



SDOT SIDEWALK CONDITION ASSESSMENT REPORT



Executive Summary – Revision 5

2018



Seattle
Department of
Transportation

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Cover Photos are of SDOT's Intern team and representative sidewalk conditions. Bottom right photo courtesy of Douglas MacDonald

Sources

Financial figures used in this document are generally expressed in 2017 dollars unless otherwise noted
Financial/budget data was obtained from the City's Summit PeopleSoft and Hansen Work Management databases
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EXECUTIVE SUMMARY

OVERVIEW

This report provides an overview of the 2017 Sidewalk Assessment project. It presents a comprehensive analysis of sidewalk infrastructure, describes the new condition rating, and provides recommendations for improving a future proactive sidewalk program. With a replacement value of over \$5.6 billion dollars, Seattle's sidewalks are one of the city's most valuable assets. During the summer of 2017, the Seattle Department of Transportation (SDOT) hired 14 college interns to inspect over 2,300 miles of city sidewalk. The assessment not only validated asset data on over 34,000 blocks of sidewalk, but also produced information that will help inform repair efforts and develop a proactive repair program.

The 2017 Adopted budget included \$400,000 for the assessment. The Seattle Pedestrian Advisory Board (SPAB) advocated for the study in their evaluation of the Pedestrian Master Plan (PMP). SDOT engaged stakeholders across the city and began planning for the first ever comprehensive survey of Seattle's sidewalks.

SDOT recorded observations along all known Seattle sidewalks. The list included uplifts, obstructions, cross slopes, cracks, and vegetation overgrowth. SDOT also collected the location of benches and other street furnishings, pedestrian rails, and curb bulbs. All told, over 156,000 data points were collected.

The primary goal of this project was to collect observations about our sidewalks to help inform our maintenance and repair needs. By locating issues on the sidewalks, we were able to assign condition ratings to 99% of the inventory. Observations are used to inform repair and replacement efforts and to design a more proactive sidewalk inspection approach. Temporary and permanent obstructions, such as vegetation, perpendicular curbs, and utility poles, can make it difficult for people using wheelchairs or canes to pass through a sidewalk. Using the data acquired through this assessment, we can focus on making the city more accessible for everyone, including those with mobility disabilities.

SDOT performed its first sidewalk and curb ramp inventory collection in 2007 and uploaded the information to an asset management database. In 2016, SDOT completed a survey of known curb ramps to provide a better understanding of available inventory citywide. Detailed engineering measurements about each curb ramp help identify improvement priorities in the future. This assessment represents the department's efforts to continue improving on pedestrian infrastructure data quality.

The PMP envisions making Seattle the most walkable city in the nation. This goal requires multiple initiatives including improving existing sidewalk conditions along with adding new blocks of sidewalk as identified in the Priority Investment Network (PIN.) Most sidewalks constructed in Seattle occurred at the time each area was originally subdivided and paid for through Local Improvement Districts (LIDs), along with each development's roads, sewers, and water service. Not all developers chose to include sidewalks. Areas annexed to the city in the 1950s developed sidewalks under the standards of unincorporated King County, which did not require sidewalks. SDOT has acquired its infrastructure assets through direct capital projects (including various state, federal, and local funding sources), SDOT crews, by donation of assets constructed by private developers and other public agencies to meet increased demand, and annexations of adjacent communities and municipalities. Sidewalk age ranges from recently constructed to over 100 years old.

Seattle has implemented several pedestrian initiatives, for which it has been recognized as a national leader. In some neighborhoods, Seattle has achieved a high level of walkability. Older established neighborhoods have a commercial core that serves as a hub of activity and is easily accessible on foot. And yet, these accomplishments do not extend to all of Seattle's neighborhoods, many of which have streets lacking sidewalks and curb ramps. In

