2014 Pedestrian Accessibility Study

Lexington, Massachusetts

Prepared for
Town of Lexington
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1. INTRODUCTION

BACKGROUND

The Town of Lexington is located in Middlesex County, just outside of Boston, Massachusetts. Lexington has a comprehensive pedestrian accessibility infrastructure consisting of over 84 miles of sidewalk and a little less than 1,000 ramps which allow the population of over 31,000 people, as well as tourists, to enjoy the town.

The Town of Lexington, in September 2014, retained the firm of Fay, Spofford & Thorndike (FST) to create an inventory and assessment for both sidewalks and ramps in an effort to make the Town more accessible. From the first meeting with Town Engineer John Livsey, it was clear that the Town of Lexington is committed to asset management, specifically addressing sidewalk condition, accessibility, and conformance with the Massachusetts Architectural Access Board (MAAB).

This inventory and assessment was undertaken in order to develop a comprehensive pedestrian sidewalk and ramp database describing ramp locations and conditions, and to better understand Lexington's pedestrian accessibility infrastructure, so Town-wide repair policies and priorities could be developed and established. The inventory was conducted utilizing geographic information systems (GIS) and a web based data collection software in order to create a comprehensive database describing locations and conditions. This inventory does not include detailed pedestrian ramp measurements to be used to determine absolute MAAB conformity, but rather general network-level information describing each ramp, so systematic analyzes could prioritize ramps for future pedestrian ramp construction programming, detailed MAAB compliant survey, and engineering. This inventory builds upon the pavement condition inventory conducted by FST, which provides Lexington with a more complete picture of the overall conditions to assist with long-term capital improvement planning.

This report is designed to be a network level - planning tool and intended to provide a foundation for managing the Town's pedestrian accessibility resources by combining technology, local knowledge, and professional engineering input. The following pages describe our approach.

INVENTORY APPROACH

Using field tablets with PeopleGIS web based software and existing Geographic Information Systems (GIS) layers on the PeopleGIS software, FST conducted a Town-wide pedestrian sidewalk and ramp inventory and assessment with GIS integration to build a comprehensive database.

Sidewalks Inventory:

Brick sidewalk on Mass Ave.

Beginning in September 2014, FST collected five (5) primary types of sidewalk field data:

1. Sidewalk material type; Examples of materials include:
    - CC – Cement Concrete
    - BR – Brick
    - BC – Bituminous Concrete
    - CB – Cement Concrete w/ Brick
    - OT – Other

2. Sidewalk distresses

   FST identified and quantified damage areas included hairline cracking, lips at curb and back of sidewalk, missing bricks, empty tree pits, lifting concrete sidewalk panels, utility cuts, and tripping hazards. These distressed areas were measured and used to calculate a total damage area for each sidewalk segment using the following measurements:

   Length of Damage: The linear measure of damaged sidewalk in aggregate accurate to the nearest foot.

   Width of Damage: The average sidewalk damage width within the segment. (Measured to the nearest half foot) Occasionally, sidewalk damages did not extend the full width of the sidewalk and repairs would only require a small section to be replaced.

3. Sidewalk width; Average width of the sidewalk segment. (Measured to the nearest half foot)

4. Curb reveal; Average curb reveal along a given sidewalk segment. Sidewalk segments were broken out in the database on a street block-to-block basis.

5. Sidewalk slope; This measurement was based on a sidewalk cross-slope taken at a visually determined location where the slope appears to be the steepest, as a worst-case scenario within the segment.

Additional data was gathered during field collection including the total number of trip hazards, any sidewalk width pinch points (points at which the sidewalk width is less than 36" due to obstructions such as trees, telephone poles, etc.), a notes field for any comments or special considerations at sidewalk location, the initials of the inspector, and a timestamp with the date of the field inspection. See Appendix C for a full listing of data collection attributes.

Ramps Inventory:

Beginning in September 2014, field personnel also collected five (5) primary types of ramp field data:

1. Ramp material information; Examples of materials include:

    - CC – Cement Concrete
    - BR – Brick
    - BC – Bituminous Concrete
    - CB – Cement Concrete w/ Brick

2. Ramp surface material conditions

    Based on a visual inspection of the ramp on the day of the survey- Ramp conditions were classified as:

    - Excellent – Like New
    - Fair – Needs Maintenance
    - Poor – Full Replacement

3. Numeric code identifying obvious ramp deficiency

    This is a simple visual assessment (no field measurements) as to whether a wheelchair could access and utilize the ramp. Attributes consisted of:

    - 0 – Ramp is missing with no crosswalk, a likely sidewalk obstruction
    - 1 – Ramp is missing while crosswalk is present
    - 2 – All appears okay (has ramp and landing)
    - 3 – No level landing present
    - 4 – Obstruction within fair proximity to path of travel (in either ramp apron or landing)

Missing ramp with crosswalk on Mass Ave.

4. Numeric code for crosswalks; Identified using the following convention:

    - 0 – Crosswalk does not exist
    - 1 – Crosswalk exists, not out of alignment with ramp
    - 2 – Crosswalk exists and encloses the ramp threshold

5. Ramp and landing slopes

A 2-foot electronic smart level was used to record the slope(s) of the ramp and landing for each pedestrian ramp. MAAB maximum slope for a ramp is 8.3% and maximum landing slope for a landing is 2.0%. While the MAAB has many other requirements for pedestrian ramp components, these measurements were not taken during this phase of data collection. Only the running ramp and landing slope were collected. The intent of this survey was to gather the basic data required to prioritize ramps.

Recording ramp slope in field

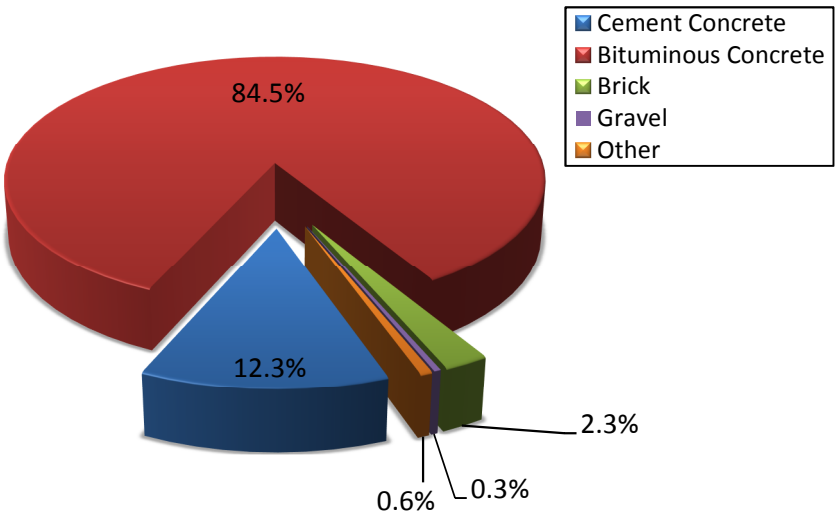
Additional gathered data included whether there was a "lip" present based on transition from the street to the bottom of the pedestrian ramp; a comments field containing any other information pertaining to the ramps not covered in the other data fields; the initials/identity of the data collector; and finally a timestamp from when the survey was conducted. See Appendix C for a full listing of data collection attributes.

2. EXISTING CONDITIONS

SIDEWALK INVENTORY:

A total of 904 sidewalk segments were inventoried throughout the Town of Lexington. The predominant material used for sidewalks in Lexington is bituminous concrete. Figure 1 below shows the Townwide distribution of sidewalk area based on material type. As can be seen, the majority of sidewalks in Lexington (85%) are Bituminous Concrete.

Figure 1
Distribution of Sidewalks by Material Type



SIDEWALK CONDITION INDEX

A sidewalk condition index or SCI value was established to quickly categorize sidewalk conditions into a repair strategy schema. This index is based on a 0 to 100 scale which is calculated by taking the damaged area and dividing it by the total sidewalk area, then multiplying by 100. The result is then subtracted by 100 to produce an SCI value.

$$SCI = 100 - ((\frac{damage\ area}{sidewalk\ area}) * 100)$$

SCI treatment bands were established and categorized to determined repair strategies accordingly:

0-49 = Full Replacement/ Reconstruction
50-79 = Localized Repairs/ Panel Replacement
80-100 = Do Nothing

The figures below show the visual difference between the three categories:

FULL REPLACEMENT/ RECONSTRUCTION

Massachusetts Ave.

