

Georgia Institute of Technology

The Costs of Owning and Operating Sidewalks: A Strategy for the City of Atlanta

Esteban Carrillo
Chris Maddox
George Maier
Charlene Mingus
Maria Sotnikova
12/12/2012

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1.0 Introduction

State, city and community-level land use and transportation plans often incorporate sidewalk guidelines to address pedestrian travel. Additionally, the Americans with Disabilities Act (ADA) established federal-level sidewalk standards by which all local governments must abide. These ADA standards range from the implementation of curb cuts to the connectivity of sidewalks as a whole. However, despite the precedent set by such widely applied regulations, the mechanisms by which the cost of constructing and maintaining sidewalks are funded are not common knowledge. Therefore, the intent of this project was to research the financial aspect of sidewalk management and to propose a new sidewalk management plan for the City of Atlanta.

1.1 Problem Statement

A trio of objectives was outlined to identify the scope of the project. First, an evaluation of the City of Atlanta's current sidewalk maintenance program framed the local methodologies and practices for sidewalk management. Based on this analysis, several underlying issues associated with the cost of owning and operating sidewalks in the City became apparent. These issues were discussed, and possible managerial solutions were proposed. Finally, the project quantified the cost of an appropriate sidewalk maintenance plan and proposed alternative funding approaches for Atlanta's sidewalks. Together, these three lines of analysis attempt to construct a comprehensive overview of sidewalk maintenance policy and funding that could be applied by the City of Atlanta and by similar communities. Adoption of this overview may help achieve an improved pedestrian network for greater mobility and accessibility.

1.2 Methodology

The primary methodology for this project was extensive research into sidewalk policy. As previously noted, an initial review of the City of Atlanta's existing sidewalk policies and procedures was conducted. Preliminary findings indicated that many sidewalks in the City were aging, in disrepair, and ADA non-compliant. Two main types of issues within the Atlanta sidewalk maintenance program were identified: policy problems and funding problems. Issues of policy commonly revolved around the lack of common knowledge of sidewalk ownership, maintenance responsibility, and injury liability regulations, while funding shortcomings were mainly associated with budget inadequacies.

Following the identification of these two primary issues, case studies were conducted on four other metropolitan areas in the United States with similar demographics and land use patterns, but marginally different sidewalk management systems. The four cities included in this analysis were Boston, MA; New

York City, NY; Portland, OR; and San Diego, CA. Maintenance programs, injury liability laws, and funding mechanisms were all identified using city code, case precedent, and budgetary analysis for each city. Miles of sidewalk and other infrastructure characteristics were identified as well.

Finally, supplementary research was conducted, mainly via telephone interviews, to identify other possible funding approaches not found in case studies. This tertiary line of investigation resulted in the identification of four primary funding structures: special assessment bonds, municipal bonds, local option sales taxes, and property taxes. Based on these findings, a modified sidewalk maintenance plan was recommended for the City of Atlanta. Specific alterations and additions pertaining to maintenance prioritization, tree remediation, and application of technology like geographic information systems (GIS) were also included.

2.0 Sidewalks in the City of Atlanta

2.1 A Summary of the City of Atlanta's Sidewalk History

Adjacent property owners are responsible for sidewalk and curb maintenance; however, property owners are only required to take action after notification by the City of Atlanta's Department of Public Works (Jablon 5). When property owners receive a notification from the City about sidewalk disrepair, property owners can hire a city-approved contractor or send funds to the Sidewalk Trust Fund through a paid permit and request that the City handle the repair (Minutes 2).

2.2 Sidewalk Trust Fund

In 2011 the Sidewalk Trust Fund was created through legislation introduced by City Council Member Kwanza Hall. The Sidewalk Trust Fund was created to ensure that adequate funds would be available to the Department of Public Works to make sidewalk repairs that private property owners had contracted the City to complete. Before the Fund was created, all payments made to the City by private property owners for contracted repairs were deposited in the General Fund (McWilliams, 2011). By June 2012, the Sidewalk Trust Fund had built up \$1.5 million to make sidewalk repairs (McWilliams, June 2012).

2.3 Sidewalk Task Force

City of Atlanta Council members Natalyn Archibong and Carla Smith created the Sidewalk Task Force to research methods that Atlanta could use to improve sidewalk maintenance (Varela). The taskforce will present its findings to the City Utilities Committee of the City Council (Minutes 1). The first taskforce

meeting was held in October 2012 and four subcommittees were created; Neighborhood Initiatives, Funding and Best Practices, Streamlining of Regulations and Red Tape, Legal Concerns and Policy Directions (Minutes 7). A timeline for the taskforce to report to the City Utilities Committee was not made during the first meeting.

2.4 The State of The City of Atlanta's Sidewalks and Curbs

There are more than 2,100 miles of sidewalks and curbs in the City of Atlanta. However, 18 percent or 395 miles of sidewalk are in disrepair and ten percent or 216 miles of curbs are in disrepair (Department of Public Works 9). According to the City's Department of Public Works *2010 State of the City's Transportation Infrastructure and Fleet Inventory Report*, \$152 million would be needed to eliminate the combined backlog of sidewalk and curb disrepair (9). The 2010 estimated backlog remains the same as the backlog in the Department of Public Works' 2008 report. While sidewalks and curbs had been replaced in the two years between the reports, such infrastructure replacements were offset by the deterioration of other sidewalk and curb stock (Department of Public Works 9). In addition to the \$152 million needed to eradicate the sidewalk and curb backlog, the *2010 State of the City's Transportation Infrastructure and Fleet Inventory Report* recommends that the City commit to a dedicated annual budget of \$15 million for a sidewalk maintenance program (Department of Public Works 10). The funding gap between the recommended annual budget and \$42,000 annual sidewalk maintenance budget in 2010 was 3,500 percent.

2.5 Department of Public Works

Budget

The annual budget of the Department of Public Works' sidewalk maintenance program increased slightly in fiscal year 2011 to \$50,000, still significantly less than the recommended \$15 million annual sidewalk maintenance budget (Minutes 3). However, the annual sidewalk budget increased dramatically in fiscal year 2012 to \$245,000 and again in fiscal year 2013 to \$860,000 for repairs and additional funds for two new staff positions; a sidewalk program manager and a sidewalk inspector (Minutes 3). The Department of Public Works secured an emergency contract in fiscal year 2012 with \$245,000 from the Sidewalk Trust Fund to reduce the backlog of repairs that the City was responsible to fix. The City made 266 repairs in fiscal year 2012, a five-fold increase over fiscal year 2011 (Minutes 3). This backlog had increased significantly due to the rise in reports of sidewalk disrepair and paid permits by abutting property owners (Minutes 2). While the sidewalk maintenance budget was increased significantly in

fiscal year 2012 and 2013, these increases are not sustainable without a dedicated funding source. Also, the budget increases were still too small to eliminate the \$152 million in sidewalk and curb disrepair.

Sidewalk Policy

The newly created sidewalk inspector position at the Department of Public Works offers the opportunity for the sidewalk maintenance program to become more proactive. The sidewalk maintenance program has been a reactive program relying on citizens to report sidewalks in disrepair or repairing sidewalks were an injury has occurred. As reported by Department of Public Works Commission Richard Mendoza, the policy of the Department of Public Works is to respond to a damaged sidewalk report within 15 days by inspecting the reported sidewalk to determine the level of damage and to set the sidewalk or curb's priority for repair and to determine if the City or abutting property owner is responsible for the repair. Property owners are responsible for funding the repair of sidewalks and curbs adjacent to their property as outlined in the City of Atlanta's Code of Ordinances;

Damaged sidewalk abutting the right-of-way. When the sidewalk abutting the right-of-way is damaged, it is the obligation of the abutting property owner to repair such sidewalk upon notice from the department of public works. If after receiving such notice, the abutting property owner fails to repair the sidewalk within a reasonable time, the department of public works is authorized to make such repairs and assess the abutting property owner for costs incurred. (Code of Ordinances Sec. 138-14. Maintenance of sidewalk area)

Once the fiscal responsibility is determined to be the abutting property owner's, the Department of Public Works will send the property owner a notification of the needed repair or replacement. The property owner can hire a private contractor with a permit from the City to make the necessary repair or the property owner can complete a paid permit with the City and the City will make the necessary repair (Minutes 2).

