

User-friendly Asset Management Tools

*Town of North Andover
Roadway Management &*



MUTCD Compliance Program

NBM Highway Association



Benefits of Asset Management

- ***Reactive vs. Proactive***
- **Maximize Available Funding**
- **Reduce long-term maintenance costs**
- **Short and long range repair plan**
- **Better infrastructure for less money**



Scope of Services

- ✓ Develop System Specifications
- ✓ Identify GIS Base Mapping
- ✓ Roadway Management
- ✓ MUTCD Compliance Program
- ✓ CIP & Action Planning
- ✓ System Maintenance & Support

System Specifications

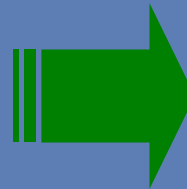
- MS Access-based Program
- Geodatabase Format (ESRI Backbone)
- Dynamic Link with GIS Layers
- Custom Reports
- Intuitive Tools
- Non-Proprietary



System Specifications

Key System Components

- ✓ Foundation
- ✓ Planning
- ✓ Mapping
- ✓ Compliance
- ✓ Competitive



Town of North Andover
<i>Asset Management System</i>
Pavement Management
Sidewalks and Ramps
Municipal Parking Lots
Stormwater Management
MUTCD Sign Program
Signal Inventory
Capital Planning
GIS Mapping
System Settings
BETA ENGINEERING SUCCESS TOGETHER
Version 6.0 2011

System Specs - Roadways

MS Access Interface – Forms, Tables, Reports

The screenshot displays the 'North Andover Asset Management' software interface. On the left is a navigation menu for the 'Town of North Andover Asset Management System', with 'Pavement Management' highlighted. The main area is divided into several windows:

- Inventory and Inspection Form:** Shows details for 'ABBOTT STREET' (GIS ID: 938). It includes fields for 'Street', 'Segment Name', 'From Street', and 'To Street'. The 'Inspection Data' section shows 'Inspector: BETA', 'Inspection Date: 4/30/2009', 'Alignment: Acceptable', and 'Pavement Material: Jc'. The 'Detailed Distresses' table lists various distress types with their severity and extent.
- Distresses:** A table listing distress types and their weighting.

DistressNumber	Distress	Weighting
6	Rutting	1
1	Edge Cracking	2
8	Drainage	2
4	Potholes	5
5	Patching	20
7	Depressions	20
2	Alligator Cracking	20
3	Linear Cracking	30
(AutoNumber)		0
- Repair Methods:** A table listing repair methods and their associated costs.

Repair Method	RSR Low Limit	RSR High Limit	Unit Cost per S
Reconstruction	0	25	38.5
Reclamation	25	50	22.5
Mill and Overlay	50	60	16.5
Level and Overlay	60	60	14.5
Crack Seal	80	90	0.35
Defer Maintenance	90	100	0
- Proposed Roadway Improvement Plan Summary Report:** A report titled 'Town of North Andover, Massachusetts Pavement Management Program Proposed FY 2011 - Roadway Improvement Plan Summary'. It includes a table with columns for 'Miles', 'Initial Cost', 'Police Estimate', and 'Corr E:'.

	Miles	Initial Cost	Police Estimate	Corr E:
Project Year: FY 2011				
Funding Source: Chapter 90				
Level and Overlay	0.44	\$62,065.00	\$4,480.00	\$6
Mill and Overlay	0.93	\$216,473.00	\$15,153.00	\$21
Reclamation	1.10	\$252,155.00	\$17,651.00	\$25
Total	2.48	\$531,493.00	\$37,284.00	\$53



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System Specs - Signs

MS Access Interface – Forms, Tables, Reports

Town of North Andover
MUTCD Sign Program
 Sign Inventory Form
 General Inventory Reports
 Compliance Reports
 Local Ordinance Review Reports
 Capital Plan Reports
 Maintenance Activities Reports
 GIS Mapping

Exit MUTCD Sign Program

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WORLDTECH
 ENGINEERING

Sign Location Information
 Sign ID: P919-190 Street Name: ABBOTT STREET

Sign Type and MUTCD Compliance
 MUTCD Compliance (Size, Condition, Mounting): Yes
 Regulatory Sign type: R4 - Movement Regulation
 Warning Sign type: 0
 School Sign type: 0
 Trail Blazer: 0

Sign Inspection Information
 Sign Material: Engineering Grade
 Sign Size: Yes
 Sign Condition: Good
 Obstructed: No
 Speed Limit: 0
 Parking Limit: 0
 Notes: 0

Local Ordinance Compliance

MUTCD Compliance
 Select Report (Click Heading to View Report)

Heading	Report Description
MUTCD Retroreflectivity Compliance	Signs That Meet MUTCD Compliance, 5
MUTCD Retroreflectivity Non-Compliance	Signs That DO NOT Meet MUTCD Com

Capital Plan Reports
 Select Report (Click Heading to View Report)

Heading	Report Description
Sign Replacement Program 3 Year Plan Summary	Sign Replacement Program - 3 Year Plan
Sign Replacement Program 3 Year Plan	Sign Replacement Program - 3 Year Data

3 Year CP Summary
 Town of North Andover, Massachusetts
 Sign Replacement Program - 3 Year Summary

Signs Prioritized by Sign Type (Regulatory, Warning, School, Guide, Unidirectional Sign and the Sign) and Retroreflectivity Rating. Signs in our Best-Local Ordinance Signatures Included in CIP. For List of Local Ordinance Sign Refer to "Local Ordinance Review" Report

