TRAFFIC CONTROL DEVICES
Program Review

Gladstone, Oregon

DATE:
July 14, 2016

PREPARED FOR:
City of Gladstone

PREPARED BY:
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July 14, 2016

Jim Whynot
Public Works Supervisor
18595 Portland Ave
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Dear Mr. Whynot:

On behalf of Bob Layton, Rob Burchfield, and Ed Fischer, I would like to thank you for the opportunity to work with you last month. We learned quite a bit about the challenges facing a medium-sized city with limited resources, and we hope that Gladstone will also benefit from our visit.

We conducted a general review of traffic signing in the City for conformance with the MUTCD, and we reviewed several locations where the City had some specific concerns. As a result of our reviews we do have some suggestions for possible traffic control device improvements, and these suggestions are discussed in this report.

As always, the suggested traffic control revisions involve trade-offs between benefits and costs, and we understand that the City's financial resources are always limited. Also, some of our suggestions might be affected by written or unwritten City policies relating to traffic control. Because of our limited time we did not attempt to analyze the benefit-cost feasibility of any of the suggested traffic control revisions, nor did we assess the traffic volumes or crash experience; we simply present the suggestions for the City's consideration.

In the meantime, if you have any questions regarding any of the comments in this report or need any additional information, please don't hesitate to call any one of us.

Thanks again for your assistance and hospitality.

Yours truly,

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Ed Fischer (503) 348-8876
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TRAFFIC CONTROL DEVICES REVIEW
Gladstone, Oregon

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Introduction

As requested by the City of Gladstone, we performed a peer review of safety and traffic operations at selected locations on the City's street system as well as a general review of traffic control devices in June 2016. As the result of our review we have a few suggestions for possible revisions to traffic control devices at some of the locations. We found that the traffic control devices on Gladstone's streets are typically appropriate, properly located, and well-maintained. There are some school zones where the signing could be improved, but that's not unusual. School zone signing requirements in Oregon can be complicated and confusing.

We would like to acknowledge the assistance of Steve Graves who provided us with extensive background information on the locations that we observed.

Overview

The population of Gladstone is about 13,000. There are approximately 45 to 50 miles of streets in the City.

Street centerline striping on State highways is performed by ODOT. Centerline striping on City streets is performed by Clackamas County crews under an annual contract. City crews paint curbs and crosswalks on City streets.

The City does not currently have a traffic sign inventory or a retroreflective sign inspection program. A GIS is currently under development by City staff, and it is expected that eventually the City's traffic signs will be included in this System. All of the traffic signals in Gladstone are timed and maintained by either ODOT or Clackamas County.

A Transportation System Plan for the City is currently underway.

Signing and striping standards for cities and counties in Oregon are prescribed by the Manual on Uniform Traffic Control Devices. The current edition is the 2009 MUTCD. It is a long and complex document, but it is important to be familiar with it because Oregon state law requires that all cities and counties follow the requirements in this Manual.

The MUTCD is accompanied by the *Oregon Supplement to the 2009 MUTCD*. This supplement lists deviations to the MUTCD which have been adopted by the Oregon Transportation Commission. These deviations are items in the MUTCD which, for legal or policy reasons, are not used in Oregon. The *Oregon Supplement* can be found on the ODOT website at:

https://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/oregon_supplement_mutcd_2009_edition.pdf

Legal Aspects of Budget Constraints

Cities in Oregon typically fund their own desired street improvements, transportation activities, and maintenance. It is up to the City Council to decide where available resources should be used. When available resources are insufficient to fund all desired improvements, equipment, and maintenance, funds must be allocated based on safety and importance. In doing this the City Council must use its discretion. This provides the decision-making body the opportunity to employ discretionary immunity in their planning and allocation of funds to control their liability for tort claims arising from crashes.

A page in the Appendix on "Discretionary Immunity" discusses the discretionary immunity concept, and how it may be used in the operations and planning process for transportation activities to reduce liability for local jurisdictions. Another page in the Appendix discusses the application of discretionary immunity to traffic sign retroreflectivity programs.

Sign Maintenance

Traffic sign maintenance can be required as a result of a number of different problems. One example is if a sign is damaged by an accident or vandalism. A second example is if a sign loses its effectiveness due to fading of colors and reflectivity in the sun or exposure to weather. A third example is if the design standards for a sign change, making the sign obsolete.

Although much of the traffic signing in Gladstone is in good condition at this time, the City should have a formal planned program for replacing signs that have lost their effectiveness or are obsolete.

A sign replacement program should include an inventory of the location, type, and condition of each sign. One option might be to use an intern for this work. This provides an indication of the extent of the problem, and can be the basis of a cost estimate for a replacement program. Then, priorities can be set for replacing different classes of signs. As funding or grants become available, work can proceed on the replacement program in priority order.

There are numerous types of systems for traffic sign inventories. Some small cities use a simple card file system or a wall map to record the inventory and log changes and maintenance activities. A simple Excel spreadsheet could also be used to record this information, and there are commercial computerized sign inventory programs that are available. For Gladstone, using a spreadsheet or a database as a temporary measure until a traffic sign module for the GIS is completed might be the most economical course of action.

Traffic sign inventories provide information that can improve the ability to plan maintenance activities and reduce costs. The sign inventory should include, for example, data such as:

- Sign Code (from the MUTCD)
- Sign Size
- Location
- Sheeting Type (from sign vendor)
- Installation Date (for new signs)
- Maintenance Activity

Maintenance activity should include information on each inspection date and the date and type of activity (e.g. cleaned graffiti, tightened bolts, straightened sign post, trimmed tree obscuring sign, etc.). The application of a sticker or the use of a marking pen on the back of every new sign to indicate the date of installation or maintenance work can be helpful.

These types of data can be used to identify signs that are approaching their warranty age and may no longer be retroreflective. Signs that need to be replaced can be ordered and stocked accordingly. A maintenance history can also help the City defend itself against lawsuits by demonstrating that the City has a systematic and rational approach to inspecting and maintaining traffic signs.

Examples of forms that can be used for sign inspection are included in *"Sign Reflectivity: A Minnesota Toolkit"* in the Appendix to this report.

Following are examples of signing problems which could be noted by a regular sign inspection program:

Stop sign at Portland and Clackamas that needs cleaning and is obstructed by a tree.

Signs on Stonewood Drive that are dirty and obstructed by vegetation.

School sign at Arlington and Harvard that is obscured by tree branches.

School sign on Oatfield near Angus obscured by vegetation.

Sign at Nelson and Sunlite in poor condition

School sign southbound on Oatfield near Angus (on metal sign pole near blue garbage can) is completely hidden by vegetation.

School sign on Nelson near Harvard that should be cleaned.

Sign Retroreflectivity

Traffic sign retroreflectivity defines the ability of a sign to reflect light back to its source. Retroreflective signs and pavement markings return light from vehicular headlights back toward the vehicle and the eyes of the driver, making the signs and markings visible to the driver.

The MUTCD now requires that every jurisdiction implement a retroreflectivity management program for regulatory and warning signs as of June 2014. Signs that are found to be deficient should be replaced as soon as resources permit. Types of signs other than regulatory and warning should be added to the program as resources allow.

These new requirements are in Section 2A.08 (page 30) of the 2009 MUTCD, and are summarized here.

The MUTCD states that any of these methods can be used to evaluate and replace signs that have inadequate reflectivity:

- *Visual Nighttime Inspection* – retroreflectivity of existing signs is visually assessed by a trained sign inspector
- *Measured Sign Reflectivity* – sign reflectivity is measured using a retro-reflectometer
- *Expected Sign Life* – signs are labeled or recorded at installation, and are replaced when the expected life is exceeded
- *Blanket Replacement* – all signs in an area/corridor, or of a given type, are replaced at specified intervals
- *Control Signs* – a sample of control signs, such as STOP signs, are monitored and when the control signs no longer meet retroreflectivity standards, all the signs in the group they represent are replaced
- *Other Methods* – other methods developed based on engineering studies can be used

The use of "Other Methods" could include a combination of alternative methods that is based on resources available and suited to the jurisdiction.

For Gladstone, the easiest and most economical retroreflectivity program would probably be *Visual Nighttime Inspection*. Under *Visual Nighttime Inspection*, a City staff member would periodically (typically once every year or two) look at every sign in the sign inventory at night, and observe whether the sign reflectivity is adequate. If not, the sign is marked for replacement. If the available funding for sign replacement is limited, the City should prioritize sign replacement, starting with STOP and YIELD signs, then warning signs, then other regulatory signs, then other types of signs.

Although a retroreflectivity sign inspector must be trained, the training is not complicated or difficult. An FHWA publication describing the suggested training for a sign inspector is included in the Appendix to this report. We have also included in the Appendix a report from Minnesota which provides more information on implementing retroreflectivity programs.

In any case, when the City purchases new signs, assurance should be obtained from the vendor that the signs meet current MUTCD standards for retroreflectivity.

Page 31 of the MUTCD lists some types of signs, such as parking signs, which need not be included in the retroreflectivity program.

STOP sign at Exeter and Portland that is faded and might have poor retroreflectivity.

Sign at Berkeley and Portland which is faded and has probably lost much of its retroreflectivity.

School Crosswalk Signing and Marking

The signing for school zones is complicated, but it is important to install the signing correctly so that it is legally enforceable.