If the abutting property owner does not respond to the notification of needed repair, the City policy is to place a lien on the property. The City would proceed with the needed repairs and collect payment for the repairs at the time the property is sold through the lien. While the City's policy allows for the use of liens, in practice they are not frequently used. Liens are often seen as an equity issue as low-income property owners would be disproportionately affected by a lien. As illustrated in Figure 2.5.1, the reluctance to use liens to ensure that sidewalk repairs are made by abutting property owners results in a

discrepancy between policy and reality, leaving the Department of Public Works with no guidance on how to make the needed repairs without depleting their limited budget.

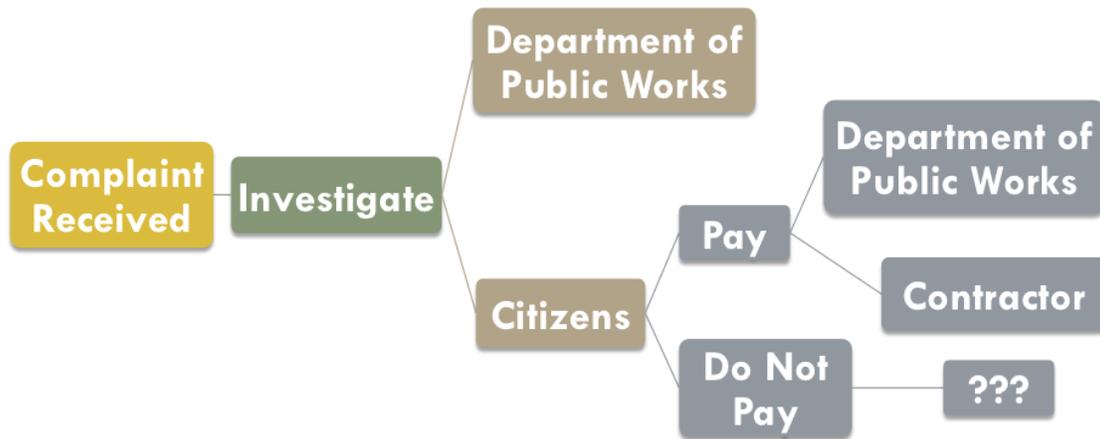


Figure 2.5.1. “Mendoza and White”

2.6 The City of Atlanta and Americans with Disabilities Act (ADA)

The City of Atlanta’s ADA Ramp History: U.S. Department of Justice Compliance Review

In 2009 the United States Department of Justice conducted a compliance review of the City of Atlanta to ensure that the City complied with the Americans with Disabilities Act (ADA). At the time, the Department of Justice had conducted compliance reviews in all 50 states as a part of their Project Civic Access initiative (Department of Justice). After the survey was completed, the City and the Department of Justice came to an agreement that outlined the steps that Atlanta needed to take to improve access for persons with disabilities. Along with other requirements, the agreement specifically addressed the ADA compliance of ramps,

Within three months of the effective date of this Agreement, the City will identify and report to the Department all streets, roads, and highways that have been constructed or altered since January 26, 1992. Paving, repaving, or resurfacing a street, road, or highway is considered an alteration for the purposes of this Agreement. Filling a pothole is not considered an alteration for the purposes of this Agreement. Within three years of the effective date of this Agreement, the City will provide curb ramps or other sloped areas complying with the Standards or UFAS at all intersections of the streets, roads, and highways identified under this paragraph having curbs or other barriers to entry from a street level pedestrian walkway (Settlement, par. 37).

The agreement required that the Department of Public Works identify and install or repair curb ramps on sidewalks located on streets resurfaced since January 1992 (Department of Public Works 11).

The State of The City of Atlanta's Sidewalks and Curbs

In 2010, the Department of Public Works completed an inventory of 757 miles of city streets which had been resurfaced since 1992 as a step toward meeting the agreement with the U.S. Department of Justice. According to the *2010 State of the City's Transportation Infrastructure and Fleet Inventory Report*, the surveyed streets represented 44 percent of the entire street network in the City. However, more information must be obtained to determine what percentage of the street network, which has been resurfaced since 1992, was surveyed. The survey indicates the general state of disrepair or lack of ADA compliant ramps at intersection nodes. The Department of Public Works identifies an intersection node as one corner of crossing streets (Department of Public Works 11). The inventory found 18,884 intersection nodes with ADA ramp requirements. Of the nodes surveyed in the inventory, 3,080 intersection nodes were ADA compliant, 8,705 of the ramps were non-compliant, and 7,099 intersection nodes had no ADA ramps (Department of Public Works 11). The inventory only includes ramps on roads resurfaced since 1992. The backlog of curb ramps jumps to 31,442 when all city streets are considered (Department of Public Works 12). Almost \$52 million would be required to reduce the backlog of curb ramps required at intersection nodes (Department of Public Works 12).

The Department of Public Works *2010 State of the City's Transportation Infrastructure and Fleet Inventory Report* recommends that the City eliminate the current ADA ramp repair and replacement backlog and then dedicate \$5 million annually for an ADA ramp maintenance program (Department of Public Works 13). In 2010, the annual budget for ADA ramp replacement was \$18,000 (2,800 percent) less than the recommended annual budget (Department of Public Works 13). Since 2008, the replacement of ADA ramps was primarily funded through the Quality of Life Bond (Department of Public Works 11). However, the bond has proven to be an inadequate source of funding for ramp replacement since only 813 ramps were replaced from 2008 to 2010 (Department of Public Works 11). This turns out to be only 2.6 percent of the estimated ADA ramp inventory backlog.

2.7 The City of Atlanta Sidewalk Liability

Miriam Nichole Hancock v. City of Atlanta

In 2011, a Fulton County jury awarded \$1,137,665 to a woman who had been injured after catching her heel in loose concrete on a downtown Atlanta sidewalk and injuring her ankle in the resulting fall

(*Miriam Nichole Hancock v. City of Atlanta* 3-4). The plaintiff, Miriam Nicole Hancock, alleged that the City of Atlanta had been notified of the loose concrete or the condition had been in existence for, “a sufficient length of time for notice thereof to be inferred” and the danger that it created but had neglected to make the necessary repairs (*Miriam Nichole Hancock v. City of Atlanta* 4-5). The repair to the sidewalk would have cost \$450, however, the City reportedly did not perform the repairs for four years after the plaintiff’s fall (*Miriam Nichole Hancock v. City of Atlanta*).

Alex Jenkins v. City of Atlanta

On May 15, 2012 the Council of the City of Atlanta approved a \$3 million settlement in response to a lawsuit brought by a blind man who had been injured after tripping and falling on a sidewalk in the City (*McWilliams*, Nov. 2012). The plaintiff, Alex Jenkins, alleged that the Department of Public Works had been, “negligent in failing to repair or maintain the sidewalk prior to his fall, and that this failure to repair and/or maintain the sidewalk caused the Plaintiff’s bodily injuries” (Public Safety and Legal Administration Committee). After extensive review, the City Attorney determined that the City’s potential liability far exceeded the \$3 million settlement amount, which was paid from the General Funds of the City of Atlanta (Public Safety and Legal Administration Committee). Sally Flocks, of the pedestrian advocacy group PEDS, estimated that the repair to the sidewalk would have cost the City about \$2,000 (Young).

2.8 Other Cities and ADA Lawsuits

Sacramento, California: *Barden v. Sacramento*

In 2004, the 9th Circuit Court ruled that the City of Sacramento was responsible for not only repairing and installing ADA compliant curb ramps, but also for ensuring that the sidewalks that connected the curb ramps were accessible. Before this case, Title II of the ADA had been interpreted to only apply to curb ramps. However, the ruling held that requiring curb ramps installation and maintenance to increase accessibility for persons with a disability would be meaningless without accessible sidewalks to connect the ramps (*Loewner* 242).

Title II's prohibition of discrimination in the provision of public services applies to the maintenance of public sidewalks, which is a normal function of a municipal entity. The legislative history of Title II indicates that all activities of local governments are subject to this prohibition of discrimination. This conclusion is also supported by the language of § 35.150, which requires

the provision of curb ramps in order for sidewalks to be accessible to individuals 1078*1078 with disabilities. (Barden v. Sacramento).

The city of Sacramento settled the case with the plaintiffs and agreed to dedicate 20 percent of its transportation funds for the next 30 years to sidewalk, crosswalk, and curb ramp maintenance and installation (The Center for an Accessible Society).

