New Jersey Water System Asset Management Assessment

Baseline Survey Report

September 2016

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

New Jersey
Environmental Infrastructure Trust

Table of Contents

EXECUTIVE SUMMARY

New Jersey estimates the total water infrastructure investment need over the next 20 years will exceed $45[1] billion. Investment in the physical assets of a water system is necessary to maintain operations. Without this investment, there is a risk of ineffective operations and malfunction, potentially effecting not only economic activity in the State, but also potentially posing a threat to the public health and the environment as well. To address the need for timely and effective investment over the long-term, Asset Management (AM) is an approach taken by owners and operators of water systems to prioritize investment and improvements to their infrastructure in a cost-effective way that assure long-term sustainability of operations at the lowest cost.

The New Jersey Department of Environmental Protection (DEP) and its financing partner, the New Jersey Environmental Infrastructure Trust (NJEIT), are developing a long-term strategy to confirm that all clean water and drinking water systems in the State are developing and following Asset Management. Together, DEP and NJEIT developed and conducted a survey of a large segment of New Jersey's water systems[2] to broadly identify the extent to which AM is currently being used. The survey was conducted from January through May 2016. The survey addressed the basic components of AM and the results provide valuable information to all stakeholders regarding the current status of AM activity amongst the water industry in New Jersey. The results from this baseline survey will inform strategies and mechanisms for DEP/ NJEIT to assist the State's water systems in the advancement of AM.

The survey questions were developed from the core principles of AM outlined by the U.S. Environmental Protection Agency (USEPA) and inquired as to the status of each respondent's water systems with respect to select components of Asset Management, specifically:

- Asset Inventory;
- Asset Mapping;
- Condition Assessment;
- Criticality Assessment;
- Long Term Funding Strategy.

The survey response rate exceeded 75% and provided valuable insight regarding the status of AM activity amongst those systems responding. Of the systems that responded to the survey, 76% have done some inventorying of their physical assets, and 74% have mapped more than half of their assets. Furthermore, 72% of responding systems have performed a condition assessment and 53% a criticality assessment on more than half of the inventoried assets. Approximately 90% of the responding systems intend to complete some component of AM (inventory, mapping, condition assessment, criticality

[1] Based on EPA's 2011 Drinking Water Infrastructure Needs Survey and Assessment and 2008 Clean Watersheds Needs Survey

[2] For the purposes of this survey, "water systems" included community drinking water utilities serving greater than 500 residents and wastewater utilities handling greater than 2,000 gallons per day of residential waste.

assessment) during the next three (3) years. In addition, more than 70% of responding systems reported that they have a long-term strategy in place to fund asset management.

SURVEY OBJECTIVES / DESIGN

DEP and the NJEIT recognized the need to better understand the extent to which Asset Management is being used by water systems in New Jersey. With the assistance of a water industry workgroup[3], a survey was developed to answer the following questions:

- How many water systems have inventoried any of their assets?
- What assets have been mapped by water systems?
- How many water systems have done condition assessments on inventoried assets?
- How many water systems have done criticality assessments on inventoried assets?
- How many water systems have long-term funding strategies in place to supplement AM plans?
- What is the intent of water systems to conduct aspects of asset management?

The survey was kept broad and short to increase the likelihood of participation.

The survey was distributed to both drinking water and wastewater utilities as they comprise the ownership and operation of much of the State's water infrastructure. It was distributed via email to system contacts on record with DEP and included licensed operators and management contacts. As the survey was intended to be a collaborative effort between those overseeing operations and management of the water system, recipients of the survey were asked to work together, as needed, to complete the survey. Separate surveys were completed for conveyance, treatment, and distribution systems.

