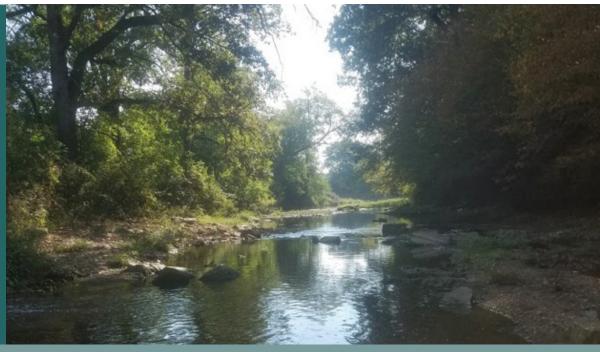
# CITY OF ROLLA INTEGRATED MANAGEMENT PLAN



Final Report







City of Rolla, MO

March 4, 2019





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Attachment A. City of Rolla's Anticipated Clean Water Act Compliance Timeline.

Attachment B. IMP Cost Projection Summary.





# 1. Introduction

The City of Rolla, Missouri (City) is currently facing a number of infrastructure challenges and evolving state and federal water quality drivers that will impact planning decisions and drive investments over the next several decades (**Attachment A**). The City's situation is not unique, as aging infrastructure, increasingly complex water quality issues, and challenging economic conditions have strained municipal utility management across the country. These issues have been further complicated by federal and state regulatory structures that historically focused on enforcing individual Clean Water Act (CWA) requirements on fixed schedules, without full consideration of all obligations that a utility may be facing or whether compliance efforts will result in meaningful improvements in environmental and public health.

The purpose of this integrated plan is to identify affordable solutions and implementation schedules that address the City's infrastructure needs, improve water quality, and provide regulatory certainty over the next 15 to 20 years. Results from this planning effort will be used to inform future capital improvement projects and extend CWA compliance schedules so that user rates remain affordable over the planning period.

# 1.1 Integrated Planning Background

In 2011, the US Environmental Protection Agency (EPA) recognized that when afforded the opportunity to use regulatory flexibilities to balance wastewater and stormwater improvements, municipalities can appropriately prioritize and schedule work that is affordable and aligned with community priorities and meet CWA requirements<sup>1</sup>. In 2012, EPA<sup>2</sup> released the *Integrated Municipal Stormwater and Wastewater Planning Approach Framework* (Framework), which outlined the guiding principles that municipalities should follow if they wish to pursue this integrated planning approach.

The Missouri Department of Natural Resources (MDNR) also understands the value that integrated planning provides and supports municipality efforts to develop implementation schedules that align with community priorities and affordability<sup>3</sup>. Since the passage of Missouri's municipal affordability statutes (644.145 RSMo), MDNR has developed robust processes for evaluating the municipal financial capability to afford wastewater and stormwater programs and has emerged as a leading state agency in these assessments.

In their 2012 Framework, EPA recommended a number of overarching principles that municipalities should consider when developing integrated plans; MDNR's integrated planning framework closely mirrors EPA's Framework. According to EPA, integrated plans should:

1. Reflect State requirements and planning efforts and incorporate State input on priority setting and other key implementation issues.

Stoner, N. and C. Giles. 2011. Achieving Water Quality through Integrated Municipal Stormwater and Wastewater Plans. October 27, 2011. Washington DC.

<sup>&</sup>lt;sup>2</sup> Stoner, N. and C. Giles. 2012. Integrated Municipal Stormwater and Wastewater Planning Approach Framework. June 5, 2012. Washington DC.

<sup>&</sup>lt;sup>3</sup> Hirschvogel, L. 2016. Missouri Integrated Planning Framework. Water Protection Program. Jefferson City, Missouri.





- 2. Provide for meeting water quality standards and other CWA obligations by utilizing existing flexibilities in the CWA and its implementing regulations, policies, and guidance.
- 3. Maximize the effectiveness of funds through analysis of alternatives and the selection and sequencing of actions needed to address human health and water quality-related challenges and non-compliance.
- 4. Evaluate and incorporate, where appropriate, effective sustainable technologies, approaches and practices, particularly including green infrastructure measures, in integrated plans where they would provide more sustainable solutions for municipal wet-weather control.

"The integrated planning approach does not remove obligations to comply with the CWA [Clean Water Act], nor does it lower existing regulatory or permitting standards, but rather recognizes the flexibilities in the CWA for the appropriate sequencing and scheduling of work."

From EPA's 2012 Integrated Municipal Stormwater and Wastewater Planning Approach Framework

- **5.** Evaluate and address community impacts and consider disproportionate burdens resulting from current approaches as well as proposed options.
- **6.** Ensure that existing requirements to comply with technology-based and core requirements are not delayed.
- 7. Ensure that a financial strategy is in place, including appropriate fee structures.
- **8.** Provide appropriate opportunity for meaningful stakeholder input throughout the development of the plan.

EPA and MDNR recognize that municipalities will need to develop integrated plans that are appropriately tailored to the size of the municipality and the scope and complexity of the issues they face. However, EPA suggests that all integrated plans should generally address the following six elements:

- **Element 1:** A description of the water quality, human health and regulatory issues to be addressed.
- **Element 2:** A description of existing wastewater and stormwater systems under consideration and summary information describing the systems' current performance.
- **Element 3:** A process which opens and maintains channels of communication with relevant community stakeholders in order to give full consideration of the views of others in the planning process and during implementation of the plan.
- **Element 4:** A process for identifying, evaluating, and selecting alternatives and proposing implementation schedules.





**Element 5:** A process for evaluating the performance of projects identified in a plan.

**Element 6:** An adaptive management process for making improvements to the plan.

# 1.2 Rolla's Infrastructure and Regulatory Challenges

The City recognizes that the EPA and MDNR integrated planning frameworks provide a powerful tool that can be used to efficiently and effectively satisfy CWA requirements and meet

evolving regulatory obligations over time, while continuing to address issues associated with managing existing and future infrastructure investments. The City initiated the current integrated planning effort after multiple and significant regulatory challenges and infrastructure demands highlighted the importance of balancing and prioritizing investments.

In 2011, the City entered into a Voluntary Compliance Agreement with MDNR to improve wet-weather flow management strategies through development and implementation of a Bypass Elimination Plan<sup>4</sup>. The Voluntary Compliance Agreement allows the City 10 years to reduce inflow and infiltration (I/I), minimize unauthorized sanitary sewer overflows (SSOs), and eliminate bypasses caused by excess flow at two (Vichy Road and Southeast) of the City's three WWTPs. The City has made significance progress reducing I/I and SSOs in the system and intends to address wet-weather management issues at the WWTPs to fully meet their obligations by the 2021 deadline.



Rolla's IMP was developed using EPA's six-step process

In addition to improving wet-weather management, the City understands that each of the three WWTPs must

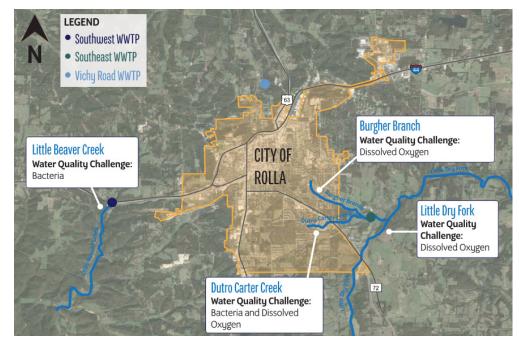
be upgraded over the next 20 years to replace aging components that are beyond their useful life, resolve capacity limitations to allow for future growth and development, and ensure that treatment performance is sufficient to protect and restore impaired waters in the City's service area. The City recently completed a Facility Plan<sup>5</sup> which outlined potential upgrade alternatives, costs, and schedules to meet these needs, but understand that the improvements must be balanced with respect to regulatory requirements and other wastewater and stormwater system needs to ensure that services remain affordable to residents.

<sup>&</sup>lt;sup>4</sup> City of Rolla. 2012. Bypass Elimination Plan for the Southeast and Vichy Road Wastewater Treatment Plants. Prepared by HDR and CM Archer. <a href="http://www.rollacity.org/pubworks/forms/Bypass%20&%20Elimination%20Plan.pdf">http://www.rollacity.org/pubworks/forms/Bypass%20&%20Elimination%20Plan.pdf</a>

<sup>&</sup>lt;sup>5</sup> City of Rolla. 2018. Facility Plan for the Southeast, Vichy Road, and Southwest Wastewater Treatment Plants and Collection Systems. Completed by HDR and Archer Elgin, June 2018.







Rolla's IMP prioritizes future wastewater and stormwater infrastructure investments to improve water quality in streams across the City

The City and MDNR recently negotiated a Memorandum of Understanding (MOU) to acknowledge that Rolla is developing an integrated management plan (IMP) for stormwater and wastewater investments using the federal and state frameworks to prioritize projects within their wastewater and stormwater systems. Results of this planning effort will allow the City to affordably schedule and implement projects to address infrastructure needs and meet CWA requirements over time. In return, MDNR has committed to use the IMP to guide future regulatory decisions and compliance schedules.

The City retained HDR, Inc., and CM Archer Group, P.C., to assist in developing the IMP. This planning effort is focused on developing a prioritized and balanced infrastructure investment strategy to address wastewater and stormwater management needs, including programmatic and capital funding for the wastewater collection, wastewater treatment, and stormwater management programs.

# 1.3 Rolla's IMP Approach

The City followed EPA's integrated planning principles and applied the six steps to develop a tailored, adaptive IMP that outlines short- and long-term wastewater and stormwater plans to address infrastructure needs and achieve CWA compliance. The IMP identifies affordable projects and improvements that address the most critical infrastructure and regulatory drivers first, while allowing adequate time to assess the public health and water quality benefits resulting from those projects. This phased approach will allow the City to gather necessary information to measure implementation progress, inform future infrastructure planning, and affordably adapt the IMP over time, if necessary. Results form the City's planning efforts are described in the sections that follow, and are organized according to the six steps identified by EPA.