Chicago, Illinois: Council for Disability Rights, et.al. v. The City of Chicago

In the largest ADA settlement to date, the City of Chicago agreed to a \$50 million settlement in 2007. From 2007 to 2012, the City was required to spend \$10 million a year to repair and replace curb ramps to ensure ADA compliance. The Council for Disability Rights filed the lawsuit in 2005 and claimed that the City had neglected to provide and repair ADA compliant curb ramps. On top of the annual settlement, the City continued to spend \$18 million a year on sidewalk and curb repair and replacement as a part of their annual budget. In total, the City of Chicago spent \$140 million on sidewalks in five years (Council for Disability Rights, et. al, v. The City of Chicago).

3.0 Property Management and Cost Estimate

In order to avoid large settlements and litigation, sidewalks must be continually maintained to remain safe for the public. Unfortunately, many of the sidewalks in the City of Atlanta are old and dilapidated because of a lack of maintenance caused by inadequate funding. The associated costs of infrequent maintenance escalate exponentially. Figure 3.0.1 shows the dramatic decline in pavement quality if maintenance is deferred, resulting in increased costs. As sidewalk maintenance is delayed, deterioration accelerates over time, eventually leading to a point where maintenance repairs no longer become an option and reconstruction is needed. A database of all sidewalk assets should be kept in order to keep track of life cycles in order to avoid high costs of rehabilitation and reconstruction.

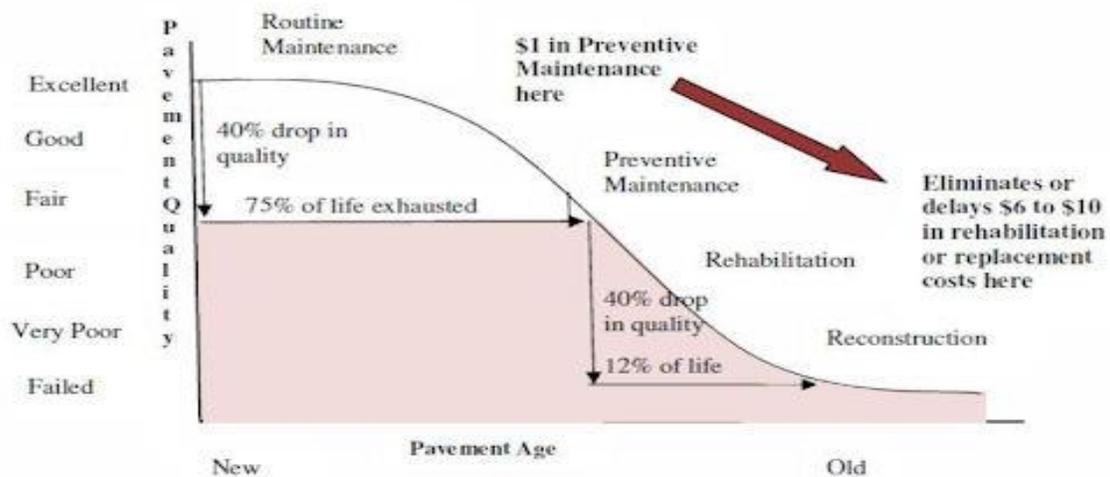


Figure 3.0.1: Pavement maintenance and quality index (Bacon, 2011)

Furthermore, the City of Atlanta’s reactive approach toward the repair and maintenance of sidewalks has led to a tremendous backlog. If the City of Atlanta were to keep repairing the sidewalk in a piece-by-piece manner, then the total replacement cost for the entire sidewalk network would be just under \$400 million. Table 3.0.1 shows the potential cost of replacing the entire sidewalk network in the city. As current policy and procedures stand, the entire 2,100 miles of sidewalks would need to be replaced in the City because of poor maintenance practices and deteriorating assets. This deferred maintenance will ultimately lead to higher costs and a shorter overall lifecycle.

Table 3.0.1. Estimated cost of Atlanta’s sidewalk repairs

Sidewalks in Atlanta	
Cost per Square Foot	\$7.11
Miles of Sidewalk	2,100
Square Feet of Sidewalk	55,400,000
Average Lifespan of Sidewalks	50 years
Total Replacement Cost*	\$394,000,000

*Total replacement cost includes professional work and materials

4.0 Case Studies

Sidewalk repair programs from other cities were analyzed in comparison to the City of Atlanta's program. The four cities examined were New York City, Portland, San Diego, and Boston. Summary characteristics of these cities are shown in Table 4.0.1 below, with similarities to the City of Atlanta

highlighted in green. These programs help guide the eventual recommendations for how the City of Atlanta should restructure their sidewalk repair program.

Table 4.0.1. Characteristics of cities compared to Atlanta. Green values are similar to City of Atlanta. (2010 US Census)

Statistics	Cities				
	Atlanta	New York City	Portland	San Diego	Boston
Population (Persons)	420,000	8,176,000	584,000	1,307,000	618,000
Land Area (Square Miles)	133	302	133	325	48
Density (Persons per Square Mile)	3,145	27,012	4,375	4,020	12,792
Walk to Work	4.4%	10.2%	5.4%	3.1%	14.9%
Transit to Work	12.7%	55.2%	12.0%	4.1%	32.9%
Population Under 18	19.4%	21.6%	19.1%	21.4%	16.8%
Population Over 65	9.8%	12.1%	10.4%	10.7%	10.1%

4.1 New York City

New York City’s Department of Transportation (DOT) has a sidewalk repair program for the city owned property and subsequently replaces more than 2 million square feet of sidewalk per year. For other properties New York, similarly to the City of Atlanta, requires property owners to construct and maintain the rest of the sidewalks. In addition, the NYC Administrative Code states that property owners are potentially liable for injuries cause by sidewalks in disrepair (New York City DOT). The DOT determines which sidewalks to inspect based on reported injuries, complaints, and the time since previous inspection. If a sidewalk is deemed unsafe, the property owner will receive a sidewalk violation issued by the DOT. The violations are to encourage the adjacent property owners to repair their sidewalks to increase public safety. There is no fine associated with the violation, but it could result in a complication of selling or refinancing the property (New York City DOT). However, in the case that the damage to the sidewalk was the result of tree roots or utilities owned by the city, it is the city that will assume responsibility for the repairs.

Maintaining & Repairing Sidewalks

Once a violation is received the DOT suggests the property owner hire a contractor familiar with the required design standards to perform the repairs. The DOT provides a link to the Department of Consumer Affairs database of licensed contractors. With a contractor hired the owner needs to purchase the proper permits at a cost of \$70 per 300 linear feet of sidewalk. This cost pays for administrative and inspector costs. If the property owner does not make the repairs within 45 days of

receiving the violation then either the DOT will perform the repairs or hire a contractor to do the repairs, and bill the property owner for the work and the violation will be removed. If the bill is not paid within 90 days then the owner will be charged interest and a monetary lien will be placed on the property. The DOT attempts to help property owners by posting videos onto their website explaining the entire ownership structure and the owners' responsibilities (New York City DOT). The videos can be found at the following website: <http://www.nyc.gov/html/dot/html/sidewalks/sidewalkintro.shtml>.

Liability

The City of New York used to be liable for all personal injuries occurring on city sidewalks until 2003. Prior to 2003 for the city to be liable the city needed to be notified of sidewalk damages at least 15 days prior to injury. As a result of this the Big Apple Pothole and Sidewalk Protection committee formed in 1982. The committee was formed by the New York lawyers that paid for the sidewalk system to be mapped for damages. The map was then delivered to the Department of Transportation, thus submitting notification of the damages and meeting the 15 day rule. This resulted in millions of dollars in lawsuits until 2003 when a new law was passed that shifted responsibility from the city to adjacent property owners. It is currently in dispute as to who assumes liability in Atlanta, but New York has strengthened its defenses using their inspectors and issuing violation notices to the property owner (New York State Trial Lawyers Association). More detailed information concerning the cities sidewalk inspection program was difficult to obtain due to the fact that the timing of this research coincided with Hurricane Sandy, in which the state had all resources focused on recovery efforts.