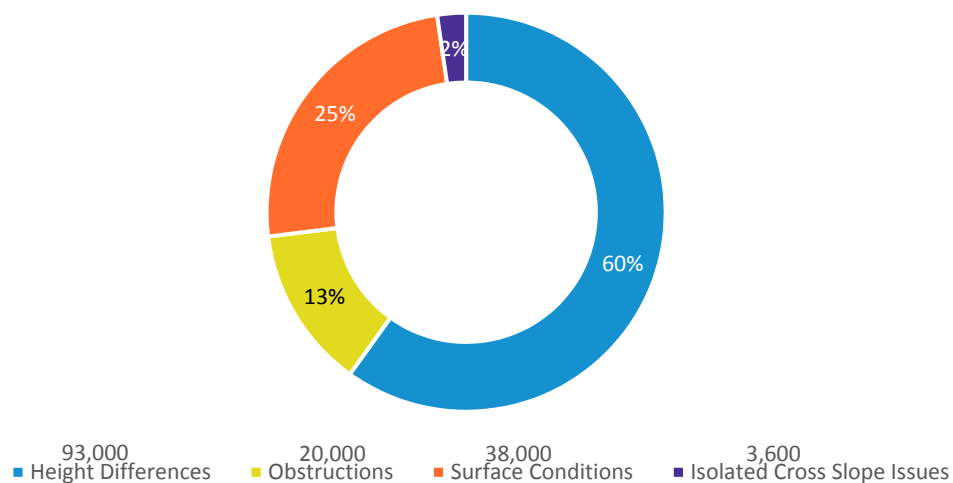
contrast, older neighborhoods with established pedestrian facilities also have larger trees and potential sidewalk displacement from roots.

While Seattle has done much to enhance walking conditions, there is room for improvement. Walking conditions along and across streets with high traffic volumes can be challenging, especially in locations that have long blocks and more suburban-scaled land uses. These physical characteristics can make walking in Seattle difficult and the challenges they present are especially acute for people living with disabilities and older residents.¹

Sidewalk Conditions Identified & Collected Data

Interns used digital levels, tape measures, and iPad minis to record sidewalk conditions. The data was collected using the Collector for ArcGIS application. The assessment began May 22, 2017 and was concluded September 12, 2017. Identified conditions potentially have impacts for pedestrians. The following are descriptions of the sidewalk conditions that were observed:

- **Uplift:** A vertical change in height along a sidewalk that exceeds ½ inch at its highest point. This can occur at areas where panels of the sidewalk meet, or at locations where the sidewalk has cracked.
- **Cracking:** Locations where the paved surface of the sidewalk has cracked and show signs of crumbling and/or movement.
- **Settling:** The sinking of sidewalk panels that creates vertical height differences on either side of the panel.
- **Cross Slope:** The slope measured perpendicular to the direction of travel. Measurements were taken for the predominant cross slope of each sidewalk as well as isolated, elevated cross slopes at driveways or similar.
- **Fixed Obstructions:** Anchored objects that reduce sidewalk width to less than 36 inches. These include transit shelters, utility poles, fencing, hydrants, sidewalk cafés, fencing, street furnishings, and non-flush utility vault lids.
- **Vegetation Obstruction:** Vegetation overgrowth that reduces the horizontal clearance of the sidewalk to below 36 inches.
- **Vertical Obstruction:** Vertical obstructions are those objects that are between 27 inches and 80 inches off the ground and extend more than 12 inches over the sidewalk. These can be fixed like awnings from businesses or cafes, or they can be vegetation such as tree branches.



Distribution of Conditions Identified

¹ SDOT PMP <http://www.seattle.gov/transportation/document-library/modal-plans/pedestrian-master-plan>

Data obtained during the Sidewalk Condition Assessment is currently in beta form and can be accessed through the following OpenData.gov links. In mid-2018, we anticipate providing this data set in public map that will be updated as sidewalks are repaired, or issues mitigated. Observations are available at:

<https://data.seattle.gov/dataset/SidewalkObservations/q37p-ync7> OR http://data-seattlecitygis.opendata.arcgis.com/datasets/4e4c46b13e69415c93a34a7057e22689_0

We also validated the following sidewalk attributes:

- **Surface Type:** Sidewalk composition, which may include concrete, asphalt, permeable pavement, gravel, brick and/or pavers (also shows unimproved).
- **Incomplete Sidewalk:** A block that does not have a continuous walking surface from intersection to intersection.
- **Primary Width:** The predominant width of a sidewalk along a block.
- **Minimum Width:** The width at an obstruction when a sidewalk is constricted to less than 36 inches.
- **Planting Strip Type:** The area between the curb and the sidewalk that acts as a pedestrian buffer—may include trees, landscaping, utility poles, street furnishings, parking pay stations and/or pavers.
- **Planting Strip Width:** The distance between the curb and the sidewalk.
- **Primary Cross Slope:** The slope measured perpendicular to the direction of travel.

