

SAFETY AND ACCESSIBILITY OF DYNAMIC MESSAGE SIGNS (DMS)

FINAL REPORT

August 2014

Submitted by

Janice R. Daniel, Ph.D. and Wei Hao, Ph.D.
Department of Civil and Environmental Engineering
New Jersey Institute of Technology
University Heights, Newark, NJ 07102-1982

Thomas Schumacher, Ph.D., P.E.
Investigator/Assistant Professor
University of Delaware
Department of Civil and Environmental Engineering
Newark, Delaware 19716



NJDOT Research Project Manager
Edward Stephen Kondrath

In cooperation with

New Jersey
Department of Transportation
Bureau of Research
and
U.S. Department of Transportation
Federal Highway Administration

DISCLAIMER STATEMENT

“The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the New Jersey Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation”.

1. Report No. FHWA-NJ-2014-016	2. Government Accession No.	3. Recipient's Catalog No.			
4. Title and Subtitle Safety and Accessibility of Dynamic Message Signs (DMS)		5. Report Date August 2014			
		6. Performing Organization Code			
7. Author(s): Daniel, Janice R., Hao, Wei and Thomas Schumacher		8. Performing Organization Report No.			
9. Performing Organization Name and Address Department of Civil and Environmental Engineering New Jersey Institute of Technology University Heights Newark, NJ 07102-1982		10. Work Unit No.			
		11. Contract or Grant No. NJDOT 2013 – 09			
12. Sponsoring Agency Name and Address <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> N.J. Department of Transportation 1035 Parkway Avenue P.O. Box 600 Trenton, NJ 08625-0600 </td> <td style="width: 50%;"> Federal Highway Administration U.S. Department of Transportation Washington, D.C. 20590 </td> </tr> </table>		N.J. Department of Transportation 1035 Parkway Avenue P.O. Box 600 Trenton, NJ 08625-0600	Federal Highway Administration U.S. Department of Transportation Washington, D.C. 20590	13. Type of Report and Period Covered Final Report July 2013 – August 2014	
		N.J. Department of Transportation 1035 Parkway Avenue P.O. Box 600 Trenton, NJ 08625-0600	Federal Highway Administration U.S. Department of Transportation Washington, D.C. 20590		
14. Sponsoring Agency Code					
15. Supplementary Notes					
16. Abstract <p>The MUTCD provides guidance on the installation of permanent DMSs considering factors such as: identifying locations to enable road users to select alternate routes or take other appropriate actions; factors related to safety and avoiding driver overload. No guidance, however, is provided to ensure the safety and accessibility to overhead DMSs for the required regular maintenance of these signs. Occupational Safety and Health Standards (OSHA) Part 1910.23 provides standards on "Walking-Working Surfaces" which should be adhered to by employees accessing DMSs. The standards require that catwalks include handrails capable of supporting 200 lbs. of force, with means of egress be from/to permanent or stationary structures. Although DMSs in New Jersey are now designed to meet OSHA requirements for employee access of overhead signs during maintenance, older generation signs exist with limited or no safe access. For some older generation signs, walkways are not provided in accordance with OSHA regulations, may not be wide enough or may be loose and not properly supported. In addition, for some older DMS signs, hand-rails may not meet OSHA standards and although gates in front of the sign are provided, these gates can be loose or do not close.</p> <p>In this research, an evaluation of all older sign designs was performed to identify safe maintenance practices and to develop engineering solutions or alternative solutions to allow employees to safely access overhead DMSs in New Jersey. An inspection of one hundred and seventy locations throughout the State of NJ was performed to ensure that New Jersey staff will be able to safely perform maintenance on DMSs in the future.</p>					
17. Key Words DMS, dynamic message signs, sign maintenance		18. Distribution Statement No Restrictions.			
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No of Pages 116	22. Price		

ACKNOWLEDGEMENTS

The authors would like to acknowledge the support of the New Jersey Department of Transportation (NJDOT) including the Project Manager Edward Stephen Kondrath and Camille Crichton-Sumners, Manager of the Bureau of Research. The authors thank the Research Selection and Implementation Panel members including: Anthony Pellegrino and Angelo Nucci. These individuals offered valuable comments and suggestions on the research resulting in an improved product.

TABLE OF CONTENTS

Page

INTRODUCTION.....	1
RESEARCH OBJECTIVES	2
RESEARCH APPROACH.....	2
SUMMARY OF LITERATURE REVIEW	3
SUMMARY OF DMS ACCESSIBILITY INSPECTION.....	6
Inspection Details	7
Overview of Inspection Results.....	7
SUMMARY OF DMS SAFETY ASSESSMENT AND RATING.....	12
Minimum Standards for Catwalks	12
Minimum Standards for Utility Lines Adjacent to DMS	15
Minimum Standards for Accessibility	17
STRUCTURAL INSPECTION OF CATWALKS ON SIGN STRUCTURES	20
Background.....	20
Comments on Selected Catwalks.....	23
Disclaimer	23
RECOMMENDATIONS.....	24
Installation of Catwalks.....	24
Installation of Catwalk and Replacement of Sign Support	26
Replacement of Existing Catwalks.....	27
Modification of Existing Catwalks.....	30
Catwalk Not Recommended	32
<u>Front Access DMS</u>	<u>32</u>
<u>Ground Mounted and Butterfly DMS</u>	<u>35</u>

Install Parking Pad.....	35
Relocation of Utility Lines.....	37
REFERENCES.....	45
APPENDIX I: ASSESSMENT OF MINIMUM STANDARDS FOR CATWALKS.....	46
APPENDIX II: ASSESSMENT OF MINIMUM STANDARDS FOR UTILITY LINES	56
APPENDIX III: ASSESSMENT OF MINIMUM STANDARDS FOR ACCESS	66
APPENDIX IV: RECOMMENDATIONS FOR IMPROVING SAFETY AND ACCESSIBILITY	76

List of Figures	Page
Figure 1. Span Structure (Edison, NJ).....	4
Figure 2. Cantilever Sign Structure (Woodbridge, NJ)	4
Figure 3. Butterfly Sign Structure (Newark, NJ)	4
Figure 4. Ground Mounted Structure (Wall, NJ)	4
Figure 5. Catwalk with Safety Rails in Collapsed Position.....	5
Figure 6. Catwalk with Safety Rails in Upright Position	5
Figure 7. Examples of Ground Mounted and Butterfly DMS.....	13
Figure 8. Presence of Catwalk Safety Features at DMSs	14
Figure 9. Accessibility Features at DMS.....	18

List of Tables	Page
Table 1. DMS Inspection Form.....	8
Table 2. Location of Inspected DMSs by County	9
Table 3. Location of Inspected DMSs by Route	9
Table 4. Support Types of Inspected DMSs.....	10
Table 5. Front/Side Access by DMS Type.....	10
Table 6. Number of DMSs with Catwalks	11
Table 7. Presence of Catwalk Safety Feature	11
Table 8. DMS Rating for Minimum Standards for Catwalks	14
Table 9. DMS Not Meeting the Minimum Standards for Catwalks.....	15
Table 10. DMSs Not Meeting Minimum Standards for Utility Lines	16
Table 11. DMS Rating for Minimum Standards for Utility Lines.....	17
Table 12. DMS Rating for Minimum Standards for Access	19
Table 13. Element condition rating according to (FHWA 2005).....	20
Table 14. Condition State Descriptions for Catwalks (FHWA 2005).....	21
Table 15. Condition states according to the 'Manual for Bridge Element Rating'	22
Table 16. Summary of selected catwalks with issues and proposed actions.	23
Table 17. DMS Recommendations by Priority.....	41
Table 18. Assessment of Minimum Standards for Catwalks	46
Table 19. Assessment of Minimum Standards for Utility Lines.....	56
Table 20. Assessment of the Minimum Standards for Access	66
Table 21. Recommendations for Improving Safety and Access to DMS	76

INTRODUCTION

The Manual of Uniform Traffic Control Devices (MUTCD, 2012), defines dynamic message signs (DMSs) (or changeable message signs) as "...a traffic control device that is capable of displaying one or more alternative messages". Both permanent and portable DMSs are used to provide messages related to: Incident management and route diversion; warning of adverse weather conditions; travel times; and other types of warning situations. DMSs may also be used by State and local highway agencies to display safety messages, transportation-related messages, emergency homeland security messages, and America's Missing: Broadcast Emergency Response (AMBER) alert messages.

Section 2L.06 of the MUTCD provides guidance on the installation of permanent DMSs. The factors to be considered include: identifying locations to enable road users to select alternate routes or take other appropriate actions; factors related to safety and avoiding driver overload. No guidance, however, is provided to ensure the safety and accessibility to overhead DMSs for the required regular maintenance of these signs.

Occupational Safety and Health Standards (OSHA) Part 1910.23 provides standards on "Walking-Working Surfaces" which should be adhered to by employees accessing DMSs. The standards require that catwalks include handrails capable of supporting 200 lbs. of force, with means of egress be from/to permanent or stationary structures. Although DMSs in New Jersey are now designed to meet OSHA requirements for employee access of overhead signs during maintenance, older generation signs exist with limited or no safe access. For some older generation signs, walkways are not provided in accordance with OSHA regulations, may not be wide enough or may be loose and not properly supported. In addition, for some older DMS signs, hand-rails may not meet OSHA standards and although gates in front of the sign are provided, these gates can be loose or do not close.

In this research, an evaluation of all older sign designs was performed to identify safe maintenance practices and to develop engineering solutions or alternative solutions to allow employees to safely access overhead DMSs in New Jersey. NJDOT has developed procedures for accessing and maintaining the newest signs. The research determined if these procedures can also be used for the older signs or if revised procedures are needed. An inspection of one hundred and seventy locations throughout the State of NJ was performed to ensure that New Jersey staff will be able to safely perform maintenance on DMSs in the future.

RESEARCH OBJECTIVES

The overall objective of the proposed research is to perform an evaluation of all older DMS designs to allow employees to safely access overhead DMSs.

Specific objectives to be accomplished in this research include:

- To perform a systematic inspection of the approximately one hundred and seventy DMSs located in the State of New Jersey to determine the safety and accessibility for maintenance of the signs;
- To assess whether existing procedures used for accessing newer signs can also be used for the older signs or whether revised procedures are needed; and
- To identify safe work practices and develop engineering solutions or alternative solutions to allow employees to safely access overhead DMSs.

RESEARCH APPROACH

The tasks performed to achieve the objectives include the following:

PHASE I – Conduct a literature search of state-of-practice

PHASE II – Research Approach

Task II-1: Develop Research Exit Criteria.

Task II-2: Preliminary Data Gathering

Task II-3: Perform DMS Accessibility Inspection

Sub-Task II-3.1: Identify Procedural Approach

Sub-Task II-3.2: Prepare Inspection Schedule

Sub-Task II-3.3: Perform Training of Inspectors

Sub-Task II-3.4: Perform Inspection

Task II-4: Perform DMS Safety Assessment

Task II-5: Prepare DMS Database

Task II-6: Prepare quarterly and final reports.

SUMMARY OF LITERATURE REVIEW

Little previous research could be found on the safety and accessibility of DMSs. Literature on the maintenance of these signs, however, has primarily been in the form of manuals related to structural inspection of highway sign supports. These manuals provide some guidance not just on the structural inspection, but on safe procedures for accessing the signs.

DMSs may be accessed using several approaches including: through the use of a bucket lift; using ladders that may be part of the sign support or brought to the location; through climbing the sign support structure; as well as several other approaches. The accessibility to DMSs varies depending on several factors including: the type of DMS, manufacturer specifications, sign location and presence of a catwalk. The following provides a general overview of some of the factors influencing safety and accessibility of these signs.

The accessibility of DMSs is influenced by the sign support structure. New Jersey uses four types of overhead DMS support structures including: span, cantilever, butterfly and ground mounted. These structures typically consist of steel tubular posts (or columns) combined with space trusses which support the DMS. Figures 1, 2, 3, and 4 show examples of span, cantilever, butterfly and ground mounted DMS types, respectively, used in New Jersey. A span support extends over the roadway with supports on both sides of the roadway. A cantilever DMS extends over the travel lanes and has a support on only one side of the roadway. A butterfly consists of a single vertical steel post and one or two pairs of horizontal steel tubes. Ground mounted DMSs are the front access DMSs mounted on two posts with a 7' minimum clearance under the bottom of the sign.

The NJDOT *ITS Interim Design Guidelines* provides information on the sign support selection for DMS. The type of DMS used is dependent on the functional classification of the roadway for which it is used. For arterial/land service highways, ground mounted DMSs are preferred. For interstates/freeways with wide enough medians, Butterfly sign structure with front access DMSs in the median are preferred. Over lane DMSs must be considered for the following conditions: when there are three or more lanes in each direction; when the local/express lane splits; or if there are other special traffic patterns.

The accessibility of the DMS will be impacted by the make and model of the DMS and how access is provided for maintenance of the unit. A great variety exists in the specification of DMSs between manufacturers and also between models of the same manufacturer. Access to the DMS can be provided using either a walk-in design, a front-access design or a rear-access.

Route 1 NB,1203221,MP 30.90



Figure 1. Span Structure (Edison, NJ)

Route 17 NB,0212203,MP 6.71



Figure 2. Cantilever Sign Structure (Woodbridge, NJ)

Route 21 NB,3157,MM:2.8



Figure 3. Butterfly Sign Structure (Newark, NJ)

Route 138 WB, MP 2



Figure 4. Ground Mounted Structure (Wall, NJ)

Section 30 of the *New Jersey Design Manual for Bridges and Structures* provides design criteria on “Sign and VMS/DMS Support Structures (Overhead and Cantilever)”. Included in the design criteria are guidelines regarding the placement of DMSs which has impact on the accessibility of these signs. One guideline is to place DMSs outside traffic lanes where possible to allow the use of front-access type cabinets. If the DMS must be placed over traffic lanes, then walk-in type cabinets are required.

NJDOT specifications for walk-in DMSs provide guidance on how service access shall be provided. Service access is provided through a vertically hinged access door located on the left and right sides of the DMS housing. Included in the specifications is the need for OSHA compliant safety rail assembly for each door in the display. In addition, the DMS cabinet must be equipped with an OSHA compliant anchor point at each entrance location for the connection of a personal fall arrest system. The anchorage points must be located just inside the access door and must be strong enough to withstand a force of 5,000 lb, as required by OSHA.

