MUNICIPAL ENGINEERING, INC.

Engineering Excellence: Innovative Approaches / Sustainable Solutions

May 31, 2023

Mr. Michael Ambrose, Interim Town Manager
Town of Landis
312 S. Main St.
Landis, N.C. 28088

RE: Statement of Qualifications
Wastewater Asset Inventory & Assessment

Dear Mr. Ambrose:

Municipal Engineering, Inc. (MESCO) is pleased to submit our Statement of Qualifications for Professional Engineering Services associated with the development of a Wastewater Asset Inventory and Assessment for the Town of Landis. Mr. Bobby Blowe, P.E. will be your primary point of contact for questions during the RFQ selection process. He can be reached at (919) 772-5393 Office, or bblowe@mesco.com.

MESCO is a corporation headquartered in Garner, North Carolina with a branch office in Boone. Established in 1978, we have had the opportunity to complete numerous water and wastewater Asset Inventory and Analysis projects for the Town of Landis and other municipalities across North Carolina – all of which were funded by programs administered by the North Carolina Division of Water Infrastructure. As an added bonus, our ***NC HUB Certification*** will assist the Town in meeting the requirements of the ARPA program.

If selected, our engineering team will be headed by Mr. Gary Flowers, P.E. at our Garner location. Mr. Flowers will be supported by Mr. Mike Michael McAllister, Mr. Bobby Blowe, P.E. and other staff members as necessary. Each of these gentlemen has many years of experience in water and wastewater system evaluations. Our Design Engineers and Project Managers are very familiar with the new requirements of the ARPA Programs and have great working relationships with the staff.

In closing, I would like to assure you and the Town that our Project Managers and I will be available at any time you need assistance. I have the professional staff available to get started immediately and complete the project within the timeframe provided by the funding agency. We look forward to continuing our work with you and the Town of Landis.

Very truly yours,
MUNICIPAL ENGINEERING, INC.

Carol R. Woodie
Principal Owner

MESCO.COM
Licenses: F-0812 & C-586

Garner Ph: (919) 772-5393
Boone Ph: (828) 262-1767
68 Shipwash Dr., Garner, NC 27529
820 State Farm Rd., Boone, NC 28607
Garner Fx: (919) 772-1176
Boone Fx: (828) 265-2601

STATEMENT OF QUALIFICATIONS

Professional Services - Engineering Services

Wastewater Asset Inventory Analysis (AIA)

• Town of Landis, NC •

Submitted by:

Municipal Engineering, Inc.

Due: June 16, 2023

68 Shipwash Drive, Garner, NC 27529 — 820 State Farm Road, Boone, NC 28607 — www.mesco.com

TABLE OF CONTENTS

MUNICIPAL ENGINEERING INC.

A Woman Owned Business with 45 Years of Experience

INTRODUCTION – BACKGROUND INFORMATION

Municipal Engineering, Inc. (MESCO) has prepared a response to the Town of Landis' Request for Qualifications that highlights our expertise in the assessment of all aspects of Sewer Collection Systems; Sewer Lift Stations; Condition Assessments; and incorporating that information into beneficial Asset Management Plans (AMP) and Capital Improvement Plans (CIP).

Included in the following pages of this Statement of Qualifications is information on the strengths and experience of our Staff and a number of Asset Inventory and Assessment Grants that we've been involved with over the years. Many of our clients have been with the Company since its inception in 1978 and during that time we have continuously been involved in the assessment, planning, design, construction, and maintenance of their systems.

MESCO is a full-service civil engineering consulting firm headquartered in Garner, N.C., with a satellite office in Boone, N.C. Since 1978, MESCO has performed Municipal and County Infrastructure projects throughout North Carolina – including several for the Town of Landis. Our 6,500 square foot Corporate Office at 68 Shipwash Drive in Garner, N.C. employs 30 professional and support staff, and there are five professional and support staff in our Boone Office to serve our many clients in that area of the state. MESCO has demonstrated its stability and commitment to North Carolina local Governments over the past 45 years by providing consistent and quality service throughout the firm's history. We have staff with experience working on many water and wastewater related projects funded by the Division of Water Infrastructure. The Highlighted Projects listed on the following pages will demonstrate a strong background in understanding comprehensive Sewer System Design and Operation as well as experience in managing over 30 AIA grants for our clients.

