ANNUAL DEPARTMENT REPORT
UNDERGROUND FACILITIES
December 2024

MISSION STATEMENT

1. Provide safe, quality drinking water in sufficient quantity to meet all customer needs; maintain water distribution and wastewater collection systems; using operating procedures and service maintenance methods to meet all federal and state requirements.
2. Maintain water and collection systems' integrity.
3. Plan and provide for water and collection system improvements and expansions necessary to meet the needs of our owners.

LIST OF PROJECTS THIS PAST YEAR

WASTEWATER COLLECTION

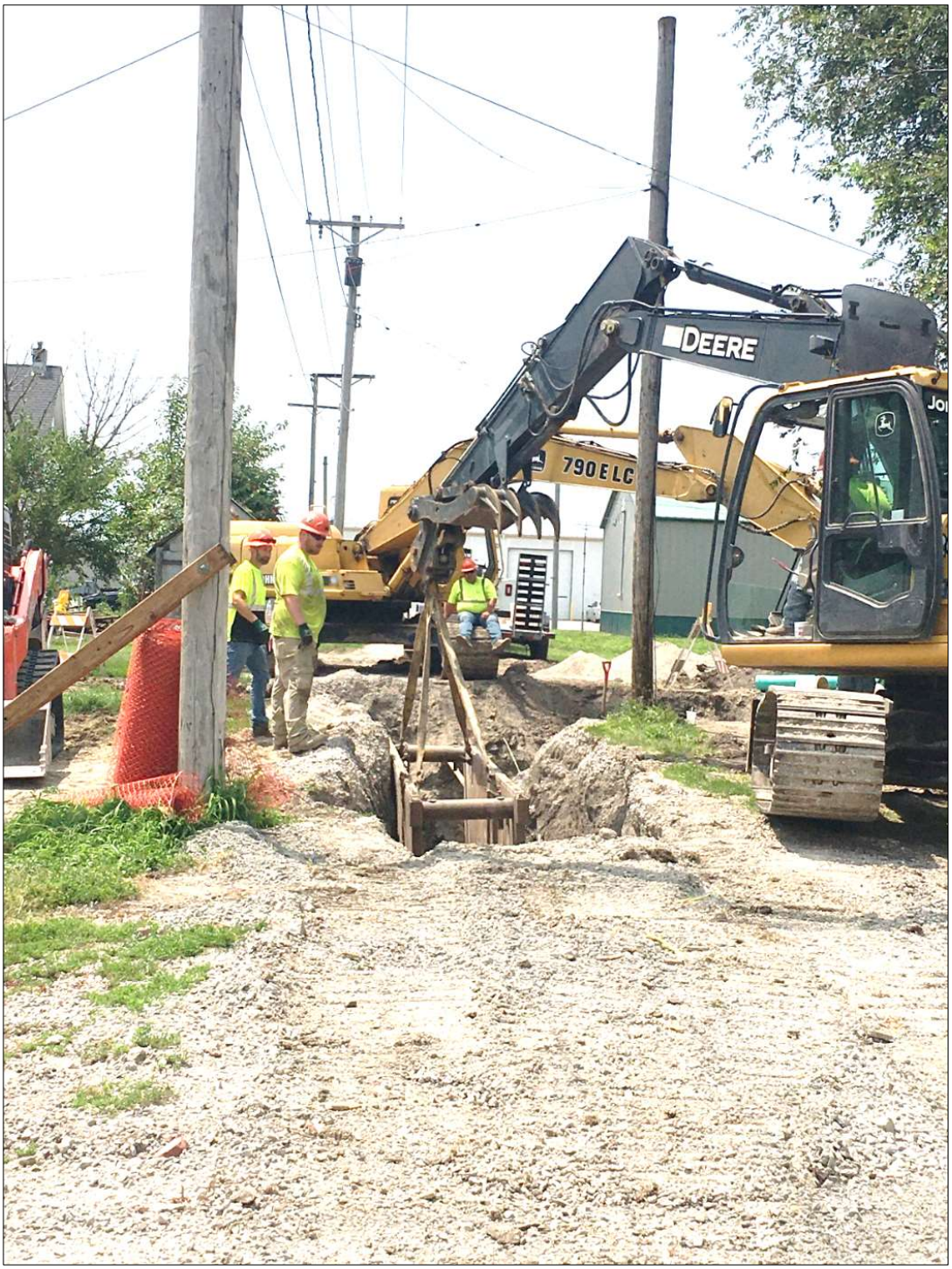
The Wastewater Collection System was established by ordinance in 1897, at which time the first public sewer and sewer districts were constructed. The first sewer district encompassed the area east of Odell, north of Morgan, west of Brunswick, south of Eastwood, west of Allen and south of Porter. Old records show the cost of construction for the first public sewer was $520.84 and the cost of Sewer District #1 was $5,285.16 and was billed to the properties within the district on a square footage basis at $0.0015859492 per square foot (approximately $15.86 for a 100'x100' lot).

In June of 1972, the operation and maintenance of the City Sewer Collection System was transferred from the City Street Department to MMU. MMU had been operating two wastewater treatment facilities for several years prior to accepting the Sewer Collection System. Underground Facilities is also responsible for the operation of five lift stations: Southwest, North Miami, North Conway, North English and South Odell Lift Stations.

The wastewater collection system has grown to include one treatment plant, five lift stations, 1,545 manholes and over 84 miles of main. The main sizes and types range from 2" to 16" force main and 6" to 36" gravity line.