Sign Type	Sign Type	Number of Signs	Sign Cost	Post Cost	Replacement Cost
2011					
Stop	Regulatory	207	\$15,525.00	\$1,890.00	\$17,415.00
Yield	Regulatory	5	\$375.00	\$380.00	\$555.00
Yield	Regulatory	4	\$552.00	\$0.00	\$552.00
Speed Limit	Regulatory	177	\$10,620.00	\$900.00	\$11,520.00
		393	\$26,871.00	\$3,970.00	\$29,841.00
2012					
No Right Turn	Regulatory	2	\$150.00	\$0.00	\$150.00
No Left Turn	Regulatory	8	\$600.00	\$90.00	\$690.00
No Turns	Regulatory	1	\$75.00	\$0.00	\$75.00
Right Turns Only	Regulatory	6	\$450.00	\$0.00	\$450.00

SignRepairMethods:

Sign Subtype	Unit Cost	Priority	Year
R3-7L	\$75.00		10/2012
R4-1	\$21.00		11/2012
R4-7	\$75.00		12/2012
R4-3X	\$75.00		12/2012



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GIS Base Mapping

Typical Mapping Resources

- **Planimetric Base Mapping**
 - *Edge of Pavement, Back of Sidewalk, Buildings*
 - *Signs, Manholes, Catchbasins, Valves*
- **Municipal Road Centerline File**
- **State Road Inventory File (EOT/MassDOT)**
- **Ortho Photography**
- **Municipal Parcel Mapping**

System Specs – GIS Mapping

GIS Interface – ArcReader, ArcView, Web App

Town of North Andover
Asset Management System

- Pavement Management
- Sidewalks and Ramps
- Municipal Parking Lots
- Stormwater Management
- MUTCD Sign Program
- Signal Inventory
- Capital Planning**
- GIS Mapping**
- System Settings

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Version 6.0 2011

Pavement - ArcReader

- Street Label
- Sign_Inventory
 - Regulatory Sign
 - Warning Sign
 - School Sign
 - Guide Sign
 - Unlimited Sign
 - No Sign
- RSR (Road Surface Rating)
 - Reconstruction
 - Paved and Overlay
 - Level and Overlay
 - Crack Seal
 - Defer Maintenance
- 2011 Roadway Projects
 - Major Roads
 - Local Roads
 - parcels
 - Mb_Town
 - Ortho

762498.39 3073367.91 Feet



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System Specs – GIS Mapping

GIS Interface – ArcReader, ArcView, Web App

Town of North Andover
Asset Management System

- Pavement Management
- Sidewalks and Ramps
- Municipal Parking Lots
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BETA
ENGINEERING SUCCESS TOGETHER
Version 6.0 2011

WORLDTECH ENGINEERING

WTFCD ArcReader

Layers:
[x] Street Label
[x] Sign Inventory
[x] Sign Inventory

ID	Sign Type	Code
ID: P10-01	Regulatory Sign	31.1 DR N
ID: P10-02	Regulatory Sign	R1.1 DR N
ID: P10-03	Regulatory Sign	R1.1 DR N
ID: P10-04	Regulatory Sign	31.1 DR N
ID: P10-05	Regulatory Sign	R1.1 DR N
ID: P10-06	Regulatory Sign	31.1 DR N
ID: P10-07	Regulatory Sign	R1.1 DR N
ID: P10-08	Regulatory Sign	R1.1 DR N
ID: P10-09	Regulatory Sign	31.1 DR N
ID: P10-10	Regulatory Sign	R1.1 DR N
ID: P10-11	Regulatory Sign	31.1 DR N
ID: P10-12	Regulatory Sign	R1.1 DR N



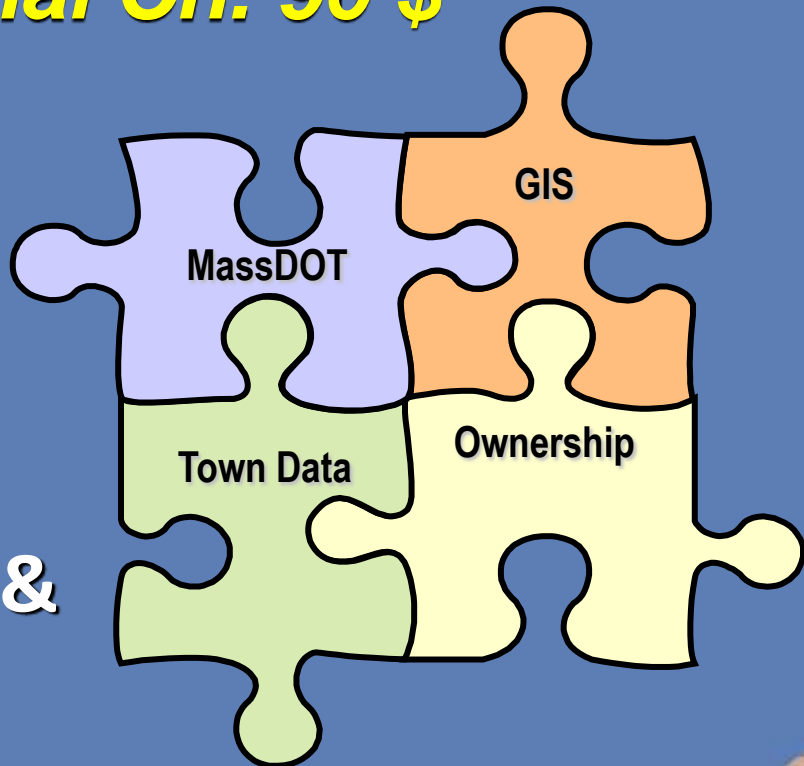
NBM Highway Association



Roadway Management

Roadway Inventory Audit Could Yield Additional Ch. 90 \$

- Verify Town Accepted Streets
- Review MassDOT Road Inventory File
- Compare MassDOT & Town Records



