

Transportation Elements Assessment Town of Milton



Delaware T² Center

November 2, 2009

Introductions

- Larry Klepner – T² Program Coordinator , Delaware T² Center
- Matt Carter – T² Engineer and Municipal Engineering Circuit Rider, Delaware T² Center; Licensed Professional Engineer
- Kate Smagala – Engineering Intern, Delaware T² Center and Engineering Undergraduate Student at University of Delaware
- Bob McGurk – Engineering Intern, Delaware T² Center and Engineering Undergraduate Student at University of Delaware

Delaware T² Center

- T² Centers or LTAPs located in all 50 states
- Funded by FHWA and state DOTs
- Mission – promote training, tech transfer, research implementation at local level
- Delaware T² hosted by University of Delaware, part of Delaware Center for Transportation
- Our services are already paid for by federal and state taxes, so we're pleased to help the Town of Milton any way we can



Delaware T² Center



Why We're Here

- April 15, 2009 Meeting
 - George Dickerson, Stephanie Coulbourne, Julie Powers, Matt Carter
 - Exploratory – how can T² Center help Milton
 - Identified issues of interest – pedestrian safety, pavement management, signage issues, ADA compliance, SRTS coordination, etc.
- Safety Circuit Rider Funding
 - Unusual supplemental funding provided additional resources this year
 - Enabled hiring of engineering interns to complete more involved data collection and analyses than normal

What Have We Done?

Data Collection (summer 2009) and analyses:

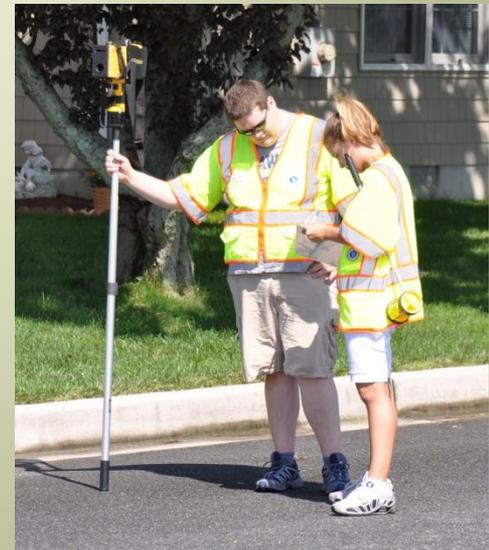
- Motorist and pedestrian safety
- Pavement condition and management
- Sidewalk ADA consistency
- Stormwater drainage
- Street signage

Meetings/discussion with Allen Atkins

Report of Findings (October 2009), including data, recommendations, and analytical tools for future use

Scope of Study

- Pavement condition
 - Walking inspection of all Milton-owned/maintained streets
 - Applied the Pavement Condition Rating (PCR) system
 - Developed by the Ohio DOT and FHWA
 - Used here with minor modifications
 - Streets widths and lengths were measured, cross and longitudinal slopes were collected, and pavement distresses were recorded



Scope of Study (cont'd)

- Sidewalks

- Physical inspection of all continuous sidewalks
- Particular emphasis on ADA consistency of ramps
 - U.S. Access Board
 - DeIDOT Standards
- Sidewalk widths, ramp widths, longitudinal and cross slopes measured, presence of detectible warning devices
- Interaction with Safe Routes to Schools contractor (Toole & Associates)



Scope of Study (cont'd)

- Storm drainage
 - Where conditions suggest possible stormwater impact on pavement condition or ADA consistency



Scope of Study (cont'd)

- Signage

- Inspection of signs limited to Stop, Speed Limit, Do Not Enter, One Way, Yield, Wrong Way, and some Pedestrian Crossing
- Delaware MUTCD
- Physical inspection and measurement of retroreflectivity, size, height, breakaway anchor, sheeting damage, etc.



By the way...

Did we mention what a beautiful town you have?



Thanks for letting us enjoy it for a while.