Part 7 (page 731) in the MUTCD shows illustrations of typical school signing in Figures 7B-2 and 7B-3. Information on the design and location of school zone traffic control specifically for Oregon, and which reflects the latest State school zone laws, is in Chapter 7 of the ODOT Sign Policy which is on the internet at:

http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/english_chapter_7.pdf

Following are two illustrations from the ODOT Sign Policy which show the proper signing for school speed zones at crosswalks. The first illustration (Condition A) shows the signs that should be used for a school crosswalk on a street adjacent to the school grounds. The second illustration (Condition B) shows the signs that should be used for a school crosswalk on a street that is *not* adjacent to the school grounds. For both conditions, the following signs should be used (in the order shown):

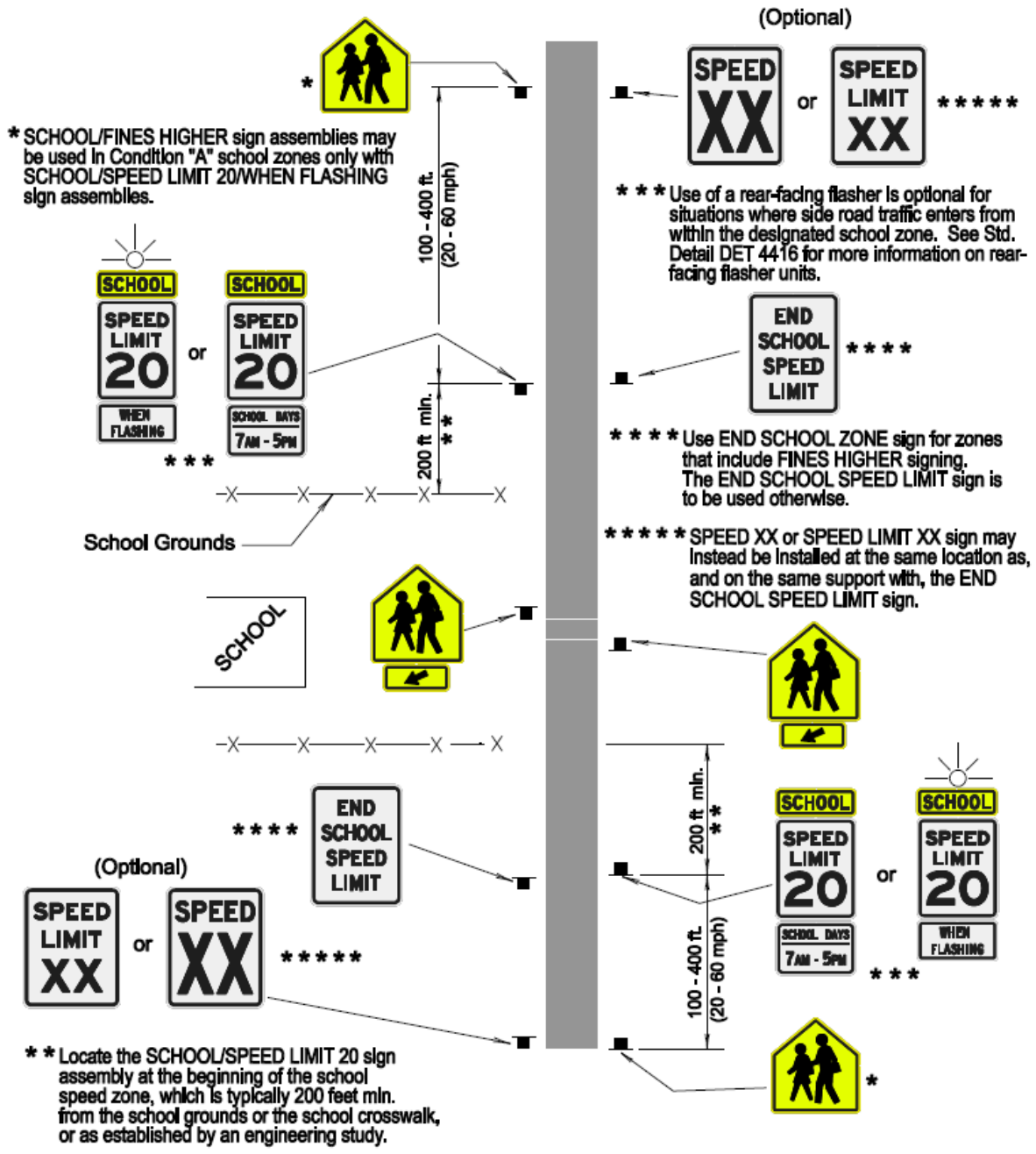
1) A school symbol sign
2) A "SCHOOL SPEED LIMIT 20" sign with a plaque
3) A school symbol sign with a diagonal downward-pointing arrow located at the crosswalk
4) An "END SCHOOL SPEED LIMIT" sign

The only difference between Condition A and Condition B is that under Condition A, where the crosswalk is adjacent to a school, the plaque under the school speed limit sign is "SCHOOL DAYS 7AM TO 5 PM". Under Condition B, where the crosswalk is not adjacent to the school, the plaque is "WHEN CHILDREN ARE PRESENT". As an option, flashing yellow beacons with a plaque with the legend "WHEN FLASHING" can be used with either Condition A or Condition B as a substitute for the other plaques.

Optionally, a "SPEED XX" or "SPEED LIMIT XX" sign may also be used at the end of the school zone (see following illustrations for sign placement details).

All new school warning signs are now required to have a fluorescent yellow-green background color, rather than the yellow color which has been used in the past. It is not necessary to replace the existing yellow school signs until they wear out, but when the school signs are replaced, all the school signs at each school should be replaced at the same time so that there is not a mixture of colors.

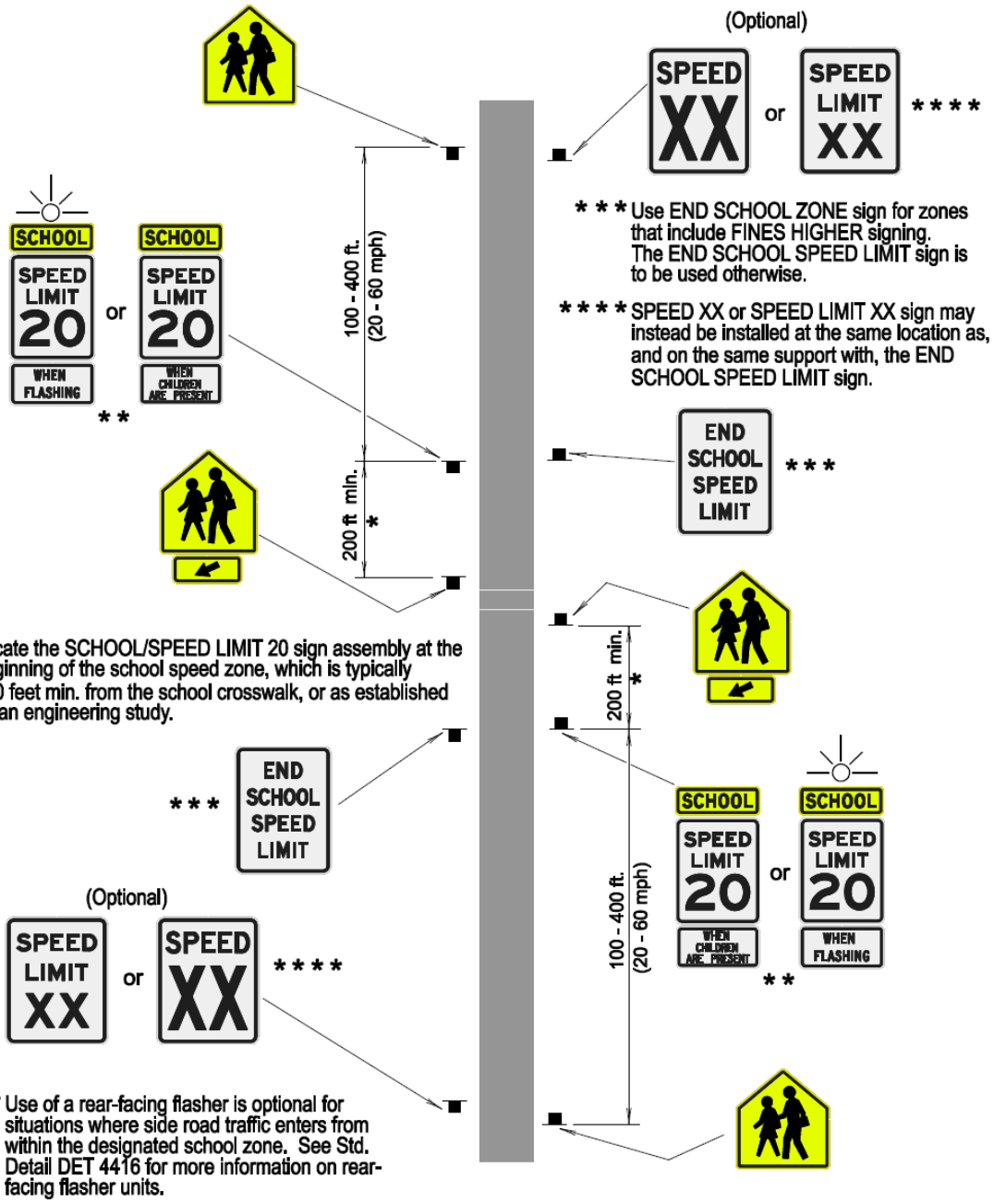
SCHOOL SIGNING
Condition "A" with School Crosswalk
• Adjacent to School Grounds



OREGON DEPARTMENT OF TRANSPORTATION

Approved By: S.T.E.	Date: 5/04	Publication Date: 5/12

SCHOOL SIGNING
Condition "B"
School Crosswalk Not Adjacent To School Grounds



OREGON DEPARTMENT OF TRANSPORTATION

Approved By: S.T.E.	Date: 5/04	Publication Date: 5/12

Portland Ave School Zone

There is a long school zone on Portland Avenue adjacent to Gladstone High School. Included within the school zone are three crosswalks: one near the south end of the football field, a second one near the center of the football field between the two school driveways, and a third at Barclay Street. Because the High School is adjacent to the street, this is Condition A.

As discussed earlier, the first sign in each direction should be a school symbol sign. The use of an AHEAD plaque below this sign is optional, at the discretion of the City.

The second sign should be the SCHOOL SPEED LIMIT 20 sign. Because this is Condition A, the plaque below the SCHOOL SPEED LIMIT 20 sign should have the legend SCHOOL DAYS 7 AM – 5 PM. Both the school symbol sign and the Speed Limit sign should be located prior to the first crosswalk.

The third sign should be a school symbol sign with a diagonal downward-pointing arrow. This sign should be located at each of the three crosswalks.

The fourth sign should be the END SCHOOL SPEED LIMIT sign. This sign should be located opposite the SCHOOL SPEED LIMIT 20 sign for the opposite direction of traffic.

To meet these requirements, some changes to the existing signing will be needed. First, there is no school symbol sign in advance of the school zone. It could be located just north of Abernethy for northbound traffic, and near the south property line of the Public Works Shops for southbound traffic.

Second, there should be a SCHOOL SPEED LIMIT 20 sign with a SCHOOL DAYS 7 AM – 5 PM plaque. This should be located about halfway between Abernethy and the south end of the football field for northbound traffic, and near Nelson Lane for southbound traffic.

Third, there should be a school symbol sign with a diagonal downward-pointing arrow in each direction at each of the three crosswalks. These signs are presently in place, except that the crosswalk sign for southbound traffic at the southernmost crosswalk (at the south end of the football field) is an older-style sign with crosswalk line symbols on the sign.