Sidewalk Network Status

The Hansen/Infor database maintains the sidewalk system physical inventory. We maintain sidewalk asset attributes in our inventory including surface type, width, length, incomplete sidewalks, planting (or filler) strip type, planting strip width, and primary cross slope. Bridging the Gap (BTG) provided the funding to build 7-20 new block faces of sidewalk per year between 2007 and 2015. In all, BTG funding was used to repair 220 block faces and build 118 new blocks of sidewalks. The Levy to Move Seattle includes funding to build 250 blocks of traditional and non-traditional sidewalk between 2016 and 2024. The cost of new sidewalk construction varies substantially between projects. Factors such as right of way acquisition, retaining walls, and significant drainage adjustments can increase the cost of a new sidewalk project.

Asset	Inventory Count	Data Confidence	Replacement Value (2017 \$)	Useful Life (Years)	System Replacement Value (2017 \$)	Anticipated Annual Growth
Sidewalk/Walkway*	71,417,105 square feet	High	\$42/sf**	100	\$2,999,518,410	45,800 square feet
Curbs	12,764,428 linear feet	Medium	\$179/lf	100	\$2,284,832,612	9,100 linear feet
Curb Ramps	30,061	High	\$12,000 ea		\$360,732,000	1,250
Curb Bulb	807	Medium	\$5,250**	100	\$4,236,750	Unknown
Total	33,757 block faces 2,336 miles	High			\$5,645,083,022	