Pavement Distress 101

- Block cracking
- Patching
- Alligator cracking
- Potholes

Previous patch area that exhibits new distress; can become structural



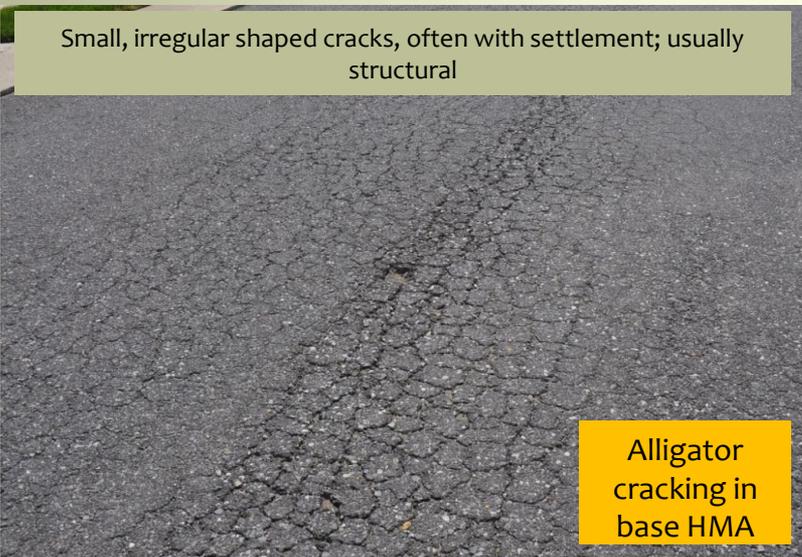
Patch deterioration

Localized pavement loss; structural



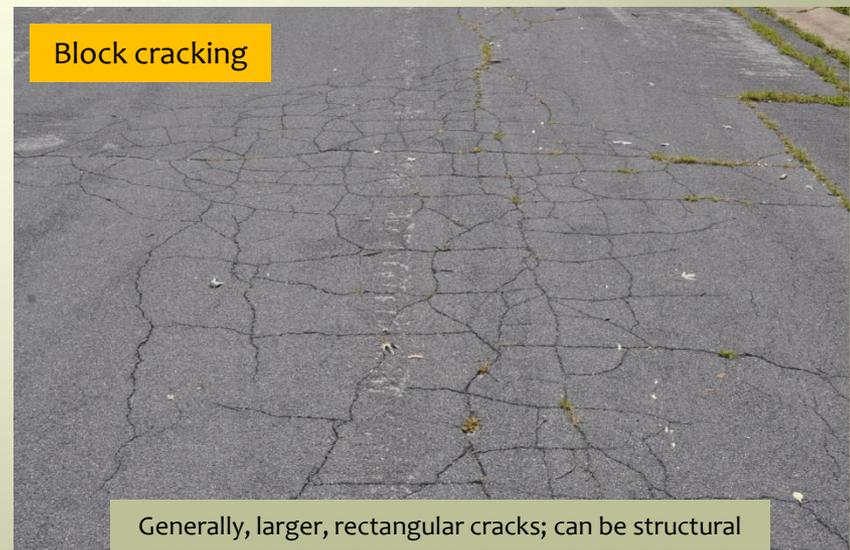
Potholes

Small, irregular shaped cracks, often with settlement; usually structural



Alligator cracking in base HMA

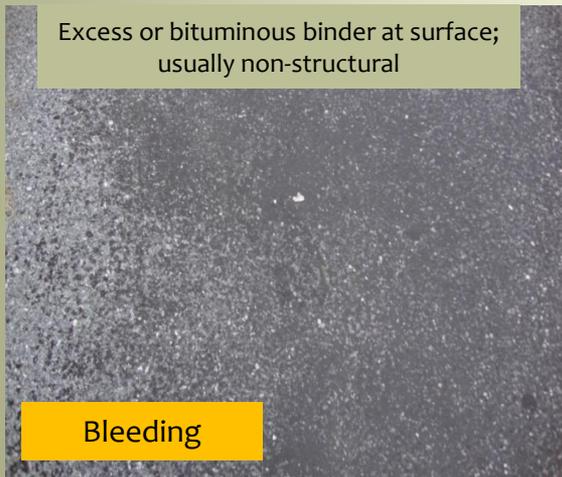
Block cracking



Generally, larger, rectangular cracks; can be structural

Pavement Distress 101 (cont'd)