4.2 Portland

New Sidewalk Construction

Under Portland, Oregon City Code and Charter, the abutting landowner is responsible for constructing sidewalks, curbs, driveways, and parking strips immediately adjacent to said property unless the curb in question is located at a city-constructed intersection, in a green street, or other public stormwater management facilities' right of way ("Chapter 17.28"). Prior to July 2012, the city had a proactive Sidewalk Maintenance Program (Munson). Inspectors were sent out around Portland to primarily look for obstructions that would cause people to trip and fall including holes, tree root damage, chips, wide cracks, and other deterioration. Once identified, the Sidewalk Inspectors completed a Sidewalk Repair Notice form detailing relevant information like date of inspection, repair estimation, legal property description, and a diagram of the posted hazard. Responsible property owners were given 90 days to

repair or construct a sidewalk to Portland and federal ADA standards, otherwise city contractors would begin work on the issue, charging the property owner for the cost of the project plus a 10% assessment fee (City of Portland Bureau of Transportation 5-15).

Maintaining & Repairing Sidewalks

As with new sidewalk construction, maintenance of sidewalks is the responsibility of the abutting property owner in Portland. Subsequently, property owners are also held liable for injuries on sidewalks (City of Portland Bureau of Transportation 4-5). If a sidewalk or curb, as reported by the Inspector, was in need of repair according to the City Engineer, a notice that directed the owner to repair the sidewalk or curb in a good and substantial manner had to be posted (“Chapter 17.28”). Typical costs are reported in Table 4.2.1. All damage due to trees required contacting the Urban Forestry Division for a root inspection prior to repair work. Separate inspection criteria also existed for Transit Mall and other Light Rail stations, which receive heavy pedestrian traffic but are predominantly paved with brick (City of Portland Bureau of Transportation 6-9). In most neighborhoods, sidewalks and corners were inspected in 25-year cycles except for those in the Central Business District, which were inspected in 5-year cycles (City of Portland Bureau of Planning 130).

**Table 4.2.1. 2009 Portland Infrastructure Condition and Capacity Background Report
(City of Portland Bureau of Planning)**

Infrastructure Type	Inventory	Replacement Cost
Sidewalks	2.824 sq mi	\$247.8 mil/sq mi
Curbs	3,247 centerline mi	\$142,562.37/mi
Ramps	13,195	N/A

Americans with Disabilities Act Compliance

Unlike sidewalks, corners (and subsequently often ramps) are the responsibility of the City of Portland. According to a 2009 infrastructure inventory, the city’s Bureau of Planning and Sustainability determined that approximately 65% or 24,372 corners were in need of new ramps to comply with Americans with Disabilities Act (ADA) standards at a projected cost of \$73.6 million. Pedestrian accessibility guidelines exist within the City of Portland’s Pedestrian Design Guidelines. The City also has a separate ADA transition plan. Together, these two documents serve to ensure that the city’s sidewalks, curbs, and ramps are ADA compliant. At the time of the inventory, Portland was making necessary corner accommodations at a rate of about 1,500 per year. A request-based curb cut program was also in effect to address urgent needs (City of Portland Bureau of Planning 133).

Sidewalk Maintenance Enforcement & Financing

If, following an inspection, the owner of the abutting property failed to make needed improvements within 20 days after the notice was posted, the City made the repairs instead. The costs of these repairs plus a 10% charge for administrative costs would be assessed upon the property by the City Auditor based on amounts reported by the City Engineer (“Chapter 17.28”). Repair costs had to be paid or financed within a 30-day deadline, otherwise risking a 12% annual interest rate on late payment. The City of Portland provided a monthly financing plan that charged a present interim interest rate and transaction fee with each installment until repairs were paid. Liens were also placed on properties to ensure payment of final assessment. Property owners living in affected residences and making less than \$35,000 a year could apply to have their repair costs covered by the state (City of Portland Bureau of Transportation 15-17).

4.3 San Diego

The city of San Diego has a similar sidewalk repair structure as that of the City of Atlanta in that the residential or commercial owner of the adjacent property of the sidewalk is responsible for repairing and maintaining the sidewalk such that it will not endanger persons or property. The California Streets and Highway Code sets up these statutes (CA Codes,shc:5610-5618). The key difference between San Diego’s and the City of Atlanta’s sidewalk programs is that the City of San Diego is liable for any injuries that occur in the sidewalks. Also, San Diego has a 50/50 Cost Sharing Program in place in which the cost of the sidewalks is evenly split between the city and the property owner. Few exceptions exist where the City takes complete responsibility for sidewalk repair; the City will repair the damaged sidewalk in its entirety if the sidewalk has been damaged by parkway trees, the sidewalk has been damaged by grade subsidence, the sidewalk has been damaged by City utility cuts, the sidewalk has failed due to heat expansion, the sidewalk exists at street intersections, or the sidewalk fronts on City-owned property (Sidewalk Maintenance Policy, 1975).

50/50 Cost Share Program

The Streets Division under the Public Works department is in charge of handling any sidewalk repair requests and repairs. The Streets Division has implemented a 50/50 Cost Sharing Program for the cases where sidewalk replacement is needed and the owner is responsible for the work. The program allows the owner to pay for half of the cost and the City will pay for the other half. To qualify for the program, the sidewalk must be a standard, city-installed concrete sidewalk with no additional upgrades. A request must be sent to the Streets Division office via telephone or through their website. Once the

request is received, the City will send out an appraisal to get an estimate which will then be mailed to the owner (Sidewalks | Street Division). After the owner sends in his or her half of the replacement cost, then the City will schedule the work to be completed. The program will also alleviate additional costs in permits (about \$500) and mandatory inspections (about \$200) which will be waived to the property owner. The program is aimed to save costs for both parties as well as to facilitate the work (Sherman, 2012).

In order to ensure that the sidewalks are properly maintained, a written notice is sent to the owner “to repair the sidewalk so out of repair.” Then, a copy of the notice is posted “in a conspicuous place on the property” at the time when the first notice is sent. After “not less than seven days or more than 10 days” from the first notice, a second notice is sent out to the owner. The second notice specifies “what work is required to be done, and how it is to be done, and what materials shall be used in the repair.” Finally, if the owner ignores the notices and repair is not started within two weeks of the notice by, then “the superintendent of streets shall make such repair, and the cost of the same shall be a lien on the property” (CA Codes, shc: 5610-5618).

Funding

The City allocates about \$200,000 to \$300,000 per year for the 50/50 program (Sherman, 2012).

Sidewalk repair projects are scheduled on a priority basis and as funding methods are identified.

Sidewalk maintenance in San Diego is funded by several funds including Gas Tax, TransNet, City Bonds, Hotel Tax, and Property Tax (The City of San Diego, 2006). In the TransNet sales tax, the city receives a portion of the regional half-cent sales tax which could be used for any transportation improvement project. However, the estimated funding needs for the “Fiscal Year of 2014 and beyond is entirely unfunded” (Sidewalks - Replacement and Reconstruction 59-002.0). These regional and state funds are used for pedestrian projects but there isn’t a dedicated funding source merely for sidewalk repairs and for reducing the backlog. For fiscal year 2012, there were 1,078 curb ramps constructed totaling over \$4,300,000 (Public Works Department, 2012). Table 4.3.1 shows the quantity and cost of ADA facilities for the past three years.

Table 4.3.1. ADA compliance construction activities over the past 3 fiscal years (Public Works Department, 2012)

	Number of Curb Ramps	Cost of Curb Ramps	Cost of Additional ADA Components	Total
Total FY 12	1,078	\$4,352,417	\$3,352,419	\$7,704,836
Total FY 11	1,839	\$4,664,996	\$2,606,897	\$7,271,893
Total FY 10	623	\$1,600,800	\$4,647,616	\$6,248,216

Note: Examples of additional ADA retrofit accomplishments other than curb ramps include ADA compliant audible pedestrian signals and pedestrian push buttons at intersections and sidewalks barriers removal.

Liability

The owner is generally not liable for injuries to the public which places a lot of responsibility to the City. The City doesn't have large enough funding structure to allocate sidewalk repair needs in the City (Sherman, 2012). The 50/50 program provides benefits to maintaining suitable sidewalks because owners are not burdened with the entire cost of replacing the facility. The method used by the City is a reactive one which is dependent on citizens to report any sidewalk repairing need or any possible lawsuits due to unsafe sidewalks.