Catwalks or walkways are important features in assessing the accessibility to the DMS. Figures 5 and 6 show two views of catwalks for static overhead signs. The figures show components of the catwalk that impact safety including the use of grates, presence of a handrail and safety chains. Figure 5 shows the catwalk with safety rails in a collapsed position. This type of collapsible safety rail is also used with DMSs in New Jersey. Figure 6 shows the safety rails in an upright position.



Figure 5. Catwalk with Safety Rails in Collapsed Position (Source: WSDOT, Structure Inspection Manual Part 4)



Figure 6. Catwalk with Safety Rails in Upright Position (Source: WSDOT, Structure Inspection Manual Part 4)

SUMMARY OF DMS ACCESSIBILITY INSPECTION

The major portion of this research was to perform an in-situ assessment of the safety and accessibility of DMSs in New Jersey. The assessment included first gathering information about the DMSs in the field and then using the field data to perform the assessment. The DMS accessibility inspection was performed under four subtasks:

- Sub-Task II-3.1: Identify Procedural Approach
- Sub-Task II-3.2: Prepare Inspection Schedule
- Sub-Task II-3.3: Perform Training of Inspectors
- Sub-Task II-3.4: Perform Inspection

Inspection Procedure

In the first sub-task, an approach for visiting the site and inspecting the accessibility of the DMS was developed. The inspection did not include climbing or mounting the DMS support structure or the use of a bucket truck, but instead involved a nearby visual inspection of the access to the DMS. Although the elements to be inspected remained consistent for each DMS, the inspection procedure varied depending on where the DMS was located and the ability of the research team to safely inspect the DMS access. Each inspection visit was documented with digital photos and notes.

The inspection procedure involved the following:

1. Arrive at the site.
2. Determine if safe parking is available adjacent to the DMS.
3. If no safe parking exists adjacent to the DMS, take a photo of the DMS and environs.
4. If safe parking is available, safely exit the travel way and make visual connection with the DMS and the support structure.
5. Identify DMS Number on the structure.
6. Confirm previously obtained information about the DMS.
7. Perform inspection gathering information from the inspection sheet.
8. Review the inspection results to verify report is complete and correct.
9. Take digital pictures of the DMS, support structure and environs.
10. Leave site.

Inspection Details

To ensure the sign-inventory was completed in a timely manner, a schedule for visiting the locations was developed. The schedule was based on completing the sign-inventory over a 3 to 4-month time period. The inspection began in September 2013 and was completed in November 2013. Inspectors were trained to gather the data needed at the locations in a safe and thorough manner. The training involved first providing guidance to the inspectors on the features of the DMS and the location of these features; the terminology being used; and on safety procedures. The training included field visits to the DMS to train the inspectors on identifying the accessibility features of the DMS. The tools used by the DMS inspectors included: digital camera; measuring wheel; binoculars; clip board; and safety vests.

A copy of the inspection sheet is provided in Table 1. In addition to providing information about the location of the DMS, the inspection form answered questions about: road characteristics; DMS features; catwalk; traffic control; and about structural condition of the DMS safety features, including the catwalk. Using the procedural approach and inspection schedule developed, inspection of the DMSs accessibility was performed. The inspection was performed from a ground level position. For this reason, although it may be possible to see whether a safety feature is present, it was not always possible to determine the condition of the feature. It was not possible to determine if safety features were loose or improperly secured.

Digital pictures were taken of each DMS. The intent was to take pictures from standard views including:

- Frontal view showing entire structure, number of lanes, shoulder presence/width
- Close-up view of DMS and catwalk (frontal view)
- Close-up view of DMS and catwalk (from under sign)
- Showing the base of structure
- DMS No.

Summary sheets showing the results of the inspection of each DMS were prepared and provided in the document "Safety and Accessibility of Dynamic Message Signs: Inspection Data – May, 2014".

Overview of Inspection Results

Location

In total, inspections were performed at 171 DMSs in 19 counties in New Jersey. As shown in Table 2, a majority of inspected DMSs are located in the northern and middle portion of the state. Table 3 shows the location of the inspected DMSs by Route. Over

forty percent (43%) of the inspected DMSs are located on Interstate roadways and the remainder on State routes.

Table 1. DMS Inspection Form

LOCATION	
Surveyor _____ County _____ DMS ID Number _____	Date _____ Municipality _____ Route Direction _____
Route _____ Milepost _____	
ROADWAY CHARACTERISTICS	
No. of Lanes by Dir. _____ Shoulder Present? _____ No. of Lanes Under Sign _____	Speed Limit _____ Approx. Width of Shoulder _____
DMS ACCESS FEATURES	
Support Type: <input type="checkbox"/> Span <input type="checkbox"/> Cantilever <input type="checkbox"/> Butterfly <input type="checkbox"/> Ground Mounted <input type="checkbox"/> Unclassified _____	Anchorage Point Location: <input type="checkbox"/> Front <input type="checkbox"/> Side <input type="checkbox"/> Back <input type="checkbox"/> Other _____ <input type="checkbox"/> None observed <input type="checkbox"/> Unknown
Access Service Door Location: <input type="checkbox"/> Front <input type="checkbox"/> Side <input type="checkbox"/> Back <input type="checkbox"/> Unknown	Access to DMS Obtained From: <input type="checkbox"/> Bucket Truck <input type="checkbox"/> Portable Ladder <input type="checkbox"/> Other _____ <input type="checkbox"/> Unknown
Model/Manufacturer _____	
CATWALK/WALKWAY	
Catwalk provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown Hand Railings provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown Safety Chain provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Kickplate provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown Grate provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown Approximate Width of Catwalk _____
TRAFFIC CONTROL	
No. of Lanes Need to be Closed to Access DMS: <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 or More	Location for Maintenance Personnel to Park: <input type="checkbox"/> Shoulder <input type="checkbox"/> Travel Lane <input type="checkbox"/> Median <input type="checkbox"/> Off-Road
Does Maintenance Personnel need to cross active Roadway to Access DMS? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Landing Pad provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown Parking Platform provided? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
OTHER	
Any visible corrosion (rust) or discoloration to catwalk or handrail? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Any visible dents or deformations to catwalk or handrail? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
Are power lines located above or adjacent to the DMS? <input type="checkbox"/> Yes, Above <input type="checkbox"/> Yes, Adjacent <input type="checkbox"/> No <input type="checkbox"/> Unknown	
NOTES	

Table 2. Location of Inspected DMSs by County

County	No of DMSs	County	No of DMSs
Atlantic	1	Middlesex	17
Bergen	17	Monmouth	14
Burlington	12	Morris	15
Camden	16	Ocean	5
Cape May	1	Passaic	8
Cumberland	2	Passaic	1
Essex	17	Somerset	9
Gloucester	9	Union	9
Hudson	10	Warren	2
Mercer	6		

Table 3. Location of Inspected DMSs by Route

Route	No. of DMSs	Route	No. of DMSs	Route	No. of DMSs
00000295__	16	00000009__	4	00000022__	1
00000001__	15	00000017__	4	00000023__	1
00000080__	15	00000021__	4	00000024__	1
00000287__	15	0000073__	4	00000030__	1
00000078__	13	00000444__	4	00000072__	1
00000036__	9	00000037__	3	00000130__	1
00000046__	9	00000070__	3	00000138__	1
00000195__	6	00000095__	3	00000139__	1
00000003__	5	00000010__	2	00000202__	1
00000018__	5	00000038__	2	0000322__	1
00000042__	5	00000076__	2	00000440__	1
00000055__	5	00000004__	1		
00000280__	5	00000007__	1		

DMS Types and Features

Table 4 shows the distribution of DMSs by support type. Of the DMSs inspected, 11 percent were butterfly, 36 percent cantilever, 26 percent span and 29 percent ground mounted DMS. The largest number of DMSs are cantilever type support representing

36 percent of the DMSs inspected. The smallest number of DMSs inspected were butterfly type support representing 11 percent of inspected DMSs.

Table 4. Support Types of Inspected DMSs

DMS Support Type	Number	Percent
Butterfly	19	11.1%
Cantilever	59	34.5%
Span	44	25.7%
Ground Mounted	49	28.7%
Total	171	

Access to the DMSs for maintenance is provided either through a side access door or from the front of the DMS. Table 5 shows the distribution of side and front access by DMS type. In general, butterfly and ground mounted DMSs provide access through the front of the DMS. Cantilever DMS provide access to the side. Span DMSs provide access both through the side and front, however, a larger portion of the span DMSs provide access to the side.

Table 5. Front/Side Access by DMS Type

DMS Type	Side Access		Front Access	
	No.	Percent	No.	Percent
Butterfly	1	5.3%	18	94.7%
Cantilever	55	93.2%	4	6.8%
Span	34	77.3%	10	22.7%
Ground Mounted	0	0.0%	49	100.0%
Total	90	52.6%	81	47.4%

Catwalk

One of the inspection items was whether a catwalk was present and if so were the safety features of the catwalk present. As shown in Table 6, the inspection found over half (53%) of the DMSs inspected did not have a catwalk. However, over half of DMSs not having a catwalk were ground mounted DMSs. No ground mounted DMS had a catwalk. The other type of DMS not having a catwalk were the butterfly DMSs. About 84 percent of butterfly DMSs did not have a catwalk.

Table 6. Number of DMSs with Catwalks

	Catwalk Provided		No Catwalk	
	No.	Percent	No.	Percent
Butterfly	3	15.8%	16	84.2%
Cantilever	46	78.0%	13	22.0%
Span	31	70.5%	13	29.5%
Ground Mounted	0	0.0%	49	100.0%
Total	80	46.8%	91	53.2%

Four safety features were inspected to determine if they were present at the catwalk. These features included: kickplate, hand railings, grate and safety chain. Table 7 shows the number and percent of inspected DMSs with these features. Over ninety percent of the inspected DMSs have hand railings and grates. About 65 percent of DMSs have a kickplate. None of the DMSs inspected had a safety chain.

Table 7. Presence of Catwalk Safety Feature

Catwalk Feature	Present		Not Present	
	No.	Percent	No.	Percent
Kickplate	52	65.0%	28	35.0%
Hand Railings	73	91.3%	7	8.8%
Grate	78	97.5%	2	2.5%
Safety Chain	0	0.0%	80	100.0%

SUMMARY OF DMS SAFETY ASSESSMENT AND RATING

The primary objective of this research is to assess whether existing procedures used for accessing newer signs can also be used for the older signs or whether revised procedures are needed. To assist in performing the assessment, criteria were developed to identify minimum standards that should exist at each DMS to be deemed safe for access. Minimum standards were developed for three areas: (1) Minimum standards for catwalks; (2) Minimum standards for utility lines adjacent to DMS; and (3) Minimum standards for accessibility. All three criteria would need to be satisfied to state the DMS had safe access for maintenance personnel.

In addition to applying the minimum standards to each inspected DMS, a rating of the DMS for safety and accessibility was determined for each of the three areas of assessed. Four ratings were used as follows:

Rating	Description
0	Minimum standards are not met. Limited opportunity to improve accessibility.
1	Minimum standards are partially met. Recommendations exist to improve accessibility.
2	Minimum standards are met.
3	Not used at this type DMS.

The following provides an overview of the minimum standards for each of the three areas. The results of applying these standards are then provided.

Minimum Standards for Catwalks

To be deemed safe for access, catwalks must meet the following standards:

- Transfer points or anchorage points are provided allowing employees to transfer from the aerial lift to the catwalk; and
- Catwalk meets OSHA 29 CFR 1910.23 standards including the provision of: a standard railing system, kickplate, 28 inch minimum width of the crosswalk; adequate strength to support weight of all individuals/equipment; and has a self-closing gate.

In New Jersey, ground mounted and butterfly type DMSs are typically not provided with a catwalk. Figure 7 shows a typical ground mounted and butterfly DMS support. As shown in Table 4, 19 DMSs are butterfly and 49 DMSs are ground mounted. Applying

the minimum standards for catwalks at these type DMSs would result in these DMSs being identified as having unacceptable accessibility.



Ground Mounted DMS
ID 138 Route 138 WB, MP 2



Butterfly DMS
ID 31 Route 17 NB, MP 8.4

Figure 7. Examples of Ground Mounted and Butterfly DMS

Access to ground mounted and butterfly type DMSs, however, may be provided either through the use of a ladder or through the use of a bucket truck. For this reason, the minimum standards for catwalks are not applied to butterfly and ground mounted DMSs.

Assessment of Minimum Standards for Catwalks

The minimum standards for catwalks were applied to the inspected DMS. Six items were included in the assessment of catwalks including:

- Presence of a handrail
- Presence of a grate
- Presence of a kickplate
- Whether the catwalk is structurally sound
- Whether an anchorage point is accessible
- Whether a hinged gate is provided.

Appendix I provides the results of applying these standards. The table indicates “Y” if the safety feature is provided, “N” if the safety feature is not provided and “-“ if the safety feature has historically not been used in New Jersey. Of those DMS with a catwalk, 48 or 58.5% of the DMS had all six of the safety features, 18 percent had five of the features, and 23 percent had four or less of the features. Figure 8 shows the percentage of catwalks with each of the safety features. Almost all of the catwalks are

provided with a handrail (98.8%) and 100 percent are provided with a grate. The safety feature most missing from the catwalks are kickplates, with 67 percent of the catwalks having this feature, and a hinged gate, with 69.5% of catwalks with this feature.