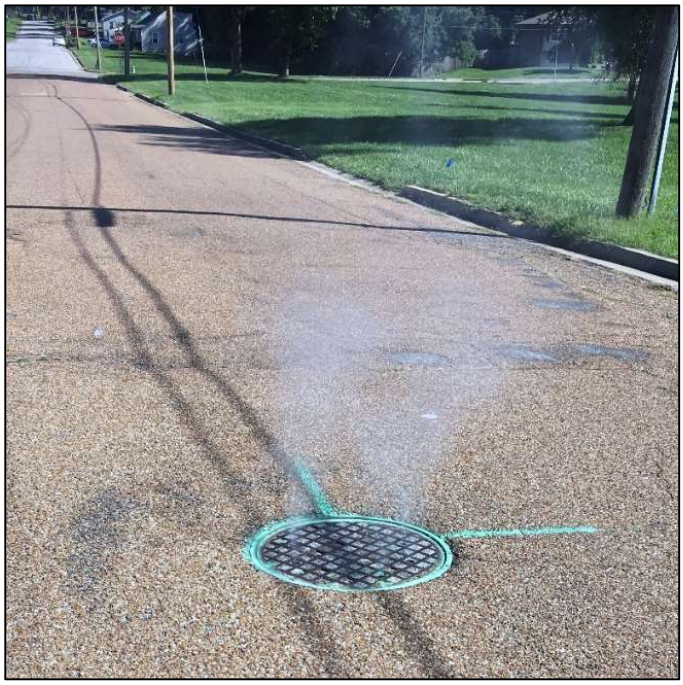
IMPROVEMENTS THIS YEAR

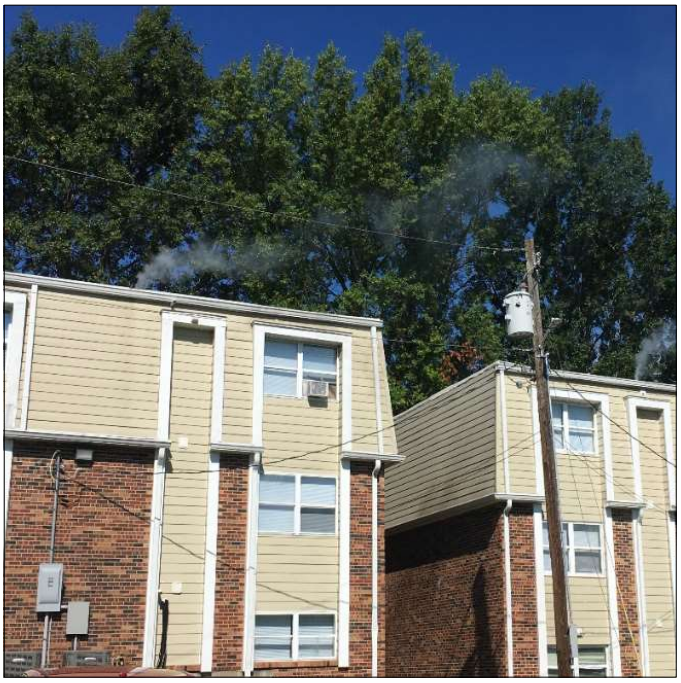
A sewer main replacement project in the alley between West Marion Street and West North Street from Benton Avenue to Lyon Avenue was completed in September 2024. The 6” clay main, installed in 1913, was in poor condition. The project consisted of approximately 550’ of 8” PVC main, 17 services, and 2 new precast manholes.



Smoke Testing

A sanitary sewer smoke testing project was started in August 2023. The engineering firm of Burns & McDonnell was selected to assist with this project. Crews infused mains identified in the prior year's flow study with liquid smoke. The smoke fills the main and travels up the service line and surfaces at problem areas such as open clean-outs, foundation drains and broken laterals. Approximately 240,000 feet of sanitary sewer main was tested. Crews identify, log and inventory the findings. This project was completed in Fall 2024.

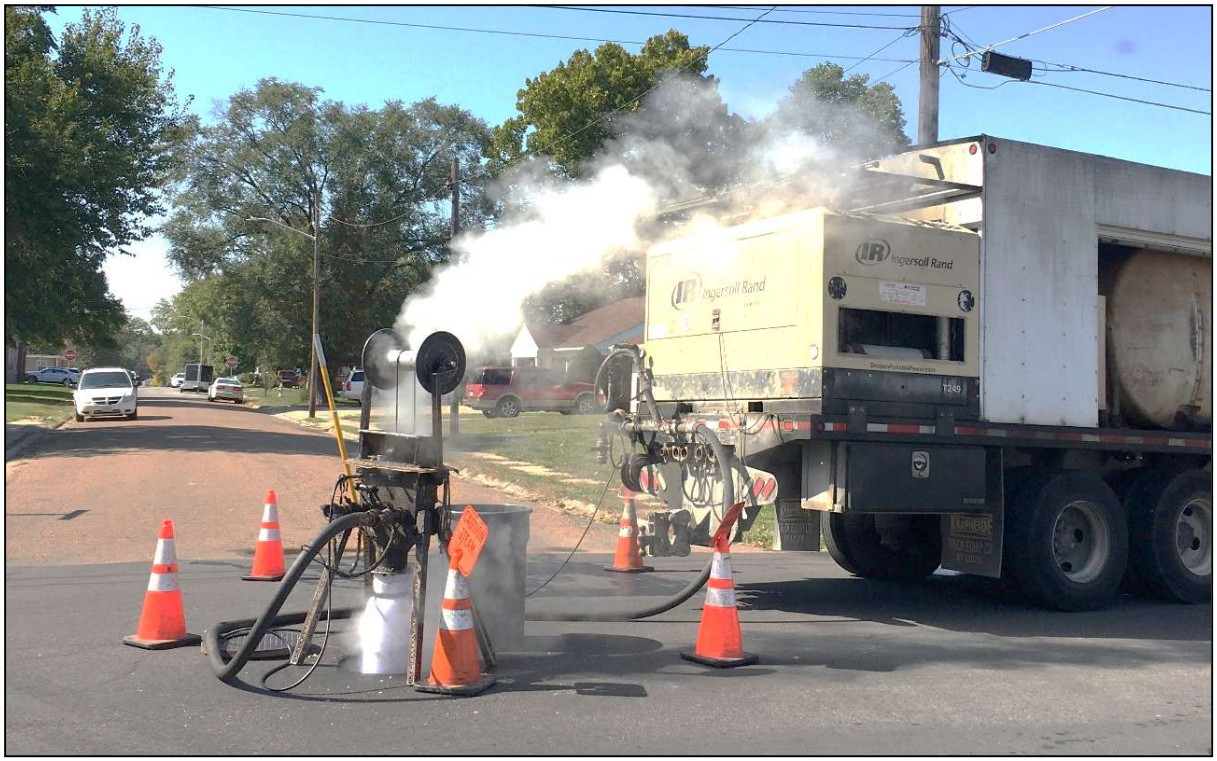




Cured-In-Place-Pipe (CIPP)