# 2. Establish the Vision

Element 1 of EPA's framework involves identifying the important regulatory, environmental, human health, and infrastructure issues that will be addressed in the planning process. Early in the planning process, the City identified a set of goals and issues that should be addressed by the IMP. The City's initial IMP goals are as follows:

- Plan for necessary improvements at three WWTPs. Wastewater is treated at three
  WWTPs across the City: the Southeast WWTP, the Vichy Road WWTP, and the
  Southwest WWTP. Addressing aging infrastructure to comply with regulatory
  requirements and responsibly plan for future growth and service demands at these three
  facilities is the City's primary IMP goal in the near-term. This plan outlines both the
  anticipated near-term (10 years) and long-term (20 years) upgrade needs for each of the
  WWTPs.
- Improve water quality in City streams while reducing regulatory uncertainty. The City faces a number of evolving state and federal water quality drivers that impact wastewater and stormwater infrastructure planning (Attachment A). In particular, dissolved oxygen impairments for Dutro Carter Creek, Little Dry Fork Creek, and Burgher Branch are an important challenge facing the City that have the potential to lead to significant treatment upgrades in the future. In addition, the Little Beaver Creek bacteria impairment could lead to more stringent regulatory controls for the City's stormwater program. The plan includes efforts to address impairments in an iterative approach to provide at least ten to twenty years of regulatory certainty for these regulatory drivers.
- Maintain affordable rates. Financial impacts on all City ratepayers must be carefully
  considered as IMP alternatives are developed or implemented. This plan evaluates
  anticipated service cost increases with respect to state and federal CWA affordability
  guidance to confirm that future rates remain affordable to the City's ratepayers.
- Address community priorities. Integrated planning is a community-driven process.
   Stakeholder and community involvement is critical to developing an effective IMP because it helps the City identify and prioritize issues that are important to residents and ratepayers. It also allows the City to communicate the known infrastructure and water quality problems and how the proposed projects will address these problems and provide additional benefits.





# 3. Evaluate Existing System Performance

The second step of the City's IMP process is to evaluate the performance and needs of its existing wastewater and stormwater systems. This step directly addresses Element 2 of EPA's IMP framework and forms the basis for developing IMP alternatives (Element 4). As part of this effort, the City:

- Characterized current surface water quality conditions to identify current and potential future water quality priorities in the City;
- Summarized wastewater and stormwater system asset information to present a comprehensive view of the existing wastewater and stormwater systems; and
- Compiled existing wastewater and stormwater data to understand the effectiveness of existing processes and develop performance baselines that can be used to measure future improvements.

Guided by the IMP Vision developed in Step 1, the City used the information collected in Step 2 to prioritize asset needs, identify critical issues or high priority areas, and outline important data needs that should be collected to address these issues. A summary of the existing system performance evaluation is included below.

# 3.1 Surface Water Quality Conditions

The City is located in the Ozark Highlands region of Missouri on the border of two ecological drainage units<sup>6</sup> (EDUs). The Ozark Highlands are characterized by diverse topographic, geologic, soil, and hydrologic conditions. A large number of springs are also located throughout the region. These conditions support a wide variety of terrestrial and aquatic organisms.

Because the City is located on a plateau between two EDUs, the watershed area that adjoins or intersects the City is large (270 square miles) and contains more than 140 miles of streams. Within the City itself however, there are only approximately eight miles of streams and two lakes. There are four prominent streams in the Rolla area (Little Beaver Creek, Burgher Branch, Little Dry Fork, and Dutro Carter Creek) that support aquatic life and recreational opportunities.

The State of Missouri has established water quality standards for streams and lakes, including those in Rolla. These standards are implemented by MDNR and specify surface water quality conditions that are considered protective of both aquatic life and public health. If MDNR finds that surface water quality standards are not met in a stream or lake, they could require that the City take corrective action if the impairment is attributed to activities within the City's jurisdictional area. Therefore, understanding current water quality conditions in the Rolla area is critical for establishing priorities through the IMP process.

<sup>&</sup>lt;sup>6</sup> An EDU is a distinct geographic area that has relatively homogeneous environmental conditions and aquatic communities. There are 17 EDUs in the state. EDUs form the basis for MDNR's biological monitoring program. The City is located on the border of EDU 23 and 25.



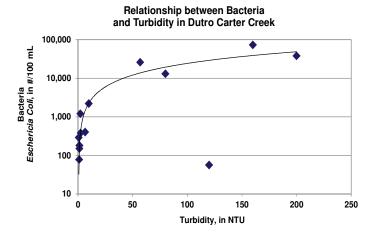


Section 303(d) of the federal Clean Water Act requires each state to periodically identify waters not meeting water quality standards that protect designated beneficial uses. Designated beneficial uses associated with waters in the Rolla area include: whole body contact recreation (e.g., swimming), secondary contact recreation (e.g., fishing, wading), protection of warm water aquatic life, human health-fish consumption and livestock and wildlife watering. The most recent MDNR 303(d) list of impaired waters<sup>7</sup> includes streams within and around the Rolla area that are impaired for either whole body contact recreation (due to high bacteria levels) or aquatic life protection (due to low dissolved oxygen). Frisco Lake is also impaired due to deposition of atmospheric mercury.

The IMP will provide solutions to address water quality standards impairments in Rolla's streams

| Waterbody ID | Waterbody           | Impaired Use                                | Pollutant           | Source                    |
|--------------|---------------------|---|---------------------|---------------------------|
| 1529         | Little Beaver Creek | Whole Body Contact<br>Recreation Category B | Bacteria            | Unknown                   |
| 1865         | Burgher Branch      | Warm-Water Habitat Aquatic<br>Life          | Dissolved<br>Oxygen | Unknown                   |
| 3569         | Dutro Carter Creek  | Warm-Water Habitat Aquatic<br>Life          | Dissolved<br>Oxygen | Southeast WWTP            |
| 3570         | Dutro Carter Creek  | Whole Body Contact<br>Recreation Category B | Bacteria            | Unknown                   |
| 1863/1864    | Little Dry Fork     | Warm-Water Habitat Aquatic<br>Life          | Dissolved<br>Oxygen | Southeast WWTP & Unknown  |
| 7280         | Frisco Lake         | Human Health Protection                     | Mercury             | Atmospheric<br>Deposition |

A review of data from Little Beaver and Dutro Carter Creeks indicates that bacteria levels are consistently above the Missouri state water quality criterion of 206 colonies/100 milliliters (mL), which is measured as a recreational season geometric mean value. In Dutro Carter Creek, sample results have ranged from 56 colonies/100 mL to to 73,000 colonies/100 mL. The geometric mean of all recreational season data is approximately 1,250 colonies/100 mL.



Instream bacteria levels increase during stormwater runoff events

Contemporaneous turbidity and bacteria data collected in 2011 demonstrate that bacteria levels are positively correlated with increased turbidity. Because turbidity generally increases due to stormwater runoff, these results suggest that nonpoint sources may be the primary source of bacteria loading in Dutro Carter Creek.

Bacteria levels in Little Beaver Creek are lower than Dutro Carter Creek but the geometric mean of all recreational season data is

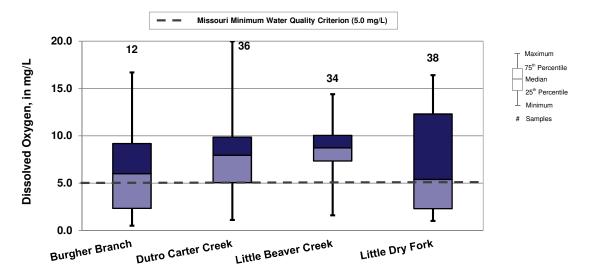
https://dnr.mo.gov/env/wpp/waterguality/303d/documents/2018-303d-list-cwc-approved-10-18-2018.pdf





approximately 650 colonies/100 mL. Turbidity data from Little Beaver Creek are not available to quantitatively evaluate potential sources but a qualitative review of the data suggest that high bacteria levels are related to stormwater runoff.

DO is necessary in streams and lakes to support aquatic life. MDNR has established a DO criterion of 5.0 milligrams per liter (mg/L) as a minimum concentration for the protection of aquatic life in warm water fisheries. MDNR considers a stream impaired for DO when more than 10% of collected DO measurements fall below this water quality criterion<sup>8</sup>. A review of DO data collected in Little Beaver Creek, Burgher Branch, Little Dry Fork, and Dutro Carter Creek indicates that MDNR's 303(d) list accurately characterizes DO conditions in the City. Of the four streams, only Little Beaver Creek meets the 5.0 mg/L criterion more than 90% of the time.



Dissolved oxygen levels are generally below the statewide criterion of 5.0 mg/L

As a means to restore beneficial uses, MDNR schedules and develops a Total Maximum Daily Load (TMDL) to address each impairment. The TMDL calculates the maximum pollutant load that a waterbody can assimilate while still being protective of the beneficial uses. Load allocations for the pollutant are then assigned to each point or non-point source, and an implementation plan is established to meet the TMDL targets. During the recent 303(d) assessment process, MDNR indicated that bacteria impairments in Little Beaver Creek and Dutro Carter Creek were prioritized for TMDL development in 2022; the remaining stream impairments were scheduled for the 2024-2028 timeframe.

A key benefit of EPA's Framework is that it can be used to extend regulatory compliance schedules as integrated plans are implemented and water quality benefits are realized. With respect to potential TMDLs on Little Beaver and Dutro Carter Creeks, the City believes that the IMP will serve as an appropriate alternative restoration approach that will be more beneficial and practicable for achieving water quality standards in these streams compared to TMDL development. In early 2018, MDNR agreed and extended all Rolla TMDL schedules out to the

https://dnr.mo.gov/env/wpp/waterquality/303d/docs/final-2018lmd-approved-cwc-4-6-2016.pdf





2024-2028 timeframe to allow the City to finalize and implement the IMP. MDNR has also indicated that the schedules can be extended further as water quality improves in the future.

# 3.2 Wastewater Treatment Systems

The City has three WWTPs (Southeast WWTP, Vichy Road WWTP, Southwest WWTP) that serve approximately 20,000 Rolla residents, 8,000 Missouri University of Science and Technology students, 500 residents of nearby Doolittle, MO, 250 residents in four adjacent sewer districts, and numerous commercial and industrial users. As described previously, the WWTP improvements will be needed over the next 10 to 20 years to address capacity issues, replace aging components, and effectively meet existing and future regulatory requirements. The City recently completed a Facility Plan<sup>9</sup> that included an in-depth evaluation of the existing condition and performance of each WWTP, as well as potential alternative improvements. A summary of the existing facilities are included in the section below. For more specific information regarding the WWTPs, including service area maps, refer to the Facility Plan. Recommended WWTP improvements from the Facility Plan are summarized in **Section 6.1** of this report.