- Crack sealing deficiency
- Longitudinal cracking
- Bleeding
- Debonding



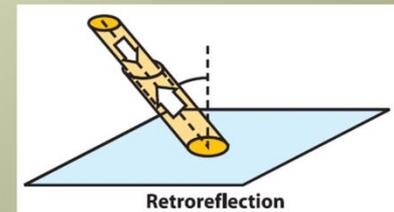
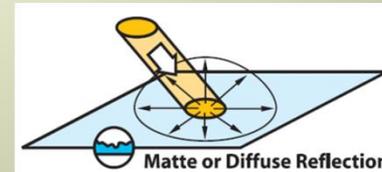
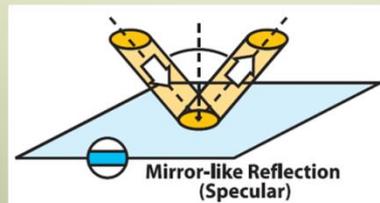
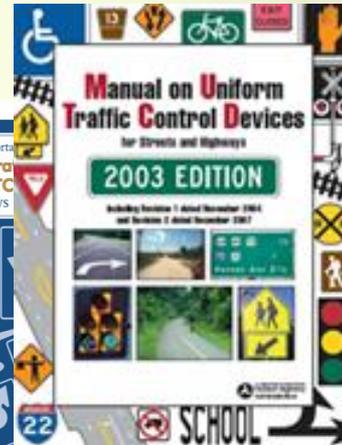
Sidewalks 101

- ADA Accessibility Guidelines (ADAAG)
 - Widths: 36" minimum; 60" desirable
 - Ramp running slope: no more than 8.33%
 - Cross slope: no more than 2%
 - Truncated domes
- Case Law (tort liability)
 - Barden v. City of Sacramento
 - Kinney v. Yerusalim
 - CDR v. Caltrans
 - CLASI v. DeIDOT



Traffic Signs 101

- Manual on Uniform Traffic Control Devices (MUTCD)
- Delaware MUTCD versus Federal
- Placement standards (size, height, lateral offset)
- Retroreflectivity



Storm Drainage 101

Water and pavement don't get along

- Ponding at intersections = sliding/skidding crashes
- Inadequate cross slopes = pavement distress
- Inadequate longitudinal slope = pavement distress
- Degraded or unfinished drainage leads to pavement distress



Class Dismissed

(figuratively speaking; everybody stay where you are)

We don't want to dwell on these technical issues too much today:

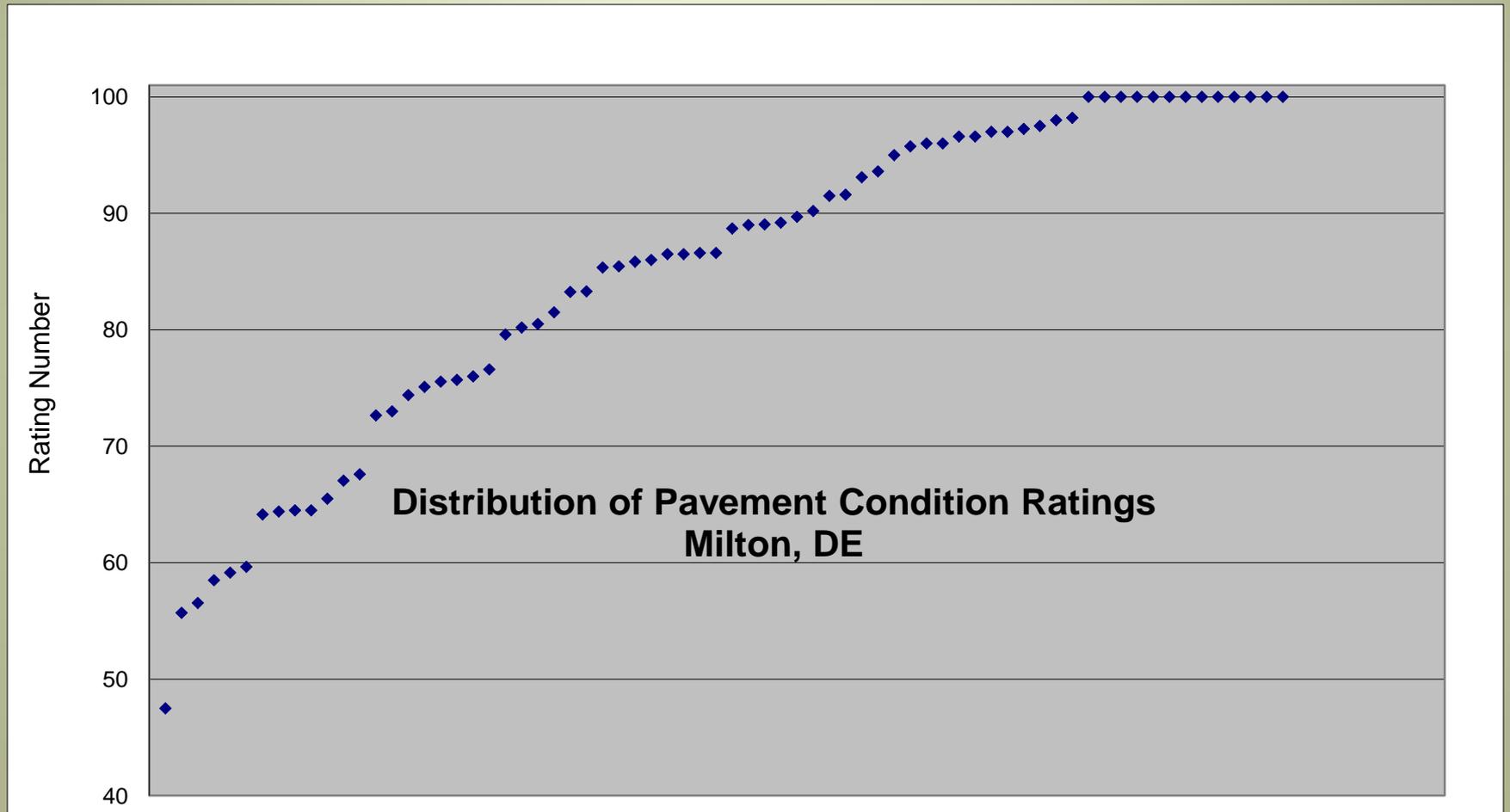
- We know some of you are already well versed
- In our written report, you'll see more in-depth explanations, particularly in our Tech Topics
- We'll be glad to help you understand any of these topics better over time and as you need
- Time is limited tonight and we want to get to what we found

So, What Did We Find?

Generally speaking:

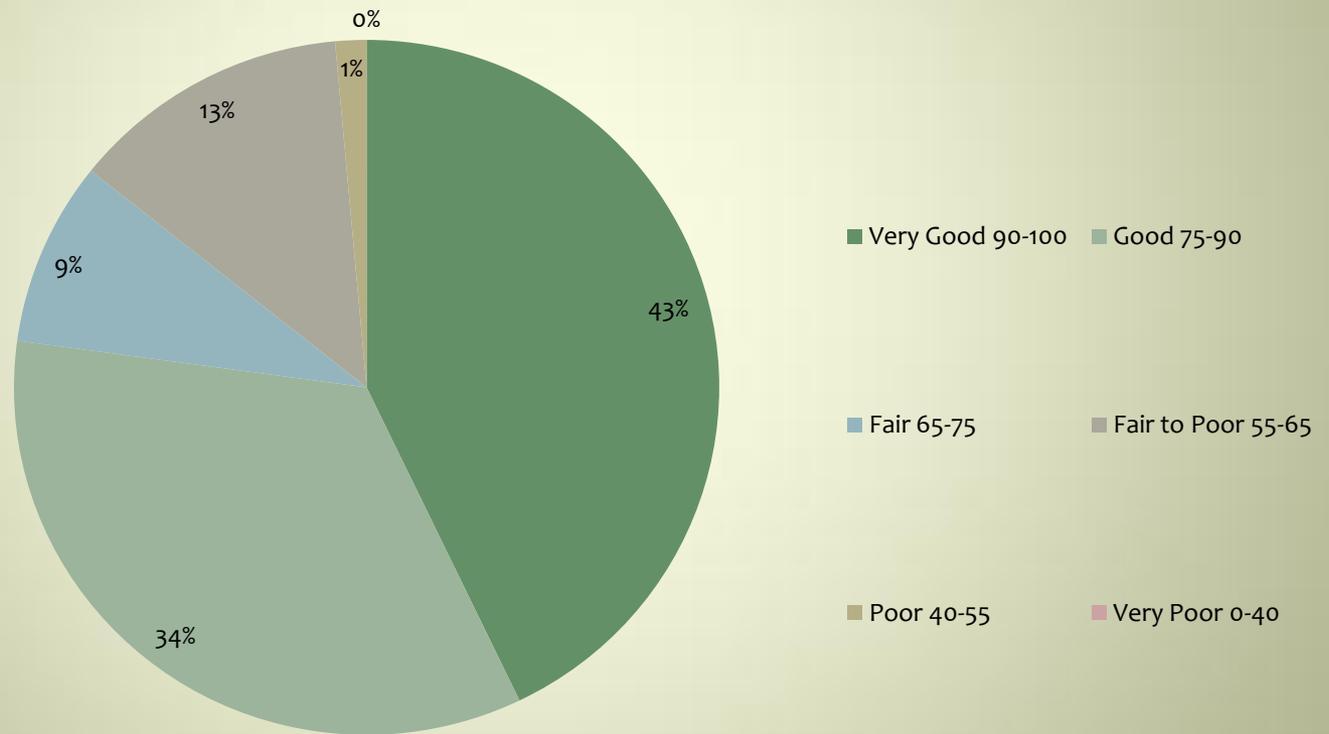
- Pavement – much of it in better condition than we're used to seeing
- Sidewalks – some great examples and some in real need of attention – a mixed bag
- Storm drainage – generally not a problem, at least directly
- Signage – typical of other jurisdictions – there's some work to be done on signs

Findings - Pavement



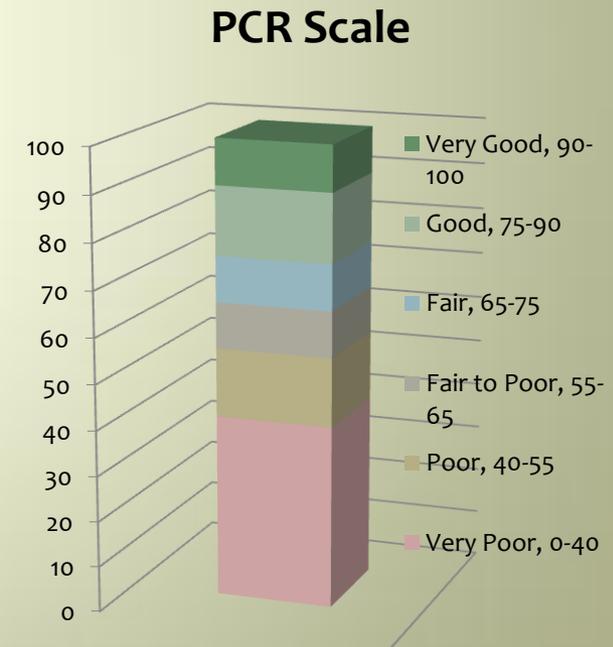
Findings - Pavement

Rating Distribution



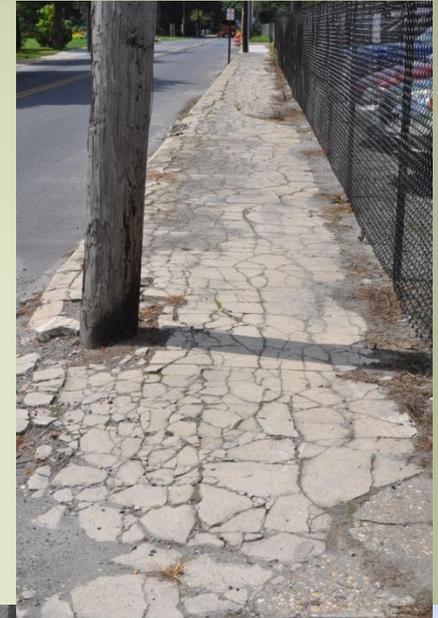
Findings - Pavement

- Most streets short (i.e. 600')
- Paved widths often large, ranging 9' to 47'
- Open section and closed (curb/gutter)
- Drainage generally good
- PCR ratings from 47.5 to 100
- Cross slopes generally good
- Longitudinal slopes generally good
- Few pavement safety concerns
 - Atlantic Avenue bleeding
 - Main-sail Lane intersection ponding
- Vegetative concerns
- Cross walks & other markings