The main will be cleaned and all the live and abandoned taps will be identified. The new pipe material is a flexible fabric with a two-part resin applied. The material is kept under 32 degrees from the factory until it is installed. The material is inserted into the main and takes the shape of the old pipe. Hot water or steam under pressure is used to cure the two-part resin. Approximately 5,000' of sewer main was contracted to Visu-Sewer of Missouri and was completed in the summer of 2024. The cost of CIPP projects has increased over the past years but is cheaper than the open-cut method. We have plans for more CIPP projects in the coming years, once improvements have been made at the Wastewater Treatment Plant.

We are spending more time on maintenance cleaning and using the camera to inspect the mains in town. Problem areas may be from grease, roots, or main failures. The camera is used to identify problems and locations of roots or main failures. The roots are cut out and the mains are repaired as time allows. We are taking more aggressive action in making sewer main repairs. MMU crews have made 6 main repairs this last year. In 2008, we started an aggressive project of cleaning and inspecting the mains. Last year alone over 11 miles of main were cleaned and over 2.6 miles of main were inspected. A report is completed on each section of the main with information on condition, taps, and needed repairs.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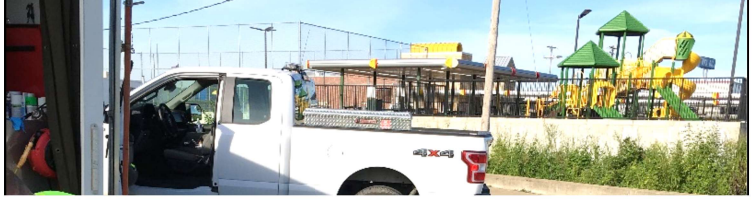


2024 I&I REPORT VIDEO INSPECTED MAINS

SEWER MAINS MAP LEGEND

- MAINS TO VIDEO
- SEWER FORCE MAIN
- MAINS VIDEO 2009-2024

Manhole Rehab

Inspecting each manhole and recording any needed improvements is another task that was started in 2010. MMU personnel have inspected over 730 manholes in the past years. Manhole depth, lid size, invert condition, type of manhole and inflow/infiltration locations, if any, are some items in the inspection. The manholes are given a rating depending on the nature of the problem and the information is recorded on a GIS layer. Repairs are made as we have time.

In June of 2021, the Department of Natural Resources conducted an inspection of the wastewater collection system. We collected information from our records, maps, operations and projects. The inspector visited the lift stations. One required action is to continue to report all sanitary sewer overflows within 24 hours. Recommendations by DNR are to continue to locate inflow/infiltration problems, record pump hours at the lift stations, develop a 3- to 20-year plan for maintenance on the collection system and develop written procedures on the proper response to all sanitary sewer overflows. Overall, the inspection did not find any major problems and indicated that we should continue to improve the collection system

Overall, we are making more repairs to the collection system. We are inspecting new and replaced sewer laterals and are mapping and recording this information. We are making repairs to the mains and recording other problems to be repaired at a later date. Service calls due to main stoppages have decreased. The collection system is in significantly better condition than 20 to 30 years ago.