LOCALIZED REPAIRS

Massachusetts Ave.

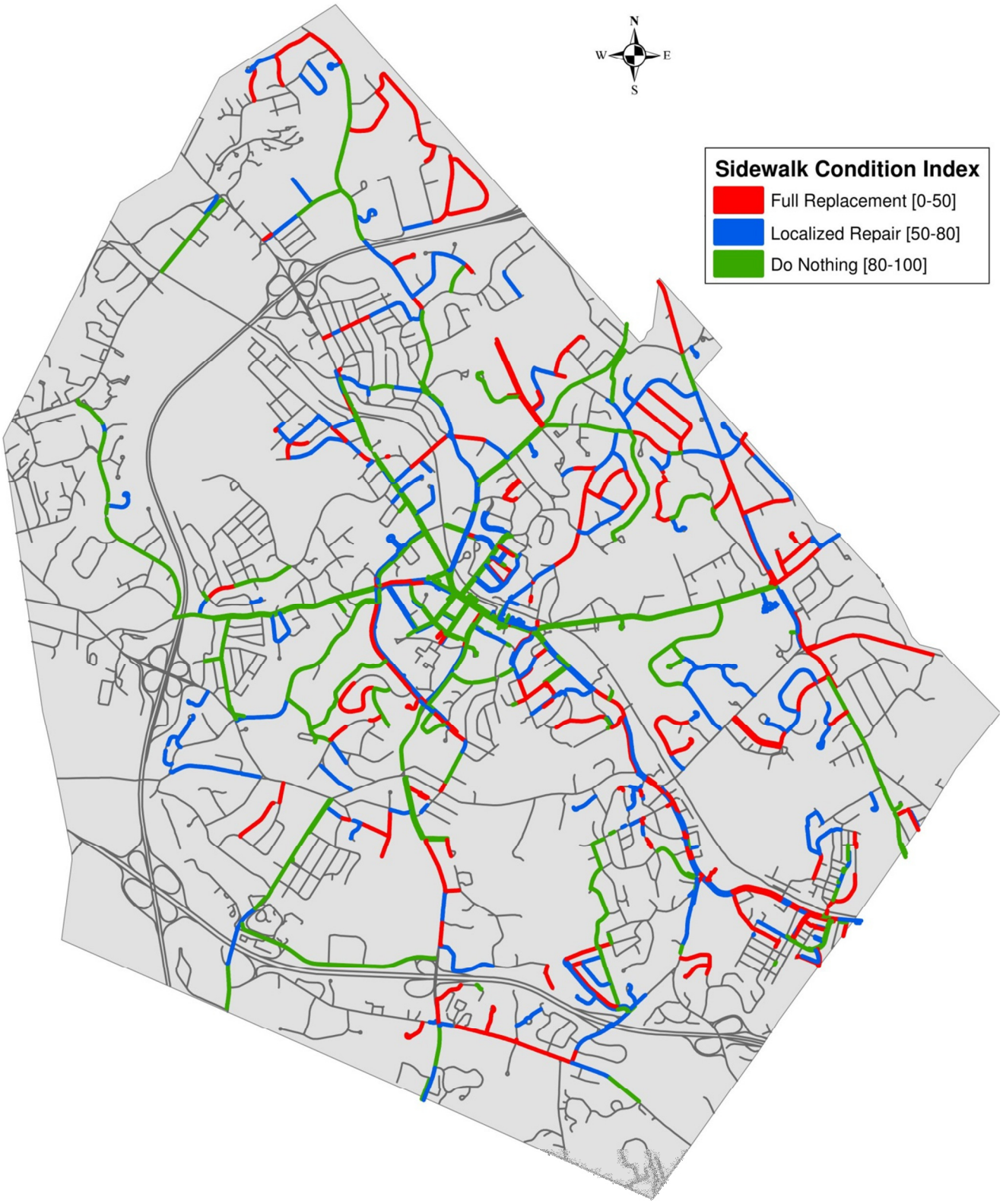
Table 1 below shows the distribution of these SCI treatment bands throughout the Town.

Table 1
Distribution of SCI treatment bands

SCI Treatment Band	Sidewalk Count	Sidewalk Miles	Sidewalk Area
Full Replacement/Reconstruction	258	23.0	580,918
Localized Repair/ Panel Replacement	293	29.8	766,819
Do Nothing	353	31.6	902,208

The average area based SCI in Lexington was 68, which puts it in the middle of the Localized Repair treatment band. With 40% of the sidewalk network in the 'Do Nothing' treatment band and 34% in the 'Localized Repair' treatment band, the Town of Lexington is in good shape. The current budget has done an adequate job keeping the network in good conditions with most of the mileage in the Do Nothing treatment band. Figure 2 below shows the distribution of the different SCI treatment bands throughout the Town.

Figure 2
SCI of Sidewalk Network



SIDEWALK SEGMENT ACCESSIBILITY

In order to determine the likelihood of meeting the minimum MAAB sidewalk standard, the cross-slope and sidewalk width values were examined. In order to be a likely MAAB compliant sidewalk, a segment must have a cross-slope of less than 2% and a sidewalk width greater than 4 feet. The notes field was also evaluated to determine if street furniture, buildings, or other hardscape obstructions prevented passage along the sidewalk. Figures 3 and 4 display both the cross-slope and sidewalk widths respectively, where green bars represent likely compliant attributes, and red bars represent likely non-compliant attributes. It can be seen from these that the primary reason for likely non-compliance in Lexington is the sidewalk cross-slope since the majority of sidewalk widths far surpass the 4 foot threshold.

If the sidewalk is considered likely compliant, it is likely to assume that the sidewalk is accessible. However, being "likely compliant" does not mean that the sidewalk is MAAB compliant and further verification is required to confirm complete compliance. An example requiring further verification would be a sidewalk segment that may include non-standard driveways, and/or overgrown tree roots.

This investigation has revealed approximately 74% of Lexington sidewalks do not comply with MAAB requirements.

