



TRANSPORTATION RESEARCH SYNTHESIS

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Pedestrian Snow Removal Best Practices and Lessons Learned

Introduction

The Minnesota Department of Transportation (MnDOT) is currently reviewing its policy on snow and ice removal from pedestrian and bicycle facilities. This report serves to provide MnDOT with a comprehensive review of existing practices and policies from other states, as well as a summary of valuable publications that could be referenced while developing a new policy.

Summary

An online survey was sent out to employees that are directly involved with snow and ice removal operations at various state Departments of Transportation (DOTs) from around the country. Many respondents started, but did not complete the survey, as their DOT does not clear snow and ice on pedestrian or bicycle facilities. A total of seven DOT's completed the entire survey.

A thorough search of publications regarding cities around the world was also conducted. This search echoed the survey as there are not many state DOTs that clear snow and ice from pedestrian facilities in urban areas. Most snow and ice removal is left to local agencies that in turn pass the responsibility of clearing these areas onto property owners.

Survey Responses

- The survey was sent to approximately 80 maintenance personnel from 21 different state DOTs. Of the surveys sent, 33 responses were received. The first question of the survey asked whether or not their DOT clears snow from pedestrian/bicycle facilities. If the respondent answered "no" to this first question, they were done with the survey. If they answered "yes" they were then taken through a series of more detailed questions aimed at gathering useful information about their current practices. Fifty one percent (17 of 33) of the survey respondents do not clear snow

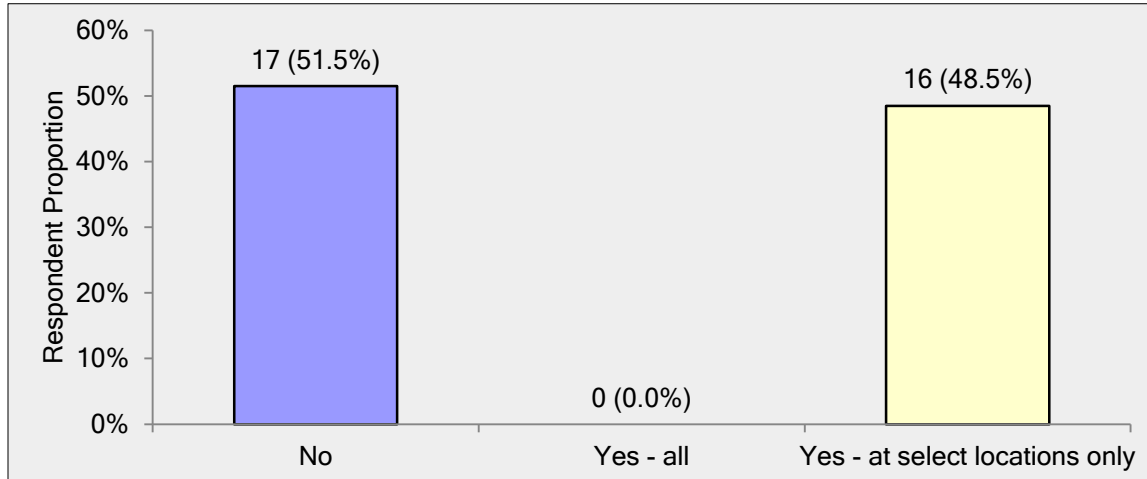
from pedestrian/bike facilities. Of the remaining 49% (16 of 33) that do clear snow from pedestrian/bike facilities, seven finished all 33 questions of the survey. The respondents that completed the survey were from the states of Connecticut, Illinois, New Jersey, Pennsylvania, Delaware and Wisconsin. The seventh respondent did not provide contact information so the state is unknown.

Analysis of Survey of State DOTs' Pedestrian Snow Removal Policies and Procedures

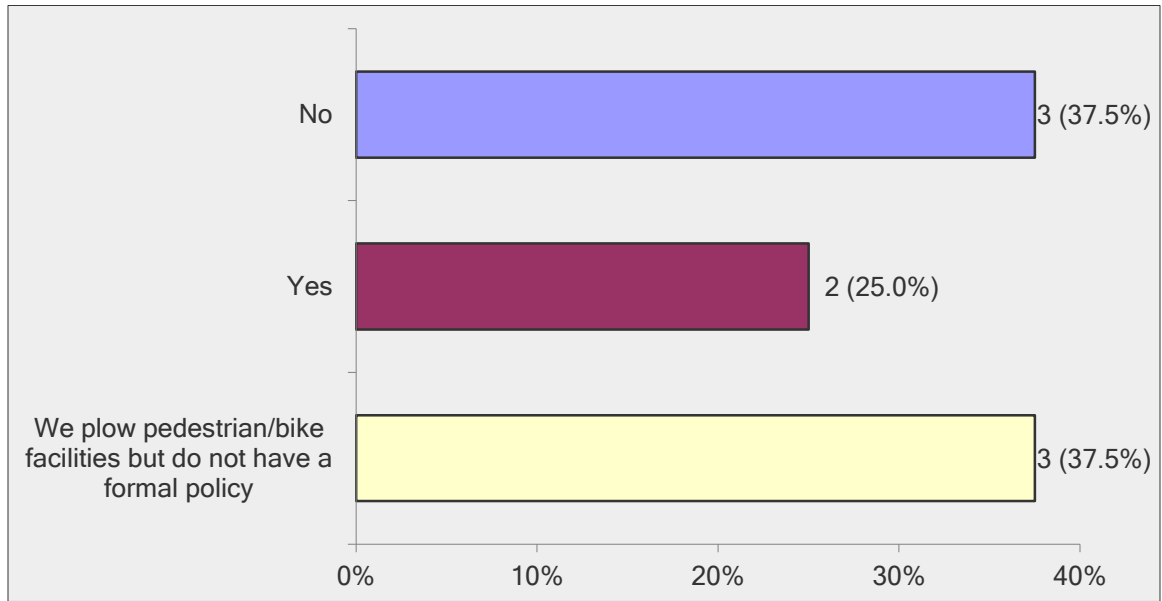
The following is a brief summary of key findings from the seven respondents who finished the entire survey, followed by the detailed responses for each survey question.

- Only respondents from two states, Delaware and Wisconsin, stated they have a snow and ice policy for pedestrian facilities
- All of the survey respondents plow less than 25% of their pedestrian and bike facilities
- 72% of survey respondents consider bare pavement acceptable for pedestrians/bikes (i.e. after a snowfall the pavement must be bare, 1/2 inch of snow is not acceptable)
- None of the responding DOTs have a performance measure for customer satisfaction
- All survey respondents stated that they do not plow roadways differently because of nearby sidewalks or trails.
- 72% of survey respondents rely on adjacent property owners to help clear the sidewalks and trails.
- None of survey respondents pre-treat sidewalks or trails before a snow event.

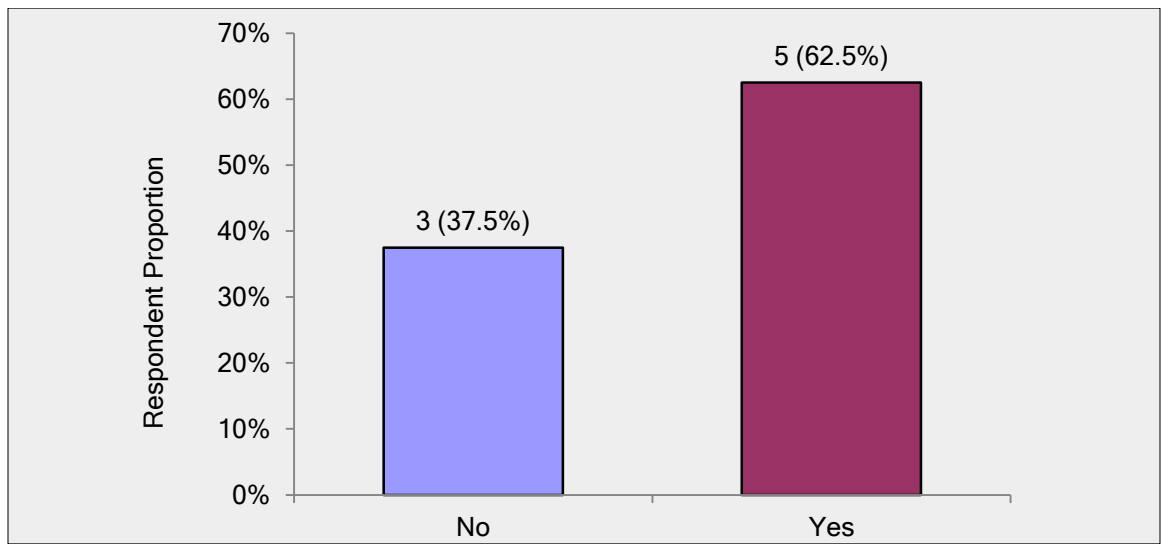
Question 1: Does your DOT clear snow from pedestrian/bicycle facilities?



Question 2: Does your DOT have a snow removal policy for pedestrian/bike facilities?



Question 3: Do you have any agreements in place with local agencies for snow removal on pedestrian/bike facilities on state rights of way? If yes, please briefly describe your agreement (city or county agreement, formal or informal, what the agreement terms are, do you pay a fee, etc.)