The survey was distributed to all public community water systems[4] serving a population greater than 500 residents and excluded "very small" water systems, which typically consist of apartment complexes and mobile home parks (368 drinking water utilities). These utilities include drinking water treatment, drinking water distribution, or both. The survey was also distributed to wastewater treatment systems that handle residential wastewater and receive more than 2,000 gallons of wastewater per day (gpd)[5]. There are 212 of these wastewater treatment systems in the State. Since wastewater collection/conveyance systems are not regulated under a specific operating permit, DEP did not have contact information for this sector. The survey was received by operators or owners of wastewater conveyance systems through a variety of other means: operators from the other sectors that did receive the survey and were also responsible for a conveyance system or forwarded the survey to those they knew were responsible for the conveyance system.

[3] The Industry Workgroup consists of drinking water and wastewater professionals representing professional associations of the New Jersey chapter of the American Water Works Association (AWWA), the New Jersey Water Environment Association (NJWEA), the Association of Environmental Authorities of New Jersey (AEA), and the New Jersey Water Association (NJWA).

[4] The New Jersey Safe Drinking Water Act Regulations (N.J.A.C. 7:10) define a "public community water system" as a system providing water to the public, serving at least 15 service connections used by year-round residents or serving at least 25 year-round residents.

[5] These are systems holding a New Jersey Pollutant Discharge Elimination System (NJPDES) permit.

DATA COLLECTED

The survey consisted of 15 questions. (A copy of the full survey can be found in the Appendix.) The first six questions gathered information about the utility that was needed to categorize responses. The following nine questions asked about asset management activity:

1. Have any of the system's assets been inventoried?

   An "asset" was defined as any component within a water system, either above or below ground that is attributed to the operation of that system, to include the components utilized in the distribution to and from that system

   a. Please provide the qualifier used to determine what assets were inventoried (for example, “assets deemed $5,000 or greater”, “critical”, “vulnerable”, etc.)

2. Which of the following percentage ranges most accurately describe how much of the system's assets have been inventoried: 1-25%; 26-50%; 51-75%; or 76-100%?

3. Of those assets that have been inventoried, have you formally assessed the condition of more than 50%?

   Condition assessment was described as involving the evaluation of the asset condition and approximate age.

4. Of those assets that have been inventoried, has a formal criticality assessment been done?

   "Criticality" was described as determining a component's significance to the continued, effective operation of the system and its consequence of failure.

5. How the inventory is tracked (check all that apply): Computer software utility management program; Spreadsheet (e.g., Microsoft Excel); Paper copy; or Other.

6. Which of the following percentage ranges most accurately reflects the amount of assets mapped in a Geographic Information System (GIS) or other schematic or blueprint: 0%; 1-25%; 26-50%; 51-75%; or 76-100%?

7. Of the assets that are mapped, in what form are they mapped (check all that apply): Spatially via GIS; Blueprint; Schematic; or Other

8. Do you intend to complete any of the above (inventory, mapping, condition assessment, criticality assessment)?

9. Is there a long-term funding strategy for asset management (i.e., O&M, rehabilitation, repair and replacement of prioritized system components, inventory and mapping, condition assessment, etc.)?

Survey participants were instructed to skip questions 8-11 (#2-5 above) if they answered “no” to question 7 (#1 above asking if the system had inventoried any of its assets).

A total of 440 systems submitted completed surveys for the four sectors: drinking water treatment systems, drinking water distribution systems, wastewater collection/conveyance systems, and wastewater treatment systems. The table below shows the number of surveys received for each sector, broken down by size. The results presented here represent 185 drinking water treatment systems, 258 drinking water conveyance systems, 173 wastewater treatment systems and 109 wastewater collection systems.

To help present the findings of the survey, data is presented by system size, as known through DEP's records. The size of drinking water systems was determined by population served:

- **Small Water System**, serving a population greater than 500 and fewer than or equal to 3,300;
- **Medium Water System**, serving a population greater than 3,301 and fewer than or equal to 10,000;
- **Large Water System**, serving a population greater than 10,000.

