



# Sign Retroreflectivity A Minnesota Toolkit

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*Your Destination... Our Priority*



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16. Abstract (Limit: 200 words) The Minnesota LRRB has developed a Sign Retroreflectivity Toolkit that is designed to provide local governments, especially small cities and townships, with guidance on FHWA's sign retroreflectivity deadlines as well as resources they can use to meet these deadlines. This toolkit focuses primarily on FHWA's first deadline: <i><b>By January 2012:</b> Agencies must establish and implement a sign assessment or management method to maintain minimum levels of sign retro reflectivity.</i>  The toolkit includes a variety of resources: <ul style="list-style-type: none"><li>• <a href="#">County Letter</a> - Letter to be sent by County Engineers to small local agencies within their county, to notify them of requirements and resources</li><li>• <a href="#">Other Agency Letter</a> - Letter to be sent by other agencies as a follow-up to the County letter, to stress the importance of addressing FHWA requirements.</li><li>• <b>MN MUTCD Requirements</b></li><li>• <b>Summary of FHWA guides: Methods for Maintaining Traffic Sign Retroreflectivity and Know Your Retro2007</b></li></ul> <b>Appendix A: Examples of Sign Inventory/Inspection Forms</b> <b>Appendix B: Examples of Sign Inspection/Replacement Policies/Procedures</b> <b>Appendix C: Examples of Sign Management Agreements</b>  The letters provided in this report can be downloaded from the LRRB website (See URL above) in electronic Microsoft Word format, so that agencies can edit them for their specific situation. All Blank forms can be downloaded at: <a href="http://www.lrrb.org/pdf/2010RIC02_All Blank Forms.xlsx">http://www.lrrb.org/pdf/2010RIC02_All Blank Forms.xlsx</a>			
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# **Sign Retroreflectivity** *A Minnesota Toolkit*

## **FINAL Report**

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The authors and the Minnesota Department of Transportation and/or Center for Transportation Studies do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to this report.

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## Introduction

The Minnesota LRRB has developed this document *Sign Retroreflectivity – A Minnesota Toolkit* to provide local governments, especially small cities and townships, with guidance on the Federal Highway Administration's (FHWA) sign retroreflectivity requirements as well as resources they can use to meet the compliance deadlines. This toolkit focuses primarily on FHWA's January 2012 deadline requiring all agencies to establish a sign assessment or management method (see below). While not required, it is strongly recommended that all agencies create a sign inventory as part of this process to increase maintenance efficiency in the future. In addition, each agency is encouraged to create a written plan to document their selected sign assessment or management method for liability purposes. A few examples of existing policies are included in Appendix B of this report. Work is underway to develop a model policy for local agencies to use as a template, which will be posted on the Minnesota Township Association's website in the spring on 2010 [www.mntownships.org](http://www.mntownships.org).

FHWA's sign retroreflectivity requirements and deadlines are as follows:

***By January 2012:*** Agencies must establish and implement a sign assessment or management method to maintain minimum levels of sign retro reflectivity.

***By January 2015:*** Agencies must replace regulatory, warning, and ground-mounted guide signs (except street name) that are identified using the assessment or management methods as failing to meet the established minimum levels.

***By January 2018:*** Agencies must replace street name signs and overhead guide signs that are identified using the assessment or management methods as failing to meet the established minimum levels.

FHWA has developed a *Sign Retroreflectivity Guidebook* (FHWA-CFL/TD-09-005) to assist local agencies in evaluating and selecting which sign assessment or management plan will best meet their needs. This guidebook is an interactive online toolkit that will step you through a series of questions to determine the appropriate assessment or management method for your agency: [http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/retrotoolkit/](http://safety.fhwa.dot.gov/roadway_dept/night_visib/retrotoolkit/)

For agencies that do not have access to the internet, a hard copy of this toolkit and a CD with the interactive toolkit program is available from the Minnesota Local Technical Assistance Program (LTAP). Contact Mindy Carlson – LTAP Program Associate at [carlson@umn.edu](mailto:carlson@umn.edu) or 612-625-1813 for a copy.

As a supplement to FHWA's guidebook, the Minnesota Local Road Research Board (LRRB) has funded the development of this toolkit to help local agencies find the resources they need to meet FHWA's requirements by the compliance date. The toolkit includes a variety of resources:

- **County Letter** - Letter to be sent by County Engineers to small local agencies within their county, to notify them of requirements and resources
- **Other Agency Letter** - Letter to be sent by other agencies as a follow-up to the County letter, to stress the importance of addressing FHWA requirements.

- **MN MUTCD Requirements** – *Official Minimum Retroreflectivity Requirements in Minnesota.*
- **Summary of FHWA guides: *Methods for Maintaining Traffic Sign Retroreflectivity (FHWA-HRT-08-026)* and *Know Your Retro 2007: New MUTCD Sign Retroreflectivity Requirements (FHWA-SA-07-020)*** - *One page summaries of each method including the advantages/disadvantages of each:*
  - Summary Table of all Methods
  - Visual Nighttime Inspection (including: calibration signs, comparison panels and consistent parameters procedures)
  - Measured Sign Retroreflectivity
  - Expected Sign Life
  - Blanket Replacement
  - Control Signs

## **Appendix A: Examples of Sign Inventories**

- A. Generic Township
  - A-1 – Sign Inventory and Inspection Form Example
  - A-2 – Sign Inventory and Inspection Form Blank
  - A-3 – Sign Inventory Map Example
- B. Mn/DOT State Aid Township Pilot Program
  - B-1 – Inventory Form Example
  - B-2 – Inventory Form Blank
  - B-3 – Sign Ownership Form Example
  - B-4 – Sign Ownership Form Blank
  - B-5 – Inventory Map Example
  - B-6 – Inspection Form Example
  - B-7 – Inspection Form Blank
- C. Generic County
  - C-1 – Inspection Form Example
  - C-2 – Inspection Form Blank
- D. FHWA
  - D-1 – Inspection Form Blank
- E. Computer Programs (free)
  - E-1 – NDLTAP “SIGNS 7.1” Summary
  - E-2 – Utah LTAP “Safety Software Suite”

## **Appendix B: Examples of Sign Assessment and Management Methods**

- Generic Rural County
- Generic Metro County
- Generic Township

## **Appendix C: Examples of Sign Management Agreements**

- Lac Qui Parle County/Madison Township Sign Maintenance Agreement

The letters provided in this report can be downloaded from the LRRB website <http://www.lrrb.org/pdf/2010RIC02.pdf> in electronic Microsoft Word format, so that agencies can edit them for their specific situation.

## **County Letter**

*Letter to be sent by County Engineers to small local agencies within their county, to notify them of requirements and resources*



June 10, 2010

[Mr. Ms.] First & Last Name

Title

COMPANY

Address Line 1 & Suite

Address Line 2

City, State Zip

SUBJECT: FHWA TRAFFIC SIGN RETROREFLECTIVITY REQUIREMENTS

Dear [Mr. Ms.] Last Name:

All local agencies are required to comply with the Federal Highway Administration's (FHWA) traffic sign retroreflectivity requirements. This letter is being sent to you to:

- Inform you of the upcoming deadlines
- Notify you of resources available to educate you on the requirements
- Offer assistance in meeting these deadlines

The deadlines for compliance with the FHWA's retroreflectivity requirements (first published on December 22, 2008) are quickly approaching. The requirements established that minimum sign retroreflectivity requirements be implemented incrementally for all traffic signs. **These requirements apply to all agencies, regardless of size, including cities with a population less than 5,000 and townships.** The following are the deadlines for compliance:

*By January 2012: Agencies must establish and implement a sign assessment or management method to maintain minimum levels of sign retro reflectivity.*

*By January 2015: Agencies must replace regulatory, warning, and ground-mounted guide signs (except street name) that are identified using the assessment or management methods as failing to meet the established minimum levels.*

*By January 2018: Agencies must replace street name signs and overhead guide signs that are identified using the assessment or management methods as failing to meet the established minimum levels.*

**The deadlines for compliance are quickly approaching. It is important for agencies to develop a plan early in order to maximize time for budget planning to meet the compliance dates.** While not required, it is strongly recommended that all agencies create a sign inventory as part of this process to increase maintenance efficiency in the future. There currently is no dedicated funding or new funding source to assist in achieving this mandate. These mandates are expected to be funded through your local agencies.

A number of resources are available for your use in meeting the January 2012 deadline of establishing and implementing a sign assessment or management method to maintain minimum levels of sign retroreflectivity:

- Federal Resources:
  - FHWA's *Know Your Retro 2007- New MUTCD Sign Retroreflectivity Requirements (FHWA-SA-07-020)* Information sheet – detailed information about sign retroreflectivity compliance: [http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/policy\\_guide/fhwasa07020/fhwasa07020.pdf](http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/fhwasa07020/fhwasa07020.pdf)

- FHWA's *Methods for Maintaining Traffic Sign Retroreflectivity* (FHWA-HRT-08-026) – details information about sign management plans:  
[http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/policy\\_guide/fhwahrt08026/fhwahrt08026.pdf](http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/fhwahrt08026/fhwahrt08026.pdf)
- Latest FHWA news on Nighttime Visibility:  
[http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/](http://safety.fhwa.dot.gov/roadway_dept/night_visib/)
- FHWA's *Sign Retroreflectivity Guidebook* (FHWA-CFL/TD-09-005)- Interactive online toolkit to determine the appropriate assessment or management method for your agency:  
[http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/retrotoolkit/](http://safety.fhwa.dot.gov/roadway_dept/night_visib/retrotoolkit/)

For Agencies that do not have access to the internet, a hard copy and CD of this toolkit are available from the Minnesota Local Technical Assistance Program (LTAP). Contact Mindy Carlson, LTAP Program Associate at [carlson@umn.edu](mailto:carlson@umn.edu) or 612-625-1813.

- Minnesota Resources:
  - *Sign Retroreflectivity: A Minnesota Toolkit* – Toolkit including summaries of assessment and management methods and example policies, inventories and sign maintenance agreements for local agencies within MN. Developed by the Minnesota Local Road Research Board (LRRB) and available online at: <http://www.lrrb.org/pdf/2010RIC02.pdf> or Mn/DOT State Aid Traffic Safety website (see below).
  - *Minimum Retroreflectivity Levels for Traffic Signs* – training on Retroreflectivity compliance is available to local agencies on a limited basis, organized by your county engineer and provided by Ken Schroepfer – Mn/DOT Traffic Standards Specialist. Contact your County engineer to discuss training options for your agency.
  - *Mn/DOT State Aid Traffic Safety Website* –  
[http://www.dot.state.mn.us/stateaid/sa\\_traffic\\_safety.html](http://www.dot.state.mn.us/stateaid/sa_traffic_safety.html)  
Includes information on federal requirements, the MN township pilot program and *Sign Retroreflectivity: A Minnesota Toolkit*. This website will be updated periodically. For more information, contact Mark Vizecky, State Aid Program Support Engineer at [Mark.Vizecky@state.mn.us](mailto:Mark.Vizecky@state.mn.us) or 651-366-3839.
  - *Sign Removal Manual and Presentations* – A new manual titled *Minnesota's Best Practices for Traffic Sign Maintenance and Management* addressing sign maintenance, management and removal will be available on the State Aid Traffic Safety website (see above) in Spring 2010. Sponsored by LTAP, three presentations on this manual will be offered in Fall 2010. For more information go to [www.mnltap.umn.edu](http://www.mnltap.umn.edu) or contact Mindy Carlson, LTAP Program Associate at [carlson@umn.edu](mailto:carlson@umn.edu) or 612-625-1813.