Within the area of the school zone, there are currently several SPEED 20 signs. Because this is not a business district, this speed limit is probably not enforceable and these signs should be removed. However, with the installation of the SCHOOL SPEED LIMIT 20 signs, the speed limit will be enforceable. North of the school zone the area is residential, and SPEED LIMIT 25 signs would be appropriate. Also, the section of Portland Avenue from Abernethy to Hereford is residential, and SPEED LIMIT 25 signs would be appropriate here. South of Hereford is a business district, and SPEED LIMIT 20 signs would be appropriate and enforceable.

This school crosswalk sign with the diagonal arrow is properly located.
The SPEED 20 sign is probably not enforceable because this is not a business district.

This school crosswalk sign with the diagonal arrow is properly located, but is an older-style sign with crosswalk lines on the sign. When this sign needs to be replaced for maintenance reasons, the current standard (without the crosswalk lines on the sign) should be used.

Nelson Ln and Harvard Ave School Zones

There are several SCHOOL SPEED 20 signs on Fulton Lane east of Portland Avenue and on Harvard Avenue south of Nelson. However, they are not accompanied by the necessary school symbol signs and END SCHOOL SPEED LIMIT signs. To meet the required standards for school zone signing would require several additional signs.

The City has several options for school signing on these streets. One option is to install the required number of signs for a school speed zone, which would mean six signs on Nelson (three in each direction) and six signs on Harvard, for a total of 12 signs.

A second option is to establish a school zone on each street without a school speed limit, since the traffic speeds appear to be very low already. This would require a school symbol sign for each direction of traffic on each of the two streets, which would be a total of four signs.

A third option would be to remove all school zone signing on these two streets. Because traffic volumes and speeds are low on both of these streets, there might not be a need for a school speed zone on these streets.

Webster Rd School Zone

The middle school is located on Webster Road. There are two crosswalks, one near the south end of the school grounds and a second near the north end. There is a school speed zone with flashing lights indicating when the school speed zone is in effect.

The signing here should follow the same signing pattern as discussed for the High School. The first sign in each direction is a school symbol sign, followed by a SCHOOL SPEED LIMIT 20 sign, followed by a school symbol sign with a diagonal arrow at each crosswalk, followed by an END SCHOOL SPEED LIMIT sign.

On Webster Road, the plaque below the SCHOOL SPEED LIMIT 20 sign has the legend WHEN CHILDREN ARE PRESENT OR WHEN LIGHTS ARE FLASHING. Because this is Condition A, with the school grounds adjacent to the street, the WHEN CHILDREN ARE PRESENT legend cannot be used. The plaque should read WHEN FLASHING. There is a supplementary SCHOOL SPEED LIMIT 20 sign midway in the school zone which has the proper WHEN FLASHING legend.

Gloucester St School Zone

There is a school zone on Gloucester Street at Harvard Avenue for the elementary school. The school signing at this location is nearly complete, but a few changes would be necessary to meet current standards.

There is a school symbol sign with an AHEAD plaque in each direction at the beginning of the school zone. Following that is a SCHOOL SPEED 20 sign with SCHOOL DAYS 7 AM – 5 PM. The SCHOOL plaque at the top of this sign is yellow rather than fluorescent yellow-green. When this sign is replaced for maintenance reasons, the fluorescent color should be used. At the crosswalk there is a school symbol sign with a diagonal arrow, but the sign includes crosswalk lines. Again, when this sign is replaced for maintenance reasons, the current standard sign (without crosswalk lines) should be used. At the end of the school, across from the SCHOOL SPEED LIMIT 20 sign for the opposite direction, an END SCHOOL SPEED LIMIT sign should be used. If desired, the END SCHOOL SPEED LIMIT sign can be supplemented with a SPEED LIMIT 25 sign on the same post.

Cason Rd School Zone

On Cason Road at Ohlson Road there is a school zone with a school speed limit. Because the school grounds are not adjacent to Cason Road, a school zone is permitted only if there is a crosswalk (Condition B). If students attending this school cross Cason Road, then a crosswalk should be marked and signed with school crossing signs. If students do not cross here, then the school zone signing should be removed.

Oatfield Rd School Zone

There is a marked crosswalk across Oatfield Road at the intersection with Ridgegate Drive. There is advance signing in each direction on Oatfield with a school symbol sign and an AHEAD plaque. That is followed by a School Speed Limit sign with a WHEN CHILDREN ARE PRESENT plaque and a OR WHEN LIGHTS ARE FLASHING plaque, with flashing lights above the sign. Following that is a pedestrian crossing symbol sign with an AHEAD plaque. At the crosswalk there is a pedestrian crossing symbol sign with a diagonal downward-pointing arrow. There are flashing LED lights embedded within the sign border which are activated when a pedestrian pushes a button.

Although not specifically prohibited by the MUTCD, we think that signing a crosswalk within a school speed zone as a pedestrian crossing rather than as a school crossing is not consistent with the intent of the school zone signing in the Manual and has the potential to be confusing to road users. The 20 mph speed zone would apply at the crosswalk when children are present, but not when adults are present. It's possible that driver uncertainty due to the mixture of school crossing and pedestrian crossing signs could lead to less compliance with the 20 mph school zone.

If the primary intent of the crosswalk is to warn of high volumes of pedestrian crossings at times other than school crossing times, the City could consider removing the school zone signing and leaving the pedestrian crossing signs in place. If the primary purpose of the crosswalk is to provide a school crossing, the City could consider removing the pedestrian crossing signs and replacing them with school crossing signs at the crosswalk. The activated embedded lights could be used in the border of a school crossing sign; the MUTCD specifically allows embedded lights in a school sign. The City might wish to use a time clock so that the embedded lights would flash only when the flashers on the school speed limit sign are activated.

If the City chooses to retain the school crossing, consideration should be given to removing the WHEN CHILDREN ARE PRESENT plaque, and using only a WHEN FLASHING plaque. We believe that it is the intent of the ODOT school zone standard that one or the other of the plaques be used, but not both. The WHEN FLASHING plaque is probably the more effective of the two plaques in reducing vehicle speeds in a school zone.

Looking south on Oatfield near Ridgegate, showing the school zone advance sign, the school speed limit sign with flashers and two plaques, and the pedestrian crossing advance sign.

Location Reviews

STOP Signs

When all approaches to an intersection are controlled by STOP signs, an ALL WAY plaque must be used below each STOP sign. There are some all-way Stops in Gladstone, including Portland Avenue and Clackamas Boulevard, that do not have ALL WAY plaques. Plaques with the legend 4-WAY, such as at Arlington and 82nd Drive, should not be used.

It is not necessary to control every intersection with STOP signs. Intersections with low volumes and low speeds with good sight distance can operate safely without STOP signs. In particular, T-shaped intersections can operate well without STOP signs. State law requires drivers on the stem of the T to yield to drivers on the top of the T, which is consistent with the way most drivers approach T intersections. The disadvantage of over-using STOP signs is that it tends to result in high violation rates of the STOP signs.

When new STOP AHEAD signs are installed, the MUTCD states that they must be symbol signs rather than word message signs. Existing word-message signs can remain in place until they are replaced for maintenance reasons.

At the intersection of Exeter and Cornell, there are CROSS TRAFFIC DOES NOT STOP plaques mounted below the STOP signs. If there is some driver uncertainty as to the stopping requirements for cross traffic, this sign is a good solution. However, when these plaques are replaced for maintenance reasons, the new signs should have black legend on a yellow background.

This is the standard design for this sign in the MUTCD.

This STOP AHEAD sign, located on Ridgegate east of Oatfield, should be on a separate signpost. The City should consider moving the STOP AHEAD sign closer to the STOP sign to which it applies, and replacing it with a Stop Ahead symbol sign.

An example of a Stop Ahead symbol sign on Portland at Exeter. The STOP AHEAD plaque is optional.

When this STOP sign plaque is replaced for maintenance reasons, the new plaque should be black and yellow.

Street Name Signs

With the new 2009 edition of the MUTCD, the standard lettering for street name signs was changed. In the past, all upper-case lettering was used. The new MUTCD states that for local roads with speed limits of 25 mph or less, the lettering height should be composed of initial upper-case letters at least 4 inches in height and lower-case letters at least 3 inches in height. Supplementary lettering to indicate the type of street (such as Street, Avenue, or Road) may be in smaller lettering. For streets with higher speed limits, the upper case should be 6 inches and the lower case 4.5 inches.

The change in lettering style was made because studies found that the new style was more readable than lettering that is all upper case. The change in size requirements for speed limits higher than 25 mph was made in recognition of larger numbers of older drivers.

It is not necessary to replace any existing street name signs to meet the new standards, but all new or replacement signs should meet the new requirements. As with other signs, all street name signs should be retroreflectorized. Sign vendors are aware of the new requirements and should be able to furnish signs and reflective material that meet the new standards.

We also noticed some street name signs with black legend on a white background. When these are replaced, white legend on a green background should be used.

An example of a street name sign using the old standard.

An example of the new street name sign standards.

Sign Mounting Heights

The MUTCD has minimum mounting heights for traffic signs. The minimum mounting heights are intended to prevent signs from being obstructed by weeds and parked cars, and to prevent them from being struck by pedestrians and bicyclists. Higher mounting heights might also discourage vandalism and theft of signs.

The MUTCD specifies minimum mounting heights on page 42. In general, the height from the roadway to the bottom of the sign should be seven feet in urban areas where parking and pedestrian movements are likely to occur, but it can be six feet if there is a secondary sign on the same post. Where there is no parking or pedestrians, the height can be five feet (four feet with a secondary sign on the same post).

We observed several STOP signs in Gladstone with mounting heights of less than seven feet in areas where there are pedestrians, bicyclists, and parked cars.

This Keep Right symbol sign on Ridgegate at Oatfield, should have a minimum mounting height of five ft from the pavement to the bottom of the sign. The KEEP RIGHT plaque is not required. An alternative would be a Type 1 object marker (see page 135 in the MUTCD).