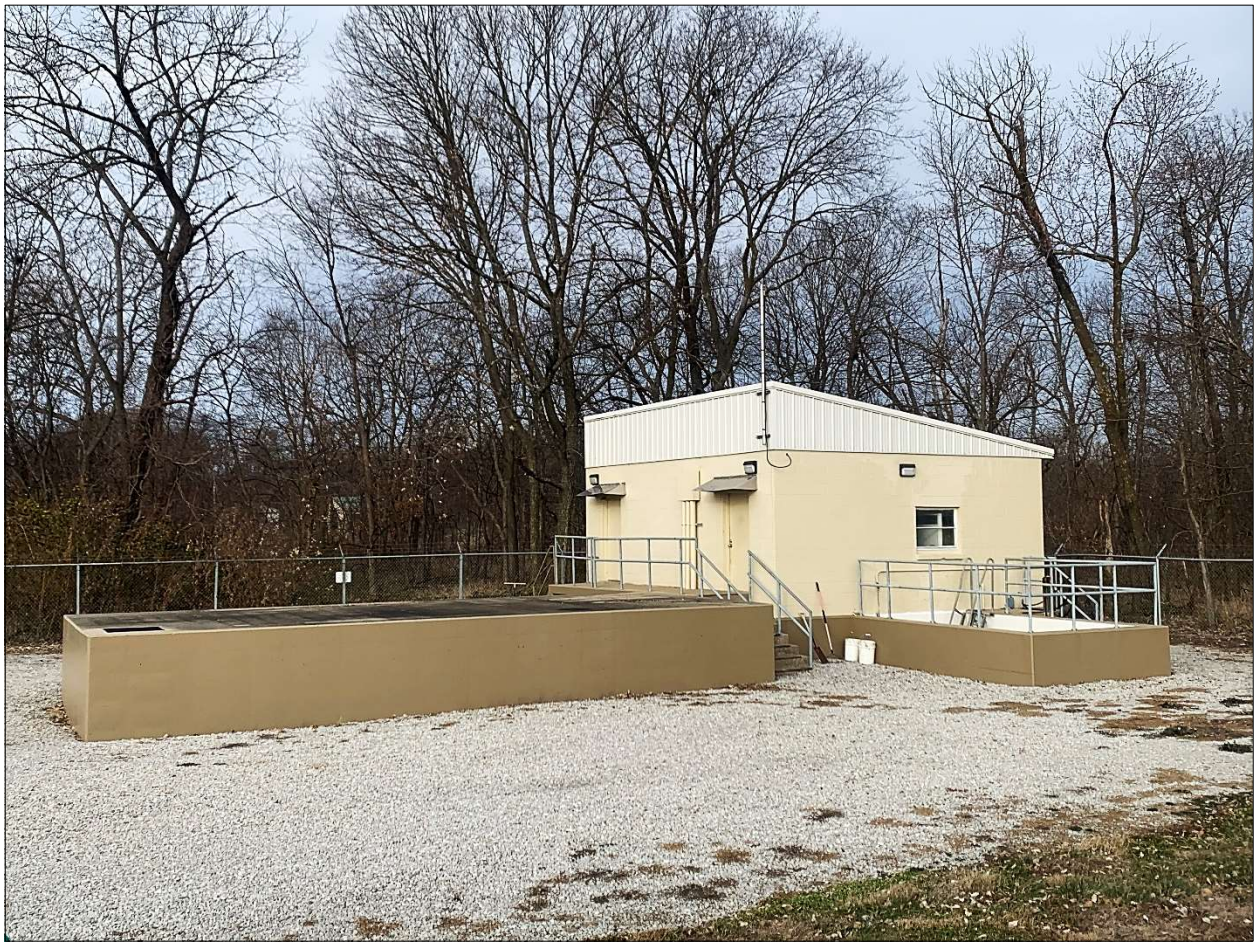
FIXED ASSETS AND INFRASTRUCTURE

The *Southwest Lift Station* has three 125 hp Aurora sewage pumps rated at 130' of head. The capacity of this lift station is 2,100 gallons per minute (3.0 mgd) with 1 pump or 3,000 gallons per minute (4.3 mgd) with 2 pumps. Originally this lift station pumped all flow through a 12" cast iron force main to manhole #963 just east of Odell, north of Cypress Boulevard, where it changed from a force sewer main to a gravity flow main to the Wastewater Treatment Plant. In 1984, a 16" ductile force main was installed parallel to the 12" force main to discharge to another manhole further east; manhole #961 east of Cypress Drive. In 2011, all the pumps were taken out of service for maintenance. New bearings, seals, wear rings and impeller, u-joints and carrier bearings were installed and the casing was reconditioned on each pump. This preventive maintenance should extend the life of the pumps for several years. In 2018, all three check valves to the force main were replaced. In 2022, pump #3 was taken out of service and new bearings, seals and wear rings were installed.

Old Impeller

Reconditioned Pump

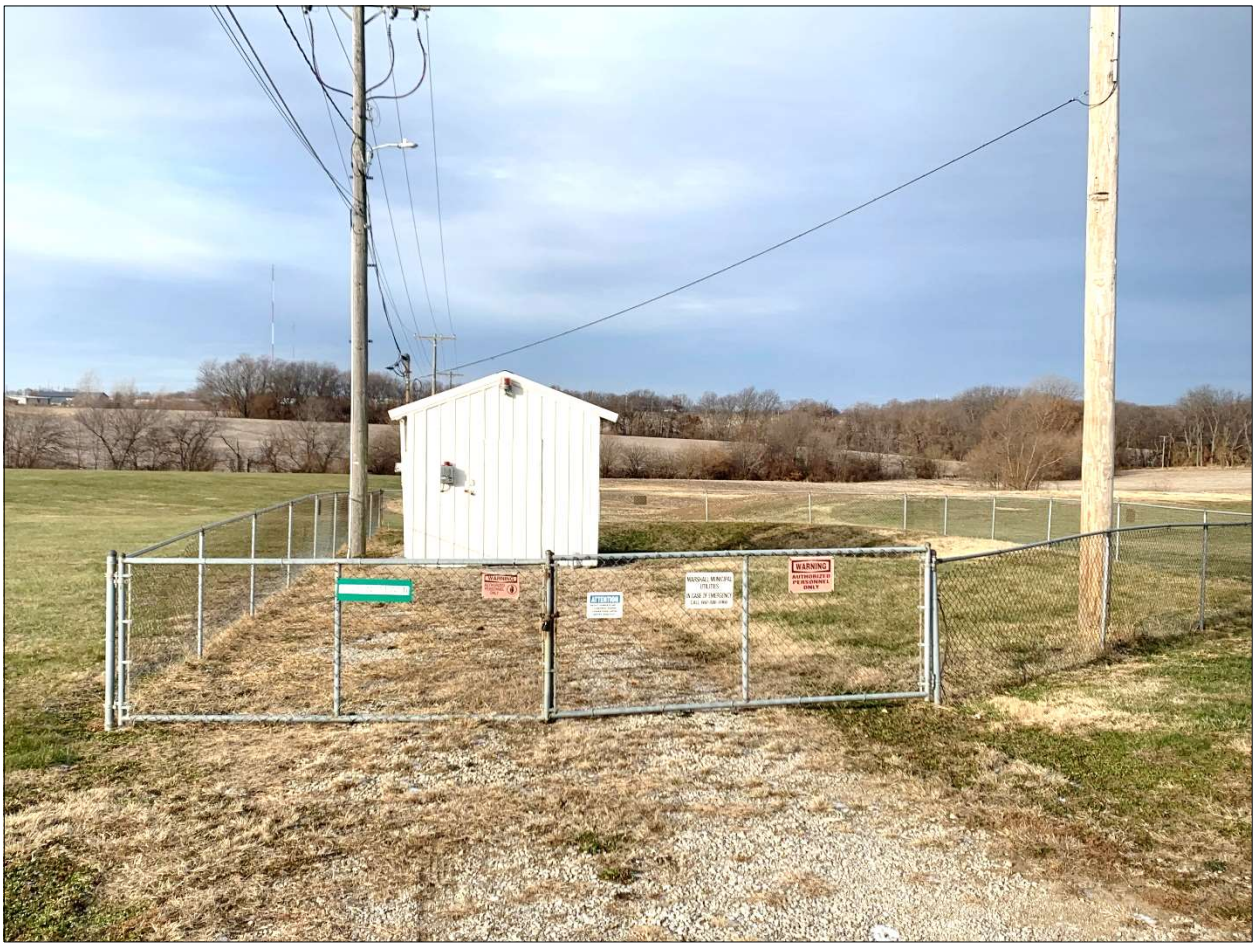
The building is a concrete block structure originally built in the early 1970's when the Wilson Foods Plant came to Marshall. The building is well-maintained and is still in good condition. A new metal roof was installed in 2019.