For wastewater systems, size was determined by the average daily flow handled in million gallons per day (MGD) by the treatment plant:

- **Small Wastewater System**, handling flows less than 0.1 MGD;
- **Medium Wastewater System**, handling flows greater than or equal to 0.1 MGD and less than 1.0 MGD;
- **Large Wastewater System**, handling flows greater than 1.0 MGD.

Not all responses could be captured in the results, due to inconsistencies with the format of some of the responses. For example, open-ended questions provided a wide variety of responses, some that were unable to be categorized due to analytical limitations. Small differences in the responses such as capitalization, spacing, and spelling made some of the responses difficult to group. Also, the results do not include results from those systems that provided an invalid DEP identification number as the survey data could not be categorized.

The results present data from the following number of systems:

Drinking Water (DW):

Size of system (population served)	**Survey Responses**	**Sector**	
Large (>10,000)	224	Distribution	126
		Treatment	98
Medium (3,301-10,000)	99	Distribution	61
		Treatment	38
Small (501-3,300)	120	Distribution	71
		Treatment	49
Total DW systems surveys	**443**	**Distribution**	**258**
		Treatment	**185**

Wastewater (WW):

Size of treatment system (flow, MGD)	Survey Responses	Sector	
Large (>1 MGD)	154	Conveyance/Collection	67
		Treatment	87
Medium (0.1-1 MGD)	58	Conveyance/Collection	21
		Treatment	37
Small (<0.1 MGD)	70	Conveyance/Collection	21
		Treatment	49
Total WW systems surveys	**282**	**Conveyance/Collection 109**	
		Treatment 173	

RESULTS

The assessment results are grouped by the components of AM: 1. inventory; 2. asset mapping; 3. condition assessment; 4. criticality assessment; and, 5. long-term funding strategy. For each data set, the survey question and the number of systems that the results reflect is presented.

1. INVENTORY:

Table 1.1: Percentage of water systems that have inventoried some of their assets

Question: Have any of the system's assets been inventoried?

DW Systems	Yes	No
Small (120)	60%	40%
Medium (99)	65%	35%
Large (224)	78%	22%
Total (443)	**70%**	**30%**
WW Systems	**Yes**	**No**
Small (70)	84%	16%
Medium (58)	79%	21%
Large (154)	88%	12%
Total (282)	**85%**	**15%**

Table 1.2: Number of water systems that are using a certain qualifier to determine what assets are inventoried.

Survey participants were asked to: Provide the qualifier used to determine what assets were inventoried (for example, "assets deemed $5,000 or greater", "critical", "vulnerable", etc.)

Note: This was a manual entry response: systems were not limited to one response. Since a number of systems gave more than one qualifier that is used to determine which assets are prioritized for inventories, the data is not represented as a percentage.

DW systems	$500 or greater	$1,000 or greater	$2,000-$5,000 or greater	$10,000 or greater	Critical/ Vulnerable	All Assets	Other**
Small (60)	1	28	14	0	14	9	2
Medium (56)	2	22	9	1	15	11	0
Large (150)	2	47	24	4	51	20	10
Total (266)	**5**	**97**	**47**	**5**	**80**	**40**	**12**
WW systems	**$500 or greater**	**$1,000 or greater**	**$2,000-$5,000 or greater**	**$10,000 or greater**	**Critical/ Vulnerable**	**All Assets**	**Other****
Small (58)	**0**	**37**	**9**	**0**	**40**	**1**	**33**
Medium (45)	**2**	**18**	**6**	**0**	**22**	**2**	**16**
Large (121)	**5**	**14**	**39**	**2**	**37**	**17**	**29**
Total (224)	**7**	**69**	**54**	**2**	**99**	**20**	**78**

Table 1.3: Percentage of systems that have inventoried a certain proportion of their total assets

Question: Which of the following percentage ranges most accurately describe how much of the system's assets have been inventoried?

Note: Systems were instructed to skip this question if they have not done any asset inventorying.