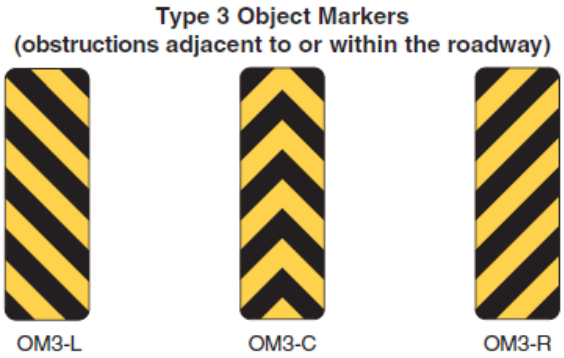
Minimum Sign Sizes

The MUTCD specifies minimum sign sizes for most signs. For STOP signs, the minimum sign size is 30” x 30”. We observed some 24” x 24” STOP signs in Gladstone. It is not necessary to immediately replace any of the existing smaller STOP signs, but as they wear out and are replaced, the new signs should meet the minimum size standard.

The MUTCD also specifies a standard sign size for Speed Limit signs of 24” x 30”. A smaller Speed Limit sign (18” x 24”) is permitted only for low-speed roadways, alleys, and private roads. Many of the existing SPEED and SPEED LIMIT signs in Gladstone are 18” x 24”. When these are replaced, the larger size should be used.

Object Markers

Object markers can be used to mark trees, guardrails, bridge railings, and other objects when they are close to the roadway. For these situations, Type 3 object markers are used. When these markers are used, the stripes should slope down toward the side of the object on which traffic is to pass the obstruction.



This curbed island on Devonshire at Doncaster extends into the roadway. The City may wish to consider the installation of an OM3-R object marker in this island. An OM3-L object marker for traffic in the opposite direction would be optional.

NO OUTLET Signs

DEAD END and NO OUTLET signs are intended for different situations. DEAD END signs are used at the entrance to a single street that terminates in a dead end or a cul-de-sac. NO OUTLET signs are used at the entrance to a street network from which there is no other exit.

As an example of NO OUTLET, traffic entering Windsor Drive from Glen Echo Avenue has no other exit, but drivers can travel on a loop roadway through the neighborhood. The use of DEAD END and NO OUTLET signs is optional at the discretion of the City.

Jersey Street east of Harvard Avenue terminates in a dead end. The DEAD END sign at this location is appropriate, not the NO OUTLET sign.

CHILDREN AT PLAY Signs

We did not observe any “CHILDREN AT PLAY”, “SLOW CHILDREN”, “WATCH CHILDREN”, or “CAUTION CHILDREN” signs in Gladstone. We concur with the City’s policy to avoid the use of these and similar signs. They are not approved by the MUTCD or by ODOT, and their use is discouraged for two reasons. First, they have not been shown to be effective. Studies have found that they have no effect on traffic speeds or on accidents involving pedestrians. Second, the signs may tend to encourage children to play in the street, mistakenly believing that cars will travel slower or more carefully because of the signs. It is also possible that the use of these signs could lead drivers to believe that there will not be children in areas where the signs are not used.

Another problem with this type of sign is that once this sign is installed, other people observe them and request that the signs be installed on additional streets.

Back-to-Back Signs

The MUTCD states that a sign that is mounted back-to-back with a STOP or YIELD sign should stay within the edges of the STOP or YIELD sign. There are some locations in Gladstone, primarily school driveways, where back-to-back mounting occurs and the shape of the STOP sign is obscured. The situation can be remedied by using a bigger STOP sign or by relocating the other sign.

This DO NOT ENTER sign at the Gladstone High School exit driveway obscures much of the STOP sign. The DO NOT ENTER sign could be mounted lower on the post or on a separate post.

Turn and Curve Signs

When a curve has an advisory speed of 30 mph or less, a Turn sign should be used. When a curve has an advisory speed of more than 30 mph, a Curve sign should be used.

Turn Sign

Curve *Sign*

This Curve sign is located on Devonshire Drive south of Paola Court. Because the advisory speed is less than 30 mph, it should be a Turn sign rather than a Curve sign.

Oatfield Rd at Oakridge Dr

We were advised that there have been crashes at the intersection of Oatfield Road and Oakridge Drive involving northbound vehicles on Oatfield leaving the roadway at the Oakridge intersection and striking fixed objects on the outside of the curve.

During our field review we found that there is a crest vertical curve on Oatfield just south of Oakridge. When approaching the intersection in a northbound direction, the striping beyond the hillcrest is not visible to drivers. Prior to the hillcrest, the center line striping and the edge line stripe appear to be turning to the right. After reaching the hillcrest, it becomes apparent that the road actually turns to the left. A driver approaching this intersection at night or under poor visibility conditions, and particularly at high speed, could possibly be misled into thinking that the road is turning to the right, and be unable to safely negotiate the curve to the left. The situation appears to be aggravated by the slight dip in the road at the intersection and by superelevation (banking) in the curve that might not be adequate.

Options for improvement at this location could include continuing the center line and edge line stripes through the intersection as dotted lines, supplementing the center line and edge line stripes with raised pavement markings on the approach to and through the intersection, installing a Turn or Curve sign for northbound traffic with the appropriate advisory speed plaque about halfway between Caldwell and Oakridge, and installing a Large Arrow sign or a series of Chevron signs on the outside of the curve on the north side of the intersection.

We believe that the most effective options for this curve would be the installation of an advance Turn or Curve warning sign with an advisory speed plaque, and the installation of a series of Chevron signs on the far side of the intersection. We would suggest a Chevron sign on the right sign of the Oakridge neighborhood sign (see photo below), a second Chevron on the left side of the Oakridge sign, a third Chevron farther to the left, and possibly a fourth Chevron still farther to the left. If used, the Chevrons should have a minimum mounting height of six feet so that they are visible to drivers prior to reaching the hillcrest.

We recognize that the installation of Chevron signs might detract from the attractiveness of the Oakridge sign and the landscaping, but Chevrons would probably decrease the frequency of repairs of the sign and enhance safety. While at the site, we had a casual conversation with an official of the neighborhood group, and explained our reasoning behind our suggestion for the use of Chevron signs.

Chevron sign.

Looking north on Oatfield south of Oakridge. The road appears to be turning to the right.

Looking north on Oatfield closer to Oakridge. At this point it becomes clear that the road turns to the left.

We suggest that the City consider the installation of a series of Chevron signs on the outside of this curve to provide additional guidance to drivers.

Parking Signs

The general rule in the MUTCD for the design of parking restriction signs is that when parking is prohibited at all times or at specific times, the signs have red legend on a white background. Where only limited-time parking or parking in a particular manner are permitted, the signs have green legend on a white background.

We observed a parking restriction sign in front of the post office on Portland Avenue. There are three parking spaces, and there is a sign located near the middle space that limits parking to 15 minutes. It is not clear whether the sign applies to all three spaces or only the middle space. If the intent is to apply the limit to all three spaces, the City might wish to consider installing a 15 MINUTE PARKING sign at the south end of the block with an arrow pointing to the left, and a 15 MINUTE PARKING sign at the north end of the third space with an arrow to the right. We also noticed that a painted yellow curb extends only halfway through the first parking space.

This sign is located on Berkeley just west of Portland. It is in poor condition, and when it is replaced, it should have red legend on a white background.

These spaces are located in front of the Post Office. It is not clear whether or not the parking limit sign applies to all three spaces. The yellow curb extends into the first space.

McLoughlin Blvd/River Rd/Arlington St

This four-leg intersection is unusual in that the two side streets intersect McLoughlin at an angle, and most of the traffic entering from the side streets turns south onto McLoughlin. We understand that there are some concerns regarding delay, particularly involving westbound left turns from Arlington onto McLoughlin.

We did not have access to traffic volume counts, capacity calculations, or the crash history, and a complete analysis of the intersection is beyond the scope of this review. However, we noted a few items that could be considered if a new intersection analysis is made.

If westbound left-turning drivers and eastbound right-turning drivers each turned into the near lane on McLoughlin, then the two movements could occur simultaneously. To encourage this type of operation, dotted line extensions of the lane lines could be painted through the intersection for these two turning movements. Before implementing this, a careful analysis of the turning movement pathways should be made to ensure that there is sufficient space for these two movements to be made at the same time.

To reduce delays to the westbound left turn and the eastbound right turn, the crosswalk across the south leg of the intersection could be closed. However, due to the presence of apartments west of the intersection and retail destinations in the southeast quadrant of the intersection, the pedestrian volume might be sufficiently high to make a crosswalk closure impractical or undesirable.

On the east leg of the intersection, there are two approach lanes. The left lane is an optional through and left, and the right lane is right-turn only. Through westbound traffic from Arlington to River Road is often delayed behind left-turning cars that are waiting for oncoming traffic to clear. If the lane configuration were changed so that the left lane was for left turns only, and the right lane was an optional through and right, delays for through traffic would be reduced. Before implementing this, a review of turning movement volumes should be made.

On the west leg of the intersection there are also two approach lanes. The left lane is an optional through and left, and the right lane is right-turn only. There is an overhead sign at the intersection indicating that the right lane must turn right, and there is also a post-mounted sign at the intersection indicating that the left lane is through or left, and the right lane is for right turns only. There is no advance signing indicating the lane-use configuration. If any driver uncertainty is observed regarding lane usage, the City could consider installing an additional lane-use control sign in advance of the intersection.

When drivers making the left turn from eastbound on River Road to northbound on McLoughlin are waiting for oncoming traffic to clear, they delay through traffic from River Road to Arlington. If this delay becomes excessive, eastbound left turns could be prohibited at the intersection. An alternative route for this left turn would be the section of Gloucester from River Road to McLoughlin. The intersection of Gloucester and McLoughlin is signalized.

Due to the complexity of this intersection, the City might wish to request an overall intersection analysis by ODOT or by an independent traffic engineering consulting firm. The analysis could consider lane-use designations, the conflict of eastbound right turns with westbound left turns, the feasibility of left-turn phasing on Arlington because of limited sight

distance to oncoming traffic from River Road due to the angle of the approach, and the potential for eliminating the eastbound left turn.

Pedestrian Crossing Signs

In previous editions of the MUTCD, pedestrian crossing signs that were located at the crossing point had a symbol of a pedestrian with pedestrian crosswalk lines on the sign, while advance warning signs did not have the crosswalk lines. The current edition of the Manual has eliminated the crosswalk lines on the sign because the difference was too subtle for most drivers to notice.

The current standard uses the pedestrian symbol sign (without the crosswalk lines) both in advance of the crossing and at the crossing. When the sign is used at the crossing, it must be accompanied by a plaque with a diagonal downward-pointing arrow. When it is used in advance of the crossing, it should have an AHEAD plaque. Existing signs with the crosswalk lines can remain in place until the sign wears out, but its replacement should meet the current standard.

