

7. MAINTENANCE ISSUES

7.1. Background

Like any other form of public infrastructure, a sidewalk must be maintained in order to remain useful. Unlike a city street or a park, sidewalks require little in the way of annual maintenance in order to remain structurally sound. Over a period of several years, weeds, poor drainage and tree roots can erode the value of a stretch of sidewalk, but the costs of maintaining a small portion of sidewalk are low relative to the benefits that a sidewalk provides. Full sidewalk replacement is not likely to be needed more than once every 20 years and will mean a one-time cost to the average homeowner of approximately \$1,560.⁵ Considered in aggregate, however, at the level of a town, village or city, sidewalk maintenance costs can become quite substantial.

In Central New York, the issue of snow clearance is especially problematic. Not only can clearance of a typical snowfall of one or two feet be physically difficult for senior citizens and disabled residents, but snowfall is frequently combined with snow plowed from roads onto adjacent sidewalks, creating barriers that are difficult to eliminate without a snow blower. Other difficulties include locations where the adjacent property owner is the State or County, such as bridges on county highways or at freeway interchange ramps.

7.2. Responsibility

While there are many different ways to find funding for sidewalk construction (see [Chapter 5](#)), the problems of maintenance (snow clearance and sidewalk repair) become the responsibility of some combination of the adjacent property owner and the city, town or village in which the sidewalk is located. State law specifies that neither NYSDOT nor county departments of transportation are responsible for sidewalk maintenance (see [Section 1, Legal Issues](#)). Most of the municipalities in the MPA have ordinances that spell out that the adjacent property owner is responsible for sidewalk maintenance (see [Chapter 3, Municipal Ordinances](#)). In some villages, the Department of Public Works assists property owners with maintenance by, for example,

Most municipalities in the MPA assign responsibility for sidewalk maintenance to the adjacent property owner.

⁵ Based on a 40-foot property frontage, five-foot-wide sidewalks and a sidewalk replacement cost of \$39 per linear foot. See [Chapter 5](#) for average costs. Homeowners are typically not responsible for elements such as curbing.

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providing snow removal and subsidized sidewalk repairs.

7.3. Lifespan

As the report *Constructing, Maintaining and Financing Sidewalks in New Jersey* says: “The preference for concrete is based on its long service life – many sidewalk slabs in older cities remain in good condition even after 75 years of service.” (Alan M. Voorhees Transportation Center, 2006)

According to a 2007 survey of 35 state, local and provincial departments of transportation and public works departments, the minimum reported lifespan for a concrete sidewalk is 20 years. The average reported lifespan is 34.3 years (Markow, 2007) (see Table 7.1). Another source puts the average lifespan of a sidewalk at 30 years, but cautions that “the amount of rain or snow and fluctuations in temperature affect the life of sidewalks”. (Gruenwald, 2002) Based on weather patterns in Central New York, which tend toward extreme levels of snow and rain, as well as temperatures that can fluctuate rapidly, this report assumes an average lifespan of 20 years for sidewalks.

Table 7.1 – Estimated Service Lives of Sidewalks by Material

Sidewalk Material	No. of Responses	Survey Responses (Years)				
		Minimum	Maximum	Mean	Median	Mode
Concrete	7	20	60	34.3	25	20
Asphalt	5	5	20	11.4	10	10
Brick or block	2	20	20	20	20	20
Gravel / crushed rock	1	n/a	n/a	10	n/a	n/a

Source: (Markow, 2007)

Over time, vegetation and precipitation wear away at a concrete sidewalk. When moisture from rain or melted snow infiltrates a crack in the concrete (without draining through the material, as in the case of porous pavements), the expansion and contraction caused by freezing and thawing can turn a small opening into a large fissure. Additionally, tree roots (see Tree Roots, below), grass and other vegetation can grow between or next to sidewalk blocks. Inadequately compacted subgrade can also cause sidewalk failure over time.