Roadway Management

Inspection Program

- Calculate Road Surface Rating (RSR) based on existing distresses
- Ratings are 0 to 100 (Worst to Best)
- Identify other Assets (Sidewalks, Curb, etc)

Roadway Inventory

Inventory and Inspection Form

GIS ID: 201

Street: COURT STREET

Segment Name: COURT STREET

From Street: ACADEMY ROAD

To Street: PLEASANT STREET

BSIB: 20

Length Feet: 2,079.03

Length Miles: 0.29

Plan Route: 3

Owner: Town

Accepted: Accepted

Fix: 0

Inspection Data

Inspector: BETA

Inspection Date: 6/12/2009

Alignment: Acceptable

Sub: Acceptable

Pavement Material: Width: 78.00

Detailed Distresses

Distress	Severity	Extent (%)	Notes
Spalls/Cracks	Moderate	40	
Alligator Cracking	Moderate	60	
Linear Cracking	Moderate	70	
Potholes	Moderate	50	
Patching	Moderate	60	
Stains	Moderate	10	
Depressions	Moderate	60	
Seams	Moderate	10	

Overall Notes: Worst street I have seen in year.

Curb Data

Odd Curb Type: None

Even Curb Type: None

Avg. Finish: 0

Sidewalk Data

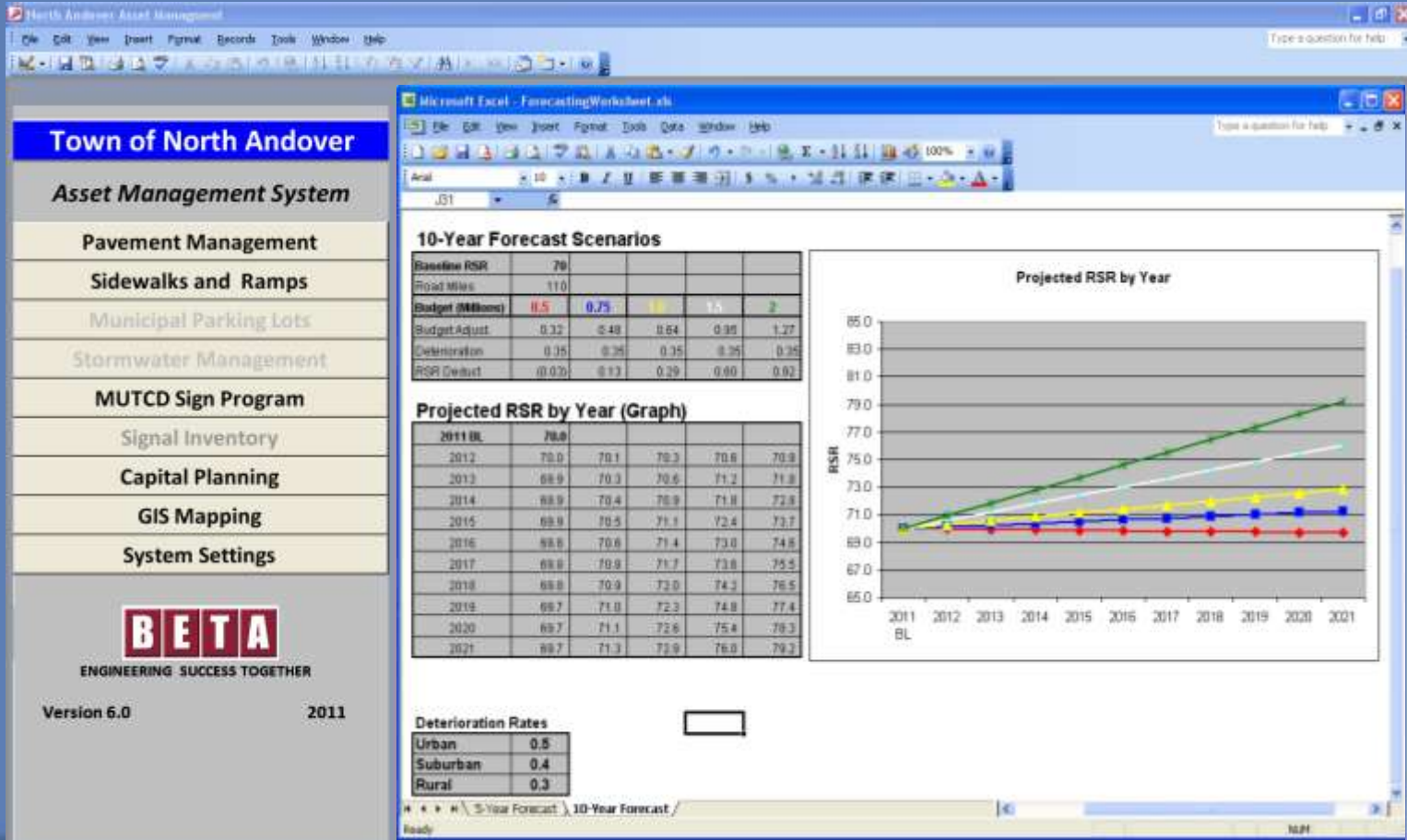
Sidewalk Odd: No

Sidewalk Even: No



Roadway Management

Model RSR based on Budget Scenarios



Roadway Management

Capital Improvement Planning

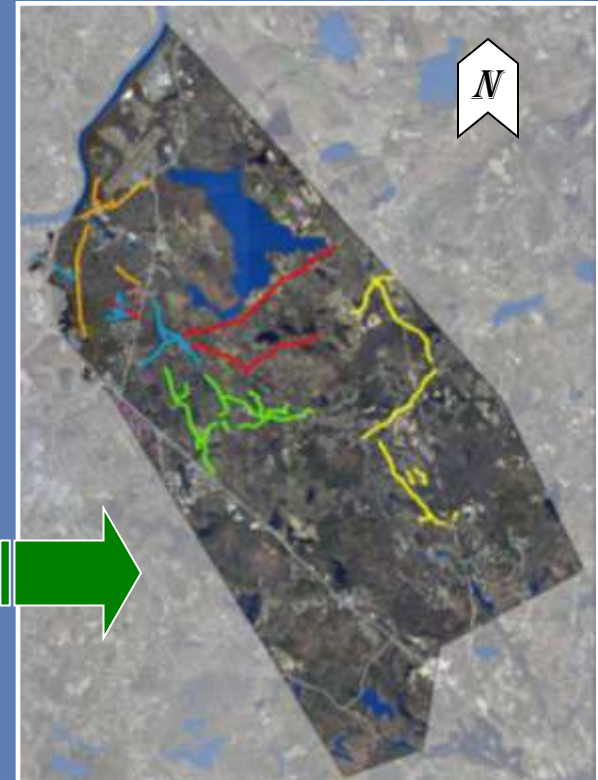
Town of North Andover, Massachusetts Pavement Management Program Proposed 5 - Year Roadway Improvement Plan Summary

Note: Police Detail at 7% of Total Cost. DYCL Striping at \$.72 linear Foot and Fog Line striping at \$.36 linear foot. Calculated at \$.72 to account for both lines. 5% Contingency has been added to the CIP Estimate.

	Miles	Initial Cost	Police Estimate	DYCL Striping	Fog Line Striping	CIP Estimate
Project Year: FY 2011						
Funding Source: Chapter 90						