Note also that pedestrian crossing may be fluorescent yellow-green at the option of the City, but there should not be a mixture of yellow and fluorescent yellow-green signs.

The sign on the left, located on River Road at Gloucester, is the old-style sign with the crosswalk lines. The sign on the right is the new style with a diagonal arrow located at the crossing point.

Speed Bumps

We observed the presence of speed bumps on several residential and park streets in Gladstone. They can be an effective speed control device, but they should be properly signed and marked.

Signing for speed bumps is specified in the MUTCD on page 120. The MUTCD states that a SPEED BUMP sign should be used in advance of each bump. If SPEED BUMP signs are used, they should have an advisory speed plaque, but if there is a series of closely-spaced bumps, only the first sign needs to have the advisory speed plaque.

Markings for speed bumps are shown in the MUTCD on page 396. Markings on or in advance of speed bumps are optional, but if they are used, they should conform to the standards in the Manual.

To be effective in controlling speed, it is important to consider both the bump design and the spacing of bumps. For example, a series of closely spaced bumps with a higher design speed (15 to 20 mph) will typically result in better speed control along the length of the street than bumps with a very low design speed (5 to 10 mph) that are based far apart. Also, bumps that are too abrupt can create safety issues with motorcycles, bicycles, and ambulances. When planning speed bumps for speed control, the City might wish to consider consulting with people who have expertise in this area, such as Clackamas County or City of Portland engineering staff or engineering consulting firms. A Google search can provide numerous sources for best practices for speed humps, including publications from ITE, NACTO, and FHWA.

This speed bump is on Stonewood Drive. Markings on speed bumps are optional, but if they are used, they should conform to the markings in the MUTCD.

APPENDIX

1. Document protection
2. Top ten traffic control issues
3. Discussion of discretionary immunity
4. Discussion of discretionary immunity as applied to sign retroreflectivity
5. Guidance on maintaining traffic sign retroreflectivity through visual nighttime inspections
6. Minnesota toolkit for traffic sign retroreflectivity
7. ADA requirements for curb ramps when streets are resurfaced

23 U.S.C.
United States Code, 2011 Edition
Title 23 - HIGHWAYS
CHAPTER 4 - HIGHWAY SAFETY

§409. Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

TOP 10 TRAFFIC CONTROL ISSUES

- ***School Zone Signing:*** Signing for schools is complicated. It is important to follow the ODOT guidance for school zones to be sure that the signing is correct and legally enforceable:

http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/english_chapter_7.pdf

- ***STOP Signs:*** The minimum size of STOP and YIELD signs is 30" x 30".

- ***ALL WAY plaques:*** STOP signs used at all-way Stops must have ALL WAY plaques.

- ***Back-to Back Signs:*** Signs that are large enough to obscure the shape of STOP or YIELD signs may not be placed back-to-back with STOP or YIELD signs.

- ***STOP AHEAD, YIELD AHEAD, and SIGNAL AHEAD Signs:*** New installations of these signs must use symbols, not word legends.

- ***Centerline Striping:*** A single solid yellow centerline cannot be used. A broken yellow line or a double yellow line may be used.

- ***Street Name Signs:*** New street name signs must use upper and lower case legend.

- ***Children at Play, Slow Children, etc:*** These signs are not effective and should not be used.

- ***Yellow Curbs:*** There is no State law prohibiting parking at yellow curbs. Yellow curbs must be supplemented with NO PARKING signs, or there must be a local ordinance prohibiting parking at yellow curbs.

- ***More Than One Sign:*** There should be no more than one primary sign on each sign post. Supplementary signs such as plaques, parking regulations, and advisory speeds may be used on the same post with a primary sign.

DISCRETIONARY IMMUNITY

Are Your Policy Makers and City Counsel Using it Effectively in the Planning Process?

This appendix is based on discussions on risk management relative to highway safety liability. The general concept behind "discretionary immunity" is that the governing body of a jurisdiction must decide the effective and equitable use of their resources to perform all the necessary activities for which they are responsible, be they social, safety, financial, educational, etc. They plan with aid of legal counsel to order, restrict, or exclude activities from their budget and program to achieve jurisdictional objectives.

It may be that city councilors could legally, with the aid of counsel, set a policy to reduce the city's liability for serious safety hazards under "discretionary immunity" where resources are limited.

A county road department may be directed by the County Commission to leave some roads unplowed in the winter, or may be given a list of the priorities on which roads should be plowed and when, recognizing the resources available. The county road department should use its data and expertise to inform and guide the county commissioners to the most cost-effective and equitable program. However, if the final decision and plan resolution are enacted by the county commissioners with guidance from legal counsel, "discretionary immunity" might be claimed.

Another example where "discretionary immunity" might be employed is where there are numerous low volume unsignalized intersections that do not justify the expense of signing. The city council, together with legal counsel, may consider a policy that certain intersections will not be controlled, even though intersection sight distance may be restricted at some times of the year by crops or snow. STOP signs placed at very low volume intersections are frequently violated, and their use is not cost effective at such sites. Consequently, the use of STOP signs at these sites may not be in the public's best interest.

Note: For more information on this concept contact Dave Kramer, Attorney-in-Charge, Trial Division, Oregon Department of Justice.

ENFORCEMENT OF MUTCD RETROFLECTIVITY REQUIREMENTS

Every highway agency or jurisdiction must have implemented a Retroreflectivity Program for Regulatory and Warning Signs by June 13, 2014. The FHWA has proposed five different methods to meet this requirement.

To our knowledge, there is no formal, organized program to assure that jurisdictions have met this requirement. Neither FHWA nor ODOT will review or issue advisory opinions about whether a particular jurisdiction's Retroreflectivity Program satisfies federal or state law.

The resulting challenge for a city, county or other local highway department is that there is no advance "seal of approval" that would prevent or limit the ability of an injured motorist from accusing the department of negligence, in the event of a crash where a sign does not meet retroreflectivity standards. Certainly, if a road department does not establish such a program at all, its liability exposure will dramatically increase.

A jurisdiction may select any one method, or combination of them that have been specified to assure that sign retroreflectivity for a jurisdiction has been maintained. However, none of the methods can assure that each and every sign in the jurisdiction will meet the retroreflectivity standard, as measured by a retroreflectivity meter. That would only be assured if each sign were evaluated with a retroreflectivity meter. So the legal liability of the jurisdiction at a location could be in question if a crash happens at a location at night, and measured retroreflectivity of the sign is less than the standards. In this case, the jurisdiction's defense could rely on the jurisdiction's "Discretionary Immunity."

Discretionary Immunity for Retroreflectivity

There is a significant risk management incentive to follow the MUTCD, including the new provisions about reflectivity. To the extent a state or local government governing body adopts the MUTCD as "policy" for that jurisdiction, then its highway department will likely have "discretionary immunity" against tort claims suggesting that more extensive, and expensive, safeguards should have been in place. Governmental Discretionary Immunity applies when making "spending decisions based on balancing the allocation of scarce public resources with public safety concerns."[1]

> *Governmental discretionary immunity generally applies to choices involving public policy by a person or body who has the responsibility or authority to make such a choice. However, the immunity may not apply to choices a public employee makes as part of the employee's routine job duties.*

Thus, for a jurisdiction to be able to claim Discretionary Immunity for their Retroreflectivity Program with certainty that it will be accepted, the highest decision-making body, i.e., city council or county commission, must review and adopt the Retroreflectivity Program. It is not sufficient for the engineer or maintenance staff to develop and implement the program for Discretional Immunity requirements to be met.

The review must assure the program meets the requirements of one of the potential MUTCD retroreflectivity programs. An assessment of the resources required to implement the selected program must also be made. The council/commission must adopt the program that is affordable within jurisdictional resources and meets the safety objectives for the jurisdiction. This must be done with the knowledge and blessing of the legal counsel for the jurisdiction.

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[1] "Does Governmental Discretionary Immunity Apply when a Public Employee Makes Facility Design Decisions," latest Oregon updates, Smith Freed and Eberhard, P.C.

GUIDANCE ON MAINTAINING TRAFFIC SIGN RETROFLECTIVITY THROUGH VISUAL NIGHTTIME INSPECTIONS

November 2007, Publication No. FHWA-HRT-08-026

The basic concept of an assessment method is that the condition of each individual sign is assessed or evaluated on a periodic basis. The MUTCD does not set specific intervals, but many agencies currently assess their signs every one to two years.

VISUAL NIGHTTIME INSPECTIONS

Visual inspections are perceived to be the most likely means to find nighttime visibility problems with signs. Using this approach, it is possible to assess more than just the retroreflectivity of a sign. Damage, obstructions, poor placement, and other factors that might detract from the nighttime visibility of the sign can be observed. The MUTCD currently includes language that encourages agencies to undertake periodic daytime and nighttime visual inspections. Many agencies already perform some type of periodic sign inspection, although not all inspections are performed at nighttime. This method requires a minimal investment of resources on the part of the agency, although there is a need for a record-keeping system for inspection data and the potential for higher labor costs where overtime pay is required. While visual inspections will reveal night visibility problems not discernible under any other method, they are subjective and hence more difficult to tie to a benchmark value of retroreflectivity. Agencies using visual inspections must establish procedures to provide consistency in inspections. This implies the need for training programs and certification of inspectors to assure consistency of inspections. Inspection procedures should address the type of vehicle used, type of headlamps on the inspection vehicle, headlamp aiming, and age and visual acuity of the inspector(s).

Background

Probably the most common type of sign maintenance program is the visual inspection method. Guidelines have been available for at least 50 years concerning the details of how to conduct a proper nighttime sign inspection. While there are some concerns about the reliability of the visual nighttime inspection, research has shown that trained inspectors can do a reasonable job of determining which signs need to be replaced because of inadequate retroreflectivity.

The visual inspection technique uses trained personnel to observe traffic signs during the nighttime to assess the overall appearance of a sign and determine if it meets the required minimum retroreflectivity level. The observation is typically done through the windshield of the vehicle at or near the speed limit of the roadway.