Figure 3
Distribution of Sidewalk Cross-Slope

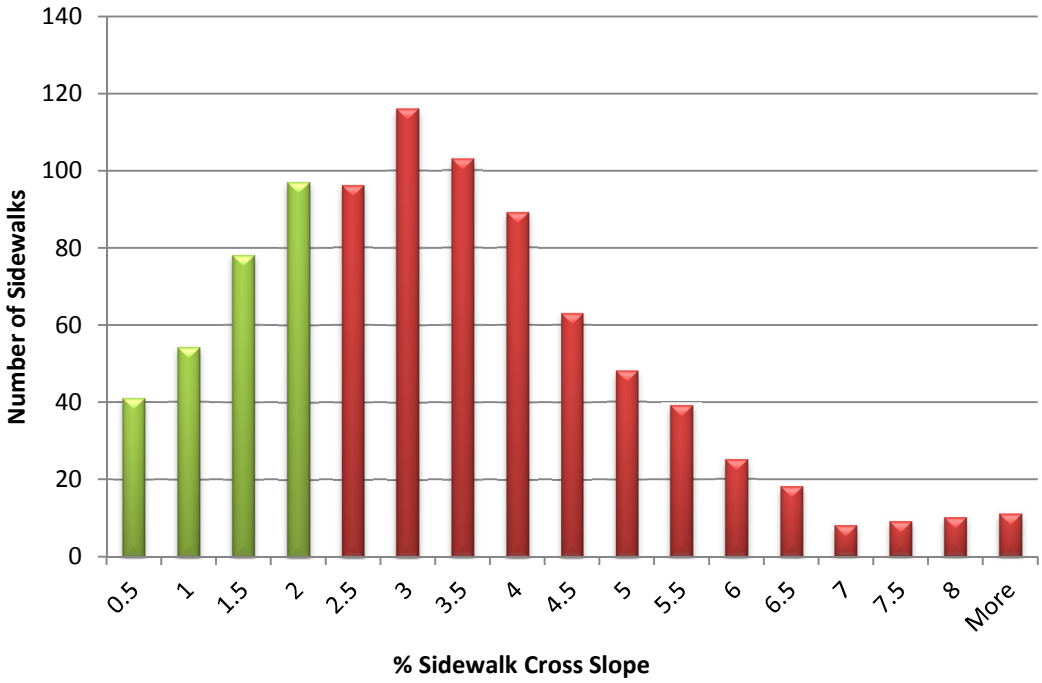
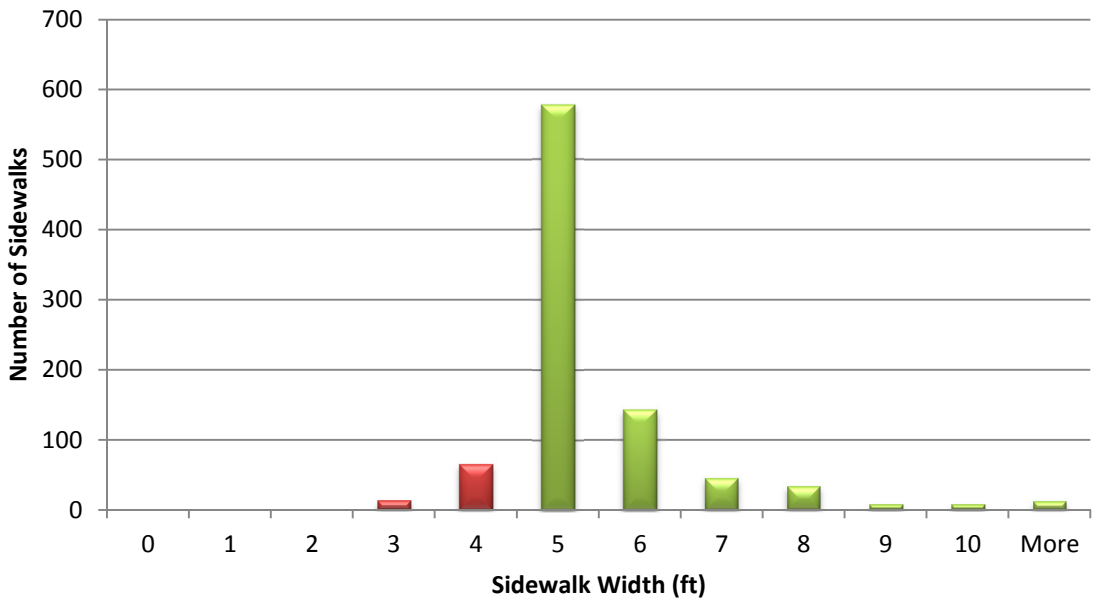


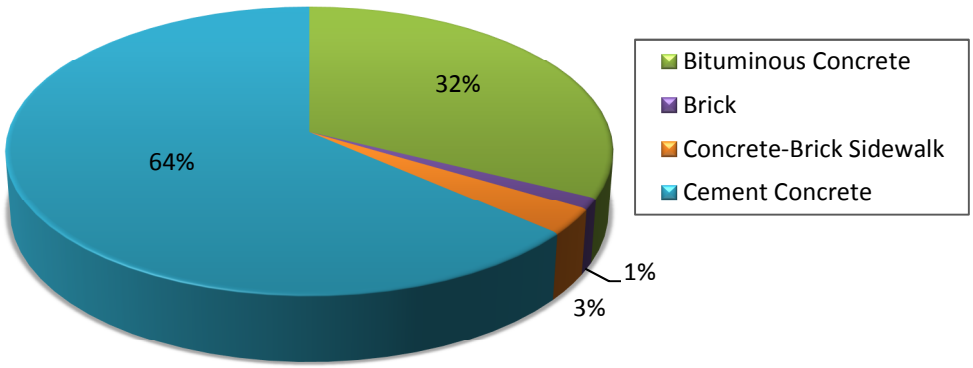
Figure 4
Distribution of Sidewalk Widths



RAMP INVENTORY:

890 Pedestrian ramps were inventoried throughout the Town of Lexington, including ramps that were classified as "missing" where existing crosswalk markings led to vertical curb face(s) with no curb cut to access sidewalk. This value also includes ramps which were classified as "future ramp considerations" in instances where installing a ramp at the location would improve pedestrian accessibility. A categorization of the inventoried pedestrian ramps, as seen in Figure 5, shows that they are predominately made from cement concrete (64%) and bituminous concrete (32%) with brick, and cement concrete with brick making up the last 4%.

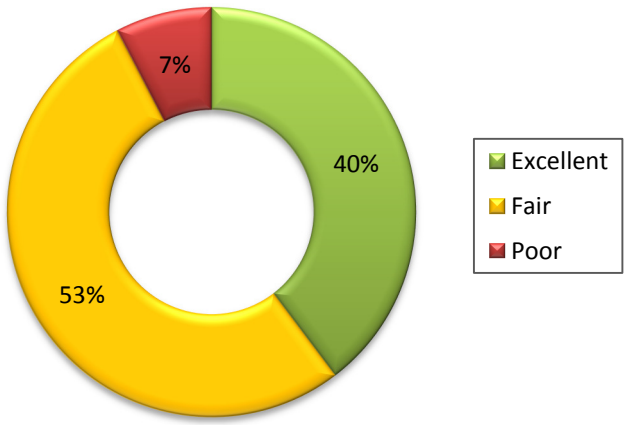
Figure 5
Distribution of Ramps by Material Type



RAMP CONDITIONS:

Surface material conditions revealed that the majority of pedestrian ramps in Lexington are in Fair condition, with more in Excellent condition than Poor condition. Figure 6 shows the split between these three categories.

Figure 6
Surface Material Conditions



While Table 2 displays general condition data, more extensive field measurements were collected to assess MAAB compliance probability based on two main criterion: ramp and landing slopes.

Table 2
Visual Ramp Assessment

NUMERIC CODE	COUNT OF INSTANCES
0- Ramp is missing	102
1- Existing Ramp w/landing and no obstruction	750
2- Existing Ramp w/ no landing present	65
3- Existing Ramp w/obstruction within proximity to travel of path	1
4- Future Ramp Consideration	74
TOTAL	992

To get a more in depth analysis of MAAB compliance beyond visual inspection, pedestrian ramp and landing slopes were integrated. MAAB maximum slope for ramps and landings is 8.3% and 2.0% respectively. Figures 7 and 8 show distributions of both attributes with green bars showing compliant standards and red showing non-compliant standards and a black bar representing ramps which are missing or future ramp considerations.

Figure 7
Distribution of Ramp Slope Percentage

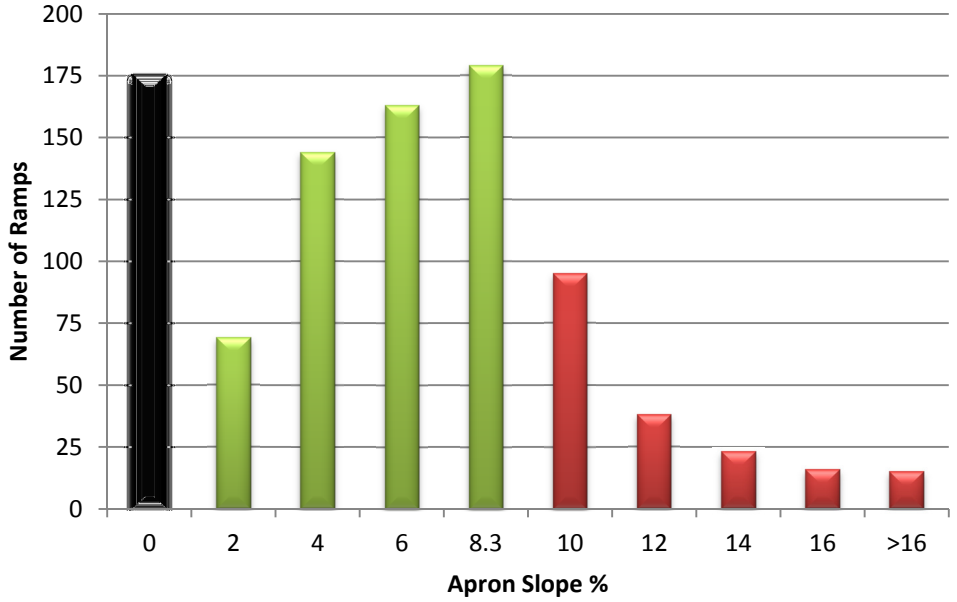
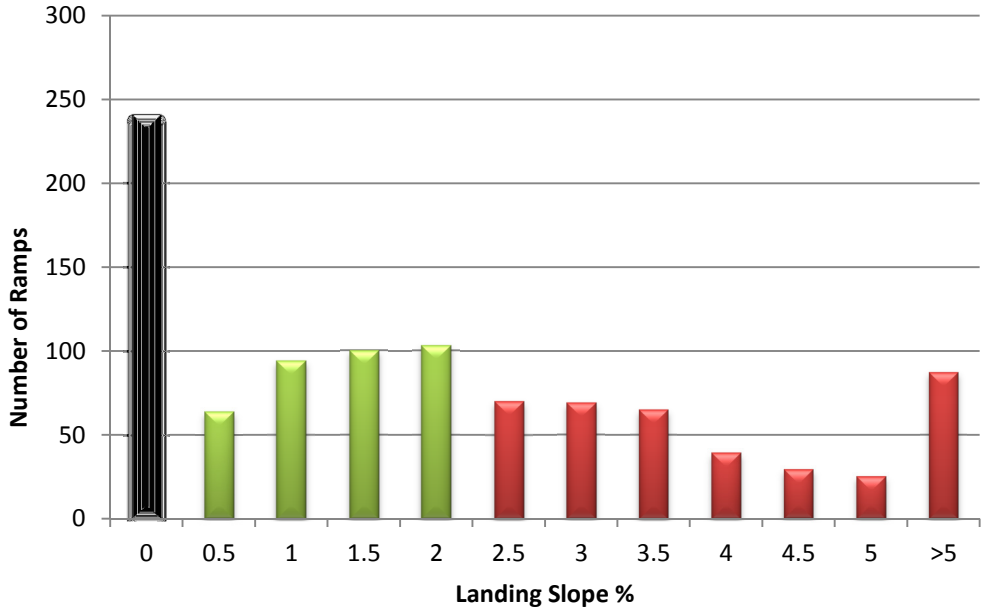