Cock Seal	3.38	\$31,891.00	\$2,234.00	\$0.00	\$0.00	\$34,125.00
Mil and Overlay	1.04	\$276,620.00	\$19,382.00	\$3,969.00	\$3,969.00	\$317,731.00
Reclamation	0.32	\$102,061.90	\$7,180.00	\$1,230.00	\$1,230.00	\$117,333.00
	4.73	\$411,072.00	\$28,776.00	\$5,199.00	\$5,199.00	\$449,176.00
Funding Source: Local Funds						
Mil and Overlay	0.20	\$89,349.00	\$4,804.00	\$0.00	\$0.00	\$17,871.00
Reclamation	0.79	\$239,314.00	\$16,792.00	\$0.00	\$0.00	\$256,032.00
Reconstruction	0.17	\$89,081.00	\$6,938.00	\$0.00	\$0.00	\$116,971.00
	1.07	\$407,744.00	\$28,542.00	\$0.00	\$0.00	\$436,274.00
FY 2011 Total:	5.79	\$818,816.00	\$57,318.00	\$5,199.00	\$5,199.00	\$925,623.00
Project Year: FY 2012						
Funding Source: Chapter 90						
Cock Seal	0.41	\$28,041.00	\$1,888.00	\$0.00	\$0.00	\$30,539.00
Mil and Overlay	2.04	\$478,023.00	\$33,480.00	\$7,792.00	\$7,792.00	\$526,905.00
	2.45	\$506,074.00	\$35,468.00	\$7,792.00	\$7,792.00	\$557,144.00
Funding Source: Local Funds						
Mil and Overlay	1.37	\$211,862.00	\$14,810.00	\$0.00	\$0.00	\$226,672.00
Reclamation	0.89	\$195,714.00	\$13,700.00	\$0.00	\$0.00	\$219,200.00
	2.22	\$407,296.00	\$28,510.00	\$0.00	\$0.00	\$436,172.00
FY 2012 Total:	3.67	\$913,870.00	\$63,989.00	\$7,792.00	\$7,792.00	\$1,037,819.00
Project Year: FY 2013						
Funding Source: Chapter 90						
Cock Seal	0.32	\$32,333.00	\$2,266.00	\$0.00	\$0.00	\$34,599.00
Mil and Overlay	1.00	\$398,770.00	\$27,199.00	\$9,429.00	\$9,429.00	\$446,822.00
	1.11	\$423,103.00	\$29,421.00	\$9,429.00	\$9,429.00	\$482,518.00
Funding Source: Local Funds						

10/17/2008

Page 1 of 2



MUTCD Compliance Deadlines

Key Dates: (Changes Pending)

January 2012

- Implement method to maintain minimum levels of retroreflectivity.