The City of San Diego faces similar problems as the City of Atlanta in that the property owners often do not know that they are responsible for maintaining the sidewalks. This lack of property owner's involvement in repairing sidewalks has lead to a substantial backlog of repairs (The City of San Diego, 2006). In fact, As of November 2005, there was a two-year backlog for sidewalk repairs not related to City street trees which has a five year backlog. Funding is also another major problem which the City faces in order to bring all of their sidewalk facilities in compliance with ADA regulations.

4.4 Boston

Like many cities, the official website of Boston claims that "the Public Works Department provides a quality environment for the City of Boston and ensures that the City's roadways, streets and bridge infrastructure are safe, clean, and attractive" (Boston Public Works). However, unlike many cities, sidewalks and the public right-of-ways are included in Boston's definition of a street. This crucial distinction enables the city to hold control over the sidewalk maintenance and construction.

Public Works Department

Housed within the Public Works Department, the Construction Management Division maintains the safety and security of these sidewalks. In order to fulfill this commitment, roads and sidewalks are

visually inspected and documented by the Public Works Department every three years. Upon inspection, infrastructure is enumerated on a scale of 0 (worst) to 100 (best), as in a standard pavement condition index (PCI). This is used to establish the areas that are in need of routine and preservation maintenance, resurfacing, or complete reconstruction. This process enables the Division to minimize the cost of maintenance by strategically timing each repair, anticipating when roads and sidewalks are likely to degrade (Boston Public Works). This proactive approach saves money and maximizes use of resources.

Boston's progressive philosophy to maintaining sidewalks is evident in their approach to asphalt resurfacing. In a typical year, the Public Works department directs the resurfacing of over 200 streets. The first of six steps to resurfacing the asphalt on these streets is to "construct or upgrade of pedestrian access ramps and adjacent sidewalks". This starts the two-week process of upgrading the roads, which culminates in painting the street, including crosswalks and bike lanes. A list of streets that are either being resurfaced, have been resurfaced, or are planned to be resurfaced are kept up-to-date on the Public Works website.

Coordinated Efforts

Coordination of maintenance is a clearly stated essential goal of the Public Works Department in Boston. Because of the frequency and complexity of resurfacing and reconstruction, coordination of all players requires great care. In fact, Public Works issues almost 8,000 construction permits every year. Utility companies, private contractors, and other agencies must communicate with the Public works Department to obtain permits to ensure organized and efficient construction. In order to facilitate this massive amount of coordination, the Public Works Department developed a database tool entitled the City of Boston Utility Coordination Software that can be accessed from any home or office computer. All projects must be submitted and approved before entering into the program. One of twenty-four entities in Boston that typically do street construction are charged with "clearing" streets, meaning that the street infrastructure is highly reliable and shows very little to no signs of failure. Once a street is cleared there is a minimum of five years before anyone can excavate (Boston Public Works).

The Public Works Department website indicates that this program has circumvented over 1,700 conflicting utility projects that could have resulted in excavation on a freshly paved street. Also noted is the fact that Boston is one of the only cities in the U.S. that utilizes such a coordination program before an excavation permit may be issued.

Accountability

Accountability in construction is a major issue in repair and maintenance of sidewalks. In the spring of 2011, Boston's Public Works Department started a policy entitled "Utility Repair Tag Markers" to ensure accountability for every excavation job on both roadways and sidewalks. Under this policy, utility companies, private and city contractors, and any others must install a color-coded identification marker where excavation of pavement had taken place. These tags are inserted directly into the pavement patch, and include the permittee's unique bond number, the year the patch was performed, and either the permittee's name or identification code, (examples seen in Figures 4.4.1 and 4.4.2). Pedestrians are encouraged to call the "Mayor's 24-Hour Hotline" or send an email through the public work's website in the case of shoddy excavation or repaving (Boston Public Works). All roads and temporary sidewalk repairs are required to include these tags (unfortunately permanent sidewalk repairs using concrete or brick do not require a tag). These tags provide fast and easy access to those who did the work, thereby creating accountability and incentivizing sound craftsmanship.

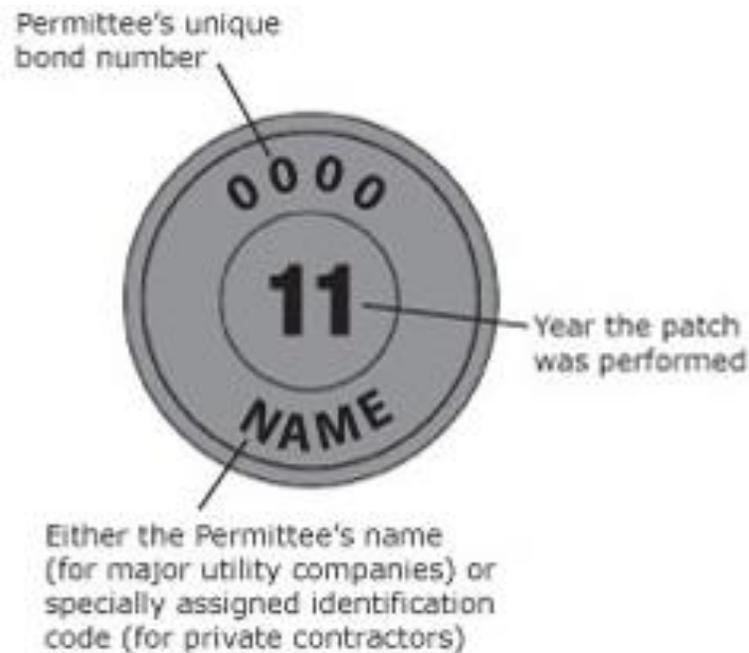


Figure 4.4.1. Utility repair tag pavement marker diagram (Boston Public Works)



Figure 4.4.2. Utility repair tag pavement marker in pavement (Boston Public Works)

Boston About Results

Accountability is also a prevalent ambition on the city level. A scorecard for sidewalk improvement in Boston is publicly available through the Boston About Results (BAR) performance management. Boston's BAR reports are a series of specific metrics issued quarterly to analyze 16 different aspects of city programs. The goals of BAR include supporting the mission of giving Boston's citizens the best possible City services, finding sustainable solutions to performance deficits, and sharing the results with the people.

Unfortunately, the only metric for measuring sidewalk safety currently is the number of pedestrian ramps brought into compliance. However, this metric does provide a general representation of the current progress towards sidewalk improvements. Specifically, it counts the total number of pedestrian sidewalk ramps that become compliant with the Massachusetts Architectural Board and the Americans with Disabilities Act.

Through this process, the Public Works Department has brought 578 pedestrian ramps to compliance with ADA standards during the first quarter of 2013 fiscal year. This represented a 54% increase over the first quarter of the 2012 fiscal year. An example of the available data from September 2009 to September 2012 is shown in Figure 4.4.3 below (Boston About Results). The intermittent pattern in the

data represents the construction season, which only operates in fair weather during late spring, summer and early fall.



Figure 4.4.3. BAR graph showing pedestrian ramps and sidewalks brought to compliance (Boston About Results)

4.5 Comparison of Sidewalk Programs

The sidewalk repair programs for the other case study cities showed both similarities and differences to the City of Atlanta program. Table 4.5.1 summarizes the sidewalk repair program structures of the case study cities compared to the City of Atlanta. Atlanta, New York City, and Portland all utilize a system in which the adjacent property owner is responsible for maintenance and liable for injuries. San Diego is different because the city splits the cost of repair with the property owner and the city is liable for injuries. In Boston, the city assumes all responsibility for maintenance and liability.

Table 4.5.1. A comparison of sidewalk repair programs.

Statistics	Cities				
	Atlanta	New York City	Portland	San Diego	Boston
Miles of Sidewalk	2,185	12,750	4,804	5,000	1,200
Maintenance Responsibilities	Adjacent Property Owner	Adjacent Property Owner	Adjacent Property Owner	Adjacent Property Owner	City
Property Owner Liable	In Dispute	Yes	Yes	No	No
Funding Mechanism	Owner Pays	Owner Pays	Owner Pays	50/50 City/Owner	City Pays

5.0 Funding Alternatives

Locating funding sources to repair and replace the sidewalk infrastructure is one of the major problems that the City of Atlanta faces. Various alternatives are recommended to seek funding needs, which include bonds and additional taxes levied on citizens.