#### **Southeast WWTP**

The Southeast WWTP is located southeast of the City approximately one mile east of Highway 72. This facility is comprised of two distinctly different treatment trains, referred to as the East and West Plants, and has a average daily flow (ADF) design capacity of 4.8 million gallon per day (MGD). The Southeast WWTP has a service area of 7,267 acres and covers the majority of the area currently developed within the city limits. This area includes the downtown commercial district, industrial areas located in the northern extent of the City, and the Missouri University of Science and Technology. Outfall 001 of the Southeast WWTP discharges to Burgher Branch. The WWTP operates under discharge permit MO-0050652, which was renewed September 1, 2018.

The West Plant was constructed in a number of phases during the 1950s. It has been periodically modified since initial construction and includes preliminary, primary, and secondary treatment. The East Plant consists of preliminary treatment followed by extended aeration activated sludge. The East Plant was originally constructed in 2000 and was modified in 2012 to consolidate West and East Plant flows and add disinfection facilities. Waste sludge from both plants is stabilized in a lagoon prior to land application. As part of the Voluntary Compliance Agreement with MDNR, the City is working to reduce wet weather discharges from Outfalls 002 and 003 but elimination of these bypasses by 2021 will likely require auxiliary treatment and increased disinfection capacity to treat wet weather flow. The City is also evaluating improvements that will facilitate compliance with future ammonia and nutrient requirements and improve water quality in impaired waters downstream from the discharge.

#### Vichy Road WWTP

The Vichy Road WWTP is located in the northwest part of the City near Vienna Road. The Vichy Road WWTP service area is the northern extent of the city limits, due west of the intersection of

<sup>&</sup>lt;sup>9</sup> City of Rolla. 2018. Facility Plan for the Southeast, Vichy Road, and Southwest Wastewater Treatment Plants and Collection Systems. Completed by HDR and Archer Elgin, June 2018.





US Highway 63 and Interstate 44. The service area is 747 acres and serves predominantly residential developments (Attachment B). Outfall 001 of the Vichy Road WWTP discharges to an unnamed tributary of Spring Creek. The WWTP operates under discharge permit MO-0047031, which was renewed November 1, 2018.

Prior to 1970, the Vichy Road WWTP consisted of an activated sludge facility. Since that time, primary treatment and a peak flow clarifier was added. In 1996 improvements were made to include new influent screening, a nitrifying trickling filter, and a secondary clarifier. The Vichy Road WWTP has a permitted ADF design capacity of 0.4 MGD. The City is working under the Voluntary Compliance Agreement to reduce wet weather discharges from Outfall 002. Similar to the Southeast WWTP, elimination of the Vichy WWTP bypass by 2021 will require high rate treatment and disinfection of peak wet weather flows. The City is also evaluating improvements that will facilitate compliance with current disinfection requirements and future ammonia and nutrient requirements.

#### **Southwest WWTP**

The Southwest WWTP located west of the City near Interstate Highway 44. The facility has a ADF design capacity of 1 MGD and was constructed in 2007. It operates under discharge permit MO-0047023, which was reissued November 1, 2018. The WWTP includes preliminary treatment, activated sludge biological treatment, and disinfection and discharges to Little Beaver Creek. Much of the service area is currently undeveloped; however, extensive growth associated with the proposed Rolla West development is anticipated within the project planning period. The projected Southwest WWTP service area is 4,227 acres. Space was provided on the site to expand the secondary treatment to accommodate the anticipated future growth. The City is evaluating improvements that will facilitate compliance with future ammonia and nutrient requirements and improve water quality in impaired waters downstream from the discharge.

# Wastewater Collection System

The City wastewater collection system is divided into three discrete service areas which drain to their respective WWTPs, as described above. The City has worked diligently to develop an extensive, dedicated GIS-based information management system to manage the collection system. The Facility Plan includes a detailed description of wastewater collection system information contained in the GIS database. A brief summary of the collection system inventory and performance are included in the sections below. For more specific information regarding the wastewater system, including system maps, refer to the Facility Plan.





#### **System Inventory**

The spatial location and connectivity of all known pipes and structures are included in the GIS. The GIS database includes over 3,600 pipe assets (142 miles) that have various designations such as public, private, or related to Missouri S&T. It also includes abandoned assets and proposed assets that are not yet in service. Active public sewers account for

The City maintains a comprehensive GIS database of their collection system assets

| Туре                    | Length (mi) | Length (%) |
|-------------------------|-------------|------------|
| Abandoned Sewer Main    | 2.1         | 1.5%       |
| Missouri S&T Sewer Main | 1.0         | 0.7%       |
| Private Force Main      | 0.4         | 0.3%       |
| Private Sewer Main      | 0.8         | 0.6%       |
| Proposed Sewer Main     | 0.8         | 0.5%       |
| Public Force Main       | 4.9         | 3.5%       |
| Public Sewer Main       | 118.0       | 82.9%      |
| Public Trunk Line       | 14.3        | 10.0%      |
| Total                   | 142.4       | 100.0%     |

approximately 96% (137 miles) of all pipes in the system.

Pipe attributes such as material, size, installation date, and invert elevation are available in GIS for much of the system. Pipe materials and sizes are nearly 100% complete and installation dates are available for approximately 97% of the pipes. A majority of the system is made up of polyvinyl chloride pipe (PVP, 51%) and vitrified clay pipe (VCP, 40%). The most significant data gap with respect to pipes is invert elevations. Only 5% of pipe entries in the database include invert information.

The GIS database also includes over 3,500 manholes and other structures. Approximately 99% of the structures contained in the database are manholes, while the other 1% of structures includes lift stations and lampholes. Lampholes are rarely constructed today, as they are not suitable access points for inspections, cleaning, or rehabilitation. For this reason, many utilities are replacing lampholes with manholes in their systems. According to the GIS database, there are 13 lampholes in the system.

Structure attributes such as material, depth, and installation dates are available in GIS for much of the system. Known manhole materials in the system are primarily brick and pre-cast. However, a majority (about 73%) of the manhole materials are not listed. Further, only 40% of manhole entries include depths. Filling in the missing materials would position the City to be able to make risk-based decisions for future rehabilitation (for structural repairs and I/I reduction) and replacement of manholes. Installation dates for manholes, like pipes, are nearly complete, with only about 6% of dates missing. Remaining missing manhole ages could be estimated using the age of adjacent infrastructure and subdivision platting.



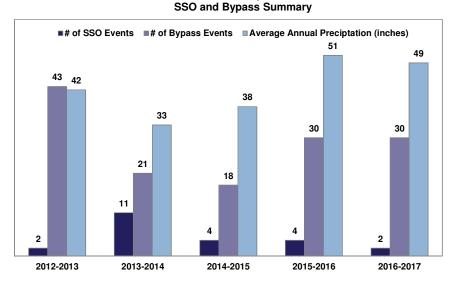


#### **Bypass Elimination Plan Progress**

As described in Section 1.2, the City developed a Bypass Elimination Plan in 2012 to reduce I/I, minimize SSOs, and ultimately eliminate bypasses at the Vichy Road and Southeast WWTPs that are caused by excess flow in the system. The Bypass Elimination Plan outlines a

prioritized, 10-year long schedule to conduct flow and rainfall monitoring, complete system inspections, and implement repair and rehabilitation activities. The estimated annual cost of the I/I reduction program was \$620,000 (in 2012 dollars).

The City has measured significant collection system performance improvements since implementing the Bypass Elimination Plan. Since 2012, the number of SSO



Southeast and Vichy Road WWTP

The City continues to make significant progress towards eliminating SSOs and bypasses

events has generally decreased even though annual precipitation amounts have increased. Most recently, the City only experienced two SSO events in 2017 compared to a maximum of 11 in 2014. As the City continues to reduce I/I, SSO events will continue to decrease. The number of bypass events has also been reduced from a maximum of 43 in 2013 to 30 in 2017. Planned upgrades at the WWTPs will serve to eliminate the remaining bypasses.

# 3.4 Stormwater Management System

The City's stormwater conveyance system includes a variety of manmade and natural features, including curbs, gutters, storm drains, pipes, box culverts, and detention or retention basins. The City's system currently includes approximately 60 miles of pipe and 4,600 structures. Effective management of the stormwater system is necessary for meeting important environmental and public safety goals such as improving water quality, meeting regulatory requirements, minimizing flooding impacts, and reducing property damage.

The City reviewed their stormwater system assets, as well as performance relative to regulatory goals, to characterize the current status and potential needs of their stormwater system. A summary of the evaluation is included in the sections that follow.

#### **System Inventory**

The GIS database includes over 4,600 pipe assets. These assets contain attributes such as pipe material, diameter, and installation date. More than 95% of pipe assets include both material and diameter data. Unlike the collection system however, the GIS database only

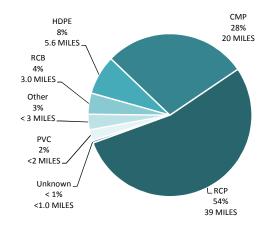




contains age data for approximately 10% of the stormwater pipes, most of which are attributed to those pipes installed after 2010. The City should continue to document installation dates as new storm sewers are constructed. To develop a more holistic understanding of the system and potential future rehabilitation needs, the missing records could be assessed and filled in based on as-built drawings, subdivision platting, or the installation date or age of the nearest sanitary sewer assets.

As is common in most municipalities, reinforced concrete pipe (RCP) and corrugated metal pipe (CMP) represent the majority (83%) of pipe materials present in the stormwater system.

Condition assessment data are not available for the City's system but the average life span of most materials present is generally assumed to range between 50 and 75 years, although the actual design life will vary based on induced stress, installation methods, proximity to groundwater, and soil corrosiveness. Of the materials present however, CMP has the shortest average lifespan (30 years) before it is prone to rust and structural deficiencies that cause sinkholes, flooding, or pavement failures.



The City's GIS database also includes the location of approximately 4,600 structures. These assets include inlets (72%), manholes Corrugated metal pipe is prone to structural deficiencies and must be replaced to maintain a dependable stormwater system

(1%), junction boxes (7%), box culverts (3%), and other non-standard and unknown (17%) structures. Similar to the pipes, age data are only available for approximately 10% of the structures.