*includes transit and median islands

**Does not include cost of working around utilities, drainage, tree issues, complex traffic, or business accommodations

*** Curb bulb sf est. at 125 sf



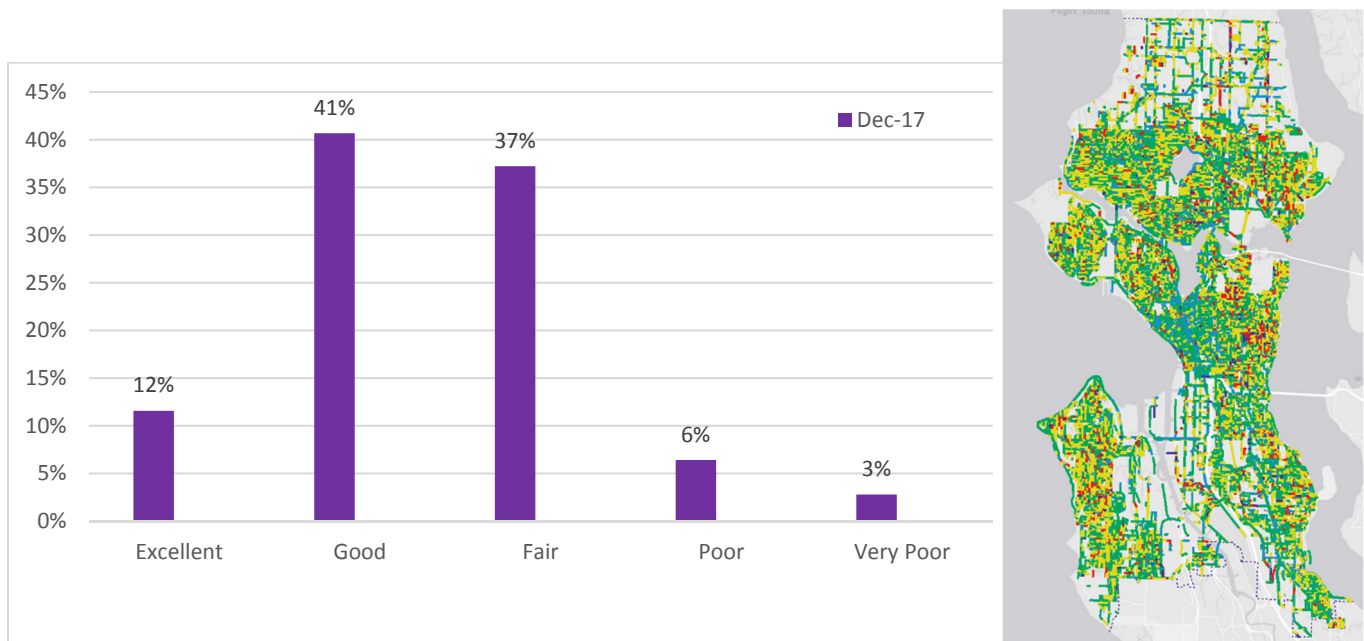
Surface Type by Block-face Quantity

Sidewalk Condition Rating

SDOT establishes a standard condition rating for transportation assets in alignment with international ISO 55000 and MAP-21 guidance standards. This data is maintained in the asset database, published on GIS maps like the [Accessible Route Planner](#), and available on data.seattle.gov. Given the improved data, SDOT developed a sidewalk condition assessment methodology beyond the standard condition rating system of good, fair, and poor. This assessment used current ADA guidance² on wholistic sidewalk conditions, width, and cross slope, along with amount of sidewalk replacement, to score each inspected sidewalk with the following ratings:

	Excellent	Score = 100	No observable issues along the pedestrian clear zone, compliant width of ≥ 48 inches, and compliant primary cross slope of $\leq 2\%$
	Good	$85 \leq \text{Score} < 100$	Minor issues along the pedestrian clear zone: sidewalk extends the full length of the block with no discontinuities; may have minor uplifts and $\leq 5\%$ of the sidewalk requires slab replacement; may have a width < 48 inches to ≥ 36 inches and/or primary cross slope $\leq 4\%$ and $> 2\%$
	Fair	$45 \leq \text{Score} < 85$	Issues are of medium severity; discontinuities exist that may impact mobility; $\leq 25\%$ and $> 5\%$ of the sidewalk may need replacement; may have a width between < 36 and ≥ 24 inches and/or a primary cross slope $\leq 6\%$ and $> 4\%$
	Poor	$5 \leq \text{Score} < 45$	Issues are severe; discontinuities exist that may impact mobility; $\leq 75\%$ and $> 25\%$ of the sidewalk may need replacement; may have a width < 24 and ≥ 12 inches and/or a primary cross slope $\leq 8\%$ and $> 6\%$
	Very Poor	Score < 5	Widespread severe issues; discontinuities exist that impact mobility; between 100% to 76% of the sidewalk needs replacement; may have a width < 12 inches and/or a primary cross slope $> 8\%$

² Although the City is not required to bring sidewalks that pre-existed current ADA guidance into compliance, the guidance provides useful metrics.



Sidewalk Condition

Conditions assist the department in understanding maintenance and replacement needs across an entire asset class. Since this is the first such ranking used by SDOT and there is not an accepted national prototype to rank sidewalk condition, we anticipate some revisions to the scoring methodology as work progresses.

Utilizing the Sidewalk Condition Assessment Data

The information collected will allow SDOT to:

- Project system-wide repair needs
- Recommend additional funding for proactive repairs
- Increase awareness of sidewalk maintenance needs
- Enact a sidewalk inspection and enforcement program
- Respond to claims and support litigation efforts
- Take advantage of possible funding opportunities including grants
- Explore the possibility of implementing property point of sale programs, property owner cost sharing programs, and sidewalk repair under adjacent private and publicly permitted projects
- Enhance property owner education

Locating sidewalk conditions allows us to develop a comprehensive repair program that identifies work based on several important considerations. The goal is to provide the best value to the community given a limited sidewalk repair budget. Reactive repair and mitigation response will continue when triggered by claims, litigation, and complaints. SDOT will explore opportunities to leverage additional funding in repairing sidewalks. Repairs and capital projects consider race and social justice objectives and other city initiatives such as PMP Priority Investment Network (PIN), Safe Routes to School, Transportation Equity, Seattle 2035, ADA compliance, and/or the Age-Friendly Seattle.

Performance Measures

The City of Seattle established an external facing performance measures website in 2015: performance.seattle.gov. Following that effort, the city added a [Levy to Move Seattle](#) and [Capital Projects](#) performance dashboards to track our progress toward both maintaining our success rates as well as improving our service delivery for the benefit of all Seattle residents. Performance measures, including Levy to Move

Seattle accomplishments, are included in this report to track the department's ability to reach targets which measure SDOT's success at delivering different aspects of service. The chart below compiles some of the most important sidewalk measures and identifies whether SDOT met the goal. Performance measures increase transparency and efficiency and ensure that SDOT remains accountable to the public. Below are several key performance measures for pedestrian infrastructure:

Policy goal/Performance Measure	2017 Planned	Q4 2017 Results	2018 Planned	Target Goal
Levy to Move Seattle				
Prioritize Pedestrians: # of blocks of new sidewalk	50	44	44.75	 *
Prioritize Pedestrians: # of blocks of existing sidewalk repaired	5	6.54**	16	
BIKE & PEDESTRIAN SYSTEM				
Curb Ramps – # of curb ramps installed	625	638	1250	
Sidewalks – % of sidewalk repair requests responded to within 5 business days of notification	>60%	24%***	>60%	
Sidewalks - # of uplifts mitigated with beveling or shimming (note this is a new measure to baseline accomplishments)	NA	NA	TBD	

*Target goal represents on target for new sidewalks built over the life of the Move Seattle Levy

**An additional 5.1 blocks of sidewalk repairs were completed on the 23rd Avenue Project

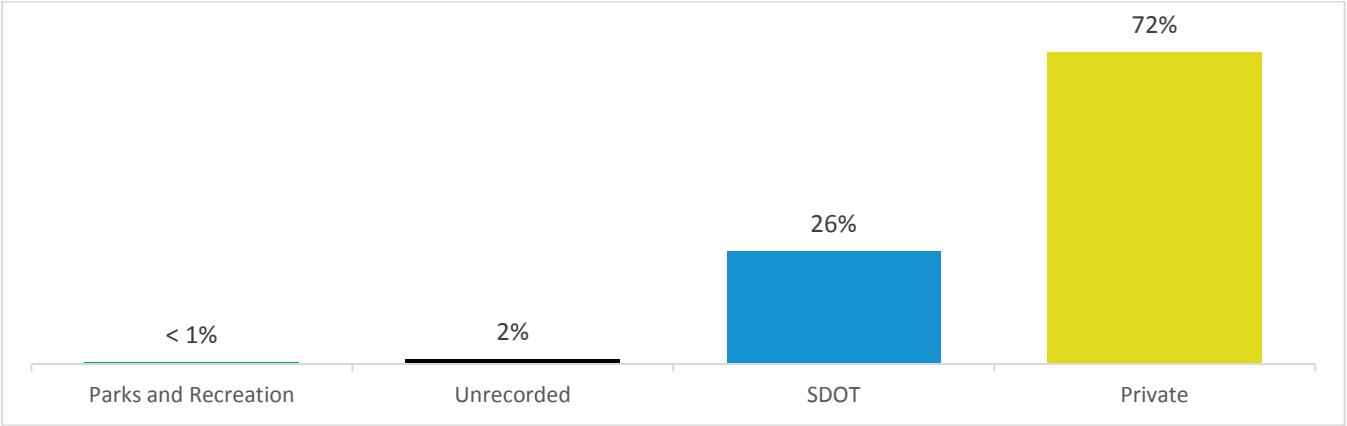
***Due to an increased need of pothole repair, SDOT was unable to meet its repair request target.

FINANCIAL IMPLICATIONS

SDOT used the resources allocated to complete this study on time and on budget. Hiring summer interns, rather than using professional staff or consultants, allowed for a cost-effective approach to completing this project. Remaining 2017 funds were used to perform beveling on sidewalks distributed across the city and Maintenance Operations Division engineering labor associated with this project. The 2018 budget includes a one-time addition of \$2 million for proactive sidewalk repairs over and above the City's existing sidewalk repair budget, which is typically around \$1.5 million annually. SDOT's Levy to [Move Seattle](#) provides funding for implementing the PMP and other capital improvement projects; see the [Capital Projects Dashboard](#) for more information. However, funding associated with the PMP and other capital projects has not fully addressed sidewalk maintenance needs.

Seattle's Sidewalk Repair Program budget has primarily provided funding to mitigate or repair sidewalks. Crews may place asphalt shims over cracks and uplifts on sidewalks, bevel or grind the sidewalk to create a flush surface or paint a sidewalk to indicate the change in elevation of the walking surface. All three of these activities are temporary in nature and are used to mitigate an area before long-term repairs can be made, or as funding is available. Initial estimates indicate that it may cost between \$500 million and \$1.33 billion to remove all utility obstacles, permanently repair sidewalks, and remove isolated cross slope issues.