The key to this method is having trained inspectors. While there is no nationally-recognized training course or certification for sign inspectors, agencies should provide some form of training before sign inspections are performed. One way to perform the training is to have the inspectors observe sample signs at a variety of known retroreflectivity levels before conducting the inspections. Training helps facilitate an inspector’s ability to discern sign retroreflectivity levels that are at the minimum levels prior to conducting inspections. Preferably, there should be sample signs that are at or near the minimum retroreflectivity levels associated with each sign type and color. The inspector should view the sample signs under similar

conditions to those under which inspections will be performed. This includes using the appropriate vehicle and placing the sample signs at typical positions that will be encountered during an inspection. For this method to be effective, the training must prepare the inspector in advance, using correct sample signs that represent retroreflectivity levels at or near the MUTCD minimum retroreflectivity levels.

Procedures

The usual method of inspecting signs at night is to use a two-person crew. While the driver focuses on the driving task, the passenger evaluates the signs and records the appropriate information. An alternative to a two-person crew is to use one person with a tape recorder or camcorder. If an inventory is available, signs that have been knocked down or missing for some other reason can be identified during the nighttime inspection. If no inventory exists, an inventory of existing signs can be created while conducting the nighttime inspection, but it may not account for missing signs. A nighttime inspection procedure can be performed without a sign inventory.

The nighttime visual inspection method should only use the low-beam headlamps of the vehicle as the source of illumination for the signs. The interior light of the vehicle should remain off to the extent feasible. The inspection should be performed at highway speeds and from the travel lanes and not the shoulder. As the vehicle approaches the sign, the sign's overall appearance in terms of brightness and legibility is assessed. Usually the sign is given a rating defined by the agency. At a minimum, the scale should include three designations: good, fair, and poor. The inspector records the information for each sign and the rating that it is given. Signs rated as poor should be scheduled for replacement as soon as possible. Depending on the inspection schedule, signs rated as fair can be noted as requiring attention during the next set of scheduled inspections or can be identified for additional assessment, such as measurement at a later date using a handheld retroreflectometer.

The vehicle and inspector combination should be selected to provide a conservative estimate of sign retroreflectivity. The increased sales of pickup trucks and sport utility vehicles, which result in larger observation angles, make these types of vehicles appropriate for use in many regions. Relatively new vehicles, with visually/optically aimable (VOA) headlamps, should be considered. Ideally, the inspector should be older, with nighttime visual capabilities similar to older drivers. The vision of the inspector should be tested to ensure that it is within the legal limits of the State. It is important that an agency develop consistent guidelines to decrease the subjectivity of inspections. For instance, some items to consider are procedures to clean the headlamps and windshield before each night of inspections and to periodically check the headlamp aiming. A procedure to check the headlamp aim of VOA headlamps is provided in the following pages.

Headlamp Aiming Procedure.

What you will need:

- A level area with a distance of approximately 25 ft plus the length of the vehicle from a flat lightly colored wall
- A tape measure
- Masking tape

Instructions:

Park the vehicle so that the headlamps are precisely 25 ft from a flat lightly colored wall. The vehicle should have at least ½ of a tank of gas and should be loaded as it would be when inspecting signs. This includes the weight of the driver (and passenger present).

Measure the exact middle of both the windshield and rear window, and mark them with strips of tape, creating vertical centerlines, front and rear.

Standing behind the car, sight along the centerlines, and have an assist mark the position of the vehicle centerline on the wall with a vertical strip of tape.

Measure the distance between the vehicle centerline and the headlamp lenses. Mark that distance to the right and left of the centerline on the wall with vertical strips of tape.

Measure the height of each headlamp from the ground (measuring to the center of the lens). Using those measurements, place horizontal strips of tape on the wall where the vertical strips have been applied. There should now be two crosses on the wall, with centers that correspond to the center of each headlamp lens.

For headlamps with a left-side cutoff (VOL), mark a horizontal line that is 2.1 inches below the headlamp centers with a horizontal strip of tape. For headlamps with a right-side cutoff (VOR), mark a horizontal line that runs through the headlamp centers.

Turn the vehicle headlamps on low beam. The left edge of the bright spots on the wall should just touch the vertical bars of the crosses. The top edge of the strongest gradient of light should just touch the horizontal line. Adjust the headlamp aim per manufacturer's instructions, if required.

Probably the most important element of the nighttime inspection is documenting the process and results. This can be done with a voice or video recorder, or even with paper and pencil. Whichever method is selected, it is important that inspections are properly documented and archived to provide tort protection.

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. The inspection plans should include specific routings to ensure full coverage of the road network and that the inspections can be safely conducted with the levels of traffic on the road. A variety of practices exist for documenting inspection results and initiating actions to replace signs that are at or near the minimum levels.

Concerns

One concern associated with nighttime visual inspections is that it is the most subjective of all the methods. Another concern is funding overtime pay to conduct the inspections during late-evening or early-morning hours. It is also important that inspectors are properly trained.

Linking Nighttime Visual Inspections to Minimum Retroreflectivity Levels

Minimum retroreflectivity levels are incorporated into this method by training the inspectors and using procedures that allow them to correlate their observations through the use of sample signs. A good practice is for inspectors to observe the sample signs prior to each inspection run. The use of appropriate sample signs at or near minimum retroreflectivity levels is a key element to training that links the nighttime visual inspection method to the minimum retroreflectivity levels.

Advantages and Disadvantages

One of the major benefits of using the visual inspection method is that it has the least administrative and fiscal burden of all the methods. Many agencies already perform some type of periodic sign inspection, although not all inspections are performed at night. This method also has a unique feature in that the signs are viewed in their natural surroundings. Thus, the overall appearance of the sign and the ability of the sign to provide information to the driving public can be assessed.

Another advantage of the visual inspection method is that it has the lowest level of sign replacement and sign waste. Only those signs identified as needing to be replaced because of low retroreflectivity levels are replaced, assuming that the inspection frequency is appropriate. With management methods, it is probable that some signs will be replaced before their full life is achieved. This may imply that the visual inspection method (as compared to the measured retroreflectivity method) maximizes sign life.

While this method may be more subjective than other methods, research has shown that trained observers can reasonably and repeatedly detect signs with marginal retroreflectivity. There is some risk involved while doing these inspections, particularly if the driver is also the evaluator and recorder. Ideally, nighttime inspections should be conducted with two people for safety reasons.

Minnesota Department of Transportation

RESEARCH SERVICES

Office of Policy Analysis, Research & Innovation

Sign Retroreflectivity A Minnesota Toolkit

Mike Marti, Primary Author
SRF Consulting Group

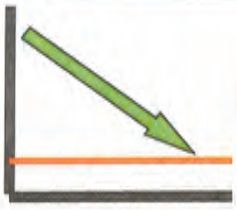
June 2010

Research Project
Final Report #2010RIC02

LRRB
LOCAL ROAD RESEARCH BOARD

Your Destination...Our Priority

Summary of Sign Retroreflectivity Maintenance Methods

				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
ASSESSMENT METHODS	Visual Procedures	Calibration Signs	Note: Insert photo of variety signs hanging on a fence (use signs I have in depot)			(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
MANAGEMENT METHODS	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/border), 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 on 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.

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

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.

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

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:

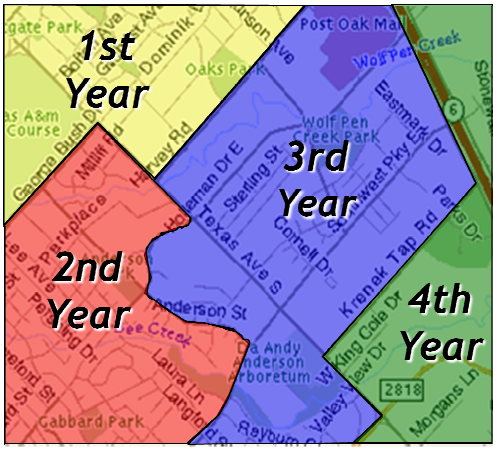
- Can easily identify when signs need to be replaced.
- Can measure sign retroreflectivity at the end of the expected sign life to confirm if the sign life estimate for that type of sign is accurate or not. Adjusting expected sign life based on these reading could create a cost savings if it is found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

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 <u>all</u> 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 agencies 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.

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	
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	171465.709	
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/Vandelized/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			
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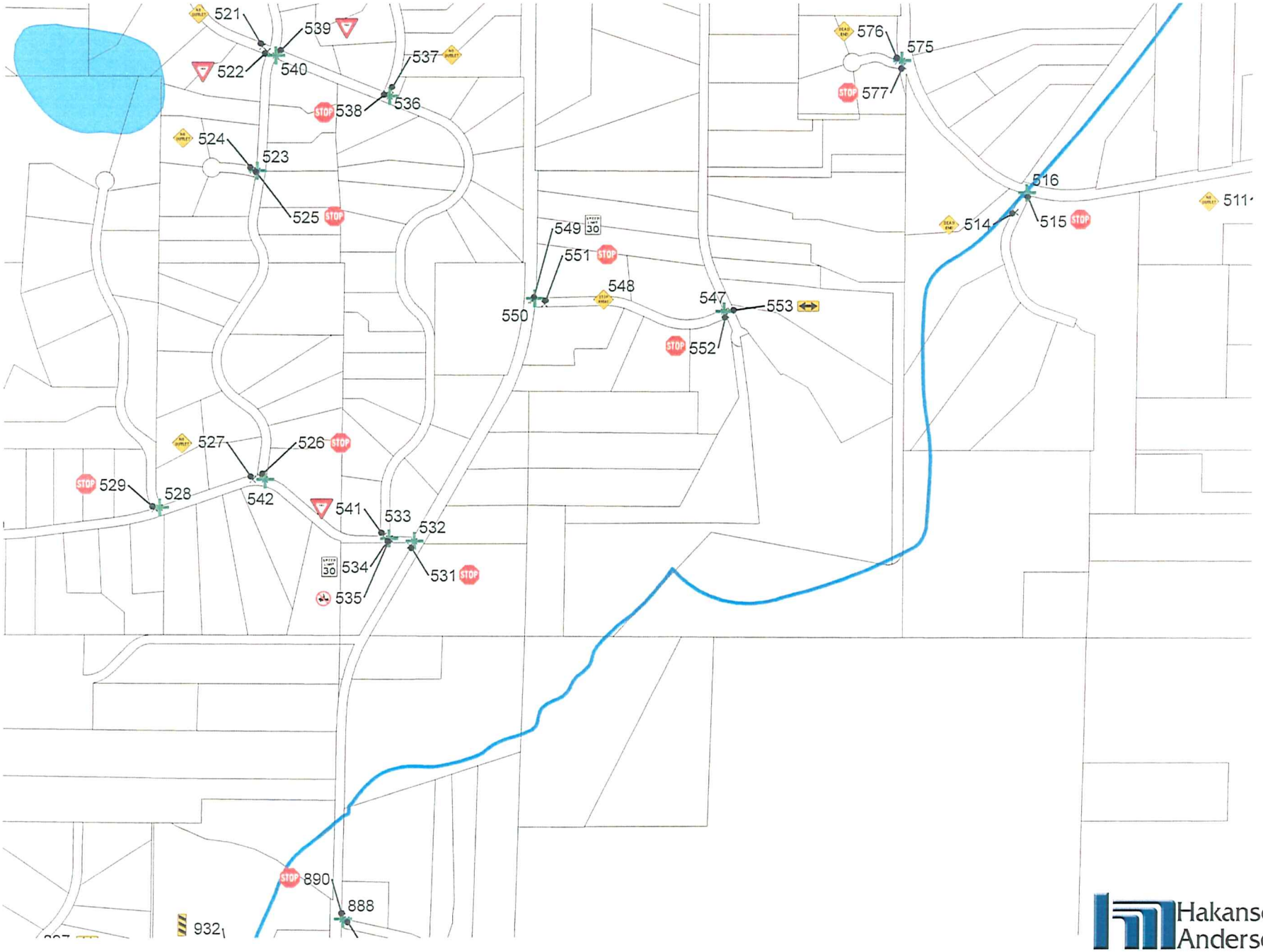
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			
				N A P	F M A			