**County/City Engineers - This space is for you to add text, depending on your willingness to offer assistance to neighboring smaller agencies.**

Sincerely,  
Name  
Title

## **Other Agency Letter**

*Letter to be sent by other agencies as a follow-up to the County letter, to stress the importance of addressing FHWA requirements.*

June 10, 2010

[Mr. Ms.] First & Last Name  
Title  
COMPANY  
Address Line 1 & Suite  
Address Line 2  
City, State Zip

SUBJECT: FHWA SIGN RETROREFLECTIVITY REQUIREMENTS

Dear [Mr. Ms.] Last Name:

As a follow-up to the letter you may have received from your county engineer, I would like to stress the importance of complying with the FHWA's sign retroreflectivity requirements. **The deadline for compliance is quickly approaching.** The requirements established that minimum retroreflectivity requirements be implemented incrementally for all traffic signs. **These requirements apply to all agencies, regardless of size, including cities with a population less than 5,000 and townships.** The following are the deadlines for compliance:

*By January 2012: Agencies must establish and implement a sign assessment or management method to maintain minimum levels of sign retroreflectivity.*

*By January 2015: Agencies must replace regulatory, warning, and ground-mounted guide signs (except street name) that are identified using the assessment or management methods as failing to meet the established minimum levels.*

*By January 2018: Agencies must replace street name signs and overhead guide signs that are identified using the assessment or management methods as failing to meet the established minimum levels.*

**The deadlines for compliance are quickly approaching. It is important for agencies to develop a plan early in order to maximize time for budget planning to meet the compliance dates.** While not required, it is strongly recommended that all agencies create a sign inventory as part of this process to increase maintenance efficiency in the future. There currently is no dedicated funding or new funding source to assist in achieving this mandate. These mandates are expected to be funded through your local agencies.

A number of resources are available for your use in meeting the January 2012 deadline of establishing and implementing a sign assessment or management method to maintain minimum levels of sign retroreflectivity. These resources are available to you on the State Aid Traffic Safety website at: [http://www.dot.state.mn.us/stateaid/sa\\_traffic\\_safety.html](http://www.dot.state.mn.us/stateaid/sa_traffic_safety.html). Your county engineer is also a good source for more information.

**Letter Author - This space is for you to add text, depending on your willingness to offer assistance to neighboring smaller agencies.**

Sincerely,  
Name  
Agency

# **MN MUTCD Requirements**

*Official Minimum Retroreflectivity Requirements in Minnesota.*

## 2A.9 Maintaining Minimum Retroreflectivity

### SUPPORT:

Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility (see Section 2A.22).

### STANDARD:

Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.

Assessment or management method

**Compliance Date: January 22, 2012**

Regulatory, warning and ground-mounted guide signs must meet the minimum retroreflectivity levels.

**Compliance Date: January 22, 2015**

Street name signs and overhead guide signs must meet the minimum retroreflectivity levels.

**Compliance Date: January 22, 2018**

### SUPPORT:

Compliance with the above Standard is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3. Provided that an assessment or management method is being used, an agency or official having jurisdiction would be in compliance with the above Standard even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.

### GUIDANCE:

Except for those signs specifically identified in the Option in this Section, one or more of the following assessment or management methods should be used to maintain sign retroreflectivity:

- A. Visual Nighttime Inspection – The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replaced.
- B. Measured Sign Retroreflectivity – Sign retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels should be replaced.

- C. Expected Sign Life – When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.
- D. Blanket Replacement – All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the short-estlife material used on the affected signs.
- E. Control Signs – Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs. All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.
- F. Other Methods – Other methods developed based on engineering studies can be used.

### SUPPORT:

Additional information about these methods is contained in the 2007 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see Section 1A.11).

### OPTION:

Highway agencies may exclude the following signs from the retroreflectivity maintenance guidelines described in this Section:

- A. Parking, Standing, and Stopping signs (R7 and R8 series)
- B. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
- C. Adopt-A-Highway signs
- D. All signs with blue or brown backgrounds
- E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G $\geq$ 7	W*;G $\geq$ 15	W*;G $\geq$ 25	W $\geq$ 250; G $\geq$ 25	Overhead
	W*; G $\geq$ 7	W $\geq$ 120; G $\geq$ 15			Ground-Mounted
Black on Yellow or Black on Orange	Y*; O*	Y $\geq$ 50; O $\geq$ 50			②
	Y*; O*	Y $\geq$ 75; O $\geq$ 75			③
White on Red	W $\geq$ 35; R $\geq$ 7				④
Black on White	W $\geq$ 50				--
<p>① The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m<sup>2</sup> measured at an observed angle of 0.2° and an entrance angle of -4.0°.</p> <p>② For text and fine symbol signs measuring at least 1200mm (48 in) and for all sizes of bold symbol signs.</p> <p>③ For text and fine symbol signs measuring less than 1200mm (48in).</p> <p>④ Minimum Sign Contrast ratio <math>\geq</math> 3:1 (white retroreflectivity <math>\div</math> red retroreflectivity).</p> <p>* This sheeting type should not be used for this color for this application.</p>					
<b>Bold Symbol Signs</b>					
<ul style="list-style-type: none"> <li>W1-1, -2 -- Turn and Curve</li> <li>W1-3, -4 -- Reverse Turn and Curve</li> <li>W1-5 -- Winding Road</li> <li>W1-6, -7 -- Large Arrow</li> <li>W1-8 -- Chevron</li> <li>W1-10 -- Intersection in Curve</li> <li>W1-11 -- Hairpin Curve</li> <li>W1-15 -- 270 Degree Loop</li> <li>W2-1 -- Cross Road</li> <li>W2-2, -3 -- Side Road</li> <li>W2-4, -5 -- T and Y Intersection</li> <li>W2-6 -- Circular Intersection</li> <li>W3-1 -- Stop Ahead</li> </ul>		<ul style="list-style-type: none"> <li>W3-2 -- Yield Ahead</li> <li>W3-3 -- Signal Ahead</li> <li>W4-1 -- Merge</li> <li>W4-2 -- Lane Ends</li> <li>W4-3 -- Added Lane</li> <li>W4-5 -- Entering Roadway Merge</li> <li>W4-6 -- Entering Roadway Added Lane</li> <li>W6-1, -2 -- Divided Highway Begins and Ends</li> <li>W6-3 -- Two-Way Traffic</li> <li>W10-1, -2, -3 -4, -11, -13 -- Highway-Railroad Advance Warning</li> </ul>		<ul style="list-style-type: none"> <li>W11-2 -- Pedestrian Crossing</li> <li>W11-3 -- Deer Crossing</li> <li>W11-4 -- Cattle Crossing</li> <li>W11-5 -- Farm Equipment</li> <li>W11-6 -- Snowmobile Crossing</li> <li>W11-7 -- Equestrian Crossing</li> <li>W11-8 -- Fire Station</li> <li>W11-10 -- Truck Crossing</li> <li>W12-1 -- Double Arrow</li> <li>W16-5p, -6p, -7p -- Pointing Arrow Plaques</li> <li>W20-7a -- Flagger</li> <li>W21-1a -- Worker</li> </ul>	
<b>Fine Symbol Signs - Symbol signs not listed as Bold Symbol Signs.</b>					
<b>Special Cases</b>					
<ul style="list-style-type: none"> <li>W3-1 -- Stop Ahead: Red retroreflectivity <math>\geq</math> 7</li> <li>W3-2 -- Yield Ahead: Red retroreflectivity <math>\geq</math> 7; White retroreflectivity <math>\geq</math> 35</li> <li>W3-3 -- Signal Ahead: Red retroreflectivity <math>\geq</math> 7; Green retroreflectivity <math>\geq</math> 7</li> <li>W3-5 -- Speed Reduction: White retroreflectivity <math>\geq</math> 50</li> <li>For non-diamond shaped signs such as W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), or W13-1, -2, -3, -5 (Speed Advisory Plaques, use largest sign dimension to determine proper minimum retroreflectivity level.</li> </ul>					

**Table 2A-3 Minimum Maintained Retroreflectivity Levels ①**

## Summary of FHWA guides:

- *Methods for Maintaining Traffic Sign Retroreflectivity (FHWA-HRT-08-026)*
- *Know Your Retro 2007: New MUTCD Sign Retroreflectivity Requirements (FHWA-SA-07-020)*

*There are multiple methods for local agencies to use to maintain sign retroreflectivity that meet FHWA's requirements. The following is a brief overview of each method, including what the method is, how it is administered and the advantages/disadvantages of each.*


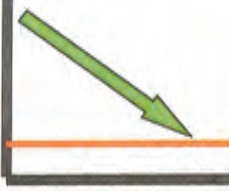
*The following is a list of the FHWA approved methods that are covered:*

- Summary Table of all Methods
- Visual Nighttime Inspection
  - calibration signs
  - comparison panels
  - consistent parameters
- Measured Sign Retroreflectivity
- Expected Sign Life
- Blanket Replacement
- Control Signs



## Summary of Sign Retroreflectivity Maintenance Methods

▶ A method must be implemented and in use by January 2012 ◀

			EQUIPMENT NEEDS			INSPECTOR REQUIREMENT		TIME DEMANDS	
			Retro-Reflec-tometer	Must know sheeting type	Inven-tory	Trained	60+ years old	At night	Must stop at signs
<b>ASSESSMENT METHODS</b>	<b>Visual Procedures</b>	Calibration Signs			(1)	✓		✓	Only at Start, To Calibrate Eyes
		Comparison Panels			(1)	✓		✓	Only ✓ Marginal Signs
		Consistent Parameters	Note: Take picture at night of older person in passenger seat of SUV (do at Fargo workshop)		(1)	✓	✓	✓	
	Measured Retro	Note: Take picture of digital readout on retroreflectometer	✓	✓	(1)	(2)			✓ Every Sign
<b>MANAGEMENT METHODS</b>	Expected Sign Life			✓	(1)				
	Blanket Replacement	Note: Insert clip of map showing a section		✓	(1)				
	Control Signs	Note: Insert photo of sign with text "control sign" on it.	To Check Control Signs	✓	(1)	(2)			Only ✓ Control Signs

- (1) Not required in MUTCD, but might be beneficial  
 (2) Need training on operation of retroreflectometer

# VISUAL NIGHTTIME INSPECTION

**Method Description:** The retroreflectivity of existing signs are assessed by a trained sign inspector from a moving vehicle during nighttime conditions. There are three procedures to choose from:

- Calibration Signs Procedure
- Comparison Panels Procedure
- Consistent Parameters Procedure

**Background:** This is the most common type of sign maintenance program used. While there are some concerns about the reliability of this method, research has shown that trained inspectors can do a reasonable job of determining which signs need to be replaced.



