

## MEMORANDUM

To: Elaine Ramesh, Roads & Bridges Chair  
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From: Dan Strahan, P.E.  
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Date: November 16, 2010

Re: Sign Inventory  
MUTCD Reflectivity Program Requirements

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Recently our office completed an inventory of all regulatory, warning, and guide signs on Village roadways, including all signs located within the storage barn at the Village Hall site. In addition to documenting the physical location of each sign, the inventory included a photograph as well as a reading of retroreflectivity using a retroreflectometer. A unique readable bar code tag was placed on each sign to allow the inventory to be updated as needed. The retroreflectivity reading was taken to assist the Village in compliance with the requirements of the MUTCD. Please note this review included only an analysis of the retroreflectivity of the signs included, and did not consider the underlying warrant for the placement of the signs.

### **MUTCD Reflectivity Requirements**

Revisions to the Manual of Uniform Traffic Control Devices (MUTCD) established both minimum standards for traffic sign retroreflectivity and required local agencies that own and maintain signs to establish a sign maintenance program. The requirements took effect on January 22, 2008 and established a compliance schedule for local agencies to follow. The following is a summary of the key compliance dates established in the regulations:

- January 2012- Deadline for agencies to establish and implement a sign maintenance program that addresses the minimum sign retroreflectivity program. All signs need not be in compliance by this date, but the program to bring them into compliance must be in place.
- January 2015- Deadline for replacement of all regulatory, warning, and ground-mounted guide signs (except street identification signs) to comply with retroreflectivity requirement.
- January 2018- Deadline for replacement of overhead guide signs and street identification signs.

The Federal Highway Administration lists four steps required for implementation of the retroreflectivity standards:

1. Gather Basic Information
2. Identify Sign Maintenance Method
3. Prepare Budget
4. Administer Sign Maintenance Method

The sign inventory completed this summer satisfies step 1 of the implementation process. The purpose of this memorandum is to document the results of the sign inventory and examine the recommended approach to the remaining steps in the implementation process.

### Sign Inventory Results

The field work for the 2010 sign inventory was completed by GHA in July and August of 2010. The inventory identified and catalogued a total of 909 roadway signs owned by the Village of Barrington Hills. At this time road identification signs were excluded in order to reduce the cost of the inventory, as the MUTCD requirements do not apply to these signs until 2018. This includes 530 post-mounted signs along Village maintained roadways, with the remaining 379 signs inventoried located in the storage barn located on the Village Hall property. The signs in the barn are for a wide variety of purposes; some are available for emergency use during storm events, many are utilized for the seasonal posting of reduced load limits, and some were roadway signs that had been replaced and not yet discarded. A total of 119 of these signs do not meet the retroreflectivity requirements.

As the MUTCD regulations deal with signs posted in the community, the remainder of this analysis will focus on those signs posted throughout the Village.

### Regulatory Signs

Regulatory signs are those signs used to inform road users of selected traffic laws or regulations and indicate the applicability of the legal requirements. A total of 169 regulatory signs were inventoried within the Village. The table below summarizes the results for regulatory signs within the Village.

MUTCD Code	Description	Quantity	Number (Percentage) meeting Requirement
R1-1	Stop Sign	64	57 of 64 (89.1%)
R1-4	All Way	2	2 of 2 (100%)
R2-1	Speed Limit 25	85	80 of 85 (94.1%)
R3-4	Turn Prohibition Sign	8	8 of 8 (100%)
R3-5	Right Turn Only	1	1 of 1 (100%)
R4-1	Do Not Pass	2	0 of 2 (0%)
R4-7	Keep Right	3	3 of 3 (100%)
R7-1	No Parking Any Time	3	N/A*
R8-8	Do Not Stop on Tracks	1	1 of 1 (100%)
Totals		169	152 of 166 (91.6%)

\*Local Agencies have the option of excluding no parking signs from the requirements.

