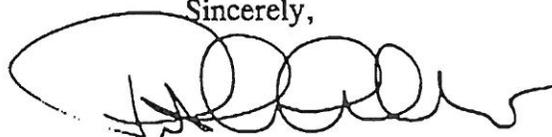
this area. At the subject intersection, the area between the service road and the right of way is very short increasing the difficulty locating a pole in this area. Another consideration in locating poles adjacent to the right of way is contingent on the signal indications aligning to the intersection. In regard to the intersection in question, the pole could not be place adjacent to the right of way line because the signal heads would not align correctly with the intersection.

The highlighted text from the FHWA identifies the specifications and its importance because this document gives exceptions allowed by the FHWA. Item 6 refers specifically to traffic signal supports stating, "because of the structural requirements for utility poles and most traffic signal supports, the technical problems with making them breakaway, and the assumed net benefit to the public from allowing them, unshielded, with the clear zone, a requirement that they be made breakaway, historically, has not been imposed on them". The "technical problems" refers to the reaction characteristics if these poles would be breakaway. A signal support pole has at least one span wire attached to the top and the span crosses the roadway to another pole. This span wire has the traffic signals attached to it. The poles support the span wire and are under stressed. If these poles were made to breakaway then struck, the result would be that the pole would fall into the intersection since the span wire would restrict its movement. The pole would fall on vehicles in the intersection and would come to rest in the intersection along with the span wire blocking traffic until a crew could arrive to remove them. This is unlike breakaway poles that are not restricted by a span wire. Breakaway poles are designed to be thrown clear of the vehicle striking the pole and generally landing away from the roadway.

We feel a major concern apart from those that are mentioned above is the intersection will be unsignalized until repaired. Emergency repair could take the better part of a day, possibly two.

Hopefully this information will be helpful to you. Should you have any questions please feel free to contact Mr. John Vaughn at (225) 935-0110.

Sincerely,



PETER A. ALLAIN, P.E.
STATE TRAFFIC ENGINEER

PAA/vab

Enclosures

cc: Mr. William Temple
Mr. John Broemmelsiek (w/attachments)
Mr. John Vaughn (w/attachments)