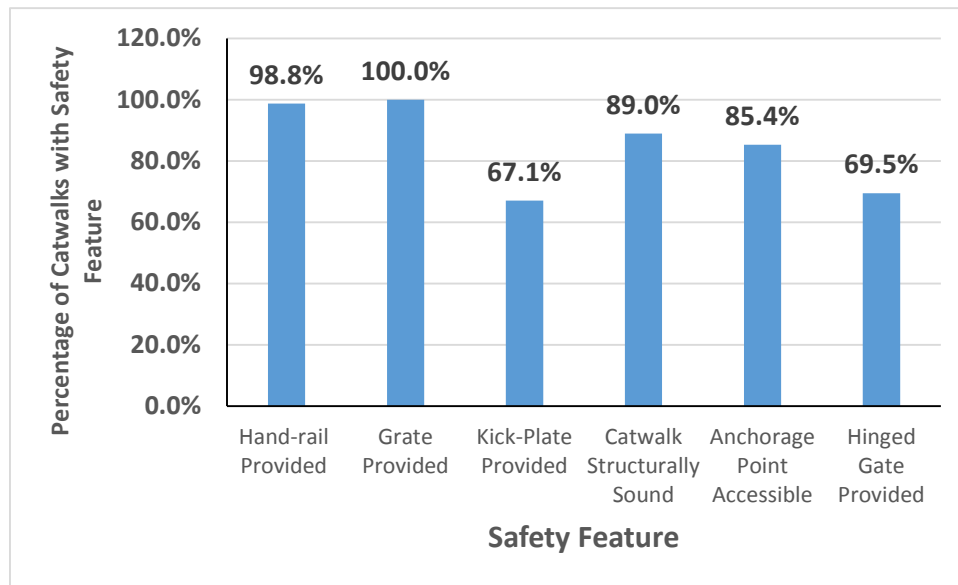


Figure 8. Presence of Catwalk Safety Features at DMSs

Using the rating scheme, a rating indicating whether the DMS met the minimum standards for catwalks was determined and is shown in Appendix I. Table 8 summarizes these ratings. The minimum standards for catwalks were found to be met at 53 or approximately one-third (31%) of the DMSs. For a small portion of the DMS (17%), part of the standards are met. For 23, or 13.5% of the DMSs, the standards are not met and these DMS received a rating of 0. These locations where the standards are not met are cantilever and span DMSs where no catwalk is provided. Table 9 provides a list of these locations. Rating 3 applies to butterfly and ground-mounted DMS where catwalks are not traditionally used at this type of DMS in New Jersey.

Table 8. DMS Rating for Minimum Standards for Catwalks

Rating	Description	Number of DMS	Percent of DMS
0	Standards not met	23	13.5%
1	Standards partially met	29	17.0%
2	Standards are met	53	31.0%
3	Not used at this type DMS	66	38.6%

Table 9. DMS Not Meeting the Minimum Standards for Catwalks

ID No.	DMS Type	Route	ID No.	DMS Type	Route
1	Cantilever	00000001__	111	Span	00000078_W
13	Span	00000001__	114	Span	00000078__
22	Cantilever	00000007__	115	Span	00000078_W
33	Cantilever	00000017_S	116	Span	00000078_W
54	Span	00000030_W	121	Cantilever	00000080__
59	Cantilever	00000036__	130	Span	00000080__
78	Cantilever	00000046__	186	Cantilever	00000440__
81	Cantilever	00000046_W	187	Cantilever	00000444__
84	Cantilever	00000046__	188	Cantilever	00000444_S
88	Span	00000055_S	189	Span	00000444__
93	Cantilever	00000070_W	190	Span	00000444_S
98	Cantilever	00000073__			

Minimum Standards for Utility Lines Adjacent to DMS

Utility lines within close proximity of DMSs can limit the safe access to these signs and pose serious dangers to maintenance personnel. For this reason, minimum standards for utility lines adjacent to DMSs were also developed. The criteria used to identify acceptable location of utility lines included the following:

- Maintain a vertical distance between utility lines and maintenance personnel standing in an aerial lift of approximately 10 feet;
- Maintain a horizontal distance between utility lines and DMS large enough for bucket truck to access DMS, or approximately 20 feet.

Assessment of Minimum Standards for Utility lines

The minimum standards were applied to the inspected DMSs. Two items were included in the assessment of utility lines including whether the DMS is:

- Influenced by utility line in the vertical direction
- Influenced by utility line in the horizontal direction.

The minimum standards were applied to the inspected DMS. In total, twelve or 7 percent of inspected DMSs were influenced both vertically and horizontally by utility lines. Two DMS were only influenced horizontally. Table 10 provides a list of the DMS

Table 10. DMSs Not Meeting Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility Lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
8	Span	00000001__	Union	Y	Y	0
16	Ground Mounted	00000003__	Passaic	Y	Y	0
28	Ground Mounted	00000010__	Morris	Y	Y	0
29	Ground Mounted	00000010_W	Morris	Y	Y	0
32	Cantilever	00000017_S	Bergen	Y	Y	0
33	Cantilever	00000017_S	Bergen	N	Y	1
51	Butterfly	00000023__	Passaic	Y	Y	0
65	Ground Mounted	00000036_S	Monmouth	Y	Y	0
78	Cantilever	00000046__	Morris	Y	Y	0
81	Cantilever	00000046_W	Passaic	Y	Y	0
83	Cantilever	00000046_W	Bergen	Y	Y	0
84	Cantilever	00000046__	Bergen	N	Y	1
85	Cantilever	00000046__	Bergen	Y	Y	0
186	Cantilever	00000440__	Hudson	Y	Y	0

influenced by utility lines. The table indicates “Y” if utility lines influence the safety and accessibility of the DMS or “N” if there is no influence.

Using the rating scheme, a rating indicating whether the DMS met the minimum standards for utility lines was determined and is shown in Appendix II. The minimum standards for utility lines were found to be met at 157 or 91.8 percent of the DMSs. These DMSs received a rating of 2. The twelve DMS previously identified as influenced both vertically and horizontally by utility lines all received a rating of 0, indicating that the minimum standards are not met. For two DMSs influenced horizontally by utility lines, these DMSs partially met the minimum standards and received a rating of 1.

Table 11. DMS Rating for Minimum Standards for Utility Lines

Rating	Description	Number of DMS	Percent of DMS
0	Standards not met	12	7.0%
1	Standards partially met	2	1.2%
2	Standards are met	157	91.8%

Minimum Standards for Accessibility

The criteria used to identify acceptable locations for accessibility to the DMS included the following:

- Maintenance personnel using an aerial lift to access the DMS can safely park in an adjacent shoulder or within the median.
- At locations with no shoulder or median, maintenance personnel can safely close travel lane(s) adjacent to DMS for parking.
- Maintenance personnel does not have to cross active travelway to access DMS.

Assessment of Minimum Standards for Accessibility

The minimum standards were applied to the inspected DMSs. Four items were included in the assessment of accessibility including:

- Availability of parking
- Hard surface provided for parking

- Safe access by ladder available
- Personnel is not required to cross active road

Figure 9 shows the percentage of DMSs meeting each of the minimum standards for access to the DMS. At all of the DMSs, parking was available and the maintenance personnel did not have to cross an active roadway. For 155 or 90 percent of the DMS, a hard surface is available for parking. Access to the DMS by ladder was only evaluated at ground mounted DMS where it would be feasible to use a ladder. At three ground mounted locations, no assessment is provided as at these locations the DMS was located within the median of a high-speed roadway and a clear assessment of the ability to use a portable ladder difficult to assess. For this reason, at 125 DMSs no assessment of this standard is applied. For 12 or 7 percent of the DMSs, it is safe to access the DMS by ladder and at 34 or 20 percent of the DMSs it is not safe to access the DMS by ladder. Unsafe access may be due to not having either an even surface or a clearing at the DMS for the placement of a ladder.

Using the rating scheme, a rating indicating whether the DMS met the minimum standards for access is summarized in Appendix III. Table 12 summarizes these ratings. In total, 125 or 73.1 percent of DMS met the minimum standards for access. For those DMSs where access by a ladder was not feasible, this standard was removed as part of the criteria for fully meeting the minimum standards. Forty-six or 26.9 percent of DMS partially met the standard.

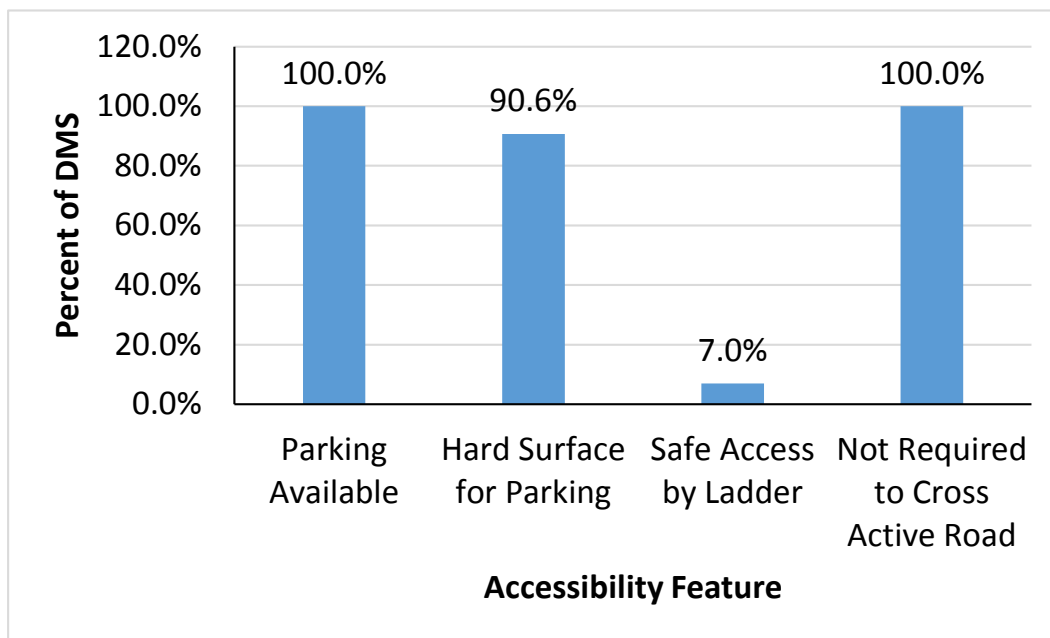


Figure 9. Accessibility Features at DMS

Table 12. DMS Rating for Minimum Standards for Access

Rating	Description	Number of DMS	Percent of DMS
0	Standards not met	0	0.0%
1	Standards partially met	46	26.9%
2	Standards are met	125	73.1%

STRUCTURAL INSPECTION OF CATWALKS ON SIGN STRUCTURES

Background

NJDOT inspects sign structures (including DMS or VMS) in a similar manner to bridges based on a document entitled 'Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signs' (FHWA 2005). This document gives guidance on the inspection, rating procedure, and reporting for sign structures. NJDOT employs special contracts for this work explained in the document entitled 'Additional Guidance for Sign Structure Inspection Contracts' (NJDOT 2014). The document gives basic definitions for sign structure terminology and guidance on the inspection procedure and condition rating. Table 13 illustrates the element condition rating of a sign structure based on a numerical scale from 1 to 4 corresponding to 'good' and 'critical', respectively (Table 10 in (FHWA 2005)). Inspection intervals for sign structures are set to 60 months. Shorter intervals are based on judgment and a function of the estimated remaining life. Also, aluminum structures are inspected every 36 or 48 months depending on available funding (NJDOT 2014). Shorter intervals are also specified for structures with fatigue cracks in critical locations or when impact damage exists. So-called 'crack flags' are used to indicate cracking and prioritize maintenance.

Table 13. Element condition rating according to (FHWA 2005).

Condition	Description	Feasible Action
0	Not Applicable	None
1	Element performs intended function with high degree of reliability (Good)	None
2	Element performs intended function with small reduction in reliability (Fair)	Repair element, increase inspection frequency, do nothing
3	Element performs intended function with significant reduction in reliability (Poor)	Repair or replacement of element within specified time frame
4	Element does not perform intended function with any degree of reliability (Critical)	Immediate repair or replacement of element

Catwalks are represented by Element Number S12 (Table 9 in (FHWA 2005)). A rating was proposed by the South Carolina DOT on a scale of 1 to 5 but a document entitled 'NJDOT Comments for Sign Structure Inspection Based on Publication No. FHWA NHI 05-036' (NJDOT 2005) instructs to ignore that section.

Table 14. Condition State Descriptions for Catwalks (FHWA 2005).

Condition	Description	Actions
1 – Good	The connections are in new or like-new condition with no significant deficiencies or evidence of active corrosion.	Do nothing
2 – Satisfactory	Minor damage or deterioration of the element may be observed. Connections may have loose nuts but have no significant deficiencies.	1 Do nothing 2 Rehab unit
3 – Fair	Moderate deterioration of the connections may be present. Handrails and locking pins may be misaligned or inoperable. Safety chain(s) may be missing or deteriorated.	1 Do nothing 2 Rehab unit
4 – Poor	Sections of gratings or handrails may be misaligned, unstable, damaged or missing. Damage is sufficient to warrant structural analysis to ascertain the impact on the ultimate strength and/or serviceability of the element. Heavy deterioration of the connections may be present.	1 Do nothing 2 Rehab unit 3 Replace unit
5 – Critical	Any collision damage or deterioration significant enough to threaten collapse or separation from the sign structure.	1 Do nothing 2 Rehab unit 3 Replace unit

Finally, the ‘Manual for Bridge Element Inspection’ (AASHTO 2013) could serve as a guideline to evaluate the condition of catwalks following Element #120 – Steel Truss (Table 15).

Table 15. Condition states according to the 'Manual for Bridge Element Rating' (AASHTO 2013).

Defects	Condition States			
	1	2	3	4
	GOOD	FAIR	POOR	SEVERE
Corrosion (1000)	None	Freckled rust. Corrosion of the steel has initiated.	Section loss is evident or pack rust is present, but does not warrant structural review.	The condition warrants a structural review to determine the effect on strength or serviceability of the element or bridge; OR a structural review has been completed and the defects impact strength or serviceability of the element or bridge.
Cracking (1010)	None	Crack that has self-arrested or has been arrested with effective arrest holes, doubling plates, or similar.	Identified crack exists that is not arrested but does not warrant structural review.	
Connection (1020)	Connection is in place and functioning as intended.	Loose fasteners or pack rust without distortion is present but the connection is in place and functioning as intended.	Missing bolts, rivets, broken welds, fasteners, or pack rust with distortion but does not warrant structural review.	
Distortion (1900)	None	Distortion not requiring mitigation or mitigated distortion.	Distortion that requires mitigation that has not been addressed but does not warrant structural review.	
Damage (7000)	Not applicable	The element has impact damage. The specific damage caused by the impact has been captured in condition state 2 under the appropriate material defect entry.	The element has impact damage. The specific damage caused by the impact has been captured in condition state 3 under the appropriate material defect entry.	