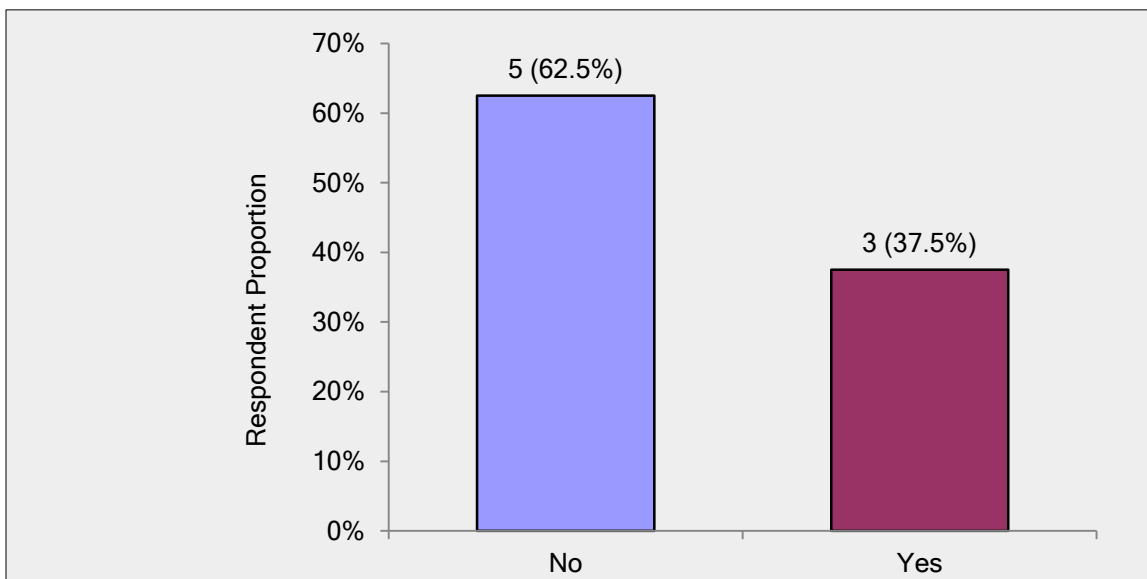
Additional responses about agreement details:

- Maintenance agreement to plow pedestrian/bike facility at a specific location in the County. (State DOT Unknown)
- Municipal agreements (CTDOT)
- Usually this is limited to sidewalks on the random bridge that the DOT did not get an agreement signed that the local/city was to maintain snow removal operations on. We do

have bikeways that are extended shoulders that the DOT plows with wing plows during normal snow removal operations. The DOT does not take care of any sidewalks as they are the property of the municipality in PA. In the rare case listed above we try to enter into a paying agreement for the municipality to handle...if that doesn't work, the DOT will plow or snowblow the bridge sidewalk during significant events. (*PennDOT*)

- If the bike/ped facility is off road we do not remove snow and ice. We can have an agreement with the locals that allows them to handle those responsibilities. (*WisDOT*)

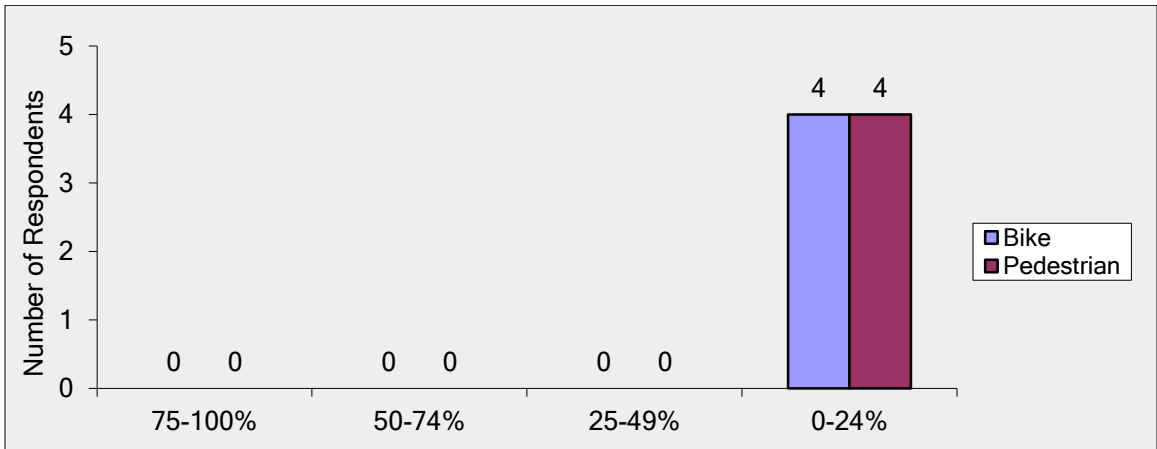
Question 4: Do you have any type of Public Education campaign that draws attention to your snow removal policy? If yes, please explain in comment box the specific type(s) of media used for this and how often is it published, for example, is the policy posted year round on the website, do you send out tweets, etc.



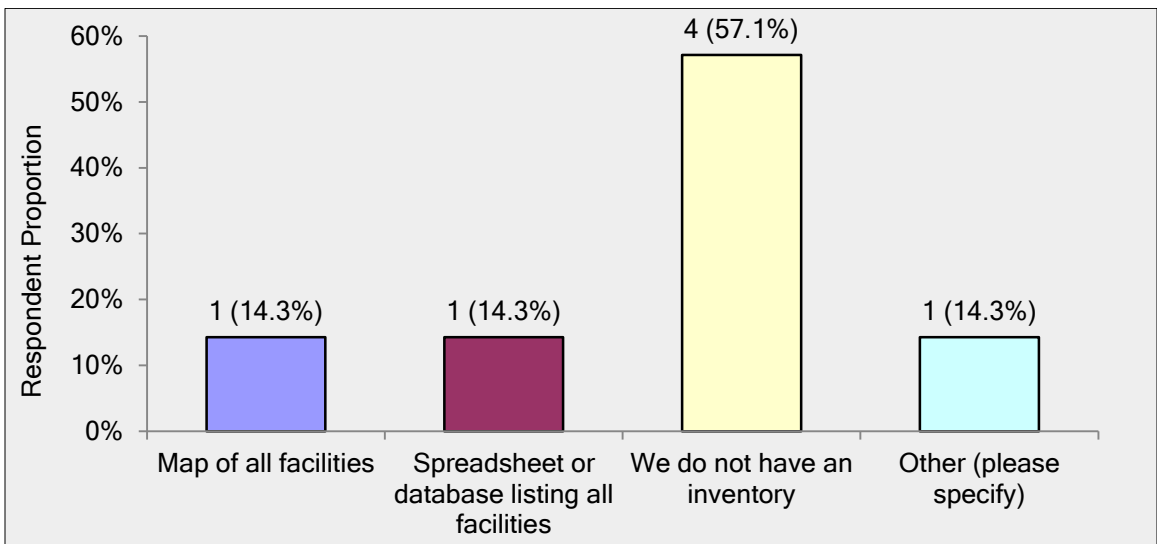
Additional Responses about media uses:

- A Winter Maintenance Guide is published on the PennDot Web Site Statewide for all Districts. Also, locally, the Press Office distributes a Winter Maintenance Guide (<ftp://ftp.dot.state.pa.us/public/Districts/District6/Winter%20Guide.pdf>) for the jurisdictional area prior to the onset of winter. (*PennDOT*)
- General Media (*CTDOT*)

Question 5: What percentage of your pedestrian and bike facilities do you clear snow from during a snow event?



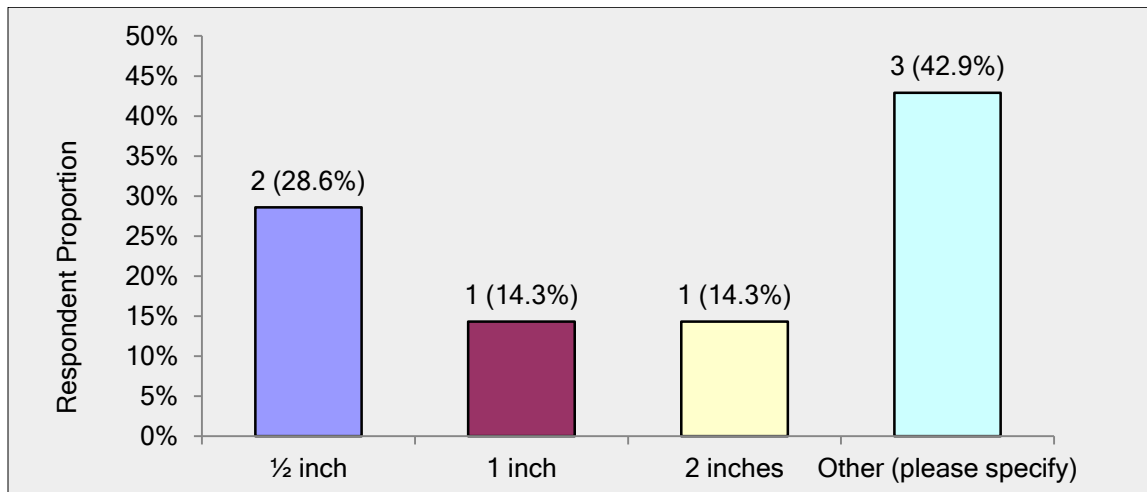
Question 6: How do you inventory your sidewalks/trails? (check all that apply)



“Other” response about other inventory methods used:

- We have a data base in our region. Our agreements with the locals are scattered and currently being accumulated into one data base. These agreements are found in environmental documents, State Municipal agreements, MOU's and MOA's. (*WisDOT*)