January 2015

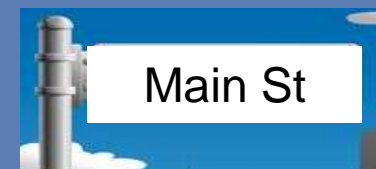
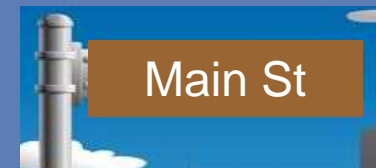
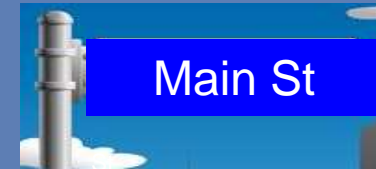
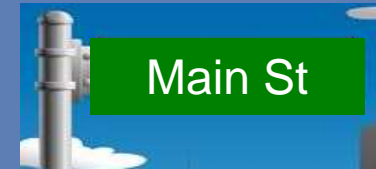
- Retroreflectivity levels must be met on:
 - Red & White Regulatory Signs
 - Yellow Warning Signs
 - Green & White Post-mounted Guide Signs



MUTCD Compliance Deadlines

January 2018

- Retroreflectivity levels and format must be met on:
 - *Overhead Guide Signs*
 - *Street Name Signs*



NO UPPER CASE

MUTCD Compliance Program


Establish Inventory of Existing Signs

- Tablet Laptop
- GIS-based Approach
- Custom ArcView App
- Attributes Collected
 - *Type*
 - *Size*
 - *Legend*
 - *Material*
 - *Condition*
 - *Sign Support*
 - ***Retroreflectivity***



MUTCD Compliance Program

Inventory Analysis

- Signs to be retained
- Signs to be replaced
- Sign supports to be replaced/altered
- Signs requiring height adjustment
- Obstructed Signs 
- Local Ordinance Review

Sign Obstructed

Town of North Andover, Massachusetts
Sign Obstructed - 46

Sign ID	Sign Type	Sign Type	Material
ANDOVER STREET 3 Signs			
PR 8-59	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
PR 8-62	School Sign	Ed School Zone	DG Prismatic
PR 8-63	Guide Sign	Guide Sign	HI Prismatic
APPLETON STREET 1 Signs			
PR 10-15	Regulatory Sign	Stop	HI Prismatic
BAY STATE ROAD 1 Signs			
PR 3-162	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
BERKELEY ROAD 2 Signs			
PR 8-32	Regulatory Sign	Right Turn Only	Engineering Grade
PR 8-34	Regulatory Sign	No Left Turn	DG Prismatic
DALE STREET 2 Signs			
PR 10-4	Regulatory Sign	Speed Limit	Engineering Grade
PR 11A-2	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
DELUCIA WAY 1 Signs			
PR 7-90	Regulatory Sign	Stop	Engineering Grade
FAULKNER ROAD 1 Signs			
PR 6-94	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
FOSTER STREET 1 Signs			
PR 13-10	Regulatory Sign	Stop	Engineering Grade
GREAT POND ROAD 2 Signs			
PR 4-1	Regulatory Sign	Speed Limit	Engineering Grade
PR 4-26	Regulatory Sign	Speed Limit	Engineering Grade
GREENE STREET 1 Signs			
PR 7-28	Regulatory Sign	Stop	Engineering Grade
HEWITT AVENUE 1 Signs			
PR 8-3	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
HILLSIDE ROAD 3 Signs			
PR 12-23	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
PR 8-90	Unlit Ed Sign	Unlit Ed Sign	Engineering Grade
PR 8-97	Warning Sign	Stop Ahead	Engineering Grade
LACY STREET 1 Signs			
PR 13-97	School Sign	School Bus Stop Ahead	Engineering Grade
MASSACHUSETTS AVENUE 3 Signs			
PR 7-145	Warning Sign	Signal Ahead	Engineering Grade
PR 7-160	Regulatory Sign	No Left Turn	Engineering Grade