Comments on Selected Catwalks

The following assessment (Table 16) is based on photographs and not close-up in person inspections. The following DMS were found to have catwalks exhibiting safety deficiencies, corrosion or discoloration, and some dents or deformations. It is recommended that these are closely evaluated during the next scheduled inspection.

Table 16. Summary of selected catwalks with issues and proposed actions.

DMS	Table 13	Table 14	Table 15	Proposed action
ID 15, Route 1 SB, MP 56.3	2	3	1	Add safety features to catwalk: widen steel grid, add kick plate, add hand rails
ID 26, Route 9 NB, MP 131.88	2	2	1	Extend catwalk past vertical member (current horizontal space too small)
ID 32, Route 17 SB, MP 11.1	2	2	1	Extend catwalk to vertical member, add kick plate
ID 135, Route 95 SB, MP 75.2	2	2	2	Detailed evaluation of entire catwalk during next inspection!
ID 136, Route 95 SB, MP 75.2	2	2	2	Extend catwalk to vertical member. Detailed evaluation of entire catwalk during next inspection!
ID 148, Route 202 SB, MP 63.7	2	2	2	Detailed evaluation of entire catwalk during next inspection!
ID 169, Route 295 SB, MP 15.1	2	2	2	Detailed evaluation of entire catwalk during next inspection!
ID 170, Route 295 SB, MP 15.1	2	2	2	Detailed evaluation of entire catwalk during next inspection!
ID 171, Route 295 NB, MP 22.89	2	2	2	Detailed evaluation of entire catwalk during next inspection!

Disclaimer



The comments and recommendations in this section are solely based on photographs and notes collected during the visits and not actual visits and close-up views. Based on past performance it is assumed that the catwalks have performed satisfactorily with respect to both strength (safety) and serviceability. No structural rating was performed.

RECOMMENDATIONS

Using the assessment performed, recommendations were developed for DMSs not meeting or partially meeting the minimum standards for catwalks, utility lines or for access. Appendix IV summarizes each DMS's ratings and provides the recommendation based on these ratings. The following provides a brief overview of these recommendations.

Installation of Catwalks

Catwalks are recommended for installation at cantilever and span type DMSs where no catwalk is currently provided. These locations include the following:

	
ID 13, Route 1 NB, MP 53.8	ID 111, Route 78 WB, MP 52.3



ID 22, Route 7 SB, MP 2.11



ID 114, Route 78 EB(Express), MP 55



ID 33, Route 17 SB, MP 13.5



ID 115, Route 78 WB, MP 56



ID 54, Route 30 WB, MP 1.4



ID 121, Route 80 EB, MP 43.8



ID 78, Route 46 EB, MP 48.5



ID 84, Route 46 EB, MP 67.1



ID 81, Route 46 WB, MP 57.8



ID 186, Route 440 NB, MP 21.7

Installation of Catwalk and Replacement of Sign Support

Installation of catwalks is also recommended at some DMS locations where the existing sign support would not adequately support the catwalk. At these locations it is recommended not only that the catwalk be installed, but also that the sign support be replaced to accommodate the catwalk. These locations include the following:

G1



ID 116, Route 78 WB, MP 58.4

ID 93, Route 70 WB, MP 6.6



ID 59, Route 36 NB, MP 6.15

ID 98, Route 73 NB, MP 22.98

Replacement of Existing Catwalks

At some DMS locations, the minimum standards for catwalks are partially met. If more than one of the safety features identified in the minimum standard is not met, it is recommended that these catwalks be replaced with catwalks that meet the minimum standards. These locations include the following:



ID 15, Route 1 SB, MP 56.3



ID 79, Route 46 WB, MP 50.2



ID 85, Route 46 WB, MP 69.4



ID 32, Route 17 SB, MP 11.1



ID 126, Route 80 EB, MP 57.5



ID 12, Route 1 NB, MP 50.73



ID 127, Route 80 EB, MP 59



ID 136, Route 95 SB, MP 75.2



ID 160, Route 287 SB, MP 13.64



ID 139, Route 139 WB, MP 1.37



ID 162, Route 287 NB, MP 20.14



ID 14, Route 1 SB, MP 55



ID 11, Route 1 NB, MP 48.2



ID 39, Route 21 NB, MP 0.4



ID 120, Route 80 EB, MP 40.8



ID 8, Route 1 NB, MP 45.5



ID 123, Route 80 WB, MP 48.5









ID 161, Route 287 SB, MP 20.1

Modification of Existing Catwalks

Replacement of catwalks is recommended at DMS locations where more than one of the minimum standards is not met. At some locations where catwalks are provided, the

kickplate was not observed during the inspection and therefore the DMS partially met the minimum standards for catwalks. At these locations, it is recommended that a verification be performed to determine whether the kickplate is present and, if needed, the catwalk be modified to meet minimum standards. These locations include the following:

	
<p>ID 17, Route 3 EB, MP 2</p>	<p>ID 3, Route 1 SB, MP 26.1</p>
	
<p>ID 103, Route 76 SB, MP 1.56</p>	<p>ID 4, Route 1 NB, MP 26.2</p>
	
<p>ID 92, Route 70 WB, MP 1.19</p>	<p>ID 5, Route 1 SB, MP 28.5</p>



ID 134, Route 95 NB, MP 6.3



ID 6, Route 1 NB, MP 31



ID 149, Route 280 WB, MP 2.5



ID 151, Route 280 EB, MP 12.6

Catwalk Not Recommended

Front Access DMS

At some DMS locations, access to the DMS is provided through a front panel and no catwalk currently exists. At these locations, catwalks are not recommended and access to the DMS continue to be provided through the use of a bucket truck. These locations include the following:



ID 1, Route 1 NB, MP 6.2



ID 188, Route 444 SB, MP 31.4



ID 130, Route 80 EB, MP 63.8



ID 189, Route 444 NB, MP 141.5



ID 88, Route 55 SB, MP 39.96



ID 190, Route 444 NB, MP 142.2



ID 187, Route 444 NB, MP 23.9

Ground Mounted and Butterfly DMS

At most ground mounted and butterfly DMSs, catwalks are not currently provided and are accessed using a bucket truck. These DMSs can also be accessed using a ladder. At some locations, there is no safe place for a ladder to be used or the use of a ladder is not feasible because of the height of the DMS. In those cases, access would continue to be provided using a bucket truck and no modification or installation of a catwalk is recommended. These locations include the following:

ID 157, Route 287 NB, MP 7.26	ID 180, Route 295 SB, MP 47.5
ID 158, Route 287 SB, MP 11.55	ID 183, Route 295 NB, MP 57.3
ID 105, Route 78 EB, MP 28.5	ID 185, Route 322 EB, MP 1.69
ID 106, Route 78 WB, MP 33	ID 25, Route 9 SB, MP 122.1
ID 118, Route 80 WB, MP 13	ID 55, Route 36 NB, MP 1.2
ID 137, Route 130 SB, MP 34.9	ID 56, Route 36 NB, MP 1.2
ID 138, Route 138 WB, MP 2	ID 60, Route 36 SB, MP 11.32
ID 144, Route 195 WB, MP 10.2	ID 64, Route 36 SB, MP 13.18
ID 145, Route 195 EB, MP 12.8	ID 87, Route 55 SB, MP 25.8
ID 146, Route 195 WB, MP 17.66	ID 89, Route 55 NB, MP 48.8
ID 155, Route 287 NB, MP 4.62	ID 90, Route 55 NB, MP 55.1
ID 156, Route 287 SB, MP 4.62	ID 99, Route 73 SB, MP 28.5
ID 164, Route 287 NB, MP 28.3	ID 28, Route 10 EB, MP 10.68
ID 165, Route 287 SB, MP 30.9	ID 65, Route 36 SB, MP 14.5
ID 172, Route 295 NB, MP 24.4	ID 29, Route 10 WB, MP 10.71
ID 173, Route 295 SB, MP 24.6	
ID 18, Route 3 EB, MP 6.32	

Install Parking Pad

At some DMS locations, no hard surface is available for maintenance personnel to park the vehicle. Without a hard surface, weather related conditions can impact accessibility to the DMS. At these locations, a parking pad is recommended for installation. These locations include the following:



ID 97, Route 72 WB, MP 24.95



ID 104, Route 78 WB, MP 5



ID 57, Route 36 SB, MP 3



ID 119, Route 80 EB, MP 26.2



ID 143, Route 195 WB, MP 5.85



ID 182, Route 295 SB, MP 54



ID 181, Route 295 NB, MP 49



ID 58, Route 36 NB, MP 3



ID 142, Route 195 EB, MP 4.1

Relocation of Utility Lines

These recommendations identify locations where the minimum standards for utility lines are not met. At these locations, the recommendations indicate utility lines adjacent to the DMS. The recommendations do not explicitly state that the utility lines should be relocated as the vertical and horizontal distances between the DMS and the utility lines were estimated. These locations are as follows:



ID 85, Route 46 WB, MP 69.4



ID 28, Route 10 EB, MP 10.68



ID 32, Route 17 SB, MP 11.1



ID 65, Route 36 SB, MP 14.5



ID 8, Route 1 NB, MP 45.5



ID 29, Route 10 WB, MP 10.71



ID 186, Route 440 NB, MP 21.7



ID 16, Route 3 EB, MP 1.1



ID 78, Route 46 EB, MP 48.5



ID 83, Route 46 WB, MP 65.3



ID 81, Route 46 WB, MP 57.8



ID 51, Route 23 NB, MP 4.7

Costs and Prioritization of Recommendations

Costs associated with the recommendations are limited as the cost will differ by location. Cost data is available from NJDOT, however, on retrofitting a DMS structure with a catwalk. The material cost for retrofitting a DMS structure with a catwalk varied from \$8,000 to \$20,000. Average installation costs varied from \$5,000 to \$10,000. In some cases rather than retrofit, replace or repair a catwalk on a DMS structure, new DMS signs were installed. This occurred at locations where the existing signs were not repairable or were outdated.

There is no clear priority between the minimum standards with a need for each of the minimum standards to be fully met. However, locations where the DMS received a "0" indicating the minimum standard was not met represent locations with a priority. A priority for the recommendations was determined by summing the ratings, with the lowest sum of ratings receiving the highest priority. Table 17 summarizes these ratings.

Table 17. DMS Recommendations by Priority

Sum of Ratings	ID	Catwalk	Access	Utility Line	Recommendation
2	78	0	2	0	Install catwalk meeting minimum standards. Utility line is adjacent to DMS.
2	81	0	2	0	Install catwalk meeting minimum standards. Utility line is adjacent to DMS.
2	186	0	2	0	Install catwalk meeting minimum standards. Utility line is adjacent to DMS.
3	8	1	2	0	No kickplate, anchorage point or hinged gate. Utility line is adjacent to DMS. Replace catwalk with a catwalk meeting minimum standards.
3	32	1	2	0	No kickplate, anchorage point or hinged gate provided. Utility line adjacent to DMS. Replace catwalk with a catwalk meeting minimum standards.
3	85	1	2	0	No hinged gate provided. Utility line is adjacent to DMS. Replace catwalk with a catwalk meeting minimum standards.
4	13	0	2	2	No catwalk. Install catwalk meeting minimum standards.
4	22	0	2	2	Install catwalk or landing pad meeting minimum standards. May need to relocate cable adjacent to access door.
4	28	3	1	0	No safe access by ladder. Utility line is adjacent to DMS. Requires use of bucket truck to access sign.
4	29	3	1	0	No safe access by ladder; Utility line is adjacent to DMS. Requires use of bucket truck to access sign.
4	33	0	2	2	Install catwalk meeting minimum standards.
4	54	0	2	2	Install catwalk meeting minimum standards.
4	59	0	2	2	No space on DMS support structure for a catwalk. Access only available from bucket truck. Replace DMS support structure and install a catwalk.
4	65	3	1	0	No safe access by ladder. Utility line is adjacent to DMS. Requires use of bucket truck to access sign. No modification required.
4	83	2	2	0	Utility line is adjacent to DMS.
4	84	0	2	2	Install catwalk meeting minimum standards.
4	93	0	2	2	No space on DMS support structure for a catwalk. Access only available from bucket truck. Replace DMS sign support and provide a catwalk.
4	98	0	2	2	No space on DMS support structure for a catwalk. Access only available from bucket truck. Replace DMS support and install catwalk.

4	111	0	2	2	Install catwalk meeting minimum standards.
4	114	0	2	2	Install catwalk meeting minimum standards.
4	115	0	2	2	Install catwalk meeting minimum standards.
4	116	0	2	2	No space on DMS sign support structure for a catwalk. Access only available from bucket truck. Replace DMS sign support and install a catwalk.
4	121	0	2	2	Install catwalk meeting minimum standards.
5	3	1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
5	4	1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
5	5	1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
5	6	1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
5	11	1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	12	1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
5	14	1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
5	15	1	2	2	No hand-rail, kickplate, anchorage point or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	16	3	2	0	Utility line is adjacent to DMS.
5	17	1	2	2	No kickplate or hinged gate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
5	39	1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
5	51	3	2	0	Utility line is adjacent to DMS. Relocation of utility line needed.
5	79	1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	92	1	2	2	No kickplate provided on catwalk. Verify presence of kickplate and modify catwalk to meet minimum standards.
5	103	1	2	2	No kickplate provided on catwalk. Verify presence of a kickplate and modify catwalk to meet minimum standards.