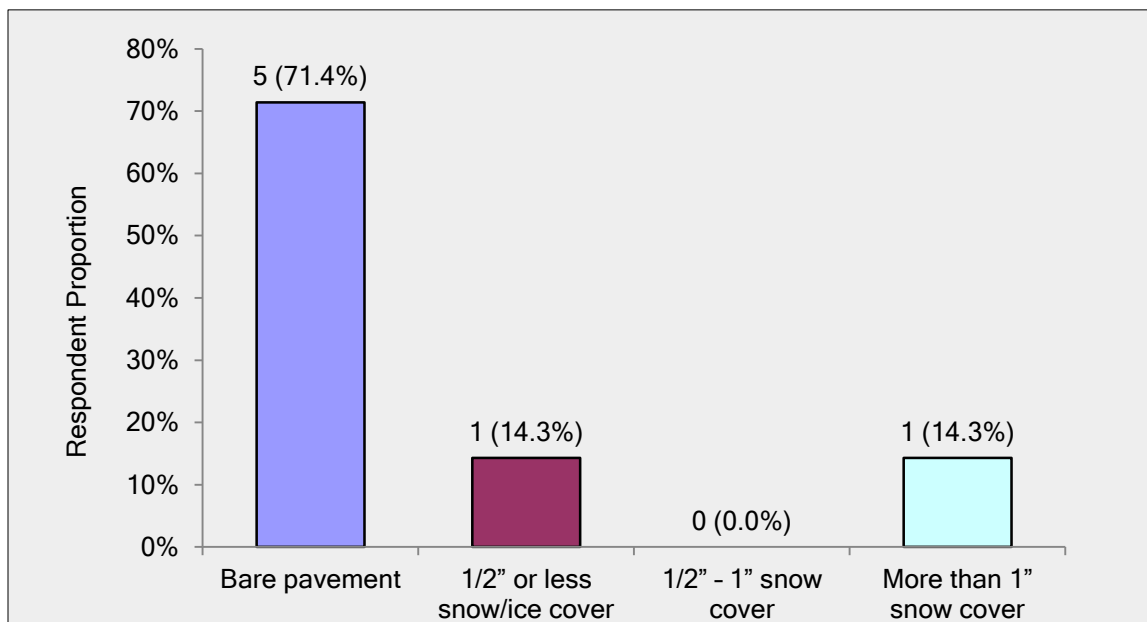
Question 7: What is your minimum snow fall requirement to trigger snow removal on pedestrian/bike facilities?



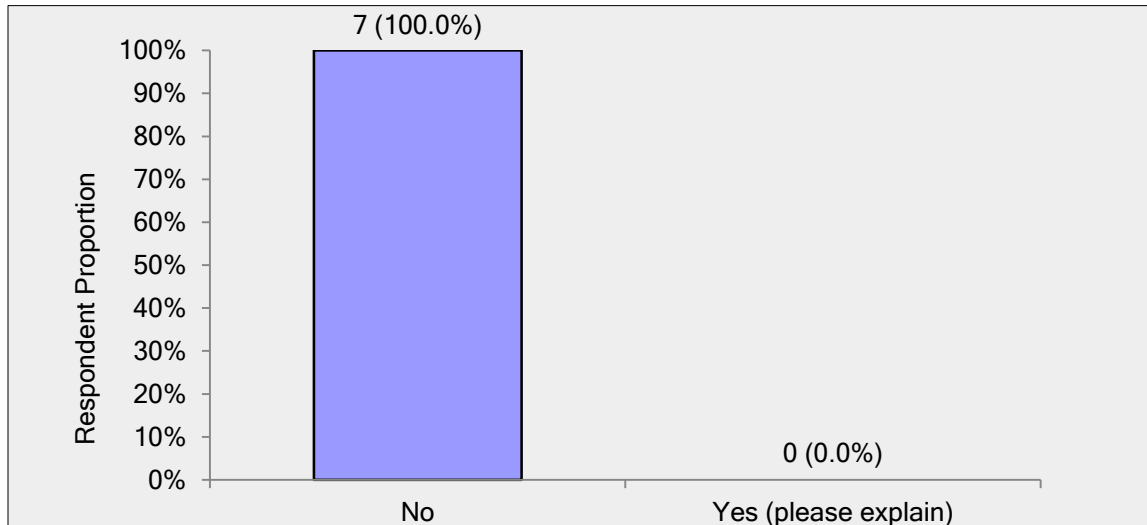
“Other” responses about snow fall requirements:

- When crews perceive a significant impediment to travel or when there is a strong rise in public concern. (*IDOT*)
- We have no formal minimum. (*NJDOT*)
- If it's a bike path on the road, then the road needs snow removal. We do not remove snow for off road bike/ped facilities. (*WisDOT*)

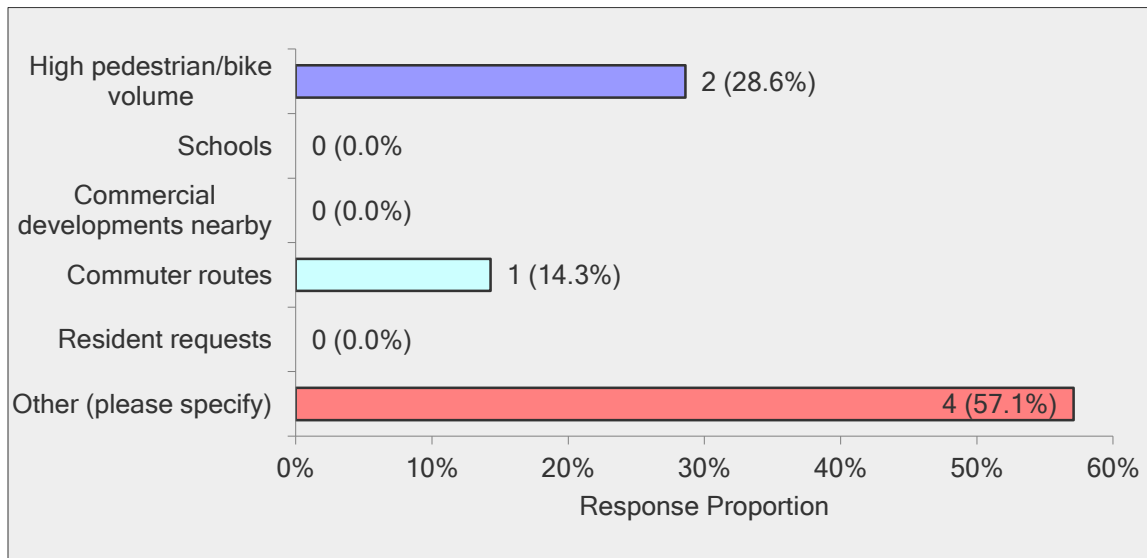
Question 8: What degree of clearing do you consider acceptable for pedestrians/bikes?



Question 9: Do you have a performance measure for customer satisfaction of snow removal practices for bikes/pedestrians?



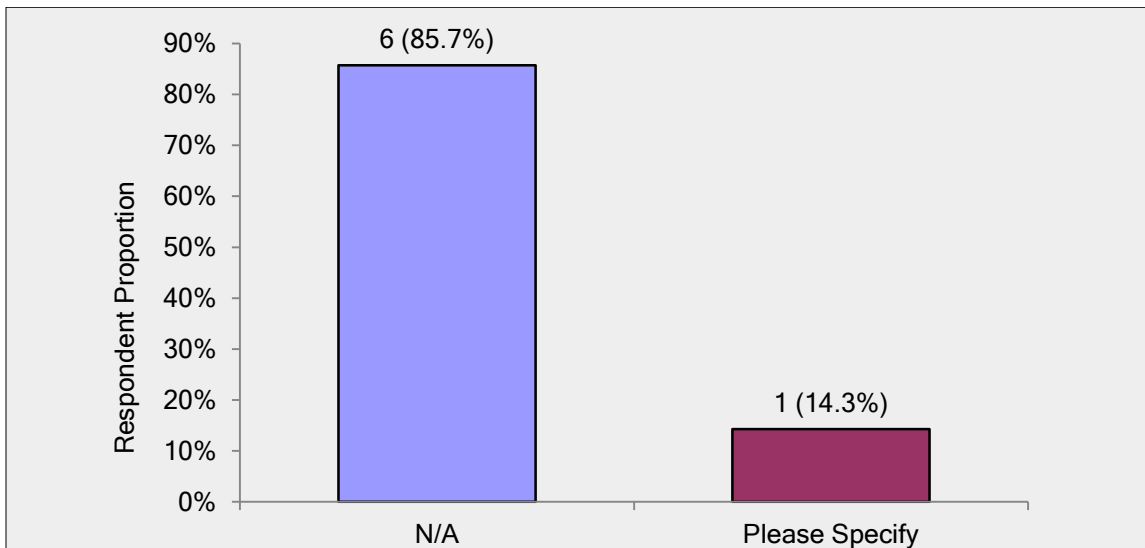
Question 10: If you do not plow all pedestrian/bike facilities, how do you determine high priority locations? (check all that apply)



“Other” responses about determining high priority locations:

- Maintenance Agreements with Agencies. (*State DOT Unknown*)
- Sidewalks on bridges are the main areas we consider. (*IDOT*)
- Since ped routes are limited to one or two bridge sidewalks, usually a request from the city is the trigger. For the bike trails that are widened shoulders are plowed with the priority of the route. (*PennDOT*)
- On road facilities only (e.g. a bike path on road). (*WisDOT*)

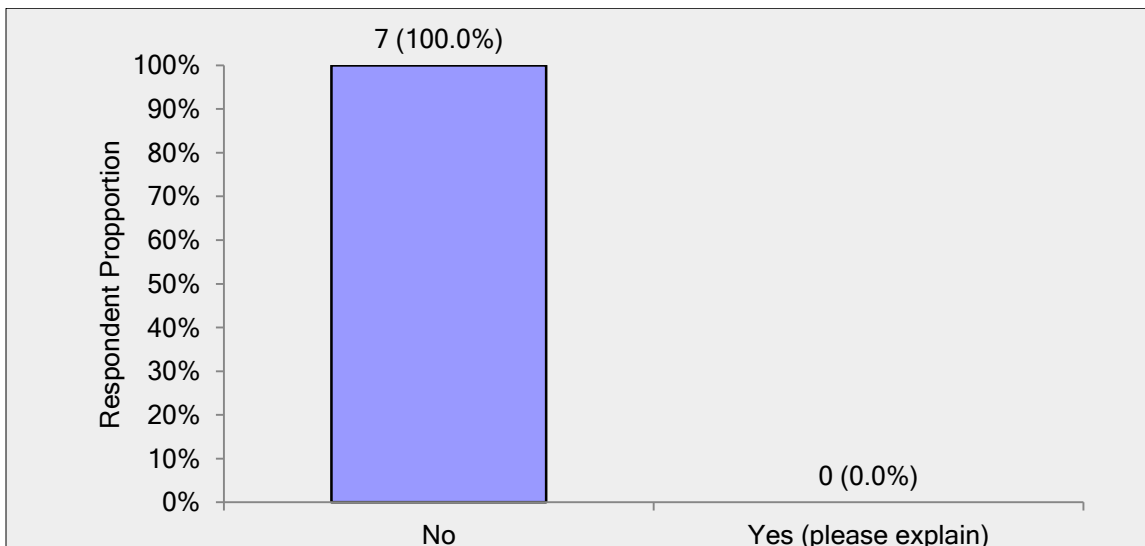
Question 11: If you consider “High Pedestrian/Bike volume” as a high priority criterion, what volume do you consider “high”?