The result is frequently cracking of sidewalks and the lifting (vertical displacement) of one block above another. According to the FHWA, when the vertical displacement between sidewalk blocks reaches ½ an inch, this change in elevation should be beveled in order to be passable by people in wheelchairs:

The Federal accessibility standards permit changes in level less than 6 mm (0.25 in) high to be vertical but require changes in level between 6 mm and 13 mm (0.25 in and 0.50 in) to have a maximum bevel of 50 percent, as shown in Figure 4-11. A ramp is required for changes in level that exceed 13 mm (0.50 in) (US DOJ, 1991; UFAS,U.S. DoD et al., 1984). ([Designing Sidewalks and Trails for Access](#))

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7.4. Maintenance Planning

7.4.1 Evaluation

The City of Ventura, California, has responsibility for maintaining approximately 420 linear miles of sidewalk. Faced with a dramatic decline in public funding for sidewalk maintenance, the City has developed a system for prioritizing repairs, based on the severity of the sidewalk's problem and the location's importance in the sidewalk network. For example, a sidewalk slab lifted two inches above the adjacent slab by tree roots would be a higher priority if it were near a hospital and on an arterial route than if it were in a residential neighborhood on a local street. (City of San Buenaventura Public Works, 2013)

7.4.2 Funding

For information on funding sidewalk maintenance, see [Chapter 5](#).

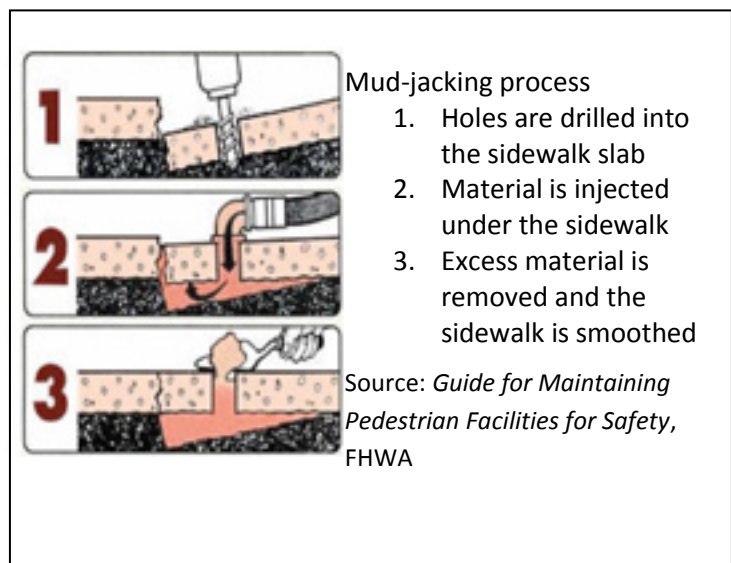
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7.5.1 Sidewalk Grinding

Relatively minor sidewalk disruptions (one inch or less) can usually be addressed through sidewalk grinding. This is done with machinery such as a rotary scarifier, followed by use of a grinder to smooth out the surface. (Concrete Network, 2013) This is not work that the typical homeowner is either trained or equipped to handle, and requires either bringing in an outside contractor or, depending on the municipality, requesting public works department's assistance.

7.5.2 Mud-jacking

Mud-jacking is used to elevate sidewalk slabs that have sunken by a half-inch or more, relative to the adjacent sidewalk. The process involves drilling holes in the sidewalk and pressure injecting cement (or other material) under the sidewalk slab until it is lifted into place (see Figure 7.1). Mud-jacking must be performed cautiously, since the cause of sidewalk subsidence may be related to problems with underground utilities, such as leaking pipes, and the process of injecting a slurry under the sidewalk could exacerbate these problems.



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7.5.3 Tree Roots

In some ways, trees are as much a part of a complete and sustainable street as are facilities for cyclists, pedestrians, transit and motor vehicles. Dan Burden's *Urban Street Trees* lists 22 of the benefits of street trees, including the following cost-benefit statistic: "For a planting cost of \$250-600 (includes first 3 years of maintenance) a single street tree returns over \$90,000 of direct benefits (not including aesthetic, social and natural) in the lifetime of the tree." (Burden, 2006) Benefits reported include improvements in business activity, reductions in drainage infrastructure costs, improved cooling efficiency for adjacent buildings and added property value.

When tree plantings are designed properly, conflicts between tree roots and sidewalks can be minimized. When trees are planted too close to sidewalks, conflicts are common and both the sidewalk and the tree are frequently damaged.