MUNICIPAL ENGINEERING, INC.

A NC Hub Certified Woman Owned Business

NC Board of Examiners for Engineers and Surveyors: License # F-0812

NC Board for Licensing of Geologists: License # C-586

Federal ID # 56-2177667

Carol Woodie, Principal Owner
cwoodie@mesco.com

Headquarters

68 Shipwash Drive
Garner, NC 27529
Telephone: (919) 772-5393

Branch Office

820-B State Farm Rd.
Boone, NC 28607
Telephone: (828) 262-1767

Proudly providing Excellence in Engineering for our clients since 1978!

On January 1, 2022, **Municipal Engineering, Inc.** became a majority ***woman-owned business, or MBE,*** offering **Professional Engineering, Surveying, *and* Geology services** under the same name. As an added bonus, our ***NC HUB Certified MBE designation*** often assists our clients attain one of the goals of the American Rescue Plan Act (ARPA), as well as, other State and Federal Agencies.

As a local North Carolina consulting firm, we can provide a much higher level of client support with lower overhead than many of our competitors. Over the years, our conservative business approach has allowed MESCO to remain a strong, debt-free, and financially stable company. As the founder of MESCO, Jimmy Woodie, often says, *"There are many engineering firms that can design a project for you, but few that will offer you the level of personal attention that we do throughout the life of the project and beyond."*

MESCO staff has been involved in the preparation of budgets, performed rate and debt service analyses and assisted in the development of Capital Improvement Plans and projects based on an assessment of their systems long before the term "Asset Management Plan" was coined.

Mr. Bobby Blowe, P.E. will be the primary point of contact for the purposes of this Statement of Qualifications. He can be reached at (919) 772-5393, or bblowe@mesco.com . The Senior Project Manager / Engineer assigned to any particular project will be the primary point of contact on all other matters. The Town's primary point of contact will be provided mobile phone numbers for all key MESCO personnel involved in the Project with the invitation to call at any time!

SERVICES OFFERED

MESCO offers a full scale of civil engineering services in the areas of Water & Wastewater Treatment, Distribution, and Collection; in-house Surveying and Mapping; Rate Studies; Site Development; Stormwater; Solid Waste; Sidewalks; Permitting; Contract Administration; Construction Observation; and Funding Assistance.

MESCO has also been approved as a private consulting firm by the NC-DOT for the following disciplines: Erosion & Sediment Control Design, GPS-Technical Services, Field Data Collection-GIS, Public Water Distribution System-Utilities, Public Water Transmission Systems – Utilities, Route Location Surveys-Technical Services, Sanitary Sewer Collection System-Utilities, Sanitary Sewer Outfall System-Utilities, SUE-Technical Services, Utility Coordination-Utilities, Building Site Design-Facilities Management, Topographic Surveying-Facilities Management, Boundary Surveying-Facilities Management, and Easement Surveying-Facilities Management. Our project team also includes professionals who are certified Haested Methods Master Modelers of Water CAD and graduates of the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program.

EXPERIENCE WORKING WITH GOVERNMENT AGENCIES

Most of our clients desire some form of financial assistance to help offset the impact on the user's rate structure necessary to complete the project, and we are pleased to have assisted the Town of Landis in obtaining grant funding for this project! Each of our Senior Project Managers has extensive experience working with the State and Federal Agencies that manage financial assistance programs. Mr. Bobby Blowe, P.E. of our staff, has over 18 years of experience managing the Grant and CWSRF Programs administered by what is now the NC. Division of Water Infrastructure. He is also experienced working with other funding agencies such as EDA, USDA-Rural Development, Golden Leaf, Appalachian Regional Commission, CDBG-I, and the NC Department of Commerce. Mr. Blowe will be available to assist in the administration of the AIA grant that was recently awarded to the Town.

On April, 2022, MESCO welcomed Mr. Vincent Tomaino, P.E. to our team. Mr. Tomaino was previously the DWSRF Branch Head in the NC Division of Water Infrastructure and has over 29 years of experience in Drinking Water and Air Quality Engineering. His contributions to the development of the Division of Water Infrastructure's ARPA policies have made him an extremely valuable member of our team.