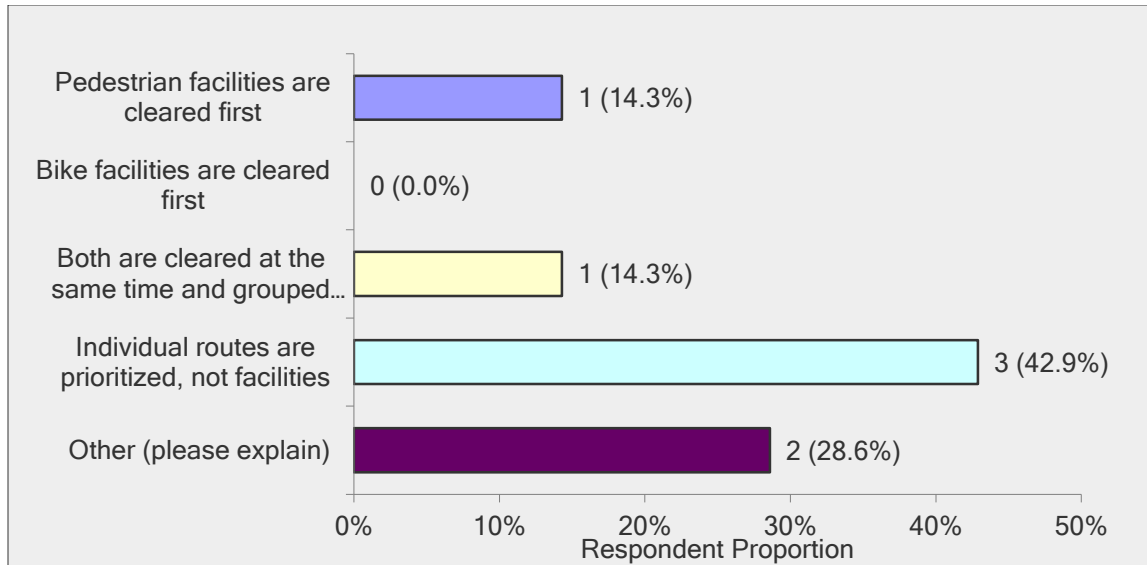
Additional response about “high ped/bike volume”:

- Known areas that are around schools, college campuses or areas where there is obvious high foot traffic leading to workplaces. State law requires that adjacent property owners clear sidewalks, but in cases where our bridges go over waterways, NJDOT is the adjacent property owner. (NJDOT)

Question 12: Do you use a pedestrian/bike Level of Service measurement when prioritizing facilities to remove snow? If so, how do you measure LOS?



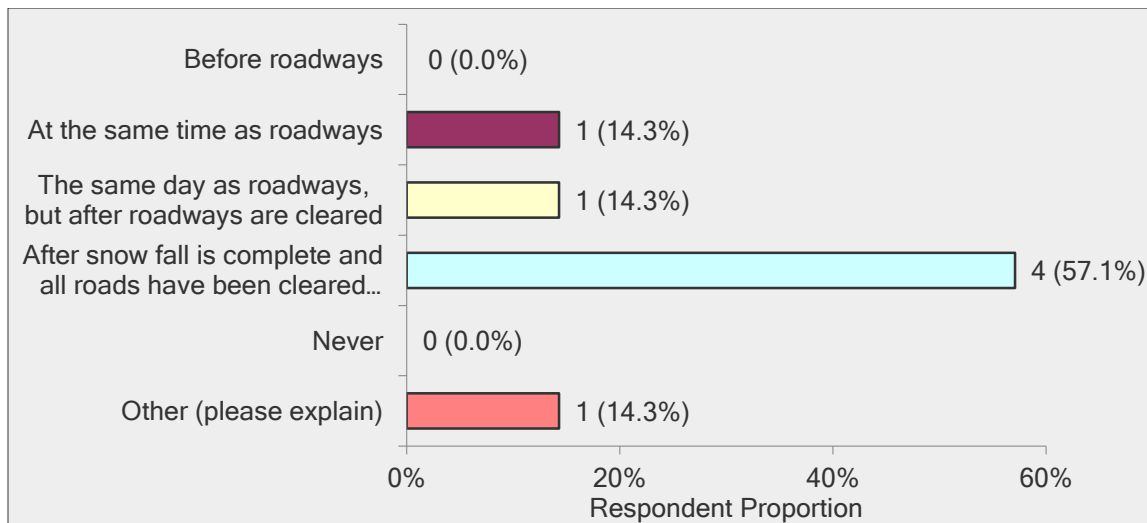
Question 13: For pedestrian/bike facilities, what is your snow removal priority?



“Other” snow removal priority responses:

- Pedestrian sidewalks and crossings are last priority. (*NJDOT*)
- This would be a local function for off road bike/ped facilities. The State of Wisconsin does not engage in snow and ice removal of off road facilities. (*WisDOT*)

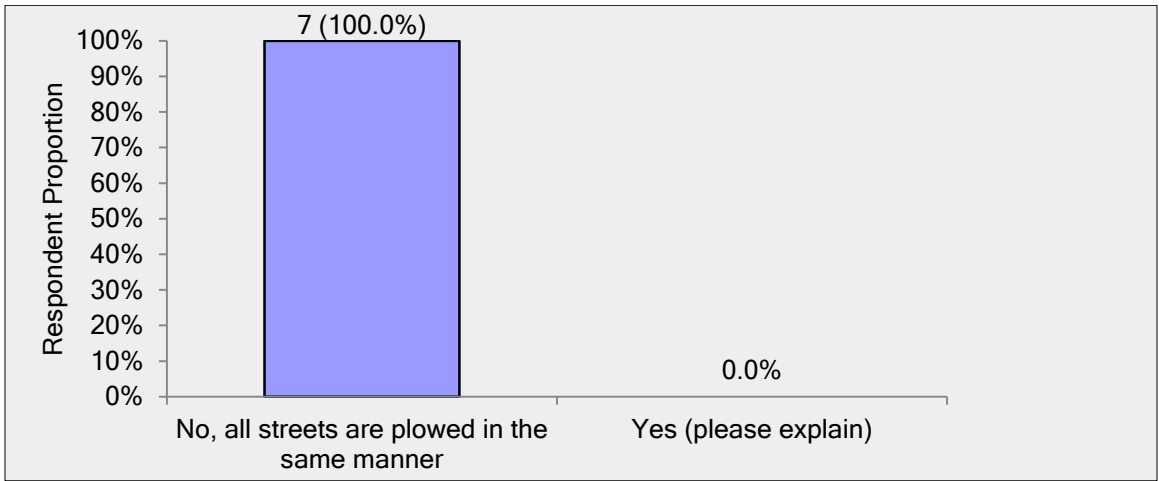
Question 14: When are sidewalks and pedestrian ramps cleared?



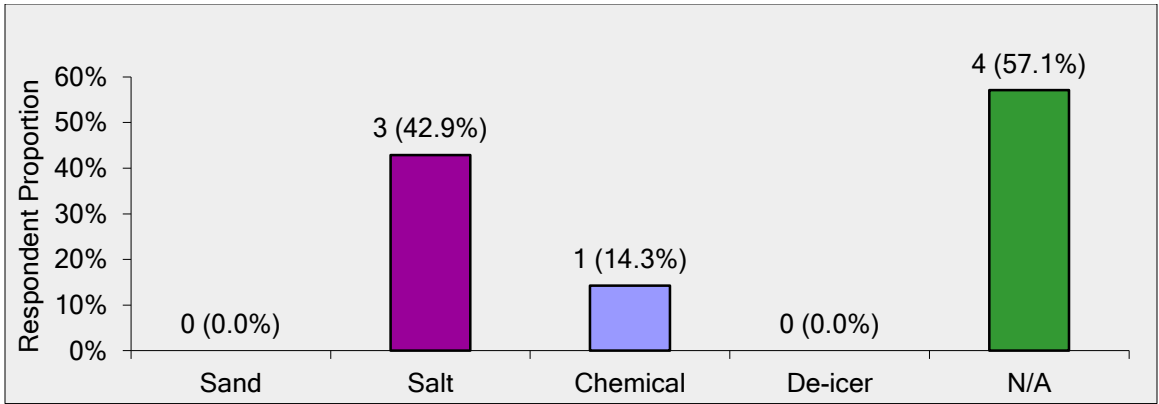
“Other” response:

- Again, this would be a local function for off road bike/ped facilities. The State of Wisconsin does not engage in snow and ice removal of off road facilities. (*WisDOT*)

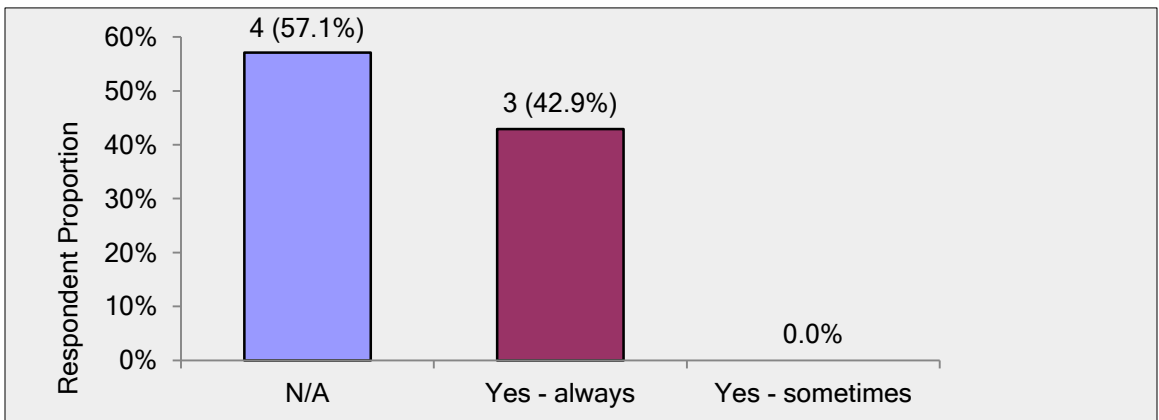
Question 15: Are there areas where you handle snow removal on streets differently because of nearby sidewalks and trails?