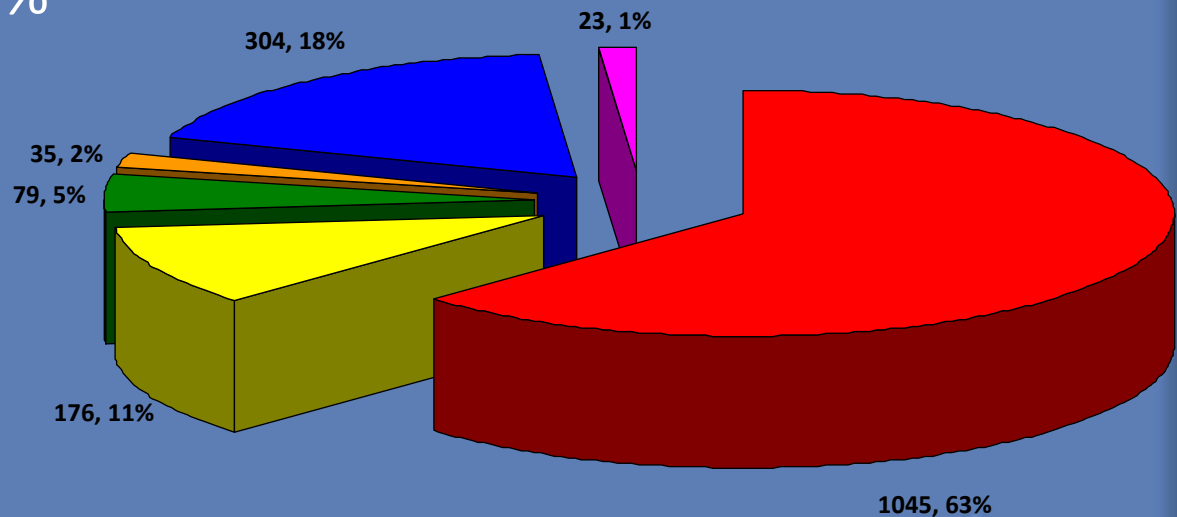
8/11/2011 Page 1 of 3

Page: 1

MUTCD Compliance Program

Inventory Analysis – Sign Type

- Regulatory: 63%
- Warning: 11%
- School: 5%
- Guide: 2%
- Unlisted: 18%
- Post Only: 1%

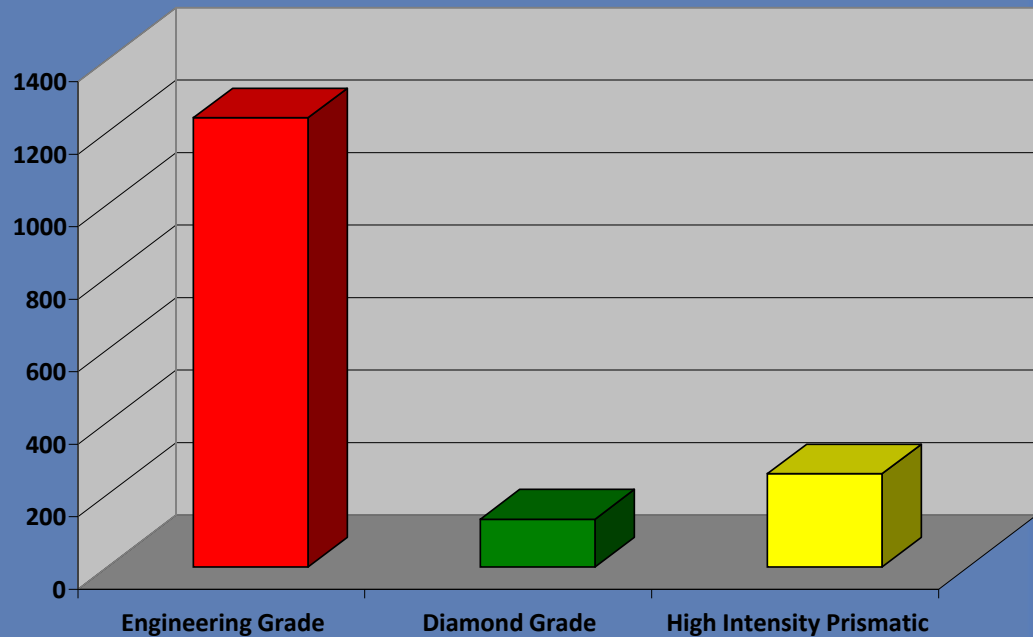


1,662 Total Signs
142 Road Miles

MUTCD Compliance Program

Inventory Analysis – Material Type

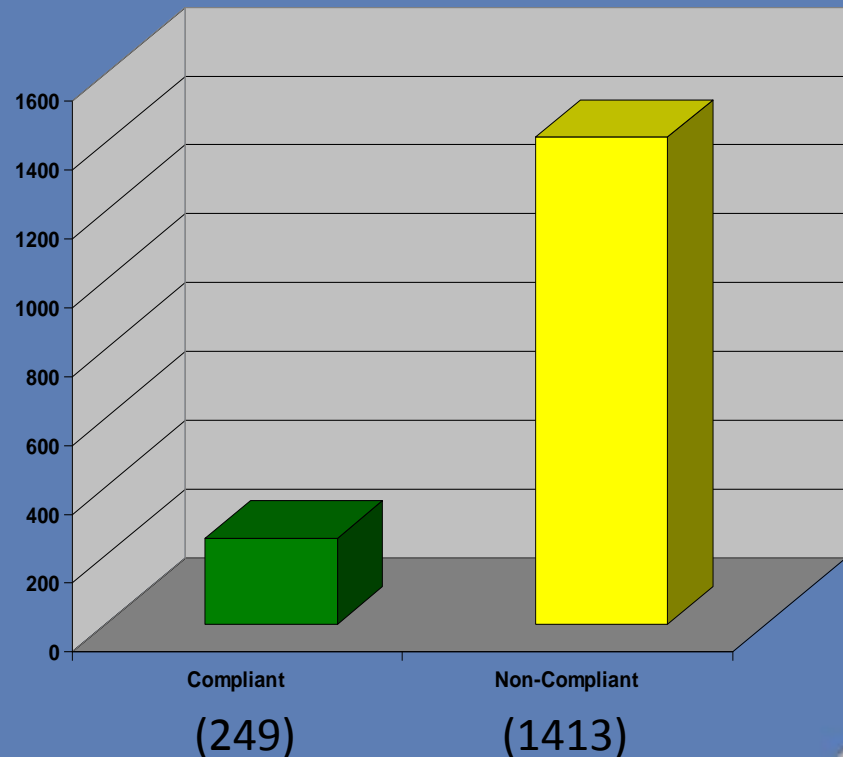
- Engineering Grade: 76%
- High Intensity Prismatic: 16%
- Diamond Grade: 8%