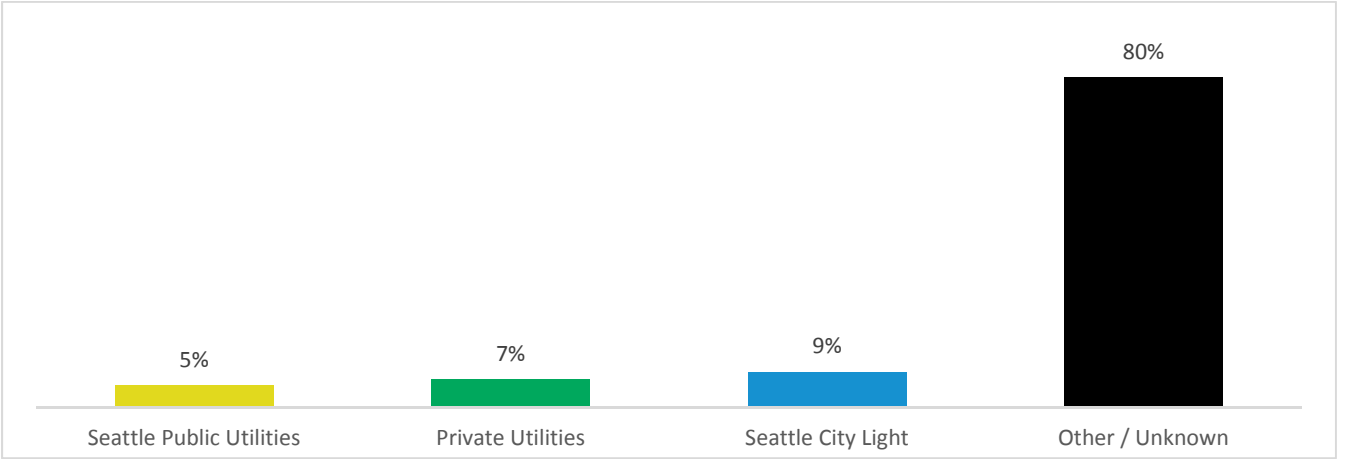
While potential tree related sidewalk uplifts and damage constitute 12% of observed conditions, 80% of the complaints received in recent years are related to trees.



The table below provides a breakdown of tree related data points by tree ownership and observation type.

Tree Ownership	Observation Type				Total
	Height Differences	Isolated Cross Slope Issues	Obstructions	Surface Conditions	
Private 	11,033	131	1,870	74	13,108
SDOT 	4,167	46	440	63	4,716
Not Recorded 	99	5	10	78	192
Parks and Recreation 	63	-	6	-	69
Total	15,362	182	2,326	215	18,085

Approximately 1% of observations appear to be associated with utilities. 80% (1,234) of those observations are associated with unknown utility ownership. It would take a concerted effort to determine accurate ownership.



Below is a table of these results organized by observation type. Most observations collected during the condition assessment were non-flush utility lids that created height differences in the sidewalk. Few utility lids were observed to cause potentially hazardous surface conditions from being smooth.

Utility Ownership	Observation Type			Total
	Height Difference	Obstruction	Surface Condition	
Other / Unknown 	977	2	4	983
Seattle City Light 	80	-	2	82
Private Utilities 	105	-	-	105
Seattle Public Utilities 	64	-	-	64
Total	1,226	2	6	1,234

Sidewalk uplifts and other issues present a legal risk to the City from claims and litigation. These average over \$1 million annually, not including staff time. SDOT is committed to maintaining and repairing as many locations as is possible within its budget. An enhanced mitigation program would reduce the City's risk. In evaluating historic claims liability, private property owners and the City may share financial liabilities. Final determination depends on contributing conditions such as trees, utilities, and ownership.