In addition, each of our Project Managers and Engineers has an excellent long-standing professional relationship with the financial and permitting personnel of the NC Division of Water Infrastructure and Division of Water Resources. Another of MESCO's more recent hires, Mr. Jay Zimmerman, P.G., joined the MESCO team in February 2021. Mr. Zimmerman is a Professional Geologist and has over 36 years of experience associated with water resource management and protection. His previous experience as the Director of the NC Division Water Resources has uniquely prepared him to oversee regulatory compliance issues for projects in the water resource program areas. We feel strongly that our team's expertise, knowledge, and experience will meet and exceed the Town's expectations.

PROPOSED PROJECT SCHEDULE

As per the Town's Letter of Intent to Fund, AIA projects funded through the Division of Water Infrastructure (DWI) are required to submit a preliminary project scope, cost estimate and schedule for approval prior to incurring cost. Upon approval of the project scope, there is generally a two-year window for the project to be completed. MESCO begins each Project with a kick-off meeting with the Client. The meeting with the Client usually includes a senior-level project/client manager and project engineer to ensure that we clearly understand the scope of work to be performed and the Client's expectations. Having assisted in the preparation of a funding application for this project, we feel that we fully understand the scope of work envisioned by the Town. We understand that this project was funded with ARPA dollars and, as such, must be completed within 2 years from the date of grant award, but no later than December 31, 2026.

A preliminary project scope and schedule is as follows:

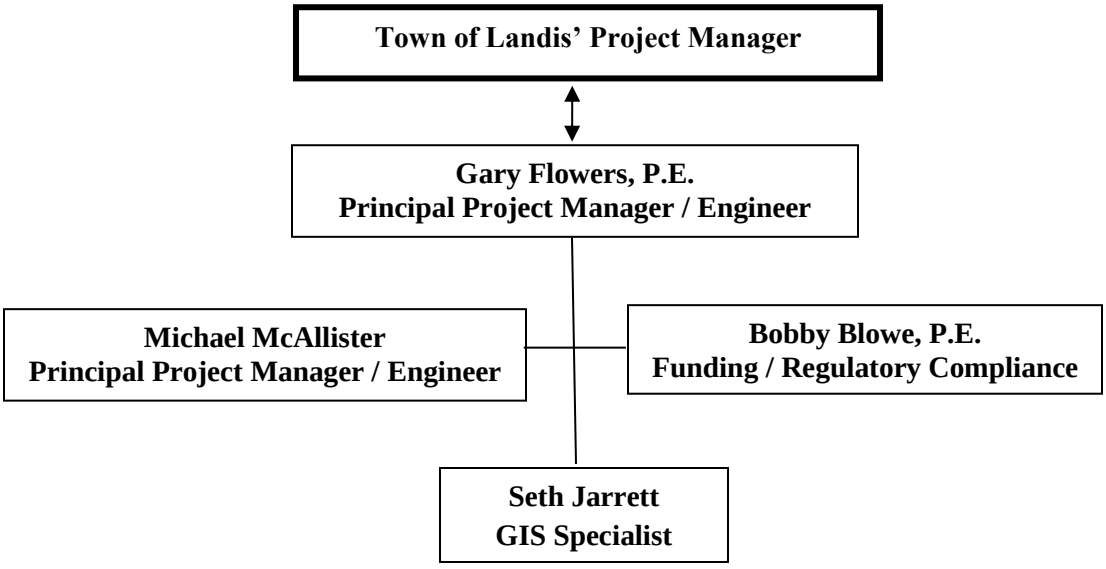
TASK	DURATION (MONTHS)	MILESTONE DATES
Project Management	24	July 2023 through June 2025
Sewer Lift Station Inspection / Evaluation / Technical Memorandum	8	Jan 2024 through Aug 2024
CCTV and Condition Assessments	12	Sept 2023 through Aug 2024
Asset Management Plan Update	6	Aug 2024 through Jan 2025
CIP Project Development / 10-yr update	5	Jan 2025 through May 2025
Receive Deliverables/Project Closeout	2	May 2025 through June 2025

QUALIFICATIONS OF INDIVIDUAL TEAM MEMBERS

All project planning and design services for the Town of Landis will be managed from our Corporate Office located at 68 Shipwash Drive near Garner, NC, 27529. Our Corporate Office employs 30 professional, administrative, and support personnel.