Findings - Sidewalks

- Many streets without sidewalks
- Good, bad, and the ugly
- 121 curb ramps examined
 - 1 failed 36" width
 - 12 failed 48" width
 - 56 failed 2% cross slope
 - 28 failed 8.33% running slope
 - Utility poles and other obstructions
- Vegetative encroachments



Findings – Storm Drainage

- Limited problem areas
- Where they exist, they are potential safety issues
 - Ponding
 - Incomplete drainage
 - No surface asphalt layer
- Elsewhere, potential pavement degradation

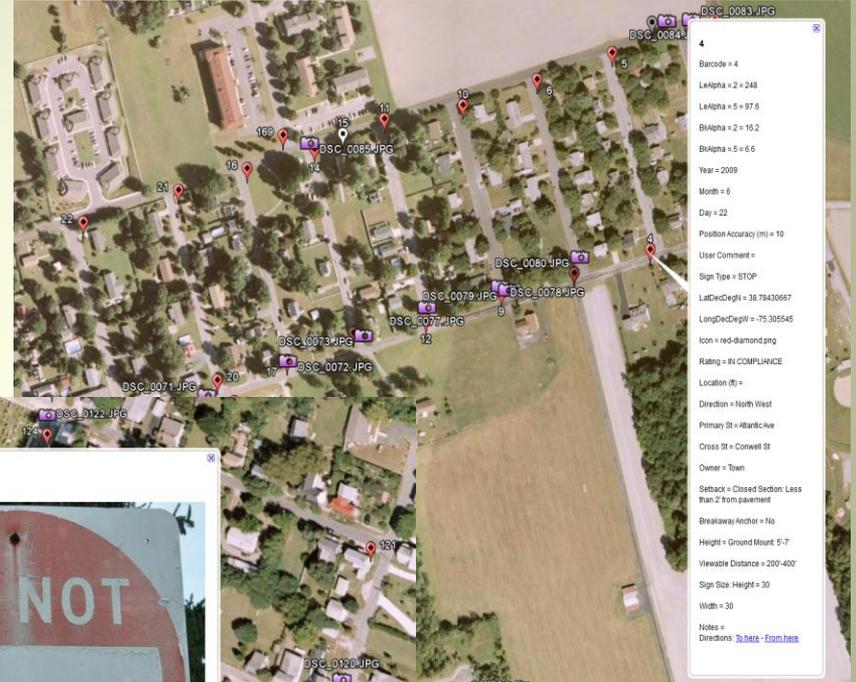


Findings - Signage

- 170 signs inventoried (116 of them Stop signs)
 - Retroreflectivity
 - 96/170 compliant
 - 43 of the 74 noncompliant signs were Stop signs
 - 20/28 One Way signs noncompliant
 - 7/9 Do Not Enter signs noncompliant
 - Most south facing signs noncompliant
 - Placement/mounting
 - Inadequate lateral offset
 - Inadequate mounting height
 - Non-breakaway anchorages
 - Vegetative obstructions



Findings – Signage (cont'd)



4
Barcode = 4
LeAlpha = 2 = 248
LeAlpha = 5 = 97.5
BkAlpha = 2 = 16.2
BkAlpha = 5 = 6.6
Year = 2009
Month = 6
Day = 22
Position Accuracy (m) = 10
User Comment =
Sign Type = STOP
LatDecDegW = 38.78430667
LongDecDegW = -75.305545
Icon = red-diamond.png
Rating = IN COMPLIANCE
Location (ft) =
Direction = North West
Primary St = Atlantic Ave
Cross St = Cornwell St
Owner = Town
Setback = Closed Section. Less than 2' from pavement
Breakaway Anchor = No
Height = Ground Mount 5'-7'
Viewable Distance = 200'-400'
Sign Size Height = 30
Width = 30
Notes =
Directions: [To here](#) - [From here](#)



