2017 WASHINGTON STATE MUNICIPAL STORMWATER REPORT

Seattle Section of the American Society of Civil Engineers

ASCE
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EXECUTIVE SUMMARY

This Municipal Stormwater Infrastructure Report summarizes the results of a survey that was distributed to 237 Washington cities and counties in 2013 to evaluate and better understand the status of stormwater infrastructure in the State of Washington. Stormwater infrastructure consists of the conveyance, storage and treatment facilities that are constructed to reduce flooding and remove pollutants before discharging to surface waters such as rivers, lakes, creeks, and Puget Sound. These drainage facilities serve both public and private properties, and drain and protect roads and highways, housing developments, shopping centers, and industrial facilities. These facilities also protect downstream aquatic habitat and the overall health of surface waters.

To date, minimal data has been collected and reported to evaluate the overall status of existing stormwater infrastructure. The purpose of this survey was to collect data from municipalities from across the state to assess the state of stormwater infrastructure that is owned or operated by cities and counties as well as the status of private stormwater infrastructure. Eighty one municipalities responded and the results indicate there is a significant amount of work that needs to be done to reduce flooding and remove pollutants from surface waters. While new development in urban areas is required to meet strict standards, the survey found that a significant funding shortfall exists for retrofitting and maintaining existing aging infrastructure to meet current standards.

METHODOLOGY

The survey was intended to provide a broad overview of infrastructure across Washington State. It was expected that not all municipalities would have detailed stormwater information available, and to encourage participation, the survey questions asked municipalities to rate infrastructure in general categories (e.g. good, fair, or poor condition). The responses received were from a wide range of populations, from small rural communities to large cities. The survey responses were divided into population categories that were selected to be representative of the current population distribution for cities and counties across the State of Washington.

The survey results were compiled and analyzed using criteria provided by the American Society of Civil Engineers (ASCE) for Infrastructure Report Cards. Questions were divided into five categories; capacity, condition, funding, operations and maintenance, and public safety. The report is intended to be informative and easy to understand, and provides recommendations to improve the condition of stormwater infrastructure. Professional peer reviewers were selected to validate and interpret the findings and provide an expert review both in terms of the substance of the content and recommendations for action.

FINDINGS

The lack of funding to retrofit existing infrastructure to current standards is a major concern for municipalities, including funding for maintenance and replacement of existing infrastructure. Based on the survey results, few municipalities have the resources to identify, plan, and fund the long-term replacement of existing piping and associated stormwater infrastructure. It should be noted that while the survey asked municipalities to answer various questions related to the overall condition of their

stormwater infrastructure, only about one-third stated that they had asset management systems in place. No matter whether detailed information was available or not, most municipalities identified a backlog of maintenance and proposed capital improvement projects.

The maintenance of stormwater infrastructure on private property is another area that challenges municipalities. Private property owners are often unaware of how their stormwater infrastructure operates and impacts downstream areas, much less the need to budget for future maintenance and replacement. The future needs of stormwater infrastructure include significant challenges for both municipalities and private property owners. Based on the survey results, municipalities need to work towards instituting asset management programs to be able to plan for the future and determine the best use of limited resources. In addition, private property owners will need to be educated to properly budget and plan for future maintenance and infrastructure replacement. The survey results show that in order to accomplish these tasks, additional funding and resources need to be provided beyond what is available today.

Some of the key findings from the survey results include;

- Two thirds of respondents stated that less than 35% of their public stormwater infrastructure drains to flow control facilities designed to standards intended to support healthy aquatic ecosystems.
- 70% of respondents rated the overall condition of their public stormwater infrastructures as fair or poor.
- Only 17% of respondents reported that they have adequate funding to meet the minimum standards for stormwater infrastructure.
- 50% of respondents stated they do not have adequate funding for routine maintenance activities such as inspecting and cleaning stormwater infrastructure.
- 36 jurisdictions identified a backlog of 515 projects that are unfunded, with a total cost of close to $1 billion. Based on this data, the backlog of stormwater infrastructure projects across the state could be in the range of $6 billion.

Overall, the information collected during the 2013 survey was useful in making an initial assessment of the state of municipal stormwater infrastructure and funding needs.

Further studies would be helpful to better understand the issues municipalities are facing and determine what additional resources are needed to both maintain existing infrastructure and build new facilities to meet the current standards intended to protect downstream surface waters.

RECOMMENDATIONS

The survey results show that additional data is needed to better understand the status of stormwater infrastructure in the State of Washington. This could be accomplished with more collaboration between municipalities and elected officials to support and identify additional stormwater infrastructure resources and funding options to protect surface waters. Currently stormwater infrastructure is funded by a combination of local stormwater utility fees, state and federal grants, but these sources are inadequate to fund the backlog of needed improvements to retrofit existing infrastructure to current standards.

Another recommendation is to investigate regional solutions that could enable smaller municipalities, with very limited staff and funding, to develop partnerships with larger jurisdictions that have more resources available. Additionally, a regional education program for owners and managers of private stormwater infrastructure including homeowners associations, commercial, and industrial properties would help owners better understand stormwater impacts to downstream waterways and implement long-term strategies to maintain their stormwater systems.

Lastly, educating the public about the importance of stormwater infrastructure and the role that stormwater utility fees play in funding programs and construction projects should be a priority. While most municipalities have stormwater utility fees, they are insufficient and there is uncertainty whether future rate increases will be able to keep pace with the backlog of maintenance and retrofit needs.

WASHINGTON STATE MUNICIPAL STORMWATER INFRASTRUCTURE REPORT

Stormwater runoff is rain or snow melt that runs off surfaces such as roads, parking areas, rooftops, and landscaped areas. Stormwater infrastructure consists of the conveyance, storage and treatment facilities that are constructed to reduce flooding and remove pollutants before discharging to surface waters such as rivers, lakes, creeks, and Puget Sound. These drainage facilities serve both public and private properties such as roads and highways, housing developments, shopping centers and industrial facilities. The Washington State Department of Ecology (Ecology) enforces the requirements of the Clean Water Act, which created a permit program for municipalities, industrial facilities, and large construction sites. Most cities and counties are now regulated by Ecology, and are required to ensure that new public and private stormwater infrastructure meets strict state standards. The Washington State Department of Transportation, which manages highways and freeways thought the state, is also required to meet these strict standards. To date, minimal data has been collected and reported to evaluate the overall status of existing public or private stormwater infrastructure. Because this infrastructure is typically managed at the local level, this report focuses on municipalities and is based on a survey that was sent out to 237 Washington cities and counties in 2013. Approximately one-third responded and the results indicate a significant amount of work is needed to protect and restore Washington creeks, rivers, lakes and coastal resources including Puget Sound. While new development in urban areas is required to meet strict standards, a funding shortfall exists for retrofitting and maintaining existing aging infrastructure to current standards.