## Procedure:

- Preferably conducted by a two person crew (driver and inspector), in a vehicle driving in the travel lane (not the shoulder) with low-beam lights at or near the speed limit of the roadway during nighttime conditions.
- **The key to this method is having a trained inspector.** There is no nationally-recognized training course for sign inspectors. To reduce subjectivity, agencies should develop guidelines and procedures for inspectors to use and train them on how to use them.
- Each agency should have a defined rating system for signs (e.g. adequate, marginal and fail) and properly document the ratings as this is important to know which signs to replace as well as to provide tort protection.
- **Three different methods are available (must select one):**
  - **Calibration Signs Procedure**
    - Have inspector view calibration signs with retroreflectivity levels at or above the minimum level prior to inspection. (Agency must have access to calibration signs for each color of sign)
    - Requires a retroreflectometer to measure calibration signs periodically.
    - During inspection, evaluate signs compared to calibrations signs viewed earlier.
  - **Comparison Panels Procedure**
    - Requires developing a set of comparison panels that are at or above minimum levels that can be compared to individual signs during the inspection.
    - Comparison panels are clipped to signs in questions and viewed by inspector.
  - **Consistent Parameters Procedure**
    - Retroreflectivity of signs is evaluated based on brightness and readability of the sign.
    - This method requires the inspections to follow these consistent parameters:
      - Inspections must be conducted during nighttime conditions.
      - Inspections must be conducted using an SUV or pick-up truck model year 2000 or newer
      - Inspector must be at least 60 years old.

[Over]

## VISUAL NIGHTTIME INSPECTION (CONT.)

**Current Practices:** Visual nighttime inspections are typically used in conjunction with a signage replacement schedule to make sure that the signs are legible and to find signs that may have been passed over or accidentally skipped during the last replacement schedule. Inspections are usually performed every one to two years and rotate between predefined sections of roads under the agency's jurisdiction.

**Advantages:**

- Possible to assess more than just the retroreflectivity of a sign. Damage, obstructions, poor placement, and other factors can be observed.
- A sign inventory can be established, if none currently exists.
- Has the least administrative and fiscal burden of all the methods
- Has the lowest level of sign replacement and sign waste, implying that it maximizes sign life.

**Disadvantages:**

- Most subjective of all the methods.
- Funding overtime pay to conduct the inspections during late evening or early-morning hours.
- Inspectors need to be properly trained.

## MEASURED SIGN RETROREFLECTIVITY

**Method Description:** Sign retroreflectivity is measured using a retroreflectometer. Handheld contact reflectometers (shown to the right) or non-contact reflectometers held at a distance can be used.



**Background:** Contact instruments (shown here – measurements read while in contact with the sign) are believed to provide relatively low levels of uncertainty for a given measurement. Non-contact instruments (measurements read from a distance) have a higher level of uncertainty which has not been well evaluated. ASTM procedures (see below) for the measurement of sign retroreflectivity require the averaging of multiple measurements on the face and legend (text/boarder) of the sign. The selection of the measurement points and the calibration of the device can lead to different results, even when measuring the same sign. This can create an issue if there are small differences between measured values and the required minimum levels.

**Procedure:** Measuring retroreflectivity using a contact instrument should be performed as specified in ASTM Standard Test Method E1709-00e1, which requires a minimum of four retroreflectivity measurements to be taken of the sign background and legend (text/boarder), if applicable. The four measurements for each color are averaged to obtain an overall measurement of the retroreflectivity for each color on the sign. Two types of hand-held contact reflectometers exist: point and annular (internal reading device is different), which measure differently and produce differing results. Be sure the inspector knows which type of instrument they are using and understand the readings.

**Current Practices:** Few agencies solely use the measurement method, rather, most use this method to supplement other inspection methods. Some also use measured retroreflectivity values from a sample set of signs as an assessment of their total sign inventory.

### Advantages:

- Provides the most direct means of monitoring the maintained retroreflectivity levels of deployed traffic signs and removes all subjectivity that exists in other methods.
- Provides the most direct comparison of the sign's in-service retroreflectivity relative to the minimum maintained retroreflectivity levels
- Non-contact reflectometers offer flexibility and speed-up the measurement process

### Disadvantages:

- Reflectometers can be expensive for an agency to purchase (approximately \$10,000)
- The use of a handheld contact reflectometer tends to be time consuming and may be cost prohibitive
- **Readings from a reflectometer can differ and vary significantly because the instrument is rotationally sensitive when reading prismatic sheeting.**
- Retroreflectivity only accounts for one aspect of a sign's appearance. Other factors should be considered when determining whether or not a sign is adequate including ambient light levels, presence of glare, location relative to the road, and the complexity of the visual background.

## EXPECTED SIGN LIFE

**Method Description:** The date a sign is installed is usually marked on the sign or recorded so that the age of any given sign is known. The age of the sign is compared to the expected sign life.

**Background:** The expected service life of a sign can be based on sign sheeting warranties, test deck measurements, measurement of signs in the field (control signs), measurement of signs taken out of service, or information from other agencies. The key to this method is being able to identify the age of individual signs. This is often accomplished by placing a sticker or other label on the sign (usually on the back) that identifies the year of fabrication, installation, or planned replacement or by recording the date of installation in a sign management system.

**Procedure:** The basic idea is that the installation date of every sign in an agency's jurisdiction is known, along with the type of retroreflective sheeting material used on the sign face. It is also necessary to define an expected sign life for each type of retroreflective sheeting material. This can be done for individual signs or as a general parameter for the types of material used by the agency. Common tracking methods used are:

- Computerized sign management system
- Installation or replacement date stickers
- Spreadsheets
- Mapping

**Current Practices:** The use of expected sign life as a maintenance method is widely used because of its ease of implementation. Most agencies use the warranty period provided by the manufacturer to determine when a sign should be replaced. However, some agencies are beginning to extend their expected sign life levels beyond the warranted sign life as a result of research documenting the durability of sign materials in their area.

### Advantages:

- Can easily identify when signs need to be replaced.
- Can measure sign retroreflectivity at the end of the expected sign life to confirm if the sign life estimate for that type of sign is accurate or not. Adjusting expected sign life based on these reading could create a cost savings if it is found that signs can remain in service longer.

### Disadvantages:

- The actual retroreflectivity of a sign is not assessed—only the age of the sign is monitored.
- Little data exists on how different types of sheeting deteriorate over time in a given climate.
- There are no definitive results relating orientation of the sign face (sun angle) to its deterioration rate. Many studies have been conducted and do not come to the same conclusions.
- Basing replacement on the manufacturer's warranty period may result in removing signs before their service life is complete.
- Identifying signs to replace based on stickers placed on a sign can be time consuming if signs along a roadway vary significantly in age.
- Stickers placed on the back of a sign make it more difficult for maintenance staff to identify as they drive by, particularly on wide roads.



*Example of sticker indicating year "95" on front of sign*



*Example sticker that Mn/DOT places on the back of signs*

# BLANKET REPLACEMENT

**Method Description:** All signs in an area/corridor or of a given type are replaced at specified intervals eliminating the need to assess retroreflectivity or track the life of individual signs.

**Background:** The replacement interval is based on the expected sign life for the shortest-life material used in the area/corridor or on a given sign type.

**Procedure:** At set time periods, a sign maintenance crew will go to a specific area or corridor and replace all the designated traffic signs under its jurisdiction (no judgment of sign condition used). There are two typical approaches for blanket replacement:

- Spatial basis - all the signs in a specific area or corridor are replaced at the same time, when the effective service life is reached.
- Strategic basis - all the signs of a specific type (e.g. regulatory signs, warning signs, guide signs, etc.) are replaced at the same time.

The time interval between replacements for both approaches is usually based on the expected sign life. Under this method, all signs are replaced regardless of the amount of time they have been in the field or the condition at the time of replacement.

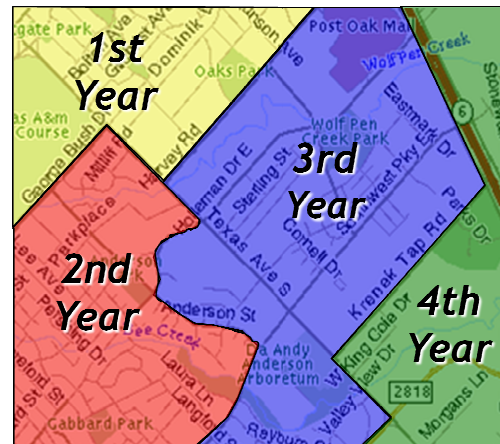
**Current Practices:** This maintenance method is popular with State DOTs. Of the agencies that use a blanket replacement method, most replace their Type I signs every 7 to 10 years; Type III signs every 10 to 15 years; and Types VI, VIII, and IX signs every 15 years. The vast majority of the agencies use Type III sheeting for the majority of their traffic signs. (See MN MUTCD Requirements in previous section for more details on sheeting types)

## Advantages:

- This is the simplest of the management methods since it is not necessary to track the age of individual signs or measure the signs retroreflectivity. It is only necessary to maintain a record of when the blanket actions were undertaken and when they need to be repeated.
- The major benefit of using this method is that all signs are replaced, reducing the likelihood of a given sign being skipped over or not being replaced, ensuring that all replaced signs are visible and meet minimum retroreflectivity levels.

## Disadvantages:

- Replacement times can vary depending on the region of the country in which the agency is located, or even across a jurisdiction for large agencies.
- Replacement time depends on the type of sign sheeting used.
- Risk wasting resources by removing signs before their useful life has been reached. This is particularly true where signs have been added or replaced in an area after the last replacement cycle.
- Under this method, retroreflectivity levels of signs are not measured, and opportunities are limited for capturing data that may be useful in adjusting service lives, trigger points, or sign maintenance strategies.



## CONTROL SIGNS

**Method Description:** Replacement of signs in the field is based on the performance of a sample set of signs that represent an agency's inventory.

**Background:** The control signs might be a small sample located in a maintenance yard or a selection of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs.

**Procedure:** The control signs represent a population of signs made with the same material for which the retroreflectivity performance is monitored over time by actual measurements. As the retroreflectivity levels of the control signs approach the minimum levels, it triggers action to begin replacement of the entire associated population. The control signs can be located at one or more of the agency's maintenance yards or can be traffic signs that are deployed at various locations in the jurisdiction. The control signs are measured periodically to monitor actual degradation of retroreflectivity. This method requires only the management of the control sign information and the retroreflectivity measurements of those signs over time. The effectiveness of this method is dependent upon the size of the control sign sample (e.g. a larger sample provides better estimation of the retroreflectivity levels)



**Current Practices:** Few agencies solely use this method to maintain their traffic signs. Some agencies do take retroreflectivity readings on a sample set of signs to estimate how the overall sign population is performing. This is used primarily as a verification method for agency sign management policies and practices.

### Advantages:

- It is not nearly as labor intensive as taking retroreflectivity readings on every sign in an agency's jurisdiction
- Signs that do meet the required minimum retroreflectivity levels are not removed prematurely (like with the blanket replacement method), allowing for an efficient use of the signs and their material. This may be particularly advantageous when the life of a new sign material exceeds the warranties provided by the manufacturer.

### Disadvantages:

- There is no specific guidance on the number or percentage of the population the sample represents. However, a minimum of three signs per type of sheeting and color should be monitored.
- There is no guidance on how often a new set of control signs should be established. Possible scenarios include when a new sign material or a new sign fabrication process is used or when a major change in the sign management process occurs.
- There is no guidance on how often the control signs should be checked for their retroreflectivity levels and appearance.

# **Appendix A:**

## **Examples of Sign Inventories**

The following are example sign inventories and maps currently used by local agencies as well as two computer software programs that can be used to inventory signs within your agency.