Analytical Tools

With the completion of our final report, we delivered some electronic tools we hope will support your strategic planning and prioritization efforts over the next few years:

- Google Earth sign overlay (.kml & .kmz files)
- Excel spreadsheets
 - Pavement characteristics and condition
 - Sidewalk data and ADA elements
 - Signage data and compliance information
- Photograph files

Recommendations - Pavement

Distress-based recommendations

- Alligator cracking
 - No settlement yet? Preventative maintenance possibly
 - Settlement? Subgrade repairs, mill, & pave
- Longitudinal cracking
 - Crack seal to avoid further degradation
- Potholes
 - Avoid “throw and go” where you can
 - Apply high quality patch whenever possible
- Random cracking
 - Crack seal before cracking becomes pervasive
 - Where extensive, consider thin preservation overlay (e.g., slurry seal or microsurfacing)

Recommendations - Pavement

Prioritization – no one factor

- Distresses that compromise safety
 - Bleeding, potholes, settlement, etc.-drivers lose control
- Pavement Condition Ratings (PCR)
 - Report and electronic deliverables include tools to browse PCR
- Traffic volumes
- Relative pedestrian and biking use
- Use by visitors
- Your local knowledge is a key factor

Recommendations - Pavement

Some street by street recommendations

- Consider for milling and paving
 - Atlantic Avenue – bleeding presents safety concerns
 - Main-sail Lane, portions of South Spinnaker Lane – lack of surface course and damaged base
 - Rudder Lane – extensive alligator cracking
 - New Street – variety of severe and extensive distresses
- Consider for crack sealing
 - Most streets can benefit from this proactive technique
 - But some can be saved from more expensive remediation, such as Broad Street, Behringer Avenue (Chandler to Atlantic), Chestnut Street, portions of S. Spinnaker
- Consider for slurry seal or fog seal
 - Pine Street, Ocean Street, Carey Street
- Consider chip seals
 - B Street
- Consider drainage improvements
 - Shipbuilders Cove Area (correct drainage system, surface asphalt)
 - Conwell Street (sump areas, alligator cracking/settlement, bird baths)
 - Tobin Drive (correct inverted slope at Union Street end)

Recommendations - Pavement

Some targeted safety recommendations

- Atlantic Avenue – excessive cross slope and slick surface is a high skid risk
- Vegetative encroachment – routine canvassing of the town and cooperative approach with residents could minimize the safety concern
- Centerline striping – double yellow centerlines and even some white edge striping
- Crosswalks
- Union and Federal Streets intersection
- Drainage improvements

Recommendations - Pavement

Final thoughts on roadways

- New construction (subdivisions, etc.) will benefit (to extent you don't already have) by strong, clear codes, active inspection, and aggressive enforcement
 - Consistent pavement cross slopes (3% better than 1%)
 - Best construction practices, particularly for asphalt
 - Strong public works agreements and financial assurance
- Warm Mix Asphalt
 - As opposed to Hot Mix Asphalt
 - It's coming our way in Delaware
 - No reason to fear it, but...

Recommendations - Sidewalks

- Clarify meaning of DelDOT/Town agreements
- Establish transition plan
- Upgrade ramps and sidewalks during “alterations”
- Continue coordination with SRTS
- Consider “passage plane” maintenance ordinance
- New construction standards
- Targeted safety improvements
 - Chestnut Street
 - Parking enforcement

Recommendations - Signage

- Know your liabilities
- Clarify the Town agreements
- Develop, adopt, and implement management plan
- Routine inspection and maintenance cycles
- Keep records
- As signs are replaced, upgrade the whole assembly
- Where you can, get signs out of pavement now
- Develop a high priority list that need replaced now
- Revisit sign sheeting selections based on selected management methods

Recommendations - Signage

Targeted safety improvements

- Replace noncompliant Stop signs ASAP
- Correct or replace leaning sign posts before they create a traffic safety issue
- Trim and prune vegetation at obstruction locations
- Consider Chevron signs in the vicinity of Country Road and Atlantic Avenue (may require DelDOT coordination)