DW Systems	1-25%	26-50%	51-75%	76-100%
Small (75)	8%	12%	7%	73%
Medium (62)	6%	8%	24%	61%
Large (179)	7%	7%	17%	70%
Total (316)	**7%**	**8%**	**16%**	**69%**
WW Systems	**1-25%**	**26-50%**	**51-75%**	**76-100%**
Small (64)	16%	20%	3%	61%
Medium (45)	9%	11%	13%	67%
Large (137)	3%	4%	20%	72%
Total (246)	**7%**	**10%**	**15%**	**68%**

Table 1.4: Number of systems that are using certain inventory tracking methods

Question asked: How is the inventory tracked? (Computer software utility management program (UMS), Spreadsheet, Paper copy, Other.)

Note: Systems were instructed to skip this question if they have not inventoried assets. Systems were able to select multiple responses, so the data is not represented as a percentage.

DW Systems	UMS	EXCEL	PAPER COPY	OTHER
Small (75)	27	31	33	4

Medium (65)	16	21	36	5
Large (176)	65	67	69	13
Total (316)	**108**	**119**	**138**	**22**
WW Systems	**UMS**	**EXCEL**	**PAPER COPY**	**OTHER**
Small (64)	18	18	40	3
Medium (46)	16	19	19	3
Large (134)	44	53	64	8
Total (244)	**78**	**90**	**123**	**14**

2. ASSET MAPPING:

Table 2.1: Percentage of systems that have mapped a certain proportion of their assets

Question: Which of the following percentage ranges most accurately reflects the amount of assets mapped in a Geographic Information System (GIS) or other schematic or blueprint?

DW Systems	**0**	**1-25%**	**26-50%**	**51-75%**	**76-100%**
Small (120)	15%	8%	5%	8%	63%
Medium (99)	9%	12%	4%	16%	59%
Large (224)	9%	8%	5%	14%	63%
Total (443)	**11%**	**9%**	**5%**	**13%**	**62%**
WW Systems	**0**	**1-25%**	**26-50%**	**51-75%**	**76-100%**
Small (70)	9%	14%	11%	3%	63%
Medium (58)	19%	5%	10%	10%	55%
Large (154)	8%	7%	5%	14%	66%
Total (282)	**11%**	**9%**	**7%**	**10%**	**63%**

Table 2.2: Number of systems that are using certain mechanisms to map their assets

Question: Of the assets that are mapped, in what form are they mapped? (Spatially via GIS, Blueprint, Schematic, Other)

Note: Systems were able to select multiple responses so the data is not represented as a percentage.

DW Systems	**GIS**	**Blueprint**	**Schematic**	**Other**
Small (120)	33	52	35	12
Medium (99)	33	51	28	10
Large (224)	111	112	77	13
Total (443)	**177**	**215**	**140**	**35**
WW Systems	**GIS**	**Blueprint**	**Schematic**	**Other**
Small (70)	19	36	41	6
Medium (58)	11	40	23	5
Large (154)	55	96	60	15
Total (282)	**85**	**172**	**124**	**26**

3. CONDITION ASSESSMENT:

Table 3.1: Percentage of systems that have done a condition assessment of more than half their inventoried assets

Question: Of those assets that have been inventoried, have you formally assessed the condition of more than 50%?

Note: Systems were instructed to skip this question if they have not inventoried assets.

DW Systems	Yes	No
Small (75)	59%	41%
Medium (62)	76%	24%
Large (177)	71%	29%
Total (314)	**69%**	**31%**
WW Systems	**Yes**	**No**
Small (65)	83%	17%
Medium (46)	76%	24%
Large (135)	71%	29%
Total (246)	**75%**	**25%**

4. CRITICALITY ASSESSMENT:

Table 4.1: Percentage of systems that have done a criticality assessment of more than half of their assets

Question: Of those assets that have been inventoried, has a formal criticality assessment been done?

Note: Systems were instructed to skip this question if they have not inventoried assets.