Tree roots spread out in search of soil oxygen, water and minerals. Depending on the site, this can mean that they are quite close to the surface; several studies have indicated "that most roots grow in the upper 30 cm of soil, and that they spread well beyond the crown." (Morgenroth, 2011). Roots expand radially, meaning that buffer space is needed between trees and sidewalks in order to ensure the tree's well-being and the sidewalk's structural integrity. In many cases, the cause of conflicts between sidewalks and tree roots is a lack of adequate space between the two. Other causes are the use of fast-growing tree species and trees that are too large for the area in which they are meant to grow. (Randrup, McPherson, & Costello, 2001)

In some municipalities, damage done to a sidewalk by a tree located in the public right of way is the responsibility of the municipality, not the property owner. In these cases, it is because the tree itself is public property and cannot be pruned or removed by the property owner without a permit. Local public works staff should be consulted in order to make this determination. The City of Syracuse's stated policy is that the homeowner is responsible for sidewalk repairs even if a city-owned tree has damaged the sidewalk. (City of Syracuse, 2008)

Additionally, the Village of Rhinebeck's [Worth Walking](#) plan is an excellent resource for how to evaluate both sidewalks and adjacent trees and to develop a plan of action (e.g., grinding the sidewalk, re-designing the sidewalk around the tree, or pruning the tree's roots) based on the quality of the tree and the damage to the sidewalk.

Additional resources on
minimizing conflicts
between sidewalks & tree
roots include:

[Village of Rhinebeck,](#)

[Worth Walking;](#)

[University of Florida Dept.
of Environmental
Horticulture presentations](#)

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The University of Florida's Department of Environmental Horticulture provides PowerPoint presentations online summarizing best practices in managing conflicts between sidewalks and tree trees. While much of this guidance is rooted in design practices, it recommends re-routing sidewalks around trunks without cutting large (greater than one-inch diameter) roots. Pruning or shaving tree roots is a less expensive approach, but if done improperly it can damage or kill the tree. Root pruning should be done under the supervision of an arborist. Generally, a rule of thumb is to preserve all roots within an area about five times the trunk's diameter. (University of Florida, 2007)



Figure 7-1 - Route sidewalk around tree

Other solutions include:

- Removing concrete sidewalks and replacing them with different surface materials, such as crushed rock, stone dust or porous pavers
- Using metal decking or other material to create a bridge over exposed roots

7.5.4 Do it Yourself Maintenance

Generally speaking, repairing a cracked or heaved sidewalk block is not the type of project that a homeowner is encouraged to undertake without professional assistance.

In New York City, however, the New York City Department of Transportation's web site includes a page on "Do it Yourself Repairs" and provides property owners with the specifications that must be met in order to comply with the City's regulations. (New York City Department of Transportation, 2013)

Similarly, the City of Portland provides a user-friendly [Sidewalk Repair Manual](#) that includes estimated number of hours that a specific project could take. It also provides a list of equipment needed, an overview of the process for installing a sidewalk and the specifications that a City inspector will review prior to project approval. (City of Portland, 2013)

7.5.5 Snow Removal

Individual Property Owner

Where they are the party responsible for clearing sidewalk snow, property owners frequently discharge this responsibility themselves, using shovels, snow blowers and rock salt. They may also contract out for this service. Typical seasonal fees for this service are on the order of \$200 (UNP 2009). Given a block of property owners who are either doing their own snow removal or hiring someone else to remove snow from their property, sidewalks on any given block should be completely clear within two days of a snowfall. Unfortunately, individual property owners have varying responses to this responsibility. The

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owner of a vacant structure who is not paying the taxes owed on that structure is extremely unlikely to be paying someone to maintain the adjacent sidewalk.

Several local municipal codes make the penalty for failing to clear ice and snow from sidewalks equal to the cost of having the municipality do the ice and snow clearance. In some cases, this requires the municipality to provide property owners with written notice of noncompliance and allow the property owner time to respond to the notice before clearing the snow and ice.

Groups of Property Owners

UNIVERSITY NEIGHBORHOOD PARTNERSHIP COMMITTEE:

During the winter of 2009/2010, the Syracuse University Neighborhood Partnership Committee (UNP), a non-profit organization made up of representatives of the University and the surrounding neighborhood, developed a plan for snow removal on a 4.75 mile stretch of sidewalks. This organization considered developing a Business Improvement District (BID), but ultimately determined that it would be less expensive and less complicated to hire a contractor, to be paid by property owners.