5.1 Bonds

The City of Atlanta currently uses the Quality of Life Bond Program for capital improvement projects like sidewalk construction and sidewalk repairs (Atlanta Public Works Department). As a General Obligation bond, it does not produce revenues and is instead paid by levying an ad valorem tax on all taxable property in the City. In order to obtain a General Obligation bond greater than \$8 million, a referendum must pass. The City, however, can only issue up to \$150 million in bonds and the bond lapses after that amount is spent.

Another type of bonding alternative is municipal bonds. Municipal bonds are issued city-wide for capital improvements projects, repairs, and facility maintenance costs. A tax is levied on all citizens regardless, thereby imposing the burden on everyone rather than solely those who receive the benefits from the improvements. A special assessment bond is a special type of municipal bond that can be granted to community districts. Special assessment bonds are tax-exempt and issued by community improvement districts to finance infrastructure facilities such as sidewalks. These bonds are also paid by taxes levied on the property within the community improvement district. A community Improvement districts is defined as a “unit of government with power to provide governmental services and facilities”, and the

General Assembly must enact local law for its activation (Monacell, 2002). These community improvement districts are flexible enough to include as small as one parcel of land; they can also be made to fit a particular circumstance from large capital projects to lower cost maintenance work.

5.2 Taxes

Additional funding sources could be implemented with tax alternatives. The Georgia Constitution and the Official Code of Georgia allow for the use of special purpose taxes to be used for public improvements such as sidewalks. The Local Option Sales Tax (LOST) allows for citizens to vote on a one percent tax from all sales for a limited period to be used for special projects to benefit the community. Such improvement projects can include sidewalk restructuring projects and accessibility projects that benefit the communities that wish to make use of this sales tax (Official Code of Georgia, 2011).

City-wide or community based property taxes could also be used for sidewalk maintenance and construction. Property taxes are would typically be used as a vessel for financing bonds. As mentioned above, municipal bonds are financed by levying a tax on either all citizens or on the community members, which are directly benefitted by the improvements brought about by the bond. In a municipal bond, a property tax is placed on all citizens; whereas in a special assessment bond, a property tax is placed only on citizens within the community improvement district.

6.0 Recommendations

Observed in the case studies, maintaining sidewalks requires; clearly defined responsibilities for all parties, accountability for actions taken, and a dedicated funding source. The following recommendations are set forth to the City of Atlanta to reduce the current confusion on ownership and liability in the City and to have a more efficient repair program. These recommendations will also help protect the City against future lawsuits, by enabling the City to perform to its highest ability in maintaining a safe and compliant sidewalk system.

Ultimately, it is the City that should be responsible for conducting sidewalk inspections and maintenance. A sidewalk master plan is a sound initial step toward the efficacious ownership of this system. A prioritization methodology should be included in the master plan, which ranks the priority of sidewalks for repair. Ideally, the master plan should also designate a plan for securing a dedicated funding source. The funding methods mentioned earlier in the 'Funding alternatives' section of the

report would provide the city with a solid continuous source of funding for sidewalk repair. The City of Atlanta should begin to create a detailed inventory of their sidewalk system that shows damaged and non-compliant areas, and has general notes about their location and condition. Finally, it is recommended that the City create a coordination plan in which nearby sidewalks are inspected and repaired if additional City projects are being conducted in the area (i.e. road repaving or utility relocation/installation). These recommendations would allow the City of Atlanta to have a more proactive inspection program in which the repair of sidewalks are prioritized based on need. These practices would demonstrate that the City of Atlanta is doing the most they can to repair the sidewalks and provide some defense against any possible lawsuits.

6.1 A Pedestrian Master Plan

The creation of a pedestrian and/or a bike plan for the City of Atlanta would improve the coordination and eventual state of the sidewalk. Pedestrian master plans provide a comprehensive framework for the policies and procedures for sidewalk construction and maintenance. In 2007, the Atlanta Regional Commission created a “BikePed” plan including a study network, level of service, latent demand, and facility recommendations for the Atlanta region’s bicycle and pedestrian network (Atlanta Regional Commission). This report, although dated, would serve as a useful guide in the creation of a new, updated pedestrian master plan. Most importantly, it could serve as a unifying resource for policymakers and citizens alike to gain information on the sidewalk system. The availability of a comprehensive set of goals and objectives for the City of Atlanta to strive for would enable better communication and coordination of efforts.

6.2 Prioritization Method

The City of Atlanta needs to construct a method for prioritizing which sidewalks are repaired first. This should most likely take the form of a weighted equation that should consider multiple variables. It could consider the sidewalks proximity to a school and/or hospital, number of pedestrian users per day, disabled residents in the vicinity, proximity to store fronts, severity of damage, condition of pavement, recent injuries, and many other variables could be taken into consideration. It is important for the City to have a way of deciding where they should focus limited funds for sidewalk repairs, and be able to explain their justifications.

6.3 Citywide Sidewalk Inventory

The City of Atlanta needs to begin creating a database containing information on the location and status of their entire sidewalk network. The City can accomplish this by utilizing both database and GIS software and technologies. These information systems would help the City in maintaining an up-to-date inventory of the sidewalk systems as well as locate all damages and recent repairs.

To create a centralized database the City of Atlanta must first develop a way of managing their data. This can be done using Microsoft Access. Access is a software created by Microsoft that allows its users to (Microsoft):

- Publish, update, manage, and share data with others via the web
- Analyze your information from multiple sources and gain more insights by bringing together all of your data, from spreadsheets to server databases
- Keep your data secure and compliant with easy data backup and auditing

The city of Fond du Lac, WI shifted to a database and GIS system in 2000. They created a database application that, "stores all of the sidewalk data in one central location, and automatically generates several reports." Fond du Lac found that the database system offered many advantages including: a central storage location, providing current parcel information, automatic calculation of quantities, and generated reports (Weis). The current parcel information provides data about the current property owner and any recent violations or reports on the property. The automatic calculation of quantities provides the public works department with a quick cost estimate for repairs based on the type of sidewalk damage and the area to be replaced. The generated reports list all recent inspections, construction projects, and repairs performed on the sidewalk in that area (Weis). This information can then all be linked to a GIS sidewalk inventory file.

Having a GIS file for the City of Atlanta's sidewalk system would provide the City with a strong visual tool. The GIS file would map the existing sidewalk system and damages in reference to adjacent properties and roads. GIS would provide inspectors with a site map that would facilitate inspections by making the damaged area easier to locate. The GIS file will also hold specific data important to each damaged area that can be viewed in table format.

The GIS file data could include (Bedoya):

- Unique damage ID
- Street name
- Location description
- Dates - inspected
- Sidewalk width
- Material
- Dimensions
- Type of damage
- Recommended action
- General notes
- Replacement area

The damage type and replacement area from the GIS file could also be used to generate a quick repair estimate. Photographs taken at each location could also be linked to each damaged area.

For this process to be as efficient and accurate as possible it is recommended that the City of Atlanta invest in mobile GIS tools to allow its inspectors to collect the data on site. The City should purchase a handheld computer with GPS capabilities and GIS software, which can be synchronized with the computers in the office. The Trimble Nomad, Figure 6.3.1, is a handheld computer that could run the ArcPad mobile GIS software. A specific application has been developed for ArcPad for sidewalk inspections. "The application uses a GIS parcel map as the base map. As defective sidewalk segments are identified, the inspector creates a new defect point in the application. The point is created at the inspector's current GPS location, and the corresponding parcel number is recorded with the point." (Weis) The software allows for field notes, any of the aforementioned data, to be added to the point allowing for the most accurate data to be recorded while on site. This mobile method of inventory provides several benefits (Weis):

- GPS location for defects
- Automatic assignment to parcel/property owner
- Electronic data entry forms
- Database synchronization
- Mapping capabilities



Figure 6.3.1. The Trimble Nomad handheld computer capable of running ArcPad. (Trimble)

With this data the City could also provide an online map that provides the location of damaged sidewalk areas. These maps could alert pedestrians of potential hazards and potentially reduce injuries. The map will also show accountability for the damages and encourage repairs. There is a similar map, Figure 6.3.2, available showing snow violations in New York. Each address that has received a violation for failing to maintain their sidewalks during/after a snow fall are marked on the map. The mark provides the address and number of violations received.