5	120	1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	123	1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	126	1	2	2	No hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	127	1	2	2	No hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
5	134	1	2	2	No kickplate provided. Verify presence of a kickplate and modify catwalk to meet minimum standards.
5	135	1	2	2	No kickplate or anchorage point. Verify presence of kickplate and anchorage point and modify catwalk to meet minimum standards.
5	136	1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
5	139	1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
5	149	1	2	2	No kickplate provided. Verify presence of a kickplate and modify catwalk to meet minimum standards.
5	151	1	2	2	No kickplate provided. Verify the presence of a kickplate and modify catwalk to meet minimum standards.
5	160	1	2	2	No kickplate or grate provided. Replace catwalk with catwalk meeting minimum standards.
5	161	1	2	2	No kickplate, front railings or grate provided. Replace catwalk with catwalk meeting minimum standards.
5	162	1	2	2	No kickplate or grate provided. Replace catwalk with catwalk meeting minimum standards
6	57	3	1	2	No hard surface for parking. Parking pad should be installed.
6	58	3	1	2	No hard surface for parking. Parking pad should be installed.
6	97	3	1	2	No hard surface for parking.
6	104	3	1	2	No hard surface for parking. No safe access by ladder. Install parking pad.
6	119	3	1	2	No hard surface for parking. No safe access by ladder. Install a parking pad.
6	142	3	1	2	No hard surface for parking. No safe access by ladder. Install a parking pad.
6	143	3	1	2	No hard surface for parking. Install a parking pad.
6	181	3	1	2	No hard surface for parking. Install parking pad.

6	182	3	1	2	No hard surface for parking. No safe access by ladder. Install parking pad.
---	-----	---	---	---	---

REFERENCES

Manual of Uniform Traffic Control Devices for Streets and Highways. Federal Highway Administration, U.S. Department of Transportation, 2009, Revisions dated May, 2012.

New Jersey Design Manual for Bridges and Structures (5th Edition), 2011, <http://www.state.nj.us/transportation/eng/documents/BSDM/>. Accessed on May 6, 2013.

Intelligent Transportation Systems, Bureau of Mobility and Systems Engineering Inventory. <http://www.state.nj.us/transportation/eng/elec/ITS/ITSDB.shtm>. Accessed on May 6, 2013.

Federal Highway Administration (FHWA)'s Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signals (March, 2005) also contains information on accessing of highway signs, including DMSs.

Wisconsin Department of Transportation, Structures Inspection Manual, Part 4 Miscellaneous Support Systems, Chapter 2 Traffic Operations Support Systems (Updated August 2003). Accessed on May 6, 2013. http://on.dot.wi.gov/dtid_bos/extranet/structures/maintenance/index.htm

AASHTO (2013). Manual for Bridge Element Inspection. Washington, D.C.

FHWA (2005). Guidelines for the Installation, Inspection, Maintenance and Repair of Structural Supports for Highway Signs, Luminaires, and Traffic Signs. Washington, D.C.

NJDOT (2005). NJDOT Comments for Sign Structure Inspection Based on Publication No. FHWA NHI 05-036. Trenton, NJ.

NJDOT (2014). Additional Guidance for Sign Structure Inspection Contracts. Trenton, NJ.

APPENDIX I: ASSESSMENT OF MINIMUM STANDARDS FOR CATWALKS

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
1	Cantilever	00000001__	N	-	-	-	-	-	-	0
2	Span	00000001_S	Y	Y	Y	Y	Y	Y	Y	2
3	Span	00000001_S	Y	Y	Y	N	Y	Y	Y	1
4	Span	00000001__	Y	Y	Y	N	Y	Y	Y	1
5	Span	00000001_S	Y	Y	Y	N	Y	Y	Y	1
6	Span	00000001__	Y	Y	Y	N	Y	Y	Y	1
7	Span	00000001_S	Y	Y	Y	Y	Y	Y	Y	2
8	Span	00000001__	Y	Y	Y	N	N	N	N	1
9	Cantilever	00000001__	Y	Y	Y	Y	Y	Y	Y	2
10	Cantilever	00000001__	Y	Y	Y	Y	Y	Y	Y	2
11	Span	00000001__	Y	Y	Y	N	Y	Y	N	1
12	Span	00000001__	Y	Y	Y	N	N	N	N	1
13	Span	00000001__	N	-	-	-	-	-	-	0
14	Span	00000001_S	Y	Y	Y	N	N	N	N	1
15	Cantilever	00000001_S	Y	N	Y	N	N	N	N	1
16	Butterfly	00000003__	N	-	-	-	-	-	-	3
17	Cantilever	00000003__	Y	Y	Y	N	Y	Y	N	1
18	Ground Mounted	00000003__	N	-	-	-	-	-	-	3
19	Butterfly	00000003_W	N	-	-	-	-	-	-	3

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
20	Ground Mounted	00000003__	N	-	-	-	-	-	-	3
21	Cantilever	00000004__	Y	Y	Y	Y	Y	Y	Y	2
22	Cantilever	00000007__	N	-	-	-	-	-	-	0
24	Ground Mounted	00000009__	N	-	-	-	-	-	-	3
25	Ground Mounted	00000009_S	N	-	-	-	-	-	-	3
26	Span	00000009__	Y	Y	Y	Y	Y	Y	Y	2
27	Butterfly	00000009__	N	-	-	-	-	-	-	3
28	Ground Mounted	00000010__	N	-	-	-	-	-	-	3
29	Ground Mounted	00000010_W	N	-	-	-	-	-	-	3
30	Cantilever	00000017__	Y	Y	Y	Y	Y	Y	Y	2
31	Butterfly	00000017__	N	-	-	-	-	-	-	3
32	Cantilever	00000017_S	Y	Y	Y	N	Y	N	N	1
33	Cantilever	00000017_S	N	-	-	-	-	-	-	0
34	Span	00000018__	Y	Y	Y	Y	Y	Y	Y	2
35	Span	00000018_S	Y	Y	Y	Y	Y	Y	Y	2
36	Cantilever	00000018_S	Y	Y	Y	Y	Y	Y	Y	2
37	Cantilever	00000018__	Y	Y	Y	Y	Y	Y	Y	2
38	Cantilever	00000018_S	Y	Y	Y	Y	Y	Y	Y	2
39	Span	00000021__	Y	Y	Y	N	N	N	N	1

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
40	Butterfly	00000021_S	N	-	-	-	-	-	-	3
41	Butterfly	00000021__	N	-	-	-	-	-	-	3
42	Cantilever	00000021_S	Y	Y	Y	Y	Y	Y	Y	2
50	Cantilever	00000022__	Y	Y	Y	Y	Y	Y	Y	2
51	Butterfly	00000023__	N	-	-	-	-	-	-	3
52	Butterfly	00000024__	N	-	-	-	-	-	-	3
54	Span	00000030_W	N	-	-	-	-	-	-	0
55	Ground Mounted	00000036_S	N	-	-	-	-	-	-	3
56	Ground Mounted	00000036__	N	-	-	-	-	-	-	3
57	Ground Mounted	00000036_S	N	-	-	-	-	-	-	3
58	Ground Mounted	00000036__	N	-	-	-	-	-	-	3
59	Cantilever	00000036__	N	-	-	-	-	-	-	0
60	Ground Mounted	00000036__	N	-	-	-	-	-	-	3
63	Overhead	00000036_S	N	-	-	-	-	-	-	3
64	Ground Mounted	00000036_S	N	-	-	-	-	-	-	3
65	Ground Mounted	00000036_S	N	-	-	-	-	-	-	3
66	Cantilever	00000037__	Y	Y	Y	Y	Y	Y	-	2

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
68	Cantilever	00000037__	Y	Y	Y	Y	Y	Y	Y	2
69	Cantilever	00000037_W	Y	Y	Y	Y	Y	Y	Y	2
70	Cantilever	00000038_W	Y	Y	Y	Y	Y	Y	Y	2
71	Cantilever	00000038_W	Y	Y	Y	Y	Y	Y	Y	2
72	Ground Mounted	00000042_S	N	-	-	-	-	-	-	3
73	Ground Mounted	00000042__	N	-	-	-	-	-	-	3
74	Ground Mounted	00000042__	N	-	-	-	-	-	-	3
75	Span	00000042__	Y	Y	Y	Y	Y	Y	Y	2
76	Span	00000042_S	Y	Y	Y	Y	Y	Y	Y	2
77	Cantilever	00000046__	Y	Y	Y	Y	Y	Y	Y	2
78	Cantilever	00000046__	N	-	-	-	-	-	-	0
79	Cantilever	00000046_W	Y	Y	Y	N	Y	Y	N	1
80	Cantilever	00000046__	Y	Y	Y	Y	Y	Y	Y	2
81	Cantilever	00000046_W	N	-	-	-	-	-	-	0
82	Cantilever	00000046__	Y	Y	Y	Y	Y	Y	N	2
83	Cantilever	00000046_W	Y	Y	Y	Y	Y	Y	Y	2
84	Cantilever	00000046__	N	-	-	-	-	-	-	0
85	Cantilever	00000046__	Y	Y	Y	Y	Y	Y	N	1
86	Cantilever	00000055__	Y	Y	Y	Y	Y	Y	Y	2
87	Ground	00000055_S	N	-	-	-	-	-	-	3

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
	Mounted									
88	Span	00000055_S	N	-	-	-	-	-	-	0
89	Ground Mounted	00000055__	N	-	-	-	-	-	-	3
90	Ground Mounted	00000055__	N	-	-	-	-	-	-	3
92	Cantilever	00000070_W	Y	Y	Y	N	Y	Y	Y	1
93	Cantilever	00000070_W	N	-	-	-	-	-	-	0
94	Cantilever	00000070_W	Y	Y	Y	Y	Y	Y	Y	2
97	Ground Mounted	00000072_W	N	-	-	-	-	-	-	3
98	Cantilever	00000073__	N	-	-	-	-	-	-	0
99	Ground Mounted	00000073_S	N	-	-	-	-	-	-	3
100	Ground Mounted	00000073_S	N	-	-	-	-	-	-	3
101	Ground Mounted	00000073__	N	-	-	-	-	-	-	3
102	Butterfly	00000076__	N	-	-	-	-	-	-	3
103	Cantilever	00000076_S	Y	Y	Y	N	Y	Y	Y	1
104	Ground Mounted	00000078_W	N	-	-	-	-	-	-	3
105	Ground Mounted	00000078__	N	-	-	-	-	-	-	3

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
106	Ground Mounted	00000078_W	N	-	-	-	-	-	-	3
107	Cantilever	00000078__	Y	Y	Y	Y	Y	Y	Y	2
108	Cantilever	00000078_W	Y	Y	Y	Y	Y	Y	Y	2
109	Butterfly	00000078__	N	-	-	-	-	-	-	3
110	Butterfly	00000078__	N	-	-	-	-	-	-	3
111	Span	00000078_W	N	-	-	-	-	-	-	0
112	Span	00000078_W	Y	Y	Y	Y	Y	Y	Y	2
113	Span	00000078__	Y	Y	Y	Y	Y	Y	Y	2
114	Span	00000078__	N	-	-	-	-	-	-	0
115	Span	00000078_W	N	-	-	-	-	-	-	0
116	Span	00000078_W	N	-	-	-	-	-	-	0
118	Ground Mounted	00000080_W	N	-	-	-	-	-	-	3
119	Ground Mounted	00000080__	N	-	-	-	-	-	-	3
120	Cantilever	00000080__	Y	Y	Y	N	Y	Y	N	1
121	Cantilever	00000080__	N	-	-	-	-	-	-	0
123	Cantilever	00000080_W	Y	Y	Y	N	Y	Y	N	1
124	Cantilever	00000080__	Y	Y	Y	Y	Y	Y	Y	2
125	Cantilever	00000080_W	Y	Y	Y	Y	Y	Y	Y	2
126	Cantilever	00000080__	Y	Y	Y	Y	Y	Y	N	1
127	Cantilever	00000080__	Y	Y	Y	Y	Y	Y	N	1

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
128	Cantilever	00000080__	Y	Y	Y	Y	Y	Y	Y	2
129	Cantilever	00000080_W	Y	Y	Y	Y	Y	Y	Y	2
130	Span	00000080__	N	-	-	-	-	-	-	0
131	Cantilever	00000080_W	Y	Y	Y	Y	Y	Y	Y	2
132	Butterfly	00000080_W	N	-	-	-	-	-	-	3
133	Butterfly	00000080__	N	-	-	-	-	-	-	3
134	Span	00000095M_	Y	Y	Y	N	Y	Y	Y	1
135	Span	00000095_S	Y	Y	Y	N	Y	N	Y	1
136	Span	00000095_S	Y	Y	Y	N	Y	N	N	1
137	Ground Mounted	00000130_S	N	-	-	-	-	-	-	3
138	Ground Mounted	00000138_W	N	-	-	-	-	-	-	3
139	Span	00000139_W	Y	Y	Y	N	N	N	N	1
142	Ground Mounted	00000195__	N	-	-	-	-	-	-	3
143	Ground Mounted	00000195_W	N	-	-	-	-	-	-	3
144	Ground Mounted	00000195_W	N	-	-	-	-	-	-	3
145	Ground Mounted	00000195__	N	-	-	-	-	-	-	3
146	Ground Mounted	00000195_W	N	-	-	-	-	-	-	3

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
147	Ground Mounted	00000195__	N	-	-	-	-	-	-	3
148	Cantilever	00000202_S	Y	Y	Y	Y	Y	Y	Y	2
149	Cantilever	00000280_W	Y	Y	Y	N	Y	Y	-	1
150	Cantilever	00000280__	Y	Y	Y	Y	Y	Y	Y	2
151	Cantilever	00000280__	Y	Y	Y	N	Y	Y	Y	1
152	Cantilever	00000280__	Y	Y	Y	Y	Y	Y	N	2
153	Cantilever	00000280_W	Y	Y	Y	Y	Y	Y	Y	2
154	Butterfly	00000287__	N	-	-	-	-	-	-	3
155	Ground Mounted	00000287__	N	-	-	-	-	-	-	3
156	Ground Mounted	00000287_S	N	-	-	-	-	-	-	3
157	Butterfly	00000287__	N	-	-	-	-	-	-	3
158	Butterfly	00000287_S	N	-	-	-	-	-	-	3
159	Butterfly	00000287__	N	-	-	-	-	-	-	3
160	Butterfly	00000287_S	Y	Y	Y	N	N	N	N	1
161	Butterfly	00000287_S	Y	Y	Y	N	N	N	N	1
162	Butterfly	00000287__	Y	Y	Y	N	N	N	N	1
163	Butterfly	00000287_S	N	-	-	-	-	-	-	3
164	Ground Mounted	00000287__	N	-	-	-	-	-	-	3
165	Ground Mounted	00000287_S	N	-	-	-	-	-	-	3