Southwest Sewer Lift Station
Fairgrounds Road West of Hospital

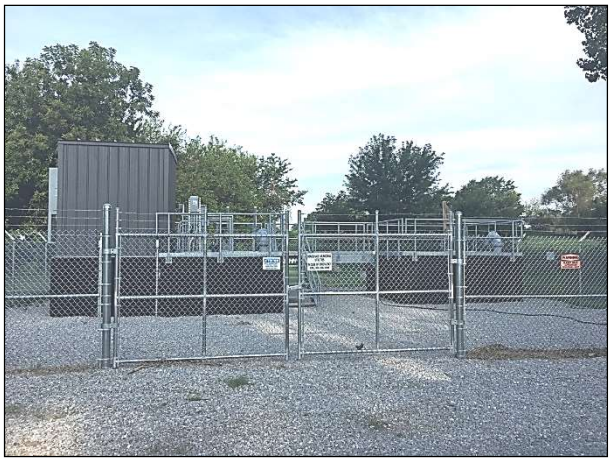
The *North Miami Lift Station*, which was installed in 1988, has two Ebara submersible grinder pumps with a design capacity of 144,000 gallons per day (100 gpm) and discharges through a 4" PVC force main to manhole #858 on Miami Street, just north of 240 Highway. From this point, the gravity line flows to the North English Lift Station. The area served by this lift station is the west side of Miami Street and north of Darling Street, north to the city limits.

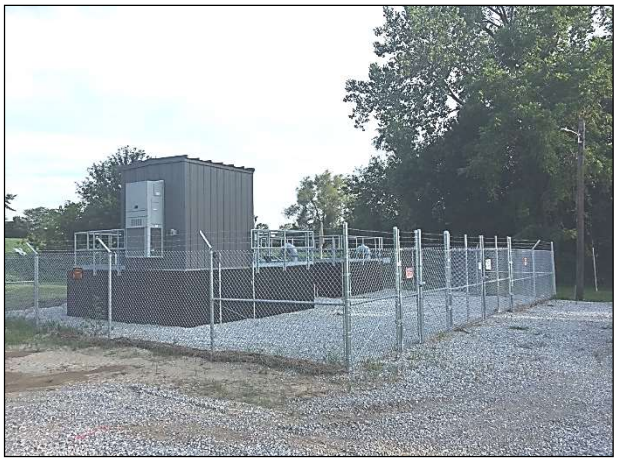
In 2013, the pumps were taken out of service for maintenance. New bearings, seals, wear rings and impellers were installed on each pump. This preventive maintenance should extend the life of the pumps for several years. A new metal roof was installed in 2019.



North Miami Sewer Lift Station
North Miami and Darling Street

The *North English Lift Station* experienced major improvements in 2016/2017. Two KBS pumps were installed when the existing wet well was raised approximately 4 feet and the addition of a new wet well of the same size was completed, more than doubling its storage capacity. The pumps are located in a dry well adjacent to the wet well. All the control panels are now housed in a climate-controlled building located on top of the new wet well. These upgrades have increased the pumping capacity of the station by approximately 19%. The lift station discharges into an 8" cast iron force main to manhole #260, located on Slater St. just west of Garfield Ave. The gravity line flows east to Lincoln St. then south to a trunk main near the railroad tracks. This serves the areas of Miami Ave., Bond Ave., Ted Ave., Benton Ave. and High St. in the northern part of town.