### Warning Signs

Warning signs are those signs that call attention to unexpected conditions on or adjacent to a highway, street, or road and to situations that might not be readily apparent to road users. A total of 188 warning signs were inventoried within the Village. The table below summarizes these results:

MUTCD Code	Description	Quantity	Number (Percentage) meeting Requirement
W1-1	Road Turns Left/Road Turns Right	9	3 of 9 (33.3%)
W1-2	Curve Left/Curve Right	7	1 of 7 (14.3%)
W1-3	Road Jogs	2	1 of 2 (50%)
W1-5	Road Curves	4	0 of 4 (0%)
W1-6	One Direction Arrow Sign Left/Right	8	0 of 8 (0%)
W1-7	Two Direction Arrow	8	4 of 8 (50%)

<b>W2-1</b>	Intersection Warning Sign	1	0 of 1 (0%)
<b>W2-4</b>	Intersection Warning Sign Tee	6	0 of 6 (0%)
<b>W3-1</b>	Stop Sign Ahead	42	24 of 42 (57.1%)
<b>W3-3</b>	Signal Ahead	2	0 of 2 (0%)
<b>W3-4</b>	No Passing Zone	1	1 of 1 (100%)
<b>W5-2</b>	Narrow Bridge	1	0 of 1 (0%)
<b>W7-3a</b>	Warning Sign Distance Plaque	9	9 of 9 (100%)
<b>W8-1</b>	Bump	1	0 of 1 (0%)
<b>W10-1</b>	Railroad Crossing	2	2 of 2 (100%)
<b>W11-3</b>	Non-vehicular Warning Sign	1	0 of 1 (0%)
<b>W11-5</b>	Vehicular Traffic Signs	1	0 of 1 (0%)
<b>W11-7</b>	Non-vehicular Warning Sign-Horse	16	12 of 16 (75%)
<b>W13-1</b>	Advisory Speed Plaque- 20/25 MPH	13	3 of 13 (23.1%)
<b>W14-2</b>	No Outlet	13	1 of 13 (7.7%)
<b>W14-3</b>	No Passing Zone	30	18 of 30 (60%)
<b>W16-9p</b>	Ahead	1	0 of 1 (0%)
<b>W18-8</b>	Advanced Street Name Plaque	10	0 of 10 (0%)
Totals		188	79 of 188 (42.0%)

#### *Guide Signs & Other Signage*

Guide signs are essential to direct road users along streets and highways, to inform them of intersecting routes, to direct them to cities, towns, villages, or other important destinations, and generally to help them along their way in the most simple, direct manner possible. A few defined guide signs are present along Village maintained roadways; they are presented below along with the remaining signs that are not categorized by the MUTCD.

<b>MUTCD Code</b>	<b>Description</b>	<b>Quantity</b>	<b>Number (Percentage) meeting Requirement</b>
	Village Barrington Hills (3700)	11	3 of 11 (27.3%)
	Caution Plum Tree Road Traffic Will Not Stop	1	0 of 1 (0%)
	Driveway Ahead	1	0 of 1 (0%)
	Farm Machinery	1	1 of 1 (100%)
	Permit Required for Local Vehicles over 36,000 LBS Gross	59	48 of 59 (81.4%)
	Road Closed	3	0 of 3 (0%)
	Road Ends 500 FT	2	1 of 2 (50%)
	School Entrance Ahead	3	0 of 3 (0%)
	Single File Only	15	15 of 15 (15%)
	Slow	2	0 of 2 (0%)
	Slow Children at Play	4	0 of 4 (0%)
	This is a Neighborhood Watch Community	11	1 of 11 (9.1%)
	Through Truck Traffic over 12,000 LBS Gross Prohibited	24	17 of 24 (70.8%)
	Traffic from Left/Right Does not Stop	2	1 of 2 (50%)
	Unlawful to Litter \$500 fine	9	6 of 9 (66.7%)

	Unlawful to Pass Stopped School Bus	1	1 of 1 (100%)
	Water on Pavement	1	1 of 1 (100%)
<b>D12-4</b>	Emergency Dial 911	8	0 of 8 (0%)
<b>OM-3L</b>	Marking for Objects in Roadway	4	3 of 4 (75%)
<b>OM4-3</b>	End-of-Roadway Markers	7	No Requirements
<b>M6-4</b>	Directional Arrow Signs	1	0 of 1 (0%)
<b>S3-1</b>	School Bus Stop Ahead	3	2 of 3 (66.7%)
<b>Totals</b>		<b>173</b>	<b>100 of 166 (91.6%)</b>

Several of the signs on the list above are not categorized by MUTCD, but were fabricated to meet a specific purpose within the Village. Consideration should be given to whether the purpose of these signs meets the intent of regulatory, warning, or guide signs, and whether the Village should apply the regulations to these signs depending upon the intent.