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
166	Cantilever	00000287__	Y	Y	Y	Y	Y	Y	Y	2
167	Cantilever	00000287__	Y	Y	Y	Y	Y	Y	Y	2
168	Cantilever	00000287_S	Y	Y	Y	Y	Y	Y	Y	2
169	Span	00000295_S	Y	Y	Y	N	Y	Y	N	2
170	Span	00000295__	Y	Y	Y	Y	Y	Y	Y	2
171	Cantilever	00000295__	Y	Y	Y	Y	Y	Y	Y	2
172	Ground Mounted	00000295__	N	-	-	-	-	-	-	3
173	Ground Mounted	00000295_S	N	-	-	-	-	-	-	3
174	Span	00000295__	Y	Y	Y	Y	Y	Y	-	2
175	Cantilever	00000295_S	Y	Y	Y	Y	Y	Y	Y	2
176	Span	00000295_S	Y	Y	Y	Y	Y	Y	Y	2
177	Span	00000295__	Y	Y	Y	Y	Y	Y	Y	2
178	Span	00000295_S	Y	Y	Y	Y	Y	Y	Y	2
179	Span	00000295_S	Y	Y	Y	Y	Y	Y	Y	2
180	Ground Mounted	00000295_S	N	-	-	-	-	-	-	3
181	Ground Mounted	00000295__	N	-	-	-	-	-	-	3
182	Ground Mounted	00000295_S	N	-	-	-	-	-	-	3
183	Ground Mounted	00000295__	N	-	-	-	-	-	-	3

Table 18. Assessment of Minimum Standards for Catwalks

ID	Sign Type	Route	Minimum Standards for Catwalks							Rating 0=Not Met 1=Partial 2=Met 3=Not Used
			Catwalk Provided	Hand-rail Provided	Grate Provided	Kick-Plate Provided	Catwalk Structurally Sound	Anchorage Point Accessible	Hinged Gate Provided	
184	Span	00000295__	Y	Y	Y	Y	Y	Y	Y	2
185	Ground Mounted	00000322__	N	-	-	-	-	-	-	3
186	Cantilever	00000440__	N	-	-	-	-	-	-	0
187	Cantilever	00000444__	N	-	-	-	-	-	-	0
188	Cantilever	00000444_S	N	-	-	-	-	-	-	0
189	Span	00000444__	N	-	-	-	-	-	-	0
190	Span	00000444_S	N	-	-	-	-	-	-	0

APPENDIX II: ASSESSMENT OF MINIMUM STANDARDS FOR UTILITY LINES

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
1	Cantilever	00000001__	Mercer	N	N	2
2	Span	00000001_S	Mercer	N	N	2
3	Span	00000001_S	Middlesex	N	N	2
4	Span	00000001__	Middlesex	N	N	2
5	Span	00000001_S	Middlesex	N	N	2
6	Span	00000001__	Middlesex	N	N	2
7	Span	00000001_S	Middlesex	N	N	2
8	Span	00000001__	Union	Y	Y	0
9	Cantilever	00000001__	Essex	N	N	2
10	Cantilever	00000001__	Essex	N	N	2
11	Span	00000001__	Essex	N	N	2
12	Span	00000001__	Essex	N	N	2
13	Span	00000001__	Hudson	N	N	2
14	Span	00000001_S	Hudson	N	N	2
15	Cantilever	00000001_S	Hudson	N	N	2
16	Butterfly	00000003__	Passaic	Y	Y	0
17	Cantilever	00000003__	Passaic	N	N	2
18	Ground Mounted	00000003__	Bergen	N	N	2
19	Butterfly	00000003_W	Hudson	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
20	Ground Mounted	00000003__	Hudson	N	N	2
21	Cantilever	00000004__	Bergen	N	N	2
22	Cantilever	00000007__	Hudson	N	N	2
24	Ground Mounted	00000009__	Monmouth	N	N	2
25	Ground Mounted	00000009_S	Middlesex	N	N	2
26	Span	00000009__	Middlesex	N	N	2
27	Butterfly	00000009__	Middlesex	N	N	2
28	Ground Mounted	00000010__	Morris	Y	Y	0
29	Ground Mounted	00000010_W	Morris	Y	Y	0
30	Cantilever	00000017__	Bergen	N	N	2
31	Butterfly	00000017__	Bergen	N	N	2
32	Cantilever	00000017_S	Bergen	Y	Y	0
33	Cantilever	00000017_S	Bergen	N	Y	1
34	Span	00000018__	Middlesex	N	N	2
35	Span	00000018_S	Middlesex	N	N	2
36	Cantilever	00000018_S	Middlesex	N	N	2
37	Cantilever	00000018__	Middlesex	N	N	2
38	Cantilever	00000018_S	Middlesex	N	N	2
39	Span	00000021__	Essex	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
40	Butterfly	00000021_S	Essex	N	N	2
41	Butterfly	00000021__	Essex	N	N	2
42	Cantilever	00000021_S	Essex	N	N	2
50	Cantilever	00000022__	Union	N	N	2
51	Butterfly	00000023__	Passaic	Y	Y	0
52	Butterfly	00000024__	Morris	N	N	2
54	Span	00000030_W	Camden	N	N	2
55	Ground Mounted	00000036_S	Monmouth	N	N	2
56	Ground Mounted	00000036__	Monmouth	N	N	2
57	Ground Mounted	00000036_S	Monmouth	N	N	2
58	Ground Mounted	00000036__	Monmouth	N	N	2
59	Cantilever	00000036__	Monmouth	N	N	2
60	Ground Mounted	00000036__	Monmouth	N	N	2
63	Overhead	00000036_S	Monmouth	N	N	2
64	Ground Mounted	00000036_S	Monmouth	N	N	2
65	Ground Mounted	00000036_S	Monmouth	Y	Y	0
66	Cantilever	00000037__	Ocean	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
68	Cantilever	00000037__	Ocean	N	N	2
69	Cantilever	00000037_W	Ocean	N	N	2
70	Cantilever	00000038_W	Camden	N	N	2
71	Cantilever	00000038_W	Burlington	N	N	2
72	Ground Mounted	00000042_S	Camden	N	N	2
73	Ground Mounted	00000042__	Camden	N	N	2
74	Ground Mounted	00000042__	Camden	N	N	2
75	Span	00000042__	Camden	N	N	2
76	Span	00000042_S	Camden	N	N	2
77	Cantilever	00000046__	Morris	N	N	2
78	Cantilever	00000046__	Morris	Y	Y	0
79	Cantilever	00000046_W	Morris	N	N	2
80	Cantilever	00000046__	Essex	N	N	2
81	Cantilever	00000046_W	Passaic	Y	Y	0
82	Cantilever	00000046__	Passaic	N	N	2
83	Cantilever	00000046_W	Bergen	Y	Y	0
84	Cantilever	00000046__	Bergen	N	Y	1
85	Cantilever	00000046__	Bergen	Y	Y	0
86	Cantilever	00000055__	Cumberland	N	N	2
87	Ground	00000055_S	Cumberland	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
	Mounted					
88	Span	00000055_S	Gloucester	N	N	2
89	Ground Mounted	00000055__	Gloucester	N	N	2
90	Ground Mounted	00000055__	Gloucester	N	N	2
92	Cantilever	00000070_W	Camden	N	N	2
93	Cantilever	00000070_W	Camden	N	N	2
94	Cantilever	00000070_W	Burlington	N	N	2
97	Ground Mounted	00000072_W	Ocean	N	N	2
98	Cantilever	00000073__	Burlington	N	N	2
99	Ground Mounted	00000073_S	Burlington	N	N	2
100	Ground Mounted	00000073_S	Burlington	N	N	2
101	Ground Mounted	00000073__	Burlington	N	N	2
102	Butterfly	00000076__	Camden	N	N	2
103	Cantilever	00000076_S	Camden	N	N	2
104	Ground Mounted	00000078_W	Warren	N	N	2
105	Ground Mounted	00000078__	Somerset	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
106	Ground Mounted	00000078_W	Somerset	N	N	2
107	Cantilever	00000078__	Somerset	N	N	2
108	Cantilever	00000078_W	Union	N	N	2
109	Butterfly	00000078__	Union	N	N	2
110	Butterfly	00000078__	Union	N	N	2
111	Span	00000078_W	Union	N	N	2
112	Span	00000078_W	Union	N	N	2
113	Span	00000078__	Essex	N	N	2
114	Span	00000078__	Essex	N	N	2
115	Span	00000078_W	Essex	N	N	2
116	Span	00000078_W	Essex	N	N	2
118	Ground Mounted	00000080_W	Warren	N	N	2
119	Ground Mounted	00000080__	Morris	N	N	2
120	Cantilever	00000080__	Morris	N	N	2
121	Cantilever	00000080__	Morris	N	N	2
123	Cantilever	00000080_W	Essex	N	N	2
124	Cantilever	00000080__	Essex	N	N	2
125	Cantilever	00000080_W	Passaic	N	N	2
126	Cantilever	00000080__	Passaic	N	N	2
127	Cantilever	00000080__	Passaic	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
128	Cantilever	00000080__	Bergen	N	N	2
129	Cantilever	00000080_W	Bergen	N	N	2
130	Span	00000080__	Bergen	N	N	2
131	Cantilever	00000080_W	Bergen	N	N	2
132	Butterfly	00000080_W	Bergen	N	N	2
133	Butterfly	00000080__	Bergen	N	N	2
134	Span	00000095M_	Mercer	N	N	2
135	Span	00000095_S	Bergen	N	N	2
136	Span	00000095_S	Bergen	N	N	2
137	Ground Mounted	00000130_S	Camden	N	N	2
138	Ground Mounted	00000138_W	Monmouth	N	N	2
139	Span	00000139_W	Hudson	N	N	2
142	Ground Mounted	00000195__	Mercer	N	N	2
143	Ground Mounted	00000195_W	Mercer	N	N	2
144	Ground Mounted	00000195_W	Monmouth	N	N	2
145	Ground Mounted	00000195__	Monmouth	N	N	2
146	Ground Mounted	00000195_W	Ocean	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
147	Ground Mounted	00000195__	Monmouth	N	N	2
148	Cantilever	00000202_S	Passaic	N	N	2
149	Cantilever	00000280_W	Morris	N	N	2
150	Cantilever	00000280__	Essex	N	N	2
151	Cantilever	00000280__	Essex	N	N	2
152	Cantilever	00000280__	Hudson	N	N	2
153	Cantilever	00000280_W	Hudson	N	N	2
154	Butterfly	00000287__	Middlesex	N	N	2
155	Ground Mounted	00000287__	Middlesex	N	N	2
156	Ground Mounted	00000287_S	Middlesex	N	N	2
157	Butterfly	00000287__	Middlesex	N	N	2
158	Butterfly	00000287_S	Somerset	N	N	2
159	Butterfly	00000287__	Somerset	N	N	2
160	Butterfly	00000287_S	Somerset	N	N	2
161	Butterfly	00000287_S	Somerset	N	N	2
162	Butterfly	00000287__	Somerset	N	N	2
163	Butterfly	00000287_S	Somerset	N	N	2
164	Ground Mounted	00000287__	Morris	N	N	2
165	Ground Mounted	00000287_S	Morris	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
166	Cantilever	00000287__	Morris	N	N	2
167	Cantilever	00000287__	Morris	N	N	2
168	Cantilever	00000287_S	Morris	N	N	2
169	Span	00000295_S	Gloucester	N	N	2
170	Span	00000295__	Gloucester	N	N	2
171	Cantilever	00000295__	Gloucester	N	N	2
172	Ground Mounted	00000295__	Gloucester	N	N	2
173	Ground Mounted	00000295_S	Gloucester	N	N	2
174	Span	00000295__	Camden	N	N	2
175	Cantilever	00000295_S	Camden	N	N	2
176	Span	00000295_S	Camden	N	N	2
177	Span	00000295__	Camden	N	N	2
178	Span	00000295_S	Burlington	N	N	2
179	Span	00000295_S	Burlington	N	N	2
180	Ground Mounted	00000295_S	Burlington	N	N	2
181	Ground Mounted	00000295__	Burlington	N	N	2
182	Ground Mounted	00000295_S	Burlington	N	N	2
183	Ground Mounted	00000295__	Burlington	N	N	2

Table 19. Assessment of Minimum Standards for Utility Lines

ID	Sign Type	Route	County	Minimum Standards for Utility lines		Rating 0=Not Met 1=Partial 2=Met
				Influenced Utility line(Vertical Distance)	Influenced by Utility Line(Horizontal Distance)	
184	Span	00000295__	Mercer	N	N	2
185	Ground Mounted	00000322__	Gloucester	N	N	2
186	Cantilever	00000440__	Hudson	Y	Y	0
187	Cantilever	00000444__	Cape May	N	N	2
188	Cantilever	00000444_S	Atlantic	N	N	2
189	Span	00000444__	Union	N	N	2
190	Span	00000444_S	Union	N	N	2

APPENDIX III: ASSESSMENT OF MINIMUM STANDARDS FOR ACCESS

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
1	Cantilever	00000001__	Mercer	Y	Y	-	Y	2
2	Span	00000001_S	Mercer	Y	Y	-	Y	2
3	Span	00000001_S	Middlesex	Y	Y	-	Y	2
4	Span	00000001__	Middlesex	Y	Y	-	Y	2
5	Span	00000001_S	Middlesex	Y	Y	-	Y	2
6	Span	00000001__	Middlesex	Y	Y	-	Y	2
7	Span	00000001_S	Middlesex	Y	Y	-	Y	2
8	Span	00000001__	Union	Y	Y	-	Y	2
9	Cantilever	00000001__	Essex	Y	Y	-	Y	2
10	Cantilever	00000001__	Essex	Y	Y	-	Y	2
11	Span	00000001__	Essex	Y	Y	-	Y	2
12	Span	00000001__	Essex	Y	Y	-	Y	2
13	Span	00000001__	Hudson	Y	Y	-	Y	2
14	Span	00000001_S	Hudson	Y	Y	-	Y	2
15	Cantilever	00000001_S	Hudson	Y	Y	-	Y	2
16	Butterfly	00000003__	Passaic	Y	Y	-	Y	2
17	Cantilever	00000003__	Passaic	Y	Y	-	Y	2
18	Ground Mounted	00000003__	Bergen	Y	Y	N	Y	1