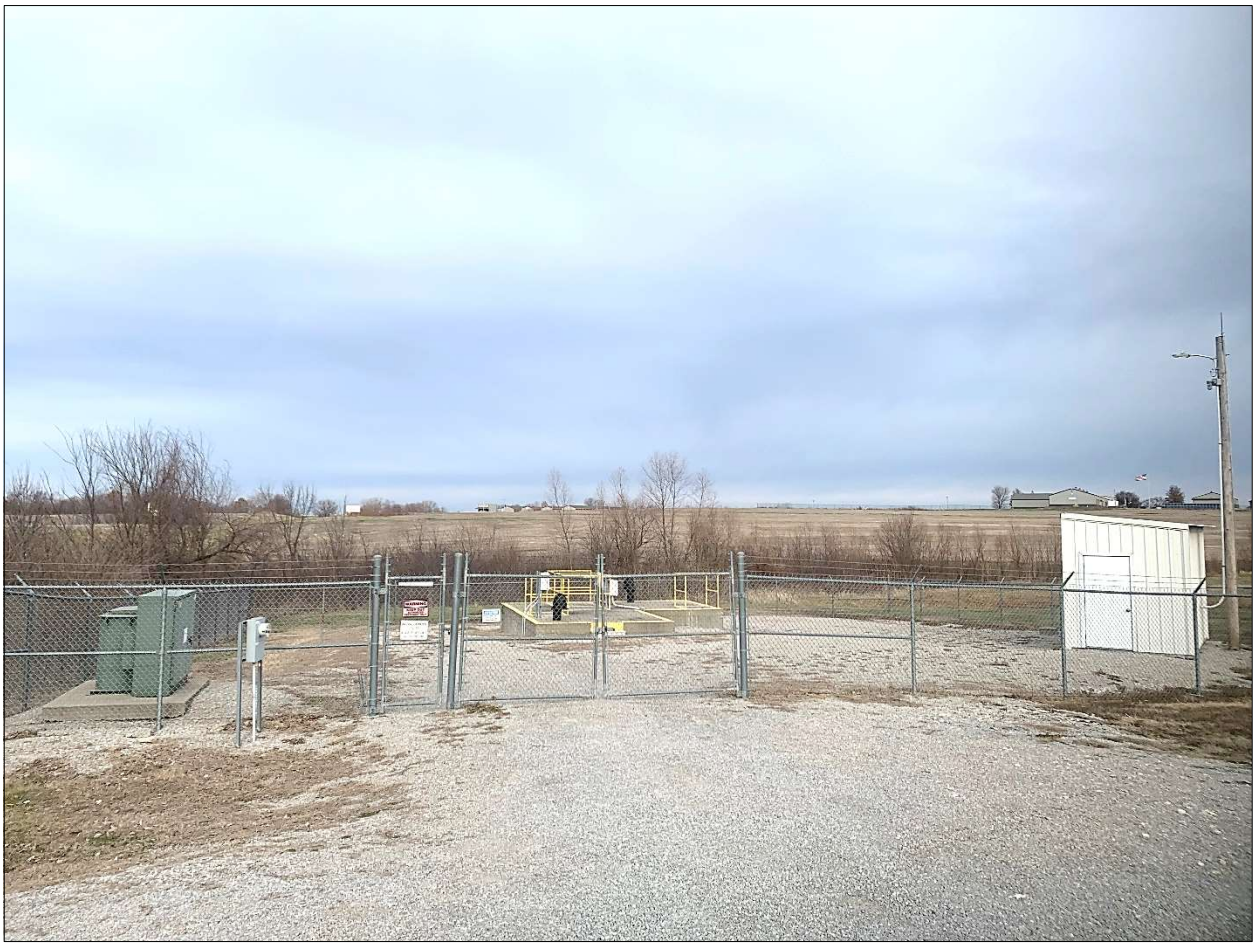


The *North Conway Lift Station,* which was installed in 1979, has two Paco pumps. The capacity of this lift station is 288,000 gallons per day (200 gpm) and discharges into a 4" cast iron force main to manhole #876 at the intersection of State Street and Conway Avenue. From this point, the gravity line flows east to Lincoln and south to a larger trunk main near the railroad tracks. The area served by this lift station is the Ludwig Addition, Felix, Star and Courtney Streets in the northeast section of town.

In 2012, both pumps were taken out of service and rebuilt. The pumps were remanufactured just as the pumps were in the Southwest Lift Station, along with new check valves. This should extend the life of the pumps for several years.

North Conway Sewer Lift Station

The *South Odell Lift Station* was constructed to pump part of the flows from the South Odell Sewer District. The flows from Stone Hedge Lift Station were diverted to the lift station. This station has two submersible ABS pumps with a capacity of 700 gallons per minute and discharges through an 8" PVC force main to a manhole on South Odell. The areas served by the lift station, besides Stone Hedge Subdivision and South Odell, are areas near Drake Road and areas east of Odell known as the Banks property. The lift station is large enough for future development.



South Odell Lift Station

OPERATIONS

These lift stations are in good condition and should be adequate for several years. We currently have graphic displays on our computers for North Conway, North English, Southwest and South Odell Lift Stations.

Southwest Lift Station: The lift station is monitored for runtime, starts, voltage, bubbler pressure, seal water pressure, well level and temperature, with alarms for high level, intrusion, panic button, low seal water pressure, low bubbler, bubbler trouble, flood, PLC power and site power.

North English Lift Station: The lift station is monitored for wet well level, starts and runtime and with alarms for panic button, flood, intrusion, PLC power, pump status and site power.

North Conway Lift Station: The lift station is monitored for wet well level, starts, runtime and bubbler pressure, with alarms for panic button, air pressure, flood intrusion, PLC power, pump status and site power.

The *South Odell Lift Station* is monitored for wet well levels at this time. As we have time, we will monitor other phases of the entire lift station.

The *North Miami Lift Station* is not currently being monitored through the SCADA system.

The current staffing level for the collection system is appropriate. Employees involved in the operation and maintenance of a sewer collection system are not required to have a state operator's certificate. Currently, Underground Facilities has one class "D" certified employee. A class "D" certificate is the highest level of certification an Underground Facilities employee can obtain under MoDNR rules without working for at least one year in a wastewater treatment plant as an operator. Also, we are requiring certain positions in Underground Facilities to have a class "C" collection systems operator certificate. This is a new Missouri Water Environment Association program. Currently, three employees have the "C" certificate, with four employees having the higher "A" certificate.

REGULATORY COMPLIANCE

One regulatory requirement is that we shall not start any new sewer construction project or allow any new sewer construction by others without first receiving a construction permit issued by the Missouri Department of Natural Resources (DNR) (10 CSR 20-6.010). DNR requires a registered professional engineer to design plans and the plans must be submitted to DNR for review and approval. MMU is, however, allowed to improve, replace, repair and maintain its existing collection system without obtaining a construction permit.

Equipment:

The sewer jetter was replaced in 2017. The pump provides 2,000 psi and up to 40 gpm to clean the sewer mains. All of the equipment within the collection system is maintained to keep it in good operating condition and to detect failures. The pickups and service trucks are used daily and need to be replaced after 8 to 10 years of service. The rest of the small tools and equipment that are used on a daily basis should be replaced as they wear out.