RECOMMENDATIONS

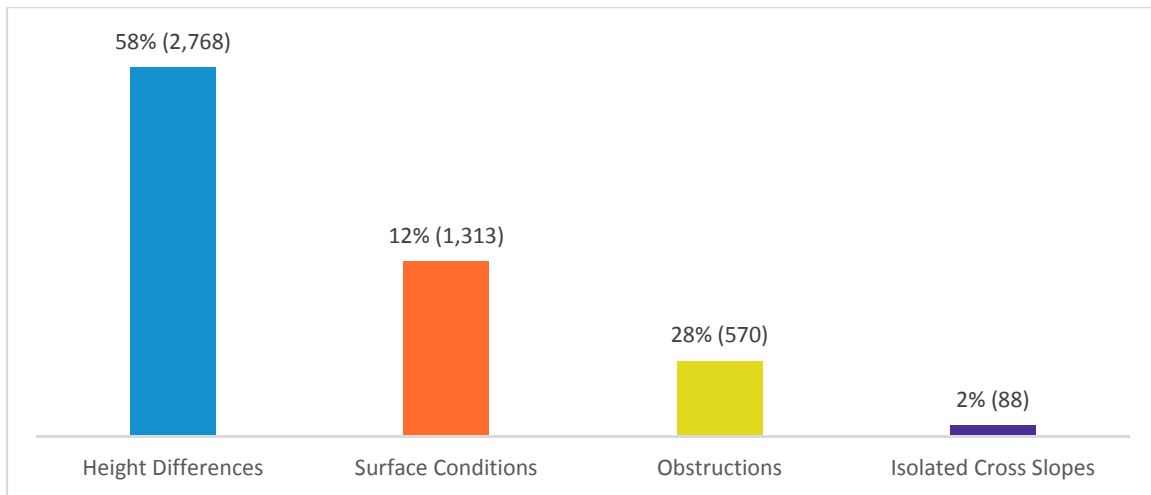
To achieve a proactive and comprehensive sidewalk program, given the City's budgeting and resource constraints, SDOT can employ multiple programmatic approaches to remove uplifts and obstructions, repair sidewalks, and improve the pedestrian clear zone for all users. All recommendations below require additional resources, or a reprioritization of existing resources.

In the coming months, SDOT will evaluate the following recommendations with the City Attorney's Office, SDCl, SPU, SCL, and the City Budget Office (CBO) with the goal of developing a comprehensive and strategic sidewalk repair program. The final proposal will analyze options and recommend strategies for early wins and long-term programs for implementation.

- 1) The funding required to meet repair and mitigation needs of a \$5 billion sidewalk asset that covers over 34,000 blocks, is much greater than the available budget. Currently, SDOT's Sidewalk Safety Repair program will only make permanent repairs (non-mitigation work) when the City infrastructure is responsible for tree damage or on sidewalks adjacent to City property. Our highest cost, pedestrian traffic impact, and complexity repair type is tree related sidewalk damage. We estimate the cost to address this issue to represent less than 1% of the total sidewalk repair and replacement needs. SDOT recognizes there are competing policies for tree preservation and sidewalk repair. Funding to achieve the preferred outcomes of both policies has not been provided.
- 2) As with many programmatic repair approaches, SDOT has realized economies of scale by repairing similar issues en masse. Given an additional annual budget of \$5 million, SDOT would likely repair the conditions in

item 1 within approximately 20 to 40 years³. This budget would be an addition to the base budget set aside to manage the program and complete needed mitigation measures to reduce the number of uplifts caused by other issues. Furthermore, the department would evaluate these issues within capital project boundaries for better economies of scale and complete repairs in an equitable manner using the City’s Race and Social Equity Tool Kit.

Within 25 feet of City-owned property, there were 4,739 observations collected, not including observations related to trees. These follow a similar trend with uplifts accounting for the largest share of these. For City owned properties, we anticipate the repair cost in the range of \$15 and \$38 million.



- 3) Our lowest cost mitigation treatment involves employing beveling contractors for uplifts under 2”. If there are no tree, utility, or surface water issues causing the uplift, this may be used as a permanent repair strategy. Given funding, SDOT can implement a more robust risk mitigation program. A reactive strategy and 5-day response performance measure drive the current response process. SDOT staff utilize multiple approaches to determine sidewalk repair investment, including partnering opportunities on capital and maintenance projects and staff observations of sidewalk condition.

The reactive approach starts when a customer complaints or internal notification occurs. Previously, dispatch issued a work order to the crew for evaluation. This activity usually involved paint and a future secondary site visit to shim the uplift. This was an inefficient use of crew staff time due to the cost of labor and equipment, as well as the inability to shim during wet weather.

We are currently piloting a revised initial intake process with Maintenance Operations Division engineering staff as follows:

- a) Receive the customer service request, perform a preliminary evaluation, spray paint grade differences.
- b) Identify if the City or the property owner is responsible, determine most effective action including if a mitigation measure can be completed by crews or a beveling contractor and if funding is available for a more permanent repair.