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
19	Butterfly	00000003_W	Hudson	Y	Y	-	Y	2
20	Ground Mounted	00000003__	Hudson	Y	Y	-	Y	2
21	Cantilever	00000004__	Bergen	Y	Y	-	Y	2
22	Cantilever	00000007__	Hudson	Y	Y	-	Y	2
24	Ground Mounted	00000009__	Monmouth	Y	Y	Y	Y	2
25	Ground Mounted	00000009_S	Middlesex	Y	Y	N	Y	1
26	Span	00000009__	Middlesex	Y	Y	-	Y	2
27	Butterfly	00000009__	Middlesex	Y	Y	-	Y	2
28	Ground Mounted	00000010__	Morris	Y	Y	N	Y	1
29	Ground Mounted	00000010_W	Morris	Y	Y	N	Y	1
30	Cantilever	00000017__	Bergen	Y	Y	-	Y	2
31	Butterfly	00000017__	Bergen	Y	Y	-	Y	2
32	Cantilever	00000017_S	Bergen	Y	Y	-	Y	2
33	Cantilever	00000017_S	Bergen	Y	Y	-	Y	2
34	Span	00000018__	Middlesex	Y	Y	-	Y	2
35	Span	00000018_S	Middlesex	Y	Y	-	Y	2
36	Cantilever	00000018_S	Middlesex	Y	Y	-	Y	2
37	Cantilever	00000018__	Middlesex	Y	Y	-	Y	2

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
38	Cantilever	00000018_S	Middlesex	Y	Y	-	Y	2
39	Span	00000021__	Essex	Y	Y	-	Y	2
40	Butterfly	00000021_S	Essex	Y	Y	-	Y	2
41	Butterfly	00000021__	Essex	Y	Y	-	Y	2
42	Cantilever	00000021_S	Essex	Y	Y	-	Y	2
50	Cantilever	00000022__	Union	Y	Y	-	Y	2
51	Butterfly	00000023__	Passaic	Y	Y	-	Y	2
52	Butterfly	00000024__	Morris	Y	Y	-	Y	2
54	Span	00000030_W	Camden	Y	Y	-	Y	2
55	Ground Mounted	00000036_S	Monmouth	Y	Y	N	Y	1
56	Ground Mounted	00000036__	Monmouth	Y	Y	N	Y	1
57	Ground Mounted	00000036_S	Monmouth	Y	N	Y	Y	1
58	Ground Mounted	00000036__	Monmouth	Y	N	Y	Y	1
59	Cantilever	00000036__	Monmouth	Y	Y	-	Y	2
60	Ground Mounted	00000036__	Monmouth	Y	Y	N	Y	1
63	Overhead	00000036_S	Monmouth	Y	Y	-	Y	2
64	Ground Mounted	00000036_S	Monmouth	Y	Y	N	Y	1

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
65	Ground Mounted	00000036_S	Monmouth	Y	Y	N	Y	1
66	Cantilever	00000037__	Ocean	Y	Y	-	Y	2
68	Cantilever	00000037__	Ocean	Y	Y	-	Y	2
69	Cantilever	00000037_W	Ocean	Y	Y	-	Y	2
70	Cantilever	00000038_W	Camden	Y	Y	-	Y	2
71	Cantilever	00000038_W	Burlington	Y	Y	-	Y	2
72	Ground Mounted	00000042_S	Camden	Y	N	Y	Y	1
73	Ground Mounted	00000042__	Camden	Y	N	Y	Y	1
74	Ground Mounted	00000042__	Camden	Y	N	Y	Y	1
75	Span	00000042__	Camden	Y	Y	-	Y	2
76	Span	00000042_S	Camden	Y	Y	-	Y	2
77	Cantilever	00000046__	Morris	Y	Y	-	Y	2
78	Cantilever	00000046__	Morris	Y	Y	-	Y	2
79	Cantilever	00000046_W	Morris	Y	Y	-	Y	2
80	Cantilever	00000046__	Essex	Y	Y	-	Y	2
81	Cantilever	00000046_W	Passaic	Y	Y	-	Y	2
82	Cantilever	00000046__	Passaic	Y	Y	-	Y	2
83	Cantilever	00000046_W	Bergen	Y	Y	-	Y	2

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
84	Cantilever	00000046__	Bergen	Y	Y	-	Y	2
85	Cantilever	00000046__	Bergen	Y	Y	-	Y	2
86	Cantilever	00000055__	Cumberland	Y	Y	-	Y	2
87	Ground Mounted	00000055_S	Cumberland	Y	Y	N	Y	1
88	Span	00000055_S	Gloucester	Y	N	-	Y	1
89	Ground Mounted	00000055__	Gloucester	Y	Y	N	Y	1
90	Ground Mounted	00000055__	Gloucester	Y	Y	N	Y	1
92	Cantilever	00000070_W	Camden	Y	Y	-	Y	2
93	Cantilever	00000070_W	Camden	Y	Y	-	Y	2
94	Cantilever	00000070_W	Burlington	Y	Y	-	Y	2
97	Ground Mounted	00000072_W	Ocean	Y	N	Y	Y	1
98	Cantilever	00000073__	Burlington	Y	Y	-	Y	2
99	Ground Mounted	00000073_S	Burlington	Y	Y	N	Y	1
100	Ground Mounted	00000073_S	Burlington	Y	Y	Y	Y	2
101	Ground Mounted	00000073__	Burlington	Y	Y	Y	Y	2
102	Butterfly	00000076__	Camden	Y	Y	-	Y	2

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
103	Cantilever	00000076_S	Camden	Y	Y	-	Y	2
104	Ground Mounted	00000078_W	Warren	Y	N	N	Y	1
105	Ground Mounted	00000078__	Somerset	Y	Y	N	Y	1
106	Ground Mounted	00000078_W	Somerset	Y	Y	N	Y	1
107	Cantilever	00000078__	Somerset	Y	Y	-	Y	2
108	Cantilever	00000078_W	Union	Y	Y	-	Y	2
109	Butterfly	00000078__	Union	Y	Y	-	Y	2
110	Butterfly	00000078__	Union	Y	Y	-	Y	2
111	Span	00000078_W	Union	Y	Y	-	Y	2
112	Span	00000078_W	Union	Y	Y	-	Y	2
113	Span	00000078__	Essex	Y	Y	-	Y	2
114	Span	00000078__	Essex	Y	Y	-	Y	2
115	Span	00000078_W	Essex	Y	Y	-	Y	2
116	Span	00000078_W	Essex	Y	Y	-	Y	2
118	Ground Mounted	00000080_W	Warren	Y	Y	N	Y	1
119	Ground Mounted	00000080__	Morris	Y	N	N	Y	1
120	Cantilever	00000080__	Morris	Y	Y	-	Y	2
121	Cantilever	00000080__	Morris	Y	Y	-	Y	2

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
123	Cantilever	00000080_W	Essex	Y	Y	-	Y	2
124	Cantilever	00000080__	Essex	Y	Y	-	Y	2
125	Cantilever	00000080_W	Passaic	Y	Y	-	Y	2
126	Cantilever	00000080__	Passaic	Y	Y	-	Y	2
127	Cantilever	00000080__	Passaic	Y	Y	-	Y	2
128	Cantilever	00000080__	Bergen	Y	Y	-	Y	2
129	Cantilever	00000080_W	Bergen	Y	Y	-	Y	2
130	Span	00000080__	Bergen	Y	Y	-	Y	2
131	Cantilever	00000080_W	Bergen	Y	Y	-	Y	2
132	Butterfly	00000080_W	Bergen	Y	Y	-	Y	2
133	Butterfly	00000080__	Bergen	Y	Y	-	Y	2
134	Span	00000095M_	Mercer	Y	Y	-	Y	2
135	Span	00000095_S	Bergen	Y	Y	-	Y	2
136	Span	00000095_S	Bergen	Y	Y	-	Y	2
137	Ground Mounted	00000130_S	Camden	Y	Y	N	Y	1
138	Ground Mounted	00000138_W	Monmouth	Y	Y	N	Y	1
139	Span	00000139_W	Hudson	Y	Y	-	Y	2
142	Ground Mounted	00000195__	Mercer	Y	N	N	Y	1
143	Ground	00000195_W	Mercer	Y	N	Y	Y	1

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
	Mounted							
144	Ground Mounted	00000195_W	Monmouth	Y	Y	N	Y	1
145	Ground Mounted	00000195__	Monmouth	Y	Y	N	Y	1
146	Ground Mounted	00000195_W	Ocean	Y	Y	N	Y	1
147	Ground Mounted	00000195__	Monmouth	Y	N	Y	Y	1
148	Cantilever	00000202_S	Passaic	Y	Y	-	Y	2
149	Cantilever	00000280_W	Morris	Y	Y	-	Y	2
150	Cantilever	00000280__	Essex	Y	Y	-	Y	2
151	Cantilever	00000280__	Essex	Y	Y	-	Y	2
152	Cantilever	00000280__	Hudson	Y	Y	-	Y	2
153	Cantilever	00000280_W	Hudson	Y	Y	-	Y	2
154	Butterfly	00000287__	Middlesex	Y	Y	-	Y	2
155	Ground Mounted	00000287__	Middlesex	Y	Y	N	Y	1
156	Ground Mounted	00000287_S	Middlesex	Y	Y	N	Y	1
157	Butterfly	00000287__	Middlesex	Y	N	-	Y	1
158	Butterfly	00000287_S	Somerset	Y	N	-	Y	1
159	Butterfly	00000287__	Somerset	Y	Y	-	Y	2

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
160	Butterfly	00000287_S	Somerset	Y	Y	-	Y	2
161	Butterfly	00000287_S	Somerset	Y	Y	-	Y	2
162	Butterfly	00000287__	Somerset	Y	Y	-	Y	2
163	Butterfly	00000287_S	Somerset	Y	Y	-	Y	2
164	Ground Mounted	00000287__	Morris	Y	Y	N	Y	1
165	Ground Mounted	00000287_S	Morris	Y	Y	N	Y	1
166	Cantilever	00000287__	Morris	Y	Y	-	Y	2
167	Cantilever	00000287__	Morris	Y	Y	-	Y	2
168	Cantilever	00000287_S	Morris	Y	Y	-	Y	2
169	Span	00000295_S	Gloucester	Y	Y	-	Y	2
170	Span	00000295__	Gloucester	Y	Y	-	Y	2
171	Cantilever	00000295__	Gloucester	Y	Y	-	Y	2
172	Ground Mounted	00000295__	Gloucester	Y	Y	N	Y	1
173	Ground Mounted	00000295_S	Gloucester	Y	Y	N	Y	1
174	Span	00000295__	Camden	Y	Y	-	Y	2
175	Cantilever	00000295_S	Camden	Y	Y	-	Y	2
176	Span	00000295_S	Camden	Y	Y	-	Y	2
177	Span	00000295__	Camden	Y	Y	-	Y	2

Table 20. Assessment of the Minimum Standards for Access

ID	Sign Type	Route	County	Minimum Standards for Access				Rating 0=Not Met 1=Partial 2=Met
				Parking Available	Hard Surface for Parking	Safe Access by Ladder	Not Required to Cross Active Road	
178	Span	00000295_S	Burlington	Y	Y	-	Y	2
179	Span	00000295_S	Burlington	Y	Y	-	Y	2
180	Ground Mounted	00000295_S	Burlington	Y	Y	N	Y	1
181	Ground Mounted	00000295__	Burlington	Y	N	Y	Y	1
182	Ground Mounted	00000295_S	Burlington	Y	N	N	Y	1
183	Ground Mounted	00000295__	Burlington	Y	Y	N	Y	1
184	Span	00000295__	Mercer	Y	Y	-	Y	2
185	Ground Mounted	00000322__	Gloucester	Y	Y	N	Y	1
186	Cantilever	00000440__	Hudson	Y	Y	-	Y	2
187	Cantilever	00000444__	Cape May	Y	Y	-	Y	2
188	Cantilever	00000444_S	Atlantic	Y	Y	-	Y	2
189	Span	00000444__	Union	Y	Y	-	Y	2
190	Span	00000444_S	Union	Y	Y	-	Y	2

APPENDIX IV: RECOMMENDATIONS FOR IMPROVING SAFETY AND ACCESSIBILITY

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 1, Route 1 NB, MP 6.2		0	2	2	This is a front-access DMS with no catwalk. No catwalk recommended.
ID 2, Route 1 SB, MP 8.7		2	2	2	No modification required.
ID 3, Route 1 SB, MP 26.1		1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
ID 4, Route 1 NB, MP 26.2		1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
ID 5, Route 1 SB, MP 28.5		1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 6, Route 1 NB, MP 31		1	2	2	No kickplate provided. Verify presence of kickplate and modify catwalk to meet minimum standards.
ID 7, Route 1 SB, MP 35.1		2	2	2	No modification required.
ID 8, Route 1 NB, MP 45.5		1	2	0	No kickplate, anchorage point or hinged gate. Utility line is adjacent to DMS. Replace catwalk with a catwalk meeting minimum standards.
ID 9, Route 1 NB, MP 46.4		2	2	2	No modification required.
ID 10, Route 1 NB, MP 46.7		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 11, Route 1 NB, MP 48.2		1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
ID 12, Route 1 NB, MP 50.73		1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
ID 13, Route 1 NB, MP 53.8		0	2	2	Install catwalk meeting minimum standards.
ID 14, Route 1 SB, MP 55		1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
ID 15, Route 1 SB, MP 56.3		1	2	2	No hand-rail, kickplate, anchorage point or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 16, Route 3 EB, MP 1.1		3	2	0	Utility line is adjacent to DMS.
ID 17, Route 3 EB, MP 2		1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
ID 18, Route 3 EB, MP 6.32		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 19, Route 3 WB, MP 8.9		3	2	2	No modification required.
ID 20, Route 3 EB, MP 8.9		3	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS







Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 21, Route 4 EB, MP 2.2		2	2	2	No modification required.
ID 22, Route 7 SB, MP 2.11		0	2	2	Install catwalk or landing pad meeting minimum standards. May need to relocate cable adjacent to access door.
ID 24, Route 9 NB, MP 109.9		3	2	2	No modification required.
ID 25, Route 9 SB, MP 122.1		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 26, Route 9 NB, MP 131.88		2	2	2	No modification required.
ID 27, Route 9 NB, MP 132.72		3	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS

Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 28, Route 10 EB, MP 10.68		3	1	0	No safe access by ladder. Utility line is adjacent to DMS. Requires use of bucket truck to access sign.
ID 29, Route 10 WB, MP 10.71		3	1	0	No safe access by ladder; Utility line is adjacent to DMS. Requires use of bucket truck to access sign.
ID 30, Route 17 NB, MP 6.7		2	2	2	No modification required.
ID 31, Route 17 NB, MP 8.4		3	2	2	No modification required.
ID 32, Route 17 SB, MP 11.1		1	2	0	No kickplate, anchorage point or hinged gate provided. Utility line adjacent to DMS. Replace catwalk with a catwalk meeting minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 33, Route 17 SB, MP 13.5		0	2	2	Install catwalk meeting minimum standards.
ID 34, Route 18 NB, MP 39.5		2	2	2	No modification required.
ID 35, Route 18 SB, MP 41.19		2	2	2	No modification required.
ID 36, Route 18 SB, MP 42.6		2	2	2	No modification required.
ID 37, Route 18 NB, MP 43.9		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS


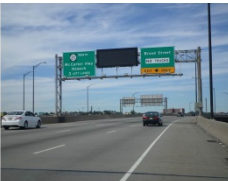



Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 38, Route 18 SB, MP 45.3		2	2	2	No modification required.
ID 39, Route 21 NB, MP 0.4		1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
ID 40, Route 21 SB, MP 0.8		3	2	2	No modification required.
ID 41, Route 21 NB, MP 2.8		3	2	2	No modification required.
ID 42, Route 21 EB, MP 5.2		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 50, Route 22 EB, MP 58.2		2	2	2	No modification required.
ID 51, Route 23 NB, MP 4.7		3	2	0	Utility line is adjacent to DMS. Relocation of utility line needed.
ID 52, Route 24 EB, MP 5.4		3	2	2	No modification required.
ID 54, Route 30 WB, MP 1.4		0	2	2	Install catwalk meeting minimum standards.
ID 55, Route 36 NB, MP 1.2		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 56, Route 36 NB, MP 1.2		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 57, Route 36 SB, MP 3		3	1	2	No hard surface for parking. Parking pad should be installed.
ID 58, Route 36 NB, MP 3		3	1	2	No hard surface for parking. Parking pad should be installed.
ID 59, Route 36 NB, MP 6.15		0	2	2	No space on DMS support structure for a catwalk. Access only available from bucket truck. Replace DMS support structure and install a catwalk.
ID 60, Route 36 SB, MP 11.32		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS







Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 63, Route 36 SB, MP 11.9		3	2	2	No modification required.
ID 64, Route 36 SB, MP 13.18		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 65, Route 36 SB, MP 14.5		3	1	0	No safe access by ladder. Utility line is adjacent to DMS. Requires use of bucket truck to access sign. No modification required.
ID 66, Route 37 EB, MP 6.9		2	2	2	No modification required.
ID 68, Route 37 EB, MP 10.3		2	2	2	No modification required.
ID 69, Route 37 WB, MP 11.1		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 70, Route 38 WB, MP 3.53		2	2	2	No modification required.
ID 71, Route 38 WB, MP 6.39		2	2	2	No modification required.
ID 72, Route 42 SB, MP 8.75		3	1	2	No hard surface for parking. Requires use of bucket truck to access sign. No modification required.
ID 73, Route 42 NB, MP 8.8		3	1	2	No hard surface for parking. Requires use of bucket truck to access sign. No modification required.
ID 74, Route 42 NB, MP 11		3	1	2	No hard surface for parking. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS





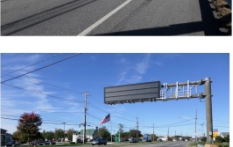
Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 75, Route 42 NB, MP 13.3		2	2	2	No modification required.
ID 76, Route 42 SB, MP 13.7		2	2	2	No modification required.
ID 77, Route 46 EB, MP 45		2	2	2	No modification required.
ID 78, Route 46 EB, MP 48.5		0	2	0	Install catwalk meeting minimum standards. Utility line is adjacent to DMS.
ID 79, Route 46 WB, MP 50.2		1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 80, Route 46 EB, MP 55.2		2	2	2	No modification required.
ID 81, Route 46 WB, MP 57.8		0	2	0	Install catwalk meeting minimum standards. Utility line is adjacent to DMS.
ID 82, Route 46 EB, MP 62.4		2	2	2	No modification required.
ID 83, Route 46 WB, MP 65.3		2	2	0	Utility line is adjacent to DMS.
ID 84, Route 46 EB, MP 67.1		0	2	2	Install catwalk meeting minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 85, Route 46 WB, MP 69.4		1	2	0	No hinged gate provided. Utility line is adjacent to DMS. Replace catwalk with a catwalk meeting minimum standards.
ID 86, Route 55 NB, MP 23.3		2	2	2	No modification required.
ID 87, Route 55 SB, MP 25.8		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 88, Route 55 SB, MP 39.96		0	1	2	This is a front-access DMS with no catwalk. No catwalk recommended. No hard surface for parking. Requires use of bucket truck to access sign.
ID 89, Route 55 NB, MP 48.8		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 90, Route 55 NB, MP 55.1		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 92, Route 70 WB, MP 1.19		1	2	2	No kickplate provided on catwalk. Verify presence of kickplate and modify catwalk to meet minimum standards.
ID 93, Route 70 WB, MP 6.6		0	2	2	No space on DMS support structure for a catwalk. Access only available from bucket truck. Replace DMS sign support and provide a catwalk.
ID 94, Route 70 WB, MP 9.35		2	2	2	No modification required.
ID 97, Route 72 WB, MP 24.95		3	1	2	No hard surface for parking. Installing a parking pad.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 98, Route 73 NB, MP 22.98		0	2	2	No space on DMS support structure for a catwalk. Access only available from bucket truck. Replace DMS support and install catwalk.
ID 99, Route 73 SB, MP 28.5		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 100, Route 73 SB, MP 31		3	2	2	No modification required.
ID 101, Route 73 NB, MP 31		3	2	2	No modification required.
ID 102, Route 76 NB, MP 0.69		3	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 103, Route 76 SB, MP 1.56		1	2	2	No kickplate provided on catwalk. Verify presence of a kickplate and modify catwalk to meet minimum standards.
ID 104, Route 78 WB, MP 5		3	1	2	No hard surface for parking. No safe access by ladder. Install parking pad.
ID 105, Route 78 EB, MP 28.5		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 106, Route 78 WB, MP 33		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 107, Route 78 EB, MP 41.8		2	2	2	No modification required. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 108, Route 78 WB, MP 45.1		2	2	2	No modification required.
ID 109, Route 78 EB, MP 46.6		3	2	2	No modification required.
ID 110, Route 78 EB, MP 50.6		3	2	2	No modification required.
ID 111, Route 78 WB, MP 52.3		0	2	2	Install catwalk meeting minimum standards.
ID 112, Route 78 WB, MP 52.3		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS




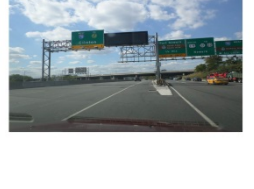

Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 113, Route 78 EB(Local), MP 55		2	2	2	No modification required.
ID 114, Route 78 EB(Express), MP 55		0	2	2	Install catwalk meeting minimum standards.
ID 115, Route 78 WB, MP 56		0	2	2	Install catwalk meeting minimum standards.
ID 116, Route 78 WB, MP 58.4		0	2	2	No space on DMS sign support structure for a catwalk. Access only available from bucket truck. Replace DMS sign support and install a catwalk.
ID 118, Route 80 WB, MP 13		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 119, Route 80 EB, MP 26.2		3	1	2	No hard surface for parking. No safe access by ladder. Install a parking pad.
ID 120, Route 80 EB, MP 40.8		1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
ID 121, Route 80 EB, MP 43.8		0	2	2	Install catwalk meeting minimum standards.
ID 123, Route 80 WB, MP 48.5		1	2	2	No kickplate or hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
ID 124, Route 80 SB, MP 52.4		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 125, Route 80 WB, MP 55.8		2	2	2	No modification required.
ID 126, Route 80 EB, MP 57.5		1	2	2	No hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
ID 127, Route 80 EB, MP 59		1	2	2	No hinged gate provided. Replace catwalk with a catwalk meeting minimum standards.
ID 128, Route 80 EB, MP 61.1		2	2	2	No modification required.
ID 129, Route 80 WB, MP 61.5		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 130, Route 80 EB, MP 63.8		0	2	2	This is a front-access DMS with no catwalk. No catwalk recommended.
ID 131, Route 80 WB, MP 64		2	2	2	No modification required.
ID 132, Route 80 WB, MP 66.3		3	2	2	No modification required.
ID 133, Route 80 EB, MP 66.4		3	2	2	No modification required.
ID 134, Route 95 NB, MP 6.3		1	2	2	No kickplate provided. Verify presence of a kickplate and modify catwalk to meet minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 135, Route 95 SB, MP 75.2		1	2	2	No kickplate or anchorage point. Verify presence of kickplate and anchorage point and modify catwalk to meet minimum standards.
ID 136, Route 95 SB, MP 75.2		1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.
ID 137, Route 130 SB, MP 34.9		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 138, Route 138 WB, MP 2		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 139, Route 139 WB, MP 1.37		1	2	2	No kickplate, anchorage point or hinged gate. Replace catwalk with a catwalk meeting minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS


Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 142, Route 195 EB, MP 4.1		3	1	2	No hard surface for parking. No safe access by ladder. Install a parking pad.
ID 143, Route 195 WB, MP 5.85		3	1	2	No hard surface for parking. Install a parking pad.
ID 144, Route 195 WB, MP 10.2		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 145, Route 195 EB, MP 12.8		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 146, Route 195 WB, MP 17.66		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 147, Route 195 EB, MP 28.6		3	1	2	No hard surface for parking. Requires use of bucket truck to access sign. No modification required.
ID 148, Route 202 SB, MP 63.7		2	2	2	No modification required.
ID 149, Route 280 WB, MP 2.5		1	2	2	No kickplate provided. Verify presence of a kickplate and modify catwalk to meet minimum standards.
ID 150, Route 280 EB, MP 6.7		2	2	2	No modification required.
ID 151, Route 280 EB, MP 12.6		1	2	2	No kickplate provided. Verify the presence of a kickplate and modify catwalk to meet minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 152, Route 280 EB, MP 16.19		2	2	2	No modification required.
ID 153, Route 280 WB, MP 16.3		2	2	2	No modification required.
ID 154, Route 287 NB, MP 0.4		3	2	2	No modification required
ID 155, Route 287 NB, MP 4.62		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 156, Route 287 SB, MP 4.62		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 157, Route 287 NB, MP 7.26		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 158, Route 287 SB, MP 11.55		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 159, Route 287 NB, MP 12.27		3	2	2	No modification required.
ID 160, Route 287 SB, MP 13.64		1	2	2	No kickplate or grate provided. Replace catwalk with catwalk meeting minimum standards.
ID 161, Route 287 SB, MP 20.1		1	2	2	No kickplate, front railings or grate provided. Replace catwalk with catwalk meeting minimum standards.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 162, Route 287 NB, MP 20.14		1	2	2	No kickplate or grate provided. Replace catwalk with catwalk meeting minimum standards
ID 163, Route 287 SB, MP 23.6		3	2	2	No modification required.
ID 164, Route 287 NB, MP 28.3		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 165, Route 287 SB, MP 30.9		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 166, Route 287 SB, MP 37.1		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 167, Route 287 NB, MP 40.2		2	2	2	No modification required.
ID 168, Route 287 SB, MP 44.5		2	2	2	No modification required.
ID 169, Route 295 SB, MP 15.1		2	2	2	No modification required.
ID 170, Route 295 SB, MP 15.1		2	2	2	No modification required.
ID 171, Route 295 NB, MP 22.89		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS






Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 172, Route 295 NB, MP 24.4		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 173, Route 295 SB, MP 24.6		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 174, Route 295 NB, MP 28.6		2	2	2	No modification required.
ID 175, Route 295 SB, MP 29.07		2	2	2	No modification required.
ID 176, Route 295 SB, MP 31.2		2	2	2	No modification required.

Table 21. Recommendations for Improving Safety and Access to DMS

Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 177, Route 295 NB, MP 35.5		2	2	2	No modification required.
ID 178, Route 295 SB, MP 36		2	2	2	No modification required.
ID 179, Route 295 SB, MP 42.37		2	2	2	No modification required.
ID 180, Route 295 SB, MP 47.5		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 181, Route 295 NB, MP 49		3	1	2	No hard surface for parking. Install parking pad.

Table 21. Recommendations for Improving Safety and Access to DMS










Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 182, Route 295 SB, MP 54		3	1	2	No hard surface for parking. No safe access by ladder. Install parking pad.
ID 183, Route 295 NB, MP 57.3		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 184, Route 295 NB, MP 66.6		2	2	2	No modification required.
ID 185, Route 322 EB, MP 1.69		3	1	2	No safe access by ladder. Requires use of bucket truck to access sign. No modification required.
ID 186, Route 440 NB, MP 21.7		0	2	0	Install catwalk meeting minimum standards. Utility line is adjacent to DMS.

Table 21. Recommendations for Improving Safety and Access to DMS

Location	DMS	Rating			Recommendation
		Catwalk	Access	Utility Line	
ID 187, Route 444 NB, MP 23.9		0	2	2	This is a front-access DMS with no catwalk. No catwalk recommended.
ID 188, Route 444 SB, MP 31.4		0	2	2	This is a front-access DMS with no catwalk. No catwalk recommended.
ID 189, Route 444 NB, MP 141.5		0	2	2	This is a front-access DMS with no catwalk. No catwalk recommended.
ID 190, Route 444 NB, MP 142.2		0	2	2	This is a front-access DMS with no catwalk. No catwalk recommended.