IMPROVEMENTS NEEDED

First Priority Projects:

Wastewater Inventory - A complete inventory of all the wastewater facilities has been done, however, this is an ongoing process. New or replaced sewer services are inspected and recorded. All this information is delivered to the engineering department and recorded, filed and transferred into the Geographic Information System (GIS) layer.

Manholes - For many years, manholes were constructed using brick and mortar. Over time, the brick and mortar have deteriorated, allowing water to infiltrate into the wastewater system. On average, manholes account for 10% of the wastewater system's total inflow and infiltration. During routine duties and as we find problems, the brick manholes are repaired or replaced. Today manholes are made of pre-cast concrete and the outside is sealed with a bituminous coating. Presently there are 1,546 manholes in the collection system, 10% are brick manholes, 10% are concrete block manholes, 75% are pre-cast concrete and 5% are other types. We are approximately 75% complete on the manhole inspection program. The information from the inspection will help us develop and prioritize replacement or rehabilitation projects.

Mains - Clay pipe was used for most of the sewer mains until the 1970's. Some of the mains are smaller than what is currently required. Over time, these clay pipes become deteriorated, broken down, or cracked, allowing roots to grow into mains causing blockages and allowing groundwater infiltration. Some of the roots enter the mains through deteriorated service laterals. During the inspections with the camera, we are gathering information on lengths, sizes and conditions of the mains. All of this information is recorded and filed. Complete pipe failures are repaired immediately, potential failures are repaired as we have time and mains are rehabbed or replaced depending on budget and time. We have a list of mains that need to be repaired, replaced, or rehabbed. As we continue with the inspections, we need to organize and prioritize the recorded problems. This will help us develop a plan for making improvements on the mains.

Private Mains - There are several private common sewer mains connected to our wastewater system. MMU does not take responsibility for the mains and cannot find records indicating their location, age, construction methods, or design standards. A complete inventory of each private main is needed. The size, condition, location and number of houses on each private main are needed. These mains should be replaced with a public sewer, sized and designed to our specifications. A method has been developed to help property owners replace the private mains. The owner pays for materials and obtains the required easements and MMU supplies the design, labor and equipment for the project.

Private Service Laterals - All new laterals for new homes and businesses are inspected, mapped and recorded. All laterals that have failed and been replaced are also inspected, mapped and recorded. Tap location, depth, footing drain location, sump pump location, condition of the pipe and a complete map are needed for every service lateral. All this information from the private service laterals will be needed before an inflow/infiltration or a foundation drain disconnection program is started.

Inflow/Infiltration (I/I) Inspection on the Private Laterals - As the public mains are being replaced, repaired, or rehabbed, more of the inflow/infiltration is entering from private laterals. MMU is working on implementing a plan to find sources of I & I on the private laterals. Pipe failures, joint separation, failed connection at the main and footing drains are types of I/I that may be causing excessive groundwater to enter the sewer main. Inspection of the private laterals would provide owners with information on deficiencies of their laterals. MMU, with assistance from Burns & McDonnell Engineering Services, is conducting a flow study to identify the major problem areas in the City for I & I on the private laterals. In 2010, the Board of Public Works approved allocating $5 per wastewater customer per month to fund major capital improvement projects such as cured-in-place-pipe and open-cut replacement. Extra manpower and equipment may be needed to inspect the service laterals.

ENGINEERING

The Engineering Department continues to provide project designs, collect geographic information on Utility facilities and write easement descriptions, survey, maintain records and maps of water and sewer main repairs, new installation of sewer, water, electrical and fiber features.

Manifold, the Geographic Information System (GIS) program along with the handheld geographic positioning instrument are used to collect entity coordinate positions and update entity information. This information is used for project design, trouble analysis and to determine areas for cured-in-place sewer main projects, tree trimming, power pole inspection and water main replacement or extension.

We continue sharing information with the County and the City to keep everyone as up-to-date as possible and to build a firm GIS foundation for the community.

NATURAL GAS LINE

The natural gas line was constructed in the fall of 2004. This 10" gas line starts at a meter site in northern Pettis County. The meter, regulators, odorizer and other equipment are at this location. The gas line is connected to two high-pressure gas lines owned by Panhandle Eastern.

The gas line runs generally north past Blackwater River, under Interstate 70 and into the city limits of Marshall. At the intersection of Highway 20 and Excel Road, an 8" line continues north to a second meter location. This is the location for the meter, regulators and other equipment for gas to the Mid-Missouri Energy (MME) Plant, located west of the City of Malta Bend. MME owns and operates the gas line past the meter.

Back at Highway 20 and Excel Road, the 10" main continues east to MMU's Electric Production Facility. A regulator station with a meter to serve the Electric Production Facility is on the north side of the tracks in the pipe yard. All the gas to serve the Electric Production Facility will flow through this station.

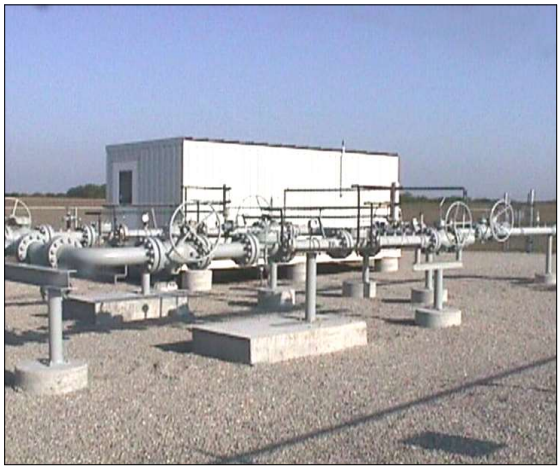
FIXED ASSETS AND INFRASTRUCTURE

Meter Site in Pettis County:

The meter site in Pettis County is on McGruder Road approximately a half mile north of D Highway. Panhandle Eastern owns four gas lines that serve areas to the east. MMU's line is tapped into two separate lines of Panhandle Eastern. If one line is taken out of service, the other line can serve the meter station.