- A. Generic Township
  - A-1 – Sign Inventory and Inspection Form Example
  - A-2 – Sign Inventory and Inspection Form Blank
  - A-3 – Sign Inventory Map Example
  
- B. Mn/DOT State Aid Township Pilot Program
  - B-1 – Inventory Form Example
  - B-2 – Inventory Form Blank
  - B-3 – Sign Ownership Form Example
  - B-4 – Sign Ownership Form Blank
  - B-5 – Inventory Map Example
  - B-6 – Inspection Form Example
  - B-7 – Inspection Form Blank
  
- C. Generic County
  - C-1 – Inspection Form Example
  - C-2 – Inspection Form Blank
  
- D. FHWA
  - D-1 – Inspection Form Blank
  
- E. Computer Programs (free)
  - E-1 – NDLTAP “SIGNS 7.1” Summary
  - E-2 – Utah LTAP “Safety Software Suite”



# Generic Township - SIGN INVENTORY AND INSPECTION FORM EXAMPLE DECEMBER 2009

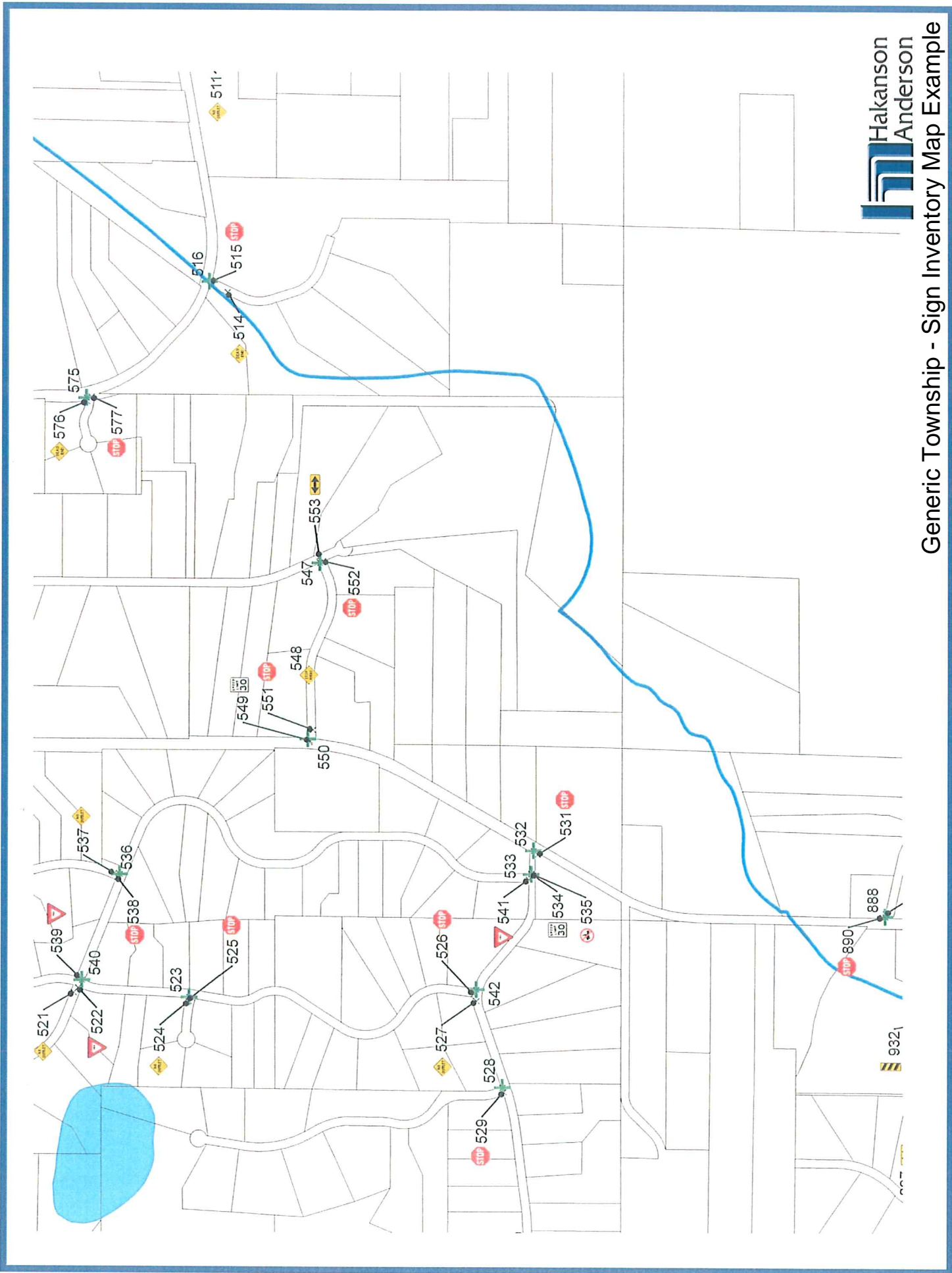
SIGN ID	MUTCD CODE	DESCRIPTION	SIZE	VISUAL DAYTIME CONDITION	SIGN RETROREFLECTIVITY	EASTING	NORTHING	COMMENTS
510	R1-1	STOP	30X30	N A P	F M A	489795.954	172312.018	MAINTAINED BY COUNTY
511	W14-2	NO OUTLET	30X30	N A P	F M A	489034.873	171722.278	MAINTAINED BY COUNTY
512	R1-1	STOP	30X30	N (A) P	F M A	489048.893	171768.823	MAINTAINED BY COUNTY
513	STREET	XXX AVE		N A P	F M A	489048.881	171768.851	ON 512 POST
514	W14-1	DEAD END	30X30	N (A) P	F M A	487193.008	171485.709	
515	R1-1	STOP	30X30	N (A) P	F M A	487273.96	171590.548	MAINTAINED BY COUNTY
516	STREET	XXX CT., XXX AVE (9')		N A P	F M A	487277.64	171596.383	END 12/17
517	W14-2	NO OUTLET	30X30	N A P	F M A	479803.925	173659.798	
518	R2-1	30 MPH	24X30	N A P	F M A	479820.97	173555.711	
519	R1-1	STOP	30X30	N A P	F M A	479825.858	173728.101	MAINTAINED BY COUNTY
520	R2-1	30 MPH	24X30	N (A) P	F M A	481956.017	173645.128	
521	W14-2	NO OUTLET	30X30	N A P	F M A	481836.071	172641.872	
522	R1-2	YIELD	30X30X30	N A P	F M A	481872.066	172607.838	
523	STREET	XXX AVE., XXX AVE (9')		N A P	F M A	481801.08	171765.844	
524	W14-2	NO OUTLET	30X30	N (A) P	F M A	481770.665	171768.902	
525	R1-1	STOP	30X30	N A P	F M A	481795.982	171743.268	
526	R1-1	STOP	30X30	N (A) P	F M A	481828.508	169587.73	
527	W14-2	NO OUTLET	30X30	N (A) P	F M A	481777.527	169566.4	
528	STREET	XXX AVE., XXX AV (9')		N A P	F M A	481116.512	169367.336	
529	R1-1	STOP	30X30	N A P	F M A	481082.002	169360.437	
530	N/A	STREET MAY BE EX. IN FUTURE, SAVED AS SIGN 30X 24	30X24	N (A) P	F M A	479788.023	169148.059	SP-10
531	R1-1	STOP	30X30	N (A) P	F M A	482896.414	169095.534	MAINTAINED BY COUNTY
532	STREET	XXX AVE., XXX (9')		N A P	F M A	482927.231	169125.383	
533	STREET	XXX DR., XXX (9')		N A P	F M A	482745.347	169146.322	
534	R2-1	30 MPH	24X30	N (A) P	F M A	482749.459	169145.486	
535	R5-X1	NO SNOWMOBILES	12X18	N (A) P	F M A	482751.336	169145.221	ON 534 POST, PICTURE #37
536	STREET	XXX ST., XXX DR (9')		N A P	F M A	482739.274	172288.967	
537	W14-2	NO OUTLET	30X30	N A P	F M A	482748.267	172334.84	
538	R1-1	STOP	30X30	N (A) P	F M A	482719.327	172313.184	
539	R1-2	YIELD	30X30X30	N (A) P	F M A	481948.409	172599.006	
540	STREET	XXX AVE., XXX DR. (9')		N A P	F M A	481930.459	172578.624	

Visual Daytime Condition  
 N = New or near new  
 A = Adequate Appearance  
 P = Poor Condition/Vandalized/Damaged  
 Sign Retroreflectivity  
 F = Fail  
 M = Marginal  
 A = Adequate

## Generic Township - SIGN INVENTORY AND INSPECTION FORM BLANK [insert date]

SIGN ID	MUTCD CODE	DESCRIPTION	SIZE	VISUAL DAYTIME CONDITION	SIGN RETROREFLECTIVITY	EASTING	NORTHING	COMMENTS
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			

<p><b>Visual Daytime Condition</b>          N = New or near new          A = Adequate Appearance          P = Poor Condition/Vandalized/Damaged</p>	<p><b>Sign Retroreflectivity</b>          F = Fail          M = Marginal          A = Adequate</p>
---	--



Township Traffic Sign  
Field Inventory Report  
Watonwon County, MN

Twp Name: FIELDON

SIGN ID NO#: 2144  
Sign Code: X4-4(R)  
Sign Panel CLEARANCE MARKER -  
Legend: RIGHT  
Sign Owner: FIELDON  
Sign Width (in): 12  
Sign Height (in) 36  
Sign Condition:  
Install Date:  
Substrate: ALUMINIUM  
Sign Sheeting Mat'l:  
Direction Sign Faces: WEST

Route: 360th ST  
Ref. Point: CR 109  
Ref. Point Distance (ft): 9504  
GPS Latitude: 43.9639822  
GPS Longitude: -94.4536685  
Structure Condition:  
Sign StructureType: 1U  
Mounting Height (ft):  
Offset (ft):  
Manufacturer:  
Comments:

Inspected By: Date Inspected: Reason Inspected:

SIGN MAINTENANCE HISTORY

Date:	Inspector Name:	Action Required:	Comments:

SAMPLE

## Township Traffic Sign Field Inventory Report

<div style="margin-bottom: 10px;">Sign ID No. <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Code <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Legend <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Route <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Reference Point <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Reference Pt. Dist. (FT) <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">GPS Latitude <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">GPS Longitude <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Inspected By <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Date Inspected <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Reason Inspected <input style="width: 100%;" type="text"/></div>	<div style="margin-bottom: 10px;">Township Name <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Owner <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Width (inches) <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Height (inches) <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Direction Sign is Facing <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Substrate <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sheeting Material <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Condition <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Mounting Height (FT) <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Offset (FT) <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Structure Type <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Structure Condition <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Sign Manufacturer <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">County Name <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Installation Date <input style="width: 100%;" type="text"/></div> <div style="margin-bottom: 10px;">Comments <input style="width: 100%; height: 60px;" type="text"/></div>
--	---