MUTCD Compliance Program

Inventory Analysis – Compliance

- MUTCD Compliant: 15%
(Size, Height/Location, Legend and Retroreflectivity)
- MUTCD Non-Compliant: 85%
(Size, Height/Location, Legend and Retroreflectivity)



MUTCD Compliance Program

BETA/Worldtech Sign Inventory Projects

City/Town	No. of Signs	Ch. 90 Road Miles	Signs per Mile	High Grade Sheeting	Retro Pass Rate
Beverly, MA	4181	125	34	440	44%
Newburyport, MA	1448	67	22	339	40%
North Andover, MA	1662	117	14	389	63%
Hamilton, MA	560	45	13	114	48%
Lynn, MA	2049	40	51	245	44%
Uxbridge, MA	1224	89	14	365	65%
Manchester, NH	1028	25	41	262	90%
Watertown, MA	2893	72	40	795	55%
Wareham, MA	Approx. 2000	120	TBD	TBD	TBD
Lakeville, MA	Approx. 1500	66	TBD	TBD	TBD



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MUTCD Compliance Program

Action Planning Options

- Prioritized Approach

Sign Type (Stop, Yield), Material Type, Functional Class.

- Blanket Replacement

Organized by District – Plow Route, Precinct

- Retroreflectivity

Based on Readings or Field Observations

- Hybrid



MUTCD Compliance Program

North Andover's Action Plan

- Bid Awarded to Liddell Brothers (3 Year Contract)
- Locked in Sign Replacement & Installation Costs
- Developed 3-Year Prioritized Plan (by Sign Type)
- Plan Designed to Bring North Andover in Compliance by 2015 Deadline (Pending Change)

Year 1 - \$29,842

Year 2 - \$20,113

Year 3 - \$16,034

Total - \$65,889



MUTCD Compliance Program

3 Year CIP Summary

Town of North Andover, Massachusetts Sign Replacement Program - 3 Year Summary

Signs Prioritized by Sign Type (Regulatory, Warning, School, Guide, Directional, Sign and No Sign) and Performance Rating. More to come. A quality assurance sign and installation (QI) for all installed signs. Sign Refer to "Accessibility Review" Report

Sign Type	Sign Type	Number of Signs	Sign Cost	Post Cost	Replacement Cost
2011					
Stop	Regulatory	207	\$15,525.00	\$1,890.00	\$17,415.00
Yield	Regulatory	5	\$375.00	\$80.00	\$555.00
Yield	Regulatory	4	\$352.00	\$0.00	\$352.00
Speed Limit	Regulatory	177	\$30,620.00	\$900.00	\$31,520.00
		393	\$16,872.00	\$2,770.00	\$20,642.00
2012					
No Right Turn	Regulatory	2	\$150.00	\$0.00	\$150.00
No Left Turn	Regulatory	8	\$600.00	\$90.00	\$690.00
No Turns	Regulatory	1	\$75.00	\$0.00	\$75.00
Right Turn Only	Regulatory	6	\$450.00	\$0.00	\$450.00
Right Lane Must Turn Right	Regulatory	5	\$375.00	\$0.00	\$375.00
Left Lane Must Turn Left	Regulatory	5	\$375.00	\$0.00	\$375.00
Do Not Pass	Regulatory	4	\$84.00	\$0.00	\$84.00
Keep Right	Regulatory	5	\$375.00	\$90.00	\$465.00
Keep Right Arrow	Regulatory	8	\$600.00	\$0.00	\$600.00
Keep Right Arrow	Regulatory	2	\$150.00	\$30.00	\$180.00
Do Not Enter	Regulatory	33	\$2,475.00	\$90.00	\$2,565.00
One Way Arrow	Regulatory	21	\$882.00	\$90.00	\$972.00
One Way	Regulatory	6	\$252.00	\$0.00	\$252.00
No Parking Any Time	Regulatory	51	\$1,071.00	\$90.00	\$1,161.00
Reserved Parking For Handicapped	Regulatory	9	\$189.00	\$0.00	\$189.00
Parking Time Limit	Regulatory	56	\$1,176.00	\$30.00	\$1,206.00
Tow-Away Zone	Regulatory	23	\$483.00	\$90.00	\$1,473.00
No Parking	Regulatory	226	\$4,746.00	\$1,380.00	\$6,126.00
Weight Limit	Regulatory	7	\$525.00	\$0.00	\$525.00
No Trucks Over X Lbs	Regulatory	3	\$225.00	\$0.00	\$225.00
Railroad Crossing	Regulatory	7	\$525.00	\$0.00	\$525.00
Number of RR Tracks	Regulatory	6	\$450.00	\$0.00	\$450.00
		494	\$16,233.00	\$3,780.00	\$20,013.00
2013					
Turn	Warning	1	\$75.00	\$0.00	\$75.00
Curve	Warning	7	\$525.00	\$90.00	\$615.00
Winding Road	Warning	4	\$300.00	\$0.00	\$300.00
Winding Road	Warning	5	\$375.00	\$0.00	\$375.00
Horizontal Alignment	Warning	1	\$75.00	\$0.00	\$75.00
Cross Road	Warning	4	\$300.00	\$0.00	\$300.00
Side Road	Warning	1	\$75.00	\$0.00	\$75.00
Gravel Intersection	Warning	1	\$75.00	\$0.00	\$75.00
Stop Ahead	Warning	13	\$975.00	\$90.00	\$1,065.00
Stop Ahead	Warning	8	\$600.00	\$0.00	\$600.00
Signal Ahead	Warning	1	\$75.00	\$0.00	\$75.00

