San Antonio Water System

Sanitary Sewer Overflow Reduction Program

Condition Assessment Report

Submitted January 19, 2018
Condition Assessment Report

January 19, 2018
II. CERTIFICATION DECLARATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jeffrey J. Hady, P.E.
Vice President, Production & Treatment

1-19-2018
(Date)
# Condition Assessment Report

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IV. ACRONYMS AND ABBREVIATIONS

CCTV Closed-Circuit Television
CD Consent Decree
CMOM Capacity, Management, Operation, and Maintenance
EARZ Edwards Aquifer Recharge Zone
EPA United States Environmental Protection Agency
GIS Geographic Information System
NASSCO National Association of Sewer Service Companies
PACP Pipeline Assessment and Certification Program
SAWS San Antonio Water System
SSO Sanitary Sewer Overflow
V. INTRODUCTION

A. Purpose

On October 15, 2013 a Consent Decree (CD) between San Antonio Water System (SAWS) and the United States of America and the State of Texas was entered in Civil Action No. 5:13-cv-00666-DAE in the United States District Court for the Western District of Texas, San Antonio Division. This Condition Assessment Report was prepared and submitted pursuant to Paragraph 28 of the CD.

B. Regulatory Requirements

This Condition Assessment Report summarizes the Condition Assessment inspections completed by SAWS as of four years after the Date of Lodging pursuant to Paragraphs 23 through 28 of the CD. These Condition Assessment Requirements include Large Diameter Gravity Main Sewer inspections, Small Diameter Gravity Sewer Main Inspections and Manhole Inspections.
VI. SYSTEM-WIDE INSPECTION ACTIVITIES

A. Inspection Method Overview

In accordance with the Condition Assessment and Remediation Process and Guidelines included in Appendix C of the Consent Decree, the following inspection methods were utilized:

- Closed-circuit Television (CCTV): CCTV inspection performed within the sewer main. A video recording was made of each inspection. Defects were logged as found during the inspection in accordance with National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) standards.

- Pole Camera: CCTV inspection of a sewer main performed from an adjacent manhole using a zoom lens video camera attached to a pole that was lowered into a manhole. A video recording of each inspection was made.

- Sonar: Acoustic technology applied in submerged or partially submerged sewer mains that generated a two-dimensional profile of the submerged portion of the asset. A computer generated visual summary of the sonar data and a report measuring debris levels was generated for each inspection.

- 360-Degree Video: A means of scanning a pipeline in a continuous, non-stop run between start and end points. The scanner utilized two (2) high definition cameras with a minimum 185-degree field of view for each camera, with one camera located at the forward position of the scanner and one camera at the rear position of the scanner. Still images were stitched together and a pan and zoom profile of the asset was provided for each inspection. Defects were logged as found during the inspection in accordance with NASSCO PACP standards.

- Visual Inspections for Sewer Mains:
  - Smoke Testing: A process of forcing a mixture of air and smoke through a sewer main from an adjacent manhole and identifying areas of the main that are prone to infiltration. Photographs and data for each inspection location and potential defects identified were documented.
  - Sewer Cleaning Findings: Information collected during sewer main cleaning activities that reflected grease, root, and debris findings. Cleaning records and findings were logged for each inspection.
  - Visual Inspections also included mains that were determined to have been removed from the system, no longer in service, pending rehabilitation, or no longer met the criteria of asset groups required to be...
inspected within four (4) years of the date of lodging. Visual inspection records and findings were logged for each inspection.

- Visual Inspections for Sewer Manholes:
  - Visual Inspections: Visual inspections that documented manhole defects that required issuance of a corrective maintenance work order.