### Sign Maintenance History

Date	Inspector Name	Action Required	Comments

### Sign Ownership

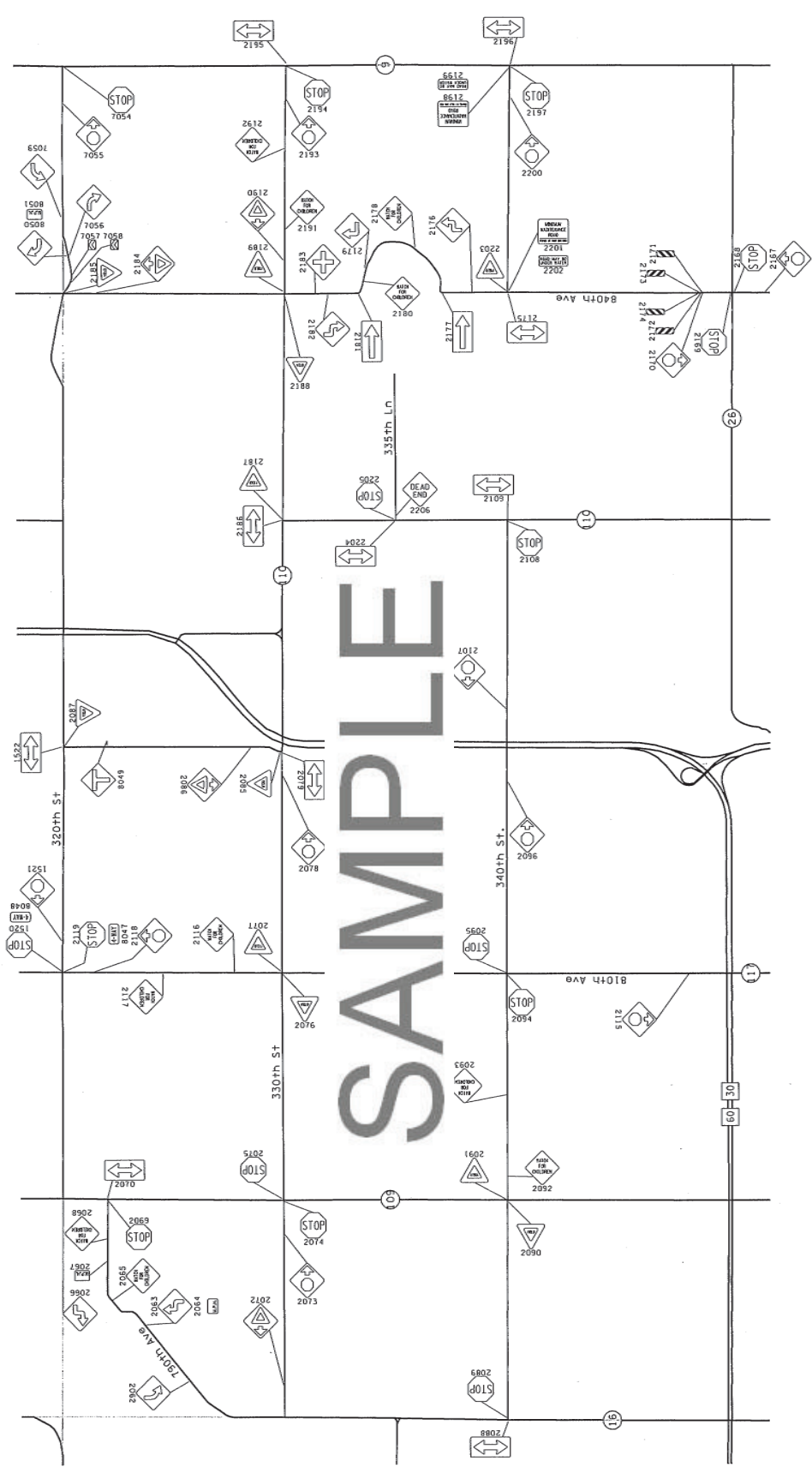
Sheet #	Sign ID #	Sign Code	Owner
46	1520	R1-1	Fieldon
46	1521	W3-1	Fieldon
46	2062	W1-2(L)	Fieldon
46	2063	W1-3(L)	Fieldon
46	2064	W13-1	Fieldon
46	2065	W11-X5	Fieldon
46	2066	W1-3(L)	Fieldon
46	2067	W13-1	Fieldon
46	2068	W11-X5	Fieldon
46	2072	W3-2	Fieldon
46	2073	W3-1	Fieldon
46	2076	R1-2	Fieldon
46	2077	R1-2	Fieldon
46	2078	W3-1	Fieldon
46	2079	W1-7	Fieldon
46	2085	R1-2	Fieldon
46	2086	W3-1	Fieldon
46	2087	W1-7	Fieldon
46	2088	W1-7	Fieldon
46	2089	W1-7	Fieldon
46	2090	W1-7	Fieldon
46	2091	W1-7	Fieldon
46	2108	W1-7	Fieldon
46	2109	W1-7	Fieldon
46	2168	W1-7	Fieldon
46	2169	W1-7	Fieldon
46	2186	W1-7	Fieldon
46	2187	W1-7	Fieldon
46	2194	W1-7	Fieldon
46	2195	W1-7	Fieldon
46	2196	W1-7	Fieldon
46	2115	W3-1	Fieldon
46	2118	W3-1	Fieldon
46	2119	R1-1	Fieldon
46	2167	W3-1	Fieldon
46	2170	W3-1	Fieldon
46	2171	X4-4(R)	Fieldon
46	2172	X4-4(L)	Fieldon
46	2173	X4-4(L)	Fieldon
46	2174	X4-4(R)	Fieldon
46	2175	W1-7	Fieldon
46	2176	W1-3(R)	Fieldon
46	2177	W1-6(R)	Fieldon
46	2179	W1-1(R)	Fieldon
46	2181	W1-6(L)	Fieldon
46	2182	W1-3(L)	Fieldon
46	2183	W2-1	Fieldon
46	2184	W3-2	Fieldon
46	2185	R1-2	Fieldon
46	2188	R1-2	Fieldon
46	2189	R1-2	Fieldon
46	2190	W3-2	Fieldon
46	2191	W11-X5	Fieldon
46	2192	W11-X5	Fieldon
46	2193	W3-1	Fieldon
46	2198	W21-X8	Fieldon
46	2199		Fieldon

Sheet #	Sign ID #	Sign Code	Owner
46	2200	W3-1	Fieldon
46	2201	W21-X8	Fieldon
46	2202		Fieldon
46	2203	R1-2	Fieldon
46	2206	W14-1	Fieldon
46	7055	W3-1	Fieldon
46	7056	W1-2(R)	Fieldon
46	7057	W1-8(L)	Fieldon
46	7058	W1-8(L)	Fieldon
46	7059	W1-2(L)	Fieldon
46	8047	R1-3	Fieldon
46	8048	R1-3	Fieldon
46	8049	W2-4	Fieldon
46	8050	W1-2(R)	Fieldon
46	8051	W13-1	Fieldon
47	2120	W21-X8	Fieldon
47	2121	W3-1	Fieldon

Sheet #	Sign ID #	Sign Code	Owner
46	2069	R1-1	County
46	2070	W1-7	County
46	2074	R1-1	County
46	2075	R1-1	County
46	2088	W1-7	County
46	2089	R1-1	County
46	2090	R1-2	County
46	2091	R1-2	County
46	2108	R1-1	County
46	2109	W1-7	County
46	2168	R1-1	County
46	2169	R1-1	County
46	2186	W1-7	County
46	2187	R1-2	County
46	2194	R1-1	County
46	2195	W1-7	County
46	2196	W1-7	County
46			County
46			County
46			County
46			County
46			County
46			County
46			County
46			County
47	2148	R1-2	County
47	2149	R1-2	County
47	2156	R1-2	County
47	2157	R1-2	County
47	2161	R1-1	County
47	2162	W1-7	County
47	2163	R1-2	County
47			
47			
46	1522	W1-7	Removed
46	2116	W11-X5	Removed
46	2117	W11-X5	Removed
46	2178	W11-X5	Removed
46	2180	W11-X5	Removed

SAMPLE





FOR  
REFERENCE  
ONLY

MINNESOTA DEPARTMENT OF TRANSPORTATION  
WATONWAN COUNTY

SIGNING PLANS  
NORTH HALF FIELDON TOWNSHIP  
STATE PROJ. NO. 83-070-02

**JE JACOBS**

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME  
OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY  
LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF  
THE STATE OF MINNESOTA.  
CERTIFIED BY *Jeffrey A. Hilden* DATE 6/5/08  
NAME: JEFFREY A. HILDEN L.I.C. NO. 20781

2500  
SCALE IN FEET

SHEET NO. 46 OF 79 SHEETS



## Township Annual Sign Maintenance and Inspection Form

Township: Oak Grove

County: Watsonwan

Year: 2009

Sign ID	Sign Code	Sign Panel Legend	Size	GPS Lat.	GPS Long.	Action	Reason	Comments	Date
1245	R2-1	SPEED LIMIT 30	24" x 30"			Trim Bushes	Sign not visible		4/9/2009
73	W1-2R	Curve Right	30" x 30"			Replace	Hit by vehicle	New sign panel and post	5/20/2009
8080	R1-1	STOP	30" x 30"	44.862092	-94.0890116			New sign-needed GPS for records	6/13/2009
1500	W2-1	Crossroad	30" x 30"			Replaced Panel	Graffiti		6/13/2009
120	W1-8	Chevron	18" x 24"			Replaced Panel	Retroreflectivity	Does not meet minimums	6/14/2009
216	W21-X8	MINIMUM MAINT ROAD	36" x 30"			Replaced Posts	Bent		6/14/2009
772	R1-2	YIELD	36" x 36"			Replaced Panel	Bullet Holes	Legend becoming unreadable	6/14/2009
829	W13-1	30 MPH	18" x 18"			Replace	Hit by vehicle	New sign panel and post	8/1/2009
224	W20-100p	500 FEET	24" x 18"			Replaced Panel	Stolen	Post still in ground	9/27/2009

SAMPLE

Date of Annual Inspection: 6/13/2009 to 6/14/2009

**General Comments:**  
 Utilized the assessment method of a Visual Nighttime Inspection to measure sign retroreflectivity.

The Town of Oak Grove certifies that the inventory of all township road signs have been inspected and maintained for inspection year 2009 pursuant to the retroreflectivity requirements set forth by the Federal Highway Administration (FHWA) and sign requirements set forth by the current Minnesota Manual on Uniform Traffic Control Devices (MMUTCD).

SIGNATURE- TOWNSHIP CHAIRPERSON \_\_\_\_\_ DATE \_\_\_\_\_

## Township Annual Sign Maintenance and Inspection Form

Township: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Year: \_\_\_\_\_

Sign ID	Sign Code	Sign Panel Legend	Size	GPS Lat.	GPS Long.	Action	Reason	Comments	Date

Date of Annual Inspection: \_\_\_\_\_

General Comments:

The Town of \_\_\_\_\_ certifies that the road signs described in this form have been inspected and maintained for inspection year \_\_\_\_\_ pursuant to the retroreflectivity requirements set forth by the Federal Highway Administration (FHWA) and sign requirements set forth by the current Minnesota Manual on Uniform Traffic Control Devices (MMUTCD).