10/17/2011

Page 1 of 2

Page: 1

SignRepairMethods

Sign Type	Sign Subtype	Unit Cost	Priority	Year
R1-1 Stop	R1-1	\$75.00		1 2011
R1-2 Yield	R1-2	\$75.00		2 2011
R1-6 - In-Street Pedestrian Crossing (Yield)	R1-6	\$88.00		3 2011
R2-1 - Speed Limit	R2-1	\$60.00		4 2011
R3-1 - No Right Turn	R3-1	\$75.00		5 2012
R3-2 - No Left Turn	R3-2	\$75.00		6 2012
R3-3 - No Turns	R3-3	\$75.00		7 2012
R3-5R - Right Turn Only	R3-5R	\$75.00		8 2012
R3-7R - Right Lane Must Turn Right	R3-7R	\$75.00		9 2012
R3-7L - Left Lane Must Turn Left	R3-7L	\$75.00		10 2012
R4-1 - Do Not Pass	R4-1	\$21.00		11 2012
R4-7 - Keep Right (symbol)	R4-7	\$75.00		12 2012
R4-7a - Keep Right (horizontal arrow)	R4-7A	\$75.00		13 2012
R4-7b - Keep Right (diagonal arrow)	R4-7B	\$75.00		14 2012
R5-1 - Do Not Enter	R5-1	\$75.00		15 2012
R6-1(L or R) - One Way (arrow)	R6-1L	\$42.00		16 2012
R6-2(L or R) - One Way (rectangular)	R6-2L	\$42.00		17 2012
R7-1 - No Parking Any Time	R7-1	\$21.00		18 2012
R7-8 - Reserved Parking For Handicapped	R7-8	\$21.00		19 2012
R7-10B - (Hour/Minute) Parking (time limit)	R7-10B	\$21.00		20 2012
R7-201 - Tow-Away Zone	R7-201	\$21.00		21 2012
R8-3 - No Parking (word legend)	R8-3	\$21.00		22 2012
R10-11a - No Turn On Red (4 line)	R10-11a	\$75.00		23 2012
R10-11b - No Turn On Red (3 line)	R10-11b	\$75.00		24 2012
R10-22 - Bicycle Signal Actuation	R10-22	\$75.00		25 2012
R12-1 - Weight Limit	R12-1	\$75.00		26 2012
R12-3 - No Trucks Over X Lbs Empty Weight	R12-3	\$75.00		27 2012
R14-5 - National Network (Trucks) Prohibited	R14-5	\$75.00		28 2012
R15-1 - Railroad Crossing (crossbuck)	R15-1	\$75.00		29 2012
R15-2 - Number of Tracks	R15-2	\$75.00		30 2012
W1-1(L&R) - Turn	W1-1L	\$75.00		31 2013
W1-2(L&R) - Curve	W1-2L	\$75.00		32 2013

Record: 32 of 70

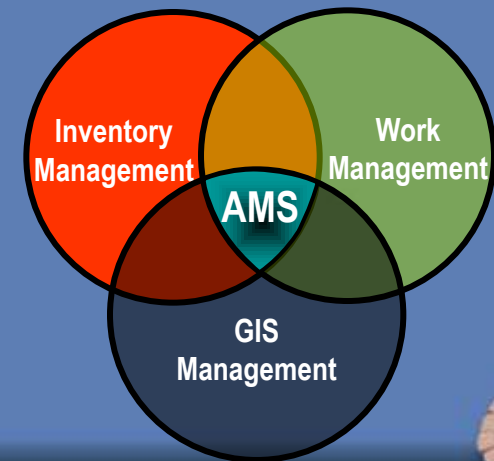


NBM Highway Association



System Maintenance & Support

- Training Program
- Update Data as Projects/ Maintenance are Completed
- Review Unit Costs Annually
- Re-inspect Roads & Signs periodically (3 years)
- Add Newly Accepted Roads
- On-going Coordination – Roads, Signs, Utilities



User-friendly Asset Management Tools



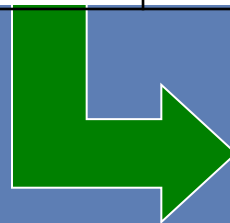
Thank You
NBM Highway Association



Roadway Management

Establish Repair Bands & Backlog

<u>Repair Method</u>	<u>Length (Miles)</u>	<u>Cost</u>	<u>% By Repair</u>
<i>Reconstruction</i>	0.66	\$289,221	4.06
<i>Reclamation</i>	24.40	\$7,631,124	17.23
<i>Mill and Overlay</i>	29.87	\$6,761,024	21.09
<i>Level and Overlay</i>	52.57	\$10,217,770	37.12
<i>Crack Seal</i>	17.84	\$128,347	12.60
<i>Defer Maintenance</i>	16.27	\$0	11.49
TOTALS:	141.61	\$25,287,486	100.00



Network RSR = 70

Roadway Management

Capital Improvement Planning

- Budgetary Requirements
 - Chapter 90
 - Local, Other
- Prioritization Strategies
- Utility Coordination
- Deterioration Rates