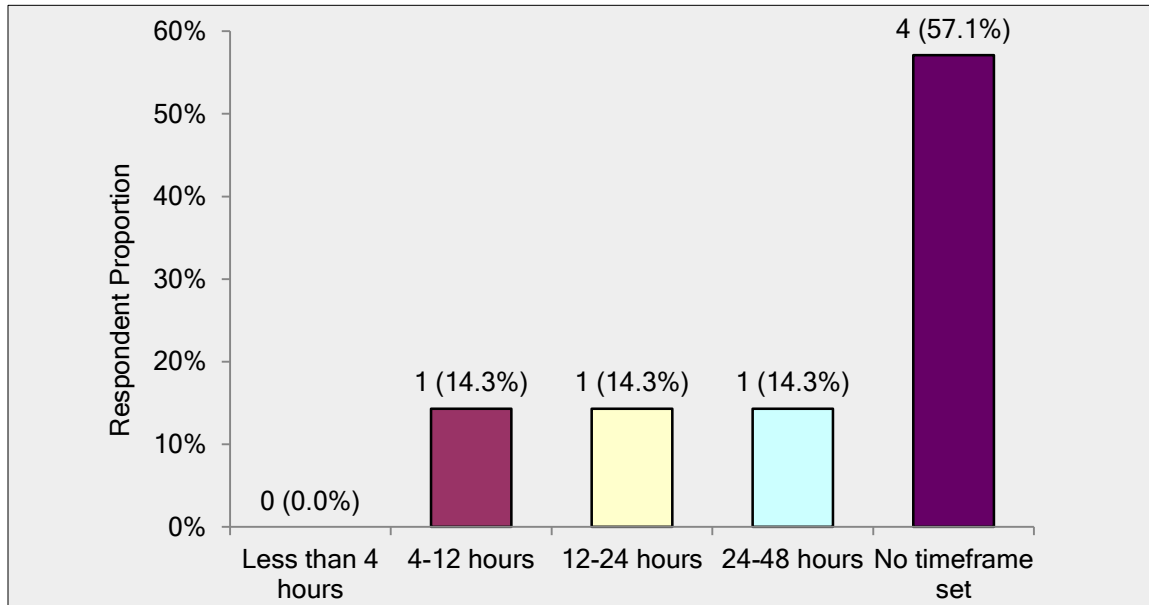
Question 16: Do you treat the sidewalks and trails with: (check all that apply)



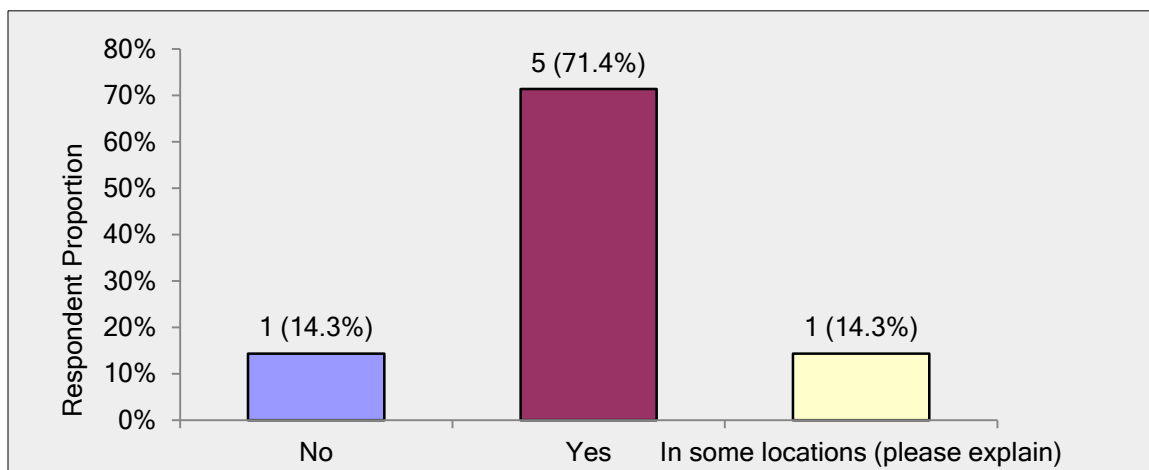
Question 17: If you do treat your sidewalks/trails with sand/salt/chemical, do you use it for all snow events?



Question 18: How soon after a snowfall do you aim to have pedestrian/bike facilities cleared?



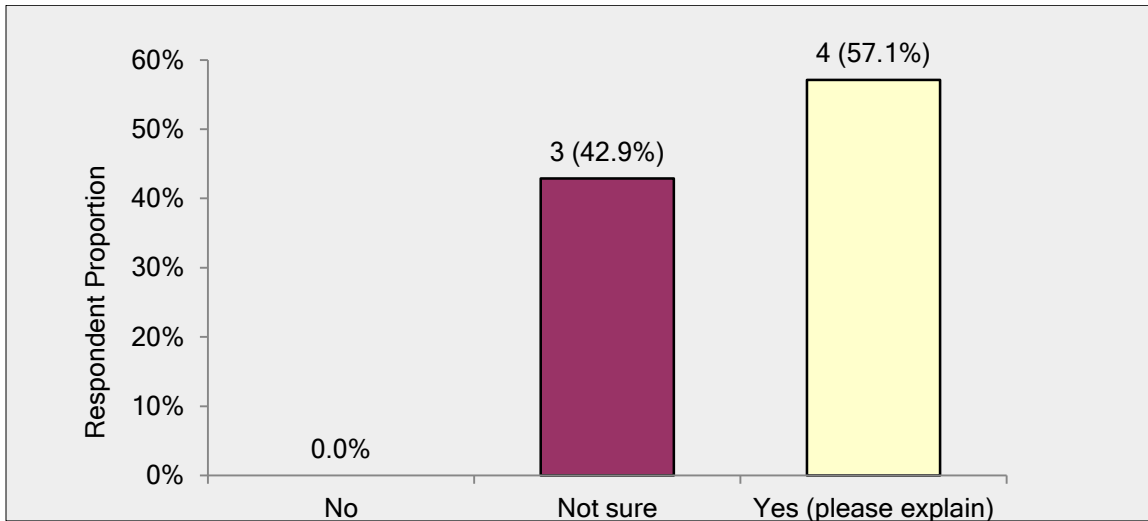
Question 19: Do you rely on adjacent property owners to help clear pedestrian and bike facilities?



Additional Response:

- For off roadway facilities it is the local government that handles these activities. (WisDOT)

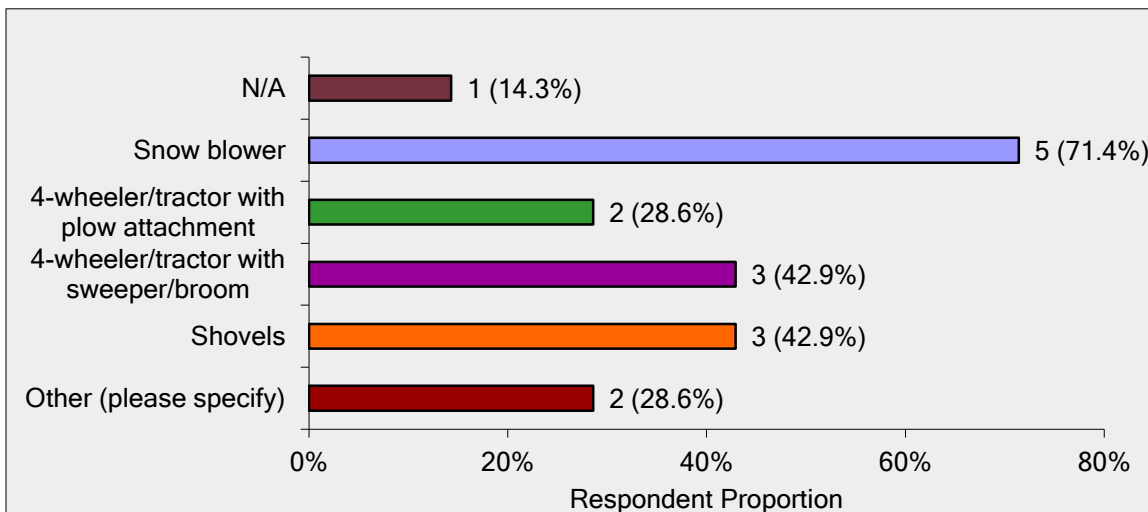
Question 20: Are adjacent property owners required through local code/law to maintain any portion of sidewalks and trails?