The City's stormwater system also includes 31 stormwater basins that are used to store excess runoff from approximately 2,400 acres of land in and around the City. The City's system includes both detention and retention basins; of the 31 basins included in the GIS database, 26 are listed as detention basins and five are listed as retention basins. The purpose of this retention and detention storage is to help control stormwater discharges from developments to protect downstream areas from flooding, reduce damage to receiving streams, and to assure the long-term adequacy of storm drainage systems<sup>10</sup>. Detention basins are areas that reduce peak runoff rates by holding stormwater runoff during and shortly after a storm event. Retention basins collected and store runoff for a longer period of time and often have agricultural, recreational, or aesthetic value.

#### **Stormwater Management Program**

In 1999, federal water quality regulations were expanded to include permit requirements for small (population <10,000) municipal separate storm sewer systems (MS4s). These small

<sup>&</sup>lt;sup>10</sup> City of Rolla. 2017. City of Rolla Stormwater Design Standards. Prepared by Integrity Engineering, Inc. Revised November 7, 2017. https://rollacity.org/pubworks/forms/design-guide.pdf





systems are referred to as Phase II MS4s and are regulated by MDNR. The City is permitted under a general permit (Permit No. MOR-040033), which was reissued on October 1, 2016<sup>11</sup>. Federal (40 CFR 122.34) and state (10 CSR 20-6.200(5)(A)1-6)) regulations stipulate that MS4 permits include provisions for developing, implementing, and enforcing a stormwater management program and plan (SWMP) to reduce pollutant discharges to the maximum extent practicable (MEP).

The MS4 permit stipulates that the City must revise their SWMP to reflect the most recent operating permit, if necessary, and to prepare and submit progress reports to MDNR every odd year during the life of the permit. The City is currently working to revise their SWMP to reflect the operating permit and incorporate the alternatives developed through the IMP process (see Section 6.1). The City also maintains past progress reports and other information relevant to the MS4 program on their stormwater website at www.rollastormwater.com.

The City's ability to maintain compliance with the requirements of the MS4 permit is an important consideration for the IMP. The City's most recent SWMP<sup>12</sup> reflects federal (40 CFR 122.34) and state (10 CSR 20-6.200(5)(A)1-6)) regulations which require six (6) minimum control measures (MCMs) to meet the MEP standard. The six MCMs are:

- 1. Public Education and Outreach Permittees are required to conduct outreach activities to communicate the impacts of stormwater and provide steps that the public can take to reduce pollutants in stormwater runoff.
- 2. Public Involvement and Participation Permittees are required to provide opportunities for citizens to participate in program development and implementation.
- 3. Illicit Discharge Detection and Elimination (IDDE) Permittees are required to develop and implement a plan to detect and eliminate illicit discharges to the storm sewer system.
- 4. Construction Stormwater Runoff Control Permittees are required to develop, implement and enforce an erosion and sediment control program for construction.
- 5. Post-Construction Stormwater Management in New Development Redevelopment - Permittees are required to develop, implement and enforce a program to address discharges of post-construction stormwater runoff from new development and redevelopment areas.
- 6. Pollution Prevention and Good Housekeeping for Municipal Operations -Permittees are required to develop and implement a program with the goal of preventing or reducing pollutant runoff from municipal operations.

The City is responsible for developing, implementing, and maintaining best management practices (BMPs), as well as measurable goals, for each of the six MCMs. EPA<sup>13</sup> defines measurable goals as "...BMP design objectives or goals that quantify the progress of program implementation and the performance of...BMPs." EPA further "...strongly recommends that measurable goals include, where appropriate, the following three components:

https://dnr.mo.gov/env/wpp/permits/issued/docs/R040000.pdf

<sup>12</sup> City of Rolla. 2013. Storm Water Management Plan for the City of Rolla. Prepared by City of Rolla Public Works, June 2013. https://rollacity.org/pubworks/forms/City%20of%20Rolla%20Storm%20Water%20Management%20Plan.pdf

13 US Environmental Protection Agency (EPA). 2001. Measureable Goals Guidance for Phase II Small MS4s. Office of Water.

Washington, DC. https://www3.epa.gov/npdes/pubs/measurablegoals.pdf





- The activity, or BMP, to be completed;
- · A schedule or date of completion; and
- A quantifiable target to measure progress toward achieving the activity or BMP."

According to EPA, measurable goals that include these three components and are easy to quantify and allow the permittee and regulatory agencies to assess progress at reducing pollutants to the MEP. The City's SWMP includes 45 current BMPs and 60 planned BMPs. Collectively, BMP progress is tracked using nearly 170 measureable goals. Progress towards meeting each of the measureable goals has been limited by budgetary and staffing constraints. As the City revises the SWMP to address the new permit and incorporate IMP recommendations, the City will develop a more focused set of BMPs and goals that improve water quality and can be successfully implemented given the available financial and staffing resources.

As required by their MS4 permit, the City implements a variety of stormwater management practices to reduce pollutants to the maximum extent practicable

|        | Minimum Control Measure  | Number of<br>Current BMPs | Number of<br>Planned BMPs | Number of<br>Measureable<br>Goals |
|--------|--|---------------------------|---------------------------|-----------------------------------|
| MCM 1: | Public Education and Outreach  | 10                        | 15                        | 42                                |
| MCM 2: | Public Involvement and Participation   | 10                        | 10                        | 22                                |
| MCM 3: | Illicit Discharge Detection and Elimination                                  | 6                         | 0                         | 21                                |
| MCM 4: | Construction Stormwater Runoff Control                                       | 7                         | 9                         | 31                                |
| MCM 5: | Post-Construction Stormwater Management in New Development and Redevelopment | 10                        | 11                        | 21                                |
| MCM 6: | Pollution Prevention and Good Housekeeping for Municipal Operations          | 12                        | 15                        | 30                                |
|        | Total  | 33                        | 46                        | 167                               |





# Community Outreach

Outreach is an important part of the planning process because the community's input helps to highlight important infrastructure, environmental, and public health needs and inform development of targeted alternatives to address those needs. Element 3 of EPA's Framework suggests that municipalities pursue the following principles when conducting integrated planning outreach activities:

- Provide appropriate opportunities that allow for meaningful input during the identification, evaluation, and alternative selection phases of the planning effort,
- Make new information available and provide opportunities for input into the development of proposed modifications of the plan, and
- Allow public involvement to assist in evaluating the opportunities and effectiveness of potential green infrastructure alternatives, if they are relevant to the plan.

The City followed these three principles as the IMP was developed and focused on communicating with three distinct stakeholder groups: community residents, the Rolla City Council (Council), and MDNR staff.

#### Communication with Residents 4.1

Outreach efforts with community residents focused on preparing and providing relevant information to educate the community at large and obtaining high-level input from interested stakeholders. Several communication methods were used to accomplish these goals. First, a dedicated project website<sup>14</sup> was created to provide a convenient way for the public to access information. The website includes background information about the IMP, supporting documents and reports, and other relevant educational materials. The City will continue to use this website to distribute information as the IMP is implemented.

In addition to the website, the City prepared and distributed a project factsheet to introduce the IMP, share the desired outcomes, and provide opportunities for the public to get involved. The factsheet was hosted on the project website and was made available to interested residents at an open house event on March 12, 2018. More than 80 residents attended the March open house event. At the open house, the City staff and their consultants discussed the IMP objectives, anticipated wastewater and stormwater improvements, potential user rate outcomes, and implementation schedules with interested residents.

#### 4.2 Council Briefings

In addition to conducting broader outreach with the community, the City met with Council several times throughout development of the IMP so that they were informed and could provide input into the planning process. Those meetings included the following:

September, 25, 2017 - The City and their consultants met with the Council during a workshop session to provide a progress update on the Voluntary Compliance

<sup>14</sup> https://rollacity.org/pubworks/cip.shtml#imp





Agreement, describe the results of the preliminary engineering report<sup>15</sup> that identified potential WWTP upgrade alternatives and user rate impacts, and discuss the benefits of EPA's integrated planning process.

- October 16, 2017 During this Council meeting, the Council authorized an agreement to initiate the IMP.
- March 5, 2018 During this Council meeting, the City gave a brief updated and reported that the IMP information would be presented at the March 12 open house event.
- May 7, 2018 During this Council meeting, the City and their consultants met with the
  Council to present an update on the IMP and provide additional details on the
  anticipated Southeast and Vichy Road WWTP upgrades. Representatives from MDNR
  attended this meeting and publicly supported the City's efforts to develop an IMP for the
  wastewater and stormwater systems. The Council also authorized an agreement for
  design and bid services for the WWTP upgrades at this meeting.

Upon completion of the planning process, the final IMP will be presented to the Council for their approval and direction in implementing the plan. In the context of EPA's Framework, community outreach should be an ongoing process that is used to inform and refine IMP goals and outcomes over time. Therefore, the City expects that IMP will be periodically reviewed through by the City Council and the public at large.

#### 4.3 MDNR Coordination

The City met with MDNR staff several times during the development of the IMP to gain consensus on the IMP goals and objectives, discuss regulatory issues and infrastructure improvements that would be addressed by the plan, and review the potential implementation schedule. The City also coordinated with MDNR to ensure that the conditions and effluent limits contained in the new and renewed discharge permits for the each of the three WWTPs reflect the outcomes of this IMP. Going forward, the City will continue to coordinate with MDNR to provide progress updates, periodically review anticipated infrastructure needs and regulatory requirements, and ensure that IMP project schedules are reflected in any regulatory compliance schedule.

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<sup>&</sup>lt;sup>15</sup> City of Rolla. 2018. Final Preliminary Engineering Report for the Southeast, Vichy Road, and Southwest Wastewater Treatment Plants and Collection System. Prepared by HDR, Inc., and CM Archer, PC. February 2018. <a href="https://rollacity.org/pubworks/forms/cip/Sewer%20Plant%20Upgrades%20-%20Final%20Engineering%20Report%20-%2020180409.pdf">https://rollacity.org/pubworks/forms/cip/Sewer%20Plant%20Upgrades%20-%20Final%20Engineering%20Report%20-%2020180409.pdf</a>





#### **Evaluate Alternative Solutions and Schedules** 6.

Element 4 of EPA's Framework includes the identification, evaluation, and selection of alternatives and implementation schedules for system and water quality improvements. For Rolla, the final wastewater and stormwater alternatives were selected and prioritized to affordably meet the immediate regulatory deadlines with the Voluntary Compliance Agreement and address critical infrastructure needs first, while providing flexibility to meet future anticipated regulatory requirements. The proposed improvements are expected to provide the greatest environmental benefits at the lowest cost to the community.