Figure 8
Distribution of Landing Slope Percentage



Note: Figure 8 also discludes ramps in which no landing was present

In determining likelihood of MAAB compliance, five primary attributes were used: visual inspection, ramp slope, landing slope, crosswalk deficiences, and presence of a lip. In using these, it was determined that 67% of the built ramps in Lexington (discluding missing and future ramps) are likely not compliant with MAAB standards.

3. METHODOLOGY

NETWORK PRIORITY RANKING (NPR):

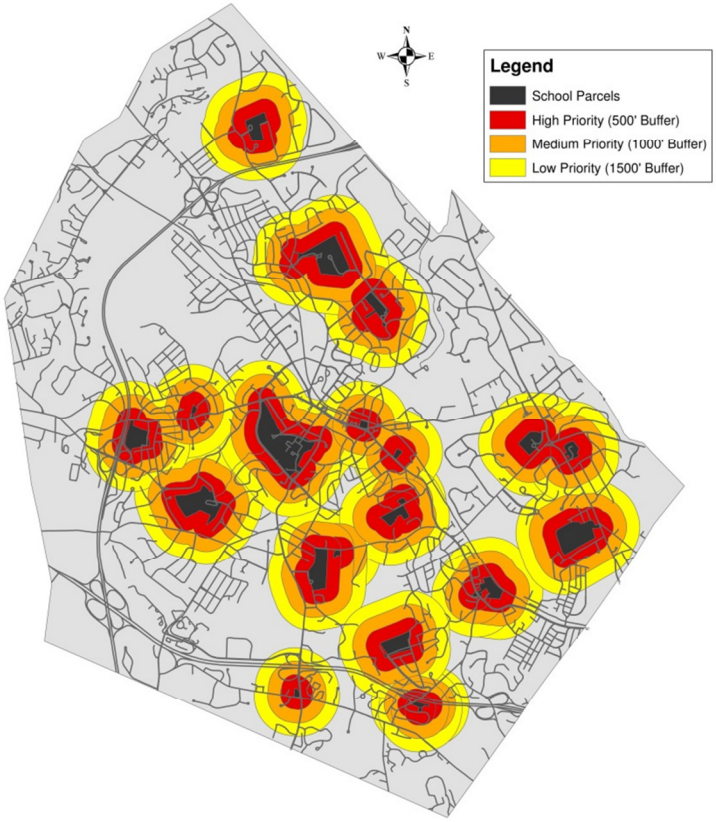
The NPR number reflects the comparative merit of repairing one sidewalk/ramp over another, using variables other than simple observed deficiencies. In order to effectively manage Lexington's pedestrian accessibility backlog, a systematic NPR was developed for each sidewalk/ramp. The NPR criteria were developed and discussed between FST and Lexington Public Works Staff. The database of sidewalk and ramp locations and ensuing methodology was tailored to reflect Lexington's specific decision making criteria for selecting ramps that would be most beneficial to repair first.

RAMPS NPR:

The NPR served as the means to prioritize ramp repair using 5 criteria that were scored separately and were key to the overall decision making process. The criterion is:

1. Proximity to Schools
2. Proximity to MBTA station
3. Proximity to parcels with high pedestrian traffic
4. Ramp Existence
5. Ramp Condition

Figure 9
School Proximity NPR



1. Proximity to Schools

The ramps locations were related spatially to the closest School parcels - both public and private. Three (3) different buffer zones were created to prioritize ramps in the proximity of a school. If the ramps fell within 500 feet of the school parcel a score of 700 was given. If the ramp fell between 500 and 1000 feet away, a score of 300 was given. If the ramp fell between 1000 and 1500 feet away, a score of 150 was given. Figure 9 to the right shows the school parcels and buffer zones for the Town.

2. Proximity to MBTA stations

The ramps locations were related spatially to the closest MBTA stations within a buffer of 300 feet. The NPR score for a ramp was based on its distance from a MBTA station ranged from 0-300. If the ramp fell outside of the buffer, a score of 0 was given. However, if the ramp fell within the buffer, a score was given based on distance from the station, shown below.

$$NPR_{MBTA} = 300 - distance\ to\ MBTA\ station$$

The rationale behind this calculation is the closer a pedestrian ramp is to a transit station, the higher the score will be for that ramp will be.

3. Proximity to High Pedestrian Parcels (HPP)

The ramps locations were related spatially to Commercial Pedestrian Parcels within a buffer of 200 feet. High Pedestrian Parcels include hospitals, retail, nursing homes, etc. The NPR score for a ramp was based on its distance from an HPP ranged from 0-200. If the ramp fell outside of the buffer, a score of 0 was given. However, if the ramp fell within the buffer, a score was given based on distance from the HPP, shown below.

$$NPR_{HPP} = 200 - distance\ to\ Parcel$$

4. Ramp Existence

Missing ramps significantly hinder pedestrian accessibility, which is why ramp existence played a key role in determining the NPR for ramps. For the case in which a ramp was missing with no crosswalk, an NPR score of 250 was given. If the ramp was missing, but a crosswalk was present, an NPR score of 450 was given. If a ramp was present regardless of material or damage present, a score of 0 was given.

5. Ramp Condition

The NPR value also includes information on the condition of the ramp. The NPR values were determined by linearly interpolating between ranges based on the severity of apron and landing slopes. The table below shows the ranges used in establishing NPR values:

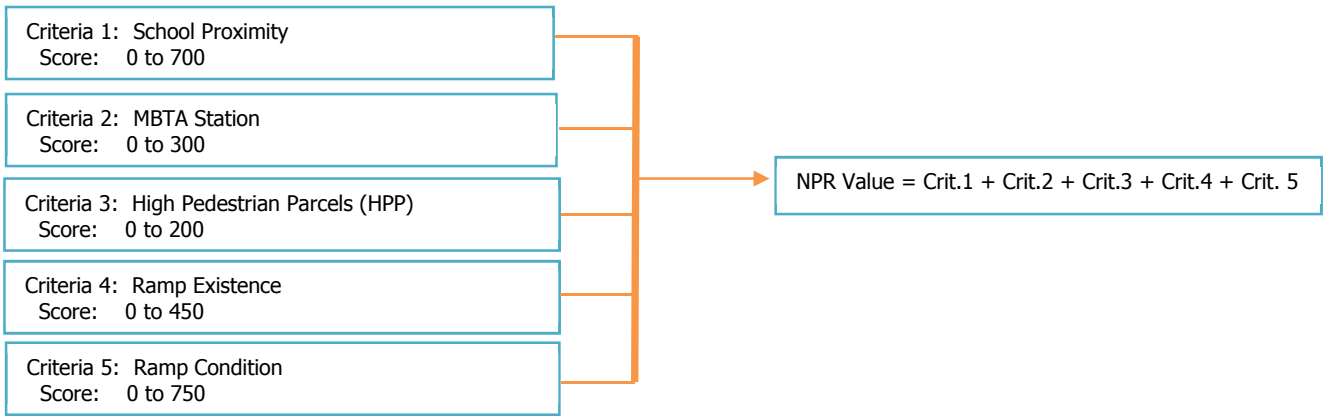
Slope Type	Slope Range	NPR Scores
Apron	8.3-12%	0-75
Apron	12-15%	100-200
Apron	15-25%	250-350
Landing	2-5%	0-175
Landing	5-15%	200-400

If there was no level landing present- an NPR score of 400 was given. This strategy was established to increase points based on the level of severity in accessibility. The total NPR score a ramp could achieve based on ramp condition is 750.