“Yes” responses, additional information:

- Municipal Law (*CTDOT*)
- City ordinances require property owners to clear sidewalks in many areas. (*IDOT*)
- Must clear sidewalks by law. We only clear sidewalks in cases where we are the adjacent property owner. (*NJDOT*)
- Adjacent property owners are required in a significant portion of municipalities to maintain snow removal. (*PennDOT*)

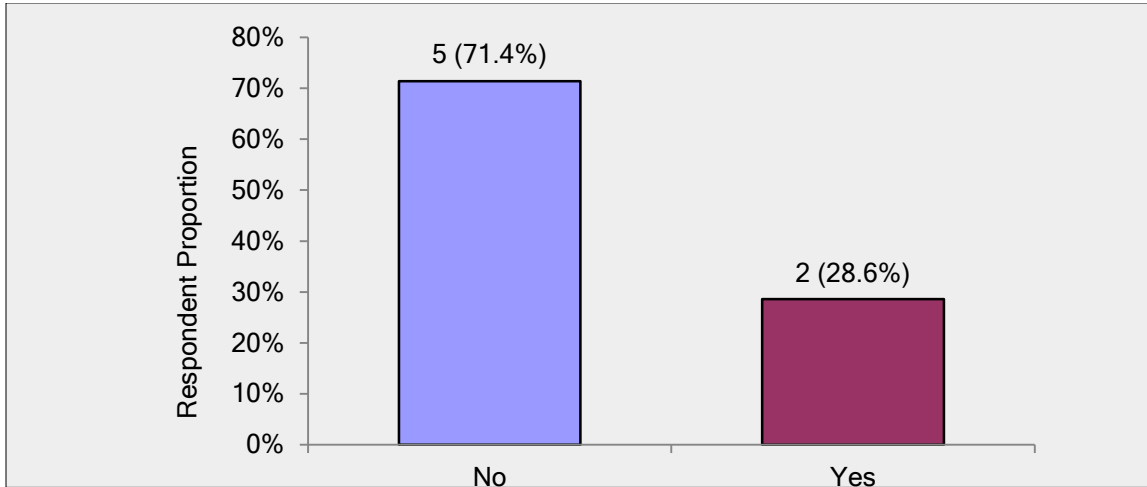
Question 21: Which of the following methods are used to clear sidewalks and trails? (check all that apply)



“Other” methods used:

- Pick-up truck with plow and spreader (*State DOT Unknown*)
- Ice choppers (*NJDOT*)

Question 22: Do you have a specialized group that is formed to do pedestrian/bike facilities during the winter?



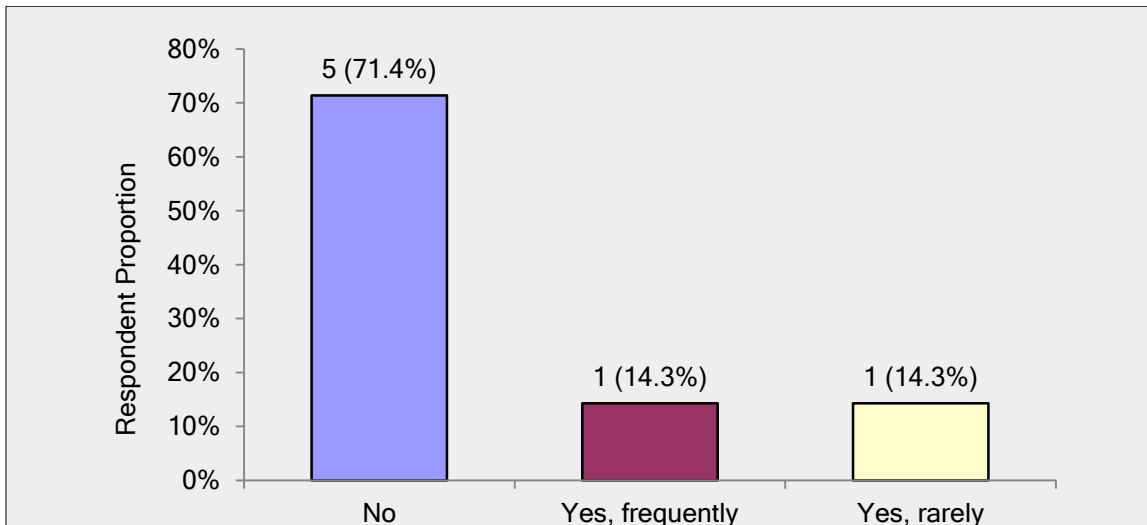
Question 23: What types of employees are used for snow and ice removal on pedestrian and bike facilities? What percentage of each of these employees is used?

Answer Options	Employee Not used	0%-24%	25%-49%	50%-74%	75%-100%	Response Count
Supervisor	3	1	0	0	0	4
Asst. Supervisor	3	1	0	0	0	4
Lead Worker	1	3	1	0	0	5
General Maintenance Staff	0	2	0	0	3	5
Other (please specify below)	1	0	0	0	1	2

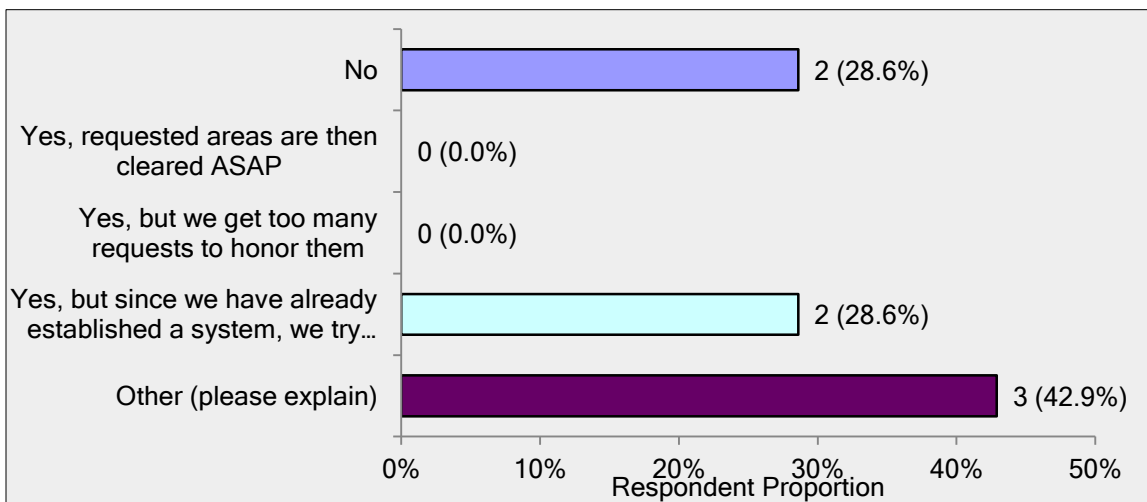
“Other” responses about employees used:

- Other employees with 75% - 100% usage
 - Contracted work (*State DOT Unknown*)
- Other employees not used
 - We only engage in facilities on road...those are primarily bike (*WisDOT*)

Question 24: Are outside sources ever contracted by the DOT to assist in clearing sidewalks and trails?



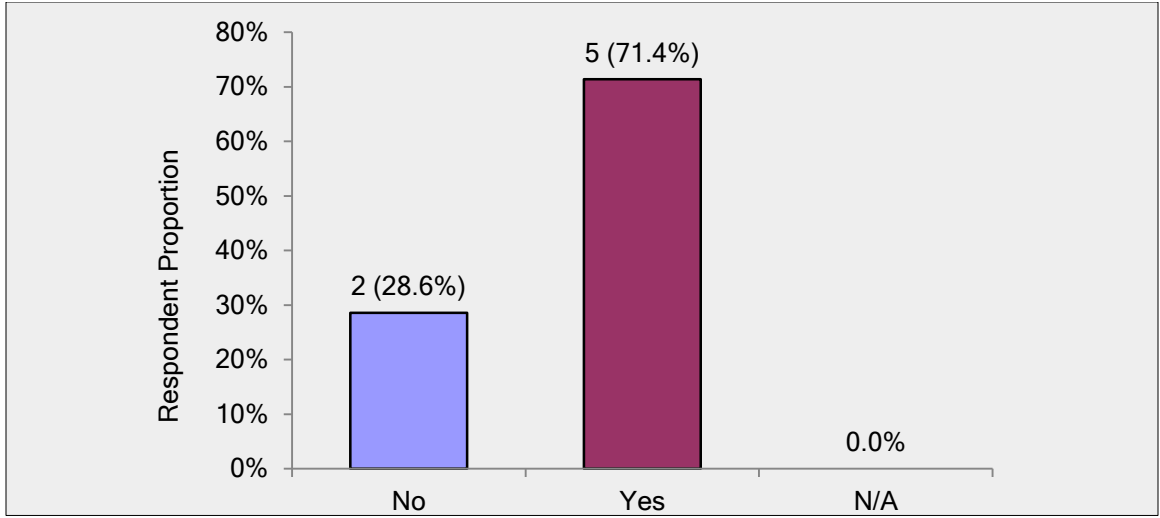
Question 25: Do you ever receive requests from citizens that certain stretches of sidewalks and trails be cleared? How are these requests handled?