OVERVIEW

Historically, stormwater infrastructure was constructed as properties were developed with the goal of quickly conveying stormwater runoff away from an area to control flooding and reduce property damage. Streams were often rerouted or diverted into pipes to maximize the use of the land, and wetlands and low areas were filled in. As land development progresses through time, the associated increase in impervious surfaces such as roads, parking lots, and rooftops generate much more stormwater runoff than natural forest or vegetation. Unless this runoff is managed properly, natural waterways

Stormwater Treatment Pond

and wetlands are degraded in correlation to the increases in developed land, and the watershed and downstream receiving waters suffer negative impacts such as flooding, pollution, and the erosion of stream channels.

To address these issues King County developed one of the first stormwater design manuals for Washington State in 1979. Today it is generally accepted that stormwater facilities constructed using this manual were undersized and provided inadequate downstream benefits. In 1992, the Washington State Department of Ecology released its first guidance manual, the Stormwater Management Manual for the Puget Sound Basin. This manual has been updated several times and there are now two versions in use, the 2014 Stormwater Management Manual for Western Washington and the 2004 Stormwater Management Manual for Eastern Washington. The King County manual has been updated several times, and other local jurisdictions have created and continue to update their own manuals that are equivalent to the Ecology manuals and also reflect local regulations.

Stormwater Treatment Pond

IS YOUR JURISDICTION COVERED BY THE NPDES MUNICIPAL STORMWATER PERMIT?

YES 57 **NO** 20

Stormwater infrastructure was largely unregulated as compared to other utilities until the 1987 amendments of the Federal Clean Water Act were passed, which provided the statutory basis for the National Pollutant Discharge Elimination System (NPDES) Permit Program. The NPDES program requires stormwater permits for industrial, construction, and municipal activities that discharge to surface waters. All of these permits are intended to reduce pollutants from entering waterways to the "maximum extent practicable". Municipalities are also required to create and implement comprehensive stormwater programs that address planning, public education and involvement, illicit discharge detection and elimination, development and construction, and city operations. This includes adopting ordinances to regulate development and stormwater discharges.

The first Phase I NPDES municipal stormwater permit was issued by Ecology in 1995 for local jurisdictions serving populations over 100,000, and included the cities of Tacoma and Seattle, as well as Snohomish, King and Pierce Counties, with Clark County being added in 1999. Phase II significantly expanded the permit coverage to include smaller cities and counties, and now 112 cities and counties in Washington are covered. New stormwater infrastructure associated with both public and private development in these municipalities is required to meet the standards in the appropriate Ecology stormwater manual or an equivalent approved manual. Under the current permits, municipalities are required to use low impact development (LID) techniques where feasible with the goal of designing new stormwater infrastructure to mimic natural conditions more closely than conventional engineered facilities.

Definitions:

Flow Control Facilities: A drainage facility designed to mitigate the impacts of increased surface and storm water runoff generated by site development. Flow control facilities are designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground, or to hold runoff a short period of time and then release it to the conveyance system.

Water Quality Treatment Facilities: A drainage facility designed to reduce pollutants once they are already contained in surface and stormwater runoff. Water quality treatment facilities are the structural component of best management practices (BMPs); when used singly or in combination, water quality facilities reduce the potential for contamination of surface and/or ground waters.–*Source: King County.*

METHODOLOGY

To assess the status of municipal stormwater infrastructure in Washington, the Seattle Section of the American Society of Civil Engineers (ASCE) prepared a survey. The survey questions were categorized to align with the ASCE State Infrastructure Report Cards. Questions were divided into five categories; capacity, condition, funding, operations and maintenance, and public safety. It was decided to make the questions fairly broad in scope as it was expected that many municipalities would not have detailed information available and would be less likely to respond if the questions were too specific. For example, several questions asked respondents to rate the condition of their infrastructure as good, fair, or poor. Answering good assumed that the overall condition is adequate, while fair means it needs improvement, and poor indicated the system is inadequate. The draft survey questions were presented to the American Public Works Association Washington Stormwater Managers Committee, and were revised based on feedback from the group.

Population	Survey Responses	Surveys Sent	Percent Response
<15,000	38	150	25%
15,000-60,000	30	62	48%
60,000-	5	11	45%
>100,000	8	14	57%
Total	**81**	**237**	**34%**

Table 1: Survey Response

The survey was distributed in February 2013 by the Association of Washington Cities (AWC) to 237 cities and counties across the state. The overall response rate was 34% as shown in Table 1. Surveys were completed by municipalities ranging across the population spectrum, and were received from across the state. Of the 81 responses, 10 were from counties that ranged from small rural to large urban jurisdictions. Seventy-five percent or 57 of these participants are covered under a NPDES permit.

The results were broken down into population categories in order to identify any significant differences related to the size of the population the local government serves. Further comparisons between cities and counties or between Eastern and Western Washington were determined to be beyond the scope of this report.

As a first attempt in collecting this type of information, the overall survey response was considered to be adequate to draw conclusions and make general recommendations.

CAPACITY

Capacity is defined as the ability of the system to meet current and future demands. In the past, stormwater capacity focused on constructing ditches and pipes to convey stormwater quickly away from developed areas in order to minimize flooding and the associated property damage. Current regulations under the NPDES municipal permits are far more complex and focus on reducing the amount of pollutants in stormwater runoff

What percentage of your public stormwater infrastructure (MS4) drains to flow control facilities before discharging to surface waters?	0-35%	35-70%	70-100%	Don't Know
<15,000	28	4	2	3
15,000-60,000	16	8	4	2
60,000-100,000	4	-	1	-
>100,000	5	1	-	2

Table 2: Survey Question 14

and controlling erosion caused by the increased flows resulting from increases in the amount of impervious surface. In addition to conveyance systems, stormwater infrastructure also includes ponds, vaults, tanks and a variety of other structures and technologies that are designed to control downstream flows and provide treatment. These facilities help protect aquatic habitat and other beneficial uses such as swimming and fishing.