NPR Formula

The NPR formula adds the rankings for each NPR criterion together to get a composite NPR ranking for each ramp in the data set. Figure 10 below shows a flowchart of the method:

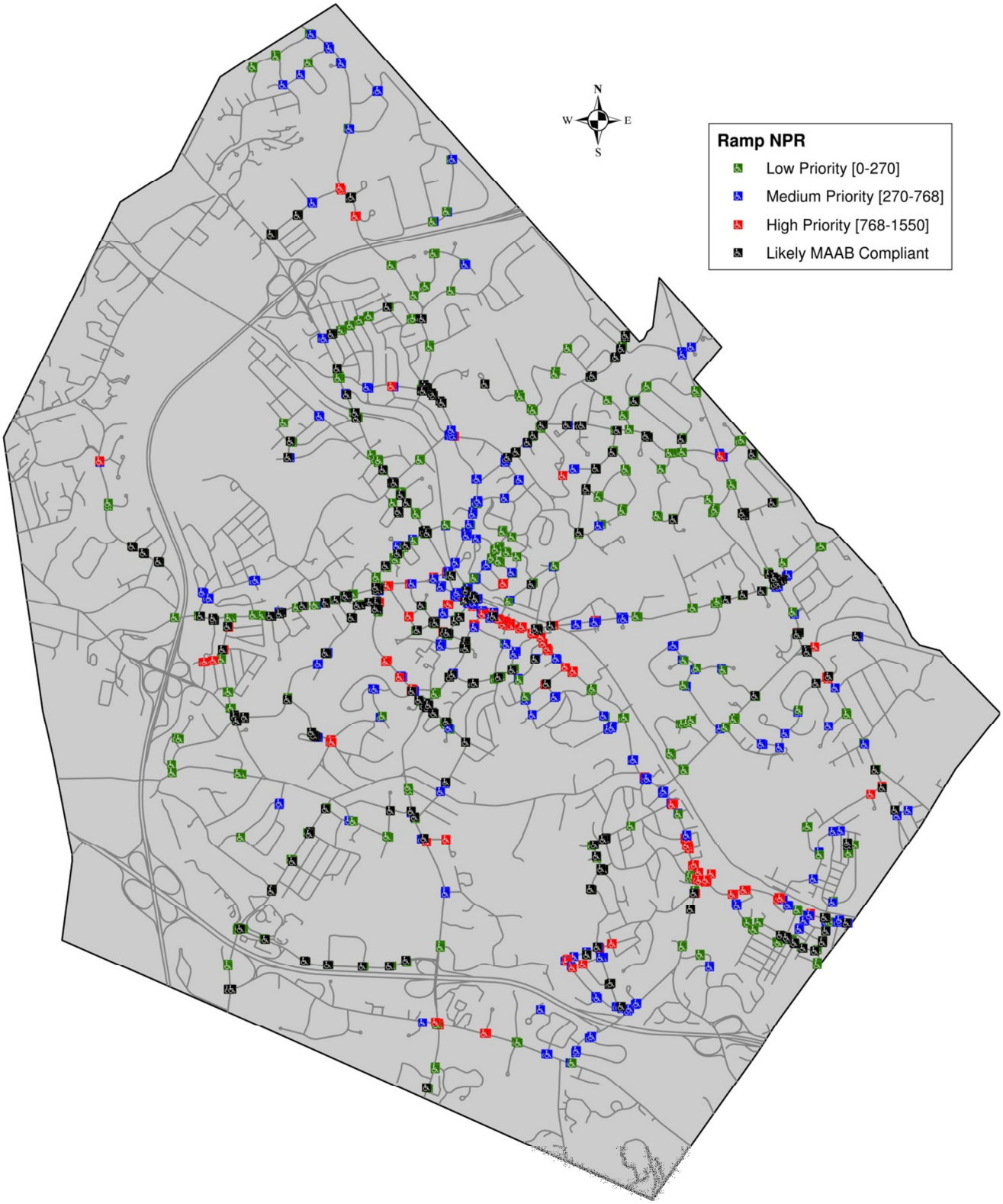
Figure 10
Ramps NPR Calculation Flowchart



Note - if a ramp was likely-compliant, it received an NPR value of 0. If a ramp was considered 'newly constructed' and minimally non-compliant with minor deficiencies, it also received an NPR value of 0. These deficiencies could have been during construction or post construction due to frost action, vehicles driving over ramps and impacting slopes. Even if the ramp is not compliant, since it is newly constructed, it has the lowest priority.

Once the final NPR values were summed for ramps, they were distributed into three categories based on the distribution of the values. Figure 11 shows all the likely-compliant ramps, as well as the priority levels on all non-compliant ramps.

Figure 11
Network Ramp NPR



SIDEWALKS NPR:

The first three elements in determining the NPR for sidewalks was the same used in the previous section for ramps. Only the last two elements vary which will be discussed below:

1. Proximity to Schools
2. Proximity to MBTA station
3. Proximity to high pedestrian parcels
4. Sidewalk condition
5. Number of Trip Hazards

4. Sidewalk Condition

The condition of the sidewalk contributes into the overall NPR score. If the sidewalk segment has an SCI less than 25 it was assigned a score of 300, while if the SCI was between 25 and 50 it was assigned a value of 150. The cross slope was also factored into the NPR score by linearly interpolating the slope values shown in the table above.

Cross Slope % Range	NPR Scores
2-4%	0-35
4-6%	50-150
6-10%	200-300

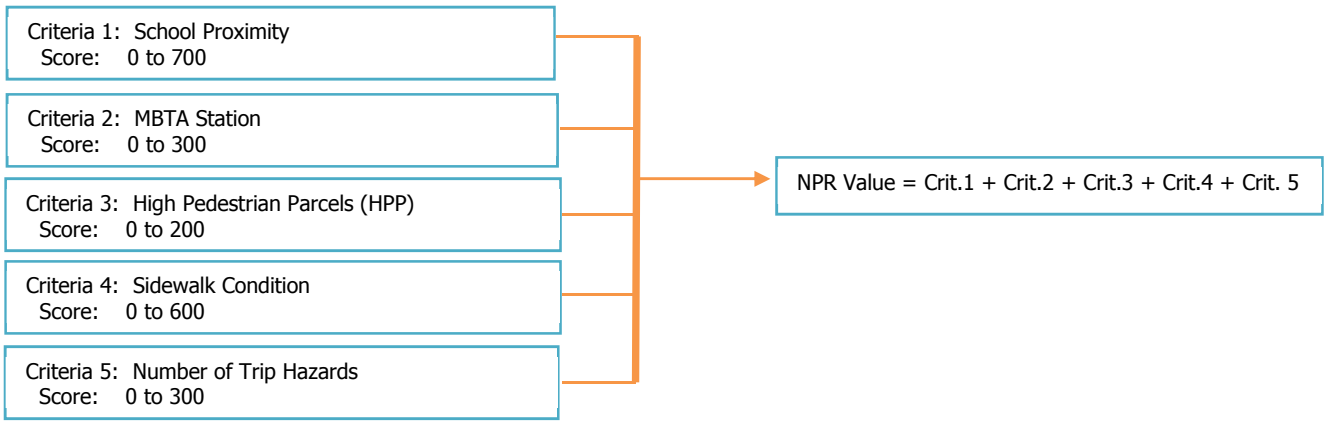
5. Number of Trip Hazards

The last criterion in the sidewalk NPR score is the number of trip hazards. If there were between 1 and 3 trip hazards detected a score of 100 was given. If there were between 3 and 8 trip hazards detected, a score of 200 was assigned. If there were more than 8 trip hazards, a score of 300 was given.