Recommendations - General

Planning level cost estimating tool

- Pavement
- Sidewalks
- Signage
- Easily modified input factors
- Don't use beyond planning, don't use for budgeting projects

Next Steps

From Milton

- Questions or specific areas of interest
- Comments
- Concerns and corrections

From our end

- Analyze any additional questions you raise
- We have published our report to Milton
- Stand ready to help further in the future

There's much more in our report

Tech Topic

Pedestrian Passage Corridors for Sidewalks

A successful, ideal sidewalk system would be 100% clear throughout its length, would be free of obstructions, and meet all cross street and adjacent driveway requirements. Sidewalk areas such as sidewalks, stairs, or curbs, if not properly maintained, can present a safety hazard. For example, available sidewalk widths are not to be less than 4.5 feet, except for one-way streets, one-way streets with one-way traffic, or one-way streets with one-way traffic and one-way parking.



Vegetation encroachments take the form of shade trees, shrubs, ground cover, flowers, and grass. There are other factors when it comes to vegetation, but one of the most important is the amount of shade. The amount of shade is important because it affects the amount of light that reaches the sidewalk. If there is too much shade, the sidewalk will be less visible to pedestrians. In addition, shade can affect the growth of vegetation, which can lead to more frequent maintenance.

Transportation Elements Assessment Town of Milton, Delaware



Pavement
Sidewalks
Safety Elements
ADA Consistency
Signage
Stormwater Drainage




Produced by
Delaware T² Center
Delaware Center for Transportation
Matheu J. Carter, P.E.
Kate Smagala
Bob McGurk

August 30, 2009

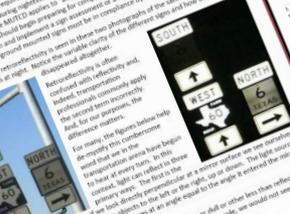
Delaware Center for Transportation University of Delaware



Tech Topic

Sign Retroreflectivity

The Federal Highway Administration (FHWA) has issued changes to the Manual on Uniform Traffic Control Devices (MUTCD) that require new retroreflectivity (a measure of a sign's ability to be read by oncoming drivers) standards for signs. Signs that do not meet these standards will be required to be replaced. Local governments and highway agencies are responsible for ensuring that signs meet these standards. This report provides information on how to ensure that signs meet these standards.



The importance of sign retroreflectivity is that it allows drivers to see signs at night or in low light conditions. Retroreflective material on signs reflects light back to the driver, making the sign more visible. This is especially important for safety signs, which need to be seen quickly and clearly.

Pavement Condition Rating Sheet

Route	Segment	Length (mi)	Good	Fair	Poor	Very Poor	Dist	Other
1	DUROY CIR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	SAILOR LN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	SHRUBBUILDERS BLVD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAY AVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	BRIDGE RD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	LAVINIA ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	SPRIDGE ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	LAUREL ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	MERMAID LN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	DOPLAR ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	IN SPRINGWOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	SUSSEX ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	FREDERICK ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	HEMLOCK ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	CHANDLER ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	MARSHAL DR - AT MILLS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	STRANBERRY ALLEY	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	BETS ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	HANZARD ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	MARSHALL LN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	HOLLAND ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	REED ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	WALNUT ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tech Topic

Sidewalks, ADA, and Civil Suits

Like the rest of the transportation network, sidewalks can pose safety concerns under the best of circumstances, and certainly pose a source of litigation for a variety of reasons. Historically, the classic sidewalk liability case has involved a pedestrian who has been injured by a sidewalk that is not properly maintained. This report discusses the legal and practical aspects of sidewalk maintenance and the potential for litigation.

Under the Americans with Disabilities Act (ADA), public entities are required to ensure that sidewalks are accessible to people with disabilities. Failure to do so can result in civil suits. This report provides information on how to ensure that sidewalks are accessible and how to avoid litigation.

Contact Information

Delaware T² Center

Larry Klepner
(302) 831-6241
lklepner@udel.edu

Matt Carter
(302) 831-7236
matheu@udel.edu

Bob McGurk
bobmcg@udel.edu

Kate Smagala
ksmagala@udel.edu