MESCO has a number of highly qualified Senior Project Managers / Design Engineers that will be available to participate as part of a Project Team based upon the individual experience, and/or desires of the Client. The Overall Project Management Team will likely be headed by Gary Flowers, P.E., with engineering and management support from Mike McAllister, Bobby Blowe, P.E., and Seth Jarrett. These are the individuals that the Town's staff will actually be meeting and working with throughout the life of this project. These gentlemen will be supported by a plethora of technical and administrative support personnel, as well as having access to other professionals within our organization.

O-CHART OF PROPOSED KEY PROJECT TEAM MEMBERS



Gary Flowers, P.E.
NC Professional Engineer # 20148
NASSCO Certified in Pipeline Condition Assessment, Manhole Condition Assessment and Lateral Condition Assessment.

Mr. Flowers has over 30 years of experience in water and wastewater infrastructure projects. He graduated from NC State University in 1991 with a BS in Civil Engineering. Mr. Flowers joined MESCO in February 2016 after 8 1/2 years with WK Dickson & Co. Prior to that, Mr. Flowers spent 2-1/2 years with Earth Tech and 19 years with Peirson & Whitman Architects and Engineers. During that time, Mr. Flowers personally managed the design and construction of over $105,000,000 in municipal infrastructure projects involving over 225 miles of pipeline (new and rehabilitation), pump stations, roadways, elevated tanks and utility relocation projects. He has also managed

over a dozen Water & Sewer AIA projects for our clients, including the previous Water and Sewer AIA projects for the Town of Landis.

Bobby Blowe, P.E.
NC Professional Engineer #19677

Regulatory Compliance – Water Resources. Mr. Blowe has a BS Degree in Civil Engineering from NC State University and has over eight years with MESCO. He is also a licensed NC General Contractor and is licensed in NC Plumbing/HVAC (Plumbing-Class 1, H-1, H-2 & H-3). Mr. Blowe continually monitors changes in rules and regulations (both proposed and implemented), so MESCO can be "ahead of the game" in keeping our clients compliant. Mr. Blowe came to MESCO from the North Carolina Rural Economic Development Center (5 years) and NC Department of Environmental Quality (30 years). Mr. Blowe's experience meshes well with MESCO because of his work managing the NC Clean Water State Revolving Fund Program and the Construction Grants & Loans Section for 19 years.

Mike McAllister

Mr. McAllister has been employed by MESCO as a Principal Engineering Project Manager since April, 2011. He has a **Civil Engineering Technology Degree from Wilson Technical Community College and studied Civil Engineering at North Carolina State University.** Mr. McAllister has over 40 years of experience in municipal and industrial wastewater treatment and collection system design, municipal water distribution and treatment design; civil / site design permitting, environmental assessments, project funding, project management, surveying and construction administration.

Mr. McAllister is currently working on a number of water and wastewater related American Rescue Plan Act (ARPA) projects for our clients and represents the Town of Kenly on the Lower Neuse River Basin Association. He has also managed, or is managing, over a dozen Water & Sewer AIA projects for our clients. In addition, he has provided planning, design, permitting and project management services for many conventional and land application type wastewater treatment projects during his career. Mr. McAllister has also been successful in assisting clients navigate technical agency requirements imposed by CAMA, DWI, USDA, EDA, Golden Leaf, the NC Department of Commerce, CDBG, FEMA, and more recently, ARPA funding.

Seth Jarrett
GIS Specialist

Mr. Jarrett has a BS in Geography from Appalachian State University and a Certificate in Geographic Information Systems. He started with MESCO upon his graduation in 2016. He is experienced in GIS and Remote Sensing, data collection and management, spatial analysis, LiDAR point cloud data, both vector and raster data, geo-computation, and floodplain mapping. He is also experienced in field surveying with Total Station

and Trimble GNSS. He has provided GIS mapping for many of our clients' water distribution and wastewater collection systems.