Based on the 2013 survey results, two-thirds of the respondents reported that less than 35% of their public stormwater infrastructure drains to flow control facilities that have been designed to standards that are intended to support healthy aquatic ecosystems. Less than 10% responded that the majority of public stormwater facilities drain to flow control facilities before discharging to surface waters.

What percentage of your private stormwater infrastructure drains to water quality treatment facilities before discharging to surface waters?	0-35%	35-70%	70-100%	Don't Know
<15,000	20	5	7	4
15,000-60,000	15	7	4	4
60,000-100,000	3	-	1	1
>100,000	5	1	-	2

Table 3: Survey Question 15

A similar question about private stormwater facilities and water quality treatment facilities fared slightly better. Just over half of respondents stated that less than 35% of their private stormwater infrastructure drains to water quality treatment facilities. Fourteen percent responded that they did not know, which suggests that jurisdictions are not as familiar with private infrastructure.

Another capacity question was related to combined sewer systems, which are wastewater collection systems designed to convey sanitary sewer wastewater and stormwater in a single piping system to a wastewater treatment plant. During periods of heavy rain or snowmelt, the capacity of these systems can be exceeded and combined sewer overflows (CSOs) discharge untreated sewage mixed with stormwater directly into water bodies including lakes, rivers, and Puget Sound. Eleven jurisdictions reported that they had a combined sewer system but not all of them are included on Ecology's list of regulated CSO communities. All respondents indicated that annual overflows were in the 0-5 range, with one reporting 5-50.

How many combined sewer overflows occur to surface water each year?	0-5	5-50	>50
<15,000	5	-	-
15,000-60,000	5	-	-
60,000-100,000	1	-	-
>100,000	1	1	-

Table 4: Survey Question 10

Several of the cities with regulated combined sewer overflow outfalls did not complete the survey, including Seattle and King County. The City of Seattle website states that each year, on average, more than 300 sewage overflows send millions of gallons of raw sewage and stormwater flow into Seattle waters. Seattle and King County are both operating under a consent decree with the Environmental Protection Agency, the Department of Justice, and Ecology to reduce combined sewer overflows.

Do you have a capital improvement program that includes storm/surface water infrastructure needs?	Yes	No
<15,000	20	15
15,000-60,000	26	2
60,000-100,000	3	1
>100,000	7	-

Table 5: Survey Question 29

This question was not comprehensive enough and did not provide enough context to be able to draw any conclusions other than that combined sewer overflows are occurring.

The last question related to capacity asked if they had a Capital Improvement Program (CIP) in place. A CIP is a public infrastructure planning program that municipalities use to identify infrastructure improvement needs and the level of funding required. Approximately 70% of respondents stated that they have a CIP in place. The smaller population sizes were less likely to have a CIP, most likely due to a limited tax base and resources.

Stormwater Manhole

CONDITION

Condition relates to the physical condition, state of readiness, and reliability of existing stormwater infrastructure. Jurisdictions were asked to rate the overall condition of their public and private stormwater systems in four questions.

Seventy percent of respondents rated the overall condition of their public stormwater systems as fair or poor, while the remaining 30% rated the overall condition of public systems as good. Most jurisdictions across all population ranges indicated that their public stormwater infrastructure needs improvement.

How would you rate the overall condition of your public stormwater system?	Poor	Fair	Good
<15,000	3	24	10
15,000-60,000	-	18	12
60,000-100,000	1	2	2
>100,000	-	8	-

Table 6: Survey Question 5

Ratings for the overall condition of private stormwater infrastructure were slightly lower, with 83% stating fair or poor. This was expected since property owners are responsible for maintaining stormwater facilities and not all private owners maintain a budget for this purpose or are even aware of the need to maintain them. However, private stormwater system maintenance has improved since the Phase I permit started requiring municipalities to inspect private facilities and enforce penalties against those who fail to perform the needed maintenance. For Phase II jurisdictions, they are only required to inspect new private stormwater facilities constructed since 2010, although many have had private stormwater inspection programs for many years.

How would you rate the overall condition of your private stormwater system?	Poor	Fair	Good
<15,000	4	26	7
15,000-60,000	2	23	5
60,000-100,000	-	4	1
>100,000	2	5	1

Table 7: Survey Question 6

Another question related to condition asked jurisdictions to estimate the percentage of their public and private stormwater infrastructure that is in good condition. Approximately 33% responded that 70-100% of public infrastructure was in good condition while only 17% responded that 70-100% of private infrastructure was in good condition. Overall, public drainage facilities are rated to be in

What percentage of your public stormwater infrastructure is in good (i.e. adequate) condition?	0-35%	35-70%	70-100%	Don't Know
<15,000	9	17	9	1
15,000-60,000	2	14	11	3
60,000-100,000	1	2	1	1
>100,000	1	2	4	-

Table 8: Survey Question 17

What percentage of your private stormwater infrastructure is in good (i.e. adequate) condition?	0-35%	35-70%	70-100%	Don't Know
<15,000	8	12	6	10
15,000-60,000	3	10	5	12
60,000-100,000	1	0	1	3
>100,000	0	3	2	3

Table 9: Survey Question 19

better condition than private systems. In the survey, the smaller populations indicated that a low percentage of either public or private infrastructure is in good condition. Only 6% of respondents stated they did not know what percentage of public infrastructure was in good condition, while 36% stated they did not know for private infrastructure, again suggesting that municipalities are less familiar with private systems.

Does your jurisdiction have a stormwater/surface water utility fee?	Yes	No
<15,000	19	18
15,000-60,000	27	-
60,000-100,000	5	-
>100,000	8	-
Table 10: Survey Question 26		

FUNDING

One primary source of stormwater funding is utility fees. Most municipalities charge a fee to the owners of developed properties, typically based on the amount of impervious surface on the property. This revenue is used to fund maintenance, construction, and other stormwater programs including expenditures related to the NPDES municipal permits.

Grants also provide a source of funding for stormwater infrastructure retrofits. According to an Ecology News Release in May of 2012, the Washington State Legislature provided $68 million in competitive grant funds for statewide retrofit projects including LID projects in 2012. Ecology has also provided stormwater grants to municipalities to help implement the NPDES municipal stormwater permits. According to Ecology, for the period from 2005 to 2012, local governments received $183 million for stormwater needs from state and federal funding. Other water quality grants are available that focus primarily on wastewater or stormwater-related programs such as public education and stream restoration but they are extremely limited as compared to funding for stormwater projects. Funding for stream restoration is extremely limited as compared to funding for stormwater projects.