As discussed above, the compliance date for warning, regulatory, and guide signs is January 2015. Based on the reflectivity levels observed in the inventory, 123 individual signs (not including the non-categorized signs above) would require replacement over the next four years.

### **FHWA Sign Maintenance Methods**

The Federal Highway Administration (FHWA) outlines four suggested management methods that meet the program requirements. A description of each is provided below.

#### *Visual Inspection Method*

The intent of this method is to replicate the conditions under which the research was conducted that led to the retroreflectivity requirements. The method requires that once the inventory is established, an inspector at least 60 years old must complete a drive-by inspection of all signs in the inventory. The inspection must take place in a model year 2000 or newer SUV or pick-up truck, at highway speeds at night, rating each sign as “good, marginal, or replace.” This method leads to a subjective determination of sign retroreflectivity and is not recommended.

#### *Sign Age Method*

This maintenance technique tracks the age and expected life of the sheeting type of signs in a given area and replaces signs once they reach a given age. The expected life of a sign can be determined by using warranty information from the sign manufacturer or building a weathering rack and tracking the retroreflectivity of a set of sample signs. This would require the Village to track the year in which each sign is installed, and thus could not be used as the initial maintenance method as this information would not be available for most signs in the Village.

#### *Blanket Replacement*

This maintenance technique involves replacing all signs within in an area or corridor at specified intervals. One possible way of implementing this method within the Village would be to replace all signs as roadways are resurfaced, which would lead to replacement of signs on a 10-15 year cycle depending on the type of roadway. This would generally comply with the expected sheeting life of most signs. This method is the simplest in terms of tracking as the age and even retroreflectivity do not have to be measured. The primary disadvantage of this approach would be the potential for waste for signs that are newer at the start of the program, or are replaced partway through a cycle due to damage. This method

also would not address signs that weather faster than expected, which could expose the Village to liability if a stop sign or speed limit sign does not meet the requirements due to premature weathering.

#### *Measurement Method*

This technique involves taking field measurements of all signs in the inventory on a routine basis, generally every year or every other year. This method would likely be the highest cost of the methods presented, but also affords the highest level of confidence that all signs in the inventory are meeting the requirements. Some of the costs of taking this approach are mitigated by the assurance of no waste coming from replacing new signs that meet the standards.

#### **Sign Maintenance Program Recommendation**

Meeting the retroreflectivity requirements outlined in the MUTCD while minimizing unnecessary costs will require a combination of different elements from the various approaches described above. Below are the steps recommended to meet the MUTCD requirements:

1. To eliminate the chance of deploying a new non-conforming sign, even on an emergency basis, all signs within the barn that do not meet the requirements should be disposed of. This may require ordering a few new signs to maintain an emergency inventory (Winter 2010-2011).
2. Replace all non-conforming regulatory signs (14 signs total). This would include stop signs, speed limits signs, and “Do Not Pass” signs. Any new signs deployed would include a bar code sticker that would include an entry for installation date (Summer 2011).
3. Complete street identification sign inventory and identify replacement schedule (Summer 2011).
4. Replace remaining 109 non-conforming warning signs during the summers of 2012-2014. As Village-maintained roadways are located in Cook, Lake, and McHenry counties, one potential approach would be to complete the replacements in one county each year. Again, the installation date would be noted with the bar code information as each new sign is installed.
5. To track retroreflectivity levels on an ongoing basis, we would recommend the following approach:
  - For warning signs and street identification signs, we would recommend a blanket replacement approach that would replace these signs as part of the annual road program, beginning in the summer of 2015.
  - Utilize the measurement method for all regulatory signs on Village maintained roadways to track the retroreflectivity levels of all signs every other year. Regulatory signs found to be out of compliance with the MUTCD requirements would be replaced as part of that year’s road program.

Appendix A- Regulatory Signs



R1-1



R1-3P



R2-1



R3-4



R3-5



R4-1



R4-7



R7-1



R8-8

**Appendix B- Warning Signs**



W1-1



W1-2



W1-3



W1-5



W1-6



W1-7



W2-1



W2-4



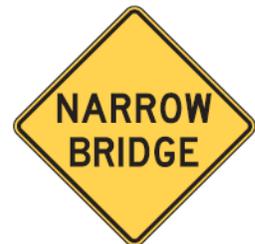
W3-1



W3-3



W3-4



W5-2



W7-3aP



W8-1



W10-1



W11-3 (Deer)



W11-5



W11-7



W13-1P



W14-2



W14-3



W16-9P