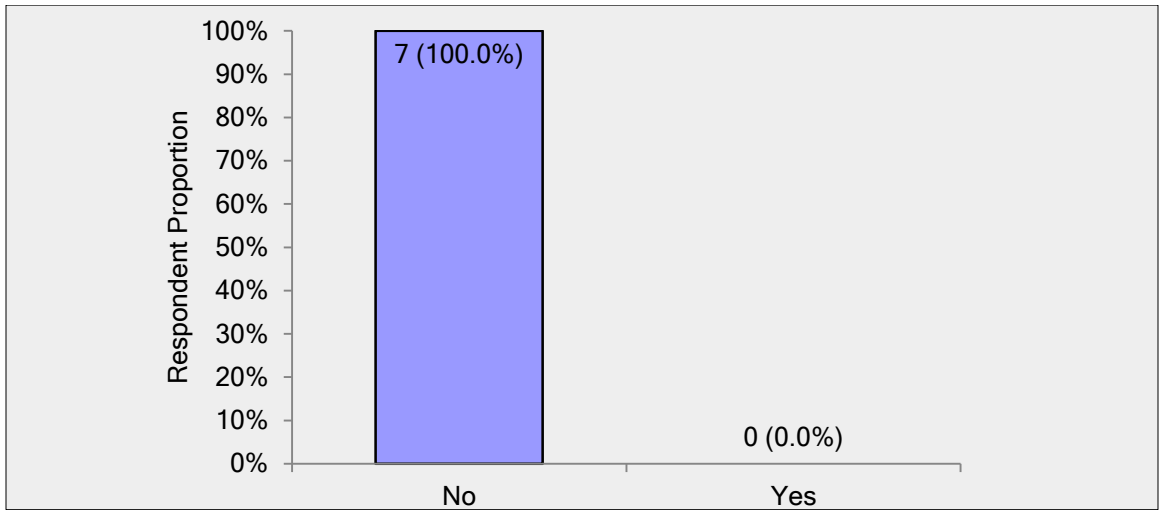
“Other” responses about citizens clearing sidewalks and trails:

- Yes, the requested areas are cleared when crews are available but only after highways are cleared. (*IDOT*)
- Yes, and if it is our responsibility, we handle it within 24 hours. (*NJDOT*)
- DOT is responsible for curb to curb only in most municipalities. Anything beyond the curb is the municipalities’ responsibility. (*PennDOT*)

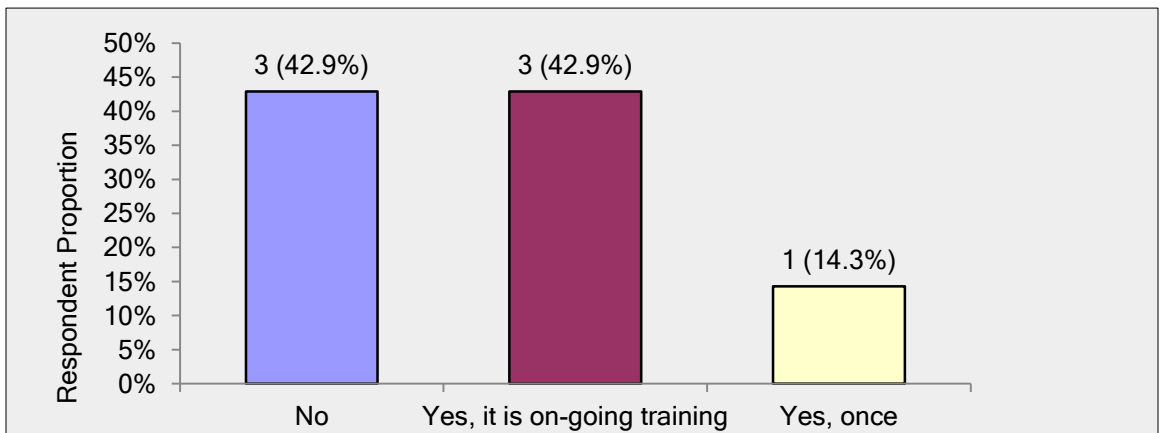
Question 26: Do you track or log your requests/complaints from citizens?



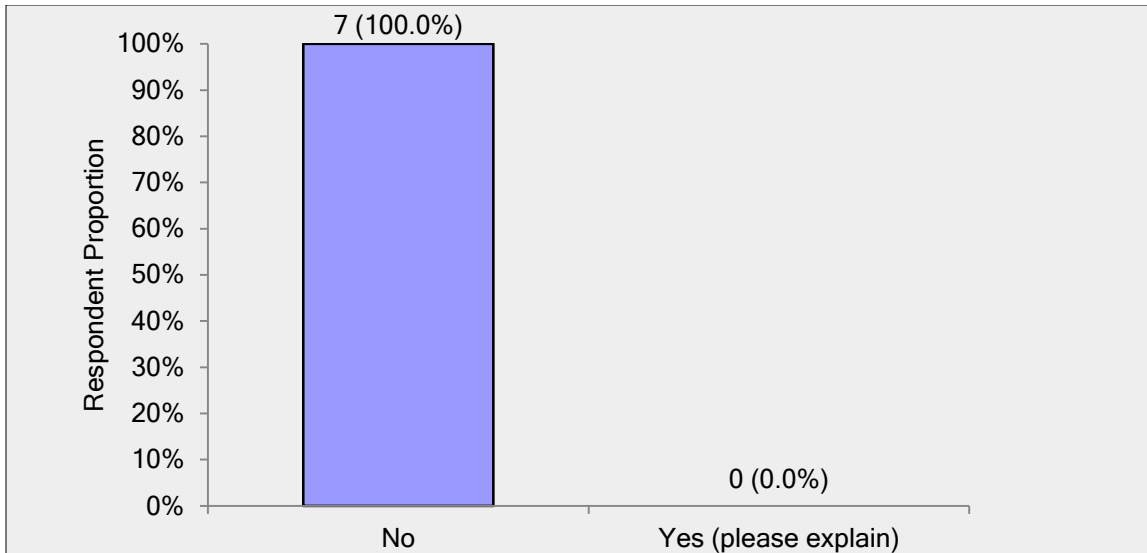
Question 27: Are sidewalks and trails ever pre-treated before a snow event?



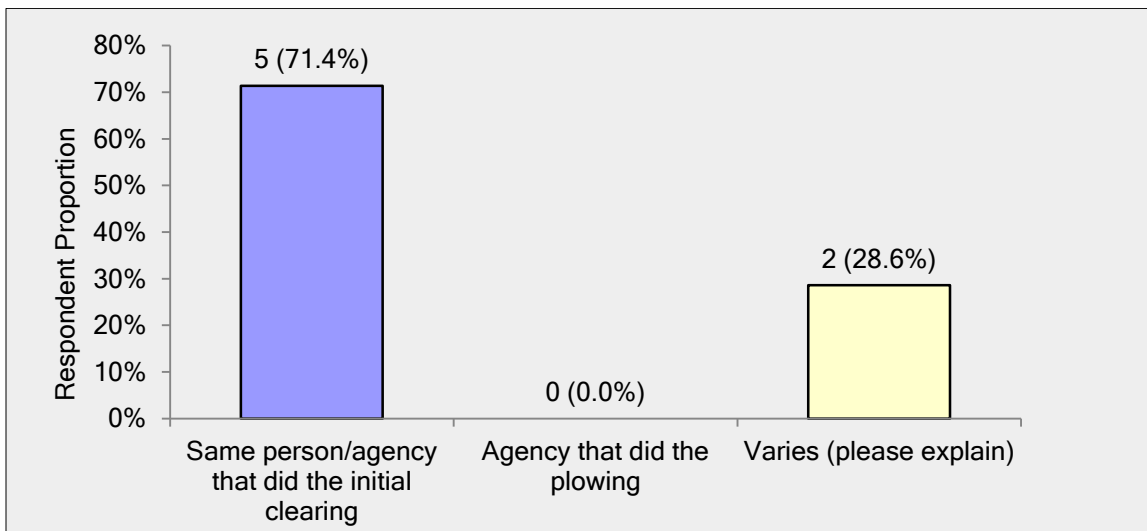
Question 28: Are street plow operators trained in best practices as to avoid pushing snow onto sidewalks/pedestrian ramp and trails?



Question 29: Do you have a plan in place to avoid depositing snow onto already cleared areas?



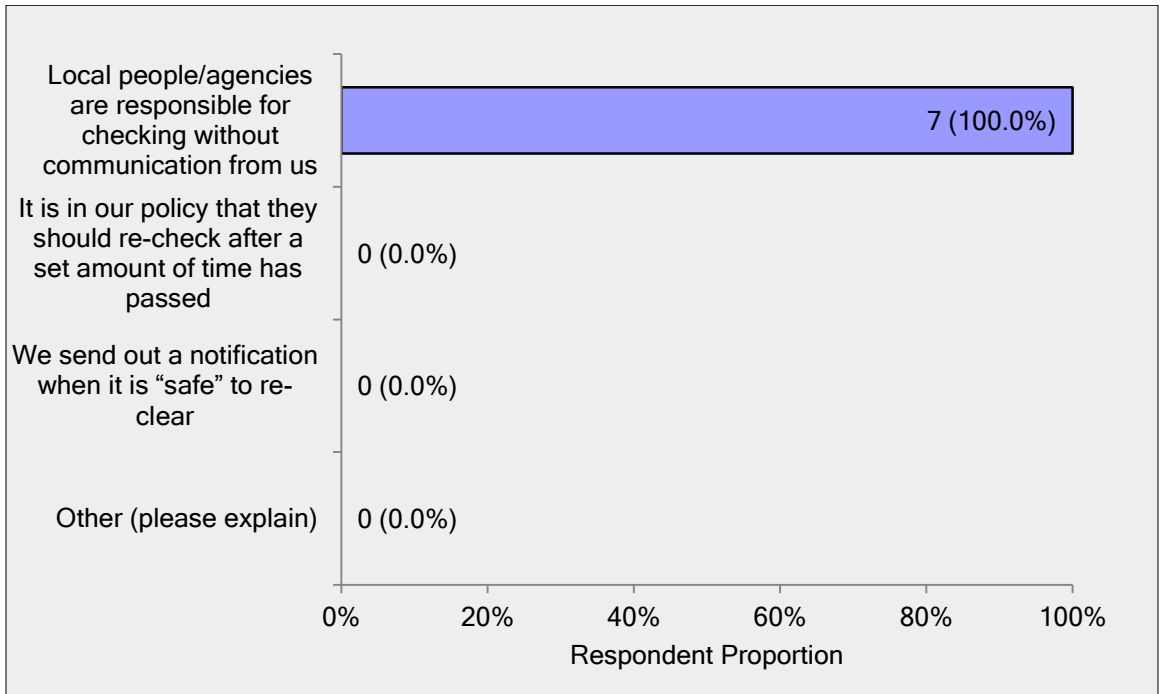
Question 30: If plows deposit snow on already cleared sidewalks and trails, who is responsible for re-clearing these areas?