Do you have sufficient funding for the new obligations from the upcoming NPDES Municipal Stormwater Permits?	Yes	No	Don't Know	How much additional funding do you require? (average)
<15,000	1	20	5	$ 128,000
15,000-60,000	8	12	8	$ 397,000
60,000-100,000	-	2	3	$ 370,000
>100,000	2	2	4	-
Overall Average				$ 268,000
Table 11: Survey Questions 34 and 35				

Based on the survey, 73% of the survey respondents reported they have a stormwater utility fee. The jurisdictions that did not charge a fee typically had a population of less than 15,000. Only one jurisdiction covered under an NPDES permit does not have a stormwater utility fee, while four jurisdictions that are not covered do have a stormwater utility fee.

Jurisdictions covered by NPDES permits were asked whether they have sufficient funding to meet the requirements of the current permits effective August 1, 2013 through July 31, 2018. Only 17% reported that they had adequate funding, while 83% replied that they either did not have adequate funding or did not know. Dollar amounts for those

Does your jurisdiction have sufficient funding for routine annual maintenance of your stormwater infrastructure?	Yes	No	How much additional annual funding do you require? (average)
<15,000	14	19	$ 114,000
15,000-60,000	15	8	$ 1,010,000
60,000-100,000	4	1	$ 500,000
>100,000	4	2	$ 750,000
Overall Average			$431,000
Table 12: Survey Question 32, 33			

who responded ranged from $25,000 up to $2 million with an overall average of $268,000.

Overall, municipalities are indicating there is a significant need for additional funding to meet the permit requirements. It should be noted that meeting the permit requirements is a minimum standard and may not be enough to protect against flooding or to support healthy aquatic ecosystems. There is a significant retrofit need that is not addressed by the NPDES permits.

Jurisdictions were asked if sufficient funding was available to perform routine annual maintenance for activities such as inspecting and cleaning catch basins, pipes, ditches, flow control and water quality treatment facilities. Only half of the respondents replied that they have sufficient funding, while 40% replied that they do not. The amount of additional funding needed ranged from $10,000 to $5 million annually, with a total of $10.78 million. This dollar amount indicates there is a substantial shortfall in available funding for the routine maintenance of stormwater infrastructure.

Stormwater Culvert

Jurisdictions were asked how much funding was requested in the current funding cycle for their Capital Improvement Program. Responses varied widely within the population groups, for example jurisdictions with a population less than 15,000 requested from $10,000 to $1.37 million, and in the 15,000-60,000 range, responses ranged from $53,000 to $13 million. Some of this variation may be explained by the fact that the funding cycle may not have the same time period across jurisdictions.

As a supplemental question, jurisdictions were asked if the requested funding was provided in the current funding cycle. Again, the responses varied widely with some jurisdictions receiving full funding and others receiving a small percentage of the amount requested. For example, one jurisdiction reported they requested $1.37 million and only received $45,000, which is a substantial shortfall. As with maintenance, these numbers indicate a funding deficit for stormwater infrastructure projects.

What is the dollar amount requested and funded in the current funding cycle for your Capital Improvement Program?	Total Amount Requested	Total Amount Funded	% Funded	Average Amount Requested (per jurisdiction)	Average Amount Funded (per jurisdiction)
<15,000	$ 6,351,659	$ 5,498,259	87%	$ 423,444	$ 323,427
15,000-60,000	$ 37,543,018	$ 22,918,518	61%	$ 1,632,305	$ 996,457
60,000-100,000	S 4,050,000	$ 6,037,000	149%	$ 1,350,000	$ 2,012,333
>100,000	$ 21,976,000	$ 18,276,000	83%	$ 3,139429	$ 2,610,857

Table 13: Survey Question 30, 31

The last funding question asked whether jurisdictions maintained an unfunded backlog of storm/surface water projects that are not considered routine maintenance, including capital improvement projects and rehabilitation or retrofit projects that

Do you have a backlog of storm/surface water projects that are unfunded?	Average # of Projects per Jurisdiction	Total Cost	Average Cost per Project
<15,000	14	$ 80,517,200	$ 5,751,229
15,000-60,000	14	$ 69,696,500	$ 4,978,321
60,000-100,000	29	$ 758,840,000	$ 26,166,896
>100,000	8	$ 11,500,000	$ 1,437,500

Table 14: Survey Questions 36, 37

are not considered maintenance. Thirty-six jurisdictions responded with a total of 515 identified projects that are not currently funded, with a total cost of approximately $920.5 million. If just 36 jurisdictions indicate a backlog of almost $1 billion, the total backlog of unfunded projects for all jurisdictions across the state could be in the range of $6 billion. These results are consistent with the Urban Stormwater Runoff Preliminary Needs Assessment prepared for the Puget Sound Partnership in 2010, which estimated that funding needs to retrofit stormwater infrastructure just in the Puget Sound Basin ranged from $3 billion to $16 billion.

Does your jurisdiction have a comprehensive storm and surface water management plan that includes goals and recommendations to address surface and stormwater issues such as flooding, water quality and aquatic habitat?	Yes	No
<15,000	21	13
15,000-60,000	22	6
60,000-100,000	5	-
>100,000	5	3
Has the plan been updated in the past 5 years?		
<15,000	14	6
15,000-60,000	14	8
60,000-100,000	3	2
>100,000	3	2

Table 15: Survey Questions 27, 28

OPERATION AND MAINTENANCE

Municipal stormwater infrastructure operation and maintenance programs range from reactive complaint-driven maintenance programs to sophisticated programs utilizing asset management software to track maintenance schedules and the condition of infrastructure. This is typically related to population size and the amount of available funding.

The NPDES permits include inspection and maintenance requirements for municipal catch basins and stormwater infrastructure that provides flow control and water quality treatment, and these requirements are driving municipalities to improve their maintenance programs.

The survey included six questions related to operations and maintenance, covering comprehensive management planning, mapping, and deferred maintenance.

Seventy percent of jurisdictions responding indicated they have a comprehensive management plan that includes goals and recommendations to address surface and stormwater issues such as flooding, water quality and aquatic habitat. Thirty-four jurisdictions, or 65%, had updated their plans in the last 5 years. Although over two-thirds of the respondents had a plan in place, the plans may not be as useful or relevant if they are not being updated as conditions and priorities change over time.