NPR Formula

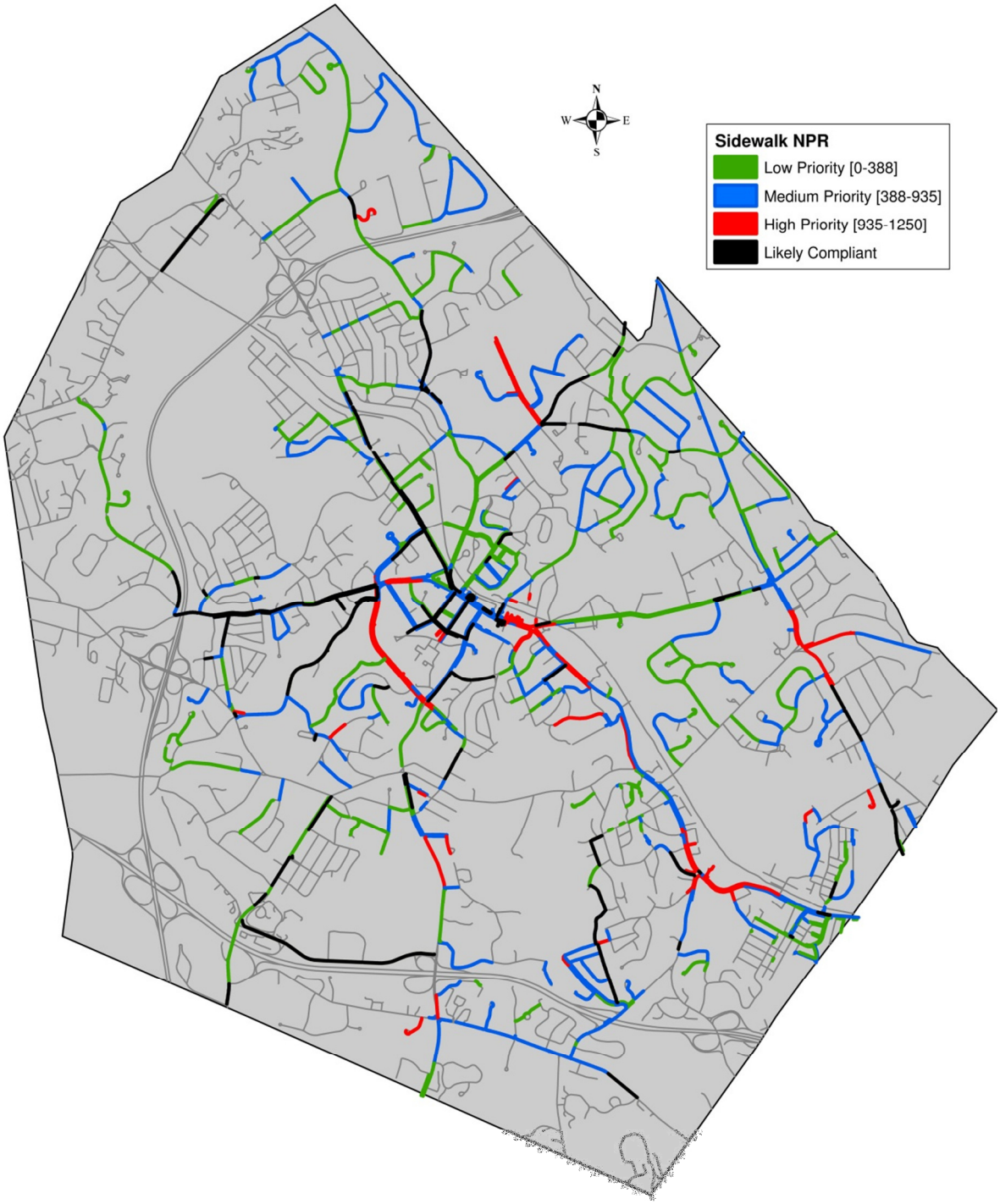
The NPR formula adds the rankings for each criterion together to get a composite number ranking for each ramp in the data set. Figure 12 below shows a flowchart of the method:

Figure 12
Sidewalks NPR Calculation Flowchart



Once the final NPR values were summed for sidewalks, they were distributed into three categories based on geometric split. Figure 13 shows the NPR values for sidewalks throughout the Town- sidewalks with a cross slope less than 2%, width greater than 4 feet, and SCI greater than 90 are considered compliant below.

Figure 13
Network Sidewalk



4. BACKLOG/FUNDING SCENARIOS

SIDEWALK REPAIR COSTS:

Having established a detailed inventory for existing sidewalks, financial costs were needed for future budget planning. Consideration was given based on historical pedestrian sidewalk repair costs, material classification, and sidewalk damage area. The following sidewalk budgetary reconstruction costs were used for analysis:

Table 3
Sidewalk Reconstruction Costs

SIDEWALK MATERIAL	COST (2014 Dollars)
CC- Cement Concrete	$ 11.50/ft^2
BR- Brick	$ 20/ft^2
BC- Bituminous Concrete	$ 8/ft^2

The above costs were applied to the Town-wide sidewalk network based on damage area based on the following categories:

1. Reconstruction: SCI = 0-49 – Entire sidewalk area is budgeted to be reconstructed
2. Localized Repair: SCI = 50-79 – Only damage area is budgeted to be reconstructed
3. Do Nothing: SCI = 80-100 – Zero backlog

Note: The costs in Table 4 include the full replacement of ramps on the sidewalk segment. Separate analysis was done on the ramps for accessibility and NPR to show the compliance and priority of repair, but the budget analysis will include the ramps within the sidewalk segments.

CURRENT SIDEWALK BACKLOG:

Backlog is defined as the cost of repairing all sidewalks, partial panel replacement, and full replacement sidewalk reconstruction within one year bringing sidewalks to a near perfect condition. Backlog is a "snapshot" or relative measure of outstanding repair work. The backlog not only represents how far behind the Lexington sidewalk network is in terms of its condition, but it also offers a basis for comparison for future and/or past year's backlog(s) to determine if the Town is catching up, or falling behind. Backlog dollars represent the cost to repair sidewalks and curbing only. It does not include related repair costs for relocation and installation of utilities, lighting, signal apparatus, or landscaping.

As of December 2014, Lexington's backlog of sidewalk repair work totaled $7,037,124

FUNDING SCENARIOS:

In order to determine the necessary funding to keep the network in good conditions, three future funding scenarios were run for three years. In these scenarios, a lifetime of 20 years, 30 years and 40 years were used for Brick, Bituminous and Cement Concrete sidewalks respectively. The units priced used include the repair of ramps, if applicable to the sidewalk segment. For the funding analysis, 90% of the budget was dedicated to full replacement while 10% was used for partial repair. An inflation rate of 3.5% was used on a yearly basis.

The first scenario run was to have no funding contributed to the sidewalk network. This scenario is used to gauge the deterioration levels of the network in a worst case scenario where there is no funding available. Table 5 below shows the results of this scenario. As expected, the sidewalk network deteriorates to an SCI of 58 in just three years, while the backlog jumps to $10,268,737.

Table 4
$0 Funding Scenario

YEAR	FUNDING	BACKLOG	NETWORK SCI
10/2014		$ 7,037,124	68
FY2016	$0	$ 8,174,735	65
FY2017	$0	$ 8,931,168	62
FY2018	$0	$ 10,268,737	58

Next, a scenario was run to spend $400k on the sidewalk network per year. In this scenario, the network SCI is losing approximately a point a year while the backlog increases approximately $1,300,000 in three years. While these levels aren't necessarily skyrocketing, they are still increasing enough to be considered unsustainable in the future.