Some of Mr. Jarrett's recent related projects include: *Water and Sewer Asset Inventory and Assessment* projects for the Towns of Landis, Warrenton, Old Fort, Murfreesboro, Louisburg, Kenly, Ayden, Fremont, Jamesville, Kinston, Bunn, North Wilkesboro, Micro, River Bend, Robersonville, and the Ocracoke Sanitary District. Each of those projects involved the creation of a GIS database and collection of existing water and sewer systems for physical and interactive digital maps for the Towns to manage and improve their systems. Mr. Jarrett also completed the mapping of the Town of Atlantic Beach's Water System.

OTHER SIMILAR AIA PROJECTS

MESCO has completed, or is in the process of performing, Asset Inventory Assessments for the Towns of North Wilkesboro (Water & Sewer), Old Fort (Sewer), Stantonsburg (Sewer), Jamesville (Water & Sewer), Landis (Water & Sewer), Warrenton (Water & Sewer), Kinston (Water), Ayden (Water & Sewer), Murfreesboro (Water, Sewer & Stormwater), Louisburg (Water & Sewer), Kenly (Water & Sewer), Fremont (Water & Sewer), Ocracoke Sanitary District (Water), River Bend (Water & Sewer), Bunn (Water & Sewer), Micro (Water & Sewer), Robersonville (Water & Sewer), and the Village of Walnut Creek (Water & Sewer). **In addition, MESCO recently completed mapping of the Town of Atlantic Beach's Water System.**

In addition to our Water & Sewer AIA projects previously completed for the Town of Landis, three (3) other recently completed AIA projects are highlighted below. However, since there have been several personnel changes since the completion of our previous AIA projects for the Town of Landis, it may be helpful to start with an overview of those previous projects…..

TOWN OF LANDIS, NC – WATER SYSTEM & SEWER SYSTEM AIA
Water System AIA funded by NC Division of Water Infrastructure grant of $150,000
Sewer System AIA funded by NC Division of Water Infrastructure grant of $150,000

Working with the Interim Town Manager, Leonard Barefoot, MESCO assisted the Town of Landis in preparing an Application for Funding to the NC Division of Water Infrastructure for both a Water System and Sewer System AIA. Both applications were approved for funding in February, 2017.

The *Sewer AIA* grant was used to prepare GIS mapping of the Town's entire sewer system. Once the field data was collected, it was processed by our GIS team to create physical maps and map books of the sewer system. The GIS team then created an interactive GIS mapping tool that the Town could use to display the location, attributes and a photograph of the associated asset. Since the Town did not have ArcGIS software or the technical staff to use the software, a free GIS reader was provided that can be installed on individual desktops, laptops, and tablets to allow staff to view the map and attribute files. In addition to the computer applications, overall system maps and maps books were created in PDF format and assembled into notebooks allowing O&M personnel to have access to detailed maps while out in the field.

As part of the Sewer AIA project, a condition assessment of the S. Upright Street Lift Station sub-basin was performed. The sub-basin was selected by the town's O&M personnel as one of the more critical sub-basins in town with suspected high rates of I/I. The assessment consisted of a closed-circuit television

inspection and smoke testing of approximately 8,500 LF of mostly terra cotta sewer pipe. Most of the sewers and manholes in that sub-basin were found to be in poor condition. Repair/replacement of those sewers was subsequently included in the CIP and a successful $2.7 million grant application was filed with the Division of Water Infrastructure to fix the problems.

As part of the *Water AIA* grant, the Town proposed to conduct a limited leak detection survey and condition assessment on approximately 3 miles of old cast and ductile iron water mains. The leak detection survey involved the use of non-invasive, acoustic sound wave technology to search for the presence of active leaks. After surveying approximately two-thirds of the most critical water lines identified by town personnel, only two leaks were discovered. With the concurrence of the State AIA Program, most of the funds allocated to leak detection were reallocated to the task of developing a water system hydraulic model.

A properly developed and calibrated water system model can be used to replicate the behavior of the existing system as well as look at the effects of the system under simulated and future conditions, estimate fire protection capacities, identify low pressure and water age/quality issues as well as guide the town in making capital investment decisions. A water system model can also aid the Town in analyzing the effects of new extensions, estimate future demands and analyze the effects of rehabilitation and/or upgrade projects on the existing system. *Another benefit of having a calibrated hydraulic water system model is that certification of the model can be submitted to the State Fire Marshall for the ISO ratings in lieu of Fire Department two-hydrant flow tests of all hydrants every five years.*

As a result of the Water AIA project, the Town of Landis received updated Water System Maps, Leak Report Forms (on USB Drive), a Water and Sewer System Asset Management Plan including water and sewer system assets and maps, a 10-year CIP and O&M Plan, and Water System Hydraulic Modeling Data.