“Varies” Responses about who is responsible for re-clearing sidewalks and trails:

- Depends on who’s responsible for the sidewalk/trail. (*DelDOT*)
- Most of the time in residential type areas we have connecting highways where the locals plow their streets. They assure plowing is done properly. The State of Wisconsin contracts all highway snow plowing out to the 72 Counties located within the State. The State of Wisconsin does NOT plow highways and we do not fund the plowing of off-roadway bike/ped facilities. (*WisDOT*)

Question 31: When areas do need to be re-cleared, how is it communicated to those people/agencies that you are done plowing and that sidewalks/trails should be checked again?



Question 32: If you have any other information regarding pedestrian/bicycle facility snow removal that you would like to add, please enter it below.

- ❖ We love the bike/ped facilities and assure they get built. However, State of Wisconsin request local governments to fund the general maintenance of these facilities. The state provides lump sum aid to locals for these types of maintenance activities as well as others. (*WisDOT*)

Literature Review

A literature review was completed to identify resources that could assist MnDOT in developing their own policy for snow and ice removal on pedestrian facilities. The initial intent was to review documents that focused on the policies and practices at the DOT level. Through general literature searches and contacting state DOT snow and ice maintenance staff, we found that little information exists at the DOT level. Many of the references below document practices at the city level. Many cities' policies state that it is the responsibility of the property owner to maintain adjacent sidewalks and trails, therefore not all city policies are listed here.

- ❖ Scott, Marcia and Brandon Rudd. "Winter Maintenance of Pedestrian Facilities in Delaware: A Guide for Local Governments" *University of Delaware*. Feb 2012 Web. July 1, 2013.
<http://www.ipa.udel.edu/publications/SnowRemoval.pdf>
Comprehensive research publication that provides a wealth of information to Delaware's local governments regarding pedestrian accessibility issues during the winter maintenance season.
- ❖ "Street, Sidewalk and Path Snow Removal." *City of Boulder, Colorado*. 14 May 2013. Web. 12 June 2013.
http://www.bouldercolorado.gov/index.php?option=com_content&id=173&Itemid=1206
The City of Boulder prioritizes multi-use paths and maintains these to high-level transportation standards. They are plowed at the same time as city streets. Also outlines the order in which they are cleared and who is responsible for clearing them. The city does not, however, clear sidewalks. This is left to property owners.
- ❖ Stelson, Aaron, Kate Setterlund and Steve Miller. "Keep It Clear; Recommendations for Sidewalk Snow and Ice Removal in Massachusetts." *WalkBoston*. Web 12 June 2013.
<http://walkboston.org/policy-positions/snow-clearing>
Recommendations to improve sidewalk snow and ice clearance. These recommendations include creating a norm of snow clearance through social awareness campaigns, identifying a municipal point person, setting priorities for clearance, improving monitoring and enforcement, designing sidewalks for easier snow removal, training municipal and private snow plowing personnel and creating sensible state policies through appropriate legislation.
- ❖ "Pedestrian Compatible Planning and Design Guidelines, Chapter 4: Operations and Maintenance of Pedestrian Facilities, Section 2b: Winter Season Maintenance Requirements." *State of New Jersey Department of Transportation*. 26 Nov 2012. Web. 12 June 2013.
<http://www.state.nj.us/transportation/publicat/pdf/PedComp/pedintro.pdf>
These guidelines discuss proper clearing of sidewalks during winter months and specifically address the problem of snow melt causing puddles at crosswalks.
- ❖ "FAQs: What are examples of model snow removal policies for city sidewalks?" *Walkinginfo.org; Pedestrian and Bicycle Information Center*. Web. 12 June 2013.
<http://www.walkinginfo.org/faqs/answer.cfm?id=4125>
Outlines important points that should be included in a snow removal policy. These include dedicating specific crews to sidewalk clearance, prioritizing multi-use paths, requiring that snow be removed promptly and enforcing the laws. Further, this document and mentions that cities should provide sand for free to apply to sidewalks when there is an accumulation of ice. It also

discusses the importance of maps, assistance for those who are unable to clear their sidewalk and having a hotline to call with complaints.

- ❖ “Snow and Ice Removal on Sidewalks.” *City of Ann Arbor*. Web. 12 June 2013.
<http://www.a2gov.org/government/safetyservices/Police/Pages/SnowRemovalonSidewalks.aspx>
Ann Arbor relies on its citizens to remove all snow and ice from the entire width of public sidewalks. Violations of the ordinance requiring this can result in fines up to \$1000 which are among most expensive fines we found.
- ❖ Colville-Anderson, Mikael. “The Ultimate Bike Lane Snow Clearance Blogpost!” *Copenhagenize.com*. 05 Dec 2010. Accessed 12 June 2013.
<http://www.copenhagenize.com/2010/12/ultimate-bike-lane-snow-clearance.html>
Blog entry about a city that prioritizes bike lanes over streets. This includes salting bike lanes before the snow falls and clearing the bike lanes of snow before the streets are cleared and even pushing the snow from the bike lanes onto the street and parked cars. Because the bike lanes are cleared even when it is still snowing, they are able to use a brush to clear the snow because it is never allowed to accumulate enough to need a plow.
- ❖ “Snow Ploughing-priorities and requirements for snow clearing in the City of Toronto.” *Toronto*. 2013. Web. 12 June 2013.
<http://www.toronto.ca/311/knowledgebase/84/101000049384.html>
The City of Toronto clears sidewalks wherever feasible, but only after a set accumulation amount. This amount varies according to the month. If snow fall totals are less than the set amount, it is left to the property owners to clear the paths.
- ❖ “Snow Removal Policy Toolkit 2012.” *Metropolitan Area Planning Council (Massachusetts)*. 08 May 2012. Web. 12 June 2013.
<http://www.mapc.org/sites/default/files/Snow%20Removal%20ToolkitFINAL1.10.12.pdf>
Toolkit to help communities be more informed about snow removal policies and procedures and ways to help those communities increase compliance. Among these tools are examples of maps, various policies and ordinances, and brochures.
- ❖ “Winter Maintenance Snow Removal and Ice Control Policy.” *New Hampshire Department of Transportation*. Web. 13 June 2013.
<http://www.nh.gov/dot/org/operations/highwaymaintenance/documents/wmsrip.pdf>
The State of New Hampshire states that even though there are some sidewalks adjacent to highways, they have a firm and longstanding policy that it is the responsibility of the local community to maintain these sidewalks.
- ❖ “Sidewalk Snow Removal; Guidance for Chicago Residents and Businesses” *The City of Chicago’s Official Site*. Web. 14 June 2013.
<http://www.cityofchicago.org/content/dam/city/depts/cdot/pedestrian/sidewalksnowremoval/ChicagoGuidanceDocV102011sm.pdf>
The City of Chicago, like most other cities, requires property owners to clear sidewalks during winter conditions. This brochure covers several topics including timeframe for clearing, a hotline to report unclear areas, photos showing where to deposit cleared snow and lists the possible fines for non-compliance.

- ❖ “Sidewalk Snow Removal” *City of Rochester, NY* Web 2 July 2013.
<http://www.cityofrochester.gov/article.aspx?id=8589936460>
 Details both the property owner’s responsibility and the City’s role in sidewalk snow removal. Also lists specific details about how much snow must fall before the city helps, size of the sidewalks it plows and the fact that the City of Rochester, NY uses private contractors to plow sidewalks.

- ❖ “PennDOT Maintenance First” *Pennsylvania Department of Transportation* Web. 2 July 2013.
<ftp://ftp.dot.state.pa.us/public/PubsForms/Publications/PUB%20370G.pdf>
 Publication that was developed to educate the public about common winter maintenance operations.

- ❖ PennDOT 2012-2013 Winter Maintenance Guide, *Pennsylvania Department of Transportation* Web. 2 July 2013.
<ftp://ftp.dot.state.pa.us/public/Districts/District6/Winter%20Guide.pdf>
 Documents the winter maintenance budget, miles plowed, municipal agreements, private contractors, salt used and equipment use for the 2012-2013 plowing season in Pennsylvania.

- ❖ "Cooperative Agreement between the National Park Service, Wyoming Department of Transportation, and the City of Jackson” *Town of Jackson (WY)* Web. 2 July, 2013
[http://www.townofjackson.com/resources/files//Government/F.%20Meeting%20Agendas/Council%20Packets/2013/032513sp/WYDOT%20COOPERATIVE%20AGREEMENT%20Jackson%20\(ACD%20revisions%203%2022%2013\).pdf](http://www.townofjackson.com/resources/files//Government/F.%20Meeting%20Agendas/Council%20Packets/2013/032513sp/WYDOT%20COOPERATIVE%20AGREEMENT%20Jackson%20(ACD%20revisions%203%2022%2013).pdf)
 Agreement between the National Park Service, Wyoming Department of Transportation, and the City of Jackson for snow plowing.

- ❖ “Montana Department of Transportation Snow Plowing and Maintenance Agreement for maintenance responsibilities” *The City of Bozeman (MT)* Web. 2 July 2013.
<http://weblink.bozeman.net/WebLink8/0/doc/50537/Page1.aspx>
 Informal agreement between Montana Department of Transportation, Gallatin County and the City of Bozeman for street and snow plowing and maintenance.