What percentage of your *public* stormwater infrastructure is mapped?	0-35%	35-70%	70-100%	Don't Know
<15,000	8	6	21	2
15,000-60,000	1	1	27	1
60,000-100,000	-	-	5	-
>100,000	-	-	7	1

Table 16: Survey Question 11

What percentage of your *private* stormwater infrastructure is mapped?	0-35%	35-70%	70-100%	Don't Know
<15,000	16	5	8	7
15,000-60,000	11	7	12	-
60,000-100,000	2	2	-	1
>100,000	1	1	4	2

Table 17: Survey Question 12

The NPDES permit requires mapping of certain stormwater infrastructure such as outfall locations, tributary conveyances, flow control and treatment facilities, and private connections to the public system. While there are some differences in the mapping requirements in the different NPDES

permits, typically all jurisdictions are required to have infrastructure maps. These typically range from basic maps to comprehensive database systems using geographic information systems (GIS). This is reflected in the survey, with 75% stating that 70-100% of their public stormwater infrastructure is mapped.

Do you have an asset management or other system that rates your stormwater infrastructure?	Yes	No
<15,000	5	31
15,000-60,000	10	19
60,000-100,000	3	2
>100,000	6	1

Table 18: Survey Question 16

In contrast, for private infrastructure only 35% stated that 70-100% of the stormwater infrastructure was mapped. Fourteen percent did not know what percentage was mapped, compared to 5% for public infrastructure. Since the NPDES permit only requires that connections from private stormwater facilities to the public system be mapped, it is to be expected that the percentage will be lower. The future maintenance and upkeep of infrastructure mapping will require ongoing funding as jurisdictions continue to move from paper-based systems to technology-based mapping such as GIS.

The NPDES permit requires extensive recordkeeping related to maintenance operations and inspections. Jurisdictions are increasingly investigating and using asset management systems to manage public infrastructure. Asset management systems are a data management framework, typically a database, where the components of stormwater infrastructure (e.g. pipes, catch basins) are inventoried, including the condition and importance of the asset.

What percentage of your public stormwater infrastructure has deferred maintenance or retrofit needs?	0-35%	35-70%	70-100%	Don't Know
<15,000	13	17	7	-
15,000-60,000	18	5	2	4
60,000-100,000	2	1	1	1
>100,000	3	4	-	-

Table 19: Survey Question 18

Having this data resource available helps municipalities plan maintenance and capital improvement projects more efficiently. The use of asset management systems by smaller jurisdictions is low. As population increased, so did the percentage of jurisdictions that used an asset management system, with 6 of the 7 respondents with a population greater than 100,000 having a system in place.

Jurisdictions were asked what percentage of their public infrastructure has deferred maintenance or retrofit needs. The answers varied across population groups with 19% of the smaller jurisdictions responding with 70-100% and about half responding 0-35%. More than half of the jurisdictions over 100,000 responded 35-70%. It is likely that many jurisdictions have had to reduce their budgets for operation and maintenance activities during the recent recession.

How often does your jurisdiction experience the following types of flooding:	Once every 2-5 years	Once	Less frequently than once every 10 years	Never
River or stream flooding that damages property?				
<15,000	5	10	5	9	5
15,000-60,000	3	11	5	8	3
60,000-100,000	1	3	-	-	1
>100,000	2	5	-	1	-
Caused by a failure of the stormwater infrastructure that damages property?					
<15,000	3	5	5	13	8
15,000-60,000	3	10	7	6	1
60,000-100,000	1	2	1	1	-
>100,000	1	4	1	-	-
River or stream nuisance flooding (public inconvenience only)?					
<15,000	6	11	7	6	5
15,000-60,000	13	12	-	3	2
60,000-100,000	3	1	-	-	1
>100,000	4	1	2	-	-
Nuisance flooding (public inconvenience only) caused by a failure of the stormwater infrastructure?					
<15,000	4	9	5	7	9
15,000-60,000	14	10	3	2	-
60,000-100,000	3	0	1	0	1
>100,000	4	1	1	-	-

Table 20: Survey Questions 20, 21, 22, 23

PUBLIC SAFETY

Public safety was evaluated by looking at the frequency of flooding events that cause property damage or nuisance flooding due to the failure of stormwater infrastructure. Flooding related to rivers and streams and the failure of stormwater infrastructure were addressed in separate questions.

Based on the responses, most jurisdictions experience some level of flooding from rivers and streams and also from failures of stormwater infrastructure. Slightly more than half responded that they experience river or stream flooding that damages property either annually or every 2-5 years, while two-thirds experience nuisance flooding from rivers and streams. Forty percent stated that they experience flooding caused by a failure of stormwater infrastructure that damages property either annually or once every 2-5 years, while 61% experience nuisance flooding caused by stormwater infrastructure either annually or every 2-5 years. While further investigations are needed to better understand the costs associated with flooding, it appears that both property damage and nuisance flooding are a regular occurrence for many jurisdictions as a result of inadequacies in stormwater infrastructure.

Finally, the majority of respondents stated they participate in the FEMA National Flood Insurance Program and provide current flood insurance rate maps. This federal program offers subsidized flood insurance to property owners if the jurisdiction adopts and enforces FEMA regulations.

Puget Sound Action Plan Initiatives:

- Prevention of pollution from urban stormwater runoff
- Protection and restoration of habitat
- Recovery of shellfish beds

CONCLUSIONS

The survey was useful in collecting information from cities and counties to help assess the state of municipal stormwater infrastructure. Survey responses were received from a wide range of populations across Washington State. While some questions were too limited to provide enough information to make detailed conclusions, the survey has provided a useful initial assessment of municipal stormwater infrastructure. Additional studies would be helpful to better understand the state of stormwater infrastructure and funding needs, for example the Washington State Department of Transportation (WSDOT) owns and manages a substantial amount of infrastructure across Washington. Infrastructure for industrial properties subject to the NPDES Industrial Stormwater Permit is another area where additional information would be useful in an overall assessment.

According to the survey, the primary need related to stormwater infrastructure appears to revolve around the need for additional funding. Survey responses clearly show that municipalities need additional resources to both maintain existing infrastructure and build new facilities to protect downstream receiving waters and aquatic habitats.

The Puget Sound Partnership, a State agency dedicated to leading the cleanup and restoration of Puget Sound, identifies urban stormwater runoff as the primary pollution threat to Puget Sound. The prevention of pollution from urban stormwater runoff has been identified as a strategic initiative, and near term and long term plans have been developed to ensure progress is made. The Implementation Plan for the Stormwater Strategic Initiative notes that the lack of sustainable funding for ongoing

programs is a barrier to successful implementation of the strategies in the plan. In addition, Ecology states that stormwater is the leading contributor to water quality pollution in our urban waterways. Because stormwater infrastructure is largely managed at the local level, providing additional funding for cities and counties is an important consideration in developing an overall strategy to protect and restore our streams, rivers, lakes, and marine coastal waters including the Puget Sound.