TOWN OF WARRENTON, NC – WATER SYSTEM & WASTEWATER SYSTEM AIA
Robert Davie, Town Manager, (252) 257-1122
townadministrator@warrenton.nc.gov

Water System AIA funded by NC Division of Water Infrastructure grant of $100,000
Wastewater System AIA funded by NC Division of Water Infrastructure grant of $150,000

MESCO assisted the Town of Warrenton in preparing an Application for Funding to the NC Division of Water Infrastructure for both a Water System and Sewer System AIA. The Water System AIA grant was approved in February, 2017 and the Wastewater System AIA grant was approved in March, 2018.

The project scope of the *Wastewater System AIA* grant project was very similar to that of Landis. As part of the AIA project, a limited condition assessment of select segments of the gravity sewer system was performed. The assessment areas were selected by town personnel as the most critical areas in town based on age, condition, sanitary sewer overflows and suspected inflow and infiltration.

The assessment consisted of closed-circuit television (CCTV) inspection of the collector sewers, a level 2 aboveground inspection of the manholes and smoke testing of the collector lines. Approximately 14,000 feet of sewer pipe was CCTV inspected and smoke tested along with a Level II visual inspection of 64 manholes. The pipes and manholes were inspected and graded using protocols and standards established by

the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) and the Manhole Assessment Certification Program (MACP).

Most of the sewers inspected were constructed of terra cotta clay pipe and were in fair to poor condition. Numerous pipe defects such as cracks, fractures, holes, offset joints, roots, and pipe sags were noted throughout the survey area. Similarly, many of the manholes inspected were found to be in poor condition. Most were constructed of brick or masonry block and had active infiltration occurring. Approximately 92% (12,840 LF) of the sewers inspected were in need of replacement or rehabilitation at an estimated cost of $1,000,000.

The town's entire wastewater collection system was GIS mapped as part of the AIA project. The collection of data for the mapping portion of the project involved a 3-stage process. The data was first collected in the field by our GIS surveyors. Once the field data was collected, it was processed by our GIS team in Raleigh and Boone to create physical maps and map books of the collection system. The GIS team then created an interactive GIS mapping tool that the Town could use to display the location and attributes of the infrastructure asset.

The Deliverables for this project were: Wastewater System GIS Maps – two (2) bound Map Books, one electronic copy on flash drive in PDF format with all GIS Database files, ArcGIS Reader for installation on desktops, laptops, and tablet computers; one (1) bound copy of the Sewer Condition Assessment performed by Compliance Environmental Services (CES) including inspection reports, PACP/MACP database with CCTV inspection media, summaries and reference data; and, one (1) copy of the Engineer's Executive Summary of the project's goals and accomplishments including a summary of the CCTV inspections and planning level cost estimates to replace or rehabilitate lines in the assessment areas.

The *Water System AIA* grant for the Town of Warrenton involved the GIS mapping of the Town's entire water distribution system and the development of a 10-year Capital Improvements Plan. Potential projects identified in the CIP were based on current CIP planning, criticality and discussions with Town staff.

As a result of the Water AIA project, the Town of Warrenton received Water System GIS Maps in – Two (2) bound Map Books, one electronic copy on flash drive in PDF format with all GIS Database files, and an ArcGIS Reader for installation on desktops, laptops, and tablet computers.

TOWN OF MURFREESBORO, NC – WASTEWATER SYSTEM AIA
Carolyn Brown, Town Administrator, (252) 398-5904
cbrown@murfreesboronc.net

Wastewater System AIA funded by NC Division of Water Infrastructure grant of $150,000

MESCO assisted the Town of Murfreesboro in preparing an Application for Funding to the NC Division of Water Infrastructure for a Sewer System AIA. The Sewer System AIA grant was approved in March, 2019. This project included mapping and sewer system condition assessment as follows:

GPS Sewer System Survey and Mapping – The town used part of the AIA grant funds to GPS survey its entire sewer system and develop a GIS based system map. The GPS field survey was conducted to identify, locate and geo-reference approximately 20 miles of gravity sewer and 3 miles of force mains. All

aboveground features such as manholes, service clean-outs and pump stations were located. Each system feature was assigned a unique number/code, and attributes such as location, age, condition, material and size, were assigned to each feature. In addition, all SSO locations occurring within the past 5 years were geo-located. Once the field work was completed, a system map was developed.