SIGNATURE- TOWNSHIP CHAIRPERSON \_\_\_\_\_ DATE \_\_\_\_\_

# Sign Inventory and Inspection Collection Sheet

Route: County Road 16

Date: 5/25/2006

Starting Point: 210th Street

Observer: Luke and Jason

Travel Direction: West to East

Sheet #:

Meter Reading	Position	Offset	MnMUTCD Code	Orient	Size	Sheeting	Backing	Posts	Post Type	Date	Comments	Condition
0											CL of US Highway 75	E G F P
57 R			M1-X4	W		E		1	M		LQP 16 County	E G F P
57 R				W		E					Adolphr Rosetter Memorial Drive	E G F P
685 L			W3-1	E		VIP		2	M	2005		E G F P
2683 R			R1-2	N		HI		1	M	Made 1993		E G F P
7861 L			R1-1	N		VIP		1	M	2004		E G F P
7879											CL of 241st Ave.	E G F P
7900 R			R1-2	S		HI		1	M	Made 1993	Bullet Holes	E G F P
14606 R			W2-1	E		E		1	M		Bent Post	E G F P
15460 L			R1-1	N		VIP		1	M	2004		E G F P
15473											CL of 255th Ave.	E G F P
15494 R			R1-2	S		HI		1	M	Made 2002		E G F P
16207 L			W2-1	W		E		1	M		Bullet Holes	E G F P
21400 R			W10-1	W		VIP		2	M	Made 1993		E G F P
22129 R				W		VIP		1	W		Railroad Crossing	E G F P
22152 L				E		VIP		1	W		Railroad Crossing	E G F P
22266 L			W10-X3	E		VIP		2	M	Made 1993		E G F P
22883 L			W10-1	E		VIP		2	M	Made 1993		E G F P
22943 R			W3-1	W		VIP		2	M	2005		E G F P
23676 L			R1-1	N		HI		1	M	2005		E G F P
23676 L			R1-3	N		VIP				2005		E G F P
23702											CL of 271st Ave.	E G F P
23724 R			R1-1	S		HI		1	M	Made 1996		E G F P
23724 R			R1-3	S		VIP				2005		E G F P
24463 L			W3-1	E		VIP		2	M	2005		E G F P
29018 L			R1-2	N		HI		1	M	Made 2002		E G F P
29038											CL of 281st Ave	E G F P
29057 R			R1-2	S		HI		1	M	Made 2000	Bullet Holes	E G F P

Right Overhead Left

N E S W

Excellent Good Fair Poor



Agency \_\_\_\_\_

Sheet \_\_\_ of \_\_\_

### Traffic Sign Inspection Sheet

Date Surveyed \_\_\_\_\_

Zone \_\_\_\_\_ Roadway \_\_\_\_\_ Location/Direction \_\_\_\_\_

From \_\_\_\_\_ To \_\_\_\_\_

Milepoint	Direction	Sign Type	MUTCD Number	Sign Size	Sign Message	Retroreflectivity OK	Remove Sign	Replace Sign	Adjust Height	Steel Post	Wood Post	New Post	Level Post	Remarks
Inspector _____														

✓ = okay  
 X = needs attention

# Traffic Sign Inspection Sheet

Agency \_\_\_\_\_ Road Identification \_\_\_\_\_ Direction \_\_\_\_\_

Beginning Point \_\_\_\_\_ Ending Point \_\_\_\_\_

Date \_\_\_\_\_ Inspector \_\_\_\_\_

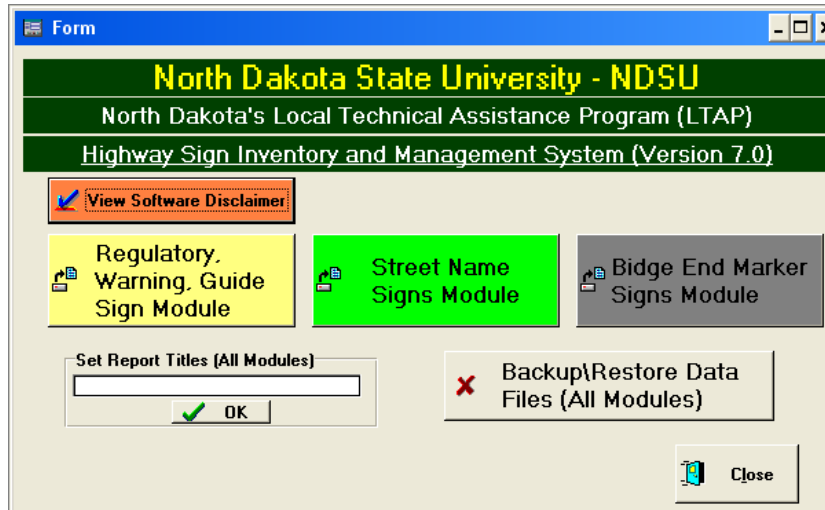
Odometer Reading	Side of Road	Sign No.	Sign I.D.	Sign Type	Sign Inspection			
					Date	Action Taken	Date	Action Taken

Approved \_\_\_\_\_  
Title \_\_\_\_\_

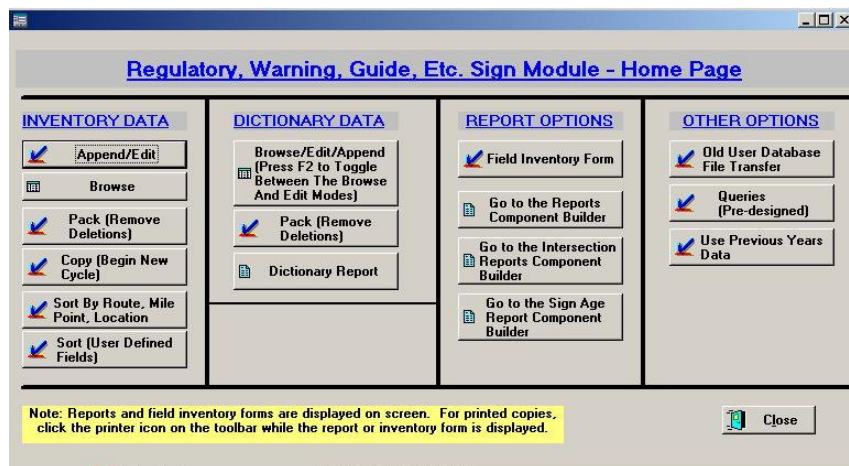
## North Dakota's Local Technical Assistance Program (LTAP) – SIGNS 7.1

**SIGNS 7.1** - Roadway Sign Inventory & Management System for County Road or City Street Departments

Available for FREE download at: <http://www.ndltap.org/library/software.php>



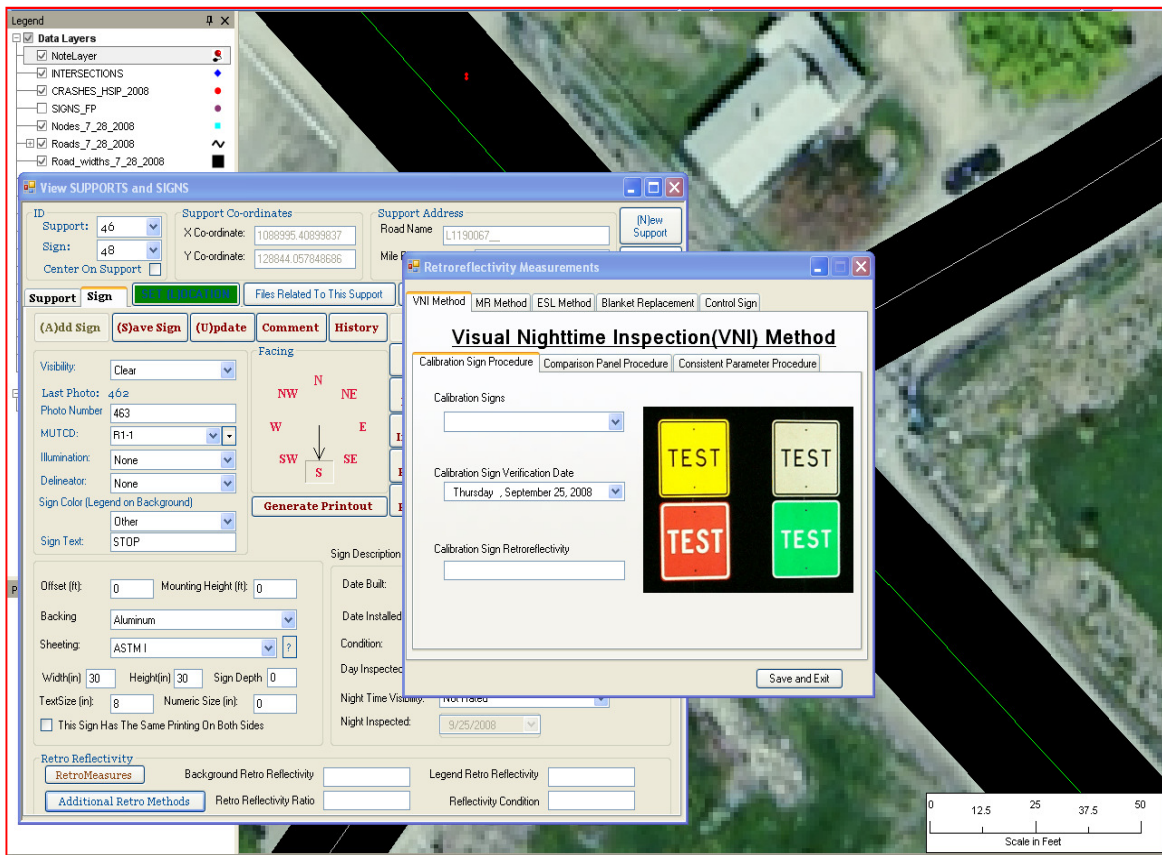
**Program Summary:** The North Dakota State University's Local Technical Assistance Program (LTAP) Sign Inventory and Management System is designed to meet the needs of both County Highway and City Street Departments. While the process was developed to provide a procedure for collecting and recording initial sign inventories, it serves equally well as a vehicle for maintaining the inventory and managing the system. **The objective of the version 7.0 Sign Program is to develop a program that can be used to implement any of FHWA's five approved management methods**



## Utah's Local Technical Assistance Program (LTAP) – Safety Software Suite

**Safety Software Suite** - FREE geographic information system with plug-in's for Crash analysis, Signs Management and Inventory, Intersection Analysis, Road Safety Audits, ADA Ramp Management, and more

Available for FREE download at: <http://www.utahltap.org/safetysoftwaresuite/>



**Program Summary:** The Signs Plug-in is a complete package for signs management. It allows you to inventory the locations/conditions and other important attributes for Signs and Supports On the map. The tool allows you to keep a history of all changes made to a sign or support. It allows you to keep photos, and files stored with the sign they belong to. It has a book-keeping tool that lets you keep track of how many signs/supports of a specific type you have on hand in your shop inventory. It has reporting tools that allow you to print out a list of the signs inspected by an inspector and any extra work done on the sign. There is a Warrant Life tool that allows you to figure out how many signs will be expiring in a given date range and how much it will cost to fix them. There are Merging tools that allow you to merge two signs projects together.



## **Appendix B:**

# **Examples of Sign Inspection/Replacement Policies/Procedures**

The following are example sign policies currently used by local agencies:

- Generic Rural County
- Generic Metro County
- Generic Township

# GENERIC RURAL COUNTY HIGHWAY DEPARTMENT

Effective Date: XX

## **Traffic Signing and Maintenance Procedure**

### Overview

The County Highway Engineer is authorized and responsible for the placement of traffic control devices to aid in safe movement of the traveling public. The traffic control devices shall be placed in accordance with the Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways (MMUTCD) and hereby supplemented by the Pavement Marking and Traffic Signing Procedure.

The County Highway Department is responsible for the maintenance and placement of the Rural E-911 signing for the county.