DW Systems	Yes	No
Small (75)	47%	53%
Medium (63)	51%	49%
Large (177)	51%	49%
Total (315)	**50%**	**50%**
WW Systems	**Yes**	**No**
Small (62)	79%	21%
Medium (45)	62%	38%
Large (134)	46%	54%
Total (241)	**58%**	**42%**

5. LONG-TERM FUNDING STRATEGY:

Table 5.1: Percentage of systems that have a strategy to fund aspects of Asset Management

Question: Is there a long-term funding strategy for asset management? (i.e. O&M, rehabilitation, repair and replacement of prioritized system components, inventory and mapping, condition assessment, etc.)

DW Systems	Yes	No
Small (120)	54%	46%
Medium (99)	67%	33%
Large (224)	78%	22%
Total (443)	**69%**	**31%**
WW Systems	**Yes**	**No**
Small (70)	66%	34%
Medium (58)	72%	28%
Large (154)	82%	18%
Total (282)	**76%**	**24%**

Table 5.2: Number of systems that intend to complete aspects of Asset Management (A) and the estimated timeframe (B)

Question: Do you intend to complete any of the above (inventory, mapping, condition assessment, criticality assessment)? Please indicate when you plan to complete. (If no blocks are checked after a specific entry, it is assumed you will not be completing this task.)

A.

DW Systems	Yes	No
Small (120)	73%	28%
Medium (99)	80%	20%
Large (224)	82%	18%
TOTAL (443)	**79%**	**21%**
WW Systems	**Yes**	**No**
Small (70)	63%	37%
Medium (58)	81%	19%
Large (154)	85%	15%
TOTAL (282)	**79%**	**21%**

B.

DW Systems – Small	Complete	In Progress	6-12 months	1-3 years	4-6 years	7+ years
Inventory	17	20	5	24	2	0
Mapping	15	21	3	29	4	0
Condition	11	19	11	26	3	0
Criticality	10	14	15	25	2	1
DW Systems - Medium	Complete	In Progress	6-12 months	1-3 years	4-6 years	7+ years
Inventory	10	19	5	20	3	1
Mapping	12	16	3	19	5	4
Condition	7	20	5	16	8	2
Criticality	7	23	4	15	6	2

DW Systems - Large	Complete	In Progress	6-12 months	1-3 years	4-6 years	7+ years
Inventory	48	48	7	33	5	0
Mapping	57	49	5	37	1	0
Condition	20	57	17	38	7	1
Criticality	20	52	14	38	10	5
TOTAL DW	**234**	**358**	**94**	**320**	**56**	**16**
WW Systems - Small	Complete	In Progress	6-12 months	1-3 years	4-6 years	7+ years
Inventory	20	6	0	3	0	0
Mapping	19	0	0	8	0	0
Condition	21	1	0	7	0	0
Criticality	19	2	4	3	0	0
WW Systems - Medium	Complete	In Progress	6-12 months	1-3 years	4-6 years	7+ years
Inventory	11	11	7	5	3	0
Mapping	14	5	6	9	3	1
Condition	11	12	3	7	4	1
Criticality	8	12	7	5	4	1
WW Systems - Large	Complete	In Progress	6-12 months	1-3 years	4-6 years	7+ years
Inventory	45	30	5	11	8	0
Mapping	39	24	6	19	10	7
Condition	21	40	9	22	12	4
Criticality	21	34	8	28	13	0
TOTAL WW	**249**	**177**	**55**	**127**	**57**	**14**

DISCUSSION/ CONCLUSIONS

The baseline survey results provide useful knowledge of the current state of asset management work being done by water utilities in New Jersey. The results indicate that asset management programs are being implemented, or at least planned for, whether they are formalized or documented in a plan, by a majority of water systems in the State. The findings of this survey encourages DEP/ NJEIT's strategies to promote and ultimately require AM for regulated water systems.