As the IMP is implemented over time, the City will continue to monitor and evaluate their environmental, regulatory, and system needs and modify future implementation actions, if necessary (EPA Elements 5 and 6, see Section 7). Descriptions of the City's planned wastewater treatment, wastewater collection, and stormwater management solutions are presented below and costs are detailed in Attachment B.

#### Wastewater Treatment Plant Upgrade Alternatives 6.1

In their recent Facility Plan, the City evaluated alternatives to address capacity needs and meet regulatory requirements at each of the three WWTPs over the next 20 years. Capacity needs were determined for each facility following a review of existing influent flow and analytical data, as well as detailed population, flow, and loading projections over the next 20 years. Regulatory drivers considered during development of the WWTP alternatives include both existing and anticipated requirements most likely to impact discharge permit conditions for each of the facilities over the next 20 years. It should be noted that the timing and impact of these drivers was evaluated based on the information available at the time this IMP was drafted, and is subject to change as the federal and state regulatory environments evolve over time. During future implementation phases, regulatory requirements will be reevaluated to determine if IMP modifications are necessary.

The City determined that the most impactful CWA drivers for the WWTP include the following:

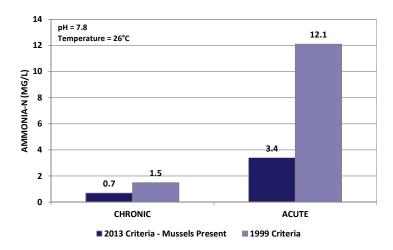
- Voluntary Compliance Agreement Requirements The City's highest, near-term regulatory priority is to improve wet-weather flow management at the Vichy Road and Southeast WWTPs by December 2021.
- Impaired Streams There are currently six water quality standards impairments in the City's service area (Section 3.1). Two of those impairments (DO in Dutro Carter Creek and Little Dry Fork) would directly impact the City's Southeast WWTP. Based on their current implementation schedule, MDNR intends to develop a TMDL for those streams in 2024 if water quality does not improve in the interim period.





• **Ammonia Criteria Revisions** – In 2013, EPA finalized new water quality criteria recommendations for total ammonia nitrogen (ammonia)<sup>16</sup>. The recommendations are

based on new toxicity data which demonstrate that some organisms, particularly some species of gill-breathing snails and freshwater mussels, are more sensitive to ammonia than other organisms in the national toxicity dataset used in previous criteria recommendations.



EPA's ammonia criteria recommendations may lead to lower effluent limits for the City's WWTP over the next 10 years

The new criteria

could potentially result in a 50% to 70% reduction in effluent limits at each of the three WWTPs. MDNR is currently considering the EPA ammonia recommendations and is expected to adopt them into Missouri's regulations within the next five years. As a result, lower ammonia limits will likely be required within the next two permit cycles (10 years) at each of the WWTPs.

• Nutrient Removal Requirements – The timing and impact of nutrient (total nitrogen and total phosphorus) removal drivers are uncertain because statewide stream nutrient regulations have not yet been adopted. In January 2018, MDNR adopted lake nutrient criteria into the state regulations; EPA approved those criteria in December 2018. The lake criteria will not impact the City directly, but MDNR's proposed implementation plan may set a precedent for all municipal discharges in the future. In their proposal, MDNR outlined a three-phased approach for implementing nutrient removal. The phases include monitoring, voluntary optimization of existing facilities, and then final effluent limits. The final effluent limits have not been defined but would likely be set at levels achievable through biological nutrient removal (10 mg/L total nitrogen, 1 mg/L total phosphorus). These phases would be implemented over three permit cycles (15 years).

In the Facility Plan, the City identified and evaluated seven alternatives to meet the projected capacity needs and regulatory drivers over the next 20 years. Each of the alternatives includes two phases of improvements, which were scheduled based on infrastructure need, funding availability, and the timing of anticipated regulatory drivers. A brief summary of the alternatives

<sup>&</sup>lt;sup>16</sup> US Environmental Protection Agency. 2013. Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater. Office of Water. Washington, DC. EPA 822-R-13-001.





is included below. More detailed information is available in the Facility Plan and associated Addendum<sup>17</sup>.

The WWTP Facility Plan outlines phased improvements that allow the City to meet their infrastructure and regulatory needs

| WWTP       | Regulatory Drivers   | Alternative | Phase 1<br>Improvements<br>Implemented<br>by 2021   | Phase 2<br>Improvements<br>Implemented<br>beyond 2031† | Total Capital<br>Cost‡ |
|------------|--|-------------|---|--|------------------------|
|            | Existing 1) Voluntary Compliance Agreement                           | 1*          | Construct New WWTP \$7.96 million   | Add Nutrient<br>Removal<br><i>\$1.3 million</i>        | \$9.3 million          |
| Vichy Road | Future 2) Ammonia 3) Nutrients                                       | 2           | Pump to Southwest<br>WWTP<br>\$7.95 million   |  | \$7.95 million         |
|            | Future   | 1*          | **  | Add Nutrient<br>Removal<br><i>\$1.8 million</i>        | \$1.8 million          |
| Southwest  | Peak flow disinfection     Ammonia     Nutrients                     | 2           | Expand Capacity to Accept Vichy Flows & Add Peak Flow Disinfection \$6.4 million                        | Add Nutrient<br>Removal<br>\$2.5 million               | \$8.9 million          |
|            | Existing 1) Voluntary Compliance Agreement 2) Little Dry Fork, Dutro | 1*          | Add Peak Flow<br>Disinfection & Ammonia<br>Removal<br>\$18.1 million                                    | Add Nutrient<br>Removal<br>\$10.3 million              | \$28.4 million         |
| Southeast  | Carter Creek DO Impairment  Future 3) Ammonia 4) Nutrients           | 2           | 1A – Add Peak Flow Disinfection & Ammonia Removal \$11.5 million  1B – Expanded Capacity \$10.1 million | Add Nutrient<br>Removal<br><i>\$10.0 million</i>       | \$31.6 million         |

<sup>\*</sup> Recommended alternatives from the Facility Plan.

#### **Vichy Road WWTP Alternatives**

The first alternative assumes that a new Vichy Road WWTP with 0.5 MGD capacity and peak flow disinfection facilities will be constructed on a new site contiguous with the existing site in Phase 1. Wet weather facilities include an influent splitter structure, mechanical coarse screen with a bypass channel, peak flow clarifier, chemical disinfection, and a chemical storage building. After disinfection, peak flows will be blended with plant flows prior to discharge. Dry weather facilities include influent screening, grit chamber, oxidation ditch, two secondary clarifiers, ultraviolet disinfection, RAS pump station, and a sludge lagoon. A post aeration structure will also be included to increase DO in the plant effluent. Phase 2 improvements

<sup>\*\*</sup>The Facility Plan identified Phase 1 improvements for Southwest that would only be implemented if additional capacity is needed to accommodate growth. However, additional capacity is not currently needed so the improvements were not considered in the development of this IMP. If new information suggests that additional capacity is needed, these assumptions will be revisited. †For planning purposes, the IMP currently assumes that nutrient removal will be required by 2031. However, actual compliance dates may be modified in during future phases of the plan to address future regulatory changes or infrastructure needs. ‡All costs are presented in 2018 dollars.

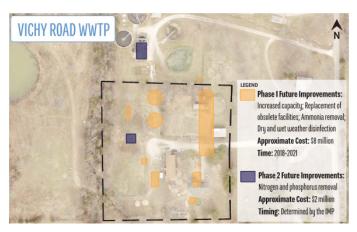
<sup>&</sup>lt;sup>17</sup> City of Rolla. 2018. Facility Plan Addendum for the Southeast, Vichy Road, and Southwest Wastewater Treatment Plants and Collection Systems. Completed by HDR and Archer Elgin, June 2018.





target phosphorus removal through chemical additions. The total estimated capital cost for this alternative is \$9.3 million (in 2018 dollars).

The second Vichy Road WWTP alternative evaluated was decommissioning the existing WWTP and pumping flows to the Southwest WWTP. The estimated capital cost of this alternative is \$7.95 million (in 2018 dollars). However, this alternative assumes that the Southwest WWTP is also expanded to accept the flows. As described below, the capital cost of expanding the Southwest WWTP (Alternative 2) is \$8.9 million.



Vichy Road WWTP alternative 1 improvements

Alternative 1 was selected because it is the lowest cost alternative when Southwest WWTP improvement costs are also considered.

#### **Southwest WWTP Alternatives**

In Alternative 1, Phase 2 improvements target phosphorus removal. The new wet, dry, and phosphorus removal facilities would be similar to those described for Alternative 1 at Vichy

Road WWTP. The total estimated cost for this alternative is \$1.8 million (in 2018 dollars).

Alternative 2 assumes that the Southwest WWTP is expanded to accept flows from the Vichy Road WWTP. It would include an expansion of both the wet and dry weather trains. Wet weather facilities include an influent splitter structure, mechanical coarse screen with a bypass channel, peak flow splitter structure, two peak flow clarifiers



Southwest WWTP alternative 1 improvements

and chemical storage building. The existing walker unit would be converted to a peak flow clarifier and an additional clarifier would be constructed. Sodium hypochlorite and ferric chloride would be added to disinfect peak flows. Dry weather facility expansion would include an additional oxidation ditch, secondary clarifier, upgraded ultraviolet disinfection, and an upgrade lift station. After disinfection, peak flows would be blended before discharge. In order to achieve phosphorus removal through chemical addition in Phase 2, a tertiary pump station would be needed. The total estimated capital cost for this alternative is \$8.9 million (in 2018 dollars).

In the Facility Plan, Alternative 1 was selected because it is the lowest cost alternative when Vichy Road WWTP improvement costs are also considered.