Visual Daytime Condition
N = New or near new
A = Adequate Appearance
P = Poor Condition/Vandelized/Damaged

Sign Retroreflectivity
F = Fail
M = Marginal
A = Adequate



Hakanson Anderson

Generic Township - Sign Inventory Map Example

Township Traffic Sign
Field Inventory Report

Sign ID No.		Township Name		Sign Owner	
Sign Code		Sign Width (inches)		County Name	
Sign Legend		Sign Height (inches)			
				Installation Date	
Route		Direction Sign is Facing			
Reference Point		Substrate		Sign Manufacturer	
Reference Pt. Dist. (FT)		Sheeting Material			
GPS Latitude		Sign Condition		Comments	
GPS Longitude		Mounting Height (FT)			
		Offset (FT)			
Inspected By					
Date Inspected		Sign Structure Type			
Reason Inspected		Structure Condition			

Sign Maintenance History

Date	Inspector Name	Action Required	Comments

Sign Inventory and Inspection Collection Sheet

Page ___ of ___

Route: _____ Date: _____

Starting Point: _____ Observer: _____

Travel Direction: _____ Sheet #: _____

Meter Reading	Position	Offset	MnMUTCD Code	Orient	Size	Sheeting	Backing	Posts	Post Type	Date	Comments	Condition
	R O L											E G F P
	R O L											E G F P
	R O L											E G F P
	R O L											E G F P
	R O L											E G F P
	R O L											E G F P
	R O L											E G F P
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	R O L											E G F P
	R O L											E G F P
	R O L											E G F P
	R O L											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 _____

SUMMARY OF US DEPARTMENT OF JUSTICE AND US DEPARTMENT OF TRANSPORTATION REQUIREMENTS FOR CURB RAMPS WHEN STREETS ARE RESURFACED

https://www.ada.gov/doj-fhwa-ta.htm

Title II of the Americans with Disabilities Act (ADA) requires that state and local governments ensure that persons with disabilities have access to the pedestrian routes in the public right of way. An important part of this requirement is the obligation whenever streets, roadways, or highways are *altered* to provide curb ramps where street level pedestrian walkways cross curbs. This requirement is intended to ensure the accessibility and usability of the pedestrian walkway for persons with disabilities.

An alteration is a change that affects or could affect the usability of all or part of a building or facility. Alterations of streets, roads, or highways include activities such as reconstruction, rehabilitation, *resurfacing*, widening, and projects of similar scale and effect. Maintenance activities on streets, roads, or highways, such as filling potholes, are not alterations.

Without curb ramps, sidewalk travel in urban areas can be dangerous, difficult, or even impossible for people who use wheelchairs, scooters, and other mobility devices. Curb ramps allow people with mobility disabilities to gain access to the sidewalks and to pass through center islands in streets. Otherwise, these individuals are forced to travel in streets and roadways and are put in danger or are prevented from reaching their destination; some people with disabilities may simply choose not to take this risk and will not venture out of their homes or communities.

Because resurfacing of streets constitutes an alteration under the ADA, it triggers the obligation to provide curb ramps where pedestrian walkways intersect the resurfaced streets. This obligation has been discussed in a variety of technical assistance materials published by the Department of Justice beginning in 1994. Over the past few years, state and local governments have sought further guidance on the scope of the alterations requirement with respect to the provision of curb ramps when streets, roads or highways are being resurfaced. These questions have arisen largely due to the development of a variety of road surface treatments other than traditional road resurfacing, which generally involved the addition of a new layer of asphalt. Public entities have asked the Department of Transportation and the Department of Justice to clarify whether particular road surface treatments fall within the ADA definition of alterations, or whether they should be considered maintenance that would not trigger the obligation to provide curb ramps. This Joint Technical Assistance addresses some of those questions.

Where must curb ramps be provided?

Generally, curb ramps are needed wherever a sidewalk or other pedestrian walkway crosses a curb. Curb ramps must be located to ensure a person with a mobility disability can travel from a sidewalk on one side of the street, over or through any curbs or traffic islands, to the sidewalk on the other side of the street. However, the ADA does not require installation of ramps or curb ramps in the absence of a pedestrian walkway with a prepared surface for pedestrian use. Nor are curb ramps required in the absence of a curb, elevation, or other barrier between the street and the walkway.

When is resurfacing considered to be an alteration?

Resurfacing is an alteration that triggers the requirement to add curb ramps if it involves work on a street or roadway spanning from one intersection to another, and includes overlays of additional material to the road surface, with or without milling. Examples include, but are not limited to the following treatments or their equivalents: addition of a new layer of asphalt, reconstruction, concrete pavement rehabilitation and reconstruction, open-graded surface course, micro-surfacing and thin lift overlays, cape seals, and in-place asphalt recycling.

What kinds of treatments constitute maintenance rather than an alteration?

Treatments that serve solely to seal and protect the road surface, improve friction, and control splash and spray are considered to be maintenance because they do not significantly affect the public's access to or usability of the road. Some examples of the types of treatments that would normally be considered maintenance are: painting or striping lanes, crack filling and sealing, surface sealing, chip seals, slurry seals, fog seals, scrub sealing, joint crack seals, joint repairs, dowel bar retrofit, spot high-friction treatments, diamond grinding, and pavement patching. In some cases, the combination of several maintenance treatments occurring at or near the same time may qualify as an alteration and

would trigger the obligation to provide curb ramps.

What if a locality is not resurfacing an entire block, but is resurfacing a crosswalk by itself?

Crosswalks constitute distinct elements of the right-of-way intended to facilitate pedestrian traffic. Regardless of whether there is curb-to-curb resurfacing of the street or roadway in general, resurfacing of a crosswalk also requires the provision of curb ramps at that crosswalk.

QUESTIONS & ANSWERS

Q1: ***When a pavement treatment is considered an alteration under the ADA and there is a curb ramp at the juncture of the altered road and an existing sidewalk (or other prepared surface for pedestrian use), but the curb ramp does not meet the current ADA Standards, does the curb ramp have to be updated to meet the current ADA Standards at the time of the pavement treatment?***

A1: It depends on whether the existing curb ramp meets the appropriate accessibility standard that was in place at the time it was newly constructed or last altered.

When the Department of Justice adopted its revised title II ADA Regulations including the updated ADA Standards for Accessible Design[1], it specified that "(e)lements that have not been altered in existing facilities on or after March 15, 2012, and that comply with the corresponding technical and scoping specifications for those elements in either the 1991 Standards or in the Uniform Federal Accessibility Standards (UFAS) … are not required to be modified in order to comply with the requirements set forth in the 2010 Standards." As a result of this "safe harbor" provision, if a curb ramp was built or altered prior to March 15, 2012, and complies with the requirements for curb ramps in either the 1991 ADA Standards for Accessible Design (1991 Standards, known prior to 2010 as the 1991 ADA Accessibility Guidelines, or the 1991 ADAAG) or UFAS, it does **not** have to be modified to comply with the requirements in the 2010 Standards. However, if that existing curb ramp did not comply with either the 1991 Standards or UFAS as of March 15, 2012, then the safe harbor does not apply and the curb ramp must be brought into compliance with the requirements of the 2010 Standards concurrent with the road alteration.

Note that the requirement in the 1991 Standards to include detectable warnings on curb ramps was suspended for a period between May 12, 1994, and July 26, 1998, and again between December 23, 1998, and July 26, 2001. If a curb ramp was newly constructed or was last altered when the detectable warnings requirement was suspended, and it otherwise meets the 1991 Standards, the ADA does not require that the curb ramp be modified to add detectable warnings in conjunction with a road resurfacing alteration project. *See* Question #14 however, for a discussion of the DOT Section 504 requirements, including detectable warnings.

Q2: ***The Joint Technical Assistance states that "[r]esurfacing is an alteration that triggers the requirement to add curb ramps if it involves work on a street or roadway spanning from one intersection to another, and includes overlays of additional material to the road surface, with or without milling." What constitutes "overlays of additional material to the road surface" with respect to milling, specifically, when a roadway surface is milled and then overlaid at the same height (i.e., no material is added that exceeds the height of what was present before the milling)?***

A2: A project that involves milling an existing road, and then overlaying the road with material, regardless of whether it exceeds the height of the road before milling, falls within the definition of "alteration" because it is a change to the road surface that affects or could affect the usability of the pedestrian route (crosswalk). Alterations require the installation of curb ramps if none previously existed, or upgrading of non-compliant curb ramps to meet the applicable standards, where there is an existing pedestrian walkway. *See* also Question 8.

Q3: ***If a roadway resurfacing alteration project does not span the full width of the road, do I have to put in curb ramps?***

A3: It depends on whether the resurfacing work affects a pedestrian crosswalk. If the resurfacing affects the crosswalk, even if it is not the full roadway width, then curb ramps must be provided at both ends of the crosswalk.

Public entities should not structure the scope of work to avoid ADA obligations to provide curb ramps when resurfacing a roadway. For example, resurfacing only between crosswalks may be regarded as an attempt to circumvent a public

entity's obligation under the ADA, and potentially could result in legal challenges.