The County Highway Department will complete a daytime inspection, twice a year, for traffic signs along the county roads, and complete E-911 daytime inspection once a year. In the process of "Maintaining Traffic Sign Retroreflectivity" the County will use the Expected Sign Life method and replace the traffic sign as follows:

<u>MATERIAL GRADE</u>	<u>FROM INSTALLATION</u>
Engineering	8 Years
HI or HIP	10 Years (South Facing) 11 Years (East/West Facing) 12 Years (North Facing)
VIP or DG3	13 Years (South Facing) 14 years (East/West Facing) 15 Years (North Facing)
E-911 Signing (HIP)	12 Years
E-911 Signing (DG3)	15 Years

Signs requested to be placed within the right of way, along the county roadway, must meet the requirement of the MMUTCD and have County Highway Engineer approval. (*See Signing Request Policy*)

(Specific agency name) Transportation  
Sign Maintenance Policies and Procedures – Sample Document  
Adopted by (\_\_\_\_ County) Board: Date – Resolution \_\_\_\_\_

## Purpose

The purpose of the Traffic Operations Policies and Procedures is to establish and maintain uniform definitions and practices concerning sign maintenance and operations on (specific agency name) highways. The county will provide such control in a safe and cost-effective manner balancing the needs of safety for highway users and county personnel, budget, social and environmental concerns. It is in the county's best interest to have traffic operation maintenance procedures. Because of variables in the weather, traffic issues, changing driver demographics, road design, standards and other factors, these procedures must remain flexible. The county may use county employees or other entities under contract to provide this service.

## I. Procedure

The sign maintenance supervisor or designated lead worker will make decisions concerning scheduling and the procedures to be followed for daily traffic operation maintenance needs and subsequent yearly detailed condition inspections. Scheduling and the procedures to be followed will be based upon consideration of the following factors: significance of the traffic device to driver safety, condition and effectiveness of the device, standards compliance, and whether damage or condition creates an immediate safety hazard.

In every instance, the onsite Traffic Technician must assess the conditions of the traffic control device and rely on judgment and experience to determine the appropriate action to correct or maintain the device. Factors that may delay completion of traffic operation maintenance include other repair needs; utility locates needs, fabrication of necessary material, weather conditions including severe cold or significant winds, limited visibility, and other staff and field condition issues.

- II. **General Practices:** Subject to the factors set forth in Section II, Procedures, the county will maintain traffic control devices (signs, traffic signals and pavement markings) to ensure a safe and efficient operation. **Note: This example details sign practices but, can be expanded to pertain to all traffic operation practices.**

## Sign Maintenance

- A. Sign Installation: Signs will be installed to meet federal standards set forth in the most recent Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) in accordance to (specific agency name) guidelines and practices.
- B. Maintain Signing, Overall Responsibility: County sign maintenance practices are established to meet all requirements and ensure appropriate signing for the traveling public.
- C. Sign Retro-Reflectivity: (Specific name) county is currently creating a field sign inventory database. Once data collection is done and the system is in place, County will utilize the database for sign management through the expected sign life practice

to meet federal sign retro-reflectivity standards. Expected sign life will be conducted through a combination of review of signs that are at the sheeting warranty life and sample measurements to establish a base line life for each sign type.

Prior to completion of the database, County will utilize the Visual Inspection Method, following the general criteria of the calibrated sign procedure to conduct a nighttime inspection as outlined in the specific section below.

Once the sign management practice is fully implemented nighttime sign survey may be conducted periodically (up to every four years) to supplement the management program and monitor for sign replacement needs based on vandalism or other premature sign degradation.

- D. Sign Maintenance Responsibility: Maintain highway signs and street identification signs on all (specific agency name) highways, with the exception of:
- 1) All signing on approaches to county highways are not installed or maintained by the county other than street name signs and stop signs intersecting the county Highway which are maintained by the county .
  - 2) Stop signs at Minnesota Department of Transportation (MnDOT) controlled intersections and highway ramps with county highways;
  - 3) Specific signs installed by others (Mn/DOT, transit agencies, and Cities permitted to place signs on county highways) as outlined in the advanced signing guideline document.
  - 4) Signs along county Highway within Mn/DOT right of way, unless specific agreement with Mn/DOT stipulates a county maintenance responsibility for signing.
  - 5) Bike path and other pedestrian-control signs not pertaining to vehicle traffic.
- E. Response to Incident Report for Sign Repair Needs: Sign maintenance staff will respond after receiving notice of a repair need to determine appropriate action with the following priorities:
- 1) Stop sign: as soon as practical, no later than one business day, a temporary stop sign will be placed if required.
  - 2) Other regulatory signs: no later than three business days.
  - 3) Warning signs: within one scheduled workday.
  - 4) Informational/guidance signs: within two scheduled workweeks.
- F. Visual Sign Inspection: Traffic staff will perform a night time survey as follows:
- 1) Acceptable retro reflectivity will be determined by the technicians conducting the night time inspect.
  - 2) Staff will be given direction as training by the supervisor or take a night time sign inspection course if available in the area for conducting the study appropriately. The night of the inspection, staff will view each sign type mounted at the standard sign height (regulatory black/white, stop sign, warning sign and guidance sign) that are at or above minimum criteria from the standard county pick-up truck with low-beans to mimic field conditions as much as practical.

- 3) Written documentation of the location, sign type, size and reason for sign replacement will be recorded for each sign that is not in an acceptable condition and needs replacement.
- 4) Sign replacement will occur as follows:
  - a) Stop signs – within three working days
  - b) All other signs – by segment with the entire replacement program for signs identified through the survey being replaced within four months of completion of the review.

G. Miscellaneous Sign Practices:

- 1) Sign staff is not directly on-call after normal working hours. After hours phone numbers for traffic operation sign staff is provided to the Communications Center (911 response) so staff can be contacted in case of an emergency. In addition, a signal maintenance and highway maintenance person is on-call at all times after normal working hours and can respond to emergency situations in case traffic operation staff cannot be contacted.
- 2) Training is provided to ensure traffic staff can perform sign maintenance duties in an efficient, effective and responsive manner. Such training shall consist of, at a minimum, appropriate signing and traffic control seminars (when available and funds are available in the county training budget), appropriate available training videos or website trainings, and yearly training by supervisors.
- 3) Unauthorized signs will be removed from county right of way consistent with the (specific agency name) Sign Placement Policy 8252.
- 4) Support staff will be informed and updated regarding sign maintenance operations (e.g., schedules and other priority needs or equipment failures) to ensure accurate information is available to respond to telephone inquiries.
- 5) Sign staff may park a sign maintenance vehicle against traffic flow in order to perform necessary emergency and routine maintenance duties.
- 6) Sign staff may drive or park maintenance vehicles on the center medians or boulevards in order to perform necessary emergency and routine maintenance duties.

**(TOWNSHIP/CITY)**

**ROADWAY SIGN INVENTORY  
AND  
RETROREFLECTIVITY SIGN MAINTENANCE  
PROGRAM**

PREPARED BY:

Hakanson Anderson Associates, Inc.  
3601 Thurston Avenue N.E.  
Anoka, MN 55303

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## **I. INTRODUCTION**

(Township/City) has authorized the development of a roadway sign inventory and sign retroreflectivity maintenance program. Implementation of this program will ensure that the minimum retroreflectivity levels, as determined by the Federal Highway Administration (FHWA), will be maintained to the best of the (Township's/City's) ability.

Retroreflectivity refers to the property of an object to reflect light back to the source. In this case, retroreflective traffic sign sheeting is used to reflect light from a vehicles headlamps back to the driver's eyes, thus increasing the sign visibility at night. Retroreflective traffic sign sheeting is created using tiny glass beads or prismatic reflectors, which have been developed to reflect light.

Maintaining traffic sign retroreflectivity is increasingly more important as the older driver population increases. Therefore, the FHWA recently adopted language that requires all agencies that maintain roadways open to the traveling public to adopt a sign maintenance program which is designed to maintain traffic sign retroreflectivity at or above specific levels. The 2003 Manual of Uniform Traffic Control Devices (MUTCD), revision 2, identifies the minimum retroreflectivity levels.

## **II. OBJECTIVES**

The objectives for this sign inventory and retroreflectivity sign maintenance program are:

- A. Complete the sign inventory of all (Township/City) roads.
- B. Develop a sign inventory database.
- C. Prepare a GIS map showing sign locations within the (Township/City).
- D. Identify the method(s) that the (Township/City) will use to maintain minimum retroreflectivity levels for all signs subject to the new requirements.

## **III. UNIFORM STANDARDS FOR SIGNS**

FHWA establishes basic standards for signs, as found in the Manual on Uniform Traffic Control Devices (MUTCD). The Minnesota Department of Transportation (Mn/DOT) has established their own (MN MUTCD) policy for traffic control on all public streets, roads and highways within the State of Minnesota. Most of the text, figures and tables are identical to the



Federal MUTCD, while others have been modified to meet state laws, or to more closely reflect the conditions and policies of Minnesota.

The MN MUTCD regulates the different types of signs, such as regulatory, warning and guide signs. This document also establishes standards for temporary traffic controls, traffic signals, and pavement markings.

In order to ensure the safety and efficiency of (Township/City) roads, the (Township/City) will install and maintain their signs in accordance with the MN MUTCD.

#### **IV. TRAFFIC CONTROL FOR LOW VOLUME ROADS**

Part 5 of the MN MUTCD is titled "Traffic Control for Low-Volume Roads". This section of the manual provides guidance for signing local low-volume roadways, with traffic volumes of less than 400 AADT.

This section of the manual specifically supplements and references the criteria for traffic control devices commonly used on low volume roads. While certain roadway signs are required, others are suggested with the statement "should be used" or "may be used".

- A. The MN MUTCD **requires** very few signs on low volume roads. The following signs are included as **required** signs:
  - 1. Minimum Maintenance Road – Shall be posted at the entry points to all minimum maintenance roads.
  - 2. Railroad crossing and advance railroad crossing signs shall be posted for all at grade intersections between roadways and railroads.
- B. Part 5 of the MN MUTCD also provides guidance for the use of regulatory signs, warning signs, guide signs, pavement markings, highway-rail grade crossings, and temporary traffic control zones for low volume roads. The application of "suggested" traffic control devices on low volume roads will be based on engineering judgment or studies.

#### **V. SIGN INVENTORY**

Hakanson Anderson inventoried all roadway signs that have established minimum retroreflectivity requirements. Hakanson Anderson also inventoried all guide signs. Emergency 911 signs were not inventoried.

The following information is a summary of the field inventory, which is included in Appendix A.

- A. **Regulatory Signs – Total 450 Signs (Compliance by 2015)**  
Including:
  - 153 Stop Signs
  - 19 Yield Signs
  - 63 Speed Limit Signs
  
- B. **Warning Signs – Total 380 Signs (Compliance by 2015)**  
Including:
  - 30 Barricades
  - 23 RT/LT Turn
  - 20 Pedestrian
  - 19 RT/LT Curve
  - 23 Speed Advisory Plaques
  - 30 Dead End
  - 38 No Outlet
  - 42 Double arrows
  - 39 Stop Ahead
  - 108 Delineators
  
- C. **Green and White Guide Signs – Total 5 Signs (Compliance by 2015)**
  
- D. **Street Name Signs – Total 176 Signs (Compliance by 2018)**
  
- E. **Other Signs – Total 22 Signs (No Established Minimum Retroreflective Levels)** A majority of these signs are route markers and advance route markers, which do not have established minimum retroreflectivity standards.