Condition Assessment – Approximately 12,700 linear feet of gravity sewer condition assessment was performed. Most of the lines in town are constructed of 8-inch and 10-inch terra cotta (clay) pipe. The assessment involved CCTV inspection of the main sewer lines to ascertain the condition of the sewers, smoke testing to locate sources in inflow and possible cross connections and an aboveground, Level 2 inspection of approximately 48 manholes to determine their condition. A particular area of concern was the portion of the sewer system that serves a McDonalds Restaurant in Town. During heavy rain events, the restaurant had to close to prevent backups into the restaurant. The mapping and condition assessment focused on this area of the system first in order to identify possible solutions to this problem. *By performing the condition assessment, the town was able to identify major sources of I/I and submit another successful application for funding sewer system rehabilitation for the next funding cycle. The Town was awarded a $1.8 million loan with $500,000 of principal forgiveness to address the conditions identified in the AIA project.*

TOWN OF AYDEN, NC – WATER AND SEWER SYSTEM AIA
David Jones, Water & Sewer Superintendent, djones@ayden.com , (252) 814-6447
Gary Flowers, P.E, was the Project Manager for MESCO.

MESCO assisted the Town of Ayden in preparing an Application for Funding to the NC Division of Water Infrastructure for both a Water System and Sewer System AIA. Both the Water System AIA grant Wastewater System AIA grants were approved in March, 2019.

The components of the Sewer System AIA are outlined below:

Update Water System GIS Database and Mapping
A portion of the AIA grant funds were used to update the town's current sewer system GIS database and system maps. A preliminary GIS field survey was conducted of random segments of the sewer system to verify attribute data and location accuracy. The survey revealed that while most of the attribute data (size, material, etc.) was in order, many of the manhole locations were off by 5 to 7 feet with some being off by as much as 10 to 20 feet. As a result, all sewer system assets found were horizontally and vertically located to a minimum sub-meter accuracy (sub-meter accuracy typically being within a 1–2-foot range with many assets falling within a 3–4-inch range).

Once the field data was collected, it was processed by our GIS team using Trimble Business Center and then exported to ArcGIS Pro to create physical maps and map books of the sewer system. Once initial field work and mapping were completed, GIS staff met with town personnel on several occasions to check the maps for accuracy and provide quality assurance/quality control (QA/QC) of the final product. Once the QA/QC process was complete, MECO's GIS staff worked to complete the final mapping deliverables for the town.

Since the town already utilized ArcGIS software, digital files of all surveyed assets were turned over to the town for direct download. In addition to the computer files and applications, overall system maps and map

books were created in PDF format and assembled into 11" x 17" mapbooks allowing O&M personnel to have access to detailed, reproducible paper maps while in the office or out in the field.

Trailer Mounted Closed-Circuit Television (CCTV) Camera System

As part of the AIA project, a trailer-mounted CCTV sewer camera system was purchased to allow the town's O&M staff to video inspect the gravity sewer system lines. The CCTV camera is connected to a computer and it feeds data and images back to the operator, in real-time, with information that can be stored for referencing at a later date. Utilizing the CCTV system, the town's O&M staff is able to see and record entire sewer segments from manhole to manhole and check those segments for leaks, infiltration and inflow sources (I/I), pipe defects, service connection defects, root infiltration, and pipe blockages. Having the CCTV equipment takes the guesswork out of pipe inspections, enabling quick, accurate and cost-effective examination of gravity sewers and other pipelines without having to excavate and without causing any potential damage to the infrastructure.