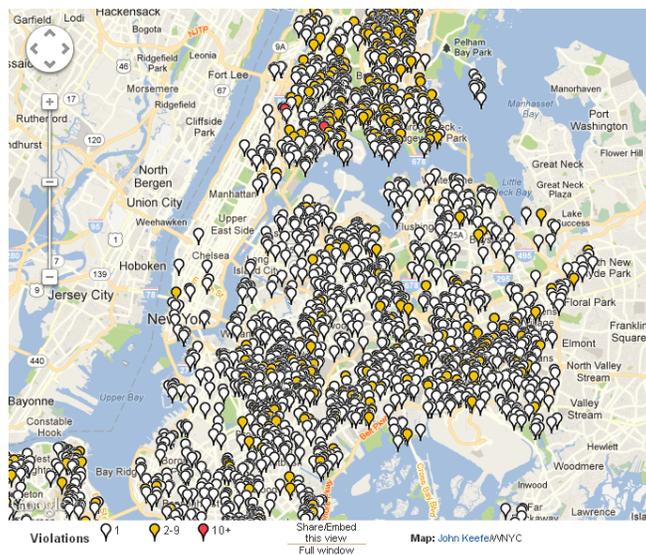


Figure 6.3.2. Map of New York City sidewalk snow violations. (Goldmark)

The City of Atlanta would be able to purchase all of the inventory tools for the following costs: Microsoft Access 2010 - \$140, ArcPad (single license) - \$700, and Trimble Nomad for \$1,300. If the City were to purchase two sets of portable systems for their inspectors they would have to spend a total of \$4,140 to purchase the products to keep an accurate, updated sidewalk inventory. The systems can further be used to inventory ADA complaint and non-complaint ramp locations. The use of these modern day technologies could help the City streamline their sidewalk management process and reduce the amount of time and materials for paper work resulting in additional monetary savings for the City of Atlanta.

6.4 Tree Maintenance Plan

In addition to the City of Atlanta maintaining its sidewalk system, the City should also be concerned with the health of their trees. Tree roots are a major cause of sidewalk damage. Practices can be put into place to both prevent trees from damaging the sidewalks and reduce the number of tree removals along sidewalks. Trees can provide multiple benefits to the sidewalk system including protecting the sidewalk from weather, providing shade to pedestrians, aesthetics, reducing pollution, and promoting a more walkable community. A tree evaluation plan should be put in place to protect the existing trees, in the City of Atlanta's right-of-way and adjacent to the sidewalks to reduce the number of tree removals resulting from sidewalk damage and repair.

Trees are a major piece of sidewalk infrastructure. The City of Los Angeles recognized their value and in 2000, the City instated a plan to protect nearly 700,000 street trees. It is recommended that the City of Atlanta incorporate a tree evaluation and protection plan into its sidewalk plan that is similar to that of Los Angeles. The plan should have a rating system to determine if the tree is healthy, stable, or has any historical or important significance to the area. The plan should also propose multiple solutions that would prevent the tree from being removed and causing further harm to new replacement sidewalks. Information about the trees could also be incorporated into the GIS system to create a detailed and full inventory of the trees throughout the city. The tree plan should have multiple stated goals to protect the existing trees. Similar to Los Angeles some of the overall goals should include (Gonzalez):

1. Maintain a healthy, safe, and sustainable urban forest.
2. Preserve as many large, healthy trees as possible, while providing for infrastructure stability and public safety on sidewalks and streets.
3. Plant the largest species appropriate for the site and, where feasible, enlarge planting areas.

4. Foster neighborhood involvement in the decision-making process and promote communication regarding infrastructure conflicts.

When evaluating the sidewalk repair location, the City of Atlanta should utilize a grading system for the trees conflicting with the sidewalk. Los Angeles has five grades, ranging from A to F, which are assigned to trees by city arborists. Trees ranked “A” are deemed to be the most desirable while trees receiving a grade of “D” or “F” should be removed. The grades are as follows (Gonzalez):

- A – Tree is healthy, structurally stable, and has exceptional historical, aesthetic, and/or environmental qualities.
- B – Tree is healthy, structurally stable, and has a usual lifespan of more than five years.
- C – Tree is declining, creating extensive structural damage, and/or is the improper species/size for the site.
- D – Tree is declining, structurally unsound, has a high failure potential, and is senescent
- F – Tree is dead

It is not recommended that the City of Atlanta hire an arborists to evaluate the trees because such evaluations would result in a significantly higher cost for sidewalk repairs. Instead the City of Atlanta should train their sidewalk inspectors to analyze the trees or partner with Trees Atlanta, a local advocacy group “dedicated to protecting Atlanta’s urban forest”, to perform an inspection (Trees Atlanta). Once the tree has been graded the Department of Public Works would determine whether to preserve the tree or remove it.

If it is determined that the tree should be preserved, there are multiple methods that can be pursued during the sidewalk. If the tree roots caused the sidewalk damage then the Department of Public Works could perform root pruning, the tree roots are trimmed down to reduce their interference with the sidewalk. However, it should be advised that this method may damage the trees structural integrity, and if performed a follow up inspection should be performed at a later date to ensure the tree’s stability. Additionally there are sidewalk engineering strategies that can be employed to preserve the tree including sidewalk grinding, sidewalk cutouts, sidewalk meandering, sidewalk ramping, and using flexible paving materials. Sidewalk grinding can be performed to level out the sidewalk if tree roots have uplifted the sidewalk but not caused any breaks. Sidewalk grinding is only a temporary solution but it will remove the dangerous sidewalk defects. Sidewalk cutouts may also be performed in the area, which will place the edge of the sidewalk father away from the tree and its roots. Sidewalk meandering

constructs the sidewalk so that it goes around existing trees without damaging the tree. Sidewalk ramping constructs the sidewalk so that it will go over existing roots at a safe slope for pedestrians. Using flexible paving materials such as rubber bricks will allow the sidewalk to move with the tree roots without causing structural damage. The flexible materials may also be removed so that the roots or other problems may be solved, and then reinstalled (Gonzalez). Figure 6.4.1 shows where rubber brick has been used to replace a concrete sidewalk broken by tree roots.

Before and After



Figure 6.4.1. A segment of broken sidewalk that was repaved with rubber bricks. (Goodspeed)

Including a tree maintenance portion into the City of Atlanta’s Pedestrian Master Plan would help the City preserve its trees, improve aesthetics along its sidewalk, and reduce the amount of sidewalk damage cause by trees. A tree plan would save the City money and promote a green, walkable community along its streets.

7.0 Current Research and Future Directions

The Georgia Institute of Technology has recently developed a new automated sidewalk quality assessment tool that is currently being calibrated and awaiting field deployment. The tool is an Android application, created to collect specific data about sidewalks, which runs on a handheld tablet. The tablet is then connected to a wheelchair that will and pushed by a user. The application is able to collect GPS data, vibration data, and video of the sidewalk. The data will then be uploaded to Georgia Tech computers where software will process the GPS and video data into a GIS based sidewalk inventory. The software will be able to estimate the sidewalk width, record any walkway obstructions, and identify

major sidewalk damages. Through the vibration data it can be determined whether segments of sidewalk meet ADA compliance. The research team plans on creating a prioritization index so that the program can rank prioritize segments in higher need of repair (STRIDE). This research has the potential to help the City of Atlanta create a base GIS inventory of its sidewalk system, identify the sidewalk segments that are in disrepair and/or do not meet ADA requirements, and create a prioritization method for determining which sidewalks need repair.

8.0 Conclusion

The City of Atlanta has faced multiple personal injury lawsuits years resulting from damaged sidewalks, which have escalated in cost in the past two years resulting in the most recent pay out of \$3 million in 2012. There is increasing discussion about who is responsible for the sidewalk maintenance and who is liable for injuries between the City and property owners. A new sidewalk repair program needs to be developed by the City to create a proactive inspection program and create a dedicated funding source for repairs. The program should clearly state who is responsible for maintenance and injuries. It is recommended that the City of Atlanta assume responsibility for conducting sidewalk inspections and maintenance and develop a pedestrian master plan that includes a prioritization method for sidewalk repair, create a citywide sidewalk inventory, and select a dedicated funding source. If the City of Atlanta continues with its current program, the backlog of maintenance projects will continue to grow and result in escalating costs due to piecemeal reconstruction and personal injury lawsuits.