### B. Gravity Sewer Main Inspection Map

This Gravity Sewer Main Inspection Maps (Map VI.B.1 and VI.B.2) show the location of the inspections for large diameter and small diameter pipelines showing inspection method (CCTV, Pole Camera, Visual Inspection), and type of visual inspection (smoke testing, cleaning, and record updates). Maps VI.B.2.a, VI.B.2.b, VI.B.2.c, and VI.B.2.d show the same information provided on Map VI.B.2, but provide data for each of the small diameter inspection methods separately.
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VI.B.2.a Small Diameter Gravity Sewer Main Inspection Map (Smoke Testing)

Legend
- Smoke Testing
- SAWS Boundary
- Low Income Census Tracts

January 19, 2018
VI.B.2.b Small Diameter Gravity Sewer Main Inspection Map
(Cleaning Findings)
VI.B.2.c Small Diameter Gravity Sewer Main Inspection Map
(Pole Camera)

Legend

- Pole Camera
- SAWS Boundary
- Low Income Census Tracts

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VI.B.2.d Small Diameter Gravity Sewer Main Inspection Map (CCTV)

Legend
- CCTV
- SAWS Boundary
- Low Income Census Tracts
## C. Gravity Sewer Main Inspection Status

### Table VI-I: Gravity Sewer Main Inspection Progress Summary

<table>
<thead>
<tr>
<th>Asset Description</th>
<th>Inspection Method</th>
<th>Miles of Inspections Required Under CD¹</th>
<th>Miles Completed Prior to Date of Lodging³</th>
<th>Miles Completed since Date of Lodging³</th>
<th>Miles of Inspections Completed³</th>
<th>% Complete⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Diameter Gravity Sewer – EARZ*, Concrete Pipe and Clay Pipe Installed Prior to 1973</td>
<td>CCTV or other approved techniques</td>
<td>1869</td>
<td>280.76²</td>
<td>1,627.73²</td>
<td>1,908.49</td>
<td>102%</td>
</tr>
<tr>
<td>Small Diameter Gravity Sewer - Clay Pipe Installed from 1973 through 1982</td>
<td>Pole Camera, CCTV, or other approved techniques</td>
<td>410</td>
<td>47.65²</td>
<td>363.07²</td>
<td>410.72</td>
<td>100%</td>
</tr>
<tr>
<td>Small Diameter Gravity Sewer - Other Pipe¹</td>
<td>Pole Camera, CCTV, or other approved techniques</td>
<td>N/A</td>
<td>330.73</td>
<td>450.13</td>
<td>780.86</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Visual Inspection - Smoke Testing</td>
<td>N/A</td>
<td>5.63</td>
<td>1.93</td>
<td>7.56</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Visual Inspection - Mech. Proofing</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Visual Inspection - Sewer Cleaning Findings</td>
<td>N/A</td>
<td>596.44</td>
<td>1,426.09</td>
<td>2,022.53</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Visual Inspection - Dye Testing</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>N/A</td>
<td>932.81</td>
<td>1,878.15</td>
<td>2,810.96</td>
<td>N/A</td>
</tr>
<tr>
<td>Unique Subtotal⁴</td>
<td></td>
<td>2,456</td>
<td>551.42</td>
<td>1,526.58</td>
<td>2078.00</td>
<td>85%</td>
</tr>
<tr>
<td>Large Diameter Gravity Sewer</td>
<td>CCTV/other approved method</td>
<td>364</td>
<td>78.34²</td>
<td>299.20²</td>
<td>377.54</td>
<td>104%</td>
</tr>
</tbody>
</table>

*Edwards Aquifer Recharge Zone*

**Note 1:** Inspection of 100% of Small Diameter Gravity Sewer – Other Pipe is not required to be completed prior to submittal of this Report. These Inspections will be completed as part of CMOM after submittal of this Report per CD Requirements.

**Note 2:** Includes small diameter gravity sewer inspections since January 1, 2009 and large diameter gravity sewer inspections since inception of the large diameter program in 2005; if multiple inspections were performed on the same pipe, only one inspection was utilized to calculate mileage.
Note 3: Full pipe length is included in mileages.

Note 4: Since some gravity sewer mains were inspected with multiple inspection techniques, this subtotal includes unique miles of small diameter gravity sewer main inspections in order to demonstrate compliance for visual inspection.