#### **Southeast WWTP Alternatives**

Alternative 1 addresses near term peak flow disinfection compliance issues associated with the Voluntary Compliance Agreement and will provide for additional ammonia removal. Improvements include eliminating the West Plant, installing new oxidation ditches, and constructing a third secondary clarifier to accommodate future flows. Phase 2 improvements that target nutrient removal include the addition of anoxic basins, a tertiary pump station, tertiary filtration, and a chemical building. The total estimated capital cost for this alternative is \$28.4 million (in 2018 dollars).



Southeast WWTP alternative 1 improvements

Alternative 2 splits Phase 1 into two subphases (1A and 1B) and was evaluated in order to provide a lower up front cost for peak flow disinfection and ammonia removal. Phase 1A can provide ammonia removal for an estimated 10-13 years until the existing clarifiers become overloaded (approximately 3.7 MGD), at which point Phase 1B will be constructed to increase capacity. Phase 1B increases the WWTP capacity by constructing two new oxidation ditches and an additional clarifier. As with Alternative 1, Phase 2 for

this alternative includes nutrient removal. The total estimated capital cost for this alternative is \$31.6 million (in 2018 dollars).

Alternative 1 was selected because it is the lowest cost alternative.

# 6.2 Wastewater Collection System Alternatives

As discussed in **Section 3.3**., the City has made significant progress in reducing I/I and related overflows in the collection system since implementing BEP activities. Because the data show that the City is improving system effectiveness, the City intends to maintain their collection system management approach and level of investment for the foreseeable future (**Attachment B**). This will allow the City to continue to make steady progress towards reducing overflows, improving water quality, and addressing aging infrastructure while fully funding the WWTP alternatives identified in **Section 6.1**. During future iterations of the IMP, collection system needs will be reevaluated to determine if additional investments are necessary. The City's planned collection system investments are summarized below.

Maintenance and Cleaning – Effective maintenance and cleaning is important for
continuing the downward trend in overflows in the collection system. The City currently
invests approximately \$133,000 (in 2018 dollars) per year cleaning pipes, responding to
emergency calls from the public, and conducting maintenance at the airport. The IMP
assumes that this level of effort and funding will be maintained.





- Evaluation and Repair System evaluation and repair activities are critical to reducing I/I and improving the efficiency and effectiveness of the collection system. Evaluation activities include prioritized inspection of sewer mains and manholes, smoke and dye testing, stream crossing inspections, and private I/I reduction efforts. On average, the City invests approximately \$750,000 (in 2018 dollars) per year on these activities. The IMP assumes that this level of effort and funding will be maintained.
- Renewal Renewal activities are necessary for extending the useful life of aging and deteriorating infrastructure. They also help to reduce I/I entering the system from public sources, minimize expensive failures and emergency repairs that pose a risk and are disruptive to the community, and mitigate potential exfiltration through broken pipes that adversely impact stream water quality. On average, the City invests approximately \$200,000 (in 2018 dollars) per year on lining and renewal activities. The IMP assumes that this level of effort and funding will be maintained.
- Capacity Enhancements Capacity enhancements (installing larger diameter pipes)
  are occasionally necessary to address community growth or improve the ability to
  convey wet-weather flows. Although it is highly dependent on the source and location,
  capacity enhancements can also be more cost-effective than volume reduction activities
  related to private I/I control. On average, the City invests approximately \$50,000 (in 2018
  dollars) per year on capital improvements related to increasing capacity. The IMP
  assumes that this level of effort and funding will be maintained.
- Pump Stations As pump stations age, mechanical, electrical, process, and structural repairs are required. This can involve both specific equipment replacement, improvements required for code compliance, and complete rehabilitation of aging facilities. On average, the City invests approximately \$25,000 (in 2018 dollars) per year addressing pump station issues. The IMP assumes that this level of effort and funding will be maintained.

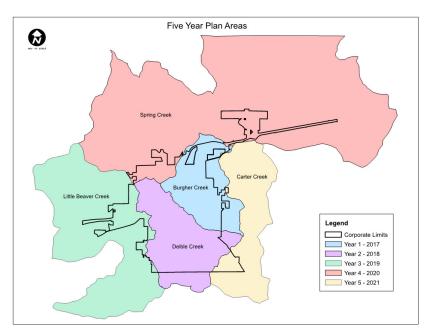
# 6.3 Stormwater Management System Alternatives

Stormwater management in the City currently includes limited repair and replacement activities, managing the MS4 program, and maintaining detention basins. Similar to the wastewater collection system, the City intends to maintain their current level of investment (approximately \$400,000 annually, in 2018 dollars) in the stormwater management system for the forseeable future (**Attachment B**). Approximately 50% of the existing budget is committed to through 2025 for servicing existing debt on City-owned detention and retention basins that were designed to provide flood control. However, the City intends to reallocate the remaining stormwater budget to address the most critical needs first. As discussed in **Section 3.4**, the City's two most significant stormwater needs include addressing aging CMP and streamlining the existing SWMP to more efficiently and effectively address MS4 permit requirements. The City's planned stormwater investments to address these needs are discussed below.





- Repair and Replacement Over the IMP planning period, the City anticipates spending approximately \$4.4 million (in 2018 dollars) to replace nearly 18 of the 20 miles of CMP in the system. These replacement activities will be conducted in conjunction with planned roadway activities. For planning purposes, the IMP assumes that funding will average \$100,000 annually through 2025 and will increase to \$300,000 annually in 2026.
- **MS4 Program** The City currently spends approximately \$100,000 (in 2018 dollars) per year administering their MS4 program. The City intends to maintain the current level of funding throughout the IMP planning period. However, the City is revising and streamlining the current SWMP to more efficiently make water quality improvements. Most notably, the City is transitioning from a Citywide management approach to one that is



The City is currently revising their SWMP to more effectively manage water quality on a watershed scale

watershed-based. The City has identified five major watersheds that incorporate the MS4 area and intends to implement BMPs in those watersheds on a rotating basis. This approach will allow the City to tailor their management activities to address specific water quality impairments within each basin.

Detention Basins – As mentioned above, the City is currently committed to spending approximately \$200,000 (in 2018 dollars) per year through 2025 servicing existing debt on City-owned detention and retention basins that were designed to provide flood control. After 2025, the City intends to investigate potential retrofits for those basins to also provide water quality benefits. For planning purposes, the IMP assumes that the City will spend \$50,000 per year on these retrofits. However, these costs will be reevaluated as additional information is developed.

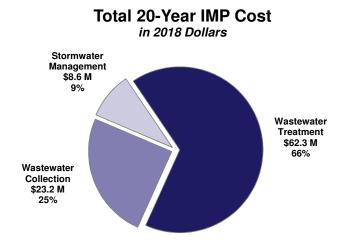
# 6.4 Implementation Costs

The City's projected IMP investments will allow them to address immediate infrastructure and regulatory needs at their WWTPs while continuing to implement their current wastewater collection system and stormwater management systems at existing funding levels. This





approach is consistent with EPA's Framework because the City is addressing the most critical issues first, while making steady progress towards meeting all CWA requirements over time.



The IMP includes projects and program enhancements that balance and prioritize infrastructure needs with Clean Water Act goals

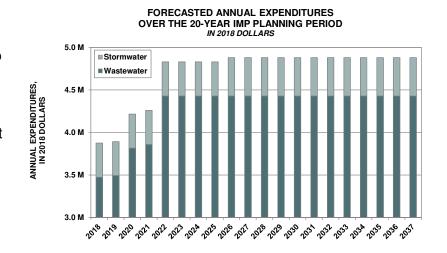
#### 20-Year IMP Cost

The total projected 20-year cost of the IMP is approximately \$94 million (in 2018 dollars, Attachment B). Investments in the WWTPs are the largest planned expenditures over that time and make up approximately 66% of the total cost. Those WWTP investments include full implementation of Alternative 1 at both the Vichy Road and Southeast WWTP, and implementation of Alternative 1, Phase 2 at the Southwest WWTP. Phase 1 WWTP projects will be implemented in the year 2021. For planning purposes, Phase 2 WWTP projects are currently forecasted for implementation in the

year 2032 when the City will have sufficient debt capacity to take on additional projects. However, the Phase 2 improvements could be reprioritized in future iterations of the IMP if new or different infrastructure or regulatory needs are identified.

The wastewater collection and stormwater management system investments make up the remaining 25% and 9%, respectively, of the total planned 20-year cost. The collection system costs assume a continued annual funding level of approximately \$1.2 million to address

maintenance, cleaning, inspections, rehabilitation, renewal, capacity enhancements, and pump station maintenance. The stormwater funding will primarily go towards replacing CMP throughout the system, revising the SWMP to more fully comply with MS4 permit requirements, and servicing existing debt. During the second half of the 20-year planning period, the City will investigate the potential for



Under the IMP, forecasted annual expenditures will increase through 2022 and then remain steady for the remainder of the planning period

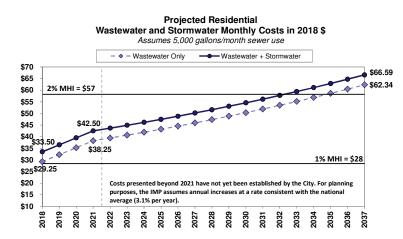
water quality improvements through detention basin retrofits.





#### IMP Funding and User Rate Evaluation

The City intends to finance the Phase 1 WWTP improvements through the MDNR State Revolving Fund (SRF). The proposed schedule includes the Revenue Bond which was approved by 82% of voters in November 2018 and assumes a SRF loan closing in the fall of 2019. In preparation for the debt service requirements, the City Council has implemented a



Sewer rates will be increased gradually over the next four years to support proposed IMP projects

revision of their sewer user charge. The new structure includes the establishment of a Service Availability Fee (SAF), which is intended to cover the fixed cost associated with operating the sewer collection system. In addition to the SAF, a volumetric rate will cover the treatment cost per 1,000 gallons of usage. The SAF is based on the user's water meter size. For a typical single family residential user, the SAF started in January 2018 at

\$3.00 per month. By ordinance, the SAF will increase incrementally annually to \$12.00 per month in January 2021. The current rate ordinance projects the volumetric charge to remain at \$5.25 per 1,000 gallons through 2021. The monthly sewer bill for a typical single family residential user (assuming 5,000 gallons per month usage) will increase annually from \$29.25 per month in 2018 to \$38.25 per month in 2021.