Table 5
$400k Funding Scenario

YEAR	FUNDING	BACKLOG	NETWORK SCI
10/2014		$ 7,037,124	68
FY2016	$400k	$ 7,754,994	67
FY2017	$400k	$ 8,094,726	65
FY2018	$400k	$ 8,470,594	64

Lastly, a scenario was run to try to keep the backlog at sustainable levels while keeping the network in good conditions. It was observed that spending $750k a year keeps both the network conditions and backlog at current levels. This is a good baseline for the Town to establish when budgeting for their sidewalk network.

Table 6
$750k Funding Scenario

YEAR	FUNDING	BACKLOG	NETWORK SCI
10/2014		$ 7,037,124	68
FY2016	$750k	$ 7,244,280	68
FY2017	$750k	$ 7,245,514	69
FY2018	$750k	$ 7,395,091	68

5. RECOMMENDATION

RECOMMENDED PLAN OF ACTION

The overall pedestrian sidewalk network in the Town of Lexington is currently in good to fair condition. With an average SCI of around 68, the Town has a good overall network condition level with the average sidewalk requiring localized repair. However, only 26% of the sidewalks are likely MAAB compliant based on existing cross slope and width of the sidewalks. If cross slope of the sidewalk exceeds 2% the sidewalk is considered non-compliant. With predominantly bituminous concrete sidewalks which tend to distort (due to structural weakness in base, tree roots, etc.) more than cement concrete sidewalks, attaining this cross slope can be challenging. Based on the sidewalk condition index, it was determined that the current backlog of Lexington's sidewalk network is $7,037,124.

The overall pedestrian ramp network in the Town of Lexington is currently in fair condition. The data gathered from this study shows with a "high-probability" that 33% of Lexington's built pedestrian ramps (excluding missing ramps) are in compliance with MAAB standards. This study shows that future diligence with respect to MAAB standards will be necessary to improve Town-wide ramp conditions.

Given the current condition of the network, it is likely that Lexington has been funding the needs of the sidewalk and ramp network throughout the years. Based on the analysis from this study, a baseline of $750k should be spent to maintain current conditions. However, FST recommends spending $825k a year on sidewalks and ramps to ensure both quantity and quality. FST observed some 'newly constructed' ramps in the field which were minimally non-compliant due to workmanship which can be improved with better field layout and inspection. By putting a little more effort to build it right the first time, the Town can get more benefit from its asset investment of the network. The image to the right shows a new ramp built on Worthen Road which failed the landing slope compliance by 0.1% and apron slope compliance by 0.2%.

New ramp on Worthen Rd with an Apron Slope of 8.5% and Landing Slope of 2.1%

The Town should consider funding two (2) sidewalk repair programs, one maintenance program to address repairs primarily on neighborhood sidewalks consisting of bituminous concrete surface, significant tree root distortions, trip hazards, etc., and a second capital improvement program using the NPR strategy as outlined in this study to address critical areas around schools and other high pedestrian traffic locations.

Lexington should assemble an ADA Task Force including members from different Town departments, as well as members from the physically challenged and disabled communities. Review and feedback from the accessibility community can vastly benefit Lexington's efforts for improving pedestrian accessibility.

The Town's ADA Task Force should maintain and expand upon the database assembled by FST. Asset management is a systematic process that needs the long-term commitment and support of Lexington's practitioners and decision-makers to maintain the asset management database system.

The following are general recommendations and standard management and upkeep practices for ramps and sidewalks:

Ramps and Sidewalks:

1. Implement a sound departmental quality control/assurance program, with particular focus on MAAB construction standards. Offer incentive/disincentive(s) based on new, in-placed ramp construction.
2. Identify a single individual who will act as a custodian of the maintenance and upkeep of the sidewalk GIS layer/database.
3. Update sidewalk segment information where past reconstruction dates are known. The ADA standards for accessible design changed January 26, 1992, having these dates could assist in avoiding MAAB violations.
4. Post all annual pedestrian ramp and sidewalk improvements into the GIS database. Both the pedestrian ramp condition ratings and the repair history information should be entered. Track MAAB ramp variance requests and grants in a geo-database environment.
5. Add any new pedestrian ramps and sidewalks to the database as soon as the Town accepts them. Pavement and sidewalk data can be added/modified as it becomes available.
6. Re-inspect 20% of sidewalks/ramps annually.

In summary, the pedestrian accessibility inventory should serve as a valuable tool to the Town of Lexington and to Lexington decision-makers in their pro-active approach to managing Lexington's sidewalk assets.

APPENDIX A

DATA ATTRIBUTE DICTIONARY

Town of Lexington Pedestrian Ramp and Sidewalk Inventory Attribute Definitions

RAMP:

CONDITION: This is the general overall surface condition of the ramp surface material.

- Excellent – Like New
- Fair – Needs Maintenance
- Poor – Full Replacement

MATERIAL: This code represents the ramp/sidewalk material.

- CC – Cement Concrete
- BR – Brick
- BC – Bituminous Concrete
- CB – Cement Concrete w/brick

ACCESS: It has been assumed that many to the existing pedestrian ramps do <u>not</u> meet today's MAAAB requirements. This rating is intended to help identify apparent pedestrian ramps deficiencies to develop a strategy to prioritize repair/upgrade. This rating is a simple visual assessment (no field measurements) as to whether a wheelchair can access this ramp. The following is the numeric coding system and priority ranking for each ramp point:

0 – Ramp is missing with no crosswalk, a likely sidewalk obstruction - 350
1 – Ramp is missing while a crosswalk is present - 250
2 – All appears Okay - 0
3 – No Landing - 0
4 – Obstruction within fair proximity to path of travel (in either ramp apron or landing) - 0

CROSSWALK: This is a numeric rating code to identify apparent crosswalk deficiencies.

0 – Crosswalk does not exist
1 – Crosswalk exists, but out of alignment with ramp
2 – Crosswalk exists and encloses the ramp threshold

APRON_SLOPE: Recorded running ramp slope percentage field measurement using 2' Smart level.
LANDING_SLOPE: Recorded worst running or cross-slope landing (if substantial landing present) slope percentage field measurement using 2' Smart level.
TYPE: Recorded running ramp slope percentage field measurement using 2' Smart level.
LIP: Yes or No field identifying whether the ramp surface is <u>not</u> within ¼" of adjacent roadway surface.
NOTES: Any other comments pertaining to ramp.
INSPECTOR: This is initials/identity of data collector.
INSPECTION DATE: Date attributes were collected.
RAMP ID: Unique number ramp identifier.
ROUTE: This is the general street where the ramp threshold leads to.
AAB COMP: Yes or No field if the ramp is likely MAAAB compliant based on data gathered as part of this project.
CURB REV: Average vertical curb height (non-transitional curbing) adjacent to ramp.
PHOTO LINK: Picture of ramp taken by inspector on date of inspection.
SITE DEFICIENCY: If there was any object hindering site visibility around ramp
VARIANCE: If there a likelihood of variance based on topography

Town of Lexington Pedestrian Ramp and Sidewalk Inventory Attribute Definitions

SIDEWALK:

MATERIAL: This code represents the sidewalk material.

- CC – Cement Concrete
- BR – Brick
- BC – Bituminous Concrete
- CB – Cement Concrete w/brick
- OT – Other (see notes)

INSPECTOR: This is initials/identity of data collector.

INSPECTION DATE: Date attributes were collected.

NOTES: Any other comments pertaining to ramp.

CROSS SLOPE: Recorded average cross-slope field measurement using 2' Smart level.

CURB REVEAL: Average curb reveal along the sidewalk segment in inches.

SIDEWALK WIDTH: Recorded average sidewalk width in feet.

DAMAGE LENGTH: Measured aggregate length of sidewalk damage along the sidewalk segment in feet.

DAMAGE WIDTH: Average sidewalk width of damage area. In some instances the damage width may be smaller than the actual sidewalk width.

DAMAGE AREA: Approximated damage area based on field measurements. Damages include sunken or raised curb, hairline cracks, fractured slabs, missing brick, black patches, empty tree pits, tree root lifting of sidewalk, etc.

SIDEWALK AREA: Geospatially calculated area value based on the size of the segment layer as provided by the City of Somerville.

PHOTO LINK: Picture of ramp taken by inspector on date of inspection.