References

- Atlanta Public Works Department. "City of Atlanta, GA : Quality of Life Bond Program & Capital Improvement Projects." *City of Atlanta, GA*. N.p., n.d. Web. 9 Dec. 2012.
- Atlanta Regional Commission. "Atlanta Regional Bicycle Transportation & Pedestrian Walkways Plan." *Atlanta Regional*. N.p. n.d. Web. 9 Dec. 2012.
- Bacon, James A. "A Glimpse into Virginia's Road Maintenance Future?" *Bacon's Rebellion*. 16 Nov. 2011. Web. 7 Dec. 2012.
- Barden v. Sacramento. No. 01-15744. United States Court of Appeals, Ninth Circuit. 12 June 2002. n.p. Web. 6 Dec. 2012
- Bedoya, Alexandra, and Deodat Budhu. "Sidewalk repair program in Orange County." *American Public Works Association - APWA Reporter*. Apr. 2006. Web. 20 Nov. 2012.
- Boston Public Works Department. "Boston About Results (BAR) – Performance Management." City of Boston. N.p. n.d. Web. 9 Dec. 2012.
- Boston Public Works Department. "Construction Management." *City of Boston*. N.p. n.d. Web. 9 Dec. 2012.
- "CA Codes (shc:5610-5618)." Web. 15 Oct. 2012.
- The Center for an Accessible Society. "Sacramento settles sidewalk case, avoiding Supreme Court." 27 June, 2003. n.p. Web. 4 Dec, 2012.
- Chapter 17.28 - Sidewalks, Curbs and Driveways*. City of Portland - Auditor's Office, n.d. Web. 28 Oct. 2012.
- The City of Atlanta. Department of Public Works. *2010 State of the City's Transportation Infrastructure and Fleet Inventory Report, Atlanta: The City of Atlanta, 2011*. Print.
- The City of Atlanta. Public Safety and Legal Administration Committee. *A Resolution Authorizing the Settlement of All Claims Against the City of Atlanta in the Case of Alex Jenkins v. City of Atlanta*. Atlanta, 2012. Web. 1 Dec, 2012.
- The City of Atlanta. Code of Ordinances. Sec. 138-14. Maintenance of sidewalk area. Web. 10 Nov 2012.
- City of Portland Bureau of Planning and Sustainability. "Infrastructure Condition and Capacity." Web. Nov. 2012.
- City of Portland Bureau of Transportation. Maintenance Operations. *Sidewalk Maintenance Program Policy and Operating Guidelines*. 7th ed. N.p.: n.p., 2009. Print.
- Goldmark, Alex. "Interactive Map: Who Gets Fined When NYC Sidewalks Stay Covered with Snow, Ice." *Transportation Nation*. 11 Apr. 2011. Web. 3 Dec. 2012

Goodspeed, Robert. "Where the (Brick) Sidewalk Ends." *Goodspeed Update: Rob Goodspeed's Blog*. 3 Jan. 2009. Web. 3 Dec. 2012

Gonzalez, George. "Innovative sidewalk repair in the City of Los Angeles." *American Public Works Association - APWA Reporter*. Apr. 2006. Web. 20 Nov. 2012.

Illinois ADA Project. "Chicago agrees to Pay Largest ADA Curb Ramp Settlement Ever -- \$50,000,000 in New Money." n.d. n.p. Web. 1 Dec 2012.

Jablon, Rebecca, Vidyut Nayak, and Nancy Walsh. "Sidewalk Maintenance and Repair: An Evaluation of Atlanta's Policies From a Transportation Perspective." (2004)

Loewnerherz, Franz. "Asset Management For ADA Compliance Using Advanced Technologies." *Journal of Public Works & Infrastructure* 2.3 (2010): 241-253. *Business Source Complete*. Web. 6 Dec. 2012.

McWilliams, Jeremiah. "Atlanta loses its footing on sidewalks: Decaying pathways cost millions in repairs, lawsuits." *Atlanta Journal Constitution*, June 24, 2012. Web. Nov. 13 2012.

McWilliams, Jeremiah. "Dedicated funding to fix broken sidewalks proposed in Atlanta City Council." *The Atlanta Journal Constitution* 22 Sept. 2011. n.p. Web. 4 Nov. 2012.

McWilliams, Jeremiah. "Man may get \$3M after fall on Atlanta sidewalk." *The Atlanta Journal Constitution* 21 May 2012. n.p. Web. 13 Nov. 2012.

Mendoza, Richard and White, Dexter C. The City of Atlanta Department of Public Works. *Sidewalk Repair Plan to Minimize Critical Risk*. n.d. Web. 13 Nov. 2012

Microsoft. "Microsoft Access 2010 - At a glance." *Microsoft Store*. 2012. Web. 3 Dec. 2012.

Miriam Nichole Hancock v. City of Atlanta. 2009CV169767. Georgia Superior Court. 25 Feb. 2011. Print.

Minutes of the Sidewalk Task Force Meeting. 26 Sept. 2012. Meeting Minutes. Atlanta. Print.

Monacell, James P. "Community Improvement Districts as a Tool for Infrastructure Financing." *Smith, Gambrell & Russell, LLP*. N.p., 26 Feb. 2002. Web. 8 Dec. 2012.

Munson, Lee. "RE: City Planning Student Seeking Info on Portland Sidewalk Infrastructure." Message to the author. 15 Oct. 2012. E-mail.

New York City Department of Transportation. "Questions & Answers to Common Sidewalk Violations." *New York City DOT*. 2012. Web. 25 Oct. 2012.

New York State Trial Lawyers Association (NYSTLS). "Municipal Liability - Background on Big Apple Pothole." *New York State Trial Lawyers Association*. 2003. Web. 25 Oct. 2012.

Official Code of Georgia. "Title 48. Revenue and Taxation; Chapter 8. Sales and Use Taxes." *DT Services - DT Services*. N.p., 2011. Web. 10 Dec. 2012.

Public Works Department. "State of the CIP Status Report." *City of San Diego Official Website*. N.p., 24 Oct. 2012. Web. 7 Dec. 2012.

"Sidewalks - Replacement and Reconstruction 59-002.0." *City of San Diego – Fiscal Year 2009 Annual Budget*, pgs. 281-283. 2009. Web. 16 Oct. 2012.

Sherman, Pat. "Who owns the sidewalk?" *La Jolla Light* 24 Apr. 2012: n.pag. Web. 10 Oct. 2012.

"Sidewalk Maintenance Policy." *City of San Diego - Council Policy*, Policy No. CP-200-12 (1975): 1-2. Web. 12 Oct. 2012.

"Sidewalks | Street Division." *City of San Diego Official Website*. N.p., n.d. Web. 12 Oct. 2012.

Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE). "Current Projects – Guensler Abstract." *Southeastern Transportation Research, Innovation, Development and Education Center – Research*. 2012. Web. 1 Dec. 2012.

The City of San Diego. "Pedestrian Master Plan." *City of San Diego Official Website*. N.p., Dec. 2006. Web. 8 Dec. 2012.

Trees Atlanta. "Who we are." *Trees Atlanta*. 2012. Web. 3 Dec. 2012.

Trimble. "Trimble Nomad." *Trimble Products*. 2012. Web. 3 Dec. 2012.

United States Department of Justice Office of Public Affairs. "Justice Department Signs Agreement with City of Atlanta to Ensure Civic Access for Persons with Disabilities." *Justice Department Signs Agreement with City of Atlanta to Ensure Civic Access for Persons with Disabilities*. Department of Justice, 8 Dec. 2009. Web. 20 Nov. 2012.

United States. Department of Justice. *Settlement Agreement Between The United States Of America and Atlanta, Georgia Under the Americans With Disabilities Act*. Washington, 2009. Website.

US Census Bureau. "State and County Quick Facts." *2010 US Census*. 2011 Web. 25 Oct. 2012.

Varela, Anna. "Task Force Forms to Fix Atlanta Sidewalks." Virginia Highland-Druid Hills Patch. 19 Sept. 2012. n.p. Web. 28 Oct. 2012

Weis, Jason. "Managing sidewalk maintenance in the 21st Century." *American Public Works Association – APWA Reporter*. Apr. 2006. Web. 20 Nov. 2012.

Young, Caroline. "City sidewalks need new money source." Northside Neighbor. 27 July, 2012. n.p. Web. 10 Nov. 2012.