Based on current projections, revenues from the above described rate structure will be sufficient to service the SRF loan and fund operations, maintenance and replacement for wastewater system. The proposed rate structure will be gradually implemented over the next four years such that the rate will be sufficient to cover full debt service upon construction completion in 2021. It is anticipated that some interim financing will be necessary to fund engineering design and property acquisition prior to permanent financing.

The Phase 2 WWTP improvements described in the IMP are currently forecasted for implementation in the year 2032 to allow the City sufficient time to service existing debt on three bonds used to make previous improvements at each of the three WWTPs. The City's currently wastewater bonds and repayment schedules are as follows:

- 2000A Wastewater Bond SRF Approximately \$425,000 per year through 2020 for Southeast WWTP improvements
- 2006A Wastewater Bond SRF Approximately \$250,000 per year through 2020 for Southwest WWTP improvements
- 2012 Wastewater Bond COP Approximately \$275,000 per year through 2032 for Southeast WWTP disinfection improvements





These existing bond obligations, combined with the newly approved revenue bond to address Phase 1 improvements, will preclude the City from taking on new debt to address Phase 2 until at least 2032. These conclusions will be reevaluated during future updates to the IMP and could be reprioritized based on the changing infrastructure needs, regulatory demands, community priorities, or economic conditions.

The City does not currently charge a dedicated stormwater fee. Stormwater funding is derived from the street capital improvement fund and averages approximately \$400,000 (in 2018 dollars) per year. This equates to a cost of approximately \$4.25 per customer. For planning purposes, the IMP assumes that this same level of funding will continue into the future.

#### **Residential Affordability Considerations**

EPA's Framework recommends that integrated plans provide a financial strategy and capability assessment that demonstrates system improvements can be sufficiently funded over time. In doing so, both EPA<sup>18</sup> and MDNR<sup>19</sup> understand the importance of maintaining ratepayer affordability and recognize that there is no "one-size-fits-all" approach for determining what is affordable in every community.

Although it is an imperfect indicator, historical EPA guidance<sup>20</sup> has generally characterized affordability relative to the community's median household income (MHI). EPA considers financial impacts to be low if average bills are less than 1% of community MHI, mid-range if average bills are between 1% and 2% of MHI, and high if they are greater than 2% of MHI. The City's combined wastewater and stormwater bills are currently in the mid-range category according to EPA's guidance. As discussed in the previous section, the City recently adopted rate increases through 2021 to fund the WWTP improvements, but they have not yet determined if rate increases beyond that date are necessary. For planning purposes, the IMP assumes that average bills after 2021 will increase at a rate consistent with the national average (3.1% per year after inflation). With these projected increases, costs will exceed 2% MHI at the end of the IMP planning period.

By approving the SAF and an increased volumetric rate for wastewater, the City Council has established the necessary finance strategy to implement the planned near-term IMP projects. In doing so, the Council has also made the determination that the increased wastewater rate (per 5,000 gallons of usage) through 2021 and existing stormwater cost is affordable to ratepayers. The need for additional funding to address existing or future IMP projects will be reevaluated during future revisions to the IMP.

Kopocis, K., and C. Giles. 2014. Financial Capability Assessment Framework for Municipal Clean Water Act Requirements. Office of Enforcement and Compliance Assurance. Washington, D.C.

Hirschvogel, L. 2016. Missouri Integrated Planning Framework. Water Protection Program. Jefferson City, Missouri.

Davies, T. 1995. Economic Guidance for Water Quality Standards Workbook. Office of Science and Technology. Washington, DC. EPA-823-B-95-002.





# 5-Year IMP Action Plan

Element 4 of EPA's Framework recommends that municipalities identify an schedule for their projects but recognize that adaptive management strategies are key to successful integrated planning. This means monitoring and evaluating projects and practices as work proceeds (Element 5), and adapting or revising plans and designs as new information is developed (Element 6).

The suite of alternatives presented in the sections above reflects the City's understanding of infrastructure and regulatory priorities over the next 20-years with respect to the information currently available. However, uncertainties exist which preclude those priorities could change as additional needs or regulatory requirements are identified over time. Therefore, the forecasted timing and cost of wastewater and stormwater program improvements currently identified should be considered planning level estimates that must reevaluated over time.

Consistent with Elements 5 and 6, the City anticipates implementing the IMP in a phased approach to provide investment certainty over the next 5 to 10 years but allow flexibility to respond to new regulatory or non-regulatory needs that arise over the 20-year planning horizon. To implement early actions, the City will pursue a 5-Year IMP Action Plan focused on implement critical, near-term projects and evaluating the resulting water quality benefits and system performance improvements. The City will pursue these actions to the extent possible but acknowledge that funding, staff availability, and other resource constraints or unanticipated needs may impede complete implementation of the action plan. After five years, the City will use the new information to revise IMP projections with respect to evolving regulatory requirements and program needs.





| Program or<br>Project  | Goal   | Anticipated Actions  | Targeted Community<br>Benefits   |
|--|--|--|--|
|  | •  | Wastewater Treatment   |  |
| Phase 1 WWTP<br>Improvements   | Implement Phase 1<br>WWTP improvements<br>at Vichy Road and<br>Southeast WWTP to<br>address Voluntary<br>Compliance<br>Agreement<br>requirements.                                  | Coordinate with MDNR to gain Facility Plan and SRF approval.  Pursue November 2018 revenue bond election (Complete).  Construct Vichy Road and Southeast WWTP improvements by December 2021.   | Achieve regulatory compliance.     Improve water quality.     Improve public health and safety protections.     Reduce system failures.     Provide sustainable services for the future. |
|  |  | Wastewater Collection  | •  |
| Maintenance and Cleaning Evaluation and Repair Renewal Capacity Enhancements Pump Stations | Implementing existing programs to provide effective wastewater collection services, reduce I/I and exfiltration, rehabilitate existing assets, and practicably mitigate overflows. | Maintain existing funding level to clean pipes and respond to emergency calls.     Maintain existing funding level to conduct prioritized inspection of sewer mains and manholes, smoke and dye testing, stream crossing inspections, and private I/I reduction.     Maintain existing funding level to reduce I/I from entering the system from public sources and impacting stream water quality.     Maintain existing funding level to address community growth or improve the ability to convey wet-weather flows.     Address pump station maintenance, as needed.     Continue to update system inventory database. | Achieve regulatory compliance.     Improve water quality.     Improve public health and safety protections.     Reduce system failures.     Provide sustainable services for the future. |
|  |  | Stormwater Management  | I.   |
| MS4 Program<br>Enhancements  | Revise existing<br>SWMP to reflect<br>watershed-based<br>management<br>approach.   | Develop new watershed-based SWMP in coordination with MDNR.  Implement actions to meet existing SWMP Native riparian plantings in impaired stream watersheds. Filter strip installation at City Hall. Downsize outfalls at detention basins to allow for slower drainage and additional settling. Stream walks to address IDDE requirements. Outreach activities to target impairment parameters (bacteria and sediment). Impervious surface mapping.  | Improve public health and safety protections.     Improve water quality.     Achieve regulatory compliance.  |
| Renewal  | Replace up to 10 miles of corrugated metal pipe (CMP) in coordination with roadway projects.   | The following replacement activities are planned but may be modified based on roadway project schedules and available funding:  2019 – 0.1 miles 2020 – 0.1 miles 2021 – 3.1 miles 2022 – 2.5 miles  | Improve public health and safety protections.     Provide sustainable services for the future.   |
|  | Activ  | ities to Measure Water Quality Improvements <sup>2</sup>   |  |
| Water Quality<br>Planning  | Coordinate with<br>MDNR to plan,<br>evaluate, and interpret<br>new water quality and<br>system data as it<br>becomes available.  | Continue to track and report system overflow and bypass information. Coordinate MDNR bacteria sampling activities in Little Beaver Creek and Dutro Carter Creek to reassess impairment. Summarize and review effluent and instream monitoring data collected for each WWTP under their respective discharge permits. Coordinate with MDNR to evaluate the use of alternative restoration approaches in lieu of TMDL development.   | Evaluate IMP effectiveness with respect to water quality.     Provide technical basis for future IMP modifications.  |

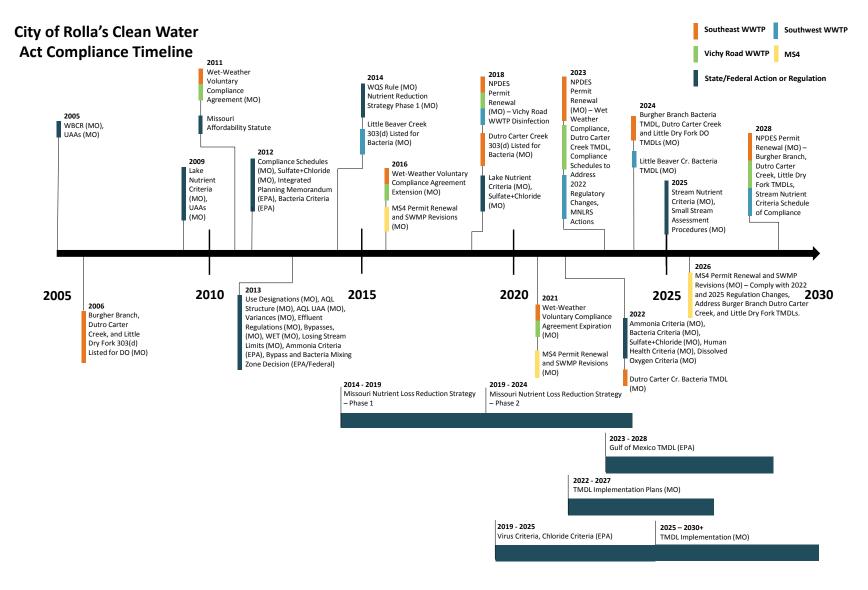
Note 1 - Goals and actions identified in this 5-Year IMP Action Plan reflect the City's understanding of infrastructure and regulatory needs and priorities with respect to the information currently available. The City will implement these actions to the extent possible but acknowledge that weather, staff availability, and other resource constraints or unanticipated needs may impede complete implementation of the Action Plan or require that it be modified. Further, the City notes that many of the activities outlined in this Action Plan assume that sufficient additional funding will be made available through bond financing that must be approved through a local election.

Note 2 - Element 5 of EPA's Framework requires that municipalities outline activities that will be used to measure IMP effectiveness. Activities listed here will be used to measure water quality improvements that occur over time.