The survey response rate far exceeded the expectations of DEP/ NJEIT and the Industry Workgroup. In the timespan of a few months, the survey – which had been distributed to over 500 regulated entities –received greater than a 75% response rate. Furthermore, the Wastewater Conveyance/Collection systems, which were not explicitly contacted (as mentioned under the "Design" section above), nevertheless accounted for 19% of the responses. The survey findings show that there is an awareness of the importance of asset management amongst New Jersey water utilities.

The survey results indicate that the priorities and processes of implementation of asset management are different for different systems and not clearly associated with the size of system. For example, the survey found that systems use a wide variety of justification (qualifiers) to determine which assets are inventoried. This was confirmed through

discussion with the Industry Workgroup who shared that prioritization of components of AM as well as prioritization of assets may depend on the system sector (distribution vs. treatment), system size, and/or infrastructure components. For example, according to the Industry Workgroup, a component that plays a critical/significant role in the operations of a system will be prioritized, even if it is of nominal dollar value.

Regardless of the qualifier(s) used, the survey found that the majority of systems responding to the survey (70% drinking water systems and 85% of wastewater systems) are inventorying their assets, and that almost 70% of them have inventoried more than 75% of their assets. In addition, 84% of all systems responding have mapped more than half of the assets they have inventoried. The method of mapping inventories assets varied among the water systems and many systems use more than one form of mapping (e.g. GIS and blueprint). Forty percent (40%) of the responding DW systems and 30% of WW systems map their assets spatially via GIS, a preferred electronic method that allows for easy data transfer. This finding may be due to the fact that it may be less useful to map vertical assets, such as a treatment plant, in GIS versus maintaining blueprints or schematics. The Industry Workgroup confirmed that most systems will prioritize spatially mapping horizontal assets, such as mains and laterals, over vertical assets.

The survey results indicate that systems are beginning the assessment phases of asset management by determining the condition of inventoried assets' prior to doing a criticality assessment of those assets. More systems have performed a condition assessment of at least 50% of their inventoried assets than have done a criticality assessment of those assets, which is consistent with much of the available guidance on asset management. About 70% of the responding systems have performed a condition assessment on more than half of their inventoried assets. And, approximately 50% of systems have conducted a criticality assessment of inventoried assets. The results also show that the size of the system is not a determinant for conducting assessment work of inventoried assets.

One of the most positive findings from the survey was that nearly 80% of all the systems surveyed intend to implement components of asset management. And even more encouraging is the finding that 90% of the responding water systems are planning to complete components of asset management within the next three years.

This is the first survey of New Jersey's water systems and the results have produced a broad baseline of the current status of asset management amongst the State's water systems. Clearly, the drinking water and wastewater systems in the State of New Jersey do appreciate the importance of proactive, prioritized investment and improvement to water infrastructure and most are at some stage in implementing an asset management program. While the funding of any such program or it components remains a large uncertainty for many of these systems, this survey and the positive response received concerning the intention to complete components of AM throughout the State, have solidified DEP and NJEIT's appreciation of the capabilities the State's water utilities to conduct asset management. The survey made clear that AM work will be unique for each system and, an AM program is most effective when it is designed by the utility.

DISCLOSURE

This survey was constructed to serve as a baseline and presents a snapshot status of asset management for only portion of water systems throughout the State. And, there is

information that the survey did not uncover in which future surveys may be able to reveal. The survey did not ask details about utilities' asset management programs, nor did it ask for detail as to why answers were chosen. For example, a key component of AM is prioritizing assets for repair, replacement, and improvement as well as capital improvements. Each system will have different justifications for prioritizing assets and this includes achieving Level of Service (LOS) goals. Systems surveyed were not asked about their prioritization of the components of asset management or how their utility-specific goals inform their priorities. As suggested in the findings, systems use a range of qualifiers to determine which assets are inventoried. The goals and metrics defined by a utility's LOS goals are expected to be equally diverse. Although it is expected that eventually all water systems' will be required to document their asset management programs, this survey specifically did not ask whether utilities had an AM Plan.