The regulators, odorizer and other equipment are located at the meter site. The main meter is located in the Panhandle station. The piping is in place if we need to install a meter. On our station, pairs of regulators are installed to reduce gas pressure down to 400 psi. Control valves are also located at the station. A tee, valve and plug were installed to launch a smart pig — a tool to inspect the interior of the pipe. These sites were painted in 2018.

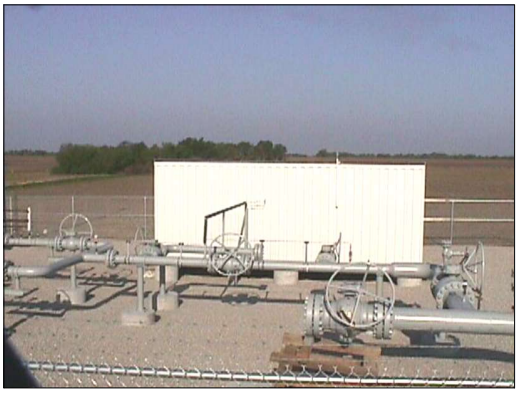
Panhandle meter site, looking southwest



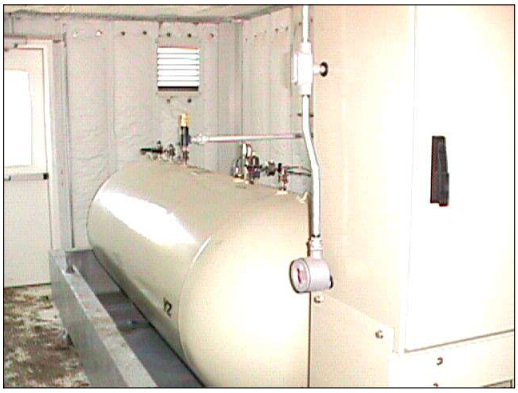
Panhandle meter site, looking northwest

Odorizer Equipment:

Natural gas in its original state has no odor or smell. The gas from the Panhandle pipeline is in its original form. Odorant is injected into the gas at the meter site. The building stores all the equipment and the liquid material used as an odorant. The tank holds approximately 400 gallons of material which will last several months, depending on the amount of gas being delivered.



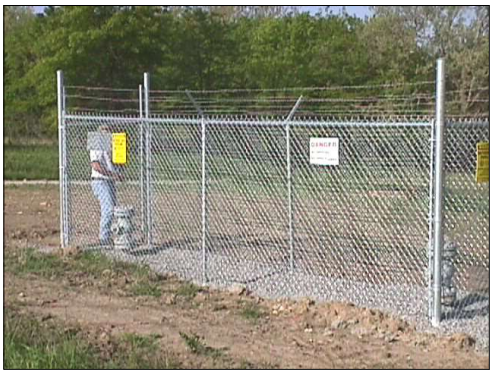
Panhandle meter site, odorizer building



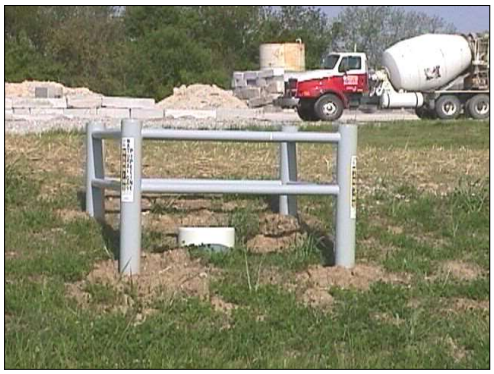
Odorant Tank

Valves:

There are six control valves located on the gas line. Two locations have valves on both sides of the control valve to blow off the gas. Two other locations have piping with tees and valves for new development. At Excel Road, there is one control valve for the MME meter site and a valve for catching the smart pig.



Valves with Blow-offs



Control Valve

Control Valve with Tee and
Valve for Future Development

Meter Station for MME:

The meter station for MME is located north of 20 Highway on Excel Road. Regulators, meter and valves are in this station. The meter information on the amount of gas delivered can be found on Panhandle's website. The amount of gas delivered per day, per hour and totals are available.

MME meter station, looking east

Regulator Station at the Electric Production Facility:

The regulator station at the Electric Production Facility is in the pipe/storage yard. The line to serve Units #10 and #11 connects at this point and a line to serve the Electric Production Facility also connects at this point. This station includes metering for the Electric Production Facility, regulators and valves. It also includes one tee and valve for future use.

OPERATIONS AND REGULATORY COMPLIANCE

Operations of the gas line are much different than operations of the water and wastewater lines. The Missouri Public Service Commission (PSC) enforces regulations concerning, in detail, what and who operates the gas line. Operation of the gas line is contracted to Utility Safety and Design, Inc. (USDI).

Currently, MMU has five operators qualified to perform basic tasks for the gas line. Locates, odor calls, valve operation and first responders are some of the tasks that the MMU staff can perform.

USDI performs the rest of the duties for the gas line. Maintenance and repair of regulators, valves, odorizer and other equipment must be performed by qualified operators. Leak and corrosion survey of the pipe must be performed on a regular basis. USDI performs all of these tasks and satisfies other regulatory compliance.

IMPROVEMENTS NEEDED

The gas line was built large enough to serve future industrial development. If new industry has a need for gas and is near the gas line, regulators can be installed to serve the new industry. Three areas have valves, tees and plugs stubbed out for future development. The industrial site on Highway 20, north of the Service Center and the railroad tracks and the Electric Production Facility's regulator station are the three locations for future connections. If there are needs for gas near the gas line route, a regulator station can be built.