Note 5: During the required assessment period, additional miles of pipes in some categories were identified, resulting in quantities that exceeded 100 percent of the CD four-year requirement.

D. Manhole Inspection Map

The Manhole Inspection Map (Map VI.D) shows the location of manhole inspections.
### E. Manhole Inspection Status

#### Table VI-II: Manhole Inspection Summary

<table>
<thead>
<tr>
<th>Asset Description</th>
<th>Inspection Method</th>
<th>Number of Manholes in System(^3)</th>
<th>Manholes Inspected Prior to Date of Lodging(^2)</th>
<th>Manholes Inspected Since Date of Lodging</th>
<th>Inspections Completed</th>
<th>% Complete(^1,(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manholes</td>
<td>Visual Inspection</td>
<td>101,928</td>
<td>17,856</td>
<td>37,864</td>
<td>55,720</td>
<td>55%</td>
</tr>
</tbody>
</table>

Note 1: Manhole Inspections are not required to be 100% completed prior to submittal of this Report. Manhole Inspections will be completed as part of CMOM after submittal of this report per CD Requirements.

Note 2: Includes manhole inspections since January 1, 2009.

Note 3: Number of Manhole Inspections required under the Consent Decree.
CATEGORIZATION OF SEWER MAIN AND MANHOLE CONDITION

A. Guidelines

In accordance with SAWS Condition Assessment and Remediation Program Process and Guidelines included in Appendix C of the Consent Decree, each inspection was reviewed manually, and the gravity sewer main assets were categorized using best engineering practices and best professional judgement in accordance with paragraph 8 of the Consent Decree.

Manholes were categorized based on manhole condition and age. Category A manholes were in very good condition. Category B manholes were in good condition. Category C manholes were in fair condition. Category D manholes were in poor condition. Category E manholes were in very poor condition.

B. Condition Categorization Summary

The following section describes the condition category score summary for the gravity sewer main inspections and manhole inspections. Table VII-I summarizes the condition category score for the mileage of gravity main sewer inspection performed on sewer mains and manholes documented in Section VI.C and Section VI.E, respectively.

<table>
<thead>
<tr>
<th>Condition Category</th>
<th>Miles of Small Diameter Sewer Mains&lt;sup&gt;1,2&lt;/sup&gt;</th>
<th>Miles of Large Diameter Sewer Mains&lt;sup&gt;1,3&lt;/sup&gt;</th>
<th>Number of Manholes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category A – Very Good</td>
<td>1,019.32</td>
<td>79.22</td>
<td>21,611</td>
</tr>
<tr>
<td>Category B – Good</td>
<td>415.67</td>
<td>52.72</td>
<td>32,406</td>
</tr>
<tr>
<td>Category C – Fair Condition</td>
<td>1,156.74</td>
<td>114.29</td>
<td>270</td>
</tr>
<tr>
<td>Category D – Poor</td>
<td>332.26</td>
<td>83.18</td>
<td>1,171</td>
</tr>
<tr>
<td>Category E – Very Poor</td>
<td>178.93</td>
<td>32.27</td>
<td>262</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3,102.92</td>
<td>361.68</td>
<td>55,720</td>
</tr>
</tbody>
</table>

Note 1: Full pipe length is included in mileages.
Note 2: There is a mileage difference between Table VI-I and Table VII-I because condition categorization of Small Diameter Gravity Sewer – Other Pipe was not required prior to completion of this Report; also some pipes inspected were taken out of service, were remediated, or were included in planned remediation projects prior to categorization for purposes of this Report.

Note 3: There is a mileage difference between Table VI-I and Table VII-I for Large Diameter Gravity Sewer Pipe because some pipes inspected were taken out of service, were remediated, or were included in planned remediation projects prior to categorization for purposes of this Report.

C. Maps of Condition Categories

Map VII.C.1 shows the location of the small diameter condition categories.

Map VII.C.2 shows the location of large diameter condition categories.