If curb ramp improvements are needed in the vicinity of an alteration project, it is often cost effective to address such needs as part of the alteration project, thereby advancing the public entity's progress in meeting its obligation to provide program access to its facilities. *See* Question 16 for further discussion.

Q4: ***When a road alteration project triggers the requirement to install curb ramps, what steps should public (State or local) entities take if they do not own the sidewalk right-of-way needed to install the required curb ramps?***

A4: The public entity performing the alteration is ultimately responsible for following and implementing the ADA requirements specified in the regulations implementing title II. At the time an alteration project is scoped, the public entity should identify what ADA requirements apply and whether the public entity owns sufficient right-of-way to make the necessary ADA modifications. If the public entity does not control sufficient right-of-way, it should seek to acquire the necessary right-of-way. If a complaint is filed, the public entity will likely need to show that it made reasonable efforts to obtain access to the necessary right-of-way.

Q5: ***The Joint Technical Assistance is silent on when it becomes effective. Is there an effective date for when States and local public entities must comply with the requirements discussed in the technical assistance?***

A5: The Joint Technical Assistance, as well as this Supplement to it, does not create any new obligations. The obligation to provide curb ramps when roads are altered has been an ongoing obligation since the regulation was initially adopted in 1991. This technical assistance was provided to respond to questions that arose largely due to the development of a variety of road surface treatments, other than traditional road resurfacing, which generally involved the addition of a new layer of asphalt. Although the Joint Technical Assistance was issued on July 8, 2013, public entities have had an ongoing obligation to comply with the alterations requirements of title II and should plan to bring curb ramps that are or were part of an alteration into compliance as soon as possible.

Q6: ***Is the curb ramp installation work required to be a part of the Plans, Specifications and Estimate package for an alteration project or can the curb ramp work be accomplished under a separate contract?***

A6: The curb ramp installation work can be contracted separately, but the work must be coordinated such that the curb ramp work is completed prior to, or at the same time as, the completion of the rest of the alteration work.

Q7: ***Is a curb ramp required for a sidewalk that is not made of concrete or asphalt?***

A7: The Joint Technical Assistance states that "the ADA does not require installation of ramps or curb ramps in the absence of a pedestrian walkway with a prepared surface for pedestrian use." A "prepared surface for pedestrian use" can be constructed out of numerous materials, including concrete, asphalt, compacted soil, decomposed granite, and other materials. Regardless of the materials used to construct the pedestrian walkway, if the intent of the design was to provide access to pedestrians, then curb ramps must be incorporated where an altered roadway intersects the pedestrian walkway.

Q8: ***If an existing curb ramp is replaced as part of a resurfacing alteration, is there an obligation to address existing obstacles on the adjacent sidewalk at the same time?***

A8: No. The Joint Technical Assistance addresses those requirements that are triggered when a public entity alters a roadway where the roadway intersects a street level pedestrian walkway. Public entities are required to address other barriers on existing sidewalks, such as steep cross slopes or obstructions, as part of their on-going program access and transition plan obligations and in response to requests for reasonable modifications.

Q9: ***Several pavement preservation treatment types are not listed in the technical assistance. If the treatment type is not specifically on the list of maintenance treatments, is it an alteration?***

A9: New treatments are always being developed and the best practice is for the City or other local public entity conducting the work, the State transportation agency, and FHWA to work together to come to an agreement on a reasonable determination of whether the unlisted treatment type is an alteration or maintenance and document their decisions. If the new treatment can be deemed to be the equivalent of any of the items listed as alterations, it is a reasonable interpretation that they are in fact alterations and should be treated as such.

Q10: ***When does a combination of two or more 'maintenance' treatments rise to the level of being an alteration?***

A10: The list of the pavement types that are considered maintenance, as stated in the 2013 Joint Technical Assistance document, are Chip Seals, Crack Filling and Sealing, Diamond Grinding, Dowel Bar Retrofit, Fog Seals, Joint Crack Seals, Joint Repairs, Pavement Patching, Scrub Sealing, Slurry Seals, Spot High-Friction Treatments, and Surface Sealing. The combination of two or more maintenance treatments may rise to the level of being an alteration.

The best practice is for the City or other local public entity conducting the work, the State transportation agency, and FHWA to work together to come to an agreement on a reasonable determination, document their policies, and apply that determination consistently in their locality.

Q11: ***When will utility trench work require compliance with ADA curb ramp requirements?***

A11: The answer to this question depends on the scope and location of the utility trench work being done. If the utility trench work is limited to a portion of the pavement, even including a portion of the crosswalk, repaving necessary to cover the trench would typically be considered maintenance and would not require simultaneous installation or upgrading of curb ramps. Public entities should note that the ADA requires maintenance of accessible features, and as such, they must ensure that when the trench is repaved or other road maintenance is performed, the work does not result in a lesser level of accessibility. If the utility work impacts the curb at a pedestrian street crossing where no curb ramp exists, the work affecting the curb falls within the definition of "alteration," and a curb ramp must be constructed rather than simply replacing the curb.

If a public entity is unsure whether the scope of specific trench work and repair/repaving constitutes an alteration, the best practice is for the public entity to work together with the State transportation agency and the FHWA Division to come to an agreement on how to consistently handle these situations and document their decisions.

Q12: ***Is full-depth pavement patching considered maintenance?***

A12: The answer to this question depends on the scope and location of the pavement patch. If the pavement patch work is limited to a portion of the pavement, even including a portion of the crosswalk, patching the pavement would typically be considered maintenance and would not require simultaneous installation or upgrading of curb ramps. Public entities should note that the ADA requires maintenance of accessible features, and as such, they should ensure that when the pavement is patched or other road maintenance is performed, the work does not result in a lesser level of accessibility. If the pavement patching impacts the curb at a pedestrian street crossing where no curb ramp exists, the work affecting the curb falls within the definition of "alteration," and a curb ramp must be constructed rather than simply replacing the curb.

If a public entity is unsure whether the scope of specific full-depth pavement patching constitutes an alteration, the best practice is for the public entity to work together with the State transportation agency and the FHWA Division to come to an agreement on how to consistently handle these situations and document their decisions.

Q13: ***Do any other requirements apply to road alteration projects undertaken by public entities that receive Federal financial assistance from DOT either directly or indirectly, even if such financial assistance is not used for the specific road alteration project at issue?***

A13: Yes, if a public entity receives any Federal financial assistance from DOT whether directly or through another DOT recipient, then the entity must also apply DOT's Section 504 requirements even if the road alteration project at issue does not use Federal funds.

The revised DOT Section 504 regulation also provided a "safe harbor" provision (similar to the ADA provision discussed in Question 1) that applies to curb ramps that were newly constructed or altered by entities receiving Federal financial assistance from DOT and that were in compliance with the 1991 ADAAG requirements prior to November 29, 2006. If the "safe harbor" applies, these curb ramps are still considered compliant and do not have to be modified to add detectable warnings unless they are altered after November 29, 2006.

The Section 504 safe harbor does not apply, however, if, at the time of the road alteration project, the existing curb ramp does not comply with the 1991 ADAAG and at that time it must be brought into compliance with the current DOT requirements (2004 ADAAG) including detectable warnings.

Q14: ***Does the Section 504 safe harbor apply to curb ramps built in compliance with 1991 ADAAG during the time***

period when the requirement for detectable warnings was suspended and the roadway is now being resurfaced where it intersects the pedestrian walkway?

A14: If the curb ramps that were built or altered prior to November 29, 2006 were fully compliant with 1991 ADAAG at the time that the detectable warnings requirements were suspended, then the DOT Section 504 safe harbor applies to them and the recipient does not have to add detectable warnings as a result of a resurfacing project.

Q15: ***In addition to the obligations triggered by road resurfacing alterations, are there other requirements that trigger the obligation to provide curb ramps?***

A15: In addition to the obligation to provide curb ramps when roads are resurfaced, both DOJ's title II ADA regulation and DOT's Section 504 regulation (applicable to recipients of DOT Federal financial assistance), require the provision of curb ramps if the sidewalk is installed or altered at the intersection, during new construction, as a means of providing program accessibility, and as a reasonable modification under title II or a reasonable accommodation.

New Construction and Alterations

DOJ's ADA regulation provides that newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway. In addition, the regulation provides that newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads, or highways. These curb ramps must comply with the 2010 Standards.

Program Accessibility

Both DOJ's title II ADA regulation and DOT's Section 504 regulation require that public entities/recipients operate each service, program, or activity so that the service, program, or activity, when viewed in its entirety, is readily accessible to and usable by individuals with disabilities. This obligation, which is known as providing "program accessibility," includes a requirement to evaluate existing facilities in the public right-of-way for barriers to accessibility, including identifying non-existent or non-compliant curb ramps where roads intersect pedestrian access routes (sidewalks or other pedestrian walkways). After completing this self-evaluation, a public entity/recipient must set forth a plan for eliminating such barriers so as to provide overall access for persons with disabilities.

Since March 15, 2012, the DOJ regulation requires the use of the 2010 Standards for structural changes needed to provide program access. However, in accordance with the ADA safe harbor discussed in Question 1, if curb ramps constructed prior to March 15, 2012 already comply with the curb ramp requirements in the 1991 Standards, they need not be modified in accordance with the 2010 Standards in order to provide program access, unless they are altered after March 15, 2012.

Similarly, DOT's Section 504 "safe harbor" allows curb ramps that were newly constructed or altered prior to November 29, 2006, and that meet the 1991 ADAAG to be considered compliant. Elements not covered under the safe harbor provisions may need to be modified to provide program access and should be incorporated into a program access plan for making such modifications.

Under Section 504, self-evaluations and transition plans should have been completed by December 29, 1979. Under the ADA, transition plans should have been completed by July 26, 1992, and corrective measures should have been completed by January 26, 1995. While these deadlines have long since passed, entities that did not develop a transition plan prior to those dates should begin immediately to complete their self-evaluation and develop a comprehensive transition plan.

Reasonable Modification /Accommodation

In addition to alteration and program accessibility obligations, public entities may have an obligation to undertake curb ramp construction or alteration as a "reasonable modification/accommodation" in response to a request by, or on behalf of, someone with a disability. Such a request may be made to address a non-compliant curb ramp outside of the schedule provided in the public entity's transition plan. A public entity must appropriately consider such requests as they are made.

1 The 2010 Standards can be found on DOJ's website at http://www.ada.gov/2010ADAstandards_index.htm.