The program charged \$70 per 40 feet of sidewalk for the season, anticipating that approximately half of the property owners along the 4.75 mile plowing route would actually pay this money. Not all property owners paid the fee, but all property owners along the route had their sidewalk plowed. The total cost of the plowing program was \$10,000 for up to 26 plow runs over the winter months.

Program charges were projected to cover all the costs of the contractor's operations, including:

Plowing of sidewalks on the entire route once per 24-hour period when accumulation reached 3" or more between the hours of 2 a.m. and 8 a.m.

Moving snow banks back with snow blower twice per season if large amounts of snow accumulate without a thaw. (University Neighborhood Partnership, 2010)

Salting of sidewalks was not included because of concerns over damage to sidewalks and the lack of equipment. The contractor also indicated that additional insurance would be needed if salt were applied to the sidewalks.

Sidewalk snow clearance may be accomplished by:

Individual property owners **Groups of property owners**

- University Neighborhood Partnership

Volunteers

- Westside Residents Coalition, Syracuse
- Snow Corps, Chicago

Municipalities

- City of Rochester
- Town of Penfield

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Volunteers

WESTSIDE RESIDENTS COALITION

During the winter of 2012/2013, the Westside Residents Coalition, based in Syracuse's Near Westside Neighborhood, began a volunteer-based sidewalk snow removal program. The program was funded in part by a \$3,900 grant from a local foundation; the funds were used to buy snow shovels, hats and gloves. The community group met in December 2012 to discuss the routes most in need of shoveling and to encourage volunteers to participate. The organization is continuing this effort in the 2013/2014 winter season.

SNOW CORPS, CHICAGO

The City of Chicago began a program called Snow Corps in January 2012, to match snow shoveling volunteers to places in the city in which elderly and disabled citizens requested help clearing snow from sidewalks. City residents age 60 and over and/or residents with disabilities can request assistance by dialing "311." Volunteers sign up online and receive e-mails and assignments from the City, instructing them as to where help is needed. Volunteers commit to removing snow from these sidewalks within 24 hours following a snowstorm.

Municipal Sidewalk Snow Clearing

CITY OF ROCHESTER

The City of Rochester provides municipal sidewalk snow clearing to supplement property owners' snow clearance. This service is paid for through an "embellishment fee" added to property taxes, which also includes street cleaning, roadway snow plowing and sidewalk repair. Costs are based on street frontage. A home with the standard 40-foot frontage on a city street pays approximately \$32 a year for sidewalk snow plowing; total embellishment fees for such a property are approximately \$210.

The City of Rochester's [website](#) provides the following summary of its sidewalk snow plowing program:

The City begins plowing sidewalks once new snowfall exceeds 3 inches.

The City plows all sidewalks that are at least five feet in width.

The City plows 880.5 miles of sidewalks. These miles are divided into distinct sidewalk plow runs of approximately 15 miles. Each sidewalk plow run takes about five hours to complete.

Depending on the severity of a storm, sidewalk snow plowing policies must sometimes be altered to meet the needs of the situation.

The City uses private contractors to plow sidewalks.

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Sidewalk plowing usually happens in the evening and early morning when pedestrian traffic is lowest, but this schedule is modified to respond to actual storm conditions.

Additional information from the City of Rochester indicated that the annual operating cost of the sidewalk snow clearing program is on the order of \$1.2 million. The average seasonal cost per mile of snow clearing is \$1,365. (Gillis, 2014)

The City has averaged 10 snow plow runs a year over the last 24 years, but the City's budget allows for up to 13 runs. Most years (19 out of the past 24 years), there are fewer than 13 snowplow runs, meaning that on average, this program uses less than the amount for which it has been budgeted.

The City utilizes contractors for sidewalk snow plowing. In 2013/2014, there were eight separate contractors involved. Contractors are paid per snowplow run, but are also guaranteed a minimum dollar amount in the event of a winter with less than normal snowfall amounts. This minimum compensates contractors for holding on to personnel and equipment.

Equipment used includes large farming tractors with V-plows, as well as bombardiers (see Figure 7-2). Any damage done to property as a result of plowing is the responsibility of the individual contractor and the City can withhold payment to contractors until appropriate repairs have been made.