## **VI. SIGN RETROREFLECTIVITY ASSESSMENT**

Prior to authorization of this inventory and program, the (Township/City) did not actively track and/or maintain an inventory of (Township/City) signs. Therefore, the (Township/City) will initially utilize the Visual Nighttime Inspection Method to identify which existing signs fail to meet the established minimum levels of retroreflectivity. This procedure is the most practical method allowed because it does not require any specialized equipment or other large investments by the (Township/City).

The (Township/City) will utilize the Consistent Parameters Procedure of the Visual Inspection Method. The following is an outline of the procedure to be followed by the (Township/City) in performing the Visual Nighttime Inspection of the signs.

Procedure:

- A. The assessment shall be done by a team of two trained inspectors, one driver and one inspector over the age of 60 years old.
- B. The team shall be driving a model year 2000 or newer SUV or pickup truck.
- C. The team shall view a set of calibration signs of each color each night before beginning the inspections, which are known to be slightly above the established minimum retroreflectivity levels. Viewing the calibration signs shall be done with the headlights on low beam at or near the speed limit of the roadway, or at a typical viewing distance which would be adequate to react to the traffic control device.
- D. The inspector shall evaluate the existing retroreflectivity of all signs while traveling at or near the posted speed limit with the headlights on low beam. Signs shall be rated according to the following:
  - Fail: Signs with retroreflectivity below that of the calibration test panels.
  - Marginal: Signs with retroreflectivity at or slightly above that of the calibration test panels.
  - Adequate: Signs with retroreflectivity clearly above that of the calibration test panels.
- E. Consistency of testing conditions. Inspections will be conducted during consistent nighttime conditions whenever possible. More specifically, inspections will be conducted on clear nights when there is no rain or fog. The interior light of the inspection vehicle will be off. A pen light will be used for recording the results of the inspection.

**VII. SIGN REPLACEMENT PLAN**

Signs with a rating of “fail” will be scheduled for replacement as soon as possible. Regulatory sign replacement will take precedence with regards to funding.

Signs with retroreflectivity ratings of “marginal” will be scheduled for replacement as soon as practical and in accordance with the schedule below. Although the signs may be at, or slightly above, the minimum retroreflectivity levels at the time of the inspection, the retroreflectivity

levels will degrade over time and will eventually fall below the minimum levels. Therefore, signs with a rating of "marginal" will be scheduled for replacement and replaced according to the following schedule:

**By January 2015:** All regulatory, warning, and green and white ground mounted guide signs (except street name signs) with "marginal" ratings will be replaced.

**By January 2018:** All street name signs with "marginal" ratings will be replaced.

Signs with a rating of adequate shall be reviewed on a biannual basis. When the retroreflectivity reaches a marginal condition, the sign shall be scheduled for replacement.

## **VIII. RETROREFLECTIVE SHEETING MATERIALS**

ASTM D4956 describes the types of retroreflective sheeting materials that can be used on traffic signs. The new MUTCD minimum retroreflectivity requirements refer to sheeting types as defined in ASTM D4956. Sheeting types that can be used, according to the new requirements, are as follows (current as of March 2008):

- A. All prismatic sheeting materials may be used for all signs.
- B. High Intensity Beaded (Type III) and Super Engineer Grade (Type II) may be used for all signs, except for the white legend on overhead guide signs.
- C. Engineer Grade (Type I) may be used for all signs except for:
  - 1. The white legend on guide signs.
  - 2. The white legend on street name signs.
  - 3. All yellow and orange warning signs.

Even though a particular type of sheeting may initially meet the minimum retroreflectivity levels when new, it may quickly degrade to below the minimum retroreflectivity levels.

The use of higher performance sheeting, even though it has a higher initial cost, might provide a better life cycle cost for the agency.

The FHWA has developed a sheeting ID guide and has posted it at: [www.fhwa.dot.gov/retro](http://www.fhwa.dot.gov/retro). Also refer to Table 2A-3 in FHWA's *Know Your Retro 2007* Information sheet.

**IX. ONGOING REPLACEMENT PLAN**

As the (Township/City) replaces roadway signs, they will document the year installed and sheeting material used for each sign.

When the installation year and sheeting type of the sign are known, the (Township/City) will use the Expected Sign Life method to maintain the minimum retroreflectivity levels. Signs of known age and sheeting type will be replaced just before their expected life has expired. The (Township/City) will utilize the following schedule for replacement of signs with known age and sheeting type:

<u>Material Grade</u>	<u>Replacement Interval</u>
Engineer Grade (Type I)	8 year replacement
High Intensity Beaded (Type III)	10 year replacement
Prismatic Sheeting	12 year replacement

If the sign sheeting has a warranty exceeding the above interval, the replacement interval may be extended to the number of years of the warranty. If an engineering study is available showing that the expected life may differ or be extended from the above schedule, the (Township/City) may consider revising the above schedule as supported by the engineering study. The (Township/City) may only consider engineering studies that have consistent parameters and were performed in a similar geographic area.

**X. CONCLUSIONS**

The information in this report is intended to serve as a framework for ensuring that all traffic signs under the jurisdiction of the (Township/City) are maintained at or above the minimum retroreflectivity levels as determined by the FHWA.

A retroreflectivity assessment shall be completed by the (Township/City), as outlined in Section VI of this report, for all signs with an unknown age or sheeting type. After completion of the Visual Nighttime Assessment, a replacement plan shall be prepared and implemented for all signs not meeting the minimum retroreflectivity requirements.

As the (Township/City) replaces signs, the (Township/City) will document the year installed and sheeting type and will use the Expected Sign Life Method for maintaining minimum retroreflectivity levels.

Therefore, the retroreflectivity levels of all signs subject to the retroreflectivity standards will be maintained using a combination of the Visual Assessment Method and Expected Sign Life Method, as described herein.

As signs are replaced under this program, the (Township/City) will consider the need for each sign. However, the (Township/City) will not eliminate any signs from its roadway system without first adopting a written sign removal policy.

## **Appendix C:**

# **Examples of Sign Management Agreements**

The following is an example sign management agreement currently used by local agencies:

- Lac Qui Parle County/Madison Township Sign Maintenance Agreement

# **AGREEMENT FOR TRAFFIC SIGN MAINTENANCE SERVICES BETWEEN LAC QUI PARLE COUNTY & MADISON TOWNSHIP**

**THIS AGREEMENT** is made and entered into by and between the Township of Madison (“Township”), and the County of Lac qui Parle (“County”), governmental subdivisions of the State of Minnesota, pursuant to the authority granted to the parties by Minnesota Statutes 161.39 and 471.59.

Minnesota Statute 161.39 allows road authorities to contract with each other for technical and engineering assistance and to perform maintenance on any highway, street, road, or bridge under their jurisdiction, and

The Township requests that the County assist in the installation and maintenance of traffic signs on Township roads.

In consideration of the mutual promises and covenants of each to the other contained in this Agreement and other good and valuable consideration, the parties covenant and agree as follows:

## **SECTION 1. THE AGREEMENT**

- 1.01. The County shall conduct an initial review and inventory of the Township signs and create a database recording the inventory.
- 1.02. The Township shall review and approve the database for accuracy and completeness.
- 1.03. The Township, upon completion, shall inform the County in writing of all signs it replaces, removes or installs during the term of this Agreement so the County can update the database.
- 1.04. By January 1<sup>st</sup> of each year the County shall submit to the Township a suggested list of signs that should be installed or replaced during the year based upon the County’s Sign Replacement Policy, a copy of which is attached hereto and marked as “Exhibit A.” The placement and installation of signs will be in accordance with the Minnesota Manual of Uniform Traffic Control Devices or other federal or state regulations.
- 1.05. By March 1<sup>st</sup> of each year the Township shall advise the County in writing as to which suggested signs are to be installed or replaced.
- 1.06. The coordination, timing, and dispatching of County operators and equipment shall be at the discretion of the County Engineer, County Maintenance Supervisor, or his/her direct representative but all work will be completed by September 1<sup>st</sup> of each year.
- 1.07. The Township can request additional sign work during the year that if the County is available will be handled by the County balancing inventory, equipment and staff.
- 1.08. The Township agrees to reimburse the County for all costs including but not limited to labor, material and equipment arising from the initial sign inventory, development and



maintenance of Township sign data base, inventory and installation and replacement of Township signs.

- 1.09. The Township shall reimburse the County monthly after receipt of invoice.
- 1.10. The term of this Agreement shall be for a period commencing on the date hereof and terminating on December 31, 2007, and will automatically renew for additional one year terms thereafter. Either party may terminate this agreement, at any time, upon 60 day written notice.
- 1.11. Each party shall fully indemnify and hold harmless the other party against all claims, losses, liability, suits, judgments, costs and expenses by reason of the action or inaction of its employees participating in this joint arrangement. This agreement to indemnify and hold harmless does not constitute a waiver by any participant of limitations on liability provided under Minnesota States Statutes, Chapter 466. The parties of this agreement are not liable for the acts or omissions of the other party to this agreement except to the extent to which they have agreed in writing to be responsible for acts or omissions of the other party.
- 1.12. Each party shall be responsible for injuries or death of its own personnel. Each party will maintain workers' compensation coverage, as required by law, on its personnel when performing work pursuant to this agreement.

**SECTION 2. GENERAL PROVISIONS**

- 2.01. **Notices.** All notices or communications required or permitted pursuant to this Agreement shall be either hand delivered or mailed to Township and County, certified mail, return-receipt requested, at the following address:

**Township**

**County**

Township of Madison

Lac qui Parle County Engineer  
Lac qui Parle County Hwy Department  
308 6<sup>th</sup> Avenue South  
Madison, MN 56256

C/O \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Either Party may change its address or authorized representative by written notice delivered to the other party pursuant to this Section 2.01.

- 2.02. **Survival of Representations and Covenants.** The representations, covenants, and agreements of the parties under this Agreement, and the remedies of either party for the breach of such representations, covenants, and agreements by the other party shall survive the execution and termination of this Agreement.

- 2.03. **Alteration.** Any alteration, variation, modification or waiver of the provisions of the Agreement shall be valid only after it has been reduced to writing and duly signed by all parties.
- 2.04. **Waiver.** The waiver of any of the rights and/or remedies arising under the terms of this Agreement on any one occasion by any party hereto shall not constitute a waiver of any rights and/or remedies in respect to any subsequent breach or default of the terms of this Agreement. The rights and remedies provided or referred to under the terms of this Agreement are cumulative and not mutually exclusive.
- 2.05. **Interpretation According to Minnesota Law.** This Agreement shall be interpreted and construed according to the laws of the State of Minnesota.
- 2.06. **Entire Agreement.** This Agreement shall constitute the entire agreement between the parties and shall supersede all prior oral or written negotiations.
- 2.07. **Further Actions.** The parties agree to execute such further documents and take such further actions as may reasonably be required or expedient to carry out the provisions and intentions of this Agreement, or any agreement or document relating hereto or entered into in connection herewith.

**IN WITNESS WHEREOF**, the parties hereto have caused this Agreement to be executed by their duly authorized representatives as of the day and year first above written.

**TOWNSHIP OF MADISON**

Attest:

By: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

By: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

**LAC QUI PARLE COUNTY**

By: \_\_\_\_\_  
 Name: \_\_\_\_\_  
 Title: County Board Chairperson  
 Date: \_\_\_\_\_

**APPROVED AS TO FORM:**

\_\_\_\_\_  
 County Attorney