³ Recommended budget based on 2017 dollars to resolve existing issues and does account for continued normal deterioration of the sidewalk system.

- c) Engineering staff reinspect the sidewalk during the visit to confirm accuracy of observation data.

As one of the three mitigation options, paint helps to alert pedestrians and abutting property owners to grade differences and damaged sidewalk.

- 4) SDOT is implementing a new sidewalk observation data application. This application will allow us to correct or update data when we perform inspections or are notified that repairs from our crews and capital, private and utility projects improved sidewalks. After implementing this application, we will develop an interactive web map and educational web site that supports property owner education of liability and explains the sidewalk repair permitting process through an updated [Client Assistance Memo 2208](#). Property owners identify obtaining a qualified contractor at a reasonable cost is a boundary to repairing sidewalks. Sidewalk repair cost sharing programs and providing a contractor list would support this challenge. Furthermore, we are working on a revised notification property owner follow up program.
- 5) The highest quantity of obstructions (20,000 instances) comes from a mix of private and publicly owned trees and vegetation. The Seattle Department of Construction and Inspections (SDCI) currently notifies property owners of clearing needs when their inspectors discover the issue or through a complaint. SDOT recommends a mass mailing using property address adjacent to the issues or a prioritized notification process by sidewalk usage score or neighborhood. The City could also provide property owner education about vegetation in utility mailers. It is further recommended the City institute a fine enforcement program on vegetation and repair issues after a certain number of notices and follow-up site assessment.
- 6) It is recommended that SDOT implement an inspection program using the new sidewalk observation application. National guidance recommends inspections every 10 years and SDOT may increase inspection frequency based on usage, sidewalk types like pavers and permeable surfaces that typically generate higher maintenance needs, and on-site evaluations to claims or complaints.
- 7) We are developing a three to five-year capital plan that evaluates these opportunities, programs funds, and improves conditions for pedestrians simultaneously to reduce overall project impacts. Some sidewalks are beyond maintenance thresholds and require full replacement. These sidewalks should be added to the PIN network evaluation or a capital improvement program like the Arterial Asphalt and Concrete program. Maintenance Operations staff plans to utilize SPAB to evaluate the proposed annual program and select project opportunities as emerging needs arise or identify additional funding needs.

The department is improving pedestrian conditions by including sidewalk repairs in its CIP projects. This approach allows for significant economies of scale in terms of mobilization, traffic control, established unit pricing, and reduction in public disruption. The process of evaluating opportunities from capital or other programs includes:

- a. Overlaying observed sidewalk conditions with map layers from dotMaps, and / or the CIP project dashboard, to identify CIP project opportunities. With the new data layers, this effort can be performed from a Maintenance Operations perspective and a CIP project management perspective.
 - b. Adding a sidewalk condition data review step to the Complete Streets Checklist and Streets Illustrated project tools.
- 8) During this assessment, SDOT identified different types of permanent sidewalk obstructions that reduce the path of travel to less than 36" wide. Some obstructions such as utilities or retaining walls, can be prohibitively costly to remove. Others like signs, vertical curbs, recycling/ garbage containers, and permitted uses (sidewalk cafes, fencing, newspaper boxes, etc.) are easier to remove the obstruction or change the

path constriction. Conflicts should be caught during permitting reviews and prior to construction acceptance.

- 9) Private and utility projects trigger sidewalk repairs under certain circumstances. If state and federal law allows, we recommend modifying the Municipal Code or lobbying the state legislature to allow for the following:
 - a. A Point of Sale program. When a property sells, the seller would potentially be responsible for correcting sidewalk issues it created, such as; cracking, uplifts, and obstructions not owned by the City or Utilities. Exemptions could be made under certain circumstances (inability to pay, short sale, etc.)
 - b. SDOT is researching when the City can take corrective action based on uncorrected sidewalk issues caused by a utility or private property owner, following multiple notifications, and recover those costs from the property owner.
- 10) SDCI evaluates the impact of proposed development. The city permitting process may require mitigation as a deposit for specific improvements that remedy the development's impacts. SDOT will work with SDCI and the Law Department to evaluate the potential use of these mitigation deposits as a potential funding source for sidewalk repair.