Figure 7-2: A bombardier with snowplow in Chicago (left) and a tractor with a V-plow clearing sidewalks in the Rochester suburb of Chili (right)

TOWN OF PENFIELD

The Town of Penfield in Monroe County has an extensive sidewalk network along major roads, and it is responsible for keeping these sidewalks free of snow (see [Section 3.3.2](#) for information on the town's ordinance structure, which makes this possible). The Town divides its Primary Sidewalk Network into three snow clearing routes, with each route taking approximately 4 to 5 hours to complete, typically starting at or near schools and working outward.

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INFORMAL PROGRAMS

Several villages in the Study Area provide what might be termed “informal” assistance with sidewalk snow clearance efforts by using small bulldozers (Bobcats) to clear all or some village sidewalks after a heavy snowfall. In the Villages of Liverpool and North Syracuse, for example, it is not officially the Department of Public Works’ responsibility to clear sidewalks on residential streets, but these villages will periodically clear them.

Road Plowing and Sidewalks

ITE’s *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities* includes a brief summary of the problem that many municipalities in the Study Area face after a heavy snowfall:

During and after a snowstorm, most snow plows operate in emergency or “hurry-up” mode, focusing on opening up lanes for vehicles. Often, when snow is scraped from the vehicular lanes, it is piled up in the bicycle lane, parking lane, or along the sidewalk, thus making it difficult for bicyclists and pedestrians to use the facilities that have been provided for them.

This guidance includes the following recommendations:

Streetsides should be designed to accommodate a normal level of plowed snow behind the curb without blocking the pedestrian throughway. A wide planting strip or furnishings zone can accommodate plowed snow.

Avoid designing objects in the furnishings zone that interfere with the ability to plow snow onto the streetside, such as large raised planters, continuous hedges and large utility and traffic control cabinets. Objects that snow can wrap around include trees, signs and light poles.

7.6. More Information

Snow Removal

City of Rochester Sidewalk Snow Removal
<http://www.cityofrochester.gov/article.aspx?id=8589936460>

Constructing, Maintaining and Financing Sidewalks in New Jersey, Alan M. Voorhees Transportation Center
http://www.sacog.org/complete-streets/toolkit/files/docs/NJDOT_Constructing,%20Maintain,%20and%20Financing%20Sidewalks%20in%20New%20Jersey.pdf

Think about snow storage when designing new roads or streetscaping projects. Wide planting strips and furnishing zones can accommodate plowed snow. Large objects in the furnishings zone can impede snow storage.

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Snow Corps, City of Chicago

http://www.cityofchicago.org/city/en/depts/mayor/snowportal/snow_corps.html

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, Institute of Transportation Engineers

<http://www.ite.org/bookstore/RP036.pdf>

Sidewalk Maintenance

A Guide for Maintaining Pedestrian Facilities for Enhanced Safety, FHWA (2013)

http://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/research_report/

Sidewalk Maintenance and Repair Plan, City of Buenaventura Public Works

<http://www.cityofventura.net/files/file/SidewalkMaintenanceandRepairPlan.pdf>

Sidewalk Repair Manual, City of Portland, Bureau of Transportation

<http://www.portlandoregon.gov/transportation/article/443054>

Do It Yourself Repairs: New York City Specifications for Residents Installing their Own Sidewalk, New York City Department of Transportation

<http://www.nyc.gov/html/dot/html/infrastructure/sidewalkspecs.shtml>

Street Trees

Urban Design to Accommodate Street Trees - Solutions (PowerPoint presentation), University of Florida

<http://hort.ufl.edu/woody/powerpoints/urbandesigntoaccommodatetreessidewalksolutions.ppt>

Urban design for a wind resistant urban forest, University of Florida.

<http://hort.ufl.edu/woody/documents/EP309.pdf>

Urban Street Trees - 22 Benefits, Specific Applications, Dan Burden - Walkable Communities, Inc.

http://www.michigan.gov/documents/dnr/22_benefits_208084_7.pdf

Randrup, T., McPherson, E., & Costello, L. (2001). A review of tree root conflicts with sidewalks, curbs, and roads. *Urban Ecosystems*, 209 - 225.

<http://goo.gl/mj52Bx>