DISCUSSION OF FUTURE NEEDS

Flow Control Structure

While new stormwater infrastructure is strictly regulated in the urban areas of the state, the infrastructure for historical development and the associated increase in impervious surface was not designed and constructed to protect surface waters. This has left a significant portion of the urbanized areas of Washington without the stormwater infrastructure necessary to minimize flooding and support healthy aquatic ecosystems. This is evident in water bodies ranging from small freshwater streams to Puget Sound. King County completed a comprehensive study of the methods and costs to retrofit the Juanita Creek basin, an urbanized area draining to Lake Washington that was largely developed in the middle to late 20th century. The study estimated the cost of retrofitting the basin to be able support healthy aquatic ecosystems to be approximately $200 million per square mile, an amount that would seem to be economically unfeasible.

While the lack of funding to retrofit existing infrastructure to current standards is a major concern, the future maintenance and replacement of existing infrastructure provides another significant challenge to municipalities. Few municipalities have the resources to identify, plan, and fund the long-term replacement of existing piping and associated stormwater infrastructure. It should be noted that while the survey asked various questions related to the overall condition of their stormwater infrastructure, only about one-third stated that they had asset management systems in place. The two-thirds of respondents who do not have asset management systems likely have little detailed information about the condition of their stormwater drainage pipes and facilities. Without this information it is difficult to accurately estimate future funding needs just to maintain the current existing infrastructure, much less the retrofit needs to protect and restore beneficial uses.

The upkeep of stormwater infrastructure on private property is another area that faces challenges in the future. Private property owners and homeowner associations are often unaware of how their stormwater infrastructure operates and impacts downstream areas, much less the need to budget for future maintenance and replacement. New private infrastructure being constructed today is typically designed to minimize the design and construction costs, often without regard for the future maintenance and replacement costs. Also, private stormwater infrastructure has historically been constructed with minimal construction oversight by municipal permitting agencies, although this situation is changing due to the NPDES municipal permits.

The future needs of stormwater infrastructure include significant challenges for both municipalities and private property owners. Municipalities need to work towards instituting asset management

programs to be able to plan for the future and determine the best use of limited resources. In addition, private property owners will need to be educated to budget for future maintenance and infrastructure replacement. The ability to accomplish these tasks will require dedicated funding and resources beyond what is available today.

RECOMMENDATIONS

- Continue to educate elected officials of the need to support additional stormwater infrastructure funding to protect the surface waters of the State. While the legislature does provide funding for stormwater in the form of grants, the amount provided is relatively small compared to the need.
- Research is needed to identify additional funding sources. Stormwater infrastructure construction is funded by a combination of local stormwater utility fees, state and federal grants, but these sources are inadequate to fund the backlog of needed improvements to retrofit existing infrastructure to current standards.
- Investigate regional solutions that could enable smaller municipalities, with very limited staff and funding, to work collaboratively with larger jurisdictions that have more resources available. For example, Pierce County's CountyView Web service provides fee-based GIS services to the smaller Pierce County cities. Another example is to investigate whether municipalities with established asset management systems could provide services to smaller cities with limited resources.
- Educate the public about the importance of stormwater infrastructure funding and the role of stormwater utility fees. While most municipalities have stormwater utility fees, it is uncertain whether future rate increases will be able to keep pace with the increasing permit requirements and backlog of maintenance and retrofit needs.
- Future permits issued by the Department of Ecology should emphasize the most cost-effective strategies, treatments and technologies so that limited resources are used for the greatest benefit. Ecology is currently working on developing the 2018 NPDES Municipal Stormwater Permits.
- More data is needed to understand the status of stormwater infrastructure. Additional research is needed to develop a consistent and useful tool to collect data regarding the status of both public and private infrastructure.
- Investigate creating a regional education program targeting the owners and managers of private stormwater infrastructure, including homeowners associations, and commercial and industrial properties. The program should encourage owners to develop a long term strategy for maintaining stormwater infrastructure.

RESOURCES

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Puget Sound Partnership, 2016. The 2016 Action Agenda for Puget Sound - Implementation Plan. June 2016.

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Ecology, 2012a. Western Washington Phase I Municipal Stormwater Permit: National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Discharges from Large and Medium Municipal Separate Storm Sewer Systems. Olympia, WA. August 2012.

Ecology, 2012b. Western Washington Phase II Municipal Stormwater Permit: National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Discharges from Small Municipal Separate Storm Sewers in Western Washington. Olympia, WA. August 2012.

Ecology, 2012c. Eastern Washington Phase II Municipal Stormwater Permit: National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Discharges from Small Municipal Separate Storm Sewers in Eastern Washington. Olympia, WA. August 2012.

Bissonnette and Parametrix, 2010. Final Review Draft Task 1: Urban Stormwater Runoff Preliminary Needs Assessment Technical Memorandum. Prepared by Bissonnette Environmental Solutions, Seattle, WA and Parametrix, Bellevue, Washington for the Puget Sound Partnership. September 2010.

King County, 2012. Stormwater Retrofit Analysis for Juanita Creek Basin in the Lake Washington Watershed. Ecology Grant: G0800618. Prepared by Jeff Burkey, Mark Wilgus P.E., and Hans Berge. King County Department of Natural Resources and Parks. Water and Land Resources Division. August 2012.

Survey Questions and Results

1. Name

Anonymous

2. Job Title

Anonymous

3. City/County

Population	*Respondents*	*Number of Surveys Sent*	*Percent Response*
0-15,000	38	150	25%
15,000-60,000	30	62	48%
60,000-100,000	5	11	45%
>100,000	8	14	57%
Total	**81**	**237**	**34%**

4. Job Title

Anonymous

5. How would you rate the overall condition of your public stormwater system? (Consider the overall condition, capacity, maintenance, public safety and funding available.)

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Good (adequate)	10	12	2	0	24
Fair (needs improvement)	24	18	2	8	52
Poor (not adequate)	3	0	1	0	4
No Answer	1	0	0	0	1

6. How would you rate the overall condition of your private stormwater system? (Consider the overall condition, capacity, maintenance, public safety and funding available.)