APPENDIX A: BASELINE SURVEY

Water System Baseline Data Collection Survey

State of New Jersey
Department of Environmental Protection

New Jersey
Environmental Infrastructure Trust

January 2016

1. Facility[6]/Utility Name: _____

2. PWSID/NJPDES #: _____

   Facilities having multiple NJPDES numbers should only list the number identifying the largest part/component of the system.

3. Sector for which you are completing the survey:
   (Select only one - complete a separate survey for each sector)
   - ☐ Water Distribution
   - ☐ Water Treatment
   - ☐ Wastewater Treatment
   - ☐ Wastewater Conveyance/Collection

4. Name: _____

5. Title of individuals involved in completing the survey:
   - ☐ Licensed Operator
     License Type and Operator Number: _____
   - ☐ Other. Please specify: _____

   If you have more than one License Type and Operator Number, please provide each type and number in the space provided. If you are not the Licensed Operator, please provide your title.

6. Email: _____

   A copy of the answers you have provided in this survey will be emailed to the address you provide

[6] A "**facility**" includes the primary water system and any external components such as pump houses, treatment stations, wells, etc.

7. Have any of the system's assets[7] been inventoried?
   - ☐ Yes
     If yes, please provide the qualifier used to determine what assets were inventoried. (For example: Assets deemed $5,000 or greater, critical, vulnerable, etc.) _____
   - ☐ No

*If you answered **"yes"** to question 7, please provide the additional information requested. If you answered **"no"**, you are not required to complete questions 8-11. Please continue on to question 12.*

8. Which of the following percentage ranges most accurately describes how much of the system's assets have been inventoried?
   - ☐ 1-25%
   - ☐ 26-50%
   - ☐ 51-75%
   - ☐ 76-100%

9. Of the assets that have been inventoried, have you formally assessed the condition[8] of more than 50%?
   - ☐ Yes
   - ☐ No

10. Of those assets that have been inventoried, has a criticality[9] assessment been done?
    - ☐ Yes
    - ☐ No

11. How is the inventory tracked?
    - ☐ A computer software utility management program.
    - ☐ A spreadsheet (e.g. Microsoft Excel)
    - ☐ Paper copy
    - ☐ Other. Please specify: _____

12. Which of the following percentage ranges most accurately reflects the amount of assets mapped in a Geographic Information system (GIS) or other schematic or blueprint?
    - ☐ 0%

[7] An **"asset"** is any component within a water system, either above or below ground, which is attributed to the operation of that system, to include the components utilized in the distribution to and from that system.
[8] "**Condition assessment**" is a technical evaluation based on physical inspection, approximate age, and remaining useful life. Default values may be obtained from manufacturer and industry guides for determining the age of the asset and the remaining useful life and value.
[9] "**Criticality**" is determined by a component's significance to the continued, effective operation of the system and its consequence of failure.

- 1-25%
- 26-50%
- 51-75%
- 76-100%

13. Of the assets that are mapped, in what form are they mapped?
    - Spatially via Geographic Information System (GIS)
    - Schematic
    - Blueprint
    - Other. Please specify: _____

14. Do you intend to complete any of the above (inventory, mapping, condition assessment, criticality assessment)?
    - Yes.

      If yes, please indicate when you plan to complete (*If no blocks are checked after a specific entry, it is assumed you will not be completing this task*):
    - No

	Completed	In Progress	6-12 Months	1-3 Years	4-6 Years	7+ Years
Inventory	○	○	○	○	○	○
Mapping	○	○	○	○	○	○
Condition Assessment	○	○	○	○	○	○
Criticality Assessment	○	○	○	○	○	○

15. Is there a long-term funding strategy for asset management (i.e. O&M, rehabilitation, repair and replacement of prioritized system components, inventory and mapping, condition assessment, etc.)?
    - Yes
    - No