SCI: Sidewalk Condition Index (SCI) value is calculated by:

SCI = 100 – ((DAM_AREA / SWK_AREA) * 100)

This index is used by PWD to indicate sidewalk segment age, density of damage, and ability to plan repairs. SCI ranges from (0-100) and generally categorized as:

RECONSTRUCTION = 0 – 49

LOCALIZED REPAIRS = 50 – 79

DO NOTHING = 80 – 100

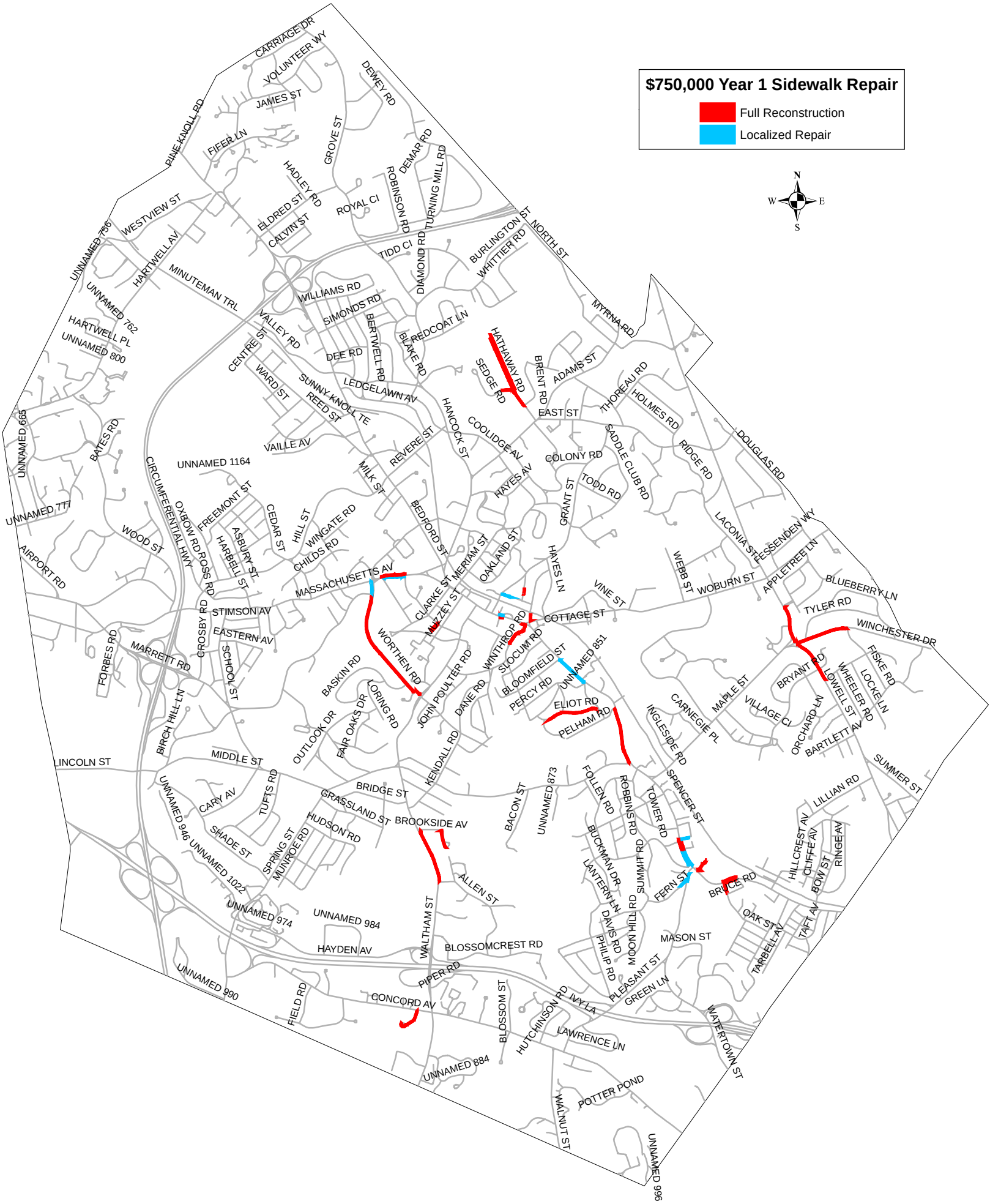
TRIP HAZARDS: Number of potential trip hazards observed by inspector.

APPENDIX B

NETWORK PRIORITY MAP OF SIDEWALKS AND RAMPS

APPENDIX C

$750,000 YEAR 1 PLAN


$750,000 Year 1 Sidewalk Repair
Full Reconstruction
Localized Repair
N
W
E
S
CARRIAGE DR
VOLUNTEER WY
DEWEY RD
JAMES ST
PINE KNOLL RD
FIFER LN
GROVE ST
HADLEY RD
ROBINSON RD
DEMAR RD
TURNING MILL RD
WESTVIEW ST
ELDRED ST
ROYAL CI
CALVIN ST
UNNAMED 755
HARTWELL AV
TIDD CI
DIAMOND RD
BURLINGTON ST
NORTH ST
WHITTIER RD
MINUTEMAN TRL
WILLIAMS RD
UNNAMED 762
HARTWELL PL
UNNAMED 800
SIMONDS RD
VALLEY RD
BERTWELL RD
BLAKE RD
REDCOAT LN
MYRNA RD
CENTRE ST
DEE RD
HATHAWAY RD
SEDGE RD
BRENT RD
ADAMS ST
WARD ST
SUNNY KNOLL TE
LEDGELAWN AV
REED ST
HANCOCK ST
EAST ST
THOREAU RD
HOLMES RD
UNNAMED 665
BATES RD
VAILLE AV
REVERE ST
COOLIDGE AV
SADDLE CLUB RD
DOUGLAS RD
UNNAMED 1164
MILK ST
COLONY RD
RIDGE RD
CIRCUMFERENTIAL HWY
HAYES AV
TODD RD
UNNAMED 777
FREEMONT ST
CEDAR ST
HILL ST
WINGATE RD
BEDFORD ST
GRANT ST
LACONIA ST
FESSENDEN WY
WOOD ST
OXBOW RD
ROSS RD
ASBURY ST
HARBELL ST
CHILDS RD
MERIAM ST
OAKLAND ST
HAYES LN
WEBB ST
APPLETREE LN
AIRPORT RD
MASSACHUSETTS AV
CLARKE ST
VINE ST
WOBURN ST
BLUEBERRY LN
STIMSON AV
MILZEY ST
COTTAGE ST
TYLER RD
CROSBY RD
EASTERN AV
WINCHESTER DR
FORBES RD
MARRETT RD
WORTHEN RD
WINTHROP RD
SLOCUM RD
UNNAMED 851
FISKE RD
SCHOOL ST
BASKIN RD
BLOOMFIELD ST
BRYANT RD
LOWELL ST
WHEELER RD
LOCKE LN
LORING RD
JOHN POULTER RD
DANE RD
PERCY RD
MAPLE ST
VILLAGE CI
BIRCH HILL LN
OUTLOOK DR
FAIR OAKS DR
ELIOT RD
CARNEGIE PL
ORCHARD LN
PELHAM RD
INGLESIDE RD
BARTLETT AV
LINCOLN ST
MIDDLE ST
KENDALL RD
SUMMER ST
BRIDGE ST
FOLLEN RD
ROBBINS RD
SPENCER ST
UNNAMED 873
BACON ST
TOWER RD
LILLIAN RD
CARY AV
TUFTS RD
GRASSLAND ST
UNNAMED 946
HUDSON RD
BROOKSIDE AV
BUCKMAN DR
SUMMIT RD
HILLCREST AV
CLIFFE AV
RINGE AV
SHADE ST
SPRING ST
MUNROE RD
LANTERN LN
FERN ST
BRUCE RD
BOW ST
UNNAMED 1022
ALLEN ST
OAK ST
UNNAMED 974
UNNAMED 984
DAVIS RD
TAFT AV
MOON HILL RD
MASON ST
HAYDEN AV
WALTHAM ST
BLOSSOMCREST RD
PHILIP RD
TARBELL AV
PLEASANT ST
PIPER RD
UNNAMED 990
GREEN LN
FIELD RD
CONCORD AV
BLOSSOM ST
IVY LA
HUTCHINSON RD
WATERTOWN ST
LAWRENCE LN
UNNAMED 884
POTTER POND
WALNUT ST
UNNAMED 996