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Good (adequate)	7	5	1	1	14
Fair (needs improvement)	26	23	4	5	58
Poor (not adequate)	4	2	0	2	8
No Answer	1	0	0	0	1

7. Is your jurisdiction covered by an NPDES Municipal Stormwater Permit?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	15	29	5	8	57
No	19	1	0	0	20
Don't know	0	0	0	0	0
No Answer	4	0	0	0	4

8. If yes, is your municipality in compliance with the NPDES Municipal Stormwater Permit?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	15	28	5	8	56
No	0	0	0	0	0
Don't Know	3	1	0	0	4
No Answer	20	1	0	0	21

9. Does your jurisdiction have a combined sewer system? (Answer yes if only a portion of your system is combined.)

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	4	5	1	1	11
No	34	25	4	7	70
Don't Know	0	0	0	0	0
No Answer	0	0	0	0	0

10. If yes, how many overflows occur to surface waters each year? (count each overflow from each individual outfall. Example: One storm event causing overflows at five outfalls counts as five overflows.)

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-5	5	5	1	1	12
5-50	0	0	0	1	1
More than 50	0	0	0	0	0
No Answer	33	25	4	6	68

11. What percentage of your public stormwater infrustructure (MS4) is mapped?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	8	1	0	0	9
35-70%	6	1	0	0	7
70-100%	21	27	5	7	60
Don't Know	2	1	0	1	4
No Answer	1	0	0	0	1

12. What percentage of your private stormwater infrustructure (MS4) is mapped?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	16	11	2	1	30
35-70%	5	7	2	1	15
70-100%	8	12	0	4	24
Don't Know	7	0	1	2	10
No Answer	2	0	0	0	2

13. What percentage of your public stormwater infrustructure (MS4) drains to surface water (as opposed to infiltrating to the ground)?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	11	1	2	3	17
35-70%	5	9	0	0	14
70-100%	19	20	3	3	45
Don't Know	2	0	0	2	4
No Answer	1	0	0	0	1

14. What percentage of your public stormwater infrustructure (MS4) drains to flow control facilities before discharging to surface waters? (Flow control facilities are those that were designed and constructed in accordance with any version of the Washington State Department of Ecology Stormwater Management Manual for Western or Eastern Washington or an equivalent manual).

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	28	16	4	5	53
35-70%	4	8	0	1	13
70-100%	2	4	1	0	7
Don't Know	3	2	0	2	7
No Answer	1	0	0	0	1

15. What percentage of your private stormwater infrustructure (MS4) drains to water quality treatment facilities before discharging to surface waters? (Water quality treatment facilities are those that were designed and constructed in accordance with any version of the Washington State Department of Ecology Stormwater Management Manual for Western or Eastern Washington or an equivalent manual).

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	20	15	3	5	43
35-70%	5	7	0	1	13
70-100%	7	4	1	0	12
Don't Know	4	4	1	2	11
No Answer	2	0	0	0	2

16. Do you have an asset management or other system that rates your public stormwater infrastructure?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	5	10	3	6	24
No	31	19	2	1	53
Don't Know	1	1	0	1	3
No Answer	1	0	0	0	1

17. What percentage of your public stormwater infrustructure is in good (i.e. adequate) condition?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	9	2	1	1	13
35-70%	17	14	2	2	35
70-100%	9	11	1	4	25
Don't Know	1	3	1	0	5
No Answer	2	0	0	1	3

18. What percentage of your public stormwater infrustructure has deferred maintenance or retrofit needs?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	13	18	2	3	36
35-70%	17	5	1	4	27
70-100%	7	2	1	0	10
Don't Know	0	4	1	0	5
No Answer	1	1	0	1	3

19. What percentage of your private stormwater infrustructure is in good (i.e. adequate) condition?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
0-35%	8	3	1	0	12
35-70%	12	10	0	3	25
70-100%	6	5	1	2	14
Don't Know	10	12	3	3	28
No Answer	2	0	0	0	2

20. How often does your jurisdiction experience river or stream flooding that damages property?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Annually	5	3	1	2	11
Once every 2-5 years	10	11	3	5	29
Once every 5-10 years	5	5	0	0	10
Less frequently than once every 10 years	9	8	0	1	18
Never	5	3	1	0	9
Unknown	3	0	0	0	3
No Answer	1	0	0	0	1

21. How often does your jurisdiction experience flooding caused by a failure of the stormwater infrastructure that damages property?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Annually	3	3	1	1	8
Once every 2-5 years	5	10	2	4	21
Once every 5-10 years	5	7	1	1	14
Less frequently than once every 10 years	13	6	1	0	20
Never	8	1	0	0	9
Don't Know	3	3	0	2	8
No Answer	1	0	0	0	1

22. How often does your jurisdiction experience river or stream nuisance flooding (public inconvenience only)?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Annually	6	13	3	4	26
Once every 2-5 years	11	12	1	1	25
Once every 5-10 years	7	0	0	2	9
Less frequently than once every 10 years	6	3	0	0	9
Never	5	2	1	0	8
Don't Know	2	0	0	1	3
No Answer	1	0	0	0	1

23. How often does your jurisdiction experience nuisance flooding (public inconvenience only) caused by a failure of the stormwater infrastructure?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Annually	4	14	3	4	25
Once every 2-5 years	9	10	0	1	20
Once every 5-10 years	5	3	1	1	10
Less frequently than once every 10 years	7	2	0	0	9
Never	9	0	1	0	10
Don't Know	2	0	0	2	4
No Answer	2	1	0	0	3

24. Does your jurisdiction participate in the FEMA National Flood Insurance Program?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	27	26	4	8	65
No	3	1	0	0	4
Don't Know	7	3	1	0	11
No Answer	1	0	0	0	1

25. Does your jurisdiction provide current flood insurance rate maps?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	17	22	4	8	51
No	11	6	0	0	17
Don't Know	9	2	1	0	12
No Answer	1	0	0	0	1

26. Does your jurisdiction have a stormwater/surface water utility fee?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	19	27	5	8	59
No	18	0	0	0	18
Don't Know	0	0	0	0	0
No Answer	1	3	0	0	4

27. Does your jurisdiction have a comprehensive storm/surface water management plan that includes goals and recommendations to address surface and stormwater issues such as flooding, water quality, and aquatic habitat?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	21	22	5	5	53
No	13	6	0	3	22
Don't Know	3	0	0	0	3
No Answer	1	2	0	0	3

28. Has the comprehensive storm/surface water management plan been updated in the last 5 years?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	14	14	3	3	34
No	6	8	2	2	18
Don't Know	4	0	0	1	5
No Answer	14	8	0	2	24