#### Attachment A. City of Rolla's Anticipated Clean Water Act Compliance Timeline.





## **Attachment B. IMP Cost Projection Summary.**

#### Attachment B.1. 2018 through 2027 Projections.

|                                       |              |                 |    | (            | ity | of Rolla     |     |            |                  |                  |                  |                  |                  |
|---------------------------------------|--------------|-----------------|----|--------------|-----|--------------|-----|------------|------------------|------------------|------------------|------------------|------------------|
|                                       |              |                 | IN | /IP Cost Pro | jec | tions in 201 | 8 E | Oollars    |                  |                  |                  |                  |                  |
| Project Category                      | 2018         | 2019            |    | 2020         |     | 2021         |     | 2022       | 2023             | 2024             | 2025             | 2026             | 2027             |
| WWTP Improvements                     | \$ 2,304,571 | \$<br>2,310,000 | \$ | 2,633,330    | \$  | 2,701,097    | \$  | 3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  |
| Vichy Road WWTP                       | \$ 162,949   | \$<br>165,000   | \$ | 268,466      | \$  | 290,151      | \$  | 450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    |
| SE WWTP                               | \$ 2,025,230 | \$<br>2,025,000 | \$ | 2,244,864    | \$  | 2,290,946    | \$  | 2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  |
| SW WWTP                               | \$ 116,392   | \$<br>120,000   | \$ | 120,000      | \$  | 120,000      | \$  | 120,000    | \$<br>120,000    | \$<br>120,000    | \$<br>120,000    | \$<br>120,000    | \$<br>120,000    |
| Wastewater Collection System          | \$ 1,169,832 | \$<br>1,183,000 | \$ | 1,183,000    | \$  | 1,158,000    | \$  | 1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  |
| Renewal .                             | \$ 216,210   | \$<br>200,000   | \$ | 200,000      | \$  | 200,000      | \$  | 200,000    | \$<br>200,000    | \$<br>200,000    | \$<br>200,000    | \$<br>200,000    | \$<br>200,000    |
| Maintenance and Cleaning              | \$ 133,000   | \$<br>133,000   | \$ | 133,000      | \$  | 133,000      | \$  | 133,000    | \$<br>133,000    | \$<br>133,000    | \$<br>133,000    | \$<br>133,000    | \$<br>133,000    |
| Evaluation and Repair (I&I Reduction) | \$ 742,343   | \$<br>750,000   | \$ | 750,000      | \$  | 750,000      | \$  | 750,000    | \$<br>750,000    | \$<br>750,000    | \$<br>750,000    | \$<br>750,000    | \$<br>750,000    |
| Capacity Enhancements                 | \$ 55,000    | \$<br>75,000    | \$ | 75,000       | \$  | 50,000       | \$  | 50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     |
| Pump Stations                         | \$ 23,279    | \$<br>25,000    | \$ | 25,000       | \$  | 25,000       | \$  | 25,000     | \$<br>25,000     | \$<br>25,000     | \$<br>25,000     | \$<br>25,000     | \$<br>25,000     |
| Stormwater Management Program         | \$ 400,000   | \$<br>400,000   | \$ | 400,000      | \$  | 400,000      | \$  | 400,000    | \$<br>400,000    | \$<br>400,000    | \$<br>400,000    | \$<br>450,000    | \$<br>450,000    |
| Renewal .                             | \$ 100,000   | \$<br>100,000   | \$ | 100,000      | \$  | 100,000      | \$  | 100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>300,000    | \$<br>300,000    |
| Flood Control Improvements            | \$ 200,000   | \$<br>200,000   | \$ | 200,000      | \$  | 200,000      | \$  | 200,000    | \$<br>200,000    | \$<br>200,000    | \$<br>200,000    |                  |                  |
| Water Quality BMPs                    |              |                 |    |              |     |              |     |            |                  |                  |                  | \$<br>50,000     | \$<br>50,000     |
| MS4 Program Enhancements              | \$ 100,000   | \$<br>100,000   | \$ | 100,000      | \$  | 100,000      | \$  | 100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>100,000    |
| Wastewater Total                      | \$ 3,474,403 | \$<br>3,493,000 | \$ | 3,816,330    | \$  | 3,859,097    | \$  | 4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  |
| Stormwater Total                      | \$ 400,000   | \$<br>400,000   | \$ | 400,000      | \$  | 400,000      | \$  | 400,000    | \$<br>400,000    | \$<br>400,000    | \$<br>400,000    | \$<br>450,000    | \$<br>450,000    |
| Annual IMP Total                      | \$ 3,874,403 | \$<br>3,893,000 | \$ | 4,216,330    | \$  | 4,259,097    | \$  | 4,828,000  | \$<br>4,828,000  | \$<br>4,828,000  | \$<br>4,828,000  | \$<br>4,878,000  | \$<br>4,878,000  |
| Cumulative IMP Total                  | \$ 3,874,403 | \$<br>7,767,403 | \$ | 11,983,733   | \$  | 16,242,830   | \$  | 21,070,830 | \$<br>25,898,830 | \$<br>30,726,830 | \$<br>35,554,830 | \$<br>40,432,830 | \$<br>45,310,830 |



# Attachment B. IMP Cost Projection Summary.

#### Attachment B.2. 2028 through 2037 Projections.

|                                       |              |      |            |    | (           | City | of Rolla     |     |            |                  |                  |                  |                  |      |            |
|---------------------------------------|--------------|------|------------|----|-------------|------|--------------|-----|------------|------------------|------------------|------------------|------------------|------|------------|
|                                       |              |      |            | IN | MP Cost Pro | jec  | tions in 201 | 8 [ | Oollars    |                  |                  |                  |                  |      |            |
| Project Category                      | 2028         |      | 2029       |    | 2030        |      | 2031         |     | 2032       | 2033             | 2034             | 2035             | 2036             |      | 2037       |
| WWTP Improvements                     | \$ 3,270,000 | \$   | 3,270,000  | \$ | 3,270,000   | \$   | 3,270,000    | \$  | 3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  | \$<br>3,270,000  | \$   | 3,270,000  |
| Vichy Road WWTP                       | \$ 450,000   | \$   | 450,000    | \$ | 450,000     | \$   | 450,000      | \$  | 450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$   | 450,000    |
| SE WWTP                               | \$ 2,700,000 | \$   | 2,700,000  | \$ | 2,700,000   | \$   | 2,700,000    | \$  | 2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  | \$<br>2,700,000  | \$   | 2,700,000  |
| SW WWTP                               | \$ 120,000   | \$   | 120,000    | \$ | 120,000     | \$   | 120,000      | \$  | 120,000    | \$<br>120,000    | \$<br>120,000    | \$<br>120,000    | \$<br>120,000    | \$   | 120,000    |
| Wastewater Collection System          | \$ 1,158,000 | \$   | 1,158,000  | \$ | 1,158,000   | \$   | 1,158,000    | \$  | 1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  | \$<br>1,158,000  | \$   | 1,158,000  |
| Renewal                               | \$ 200,000   | \$   | 200,000    | \$ | 200,000     | \$   | 200,000      | \$  | 200,000    | \$<br>200,000    | \$<br>200,000    | \$<br>200,000    | \$<br>200,000    | \$   | 200,000    |
| Maintenance and Cleaning              | \$ 133,000   | \$   | 133,000    | \$ | 133,000     | \$   | 133,000      | \$  | 133,000    | \$<br>133,000    | \$<br>133,000    | \$<br>133,000    | \$<br>133,000    | \$   | 133,000    |
| Evaluation and Repair (I&I Reduction) | \$ 750,000   | \$   | 750,000    | \$ | 750,000     | \$   | 750,000      | \$  | 750,000    | \$<br>750,000    | \$<br>750,000    | \$<br>750,000    | \$<br>750,000    | \$   | 750,000    |
| Capacity Enhancements                 | \$ 50,000    | \$   | 50,000     | \$ | 50,000      | \$   | 50,000       | \$  | 50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     | \$   | 50,000     |
| Pump Stations                         | \$ 25,000    | \$   | 25,000     | \$ | 25,000      | \$   | 25,000       | \$  | 25,000     | \$<br>25,000     | \$<br>25,000     | \$<br>25,000     | \$<br>25,000     | \$   | 25,000     |
| Stormwater Management Program         | \$ 450,000   | \$   | 450,000    | \$ | 450,000     | \$   | 450,000      | \$  | 450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$   | 450,000    |
| Renewal                               | \$ 300,000   | \$   | 300,000    | \$ | 300,000     | \$   | 300,000      | \$  | 300,000    | \$<br>300,000    | \$<br>300,000    | \$<br>300,000    | \$<br>300,000    | \$   | 300,000    |
| Flood Control Improvements            |              |      |            |    |             |      |              |     |            |                  |                  |                  |                  |      |            |
| Water Quality BMPs                    | \$ 50,000    | \$   | 50,000     | \$ | 50,000      | \$   | 50,000       | \$  | 50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     | \$<br>50,000     | \$   | 50,000     |
| MS4 Program Enhancements              | \$ 100,000   | \$   | 100,000    | \$ | 100,000     | \$   | 100,000      | \$  | 100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>100,000    | \$<br>100,000    | \$   | 100,000    |
| Wastewater Total                      | \$ 4,428,000 | \$   | 4,428,000  | \$ | 4,428,000   | \$   | 4,428,000    | \$  | 4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  | \$<br>4,428,000  | \$   | 4,428,000  |
| Stormwater Total                      | \$ 450,000   | \$   | 450,000    | \$ | 450,000     | \$   | 450,000      | \$  | 450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$<br>450,000    | \$   | 450,000    |
| IMP Total                             | \$ 4,878,000 | \$   | 4,878,000  | \$ | 4,878,000   | \$   | 4,878,000    | \$  | 4,878,000  | \$<br>4,878,000  | \$<br>4,878,000  | \$<br>4,878,000  | \$<br>4,878,000  | \$   | 4,878,000  |
| Cumulative IMP Total                  | \$50,188,830 | \$ ! | 55,066,830 | \$ | 59,944,830  | \$   | 64,822,830   | \$  | 69,700,830 | \$<br>74,578,830 | \$<br>79,456,830 | \$<br>84,334,830 | \$<br>89,212,830 | \$ 9 | 94,090,830 |



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