Importantly, CCTV is a very cost-effective inspection method for the town for the following reasons:

- No costly or time-consuming excavation is required
- Problems are located, identified and solved quickly, thereby reducing labor costs and increasing productivity
- Preventative repairs can be done as a result of the information collected by the camera
- Minor pipe defects can be addressed before they turn into expensive, major issues
- Identifies issues accurately the first-time, thereby avoiding unnecessary costs involved with guesswork/incorrect diagnosis of a problem

In addition to the cost savings presented above, the benefits of this easy-to-use, yet highly specialized equipment are:

- Completely non-destructive method of inspection
- Fast and precise
- Pinpoint's accurate location of problem
- Incorporates fully integrated software which enables real-time results and decision-making as well as recordable data for future use/referencing
- Easy to operate
- Environmentally friendly

The CCTV camera system was purchased, as part of the AIA grant work, at a cost of $96,097.

Because of the efforts undertaken through the Wastewater Asset Inventory and Assessment grant program, the Town of Ayden has a more accurate inventory of its wastewater collection system manholes and sewers. The town was also able to purchase a modern, trailer-mounted CCTV sewer camera that can be used to

remotely inspect sanitary sewer pipes to locate problems as well as evaluate the condition of those pipes to aid in developing and prioritizing future wastewater improvement and rehabilitation projects. Having an accurate inventory of the town's wastewater collection system infrastructure and the ability to inspect and document the condition of those pipelines, will help the town to develop and prepare competitive funding applications to help pay for critical infrastructure improvements as part of a proactive asset management strategy.

As a result of the findings of the Sewer AIA, the Town of Ayden was able to identify over $2.5 million of upgrades needed to upgrade one pump station and replace approximately 7,400 lf of old 8" terra cotta clay pipe. An application has been filed and is currently under review by the NC Division of Water Infrastructure.

REFERENCES

In addition to the Contact Info for the three AIA projects highlighted above, please feel free to contact the following AIA clients – unfortunately, many of the Managers listed have relocated since we completed our reports:

Town of Murfreesboro: Carolyn Brown, Town Administrator, (252) 398-5904
Town of Jamesville: Kim Cockrell, Clerk/Finance Officer, (252) 792-5006
Town of Fremont: Robert Jones, *New* Town Administrator, (919) 242-5151
Town of Louisburg: Sean Medlin, Town Administrator, (919) 497-1015

FIRM AVAILABILITY

Municipal Engineering, Inc. has the availability to get started immediately upon notice to proceed. This project will build upon the information gathered as a result of the Town's previous Sewer AIA project. The sewer system assessment will provide an in-depth evaluation of approximately 60,000 additional linear feet of old clay gravity sewer pipes and associated manholes. Six (6) of the Town's ten (10) sanitary sewer lift stations will also be evaluated as a part of this project. MESCO is absolutely committed to completing this project within the two year window required by the Division of Water Infrastructure and well ahead of the drop dead date of December 31, 2026 imposed by the Federal Government on ARPA funded projects.

Recent
MESCO PROJECTS in Partnership with the TOWN of LANDIS

Sanitary Sewer System Rehabilitation
$2,746,260

AIA for Sewer System
$150,000

AIA for Sewer System
$400,000

AIA for Water System
$150,000

Sewer Lift Station Replacement
$1,200,000

Mt. Moriah-Main St Water System
$2,120,500

Elevated Water Tank
$1,453,740

WHY HIRE MESCO?

- ✓ **Our Team:** Our team members have many years of experience in the areas of Water System planning, design, and Asset Inventory and Assessments.

- ✓ **Our Project Experience:** MESCO has been providing these services to clients all across NC since 1978 – including many for the Town of Landis. We extensive in-house knowledge of the Town of Landis' system and can hit the ground running on this project.

- ✓ **Our Funding Administration Experience:** Two of our team members managed the Clean Water and Drinking Water SRF Programs for the Division of Water Infrastructure. Mr. Blowe was also the Senior Project Engineer at the NC Rural Center and Mr. Tomaino was involved in developing the State's guidance for ARPA funds administered by the Division of Water Infrastructure.

- ✓ **MBE / HUB Goals:** Municipal Engineering, Inc. is a majority Woman Owned Business. We also utilize the services of MBE / HC HUB sub-consultants for electrical and geotechnical engineering.

- ✓ **Personal Service:** Our conservative business approach, lower overhead, attention to detail, accessibility, and level of personal service coupled with the knowledge and experience of our Team Members makes MESCO the obvious choice.