29. Do you have a capital improvement program that includes storm/surface water infrastructure needs?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	20	26	3	7	56
No	15	2	1	0	18
Don't Know	1	0	1	1	3
No Answer	2	2	0	0	4

30. If yes, what is the dollar amount requested in the current funding cycle?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
	$ 10,000	$ 53,000	$ 100,000	$ 1,000,000	**$ 69,920,677**
	$ 20,000	$ 75,000	$ 750,000	$ 1,976,000	
	$ 40,000	$ 100,000	$ 3,200,000	$ 2,500,000	
	$ 100,000	$ 250,000	**$ 4,050,000**	$ 2,500,000	
	$ 151,414	$ 350,000		$ 3,000,000	
	$ 249,000	$ 685,000		$ 4,500,000	
	$ 292,145	$ 700,000		$ 6,500,000	
	$ 300,000	$ 700,000		**$ 21,976,000**	
	$ 300,000	$ 753,000			
	$ 370,000	$ 810,000			
	$ 600,000	$ 1,000,000			
	$ 700,000	$ 1,034,268			
	$ 715,000	$ 1,132,250			
	$ 1,134,100	$ 1,195,000			
	$ 1,370,000	$ 1,200,000			
	$ 6,351,659	$ 1,400,000			
		$ 1,460,000			
		$ 1,500,000			
		$ 2,250,000			
		$ 2,600,000			
		$ 2,611,500			
		$ 2,684,000			
		$ 13,000,000			
		$ 37,543,018			

31. What is the dollar amount funded in the current funding cycle?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
	$ 5,000	$ 53,000	$ 100,000	$ 300,000	**$ 52,729,777**
	$ 10,000	$ 100,000	$ 2,737,000	$ 1,000,000	
	$ 20,000	$ 201,500	$ 3,200,000	$ 1,000,000	
	$ 35,000	$ 232,250	**$ 6,037,000**	$ 1,976,000	
	$ 40,000	$ 250,000		$ 3,000,000	
	$ 45,000	$ 270,500		$ 4,500,000	
	$ 45,000	$ 685,000		$ 6,500,000	
	$ 100,000	$ 700,000		**$ 18,276,000**	
	$ 150,000	$ 700,000			
	$ 151,414	$ 753,000			
	$ 249,000	$ 810,000			
	$ 292,145	$ 1,000,000			
	$ 300,000	$ 1,000,000			
	$ 300,000	$ 1,034,268			
	$ 370,000	$ 1,195,000			
	$ 600,000	$ 1,200,000			
	$ 2,785,700	$ 1,265,000			
	$ 5,498,259	$ 1,400,000			
		$ 1,460,000			
		$ 1,500,000			
		$ 2,250,000			
		$ 2,259,000			
		$ 2,600,000			
		$ 22,918,518			

32. Do you have sufficient funding for routine annual maintenance of your stormwater infrastructure?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	14	15	4	4	37
No	19	8	1	2	30
Don't Know	2	4	0	2	8
No Answer	3	3	0	0	6

33. If no, how much additional annual funding do you require?

Population	*15-60 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
	$ 10,000	$ 100,000	$ 500,000	$ 500,000	**$ 10,780,000**
	$ 10,000	$ 120,000	**$ 500,000**	$ 1,000,000	
	$ 10,000	$ 150,000		**$ 1,500,000**	
	$ 50,000	$ 200,000			
	$ 50,000	$ 200,000			
	$ 50,000	$ 1,300,000			
	$ 50,000	$ 5,000,000			
	$ 60,000	**$ 7,070,000**			
	$ 70,000				
	$ 100,000				
	$ 175,000				
	$ 175,000				
	$ 200,000				
	$ 200,000				
	$ 500,000				
	$ 1,710,000				

34. Do you have sufficient funding for the new obligations from the upcoming NPDES Municipal Stormwater Permits?

Population	*< 15 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
Yes	1	8	0	2	11
No	20	12	2	2	36
Don't Know	5	8	3	4	20
No Answer	12	2	0	0	14

35. If no, how much additional annual funding do you require?

Population	*15-60 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
	$ 25,000	$ 50,000	$ 370,000	$ 0	**$ 5,093,500**
	$ 50,000	$ 100,000	**$ 370,000**	**$ 0**	
	$ 70,000	$ 120,000			
	$ 100,000	$ 150,000			
	$ 100,000	$ 150,000			
	$ 108,500	$ 200,000			
	$ 150,000	$ 400,000			
	$ 200,000	$ 400,000			
	$ 350,000	$ 2,000,000			
	$ 1,153,500	**$ 3,570,000**			

36. Do you have a backlog of storm/surface water projects that are unfunded? Include capital improvement projects and rehabilitation/retrofir projecs that are not considered routine mainenance.

Number of projects:

Population	*15-60 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
	0	1	7	0	**515**
	0	2	50	3	
	0	2	**57**	10	
	0	4		12	
	0	5		**25**	
	2	5			
	3	5			
	3	6			
	5	7			
	5	11			
	5	15			
	6	20			
	7	30			
	8	35			
	11	66			
	12	**214**			
	14				
	15				
	18				
	25				
	80				
	219				

Total amount in $:

Population	*15-60 K*	*15-60 K*	*60-100 K*	*> 100 K*	*Total*
	$ 350,000	$ 500,000	$ 2,540,000	$ 1,500,000	**$ 920,553,700**
	$ 500,000	$ 1,200,000	$ 80,000,000	$ 2,500,000	
	$ 750,000	$ 1,346,500	$ 676,300,000	$ 7,500,000	
	$ 1,000,000	$ 2,000,000	**$ 758,840,000**	**$ 11,500,000**	
	$ 1,200,000	$ 2,000,000			
	$ 1,250,000	$ 2,400,000			
	$ 1,540,200	$ 3,000,000			
	$ 1,566,000	$ 3,000,000			
	$ 2,000,000	$ 3,000,000			
	$ 2,211,000	$ 4,000,000			
	$ 2,320,000	$ 5,000,000			
	$ 2,500,000	$ 6,000,000			
	$ 5,750,000	$ 11,000,000			
	$ 8,075,000	$ 12,250,000			
	$ 19,505,000	$ 13,000,000			
	$ 30,000,000	**$ 69,696,500**			
	$ 80,517,200				

ASCE SEATTLE SECTION

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ASCE GOVERNMENT RELATIONS

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SEATTLE SECTION