Map VII.C.3 shows the location of the manhole condition categories.
VII.C.1 Small Diameter Condition Categories

Legend

- A - Very Good
- B - Good
- C - Fair
- D - Poor
- E - Very Poor

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VII.C.2 Large Diameter Condition Categories

Legend
- A - Very Good
- B - Good
- C - Fair
- D - Poor
- E - Very Poor

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VII.C.3 Manhole Condition Categories

Legend

A  SAWS Boundary
B  Low Income Census Tracts
C
D
E

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GIS Division

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VIII. CONDITION ASSESSMENT RESULTS

A. Condition Assessment Guidelines

In accordance with the Condition Assessment and Remediation Process and Guidelines included in Appendix C of the Consent Decree, SAWS assigned assets with an assessed condition evaluated by qualified personnel into the Condition Assessment Result categories identified in Appendix C using the following criteria:

- Remedial Measures Alternatives Analysis:
  - All Category E pipes
  - Category D pipes except as noted below
  - Category A, B or C pipes that were included in existing sewer rehabilitation or replacement projects
  - All Category D and E manholes
- Monitoring under SAWS CMOM Program:
  - Category D pipes where inspection data clearly did not identify conditions that were likely to cause a future SSO
  - Category C pipes that had caused an SSO or that were likely to cause a future SSO, including unlined concrete pipes
- Maintenance Analysis under SAWS CMOM Program:
  - Category A and Category B pipes, with the exception of any Category A or B pipes included in an existing sewer rehabilitation or replacement project
  - Category C pipes not selected for Alternatives Analysis or Monitoring
  - Category A, B, and C manholes

During Alternatives Analysis, SAWS will utilize the guidelines in the CD, including Appendix C, SAWS Condition Assessment and Remediation Program Process and Guidelines. Outcomes from Alternatives Analysis could include point repair, pipe rehabilitation, pipe replacement, monitoring, maintenance analysis, other techniques and/or results.
B. Condition Assessment Results

<table>
<thead>
<tr>
<th>Condition Assessment Result</th>
<th>Miles of Small Diameter Sewer Mains$^{1,2}$</th>
<th>Miles of Large Diameter Sewer Mains$^{1,3}$</th>
<th>Number of Manholes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remedial Measures</td>
<td>570.71</td>
<td>153.50</td>
<td>1,433</td>
</tr>
<tr>
<td>Alternatives Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring (CMOM)</td>
<td>233.77</td>
<td>57.38</td>
<td>0</td>
</tr>
<tr>
<td>Maintenance Analysis (CMOM)</td>
<td>2,263.19</td>
<td>152.32</td>
<td>54,287</td>
</tr>
</tbody>
</table>

Note 1: Full pipe length is included in mileages.

Note 2: There is a mileage difference between Table VII-I and Table VIII-I because condition assessment of 100% of Small Diameter Gravity Sewer – Other Pipe was not required prior to completion of this Report; also some pipes categorized were taken out of service, were remediated, or were included in planned remediation projects prior to condition assessment for purposes of this Report.

Note 3: There is a mileage difference between Table VII-I and Table VIII-I for Large Diameter Gravity Sewer Pipe because some pipes categorized were taken out of service, were remediated, or were included in planned remediation projects prior to condition assessment for purposes of this Report.

C. Maps of Condition Assessment Results

The Map of Condition Assessment Results (Map VIII.C.1) shows the location of condition assessment results for small diameter pipe.

Map VIII.C.2 shows the location of condition assessment results for large diameter pipe.

Map VIII.C.3 shows the location of condition assessment results for manholes.
VIII.C.1 Small Diameter Condition Assessment Results

Legend
- Maintenance Analysis
- Monitoring
- Remedial Measures Alternatives Analysis
- SAWS Boundary
- Low Income Census Tracts

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VIII.C.3 Manhole Condition Assessment Results

Legend
- MAINTENANCE ANALYSIS (CMOM)
- REMEDIAL MEASURES/ALTERNATIVE ANALYSIS
- SAWS Boundary
- Low Income Census Tracts

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December 28, 2017

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